

**▶ Table of Contents ◀**

1. Introduction
2. Description of Unit
3. Technical Specifications
4. Features and operation
5. Antenna Installation

**1. Introduction**

IM401 has a compact size with a various features in the range of 403~470MHz.

Has a various features shown as below.

IM401 constructed with a microprocessor controlled, temperature compensated Phase Locked Loop(PLL) frequency synthesizer. The radio features a double conversion receiver and a direct FM transmitter modulator. A special integrated circuit provides support to sub-audible signaling(CTCSS & DCS) and most of the receiving parts are switched off periodically in the power save mode to reduce battery current drain during standby.

**2. Description of Unit**

| Supplied<br>Package | Items       | Model  |
|---------------------|-------------|--------|
|                     | Radio       | IM 401 |
|                     | User manual |        |

| Accessories | Items  | Model |
|-------------|--|-------|
|             | Hand Microphone<br>Battery Cable<br>Pedestal |       |

### 3. Technical Specifications

#### 3-1 General

- |     |                              |   |                        |           |
|-----|------------------------------|---|------------------------|-----------|
| 1)  | Frequency range              | : | 403~470 MHz            |           |
| 2)  | Channels                     | : | 255 Channels           |           |
| 3)  | Channel spacing              | : | 12.5 kHz/25 kHz        |           |
| 4)  | Communication method         | : | Simplex                |           |
| 5)  | Antenna Impedance            | : | 50 ohm                 |           |
| 6)  | Power supply voltage         | : | DC 13.6V               |           |
| 7)  | Current Drain                | : | When Transmitting(40W) | - < 9A    |
|     |                              |   | When Receiving(3W)     | - < 1A    |
|     |                              |   | Transmit standby       | - < 150mA |
| 8)  | Microphone                   | : | External Condenser Mic |           |
| 9)  | Operating temperature range: |   | -30℃ ~ +60℃            |           |
| 10) | Size                         | : | 178(W)x49(H)x195(D)    |           |
| 11) | Weight                       | : | 1600g                  |           |

#### 3-2 Transmitter

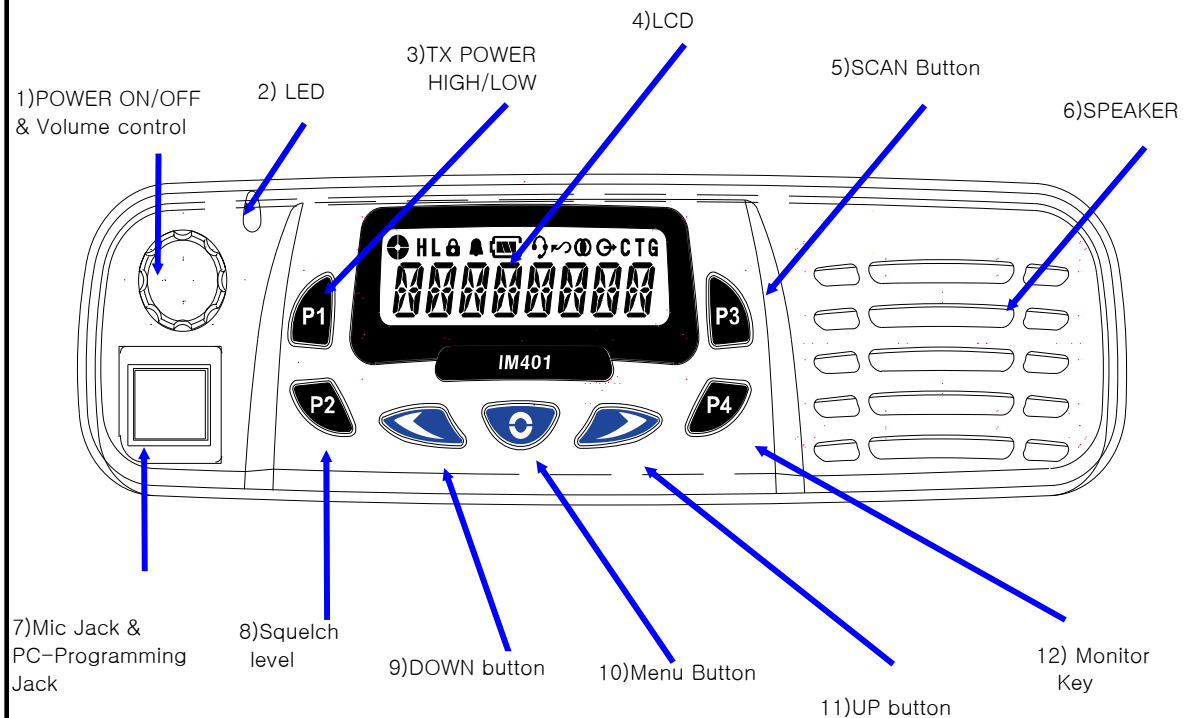
- |    |                              |   |  |
|----|------------------------------|---|--|
| 1) | Power Output                 | : | HIGH – 40W, LOW - 5W                       |
| 2) | Modulation                   | : | 8K50F3E/16K0F3E                            |
| 3) | Oscillator method            | : | PLL  |
| 4) | Frequency Stability          | : | less than $\pm 0.00025\%$ ( $\pm 2.5$ PPM) |
| 5) | Maximum frequency deviation: |   | $\pm 2.5$ kHz(Narrow)/ $\pm 5$ kHz(Wide)   |
| 6) | Audio Distortion             | : | less than 5% (1 kHz 60%)                   |
| 7) | SPURIOUS Emission            | : | -75 [dBc]                                  |
| 8) | FM Hum & Noise               | : | -40 / -45 [dB] (HP8920A 300Hz ~ 3kHz BPF)  |
| 9) | BAND SPREAD                  | : | 67[MHz]                                    |

