Preface

Thanks for your favor in our product. To derive optimum performance from the product, please read this manual carefully before use.

This manual is applicable to the following product:

CHU-P1BA01 DMR Trunking Lite Channel Unit

Documentation Conventions

For your better understanding of this manual, please read the following conventions first.

Instructional Icons

Caution: Indicates situations that could cause damage to your product or bodily injury.

Note: Indicates tips that can help you make better use of your product.

*: Indicates functions available in later version.

Key Operation

- Short Press: To press a key and release it immediately.
- Long Press: To press a key and hold it for the preset time (two seconds by default).
- Hold: To press a key and keep holding it down.

Term Explanation

- Duplexer is a device that allows bi-directional communication. Its role is to isolate the TX signal from the RX signal to ensure that the transmitter and receiver can work normally. It consists of two groups of band-stop filters with different frequencies, to prevent it from transmitting the signals to the receiver.
- Feed Line is the cable or transmission line that connects the antenna with the radio transmitter or receiver.
- Voltage Standing Wave Ratio (VSWR) is a value that measures how well a load is impedance-matched to a source.
- Squelch is a circuit function that acts to suppress the audio output of a receiver in the absence of a sufficiently strong desired input signal.

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Disclaimer

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If you have any suggestions or would like to learn more details, please visit our website at: http://www.hytera.com.

RF Radiation Information

This product must be restricted to operations in an Occupational/Controlled RF exposure Environments. Users must be fully aware of the hazards of the exposure and 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 2 sub-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/IC 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 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 50% of the time and always adhere to the following procedures:

- Antenna gain must not exceed 9.6dBi.
- The antenna must be installed complying with the requirements of manufacturer or supplier, and it must be at least 2meters away from human body.

Note: Use the accessories specified by Hytera only. If not, Hytera shall not be liable for any losses or damages arising out of use of unauthorized accessories.

FCC Radiation Exposure

This equipment complies with FCC radiation exposure limits set forth for an controlled environment. This equipment should be installed and operated with minimum distance 200cm between the radiator and your body. This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

FCC Statement

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 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.

This device complies with part 15 of the FCC Rules. 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: Any 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.
This radio complies with IEEE and ICNIRP exposure limits for occupational/controlled RF exposure environment at operating duty factors of up to 50% and is authorized by the FCC for occupational use only.

ISEDC Radiation Exposure Statement:

This equipment complies with ISEDC RF radiation exposure limits set forth for an occupational/ controlled environment. This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter. This equipment should be installed and operated with minimum distance 200cm between the radiator& your body.

IC exposition aux radiations:

Cet équipement est conforme avec ISEDC les limites d'exposition aux rayonnements définies pour un environnement professionnel/contrôlé.Cet émetteur ne doit pas être co-localisés ou fonctionner en conjonction avec une autre antenne ou émetteur.Cet équipement doit être installé et utiliséavec une distance minimale de 200cm entre leradiateur & votre corps.

ISEDC Statement:

This device complies with Innovation, Science and Economic Development Canada Compliance licence-exempt RSS standard (s). Operation is subject to the following two conditions: (1) this device may not cause interference

(2) this device must accept any interference, including interference that may cause undesired operation of the device.

Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence.L'exploitation est autorisée aux deux conditions suivantes :

(1) l'appareil ne doit pas produire de brouillage,

et (2) l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

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 2014/53/EU.

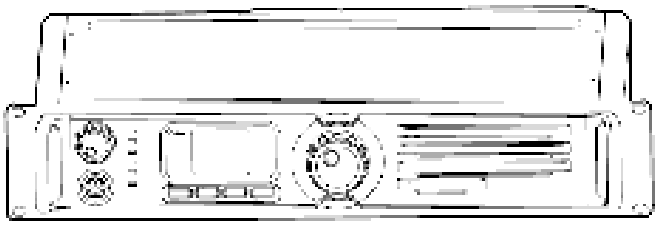
To satisfy RF exposure requirements, a separation distance of 10.9m or more should be maintained between this device and persons during device operation. To ensure compliance, operations at closer than this distance is not recommended.

Please note that the above information is applicable to EU countries, and the functions of Digital repeater including UHF within the band 400-470MHz for this device are restricted to use within all European Union countries(BE, BG, CZ, DK, DE, EE, IE, EL, ES, FR, HR, IT, CY, LV, LT, LU, HU, MT, NL, AT, PL, PT, RO, SI, SK, FI, SE, UK). For more details, please contact the local distributor or responsible part.

Contents

1. Items in the Package

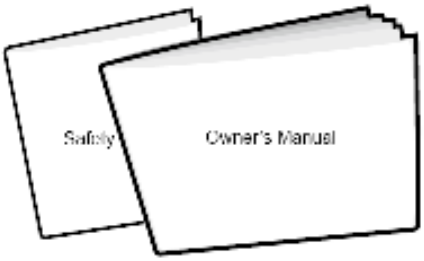
Please unpack carefully and check that all items listed below are received. If any item is missing or damaged, please contact your local dealer.



