

CDM-750 Advanced High-Speed Trunking Modem



INTRODUCTION

The CDM-750 Advanced High-Speed Trunking Modem was designed to be the most efficient, highest throughput, point-to-point trunking modem available. The CDM-750 accommodates the most demanding Internet Service Provider (ISP) and telco backhaul links by offering users the most advanced combination of space segment saving capabilities while minimizing the need for unnecessary overhead. With the ability to process packets at line speed, the CDM-750 will not throttle throughput due to processing limitations.

Beginning with the most efficient coding and modulation available, the CDM-750 leverages the DVB-S2 EN 302 307 LDPC/BCH standard to provide the best possible combination of coding and forward error correction ensuring that the maximum amount of satellite traffic is transported for a given signal to noise capacity.

Implementing Adaptive Coding and Modulation (ACM) operation (in packet-based applications) allows link margin to be converted to user capacity during non-faded conditions by taking advantage of the actual signal to noise ratio rather than calculated worst case signal to noise. This technology transforms link margin, implementation margin and margin for antenna pointing directly to improved throughput.

By using the best encapsulation methods, the CDM-750 further increases throughput by using minimal overhead. In G.703 synchronous mode, users can implement monitor and control over the satellite with no additional overhead. When using Ethernet bridge mode, less than 1% overhead is used for encapsulation.

Additionally, the CDM-750 leverages Comtech EF Data's powerful DoubleTalk® Carrier-in-Carrier® "Adaptive Cancellation" technology. With the ability to overlay TX and RX carriers, Carrier-in-Carrier enables the operator to establish the perfect balance between bandwidth and power, enabling the best possible use of the satellite resource and reducing operating expenses (OPEX).

These technologies alone offer enormous savings to the ISP and telco operator. When used in combination, however, the savings are astronomical.

The innovative high-performance architecture of the CDM-750 allows efficient networking and transport over satellite links while supporting a wide range of applications and network topologies.

APPLICATIONS

- IP Trunking
- G.703 Trunking
- High-Speed Content Delivery
- Disaster Recovery & Emergency Communications

TYPICAL USERS

- Mobile Operators
- Telecom Operators
- ISPs
- Government & Military

KEY FEATURES

- Symbol Rate: 1 – 63 Msps
- Data Rate: 1 – 169 Mbps
- DVB-S2 ETSI EN 302 307 compliant
- DoubleTalk Carrier-in-Carrier bandwidth compression
- ACM and CCM
- GSE – industry standard encapsulation
- Modulation: QPSK, 8-PSK, 16-APSK, 32-APSK
- Coding: DVB-S2 LDPC/BCH
- Dual IF: 70/140, L-Band and L-Band monitor (standard)
- Data Interfaces
 - 2 Gigabit 10/100/1000Base-T Interfaces (standard)
 - 1 Optical Gigabit Interface (optional)
 - 2 data interface slots (optional) G.703: E3 & T3 (34.368 & 44.768 Mbps)
 - Process > 300,000 pps simplex, > 600,000 pps duplex
- Management: HTTP, SNMP, Telnet, RS-232/485
- In-band (over satellite) M&C control
- 1:1 redundancy switching available

DOUBLE TALK 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 space.

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.

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

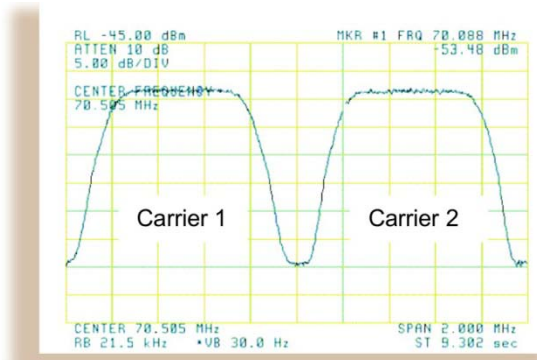


Figure 1: Traditional Full Duplex Link

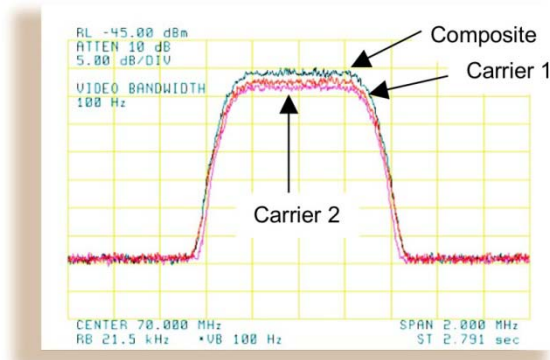


Figure 2: Duplex Link with DoubleTalk Carrier-in-Carrier

Carrier-in-Carrier® is a registered trademark of Comtech EF Data.

