

MAGNUM S-3

AM/FM/PA 10 METER MOBILE AMATEUR TRANSCEIVER

OWNER'S MANUAL



MAGNUM INTERNATIONAL
a division of RF Limited

INTRODUCTION

Congratulations on your purchase of a Magnum S-3 FM/AM 10 meter transceiver. Your Magnum S-3 is designed to provide years of enjoyment and trouble-free service. There are many features and functions designed into this transceiver. To ensure that your investment is enjoyed to its fullest extent please take a few moments and thoroughly read this manual.

Your Magnum S-3 is a combination microprocessor and phase-lock loop (PLL) controlled radio combining both high RF performance with a user-friendly front panel. The Magnum S-3 is built rugged to withstand years of use in harsh mobile environments. Although engineered with mobile use in mind the Magnum S-3, with the addition of a high quality 10 amp regulated power supply, may be easily adapted to fixed station operation.

IMPORTANT: The Magnum S-3 is designed for entry level amateur use. If the transmitter is operated in the United States or within it's territories a licensed amateur radio operator must be present at the station. The minimum license class to operate 10-meter phone is Novice/Technician. If you are studying for your license and want to familiarize yourself with the operation of the radio, the receiver may be operated with or without a licensed operator present. For more information regarding FCC licensing, contact your nearest amateur radio dealer, or for complete details contact the American Radio Relay League.

American Radio Relay League (ARRL)
225 Main Street
Newington, CT 06111

Telephone 860-594-0200
Facsimile 860-594-0259
<http://www.arrl.org>

LIMITED WARRANTY

Magnum International warrants this product to be free of defects for a period of one (1) year from the original date of purchase. This warranty is non-transferable. This limited warranty is subject to repair or replacement of defective components only. This warranty is void if the radio has been tampered with or misused.

IMPORTANT: RETAIN YOUR SALES RECEIPT

The enclosed warranty registration form must be filled out and mailed along with a photocopy of your sales receipt within 15 days from the purchase date. If the warranty registration form and copy of your sales receipt are not received the radio is not covered under warranty. Please fill out the enclosed warranty registration form and send it along with a copy of your sales receipt to:

Magnum International
PO Box 445
Issaquah, WA 98027

Registering your S-3 with Magnum provides several benefits:

- 1) Validates your warranty.
- 2) Entitles you to free updates and information regarding your radio and new accessories for your radio.
- 3) Provides possible recovery of lost or stolen radios through our serial number tracking database.

INSTALLATION

1. Contents

Unpack and inspect your Magnum S-3 for missing or damaged components. Your Magnum S-3 includes the following items:

<u>Quantity</u>	<u>Description</u>
1	Magnum S-3 Transceiver
1	Microphone
1	DC Power Cord with Inline Fuse
1	Mounting Bracket with Hardware
1	Microphone Hanger with Hardware Set
1	Operating Manual with Schematic/PLO
1	Warranty Registration Form

2. Microphone Hanger

The microphone hanger may be attached to the side of the transceiver, or any other convenient location. Locate the mounting holes on either side of the transceiver. Use the provided screws to attach the microphone hanger either vertically or horizontally to the side of the transceiver.

3. Mounting

When attaching the Magnum S-3 mounting bracket to the vehicle, choose a location that will provide easy access to all front panel controls and air circulation to the rear panel. When selecting a mounting location, make sure that there is ample space behind the control deck for the cables. Do not pinch, or bend sharply, the power or antenna cables. Do not install the Magnum S-3 in any compartment that restricts airflow and do not install in a location that interferes with the safe operation of the vehicle.

Attach the mounting bracket to the vehicle first then mount the Magnum S-3 to the bracket. If the rear panel is not accessible you may want to attach the power and antenna cable prior to mounting.

4. Electrical Connections

The Magnum S-3 is designed to work on any 13.8 volt DC, negative ground, source. The condition of a vehicle's electrical system can affect operation. A low battery, worn generator/alternator, or poor voltage regulator will seriously impair the performance of the transceiver. Any of the above conditions could result in a high level of receiver noise generation or a substantial loss of the transmitter's RF output. Make sure that all of these components of your vehicle's electrical system are in good condition prior to installing the transceiver.

