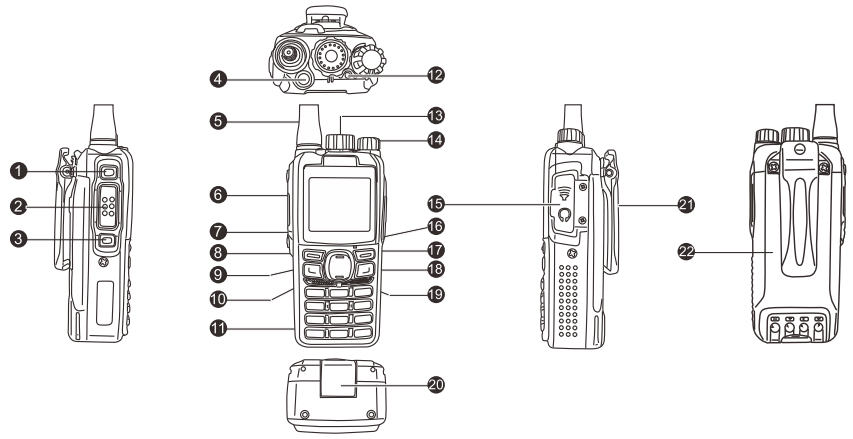
DM-960

USER'S MANUAL

DMR Digital Radio

Radio controls



1、FP1 (side key 1)
2、PTT button
3、FP2 (Side key 2)
4、FP3 (Top key 3)
5、Antenna
6、LCD Display
7、Up key
8、OK / Menu key
9、P1 (Programmable key)
10、Speaker
11、Numeric Keypad
12、LED indicator
13、Channel selector
14、Volume control/ Power switch
15、MIC /SP connector
16、MIC
17、Back key (function multiplex key)
18、P2 (Programmable key)
19、Down key
20、Battery latch
21、Belt clip
22、Battery pack

Note: Buttons like [FP? / P?] are programmable keys.

Common keys

1. Menu navigator / OK button
2. Up / Down key
3. Back / Digital & Analog switch button
4. Exit / Back to home screen key

Icons & Characters on LCD display

- Function and usage for following icons or characters showing on LCD display.

(RSSI): Signal strength indicator icon, the more bars show, the stronger the signal is. Five bars indicate the strongest signal.

- Monitor

Indicates it is monitoring the selected channel

- Power level

"L" means the radio is set at low power
"H" means the radio is set at high power

- Ringing tones are disabled.

Tones are turned off.

- VOX

Appears when VOX is activated.

- GPS available

This icon appears when GPS is activated for locating There is no icon appearing, if GPS is not available or out of range or not receiving data from satellite when GPS is enabled.

- Scan

Indicates Scanning is started

- Priority scan

"P" in scanning list, channels with "P" are set as priority scan channels

- Unread SMS

Indicates there is unread SMS in inbox
Indicates the inbox is full

- Emergency alarm

Indicates the radio is in emergency mode

- Safety

Indicates communication encryption is activated

- Battery pack

The number of bars indicates the remaining battery level.

- CTCSS

"QT" means CTCSS is activated

◆ In standby mode, "QT" appearing means CTCSS is available in receiving.

◆ In transmitting, "QT" appearing means CTCSS is available in transmitting

- CDCSS

"DQT" means DCS is activated

◆ In standby mode, "DQT" appearing means DCS is available in receiving.

◆ In transmitting, "DQT" appearing means DCS is available in transmitting

Function identification between Analog and Digital mode.

This icon indicates the function is only available in Analog mode

This icon indicates the function is only available in Digital mode

Note: There is no special icon for function that is available both in Analog and Digital mode.

Initiate a call icon

When initiating a call, the below icon appears on LCD display, and also ID type indicates in Contact list.

Indicates initiating a private call

Indicates initiating a group call

Indicates initiating a general call

Note: These icons only appear in Digital mode.

Receive a call icon

Indicates receiving a private call

Indicates receiving a group call

Indicates receiving a general call

Note: These icons only appear in Digital mode.

LED indicators

The LED indicator indicates the working status of the radio. Turn on or off LED indicator can be programmed by software.

◆ Lighting Red — radio is transmitting.

