Hytera

OWNER'S MANUAL

使用说明书

DIGITAL REPEATER

数字中转台



Preface

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

This manual is applicable to the following model:
RD98X (X may indicate 2, 5, 6 or 8)

English

Instructional Icons

The following icons are available through this manual:

Caution: indicates situations that could cause damage to your product.

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

* indicates functions available in later version.

Term Explanation

- Duplexer

  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.

- Feed Line

  Feed Line is the cable or transmission line that connects the antenna with the radio transmitter or receiver.

- Voltage Standing Wave Ratio (VSWR)

  VSWR is a value that measures how well a load is impedance-matched to a source.

- Squelch

  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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U.S. Patent Nos. #6,912,495 B2, #6,199,037 B1, #5,870,405, #5,826,222, #5,754,974, #5,701,390, #5,715,365, #5,649,050, #5,630,011, #5,581,656, #5,517,511, #5,491,772, #5,247,579, #5,226,084 and #5,195,166.

Disclaimer

The Company endeavors to achieve the accuracy and completeness of this manual, but no warranty of accuracy or reliability is given. All the specifications and designs are subject to change without notice due to continuous technology development. No part of this manual may be copied, modified, translated, or distributed in any manner without the express written permission of us.

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

RF Radiation Information

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 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 always adhere to the followings:

- Gain of antenna must not exceed 6.5dBi.
- Antenna Installation: install the antenna at least 3.5 meters away from your body, in accordance with the requirements of the antenna manufacturer/supplier.

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.

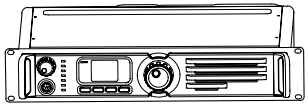
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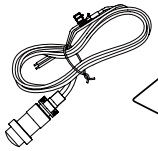
Checking Items in the Package

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

Repeater



Power Cord

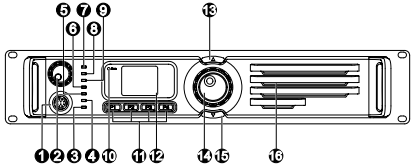


Documentation Kit



Product Overview

Front Panel

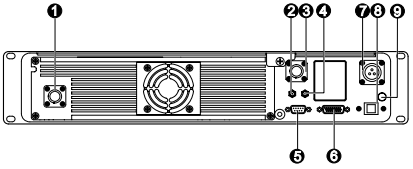


No.	Part Name	No.	Part Name
1	Accessory Jack	9	Slot 1 RX Indicator
2	Volume Control Knob / Power Indicator	10	Alarm Indicator
3	Repeat Mode Indicator	11	Programmable Key *
4	Analog Mode Indicator	12	LCD Display
5	Slot 2 RX Indicator	13	Channel Up (CH+)
6	Slot 2 TX Indicator	14	Navigation Knob
7	Digital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

Programmable Keys *

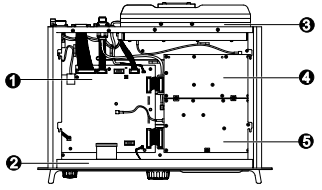
For enhanced convenience, you can request your dealer to program the keys **P1, P2, P3** and **P4** as shortcuts to appropriate functions.

Rear Panel



No.	Part Name	No.	Part Name
1	TX Antenna Interface	6	Accessory Jack
2	Optional Interface 1	7	DC Power Interface
3	RX/Duplex Antenna Interface	8	Ethernet Port *
4	Optional Interface 2	9	Ground Screw
5	Monitor/Tuning Interface	/	/

Internal Parts



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

Installation Guide

Proper installation can ensure optimum performance and reliability of the repeater. Therefore, be sure to read the following instructions before installation.

Installation Requirements

Installation Environment

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

Installation Location

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

Installation Tools

Tools required for installing the repeater include a cross head screwdriver, a torx screwdriver and a spanner.

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

Before Installation

Voltage Check

Please check whether the voltage of DC power or battery meets the repeater specifications.

Product Check

Please check whether the repeater works properly by observing the 8 LEDs located in the front panel.

Parameter Configuration

When the repeater proves to work normally, configure appropriate parameters according to your actual requirements. And then you can proceed with on-site installation.

Installation Steps

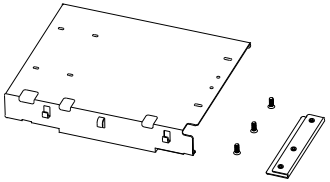
Install the repeater as follows:

1. Install the repeater at a proper location;
2. Attach all necessary accessories;
3. Ground the repeater through the Ground Screw located on the rear panel.

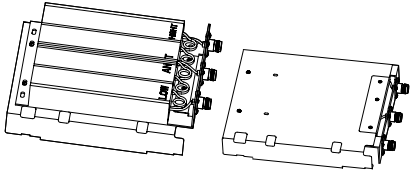
Installing the Duplexer

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

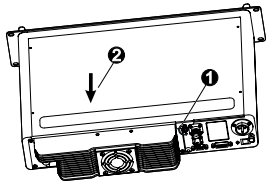
1. Loosen the three screws on the bracket with a cross head screwdriver. See the figure below.



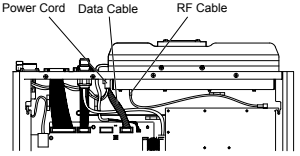
2. Install the duplexer onto the bracket.
   Be sure to observe the specifications of two antenna connectors on the duplexer, to determine which one should be connected to the transmitter. The connector connecting the transmitter should be close to the PA module to reduce RF loss, as shown below:



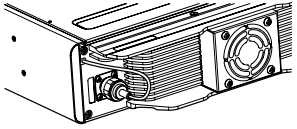
3. Loosen the screw at the back of the top cover, and then pull the top cover to remove it.



