ICOM

INSTRUCTION MANUAL

VHF TRANSCEIVER

IC-F110S

UHF TRANSCEIVER

IC-F210S

Icom Inc.

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-F110S VHF TRANSCEIVER** and **IC-F210S UHF TRANSCEIVER**.

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

DO NOT use or place the transceiver in areas with temperatures below –30°C or above +60°C, or in areas subject to direct sunlight, such as the dashboard of a vehicle.

AVOID operating 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.

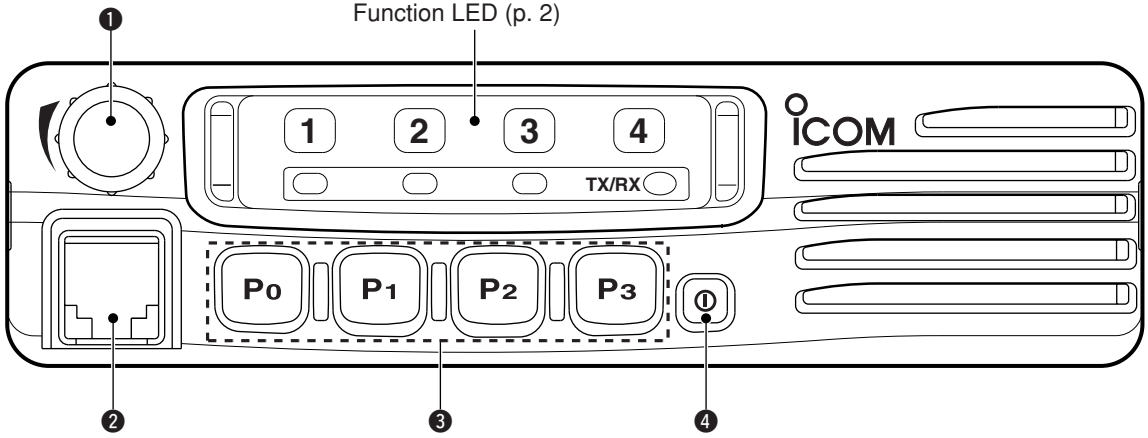
BE CAREFUL! The transceiver will become hot when operating continuously for long periods.

TABLE OF CONTENTS

IMPORTANT i
EXPLICIT DEFINITIONS i
CAUTIONS i
TABLE OF CONTENTS ii
1 PANEL DESCRIPTION 1–5
■ Front panel 1
■ Function LED 2
■ Programmable function keys 3
2 OPERATION 6–8
■ Turning power ON 6
■ Channel selection 6
■ Receiving and transmitting 7
◇ Transmitting notes 7
◇ Scrambler function 8
◇ Emergency Call 8
◇ User set mode 8
3 CONNECTION AND MAINTENANCE 9–13
■ Rear panel and connection 9
■ Supplied Accessories 10
■ Mounting the transceiver 11
■ Optional UT-108 installation 11
■ Optional UT-109/UT-110 installation 12
■ Optional OPC-617 installation 12
■ Antenna 13
■ Fuse replacement 13
■ Cleaning 13
4 OPTIONS 14

1 PANEL DESCRIPTION

■ Front panel



❶ AF VOLUME CONTROL KNOB

➥Rotate the knob to adjust the audio output level.

• Minimum audio level is pre-programmed.

❷ MICROPHONE CONNECTOR

➥Connect the supplied microphone or optional DTMF microphone.

NEVER connect non-specified microphones. The pin assignments may be different and the transceiver may be damaged.

❸ DEALER-PROGRAMMABLE KEYS [P0] to [P3]

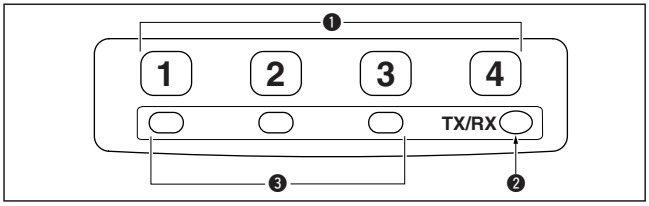
➥Desired functions can be programmed independently by your Dealer.

