BelFone

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BF-TR8500

Professional DMR Repeater

Notice to the user

Government law prohibits the operation of unlicensed radio transmitters within the territories under government control.
Illegal operation is punishable by fine or imprisonment or both.

Acknowledgement!

Thank you for choosing BelFone series professional radio communication products!
Since 1989, BelFone has been dedicated to research and exploration in the field of radio communication technology throughout the decades, and has developed leading smart technology in the industry. Underpinned by research, development and design geared towards modern complicated and changeable communication environment, it is capable of tailoring specific communication solutions to your needs based on features of your industry. Superior products with outstanding performance may help you control the overall situation, while providing you with the best choice for smart scheduling and instructions communicating.

This User Manual is applicable to:
BF-TR8500 Series all of frequency band

Instructions before Use

Following the safety precautions below may prevent damage to this product and personal injuries. To avoid potential risks, please read these instructions carefully before using the product, and operate the product as instructed.

◆ The repeater shall be protected from long-time direct exposure to the sun, kept in a place away from high temperature, high humidity, high dustiness or water splashes, and put on a stable surface;

◆ Where use of the repeater is prohibited or use of intercommunication may cause interference or danger, the repeater shall have its power turned off as required by relevant regulations;

◆ If you find any fault of the product, please turn off the power directly, and then contact the local distributor of BelFone; unless otherwise specified in this Manual, maintenance shall not be performed by any person other than a maintenance worker authorized by BelFone Company;

◆ If this product is needed for further development, please contact BelFone Company or BelFone's distributor;

◆ Do maintain the product surface clean and dry; for cleaning, use a piece of soft cloth dipped with mild detergent or clear water (without water dripping) to wipe the product surface.

Content

Unpacking and Device Inspection

Note: The following instructions regarding unpacking are only for BelFone's distributors, and service agencies or factories authorized by BelFone.

Be careful when taking the device out of the packing box. You'd better count the accessories against the following list before discarding the packaging. If you find any item is missing or damaged, please contact the local distributor of BelFone or directly contact BelFone Communication immediately.

Standard Accessory

Item	Quantity
Main Equipment	1
Power Cord	1
Operationing Manual	1
Warranty Card	1
Conformity Certificate	1

Optional Accessory

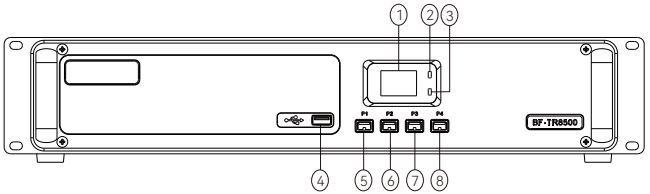
Item	Quantity
Duplexer	1
DC Power Cord	1
Position Antenna	1
programming Cord	1

Features

- ●Dual Mode(Analog & Digital) Repeater Function
- ●Support digital, analog and analog digital auto-switch
- ●Support customization, work with BelFone Intelligent IP interconnection system
- ●Support customization, IP Multi-site Connect
- ●Support customization, work as Simulcast Base Station
- ●Support GPS+BD Satellite Positioning
- ●Over voltage, over temperature alarm and protection
- ●Switching High, Middle and Low TX power.

Get Familiar with the Device

Front Panel View

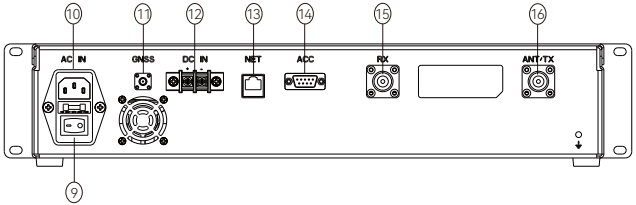


①	LCD	⑤	**P1:** Short press to decrease the channel number, long press to display IP address; (programming supported)
②	**A Indicator:** Timeslot 1 working state indication	⑥	**P2:** Short press to increase the channel number, long press to display version (programming supported)
③	**B Indicator:** Timeslot 2 working state indication	⑦	**P3:** Short press to display TX frequency, long press to display IP internet site type; (programming supported)
④	**USB Port**	⑧	**P4:** Short press to display RX frequency, long press to display IP interconnection status. (programming supported)

Indicator Status

LED Indication		LCD Display	Device State
A Indicator	B Indicator		
Normally on in orange	/	Channel Number	Timeslot 1 emission
Green light flickers (1s)	/	Channel Number	Analog receiving
/	Normally on in orange	Channel Number	Timeslot 2 emission
/	Flashing in red (1s)	Channel Number	Analog transmission
Orange light flickers (1s)	Green light flashes quickly (0.5s)	E0	PLL receiving abnormality
Orange light flickers (1s)	Red light flickers quickly (0.5s)	E1	PLL transmitting abnormality
Orange light flickers (1s)	Red light flickers slowly (2s)	E2	Excessively high voltage
Orange light flickers (1s)	Green light flickers slowly (2s)	E3	Excessively low voltage
/	/	E4	Excessively high temperature
/	/	E5	Fan working abnormality
/	/	E6	The network is unconnected or abnormal

Back Panel view



⑨	Power Switch	⑬	Network Port
⑩	AC Power Input Port	⑭	ACC Accessory Unit Port
⑪	GPS Antenna Port	⑮	RX RF Input Port
⑫	DC Power Input Port	⑯	TX RF Output Port

Basic Operations

Power on/off

Press the [power switch] on the back of the repeater, the screen will light up and the LCD will display the channel number; and press the [power switch] again, the screen will go dark and the device is shut down.