**3-3 Receiver**

- |                                  |   |  |
|----------------------------------|---|--|
| 1) Receiver Type                 | : | Double Super Hetero type               |
| 2) Sensitivity                   | : | -0.25uV e.m.f ( 12dB SINAD )           |
| 3) Frequency Stability           | : | $\pm 0.00025\%$ ( $\pm 2.5$ PPM)       |
| 4) SPURIOUS Rejection            | : | -70 dB                                 |
| 5) Adjacent Channel Selectivity: |   | -65 dB (Narrow) , -70 dB (Wide)        |
| 6) Distortion                    | : | 5% (1 kHz 60%)                         |
| 7) Hum & Noise                   | : | -40 / -45 dB(HP8920A 300Hz ~ 3kHz BPF) |
| 8) Audio output                  | : | Normal 3W ( Max 5W )                   |
| 9) BAND SPREAD                   | : | 67MHz                                  |
| 10) Speaker size                 | : | 58 * 35 Oval                           |

**4. Features and Operation**

## EXTERNAL VIEW



#### 4-1 Features & Operation

##### 1. Monitor

Press the Monitor key momentarily to disable the Tone squelch.

##### 2. Radio Call

By using Various 5Tone, individual / Group call is available.

16 Receiving codes are available as well as open call.

##### 3. Missed calls list

16 Missed calls can be listed. If a call remains unanswered, the call will be stored by the radio.

##### 4. contact list

During a call, the contact list may be used to give access to up to 16 preprogrammed numbers accessed via the menu.

##### 5. status list

A status is a code for transmitting prearranged messages, e.g. status "05" may indicate "launch". Status list contains up to 30 entries.

##### 6. Channel : 255 channel

##### 7. Scan ON/off

##### 8. Power level : Power level is adjustable in each channel respectively.

##### 9. Talkaround on/off

##### 10. Emergency :

##### 11. Lone Worker

##### 12. Tx Tone select : In the menu, tx dcs /ctcss tone is adjustable.

##### 13. Rx Tone select : In the menu, rx dcs /ctcss tone is adjustable.

##### 14. Group : Defines group tone. You can select tone code for group, and it is used as a default value . 0~9 and a, b, c, d available. And "A" is used as a basic value..

