

# SDM-300L3 Satellite Modem



## INTRODUCTION

- 2.4 kbps to 5.0 Mbps
- Burst Modulation Mode: 19.5 kbps and 57.6 kbps
- Fully Accessible System Topology (FAST)
- Open and Closed Network Capability
- Built-in Test Self Test

## APPLICATIONS

Fully configured, the SDM-300L3 will meet or exceed all of the applicable requirements in IESS-308/-309/-310/-314 and is available with a full range of industry standard digital interfaces. The SDM-300L3 expands the open network capabilities of SDM-300 series modems into L-Band frequencies. Utilizing advanced technology and proprietary digital signal processing techniques, the design eliminates analog circuitry to perform modem signal processing, resulting in higher reliability and reduced packaging size.

## COMPATIBILITY

Maintaining our excellent history of modem compatibility, the SDM-300L3 is fully compatible with many Comtech EF Data modems. When configured properly, the SDM-300L3 interoperates with the following Comtech EF Data modems:

- SDM-100
- SDM-100A
- SDM-300
- SDM-300A
- CDM-600 (Open Network & Turbo)
- SDM-650B
- SDM-6000
- SDM-8000
- CDM-550 (Turbo)

## COST EFFECTIVE

Comtech EF Data's SDM-300L3 employs Fully Accessible System Topology (FAST). This technology provides a cost-effective approach to upgrading satellite modem configurations. FAST is an exclusive, industry-first feature that eliminates the need to purchase options before they are needed. Modem selection is easy with no guesswork. An SDM-300L3 base modem includes the following features:

- BPSK and QPSK
- Viterbi or Sequential decoding
- Variable data rate to 512 kbps
- Tx IF range: 950 to 1750 MHz
- Rx IF range: 950 to 1750 MHz
- BUC FSK Reporting and Power Leveling

## FEATURE ENHANCEMENTS

Enhancing the SDM-300L3's performance is easy. Additional features are added quickly on site, using the FAST access code purchased from Comtech EF Data. To enable these features, simply enter the code at the front panel. Base unit enhancements include:

- Variable data rate to 5.0 Mbps
- Viterbi and Sequential decoding
- OQPSK and 8-PSK
- Turbo: BPSK 21/44 or 5/16, QPSK 1/2 or 3/4, 8-PSK 3/4
- Reed-Solomon (R-S) Codec
- IDR/IBS/D&I/AUPC/ASYN
- I/O Connector (25-, 34-, 37-, 50-, 100-pin)
- G.703 Interface with DB-9, BNC and ASYN
- 2 x ADPCM Voice in 64 kbps IBS Frame

## BUILT-IN SELF-TEST

Comtech EF Data's unique built-in self-test feature allows the SDM-300L3 to complete a bit error rate (BER) measurement without the use of expensive noise generators and BER test equipment. The built-in self-test:

- Provides fully functional modem testing with noise
- Displays pass or fail results
- Establish modem confidence
- Eliminates BER test equipment

## TEST AND MONITOR FEATURES

The SDM-300L3 has extensive test capability to aid installation, troubleshooting, and, maintenance:

- Baseband Loopback – at the data interface (bi-directional)
- BER, Eb/N0, and Buffer Fill %
- Interface Loopback – at the modulator and demodulator data interface (bi-directional)
- IF Loopback
- RX Carrier Level

## BURST OUTBOUND OPERATION

SDM-300L3 dual-function modem can operate in continuous inbound and either continuous or burst outbound. Burst outbound presently operates with the SDM-1001L Satellite Burst Modem.

# SDM-300L3 Satellite Modem

## SYSTEM SPECIFICATIONS (FULLY ENHANCED)

Operating Frequency Range	950 to 1750 MHz, Tx and Rx
Digital Interface:	
Standard	EIA-232, EIA-422, and V.35 (25-pin D)
Optional	G.703
Digital Data Rate	2.4 kbps to 5.0 Mbps
Symbol Rate	4.8 ksym/s to 2.5 Msym/s
Modulation and Coding	
Viterbi (K=7)	QPSK/OQPSK 1/2, 3/4, and 7/8 8-PSK 2/3 TCM
Sequential	BPSK 1/2 QPSK 1/2, 3/4, and 7/8
Concatenated Viterbi and Reed-Solomon	BPSK 1/2 QPSK/ OQPSK 1/2, 3/4, and 7/8 8-PSK 2/3 TCM
Turbo	BPSK 21/44 and 5/16 QPSK/OQPSK 1/2 and 3/4 8-PSK 3/4
Uncoded	BPSK, QPSK, OQPSK
Plesiochronous Buffer	1 to 99 ms, in 1 ms steps 32 to 262,144 bps, in 16 bit steps
Data Scrambling	IESS-308 (V.35 Intelsat), IESS-309/310, FDC, V.35 (EDF/CSC). Modified V.35, or None ± 0.02 PPM Optional: 1 PPM
Internal Stability	1.5, 10.20 MHz (10 MHz only with BUC)
External Reference Input	(75Ω 0 to 20 dBm on 50Ω BNC Female) CE Mark
Agency Approvals	

