

ICOM

FM TRANSCEIVER
IC-GW1



Icom Inc.

IMPORTANT

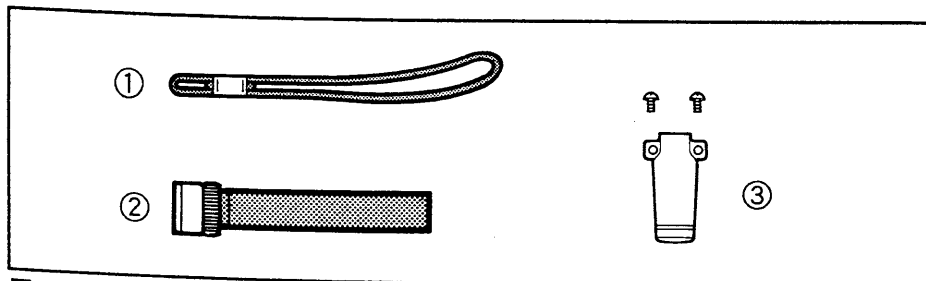
READ ALL INSTRUCTIONS carefully and completely before using the transceiver.

SAVE THIS INSTRUCTION MANUAL. This instruction manual contains important safety and operating instructions.

This transceiver has both channel indication and frequency indication. Before channel indication operation, each channel must be programmed using frequency indication. Refer to Sections 6–18 for details.

UNPACKING

- ① Handstrap 1
- ② Flexible antenna (FA-B01U) 1
- ③ Belt clip and screws 1 set



The BP-130A BATTERY CASE is attached to the transceiver.

CAUTIONS

⚠ NEVER connect the transceiver to an AC outlet or to a power source of more than 16 V DC.

⚠ NEVER connect the transceiver to a power source using reverse polarity. This connection will ruin the transceiver.

⚠ NEVER allow children to touch the transceiver.

AVOID using or placing the transceiver in areas with temperatures below -10°C ($+14^{\circ}\text{F}$) or above $+60^{\circ}\text{C}$ ($+140^{\circ}\text{F}$).

AVOID placing the transceiver in direct sunlight.

BE CAREFUL! When transmitting for a long time with high output power, the rear panel will become hot.

BE CAREFUL! During external DC power operation, connected battery pack or battery case is charged. If the BP-130A BATTERY CASE is connected, remove dry cell batteries. Otherwise, battery leakage may occur.

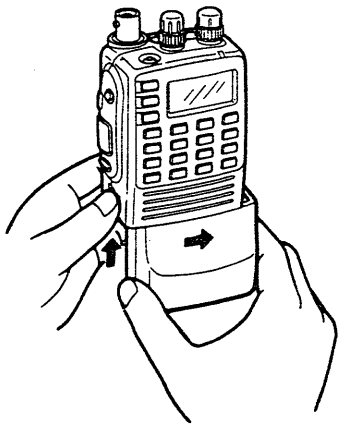
BE CAREFUL! The use of non-Icom battery packs and chargers may impair transceiver performance and invalidate the warranty.

TABLE OF CONTENTS

1 PRE-OPERATION	1 – 2	7 PROGRAMMING PROCEDURE	17 – 18	13 TIMER SETTINGS	26 – 28
2 PANEL DESCRIPTION	3 – 5	■ Programming outline	17	■ Auto power-off setting	26
■ Front, side and top panels	3	■ Programmable contents	17	■ Power-on timer setting	26
■ Function display	5	■ MEMORY and VFO modes	18	■ Power-off timer setting	27
3 BASIC OPERATION	6 – 11	■ Number of memory channels	18	■ Power-on/off timer operations	27
■ Channel selection	6	■ Skip channel setting	18	■ Time-out timer setting	28
■ Volume and squelch settings	6	■ Frequency transferring	18	■ Time-out timer operation	28
■ Programmed functions	6	8 FREQUENCY SETTING	19 – 20	14 OTHER SETTINGS	29
■ Normal operation	7	■ Using digit keys	19	■ Fixed squelch	29
■ Tone squelch operation	7	■ Using Δ / ∇ keys	19	■ Temporary fixed squelch	29
■ Voice scrambler operation	7	■ Using dial	20	■ Busy detection	29
■ ANI operation	8	9 SEMI-DUPLEX SETTINGS	21	15 FUNCTIONS DURING FREQUENCY	
■ DTMF code transmitting	10	■ Offset direction	21	INDICATION	30 – 33
■ Display lighting	11	■ Offset frequency	21	■ Code channel programming	
■ Output power selection	11	10 TONE SETTINGS	22	for pager and code squelch	30
■ Beep tones	11	■ Required optional unit	22	■ Pager operation	31
4 CLOCK AND TIMER OPERATIONS	12	■ Subaudible tone encoder	22	■ Code squelch operation	31
■ Clock operation	12	■ Tone squelch	22	■ Scan during frequency indication	32
■ Power-on/off timers and		■ Tone frequency	22	■ Power saver	33
auto power-off	12	11 ANI SETTINGS	23 – 24	■ Pocket beep	33
5 SCAN OPERATION	13	■ ANI setting outline	23	16 OPTIONAL UNIT INSTALLATIONS	34
■ Basic operation	13	■ Code setting	23	17 MODE ARRANGEMENT CHART	35 – 36
■ Calling while scanning	13	■ Code channel number setting	24	18 TROUBLESHOOTING	37
■ When a signal is received	13	■ ANI delay time setting	24	19 SPECIFICATIONS	38
6 PRE-PROGRAMMING	14 – 16	12 DTMF MEMORY SETTINGS	25	20 OPTIONS	39 – 40
■ Indication selection	14	■ DTMF memory setting	25		
■ Frequency indication display	14	■ DTMF memory transmitting	25		
■ Keys and switches during					
frequency indication	15				

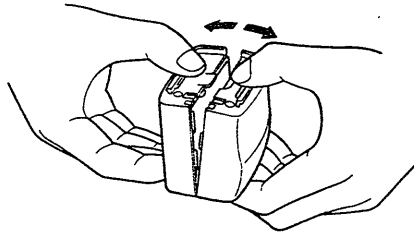
◇ Battery case removal

Push and hold the battery release button upwards, then slide the battery case to the right with the transceiver facing you.



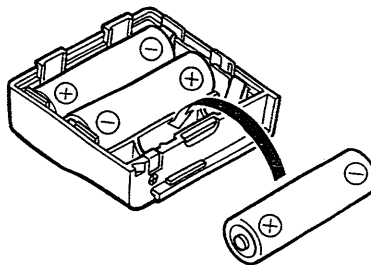
◇ Dry cell battery installation

Open the battery case.



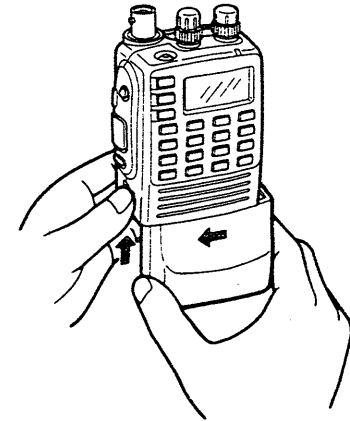
Install AA (R6) × 6 dry cell batteries.

- Pay attention to the polarities.



◇ Battery case attachment

Slide the battery holder into the battery case.



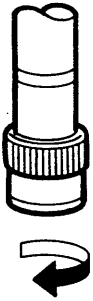
To attach the battery case to the transceiver, mate the notched ends of the transceiver and the battery case, and slide until a click sounds.

BE CAREFUL!

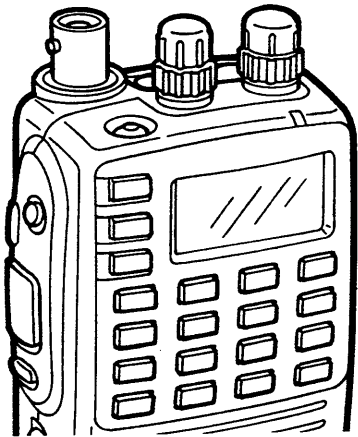
Before external DC power operation, remove dry cell batteries to prevent battery leakage.

◇ Antenna

Connect the supplied flexible antenna into the antenna connector and rotate clockwise.

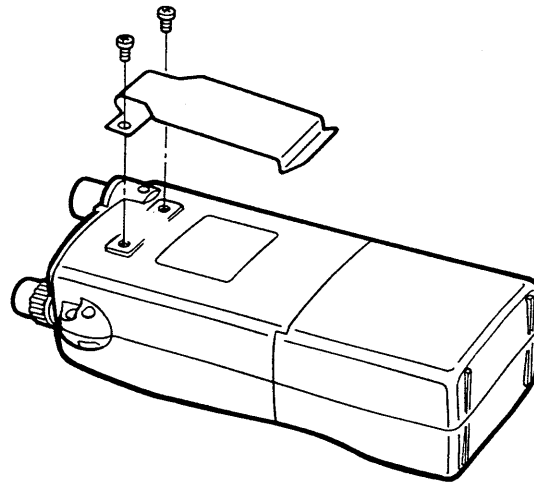


CAUTION:
Transmitting without the antenna may damage the transceiver.



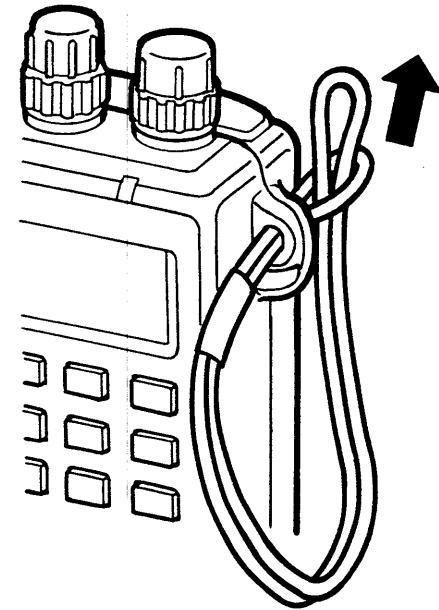
◇ Belt clip

Remove the plastic screws, then attach the belt clip with the supplied metal screws. Conveniently attaches to your belt.

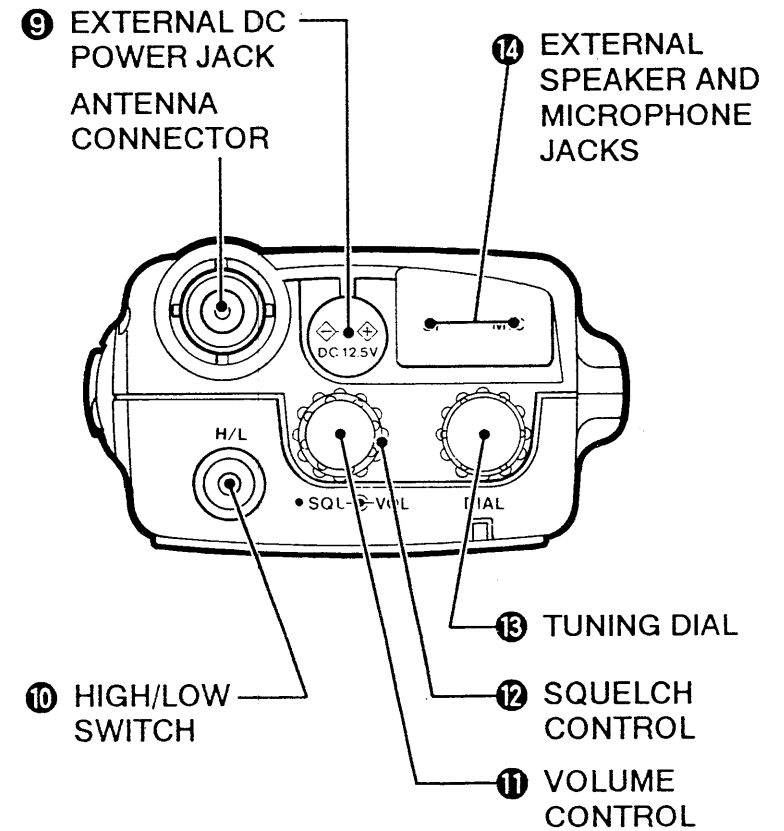
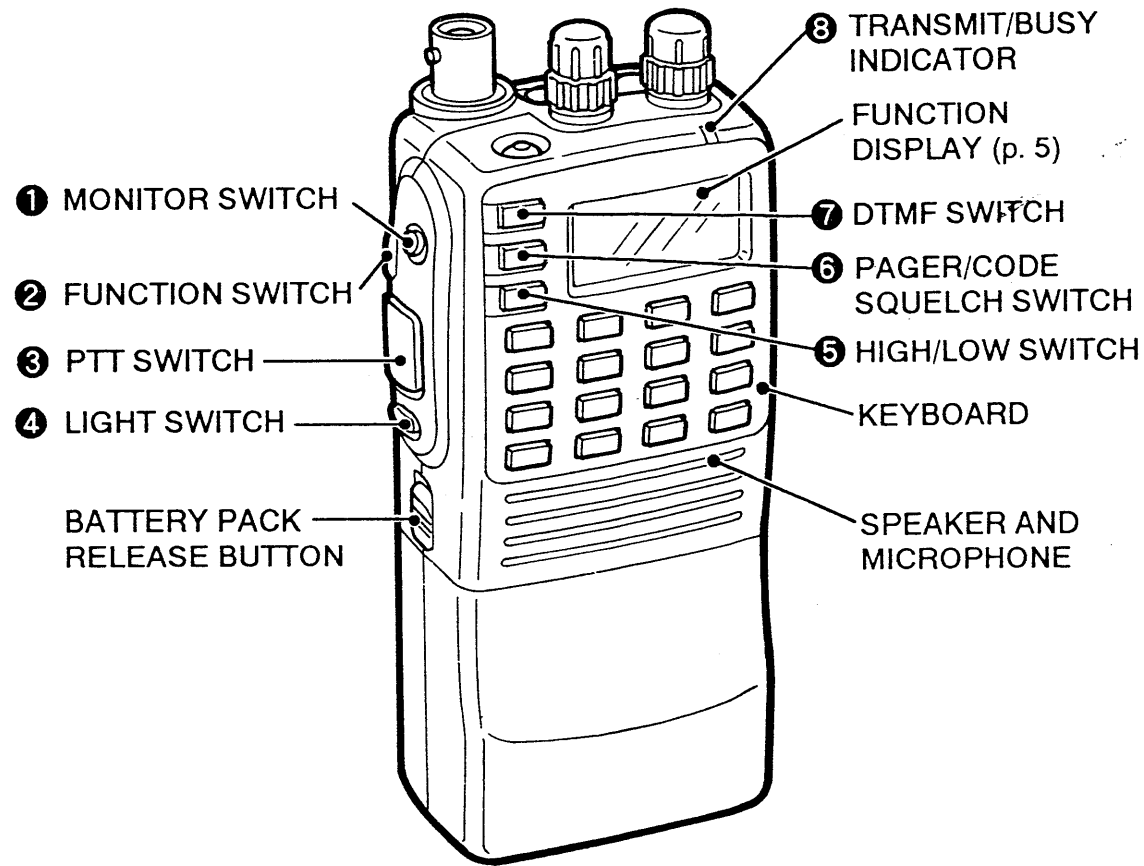


