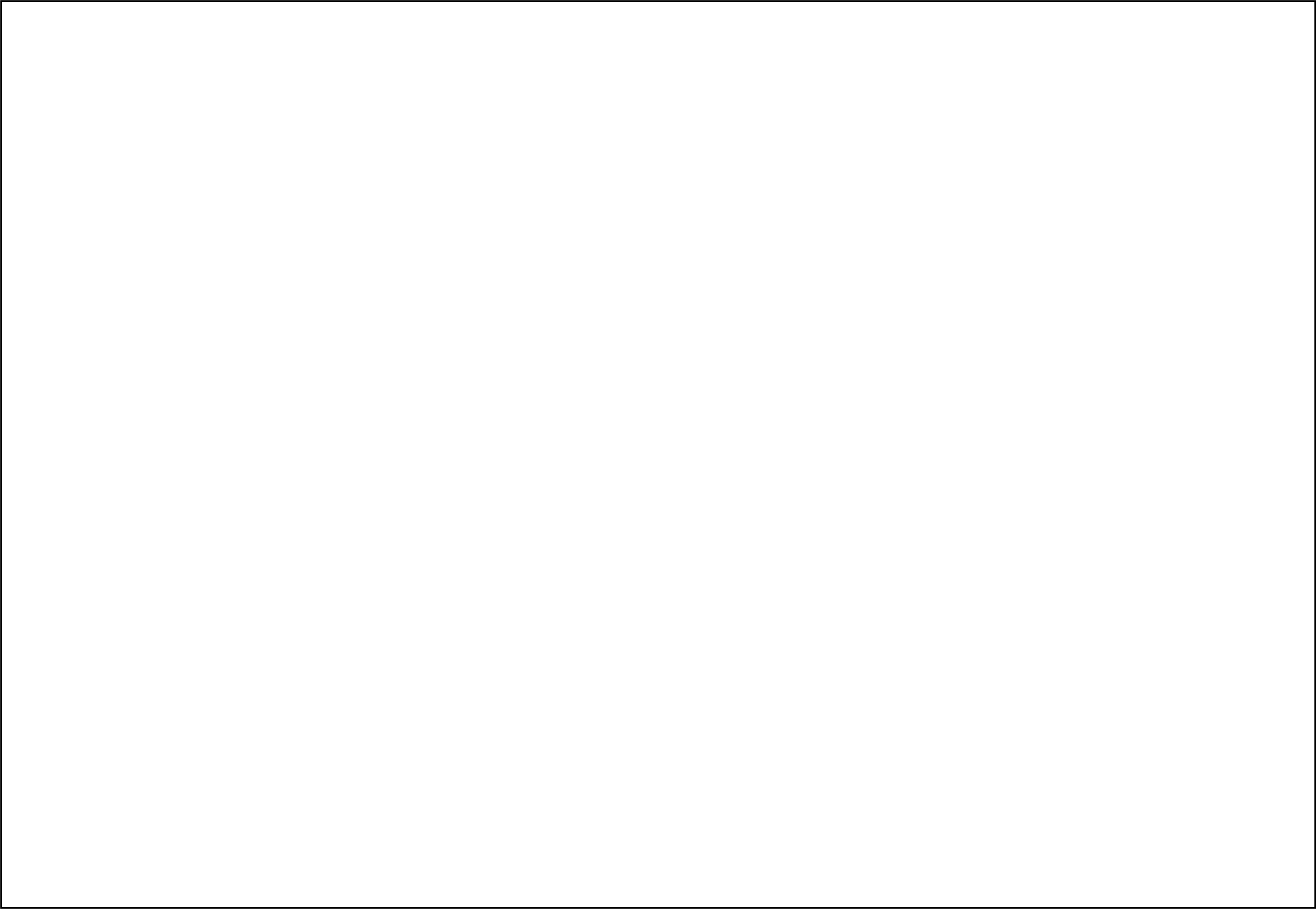


# adi

## AM-145

### USER'S MANUAL





**Nice Housing, Stoutness & Stability, Advanced and Reliable functions, Perfect & Valuable. FCC Approval. AM-145 mobile radio especially designs for drivers and it pursues company philosophy of innovation and practicality.**



**NOTE**

When programming the transceiver, read the factory initial data firstly, then rewrite the frequency and signaling etc., otherwise errors may occur because of different frequency band etc..

AM-145 Mobile Radio Applicable Software, Models Apply To This Manual: AM-145 Mobile radio

A grayscale background image showing the front left corner of a car, including the headlight and wheel.

# MOBILE RADIO

---

---

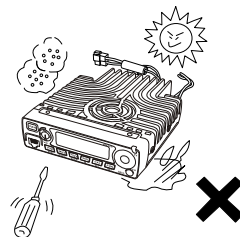
Thank you for choosing this **adi** vehicle transceiver, **adi** always provides high quality products, And this transceiver is no exception. As you learn how to use this transceiver, you will find that **adi** is pursuing "user friendliness". For example, each time you change the menu no. in Menu mode, you will see a text message on the display that lets you know what you are configuring.

Though friendly design for user, this transceiver is technically complicated and some features may be new to you. Consider this manual to be a personal tutorial from the designers, allow the manual to guide you through the learning process now, then act as a reference in the coming years.

## Precautions

Please observe the following precautions to prevent fire, personal injury, or transceiver damage:

- ⚠ Do not attempt to configure your transceiver while driving, it is dangerous.
- ⚠ This transceiver is designed for a 13.8V DC power supply. Don't use a 24V battery to power on the transceiver.
- ⚠ Do not place the transceiver in excessively dusty, humid or wet areas, nor unstable surfaces.
- ⚠ Please keep it away from interferential devices (such as TV, generator etc.)
- ⚠ Do not expose the transceiver to long periods of direct sunlight nor place it close to heating appliances.
- ⚠ If an abnormal odor or smoke is detected coming from the transceiver, turn OFF the power immediately. Contact an Anytone service station or your dealer.
- ⚠ Do not transmit with high output power for extended periods; the transceiver may overheat.



---

---

# CONTENTS

## **New and Innovative Features .....1**

## **Supplied Accessories/Optional Accessories .....2**

Supplied Accessories .....2

Optional Accessories .....2

## **Initial Installation .....3**

Mobile Installation .....3

DC Power Cable Connection .....4

Power Supply Voltage Display .....6

Antenna Connection .....6

Accessories Connections .....7

## **Getting Acquainted .....8**

Front panel .....8

Rear panel .....9

Display .....9

Microphone .....10

Working Mode.....11

## **Basic Operations .....12**

Switching the Power On/Off .....12

Adjusting the Volume .....12

Receiving .....12

Transmitting .....12

Transmitting Tone-Pulse .....13

Transmitting Optional Signaling .....13

## **General Setting .....14**

DTMF, DTMF ANI, 2Tone or 5Tone Signaling .....14

Sending 2-Tone Call .....15

Sending 5-Tone Call .....15

Sending DTMF call .....15

Signaling Combination Setup .....15

---

---

---

## CONTENTS

|                                          |           |                                             |           |
|------------------------------------------|-----------|---------------------------------------------|-----------|
| TX OFF Setup.....                        | 16        | Scan Skip .....                             | 23        |
| Busy Channel Lockout.....                | 16        | Frequency/Channel Scan .....                | 23        |
| Editing Channel Name.....                | 16        | Busy Channel Lockout.....                   | 23        |
| Reverse TX/RX .....                      | 16        | Reverse TX/RX .....                         | 23        |
| Talk Around .....                        | 17        | TOT (Time-out timer).....                   | 24        |
| Voice Componder .....                    | 17        | CTCSS/DCS Encode and Decode.....            | 24        |
| Radio's DTMF SELF ID ENQUIRY .....       | 17        | Talk Around .....                           | 24        |
| Radio's 5TONE SELF ID ENQUIRY .....      | 18        | Voice Prompt.....                           | 24        |
| Voice Prompt.....                        | 18        | LCD Backlight .....                         | 25        |
| TOT (Time-out timer) .....               | 18        | <b>Long-distance Anti-theft Alarm .....</b> | <b>26</b> |
| APO (Auto power off).....                | 18        | <b>Cable Clone .....</b>                    | <b>27</b> |
| DTMF Transmitting Time.....              | 19        | <b>Maintenance.....</b>                     | <b>28</b> |
| Squelch Level Setup.....                 | 19        | Default Setting after Resetting(VHF) .....  | 28        |
| Scan Dwell Time Setup.....               | 19        | Trouble Shooting.....                       | 28        |
| LCD Backlight .....                      | 19        | <b>Specifications .....</b>                 | <b>29</b> |
| PIN Setup .....                          | 20        | <b>Attached Chart.....</b>                  | <b>30</b> |
| Factory Default.....                     | 21        | 50 groups CTCSS Tone Frequency(Hz) .....    | 30        |
| <b>Microphone Operation .....</b>        | <b>22</b> | 1024 groups DCS Code.....                   | 30        |
| Function Setup By Microphone Keypad..... | 22        |                                             |           |

---

AM-145 Mobile Radio has nice housing, stoutness & stability, advanced and reliable functions, perfect & valuable. This mobile radio especially designs for drivers and it pursues company philosophy of innovation and practicality. More functions as follows:

Display on a large LCD with adjustable brightness, convenient for nighttime use.      There are Default operation mode and Professional operation mode for option.

