



## INSTRUCTION MANUAL

VHF FM TRANSCEIVER

# IC-V8000

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This device complies with Part 15 of the FCC rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

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Icom Inc.

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## FOREWORD

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Thank you for purchasing this Icom product. The IC-V8000 VHF FM TRANSCEIVER is designed and built with Icom's superior technology and craftsmanship. With proper care, this product should provide you with years of trouble-free operation.

We understand making you have a choice of many different radios in the market place. I want to take a couple of moments of your time to thank you for making your IC-V8000 your radio of choice, and hope you agree with ICOM's philosophy of "technology first." Many hours of research and development went into the design of your IC-V8000.

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## FEATURES

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- *75 W\* of high transmit output power (except Taiwan version)*
- *Front mounted speaker for clear readability*
- *Tone squelch, DTCS squelch standard*
- *Dual color (amber & green) LCD backlight*
- *Remote control microphone available (optional for some versions)*
- *Optional DTMF decoder*

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## IMPORTANT

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**READ ALL INSTRUCTIONS** carefully and completely before using the transceiver.

**SAVE THIS INSTRUCTION MANUAL**— This instruction manual contains important operating instructions for the IC-V8000.

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## EXPLICIT DEFINITIONS

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WORD	DEFINITION
⚠ <b>WARNING!</b>	Personal injury, fire hazard or electric shock may occur.
<b>CAUTION</b>	Equipment damage may occur.
<b>NOTE</b>	Recommended for optimum use. No risk of personal injury, fire or electric shock.

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## CAUTIONS

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**⚠ WARNING RF EXPOSURE!** This device emits Radio Frequency (RF) energy. Extreme caution should be observed when operating this device. If you have any questions regarding RF exposure and safety standards please refer to the Federal Communications Commission Office of Engineering and Technology's report on Evaluating Compliance with FCC Guidelines for Human Radio frequency Electromagnetic Fields (OET Bulletin 65)

**⚠ WARNING! NEVER** connect the transceiver to an AC outlet. This may pose a fire hazard or result in an electric shock.

**⚠ WARNING! NEVER** operate the transceiver while driving a vehicle. Safe driving requires your full attention—anything less may result in an accident.

**NEVER** connect the transceiver to a power source of more than 16 V DC. This will ruin the transceiver.

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

**NEVER** cut the DC power cable between the DC plug and fuse holder. If an incorrect connection is made after cutting, the transceiver may be damaged.

**NEVER** place the transceiver where normal operation of the vehicle may be hindered or where it could cause bodily injury.

**NEVER** let objects impede the operation of the cooling fan on the rear panel.

**DO NOT** push the PTT when not actually desiring to transmit.

**DO NOT** allow children to play with any radio equipment containing a transmitter.

During mobile operation, **DO NOT** operate the transceiver without running the vehicle's engine. When the transceiver's power is ON and your vehicle's engine is OFF, the vehicle's battery will soon become exhausted.

**BE CAREFUL!** The transceiver will become hot when operating it continuously for long periods.

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

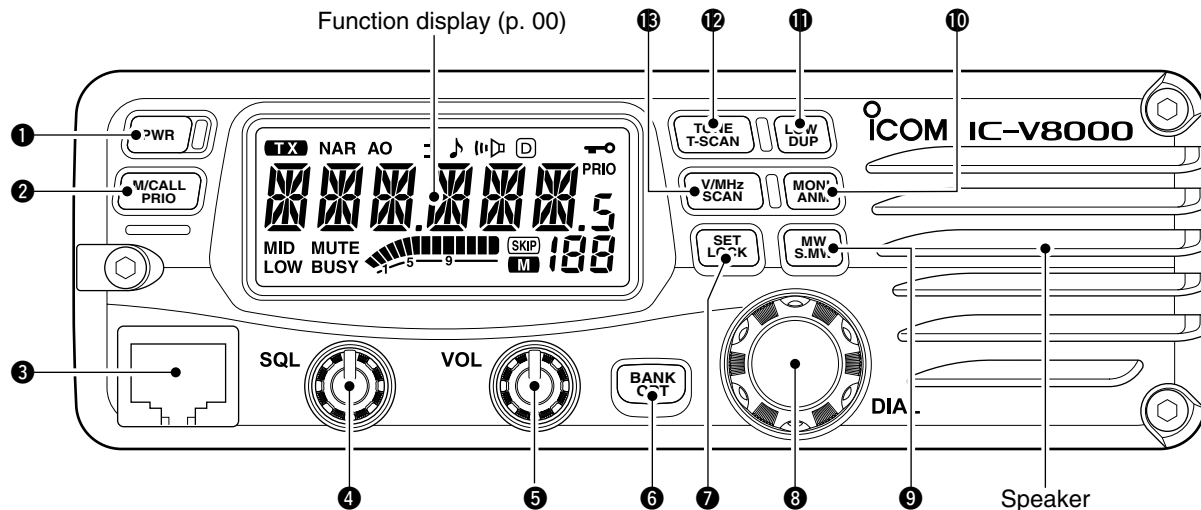
**AVOID** the use of chemical agents such as benzine or alcohol when cleaning, as they can damage the transceiver's surfaces.

**USE** Icom microphones only (supplied or optional). Other manufacturer's microphones have different pin assignments and may damage the transceiver if attached.

# 1

## PANEL DESCRIPTION

### ■ Front panel



#### 1 POWER SWITCH [PWR]

Turns power ON and OFF when pushed for 1 sec.

#### 2 MEMORY/CALL•PRIORITY SWITCH [M/CALL(PRIO)]

(p. 00)

➔ Push to selects and toggles memory, call and weather channel\* mode.

\*Weather channels available for USA versions only.

➔ Starts priority scan when pushed for 1 sec.

#### 3 MICROPHONE CONNECTOR

Connects the supplied microphone. (p. 00)

#### 4 SQUELCH CONTROL [SQL]

Varies the squelch level. (p. 00)

• The RF attenuator activates and increases the attenuation when rotated clockwise to the center position and further.

#### 5 VOLUME CONTROL [VOL]

Adjusts the audio level. (p. 00)

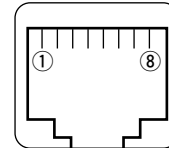
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- ⑥ **BANK•OPTION SWITCH [BANK(OPT)]**
  - ➔ Selects memory memory bank when pushed. (p. 00)
  - ➔ Push for 1 sec. to turn the DTMF decoder ON and OFF when the optional UT-108 is installed. (p. 00)
- ⑦ **SET•LOCK SWITCH [SET(LOCK)]**
  - ➔ Selects set mode when pushed.
  - ➔ Switches the lock function ON and OFF when pushed for 1 sec. (p. 14)
- ⑧ **TUNING DIAL [DIAL]**

Selects the memory channel (p. 00), call channel (pgs. 00, 00, 00), the contents of the set mode display and the scanning direction (p. 00).
- ⑨ **MEMORY WRITE SWITCH [MW(S.MW)]**
  - ➔ Enter to memory edit mode when pushed. (p. 00)
  - ➔ Program into the selected memory channel when pushed for 1 sec. (p. 00)
  - Continue to hold the switch to increment the memory channel automatically.
- ⑩ **MONITOR•CHANNEL NAME SWITCH [MONI(ANM)]**
  - ➔ Push to switch the monitor function ON and OFF. (p. 00)
  - ➔ Push for 1 sec. to toggle the frequency indication and channel name indication. (p. 00)
- ⑪ **OUTPUT POWER SWITCH [LOW(DUP)]**
  - ➔ Each push changes the output power selection. (p. 00)
  - ➔ Select DUP-, DUP+ and simplex operation when pushed for 1 sec. (p. 00)

- ⑫ **TONE/TONE SCAN SWITCH [TONE(T-SCAN)]**
  - ➔ Each push selects a tone function. (p. 00)
    - Tone encoder, pocket beep, tone squelch or tone function OFF can be selected.
  - ➔ Push for 1 sec. to start/stop the tone scan function. (p. 00)
- ⑬ **VFO/MHz TUNING•SCAN SWITCH [V/MHz(SCAN)]**
  - ➔ Selects and toggles VFO mode and 1 MHz or 100 kHz tuning when pushed. (p. 00)
    - Cancels a scan when pushed during scan.
  - ➔ Starts scan when pushed for 1 sec. (p. 00)

◇ **Microphone connector** (front panel view)