CAUTION!

VOLTAGE EXCEEDING 15 VDC WILL DAMAGE THE RADIO. MEASURE VOLTAGE AT BATTERY TERMINALS, WITH VEHICLE RUNNING, PRIOR TO INSTALLATION!

Before making any electrical connections make sure the volume (VOL) control is in the "OFF" position. Connect the positive (+) red wire of the DC power cord to a positive 13.8-volt source at the vehicle fuse block. If connecting to the fuse block, it is recommended that a switched power source be used so that the power to the transceiver is disconnected when the vehicle is off. This will eliminate the possibility of the transceiver draining the vehicle's battery.

Connect the negative (-) black wire to a metal part of the vehicle's frame, or chassis ground. Make sure that this is a good ground connection.

The Magnum S-3 power cord may also be connected directly to the battery. Connecting directly to the battery has several benefits, the first of which is to maximize RF output. Secondly, the battery is a very large capacitor and will help eliminate certain types of ambient and vehicle noise. If connecting directly to the vehicle's battery, additional power cable may be required. On runs of 8 feet or less use 14-gauge stranded wire. Use 12-gauge wire on longer runs.

5. Antenna Connection

The transceiver will operate using any standard 50-ohm ground-plane, vertical, mobile whip, long wire or similar antenna. The antenna should be rated at 100 watts PEP minimum. A standard SO-239 type antenna connector is located on the rear panel of the Magnum S-3. Connection is made using a PL-259 and high-grade coaxial cable (RG213, RG58A/U or Mini RG-8 is recommended).

A ground-plane antenna provides greater coverage and is recommended for fixed station-to-mobile operation. For point-to-point fixed station operation, a directional beam antenna operates at greater distances even under adverse conditions. A non-directional antenna should be used in a mobile installation; a vertical whip is best suited for this purpose. The base loaded whip antenna normally provides effective communications. For greater range and more reliable operation, a full quarter wave whip may be used. Either of these antennas uses the metal vehicle body as a ground plane.

Once the antenna is mounted on the vehicle, route the coaxial cable so that it is not next to any power cables or vehicle cables. Connect the PL-259 to the antenna connector on the rear panel of the Magnum S-3. Make sure that the cable does not interfere with the safe operation of the vehicle.

6. VSWR

Before use, it is important to determine the antenna system's VSWR (voltage standing wave ratio). You will need a high quality SWR bridge (meter) to accurately tune your antenna system. First, make sure the SWR bridge is in good working order and is calibrated. To ensure your radio is performing properly the VSWR should never exceed 1.5 to 1. Never transmit on any antenna system where the VSWR exceeds 1.8 to 1. This will stress the output stage and could destroy the RF transistors; this type of misuse and failure is not covered under warranty.

Measure the VSWR at the center of the operating band. Tune the antenna (according to the antenna manufacturer's tuning instructions) so that the VSWR is as close to 1 to 1 at the center of the operating band.

Next, measure the VSWR at the lowest and highest frequency of the transceiver. If the antenna has a wide enough frequency range and band-pass, the VSWR readings should be below 1.5 to 1 across the entire operating band. If at the lower or upper end of the transceiver operating frequency, the VSWR measures more than 1.5 to 1, it is recommended that the antenna be re-tuned before operating on those frequencies.

If you are experiencing unusual VSWR readings check for the following possible problems:

- 1) Make sure that the antenna is installed properly and grounded.
- 2) Check all coaxial cable and connectors for defects and poor routing.
- 3) If testing a vehicle installation, make sure that all vehicle doors are closed when testing.
- 4) Do not test near or around large metal objects or buildings.

7. Ignition Noise

In certain vehicle installations, electrical noise or interference may be present in the receive audio of the transceiver. Typically the vehicle's ignition system or more specifically the alternator generates this noise. The Magnum S-3 is equipped with both ANL and noise blanker circuits that are designed to improve, and in many instances eliminate, electrical noises.

