Professional Digital Two-Way Radio System

MOTOTRBO™ Repeater

Installation Guide

XPR™ 8300 Repeater

MOTOROLA

Foreword

This manual is intended for use by experienced technicians familiar with similar types of equipment. Specifically, it contains installation information required for the MOTOTRBO XPR 8300 Repeater.

For information related to the service of the XPR 8300 Repeater, refer to the list applicable manuals available separately. This list is provided in the *Related Publications* section on page ii.

Product Safety and RF Exposure Compliance

See *Installation Requirements for Compliance with Radio Frequency (RF) Energy Exposure Safety Standards* on page i.

Manual Revisions

Changes which occur after this manual is printed are described in PMRs (Publication Manual Revisions). These PMRs provide complete replacement pages for all added, changed, and deleted items.
To obtain PMRs, go to:

http://motorola.com/businessonline

Parts Ordering

See Appendix A: Replacement Parts Ordering for information on how to obtain replacement parts. For part numbers, refer to the XPR 8300 Repeater Basic Service Manual (Motorola publication part number 6816810H01).

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Disclaimer

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Trademarks

Installation Requirements for Compliance with Radio Frequency (RF) Energy Exposure Safety Standards

ATTENTION!

This radio is intended for use in occupational/controlled conditions, where users have full knowledge of their exposure and can exercise control over their exposure to meet FCC limits. This radio device is NOT authorized for general population, consumer, or any other use.

To ensure compliance to RF Energy Safety Standards:

- Install only Motorola approved antennas and accessories
- Be sure that Product Safety and RF Safety Booklet enclosed with this radio is available to the end user upon completion of the installation of this radio

Before using this product, the operator must be familiar with the RF energy awareness information and operating instructions in the Product Safety and RF Exposure booklet enclosed with each radio (Motorola Publication part number 6881095C99) to ensure compliance with Radio Frequency (RF) energy exposure limits.

For a list of Motorola-approved antennas and other accessories, visit the following web site which lists approved accessories for your radio model:

http://www.motorola.com/governmentandenterprise

Declaration of Conformity

This declaration is applicable to your radio only if your radio is labeled with the FCC logo shown below.

DECLARATION OF CONFORMITY

Per FCC CFR 47 Part 2 Section 2.1077(a)

Responsible Party
Name: Motorola, Inc.

Address: 1301 East Algonquin Road, Schaumburg, IL 60196-1078, U.S.A.
Phone Number: 1-888-567-7347

Hereby declares that the product:

Model Name: **XPR 8300**

conforms to the following regulations:

FCC Part 15, subpart B, section 15.107(a), 15.107(d) and section 15.109(a)

Class B Digital Device

As a personal computer peripheral, this device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:

1. This device may not cause harmful interference, and
2. This device must accept any interference received, including interference that may cause undesired operation.

Note: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation.

If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

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Related Publications

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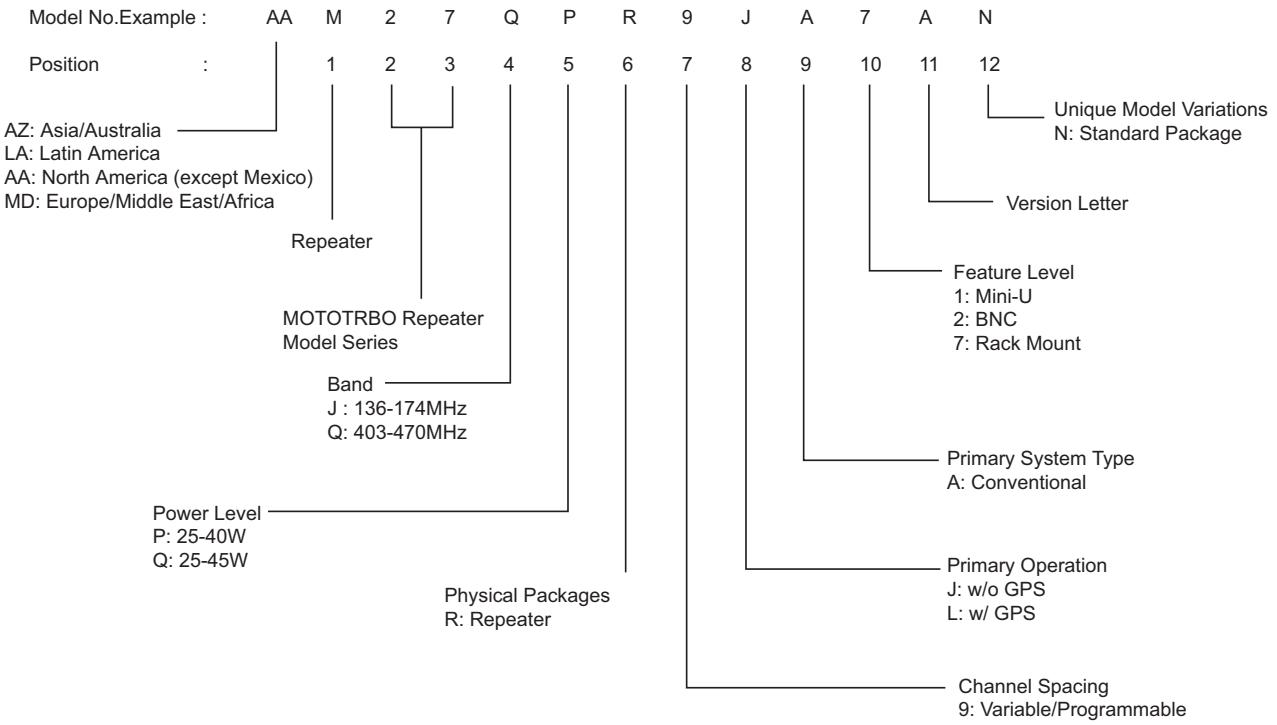
Repeater Model Numbering Scheme



