

CM

Digital Microwave Radios

**Operating at 6, 7, 8 & 11 GHz
With Capacities of 4, 8, 12, 28xDS1
DS3, 3xDS3, OC-3 & 2x100BaseT**

The CM offers bandwidth efficient long haul data transmission for common carrier, cellular and private user networks. Its unique combination of in-field upgrades, high system gain, rugged modular construction and powerful anti-fade mechanisms ensures years of reliable service.

The CM Series flagship product, providing reliable long haul data transmission at rates from 4DS1 to OC-3 in a single platform. In-field data rate upgrades, multiple system gain options, bandwidth efficiency, and a variety of protection configurations ensure that the CM is the cost effective solution for your current requirements with the flexibility to grow. All CM radios share a common architecture, regardless of data rate, protection configuration, or frequency. The design centers around a rack mounted chassis that houses a Customer Access Panel, a Signal Processing Card section, an RF Waveguide Filter compartment, and an RF Module section. This unique design allows simple data rate upgrades from the lowest to highest capacity by simply exchanging plug-in Signal Processing cards. The field-tunable synthesized RF transmitter and receiver modules are shared by all data rates.

Reliable

- 100% in-factory testing over temperature
- No active single point of failure in protected systems
- Multiple switching levels in protected terminals
- Thousands deployed around the world
- State of the art design

Flexible

- In-field data rate and protection configuration upgrade
- Signal processing common to all frequency bands
- RF transmitters and receivers common to all data rates
- Multiple system gain options
- Standard Automatic Transmit Power Control
- Non-protected, Space Diversity, 1+1 Protected configurations

Customer Satisfaction

Low Maintenance

- Fewer spares due to module commonality
- BER monitor, G.826 statistics
- Tributary, IF and RF loopback
- On-board alarm log
- SNMP or TeleScan Network Management
- All front access, hot-swappable modules

Upgrades

- 4DS1 to OC-3 upgrade in the same platform
- Data rate upgrades require front access only
- Non-protected to Protected upgrade
- Protected to Space Diversity upgrade
- Minimum down time during upgrade

Technical Specifications

System Parameters

Operating Frequencies (Channel Plans)	5.925 - 7.125 GHz (FCC Part 101, ITU Rec. 383-5) 7.125 - 7.9 GHz (ITU Rec. 385-6) 7.9 - 8.5 GHz (ITU Rec. 386-5) 10.7 - 11.7 GHz (FCC Part 101, ITU Rec. 387-7)
Transmitter Source	Synthesized VCO - $\pm 0.001\%$
Receiver Local Oscillator	Synthesized VCO - $\pm 0.001\%$
Intermediate Frequency	70 MHz
Residual BER	$<10^{-13}$

Service Channel

Data Channels (RS-232/RS-422)	
Quantity	2
Data Rate	19.2 kbps, async
Audio Channels	
Quantity/Frequency	2 x 300-3400 Hz
I/O Impedance	4-wire, 600 Ω
Input Level	-3.5 or -16 dBm
Output Level	-3.5 or +7 dBm

Orderwire (Optional)

Frequency	300-3400 Hz
Signaling	DTMF (Allows all-call, group and local)
Features	Talk Switch, 4-way/4-wire bridge

Wayside Traffic Unit (Optional)

(28DS1, DS3, 3DS3, SONET, 100BaseT only)	
Wayside Traffic Channel	1
Data Rate	1.544 Mbps
Connector	RJ-11 Jack

External Alarms/Controls (Additional with NMU)

External Alarms	4 x TTL (4 x TTL w/ P4 NMU)
External Control	4 x Form C dry contact (4 x TTL w/ P4 NMU)

Additional Branching Losses

Configuration	TX A	TX B	RX A	RX B
1 + 1 Protected	0 dB	1 dB	0.5 dB	10.5 dB
1 + 1 Space Diversity	0 dB	1 dB	0 dB	0 dB

Interface Parameters

Digital Interface	
DS1	1.544 Mbps, AML or B8ZS 100 Ω balanced, 50-pin connector
DS3	44.736 Mbps, B3ZS 75 Ω unbalanced, BNC connector
STS-3	155.52 Mbps, CMI 75 Ω unbalanced, BNC connector
OC-3	155.52 Mbps, 1310 nm, SC connector, multimode standard, single mode optional
10/100BaseT	Up to 100 Mbps, IEEE 802.3 2 x RJ-45 jack
Network Management	
SNMP	10BaseT, RJ-45 jack
P4-TeleScan	19.2 kbps RS-485, RJ-11 jack
Local Access	19.2 kbps RS-232, DB-9 jack

