

MAGNUM
ALPHA FORCE
OPERATING MANUAL

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INTRODUCTION

Congratulations on your purchase of a Magnum AlphaForce 10 meter FM/AM transceiver. The AlphaForce 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.

The Magnum AlphaForce is a microprocessor controlled, user programmable radio combining high RF performance with a user-friendly environment. The AlphaForce is built rugged to withstand years of use in harsh mobile environments. Although engineered with mobile use in mind the AlphaForce, with the addition of a high quality 10 amp regulated power supply, may be easily adapted to fixed station operation.

Some of the features of the AlphaForce are; an advanced design liquid crystal display that provides the operator with a full visual account of the transceivers operating status, automatic frequency scanning from either the front panel or microphone, memory storage of your favorite frequencies, programmable frequency resolution of either 1 kHz, 10 kHz or 100 kHz, and split (offset) frequency operation for repeater use. These are just a few of the features that make the AlphaForce a pleasure to own and operate.

IMPORTANT: The Magnum AlphaForce 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 AlphaForce 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.
- 4) Receive your free Magnum logo baseball cap within 30 days after registering.

INSTALLATION

1. CONTENTS

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

<u>Quantity</u>	<u>Description</u>
1	Magnum AlphaForce Transceiver
1	Microphone with Up/Down Controls
1	DC Power Cord with Inline Fuse
1	Mounting Bracket with Hardware
1	Microphone Hanger with Hardware Set
1	Operating Manual with Schematic

2. MICROPHONE HANGER

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

3. MOUNTING

When attaching the AlphaForce 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 AlphaForce 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 AlphaForce 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 AlphaForce 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/power control on the AlphaForce 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 is 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 AlphaForce 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 50 watts PEP minimum. A standard SO-239 type antenna connector is located on the rear panel of the AlphaForce. 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 AlphaForce. Make sure that the cables does not interfere with the safe operation of the vehicle.

The Penetrator™ and Super Penetrator™ mobile antennas, available from RF Limited, are the perfect antennas for use with the Magnum AlphaForce. The Penetrator™ and Super Penetrator™ feature power ratings of up to 3,500 watts PEP and bandpass ratings of 1.5 MHz, the widest bandpass of any mobile antenna of its kind.

6. VSWR

Before use, it is important to determine the antenna system's VSWR (voltage standing wave ratio). First, make sure the SWR bridge (meter) 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 manufacturer's tuning instructions) so that the VSWR is as close to 1.1 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.

