



Qixiang Electron Science& Technology Co., Ltd.
www.anytone.net

AnyTone[®]

AT-D890UV

Multi-Protocol Digital+Analog Handheld Radio

Operating Manual



DMR
DIGITAL MOBILE RADIO ASSOCIATION

THANK YOU!

Thank you very much for choosing our *AnyTone* Multi-Protocol Digital +Analog Handheld Radio

This radio adopts the latest advances in technology, providing reliable communication in today's demanding communication environment.

This radio offers both digital and analog communication, introduces innovative digital processing system to achieve SMS, high-audio quality and digital encryption. It offers great stability, and reliability, together with long-distance communication as well as fashionable design and compact exterior lines. AT-D890UV has Text Messaging, Recording, Voice Message, Digital Encryption, Emergency Alarm, Man Down Alarm, Work Alone GPS, APRS Location Reporting, Roaming, Vibration, Analog DTMF, 2TONE, 5TONE, CTCSS/DCS encode/decode functions.



» **When programming the radio, start by reading the factory software data, and then rewrite this data with your frequency etc., to a new saved code plug, otherwise errors may occur.**

» **You can use the programming cable with a PC to program the frequency, channel type, power etc. Your programming must comply with your FCC (or other country) license certification.**

CONTENTS

1.UNPACKING AND CHECKING THE EQUIPMENT.....	1
1.1 Supplied Accessories.....	1
1.2 Standard Accessories	2
1.3 Optional Accessories	2
2.BATTERY INFORMATION	3
2.1 Charging the Battery Pack.....	3
2.2 Charger Supplied.....	3
2.3 Use Caution with the Li-ion Battery	3
2.4 How to Charge.....	4
2.5 Charging Stand Indicator	5
2.6 How to Store the Battery.....	5
3. PREPARATION	6
3.1 Installing / Removing the Battery	6
3.2 Installing / Removing the Antenna	6
3.3 Installing / Removing the Belt Clip	7
3.4 Installing the Additional Speaker/Microphone (Optional)	7
4. Radio Overview.....	8
4.1 LCD.....	9
4.2 Status Indications	9
4.3 Programmed Key.....	10
4.4 Hot Key Setting for PF1, PF2, PF3, P1, P2	13
4.5 Combination Key Function.....	13
5.BASIC OPERATIONS.....	14
5.1 Power on the Radio	14
5.2 Adjust Volume	14
5.3 Main band/Sub band switch.....	14
5.4 VFO/Channel switch	14
5.5 Set up VFO frequency	14
5.6 Select a Channel	14
5.7 Receiving and Responding to a Radio Call	15
5.8 Making a Call	15
5.9 Monitor	16

5.10 Emergency Alarm	16
5.11 Man Down Alarm.....	16
5.12 Battery Voltage Test.....	16
6. ADVANCED FEATURES	17
6.1 Access Advanced Features for Private Call.....	17
6.2 Set up Advanced Features for Private Call.....	17
7. MAIN MENU FUNCTIONS.....	19
7.1 Talk Group	19
7.2 SMS	19
7.3 Call Log.....	19
7.4 Zone.....	19
7.5 Scan.....	20
7.6 Roaming	20
7.7 Settings.....	21
7.7.1 Radio Set.....	21
7.7.2 Chan Set.....	30
7.7.3 Device Info.....	37
7.8 Record	37
7.9 GPS Positioning Function(Optional with installed GPS).....	37
7.10 Satellite	39
7.11 Digital Monitor	39
7.12 APRS Location Reporting(Supported by GPS).....	40
7.13 NOAA weather Alert (for US only).....	42
8.RESET.....	43
9.TROUBLE SHOOTING GUIDE.....	44
10.PROGRAMMING GUIDE	45
11.ON-LINE SERVICE AND SUPPORT	47
SAFETY	48
EU DECLARATION OF CONFORMITY	50
12.TECHNICAL SPECIFICATIONS.....	51

1. UNPACKING AND CHECKING THE EQUIPMENT

Unpack the radio carefully. We recommend that you identify the items listed in the following table before discarding the packing materials. If any items are missing or have been damaged during shipment, please contact the carrier or the dealers immediately.

1.1 Supplied Accessories

Item	Quantity
Antenna	1
Li-ion Battery Pack	1
Battery Charger	1
AC Adaptor	1
TYPE-C cable	1
Belt Clip	1
Hand Strap	1
Instruction Manual	1

1. UNPACKING AND CHECKING THE EQUIPMENT

1.2 Standard Accessories



Antenna*1



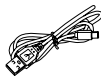
Li-ion Battery Pack



Charger



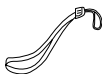
AC Adaptor



TYPE-C
cable



Belt Clip



Wrist strap



Instruction Manual

*** Note:** For frequency band of antenna, please refer to label indicated in the bottom of the antenna.

*** Note:** Car Charger and QBC-47L Charger should be used together.

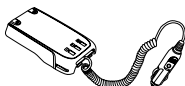
1.3 Optional Accessories



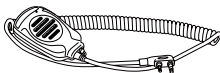
Earphone
EJX-023



BT wireless PTT
BP-03



Battery Eliminator
CPL-02



Speaker Microphone
QHM-024



Leather Case
PT-878

2. BATTERY INFORMATION

2.1 Charging the Battery Pack

To comply with the regulatory requirements released by the International Civil Aviation Organization (ICAO), the lithium-ion batteries packed with the products have a 30% or less state-of-charge before offering the product for air transportation.

There is a label on battery to indicate the produce date. The battery should be charged within 6 months from the produce date. If the battery capacity is too low, it will lead to the battery going dead and can't be charged to normal voltage any more.

Charging the battery pack for the first time after purchase or extended storage (more than 2 months) may not bring the battery pack to its normal maximum operating capacity. Best operation will require fully charging/discharging the battery two or three times before the operating capacity will reach its best performance. The battery pack life may be depleted when its operating time decreases even though it has been fully and correctly charged. If this is the case, replace the battery pack.

2.2 Charger Supplied

Please use the supplied charger provided by AnyTone. Other models may cause an explosion and personal injury. After installing the battery pack, and if the radio displays low battery with a red flashing lamp or voice prompt, please charge the battery.

2.3 Use Caution with the Li-ion Battery

- a.** Do not short the battery terminals or throw the battery into a fire. Never attempt to remove the casing from the battery pack, as AnyTone cannot be held responsible for any accident caused by modifying the battery.
- b.** The ambient temperature should be between 5°C-40°C (40°F - 105°F) while charging the battery. Charging outside this range may not fully charge the battery.
- c.** Please turn off the radio before inserting it into the charger. It may otherwise interfere with correct charging.
- d.** To avoid interfering with the charging cycle, please do not cut off the power or remove the battery during charging until the green light is on.

2. BATTERY INFORMATION

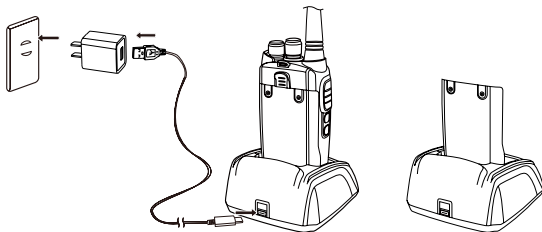
- e. Do not recharge the battery pack if it is fully charged. This may shorten the life of the battery pack or damage the battery pack.
- f. Do not charge the battery or the radio if it is damp. Dry it before charging to avoid damage.

WARNING:

» **When keys, ornamental chain or other electric metals contact the battery terminal, the battery may become damaged or injure a human. If the battery terminals are short circuited it will generate a lot of heat. Take care when carrying and using the battery. Remember to put the battery or radio into an insulated container. Do not put it into a metal container.**

2.4 How to Charge

- a. Connect the power adapter and base charger through a TYPE-C data cable.
- b. Insert the power adapter into the AC socket, and the green indicator light on the charging set will light up.
- c. Place the battery into the charger, ensuring that the battery terminals are in good contact with the charger. The red indicator light on the charger will light up, indicating that it is charging.
- d. When the indicator light changes from red to green, it indicates that the battery is fully charged.



 » **If the walkie talkie is charged with a battery in the charging dock, please turn off the walkie talkie, otherwise the charger may not indicate full charge.**

2. BATTERY INFORMATION

2.5 Charging Stand Indicator

STATUS	LED
Waiting(No Battery)	Green Light
Charging	Red Light
Fully Charged	Green Light



NOTE

» **Trouble means battery is too warm, battery is short-circuited or charger is short-circuited.**

2.6 How to Store the Battery

- a.** If the battery needs to be stored, keep it 80% discharged.
- b.** It should be kept in low temperature and dry environment.
- c.** Keep it away from hot places and direct sunlight.



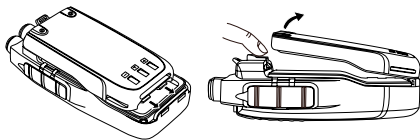
NOTE

- » **Do not short circuit the battery terminals.**
- » **Never attempt to remove the casing from the battery pack.**
- » **Never store the battery in unsafe surroundings, as a short may cause an explosion.**
- » **Do not put the battery in a hot environment or throw it into a fire, as it may cause an explosion.**

3. PREPARATION

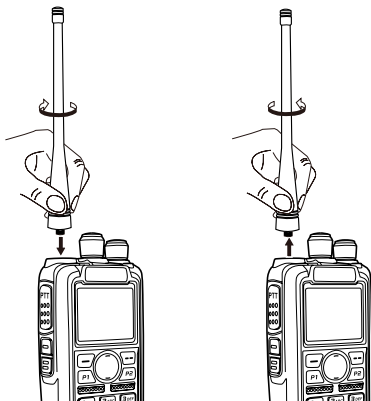
3.1 Installing / Removing the Battery

- a.** Match the two bottom grooves of the battery pack with the corresponding guides on the back of the radio and then push it.
- b.** To remove the battery pack, slide the release latch at the top away from the battery and remove the pack away from the transceiver.



