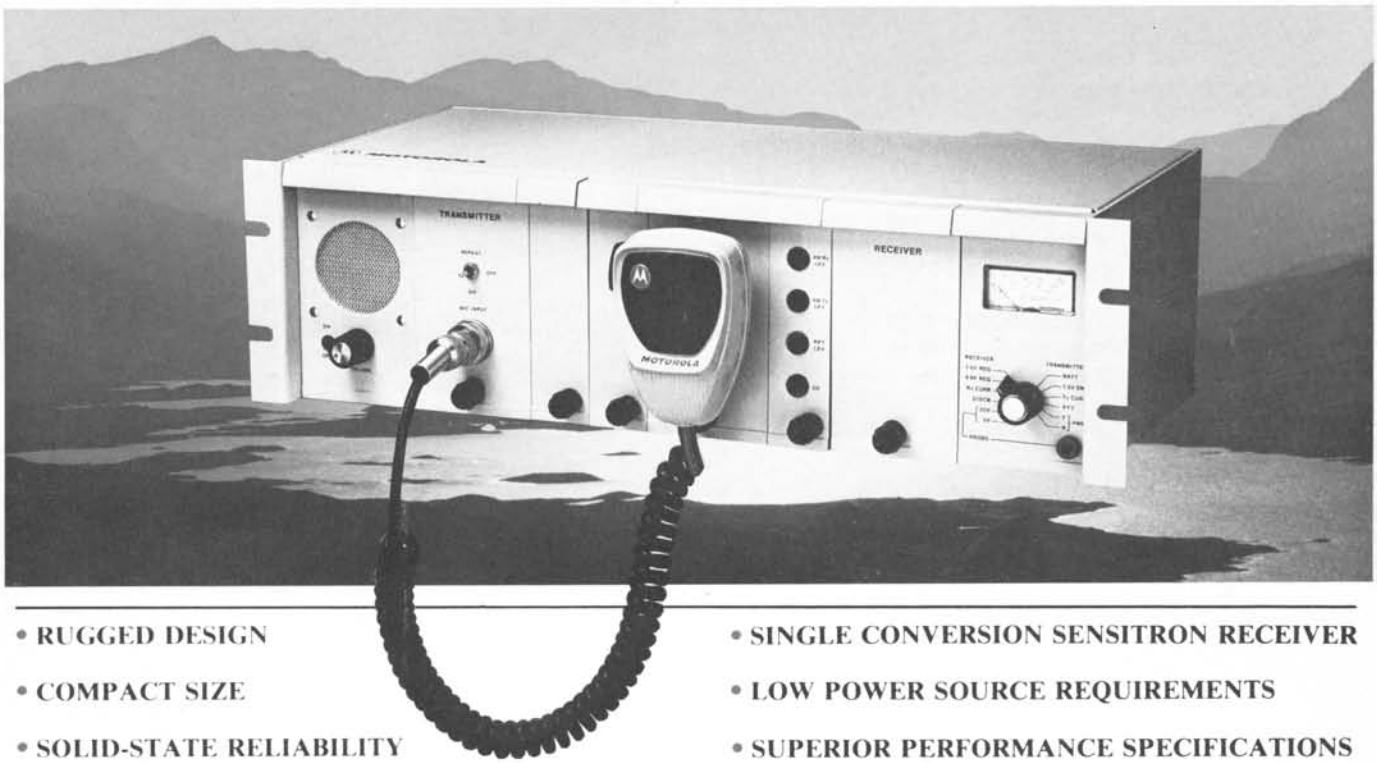
Eq.Cat	Sec.	Item
R40	2.1	88

MOTOROLA

MTR-300
Mountain Top Repeater
136-174 MHz, 5W
403-430 MHz, 4W
440-470 MHz, 4W



- RUGGED DESIGN
- COMPACT SIZE
- SOLID-STATE RELIABILITY
- PLUG-IN HYBRID CIRCUITRY
- SELF CONTAINED MODULES
- UNIQUE PHASE-LOCK LOOP TRANSMITTER
- SINGLE CONVERSION SENSITRON RECEIVER
- LOW POWER SOURCE REQUIREMENTS
- SUPERIOR PERFORMANCE SPECIFICATIONS
- DUPLEX, SEMIDUPLEX, OR SIMPLEX OPERATION

GENERAL

Motorola MTR-300 Mountain Top Repeater is a fully solid-state trunk/drop terminal designed to be used at remote sites.

A low power requirement and very reliable maintenance free operation make this terminal ideal for use at the sites where no commercial AC power is available or where maintenance costs would otherwise be high.

The unit can operate as a standard mobile repeater with T/R spacing as close as 300 KHz. Non standard UHF offset frequencies are also available. A high receiver selectivity, narrow channel spacing (25 or 30 KHz) and very good receiver spurious response allow use of MTR-300 at multi-station sites. The low transmitter spurious output eliminates transmitter intermodulations at crowded sites.

