O
ICOM

MULTI-FUNCTION OPERATION GUIDE

Tech Talk

IC-2iA · IC-4iA
IC-2iE · IC-4iE

Icom Inc.

IMPORTANT //////

This is a multi-function guide for the IC-2iA, IC-2iE, IC-4iA and IC-4iE.

Functions described in this Tech Talk cannot be used until entering the MULTI-FUNCTION mode.

To use all functions described in this Tech Talk, the "all function type AI" (A-type AI) is recommended.
- When first entering the MULTI-FUNCTION mode, the all function type AI may be selected.

EASY and MULTI-FUNCTION modes

■ EASY mode
These transceivers are designed for basic simplex operation, ensuring easy operation in this mode.
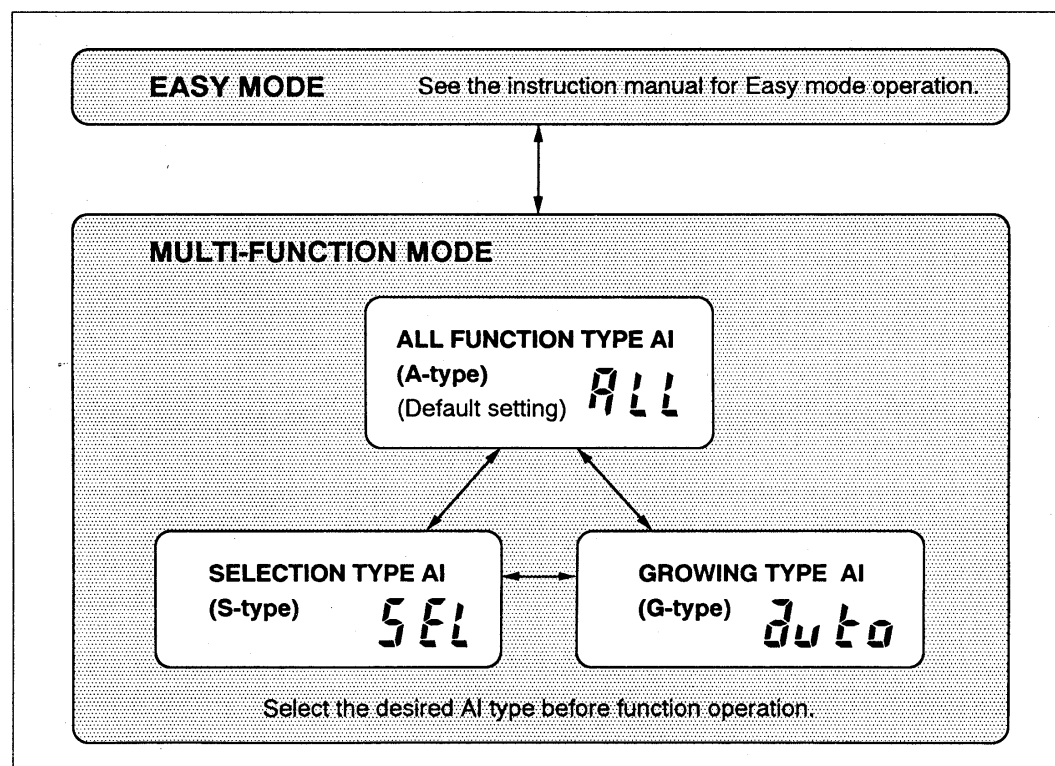
This mode covers all basic functions, such as transmitting, receiving, scanning, clock settings, LCD lighting, etc. which are essential for daily operations.

■ MULTI-FUNCTION mode
Has many advanced functions, such as repeater operation, timer, memory skip/mask, priority watch, DTMF memories, etc. In this mode, 100 memory channels can be used for various operations.

As the multi-function mode has many accessible functions, the AI (artificial intelligence) restricts accessible functions to match your operating needs. You can also restrict used functions to speed-up access.
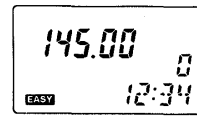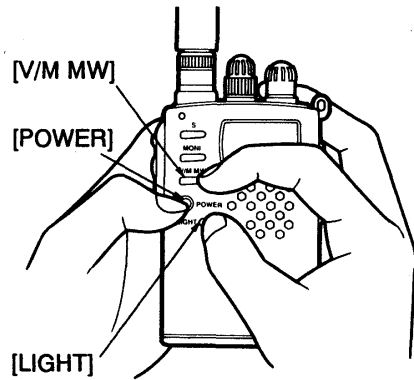
If you select the growing type AI, only a few functions can be accessed initially. Depending on your operating experience, accessible functions increase automatically. Also, you can access all functions by selecting the all function type AI.
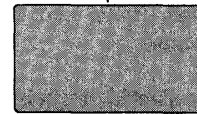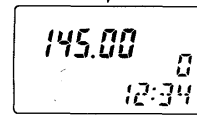
EASY MODE   See the instruction manual for Easy mode operation.

MULTI-FUNCTION MODE

ALL FUNCTION TYPE AI
(A-type)
(Default setting)   ᴀ ʟ ʟ

SELECTION TYPE AI
(S-type)   5 ε ʟ

GROWING TYPE AI
(G-type)   ᴀ u ʟ ᴏ

Select the desired AI type before function operation.

■ Entering the MULTI-FUNCTION mode

① Turn power OFF.

② While pushing [V/M MW] and [LIGHT], push and hold [POWER] to turn power ON.

[V/M MW]

[POWER]

[LIGHT]

145.00 0

EASY *12:34*

• Both VFO and MEMORY mode can be used.

①

②

145.00 0

12:34

• The transceiver enters the MULTI-FUNCTION mode.
• "EASY" disappears.

The previously selected AI type is automatically selected.

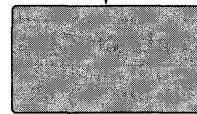When first entering the MULTI-FUNCTION mode, AI type selection is necessary.
• See the "AI TYPE SELECTION" section for details.
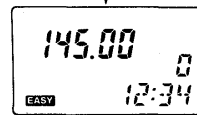
■ Returning to the EASY mode

① Turn power OFF.

② While pushing [V/M MW] and [LIGHT], push and hold [POWER] to turn power ON.

[V/M MW]

[POWER]

[LIGHT]

145.00 0

12:34

• Both VFO and MEMORY mode can be used.

①

②

145.00 0

EASY *12:34*
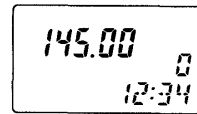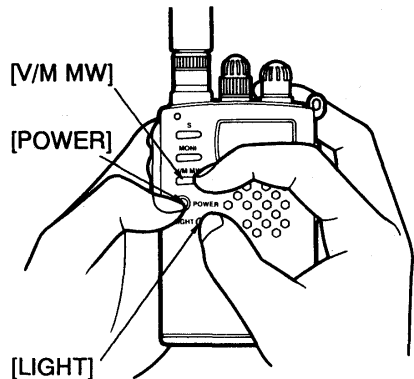
• The transceiver enters the EASY mode.
• "EASY" appears.
• VFO mode is always selected.

NOTE: When returning to the EASY mode, all modified SET mode contents are initialized to their default values and conditions.

The following is a function list for the MULTI-FUNCTION mode. Functions can be accessed when their corresponding SPECIAL indicators appear.

SPECIAL INDICATOR
All or some of "SPECIAL" appears. Indicates the accessible functions.

145.00 0

SPECIAL *SET*
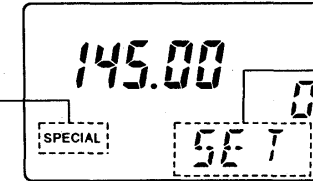
FUNCTION INDICATOR
Shows the function which can be activated by pushing the [S] switch.

SPECIAL Indicator	Function Indicator	Accessible functions	Function class
S	*SET*	SET mode	S-functions
	SKIP	Memory skip (skip)	
P	*PrIO*	Priority watch	P-function
E	*TONE*	Tone encoder, Tone squelch, Pocket beep	E-functions
	TS	Tuning step	
	DUP	Duplex ON/OFF and direction	
C	*12:34*	Clock function	C-functions
	TIME	Power ON/OFF timers, Auto power-OFF	
	SCAN	Scan functions	
	–	Scan edge channels PA, PB	
I	*SKIP*	Memory skip (mask)	I-functions
	–	Memory channels 10 ~ 99	
A	*DTMF*	DTMF	A-functions
	PGr	Pager, Code squelch	
L	–	LCD lighting	L-function

S S-functions

Use the symbol at left as a quick reference in these instructions. The upper case letter indicates what functions are being described and what special indicator must appear to operate these functions (in this case S-functions and "S" respectively.)
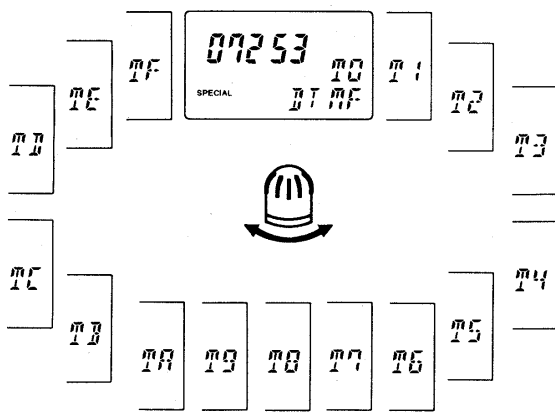
DTMF

DTMF codes are used for autopatch operation, accessing repeaters, controlling other equipment, etc. This transceiver has 16 DTMF memories for storage of often-used DTMF codes of up to 15 digits.

◇ DTMF memories

DTMF memories are named "T0"~"TF" (see right) and up to 15 digits can be programmed in each DTMF memory.

The number digits (0 ~ 9) and number digits (A ~ F) can be used as DTMF digits.
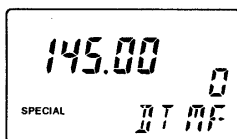
• "E" and "F" stand for # and ✳ respectively.
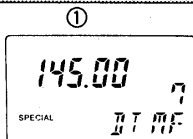
◆ Pre-operation ◆

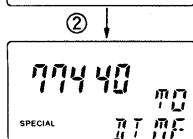① While pushing [S], rotate [DIAL] to select "DTMF."

② Release [S].

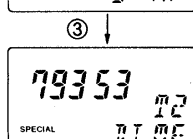## ■ Transmitting a DTMF code (e.g. transmitting DTMF code in "T2")

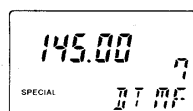① Select the DTMF display as described in the "Pre-operation" box.