3.2 Installing / Removing the Antenna

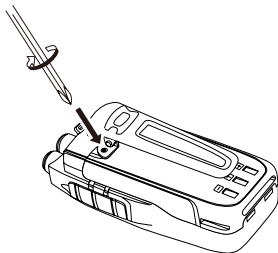
- a.** Installing the Antenna: Screw the antenna into the connector on the top of the transceiver by holding the antenna at its base and turning it clockwise until secure.
- b.** Removing the Antenna: Turn the antenna counter-clockwise to remove it.



3. PREPARATION

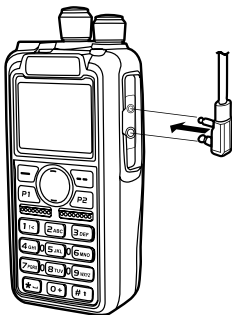
3.3 Installing / Removing the Belt Clip

- a. Installing the Belt Clip: Place the belt clip above the corresponding holes on the back of the radio, and screw it into place clockwise with the two supplied screws.
- b. Removing the Belt Clip: Unscrew counter-clockwise to remove the belt clip.

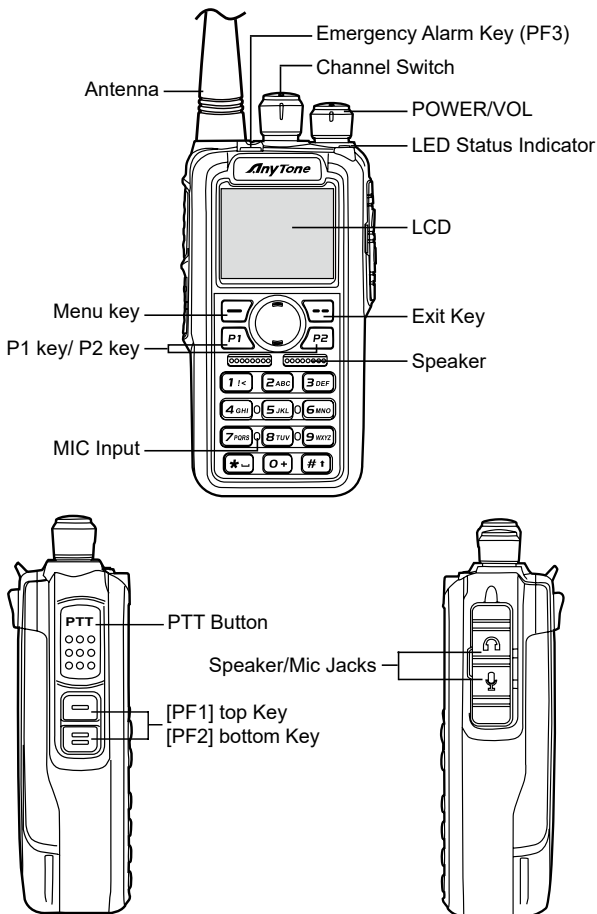


3.4 Installing the Additional Speaker/Microphone (Optional)

Pry open the rubber MIC-Headset jack cover and then insert the Speaker / Microphone plug into the double jack.

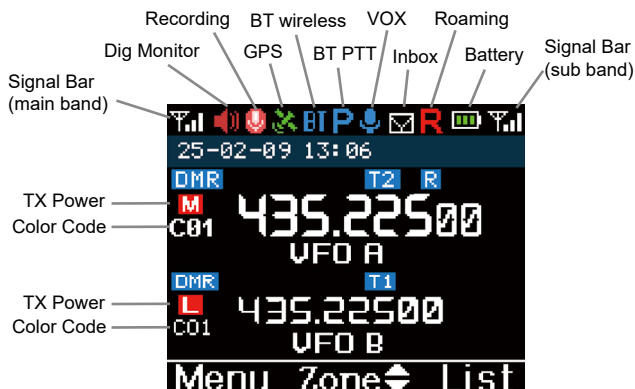


4. RADIO OVERVIEW



4. RADIO OVERVIEW

4.1 LCD



4.2 Status Indications

The top LED will help you to identify the current radio status.

LED Indication	Status
Flashes Red	Low battery voltage
Constant Red	Transmitting
Constant Green	Analog Receiving
Constant Cyan	Digital Receiving
Flashes Green	Scan

4. RADIO OVERVIEW

4.3 Programmed Key

It is possible to set different functions for [PF1], [PF2], [PF3], **[P1]**, **[P2]** keys.

Method 1: In radio Menu - Settings - Radio Set - Key - PF1, PF2, PF3, P1, P2.

Method 2: In PC software - Public - Optional Setting - Key function.

OFF	No Function
Volt	Check the current battery capacity voltage
Tx Power	Switch the power between high and low power.
Talk Around	Switch between Talk Around and Repeater mode
Reverse	Turn on/off the frequency reverse function.
Digi Encrypt	Choose the digital encryption group for digital channel
Call	In Analog mode, send the DTMF/5TONE/2TONE encode. This function is only valid for analog channel.
VOX	Set up the VOX level
VFO / MR	Switch between VFO mode and memory channel mode.
Sub PTT	Sub channel PTT, press to start the call on sub channel (NOTE: On PF1 - PF2 - PF3 Keys Only)
Scan	Press the key to start or stop scanning the channels in scan list.
FM/AM Air	Turn on or off the FM radio and AM air band receiving
Alarm	Long press the key to start alarm, short press again to exit the alarm.
Record Switch	Enable/disable the recording function
Record	Start/stop recording. When stop recording, the radio will remind repeat or send the record.
SMS	In digital mode, press to enter into SMS messages
Dial	Start the manually dial
GPS Info	Check the GPS position information
Monitor	Monitor the weak signal or the signal with unmatched ID.
Main CH Switch	Choose channel A or channel B as the main channel

4. RADIO OVERVIEW

Hot Key 1~6	Selects Hot Keys 1-6 Note: Hot key setup details on next page
Work Alone	Turn on/off the work alone function.
Nuisance Delete	During scanning, press the key to skip the unwanted channel
Digi Monitor	In DMR mode, press the key to turn on/off digital monitor
Sub CH Hide	Turn on/ off the sub channel
Prior Zone	Switch to Priority Zone
VFO Scan	Press the key to start or stop the VFO scan. The VFO scan start and end frequency should be set in CPS -Optional Setting - VFO Scan.
Enhance Sound	In digital channel, switch the microphone tone to normal or enhanced mode.
LastCall Reply	In digital channel, press the key to access the last call and press PTT to call back.
Switch ChType	Switch the channel type(Analog, Digital, Ana+Dgi, Dgi+Ana)
Ranging	When the radio receives a call and the suspension time is on, press the key programmed as "Ranging" to obtain the caller's position and distance. (Both party need GPS position, or you will receive only GPS information)
Roaming	In standby, press the key programmed as "Roaming" to search and lock on the repeater with strongest signal. (Note: After lock on a repeater, the radio will return to last frequency only after channel or frequency is changed. The repeater frequency list must be pre-programmed in the CPS.)
Channel Ranging	In standby, if the call contact type for a channel is "Private call" , press the key programmed as "Channel Ranging" to turn on this function. The radio will automatically start the ranging function when turn to this channel.
Max VOL Set	In standby, press the key programmed as "Max Volume", will enable users to set the maximum RX volume.
Slot Set	Choose Slot for current channel, this function is only valid in repeater mode.
APRS Type	Choose APRS Type for current channel.
Zone Select	In standby, press the programmed "Zone Select" key. It will allow you input the zone number and then press confirm key will switch to the zone.
Roaming Set	Sets the Roaming Function
APRS Set	Sets the APRS Function
FixedTime Mute	Press the key to mute the radio in set time. The mute timing should be set in CPS -Optional Setting - Other -Mute Timing.

4. RADIO OVERVIEW

CTC/DCS Set	Set the CTCSS/DCS for an analog channel
TBST Send	Send the TBST Tone
Bluetooth	Enable / disable the bluetooth function
GPS	Enable / disable the GPS function
Ch. Name	Switch between channel name display and frequency display for the current channel
CDT Scan	Enable / disable the CTCSS/DCS scanning for the analog channel. When the radio finds matched CTCSS/DCS for current channel, it will open the speaker and start receiving. Only the analog channels with CTCSS/DCS signalling is able to start the CDT scanning.
ARPS Send	Manually transmit the APRS at the current channel.
Ana APRS Info	Fast access to the APRS->Ana APRS Info menu.
GPS Roaming	Turn on or turn off GPS roaming.
DIM Shut	This function allows you turn off the radio display and indicator light completely, without affecting the TX and RX.
Predicting	Fast access to the Satellite predicting function.
Sq Level	Set the squelch level for analog channel.
WX Alarm	Turn on or turn off the weather alert function.
CH Set	Fast access to the channel setting menu.
RX NrFilter	Turn on or turn off the noise reduction for receiving audio.
TX NrFilter	Turn on or turn off the noise reduction for transmitting audio.
Repeater	Enable/disable the cross band repeater funtion. (Analog-Digital or Digital-Analog U-V or V-U repeater)
Freq Sync	Turn on or turn off the Freq Sync function, when the radio receives an analog signal, it will match with the RX frequency and the radio can communicate at the frequency.

4. RADIO OVERVIEW

4.4 Hot Key Setting for PF1, PF2, PF3, P1, P2

Enter radio Menu-Settings-Radio Set-PF1, PF2,PF3,P1,P2,sub menu. Users can choose settings for Hot Keys 1-6.

Hot Key function details must be setup in PC software – Public - Hot key.

