

RADIO AMPLIFIER

**RETCVIS**  
**USER MANUAL**

**DIGITAL & ANALOG AMPLIFIER**

## Product Highlights

RT91 amplifiers are portable, lightweight, wide coverage RF power amplifiers for handheld radio equipment and are equally capable of amplifying both analog and digital signals:

- RT91 amplifiers can be used for analog FM, P25 Phase 1, C4FM (System Fusion), NXDN, IDAS, dPMR, and MPT1327 modes.
- The 'D' series amplifiers also includes support for DMR and P25 Phase 2.
- Clean output signal: Harmonic filters on the input allow the amplifier to transmit a cleaner signal.
- Small size: The amplifier measures 5.5-in D x 4.5-in. W x 1.4-in. H (40 mm D x 115mm W x 36mm H), making it the perfect companion for field operation without adding a lot of weight.
- Power cable: Fused power cable with 12V auxiliary power plug that connects to 12V auxiliary sockets in most vehicles.
- Build-in speaker microphone sockets.
- Status indicators: Shows the amplifier's current status.
- Protection circuitry: The unit includes voltage spike suppression, over-temperature protection, RF sensing, and automatic power control (APC) to protect it under adverse operating conditions.

Features include:

High output power: 20 - 40W output with an input of 2 - 6W as follows:

2W In → 20W Out

3W In → 30W Out

4W In → 35W Out

6W In → 40W Out

## Supported Radios

RT91 amplifiers Series is designed to work with any analog and digital handheld transceivers, but it will also work with any handheld radio that outputs 2W – 6W with the appropriate cable. If the supplied cables do not connect to your radio, you will need to use adaptors or build cables with the appropriate connectors.

## Unpacking the Box

Carefully remove the amplifier and accessories from the box. It should contain one each of the following:

- Amplifier
- Radio to Amplifier RF Cable
- Radio to Amplifier Accessory Control Cable(Optional)
- Speaker Microphone(Optional)
- Microphone Hanger(Optional)
- Mobile Mounting Bracket and Screw Set
- User Guide

If any of these items are missing, please contact your dealer immediately.

## Front Panel

The front panel contains the following connectors and controls:

### **ON/OFF switch:**

To turn the amplifier on, press and hold the ON/OFF button until the POWER light comes on. To turn the amplifier off, press and hold the ON/OFF button until the POWER light goes off.

### **POWER:**

When lit, the amplifier is on. When off, the amplifier is off.

### **TX:**

When transmitting, this light is lit.

### **ALM:**

When lit, the supplied voltage is great than 15.9V DC. This could damage the amplifier. Turn the amplifier off and adjust the output voltage of your power supply.

### **MIC:**

This jack accepts the external speaker/micropohne.

### **CONTROL:**

This jack accepts one of the K1 plugs from the Radio to Amplifier Accessory Control Cable.

## Rear Panel

The rear panel has the following connectors:

**RF IN:** Connect the male end of the Radio to Amplifier RF Cable to this connector.

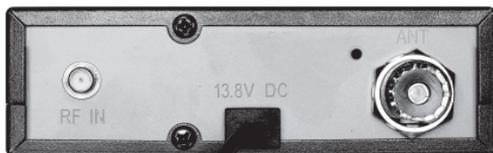
**13.8V DC:** Connect the power cable to a DC power source with a voltage of 13.8V DC,  $\pm 15\%$ .

**ANT:** Connect the feedline from your antenna to this connector.



## Operating The Amplifier

There are three different ways to connect a handheld transceiver to the amplifier. Whichever method you choose, you must connect a proper external antenna or dummy load to the amplifier. Failure to do so, could damage the amplifier. See the Antenna Basic section for more information.



## RF Control

Connect the output of the handheld transceiver to the RF IN connector on the rear panel of the amplifier with the Radio to Amplifier RF cable. Connect the power cable of the amplifier to a +13.8 VDC supply and turn

on the amplifier by pressing the ON/OFF button and holding it until the POWER indicator turns on. When the amplifier detects an in-band RF signal, it turns on and amplifies the input signal.



