



INSTRUCTION MANUAL

UHF TRANSCEIVER

IC-F610
IC-F620

Icom Inc.

FCC RF EXPOSURE COMPLIANCE



WARNING For compliance with FCC and Industry Canada RF Exposure Requirements, the transmitter antenna installation shall comply with the following two conditions:

- 1.** The transmitter antenna gain shall not exceed 0 dBi
- 2.** The transmitter antenna is required to be located outside of a vehicle and kept at a separation distance of 85 centimeters or more between the transmitter antenna of this device and persons during operation.

IMPORTANT

READ ALL INSTRUCTIONS carefully and completely before using the transceiver.

SAVE THIS INSTRUCTION MANUAL — This instruction manual contains important operating instructions for the **IC-F610** and **IC-F620 UHF TRANSCEIVERS**.

EXPLICIT DEFINITIONS

WORD	DEFINITION
⚠ WARNING	Personal injury, fire hazard or electric shock may occur.
CAUTION	Equipment damage may occur.
NOTE	If disregarded, inconvenience only. No risk of personal injury, fire or electric shock.

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CAUTIONS

⚠ WARNING! NEVER connect the transceiver to an AC outlet. This may pose a fire hazard or result in an electric shock.

NEVER connect the transceiver to a power source of more than 16 V DC such as a 24 V battery. This connection will ruin the transceiver.

NEVER cut the DC power cable between the DC plug and fuse holder. If an incorrect connection is made after cutting, the transceiver might be damaged.

NEVER place the transceiver where normal operation of the vehicle may be hindered or where it could cause bodily injury.

NEVER allow children to touch the transceiver.

NEVER expose the transceiver to rain, snow or any liquids.

USE supplied microphone only. Other microphones have different pin assignments and may damage the transceiver.

DO NOT use or place the transceiver in areas with tem-

peratures below -30°C or above $+60^{\circ}\text{C}$ or, in areas subject to direct sunlight, such as the dashboard.

AVOID operate the transceiver without running the vehicle's engine. The vehicle's battery will quickly run out if the transceiver is in transmission while the vehicle's engine OFF.

AVOID placing the transceiver in excessively dusty environments.

AVOID placing the transceiver against walls. This will obstruct heat dissipation.

AVOID the use of chemical agents such as benzine or alcohol when cleaning, as they damage the transceiver surfaces.

BE CAREFUL! The transceiver will become hot when operating continuously for long periods.

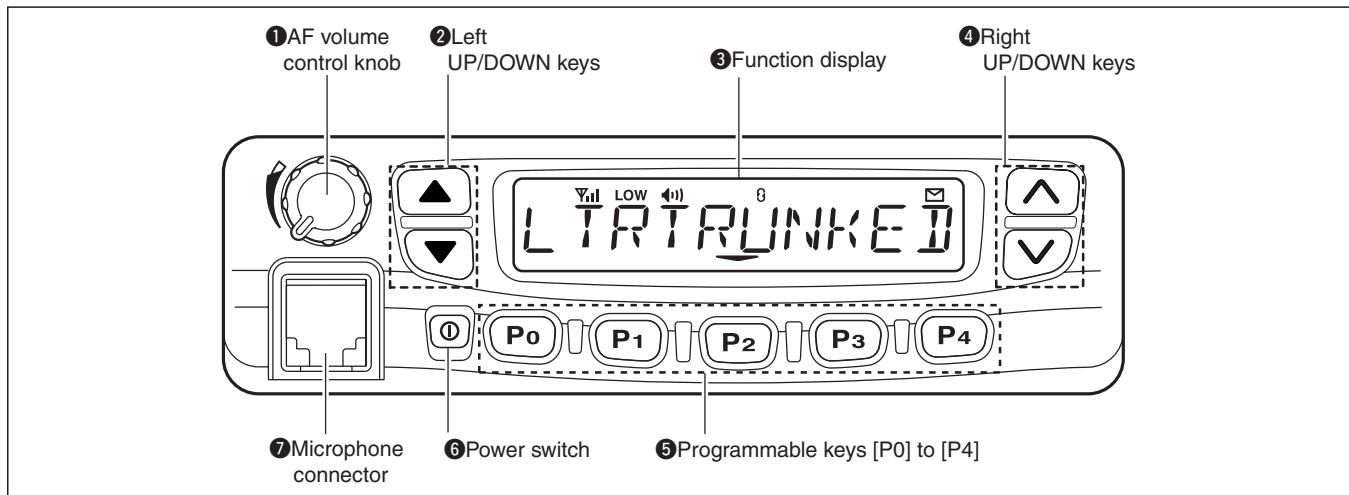
For U.S.A. only

CAUTION: Changes or modifications to this transceiver, not expressly approved by Icom Inc., could void your authority to operate this transceiver under FCC regulations.