Call	Analog	Should edit the analog quick call first, then choose analog in the hot key set. Press the key to transmit 2Tone/5Tone/DTMF to start the analog quick call.
	Digital	It allows to select a contact from the digital contact list, press the key to switch the channel to the contact temporary. It will switch back to the original contact after the group/personal call hold time.
Menu	SMS	Quick access to Messages in the menu
	New Msg	Quick access to New Msg in the Menu - Messages
	Hot Text	Quick access to Quick Text in the Menu - Messages
	Received SMS	Quick access to Inbox in the Menu - Messages
	Send SMS	Quick access to Out box in the Menu - Messages
	Contact list	Quick access to Contact list in the Menu - Contacts
	Manual dial	Quick access to Manual Dial in the Menu - Contacts
	Call Log	Quick access to Call Log in the Menu
	Dialed Calls	Quick access to Dialed Calls in the Menu - Call Log
	Received Calls	Quick access to Answered Calls in the Menu - Call Log
	Missed Calls	Quick access to Missed Calls in the Menu - Call Log
	Zone	Quick access to Zone in the Menu
	Radio set	Quick access to Radio Set in the Menu - Settings

4.5 Combination Key Function

 + number key operation:

Press  key and hold until the LCD display “Next Please Press Dial Key”, press the number key, it will perform the programmed function.

Combination key function shall be setup in PC software-Public-Hot key.

5. BASIC OPERATIONS

5.1 Power on the Radio

Turn on the radio by turning the [Power/Volume] switch clockwise till a click is heard, and the LCD displays will show a start-up message, and you will hear a beep after 7 seconds.

5.2 Adjust Volume

Rotate the [Power/Volume] knob to adjust the volume. Turn clockwise to increase the volume and counterclockwise to decrease the volume. The LCD display will show the volume status during an adjustment.

In CPS-Optional Setting-Volume/Audio, there are two options, Power-on Volume Type and Power-on Volume.

When the Power-on Volume Type sets to Preset, you can set a Power-on Volume, and the radio will start up with a fixed volume instead of the volume level corresponding to the volume knob. When the volume knob is turned, the radio will return to normal working mode, the volume level is corresponding to the volume knob.

5.3 Main Band/Sub Band Switch

Press the **[P1]** key to switch the main channel to the other channel if there is 2 channels shown on the display. The channel with bold characters is the main channel.

5.4 VFO/Channel Switch

Press the **[P2]** key to switch between VFO and channel display.

5.5 Set Up VFO Frequency

Turn the radio to VFO mode **[P2]**, then press the **[P1]** key to switch to the main band, the VFO frequency can only be set up when the channel is in the main “bold text” channel.

Operation 1: Input the VFO frequency directly from the keyboard.

Operation 2: Turn the channel selector to adjust the VFO frequency steps.

5.6 Select a Channel

Press **[P2]** key to switch the radio between VFO and Channel mode, **select Channel mode.**

Operation 1: Turn the channel switch to select a channel.

Operation 2: Input the channel numbers from the keyboard. For example, if you want switch to channel 99, input 0+0+9+9 a total of 4 digits, and it will switch to channel 99.

5. BASIC OPERATIONS

A channel can either be Analog or Digital.

For the analog channels the Push-To-Talk button is always available, and on the Digital Channels the parameters can be set up by the users / system operators by individual channel to allow talk permit.

There are four possible settings that can be selected in the CPS channel:

- (1) Always Allow: The user can transmit all the time.
- (2) Channel Free: The radio can transmit only if the channel is free.
- (3) Different Color Code: The radio can transmit if the channel is free, but the color code is mismatch.
- (4) Same Color Code: The radio can transmit only if the channel is free and the color code matches.

5.7 Receiving and Responding to a Radio Call

When the radio is in the digital mode, it can receive and respond to a call with the same frequency/color code/ slot. When receiving a call:

- a. If the radio is programmed with callers DMR ID number in the digital contact list, when receiving a call, the radio will ring or vibrate briefly.
- b. The blue LED lights up.
- c. The left top corner of LCD shows the **RSSI** icon, and the LCD display will show DMR ID/name/city/state/country/call type and incoming icon based on what is in the digital contact list.
- d. When the call is ended, it will display "Call end", and you can press [PTT] to respond to the call.

5.8 Making a Call

Method 1: from the Channel switch.

Turn the channel switch to choose a programmed channel.

Method 2: from the Talk Group.

- (1) Turn the channel switch to choose a programmed channel;
- (2) Press  (exit) key to enter the TG List, press the  /  key to choose a TG.

Method 3: from the keypad.

- (1) Turn the channel switch to choose a programmed channel.
- (2) Press  (Menu) key to Talk Group, press select to enter TG.
- (3) Press  /  key to Manual Dial, press Select.
- (4) Input the ID number by the keypad, press  key to switch group ID or

5. BASIC OPERATIONS

Private DMR ID.

Hold the radio vertical 2.5-5cm from your mouth, press the [PTT] key to start the call, the red LED lights up, the receiver ID/name/city/state/country/call type and call out icon will be display on the LCD.

Release [PTT] key to receive the reply.

5.9 Monitor

In standby, press the [PF2] key to enter Monitor. When receiving matched carrier but the signaling / ID is unmatched or the signal is too weak, this function allows monitor the weak signal and signal with unmatched ID. Press the [PF2] key again to shut off speaker and return to standby.



» **When in the analog mode, and if no signal, it will emit noise when pressing the Monitor Key. ** The Rx icon is seen when monitor is activated.**

5.10 Emergency Alarm

Press Emergency Alarm key [PF3] to turn alarm function, then press this key again to return.

5.11 Man Down Alarm

In the radio Menu-Setting-Radio Set-Man down, it allows to enable/disable the man down alarm function.

When the function is on, the radio will start an alarm if the radio is falling to the ground. Raise the radio to stop the alarm.

Note: When GPS is on and positioning successfully, it will auto send out the GPS information when the radio starts the alarm.

5.12 Battery Voltage Test

Press the key programed as Voltage function to check the current battery voltage, press this key again to return.

6. ADVANCED FEATURES

6.1 Access Advanced Features for a Private Call

Method 1: To Access a Private Call from the Contact list

- a. Press the  (Exit) key to enter the Talk Group, press the  /  key to a private call ID name.
- b. Press Select to View the Contact, press Select to see the contact information.
- c. Press Option to access the advanced features.

Method 2: Access from Manual Dial

- a. Press the  (Menu) key to enter Talk Group, press  /  key to Manual Dial.
- b. Press Select to enter Manual Dial.
- c. Input the Private ID, press the Option to access the advanced features.

6.2 Set Up Advanced Features for Private Call

6.2.1 Call Alert

Select Call Alert, and it will send out a call alert. The target radio will sound a beep or vibrate when receiving the call alert, and it will return a successful call or failed call message to the transmitting radio.

6.2.2 Remote Ranging

Select Remote Ranging, and it will send out a signal to the target radio and will turn on its microphone and transmit when receiving the signaling, it will send back the voice to the transmitting radio. With this feature you can monitor the sound activity near the target radio remotely.

6.2.3 Get GPS info

Select Get GPS info, and it will send out a signal to the target radio which will start the GPS positioning and send a message of its GPS position to the transmitting radio.

6.2.4 Check Radio

Select Check Radio, and it will send out a radio check to the target radio which will send back a message if it is available or not available to the transmitting radio. With this feature, you can determine if another radio is active and powered on in the system.

6. ADVANCED FEATURES

6.2.5 Kill

Select Kill, and it will send out a kill signaling to the target radio which will be killed (No display, no operation) when receiving the signaling and it will send back a kill successful message to the transmitting radio.

6.2.6 Wake

Select Wake, and it will send out a wake signaling to the killed radio and the target radio will return to standby when it receives this signaling and send back a Wake successful message to the transmitting radio.

6.2.7 Ranging

When caller and receiver both are GPS positioned, if the caller turn on ranging function and the receiver is within communication range, TX radio will detect the distance and direction between two radios at fixed interval, and then show the information on the display of TX radio.

7. MAIN MENU FUNCTIONS

7.1 Talk Group (TG)

TG List: Will display the talk group list which had been programmed in the PC software. This list is used as a look-up table to display the contact TG information when receiving a call.

New Contact: Allows to create a new TG.

Manual Dial: Input the group ID or private ID to access a TG quickly.

Talker Alias: Allows Alias Tx Set / Alias Rx Set.

7.2 Short Message Service (SMS)

New Msg: Create a new message and send to a contact.

InBox: Shows all the received messages, and allows forward or delete of the message.

OutBox: Shows all the sent messages, and allows resend, forward or delete of the message.

Quick Text: Pre-saved messages, and allows to send, edit or delete the message.

Draft: Draft messages, and allows send, edit or deleting of the message.

7.3 Call Log

Last Call: The Last Call List show the last caller ID and time information. It allows you save the last caller as a new contact if it is not in your contact.

Sent: The Sent List shows sent messages until selected and deleted.

Answered: Shows all the answered calls, and allows deleting the call record or saving the ID as a new contact.

Missed: Shows all the missed calls, and allows deleting the call record or saving the ID as a new contact.

7.4 Zone

A Zone is a group of channels grouped together. AT-D890UV DMR radio has 250 Zones. A Zone can have the maximum of 160 analog and/or digital channels.

Select Zone: Select a zone and the radio will switch to this zone.

Select As Prior: Select a zone as the priority zone, you can assign a side button as "Prior Zone" and click on the button to switch to the priority zone quickly.

Edit Name: Edit the name of this zone.

Edit Chan: Remove channel from the zone, or add the channel to the zone.

Zone Hide: Set ON to hide the zone if you don't need the zone to be

7. MAIN MENU FUNCTIONS

displayed on the radio. Set OFF to show the zone on the radio display.

Save: Save the above changes.

Delete Zone: Delete the zone from the radio.

7.5 Scan

In the PC software – Public – Scan list, it allows to save 250 scan lists, and to program the required scan lists and write it into radio. Switch the radio to channel mode, as the scan list is only valid in the channel mode.

7.5.1 Scan On/Off

Set ON to start scanning on the radio.