Repeater

DC Power Cord

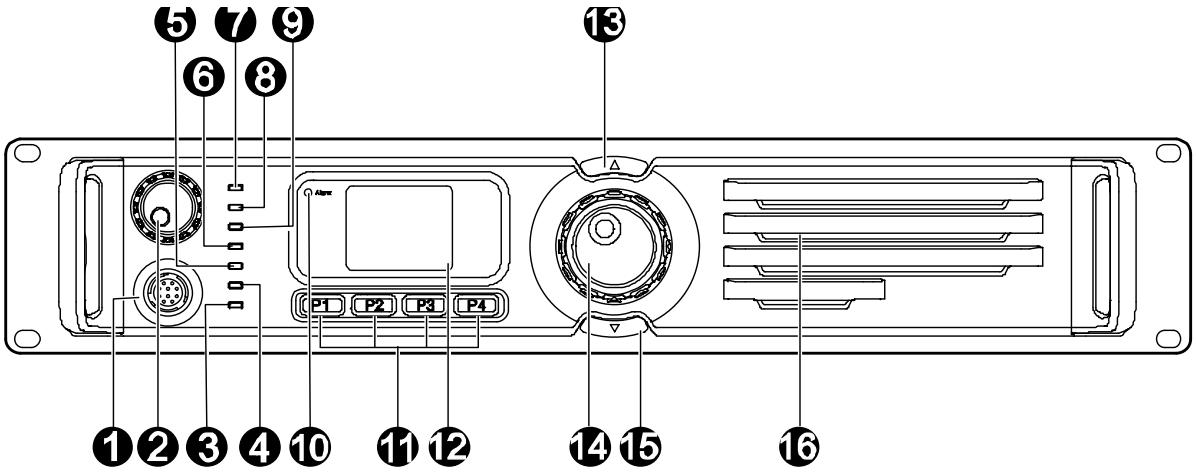
Fuse



Documentation Kit

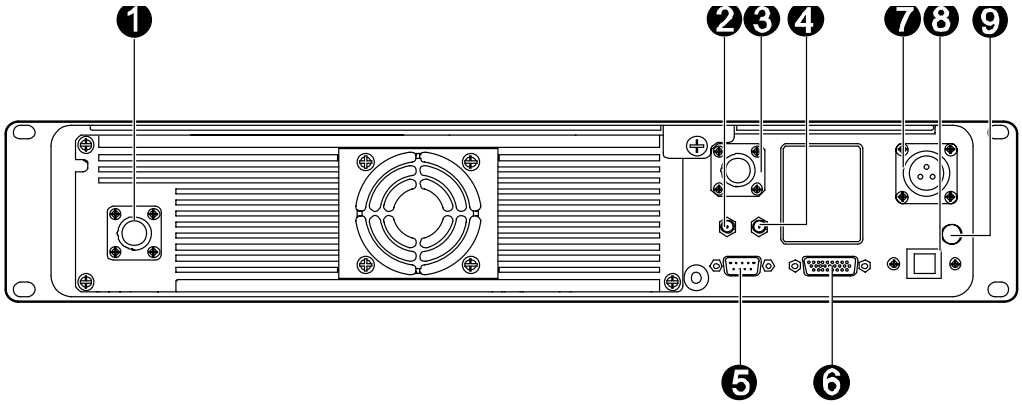
2. Product Overview

2.1 Front Panel



No.	Part Name	No.	Part Name
1	Accessory Jack	9	Slot 1 RX Indicator
2	Volume Control Knob/Power Indicator	10	Alarm Indicator
3	Operation Status Indicator	11	Programmable Keys *
4	Analog Mode Indicator	12	LCD Display
5	Slot 2 RX Indicator	13	Channel Up Key
6	Slot 2 TX Indicator	14	Navigation Knob
7	Digital Mode Indicator	15	Channel Down Key
8	Slot 1 TX Indicator	16	Speaker

2.2 Rear Panel

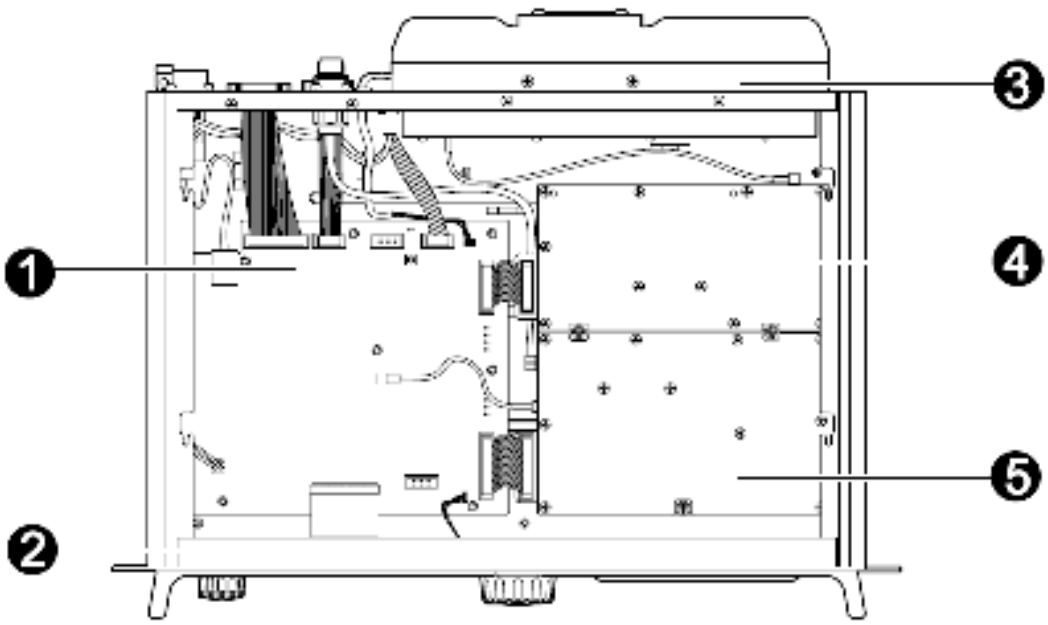


No.	Part Name	No.	Part Name
1	TX Antenna Connector (Type-N Female)	6	Accessory Jack
2	Optional Interface 1	7	DC Power Inlet
3	RX/Duplex Antenna Connector (Type-N Female)	8	Ethernet Port *
4	Optional Interface 2	9	Ground screw
5	Monitor/Tuning Interface	/	/

2.3 Programmable Keys *

For enhanced convenience, you can request your dealer to program the keys **P1**, **P2**, **P3** and **P4** as shortcuts to the functions. Please contact your dealer for more information.

2.4 Internal Parts



No.	Part Name	No.	Part Name
1	Baseband Module	4	Exciter Module
2	Front Panel	5	Receiver Module
3	PA Module	/	/

3. Before Use

The repeater is used to transfer and amplify the radio signal, increasing the coverage and call distance.

Proper installation can ensure optimum performance and reliability of this product. Thus, please install it properly before use.

3.1 Application

Single repeater application

Target industries: neighborhood coverage, building blind spot elimination, and dispatch.

Application requirements: small-scale coverage, dispatch, and building blind spot elimination.

Multiple repeater application

Target industries: public safety, transportation, and forestry fire fighting.

Application requirements: industries or groups with network demand and large-scale use of radios.

When operating alone, the repeater can be used for data transferring between radios or between the radio and the repeater. It can also work with our DMR digital simulcast system, analog simulcast system and lite digital trunking system. Please refer to our corresponding system product documents for details.

3.2 Installation

3.2.1 Installation Requirements

Installation Environment

The repeater must be installed in a dry and well-ventilated place with ambient temperature of -30℃ to +60℃ and relative humidity of 95%.

Installation Location

The repeater can be installed in a rack, bracket and cabinet or on a desk.

Installation Tools

Tools required for installing the repeater include a crosshead screwdriver, a T-10 torx screwdriver and a spanner.

