

■ Unpacking

After unpacking, immediately report any damage to the delivering carrier or dealer. Keep the shipping cartons.

For a description and a diagram of accessory equipment included with the IC-FR3000/FR4000 series, see 'Supplied accessories' on p. iii of this manual.

■ Selecting a location

Select a location for the repeater that allows adequate air circulation, free from extreme heat, cold, or vibrations, and away from TV sets, TV antenna elements, radios and other electromagnetic sources.

■ Antenna connection

For radio communications, the antenna is of critical importance, along with output power and sensitivity. Select antenna(s), such as a well-matched 50 Ω antenna, and feedline. 1.5:1 or better of Voltage Standing Wave Ratio (VSWR) is recommended for desired band. Of course, the transmission line should be a coaxial cable.

CAUTION: Protect repeater from lightning by using a lightning arrestor.

NOTE: There are many publications covering proper antennas and their installation. Check with your local dealer for more information and recommendations.

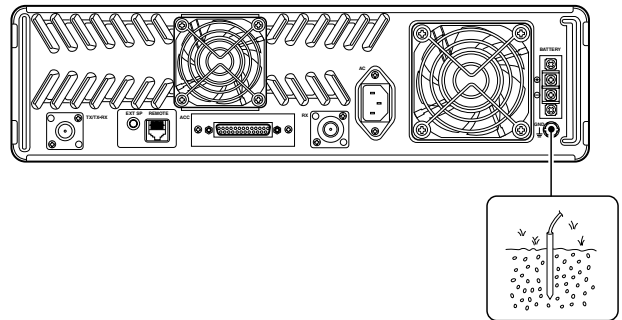
■ Duplexer

A duplexer is separately required when only one antenna is used for both transmitting and receiving. Select a duplexer according to the transmitting and receiving frequencies. Ask your Dealer for details.

■ Grounding

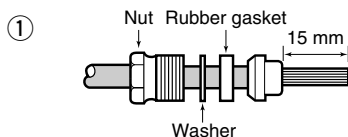
To prevent electrical shock, television interference (TVI), broadcast interference (BCI) and other problems, ground the transceiver through the [GND] terminal on the rear panel.

For best results, connect a heavy gauge wire or strap to a long earth-sunk copper rod. Make the distance between the [GND] terminal and ground as short as possible.

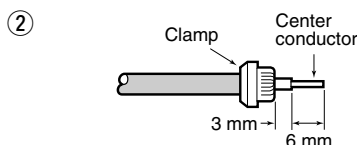


WARNING: NEVER connect the [GND] terminal to a gas or electric pipe, since the connection could cause an explosion or electric shock.

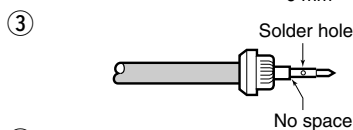
TYPE-N CONNECTOR INSTALLATION EXAMPLE



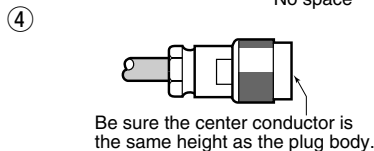
Slide the nut, flat washer, rubber gasket and clamp over the coaxial cable, then cut the end of the cable evenly.



Strip the cable and fold the braid back over the clamp.



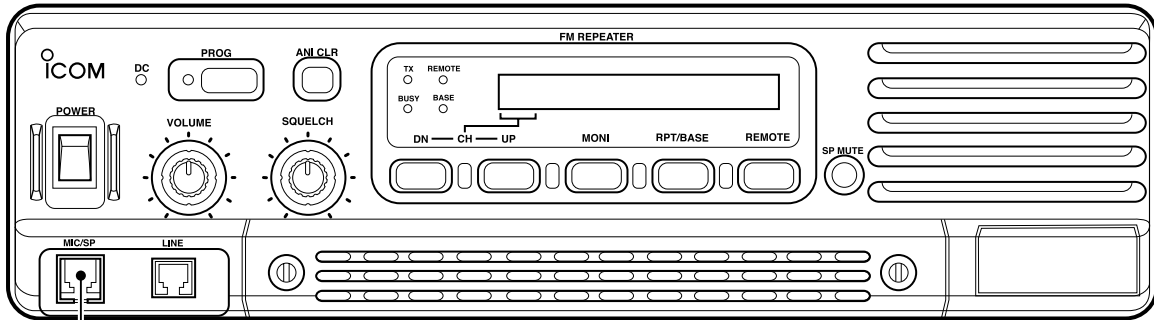
Soft solder the center conductor. Install the center conductor pin and solder it.



