SpacePath COMMUNICATIONS

STEP ELECTRONICS
A Division of Av-Comm

Precision Satellite Modems

M7D IF & M7LD L-Band

Compact Satellite Dual-Demods

M7 Modular MODEM SERIES

System Architectures Supported

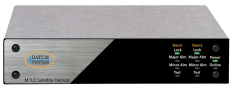
- Point-to-Point
- Point-to-Multipoint
- Mesh
- Multicasting

Key Highlights

- Modular Dual-Demod Design
- *FlexLDPC* Multi Block Sizes & Code Rates
- 1.2 kbps to 59.4 Mbps, 1 bps steps
- BPSK/QPSK/OQPSK/8PSK/8QAM/16QAM
- Independent Demods, IF or L-Band
- Serial Interface Optional
- Advanced IP Interface
  - 70,000 Packet Per Seconds Throughput
  - Bridge and Router Modes
  - Integrated Linux and Vyatta Routing
- Express Ethernet Interface
  - Layer 2 Bridge, Switch Based
  - 4-Port with additional SFP Port
  - QoS and VLAN Support
- Lowest Latency Solution
- Typical acquisition time, 71 ms at 64 kbps
  - Perfect for Managed BW Systems
- Front Panel Optional
- State-of-the-Art Web Browser GUI

Applications

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



M7 Dual Demod

M7 Quad Demod

Datum Systems innovation is transforming the SCPC and MCPC modem industry with a new generation modular modem product, the M7 Series, that is versatle, compact, highly efficient and costs less to own and operate. Flexible M7 configurations include a full modem, mod-only, demod-only or multi-demod capability, all using common integrated assembly modules. Standard hardware houses our optional *FlexLDPC* FEC and many other advanced upgradable features to create the industry's most spectral and space efficient low cost modem.

Compact Modular Design - The completely new M7D and M7LD Dual-Demod platform fits within a half-rack 1 RU space, saving expensive rackspace at hub or remote locations. Demods can be mounted and operated side-by-side or used in a simple and clean 1:1 redundant configuration. The M7 Series Dual-Demod uses fully independent demod assemblies, which are not restricted by bandwidth allocation or single transponder requirements. The M7D and M7LD also supports multiple interface options, making it a true flexible and multipurpose demod-only platform.

Advanced *FlexLDPC* Onboard – With unparalleled configuration flexibility and superior coding gain, *FlexLDPC* takes FEC technology innovation to the next level, bringing strong economic advantages to satellite service providers and their customers. Granular code rates and block sizesget you the most out of your available satellite bandwidth and spectral power, while keeping processing latency at the desired level.

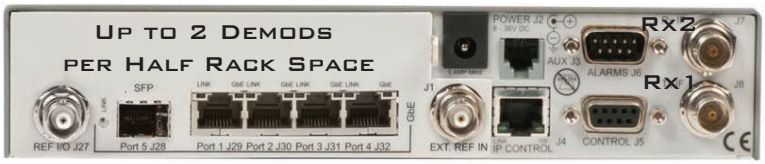
Sharp Carrier Roll-Off Technology – The M7 Series supports advanced filter shaping for optimizied carrier spacing as a standard feature. Datum currently offers down to an 5% Alpha, which means that carriers can be spaced at 1.05 times the symbol rate instead of the historical factor of 1.35. This allows 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%. See Advanced Filter Shaping White Paper for more information.

Half-Rack M7D
(with Serial Interface)

Half-Rack M7D
(with Express Ethernet Interface)

24/9 Powells Road, Brookvale, NSW 2100, Australia
+61 2 9939 4377 sales@stepselectronics.com.au

Specifications	
Operating Modes	RX Continuous (SCPC) *Flex*LDPC, Flexible Block and Code Rates, Low Latency Advanced TPC and Industry Compatible Std and Custom Async Low Overhead Channels, AUPC Remote Modem Control Channel IP, Ethernet, Dual G.703/E1 (D&I), Serial, HSSI Opt Plug-in I/O Selections (Up to 2 per M7 Unit)
Data Rate Range	1.2 kbps to 59.04 Mbps, (1 bps steps)
Symbol Rate Range	2400 sps to 14.76 Msps (1 sps steps)
FrequencyTuning Range	M7D 50-180 MHz, M7LD 950-2150 MHz(1 Hz
Demodulation Types	BPSK,QPSK,OQPSK,8PSK/QAM,16QAM
FEC Options	None, Viterbi, TCM, Reed-Solomon, *Flex*LDPC TPC 4k and TPC 16k (Opt Plug-in HW)
Advanced *Flex*LDPC	Block Sizes 256,512,1k,2k,4k,8k,16k Rates 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
Viterbi	1/2, 3/4, 7/8 (k=7), Trellis 2/3
Reed Solomon	Selectable N & K, IESS 308/309/310
Descrambler	IBS, V.35, IESS, TPC, RS, LDPC, EFD



