



M7LT L-Band Sat-Terminal

Modular Satellite Modems



SYSTEM ARCHITECTURES SUPPORTED

- Point-to-Point
- Point-to-Multipoint
- Mesh
- Unicast
- Multicast

KEY FEATURES

- L-Band Frequency 950 to 2150 MHz
- AC or DC Input Power Options
- Internal BUC and LNB Power Supply
- High Stability 10 MHz Reference
- FlexLDPC Multi Block Sizes & Code Rates
- 1.2 kbps to 59.4 Mbps, 1 bps steps
- BPSK/QPSK/OQPSK/8PSK/8QAM/16QAM
- Widest Range of Carrier Roll-Off Factors
- Dual G.703/E1 Full & Fractional D&I (N x 64)
- Advanced IP Interface
 - 200,000 Packets Per Second Throughput
 - Bridge and Router Modes
 - 3rd Party Platform for IP Optimization
- Express Ethernet Interface
 - Layer 2 Bridge, Switch Based
 - 4-Port with additional SFP Port
 - QoS and VLAN Support
- Lowest Latency, <15 ms at 64 kbps 3/4 QPSK
- Fast acquisition time
- Multi-Flo Async Channel, AUPC
- State-of-the-Art Web Browser GUI
- Local and Remote SNMP and Web Browser

APPLICATIONS

- Cellular Backhaul
- Enterprise
- IP Networks
- E1 Trunking
- On-the-Move
- Bandwidth on Demand

Datum Systems gives you a modern and highly efficient low cost satellite modem with the M7 Series, that is versatile, compact, extremely bandwidth efficient and costs less to own and operate. The M7 Series platform supports many advanced options and features, including our Smart Carrier canceller and Adaptive Coding Modulation (ACM).

Smart Carrier Cancelling – Smart Carrier is a patented advanced second generation carrier canceller which allows 2 similar carriers to occupy the same transponder spectrum. Smart Carrier is easy to set-up and provides a Shannon Capacity improvement of up to ~ 2 dB, which is ~50 % increase in the fundamental channel capacity. Smart Carrier cancelling is supported by Datum AUPC.

ACM - Adaptive Coding Modulation provides a significant increase in throughput by utilizing margin provided in link budgets for worst case scenarios. ACM also increases link availability as the link will adjust for poor link conditions by seamlessly adjusting it's available Modcods.

FlexLDPC – Provides strong economic advantages to satellite service providers and their customers. Granular code rates and block sizes get you the most out of your available satellite bandwidth and spectral power, while keeping processing latency at the desired level.

Sharp Carrier – This standard Roll-off capability allows an immediate spectral efficiency increase and significant bandwidth savings, at no additional hardware or software cost. Filter Roll-Off options in the new M7 modems Series include 5%, 8%, 10%, 15%, 20%, 25%, 30%, 35% and 40%.

Flexible Interface Options - Serial interface (S7), Managed IP interface (I7), Multi-port Ethernet Bridge interface (E7), Dual G.703 (G7), and High Speed Serial interface (H7). Consult the factory for new interface options.

IP and 3G/LTE Optimization - The managed IP interface provides Advanced QoS and supports optional TCP/IP Acceleration, Payload & Header Compression, Packet Coalescing and Byte Caching using the industry's best IP Optimization embedded software from award winning Xiplink.

1:1 Redundancy - Built in 1:1 redundancy control allows for low cost implementation of redundancy when required.

BUC and LNB Power Supply Options - Factory select Input Power and BUC/LNB Power and High Stability 10 MHz Reference

SPECIFICATIONS	
Operating Modes	TX and RX SCPC FlexLDPC and Opt. TPC Viterbi, RS Outer Codes Remote M&C OH Channel Adv AUPC, ESC Channel ACM Smart Carrier Cancelling
Data Rate Range	1.2 kbps to 59.04 Mbps, (1 bps)
Symbol Rate Range	2400 sps to 14.76 Msps (1 sps)
Frequency Range	950 to 2150 MHz (1 Hz)
Demodulation Types	BPSK,QPSK,OQPSK, 8PSK/QAM,16QAM
FEC Options	None, Viterbi, TCM, RS, FlexLDPC TPC 4k & TPC 16k (Opt Plug-in HW)
Advanced FlexLDPC	Block Sizes 256,512,1k,2k,4k,8k,16k CR 1/2,2/3,3/4,14/17,7/8,10/11,16/17
Turbo Product Code	TPC-4k 21/44, 1/2, 3/4, 7/8, 0.950 TPC-16k 1/2, 3/4, 7/8, 0.453, 0.922
Viterbi	1/2, 3/4, 7/8 (k=7), Trellis 2/3
Reed Solomon	Selectable N & K, IESS 308/309/310
Scram/Descram	IBS, V.35, IESS, TPC, RS, LDPC, EFD

