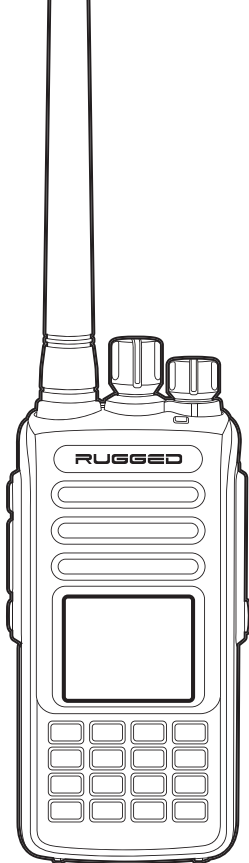# RDH-X

USER MANUAL   VERSION 1.0.1

SAFETY

Safety: This radio generates RF electromagnetic energy during transmit mode. This radio is designed for and classified as "Occupational Use Only," meaning it must be used only during the course of employment by individuals aware of the hazards, and the ways to minimize such hazards. This radio is NOT intended for use by the "General Population" in an uncontrolled environment. This radio has been tested and complies with the FCC RF exposure limits for "Occupational Use Only". In addition, this radio complies with the following Standards and Guidelines with regard to RF energy and electromagnetic energy levels and evaluation of such levels for exposure to humans: FCC OET Bulletin 65 Edition 97-01 Supplement C, Evaluating Compliance with FCC Guidelines for Human Exposure to Radio Frequency Electromagnetic Acids. American National Standards Institute (C95.1-1992), IEEE Standard for Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 kHz to 300 GHz. American National Standards Institute (C95.3-1992), IEEE Recommended Practice for the Measurement of Potentially Hazardous Electromagnetic Fields— RF and Microwave. The following accessories are authorized for use with this product. use of accessories other than those (listed in the instruction) specified may result in RE exposure levels exceed the FCC requirements for wireless RE exposure. To ensure that your exposure to RF electromagnetic energy is within the FCC allowable limits for occupational use, always adhere to the following guidelines: DO NOT operate the radio without a proper antenna attached, as this may damage the radio and may also cause you to exceed FCC RF exposure limits. A proper antenna is the antenna supplied with this radio by the manufacturer or antenna specifically authorized by the manufacturer for use with this radio. DO NOT transmit for more than 50% of total radio use time. Transmitting more than 50% of the time can cause FCC RF exposure compliance requirements to be exceeded. The radio is transmitting when the 'TX indicator' lights up red. You can cause the radio to transmit by pressing the PTT switch. ALWAYS keep the antenna at least 2.5 cm (1 inch) away from the body when transmitting and only use the provided belt-clip to ensure FCC RF exposure compliance requirements are not exceeded. To provide the recipients of your transmission the best sound quality, hold the antenna at least 5 cm (2 inches) from your mouth, and slightly off to one side. The information outlined in this manual provides the user with the information needed to make him or her aware of RF exposure and what to do in order to assure this radio is operated safely within the FCC exposure limits.

Electromagnetic Interference/Compatibility During Transmission: Your radio generates RF energy that can possibly cause interference with other devices or systems. To avoid such interference, turn off the radio in areas where signs are posted to do so. DO NOT operate the transmitter in areas that are sensitive to electromagnetic radiation such as hospitals, aircraft, and blasting sites.

Occupational/Controlled Use: The radio transmitter is used in situations in which persons are exposed as consequence of their employment provided those persons are fully aware of the potential for exposure and can exercise control over their exposure.

rt SYSTEMS

To program your radio and to access advanced features, visit

rtsystemsinc.com

or contact them at 800-921-4834

CONTENTS

USER SAFETY INFORMATION

- Please read the following brief instructions, non-compliance with these rules may cause danger or violate the law.
- Obey the local government regulation before using this radio, improper use may violate the law and be punishable.
- Turn off the radio before entering flammable or explosive areas.
- Do not charge or change the battery in flammable or explosive areas.
- Turn off the radio before getting close to the blasting zone or detonator areas.
- Do not use radio whose antenna is damaged, touching of damaged antenna will cause heat injury.
- Do not attempt to open the radio; any maintenance work should be done by a technical expert only.
- To avoid troubles caused by electromagnetic interference or electromagnetic compatibility, please turn off the radio in places where the banner displays "Do not use wireless equipment", such as hospitals and other healthcare locations.
- In vehicles, do not put the radio within the area of airbag deployment.
- Do not store the radio in direct sunlight or in hot areas.
- When you transmit with the radio, keep away from its antenna at least 5cm.
- If the radio appears defective or starts to smoke, please shut off its power immediately and contact your local dealer.
- Do not transmit too long, for the radio may heat and cause injury.