◇ Handstrap

Install the handstrap as shown in the figure below. Facilitates carrying.



■ Front, side and top panels



1 MONITOR SWITCH [MONI]

Manually opens the squelch and monitors the channel. (p. 6)

2 FUNCTION SWITCH [F]

While pushing [F], some switches perform secondary functions.

3 PTT SWITCH [PTT]

Push and hold to transmit. (p. 7)

4 LIGHT SWITCH [LIGHT]

- Turns the display lighting ON for 5 sec. Turns the lighting OFF. (p. 11)

- [F] + [LIGHT]: Turns the display lighting ON continuously. (p.11)

5 HIGH/LOW SWITCH [H/L]

Selects high or low output power level. (p. 11)

6 PAGER/CODE SQUELCH SWITCH [PGR/CS · CODE]

No function.

7 DTMF SWITCH [DTMF · CODE]

Used to select a DTMF memory channel to be transmitted. (p. 10)

8 TRANSMIT/BUSY INDICATOR

- Lights up in red while transmitting. (p. 7)

- Lights up in green while the channel is busy. (p. 7)

9 EXTERNAL DC POWER JACK [DC 12.5V]

- Connects a wall charger or a 12-16 V DC power source for charging. (p. 39)

- Connects a 6-16 V DC power source for operation. (p. 39)

10 HIGH/LOW SWITCH [H/L]

Selects high or low output power level. The same function as 5 [H/L] on the front panel. (p. 11)

11 VOLUME CONTROL [VOL]

Turns the power ON and OFF, and adjusts audio output level. (p. 6)

12 SQUELCH CONTROL [SQL]

Adjusts the squelch level. (p. 6)

13 TUNING DIAL [DIAL]

Selects a channel, etc. (p. 6)

14 EXTERNAL SPEAKER AND MICROPHONE JACKS [SP], [MIC]

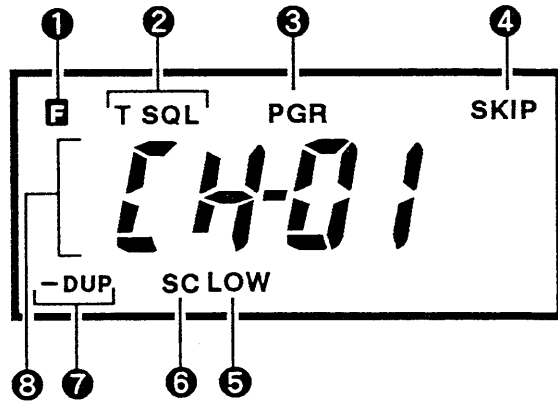
Connects an optional speaker-microphone or headset, if required. (p. 40)

Effective keys on the keyboard

[A] · CLR	Cancels the scan, etc.
[F] + [C] · sc	Activates and cancels the optional voice scrambler function. (p. 7)
[F] + [8] · SET	- Used to select the beep tones ON and OFF. (p. 11) - During clock indication: Used to set built-in clock. (p. 12)
[F] + [O] · CLOCK	Selects clock indication. (p. 12)
[#] · Δ or [*] · ∇	- When pushed: Changes channel number. (p. 6) - When pushed and held: Starts the scan. (p. 13)
[F] + [#] · Δ /SCAN or [F] + [*] · ∇ /SCAN	Starts the scan. (p. 13)

2 PANEL DESCRIPTION

■ Function display



① FUNCTION INDICATOR

Appears while [F] is pushed and held.

② TONE INDICATOR

- "T" appears when the subaudible tone encoder is set for the selected channel.
- "T SQL" appears when the tone squelch function is set for the selected channel. (p. 7)

③ PAGER INDICATOR

Appears when the ANI function is set for the selected channel. (p. 8)

④ SKIP INDICATOR

Appears when the selected channel is set as a skip channel. (p. 13)

⑤ LOW POWER INDICATOR

- Appears when low output power is set for the selected channel. (p. 11)
- Appears when low output power is manually selected. (p. 11)

⑥ SCRAMBLER INDICATOR

- Appears the voice scrambler function is set for the selected channel. (p. 7)
- Appears when the voice scrambler function is manually selected. (p. 7)

⑦ DUPLEX INDICATOR

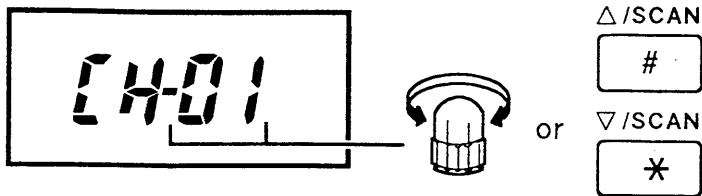
"DUP" or "-DUP" appears when duplex is set for the selected channel.

⑧ CHANNEL NUMBER READOUT

Shows the channel number.

Channel selection

- ① Rotate [VOL] clockwise to turn the power ON.
- ② Rotate [DIAL] to set a channel.
 - [\oplus · \triangle] and [\otimes · ∇] also set a channel.



NOTE: DO NOT push and hold [\oplus · \triangle] or [\otimes · ∇], since the scan function may be activated. To cancel the scan function, push [\oplus · \triangle] or [\otimes · ∇] again.

Volume and squelch settings

- ① While pushing [MONI], rotate [VOL] to adjust the desired audio output level.
- ② Rotate [SQL] clockwise until the transmit/busy indicator goes out while the channel is not busy.

◇ Monitor function

Push and hold [MONI] to temporarily monitor a channel:

- During tone squelch operation. (p. 7)
- During ANI operation. (p. 8)
- To listen to a weak signal while the fixed squelch function is programmed. (p. 29)

Programmed functions

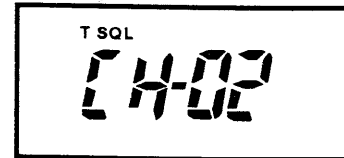
Operations vary according to the display.

◇ Normal operation



Only the channel number readout appears. Refer to p. 7 for operation.

◇ Tone squelch operation



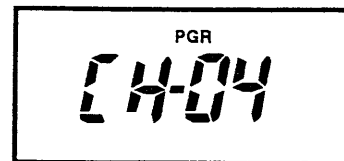
“T SQL” appears when the tone squelch is set for the selected channel. Refer to p. 7 for operation.

◇ Voice scrambler operation



“SC” appears when the voice scrambler function is set for the selected channel. Refer to p. 7 for operation.

◇ ANI operation



“PGR” appears when the ANI function is set for the selected channel. Refer to p. 8 for operation.

3 BASIC OPERATION

■ Normal operation

CAUTION: Transmitting without an antenna may damage the transceiver.

- ① Select a channel, then adjust [VOL] and [SQL]. (p. 6)
- ② Push and hold [PTT] to transmit.
 - The transmit/busy indicator lights up in red.
- ③ Speak into the microphone at your normal voice level.
 - **DO NOT** hold the transceiver too close to your mouth or speak too loudly. This may distort the signal.
- ④ Release [PTT] to return to receive.

◇ Time-out timer

The time-out timer prevents prolonged channel occupation. When the time-out timer is set for a channel, the transceiver operates as follows:

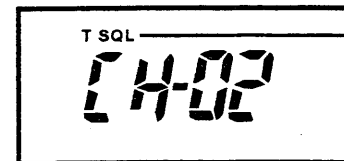
- When [PTT] is continuously pushed, 5 beeps sound 10 sec. before the programmed period arrives.
- When the programmed period arrives, 5 beeps sound again and the transmitting is stopped.

◇ Busy detection function

When the busy detection function is set for a channel, while the transmit/busy indicator lights up in green, transmitting is electronically inhibited. Wait until other stations' communication is finished.

■ Tone squelch operation

This function allows you to silently wait for a call from group members.

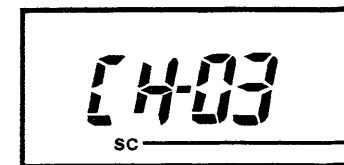


"T SQL" appears when the tone squelch is set for the selected channel.

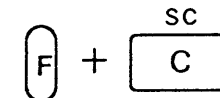
Only when a matched subaudible tone frequency is received, an audio signal is heard. While the transmit/busy indicator lights up in green, but no audio signal is heard, another group is using the channel. Other operations are the same as "Normal operation" at left.

■ Voice scrambler operation

The voice scrambler function provides communications privacy.



"SC" appears when the voice scrambler is set for the selected channel.



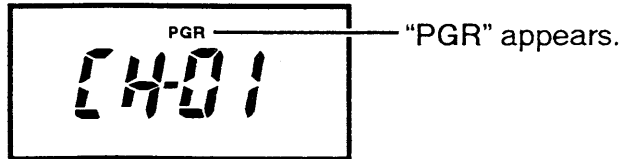
To activate or cancel the voice scrambler function manually, push [F] + [C • SC]. Other operations are the same as "Normal operation" at left.

■ ANI operation

The ANI (Automatic Number Identification) function provides individual calling or group calling.

◇ Calling a station

- ① Select a channel with an ANI setting.



- ② Push [PTT] to transmit your call.
 - To manually specify the desired station's receive code, push 3 digit keys instead of [PTT].
- ③ Beeps sound when your call reaches the desired station.
 - If "PGR" continuously appears and beeps do not sound, the desired station may be out of communication range.
- ④ When the desired station's answer back is received, the beeps are cancelled and the squelch opens.
 - If the desired station's answer back is not received, push [PTT] to cancel the call and beep tones.
- ⑤ Operate the transceiver normally.
 - "PGR" blinks while connected.
- ⑥ When communication is finished, push [#] while pushing [PTT] to disconnect.
 - Either you or the other party may perform this operation.

◇ Waiting for a call

- ① Select a channel with an ANI setting.
- ② When you receive a call from another party, your transceiver beeps.
- ③ Push [PTT] to answer the calling station.
- ④ Operate the transceiver normally.
 - "PGR" blinks while connected.
- ⑤ When communication is finished, push [#] while pushing [PTT] to disconnect.
 - Either you or the other party may perform this operation.

◇ Time-out timer during ANI operation

The time-out timer prevents prolonged channel occupation. After the squelch opens, the time-out timer operates whether [PTT] is continuously pushed or not. When the time-out timer is set for a channel, the transceiver operates as follows:

- 10 sec. before the programmed period arrives, 5 beeps sound.
- When the programmed period arrives, 5 beeps sound again, transmitting is stopped and disconnected.

Time-out time may vary according to channels. Ask your system operator for details.

3 BASIC OPERATION

◇ Calling group stations

Group transceivers can be called simultaneously, if required. This function is convenient to transmit a message from headquarters, etc. to group stations.

- ① Select a channel with an ANI setting.
- ② To specify a desired group code, push 3 digit keys including [D] for a digit or digits.
 - Refer to "Group call code examples" below.
 - "PGR" blinks.
- ③ The squelch opens and communication is possible.
- ④ When communication is finished, push [#] while pushing [PTT] to disconnect.
 - Called stations cannot perform the disconnect operation.