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■ Front panel



① AF VOLUME CONTROL KNOB

Turn the knob to adjust the audio output level.

- Minimum audio level is pre-programmed.

② LEFT UP/DOWN [▲]/[▼] KEYS

- Push to select the operating channel.
- Can be programmed for one of several functions by your dealer. (Same as [P0] to [P4] keys)

③ FUNCTION DISPLAY

Displays variety of information, such as operating channel number/names, 5-tone code, DTMF numbers and audible condition, etc.

NOTE: The above functions depend on pre-setting.

④ RIGHT UP/DOWN [▲]/[▼] KEYS

- Push to select the operating channel.
- Can be programmed for one of several functions by your

dealer. (Same as [P0] to [P4] keys)

5 DEALER-PROGRAMMABLE KEYS [P0] to [P4]

Can each be programmed for one of several functions by your Icom dealer.

6 POWER SWITCH

Push to turns the power ON and OFF.

- The following functions are available at power ON as options:
 - Automatic scan start
 - Password prompt
 - Set mode

7 MICROPHONE CONNECTOR

Connect the supplied microphone or optional DTMF microphone for SmarTrunk II™ operation here.

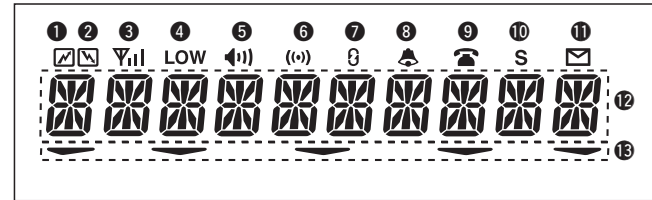
NEVER connect other microphones. The pin assignments may be different and the transceiver may be damaged.

MICROPHONE

The supplied microphone has a PTT switch and a hanger hook.

- The following functions are available when the microphone is on or off hook:
 - Automatic scan start when hung on.
 - Automatic priority channel selection when hung off.
 - Sets to 'Inaudible' condition (mute condition) when hung on.
 - Sets to 'Audible' condition (un-mute condition) when off.

Function display



1 TRANSMIT INDICATOR

- Appears while transmitting or sending a 5-tone code.
- When internal temperature increases to a specific level, the transmit indicator blinks to indicate that the power down circuit has been activated.

2 BUSY INDICATOR

Appears while the channel is busy.

3 SIGNAL STRENGTH METER

Indicates relative signal strength level.

4 LOW POWER INDICATOR

Appears when low output power is selected.

5 AUDIBLE INDICATOR

Appears when the channel is in the 'Audible' condition (unmute condition).

6 COMPANDER INDICATOR

Appears when compander function is activated.

1 PANEL DESCRIPTION

⑦ SCRAMBLER INDICATOR

Appears when scrambler function is activated. (Optional UT-109 (#02)/UT110 (#02) SCRAMBLER UNIT is required.)

⑧ 2/5TONE INDICATOR

Appears when specified 2/5tone call is received.

⑨⑩ LTR INDICATOR

Appears when LTR function is selected.

⑪ SHORT MESSAGE INDICATOR

Appears when a short message is received.

⑫ ALPHANUMERIC DISPLAY

Displays the CH number, 5-tone indication, DTMF numbers, Audible indication, etc.

NOTE: When the alphanumeric display blinks and transmitting becomes impossible. In this case, check that the antenna is not miss-matched or that DC battery voltage has not dropped below 8 V

⑬ ACTIVATED KEY INDICATOR

Appears or blinks when the key under this indicator is activated.

■ Programmable function keys

The following functions can be assigned to [P0], [P1], [P2], [P3], [P4], [▲], [▼], [^] and [✓] programmable function keys.

Consult your Icom Dealer or System operator for details concerning your transceivers programming.

In the following explanations, programmable function names are bracketed, the specific switch used to activate the function depends on programming.

[CH UP]

CH UP AND DOWN KEYS

[CH DN]

- Select an operating channel.
- Select a transmit code channel after pushing the [TX CH] key.
- Select a DTMF channel after pushing the [DTMF] key.
- Select a scan group after pushing and holding the [SCAN] key.

[CH1]

OPERATING CHANNEL KEYS

[CH2]

Select an operating channel directly.

[CH3]

[CH4]

[PRI A]

PRIORITY CHANNEL KEYS

Select priority A or priority B channel with each push.

[Bank] **BANK KEY**
 Select a bank.
 • When the optional UT-105 is installed, push one or more times to select a channel bank for conventional channels or SmarTrunk II™ channels.

