

## Preface

Welcome to the world of Hytera and thank you for purchasing this product. This manual includes a description of the functions and step-by-step procedures for use. To avoid bodily injury or property loss caused by incorrect operation, please carefully read the *Safety Information Booklet* before use.

This manual is applicable to the following product:

RD106X Digital Repeater (X may represent 2, 5, 6 or 8)

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## 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; 47 CFR § 1.1307, 1.1310 and 2.1091
- American National Standards Institute (ANSI) / Institute of Electrical and Electronic Engineers (IEEE) C95. 1:2005; Canada RSS102 Issue 5 March 2015
- Institute of Electrical and Electronic Engineers (IEEE) C95.1:2005 Edition

## **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.

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: 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.

## **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 10dBi (Outdoor) or 5dBi (Indoor).
- Antenna Installation: install the antenna at least 150cm (Outdoor) or 85cm (Indoor) away from your body, in accordance with the requirements of the antenna manufacturer/supplier.

## **ISED Statement**

This device complies with Innovation, Science and Economic Development Canada Compliance license-exempt RSS standard(s). 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.

Le présent appareil est conforme aux CNR d'ISED 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

## **ISED Radiation Exposure Statement:**

This device must be restricted to work related operations in an Occupational/Controlled RF exposure Environment.

This equipment should be installed and operated with minimum distance 150cm (Outdoor) or 85cm (Indoor) between the antenna & your body.

ISED exposition aux radiations:

Ce dispositif doit être limité aux opérations liées au travail dans un environnement d'exposition RF professionnel/contrôlé.

Cet équipement doit être installé et utilisé avec un minimum de 150cm (extérieur) or 85cm (intérieur) de distance entre le antenne et votre corps.



## **EU Regulatory Conformance**

As certified by the qualified laboratory, the product is in compliance with the essential requirements and other relevant provisions of 2014/53/EU.

Please note that the above information is applicable to EU countries only.

# Documentation Information

## Icon Conventions

Icon	Description
 <b>NOTE</b>	Indicates references that can further describe the related topics.
 <b>CAUTION</b>	Indicates situations that could cause data loss or equipment damage.

## Notational Conventions

Item	Description	Example
<b>Boldface</b>	Denotes menus, tabs, parameter names, window names, dialogue names, and hardware buttons.	To save the configuration, click <b>Apply</b> .
		The <b>Log Level Settings</b> dialogue appears.
		Press the <b>PTT</b> key.
" "	Denotes messages, directories, file names, folder names, and parameter values.	The screen displays "Invalid Battery!".
		Open "PDT_PSS.exe".
		Go to "D:/opt/local".
		In the <b>Port</b> text box, enter "22".
>	Directs you to access a multi-level menu.	Go to <b>File &gt; New</b> .
<i>Italic</i>	Denotes document titles.	For details about using the DWS, refer to <i>Dispatch Workstation User Guide</i> .
Courier New	Denotes commands and their execution results.	To set the IP address, run the following command:  vos-cmd - m name IP

# 1. Packing List

Please unpack carefully and check that you have received the following items. If any item is missing or damaged, please contact your dealer.

Item	Quantity (PCS)	Item	Quantity (PCS)
Repeater	1	Documentation Kit	1
Power Cord	1	/	/

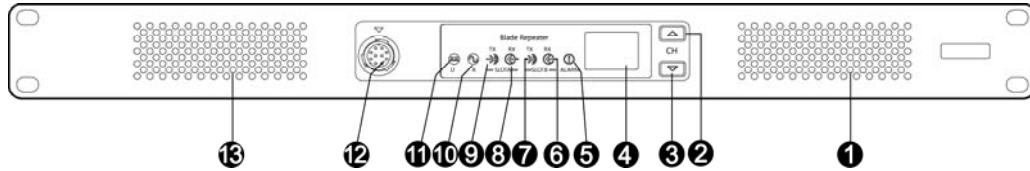
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 **NOTE**

- Figures in this manual are for reference only.
  - Check the main unit label to ensure that the purchased product is correct.
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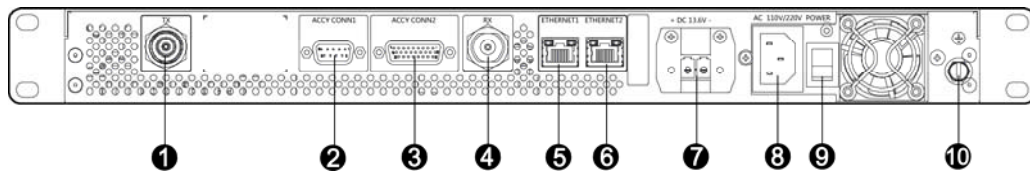
## 2. Product Overview