◇ Group call code examples

[Example 1]

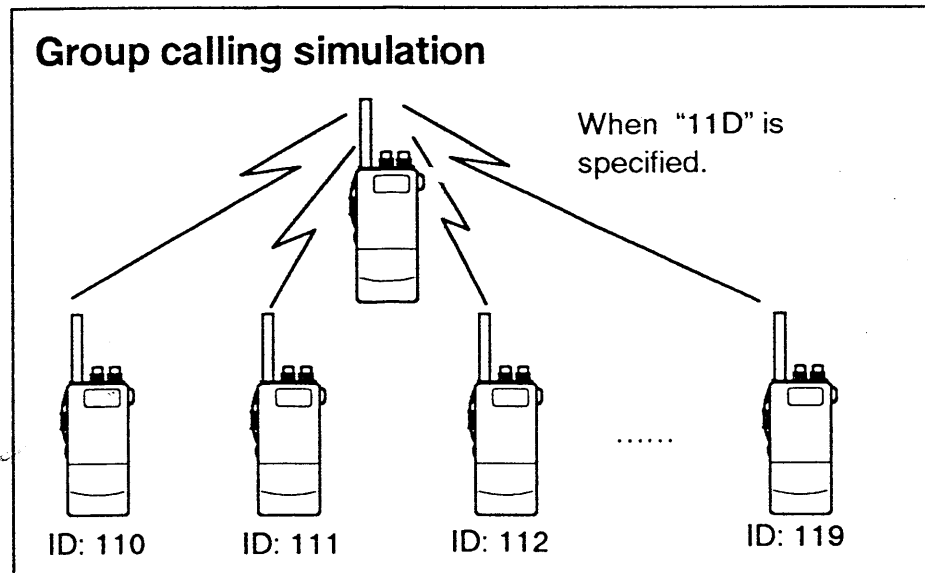
If "11D" is transmitted, transceivers with receive codes "110" – "119" are called.

[Example 2]

If "1D3" is transmitted, transceivers with receive codes "103," "113," "123," ... "183" and "193" are called.

[Example 3]

If "1DD" is transmitted, transceivers with receive codes "100," "101," "102," ... "198" and "199" are called.



◇ Transmit and receive codes

The following codes are assigned to transceivers.

Code name	Code function
Receive code	3-digit ID code for each transceiver. Each transceiver is called with this code.
Transmit code	3-digit ID code for calling another party's transceiver. The calling station transmits the desired station's receive code. In this instruction manual, "desired station's receive code" stands for "transmit code."

DTMF code transmitting

DTMF codes are used for autopatching, accessing repeaters, controlling other equipment, etc.

◇ Manual transmitting

While pushing [PTT], push [①]–[⑩], [Ⓐ]–[Ⓓ], [✳] or [♯] keys. For subsequent key entries, transmitting continues without pushing [PTT].

NOTE: Be careful! When pushing 3 digit keys without pushing [PTT], an ANI signal is transmitted. (p. 8)

◇ DTMF memory transmitting




If DTMF memory channels are programmed, a required DTMF code can be instantly transmitted.

To transmit a DTMF memory channel's contents, while pushing [PTT] push [DTMF], then push [①]–[⑩] or [Ⓐ] to select a DTMF memory channel.

- While transmitting, DTMF memory channel contents sequentially appear.
- On the function display, "E" and "F" stand for "✳" and "♯."

Ask your system operator for DTMF memory channel contents.

[Example] Transmitting DTMF memory channel T4.

While pushing  push  



While transmitting, DTMF memory channel contents appear.

◇ DTMF memory confirmation

DTMF memory channels can be confirmed without transmitting them.

To confirm a DTMF memory channel's contents without pushing [PTT], push [DTMF], then push [①]–[⑩] or [Ⓐ] to select a DTMF memory channel.

3 BASIC OPERATION

■ Display lighting

◇ 5 sec. timer

Push [LIGHT] to turn the lighting ON. When the switches, keyboard or [DIAL] are not operated, the lighting automatically turns OFF after 5 sec.

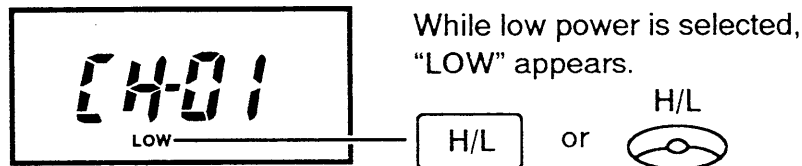
◇ Continuous lighting

Push [F] + [LIGHT] to turn the lighting ON continuously. To turn the lighting OFF, push [LIGHT].

- To conserve battery power, turn OFF the lighting after reading the function display.

■ Output power selection

When a channel with low output power is selected, "LOW" appears. Push [H/L] to select output power, if required.



■ Beep tones

Using SET mode

The speaker emits confirmation beep tones for key and switch operations. The beep tones can be cancelled, if required.

- ① Push [F] + [8] • SET] to enter SET mode.
 - "BE" appears.
- ② Rotate [DIAL] to select the beep tone condition.
 - "on" : The speaker emits beep tones.
 - "oFF" : The speaker does not emit beep tones.



Initial setting before shipping:
"on"

- ③ Push [PTT] or [A] • CLR] to set the beep tone setting and to exit SET mode.

NOTE: Even when the beep tones are cancelled, the transceiver beeps in the following cases:

- During ANI operation. (p. 8)
- When the time-out timer is set for the channel. (pgs. 7, 8)

■ Clock operation

The transceiver has a built-in 24-hour clock. This is convenient to confirm the current time.

◇ Clock indication

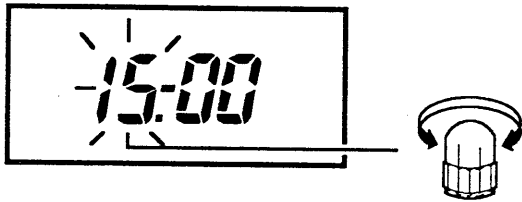
- ① Push [F] + [⊙ • CLOCK] to select clock indication.



- ② Push [A • CLR] to exit clock indication.

◇ Clock setting

- ① Push [F] + [⊙ • CLOCK] to select clock indication.
- ② Push [F] + [8 • SET] .
 - The hour digits blink.
- ③ Rotate [DIAL] to set the hour digits using the 24-hour system.



- ④ Push [# • Δ /SCAN].
- ⑤ Rotate [DIAL] to set the minute digits.
- ⑥ Push [A • CLR] 2 times to exit clock indication.

■ Power-on/off timers and auto power-off

Operations vary according to programming. Ask your system operator for details.

◇ Power-on/off timers

If power-on timer is programmed	Everyday, when the specified time arrives, the transceiver automatically turns ON.
If power-off timer is programmed	Everyday, when the specified time arrives, the transceiver automatically turns OFF.
If both power-on and power-off timers are programmed	Everyday, the transceiver automatically turns ON and OFF according to the specified times.

/// **NOTE:** During power-on/off timer operation, **DO NOT** turn the power OFF with [VOL].

◇ Auto power-off

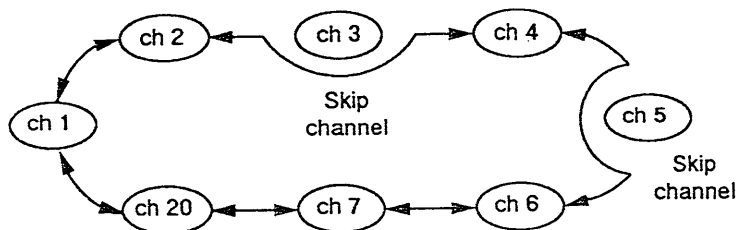
If auto power-off is programmed, the transceiver automatically turns the power OFF after programmed period in which no switches, keys or [DIAL] are operated.

◇ Manual power ON

To turn the power ON manually, rotate [VOL] counter-clockwise until a click sounds, then turn clockwise when the transceiver automatically turns OFF.

Basic operation

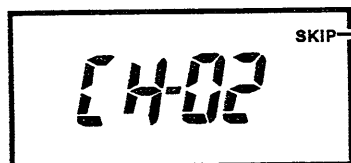
The scan function repeatedly scans channels sequentially. This is convenient when searching for a signal.



- ① Rotate [SQL] clockwise until the transmit/busy indicator goes out while the channel is not busy.
- ② Start the scan.
 - Forward direction: Push and hold [# · Δ/SCAN] or push [F] + [# · Δ/SCAN].
 - Reverse direction: Push and hold [⊗ · ∇/SCAN] or push [F] + [⊗ · ∇/SCAN].
 - To change the scanning direction, rotate [DIAL].
- ③ To cancel the scan, push [# · Δ/SCAN], [⊗ · ∇/SCAN] or [A · CLR].

◆ Skip channels

Some channels may be programmed as skip channels. While scanning, these channels are skipped.



"SKIP" appears when the selected channel is set as a skip channel.

Calling while scanning

- While pushing [PTT], the transceiver transmits on a non-busy channel.
- After transmitting and when no signal is received for 20 sec., scan resumes.

When a signal is received

◆ During normal operation

- Scan pauses on the channel until the signal disappears and then resumes 2 sec. after that.
- While pausing, push [PTT] to answer back, if required.

◆ During ANI operation

- Scan pauses on the channel and waits for 2 sec. for your receive code.
- If your code is not received within 2 sec., scan resumes after that.
- While pausing, push [PTT] to answer back, if required.
- After the communication is finished, the scan resumes 20 sec. after that.

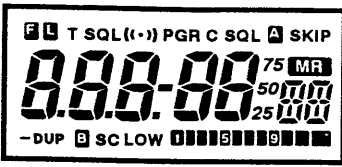
◆ During tone squelch operation

- When a matched tone frequency is received, scan pauses on the channel.
- While pausing, push [PTT] to answer back, if required.

■ Indication selection

Before operation, select frequency indication and program channels. Refer to Sections 7–18 to program memory channels. After programming, select channel indication.

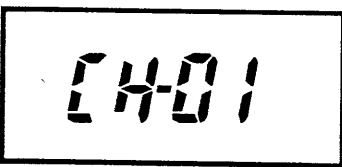
- ① Turn the power OFF.
- ② While pushing [③] + [⑦], turn the power ON.
 - All segments appear on the function display.



- ③ While all segments appear, push [①], [②], [③], [④] in sequence.
 - Another pass number may be used instead of [①], [②], [③], [④].

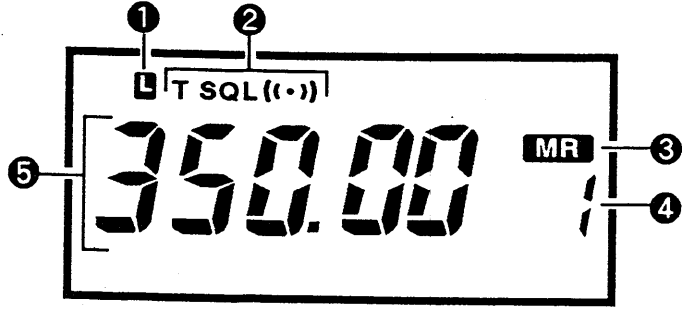


If channel indication is previously selected, frequency indication appears.



If frequency indication is previously selected, channel indication appears.

■ Frequency indication display



- ① **LOCK INDICATOR**
Appears while the lock function is in use. (p. 20)
- ② **TONE INDICATOR**
“T SQL ((·))” appears while the pocket beep is in use. (p. 33)
- ③ **MEMORY MODE INDICATOR**
Appears while in MEMORY mode, and disappears while in VFO mode. (p. 18)
- ④ **MEMORY CHANNEL READOUT**
Shows a memory channel number. Each memory channel number corresponds to a channel number during channel indication.
- ⑤ **FREQUENCY READOUT**
Shows an operating frequency.

■ Keys and switches during frequency indication

CODE

DTMF

CODE

PGR/CS

H/L

T/TSQL 1	D SEL 2	SKIP 3	CLR/M-V A
DUP 4	5	MASK 6	MR/MW B
7	SET 8	TIMER 9	SC C
▽/SCAN *	CLOCK 0	△/SCAN #	LOCK D

[①] – [⑩], [A] – [D], [⊛] and [⊞] keys encode DTMF codes while transmitting. (p. 10)

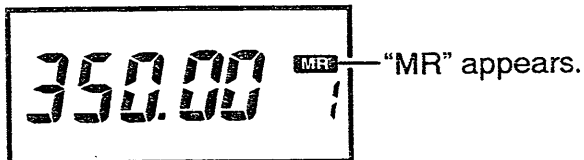
Some keys have functions as in the tables at right.