The MTR-300 Mountain Top Repeater can also be used as a trunk terminal. The basic unit is equipped with 4-wire 600 ohm unbalanced input/output. Good performance characteristics of the station ensure a high quality audio channel (typical per hop audio frequency response is flat within $\pm$ 1.0 dB and distortion is less than 3% per hop).

A modular design is employed throughout the unit. The basic sub-assemblies (Transmitter, receiver, repeater control) are self contained modules. The transmitter and receiver are built using plug-in hybrid circuits.

MTR-300 MOUNTAIN TOP REPEATER

FEATURES

Solid-State Reliability

The MTR-300 transmitter and receiver employ advanced microelectronic technology. The sub-assemblies are built as self contained plug-in hybrid modules. Integrated circuits, thick film and thin film components are used throughout the plug-in modules ensuring reliable performance. Very low power consumption is required for the circuit operation. A minimum number of modules is used to achieve longer equipment life and lower operating costs.

MTR 300 Mountain Top Repeater [receiver extends for serviceability]

Compact Size

The compact size of the unit allows various installation arrangements. The unit can be mounted on a standard 19" rack, floor mounted or ceiling mounted. Metal parts of the station are made from high quality aluminum ensuring a long unit life without corrosion or rusting.

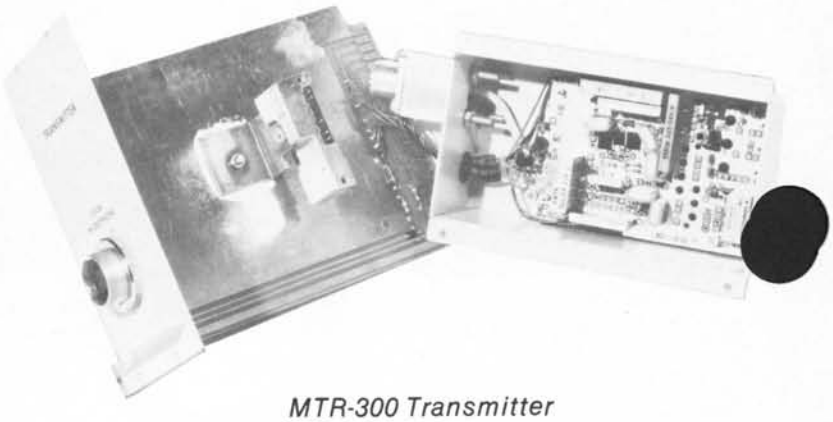
Unique Phase-Lock Loop Transmitter

The transmitter is built around a phase-lock loop circuit that governs the voltage controlled oscillator. The output of the oscillator is on the transmitter RF carrier frequency thus eliminating need for multiplying stages. The transmitter has only three adjustments: (a) Deviation set (b) Channel element warp (c) RF output level setting.

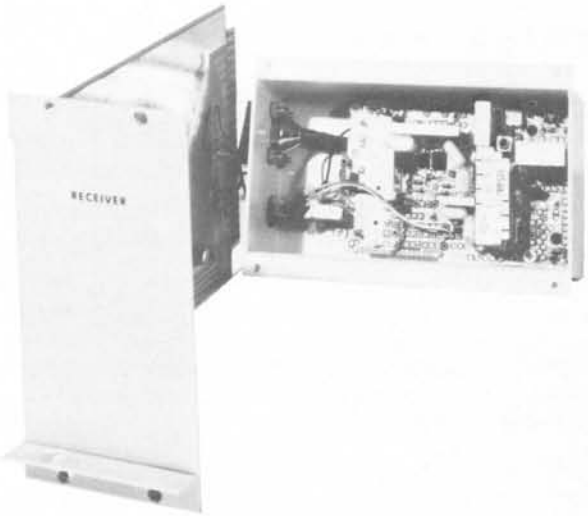
The transmitter RF output has very low spurious content thus greatly reducing intermodulations at crowded repeater sites.

A low transmitter audio distortion (2%) and good audio frequency response make MTR-300 ideal for use in trunk systems.

The transmitter RF power output level remains unchanged over a wide temperature and DC voltage range. The automatic gain control in the transmitter ensures stable RF power output. RF frequency stability over wide temperature range complements the other excellent transmitter characteristics.



MTR-300 Transmitter



MTR-300 Receiver

Single Conversion Sensitron Receiver

The high selectivity, excellent intermodulation protection, and sensitivity (0.5 μV) combine to ensure reception of weak signals. The design uses monolithic crystal filters and hybrid technology to minimize tuning adjustments and increase reliability.

OPTIONS

Time-Out Timer

The time-out timer prevents battery drain and increases battery life by shutting off the MTR-300 transmitter if a transmission exceeds a preset time limit. The time limit can be set for 1 to 8 minute intervals. This prevents inadvertent prolonged keying of a transmitter, a source of heavy power drain on the batteries.

