

SYSTEM DESCRIPTION

Operating in the 10 and 2 GHz frequency bands, DMC's high-performance M-SE Series Digital Microwave Radios provide the microwave solution for point-to-point, medium-capacity applications of cellular network operators, common carriers, corporate networks, and government networks.

Available in various capacities, the basic non-protected terminal includes a Modem Unit, an RF Unit, an Installation Kit, and Coaxial Cable for the Modem-RF Unit interconnection. Monitored-Hot-Standby systems with redundant circuitry are also available for on-line protection switching. The Modem Unit, which contains the digital signal processing and multiplex circuitry, interfaces with either AMI or B8ZS coded DS1 terminal equipment. The Modem Unit installs indoors on a desktop or in a standard equipment rack or cabinet. The RF Unit typically mounts directly behind the antenna to minimize transmission line losses. As an alternative, the RF Unit can be pole-mounted below the antenna, or indoor-mounted in an equipment rack. The Modem Unit and RF Unit can be separated by up to 1000 feet of coaxial cable, thereby providing flexibility in location of the equipment.

Complete system diagnostics and maintenance features are standard on all M-SE Series Radios. The performance of the Modem Unit and RF Unit is displayed by the LED indicators on the front panel of the Modem Unit. M-SE Series Radios also provide local display of the far-end status and alarm indicators, allowing complete system maintenance from one end of the microwave link. In addition to local loopback testing, the Modem Unit provides

integral remote loopback testing on an individual T1 basis. These features combine to allow rapid troubleshooting without requiring expensive external test equipment.

Forward Error Correction (FEC) comes standard with the M-SE product line. This feature extends the performance of the receiver by correcting transmission errors before the digital signal is delivered to the customer premise equipment. By providing 3 dB of improvement to the system gain of the radio, FEC translates into smaller antennas, longer radio paths, improved bit error rate (BER) performance and better overall path reliability.

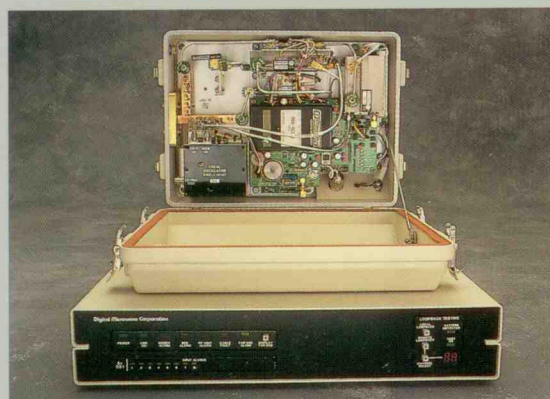
In addition to these standard features, the M-SE Series product line offers several useful options. Synthesized options of the RF Units utilize a synthesized phase-locked oscillator as the frequency source. For the operator of a multi-hop system, this means that sparing of the phase-locked oscillator is less costly because one spare oscillator can be quickly tuned across multiple RF channels within the same band. This enables its use at several different transmit frequencies, allowing the operator to use one oscillator as a spare for

many terminals. In addition, this option is beneficial for users who expect to move their systems in the future and therefore may need to change frequencies. Similarly, system implementation is less impacted by last minute frequency changes prior to installation.

DMC Net is a monitor and control system consisting of a personal computer and DMC provided software which interfaces directly to standard M-SE Series product. It eliminates the need for additional alarm supervisory systems by allowing full diagnostic monitoring, maintenance and control of DMC M-SE Series radios. Additionally, a network including other DMC microwave radios, DMC fiber optic products, and external equipment alarms can be integrated and maintained with a single DMC Net master terminal.

Other options include a built-in voice-frequency orderwire with a standard telephone set interface and a 0-9600 bit/second RS-232C data port. For installations where -48 VDC is not available, the Modem can be equipped with an Alternate Power Input Card that accepts a DC input of ± 12 to 32 VDC and provides emergency battery backup.