4. Loosen the 6 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 figure below.

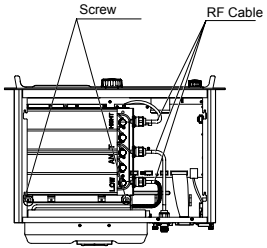


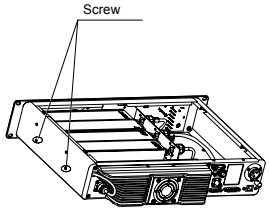
5. Connect the RF cable. See the figure below.



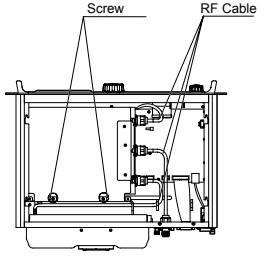
6. Install the duplexer to the repeater.
   After the duplexer is mounted properly, fasten it with the 2 screws inside the housing and on the side respectively.
7. Then attach the PA heat sink and connect all cables.
8. Close the repeater cover.

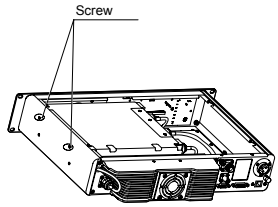
Installation Diagram





Duplexer with Front Side Facing Upwards





Duplexer with Front Side Facing Downwards

After-installation Verification

After installation is completed, power it on and verify whether it works properly by observing the 8 LEDs located in the front panel.

Status Indication

LCD Icon

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

Icon Name	Icon	Repeater Status
RSSI Indicator *		More bars indicate better signal strength.
TX Power Indicator		Low TX power for the current channel.
		High TX power for the current channel.
Scan Indicator		Scan is in progress.
Monitor Indicator *		The Monitor feature is active.
Speaker Indicator		The speaker is unmuted.
Alarm Indicator		An alarm message is given.
Accessory Indicator *		An accessory is connected.
Scrambler/ Encrypt Indicator		The Scrambler/ Encrypt feature is active.
Operation Mode Indicator	RM	The repeater is operating in Repeat mode.

LED Indicator

LED Indication	Part No.	Repeater Status
Power Indicator glows green.	2	Normal power-on
Alarm Indicator glows red.	10	Abnormal operation
Repeat Mode Indicator glows green.	3	The repeater is operating in Repeat mode.
Repeat Mode Indicator goes out.	3	The repeater is operating in Base mode.
Slot 1 TX Indicator glows red.	8	The repeater is transmitting on an analog channel or on slot 1.
Slot 1 RX Indicator glows green.	9	The repeater is receiving on an analog channel or on slot 1.
Slot 2 TX Indicator glows red.	6	The repeater is transmitting on slot 2.
Slot 2 RX Indicator glows green.	5	The repeater is receiving on slot 2.
Analog Mode Indicator glows yellow.	4	The repeater is operating in Analog mode.
Digital Mode Indicator glows blue.	7	The repeater is operating in Digital mode.

Basic Operations

Turning the Repeater On/Off

- **ON:** To power up the repeater, connect a DC power supply to it. In this case, the repeater shows power-up screen and the Power Indicator glows green.
- **OFF:** To power off the repeater, disconnect the DC power supply.

Adjusting the Volume

- **On an analog channel:** Rotate the **Volume Control** knob clockwise to increase the volume or counter-clockwise to decrease it.
- **On a digital or mixed channel:** This knob does not work.

Adjusting the Power Level

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

There are two levels available: High (indicated by [H]) and Low (indicated by [L]).

Backlight

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

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

- Timed: key press, knob operation or signal reception/transmission 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 alarm event occurs, the backlight will remain activated until the alarm disappears.

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.

Changing the Channel

You can use the **Channel Up** or **Channel Down** key in the front panel to change the channel cyclically. The alias of the current channel is displayed on the LCD display.

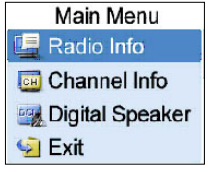
Menu Navigation

The options under the main menu vary with the channel type.

- Analog Channel



- Digital or Mixed Channel

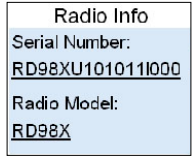


Radio Info

Under this menu, you can view product information, including Radio ID, Radio Alias, Serial Number, Radio Model, Freq Range, Firmware Ver, RCDB Ver, Bootload Ver, Program Date and En Lang Ver.

To access this menu:

1. In the home screen, press the **Navigation** knob to enter the main menu.
2. Rotate this knob to select the "Radio Info" option.
3. Press this knob again to view details, as shown below.



In the above interface, you can rotate the **Navigation** knob to scroll through related information. To exit and return to the main menu, press the knob.

Note: If a non-English package is programmed into your repeater, the "Other Lang Ver" will appear under this menu.

Channel Info

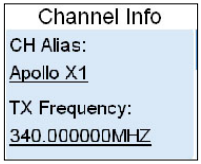
Under this menu, you can view channel information. The LCD will display different channel items as per the channel type.

Channel Type	Channel Information
Digital Channel	CH Alias, TX Frequency, RX Frequency, Color Code
Analog Channel	CH Alias, TX Frequency, RX Frequency, CH Band, TX CTCSS/CDCSS, RX CTCSS/CDCSS

Mixed Channel	CH Alias, TX Frequency, RX Frequency, CH Band, TX CTCSS/ CDCSS, RX CTCSS/CDCSS, Color Code

To access this menu:

1. In the home screen, press the **Navigation** knob to enter the main menu.
2. Rotate this knob to select the "Channel Info" option.
3. Press this knob again to view details, as shown below.



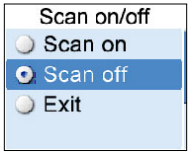
In the above interface, you can rotate the **Navigation** knob to scroll through related information. To exit and return to the main menu, press the knob.

