



- Dual-RX*
- Dual-Band*
- Dual-Watch*
- Dual-Display*
- MICRO USB Charging*
- DTMF Selective Calling*
- Channel Scan/Memory Scan*
- Wide viewing angle LCD Screen*

## USER'S MANUAL

## **Preface**

Thank you for buying the company's products.

This product offers latest design, enhanced features, solid performances and easy accessibility. We believe you will be pleased with the high quality and reliable features for all your communication needs. This manual includes functional descriptions and step-by-step instructions. It also includes troubleshooting guides. If the body is damaged due to incorrect operation, please read the safety information manual carefully before use.

## **Disclaimer**

The accuracy and completeness of the contents are sought in the process of compilation, but we do not bear any responsibility for the possible errors or omissions. With the continuous development of technology, we reserve the right to change the design and specification of the product without notice. This manual may not be reproduced, modified, translated or transmitted in any form without the prior written authorization of the company.

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## Highlight Function

- Fast scan frequency and radios pairing
- DTMF encoding/Decoding
- Up to 128 named memory channels.
- 128-64 full dot matrix wide viewing angle LCD screen
- Manual input frequency and programming
- Twin band simultaneous receiving (U-U,U-V,V-U,V-V)

## Main Features

- Frequency range: VHF136-174MHz (Rx) UHF400-480MHz (Rx) 136-174MHz,400-480MHz(Scanning)  
462.5500-462.7250,462.5625-462.7125,467.5500-467.7250,467.5625-467.7125MHz(TX/RX)
- Friendly man-machine interface, easier to operate
- CTCSS/DCS Scan, channel scan
- Dual-band, dual-display, dual-watch
- CTCSS/DCS, DTMF signaling
- MICRO USB charging, battery life is more convenient
- SOS emergency alert function
- Emergency alarm and ANI identification through DTMF
- Voice Operated Transmit (VOX)
- Equipped with the relay pilot and scramble function
- Priority scan, priority channel setting
- High Capacity Lithium-Ion battery
- LED flashlight
- Broadcast FM radio receiver 65-108MHz
- Programmable repeater offset
- PC programming (frequency reading and writing frequency) will be password protected
- Frequency step, selectable between 25K

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# Chapter 1. Getting started

## 1. Packing List

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

| Item            | Quantity(PCS) | Item                     | Quantity(PCS) |
|-----------------|---------------|--------------------------|---------------|
| Radio           | 1             | Antenna                  | 1             |
| Belt Clip       | 1             | Wrist Strap              | 1             |
| Charging Cradle | 1             | Lithium Ion Poly Battery | 1             |
|                 |               |                          |               |



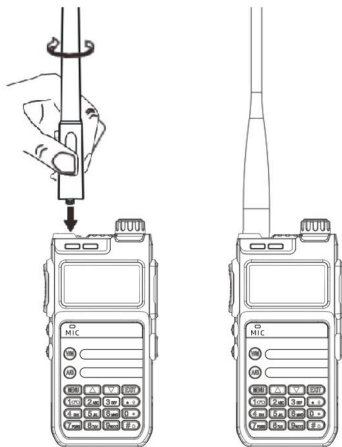
The frequency band is marked on the label of antenna; if it is unavailable there; see the label on the radio.

## 2. Assembly

Before the radio is ready for use we need to attach the antenna and battery pack, as well as charge the battery.

## 2.1 Antenna

This transceiver is fitted with a Male SMA connector. To mount your antenna (Female SMA Connector), align the two connectors and turn clockwise until it stops.



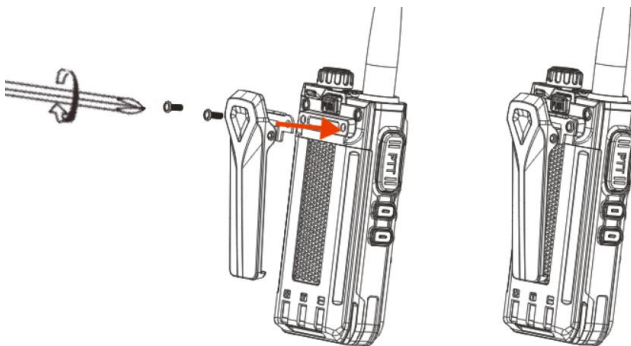
### NOTE

- Do not over-tighten your antenna to avoid damage to the connectors.
- When installing the antenna, don't grip it by the top. Grip by the base and turn.
- Do not hold the antenna with your hand or wrap the outside of it to avoid bad operation of the transceiver.
- Never transmit without an antenna.

## 2.2 Belt clip

At the back of the radio there are two parallel screws mounted above the battery, remove these and thread

them through the holes on the belt clip as you screw them back into the radio body.



## NOTE

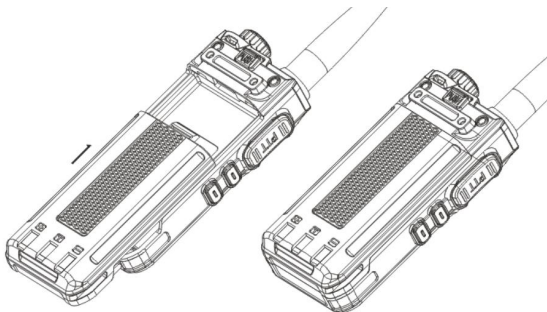
Do not use any form of glue to fix the screws on the battery clip. The solvents in the glue may cause damage to the battery casing.

### 2.3 Battery

Before attaching or removing the battery make sure your radio is turned off by turning the power/volume knob all the way counter-clockwise.

## ■ Installation

Make sure the battery is aligned in parallel with the radio body with the lower edge of the battery about 1-2cm below the edge of the radio.

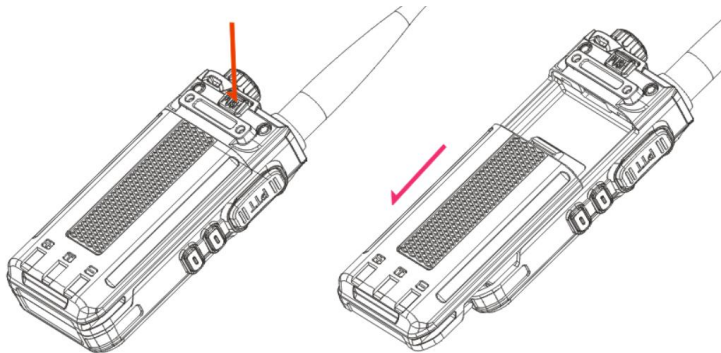


## NOTE

Once aligned with the guide-rails, slide the battery upward until you hear a click as the battery locks in place.

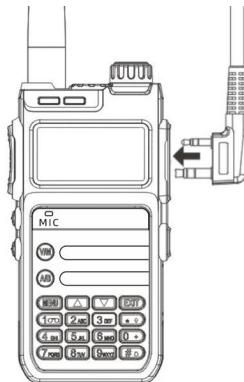
## ■Removal

To remove the battery, press the battery release above the battery pack, as you slide the battery downward.



## 2.4 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.



## 2.5 Charging and battery maintenance

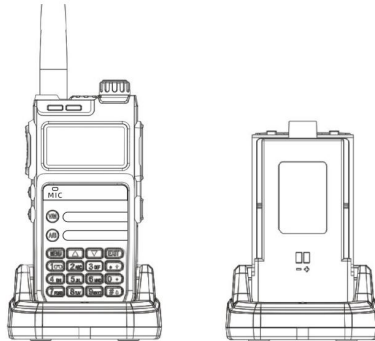
### ■Charging



Battery should be fully charged before initial use. Optimum battery efficiency will be achieved after the three full battery charge and discharge cycles.

Follow these steps to hook up and use the charger:

1. Plug the DC connector of the power adaptor into the charger base.
2. Plug the AC connector of the power adaptor into a main AC wall outlet.
3. Place the radio in the charging slot on the charger.
4. Make sure the radio is making contact with the charger. When the red LED comes on steady, your radio is charging.
5. The radio is fully charged once the charger's green status LED goes steady. Please remove the radio at that time to avoid over-charging your battery.



To determine the charging status, check the light-emitting diode (LED) indicator on the charger according to the following table:

| Charging Indicator  | Charging Status                  |
|---------------------|----------------------------------|
| Glows red           | The battery is charging.         |
| Glows green         | The battery is fully charged.    |
| Flashes red rapidly | The battery fails to be charged. |



The charger and battery are fitted with matching notches so that you can charge your battery on its own!

Practical if you have two batteries. That way you can charge one battery while still using your radio.

Radio should be turned OFF during charge cycle.

Press and hold the [0] key to display the battery voltage.

### ■ Lithium Ion Battery Warning

This equipment contains a rechargeable Lithium Ion battery. The rechargeable Lithium Ion battery contained in this equipment may explode if disposed of in a fire.

- Never attempt to disassemble your battery pack.
- Do not short-circuit the battery.
- Use only batteries approved by the original manufacturer.
- Do not charge the rechargeable battery used in this equipment in any charger other than the one specified in the owner's manual. Using another charger may damage the battery or cause the battery to explode.
- The battery for your radio comes uncharged from the factory; Please let it charge for at least four to five hours before you start using your radio.