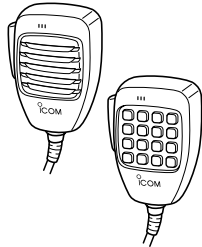
Carefully slide the plug body into place aligning the center conductor pin on the cable. Tighten the nut onto the plug body.

30 mm \approx $\frac{9}{8}$ in 10 mm \approx $\frac{3}{8}$ in 1-2 mm \approx $\frac{1}{16}$ in

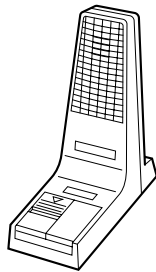
Required connections



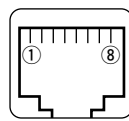
HM-100/TN HAND MICROPHONE (optional)



SM-25 DESKTOP MICROPHONE (optional)



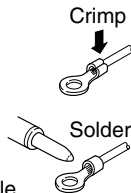
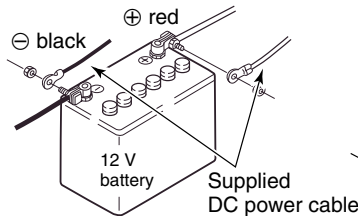
MICROPHONE CONNECTOR (Front panel view)



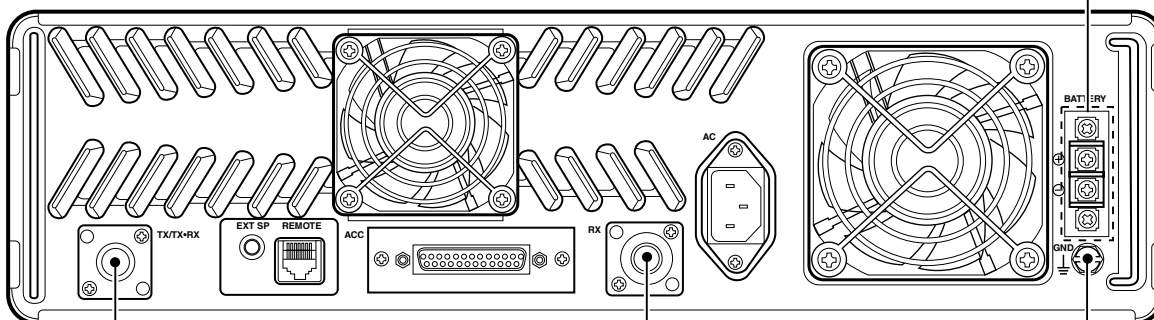
- ① +9 V DC output (Max. 10 mA)
- ② I/O port for PC programming
- ③ NC
- ④ M PTT (Input port for TX control)
- ⑤ Microphone ground
- ⑥ Microphone input
- ⑦ Ground
- ⑧ M MONI (Input port for monitor control)

CAUTION: DO NOT short pin 1 to ground as this can damage the internal 9 V regulator. DC voltage is applied to pin 1 for microphone operation. Take care when using a non-Icom microphone.

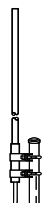
[DC POWER INPUT TERMINAL] (p. 8)



Make sure the back up battery is correctly connected. Use a cable with following current capacity. Solder or clamp the cable lug when connecting the power cable to the backup battery to prevent voltage drops.
Power cable current capacity: 25 A or more



[TX(TX•RX) ANT] (p. 5)

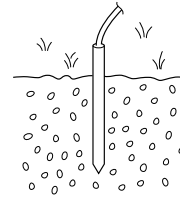


TX•RX antenna required for installing an internal duplexer.

