DATUM SYSTEMS

M7 Series Advanced IF & L-Band
Troposcatter Modem
Modular Tropo Modem

M7 Tropo Dual Modulator with Dual/Quad Diversity Multi-Demod

The M7-Tropo Modem is Datum' Systems' latest technical achievement with the most modern digital troposcatter modem and features available. The advanced features include Dual or Quad diversity with a Maximum Data Rate up to 100 Mbps of throughput, and FlexLDPC Forward Error Correction (FEC). The M7 Tropo has advanced monitor and control (M&C) Capability for local and remote modem M&C with complete access to the modem parameters through the Web Browser, SNMP, and Serial interfaces.
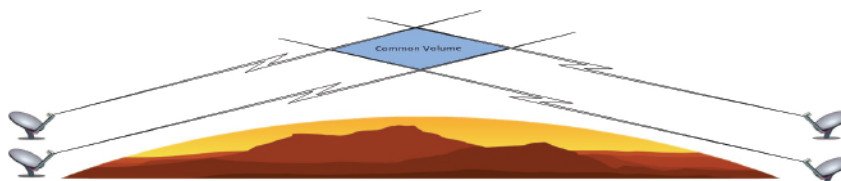
Compact Modular Design – The modern M7 Platform dramatically reduces the weight and footprint over other available troposcatter modems to a single 1-RU Rack Space, saving expensive rackspace and weight. The Dual Modulator, Quad Diversity Demod and the Dual-Diversity units all fit within a single 1/2 RU space, making it the world's most modular platform available. A complete Quad-Diversity tropo modem fits within a single 1 RU Rack Space, and weighs less than 12 pounds. The Modulator and Demodulator units can be used as stand-alone for one-way traffic.

Advanced FlexLDPC FEC – With superior coding gain and flexibility, FlexLDPC provides superior error correction performance and an unparalleled amount of granular code rates and block size selections.

Superior Multi-Path Performance – The M7 Tropo Series offers the highest dispersion tolerance available.

Two Sigma over Tau Performance - The M7 Tropo uses a new and different patented technique to equalize troposcatter channels, and is able to equalize channels that are much more dispersive than usually encountered on tropo links. The usual measure of the dispersion of a tropo channel is the delay spread over the symbol period, "Two Sigma/Tau" or $(2\sigma/\tau)$. Typical tropo modem specifications available today are based on $2\sigma/\tau$ operation up to 3, or in a rare case up to 6. The M7 Tropo is highly insensitive to this parameter and the performance improves for higher $2\sigma/\tau$. As data rates go up, the symbol period goes down, making $2\sigma/\tau$ larger. This important design aspect allows the Datum Tropo Modem to scale much better than other tropo modem types.

Network Interface (N7) - The N7 is a Layer 2 Bridge-only Switch based 5 Port Gigabit Ethernet interface, which includes an additional SFP Port for an Optic Fiber connection. The N7 also supports optimal QoS, VLAN operation and Jumbo Frames.

• L-Band and IF Selectable

• Frequency Agile 50-180, 950-2250 MHz, 1 Hz Steps

• 256 kbps to 100 Mbps Data Rate

• 256 ksps to 39.9999 Msps, Symbol Rate

• 2 Frequency Independent TX Carriers in 1/2 RU

• Dual-Diversity Modem in 1/2 RU

• Single, Dual or Quad Diversity Modem in 1 RU

• Compact and Lightweight

• FlexLDPC Multi Block Sizes & Code Rates

• BPSK/QPSK/8PSK/16APSK (optional 32/64APSK)

• Auto Spectral Inversion Correction

• Multi-Channel RX-Level Balancing

• Interleaver/Deinterleaver

• Adaptive and ACM Control

• Ethernet Interface
  ◦ Layer 2 Bridge, Switch Based
  ◦ 5-Port with additional SFP Port
  ◦ QoS and VLAN Support

• Optional Front Panel Menu Control

• State-of-the-Art Web Browser (Local and Remote)

• SNMP Control and Monitor

• Over the Air MCC Channel for Far End M&C

APPLICATIONS

• Fixed and On-the-Move

• Oil and Gas - Offshore Platforms

• Supports C-band, Ku-band X-Band

• Just BeyondLine of Sight Microwave

Half-Rack M7 Tropo Dual-Output Modulator with Independent Frequency Control

Half-Rack M7 Tropo Dual-Diversity Modem

Half-Rack M7 Tropo Quad Diversity Demod

SPECIFICATIONS

Operating Modes	Single, Dual and Quad Diversity for Frequency, Space & Polarization Diversity System Designs
	FlexLDPC, Flexible Block and Code Rates, Low Latency
Symbol Rate Range	Remote Modem Channel (MCC)
Data Rate Range	256 ksps to 39.9999 Msps (1 sps steps)
FreqTuning Range	256 kbps to 100 Mbps (1 bps steps)
	L-band = 950-2250 MHz (1 Hz steps)
Modulation Types	IF = 50-180 MHz (1 Hz steps)
LDPC FEC Options	BPSK, QPSK, 8PSK, 8APSK, 16APSK
	FlexLDPC - Block Size: 2k, 4k, 8k, 16k Code Rates: 1/2, 4/7, 2/3, 8/11, 4/5, 16/27, 16/19, 8/9, 16/17