In extreme cases, the noise blanker may not eliminate all electrical noises. In such cases, an inline DC noise filter can be used. The PLF-10C FilterCord by Magnum International is designed for use with the Magnum S-3 and is an effective way to eliminate all noise emanating from the 12VDC line. The filter will not have any effect on airborne noise entering the radio through the antenna system. This includes the 'popping' sound associated with ignition systems.



FRONT PANEL CONTROLS

1. MICROPHONE INPUT

A 4 pin, screw ring microphone connector is used. Microphone wiring is as follows:

- Pin 1: Ground (Gnd)
- Pin 2: Microphone Audio (AF)
- Pin 3: Transmit (TX)
- Pin 4: Receive (RX)

2. (OFF) VOL SQL

(OFF): Turns the radio on and off. Rotate the control counterclockwise until it clicks.

VOL: Volume. Adjusts the AF gain, or volume of the receive audio. Turn clockwise to increase and counterclockwise to decrease.

SQ: Squelch. Used to eliminate background or “white” noise when monitoring strong signals. To properly adjust the squelch circuit, start rotating the control slowly clockwise until the received white noise disappears.

3. MIC-G RF-G

MIC-G: Microphone Gain. Increases or decreases the microphone audio output, or “talk power”. The gain increases as the control is rotated clockwise.

RF-G: RF Gain. Adjusts the receiver sensitivity to both signals and background noise. This affects the distance at which a signal can be detected. Turning the control counterclockwise reduces the receiver sensitivity. This is particularly useful in areas where large volumes of signals are present. The S/Rf display (“SIG” bar) indicates the received signal’s strength.

4. BAND

Use to select the following band segments (frequency groups).

Band	Frequency Range
A	28.015 - 28.455 MHz
B	28.145 - 28.585 MHz
C	28.115 - 28.555 MHz
D	28.085 - 28.525 MHz
E	28.055 - 28.495 MHz
F	28.025 - 28.465 MHz

5. TURBO™ ECHO VOL DEL

TURBO™ Digital Echo is a Magnum radio exclusive feature. The **TURBO™ Digital Echo** is louder, has a wider range, and a more natural sound than any other echo processor available.

VOL: Echo Volume. Varies the volume or number of echo repetitions. To increase the echo volume, rotate the control clockwise.

DEL: Echo Delay. Varies the amount of delay, or duration of the echo repetition. Rotate clockwise to increase the amount of delay and counterclockwise to decrease.

6. PWR AMT

PWR: Variable RF Output Power. The transmitted power of the Magnum S-3 may be varied from 1 to 50 watts peak. Rotate clockwise to increase RF output power. Rotate counterclockwise to decrease RF output power.

Variable RF output power allows low power transmitting for QRP operation in compliance with the FCC request for reduced signal strength during periods when propagation levels are high.

AMT: All Mode Talk Back. AMT, a Magnum exclusive, is an independent talk back monitor. The AMT functions in all modes and allows the operator to monitor the transmitted audio of the Magnum S-3. To increase the volume of the talk back rotate the control clockwise. To decrease rotate counterclockwise. To turn off the talk back rotate the control completely counterclockwise.

7. **FREQUENCY:** Rotate clockwise or counterclockwise to select the desired frequency.
8. **S/RF METER:** Indicates receive signal strength and RF output power. The top bar on the meter indicates RF output power. The bottom bar indicates receive signal strength.
9. **AM - FM - PA:** Selects the mode of operation - AM, FM or PA (public address).

PA: Public Address. The PA feature allows the radio operator to use the Magnum S-3 as a public address amplifier. The PA feature requires the use of an 8-ohm, 4 watt public address speaker or horn. PA horns may be purchased from most electronic or automotive shops. The horn is connected to the PA jack on the rear panel of the Magnum S-3.

