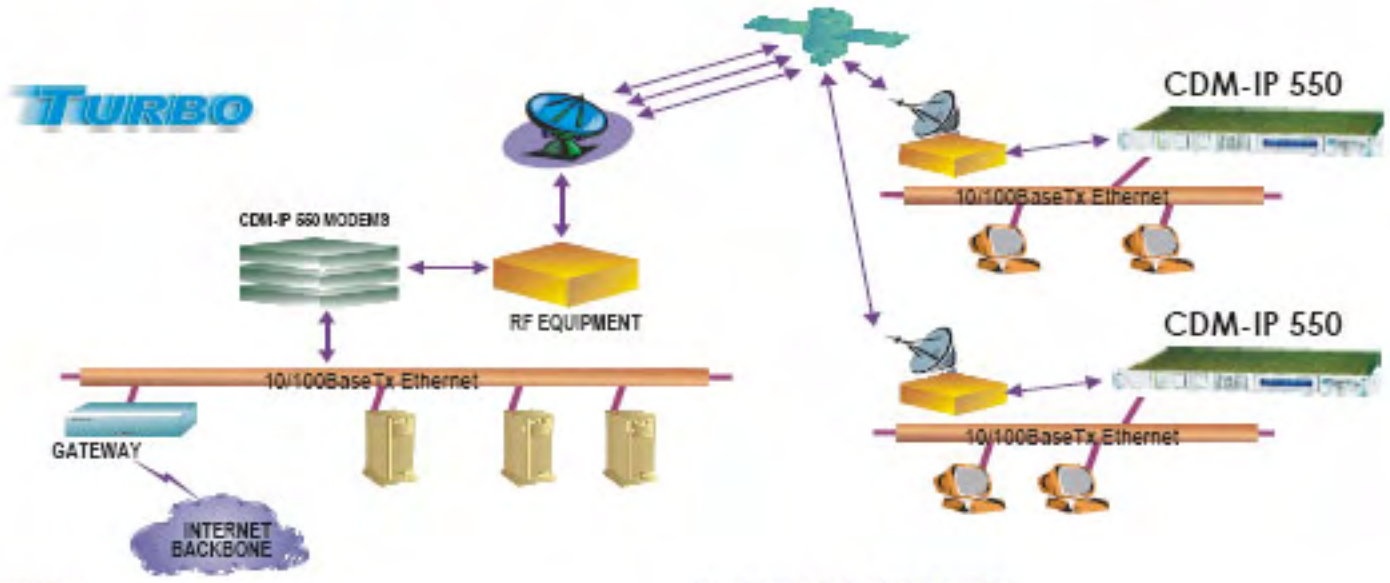
CDM-IP 550

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 2.048 Mbps in 1 bit per second steps.

KEY STANDARD FEATURES

- 10/100BaseTx Ethernet interface
- easyConnect™ allows the CDM-IP 550 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
- Data rates from 2.4 to 2.048 Mbps
- IGMP v1 and v2
- Symmetric as well as asymmetric operation for maximum bandwidth efficiency
- Point-to-Point or Point-to-Multi-Point configuration

CDM-550 EMULATION MODE

The CDM-IP 550 can be made to operate in CDM-550 emulation mode, where it behaves exactly like the Comtech EF Data CDM-550 satellite modem, plus having modem management using SNMP, HTTP, and TELNET.

FEATURE ENHANCEMENTS

Enhancing the CDM-IP 550'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.

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OPTIONAL FEATURES

- Header Compression (IP/TCP and IP/UDP/RTP)
- Payload Compression
- Quality of Service (QoS)
- 3x DES Data Encryption
- 1:1 Redundancy with CRS-100

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 550 provides 3xDES data encryption to prevent unauthorized access to data over the satellite link, and is configurable on a per route basis.

1:1 Redundancy

The CDM-IP 550 supports 1:1 redundancy in conjunction with the CRS-100 IF Switch.

IP PRODUCTS

CDM-IP 550

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CDM-IP 550 Satellite IP Modem

SYSTEM SPECIFICATIONS (FULLY ENHANCED)

