430/440MHz FM TRANSCEIVER

IC-μ4A/AT/E

INSTRUCTION MANUAL

ICOM

FOREWORD

ICOM announces the debut of a versatile newcomer in the Amateur Radio field - the **IC-μ4A/AT/E** pocket-sized handheld transceiver.

Exceptionally flexible for a variety of uses yet surprisingly compact and easy to handle, the **IC-μ4A/AT/E** is a complete, high performance integrated handheld - the beneficiary of the very latest in ICOM technical know-how and state-of-the-art integrated engineering.

To fully enjoy the use of your new **IC-μ4A/AT/E** handheld, please study this instruction manual thoroughly prior to operation. Also, feel free to contact your nearest authorized ICOM Dealer if you have any questions relating to the operation of this transceiver.

UNPACKING
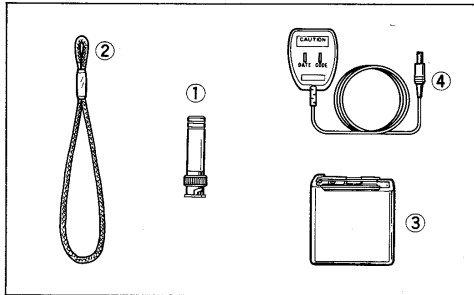
The picture shows accessories for the
IC-μ4A/AT U.S.A. versions.

Accessories included with the IC-μ4A/AT/E   QTY.
1. Flexible antenna 1
2. Handstrap 1
3. BP-22 BATTERY PACK 1
4. Wall charger* 1

* U.S.A. version   :   BC-25U
  Australia version   :   BC-27
  Europe version   :   BC-26E

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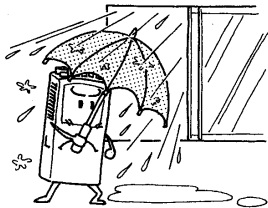
● **Avoid using the transceiver under the following conditions:**
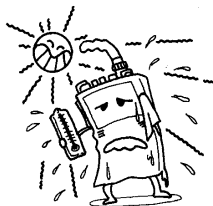
— In places subject to excessive heat or cold
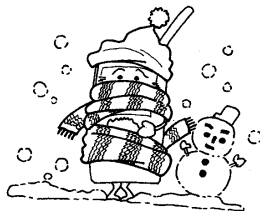
— In places subject to excessive dust

— In places subject to excessive humidity, including bathrooms

— In places subject to excessive vibrations

■ **ULTRA COMPACT DESIGN**

The **IC-μ4A/AT/E** measures only *58mm wide by *140mm high by *29mm deep.   This small, light-weight, ultra compact handheld transceiver comes in handy for use any time, whether outdoors, in your car, or at home.

* Projections not included.

■ **EASY FREQUENCY ENTRY**

Frequency entry can be easily performed with the top panel **Digital Touchstep** switches.

■ **10 MEMORY CHANNELS**

Though ultra compact in design, the **IC-μ4A/AT/E** has a total of ten programmable memory channels.
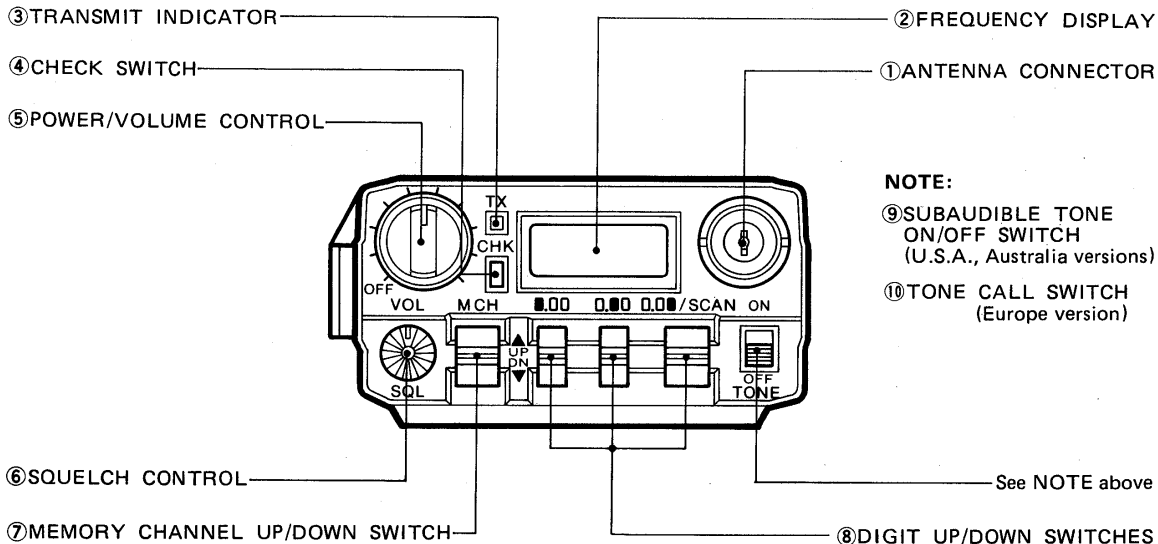
■ **EASY-TO-READ DISPLAY**

A new Liquid Crystal Display with soft green illumination gives the user excellent operating visibility even in dark environments.   This LCD indicates the operating frequency as well as the memory channel number.