## Single PTT Earpiece Control

Connect the single PTT earpiece to the accessory jack on the handheld transceiver. Connect the output of the handheld transceiver to the RF IN connector on the rear panel of the amplifier with the Radio to Amplifier RF cable. Connect the power cable of the amplifier to a +13.8 VDC supply and turn on the amplifier by pressing the ON/OFF button and holding it until the POWER indicator turns on. In this mode, the PTT switch of the external microphone on the earpiece keys the handheld transceiver, and when the amplifier detects an in-band RF signal, it turns on and amplifies the input signal.



## Speaker Microphone Control

Connect the speaker microphone to the MIC jack on the front panel of the amplifier. Connect the output of the handheld transceiver to the RF IN connector on the rear panel of the amplifier with the Radio to Amplifier RF cable. Connect one end of the Radio to Amplifier Accessory Control Cable to the CONTROL jacks on the front panel of the amplifier and the other end to the accessory jack of the handheld transceiver. Connect the power cable of the amplifier to a +13.8 VDC supply and turn on the amplifier by pressing the ON/OFF button and holding it until the POWER indicator turns on. In this mode, you transmit by pressing the PTT switch of the speaker microphone and speaking into the microphone.

**NOTE:** You will need to use an accessory adaptor if your radio does not use the Kenwood K1 connector standard.



### **NOTE:**

Do not transmit an out-of-band signal while the amplifier is turned on.

## **Antenna Basics**

Your amplifier does not include an antenna. It is very important to not transmit without an antenna or dummy load connected to the ANT connector on the rear panel of the amplifier. Transmitting without an antenna or dummy load may cause harm to the radio equipment.

When choosing an antenna, make sure that it is suitable for the bands you plan on transmitting and receiving on. For example, if you plan on transmitting on 145MHz, make sure that the antenna you select has an SWR of 1.5:1 or less on that frequency. Using an antenna with an SWR greater than 1.5:1 could damage the amplifier.

If you plan to use a magnetically-mounted (mag-mount) antennas, ensure that the antenna is grounded to a metal surface, such as a vehicle body. Magnetically-mounted antennas do not operate properly without a good ground.

## **Mobile Operation**

When operating mobile, install the Mobile Mounting Bracket and secure the amplifier to the vehicle with the so that it is not damaged while the vehicle is moving and it does not distract the driver of the vehicle. Also included is a speaker microphone hanger.

## **Specifications**

Frequency range:

136 – 174 MHz

400 – 480 MHz

Power supply: 13.8 VDC ( $\pm 15\%$ ), 5.5 A maximum

Input RF power: 2 - 6W ( $\pm 10\%$ )

Output RF power: 20 - 40W

Size: 5.5-in D x 4.5-in. W x 1.4-in. H (40 mm D x 115 mm W x 36 mm H)

Net weight: 1.8 lbs. (800g)

## **FCC Statement**

This equipment has been tested and found to comply with the limits for part 90 of FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates and can radiate radio frequency energy. If not installed and used in accordance with the instructions, it may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. Verification of harmful interference by this equipment to radio or television reception can be determined by turning it off and then 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 different circuit to that of the receiver's outlet.

Consult the dealer or an experienced radio/TV technician for help.

Operation is subject to the following two conditions:

This device may not cause harmful interference.

This device must accept any interference received, including interference that may cause undesired operation. Note: Changes or modifications to this unit not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

Compliance with RF Exposure Standards

United States Federal Communications Commission, Code of Federal Regulations; 47 CFR §1.1307, 1.1310 and 2.1091

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Institute of Electrical and Electronic Engineers (IEEE) C95.1:2005 Edition  
Any Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

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.

## **RF Exposure Compliance and Control Guidelines and Operating Instructions**

To control your exposure and ensure compliance with the occupational/-controlled environment exposure limits always adhere to the following procedures.

### **Guidelines**

Do not remove the RF Exposure Label from the device.

User awareness instructions should accompany device when transferred to other users. Do not use this device if the operational requirements described herein are not met. Operating Instructions:

Keep the device at least 50 mm away from the body. Keeping the device at the proper distance is important as RF exposure decreases with distance from the antenna. The antenna should be kept away from the face and eyes.

Use of non-approved accessories may result in exposure levels which exceed the FCC's occupational/controlled environmental RF exposure limits.

Use of non-approved antennas, batteries, and accessories cause the repeater to exceed the FCC RF exposure guidelines. Contact your local dealer for the product's optional accessories.

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