Note: Please refer to *Safety Information Booklet* for more information.

3.2.2 Before Installation

Voltage Check

Please check whether the voltage of DC power or battery meets the repeater specifications (28V±15%).

Product Check

Please check whether the repeater works properly by observing the eight LEDs located in the front panel.

Parameter Configuration

Having confirmed that the repeater works properly, you can let your dealer configure the parameters for the repeater based on your actual needs (such as Frequency Range, TX Power, etc.), and then you can proceed with on-site installation.

3.2.3 Installation Procedures

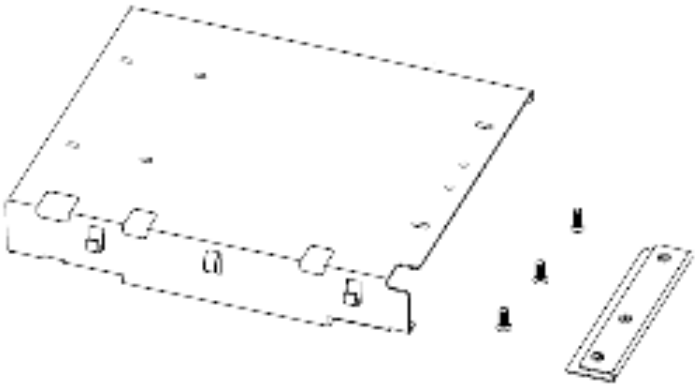
Follow the steps to install the repeater:

1. Install the repeater at a proper location;
2. Connect accessories such as the antenna, feed line and power cord to the repeater.
3. Ground the repeater through the ground screw located on the rear panel.

3.3 Installing the Duplexer (Optional)

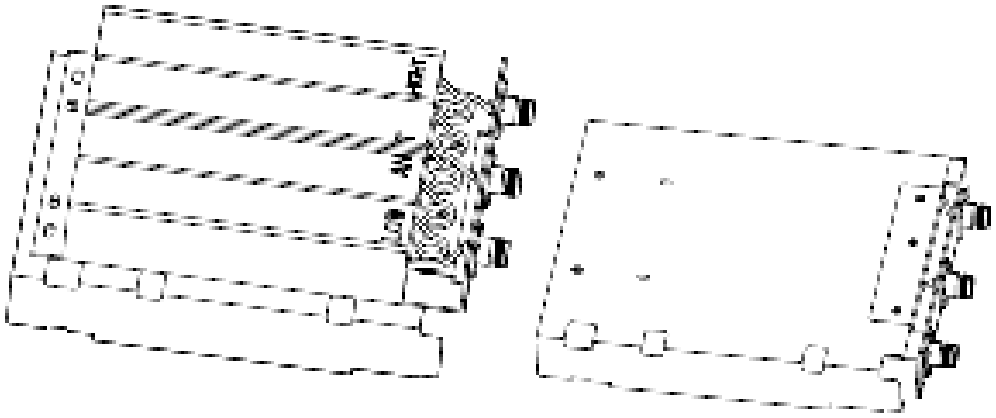
If the repeater needs to work with a duplexer, you should implement the following operations before installation.

1. Loosen the three screws on the bracket with a crosshead screwdriver. See the following figure:

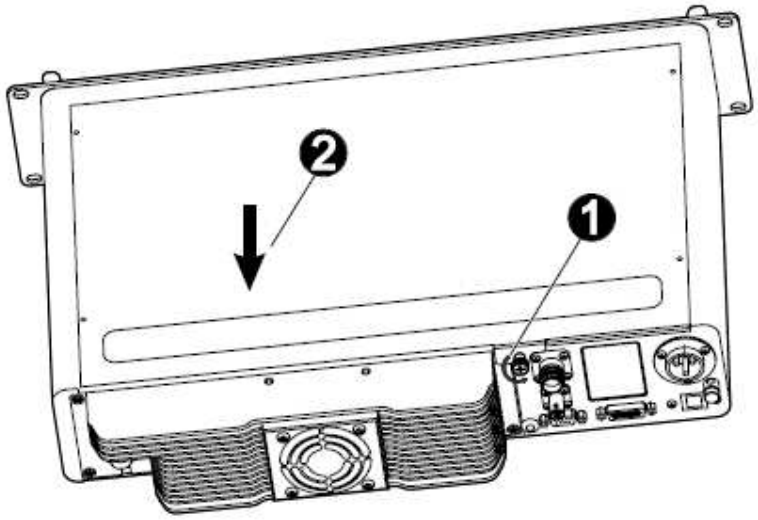


2. Install the duplexer onto the bracket.

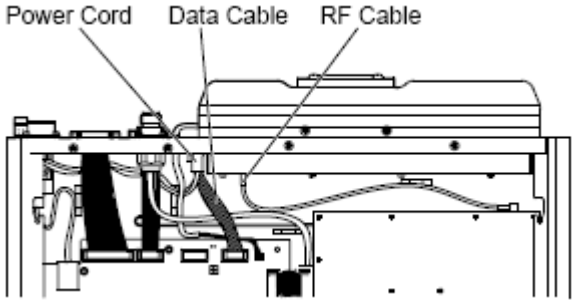
Be sure to observe the specifications of the two antenna interfaces on the duplexer, to determine which one should be connected to the transmitter. The interface connecting the transmitter should be close to PA module to reduce RF loss. See the following figure:



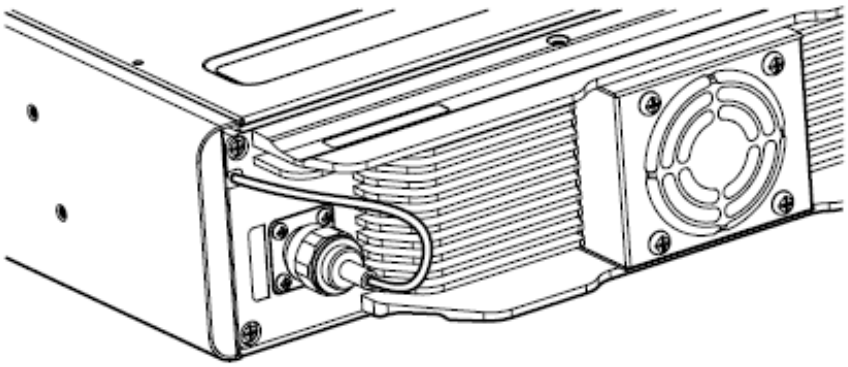
3. Loosen the screws at the back of the top cover, and then pull the top cover backwards to remove it. See the following figure:



4. Loosen the six screws locking the PA heat sink, remove all power, data and RF cables from the PA, and finally remove the PA heat sink. See the following figure:



5. Connect the RF cable. See the following figure:



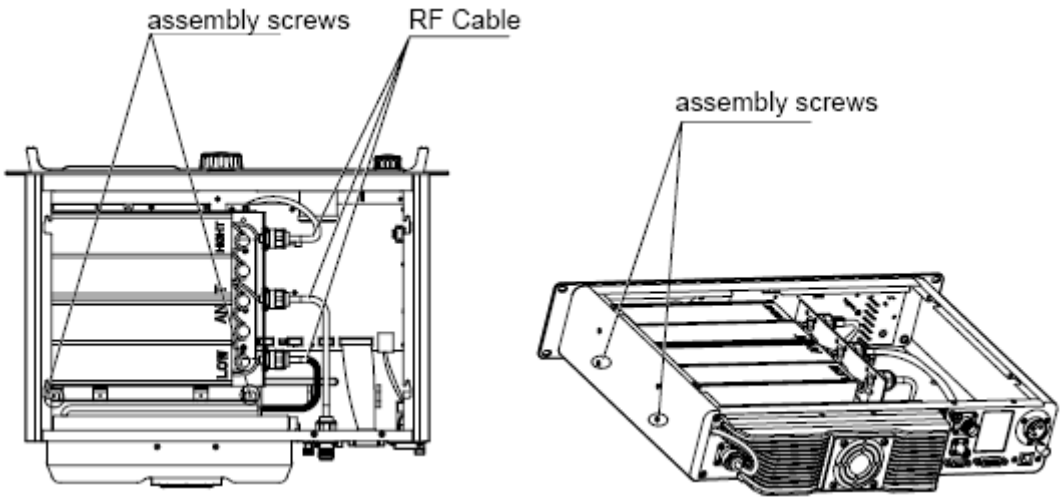
6. Install the duplexer to the repeater.

   Mount the duplexer properly on the exciter module and receiver module, and then fasten it with the two screws inside the housing and on the side respectively.

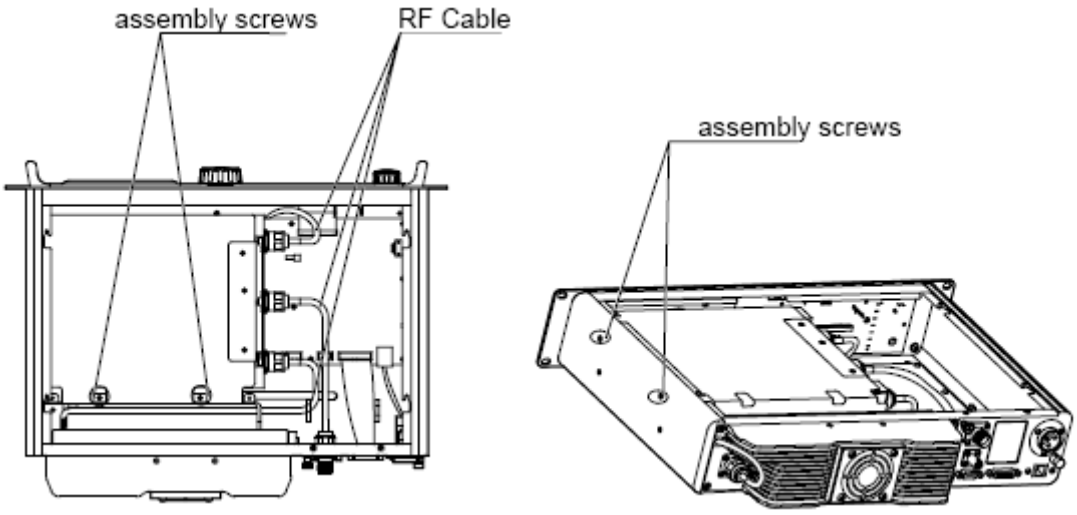
7. Attach the PA heat sink and connect all PA power, data and RF cables to it.

8. Close the repeater top cover and the installation is complete.

Installation Diagram



Duplexer with Front Side Facing Upwards



Duplexer with Front Side Facing Downwards

3.4 After-installation Check

After installation is completed, power on the product and check whether it works properly by observing the eight LEDs and the LED segment display located in the front panel.

You may customize repeater parameters such as TX/RX frequency, TX power and signalling, according to user needs. After configuration of parameters is complete, you may perform site installation.

Installation Requirements

1. Environmental Conditions at Intended Installation Site

The repeater may be installed in any location suitable for electronic communication equipment, provided that the environmental conditions do not exceed the equipment specifications for temperature, humidity and air quality.

- Operating Temperature

-30℃ to +60℃

This is the temperature measured in close proximity to the repeater. For example, if the repeater is mounted in a cabinet, the temperature within the cabinet is measured.

- Humidity

Humidity conditions should not exceed 95% relative humidity @ 50°C.

- Air Quality

For equipment operating in an area which is environmentally controlled and with the repeater rack mounted, the airborne particle level must not exceed 25μg/m^3.

And for equipment operating in an area which is not environmentally controlled and with the repeater cabinet mounted, the airborne particle level must not exceed 90μg/m^3.

⚠ Caution: If the repeater is to be installed in an area which is usually dusty, dirty, or does not meet the air quality requirements, then the air used to cool the repeater modules must be treated using appropriate filtering devices. Dust or dirt accumulated on the internal circuit boards and modules is not easily removed, and can cause malfunctions such as overheating and intermittent electrical connections.

2. Equipment Ventilation

The PA heatsink is equipped with a cooling fan used to provide forced convection cooling. When planning the installation, observe the following ventilation guidelines:

- Customer supplied cabinets must be equipped with ventilation slots or openings for

air to enter and exit. If several repeaters are installed in a single cabinet, ensure ventilation openings surrounding each repeater allow for adequate cooling.

- All cabinets must have at least 10cm of open space between the air vents and any wall or other objects.
- When multiple cabinets (each equipped with several repeaters) are installed in an enclosed area, ensure appropriate ventilation and consider air conditioning or other climate control equipment, to satisfy the temperature requirements stated above.

3. Equipment Installation Methods

The CHU-P1BA01 may be mounted in a rack, bracket or cabinet, and may be placed on your desk.

4. Site Grounding and Lightning Protection

⚠ Caution: Proper site grounding and lightning protection are vitally important considerations. Failure to provide proper lightning protection may result in permanent damage to the repeater.