■ **POWER SAVER DESIGN**

All circuits were designed using low power dissipation techniques with a special power saver circuit. The power saver circuit functions if no signal is received or no switch operation is performed for more than 30 seconds, and requires only 1/4 current flow during regular receiving conditions.

TOP PANEL

③TRANSMIT INDICATOR

④CHECK SWITCH

⑤POWER/VOLUME CONTROL

②FREQUENCY DISPLAY

①ANTENNA CONNECTOR

NOTE:

⑨SUBAUDIBLE TONE
ON/OFF SWITCH
(U.S.A., Australia versions)

⑩TONE CALL SWITCH
(Europe version)

TX
CHK
OFF
VOL   MCH   8.00   0.80 0.08/SCAN   ON
UP
DN
SQL
OFF
TONE

⑥SQUELCH CONTROL

⑦MEMORY CHANNEL UP/DOWN SWITCH

See NOTE above

⑧DIGIT UP/DOWN SWITCHES

This diagram shows the **IC-μ4A/AT** versions.

FRONT AND SIDE PANEL

REAR PANEL

⑪LOCK SWITCH

⑫INTERNAL MICROPHONE

⑬EXTERNAL MICRO-PHONE JACK

⑭EXTERNAL SPEAKER JACK

⑮INTERNAL SPEAKER

⑯DTMF KEY PAD

CHARGE

⑰BATTERY CHARGE INDICATOR

⑱BATTERY CHARGER JACK

⑲PUSH-TO-TALK (PTT) SWITCH

⑳LIGHT SWITCH

㉑BATTERY PACK RELEASE BUTTON

㉒RF POWER OUTPUT SELECTOR SWITCH

㉓SIMPLEX/DUPLEX SELECTOR SWITCH

㉔CHARGER TERMINALS
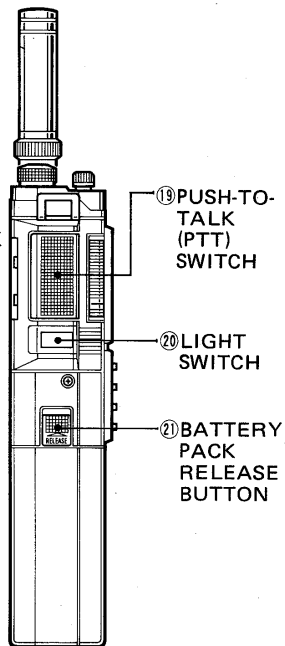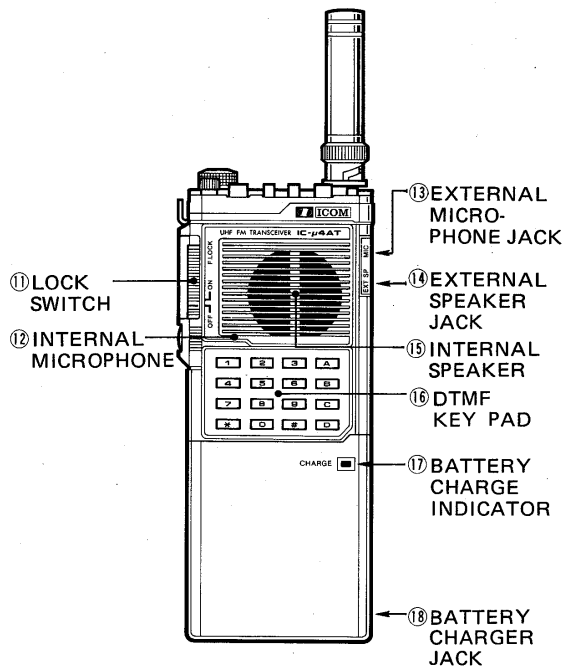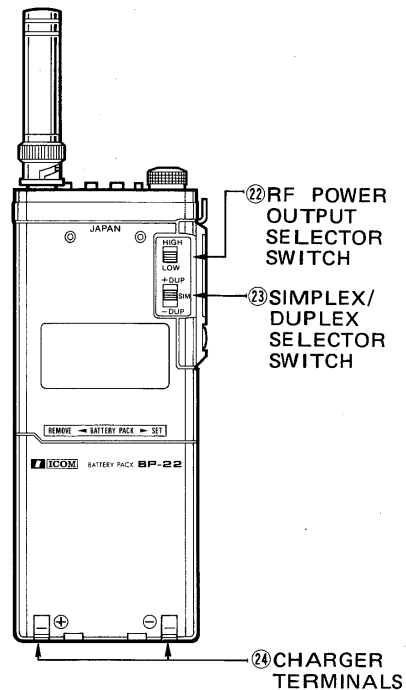
These diagram show the **IC-μ4AT** version.
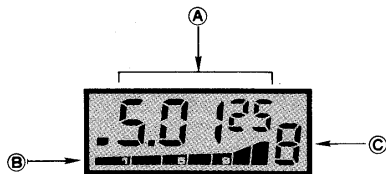
2-1 TOP PANEL

① ANTENNA CONNECTOR

Connect the supplied flexible antenna.

