IMPORTANT

(1) READ THIS INSTRUCTION MANUAL CAREFULLY before attempting operation. If you have any questions regarding the operation of the IC-970A/E/H, feel free to contact your nearest authorized Icom Dealer or Service Center.

(2) SAVE THIS INSTRUCTION MANUAL — This instruction manual contains important safety and operating instructions for the IC-970A/E/H.

INTRODUCTION

Thank you for purchasing the IC-970A/E/H MULTI BAND ALL MODE TRANSCEIVER.

Icom’s advanced IC-970A/E/H is designed to meet the increasing demand of today’s amateur radio operators for high precision, sophisticated radio communications. Two bands with multi-mode and additional band capability. Moreover, a wideband receiver unit can be installed. Serious satellite operators and V/UHF band enthusiasts will love the multi-function capability of this state-of-the-art rig.

EXPLICIT DEFINITIONS

The following explicit definitions apply to this instruction manual.

<table>
<thead>
<tr>
<th>WORD</th>
<th>DEFINITION</th>
</tr>
</thead>
<tbody>
<tr>
<td>WARNING</td>
<td>Personal injury, fire hazard or electric shock may occur.</td>
</tr>
<tr>
<td>CAUTION</td>
<td>Equipment damage may occur.</td>
</tr>
<tr>
<td>NOTE</td>
<td>If disregarded, inconvenience only. No personal injury or risk of electric shock.</td>
</tr>
</tbody>
</table>

FEATURES

- Separate receiver on the MAIN and SUB bands
- Expansion capability with 1200 MHz and wideband receiver
- Perfect satellite communication
- Multiple-action scan functions
- Large multi-function display
- 99 memory channels in each band
- Selective calling system
- Dial click function
- DDS (Direct Digital Synthesizer) System
- Notch filter and speech compressor
- CW break-in and optional electronic keyer

UNPACKING

![Image of unpacking items]

Accessories included with the IC-970A/E/H Qty.

1 DC power cable (OPC-025A)* ........................................ 1
2 Keyer plug (AP-330) ................................................................ 1
3 External speaker plug (AP-313) ........................................ 1
4 Spare fuses (for DC power cable; FGB 20 A) .... 2
5 Spare fuse (for internal circuitry; 5 A) ............... 1

* Some versions include an AC power cable instead of a DC power cable.

PRECAUTIONS

(1) NEVER connect the DC power cable to an AC outlet. This will ruin the transceiver.

(2) NEVER apply more than 16 V DC to the DC power socket on the transceiver rear panel. Check the power source voltage before connecting the power cable.

(3) NEVER allow metal, wire or other objects to touch any internal part of the transceiver. Risk of electric shock could occur.

(4) NEVER allow children to touch the transceiver.

(5) NEVER expose the transceiver to rain, snow or any liquid.

(6) AVOID to use of strong chemical agents for cleaning such as benzine or alcohol. Use a dry, soft cloth only.
TABLE OF CONTENTS

IMPORTANT ......................................................... i
EXPLICIT DEFINITIONS ......................................... i
UNPACKING ......................................................... i
INTRODUCTION ...................................................... i
FEATURES ........................................................... i
PRECAUTIONS ...................................................... i
TABLE OF CONTENTS ............................................... ii
FRONT PANEL INDEX ............................................... ii
1. CONTROL FUNCTIONS ......................................... 1
2. BASIC CONNECTIONS ........................................ 8
3. ADVANCED CONNECTIONS ................................... 11
4. FREQUENCY SETTINGS ....................................... 15
5. AMATEUR BAND RECEIVING ................................. 19
6. TRANSMITTING .................................................. 21
7. GENERAL COVERAGE RECEIVING ......................... 24
8. MEMORY CHANNEL OPERATION ............................. 25
9. CALL CHANNEL OPERATION ................................. 28
10. SCAN OPERATION ............................................. 29
11. SATELLITE OPERATION ..................................... 31
12. PAGER AND CODE SQUELCH ............................... 33
13. POCKET BEEP AND TONE SQUELCH ....................... 35
14. OPTIONAL UNIT INSTALLATION ............................ 37
15. ADJUSTMENT AND SETTING ............................... 41
16. MAINTENANCE ................................................ 43
17. INSIDE VIEWS ................................................ 45
18. SPECIFICATIONS ............................................ 46
19. OPTIONS ....................................................... 47

FRONT PANEL INDEX
1 **POWER SWITCH [POWER]**
Turns power ON and OFF.

2 **TRANSMIT/RECEIVE SWITCH [TRANSMIT/RECEIVE]** (p. 21)
Selects transmit or receive.

3 **SATELLITE SWITCH [SATELLITE]** (p. 31)
Allows tracking operation for satellite communications.
- **OFF**
  For normal operation. The MAIN and SUB bands have no frequency tracking relation.
- **N (NORMAL)**
  The MAIN and SUB band frequencies simultaneously change in the same direction. (Normal tracking)
- **R (REVERSE)**
  The MAIN and SUB band frequencies simultaneously change in the opposite direction each other. (Reverse tracking)
- **SATL (SATELLITE)**
  Enters SATELLITE MEMORY mode. The [MEMO-CH] selector is used for satellite memory channel selection.
Use for programming frequencies. The MAIN and SUB band frequencies have no tracking relation.
- **SATL-N (NORMAL)**
  When the [SUB] switch is ON: The MAIN band frequency simultaneously changes with the SUB band frequency in the same direction each other.
  When the [SUB] switch is OFF: Only MAIN band frequency changes.
- **SATL-R (REVERSE)**
  When the [SUB] switch is ON: The MAIN band frequency simultaneously changes with the SUB band frequency in the opposite direction.
  When the [SUB] switch is OFF: Only the MAIN band frequency changes.

4 **HEADPHONES JACK [PHONES]** (p. 11)
Accepts a standard 1/4 inch plug from 4 ~ 16 Ω mono or stereo headphones.

5 **MICROPHONE CONNECTOR** (p. 9)
Accepts an optional microphone described on p. 47.

6 **SCAN SWITCHES** (p. 29)
- **MAIN BAND SCAN SWITCH [MAIN-SCAN]**
  Starts and stops a scan function in the MAIN band.
- **SUB BAND SCAN SWITCH [SCAN-SUB]**
  Starts and stops a scan function in the SUB band.

7 **MODE SELECT SWITCH [MODE-SEL]** (pgs. 25, 29)
Activates the mode-select function.
- **[MEMO-CH]** selects only the same mode memory channels as currently displayed mode.
- The mode-select scan is selected instead of the memory scan.

8 **MULTI-BAND SWITCH [MULTI-BAND]** (pgs. 25, 29)
Activates the multi-band memory function.
- **[MEMO-CH]** selects SUB band and undisplayed band memory channels (except the general coverage receiver band).
- The multi-band memory scan is selected instead of the memory scan.
The function can be used when an optional band unit is installed.

9 **MULTI-FUNCTION METER** (pgs. 19, 20)
Acts for the MAIN band. Functions as an S-meter (signal strength meter) or center meter while receiving and an RF meter or ALC meter while transmitting. See item 9 for selection.
10 TRANSMIT INDICATOR [TX] (p. 21)
Lights up in red while transmitting.

11 MAIN BAND RECEIVE INDICATOR [RX MAIN]
(p. 19)
Lights up in green while the MAIN band is in receive
with the squelch open.

12 SUB BAND RECEIVE INDICATOR [RX SUB] (p. 19)
Lights up in green while the SUB band is in receive
with the squelch open.

13 SUB BAND INDICATOR [SUB] (p. 16)
Lights up in red when the SUB band control is
selected.

14 SATELLITE INDICATOR [SATL] (p. 31)
Lights up in red when a satellite memory is used and
lights up in green when the tracking operation is in
the MAIN and SUB bands.

15 MODE SWITCHES (pgs. 19, 24)
Select the desired operating mode.
FM wide (FM-W) and AM modes can be selected when
an optional UX-R96 RECEIVE UNIT is installed.

16 GENERAL COVERAGE SWITCH [GENE] (p. 24)
Selects an optional UX-R96 RECEIVER UNIT.

17 SPEECH SWITCH [SPEECH]
Activates an optional UT-36 VOICE SYNTHESIZER
UNIT for announcing the selected band (MAIN or
SUB) frequency in English.

18 METER FUNCTION SWITCH [S-RF/C-ALC]
( pgs. 20, 22)
Selects the function of the multi-function meter ⑨
for the MAIN band as follows:

<table>
<thead>
<tr>
<th>MODE</th>
<th>FM</th>
<th>SSB/CW</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>RECEPT</td>
<td>TRANSMIT</td>
</tr>
<tr>
<td>S-RF (OUT)</td>
<td>S-meter</td>
<td>RF meter</td>
</tr>
<tr>
<td></td>
<td>RECEIVE</td>
<td>TRANSMIT</td>
</tr>
<tr>
<td>C-ALC (IN)</td>
<td>Center meter</td>
<td>ALC meter</td>
</tr>
</tbody>
</table>

19 SPEAKER SEPARATE SWITCH [SP SEPARATE]
(p. 11)
Selects the internal and external speaker combina-
tion as follows:

<table>
<thead>
<tr>
<th>[SP SEPARATE] SWITCH</th>
<th>ON (IN)</th>
<th>OFF (OUT)</th>
</tr>
</thead>
<tbody>
<tr>
<td>When no external speaker is connected.</td>
<td>The internal speaker outputs the MAIN band audio only.</td>
<td>The internal speaker outputs both MAIN and SUB bands audio.</td>
</tr>
<tr>
<td>When an external speaker is connected.</td>
<td>The internal speaker outputs the MAIN band audio. The external speaker outputs the SUB band audio.</td>
<td>The external speaker outputs both MAIN and SUB bands audio.</td>
</tr>
<tr>
<td>When stereo headphones are connected.</td>
<td>The left speaker outputs MAIN band audio. The right speaker outputs SUB band audio.</td>
<td>The left and right speakers output mixed audios.</td>
</tr>
</tbody>
</table>
1 MAIN BAND AF CONTROL [AF] (p. 19)
Adjusts the MAIN band audio level.

2 MAIN BAND SQUELCH CONTROL [SQL] (p. 19)
Adjusts the MAIN band squelch threshold level.

3 SUB BAND AF CONTROL [AF] (p. 19)
Adjusts the SUB band audio level.

4 SUB BAND SQUELCH CONTROL [SQL] (p. 19)
Adjusts the SUB band squelch threshold level.

5 TONE CONTROL [TONE]
Adjusts the receive audio frequency response of the MAIN band.
The SUB band frequency response is fixed.

6 RF GAIN CONTROL [RF] (p. 20)
Adjusts gain at the MAIN band receiver RF stage.
The SUB band RF gain is fixed.

7 MIC GAIN CONTROL [MIC]
Adjusts the microphone input gain. See p. 22 RF and ALC meter for adjusting details.

8 RF POWER CONTROL [RF PWR] (p. 22)
Adjusts transmit output power.

9 PREAMP SWITCH [PREAMP] (pgs. 20, 42)
Activates an optional external preamplifiers.

NOTE: The antenna connectors of the displayed band frequencies output DC voltages when [PREAMP] is pushed in. BE CAREFUL when connecting a non-Icom preamplifier or linear amplifier. See p. 42 for control voltage information.

10 NOISE BLANKER SWITCH [NB] (p. 20)
Blanks pulse-type noise such as vehicle ignition noise from the receiving audio.

Noise blanker activates in SSB, CW and AM (optional) modes on both MAIN and SUB bands.

11 GENERAL COVERAGE BAND ATTENUATOR SWITCH [GENE ATT] (p. 24)
Attenuates receiving signals with 20 dB attenuation when an optional UX-R96 RECEIVER UNIT is selected.

12 AGC (Auto Gain Control) SWITCH [AGC] (p. 20)
Selects the time constant of the AGC circuit.

- : AGC slow
- : AGC fast

The SUB band AGC time constant is fixed as “slow” for SSB mode and “fast” for CW mode.

13 CW SEMI BREAK-IN SWITCH [BK-IN] (p. 23)
Activates the CW semi break-in function.

14 CW BREAK-IN DELAY CONTROL [DELAY] (p. 23)
Adjusts the transmit-to-receive switching delay time for CW semi break-in operation.

To activate this control, push IN [BK-IN] 2.

15 CW SIDE TONE CONTROL [SIDE TONE] (p. 23)
Adjusts the CW side tone level regardless of the [AF] control position.

16 ELECTRONIC KEYER SWITCH [ELEC-KEY] (pgs. 23, 40)
Activates an optional ICOM-EX243 ELECTRONIC KEYER UNIT.
KEYING SPEED CONTROL [KEY SPEED] (p. 23)
Adjusts the keying speed when operating in CW mode with an optional IC-EX243.
To activate this control, push IN [ELEC-KEY] ⑨.

SPEECH COMPRESSOR SWITCH [COMP] (p. 22)
Activates the built-in speech compressor.