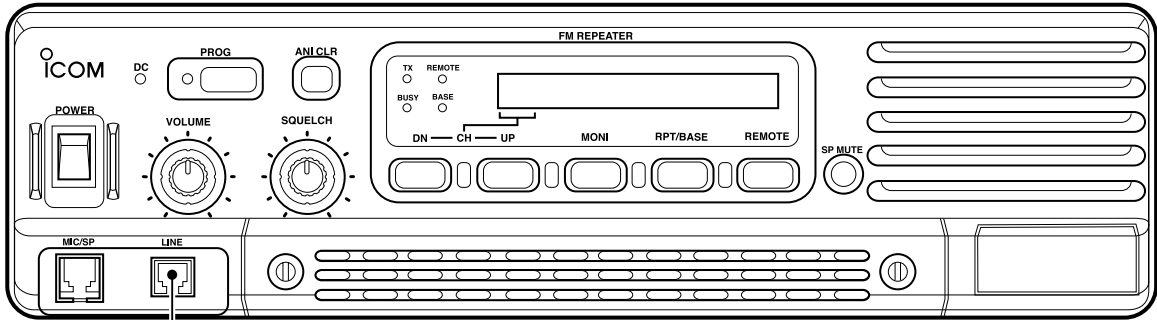
[RX ANT] (p. 5)



GROUND (p. 5)



■ Advanced connections



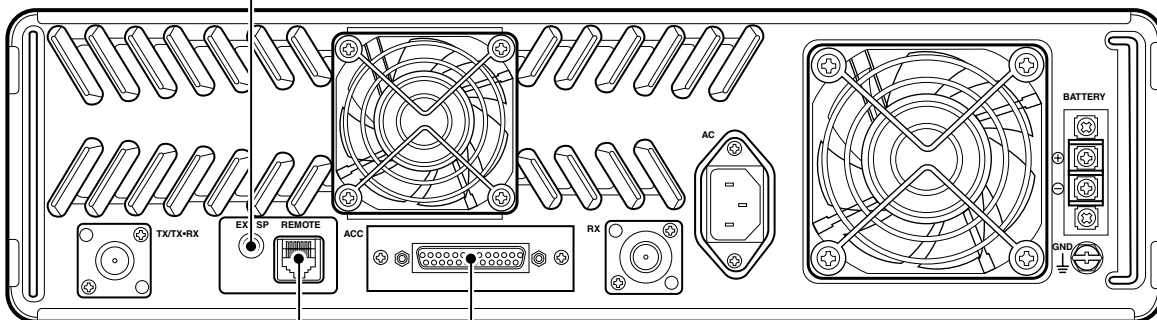
LINE CONNECTOR (Front panel view)

① NC (No connection)
 ② L1 input/output
 ③ L2 input/output
 ④ NC (No connection)

* This illustration is example only.
 Telephone connector type is different for some countries.

EXTERNAL SPEAKER

Use a 4 Ω speaker.



[REMOTE] (p. 3)
 Used for external equipment control.

ACC CONNECTOR (pgs. 3, 4)
 Used for external equipment control.

■ Power

Make sure the [POWER] switch is turned OFF when connecting an AC power cable and a backup battery (emergency power supply).

The IC-FR3000/FR4000 series can operate with an AC or DC power supply. If AC power is interrupted when operating the repeater with an AC power supply, power is automatically provided to the [BATTERY] terminals.

NOTE: When repeat to turn the repeater ON and OFF quickly, the repeater may not turn ON. In this case turn OFF the power switch and wait for a while, then turning power ON again.

◇ In AC operation

- The [DC] indicator turns OFF.
- Use the supplied AC power cable for connection to a domestic AC outlet.
- Extension cords should not be used unless absolutely necessary. Using improper extension cords could result in fire risk.
- Usually the battery is continuously charged with a small amount of current from an AC power supply through the regulator circuit in the repeater. Discharging is therefore prevented even if the battery is not used for a long time.

◇ In DC operation

CAUTION: Voltages greater than 16 V DC will damage the repeater. Check the source voltage before connecting the power cable.