CAUTION: Transmitting without an antenna may damage the transceiver.

② FREQUENCY DISPLAY

Indicates not only the operating frequency but also memory channel number and S-LEVEL/POWER SELECTION INDICATOR functions.

Ⓐ FREQUENCY INDICATOR:

Shows the current operating frequency.

| U.S.A. version	:	440MHz band
Australia, Europe versions	:	430MHz band

Ⓑ S-LEVEL/POWER SELECTION INDICATOR

Indicates signal strength and selection of the RF POWER OUTPUT SELECTOR SWITCH with bars. The bars only indicate relative switch positions.

- LOW power : 3 segments appear
- HIGH power : All segments appear

Ⓒ MEMORY CHANNEL:

Indicates a memory channel number.

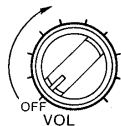③ **TRANSMIT INDICATOR [TX]**   Lights up while transmitting.

Lights up
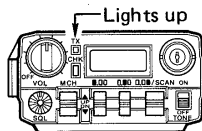
Indicates that the transceiver is transmitting and also the condition of the batteries. If the indicator goes out while transmitting, the battery pack is exhausted and should be charged again.

④ **CHECK SWITCH [CHK]**   Allows the operator to monitor the transmit frequency when the duplex mode is selected while pressing this switch.

⑤ **POWER/VOLUME CONTROL [VOL]**   Rotate clockwise to turn the transceiver ON and increase the audio level.

Increases the audio level.
OFF VOL

⑥ **SQUELCH CONTROL [SQL]**   Sets the squelch threshold level. Rotate this control fully counter-clockwise to turn OFF the squelch function, and clockwise to raise the threshold level.

Raises the threshold level.
SQL

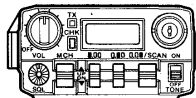⑦ **MEMORY CHANNEL UP/DOWN SWITCH [M CH]**   Push either upward or downward to change the selected memory channel. See page 21 for more information.
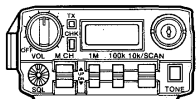

[M CH]
UP
DN

⑧ DIGIT UP/DOWN SWITCHES

Ⓐ 1MHz DIGIT UP/DOWN SWITCH:
Push either upward or downward to change the 1MHz digit numbers.

Ⓑ 100kHz DIGIT UP/DOWN SWITCH:
Push either upward or downward to change the 100kHz digit numbers.

Ⓒ 10kHz DIGIT UP/DOWN SWITCH:
Push either upward or downward to change the minimum frequency step of each version.
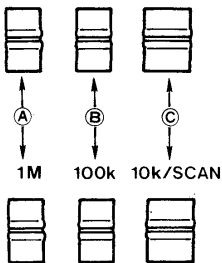
⑨ SUBAUDIBLE TONE ON/OFF SWITCH [TONE] (IC-μ4AT version)

SUBAUDIBLE TONE SWITCH

Slide to switch the subaudible tone encoder ON and OFF when using the duplex mode. See page 19 for more information.

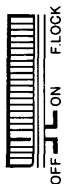• This switch does not function in the Australia version.

⑩ TONE CALL SWITCH [TONE] (IC-μ4E version)

TONE CALL SWITCH

Push to transmit the 1750Hz tone for accessing repeaters. See page 20 for more information.

2-2 FRONT AND SIDE PANEL

⑪ LOCK SWITCH [F.LOCK]

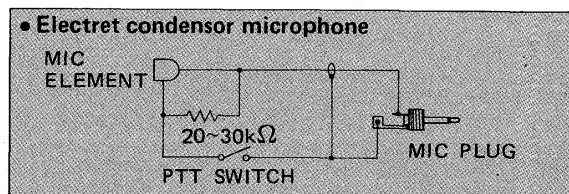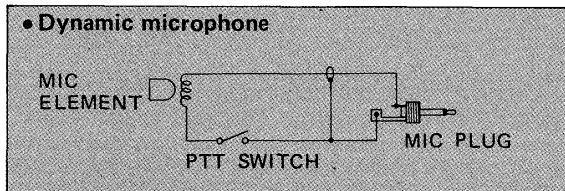This switch prevents accidental frequency and memory channel changes.

⑫ INTERNAL MICROPHONE

This microphone operates when the transceiver is transmitting. However, it will not operate if an external microphone is connected to the EXTERNAL MICROPHONE JACK.

⑬ EXTERNAL MICROPHONE JACK [MIC]

The optional IC-HM9 SPEAKER-MICROPHONE can be connected for additional versatility to the EXTERNAL MICROPHONE JACK. The internal microphone does not function when an external microphone is connected.


• Dynamic microphone

MIC ELEMENT

PTT SWITCH

MIC PLUG

• Electret condensor microphone

MIC ELEMENT

20~30kΩ

PTT SWITCH

MIC PLUG

⑭ **EXTERNAL SPEAKER JACK**
[EXT SP]

Connect an 8Ω external speaker to this jack. The INTERNAL SPEAKER will not operate if an external speaker is connected to the EXTERNAL SPEAKER JACK.

⑮ **INTERNAL SPEAKER**

This speaker operates when the transceiver is receiving. However, it will not operate if an external speaker is connected to the EXTERNAL SPEAKER JACK.