② Push [S].
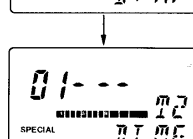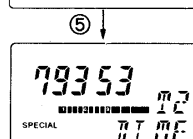• Previously selected DTMF memory appears.

③ Rotate [DIAL] to select the desired DTMF memory already programmed.

④ Push [PTT] to return to the operating condition.

⑤ While pushing [PTT], push [S] to transmit the selected DTMF code.
• Display returns to the frequency indication after transmitting the DTMF code.

☐ Programming a DTMF code (e.g. "12ABCD776" into "T5")

① Select the DTMF display as described in the "Pre-operation" box.

② Push [S].
• Previously selected DTMF memory appears.

③ Rotate [DIAL] to select the desired DTMF memory to be programmed.

④ Push [FUNC] + [S] to enter the programming condition.
• Previously stored DTMF code is erased and the first " – " blinks.

⑤ Rotate [DIAL] to select the first DTMF digit; then, push [S].
• The second " – " blinks.

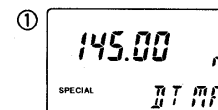⑥ Enter the 2nd digit and the following digits by [DIAL] and [S] as in step ⑤.

⑦ Push [FUNC] to store the entered digits.
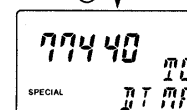• If 15 digits are input, it is not necessary to push [FUNC].

⑧ When programming another DTMF memory, repeat steps ③ ~ ⑦.

⑨ Push [PTT] to return to the operating condition.
• If [S] is pushed instead of [PTT], you can confirm the DTMF by aurally.
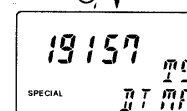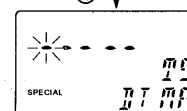
① 145.00
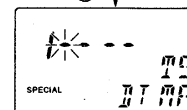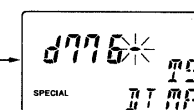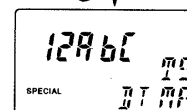② Previously selected DTMF memory appears. When no code is programmed, "– – – – –" appears.

③ Previously stored DTMF code disappears.

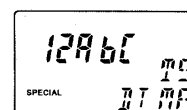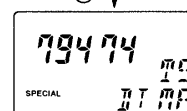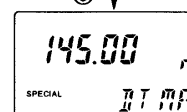⑤ Selected " – " blinks.

⑦ The first 5 digits of the entered code appear.

⑧ (e.g. when programming "79474449" in the DTMF memory T9.)
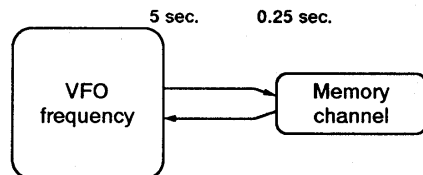
Priority watch checks a memory channel for 250 msec. when operating in VFO mode at 5 sec. intervals. You can wait for calls on a memory channel while operating on other frequencies by using priority watch.

■ Memory channel watch

While operating in VFO mode, priority watch checks the selected memory channel every 5 sec.

NOTE: When the selected memory channel is masked, priority watch does not start.

```
      5 sec.        0.25 sec.

   VFO  ────────►  Memory
frequency ◄──────── channel
```

■ Memory scan watch

While operating in VFO mode, priority watch checks each memory channel in sequence.

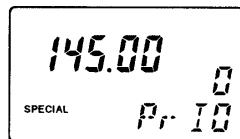**NOTE:** Skip channels and masked channels are skipped during the memory scan watch.

```
          ┌──► Mch 0
   VFO    ├──► Mch 1
frequency ├──► Mch 2
          │      ┊
          └──► Mch 99
```
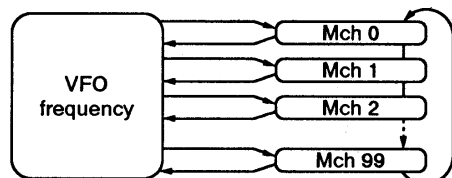
◆ Pre-operation ◆

① While pushing [S], rotate [DIAL] to select "PrIO."

② Release [S].

NOTE: For memory scan watch, select "SCAN."

```
   145.00
            0
SPECIAL  Pr IO
```
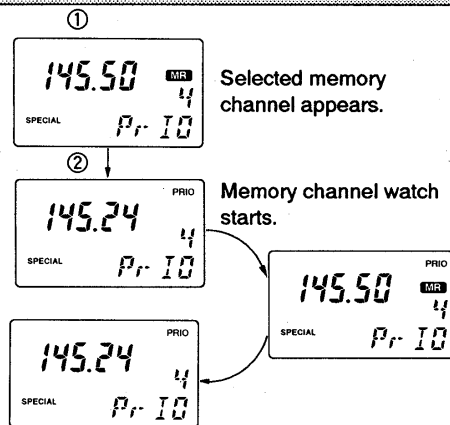
■ Starting memory channel watch

① Select the desired memory channel to be priority watched in MEMORY mode.

② Push [S] to start memory channel watch.
  • "PRIO" appears.

To stop memory channel watch, push [S] again.
  • "PRIO" disappears.

```
        ①
   145.50  MR
            4
SPECIAL  Pr IO
```
Selected memory channel appears.

```
        ②
   145.24  PRIO
            4
SPECIAL  Pr IO
```
Memory channel watch starts.

```
   145.50  PRIO
            4
SPECIAL  Pr IO

   145.24  PRIO
            4
SPECIAL  Pr IO
```

■ Starting memory scan watch

① Start memory scan in MEMORY mode.
  - Select the "SCAN" display with [S]+[DIAL].
  - Select MEMORY mode with [V/M MW].
  - Start memory scan with [S].
  • When you want to scan the memory channels in descending order, rotate [DIAL] counter-clockwise after the scan starts.

② While pushing [S], rotate [DIAL] to select "PrIO."
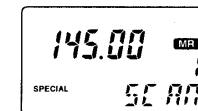 • Memory scan temporarily stops.

③ Release [S].
  • Memory scan resumes.
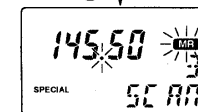
④ Push [S] to start memory scan watch.
  • "PRIO" appears and decimal point stops blinking.
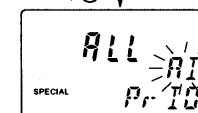
To stop memory scan watch, push [S] again.
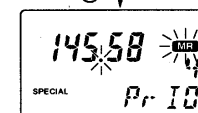 • Memory scan stops at the same time.
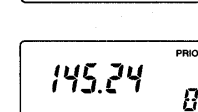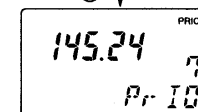
```
   145.00  MR
            1
SPECIAL  SCAn
        ①
   145.50  MR
            13
SPECIAL  SCAn
```
Memory scan starts. (Decimal point and "MR" blink.)

```
        ②
   ALL   AI
SPECIAL  Pr IO
```
"PrIO" appears and "AI" blinks.

```
        ③
   145.58  MR
            4
SPECIAL  Pr IO
```
Decimal point and "MR" blink.

```
        ④
   145.24  PRIO
            0
SPECIAL  Pr IO
```
Memory scan watch starts.

```
   145.06  MR
            0
SPECIAL  Pr IO

   145.24  PRIO
            0
SPECIAL  Pr IO
```
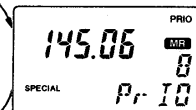
□ When the watch detects a signal

- Priority watch pauses on the memory channel for 15 sec. and then resumes.
  • When the signal on the memory channel disappears before 15 sec., priority watch resumes 2 sec. after the signal disappears.

- To resume manually, push [S].

- When you want to operate on the memory channel, push [S] then, push [V/M MW].
  • MEMORY mode is automatically selected.

- To stop the priority scan while the priority watch pauses, push [S] twice.
  • VFO mode is selected.

The set mode is used for programming infrequently changed values or conditions of functions. This transceiver's SET mode has 7 items.

NOTE: Even if you have set items to your desired values, all settings are reset to the initial values or conditions once you enter the EASY mode. Set the items again when re-entering the MULTI-FUNCTION mode from the EASY mode.
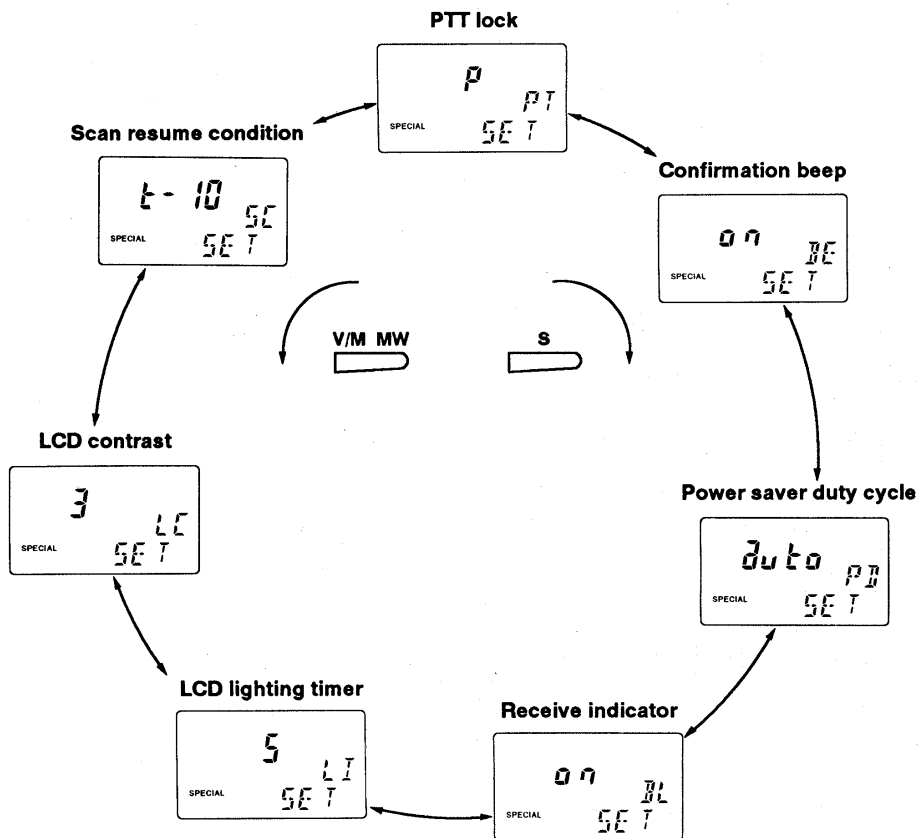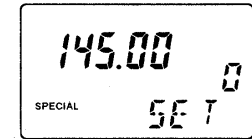
◇ Set mode construction chart

The following displays show the initial setting value or condition of each item.