7.5.2 CDT Scan

When the analog channel sets with CTCSS or DCS, turn On CDT scan will allow the radio to scan the CTCSS/DCS codes when it receives the analog signal, and it will change the CTCSS/DCS setting momentary in the radio to match with the received CTCSS/DCS code, so the communication is smooth.

7.5.3 Scan list (only in digital)

Select and assign a scan list to the current channel.

7.6 Roaming

Roaming function enable users to search the roaming channel list by a programmed time interval and lock on the repeater with strongest signal.

7.6.1 Roaming On/Off

Allow you turn on the roaming manually. After the roaming is finished, it will return to the off state. *** Manually Roaming is a onetime action only.*

7.6.2 Roaming Zone

Select **Roam Test Zone**: select a Roaming Zone from the list to set it as an active zone. You can also scroll down the list of Zones and select Add Channel to add a new channel to the current Roaming Zone and set the parameters.

Select **Add Channel**: Add a new roaming channel to the current zone.

New Roam Ch: Allows you modify the RX frequency/TX frequency/CC/TS/CH name for the roaming channel. It also allow you remove the roaming channel from the zone.

Edit Name: Edit the zone name.

7. MAIN MENU FUNCTIONS

Select Zone: Select the roaming zone for the current channel.

Delete Zone: Delete the roaming zone from the current channel.

7.6.3 Auto Roaming settings

Set the fixed time waiting interval to begin automatic roaming when the repeater cannot be found, roaming will begin at the end of this time.

Fixed Time Set: The roaming will be started at preset fixed time or set to off.

Start Roaming

Fixed Time: The radio will start the roaming on a time interval set in CPS-Optional Setting-Auto Repeater-Auto Roaming at Fixed Time.

Out of Range: The roaming will be started when the radio cannot find a repeater - "The repeater is out of range" icon will appear 3 times, then the radio will perform roaming one time, and return to roaming off condition automatically.

7.6.4 Repeater Check - Off / On

Turn on this function will allow the radio to check the repeater status, the "Repeater is out of range" icon shows if the repeater is not in range.

7.7 Settings

7.7.1 Radio Set

7.7.1.1 Voice Func

(1) Key Tone

Beep On: The radio will beep when you press the keypad.

Beep Off: No beep when you press the keypad.

(2) Digi Idle

Set on if you want a tone when the digital channel is free.

(3) Ana Idle

Set on if you want a tone when the analog channel is free.

(4) Startup Sound

Set On if you want a tone when powering on.

(5) Talk Permit

Select if you want a tone confirming Digital and/or Analog repeater connection at the start of a call.

(6) D-Reset Tone

Select Off or On, digital call has a group call hold time and a private call

7. MAIN MENU FUNCTIONS

hold time to prevent voice missing after the call. When set Digi Call Reset Tone is On, it will beep when the hold time terminates.

(7) Max Vol Level

Indoor: Very low volume, suitable for the indoor use.

Level 1-8: Set up the maximum volume level.

(8) Ear Max Vol

Indoor: Very low volume, suitable for indoor use.

Level 1-8: Set up the maximum volume level for earphone. When the radio connect with an earphone, it will auto change to earphone maximum volume.

(9) Enhanced Sound

It will allow you set up the microphone audio pitch.

Normal: Low pitch.

Enhance: High pitch.

(10) SMS Notify

Different prompt options when receiving a new message.

(11) Call Ring

Different prompt options when receiving a new call.

(12) DigiMic Level

Digital microphone level selection.

(13) AnaMic Level

Analog microphone level selection.

(14) Fix Time Mute

With the "Fix Time Mute" function is activated (On) it is possible to mute the loud speaker for a wished selected time segment.

The duration of the "Mute Time" may be set by the CPS->Optional Setting->Other->Mute Timing.

(15) TX NR Filter

Set the noise reduction level for the transmit audio to Off or 1 of 5 levels.

Noise reduction works based on the noise intensity, when the noise is strong, noise reduction reduces more noise and the audio has more distortion.

When the noise is slight, noise reduction reduces less noise and the audio has less distortion, and it may not be noticeable for the noise reduction.

7. MAIN MENU FUNCTIONS

When you set the noise reduce level higher, the noise will be reduced more and the audio has more distortion. You can set a suitable noise reduce level to get acceptable noise and audio effect.

(16) RX NR Filter

Set the noise reduction level for the received audio to Off or 1 of 5 levels. The higher level you set, the noise will be reduced more but the audio has more distortion.

(17) RX DRC

Set ON to enable the DRC function. It helps to make the RX audio leveling, so the loud audio will be reduced, and lower audio will be amplified.

7.7.1.2 Display Func

(1) Back Light

LCD backlight intensity is adjustable in 5 steps

(2) Night Mode

OFF: When the radio is standby, it will turn off the backlight completely.

ON: When the radio is standby, it will reduce the backlight to level 1, no matter what is the backlight brightness setting.

(3) Light Time

Always: The backlight is always on.

5Sec-5Min adjustable.

Note: This function is valid when the turn off of the power save.

(4) Ch. Name

CH name: The radio will work in channel mode and display the channel name, and then the programmed VFO/ MR key is not valid.

Frequency: The radio will work in VFO mode and display the frequency, which allows the programmed VFO/MR key to switch the VFO and Memory channels.

(5) Language

Choose the Chinese or English language.

(6) Menu Exit Time

5Sec-60Sec: When enter in the menu, the radio will stay at that time set in the menu. When the time is reached, the radio will auto exit the menu.

(7) Start Display

Picture: The radio will display an AnyTone picture when powered on.

7. MAIN MENU FUNCTIONS

Character: The radio will display the characters set up in PC software when powered on.

Customer's Pic: The radio will display the picture uploaded by PC software. In CPS -Tool -Boot Image, it will allow you upload a Power-on Picture in .bmp format.

(8) CH Background

Default Picture: In standby, the radio will display default picture.

Customer's Pic: The radio will display the picture uploaded by PC software. In CPS-Tool-Standby BK Picture, it will allow you to upload a standby background picture.

(9) CHG Font Color

Set color for the standby display of the date/time, menu etc.

(10) CH Color A

Set color for the band A channel display.

(11) CH Color B

Set color for the band B channel display.

(12) Zone Color A

Set color for the band A zone display.

(13) Zone Color B

Set color for the band B zone display.

(14) Main Ch

Channel A: The upper displayed channel will be set to become the main channel.

Channel B: The lower displayed channel will be set to become the main channel.

(15) Sub Ch hide

Sub Channel On: Turns on the sub channel, and the radio will display both channel.

Sub Channel Off: Turns off the sub channel, and the radio will display the main channel only.

7.7.1.3 Key Func

(1) Key Lock

Manual Lock: Long press of the  key to lock the keypad. Press  key, then press the  key to unlock the keypad.

Auto Lock: Radio will auto lock the keypad when in standby for a while. Press  key, then press the  key to unlock the keypad.

Notice: To get the key lock function working, a few options should be set ON in CPS -> Optional Setting -> Key function first.

7. MAIN MENU FUNCTIONS

Knob Lock: Set On to lock the knobs.

Keypad Lock: Set On to lock the keypad.

Side Key Lock: Set On to lock the PF1, PF2 and PF3(top blue key).

Forced Key Lock: Set On to prevent the key from unlocked. When this function is ON, the keys are not able to unlock manually.

(2-11) Key PF1, PF2, PF3, P1, P2

You can program these keys for different functions.(Refer to page 10 & 11)

7.7.1.4 DMR Func

(1) Repeater

Turning on the cross-band repeater function will allow the radio to work as a small local repeater. The radio will TX on one channel, RX on the other channel.

Note: Cross-band DMR to DMR: Must be UHF-VHF or VHF-UHF cross bands.

Cross-band Analog to DMR or DMR to Analog: Must be UHF-VHF, or VHF-UHF cross bands.

Cross-band Analog to Analog: Must be UHF-VHF, or VHF-UHF cross bands.

When the radio is active as a repeater it is in a locked mode. You have to wait until a call is completed to turn the radio off or stop the repeater mode.

****Please Turn Off Digital Monitor when using the Cross-band repeat function. And the radio has to have both the primary and the sub channel on. Turn on the repeater function in the Menu – Settings – Radio Set - DMRFunc – Repeater.****

(2) Rep CC Limit

This function is valid when Repeater Mode set ON.

OFF: All the received call will pass the D890UV repeater and transmit.

Match Channel A Color Code: Only when the received call has matched color code of Channel A, it will pass the D890UV repeater and transmit.

Match Channel B Color Code: Only when the received call has matched color code of Channel B, it will pass the D890UV repeater and transmit.

(3) Rep Slot Path A

This function is valid when Repeater Mode set ON.

OFF: When D890UV receives a call in one slot, it will transmit in the other slot.

Channel A at fixed slot 1: D890UV receives the call in channel A fixed slot 1,

7. MAIN MENU FUNCTIONS

and transmit in channel B slot 2.

Channel A at fixed slot 2: D890UV receives the call in channel A fixed slot 2, and transmit in channel B slot 1.

DMR mode setting in channel A and B is invalid when this function is ON.

(4) Rep Slot Path B

This function is valid when Repeater Mode set ON.

OFF: When D890UV receives a call in one slot, it will transmit in the other slot.

Channel B at fixed slot 1: D890UV receives the call in channel B fixed slot 1, and transmit in channel A slot 2.

Channel B at fixed slot 2: D890UV receives the call in channel B fixed slot 2, and transmit in channel A slot 1.

DMR mode setting in channel A and B is invalid when this function is ON.

(5) SMS Format

M-SMS: Motorola Format

H-SMS: Hytera Format

DMR Standard: ETSI DMR standard format

(6) TX Preamble

The radio transmits a preamble before data, SMS or private call is sent. This is useful to wake up the receiver from battery-saving mode or stop the receiver from scanning before sending the data.

This settings allows to set the duration of the preamble transmission.