##### 15. BEEP ON/OFF : BEEP sound ON/OFF.

##### 16. KEY LOCK : LOCK/UNLOCK Button KEY.

##### 17. SQUELCH : Squelch level is adjustable

##### 18. AUTO SQUELCH : Squelch level is adjustable automatically by surroundings.

##### 19. DTMF ON/OFF : DTMF function is available.

##### 20. VOX : VOX LEVEL is adjustable by pushing up and down button.

##### 21. AUTO VOX : VOX level is adjustable automatically by surroundings.

##### 22. P - SCAN : Priority Scan

##### 23. POWER SAVE : Power save mode is available.

##### 24. PASS WORD : This function is useful for security reason.

##### 25. Dimmer : Control back light

##### 26. SCRMABLE : Internal Voice Scrambler is available.

##### 27. STUN / UNSTUN : For added security and to avoid abuse of the radio system in which you operate a feature known as Stun/Unstun is included in your radio.

##### 28. BACK LIGHT : Lamp is lighting when you check LCD status.

##### 29. Reset : Radio Data Reset.

##### 30. MIC GAIN: Mic sensitivity control

##### 31. Vari Call : Variable Call

#### 4-2 LCD Display and Icons



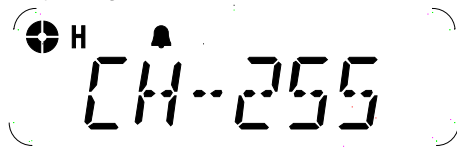
1. ANT GAZE ; Shows the received signal strength.
2. TX POWER HIGH: Indicate power level
3. KEY LOCK: Appears during key lock function is ON.
4. ALART(BEEP) ON/OFF: Appears when beep sound is turned ON.
5. VOX ON/OFF: Appears when VOX function is turned On.
6. SCAN: Appears when Scan function is activated.
7. SCRAMBLE: Appears while the voice scrambler function is activated.
8. TALK AROUND Indicator.

#### 4-3 Features

##### 1. Channel

This radio offers up to 255 channels

- 1). By using  or  button, you can select the desired channel.

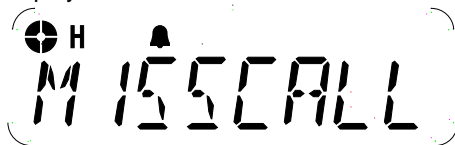






##### 2. Missed calls list

Up to 16 calls can be stored. If the same radio calls more than once, only the most recent call is stored. When fifteen calls have been stored by the radio, depending on the radio programming the sixteenth call received may overwrite the first or not be stored by the radio.


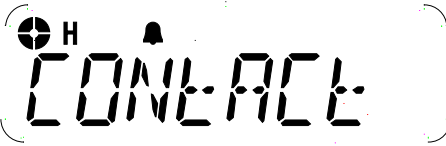






- 1).  to enter Menu Mode.

##### 2) Display shows




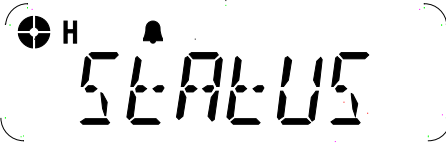





- 3)  to select
- 4)  or  to scroll list
- 5)  to exit

## 3. Contact list








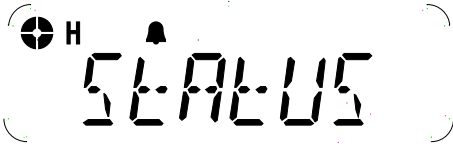
- 1)  to enter Menu Mode.
- 
- 2)  or  to until
  - 3)  to select
  - 4)  or  to scroll list
  - 5)  to exit

## 4. Status call list







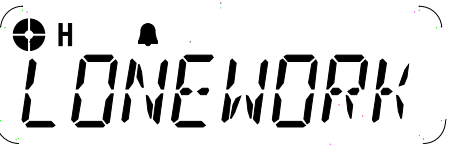
## 4-1. Making STATUS call

- 1)  to enter Menu Mode.
- 
- 2)  or  to until
  - 3)  to select
  - 4)  or  to scroll list
  - 5) Push PTT KEY for sending message on the LCD.

4-2 Make STATUS Message

- 1)  to enter Menu Mode.
  - 2)  or  to until
  - 3)  to select
  - 4)  or  to scroll list
  - 5)  to SELECT
- 

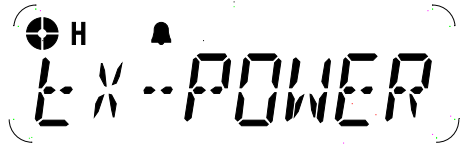
5. Lone work

- 1).  to enter Menu Mode.
  - 2)  or  to until
  - 3)  to select
  - 4)  or  to select ON/OFF
- 



## 6. Tx power

- 1)  to enter Menu Mode.