PACKAGE INCLUDES

Please check if there is any damage to the package when you receive it. Carefully unpack the transceiver. We recommend that you check the items listed in the following table. If any items are missing or damaged during shipment, please contact with your local dealer immediately.

- RDH-X handheld radio
- Antenna
- Long range antenna
- Rechargeable Li-ion Battery
- Charging Cradle
- Belt Clip

CHARGING YOUR BATTERY PACK

CHARGING PREPARATION

Precaution: The supplied battery pack of this radio is a high-performance Li-ion with 7.4V standard voltage 2200mAh high capacity in a very compact package. Under normal use, the battery pack may be used for approximately 500 charge cycles and more, after which operating time maybe expected to decrease. If you have an old battery pack which is displaying capacity which has become diminished, you should replace the pack with a new one.

- Do not short-circuit the battery terminals or expose to fire. Do not disassemble the battery.
- Charge the battery between 32°F and 113°F. The battery cannot normally be charged beyond this temperature range.
- Turn off the transceiver when you charge it. Transmitting with the transceiver in charge will affect its normal charge.
- Do not unplug the Power Adapter or battery when it is charging.
- If the battery does not last its normal charge, it means that the battery is depleted, change the battery pack.
- Do not charge when the battery or the radio is wet. Dry it with a cloth and wait for it to be fully dry before charging to avoid any danger.

Warning: When the conductive metals such as jewelry, keys, or decorative chains touch the battery terminals, all the batteries are likely to cause damage to the items or personal injury. These conductive metals may form a short circuit and generate heat. Handle the battery carefully, especially when placed in a pocket or metallic container.

CHARGING YOUR BATTERY PACK

CHARGING OPERATION

After installing the battery pack, if the battery icon shows [   ], it means that the battery pack is out of power. Please charge it.

Charging indicator light conditions:

Indicator Display	Status
Red	Charging
Green	Completed

Battery Tips

- The battery is not fully charged at the factory, please charge it before using it.
- Charge and discharge the battery two or three times, the battery capacity will reach the best condition. When the battery capacity is low, please charge or change the battery.
- If the battery lasts a short time, even if it is fully charged, the battery is depleted, please contact your local dealer to buy a new battery.

ACCESSORIES CONNECTIONS

BATTERY PACK

1. Align the battery to the radio starting at the top of the radio, ensure the notches in the battery are seated into the radio.
2. Firmly push the battery in place.
3. Latch the battery clip on the radio to the battery until it snaps in place.
4. To ensure a watertight connection, make sure there are no gaps between the battery and the body of the radio.

CORRECT

INCORRECT

ACCESSORIES CONNECTIONS

BELT CLIP

Align the two holes of belt clip and the two holes of the radios, fix them with the supplied M2.5x5 screws. Loosen the screw set to remove belt clip.

EXTERNAL MICROPHONE/SPEAKER

Unscrew the bolt to the cover of the microphone/speaker jack using a flathead screwdriver and insert the microphone/speaker plugs into the jack.

- Using the external headset or mic/speaker will affect the water-tightness performance of radio.

- When reinstalling the cover of the microphone/speaker jack, make sure to tighten down the bolt sufficiently to ensure a water-tight seal.