Distribute buttons reasonably, convenient for operation. Adopt superior quality material, better technology and high quality radiator to ensure stable and durable operation.

200 programmable memorized channels, identified by editing name.

Programming different CTCSS, DCS, 2Tone, 5Tone in per channel, rejecting extra calling from other radios.

Various scan functions including CTCSS/DCS Scan function.

Using 5Tone to send Message, Emergency alarm, Call all, ANI, Remotely kill, Remotely Waken, etc.

Automatic calling Identification function by DTMF--ANI or 5Tone--ANI .

Compannder function for decrease the background noise and enhance audio clarity, it can set compander ON/OFF per channel.

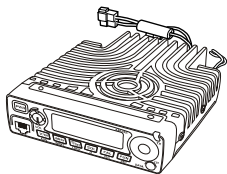
Different band width per channel, 25K for wide band, 20K for middle band ,or 12.5K for narrow band.

Theft alarm provides extra safety.

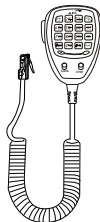
**Supplied Accessories**

After carefully unpacking the transceiver, identify the items listed in the table below. We suggest you keep the box and packaging.

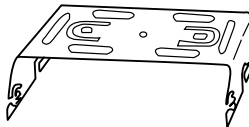
- Transceiver



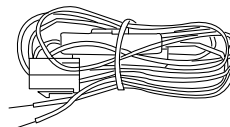
- Microphone  
(with DTMF keyboard)



- Mobile Mounting  
Bracket



- DC Power Cable with  
Fuse Holder



- Hardware Kit for Bracket

Black screws  
(M4X8mm 4PCS)



Tapping screws  
(M5X8mm 4PCS)



S-Washer



- Spare Fuses



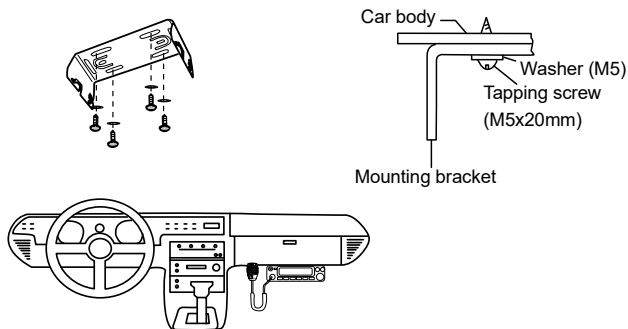
- User Manual



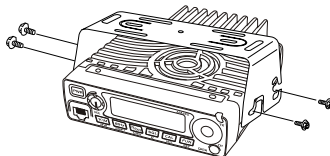
## Mobile installation

To install the transceiver, select a safe, convenient location inside your vehicle that minimizes danger to your passengers and yourself while the vehicle is in motion. Consider installing the unit at an appropriate position so that knees or legs will not strike it during sudden braking of your vehicle. Try to pick a well ventilated location that is shielded from direct sunlight.

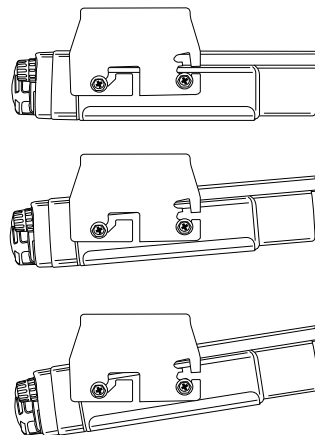
1. Install the mounting bracket in the vehicle using the supplied self-tapping screws (4pcs) and flat washers (4pcs).



2. Position the transceiver, then insert and tighten the supplied hexagon SEMS screws.  
Double check that all screws are tightened to prevent vehicle vibration from loosening the bracket or transceiver.



Determine the appropriate angle of the transceiver, using the 3 screw hole positions on the side of the mounting bracket.



## DC Power Cable Connection



Locate the power input connector as close to the transceiver as possible.

### Mobile Operation

The vehicle battery must have a nominal rating of 12V. Never connect the transceiver to a 24V battery. Be sure to use a 12V vehicle battery that has sufficient current capacity. If the current to the transceiver is insufficient, the display may darken during transmission, or transmitting output power may drop excessively.

1. Route the DC power cable supplied with the transceiver directly to the vehicle's battery terminals using the shortest path from the transceiver.

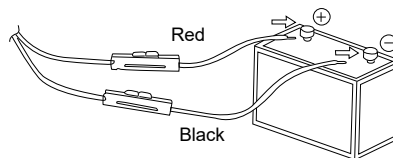
We recommend you do not use the cigarette lighter socket as some cigarette lighter sockets introduce an unacceptable voltage drop.

The entire length of the cable must be dressed so it is isolated from heat, moisture, and the engine secondary (high voltage) ignition system/ cables.

2. After installing cable, in order to avoid the risk of damp, please use heat-resistant tape to tie together with fuse box. Don't forget to reinforce whole cable.
3. In order to avoid the risk of short circuit, please cut down connection with negative (-) of battery, then connect with radio.
4. Confirm the correct polarity of the connections, then attach the power cable to the battery terminals; red connects to the positive (+) terminal and black connects to the negative (-) terminal.

Use the full length of the cable without cutting off excess even if the cable is longer than required. In particular, never remove the fuse holders from the cable.

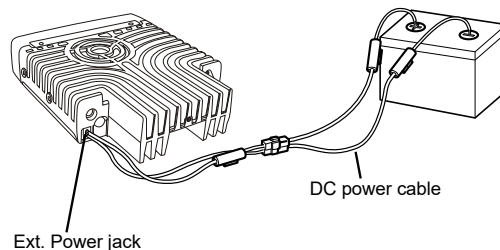
5. Reconnect any wiring removed from the negative terminal.



6. Connect the DC power cable to the transceiver's power supply connector.

Press the connectors firmly together until the locking tab clicks.

If the ignition-key on/off feature is desired(optional feature), use the



optional cable. Connect one of the cables between the ACC terminal or a Cigar-Plug that operates with the vehicle ignition or ACC switch on the vehicle and EXTPOWER jack on the rear side of the unit.



In many cars, the cigar-lighter plug is always powered. If this is the case, you cannot use it for the ignition key on/off function.

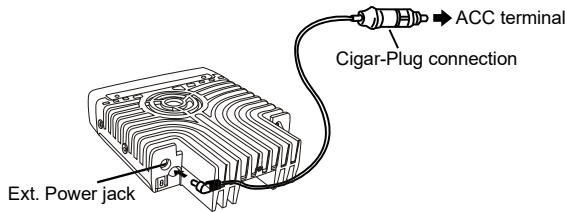
7. When the ignition key is turned to ACC or ON(Start) position with the radio turned off, the power switch illuminates. The illumination will be turned off when the ignition key is turned to the off position.

To turn on the unit, press the power switch manually while it is illuminated. (While ignition key is at ACC or ON position)

8. When the ignition key is turned to ACC or ON position with the radio's power switch on, the unit turns on automatically and the power switch will be lit. Turn the ignition key to OFF position or manually turn the power switch off to shut down the radio.

9. Using extra cable, power consumption: 5MAH.

10. Without this function, user can turn on/off radio by Power knob.



## Fixed Station Operation

In order to use this transceiver for fixed station operation, you will need a separate 13.8V DC power supply (not included), as optional accessories. Please contact local dealer to require.

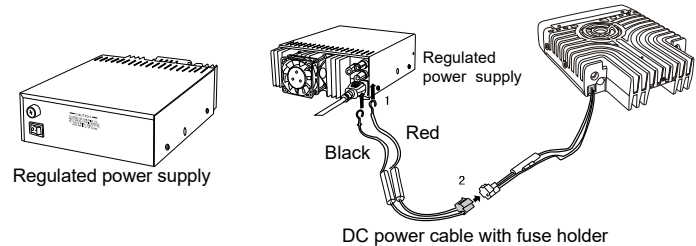
The recommended current capacity of your power supply is 20A.

