

Instruction Manual**PR800U(1)****Digital Repeater**

We are very grateful for your purchasing PR800U(1). We believe PR800 U(1) can bring great convenience to your life and work. PR800U(1)Digital repeater which always incorporates the advanced technologyand exquisite craft, we hope that the quality and function of this product could make you feel satisfied.

ZTE**ZTE TRUNKING TECHNOLOGY CORPORATION**

Notice to User

- ◆ Please read this Instruction Manual carefully before any operation to this product. When you start to use the product, we deem that you have read this manual carefully.
- ◆ Please save this Instruction Manual in a safe place for inference in need.
- ◆ In order to preserve your rights and interests, please fill in the Warranty Card seriously and actually when you purchase this product, and ask for the valid purchasing certificate.
- ◆ ZTE and the authorized parties own the related intellectual property of all the product parts include accessories. Any design and materials may not be modified, copied, extracted or translated without the authorization of ZTE or its authorized parties.

- ◆ Due to the update or modification of the product, ZTE owns the right to change the specifications of software and hardware described in this manual without further notice. Specifications and information contained in this manual are for reference only.
- ◆ All described information in this manual are verified, if any missing or mistakes, ZTE reserves the rights to the interpretation of this manual.

Safety Information

In order to use the indoor digital repeater effectively, please read the following information.

- ◆ This product can only be maintained by the professional technicians.
Do not disassemble the radio by yourself.
- ◆ The repeater setting and mounting must be approved by the local Radio Management Departments.
- ◆ Installing the antenna of repeater must be do well of lightning protection, otherwise life or property damage may be occurred.
- ◆ Please use the qualified power, antenna, lightning protection device, power divider and corresponding accessories and make sure they are installed correctly, otherwise repeater damage will be occurred.

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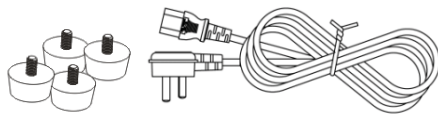
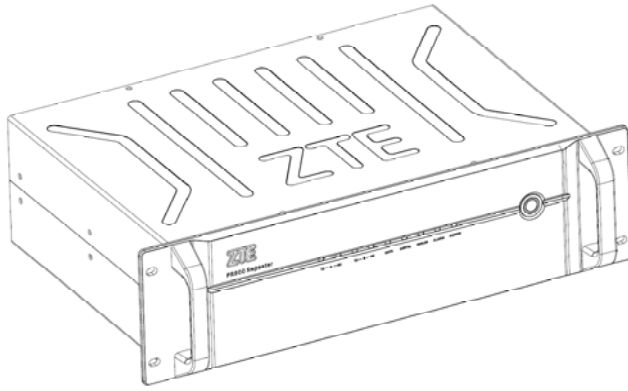
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1 Unpacking and Checking

Please unpack carefully and check all the items listed in the following table before discarding the packing material. If any damage or loss occurs during shipment, please contact your dealer.

1.1 Standard Accessories

Item	Quantity
Repeater 1	
Foot pad (4 pcs)	1
Instruction Manual	1

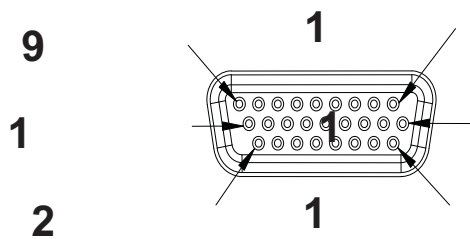


2 Radio Overview

No.	Part Name
1 Han	dles
2	Frond Panel LED Indicators
3 Po	wer Switch
4 GPS	Antenna Connector
5 A	CCY Connector
6 Net	work Connector(IP)
7	100-240V AC Cable Connector
8 G	ND Screw
9 Tx	Connector
10 Fan	
11 Co	oler
12 RX	Connector
13	13.6V DC Connector

Power On/Off Button

Power on/off the repeater.

ACCY Connector

Pin Instruction

Pin	Instruction
PIN1 Undefined	
PIN2 Undefined	
PIN3 Undefined	
PIN4 GND	
PIN5	ACC_MAP_ID2: It is used for test.
PIN6	ACC_MAP_ID1: It is used for test.
PIN7 Undefined	
PIN8 GND	
PIN9 +SPEAKER	
PIN10 -SPEAKER	
PIN11 MIC	
PIN12 GND	
PIN13 Undefined	
PIN14 Undefined	

PIN15 Undefined	
PIN16 GND	
PIN17	External PTT, High level is effective
PIN18 GND	
PIN19 Undefined	
PIN20 Undefined	
PIN21 Undefined	
PIN22	PRGM_IO_7, External high level signal input
PIN23 Undefined	
PIN24 Undefined	
PIN25 Undefined	

