

Operation instructions

USER'S MANUAL



Professional wireless intercom

PROFESSIONAL FM TRANSCEIVER

User Manual for KSUN DM8200

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Installation of Accessories Installing the Mobile Radio

To install the transceiver (transmitter/receiver radio), select a safe and convenient location inside the vehicle to minimize risks to passengers and yourself while the vehicle is in motion. Whenever possible, choose a well-ventilated area away from direct sunlight. Use the provided screws to mount the installation bracket to the vehicle. Ensure all fasteners are tightly secured; use only the specified mounting bracket and screws during installation.

Installing the Antenna

Before starting, you need to install a high-performance, well-tuned antenna. The

success of the installation largely depends on the type of antenna and the correctness of its installation. The performance of the radio transmitter/receiver will be affected by the quality of the antenna system and its installation.

Base station antennas should be installed at a high position with no obstacles around; the radio antenna for this device is suitable for installation at the center of the car roof. A taller antenna will provide better coverage.

Notes

- Use a low-loss coaxial feeder with an impedance (resistance between two nodes in a circuit) of $50\ \Omega$ to match the input impedance of the radio. Connecting the antenna to the radio receiver via a power line with an impedance (complex impedance) other than $50\ \Omega$ will reduce the efficiency of the antenna system and damage the radio receiver.
- Transmitting without connecting an antenna or other matched load may damage the radio receiver. Always

connect the antenna to the radio before transmitting.

- All fixed stations must be equipped with a lightning rod to reduce the risk of fire, electric shock, or damage to the radio receiver.

Connecting the Power Cable

Ensure you use a 12V car battery with sufficient current capacity. If the current supplied to the transceiver radio is insufficient, the transmit output power may drop excessively and a warning signal may be generated. **Never** connect the transceiver to a 24V battery. If it is necessary to connect the transceiver to a 24V power supply, select a designated DC-to-DC converter.

To avoid the risk of short circuits, disconnect other wires from the negative terminal of the battery before connecting the radio.

Notes

- This radio transceiver is designed for use with a 13.8V power supply. Never

power the radio with a 24V battery. Before installing the device, check that the battery polarity and voltage are correct. Note the battery connection and disconnection procedures as follows:

- Use the power cable specified for the radio transceiver to connect to the battery terminals; connect the red wire to the positive (+) terminal and the black wire to the negative (-) terminal. Exercise caution during connection to prevent the risk of short circuits.
- After confirming that the connection is correct and secure, you can power on the device. Do not remove the fuse holder from the cable; otherwise, incorrect connections may cause the device to emit smoke.

Installing the Microphone

Align the groove on the plug of the handheld microphone with the top of the external microphone (Push-To-Talk, PTT) jack, insert it into the jack, and press gently downward until the latch clicks into place.

To remove the microphone from the radio, pull out the microphone locking knob.

Installing the Fixed Station

- Do not connect the radio directly to an AC power outlet until all connections are completed.
- Ensure both the radio and the DC power supply are turned off.
- Connect the DC power connector of the radio to the connector on the DC power cable, ensuring the connection polarity is correct (Red: Positive, Black: Negative).
- Press the connector firmly until the locking tab clicks into place. Note: To ensure the radio functions optimally, we recommend using the power supply designated by COMRADE.

Replacing the Fuse

If the fuse blows, identify and resolve the cause first. After the issue is resolved, replace the fuse. If the newly installed fuse continues to blow, disconnect the power cable and contact an authorized dealer or service center for assistance.

Understanding the Device

Front Panel (Previous Toolbar)

No.	Function Description
1	Power Button: Short press to turn on, long press to turn off the power.
2	LED Indicator
3	Microphone Jack
4	Left Button: Short press to select a channel, long press to select a zone.
5	Programmable F3 Key
6	Down Button: Short press to decrease volume, long press to quickly decrease volume.

7	OK Button: Press to confirm or enter the menu.
8	Programmable F4 Key
9	Right Button: Short press to select a channel, long press to select a zone.
10	Programmable F1 Key
11	Up Button: Short press to increase volume, long press to quickly increase volume.
12	Programmable F2 Key
13	Orange Button: Short press to activate the emergency call function, long press to deactivate the emergency call function.