[SCAN A] **SCAN START/STOP KEY**

[SCAN B] Push this key to start scanning; and push again to stop.

 **NOTE:** Place the microphone on hook to start scanning.
 Take the microphone off hook to stop scanning.

Push and hold this key to indicate the scan group, then push to select the desired group.

[TAG] **SCAN TAG KEY**

Adds or deletes the selected channel to the scan group.

[LOCK] **LOCK KEY**

Electronically locks all programmable keys except the following:
 • **[CALL]** (incl. CAL A and CAL B), **[MONI]** and **[EMER]** keys.

[MONI] **MONITOR KEY**

Activates one of (or two of) the following functions on each channel independently:

- Push and hold the key to unmute the channel (audio is emitted; 'Audible' condition).
- Push the key to toggle the mute and unmute conditions (toggles 'Audible' and 'Inaudible').
- Push the key to mute the channel (sets to 'Inaudible' only).
- Push the key to unmute the channel (sets to 'Audible' only).
- Push the key after the communication is finished to send a 'reset code'.

 **NOTE:** The unmute condition ('Audible' condition) may automatically return to the mute condition ('Inaudible' condition) after a specified period.

[W/N] **WIDE/NARROW KEY**

Push **[W/N]** to toggle bandwidth between wide or narrow.

- This function is available for W/N versions only.

[H/L] **OUTPUT POWER SELECTION KEYS**

Select the transmit output power temporarily or permanently depending on the pre-setting.

1 PANEL DESCRIPTION

- Ask your Dealer or System Operator for the output power level for each selection.

[TA]

TALK AROUND KEY

Turns the talk around function ON and OFF.

- The talk around function equalises the transmit frequency to the receive frequency for mobile-to-mobile communication.

[CALL]

CALL KEYS

[CAL A]

Transmit a 5-tone call.

[CAL B]

- Call transmission is necessary before you call another station depending on your signaling system.
- The [CAL A] and/or [CAL B] keys may be available when your system employs selective 'Individual/Group' calls. Ask your System Operator which call is assigned to each key.

[EMER]

EMERGENCY KEY

Push and hold the key to transmit an emergency call.

- If you want to cancel the emergency call, push (or push and hold) the key again before transmitting the call.
- The emergency call is transmitted one time only or repeatedly until receiving a control code depending on the pre-setting.

[TX CH]

TX CODE KEY

Select a transmit 5-tone code (station code) channel.

[CODE]

TX CODE CHANNEL UP/DOWN KEY

Push to selects a TX code channel directory.

[DTMF]

DTMF CHANNEL SELECT KEY

Push this key to select a DTMF channel.

- Push this key, then select the desired DTMF channel using the [^]/[v] keys.

Push and hold this key to transmit the selected DTMF code.

NOTE (LMR ONLY): DTMF channels 7 (EMERGENCY) and 8 (LOG/ID) are used for ID code and emergency code respectively, depending on your system set up.
Ask your System Operator or Dealer about DTMF channels 7 and 8 before using these.

[TONE]

C. TONE CHANNEL ENTER KEY

Push this key then input a continuous tone memory channel number via the keypad to change the tone frequency.

- [ID MR] ID MEMORY READ KEY**
 Recalls detected ID codes.
- Push this key, then push [**^**]/[**v**] for selection.
 - Up to 5 ID's are memorized.
- Push and hold this key to erase all memorized IDs.
- [GRP] TRUNKING GROUP KEY**
 Push to select the Trunking group.
- [COMP] MIC COMPANDER KEY**
 Push to toggle the mic compander function ON or OFF.
- [SET] SET MODE KEY**
 Changes the contents of the items in the User Set mode.
- Push and hold [SET], push [CH UP]/[CH DN] key to change the contents.

- [SCRM] SCRAMBLER KEY**
- Push and hold to turn the voice scrambler function ON.
 - Push to turn the voice scrambler function OFF.

NOTE:

- Optional UT-109 (#02) or UT-110 (#02) VOICE SCRAMBLER UNIT is required.
 - UT-109: Non-rolling type. 32 code numbers are available.
 - UT-110: Rolling type. Provides higher communication security. 1020 (4 groups x 255) code numbers are available.
- This transceiver requires version #02 scrambler units, do not install version #01, as they are not compatible.
- UT-109 and UT-110 require some PC board modifications. Please refer to the additional installation manual.
- Please contact your dealer for details.

■ Turning power ON

- ① Push [①] to turn the power ON.
 - A power-up alert tone sounds for about 1 sec. and an opening message may appear.
- ② If the transceiver is programmed for a start up passcode, input digit codes as directed by your System operator.
 - The keys in the diagram below can be used for password input:
 - The transceiver detects numbers in the same block as identical. Therefore “01234” and “56789” are the same.