In the EASY mode, the following initial setting values or conditions are used.

◆ Pre-operation ◆

① While pushing [S], rotate [DIAL] to select "SET."

② Release [S].

■ Setting each item (e.g. setting the power saver duty cycle to 1:4)

① Select the SET display as described in the "Pre-operation" box.

② Select VFO mode if MEMORY mode has been selected.
  • You cannot enter the SET mode from MEMORY mode.

③ Push [S].
  • The transceiver enters the SET mode.

④ Push [S] or [V/M MW] several times to select the desired item to be set.

⑤ Rotate [DIAL] to set the value or condition of the selected item.

⑥ Repeat steps ④ and ⑤ to set other items when desired.

⑦ Push [PTT] to exit the SET mode.
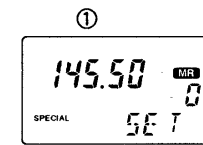
"MR" is not indicated in VFO mode.
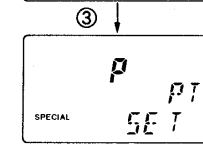
The SET mode is selected and the last set item appears.
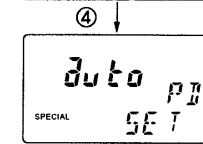
"PD" appears. It shows that the power saver duty cycle is selected.
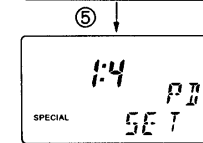
Stop [DIAL] rotation at the point where "1:4" is indicated.
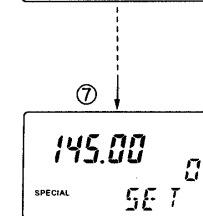
☐ PTT lock

The PTT lock function locks the PTT switch electronically to prevent accidental transmission.

When PTT is pushed with the PTT lock ON, a low beep tone sounds to indicate transmission is impossible.

```
   P      PT          PL     PT
SPECIAL  SET       SPECIAL  SET
```
PTT lock OFF   **PTT lock ON**
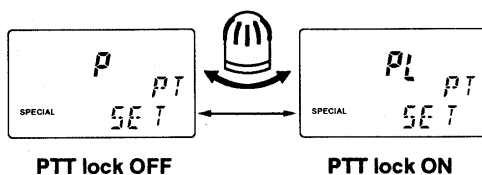
☐ Confirmation beep

A beep sounds each time a switch is pushed to confirm it. This confirmation beep can be turned OFF for silent operation or to save battery power.

NOTE: Even if the confirmation beep is OFF, the auto power-off, timer and pager/code squelch beeps still sound.

```
  on      BE          oFF    BE
SPECIAL  SET       SPECIAL  SET
```
Confirmation   **Confirmation**
beep ON   **beep OFF**
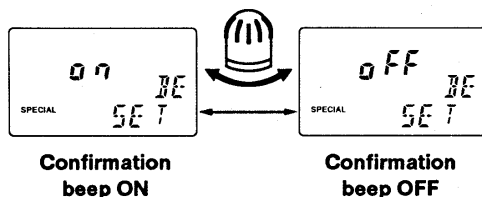
☐ Receive indicator

The receive indicator lights up in green when the squelch opens. This receive indicator can be turned OFF to save battery power.

NOTE: Transmit indicator lights while transmitting even when the receive indicator is turned OFF.

```
  on      BL          oFF    BL
SPECIAL  SET       SPECIAL  SET
```
Indicator ON   **Indicator OFF**
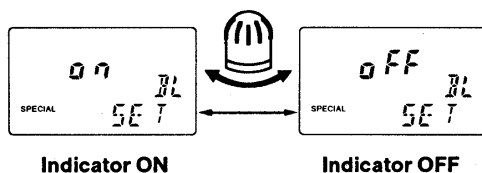
☐ LCD lighting timer

- When the 5 sec. timer is ON, the LCD lighting is automatically turned OFF if no switches and controls are operated for 5 sec.

- When the continuous lighting is ON, turn the lighting ON and OFF by pushing [LIGHT] manually.
  • The lighting will not be turned OFF automatically.

```
   5      LI          on     LI
SPECIAL  SET       SPECIAL  SET
```
5 sec. timer ON   **Continuous**
                              lighting ON
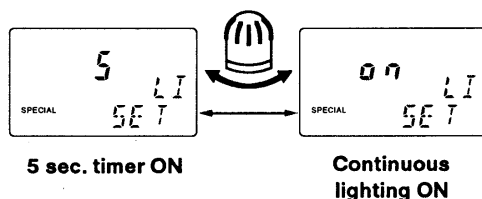
☐ LCD contrast

The LCD contrast can be selected from 4 levels (1~4) for your preference.

Select a suitable level depending on the ambient light.
  • Level 4 is the highest contrast.

```
   4      LC          1      LC
SPECIAL  SET       SPECIAL  SET
```
Level 4   3~2   **Level 1**
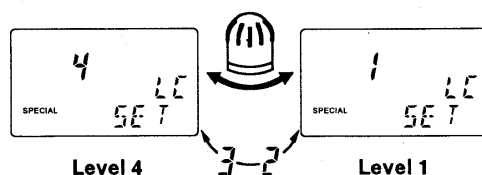
☐ Power saver duty cycle

The power saver function reduces the current flow for battery conservation. The duty cycle can be selected from 1:4, 1:16 or variable.

◇ Duty cycle 1:4
The function turns the receiver circuit ON and OFF repeatedly as follows:
  • Circuit on: 125 msec;   circuit off: 500 msec.

◇ Duty cycle 1:16
The function turns the receiver circuit ON and OFF repeatedly as follows:
  • Circuit on: 125 msec;   circuit off: 2 sec.

◇ Duty cycle variable (auto)
The duty cycle varies depending on the standby time. Longer standby times result in smaller duty cycle ratios.
  • See the diagram at upper right for details.

[Variable duty cycle alternation]

From power saver ON to 3.25 min.
1:1→1:2→1:3→1:4→1:5→1:6→1:7→1:8→1:9 ↓
The ratio becomes smaller.

After 3.25 min
1:4→1:8→1:4→1:16→1:4→1:32→1:4→1:64→1:4→1:8→
The above cycle continues repeatedly.

```
  oFF     PD          1:4    PD
SPECIAL  SET       SPECIAL  SET
```
Power saver OFF   **1:4**

```
  auto    PD          1:16   PD
SPECIAL  SET       SPECIAL  SET
```
Variable   **1:16**

☐ Scan resume condition

The scan resume condition can be selected as a pause scan, timer scan or empty scan.
  • This setting is not related to priority watch.

◇ Pause scan (P-02)
When the operating scan detects a signal, the scan pauses on the frequency until the signal disappears and resumes 2 sec. later.

```
Time ___ No signal | Signal | No signal ___
Scan /\/\/\/\/\          /\/\/\/\/\/\
     Scanning    Pausing  |  Scanning
                      2 sec.
```

◇ 5 sec. timer scan (t-05)
◇ 10 sec. timer scan (t-10)
When the operating scan detects a signal, the scan resumes after pausing on the frequency for 5 (10) sec.

```
Time ___ No signal | Signal | No signal ___
Scan /\/\/\/\/\   /\/\/\/\/\/\/\/\/\/\
     Scanning  Pausing  Scanning
              5 (10) sec.
```

◇ Empty scan (t-EP)
Scan searches for a non-busy frequency. When the empty scan is selected, the scan does not stop on busy frequencies but pauses on non-busy frequencies. If a signal appears while the empty scan pauses, the scan resumes 2 sec. later to search for another non-busy frequency.

```
  P-02    SC          t-05   SC
SPECIAL  SET       SPECIAL  SET
```
Pause scan   **5 sec. timer scan**

```
  t-EP    SC          t-10   SC
SPECIAL  SET       SPECIAL  SET
```
Empty scan   **10 sec. timer scan**

DUPLEX

The duplex function is used for repeater operation. The transmit frequency is shifted from the receive frequency by the duplex function. – duplex is normally used.

The use of this function is also explained in the instruction manual.

NOTE: Duplex information can be stored into a memory channel.

◆ Pre-operation ◆

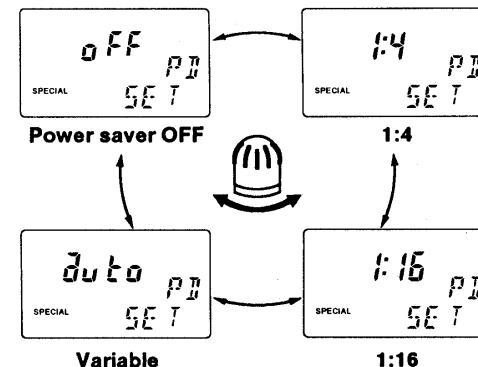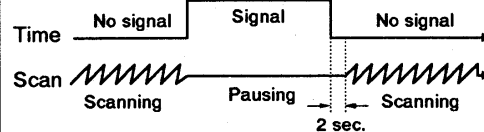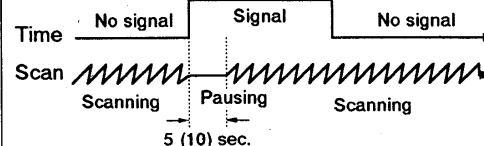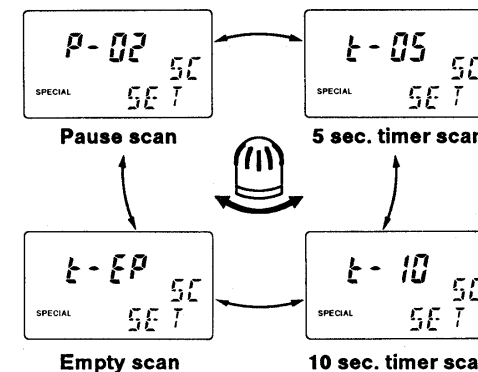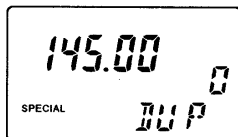① While pushing [S], rotate [DIAL] to select "DUP."