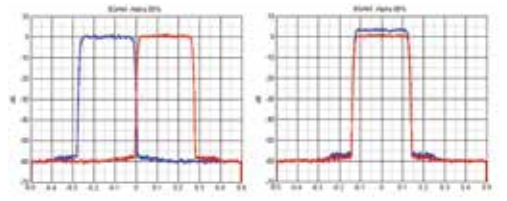
MODULATOR	
Output Level	L-Band +5 to -35.00 (dBm)
Output Level Accuracy	±0.5 dB Over Freq, Level and Temp
Output Impedance	50 Ohms N-Type or 75 Ohms F-Type (factory option)
Output Return Loss	> 16 dB
Output Impedance	> 60 dB
Output Off Isolation	< -60 dBc / 4 kHz BW
Phase Noise:	
Offset = 10 Hz	< -78 dBc/Hz
Offset = 100 Hz	< -95 dBc/Hz
Offset = 1.0 kHz	< -110 dBc/Hz
Offset = 10 kHz	< -115 dBc/Hz
Offset = 100 kHz	< -115 dBc/Hz
Offset = 1.0 MHz	< -130 dBc/Hz
Mod Roll-Off Factor %	5, 10, 15, 20, 25, 30, 35 (%)
Ext Ref Frequency	1,1544, 2,048, 5, 10, 20 (in MHz)
External Ref Level	-10 dBm to +10 dBm

DEMODULATOR	
Rx Acquisition Range	±100 Hz to ±3 MHz, 1 Hz Steps
Minimum Input Level	10 × Log(SymRate) -125 = Lvl (dBm)
Maximum Input Level	10 × Log(SymRate) - 80 = Lvl (dBm)
Max IF Input Power Density	+20 dBc/Hz
Maximum Total Power	+10 dBm
Rx Acquisition Time	Typical 71 ms at 64 kbps, QPSK
Input Impedance	50 Ohms N or 75 Ohms F (factory option)
Input Return Loss	L-Band > 16dB
Input Phase Noise	> Intelsat by 6 dB typical, 4 dB min
Demod Roll-Off Factors	5, 8, 10, 15, 20, 25, 30, 35, 40 (%)

TYPICAL EB/NO 1E-8 BER						
FlexLDPC™	BPSK/QPSK (dB)	8PSK (dB)	8QAM (dB)	16QAM (dB)	Delay @ 64kbps (mSec)	
LDPC-1/2-2k	2.04	n/a	3.80	4.48	49.6	
LDPC-1/2-16k	1.38	n/a	3.04	3.76	388.6	
LDPC-2/3-2k	2.77	4.88	4.68	5.85	44.4	
LDPC-2/3-16k	2.09	4.14	3.91	5.01	346.1	
LDPC-3/4-2k	3.52	5.97	5.51	6.78	41.9	
LDPC-3/4-16k	2.72	5.07	4.63	5.87	325.0	
LDPC-14/17-2k	4.23	6.92	6.27	7.66	39.6	
LDPC-14/17-16k	3.27	5.86	5.24	6.68	306.3	
LDPC-7/8-2k	4.96	7.89	6.98	8.48	38.1	
LDPC-7/8-16k	3.90	6.66	5.87	7.32	293.6	
LDPC-10/11-2k	5.63	8.73	7.68	9.37	37.0	
LDPC-10/11-16k	4.40	7.33	6.35	7.95	284.5	
LDPC-16/17-2k	6.35	9.53	8.39	10.14	35.8	
LDPC-16/17-16k	7.99	8.01	6.99	8.63	276.1	

