ARRIS D5™

Universal Edge QAM (UEQ)

The ARRIS D5™ Universal Edge QAM (UEQ) is a unique class of IP edge network device that enables delivery of a wide variety of multimedia content in a redundant, modular, and cost-effective package. It supports a complete QAM-Sharing solution with simultaneous delivery of any combination of Video-On-Demand, Digital Broadcast, Switched Digital Video (SDV) Services, and DOCSIS downstream data using the Modular Cable Modem Termination System (M-CMTS™) architecture. Operators are saved from the capital and operational expense burden of having to replace or retrofit non-compliant Edge QAMs when transitioning to advanced multimedia services. The ARRIS D5 UEQ offers extensive, industry-leading, remote or locally-attached graphical and command line tools for operations management. All management options provide complete access control to all elements of the D5. For those operators seeking additional user-level access control, Radius and TACACS+ authentication is offered as well.

Introduction

As an integral part of an operator's HFC infrastructure, Edge QAMs supply digital broadcast and Video on Demand (VOD) services to their subscribers. Increases in subscriber penetration, variety of content, and rates of concurrence of linear, SDV, and VOD, drive the need for additional QAM streams in a dense and space-saving package. Operators looking for the next-generation of Edge QAM5 to support additional features, flexibility, and functionality will find the ARRIS D5 UEQ an optimum choice. Additionally, the ARRIS D5 UEQ supports open approaches for SDV using either RPC or RTSP protocols. Inclusive on the D5 UEQ and to SDV is support for automatic hot-hot/warm GbE network redundancy using IGMPv3 and source specific multicasting.

Emerging wideband and multimedia services are beginning to have impacts on operators' existing network utilization models. As the types and densities of new media traffic change, operators require options for IP/DOCSIS-based downstream solutions that cannot be handled cost-effectively by the existing CMTS products. The ARRIS D5 UEQ efficiently and economically addresses both video Edge QAM requirements and downstream DOCSIS market segments in one flexible solution that evolves with the operator's needs.

The ARRIS D5 UEQ fully supports DOCSIS downstream traffic when deployed as part of an M-CMTS or data by-pass solution. As well, it fully supports data delivery from the M-CMTS Core using the M-CMTS DEPI MPT-mode interface. The D5 fully supports the Cablelabs specification for Dual DOCSIS Timing Interface (DTI), and DOCSIS 3.0 DRFI. For QAM sharing applications, the ARRIS D5 UEQ delivers DOCSIS 2.0/3.0 downstream packets while simultaneously supporting all of the rich Edge QAM functionality for delivery of digital video services within a single D5 chassis.

The ARRIS D5 UEQ links MPEG-2 SPTS and MPTS streams from IP-based Gigabit Ethernet metro networks to QAM-based HFC networks. The platform can ingest up to 1,488 simultaneous MPEG-2 transport streams (single or multiple) via any of its four GbE interfaces and flexibly multiplex them across any of its available output channels. Traditional MPEG-2 functions such as PSI table insertion, automatic PID re-mapping, PCR re-stamping, and encryption are supported. The ARRIS D5 UEQ supports highly dense QAM output configurations with capacity for up to 72 QAM channels in a 2 RU chassis. The ARRIS 05 UEQ has six QAM card slots, and each QAM card supports up to twelve QAM channels, thus affording the operator population flexibility for growth without stranding capacity.

The ARRIS D5 UEQ supports edge-based encryption using Privacy Mode, DVB Simulcrypt, and OpenCAS techniques. ARRIS provides an external, bulk proxy tool which serves as a secure solution for managing key exchange when required.