② Release [S].

```
 145.00
                   0
SPECIAL      DUP
```

■ Activating the function

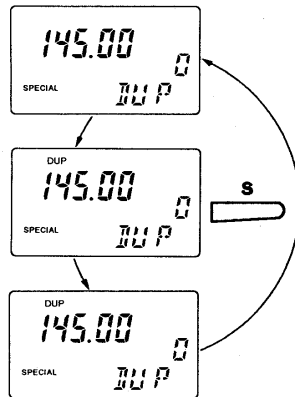Before activating this function, the offset frequency should be properly set. (See the box below.)

① Select the dup display as described in the "Pre-operation" box.

② Push [S] once to select " – DUP"; push [S] twice to select "+DUP."
  • To cancel the function, push [S] several times until "DUP" disappears.

– DUP: TX freq. = RX freq. – Offset freq.
+ DUP: TX freq. = RX freq. + Offset freq.

FUNCTION OFF

```
 145.00
                   0
SPECIAL      DUP
```

– DUPLEX ON
" – DUP" is indicated.

```
       DUP
 145.00
                   0        S
SPECIAL      DUP
```

+ DUPLEX ON
"DUP" is indicated.

```
       DUP
 145.00
                   0
SPECIAL      DUP
```

□ Setting the offset frequency   (e.g. setting to 0.6 MHz)

① Select VFO mode.

② Select the dup display as described in the "Pre-operation" box.

③ Push [FUNC] + [S].
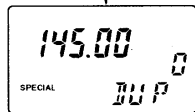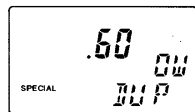 • Previously selected offset frequency appears.
  • The frequency unit is MHz.

① ②
```
 145.00
                   0
SPECIAL      DUP
```
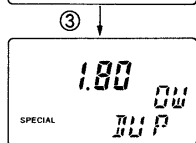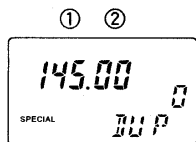
③ ↓
```
 1.80
              OW
SPECIAL      DUP
```
④ ↙

④ Rotate [DIAL] to set the desired offset frequency.
  • For quick frequency changing, rotate [DIAL] while pushing [FUNC].

⑤ Push [S] to set the offset frequency and to return to the operating condition.

```
 .60
              OW
SPECIAL      DUP
```

⑤ ↓
```
 145.00
                   0
SPECIAL      DUP
```

SKIP, MASK

■ Memory skip function (I-function)

The memory skip function designates memory channels as skip channels for more efficient memory scan or programmed skip scan.

This function is different from the frequency skip function.

■ Mask function (S-function)

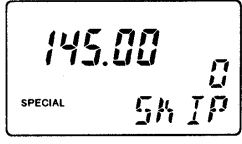The mask function masks all memory channel contents such as frequency, skip information, duplex information, etc.

To select a masked memory channel, rotate [DIAL] while pushing [FUNC].
• Mch 10 ~ Mch 99 are masked initially.
• Mch 0 cannot be masked.

◆ Pre-operation ◆

① While pushing [S], rotate [DIAL] to select "SKIP."

② Release [S].

NOTE: Both "S" and "I" of the "SPECIAL" indicator are necessary to activate both functions when S-type or G-type AI has been selected.

```
145.00
              0
SPECIAL   SKIP
```
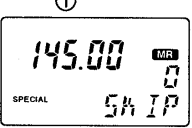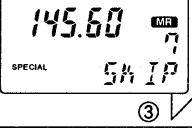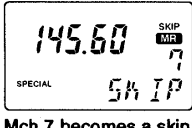

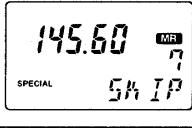
■ Memory skip function (e.g. designating Mch 7 as a skip channel)

"I" must be ON when the S-type or G-type AI is selected.

① Select MEMORY mode.

② Select a memory channel with [DIAL].

```
①
145.00  MR
              0
SPECIAL   SKIP
②↓
145.60  MR
              7
SPECIAL   SKIP
③
```

③ Push [S] to designate the memory channel as a skip channel.
• "SKIP" appears.

To cancel the skip information, push [S] again after the memory channel selection.

```
145.60  SKIP
        MR
              7
SPECIAL   SKIP
```

Mch 7 becomes a skip channel.
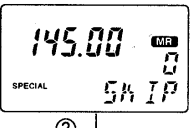
```
145.60  MR
              7
SPECIAL   SKIP
```
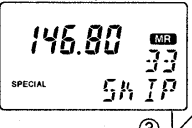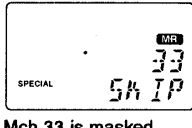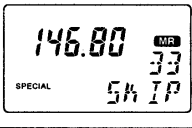

■ Mask function (e.g. masking Mch 33)

"S" must be ON when the S-type or G-type AI is selected.

① Select MEMORY mode.

② Select a memory channel with [DIAL].

```
①
145.00  MR
              0
SPECIAL   SKIP
②↓
146.80  MR
              33
SPECIAL   SKIP
③
```

③ Push [FUNC] + [S] to mask the memory channel.
• Frequency disappears.

To cancel masking, push [FUNC] + [S] again after memory channel selection by [FUNC] + [DIAL].

```
.       MR
              33
SPECIAL   SKIP
```

Mch 33 is masked.

```
146.80  MR
              33
SPECIAL   SKIP
```

SUBAUDIBLE TONE ENCODER, TONE SQUELCH, POCKET BEEP

To use these functions, an optional UT-72 TONE SQUELCH UNIT is necessary. See the "UT-72 installation" box for details.
• The U.S.A. version already includes the UT-72.

■ Subaudible tone encoder

The subaudible tone encoder is used to access a closed repeater which requires a specified subaudible tone. A subaudible tone generated from the encoder is superimposed over your transmitted voice signal while the PTT switch is pushed.

NOTE: The subaudible tone encoder ON/OFF information can be stored into memory channels 0 ~ 99 with operating frequencies, and tone frequency can be stored into memory channels 0 ~ 9 independently.

[Subaudible tone encoder example]

No tone

88.5 Hz tone

Closed repeater

Tone frequency: 88.5 Hz
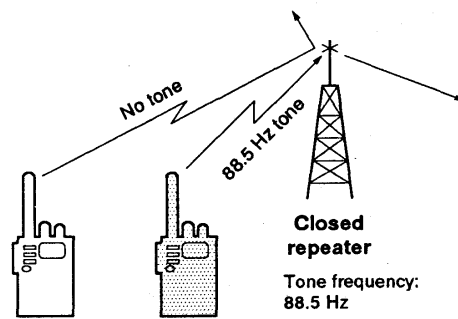
■ Pocket beep

The pocket beep function is a selective calling system using a subaudible tone. If your transceiver receives a subaudible tone which matches the tone frequency programmed in your transceiver, your transceiver beeps for 30 sec. to alert you.

To call the other station's pocket beep, set the suitable tone frequency and activate the tone squelch function; then, push [PTT] to transmit the subaudible tone.

[Pocket beep example]

Other signals

77.0 Hz tone

Beep
Beep
Beep

Pocket beep: ON
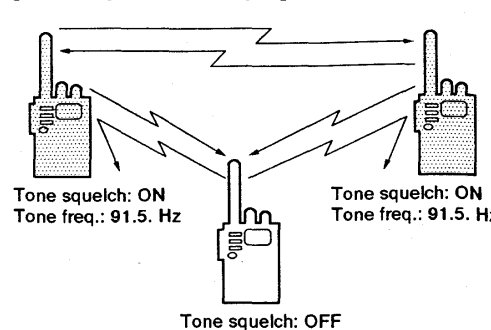Tone frequency: 77.0 Hz
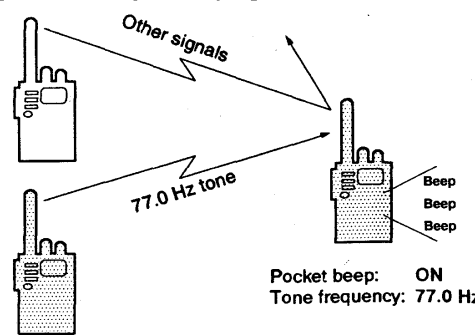
■ Tone squelch

Tone squelch is used for private communication and allows quiet standby. When the tone squelch is activated, your transceiver only accepts a signal with the selected subaudible tone and rejects any other signals.

NOTE: Even though your transceiver rejects undesired signals, your transmit signal is received by other transceivers without tone squelch. Tone squelch can be used simultaneously with the pager or code squelch.

[Tone squelch example]

Tone squelch: ON
Tone freq.: 91.5 Hz

Tone squelch: ON
Tone freq.: 91.5 Hz

Tone squelch: OFF

◆ Pre-operation ◆

① While pushing [S], rotate [DIAL] to select "TONE."

② Release [S].

```
145.00    0
SPECIAL   TO NE
```

■ Activating a function

Before activating a function, the subaudible tone frequency should be properly set. (See the box below.)

① Select the tone display as described in the "Pre-operation" box.

② Push [S] several times until your desired function is indicated.

• To activate the subaudible tone encoder, push [S] several times until only "T" is indicated.
• To activate the pocket beep function, push [S] several times until "T SQL ((•))" is indicated.
• To activate the tone squelch function, push [S] several times until "T SQL" is indicated.
• To cancel these functions, push [S] several times until the "T" indicator disappears.
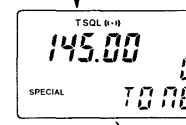
FUNCTION OFF
```
145.00    0
SPECIAL   TO NE
```
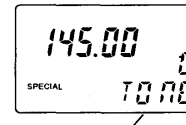
SUBAUDIBLE TONE ENCODER ON
Only "T" is indicated.
```
      T
145.00    0
SPECIAL   TO NE
```
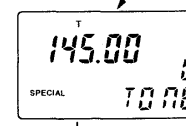
POCKET BEEP ON
"T SQL ((•))" is indicated.
```
T SQL ((•))
145.00    0
SPECIAL   TO NE
```

TONE SQUELCH ON
"T SQL" is indicated.
```
T SQL
145.00    0
SPECIAL   TO NE
```
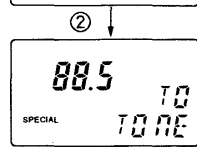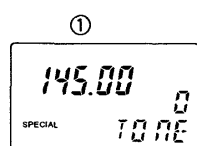
S

□ Selecting a tone frequency   (e.g. selecting 77.0 Hz)

The UT-72 has 38 tone frequencies.

① Select the tone display as described in the "Pre-operation" box.

② Push [FUNC] + [S].
• Previously selected tone frequency appears.

①
```
145.00    0
SPECIAL   TO NE
```

②
```
88.5     TO
SPECIAL   TO NE
```

③ Rotate [DIAL] to select the desired tone frequency.