**Lithium Ion battery must be recycled or disposed of properly.**

Avoid exposing the battery (whether attached to the radio or not) to direct sunlight, heated cars, or temperatures below  $-30^{\circ}\text{C}$  or above  $+50^{\circ}\text{C}$ . Exposing the chemical contained within the battery pack to temperatures above  $+50^{\circ}\text{C}$  may cause the battery to rupture, fail, or reduce performance.

In case of exposure to the cell contents, wash the affected area thoroughly, and seek medical attention.

## ■Storage

Partially charge your battery before long-term storage in order to prevent damage from over- discharge. While lead acid must always be kept at full charge during storage, this radio uses a lithium-based battery and should be stored at around a 40 percent charge. This level minimizes age-related capacity loss while keeping the battery in operating condition and allowing self-discharge.

To avoid severe capacity degradation of your battery while in long-term storage, please cycle the battery at least every six (6) months.

Store your batteries in a cool and dry place, never above normal room temperatures.

## RBRC INFORMATION

As part of our commitment to protect the environment and conserve natural resources, our voluntarily participates in an RBRC® industry program to collect and recycle used Li-Ion batteries within the US.

Please call 1-800-8-BATTERY for information on Li-Ion battery recycling in your area.

(RBRC® is a registered trademark of the Rechargeable Battery Recycling Corporation.)



### 3. Getting to know your radio

#### 3.1 Radio Controls and Indicators

Figure 1.3.1. Radio Controls and Indicators

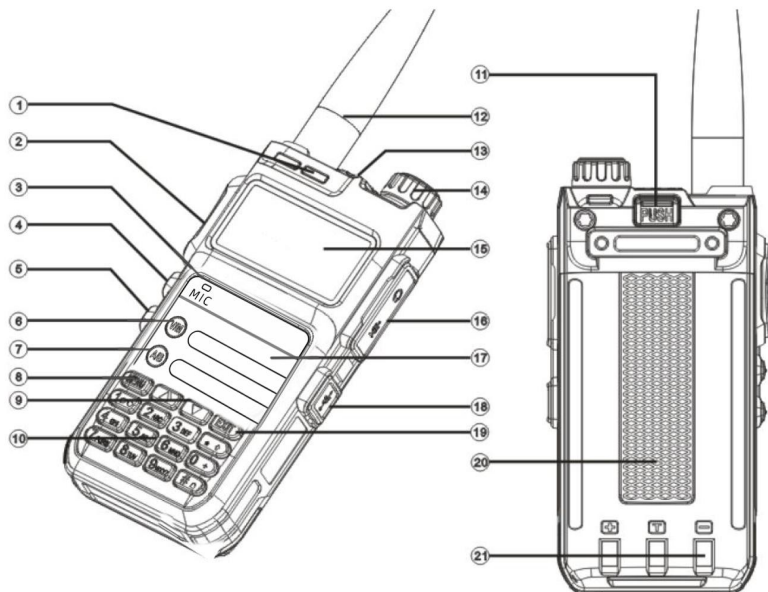


Table 1.3.1 Radio controls and indicators

|                           |                           |                           |                      |
|---------------------------|---------------------------|---------------------------|----------------------|
| 1. Status LED             | 2. PTT key                | 3. Microphone             | 4. Side key2 (PF2)   |
| 5. Side key3 (PF3)        | 6. VFO/MR mode key        | 7. A / B select key       | 8. MENU function key |
| 9. UP/DOWN Navigation key | 10. Numeric keypad        | 11. Battery release latch | 12. Antenna          |
| 13. Flashlight            | 14. Power / Volume knob   | 15. Dual band LCD         | 16. Accessory jack   |
| 17. Speaker               | 18. MICRO USB charge jack | 19. EXIT key              | 20. Battery pack     |
| 21. Battery contacts      |                           |                           |                      |

### 3.2 Reading the display

The LCD display shows different information depending on what you are doing. This sample screen shows some of this information. The following table shows all the possible icons and what they mean.

Figure 1.3.2. Reading the display

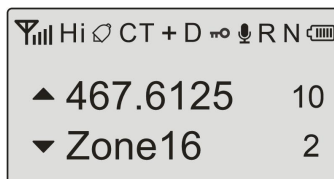


Table 1.3.2. Display icons and what they mean

| Icon                                                                              | Description                                                     | Icon   | Description                                    |
|-----------------------------------------------------------------------------------|-----------------------------------------------------------------|--------|------------------------------------------------|
|  | Squelch Open/ Close Indicator                                   |        |                                                |
|  | Battery level indicator                                         | D      | Dual watch enabled                             |
|  | VOX enabled                                                     | N      | Narrowband enabled                             |
|  | The keys are locked.                                            | +      | TX will be shifted higher in frequency than RX |
|  | Indicates active band or channel                                | -      | TX will be shifted lower in frequency than RX  |
| DCS                                                                               | DCS enabled                                                     | CT     | CTCSS enabled                                  |
| 10/2                                                                              | Current channel number                                          | R      | Reverse function enabled                       |
| 467.6125                                                                          | Current channel frequency                                       | Zone16 | Current channel name                           |
|  | This icon appears when DTMFST is set to<br>DT-ST/ANI-ST/ DT+ANI | Hi     | The transmitter power is Hi                    |

### 3.3 Status LED

The status LED has a very simple and traditional design. When you receive a signal it turns green, when you transmit it turns red, and it's off in standby.

| LED Indicator | Radio Status  |
|---------------|---------------|
| Glows red     | Transmitting. |
| Glows green   | Receiving.    |

### 3.4 The main keys

#### ■Side key 2 –SK2 (Flashlight and alarm)

Press [SK2] momentarily to turn on the LED flashlight. Another momentary press will flash the LED. Another momentary press turns the flashlight off.

Press and hold [SK2] to activate the alarm function. Press (a short press) again to turn it off.

#### ■Side key 3–SK3 (Broadcast FM and Monitor)

Press [SK3] momentarily to start the broadcast FM receiver. Another momentary press turns the broadcast FM receiver off. If a signal is received on the active frequency or channel while you are listening to the broadcast FM, the receiver will open squelch to that frequency (as if scanning) and remain there until the signal goes away; it will then switch back to broadcast FM.

Press and hold [SK3] to monitor the signal. This will open up the squelch so you can listen to the unfiltered

signal.

### ■V/M(VFO / MR) mode key

Press [V/M] switches between Frequency (VFO) Mode and Memory (MR) mode. Memory mode is sometimes also referred to as Channel mode.

To save frequencies to channel memory you must be in Frequency (VFO) mode.

### ■A/B select key

The [A/B] key switches between A (upper) and B (lower) displays. The frequency or channel on the selected display becomes the active listening and transmit frequency or channel.

To save frequencies to channel memory you must be on the A display.

### ■Numeric keypad

The radio comes standard with a full numeric keypad.



The numeric keys have their secondary function printed on them (in reality it's rather menu short-cuts, more on that in Chapter 3.1, working the menu system).

The [\*↑] and [#🔒] keys on the other hand have actual secondary functions, scan and keypad lock respectively. Press and hold the [0] key to display the battery voltage.

## NOTE

The charger and battery are fitted with matching notches so that you can charge your battery on its own! Practical if you have two batteries. That way you can charge one battery while still using your radio. Radio should be turned OFF during charge cycle.

### ■ Pound [#🔒] Key

When listening to broadcast FM a momentary press [#🔒] will start the scanning. Scanning in broadcast FM will

stop as soon as an active station is found, regardless of scanner resume method.

The radio features a keypad lock that locks out all keys except for the three side keys.

To enable or disable the keypad lock, press and hold the [#] key for about two seconds.

You can also enable so that the radio automatically locks the keypad after ten seconds from the menu, see Chapter 3.1, working the menu system (menu 23).

### ■Star[\*]/scan Key

To enable the scanner, press and hold the [\*] key for about two seconds. See Chapter 3.2, scanning for details.

### ■Menu and function keys

-The [MENU] key, used to enter the menu and confirm menu options.

-The [UP] and [DOWN] keys are used to navigate through the menu as well as select channels and step up or down in frequency (depending on operating mode).

-The [EXIT] key is used to exit menus and cancel menu options.

For a more in-depth explanation on how to work the menu see Chapter 3.1, working the menu system.

## Chapter 2. Basic Operations

### 2.1 Power and volume



Before we turn the power on, make sure you have attached the battery and antenna.

#### ■Turning the unit on

To turn the unit on, simply rotate the volume/power knob clockwise until you hear a "click". If your radio powers on correctly there should be an audible double beep after about one second and the display will show a message or flash the LCD depending on settings for about one second. Then it will display a frequency or channel. If the Voice prompt is enabled, the voice will announce "frequency mode" or "channel mode".

Figure 2.1.1.Frequency mode

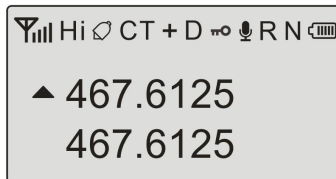
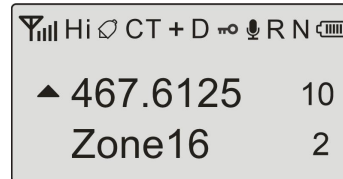


Figure 2.1.2.Channel mode



## ■Turning the unit off

Turn the volume/power knob counter-clock wise all the way until you hear a "click". The unit is now off.