To operate the PA feature, switch the Magnum S-3 to the PA mode, depress the PTT and speak in a normal voice into the microphone - just as though you are transmitting. Your audio will be sent to the PA horn and not transmitted over the air.

10. **TOP GUN MODULATOR - OFF:** Modulator on/off switch. To activate the Top Gun modulator circuit move the switch to the up position. To bypass the modulator circuit move the switch to the OFF position.

The modulator circuit, created by TOP GUN TECHNOLOGIES (www.TopGunTec.com), is a Magnum radio exclusive. Activating the modulator allows the radio operator to set the AM power output level to as little as 1 watt carrier and still modulate (swing) to 50 watts – without adding distortion! The modulator maximizes efficiency and makes the Magnum S-3 a powerhouse!

Your Magnum S-3 also features the TOP GUN COMPRESSOR circuit – another Magnum exclusive! The compressor circuit is always on and requires no adjusting or control. The compressor continually shapes the transmitted audio for maximum punch through crowded conditions.

11. **NB / ANL - OFF:** Noise Blanker and Automatic Noise Limiter on/off switch. To activate the noise blanker and automatic noise limiter move the switch to the NB / ANL position. To deactivate, select the OFF position.

NOTE: The noise blanker is effective in eliminating pulse type interference usually associated with automotive ignition systems.

12. **+10kHz - OFF:** In the +10kHz position, the frequency is shifted up 10 kHz.
13. **RX/TX/SWR:** Receive, Transmit and High SWR Warning Indicator LED. A two color LED that is green while the receiver is active and red while the transmitter is active.

SWR warning light illuminates when the antenna's standing wave ratio is over the recommended ratio - 2 to 1.
14. **Channel Display:** Two digit "channelized" frequency display. See frequency chart for cross-reference of channel.
15. **Microphone Push-To-Talk Switch:** Press and hold the switch to transmit. While transmitting, speak into the front grill of the microphone.

The RX / TX LED indicator will turn from green to red. Release the switch to receive.

REAR PANEL

1. **EXT. SP.: External Speaker Jack**
An external speaker jack is located on the rear panel of the transceiver. The Magnum S-3 is designed to accept any standard 8-ohm external speaker for use with two-way transceivers.
2. **PA: Public Address Speaker Jack**
A public address horn (speaker) jack is located on the rear panel of the transceiver. Plug the PA horn into the back panel and follow the instructions included with the product.
3. **DC Power Connection**
The Magnum S-3 uses the standard 3-pin DC power connector.
4. **SWR Detection Circuit On / Off Switch**
This switch turns the Magnum S-3's SWR detection circuit on or off. When turned off, the SWR warning light on the front panel will not illuminate.

