



### INTRODUCTION

The CDM-Qx is the first 70/140 MHz modular multi-channel satellite modem packaged in a single rack unit chassis. The unit offers exceptional flexibility, redundancy, integration, and performance with four configurable slots. The unique architecture allows cost-effective deployment of multiple modulators, demodulators or modems.

CDM-Qx also supports the DoubleTalk<sup>1</sup> Carrier-in-Carrier option, allowing it to transmit and receive in the same transponder segment.

This flexible modem was designed with satellite operators, service providers and enterprise users in mind. It addresses common challenges encountered when utilizing satellite communications, including:

- Requirement for increasing throughput of point-to-point links without utilizing additional transponder resources
- Need to expand networks with multiple modulators and/or demodulators (asymmetrical links)
- Limited rack space

### FEATURE ENHANCEMENTS

Enhancing the performance of the CDM-Qx 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.

### DOUBLETALK CARRIER-in-CARRIER

Designed for bandwidth compression, Carrier-in-Carrier is based on Applied Signal Technology's DoubleTalk which uses "Adaptive Cancellation," a patent pending technology that allows full duplex satellite links to transmit concurrently in the same segment of transponder bandwidth.

Available as an option to the CDM-Qx, this added dimension can result in a significant improvement in satellite transponder utilization. When combined with our advanced forward error correction and modulation techniques, DoubleTalk Carrier-in-Carrier can deliver unprecedented operating expense savings

<sup>1</sup> DoubleTalk™ patented technology

### FEATURES

- Optional DoubleTalk Carrier-in-Carrier allowing Tx and Rx in the same transponder segment
- 50 to 90 & 100 to 180 MHz frequency range
- 10 kbps to 20 Mbps
- BPSK, QPSK, OQPSK, 8-PSK, 16-QAM operation
- Flexible Configuration
  - 1 or 2 modems
  - Up to 4 modulators
  - Up to 4 demodulators
  - Any combination, four slots available
- Optional: Built In Redundancy
  - 1:1 modem
  - Up to 1:3 modulator
  - Up to 1:3 demodulator
- RS-422, V.35, Sync RS-232, G.703 (E1/T1) Interfaces
- RS-232 or RS-485 for M&C remote control
- 2<sup>nd</sup> Generation Turbo Product Coding Forward Error Correction Intelsat IESS-315 compliant
- Hot Swappable Mods and Demods
- Asymmetric Loop Timing
- Common frequency reference for all modules
- Optional: High Stability Reference
- Optional: Redundant Power Supply
- Individual Modulator output power control
- Interoperable with many Comtech EF Data satellite modems: CDM-550T, 570L, 600, 600L, SDM-8000, 300A, and 300L3

### TURBO PRODUCT CODING

The CDM-Qx offers optional 2<sup>nd</sup> generation Turbo Product Codec (TPC). TPC simultaneously delivers increased coding gain, lower decoding delay, and significant bandwidth savings. The TPC provides:

- BPSK 21/44 and 5/16
- QPSK / OQPSK 1/2, 3/4, 7/8 and 0.95
- 8-PSK 2/3, 3/4, 7/8, and 0.95
- 16-QAM 3/4 and 7/8

### REMOTE CONTROL

The operator may configure and monitor the modem from the front panel, or through the remote M&C port. M&C is via RS-232, or RS-485 (2/4 wire).



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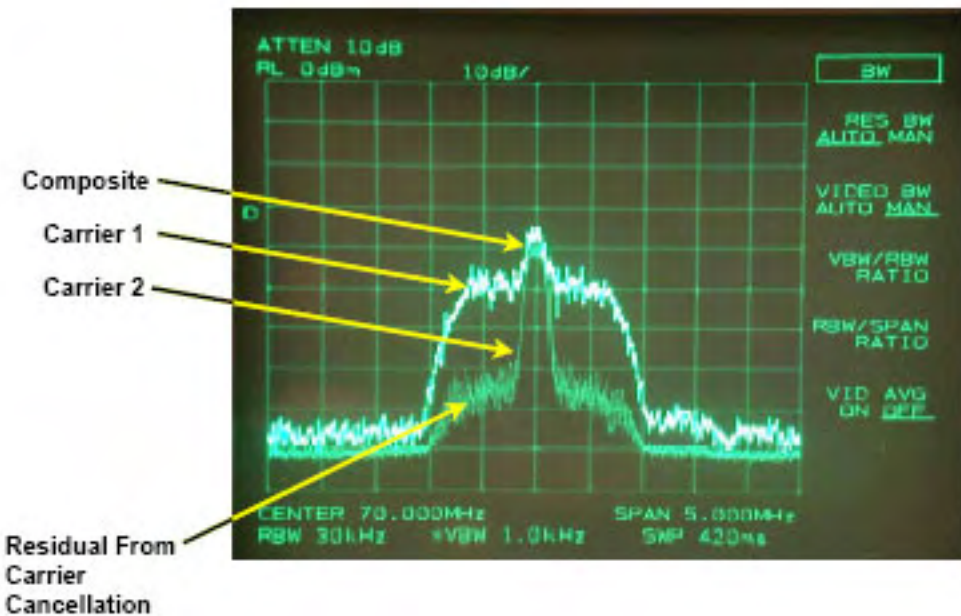
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### DoubleTalk Carrier-in-Carrier Example

DoubleTalk Carrier-in-Carrier allows two carriers to occupy the same spectral space as shown in the accompanying figure. The carriers are operating at different data rates to make it easier to view both of them. The wider Carrier 1 operates at a higher data rate than the narrower Carrier 2. The effect of both carriers is revealed on the Composite at the hump where Carrier 1 and Carrier 2 overlap and their power adds together. The Residual component represents power left over from the adaptive carrier cancellation process that subtracts the unwanted Carrier 1 from the Composite to deliver the desired Carrier 2 to the demodulator.



A white paper, *DoubleTalk Carrier-in-Carrier Bandwidth Compression Providing Significant Improvements in Satellite Transponder Bandwidth*, is available on the Comtech EF Data web site in the Download section under **White Papers**.

### CDM-Qx Shown With:

- Slot 1 Modulator Card with G.703 Balanced Interface
- Slot 2 Modulator Card with G.703 Balanced Interface
- Slot 3 Modulator Card with G.703 Balanced Interface
- Slot 4 Modulator Card with G.703 Balanced Interface
- IF 75Ω



### Notes:

1. Also shown placed above the modem are the Modulator and Demodulator cards with G.703 Unbalanced (BNC) interface.
2. Select one per Modem (i.e. Modulator and Demodulator card combination) OR one per Modulator card and Demodulator card, if using independently.
3. Redundant units do not need an interface.



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