- 2)  or  to until

- 3)  to select

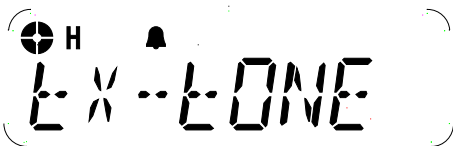
- 4)  or  to select HIGH / LOW POWER

- 5)  to select

## 7. Tx Tone

Selecting Transmitting TONE(CTCSS/DCS).

- 1)  to enter Menu Mode.



- 2)  or  to until

- 3)  to select

- 4)  or  to Select TONE을 either CTCSS or DCS.

0= NON TONE

1-38 CTCSS

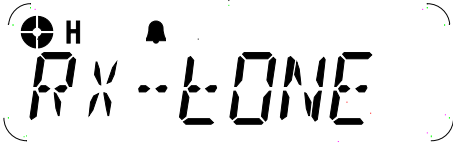
101 - 183 DCS TONE

- 5)  to select exit

## 8. Rx Tone



Changing Receiving TONE(CTCSS/DCS).

- 1)  to enter Menu Mode.



- 2)  or  to until

- 3)  to select

- 4)  or  to select TONE either CTCSS or DCS.

0= NON TONE  
 1-38 CTCSS  
 101 – 183 DCS TONE.

- 5)  to select exit

## 9. Group

Changing GROUP Tone.

- 1)  to enter Menu Mode.



- 2)  or  to until

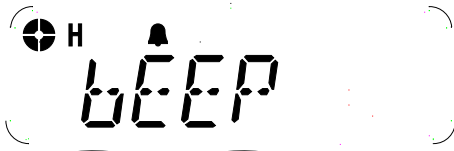
- 3)  to select

- 4)  or  to select scroll list

- 5)  to select exit

10. Beep on/off

1).  to enter Menu Mode.



2).  or  to until

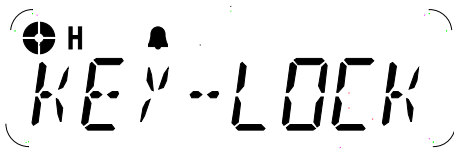
3).  to select

4).  or  to select on off .

5).  to select

11. Key lock

1).  to enter Menu Mode.



2).  or  to until

3).  to select

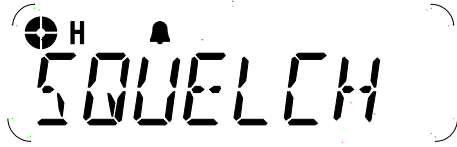
4).  or  to select key lock /unlock.

5).  to select

## 12. Squelch level

16 level is available. 0 = terminate sq function

- 1)  to enter Menu Mode.



- 2)  or  to until

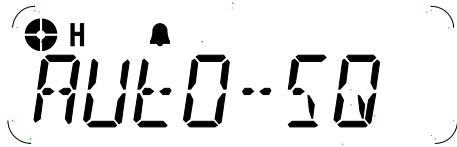
- 3)  to select

- 4)  or  to the scroll list

- 5)  to select exit

## 13. Auto Squelch

- 1)  to enter Menu Mode.



- 2)  or  to until

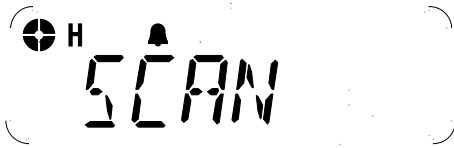
- 3)  to select

- 4)  or  to select on /off .

- 5)  to select

14. Scan

- 1)  to enter Menu Mode.



- 2)  or  to until

- 3)  to scan.

- 4) Push PTT for exit

15. DTMF

- 1)  to enter Menu Mode.













- 2)  or  to until

- 3)  to select

- 4)  or  to select ON /OFF.