MAGNUM S-3 Frequency Table

Channel	+10kHz	Band					
		A	B	C	D	E	F
1	OFF	28.065	28.145	28.165	28.085	28.065	28.065
2	OFF	28.075	28.155	28.175	28.095	28.075	28.075
3	OFF	28.085	28.165	28.185	28.105	28.085	28.085
3	ON	28.095	28.175	28.195	28.115	28.095	28.095
4	OFF	28.105	28.185	28.205	28.125	28.105	28.105
5	OFF	28.115	28.195	28.215	28.135	28.115	28.115
6	OFF	28.125	28.205	28.225	28.145	28.125	28.125
7	OFF	28.135	28.215	28.235	28.155	28.135	28.135
7	ON	28.145	28.225	28.245	28.165	28.145	28.145
8	OFF	28.155	28.235	28.255	28.175	28.155	28.155
9	OFF	28.165	28.245	28.265	28.185	28.165	28.165
10	OFF	28.175	28.255	28.275	28.195	28.175	28.175
11	OFF	28.185	28.265	28.285	28.205	28.185	28.185
11	ON	28.195	28.275	28.295	28.215	28.195	28.195
12	OFF	28.205	28.285	28.305	28.225	28.205	28.205
13	OFF	28.215	28.295	28.315	28.235	28.215	28.215
14	OFF	28.225	28.305	28.325	28.245	28.225	28.225
15	OFF	28.235	28.315	28.335	28.255	28.235	28.235
15	ON	28.245	28.325	28.345	28.265	28.245	28.245
16	OFF	28.255	28.335	28.355	28.275	28.255	28.255
17	OFF	28.265	28.345	28.365	28.285	28.265	28.265
18	OFF	28.275	28.355	28.375	28.295	28.275	28.275
19	OFF	28.285	28.365	28.385	28.305	28.285	28.285
19	ON	28.295	28.375	28.395	28.315	28.295	28.295
20	OFF	28.305	28.385	28.405	28.325	28.305	28.305
21	OFF	28.315	28.395	28.415	28.335	28.315	28.315
22	OFF	28.325	28.405	28.425	28.345	28.325	28.325
23	OFF	28.335	28.415	28.435	28.355	28.335	28.335
24	OFF	28.345	28.425	28.445	28.365	28.345	28.345
25	OFF	28.355	28.435	28.455	28.375	28.355	28.355
26	OFF	28.365	28.445	28.465	28.385	28.365	28.365
27	OFF	28.375	28.455	28.475	28.395	28.375	28.375
28	OFF	28.385	28.465	28.485	28.405	28.385	28.385
29	OFF	28.395	28.475	28.495	28.415	28.395	28.395
30	OFF	28.405	28.485	28.505	28.425	28.405	28.405
31	OFF	28.415	28.495	28.515	28.435	28.415	28.415
32	OFF	28.425	28.505	28.525	28.445	28.425	28.425
33	OFF	28.435	28.515	28.535	28.455	28.435	28.435
34	OFF	28.445	28.525	28.545	28.465	28.445	28.445
35	OFF	28.455	28.535	28.555	28.475	28.455	28.455
36	OFF	28.465	28.545	28.565	28.485	28.465	28.465
37	OFF	28.475	28.555	28.575	28.495	28.475	28.475
38	OFF	28.485	28.565	28.585	28.505	28.485	28.485
39	OFF	28.495	28.575	28.595	28.515	28.495	28.495
40	OFF	28.505	28.585	28.605	28.525	28.505	28.505

GENERAL SPECIFICATIONS

Emission Modes	: FM (F3E) / AM (A3E)
Antenna Impedance	: 50 ohm, unbalanced
Frequency Control	: Digital Phase-Lock Loop (PLL) Synthesizer
Frequency Accuracy	: Better than +10 ppm from 0 - 40 °C after 15 min. warm up
Power Requirement	: 10.5 - 15 V DC, negative ground
Current Consumption	: 7.0 amps maximum
Dimensions	: 7 ⁷ / ₈ x 10 ⁵ / ₈ x 2 ³ / ₈ inches
Weight	: 4 ¹ / ₂ lbs.

TRANSMITTER SPECIFICATIONS

Power Output	: FM 30 Watts
	: AM 10 Watts Average / 50 Watts PEP
Tuning Steps	: 10 kHz
Final Transistors	: 2SC1969 (x2)
Spurious Emissions	: More than 50 dB below peak output power
Carrier Suppression	: More than 40 dB below peak output power
FM Deviation	: +/- 2 kHz maximum
Audio Response	: More than 30dB below peak output
Frequency Response	: 400 to 2800 Hz
Microphone Impedance	: Dynamic Microphone, 600 ohm

RECEIVER SPECIFICATIONS

Circuit Type	: Dual-Conversion Superheterodyne
Sensitivity	: AM 1.0 µV at 10 dB S + N/N
	: FM 0.3 µV at 12 dB SINAD
Selectivity	: AM / FM 6.0 kHz (-6 dB) / 18 kHz (-60 dB)
Adjacent Channel Rejection	: Better than 70 dB
IF Rejection	: Better than 80 dB for all frequencies
Frequency Response	: 250 to 3000 Hz
Audio Output Power	: 2 watts minimum at 10% THD with an 8 ohm load
Audio Output Impedance	: 8 ohms

MAGNUM INTERNATIONAL

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