COMPRESSOR LEVEL CONTROL [LEVEL] (p. 22)
Adjusts the speech compressor level.
To activate this control, push IN [COMP] ⑩.

LOCK SWITCH [LOCK] (p. 18)
Deactivates the main dial and electrically locks the currently displayed frequencies.

CALL SWITCHES [CALL-1]/[CALL-2] (p. 28)
Call up a user-programmable call channel.
• [CALL-1]
The call-1 channel remains on one frequency in all bands.
• [CALL-2]
The call-2 channel remains on a frequency in each band.

FUNCTION SWITCH AND INDICATOR [FUNCTION] (pgs. 17, 27, 28)
The switch activates the secondary function of switches ⑧ - ⑩ and the keyboard for digit entry.
The red indicator lights up when the switch is pushed.

SPLIT SWITCH [SPLIT] (p. 22)
Selects split operation — Receiving on VFO A and transmitting on VFO B or vice versa.

VFO SWITCH [A/B] (p. 17)
Selects VFO mode and changes VFO A and B.

VFO EQUALIZING SWITCH [A = B] (p. 17)
Equalizes contents of the undisplayed VFO to the displayed VFO.

RIT SWITCH [RIT] (p. 20)
Activates the RIT (Receive Incremental Tuning) function.
After pushing [FUNCTION], this switch clears the displayed RIT shift frequency.

MEMORY SWITCH [MEMO] (pgs. 25, 26)
Selects MEMORY mode.
After pushing [FUNCTION] and digit keys, this switch selects the memory channel directly.

MEMORY WRITE SWITCH [MW] (pgs. 26, 27)
Stores the displayed frequency, mode and repeater information into the displayed memory channel.
After pushing [FUNCTION], this switch clears the displayed memory contents.

FREQUENCY TRANSFER SWITCH [M ▶ VFO] (pgs. 27, 28)
Transfer the displayed memory or call channel information into a VFO.
After pushing [FUNCTION], this switch sets the skip function into the displayed memory channel.

NOTCH FILTER CONTROL AND SWITCH [NOTCH] (p. 20)
• NOTCH SWITCH
Activates the notch filter function to reduce an interference signal.
• NOTCH CONTROL
Adjusts the center frequency of the notch filter.
The notch filter functions in the MAIN band only.
**RIT CONTROL [RIT]** (p. 20)
When "RIT" appears on the MAIN band display:
Sets the RIT shift frequency.
When "RIT" does not appear: Sets the SUB band frequency.

**MEMORY CHANNEL SELECTOR [MEMO-CH]**
(pgs. 25, 32)
Selects the memory channel.

**MAIN/SUB BAND SWITCH [M/S]** (p. 16)
Exchanges the MAIN and SUB bands.

**SUB BAND SWITCH [SUB]** (p. 16)
Accesses the SUB band for tuning purposes.

**CLICK INDICATOR [CLICK]** (pgs. 18, 42)
Lights up while operating the dial click function.

**MAIN DIAL** (p. 18)
Sets the displayed frequency.

**CLICK SWITCH [CLICK]** (p. 18)
Activates the dial click function.
The dial click function may not operate depending on the condition such as operating mode, internal S1 switch position, etc. See p. 42 for details.

**KEYBOARD** (p. 17)
After pushing [FUNCTION], the keyboard functions as digit keys.
When [FUNCTION] has not been pushed, a key has its own function.

<table>
<thead>
<tr>
<th>Function</th>
<th>Description</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>TONE</td>
<td>Turns ON and OFF the subaudible tone encoder. Functions in FM only.</td>
<td>22</td>
</tr>
<tr>
<td>DUP</td>
<td>Selects - duplex, + duplex and simplex in sequence.</td>
<td>22</td>
</tr>
<tr>
<td>CHECK</td>
<td>Checks the transmit frequency when duplex is selected.</td>
<td>21</td>
</tr>
<tr>
<td>-M/S-</td>
<td>Turns ON and OFF the pocket beep function. Functions in FM only.</td>
<td>36</td>
</tr>
<tr>
<td>T-30K</td>
<td>Turns ON and OFF the optional tone squelch function. Functions in FM only.</td>
<td>36</td>
</tr>
<tr>
<td>SET</td>
<td>Sets the offset frequency, tone frequency and DTMF code.</td>
<td>22</td>
</tr>
<tr>
<td>PAGER</td>
<td>Turns ON and OFF the pager function. Functions in FM only.</td>
<td>33</td>
</tr>
<tr>
<td>C-30K</td>
<td>Turns ON and OFF the code squelch function. Functions in FM only.</td>
<td>33</td>
</tr>
<tr>
<td>PITCH</td>
<td>Sets the tuning pitch. Functions in FM only.</td>
<td>18</td>
</tr>
<tr>
<td>MHz</td>
<td>Sets the tuning steps at 1 MHz.</td>
<td>18</td>
</tr>
<tr>
<td>MHz</td>
<td>Sets the tuning steps at 1 kHz.</td>
<td>18</td>
</tr>
<tr>
<td>BAND</td>
<td>Selects the operating band when an optional band unit is installed.</td>
<td>16</td>
</tr>
</tbody>
</table>
Function display

The transceiver has a large function display to display the MAIN and SUB band information simultaneously.

FREQUENCY READOUTS
Display the operating frequency from the 100 Hz unit.

MODE INDICATORS
Indicate the operating mode.

GENERAL COVERAGE INDICATORS (p. 24)
Appear when an optional general coverage receiver band is selected.

RIT INDICATOR (p. 20)
Appears when the RIT function is activated and displays shift frequency up to ±9.9 kHz.

The RIT function operates in the MAIN band only with ±9.99 kHz.

VFO INDICATORS (p. 17)
Indicate VFO mode and show the selected VFO.

MEMORY INDICATORS (p. 25)
"MEMO" appears when MEMORY mode is selected. Shows the selected memory channel number.

LOCK INDICATOR (p. 15)
Appears when the [LOCK] switch is ON.

MULTI-BAND INDICATOR (pgs. 25, 30)
Appears when the [MULTI-BAND] switch is ON.

MODE SELECT INDICATOR (pgs. 25, 30)
Appears when the [MODE-SEL] switch is ON.

SUB BAND METER (p. 19)
Acts for the SUB band S-meter (signal strength meter).

TON/TONE SQUELCH/POCKET BEEP INDICATORS (p. 35)
• “TONE” appears when the subaudible tone encoder is turned ON.
• “TONE SQL” appears when the optional tone squelch is turned ON.
An optional UT-34 TONE SQUELCH UNIT is necessary.
• “(l=x)” and “TONE SQL” appear when the pocket beep function is activated.
The pocket beep function operates with or without an optional UT-34.

TUNING DIGIT INDICATORS (p. 18)
Point to the lowest tuning digit.

CODE SQUELCH/PAGER INDICATORS (p. 33)
• “C-SQL” appears when the code squelch is activated.
• “(l=x)” and “C-SQL” appear when the pager function is activated.

DUPLEX INDICATOR (p. 21)
“DUP =” appears when selecting -duplex or “DUP +” appears when selecting + duplex.

SPLIT INDICATOR (p. 22)
Appears when operating split function using 2 VFOs.

SCAN INDICATORS (p. 29)
Appears while scanning.

MEMORY SKIP INDICATORS (p. 29)
Indicates the skip function being set on the displayed memory channel. The memory channel is skipped during memory scan.
Rear panel

AC Socket [ACC (1)] (p. 13)
Used for external equipment connections. This connector includes MAIN band output ports.

DATA SOCKET [DATA] (p. 13)
Used for external equipment connections. This connector includes MAIN and SUB band output ports.

430 MHz Antenna Connector [ANT 430MHz] (pgs. 8, 9)
Connects a 430 MHz band antenna with a Type-N connector.

144 MHz Antenna Connector [ANT 144 MHz] (pgs. 8, 9)
Connects a 144 MHz band antenna with a PL-259 connector.

CI-V Remote Control Jack [REMOTE] (p. 14)
Designed for use with a personal computer for remote operation of transceiver functions.

DC Power Socket [DC13.8V] (p. 9)
Accepts 13.8 V DC using the supplied DC cable. The connector is already used on some versions.

Ground Terminal [GND] (p. 9)
To prevent electrical shock, TVI, BCI and other related problems, connect this terminal to ground.

CW Key Jack [KEY] (pgs. 9, 23)
Accepts straight key or electronic keyer with the supplied key plug.
An Iambic keyer paddle is also acceptable when an optional IC-EX243 ELECTRONIC KEYER UNIT is installed.

External Speaker Jack [EXT SP] (p. 11)
Accepts a 4 – 16 Ω speaker. External speaker may be convenient for simultaneously receiving. See [SP SEPARATE] for details.
Unpacking
After unpacking, immediately report any damage to the delivering carrier or dealer. Keep the shipping cartons. For a description and a diagram of accessories included with the IC-970A/E/H, see UNPACKING on the inside front cover (p. 1).

Antenna
For radio communications, the antenna is one of the important factors along with output power and sensitivity. Select good antennas and mounting locations. The transceiver accepts a 50 $\Omega$ antenna and less than 3:1 of VSWR.

The IC-970A/E/H requires 2 antennas for 144 and 430 MHz operation. If you install optional band units, additional antennas are necessary.

Antenna connectors

- PL-259 connector installation

1. Slide the coupling ring. Strip the cable jacket and soft solder.
2. Strip the cable as shown at left. Soft solder the center conductor.
3. Solder the connector body and solder it.
4. Screw the coupling ring onto the connector body.

(10 mm ≈ 3/8 inch)

- Type-N connector installation

1. Slide parts as shown at left. Cut the end of the cable evenly.
2. Strip the cable and fold the braid over the clamp. Evenly trim the braid ends.
3. Soft solder the center conductor. Install the pin and solder it.
4. Slide the plug body and tighten the nut.

(10 mm ≈ 3/8 inch)
Required connections

- Front panel
  MICROPHONE

For FM and SSB operation, connect a microphone to this connector. See p. 47 for optional microphone details.

- Rear panel
  430 MHz ANTENNA
  144 MHz ANTENNA
  POWER SUPPLY

See the page at right for details.

KEY JACK
For CW operation, the transceiver accepts a straight key or external electronic keyer.

An iambic key paddle can be used when an optional IC-EX243 ELECTRIC KEYER UNIT is installed.

STRAIGHT KEY CONNECTION

IAMBIC KEY PADDLE CONNECTION

GROUNDING
Use the heaviest gauge wire or strap available and make the connection as short as possible.

Grounding prevents electrical shocks, TVI and other problems.
Power supply connection

**CAUTION:** Turn the transceiver [POWER] switch OFF before connecting a power cable.

- **Using the IC-PS35 internal power supply**
  (Some versions already include the IC-PS35)

  ![Diagram of IC-PS35 internal power supply]

  See p. 37 for the IC-PS35 installation.

**WARNING:** NEVER connect the AC power cable to the [DC 13.8 V] connector. The AC socket is supplied with the IC-PS35.

- **Using an Icom AC power supply, IC-PS15 or PS-55**

  ![Diagram of IC-PS15 or PS-55 AC power supply]

  The [POWER] switch of the transceiver synchronizes the IC-PS15 or PS-55 with the transceiver.

- **Using a non-Icom AC power supply**

  ![Diagram of non-Icom AC power supply]

  **CAUTION:** Check the following points before connecting the DC power cable:
  - Output voltage of the power source is 12 – 15 V when you want to use a non-Icom power supply.
  - DC power cable polarity is correct, red → positive (+) terminal, black → negative (−) terminal.
Optional connections

- Front panel

[Diagram of front panel with various components labeled: HEADPHONES, MB-19 RACK MOUNTING HANDLES, and others.]

When using stereo headphones, the MAIN and SUB band audio can be separately heard.

HP-2
Monaural headphones

- Rear panel

[Diagram of rear panel with various components labeled: DATA COMMUNICATIONS TERMINAL UNIT, COMPUTER CONTROL AND TRANSCEIVE, and others.]

DATA COMMUNICATIONS TERMINAL UNIT (p. 12)

COMPUTER CONTROL AND TRANSCEIVE (p. 14)

ANTENNA MOUNTING TYPE PREAMPLIFIER

AG-25 (144 MHz band)
AG-35 (430 MHz band)
AG-1200 (1200 MHz band)

OPTIONAL ANTENNA CONNECTORS

Use when installing an optional UX-97 1200 MHz BAND UNIT or UX-R96 RECEIVER UNIT.

EXTERNAL SPEAKER

SP-20

Use with the [SP SEPARATE] switch for the MAIN and SUB band audios, combined or separate output.
**Linear amplifier connections**

To an [ANT] connector, 144 MHz or 430 MHz

IC-970A/E/H

To power input

To antenna

Linear amplifier

Current flow of the external relay MUST be less than 20 mA.

**NOTE:** Turn OFF the power switch of the linear amplifier when the operating frequency is not selected on the MAIN band.