❹ POWER SWITCH [POWER]

➥Push to turn the power ON and OFF.

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

■ Function LED



❶ CHANNEL INDICATORS

➥ Indicates the operating channel.

➥ Blinks when receiving a signal during scanning operation.

➥ All LEDs blink while entering the power ON password.

❷ TX/RX INDICATOR

➥ Lights red: while transmitting

➥ Lights green: while the channel is busy

➥ Blinks orange (green and red blink simultaneously): when the specified 2-tone, 5-tone call is received.

➥ Green and red blink alternately: cloning error

❸ ACTIVATED KEY INDICATOR (LP 0/1/2)

➥ Appears when a pre-programmed key function is activated.

NOTE: When all function LEDs blink, check the DC battery voltage is not too high.

◇ 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 hook on.
- Automatic priority channel selection when hook off.
- Sets to 'Inaudible' condition (mute condition) when hook on.
- Sets to 'Audible' condition (unmute condition) when hook off.

■ Programmable function keys

The following functions can be assigned to **[P0], [P1], [P2]** and **[P3]** programmable function keys.
Consult your Icom Dealer or System operator for details concerning your transceiver's programming.
In the following explanations, programmable function names are bracketed. The specific switch used to activate the function depends on programming.

● ***CH UP AND DOWN KEYS***
Select an operating channel.

● ***BANK KEY***
Select and determine a bank number.

● ***SCAN A START/STOP KEY***
➥ This key's operation depends on the Power ON Scan setting.
When the power ON scan function is turned OFF;
Push to start and cancel scanning operation.
When the power ON scan function is turned ON;
Push to pause scanning, then resumes scanning after a specified time period has passed.
➥ Push and hold this key for 1 sec. to indicate the scan group, then select the desired group using [CH Up]/[CH Down].

● ***SCAN B START/STOP KEY***
➥ Push to start and cancel scanning operation. Scan resumes after a specified time period has passed when scan is cancelled except for this key.
➥ Push and hold this key for 1 sec. to indicate the scan group, then select the desired group using [CH Up]/[CH Down].

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

● ***SCAN TAG KEY***
Adds or deletes the selected channel to the scan group.

● ***PRIORITY CHANNEL KEYS***
Push these keys to select priority A or priority B channel, respectively.

● ***OPERATING CHANNEL KEYS***
Select an operating channel directly.

● ***LOCK KEY***
Push this key for 1 sec. to lock all programmable keys except the following:
• **[CALL]** (incl. **[CAL A]** and **[CAL B]**), **[MONI]** and **[EMER]** keys.

● ***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 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 depending on the pre-setting.

● ***OUTPUT POWER SELECTION KEYS***

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

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

● ***TALK AROUND KEY***

Turns the talk around function ON and OFF.

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

● ***WIDE/NARROW KEY***

Push this key to toggle the bandwidth between wide or narrow.

● ***DTMF AUTODIAL KEY***

Push this key to transmit a specified DTMF code.

● ***CALL KEY***

Transmit a 2-tone, 5-tone code.

- 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 Dealer which call is assigned to each key.

● ***EMERGENCY KEY***

Push and hold the key to transmit an emergency call. (p. 8)

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

● ***Hook Scan***

Several functions are available for the hanger function when taking the microphone from its hanger (hanger-off) and/or returning it to the hanger (hanger-on).

● ***USER SET MODE KEY***

Changes the contents of the items in the User Set mode. Please refer to p. 8.

- Push and hold this key for 1 sec. to enter set mode. Push this key again momentarily to select the desired item. Push **[P2]** and **[P3]** to set the desired level/condition.
  Push and hold this key again to exit set mode.