Frequency Range	52 to 88 MHz 104 to 176 MHz (option)
Input/Output Impedance	50 and 75 Ohms (Front panel selectable)
IF Connector	BNC, female
Data Interface	10/100BaseTx Ethernet (RJ-45 connector) DB25 female, providing: *(CDM-550 mode only)* EIA422/EIA530 DCE V.35 DCE X.21 DCE and DTE Sync / Async EIA232
WAN Encapsulation	HDLC [1]
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 2048 kbps
Rate 7/8 QPSK/OQPSK	8.4 to 2048 kbps
Rate 21/44 BPSK Turbo	2.4 to 1145 kbps
Rate 5/16 BPSK Turbo	2.4 to 750 kbps
Rate 1/2 QPSK Turbo	4.8 to 2048 kbps
(Fully Independent Tx and Rx rates)	
Scrambler	ITU V.35 self synchronizing Externally synchronized (synchronous) per IESS-308
Forward Error Correction	
Viterbi	Rate 1/2, 3/4, or 7/8
Turbo	Rate 1/2, 3/4 QPSK
Turbo	Rate 5/16 or 21/44 BPSK
Overhead Framed	5% overhead (Except Turbo BPSK modes, which add 1.5%)
EDMAC/AUPC	
AUPC	Target Eb/No Range: 0 to 9.9 dB Max AUPC Range: 0 to 9 dB
Monitor Functions	Distant end Eb/No Tx power level increase

NETWORKING PROTOCOLS [1]

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 [2]

Configuration & Management
- Console interface
- SNMP with private, modem-specific MIB
- Telnet
- HTTP

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
1:1 Redundancy (optional) using external IF switch

SECURITY [1]

Password Protection
Access List

CONSOLE PORT [1]

Interface	EIA-232 (RJ-12 connector)

REMOTE PORT

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

[1] Not available in CDM-550 mode

[2] Some features are not available in CDM-550 mode

MODULATOR

Transmit Filtering	6th order Butterworth, per IESS 308
Frequency Stability	± 1.5 ppm, 0 to 50° C
Harmonics and Spurious	< -55 dBc/4 kHz
Transmit On/Off Ratio	55 dB minimum
Phase Noise	< 0.24° rms double-sided (100 Hz to 1 MHz)
Output Power	0 to -20 dBm, 0.1dB steps
Accuracy	± 0.5 dB over frequency and temperature
Clocking Options	Internal (± 1.5 ppm) External (± 100 ppm tracking range) Loop timing (Rx sat clock)
Asymmetric Loop Timing	Master / Slave clock relationships Tx ⇔ Rx data rate No step size limitation

DEMODULATOR

Input Range	-30 to -60 dBm
Max Composite Level	-35 dBc up to a max of -5 dBm
Acquisition Range	± 1 to ± 30 kHz (1 kHz steps)
Acquisition Time	Depends on data rate, FEC rate and acquisition range
Example:	At 512 kbps, R1/2 QPSK, ± 30 kHz sweep acquisition time = 0.25 seconds, average

OPTIONS

Header Compression
Payload Compression
Quality of Service (QoS) – 3 modes
3x DES Data Encryption
1:1 Redundancy (with CRS-100)
Low Data Rate (up to 512 kbps)
Turbo Codec

ENVIRONMENTAL AND PHYSICAL

Temperature	Operating: 0 to 50°C Storage: -25 to 70°C
Power Supply	100 to 240 volts AC, 50/60 Hz
Power Consumption	22 W typical, 30 W maximum
Physical Dimensions	1U high, 12" (305 mm) deep
Weight	7 lbs (3.2 kg)
CE Approvals	EN55022 Class B (Emissions) EN50082-1 Part 1 (Immunity) EN60950 (Safety)
FCC Approval	FCC Part 15 Class B

BER PERFORMANCE

(Met with two adjacent carriers 7 dB higher)
Guaranteed Eb/No, in dB (Typical values in parentheses)

Viterbi	1/2	3/4	7/8	
10^{-5}	5.4 (4.9)	6.6 (6.3)	7.7 (7.2)	
10^{-6}	6.0 (5.5)	7.4 (6.9)	8.4 (7.9)	
10^{-7}	6.7 (6.2)	8.2 (7.7)	9.0 (8.6)	
Sequential (64 kbps)	**1/2**	**3/4**	**7/8**	
10^{-5}	4.8 (4.2)	5.8 (5.3)	7.0 (6.6)	
10^{-6}	5.2 (4.5)	6.4 (5.8)	7.5 (7.2)	
10^{-7}	5.6 (4.8)	6.9 (6.3)	8.0 (7.7)	
Turbo Product Codec	**1/2 Q**	**3/4 (Q)**	**21/44 (B)**	**5/16 (B)**
10^{-6}	2.9 (2.6)	3.9 (3.5)	2.8 (2.5)	2.3 (2.0)
10^{-7}	3.1 (2.7)	4.1 (3.7)	3.1 (2.8)	2.6 (2.3)
10^{-8}	3.3 (2.8)	4.3 (4.0)	3.3 (3.0)	2.8 (2.5)

Receive Buffer	Selectable up to 8192 bits
Monitor Functions	Eb/No, Frequency Offset, BER, Buffer fill status, coarse AGC value

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