GETTING ACQUAINTED

FRONT PANEL OPERATION

DUAL BAND ANTENNA

INDICATOR LIGHT

CHANNEL SELECTION KNOB

ON/OFF VOLUME KNOB

RUGGED

LED DISPLAY

UP/BANK SELECT

DOWN/BANK SELECT

MENU

BACK/EXIT

LOCK

NUMBER/TEXT KEYS
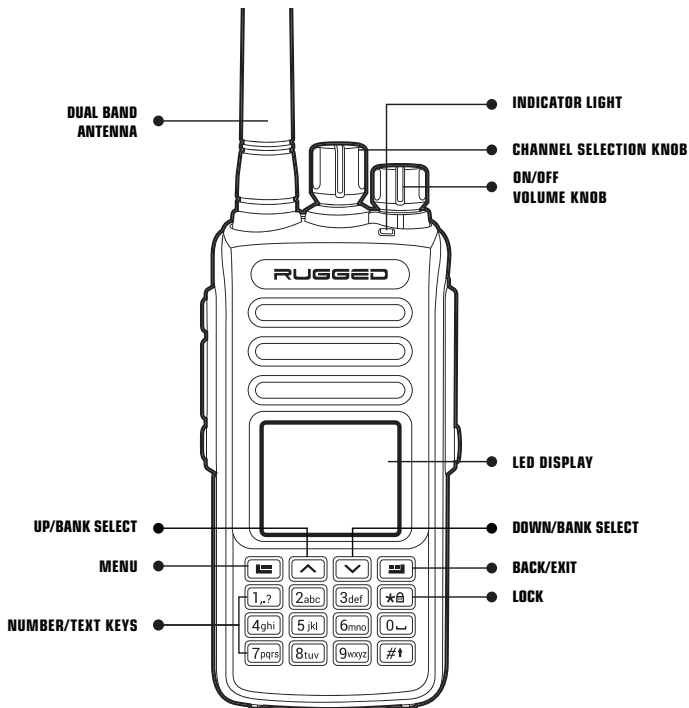
GETTING ACQUAINTED

SIDE PANEL OPERATION

DUAL BAND
ANTENNA

VOLUME
ON/OFF

PROGRAMMABLE BUTTOM
(REQUIRES SOFTWARE)

ACCESSORY
PORT

PUSH-TO-TALK

MONITOR

BELT CLIP

RECHARGEABLE
LITHIUM ION
BATTERY

PTT

SP

MIC

M
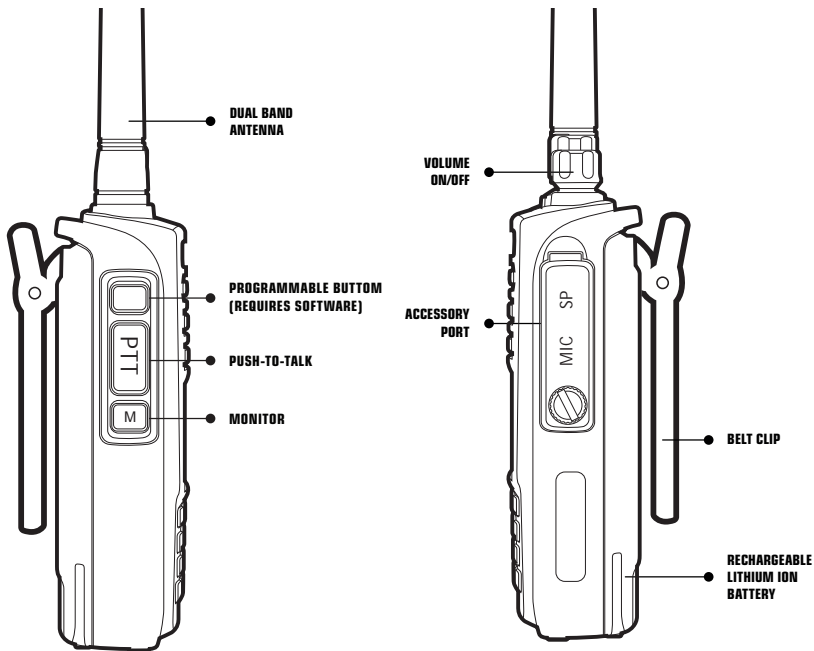
GETTING ACQUAINTED

OPERATION

Key	Function
Indicator Light	Illuminates while transmitting.
Channel Selection Knob	Turn to change channels.
On/Off Volume Knob	Turn to turn radio On/Off and control volume.
Up/Bank Select	Press to select first banked channel. When in menu press to scroll up.
Down/Bank Select	Press to select second banked channel. When in menu press to scroll down.
Menu	Press to enter menu. When in menu press to confirm.
Back/Exit	When in menu press to go back menu items.
Number/ Text Keys	Press the numbers of a channel in your channel list to short-cut to that channel. When composing a text, press the keys to select desired letters.
Programmable Button	Can be designated a function using programming software available from RT Systems.
Push-to-Talk	Press and hold to transmit and release it to receive after your transmission is completed.
Monitor	Press and hold to temporarily change the squelch to zero allowing you to hear very weak signals.
Accessory Port	The jack provides connection points for microphone audio, earphone audio, speaker and program cable.