KEY	[P0]	[P1]	[P2]	[P3]	[P4]
NUMBER	0 5	1 6	2 7	3 8	4 9

- ③ When the “PASSWORD” indication does not clear after inputting 4 digits, the input code number may be incorrect. Turn power off and start over in this case.

■ Channel selection

Several types are available, and the channel selection method may differ according to your system set up.

NON-BANK TYPE:

Push the [CH Up]/[CH Down] keys to select the desired operating channel, in sequence; or, push one of the [CH 1] to [CH 4] keys to select these channels directly.

BANK-TYPE:

Push [BANK] to select the desired bank number.

AUTOMATIC SCAN TYPE:

Channel setting is not necessary for this type. When turning the power ON, the transceiver automatically starts scanning. Scanning stops when receiving a call or when taking the microphone off hook.

■ Receiving and transmitting

RECEIVING:

- ① Push [①] to turn the power ON.
- ② Push [CH UP] or [CH DN] to select a channel.
- ③ When receiving a call, adjust the audio output level to a comfortable listening level.

TRANSMITTING:

- ④ Take the microphone off hook.
 - 5-tone mute may be released (the 'audible' condition is selected and "☒" appears).
 - A priority channel may be selected automatically.
- ⑤ Wait for the channel to become clear.
 - The channel is busy when "☒" appears.
- ⑥ Push the [CALL] key when initiating a call from your side.
 - Coded audio may be heard from the transceiver, then "☎)" appears.
 - This operation may not be necessary depending on your signaling system. Ask your System Operator or Dealer.
- ⑦ While pushing and holding [PTT], speak into the microphone at your normal voice level.
- ⑧ Release [PTT] to receive.

IMPORTANT: To maximize the readability of your signal: (1) pause briefly after pushing [PTT], (2) hold the transceiver 15 to 20 cm from your mouth, then speak into the microphone at a normal voice level.

◇ Transmitting notes

• Transmit inhibit function

The transceiver has several lockout/inhibit functions which restrict transmission under the following conditions:

- The channel is in mute condition ('Inaudible' condition; "☎)") does not appear).
- Channel is busy.
- No matched (or matched) CTCSS is received.
- The selected channel is a 'receive only' channel.

• Time-out timer

After continuous transmission for a pre-programmed period, the time-out timer is activated causing the transceiver to stop transmitting and automatically select receive.

• Penalty timer

Once the time-out timer is activated, transmission is further inhibited for a period determined by the penalty timer.

2 OPERATION

◇ Tx code channel selection

If the transceiver has a [TX CH] key, display can be toggled between the operating channel number (or name) and Tx code channel number (or name). When the Tx code channel number (or name) is displayed, the [CH UP]/[CH DN] keys select the Tx code channel.

TO SELECT A TX CHANNEL:

- ① Push [TX CH] — a Tx code channel appears.
- ② Push [CH UP]/[CH DN] to select the desired Tx code channel.
- ③ Push [CALL] to transmit the selected Tx code.
- ④ Push [TX CH] again to return to the channel display.

◇ Tx code number selection

If the transceiver has a [CODE] key, Tx code contents can be changed within the allowable digits.

TO SELECT A TX CODE:

- ① Push [CODE] — a Tx code number appears and an allowable digit blinks.
- ② Push [CH UP]/[CH DN] to select the desired number at the blinking digit.
- ③ Push [CODE] to enter the selected number.
- ④ Repeat steps ② and ③ to input all allowed digits.
- ⑤ Push [CALL] to transmit the selected Tx code.

◇ DTMF transmission

If the transceiver has a [DTMF] key, the automatic DTMF transmission function is available. Up to 7 DTMF channels may be available.

- ① Push [DTMF] to select the display as at right.
- ② Push [CH UP]/[CH DN] to select the desired DTMF channel.
- ③ Push and hold [DTMF] to transmit the DTMF code on the selected DTMF channel.

◇ Scrambler function

A UT-109 (#02) or UT-110 (#02) optional voice scrambler unit provides high performance private communication between stations with the same scrambler codes.

- ① Push and hold [SCRM] to turn the scrambler function ON.
- ② Push [SCRM] to turn the function OFF.

◇ User set mode

User set mode is accessed at power ON and allows you to set seldom-changed settings. In this case you can “customize” transceiver operation to suit your preferences and operating style.

