SDM-300L

INTRODUCTION

The SDM-300L expands the closed network capabilities of SDM-300 series modems into L-Band frequencies. The SDM-300L is available in two versions:

- L1 Version: 70 / 140 MHz Transmit and L-Band Receive
- L2 Version: L-Band Transmit and L-Band Receive

The SDM-300L utilizes advanced technology and proprietary digital signal processing techniques. This design eliminates analog circuitry to perform modem signal processing, resulting in higher reliability and reduced packaging size.

MAIN FEATURES

- 19.2 kbit/s to 4.375 Mbit/s
- Fully Accessible System Topology (FAST)
- Closed Network Capability
- Automatic Uplink Power Control (AUPC)
- Asynchronous (Async) Channel Unit Overhead
- Reed-Solomon
- Fast Acquisition
- Built-In Self Test (with L-Band TX and RX only)
- OQPSK

APPLICATIONS

Fully configured, the SDM-300L meets or exceeds all closed network requirements and is available with a full range of industry standard digital interfaces.

COMPATIBILITY

Maintaining ComTech EFData's excellent history of modem compatibility, the SDM-300L is functionally compatible with many ComTech EFData modems. When configured properly, the SDM-300L will inter-operate with the following ComTech EFData modems:

- SDM-100
- SDM-100A
- SDM-300
- SDM-300A
- SDM-650B
- SDM-6000
- SDM-8000

COST EFFECTIVE

ComTech EFData's SDM-300L employs Fully Accessible System Topology (FAST). This technology provides a cost-effective approach to upgrading satellite modem configurations on site instead of returning the equipment to the factory. FAST is an exclusive and industry-first feature that eliminates the need to purchase options before they are needed. This makes feature selection easy and eliminates guesswork.

Purchase of an SDM-300L base modem includes the following features:

- BPSK and QPSK
- Either Viterbi or Sequential decoding (Customer-Selection)
- Single data rate
- TX IF range of 50 to 180 MHz or L-Band 950 to 1750 MHz
- RX IF range of 950 to 1750 MHz

Enhancing the SDM-300L's performance is easy and uncomplicated. When additional features are required, they are added quickly *on site.* using the FAST access code purchased from ComTech EFData. These features are enabled by entering this code at the front panel.

FEATURE ENHANCEMENTS

Base unit enhancements include:

- Changing from single rate to variable rate
- Extending the data rate from 512 kbit/s to 4.375 Mbit/s
- Both Viterbi and Sequential decoding
- OQPSK

Option card enhancements include:

- AUPC/ASYNC (automatic up link power control/asynchronous EIA-232 / 485 channel)
- Reed-Solomon concatenated codec

TEST AND MONITOR FEATURES

The SDM-300L has extensive test capability to aid installation, troubleshooting, and maintenance.

Features Include:

- Interface Loopback – at the modulator and demodulator data interface (bi-directional)
- Baseband Loopback – at the data interface (bi-directional)
- BER, E_b/N_o, Buffer Fill %
- IF Loopback (not available with 70/140 MHz Tx IF)

SDM-300L SPECIFICATIONS

SPECIFICATIONS (FULLY ENHANCED)

Digital Interface (Standard)	EIA-232, EIA-422, and V.35 (25-pin D)
Digital Data Rate	19.2 kbit/s to 4.375 Mbit/s, in 1 bit/s steps
Symbol Rate	10.9 ksym/s to 2.5 Msym/s
Modulation/Demodulation	BPSK 1/2 rate QPSK 1/2, 3/4, and 7/8 rates OQPSK 1/2, 3/4, and 7/8 rates
Plesiochronous Buffer	2 to 99 ms, in 2 ms steps 32 to 262,122 bit/s, in 16 bit steps
Forward Error Correction	Viterbi, K=7, 1/2, 3/4, and 7/8 rates Sequential 1/2, 3/4, and 7/8 rates Reed-Solomon
Data Scrambling	IESS-308 (V.35) or None
External Reference Input	1, 5, 10, 20 MHz
Agency Approvals	CE Mark