⑯ **DTMF KEY PAD**
(IC-μ4AT only)
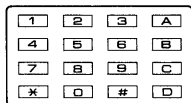
Keys on this pad are used for accessing a repeater or making an auto-phone-patch.

1	2	3	A
4	5	6	B
7	8	9	C
*	0	#	D

⑰ **BATTERY CHARGE**
INDICATOR

Lights up while battery pack is charging with the supplied wall charger or the optional IC-CP1 CIGARETTE LIGHTER CABLE.

⑱ **BATTERY CHARGER JACK**

This jack accepts the output plug of the supplied BC-25U, BC-26E or BC-27 WALL CHARGER, or a 13.8V DC power source.

⑲ **PTT (PUSH-TO-TALK) SWITCH** Push this switch to begin transmitting.

⑳ **LIGHT SWITCH**

Press this switch to turn ON and OFF the backlight for the FRE-QUENCY DISPLAY. The backlight has a timer function and will turn OFF automatically unless switches are being used.
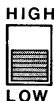
2 BATTERY PACK RELEASE BUTTON [RELEASE]

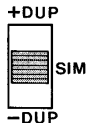Push this button upwards and slide the battery pack out to remove it from the transceiver.

2-3 REAR PANEL

㉒ **RF POWER OUTPUT SELECTOR SWITCH [HIGH] [LOW]**

Selects the RF output power. Set the switch to the [HIGH] position for 1W and the [LOW] position for 0.1W.

㉓ **SIMPLEX/DUPLEX SELECTOR SWITCH [+DUP] [SIM] [−DUP]**

Selects either the simplex or duplex mode.

㉔ **CHARGER TERMINALS**

These terminals are used for battery charging with the optional BC-50U/E AC BATTERY CHARGER.

3 - 1 BATTERY PACK INSTALLATION

(1) Using the BP-22 BATTERY PACK

The supplied BP-22 BATTERY PACK is rechargeable and can be easily slipped ON or OFF the transceiver.

1) To recharge the battery pack use the supplied wall charger or the optional BC-50U/E DESK BATTERY CHARGER, or a 12V-type cigarette lighter socket with the IC-CP1 CIGARETTE LIGHTER CABLE.

2) Battery charging takes about 15 hours using either the supplied wall charger or the optional IC-CP1. It takes about 1 hour using the optional BC-50U/E.

TRANSCEIVER	SUITABLE BATTERY CHARGER		
IC-μ4AT (U.S.A. version)	*BC-25U	BC-50U (117V) (Option)	IC-CP1 (Option)
IC-μ4A (Australia version)	*BC-27	BC-50E (240V) (Option)	IC-CP1 (Option)
IC-μ4E (Europe version)	*BC-26E	BC-50E (220V) (Option)	IC-CP1 (Option)

*Supplied with IC-μ4A/AT/E.

(2) Battery pack note

The full charge capacity of NiCd rechargeable batteries may be reduced if repeatedly charged with only partial discharge periods. This is called the battery memory effect. If the battery capacity seems lower than new, discharge the pack through normal use, then charge fully using the proper charger.

3-2 ANTENNA CONNECTION

Insert the connector on the flexible rubber antenna into the ANTENNA CONNECTOR on the top panel.
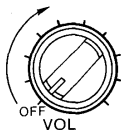
3-3 FOR OUTDOOR USE

1) Attach the handstrap to the projecting metal loop on the side of the transceiver as shown in the diagram.

2) An optional MB-20 BELT CLIP is available.


Handstrap
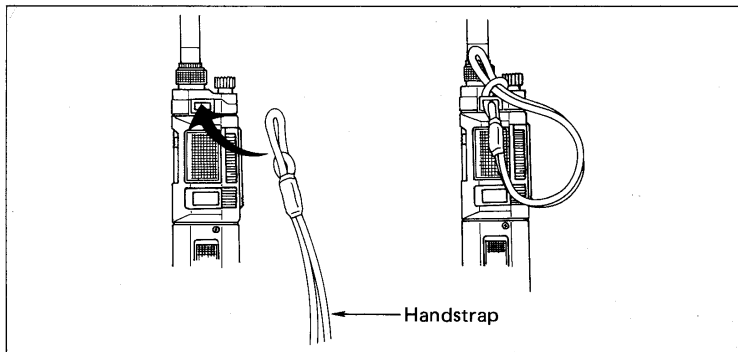
4-1 SETTING FREQUENCY

1) Turn power ON.

2) Push either FREQUENCY SET-TING SWITCH upward or down-ward.

IC-μ4A/AT versions
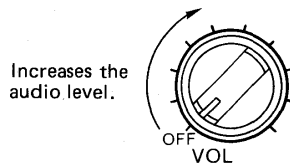(447.085MHz)

1) Turn power ON.

2) Push either FREQUENCY SETTING SWITCH upward or down-ward to set the frequency.

