

# Trio M-Series Licensed Digital Data Radios

## Features:

- 400-520MHz band operation
- Up to 9600bps true over-air data rates
- Unique C/DSMA collision avoidance
- Synthesized digital data radio design
- High-frequency stability
- Compatible with E-Series Base/Repeater and Hot-Standby Base stations
- Local and Remote programming/diagnostics
- Multistream™ simultaneous data stream
- Configurable Stream Identifier Codes
- TView+ - user friendly configuration and diagnostics interface
- 3-Year Warranty (parts and labor)



**Trio M-Series** licensed UHF radio modems are designed to provide the reliable transmission of data for SCADA, telemetry and other information, and control applications. M-Series radios use advanced digital modulation and signal processing techniques to achieve exceptionally high data throughput efficiency using traditional licensed narrow band radio channels. M-Series radios are available in a wide range of frequency bands and carry the best warranty in the industry.

As with all Trio radio solutions, M-Series radios can be rapidly deployed as a permanent or temporary alternative to wired communication networks which are costly to install and difficult to modify. When integrated into legacy systems or used as the communications backbone of a new system, Trio radios instantly bring up-to-date communication technology and performance to your network.

### Applications

Trio M-Series radios are used across a wide range of industrial markets in point-to-point and point-to-multipoint applications. They are often used for remote interconnection of PLCs, RTUs,

data loggers, and other data monitoring and control devices. M-Series radios are compatible with the powerful Trio E-Series Base Stations and Hot-Standby units and can be ordered as a CSA Class I, Division II-compliant product.

### Features

Designed for maximum value and functionality Control Microsystems has incorporated a wide range of state-of-the-art features in the M-Series radio:

**Data modem:** Advanced technology DSP-based GMSK digital data modem featuring built-in error checking and true 2400/4800bps, 4800/9600bps or 9600bps over-the-air data rates. M-Series radios boast intelligent transmitter control (auto Tx on data), simplex and half-duplex operational modes and support industry-standard protocols including Modbus, DNP3 and IEC 60870-5-101.

**Radio:** Synthesized digital data radio design with High-frequency stability and software-selectable Tx and Rx frequencies. These highly flexible radios are universally applicable with compliance to FCC and ETSI radio communication regulatory requirements.

### Configuration and Management

All Trio radios offer maximum versatility by providing local and over-the-air configuration options.

#### TView+

As the Network Management and Remote Diagnostics environment for all Trio radios this tool helps to eliminate system down-time and reduce maintenance costs. The software incorporates a wide range of efficient network management utilities including error rate testing, channel occupancy statistics and data error statistics. TView+ also includes a diagnostics utility that permits monitoring and logging of radio performance parameters for all units in the network.

### Design and Environmental

Trio M-Series radios are built using a compact, lightweight housing ensuring maximum reliability together with ease-of-installation and serviceability. Full specification operation is guaranteed over the entire -30 to +60°C, [-22 to 140°F] temperature range.

