SDM-300A

Satellite Modem

COMTECH EF DATA

TURBO

MODEMS

SDM-300A

FEATURES

- 2.4 kbps to 5 Mbps
- Fully Accessible System Topology (FAST)
- Intermediate Data Rate (IDR)
- INTELSAT Business Services (IBS)
- Drop and Insert (D&I)
- Automatic Uplink Power Control (AUPC)
- Asynchronous Channel Unit Overhead
- Turbo Product Codec (Option)
- Reed-Solomon
- Built-In Self Test
- Burst Mode Operation

APPLICATIONS

Fully configured, the SDM-300A will meet or exceed all of the applicable requirements in IESS-308, 309, and 310 and is available with a full range of industry standard digital interfaces.

COMPATIBILITY

Maintaining Comtech EF Data's excellent history of modem compatibility, the SDM-300A is a direct replacement for many Comtech EF Data modems. When configured properly, the SDM-300A can be installed to communicate with or replace the following Comtech EF Data modems:

- SDM-100
- SDM-300
- SDM-309B
- SDM-650B
- SDM-308B
- SDM-6000
- CDM-600 (Open Network w/Turbo)

COST EFFECTIVE

Comtech EF Data's SDM-300A 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-300A base modem includes the following features:

- BPSK and QPSK
- Viterbi or Sequential decoding
- Variable data rate to 512 kbps
- IF range from 50 to 180 MHz (1 Hz steps)

FEATURE ENHANCEMENTS

Enhancing the SDM-300A's performance is easy. Some features are added quickly on site, using the FAST access code purchased from Comtech EF Data, other features may require an overhead card. To enable FAST features, simply enter the code at the front panel. Unit enhancements include:

- Variable Data Rate to 5 Mbps
- Viterbi and Sequential Decoding
- 8PSK
- Turbo Product Codec
- Reed-Solomon (R-S) Codec
- Duplex R-S Codec (for R-S and Turbo in the same unit)
- IDR / IBS / D&I / AUPC / ASYNC
- I/O Connector (25-, 50-, 34-, 37-, 100-pin)
- Asymmetrical Loop Timing
- G.703 Interface with DB-9 and BUC
- 2 x ADPCM Voice in 64 kbps IBS Frame
- 4 or 8 Channel Mux
- Flex Mux

BUILT-IN SELF TEST

Comtech EF Data's unique built-in self test feature allows the SDM-300A 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
- Establishes modem confidence
- Eliminates BER test equipment

When commanded to the self test mode through the front panel or remote port, the SDM-300A disables the Tx and Rx IF ports and internally tests modulator, demodulator, and interface functions by means of a BER measurement. The BER measurement is achieved via an internal IF noise generator and BER test equipment built into the SDM-300A.

REDUNDANCY

The SDM-300A redundancy is supported by the SMS-301 (1:1) and SMS-7000 (2:8) switches.

SDM-300A Satellite Modem

COMTECH EF DATA

SYSTEM SPECIFICATIONS (FULLY ENHANCED)

Operating Frequency Range	50 to 180 MHz, in 1 Hz steps
Digital Interface (Standard)	EIA-232, EIA-422, and V./35 (25-pin D)
Digital Data Rate	2.4 kbps to 5 Mbps, in 1 bit/s steps
Symbol Rate	4.8 kbps to 2.5 Mbps
Modulation and Coding	
Viterbi (K=7)	BPSK 1/2 QPSK / OQPSK 1/2, 3/4, 7/8 8PSK 2/3 TCM
Sequential	BPSK 1/2 QPSK / OQPSK 1/2, 3/4, 7/8
Concatenated Viterbi and Reed-Solomon	BPSK 1/2 QPSK / OQPSK 1/2, 3/4, 7/8 8PSK 2/3 TCM
Turbo	BPSK 21/44, 5/16 QPSK / OQPSK 3/4 8PSK 3/4
Uncoded	BPSK, QPSK, OQPSK
Plesiochronous Buffer	2 to 99 ms, in 2 ms steps 32 to 262,122 bps, in 16 bit steps
Data Scrambling	IESS-308 (V.35), IESS-309, IESS-310, or None
External Reference Input	1, 5, 10, or 20 MHz
Agency Approvals	CE Mark

MODULATION SPECIFICATIONS

Output Power	-5 to -30 dBm, adjustable in 0.1 dB steps Optional: +5 to –20 dBm, high-power output
Output Spurious	< -55 dBc, 0 to 500 MHz (4 kHz band)
Output Frequency Stability	± 10 PPM
Output Return Loss	> 20 dB
Output Impedance	75Ω (Optional: 50 Ω)
Data Clock Source	Internal or External

DEMODULATION SPECIFICATIONS

Input Power:	
Desired Carrier	-30 to –55 dBm
Maximum Composite	-5 dBm to +40 dBc
Input Impedance	75Ω (Optional: 50 Ω)
Input Return Loss	> 20 dB
Carrier Acquisition Range	± 35 kHz from 100 Hz to 35 kHz
Acquisition Time	< 1 second for 64 kbps 1/2 rate
Clock Acquisition Range	± 100 PPM
AGC Output	0 to 10 V at 10 mA maximum