Key	Function	Function while pushing [F]
T/TSQL 1	- While in VFO mode: Sets the operating frequency. (p. 23)	Activates and cancels the subaudible tone encoder, tone squelch or pocket beep function. (pgs. 22, 33)
D SEL 2		Selects digits for the dial select step. (p. 20)
SKIP 3		While in MEMORY mode: Selects or cancels skip channel setting. (p. 18)
DUP 4		Selects + duplex, – duplex or simplex. (p. 21)
5		_____
MASK 6		While in MEMORY mode: Selects or cancels memory masking setting. (p. 18)
7		_____
SET 8		Selects SET mode.
TIMER 9		Selects TIMER mode. (pgs. 26, 27)
CLOCK 0		Selects clock indication. (p. 12)

Key	Function	Function while pushing [F]
CLR/M▶V <input type="button" value="A"/>	<ul style="list-style-type: none"> - While in VFO mode: Clears frequency input before entry. (p. 19) - Cancels the scan. (p. 32) - While in MEMORY mode: Selects VFO mode. (p. 18) 	While in MEMORY mode, when pushed and held: Transfers a memory channel's contents into the VFO. (p. 18)
MR/MW <input type="button" value="B"/>	While in VFO mode: Selects MEMORY mode. (p. 18)	While in VFO mode, when pushed and held: Writes VFO contents into a memory channel. (p. 17)
SC <input type="button" value="C"/>	_____	Activates and cancels the voice scrambler function.
LOCK <input type="button" value="D"/>	_____	Activates and cancels the lock function. (p. 20)
Δ/SCAN <input type="button" value="#"/> ▽/SCAN <input type="button" value="*"/>	<ul style="list-style-type: none"> - While in VFO mode: Set operating frequency. (p. 19) - While in MEMORY mode: Set a memory channel. (p. 17) - While in VFO mode, when pushed and held: Start full scan. (p. 32) - While in MEMORY mode, when pushed and held: Start memory scan. (p. 32) - While scanning: Cancel the scan. (p. 32) 	<ul style="list-style-type: none"> - While in VFO mode: Start programmed scan. (p. 32) - While in MEMORY mode: Start memory skip scan. (p. 32)
CODE <input type="button" value="DTMF"/>	Allows you to transmit a DTMF memory channel. (p. 25)	Allows you to program DTMF memory channels. (p. 25)
CODE <input type="button" value="PGR/CS"/>	Activates and cancels the ANI, pager or code squelch function. (pgs. 24, 31)	Allows you to program code channels for the ANI, pager and code squelch functions. (pgs. 23, 31)
<input type="button" value="H/L"/>	Selects high or low output power.	_____

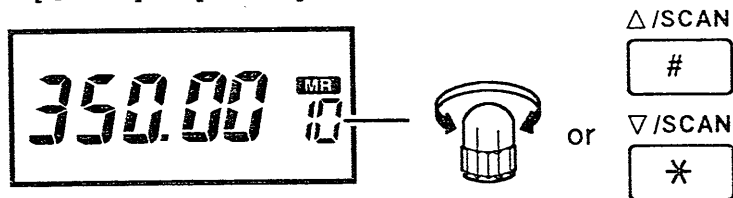
Programming outline

- ① Confirm that frequency indication is selected. (p. 14)
- ② Push [B] · MR/MW] to select MEMORY mode. (p. 18)



- ③ Rotate [DIAL] to select a memory channel to be programmed.

• [⊕ · Δ] or [⊗ · ▽] also selects a memory channel.



- ④ Push [A] · CLR] to select VFO mode. (p. 18)
 - “MR” disappears.
- ⑤ Select the desired frequency, etc. to be programmed.
 - Refer to “Programmable contents” at right.
- ⑥ Push and hold [F] + [B] · MR/MW] to program.
- ⑦ To program another channel, repeat steps ②–⑥.
- ⑧ Select channel indication. (p. 14)

Programmable contents

The following settings are independently possible for each memory channel:

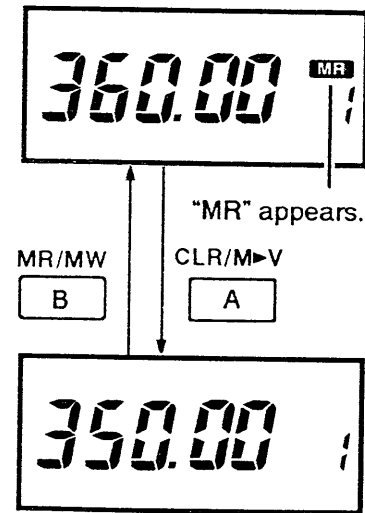
Programmable contents	Operation	Ref.
Frequency	Digit keys	p. 19
	[⊕ · Δ] or [⊗ · ▽]	p. 19
	[DIAL]	p. 20
Offset direction	[F] + [4] · DUP]	p. 21
Offset frequency	SET mode	p. 21
Tone frequency	SET mode	p. 22
Tone encoder or tone squelch	- [F] + [1] · T/SQL] 1 time to select “T” for tone encoder - [F] + [1] · T/SQL] 3 times to select “T SQL” for tone squelch	p. 22
ANI	[PGR/CS]	p. 24
Code for ANI	[F] + [PGR/CS · CODE]	p. 23
Time-out timer	SET mode	p. 28
Memory masking	While in MEMORY mode, [F] + [6] · MASK]	p. 18
Skip channel	While in MEMORY mode, [F] + [3] · SKIP]	p. 18
Output power level	[H/L]	—
Voice scrambler	[F] + [C] · SC]	—

■ MEMORY and VFO modes

During frequency indication, this transceiver has MEMORY mode and VFO mode.

MEMORY mode

Used for channel selection and channel contents confirmation. Each memory channel number corresponds to a channel number during channel indication.



VFO mode

Used for setting an operating frequency, etc.

■ Number of memory channels

The transceiver has 20 memory channels. However, by specifying blank channels, the usable memory channel number can be restricted. The blank channels do not appear during channel indication.

- ① Push [B] · MR/MW] to select MEMORY mode.
- ② Select a memory channel to be masked.
 - Channel 1 cannot be specified as a masked channel.
- ③ Push [F] + [6] · MASK].

◇ Canceling

- ① While pushing [F] rotate [DIAL] to select a masked channel.
- ② Push [F] + [6] · MASK].

■ Skip channel setting

Memory channels that you do not wish to scan can be specified as skip channels. This is useful to speed up the memory scan interval.

- ① Push [B] · MR/MW] to select MEMORY mode.
- ② Select a memory channel to be set as a skip channel.
 - Channels PA and Pb cannot be specified as skip channels.
- ③ Push [F] + [3] · SKIP] to set the channel as a skip channel.
 - "SKIP" appears.
- ④ Repeat step ③ to cancel skip channel setting.

■ Frequency transferring

Channel contents can be transferred into VFO. This is convenient for modifying channel contents.

- ① Push [B] · MR/MW] to select MEMORY mode.
- ② Select a memory channel.
- ③ Push and hold [F] + [A] · CLR/M>V] to transfer the memory channel's contents into VFO.

8

FREQUENCY SETTING

Using digit keys

- ① Push [A] · CLR] to select VFO mode.
- ② Input 6 digit keys starting from the 100 MHz digit.
 - When a digit is mistakenly input, push [A] · CLR].

[Example] Setting to 345.10 MHz.

SKIP
3



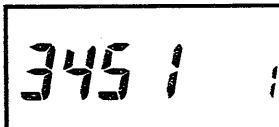
DUP
4



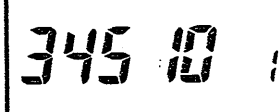
5



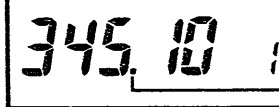
T/TSQ
1



CLOCK
0



CLOCK
0



A decimal point appears.

Using Δ/∇ keys

- ① Push [A] · CLR] to select VFO mode.
- ② Push [#] · Δ] or [*] · ∇] to set the frequency.
 - Frequency changes according to selected tuning step.

◇ Tuning step

Select a tuning step according to your area of operation.

- ① Push [A] · CLR] to select VFO mode.
- ② Push [F] + [8] · SET] to enter SET mode.
- ③ Push [#] · Δ] or [*] · ∇] several times until "TS" appears.
- ④ Rotate [DIAL] to select the desired tuning step.
 - 5, 10, 12.5, 15, 20, 25, 30 and 50 kHz steps are available.

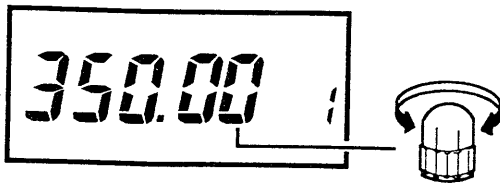


Initial setting before shipping: 25 kHz

- ⑤ Push [A] · CLR] or [PTT] to set the tuning step and to exit SET mode.

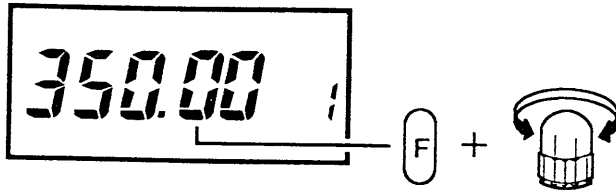
Using dial

- ① Push [A] • CLR to select VFO mode.
- ② Rotate [DIAL] to set the frequency.
 - Frequency changes according to the selected tuning step. (p. 19)



◇ Dial select step function

While pushing [F] and rotating [DIAL], a 100 kHz step is available. This is called the dial select step function.

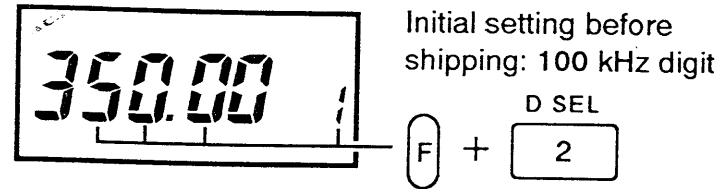


The dial select step function also offers 1 MHz or 10 MHz steps and memory channel number selection in VFO mode. Refer to "Dial select step pre-setting" at right.

◇ Dial select step pre-setting

For the dial select step function, select the 100 kHz, 1 MHz or 10 MHz digit. To program 2 or more channels, the channel number can be changed while in VFO mode, if required.

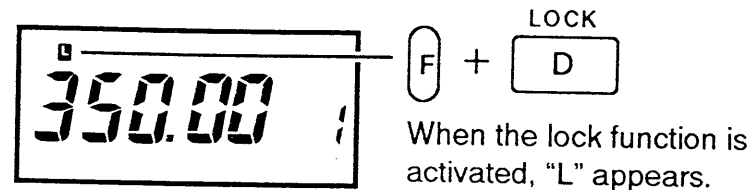
- ① Push [A] • CLR to select VFO mode.
- ② Push [F] + [2] • D SEL several times to select a blinking digit.



◇ Lock function

To prevent accidental frequency changes and unnecessary function access, the lock function electronically locks [DIAL], switches on the front panel and the keyboard.

Push [F] + [D] • LOCK to activate or cancel the lock function.



■ Offset direction

Semi-duplex means transmitting and receiving on different frequencies. Program semi-duplex for repeater operation, etc. On p. 17 “Programming outline” step ⑤, set the following:

- ① Select receive frequency.
- ② Referring to “Offset frequency” at right, select an offset frequency.
- ③ Push [F] + [④ • DUP] 1 or 2 times to select “– DUP” or “DUP” offset direction.



“– DUP” : Transmitting frequency shifts in a lower direction.
 “DUP” : Transmitting frequency shifts in a higher direction.

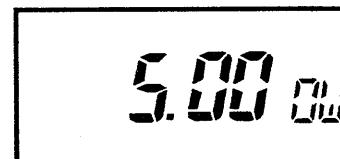
- ④ If a repeater or another station requires, activate the subaudible tone encoder or tone squelch function. (p. 22)

To select simplex, in step ③ above, push [F] + [④ • DUP] 1 or 2 times until “DUP” or “– DUP” disappears.

■ Offset frequency Using SET mode

The difference between the transmit and receive frequencies is called the offset frequency. Select an offset frequency that matches the repeater, etc. for each channel.

- ① Push [F] + [⑧ • SET] to enter SET mode.
- ② Push [⊕ • Δ] or [⊗ • ∇] several times until “OW” appears.
- ③ Rotate [DIAL] to select the offset frequency.
 - Selectable frequency step is the same as the tuning step. (p. 19)
 - To change in 100 kHz steps, while pushing [F], rotate [DIAL].



Initial setting before shipping: 5 MHz

- ④ Push [PTT] or [Ⓐ • CLR] to set the offset frequency and to exit SET mode.

After programming, this setting can be modified, if required.

- ① Select MEMORY mode.
- ② Select a memory channel to be modified.
- ③ Perform steps ①–④ above.

Required optional unit

Install an optional UT-86 TONE SQUELCH UNIT or UT-88 VOICE SCRAMBLER UNIT in advance. (p. 34)

Subaudible tone encoder

This function allows you to access a repeater that requires a subaudible tone frequency. On p. 17 "Programming outline" step ⑤, set the following:

- ① Push [F] + [① • T/SQL] 1 time to activate the subaudible tone encoder function.
 - "T" appears.
- ② Set a transmit tone frequency as at right.

Tone squelch

This function allows you to silently wait for a call from group members that use the same subaudible tone frequency. On p. 17 "Programming outline" step ⑤, set the following:

- ① Push [F] + [① • T/SQL] 3 times to activate the tone squelch function.
 - "T SQL" appears.
- ② Set receive and transmit tone frequencies as at right.

Tone frequency Using SET mode

Program a transmit tone frequency for each channel. For the tone squelch, also program a receive tone frequency.