(7) Voice Hdr Rpt

Before the voice packet is transmitting, the radio will send voice header with Group Call identification packet first.

Repeat sending voice header will help to synchronize the receive radio and improve the successrate of the communication. This setting allows you set the voice header repeat times.

7.7.1.5 Other Func

(1) Auto Power Off

Allow to set automatic power off when not used for a period of 10 minutes, 30minutes, 1 hour or 2 hours of non-operation.

Off: Turn off the function.

(2) TX Timer

30Sec-240Sec: The TX will be limited in the set time. When this time is reached, the radio will auto stop transmission.

OFF: Turn off the TX time limit, and there is no limit for the transmission time.

7. MAIN MENU FUNCTIONS

(3) TOT (Transmitter Out Timer) Predict

With the "TOT Predict" function is activated (On), 5 seconds before the TOT is expiring, a beep sound is heard indicating that the transmitting mode will be interrupted.

(4) TXPow ALC (Automatic Level Control)

With the "TxPow ALC" function activated (On), while receiving extremely strong signal, the TX power will automatically reducing the level of the TX Power proportionally to the strength of the RX signal.

(5) Freq Step

2.5K, 5K, 6.25K, 10K, 12.5K, 20K, 25K, 30K, 50K, total of 9 frequency steps.

(6) Ana SQ Level

Adjusts the squelch level of received signals with different signal strength, and a total of 5 levels are offered. This function is only valid for analog channel.

(7) Power Save

Turn on the function to extend the battery life.

Save 1:1, work 30ms, dormant 30ms.

Save 2:1, work 60ms, dormant 30ms

When turning on the power save, it may not receive the message in time.

(8) TBST Sel

TBST frequency is used to activate some dormant repeaters, 1000Hz, 1450Hz, 1750Hz, 2100Hz a total of 4 options are offered.

Press PTT and PF1 key together to transmit the TBST tone.

(9) VOX

Enable the VOX, you can speak into the microphone to start transmitting instead of pressing the [PTT] key. A total of 3 levels are provided.

(10) VOX Delay

When the VOX is enabled, set up the VOX delay will help to extend the transmission time to avoid stopping a transmission too early. 0.5Sec-3Sec, a total of 26 times offered.

(11) Scan Mod

SCM TO: When scanning and stopping for a signal, stays at the channel 5Sec before resuming the scan.

SCM CO: When scanning and stopping for signal, stays at the channel until the signal disappears, and resumes scan 2Sec later.

7. MAIN MENU FUNCTIONS

SCM SE: When scanning and stopping for a signal, will terminate the scan. This function is only valid for a VFO scan.

(12) DTMF Speed

Offers DTMF encode speed which will help the receiver decode successfully, 50~500mS are the options.

(13) AM Air/FM

Off: AM air band or the FM Radio function is off.

FM Mode: Turn on the FM radio.

AM Mode A: Turn on the AM air band receive, the AM channel will default at band A in display.

AM Mode B: Turn on the AM air band receive, the AM channel will default at band B in display.

(14) FM Radio Moni

Radio Mon On: When the FM radio is used, you can still receive or transmit on the channel.

Radio Mon Off: When the FM radio is used, the radio will not permit a transmission or reception.

(15) AM Offset

Set the appropriate offset for the AM air channel to improve the RX effect.

(16) AM Sq Level

Set the appropriate squelch level for the AM air channel to improve the RX effect.

(17) Man Down Alarm

When the function is on, the radio will start an alarm if the radio is falling to the ground. Raise the radio to stop the alarm.

When GPS is on and the positioning successfully, it will auto send out the GPS information when the radio starts the alarm.

(18) Start Up Pwd

On: Set up the password for power on start up. You need to input the password to power on the radio.

Off: No password is required for the radio power on start up.

The password shall be set up in CPS-Optional Setting-Power on-Power-on Password Char.

7. MAIN MENU FUNCTIONS

(19-20) AuRepeater A or B (For VFO A or B)

Turn on the Auto Repeater function, the TX frequency in VFO mode will auto increase or reduce frequency base on the set up offset frequency in the CPS.

Off: Turn off the function.

Positive: TX frequency= RX frequency + Offset frequency.

Negative: TX frequency= RX frequency - Offset frequency.

(21-24) VFO SC-MinU/MaxU/MinV/MaxV (For VFO scan ranging setting)

VFO Scan is only valid in VFO frequency mode. Press the "VFO Scan" key to turn on/off the VFO scan.

The radio will scan the frequency range between VFO scan start frequency and VFO Scan end frequency, at the frequency step.

VFO SC-MinU: Set start frequency for a UHF VFO scan

VFO SC-MaxU: Set end frequency for a UHF VFO scan

VFO SC-MinV: Set start frequency for a VHF VFO scan

VFO SC-MaxV: Set end frequency for a VHF VFO scan

(27) CTC STE (Squelch Tail Eliminate)

In case of active CTCSS, the STE function will blank the background noise of clicking interferences at the break of the transmitter.

(28) DCS STE (Squelch Tail Eliminate)

Tail eliminate is valid for simplex radio to radio only.

At the end of the analog call, the radio will beep 'chap' noise when detecting there is no signal, and then turn the audio off.

In order to avoid hearing the noise, you can set this function for the analog channels with DCS signaling.

(29) No-Signal Ste

Normal Squelch Tail Eliminate (STE) setting will be monitored (no signaling).

(30) Time Zone

Set up the time zone of your location.

(31) Time Display

Set On to show the date/time on display.

Set Off to hide the date/time display.

(32) Date Time

Time Set: Allows to set up the date and time manually. Use the  /  key to set the current year. Move to the month by pushing the  key. Set

7. MAIN MENU FUNCTIONS

the month, and use the  key to move forward each step. Once done, click the Menu key to save the date and time.

GPS Check: When GPS is positioning successfully, enter this menu, select GPS check to do the date & time correction automatically.

7.7.2 Chan Set

Channel set menu Route: Main Menu - Settings - Chan Set. The channel set menu will change accordingly to the channel type. When the channel type is digital, it will automatically hide the analog menu.

※ Chan Set (Digital Channel)

(1) New Chan

Allows to create a new channel and save current set up to the new channel.

- Select "New Chan", then input new channel number and confirm.
- Input channel name and confirm.
- Select a zone and confirm. The new channel will be saved to the selected zone.

(2) Delete Chan

Allows to delete current channel.

- Select "Delete Chan", and the radio will remind "Delete? "
- Press confirm, and the current channel will be deleted.

Note: After deleting one channel, the radio will move to the next channel.

(3) Channel Type

A-Analog : Set up to analog channel

D- Digital : Set up to digital channel

A+D TX A: Mixed analog, allow receive analog and digital signal, TX is analog.

D+A TX D: Mixed digital, allow receive analog and digital signal, TX is digital.

(4) TX Power

Set up the TX power for current channel.

(5) Offset

Press  /  to adjust offset frequency. Primarily used with a hot-spot.

(6) Band Width

12.5kHz and 6.25kHz for digital channel.

7. MAIN MENU FUNCTIONS

(7) RX Freq

Input the RX frequency by keypad, and click the Menu key to save, press the [P2] key to return.

(8) TX Freq

Input the TX frequency by keypad, and click the Menu key to save, press the [P2] key to return.

(9) Talk Around

When a TX radio and an RX radio both are set up with Talk Around on, they can communicate directly without a repeater. The analog channel will use the RX frequency as TX/RX frequency, the RX CTCSS/DCS decode as TX CTCSS/DCS encode.

(10) Name

Allow reset off the channel name. This function is only valid in channel mode.

(11) TX Allow

Select PTT transmit criteria, that should normally be set to Channel Free.

Always: The user can transmit all the time.

Channel Free: The radio can transmit only if the channel is free.

Different Color Code: The radio can transmit if the received signal has matched frequency and slot, but mismatch color code.

Same Color Code: The radio can transmit only if the received signal has matched frequency and slot, and matched color code.

(12) TX Prohibit

TX ON: Will allow transmit on the current channel.

TX OFF: Will not allow transmit on the current channel.

(13) Radio ID

For Digital channel, it will show the DMR ID, which must be programmed in the PC software – Digital – DMR ID list- DMR ID. It will allows edit and select an ID for the channel, where each channel allows one ID.

For Analog channel, it will show the radio 5Tone self ID or DTMF self ID which is programmed in PC software – Analog – 5Tone Self ID or DTMF Self ID.

(15) Time Slot

Set up Slot 1 or Slot 2 for the current channel which only applies to DMR.

7. MAIN MENU FUNCTIONS

(16) RX CC (Color Code)

Set color code for receiving use.

(17) TX CC

Set color code for transmitting use.

(18) R&T CC

Allows to set the RX and TX CC at the same time, the separated RX CC and TX CC will be recovered with the R&T CC setting.

(19) Digi Encrypt

With the digital encryption set to On, the communication will be confidential. A total of 32 digital encryptions is offered, and it can be programmed in the PC software or defined in the radio Menu.

(20) Encrypt Type

Choose normal encryption or enhanced encryption type.

(21) RX Group List

It will allow edit of the RX Group List and assign a new RX Group List to the channel.

Select Cur List: Select the current RX Group List.

Add Group: Add a TG to the current RX Group List.

Remove Group: Remove a TG from the current RX Group List.

(22) Work Alone

In the PC software – Public – Alarm settings – Work Alone, you have to set up the response time, warning time and response method initially.

Turn on the work alone function for the current channel. When the radios predetermined time has been reached for the alone working time, the radio will beep a sound and show "Work Alone Predict". The user has to confirm by pushing the programmed work alone key to confirm continuing work alone, otherwise, the radio will start its alarm and send the alarm on the channel when reaching its preset response time.

(23) CH Ranging

In standby, if the call contact type for a channel is "Private call", The radio will automatically start ranging function when turned to this channel. The other radio's location will be showed on the screen at set intervals.