- The 10kHz and 1MHz DIGIT UP/DOWN SWITCHES have a digit carrying function. While these switches are pushed the frequency moves continuously up or down.
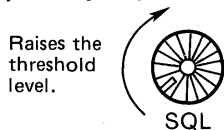

IC-μ4E version
(435.0125MHz)
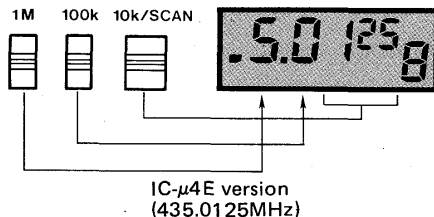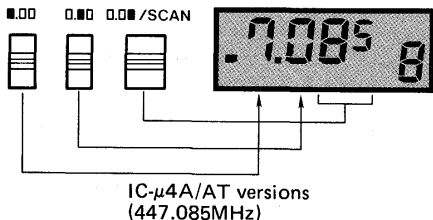
4-2 RECEIVING

1) Turn power ON and adjust the [VOL] CONTROL.

Increases the audio level.

OFF
VOL

2) Adjust the [SQL] CONTROL.
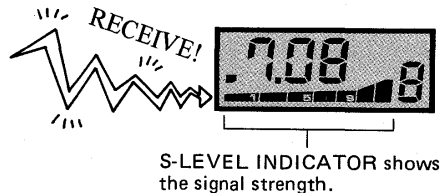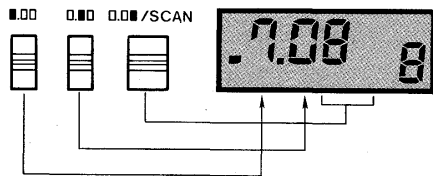
Raises the threshold level.

SQL

3) Set the desired frequency

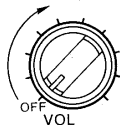1) Turn power ON and adjust the [VOL] CONTROL to a suitable listening level.

2) Adjust the [SQL] CONTROL until the noise is quieted.

3) Set the desired frequency using the FREQUENCY UP/DOWN SWITCHES. See page 13 for setting the frequency.

■.□□   □.■□   □.□■/SCAN

RECEIVE!

S-LEVEL INDICATOR shows the signal strength.

4 - 3 TRANSMITTING

1) Turn power ON.

2) Select output power.

HIGH

LOW

3) Select either simplex or duplex mode.

+DUP
SIM
−DUP
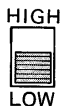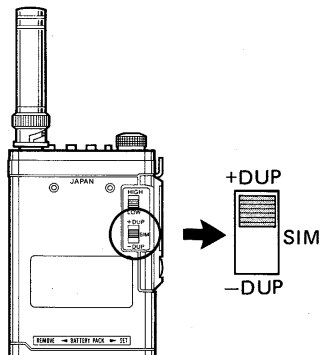
1) Turn power ON.

2) Select output power.

- [HIGH] : 1W
- [LOW]   : 0.1W

3) Select either simplex or duplex mode.

- Simplex [SIM] mode:
  Transmit and receive frequencies are the same.

- Duplex [+DUP] or [−DUP] mode:
  Transmit and receive frequencies are different.

- See page 17 for resetting the offset frequency.

4) Press the [PTT] SWITCH to begin transmitting and speak into the microphone.

- The red [TX] INDICATOR lights up.

- POWER SELECTION INDICATOR appears with bars. The bars only indicate relative switch positions.

Push
[PTT]
SWITCH

TX
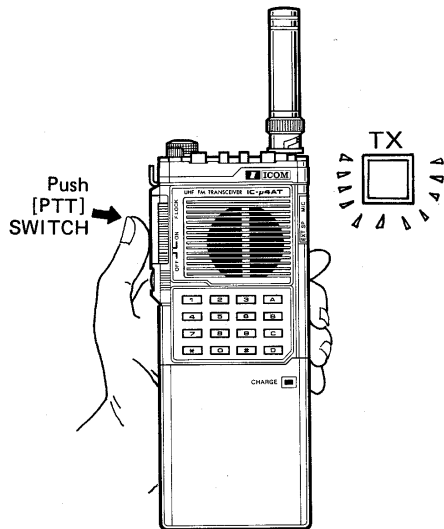
[High power output]

All bars

[Low power output]
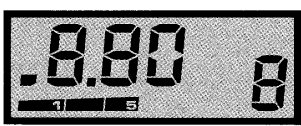
3 bars

5-1 SETTING OFFSET FREQUENCY

The offset frequency for duplex operation is preset for each version. However, the frequency can be changed by the following method:
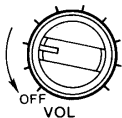
1) Turn power **OFF**.

2) Set either to [+DUP] or [−DUP] position.

3) Hold down the [LIGHT] SWITCH and turn power ON.

1) Turn power **OFF**.

• The FREQUENCY INDICATOR disappears.

2) Set the DUPLEX/SIMPLEX SELECTOR SWITCH to either the [+DUP] or [−DUP] positions.

• **DO NOT** set in the [SIM] position.

3) Push and hold the [LIGHT] SWITCH and turn the power ON. Then, release the [LIGHT] SWITCH.

5.0MHz: IC-μ4A/AT version

7.6MHz: IC-μ4E version

4) Set the desired offset frequency.

