



# ERICSSON EQ8096 EDGE QAM



Cable operators are moving fast to enhance the customer entertainment experience with a new wave of services and more channels that require maximizing HFC bandwidth utilization. They are looking towards the next generation of Edge QAMs to expedite deployment of these services, provide cost-efficiencies and plant management simplification.

Ericsson is breaking new ground delivering the next generation Edge QAM that is based on open standards and incorporates Cablelabs DOCSIS 3.0 (including DRFI and M-CMTS) specifications. The Ericsson EQ8096 is a step-change in QAM devices and is designed to exceed the functionality, density and cost points required for all uses of a cable edge modulator. It has the unique ability to operate in Broadcast, VOD, Switched Digital Video (SDV) and High Speed Data (DOCSIS) applications simultaneously within the same chassis.

The EQ8096's "pay as you grow" modular design supports up to 96QAM channels per chassis using eight 12QAM modulator cards; each RF output supporting up to four adjacent QAMs to hit the sweet spot for QAM striping resiliency strategies. The EQ8096 sets a new standard with designed-in redundancy on all inputs, hot-swap modulator cards, low power consumption and built-in options for scrambling/encryption and DTI. It is tailored for the new wave of multimedia applications to enable cable operators to take a leadership role.

## PRODUCT OVERVIEW

### Cost Reductions

Market leading 96QAM channel density, modulation and up-conversion in a single 2RU enclosure, enables space and cost savings. Fewer numbers of units need to be installed, configured and maintained giving further savings through operational costs, time and labor.

### Increased Reliability

The EQ8096's high intrinsic reliability is supplemented with hot swappable RF cards, redundant fans, dual redundant power supplies and 1+1 Gigabit Ethernet inputs to ensure long-term fault-free operational usage.

### Supports DOCSIS 3.0 and SDV Specifications

The EQ8096 meets the DOCSIS 3.0 and the SDV specifications providing operators flexibility to launch a combination of SDV, VOD or HSD services.

### Remote Access

The EQ8096 provides web access thus allowing operators to remotely configure and monitor its status via GUIs or through Configuration tools. It further provides SNMP messages for monitoring platforms.

## BASE UNIT FEATURES

**High Density Edge QAM available in four base variants (EQ8096/BAS, EQ8096/BAS/48V, EQ8096/BAS/SFP, EQ8096/BAS/SFP/48V or FAZ 101 0127/1, FAZ 101 0127/2, FAZ 101 0127/3, FAZ 101 0127/4)**

The EQ8096 provides service filtering and modulation for broadcast services in a single highly integrated 96QAM channel 2RU unit. Core features of the EQ8096 include:

- Open standards interface
- Supports Switched Digital Video protocols
- Supports DOCSIS 3.0 standards
- Hot swappable modulator cards
- Up to 12QAM channels per modulator card (three RF outputs)
- Simultaneous support of HD and SD streams
- Supports internal stream replication for QAM striping
- Advanced de-jittering algorithms
- Automatic PID remapping, service filtering, PSI extraction
- Multiplex services to incoming MPTS
- Externally generated SI insertion via a single UDP port to multiple output streams
- Multiplexing and stream routing to user defined configuration
- Redundant 4+4 Gigabit Ethernet input
- Output frequency accuracy better than  $\pm 500$  Hz
- Supports mapping of any QAM channel on to the built-in ASI output
- Control via Ericsson system management applications

## SOFTWARE OPTIONS

### DVB Conditional Access Scrambling (EQ8096/SWO/DVBCA, FAZ 101 0127/11)

EQ8096 protects against broadcast piracy using built-in DVB Common Scrambling Algorithm

- Scrambling enabled on a per-service basis
- Capable of scrambling every service
- Standard Simulcrypt/OpenCAS interfaces