* Guaranteed Eb/No is 0.2 dB > Typical

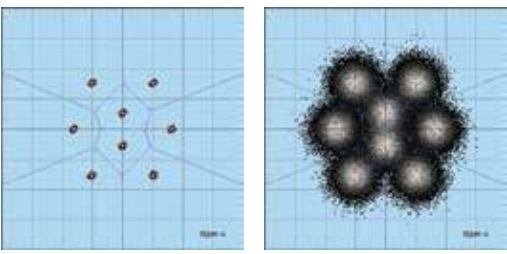
SMART CARRIER CANCELLING	
Delay Range	0 to 320 msec
Acquisition Time	< 30 Sec for Full Delay Sweep < 2 Sec for 10 msec range
Power Spectral Density Ratio	+/- 10 dB
Symbol Rate Ratio	+/- 30% of Symbol Rate
Frequency Offset	+/- 12.5% of Symbol Rate
Eb/No Degradation	PSD Ratio: 0 dB QPSK: 0.2 dB 8PSK/8QAM: 0.3 dB 16QAPSK: 0.5 dB



Smart Carrier Cancelling Example

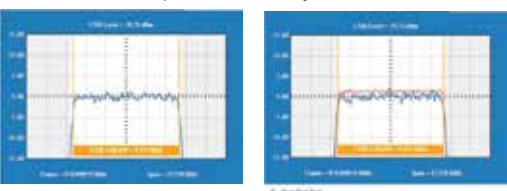
WEB BROWSER INTERFACE MONITOR

Constellation



8QAM with and without Noise

Spectrum Analyzer



Spectrum with and without Max Hold

INTERFACE OPTIONS: (Choose Up to Two Per Modem)

SERIAL DATA INTERFACE (S7)	
Main Interface Modes	Sync RS-232, 449, V.35, EIA-530 (DB-25)
Int Clk (ST) Accuracy	±1E-12, (±1 part per Trillion)
Doppler Buffer Depth	4 Bits to 524,284 Bits, 1 Bit Steps
ESC OH I/O Modes	Async RS-232, RS-485 (DB-25)
Adv Mux ESC OH DR	Disabled, 300 bps to 3.5 Mbps, 1 bps Steps
Adv Mux MCC OH DR	Disabled, 300 bps to 29.52 Mbps, 1 bps Steps
ESC Rem Signaling I/O	Form C (Qty 2)

ADVANCED IP INTERFACE (I7)

Adv Ethernet Port	10/100/1000 BaseT Ethernet (RJ-45)
Operating System	Debian Linux Operating System
Operating Modes	Bridge and Vyatta Router
Packets Per Second	70,000 PPS
Network Protocols	See Specification

EXPRESS ETHERNET INTERFACE (E7)

Express Ethernet Ports	4Ports (RJ-45), 1 Port SFP
4 Port Interface	10/100/1000 BaseT, Ethernet (RJ-45)
SFP Port	Optional Gigabit or Optic Fiber
Ethernet Protocol	Layer 2 Switched Bridge Only
Features	QoS and VLAN Selectable

DUAL G.703/E1 INTERFACE (G7)

G.703 E1 Phys Inputs	Dual Bal Inputs on (RJ-48), UnBal Opt
Formats Supported	Full E1, D&I / PCM-30 (CAS), PCM-31 (CCS)
D&I Time Slots Supported	N x 64, N = 1 to 31 Time Slots

MONITOR AND CONTROL

Remote Control Interfaces	RS-232, RS-485, SNMP, Web Browser
Alarm Outputs	Qty 2 Form C

ENVIRONMENT AND PHYSICAL M7LT

AC or DC Input (factory option)	90-264 VAC, Optional 48 VDC (20-60 VDC)
High Stability Ref Option	Internal 10 MHz at Nominal, -3 dBm
Reference Stability	1 x 10-8 OCXO, 2 x 10-7/year aging
BUC Power Options	AC Input Models: (Max Current Rating Listed) (1) 24 VDC@110 watts, 4.2A (2) 24 VDC@120 watts, 5.0A DC Input Models: (1) 48 VDC@100 watts, 2.1A (2) 48 VDC@150 watts, 3.1A (3) 48 VDC@200 watts, 4.2A
LNB Output Power	Selectable: Off, 13 or 18 VDC
Operating Temp Range	0 to +50°C, 99% humidity, non-cond
Storage Temperature	-20°C to +70°C, 99% humidity, non-cond
Size	19" (W) x 11" (D) x 1.75" (H),
Weight	10 lbs, fully configured

CERTIFICATION AND COMPLIANCE

CE Certified for:	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



M7LT Rear Panel