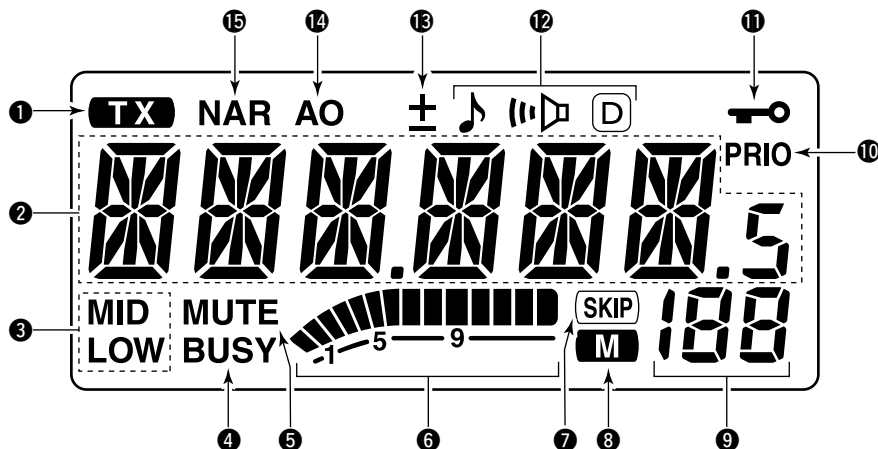


- ① +8 V DC output (Max. 10 mA)
- ② Channel up/down
- ③ 8 V control IN
- ④ PTT
- ⑤ GND (microphone ground)
- ⑥ MIC (microphone input)
- ⑦ GND
- ⑧ Data IN

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# 1 PANEL DESCRIPTION

## ■ Function display



### ① TRANSMIT INDICATOR

- ➔ Appears while transmitting. (p. 00)
- ➔ Flashes while transmitting with the one-touch PTT function. (p. 00)

### ② FREQUENCY READOUT

- Shows the operating frequency, channel names, set mode contents, etc.
- Frequency decimal point flashes while scanning. (p. 00)
  - “d” appears in place of the 1st digit while the DTMF memory function is in use. (p. 00)

### ③ OUTPUT POWER INDICATORS (p. 00)

- “LOW” appears when low output power; “LOW” and “MID” appear when low mid output power; “MID” appears when middle output power is selected

### ④ BUSY INDICATOR

- ➔ Appears when a signal is being received or the squelch is open. (p. 00)
- ➔ Flashes while the monitor function is activated. (p. 00)

### ⑤ AUDIO MUTE INDICATOR (p. 00)

- Appears when the audio mute function is activated via microphone control.

**6 S/R F INDICATORS**

- Show the relative signal strength while receiving signals. (p. 00)
- Show the output power level while transmitting. (p. 00)

**7 SKIP INDICATOR** (p. 00)

Appears when the displayed memory channel is specified as a skip channel.

**8 MEMORY INDICATOR** (p. 00)

Appears when memory mode is selected.

**9 MEMORY CHANNEL NUMBER INDICATORS**

- Shows the selected memory channel number. (p. 00)
- “C” appears when the call channel is selected. (p. 00)

**10 PRIORITY WATCH INDICATOR** (p. 00)

Appears while the priority watch is activated; flashes while the watch is paused.

**11 LOCK INDICATOR** (p. 00)

Appears when the lock function is activated.

**12 TONE INDICATORS**

- “J” appears while the subaudible tone encoder is in use. (p. 00)
- “D” appears while the tone (CTCSS) squelch function is in use. (p. 00)
- “D ” appears while the tone (DTCS) squelch function is in use. (p. 00)
- “H” appears with the “D” or “D ” indicator while the pocket beep function (CTCSS or DTCS) is in use. (p. 00)

**13 DUPLEX INDICATORS** (p. 00)

“+” appears when positive duplex, “-” appears when negative duplex operation is selected.

**14 AUTO POWER-OFF INDICATOR** (p. 00)

Appears while the auto power-off function is in use.

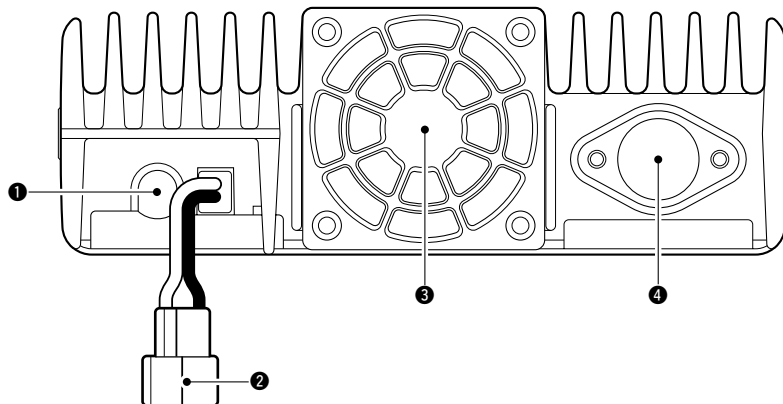
**15 NARROW MODE INDICATOR** (p. 00)

Appears when the narrow mode is selected.

\*The narrow mode is available with some version

# 1 PANEL DESCRIPTION

## ■ Rear panel



### ① SPEAKER JACK [SP]

Accepts an 8  $\Omega$  speaker.

- Audio output power is more than 2.0 W.

### ② POWER RECEPTACLE [DC13.8V]

Accepts 13.8 V DC  $\pm 15\%$  with the supplied DC power cable.

**NOTE: DO NOT** use a cigarette lighter socket as a power source when operating in a vehicle. The plug may cause voltage drops and ignition noise may be superimposed onto transmit or receive audio.

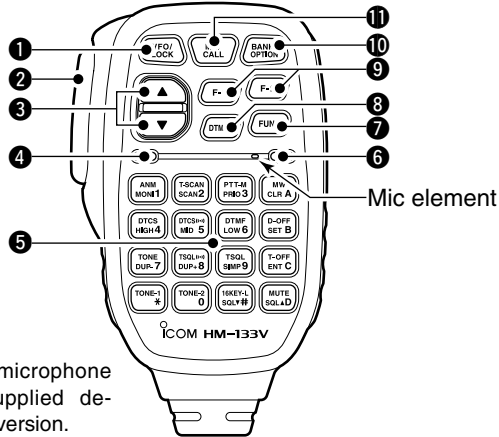
### ③ COOLING FAN

### ④ ANTENNA CONNECTOR [ANT]

Connects a 50  $\Omega$  antenna with a PL-259 connector and a 50  $\Omega$  coaxial cable.



## Microphone (HM-133V\*)



\*A different microphone may be supplied depending on version.

### 1 VFO/LOCK SWITCH [VFO/LOCK]

- Push to select VFO mode. (p. 00)
- Push for 1 sec. to switch the lock function ON and OFF. (p. 00)

### 2 PTT SWITCH

- Push and hold to transmit; release to receive.
- Switches between transmitting and receiving while the one-touch PTT function is in use. (p. 00)

### 3 UP/DOWN SWITCHES [▲]/[▼]

- Push either switch to change memory channel, call channel, set mode contents, etc. (pgs. 00, 00)
- Push either switch for 1 sec. to start scanning. (p. 00)

### 4 ACTIVITY INDICATOR

- Lights red while any key, except [FUNC] and [DTMF-S], is pushed, or while transmitting.
- Lights green while the one-touch PTT function is in use.

### 5 KEYPAD (p. 00)

### 6 FUNCTION INDICATOR

- Lights orange while [FUNC] is activated—indicates the secondary function of switches can be accessed.
- Lights green when [DTMF-S] is activated—DTMF signals can be transmitted with the keypad.

### 7 FUNCTION SWITCH [FUNC] (p. 00)

### 8 DTMF MEMORY SELECT SWITCH [DTMF-S] (p. 00)

### 9 FUNCTION SWITCHES [F-1]/[F-2] (p. 00)

- Assign your desired key function from the front panel switches.
  - Default settings are [LOW(DUP)] for [F-1] and [TONE(T-SCAN)] for [F-2] ([T-SCAN] when pushed and held).