- 5)  to select

## 16. Vox on/off

- 1)  to enter Menu Mode.
- 2)     or  to until
- 3)  to select
- 4)  or  to select ON /OFF.
- 5)  to select

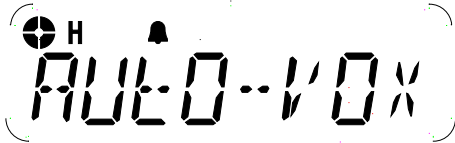
## 17. Vox Level

16 level is available..

- 1)  to enter Menu Mode.
- 2)     or  to until
- 3)  to select
- 4)  or  to scroll list
- 5)  to select for exit

18. Auto Vox

- 1).  to enter Menu Mode.



- 2).  or  to until

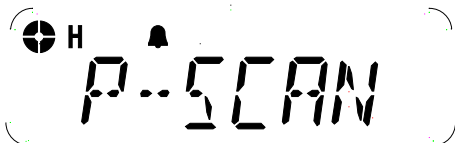
- 3).  to select

- 4).  or  to select ON /OFF.

- 5).  to select

19. Priority Scan

- 1).  to enter Menu Mode.



- 2).  or  to until

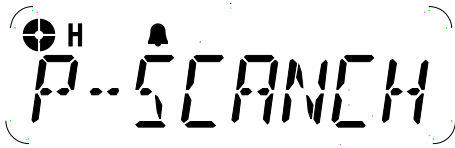
- 3).  to select

- 4).  or  to select ON /OFF.

- 5).  to select

20. Priority scan CH

- 1).  to enter Menu Mode.



- 2).  or  to until

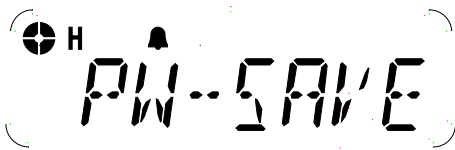
- 3).  to select

- 4).  or  to scroll list

- 5).  to select for exit

21. Power save

- 1).  to enter Menu Mode.



- 2).  or  to until

- 3).  to select

- 4).  or  to select ON /OFF.

- 5).  to select



22. Talkaround

- 1).  to enter Menu Mode.



- 2).  or  to until

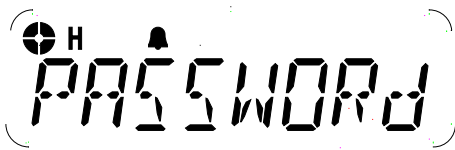
- 3).  to select



- 4).  or  to select ON /OFF.

- 5).  to select

23. Password

- 1).  to enter Menu Mode.



- 2).  or  to until

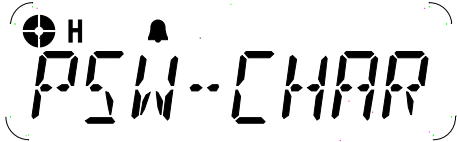
- 3).  to select

- 4).  or  to select ON /OFF.

- 5).  to select

## 24. Password CH

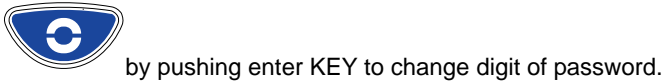
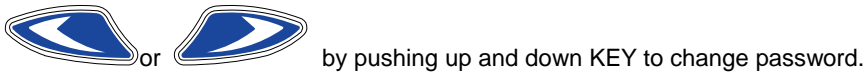
- 1).  to enter Menu Mode.



- 2).  or  to until

- 3).  to select

- 4) ---- will display on the LCD( enter old password)

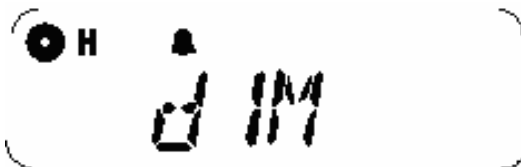


- 5) Enter new password by 4 digit.

## 25. Dimmer

## Back light Control

- 1).  to enter Menu Mode.



- 2).  or  to until

- 3).  to select

- 4).  or  to select level

- 5).  to select

26. Scramble

- 1).  to enter Menu Mode.



- 2).  or  to until

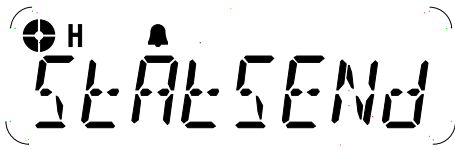
- 3).  to select

- 4).  or  to select ON /OFF.