**MR450 Specifications**

<b>Functional</b>	
<b>Location</b>	Remote station
<b>Licensed Radio Frequency Range</b>	400-470MHz or 450-520MHz
<b>Operational Modes</b>	Simplex and half-duplex
<b>RF Channel Data Rate</b>	2400/4800bps, 4800/9600bps or 9600bps
<b>Features</b>	
<b>Configuration Interface</b>	TView+ (Windows™-based GUI software) for configuration, network management and diagnostics
<b>Radio Frequency Accuracy</b>	± 1.5ppm (-30 to 60°C) [-22 to 140°F] ambient
<b>Transmitter</b>	Power: 0.1 to 5W (+20 to +37dBm) ± 1dB, software-adjustable Modulation: Narrow band GMSK PTT Control: Auto [Data] / RTS line
<b>Receiver</b>	Sensitivity: -116dBm for 12dB SINAD Intermodulation: Better than 65dB Spurious Response: Better than 70dB Mute: Programmable digital mute
<b>Connections</b>	User Data Port: DE-9 female port wired as DCE (modem) Separate connections on DB9 for simultaneous user and diagnostics data Configurable as User or Trunk Antenna: N female bulkhead Power: 2 pin locking, mating connector supplied LED Display: Multimode LED Indicators for Pwr, Tx, Rx, Sync, Data Port TxD and RxD data
<b>Modem</b>	Data Serial Port: RS-232, DCE, 300-19,200bps asynchronous Diag. Connection: RS-232, 19,200bps asynchronous Data Interface: 3-wire data interface (TxD, RxD & GND) RF carrier-driven DCD output for collision management Analog Interface: Tx/Rx analog interface for external FSK/FFSK modems Data Buffer: 8Kbyte of on-board RAM Bit Error Rate: < 1x10 <sup>-6</sup> @ -115dBm (2400 bps) < 1x10 <sup>-6</sup> @ -114dBm (4800 bps) < 1x10 <sup>-6</sup> @ -106dBm (9600 bps) Collision Avoidance: Channelshare™ supervisory channel C/DSMA collision avoidance system Data Stream: Simultaneous delivery of multiple data streams (protocols) provided by Multistream™
<b>General</b>	Temperature: -30 to +60°C, [-22 to 140°F] Power Supply: 13.8VDC nominal (10-16VDC) Transmit Current: 600mA nominal @ 1W 1500mA nominal @ 5W Receive Current: < 170mA nominal Enclosure: Solid die-cast alloy Dimensions: 154 x 102 x 29 mm (6.1 x 4.1 x 1.2 inches) Weight: 0.32kg (0.71lbs)
<b>Diagnostics</b>	Network-wide operation from any remote terminal Non-intrusive protocol - runs simultaneously with the application Over-the-air re-configuration of all parameters Storage of data error and channel occupancy statistics In-built error rate testing capabilities
<b>Approvals and Certifications</b>	FCC PART 15, PART 90 IC RS119, ICES-001 ACA AS4295-1995 (Data) ETSI EN300 113 Optional CSA Class I, Division II, Groups (A, B, C, D) for Hazardous Locations (ANSI/UL equivalent)
<b>Warranty</b>	3-Year parts and labor

**Model Code**

Tyxxx-aabbb-cde represents the part number matrix

Code T	Select: Model Type
M	M-Series
Code y	Select: Unit Type
R	Remote Station
Code xxx	Select: Generic Frequency Band
450	Generic 450MHz
Code aa	Select: Frequency (400MHz bands)
M	400 to 470MHz [Tx & Rx]
H	450 to 520MHz [Tx & Rx]
Note: Other frequency bands available upon request.	
Code bbb	Select: RF Channel Data Rate & Bandwidth (Internal Modem)
000	Analog only 12.5kHz
001	2400bps 12.5kHz / 4800bps 25kHz
002	4800bps 12.5kHz / 9600bps 25kHz
003	FCC/IC 9600bps 12.kkHz
004	ETSI 4800bps 12.5kHz

Code c	Select: Options 1
D	Diagnostics
Code d	Select: Options 2
H	Hazardous Environment Class1 Div2
Note: Specify internally or externally fitted duplexers. Externally fitted require feeder tails.	
Code e	Select: Hot Standby Configurations
0	No Options

**Communications Standards:**

- FCC – Federal Communications Commission (USA)
- IC – Industry Canada
- ETSI – European Telecommunication Standards Institute
- ACA – Australian Communications Authority

**Example: MR450-M003-DH0** specifies: Trio M-Series, Remote Station, Generic 450MHz band with a specific frequency range of 400 to 470MHz, a 9600bps modem with a bandwidth of 12.5kHz, Diagnostics, Class1 Div2.

**Accessories** (Contact Sales Support Department for up-to-date list)

Description	Part Number
<b>Programming and Communication Cables</b>	
TView+ M-Series Programming and User Data Cable	297817
Trio Communication Cable, DE-9M to DE-9F - Modem, 10 feet (3.05m)	297820
Trio Communication Cable, DE-9M to RJ45M - Modem, 10 feet (3.05m)	297821
<b>Other</b>	
TView+ Configuration/Diagnostics software package	297826

Physical Dimensions - Licensed Digital Data Radio - M-Series