## ■Adjusting the volume

To turn up the volume, turn the volume/power knob clock-wise. To turn the volume down, turn the volume/power knob counter-clock-wise. Be careful not to turn it too far, as you may inadvertently turn your radio off.

## 2.2 Making a call



Press the **【A/B】** key to switch the main channel to the other channel if there is 2 channels shown on the display.

Press the **【V/M】** key to switch between VFO and channel display.

- Call channel mode: After selecting a channel, hold down the **[PTT]** key to initiate a call to the current channel. Speak into the microphone with normal tone. Initiate a call, the red LED is on.
- Frequency mode call: Press the **[V/M]** key to switch to the frequency mode, the frequency range allowed

entering, press the [PTT] key, a call to the current channel. Speak into the microphone with normal tone.

Initiate a call, the red LED is on.

- Receive a call: When you release the [PTT] key, you can answer it without any action.

When receiving a call, the green LED is on.



To ensure the best reception volume, keep the distance between the microphone and the mouth at the time of transmission from 2.5 cm to 5 cm.

## 2.3 Channel selection

There are two modes of operation: Frequency (VFO) mode, and Channel or Memory (MR) mode.

For everyday use, Channel (MR) mode is going to be a whole lot more practical than Frequency (VFO) mode.

However, Frequency (VFO) mode is very handy for experimentation out in the field. Frequency (VFO) mode is also used for programming channels into memory.

In Channel (MR) mode you can navigate up and down the channel by using the [UP] and [DOWN] keys.

Ultimately which mode you end up using will depend entirely on your use case.

## 2.4 Frequency (VFO) mode

In Frequency (VFO) mode you can navigate up and down the band by using the [UP] and [DOWN] keys. Each press will increment or decrement your frequency according to the frequency step you've set your transceiver to.

You can also input frequencies directly on your numeric keypad with kilohertz accuracy.

The following example assumes the use of a 12.5 kHz frequency step.

### **Example 2.4.1. Entering the frequency 462.6125 MHz on display A**

1. Use the [V/M] key to switch to Frequency (VFO) mode.
2. Press [A/B] until the ▲ icon appears next to the upper display.
3. Enter [4][6][2][6][1][2][5] on the numeric keypad.



Just because you can program in a channel does not mean you're automatically authorized to use that frequency. Transmitting on frequencies you're not authorized to operate on is illegal, and in most jurisdictions a serious offence. If you get caught transmitting without a license you can and will get fined, and in worst case sent to jail. However, it is legal in most jurisdictions to listen. Contact your local regulatory body for further information on what laws, rules and regulations apply to your area.

## **2.5 Channel (MR) mode**

The use of Channel (MR) mode is dependent on actually having programmed in some channels to use.

Once you have channels programmed and ready, you can use the [UP] and [DOWN] keys to navigate between channels.

# **Chapter 3. Advanced Operations**

Chapter 3 covers the more advanced operations, such as setup of repeater offset and programming via computer link.

3.1 Working the menu system

3.2 Scanning

3.3 Fast scan frequency and pairing

3.4 Dual watch

3.5 CTCSS, DCS and Tone-burst

3.6 DTMF

3.7 DTMF call

3.8 FM Radio

3.9 VOX

3.10 Special DCS

3.11 Manual programming

## 3.1 Working the menu system

For a complete reference on available menu items and parameters, see Appendix C, Menu definitions.

### ■ Basic use

#### Procedure 3.1.1 Using the menu with arrow keys

1. Press the [MENU] key to enter the menu.
2. Use the [UP] and [DOWN] keys to navigate between menu items.
3. Once you find the desired menu item, press [MENU] again to select that menu item.
4. Use the [UP] and [DOWN] keys to select the desired parameter.
5. When you've selected the parameter you want to set for a given menu item;
  - To confirm your selection, press [MENU] and it will save your setting and bring you back to the main menu.
  - To cancel your changes, press [EXIT] and it will reset that menu item and bring you out of the menu entirely.
6. To exit out of the menu at any time, press the [EXIT] key.

## ■ Using short-cuts

As you may have noticed if you looked at Appendix C, Menu definitions, every menu item has a numerical value associated with it. These numbers can be used for direct access of any given menu item.

The parameters also have a number associated with them; see Appendix C, Menu definitions for details.

### **Procedure 3.1.2 Using the menu with short-cuts**

1. Press the [MENU] key to enter the menu.
2. Use the numerical keypad to enter the number of the menu item.
3. To enter the menu item, press the [MENU] key.
4. For entering the desired parameter you have two options:
  - A. Use the arrow keys as we did in the previous section; or
  - B. Use the numerical keypad to enter the numerical short-cut code.
5. And just as in the previous section;
  - A. To confirm your selection, press [MENU] and it will save your setting and bring you back to the main menu.
  - B. To cancel your changes, press [EXIT] and it will reset that menu item and bring you out of the menu entirely.
6. To exit out of the menu at any time, press the [EXIT] key.

## 3.2 Scanning

The radio features a built in scanner for the VHF and UHF bands. When in Frequency (VFO) mode it will scan in steps according to your set frequency step. In Channel (MR) mode it will scan your channels.

Dual Watch is inhibited while scanning



To enable the scanner, press and hold the [**\*↑**] key for about two seconds. Press [**#⏏**] key to exit scanning mode.

### ■ Scanning modes

The scanner is configurable to one of three ways of operation: Time, carrier or search, each of which is explained in further details in their respective section below.

#### **Procedure 3.2.1 Setting scanner mode**

1. Press the [MENU] key to enter the menu.
2. Enter [1][8] on your numeric keypad to come to scanner mode.
3. Press the [MENU] key to select.
4. Use the [UP] and [DOWN] keys to select scanning mode.

5. Press the [MENU] key to confirm and save.

6. Press the [EXIT] key to exit the menu.

### **-Time operation**

In Time Operation (TO) mode, the scanner stops when it detects a signal, and after a factory preset time out, it resumes scanning.

### **-Carrier operation**

In Carrier Operation (CO) mode, the scanner stops when it detects a signal, and after a factory preset time with no signal it resumes scanning.

### **-Search operation**

In Search Operation (SE) mode, the scanner stops when it detects a signal. To resume scanning you must press and hold the [\*↑] key again.



In the CPS Software Path: - Edit - Optional Features - Scan Mode, it can set three scan modes, and program the desired scan mode and write it to the radio.

## ■ Tone Scanning

Scanning for DCS and CTCSS Codes/ Tones

Scanning for a DCS code or CTCSS tone can be done while Frequency Mode (VFO) or Channel Mode (MR) is selected. Only when VFO mode is selected, can the detected code / tone be saved to menu 11/12.



DCS code and CTCSS tone scanning mode can be accessed with or without a signal being present. The scanning process itself only occurs while a signal is being received.

Not all repeaters requiring a DCS code or CTCSS tone for access will transmit one back. In that case, the transmitter of a station that can access the repeater would need to be scanned. In other words: this would be done by listening to stations on the repeater's input frequency.

### Scanning for a DCS Tone

1. Press [MENU] key to enter the menu.
2. Enter [1][1] on your numeric keypad to come to Menu 11: RX DCS.
3. Press the [MENU] key to select. Insure you have a tone activated (and it is not off).
4. Press the [\*↑] to begin DCS scanning.

## Scanning for CTCSS Tone

1. Press [MENU] key to enter the menu.
2. Enter [1][2] on your numeric keypad to come to Menu 12: RX CTCSS.
3. Press the [MENU] key to select. Insure you have a tone activated (and it is not off).
4. Press the [\*↑] to begin CTCSS scanning.

### 3.3 Fast scan frequency and pairing

This unit can be regarded as a receiver to quickly implement frequency monitoring, pairing, and callback functions.

1. In standby mode, press [MENU] [\*↑] to enter the scan receiving status, and the received frequency and sub tone code will be displayed on the screen.
2. Press [UP]/[DOWN] to switch the UHF/VHF band in the scan.
3. When the received frequency and subsonic code are relatively stable, pressing the [MENU] key of the unit will automatically store the received frequency and sub tone code and turn on the speaker.
3. Press and hold the [PTT] key of this unit to realize callback.



**The distance between the transmitter and the receiver is not less than 50 cm.**

### 3.4 Dual Watch

The radio features Dual Watch functionality (single receiver) with the ability to lock the transmit frequency to one of the two channels it monitors.

You can both have one receiver in your radio and flip-flop between two frequencies at a fixed interval (known as Dual Watch), or you can equip a radio with two receivers (known as Dual Receive or Dual VFO).

### **Procedure 3.4. Enabling or disabling Dual Watch mode**

1. Press [MENU] key to enter the menu.
2. Enter [7] on the numeric keypad to get to Dual Watch.
3. Press [MENU] to select.
4. Use the [UP] and [DOWN] keys to enable or disable.
5. Press the [MENU] key to confirm.
6. Press the [EXIT] key to exit the menu.