- The [DC] indicator lights up green.
- **DO NOT** place the backup battery on or near the repeater. Lead-acid batteries should be placed at least 5 m (16.4 ft.) away from the repeater. Use a heavy duty cable to make the connection and be sure both the positive (red) and negative (black) terminals are correctly connected.
- When connecting to the battery, keep in order to connect the DC power cable to the repeater first, then the positive (red) terminal and negative (black) terminal to the battery to prevent an electric shock.
- After the battery is connected and the [POWER] switch is ON, the repeater continuously supplies approx. 1 A for charging the battery. If the repeater stops functioning while connected to the battery, disconnect the battery, recharge it, then connect the battery to continue operation after the battery is charged. During repeater transmission, approx. 17 A of battery power is consumed.

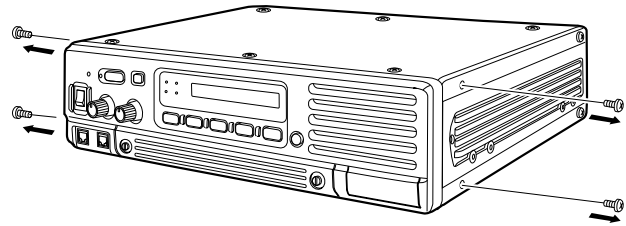
■ Mounting the repeater

◇ Using the optional MB-78

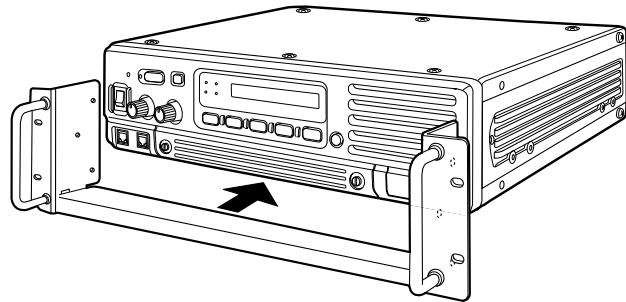
An optional MB-78 19 INCH RACK MOUNT BRACKET is available for mounting the repeater into a 19 inch rack. The MB-78 can install the repeater's bottom side and top side.

• Bottom side installation

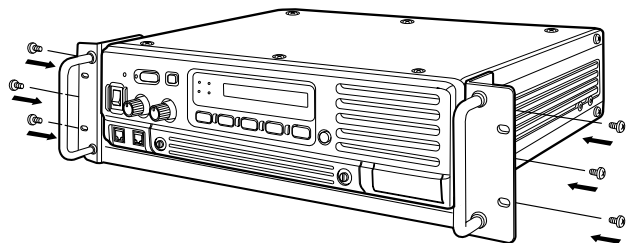
- ① Remove the 2 screws (M4 × 8) from both side of the side panel (front-end).



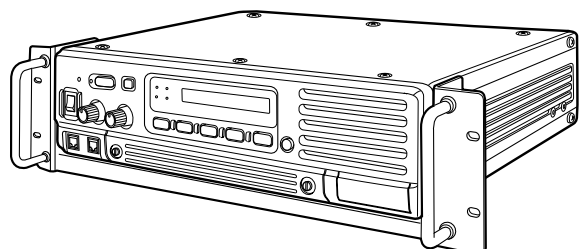
- ② Attach the MB-78 to the bottom side of the repeater.



- ③ Tighten the 1 supplied screws (M4 × 8) and 2 removed screws to each side. (6 screws at total)



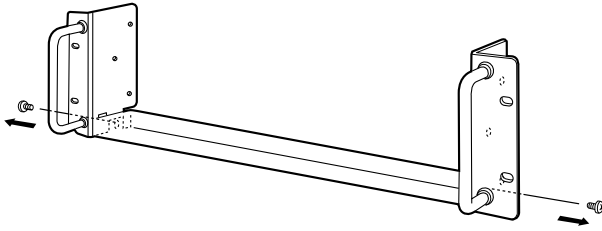
- ④ The completed bottom side installation should look like below.