- 5).  to select

27. Status call Send

- 1).  to enter Menu Mode.



- 2).  or  to until

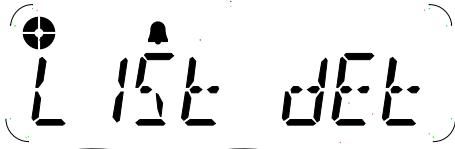
- 3).  to select

- 4).  or  to select ON /OFF.

- 5).  to select

28. Misscall List Delete

- 1).  to enter Menu Mode.



- 2).  or  to until

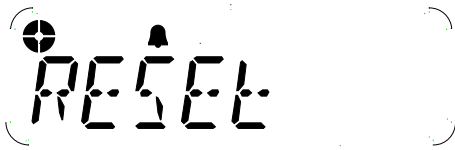
- 3).  to select

- 4).  or  to select ON /OFF.

- 5).  to select

29. Radio Reset

- 1).  to enter Menu Mode.



- 2).  or  to until

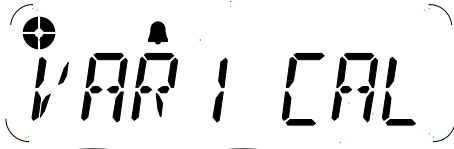
- 3).  to select

- 4).  or  to select ON /OFF.

- 5).  to select

## 30. Variable call

- 1)  to enter Menu Mode.



- 2)  or  to until

- 3)  to select

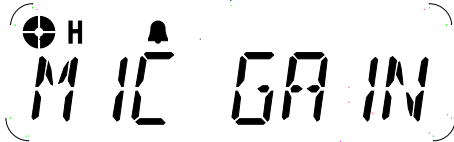
- 4)  or  to select 1,2,3~A,B,C,D,E

- 5)  to select

## 31. Mic Sensitivity Level (Mic Gain Control)

- 1)  to enter Menu Mode.

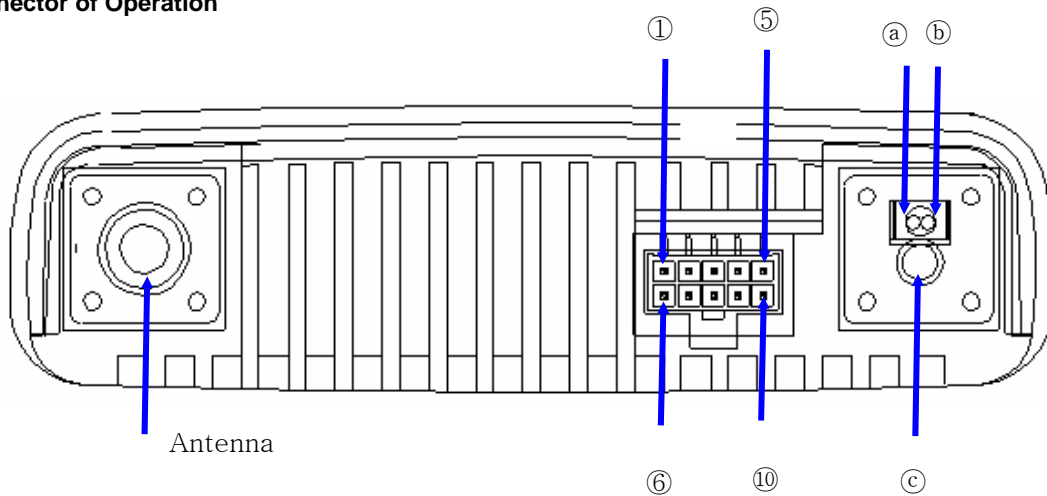
- 2)  or  to until



- 3)  to select

- 4)  or  to select HIGH/LOW.