Scan

The Scan feature allows you to listen to communication activities on other channels so that you can keep a close track of your team members. You can request your dealer to create a scan list for each channel. Each list may contain 32 channels at most.

To access this menu:

1. In the home screen, press the **Navigation** knob to enter the main menu.
2. Rotate this knob to select the "Scan" option.
3. Press this knob again to access the "Scan on/off" interface.



In the above interface, you can enable or disable the Scan feature. To exit and return to the main menu, press the knob.

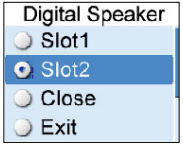
Note: If the "Scan" option is not checked in the CPS by your dealer, you can not enable or disable the Scan feature via this menu.

Digital Speaker

The Digital Speaker feature allows your repeater to receive audio from a specific slot, or to mute for the digital channel.

To access this menu:

1. In the home screen, press the **Navigation** knob to enter the main menu.
2. Rotate this knob to select the "Digital Speaker" option.
3. Press this knob again to access the "Digital Speaker" interface.



In the above interface, you can select a specific slot to receive, or mute the speaker for the digital channel. To exit and return to the main menu, press the knob.

Exit

To exit the main menu:

1. In the main menu, rotate the **Navigation** knob to select the "Exit" option.
2. Press this knob to return to the home screen.

Alarm Information

The repeater can automatically detect its operation status in real time. If the appropriate alarm indication option is checked in the CPS by your dealer, the LCD will give you a prompt message, and the Alarm Indicator will glow red in the case of a corresponding abnormality.

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 stop transmitting, and you need to:

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

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

2. Check whether ambient temperature and ventilation conditions satisfy the foregoing installation requirements. If not, please make improvements as soon as possible.

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

Fan Failure Alarm

When 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 protect the transmitter from overheating. You need to:

1. Check whether the fan is blocked by a foreign object. If yes, remove it.
2. If you cannot solve the problem, 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.

VSWR Alarm

High VSWR (voltage standing wave ratio) of TX antenna connector could result in damage to the PA, and even failure of the transmitter. When the VSWR exceeds the normal range, the Alarm Indicator will glow red and the LCD will display the prompt message below:



Then the repeater will automatically works at low TX power. You need to:

1. Check if the operating frequency of the repeater is in line with that of the antenna. Both frequency mismatch and improper antenna could result in poor transmitting performance and even damage to the transmitter. If yes, please contact your local dealer to replace the antenna or reprogram your product.
2. Check if the connection between the transmitter and RF cable or antenna feed line is loose or damaged. If yes, secure or replace the cable or antenna feed line.
3. If you cannot solve the problem, contact your local dealer for technical support.

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

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:



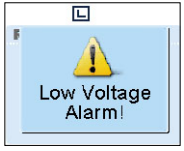
Then the repeater may continue transmission or terminate it, subject to the detection result. You need to:

1. Check if the connection between the transmitter and RF 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, contact your local dealer for technical support.

When the forward power is recovered to its normal value, the prompt message will disappear, and the Alarm Indicator will go out.

Over/Low Voltage Alarm

When power voltage is detected to be over or below the range (11V-15.6V) of repeater, 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. You need to:

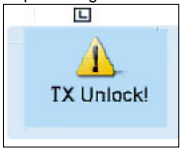
1. Check whether the power voltage is too low or too high. If yes, replace the DC power supply or external battery.
2. Check whether the power cord is loose or damaged. If yes, secure or replace the cord.
3. If you cannot solve the problem, contact your local dealer for technical support.

When the voltage falls within 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.

TX/RX Unlock Alarm

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 the repeater will automatically stop partial operations. You need to:

1. Disconnect the power supply, open the chassis and check whether the cabling is right or damaged. If yes, please secure or replace the cable.
2. If you cannot solve the problem, contact your local dealer for technical support.

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

Caution: Disconnect the power supply before opening the chassis!

Troubleshooting

Phenomena	Analysis	Solution
The repeater cannot be powered on.	Power cord is not connected or is not securely connected to the outlet.	Properly connect the power cord and ensure secure connection.
	Power cord fuse is damaged.	Check if the fuse has blown. If yes, replace it with a new one.
Group members cannot talk to each other, or the repeater cannot communicate with a subscriber radio.	TX/RX frequency of the repeater is inconsistent with that of portable/mobile terminals.	Re-set frequencies.
	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.	Your ID is inconsistent with that of other group members.	Set your ID to the same as that of other members.
	Inconsistent CTCSS/CDCSS.	Re-set CTCSS/CDCSS.
Short communication range or poor audio	Leakage of signal energy due to damaged connection cable.	Replace the cable with a new one if necessary.
	Loose connection between the antenna connector and the cable, or loss of connection	Secure or replace the cable.
	Invisible damage 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 can not fix your problems, or you may have some other queries, please contact us or your local dealer for more technical support.

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 with any edged instruments or hard objects.
- 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: Disconnect the power supply from the repeater 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 cloth with neutral cleanser to clean the keys, control knobs, LCD and jacks after long-time use. Never use chemical preparations such as stain removers, alcohol, sprays or oil preparations. Make sure the product is completely dry before use.

Optional Accessories

The following items are the main optional accessories for the product, and please consult your local dealer for more other accessories.