## **3.5 DCS, CTCSS and Tone-burst**

Some times when you're working with larger groups of people using the same channel, things can get very crowded, very fast. To minimize this problem, several methods of blocking out unwanted transmissions on your frequency have developed. In general, there are two forms of selective calling in two-way radio systems: Group calling, and individual calling.

Group calling is a one-to-many form of communication. Every radio in your working group is configured the

same way and any radio will make contact with every other radio in the group.

Individual calling, sometimes also known as paging, is a one-to-one form of communication. Every radio is programmed with a unique ID code. And only by sending out a matching code can you get that radio to open up to your transmissions.

The radio features three different ways of group calling:

- DCS
- CTCSS
- Tone-burst (1750Hz)

The radio does not feature any form of individual calling.

Using these features does NOT mean that others won't be able to listen in on your transmissions.

They only provide a method to filter out unwanted incoming transmissions. Any communications made while using these features will still be heard by anyone not employing filtering options of their own.

Also, you cannot change the DCS or CTCSS settings while in memory (MR) mode.

CTCSS and 1750Hz tone-burst are also popular methods among amateur radio operators to open up repeaters.

## ■DCS

DCS is set with menu 11 RX DCS and menu 13 TX DCS.

For a complete list of available DCS codes, see Appendix E, “DCS Codes”.

### **Procedure 3.5.1 DCS setup how-to**

1. Press the [MENU] key to enter the menu.
2. Enter [1][1] on the numeric keypad to get to receiver DCS.
3. Press [MENU] to select.
4. Enter desired DCS code on the numeric keypad.
5. Press [MENU] to confirm and save.
6. Enter [UP] on the numeric keypad to go to transmitter DCS.
7. Press [MENU] to select.
8. Enter desired DCS code on the numeric keypad. Make sure it's the same code as that you entered for receiver DCS.
9. Press [MENU] to confirm and save.
10. Press [EXIT] to exit the menu system.

For more information see the section called “11 RX DCS - Receiver DCS” and the section called “13 TX DCS - Transmitter DCS” in Appendix C, Menu definitions.

## ■ CTCSS

CTCSS is set with menu 12 RX CTCSS and menu 14 TX CTCSS.

For a complete list of available CTCSS codes and corresponding sub-tone frequencies, see Appendix D, CTCSS Table.

### **Procedure 3.5.2 CTCSS setup how-to**

1. Press the [MENU] key to enter the menu.
2. Enter [1][2] on the numeric keypad to get to receiver CTCSS (RX CTC).
3. Press [MENU] to select.
4. Enter desired CTCSS sub-tone frequency in hertz on the numeric keypad.
5. Press [MENU] to confirm and save.
6. Enter [UP] on the numeric keypad to go to transmitter CTCSS (TX CTC).
7. Press [MENU] to select.

8. Enter desired CTCSS sub-tone frequency in hertz on the numeric keypad. Make sure it's the same frequency as that you entered for receiver CTCSS.

9. Press [MENU] to confirm and save.

10. Press [EXIT] to exit the menu system.

For more information see the section called “12 RX CTCSS - Receiver CTCSS” and the section called “14 TX CTCSS - Transmitter CTCSS” in Appendix C, Menu definitions.

### ■1000Hz, 1450Hz, 1750Hz, 2100Hz Tone-burst

In the transmitting state, simultaneously press and hold the [PTT] and the [SK2] to send the selected tone-burst.

#### **Procedure 3.5.3 Tone-burst setup how-to**

1. Press the [MENU] key to enter the menu.

2. Enter [1][6] on the numeric keypad to get to tone-burst.

3. Press [MENU] to select.

4. Use the [UP] and [DOWN] keys to select between 1000Hz, 1450Hz, 1750Hz and 2100Hz.

5. Press [MENU] to confirm and save.

6. Press [EXIT] to exit the menu system.

### 3.6 DTMF

DTMF is an in-band signaling method using dual sinusoidal signals for any given code. Originally developed for telephony systems, it has proved a very versatile tool in many other areas.

In two-way radio systems, DTMF is most commonly used for automation systems and remote control. A common example would be in amateur radio repeaters where some repeaters are activated by sending out a DTMF sequence (usually a simple single-digit sequence).

|       | 1209Hz | 1336Hz | 1477Hz | 1633Hz |
|-------|--------|--------|--------|--------|
| 697Hz | 1      | 2      | 3      | A      |
| 770Hz | 4      | 5      | 6      | B      |
| 852Hz | 7      | 8      | 9      | C      |
| 941Hz | *      | 0      | #      | D      |

The radio has a full implementation of DTMF, including the A, B, C and D codes.



The numerical keys, as well as the [\*↑] and [#⏏] keys correspond to the matching DTMF codes. The A, B, C and D codes are located in the [MENU],[UP],[DOWN] and [EXIT] keys respectively.

## **3.7 DTMF calls**

### **CPS programmed**

The CPS programming settings of the DTMF call function include programming of important parameters such as DTMF code group, local ID code, and group call code.

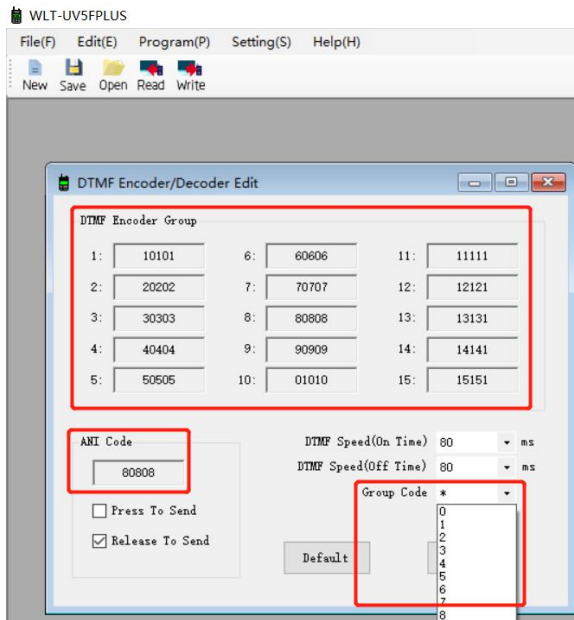
Before using the DTMF selective call function, make the following settings through the CPS programming software:

#### **Procedure 3.7.1 CPS programming setup how-to**

##### **1. DTMF encoding / decoding parameters Edit**

In the CPS software - "Edit" - "DTMF - DTMF Encoder / Decoder Edit", the important parameters such as DTMF Encoder group, ANI code, and group code are programmed.

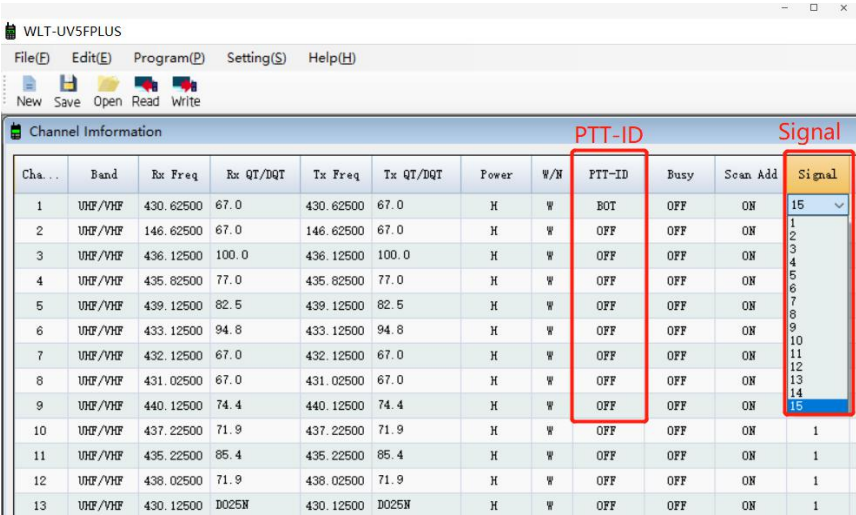
Figure 3.7.1 DTMF Encoder/ Decoder Edit



## 2. Set the signaling code, PTT-ID mode

### Method 1: PC settings

In the CPS software - "Edit" - "Channel Information", it can signal the channel selection, PTT-ID mode selection, and write it to the radio.