2 x 100BaseT + DS3

Channels	2 x 10/100BaseT auto-negotiating
Connector	2 x RJ-45 per channel, bridged
Bandwidth Priority	Channel 1 priority or No priority
Wayside	1 x DS3 in-band (can be disabled) 1 x DS1 out-of-band (optional)
Data Rate	155.52 Mbps

Electrical

Power Consumption (Non-protected / Hot standby)			
APC High	Std Pwr	High Pwr	Double HP
CM6	105 / 195 W	160 / 315 W	180 / 320 W
CM7/8	125 / 205 W	220 / 335 W	235 / 350 W
CM11	130 / 235 W	190 / 355 W	n/a
APC Low			
CM6	90 / 175 W	130 / 255 W	135 / 260 W
CM7/8	115 / 195 W	160 / 275 W	175 / 290 W
CM11	110 / 195 W	150 / 280 W	n/a
Input Voltage	± 19 to ± 60 Vdc		

Mechanical

Height	33.25 in. (19 RMUs)
Width	17.25 in. (19" rack)
Depth	10.25 in.
Weight	120 lbs.

Operating Environment

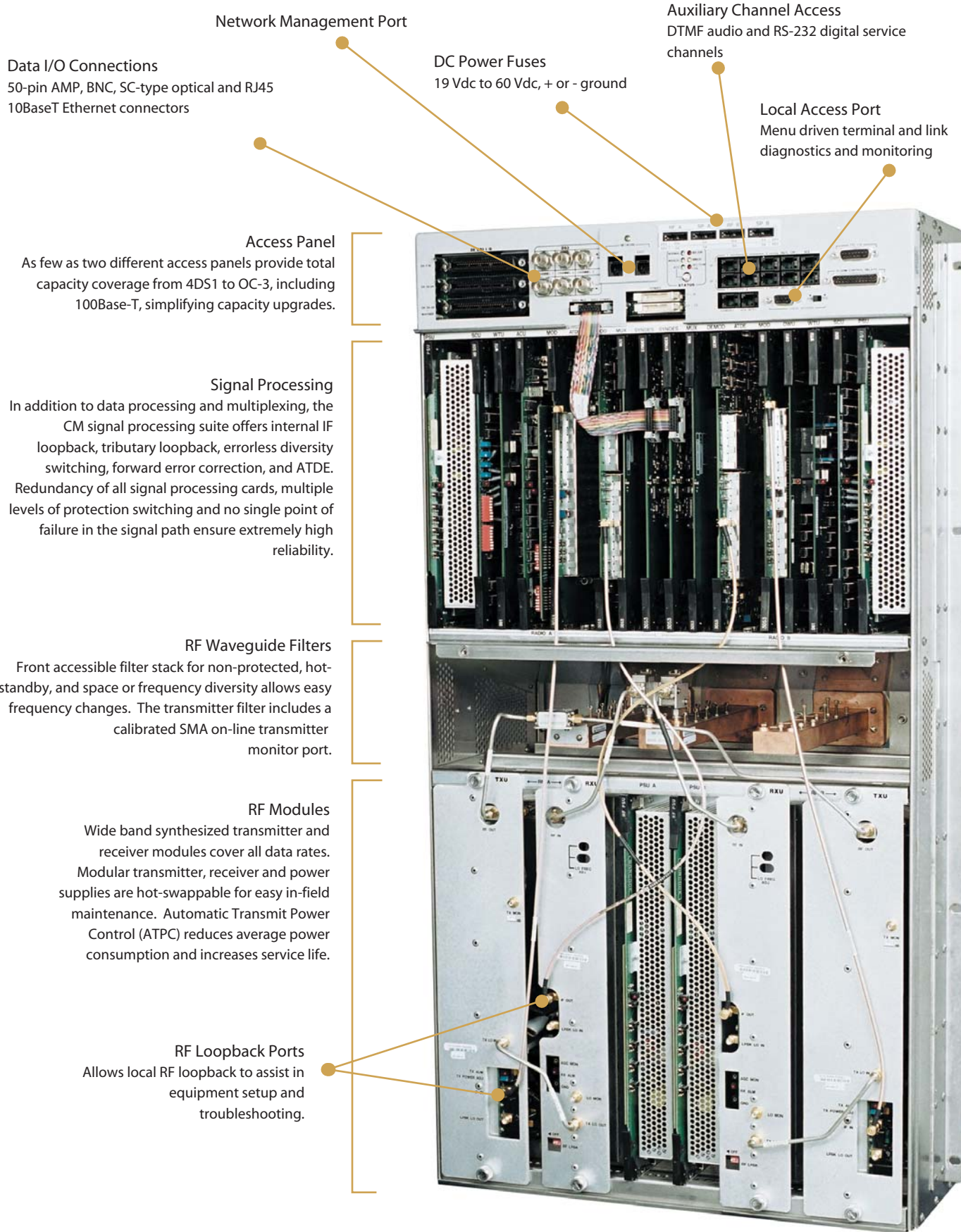
Altitude	15,000 ft.
Ambient Temperature	+32° to +122° F
Humidity	95% (no condensation)