### 12 BANK/OPTION SWITCH [BANK/OPTION]

- Push to select memory bank. (p. 00)
- Push for 1 sec. to activate the installed optional unit. (p. 00)













### 6 MEMORY/CALL SWITCH [MR/CALL]









- Push to select memory mode. (p. 00)
- Push for 1 sec. to select call channel. (p. 00)

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# 1 PANEL DESCRIPTION

## ■ Microphone keypad

KEY	FUNCTION	SECONDARY FUNCTION (after  )	OTHER FUNCTIONS
	Switches between opening and closing the squelch.	Switches between frequency indication and memory names indication. (p. 00)	After  : Transmit the appropriate DTMF code or push [0] to [9], [A] to [D] to transmit the DTMF memory contents when the DTMF memory encoder is activated. (p. 00)
	Starts and stops scanning. (p. 00)	Starts and stops tone scanning. (p. 00)	
	Starts and stops priority watch. (p. 00)	Turns the one-touch PTT function ON and OFF. (p. 00)	
	Selects high output power. (p. 00)	Turns the DTCS squelch ON. (p. 00)	
	Selects mid. output power. (p. 00)	Turns the DTCS pocket beep function ON. (p. 00)	
	Selects low output power (p. 00)	Turns the DTMF memory encoder function ON. (p. 00)	
	Selects minus duplex operation. (p. 00)	Turns the subaudible tone encoder ON. (p. 00)	
	Selects plus duplex operation. (p. 00)	Turns the CTCSS pocket beep function ON. (p. 00)	
	Selects simplex operation. (p. 00)	Turns the tone squelch function ON. (p. 00)	
	No primary function.	Sends a 1750 Hz tone signal while pushing and holding. (p. 00)	

KEY	FUNCTION	SECONDARY FUNCTION (after  )	OTHER FUNCTIONS
	<ul style="list-style-type: none"> <li>➔ Clears a digit before entry. (p. 00)</li> <li>➔ Cancels the scan, priority watch or DTMF memory function. (pgs. 00, 00)</li> <li>➔ Exit set mode (p. 00)</li> <li>➔ Increases the set mode selection order after entering set mode. (p. 00)</li> </ul>	<ul style="list-style-type: none"> <li>➔ Writes memory contents into the call channel. (p. 00)</li> <li>➔ Advances the memory channel number when continuously pushed after programming is completed. (p. 00)</li> </ul>	<p>[A] to [D] transmit DTMF memories. (p. 00)</p>
	Enters set mode and advances the set mode selection.	DTMF memory OFF.	
	<ul style="list-style-type: none"> <li>➔ Sets the keypad for numeral input (p. 00)</li> <li>➔ Decreases the set mode selection order after entering set mode.</li> </ul>	Turns the subaudible tone encoder, pocket beep or CTCSS/DTCS tone squelch OFF. (pgs. 00, 00, 00)	
	Adjusts the squelch level increments. (p. 00)	<p>Mutes the audio. (p. 00)</p> <ul style="list-style-type: none"> <li>• Mute function is released when any operation is performed.</li> </ul>	
	No primary function.	Locks the digit keys on the keypad (including the A to D, # and * keys. (p. 14)	
	Adjusts the squelch level decrement.	Sends a 1750 Hz tone signal for 0.5 sec. (p. 00)	<p>After :</p> <p>Transmits the appropriate DTMF code. (p. 00)</p>

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## ■ Location

Select a location which can support the weight of the transceiver and does not interfere with driving in any way. We recommend the locations shown in the diagram below.

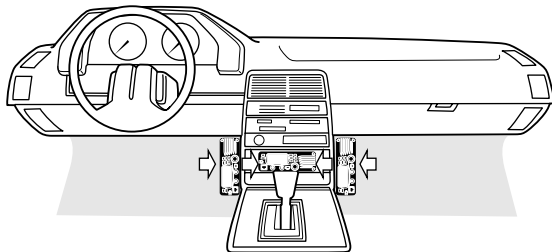
**NEVER** place the transceiver where normal operation of the vehicle may be hindered or where it could cause bodily injury.

**NEVER** place the transceiver where air bag deployment may be obstructed.

**DO NOT** place the transceiver where hot or cold air blows directly onto it.

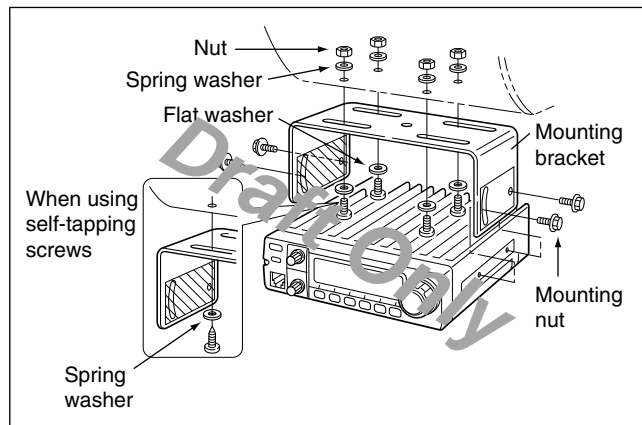
**AVOID** placing the transceiver in direct sunlight.

### • Example— Installation location



## ■ Using the mounting bracket

- ① Drill 4 holes where the mounting bracket is to be installed.
  - Approx. 5.5–6 mm ( $\frac{3}{16}$ " ) when using nuts; approx. 2–3 mm ( $\frac{1}{16}$ " ) when using self-tapping screws.
- ② Insert the supplied screws, nuts and washers through the mounting bracket and tighten.
- ③ Adjust the angle for the clearest view of the function display.



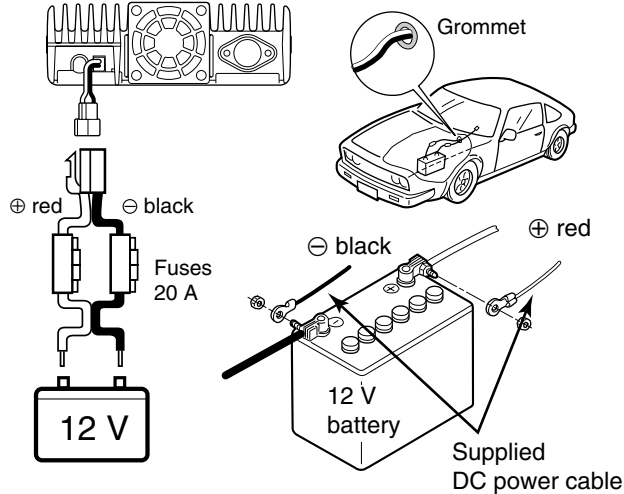
## ■ Battery connection

- ⚠ **NEVER** connect the transceiver directly to a 24 V battery.
- ⚠ **DO NOT** use the cigarette lighter socket for power connections.

Attach a rubber grommet when passing the DC power cable through a metal plate to prevent short circuits.

### • CONNECTING TO A DC POWER SOURCE

- See p. 00 for fuse replacement.



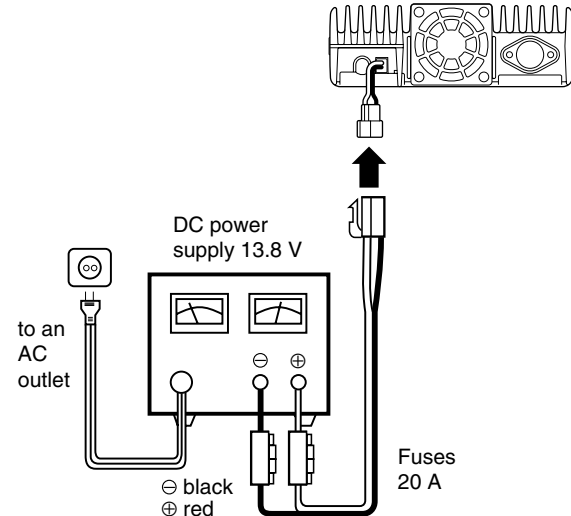
## ■ DC power supply connection

Use a 13.8 V DC power supply with more than 12 A capacity.

Make sure the ground terminal of the DC power supply is grounded.

### • CONNECTING TO A DC POWER SUPPLY

- See p. 00 for fuse replacement.



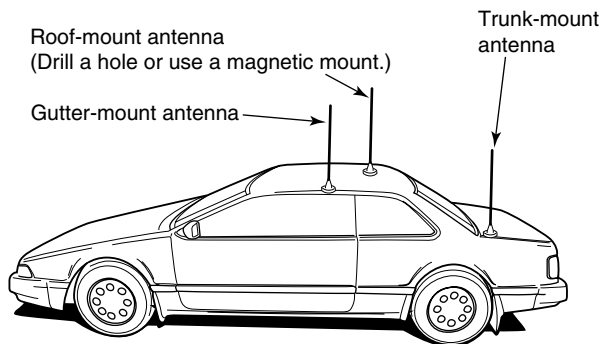
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## 2 INSTALLATION

### ■ Antenna installation

#### ◇ Antenna location

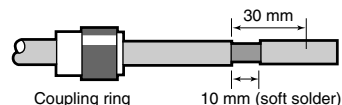
To obtain maximum performance from the transceiver, select a high-quality antenna and mount it in a good location. A non-radial antenna should be used when using a magnetic mount.



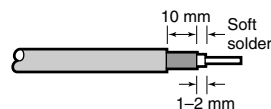
#### ◇ Antenna connector

The antenna uses a PL-259 connector.

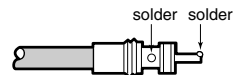
#### • PL-259 CONNECTOR



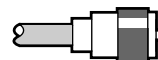
- ① Slide the coupling ring down. Strip the cable jacket and soft solder.



- ② Strip the cable as shown at right. Soft solder the center conductor.



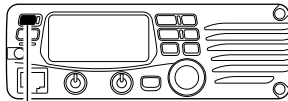
- ③ Slide the connector body on and solder it.