- ① Push [F] + [⑧ • SET] to enter SET mode.
- ② Push [# • Δ] or [* • ▽] several times until "rC" appears.
- ③ Rotate [DIAL] to set a receive tone frequency.



Initial setting of receive tone frequency before shipping: 88.5 Hz

- ④ Push [# • Δ] 1 time to select "TC."
- ⑤ Rotate [DIAL] to set a transmit tone frequency.



Initial setting of transmit tone frequency before shipping: 88.5 Hz

- ⑥ Push [PTT] or [A • CLR] to set the transmit and receive tone frequencies and to exit SET mode.

After programming, this setting can be modified, if required.

- ① Select MEMORY mode.
- ② Select a channel to be modified.
- ③ Perform steps ① – ⑥ above.

11 ANI SETTINGS

■ ANI setting outline

◇ Function availability

The ANI, pager and code squelch functions are available for ANI versions only.

While in channel indication, the ANI function is available. While in frequency indication, the pager and code squelch are available instead of the ANI function. Refer to pgs. 30 – 31 for the pager and code squelch operation.

◇ Required settings

For ANI operation, the following settings are required.

- Set a receive code and up to 5 transmit codes. Refer to “Code setting” below.
- Set the ANI function and a transmit code channel number into each memory channel. Refer to p. 24 “Code channel number setting.”

■ Code setting

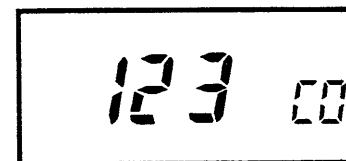
A receive code **MUST** be programmed into code channel C0. Up to 5 transmit codes are programmable into code channels C1 – C5, if required.

- ① Push [F] + [PGR/CS • CODE] to select the setting display.
 - “CP,” or “C0” – “C5” appears.

- ② Rotate [DIAL] to select code channel C0.
 - A receive code **MUST** be programmed into each transceiver.

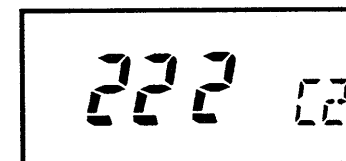


- ③ Push 3 digit keys to set a receive code.
 - When a digit is mistakenly input, push [A • CLR], then input again.



The display shows code channel C0 is programmed for 123.

- ④ Rotate [DIAL] to select a transmit code channel from C1 – C5.
- ⑤ Push 3 digit keys to set a transmit code.



The display shows code channel C2 is programmed for 222.

- ⑥ To set another transmit code channel, repeat steps ④ – ⑤.
- ⑦ Push [A • CLR] to exit the setting display.

◇ **Code channel assignment for ANI**

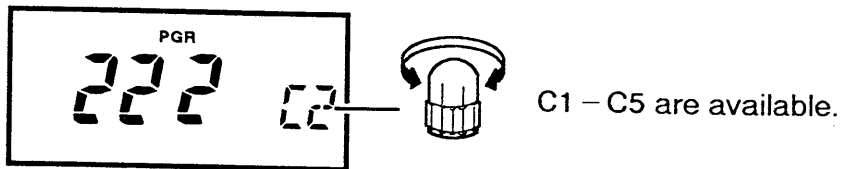
For ANI operation, program the following code channels.

Code channel	Assigned code	Code function
C0	Receive code	3-digit ID code for the transceiver.
C1 – C5	Transmit code	3-digit ID code for another party's transceiver. Calling station transmits this code to call a desired station.

■ **Code channel number setting**

After code setting, set a code channel number for a memory channel. On p. 17 "Programming outline" step ⑤, set the following:

- ① Push [A] • CLR] to select VFO mode.
- ② Push [PGR/CS • CODE] 1 time.
- ③ Push [F] + [PGR/CS • CODE] to select the setting display.
- ④ Rotate [DIAL] to select a transmit code channel.

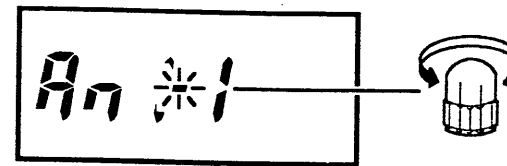


- ⑤ Push [A] • CLR] to exit the setting display.

■ **ANI delay time setting**

To call a scanning station, ANI code transmitting must be delayed after pushing [PTT]. The ANI delay time allows a called station to detect the ANI code completely.

- ① Select channel indication. (p. 14)
- ② Turn the power OFF.
- ③ While pushing [8] • SET] turn the power ON.
 - "AnI" appears.
- ④ Rotate the tuning dial to select an ANI delay time.
 - 1 – 6 sec. are available.



- ⑤ Push [8] • SET] to set the ANI delay time and to exit the setting display.

NOTE: Set an ANI delay time according to number of used channels. A longer ANI delay time provides more reliable calling, however a longer calling time is required. After actual communication testing, select a minimum-required ANI delay time.

FREQ.

12 DTMF MEMORY SETTINGS

DTMF memory setting

For auto dialing, 11 DTMF memory channels are independently available from memory channels.

- ① Push [F] + [DTMF • CODE] to enter DTMF MEMORY mode.
 - A DTMF memory channel appears.
- ② Rotate [DIAL] to select a DTMF memory channel.
 - DTMF memory channels T0 – T9 and TA are available.
- ③ Push [F] + [8 • SET].
- ④ Push keys in sequence for a DTMF code.
 - Up to a 32-digit telephone number, etc. can be memorized.
 - On the function display, “E” and “F” stand for “*” and “#.”
- ⑤ Push [DTMF] to set the DTMF code.
- ⑥ Push [A • CLR] to exit DTMF MEMORY mode.

DTMF memory transmitting



◇ During channel indication

Refer to p. 10 “DTMF code transmitting.”

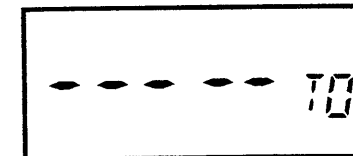
◇ During frequency indication

- ① Push [F] + [DTMF • CODE].
- ② Rotate [DIAL] to select a DTMF memory channel.
- ③ Push [A • CLR] to exit to the previous mode.
- ④ While pushing [PTT], push [DTMF] to transmit the DTMF memory channel contents.

[Example] Setting “21ABC38” into DTMF memory channel T4.

Push  + 

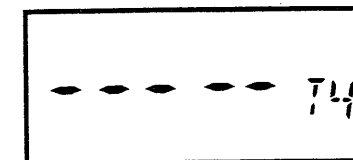
to select DTMF MEMORY mode.





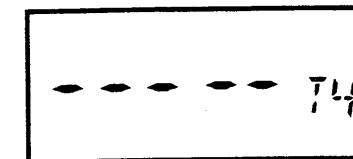
Rotate










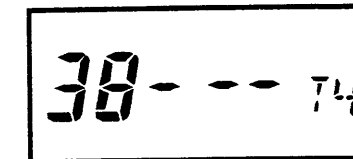
to select DTMF memory channel T4.




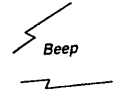
Push  + 

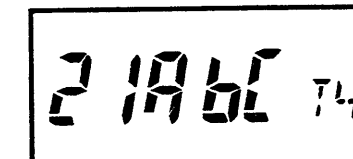



Push    
  

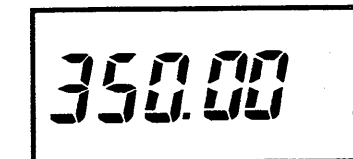


Push 


1 beep may sound.



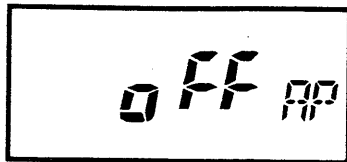
Push  to exit to the previous operating mode.



■ Auto power-off setting

The transceiver automatically turns the power OFF after a selected period in which no switches, keys or [DIAL] are operated.

- ① Push [F] + [9 • TIMER] to select TIMER mode.
- ② Push [# • Δ] or [* • ▽] several times until "AP" appears.
- ③ Rotate [DIAL] to set the auto power-off period or cancel the function.
 - 20, 40 or 60 min. is available. To cancel the function, select "oFF."



Initial setting before shipping:
"oFF."

- ④ Push [A • CLR] or [PTT] to exit TIMER mode.

◇ Auto power-off operation

When the set period passes, the power is automatically turned OFF with 5 beeps.

Even when the transceiver is automatically turned OFF, the selected period is retained. To cancel the function, select "oFF" in step ③ above.

■ Power-on timer setting

While the auto power-off or power-off timer is activated (power-off condition), the power-on timer turns the power ON when the specified time arrives. After the power is turned ON, the timer setting is retained or cancelled, depending on the indication type. (p. 27)

- ① Push [F] + [9 • TIMER] to select TIMER mode.
- ② Push [# • Δ] or [* • ▽] several times until "on" appears.
- ③ Rotate [DIAL] clockwise.
 - "–" appears and the power-on timer is set to effective.
- ④ Set the power-on time.
 - Push [F] + [8 • SET], then rotate [DIAL] to set the hour digits using the 24-hour system.
 - Push [# • Δ] or [* • ▽], then rotate [DIAL] to set the minute digits.
 - Push [A • CLR].



When the power-on time is 15:25.

"–" shows that power-on timer is set to effective.

- ⑤ Push [A • CLR] to exit TIMER mode.

To cancel the power-on timer, in step ③ above, rotate [DIAL] counterclockwise to cancel "–."

13 TIMER SETTINGS

■ Power-off timer setting

When the specified time arrives, the power-off timer turns the power OFF. After power is turned OFF, the timer setting is retained or canceled, depending on the indication type. Refer at right.

- ① Push [F] + [9] • [TIMER] to select TIMER mode.
- ② Push [⊕] • [Δ] or [⊗] • [▽] several times until "OF" appears.
- ③ Rotate [DIAL] clockwise.
 - "—" appears and the power-off timer is set to effective.
- ④ Set the power-off time.
 - Push [F] + [8] • [SET], then rotate [DIAL] to set the hour digits using the 24-hour system.
 - Push [⊕] • [Δ] or [⊗] • [▽], then rotate [DIAL] to set the minute digits.
 - Push [A] • [CLR].



When the power-on time is 23:40.

"—" shows that power-off timer is set to effective.

- ⑤ Push [A] • [CLR] to exit TIMER mode.

To cancel the power-off timer, in step ③ above, rotate [DIAL] counterclockwise to cancel "—."

■ Power-on/off timer operations

◇ Timer effectiveness

The power-on and power-off timer operations differ depending on the selected indication type.

Channel indication	Retained even after the specified times. The power-on/off timers operate everyday.
Frequency indication	Canceled after the specified times.

◇ Power-on timer operation

For power-on timer operation, the transceiver must be in the power-off condition. The power-off condition means that [VOL] is set as power ON, but the transceiver is turned OFF by the power-off timer or auto power-off.

While in frequency indication, the power-off condition can be set manually, if the power-on timer is set effective.

- ① Push [F] + [9] • [TIMER] to select TIMER mode.
- ② Push and hold [F] + [9] • [TIMER] to set the power-off condition.

◇ Manual power ON

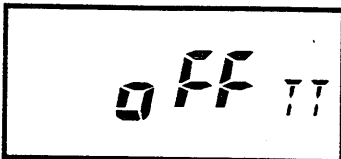
While the power-off condition, to turn the power ON manually, rotate [VOL] counterclockwise until a click sounds, then turn clockwise.

Time-out timer setting

Using SET mode

The time-out timer prevents prolonged communication periods, if required. A time-out time is independently programmable for each channel. On p. 17 "Programming outline" step ⑤, set the following:

- ① Push [F] + [8] • SET to enter SET mode.
- ② Push [#] • Δ or [X] • ▽ several times until "TT" appears.
- ③ Rotate [DIAL] to select a time-out time.
 - 1 – 30 min. are available. To cancel the time-out timer, select "oFF."



Initial setting before shipping: "oFF"

- ④ Push [PTT] or [A] • CLR to set the time-out timer and to exit SET mode.

After programming, this setting can be modified, if required.

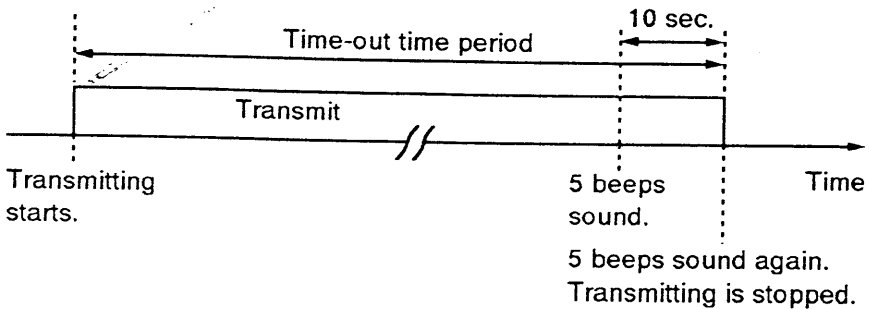
- ① Select MEMORY mode.
- ② Select a channel to be modified.
- ③ Perform steps ① – ④ above.

Time-out timer operation

Time-out timer operation varies depending on whether the ANI function is programmed for the channel or not.