7. MAIN MENU FUNCTIONS

(24) APRS Receive

Turn APRS Receive, if both the radios GPS is positioned, your radio will display the other radio's distance and position when the radio is receiving.

(25) SMS Forbid

Set On to prohibit the radio to receive SMS.

(26) DataAck Forbid

Set On to ignore the repeater data service request. The radio will not reply to repeater when it receives the call confirmation/SMS confirmation request, etc..

(27) DMR Mode

Select different DMR modes for digital channel. Recommend setting is "Repeater" for normal use.

Repeater: Allows the radios communicate through repeater or hotspot, using the same slot for TX and RX.

DMO/Simplex: Only used for the radios direct communication, without repeater or hotspot. Allows the channel to have different TX/RX frequency as long as the other radio has the matched RX/TX frequency.

DCDM/Double Slot: Only used for the radio direct communication, without repeater or hotspot. The channel should have same TX/RX frequency, time slot will be used to distinguish channels, i.e you can create two channels at same TX/RX frequency but different time slot.

DCDM/TS split: Allows the radio to communicate through a repeater or hotspot, with different time slot for TX and RX use. The slot selected in channel for RX use, therefore TX will use the other slot automatically.

(28) TX interrupt

This feature allows the supervisor to start the transmission while another person is talking. It allows the supervisor to override the ongoing transmission and brings other radios to listen what the supervisor is saying. The radio that is transmitting at the time of this override will not hear the supervisor until he release key of his radio and then he will be able to hear the rest of the conversation.

(29) Digi TX Idle

With "Digi TX Idle" ON, and when a repeater has one time slot occupied, the radio will automatically switch to the other time slot for transmission. If

7. MAIN MENU FUNCTIONS

both time slots are occupied, the radio will beep to remind that it can not connect to the repeater.

Notice: When you use this function, make sure both the TX and RX radio have the "Idle TX" function turned to ON.

(30) Slot Suit

Slot suit will let the radio ignore the time slot setting when it receives a signal with matched TX/RX frequency and color code.

Slot suit function is working for below two kinds channels.

1) Channels with "double slot" DMR mode, the TX/RX frequency is the same.

2) Channel with "repeater" DMR mode, the TX/RX frequency is different.

(31) CRC Ignore

Set to ON to enable the DMR CRC ignore function for the current channel.

It allows the DMR vocoder selectively to ignore the CRC result of the Voice LC header, and therefore radio can receive more signals.

※ Chan Set (Available for Analog Channels only)

When the channel type is analog, it will automatically hide the digital menu, The below listed menus are for analog channel only, unlisted menus are the same as the digital channel, please refer to Chan Set (Digital Channel).

(4) TCDT

Set up the CTCSS/DCS code for the TX.

(5) RCDT

Set up the CTCSS/DCS code for the RX.

(6) RTCDT

Set up the CTCSS/DCS code for both TX and RX

CTCSS code: 62.5Hz~254.1Hz, a total of 51 groups

DCS code: 000N~7771, a total of 1024 groups.

(7) Optional Signal

Allows the setup of DTMF/5TONE/2TONE encode and decode for the Analog channels.

(10) Squelch mode

When the analog channel is set up for both CTCSS/DCS decoding and optional signaling, you can set up the RX condition in this menu.

SQ: You can hear the call once the channel receive a matched carrier.

7. MAIN MENU FUNCTIONS

CDT: You can hear the call when you receive a matched CTCSS/DCS signal.

TONE: You can hear the call when you receives a matched signaling.

C&T: You can hear the call when you receives a matched CTCSS/DCS and matched signaling.

C|T: You can hear the call when you receives a matched CTCSS/DCS or matched signaling.

(11) Band Width

12.5kHz for the analog channel.

(12) Reverse

When this function is enabled, the RX frequency, and the TX frequency and CTCSS/DCS encode/decode will be reversed.

(13) Compander

Enable this function to reduce background noise and enhance audio clarity, especially in long distance communication.

(14) Scrambler

This special audio process which can offer a more confidential communication. Other radios at same frequency will receive only disordered noises.

(19) Busy Lock

Always: Always allows transmissions

RL: Will not allow transmit when receiving matched carrier but unmatched CTCSS/DCS.

BU: Will not allow transmit when receiving matched carrier.

(21) OWN ID

When the analog channel is set up with 5Tone or DTMF, you can check the radio ID number in this menu. The ID number should be set up in PC software – Analog – 5Tone or DTMF self ID.

(22) DTMF Enc

Set a DTMF ID as the default call ID for the current channel.

Press the PTT key to transmit the selected DTMF ID.

Edit the DTMF ID in the radio Menu or with the PC programing software.

(23-24) 2Tone Enc

Set a 2Tone as the default caller ID for the current channel.

Press the PTT key to transmit the selected 2Tone.

7. MAIN MENU FUNCTIONS

Edit the 2Tone in the PC programing software before it can be selected.

(25) 5Tone Enc

Set a 5Tone as the default caller ID for the current channel.

Press the [PTT] key to transmit the selected 5Tone.

Edit the 5Tone in the PC programing software before it can be selected.

(26) 5Tone BOT

Set ON to send the 5Tone encode ID when pressing the [PTT] key.

(27) 5Tone EOT

Set ON to send the 5Tone encode ID when releasing the [PTT] key.

(28) QDC Enc

When Optional Signal is "QDC1200", select a predefined QDC1200 ID. The QDC1200 ID shall be set up in the CPS.

(29) PTT ID

To get the PTT ID working, the optional signal shall be set to DTMF or 5Tone, and the EOT/BOT in the DTMF & 5Tone page shall be set up first.

OFF: OFF

Start: Start, press PTT key to send a series of DTMF code or 5Tone code.

End: End, release PTT key to send a series of DTMF code or 5Tone code.

Start&End: Start and end, press and release PTT key to send a series of DTMF codes or 5Tone codes.

(31) APRS Receive

Turn on this function to enable the radio to receiving the analog APRS information in current channel. Make sure your channel setting of Frequency, CTCSS/DCS match the transmitting radio's setting.

The radio will display the callsign, coordinates, direction, distance, digipeater paths, etc., when receive the analog APRS from the other radios.

Radio Menu -> APRS -> Ana APRS Info, allows it to check the receive analog APRS logs.

CPS -> Public -> APRS -> Analog APRS -> Receive Allow set to "On", and you input the Callsign and SSID you want to receive. The radio will only receive and display the analog APRS information of the filtered callsign, instead of displaying all analog APRS.

7. MAIN MENU FUNCTIONS

7.7.3 Device Info

Show the Radio ID, Radio name, serial number, model name, frequency range, firmware version, radio data version, latest program date, picture version, language version etc.

7.8 Record

The voice record is designed for a security use purpose. Each call will be saved as a separated recording with DMR ID and time details.

The radio supports 14 hours recordings in digital or analog mode.

The recordings can be download to a computer in CPS-Tool-Radio Recording page.

Record Switch

Set ON to enable the recording function on the radio.

Record List

All the recorded files are showed in the record list. Select a record file to check the detailed information.

Record Play: Play the selected recording file. It will play one record at a time, you can press up/down button to switch the recording without return to the previous menu.

Record Send: Select a Talk group to transmit the recording. Or input a DMR ID in Manual dial and transmit the recording.

Loop Playback: It will play all records one after the other. You can select up or down with the center button on the radio.

Record Delete

All the records will be deleted if you click on “select” button.

7.9 GPS Positioning Function

7.9.1 GPS On/Off

Turn On/Off the GPS positioning function.

7.9.2 GPS Mode

Select the GPS work mode for positioning use.

GPS mode is Global Positioning System.

BDS mode is China BeiDou Navigation Satellite System, it is working well

7. MAIN MENU FUNCTIONS

in Asia.

GLONASS mode is Russia GLONASS Navigation Satellite System, it is working well in Russia.

7.9.3 GPS Roaming

GPS Roaming function allows the radio to auto switches to a zone when GPS positioning is within the preset radiation radius of coordinates.

The function shall be set in the CPS.

7.9.4 GPS Info

When the GPS is positioned successfully (as shown on the display), enter into GPS info menu and you can check the radio's GPS position.

Method 1: Check GPS info from Menu

Press  (Menu) key to enter Main Menu, select "GPS", then select "GPS Info".

Method 2: Check GPS info from programmed key

In the PC software, Public – Optional Setting – Key function, program a key as "GPS Info", then press the programmed key to check the GPS info.

 » **If the GPS is not positioning, it will display “No Fixed Position”, and the GPS icon shows a grey color. Move the radio to an open window or outdoors, and it will take a few minutes to connect to the GPS Satellites.**

NOTE

7.9.5 Send GPS Information

- When the GPS is positioning successfully, the GPS icon shows a green color. Follow the above step to check the GPS info, press edit key to Text edit.
- Press Confirm, and it will display Send or Save. If you select Save, the GPS info will be saved as a draft message.
- Choose Send and it will display Contact list or Manual Dial.
- Select Contact list to choose a contact, press select to send the GPS info. or
- Select Manual Dial, input the DMR ID, press  key to switch group ID or private ID, press  to send the GPS info.

7. MAIN MENU FUNCTIONS

7.10 Satellite

7.10.1 Location

This function allows you to set the location for satellite function use.

GPS Beacon: The satellite function needs on the GPS positioning , make sure the GPS is turned on and positioned successfully.

Fix 1-8: You need to input the latitude and longitude for Fix1 ~ Fix8 in the APRS page in the CPS.

7.10.2 Satellite

The radio will predict the satellite past time, you can select a satellite for communication.

The satellite list should be edit in the CPS- Tool - GPS satellite data update and loaded into radio first.