GETTING ACQUAINTED
MENU

Menu Item	Function	Operation
Scan	Scan for signals in every channel in the current zone.	Press [≡] to open menu. Use [∧∨] to scroll to SCAN and press [≡] to accept. Press [≡] to select Turn On. To exit scan, press [≡] to open settings menu. Use [∧∨] to scroll to SCAN and press [≡] to accept. Press [≡] to select Turn Off.
Zone Selection	Select your active zone.	Press [≡] to open menu. Use [∧∨] to scroll to Zone and press [≡] to accept. Use [∧∨] to scroll to desired zone and press [≡] to accept.
Messages (Only Shown When Selected Zone is Digital)	Send, receive, and manage text messages.	Press [≡] to open menu. Use [∧∨] to scroll to Messages and press [≡] to accept
Call Log (Only Shown When Selected Zone is Digital)	Access and manage the call record.	Press [≡] to open settings menu. Use [∧∨] to scroll to Call Log and press [≡] to accept.

GETTING ACQUAINTED

MENU

Menu Item	Function	Operation
Utilities	Access Radio Settings and Radio Info.	Press [⊑] to open settings menu. Use [∧ ∨] to scroll to Utilities and press [⊑] to accept. Use [∧ ∨] to scroll to Radio Settings, for settings, or Radio Info, for firmware information. Press [⊑] to accept.

GETTING ACQUAINTED

MESSAGES EXPANDED

Menu Item	Function	Operation
Inbox	All received text messages will be stored here.	When in the Messages menu, use [∧∨] to scroll to Inbox and press [▭] to accept.
Write	Write and send text messages.	When in the Messages menu, use [∧∨] to scroll to Write and press [▭] to accept. Use the keypad to select your symbols or letters. Use [∧] to move the cursor back through text. Use [▭] to backspace. Review the drafted text message then press [▭] to accept. Use [∧∨] to select Send, Save, or Clear then press [▭] to accept.

GETTING ACQUAINTED

MESSAGES EXPANDED

Menu Item	Function	Operation
Quick Text	Choose from preprogrammed text messages to send or send your own programmed quick texts.*	When in the Messages menu, use [∧∨] to scroll to Quick Text and press [▬] to accept. Use the [∧∨] to scroll to the desired, preprogramed text message and press [▬] to accept. Review the selected text message then press [▬] to accept. Use the [∧∨] to select Send, Save, or Clear then press [▬] to accept.
Sent Items	All sent text messages will be stored here.	When in the Messages menu, use [∧∨] to scroll to Sent Items and press [▬] to accept.
Drafts	All text messages saved as draft will be stored here.	When in the Messages menu, use [∧∨] to scroll to Drafts and press [▬] to accept.

*Enabled via software available from RT Systems.

GETTING ACQUAINTED

CALL LOG EXPANDED

Menu Item	Function	Operation
Record	When receiving or transmitting in a digital zone this feature will keep a record of all transmissions from the radio and transmissions received by the radio. You can toggle this feature on and off in Radio Settings.	From the Call Log menu, press [▭] to open the Directory. All radio transmissions will be stored here organized by date and time. Use [∧∨] to scroll to the desired day and press [▭] to enter. When in the Record use [∧∨] to scroll to Play, Destination ID, Source ID, Date, Time, Tx/Rx, or RecordTime and press [▭] to enter.

GETTING ACQUAINTED

SETTINGS EXPANDED

Menu Item	Function	Operation
Tones/Alerts	Enable or disable Tones/Alerts.	When in the Settings menu, use [∧∨] to scroll to Tones/Alerts and press [≡] to accept. Use [∧∨] to scroll to All Tones, Talk Permit, or Keypad Tones. All Tones: Enable or disable all radio tones and prompts. Talk Permit: Enable or disable the "Talk Permit" tone, heard after pressing the PTT, to indicate permission to talk. Keypad Tones: Enable or disable tones while using the number keypad.
Backlight	Select the desired Backlight timing.	When in the Settings menu, use [∧∨] to scroll to Backlight and press [≡] to accept. Use [∧∨] to select the desired Backlight timing and press [≡] to accept.

GETTING ACQUAINTED

SETTINGS EXPANDED

Menu Item	Function	Operation
Squelch	Squelch system allows you to mute the background noise when no signal is being received. Not only is the Squelch system "standby" operation more pleasant, it also significantly reduces battery current consumption.	When in the Settings menu, use [∧∨] to scroll to Squelch and press [▬] to accept. Use [∧∨] to scroll to the desired Squelch level and press [▬] to accept.
Auto Lock	Choose whether to lock the radio keypad manually or automatically.	When in the Settings menu, use [∧∨] to scroll to Auto Lock and press [▬] to accept. Use [∧∨] to select: Manual, 5S, 10S, or 15S and press [▬] to accept.
LED Indicator	Toggle the LED indicator light on or off.	When in the Settings menu, use [∧∨] to scroll to LED Indicator and press [▬] to accept. Use [∧∨] to select the desired setting andand press [▬] to accept.