1. Connect the DC power cable to the regulated DC power supply and ensure that the polarities are correct. (Red: positive, Black: negative).

Do not directly connect the transceiver to an AC outlet.

Use the supplied DC power cable to connect the transceiver to a regulated power supply.

Do not substitute a cable with smaller gauge wires.



2. Connect the transceiver's DC power connector to the connector on the DC power cable. Press the connectors firmly together until the locking tab clicks.

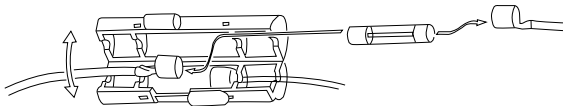


Before connecting the DC power to the transceiver, be sure to switch the transceiver and the DC power supply OFF.

Do not plug the DC power supply into an AC outlet until you make all connections.

### ✕ REPLACING FUSES

If the fuse blows, determine the cause, then correct the problem. After the problem is resolved, replace the fuse. If newly installed fuses continue to blow, disconnect the power cable and contact your authorized **adi** dealer or an authorized **adi** service center for assistance.



| Fuse Location                     | Fuse Current Rating |
|-----------------------------------|---------------------|
| Transceiver                       | 15A                 |
| Supplied Accessory DC power cable | 20A                 |

Only use fuses of the specified type and rating, otherwise the transceiver could be damaged.



NOTE

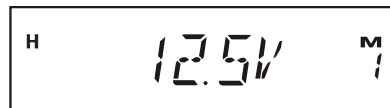
If you use the transceiver for a long period when the vehicle battery is not fully charged, or when the engine is OFF, the battery may become discharged, and will not have sufficient reserves to start the vehicle. Avoid using the transceiver in these conditions.

### ■ Power supply voltage Display

After connecting the transceiver to the power supply, the supply voltage can be displayed on LCD by pressing the **FUN** key together with the **SQL** key.

The display immediately changes as the voltage supply changes. It also displays voltage during transmission.

The transceiver will return to its normal operation when the power is switched ON or repeat above operation.



Important

The range of displayed voltage is only from 7V to 16V DC, because the displayed value is estimated, please use a voltmeter when a more precise reading is desired.

### ■ Antenna Connection

Before operating, install an efficient, well-tuned antenna. The success of your installation will depend largely on the type of antenna and its correct installation. The transceiver can give excellent results if the antenna system and its installation are given careful attention.

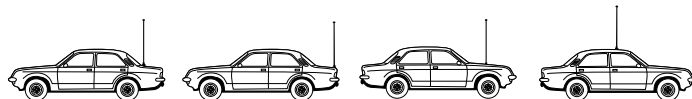
Use a 50Ω impedance antenna and low-loss coaxial feed-line that has a characteristic impedance of 50 Ω, to match the transceiver input impedance. Coupling the antenna to the transceiver via feed-lines having an impedance other than 50Ω reduces the efficiency of the antenna system and can cause interference to nearby broadcast television receivers, radio receivers, and other electronic equipment.



NOTE

Transmitting without first connecting an antenna or other matched load may damage the transceiver. Always connect the antenna to the transceiver before transmitting.  
All fixed stations should be equipped with a lightning arrester to reduce the risk of fire, electric shock, and transceiver damage.

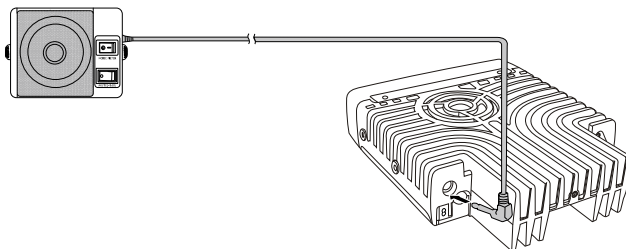
The possible locations of antenna on a car are shown as following:



## Accessories Connections

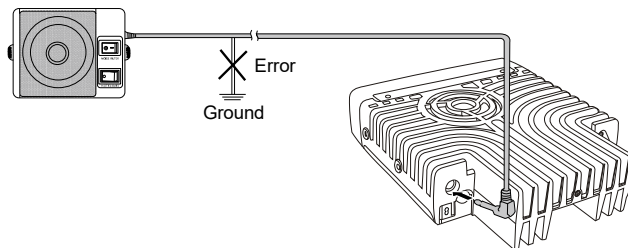
### External Speaker

If you plan to use an external speaker, choose a speaker with an impedance of  $8\ \Omega$ . The external speaker jack accepts a 3.5 mm (1/8") mono (2-conductor) plug.



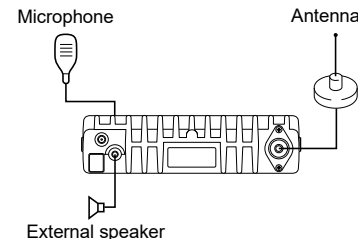
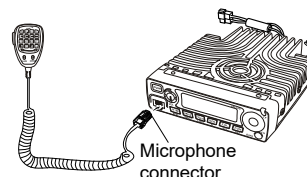
NOTE

External speaker adopt double port BTL, please care about the connecting way. The speaker can not connect with the ground, otherwise the speaker will be fault. The wrong connecting way as the following picture.



### Microphone

For voice communications, connect a microphone equipped with an 8-pin modular plug into the modular socket on the front of the main unit. Press firmly on the plug until the locking tab clicks. Attach the supplied microphone hanger in an appropriate location using the screws included in the screw set.



### PC Connecting

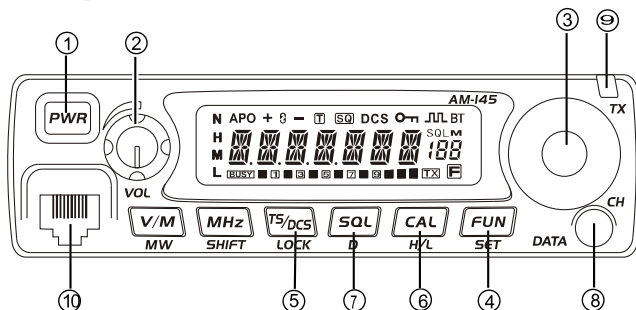
To utilize the optional software, you must first connect the transceiver to your PC then using an optional programming cable (via Data socket ).



NOTE

Ask your dealer about purchasing a Programming Cable.

## ■ Front panel



## • Basic Functions

| NO. | KEY           | FUNCTION                                                |
|-----|---------------|---------------------------------------------------------|
| 1   | Pow(Power)    | Power on/Off                                            |
| 2   | VOL           | Adjust Volume Key                                       |
| 3   | Main Dial     | Change memory channel and scan direction etc.           |
| 4   | FUN/SET       | Function Key                                            |
| 5   | TS/DCS/LOCK   | Sets CTCSS and DCS value                                |
| 6   | CAL/H/L       | Call key                                                |
| 7   | SQL/D         | Squelch off                                             |
| 8   | Data Terminal | Data reading/writing, cloning and theft alarm functions |
| 9   | TX            | lights during Transmitting                              |
| 10  | Mic.connector | Microphone connection port                              |

• Press **FUN** key until  icon appears then press the following key.

| NO. | KEY         | FUNCTION                                  |
|-----|-------------|-------------------------------------------|
| 4   | FUN/SET     | Confirms the selective functions and exit |
| 5   | V/M/MW      | Stores data into channels                 |
| 7   | TS/DCS/LOCK | Sets Keypad lock function                 |
| 9   | SQL/D       | Compander mode on/off                     |

• Press **FUN** key and following key together to activate following function:

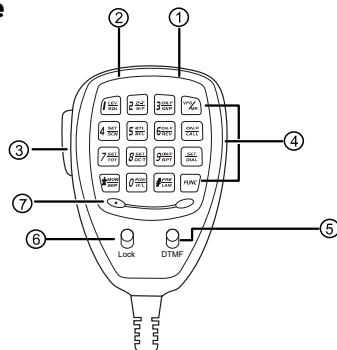
| NO. | KEY         | FUNCTION                                    |
|-----|-------------|---------------------------------------------|
| 1   | PWR         | Reset to factory default settings           |
| 5   | V/M/MW      | Erase the memory                            |
| 6   | MHz/SHIFT   | Switches between Wide/ Narrow band          |
| 7   | TS/DCS/LOCK | Auto dialer                                 |
| 8   | CAL/H/L     | Enters clone data function mode             |
| 9   | SQL/D       | Enters power supply voltage indication mode |

• Functions that require continuous pressing following key to be activated

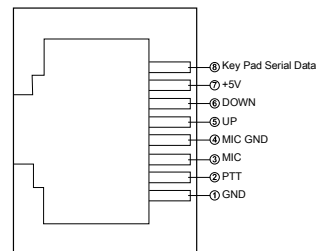
| NO. | KEY     | FUNCTION                                        |
|-----|---------|-------------------------------------------------|
| 4   | FUN/SET | Press and hold for 2s to enter the Setting mode |
| 9   | SQL/D   | Monitor mode                                    |



# microphone



MIC Connector Diagram(in the front view of connector)



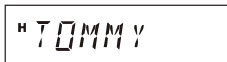
| NO. | KEY           | FUNCTION                                                    |
|-----|---------------|-------------------------------------------------------------|
| 1   | UP            | Increase channel number or setting value.                   |
| 2   | DOWN          | Decrease channel number or setting value.                   |
| 3   | PTT           | Press the PTT (Push-TO-Talk) key to transmit.               |
| 4   | Number Key    | Input VFO frequency or DTMF dial out etc..                  |
| 5   | DTMF ON / OFF | Switches between DTMF dialing or function operating.        |
| 6   | LOCK Switch   | Locks out the UP ` Down ` Numerical keys and Function keys. |
| 7   | MIC           | Speak here during transmission.                             |

Please follow the procedures below to set your mobile radios for practical use.