Features

- QAM Density—up to 72 QAM channels (48 Annex A/C)
- Video stream density with a peak capacity of 1,488 simultaneous video streams
- QAM Sharing: simultaneous processing of VOD, SDV, Linear Digital Broadcast, and DOCSIS 3.0 M-CMTS downstream using the same software image
- Redundancy: WAN, Power, Fan, QAM, GbE, & Transport Stream
- Multiple GUI, SNMP and CLI Management Options
- Linear Broadcast Digital Programming
- xVOD (Table and ERM)
- M-CMTS Edge Device (DEPI Static and Control Plane)
- SDV(RPC and RTSP)
- Radius and TACACS+ Authentication support
- CA: Privacy Mode, DVS-042, DVB Simulcrypt, CSA & OpenCAS
- Bulk Configuration and Operational Management Tool

Specifications

Environmental

Operating Temperature, °F (°C)	32 to 122 (0 to 50) Ambient
Storage Temperature ,°F (°C)	-40 to 158 (-40 to 70)
Relative Humidity	up to 90% (Non-condensing)

Electrical/Mechanical

Input Voltage AC	100-240 V$_{AC}$, 50-60 Hz
Input Voltage DC	-42 to -56 V$_{DC}$
Maximum Power Consumption (fully loaded)	< 405 Watts
Dimensions (W x H x D), in (cm)	19 x 3.5 x 24 (48 x 8.9 x 61)
Full-fill Weight, lbs (kg)	50 (22.7)

WAN Module

Standard Gigabit Ethernet input interfaces	4
All Gigabit Ethernet Interfaces can be active simultaneously, Optical SFP or 1000BaseT options (IEEE802.3z or IEEE802.3ab) Gigabit Ethernet Redundancy	2X (1 + 1), 2 + 1, 3 + 1
IP Unicast and Multicast (IGMPv2/3) UDP encapsulated packets, Multiple/Flexible UDP Port mapping options IGMPv2/3 with Source Specific Multicast	1 to 7

QAM Module

External F-type female connectors, 75 ohm (ISO-169-24) 6 block-converted adjacent channels per RF output port 2 RF output ports per module ITU-T J.83 Annex A, B, C Support Center-tuned Frequency Range	57-867 MHz
Minimum Frequency Step	10 Hz
Modulation Type	64 and 256 QAM
Single Carrier Power Per RF	52 to 60 dBmV
Dual Carrier Power per RF Output	48 to 56 dBmV
Quad Carrier Power per RF Output	44 to 55 dBmV
Hex Carrier Power per RF Output,. Annex B only	42 to 53 dBmV
Power Level Step Size	0.2 dB
Output Return Loss (active channel 88-750 MHz)	> 14 dB
Output Return Loss (active channel 750-870 MHz)	> 13 dB
Output Return Loss (inactive channel)	> 12 dB
MER (equalized)	> 43 dB
MER (unequalized) Single, Dual, Quad, Hex carriers per RF output port, RF block muting	> 36 dB

MPEG Processing

Receive up to 1,488 MPEG2 SPTS input streams (RFC768) Generate up to 72 MPTS output streams (48±250 msec for Annex A/C) MPTS and SPTS pass-thru PID filtering/remapping when required (automatic handling)
Stream Replication of multicast streams,
Support for up to 63 SPTS per QAM channel Input jitter Re-multiplexing/routing of any input stream to any output PCR de-jittering and re-stamping of input streams PSI extraction, automation generation and insertion as required Program and Elementary Stream-level Encryption DVB-SI table handling from external SI generators

Control Interfaces

Two independent 10/100BaseTX—for CAS and NMS RS-232 Serial Port Debug console connection protocols In-band or out-of-band management (Radius, TACACS+) Ethernet test/loop port for external analysis of any MPTS HTML-based Nodal Management System SNMP, XML, HTTP, CLI (Telnet/ssh, RS232), TFTP

General

Open-standards Switched Digital Video support (SDV) DOCSIS 3.0 M-CMTS Edge QAM support (DTI, DRFI, DEPI) VOD Privacy Mode Encryption support DVB Simulcrypt and Open Cas support Field-upgradeable software download support (compact flash) Hot-swappable, field-upgradeable 8-slot modular design Redundancy Field Upgradeable
Power, QAM, Gigabit Ethernet, IGMPv3, Fans