MO0DCOD AND MAX DATA RATE (SAMPLES)

QPSK LDPC-I/2	36.64 Mbps
QPSK LDPC-4/7	41.87 Mbps
QPSK LDPC-2/3	48.85 Mbps
QPSK LDPC-8/11	53.30 Mbps
QPSK LDPC-4/5	58.63 Mbps
8PSK LDPC-16/27-16k	65.14 Mbps
8PSKLDPC-2/3-16k	73.29 Mbps
16APSK LDPC-4/7-16k	83.76 Mbps
16APSK LDPC-2/3-16k	97.72 Mbps
16APSK LDPC-8/11-16k	100 Mbps
16APSK LDPC-4/5-16k	100 Mbps
16APSK LDPC-16/19-16k	100 Mbps
16APSK LDPC-8/9-16k	100 Mbps
16APSK LDPC-16/17-16k	100 Mbps

NETWORK INTERFACE (N7)

Ethernet Interface Ports	5 Ports (RJ-45), 1 Port SFP
5 Port Interface	10/100 BaseT, Gig Ethernet (RJ-45)
SFP Port	Optional Gigabit or Optic Fiber
Ethernet Protocol	Layer 2 Switched Bridge Only
Features	QoS and VLAN Selectable

MONITOR AND CONTROL

Remote Control Interfaces	RS-232, RS-485, SNMP, Web Browser
Alarm Outputs	RS-232, RS-485, SNMP, Web Browser

MODULATOR

Transmit Carriers	1 or 2
Data Rate Max	100 Mbps
Symbol Rate Max	39.9999 Msps
Output Bandwidth	80 MHz
	L-band: 950 MHz to 2250 MHz Center Settable between 986 MHz and 2214 MHz (L-Band)
	IF: 50 MHz to 180 MHz Center Settable between 86 MHz and 164 MHz (IF)
Output Level	L-Band or IF Output Power: +5 dBm to -35 dBm (30Msps)
	L-Band or IF Power Spectral Density -70 dBm/Hz to -110 dBm/Hz
Output Level Accuracy	±0.5 dB
Output Impedance	50 Ohms SMA; L-Band or IF
Output Return Loss	>14dB; L-Band or IF
Output Off Isolation	>60 dB
Output Spurious Single Carrier	<-60 dBc / 10 kHz BW (Modulated Carrier)
Phase Noise Offset = 10 Hz Offset = 100 Hz Offset = 1 KHz Offset = 10 KHz Offset = 100 KHz Offset = 1 MHz	Phase Noise Density mask <-33 dBc/Hz <-63 dBc/Hz <-73 dBc/Hz <-83 dBc/Hz <-93 dBc/Hz <-103 dBc/Hz
Mod Roll-Off Factor %	20, 25, 30, 35,40 (%)

DEMODULATOR

Diversities	Single/Dual per card Quad with 2 demod cards
Data Rate Max	100 Mbps
Symbol Rate Max	39.9999 Msps
Input Bandwidth	80 MHz
	L-band 950 MHz to 2250 MHz Center Settable between 986 MHz and 2214 MHz
	IF 50 MHz to 180 MHz Center Settable between 86MHz and 164 MHz
Receive Carriers	2 for Dual Diversity 4 for Quad Diversity
Input Acquisition Range	12.5 Hz @ 1Msps (SR/80,000)
Minimum Input Level	10 x Log(SR)-130 = Lvl (dBm)
Maximum Input Level	10 x Log(SR)-80 = Lvl (dBm)
Maximum Total Power	+10 dBm
Receive Carrier Input Pwr	InputPSD+10*log10(SR) +/-10 dB
Receive Acquisition Time	Typical < 5 seconds at 1 Msps
Input Impedance	50 Ohms SMA; L-band or IF
Input Return Loss	>14dB; L-band or IF
Input Phase Noise	Same as Modulator
Demod Roll-Off Factor %	20, 25, 30, 35,40 (%)

ENVIRONMENTAL AND PHYSICAL

AC to DC Adapter (Std)	Input 90-240 VAC, Output 24 V 65 W max (1 or 2)
DC Input (Rear of Unit)	8 to 36 VDC, -48 VDC Optional
Operating Temperature Range	-0°C to +50°C, 99% humidity, non-con (non LCD Version)
Storage Temperature	-20°C to +70°C, 99% humidity, non-con
Size	8.5" (W) x 11" (D) x 1.75" (H), (2 Units in 1 RU for Quad Diversity)
Weight	< 12 lbs, fully configured

CERTIFICATION AND COMPLIANCE

CE Certified for: CE	ETSI EN 301 489-1 V1.9.2 EN50022 Emissions EN50024 Immunity EN60950 (Safety)
RoHS	Meets RoHS lead-free standards

* Specifications subject to change without notice

M7 Web GUI Constellation Monitoring

QPSK   No Multipath   8PSK

with Multipath and Noise

Quad Frequency / Quad Space Diversity