1.1.1 External Connector Instruction

The method to activate external PTT:

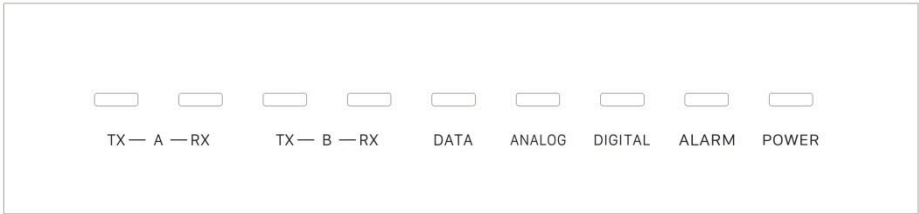
Short connect the Pin17 with Pin22 of VGA to activate external PTT. It can test the transmitting signal of repeater.

Test Analog Receiving: Short connect Pin5 with Pin22 of VGA.

Reset IP address:

Short connect PIN6 with PIN22 of VGA to reset the IP and gateway address to the IP address on the label, but it will not change data of IP address and gateway address, The IP address and gateway address will recover to configure address after restart.

2.1 LED Indicators



No.	Indicator	Description
1	TX-A	Slot 1 transmitting indicator
2	RX-A	Slot 1 receiving indicator
3	TX-B	Slot 2 transmitting indicator
4	RX-B	Slot 2 receiving indicator
5		Repeater signal indicator
6		Analog mode indicator
7		Digital mode indicator

8		Alarm indicator
9		Power indicator

3 Basic Operations

3.1 Powering On/Off

When the repeater is turned off, press the power switch "  " to power on the repeater. Then the light "  " is on. After the system working normally, the light "  ", "  " indicates the present working mode.

Press  to power off the repeater.

3.2 Voice and Data Transfer

The receiving and transmitting frequency are different on the repeater. Repeater will turn the weak receiving signal into strong transmitting signal and transmit on the same channel. When transmitting, the light

 is on. If it is analog signal,  flashes, if it is digital signal,  flashes. The receiving and transmitting frequency and CDCSS/CTCSS can be set by CPS.

An analog channel or a smart analog/digital detecting channel can be programmed with one group of CDCSS/CTCSS encoding and decoding list. When receiving CDCSS/CTCSS on the channel, repeater will transmit according to preprogrammed CDCSS/CTCSS encoding and decoding list.

3.3 IP Connecting

Default IP address: 192.168.1.100. Application update, parameters configuration and second development can be made through this port.

3.4 Warning

When unusual situation happens, warning indicator light will be enlightened. For example, when Receiving Frequency unlocks, the warning light will flash once one second; Transmitting frequency

unlocks, the warning light will flash once two seconds; When both transmitting and receiving frequency unlock, the alarm indicator will stay light on. When the repeater occurs unusual situation, please let the related professional to check and recover the repeater.

3.5 Programming Software

IP connecting status should be checked before programming. Make sure that the network button in the tools bar is pressed down, (If the button is not pressed down, the IP address bar will be grey, disabled), also need to make sure the connect button is pressed down (the default status of connect and network buttons are pressed down), under the status of connect button pressed down, the software will connect to the repeater by the IP in the address bar. While the connectivity is successfully built, the status bar will show“Network is OK”, or the address bar will show “Network XX”. If other programming software connects to the repeater, the late connect software will show“Repeater is busy”, then the connect button will pop up automatically, and need to press the connect button to

re-connect.

1.1.2 File Menu

New: Add new channel information, repeater will create new channel configuration files, a default analog channel, and set the default configurations,

Open: Open a configuration file that saved in the storage device.

Save: Save the current channel configuration, in order to open the file conveniently next time.

If a new created channel or a channel read from the repeater, when saving them, you need to select a new save path (similar with “save as”).

Save as: Select a new path to save the current configuration file.

Exit: Exit the software, if the configuration file has not been saved, software will ask user to save it.

1.1.3 Model Menu

Model Type: to select a model type, which includes the frequencies of 136MHz-174MHz, 400MHz-470MHz or custom frequency. The custom frequency cannot exceed the range of the frequencies the repeater provides.

1.1.4 Edit Menu

General Setting

Device ID: Sets an individual ID that uniquely identifies the radio. In the Multiple Site IP system, this ID is used to uniquely the different repeater.

Working Mode: Now, it only supports working in the single site.

Work Alone: Work as single repeater, not networking with other repeaters.

Connect Working Mode: If exceed one single repeater's coverage, this mode enables the repeater to connect with other repeaters to expand the coverage.

Group Call Hang Time: When a terminal radio initiates a group call, and

no PTT presses, repeater shall hang on for a period of time. During this time, the channel is being taken up, and communication is regarded still going, no accept to other signal relay. If any presses PTT, then the hang time recounts. Once the hang time is over, this communication is over too, channel will be released.