## MODULATION SPECIFICATIONS

Output Frequency	950 to 1750 MHz
Output Power	0 to -40 dBm
Output Stability	± 1.0 dB over temperature < -50 dBc, 5 to 2000 MHz < -50 dBc, 55 to 2000 MHz
Output Spurious in 4 kHz Band (measured with modulated carrier)	< -63 dBc/Hz @ 100 Hz < -73 dBc/Hz @ 1 kHz < -83 dBc/Hz @ 10 kHz < -93 dBc/Hz @ 100 kHz
Output Phase Noise	< -63 dBc/Hz @ 100 Hz < -73 dBc/Hz @ 1 kHz < -83 dBc/Hz @ 10 kHz < -93 dBc/Hz @ 100 kHz
Output Impedance, Return Loss	50Ω, ≥ 15 dB
Output Connector	Type N, Female
Output Spectrum	IESS-308/309/310, EFD Closed
Data Clock Source	Internal or External
Output Reference (center conductor of IF output connector)	On/Off, 10 MHz at 0 ± 3 dBm @ reference stability -80 dBc/Hz @ 1 Hz -110 dBc/Hz @ 10 Hz -135 dBc/Hz @ 100Hz -140 dBc/Hz @ 1 kHz -150 dBc/Hz @ 10 kHz -150 dBc/Hz @ 100 kHz
Outdoor Unit Voltage	On/Off 24 VDC, 4 amps, 100W 48 VDC, 3 amps, 180W
BUC FSK Communications	FSK Tx and Rx for M&C of the SierraCom 4 Herley BUC

## DEMODULATION SPECIFICATIONS

Input Frequency	950 to 1750 MHz in 100 Hz steps
Minimum Input Power (Desired Carrier)	+10 log (symbol rate) -135 dBm
AGC Range	50 dBc above minimum input level
Composite to Desired Carrier	+30 dBc, within 10 MHz of desired carrier +40 dBc, ≥ 64 ksym/s -5 dBm
Maximum Composite Level	-5 dBm
Input Impedance, Return Loss	75Ω, > 10 dB (L3), 50Ω, > 10 dB (L1)
Input Connector	Type F, Female (L3) <b>Note:</b> L2 version was Type N
Carrier Acquisition Range	± 500 kHz in 1 Hz steps
Acquisition Time	< 1 second at 64kbps 1/2 rate
Sweep Reacquisition	0 to 999 seconds, in 1 second steps
Buffer Clock	Internal, External, Transmit, Recovered Rx
LNB Voltage	On or Off +13 and +18 VDC per DISEqC 4.2 and 24 VDC at 500 mA, max.
LNB Frequency Reference	On or Off, 10 MHz, -3 ± 3 dBm @ reference stability

## ENVIRONMENTAL AND PHYSICAL

Prime Power, AC	90 to 264 VAC, 47 to 63 Hz
No BUC	60W max
100W BUC PS	170W max
180W BUC PS	270W max
Size	1.75H x 19.0W x 19.18D inch (1 RU) (4.4H x 48 W x 48 D cm)
Weight	< 15 lbs. (7 kg)
Operating Temperature	0 to 50°C (32 to 122°F)
Storage Temperature	-40° to +70°C (-40° to +158°F)
Humidity	< 95%, non-condensing