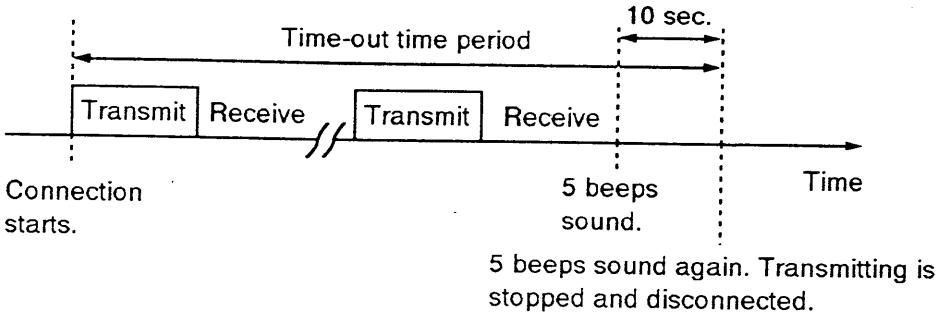
During non-ANI operation

If [PTT] is continuously pushed, when the programmed period arrives, transmitting is stopped.



During ANI operation

After connecting to another party's transceiver, when the programmed period arrives, transmitting is stopped and disconnected.



FREQ.

14 OTHER SETTINGS

■ Fixed squelch

The fixed squelch function eliminates the need for [SQL] adjustment. The squelch opens only when a strong-enough signal is received.

- ① Turn the power OFF.
- ② While pushing [①] + [④] + [⑦] + [⊗], turn the power ON to activate the fixed squelch function.

◇ Cancelling

- ① Turn the power OFF.
- ② While pushing [②] + [⑤] + [⑧] + [⊙], turn the power ON to cancel the fixed squelch level function.

■ Temporary fixed squelch

The temporary fixed squelch function eliminates the need for [SQL] adjustment during programming.

- ① Turn the power OFF.
- ② While pushing [ⓓ], turn the power ON to activate the temporary fixed squelch function.

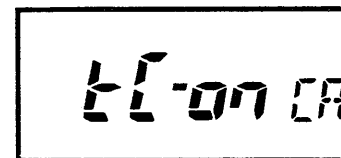
When the power is turned OFF and ON again, the temporary fixed squelch function is cancelled.

■ Busy detection

Using SET mode

This function electronically inhibits transmitting while the transmit/busy indicator lights up in green. On p. 17 “Programming outline” step ⑤, set the following:

- ① Select MEMORY mode.
- ② Select a channel to be set the busy detection condition.
- ③ Push [F] + [⑧ • SET] to enter SET mode.
- ④ Push [⊕ • Δ] or [⊗ • ∇] several times until “CA” appears.
- ⑤ Rotate [DIAL] to select a busy detection condition.
 - “tC-on” : Transmitting is inhibited while the transmit/receive indicator lights up in green.
 - “tC-oF” : Transmitting is permitted even while the transmit/receive indicator lights up in green.



Initial setting before shipping:
“on”

- ⑥ Push [PTT] or [Ⓐ • CLR] to set the busy detection condition and to exit SET mode.

/// **NOTE:** This function is effective while in channel indication only.

■ Code channel programming for pager and code squelch

◇ Before programming

The pager and code squelch functions require ID codes and a group code. These codes are 3-digit DTMF codes and must be written into the code channels before operation.

◇ Code channel assignment for pager

ID or group code	Code channel number	"Receive accept" or "receive inhibit"
Your ID code	C0	"Receive accept" only.
Another parties' ID code	C1–C5	"Receive inhibit" should be programmed in each channel.
Group code	One of C1–C5	"Receive accept" must be programmed.
Memory space*	CP	"Receive inhibit" only.

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

◇ Code setting

Refer to p. 23 "Code setting."

◇ "Receive accept" or "receive inhibit"

On p. 23 "Code setting" after step ⑤, push [F] + [③ • SKIP] to specify the code channel as "receive inhibit" or "receive accept."

Code channels C1–C5 should be effectively programmed as "receive accept" or "receive inhibit."

- "Receive accept"
"SKIP" disappears. Accepts pager calls when the transceiver receives a signal with a code the same as that in the code channel.
- "Receive inhibit"
"SKIP" appears. Rejects calls even when the transceiver receives a signal with a code the same as that in the code channel.

[Example]

The code channel that stores the group code should be programmed as "receive accept." Otherwise, you cannot receive a group code.

The code channels that store other parties' ID codes for a transmit code should be programmed as "receive inhibit." Otherwise, personal calls for parties other than yours are received.

15 FUNCTIONS DURING FREQUENCY INDICATION

■ Pager operation

During frequency indication, the pager function is available instead of the ANI function. This function can be used as a “message pager” to inform you of a caller’s ID code even if you leave the transceiver temporarily.

Personal calls and group calls are available. Personal calls use the receiving party’s ID code. Using a group code, you can call all stations in your group.

◇ Calling a specific station

- ① Push [PGR/CS] 1 time.
 - “PGR” appears.
- ② Push [F] + [PGR/CS • CODE].
- ③ Rotate [DIAL] to select a transmit code channel from C1 – C5.
- ④ Push [A • CLR] to exit to previous mode.
- ⑤ Push [PTT] to transmit the pager code.
- ⑥ Wait for an answer back.
 - When an answer back code is received, the other party’s ID or a group code appears.
- ⑦ After confirming a connection, push [PTT] to display the operating frequency.
- ⑧ Push [PGR/CS] 1 time to activate the code squelch function or 2 times to cancel the pager function.

◇ Waiting for a call from a specific station

- ① Push [PGR/CS] 1 time.
 - “PGR” appears.
- ② Wait for an answer back.
 - When receiving a call, the other party’s ID or a group code appears.
- ③ Push [PTT] to send an answer back.
- ④ Push [PGR/CS] 1 time to activate the code squelch function or 2 times to cancel the pager function.

■ Code squelch operation

During frequency indication, the code squelch function is available. The code squelch provides communication with silent standby, since the transceiver receives calls only from stations which know your ID code or group code.

- ① Push [PGR/CS] 2 times.
 - “C SQL” appears.
- ② Push [F] + [PGR/CS • CODE].
- ③ Rotate [DIAL] to select a code channel from C1-C5.
- ④ Operate the transceiver in the normal way.
 - Prior to voice transmission, a 3-digit code is transmitted to open the receiving station’s code squelch.
- ⑤ To cancel the code squelch, push [PGR/CS] 1 time.

■ Scan during frequency indication

◇ Scan types

4 types of scan functions are available.

Full scan	Repeatedly scans over the entire operating frequency range.
Programmed scan	Repeatedly scans frequencies between 2 specified frequencies.
Memory scan	Repeatedly scans memory channels, except for masked channels, in sequence.
Memory skip scan	Repeatedly scans memory channels except for masked channels and skip channels, in sequence.

◇ Scan operations

- ① Program channels in advance, if required.
 - Programmed scan: Scan edge frequencies into scan edge channels PA and Pb.
 - Memory scan or memory skip scan: Memory channels.
- ② Select mode.
 - Full scan or programmed scan: Select VFO mode.
 - Memory scan or memory skip scan: Select MEMORY mode.
- ③ Start scan.
 - Full scan or memory scan: Push and hold [# · Δ/SCAN] or [⊗ · ▽/SCAN]

- Programmed scan or memory skip scan: Push [F] + [# · Δ/SCAN] or [F] + [⊗ · ▽/SCAN].

• To change the scanning direction, rotate [DIAL].

- ④ Push [# · Δ/SCAN], [⊗ · ▽/SCAN] or [A · CLR] to cancel.

◇ Scan resume condition

Using *SET mode*

The scan resume condition can be selected, if required.

- ① Push [F] + [8 · SET] to enter SET mode.
- ② Push [# · Δ] or [⊗ · ▽] several times until "SD" appears.
- ③ Rotate [DIAL] to select a scan resume condition.

"t-EP"	Scan pauses on non-busy channels. When receiving a signal, scan resumes 2 sec. after that.
"t-05," "t-10" or "t-15"	When receiving a signal, scan pauses, then resumes 5, 10 or 15 sec. after that.
"P-02"	Scan pauses until the signal disappears and then resumes 2 sec. after that.

- ④ Push [PTT] or [A · CLR] to set the scan resume condition and exit SET mode.

◇ During channel indication

Scan resumes in "P-02" condition.

15 FUNCTIONS DURING FREQUENCY INDICATION

■ Power saver

Using *SET mode*

During standby, the power saver function reduces the current drain for battery conservation. The power saver duty cycle can be selected, if required.

- ① Push [F] + [8] • SET] to enter SET mode.
- ② Push [# • Δ] or [⊗ • ▽] several times until "PD" appears.
- ③ Rotate [DIAL] to select a power saver condition.

"1-32"	Circuit ON 70 msec. , circuit OFF 2.24 sec.
"1-8"	Circuit ON 70 msec. , circuit OFF 560 msec.
"1-2"	Circuit ON 70 msec. , circuit OFF 140 msec.
"oFF"	The power saver is cancelled.

- ④ Push [PTT] or [A] • CLR] to set the power saver and to exit SET mode.

◇ During channel indication operation

Even when "1-32," "1-2" or "oFF" is selected, the power saver operates in the "1-8" condition. While the ANI function is selected, the duty cycle automatically becomes circuit ON 70 msec., circuit OFF 70 msec.

◇ During pager or code squelch operation

The same duty cycle while the ANI function is selected as described "During channel indication operation" above.

■ Pocket beep

This function uses a subaudible tone for calling and alerts an operator to received signal. This function is effective during frequency indication only, and is not programmable into a channel.

◇ Required optional unit

Install an optional UT-86 TONE SQUELCH UNIT or UT-88 VOICE SCRAMBLER UNIT in advance. (p. 34)

◇ Waiting for a call from another station

- ① If "C SQL" or "PGR" appears, push [PGR/CS] 1 or 2 times to cancel them.
- ② Set the operating frequency.
- ③ Set receive and transmit tone frequencies. (p. 22)
- ④ Push [F] + [1] • T/SQL] 2 times to activate the pocket beep function.
 - "T SQL ((•))" appears.
- ⑤ When a matched subaudible tone frequency is received, beep tones sound for 30 sec. and "((•))" blinks.
- ⑥ Push [PTT] to answer back or push [A] • CLR].
 - The beep tones and "((•))" blinking stop, then the tone squelch function is automatically activated.

◇ Calling a waiting station

Select a transmit tone frequency matched with the waiting station. Use the tone squelch function. (p. 22)

OPTIONAL UNIT INSTALLATIONS 16

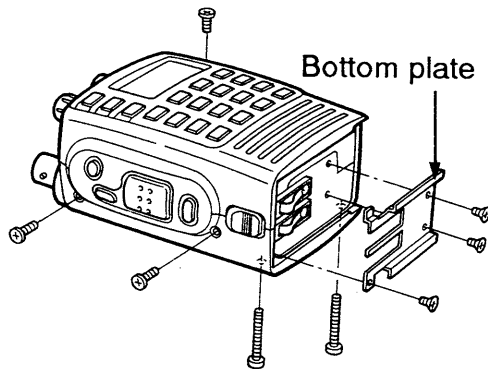
Either the UT-86 or UT-88 can be installed.

UT-86 TONE SQUELCH UNIT	Provides the subaudible tone encoder, tone squelch and pocket beep functions.
UT-88 VOICE SCRAMBLER UNIT	Provides the UT-86's functions and voice scrambler function.

- ① Turn the power OFF, then remove the battery pack.
- ② Unscrew the 5 screws from the rear and side panels. Unscrew the 3 screws from the bottom plate, if required.
 - The bottom plate need not to be removed. However, when removed, disassembly may be easier.

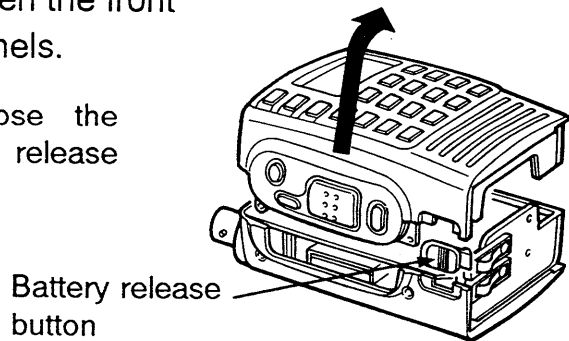
CAUTION:

Use a Phillips screw driver that matches the screw size. Otherwise, you may strip the screw head.

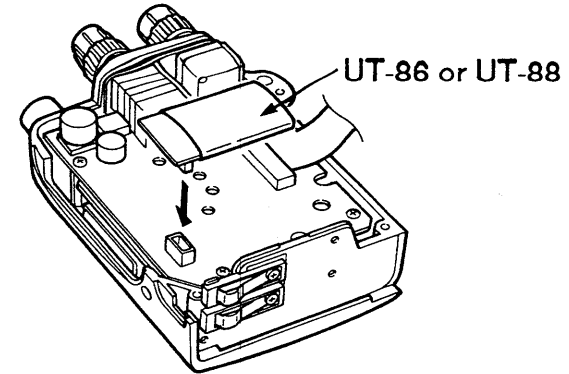


- ③ Carefully open the front and rear panels.