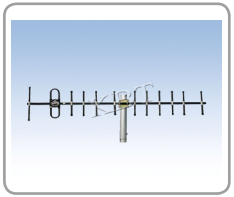
Palm Microphone SM16A1



Desktop Microphone SM10A1



Duplexer Bracket BRK09 (for DT11 and DT14 only)



Yagi Antenna



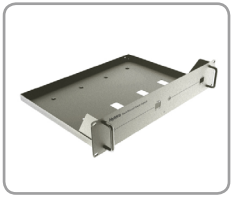
Omni-directional Antenna



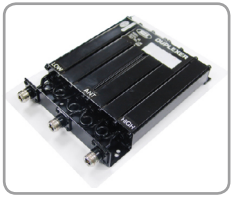
External Power Supply (240W, backup power supply applicable) PS22002



Bracket (2U)(black) BRK12



Bracket (2U)(grey) BRK14



Duplexer (frequency: 380-470MHz; RX-TX spacing: 5-13MHz) DT11
Duplexer (frequency: 160-174MHz; RX-TX spacing: 5MHz) DT12
Duplexer (frequency: 148-160MHz; RX-TX spacing: 5MHz) DT13
Duplexer (frequency: 336-370MHz; RX-TX spacing: 8-13MHz) DT14
Duplexer (frequency: 136-148MHz; RX-TX spacing: 5MHz) DT15
Duplexer (frequency: 440-480MHz; RX-TX spacing: 5MHz) DT16
Duplexer (frequency: 480-512MHz; RX-TX spacing: 5MHz) DT17



Fuse POA33



Power Cord (10A 12AWG) PWC11



10-pin Programming Cable (USB) PC37



DB26 Data Cable (USB) PC40

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

简体中文

致用户

非常感谢您对我们产品的青睐！为了确保您最大限度地享用本产品所带来的各项便利，请于使用前详细阅读本手册和《安全信息手册》。

本手册适用于以下机型：
RD980

图标说明

本手册中会使用以下图标，各图标含义如下：

使用提示图标


注意：表示可能会导致产品损坏或人身伤害的事项。


备注：表示有助于您更好地了解和使用本产品的事项。

* 表示该功能项或部件在本中转台的当前版本不支持，将在后续版本支持。

术语说明

- 双工器

  双工器是异频双工电台，是中转台的主要配件。其作用是将发射和接收信号相隔离，保证接收和发射能同时正常工作，相互不受影响。它是由两组不同频率的阻带滤波器组成，避免本机发射信号传输到接收机。

- 馈线

  在无线电发射机和天线之间传送射频能量的线路。

- 驻波比

  驻波比是一个数值，用来表示天线和电波发射台是否匹配。

- 静噪

  静噪可滤除通话过程中过度的背景噪声，用于解决通话质量和噪声问题。

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射频辐射信息

射频辐射常识

射频指可以辐射到空间的电磁频率，是通讯、医疗、食品加工等领域广泛使用的一种技术，在使用过程中会产生一定的射频辐射。

射频辐射安全

为了确保用户的身心健康，来自科学、工程、医药、健康和工业的专家们与相关组织共同研究制定了射频辐射标准和准则，如下所示：

- 美国联邦通信委员会联邦政府法规汇编第47卷第2部分J子部分。
- 美国国家标准协会（ANSI）/电气和电子工程师协会（IEEE）标准C95.1-1992版。
- 电气和电子工程师协会标准C95.1-1999版。
- 国际非电离辐射防护委员会（ICNIRP）于1998年颁布的标准。

美国联邦通信委员会监管要求

按照美国联邦通信委员会的监管要求，本产品必须符合美国联邦通信委员会射频辐射限制规定，否则不能在美国市场上销售。并要求制造商可通过在产品上张贴标签的方式，告知用户应注意的事项，提高用户的防辐射意识。

射频辐射控制及操作说明

为了使产品发挥最佳性能及确保符合上述标准中有关职业或受控环境中的辐射限制要求，请遵照下列说明：

- 天线增益不得超过6.5dBi。
- 天线的安装需按照厂商或供应商的要求进行，且安装处与人体的距离不得少于3.5米。

欧盟指令符合性声明

本产品经独立第三方机构认证，符合欧盟指令“1999/5/EC”中的相关要求。请注意，本声明仅适合欧盟国家。

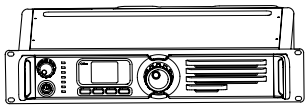
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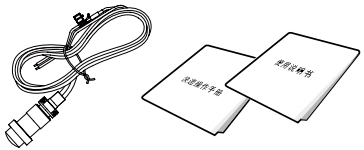
检查包装内物品

包装盒内含有以下物件。如有任何物件丢失或损坏，请与您所购产品的经销商联系。

主机

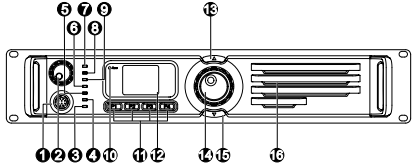


电源线　　用户资料



熟悉本机

前面板

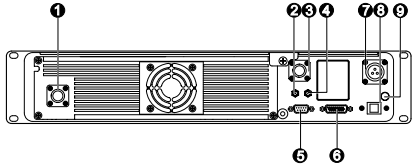


序号	部件名称	序号	部件名称
1	附件接口	9	时隙1接收状态指示灯
2	【音量控制】旋钮/电源指示灯	10	告警状态指示灯
3	中转状态指示灯	11	可编程键*
4	模拟模式指示灯	12	LCD显示屏
5	时隙2接收状态指示灯	13	信道上调按键
6	时隙2发射状态指示灯	14	【菜单导航】旋钮
7	数字模式指示灯	15	信道下调按键
8	时隙1发射状态指示灯	16	扬声器

可编程键*

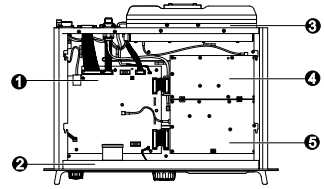
为了提升操作便利性，本机配置了4个可编程键【P1】、【P2】、【P3】和【P4】，每个按键可由经销商通过编程设置相应功能。