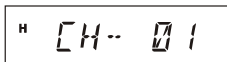
**1. Professional Transceiver Mode :**When

set display mode as "CH",it enters into Professional Transceiver mode.At this mode,except scan,other shortcut operation can't operate.And from No.1-17 menu in function setting will be auto-hidden,They should be set by PC software.If there is corresponding name for current channel,the LCD will display current channel name

Otherwise,it shows current channel number. (As pic 4) (As pic 5)



(Pic 4)



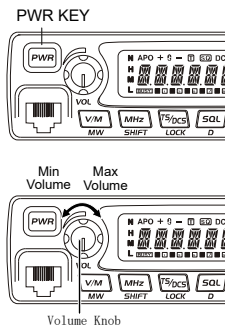
(Pic 5)

### Switching The Power On/Of

according to the option selected during installation Press the **PWR** switch or turn the ignition key to ACC (speed up) or ON (startup) position to power on radio . Press the **PWR** key for 1s or turn the ignition key to OFF position to turn off.

### Adjusting The Volume

Turn the VOL knob clockwise to increase the audio level, counterclockwise to decrease.



NOTE During communication, volume can be adjusted more accurate.

### Receiving

When the channel you are operating is called, the screen shows **BUSY** and field intensity, in this way, you can hear the calling from transmitting party.



NOTE If the transceiver has set at higher squelch level, it may fail to hear the calling.

When the channel you are operating is called, the screen shows BUSY and field intensity. you can't hear the calling from transmitting party, it means current channel receives a matching carrier but unmatching signaling (Refer to CTCSS/DCS encode and decode or Optional Signaling setup).

### Transmitting

Press and hold **SQL** key or press MIC's **MONITOR** key to monitor for a while to confirm the channel desired is not busy. Release **SQL** or press Mic's **MONITOR** key to return standby status. Then press and hold **[PTT]** key to speak into microphone.

Please hold the microphone approximately 2.5-5.0cm from your lips, and then speak into the microphone in your normal speaking voice to get best timbre.



Press and hold [PTT] key, LED lights RED and power intensity showed in NOTE screen indicates it is transmitting, release to receive.

### ■ Transmitting Tone-Pulse

Press and hold [PTT] key, then press Microphone [ **DOWN** ] key to transmit current selected tone-pulse signal.

### ■ Transmitting OPTIONAL SIGNALING

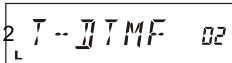
Press and hold [PTT] key, then press Microphone **UP** key or press **CAL** key in front panel or press Mic's **ORIG CAL** key to transmit pre-stored and selected DTMF/2Tone/5Tone optional signaling.

### ■ DTMF, DTMF ANI, 2Tone or 5Tone Signaling

DTMF/5Tone/2Tone signalling function as similarly as CTCSS/DCS. Without receiving correspondent tone signalling, the speaker will remain mute. DTMF and 5Tone signalling can be applied for other advanced

features such as ANI, PTT ID, group call, remotely stun, remotely kill, waken,...etc. The signalling edition must be done through programming software. Please refer to the HELP option in the programming software to know how to operate these features.

1. Press and hold **[FUN]** key for over 2s to enter into general setting menu.

2. Press **[CAL]** / **[SQL]** to choose No 2  menu, LCD displays "T-OFF".

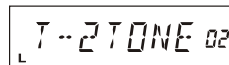
3. Turn selector knob to select the desired setup.

"DTMF": the channel will be mute by a DTMF signal. The speaker won't be open until receiving a correspondent DTMF signal. Hold "PTT" then press **[UP]** or press **[CAL]** directly to transmit the pre-stored DTMF signaling.

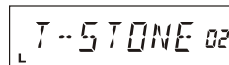


In DTMF signaling mode, press **[CAL]** for 2s until LCD displays "AN--", turn selector knob to select desired digit (the other party ID). In this mode, press **[TS/DCS]** to confirm exist digit and move cursor to next, press **[V/M]** to forward cursor. After editing, press **[CAL]** key to operate ANI call.

"2TONE": the channel will be mute by a 2-Tone signal. The speaker won't be open until receiving a correspondent 2-Tone signal. Hold "PTT" then press **[UP]** or press **[CAL]** directly to transmit the pre-stored 2-Tone signaling.



"5Tone": the channel will be mute by a 5-Tone signal. The Speaker won't be open until receiving a correspondent 5-Tone signal. hold "PTT" then press **[UP]** or



Press **[CAL]** directly to transmit the pre-stored 5-Tone signaling.



NOTE

In 5Tone signaling mode,press **[CAL]** for 2s until LCD displays "AN---",turn selector knob to select desired digit(caller ID).In this mode,press **[F5/DCS]** to confirm exist digit and move cursor to next,press **[V/M]** to forward cursor.After editing,press **[CAL]** key to operate ANI call.

4. Press **[F5/DCS]** key to confirm and exit

## ■ Sending 2-Tone Call

1. Press and hold **[FUN]** key for over 2s to enter general setting menu.
2. Press **[CAL]/[SQL]** key to choose No.03 menu, LCD displays "2TON XX","XX"indicates the group in the list.
3. Turn selector knob to select the desired sending 2TONE group,Press PTT to transmit selected group.
4. Total:32groups,00-31,Default:00.
5. Press **[F5/DCS]** key to confirm and exit.

L 2TON--00 03



NOTE

Content and name of 2TONE will be edited by programming software.

This radio only query edited group or name.If there is corresponding name for 2TONE,this operation will display 2TONE corresponding name.

## ■ Sending 5-Tone Call

1. Press and hold **[FUN]** key for over 2s to enter general setting menu
2. Press **[CAL]/[SQL]** key to choose No.04 menu, LCD displays "5TON

XX","XX"indicates the group in the list.

3. Turn selector knob to select the desired sending 5TONE group,Press PTT to transmit selected group.
4. Total:100groups,00-99,Default:00.
5. Press **[F5/DCS]** key to confirm and exit.

L 5TON--00 04

Content and name of 5TONE will be edited by programming software.This radio only query edited group or name.If there is not corresponding name for 5TONE,this operation will display 5TONE corresponding name.

## ■ Sending DTMF call

1. Press and hold **[FUN]** key for over 2s to enter general setting menu.
2. Press **[CAL]/[SQL]** key to choose No.05 menu, LCD displays "DTMF XX","XX"indicates the group in the list.
3. Turn selector knob to select the desired sending DTMF group,Press PTT to transmit selected group.
4. Total:16groups,00-16,Default:01.
5. Press **[F5/DCS]** key to confirm and exit.

L DTMF--01 05

## ■ Signaling Combination setup

This function is to improve the level of protecting the radio against receiving irrelative signal.

1. Press and hold **[FUN]** key for over 2s to enter general setting menu.
2. Press **[CAL]** / **[SQL]** key to choose No.06 menu, LCD displays "SPK--SQ".

3. Turn selector knob to select the desired combination

If select "SQ", it indicates you can hear the calling from caller when receive a matching carrier.

If LCD displays "CTC", it indicates you can hear the calling from caller when receive a matching carrier and CTCSS/DCS signaling.

If LCD displays "TON", it indicates you can hear the calling from caller when receive a matching carrier and DTMF/2TONE/5TONE signaling.

If LCD displays "C/T", it indicates you can hear the calling from caller when receive a matching carrier and CTCSS/DCS and DTMF/2TONE/5TONE signaling.