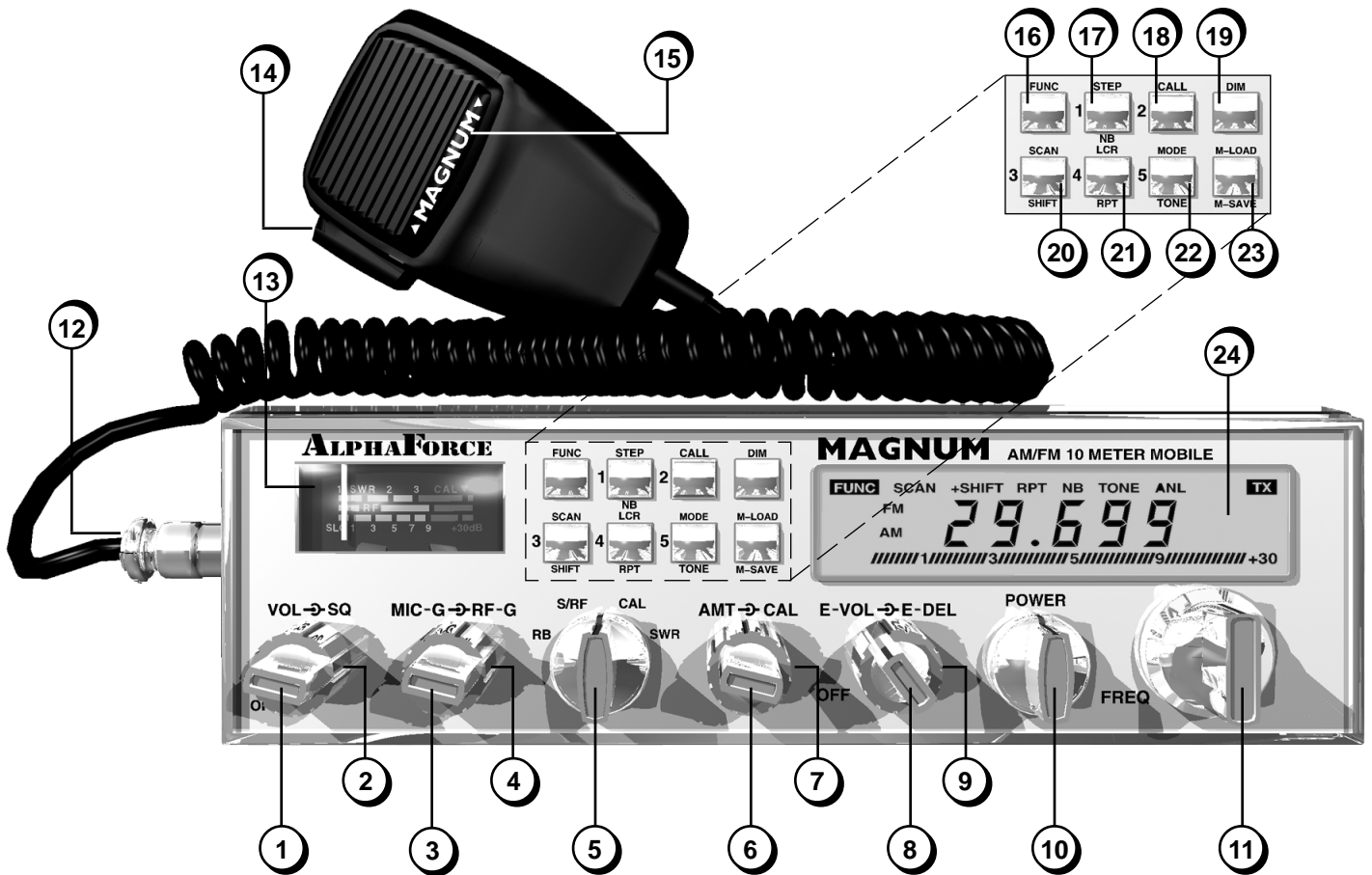
If you are experiencing unusual VSWR readings check for the following possible problems:

- 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 AlphaForce is equipped with a noise blanker circuit that is designed to improve, and in many instances eliminate, this electrical noise.

In extreme cases, the noise blanker may not eliminate all the electrical noise. In such cases, an after-market alternator noise or ignition noise filter can be purchased and installed according to the manufacturer's instructions. If purchasing an alternator noise filter for the Magnum AlphaForce make sure the filter is rated for at least 10 amps continuous current draw.



FRONT PANEL CONTROLS

1. OFF / VOLUME CONTROLS

OFF: Turns the power to the radio on and off.

VOLUME: Adjusts the AF gain, or volume of the received audio. Turn clockwise to increase and counterclockwise to decrease.

2. SQUELCH CONTROL

Used to eliminate background or “white” noise when monitoring strong signals. Also used to activate SCAN feature (refer to 20). To properly adjust the squelch circuit, start rotating the control slowly clockwise until the received white noise disappears.

3. MICROPHONE GAIN CONTROL

Increases or decreases the energy developed in the microphone amplifier circuit. The gain increases as the control is rotated clockwise.

For optimum setting, press the push-to-talk (PTT) switch on the microphone. While speaking in a constant tone (such as saying the word, “four-r-r-r”) adjust the mic gain control until the LCD peak reading RF meter (refer to 24) reads +30. Next, rotate the control counterclockwise until the +30 segment of the display starts to flicker. The microphone gain should now be set to maximum modulation without distortion.

4. RF GAIN CONTROL

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 traffic (signals) are present. The S/R/F meter (refer to 13) indicates the received signal’s strength.