## AVAILABLE OPTIONS

How Enabled	Option
<b>FAST</b>	Variable data rate
<b>FAST</b>	OQPSK, 8-PSK or Both
<b>FAST</b>	Asymmetrical loop timing
<b>FAST</b>	Add Viterbi or Sequential decoder
<b>FAST</b>	2 x ADPCM Audio in 64 Kbps IBS (included with IBS or IDR)
<b>FAST + Card</b>	Concatenated Reed-Solomon Codec
<b>FAST + Card</b>	IBS / IDR / D&I (requires OH Card)
<b>FAST + Card</b>	ASYNC + AUPC with 50-pin D connector (requires OH Card)
<b>FAST + Card</b>	AUPC with no ASYNC (requires Reed-Solomon, no OH Card)
<b>FAST + Card</b>	G.703 interface (50-pin-D connector, requires UB530 or switch)
<b>FAST + Card</b>	G.703 interface with BNC & DB9 (requires OH Card), closed network Turbo Coding
<b>Hardware</b>	1 ppm internal stability (NOT for use with BUC)
<b>Hardware</b>	ODU PWR 48 VDC at 150W
<b>Hardware</b>	ODU PWR 24 VDC at 100W
<b>Hardware</b>	L-band Tx only or Rx Only or Duplex
<b>Hardware</b>	Rx Type F or Type N connector
<b>Hardware</b>	-48 VDC power supply (not available with ODU power supply)
<b>Hardware</b>	25-pin (F) D connector with EIA-530 (EIA-422), EIA-232, and V.35
<b>Hardware</b>	37-pin (F) D connector with EIA-530 (EIA-422), and MIL-188-141
<b>Hardware</b>	34-pin (F) V.35 "Winchester" connector with V.35
<b>Hardware</b>	50-pin (F) D connector for use <b>with overhead card</b> .
<b>Hardware</b>	50-pin (F) D connector for use <b>without overhead card</b> ( EIA-422, EIA-232, and V.35).

## REMOTE CONTROL SPECIFICATIONS

Serial Interface	EIA-232 or EIA-485 (2- or 4-wire)	
Signals Controlled/Monitored:		
Tx Frequency	Power Supply Voltages	IF Loopback (L-Band)
Tx Power	Plesiochronous Buffer	Raw Error Rate
Data Rate Select	Rx Frequency	Rx Signal Level
Scrambler On/Off	Tx On/Off	Fault Status
Rx Carrier Detect	Data Loopback	Error Threshold Alarm
Configuration Retention	Will maintain current configuration for at least one year without power	

## BER PERFORMANCE

BER	Eb/No (dB), Performance Viterbi				Data Rate	Eb/No (dB), Performance Sequential					
	BPSK, QPSK, OQPSK	8-PSK	1/2	3/4		7/8	2/3	1/2	3/4	7/8	
10 <sup>-5</sup>	5.3	6.4	7.6	---	100 kbps	10 <sup>-6</sup>	4.5	5.5	6.6		
10 <sup>-6</sup>	6.0	7.2	8.3	8.7		10 <sup>-8</sup>	5.4	6.4	7.8		
10 <sup>-7</sup>	6.6	7.9	8.9	9.5	1.544 Mbps	10 <sup>-6</sup>	5.6	6.1	6.9		
10 <sup>-8</sup>	7.2	8.5	9.6	10.2		10 <sup>-8</sup>	6.3	7.0	7.9		
BER	Eb/No (dB), Performance Reed-Solomon				BER	Eb/No (dB), Performance Turbo Coding					
	BPSK, QPSK, OQPSK	8-PSK	1/2	3/4		7/8	2/3	1/2	3/4	21/44	5/16
10 <sup>-6</sup>	4.1	5.6	6.7	6.1	10 <sup>-6</sup>	3.0	3.9	2.8	---	---	7.0
10 <sup>-7</sup>	4.2	5.8	6.9	6.4	10 <sup>-7</sup>	3.2	4.1	3.1	---	---	7.3
10 <sup>-8</sup>	4.4	6.0	7.1	6.6	10 <sup>-8</sup>	3.5	4.3	3.3	---	---	7.6
					10 <sup>-9</sup>	3.8	4.8	3.7	4.0	8.0	

## ESC SPECIFICATIONS

IBS:	ASYNC Data Orderwire	1/2000 x data rate
	Backward Alarm	Form C contacts
	Total Overhead	1/15 x data rate
IDR:	Voice Orderwire	2 ADPCM (input: 4-wireVF), or 64 kbps data
	Data Orderwire Backward Alarm	8 kbps (EIA-422 interface)
	Alarm	Form C contacts (4)
D&I:	Total Overhead	96 kbps
	Interface	G.703
	Data Rate	T1 or E1
	N x 64 bits	N=1, 2, 3, 4, 5, 6, 8, 10, 12, 15, 16, 20, 24, 30
		2.048 Mbps (E1_IBS)
		1.544 Mbps (T1_IBS)



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