Ordering Information

722050	D5 UEQ Base Enclosure (AC) - Includes: 1 Chassis (8-slots), 1 Monitor Card, 1 Fan Tray, 1 Universal AC Power Supply (11 0/220V AC 50/60 Hz), and Power Converter Module. Does not include a Power Cord; Power Cord must be ordered separately.
721114	D5 UEQ Base Enclosure (DC) - Includes: 1 Chassis (8-slots), 1 Monitor Card, 1 Fan Tray, 1 DC Power Supply (-48 VDC), Power Converter Module (5V to 9V). Power Cord is included.
721936	D5 UEQ DRFI Dual QAM Module - Annex B for North America Requires Release 2.3 or higher
716604	D5 UEQ Dual QAM Module with 8 Downstream channels (4 Downstream channels per QAM)
722012	D5 UEQ DTI WAN Module (Single DTI) - Requires Release 2.3 or higher. SFP NIC not included, must be ordered separately.
728906	D5 UEQ DTI WAN Module (Dual DTI) - Requires Release 2.5 or higher, and Dual DTI Adapter. SFP NIC not included, must be ordered separately.
716635	D5 UEQSFP NIC l000Base-LX l3lOnm Singlemode,LC
716636	D5 UEQ SFP NIC l000Base-SX 850nm Multimode, LC
716637	D5 UEQ SFP NIC l000Base, 1 550nm Singlemode, LC (90km)
716639	D5 UEQSFP NIC l000Base-TX, RJ45
710631	Power Supply Cable: North American
710629	Power Supply Cable: Europe
710630	Power Supply Cable: Japan
710628	Power Supply Cable: Australian
710632	Power Supply Cable: UK
722094	D5 UEQ Release 2.4 System Software for Chassis (1 Per D5 Chassis)
728905	D5 UEQ Release 2.5 System Software for Chassis (1 Per D5 Chassis)
780195	D5 UEQ Release 2.6 System Software for Chassis (1 Per D5 Chassis)
716607	D5 UEQ License for Dual Quad QAM Module (8 Downstreams, 1 Per QAM Module) Good for Annex A and B, good for all QAM Modules.
722052	D5 UEQ License for Dual Hex QAM Module (12 Downstreams, 1 Per QAM Module) Good for Annex B, Good for DRFI QAM Module Only.
722053	D5 UEQ License for Upgrade to Dual Hex QAM Module (4 Downstreams, 1 Per QAM Module) Good for Annex B, Good for DRFI QAM Module Only.
722097	Application Manager System Release 2.0 Software Only (Privacy Mode included, for U.S. only)
728915K	Application Manager System Release 2.0 with Server (Privacy Mode included, for U.S. only)
722839	Application Manager Release 2.0 Software Only (Privacy Mode not included)
728914K	Application Manager System Release 2.0 with Server (Privacy Mode not included)
780239K	Application Manager Release 2.1 Software Only (Privacy Mode included, for U.S. only) (Compatible with D5 SW release 2.6, 2.5, & 2.4)
780240K	Application Manager System Release 2.1 with Server (Privacy Mode included, for U.S. only) (Compatible with D5 SW release 2.6, 2.5, & 2.4)
780241K	Application Manager Release 2.1Software Only (Privacy Mode not included) (Compatible with D5 SW release 2.6, 2.5, & 2.4)
780242K	Application Manager System Release 2.1 with Server (Privacy Mode not included) (Compatible with D5 SW release 2.6, 2.5, & 2.4)
722090	D5 UEQ Spares Kit for Annex B (AC). Includes: Mon Card, Front Facia, 2 QAM Modules, 2 Fan Trays, WAN Module, Power Supply Unit.
722091	D5 UEQ Spares Kit for Annex B (DC). Includes: Mon Card, Front Facia, 2 QAM Modules, 2 Fan Trays, WAN Module, Power Supply Unit.
716626	D5 UEQ Monitor Card for 8 Slot Chassis
721931	D5 UEQ Fan Tray for 8 Slot Chassis, High-Speed (For Use with all chassis)
716628	D5 UEQ Front Panel Display (PCB + Fascia)
721112	D5 UEQ Power Converter Module for 8 Slot Chassis (5V to 9V)
722058	D5 UEQ AC Power Supply Module (Power-One) (For Use with all AC chassis, but cannot mix with previous AC Power Supply (716630 for redundancy)
716630	D5 UEQ AC Power Supply Module (Telkoor) (For Use with 716625 Only)
716631	D5 UEQ DC Power Supply Module: -48 VDC
728888	D5 UEQ DC Power Adapter