5. RB / S/R/F / CAL / SWR CONTROL

ROGER BEEP: RB position activates the end of transmission, or roger beep, tone. When activated a 1 kHz tone will automatically transmit upon release of the PTT switch. This notifies contacts that your transmission has ended and you are ready to receive their signal. To turn off the roger beep, put the switch in the S/R/F position. **NOTE:** In the RB position, the meter (refer to 13) measures S/R/F.

SIGNAL STRENGTH / RF METER: S/R/F position activates the meter (see 13) to measure receive signal strength and transmitter RF output power.

CALIBRATE: CAL position activates the meter to calibrate for SWR measuring. To calibrate for SWR, set the switch to the CAL position, press the PTT switch and rotate the calibrate control (refer to 7) until the meter (refer to 13) needle lines up with the CAL mark on the far right side of the meter. Once lined up, release the PTT. The transceiver is now ready to measure SWR. *NOTE: When first attempting to calibrate make sure the transceiver is in the AM mode (refer to 22). If it is not possible to calibrate in AM, then switch to FM mode.*

STANDING WAVE RATIO: SWR position activates the meter to measure the standing wave ratio of the transceiver and antenna system. After the meter is calibrated, set the switch to the SWR position and press the PTT switch. The meter (refer to 13) will measure the SWR. For optimum performance the SWR should be below 1.5 to 1, the first green segment on the SWR portion of the meter indicates an acceptable standing wave ratio.

6. ALL MODE TALK BACK CONTROL

All Mode Talk Back, 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 AlphaForce. 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. CALIBRATE CONTROL

Rotate to calibrate the meter (refer to 13) for SWR measurements. See instruction 5 for more information.

8. ECHO ON/OFF and VOLUME CONTROL

Turns on and off the echo feature, and varies the volume or number of repetitions. To turn on the echo feature and increase the echo volume, rotate the control clockwise. To turn off the echo feature rotate the control completely counterclockwise to the OFF position.

9. ECHO DELAY CONTROL

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

10. POWER

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.

11. FREQUENCY

Rotate clockwise or counterclockwise to select the desired frequency.

12. MICROPHONE INPUT

A 6-pin, lock ring type, microphone connector is used. Microphone wiring is as follows:

Pin 1 : Microphone Audio

Pin 2 : Receive

Pin 3 : Transmit

Pin 4 : Down (Up w/ 22K Ohm Resistor)

Pin 5 : Ground

Pin 6 : +13.8 VDC

13. METER

The meter indicates receive signal strength, RF output power, SWR calibrate and SWR. The top horizontal bar graph indicates calibration and measuring of the standing wave ratio. The center bar graph indicates RF output power. The bottom bar graph indicates receive signal strength.

14. PUSH-TO-TALK SWITCH

Press and hold the switch to transmit. TX will appear on the LCD screen when transmitting. Release the switch to receive.

15. UP and DOWN FREQUENCY CONTROLS

Allows remote operation of the frequency control. Press the up arrow to increase the frequency and press the down arrow to decrease the frequency.

IMPORTANT!

Operating some of the features in 16 through 23 require the use of the function control. To activate the function control, momentarily push the FUNC (16) control, the FUNC prompt will be displayed in upper left-hand corner of LCD. Push the control again to deactivate the function control.

16. FUNCTION

This control is used to operate the functions that are printed below the control buttons. To activate, press and release. FUNC will be displayed on the LCD indicating that the function command is activated. After you have pressed one of the buttons the FUNC prompt will disappear from the screen.

17. STEP / NB / 1

STEP: The STEP control selects frequency resolution in either 1 kHz, 10 kHz or 100 kHz steps. Press the STEP button, one of the digits will flash on and off. Press the STEP button again to change stepping resolution.

To tune frequencies in either 10 kHz or 100 kHz increments, press the STEP button until the desired digit is flashing. Rotate the FREQUENCY control in either direction. The entire frequency range of the Magnum AlphaForce can be stepped through in 10 or 100 kHz increments.

To tune in 1 kHz increments, press the STEP button until the 1 kHz digit flashes on and off. Rotate the FREQUENCY control. NOTE: When stepping in 1 kHz increments, you are limited to tuning within a 10 kHz frequency range.