Value Range: 0~7000ms, the steps 500ms, the default value is 4000ms.

Individual Call Hang Time: When a terminal radio initiates an individual call and no PTT presses, repeater shall hang on for a period of time.

During this time, the channel is being taken up, and communication is regarded still going, no accept to other signal relay. If any presses PTT, then the hang time recounts. Once the hang time is over, this communication is over too, channel will be released.

Value Range: 0~7000ms, stepping is 500ms, the default value is 4000ms.

Emergency Call Hang Time: When a terminal radio initiates an emergency call and no PTT presses, repeater shall hang on for a period of time. During this time, the channel is being taken up, and

communication is regarded still going, no accept to other signal relay. If any presses PTT, then the hang time recounts. Once the hang time is over, this communication is over too, channel will be released.

Value Range: 0~7000ms, stepping is 500ms, the default value is 4000ms.

Calling Hang Time: When a call ends, the repeater will hang on for a period of time, during this time, when a terminal radio presses the PTT, no need to build connect again, just communicate directly.

Value Range: 0~7000ms, the stepping is 500ms, the default value is 4000ms.

Network Setting: When networking, different repeaters can address to build a connecting by setting the network parameters.

Local IP: The IP address of repeater, like 192.168.1.100.

Local Port: The repeaters use the UDP local port to connect to the server. The range of the port is 0~65535.

Server IP: When networking, the IP of the server that repeater connects to.

Server Port: The repeater uses TCP server, TCP server connects needs a specific server port. The range value of the port is from 0~65535.

Gateway IP: When networking, the gateway IP that repeaters interconnect to each other.

Transmit Frequency: To set the transmit frequency in the current channel. The range cannot exceed what the repeater limits.

Receive Frequency: To set the receive frequency in the current channel. The range cannot exceed what the repeater limits.

Power: To select current channel's RF power level

Fan Control: User can set the Fan Work Threshold, Power Amplifier Protect Threshold and Standing Wave Ratio.

Power Amplifier Protect Threshold: As long as the temperature is higher than the threshold value, it stops working , the default threshold value is 55℃

Fan Work Threshold: As long as the temperature is higher the threshold value, the fan starts working. The default threshold value is

55°C.

Fan Stop Work Threshold: As long as the temperature is higher the threshold value, the fan stops working. The default threshold value is 35°C.

Standing Wave Ratio: It is used to shows if it's the antenna match with the radio. The default value is 3.0

Bandwidth: It's used to select the channel spacing of the current channel. Options is 12.5 kHz the default option is 12.5 kHz.

Colour Code: It is used to select the colour code of the current channel. As long as the radios with same colour code in the same frequency can communicate with each other.

Value Range:0~15, default value is 1.

Squelch Type: It is used to select the receive mode of current channel.

Options: CSQ, CTCSS, CDCSS, -CDCSS.

Default Option: CSQ

Squelch Level: It is used to set the squelch electrical level.

CTCSS: If select this option, needs to select a CTCSS value, or the transmitter and receiver cannot communicate with each other.

Value Range: The CTCSS ranges from 0~254.1Hz, the stepping is 0.1 Hz, default value is 67 Hz.

CDCSS: If select CDCSS or –CDCSS, needs to select a CDCSS value, or the transmitter and receiver cannot communicate with each other.

Value Range: 0~777(octal number), the stepping is 1, the default value is 023.

Notes:

1. Squelch level only use for analog channel.
2. Mix channel cannot select CSQ, must select CTCSS, CDCSS or –CDCSS.

4 Program Menu

Read Data: Read data from the repeater

When reading data, a bar pops up and shows the reading process. When finish reading, software will pop up a dialog box, shows“Read data successfully”.

When you try to read data, tick the option “Exit after finish”, when finish reading data, the dialog box will exit automatically. If not tick this option, users have to press “Exit” manually to close the box.

Write Data: Write the configurations into the repeaters.

When writing data, a bar pops up and shows the writing process. When finish writing, software will pop up a dialog box, shows“Write data successfully”.

When you try to write data, tick the option “Exit after finish”, when finish writing data, the dialog box will exit automatically. If not tick this option, users have to press “Exit” manually to close the box.

Notes

(1) When try to read data, have to check the network, make sure the

program menu tick the “Network” option, make sure the IP on the tools bar is the IP of the repeater you are going to program.

(2) When the connectivity is successful, the top of the dialog box of “Reading data” and status bar will show “Network is OK”, otherwise will be shown “Network XX”.

Upgrade software: the main function is to download different function modules from PC to the repeater, then set the main parameters on them. Under the “Program” menu, find “Program Download”, then you can upgrade. But before upgrading, you should select the path of the update package. If is a standard update package, after select the path, each update file’s paths will be auto filled.