④ Push [S] to set the tone frequency and to return to the operating condition.

③
```
77.0     TO
SPECIAL   TO NE
```

④
```
145.00    0
SPECIAL   TO NE
```
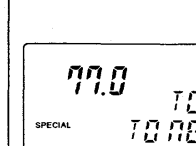
◆ UT-72 installation

The UT-72 is already built into the U.S.A. version. For other versions, install an optional UT-72 as follows.

① Turn power OFF, then remove the battery pack or case from the transceiver.

② Remove 4 screws from the rear panel of the transceiver as shown in figure 1.

③ Open the unit as shown in figure 2.
• Be careful of the speaker cable.
• The microphone and the PTT rubber may be safely removed.

④ Remove 4 screws from the logic board as shown in figure 3.

⑤ Disconnect the connector (J1) and remove the logic board as shown in figure 4.

⑥ Install the UT-72 on the rear of the logic board as shown in figure 5.

⑦ Replace the logic board and connect the connector (J1) as shown in figure 4.

⑧ Replace the 4 screws on the logic board as shown in figure 3.

⑨ Replace the microphone and the PTT ruber to their original positions as shown in figure 6.

⑩ Close the unit and tighten the 4 screws as shown in figure 1.
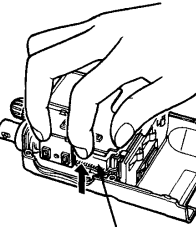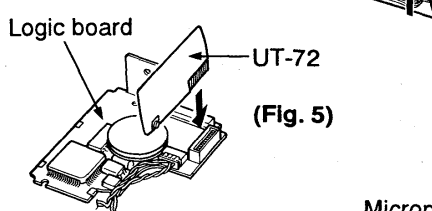
⑪ Replace the battery pack or case.
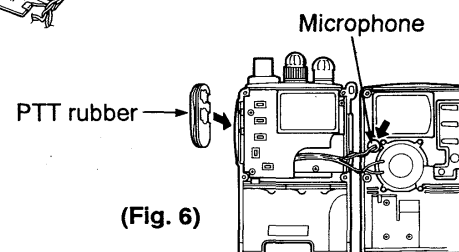
(Fig. 1)

(Fig. 2)

(Fig. 3)

Logic board

(Fig. 4)

Logic board

UT-72

J1

(Fig. 5)

Microphone

PTT rubber
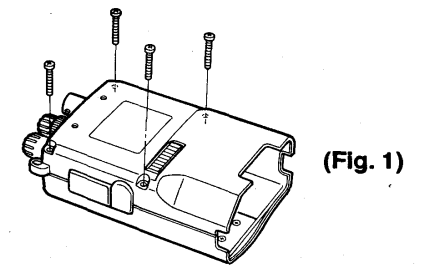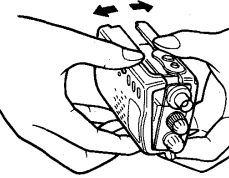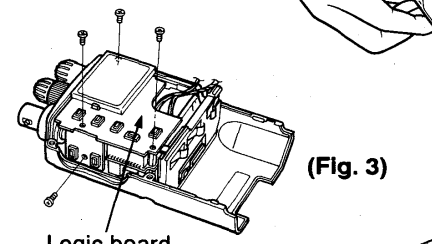
(Fig. 6)

SCANS

Scanning is convenient for searching used frequencies and for finding new signals. 3 scan types are available for your convenience. Programmed scan and memory scan can also be performed in the EASY mode.
- Scan can search non-busy frequencies instead of busy frequencies. See "SET MODE" section for details.

■ Programmed scan

Repeatedly scans all frequencies between 2 specified frequencies in the scan edge channels PA and PB. This scan is convenient for searching for signals in a specified range such as a repeater band.

NOTE: Frequency skip function must be OFF to start this scan. (See the "Frequency skip function" box for details.)
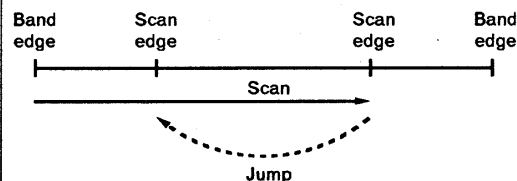
■ Memory scan

Repeatedly scans all memory channels (Mch 0 ~ Mch 99) sequentially except skip channels and masked channels. This scan searches only for your desired frequencies.

NOTE: When the S-type or G-type AI is selected and "I" of the "SPECIAL" indicator is not displayed, memory scan scans only Mch 0 ~ Mch 9 even when there are programmed memory channels between Mch 10 ~ Mch 99.
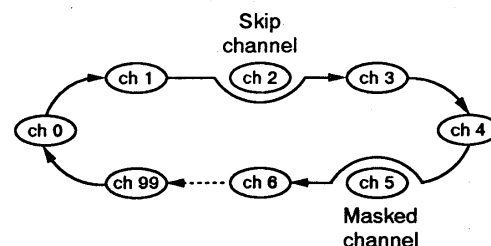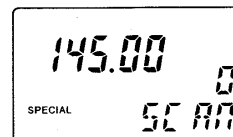
■ Programmed skip scan

Skips undesired frequencies which inconveniently stop scanning during programmed scan.

NOTE: When the S-type or G-type AI is selected, "S" and "I" of the "SPECIAL" indicator must be indicated to start this scan.
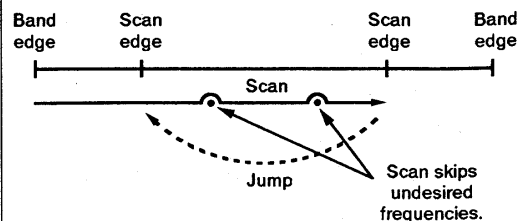
◆ Pre-operation ◆

① While pushing [S], rotate [DIAL] to select "SCAN."

② Release [S].

■ Starting a scan

① Pre-operation
◇ Programmed scan
Program scan edge frequencies into scan edge channels PA and PB, select VFO mode; then, turn the skip function OFF. (See the box at right).

◇ Memory scan
Program desired frequencies, (undesired channels can be masked or set as skip channels); then, select MEMORY mode.

◇ Programmed skip scan
Program scan edge frequencies into scan edge channels PA and PB, select VFO mode; then, turn the skip function ON. (See the box at right).
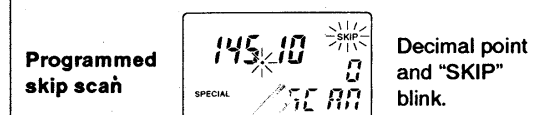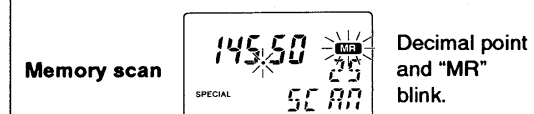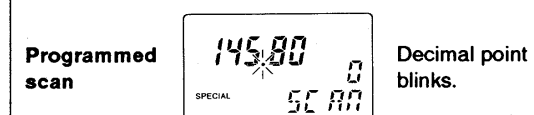
② Starting a scan
Before starting a scan, set squelch to the point where noise is just muted.

Push [S] to start a scan.
- The decimal point starts blinking.

[DISPLAY EXAMPLE DURING A SCAN]

Programmed scan — Decimal point blinks.

Memory scan — Decimal point and "MR" blink.

Programmed skip scan — Decimal point and "SKIP" blink.

③ Stopping a scan
Push [S] again.
- The decimal point stops blinking.

■ When the scan detects a signal

- Scan pauses on the frequency for 10 sec. and then resumes.
  - The scan resume condition can be changed. See the "SET MODE" section for details.

- To resume manually, rotate [DIAL].
  - [DIAL] can also be used to change the scan direction during scanning.

- In programmed scan, a detected frequency can be programmed into a memory channel by [FUNC] + [V/M MW].

- In programmed skip scan, skip frequencies can be memorized when the scan stops on frequencies which inconveniently stop the scan. (See the box at right.)

□ Frequency skip function

Frequency skip function skips the frequencies programmed in a skip memory channel (memory channel with skip information) during programmed skip scan.
- To use this function, "S," "C" and "I" are required.

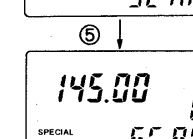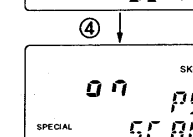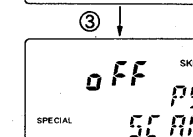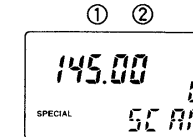① Select scan display as described in the "Pre-operation" box.

② Select VFO mode.

③ Push [FUNC] + [S].

④ Rotate [DIAL] to select "ON" or "OFF" for the function.

⑤ Push [S] to set the condition and to return to the operating condition.

NOTE: If this function is ON, programmed scan cannot be started.

③ Previously selected condition (ON or OFF) appears.

⑤ The display returns the operating condition.

□ Memorizing skip frequencies

When programmed scan stops on an undesired signal and you want to skip the frequency during the scan, perform the following procedure.
- To use this function, "S," "C" and "I" are required.

The frequency is memorized into a memory channel with skip information.
- Skip information is placed in masked memory channels in descending order. (e.g. order: Mch 99 → Mch 98 → Mch 97 — — → Mch 10)

① Start programmed skip scan.

② When the scan pauses on an undesired frequency, push and hold [FUNC] + [V/M MW] until 3 beeps are emitted.
- The memorized memory channel number appears for a moment and scan automatically resumes.
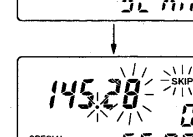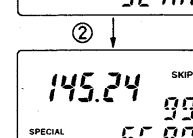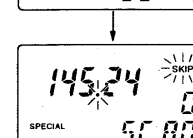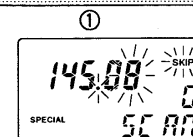
① The scan is scanning.

The scan is pausing an undesired signal.

② The frequency is memorized in a memory channel with skip information.

The scan resumes.

Pager and code squelch functions are selective calling and communication systems using a DTMF encoder and decoder. Use these functions for communications in your group. All stations in your group need the pager function.

