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SATELLITE MODEMS
CDM-570A/L-IPEN
SATELLITE MODEMS

Overview

The CDM-570A-IPEN and the CDM-570AL-IPEN are our next generation IP-centric satellite modems with data encryption that provide industry-leading performance and flexibility in a 1 RU package at a very competitive price. With their innovative architecture and support for advanced capabilities including VersaFEC-2 high performance LDPC, VersaFEC® low latency LDPC Forward Error Correction (FEC), the revolutionary DoubleTalk® Carrier-in-Carrier® bandwidth compression, and optimized transmit filter rolloffs, the CDM-570A-IPEN and CDM-570AL-IPEN allow for efficient IP networking and transport over satellite links while supporting a wide range of applications and network topologies.

This combination of advanced technologies enables multi-dimensional optimization, allowing satellite communications users to:

- Minimize operating expenses (OPEX)
- Maximize throughput without using additional transponder resources
- Maximize availability (margin) without using additional transponder resources
- Minimize capital expenses (CAPEX) by allowing a smaller BUC/amplifier and/or antenna
- Or, a combination to meet specific business needs

Typical Users

- Enterprise
- Offshore & Maritime
- Mobile Network Operators
- Satellite Service Providers
- Internet Service Providers

Common Applications

- Enterprise Networks
- Offshore & Maritime Communications
- Mobile Backhaul
- Communications on-the-Move
- Disaster Recovery & Emergency Communications
- Satellite News Gathering

The modems are available with 70/140 MHz or L-Band IF. In addition to the 10/100Base-T Ethernet traffic interface, CDM-570A/L-IPEN include serial and G.703 data interfaces to support legacy applications and assist in migrating from legacy to IP transport.

Features

- 3xDES Encryption for transport security
- Integrated high performance Packet processor with 10/100Base-T Ethernet traffic port
- Static IP routing for unicast and multicast
- Advanced Quality of Service (QoS)
- Header and payload compression for maximum efficiency
- IGMP v1 and v2
- VLAN capability with 802.1Q compliant QoS
- Support for mesh, star and hybrid network topologies
- Vipersat Management System (VMS) integration
- DoubleTalk Carrier-in-Carrier bandwidth compression with Automatic Power Control (CnC-APC)
- VersaFEC-2 High Performance LDPC
- VersaFEC low latency LDPC
- VersaFEC-2 and VersaFEC Adaptive Coding & Modulation (ACM) for point-to-point IP Circuits
- Optimized Transmit Filter Rolloff: 5%, 10%, 15%, 20%, 25% and 35%
- Data rate range from 2.4 kbps to 10.239 Mbps
- CDM-570A-IPEN: 50 to 90 or 100 to 180 MHz IF range
- CDM-570AL-IPEN: 950 to 2250 MHz IF range
- Modulation types: BPSK, QPSK, OQPSK, 8PSK/8-QAM/8-ARY, 16-QAM/16-ARY, 32-ARY
- Forward Error Correction (FEC) choices include VersaFEC-2, VersaFEC, Turbo Product Code (TPC), Viterbi, Reed-Solomon, and Trellis Coded Modulation (TCM)
- Management port: 10/100Base-T Ethernet
- Standards based management via SNMP, Web, or Telnet
- Automatic Uplink Power Control (AUPC)
- Embedded Distant-end Monitor and Control (EDMAC/EDMAC2)
- CarrierID using Comtech EF Data's MetaCarrier® spread spectrum technology
- 1:1 Redundancy options
- CDM-570A-IPEN: FSK communications to CSAT-5060 or KST-2000A
- CDM-570AL-IPEN: 10 MHz reference for BUC, FSK communications and optional BUC power supply
- CDM-570AL-IPEN: 10 MHz reference and power supply for LNB

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Doubletalk Carrier-in-Carrier

DoubleTalk Carrier-in-Carrier, based on patented “Adaptive Cancellation” technology, allows transmit and receive carriers of a duplex link to share the same transponder bandwidth. DoubleTalk Carrier-in-Carrier is complementary to all advances in modem technology, including advanced FEC and modulation techniques. As these technologies approach theoretical limits of power and bandwidth efficiencies, DoubleTalk Carrier-in-Carrier utilizing advanced signal processing techniques provides a new dimension in bandwidth efficiency.

Figure 1 shows the typical full-duplex satellite link, where the two carriers are adjacent to each other.