Upgrade Boot Loader

(1) Before upgrading, repeater should be power off, boot mode select 0101, select “Download boot loader” and find the correct serial port between PC and repeater. If necessary, select the boot loader file and uboot file.

(2) Press “Download” button, then a upgrade dialog box pops up, select “Yes”.

(3) When the control program shows “Wait for boot me.....” the interface power on (Note: if the below interface flashes back, maybe fail to open the serial port. Please check the serial port connectivity, or other program takes up the serial port.

(4) if the update is finished, software will note that. Please don’t forget to switch the boot mode back to 1000.

Upgrading the System

(1) Boot mode should be 1000 while upgrading. Choose the system programs to be downloaded, and remove unnecessary components according to needs. (For example: if the repeater could work normally and connecting the PC network before upgrade, then you could remove the hook behind the environment variable).

(2) Click “download” button to proceed. When upgrading, there is a progress bar to show the upgrading status. And there will be a prompt

message after the process is finished.

Upgrading the system

(1) Boot mode should be 1000 while upgrading. Choose the system programs to be downloaded, and remove unnecessary components according to needs.

(2) Click “download” button to proceed. When upgrading, there is a progress bar to show the upgrading status. And there will be a prompt message after the process is finished.

5 Frequently Asked Questions (FAQ)

Can't connect to the PC programming software

The IP of repeater input is error in the programming software. Or the user forgets the IP of repeater.

Can't transfer

Please confirm the frequency and the working mode of the radio is the same with the repeater.

6. Operational Instructions and Training Guidelines

To ensure optimal performance and compliance with the occupational/controlled environment RF energy exposure limits in the above standards and guidelines, users should transmit not more than 100% of the time and always adhere to the following procedures:

- Antenna gain must not exceed 8.5dBi.
- The antenna must be installed complying with the requirements of manufacturer or supplier, and it must be at least 1.6 meters away from human body.
- The operating of the device is -20~55 degree.

EU Regulatory Conformance .

RF High Power: 40W, RF Low Power: 25W.

The maximum allowable station effective radiated power (ERP) is dependent upon the station's antenna HAAT and required service area and will be authorized in accordance with table 2.

Table 2—450-470 MHz—Maximum ERP/Reference HAAT for a Specific Service Area Radius

	Service area radius (km)									
	3	8	13	16	24	32	40 ⁴	48 ⁴	64 ⁴	80 ⁴
Maximum ERP (w) ¹	2	100	2500	2500	2500	2500	2500	2500	2500	2500
Up to reference HAAT (m) ³	15	15	15	27	63	125	250	410	950	2700

³When the actual antenna HAAT is greater than the reference HAAT, the allowable ERP will be reduced in accordance with the following equation: $ERP_{allow} = ERP_{max} \times (HAAT_{ref} / HAAT_{actual})^2$.

As certified by the qualified laboratory, the product is in compliance with the essential requirements and other relevant provisions of the Directive 1999/5/EC. Please note that the above information is applicable to EU countries only.

RF Radiation Information

This product must be restricted to operations in an Occupational/Controlled RF exposure Environment. Users must be fully aware of the hazards of the exposure and who are able to exercise control over their RF exposure to qualify for the higher exposure limits.

RF Radiation Profile

Radio Frequency (RF) is a frequency of electromagnetic radiation in the range at which radio signals are transmitted. RF technology is widely used in communication, medicine, food processing and other fields. It may generate radiation during use.

RF Radiation Safety

In order to ensure user health, experts from relevant industries including science, engineering, medicine and health work with international organizations to develop standards for safe exposure to RF radiation. These standards consist of:

United States Federal Communications Commission, Code of Federal Regulations; 47CFR part 2sub-part J;
American National Standards Institute (ANSI)/Institute of Electrical and Electronic Engineers (IEEE)C95. 1-1992;
● Institute of Electrical and Electronic Engineers (IEEE) C95.1-1999;
● International Commission on Non-Ionizing Radiation Protection (ICNIRP) 1998.

FCC Regulations

Federal Communication Commission (FCC) requires that all radio communication products should meet the requirements set forth in the above standards before they can be marketed in the U.S, and the manufacturer shall post a RF label on the product to inform users of operational instructions, so as to enhance their occupational health against exposure to RF energy.

Operational Instructions and Training GuidelinesTo ensure the optimal

performance and the compliance with occupational controlled environment RFradiance limits in the above standards, please adhere to the following requirements:

When you are installing the repeater antenna outside, set up the antenna according to the supplier's requirements with its Gain within 8.5 dBi and keep it at least 1.6 meters away from human body.

EU Regulatory Conformance

As certified by the qualified laboratory, the product is in compliance with the essential requirements and other relevant provisions of the Directive 1999/5/EC. Please note that the above information is applicable to EU countries only