WLT-UV5FPLUS

File(F) Edit(E) Program(P) Setting(S) Help(H)

New Save Open Read Write

Channel Information

| Cha... | Band    | Rx Freq   | Rx QT/DQT | Tx Freq   | Tx QT/DQT | Power | W/N | PTT-ID | Busy | Scan Add | Signal |
|--------|---------|-----------|-----------|-----------|-----------|-------|-----|--------|------|----------|--------|
| 1      | VHF/VHF | 430.62500 | 67.0      | 430.62500 | 67.0      | H     | W   | BOT    | OFF  | ON       | 15     |
| 2      | VHF/VHF | 146.62500 | 67.0      | 146.62500 | 67.0      | H     | W   | OFF    | OFF  | ON       | 1      |
| 3      | VHF/VHF | 436.12500 | 100.0     | 436.12500 | 100.0     | H     | W   | OFF    | OFF  | ON       | 2      |
| 4      | VHF/VHF | 435.82500 | 77.0      | 435.82500 | 77.0      | H     | W   | OFF    | OFF  | ON       | 3      |
| 5      | VHF/VHF | 439.12500 | 82.5      | 439.12500 | 82.5      | H     | W   | OFF    | OFF  | ON       | 4      |
| 6      | VHF/VHF | 433.12500 | 94.8      | 433.12500 | 94.8      | H     | W   | OFF    | OFF  | ON       | 5      |
| 7      | VHF/VHF | 432.12500 | 67.0      | 432.12500 | 67.0      | H     | W   | OFF    | OFF  | ON       | 6      |
| 8      | VHF/VHF | 431.02500 | 67.0      | 431.02500 | 67.0      | H     | W   | OFF    | OFF  | ON       | 7      |
| 9      | VHF/VHF | 440.12500 | 74.4      | 440.12500 | 74.4      | H     | W   | OFF    | OFF  | ON       | 8      |
| 10     | VHF/VHF | 437.22500 | 71.9      | 437.22500 | 71.9      | H     | W   | OFF    | OFF  | ON       | 9      |
| 11     | VHF/VHF | 435.22500 | 85.4      | 435.22500 | 85.4      | H     | W   | OFF    | OFF  | ON       | 10     |
| 12     | VHF/VHF | 438.02500 | 71.9      | 438.02500 | 71.9      | H     | W   | OFF    | OFF  | ON       | 11     |
| 13     | VHF/VHF | 430.12500 | D025N     | 430.12500 | D025N     | H     | W   | OFF    | OFF  | ON       | 12     |

## Method 2: Radio menu settings

1. Press the [MENU] key to enter the menu.
2. Enter [1][7] on the numeric keypad to get to S-CODE.
3. Press [MENU] to select.
4. Use the [UP] and [DOWN] keys to select 1-15.
5. Press [MENU] to confirm and save.
6. Press [EXIT] to exit the menu system.

## 3.8 FM Radio

The FM radio function of the radios defaults to long press the [SK3]key.

### Procedure 3.8.1 Activating FM radio

In standby, press [SK3] to activate the FM Radio function, while it shows the FM frequencies on the display.

### Procedure 3.8.2 Searching FM stations

In the FM radio mode, press [#  ] to get it searching. When searching the correct station, it stops.

When listening to broadcast FM, the [A/B] key switches between 65-75 MHz and 76-108 MHz band.

### Procedure 3.8.3 Exit from the FM radio

Please press [SK3] to exit out from the FM radio mode.



When working on the FM frequencies, the current frequency and channel will be standby and it will be temporarily switched to two-way communication once getting the receiving signals, and then automatically get back to FM radio after the signal disappears. Press [PTT] to transmit, and still gets back to FM radio after 5 seconds.

### **3.9 VOX (Voice activated transmit)**

Enable the VOX; you can speak into the microphone to start transmitting instead of pressing the [PTT] key. A total of 10 levels are provided.

#### **Procedure 3.9 VOX setup how-to**

1. Press the [MENU] key to enter the menu.
2. Enter [4] on the numerical keypad, to enter the Vox Level.
3. Press [MENU] to select.
4. Press the [UP] or [DOWN] key to select 1 to 10.

-The larger the value, the higher the sensitivity.

5. Press [MENU] to confirm and save.

6. Press [EXIT] to exit the menu.

- Repeat the above operation and select OFF to turn off the voice-activated transmission function.

### 3.10 Special DCS

The special DCS is a dynamic DCS. Due to its dynamic nature, it is often impossible to crack DCS. He needs to set the DCS code and activate the special DCS function. This function is valid. After the special DCS signaling is enabled, only the sender and the receiver can set the same special DCS to implement the intercom.



**Other manufacturers or models may not be compatible because the encryption algorithms are different.**

#### Procedure 3.10 Special DCS setup how-to

1. Press the [MENU] key to enter the menu.

2. Enter [3] [3] on the numerical keypad, to enter the Special DCS.

3. Press [MENU] to select.
4. Press the [UP] or [DOWN] key to select ON.
  - **OFF: Turn off the special DCS function.**
5. Press [MENU] to confirm and save.
6. Press [EXIT] to exit the menu.

## 3.11 Manual programming

Memory channels are an easy way to store commonly used frequencies so that they can easily be retrieved at a later date.

The radio features 128 memory channels that each can hold: Receive and transmit frequencies, transmit power, group signaling information, bandwidth, ANI/ PTT-ID settings and a six character alphanumeric identifier or channel name .

Frequency Mode vs. Channel Mode

Switch between Modes by using the [V/M] key.

These two modes have different functions and are often confused.

Frequency Mode (VFO) - Used for a temporary frequency assignment, such as a test frequency or quick field

programming if permitted.

Channel Mode (MR) - Used for selecting preprogrammed channels.

All programming must be initially none in the frequency mode (VFO) only. From there you have the option of assigning the entered data to a specific channel for access in the channel mode.

Call tones, TX/RX tones, squelch, and power settings are adjustable on saved channels in channel mode.

### **Ex. Programming a Simplex Channel with CTCSS tone**

EXAMPLE New memory in Channel 11:

RX/TX = 462.625 MHz

TX CTCSS tone 67.0

#### **Procedure 3.11.1 Programming a Simplex Channel with CTCSS tone**

1. Set radio to VFO Mode by pressing [V/M] Channel number at the right will disappear.
2. Press [MENU][2][7][MENU] to come to Menu 27: Delete, Press [1][0][MENU] to deletes prior data in channel (Ex. CH-11).
3. Press [EXIT] to exit the menu. Enter RX frequency [4][6][2][6][2][5] on you numeric keypad.
4. Press [MENU][1][2][MENU] to come to Menu 12: RX CTCS, press [UP]/[DOWN] to select 67.0,and then

press [MENU] to confirm.

5. Press [MENU][1][4][MENU] to come to Menu 14: TX CTCSS, press [UP]/[DOWN] to select 67.0, and then press [MENU] to confirm.
6. Press [MENU][2][6][MENU] to come to Menu 26: Memory, and then Press [1][0][MENU] to confirm (Ex. CH-11).
7. Press [V/M] return to MR Mode. Channel number will re-appear.

### **Ex: Programming a Channel Repeater Offset with CTCSS Tone**

**EXAMPLE New memory in Channel 20:**

**RX = 462.625 MHz**

**TX = 452.625 MHz(This is a (+ 10.00) Offset)**

**TX CTCSS tone 67.0**

**RX CTCSS tone 67.0**

### **Procedure 3.11.2 Programming a Channel Repeater Offset with CTCSS Tone**

1. Set radio to VFO Mode by pressing [V/M] Channel number at the right will disappear.
2. Press [MENU] [2] [7] [MENU] to come to Menu 27: Delete, Press [1][9][MENU] to delete prior data in channel (Ex. CH-20).

3. Press [EXIT] to exit the menu. Enter RX frequency [4][6][2][6][2][5] on you numeric keypad.
4. Press [MENU] [1][2] [MENU] to come to Menu 12: RX CTCSS, press [UP]/[DOWN] to select 67.0, and then press [MENU] to confirm.
5. Press [MENU] [1][4] [MENU] to come to Menu 14: TX CTCSS, press [UP]/[DOWN] to select 67.0, and then press [MENU] to confirm.
6. Press [MENU] [2][5] [MENU] to come to Menu 25: Offset, enter offset frequency [1][0][0][0][0] on you numeric keypad.
7. Press [MENU] [2][4][MENU] to come to Menu 24: Direction, press [UP]/[DOWN] to select Plus or Minus offset.
8. Press [MENU] [2] [6] [MENU] to come to Menu 26: Memory, and then Press [1][9][MENU] to confirm (Ex 20).
9. Press [V/M] return to MR Mode. Channel number will re-appear.



**Certain Amateur Radio repeaters (especially in Europe) use a 1750Hz tone burst to open up the repeater.**

If you're still unable to make a connection, contact the person in charge of the radio system with your employer or your local amateur radio club, as the case may be.

If you for some reason want to listen to the repeater's input frequency instead, press [MENU] and [\*]

momentarily and you'll reverse your transmit and receive frequencies.

## **Commercial Radio Setup**

PLMR users in the United States are mandated to move to 12.5 kHz narrowband communication in the 150-174 MHz VHF and 421-512MHz UHF bands by January 1, 2013.

Follow these instructions to set your radio to Narrowband mode: This section is only true for VFO mode. WN is settable on a per channel basis and has to be set prior to storing a channel. Once a channel has been programmed, the channel must be deleted and reprogrammed to change the WN setting.

1. Press the [V/M] key to enter frequency mode.
2. Press the [MENU] key to enter the menu.
3. Enter [5] on the numerical keypad.
4. Press [MENU] to select.
5. Use the [UP] and [DOWN] keys to select between Wide and Narrow.
6. Press [MENU] to confirm and save
7. Press [EXIT] to exit the menu.

## **Amateur Radio Setup**

In contrast with Commercial radio operators, who often need very specific requirements to be compatible with a very specific radio implementation, Amateur radio operators tend to need the broadest possible settings in order to be compatible with as many systems as possible. This basically implies turning all the fancy features that you typically might need for a commercial setup off.