7.11 Digital Monitor

1) DigiMoni Switch

Off: Turn off Digital Monitor

Single Slot: Monitor the current TS

Double Slot: Monitor TS1 and TS2

2) DigiMoni Cc

Any CC: Monitor any Color Code

Same CC: Monitor the same Color Code

3) DigiMoni Id

Any Id: Monitor any TG

Same Id: Monitor the same TG

4) Slot Hold

Off: Turn off the slot hold

On: Turn on the slot hold

Recommend to turn on slot hold when monitor double slots TS1 and TS2, when the signal disappears in one slot, instead of switching to the other slot at once, the radio will hold on some seconds and wait for the audio drop.

7.11.1 Response and Save a call in Digital Monitor Mode

During Digital Monitor, when receive a call with unmatched ID, press  key, the screen will display "Monitor Response Setup Successfully", press [PTT] key will response to the call.

Press  key, the radio will remind you choose a Zone, press select key to save the new channel to the Zone.

7.12 APRS Location Reporting(Supported by GPS)

(1) Upload Type

None: No APRS.

Sel A APRS: Select analog APRS.

Sel D APRS: Select DMR APRS.

(2) Ana APRS

PTT Upload: Set the PTT transmit method.

- Off: Not transmit APRS.
- Tx Start: Transmit analog APRS when pressing the PTT.
- TX End: Transmit analog APRS when releasing the PTT.

Upload Power: Set the transmit power.

Upload WN: Set the band width.

Upload frequency: Set the transmit frequency.

Signal Path: Set the signal path.

Upload text: Set the text to be shown on the website APRS.

(3) Ana APRS SMS

New SMS: Create a new SMS for analog APRS transmitting use.

OutBox: Show the transmitted analog APRS message.

Inbox: Show the received analog APRS message.

(4) Ana APRS Info

Info Filter: The radio allows to receive all type of APRS messages in default, if you don't need some message types, you can set it to off in this menu.

Dec Path: The radio has two receiving path, you need to select a path for the APRS to do the decoding.

Path A: The analog APRS only works in the main band.

Path B: The analog APRS only works in the sub band.

Ana APRS Info: The received analog APRS information will be saved in the radio for look back use. Click on "Ana APRS Info" and it will show the received APRS information.

Delete All: All the analog APRS information will be deleted.

7. MAIN MENU FUNCTIONS

(5) Digi APRS(Only works in DMR mode)

PTT Upload: Set the PTT transmit method.

- Off: Not transmit any APRS.
- On: Transmit DMR APRS when release the PTT.

Report Channel: Allow the user to select a channel to transmit the DMR APRS, please set the 8 report channels in CPS-APRS-Digi page first.

Upload Slot: Allow user to select a slot to transmit the DMR APRS.

- Channel Slot: It uses the slot of current channel
- Slot 1: Use slot 1
- Slot 2: Use slot 2

Upload ID: Allow the user to select a DMR ID to transmit the DMR APRS

(6) Digi APRS Info(Only works in DMR mode)

The received APRS information will be saved in the radio for look back use. Clicking on "Digi APRS Info" will show the received APRS information. Clicking on "Delete All" will clear the information.

(7) Intervals Set

This function allows you to set the analog APRS or DMR APRS auto transmit at fixed times.

(8) Upload Beacon

GPS Beacon: The APRS will transmit the GPS data, only if the GPS is set to on first, then GPS must also successfully lock on the satellites.

Fixed Beacon: The APRS will transmit the fixed beacon data. Someone can transmit the fixed beacon without setting the GPS on. The fixed beacon location information should be set in the CPS first.

Note: More setup are available by PC software only. **CPS-Tools-Options-APRS**, you have to check on the APRS box first to get APRS menu added to the left Digital menu.

(APRS is a registered trademark of Bob Bruninga, WB4APR)

7. MAIN MENU FUNCTIONS

7.13 NOAA weather Alert (for US only)

7.13.1 WX alarm

Turn on or turn off the NOAA weather alert function, the weather channel always works in the sub band. The radio has the speaker default muted, when the radio receives 1750Hz tone pulse, it will open the speaker and start alarm for 3 minutes, the speaker returns to mute state after the alarm.

7.13.2 WX channel

You can select a NOAA channel for the weather alert use.

162.550 MHz	WX1	39B
162.400 MHz	WX2	36B
162.425 MHz	WX4	96B
162.450 MHz	WX5	37B
162.475 MHz	WX3	97B
162.500 MHz	WX6	38B
162.525 MHz	WX7	98B
161.650 MHz	WX8	21B
161.775 MHz	WX9	83B
163.275 MHz	WX10	113B

7.13.3 WX monitor

When the WX monitor is ON, the radio will always have the speaker opened, and the weather information will be broadcast.

8. RESET

- a. Power off the radio first. This procedure must be done after a firmware update.
- b. Then power it on while holding the [PTT] and the [PF1] button below the PTT at the same time.
- c. The radio will start up with a note on the display – “Are you sure you want to initialize radio?”
Press Exit to exit the reset and power on the radio.
Press Confirm to proceed the reset the radio, and it will come with a screen display note – Initialize Radio.
- d. After a re-start the radio will display the setting of time zone and the date and the time. Use the up-down key to set the current year. Move to the month by pushing the **P1** key. Set the month, and use the **P1** key to move forward each step. Once done, click the Confirm key to save the date and time.

Please remember set up the time zone to avoid the date/time error.

Make sure the codeplug is saved to PC before your do the update and reset. The codeplug needs to be installed again after a reset of the radio.

9. TROUBLE SHOOTING GUIDE

Problems	Solutions
The radio cannot be switched on or no display after being switched on.	A. Battery pack may not be installed properly. Remove the battery pack and install it again. B. Battery power may be insufficient. Recharge or replace the battery pack.
The battery doesn't last very long after charging.	The battery is defective; please replace it with a new battery pack.
Cannot talk to or hear other members in your group.	1. Make sure the frequency and CTCSS are the same as other members. 2. Make sure you are within range, and not too far away from your member. 3. Make sure you are setting the in correct digital mode, and frequency. 4. In digital mode, make sure to set the correct code and encrypt group used in current channel. 5. In digital mode, make sure to set correct receiving contacts and receiving group.
Other voices from non-group members are heard on the channel.	Analog: Change the CTCSS/DCS Tone, and make sure to change the tone on all radios in your group.

10. PROGRAMMING GUIDE

AnyTone AT-D890UV radios are shipped from the manufacturer with the “Keypad” locked per FCC rules.

You can press the  (Menu) key and the  (star) key to unlock the keypad for the first time of use. You will need the programming cable to connect your radio to your computer for programming.

The programming software and codeplug programming guide are available for download from AnyTone website: www.anytone.net

When programming this radio for the first time, it is recommended you first READ the radio with the software and then save this file for future reference as it contains the default programming and settings. In addition, after you READ this radio with software, first make your programming and frequency changes, then send this edited file back to your radio.

Multiple Radio ID's

The AT-D890UV radio will allow multiple DMR Radio ID numbers to be used with the radio. This feature will allow one radio to be used for example as a Commercial Radio with its own DMR ID, and at the same time also be used as an Amateur radio with another DMR ID.

In the PC software, Digital / Radio ID List, you can enter your Department Unit Number or Amateur Radio callsign.

Amateur DMR-MARC

For the best Amateur DMR experience obtain a subscriber ID from one of many available Amateur Radio sources. A U.S. Amateur can obtain a DMR ID From:

<https://www.radioid.net/cgi-bin/trbo-database/register.cgi>

For DMR repeaters in your area please see: www.repeaterbook.com

World DMR repeater network map:

<https://www.repeaterbook.com/index.php/repeater-database>

World DMR repeater network with verified Talkgroups by activity:

<https://brandmeister.network/?page=lh>

Worldwide Amateur Contact Database

The AT-D890UV DMR radios contain a separate database memory for importing and displaying Amateur DMR individual IDs, call sign and user name in comma-delimited format (.csv)

Please reference in the programming guide for import and export of the database Digital Contact.

User Digital Contact Database: <https://ham-digital.org/status/>

11. ON-LINE SERVICE AND SUPPORT

The AnyTone website provides additional information about obtaining service or support for the AnyTone line of two-way radios and accessories. Visit: www.anytone.net

Warning Notes

Every effort has been made to ensure that the information in this document is complete, accurate, and up to-date. AnyTone Radio assumes no responsibility for the results of errors beyond its control. The manufacturer of this equipment also cannot guarantee that changes in the equipment made by non-authorized users will not affect the information in it.

FCC Licensing Information

This AnyTone radio operates on Commercial / Land Mobile frequencies which require a license from the Federal Communications Commission (FCC) for business, personal, education and recreational use. To obtain forms, call the FCC forms hotline at: 1-800-418-3676 or go to <http://www.fcc.gov>

For questions concerning commercial licensing, contact the FCC at 1-888-CALL-FCC (1-888-225-5322).

The AnyTone AT-D890UV DMR handheld transceiver has been carefully designed to provide you with years of safe, reliable operation. As with all electrical equipment, however, there are a few basic precautions you should take to avoid hurting yourself or damaging the radio:

- Read the instructions in this handbook carefully. Be sure to save it for future reference.
- Read and follow all warning and instruction labels on the radio and owner's manual.
- Do not carry the transceiver by the antenna. This may damage the antenna or antenna terminal. Grasp the handheld by its base (not the antenna) when you need to place or remove it.
- Do not keep the radio with the antenna very close to, or touching exposed parts of the body, while transmitting. AnyTone radios will perform best, if you speak 2-4 inches away (0.5 – 1 dm) from the microphone and the radio is vertical.
- Be sure the "PTT" key is not pressed when you do not need to transmit.
- Do not operate the radio near unshielded electrical blasting caps or in an explosive atmosphere.
- Do not transmit without the antenna fitted on the radio. Though it is provided with a protection, it may damage the TX output final stage.
- Respect the environment conditions. The radio is designed to be used in heavy environments, however avoid exposing it to extremely hot or cold temperature (out of the range between -20°C to $+55^{\circ}\text{C}$ or -5F to 130F). Do not expose the transceiver to excessive vibrations as well as dusty or rainy locations.
- Never try to disassemble or service the radio by yourself (aside from the routine maintenance described in this handbook). It may cause damage to the radio transceiver and void your warranty requiring extensive repair work. Always contact your local dealer for assistance.
- Use only authorized accessories. Using non AnyTone radio brand accessories may seriously damage your handheld transceiver and void your warranty.
- Do not spill liquid of any kind into your radio. If the transceiver gets wet, immediately dry it with a soft and clean cloth.