---

**Data communications**

When operating AFSK, AMTOR or packet, connect external equipment to the [DATA] or [ACC(1)] socket on the rear panel.

Read the instruction manual of an external unit for the detail connection.

---

**Using the [DATA] socket**

---

**Microphone connector**

(FRONT PANEL VIEW)

1. Mic input
2. + 8 V DC output (relation with the volume control)
3. Freq. up/down
4. Squelch switch
5. AF detector output (for PTT)
6. Ground (for microphone)
7. Ground (for PTT)

**PIN NO.** | **FUNCTION** | **DESCRIPTION**
--- | --- | ---
2 | + 8 V DC output | Max. 10 mA
3 | Frequency up | Ground
3 | Frequency down | Ground via 470 Ω
4 | Squelch open | "LOW" level
4 | Squelch closed | "HIGH" level

**CAUTION:** DO NOT short pin 2 to ground as this can damage the internal 8 V regulator.
### Accessory socket information

#### DATA socket

<table>
<thead>
<tr>
<th>PIN NO.</th>
<th>PIN NAME</th>
<th>DESCRIPTION</th>
<th>SPECIFICATIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>MOD</td>
<td>Modulation input. Connected to a modulator. Regardless of [MIC] control. Selectable input level.</td>
<td>100 mV (Default)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>S1 (VR UNIT)</td>
<td>3 mV</td>
</tr>
<tr>
<td>2</td>
<td>MOD (E)</td>
<td>Used as ground for modulation input.</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>ALC</td>
<td>ALC voltage input.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Control voltage: -4 to 0 V</td>
<td>Connected in parallel with ACC (1) pin 8</td>
</tr>
<tr>
<td>4</td>
<td>SQL (M)</td>
<td>Squelch output. Goes to ground when MAIN band squelch opens.</td>
<td>Squelch open: 0.3 V/5 mA</td>
</tr>
<tr>
<td>5</td>
<td>AF (M)</td>
<td>Main band AF detector output. Regardless of [AF] control.</td>
<td>Output impedance: 4.7 kΩ, Output level: 100 – 300 mV (RMS)</td>
</tr>
<tr>
<td>6</td>
<td>NC</td>
<td>No connection.</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>SEND</td>
<td>Input/output pin. Goes to ground when transmitting. When grounded, transmits.</td>
<td>Ground level: -0.5 to +0.8 V</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Connected in parallel with ACC(1) pin 3.</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>U/D</td>
<td>Frequency or memory channel control input.</td>
<td>When grounded directly, functions as UP. When grounded via 470 Ω, functions as DOWN.</td>
</tr>
<tr>
<td>9</td>
<td>AF (E)</td>
<td>Used as ground for AF output.</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>AF (S)</td>
<td>SUB band AF detector output. Regardless of [AF] control.</td>
<td>Output impedance: 4.7 kΩ, Output level: 100 – 300 mV (RMS)</td>
</tr>
<tr>
<td>11</td>
<td>NC</td>
<td>No connection.</td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>SQL (S)</td>
<td>Squelch output. Goes to ground when SUB band squelch opens.</td>
<td>Squelch open: 0.3 V/5 mA</td>
</tr>
<tr>
<td>13</td>
<td>13.8 V</td>
<td>13.8 V output when power is ON.</td>
<td>Output voltage: 13.8 V DC</td>
</tr>
</tbody>
</table>

#### ACC(1) socket

<table>
<thead>
<tr>
<th>PIN NO.</th>
<th>PIN NAME</th>
<th>DESCRIPTION</th>
<th>SPECIFICATIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>ATV (M)</td>
<td>Microphone signal output to an external ATV unit.</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>ATVM (E)</td>
<td>Used as ground for ATV (M) output.</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>SEND</td>
<td>Input/output pin. Goes to ground when transmitting. When grounded, transmits.</td>
<td>Ground level: -0.5 to 0.8 V</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Connected in parallel with [DATA] pin 7.</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>MOD</td>
<td>Modulation input. Connected to a modulator. Regardless of [MIC] control. Selectable input level.</td>
<td>Input impedance: 10 kΩ, Input level: 100 mV (RMS)</td>
</tr>
<tr>
<td>5</td>
<td>AF (M)</td>
<td>Main band AF detector output. Regardless of [AF] control.</td>
<td>Output impedance: 4.7 kΩ, Output level: 100 – 300 mV (RMS)</td>
</tr>
<tr>
<td>6</td>
<td>SQL (M)</td>
<td>Squelch output. Goes to ground when MAIN band squelch opens.</td>
<td>Squelch open: 0.3 V/5 mA</td>
</tr>
<tr>
<td>7</td>
<td>13.8 V</td>
<td>13.8 V output when power is ON.</td>
<td>Output voltage: 13.8 V DC</td>
</tr>
<tr>
<td>8</td>
<td>ALC</td>
<td>ALC voltage input.</td>
<td>Control voltage: -4 to 0 V</td>
</tr>
</tbody>
</table>
Remote jack (CI-V)

- **CI-V connection example**
  
  The transceiver can be connected through an optional CT-17 CI-V LEVEL CONVERTER to a personal computer equipped with an RS-232C I/O port. Icom Communication Interface-V (CI-V) controls frequency, mode, memory channels, etc.
  
  The CT-17 allows up to 4 Icom CI-V transceivers or receivers for personal computer connections.
  
  The CT-17 instruction manual describes some sample programs for controlling frequency, mode, memory channels, etc.

- **CI-V internal condition**

  To use the CI-V system, the following data are set with jumper leads on the LOGIC unit. They can be selected inside the transceiver for special settings while power is ON.

  **BAUD RATE**
  
  Baud rate is the data transfer rate. The standard Icom CI-V baud rate is 1200 bps.

<table>
<thead>
<tr>
<th>BAUD RATE</th>
<th>BAU0</th>
<th>BAU1</th>
</tr>
</thead>
<tbody>
<tr>
<td>300 bps</td>
<td>Insert</td>
<td>Insert</td>
</tr>
<tr>
<td>1200 bps</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>4800 bps</td>
<td>Insert</td>
<td>—</td>
</tr>
<tr>
<td>9600 bps</td>
<td>—</td>
<td>—</td>
</tr>
</tbody>
</table>

  **TRANSCEIVER ADDRESS**
  
  When the transceiver is controlled through the CI-V, the transceiver requires an independent address.
  
  The IC-970A/E/H has the address of 2EH (46) as a default value. Figure marked with an H is hexadecimal and bracketed figures ( ) are decimals.

<table>
<thead>
<tr>
<th>ADD0 (1)</th>
<th>ADD1 (2)</th>
<th>ADD2 (4)</th>
<th>ADD3 (8)</th>
<th>ADD4 (16)</th>
<th>ADD5 (32)</th>
<th>ADD6 (64)</th>
</tr>
</thead>
<tbody>
<tr>
<td>—</td>
<td>Insert</td>
<td>Insert</td>
<td>—</td>
<td>Insert</td>
<td>—</td>
<td>—</td>
</tr>
</tbody>
</table>

  **TRANSCEIVE**
  
  Transceive operation is possible using the IC-970A/E/H with another Icom CI-V transceiver or receiver. Either transceiver can be used as the transmitter or receiver.

<table>
<thead>
<tr>
<th>ITEM</th>
<th>SETTING OPERATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Transceive OFF</td>
<td>[FUNCTION] + [2]</td>
</tr>
<tr>
<td>Transceive ON</td>
<td>[FUNCTION] + [3] or [4]</td>
</tr>
<tr>
<td>Baud rate 9600 bps</td>
<td>[FUNCTION] + [5]</td>
</tr>
<tr>
<td>Baud rate 4800 bps</td>
<td>[FUNCTION] + [6]</td>
</tr>
<tr>
<td>Baud rate 1200 bps</td>
<td>[FUNCTION] + [7]</td>
</tr>
<tr>
<td>Baud rate 300 bps</td>
<td>[FUNCTION] + [8]</td>
</tr>
<tr>
<td>Equals the LOGIC unit settings.</td>
<td>[FUNCTION] + [1]</td>
</tr>
</tbody>
</table>

- **CI-V external setting**

  Transceive ON/OFF and the baud rate can be temporarily changed without removing the top and bottom covers.

  While pushing the [FUNCTION] switch and one of numeral keys listed in the table at right turn power ON to change the CI-V condition.
Mode types

- **VFO mode** (p. 17)

This mode is used for general operation. The transceiver has 2 VFOs, VFO A and VFO B, for storing 2 frequencies/modes separately.
- To select VFO mode and to change VFO A and B, push [A/B].

- **MEMORY mode** (p. 25)

This mode is used for operating the transceiver using memory channel contents.
- To select MEMORY mode, push [MEMO].
- The transceiver has 99 memory channels and 2 programmed scan edge channels.
- Each memory channel can store an operating frequency, mode, offset and subaudible tone frequencies.

- **CALL CHANNEL mode** (p. 28)

This mode provides a one-touch access call channel. The transceiver has one call-1 channel and call-2 channels separate from the memory channels. The call-1 channel can be quickly called up from any band and a call-2 channel is provided on each band.
- To access the call-1 channel, push [CALL-1].
- To access the call-2 channel, push [CALL-2].

- **SATELLITE mode** (p. 31)

This mode is used for satellite operation with a satellite memory channel or with the displayed VFO or memory contents.
- To use SATELLITE mode with satellite memory, set the [SATELLITE] selector to [SATL] or the left side [N] or [R].
- To use SATELLITE mode without satellite memory, set the [SATELLITE] selector to the right side [N] or [R].
- [N] tracks in the same direction and [R] tracks in the opposite direction.

Initial settings

Be sure the following indicators disappear before reading this section.

- [SUB]: The [SUB] switch turns off this indicator.
- [SATL]: The [SATELLITE] switch turns off this indicator.
- RIT: The [RIT] switch turns off this indicator.
- [MEMO]: The [MEMO] switch turns off these indicators.
- [LOCK]: The [LOCK] switch turns off this indicator.
- [kHz]/[MHz]: The [kHz] or [MHz] keys turn off these indicators.
Exchanging the displayed MAIN and SUB bands

The function display shows both the MAIN and SUB band frequencies simultaneously.

Each push of [M/S] alternately exchanges the MAIN and SUB bands.

**NOTE:** The transceiver receives MAIN and SUB band frequencies simultaneously. However, the transceiver transmits only the frequency on the MAIN band display.

Selecting an operating band (optional)

When an optional band unit is installed, the band unit operation is retrieved as the MAIN or SUB band.

1) Push [M/S] to select the MAIN or SUB band for the band unit you wish to retrieve.

2) Push [BAND] to select an optional band unit.

3) Push [GENE] to select an optional UX-R96 RECEIVER UNIT.

**NOTE1:** When general coverage “GENE” is selected, [BAND] does not function.

**NOTE2:** The same operating band cannot be selected on the MAIN and SUB bands.

**NOTE3:** The same operating band can be used when selecting an operating band with an optional receiver unit.

Selecting the SUB band

Frequency control, scanning, memory selection, etc., any functions can be operated on the MAIN band. They can also be used on the SUB band when the SUB band is selected.

SUB band selection is useful when receiving on the MAIN and SUB bands simultaneously and you want to temporarily receive only on the SUB band.

1) Push [SUB] to select the SUB band.
   - The red [SUB] indicator lights up.

2) Each push of [SUB] alternately selects the SUB and MAIN bands.
### VFO operation

Each band has 2 VFOs for storing and retrieving the desired frequency instantly.

1) Push [A/B] to select VFO mode.
2) Push [A/B] again to change VFO A and B.
3) Push and hold [A = B] to equalize the undisplayed VFO to the displayed VFO.

#### VFO A/B exchange

<table>
<thead>
<tr>
<th>FM</th>
<th>VFO A</th>
</tr>
</thead>
<tbody>
<tr>
<td>145.000.0</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>CW</th>
<th>VFO B</th>
</tr>
</thead>
<tbody>
<tr>
<td>144.200.0</td>
<td></td>
</tr>
</tbody>
</table>

#### VFO A/B equalization

<table>
<thead>
<tr>
<th>FM</th>
<th>VFO A</th>
</tr>
</thead>
<tbody>
<tr>
<td>145.000.0</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>CW</th>
<th>VFO B</th>
</tr>
</thead>
<tbody>
<tr>
<td>Undisplayed VFO</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Push and hold</th>
</tr>
</thead>
</table>

### Setting frequency with the keyboard

Direct frequency entry can be performed from the keyboard. When an optional band unit is installed, the direct entry can call up the undisplayed band frequency.

1) Push [M/S] or [SUB] to select the desired band.
2) Push [FUNCTION].
   - The red indicator lights up.
3) Enter the desired frequency with numeral keys.
   - Push the [+] key after entering a 1 MHz unit and before entering a 100 kHz unit.
4) Push the [ENT] key to enter the frequency.
   - Below the 1 MHz unit, successive “0” entry can be omitted with the [ENT] key.