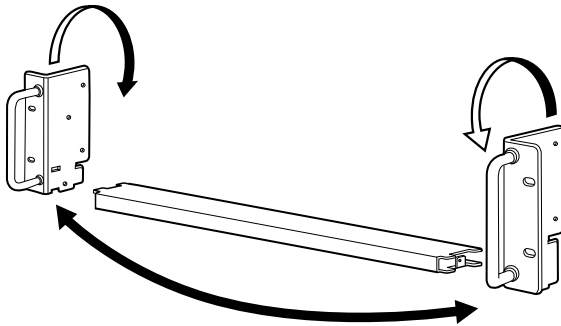
2 INSTALLATION AND CONNECTIONS

• Top side installation

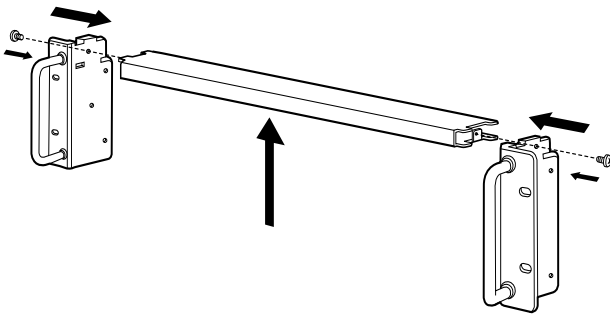
- ① Remove the 1 screw (M4 × 8) from both side of the MB-78.



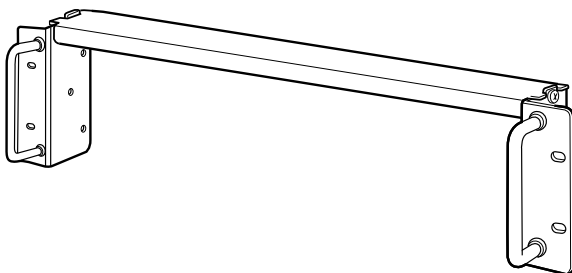
- ② Remove the handles from bottom bar. And turn the handles upside down, then replace the handles right side and left side.



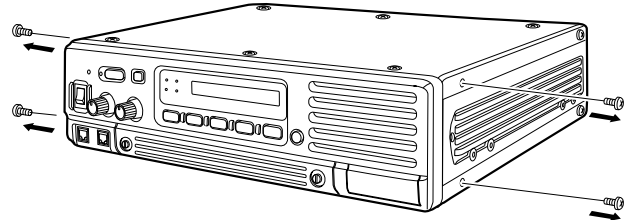
- ③ Attach the handles to the bar, then tighten the screws.



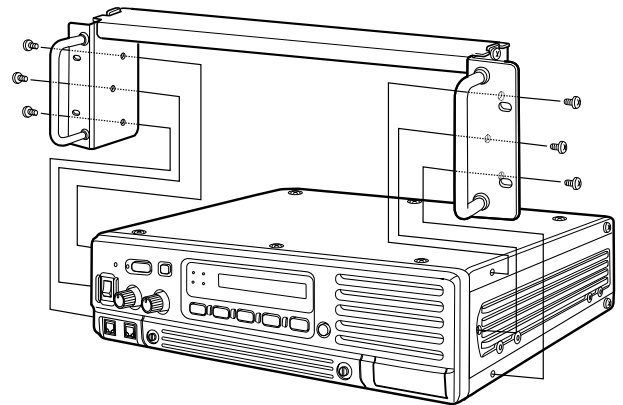
- ④ The completed MB-78 should look like below.



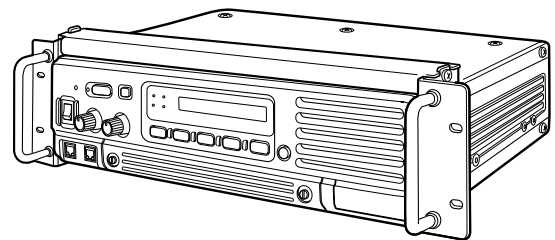
- ⑤ Remove the 2 screws (M4 × 8) from both side of the side panel (front-end).