Commercial Warranty

Limited Warranty

MOTOROLA COMMUNICATION PRODUCTS

I. What This Warranty Covers and For How Long

MOTOROLA INC. (“MOTOROLA”) warrants the MOTOROLA manufactured Communication Products listed below (“Product”) against defects in material and workmanship under normal use and service for a period of time from the date of purchase as scheduled below:

XPR 8300 Repeater	Two (2) Years

Motorola, at its option, will at no charge either repair the Product (with new or reconditioned parts), replace it (with a new or reconditioned Product), or refund the purchase price of the Product during the warranty period provided it is returned in accordance with the terms of this warranty. Replaced parts or boards are warranted for the balance of the original applicable warranty period. All replaced parts of Product shall become the property of MOTOROLA.

This express limited warranty is extended by MOTOROLA to the original end user purchaser only and is not assignable or transferable to any other party. This is the complete warranty for the Product manufactured by MOTOROLA. MOTOROLA assumes no obligations or liability for additions or modifications to this warranty unless made in writing and signed by an officer of MOTOROLA. Unless made in a separate agreement between MOTOROLA and the original end user purchaser, MOTOROLA does not warrant the installation, maintenance or service of the Product.

MOTOROLA cannot be responsible in any way for any ancillary equipment not furnished by MOTOROLA which is attached to or used in connection with the Product, or for operation of the Product with any ancillary equipment, and all such equipment is expressly excluded from this warranty. Because each system which may use the Product is unique, MOTOROLA disclaims liability for range, coverage, or operation of the system as a whole under this warranty.

II. General Provisions

This warranty sets forth the full extent of MOTOROLA'S responsibilities regarding the Product. Repair, replacement or refund of the purchase price, at MOTOROLA's option, is the exclusive remedy. THIS WARRANTY IS GIVEN IN LIEU OF ALL OTHER EXPRESS WARRANTIES. IMPLIED WARRANTIES, INCLUDING WITHOUT LIMITATION, IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE, ARE LIMITED TO THE DURATION OF THIS LIMITED WARRANTY. IN NO EVENT SHALL MOTOROLA BE LIABLE FOR DAMAGES IN EXCESS OF THE PURCHASE PRICE OF THE PRODUCT, FOR ANY LOSS OF USE, LOSS OF TIME, INCONVENIENCE, COMMERCIAL LOSS, LOST PROFITS OR SAVINGS OR OTHER INCIDENTAL, SPECIAL OR CONSEQUENTIAL DAMAGES ARISING OUT OF THE USE OR INABILITY TO USE SUCH PRODUCT, TO THE FULL EXTENT SUCH MAY BE DISCLAIMED BY LAW.

III. State Law Rights

SOME STATES DO NOT ALLOW THE EXCLUSION OR LIMITATION OF INCIDENTAL OR CONSEQUENTIAL DAMAGES OR LIMITATION ON HOW LONG AN IMPLIED WARRANTY LASTS, SO THE ABOVE LIMITATION OR EXCLUSIONS MAY NOT APPLY.

This warranty gives specific legal rights, and there may be other rights which may vary from state to state.