- ④ Screw the coupling ring onto the connector body. (10 mm  $\approx$   $\frac{3}{8}$  in)

## ■ Preparation

### ◇ Turning power ON/OFF

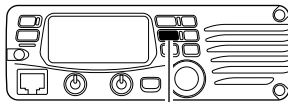


Push [PWR] for 1sec.

➔ Push [PWR] for 1 sec. to turn power ON or OFF.

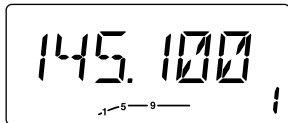
### ◇ VFO mode selection

The transceiver has 2 basic operating modes: VFO mode and memory mode.



Push [V/MHz(SCAN)]

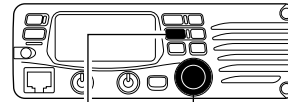
➔ Push [V/MHz(SCAN)] to select VFO mode.



➔ Push [VFO/LOCK] to select VFO mode.

## ■ Using the tuning dial

① Rotate the tuning dial to set the frequency.

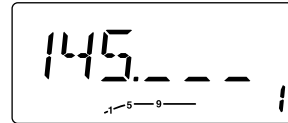


[V/MHz(SCAN)] Tuning dial

- If VFO mode is not selected, push [V/MHz(SCAN)] to select VFO mode.

- The frequency changes according to the selected tuning steps. (p. 00)

② To change the frequency in 1 MHz (10 MHz for some versions) steps, push [V/MHz(SCAN)], then rotate the tuning dial.



The display shows that the 1 MHz tuning step is selected.

- Pushing [V/MHz(SCAN)] for 1 sec. starts scan function. If scan starts, push [V/MHz(SCAN)] again to cancel it.



Note that in this manual, sections beginning with a microphone icon (as above), designate operation via the HM-133V microphone.

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### 3 SETTING A FREQUENCY

#### ■ Using the keypad

The frequency can be directly set via numeral keys on the microphone.



- 1 Push [VFO/LOCK] to VFO mode, if necessary.
- 2 Push [ENT C] to activate the keypad for digit input.
- 3 Push 6 keys to input a frequency.
  - When a digit is mistakenly input, push [ENT C] to clear the input, then repeat input from the 1st digit.
  - Pushing [CLR A] clears input digits and retrieves the frequency.

**[EXAMPLE]:** Setting frequency to 145.3625 MHz.

Push

145.600

Push

.

Push



145.60

Push



145.602.5

#### ■ Using the [▲]/[▼] keys



- Push [▲] or [▼] to select the desired frequency.
  - Pushing [▲] or [▼] for more than 0.5 sec. activates a scan. If scan starts, push [▲] or [▼] again to cancel it.



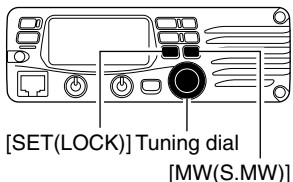
## ■ Tuning step selection

### USING SET MODE

Tuning steps are the minimum frequency change increments when you rotate the tuning dial or push [▲]/[▼] on the microphone. The following tuning steps are available.

- 5 kHz      • 10 kHz      • 12.5 kHz      • 15 kHz
- 20 kHz      • 25 kHz      • 30 kHz      • 50 kHz

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



15 kHz tuning step

- ① Push [V/MHz(SCAN)] to select VFO mode, if necessary.
- ② Push [SET(LOCK)] to enter set mode.
- ③ Push [SET(LOCK)] or [MW(S.MW)] several times until "TS" appears as shown below.
  - Cancel the DTMF memory function in advance, if necessary.
- ④ Rotate the tuning dial to select the desired tuning step.
- ⑤ Push [V/MHz(SCAN)] to exit set mode.



- 1 Push [VFO/LOCK] to select VFO mode, if necessary.
- 2 Push [SET B] to enter set mode.
- 3 Push [SET B] or [ENT C] several times until "TS" appears.
- 4 Push [▲] or [▼] to select the desired tuning step.
- 5 Push [CLR A] to exit set mode.

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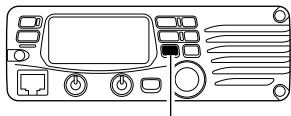
### 3 SETTING A FREQUENCY

## ■ Lock functions

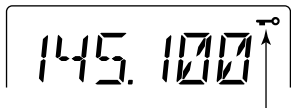
To prevent accidental channel changes and unnecessary function access, use the lock function. The transceiver has 2 different lock functions.

### ◇ Frequency lock

This function locks the tuning dial and switches electronically and can be used together with the microphone lock function.



Push [SET(LOCK)] for 1 sec.



Appears

➔ Push [SET(LOCK)] for 1 sec. to turn the lock function ON and OFF.

- [PTT], [MONI(ANM)], [VOL] and [SQL] can be used while the channel lock function is in use. Also, TONE-1, TONE-2, DTMF tones or DTMF memory contents can be transmitted from the microphone.



➔ Push [VFO/LOCK] for 1 sec. to switch the lock function ON and OFF.

### ◇ Microphone keypad lock

This function locks the microphone keypad.

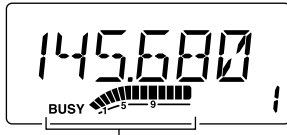


➔ Push [FUNC] then [SQL▼D(16KEY-L)] to switch the microphone keypad lock function ON and OFF.

- [PTT], [VFO/LOCK], [MR/CALL], [BANK/OPTION], [▲], [▼], [F-1], [F-2], [DTMF-S] and [FUNC] on the microphone can be used.
- All switches on the transceiver can be used.
- The keypad lock function is released when the power is turned OFF then ON again.

## ■ Receiving

- ① Push [PWR] for 1 sec. to turn power ON.
- ② Set the audio level.
  - ➔ Push [MONI(ANM)] to open the squelch.
  - ➔ Rotate the [VOL] control to adjust the audio output level.
  - ➔ Push [MONI(ANM)] again to close the squelch.
- ③ Set the squelch level.
  - ➔ Rotate [SQL] fully counterclockwise in advance.
  - ➔ Rotate [SQL] clockwise until the noise just disappears.
  - ➔ When interference is received, rotate [SQL] clockwise again for attenuator operation.
- ④ Set the operating frequency. (pgs. 00, 00)
- ⑤ When receiving a signal on the set frequency, squelch opens and the transceiver emits audio.



Appears when receiving a signal.

- “BUSY” appears and the S/R/F indicator shows the relative signal strength for the received signal.

### ✓CONVENIENT!

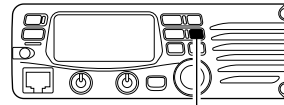


The squelch level can also be adjusted with [SQL▲ D(MUTE)] and [SQL▼ # (16KEY-L)] on the microphone.

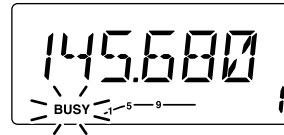


## ■ Monitor function

This function is used to listen to weak signals without disturbing the squelch setting or to open the squelch manually even when mute functions such as the tone squelch are in use.



Push [MONI(ANM)]



- ➔ Push [MONI(ANM)] to open the squelch.
  - “BUSY” flashes
  - Push [MONI(ANM)] again to cancel the function.



- ➔ Push [MONI 1] to open the squelch.
  - Push [MONI 1] again to cancel the function.

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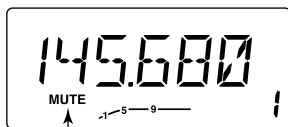
## 4 BASIC OPERATION

### ■ Audio mute function

This function temporarily mutes the audio without disturbing the volume setting.



- 1 Push [FUNC] then [SQL▲ D(MUTE)] to mute audio signals.
  - “MUTE” appears.
- 2 Push [CLR A] (or any other key) to cancel the function.
  - “MUTE” disappears.



Appears

### ■ Squelch attenuator

The transceiver has an RF attenuator related to the squelch level setting. Approx. 10 dB attenuation is obtained at maximum setting.

- Rotate [SQL] clockwise past the 12 o'clock position to activates the squelch attenuator.
  - Attenuation level can be adjusted up to 10 dB (approx.) between 12 o'clock and fully clockwise position.
  - When setting the squelch via from the microphone, the level “19” or larger setting to acitvates the squelch attenuator.

### ■ Transmitting

**CAUTION:** Transmitting without an antenna will damage the transceiver.

🔊 **NOTE:** To prevent interference, listen on the channel before transmitting by pushing [MONI(ANM)] or [MONI 1] on the microphone.





- ① Set the operating frequency. (pgs. 00, 00)
  - Select output power if desired. See section at right for details.
- ② Push and hold [PTT] to transmit.
  - “TX” appears.
  - The S/Rf indicator shows the output power selection.
  - A one-touch PTT function is available. See p. 00 for details.
- ③ Speak into the microphone using your normal voice level.
  - DO NOT hold the microphone too close to your mouth or speak too loudly. This may distort the signal.
- ④ Release [PTT] to return to receive.

