CDM-780 Modular High-Speed Modem / Mod / Demod

Datasheet

Typical Users

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

Common Applications

- IP & Telco Trunking
- DVB-S2 & S2X Video Delivery
- HTS, GEO and MEO Trunking
- Disaster Recovery & Emergency Communications

Overview

The CDM-780 Modular High-Speed Modem / Mod / Demod can be configured as a modem, up to 3 demods, up to 3 modulators, or a modulator and 2 demods for MEO / LEO make before break connections. This flexibility, extended symbol rate and data rate builds on our family of high-speed, ultra efficient trunking modems. The CDM-780 offers near theoretical performance with minimal implementation loss. The CDM-780 supports HTS, GEO, MEO and LEO mode operation with hitless antenna handover and satellite handover.

The CDM-780 Advanced High-Speed Trunking and Broadcast Modem extends Comtech's legacy of offering the most efficient, highest throughput, modem available. It accommodates the most demanding Internet Service Providers (ISPs), Broadcasters and telco backhaul links by offering users the most advanced combination of space segment saving capabilities while minimizing overhead.

The CDM-780 offers a wide range of symbol rates (10 Msps to 500 Msps) and data rates (10 Mbps to >2.4 Gbps) simplex. In a duplex setting, this is >4.8 Gbps or 1 Gsps. There are two (2) onboard 1GbE / 2.5GbE / 10GbE Ethernet interfaces for user traffic supporting Super Jumbo Frames from 64 Bytes to >10,000 Bytes and will process Ethernet frames at line speed.

The CDM-780 can be configured to run as DVB-S2X (EN 302 307-2) or DVB-S2 (EN 302 307) open standard waveforms. All waveforms are interoperable with Adaptive Coding and Modulation (ACM) and Automatic Uplink Power Control (AUPC). The modem can also be fitted with single or redundant prime power supplies as an option as well as offering 1:1 redundancy.

Implementing Adaptive Coding and Modulation (ACM) operation 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.

By using the best encapsulation methods, the CDM-780 further increases throughput by using minimal overhead. The Ethernet bridge operation uses less than 1% overhead for encapsulation.

DVB-CID ETSI TS 103 129 is the ETSI standard for combating satellite interference and is largely based on Comtech EF Data's award-winning MetaCarrier® technology. MetaCarrier technology embeds and detects a small message and unique ID within a video or data satellite carrier. This embedded message and ID significantly reduce the time to identify and clear interference sources.

These technologies alone offer enormous savings to ISPs, Broadcasters and telco operators. When used in combination, however, the capacity savings cannot be matched. The innovative high-performance architecture of the CDM-780 allows efficient networking and transport over satellite links while supporting a wide range of applications and network topologies.

Features

- Modular design
  - Modem 1TX + 1RX
  - Demodulator only up to 3RX
  - Modulator only up to 3TX
  - Modem for antenna or satellite handover 1TX & 2RX
- Symbol Rate: 10 to 500 Msps
- Data Rate: 10 to >2.4 Gbps (Simplex), >4.8 Gbps (Duplex)
- DVB-S2 ETSI EN 302 307 & DVB-S2X EN 302 307-2 compliant
- ACM and CCM
- Embedded MetaCarrier DVB-CID ETSI TS 103 129

- GSE – low overhead <1% encapsulation
- Automatic Uplink Power Control (AUPC)
- Super Jumbo Frame 64 - 10,240 Byte Support
- Modulation: QPSK, 8PSK, 16APSK, 32APSK, 64APSK, 128APSK, 256APSK
- L-Band IF
- LNB power and 10MHz reference, BUC 10MHz reference
- Data Interfaces
  - 2 SFP Data Interfaces (RJ45-1GbE, RJ45-10GbE, or Optical)
  - Processes > 4.6M pps simplex, 9.2M pps duplex
- Supports FSS, HTS, GEO, MEO and LEO mode operation
- Management: HTTP, SNMP, Telnet, via (10M/100M) USB-C Serial with In-band (over satellite) M&C control
- 1:1 and 1:N redundancy switching available