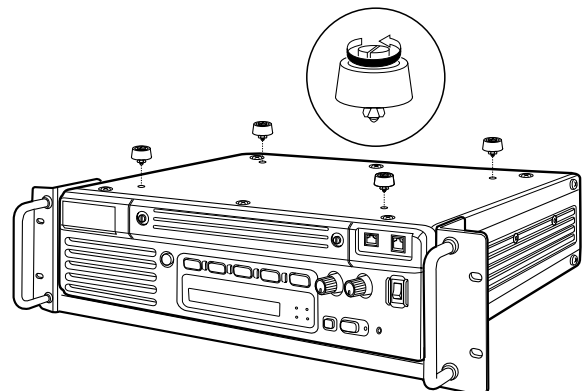
- ⑥ Attach the MB-78 to the top side of the repeater. Then tighten the 1 supplied screws (M4 × 8) and 2 removed screws to each side. (6 screws at total)



- ⑦ The top side installation should look like below.



- ⑧ Turn the repeater upside down, then removing the 4 legs for mounting the 19 inch rack.



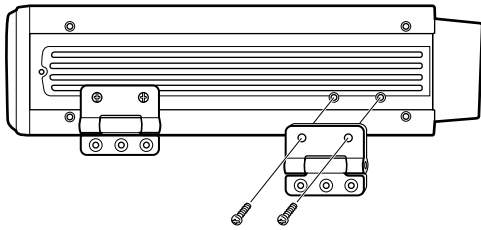
◆ Using the optional MB-77

An optional MB-77 WALL MOUNT BRACKET is available for mounting the repeater to a flat surface.

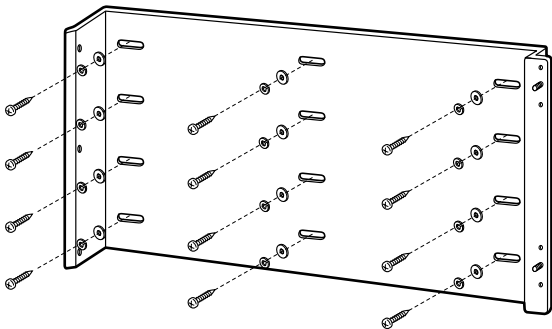
⚠ **WARNING: NEVER** mount the repeater on the MB-77 by yourself. At least two people are required to mount the repeater since it weights approx. 12 kg (26 lb).

• Mount the MB-77 securely with the 12 supplied screws (M6 × 30) to a surface which is more than 50 mm thick and can support more than 20 kg. The unit must be mounted on a flat hard surface only.

- ① Attach the hinges at right side of the repeater as shown below.
- ② Tighten the 2 supplied screws (M5 × 12) for each.

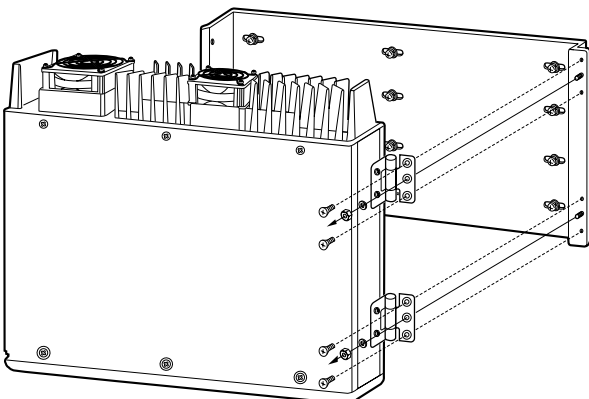


- ③ Put the MB-77 on the wall (or wherever you plan to mount the repeater).
- ④ Tighten the 12 supplied screws (M6 × 30) using flat washers and spring washers.

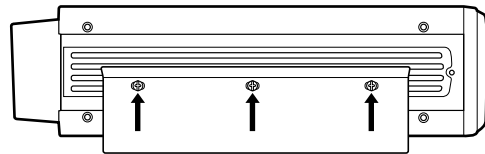


⚠ **NOTE:** Put this way to repeater's front panel will be bottom side.