Entering the user set mode:

- ① While pushing and holding [▲] and [▼], push [1] to turn the user set mode ON, allowing you to set seldom-changed settings.
- ② Push [P 0] to select the appropriate item. Then push [▲] and [▼] to set the desired level/mode.
Available set mode functions:
 - SQL Level; 0 to 255
 - Audio Filter; 3000, 3400, 0 or 300
 - Beep Level; 1 to 5 or Link (links to audio output level)
 - Back Light; AUTO, DIM, OFF or ON
 - AF Min level; 0 to 255
 - Mic Gain; 1 to 5
 - Beep; ON or OFF
- ③ Push [1] again to exit set mode.

■ SmarTrunk II™ and conventional modes

This transceiver is capable of SmarTrunk II™ functions.

The optional UT-105 allows communication in conventional channels or SmarTrunk II™ channels. Select a channel bank for SmarTrunk II™ before trunking operation.

- Push [**BANK**] one or more times to select a channel bank for conventional channels or SmarTrunk II™ channels.
 - Scanning starts when a channel bank for SmarTrunk II™ is selected.
 - Contact your Dealer for channel bank details.

 **NOTE:** Connect an optional HM-100TN DTMF MICROPHONE. Contact your Dealer for details.

■ SmarTrunk II™ operation

These features are enabled by a Dealer or System Operator and may not be available in your system. Contact your Dealer for details.

◇ Placing a telephone call

Enter the phone number followed by [1], [*].

- A high-pitched beep indicates that the number is accepted.
- When the called party answers, push the [PTT] switch to talk, and release it to listen.

◇ Calling another local system subscriber

Enter the subscriber number followed by [3], [*].

- A high-pitched beep indicates that the number is accepted.
- You hear ringing, then two short beeps when the subscriber answers.
- If the other subscriber is on another call or out of range, you hear a fast busy signal and the call terminates automatically.

◇ Receiving a call

When you hear ringing, push [*] to answer.

- For a group call, you hear a short ring followed by two short beeps. You do not have to answer a group call to hear it over the air.

◇ Terminating a call

After completing a call, push [#] to disconnect (hang up).

 **IMPORTANT:** If one person in the conversation terminates a call, all participants will be cut off.

◇ Last number re-dial

Push [*], [*] to automatically re-dial the last number called.

- A high-pitched beep indicates that the number is accepted.

◇ Memory speed-dialling

To automatically dial a commonly used number from memory:

- Push [*] followed by the memory location (0–9).

◇ Turbo Speedial

To automatically dial a commonly used number with one push:

- Push one of the turbo Speedials ([A], [B], [C] or [D]).

◇ Programming memory speed dial

- ① Push and hold [*] until you hear a high-pitched beep.
- ② Enter the memory location (0–9, A, B, C, D), the telephone or subscriber number, then [1], [*] (or [3], [*] if for another system subscriber).
 - A high-pitched beep indicates successful programming.
 - Memories [A]–[D] are used for the Turbo Speedial.

◇ System busy indication

If all channels are busy, three low beeps sound after you initiate a call. Try the call again later.

◇ PTT dispatch operation

- ① Push [PTT] once (without dialling) to initiate a dispatch call.
- ② Begin talking after you hear three beeps (one short, high-pitched, two very-short, low-pitched).
- ③ Receiving a dispatch call is indicated by the same three-beep sequence.
 - It is not necessary to push [*] to answer a dispatch call.

◇ Emergency call

Push [0], [*] to initiate an emergency call.

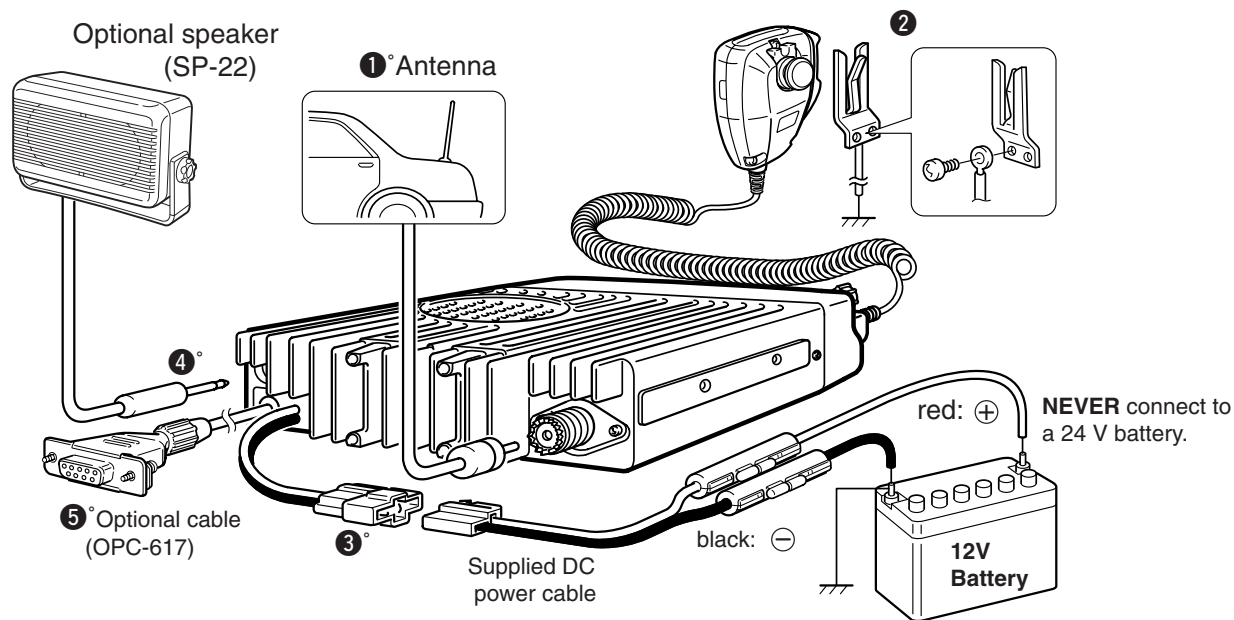
- Contact your dealer for details.

