



Crossband Duplex Repeater Controller

# RT-CRC1 User's Guide ( Version 2 )

## Thank You Notice

Thank you for purchasing RT-CRC1 Crossband Duplex Repeater Controller. Please read this User's Guide carefully before putting RT-CRC1 into operation. Support for the RT-CRC1 is available by email. Please direct all questions via email to **support@radio-tone.com**. Your question(s) will be answered promptly.

## Safety Information

### Electrical shock hazard

- Never attempt to connect the unit to any power network other than one for which it was intended.
- Do not open the housing of the units.
- Switch OFF the unit, and then disconnect the unit from the external power supply and from all other devices if a fault occurs.
- Install the unit only in a dry place protected against the elements.
- If you are uncertain about the safe operation of the unit, shut it down immediately and secure it to prevent any unauthorized start-up. Safe operation is no longer possible, for example,
  - if damage is visible to the unit or the cables,
  - if the unit no longer operates correctly,
  - if objects have penetrated inside the unit,
  - after long storage under improper conditions

Have the system checked by qualified, specialist personnel in such cases.

### Installation and operation

- Before installing or operating the system, ensure that you have read and understood the documentation for other equipment connected to the unit. These contain important safety notices and information concerning permissible applications.
- Perform only the installation and operating work described in this guide. All other work beyond this may lead to injuries to persons and damage to the system or other equipment.

### Repairs and maintenance

Never open the housing of the RT-CRC1. The unit contains no parts which you can repair or replace. Ensure that only qualified, specialist personnel (electrical technicians) are permitted to carry out maintenance or repair work.

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## Preface

The RT-CRC1 is a state-of-the-art cross band duplex repeater controller. It is an easy of operation, cost effective and highly flexible platform for setting up bi-direction cross band duplex repeater with mobile and handheld radio.

The RT-CRC1 has 2 audio ports they are used to connect with mobile and handheld radio. When the radio units are connected, the received signal on a radio unit will be real time transmit on the other unit. The 2 radio units can be set to operate on VHF/VHF, UHF/UHF, VHF/UHF or UHF/VHF modes.

DTMF remote control function with password protection is available in the RT-CRC1(Radio Link at [ A RX/TX ] Terminal only). User can control the repeater ON or OFF remotely by DTMF.

## Key Features

**The key features of RT-CRC1 are:**

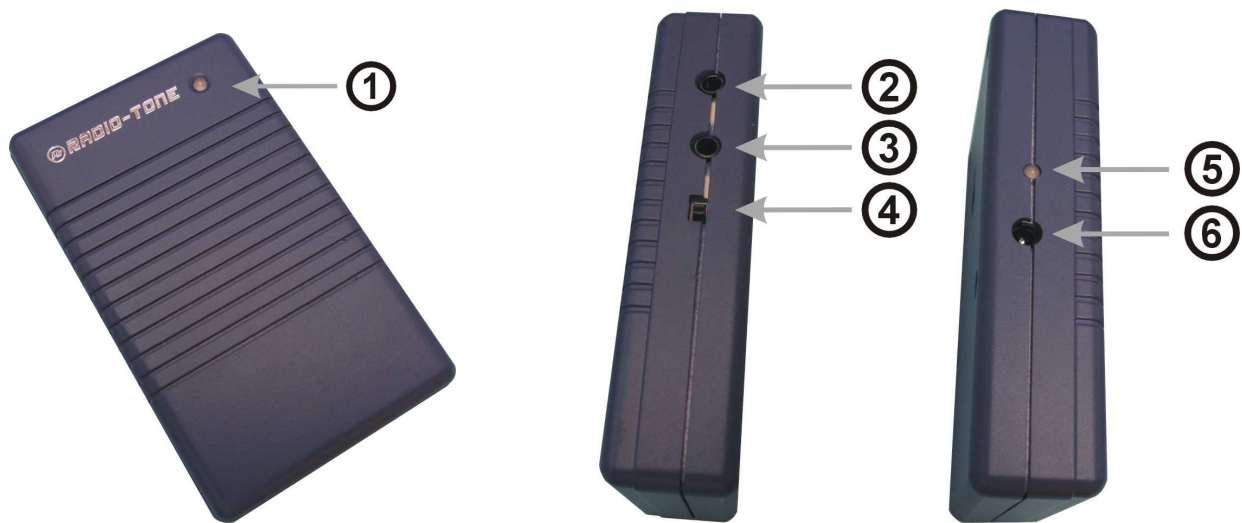
- Real time bi-direction cross band duplex repeater with mobile and handheld radio
- Operation includes VHF/VHF, UHF/UHF, VHF/UHF and UHF/VHF modes
- DTMF remote control repeater function ON and OFF with password protection
- Allows user to change the DTMF remote control password
- Allows user to enable and disable the Channel Priority Function
- Build-in rechargeable Lithium-ion battery support 30 hours long life operation
- Operates on both build-in battery and external DC 12V power supply
- Works with most popular handheld radios

## Product Descriptions

### Packing List

- RT-CRC1 Full Duplex Repeater Controller x 1
- Universal AC Adapter x 1
- Radio Unit Connection Cable x 2
- This User's Guide x 1

## Major Operating Controls, Terminals and Their Functions



### 1. [ Status ] Indicator

This is a status indicator for indicating the operation status of RT-CRC1.