### 2.1 Front Panel



No.	Part Name	No.	Part Name
1	Air Inlet for PA	8	Timeslot A RX Indicator
2	Channel Up Key	9	Timeslot A TX Indicator
3	Channel Down Key	10	Analog Mode Indicator
4	Seven-segment Display	11	Digital Mode Indicator
5	Alarm Indicator	12	Audio/Programming Connector
6	Timeslot B RX Indicator	13	Air Inlet for Power Supply
7	Timeslot B TX Indicator	/	/

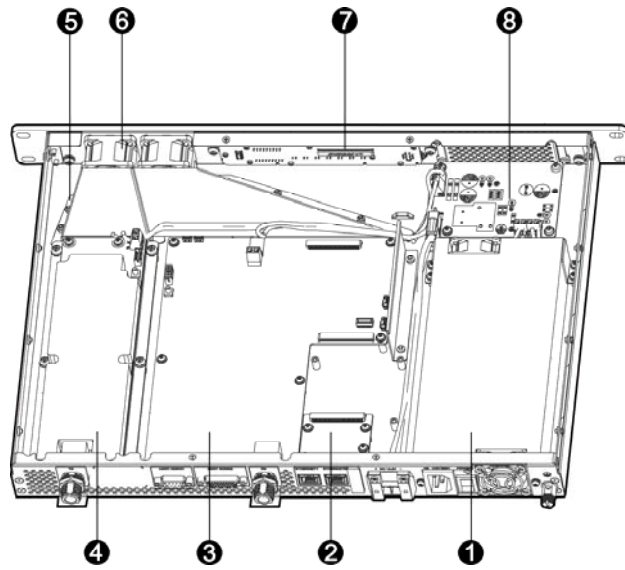
### 2.2 Rear Panel



No.	Part Name	No.	Part Name
1	TX Antenna Connector	6	Ethernet Port 2
2	Monitor/Tuning Interface	7	DC Power Inlet
3	Accessory Jack	8	AC Power Inlet
4	RX Antenna Connector	9	AC Power Switch
5	Ethernet Port 1	10	Ground Screw



## 2.3 Internal Parts



No.	Part Name	No.	Part Name
1	Power Supply Module	5	Wind Scooper
2	Network Board	6	Fan
3	Baseband Module	7	Control Panel
4	PA Module	8	Floating Charge Board

## 3. Installation

To ensure optimum performance and reliability of the repeater, install it properly according to the following instructions.

### 3.1 Installation Requirements

#### Installation Environment

The repeater must be installed in a dry and well-ventilated place. The ambient temperature ranges from -30°C to +60°C, and the relative humidity is 95%.

#### Installation Location

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

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 **NOTE**

For more information, refer to the *Safety Information Booklet*.

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### 3.2 Pre-installation Tasks

#### Preparing the tools

- Phillips screwdriver
- T-10 torx screwdriver
- Spanner
- Anti-static gloves
- Multimeter

#### Checking the power supply

Before installing the repeater, make sure that the power supply meets the following requirements:

- DC power voltage: 13.6±15% V
- AC power voltage: 100~240V

### 3.3 Installation Procedure

To install the repeater, do as follows:

1. Wear the anti-static gloves.
  2. Place the repeater to a proper location.
  3. Connect accessories including the antenna, feed lines, and power cords to the repeater.
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 **NOTE**

The antenna and feed lines need to be purchased separately.

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4. Ground the repeater through the Ground Screw located on the rear panel.

## 3.4 Post-installation Check

To check whether the repeater works properly, do as follows:

1. Turn the repeater on.
2. Observe the LED indicators and the display in the front panel.
  - If the Timeslot A RX indicator glows yellow and the display shows the current channel, the repeater works properly.
  - If the Alarm Indicator glows red and the display shows the alarm code, the repeater does not work properly.

## 4. Basic Operations

### 4.1 Turning the Repeater On or Off

If the repeater is connected to a DC power supply, press the power switch on the DC power supply to turn the repeater on or off.

If the repeater is connected to an AC power supply, press the **AC Power Switch** located in the rear panel to turn the repeater on or off.

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#### CAUTION

Do not touch the metal on the side of the repeater for more than 1 second during normal use.

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### 4.2 Switching the Channel

You can use the **Channel Up** or **Channel Down** key in the front panel to change the channel. After you change the channel, the current channel number appears on the display of the repeater.

To switch to the previous or next channel, press the **Channel Up** or **Channel Down** key.