- User set mode also available via the 'Power ON function'.

● ***SCRAMBLER KEY***

- Push and hold to turn the voice scrambler function ON.
- Push this key to turn the voice scrambler function OFF.

NOTE:

- The optional UT-109 (#02) or UT-110 (#02) VOICE SCRAMBLER UNIT is required.
  – UT-109: Non-rolling type. 32 codes are available.
  – UT-110: Rolling type. Provides higher communication security. 1020 (4 groups × 255) codes are available.
- This transceiver requires version #02 of these units. Do not install version #01, as they are not compatible.
- Some PC board modifications are required when installing UT-109 and UT-110. Please refer to 'Optional UT-109/UT-110 installation'. (p.12)
- Please contact your Dealer for details.

■ Turning power ON

① Push [⏻] to turn the power ON.

② If the transceiver is programmed for a start up passcode, input the digit codes as directed by your Dealer.
- The keys in the table below can be used for password input:
- The transceiver detects numbers in the same block as identical. Therefore “01234” and “56789” are same.

③ When all channel indicator LEDs still blink after inputting 4 digits, the input code number is incorrect. Turn the power off and start over in this case.

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

■ Channel selection

Several types of channel selection are available. The methods may differ according to your system setup.

NON-BANK TYPE:
Push **[CH UP]**/**[CH DN]** to select the desired operating channel, in sequence; or, push one of the **[CH 1]** to **[CH 4]** keys to select a channel directly.

BANK-TYPE:
Push **[BANK]** to toggle between bank 1 and 2.

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 [POWER] 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.
- The channel is busy when TX/RX indicator turns green.
- According to the trasceiver's setting;
- 2-tone, 5-tone mute may be released. (The 'audible' condition is selected)
- A priority channel may be selected automatically.

⑤ Wait for the channel to become clear.
⑥ Push the **[CALL]** key when initiating a call from your side.
- According to the trasceiver's setting;
- Coded audio may be heard from the transceiver, then TX/RX indicator turns green.
- This operation may not be necessary depending on your signaling system. Ask your 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 microphone 2 to 5 cm from your mouth, then speak into the microphone at a normal voice level.

◇ Transmitting notes

• Transmit inhibit function

The transceiver has several inhibit functions which restrict transmission under the following conditions:
- The channel is in mute condition.
- Channel is busy.
- A matched/non-matched CTCSS code 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.

• PTTID call

The transceiver sends the ID code (5-tone, DTMF or digital ANI) automatically when **[PTT]** is pushed (beginning of transmission) and released (end of transmission) depends on the setting.

◇ Scrambler function

The 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.

◇ Emergency Call

The emergency call can be performed using the **[Emergency Single]** or **[Emergency Repeat]** key (p. 5). The transceiver will send an emergency command (5-tone, DTMF or MDC 1200) once or repeatedly until receiving the control code.
The emergency transmission is performed on the emergency channel, however, when no emergency channel is specified, the signal is transmitted on the previously selected channel. Ask your dealer for details.

◇ 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:

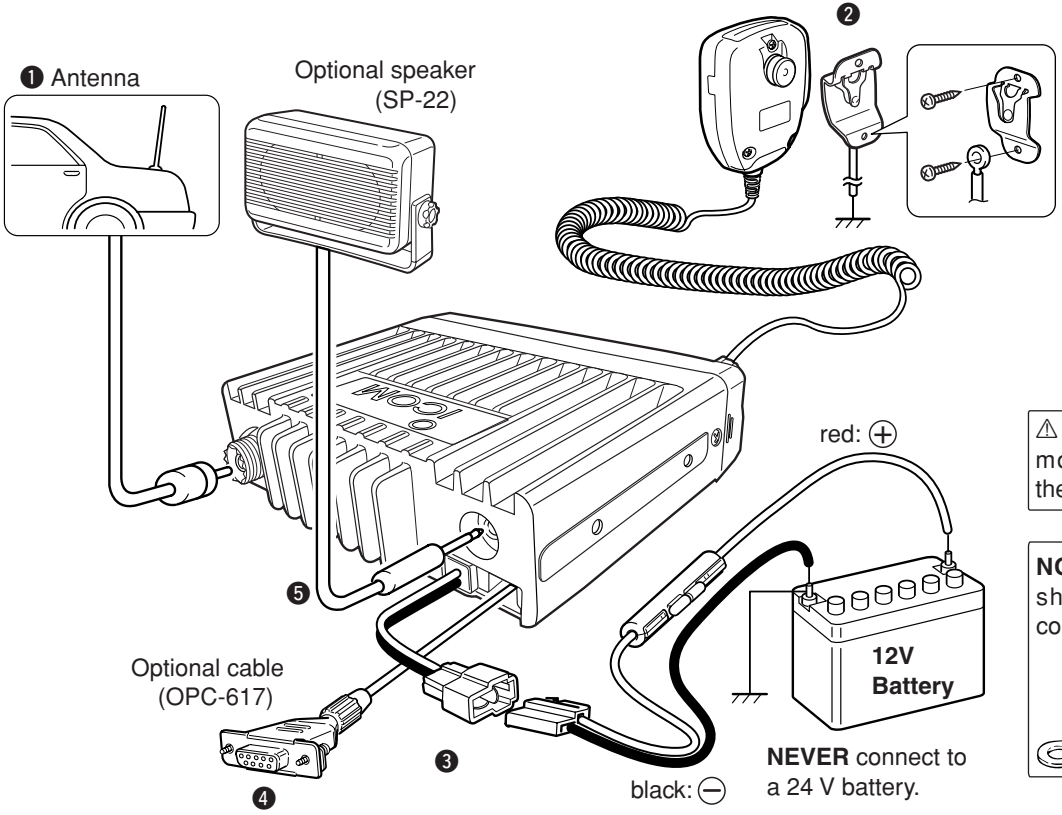
①While pushing and holding **[P1]** and **[P2]**, push [POWER] to enter user set mode at power ON.
②Push and hold **[P0]** to enter user set mode. Push **[P0]** again momentarily to select the item. The channel indicator lights respectively to indicate the function is selected.
Available set mode functions;
- Backlight (1 lights) : OFF, Dim, Auto or ON
- Beep (2 lights) : OFF or ON
- SQL Level (3 lights) : 0 to 255
- AF Min level (4 lights) : 0 to 255

③Then push **[P2]** and **[P3]** to set the desired level/condition.
④Push [POWER] (or push and hold **[P0]**) again to exit set mode.

User set mode is also available via a programmable key. Please refer to p. 5 **[SET]** section.

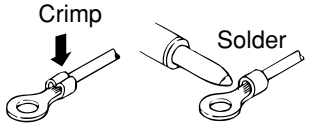
3 CONNECTION AND MAINTENANCE

■ Rear panel and connection



⚠ **CAUTION! NEVER** remove the fuse-holder from the DC power cable.

NOTE: Use the terminals as shown below for the cable connections.



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

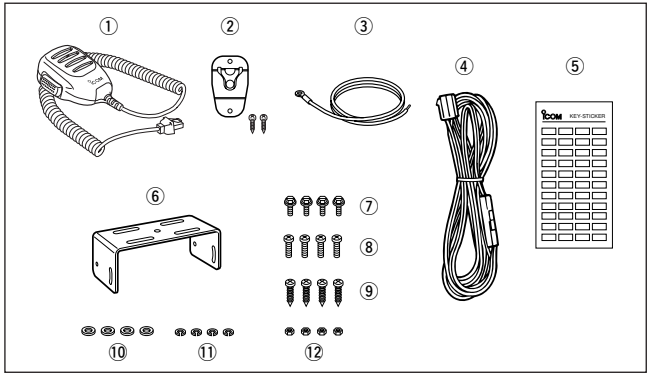
❷ MICROPHONE HANGER
Connect the supplied microphone hanger to the vehicle's ground for microphone on/off hook functions. (See p. 1)

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 OPTIONAL CABLE (OPC-617)
Connect an external modem unit, Dimmer control, etc.