■ Pager

The pager function is a selective calling system using DTMF codes. With the pager, you can call any one or all the stations in your group, and you can receive a specified call from a station in your group.
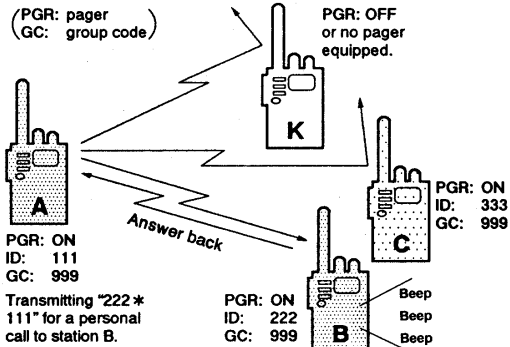
The master station sends a code consisting of a transmit code and the master stations's ID code. If the transmit code matches the code programmed in the code channel of the slave station, the slave transceiver informs the operator with beeps. For personal calls, the ID code of the slave station is used as the transmit code. For a group call, the group code is used as the transmit code.

- The pager code for a call =
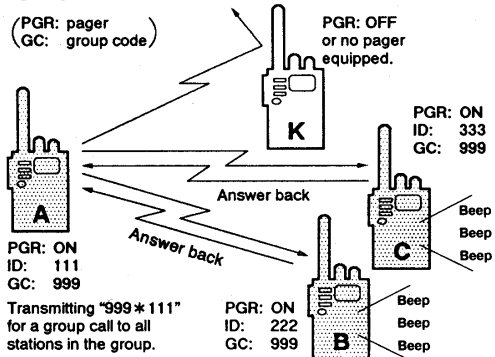
    Transmit code + "✱" + Master station's ID

The slave station can recognize the transmit station by the received ID code of the master station and can easily answer back because the received ID code is automatically programmed as a transmit code for answer back.

- The pager code for answer back =

    Received ID + "✱" + Slave station's ID

[Pager simulation, personal call]

(PGR: pager
GC: group code)

PGR: OFF or no pager equipped.

K

PGR: ON
ID: 333
GC: 999

C

PGR: ON
ID: 111
GC: 999

Transmitting "222✱111" for a personal call to station B.

PGR: ON
ID: 222
GC: 999

Answer back

Beep
Beep
Beep

B

[Pager simulation, group call]

(PGR: pager
GC: group code)

PGR: OFF or no pager equipped.

K

PGR: ON
ID: 333
GC: 999

C

Answer back

PGR: ON
ID: 111
GC: 999

Transmitting "999✱111" for a group call to all stations in the group.

PGR: ON
ID: 222
GC: 999

Answer back

Beep
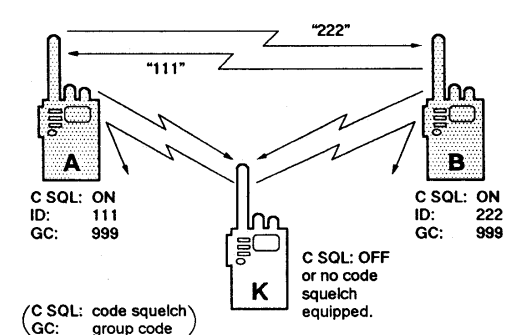Beep
Beep

Beep
Beep
Beep

B

■ Code squelch

Code squelch allows communication with quiet standby since you will only receive calls from stations which know your ID code.

Prior to voice transmission, the ID code of the receiving station is transmitted in order to open the receiving station's code squelch.

NOTE: Although your transceiver rejects undesired signals, your transmit signal is received by other transceivers without code squelch.

[Code squelch example]

"222"

"111"

A

C SQL: ON
ID: 111
GC: 999

C SQL: ON
ID: 222
GC: 999

B

K

C SQL: OFF or no code squelch equipped.

(C SQL: code squelch
GC: group code)

◇ Code channel

The pager and code squelch functions require your ID code, other station's ID codes and a group code. These codes are 3-digit DTMF codes and must be written in the code channels before operation.

□ Code channel assignment

ID or group code	Code channel number	"Receive accept" or "receive inhibit"
Your ID code	C0	"Receive accept" only.
Other stations' ID codes	C1 ~ C5	"Receive inhibit" should be programmed.
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.

◇ "Receive accept" and "receive inhibit"

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

□ **Receive accept** ("SKIP" is not indicated.)
Accepts pager calls when the transceiver receives a signal with a code the same as that in the code channel.

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

□ **Receive Inhibit** ("SKIP" is indicated.)
Rejects calls even when the transceiver receives a signal with a code the same as that in the code channel.

- The code channels that store other station's ID codes should be programmed as receive inhibit. Otherwise personal calls for other stations are received.
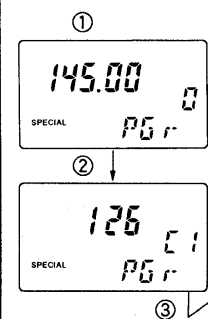
◆ Pre-operation ◆

① While pushing [S], rotate [DIAL] to select "PGr."

② Release [S].

```
145.00   0
SPECIAL  PGr
```
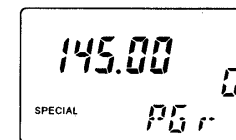
◆ Code channel selection   (e.g. selecting code channel "C5")

① Select the pager display as described in the "Pre-operation" box.

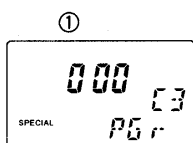② Push [FUNC] + [S].
- Previously selected code channel appears.

①
```
145.00   0
SPECIAL  PGr
```

②
```
126   C1
SPECIAL  PGr
```
③

③ Rotate [DIAL] to select the desired code channel.

④ Push [S] to return to the operating condition.

③
```
781   C5
SPECIAL  PGr
```
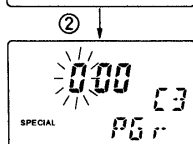④

④
```
145.00   0
SPECIAL  PGr
```
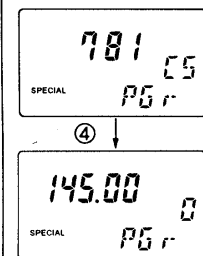
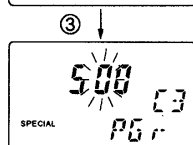## ☐ Code channel programming (e.g. programming "575" into "C3")

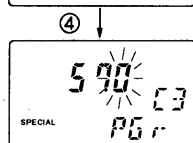① Select a code channel to be programmed as described in the "code channel selection" box.

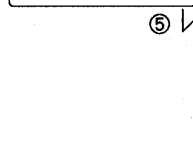② Push [FUNC] + [S].
- The first digit blinks.

③ Rotate [DIAL] to set the first digit; then, push [S].
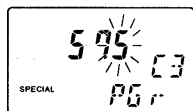- The second digit blinks.

④ Rotate [DIAL] to set the second digit; then, push [S].
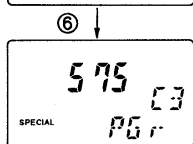- The third digit blinks.

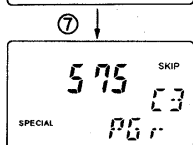⑤ Rotate [DIAL] to set the third digit.
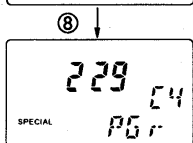
⑥ Push [FUNC] to store the code.

⑦ When programming the code channel as "receive inhibit," push [V/M MW] to display "SKIP."
- When programming as "receive accept," ignore this step.

⑧ When programming other code channels, select other code channels with [DIAL]; then, repeat steps ② ~ ⑥.

⑨ Push [S] to return to the operating condition.

[Group programming example]

(Group code: 468)

	Code channel	Code	"Receive accept" or "Receive inhibit"	Comment
STATION A (ID: 111)	C0	111	"Receive accept"	ID
	C1	333	"Receive inhibit"	ID of station B
	C2	555	"Receive inhibit"	ID of station C
	C3	777	"Receive inhibit"	ID of station D
	C4	000	"Receive inhibit"	Non-use
	C5	468	"Receive accept"	Group code

	Code channel	Code	"Receive accept" or "Receive inhibit"	Comment
STATION C (ID: 555)	C0	555	"Receive accept"	ID
	C1	777	"Receive inhibit"	ID of station D
	C2	111	"Receive inhibit"	ID of station A
	C3	333	"Receive inhibit"	ID of station B
	C4	000	"Receive inhibit"	Non-use
	C5	468	"Receive accept"	Group code

	Code channel	Code	"Receive accept" or "Receive inhibit"	Comment
STATION B (ID: 333)	C0	333	"Receive accept"	ID
	C1	555	"Receive inhibit"	ID of station C
	C2	777	"Receive inhibit"	ID of station D
	C3	111	"Receive inhibit"	ID of station A
	C4	000	"Receive inhibit"	Non-use
	C5	468	"Receive accept"	Group code

	Code channel	Code	"Receive accept" or "Receive inhibit"	Comment
STATION D (ID: 777)	C0	777	"Receive accept"	ID
	C1	111	"Receive inhibit"	ID of station A
	C2	333	"Receive inhibit"	ID of station B
	C3	555	"Receive inhibit"	ID of station C
	C4	000	"Receive inhibit"	Non-use
	C5	468	"Receive accept"	Group code

■ Pager operation

Prior to pager operation, decide whether communication after the connection will take place with or without code squelch.

◇ Waiting for a pager call

① Select the pager display as described in the "Pre-operation" box.

② Set the frequency.

③ Push [S] to turn the pager ON.
- "PGR" appears.

④ Once a call with the correct code is received, the transceiver emits a beep and the function display shows the received code and received time as shown in the box below.

⑤ Push [PTT] to send an answer back call.
- The display shows the operating frequency.

⑥ Push [S] once to select the code squelch or twice to select the non-selcall system.

[Display example when receiving a pager call]

PERSONAL CALL	
Transmit stations ID code, "SKIP," "CP" and time called appear when you are called with your ID code.	
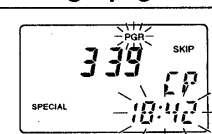
GROUP CALL	
Group code with code channel number and time called appear when you are called with the group code.	

◇ Calling a specific station

- To call a specific station, use the ID code of that station as the transmit code.
- To call all stations in your group, use the group code as the transmit code.

(pager code= transmit code + "*" + your ID code)

① Select the pager display as described in the "Pre-operation" box.

② Set the frequency.

③ Push [S] to turn the pager ON.
- "PGR" appears.

④ Select a code channel which includes the ID code of the receive station or the group code to be used as a transmit code as described in the box above.

⑤ Return to the operating condition.

⑥ Push [PTT] to transmit the pager code.

⑦ Wait for an answer back.
- When the transceiver receives an answer back code, the function display shows the receive code and time received as shown in the box at left.

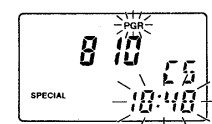⑧ After confirming a connection, push [S] to return to the frequency display.