Figure 2 shows the typical DoubleTalk Carrier-in-Carrier operation, where the two carriers are overlapping, thus sharing the same spectrum.

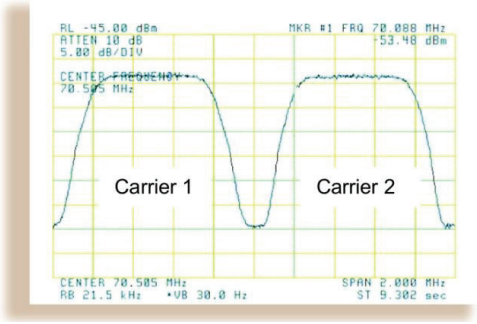

Figure 1

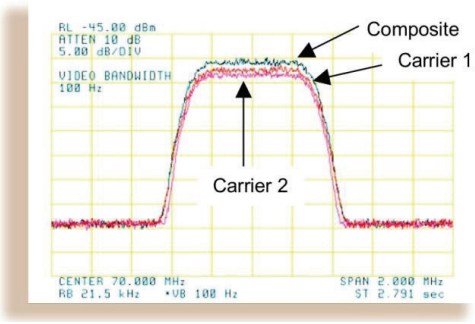

Figure 2

When observed on a spectrum analyzer, only the Composite is visible. Carrier 1 and Carrier 2 are shown in Figure 2 for reference only.

As DoubleTalk Carrier-in-Carrier allows equivalent spectral efficiency using a lower order modulation and/or code rate, it can reduce the power required to close the link thereby reducing CAPEX by allowing a smaller BUC/amplifier and/or antenna. Alternatively, DoubleTalk Carrier-in-Carrier can be used to achieve very high spectral efficiencies E.g., DoubleTalk Carrier-in-Carrier when used with 32-ARY modulation can provide bandwidth efficiency exceeding 8 bps/Hz.

When combined with VersaFEC-2 or VersaFEC and optimized transmit filter rolloffs, DoubleTalk Carrier-in-Carrier provides unprecedented savings in transponder bandwidth and power utilization. This allows for its successful deployment in bandwidth-limited and power-limited scenarios, as well as reduction in earth station BUC/amplifier power requirements.

Carrier-in-Carrier Automatic Power Control (CnC-APC)

The patent-pending Carrier-in-Carrier Automatic Power Control (CnC-APC) mechanism enables modems on both sides of a CnC link to automatically measure and compensate for rain fade while maintaining the Total Composite Power. In addition to automatically compensating for rain fade, CnC-APC also enables the modems to share link margin, i.e. a modem can effectively transfer excess link margin to a distant end modem experiencing fade, thereby further enhancing overall availability.

VersaFEC-2 High Performance LDPC Forward Error Correction

CDM-570A/L-IPEN now offers a new high performance LDPC FEC specifically designed to optimize performance at low to mid-tier sysmbol rates. VersaFEC-2 long-block provides 38 ModCods (BPSK to 32-ARY) with performance generally better than DVB-S2 at significantly lower latency and short-block provides 36 ModCods (BPSK to 32-ARY) with higher coding gain than first generation VersaFEC and similar latency. All higher order constellations are quasi-circular for optimal peak-to-average performance. ACM operation is supported for long block and short block for IP/Ethernet traffic in a point-to-point topology.

VersaFEC Forward Error Correction

VersaFEC is a patent-pending system of LDPC codes designed to provide maximum coding gain while minimizing latency. CDM-570A/L-IPEN support Constant Coding & Modulation (CCM) mode of operation for IP/Ethernet, serial or G.703 data interfaces. CDM-570A/L-IPEN support Adaptive Coding & Modulation (ACM) for IP/Ethernet traffic in a point-to-point topology.

The Ultra Low Latency (ULL) codes provide even lower latency compared to standard VersaFEC codes.

Optimized Transmit Filter Rolloffs

CDM-570A/L support 5%, 10%, 15%, 20%, 25% and 35% transmit filter rolloff allowing users to further optimize the link. Carrier-in-Carrier combined with VersaFEC and optimized transmit filter rolloffs can provide 50% or more BW savings compared to legacy modems.

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CarrierID
CDM-570A/L-IPEN now incorporate a patent-pending carrier identification (CID) technique that uses Comtech EF Data's MetaCarrier® spread spectrum technology to embed a unique carrier identification sequence for the transmitted carrier to help identify interfering carriers. CDM-570A/L-IPEN with MetaCarrier® is used in tandem with the Comtech EF Data's MCDD-100 MetaCarrier® Detection Device to provide a complete MetaCarrier embedding and decoding solution.