## ■ Selecting output power

The transceiver has 4\* output power levels to suit your operating requirements. Low output powers during short-distance communications may reduce the possibility of interference to other stations and will reduce current consumption.

\*The Thailand and Taiwan versions have only 2 levels.

Push [LOW(DUP)] several times to select the output power.

S/R/F INDICATOR	POWER OUTPUT		
		Thailand	Taiwan
High: 	70 W	10 W	25 W
Mid.: 	25 W*	N/A	N/A
Mid. Low: 	10 W*	N/A	N/A
Low: 	5 W*	5 W*	5 W*

• The output power can be changed while transmitting. \*approx.

The microphone can also be used to select output power.



➔ Push [HIGH 4] for high output power; [MID 5] for middle high output power; and [LOW 6] for low output power.



• The output power CANNOT be changed via the microphone while transmitting.



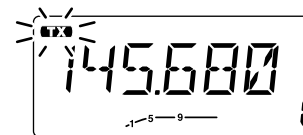
## ■ One-touch PTT function

The PTT switch can be operated as a one-touch PTT switch (each push switches transmit/receive). Using this function you can transmit without pushing and holding the PTT switch.

To prevent accidental, continuous transmissions with this function, the transceiver has a time-out timer. See p. 00 for details.



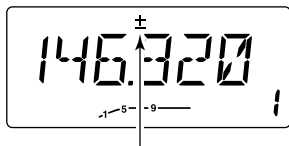
- Push [FUNC] then [PRIO 3(PTT-M)] to turn the one-touch PTT function ON.
  - The activity indicator lights green.
- Push [PTT] to transmit and push again to receive.
  - Two beeps sound when transmission is started and a long beep sounds when returning to receive.
  - “TX” flashes when transmitting with the one-touch PTT function.
- Push [FUNC] then [PRIO 3(PTT-M)] to turn the one-touch PTT function OFF.
  - The activity indicator goes out.



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## ■ Accessing a repeater

- ① Set the receive frequency (repeater output frequency). (pgs. 00–00)
- ② Push [LOW(DUP)] for 1 sec., one or two times, to select minus duplex or plus duplex.



Either “-” or “+” appears.

- “-” or “+” appears to indicate the transmit frequency for minus shift or plus shift, respectively.
- When the auto repeater function is turned ON (available for the USA version only), steps ② and ③ are not necessary. (p. 00)

- ③ Push [TONE(T-SCAN)] several times to turn ON the subaudible tone encoder, according to repeater requirements.
  - “♪” appears
  - 88.5 Hz is set to default; refer to p. 00 for tone frequency settings.
  - When the repeater requires a different tone systems, see p. 00.
- ④ Push and hold [PTT] to transmit.
  - The displayed frequency automatically changes to the transmit frequency (repeater input frequency).
  - If “OFF” appears, confirm that the offset frequency (p. 00) is set correctly.
- ⑤ Release [PTT] to receive.
- ⑥ Push [MONI(ANM)] to check weather the other station’s transmit signal can be received directly.
- ⑦ To return to simplex operation, push [LOW(DUP)] for 1 sec., once or twice, to clear the “-” or “+” indicator.

- ⑧ To turn OFF the subaudible tone encoder, push [TONE(T-SCAN)] several times until no tone indicators appear.

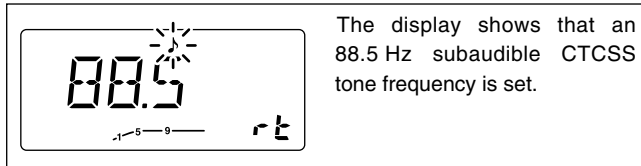


- ① Set the receive frequency (repeater output frequency). (pgs. 00–00)
- ② Push [DUP- 7] to select minus duplex; push [DUP+ 8] to select plus duplex.
- ③ Push [FUNC] then [DUP- 7(TONE)] to turn ON the subaudible tone encoder according to repeater requirements.
  - Refer to p. 00 for the tone setting.
  - When the repeater requires a different tone system, see p. 00.
- ④ Push and hold [PTT] to transmit.
- ⑤ Release [PTT] to receive.
- ⑥ Push [MONI 1] to check weather the other station’s transmit signal can be received directly.
- ⑦ To return to simplex operation, push [SIMP 9].
- ⑧ To turn OFF the subaudible tone encoder, push [FUNC] then [ENT C(T-OFF)].



## ■ Subaudible tones USING SET MODE

(Encoder function)



### ◇ Subaudible tones

- ① Select the mode/channel you wish to set the subaudible tones to, such as VFO mode or memory/channel.
- ② Push [SET(LOCK)] until “♪” and “rt” appears; or until “⌘” and “Ct” appears for tone squelch or pocket beep use.
  - Push [MONI(ANM)] to reverse the order of selection.
  - Cancel the DTMF memory encoder function in advance, if necessary. (p. 00)
- ③ Rotate the tuning dial to select and set the desired subaudible frequency.
- ④ Push [V/MHz(SCAN)] to exit set mode.

**NOTE:** The subaudible tone encoder frequency can be set in a memory channel temporarily. However, the set contents are cleared once the memory/call mode is selected. To store the tone frequency permanently, overwrite the channel information.



- ① Set the mode/channel you wish to set the subaudible tone encoder frequency to, such as VFO mode or memory/channel.
  - The subaudible tone frequency is independently programmed into each mode or channel.
- ② Push [SET B] until “♪” and “rt” appears; or until “⌘” and “Ct” appears for tone squelch or pocket beep use.
  - Pushing [ENT C] reverses the order of selection.
  - Cancel the DTMF memory encoder function in advance, if necessary. (p. 00)
- ③ Push [▲] or [▼] to select and set the desired subaudible tone frequency.
  - Push and hold [▲]/[▼] to change the above tones continuously.
- ④ Push [CLR A] to exit set mode.

### • Subaudible tone frequency list (unit: Hz)

67.0	79.7	94.8	110.9	131.8	156.7	171.3	186.2	203.5	229.1
69.3	82.5	97.4	114.8	136.5	159.8	173.8	189.9	206.5	233.6
71.9	85.4	100.0	118.8	141.3	162.2	177.3	192.8	210.7	241.8
74.4	88.5	103.5	123.0	146.2	165.5	179.9	196.6	218.1	250.3
77.0	91.5	107.2	127.3	151.4	167.9	183.5	199.5	225.7	254.1

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## 5 REPEATER OPERATION

### ◇ DTMF tones



➔ Push [DTMF-S], then push the keys of the desired DTMF digits.

- The function indicator lights green.
- 0–9, A–D, \* (E) and # (F) are available.
- Cancel the DTMF memory encoder function in advance, if necessary. (p. 00)
- Push [DTMF-S] again to return the keypad to normal function control.
- The transceiver has 14 DTMF memory channels for autopatch operation. See p. 00 for details.

### ◇ 1750 Hz tone



The microphone has 1750 Hz tone capability, used for ring tone when calling, etc.

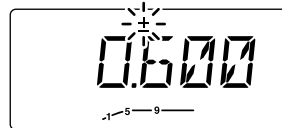


- 1 Push [FUNC].
  - The mode indicator lights orange.
- 2 Push [TONE-1] to transmit a 1750 Hz tone call signal for 0.5 sec.; push and hold [TONE-2] to transmit a 1750 Hz tone call signal for an arbitrary period.
  - The mode indicator goes out automatically.

### ■ Offset frequency

USING SET MODE

When communicating through a repeater, the transmit frequency is shifted from the receive frequency by an amount determined by the offset frequency.



- ① Push [SET(LOCK)] to enter set mode.
- ② Push [SET(LOCK)] until “±” and offset frequency appear.
- ③ Rotate the tuning dial to set the desired offset frequency.
- ④ Push [V/MHz(SCAN)] to exit set mode.

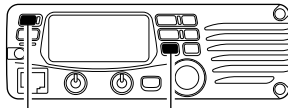


## ■ Auto repeater USING INITIAL SET MODE (USA version only)

The USA version automatically activates the repeater settings (DUP- or DUP+ and tone encoder ON/OFF) when the operating frequency falls within the general repeater output frequency range and deactivates them when outside of the range.

### ◇ Setting the auto repeater function ON/OFF

- ① Push [PWR] to turn power OFF.
- ② While pushing [SET(LOCK)], turn power ON to enter initial set mode.



While pushing [SET(LOCK)],  
turn power ON.

- ③ Push [SET(LOCK)] several times until the “RPT” display appears as shown below.

- ④ Rotate the tuning dial to turn the repeater lockout function to “R1,” “R2” or OFF.



Auto repeater function is  
turned OFF.



Auto repeater function is ON,  
tone encoder is ON.