◇ Clear channel alerting

If all channels are busy, the transceiver automatically begins searching for an open channel and beeps every ten seconds. When two short beeps (low-pitched, then high-pitched) are heard, a channel is available. Push [*], [*] immediately to re-dial the last number.

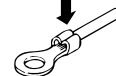
 **NOTE:** For additional operating instructions, contact your Dealer or System Operator.

■ Rear panel and connection



Note: Use the terminals for the cable connections.

Crimp



Solder



❶ ANTENNA CONNECTOR

Connects to an antenna. Ask your Dealer about antenna selection and placement.

❷ MICROPHONE HANGER

Connect the supplied microphone hanger to the vehicle's ground for on/off hook microphone functions. (See p. 2)

❸ DC POWER RECEPTACLE

Connects to a 12 V DC battery. Pay attention to polarities. **NEVER** connect to a 24 V battery. This could damage the transceiver.

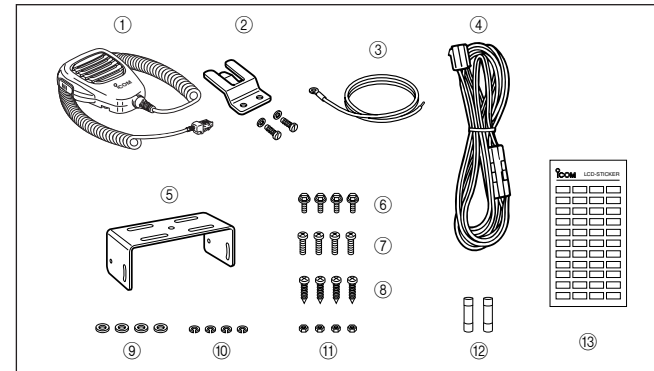
❹ EXTERNAL SPEAKER JACK

Connect a 4–8 Ω external speaker, if desired.

❺ OPTIONAL CABLE (OPC-617)

Connect an external modem unit, LCD backlight control, etc.

■ Supplied Accessories



- | | |
|---|--|
| ❶ Microphone 1
(Some versions may not be supplied with a microphone) | ❷ Mounting screw (M5×12) ... 4 |
| ❷ Microphone hanger and screw set 1 set | ❸ Self-tapping screw (M5×20) 4 |
| ❸ Microphone hanger cable . 1 | ❹ Flat washer 4 |
| ❹ DC power cable 1
IC-F510/F610: OPC-345
IC-F520/F620: OPC-346 | ❺ Spring washer 4 |
| ❺ Mounting bracket 1 | ❻ Nut 4 |
| ❻ Bracket bolt 4 | ❼ Fuse 2
IC-F510/F610: 15 A
IC-F520/F620: 20 A |
| | ❽ Function name stickers* (1705 LCD SEAL(D)) 1 |

◆ *Function name stickers

There are no names on the programmable function keys since the needed functions can be assigned to these keys.

Attach the supplied function name stickers above the appropriate keys.

4 CONNECTION AND MAINTENANCE

■ Mounting the transceiver

The front panel can be inverted for correct viewing while leaving the built-in speaker facing away from the mounting surface.