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Dynamic Indicator

Rear Panel

No.	Function Description
1	ANT: Connect an external antenna or dummy load to this terminal.
2	DC 13.8V: Connect to a 13.8V DC power supply.
3	Cable Connector: Connect to a GPS antenna.
4	PC Connector:

	Connect to a computer.
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Standard Microphone

No.	Function Description
1	PTT Transmit Button
2	Microphone (MIC)

Additional Microphone

No.	Function Description
1	Left Button
2	PTT Transmit Key
3	Programmable F3 Key
4	Microphone (MIC)

5	Numeric Keypad
6	Delete Key
7	Programmable F1 Key
8	Up Button
9	Programmable F2 Key
10	Confirm Button
11	Right Button
12	Programmable F4 Key
13	Down Button
14	# Key

Basic Operations

Display Icons

Icon	Descripti	Icon	Descripti
------	-----------	------	-----------

	on		on
Signal Level Icon	Signal Level	PC Connection Icon	Connect ed to Compute r
H/M/L	High/Medium/Low Power	Headphone Bluetooth h Icon	Connect ed to Bluetooth Headpho nes
Digital Mode Icon	Digital Mode	Direct Mode Icon	Direct Mode/Con versatio n Mode
Analog Mode Icon	Analog Mode	Message Send Failure Icon	Message Sending Failed
Analog-Digital Compatible Mode	Analog-Digital Compatible Mode	Message Send Success Icon	Message Sent Successf ully

Icon			
Digital-Analog Compatible Mode Icon	Digital-Analog Compatible Mode	Read Message Icon	Message Read
Private Call Icon	Private Call	Unread Message Icon	Unread Message
Group Call Icon	Group Call	Missed Call Icon	Missed Call
All Call Icon	All Calls	Mute All Icon	All Muted
Scan Enabled Icon	Scan Enabled	Emergency Icon	Emergency
Roaming Icon	Roaming	Input Status Icon	Normal Input (Black Icon) / Error Input (Red

			Icon)
Location Included Icon	Location Included	App Connection Icon	Connected to App
Keypad Lock Icon	Keypad Locked	Monitor Enabled Icon	Monitor Enabled

Power On/Off

Short press the Power Button to turn on the radio; an audio voice prompt will announce the current channel number.

Long press the Power Button for 3 seconds to turn off the radio.

Volume Control

Press the [UP Button] to increase the volume; press the [DOWN Button] to decrease the volume.

Channel Selection

To select a channel, press the [Left Button] or [Right Button]. A voice prompt will play when you switch channels.

Zone Selection

This radio supports up to 64 zones, with a maximum of 16 channels per zone. The 64 zones support up to 1024 channels via software programming. Select the desired zone in the menu; after successful channel switching, a voice prompt will play. Alternatively, press and hold the [Left Button] or [Right Button] for 2 seconds to select a zone.

Dual Mode Switching

If the current channel mode supports D/A (Digital/Analog) compatibility, press the side [AD On] button to switch the channel mode. If the current channel mode is Analog-Digital Compatible, press the [AD On] key to switch to Digital-Analog Compatible mode, and vice versa.

Calling Methods

In digital mode, you can make private calls, group calls, or all calls. In dual-frequency mode:

- In analog mode, long press the PTT key to transmit directly.

- On an analog-digital compatible channel, hold the PTT transmit button; if the timeout for analog call transmission has not expired, you can return the call within the timeout period.
- On a digital-analog compatible channel, if the timeout period has not expired, press the PTT button to initiate a digital call within the specified waiting time for a return call.

When transmitting, hold the walkie-talkie vertically, 3-4 cm away from your mouth, and speak in a normal tone. The LED indicator will turn red, indicating that transmission is in progress.

Private Call

If the private call confirmation function is enabled, you must confirm whether private call is enabled or activated on the current channel before initiating a private call.

1. If the private call ID on the current digital channel is set to the default value, press the PTT (Push-To-Talk) button on the mobile radio to activate the voice radio communication mode, which only allows

signal transmission in one direction at a time.

2. You can select a private call from the contact list and then press the PTT (Push-To-Talk) button on the mobile radio to make the call.

3. Enter the contact menu, access the manual dial menu or press the programmed manual dial key, enter the private call number you want to call, and then press the PTT (Push-To-Talk) button to activate the voice radio communication mode (which only allows signal transmission in one direction at a time).

4. You can select a private call from the missed/received/dialed call logs and then press the PTT button to make the call.

5. You can set a "One-Touch Call" button as a private call button, then press the programmed button to make a private call.

Group Call

1. If the group call ID on the current digital channel is set to the default value, press the PTT mode key to initiate a call.

2. You can select a group call from the

contact list and then press the PTT key to make the call.

