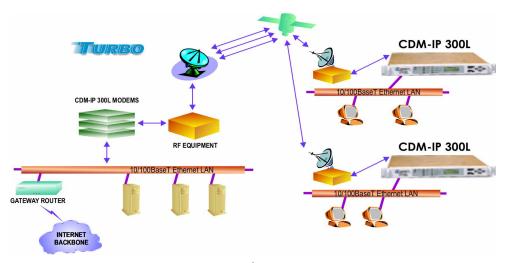# CDM-IP 300L Satellite IP Modem

INTRODUCTION

Comtech EF Data's family of CDM-IP (Internet Protocol) satellite modems are ideal for Point-to-Point and Point-to-Multi-Point applications. Using CDM-IP modems, WAN framing over the satellite becomes extremely efficient. CDM-IP modems feature innovative architecture and IP networking support. These IP-enabled modems fit many customer requirements for performance and functionality.

CDM-IP modems include Viterbi Forward Error Correction as a standard feature, with Turbo Product Codec (TPC) available as an option. The data rate range is from 2.4 to 5.0 Mbps in 1 bit per second steps.

The CDM-IP 300L provides an L-band interface and integrated IP support. Well suited for remote locations, the CDM-IP 300L is a low-cost, high-performance, single-channel terminal ready to support Internet access, Intranet, e-Commerce, and similar services.

KEY STANDARD FEATURES

- 10/100BaseTx Ethernet interface
- easyConnect® allows the CDM-IP 300L to be set up with minimal configuration and supports non-IP traffic
- Static IP routing for unicast and multicast
- Powerful network management via SNMP, Web, or Telnet
- Remote software / firmware upgrade
- L-Band IF with FSK Communication to FSK-capable BUCs
- Data rates from 2.4 kbps to 5.0 Mbps
- IGMP v1 and v2
- Symmetric as well as asymmetric operation for maximum bandwidth efficiency
- Point-to-Point or Point-to-Multi-Point configuration

FEATURE ENHANCEMENTS

Enhancing the CDM-IP 300L's capability is easy. Additional features can be added quickly on site, using the FAST access code purchased from Comtech EF Data, or via software/firmware upgrade through FTP.

OPTIONAL FEATURES

- Header Compression (IP/TCP and IP/UDP/RTP)
- Payload Compression
- Quality of Service (QoS)
- 3x DES Data Encryption

Header Compression

Configurable on a per route basis, header compression reduces the required Voice over Internet Protocol (VoIP) bandwidth by 60%. Example: A G.729 voice codec, operating at 8 kbps, will occupy 32 kbps once encapsulated into IP framing on a LAN. Using IP/UDP/RTP Header Compression, the same traffic only needs 10.8 kbps total WAN satellite bandwidth to cross the link. Normal Web/HTTP traffic can be reduced an additional 10% via IP/TCP header compression.

Payload Compression

Compressing payload condenses the size of data frames and reduces the satellite bandwidth required to transmit across the link. Configurable on a per route basis, Payload Compression provides traffic optimization in excess of 40%.

Quality Of Service (QoS)

Supports multi-level QoS that minimizes jitter and latency for real time traffic, provides priority treatment to mission critical applications and allows non-critical traffic to use the remaining bandwidth. Three modes are available, Max/Priority, Min/Max and DiffServ.

- Max/Priority - Assign a maximum bandwidth that any traffic flow can utilize combined with 8 levels of prioritization
- Min/Max - Set the minimum and maximum bandwidth for user-defined classes of traffic to ensure that a certain level of bandwidth is always applied
- DiffServ – Provide higher priority to some applications over others; Industry-standard method of adding network-wide QoS enabling seamless co-existence in networks that already have DiffServ deployed

Data Encryption

The CDM-IP 300L provides 3xDES data encryption to prevent unauthorized access to data over the satellite link, and is configurable on a per route basis.

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CDM-IP 300L   Satellite IP Modem

SYSTEM SPECIFICATIONS (FULLY ENHANCED)

Data Interface	10/100BaseTX Ethernet (RJ-45 connector)
Digital Data Rate	2.4 kbps to 5.0 Mbps, in 1 bit/s steps
Symbol Rate	10.9 ksym/s to 2.5 Msps
WAN Encapsulation	HDLC

Data Rate Range

Rate 1/2 BPSK	2.4 to 1024 kbps
Rate 1/2 QPSK/OQPSK	4.8 to 2048 kbps
Rate 3/4 QPSK/OQPSK	7.2 to 3750 kbps
Rate 7/8 QPSK/OQPSK	8.4 to 4375 kbps
Rate 21/44 BPSK Turbo	2.4 to 1193 kbps
Rate 5/16 BPSK Turbo	2.4 to 781.25 kbps
Rate 1/2 QPSK/OQPSK Turbo	4.8 to 2386 kbps
Rate 3/4 QPSK/OQPSK Turbo	7.2 to 3750 kbps
Rate 3/4 8PSK Turbo	7.2 to 3750 kbps
(Fully Independent Tx and Rx rates)	
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
	Turbo 5/16, 21/44, 1/2, 3/4 *(see BER tables)*
Data Scrambling	IESS-308 (V.35), IESS-309/310, or None
External Reference Input	1, 5, 10, or 20 MHz (10 MHz only with BUC)
Agency Approvals	CE Mark