- ⑤ Attach the hinges with repeater to MB-77 and tighten the 4 supplied screws (M5 × 10) and 2 nuts (with spring washer).

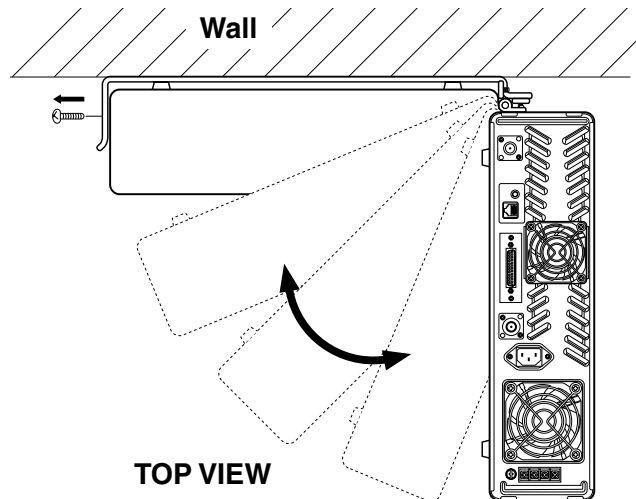
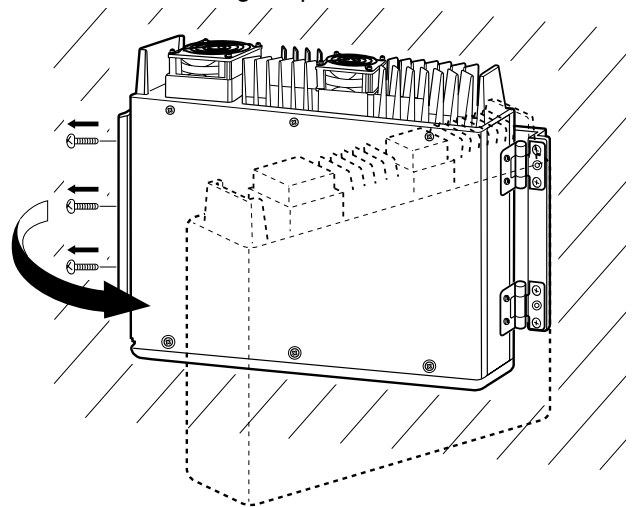


- ⑥ Tighten the 3 supplied screws (M5 × 12) to other side.



• For setting up the repeater with MB-77

- ① Remove the 3 screws (M5 × 12) at left side of the MB-77 when repeater's front panel is bottom side.
- ② Pull the left side of the repeater.
- ③ Remove the screws and open the bottom cover or top cover of the repeater, then set the repeater up.
- ④ Return the top or bottom cover of the repeater and MB-77 to their original positions.

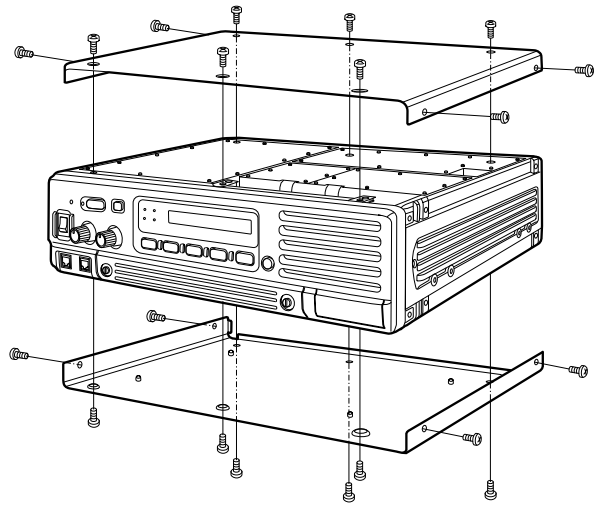


Opening the repeater's case

Follow the case and cover opening procedures shown here when an optional unit is installed or adjust the internal units, etc.

CAUTION: DISCONNECT the AC power cable and/or DC power cable from the repeater. Otherwise, there is danger of electric shock and/or equipment damage.