The ground and lightning protection system is one of the most important considerations when designing a communication site. Proper grounding techniques and lightning protection are closely related, and the general category of site grounding may be divided into the following two sections:

- Electrical Ground

Ground wires carrying electrical current from circuitry or equipment at the site are included in the category of electrical ground. Examples include the AC and DC power used to source equipment located at the site, and wires or cables connected to alarms or sensors located at the site.

- Lightning Ground

Providing adequate lightning protection is critical to a safe reliable communication site. The repeater is equipped with a ground screw located on the rear panel. This screw is used to connect the repeater to the site grounding. All antenna cables, and AC and DC power cords, should be properly grounded and lightning protected by following the rules and guidelines provided in the above sections.

Electrical Connections

After the repeater has been mechanically installed, electrical connections must be made. This involves making the following connections:

- DC power cord
- Antenna cables

See the rear panel view for the positions of connectors.

Power Supply Connections

1. Ground Connection

The repeater is equipped with a ground screw located on the rear panel. Connect ground wires to the screw.

2. DC Power Supply or Battery Backup Connection

The repeater may be connected to a regulated DC power supply or a backup battery.

The DC source or battery backup system is connected to the repeater through the DC power inlet at the rear of the repeater (see rear panel view).

⚠ Caution: Before you make the connection, ensure the DC power supply or battery backup system is capable of supplying a minimum of 200W, and check if the DC power supply has current limit. Since high current consumption is required for transmitting, improper setting of the current limit may cause transmission failure.

⚠ Caution: The repeater is to be connected to a battery that is in accordance with applicable electrical regulations for the end use country. If battery power is exhausted, you are recommended to charge the battery with an external charger. Remove the battery from the repeater when charging.

RF Antenna Connections

TX and RX antennas are connected to two separate connectors (shown in the rear panel view), and there must be adequate isolation of 75 dB UHF or 85 dB VHF between them. If only one antenna through a duplexer is connected, at least 75 dB UHF or 85 dB VHF isolation between the TX and RX antenna ports is required.

⚠ Caution: Please ensure that all power is switched off before disconnecting the TX antenna.

1. Duplexer Selection

The selection of duplexer is critical to system performance. The use of a notch (band reject) duplexer is possible in some systems that are not located at high RF density sites. If the repeater is used in high RF density sites, the use of a pass-notch duplexer is recommended.

The duplexer must be able to handle at least 50W continuously. For the best system performance, the insertion loss should be less than 2dB.

2. Antenna Selection

The selection of antenna is also critical to system performance. The selected antenna must be 50 Ohm impedance and capable of at least 50W. High gain antennas may be used to increase system coverage. Please take note of licensing restrictions when selecting high gain antennas. Some services or regions may have antenna gain or system radiation limitations.

The antenna must be connected to the duplexer with a high grade 50 Ohm transmission line (e.g. Andrew HELIAX cables). The line must have connectors to match the connectors on the duplexer and antenna.

 Caution: It is important that all antenna cables are grounded at the point they enter the building. All aspects of the antenna design must comply with the relevant local regulations.

Post-Installation Checklist

After the repeater has been mechanically installed and all electrical connections have been made, power may now be applied and the repeater should be checked for proper operation.

1. Applying Power

Before applying power to the repeater, make sure all boards are securely seated in the appropriate connectors on the rear panel and all RF cables are securely connected.

Turn on the DC power source to supply power to the repeater.

2. Verifying Proper Operation

Operation of the repeater can be indicated by the 8 LEDs located on the front panel and also by LCD prompts.

 Caution: Some repeater components can become extremely hot during operation. Turn off all power and wait until the repeater is sufficiently cool before touching the repeater.

4. Status Indication

4.1 LCD Icon

These icons may appear on LCD to help you easily identify the repeater status.

Icon Name	Icon	Product Status
TX Power Icon		Low TX power for the current channel.
		High TX power for the current channel.
Accessory Icon*		An accessory is connected.
Alarm Icon		An alarm message is given.
GPS Lock Icon		Loss of GPS lock. The GPS signals will not synchronize with the satellite signals
		GPS locked. The GPS signals will synchronize with the satellite signals.
Operation Mode Icon		Repeater Mode: The repeater will transfer the communication requests from other radios and systems.
Monitor Icon		The Monitor feature is enabled.
Scramble/Encrypt Icon		The Scrambler/Encrypt feature is enabled.
Scan Icon*		Scan is in progress.
Speaker Icon*		The speaker is unmuted.
Network Connection Icon		Successful network connection. The repeater can transfer data properly.
		Abnormal network connection. The repeater cannot connect to the control center.
		Network disconnection due to improper connection to the network cable.

4.2 LED Indicator

Name	LED Indication	Product Status
Power Indicator	Green	Normal power-on.
Alarm Indicator	Red	Abnormal operation and the alarm pops up.
Operation Status Indicator	Green	The repeater is operating in Repeater mode.
	Off	The repeater is operating in Base mode.
Slot 1 TX Indicator	Red	The repeater is transmitting on an analog channel or in slot 1.
Slot 1 RX Indicator	Green	The repeater is receiving on an analog channel or in slot 1.
Slot 2 TX Indicator	Red	The repeater is transmitting in slot 2.
Slot 2 RX Indicator	Green	The repeater is receiving in slot 2.
Analog Mode Indicator	Yellow	The repeater is operating in Analog mode.
Digital Mode Indicator	Blue	The repeater is operating in Digital mode.

