

CDM-700 High-Speed Satellite Modem



INTRODUCTION

The CDM-700 is a high-speed satellite modem intended for duplex or receive-only operation with a range of data interfaces. The modem operates in broadcast, circuit restoration, point-to-point and point-to-multipoint applications with exceptional power and bandwidth efficiency.

FEATURES

- Combines multiple data streams into a single carrier
- 52 to 88 and 104 to 176 MHz frequency range
- Optional L-Band frequency range
- 6 to 155 Mbps
- QPSK, 8-PSK, 16-QAM, 64-QAM Modulation
- Forward Error Correction (FEC)
 - Turbo Product Coding (TPC)
- Two Data Interface Slots
- Data Interfaces Include:
 - CDI-10: Dual E3/T3/STS-1, two independent channels
 - CDI-50-1: OC-3 single mode optical and STM-1 coax
 - CDI-60: HSSI Interface
 - CDI-70: 10/100/1000 Ethernet Bridge
- Adaptive Equalizer
- Unit Management / M&C, standard features
 - Front panel keypad and vacuum fluorescent display
 - Ethernet 10/100BaseT for reflashing software and firmware upgrades
 - RS-232 or RS-485
- Asymmetric Data Rates
- Standard 1.5 ppm Reference or External Reference

FEATURE ENHANCEMENTS

Enhancing the CDM-700's performance is easy. Additional features are added quickly on site, using FAST access codes purchased from Comtech EF Data. To enable these features, simply enter the code at the front panel. Other features are added with a simple module swap.

APPLICATION

The CDM-700 provides bandwidth efficient transport of broadband data for satellite links. The powerful Ethernet M&C interface for the modem easily manages point-to-point, earth station and networking environments.

TURBO PRODUCT CODING (TPC)

The CDM-700 offers Turbo Product Coding. TPC simultaneously offers increased coding gain, lower decoding delay and significant bandwidth savings compared to Viterbi and Reed-Solomon (RS). The TPC rates are:

- Rate 3/4 for QPSK, 8-PSK, 16-QAM, 64-QAM
- Rate 7/8 for QPSK, 8-PSK, 16-QAM, 64-QAM

REMOTE CONTROL

The operator may configure and monitor the modem from the front panel, or through the remote M&C port. Control and status is provided through the RS-232, RS-485 (2/4 wire) port or 10/100BaseT Ethernet.



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SYSTEM

70 / 140 MHz	52 to 88 and 104 to 176 MHz in 100 Hz steps
Impedance	50 Ω and optional 75 Ω, 18 dB min return loss
IF Connectors	BNC female
L-Band	950 to 1750 MHz in 100 Hz steps
Impedance	50 Ω, 14 dB min return loss
Connectors	Type N Female
Data Rate	1 to 155 Mbps in 1 bps steps within symbol rate range
Symbol Rate	1 to 64 Msps
Scrambling	Synchronous or OFF
FEC	
Turbo Product Coding (TPC)	Rate 3/4, 7/8 (2023 actual) for QPSK, 8-PSK, 16-QAM, 64-QAM
M&C Interface	RS-232, RS-485 (2- or 4-wire) Ethernet 10/100 Base-T
Network Management	SNMP (MIBs)
Through Ethernet Port	Telnet Web page accessible with browser
Management Parameters	Date rate, FEC, IF frequency, Tx Carrier ON/OFF and more
Monitored Parameters	RSL, Eb/No, Alarms, Buffer Fill Status and more
Test Functions	Digital Loopback, IF Loopback, Data Test Patterns, Unmodulated Carrier, SSB Carrier
Alarms, Form C Relays	Tx, Rx traffic alarms and Unit faults
Frequency Stability	Internal ± 1.5 ppm over operating temperature range
External Reference Input	10 MHz input via SMA female connector

DATA INTERFACE (Optional)

CDI-10	Dual G.703 E9/T3/STS-1
2 Independent	G.703, 75 Ω unbalanced at 34, 36B, 44, 73B, 51, 84
Duplex	Mbps, AMI, HDB3, B3ZSA
	0 to 32 ms
Line Coding	1, 2, 5, 10, 2.048 MHz, E3, T3, STS-1
Rx Buffer	
External Clock	
Input	
CDI-50-1	OC-3 Single Mode Optical STM-1 G.703 Coaxial, BNC-Female Only one of the above active at a time
CDI-60	HSSI to 52 Mbps. Supports TT, ST, SD, RT, RD, TA, CA
CDI-70	10/100/1000 Base-T Ethernet Bridge