Specifications

Symbol Rate Range	10 Msps to 500 Msps (Simplex) in 1 sps steps (modulation dependent over 64APSK)
Modulation Type	DVB-S2/S2X: ETSI EN 302 307 / 302 307-2 compliant
FECFrame	Normal (64,800 bits) or Short (16,200 bits)
Pilots	On or off
Alpha (Rolloff)	5%, 10%, 15%, 20%, 25%, 35%
Management	Front panel keypad / display RS-232 /485, or Dual 10M/100M/1GbE with SNMP, Telnet, HTTP
Reflash / FW Updates	Ethernet management port
Frequency Stability	Internal, stability ± 0.03 ppm
Form C	Modulator, demodulator and unit fault
Spectral Sense	Normal and Inverted
Configuration Retention	Non-volatile memory; returns upon power up

Options

Type	Option
FAST	Symbol rate options
FAST	ACM point to point client / controller
Hardware	Rack slides

Modulator

L-Band	950 to 2150 MHz in 100 Hz steps
Impedance / Connector	50 Ω, Type N female. Return loss ≥ 15 dB
Output Power	-40 to 0.0 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
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

L-Band	950 to 2150 in 100 Hz steps
Impedance / Connector	50 Ω, Type N female. Return loss 10 dB min.
Input Power	Desired carrier: Min. = -70 + 10Log (SR_{MSPS})dBm Max. = -20 + 10Log (SR_{MSPS}) dBm or +20 dBm whichever is less.
Maximum Composite	+20 dBm or = 43 – 10Log (SR_{MSPS}) dBc (whichever is less)

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-wire / 4-wire RJ-45 Ethernet (maximum Ethernet packet size 1536 bytes including Ethernet header & CRC)
TX & RX IF Connectors	SMA female (L-Band)
Ethernet Data Interfaces	2 x SFP Ports supporting either RJ-45 1GbE or RJ-45 10GbE or Optical Note: All Data GigE interfaces support super jumbo frames with a maximum Ethernet frame size of 10,240 bytes including Ethernet header & CRC

Test Functions

Data Test Pattern	2^10-1, 2^15-1, 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	100-240 VAC 50/60 Hz 43-60 VDC (48 VDC option) Dual PS (Optional)
Power Consumption 120 VAC at 60 Hz 230 VAC at 50 Hz 48 VDC	 88 W, 93 VA typical 88 W, 133 VA typical 85 W typical
Dimensions (1RU) (height x width x depth)	1.75” x 19” x 18” (48 x 47.4 x 4.4 cm)
Weight	15 lbs (6.8 kg)
AC Receptacles	IEC-60320-1, IEC-61058-1
Agency Compliance	CE Mark and FCC part 15

Accessories

Type	Option
1:1 Modem Redundancy	CRS-170A (L-Band)
1:N Modem Redundancy	CRS-500 L-Band (Future)

DVB-S2X Normal Block, Pilot ON, QEF (FER 1E-5)
Performance measured using 30Msps operation, 20% ROF and AWGN noise