GETTING ACQUAINTED

SETTINGS EXPANDED

Menu Item	Function	Operation
Record	Toggle the Record feature on or off.	When in the Settings menu, use [∧∨] to scroll to Record and press [⬛] to accept. Use [∧∨] to select the desired setting and press [⬛] to accept.
Clock	Set the date and time.	When in the Settings menu, use [∧∨] to scroll to Clock and press [⬛] to accept. Scroll to choose Time, Date, or Timezone and press [⬛] to accept. Press [⬛] to edit the desired setting. Use [∧∨] to scroll through digits and use the numbered keypad to edit selected digit. Press [⬛] to save setting.
Voice Announcement	Toggle the Voice Announcement feature on or off. Voice Announcement will announce which number channel you have selected when turning the Channel Knob.	When in the Settings menu, use [∧∨] to scroll to Voice Announcement and press [⬛] to accept. Use [∧∨] to select the desired setting andand press [⬛] to accept.

GETTING ACQUAINTED

SETTINGS EXPANDED

Menu Item	Function	Operation
Menu Timeout	Adjust the Menu Timeout setting.	When in the Settings menu, use [∧∨] to scroll to Menu Timeout and press [⬛] to accept. Use [∧∨] to select the desired setting and press [⬛] to accept.
Dual Monitor	Dual Monitor will allow you to monitor two channels at once.	When in the Settings menu, use [∧∨] to scroll to Dual Monitor and press [⬛] to accept. Use [∧∨] to select Turn On or Turn Off then press [⬛] to accept.
Lock Function	Choose to lock the full keypad or keep the Push-to-Talk button active when keypad lock is activated.	When in the Settings menu, use [∧∨] to scroll to Lock Function and press [⬛] to accept. Use [∧∨] to select Full Keypad or PTT Active then press [⬛] to accept.
Monitor	Monitor will temporarily change the squelch to zero allowing you to hear very weak signals.	When in the Settings menu, use [∧∨] to scroll to Monitor and press [⬛] to accept. Use [∧∨] to select Turn On or Turn Off then press [⬛] to accept.

SPECIFICATIONS

GENERAL

Frequency Range	136-174 & 400-480MHz
Channel	3000 Channels
Frequency Stability	+ 1ppm
Operating Temperature	-10°C ~+40°C
Operating Voltage	7.4V DC
Dimensions	131mm x 61mm x 36mm
Weight	258g (with battery)
Battery Type	Lithium Ion
Battery Capacity	2200mAh
Antenna Impedence	50Ω
Audio Output Power	≤1000mW @ 16
Channel Spacing	12.5KHz

SPECIFICATIONS

TRANSMITTER

Output Power	High: ≤ 5W Low: ≤1W
Frequency Stability	+-1.0PPM
Adjacent Channel Power	≤ -60dB
Free Time Slot Power	TDMA: ≤ 57dBm
Hum and Noise	-40dB @ 12.5KHz
Spurious Radiation	Antenna: 9KHz-1 GHz ≤ -36dBm 1GHz - 12.75GHz ≤ -30dBm
FM Modulation Mode	12.SKHz: 11 KOF3E 25 KHz: 16KOF3E
4FSK Digital Mode	7K60FXD@12.5KHz (Data only) 7K60FXE@12.5KHz (Data +Voice)
Modulation Maximum Deviation	2.5KHz@12.5KHz
Nonactive Slot Power	-57dBm
Digital Protocol	ETSI TS 102 361-1 -2 -3
Vocoder Type	AMBE+2TM
Audio Response	+1dB~-3dB
Modulation BER(Bit Error Rate)	≤5%

SPECIFICATIONS

RECEIVER

Analog Sensibility	0.2μV (12dB SINAD)
Digital Sensibility	0.25μV (BER:5%)
Adjacent Channel Selectivity	≤60dB @ 12.5KHz
Intermodulation	≤60dB
Spurious Response	≥-70dB
Audio Response	+1~-3dB
Rated Audio Power	1W
Rated Audio Distortion	≤5%
FM Noise	≥ 45dB@25KHz /≥4QdB@12.5KHz

NOTES

rugged radios

WWW.RUGGEDRADIOS.COM