MODULATOR

70 / 140 MHz	Output Power	+5 to -20 dBm, 0.1 dB steps (70/140 MHz) ± 0.5 dB nominal at 25°C. Within ±0.5 dB of 25°C value over frequency and temperature range.
Accuracy		
L-Band	Output Power	-5 to -25 dBm, 0.1 dB steps (L-Band) ± 0.5 dB over frequency and temperature ± 0.5 dB from 25°C value at same frequency
Accuracy		
Output Spectrum/Filtering		20%, 35% Roll-off factor
Spurious		< -55 dBc/ 4k Hz, 20 to 250 MHz (800 to 2500 L-Band)
Phase Noise		< 1° RMS 100 Hz to 1 MHz

DEMODULATOR

70 / 140 MHz	Input Power,	-58 dBm + 10 Log (Symbol Rate in MHz)
Minimum		-61 dBm at 1 Mbps, -39.8 dBm at 64 Msps
L-Band	Input Power,	-60 dBm + 10 Log (Symbol Rate in MHz)
Minimum		-60 dBm at 1 Mbps, -41.8 dBm at 64 Msps
AGC		45 dB above minimum input power
Max Composite Level		+20 dBc (70/140) or +30 dBc (L-Band) up to +10 dBm
Acquisition Range		To ± 100 kHz, programmable in 1 kHz steps
Adaptive Equalizer		Up to 3 dB tilt across symbol rate bandwidth

BER Performance with two like modulated adjacent carriers each 7 dB higher

(Typical in parenthesis)			
		3/4	7/8
QPSK TPC	10 ⁻⁶	3.9 (3.4)	4.4 (3.9)
	10 ⁻⁵	4.2 (3.7)	4.6 (4.1)
	10 ⁻⁴	4.4 (3.9)	4.9 (4.4)
8-PSK TPC	10 ⁻⁶	6.7 (6.2)	7.3 (6.8)
	10 ⁻⁵	7.0 (6.5)	7.6 (7.1)
	10 ⁻⁴	7.2 (6.7)	7.8 (7.3)
16-QAM TPC	10 ⁻⁶	7.7 (7.2)	8.3 (7.8)
	10 ⁻⁵	8.0 (7.5)	8.5 (8.0)
	10 ⁻⁴	8.2 (7.7)	8.8 (8.3)
64-QAM TPC	10 ⁻⁶	12.0 (11.5)	12.6 (12.1)
	10 ⁻⁵	12.3 (11.8)	12.9 (12.4)
	10 ⁻⁴	12.5 (12.0)	13.3 (12.8)

ENVIRONMENTAL AND PHYSICAL

Temperature	Operating: 0 to 50°C (32 to 122°F) Storage: -25 to 85°C (-13 to 185°F)
Power Supply	100 to 240 volts AC, 50/60 Hz
Power Consumption	65 W typical (80 W maximum)
Physical Dimensions (1RU)	1.75H x 19.0W x 18 D inch, (4.4H x 48W x 47.4D cm), approximate
Weight	15 lbs (7.0 kg), approx.
Agency Approvals	CE: EN55022 Class B (Emissions), EN50062-1 Part 1 (Immunity), EN60950 (Safety), FCC: Part 15 Class B

AVAILABLE OPTIONS

How Enabled	Option	How Enabled	Option
FAST	QPSK & 8-PSK to 15, 22.5, 30, 37.5, 45 Msps or 155.52 Mbps	Hardware	Duplex 70/140 Duplex L-Band Rx Only
FAST	QPSK, 8-PSK & 16-QAM to 15, 22.5, 30, 37.5, 45 Msps or 155.52 Mbps	Hardware	50 or 75 Ω IF Rx Impedance
FAST	QPSK, 8-PSK, 16-QAM and 64-QAM to 155 Mbps		

DATA INTERFACE OPTIONS (Hardware)

Interface	Slot 1	Slot 2
CDI-10 Dual G.703	OK	None or CDI-10
CDI-50-1 OC3 and STM-1	This slot only	None Only
CDI-60 HSSI Interface	OK	None or CDI-60
CDI-70 Gigabit Ethernet	This slot only	None Only



Slot 1

Slot 2



Optimizing Satellite Communications