后面板



序号	部件名称	序号	部件名称
1	发射天线接口	6	附件接口
2	可选接口1	7	直流电源输入接口
3	接收/双工天线接口	8	以太网接口*
4	可选接口2	9	接地螺钉
5	监控/调测接口	/	/

内部结构



序号	部件名称	序号	部件名称
1	基带模块	4	激励模块
2	前面板	5	接收模块
3	功放模块	/	/

安装指南

正确地安装可确保本产品具备最佳的工作性能和可靠性。因此安装之前，请务必仔细阅读以下信息。

安装要求

安装环境

本产品必须安装在“环境温度为-30℃～+60℃、相对湿度为95%且干燥通风”的环境下。

安装位置

本产品可以安装在机架和支架上，也可安装在机柜内，或者放置于工作台面上。

安装工具

安装本产品时需要使用的工具包括：十字螺丝批、T-10梅花六角螺丝批、扳手。

备注：您可以参阅《安全信息手册》了解更多的安装相关信息。

安装前准备

电压检查

检查直流电源电压或外接电池电压是否在中转台的工作电压范围之内（13.6V±15%）。

产品检查

上电后，通过观察前面板上的8个LED指示灯的状态检查中转台是否运行正常。

参数配置

在确认中转台工作正常后，根据实际需求通过CPS配置中转台的相关参数。例如：工作频率、发射功率等。完成参数配置后，您可以进行现场安装。

安装步骤

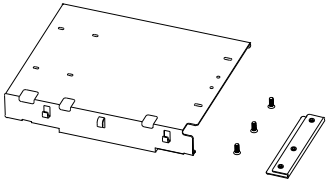
本产品的安装步骤如下所示：

1. 将中转台安装在所需的位置。
2. 将天线、馈线和电源线等附件连接至中转台。
3. 将中转台通过后面板上的接地螺钉进行接地。

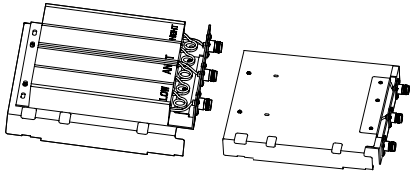
安装双工器

如果该中转台需要匹配双工器工作，在安装中转台前，请按照如下操作步骤安装双工器。

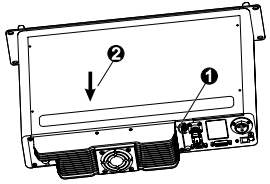
1. 用十字螺丝批拧开支架卡板的3颗固定螺钉。如下图所示：



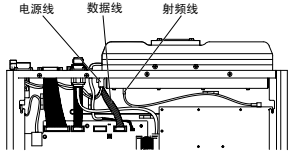
2. 将双工器装配到支架上。
   装配双工器前，请查看双工器左右两个天线口的规格，以确认哪个端口与发射机连接。和发射机相连的端口应靠近功放模块，这样可以减小发射机与双工器之间的射频损耗。如下图所示：



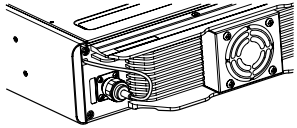
3. 打开中转台的机箱上盖（拧开机箱上盖板后端的螺钉，然后向后拉上盖板）。如下图所示：



4. 用十字螺丝批拧开中转台功放散热器6颗固定螺钉，拆除与功放连接的所有电源线、数据线和射频线，然后取出功放模块。如下图所示：

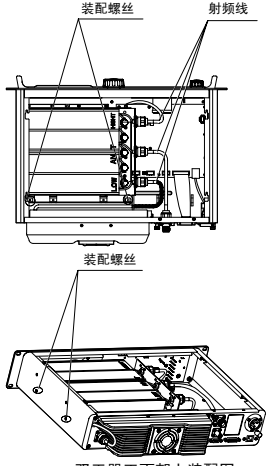


5. 将外部射频线从功放散热器旁边的小孔接出。如下图所示：

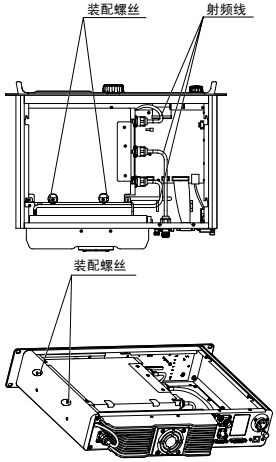


6. 将双工器安装到中转台上。
   将装配在支架上的双工器放置到中转台的激励模块和接收模块上，然后通过机箱内部2颗螺钉和机箱侧面2颗螺钉将双工器固定。
7. 重新安装功放散热器，连接所有的功放电源线、数据线和射频线。
8. 合上中转台的机箱上盖，完成双工器安装。

双工器安装示意图



双工器正面朝上装配图



双工器正面朝下装配图

安装后检查

完成上述操作后，将中转台上电，通过观察前面板上的8个LED指示灯的状态和LCD提示，检查中转台是否工作正常。

状态指示

LCD圖示

在中转台的LCD上会显示不同图标，各图标的含义如下：

图标名称	图标显示	中转台状态
信号强度标识*		信号条数越多，表示信号越强
发射功率标识	L	当前信道发射功率为低功率
	H	当前信道发射功率为高功率
扫描标识*		处于扫描状态
监听标识		已开启监听功能
扬声器标识		已开启扬声器
告警标识		处于告警状态，弹出告警信息
附件图标*		已连接附件
扰频/加密图标		已开启扰频或加密功能
工作模式标识	RM	中转模式：中转台中转其他终端、系统的通信请求