ENVIRONMENTAL AND PHYSICAL

Prime Power, AC	90 to 264 VAC, 47 to 63 Hz, 30W 38 to 64 VDC, 40W
Size	1.75H x 19.0W x 15.7D inch (1 RU) (4.4H x 48 W x 40 D cm)
Weight	< 11 lbs. (4.9 kg)
Temperature	0 to 50°C (32° to 122°F) Operating -40° to +70°C (-40° to +158°F) Storage
Humidity	< 0 to 95%, non-condensing

BURST MODE SPECIFICATIONS

Operating IF Range	50 to 180 MHz, in 1 Hz steps
Type of demodulation	QPSK
Operating Channel Spacing	< 0.5 dB degradation operating with 2 adjacent-like channels, each 10 dB higher at 1.3 times the symbol rate, or a minimum of 1.2 times the specified acquisition range.
Carrier Acquisition Range	± 4kHz at E_b/N_0 = 8 dB, 99% prob.
Digital Data Rate, QPSK, R=1/2	19.2 kbps
Forward Error Correction	Convolutional encoding with soft-decision, K=7 Viterbi decoding
Data Descrambling	Selectable or none, 2^{15-1}, Synchronous

AVAILABLE OPTIONS

How Enabled	Option
FAST	Variable data rate
FAST	Add Viterbi or Sequential decoder
FAST	8PSK
FAST	Asymmetrical loop timing
FAST + Card	IBS / IDR / D&I (requires Overhead card)
FAST + Card	2XADPCM Voice (included with IBS or IDR)
FAST + Card	G.703 interface (50-pin D connector, requires UB530 BCP)
FAST + Card	G.703 interface (PL/7838 interfaces module option, BNC)
FAST + Card	Reed-Solomon (R-S) Codec
FAST + Card	Duplex R-S Codec (Suitable with Turbo Codec)
Card	Turbo Product Codec
FAST + Card	AUPC only (requires Tx & Rx bds)
FAST + Card	Asynchronous overhead (ASYNC/AUPC) w/50-pin D connector
Hardware	50Ω IF
Hardware	High output power to +5 dBm
Hardware	2- to 8-channel multiplexer
Hardware	Flex Mux
Hardware	-48 VDC power supply
Hardware	2 x 10^{-7} internal stability for IF and data clock
Hardware	25-pin (F) D connector with EIA-530 (EIA-422), EIA-232, & V.35
Hardware	50-pin (F) D connector for use **with overhead card**
Hardware	50-pin (F) D connector for use **without overhead card** Includes EIA-422, EIA-232, & V.35
Hardware	34-pin (F) V.35 'Winchester' connector with V.35

BER PERFORMANCE (E_b/N_0, dB)

Viterbi

BER	1/2	3/4	7/8
10^{-3}	3.8	4.9	6.1
10^{-4}	4.6	5.7	6.9
10^{-5}	5.3	6.4	7.6
10^{-6}	6.0	7.2	8.3
10^{-7}	6.6	7.9	8.9
10^{-8}	7.2	8.5	9.6

Viterbi & Reed-Solomon

BER	1/2	3/4	7/8
10^{-6}	4.1	5.6	6.7
10^{-7}	4.2	5.8	6.9
10^{-8}	4.4	6.0	7.1
10^{-10}	5.0	6.3	7.5

56 kbps, Sequential

BER	1/2	3/4	7/8
10^{-3}		4.6	5.5
10^{-4}	4.1	5.1	6.1
10^{-5}	4.5	5.5	6.6
10^{-6}	5.0	5.9	7.3
10^{-7}	5.4	6.4	7.8
10^{-8}	5.8	6.8	8.4

1544 kbps Sequential

BER	1/2	3/4	7/8
10^{-3}	4.8	5.2	6.0
10^{-4}	5.2	5.7	6.4
10^{-5}	5.6	6.1	6.9
10^{-6}	5.9	6.5	7.4
10^{-7}	6.3	7.0	7.9
10^{-8}	6.7	7.4	8.4

1544 kbps, Sequential & RS

BER	1/2	3/4	7/8
10^{-6}	4.1	5.6	6.7
10^{-7}	4.2	5.8	6.9
10^{-8}	4.4	6.0	7.1
10^{-10}	5.0	6.3	7.5

8PSK with/without RS

BER	2/3 w/o RS	2/3 with RS
10^{-6}	8.7	6.1
10^{-7}	9.5	6.4
10^{-8}	10.2	6.6
10^{-9}	11	6.9
10^{-10}	11.8	7.2

Viterbi, OQPSK

BER	1/2	3/4	7/8
10^{-3}	4.1	5.2	6.4
10^{-4}	4.9	6.0	7.2
10^{-5}	5.6	6.7	7.9
10^{-6}	6.3	7.5	8.6
10^{-7}	6.9	8.2	9.2
10^{-8}	7.5	8.8	9.9

Uncoded, BPSK, QPSK, OQPSK

BER	1/1
10^{-3}	8.0
10^{-4}	9.6
10^{-5}	10.8
10^{-6}	11.6
10^{-7}	12.4

Turbo Product Codec

	QPSK	BPSK		8PSK
BER	3/4	21/44	5/16	3/4
10^{-6}	3.9	2.8	-	7.0
10^{-7}	4.1	3.1	-	7.3
10^{-8}	4.3	3.3	-	7.6
10^{-9}	4.8	3.7	4.0	8.0

SATCOM SERVICES
www.satcom-services.com

Mike Termondt
mike@satcom-services.com
Phone: 1.805.649.1384
Fax: 1.805.649.1174