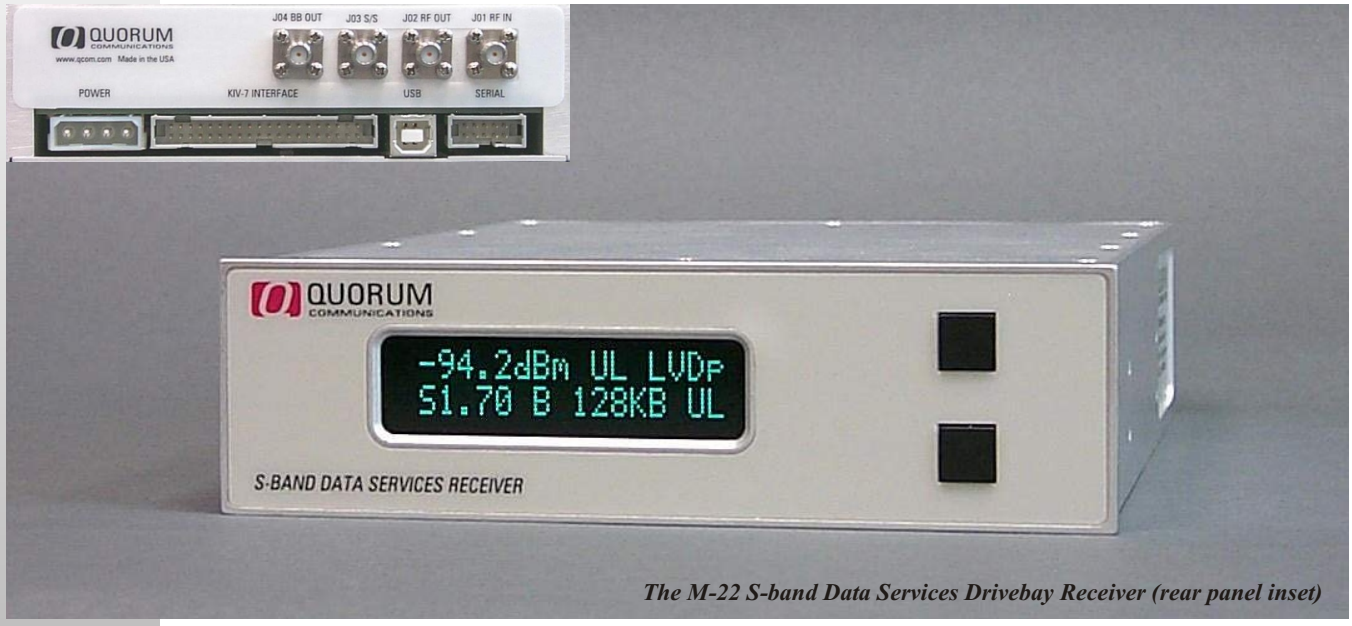
M-22 S-Band Receiver

M-22 Data Services Receiver supports AMB, Legacy and SDR modes



The M-22 S-band Data Services Drivebay Receiver (rear panel inset)

Features

- 70 MHz input from 2242.5 MHz antenna mounted downconverter (SGLS channel 9)
- 1.25 and 1.70 MHz PM subcarrier support
- QPSK / BPSK subcarrier demodulation up to 256 Kbps
- QPSK / BPSK performance within 1 dB of theoretical, 0.5 dB typical
- Supports rate ½ K=7 viterbi, V.35 IESS 308 descrambling and differential decoding
- Supports all AMB (Automated M-22 Broadcast), Legacy and SDR (Slow Data Rate) modes
- Automatic data rate, modulation mode and QPSK symbol mapping determination in AMB mode
- Flexible setup allows non-standard configurations in addition to standard modes
- Direct subcarrier A to D conversion at 40 MSPS and 10 bit resolution
- EIA-530, RS-422 clock and NRZ data outputs support direct connection to KIV-7 embeddable KG-84 COMSEC module
- Menu driven front panel switch local and RS-232 serial remote control for setup
- 2 line 16 character Vacuum Fluorecent display for status and signal level readout

Description

The M-22 S-band Data Services Receiver is a small, flexible and easy to use solution for reception of M-22 data. The M-22 receiver provides state of the art performance and can be quickly configured in the field using the front panel switches. Receiver control is also available by means of a PC compatible serial port. Direct connection to the KIV-7 COMSEC is supported.

The M-22 receiver can be used with existing S-band reception systems or can be mated with the Quorum Flat Panel antenna systems to provide a small and lightweight tactical receive system. Complete AMB reception systems can be provided by adding the Quorum AMB Router, a user supplied PC and appropriate reception software.