NB: Turns the noise blanker and automatic noise limiter on and off. The noise blanker circuit eliminates pulse type interference usually associated with automotive ignition systems. The automatic noise limiter reduces atmospheric related noise. To activate the NB and ANL, press the FUNC control and then press the NB button. NB and ANL will appear on the LCD indicating the noise blanker and ANL are turned on. To turn off the NB and ANL, repeat the same process.

1: Memory Channel 1. After programming this button is memory channel 1. See M.LOAD \ M.SAVE control for programming instructions.

18. CALL / 2

CALL: The call frequency is 29.300 MHz, FM. The radio's operating frequency and mode are automatically reset to this when the CALL button is pressed.

2: Memory Channel 2. After programming this button is memory channel 2. See M.LOAD \ M.SAVE control for programming instructions.

19. DIMMER

Press the DIM, or dimmer control, to decrease the amount of back-lighting on the front panel and LCD screen.

20. SCAN / SHIFT / 3

SCAN: Scans in increments of 10 kHz. There are two ways to scan using the front panel controls.

(1) Receive Audio On Scanning: Press the SCAN button. Scan rate is one step every 5 seconds. To stop scanning press the SCAN button again, or momentarily press the PTT button on the microphone (scanning will stop without transmitting).

(2) Receive Audio Mute Scanning: Carefully rotate the squelch control a minimum excursion (refer to 2) until the receive audio is off. The receiver scan rate will now be five frequencies per second. When a signal is detected the squelch is automatically disengaged and the scanning is paused. The squelch circuit will automatically re-engage and the receiver will continue to scan the moment the received signal is no longer detected.

SHIFT: Used for programming offsets to operate repeater networks. The AlphaForce can transmit and receive on different frequencies.

To program the offset, press the FUNC button and hold down the SHIFT button for 3 or more seconds. Three digits will appear on the LCD. This is the offset frequency in kHz. Rotate the FREQUENCY control until the desired offset frequency is displayed. To return to the main display press the FUNC button and hold down the SHIFT button for 3 or more seconds, or momentarily press the PTT button on the microphone (the transmitter will not be engaged).

To activate the programmed offset frequency, press the FUNC button, and then press the SHIFT button once. +SHIFT is displayed on the LCD. The AlphaForce will now transmit on the frequency that is XXX kHz greater than the displayed, or receive, frequency (XXX represents the programmed offset frequency in kHz).

To transmit on the frequency that is XXX kHz lower than the displayed, or receive, frequency press FUNC, then the SHIFT button. Repeat this until -SHIFT is displayed on the LCD.

To disengage the programmed offset frequency, press the FUNC button and then press the SHIFT button. Repeat this until the SHIFT indicator is no longer displayed on the LCD.

3: Memory Channel 3. After programming this button is memory channel 3. See M.LOAD \ M.SAVE control for programming instructions.

21. LCR / RPT / 4

LCR: Press the last channel recall button to return to the last frequency and mode that was transmitted on for more than 3 seconds.

RPT: Repeater Access Tone. Most repeaters require an 88.5 Hz tone burst to access. To activate the 88.5 Hz tone burst, press the FUNC control and then press the RPT button. RPT will appear on the LCD indicating that the tone burst will now automatically be transmitted whenever the PTT is pressed. To deactivate, repeat the same process.

4: Memory Channel 4. After programming this button is memory channel 4. See M.LOAD \ M.SAVE control for programming instructions.

22. MODE / TONE / 5

MODE: Press the MODE control to select the operating mode. The operating mode is indicated on the liquid crystal display, AM or FM.

TONE: Press the FUNC button, and then press the tone button to turn on the receive audio tone control. TONE will appear on the LCD indicating the feature is activated. This feature will roll-off high frequency noise (i.e. "white" noise). Under many operating conditions this will improve the clarity and understanding of received signals.

5: Memory Channel 5. After programming this button is memory channel 5. See M.LOAD \ M.SAVE control for programming instructions.