3. You can select a group call from the callable entries and then press the PTT key to make the call.

4. You can set a "One-Touch Access" button as a group call button, then press the programmed button to transfer the group call.

All Call

1. If all call IDs on the current digital channel are set to the default value, press the PTT key to initiate a call.

2. You can select "All Calls" from the contact list and then press the PTT button to make the call.

Receiving and Returning Calls

When there is an incoming call on the current channel, the LED indicator turns green. When receiving a group call or private call, you can long press the PTT key for a period to return the call. On compatible channels, the walkie-talkie detects both digital and analog signals

(must be connected to the Continuous Tone-Coded Squelch System/Continuous Digital-Coded Squelch System, CTCSS/CDCSS) during reception. If a matching signal is detected, you can make a call within the specified time.

Setting Buttons

For greater convenience, you can program the F1, F2, F3, F4 buttons, orange button, and their short-press/long-press actions to define different functions.

The programmable buttons include the following functions:

No.	Name	Description
1	Unassigned	No function assigned
2	Function Keys 1-6	By default, used for group calls/private calls/call notifications or quick SMS

		<p>sending in digital mode; used for making emergency calls in analog mode.</p>
3	Manual Dial	<p>Quick input of private call numbers to make calls</p>
4	Emergency Mode	<p>To send emergency messages, set to short press only</p>
5	Emergency Stop	<p>To exit emergency mode, set to long press only</p>
6	Monitor	<p>Quick</p>

		enable or disable of the monitor function
7	Backlight On/Off	Quick switching of backlight mode
8	Keypad Lock	Quick lock or unlock of the keypad
9	Scan On/Off	Quick enable or disable of the scan function
10	All Tone Signals On/Off	Quick enable or disable of all tones
11	Short Message	Quick access to short

		messages
12	Zone Switch	Quick access to [Zone Switch]
13	Priority Interruption	Force termination of calls on the current channel
14	AD Switch	Temporary switching of AD mode or AD channel
15	Address List	Quick access to the [Address List] menu
16	Radio On	Quick access to the [Radio On] menu
17	Radio Off	Quick

		access to the [Radio Off] menu
18	Radio Check	Quick access to the [Radio Check] menu
19	Remote Monitor	Quick access to the [Remote Monitor] menu
20	High/Medium/Low Power	Quick switching of high/medium/low power
21	Repeater/Talkie	Quick enable or disable of talk-around mode
22	Interference	Temporary ignoring of

	Cancellation	unwanted channel activity
23	Continuous Monitor	Enable or disable the Always On Monitor function
24	Site Block On/Off	Quick blocking of the current site
25	Manual Site Roaming	Quick jump to the next accessible site
26	Channel Display Mode Switch (Frequency/ Channel)	Quick switching of channel display mode

Functions and Operations

Contacts

In the Contacts menu, you can view all contacts, add new contacts, or perform manual dialing.

1. Group Call

If you select a contact as a group call contact, you can select the menu to view their ID or send a message.

2. Private Call

When you select a contact as a private call contact, you can view their details, edit their name or ID, delete the contact, send a message, send a call alert, send a device check, send a remote monitor request, or enable/disable the device.

Function	Description
Call Alert	Send an alert to a private contact and remind them to return the call.
Device Check	Allows you to check if the target radio is active on the current channel without sending a tone alert to the

	target device.
Remote Monitor	Allows you to send a "Remote Monitor" request to the target device via the menu. If the request is successful, you can turn on the target radio's microphone and monitor its activity.
Device Enable	Allows you to send a "Turn On Device" command to a target device that has been turned off, enabling it to be used in normal mode.
Device Disable	Allows you to remotely disable another radio device. The device cannot operate unless it receives a turn-on command or is reprogrammed via software to enable it.

3. All Call

If the contact type is "All Call", you can select the menu to view its ID or press the PTT button to make a call.

4. Manual Dial

You can manually enter a private call number to make a call, send a call alert, send a message, check the device, remotely monitor the device, turn on the device, or turn off the device.

5. New Contact

You can add a private call contact to your contact list. When editing the name, press the [*] key to delete characters, press the [#] key to switch input methods, and the maximum length of the name is 16 characters. Then enter the number, which can range from 1 to 16776415. After successfully adding the private call contact, the new contact will appear in your contact list.

Scanning

1. Enable/Disable Scanning

If the current channel has been added to the scan list and the list contains at least 2 channels, this function can be enabled.