◆ Light Green — radio is receiving.

◆ Flashing red light — radio is scanning.

Note:

① In analog mode, when the LED indicator flashes or lights green, it indicates the radio detects the active signal over the air.

② If the busy channel lockout function is turned on, the radio will refuse to transmit signal when you press the PTT key.

Turn the radio ON

Turn the ON / OFF / Volume Control Knob clockwise until a click sound is heard. To turn off the radio, rotate anticlockwise the volume control, till a click sound is heard.

Adjust the volume

After powering on, rotate clockwise the volume control to increase the volume or rotate anticlockwise it to decrease the volume.

Note: If the radio is used with an external earphone, please remember to decrease the volume before wearing the earphone to avoid being scared or harmed due to too large volume.

Select a Zone

A zone is a group of channels. Your radio supports up to 16 zones, with a maximum of 16 digital channels and 16 analog channels per zone (total 32 channels per zone).

To choose a zone by following procedure

Procedure:

Press the preset "Zone" key to switch in different zones.

Or

Follow the steps below:

1. Press the "Menu" key to access the main menu.
2. Press [▲/▼] key to select [Setting]→[Zone] → desired Zone, and press [OK] button to confirm.
3. Back to home screen the zone No. shows at the bottom of the display.

Note:

◆ The number and names of the zones in the list should be preset by your distributor or system administrator (there can be a maximum of 16 zones).

Choose a Channel, User ID, or Group ID

1. Rotate the Power Switch/Volume Control button to turn on the radio.
2. After choosing the desired zone (provided that there is multiple zones preset in the radio), choose a working channel, user alias or ID, or Group alias or ID with the channel selector.

Prompt:

◆ When choosing a channel, you can see the information of current channel is displayed on the screen, such as channel name, channel number, frequency, ID, etc. (it depends on the preset information and display mode the user choose).

◆ You can change current working channel mode by pressing [Analog / Digital] key. (Analog / Digital Mode)

Initiate a Private / Group / General Call

To initiating a Private/Group/General call, the radio should choose the right alias or ID for private user or group.

General call is to transmit signals to all users at current channel, but your radio should be set to allow this function.

Procedure:

1. Rotate the channel selector to choose preset private / group alias or ID
2. Hold the radio vertically 2.5cm to 5cm (1 to 2 inches) from your mouth.
3. Press the "PTT" key to initiate a call, the LED indicator lights up solid red (if LED indicator is enabled), the call icon and group alias or ID will appear on the display.
4. Release the PTT key and listen to the response, when the target radio answers, the LED indicator lights up solid green, and the call icon, the group alias or ID, and caller alias or ID.
5. If the "Tx Ended Tone" is enabled, a short tone will be heard when target radio releases the "PTT" key, which means the channel is free for answer. Press PTT key to answer.

Note:

◆ You can initiate a private or group call through Contacts or manual dial

◆ The user on the channel is unable to answer General call.

Talk Around

You can continue to communicate by using talk around feature when the repeater is not operating, or when two way radio is out of the repeater's range but within the talking range of other radios. This is known as "Talk Around"

Procedure:

1. Press preprogrammed "Talk Around" key to switching between talk around and repeater mode.

Note:

When your radio works in talk around mode, the talk around icon " " will appear on the display.

Monitor a channel

Use the monitor feature to make sure a channel is free before transmitting.

Procedure:
1. Press and hold the preset [analog monitor] key and listen to the activity.

Permanent Monitor

Use permanent monitor feature to continuously monitor a channel.
Procedure:
1. Press the preset [permanent monitor] key and listen to activity.

Send Call Alert

Procedure:
Press the user-defined [Contact] key to access contact list.
OR
1. Press [Menu] to access the main menu.
2. Press [▲/▼] key to select [Contact] → [Contact list] → [Advanced Services], and press [OK] key.
OR
Press [▲/▼] key to choose the "Manual Dial" and press [OK] key.
When a blinking cursor appears, use the keypad to type the ID number, for a maximum of 8 numbers; after editing, press [OK] key.
The display will show [Advanced Services] → [Call Alert], and press [OK] key.
3. The display will show "Alerting..."
4. If the alert order is sent to the target radio successfully, the display will show "Alert succeeded" Otherwise, it will show "Alert Failed"
5. It will back to the previous menu.
Note:
◆ If you press [Back] key when waiting for the confirmation, the radio will terminate the call alert and return to the previous menu.
◆ Your radio must be programmed through programming software to use this function.