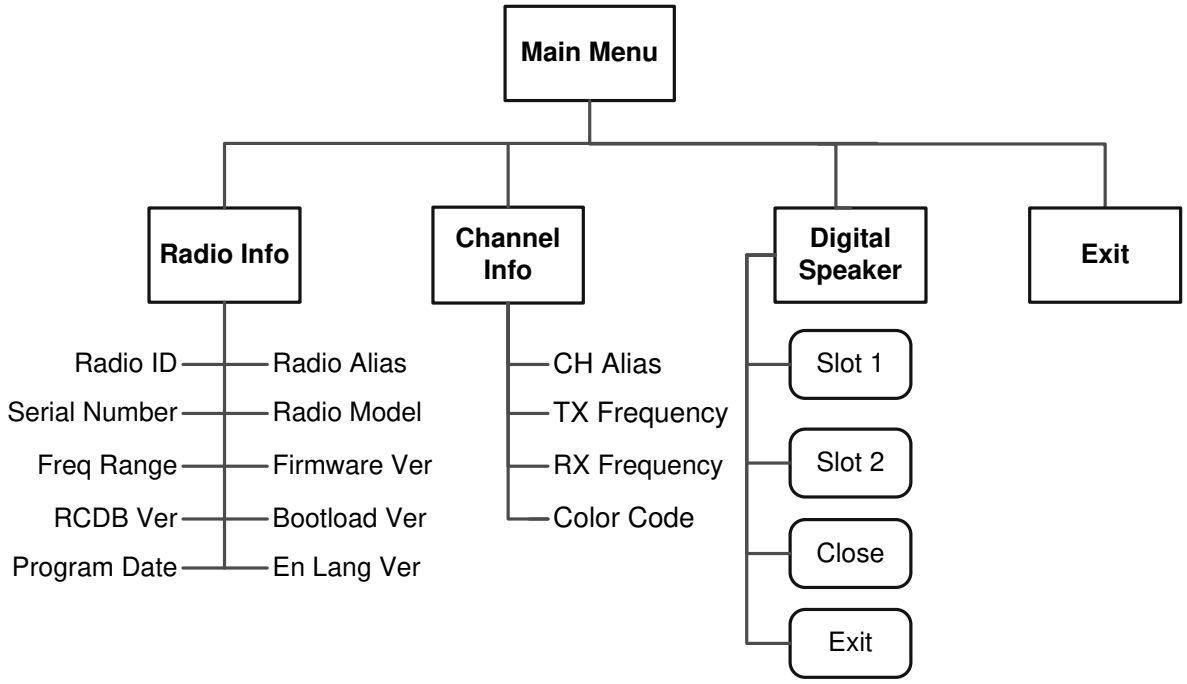
5. Menu Navigation

The following menu list shows all the menus of the repeater. You can select your needed menus to be displayed in the repeater via your dealer.

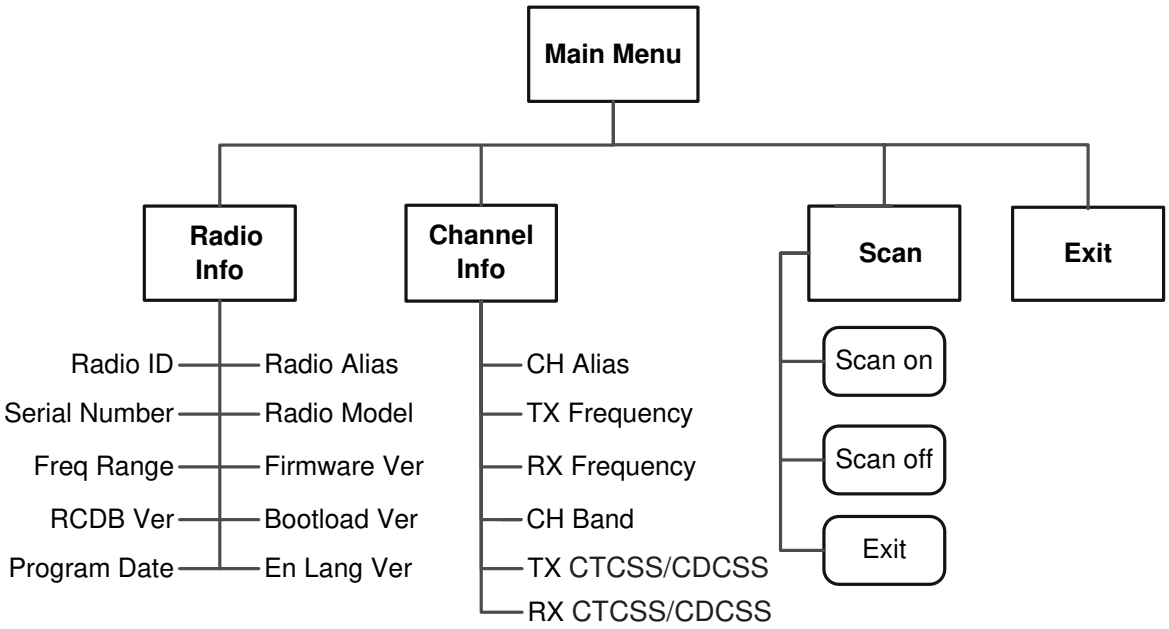
To select and confirm the options shown in the menu, press the **Menu** key to enter the main menu, and then press the **Up**/**Down** key to select your needed option, finally press the **OK** key. This manual only describes the path to the menus when instructing menu operations, for example, to close the speaker, go to “Digital Speaker -> Close”.

The repeater supports menu reset function, that is, if you do not operate the menu for a predefined time period set by the dealer, the repeater will automatically return to the home screen. You can define the reset time or cancel the reset feature via your dealer.