SAFETY

- Switch the radio off before you clean it. Follow the directions described in the paragraph “Care and maintenance”.
- Handle the battery properly. Never place the LI-ion battery in your pocket or purse with loose coins. This could result in short circuiting of the battery.
- Be certain that your power source matches the rating listed for the supplied battery charger (AC adapter). If you are not sure, check with your authorized AnyTone dealer.
- Avoid damaging the power cable of the battery charger. Do not step on or place anything on it as this could result in a damaged charger power cord. This product complies with the requirements of the Council Directives 89/336/EEC and 73/23/EEC on the approximation of the laws of the member states relating to electromagnetic compatibility and low voltage.

WARNING

Your wireless hand-held portable transceiver contains a low power transmitter. When the Push-to-Talk (PTT) button is pressed it sends out radio frequency (RF) signals. The device is authorized to operate at a duty factor not to exceed 50% TX and 50% RX.

In August 1996, the Federal Communications Commission (FCC) adopted RF exposure guidelines with safety levels for hand-held wireless devices. To maintain compliance with the FCC's RF exposure guidelines, this transmitter and its antenna must maintain a separation distance of least 2 inches from your face. Speak in a normal voice, with the antenna pointed up and away from the face at the required separation distance. The belt clip is for storage purposes only.

AVOID TRANSMITTING ON HIGH POWER WHILE RADIO IS ATTACHED TO YOUR BELT. To transmit, hold the device away from your body and ensure the antenna is at least 2 inches from your body when transmitting.

EU Declaration of Conformity

In accordance with EU Directives and Regulations

Qixiang Electron Science & Technology Co., Ltd.

Add: Qixiang Building, Tangxi Industrial Zone, Luojiang District, Quanzhou, Fujian, China
as the manufacturer, hereby declares under our sole responsibility that

product(s): Multi-Protocol Digital+Analog Handheld Radio

Model name: AT-D890UV, AT-D890UVII, AT-D890UV PLUS, AT-D890UV PRO

are in conformity with the essential requirements of the Radio Equipment Directive 2014/53/EU:
Radio

Article 3.2 EN 301 783 V2.1.1 (2016-01)
 EN 300 328 V2.2.2 (2019-07)
 EN 303 345-1 V1.1.1 (2019-06)
 EN 303 345-3 V1.1.1 (2021-06)
 EN 303 413 V1.2.1 (2021-04)

EMC

Article 3.1(b) EN 55032:2015+A1:2020
 EN 55035:2017+A11:2020
 EN IEC 61000-3-2:2019+A2:2024
 EN 61000-3-3:2013+A2:2021+AC:2022-01
 EN 301 489-1 V2.2.3 (2019-11)
 EN 301 489-15 V2.2.1 (2019-04)
 EN 301 489-17 V3.3.1 (2024-09)
 EN 301 489-19 V2.2.1 (2022-09)

Safety

Article 3.1(a) EN IEC 62368-1:2024+A11:2024

Health

Article 3.1(a) EN 50566:2017
 EN 50566:2017/A1:2023
 EN 62479:2010
 EN 50663:2017

The notified body Bay Area Compliance Labs Corp.(BACL) (EU Identification Number: 1313)
performed a conformity assessment according to Annex III, Module B.

Signed on behalf of Qixiang Electron Science & Technology Co., Ltd.



(Signature of authorized person)

Printed Name: Ken Xu

Title: General Manager

Date: 2025-11-24

12. TECHNICAL SPECIFICATIONS

General	
Frequency Range	Europe: 144-146MHz(V),430-440MHz(U) EU: GPS:1559-1610MHz, US: GPS:1575.42MHz United State: 136-174MHz(V),400-480MHz(U) BT:2402-2480NHz FM:87.5-108MHz
Channel Capacity	4000 channels
Channel Spacing	6.25kHz(Narrow Band), 12.5kHz (Narrow Band)
Phase-locked Step	5kHz, 6.25kHz
Operating Voltage	7.4V DC $\pm 20\%$ /(2100mAh/3100mAh)
Frequency Stability	± 2.5 ppm
Operating Temperature	-20°C~ +55°C
Size	129×61×39mm (with battery pack)
Weight	282g (with battery pack, antenna)
Receiving Part	
Sensitivity(12dB SINAD)	$\leq 0.35\mu\text{V}$
Digital Sensitivity	0.3uV/-117.4dBm (BER 5%) 0.7uV/-110dBm (BER 1%)
Adjacent Channel Selectivity	$\geq 60\text{dB}$
Spurious Emission	$\leq -57\text{dB}$
Spurious Rejection	$\geq 70\text{dB}$
Hum & Noise	$\geq 40\text{dB}$
Audio Distortion	$\leq 5\%$
Audio Power Output	1000mW/16Ω
Transmitting Part	
Power Output	VHF: 7/0.3W, UHF: 6/0.3W
Modulation	$\pm 2.5\text{KkHz}@12.5\text{kHz}$
Adjacent Channel Power	$\geq 60\text{dB}$
Hum & Noise	$\geq 36\text{dB}$
Spurious Emission	$\leq -36\text{dBm}$
4FSK Digital Modulation	6.25kHz 12.5kHz
Audio Distortion	$\leq 5\%$
Error rate	$\leq 3\%$

European Users should note that operation of this unit in Transmit mode requires the operator to have a valid Amateur Radio Licence from their respective Countries Amateur Radio Licensing Authority for the Frequencies and Transmitter Power levels that this Radio transmits on. Failure to comply may be unlawful and liable for prosecution. *At this subject, refer to the "EU" specification guide 2014/53/EU.*

Disposal of your Electronic and Electric Equipment

Products with the symbol (crossed-out wheeled bin) cannot be disposed as household waste. Electronic and Electric Equipment should be recycled at a facility capable of handling these items and their waste by products.

In EU countries, please contact your local equipment supplier representative or service center for information about the waste collection system in your country.



ATTENTION: conditions of use!

The band of frequencies on which this device operates is administrated by limitations and/or permissions for their usage. Consequently, in the EU countries mentioned in the sheet, operators must consult the entrusted authorities. In particular, they must possess a license or a frequency assigned to them by their respective competent authority.

ACHTUNG: informativ zur Benutzung!

Das Frequenzband, auf dem dieses Gerät arbeitet, wird durch Einschränkungen und/oder Berechtigungen für deren Verwendung verwaltet. Folglich müssen die Betreiber in den in der Tabelle aufgeführten EU-Ländern die zuständigen Behörden konsultieren. Insbesondere müssen sie über eine Lizenz verfügen, oder eine Frequenz besitzen, die ihnen von ihrer jeweiligen zuständigen Behörde zugewiesen wurde.

ATTENTION : conditions d'utilisation!

Certaines bandes de fréquence sur lesquelles cet appareil fonctionne sont régies par des limitations et/ou il faut des autorisations pour les utiliser. Par conséquent, dans les pays de l'UE indiqués dans le tableau, les opérateurs doivent d'abord consulter les autorités appropriées. Les opérateurs utilisant cet appareil doivent donc posséder une licence ou une fréquence qui leur est attribuée par les autorités compétentes.

ATENCIÓN: información sobre el uso!

La banda de frecuencias en la que opera este aparato está gestionada por limitaciones y/o permisos para su uso. Por lo tanto, en los países de la UE que se muestran en la tabla, los operadores deben consultar a las autoridades correspondientes. En particular, deben poseer una licencia o una frecuencia asignada por su respectiva autoridad competente.

ATTENZIONE: informativa all'uso!

La banda delle frequenze sulle quali opera questo apparato è amministrata da limitazioni e/o permessi al loro uso. Quindi, nei paesi UE riportati nella tabella, gli operatori devono consultare le autorità preposte. Segnatamente, devono possedere una licenza oppure una frequenza assegnata a loro dalla rispettiva autorità competente.



AT	BE	BG	CY	CZ	DE
DK	ES	EE	FI	FR	UK
EL	HR	HU	IE	IT	LT
LU	LV	MT	NL	PL	PT
RO	SK	SI	SE	CH	IS
LI	NO	-	-	-	-

Qixiang Electron Science& Technology Co., Ltd.

**Add: Qixiang Building, Tangxi Industrial Zone,
Luojiang District, Quanzhou 362011, Fujian, China**

To control your exposure and ensure compliance with the occupational/controlled environmental exposure limits, always adhere to the following procedures.

Guidelines:

- Do not remove the RF Exposure Label from the device.
- User awareness instructions should accompany device when transferred to other users.
- Do not use this device if the operational requirements described herein are not met.

Operating Instructions:

- Transmit no more than the rated duty factor of 50% of the time. To transmit (talk), press the Push-to-Talk (PTT) key. To receive calls, release the PTT key. Transmitting 50% of the time, or less, is important because the radio generates measurable RF energy only when transmitting (in terms of measuring for standards compliance).
- Keep the radio unit at least 2.5 cm away from the face. Keeping the radio at the proper distance is important as RF exposure decreases with distance from the antenna. The antenna should be kept away from the face and eyes.
- When worn on the body, always place the radio in an approved holder, holster, case, or body harness or by use of the correct clip for this product. Use of non-approved accessories may result in exposure levels which exceed the FCC's occupational/controlled environmental RF exposure limits.
- Use of non-approved antennas, batteries, and accessories causes the radio to exceed the FCC RF exposure guidelines.
- Contact your local dealer for the product's optional accessories.

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.

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.