### M-CMTS Functionality (EQ8096/SWO/MCMTS, FAZ 101 0127/12)

- Enables data applications and channel bonding using EQ8096

### Extended Frequency Range (EQ8096/SWO/1GHz, FAZ 101 0127/10)

- Extends center frequency range for EQ8096/HWO/12QAM

## HARDWARE OPTIONS

### QAM Modulator Assembly (EQ8096/HWO/12QAM/1GHZ, FAZ 101 0127/6)

- Supports up to 12QAM channels with center frequency range of 57 MHz to 999 MHz

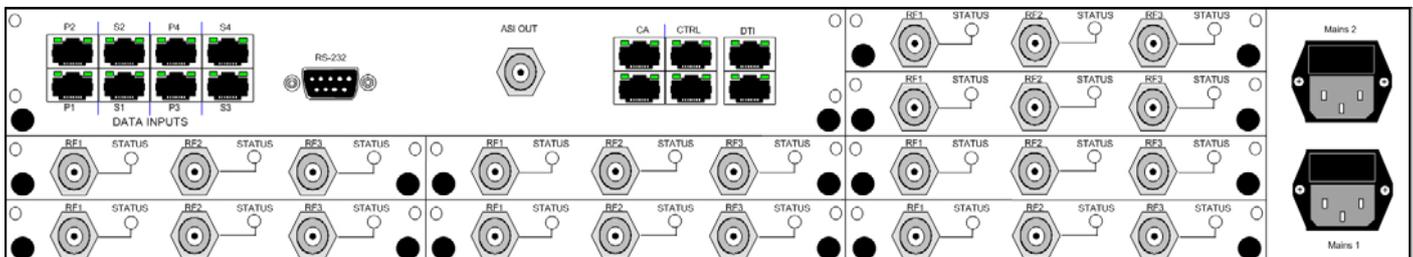
### DTI Interface (EQ8096/HWO/DTI, FAZ 101 0127/9)

- Provides 1+1 redundant DOCSIS Timing Interface

### Dual Power Supply (EQ8096/HWO/DPS, EQ8096/HWO/DPS/48V or FAZ 101 0127/7, FAZ 101 0127/8)

- Redundant power supply option for AC or DC base variant

## SAMPLE CONFIGURATION



## SPECIFICATIONS

### Inputs

Eight Gigabit Ethernet Interfaces for data available as either RJ45 or SFP<sup>†</sup> (four main, four redundant)

#### Input Capability

Capable of processing four fully-loaded Gigabit Ethernet links

Bit-rates from 1 kbps to HD

Stream encapsulation in UDP (RFC 768)

Up to seven transport stream packets per IP datagram (auto-detected)

Removes up to 120 ms input jitter

Support for unicast and multicast flows (IGMPv3)

Separate and redundant CA and Control Ports

### Processing

De-jittering of each incoming transport stream

Dynamically tracks incoming services

Automatic PID remapping

PSI extraction and SI insertion

MPEG-2 multi-program transport stream mapping to output QAM channel

<sup>†</sup> SFP modules are not included as standard, but can be supplied separately if required

### Outputs

#### QAM

75Ω F-type connector

ITU-T J.83 Annex A, B and C

64, 256QAM constellations

Symbol rate up to 7.0 Msym/s

Six MHz or eight MHz bandwidth

Center Frequency range 57 MHz to 867 MHz (57 MHz to 999 MHz optional) adjustable in 10 kHz steps

Frequency accuracy better than ±500 Hz

Maximum RF output power level +60/+56/+54/+52 dBmV for 1/2/3/4 QAMs respectively adjustable down by up to 8 dBmV in 0.1 dB steps

RF output power accuracy ±2.0 dB

Output return loss >14 dB

BER <10e-10

Each RF output provides up to four adjacent QAM channels (any of four channels may be muted)

#### ASI

Allows any QAM channel to be mapped to ASI port

### Control

Dedicated 10/100 Ethernet control port (RJ45)

SNMP and HTTP control

RPC

RS-232 port for basic configuration

Complete configuration possible with a single file download to ease large deployments

### Physical and Power

#### Dimensions (W x D x H)

483 x 543 x 89 mm (19" x 21.5" x 2RU)

#### Approximate Weight (fully configured)

15 kg (33 lbs)

#### Power Input

100 VAC to 240 VAC wide-ranging or -48 VDC

#### Power Consumption

350 Watt typical

#### Operational Temperature

0°C to +50°C (32°F to 122°F) ambient with free air flow

#### Relative Humidity

0% to 90% (Non-condensing)