NETWORKING PROTOCOLS

RFC 768 – UDP	RFC 2045 – MIME
RFC 791 – IP	RFC 2236 - IGMP v2
RFC 792 – ICMP	RFC 2474 – Diffserv
RFC 793 – TCP	RFC 2475 – Diffserv
RFC 826 – ARP	RFC 2578 – SMI
RFC 856 – Telnet	RFC 2597 - AF PHB
RFC 862 – Ping	RFC 2598 - Expedite Forwarding
RFC 894 – IP	RFC 2616 – HTTP
RFC 959 – FTP	RFC 2821 – SMTP
RFC 1112 - IP Multicast	RFC 3412 – SNMP
RFC 1213 - SNMP MIB II	RFC 3416 - SNMPv2
RFC 1812 - IPv4 Routers	RFC 3418 - SNMP MIB

OPERATIONS & MAINTENANCE

Configuration & Management
    Console interface
    SNMP with Private Modem Specific MIB
    Telnet
    Web Interface
Remote software / firmware (IP Module) upgrade via FTP
Local software / firmware (modem board) upgrade via console port
Traffic management statistics
Faults & alarms
Configuration backup & restoral

SECURITY

Password Protection	Access List

CONSOLE PORT

Interface	EIA-232 (RJ-12 connector)

REMOTE PORT

Interface	EIA-232 or EIA-485 (2- or 4-wire)

MODULATOR

Output Frequency	950 to 1750 MHz, in 100 Hz steps
Output Power	0 to –30 dBm, in 0.5 dB steps
Output Stability	± 0.5 dB
Output Spurious in 4 kHz Band	< –50 dBc
(measured with modulated carrier)	55 to 2000 MHz
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, EFD Closed
Internal Stability	± 0.02 ppm standard, required with BUC
Internal Stability (Optional)	± 1.0 ppm (Not for use with BUC)
Output Reference	On/Off, 10 MHz at Internal Stability
(center conductor of IF output connector)	at 0 ± 3 dBm
Outdoor Unit Voltage	On/Off
(center conductor of IF output connector)	(See Optional ODU Power Supply)
BUC FSK Communications	Control and constant EIRP with FSK enabled BUCs (Future)

DEMODULATOR

Input Frequency	950 to 1750 MHz in 100 Hz steps
Minimum Input Power	+10 log (symbol rate) -135 dBm
(Desired Carrier)	
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	75 Ω, > 10 dB, (Optional 50 Ω, > 10 dB)
Input Connector	Type F, Female (Optional Type N)
Carrier Acquisition Range	± 500 kHz in 1Hz steps
Acquisition Time	<1 second at 64kbits/s 1/2 rate
Sweep Reacquisition	0 to 999 seconds, in 1 second steps
LNB Voltage	On or Off
	+13 and +18 VDC per DiSEqC 4.2 and
	24 VDC at 500 mA, max.
LNB Frequency Reference	10 MHz at internal reference stability at -3 ± 3 dBm

OPTIONS

Header Compression
Payload Compression
Quality of Service (QoS) – 3 modes
3x DES Data Encryption
Low Data Rate (up to 512 kbps)
8PSK
AUPC
OQPSK
Turbo Codec
Variable Data Rate
Concatenated Reed-Solomon Codec
1 ppm Internal Stability (Not for use with BUC)
Rx Connector Type F or Type N
-48 VDC power supply (not available with ODU power supply)
ODU power supply 48 VDC at 180 W
ODU power supply 24 VDC at 100 W
LNB types: internally referenced or externally

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	< 12 lbs. (5 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

BER PERFORMANCE Eb/No (dB)

VITERBI

	BPSK, QPSK & OQPSK			8PSK
BER	1/2	3/4	7/8	2/3
10⁻⁵	5.3	6.4	7.6	---
10⁻⁶	6.0	7.2	8.3	8.7
10⁻⁷	6.6	7.9	8.9	9.5
10⁻⁸	7.2	8.5	9.6	10.2

$$BER: 10^{-5}, 10^{-6}, 10^{-7}, 10^{-8}$$

SEQUENTIAL

Data Rate	BER	BPSK (1/2 Only), QPSK		
		1/2	3/4	7/8
100 kbps	10⁻⁶	4.5	5.5	6.6
	10⁻⁸	5.4	6.4	7.8
1.544 Mbps	10⁻⁶	5.6	6.1	6.9
	10⁻⁸	6.3	7.0	7.9

CONCATENATED REED-SOLOMON

	BPSK, QPSK & OQPSK			8PSK
BER	1/2	3/4	7/8	2/3
10⁻⁶	4.1	5.6	6.7	6.1
10⁻⁷	4.2	5.8	6.9	6.4
10⁻⁸	4.4	6.0	7.1	6.6

TURBO CODING

	QPSK		BPSK		8PSK
BER	1/2	3/4	21/44	5/16	3/4
10⁻⁶	3.0	3.9	2.8	---	7.0
10⁻⁷	3.2	4.1	3.1	---	7.3
10⁻⁸	3.5	4.3	3.3	---	7.6
10⁻⁹	3.8	4.8	3.7	4.0	8.0

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