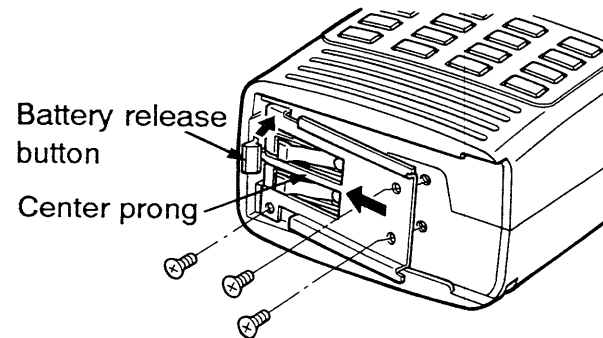
DO NOT lose the battery pack release button.



- ④ Plug in either the UT-86 or UT-88.



- ⑤ Reassemble the front panel and bottom plate.
 - Be sure the center prong is inserted into the ridge of the battery pack release button.



◆ **Selectable tone frequencies**

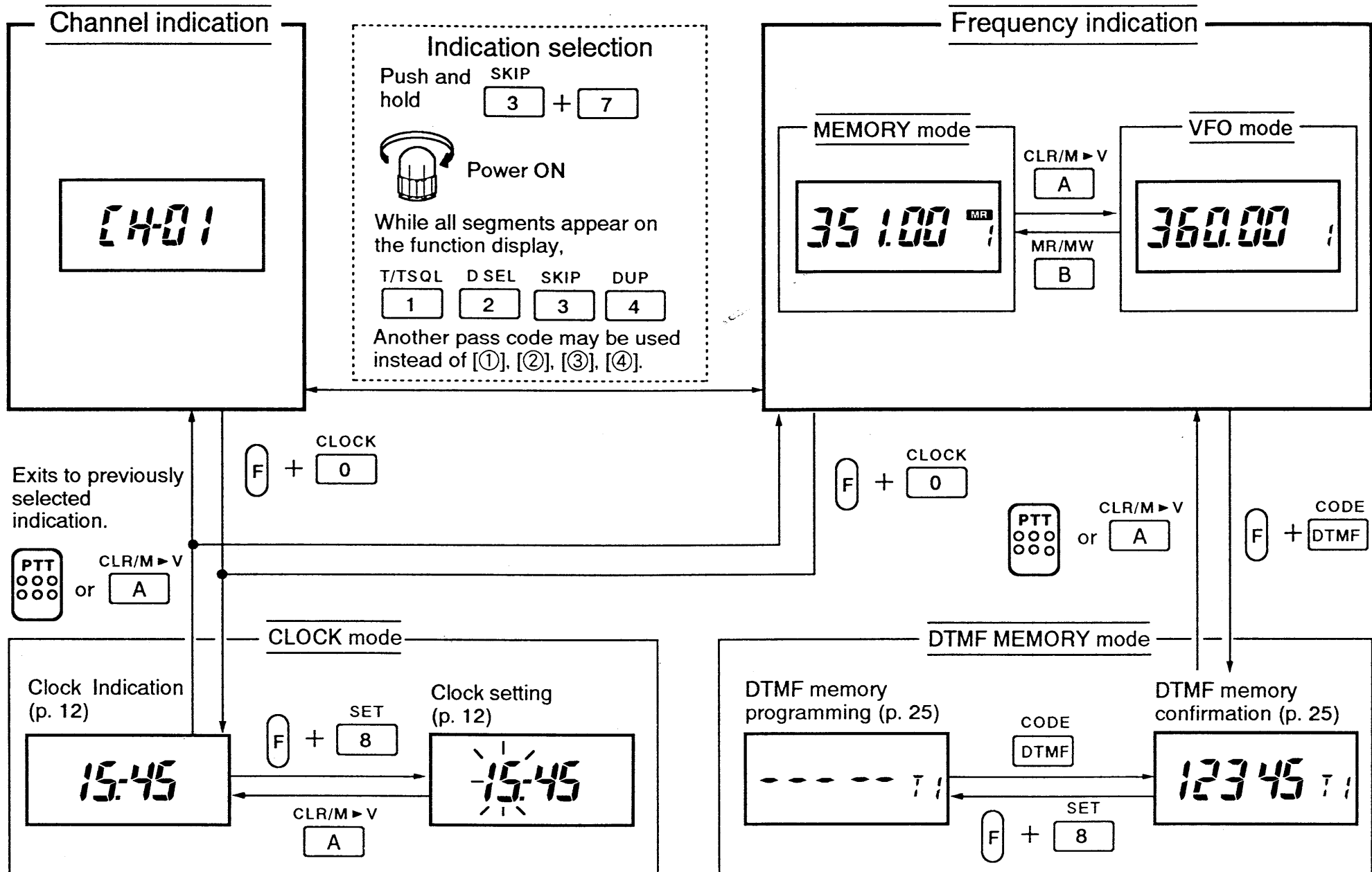
Refer to p. 22 "Tone frequency" for programming.

67.0	85.4	103.5	127.3	156.7	192.8	241.8
71.9	88.5	107.2	131.8	162.2	203.5	250.3
74.4	91.5	110.9	136.5	167.9	210.7	
77.0	94.8	114.8	141.3	173.8	218.1	
79.7	97.4	118.8	146.2	179.9	225.7	
82.5	100.0	123.0	151.4	186.2	233.6	

Unit: Hz

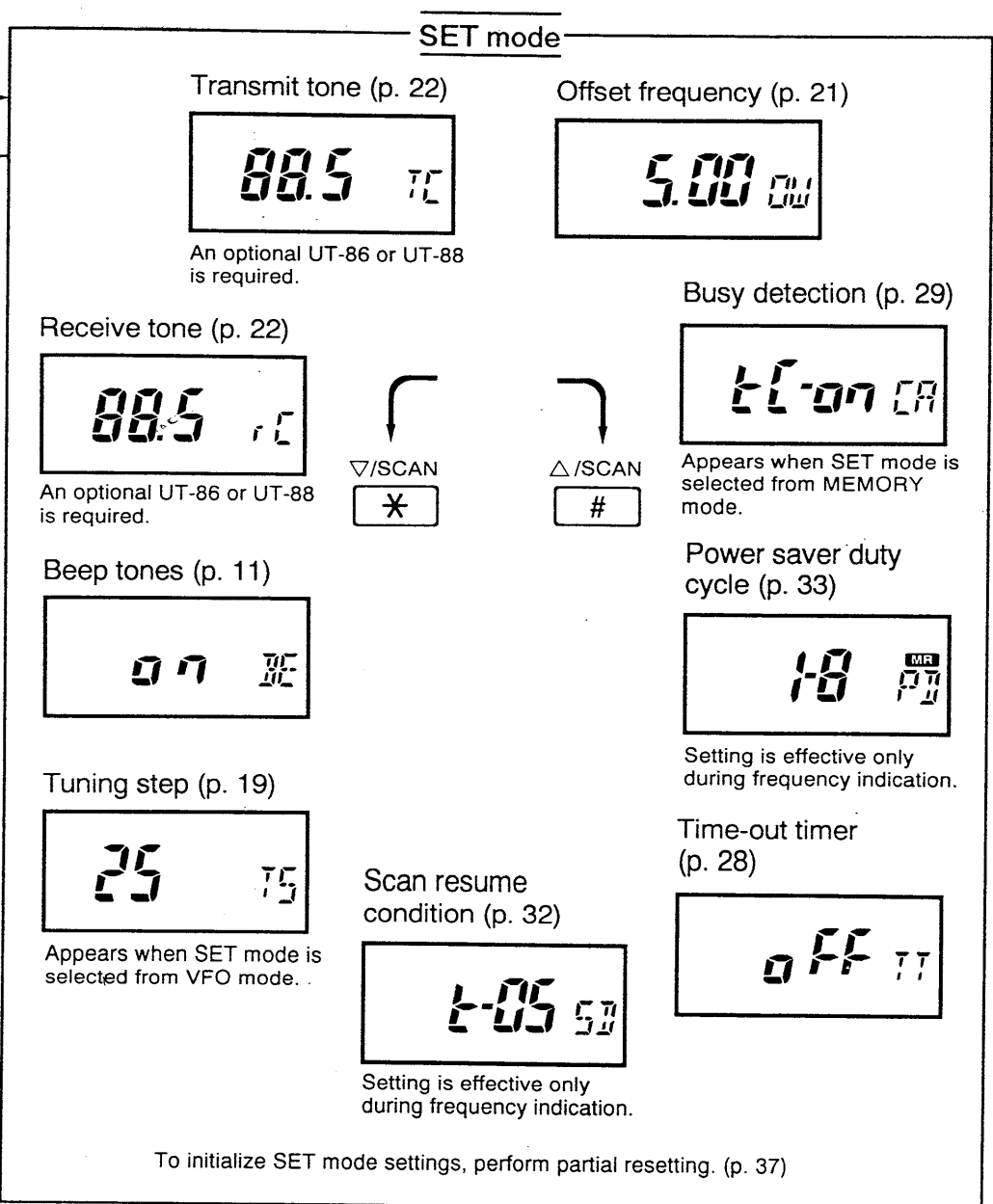
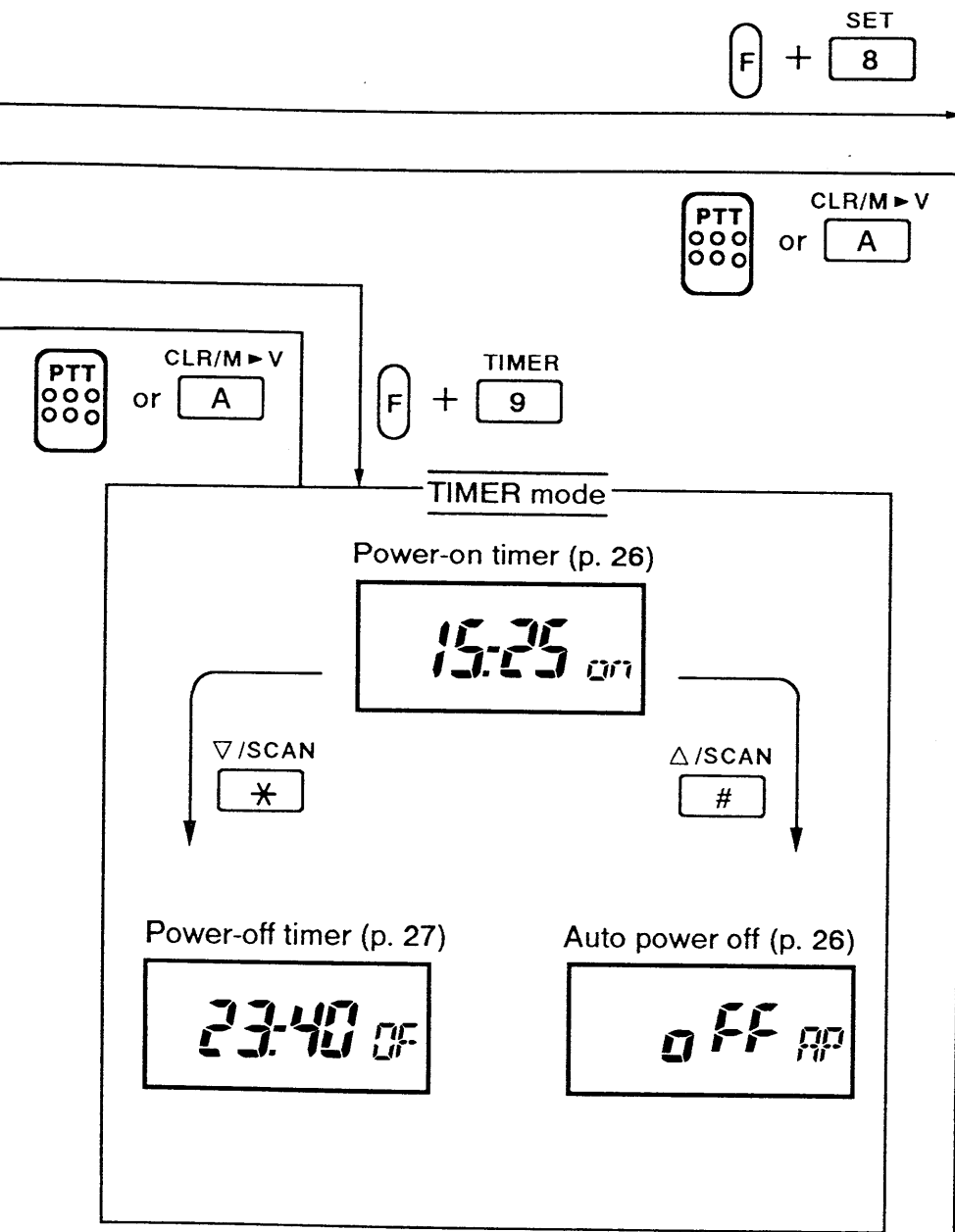
FREQ.

MODE ARRANGEMENT CHART



MODE ARRANGEMENT CHART 17

FREQ.