MOD	FEC	Min SR (Msps)	Max SR (Msps)	Min DR (Mbps)	Max DR (Mbps)	Spec Eff (Bits / Hz)	QEF Eb/No	QEF Es/No
QPSK	1/4	10	500	4.8	240.0	0.48	1.1	-2.1
QPSK	13/45	10	500	5.5	277.1	0.55	0.7	-1.9
QPSK	1/3	10	500	6.4	320.0	0.64	0.9	-1.0
QPSK	2/5	10	500	7.7	385.0	0.77	1.0	-0.1
QPSK	9/20	10	500	8.7	434.0	0.87	0.9	0.3
QPSK	1/2	10	500	9.7	482.5	0.97	1.5	1.3
QPSK	11/20	10	500	10.6	531.3	1.06	1.3	1.6
QPSK	3/5	10	500	11.6	580.0	1.16	1.9	2.5
QPSK	2/3	10	500	12.9	645.5	1.29	2.2	3.3
QPSK	3/4	10	500	14.5	726.0	1.45	2.7	4.3
QPSK	4/5	10	500	15.5	774.5	1.55	3.0	4.9
QPSK	5/6	10	500	16.2	807.5	1.62	3.3	5.4
QPSK	8/9	10	500	17.2	862.0	1.72	4.0	6.4
QPSK	9/10	10	500	17.5	873.0	1.75	4.2	6.6
8PSK	5/9-L	10	500	16.1	804.9	1.61	2.7	4.8
8PSK	26/45-L	10	500	16.8	837.3	1.67	3.0	5.2
8PSK	3/5	10	500	17.4	870.0	1.74	3.7	6.1
8PSK	23/36	10	500	18.5	926.6	1.85	3.5	6.2
8PSK	2/3	10	500	19.4	968.0	1.94	3.6	6.5
8PSK	25/36	10	500	20.2	1007.7	2.02	4.1	7.1
8PSK	13/18	10	500	21.0	1048.2	2.10	4.4	7.6
8PSK	3/4	10	500	21.8	1089.0	2.18	4.8	8.2
8PSK	5/6	10	500	24.2	1211.0	2.42	5.8	9.6
8PSK	8/9	10	500	25.9	1293.0	2.59	6.9	11.0
8PSK	9/10	10	500	26.2	1309.0	2.62	7.1	11.3
16APSK	1/2-L	10	500	19.3	962.7	1.93	3.4	6.2
16APSK	8/15-L	10	500	20.6	1027.4	2.05	3.6	6.7
16APSK	5/9-L	10	500	21.4	1070.6	2.14	3.7	7.0
16APSK	26/45	10	500	22.3	1113.7	2.23	4.2	7.7
16APSK	3/5	10	500	23.1	1156.9	2.31	4.4	8.0
16APSK	3/5-L	10	500	23.1	1156.9	2.31	4.0	7.6
16APSK	28/45	10	500	24.0	1200.0	2.40	4.5	8.3
16APSK	23/36	10	500	24.7	1232.4	2.46	4.6	8.5
16APSK	2/3-L	10	500	25.7	1286.3	2.57	4.5	8.6
16APSK	2/3	10	500	25.8	1287.5	2.58	5.4	9.5
16APSK	25/36	10	500	26.8	1340.3	2.68	5.2	9.5
16APSK	13/18	10	500	27.9	1394.2	2.79	5.4	9.9
16APSK	3/4	10	500	29.0	1448.0	2.90	6.0	10.6
16APSK	7/9	10	500	30.0	1502.1	3.00	6.0	10.8
16APSK	4/5	10	500	30.9	1545.0	3.09	6.5	11.4
16APSK	5/6	10	500	32.2	1611.0	3.22	6.9	12.0
16APSK	77/90	10	500	33.1	1653.1	3.31	7.0	12.2
16APSK	8/9	10	500	34.4	1720.0	3.44	7.8	13.2
16APSK	9/10	10	500	34.8	1741.5	3.48	8.1	13.5
32APSK	2/3-L	10	500	32.2	1609.2	3.22	6.3	11.4
32APSK	32/45	10	500	34.3	1717.2	3.43	6.6	12.0
32APSK	11/15	10	500	35.4	1771.2	3.54	7.0	12.5
32APSK	3/4	10	500	36.2	1811.5	3.62	7.6	13.2
32APSK	7/9	10	500	37.6	1879.1	3.76	7.6	13.3
32APSK	4/5	10	500	38.7	1933.0	3.87	8.1	14.0
32APSK	5/6	10	500	40.3	2015.5	4.03	8.7	14.8
32APSK	8/9	10	500	43.0	2151.5	4.30	9.9	16.2
32APSK	9/10	10	500	43.6	2178.5	4.36	10.1	16.5
64APSK	32/45-L	10	500	41.1	2055.6	4.11	8.3	14.4
64APSK	11/15	10	500	42.4	2120.3	4.24	8.9	15.2
64APSK	7/9	10	500	45.0	2249.5	4.50	9.4	15.9
64APSK	4/5	10	500	46.3	2314.1	4.63	9.6	16.3
64APSK	5/6	10	500	48.2	2411.1	4.82	10.1	16.9
128APSK	3/4	10	450	50.5	2272.5	5.05	11.8	18.8
128APSK	7/9	10	450	52.3	2353.5	5.23	12.4	19.6
256APSK	29/45-L	10	400	49.6	1984.0	4.96	11.1	18.1
256APSK	2/3-L	10	400	51.3	2052.0	5.13	10.9	18.1
256APSK	31/45-L	10	400	53.0	2120.0	5.30	12.1	19.3
256APSK	32/45	10	400	54.7	2188.0	5.47	12.3	19.7
256APSK	11/15-L	10	400	56.4	2256.0	5.64	12.4	19.9
256APSK	3/4	10	400	57.7	2308.0	5.77	13.2	20.8