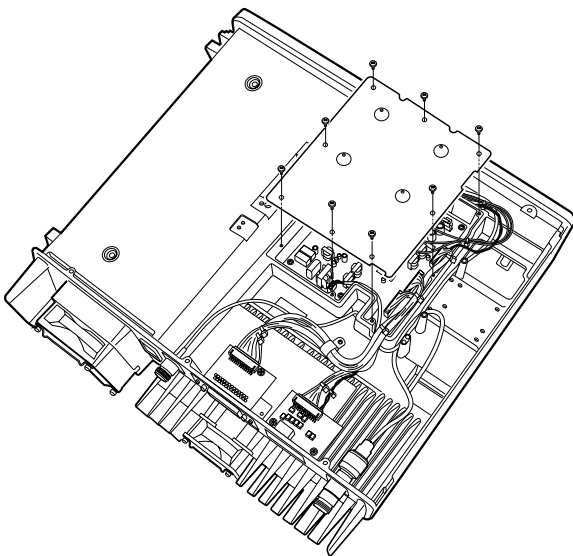
- ① Remove 6 screws from the top of the repeater and 4 screws from the sides, then lift up the top cover.
- ② Turn the repeater upside down.
- ③ Remove 6 screws from the bottom of the repeater, and 4 screws from the sides, then lift up the bottom cover.



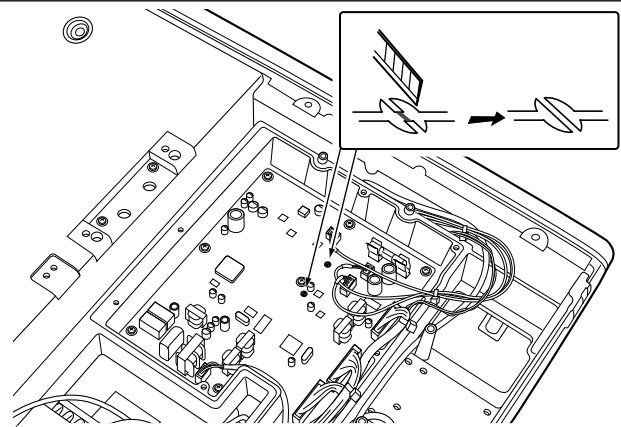
Voice scrambler unit installation

The UT-109 (#01)/UT-110 (#01) provides high performance private communication for base operating mode. In order to receive or send scrambled transmissions, the UT-109 (#01)/UT-110 (#01) must be installed and to activate the scrambler function.

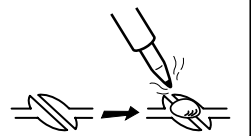
- ① Remove the top and bottom covers as shown above.
- ② Remove 8 screws from the LOGIC shielding plate, then remove the plate.



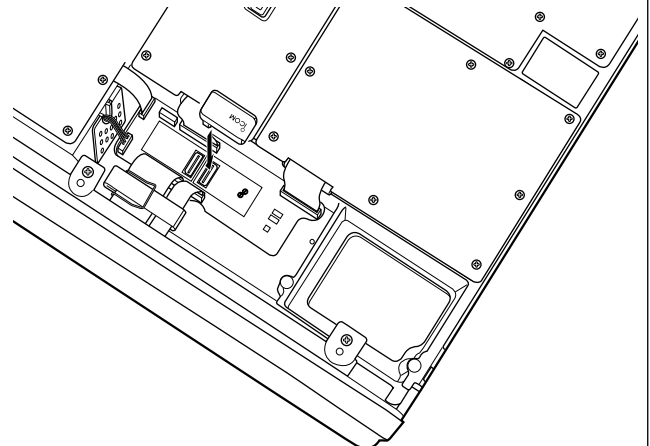
- ③ Cut the pattern on the PCB at the RX AF circuit (CP1) and TX mic circuit (CP2) on the LOGIC unit as shown at right.



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



- ④ Turn the repeater upside down, then install the scrambler unit as shown below.



- ⑤ Return the LOGIC shielding plate, top and bottom covers to their original positions.