The radio cycles through the programmed scan list of current channels to detect voice activity (supports both analog and digital channels). During scanning, the LED flashes red and stops on the channel where activity is detected. If you do not want to answer calls on this channel, press the preset [Block Nuisance Calls] key to temporarily remove the nuisance channel from the scan list. To exit the scanning process, you can disable it in the scan menu, change the channel, or press the programmed [Scan On/Off] key.

Note

If the "Auto Scan" function is enabled for the channel via software, scanning will start automatically when you switch to that channel. If the programmed key is set to On/Off, pressing the key will enable the scan function.

2. View/Edit List

Users can view members, add or delete channels by editing the scan list. The list can contain a maximum of 16 members. Creating new scan lists or deleting existing ones from the device is not

allowed. Digital and analog channels will be displayed in a single scan list.

Zones

This radio supports up to 64 zones, with 16 channels supported per zone, totaling 1024 channels. Enter the "Zones" menu and select the desired zone.

SMS Messaging

1. New Message

You can edit the desired text message (maximum 140 characters) and send it to a private call contact or group call contact. When editing the message, press the [#] key to switch input methods, press the [*] key to delete and edit, and press the Up/Down buttons to move the input cursor. In non-numeric input, the "1" key is the symbol key and the "0" key is the space key. After editing the message, you can select a contact from the address list to send the message, or manually enter a number to send it.

2. Inbox

The inbox folder can store a maximum of

50 received SMS messages. You can reply to, forward, or delete them.

- Unread messages: [Unread Message Icon]
- Read messages: [Read Message Icon]

3. Preset Messages

Using software, users can save 10 standard preset SMS messages, each with a maximum length of 140 characters. Preset messages can also be assigned to one-touch calls, allowing you to send the message by pressing the programmed key.

4. Outbox

Access the outbox menu to check if SMS messages have been sent successfully. The outbox folder can store a maximum of 50 SMS messages. If a message is sent successfully, it will be marked with [Success Icon]; if the message fails to send, it will be marked with [Failure Icon]. You can resend, forward, or delete the message.

5. Delete All

This function can be used to delete all

messages in the inbox or outbox. "Delete All" will remove all messages in the folder at once. This applies to the "Inbox" and "Outbox", but preset messages cannot be deleted.

Call Logs

1. Missed Calls

The missed calls list can store a maximum of 50 entries. Users can view details, press the PTT key to return the call, add the contact to the contact list, or delete the entry.

2. Received Calls

The received calls list can store a maximum of 50 entries. For private calls, users can view details, press the PTT key to transmit, add the contact to the contact list, or delete the entry.

3. Dialed Calls

The dialed calls list can store a maximum of 50 private call records. Users can view details, press the PTT key to transmit, add the contact to the contact list, or delete the entry.

4. Clear Entries

This function allows you to easily delete missed calls, received calls, or dialed calls. The "Clear All" function will delete all call logs at once.

Settings

Working in Talk Around Mode

When the repeater malfunctions or the walkie-talkie is out of the repeater's coverage area, you can continue to communicate in talk-around mode. When the Talk Around function is enabled, the screen displays [Direct Mode Icon], and the TX (transmit) frequency is the same as the RX (receive) frequency. If you change the channel, enable the scan function, or restart the radio, this function will be disabled.

Note: To enable this function, the TX frequency must be different from the RX frequency, and the channel must be set to "Talk-Around Permitted" in the programming software.

Press the programmed Talk Around mode button to switch between DM (Direct Mode) and RM (Repeater Mode).

Tone/Alert

To customize the radio's tones, "Tone Alert" includes settings for all tones, call alert tones, message tones, and keypad tones. If "All Tones" is turned off, all signals except the emergency call signal will be muted.

Data Transmission Power Level

Allows users to change the power level. Three levels are available: High (designated as B), Medium (designated as C), and Low (designated as H).

Backlight

You can select "ON" or "Auto" to adjust the backlight settings. When "Auto" is selected, the backlight will dim after 5 seconds of inactivity; when "ON" is selected, the backlight will remain on continuously.

Boot Screen

Allows users to enable or disable the boot screen via the menu. If the boot screen function is enabled, the COMRADE logo will be displayed on the screen when the

radio is turned on.

Keypad Lock

Allows users to enable or disable the keypad lock via the menu. If the keypad is locked [Keypad Lock Icon], press [OK] + [#] to unlock it.

LED Indication

Enables LED indication for all indicators via the menu, including TX/RX transmission indicators, scan/roaming indicators, and keypad indicators. If LED indicators are turned off, the screen will dim, so use this function with caution.