If LCD displays "C/T", it indicates you can hear the calling from caller when receive a matching carrier and either CTCSS/DCS DTMF/2TONE/5TONE signaling.

4. Press **[TS/PCS]** key to confirm and exit



**NOTE** This setting will be set together with adding optional signaling and CTCSS/DCS.

## TX OFF SETUP

Disable this function, it is invalid to press PTT, current channel only works in RX mode.

1. Press and hold **[FUN]** key for over 2s to enter general setting menu.
2. Press **[CAL]/[SQL]** key to choose No.09 menu, LCD displays "TX-ON".

TX-ON 09

3. Turn selector knob to select the desired setting.

On: In current channel, Press PTT to transmit

OFF: In current channel, Press PTT is invalid.

TX-OFF 09

4. Press **[F5/DCS]** key to confirm and exit. Default: ON.

## Busy Channel Lockout

BCLO is to disable transmitting while RX signal is received. Once the channel is busy and you press PTT, the radio will beep as warning and get back to receiving.

1. Press and hold **[FUN]** key for over 2s to enter general setting menu
2. Press **[CAL]/[SQL]** key to choose No.10 menu, LCD displays "LOCK--OFF".
3. Turn selector knob to select the desired setting.

LOCK--BU 10

LOCK--RL 10

LOCK--OF 10

BU: Enable BCLO, Carrier lockout, transmitting is inhibited when current channel receives a matching carrier; press [PTT] to emit error voice prompt and back to receiving status.

RL: Enable BTLO, transmitting is inhibited when current channel receives a matching carrier but dis-matching CTCSS/DCS. press [PTT] to emit error voice prompt and back to receiving status.

OFF: Busy channel lockout is disabled. It can transmit in any receiving status.

4. Press **[F5/DCS]** key to confirm and exit.

## Editing Channel NAME

1. Press and hold **[FUN]** key for over 2s to enter general setting menu.

M\_

2. Press **[CAL]/[SQL]** key to choose No.1. menu, LCD displays cursor and flashing.

3. Turn selector knob to select the desired letter, press **[F5/DCS]** key to confirm selected letter and enter into next edition, Press **[V/M]** to return forward edition.

4. After edition, press **[MHZ]** key to exit.

## Reverse TX/RX

TX frequency turns to RX frequency & RX frequency changes to TX frequency. The signaling will also be reversed if CTCSS/DCS signaling exited in this channel.

1. Press and hold **[FUN]** key for over 2s to enter general setting menu
2. Press **[CAL]/[SQL]** key to choose No.12 menu, LCD displays "REV--OF".

3. Turn selector knob to select the desired setting.

ON:Enable Frequency Reverse

OFF:Disable Frequency Reverse.

4. After edition, press  key to exit.

"REV--ON 12"

"REV--OF 12"

OFF".

3. Turn selector knob to select the desired setting.

ON:Enable compander

OFF:Disable compander

"COMP--ON 14"

"COMP--OF 14"

4. Press  key to confirm and exit. Default:OFF

## Talk Around

By Talk Around function, you can directly communicate with other radios in your group in case the repeater is not activated or when you are out of the repeater range. The transceiver will transmit by RX frequency with its CTCSS/DCS signaling.

1. Press and hold  key for over 2s to enter general setting menu.

2. Press / key to choose No.13 menu, LCD displays "TALK--OF".

3. Turn selector knob to select the desired setting.

ON:Enable Talk Around

OFF:Disable Talk Around

4. After edition, press  key to exit.

"TALK--ON 13"

"TALK--OF 13"

## Radio's DTMF SELF ID ENQUIRY

1. Press and hold  key for over 2s to enter general setting menu.

2. Press / key to choose No.16

menu, LCD displays "D--XXX" XXX is radio's DTMF SELF ID.

3. Press  key to confirm and exit.

"D--159 16"

## Voice Compander

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

1. Press and hold  key for over 2s to enter general setting menu

2. Press / key to choose No.14 menu, LCD displays "COMP--"

## Radio's 5TONE SELF ID ENQUIRY

1. Press and hold **[FUN]** key for over 2s to enter general setting menu.
2. Press **[CAL]** / **[SQL]** key to choose No.17 menu, LCD displays "F--XXXXX", "XXXXX" is radio's 5TONE SELF ID.
3. Press **[F5/PCS]** key to confirm and exit.

"F-- 12345 17"

## Voice Prompt

The prompting tone provides confirmation of entry, error status or malfunctions of the transceiver. You can enable or disable this function.

1. Press and hold **[FUN]** key for over 2s to enter general setting menu.
2. Press **[CAL]** / **[SQL]** key to choose No.18 menu, LCD displays "BEEP--ON".
3. Turn selector knob to select the desired setting.  
ON:Enable voice prompt  
OFF:Disable voice prompt
4. Press **[F5/PCS]** key to confirm and exit.Default:ON.

"BEEP--ON 18"

"BEEP--OFF 18"



**NOTE** Suggestion:Enable this function to check incorrect operation and malfunctions.

## TOT (Time-out timer)

The time-out timer limits the amount of transmitting time. When you reach the time limit which has been programmed by your dealer, your transmission will be cut off. In order to transmit again, you must release PTT button to reset the timer.

1. Press and hold **[FUN]** key for over 2s to enter general setting menu.
2. Press **[CAL]** / **[SQL]** key to choose No.19 menu, LCD displays "TOT--3"
3. Turn selector knob to select the desired setting.

"TOT-- 3 19"

Timer: 1-30min,each level 1min

OFF:Disable TOT

4. Press **[F5/PCS]** key to confirm and exit.Default:3.

## APO (Auto power of)

Once APO is activated, the radio will be automatically switched off when the pre-set timer is running to end.

1. Press and hold **[FUN]** key for over 2s to enter general setting menu.
2. Press **[CAL]** / **[SQL]** key to choose No.20 menu, LCD displays "APO--OFF".
3. Turn selector knob to select the desired setting.

"APO-- 60 20"

"APO--OFF 20"

30MIN:Auto power off after 30m

1 HOUR:Auto power off after 1h

2 HOUR:Auto power off after 2h

OFF:Disable Auto power off

4. Press **[TS/PCS]** key to confirm and exit.Default:OFF

## DTMF Transmitting Time

1. Press and hold **[FUN]** key for over 2s to enter general setting.

2. Press **[CAL] / [SQL]** key to choose No.2.  
menu, LCD displays"SPD--50".

"SPD-- 30 21"

3. Turn selector knob to select the desired setting.

30/50/100/200/300/500, which indicates the time for sending each DTMF signal & the interval between each DTMF being sent.

4. Press **[TS/PCS]** key to confirm and exit.Default:50MS.

## Squelch level Setup

Setting the radio to a tight squelch level, you can avoid unwanted signals or noise, but you may not receive a weak signal. Therefore, it will be better for you to select the normal squelch level

1. Press and hold **[FUN]** key for over 2s to enter general setting menu.

2. Press **[CAL] / [SQL]** key to choose No.22 menu, LCD displays"SQL--04".

"SQL-- 06 22"

3. Turn selector knob to select the desired squelch level.

OF-20 total 21,OF is min setting value(ON)

4. Press **[TS/PCS]** key to confirm and exit.Default:04



Press **[SQL]**, then turn selector knob also can select the desired squelch level.

If the transceiver has set at higher squelch level, it may fail to hear the calling. If set at lower squelch level, the radio will be interfered.

## Scan Dwell Time Setup

There are 3 kinds of Scan Dwell Time for option.

1. Press and hold **[FUN]** key for over 2s to enter general setting menu.

2. Press **[CAL] / [SQL]** key to choose No.23 menu, LCD displays"SCAN--TO".

"SCAN-- T0 23"

3. Turn selector knob to select the desired Scan Dwell Time.

TO: it pauses 15s once scanning a matching signal, then resume scan.

"SCAN-- C0 23"

CO: it pauses once scanning a matching signal, signal disappeared then resume scan.

"SCAN-- SE 23"

SE: It stops once scanning a matching signal.

4. Press **[TS/PCS]** key to confirm the selection and exit.Default:TO.

## LCD Backlight

1. Press and hold **[FUN]** key for over 2s to enter general setting menu.

2. Press **[CAL] / [SQL]** key to choose No.24 menu, LCD displays"LAMP--25".

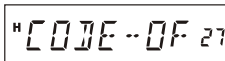
"LAMP-- 25 24"

3. Turn selector knob to select the desired LCD backlight brightness  
1-32 total 32 level backlight brightness.
4. Press  key to confirm and exit. Default: 25.

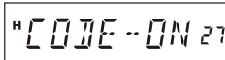
## PIN Setup

Enable this function, you have to insert a matching PIN to enter into normal status when radio is turned on. (Pin setup by programme software).