DoubleTalk® is a registered trademark of Applied Signal Technology, Inc.

OPTIONS

| Type | Option |
|-----------------|--|
| FAST | DVB-S2 TX / RX: 8-PSK, 16-APSK, 32-APSK |
| FAST | Symbol Rate options |
| FAST & Hardware | Carrier-in-Carrier options |
| FAST | ACM Point to Point Client / Controller |
| FAST | Optical Gigabit Ethernet Enable |
| Hardware | G.703 Data Interface E3, T3 (34.368 & 44.768 Mbps) |
| Hardware | Rack Slides |

SYSTEM SPECIFICATIONS

| | |
|--|--|
| Symbol/Date Rate Range | Programmable in 1 sps increments |
| DVB-S2 | QPSK 1/2, 3/5, 2/3, 3/4, 4/5, 5/6, 8/9, 9/10 to 63 Msps / 112.6 Mbps max. 8-PSK 3/5, 2/3, 3/4, 5/6, 8/9, 9/10 to 63 Msps / 168.7 Mbps max. 16-APSK 2/3, 3/4, 4/5, 5/6, 8/9, 9/10 to 47 Msps / 167.6 Mbps max. 32-APSK 3/4, 4/5, 5/6, 8/9, 9/10 to 38 Msps / 169.2 Mbps max. |
| FECFrame | Normal (64,800 bits) or Short (16,200 bits) |
| Pilots | On or Off |
| Alpha (Roll-off) | 20%, 25% or 35% |
| Management | Front panel keypad / display RS-232 /485, or 10/100Base-T with SNMP, Telnet, HTTP |
| Reflash | Ethernet management port |
| Frequency Stability | Internal, stability ± 0.06 ppm |
| External Reference Input / Output (BNC Female) | Internal, 1, 2, 5 or 10, MHz for IF and Data, internally phase locked. Output: Off or internal 10 MHz |
| Form C | Modulator, Demodulator and Unit fault |
| Spectral Sense | Normal and Inverted |
| Configuration Retention | Non-volatile memory; Returns upon power up |

MODULATOR (Dual IF)

| | |
|--|--|
| 70 / 140 MHz | 50 to 180 MHz in 100 Hz steps |
| Impedance / Connector | 75 Ω , BNC Female. Return Loss ≥ 18 dB |
| Output Power | 0 to -20 dBm, 0.1 dB steps (70/140 MHz) |
| Power Accuracy | ± 0.5 dB of nominal at 25°C; Within ± 0.5 dB from 25°C value at same frequency |
| L-Band | 950 to 2150 MHz in 100 Hz steps |
| Impedance / Connector | 50 Ω , Type N Female. Return Loss ≥ 15 dB |
| Output Power | -5 to -40 dBm, 0.1 dB steps |
| Power Accuracy | ± 0.5 dB of nominal at 25°C ± 0.5 dB from 25°C value at same frequency |
| L-Band Monitor | Same as L-Band or 900 + 70/140 MHz IF at -27 dBm ± 3 dB |
| Harmonics and Spurs | < 60 dBc/4kHz, modulated carrier; Excludes spectral mask area |
| External TX Carrier Off | TTL Low signal |
| Quadrature Phase Error and Amplitude Imbalance | Sideband 35 dB below unmodulated carrier |

DEMODULATOR (Dual IF)

| | |
|-----------------------|---|
| 70 / 140 MHz | 50 to 180 MHz in 100 Hz steps |
| Impedance / Connector | 75 Ω, BNC Female. Return loss 15 dB min. |
| Input Power | Desired Carrier = -58 + 10Log (Symbol Rate in Msps) dBm min. and -18 dBm max. |
| Max. Composite Power | The lesser of 20 dBc -10Log (Symbol Rate in Msps) or -3 dBm |
| L-Band | 950-2150 MHz in 100 Hz steps |
| Impedance / Connector | 50 Ω, Type N Female. Return loss 10 dB min. |
| Input Power | Desired Carrier = -65 + 10Log (Symbol Rate in Msps) dBm min. and -25 dBm max. |
| Maximum Composite | The lesser of 30 dBc - (Normal Frame) 10Log (Symbol Rate in Msps) or -10 dBm |