- “R1”: auto repeater is ON, tone encoder is OFF.
- “R2”: auto repeater is ON, tone encoder is ON.

- ⑤ Push [PWR] to exit initial set mode.

### ◇ Frequency range and offset direction

Frequency range	Duplex direction
145.200–145.495 MHz 146.610–146.995 MHz	“-” appears
147.000–147.395 MHz	“+” appears

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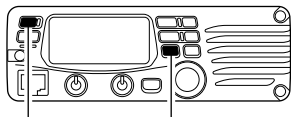
## 5 REPEATER OPERATION

### ■ Repeater lockout

USING INITIAL SET MODE

This function helps prevent interference to other stations by inhibiting your transmission when a signal is received. The transceiver has two inhibiting conditions, repeater and busy.

- ① Push [PWR] to turn power OFF.
- ② While pushing [SET(LOCK)], turn power ON to enter initial set mode.

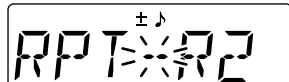


While pushing [SET(LOCK)],  
turn power ON.

- ③ Push [SET(LOCK)] several times until the “RLO” display appears as shown below.
- ④ Rotate the tuning dial to turn the repeater lockout function to “RP,” “BU” or OFF.



Auto repeater function is  
turned OFF.



Auto repeater function is ON,  
tone encoder is ON.

- “RP”: Transmit is inhibited when the tone squelch is closed.
  - “BU”: Transmit is inhibited when a signal is received.
- ⑤ Push [PWR] to exit initial set mode.

### ■ Reversed duplex mode

USING SET MODE

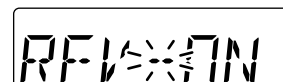
When the reversed duplex mode is selected, the receive frequency shifts. (Transmit frequency shifts in normal duplex mode.) Each receive and transmit frequency is shown in the table below with the following conditions;

Input frequency : 145.30 MHz  
Direction : – (negative)  
Offset frequency : 0.6 MHz

- ① Push [SET(LOCK)] to enter set mode.

Reversed	OFF	ON
Rx frequency	145.30 MHz	144.70 MHz
Tx frequency	144.70 MHz	145.30 MHz

- ② Push [SET(LOCK)] several times until the “REV” display appears as shown below.
- ④ Rotate the tuning dial to turn the repeater lockout function to ON or OFF.



Reverse duplex mode is  
turned ON.

- ⑤ Push [V/MHz(SCAN)] to exit set mode.

## ■ General description

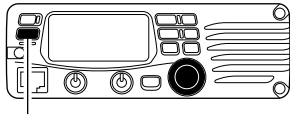
The transceiver has 207 memory channels including 6 scan edge memory channels (3 pairs), and 1 call channel. Each of these channels can be individually programmed with operating frequency (p. 00), duplex direction (p. 00), subaudible tone encoder or tone squelch and its tone frequency (pgs. 00, 00) and skip information.\* (p. 00)

In addition, a total of 10 memory banks, A to J, are available for making groups with usage, etc.

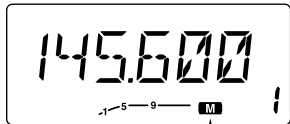
\*except for scan edge memory channels.

## ■ Memory channel selection

### ◇ Using the tuning dial



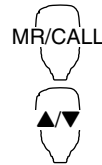
Push [M/CALL(PRIO)] to select memory mode.



Appears

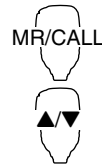
- ① Push [M/CALL(PRIO)] once or twice to select memory mode.
  - “M” indicator appears
- ② Rotate the tuning dial to select the desired memory channel.
  - Programmed memory channel can only be selected.

### ◇ Using the [▲]/[▼] keys



- ① Push [MR/CALL] to select memory mode.
- ② Push [▲] or [▼] to select and set the desired memory channel.
  - Pushing [▲] or [▼] for more than 0.5 sec. activates a scan.
  - If scan is activated, push [▲] or [▼] again to stop it.

### ◇ Using the keypad



- ① Push [MR/CALL] to select memory mode.
- ② Push [ENT C] to activate the keypad for numeral input.
- ③ Push 3 appropriate digit keys to input a channel number.
  - When inputting non-programmed channel numbers, the previous memory channel appears.
  - Push only 1 appropriate digit key, [MONI 1], [SCAN 2] or [PRIO 3], then push [VOL▼\*] or [SQL▼#] to select scan edge channels. “\*” and “#” can be used for A and b respectively.

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## 6 MEMORY OPERATION

### ■ Programming a memory channel

VFO settings, including the set mode contents such as sub-audible tone frequency, etc., can be programmed into a memory channel.

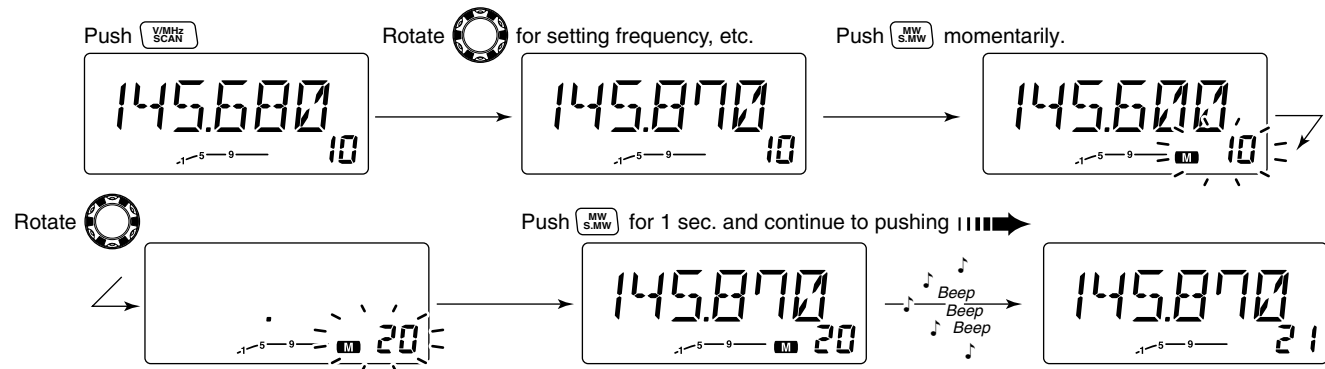
- ① Set the desired frequency in VFO mode.
  - ➔ Push [V/MHz(SCAN)] to select VFO mode.
  - ➔ Set the frequency using the tuning dial.
  - ➔ Set other data (e.g. tone frequency, duplex information, etc.) if required.
- ② Push [MW(S.MW)] momentarily.
  - "M" indicator and the memory channel number blink.

- ③ Rotate the tuning dial to select the memory channel to be programmed.
  - Memory channels not yet programmed are blank.
- ④ Push [MW(S.MW)] for 1 sec. to program.
  - 3 beeps sound
  - Memory channel number automatically advances when continuing to push [MW(S.MW)] after programming.

#### ✓ CONVENIENT

Memory programming can be performed in versatile ways e.g. memory channel to the same (or different) memory channel, memory channel to the call channel, etc.

[EXAMPLE]: Programming 145.870 MHz into memory channel 20 (blank channel) via the front panel.



## ■ Programming a memory channel via the microphone

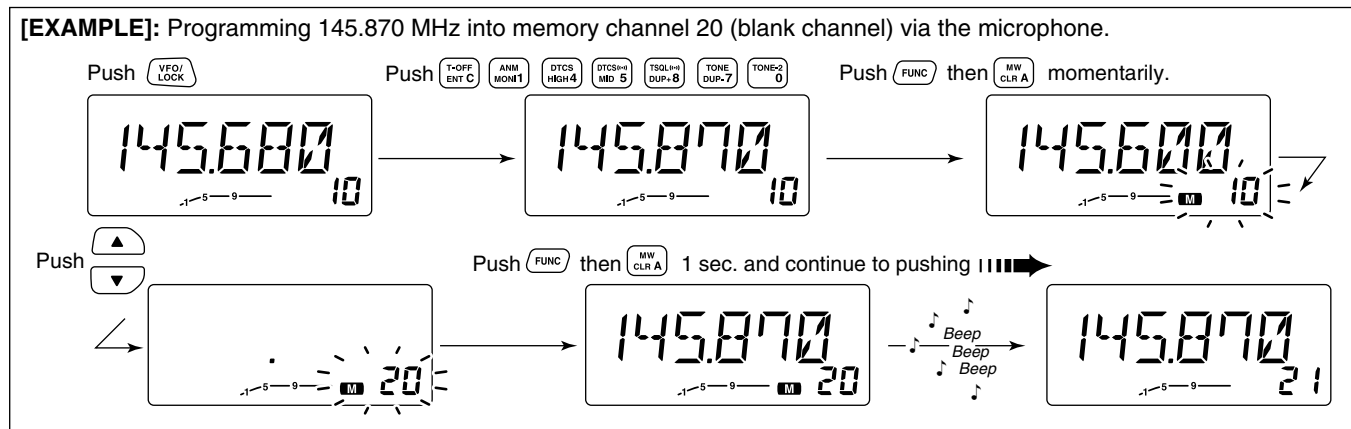


The microphone can also be used to program memory channels.