Speaker Kit and Local Microphone

These two plug-in units provide on site communication facilities. During the initial system set-up the communication link between the technician at the site and the system control point is a must. These two kits allow voice communication between repeater site and controlling point.

Metering Kit

The Metering Kit is a plug-in unit that allows monitoring of all vital transmitter and receiver adjustment points. This is essential for station realignment. This kit also provides a means of quickly checking the operation of the station.

Environmental Testing

Environmental testing is recommended as a verification of performance specifications through a wide temperature range to ensure maximum operation reliability after installation.

The unit is fully tested at specific temperatures between -40°C and +60°C. The test results taken at each temperature level are recorded on a test sheet which is shipped with the unit thus verifying the unit's performance.

Batteries and Solar Power Systems

Contact your local Motorola System Engineering Group for battery or Solar operation.

Installation Equipment, Duplexer and Housing

An insulated fiberglass conical shelter is recommended to house the MTR-300. This shelter is specifically designed for harsh mountain environments. Sections of the shelter will accommodate battery racks, radio station, duplexer, antenna and mast.

A moisture proof housing is recommended to further protect the station and duplexer from excess moisture and temperature extremes. This will further ensure maximum system operation reliability.

Various duplexers are available for use with the station. The choice of duplexer is dependent on the communication system requirements. It is recommended that Motorola System Engineering be contacted for duplexer, shelter, and moisture proof housing selection.

MTR-300 MOUNTAIN TOP REPEATER

PERFORMANCE SPECIFICATIONS

GENERAL

Model:	MBC33CKA1103.T	MBC34CKA1103.T	MBC33CKA3103.T	MBC34CKA3103.T
Frequency Range:	136-174 MHz	403-430 MHz 440-470 MHz	136-174	403-430 MHz 440-470 MHz
Standby Battery Drain:	15mA (Typical)	23mA (Typical)	25mA (Typical)	28mA (Typical)
Type of Squelch:	Carrier		Tone "Private-Line"	
Channel Spacing:	30 KHz (25 KHz Marine Channels)	25 KHz	30 KHz (25 KHz Marine Channels)	25 KHz
Battery Voltage:	8.0-15.0V DC at +20°C			

TRANSMITTER

RF Power Output:	5W	4W	5W	4W
Spurious Outputs:	—60 dB	—52 dB	—60 dB	—52 dB
Frequency Stability:	—30°C to 60°C ± 5ppm —40°C to 60°C ± 10ppm	—40°C to 60°C ± 5ppm	—30°C to 60°C ± 5ppm —40°C to 60°C ± 10ppm	—40°C to 60°C ± 5ppm
Modulation:	16F3, ± 5 KHz for 100% at 1000 Hz			
FM Noise:	—55 dB			
Audio Response:	Microphone +1, —3 dB of 6 dB/octave. Pre-emphasis from 300 to 3000 Hz. Four wire input, ± 1 dB of 6 dB/octave. Pre-emphasis from 300 to 3000 Hz.			
Distortion:	2% at 1000 Hz for ± 3 KHz deviation			
Audio Inputs:	1. 600 ohm 4 wire. 2. Repeat path from receiver. 3. Local microphone.			
Time-out-timer (Optional)	1, 2, 4, or 8 minute intervals.			
Transmit Battery Drain:	2500 mA (maximum)			
Size:	19" x 5 1/4" x 7 1/2"			
Voltage Regulators:	Two separate 7.5V regulators for receiver and transmitter. One common 4.6V regulator.			

RECEIVER

Selectivity EIA SINAD:	95 dB	85 dB	95 dB	85 dB
Intermodulation (EIA SINAD):	—80 dB	—75 dB	—80 dB	—75 dB
Frequency Stability: —30°C to 60°C —40°C to 60°C	 ± 5ppm ± 10ppm	 — ± 5ppm	 ± 5ppm ± 10ppm	 — ± 5ppm
Carrier Squelch Threshold Sensitivity:	0.25 uV Adjustable			
Tone "Private-Line" Squelch Sensitivity:	—		0.25 uV	
Audio Output:	0 dBm four-wire output (unbalanced) 2.0W local speaker (optional)			
Sensitivity:	0.5 uV 20 dB Quieting 0.35 uV 12 dB SINAD			
Audio Response:	Speaker, +1, —3 dB of 6 dB/octave De-emphasis from 300-2500 Hz. Four-wire output, ± 1 dB of 6 dB/octave De-emphasis from 300-3000 Hz.		Speaker, +1, —3 dB of 6 dB/octave De-empahsis from 400-2500 Hz. Four-wire output, +1, —3 dB of 6 dB/octave De-emphasis from 300-3000 Hz.	
Spurious Response:	—85 dB			
Audio Distortion:	3% at 1000 Hz with ± 3 KHz deviation.			
Modulation Acceptance:	± 7.5 KHz			

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