Power-On Password

If you have enabled the power-on password function via software, you can change the password in this menu. To successfully change the password, you must first enter the old password correctly, then enter the new password twice.

Note: This menu is only functional if the power-on password is set via software.

Real-Time Clock (RTC)

Configuration

This option allows you to set the current date and time. Press the * key to delete the existing value, re-enter the new date and time, and press the [OK] key to confirm.

USB Drive Mode

If voice memos are stored in the radio's memory, you can switch to external USB drive mode to download the voice memos to a computer for playback. Restart the radio to exit USB drive mode.

Select Theme

Allows users to select the screen display style. Four themes are available: Default Theme, Light Yellow, Light Blue, and Light Green.

System Information

This function allows you to view basic information about the radio, including My Number, Firmware Version, and CPU (Central Processing Unit) Version.

Channel Settings

The Channel Settings function is used to modify the current settings of digital channels; this allows you to change the RX (receive) and TX (transmit) frequencies, channel name, TOT (Transmit Time Out), TX contact, CC (Color Code) index, time slot selection, group list, and RX data. For analog channels, it allows you to change the RX and TX frequencies, channel name, TOT (Talk Time Timer), and CTCSS/CDCSS (Continuous Tone-Coded Squelch System/Continuous Digital-Coded Squelch System).

Note: After making changes to the settings, return to the home screen to save the settings; only then will all modified data take effect.

Digital Emergency Operation/Alarm Signal

You can initiate an emergency from any screen at any time. This radio supports three types of emergency signals and three emergency modes.

Types of Emergency Modes

- **Normal:** The radio transmits an alarm signal and displays audio and visual indicators.
- **Silent:** The radio transmits an alarm signal without emitting any audio or visual indicators.
- **Silent with Voice:** The radio transmits an alarm signal without audio or visual indicators but allows incoming calls.

Types of Alerts

- **Alarm:** In this mode, alarm information can be sent, and the alarm mode will exit after receiving an ACK signal or after reaching the maximum number of retries.
- **Emergency Signal with Call:** You can press the programmed "Emergency On/Off" button to send emergency information, then press the PTT button to initiate an emergency call.
- **Voice-Guided Emergency Alarm:** You can press the preset Emergency On/Off button to send emergency information, then speak into the microphone. Since you do not need to press the PTT button, your voice and background noise will be

transmitted automatically.

1. Sending an Emergency Signal

If the current channel has an emergency system added and is defined as a response channel, press the orange button to send an emergency signal. The LED will flash red, and an emergency icon ▲ will appear.

2. Exiting Emergency Mode

The radio will exit emergency mode when one of the following events occurs: receiving confirmation of the emergency signal; exhausting all attempts to send the alarm signal; or the recipient long-pressing the orange emergency button.

3. Receiving Emergency Information

When an emergency signal is received, the emergency call icon ▲ will appear, a beep will sound, and the radio will display the emergency caller's nickname. Press and hold the orange button to exit.

Analog Emergency Mode/Alarm Signal

On analog channels using 5-tone

signaling or DTMF (Dual-Tone Multi-Frequency) signaling (transmitting signals on two sets of frequencies), you can send emergency information to others, and the walkie-talkie will emit an alarm signal. The types and methods of emergencies are the same as those for digital emergencies.

1. Sending an Emergency Signal

On an analog channel, if the alarm type is set to 5-tone or DTMF (Dual-Tone Multi-Frequency) signaling, short press the orange key to send an alarm signal, and long press the orange key to exit alarm mode.

2. Receiving Emergency Information

When receiving an analog signal, if the receiver decodes the type as an emergency call and decoding is successful, the walkie-talkie will display the ▲ icon and "Emergency Received", and emit a "beep" prompt tone. To exit emergency mode, press and hold the orange button.

Lone Worker

If you are unable to press any buttons or

send voice messages within a limited time, this function will trigger an emergency. The radio will automatically send a signal to seek help. To enable this function, use software to set the trigger time and warning time.

Note: Lone Worker is an optional function.

Direct TDMA Mode

In TDMA (Time Division Multiple Access) direct mode, all radios in the same group must communicate in the same time slot. Two communication channels (Time Slot 1 and Time Slot 2) on the same frequency do not interfere with each other.

Note: This function is only available in digital mode.

Pseudo Trunk

This function allows user terminals to dynamically select an idle logical channel for communication: when one time slot is occupied, the terminal automatically switches to the second time slot.