### 4.3 Checking LED Indications

Indicator	Color	Description
Digital Mode	Blue	The repeater is operating in digital mode.
Analog Mode	Yellow	The repeater is operating in analog mode.
Alarm	Red	The repeater is not working properly.
Timeslot A TX	Red	<ul style="list-style-type: none"><li>● Analog mode: The repeater is transmitting.</li><li>● Digital mode: The repeater is transmitting in timeslot A.</li></ul>
Timeslot A RX	Green	<ul style="list-style-type: none"><li>● Analog mode: The repeater is receiving.</li><li>● Digital mode: The repeater is receiving in timeslot A.</li></ul>
Timeslot B TX	Red	Digital mode: The repeater is transmitting in timeslot B.
Timeslot B RX	Green	Digital mode: The repeater is receiving in timeslot B.

## 5. Alarm Information

With the Alarm feature enabled by your dealer, the repeater can detect alarms. When an error occurs, the display shows the alarm code with the Alarm Indicator on the front panel glowing red.

### 5.1 Low Forward Power Alarm

#### Description

When the forward power is below the preset value, the Alarm Indicator glows red and the display shows the alarm code E8.

Then the repeater may continue or stop the transmission.

#### Solution

Check if the connection between the repeater and RF adapter cable or antenna/feed line is loose or damaged.

- If yes, secure or replace the cable or antenna/feed line.
- If no, contact your local dealer for technical support.

### 5.2 TX/RX Unlock Alarm

#### Description

When the TX PLL or RX PLL is unlocked, the Alarm Indicator glows red and the display shows the alarm code E4 or E5 respectively.

Then certain features of the repeater become unavailable automatically.

#### Solution

Disconnect the power supply, and then open the housing to check if the hardware cable is loose or damaged.

- If yes, secure or replace the cable.
- If no, contact your local dealer for technical support.

## 5.3 Over Temperature Alarm

### Description

When the temperature of the PA module exceeds the upper threshold, the Alarm Indicator glows red and the display shows the alarm code E6.

Then the repeater will stop transmission.

### Solution

1. Check whether the temperature of the PA module surface is over 120 C.
  - If yes, proceed with Step 2.
  - If no, proceed with Step 3.

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 **CAUTION**

Do not touch the surface of the PA module to avoid burn. You can use a digital thermometer with thermocouple to measure the temperature.

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2. Check whether the ambient temperature and ventilation conditions of the repeater satisfy the foregoing installation requirements.
  - If yes, proceed with Step 3.
  - If no, make improvements as soon as possible by mounting air conditioning equipment, improving equipment ventilation, or reducing ambient temperature.
3. Check if the connection between the repeater and RF cable or antenna/feed line is loose or damaged.
  - If yes, secure or replace the cable or antenna/feed line.
  - If no, contact your local dealer for technical support.

## 5.4 Over/Low Voltage Alarm

### Description

When the repeater detects that the voltage inputted by the external power supply is out of the normal range (11.56–15.64 V), the Alarm Indicator glows red and the display shows the alarm code EH (over voltage) or E3 (low voltage).

Then the repeater will automatically stop working.

## Solution

1. Use voltmeter to check whether the DC or AC power voltage is too low or too high.
  - If yes, replace the DC or AC power supply.
  - If no, proceed with Step 2.
2. Check whether the power cord is loose or damaged.
  - If yes, secure or replace the power cord.
  - If no, contact your local dealer for technical support.

## 5.5 Voltage Standing Wave Ratio (VSWR) Alarm

### Description

When the repeater detects the VSWR of the TX antenna for the PA module exceeds the normal value, the Alarm Indicator glows red and the display shows the alarm code E7.

Then the repeater will automatically work at low TX power.

### Solution

1. Check if the TX frequency is within the frequency range of the antenna.
  - If yes, proceed with Step 2.
  - If no, contact your local dealer to replace the antenna.
2. Check if the connection between the repeater and RF adapter cable or antenna/feed line is loose or damaged.
  - If yes, replace the cable or antenna/feed line.
  - If no, contact your local dealer for technical support.

## 6. 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 the repeater cannot communicate with a radio.	The TX/RX frequency of the repeater is inconsistent with that of the radio.	Check if the frequencies are consistent. Reset them when necessary.
	The repeater fails to transit useful signal due to strong interference signal.	Remove or bypass the interference source, or 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 radio 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 the CTCSS/CDCSSs when necessary.
Short communication range or poor audio.	The connection cable is damaged, and the signal energy leaks.	Check the damages, and 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.

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



# 7. Care and Cleaning

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

## 7.1 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 away from substances that can corrode the circuitry.
- Do not place the product in corrosive agents, solutions or water.

## 7.2 Product Cleaning

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Be sure to power off the product before cleaning.

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- 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.

## 8. Optional Accessories

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 **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.

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For more information of the main optional accessories for the repeater, please consult your local dealer.