4) Set the desired offset frequency by using the DIGIT UP/DOWN SWITCHES.
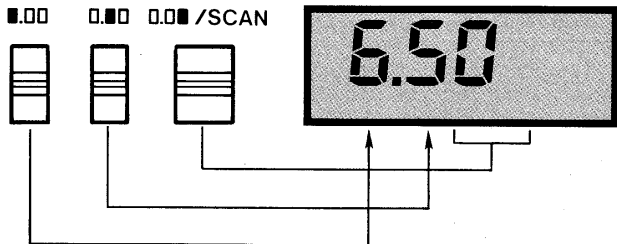
5) Push either the [PTT] or [CHK] SWITCH.

5) Push either the [PTT] or [CHK] SWITCH to set the offset frequency and return to your normal operating mode.

5-2 DTMF OPERATION
(IC-μ4AT Only)
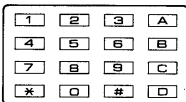
If you need DTMF tones to access a repeater or to make an auto phone-patch, follow the procedure below.

1) Push keys the desired number of times while pressing the [PTT] SWITCH.

2) After the first number has been entered, the transceiver will maintain transmit mode for about one second.

5-3 SUBAUDIBLE TONE OPERATION
(IC-μ4AT only)

The built-in subaudible tone encoder allows access to repeater stations that require subaudible tones superimposed on the transmit signal in order for their receiver squelch circuits to be opened.

1) Turn the [TONE] SWITCH ON to activate the subaudible tone encoder function.

2) The tone frequency can be changed by the tone frequency selector switches as shown in the diagram. See the SUBAUDIBLE TONE FREQUENCY TABLE to set the tone frequency.

  • When the P7 SWITCH is set in the ON position, the tone function is always turned ON regardless of the [TONE] SWITCH position.

SETTING SWITCHES   ON/OFF

The diagram shows the 88.5Hz position.
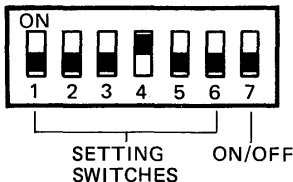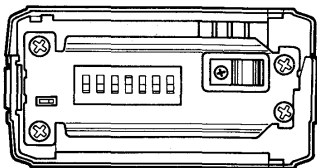
● SUBAUDIBLE TONE FREQUENCY TABLE

FREQUENCY (Hz)	P1	P2	P3	P4	P5	P6	FREQUENCY (Hz)	P1	P2	P3	P4	P5	P6	FREQUENCY (Hz)	P1	P2	P3	P4	P5	P6
67.0	1	0	0	0	0	0	107.2	0	1	1	1	0	0	167.9	1	1	0	1	1	0
71.9	0	1	0	0	0	0	110.9	1	1	1	1	0	0	173.8	0	0	1	1	1	0
74.4	1	1	0	0	0	0	114.8	0	0	0	0	1	0	179.9	1	0	1	1	1	0
77.0	0	0	1	0	0	0	118.8	1	0	0	0	1	0	186.2	0	1	1	1	1	0
79.7	1	0	1	0	0	0	123.0	0	1	0	0	1	0	192.8	1	1	1	1	1	0
82.5	0	1	1	0	0	0	127.3	1	1	0	0	1	0	203.5	0	0	0	0	0	1
85.4	1	1	1	0	0	0	131.8	0	0	1	0	1	0	210.7	1	0	0	0	0	1
88.5	0	0	0	1	0	0	136.5	1	0	1	0	1	0	218.1	0	1	0	0	0	1
91.5	1	0	0	1	0	0	141.3	0	1	1	0	1	0	225.7	1	1	0	0	0	1
94.8	0	1	0	1	0	0	146.2	1	1	1	0	1	0	233.6	0	0	1	0	0	1
97.4	1	1	0	1	0	0	151.4	0	0	0	1	1	0	241.8	1	0	1	0	0	1
100.0	0	0	1	1	0	0	156.7	1	0	0	1	1	0	250.3	0	1	1	0	0	1
103.5	1	0	1	1	0	0	162.2	0	1	0	1	1	0							

1 : ON   0 : OFF

5-4 TONE CALL OPERATION
(IC-μ4E only)

The **IC-μ4E** is equipped with a 1750Hz tone generator for accessing repeaters.

1) Press the [TONE] SWITCH.

TONE

1) Press the [TONE] SWITCH on the top panel.

[TONE] SWITCH

2) The tone transmits.
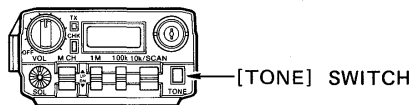
2) The tone transmits while the [TONE] SWITCH is pressed. Most repeaters require tones between 1 second and 3 seconds to be opened.

5-5 LOCK FUNCTION

This function prevents accidental frequency and memory channel changes.

Slide the [F.LOCK] SWITCH to the [ON] position to activate the lock function and to the [OFF] position to release the function.

5 - 6 MEMORY CHANNEL OPERATION
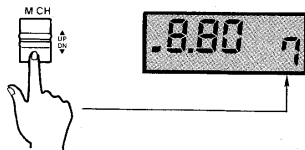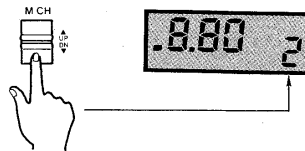
The IC-μ4A/AT/E is equipped with ten memory channels. Following are procedures for memory reading and memory writing.