In a typical Amateur radio setup the following settings would be recommended:

- Set bandwidth to Wide (menu item 5).
- Turn DCS and CTCSS off (menu items 11 through 14).
- Turn ROGER, DTMF-ST, PTT-ID off (menu item 30, menu items 15 and menu items 19).
- Turn off Squelch Tail Elimination (STE) features (menu items 29).

For further information see Appendix C, Menu definitions and Chapter 3.1, working the menu system.

## Chapter 4. Product Safety Guide

### Important Safety Information

Before using your radio, please read these general precautions and warnings.

#### Warning and Notice Statements

To make the most of this radio, it must be used properly.

Please read the installation and operating instructions carefully before using the radio. Special attention must be paid to the **WARNING** and **NOTICE** statements in this manual.



#### **WARNING**

Statements identify conditions that could result in personal injury or loss of life.



#### **NOTICE**

Statements identify conditions that could cause damage to the radio or other equipment.

## FCC Statement

This device complies with part 15 of the FCC Rules. Operation is subject to the following two (2) conditions:

1. This device may not cause harmful interference, and
2. This device must accept any interference received, including interference that may cause undesired operation.



This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and 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 circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.



Any changes or modifications to this unit not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

SAR tests are conducted using standard operating positions accepted by FCC with the device transmitting at its highest certified power level in all tested frequency bands, although the SAR is determined at the highest certified power level, the actual SAR level of the device while operating can be well below the maximum value. Before a new model is available for sale to the public, it must be tested and certified to the FCC that it does not exceed the exposure limit established by the FCC. Tests for each product are performed in positions and locations as required by the FCC.

For body worn operation, this device has been tested and meets the FCC RF exposure guidelines when used with and accessory designated for this product or when used with and accessory that contains no metal.

To maintain compliance with FCC RF exposure guidelines hold the transmitter and antenna at least 1 inch (2.5 centimeters) from your face and speak in a normal voice, with the antenna pointed up and away from the face.

The equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. In order to comply with the FCC RF exposure requirement, the antenna installation must comply with following:

Users must be fully aware of the hazards of the exposure and able to exercise control over their RF exposure to qualify for the higher exposure limits.

Your wireless hand-held portable transceiver contains a low power transmitter. This product sends out radio frequency (RF) signals when the Push-to-Talk (PTT) button is pressed.

The device is authorized to operate at a duty factor not to exceed 50%.

## **Safety Training Information**

This radio complies with the following guidelines and standards regarding RF energy and electromagnetic energy levels as well as evaluation of those levels for human exposure:

- United States Federal Communications Commission, Code of Federal Regulations; 47 CFR § 1.1307, 1.1310 and 2.1093
- American National Standards Institute (ANSI) / Institute of Electrical and Electronic Engineers (IEEE) C95.1:2005; Canada RSS102 Issue 5 March 2015
- Institute of Electrical and Electronic Engineers (IEEE) C95.1:2005 Edition

The following WARNINGS and NOTICE information will make you aware of RF exposure hazards and how to assure you operate the radio within the FCC RF exposure limits established for the radio.

## **WARNINGS**

To control your exposure and ensure compliance with the General Population/Uncontrolled 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:**

- Your radio generates electromagnetic RF (radio frequency) energy when it is transmitting. To ensure that you and those around you are not exposed to excessive amounts of that energy, **DO NOT** touch the antenna when transmitting.

- DO NOT allow children or anyone unfamiliar with proper procedures to operate the radio without supervision.
- 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.
- Changes or modifications to your radio MAY VOID its compliance with FCC (Federal Communications Commission) rules and make it illegal to use.
- Failure to observe any of these warnings may cause you to exceed FCC RF exposure limits or create other dangerous conditions.

## **EU Regulatory Conformance**

As certified by the qualified laboratory, the product is in compliance with the essential requirements and other relevant provisions of the following directives:

- 2014/53/EU
- 2012/19/EU
- 2011/65/EU
- 2006/66/EU

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

### **CE Requirements:**

- European Users should note that operation of this unit in Transmit mode requires the operator to have a valid Amateur Radio License 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.

#### **•Attention in case of use**

This product can be used in EU countries and regions, including: Belgium (BE), Bulgaria (BG), Czech Republic (CZ), Denmark (DK), Germany (DE), Estonia (EE), Ireland (IE), Greece (EL), Spain (ES), France (FR), Croatia (HR),

Italy (IT), Cyprus (CY), Latvia (LV), Lithuania (LT), Luxembourg (LU), Hungary (HU), Malta (MT), Netherlands (NL), Austria (AT), Poland (PL), Portugal (PT), Romania (RO), Slovenia (SI), Slovakia (SK), Finland (FI), Sweden (SE) and United Kingdom (UK).

For the warning information of the frequency restriction, please refer to the package or manual section.

### •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.



## **IC Requirements:**

Licence-exempt radio apparatus

This device contains licence-exempt transmitter(s)/receiver(s) that comply with Innovation, Science and Economic Development Canada's licence-exempt RSS(s).

Operation is subject to the following two conditions:

- (1) This device may not cause interference.
- (2) This device must accept any interference, including interference that may cause undesired operation of the device.

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

- (1) l'appareil ne doit pas produire de brouillage;
- (2) l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement

## Appendix A. - Troubleshooting

| Phenomena                                            | Analysis                                                                              | Solution                                                                           |
|------------------------------------------------------|---------------------------------------------------------------------------------------|------------------------------------------------------------------------------------|
| You cannot turn on the radio.                        | The battery may be installed improperly.                                              | Remove and reattach the battery.                                                   |
|                                                      | The battery power may run out.                                                        | Recharge or replace the battery.                                                   |
|                                                      | The battery may suffer from poor contact caused by dirty or damaged battery contacts. | Clean the battery contacts or replace the battery.                                 |
| During receiving, the voice is weak or intermittent. | The battery voltage maybe low.                                                        | Recharge or replace the battery.                                                   |
|                                                      | The volume level may be low.                                                          | Increase the volume.                                                               |
|                                                      | The antenna maybe loose or maybe installed incorrectly.                               | Turnoff the radio, and then remove and reattach the antenna.                       |
|                                                      | The speaker maybe blocked.                                                            | Clean the surface of the speaker.                                                  |
| You cannot communicate with other group members.     | The frequency or signaling type maybe inconsistent with that of other members.        | Verify that your TX/RX frequency and signaling type are correct.                   |
|                                                      | You may be too far away from other members.                                           | Move towards other members.                                                        |
| You hear unknown voices or noise.                    | You may be interrupted by radios using the same frequency.                            | Change the frequency, or adjust the squelch level.                                 |
|                                                      | The radio in analog mode maybe set with no signaling.                                 | Request your dealer to set signaling for the current channel to avoid interference |
| You are unable to hear anyone                        | You may be too far away from other members.                                           | Move towards other members.                                                        |

|                                     |                                                                                                                                            |                                                                    |
|-------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------|
| because of too much noise and hiss. | You may be in an unfavorable position. For example, your communication may be blocked by high buildings or blocked in an underground area. | Move to an open and flat area, restart the radio, and try again.   |
|                                     | It may be the result of external disturbance (such as electromagnetic interference).                                                       | Stay away from equipment that may cause interference.              |
| The radio keeps transmitting.       | VOX may be turned on or the headset is not installed in place                                                                              | Turn off the VOX function. Check that the headphones are in place. |
| You cannot use the keys.            | The keypad may not work temporarily.                                                                                                       | Restart the radio.                                                 |



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

## Appendix B. - Technical Specifications

### General

|                       |                                                                                                                                                                             |
|-----------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Frequency Range       | (VHF)136-174MHz/(UHF)400-480MHz (Rx)<br>136-174MHz,400-480MHz(Scanning)<br>462.5500-462.7250, 462.5625-462.7125MHz(TX/RX)<br>467.5500-467.7250, 467.5625-467.7125MHz(TX/RX) |
| Memory Channel        | 128 Groups                                                                                                                                                                  |
| Operation Voltage     | DC 7.4 V $\pm$ 10%                                                                                                                                                          |
| Battery Capacity      | 2200mAH (Li-Ion)                                                                                                                                                            |
| Frequency Stability   | 2.5ppm, 5ppm                                                                                                                                                                |
| Operating Temperature | -30°C to +50°C                                                                                                                                                              |
| Mode of Operation     | Simplex                                                                                                                                                                     |
| Antenna Impedance     | 50ohm                                                                                                                                                                       |

### Transmitter Part

|                 |                                                                                                                                                           |
|-----------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------|
| RF Output Power | 462 MHz Main Channels: 35.51dBm<br>462 MHz interstitial channels: 35.53dBm<br>467 MHz Main Channels: 35.60 dBm<br>467 MHz interstitial channels:22.66 dBm |
| FM Modulation   | 11K0F3E@12.5KHz@25KHz                                                                                                                                     |

|                        |                              |
|------------------------|------------------------------|
| Spurious Emission      | -36dBm < 1GHz, -30dBm > 1GHz |
| Adjacent Channel Power | 60dB @ 12.5KHz@25KHz         |
| Transmission current   | ≤1600mA                      |

## Receiver Part

|                                |                      |
|--------------------------------|----------------------|
| Receive Sensitivity            | 0.25μV (12dB SINAD)  |
| Adjacent Channel Selectivity   | ≥55dB@12.5KHz@25KHz  |
| Inter Modulation and Rejection | ≥55dB@12.5KHz@25KHz  |
| Conducted Spurious Emission    | ≤-57dB@12.5KHz@25KHz |
| Rated Audio Power Output       | 1W @16 ohms          |
| Receive current                | ≤380mA               |
| Rated Audio Distortion         | ≤5%                  |



All specifications may be modified without prior notice or liability. Thank you.