Receive or response to the call alert

If you receive a call alert, the display will alternates between "Call Alert" and caller alias or ID.
Procedure:
1. You will hear a short tone repeatedly (if activated).
2. Press [PTT] to reply to the private call directly within 5 seconds after call alert is received.
OR
Press [OK] key to refuse to reply the private call and

exit the call alert mode.
The screen will return to the main screen.
Note:
◆ If you don't reply to the call alert in 5 seconds, the radio will exit the call alert automatically and mark this as a missed call (which can be checked in the call log).

Send Emergency Alarm

If users are allowed to send an emergency alarm, it is non-voice signal; the screen of the target radio will shows the visual characters or icon as well as an alert tone.
Procedure:
1. Press the pre-programmed [emergency alarm on / off] key.
2. The screen alternates between an emergency call character and ID of the target radio. Then the emergency call icon will appear on the main screen.
3. When an emergency alarm is received to the target radio, the radio will make an emergency / urgent call; the screen will display "Sent Succeeded"
OR
If the radio hasn't received any emergency alert from the target radio, it will beep and the screen will display "Sent Failed".

4. Exit the Emergency alarm mode, and return to the main screen
Note:
If your radio is set to "silent" option, no audio or visible indication is shown to the your radio

Scan ON or OFF

If it is permitted by your dealer or system administrator, users can check or operate scan feature through menu display.
Note:
◆ "Talkback" or "Scan TX mode" and "Appointed channels" etc scan detail settings can be preset by your dealer or system administrator.

Procedure:
Press defined [scan] key to turn ON or OFF scan.
Or
To turn on or off scan switch as below:
1. Press [Menu] key to access the menu.
2. Press to choose [Scan] → [Scan] → [Scan list] → [Scan ON/OFF], then press [OK].
3. The radio returns back to Home screen.
Note:
◆ Once scan is activated, LED will flash RED with scan

icon [⛶] displaying on the home screen.
Or
Press key to turn off Scan, then press [OK] key.
- To choose "Disable scan" and press [OK]. A note pops up on screen and then back to previous menu.
◆ Once Scan is disabled, LED will be off, and scan icon [⛶] will disappear from home screen.

Read a Message

Procedure:
1. Press [Menu] Key to access the menu.
2. Press [▲/▼] key to menu [Message] → [Inbox] → desired message, and press [OK] key to open the message.
3. Press [Back] key to return to the Inbox.
Or:
Press [OK] key to access the Reply, Forward, Edit, or Delete message menu.
ss [▲/▼] key to choose menu, then press [OK] key.
ease refer to the details operation for Reply, Forward, Edi t, or Delete message.)
Press [Back] key to return to the previous menu.
e:
there is unread message or received new message in the inbox, the display will show message icon[✉].

Reply / Forward to a Received Message

Procedure:
1. Press [Menu] Key to access the menu.
2. Press [▲/▼] key to menu [Message] → [Inbox] → desired message, and press [OK] key to open the message.
3. Press [OK] Key to access [Reply] / [Forward] submenu, then press [OK] to confirm.
Or:
Press [Send], [Insert common message] or Exit Editor menu.
4. Press [▲/▼] key to select [Send], and press [OK] key.
5. The display will appear "MSG sent" once the message is sent successfully,
Or:
If the message is failed to send, the display will appears "Waiting-timeout"
6. The screen returns back to the previous menu.

Write and Send a message

Procedure:
1. Press [Menu] Key to access the menu.

2. Press [▲/▼] key to menu [Message] → [Write a message], and press [OK] key.
3. A flashing cursor appear, use the keypad to write the message
4. Press [▲/▼] Key to move one space to the left or right.
5. Press【Delete】key to delete any useless words before the flashing cursor.
Or:
Press [#] key to switch input mode. The current input method will be shown at the top of the display. (When it displays "AB" it means you are able to type capital letters. "ab" it means you are able to input lowercase letters. "12" it means you are able to type numbers from 0 to 9. "PY" it means you are able to type Chinese with Pinyin method.)
6. After finishing writing, press [OK] key.
7. Press key to select "Search" to choose a contact, and press [OK] key
Or:
To select "Write Number" through keypad to input contacts ID number
8. Press [OK] key to send message.
9. The display will show "MSG sending"
10. The display will appear "MSG sent" once the message is sent successfully,
Or:
If the message is failed to send, the display will appears "Waiting-timeout".
11. The screen returns back to the previous menu.