LED指示灯

指示灯状态	前面板部件编号	中转台状态
电源指示灯亮绿色灯	2	正常开机
告警状态指示灯亮红色灯	10	工作异常并弹出告警提示
中转状态指示灯亮绿色灯	3	中转台在中转模式下工作
中转状态指示灯熄灭	3	中转台在基地台模式下工作
时隙1发射状态指示灯亮红色灯	8	模拟模式发射或数字模式时隙1发射
时隙1接收状态指示灯亮绿色灯	9	模拟模式接收或数字模式时隙1接收
时隙2发射状态指示灯亮红色灯	6	数字模式时隙2发射
时隙2接收状态指示灯亮绿色灯	5	数字模式时隙2接收
模拟模式指示灯亮黄色灯	4	中转台在模拟模式下工作
数字模式指示灯亮蓝色灯	7	中转台在数字模式下工作

基本操作

开机与关机

- 开机：将本机连接外部直流电源，然后打开外部电源的开关。开机时，电源指示灯亮绿灯，并显示开机动画。
- 关机：断开电源。

调节音量

- 对于模拟信道：顺时针旋转【音量控制】旋钮增大扬声器的输出音量，逆时针旋转旋钮减小音量。
- 对于数字信道和混合信道：扬声器不能输出语音，此旋钮无效。

调整功率级别

您可以通过经销商将本机的发射功率设置为高或低。高功率可以扩大本机的覆盖范围，与距离较远的终端也能进行通信。

LCD显示H图标时，表示高功率；显示 L 图标时，表示低功率。

背光灯

开启背光灯可以点亮LCD，以便用户在光线不足的情况下仍可以操作本机。

您可以通过经销商设置背光灯的工作方式：

- 定时：任何按键操作、旋钮操作或信号的接受/发射，都可以开启背光灯。若本机在预设时间内无任何操作，也没有接收和发射信号，则在预设时间超时后，本机将自动关闭背光灯。
- 常开：本机开机后，背光灯一直打开。

备注：当本机出现异常，处于告警状态时，背光灯将长亮。告警消失后，背光灯恢复原有工作方式。

锁定与解锁

您可以通过经销商锁定前面板所有按键和旋钮，以防止用户误操作。按键和旋钮锁定后，需由经销商进行解锁。

信道切换

您可以通过前面板的信道调整按键切换信道，LCD将显示当前选择信道的别名。信道上调按键表示切换到上一个信道，信道下调按键表示切换到下一个信道。

菜单导航

信道类型不同，相应的主菜单选项不同，对应关系如下：

- 模拟信道



- 数字信道或者混合信道



对讲机信息

您可通过此菜单查看本机的相关信息，包括：本机ID、对讲机别名、序列号、对讲机型号、频率范围、主机版本、数据库版本、下载程序版本、最后编程日期、英语包版本。

您可以通过如下步骤进入此菜单：

1. 在主界面下按【菜单导航】旋钮进入主菜单。
2. 旋转【菜单导航】旋钮，选择“对讲机信息”菜单项。
3. 再次按下【菜单导航】旋钮，进入本机的“对讲机信息”界面。



此时您可以通过旋转【菜单导航】旋钮滚动浏览本机的相关信息。若想退出“对讲机信息”界面，您可以按下【菜单导航】旋钮，主机将返回主菜单界面。

备注：当本机烧录了非英语语言包时，在“对讲机信息”菜单中将会显示“其他包版本”菜单项。

信道信息

您可通过此菜单查看本机当前信道的相关信息。信道类型不同，LCD上显示的信道信息项不同，对应关系如下：

信道类别	界面菜单项
数字信道	信道别名、发射频率、接收频率、色码
模拟信道	信道别名、发射频率、接收频率、信道带宽、亚音频发射、亚音频接收
混合信道	信道别名、发射频率、接收频率、信道带宽、亚音频发射、亚音频接收、色码

您可以通过如下步骤进入此菜单：

1. 在主界面下按【菜单导航】旋钮进入主菜单。
2. 旋转【菜单导航】旋钮，选择“信道信息”菜单项。
3. 再次按下【菜单导航】旋钮，进入本机当前信道的“信道信息”界面。



此时您可以通过旋转【菜单导航】旋钮滚动浏览当前信道的相关信息。若想退出“信道信息”界面，您可以按下【菜单导航】旋钮，主机将返回主菜单界面。

扫描

此功能可助您监听其他信道上的通信活动，您可通过经销商为每个信道创建一个扫描列表，每个扫描列表最多包含32个信道。

您可以通过如下步骤进入此菜单：

1. 在主界面下按【菜单导航】旋钮进入主菜单。
2. 旋转【菜单导航】旋钮，选择“扫描”菜单项。
3. 再次按下【菜单导航】旋钮，进入“扫描开关”界面。



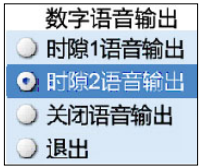
您可以通过此菜单开启或者关闭扫描功能。若想退出“扫描”界面，您可以按下【菜单导航】旋钮，主机将返回主菜单界面。

备注：如果经销商没有开启扫描功能，此设置无效。

数字语音输出

您可以选择本机是输出时隙1的语音或者时隙2的语音，也

可以关闭本机数字信道的语音输出。
您可以通过如下步骤进入此菜单：
1. 在主界面下按【菜单导航】旋钮进入主菜单。
2. 旋转【菜单导航】旋钮，选择“数字语音输出”菜单项。
3. 再次按下【菜单导航】旋钮，进入“数字语音输出”界面。