"HIGH" is high sensitivity and "LOW" is normal sensitivity

**-Connector of Operation****10PIN CONNECTOR DESCRIPTION**

| Connection        | Pin NO | Function                            | Remark                         |
|-------------------|--------|-------------------------------------|--------------------------------|
| GND               | ①      | Ground                              | GND                            |
| CPU_INT_PTT       | ②      | Push To Talk                        | GND Enable                     |
| 5V                | ③      | Internal 5 Volt Regulator           | 5 Volt                         |
| FLAT_AUDIO_IN/OUT | ④      | Constant Audio Signal Level         |                                |
| S/W_BATT          | ⑤      | Switched Battery                    | 13.6V Enable                   |
| CPU_RSSI_DET      | ⑥      | Received Signal Strength Indication |                                |
| CPU_RX_PATH       | ⑦      | Busy Rx                             | 5V Enable<br>(Rx Signal Open)  |
| MIC               | ⑧      | MIC Input                           |                                |
| CPU_SP_MUTE       | ⑨      | Speaker ON/OFF                      | 0V Enable<br>(Speaker Close)   |
| CPU_TX_PATH       | ⑩      | MIC MUTE                            | 0V Enable<br>(MIC Input Close) |

**Power Supply & External Speaker Jack**

| Connection  | Pin NO | Function              | Remark |
|-------------|--------|-----------------------|--------|
| 13.6V       | a      | Power Cable           | 13.6V  |
| GND         | b      | Ground                |        |
| Speaker OUT | c      | External Speaker Jack |        |

## 5. Antenna Installation

### 5-1 Antenna Installation and Compliance with Radio Frequency(RF) Energy Safety Standards

#### [IMPORTANT NOTE]

To assure optimum performance and compliance with RF Energy Safety standards, this antenna installation guidelines and Instructions are limited to metal-body vehicles with appropriate ground planes and take into account the potential exposure of backseat passengers and bystanders outside the vehicle.

#### [NOTE]

For mobile radios with rated power of 7 watts or less, the only installation restrictions are to use only E-tech approved antennas and install the antenna externally on metal body vehicles. For mobile radios with rated power greater than 7 watts, always adhere to all the guidelines and restrictions in 5.2 below.

### 5-2 Selecting an Antenna Site/Location on a Metal Body Vehicle

1. External installation – Check the requirements of the antenna supplier and install the vehicle antenna external to a metal body vehicle in accordance with those requirements.
2. Roof top – For optimum performance and compliance with RF Energy Safety standards, mount the antenna in the center area of the roof.
3. Trunk lid – On some vehicles with clearly defined, flat trunk lids, the antenna of some radio models (see restrictions below) can also be mounted on the center area of the trunk lid. For vehicles without clearly defined, flat trunk lids (such as hatchback autos, sport utility vehicles, and pick-up trucks), mount the antenna in the center area of the roof.

#### **Before installing an antenna on the trunk lid.**

- Be sure that the distance from the antenna location on the trunk lid will be at least 60cm (24 inches) from the front surface of the rear seat-back to assure compliance with RF Energy Safety standards.
- Ensure that the trunk lid is grounded by connecting grounding straps between the trunk lid and the vehicle chassis.

**If these conditions can not be satisfied, then mount the antenna on the roof top !**

4. Mounting restrictions for certain radio models

**For more than 40 Watt VHF models**, the 1/4 wave antenna should be mounted **only in the center area of the roof**, not on the trunk lid, to assure compliance with RF Energy Safety standards.

5. Ensure that the antenna cable can be easily routed to the radio. Route the antenna cable as far away as possible from any vehicle electronic control units and associated wiring.
6. Check the antenna location for any electrical interference.
7. Make sure any other mobile radio antenna on this vehicle is at least 30.48 cm (1 foot) away from this antenna.

**[NOTE]**

**Any two metal pieces rubbing against each other (such as seat springs, shift levers, trunk and hood lids, exhaust pipes, etc.) in close proximity to the antenna can cause severe receiver interference.**

### **5-3 Antenna Installation Procedure**

1. Mount the antenna according to the instructions provided with the antenna kit. Run the coaxial cable to the radio mounting location. If necessary, cut off the excess cable and install the cable connector.
2. Connect the antenna cable connector to the radio antenna connector on the rear of the radio.

### **5-4 Completing the Installation**

1. Mount the microphone clip to a convenient spot near your radio.
2. Your microphone has a telephone-type connector at the end of its cord. Plug the microphone into the control head connector.
3. To complete your radio installation, plug the power cable into the radio power connector.