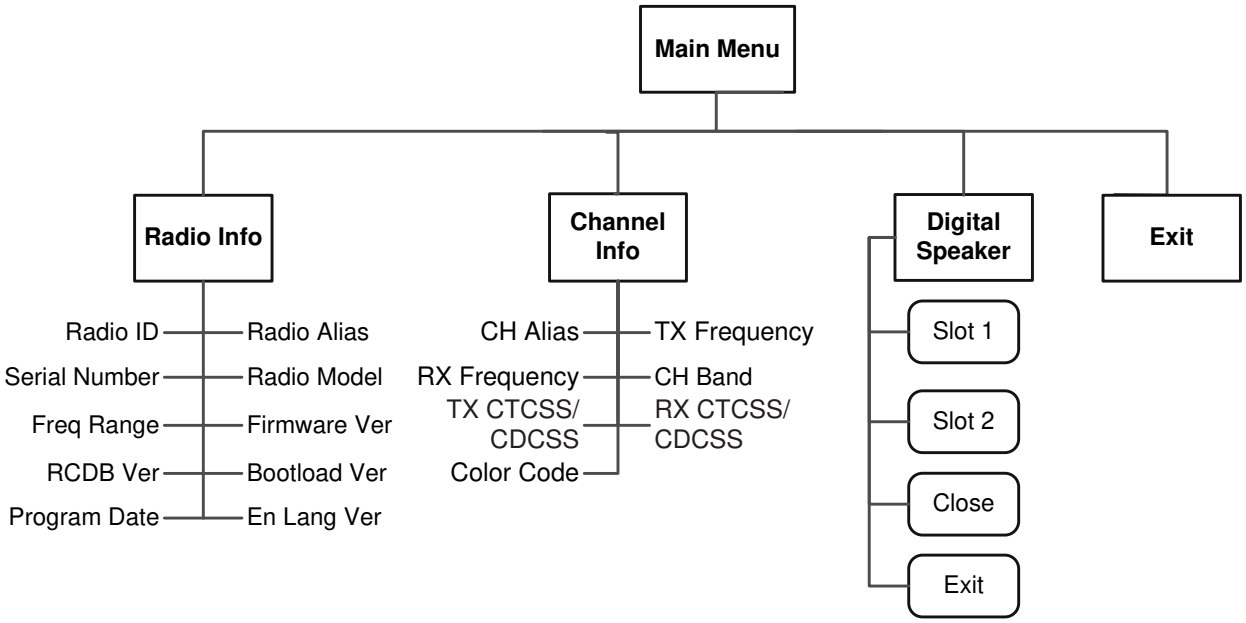
For Digital Channel



For Analog Channel



For Mixed Channel



Note: If non En Lang Ver is downloaded in the repeater, the “Other Lang Ver” menu will be available in the “Radio Info” menu on the above three channels.

6. Basic Operations

6.1 Powering On/Off

- **ON:** Turn on the repeater by connecting a DC power supply to it. During power-up process, the Power Indicator glows green and the power-up screen appears.
- **OFF:** To turn the repeater off, disconnect it from the DC power supply.

6.2 Adjusting the Volume

- For analog channel: Rotate the **Volume Control** knob clockwise to increase the volume or counter-clockwise to decrease the volume.
- For digital channel and mixed channel: The speaker cannot be unmated, this knob is null.

6.3 Adjust Power Level

You can request your dealer to set the TX power to High or Low. High power can extend the repeater coverage, enabling you to communicate with farther radios.

On the LCD, High power is indicated by  and Low power is indicated by  .

6.4 Backlight*

Activating the backlight can illuminate the LCD and all the front panel keys, so as to facilitate your operation under dim light conditions.

Your dealer may set the backlight to operate in any of the following modes:

- Timed: Key press, knob operation or receiving/transmitting signals can activate the backlight. If no foregoing event occurs within the specified time period, the backlight will go out automatically.
- Enable: The backlight remains activated all the time.

Note: When an error occurs, the backlight will glow until the alarm disappears. Then it will recover the original operation mode.

6.5 Locking/Unlocking the Repeater

You can request your dealer to lock the knob and all keys in the front panel to prevent accidental

operation. To unlock, the repeater must be re-programmed by your dealer.

6.6 Changing the Channel

You can use the **Channel Up** or **Channel Down** key in the front panel to change the channel, and the LCD will display the alias of the current channel. The **Channel Up** key is for the former channel and the **Channel Down** key for the latter one.

7. Alarm Information

The repeater will have real-time detection of its status automatically. If the Alarm feature is enabled by your dealer, the LCD will display an alarm message with the Alarm Indicator on the front panel glowing red when the repeater is operating abnormally.

7.1 Low Forward Power Alarm

When the forward power is below the preset value, the Alarm Indicator will glow red and the LCD will display the prompt message below:

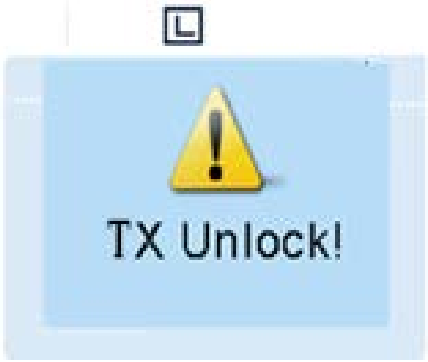
Then the repeater may continue or terminate the transmission, subject to the detection result. And you need to take the following measures:

1. Check if the connection between the transmitter and RF adapter cable or antenna/feed line is loose or damaged. If yes, secure or replace the cable or antenna/feed line.
2. If you cannot solve the problem on site, contact your local dealer for technical support.

When the forward power recovers normal value, the prompt message will disappear, and the Alarm Indicator will go out.

7.2 TX/RX Unlock Alarm

Normally, after being powered on, the repeater has its TX and RX work properly in locked status. When the TX PLL or RX PLL is unlocked, the Alarm Indicator will glow red and the LCD will display the prompt message below:



TX Unlock Alarm

RX Unlock Alarm

Then certain features of the repeater will be terminated automatically, but the LCD alarm message will remain. And you need to take the following measures:

1. Disconnect the power supply, then open the chassis to check if any cable is loose or damaged. If any cable is loose or damaged, secure or replace that cable.

   Caution: Disconnect the power supply before opening the chassis.

2. If you cannot solve the problem on site, contact your local dealer for technical support.

When the TX/RX Unlock recovers normal operation, the prompt message will disappear, and the Alarm Indicator will go out.

7.3 Fan Failure Alarm

When the repeater is operating at high temperature and the fan fails to work, the Alarm Indicator will glow red and the LCD will display the prompt message below:

Then the repeater will automatically work at low TX power, to avoid overheating. And you need to take the following measures:

1. Check whether the fan is blocked by an object. If yes, remove the object.
2. If you cannot solve the problem on site, contact your local dealer for technical support.

When the fan recovers normal operation, the prompt message will disappear, and the Alarm Indicator will go out.

7.4 Over Temperature Alarm

When the temperature of the PA module exceeds the normal range, the Alarm Indicator will glow red and the LCD will display the prompt message below:

Then the repeater will terminate transmission. And you need to take the following measures to recover transmission:

1. Check whether the temperature of the PA module surface is over 80℃. If yes, proceed with Step 2 and 3 to find out the cause.

   Caution: DO NOT touch the surface of the PA heat sink to avoid burn. You can use a digital thermometer with thermocouple to measure the temperature value.

2. Check whether the ambient temperature and ventilation conditions of the repeater satisfy the foregoing installation requirements. If not, please make improvements as soon as possible by mounting air conditioning equipment, improving equipment ventilation or reducing ambient temperature.

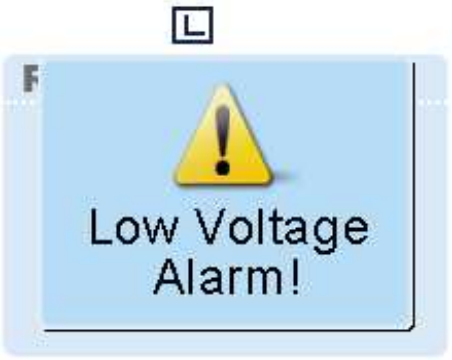
3. Check if connection between the transmitter and RF cable or antenna feed line is loose or damaged. Poor connection between them could cause over high TX power, which would make the temperature of the heat sink rise quickly. If the connection is loose or damaged, secure or replace the cable or antenna/feed line.