- 1 Set the desired frequency in VFO mode.
  - ➔ Push [VFO/LOCK]
  - ➔ Set the frequency using the keypad.
  - ➔ Set other data (e.g. offset frequency, duplex direction, sub-audible tone encoder ON/OFF and its frequency), if necessary.
- 2 Push [FUNC], then [CLR A(MW)] momentarily.

- 3 Select the memory channel to be programmed.
  - ➔ Push [▲] or [▼] to select the memory channel (direct numerical input cannot be used).
- 4 Push [FUNC] then [CLR A(MW)] for 1 sec. to program.
  - ➔ 3 beeps may sound and the VFO contents (including the subaudible tone frequency, etc.) are programmed.
  - ➔ Memory channel number advances when continuing to push [CLR A(MW)] after programming.

**[EXAMPLE]:** Programming 145.870 MHz into memory channel 20 (blank channel) via the microphone.



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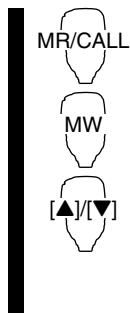
## 6 MEMORY OPERATION

### ■ Transferring memory contents

This function transfers a memory channel's contents to VFO (or another memory/call channel). This is useful when searching for signals around a memory channel frequency and for recalling the offset frequency, subaudible tone frequency etc.

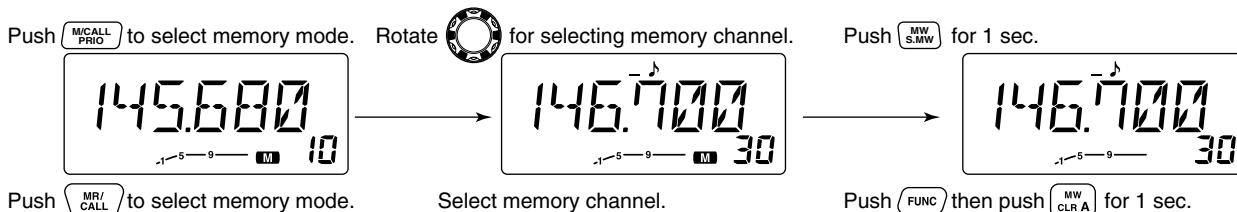
#### ◇ Memory/call→VFO

- ① Select the memory/call channel to be transferred.
  - ➔ Push [M/CALL(PRIO)] to select memory mode, then rotate the tuning dial to select the desired memory channel.
  - ➔ Push [M/CALL(PRIO)] for 1 sec. to select the call channel.
- ② Push [MW(S.MW)] for 1 sec. to transfer the selected memory/call channel contents to the VFO.
  - VFO mode is selected automatically.



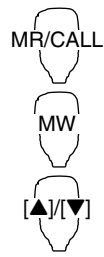
- ① Select the memory/call channel to be transferred.
  - ➔ Push [MR/CALL] to select memory mode, then select the desired memory channel via [▲]/[▼] or keypad.
  - ➔ Push [MR/CALL] for 1 sec. to select the call channel.
- ② Push [FUNC], then [CLR A(MW)] for 1 sec. to transfer the selected memory/call channel contents to the VFO.
  - VFO mode is selected automatically.

[EXAMPLE]: Transferring memory channel 30 contents to VFO.



◇ Memory/call↔call/memory

- ① Select the memory/call channel to be transferred.
  - ➔ Push [M/CALL(PRIO)] to select memory mode, then rotate the tuning dial to select the desired memory channel.
  - ➔ Push [M/CALL(PRIO)] for 1 sec. to select the call channel.
- ② Push [MW(S.MW)] momentarily.
  - “M” indicator and “- -” indication blink.
- ③ Rotate the tuning dial to select the target memory channel.
  - “C” blinks when the call channel is selected.
  - Scan edge channels, 1A/1b, 2A/2b, 3A/3b, can also be selected.
- ④ Push [MW(S.MW)] for 1 sec. to transfer the selected memory/call channel contents to the target memory.
  - The targeted memory and transferred contents are indicated.



- 1 Select the memory/call channel to be transferred.
  - ➔ Push [MR/CALL] to select memory mode, then select the desired memory channel via [▲]/[▼] or keypad.
  - ➔ Push [MR/CALL] for 1 sec. to select the call channel.
- 2 Push [FUNC], then [CLR A(MW)] momentarily.
  - “M” indicator and “- -” indication blink.
- 3 Push [▲]/[▼] to selected the target memory channel.
  - “C” blinks when the call channel is selected.
  - Scan edge channels can also be selected.
  - The keypad cannot be used for the selection.
- 4 Push [FUNC] then push [CLR A(MW)] for 1 sec. to transfer the selected memory/call channel contents to the target memory.
  - The targeted memory and transferred contents are indicated.

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**[EXAMPLE]:** Transferring memory channel 30 contents to channel 31.

Select the memory channel, then push .

Select the memory channel, push then push .

Select the target channel.

Push for 1 sec.

Push then push for 1 sec.

## 6 MEMORY OPERATION

### ■ Memory clearing

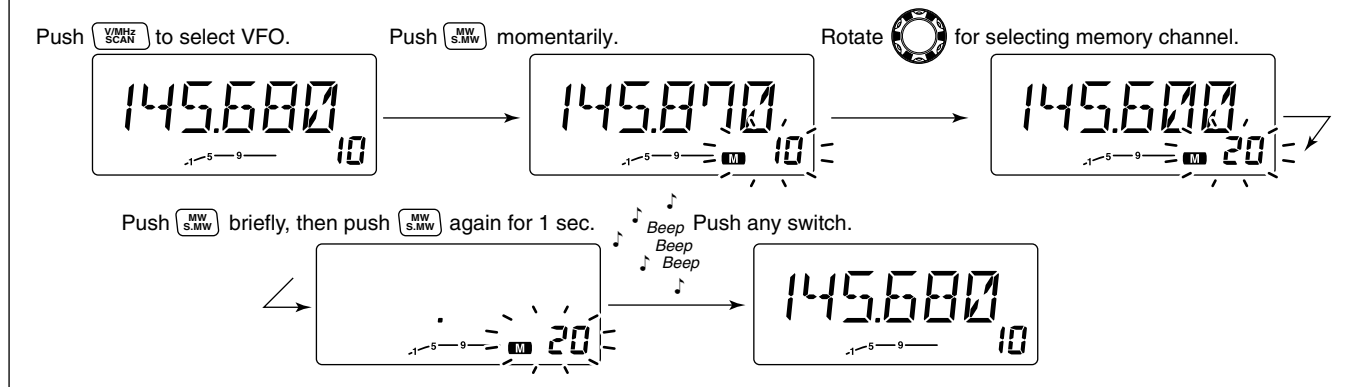
Contents of programmed memories can be cleared (blanked), if desired.

- ① Push [V/MHz(SCAN)] to select VFO mode.
- ② Push [MW(S.MW)] momentarily.
  - “M” indicator and the memory channel number blink.
- ③ Rotate the tuning dial to select the memory channel to be cleared.
  - Memory channels not yet programmed are blank.

- ④ Push [MW(S.MW)] briefly, then push [MW(S.MW)] again for 1 sec.
  - 3 beeps sound, then the frequency is cleared.
  - “M” indicator blinks continuously.
  - Scan edges, 1A/1b, 2A/2b, 3A/3b, and the call channel cannot be cleared.
  - **⚠ This operation must be performed within 1.5 sec.**
- ⑤ Push any switch, except [MW(S.MW)], to return to VFO mode.

⚠ **NOTE:** Be careful!— the contents of cleared memories CANNOT be recalled.

[EXAMPLE]: Clearing memory channel 20.





# Channel names programming

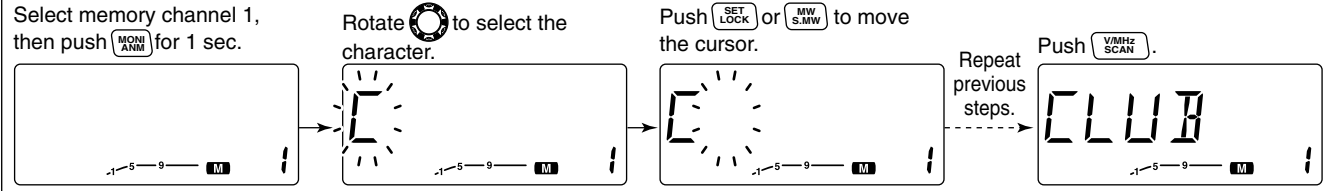
Each memory channel and the call channel can be programmed with an alphanumeric channel names for easy recognition and can be indicated channel independent. Names can be a maximum of 6 characters— see the table below for available characters.