⑨ Push [S] once to select the code squelch or twice to select the non-selcall system.

■ Code squelch operation

Code squelch is convenient for private communication after calling with the pager.

① After calling with the pager, push [S] once to turn ON the code squelch.
- "C SQL" appears.

② Operate the transceiver in the normal way (push [PTT] to transmit: release [PTT] to receive.)
- Transmit code is sent each time [PTT] is pushed.

③ To cancel the code squelch, push [S].
- "C SQL" disappears.

NOTE: When using code squelch without the pager, the transmit code must be correctly set.

Select the code channel in which the other station's ID code or group code is programmed before turning ON code squelch; then, push [S] twice in the pager display to turn ON the code squelch.

The transceiver has a built-in 24-hour system clock. Though the clock is always indicated in the EASY mode, display selection is required to indicate the clock in the MULTI-FUNCTION mode.

For the clock time setting, indicate the clock; then, push [FUNC] + [S] to enter the clock setting condition.
• See the instruction manual for the clock setting details.

◆ Clock indication ◆

①While pushing [S], rotate [DIAL] to select the clock indication.

②Release [S].

```
145.00
         0
SPECIAL
      20:45
```
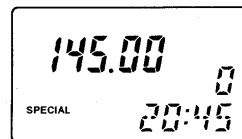
You can use the full 100 memory channels in the MULTI-FUNCTION mode.

The memory channels increase to 100 channels automatically when:
- A-type AI is selected.
- S-type AI is selected and "I" is ON.
- G-type AI is selected and "I" is indicated.

Once you store a variety of information into memory channels 0~9, the memorized information, such as duplex or tone encoder, is also available in the EASY mode.

Memory channels 10~99 are masked initially. To select a memory channel from the above range, rotate [DIAL] while pushing [FUNC] in MEMORY mode.
• See the "MASK" section for unmasking details.

Use all 100 memory channels to enjoy the full potential of your transceiver.

NOTE: Information stored in memory channels 10 ~ 99 cannot be accessed while in the EASY mode.

□The memory contents

Memory channels 0~9	Memory channels 10~99
- Operating frequency - Duplex ON/OFF and direction (− or +) - Offset frequency - Subaudible tone encoder ON/OFF - Tone squelch ON/OFF - Subaudible tone frequency	- Operating frequency - Duplex ON/OFF and direction (− or +) - Subaudible tone encoder ON/OFF - Tone squelch ON/OFF

The dial changes the frequency in specified increments. These increments are called tuning steps.

For convenience select a tuning step that matches the frequency intervals of repeaters in your area.

This transceiver has 8 different tuning steps as follows:
• 5 kHz   • 20 kHz
• 10 kHz   • 25 kHz
• 12.5 kHz   • 30 kHz
• 15 kHz   • 50 kHz

◆ Pre-operation ◆

①While pushing [S], rotate [DIAL] to select "TS."

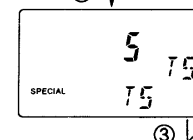②Release [S].

```
145.00
         0
SPECIAL
      TS
```
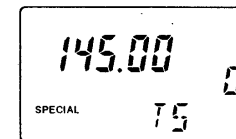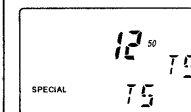
■ Selecting a tuning step (e.g. selecting the 12.5 kHz tuning step)

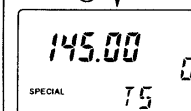①Select the tuning step display as described in the box above.
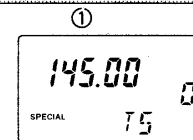
②Push [S].
• Previously selected tuning step appears.

```
①
145.00
       0
SPECIAL  TS

②↓

5   TS
SPECIAL  TS

③
```

③Rotate [DIAL] to select the desired tuning step.

④Push [S] to set the tuning step and to return to the operating condition.

```
12.50 TS
SPECIAL  TS

④↓

145.00
       0
SPECIAL  TS
```

Scan edge channels PA and PB can also be used in the MULTI-FUNCTION mode. See p. 11 in the instruction manual for details.

NOTE: If "C" is not indicated in the S-type AI or G-type AI, PA and PB cannot be selected even if they have already been programmed.

The LCD lighting function can also be used in the MULTI-FUNCTION mode. Push [LIGHT] to turn the function ON and OFF.
• You can select the continuous lighting or 5 sec. timer lighting in the MULTI-FUNCTION mode. See the "LCD lighting timer" box in the "SET MODE" function for details.

■ Power-on timer
Turns power ON at a preset time.

■ Power-off timer
Turns power OFF at a preset time.

NOTE: The power-on and power-off timers enter the "OFF" condition once they are used. To activate them again you must first select the "ON" condition.
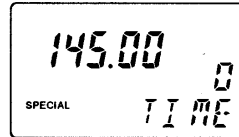
■ Auto power-off
Automatically turns power OFF after a selected period in which no switch is pushed.

NOTE: This timer does not automatically become "OFF," even when the power is turned OFF by this timer. To turn this timer OFF, you must select "OFF" manually.

◆ Pre-operation ◆

① While pushing [S], rotate [DIAL] to select "TIME."

② Release [S].

◆ Timer selection

Push [S] several times until the desired timer appears.
• Timer functions appear in the following order:
"ON" → "OF" → "AO"

To return to the operating condition, push [PTT].

Power-on timer   **Power-off timer**   **Auto power-off**
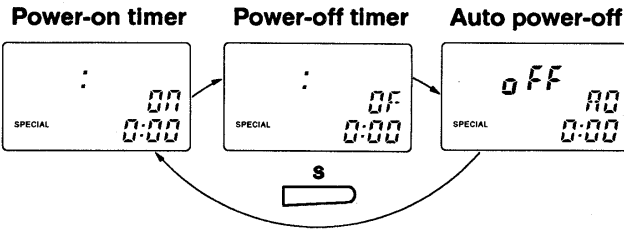
■ Auto power-off

① Select the auto power-off display.

② Rotate [DIAL] to select the desired power-off period or "OFF."

③ Push PTT to set the power-off period and to return to the operating condition.

OFF   **20 min.**   **40 min.**   **60 min.**
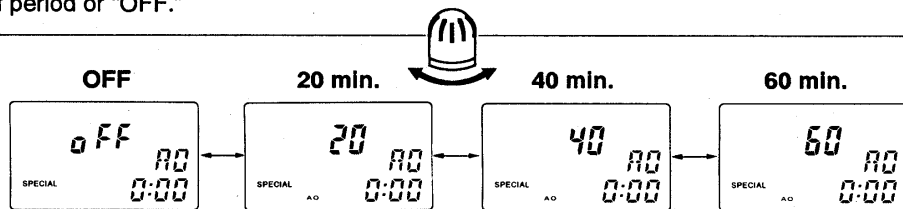
■ Power-on timer (e.g. setting the power-on timer to 15:15)

① Select the power-on timer display.

② Rotate [DIAL] clockwise to select the timer "ON" condition.
• Previousy set time and " ON ⏱ " appear.
• Skip ③ ~ ⑦ when using the displayed time.

③ Push [FUNC]+[S].
• The hour digits blink.

④ Rotate [DIAL] to set the hour.

⑤ Push [S].
• The minute digits blink.
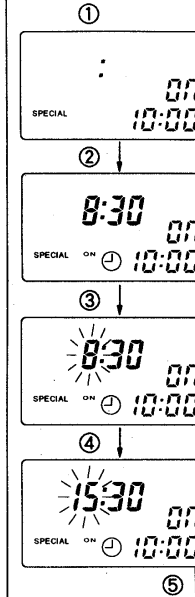
⑥ Rotate [DIAL] to set the minutes.

⑦ Push [FUNC] to set the power-on time.

⑧ Push [PTT] to activate the timer and to return to the operating condition.

⑨ Push and hold [POWER] to turn power OFF.

⑩ The transceiver automatically turns power ON at the set time.
• " ON ⏱ " disappears.
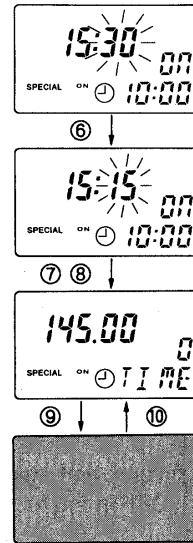
■ Power-off timer (e.g. setting the power-off timer to 18:10)

① Select the power-off timer display.

② Rotate [DIAL] clockwise to select the timer "ON" condition.
• Previousy set time and " OFF ⏱ " appear.
• Skip ③ ~ ⑦ when using the displayed time.

③ Push [FUNC]+[S].
• The hour digits blink.

④ Rotate [DIAL] to set the hour.

⑤ Push [S].
• The minute digits blink.
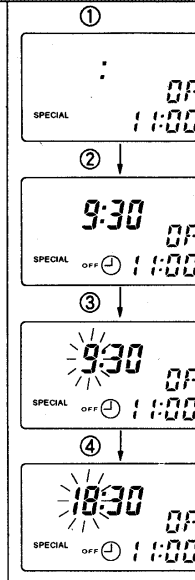
⑥ Rotate [DIAL] to set the minutes.

⑦ Push [FUNC] to set the power-off time.

⑧ Push [PTT] to activate the timer and to return to the operating condition.

⑨ The transceiver automatically turns power OFF at the set time.
• When you turn the transceiver ON again, " OFF ⏱ " disappears.
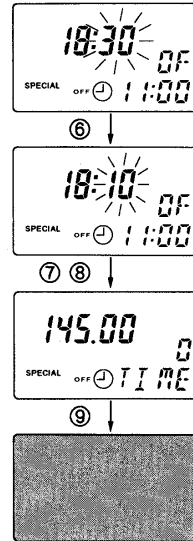
There are 3 AI types in the MULTI-FUNCTION mode. Select one that matches your operating needs.

■ All function type (A-type AI)

You can select all equipped functions in this type.
• This is the default AI type.

■ Selection type (S-type AI)

You can select accessible functions. Only functions which are set available can be accessed. This type helps speed-up function access and prevents undesired function access.

■ Growing type (G-type AI)

Accessible functions are automatically increased depending on your operating experience. Initially, no advanced functions can be accessed until you have gained some experience. After you operate the transceiver a number of times, accessible functions increase.
• When the UT-72 (optional except for the U.S.A. version) is installed, only the E-functions can be accessed in the beginning.

■ All function type (A-type AI)

□ When rotating [DIAL] while pushing [S] in this type:

All or some of "SPECIAL" appears, depending on your operating experience.
• Even though all of "SPECIAL" may not be indicated, all functions are accessible in the A-type AI.
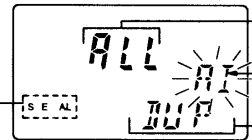
"ALL" shows the all function type is selected.

