

QM2 Modem

Digital Modulator & Demodulator for Heterodyne Radios



Applications

- Studio-to-Transmitter Links and Transmitter-to-Studio Links

Features

- 19.39 Mbps payload data rate
- 1.544 Mbps DS1 data channel
- Accepts SMPTE 310M or DVB-ASI interface
- Robust, efficient 16 QAM modulation
- Readily fits ATSC transport stream within video microwave channel plans between 17 and 25 MHz
- Adaptive equalization
- Compact size (one rack unit each for the modulator and demodulator)
- Optimized for DAR and TwinStream™ heterodyne microwave radios (from 1.9 to 13.2 GHz)

Overview

The QM2 modulator and demodulator provide cost-effective 16 QAM modulation of digitally encoded video signals for terrestrial transmission of ATSC HDTV transport stream at 19.39 Mbps. In combination with the mating MRC heterodyne microwave radio, the QM2 provides a proven, spectrally efficient transmission approach for digital STLs, backbones, and regional networks. DS1 wayside channel is also provided for independent applications such as an audio or data channel. In addition, an RS-232 interface is available for asynchronous data transmission at a data rate of less than 9.6k. The QM2 modulator and demodulator are offered in DVB-ASI models.

As a complete system, the DAR heterodyne radio and the QM2 can be configured for multi-hop and IF repeaters, as well as simplex, duplex, and various protection options.

The QM2 modulator consists of a 19.39 Mbps RF modem and SMPTE 310M or DVB-ASI interface board. The modulator generates an IF carrier at 70 MHz to drive the heterodyne upconverter in the microwave radio. In the receive direction, the 70 MHz IF output of the heterodyne radio is demodulated by the QM2 to create the 19.39 Mbps ATSC datastream.

The QM2 modems include adaptive equalization circuitry built in to the demodulators. The fractionally spaced, feed-forward and decision feed-back algorithm employed in this circuitry helps to minimize the degrading effects of frequency selective multipath fading, so often associated with digital microwave paths. In addition, adaptive equalization will help compensate for imperfections in the antenna and waveguide system that would otherwise degrade the reliability of the signal.

SPECIFICATIONS

GENERAL SPECIFICATIONS

Data rate: 19.39 Mbps
Date rate interface: SMPTE-310M
(DVB-ASI Models Available)
Data connector interface: BNC (75 ohm)
Wayside channel data rate: DS-1 (1.544 Mbps)
Wayside connector interface: 9-pin "D"
Service channel data rate: up to 9.6 Kbps
(RS-232 asynchronous)
Service channel interface: 9-pin "D"
Modulator scheme: 16
RF bandwidth: 7 MHz
Receiver threshold at 10-6 BER: <-85 dBm
(2 to 13 GHz)

TRANSMIT MODULATOR

Tx IF level: -12 ±1 dBm
Output IF impedance: 75 Ohm
Output return loss: -25 dB or better
Output IF frequency: 70 MHz ±50 ppm
Nyquist data filtering: x/sin(x) compensated
Square-root raised cosine
FEC scheme: Reed-Solomon and depth 12 interleaving

RECEIVE DEMODULATOR

Rx IF level: -12 dBm nominal
-35 dBm min, 0 dBm max
Input IF impedance: 75 Ohm
Input return loss: -25 dB or better
Input IF frequency: 70 MHz ±400 kHz
Nyquist data filtering: Square-root raised cosine
FEC scheme: Reed-Solomon and depth 12 interleaving

HDTV INTERFACE

Input/Output Line code: Biphase Mark Coding,
SMPTE-310M compliant
Input/Output connectors: 75 Ohm BNC

DS-1 INTERFACE

Input/Output Line code: AMI or B8ZS coding user select G.703 compliant
Input/Output connectors: DB-9 female on the back
panel, 100 Ohm unbalanced

POWER REQUIREMENTS

Power Supply requirement: 120/240 Vac 50/60 Hz
(Available in 24/48 Vdc Models)
Power Consumption: 10W typical, 12W max
Internal DC Voltage/Current
(each unit): +15V/0.1A, -15V/0.2A,
+5V/1.2A
Internal Voltage Tolerance: ±5%

ENVIRONMENTAL

Operating Temperature: 0° to 50°C
Relative Humidity: 95% non-condensing

PHYSICAL

QM2 Modulator: 1.75" h x 19" w (4.45 x 48.26 cm)
Weight: 11 lbs (5 kg)
QM2 Demodulator: 1.75" h x 19" w
(4.45 x 48.26 cm)
Weight 11 lbs (5 kg)

CONFIGURATIONS

QM2M 20 Mbps Modulator
QM2D 20 Mbps Demodulator



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