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

FlexLDPC™	Typical Eb/No for 1E-8 BER				Delay @ 64kbps
	QPSK	8PSK	8QAM	16QAM	
LDPC-1/2 - 2k	2.04 dB	n/a	3.80 dB	4.48 dB	49.6 ms
LDPC-1/2-4k	1.73 dB	n/a	3.44 dB	4.16 dB	98.0 ms
LDPC-1/2-8k	1.52 dB	n/a	3.19 dB	3.92 dB	195.0 ms
LDPC-1/2-16k	1.38 dB	n/a	3.04 dB	3.76 dB	388.6 ms
LDPC-2/3-2k	2.77 dB	4.88 dB	4.68 dB	5.85 dB	44.4 ms
LDPC-2/3-4k	2.46 dB	4.53 dB	4.36 dB	5.46 dB	87.5 ms
LDPC-2/3-8k	2.23 dB	4.28 dB	4.09 dB	5.19 dB	173.7 ms
LDPC-2/3-16k	2.09 dB	4.14 dB	3.91 dB	5.01 dB	346.1 ms
LDPC-3/4-2k	3.52 dB	5.97 dB	5.51 dB	6.78 dB	41.9 ms
LDPC-3/4-4k	3.14 dB	5.56 dB	5.11 dB	6.37 dB	82.4 ms
LDPC-3/4-8k	2.89 dB	5.27 dB	4.83 dB	6.07 dB	163.1 ms
LDPC-3/4-16k	2.72 dB	5.07 dB	4.63 dB	5.87 dB	325.0 ms
LDPC-7/8-2k	4.96 dB	7.89 dB	6.98 dB	8.48 dB	38.1 ms
LDPC-7/8-4k	4.32 dB	7.21 dB	6.40 dB	7.84 dB	74.6 ms
LDPC-7/8-8k	4.00 dB	6.86 dB	6.05 dB	7.51 dB	147.3 ms
LDPC-7/8-16k	3.90 dB	6.66 dB	5.87 dB	7.32 dB	293.6 ms
LDPC-10/11-2k	5.63 dB	8.73 dB	7.68 dB	9.37 dB	37.0 ms
LDPC-10/11-4k	5.00 dB	7.99 dB	7.02 dB	8.63 dB	72.3 ms
LDPC-10/11-8k	4.58 dB	7.51 dB	6.60 dB	8.18 dB	143.0 ms
LDPC-10/11-16k	4.40 dB	7.33 dB	6.35 dB	7.95 dB	284.5 ms

Guaranteed Eb/No is 0.2 dB > Typical

Interface Options: (Choose Up to Two Per Modem)

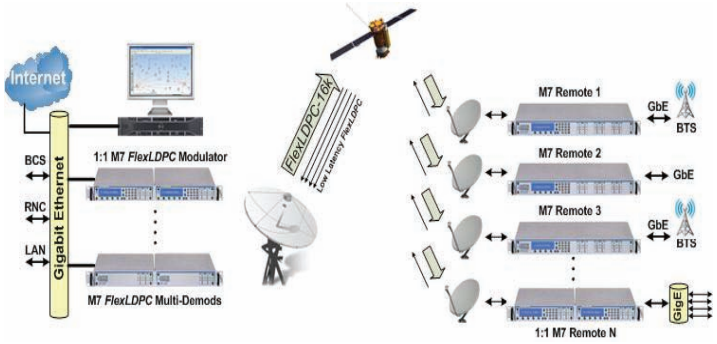
Serial Data Interface (S7)	
Main Interface Modes	Sync RS-232,449,V.35,EIA-530 (DB-25)
Internal Clock (ST) Accuracy	±1E-12, (±1 part per Trillion)
Doppler Buffer Depth	4 Bits to 524,284 Bits, 1 Bit Steps
ESC Overhead I/O Modes	Async RS-232,RS-485 (DB-25)
Adv Mux ESC OH Data Rate	Disabled, 300 bps to 3.5 Mbps, 1 bps Steps
Adv Mux (MCC) OH Data Rate	Disabled, 300 to 29.52 Mbps, 1 bps Steps
ESC Remote Signaling I/O's	Form C (Qty 2)

Advanced IP Interface (I7)	
Adv Ethernet IP Interface	10/100 BaseT, Gigabit 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 BaseT, Gigabit Ethernet (RJ-45)
SFP Port	Optional Gigabit or Optiuc Fiber
Ethernet Protocol	Layer 2 Swtched Bridge Only
Features	QoS and VLAN Selectable

Dual G.703/E1 Interface (G7)	
G.703 E1 Physical 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

HSSI Interface (H7)



Point-to-Multipoint Example

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

Environment and Physical	
AC to DC Adapter (Std)	Input 100-240 VAC, Output 24 V 65 W max
DC Input (Rear of Unit)	8 to 36 VDC, -48 VDC Optional
Operating Temperature Range	0°C to 50°C, 99% humidity, non-cond
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)
Weight	< 5 lbs, fully configured

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

- Specifications subject to chance without notice

24/9 Powells Road, Brookvale, NSW 2100, Australia
+61 2 9939 4377 sales@stepselectronics.com.au