Button Configuration

Use the programming software to configure P1~P4 key, while corresponding the P1,P2,P3,P4 key to short pressing and holding-down operations.

Programmable buttons include the following functions:

1. Undefined: No function is assigned to the programmable button;
2. Power Switch: Press it to quickly switch the transmitting power: Low, Meddle, High, user-defined, when switching to high power, the LCD will display icon: H ; when switching to meddle power, the LCD will display icon: n , when switching to low power, the LCD will display icon: L , when switching to Self-Defined power, the LCD will display icon: C ;
3. Low Power: Press this button to switch to lower power, the LCD will display icon: L;
4. Middle Power: Press this button to switch to medium power, the LCD will display icon: n;
5. High Power: Press this button to switch to high power, the LCD will display icon: H
6. Self-Define Power: Press this button to switch to a Self-Defined power, the LCD will display icon: C ;
7. Tone Alerts: Press this button to turn on or off the prompt tone, when turn on the prompt tone, the LCD will show the following icon: on, when turn off the prompt tone, the LCD will show the following icon: oFF;
8. Channel+ ： Press this button to switch the channel - the channel number will progressively increase
9. Channel- ： Press this button to switch the channel - the channel number will progressively decrease

10. Back-to-Back Switch : Press this button to turn on/off the back-to-back switch, when turn on the Back-to-Back, the LCD will show the following icon:  , when turn off the Back-to-Back, the LCD will show the following icon:  ;

11. Satellite Positioning Switch: Press this button to turn on/off the position switch, when turn on the satellite positioning, the LCD will show the following icon:  , when turn off the satellite positioning, the LCD will show the following icon: ; 

12. Display Version: Press this button to view the version, the LCD will scroll show the version number;

13. Display IP Address: Press this button to view IP address, the LCD will scroll show the IP address;

14. Display IP internet site type: Press this button to view the IP internet site type, if the connection type is None, the LCD show the icon: - ; if the connection type is: Peer, the LCD show the icon: -  ; if the connection type is: Backup Main Site, the LCD show the icon: -  ; if the connection type is: Home Station, the LCD show the icon: -  .

15. Display IP interconnection status: Press this button to view the IP interconnection status, if the interconnection function disable, the LCD show the icon: -  , if the connection type is Home Station, the LCD show the number of connected slave repeater; if the connection type is Backup main site, the LCD show the icon:-  .

16. Display TX Frequency: Press this button to view TX Frequency of current channel;

17. Display RX Frequency: Press this button to view RX Frequency of current channel;

18. Display GPS Satellite Info: Press this button to view GPS Satellite information, and the first value shows 0 means GPS unsynchronized, shows 1means GPS synchronized; the second value shows the number of satellite.(Hex digits:1~F, and the F means the satellites are fifteen or more)

19. Squelch Adjustment -: Press this button to adjust squelch level, the LCD show the squelch level of current channel, and then press again the value progressively increase;

20. Squelch Adjustment +: Press this button to adjust squelch level, the LCD show the squelch level of current channel, and then press again the value progressively decrease.

Note: While the LCD scroll shows the values and last digit will show repeatedly.

Functions and operation instructions

Digital Mode

1. Digital Repeater Mode

If the current channel operation in the repeater mode, if the repeater is transmitting in timeslot 1, indicator A will glow orange, and if the repeater is transmitting in timeslot 2, indicator B will glow orange.

2. IP Interconnection Mode

Digital mode supports IP multi-site connection, and may realize interconnection between IP sites of multiple repeaters. When programming software is used to configure network services with one master repeater and multiple slave repeaters, it is required to configure a timeslot to the IP interconnection mode, so that after the network is connected, services may be transmitted from one repeater to the other repeaters.

Network Setting

Connection type	Function
None	IP interconnection function is disabled
Peer	Set to slave (registration of the master repeater required)
Master Station	Set to master (waiting for slave repeater registration)
Master Repeater Backup	A type of slave repeater that will automatically become a master repeater when the master repeater fails.

Master Station:

In an IP multi-site connect system, it is permitted to configure only one master repeater, while other repeaters shall be configured as slave repeater, with IP addresses registered with the master repeater for IP interconnection.