The Radio is pre-configured with 8 GMRS repeater channels: 467.5500, 467.5750, 467.6000, 467.6250, 467.6500, 467.6750, 467.7000, and 467.7250 MHz. In basic terms, a repeater is a device that is used to increase the range of two way radios. Repeaters will receive a transmission on one frequency and simultaneously rebroadcast that transmission on a different frequency. Repeaters are often set up in a fixed location and connected to an antenna that is mounted at a higher elevation to provide better range than is normally available with radio-to-radio (simplex) communications.

Using GMRS repeaters can significantly increase the range of your radio, but just tuning to one of the repeater channels isn't necessarily going to work. You first have to be sure there is a repeater listening on that channel's frequency, and you have to be within range of that repeater.

It is important to keep in mind that a GMRS repeater is not necessarily intended for public use. They are owned by individuals and are sometimes intended for private use or require permission to use. Before connecting to a GMRS repeater, be sure that you have permission or that the owner is fine with public use. The description on the myGMRS website usually indicates if permission is required and provides a way to get in touch with the owner.

## Appendix C. - Menu definitions

| Menu<br>No | Name<br>(Full name)           | Setting                                              | Description                                                                                                                                                                                                          |
|------------|-------------------------------|------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 0          | Squelch -Squelch level        | [0 - 9]                                              | Setting the squelch to 0 will open up the squelch entirely.<br>- Squelch silences the receiver when there is no signal.<br>- Setting the squelch to 0 will open up the squelch entirely.                             |
| 1          | Step - Frequency Step         | 12.50K[4] 25.0K[6]                                   | Selects the amount of frequency change in VFO/Frequency mode when scanning or pressing the [up] or [DOWN] keys.                                                                                                      |
| 2          | Tx Power - Transmitting Power | High[0]                                              | The radio only transmit high power                                                                                                                                                                                   |
| 3          | Power save-Battery Save       | OFF[0]   ON[1]                                       | Select to activate or deactivate battery saver. Activating this feature will extend battery life, but you may miss the first few syllables before RX opens.<br>- ON: open the function.<br>- OFF: close the function |
| 4          | Vox Level - Voice Operated TX | OFF [0]   1   2   3   4   5   6   7   8   9   10[10] | When enabled it is not necessary to push the [PTT] key on the transceiver. Adjust the gain level to an appropriate sensitivity to allow smooth transmission.                                                         |

|    |                                                 |                                                           |                                                                                                                                                                                                                                                                                                               |
|----|-------------------------------------------------|-----------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 5  | Bandwidth<br>-Wideband /<br>Narrowband          | Width [0]   Narrow [1]                                    | -Wideband (25 kHz bandwidth) or<br>-Narrowband (12.5 kHz bandwidth).                                                                                                                                                                                                                                          |
| 6  | Backlight - Display<br>Illumination Time        | Bright [0]   1-10 in 1 second steps                       | Time-out for the LCD backlight. (seconds)                                                                                                                                                                                                                                                                     |
| 7  | Dual Standby - Dual<br>Watch, Dual<br>Reception | OFF [0]   ON [1]                                          | Monitor [A] and [B] at the same time. The display with the most recent activity ([A] or [B]) becomes the selected display.                                                                                                                                                                                    |
| 8  | Beep Prompt -<br>Keypad Beep                    | OFF [0]   ON [1]                                          | Allows audible confirmation of a key press.                                                                                                                                                                                                                                                                   |
| 9  | Voice - Voice<br>Prompt                         | OFF[0]   ON[1]                                            | Turns the menu action voice prompt on or off.                                                                                                                                                                                                                                                                 |
| 10 | Tx over time<br>-Transmission<br>Time-out-Timer | 15[1] - 600[40] in 15 second steps<br>(TIMEOUT-15)/15=[n] | This feature provides a safety switch that limits transmission time to a programmed value. This will promote battery conservation by not allowing you to make excessively long transmissions, and in the event of a stuck PTT switch it can prevent interference to other users as well as battery depletion. |
| 11 | Rx DCS - Receiver                               | OFF[0]   see DCS Table in Appendix E                      | Mutes the speaker of the transceiver in the absence of a                                                                                                                                                                                                                                                      |

|    |                              |                                               |                                                                                                                                                                                                                                                                                                                                                                               |
|----|------------------------------|-----------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|    | DCS                          |                                               | specific low-level signal. If the station you are listening to does not transmit this specific signal, you will not hear anything.                                                                                                                                                                                                                                            |
| 12 | Rx CTCSS - Receiver CTCSS    | OFF[0]   see CTCSS Table in Appendix D        | Mutes the speaker of the transceiver in the absence of a specific and continuous sub-audible signal. If the station you are listening to does not transmit this specific and continuous signal, you will not hear anything.                                                                                                                                                   |
| 13 | Tx DCS - Transmitter DCS     | OFF [0]   see DCS Table in Appendix E         | Transmits a specific low-level signal to unlock the squelch of a distant receiver (usually a repeater).                                                                                                                                                                                                                                                                       |
| 14 | Tx CTCSS - Transmitter CTCSS | OFF[0]   see CTCSS Table in Appendix D        | Transmits a specific and continuous sub-audible signal to unlock the squelch of a distant receiver (usually a repeater).                                                                                                                                                                                                                                                      |
| 15 | DTMFST - DTMF Side Tone      | OFF [0]   DT-ST[1]   ANI-ST [2]   DT+ANI[3]   | <p>Determines when DTMF Side Tones can be heard from the transceiver speaker. OFF: No DTMF Side Tones are heard.</p> <ul style="list-style-type: none"> <li>- DT-ST: Side Tones are heard only from manually keyed DTMF codes.</li> <li>- ANI-ST: Side Tones are heard only from automatically keyed DTMF codes.</li> <li>- DT+ANI: All DTMF Side Tones are heard.</li> </ul> |
| 16 | R-TONE- Tone-burst           | 1000Hz[0]   1450Hz[1]   1750Hz[2]   2100Hz[3] | 1000Hz, 1450Hz, 1750Hz, 2100Hz Tone-burst To send out a tone-burst;                                                                                                                                                                                                                                                                                                           |

|    |                                   |                                                                                                                   |                                                                                                                                                                                                                                |
|----|-----------------------------------|-------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|    |                                   |                                                                                                                   | You simultaneously will holding down the [PTT] and [SK1] key.                                                                                                                                                                  |
| 17 | S-CODE - Signal Code              | 1[0]   2[1]   3[2]   4[3]   5[4]   6[5]   7[6]   8[7]   9[8]   10[9]   11[10]   12[11]   13[12]   14[13]   15[14] | Selects 1 of 15 DTMF codes. The DTMF codes are programmed with software and are up to 5 digits each.                                                                                                                           |
| 18 | Scan Mode - Scanner Resume Method | Time[0] Carrier [1]  Search [2]                                                                                   | Scanning Resume Method :<br>Time: Scanning will resume after a fixed time has passed.<br>Carrier: Scanning will resume after the signal disappears.<br>Search: Scanning will not resume.                                       |
| 19 | PTT-ID - When to send the PTT-ID  | OFF [0]   BOT [1]   EOT [2]   BOTH [3]                                                                            | Determines when to sent PTT-ID. OFF: No ID is sent.<br>BOT: The selected S-CODE is sent at the beginning.<br>EOT: The selected S-CODE is sent at the ending.<br>BOTH: The selected S-CODE is sent at the beginning and ending. |
| 20 | MDF-A - Channel Mode A Display    | Name [0]   Frequency [1]                                                                                          | [A] Name/Frequency Mode Display Format.<br>Name: Displays the channel name.<br>Frequency: Displays programmed Frequency.<br>Note: Names must be entered using software.                                                        |
| 21 | MDF-B - Channel Mode B Display    | Name [0]   Frequency [1]                                                                                          | [B] Name/Frequency Mode Display Format<br>Name: Displays the channel name.<br>Frequency: Displays programmed Frequency.                                                                                                        |