4. If the above measures fail to solve the problem, contact your local dealer for technical support.

When temperature falls into normal range, the prompt message will disappear, and the Alarm Indicator will go out.

7.5 Over/Low Voltage Alarm

After being powered on, the repeater will have real-time detection of the voltage inputted by the external power supply. When the voltage is out of the normal range (11V–15.6V), the Alarm Indicator will glow red and the LCD will display the prompt message below:



Low Voltage Alarm

Over Voltage Alarm

Then the repeater will automatically stop working, but the LCD alarm message will remain. And you need to take the following measures:

1. Use voltmeter to check whether the DC power voltage is too low or too high. If the voltage is too low or too high, replace the DC power supply or use external battery.
2. Check whether the DC power cord is loose or damaged. If yes, secure or replace the cord.
3. If you cannot solve the problem on site, contact your local dealer for technical support.

When the voltage returns to the normal range, the prompt message will disappear, and the Alarm Indicator will go out.

⚠**Caution:** If low voltage is detected when the repeater is powered by an external battery, please charge it in time. Disconnect the battery from the repeater before charging.

7.6 Voltage Standing Wave Ratio (VSWR) Alarm

When transmitting, the repeater will detect the voltage standing wave ratio (VSWR) of the TX antenna of the PA module. Over-high VSWR will damage the PA module or even disable it. When the VSWR exceeds the normal value, the Alarm Indicator will glow red and the LCD will display the prompt message below:

Then the repeater will automatically work at low TX power. And you need to take the following measures:

1. Check if the TX frequency is within the frequency range of the antenna. (As improper antenna will result in poor transmitting performance or even damage to the transmitter.) If not, please contact your local dealer to replace the antenna.
2. Check if the connection between the transmitter and RF adapter cable or antenna/feed line is loose or damaged. If yes, please replace the cable.
3. If you cannot solve the problem on site, contact your local dealer for technical support.

When the VSWR falls into the normal value, the prompt message will disappear, and the Alarm Indicator will go out.

8. Troubleshooting

Phenomena	Analysis	Solution
Power-on Failure.	The power cord may be unconnected or not securely connected to the outlet.	Properly connect the power cord and ensure secure connection.
	The fuse in the power cord may be damaged.	Check if the fuse has blown. If yes, replace it with a new one.
Group members cannot talk to each other, or this repeater cannot communicate with a radio.	TX/RX frequency of the repeater is inconsistent with that of portable/mobile radios.	Check if the frequencies are consistent. Reset them when necessary.
	Failed to repeat useful signal due to strong interference signal.	If you cannot remove or bypass the interference source, change to operate at other frequencies.
	The group member is out of the coverage of the repeater.	Go within the coverage of the repeater.
Group members cannot talk to each other, even though RX indication is given.	The radio ID is inconsistent with that of the other group members.	Set the subscriber ID to the same as that of the other members.
	The CTCSS/CDCSS of the radio is inconsistent with that of the repeater.	Check if the CTCSS/CDCSSs are consistent. Reset CTCSS/CDCSS when necessary.
Short communication range or poor audio.	The connecting cable is damaged, and the signal energy leaks.	Check the damages, replace the cable with a new one if necessary.
	The antenna connector and the cable may get loose connection or even disconnected.	Check and secure the cable connector, or replace it if necessary.
	Invisible damage may occur to the cable.	Replace the cable with a new one.
	Duplexer is not properly set (if the duplexer is mounted).	Contact the manufacturer or your dealer to re-set the duplexer.

If the above solutions cannot fix the problems for you, or you may have some other queries, please contact us or your local dealer for more technical support.

9. Care and Cleaning

To guarantee optimal performance as well as a long service life of the product, please follow the tips below.

Product Care

- Keep the product at a place of good ventilation and heat dissipation to facilitate normal work.
- Do not place irrelevant articles on top of the product to ensure optimal heat dissipation.
- Do not pierce or scrape the product.
- Keep the product far away from substances that can corrode the circuit.
- Do not place the product in corrosive agents, solutions or water.

Product Cleaning

Caution: Be sure to power off the product before cleaning.

- Remove the dust and fine particles on the repeater surface with a clean and dry lint-free cloth or a brush regularly.
- Use a non-woven fabric with neutral cleanser to clean the keys, control knobs, LCD and connectors after long-time use. Do not use chemical preparations such as stain removers, alcohol, sprays or oil preparations.
- Make sure the product is completely dry before use.

10. Optional Accessories

The following items are the main optional accessories for the repeater. For more information of other accessories, please consult your local dealer.

Caution: Use the accessories specified by the Company only. If not, Hytera shall not be liable for any losses or damages arising out of use of unauthorized accessories.

- Power Supply: PS22002 Vehicle Power Supply (220W, backup power applicable)
- Audio: SM10A1 Desktop Microphone, SM16A1 Palm Microphone
- Wire: PC37 10pin Programming Cable (USB port), PC40 DB26 Data Cable (USB port), PC49 Back-to-Back Data Cable, Fiberglass-reinforced Plastics Omni-directional Antenna, Directional Yagi Antenna
- Duplexer: DT11 (Frequency: 380-470MHz; RX-TX spacing: 5-13MHz), DT12 (Frequency: 160-174MHz; RX-TX spacing: 5MHz), DT13 (Frequency: 148-160MHz; RX-TX spacing: 5MHz), DT14 (Frequency: 336-370MHz; RX-TX spacing: 8-13MHz), DT15 (Frequency: 136-148MHz; RX-TX spacing: 5MHz), DT16 (Frequency: 440-480MHz; RX-TX spacing: 5MHz), DT17 (Frequency: 480-512MHz; RX-TX spacing: 5MHz)
- Others: BRK09 Duplexer Mounting Bracket (for DT11 and DT12 only), BRK12 Rack for Power Supply (2U)(black), BRK14 Rack for Power Supply (2U)(grey), BRK16 Duplexer Mounting Bracket, BRK18 Power Supply Mounting Bracket, BRK19 Repeater Mounting Bracket

11. General Information

Antenna information:

Model/Part Number: SC329-HF1SFNF
Manufacturer: Sinclair Technologies
Frequency Range: 400-470MHz
Maximum Gain : 9.6dBi
Antenna Type/ Pattern: External
Antenna impedance: 50Ω