High Performance Packet Processor
The high-performance Packet Processor enables efficient IP networking and transport over satellite with header compression, payload compression and advance Quality of Service. The advanced QoS combined with header and payload compression ensures the highest quality of service with minimal jitter and latency for real-time traffic, priority treatment of mission critical applications and maximum bandwidth efficiency.

The packet processor supports Routed mode as well as Managed Switch Mode of operation. In managed switch mode, it operates as a layer 2 switch with VLAN support, enabling seamless integration with existing infrastructure while providing full optimization including header compression and payload compression and advanced QoS.

The CDM-570A/L-IPEN supports a wide range of applications and network topologies.

Header Compression Option
The packet processor incorporates industry-leading header compression for IP/Ethernet traffic. In Routed mode, header compression can be enabled on a per route basis and can reduce the typical 40 byte IP/UDP/RTP header to an average of 2 bytes. For TCP/IP, the 40 byte header is reduced to an average of 4 bytes. In Managed switch mode, header compression also compresses the Ethernet header. So, a 58 byte Ethernet header with VLAN and IP/UDP/RTP header can be compressed to as little as 2 bytes.

For applications such as VoIP, header compression can provide bandwidth savings exceeding 60%. E.g. 8 kbps G.729 voice transported in an IP/UDP/RTP datagram typically requires 24 kbps in a routed network or approximately 32.4 kbps in a switched network including VLAN header and FCS. With header compression, the same voice call needs approx 9 kbps (before HDLC encapsulation) – a savings of over 60% in a routed network or over 70% in a switched network. Bandwidth requirement for typical Web/HTTP traffic is also reduced with TCP/IP header compression.

Payload Compression Option
Implemented in the hardware for maximum throughput and efficiency, payload compression can typically reduce the required satellite bandwidth by 20-30%.

Quality of Service (QoS) Option
Today's networks have to support a wide range of applications with diverse requirements. The packet processor incorporates advanced QoS mechanism to ensure the highest service quality with minimal jitter and latency for real-time traffic, priority treatment of mission critical applications while maximizing bandwidth utilization. Four different QoS modes are available:

- DiffServ – Industry-standard method of providing QoS enabling seamless co-existence in networks that implement DiffServ.
- Max/Priority – Provides eight levels of traffic prioritization with the ability to limit maximum traffic per priority class
- Min/Max – Provides a Committed Information Rate (CIR) to each user defined class of traffic with the ability to allow a higher burstable rate depending on availability
- VLAN Priority/Max – Available in Managed switch mode when using VLANs. Uses 3-bit 802.1p VLAN priority with ability to set a maximum data rate per priority

Packet processor includes a powerful classifier capable of classifying packets based on Application/Protocol, Source IP Address/Subnet, Destination IP Address/Subnet, Source Port / Range and Destination Port / Range.

3xDES Encryption
The modems support 3xDES encryption for IP/Ethernet traffic for transmission security to prevent unauthorized access to data transmitted over the satellite link. Encryption is configurable on a per route basis. Encryption is not available if using legacy serial or G.703 data interfaces.

Vipersat Management System
- Dynamic SCPC carrier allocation & true bandwidth-on-demand
- User-defined policies for upstream carrier switching
- Star and dynamic mesh capabilities using single hop on-demand
- Guaranteed bandwidth capability

VMS Network & Bandwidth Management
A Vipersat-powered network integrates these advanced modems with a powerful network management tool, the Vipersat Management System (VMS). In addition to the traditional monitoring and control of the CDM-570A/L-IPEN modems and the demodulators, the VMS allows these devices to share bandwidth, and when needed, switch automatically to a dedicated SCPC channel. In a Vipersat-powered network, the CDM-570A/L-IPEN modem takes advantage of its fast acquisition demodulation to allow it to operate in a shared mode. Inbound transmissions (from remote to hub) can be switched from a shared Selective Time Division Multiple Access (STDMA) mode to a dedicated Single Carrier Per Channel (SCPC) connection via a variety of user defined policies or triggers. This enables the network to more effectively handle real-time connection-oriented applications and reduces both latency and network congestion. Through VMS, dynamic point-to-point mesh connections can also be established between remotes.