Encryption

Your radio supports the following types of encryption:
- Low — Basic encryption
- Middle — Strong encryption
- High — Enhanced encryption

Tips:
◆ Only one of the above mentioned groups can be assigned to a radio.
◆ To decrypt the encrypted call or data transmission, user must have the same encryption key or the same key level, key value and key ID. If user receive a different encryption key, key value and ID key with encryption call , user can hear the confusing transmission of signals (basic encryption) or listen to nothing (Enhanced / super strong encryption).
Procedure:

1. Press the preset [Encryption ON/OFF] key
2. The icon [🔒] will display on the top of the screen once the encryption function is activated, and it will disappear once the function is turned off.
Note:
◆ Your radio must be pre-programmed to allocate the key values, Key ID and encryption type.
◆ Some types of radios may not provide a single channel encryption or not encryption function. Please contact your dealer or system administrator for further information.

Technical parameters

General specification

Model	DM-960	
Items	UHF	VHF
Channel Zone	16	
Total channel capacity (512)	256 (Analog)	
	256 (Digital)	
Frequency range	400 - 480MHz	136 - 174MHz
Antenna impedance	50Ω	
Dimension(HxWxD)	125 x 60 x 39 mm	
Weight (W/battery)	317g	
Li-pol battery	3000mAh	
Rated voltage	DC:7.4V	
Battery: The average battery life under 5/5/90 duty cycle, and using carrier squelch and TX high power. 3000mAh li-pol battery Analog: 15hours / Digital: 23hours		

Note: The battery working life may have little difference.
Battery capacity maybe change without notice, but the list is standard specification.

Receiver

Frequency	400 - 480MHz	136 - 174MHz
Channel Spacing	12.5kHz / 25kHz	
Frequency stability (-20°C、+60°C、+25°C)	+ / - 1.5ppm	
Analogue sensitivity (12 dB SINAD)	0.3uV / 0.25uV	
Digital sensitivity (5% BER)	0.25uV / 0.20uV	
Intermodulation	65dB	
Adjacent channel selectivity	60dB@12.5kHz / 65dB@25kHz	
Spurious rejection	65dB	
Rated audio	800mw	
Audio distortion @rated audio	3%	
FM hum &noise	-40dB@12.5kHz / -45dB@25kHz	
Audio response	+1、-3dB	
Conducted/ radiated emission	-57dBm	

Transmitter

Frequency	400 - 480MHz	136 - 174MHz
Channel Spacing	12.5kHz / 25kHz	
Frequency stability (-30°C、+60°C、+25°C)	+ / - 1.5ppm	
Low Power	1 W	2 W
High Power	4.5 W	5 W
Modulation restriction	±2.5kHz@12.5kHz/±5.0kHz@25kHz	
FM hum& noise	-40dB@12.5kHz/-45dB@25kHz	
Conducted/radiated emission	-36dBm<1GHz/-30dBm>1GHz	
Adjacent channel selectivity	-60dB@12.5kHz/-65dB@25kHz	
Audio Response	+1、-3dB	
Audio Distortion	3%	
FM modulation	12.5kHz：11K0F3E 25kHz：16K0F3E	
4FSK digital modulation	12.5kHz data：7K60F1D and 7K60FXD 12.5kHz audio：7K60F1E and 7K60FXE 12.5kHz data and audio :7K60F1W	
Digital vocoder	AMBE+2™	
Digital agreement	ETSI-TS102 361-1、-2、-3	

GPS (Optional)

Precisely and standard designed for a long-term positioning (95% value > could find 5 satellites @ rated -130dBm signal strength	
TTFF (time to fist fix) cold start	< 1 min
TTFF(time to fist fix) warm start	< 10 s
Horizontal position accuracy	< 10 ms