If a time slot is set as a pseudo trunk and one time slot is already occupied, the

terminal can automatically switch to the idle time slot. If the TX time slot for pseudo trunk is not set, both Time Slot 1 and Time Slot 2 can be used for transmission; if the pseudo trunk TX time slot is set to 1, you can only press the PTT key to call during Time Slot 1; if the pseudo trunk TX time slot is set to 2, you can only press the PTT key to call during Time Slot 2. The TX time slot is not suitable for reception; press the PTT key to call on the time slot where the signal is received.

Note: To ensure communication stability, both the transmitting and receiving ends must enable the pseudo trunk function.

Radio Communication Priority Interruption

The call priority function allows you to forcefully interrupt an ongoing call. A preemptive call can interrupt other calls with lower priority on the current channel to free up the channel. There are 5 levels of voice priority, with Level 0 being the lowest, Level 3 being the highest, and

emergency calls having the highest priority.

You can also press the programmed [Priority Interruption] key to send a priority interruption command to free up the channel for receiving new calls or messages.

Note: This function is only available in digital mode.

Roaming

Roaming is available in digital mode, allowing your radio to extend its coverage beyond a single site by connecting to various available sites linked via an IP site connection system. When roaming is enabled, an icon will appear; when disabled, no icon is displayed. The LED flashes red during searching. To enable/disable roaming in the menu, set site blocking or unblocking, or enable roaming automatically.

Note: Each channel can enable either the scan function or the roaming function, but not both simultaneously.

Transmission Time (TOT) Timer

The TOT (Transmit Time Out) timer prevents users from occupying the channel for an extended period. If the channel is busy, the time will be shortened. After the specified time elapses, the radio will emit a beep and stop transmitting automatically.

Transmission Permission

Digital Channels

This function can restrict transmission on busy channels. Three options are available: Always, No Color Code, and Free Channel.

- If "Always" is selected, pressing the PTT key will initiate transmission directly at any time.
- If "No Color Code" is selected, transmission is allowed only if the color code is not in use; you cannot transmit on the channel if the color code is already in use.
- If "Free Channel" is selected, you

cannot transmit on the channel if it is already in use. If the channel is busy, a warning tone will sound when you press the PTT key.

Analog Channels

This function can restrict transmission on channels that are already in use; you cannot transmit on the channel if it is occupied. Three options are available: Off, Carrier, and CTCSS/CDCSS (Continuous Tone-Coded Squelch System/Continuous Digital-Coded Squelch System).

- If "Off" is selected, pressing the PTT key will initiate transmission directly each time.
- If "Carrier" is selected, you cannot transmit on the channel if it is being used by others.
- If "CTCSS/CDCSS" is selected, you cannot transmit on the channel if it is already in use and the CTCSS/CDCSS code is being used. If the channel is busy, a warning tone will sound when you press the PTT key.

Radio Functions in Analog Mode

In analog mode, the radio only supports four main operation sections in the menu: Scan, Zone, Settings, and Recording.

Noise Reduction Level

In analog mode, this function allows you to adjust the noise suppression threshold required to activate the radio's audio. If two radio stations are close to each other with strong signals, the noise reduction level can be set higher; if two radio stations are far apart with weak signals, the noise suppression level can be set lower. The appropriate noise reduction level depends on the surrounding RF (Radio Frequency) noise conditions. The SQL (Squelch) noise reduction level can be set from 1 to 9, with the default setting being Level 3.

Tone and Digital Noise Reduction System (CTCSS/CDCSS)

On analog channels, you can set a unique CTCSS/CDCSS code to ensure the privacy of your communications (if CTCSS/CDCSS is set). The current channel requires CTCSS/CDCSS matching for the radio to receive incoming signals. You can select CTCSS/CDCSS (Continuous Tone-Coded Squelch System/Continuous Digital-Coded Squelch System) from the standard CTCSS frequency table or standard CDCSS code table, or manually enter non-standard values using programming software.

- **Decoding:** You can only hear a call if the receiver receives a call containing the corresponding decoding.
- **Encoding:** The signals you send can only be heard by users whose radios have a CTCSS/CDCSS (Continuous Tone-Coded Squelch System/Continuous Digital-Coded Squelch System) signal matching yours.

Note: Non-standard codes are allowed on analog channels. You can manually enter non-standard codes as needed on

compatible channels, but only specific CTCSS/CDCSS codes can be selected from the list.

Analog Signals

2-Tone Signals

2-Tone Contacts

As long as the user sets the 2-Tone signaling type for the current channel, the 2-Tone Contacts menu supports up to 32 2-Tone call lists; you can select one of the contacts to send.

