M7D IF and L-Band
Compact Satellite Dual-Demods
Modular Satellite Demodulators

M7D Dual Demod

M7D Quad Demod

SYSTEM ARCHITECTURES SUPPORTED

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

KEY FEATURES

- 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
- Local and Remote SNMP and Web Browser

APPLICATIONS

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

Datum Systems innovation is transforming the SCPC and MCPC modem industry with a new generation modular modem product, the M7 Series, that is versatile, 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 *Flex*LDPC Onboard – With unparalleled configuration flexibility and superior coding gain, *Flex*LDPC takes FEC technology innovation to the next level, bringing 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 Roll-Off Technology – The M7 Series supports advanced filter shaping for optimized 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%.
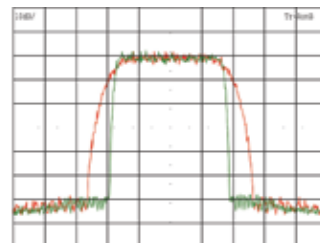
Sharp Carrier Example
Roll-Off 8% vs. 35%

*See Advanced Filter Shaping White Paper for more information.

SPECIFICATIONS

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Operating Mode	RX Continuous (SCPC)
	FlexLDPC, Flexible Block and Code Rates, Low Latency
	Advanced TPC & Industry Comp
	Std and Custom Async Low Overhead Channels
	AUPC
	Remote Modem Control Channel
Interface Options	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)
Freq Tuning Range	IF: 50-180 MHz (1 Hz Steps) L-Band: 950-2150 MHz (1 Hz Steps)
Demodulation Types	BPSK,QPSK,OQPSK,8PSK, 8QAM,16QAM
FEC Options	None
	Advanced FlexLDPC
	Blk Sizes 256,512,1k,2k,4k,8k,16k
	Rate 1/2,2/3,3/4,14/17,7/8,10/11,16/17
	Viterbi (k=7)
	Rate 1/2,3/4,7/8
	Trellis-Coded Modulation
	Rate 2/3
	Reed Solomon
	Select N & K, IESS 308/309/310
	Turbo Product Code
	TPC 4k and TPC 16k (Opt HW)
	TPC-4k 21/44, 1/2, 3/4, 7/8, 0.950
Descrambler	IBS,V.35,IESS,TPC,RS,LDPC,EFD

DEMODULATOR

Input Acq Range	±100 Hz to ±3 MHz, 1 Hz Steps
Minimum Input Level	10 x Log(SR) - 80 = Lvl (dBm)
Maximum Input Level	10 x Log(SR) - 125 = Lvl (dBm)
Max IF In Pwr Density	+20 dBc/Hz
Maximum Total Power	+10 dBm
Demod Acq Time	Typical 71 ms at 64 kbps, QPSK
Input Impedance	L-Band 50 Ohms SMA IF 50 or 75 Ohms BNC (User Selectable)
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 (%)

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
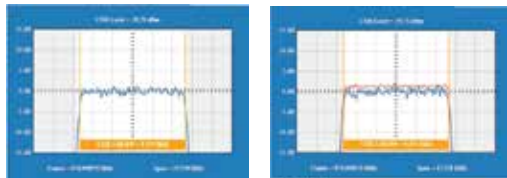
8QAM
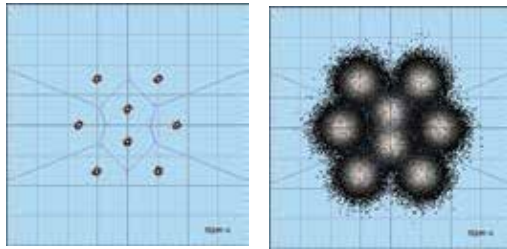
M7D Constellation monitor with and without noise
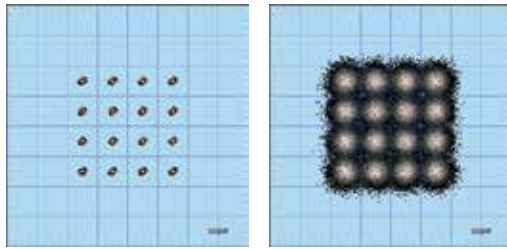
16QAM

Spectrum Analyzer

Spectrum with and without Max Hold

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 IP Interf	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 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

MONITOR AND CONTROL

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

ENVIRONMENTAL 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 Temp Range	0°C to 50°C, 99% humidity, non-con
Storage Temp Range	-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:	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

Half-Rack M7D
(with Serial Interface)

Half-Rack M7D
(with Express Ethernet Interface)