❺ EXTERNAL SPEAKER JACK
Connect a 4–8 Ω external speaker, if desired.

■ Supplied Accessories



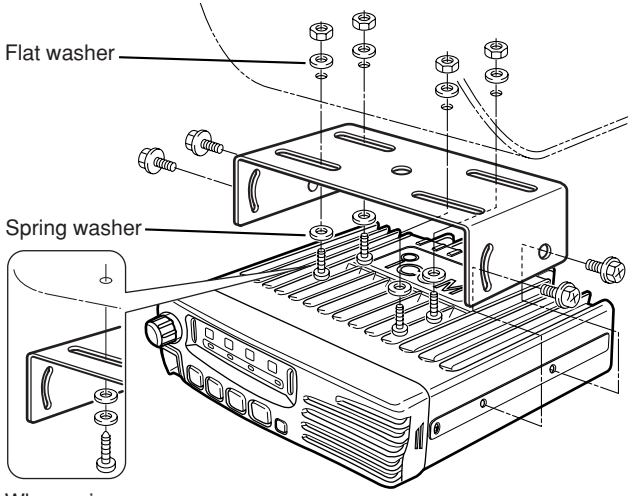
① Microphone 1
② Microphone hanger and screw set ..... 1 set
③ Microphone hanger cable . 1
④ DC power cable (OPC-1194) 1
⑤ Function name stickers* (KEY STICKER) 1
⑥ Mounting bracket 1
⑦ Bracket bolts 4
⑧ Mounting screws (M5×12) . 4
⑨ Self-tapping screws (M5×20) 4
⑩ Flat washers 4
⑪ Spring washers 4
⑫ Nuts 4

***Function name stickers**
There are no names on the programmable function keys since the functions can be freely assigned to these keys.
Attach the supplied function name stickers above the appropriate keys for easy recognition of that key's assigned function.

■ Mounting the transceiver

The universal mounting bracket supplied with your transceiver allows overhead mounting.

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

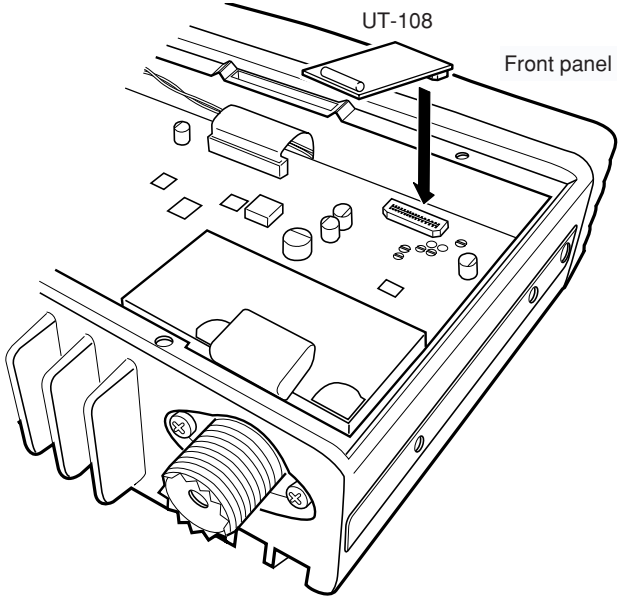


When using self-tapping screws

■ Optional UT-108 installation

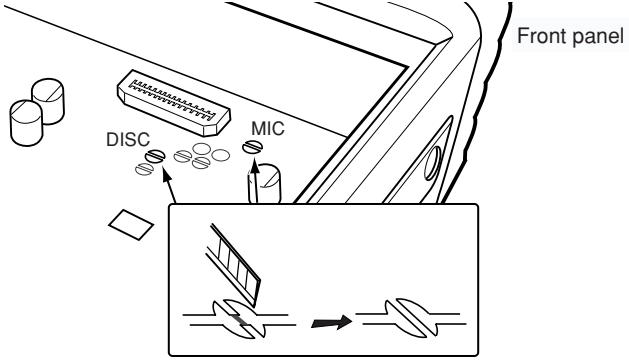
Install the optional UT-108 DTMF decoder unit as follows:

① Turn the 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 re-connect the DC power cable.