"AI" blinks.

Indicates the selected function. Rotate [DIAL] to change.

◇ Selecting the all function type

① Push and hold [POWER] to turn power OFF in the MULTI-FUNCTION mode.

② While pushing [S] and [V/M MW], push and hold [POWER] to turn power ON.
• The transceiver enters the AI type selection condition and "MODE" appears.

[S]
[V/M MW]
[POWER]

③ Rotate [DIAL] to select "ALL."

④ Push [PTT] to exit the condition and enter the operating condition.
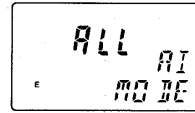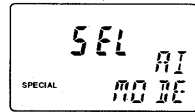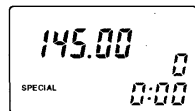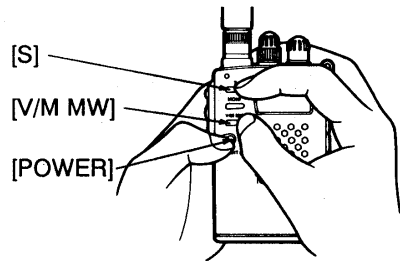
• Previously selected AI type is indicated. If "ALL" appears, the all function type has already been selected.

• Depending on your operating experience, all or some of "SPECIAL" appears.
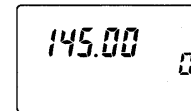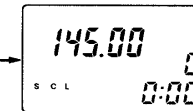• Initially, no letters appear.

• The transceiver exits from the AI type selection condition and enters the operating condition.
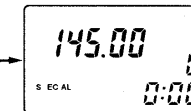
■ Growing type (G-type AI)

Growing example: The letters of the "SPECIAL" indicator increase depending on your experience.
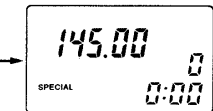
No SPECIAL functions can be used at this time.

S, C and L-functions can be used at this time.

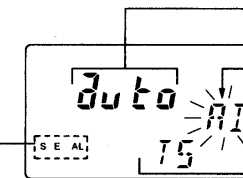S, E, C, A and L-functions can be used at this time.

All functions can be used at this time.

□ When rotating [DIAL] while pushing [S] in this type:

All or some of "SPECIAL" appears, depending on your operating experience. This shows the accessible functions in the G-type AI. Refer to "FUNCTIONS LIST."
• Initially, no indication appears.

"auto" shows the growing type is selected.

"AI" blinks.
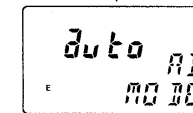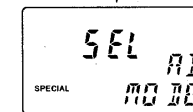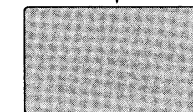
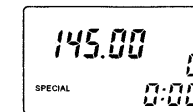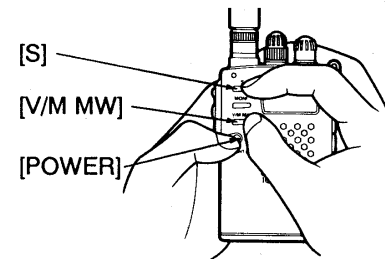Indicates the selected function. Rotate [DIAL] to change.
• Initially, no indication appears, not even the clock indication.

◇ Selecting the growing type

① Push and hold [POWER] to turn power OFF in the MULTI-FUNCTION mode.

② While pushing [S] and [V/M MW], push and hold [POWER] to turn power ON.
• The transceiver enters the AI type selection condition and "MODE" appears.

[S]
[V/M MW]
[POWER]

③ Rotate [DIAL] to select "auto."

④ Push [PTT] to exit the condition and enter the operating condition.

• Previously selected AI type is indicated. If "auto" appears, the growing type has already been selected.

• Depending on your operating experience, all or some of "SPECIAL" appears.
• Initially, no letters appear.

• The transceiver exits from the AI type selection condition and enters the operating condition.

□ When no function is indicated:

When you first enter the MULTI-FUNCTION mode, you are judged as a beginner. If you select G-type AI, no "SPECIAL" indicator and no function indicator appear. In this case the [S] switch does not function and you can not use S-functions ~ L-functions.
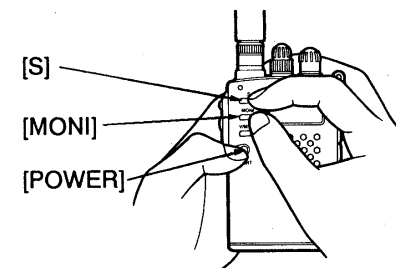
Also, when you select S-type AI and select "OFF" for all functions, no "SPECIAL" indicator and no function indicators appear.

145.00
G
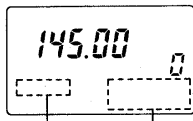
No indicators

After you have some operating experience (transmitting, receiving, memory operation, lighting, etc.), some of the indicators appear and you can use the indicated functions.

□ Turning OFF the "SPECIAL" indicator:

When the G-type AI has been selected, you can turn OFF the "SPECIAL" indicator to enjoy the "growing" from the beginning.
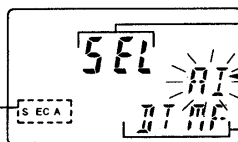
① Turn power OFF.

② While pushing [S] and [MONI], push and hold [POWER] to turn power ON.
- All of "SPECIAL" disappears.
- If the UT-72 is installed, "E" appears.

[S]
[MONI]
[POWER]

■ Selection type (S-type AI)

□ When rotating [DIAL] while pushing [S] in this type:

All or some of "SPECIAL" appears, depending on your selection. This shows the accessible functions in the S-type AI. Refer to "FUNCTIONS LIST."

SEL AI
DTMF

"SEL" shows the selection type is selected.
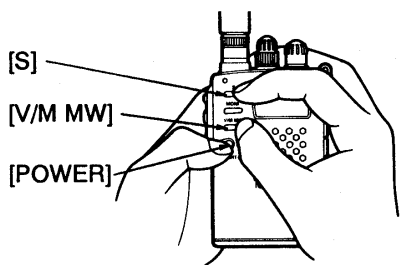
"AI" blinks.

Indicates the selected function. Rotate [DIAL] to change.

◇ Selecting the selection type

① Push and hold [POWER] to turn power OFF in the MULTI-FUNCTION mode.

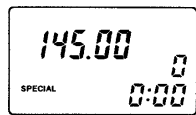② While pushing [S] and [V/M MW], push and hold [POWER] to turn power ON.
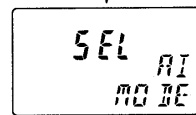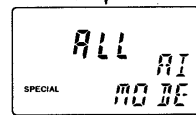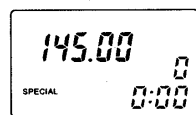- The transceiver enters the AI type selection condition and "MODE" appears.

[S]
[V/M MW]
[POWER]

③ Rotate [DIAL] to select "SEL."
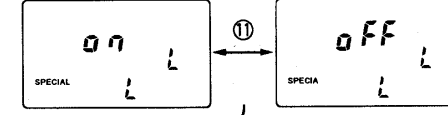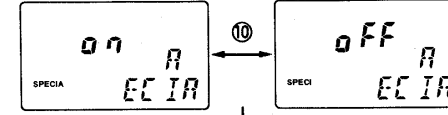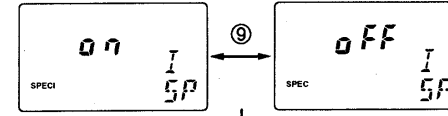
④ Push [PTT].

Continue to the right.

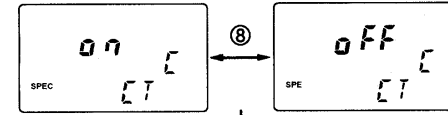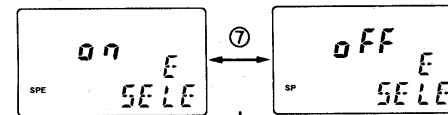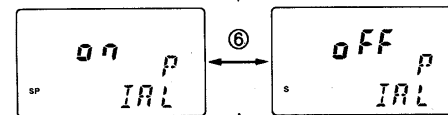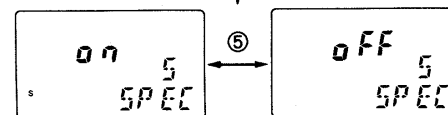① 145.00
SPECIAL 0:00

②
ALL AI
SPECIAL MODE

• Previously selected AI type is indicated. If "SEL" appears, the selection type has already been selected.

③
SEL AI
MODE

• The transceiver enters each function selection condition.

④

145.00
SPECIAL 0:00

• The transceiver exits from the AI type selection condition and enters the operating condition.

on S
S SPEC

⑤ off S
SPEC

on P
SP IAL

⑥ off P
S IAL

on E
SPE SELE

⑦ off E
SP SELE

on C
SPEC CT

⑧ off C
SPE CT

on I
SPECI SP

⑨ off I
SPEC SP

on A
SPECIA ECIA

⑩ off A
SPECI ECIA

on L
SPECIAL L

⑪ off L
SPECIA L

⑤ Rotate [DIAL] to select S-functions ON or OFF; then, push [PTT].
- ON: accessible   OFF: not accessible
- See "FUNCTIONS LIST" for the S-functions.

⑥ Rotate [DIAL] to select P-function ON or OFF; then, push [PTT].
- ON: accessible   OFF: not accessible
- See "FUNCTIONS LIST" for the P-function.

⑦ Rotate [DIAL] to select E-functions ON or OFF; then, push [PTT].
- ON: accessible   OFF: not accessible
- See "FUNCTIONS LIST" for the E-functions.

⑧ Rotate [DIAL] to select C-functions ON or OFF; then, push [PTT].
- ON: accessible   OFF: not accessible
- See "FUNCTIONS LIST" for the C-functions.

⑨ Rotate [DIAL] to select I-functions ON or OFF; then, push [PTT].
- ON: accessible   OFF: not accessible
- See "FUNCTIONS LIST" for the I-functions.

⑩ Rotate [DIAL] to select A-functions ON or OFF; then, push [PTT].
- ON: accessible   OFF: not accessible
- See "FUNCTIONS LIST" for the A-functions.

⑪ Rotate [DIAL] to select L-function ON or OFF; then, push [PTT].
- ON: accessible   OFF: not accessible
- See "FUNCTIONS LIST" for the L-function.