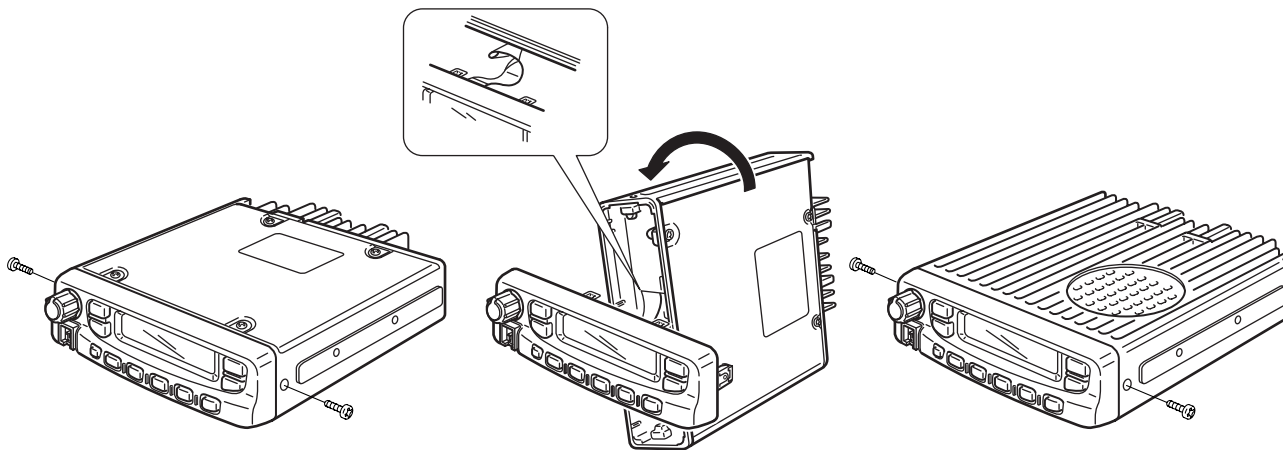
◇ Inverting the Front panel

- ① Unscrew the 2-side screws.
- ② Remove the Front panel forward from the transceiver.
- ③ Invert the transceiver 180° clockwise as below.
- ④ Insert the Front panel to the transceiver.

- ⑤ Tight the 2 screws.

NOTE:

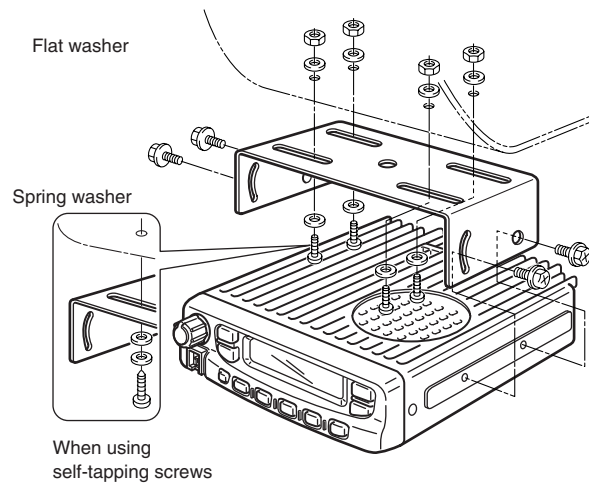
- **NEVER** rotate the transceiver more than 180°.
- **DO NOT** spread the flat cable too much on the transceiver. Damage may occur.



◇ Mounting the transceiver

The universal mounting bracket supplied with your transceiver allows overhead mounting. Please read the following instructions carefully.

- Mount the transceiver securely with the 4 supplied screws to a thick surface which can support more than 1.5 Kg.

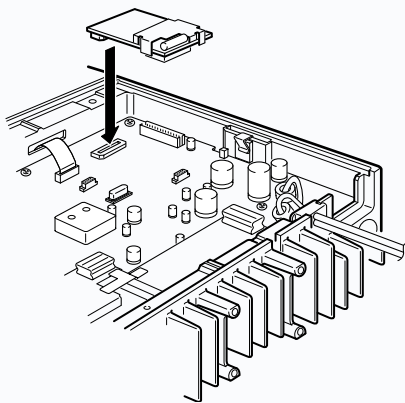


4 CONNECTION AND MAINTENANCE

■ Optional UT-105 and UT-108 installation

The optional UT-105 and UT-108 units install as follows:

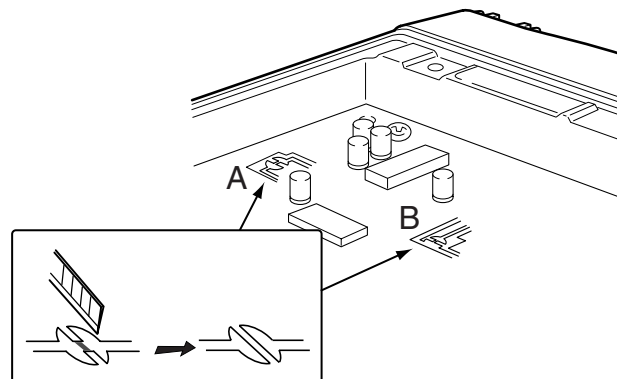
- ① Turn power OFF, then disconnect the DC power cable.
- ② Unscrew the 4 screws, then remove the bottom cover.
- ③ Install the unit as shown in the diagram below.
- ④ Replace the bottom cover and screws, then the DC power cable.