#### EXAMPLES:

- **Setting frequency at 145.00 MHz**
  
  Push keys: 
  
<table>
<thead>
<tr>
<th>FUNCTION</th>
<th>1</th>
<th>4</th>
<th>5</th>
<th></th>
<th>ENT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Frequency readout</td>
<td>14.5</td>
<td>145.</td>
<td>.</td>
<td>145.000.0</td>
<td></td>
</tr>
</tbody>
</table>

- **Setting frequency at 145.5 MHz**
  
  Push keys: 
  
<table>
<thead>
<tr>
<th>FUNCTION</th>
<th>1</th>
<th>4</th>
<th>5</th>
<th></th>
<th>5</th>
<th>ENT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Frequency readout</td>
<td>14.5</td>
<td>145.</td>
<td>.</td>
<td>145.500.0</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- **Changing frequency from 145.5 MHz to 145.62 MHz**
  
  Push keys: 
  
  | FUNCTION | 6 | 2 |  |  | ENT |  
  |-----------|---|---|---|---|-----|-----|
  | Frequency readout | 145. | 145. | 6.2 | 145.620.0 |

### CONVENIENT

**Use two VFOs as a quick memory**

When you find a new station but you wish to continue searching, the twin VFO system is comfortable for quick memory.

1) Push and hold [A = B] to store the displayed frequency to another VFO.
2) Search a station to continue.
3) Push [A/B] to retrieve the stored frequency.
4) To continue searching push [A/B] again.
5) When you wish to keep the frequency, write the frequency into a memory channel.
Setting frequency with the main dial

1) Push [M/S] or [SUB] to select the desired band.

2) Push the [kHz] or [MHz] key if you desire quick dialing.
   • "" appears on the 1-MHz digit or 1 kHz digit.
   • Push the same key again to clear ""

3) Rotate the main dial to set the desired frequency.

NOTE: In MEMORY mode, the displayed frequency can be changed with the main dial. However, the frequency may clear when changing memory channels or exiting MEMORY mode. To store the changed frequency into a VFO, push and hold [M >> VFO].

Selecting the tuning pitch (tuning step)

A variety of tuning pitches can be used in FM mode or optional FM-W and AM modes. A tuning pitch can be separately programmed on each band.

1) Push [BAND] or [GENE] then push [M/S] or [SUB] to select the desired band.

2) Push [FM] to select FM mode.
   • When selecting the general coverage band, each mode can program a tuning pitch separately.

3) Push [9](PITCH) to select the tuning pitch setting display.

4) Rotate the main dial to select the desired tuning pitch.

5) Push [9](PITCH) again to return the display to the previous one.

TUNING PITCH LIST

<table>
<thead>
<tr>
<th>AMATEUR BAND</th>
<th>GENERAL COVERAGE (OPTIONAL)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>FM MODE</td>
</tr>
<tr>
<td>0.1 kHz</td>
<td>5.0 kHz</td>
</tr>
<tr>
<td>5.0 kHz</td>
<td>10.0 kHz</td>
</tr>
<tr>
<td>10.0 kHz</td>
<td>12.5 kHz</td>
</tr>
<tr>
<td>12.5 kHz</td>
<td>20.0 kHz</td>
</tr>
</tbody>
</table>

Pitch remainder hold

The frequency below the tuning pitch (remainder) is cleared when rotating the main dial normally. However, the remainder can be held, if you desire.

1) Push [9](PITCH) to select the tuning pitch setting display.

2) Push [0](kHz) to select the remainder clear or hold.
   • "off" appears for remainder hold.
   • "off" disappears for remainder clear.

3) Push [9](PITCH) again to return the display to the previous one.

Dial click function

The transceiver has a dial click function that makes the main dial click when rotating the main dial in greater than 5 kHz tuning steps.

1) Push the [CLICK] switch IN to set the click function in the auto position.
   • When the tuning steps are greater than 5 kHz, the [CLICK] indicator lights up and the function is activated.

2) Push [CLICK] OUT to turn OFF the click function.

NOTE: The click active condition can be changed by the internal switch under the top cover. See p. 42 for details.

Dial lock function

The dial lock function deactivates the following switches and controls to prevent accidental frequency change during operation.

MODE SEL, CALL-1, CALL-2, [MULTI-BAND], [GENE], [MEMO-CH], [M >> VFO], [A/B][SPLIT], [FM][SSB][MIS][MEMO][MW]
Initial settings
Set the switches and controls as below before reading this section.

- Switches

<table>
<thead>
<tr>
<th>SWITCH</th>
<th>POSITION</th>
<th>SWITCH</th>
<th>POSITION</th>
</tr>
</thead>
<tbody>
<tr>
<td>TRANSMIT/RECEIVE</td>
<td>RECEIVE</td>
<td>AGC</td>
<td>SLOW (OUT)</td>
</tr>
<tr>
<td>SATELLITE</td>
<td>OFF</td>
<td>GENE ATT</td>
<td>OFF (OUT)</td>
</tr>
<tr>
<td>SP SEPARATE</td>
<td>OFF (OUT)</td>
<td>LOCK</td>
<td>OFF (OUT)</td>
</tr>
<tr>
<td>S RF/C ALC</td>
<td>OFF (OUT)</td>
<td>RIT</td>
<td>OFF</td>
</tr>
<tr>
<td>NB</td>
<td>OFF (OUT)</td>
<td>NOTCH</td>
<td>OFF (OUT)</td>
</tr>
<tr>
<td>PREAMP</td>
<td>OFF (OUT)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- Controls

<table>
<thead>
<tr>
<th>CONTROL</th>
<th>POSITION</th>
<th>CONTROL</th>
<th>POSITION</th>
</tr>
</thead>
<tbody>
<tr>
<td>AF MAIN</td>
<td>Max. CCW</td>
<td>SQL SUB</td>
<td>Max. CCW</td>
</tr>
<tr>
<td>SQL MAIN</td>
<td>Max. CCW</td>
<td>TONE</td>
<td>Center</td>
</tr>
<tr>
<td>AF SUB</td>
<td>Max. CCW</td>
<td>NOTCH</td>
<td>Center</td>
</tr>
</tbody>
</table>

CCW: Counterclockwise

Basic receiving
The transceiver has dual watch capability that receives the MAIN and SUB band frequencies simultaneously. When you operate only 1 band, keep the SUB [AF] control to the maximum counterclockwise position.

1) Push [POWER] IN to turn ON power.

2) Push [M/S] to select the desired band for 144 MHz, or 430 MHz as the MAIN band frequency.
   - When an optional band unit is installed, push [BAND] to select the optional band.
   - If an optional general coverage band is selected, push [GENE] at fast. See p. 24 for details.

3) Push a mode switch [FM], [SSB] or [CWN] to select the desired operating mode.
   - To select the operating mode in the SUB band, push [SUB] before pushing a mode switch.
   - To select LSB mode, push [SSB] 2 times.
   - To select CW narrow mode, push [CWN] 2 times. An optional CW narrow filter is necessary. See p. 39 for installations.

4) Rotate the MAIN and SUB [AF] controls to obtain suitable audio listening levels.

5) Rotate the MAIN and SUB [SQL] controls clockwise if you want to mute the audio without a signal.

6) Push [SUB] to select the control band, MAIN or SUB.
   - The [SUB] indicator lights up while the SUB band is selected.

7) Set the desired receive frequencies on the MAIN and SUB bands using the keyboard or the main dial. See pgs. 17 and 18 for details.
   - When the RIT function is OFF, the [RIT] control activates as a SUB dial for sub frequency change.

When receiving a signal
- Squelch opens and received audio is heard.
- An RX indicator lights up.
- An S-meter shows relative signal strength.

To turn OFF the power
Push [POWER] OUT to turn OFF power then unplug the DC power cable or AC power cable (when using an optional IC-PS35 internal power supply). DO NOT unplug the cable before turning OFF the [POWER] switch.
High-quality receiving

- **Center meter (MAIN band only)**
  Use a Center meter for fine tuning since the meter shows the signal deviation from the center frequency.
  - Push [S-RF/C-ALC] IN for the center meter.
  Center meter activates in FM only.

- **RIT function (MAIN band only)**
  Use the RIT function when compensating for off frequencies of the communicating station.
  The function shifts the receive frequency only up to ±9.99 kHz in 10 Hz steps without moving the transmit frequency.
  1) Push the [RIT] switch to activate the RIT function.
  2) Rotate the [RIT] control to adjust the shift frequency.
  3) To clear the shift frequency, push [FUNC] then [RIT].
  4) To turn OFF the function, push [RIT] again.
  When the RIT function is not used, the control can be used as the SUB band dial.

- **Speaker separate function**
  The MAIN and SUB band audios can be separated. See p. 2 for details.

- **RF gain (MAIN band only)**
  Rotate to counterclockwise when receiving a strong signal.
  The control decreases amplifier gain in SSB and CW mode, or attenuates the receive signal before the front end stage in FM mode.

- **Noise blanker**
  Use the noise blanker while pulse-type noises are received.
  The noise blanker effectively reduces interference from noises such as car ignitions while in SSB and CW modes.

- **Preamp (optional)**
  When an optional AG-25, AG-35 and AG-1200 WEATHERPROOF PREAMPLIFIERS are connected, this switch turns ON the preamplifiers.

- **Notch filter (MAIN band only)**
  The notch filter attenuates a particular frequency in the IF passband, such as that of an interfering signal.
  1) Push the [NOTCH] switch.
  2) Adjusts the [NOTCH] control to minimize interference.

- **AGC (MAIN band only)**
  AGC holds audio output constant during fluctuations in signal strength.
  - Set AGC slow (OUT) for SSB mode.
  - Set AGC fast (IN) for CW mode or searching frequencies with the main dial.
  In the SUB band AGC is automatically selected as slow in SSB and fast in CW.
  AGC does not activate in FM mode.
Initial settings
Set the switches and controls as below before reading this section.

- **Switches**

<table>
<thead>
<tr>
<th>SWITCH</th>
<th>POSITION</th>
<th>SWITCH</th>
<th>POSITION</th>
</tr>
</thead>
<tbody>
<tr>
<td>TRANSMIT/RECEIVE</td>
<td>RECEIVE</td>
<td>ELEC-KEY</td>
<td>OFF (OUT)</td>
</tr>
<tr>
<td>SATELLITE</td>
<td>OFF</td>
<td>COMP</td>
<td>OFF (OUT)</td>
</tr>
<tr>
<td>S-RF/A-LC</td>
<td>OFF (OUT)</td>
<td>LOCK</td>
<td>OFF (OUT)</td>
</tr>
<tr>
<td>BK-IN</td>
<td>OFF (OUT)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- **Controls**

<table>
<thead>
<tr>
<th>CONTROL</th>
<th>POSITION</th>
<th>CONTROL</th>
<th>POSITION</th>
</tr>
</thead>
<tbody>
<tr>
<td>RF PWR</td>
<td>Max. CCW</td>
<td>SIDE TONE</td>
<td>Center</td>
</tr>
<tr>
<td>MIC</td>
<td>Center</td>
<td>KEY SPEED</td>
<td>Max. CCW</td>
</tr>
<tr>
<td>DELAY</td>
<td>Center</td>
<td>LEVEL</td>
<td>Max. CCW</td>
</tr>
</tbody>
</table>

Transmitting at FM or SSB

**CAUTION:** Transmitting without an antenna or when the antenna is in bad connection may damage the transceiver.

**NOTE:** The transceiver can transmit only on the MAIN band frequency.

1) Set the switches and controls as described above.

2) Push [M/S] to select the desired band.

3) Push a mode switch to select the operating mode.
   - To select LSB mode, push [SSB] 2 times.

4) Set the operating frequency in the MAIN band.

5) Push and hold the PTT switch on the microphone or set the [TRANSMIT/RECEIVE] switch upward to transmit.
   - The [TX] indicator lights up in red.

6) Adjust [RF PWR] to obtain desired output power.

7) Speak into the microphone using your normal voice level.

8) Adjust [MIC], if needed. See RF and ALC meter on the page at right.

9) Release the PTT switch or set the [TRANSMIT/RECEIVE] switch downward to receive.

Operating through a repeater
When operating through an FM repeater, set the transceiver to duplex.

1) Push [FM], then set the frequency to the desired repeater output frequency on the MAIN band display.

2) Push the [2](DUP) key to select the – duplex or push [2] again to select the + duplex.
   - “DUP –” or “DUP +” appears on the function display.
   - Refer to the page at right for offset frequency setting.

3) Turn ON the subaudible tone encoder or transmit a 1750 Hz tone corresponding to a repeater. See below for details.

4) Push and hold the PTT switch to transmit.
   - After speaking, release the PTT switch to return to receive.

5) To check the transmit frequency (repeater input frequency), push [3](CHECK).
   - This allows checking of the signal strength of your connected station directly without going through a repeater.
   - **Subaudible tone encoder (IC-970A/H only)**
     Push the [1](TONE) key to turn ON and OFF the tone encoder. For setting a tone frequency, see right page for details.
     Pushing [FM] twice can select the – duplex and subaudible tone encoder simultaneously.