(1) Memory reading

Push the [M CH] MEMORY CHANNEL UP/DOWN SWITCH either upward or downward to select the desired memory channel.

• The frequency displayed can be changed by any of the DIGIT UP/DOWN switches.

(2) Memory writing

1) Select memory channel.

1) Select a memory channel you would like to store the frequency in by using the [M CH] MEMORY CHANNEL UP/DOWN SWITCH.

2) Set the desired frequency.

2) Set the desired frequency by pressing any of the DIGIT UP/DOWN SWITCHES on the top panel. The displayed frequency will be stored in the selected memory channel automatically.

• The last displayed frequency will be stored in the memory channel.

6-1 CAUTIONS
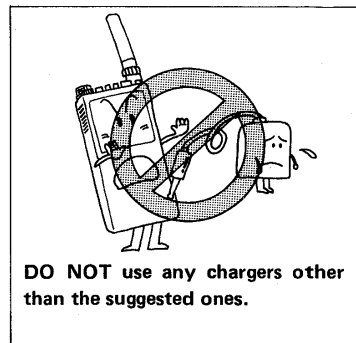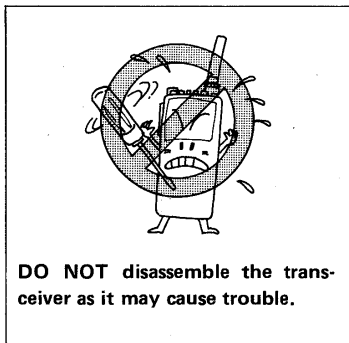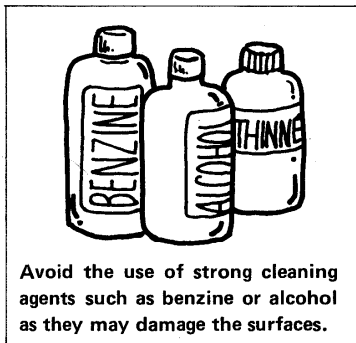
Avoid the use of strong cleaning agents such as benzine or alcohol as they may damage the surfaces.

DO NOT disassemble the transceiver as it may cause trouble.

DO NOT use any chargers other than the suggested ones.

6-2 MALFUNCTIONS

If malfunctioning occurs, stop using the transceiver immediately and see the instructions below for solving the problem.

(1) Unlocked PLL

Unlocked sign

If a "U" appears on the FREQUENCY DISPLAY as shown at the left, the PLL (Phase-Locked Loop) circuit in the transceiver is unlocked.

• At this time, the transceiver is muted and no signals are transmitted. This unlocked condition may be caused by an exhausted battery pack, so check your battery first.

(2) Resetting internal CPU

> **CAUTION:** After resetting the CPU, all information you have programmed into the memory channels will be cleared. Memory channels must be re-programmed.

Occasionally, the FREQUENCY DISPLAY may display erroneous information either during operation or when first applying power. This may, for example, be due to an external cause such as static electricity.

When this sort of problem occurs, simply reset the internal CPU according to the following procedures:

1) Turn power OFF.

1) Turn power OFF.

2) Switch to the [SIM] position.

+DUP
SIM
−DUP

2) Set the SIMPLEX/DUPLEX SELECTOR SWITCH to the [SIM] simplex position.
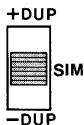
3) Hold down the [LIGHT] SWITCH and turn power ON.

(Hold down)

[LIGHT] SWITCH

OFF VOL

3) Hold down the [LIGHT] SWITCH and turn power ON. The CPU is now reset.

- All memory channel frequencies and the displayed frequency are reset at their initialized values.

(3) CPU backup battery

The **IC-μ4A/AT/E** uses a highly reliable CPU which is a complete, self-contained microprocessor. The purpose of the battery is to provide power to the CPU so it retains all memory information during power failures or in case the battery pack is detached or turned OFF.

The usual life of the backup battery is approximately one to two years. Monitor the backup battery carefully and replace it if there are repeated cases of display malfunction.

NOTE: Battery replacement should be done by your nearest authorized ICOM Service Center.

• If the internal backup battery is exhausted, the **IC-μ4A/AT/E** transmit and receive functions will still operate normally but no frequencies can be memorized in the memory channels.

PROBLEM	POSSIBLE CAUSE	SOLUTION
1. Power does not come ON when the power switch is turned ON.	• The battery pack is exhausted.	• Replace the battery pack with a new one or recharge it.
2. No sound comes from the speaker.	• Squelch setting is turned too far clockwise. • External speaker or earphone is in use.	• Turn the [SQL] CONTROL CCW until noise can be heard. Turn CW so the noise just disappears. • Check if the external speaker plug is inserted properly or if the external speaker cable is cut.
3. No or low power output.	• RF POWER OUTPUT SELECTOR SWITCH is at the [LOW] position. • The battery pack is exhausted. ([TX] INDICATOR does not light.)	• Set the switch to [HIGH] position. • Replace the battery pack with a new one or recharge it.
4. The receive mode functions properly and your signals are transmitted, but you are unable to make contact with another station.	• Improper offset frequency or input/output frequencies of the repeater. • The transceiver is in SIMPLEX mode. (When desiring DUPLEX mode.)	• Set the proper offset frequency. See page 17 for information. • Set either to the [+DUP] or [−DUP] positions.