1. Press and hold  key for over 2s to enter general setting menu.
2. Press  /  key to choose No. 27 menu, LCD displays "CODE-OF".



3. Turn selector knob to enable/disable Pin setup.



ON: Turn on Pin setup

OFF: Turn off Pin setup

4. Press  key to confirm and exit. Default: OFF

## ■ Factory Default

If your radio seems to be malfunctioning, resetting the microprocessor may solve the problem. When performing the reset, you may lose memory data and stored information. Back up or write down important data before performing the reset.

1. Press and hold **FUN** key for over 2s to enter general setting menu.
2. Press **CAL** / **SQL** key to choose No.29 menu, LCD displays "RESTORE".
3. Turn selector knob to select the desired operation.

" RESTORE 29

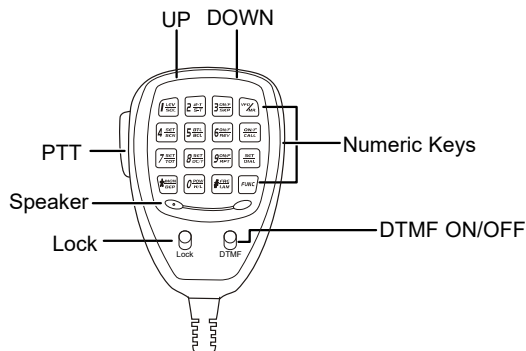
" FACT 29

FACT:Resume factory default for channel,signaling and general setting.

" SETUP 29

SETUP:Return initial setup for No.18-No 27 general setting menu.

4. Press **MHz** key to confirm.



## ✘ Keypad Lock

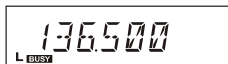
Pull down the slide switch to lock position, The lamp is turned off and all of keypads is not work except PTT switch.

## ✘ Transmitting DTMF By Microphone KeyPAD

Slide DTMF key to DTMF position, press and hold the [PTT] key, transmitting the desired DTMF signaling by the numeric key directly.  
(Note: Slide DTMF key to DTMF position, the keyboard is invalid in standby ).

## ■ Function Setup By Microphone Keypad

**Squelch off:** In standby, press key, the squelch is disabled when **BUSY** icon flashed in LCD, Press again to enable squelch and the **BUSY** icon disappears.



## ✘ Short Calling

In standby, press to transmit the selected DTMF/2TONE/5TONE in current channel.

**Transmitting DTMF Code:** In standby, press , LCD displays DTMF data and group. Press [ / ] key to select the desired transmitting DTMF group, then Press PTT to transmit.

If no DTMF data in current group, LCD displays "EMPTY", press key again and input desired DTMF code by keypad, press PTT to transmit and store DTMF data.

## ■ Squelch Level

1. In standby, press , then press , LCD displays "SQL" and current squelch level.

2. Press / to adjust the desired squelch level. (press then press , turn selector knob also can adjust the desired squelch level.

3. Press number key to confirm and exit.

## Scan Skip

In Channel mode, press  then press , decimal point displayed between frequency's ten digit and unit digit, it means current channel is scan skip. Repeat above operation to set scan or scan skip in current channel.

1. decimal point displayed between frequency's ten digit and unit digit, it means current channel is scanned skip.
2. decimal point is not displayed between frequency's ten digit and unit digit, it means current channel is scanned.

## Frequency/Channel scan

In corresponding mode, press  then press  key to enter into scanning.

In scanning mode, press  /  to change scan direction.

## Busy Channel Lockout

BCLO is to disable transmitting while RX signal is received. Once the channel is busy and you press PTT, the radio will beep as warning and get back to receiving.

1. In standby, press , then press  to enter into Busy Channel Lockout.
2. Press [  /  ] to select the desired value.

BU: Enable BCLO, Carrier lockout, transmitting is inhibited when current channel receives a matching carrier; press [PTT] to emit error voice prompt.

RL: Enable BTLO, transmitting is inhibited when current channel receives a matching carrier but dis-matching CTCSS/DCS, press [PTT] to emit error voice prompt. It can transmit in any receiving status.

OFF: Busy channel lockout is disabled.

3. Press number keys to confirm and exit.



This function can be temporarily used in Channel mode. Once the radio is turned off or switched to another channel, the temporary setting will be erased and back to initial settings.

## Reverse TX/RX

TX frequency turns to RX frequency & RX frequency changes to TX frequency. The signaling will also be reversed if CTCSS/DCS signaling existed in this channel.

REV -- ON 12

REV -- OF 12

1. In standby, press , then press , LCD displays "REV—OF".
2. Press [  /  ] to select the desired value.

ON: Enable Frequency Reverse

OFF: Disable Frequency Reverse

3. Press number keys to confirm and exit.



This function can be temporarily used in Channel mode. Once the radio is turned off or switched to another channel, the temporary setting will be erased and back to initial settings.

## TOT (Time-out timer)

The time-out timer limits the amount of transmitting time. When you reach the time limit which has been programmed by your dealer, your transmission will be cut off. In order to transmit again, you must release PTT button to reset the timer.

1. In standby, press , then press  "LCD displays "TOT-X".
2. Press [  /  ] to select the desired value.
3. Press number key to confirm and exit.

## CTCSS/DCS Encode and Decode

1. In standby, press , then press  to enter into CTCSS/DCS Encode and Decode.
2. Repeat above operation to set as below:  
 LCD displays T icon, it indicates CTCSS encode set in current channel.  
 LCD displays T and SQ icon, it indicates CTCSS encode and decode set in current channel.  
 LCD displays DCS icon, it indicates DCS encode and decode set in current channel.
3. In corresponding icon, press [  /  ] to select the desired CTCSS/DCS encode and decode.
4. Press , or C/SET to confirm and exit.



This function can be temporarily used in Channel mode. Once the radio is turned off or switched to another channel, the temporary setting will be erased and back to initial settings.

## Talk Around

By Talk Around function, you can directly communicate with other radios in your group in case the repeater is not activated or when you are out of the repeater range. The transceiver will transmit by RX frequency with its CTCSS/DCS signaling.

1. In standby, press , then press  key, LCD displays "TALK-OF".
2. Press [  /  ] to select the desired setting .  
 ON: Enable Talk Around  
 OFF: Disable Talk Around
3. Press number key to confirm and exit.



This function can be temporarily used in Channel mode. Once the radio is turned off or switched to another channel, the temporary setting will be erased and back to initial settings.

## Voice Prompt

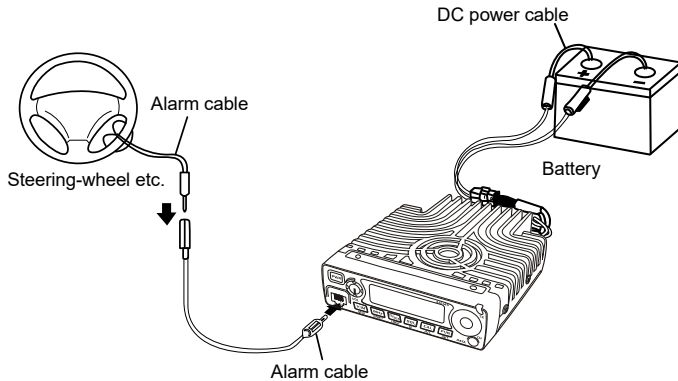
The prompting tone provides confirmation of entry, error status or malfunctions of the transceiver. You can enable or disable this function.

1. In standby, press , then press , LCD displays "BEEP--XX".
2. Press [  /  ] to turn on/off BEEP voice prompt.  
 BEEP—OF : turn off voice prompt  
 BEEP—ON : turn on voice prompt
3. Press number key to exit and store.

### ■ LCD Backlight

1. In standby status, press  , then press  LCD displays "LAMP-XX".
2. Press [  /  ] to select desired backlight brightness (1-32 levels).
3. Press number keys to confirm and exit.

This function is mainly use for simple anti-theft alarm device in vehicles. When the transceiver be removed in an improper manner,the transceiver will emit and transmit alarming and background voice to system and other transceiver of the same frequency.



Connect DC power cable with car battery.