Upstream Switching
Through protocol classification in the remote terminals, the modem initiates automatic switching. VMS establishes *dSCPC* bandwidth based on policies that can be individually enabled on a per-remote basis, or globally enabled. Policies can be configured for a variety of applications such as VoIP, video (VTC), or based on a load, or via a schedule, Type of Service (ToS), or QoS rules such as IP port or IP address and protocol type. Operators are able to set minimum and maximum data rates for each remote as well as excess data rates for an initial upstream switch.

Vipersat Operation Mode
Vipersat operation is enabled via a FAST feature code. Networks can easily start off in point-to-point or point-to-multipoint configurations. As the network grows and users wish to take advantage of the bandwidth on-demand savings by implementing a Vipersat network, modems can easily be upgraded to Vipersat mode.

EDMAC & AUPC Operation
The CDM-570A/L-IPEN has the ability to monitor and control the distant end of a point-to-point satellite link using EDMAC or EDMAC2. User data is framed and bits are added to transfer control, status, and AUPC information.

Management
The modems support SNMP, web-based and command line interfaces for management. When using legacy data interfaces the modems can also be configured and monitored from the front panel, or through the remote M&C port. Ten complete RF configurations may be stored in the modem. An event log stores alarm and status information in non-volatile RAM, while the link statistics log stores link performance (Eb/No and AUPC performance) for monitoring and reporting purposes.

G.703 Clock Extension
Mobile networks require precise synchronization of base stations, which is a challenge when using IP backhaul. Most operators are forced to use GPS-based external equipment for site synchronization. CDM-570A/L-IPEN offers a G.703 clock extension option that propagates a high stability reference from hub to the remote. This process does not require additional bandwidth.

FAST Feature Enhancements
The FAST codes make it easy to upgrade the modem capability in the field. New features can be added on site, using FAST access codes purchased from Comtech EF Data that can be entered via the front panel.

Specifications

Data Rate Range (See user manual for details)	2.4 kbps to 10.239 Mbps (depending on modulation, FEC and framing), 1 bps step with fully independent TX and RX rates
Symbol Rate	4.8 ksps to 3.0 Msps (subject to data rate range, modulation and FEC) [Please see user manual for details on supported symbol rates for different modulation and FEC]
Frequency Range	CDM-570A-IPEN: 50 to 90 or 100 to 180 MHz, 100 Hz resolution CDM-570AL-IPEN: 950 to 2250 MHz, 100 Hz resolution
Data Interfaces	10/100Base-T Ethernet EIA-422/-530 DCE, V.35 DCE, Sync EIA-232, G.703 T1 balanced, G.703 E1 balanced or unbalanced,

