BelFone

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BR1050

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.

THANK YOU!

Founded in 1989, BelFone is a leading technology and solution provider of mission and business-critical communications, dedicated to bringing cut-edge communications technologies and empowering our customers with integrated radio solutions. With outstanding performance and excellent communication capabilities, BelFone products are the proper choices for mastering the overall situation and achieving intelligent dispatching and command delivery.

This manual is applicable to

BR1050 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;

◆The place where use of the repeater is prohibited or use of intercommunication may cause interference or danger, the repeater shall have its power 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 dealer 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 dealer;

◆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.

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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 packet box. It is better to count the accessories following list before discarding the package. If find any items are missing or damaged, please contact with the local dealer of BelFone or directly contact with BelFone Communication immediately.

Standard Accessory

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

Optional Accessory

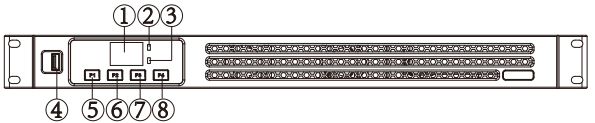
Item	Quantity
DC Power Cord	1
Position Antenna	1
programming Cord	1

Features

- Dual Mode(Analog & Digital) Repeater Function.
- Support digital, analog and analog/digital auto-switch mode.
- Support customization, work with BelFone Smart dispatching System.
- Support customization, IP Multi-site Connection.
- 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

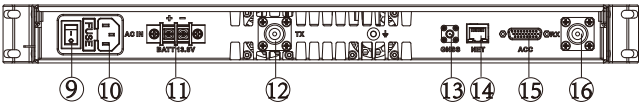


①	Display	⑤	P1: Short press to decrease the channel number, long press to display IP address; (programming supported)
②	A Indicator: Timeslot 1 working state indication	⑥	P2: Short press to increase the channel number, long press to display version(programming supported)
③	B Indicator: Timeslot 2 working state indication	⑦	P3: Short press to display TX frequency, long press to display IP internet site type; (programming supported)
④	USB Port for programming	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 transmitting
Green light flickers (1s)	/	Channel Number	Analog receiving
/	Normally on in orange	Channel Number	Timeslot 2 transmitting
/	Flashing in red (1s)	Channel Number	Analog transmitting
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	GPS Antenna Port
⑩	AC Power Input Port	⑭	Network Lan Port
⑪	DC Power Input Port	⑮	ACC Accessory Unit Port
⑫	TX RF Output Port	⑯	RX RF Input Port

Basic Operations

Power on/off

Press the [power switch] on the rear 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 set P1~P4 key, while corresponding the P1,P2,P3,P4 key to short press and long press operations.

Program buttons include the following functions:

1. Undefined: No function is assigned to the program button;
2. Power Switch: Press it to quickly switch the transmitting power: Low, Middle, High, user-defined, when switching to high power, the LCD will display icon: ; when switching to middle power, the LCD will display icon: , when switching to low power, the LCD will display icon: , when switching to Self-Defined power, the LCD will display icon: ;
3. Low Power: Press this button to switch to lower power, the LCD will display icon: ;
4. Middle Power: Press this button to switch to medium power, the LCD will display icon: ;
5. High Power: Press this button to switch to high power, the LCD will display icon: ;
6. Self-Define Power: Press this button to switch to a Self-Defined power, the LCD will display icon: ;
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: , when turn off the prompt tone, the LCD will show the following icon: ;
8. Channel+： Press this button to switch the channel number will progressively increase
9. Channel-： Press this button to switch 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 device version;
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 location Info: One button to view satellite positioning status:

The first value on the interface indicates whether the positioning is valid, [0] indicates that the satellite positioning is invalid, and [1] indicates that the satellite positioning is valid;

The second value on the interface represents the current number of satellites received. (Hexadecimal values: 1~F, F is displayed when the number of satellites is greater than 15);

The third value on the interface indicates whether the positioning pulse is synchronized, and [G] indicates that it has been synchronized; [N] Indicates unsynchronized.

Note: In simulcast system mode, the product is necessary to ensure that the positioning pulses have been synchronized.

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 digital 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 repeater 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 peer repeaters, it is required to configure a time slot to the IP interconnection mode, so that after the network is connected, services may be transmitted through IP address from one repeater to the other repeaters.

Network Setting

Connection Type

Connection type	Function
None	IP interconnection function is disabled
Peer	Set to slave (registration of the master repeater required)
Home Site	Set to master (waiting for slave repeater registration) repeater
Backup Main Repeater	The backup main repeater that will automatically become a master repeater when the master repeater fails.

Home Station:

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

Backup Main Repeater:

The backup main repeater is a peer repeater. In a system, it is permitted to configure a backup main repeater, which in normal operating conditions is the same with other peer repeaters. Only when the home site repeater fails and

cannot be connected, the backup main repeater will act to play the role of a home site repeater replace the original home site repeater for connecting other peer 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 main repeater and the current repeater's IP address for successful registration with the home site repeater.

Authorization Code: Peers shall have consistent authorization codes with the home site 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 home site 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 main repeater, 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 required 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 "home site " and one "backup main site" are permitted; other repeaters shall be configured as "peers".
The function is optional.

3. System Networking Function

The repeater can be connected to BelFone smart dispatching 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 in the analog repeater mode, and the current channel currently has any voice service, indicator A will flash green, indicator B will flash red.

Smart Digital-Analog Channel Mode

This repeater supports digital and analog channel mode, 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 pin set via the programming software to output an active level and the PTT pin 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 Smart dispatching 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：136~174MHz UHF：350~400MHz/400~480MHz/450~520MHz
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℃
Size with ear	483mm(L)*309 mm(W)* 44 mm (H)
Size	434mm(L)*309 mm(W)* 44 mm (H)
Weight	≤7.5kg
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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