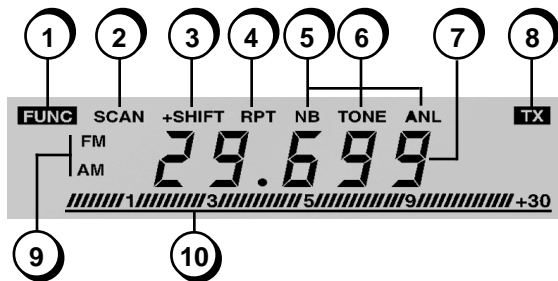
23. M.SAVE / M.LOAD

M.SAVE: To save in memory a specific frequency and operating mode, select the desired mode and rotate the FREQUENCY control to the desired frequency. Press the FUNC button, and then press the M.SAVE button. S will appear on the LCD next to the frequency. While S is displayed, immediately press any of the memory channel buttons (1 - 5). The mode and frequency is now saved into memory. If the S indicator disappears before you press the memory channel button, the information will not be saved and the process must be repeated.

M.LOAD: To load, or recall, any of the saved memory channels press the M.LOAD button. L will appear on the LCD for several seconds. While the letter is displayed press the desired memory channel button (1 - 5). The programmed mode and frequency will be displayed.

24. LIQUID CRYSTAL DISPLAY

The LCD screen is the status display for the majority of the transceiver's functions.



- 1) **FUNCTION**
Indicates the function button has been activated and that the function dependent controls may be accessed.
- 2) **SCAN**
Indicates that the transceiver is in scan mode.
- 3) **+SHIFT / -SHIFT**
Indicates that the split or offset frequency function is activated.
- 4) **RPT**
Indicates that the repeater access tone burst function is active.

- 5) **NB and ANL**
Indicates that both the noise blanker and the automatic noise limiter are active.
- 6) **TONE**
Indicates that the receive audio tone low feature is active.
- 7) **5 DIGIT FREQUENCY DISPLAY**
Indicates transmit and receive operating frequencies.
- 8) **TX**
Indicates that the transmitter is on.
- 9) **FM / AM**
Indicates the selected operating mode.
- 10) **PEAK READING RF POWER METER**
Indicates relative peak RF output power.

REAR PANEL

1. External Speaker Jack

An external speaker jack is located on the rear panel of the transceiver. The Magnum AlphaForce is designed to accept any standard 8 ohm external speaker for use with two-way transceivers.

OTHER FEATURES

1. PROGRAMMING TONE

This tone sounds each time the CPU is being programmed. It is helpful, in the beginning so you can be sure the command has been entered. You may turn off the tone by simply pressing the PTT switch on the microphone and turning on the ON/OFF POWER switch at the same time. To turn the tone back on, repeat the same process.

2. MEMORY BACK UP

The AlphaForce features a super-capacitor back up for the 5 memory channels. The AlphaForce can be disconnected from a power source for approximately 4 or 5 days before the memory is lost.

GENERAL SPECIFICATIONS

Frequency Coverage	: Transmit and Receive	28.000 to 29.699 MHz
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	: 12 - 13.8 V DC, negative ground	
Current Consumption	: 6 amps maximum	
Dimensions	: 7.75 x 2.5 x 10.75 in (W x H x D)	
Weight	: 4 lbs	

TRANSMITTER SPECIFICATIONS

Power Output	: FM.....	30 Watts
	: AM	9 Watts Average / 30 Watts PEP
Tuning Steps	: 1 kHz / 10 kHz / 100 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	: ECM, 600 to 1K ohms	

RECEIVER SPECIFICATIONS

Circuit Type	: Dual-Conversion Superheterodyne	
Intermediate Frequencies	: 1st IF	10.695 MHz
	: 2nd IF	455 kHz
Sensitivity	: AM	1.0 μ V at 10 dB S + N/N
	: FM.....	0.3 μ V 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

A Division of RF Limited

PO Box 445 • Issaquah WA 98027
Telephone 425-558-9592 • Facsimile 425-558-9704
Technical Support Only 1-877-MAGNUM-9 (1-877-624-6869)

<http://www.magnum-radio.com>
E-Mail info@magnum-radio.com