<b>ORANGE COLOR BLINKING</b>	: Allows user to change the DTMF Remote Control password. When the RT-CRC1 is switched on, the status indicator will BLINK with ORANGE color for approximate 20 seconds, user can change the remote control password by using a radio unit with DTMF function.
<b>GREEN COLOR BLINKING</b>	: The RT-CRC1 is standing by for repeating radio calls.
<b>RED COLOR LIGHTS UP</b>	: The RT-CRC1 is repeating a radio call.
<b>ORANGE COLOR LIGHTS UP</b>	: The RT-CRC1 is receiving a radio call, and only allows remote DTMF control. (The repeater function is turned OFF.)
<b>RED COLOR ONE SHORT BLINKING</b>	: PTT Mode 1, or [A RX/TX ] Terminal Priority Disabled
<b>RED COLOR TWO SHORT BLINKING</b>	: PTT Mode 2, or [A RX/TX ] Terminal Priority Enabled

### 2. [ A RX/TX ] Terminal

This terminal is used to connect to a radio unit.

### 3. [ B RX/TX ] Terminal

This terminal is used to connect to another radio unit.

### 4. [ Power ON/OFF ] Switch

This switch is used to turn ON/OFF the RT-CRC1.

### 5. [ DC Input / Charging ] Indicator

This indicator is used to indicate the battery charging and external DC input status.

**ORANGE COLOR LIGHTS UP** : The build-in battery is being charging.

**GREEN COLOR LIGHTS UP** : The build-in battery is charged up and the RT-CRC1 is working on external power supply.

## 6. [ DC 12V ] Terminal

This terminal is used to connect an external DC 12V power supply

## Installation

### Charging the built-in battery

- Connect the AC adapter to the [ DC 12V ] Terminal of the RT-CRC1.
- Plug the AC adapter to an AC outlet.



### Normal operation with build-in battery



*This picture just shows the connection of Receiver, Repeater Controller and Transmitter. For real repeater system, the antennas of both receiver and transmitter maybe extended and installed for approximate 10 meters, or use a DUPLEXER to combine the RF signal of receiver and transmitter. These are the ways to provide adequate rejection of strong transmitter signal occurring at the receiving signal.*

- Turns off the RT-CRC1 and all radio units.
- Connect the radio units to the RX/TX Terminals of the RT-CRC1 by using correct cable.

## Operation with external power supply

- Turns off the RT-CRC1 and all radio units.
- Connect the radio unit to the RX/TX Terminals of the RT-CRC1 by using correct cable.
- Connect the DC Output of AC adapter to the [ DC 12V ] Terminal of the RT-CRC1.
- Plug the AC adapter to an AC outlet.

## Operation

When the system is installed, and channel frequencies of the radio units are configured correctly. The system is ready for use now.

### Setup a new DTMF Remote Control Password(Radio Link at [ A RX/TX ] Terminal Only)

- Turn ON the power of the radio units.
- Turn ON the power of the RT-CRC1. The [ Status ] Indicator of the RT-CRC1 will BLINK with ORANGE COLOR for approximate 20 seconds.
- Push and hold the PTT switch of any radio unit with DTMF function (Besides the radio receiver and transmitter units installed with the RT-CRC1.).
- Key-in a **4-digit** new password followed by “ # ” key, for example, “ 8888# ”.
- Release the PTT switch, the new password will be stored in the memory of the RT-CRC1.

### Setup PTT Control Mode and [A RX/TX] Priority (Radio Link at [ A RX/TX ] Terminal Only)

*This repeater controller ships with PTT Mode 1 for both [ A RX/TX ] Terminal and [ B RX/TX ] Terminal. For some radio units, like KG-UVD1P, they are required the PTT Mode 2 to let them work as Transmitter. Follow below steps to change the PTT Mode.*

#### PTT Mode for [ B RX/TX ] Terminal

- Turn ON the power of the radio units.
- Turn ON the power of the RT-CRC1. The [ Status ] Indicator of the RT-CRC1 will BLINK with ORANGE COLOR for approximate 20 seconds.
- Push and hold the PTT switch of any radio unit with DTMF function.
- Key-in the control code “**1234**” and then followed by the mode number “ **1** ” or “ **2** ” to setup the PTT Mode of [ B RX/TX ] Terminal. That means “ **12341** ” for PTT Mode 1, and “ **12342** ” for PTT Mode 2. The [ Status ] Indicator of RT-CRC1 is changed to BLINK with RED COLOR. The blinking codes are:  
**ONE SHORT ON : PTT MODE 1**  
**TWO SHORT ON : PTT MODE 2**
- After release the PTT switch, the new PTT Mode of [ B RX/TX ] Terminal will be stored in the memory of the RT-CRC1.