DMC M-SE Series Modem Unit and Outdoor RF Unit



FEATURES

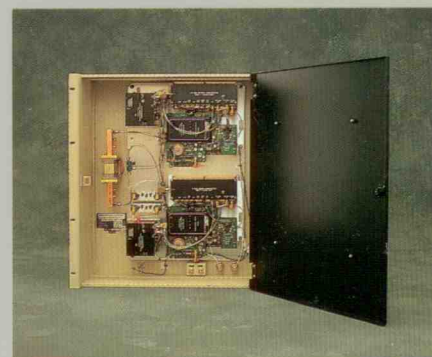
- High System Gain ensures reliable operation on long paths and in adverse weather conditions
- Forward Error Correction Coding for Maximum Reliability and Data Integrity
- Built-in Multiplexing of up to 4 DS1 (FCC) or 8 DS1 (Canadian DOC), saving on associated costs for an external multiplexer

Built-in Diagnostics and Local and Remote Loopback Testing features are easy-to-use, simplifying installation, eliminating the need for extensive training, and saving costs in maintenance and test equipment

- Low Power Consumption means less heat dissipation, resulting in improved equipment reliability, longer equipment life and allowing installation in almost any location
- Easy-to-use coaxial cable connects RF Unit to Modem Unit with up to 1000' separation, allowing flexibility in system design and simplifying installation
- Local LED display of far-end status and alarm indicators allows a single technician to diagnose a complete link from one site location
- Compact size saves space and makes easy installation possible in many environments

SYSTEM OPTIONS

- Synthesized frequency source enables operator to change frequency of radio by changing switch settings, making the equipment flexible in the event of system relocation, reducing the costs of sparing, and making system planning easier
- DMC Net allows full diagnostic monitoring, maintenance, and control of network from a single location
- Outdoor or Indoor RF Mounting minimizes waveguide requirements and offers flexibility in system planning, installation, and maintenance
- Alternate Power Input allows a DC input of ± 12 to 32 VDC and provides internal battery backup for flexibility in installation
- Orderwire provides an additional voice and data circuit during installation, maintenance, and servicing
- Monitored Hot-Standby Configuration offers complete equipment redundancy for critical applications



DMC M-SE Series Protected Indoor RF Unit

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DMC M-SE SERIES SYSTEM PERFORMANCE

TRANSMITTER

Power Output (Guaranteed at RF Unit antenna port)
 Standard Power

DMC 2M-SE

+29 dBm (794 mW)

DMC 10M-SE

+19.5 dBm (89 mW)

Frequency Stability
 Frequency Source (Standard)

±0.001%
 Synthesizer

±0.0003%
 Phase - Locked Oscillator or Synthesizer

RECEIVER

Type
 Sensitivity at 10⁻⁶ BER (Guaranteed at RF Unit antenna port)
 4 x DS1
 Forward Error Correction
 Unfaded BER
 Maximum Input Signal Level at 10⁻⁶ BER

Dual Conversion
 -86 dBm
 Standard
 10⁻¹² or better
 -25 dBm

Dual Conversion
 -84 dBm
 Standard
 10⁻¹² or better
 -25 dBm

SYSTEM GAIN at 10⁻⁶ BER (Guaranteed at RF Unit antenna port)

Standard Power
 4 x DS1

115 dB

103.5 dB

Additional Losses for Protected Terminals

Xmtr Rcvr (A/B)

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MHSB Xmtr and Rcvr - With Unequal Loss Coupler

1 dB 1.5 /11 dB

1 dB 1.5 /11 dB

MHSB Xmtr and Rcvr - With Equal Loss Splitter

1 dB 4.0 /4.0 dB

1 dB 4.0 /4.0 dB

DMC M-SE SERIES GENERAL SPECIFICATIONS

GENERAL

Operating Frequency *
 Xmt/Rcv Spacing (Standard)
 RF Channel Spacing
 Modulation Type
 RF Connector (Standard)
 Digital Capacity
 Standard Voice Channel Capacity
 Digital Interface
 Digital Input/Output Connections
 Line Build-Out (LBO)
 Digital Line Code
 Modem and RF Unit Interface
 Connector Type
 Recommended Coaxial Cable
 Maximum Separation