Sending 2-Tone Signals

On an analog channel, press the programmed "One-Touch Call" key to send 2-Tone signals. The radio display will show: "Sending 2-Tone Call".

Receiving 2-Tone Signals

Allows users to define the call type of the 2-Tone system as "Call Prompt", "Voice Call Prompt", or "Selective Call". When a signal is received and the decoding format matches, the radio will display the call type and emit a warning tone. The LED

will turn orange during receiver reset.

5-Tone Signals

5-Tone Contacts

As long as the user sets the 5-Tone signaling type for the current channel, the 5-Tone Contacts menu supports up to 200 5-Tone call lists; you can select one of the contacts to change the address code of the decoding sequence and encoding sequence.

Sending 5-Tone Signals

On an analog 5-Tone channel, press the programmed "One-Touch Call" key to send 5-Tone signals. The walkie-talkie display will show: "Sending 5-Tone Call".

Receiving 5-Tone Signals

Allows users to define the call type of the 5-Tone system as "Normal Call", "Emergency Call", "Delete", "Activate", "Silence Request", or "ACK 2 Authorization". If the received signal matches the decoding type and the LED turns orange during receiver reset, decoding is successful.

DTMF Tone Signals

DTMF (Dual-Tone Multi-Frequency) tone signals are generated by listening to the handset.

DTMF Tone Contacts

Although the user sets the 5-Tone signaling type for the current channel, the contact list contains a total of 200 entries. In the DTMF Tone Contacts menu, you can select one of the contacts to change the address code of the decoding sequence and encoding sequence.

Sending DTMF Signals

On an analog channel, press the programmed "One-Touch Call" key to send DTMF signals. The radio display will show: "Sending DTMF Call".

Receiving DTMF Signals

Allows users to define the call type of the DTMF system as "Normal Call", "Emergency Call", "Delete", "Activate", "Silence Request", or "ACK 2 Authorization". When a signal is received and matches the decoding type, decoding

is successful. The LED will emit an orange light during receiver reset.

CTCSS Tone Frequency Table

(Continuous Tone-Coded Squelch System)

CTC SS Tone Cont act No.	Freq uenc y [Hz]	CTC SS Tone Cont act No.	Freq uenc y [Hz]	CTC SS Tone Cont act No.	Freq uenc y [Hz]	CTC SS Tone Cont act No.	Freq uenc y [Hz]
1	62.5	14	100. 0	27	156. 7	40	196. 6
2	67.0	15	103. 5	28	159. 8	41	199. 5
3	69.3	16	107. 2	29	162. 2	42	203. 5
4	71.9	17	110. 9	30	165. 5	43	206. 5
5	74.4	18	114. 8	31	167. 9	44	210. 7

6	77.0	19	118.8	32	171. 3	45	218. 1
7	79.7	20	123. 0	33	173. 8	46	225. 7
8	82.5	21	127. 3	34	177. 3	47	229. 1
9	85.4	22	131. 8	35	179. 9	48	233. 6
10	88.5	23	136. 5	36	183. 5	49	241. 8
11	91.5	24	141. 3	37	186. 2	50	250. 3
12	94.8	25	146. 2	38	189. 9	51	254. 1
13	97.4	26	151. 4	39	192. 8	-	-

Note: There are a total of 39 standard CTCSS/CDCSS codes for analog

channels in the table, and 12 of the assigned codes are CTCSS/CDCSS codes specific to compatible channels.

Standard CDCSS Code Table

(Continuous Digital-Coded Squelch System)

No.	Forward Code	Reverse Code	No.	Forward Code	Reverse Code	No.	Forward Code	Reverse Code
1	D023N	D023I	29	D174N	D174I	57	D445N	D445I
2	D025N	D025I	30	D205N	D205I	58	D464N	D464N
3	D026N	D026I	31	D223N	D223I	59	D465N	D465N
4	D031N	D031I	32	D226N	D226I	60	D466N	D466I

5	D03 2N	D03 2I	33	D24 3N	D24 3I	61	D50 3N	D50 3I
6	D04 3N	D04 3I	34	D24 4N	D24 4I	62	D50 6N	D50 6I
7	D04 7N	D04 7I	35	D24 5N	D24 5I	63	D51 6N	D51 6I
8	D05 1N	D05 1I	36	D25 1N	D25 1I	64	D53 2N	D53 2I
9	D05 4N	D05 4I	37	D26 1N	D26 1I	65	D54 6N	D54 6I
10	D06 5N	D06 5I	38	D26 3N	D26 3I	66	D56 5N	D56 5I
11	D07 1N	D07 1I	39	D26 5N	D26 5I	67	D60 6N	D60 6I
12	D07 2N	D07 2I	40	D27 1N	D27 1I	68	D61 2N	D61 2I