   - **1750 Hz tone call (IC-970E/H only)**
     Push and hold the [1](TONE) key for 1 – 3 sec. to transmit a 1750 Hz tone before transmitting a voice signal.
Efficient transmitting

- **Speech compressor (SSB only)**
The speech compressor increases average output power, improving signal strength and intelligibility in SSB.

1) Set the switches and controls.
   - [COMP]: IN
   - [LEVEL]: Center
   - [S RF/C-ALC]: IN (ALC)
   - [MIC]: See RF and ALC meter below

2) Speak naturally into the microphone and adjust the compressor [LEVEL] control so that the ALC meter needle sometimes moves.

- **RF and ALC meter**
The function meter can be selected to act as an RF meter or an ALC meter while transmitting.

The RF meter shows the relative output power and the ALC meter shows the ALC activating level. Adjust the [MIC] control so that the ALC meter needle sometimes moves with your normal voice level.

- **Split operation**
The split (duplex) function uses 2 VFOs as transmit and receive frequencies for separated frequency operation.

1) Set the transmit frequency in a VFO.
2) Push [A/B] to select the other VFO.
3) Set the receive frequency.
4) Push [SPLIT].
   - "SPLIT" appears on the function display.
5) Push and hold the PTT switch on the microphone to transmit.
   - The function display shows the transmit frequency.
6) To monitor the transmit frequency, push and hold [CHECK].

- **Setting offset and subaudible tone frequencies**

1) Push the [2][DUP] or [1][TONE] key to set an offset or subaudible tone* frequency respectively.
   - *IC-970A/H only.
2) Push the [6][SET] key to select a frequency setting display as at right.
3) Rotate the main dial to select the desired frequency.
4) Push the [6][SET] key to exit or advance the setting display.

**OFFSET FREQUENCY**

0.600.0

(The above shows 600 kHz of offset)

**SUBAUDIBLE TONE FREQUENCY**

.88.5

(The above shows 88.5 Hz tone.)
Transmitting in CW mode

Plug a CW key into the [KEY] jack on the rear panel. The transceiver accepts a straight key or an electric keyer.

An iambic keyer paddle can also be used when an optional IC-EX243 ELECTRONIC KEYER UNIT is installed.

1) Set the switches and controls as described on p. 21.
2) Push [M/S] to select the desired band.
3) Push [CWN] to select CW mode.
   - To select an optional CW narrow mode, push [CWN] 2 times.
4) Set the operating frequency in the MAIN band.
5) Set the [TRANSMIT/RECEIVE] switch upward.
6) Operate the CW key.
7) Adjust [RF PWR] to obtain desired output power.
8) Adjust [SIDE TONE] to the desired monitor level.
9) Set the [TRANSMIT/RECEIVE] switch downward to return to receive.

- Split operation
  See p. 22 for details.

- Break-in operation
  Automatic transmit selection can be performed with the break-in operation. Operate a CW key while receiving.
  1) Push [BK-IN] IN.
  2) Adjust [DELAY] while operating the CW key.

- Optional electric keyer
  When an optional IC-EX243 ELECTRIC KEYER UNIT is installed, [ELEC-KEY] and [KEY SPEED] can be used.
  1) Plug an iambic keyer paddle into the [KEY] jack.
  2) Push [ELEC-KEY] IN.
  3) Adjust [KEY SPEED] while operating the key paddle.
**UX-R96 specifications**

An optional UX-R96 RECEIVER UNIT is necessary for general coverage receiving. See p. 38 for unit installation.

<table>
<thead>
<tr>
<th>Frequency coverage</th>
<th>50.00 ~ 905.00 MHz</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mode</td>
<td>FM, FM wide (FM-W), AM</td>
</tr>
<tr>
<td>Tuning steps</td>
<td>2.5 kHz (AM only), 5.0 kHz, 10 kHz, 12.5 kHz, 20 kHz, 25 kHz, 100 kHz</td>
</tr>
</tbody>
</table>

**NOTE:** AVOID to transmit on the same frequency as displayed general coverage receiver frequency.

**Operation**

1) Push [POWER] IN to turn ON power.

2) Push [GENE] to retrieve the general coverage receiver band.
   - "GENE" appears on the function display.

3) Push [M/S] to select the MAIN or SUB band for the receiver band in use.

4) Push [SUB] when the receiver band is selected as the SUB band.

5) Push a mode switch to select the desired mode, FM, AM or FM-W.

6) Set the desired frequency using the keyboard with [FUNCTION] or the main dial.

- **RF gain**
  - Does not act in the receiver band.

- **AGC**
  - AGC is selected in “fast” regardless of the switch positions in the receiver band.

- **Notch filter**
  - Not effective in the receiver band.

- **Speaker separate function**
  - The MAIN and SUB band audios can be separated. See p. 2 for details.

- **Noise blanker**
  - Reduces pulse-type noise in AM mode. Audio level may decrease when using the noise blanker.

- **Attenuator**
  - [GENE ATT] acts in the receiver band. Use the attenuator when background noise increases or a very strong signal appears near your receiving frequency.

- **Preamp**
  - Increases the receiver sensitivity. Preamplifier gain is approx. 15 dB. Note that the intermodulation and cross modulation characteristics may decrease while activating the preamplifier.

- **Center meter**
  - The Center meter does not act in the receiver band.
Memory mode

The MAIN and SUB bands can be selected in VFO or MEMORY mode separately. Each band has 99 memory channels and 2 scan edge channels, a total of 202 memory channels can be used even when no optional band unit is installed.

Memory channel selection

- Using the [MEMO-CH] selector for memory channel selection.

1) Push [MEMO] to select MEMORY mode.
   - "MEMO" appears on the selected band, MAIN or SUB.

2) Rotate the [M-CH] selector to select the desired memory channel.
   - When a blank channel (memory contents not yet programmed) is selected, only the decimal points appear.
   - The [MODE-SEL] and [MULTI-BAND] switches allow unique memory selection. See below for details.

3) Push [A/B] to return to VFO mode.

- Using the keyboard for memory channel selection.

1) Push [MEMO] to select MEMORY mode.

2) Push [FUNCTION].
   - The indicator above [FUNCTION] lights up.

3) Push digit keys to enter the memory channel number.

4) Push [MEMO] to select the memory channel.
   - The [FUNCTION] switch indicator goes off.

The mode-select function

The mode-select function selects only the same mode programmed memory channels when using the [MEMO-CH] selector. This function allows you quick memory channel selection in your desired mode.

1) Push [MEMO] to select MEMORY mode.
2) Push [MODE-SEL] to set the mode-select function.
   - "MODE-SEL" appears on the function display.
3) Push the appropriate mode switch to select your desired mode for the mode-select function.
4) Rotate the [MEMO-CH] selector to select memory channels programmed only in the same operating mode.
5) Push [MODE-SEL] to cancel the mode-select function.

The multi-band memory function (SUB band only)

When an optional band unit is installed, all memory channels in the SUB band and undisplayed band can be selected with the [MEMO-CH] selector. Memory channels in an optional general coverage receiver band cannot be selected.

1) Push [SUB] to select the SUB band.
2) Push [MEMO] to select MEMORY mode.
3) Push [MULTI-BAND] to set the the multi-band memory function.
   - "MULTI-BAND" appears on the function display.
4) Rotate the [MEMO-CH] selector to select all memory channels in the SUB band and undisplayed band.
   - Blanked memory channels do not appear.
5) Push [MULTI-BAND] to cancel the multi-band memory function.
Memory writing

Each memory channel memorizes an operating frequency, mode and offset, subaudible tone encoder and optional tone squelch frequencies. Memory writing can be performed from both VFO and MEMORY mode.

1) Select the memory channel you wish to memorize with the [MEMO-CH] selector or the keyboard.

2) Set the frequency and mode. If desired, set the required repeater frequency such as offset and subaudible tone.
   - When a blank memory channel is selected on MEMORY mode, push [A/B] to set the frequency, etc.

3) Push and hold [MW] for 1 sec. to program the contents into the memory channel.
   - 3 beeps alert you that the contents are programmed.

EXAMPLE:
Writing 145.6 MHz/FM with –duplex into memory channel 88.

Changing contents in memory channel 89 from 145.8 MHz/FM to 145.7 MHz/FM.


Set as follows:
Freq.: 145.6 MHz
Mode: FM
Dup: – Duplex

Rotate the main dial to change the freq. to 145.7 MHz.

Push and hold [MW].

Push and hold [MW].

To confirm, push [MEMO].
Memory transferring

The selected memory contents in a memory channel can be transferred to a VFO. The transferring can be performed in both VFO and MEMORY mode.

When transferring from MEMORY mode, the previously selected VFO, A or B receives the memory contents.

1) Select the memory channel you wish to transfer into a VFO.

2) Push and hold [M/VFO] for 1 sec.
   - 3 beeps alert you that the contents are transferred.
   - When the selected memory channel is a blank channel, transferring cannot be performed and the transceiver emits only 1 beep.

Memory clearing

The memory clearing function clears the contents in a memory channel. This function can be performed in MEMORY mode.

1) Push [MEMO] to select MEMORY mode.

2) Select the memory channel you wish to clear the contents of.

3) Push [FUNCTION], then push and hold [MW] for 1 sec.
   - 3 beeps are emitted and the memory contents are cleared from the function display.
   - 2 sec. after the contents are cleared, the display shows the operating band.

The operating band appears 2 sec. after keeping blank channel.

The above display shows that the 144 MHz band is selected.
Call channel outline

The transceiver has 1 call channel (call-2 channel) on each band and 1 independent call channel (call-1 channel) regardless of the selected band.

A call channel memorizes an operating frequency, mode and required repeater frequencies (offset and tone).

Calling up call-1 channel

1) Push [CALL-1] to call up the call-1 channel.
   • “C1” appears instead of the memory channel number.

2) Push [A/B] or [MEMO] to exit the call-1 channel.

EXAMPLE:
When 145.5 MHz is programmed in the call-1 channel.

When the SUB band is selected, the call-1 channel is retrieved on the SUB band.

Calling up call-2 channel

1) Push [CALL-2] to call up the call-2 channel.
   • “C2” appears instead of the memory channel number.

2) Push [A/B] or [MEMO] to exit the call-2 channel.

Call channel writing

1) Select VFO or MEMORY mode.

2) Set the frequency. Also the required repeater frequency such as offset and subaudible tone, if desired.

3) While pushing [FUNCTION], push and hold the desired call switch, [CALL-1] or [CALL-2].
   • 3 beeps alert you that the contents are programmed.

EXAMPLE:
Writing 145.6 MHz/FM with – duplex into call-2 channel.

Changing frequency in a call channel

While selecting a call channel, the frequency can be changed, if desired.
• While pushing the [CALL-1] or [CALL-2] switch, rotate the main dial to change the frequency.
• The keyboard can be used for frequency setting in a call channel.

Transferring call channel contents to a VFO

Call channel contents can be transferred to a VFO the same as in memory transferring.

1) Call up a call channel.

2) Push and hold [M►VFO] for 1 sec.
Scan types

- **Programmed scan**
  - Lower freq. \(\rightarrow\) Scan edge \(\rightarrow\) Scanning \(\rightarrow\) Scan edge \(\rightarrow\) Higher freq.

  Repeatedly scans between 2 user-programmed scan edges P1 and P2 in the selected tuning step.
  - The scan edge frequencies can be programmed in each operating band such as 144 and 430 MHz bands.

- **Mode-select memory scan**
  - ch 1 (USB) \(\rightarrow\) ch 2 \(\rightarrow\) ch 3 \(\rightarrow\) ch 4 \(\rightarrow\) ch 5
  - FM \(\rightarrow\) ch 6 \(\rightarrow\) FM \(\rightarrow\) LRB \(\rightarrow\) FM

  Repeatedly scans memory channels with the same selected operating mode in the selected band.
  - The memory skip function can be used.
  - The mode-select function simultaneously acts in the MAIN and SUB bands.

- **Memory skip function**
  - ch 1 \(\rightarrow\) ch 2 \(\rightarrow\) ch 3 \(\rightarrow\) ch 4
  - FF \(\rightarrow\) ch 5 \(\rightarrow\) ch 6 \(\rightarrow\) ch 7

  Skips unnecessary memory channels for scanning, making shorter intervals for memory scanning and preventing scan stop on unnecessary channels.

- **Memory scan**
  - ch 1 \(\rightarrow\) ch 2 \(\rightarrow\) ch 3 \(\rightarrow\) ch 4
  - Repeatedly scans all memory channels in the selected band. Of course, blank channels (frequency has not been programmed yet) are skipped.
  - The memory skip function can be used for skipping unnecessary memory channels.