Modulation & FEC Options	**Data Rate Range**
VersaFEC-2 (Long Block)	
BPSK 0.488	18.115 kbps to 1.468 Mbps (Minimum 37 ksps)
QPSK 0.489, 0.537, 0.586, 0.611, 0.635, 0.660, 0.684, 0.733	36.230 kbps to 4.397 Mbps (Minimum 37 ksps)
8-ARY 0.521, 0.537, 0.562, 0.586, 0.611, 0.635, 0.660, 0.684, 0.708, 0.733	125.081 kbps to 6.596 Mbps (Minimum 80 ksps)
16-ARY 0.586, 0.611, 0.635, 0.660, 0.684, 0.708, 0.733, 0.757, 0.782	234.527 kbps to 9.381 Mbps (Minimum 100 ksps)
32-ARY 0.660, 0.684, 0.708, 0.733, 0.757, 0.782, 0.801, 0.831, 0.855, 0.879	824.511 kbps to 10.239 Mbps (Minimum 250 ksps)
VersaFEC-2 (Short Block)	
BPSK Rate 0,489	18.115 kbps to 0.489 Mbps (Minimum 37 ksps)
QPSK Rate 0.489, 0.537, 0.586, 0.611, 0.635, 0.660, 0.684, 0.733	36.230 kbps to 1.465 Mbps (Minimum 37 ksps)
8-ARY Rate 0.521, 0.537, 0.562, 0.586, 0.611, 0.635, 0.660, 0.684, 0.708, 0.733	125.081 kbps to 2 Mbps (Minimum 80 ksps)
16-ARY Rate 0.586, 0.611, 0.635, 0.660, 0.684, 0.708, 0.733, 0.757, 0.782	234.527 kbps to 2 Mbps (Minimum 100 ksps)
32-ARY Rate 0.660, 0.684, 0.708, 0.733, 0.757, 0.782, 0.801, 0.831	824.511 kbps to 2 Mbps (Minimum 250 ksps)
VersaFEC	
BPSK 0.488	2.4 kbps to 1.462 Mbps
QPSK 0.533	5.2 kbps to 3.200 Mbps
QPSK 0.631	6.1 kbps to 3.785 Mbps
QPSK 0.706	6.8 kbps to 4.233 Mbps
QPSK 0.803	7.8 kbps to 4.818 Mbps
8-QAM 0.576 (ECCM)	8.3 kbps to 5.179 Mbps
8-QAM 0.642	9.3 kbps to 5.782 Mbps
8-QAM 0.711	10.3 kbps to 6.401 Mbps
8-QAM 0.780	11.3 kbps to 7.021 Mbps
16-QAM 0.644 (ECCM)	12.4 kbps to 7.726 Mbps
16-QAM 0.731	14.1 kbps to 8.776 Mbps
16-QAM 0.780	15 .0 kbps 9.361 Mbps
16-QAM 0.829	16.0 kbps to 9.946 Mbps
16-QAM 0.853	16.4 kbps to 10.239 Mbps
VersaFEC Ultra Low Latency (ULL) Codes	
BPSK 0.493 (ULL)	2.4 kbps to 1.479 Mbps
QPSK 0.493 (ULL)	4.8 kbps to 2.959 Mbps
QPSK 0.654 (ULL)	6.3 kbps to 3.923 Mbps
QPSK 0.734 (ULL)	7.0 kbps to 4.405 Mbps
TPC	
BPSK 5/16	2.4 kbps to 0.937 Mbps
BPSK 21/44	2.4 kbps to 1.430 Mbps
QPSK/OQPSK 21/44	4.8 kbps to 2.860 Mbps
QPSK/OQPSK 3/4	7.2 kbps to 4.500 Mbps
QPSK/OQPSK 7/8	8.4 kbps to 5.250 Mbps
QPSK/OQPSK 0.95	9.1 kbps to 5.666 Mbps
8PSK/8-QAM 3/4	10.8 kbps to 6.750 Mbps
8PSK/8-QAM 7/8	13.6 kbps to 7.875 Mbps
8PSK/8-QAM 0.95	15.3 kbps to 8.500 Mbps
16-QAM 3/4	14.4 kbps to 9.000 Mbps
16-QAM 7/8	16.8 kbps to 9.980 Mbps

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Viterbi	
BPSK 1/2	2.4 kbps to 1.500 Mbps
QPSK/OQPSK 1/2	4.8 kbps to 3.000 Mbps
QPSK/OQPSK 3/4	7.2 kbps to 4.500 Mbps
QPSK/OQPSK 7/8	8.4 kbps to 5.250 Mbps
Viterbi + Reed Solomon	
BPSK 1/2	2.4 kbps to 1.363 Mbps
QPSK/OQPSK 1/2	4.3 kbps to 2.727 Mbps
QPSK/OQPSK 3/4	6.5 kbps to 4.090 Mbps
QPSK/OQPSK 7/8	7.5 kbps to 4.666 Mbps
16-QAM 3/4	13.0 kbps to 4.000 Mbps
16-QAM 7/8	16.8 kbps to 4.666 Mbps
TCM + Reed Solomon	
2/3 8PSK TCM (Closed network)	8.7 kbps to 4.400 Mbps
Uncoded	
Uncoded BPSK	4.8 kbps to 3.000 Mbps
Uncoded QPSK/OQPSK	9.6 kbps to 5.000 Mbps

Note: Data rate specifications reflect non-Vipersat mode

Scrambling	Mode dependent – ITU V.35, or proprietary externally synchronized
Input/Output Impedance	CDM-570A-IPEN: matched for 50/75 Ω, 17 dB minimum return loss, BNC connector CDM-570A-IPEN L: transmit and receive 50 Ω, > 17 dB (950 MHz to 2250 MHz) and >19 dB (1000 MHz to 1900 MHz) minimum return loss, female Type N connector
External Reference Input	1, 2, 5, or 10 MHz, BNC connector
Form C Relays	TX, RX traffic alarms and unit faults