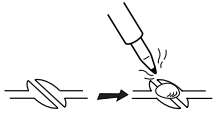


■ Optional UT-109 /UT-110 installation

① Turn the power OFF, then disconnect the DC power cable.
② Unscrew the 4 screws, then remove the bottom cover.
③ Cut the pattern on the PCB at the TX mic circuit (MIC) and RX AF circuit (DISC) as shown below.
④ Install the scrambler unit as described in optional UT-108 installation in the page at left.
⑤ Return the bottom cover and screws to the original position.

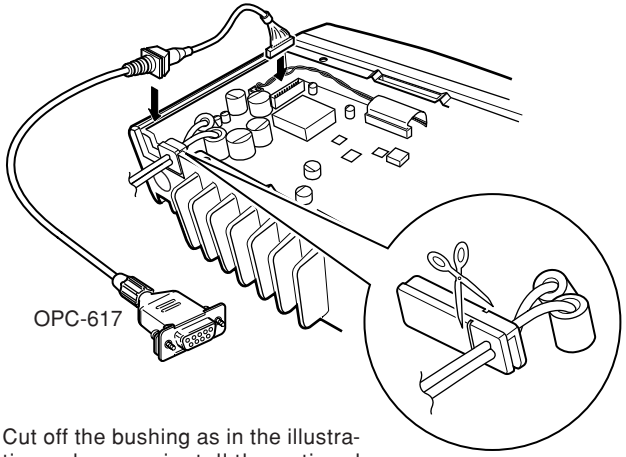


NOTE: Be sure to re-solder the above disconnected points when you remove the scrambler units. Otherwise no TX modulation or AF output is available.



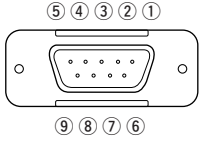
■ Optional OPC-617 installation

Install the OPC-617 as shown below.



Cut off the bushing as in the illustration, when you install the optional OPC-617.

OPTIONAL CABLE PIN ASSIGNMENT



① Dimmer cont. IN or IGSW cont. IN
② AF OUT
③ Det. AF OUT
④ Mod. IN
⑤ PTT control IN or FTSW control IN
⑥ Horn drive cont. OUT
⑦ AF GND
⑧ Det. AF GND
⑨ Mod. GND

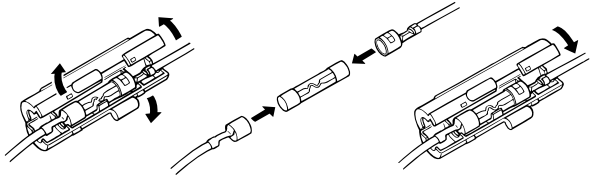
■ Antenna

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

A fuse is 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: 10 A



■ Cleaning

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

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

SP-22 EXTERNAL SPEAKER
Compact and easy-to-install.
Input impedance : 4 Ω
Max. input power : 5 W

HM-152/HM-152T/HM-148
- HM-152 : Hand microphone. The same as that supplied with the transceiver.
- HM-152T : DTMF microphone
- HM-148 : Heavy duty microphone

SM-25
Desktop microphone.

UT-108 DTMF DECODER UNIT
Provides pager and code squelch capabilities.

UT-109/UT-110 (#02) 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.

Some options may not available in some countries. Please ask your dealer for details.

MEMO

MEMO

Count on us!

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