- **Multi-band memory scan** (SUB band only)
  - MAIN BAND
  - SUB BAND
  - UNDISPLAYED BAND

  When an optional band unit is installed, multi-band memory scan can be used. This scan repeatedly scans all memory channels in the SUB band and undisplayed band except the general coverage receiver band.
  - The memory skip and mode-select functions can be used.
  - In the general coverage receiver band, multi-band memory scan acts as a memory scan.

---

**CONVENIENT**

- **Scan resume condition**
  The scan resume condition can be selected as “scan cancel” and “scan resume” with the internal scan resumption switch. See p. 42 for details.

- **Scan speed**
  The internal scan speed switch selects the scan speed fast and slow. The switch is set at fast when you purchase the transceiver.

- **Scanning while squelch opens**
  The programmed scan can be used even when the squelch opens in SSB or CW mode or in FM mode with 1 kHz step. The scan starts 10 sec. after a scan switch is pushed and pauses for 10 sec. when the squelch changes from close to open.

  The function activates when the internal scan resumption switch is set to “scan resume.” See p. 42 for switch location.
**Operation**

<table>
<thead>
<tr>
<th>SCAN TYPE</th>
<th>PRESET 1</th>
<th>PRESET 2</th>
<th>SCAN START</th>
<th>SCAN STOP</th>
</tr>
</thead>
<tbody>
<tr>
<td>MEMORY SCAN</td>
<td></td>
<td>Push [MEMO] to select MEMORY mode.</td>
<td></td>
<td>[A/B], [MEMO], [CALL-1] [CALL-2] and main dial also stops a scan.</td>
</tr>
<tr>
<td>MODE-SELECT MEMORY SCAN</td>
<td>① Push [SUB] to select the desired band for scanning.</td>
<td>① Push [MEMO] to select MEMORY mode.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>② Push [MODE-SEL] to activate the mode-select function.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>③ Push a mode switch you wish to scan.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>② Push [MEMO] to select MEMORY mode.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>③ Push [MULTI-BAND] to activate the multi-band memory function.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Memory skip function setting**

1) Push [MEMO] to select MEMORY mode.

2) Rotate the [MEMO-CH] selector to select the memory channel you wish to set as the skip channel.

3) Push [FUNCTION], then push [M►VFO] to set the channel as the skip channel.

   • "SKIP" appears under the memory channel number.

4) To cancel the skip function from the channel, repeat step 3 again.

**Programmed scan edges**

Remember, programmed scan repeatedly scans between your desired frequencies. The scan edge programming are the same as memory writing on memory channels P1 and P2. Each operating band has memory channels P1 and P2.

1) Rotate the [MEMO-CH] selector to select memory channel P1.

   • The memory channel can also be selected from the keyboard. See below for details.

2) Set your desired programmed scan edge frequency using the main dial or the keyboard.

3) Push and hold [MW] to program the frequency as a scan edge.

4) Rotate the [MEMO-CH] selector to select memory channel P2.

5) Set the other side edge frequency using the main dial or the keyboard with [FUNCTION].

6) Push and hold [MW] to program the frequency as the scan edge frequency on the other side.

SELECTING MEMORY CHANNEL FROM KEYBOARD

P1 : FUNCTION 1 0 0 MEMO
P2 : FUNCTION 1 0 1 MEMO
**Satellite communication outline**

The transceiver can track the MAIN and SUB band frequencies in the same (normal) or opposite (reverse) direction. This function is very convenient for satellite communications.

Satellite mode B can be accessed without an optional unit and mode L can be accessed with an optional UX-97 1200 MHz BAND UNIT.

Satellite communications may require an optional preamplifier, beam antennas with a rotor, headphones, orbit information and satellite communications techniques.

**Operation**

1) Set the [SATELLITE] switch to [SATL] to select SATELLITE mode.

2) Rotate the [MEMO-CH] selector to select the desired satellite memory channel.
   • See the page at right for memory writing details.

   **NOTE:** Setting frequencies may be cleared when you change the memory channel or exit SATELLITE mode before the frequencies are programmed in the memory channel.

3) Set the uplink frequency and mode in the MAIN band display.

4) Push [SUB], then set the downlink frequency and mode in the SUB band display.

5) Set the [SATELLITE] switch to the left setting to the [N] or [R] position.
   • [N]: Normal, tracking in the same direction.
   • [R]: Reverse, tracking in the opposite direction.

6) Be sure the [SUB] indicator lights up, then rotate the main dial to tune to a beacon frequency.

7) Set your antenna angle while receiving the beacon signal.

8) Rotate the main dial to set the desired frequencies.

9) Push and hold the PTT switch, and then make loop test at the selected frequency.
   • See the page at right for loop test details.

10) To compensate for the Doppler Effect, push the [SUB] switch to select the MAIN band, then rotate the main dial while listening to the downlink signal on the SUB band.

11) Release the PTT switch to return to receive.

12) Set [SATELLITE] to "OFF" to exit SATELLITE mode.
- **Satellite memory writing**

The transceiver has 10 satellite memory channels to memorize both uplink and downlink frequencies and modes.

1) Set the [SATELLITE] switch to [SATL] to select SATELLITE mode.

2) Rotate the [MEMO-CH] selector to select the desired memory channel.

3) Set an uplink frequency and mode on the MAIN band, and a downlink frequency and mode on the SUB band.

4) Push and hold [MW] for 1 sec. to program the contents into the memory channel.
   - 3 beeps alert you that the contents are programmed.

---

**EXAMPLE:**

Writing the AO-13 frequencies into memory channel 7.

1. Set [SATELLITE] to [SATL].

2. Rotate [MEMO-CH] to select the memory channel.

3. Set the MAIN and SUB band frequencies and modes.

4. Push and hold [MW].

---

- **Loop test**

The loop test checks if your transmit signal can reach a satellite and if the transceiver can receive a satellite signal. While wearing headphones, transmit your voice signal on the MAIN band (uplink frequency) and simultaneously monitor the feedback signal from the satellite on the SUB band (downlink frequency).

- The Doppler Effect may occur. At this time, compensate for the effect on the MAIN band frequency.

---

- **Orbit information**

Orbit information describes satellite locations, reaching angles, etc. This information may be available in a ham magazine or organizations issue such as from ARRL, RSGB hand bock, etc.
GENERAL DESCRIPTION

The pager and code squelch functions can be used in the MAIN band with FM mode only.

**PAGER AND CODE SQUELCH FUNCTION**

**PAGER FUNCTION**

The pager function informs your ID code, decided in your group, to the contacting station's display with beep tones. When receiving the code signal, the pager function automatically stores the received ID code and selects the code as a transmit code. An answer back code for contact confirmation is therefore easy to send.

You can call your desired station or all stations in your group because the function has a personal call and group call. Use the pager function for calling and the code squelch for communications.

The pager function transmits a code with 7 DTMF digits:
(Transmit code) + * + (your ID code)

**CODE SQUELCH FUNCTION**

The code squelch is a selective communication system that allows you silent standby since you will receive only a call from the station known as your ID code.

The code squelch function transmits a code of 3 DTMF digits.

**CODE MEMORY PROGRAMMING**

**BEFORE PROGRAMMING**

Before operating the pager function, the following contents are necessary for determining your group.

1. ID code of each transceiver and the group code in your group.
2. With or without code squelch for communication after contact.

**CHANNEL ASSIGNMENT**

<table>
<thead>
<tr>
<th>ID or group code</th>
<th>Code memory channel</th>
<th>SKIP or NON-SKIP</th>
</tr>
</thead>
<tbody>
<tr>
<td>Your ID code</td>
<td>C0</td>
<td>&quot;NON-SKIP&quot; only</td>
</tr>
<tr>
<td>Other station's ID codes</td>
<td>C1～C5</td>
<td>&quot;SKIP&quot; should be programmed in each channel.</td>
</tr>
<tr>
<td>Group code</td>
<td>One of C1～C5</td>
<td>&quot;NON-SKIP&quot; must be programmed.</td>
</tr>
<tr>
<td>Memorizing space*</td>
<td>CP</td>
<td>&quot;SKIP&quot; only</td>
</tr>
</tbody>
</table>

* Channel CP automatically memorizes an ID code when receiving a pager call. The contents in the channel CP cannot be changed manually.

**NOTE:** Channels C1～C5 can be programmed with another station's ID code or group code. We recommend that the same channel be used for group code programming.

**PROGRAMMING**

1. Push [SUB] to select the MAIN band.
2. Push [7] [PAGER] or [8] [C-SQL] to activate the pager or code squelch function.
   - "C-SQL" appears on the function display.
   - 3 digit number and code memory channel appear on the function display.
4. Rotate the [MEMO-CH] selector to select the desired code memory channel.
5. Push [FUNCTION], then push the desired digit key to input the DTMF code.
6. Push [ENT] [BAND] to enter the input digit as the DTMF code.
7. To program the receive inhibit channel ("SKIP" channel), push [FUNCTION] then push [M/VFO].
   - Transmit code channels (programmed with another station's ID code) should be set to appear as "SKIP."

The keyboard sets these digits.
### Pager operation

<table>
<thead>
<tr>
<th>CALLING STATION (ID : 111)</th>
<th>STANDBY STATION (ID : 222)</th>
</tr>
</thead>
</table>
| 1) Set the desired operating band and frequency in the MAIN band display.  
  • The function can be operated in FM mode only. | 1) Set the desired operating band and frequency in the MAIN band display.  
  • The function can be operated in FM mode only. |
| 2) Push [7](PAGER) to activate the pager function. | 2) Push [7](PAGER) to activate the pager function. |
| 3) Push [6](SET), then rotate [MEMO-CH] to select the desired code memory channel. | 3) When receiving a call, the display shows as follows with beeps:  
  When receiving an ID code.  
  When receiving a group code.  
  Channel CP appears and shows the calling station’s ID code.  
  The group code programmed channel appears. |
| For personal call  
  ![Image of Channel CP]  
  Select the channel in which programmed the standby station’s ID code. | For group call  
  ![Image of Channel CP]  
  Select the channel in which programmed the group code. |
| 4) Push the PTT switch to transmit the selected code.  
  • The speaker also emits the selected code. | 4) Push the PTT switch to transmit an answer back code.  
  5) Push [7](PAGER) again to cancel the pager function. |
| 5) When receiving a call, the display shows the Channel CP or the group code channel. | ![Image of Channel CP]  
  When receiving a code not completely caused by interference, etc., the display shows as at left. |
| 6) Push [7](PAGER) to return the display to the previous one. | ![Image of Channel CP]  
  When receiving the code sqelch after a personal call of the pager function, the code memory channel must be selected again. |
| 7) Push [7](PAGER) again to cancel the pager function. | ![Image of Channel CP]  
  When receiving the code sqelch after a personal call of the pager function, the code memory channel must be selected again. |
| 8) Operate the transceiver with or without code squelch. See below for details. | ![Image of Channel CP]  
  When receiving the code sqelch after a personal call of the pager function, the code memory channel must be selected again. |

**NOTE:** While Channel CP appears, selecting the code squelch automatically changes the Channel CP to Channel C0.

### Code squelch operation

1) Set the desired operating band in the MAIN band display.  
   • The function does not operate in SSB/CW mode.

2) Push [8](C-SQL) to activate the code squelch function.  
   • "C-SQL" appears on the function display.

3) Push [6](SET), then rotate the [MEMO-CH] selector to select the desired code memory channel.  
   • Personal communication: other station’s ID code programmed channel.  
   • Group communication: group code programmed channel.

4) Operate the transceiver in the normal way (push PTT to transmit and release to receive).  
   • A 3-digit code is transmitted at the beginning of the signal.  
   • Signals without a code or with an incorrect code cannot receive.  
   • To monitor these signals, push and hold [CHECK].

5) To cancel the function, push [8](C-SQL).
General description

An optional UT-34 TONE SQUELCH UNIT is convenient for the pocket beep and is necessary for tone squelch operation. See p. 40 for the unit installation.

Pocket beep operation

- Pocket beep

The pocket beep function alerts you with beeps for 30 sec. and flashes the "("-" indicator on the function display when receiving a call.

When using an optional UT-34 TONE SQUELCH UNIT, the pocket beep alerts you receiving only the specified call, including the same subaudible tone frequency.

- Tone squelch

An optional UT-34 TONE SQUELCH UNIT is necessary for the function.

The tone squelch prevents you from receiving undesired signals because the transceiver receives only signals that include the same subaudible tone. You can silently wait for a specified call.

Up to 2 tone squelch units can be installed to operate the function on both the MAIN and SUB bands. The tone squelch function can be used in combination with a code squelch or pager function.

Tone frequency setting

NOTE: The tone frequency of the tone squelch is separately programmed from the tone encoder frequency.

1) Push [SUB] to select the UT-34 connected band, MAIN or SUB.

2) Push [FM] to select FM mode.

3) Push [4] (P-BEEP) or [5] (T-SQL) to activate the pocket beep or tone squelch.
   • "TONE SQL" appears on the function display.

4) Push [6] (SET) to select the tone frequency setting display.

5) Rotate the main dial to select the desired tone frequency.