Modulator

	CDM-570A-IPEN	CDM-570AL-IPEN
Frequency Stability (With Internal Reference)	±1 ppm, 0º to 50ºC (32º to 122ºF)	±0.06 ppm, 0º to 50ºC (32º to 122ºF)
Output Power	0 to –25 dBm, 0.1 dB steps	0 to –40 dBm, 0.1 dB steps
Accuracy	± 0.5 dB over frequency and temperature	± 1.0 dB over frequency and temperature
Phase Noise	< 0.75 degrees RMS double-sided, 100 Hz to 1 MHz	< 1.2 degrees RMS double-sided, 100 Hz to 1 MHz
Output Spectrum/ Filtering	Meets IESS-308/-309 power spectral mask	
Alpha (Rolloff)	5%, 10%, 15%, 20%, 25% and 35%	
Harmonics and Spurious	-60 dBC/4 kHz from 600 to 2600 MHz (L-Band), from 1 to 400 MHz (IF)	
Transmit On/Off Ratio	55 dB minimum	
External TX Carrier Off	By TTL LOW signal, or RTS	
TX Clock Options	Internal (SCT), external (TT), loop timing with symmetric or asymmetric operation (data interface dependent)	

Demodulator

	CDM-570A-IPEN	CDM-570AL-IPEN
Input Power Range	-30 to -60 dBm	-130 + 10 log symbol rate, dBm (minimum) -90 + 10 log symbol rate, dBm (maximum)
Max Composite Level	+35 dBc, up to -5 dBm absolute max.	+40 dBc, up to -5 dBm absolute max.
Acquisition Range	± 1 to ± 32 kHz, 1 kHz step	± 1 to ± 32 kHz, 1 kHz step, symbol rate <= 625 ksps ± 1 to ± 200 kHz, 1 kHz step, symbol Rate > 625 ksps
Acquisition Time	Highly dependent on data rate, FEC rate, and demodulator acquisition range. Example: 120 ms average at 64 kbps, Viterbi Rate 1/2 QPSK, ± 10 kHz acquisition sweep range, 6 dB Eb/No	

Plesiochronous/ Doppler Buffer	±128, 256, 512, 1024, 2048, 4096, 8192, 16384 or 32768 bits
Receive Clock Options	Buffer disabled (RX satellite), buffer enabled (symmetric or asymmetric operation) (data interface dependent)
Clock Tracking	± 100 ppm minimum
Monitor Functions	E_b/N_o, frequency offset, BER, buffer fill status, RX signal level

DoubleTalk Carrier-in-Carrier

Delay Range	0 to 330 ms
Power Spectral Density Ratio (Interferer to Desired)	-7 dB to +7 dB
Maximum Symbol Rate Ratio	3:1 (TX:RX or RX:TX)
Eb/No Degradation	0 dB Power Spectral Density Ratio BPSK/QPSK/OQPSK: 0.3 dB 8-QAM: 0.4 dB 8PSK: 0.5 dB 16-QAM: 0.6 dB +10 dB power spectral density ratio Additional 0.3 dB
Satellite Restrictions	Satellite in “loop-back” mode (i.e., the transmit station can receive itself) “Non-processing” satellite (i.e., does not demodulate or remodulate the signal)

Networking Protocols

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

Low-Noise Block Converter (LNB) Support (CDM-570AL-IPEN)

LNB Voltage	Selectable OFF, 13 VDC or 18 VDC
LNB Reference	10 MHz via RX center conductor, Selectable ON/OFF 0.0 dBm ± 5 dB

Block Up Converter (BUC) Support (CDM-570AL-IPEN)

BUC Voltage	24 VDC, 90 W @ 50°C, 100 W @ 30°C (internally fitted option) 48 VDC, 150 W @ 50°C, 180 W @ 30°C (internally fitted option, not available with -24 VDC input)
BUC Reference	10 MHz via TX center conductor, Selectable ON/OFF 0.0 dBm ± 5 dB
FSK Support	Via TX center conductor with FSK BUCs

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Environmental & Physical

Temperature	Operating: 0 to 50°C (32 to 122°F)
	Storage: -40 to 85°C (-40 to 185°F)
Humidity	95% maximum, non-condensing
Power Supply	100 to 240 VAC, 50/60 Hz -24 VDC (HW option) -48 VDC (HW option)
Power Consumption (See Manual for Details)	CDM-570A-IPEN: 42 W typical without CnC CDM-570A-IPEN: 48 W (max) with CnC CDM-570AL-IPEN: 42 W typical without CnC or BUC Power Supply
Dimensions (height x width x depth)	CDM-570A-IPEN: 1.75" x 19" x 13" (4.4 x 48.3 x 33 cm) CDM-570AL-IPEN: 1.75" x 19" x 16" (4.4 x 48.3 x 40.6 cm)
Weight	CDM-570A-IPEN: 6.6 lbs (2.99 kg) CDM-570AL-IPEN: 8.5 lbs (3.86 kg) (with 24 VDC BUC P/S)