2.110 - 2.180 GHz
 50 MHz
 3.2 MHz
 16 QAM
 Coaxial N-Type Female
 4 x DS1
 96
 DSX-1 (1.544 Mbit/s)
 5-Pin Screw Terminals
 Switch-Selectable Electronic LBO
 AMI or B8ZS (Switch-Selectable)
 Coaxial N-Type Female
 RG-8 (Belden 9913 or Equivalent)
 1,000 Feet

10.55 - 10.68 GHz
 65 MHz
 2.5 MHz
 16 QAM
 CPR-90

ENVIRONMENTAL

Altitude
 Temperature Range
 RF Unit
 Modem
 Relative Humidity
 RF Unit
 Modem

Up to 15,000 feet
 0°C to +40°C (+32°F to +104°F)
 0°C to +40°C (+32°F to +104°F)
 95% at +40°C
 95% at +40°C

Up to 15,000 feet
 -30°C to +55°C (-22°F to +131°F)
 0°C to +40°C (+32°F to +104°F)
 Up to 100% (all-weather operation)
 95% at +40°C

* Consult DMC Sales Representative for Frequency Plan Availability.

POWER REQUIREMENTS

Source
Allowable Input Range
Optional Input Power

Power Consumption (Typical)
Non-Protected
4 x DS1

Monitored-Hot-Standby
4 x DS1

DMC 2M-SE

-48 VDC, positive ground
-41 to -56 VDC

Standard Power
80 Watts

175 Watts

DMC 10M-SE

-48 VDC, positive ground
-41 to -56 VDC
 ± 12 to 32 VDC input
(internal battery charges
between ± 15 to 32 VDC)

Standard Power
55 Watts

125 Watts

MECHANICAL

Dimensions (H x W x D)
Weight

MODEM

3.5" x 17.0" x 15.9"
17.0 lbs

RF UNIT

21.0" x 19.0" x 8.0"
25.0 lbs

MODEM

3.5" x 17.0" x 15.9"
17.0 lbs

RF UNIT

15.0" x 10.6" x 5.7"
23.0 lbs

ORDERWIRE AND DATA CHANNEL

General

Station Addressing

Up to 800 Stations

Orderwire Ports

Customer Port Interface

Telephone Connector

RJ-11 (modular jack)

VF Bandwidth

300 - 3400 Hz

Signaling

Dual Tone Multiple Frequency (DTMF)

Analog Expansion/Alarm Ports

Interface

600 Ω , unbalanced

Connector

5-Pin Screw Terminal

Frequency

300 - 3400 Hz

Level

0 dBm

Digital Data Port Interface

0-9600 bit/s, asynchronous

Interface

RS-232C

Connector

Female Sub-Miniature DB-9 Connector

Power

Source

Internal to M-SE Series Modem Unit

Power Consumption

5 Watts, Nominal

FCC AND REGULATORY INFORMATION

DMC 2M-SE

Standard Power

FCC Identifier

DYH6RMDMC2M-04

FCC Transmitter Code

300-051

Emission Designator

3M50D7W

FCC Rules

Part 21

Frequency Range

2,110 to 2,180 MHz

Frequency Tolerance

0.001%

Maximum Power Output

2.000 Watts

Minimum Power Output

0.794 Watts

Typical Power Output

1.000 Watts

DMC 10M-SE

Standard Power

DYH6RMDMC10S-04

27VL-01

2M50D7W

Part 21 and Part 94

10,550 to 10,680 MHz

0.0003%

0.200 Watts

0.089 Watts

0.112 Watts