若想退出“数字语音输出”界面，您可以按下【菜单导航】旋钮，主机将返回主菜单界面。

退出

您可以通过如下步骤退出主菜单界面：
1. 在主菜单界面旋转【菜单导航】旋钮，选择“退出”菜单项。
2. 再次按下【菜单导航】旋钮，返回主界面。

中转台告警信息

中转台可自动、实时检测本机状态。如果经销商开启了告警提示，当工作出现异常时，LCD将自动弹出告警提示，前面板告警状态指示灯亮红灯。

过温告警

当本机检测到功放模块内部温度超出正常工作温度范围时，告警状态指示灯亮红灯，并且LCD将弹出如下告警提示：：



出现此告警提示时，本机将停止发射。此时您需要采如下措施恢复发射：
1. 检查本机的功放模块表面温度是否超过80℃。如果超过80℃，请按照步骤2和3检查原因。

注意：此时本机的功放散热器可能处于高温状态，切勿用手触摸本机，您可以使用带热电耦的数字温度计进行测量。

2. 检查环境温度和本机的通风条件。若不符合前文中要求的安装条件，请尽快改善安装环境，例如：加装空调设备，促进通风，降低温度。
3. 检查与发射机连接的射频转接线或天线/馈线是　　否松脱或损坏，是否由于连接不良导致发射功率过高，使散热器温升过快。如果是，请及时紧固或更换连接线。
4. 若非上述情况，请联系您所在地的经销商协助解决。

当本机温度恢复到正常范围时，告警提示框将自动消失，并且告警状态指示灯熄灭。

风扇停转告警

当本机处于高温并且检测到风扇停转时，告警状态指示灯亮红灯，并且LCD将弹出如下告警提示：



出现此告警提示时，本机将自动降低发射功率，以防止发射机过热。此时您需要采取如下措施：
1. 检查风扇扇叶是否被硬物阻挡。如果是，请移除硬物。
2. 如果现场无法解决，请联系您所在地的经销商提供协助。

当风扇恢复工作时，告警提示框将自动消失，并且告警状态指示灯熄灭。

驻波比告警

发射天线端口的电压驻波比（VSWR）过大会损坏射频功放，严重情况下会导致发射机无法正常工作。当本机检测到电压驻波比超出正常值时，告警状态指示灯亮红灯，并且LCD将弹出如下告警提示：



出现此告警提示时，本机将自动降低发射功率。此时您需要采取如下措施：
1. 检查发射频点是否处于天线的工作频率范围内。选择错误的天线会导致发射机性能下降，并可能会损坏发射机。如果否，请联系您所在地的经销商更换天线。
2. 检查与发射机连接的射频转接线或天线/馈线是否松脱或损坏。如果是，请及时更换连接线。
3. 若现场无法解决，请联系您所在地的经销商提供协助。

当电压驻波比恢复到正常值时，告警提示框将自动消失，并且告警状态指示灯熄灭。

低前向功率告警

当本机检测到前向功率低于预设值时，告警状态指示灯亮红灯，并且LCD将弹出如下告警提示：



出现此告警提示时，本机将根据检测状态选择继续发射，或者停止发射。此时您需要采取如下措施：

1. 检查与发射机连接的射频转接线或天线/馈线是否松脱或损坏。如果是，请及时紧固或更换连接线。
2. 若现场无法解决，请联系您所在地的经销商提供协助。

当前向功率恢复到正常值时，告警提示框将自动消失，并且告警状态指示灯熄灭。

过压/低压告警

当本机检测到电压超出了电压范围（11V～15.6V）时，告警状态指示灯亮红灯，并且LCD将弹出如下告警提示：



低压告警



过压告警

出现此告警提示时，本机将自动停止工作，但仍会保留LCD告警提示。此时您需要采取如下措施：

1. 使用电压表检查直流电源输入的电压是否过低或过高。如果是，请及时更换直流电源或外接电池。
2. 检查直流电源线是否松脱或损坏。如果是，请及时紧固或更换直流电源线。
3. 若现场无法解决，请联系您所在地的经销商提供协助。

当电压恢复到正常工作电压范围时，告警提示框将自动消失，并且告警状态指示灯熄灭。

注意：若使用外接电池对本机供电并发现电压过低，请及时进行充电。充电前，请断开本机与电池的连接。

发射/接收失锁告警

当本机检测到发射锁相环或接收锁相环失锁时，告警状态指示灯亮红灯，并且LCD将弹出如下告警提示：



发射失锁告警



接收失锁告警

出现此告警提示时，本机的部分功能将自动停止，但仍会保留LCD告警提示。此时您需要采取如下措施：

1. 断开电源，打开机箱，观察硬件连接线是否连接松脱或损坏。若是，请及时紧固或更换硬件连接线。
2. 若现场无法解决，请联系您所在地的经销商提供协助。

当发射/接收失锁恢复正常时，告警提示框将自动消失，并且告警状态指示灯熄灭。

注意：若使用在您打开机箱检查失锁告警前，请断开电源。

故障处理指南

故障描述	原因分析	解决方法
中转台无法开机	电源线未连接或者与插座接触太松	正确连接电源线、并保证接触良好
	电源线内保险丝损坏	检查电源线内直流保险丝是否烧毁，如果烧毁，请替换新保险丝
系统内组员之间无法通话，中转台无法与终端通信	中转台的收发频点与终端的收发频点不对应	检查频点是否对应，必要时请重新置频
	工作频点受到强信号干扰，无法中转有用信号	查找干扰源，如果无法关闭或远离干扰源，请申请并更换信道频点
	组员已经离开中转台的信号覆盖范围	确认并回到中转台的信号覆盖范围内通话
终端有接收指示，但系统内组员之间无法通话	终端ID号与组内其他成员不同	设置与组内其他成员相同的ID号
	终端之间、终端与中转台的CTCSS/CDCSS 不对应	检查CTCSS/CDCSS是否对应，如有必要请重新设置
通话距离短，话音不清晰	连接电缆已损坏，信号能量泄漏	检查损坏程度，如果有必要，请替换新的电缆
	天线端口与电缆接头处松动或脱落	检查接头处，将接头拧紧，如果有必要，请替换新的接头
	电缆内部损坏	替换新的电缆
	双工器未完全调节好（如果已安装了双工器）	联系厂家或经销商重新调整双工器