Operations & Maintenance

Configuration and Management	Front panel
	Remote port – EIA-232 or EIA-485 (2- or 4-wire)
	10/100BaseT Ethernet
	SNMP with MIB II and private, modem-specific MIB
	Telnet
	Web browser (HTTP)
	Command Line Interface
Software/firmware upgrade via FTP	
Faults and alarms	
Configuration backup and restoral	
Security	
Password protection for web, ftp and telnet	
Access list	

Accessories

CRS-170A	CDM-570AL-IPEN: 1:1 Modem Redundancy IF Switch
CRS-180	CDM-570A-IPEN: 1:1 Modem Redundancy IF Switch

Available Options

How Enabled	Option
Hardware	Power supply, AC input
Hardware	Power supply, -24 VDC input
Hardware	Power supply, -48 VDC input
Hardware	24 VDC, 90 W @ 50°C (100 W @ 30°C) BUC power supply, AC input, -24 or -48 VDC input
Hardware	48 VDC, 150 W @ 50°C (180 W @ 30°C) BUC power supply, AC input or -48 VDC input
Hardware	DoubleTalk Carrier-in-Carrier board
Hardware	VersaFEC-2 Codec board
Hardware	Turbo Codec board (Required for Rate 0.95. Rate 5/16, 21/44, 3/4 and 7/8 can be supported with or without the TPC board)
FAST	Modem data rate to 1.1 Mbps for CCM operation
FAST	Modem data rate to 2.5 Mbps for CCM operation
FAST	Modem data rate to 5 Mbps for CCM operation
FAST	Modem data rate to 10.239 Mbps for CCM operation (Maximum data rate limited to 9.98 Mbps in CDM-570 Compatibility/Legacy mode. Maximum data rate limited to 9.98 Mbps when using TPC codec, 5.25 Mbps when using Viterbi, 4.666 Mbps when using Viterbi+RS, 4.4 Mbps when using TCM+RS)
FAST	8PSK, 8-QAM modulation (8PSK requires TPC codec or Reed-Solomon, 8QAM Requires VersaFEC codec or TPC codec)
FAST	16-QAM modulation (16-QAM requires VersaFEC codec or TPC codec or Reed Solomon)
FAST	IP ACM Symbol Rate – 375 ksps, 750 ksps, 1.5 Msps, 2 Msps or 3 Msps (VersaFEC or VersaFEC-2)
FAST	Optimized Transmit Filter Rolloffs (5%, 10%, 15%, 20% and 25%) – 512 kbps, 1.1 Mbps, 2.5 Mbps, 5 Mbps or 10.239 Mbps
FAST	VersaFEC Codec Data rate (CCM) – 512 kbps, 1.1 Mbps, 2.5 Mbps, 5 Mbps or 10.239 Mbps
FAST	TPC Codec (CCM) for Rate 5/16, 21/44, 3/4 and 7/8 (Rate 5/16, 21/44, 3/4 and 7/8 can be supported with or without the TPC board) Not required if TPC board is present.
FAST	DoubleTalk Carrier-in-Carrier Data Rate (full) – 512 kbps, 1.1 Mbps, 2.5 Mbps, 5 Mbps, 10.239 Mbps (Requires DoubleTalk Carrier-in-Carrier board
FAST	DoubleTalk Carrier-in-Carrier Data Rate (fractional) – 2.5 Mbps, 5 Mbps, 10.239 Mbps (Requires DoubleTalk Carrier-in-Carrier board
FAST	DoubleTalk Carrier-in-Carrier Automatic Power Control (CnC-APC) (Requires DoubleTalk Carrier-in-Carrier)
FAST	Reed Solomon Codec
FAST	G.703 clock extension
FAST	Header compression, Payload compression, Quality of Service (QoS), VMS Integration
FAST	CarrierID

Regulatory

CE Mark	EN 301 489-1 (ERM) EN55022 (Emissions) EN55024 (Immunity) EN 61000-3-2 EN 61000-3-3 EN60950 (Safety)
FCC	FCC Part 15, Subpart B

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