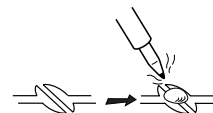
NOTE: The sponge supplied with the UT-105 is for the IC-F30/F40 series transceivers only.

■ Optional UT-109 /UT-110 installation

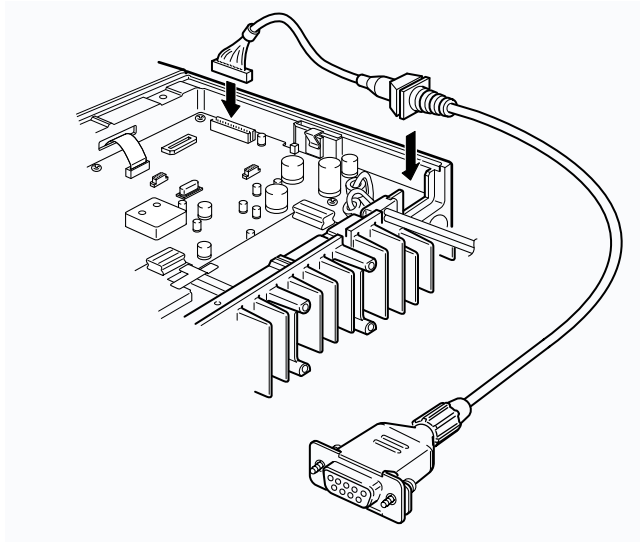
- ① Turn power OFF, then disconnect the DC power cable.
- ② Unscrew the 4 screws, then remove the bottom cover.
- ③ Cut the print pattern on the PC board at the TX mic circuit (A) and RX AF circuit (B) as shown in the following figure.
- ④ Install the Scrambler unit as shown in the left.
- ⑤ Replace the bottom cover and screws, then the DC power cable.



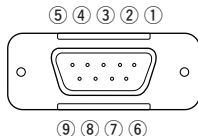
NOTE: Be sure to resolder above disconnected points, otherwise no TX modulation or AF output is available when you remove the scrambler units.



■ Optional OPC-617 installation



OPTIONAL CABLE PIN ASSIGNMENT



- | | |
|------------------------|------------------------|
| ① LCD backlit cont. IN | ⑥ Horn drive cont. OUT |
| ② AF OUT | ⑦ AF GND |
| ③ Det. AF OUT | ⑧ Det. AF GND |
| ④ Mod. IN | ⑨ Mod. GND |
| ⑤ PTT control IN | |

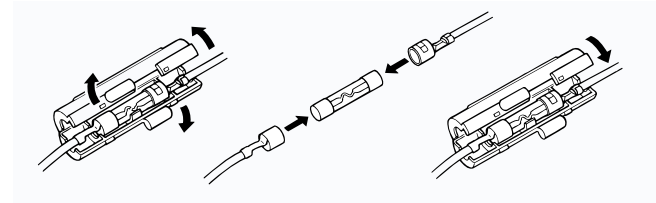
■ Antenna

A key element in the performance of any communication system is an antenna. Ask your Dealer about antennas and the best places to mount them.

■ Fuse replacement

Two fuses are installed in the supplied DC power cable. If a fuse blows or the transceiver stops functioning, track down the source of the problem, if possible, and replace the damaged fuse with a new, rated one.

□ Fuse rating IC-F510/F610: 15 A



■ Cleaning

If the transceiver becomes dusty or dirty, wipe it clean with a dry, soft cloth.



AVOID the use of solvents such as benzene or alcohol, as they may damage transceiver surfaces.

SP-22

Compact and easy-to-install

Input impedance: 4 Ω

Max. input power: 5 W

HM-100TN

DTMF microphone.

SM-25

Normal microphone.

UT-105 SmarTrunk II™ Logic Board

Provides SmarTrunk II™ capabilities.

UT-108 DTMF DECODER UNIT

Provides pager and code squelch capabilities.

UT-109/UT-110 VOICE SCRAMBLER UNIT

- UT-109: Non-rolling type (max. 32 codes)
- UT-110: Rolling type (max. 1020 codes)

OPC-617 ACC CABLE

Allows you to connect to an external terminal.

Count on us!

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