The M-22 receiver incorporates an analog PM demodulator folowed by a DSP (Digital Signal Processing) subcarrier demodulator which provides exceptional stability and performance.

User selectable operational modes which includes subcarrier frequencies, data rates, modulation type, differential coding, convolutional coding and descrambling provide a flexible solution to M-22 data reception in a PC and Workstation friendly Drivebay format.

Specifications *(subject to change without notice)*

RF	
Input Frequency	70 MHz on J01
Input Dynamic Range	-90 to -50 dBm nominal
Input Impedance	50 ohms
Input Noise Figure	7.5 dB
Input Return Loss	>15 dB
Input Bandwidth	4.2 MHz @ 1 dB 4.7 MHz @ 3 dB 6.7 MHz @ 40 dB
Signal Strength (RSSI) Output	0 to 4 VDC, 30 mV/dB nom on J03
Loop Through Output	70 MHz unity gain, 50 ohms on J02
70 Mhz Demodulator *(analog)*	
Demodulator Mode	PM, =1.2 to 1.35
Demodulator Type	PLL
Frequency Offset	±154 KHz max
Doppler Rate	Up to 20 Hz/s
Baseband Bandwidth	0.5 to 2.2 MHz
Baseband Output	50 ohms composite baseband analog
Subcarrier Demodulator *(DSP)*	
Subcarrier Frequencies	1.25 and 1.7 MHz selectable
Demodulator Modes	BPSK / QPSK (variable mapping)
Demodulator Type	Digital Costas Loop
Demodulator Implementation Loss	< 1 dB at 10^{-6} BER, 0.5 dB typical
Baseband Filters	Root Raised Cosine (RRC) =0.4
Data	
Supported Data Encoding	NRZ-L, NRZ-S, NRZ-M
Supported Data Rates	0.552 to 256 Kbps
Data Rate Tolerance	±200 ppm max
Convolutional Decoding	Viterbi rate ½, K=7, G1=171 G2=133 5.2 dB coding gain at 10^{-5} BER
Descrambling	V.35, IESS 308 (with viterbi on)
Electrical / Mechanical	
Supply Voltage	5 V @ 650 mA, 12 V @ 550 mA, 900 mA max if powering downconverter
Downconverter Power Output	12V at 650 ma (thermal fuse)
Power Connector	4 pin PC power connector
RF Input / Output Connectors	50 ohm SMA female
Signal Strength Output Connector	50 ohm SMA female
Baseband Output Connector	50 ohm SMA female
Size	½ high, 5 ¼" drivebay 5.85" W x 8.5" D x 1.7"H (14.7 cm W x 21.6 cm D x 4.32 cm H)
Weight	3.1 lbs (1.41 Kg)
Operating Temperature	32 to 122 F (0 to 50 C), non-condensing
Interface	
Remote Control Interface	RS-232 at 9600 baud
Control Interface Connector	10 pin IDC
Data / Clock Interface	EIA-530, RS-422
Data / Clock Interface Connector	40 pin IDC with adapter to 37 pin 'D' female

Supported Modes

- **Automated M-22 Broadcast**

Data Rates:

8	Kbps	BPSK
16	Kbps	BPSK
32	Kbps	BPSK
64	Kbps	BPSK
128	Kbps	BPSK
256	Kbps	QPSK
Auto		

Coding:
NRZ-L
rate ½ K=7 viterbi On
IESS descrambling On

Subcarrier:
1.7 MHz

- **Legacy**

Data Rates:

2.4	Kbps	BPSK
4.8	Kbps	BPSK
8	Kbps	BPSK
9.6	Kbps	BPSK
16	Kbps	BPSK
19.2	Kbps	BPSK
28.8	Kbps	BPSK
32	Kbps	BPSK
38.4	Kbps	BPSK
57.6	Kbps	BPSK
64	Kbps	BPSK
128	Kbps	BPSK

Coding:
NRZ-L, NRZ-S or NRZ-M
rate ½ K=7 viterbi On/Off
IESS descrambling On/Off

Subcarrier:
1.25 or 1.7 MHz

- **Slow Data Rate (SDR)**

Data Rates:

0.552	Kbps	BPSK
1.106	Kbps	BPSK
2.208	Kbps	BPSK
4.424	Kbps	BPSK
8.848	Kbps	BPSK
17.694	Kbps	BPSK
35.388	Kbps	BPSK

Coding:
NRZ-L
viterbi Off
descramble Off

Subcarrier:
1.7 MHz

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