MODULATION SPECIFICATIONS

	70/140 MHz (L1 option)	L-Band (L2 option)
Output Frequency	50 to 90 and 100 to 180 MHz in 1 Hz steps	950 to 1750 MHz in 100 Hz steps
Output Power	(+5 to -20 dBm), in 0.1 dB steps	0 to -30 dBm, in 0.1 dB steps
Output Stability	± 0.5 dB	± 0.5 dB
Output Spurious in 4 KHz Band (measured with modulated carrier)	< -50 dBc, 20 to 500 MHz > 64 Kbit/s < -45 dBc, 20 to 500 MHz ≤ 64 Kbit/s	< -50 dBc, 55 to 2000 MHz
Output Phase Noise	<-66 dBc/Hz @100 Hz <-76 dBc/Hz @1 kHz <-86 dBc/Hz @10 kHz <-96 dBc/Hz @100 kHz <-96 dBc/Hz @ 1 MHz	<-63 dBc/Hz @100 Hz <-73 dBc/Hz @1 kHz <-83 dBc/Hz @10 kHz <-93 dBc/Hz @100 kHz
Output Impedance, Return Loss	75Ω, ≥ 20 dB	50Ω, ≥ 15 dB
Output Connector	BNC, Female	Type N, Female
Output Spectrum	IESS-308/309, EFD Closed	IESS-308/309, EFD Closed
Data Clock Source	Internal or External	Internal or External
Internal Stability	± 10 ppm	± 0.02 ppm
Outdoor Reference (center conductor of IF Output connector)	N/A	On or Off 10 MHz ± 0.02 ppm at 0 dBM, +3/-1 dB
Outdoor Unit Voltage (center conductor of IF Output connector)	N/A	On or Off (See Optional LNB Power Supply)

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 dB above minimum input level
Composite to Desired Carrier	+40 dBc, composite is AWGN over ± 10 MHz
Maximum Composite Level	-5 dBm
Input Impedance, Return Loss	75Ω, ≥ 10 dB
Input Connector	Type N, Female (50Ω mechanical)
Carrier Acquisition Range	0 to 75 kHz in 100 Hz steps
Acquisition Time	<1 second at 64kbits/s 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	Same as Modulator Outdoor Frequency Reference.

ENVIRONMENTAL AND PHYSICAL SPECIFICATIONS

Prime Power	90 to 264 VAC, 47 to 63 Hz
Size	1.75H x 19W x 19.18D inch (1 RU) (4.4H x 48.26W x 48.72D cm)
Weight	12 lb. Maximum (5 kg)
Operating Temperature	0 to 50°C (32 to 122°F)
Humidity	Up to 95%, non-condensing

REMOTE CONTROL SPECIFICATIONS

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

AVAILABLE OPTIONS

How Enabled	Option
FAST	Variable Data Rate
FAST	Add Viterbi or Sequential Decoder
FAST	OQPSK
FAST	Asymmetrical Loop Timing
FAST + Card	G.703 Interface
FAST + Card	Concatenated Reed-Solomon Codec
FAST + Card	Asynchronous Overhead (Async/AUPC), with 50-pin D Connector
FAST + Card	BUC communications (future)
Hardware	ODU Power Supply ≤ 3 amps at TBD VDC (L-Band TX IF option only)
Hardware	± 0.02 ppm Internal Stability (70/140 MHz TX IF option)
Hardware	± 0.02 ppm LNB Reference (70/140 MHz TX IF option)
Hardware	50Ω IF (70/140 MHz TX IF option)
Hardware	-48 VDC Power Supply (Not available with ODU Power Supply)
Hardware	Rx (demodulator) Only
Hardware	Rx (demodulator) Only with 0.02 ppm internal stability
Hardware	70/140 MHz TX IF
Hardware	L-Band TX-IF
Hardware	25-Pin Female D Connector with EIA-530 (EIA-422), EIA-232 and V.35
Hardware	37-Pin Female D Connector with EIA-530 (EIA-422) and MIL-188-114
Hardware	34-Pin Female V.35 "Winchester" Connector with V.35
Hardware	50-Pin Female D Connector for use Without Overhead card. Inlcudes EIA-422, EIA-232, and V.35

BER PERFORMANCE

TYPICAL E_B/N_0, PERFORMANCE, SEQUENTIAL DECODER

BPSK (1/2 Only), QPSK and OQPSK

Data Rate	BER	1/2	3/4	7/8
100 kbit/s	10^{-5}	4.2 dB	5.2 dB	6.3 dB
	10^{-7}	5.1 dB	6.1 dB	7.5 dB
1.544 Mbit/s	10^{-5}	5.3 dB	5.8 dB	6.6 dB
	10^{-7}	6.0 dB	6.7 dB	7.6 dB

TYPICAL E_B/N_0 PERFORMANCE, VITERBI DECODER

BPSK (1/2 Only), QPSK And OQPSK

BER	1/2	3/4	7/8
10^{-5}	4.8 dB	5.9 dB	7.0dB
10^{-6}	5.4 dB	6.6dB	7.8dB
10^{-7}	6.0 dB	7.2dB	8.4dB
10^{-8}	6.5 dB	8.0dB	9.2dB

TYPICAL E_B/N_0 PERFORMANCE, CONCATENATED REED-SOLOMON CODES

BPSK (1/2 Only), QPSK and OQPSK

BER	1/2	3/4	7/8
10^{-6}	3.6 dB	4.6 dB	6.0 dB
10^{-7}	3.7 dB	4.8 dB	6.2 dB
10^{-8}	3.9 dB	5.0 dB	6.4 dB

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ComTech EFData products are manufactured under a quality system certified to ISO 9001.

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