6) Push [6] (SET) again to exit the setting display.

TONE FREQUENCY LIST

<table>
<thead>
<tr>
<th>Tone Frequency</th>
<th>TONE</th>
<th>FM</th>
<th>VFO A</th>
</tr>
</thead>
<tbody>
<tr>
<td>67.0</td>
<td>110.9</td>
<td>173.8</td>
<td></td>
</tr>
<tr>
<td>71.9</td>
<td>114.8</td>
<td>179.9</td>
<td></td>
</tr>
<tr>
<td>74.4</td>
<td>118.8</td>
<td>186.2</td>
<td></td>
</tr>
<tr>
<td>77.0</td>
<td>123.0</td>
<td>192.8</td>
<td></td>
</tr>
<tr>
<td>79.7</td>
<td>127.3</td>
<td>203.5</td>
<td></td>
</tr>
<tr>
<td>82.5</td>
<td>131.8</td>
<td>210.7</td>
<td></td>
</tr>
<tr>
<td>85.4</td>
<td>136.5</td>
<td>218.1</td>
<td></td>
</tr>
<tr>
<td>88.5</td>
<td>141.3</td>
<td>225.7</td>
<td></td>
</tr>
<tr>
<td>91.5</td>
<td>146.2</td>
<td>233.6</td>
<td></td>
</tr>
<tr>
<td>94.8</td>
<td>151.4</td>
<td>241.8</td>
<td></td>
</tr>
<tr>
<td>100.0</td>
<td>156.7</td>
<td>250.3</td>
<td></td>
</tr>
<tr>
<td>103.5</td>
<td>162.2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>107.2</td>
<td>167.9</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Pocket beep function

1) Push [SUB] to select the desired waiting band MAIN or SUB.
   - When one UT-34 is installed, select the UT-34 connected band.

2) Push [FM] to select FM mode.
   - The function will not activate in other modes.

3) Push [4](P-BEEP) to activate the pocket beep function.
   - "(turn)" and "TONE SQL" appears on the function display.

4) When receiving a signal (if a UT-34 is installed and
   a signal that includes the same subaudible tone is
   received), the pocket beep function alerts you with
   beeps for 30 sec.
   - "(turn)" flashes on the function display.

5) To stop the beeps, push [4](P-BEEP) or transmit an
   answer signal to the calling station.
   - The pocket beep is canceled and the tone squelch is
   automatically selected.

Tone squelch operation

1) Push [SUB] to select the UT-34 installed band, MAIN or SUB.

2) Push [FM] to select FM mode.
   - The tone squelch does not activate in other modes.

3) Push [5](T-SQL) to activate the tone squelch.
   - "TONE SQL" appears on the function display.

4) Set the desired tone frequency. See the page at
   left for details.

5) Operate the transceiver, transmit or receive in the
   normal way.
   - The transceiver transmits the selected subaudible tone
   and receives only the signal with the same tone included.
   - To monitor a signal including a different tone or includ-
   ing no tone, push and hold [3](CHECK).

CONVENIENT

Use memory channel
Tone squelch and a tone frequency can be
programmed in a memory channel. Therefore, tone
setting is not necessary once a memory channel is
programmed.
14 OPTIONAL UNIT INSTALLATION

Cover removal

Follow the cover removal procedures shown here when you want to install an optional unit or power supply.

CAUTION: DISCONNECT the DC power cable from the transceiver before removing the top and bottom covers.

IC-PS35 internal power supply

1. Remove top and bottom covers.
2. Remove 4 screws, then remove rear plate (A).
3. Remove 4 screws, then remove the internal PS chassis.
4. Attach the insulator sheet and the IC-PS35 to the PS chassis.
5. Tighten 6 screws using insulating washers. The screws and washers are supplied with the IC-PS35.
6. Replace the PS chassis.
7. Pull out the DC power cable of the IC-PS35.
8. Insert the DC power cable into the AC power socket plate and hold it using the bushing.
9. Tighten the AC power socket plate to the rear panel using the removed screws from the rear plate (A).
10. Connect the cable from the AC power socket plate to the P2 in the transceiver.
11. Replace the top and bottom covers.

NOTE: The IC-970H has a cooling fan. Unplug the connector while slowly lifting up the PS chassis.
**UX-97 1200 MHz band unit**

1. Remove top and bottom covers.
2. Remove 2 screws, then remove an antenna hole cover.
3. Install the UX-97 with the supplied radiation sheet, then tighten the supplied 6 screws.
4. Remove 1 screw, then remove TVJ hole cover.
5. Attach the JACK board, then tighten the board using the screw removed from the hole cover.
7. Connect the coaxial cable (marked red) to J1 on the UX-97.
8. Connect the coaxial cable (not marked) to J2 on the UX-97.
9. Connect the 11-pin plug from the UX-97 to LOGIC unit J4.
10. Connect the coaxial cable from the UX-97 to OSC unit J4 (Center of 3 jacks).
11. Replace the top and bottom covers.

**UX-R96 receiver unit**

1. Remove top and bottom covers.
2. Remove 2 screws, then remove an antenna hole cover.
3. Install the UX-R96, then tighten the 5 supplied screws.
4. Connect P74 (5-pin plug) to J3 on the UX-R96.
5. Connect P76 (6-pin plug) to J2 on the UX-R96.
6. Connect P3 (13-pin plug) and P4 (6-pin plug) from the UX-R96 to LOGIC unit J5 and J8 respectively.
7. Connect the coaxial cable from the UX-R96 to OSC unit J5 (LOGIC unit side of 3 jacks).
8. Replace the top and bottom covers.
**FL-132 and FL-133 CW narrow filters**

A CW narrow filter is provided for each MAIN and SUB band.

<table>
<thead>
<tr>
<th>MODEL</th>
<th>CENTER FREQ.</th>
<th>-6 dB</th>
<th>-50 dB</th>
<th>NOTE</th>
</tr>
</thead>
<tbody>
<tr>
<td>FL-132</td>
<td>10.8491 MHz</td>
<td>500 Hz</td>
<td>1340 Hz</td>
<td>For MAIN band</td>
</tr>
<tr>
<td>FL-133</td>
<td>10.9491 MHz</td>
<td>580 Hz</td>
<td>1340 Hz</td>
<td>For SUB band</td>
</tr>
</tbody>
</table>

1. Pull up the MAIN unit
2. Remove 8 screws from the MAIN unit.
3. Remove the top cover. (p. 37)
4. Remove the PS chassis. (See p. 37, IC-P839 for details.)
5. Unsolder the foil side of the filter installation part.
6. Install the desired filter to the MAIN unit.
7. Bend the filter’s leads flush with the foil side of the MAIN unit and trim the leads. Then solder it.
8. Replace the MAIN unit, PS chassis and top cover.

**CR-293 high-stability crystal unit**

1. Remove top and bottom covers (p. 37).
2. Unplug the coaxial cable (P2).
3. Remove 2 screws.
4. Pull up and pull out the OSC unit with the described arrow.
5. Remove 4 screws from the OSC unit and open the top cover.
6. Un solder the points marked A.
7. Replace the internal crystal unit with the CR-293.
8. Solder the points marked B.
9. Replace the OSC unit top cover.
10. Replace the top and bottom covers.
### UT-34, UT-36 and IC-EX243

#### UT-36 VOICE SYNTHESIZER UNIT
1. Connect P89 (5-pin) and P90 (3-pin) to UT-36 J1 and J2 respectively.
2. Remove the protective paper attached to the bottom of the UT-36 to expose the adhesive strip.
3. Attach the UT-36 as shown in the diagram's location.
4. Set the language, speech speed and speech level as shown in the diagram below.
5. Replace the top cover.

#### UT-34 TONE SQUELCH UNIT
Up to 2 UT-34s can be installed in the transceiver for the MAIN and SUB bands.
1. Install a UT-34 to the desired place using the screws supplied with the UT-34.
2. For MAIN band use, connect P85 (6-pin) and P86 (5-pin) to UT-34 J1 and J2 respectively.
3. For SUB band use, connect P87 (6-pin) and P88 (5-pin) to UT-34 J1 and J2 respectively.
4. Replace the top and bottom covers.

#### IC-EX243 ELECTRONIC KEYER UNIT
1. Attach the IC-EX243 using the 3 screws supplied with the IC-EX243.
2. Connect P91 (3-pin) and P92 (4-pin) onto IC-EX243 J1 and J2 respectively.
3. Adjust R8 for keying weight (dot-space-dash ratio). See the diagram at right.
4. Replace the top cover.
CAUTION: Your transceiver has been thoroughly adjusted and checked at the factory before being shipped. All adjustable trimmers and coils should be adjusted by an authorized Icom Dealer or Service Center. Your transceiver warranty does not cover problems caused by unauthorized internal adjustments.

External adjustment

• Main dial break adjustment
The tension of the main dial may be adjusted to suit your operating requirements.

Set the transceiver upside down.

Adjust the screw located in the hole.

Light tension Heavy tension

• Display backlight intensity
The intensity of the function display can be adjusted to prevent your eyes from tiring over long periods of operation.

Set the transceiver upside down.

Adjust the trimmer located in the hole.

Dark Bright

Beep tone level

• Beep tone ON/OFF
Beep tone ON/OFF can be selected externally. The following operation alternately turns ON and OFF both the MAIN and SUB band beep tones.

1) Turn power OFF.
2) While pushing [FUNCTION] and [-](MHz), turn power ON.

• Beep tone level
Beep tones of the MAIN and SUB bands can be adjusted separately.

R310 (SUB band) R292 (MAIN band)
Max. Min. Min. Max.

The MAIN unit is located under the PS chassis. See p. 37 IC-PS35 for PS chassis removal information.
Preamp control voltage

Each antenna connector outputs the control voltage when the [PREAMP] switch on the front panel is pushed IN. The control voltage can be cut with the following jumper leads, if you desire.

These jumper leads on the CTRL unit are located inside the bottom cover.

<table>
<thead>
<tr>
<th>JUMPER</th>
<th>NO VOLTAGE OUTPUT FROM:</th>
</tr>
</thead>
<tbody>
<tr>
<td>W20</td>
<td>All antenna connectors</td>
</tr>
<tr>
<td>W21</td>
<td>An optional UX-R96’s built-in preamp</td>
</tr>
<tr>
<td>W22</td>
<td>An optional UX-97’s antenna connector</td>
</tr>
<tr>
<td>W23</td>
<td>Do not cut this jumper.</td>
</tr>
<tr>
<td>W24</td>
<td>430 MHz band antenna connector</td>
</tr>
<tr>
<td>W25</td>
<td>144 MHz antenna connector</td>
</tr>
</tbody>
</table>

Front panel inside switches

Three switches inside the front panel control scan speed, scan auto off and the dial click function. These switches are located under the top cover.

• Dial click function

The dial click function is activated when the [CLICK] switch is pushed IN while the transceiver is in the dial click active condition. The condition can be set in 2 ways: dial clicks occur regardless of tuning step setting; dial clicks occur only in tuning steps greater than 5 kHz.

• Scan switches

Scan cancel:
Scan is canceled when signal is received.

Scan resume:
Scan resumes 10 sec. after receiving a continuous signal or 3 sec. after receiving an intermittent signal.

Modulation input level

The modulation input terminal (pin 1) on the [DATA] socket accepts 2 different input levels for low and high levels to correspond to your terminal unit such as for AMTOR or packet.

When the output level of your terminal unit is low level such as around 3 mV, set the switch to the "3 mV" position.