VERSION	f1 (TX Freq.) MHz	f2 (Local Osc. Freq.) MHz	f3 (PLL IF) MHz	f4 (TX LO Freq.) MHz	f5 (RX LO Freq.) MHz
IC-μ4A, IC-μ4AT U.S.A.	440.000 ~ 449.995	416.850 ~ 426.845	11.925 ~ 21.920	428.075	404.925
IC-μ4A Australia	430.000 ~ 439.995	406.850 ~ 416.845	12.025 ~ 22.020	417.975	394.825
IC-μ4E Europe	430.0000 ~ 439.9875	406.8500 ~ 416.8375	12.0250 ~ 22.0125		

— 26 —
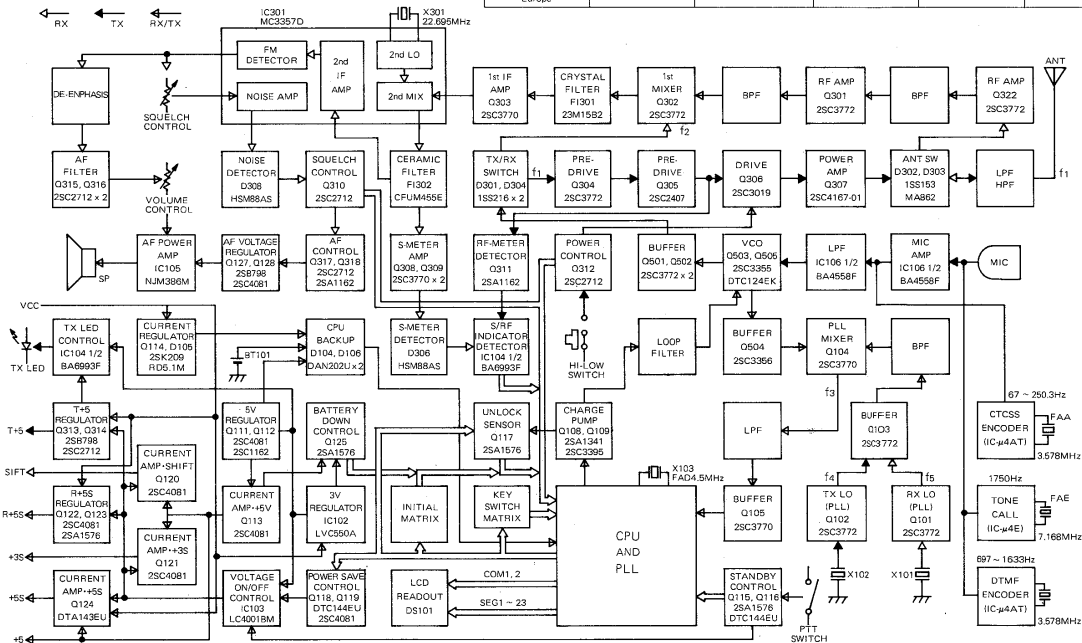
9 - 1 GENERAL

- Frequency coverage :

MODEL	OPERATIONAL RANGE
IC-μ4AT (U.S.A. version)	440.000 ~ 449.995MHz
IC-μ4A (Australia version)	430.000 ~ 439.995MHz
IC-μ4E (Europe version)	430.0000 ~ 439.9875MHz

- Frequency resolution : IC-μ4A/AT 5kHz   IC-μ4E 12.5kHz
- Antenna impedance : 50Ω unbalanced
- Usable temperature range : -10°C ~ $+60^\circ$C
- Frequency stability : ±10ppm at 0°C ~ $+60^\circ$C
- Current drain at 8.4V DC :

Receiving	Power saved	Approx.	8mA
	At max. audio output	Max.	170mA
Transmitting	High (1.0W)	Max.	700mA
	Low (0.1W)	Max.	350mA

- Dimensions (with BP-22) : 58(61)W x 140(148)H x 29(33)D mm
  Bracketed values include projections.
- Weight : 340g

9 - 2 TRANSMITTER

- Output power : HIGH 1.0W LOW 0.1W
- Emission mode : 16K0F3E
- Modulation system : Variable reactance frequency modulation
- Max. frequency deviation : ±5kHz
- Spurious emissions : More than 60dB below carrier

9 - 3 RECEIVER

- Receiving system : Double-conversion superheterodyne
- Intermediate frequencies : 1st 23.15MHz   2nd 455kHz
- Modulation acceptance : 16K0F3E
- Sensitivity : Less than 0.25μV (-12dBμ) for 12dB SINAD
- Squelch sensitivity (Threshold) : Less than 0.1μV (-20dBμ)
- Spurious response rejection ratio : More than 60dB
- Audio output power : More than 0.25W at 10% distortion with an 8Ω load

•MEMO•

Please record the serial number of your **IC-μ4A/AT/E** transceiver below for future servicing reference:

Serial number : _____

Date of purchase : _____

Place where purchased : _____

ICOM