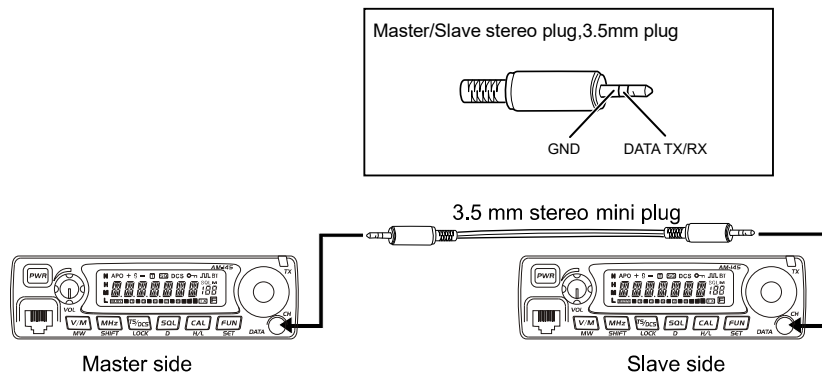
1. Connect the optional alarm cable to the data jack on the front panel as shown. Secure the other end of the cable to an object that stays fixed in vehicle. (Note: if alarm cable is not enough long, you can choose optional alarm cable to exted).
2. When transceiver power off by press  key ,the long-distance anti-theft alarm enable.
3. Note:The long-distance anti-theft alarm only available when transceiver power off .

4. When the alarm cable is removed from the DATA jack or cut by improper sequence, the alarm function enable and will alarm as programmed. In alarming,the transceiver will stop alarm once receiving a matching signal. And alarm again when a matching signal isappeared.

5. Restart radio to cancel anti-theft alarming.Reconnect with alarm cable and turn off radio,the system will return to alarm mode.

This feature will copy the programmed data and parameters in the master unit to slave units. It copies the parameters and memory program settings.

1. Use optional CP50 cloning cable, connect the cable between the data jacks on both master and slave.
2. Press and hold **[FUN]** key, then press **[CAL]** key to enter into cloning mode, LCD displays **"CLONE"**.



3. Press master unit's [PTT] key, LCD displays "SD XXX", "XXX" indicates data volume in transmitting. Slave unit displays "LD XXX", "XXX" indicates received data volume. When the transmission is successfully finished, the master and slave unit both display **"PASS"**. Turn off the power, disconnect the cable and repeat step 2 to step 3 operations to clone the next slave unit.



**NOTE** If the data is not successfully transmitted, turn off both units, make sure the cable connection is correct and repeat the entire operation from the beginning.

## ■ Default Setting after Resetting(VHF)

|                         |           |                       |     |
|-------------------------|-----------|-----------------------|-----|
|                         | AM-145    | DCS encode and decode | -   |
| VFO frequency           | 145.00MHz | DCS code              | -   |
| Memory channel 0-199    | -         | Output power          | HI  |
| Offset direction        | -         | Key-lock setting      | OFF |
| Offset frequency        | 600KHz    | TOT                   | OFF |
| Channel step            | 25KHz     | APO                   | OFF |
| CTCSS encode and decode | -         | Squelch Level         | 4   |
| CTCSS frequency         | -         |                       |     |

## ■ Trouble Shooting

| Problem                                                 | Possible Causes and Potential Solutions                                                                                                                                          |
|---------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| (a) Power is on, nothing appears on Display.            | + and - polarities of power connection are reversed. Connect red lead to plus terminal and black lead to minus terminal of DC power supply.                                      |
| (b) Fuse is blown.                                      | Check and solve problem resulting in blown fuse and replace fuse with new fuse.                                                                                                  |
| (c) Display is too dim.                                 | Dimmer setting is "LAMP-L". Please make the dimmer setting "LAMP-H".                                                                                                             |
| (d) No sound comes from speaker.                        | <ul style="list-style-type: none"> <li>• Squelch is muted. Decrease squelch level.</li> <li>• Tone or CTCSS/DCS squelch is active. Turn CTCSS or DCS squelch off.</li> </ul>     |
| (e) Key and Dial do not function.                       | Key-lock function is activated. Cancel Key-lock function.                                                                                                                        |
| (i) Rotating Dial will not change memory channel.       | Transceiver is in CALL mode. Press the VFO or memory mode.                                                                                                                       |
| (g) PTT key is pressed but transmission does not occur. | <ul style="list-style-type: none"> <li>• Microphone connection is poor. Connect microphone properly.</li> <li>• Antenna connection is poor. Connect antenna properly.</li> </ul> |

## General

|                       |                                                                              |
|-----------------------|------------------------------------------------------------------------------|
| Frequency Range       | VHF: 136-174MHz<br>245-245.9875MHz(220-260MHz)                               |
| Number of Channels    | 200 channels                                                                 |
| Channel Spacing       | 25K (Wide Band)<br>20K(Middle Band)<br>12.5K (Narrow band)                   |
| Phase-locked Step     | 5KHz, 6.25KHz, 8.33KHz, 10KHz, 12.5KHz,<br>15KHz, 20KHz, 25KHz, 30KHz, 50KHz |
| Operating Voltage     | 13.8V DC $\pm 15\%$                                                          |
| Squelch               | Carrier/CTCSS/DCS/5Tone/2Tone/DTMF                                           |
| Frequency Stability   | $\pm 2.5\text{ppm}$                                                          |
| Operating Temperature | $-20^{\circ}\text{C} \sim +60^{\circ}\text{C}$                               |
| Dimensions(WxHxD)     | 145 (W) x 47 (H) x 190 (L)mm                                                 |
| Weight                | about 1.2Kg                                                                  |

 Specifications are subject to change without notice due to advancements in NOTE technology.

## Receiver (ETSI EN 300 086 standard testing )

|                              | Wide band              | Narrow band            |
|------------------------------|------------------------|------------------------|
| Sensitivity (12dB Sinad)     | $\leq 0.25\mu\text{V}$ | $\leq 0.35\mu\text{V}$ |
| Adjacent Channel Selectivity | $\geq 70\text{dB}$     | $\geq 60\text{dB}$     |
| Intermodulation              | $\geq 65\text{dB}$     | $\geq 60\text{dB}$     |
| Spurious Rejection           | $\geq 70\text{dB}$     | $\geq 70\text{dB}$     |
| Audio Response               | +1~-3dB(0.3~3KHz)      | +1~-3dB(0.3~2.55KHz)   |
| Hum & Noise                  | $\geq 45\text{dB}$     | $\geq 40\text{dB}$     |
| Audio distortion             | $\leq 5\%$             |                        |
| Audio power output           | $> 2\text{W}@10\%$     |                        |

## Transmitter (ETSI EN 300 086 standard testing )

|                        | Wide band          |
|------------------------|--------------------|
| Power Output           | 60W /25W/10W(VHF)  |
| Modulation             | 16K $\Phi$ F3E     |
| Adjacent Channel Power | $\geq 70\text{dB}$ |
| Hum & Noise            | $\geq 40\text{dB}$ |
| Spurious Emission      | $\geq 60\text{dB}$ |
| Audio Response         | +1~-3dB(0.3~3KHz)  |
| Audio Distortion       | $\leq 5\%$         |

## ■ 50 groups CTCSS Tone Frequency(Hz)

|      |      |       |       |       |       |       |       |       |       |
|------|------|-------|-------|-------|-------|-------|-------|-------|-------|
| 67.0 | 79.7 | 94.8  | 110.9 | 131.8 | 156.7 | 171.3 | 186.2 | 203.5 | 229.1 |
| 69.3 | 82.5 | 97.4  | 114.8 | 136.5 | 159.8 | 173.8 | 189.9 | 206.5 | 233.6 |
| 71.9 | 85.4 | 100.0 | 118.8 | 141.3 | 162.2 | 177.3 | 192.8 | 210.7 | 241.8 |
| 74.4 | 88.5 | 103.5 | 123.0 | 146.2 | 165.5 | 179.9 | 196.6 | 218.1 | 250.3 |
| 77.0 | 91.5 | 107.2 | 127.3 | 151.4 | 167.9 | 183.5 | 199.5 | 225.7 | 254.1 |