DVBS2, Normal Block, Pilot ON, QEF (PER 1E-7) Performance measured using 30Msps operation, 20% ROF and AWGN noise								
MOD	FEC	Min SR (Msps)	Max SR (Msps)	Min DR (Mbps)	Max DR (Mbps)	Spec Eff (Bits / Hz)	QEF Eb/No	QEF Es/No
QPSK	1/4	10	500	4.8	239.5	0.48	1.1	-2.1
QPSK	1/3	10	500	6.4	320.5	0.64	0.9	-1.0
QPSK	2/5	10	500	7.7	385.5	0.77	1.0	-0.1
QPSK	1/2	10	500	9.7	482.5	0.97	1.5	1.3
QPSK	3/5	10	500	11.6	580.0	1.16	1.9	2.5
QPSK	2/3	10	500	12.9	645.5	1.29	2.2	3.3
QPSK	3/4	10	500	14.5	726.0	1.45	2.7	4.3
QPSK	4/5	10	500	15.5	774.5	1.55	3.0	4.9
QPSK	5/6	10	500	16.2	807.5	1.62	3.3	5.4
QPSK	8/9	10	500	17.2	862.0	1.72	4.0	6.4
QPSK	9/10	10	500	17.5	873.0	1.75	4.2	6.6
8PSK	3/5	10	500	17.4	870.0	1.74	3.7	6.1
8PSK	2/3	10	500	19.4	968.0	1.94	3.6	6.5
8PSK	3/4	10	500	21.8	1089.0	2.18	4.8	8.2
8PSK	5/6	10	500	24.2	1211.0	2.42	5.8	9.6
8PSK	8/9	10	500	25.9	1293.0	2.59	6.9	11.0
8PSK	9/10	10	500	26.2	1309.0	2.62	7.1	11.3
16APSK	2/3	10	500	25.8	1287.5	2.58	5.4	9.5
16APSK	3/4	10	500	29.0	1448.0	2.90	6.0	10.6
16APSK	4/5	10	500	30.9	1545.0	3.09	6.5	11.4
16APSK	5/6	10	500	32.2	1611.0	3.22	6.9	12.0
16APSK	8/9	10	500	34.4	1720.0	3.44	7.8	13.2
16APSK	9/10	10	500	34.8	1741.5	3.48	8.1	13.5
32APSK	3/4	10	500	36.2	1811.5	3.62	7.6	13.2
32APSK	4/5	10	500	38.7	1933.0	3.87	8.1	14.0
32APSK	5/6	10	500	40.3	2015.5	4.03	8.7	14.8
32APSK	8/9	10	500	43.0	2151.5	4.30	9.9	16.2
32APSK	9/10	10	500	43.6	2178.5	4.36	10.1	16.5

CDM-780 Back Panel

2114 West 7th Street
Tempe, AZ 85281 USA
Phone +1.480.333.2200
Email sales@comtechefdata.com
www.comtech.com

15/04/2022