13	D07 3N	D07 3I	41	D30 6N	D30 6I	69	D62 4N	D62 4I
14	D07 4N	D07 4I	42	D31 1N	D31 1I	70	D62 7N	D62 7I
15	D11 4N	D11 4I	43	D31 5N	D31 5I	71	D63 1N	D63 1I
16	D11 5N	D11 5I	44	D33 1N	D33 1I	72	D63 2N	D63 2I
17	D11 6N	D11 6I	45	D34 3N	D34 3I	73	D65 4N	D65 4I
18	D12 5N	D12 5I	46	D34 6N	D34 6I	74	D66 2N	D66 2I
19	D13 1N	D13 1I	47	D35 1N	D35 1I	75	D66 4N	D66 4I
20	D13 2N	D13 2I	48	D36 4N	D36 4I	76	D70 3N	D70 3I

21	D13 4N	D13 4I	49	D36 5N	D36 5I	77	D71 2N	D71 2I
22	D14 3N	D14 3I	50	D37 1N	D37 1I	78	D72 3N	D72 3I
23	D15 2N	D15 2I	51	D41 1N	D41 1I	79	D73 1N	D73 1N
24	D15 5N	D15 5I	52	D41 2N	D41 2I	80	D73 2N	D73 2N
25	D15 6N	D15 6I	53	D41 3N	D41 3I	81	D73 4N	D73 4I
26	D16 2N	D16 2I	54	D42 3N	D42 3I	82	D74 3N	D74 3I
27	D16 5N	D16 5I	55	D43 1N	D43 1I	83	D75 4N	D75 4I
28	D17 2N	D17 2I	56	D43 2N	D43 2I	-	-	-

Technical Specifications

General Specifications	Details
Frequency Range	146-174 MHz; 403-410 MHz; 417-422 MHz; 433-450 MHz; 459-460 MHz; 469-470 MHz
Number of Channels	1024
Number of Zones	64
Channel Spacing	12.5 kHz / 25 kHz
Power Supply	13.8V (±20%) DC
Frequency Stability	±1.5 ppm
Antenna Impedance	50 Ω
Dimensions (L x W x H)	162 × 157 × 51 mm

Weight	1300 g
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Transmitter Specifications	Details
RF Output Power	High Power: 45W; Medium Power: 25W; Low Power: 10W
Modulation Method (4FSK)	12.5 kHz Data Only: 7K60FXD; 12.5 kHz Data & Audio: 7K60FXE
FM Modulation	12.5 kHz: 8K50F3E; 25 kHz: 16K0F3E
Modulation Limit	± 2.5 kHz @ 12.5 kHz; ± 5 kHz @ 25 kHz
FM Noise	-40 dB

Conducted Emissions	-36 dBm < 1 GHz / -30 dBm > 1 GHz
Adjacent Channel Power	< -60 dB
Audio Response	+1 / -3 dB
Audio Distortion	0.03
Digital Voice Encoder Type	AMBE3000

Receiver Specifications	Details
Digital Sensitivity	0.25 μ V (5% Bit Error Rate)
Analog Sensitivity (Signal)	0.25 μ V (12 dB SINAD)
Intermodulation	60 dB
Adjacent Channel Selectivity	60 dB

Interference Rejection	60 dB
FM Noise	-40 dB
Audio Frequency Response	+1 / -3 dB
Audio Output Power	5 W
Audio Distortion	3% (Typical)
Conducted Emissions	-57 dB
GPS Accuracy	Horizontal Accuracy: < -10 m (Under Good Signal Conditions)
TTFF (Time To First Fix) - Cold Start	< 1 Minute (Under Good Signal Conditions)
TTFF (Time To First Fix) - Hot Start	< 10 Seconds (Under Good Signal Conditions)

Temperature Specifications	Details
Operating Temperature	-20°C ~ +70°C
Storage Temperature	-30°C ~ +85°C

Provided Accessories

Note: You can purchase the following accessories from the dealer. After carefully opening the radio package, check the items listed in the table below. If any items are missing or damaged during transportation, contact your dealer immediately.

Item	Quantity
Microphone	1
Mounting Bracket	1
Microphone Hanger	1
DC Power Cable	1

Screws (Self-Tapping Screws)	2
Fuse	1
User Manual	1