18 TROUBLESHOOTING

Problem	Possible cause	Solution	Ref.
<ul style="list-style-type: none"> No sound comes from the speaker. 	<ul style="list-style-type: none"> Incorrect receive code is programmed for the ANI function. Incorrect receive tone frequency is programmed for the tone squelch function. The fixed squelch function is programmed. 	<ul style="list-style-type: none"> Correct the receive codes. Correct the receive tone frequency. While pushing [2] + [5] + [8] + [0] turn the power ON to cancel the fixed squelch function. 	<p>p. 23</p> <p>p. 22</p> <p>p. 29</p>
<ul style="list-style-type: none"> The time-out timer does not operate. 	<ul style="list-style-type: none"> The time-out time is not programmed for the channel. 	<ul style="list-style-type: none"> Program the time-out time for all desired channels. 	<p>p. 28</p>
<ul style="list-style-type: none"> The ANI function does not operate. 	<ul style="list-style-type: none"> Incorrect transmit code is programmed. Incorrect code channel number is programmed in a memory channel. 	<ul style="list-style-type: none"> Correct the transmit code. Correct the code channel number for the memory channel. 	<p>p. 23</p> <p>p. 24</p>
<ul style="list-style-type: none"> Channel cannot be set. 	<ul style="list-style-type: none"> The lock function is activated. 	<ul style="list-style-type: none"> Push [F] + [D · Lock] to cancel the lock function. 	<p>p. 20</p>
<ul style="list-style-type: none"> Some memory channels cannot be used. 	<ul style="list-style-type: none"> The memory channels are masked. 	<ul style="list-style-type: none"> Cancel memory masking. 	<p>p. 18</p>
<ul style="list-style-type: none"> Repeater cannot be accessed. 	<ul style="list-style-type: none"> Incorrect offset frequency is selected. Incorrect transmit tone frequency is programmed. 	<ul style="list-style-type: none"> Correct the offset frequency. Correct the transmit tone frequency. 	<p>p. 21</p> <p>p. 22</p>
<ul style="list-style-type: none"> Scan cannot be started. 	<ul style="list-style-type: none"> The squelch is open. 	<ul style="list-style-type: none"> Rotate [SQL] clockwise. 	<p>—</p>

◇ Partial resetting

Partial resetting initializes VFO and SET mode settings only. All memory channels and the call channel contents remain unchanged. To perform partial resetting, while pushing [A], turn the power ON.

◇ Total resetting

CAUTION: Total resetting clears and initializes all channel settings. Only when the internal CPU malfunctions, while pushing [F] + [A] + [C], turn the power ON. After total resetting, program the transceiver again. Total resetting is possible during frequency indication only.

SPECIFICATIONS 19

FREQ.

General	Frequency coverage		326–366 MHz*	
				*According to versions, specifications are guaranteed 326–346 MHz or 346–366 MHz.
	Max. frequency separation		20 MHz	
	Tuning steps		5, 10, 12.5, 15, 20, 25, 30 or 50 kHz	
	Dial select steps		100 kHz, 1 MHz or 10 MHz	
	Number of channels		20	
	DTMF memory channels		11 (up to 32 digits each)	
	Mode		FM (16K0F3E)	
	Antenna impedance		50 Ω (nominal)	
	Usable battery pack, case		BP-130A, BP-132A, BP-157A, BP-160	
	External DC power		6–16 V DC (negative ground)	
	Current drain (at 13.5 V, typical)	Transmit	High	2.5 A
			Low	950 mA
		Receive	Max. audio	250 mA
			Power saved	Avg. 35 mA
	Usable temperature range		– 10 °C to + 60 °C + 14 °F to + 140 °F	
Dimensions (with BP-130A)		57(W) × 125(H) × 35(D) mm 2.2(W) × 4.9(H) × 1.4(D) in (projections not included)		
Weight (with flexible antenna, BP-130A and cells)	Non-ANI version	340 g; 12.0 oz		
	ANI version	345 g; 12.2 oz		

Transmitter	Output power*	13.5 V	High 5 W	Low 500 mW	
		9 V	High 1 W	Low 500 mW	
	Modulation system		Variable reactance frequency modulation		
	Max. freq. deviation*		± 5 kHz		
	Spurious emissions*		Less than – 60 dB		
External microphone impedance		2.2 kΩ			

Receiver	Receive system		Double-conversion superheterodyne		
	Intermediate frequencies	1st	35.8 MHz		
		2nd	455 kHz		
	Sensitivity*		Less than 0.18 μV (for 12 dB SINAD)		
	Squelch sensitivity		Less than 0.16 μV (at threshold)		
	Selectivity		More than 15 kHz/ – 6 dB Less than 30 kHz/ – 60 dB		
	Spurious rejection ratio*		More than 40 dB More than 35dB (at IF/2)		
	Audio output power* (at 13.5 V)		More than 300 mW (at 10% distortion with an 8 Ω load)		
Audio output impedance		8 Ω			

* Specifications guaranteed at a transceiver temperature of +25°C (+77°F).

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

20 OPTIONS

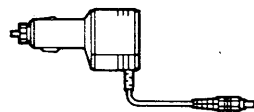
◇ Battery packs and chargers

Battery pack	Height	Voltage	Capacity	Approx. operating period*	Carrying case
BP-130A	50 mm; 2.0 in	Battery case R6 (AA) size × 6		Depends on batteries	LC-116
BP-132A	78.2 mm; 3.1 in	12.0 V	600 mAh	5 h 10 m	LC-117
BP-157A	50 mm; 2.0 in	7.2 V	900 mAh	7 h 10 m	LC-116
BP-160	50 mm; 2.0 in	7.2 V	700 mAh	5 h 30 m	LC-116

*Transmitting at high power for 1 min., receiving for 1 min. and standby for 8 min.

CP-13/L

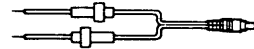
**CIGARETTE LIGHTER
CABLE WITH NOISE FILTER**
For operation and charging
with a 12 V cigarette lighter
socket.



- CP-13:
straight plug
- CP-13L:
"L"-shaped plug

OPC-288/L

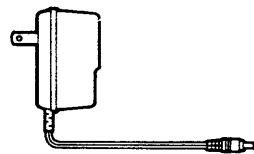
DC POWER CABLE
For operation and charging
with a DC power supply.
- Operation 6 - 16 V DC
- Charging 12 - 16 V DC



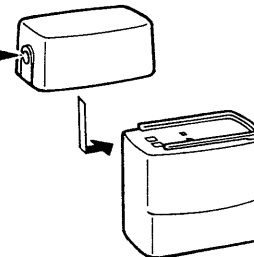
- OPC-288:
straight plug
- OPC-288L:
"L"-shaped plug

BC-77A/E/D/V

WALL CHARGER
Regularly charges a battery
pack.



AD-25 BATTERY CHARGE ADAPTER



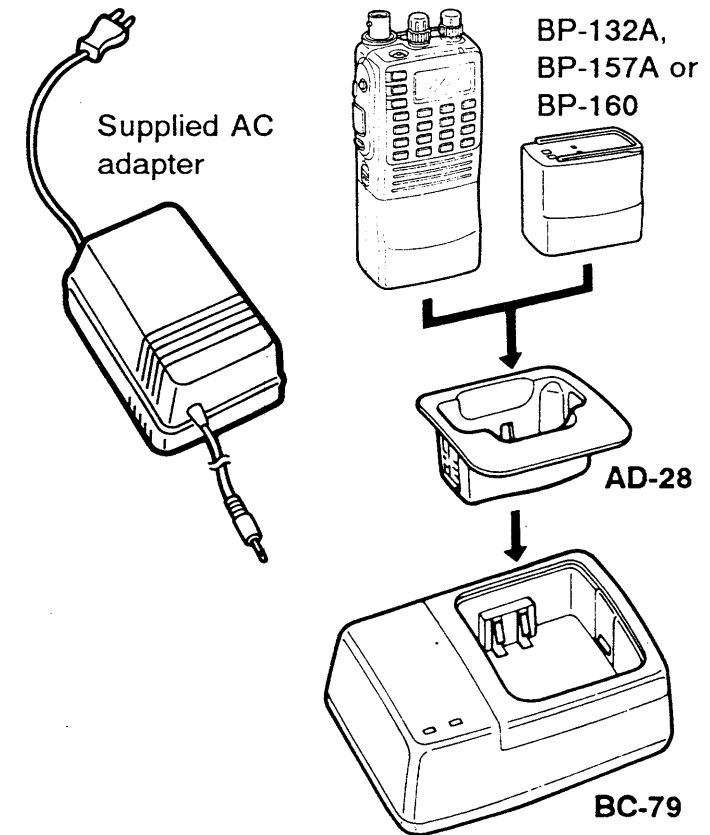
- BP-132A, BP-157A or
BP-160
- Ni-Cd batteries in
BP-130A

Approx. charging period

- BP-130A, BP-157A,
BP-160: 15 hrs.
- BP-132A: 20 hrs.

BC-79 DESKTOP CHARGER

+ AD-28 BATTERY PACK ADAPTER

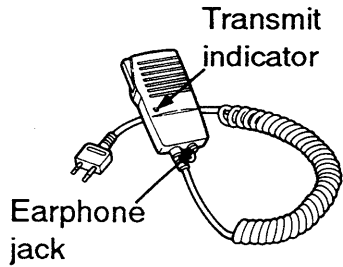


- Approx. charging period
 - BP-157A, BP-160 : 1 hr.
 - BP-132A: 1.5 hrs.
- An AC adapter is packed with the BC-79.
- The CP-13/L or OPC-288/L can be used
instead of the supplied AC adapter.

◆ **Speaker-microphones and headset**

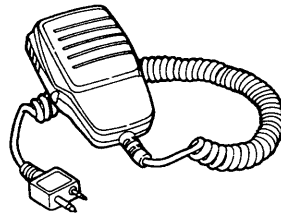
HM-46 SPEAKER-MICROPHONE

Compact and lightweight.

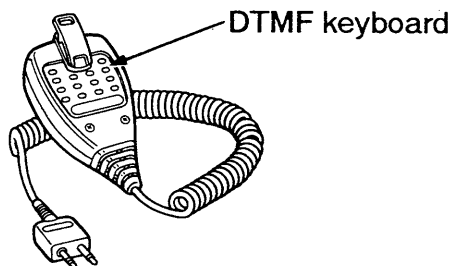


HM-54 SPEAKER-MICROPHONE

Durable and full-sized.

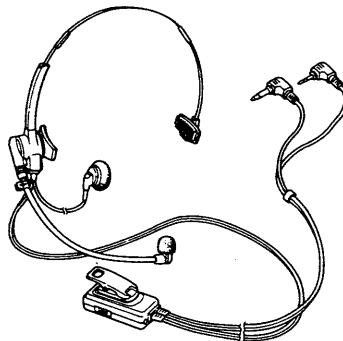


HM-55 DTMF SPEAKER-MICROPHONE



HS-51 HEADSET

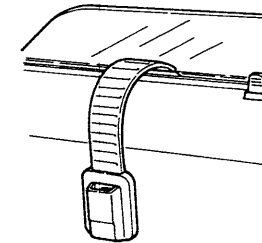
Allows you hands-free operation. Includes a VOX, PTT switch and "one-touch" PTT (time-out-timer).



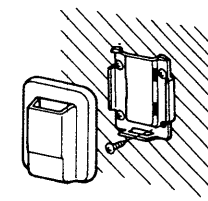
MB-30 MOUNTING BRACKET

Mounts the IC-GW1 in a vehicle or on a wall.

When using the bracket hanger



When using no bracket hanger



FA-B01U FLEXIBLE ANTENNA

The same type as supplied with the transceiver.

UT-86 TONE SQUELCH UNIT

Provides subaudible tone encoder and tone squelch functions.

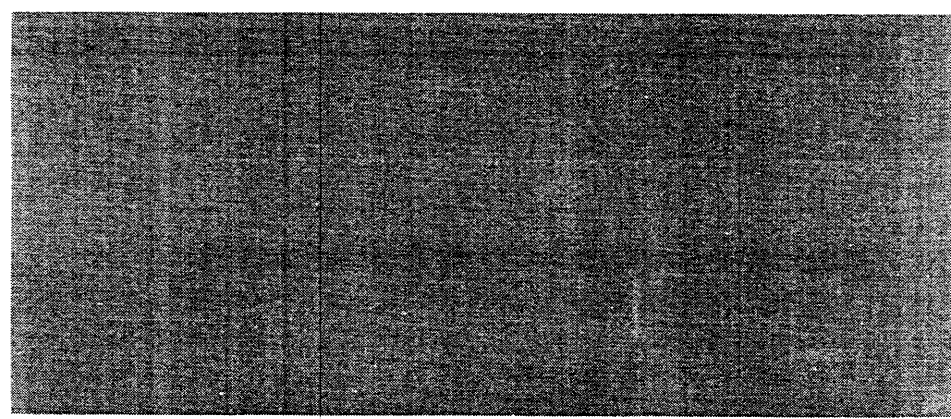
SP-13 EARPHONE

Provides clear receive audio in noisy environments.

UT-88 VOICE SCRAMBLER UNIT

Provides private communications. Also provides subaudible tone encoder and tone squelch functions.

Count on us!



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