## ■ 1024 groups DCS Code.

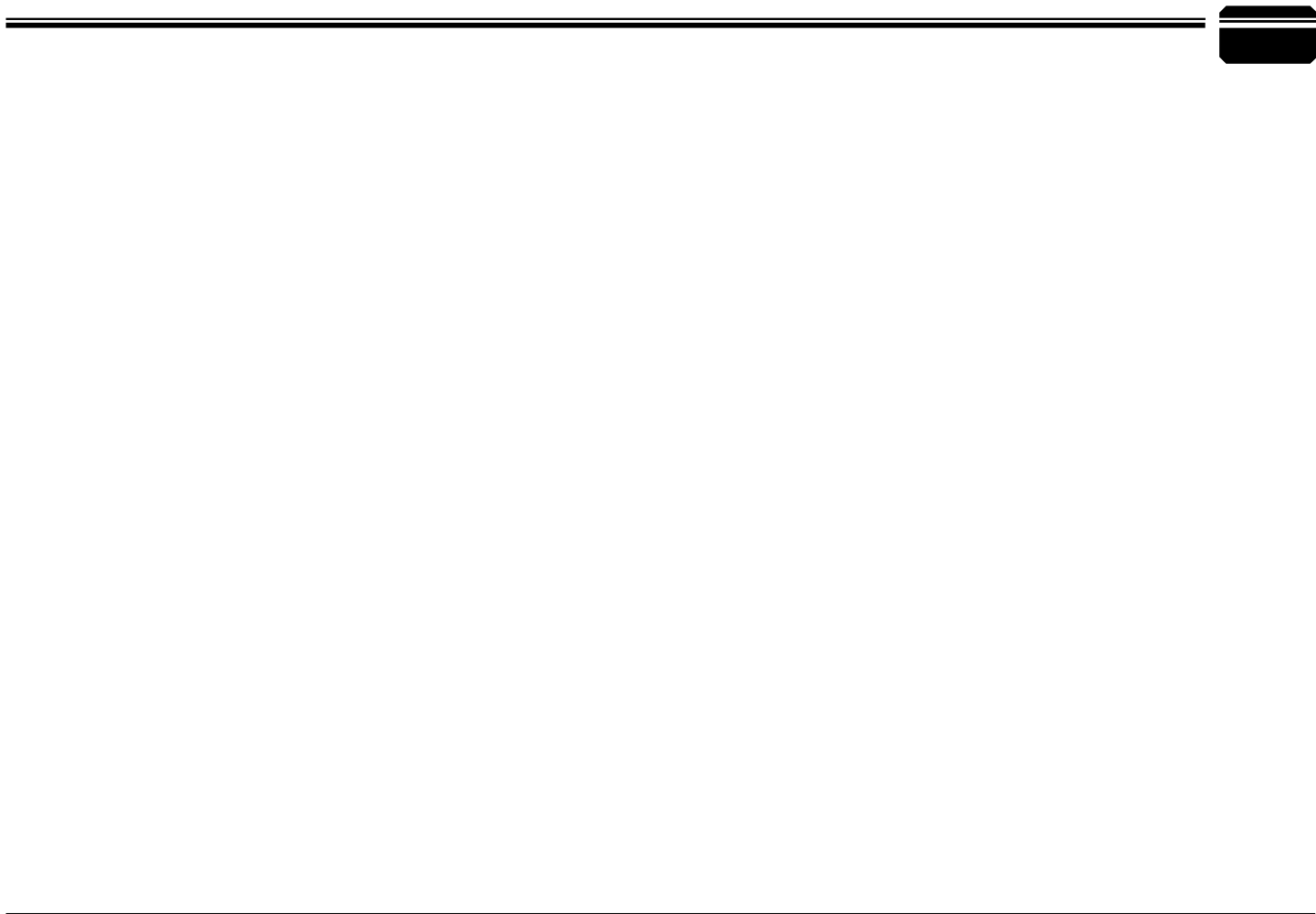
|     |     |     |     |     |     |     |     |
|-----|-----|-----|-----|-----|-----|-----|-----|
| 000 | 001 | 002 | 003 | 004 | 005 | 006 | 007 |
| 010 | 011 | 012 | 013 | 014 | 015 | 016 | 017 |
| 020 | 021 | 022 | 023 | 024 | 025 | 026 | 027 |
| 030 | 031 | 032 | 033 | 034 | 035 | 036 | 037 |
| 040 | 041 | 042 | 043 | 044 | 045 | 046 | 047 |
| 050 | 051 | 052 | 053 | 054 | 055 | 056 | 057 |
| 060 | 061 | 062 | 063 | 064 | 065 | 066 | 067 |
| 070 | 071 | 072 | 073 | 074 | 075 | 076 | 077 |
| 100 | 101 | 102 | 103 | 104 | 105 | 106 | 107 |
| 110 | 111 | 112 | 113 | 114 | 115 | 116 | 117 |
| 120 | 121 | 122 | 123 | 124 | 125 | 126 | 127 |
| 130 | 131 | 132 | 133 | 134 | 135 | 136 | 137 |
| 140 | 141 | 142 | 143 | 144 | 145 | 146 | 147 |
| 150 | 151 | 152 | 153 | 154 | 155 | 156 | 157 |
| 160 | 161 | 162 | 163 | 164 | 165 | 166 | 167 |
| 170 | 171 | 172 | 173 | 174 | 175 | 176 | 177 |
| 200 | 201 | 202 | 203 | 204 | 205 | 206 | 207 |
| 210 | 211 | 212 | 213 | 214 | 215 | 216 | 217 |
| 220 | 221 | 222 | 223 | 224 | 225 | 226 | 227 |
| 230 | 231 | 232 | 233 | 234 | 235 | 236 | 237 |
| 240 | 241 | 242 | 243 | 244 | 245 | 246 | 247 |
| 250 | 251 | 252 | 253 | 254 | 255 | 256 | 257 |
| 260 | 261 | 262 | 263 | 264 | 265 | 266 | 267 |
| 270 | 271 | 272 | 273 | 274 | 275 | 276 | 277 |
| 300 | 301 | 302 | 303 | 304 | 305 | 306 | 307 |
| 310 | 311 | 312 | 313 | 314 | 315 | 316 | 317 |

|     |     |     |     |     |     |     |     |
|-----|-----|-----|-----|-----|-----|-----|-----|
| 320 | 321 | 322 | 323 | 324 | 325 | 326 | 327 |
| 330 | 331 | 332 | 333 | 334 | 335 | 336 | 337 |
| 340 | 341 | 342 | 343 | 344 | 345 | 346 | 347 |
| 350 | 351 | 352 | 353 | 354 | 355 | 356 | 357 |
| 360 | 361 | 362 | 363 | 364 | 365 | 366 | 367 |
| 370 | 371 | 372 | 373 | 374 | 375 | 376 | 377 |
| 400 | 401 | 402 | 403 | 404 | 405 | 406 | 407 |
| 410 | 411 | 412 | 413 | 414 | 415 | 416 | 417 |
| 420 | 421 | 422 | 423 | 424 | 425 | 426 | 427 |
| 430 | 431 | 432 | 433 | 434 | 435 | 436 | 437 |
| 440 | 441 | 442 | 443 | 444 | 445 | 446 | 447 |
| 450 | 451 | 452 | 453 | 454 | 455 | 456 | 457 |
| 460 | 461 | 462 | 463 | 464 | 465 | 466 | 467 |
| 470 | 471 | 472 | 473 | 474 | 475 | 476 | 477 |
| 500 | 501 | 502 | 503 | 504 | 505 | 506 | 507 |
| 510 | 511 | 512 | 513 | 514 | 515 | 516 | 517 |
| 520 | 521 | 522 | 523 | 524 | 525 | 526 | 527 |
| 530 | 531 | 532 | 533 | 534 | 535 | 536 | 537 |
| 540 | 541 | 542 | 543 | 544 | 545 | 546 | 547 |
| 550 | 551 | 552 | 553 | 554 | 555 | 556 | 557 |
| 560 | 561 | 562 | 563 | 564 | 565 | 566 | 567 |
| 570 | 571 | 572 | 573 | 574 | 575 | 576 | 577 |
| 600 | 601 | 602 | 603 | 604 | 605 | 606 | 607 |
| 610 | 611 | 612 | 613 | 614 | 615 | 616 | 617 |
| 620 | 621 | 622 | 623 | 624 | 625 | 626 | 627 |
| 630 | 631 | 632 | 633 | 634 | 635 | 636 | 637 |
| 640 | 641 | 642 | 643 | 644 | 645 | 646 | 347 |
| 650 | 651 | 652 | 653 | 654 | 655 | 656 | 657 |
| 660 | 661 | 662 | 663 | 664 | 665 | 666 | 667 |
| 670 | 671 | 672 | 673 | 674 | 675 | 676 | 677 |

|     |     |     |     |     |     |     |     |
|-----|-----|-----|-----|-----|-----|-----|-----|
| 700 | 701 | 702 | 703 | 704 | 705 | 706 | 707 |
| 710 | 711 | 712 | 713 | 714 | 715 | 716 | 717 |
| 720 | 721 | 722 | 723 | 724 | 725 | 726 | 727 |
| 730 | 731 | 732 | 733 | 734 | 735 | 736 | 737 |
| 740 | 741 | 742 | 743 | 744 | 745 | 746 | 747 |
| 750 | 751 | 752 | 753 | 754 | 755 | 756 | 757 |
| 760 | 761 | 762 | 763 | 764 | 765 | 766 | 767 |
| 770 | 771 | 772 | 773 | 774 | 775 | 776 | 777 |



**NOTE** N is positive code, I is negative code, total: 232groups.



**adi**