### PTT Mode for [ A RX/TX ] Terminal

- Turn ON the power of the radio units.
- Turn ON the power of the RT-CRC1. The [ Status ] Indicator of the RT-CRC1 will BLINK with ORANGE COLOR for approximate 20 seconds.
- Push and hold the PTT switch of any radio unit with DTMF function.
- Key-in the control code “**1234**” and then followed by the mode number “**4**” or “**5**” to setup the PTT Mode of [ A RX/TX ] Terminal. That means “**12344**” for PTT Mode 1, and “**12345**” for PTT Mode 2. The [ Status ] Indicator of RT-CRC1 is changed to BLINK with RED COLOR. The blinking codes are:  
**ONE SHORT ON : PTT MODE 1**  
**TWO SHORT ON : PTT MODE 2**
- After release the PTT switch, the new PTT Mode of [ B RX/TX ] Terminal will be stored in the memory of the RT-CRC1.

### Disable and Enable Priority for [ A RX/TX ] Terminal

- Turn ON the power of the radio units.
- Turn ON the power of the RT-CRC1. The [ Status ] Indicator of the RT-CRC1 will BLINK with ORANGE COLOR for approximate 20 seconds.
- Push and hold the PTT switch of any radio unit with DTMF function.
- Key-in the control code “**1234**” and then followed by the number “**7**” to disable priority feature of [A RX/TX] terminal, or “**8**” to enable the priority feature of [ A RX/TX ] Terminal. That means “**12347**” is used to disable, and “**12348**” is used to enable. The [ Status ] Indicator of RT-CRC1 is changed to BLINK with RED COLOR. The blinking codes are:  
**ONE SHORT ON : DISABLE**  
**TWO SHORT ON : ENABLE**
- After release the PTT switch, the new priority setting of [ A RX/TX ] Terminal will be stored in the memory of the RT-CRC1.

### Simple Repeater Operation

- Turn ON the power of the radio receiver unit, radio transmitter unit and RT-CRC1. The system will standby for radio repeater function. The [ Status ] Indicator will BLINK with ORANGE COLOR for approximate 20 seconds, and then BLINK with GREEN COLOR.
- Push and hold the PTT switch of any other radio unit to perform a radio call.
- The receiver unit will receive the radio call and then trigger the RT-CRC1.
- The [ Status ] Indicator of the RT-CRC1 will LIGHT UP with RED COLOR, and control the transmitter unit.
- Then the transmitter unit will repeat the radio call to another channel.

**Remote Control Repeat Function OFF (Radio Link at [ A RX/TX ] Terminal Only)**

- Push and hold the PTT switch of any other radio unit with DTMF function to perform a radio call.
- The receiver unit will receive the radio call and then trigger the RT-CRC1.
- The [ Status ] Indicator of the RT-CRC1 will LIGHT UP with RED COLOR, which indicates the repeat function is turned to ON.
- Key-in a **4-digit** password followed by “ \* ” key, for example, “ 8888\* ”.
- The [ Status ] Indicator of the RT-CRC1 will LIGHT UP with ORANGE COLOR, and the Repeat Function is turned to OFF now.

**Remote Control Repeat Function ON (Radio Link at [ A RX/TX ] Terminal only)**

- Push and hold the PTT switch of any other radio unit with DTMF function to perform a radio call.
- The receiver unit will receive the radio call and then trigger the RT-CRC1.
- The [ Status ] Indicator of the RT-CRC1 will LIGHT UP with ORANGE COLOR, which indicates the repeat function is turned to OFF.
- Key-in a **4-digit** password followed by “ # ” key, for example, “ 8888# ”.
- The [ Status ] Indicator of the RT-CRC1 will LIGHT UP with RED COLOR, and the Repeat Function is turned to ON now.

**Specifications**

Power Supply	: Build-in 8.4V 900mAh Lithium-Ion Battery
Power Consumption	: 38mA (Typical)
Charging & External Power Supply	: DC 12V
Charging Current	: 250mA (Typical)
DTMF Remote Control Functions	: Repeat Function ON and OFF
DTMF Remote Control Protection	: User define 4-digit Password Protection
Channel Priority	: User define enable/disable for [ A RX/TX ] Terminal
Carrier Detect Activation Time	: Approx. 1/2 Second
Carrier Handover Time	: Approx. 1/2 Second
Indicators	: Status LED and External Power Supply Input LED
Dimensions	: 95(H) x 60(W) x 23(D) mm
Weight	: 0.1 Kg
AC Adapter	: Input: AC100~240V 50/60Hz, Output: DC 12V 1.0A