|    |                                       |                                                        |                                                                                                                                                                                                  |
|----|---------------------------------------|--------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|    |                                       |                                                        | Note: Names must be entered using software.                                                                                                                                                      |
| 22 | Busy Lockout                          | OFF [0]   ON [1]                                       | Disables the [PTT] key on a channel that is already in use. The transceiver will sound a beep tone and will not transmit if the [PTT] key is pressed when a channel is already in use.           |
| 23 | Key Auto Lock – Automatic Keypad Lock | OFF [0]   ON [1]                                       | When ON, the keypad will be locked if not used in 8 seconds. Pressing the [#] key for 3 seconds will unlock the keypad.                                                                          |
| 24 | Direction - Frequency Shift Direction | None [0]   Plus [1]   Minus[2]                         | Enables access of repeaters in VFO/Frequency Mode.<br>None: TX = RX (simplex).<br>Plus: TX will be shifted higher in frequency than RX.<br>Minus: TX will be shifted lower in frequency than RX. |
| 25 | Offset - Frequency shift amount       | Manual input frequency (range 0.001-99.998. eg 05.000) | Specifies the difference between the TX and RX frequencies                                                                                                                                       |
| 26 | Memory - Store a Memory Channel       | 001 - 128                                              | This menu is used to either create new or modify existing channels (1 through 128) so that they can be accessed from MR/Channel Mode.                                                            |
| 27 | Delete - Delete a memory channel      | 001 - 128                                              | This menu is used to delete the programmed information from the specified channel (1 through 128) so that it can either be programmed again or be left empty.                                    |
| 28 | Alarm Mode                            | On site [0]   Send sound [1]                           | On site: Sounds alarm through your radio speaker only.                                                                                                                                           |

|    |                                 |                           |                                                                                                                                                                                                                                                                                                                                     |
|----|---------------------------------|---------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|    |                                 | Send code [2]             | Send sound: Transmits a cycling tone over-the-air.<br>Send code: Transmits ANI code and alarm.                                                                                                                                                                                                                                      |
| 29 | TAIL - Squelch Tail Elimination | OFF [0]   ON [1]          | This function is used eliminate squelch tail noise between handhelds that are communicating directly (no repeater).<br>Reception of a 55 Hz or 134.4 Hz tone burst mutes the audio long enough to prevent hearing any squelch tail noise.                                                                                           |
| 30 | ROGER - Roger Beep              | OFF [0]   ON [1]          | Sends an end-of-transmission tone to indicate to other stations that the transmission has ended.                                                                                                                                                                                                                                    |
| 31 | Language                        | English [0]   Chinese [1] | English or Chinese language prompts (including voice and display) are allowed.                                                                                                                                                                                                                                                      |
| 32 | Reset - Restore defaults        | VFO [0]   ALL [1]         | Resets the radio to factory defaults, with some exceptions.<br>- VFO: Will reset all functional setting and renew factory default parameter of function setting, but not resetting the parameter of channels.<br>- ALL: Will reset all functional setting and the parameter of all channels, and renew factory default of function. |
| 33 | Special DCS                     | OFF [0]   ON [1]          | The special DCS is a dynamic DCS, only DCS is set, and this function is enabled.<br>- ON: Turn on the special DCS function;<br>- OFF: Turn off the special DCS function.                                                                                                                                                            |

## Appendix D. - CTCSS Table

CTCSS CHART (Hz)

| Number | Frequency | Number | Frequency | Number | Frequency | Number | Frequency | Number | Frequency |
|--------|-----------|--------|-----------|--------|-----------|--------|-----------|--------|-----------|
| 1      | 67.0      | 2      | 69.3      | 3      | 71.9      | 4      | 74.4      | 5      | 77.0      |
| 6      | 79.7      | 7      | 82.5      | 8      | 85.4      | 9      | 88.5      | 10     | 91.5      |
| 11     | 94.8      | 12     | 97.4      | 13     | 100       | 14     | 103.5     | 15     | 107.2     |
| 16     | 110.9     | 17     | 114.8     | 18     | 118.8     | 19     | 123.0     | 20     | 127.3     |
| 21     | 131.8     | 22     | 136.5     | 23     | 141.3     | 24     | 146.2     | 25     | 151.4     |
| 26     | 156.7     | 27     | 159.8     | 28     | 162.2     | 29     | 165.5     | 30     | 167.9     |
| 31     | 171.3     | 32     | 173.8     | 33     | 177.3     | 34     | 179.9     | 35     | 183.5     |
| 36     | 186.2     | 37     | 189.9     | 38     | 192.8     | 39     | 196.6     | 40     | 199.5     |
| 41     | 203.5     | 42     | 206.5     | 43     | 210.7     | 44     | 218.1     | 45     | 225.7     |
| 46     | 229.1     | 47     | 233.6     | 48     | 241.8     | 49     | 250.3     | 50     | 254.1     |

# Appendix E. - DCS Table

## DCS CODE LIST

| Number | Code  | Number | Code  | Number | Code  | Number | Code  | Number | Code  |
|--------|-------|--------|-------|--------|-------|--------|-------|--------|-------|
| 1      | D023N | 2      | D025N | 3      | D026N | 4      | D031N | 5      | D032N |
| 6      | D036N | 7      | D043N | 8      | D047N | 9      | D051N | 10     | D053N |
| 11     | D054N | 12     | D065N | 13     | D071N | 14     | D072N | 15     | D073N |
| 16     | D074N | 17     | D114N | 18     | D115N | 19     | D116N | 20     | D122N |
| 21     | D125N | 22     | D131N | 23     | D132N | 24     | D134N | 25     | D143N |
| 26     | D145N | 27     | D152N | 28     | D155N | 29     | D156N | 30     | D162N |
| 31     | D165N | 32     | D172N | 33     | D174N | 34     | D205N | 35     | D212N |
| 36     | D223N | 37     | D225N | 38     | D226N | 39     | D243N | 40     | D244N |
| 41     | D245N | 42     | D246N | 43     | D251N | 44     | D252N | 45     | D255N |
| 46     | D261N | 47     | D263N | 48     | D265N | 49     | D266N | 50     | D271N |
| 51     | D274N | 52     | D306N | 53     | D311N | 54     | D315N | 55     | D325N |
| 56     | D331N | 57     | D332N | 58     | D343N | 59     | D346N | 60     | D351N |

|     |       |     |       |     |       |     |       |     |       |
|-----|-------|-----|-------|-----|-------|-----|-------|-----|-------|
| 61  | D356N | 62  | D364N | 63  | D365N | 64  | D371N | 65  | D411N |
| 66  | D412N | 67  | D413N | 68  | D423N | 69  | D431N | 70  | D432N |
| 71  | D445N | 72  | D446N | 73  | D452N | 74  | D454N | 75  | D455N |
| 76  | D462N | 77  | D464N | 78  | D465N | 79  | D466N | 80  | D503N |
| 81  | D506N | 82  | D516N | 83  | D523N | 84  | D526N | 85  | D532N |
| 86  | D546N | 87  | D565N | 88  | D606N | 89  | D612N | 90  | D624N |
| 91  | D627N | 92  | D631N | 93  | D632N | 94  | D645N | 95  | D654N |
| 96  | D662N | 97  | D664N | 98  | D703N | 99  | D712N | 100 | D723N |
| 101 | D731N | 102 | D732N | 103 | D734N | 104 | D743N | 105 | D754N |
| 106 | D023I | 107 | D025I | 108 | D026I | 109 | D031I | 110 | D032I |
| 111 | D036I | 112 | D043I | 113 | D047I | 114 | D051I | 115 | D053I |
| 116 | D054I | 117 | D065I | 118 | D071I | 119 | D072I | 120 | D073I |
| 121 | D074I | 122 | D114I | 123 | D115I | 124 | D116I | 125 | D122I |
| 126 | D125I | 127 | D131I | 128 | D132I | 129 | D134I | 130 | D143I |
| 131 | D145I | 132 | D152I | 133 | D155I | 134 | D156I | 135 | D162I |
| 136 | D165I | 137 | D172I | 138 | D174I | 139 | D205I | 140 | D212I |

|     |       |     |       |     |       |     |       |     |       |
|-----|-------|-----|-------|-----|-------|-----|-------|-----|-------|
| 141 | D223I | 142 | D225I | 143 | D226I | 144 | D243I | 145 | D244I |
| 146 | D245I | 147 | D246I | 148 | D251I | 149 | D252I | 150 | D255I |
| 151 | D261I | 152 | D263I | 153 | D265I | 154 | D266I | 155 | D271I |
| 156 | D274I | 157 | D306I | 158 | D311I | 159 | D315I | 160 | D325I |
| 161 | D331I | 162 | D332I | 163 | D343I | 164 | D346I | 165 | D351I |
| 166 | D356I | 167 | D364I | 168 | D365I | 169 | D371I | 170 | D411I |
| 171 | D412I | 172 | D413I | 173 | D423I | 174 | D431I | 175 | D432I |
| 176 | D445I | 177 | D446I | 178 | D452I | 179 | D454I | 180 | D455I |
| 181 | D462I | 182 | D464I | 183 | D465I | 184 | D466I | 185 | D503I |
| 186 | D506I | 187 | D516I | 188 | D523I | 189 | D526I | 190 | D532I |
| 191 | D546I | 192 | D565I | 193 | D606I | 194 | D612I | 195 | D624I |
| 196 | D627I | 197 | D631I | 198 | D632I | 199 | D645I | 200 | D654I |
| 201 | D662I | 202 | D664I | 203 | D703I | 204 | D712I | 205 | D723I |
| 206 | D731I | 207 | D732I | 208 | D734I | 209 | D743I | 210 | D754I |

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