Guaranteed Es/No per DVB-S2 QEF specification PER 1E-7

| Mod / Cod | Es/No | Mod / Cod | Es/No |
|--------------|-------|----------------|-------|
| QPSK - 1/2 | 1.4 | 16-APSK - 2/3 | 9.9 |
| QPSK - 3/5 | 2.7 | 16-APSK - 3/4 | 11.2 |
| QPSK - 2/3 | 3.4 | 16-APSK - 4/5 | 12.0 |
| QPSK - 3/4 | 4.6 | 16-APSK - 5/6 | 12.4 |
| QPSK - 4/5 | 5.1 | 16-APSK - 8/9 | 13.8 |
| QPSK - 5/6 | 5.6 | 16-APSK - 9/10 | 14.0 |
| QPSK - 8/9 | 6.7 | 32-APSK - 3/4 | 14.6 |
| QPSK - 9/10 | 6.8 | 32-APSK - 4/5 | 15.8 |
| 8-PSK - 3/5 | 6.4 | 32-APSK - 5/6 | 16.6 |
| 8-PSK - 2/3 | 7.4 | 32-APSK - 8/9 | 19.1 |
| 8-PSK - 3/4 | 8.5 | 32-APSK - 9/10 | 19.5 |
| 8-PSK - 5/6 | 10.0 | | |
| 8-PSK - 8/9 | 11.3 | | |
| 8-PSK - 9/10 | 11.6 | | |

DOUBLETALK CARRIER-IN-CARRIER

| | |
|---|---|
| Delay Range | 0 to 400 ms (factory default 230 – 290 ms) |
| CnC Ratio | +7 dB to -7 dB Interferer to Desired |
| Es/No degradation (dB) measured at 0.0 dB CnC Ratio | QPSK: 0.3 dB 8-PSK: 0.3 dB 16-APSK: 0.6 dB 32-APSK: 1.0 dB |
| Symbol Rate Ratio | Max 3:1 TX/RX or RX/TX |
| Satellite Configuration | Transmit station sees own carrier. Non-processing satellite. |

BASE UNIT CONNECTORS

| | |
|------------------------------|---|
| Alarm Connector (DB-15 Male) | Form C: TX, RX and unit faults External TX Carrier Off IQ test point |
| Unit Management | DB-9 Male with RS-232 and RS-485 2 W / 4 W RJ-45 Ethernet (Maximum Ethernet packet size 1536 bytes including Ethernet header & CRC) |
| TX & RX IF Connectors | BNC-female (70 / 140 MHz) Type-N female (L-Band) |
| L-Band Monitor | SMA female |
| Traffic Data Interface | 2 x RJ-45 10/100/1000Base-T Ethernet 1 x Optical Gigabit Ethernet (optional) Note: All Data GigE interfaces have a maximum Ethernet packet size of 1632 bytes including Ethernet header & CRC |

TEST FUNCTIONS

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|-------------------|--|
| Data Test Pattern | 2047 and 2 ²³ -1 compatible with BERT on TX data on applicable interfaces |
| CW | Modulation disabled and CW signal is transmitted |
| SSB Carrier | Provides suppressed carrier and suppressed sideband |
| Loopback | Full Duplex only |

ENVIRONMENTAL AND PHYSICAL

| | |
|---|---|
| Temperature | Operating: 0 to 50°C (32 to 122°F) Storage: -40 to 70°C (-40 to 158°F) |
| Humidity | 95% maximum, non-condensing |
| Power Supply Input | 100 to 240 AC 50/60 Hz |
| Power Consumption | 120 VAC at 60 Hz 88 W, 93 VA typical 230 VAC at 50 Hz 88 W, 133 VA typical |
| Dimensions (1 RU) (height x width x depth) | 1.75" x 19" x 18.65" (48 x 47.4 x 4.4 cm) |
| Weight | 15 lbs (6.8 kg) |
| AC Receptacles | Includes restraint for standard IEC-320 inlet |
| Agency Compliance | CE Mark and FCC part 15 |

ACCESSORIES

| Type | Option |
|----------------------|---|
| 1:1 Modem Redundancy | CRS-170A (L-Band), CRS-180 (70/140 MHz) |