Backup Master Repeater:

The backup master repeater is a slave repeater. In a system, it is permitted to configure a backup master repeater, which in normal operating conditions is the same with other slave repeaters. Only when the master repeater fails and cannot be connected, the backup master repeater will act to play the role of a master repeater in lieu of the original master repeater for registration of other slave

repeaters.

Peer:

An peer is a slave repeater, in a system, it is permitted to configure multiple slave repeaters. Upon programming software, it is required to configure slave repeaters, the backup master repeater and the current repeater's IP address for successful registration with the master repeater.

Authorization Code: Peers shall have consistent authorization codes with the master repeater for successful registration. For an authorization code, it is allowed to enter a maximum of 16 digits and letters from 0~9 and A~F; it can be null if nothing is entered.

DHCP: When a peer is set to DHCP, the router will act as the DHCP server and automatically assign an IP address to the peer.

(The router shall support DHCP, and the IP address assigned shall be within the same network segment of the master repeater's IP).

● When the current repeater is connected as a master repeater, it is required to configure its IP, UDP port, gateway IP, network mask, NDS server IP, UDP port;

● When the current repeater is connected as a backup master rep eater, it is required to configure its IP, UDP port, gateway IP, network mask, DNS server IP, UDP port and master repeater IP, master repeater UDP port;

● When the current repeater is connected as an peer, it is requ ired to configure its IP, UDP port, gateway IP, network mask, DNS server IP, UDP port and master repeater IP, master repeater UDP port, backup master repeater IP, backup master repeater UDP port.

Note: In one system, only one "master repeater" and one "backup master repeater" are permitted; other repeaters shall be configured as "peers".

The function is optional.

3. System Networking Function

The repeater can be connected to BelFone intelligent interconnection system (SDC), and supports access to the system network for repeating DMR digital voice and data services, so as to realize interconnected communication in the networked mode.

Note: System networking is optional.

Analog Mode Function

If the channel operates in the analog repeater mode, and the current channel currently has any voice service under repeating, indicator A will flash green, indicator B will flash red.

Smart Digital-Analog Switch

This repeater supports digital and analog channel auto switching, it can smartly select the right one based on the type of received signal and then transmitting.

Back-to-Back Function

The repeater supports the back-to-back function to realize back-to-back connection between a single repeater and other device for repeating voice. The current device supports back-to-back connection of digital channels and that of analog channels. The back-to-back function can be set via the programming software or the preprogrammed [Back to back Switch] key.

Note: Back-to-back connection of analog channels requires the GPIO BUSY line set via the programming software to output an active level and the PTT line to input an active level. The "active level output by the BUSY line" of the current device shall be the same with the "active level input by the PTT line" of the other back-to-back device.

Simulcast Function

The repeater supports Simulcast function. When the Simulcast function is enabled, the repeater can be registered as an peer with the base station controller of BelFone intelligent interconnection system to realize networking of Simulcast function.

Note: Simulcast function is optional.

Positioning Service

The repeater supports satellite positioning, and can have the positioning type set via a programming software to: GPS/BD/GPS+BD. The position switch can be set via the programming software or the preprogrammed [Satellite Positioning Switch] key. When GPS is enabled, the LCD will show icon:  , When GPS is disabled, the LCD will show icon: 

Technical Specifications

General	
Frequency Range	VHF：150MHz UHF：350MHz/400MHz/450MHz
Number of Channels	99
Channel Spacing	12.5KHz /25KHz
Antenna Impedance	50Ω
Master Power Supply	85-132VAC/170-264VAC（by switching）， 47-63Hz，3A/115VAC,1.7A/230VAC
Backup Power Supply	11-13.8VDC，9A
Current Consumption	< 9A
Operating Environment	-30℃～+70℃
Storage Temperature	-40℃～+85℃
Sizes	441mm(L)*327.5 mm(W)* 88(H)
Weight	11.8Kg
Emission	
RF Power	5-50W（Continuous Emission）
Frequency Stability	≤±0.5ppm（Without Positioning） ≤±0.02ppm（With Positioning）
4FSK Digital Modulation	12.5KHz only data：7K60FXD 12.5KHz data and voice：7K60FXW
Power of Adjacent Channel	≤60dB
Spurious Emission	-36dBm<1GHz -30dBm>1GHz

Receiving	
Sensitivity	3%BER≤0.35μV
Frequency Stability	≤±0.5ppm（Without Positioning） ≤±0.02ppm（With Positioning）
Adjacent Channel Selectivity	≥60dB
Intermodulation Immunity	≥70dB
Spurious Response	≥70dB
Blocking	≥95dB

Statement

To the best of our knowledge, this Manual has been prepared in an accurate and complete manner. For any doubt, please contact us timely for specific explanation. Considering the fast development of wireless communication technology, BelFone reserves the right to modify the product design and specification without any further notification. Your understanding in this respect will be much appreciated!

BelFone

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