Technical Specifications

System Gain (dB)	4DS1	8 DS1N	8DS1	12DS1	28DS1 DS3	3DS3	OC-3 STS-3	2 x 100BaseT + DS3	
CM6	122.5	110.5	118.5	110.0	110.5	105.5	101.0	101.0	
CM7/8	122.5	110.5	118.5	110.0	110.5	105.5	102.0/101.0	102.0/101.0	
CM11	117.5	105.5	113.5	105.0	105.5	100.5	98.0	98.0	
Transmitter									
Modulation	16 QAM	128 QAM	All capacities, synthesized VCO			64 QAM	64 QAM	128 QAM	128 QAM
Channel Bandwidth (MHz)	2.50	2.50	3.75	3.75	10.0	30.0	30.0	30.0	
Aggregate Data Rate (Mbps)	7.72	13.52	14.42	20.19	49.12	142.94	166.77	166.77	
Emission Designator	2M50D7W	2M50D7W	3M50D7W	3M50D7W	10M0D7W	30M0D7W	30M0D7W	30M0D7W	
Output Power (dBm) ¹									
Standard Power (ATPC high)									
CM6	22.5	20.5	22.5	20.5	22.5	22.5	20.5	20.5	
CM7/8	23.0	21.0	23.0	21.0	23.0	23.0	23.0	23.0	
CM11	22.0	20.0	22.0	20.0	22.0	22.0	22.0	22.0	
High Power (ATPC high)									
CM6	29.0	27.0	29.0	27.0	29.0	29.0	28.0	28.0	
CM7/8	29.0	27.0	29.0	27.0	29.0	29.0	28.0	28.0	
CM11	28.0	26.0	28.0	26.0	28.0	28.0	28.0	28.0	
DHP									
CM6	32.0	30.0	32.0	30.0	32.0	32.0	30.0	30.0	
CM7/8	32.0	30.0	32.0	30.0	32.0	32.0	31.0/30.0	31.0/30.0	
CM11	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
Receiver									
10 ⁻⁶ BER Threshold (dBm) ¹			All capacities, synthesized VCO						
CM6	-88.5	-78.5	-84.5	-78.0	-76.5	-71.5	-69.0	-69.0	
CM7/8	-88.5	-78.5	-84.5	-78.0	-76.5	-71.5	-69.0	-69.0	
CM11	-87.5	-77.5	-83.5	-77.0	-75.5	-70.5	-68.0	-68.0	
10 ⁻³ BER Threshold (dBm) ¹									
CM6	-90.5	-80.5	-86.5	-80.0	-78.5	-73.5	-71.0	-71.0	
CM7/8	-90.5	-80.5	-86.5	-80.0	-78.5	-73.5	-71.0	-71.0	
CM11	-89.5	-79.5	-85.5	-79.0	-77.5	-72.5	-70.0	-70.0	
Dispersive Fade Margin (dB)									
10 ⁻³ BER, w/ATDE	67.5	63.5	66.0	62.0	62.0	50.0	49.0	49.0	
10 ⁻⁶ BER, w/ATDE	66.0	62.0	64.0	60.0	60.0	48.5	47.0	47.0	

Footnotes:

1) Measured at the antenna port. These are typical specifications for non-protected systems and are subject to change without notice.



Network Management Port

Auxiliary Channel Access
DTMF audio and RS-232 digital service channels

Data I/O Connections
50-pin AMP, BNC, SC-type optical and RJ45
10BaseT Ethernet connectors

DC Power Fuses
19 Vdc to 60 Vdc, + or - ground

Local Access Port
Menu driven terminal and link diagnostics and monitoring

Access Panel
As few as two different access panels provide total capacity coverage from 4DS1 to OC-3, including 100Base-T, simplifying capacity upgrades.

Signal Processing
In addition to data processing and multiplexing, the CM signal processing suite offers internal IF loopback, tributary loopback, errorless diversity switching, forward error correction, and ATDE. Redundancy of all signal processing cards, multiple levels of protection switching and no single point of failure in the signal path ensure extremely high reliability.

RF Waveguide Filters
Front accessible filter stack for non-protected, hot-standby, and space or frequency diversity allows easy frequency changes. The transmitter filter includes a calibrated SMA on-line transmitter monitor port.

RF Modules
Wide band synthesized transmitter and receiver modules cover all data rates. Modular transmitter, receiver and power supplies are hot-swappable for easy in-field maintenance. Automatic Transmit Power Control (ATPC) reduces average power consumption and increases service life.

RF Loopback Ports
Allows local RF loopback to assist in equipment setup and troubleshooting.