Set the transceiver upside down.
## Troubleshooting

<table>
<thead>
<tr>
<th>PROBLEM</th>
<th>POSSIBLE CAUSE</th>
<th>SOLUTION</th>
<th>REF</th>
</tr>
</thead>
</table>
| **POWER SUPPLY** | Power does not come on when [POWER] is pushed IN. | • Power cable is improperly connected.  
• Power cable is cut.  
• Fuse is blown. Fuses are installed in 2 places:  
  - in the DC power cable.  
  - inside transceiver. | • Reconnect the power cable securely.  
• Check the cable continuity.  
• Check the cause, then replace the fuse with a spare one. | p. 10  
 p. 44 |
| No sound comes from the speaker or sound level is too low. | • Volume level is too low.  
• The squelch is closed.  
• The transceiver is in transmit.  
• An external speaker or headphones are in use.  
• [RF] is rotated to maximum counterclockwise.  
• Pager or code squelch is turned ON.  
• The optional tone squelch is turned ON, when the UT-34 is installed. | • Rotate [AF] of operating band to obtain a suitable listening level.  
• Rotate [SQL] counterclockwise to open the squelch.  
• Set the [TRANSMIT/RECEIVE] switch to RECEIVE or check SEND line of the external unit, if connected.  
• Check the external speaker or headphones plug connection.  
• Rotate the [RF] control clockwise.  
• Push [5] on the keyboard to turn OFF the function. | p. 19  
 p. 19  
 p. 21  
 p. 20  
 p. 33  
 p. 35 |
| The SUB band audio cannot be heard. | • [SP SEPARATE] is pushed IN. | • Push [SP SEPARATE] OUT if no external speaker is connected. | p. 2 |
| Sensitivity is low. | • The antenna feedline is cut or shorted.  
• VHF and UHF antennas are opposite.  
• [RF] is rotated counterclockwise. | • Check the feedline and correct any improper conditions.  
• Check the antenna and antenna connector proportions.  
• Rotate [RF] max clockwise. | p. 8  
 p. 9  
 p. 20 |
| Repeater cannot be accessed. | • A wrong offset frequency is set.  
• The repeater requires a subaudible tone. | • Set the correct offset frequency.  
• Turn ON the subaudible tone encoder and set the subaudible tone frequency. Be sure the tone squelch and tone encoder separately have the tone frequency. | p. 22  
 p. 22 |
| Output power is low. | • [RF PWR] is rotated too far counterclockwise.  
• [MIC GAIN] is rotated too far counterclockwise in SSB mode.  
• VHF and UHF antennas are opposite. | • Rotate [RF PWR] clockwise.  
• Rotate [MIC GAIN] clockwise.  
• Check the antenna and antenna connector proportions. | p. 21  
 p. 22  
 p. 9 |
| The displayed frequency does not change properly. | • [LOCK] is pushed IN.  
• Call channel is selected.  
• Call channel in the SUB band is selected. | • Push [LOCK] OUT.  
• Push [A/B] or [MEMO] to exit call channel.  
• Push [SUB] to select the MAIN band. | p. 18  
 p. 28  
 p. 28 |
| Frequency cannot be entered from the keyboard. | • [FUNCTION] is not pushed before digit keys are entered.  
• [ENT] is not pushed after digit keys are entered.  
•  is not pushed after the 1 MHz digit is entered.  
• The same band frequency in the SUB band is entered on the MAIN band. | • Push [FUNCTION] before entering a frequency via the keyboard.  
• Push [ENT] after entering a frequency via the keyboard.  
• Enter the 1 MHz digit then push [ ] before entering the 100 kHz digit.  
• Push [M/S] or [SUB] then enter the frequency again. | p. 17  
 p. 17  
 p. 17  
 p. 16 |
| Frequency is changing when transmitting. | • The transceiver is set for split operation.  
• The transceiver is set for duplex operation. | • Push [SPLIT] to turn OFF the split function.  
• Push [2](DUP) to select simplex. | p. 22  
 p. 22 |
### Fuse replacement

If the fuse blows or the transceiver stops functioning, find the source of the problem if possible, and replace the damaged fuse with a new, rated fuse.

- **DC power cable fuses**

![Diagram of two 20 A fuses](image)

- **Internal fuse**
  
  An internal fuse is installed on the line affecting all circuits except V/UHF PA circuits and optional band units.

  The fuse is located under the PS chassis. See p. 37 for top cover and PS chassis removal information. Internal fuse: FGMB 125 V/5 A

### CPU resetting

The frequency display may occasionally display erroneous information, e.g., when first applying power. This may be caused externally by static electricity or other factors.

If this problem occurs, turn the [POWER] switch OFF. Wait a few seconds, and then turn ON power again. If the problem continues, perform the following procedure:

**CAUTION:** CPU resetting clears all memory information.

**RESETTING PROCEDURE:**

While pushing the [MW] switch, turn power ON.

### CPU backup battery

The CPU in the transceiver includes an externally connected RAM IC chip for storing memory channel information. The information is retained by a lithium backup battery.

The usual life of the backup battery is approximately 5 years. When the backup battery is exhausted, the transceiver transmits and receives normally but the transceiver cannot retain memory information.

**CAUTION:** Backup battery replacement should be done by an authorized Icom Dealer or Service Center.

<table>
<thead>
<tr>
<th>PROBLEM</th>
<th>POSSIBLE CAUSE</th>
<th>SOLUTION</th>
<th>REF</th>
</tr>
</thead>
</table>
| Scan does not function. | • Squelch opens.  
• The transceiver is in transmitting. | • Set [SQL] to threshold point.  
• Set the transceiver in receiving. | p. 30 |
| Programmed scan does not function. | • The same frequencies are programmed in memory channels P1 and P2. | • Program a different frequency into memory channels P1 and P2. | p. 30 |
| Memory scan does not function. | • The mode-select function is activated and the same mode memory channels are not programmed. | • Push the [MODE-SEL] to turn OFF the mode-select function. | p. 29 |
• Top view

Internal fuse (5A)

Main band BFO adjustment

BFO freq. check point: R92
1. LSB: 10.8515 MHz by C76
2. CWIT: 10.6491 MHz by L20
3. USB: 10.8485 MHz by L21

R232
C187
L36

R28 Max.

R30 70%

C7 freq. adjustment (C7 is located in the upper side hole.)

OSC UNIT

R320 Swing
R139 Center

Center meter adjustment

• Right side

PLL-B UNIT (430 MHz)

• Bottom view

CTRL UNIT

• Left side

PLL-A UNIT (144 MHz)

RF output power adjustment

R14 430 MHz
R15 144 MHz
GENERAL

- **Frequency coverage**
  - Version: 144 MHz band, 430 MHz band
  - U.S.A.: 140.1 – 150.0 MHz
  - Europe: 144.0 – 146.0 MHz
  - Australia: 144.0 – 148.0 MHz
  - Sweden: 144.0 – 146.0 MHz
  - Specifications guaranteed: 143.8 – 148.2 MHz

- **Tuning step increment**
  - FM: 1 kHz and 1 MHz
  - CW: 1 kHz and 1 MHz

- **Mode**
  - SSB (A3J), FM(F3), CW(A1)

- **Power supply requirement**
  - 13.8 V DC ± 15%

- **Antenna impedance**
  - 500 (unbalanced)

- **Current drain (144 MHz band)**
  - Transmit max. output: 9.0 A (IC-970A/E)
  - Receive max. output: 2.5 A (IC-970A/E/H)

- **Usable temperature range**
  - -10°C ~ 60°C (+14°F ~ +140°F)

- **Frequency stability**
  - ± 3 ppm

- **Dimensions**
  - 425(W) × 149(H) × 406(D) mm
  - 16.7(W) × 5.9(H) × 16.0(D) in

- **Weight**
  - (without IC-PS35): IC-970A/E 14.5 kg (32.0 lb), IC-970H 15.0 kg (33.0 lb)
  - (with IC-PS35): IC-970A/E 16.8 kg (37.0 lb), IC-970H 17.3 kg (38.1 lb)

RECEIVER

- **Sensitivity**
  - SSB, CW: Less than 0.11 μV for 10 dB S/N
  - FM: Less than 0.18 μV for 12 dB SINAD

- **Squelch sensitivity**
  - SSB, CW: Less than 0.56 μV
  - FM: Less than 0.18 μV

- **Selectivity**
  - SSB, CW: More than 2.3 kHz/−6 dB
  - FM: More than 4.2 kHz/−60 dB
  - CW narrow (option): More than 500 Hz/−60 dB
  - Less than 1.3 kHz/−60 dB

- **Intermediate frequencies**

<table>
<thead>
<tr>
<th>MAIN BAND</th>
<th>SUB BAND</th>
</tr>
</thead>
<tbody>
<tr>
<td>SSB, FM</td>
<td>CW</td>
</tr>
<tr>
<td>144 MHz band</td>
<td></td>
</tr>
<tr>
<td>1st</td>
<td>10.8500</td>
</tr>
<tr>
<td>2nd</td>
<td>0.4550*</td>
</tr>
<tr>
<td>430 MHz band</td>
<td></td>
</tr>
<tr>
<td>1st</td>
<td>71.2500</td>
</tr>
<tr>
<td>2nd</td>
<td>10.8500</td>
</tr>
<tr>
<td>3rd</td>
<td>0.4550</td>
</tr>
</tbody>
</table>

- FM mode only

- **Audio output power**
  - 1.5 W with an 8 Ω load at 10% distortion.

- **RIT variable range**
  - ± 9.99 kHz

- **Notch filter variable range**
  - More than ±2 kHz

- **Notch filter attenuation**
  - More than 25 dB

TRANSMITTER

- **Output power**
  - IC-970H: 144 MHz band 5 – 35 W (SSB, CW)
  - 6 – 45 W (FM)
  - 430 MHz band 5 – 30 W (SSB, CW)
  - 6 – 40 W (FM)

- **Modulation system**
  - SSB: Balanced modulation
  - FM: Variable reactance frequency modulation

- **Spurious emissions**
  - More than 60 dB below peak output power

- **Carrier suppression**
  - More than 40 dB below peak output power

- **Unwanted sideband**
  - More than 40 dB below peak output power

- **Microphone impedance**
  - 600 Ω

All stated specifications are subject to change without notice or obligation.
OPTIONS

UX-97 1200 MHz BAND UNIT
Adds the transceiver operating band of 1200 MHz with all mode capability. The IC-970A/E/H is converted to a tri-band transceiver with the UX-97.
Mode: SSB, CW, FM
Output power: 10 W

UX-R96 RECEIVER UNIT
Receives 50 ~ 905 MHz continuously. You can receive broadcasts, air and marine bands and other interesting stations. Adds dual watch capability to the 144 or 430 MHz band.
Mode: FM, FM-Wide, AM

IC-PS35 INTERNAL POWER SUPPLY
Built-in power supply for AC operation. A lightweight switching regulator system. 100 ~ 120 V AC and 220 ~ 240 V AC types are available.
Output voltage: 13.8 V DC
Max. current: 20 A

IC-PS15 AC POWER SUPPLY
AC power supply for AC operation. Heavy-duty power transformer system. 117, 220 and 240 V AC types are available.
Output voltage: 13.8 V DC
Max. current: 20 A

PS-55 AC POWER SUPPLY
AC power supply for AC operation. Heavy-duty power transformer system. Built-in cooling fan for full-duty operation. 117, 220 and 240 V AC types are available.
Output voltage: 13.8 V DC
Max. current: 20 A

IC-PS30 AC POWER SUPPLY
System power supply with some transceivers. Has a DC power cable and 3 output connectors. A lightweight switching regulator system. 100 ~ 120 and 220 ~ 240 V AC types are available.
Output voltage: 13.8 V DC
Max. current: 25 A

SP-20 EXTERNAL SPEAKER WITH AUDIO FILTERS
High performance speaker with audio filters for greater sound quality. Style and size are matched with the IC-970A/E/H.
Input impedance: 8 Ω
Max. input power: 5 W

SM-8 DESKTOP MICROPHONE
Attractive desktop microphone. Includes 2 connector cables for dual transceiver connection and up/down switches. A diecast frame is used for the mic base.

SM-6 DESKTOP MICROPHONE
Easy-to-use electret condenser desktop microphone. Suitable for long periods of operation.

IC-SP3 EXTERNAL SPEAKER
External speaker for high-quality audio. Designed for increased radio communication readability.
Input impedance: 8 Ω
Max. input power: 4 W

HM-58 HAND MICROPHONE
Equipped with up/down switches.
**UT-34 TONE SQUELCH UNIT**
Provides a "personalized" tone squelch system with other stations. Adds a tone-controlled pocket beep function.

**UT-36 VOICE SYNTHESIZER UNIT**
A clear, electronically-generated voice announces the displayed frequency in English or Japanese. Speech speed can be changed in 2 steps.

**IC-EX243 ELECTRONIC KEYER UNIT**
Allows you electronic keyer operation with the IC-970A/E/H for fast and efficient CW contacts.

**CR-293 HIGH-STABILITY CRYSTAL UNIT**
Contains a temperature-compensating oven heater and crystal unit for improved frequency stability.
Frequency stability : ±0.5 ppm
(0°C – +60°C; +32°F – +140°F)

**FL-132, FL-133 CW NARROW FILTERS**
Have good shape factors to provide you with better CW reception on crowded band conditions.
FL-132: for the MAIN band (10.8491 MHz)
FL-133: for the SUB band (10.8491 MHz)
Passband width: 500 Hz/−6 dB

**HP-2 COMMUNICATIONS HEADPHONES**
Monaural headphones that provide clear audio even in noisy environments.

**AH-7000 SUPER WIDE BAND OMNIDIRECTIONAL ANTENNA**
Super wideband frequency coverage from 25 – 1300 MHz. The AH-7000 is suitable for an optional UX-R96 RECEIVER UNIT.

**AG-25, AG-35, AG-1200 WEATHERPROOF PREAMPLIFIERS**
External all-weather mast-mount preamplifier for compensating for coaxial cable loss.
AG-25 : 144 MHz
AG-35 : 430 MHz
AG-1200: 1200 MHz (for UX-97)

**CT-17 CI-V LEVEL CONVERTER**
For remote transceiver control using a personal computer equipped with an RS-232C port. Sample programs are described in the CT-17 instruction manual.

**MB-19 RACK MOUNTING HANDLES**
Mounting handles for a 19-inch rack.
Count on us!