IV. How to Get Warranty Service

You must provide proof of purchase (bearing the date of purchase and Product item serial number) in order to receive warranty service and, also, deliver or send the Product item, transportation and insurance prepaid, to an authorized warranty service location. Warranty service will be provided by Motorola through one of its authorized warranty service locations. If you first contact the company which sold you the Product, it can facilitate your obtaining warranty service. You can also call Motorola at 1-888-567-7347 US/Canada.

V. What This Warranty Does Not Cover

A. Defects or damage resulting from use of the Product in other than its normal and customary manner.

B. Defects or damage from misuse, accident, water, or neglect.

C. Defects or damage from improper testing, operation, maintenance, installation, alteration, modification, or adjustment.

D. Breakage or damage to antennas unless caused directly by defects in material workmanship.

E. A Product subjected to unauthorized Product modifications, disassemblies or repairs (including, without limitation, the addition to the Product of non-Motorola supplied equipment) which adversely affect performance of the Product or interfere with Motorola's normal warranty inspection and testing of the Product to verify any warranty claim.

F. Product which has had the serial number removed or made illegible.

G. Rechargeable batteries if:

- any of the seals on the battery enclosure of cells are broken or show evidence of tampering.
- the damage or defect is caused by charging or using the battery in equipment or service other than the Product for which it is specified.

H. Freight costs to the repair depot.

I. A Product which, due to illegal or unauthorized alteration of the software/firmware in the Product, does not function in accordance with MOTOROLA’s published specifications or the FCC type acceptance labeling in effect for the Product at the time the Product was initially distributed from MOTOROLA.

J. Scratches or other cosmetic damage to Product surfaces that does not affect the operation of the Product.

K. Normal and customary wear and tear.

VI. Patent and Software Provisions

MOTOROLA will defend, at its own expense, any suit brought against the end user purchaser to the extent that it is based on a claim that the Product or parts infringe a United States patent, and MOTOROLA will pay those costs and damages finally awarded against the end user purchaser in any such suit which are attributable to any such claim, but such defense and payments are conditioned on the following:

A. that MOTOROLA will be notified promptly in writing by such purchaser of any notice of such claim;

B. that MOTOROLA will have sole control of the defense of such suit and all negotiations for its settlement or compromise; and

C. should the Product or parts become, or in MOTOROLA's opinion be likely to become, the subject of a claim of infringement of a United States patent, that such purchaser will permit MOTOROLA, at its option and expense, either to procure for such purchaser the right to continue using the Product or parts or to replace or modify the same so that it becomes noninfringing or to grant such purchaser a credit for the Product or parts as depreciated and accept its return. The depreciation will be an equal amount per year over the lifetime of the Product or parts as established by MOTOROLA.

MOTOROLA will have no liability with respect to any claim of patent infringement which is based upon the combination of the Product or parts furnished hereunder with software, apparatus or devices not furnished by MOTOROLA, nor will MOTOROLA have any liability for the use of ancillary equipment or software not furnished by MOTOROLA which is attached to or used in connection with the Product. The foregoing states the entire liability of MOTOROLA with respect to infringement of patents by the Product or any parts thereof.

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VII. Governing Law

This Warranty is governed by the laws of the State of Illinois, USA.

Notes

Chapter 1 Pre-Installation Considerations

Proper installation ensures the best possible performance and reliability of the MOTOTRBO Repeater. Pre-installation planning is required. This includes considering the mounting location of the repeater in relation to input power and antennas. Also to be considered are site environment conditions, the particular mounting method (several available), and required tools and equipment.

If this is the first time this type of equipment is being installed, it is highly recommended that the user read:

- this entire installation section before beginning the actual installation, and
- the Motorola Quality Standard Fixed Network Equipment Installation manual, R56 (6881089E50), specifically refer to the information on ground connection for lightning protection.

1.1 Installation Overview

The following information is an overview for installing the MOTOTRBO Repeater and ancillary equipment. Step-by-step procedures for each of the major installation tasks are then provided beginning in Section 2, Mechanical Installation.

- Plan the installation, paying particular attention to environmental condition at the site, ventilation requirements, and grounding and lightning protection.
- Unpack and inspect the equipment.
- Mechanical install the equipment at the site.
- Make necessary electrical and cabling connections, including the following:
  - AC input cabling
  - Coaxial cables to transmit and receive antennas
- Perform a post-installation function checkout test of the equipment to verify proper installation.
- Proceed to the Optimization procedures to customize the repeater parameters per customer specifications (e.g. operating frequency, PL, codes, color code, etc.).

1.2 Environmental Conditions at Intended Installation Site

If the repeater is to be installed in an environment which is usually dusty or dirty (and so does not meet the air quality requirements), the air used to cool the repeater modules must be treated using appropriate filtering devices. Dust or dirt accumulating on the internal circuit boards and modules is not easily removed, and can cause such malfunctions as overheating and intermittent electrical connections.

