## SYSTEM DESCRIPTION

Operating in the 23 GHz frequency band, DMC's high-performance LC-Series Digital Microwave Radios provide the economical microwave solution for point-to-point, short-haul applications of corporate networks, cellular network operators, common carriers and government networks.

Available with 4 DS1 or 8 DS1 capacity, the basic non-protected terminal includes a Modem Unit, an RF Unit, an Installation Kit, and Coaxial Cable. 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 either 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 LC-Series Radios. The performance of the Modem and RF Units is displayed by the LED indicators on the front panel of the Modem Unit. LC-Series Radios also provide local display of the far-end status and alarm indicators, allowing diagnosis from one end of the system. In addition to local loopback testing, the LC-Series Modem Unit provides integral remote loopback testing on an individual T1 basis. These features combine to allow rapid troubleshooting without expensive external test equipment.

In addition to these standard features, the LC-Series product line offers several useful options, including DMC Net, the Alternate Power Input Card, Forward Error Correction (FEC), and orderwire. DMC Net is a network monitor and control system consisting of a personal computer and DMC provided software which interfaces directly with standard LC-Series product. It eliminates the need for additional alarm supervisory systems by allowing full diagnostic monitoring, maintenance and control of DMC LC-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.

The Forward Error Correction (FEC) option 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.

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 a Alternate Power Input Card that accepts either a DC input of ±12 to 32 VDC or an AC input of 120 VAC or 220 VAC and provides battery backup.

***DMC LC Series Modem Unit and Outdoor RF Unit***

Digital Microwave Corporation

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## DMC LC SERIES SYSTEM PERFORMANCE

### TRANSMITTER

| | DMC 23LC |
|---|---|
| Power Output (at RF Unit antenna port) | +16 dBm (40 mW) |
| Frequency Stability | ±0.02% |
| Frequency Source | Dielectric Resonator Oscillator |

### RECEIVER

| | |
|---|---|
| Type | Dual Conversion |
| Sensitivity at $10^{-6}$ BER (at RF Unit antenna port) | |
| 4 x DS1 | -77 dBm |
| 8 x DS1 | -77 dBm with FEC |
| Unfaded BER | $10^{-10}$ or better |
| Unfaded BER with FEC | $10^{-12}$ or better |
| Maximum Input Signal Level at $10^{-6}$ BER | -25 dBm |

### SYSTEM GAIN at $10^{-6}$ BER (Guaranteed value at RF Unit antenna port)

| | | |
|---|---|---|
| 4 x DS1 | 93 dB | |
| 8 x DS1 | 93 dB with FEC | |
| Forward Error Correction (Optional for 4x DS1, standard for 8 x DS1) (Add to System Gain if equipped with FEC option) | 3 dB | |
| Additional Branching Losses (For Protected Terminals) | **On-Line** | **/ Standby** |
| MHSB Xmtr | 2.5 dB | 2.5 dB |
| MHSB Rcvr | 2.5 dB | 15.5 dB |

## DMC LC SERIES SPECIFICATIONS

### GENERAL

| | |
|---|---|
| Operating Frequency * | 21.2 - 23.6 GHz |
| Xmt/Rcv Spacing | 1200 MHz |
| RF Channel Spacing | 50 MHz |
| Modulation Type | ASK |
| RF Connector | SMA |
| Digital Capacity | 4 and 8 x DS1 |
| Standard Voice Channel Capacity | 96 and 192 |
| Digital Interface | DSX-1 (1.544 Mbit/s) |
| Digital Input/Output Connections | |
| 4-Port Systems | 5 - Pin Screw Terminals |
| 8-Port Systems | 25 - Pair Connectors, Cross-Connect Panels Available |
| Line Build-Out (LBO) | Switch - Selectable Electronic LBO |
| Digital Line Code | AMI or B8ZS (Switch-Selectable) |
| Modem and RF Unit Interface | |
| Connector Type | Coaxial Type F Connector |
| Recommended Coaxial Cable | RG-6 (Belden 9248 or Equivalent) |
| Maximum Separation | 1,000 Feet |

* Consult DMC Sales Representative for Frequency Plan Availability.

## ENVIRONMENTAL

| | |
|---|---|
| Altitude | Up to 15,000 feet |
| Temperature Range | |
| RF Unit/Antenna | -30°C to +55°C (-22°F to +131°F) |
| Modem | 0°C to +40°C (+32°F to +104°F) |
| Relative Humidity | |
| RF Unit/Antenna | Up to 100% (all-weather operation) |
| Modem | 95% at +40°C |

## POWER REQUIREMENTS

| | |
|---|---|
| Source-48 VDC, positive ground | |
| Allowable Input Range | -41 to -56 VDC |
| Optional Input Power | ±12 to 32 VDC, 120 VAC |
| (internal battery charges between ±15 to 32 VDC) | |
| Power Consumption (Typical) | |
| Non-Protected | |
| 4 x DS1 | 35 Watts |
| 8 x DS1 | 40 Watts |
| Monitored-Hot-Standby (Protected) | |
| 4 x DS1 | 85 Watts |
| 8 x DS1 | 90 Watts |

| MECHANICAL | MODEM | RF UNIT |
|---|---|---|
| Dimensions (H x W x D) | 3.5" x 17.0" x 15.2" | 7.0" x 4.3" x 3.6" |
| Weight | 14.5 lbs | 5.25 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 Alarm & Expansion Port | |
| Interface | 600Ω, 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 LC Series Modem Unit |
| Power Consumption | 5 Watts, Nominal |

## FCC AND REGULATORY INFORMATION

| | |
|---|---|
| FCC 4 x DS1 Identifier | DYH6RMDMC23LC-04 |
| FCC Transmitter Code | 278E-01 |
| Emission Designator | 25M0A7W |
| FCC 8 xDS1 Identifier | DYH6RMDMC23LC-08 |
| FCC Transmitter Code | Pending |
| Emission Designator | 50M0A7W |
| FCC Rules | Part 21 and Part 94 |
| Frequency Range | 21,200 to 23,600 MHz |
| Frequency Tolerance | 0.02% |
| Maximum Power Output | 0.100 Watts |
| Minimum Power Output | 0.040 Watts |
| Typical Power Output | 0.050 Watts |