如上述方法仍未解决您的问题，或者您遇到一些其它的故障，请联系当地经销商或我司以获取更多的技术支持。

保养与清洁

为了保证本产品发挥其良好性能，并延长其使用寿命，请熟悉以下内容，以便更好地对本产品进行日常保养与清洁。

保养

- 请保证本产品处于通风条件较好、易散热的位置，以便各部件正常地工作。
- 请勿将无关物品摆放在本产品上盖或散热器上，以保证其有效地散热。
- 请勿用硬物穿刺或刮花本产品。
- 请勿将本产品存放于含有腐蚀电子电路物质的环境。
- 请勿将本产品浸泡于各种腐蚀剂、溶液或水中。

清洁

注意：在您进行清洁之前，请断开本机电源。

- 请定期使用洁净干燥的无绒布或毛刷拭去本产品各部件附着的粉尘，以保持其清洁并防止接触不良。
- 如果本产品的按键、控制旋钮、显示屏和接口变脏，可以使用沾有中性洗涤剂的无纺布对其进行清洁。切勿用去污剂、酒精、喷雾剂或石油制剂等强腐蚀性化学药剂进行清洁。清洁之后，务必保证本产品彻底干燥，否则请勿使用。

质量保证和维修条款

我司承诺：凡我司生产的产品，自购买之日起，在正常使用、操作与维护条件下，出现材料或制造工艺方面的缺陷，可享受以下规定的保修服务。

保修的范围与期限

主机	24 个月
标配附件（电源线）	6 个月

保修的申请

如申请我司产品保修服务，必须提供有效的我司产品保修卡或有效购机发票原件作为凭证。保修期内，我司产品的相关标志，包括序列号码标签等，应保持清晰完整且不得撕毁。

- 产品保修卡是指由我司或我司授权的经销商填写并盖章的完整保修卡。保修卡上填写内容应包含产品名称、产品制造序列号（编号）、购买产品日期、销售单位等有效信息。
- 有效购机发票是指财税部门统一监制的发票，是产品售出的重要凭证。发票上应填写产品名称、产品制造序列号（编号）、销售日期、购机金额等有效信息。

注意：

- 本产品必须寄回我司客服总部或我司驻外维修站进行维修。
- 请将产品包装好，附上所需凭证及详细的故障说明寄至原购点或我司指定的售后服务点。您也可以通过拨打我司的服务热线400-830-7020获得帮助。

本服务保证条款不包括以下内容：

- 超出保修有效期限。
- 未按说明书要求使用、维护及保养所造成的故障或损坏。
- 在非正常和非常规情况下使用本产品所造成的故障或损坏。
- 未经我司授权的改造、改动、拆卸、使用非原装的附件或电池，或未经我司授权的情况下对产品进行软件升级、固件拆动等所造成的故障或损坏。
- 非材料或加工问题所造成的天线故障或损坏。
- 主机上的我司相关标志或序列号码标贴被撕毁、序列号被抹除或无法辨认的产品。
- 购买日期无法鉴定的产品。
- 不可抗力所造成的故障或损坏。
- 正常及常规磨损。

特别说明

- 在法律允许的限度内，我司在任何情况下都不对超过产品购买价格的损失承担责任，同时不对任何使用损失、时间损失、商业损失、利润或收入损失、不能使用产品而导致的附带的、特殊的或继发性损坏承担负责。
- 由于采用本产品所使用的环境、系统等各不相同，我司在本保修条款下不对整个系统的覆盖范围、覆盖区域或运行状况承担责任。
- 本维修条款是根据国家相关保修条例所制定的，由于技术发展与市场调整等因素，条款内容也将进行相应的修改，具体修改请以我司客户服务中心发布的维修条款变动通知为准。其他未尽事宜请以国家相关条例为准。

选购配件

本机主要的选购附件已包含在如下列表中，如需更多附件信息，请咨询您当地的经销商或拨打我司服务热线 400-830-7020。



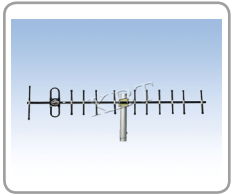
手持麦克风
SM16A1



台式麦克风
SM10A1



双工器安装支架 BRK09
（仅适用于 DT11 和 DT14）



八木定向天线



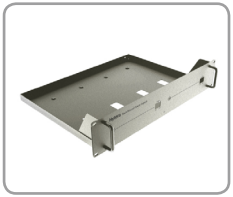
全向玻璃钢天线



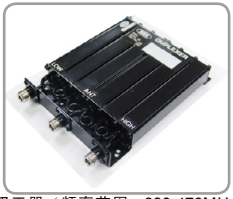
车台电源（240W，可接备用电源）PS22002



机柜电源安装附件（2U）（黑色）BRK12



机柜电源安装附件(2U)（灰色）
BRK14



双工器（频率范围：380-470MHz，收发间隔：5 ～ 13MHz）DT11
双工器（频率范围：160-174MHz，收发间距：5MHz）DT12
双工器（频率范围：148-160MHz，收发间距：5MHz）DT13
双工器（频率范围：336-370MHz，收发间距：8-13MHz）DT14
双工器（频率范围：136-148MHz，收发间距：5MHz）DT15
双工器（频率范围：440-480MHz，收发间距：5MHz）DT16
双工器（频率范围：480-512MHz，收发间距：5MHz）DT17



保险丝 POA33



直流电源线（10A 12AWG）
PWC11



10pin 航空头编程连接线（USB 口）
PC37



DB26 插头数据线（USB 口）
PC40

注意：请使用我司指定的配件。若擅自使用未经许可的配件，则由此所导致的一切后果，由用户自行负责。

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