The repeater may be installed in any location suitable for electronic communications equipment, provided that the environmental condition do not exceed the equipment specifications for temperature, humidity, and air quality.

1.2.1 Operating Temperature Range

-30°C (-22°F) to +60°C (+140°F)

This is the temperature measured in close proximity to the repeater. For example, if the repeater is mounted in a cabinet, the temperature within the cabinet is measured.

1.2.2 Humidity

Not to exceed 95% relative humidity @ 50°C (122°F).

1.2.3 Air Quality

For equipment operating in an environmentally controlled environment with repeater(s) rack mounted, the airborne particle level must not exceed 25 µg/m³.

For equipment operating in an area which is not environmentally controlled (repeater(s) cabinet mounted), air borne particle level must not exceed 90 µg/m³.

1.3 Equipment Ventilation

The repeater is equipped with a cooling fan that is used to provide forced convection cooling. When planning the installation, observe the following ventilation guidelines:

- Customer-supplied cabinets must be equipped with ventilation slots or openings in the front (for air entry) and back or side panels (for air to exit). If several repeaters are installed in a single cabinet, be sure ventilation openings surround each repeater to allow for adequate cooling.
- All cabinets must have a least 15 cm (6 inches) of open space between the air vents and any wall or other cabinets. This allows adequate air flow.
- When multiple cabinets (each equipped with several repeaters) are installed in an enclosed area, make sure the temperature within each cabinet does not exceed the recommended/ maximum operating temperature of +16°C (+140°F). It may be necessary to have air conditioning or other climate control equipment installed to satisfy the environmental requirements.

1.4 AC Input Power Requirements

The repeater is equipped with a switching power supply, this assembly operates from 100Vac to 240Vac at 47 to 63Hz AC input power. A standard 3-prong line cord is supplied to connect the power supply to the AC source.

It is recommended that a standard 3-wire grounded electrical outlet be used as the AC source.

The AC socket outlet must be installed near the equipment and must be easily accessible.

The outlet must be connected to an AC source capable of supplying a maximum of 280W. For a nominal 110/120Vac input, the AC source must supply 5A and should be protected by circuit breaker rated at 15A. For a nominal 220/240Vac input, the AC source must supply 3A and should be protected by a circuit breaker rated at 10A.

1.4.1 Circuit Overloading

Consideration should be given to the connection of the equipment to the supply circuit and the effect that overloading of the circuits might have on overcurrent protection and supply wiring. Appropriate consideration of equipment ratings should be used when addressing this concern.

1.5 Equipment Mounting Methods

The MOTOTRBO Repeater may be mounted in a rack, bracket or cabinet (available as accessories).

1.6 Site Grounding and Lightning Protection

> **Caution** Proper site grounding and lightning protection are vitally important consideration. Failure to provide proper lightning protection may result in permanent damage to the radio equipment.

One of the most important considerations when designing a communications site is the ground and lightning protection system. While proper grounding techniques and lightning protection are closely related, the general category of site grounding may be divided into the following section.

1.6.1 Electrical Ground

Ground wires carrying electrical current from circuitry or equipment at the site is included in the category of electrical ground. Examples include the AC or DC electrical power used to source equipment located at the site, and wires or cables connected to alarms or sensors located at the site.

1.6.2 RF Ground

This type of ground is related to the transmission of the radio frequency energy to earth ground. An example of RF grounding is the use of shielding to prevent or at least minimize the leakage of unwanted RF transmissions from communications equipment and cables.

1.6.3 Lightning Ground

Providing adequate lightning protection is critical to a safe reliable communications site. RF transmission cables, and AC and DC power lines must all be protected to prevent lightning energy from entering the site building.

Although a comprehensive coverage of the site grounding technique and lightning protection is not within the scope of this instruction manual, there are several excellent industry sources for rules and guidelines on ground and lightning protection at communications site.

NOTE: Motorola recommends the following reference source:
Motorola Quality Standards Fixed Network Equipment
Installation Manual R56……..…….....6881089E50

1.6.4 Equipment Grounding Guidelines

The repeater is equipped with a ground screw located on the rear of the repeater power supply module. This screw is used to connect the repeater to the site ground point. It is assumed that all antenna cables, and AC or DC power cabling, has been properly grounded and lightning protected by following the rules and guidelines provided in the above reference.

1.7 Power Supply Connections

Refer to 4.1.1 AC Input Power Connection on page 4-1 for the recommended AC input power connection and to 4.1.2 Ground Connection on page 4-2 for the recommended ground connection.

Notes