**NOTE:**  
*Scan edge channels CANNOT be programmed with alphanumeric channel names?*

(space)	1 (+)	-- (-)	-- (=)	* (*)	/ (/)	{ (<)	(I)	0 (0)	
1 (1)	2 (2)	3 (3)	4 (4)	5 (5)	6 (6)	7 (7)	8 (8)	9 (9)	A (A)
B (B)	C (C)	D (D)	E (E)	F (F)	G (G)	H (H)	I (I)	J (J)	K (K)
L (L)	M (M)	N (N)	O (O)	P (P)	Q (Q)	R (R)	S (S)	T (T)	U (U)
V (V)	W (W)	X (X)	Y (Y)	Z (Z)					

- 1 Push [M/CALL(PRIO)] to select memory mode.
- 2 Rotate the tuning dial to select the desired memory channel.
- 3 Push [MONI(ANM)] for 1 sec.
  - 3 beeps sound.
- 4 Push [SET(LOCK)] to select the channel names programmable condition.
  - Frequency readouts disappear.
- 5 Rotate the tuning dial to select the desired character.
  - The selected character blinks.
- 6 Push [SET(LOCK)] or [MW(S.MW)] to move the cursor to left or right, respectively.
- 7 Repeat steps 5 and 6 until the desired channel names are displayed.
- 8 Push [V/MHz(SCAN)] to program the name and exit channel names programmable condition.
- 9 Push [MONI(ANM)] for 1 sec. to return to frequency indication if desired.

**[EXAMPLE]:** Programming “CLUB” into memory channel 1.



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## 6 MEMORY OPERATION

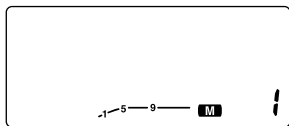


Channel names can also be programmed via the microphone.

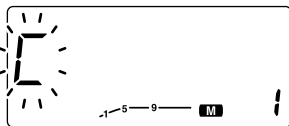
- 1 Select the memory/call channel to be assigned memory names.
  - ➔ Push [MR/CALL] to select memory mode, then select the desired memory channel via [▲]/[▼] or keypad.
    - Scan edge channels can also be selected.
  - ➔ Push [MR/CALL] for 1 sec. to select the call channel.
- 2 Push [FUNC], then [MONI 1(ANM)] momentarily.
- 3 Push [SET B(D-OFF)].
  - Frequency readouts disappear.
- 4 Push [▲]/[▼] to selected the desired character.
  - The selected character blinks.
- 5 Push [SET B(D-OFF)] or [ENT C(T-OFF)] to move the cursor to left or right, respectively.
- 6 Repeat steps 5 and 6 until the desired channel names are displayed.
- 7 Push [SET B(D-OFF)] or [ENT C(T-OFF)] to move the cursor to left or right, respectively.
- 8 Push [CLR A(MW)] to program the name and exit channel names programmable condition.
- 9 Push [FUNC], then push [MONI 1(ANM)] to return to frequency indication if desired.

**[EXAMPLE]:** Programming “CLUB” into memory channel 1.

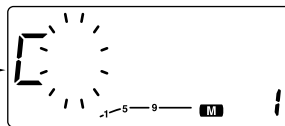
Select memory channel 1,  
push [FUNC], then push [ANM  
MONI 1].



Push [▲]  
[▼] to select the character.

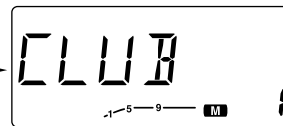


Push [D-OFF  
SET B] or [T-OFF  
ENT C] to move  
the cursor.

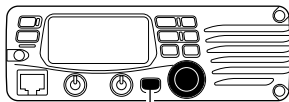


Repeat  
previous  
steps.

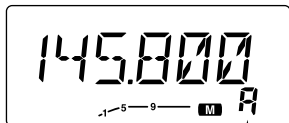
Push [MW  
CLR A].



## ■ Memory bank selection



Push [BANK(OPT)] to select memory bank mode.



Shows bank initial.

- ① Push [M/CALL(PRIO)] to select memory mode, if desired.
- ② Push [BANK(OPT)] to select memory bank selecting condition.
  - Bank initial blinks
- ③ Rotate the tuning dial to select the desired bank.
  - Initials which no contents are programmed banks are skipped.
- ④ Push [BANK(OPT)] to set the bank.
  - Stop blinking.
- ⑤ Rotate the tuning dial to select the contents in the bank.
  - No channel numbers are displayed for memory bank operation.
- ⑥ To return to regular memory condition, push [BANK(OPT)] twice.



- ① Push [MR/CALL] to select memory mode, if desired.
  - ➔ Push [MR/CALL] for 1 sec. to select the call channel.
- ② Push [BANK/OPTION] to select memory bank selecting condition.
  - Bank initial blinks
- ③ Push [▲]/[▼] to select the desired bank.
  - Initials which no contents are programmed banks are skipped.
- ④ Push [BANK/OPTION] to set the bank.
  - Stop blinking.
- ⑤ Push [▲]/[▼] to select the desired contents in the bank.
  - No channel numbers are displayed for memory bank operation.
- ⑥ To return to regular memory condition, push [BANK/OPTION] twice.

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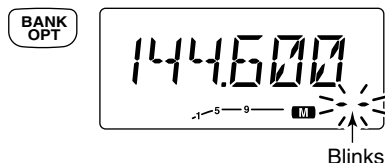
## 6 MEMORY OPERATION

### ■ Memory bank setting

① Push [MR/CALL] to select memory mode, then select the desired memory channel via the tuning dial.

② Push [BANK(OPT)].

- “M” and “- -” indication blink as follow.

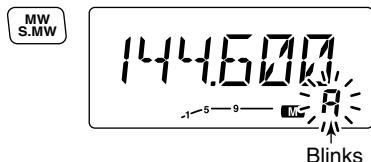


③ Push [BANK(OPT)] again to set the channel to bank setting stand-by condition.

- “M” and “- -” indication blinking stop.

④ Push [MW(S.MW)] then rotate the tuning dial to select the desired bank to be set.

- Bank initial blinks as follow.

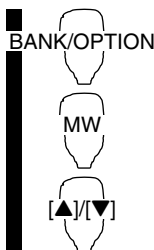


⑤ Push [MW(S.MW)] again to set the channel into the bank.

- Bank initial blinking stops.

⑥ Push [BANK(OPT)] twice to return to regular memory condition.

⑦ Repeat steps ① to ⑥ to set another memory channel into the same or another bank.



① Push [MR/CALL] then select the desired memory channel via [▲]/[▼] or keypad.

② Push [BANK/OPTION].

- “- -” indication blinks.

③ Push [BANK/OPTION] again to set the channel to bank setting stand-by condition.

- “- -” indication blinking stops.

④ Push [FUNC] then [CLR A(MW)] then push [▲]/[▼] to select the desired bank to be set.

- Bank initial blinks.

⑤ Push [CLR A(MW)] to set the channel into the bank.

- Bank initial blinking stops.

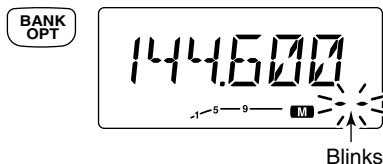
⑥ Push [BANK/OPTION] twice to return to regular memory channel condition.

⑦ Repeat steps ① to ⑥ to set another memory channel into the same or another bank.

## ■ Transferring bank contents

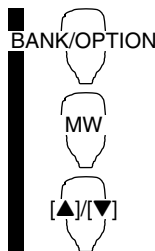
For erasing contents from bank or transferring contents to another bank, bank contents transfer is available.

- ① Select the desired bank contents to be transferred or erased.
  - ➔ Push [MR/CALL] to select memory mode.
  - ➔ Push [BANK(OPT)] then rotate the tuning dial to select the desired memory bank.
    - “M” and bank initial blink.
  - ➔ Push [BANK(OPT)] to select the bank then rotate the tuning dial to select the desired contents.
    - “M” and bank initial blinking stop.
- ② Push [MW(S.MW)] momentarily.
  - “M” and bank initial blink.



- ③ Rotate the tuning dial to select the desired bank initial to transfer or erase.
  - Select “- -” indication when erasing the contents from the bank.
- ④ Push [MW(S.MW)] again.
  - “M” and bank initial or “- -” indication blinking stop.
- ⑤ Push [BANK(OPT)] twice to return to regular memory condition.
- ⑥ Repeat steps ① to ⑤ to transferring or erasing an another

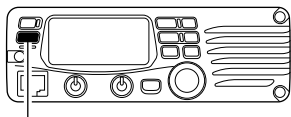
bank contents.



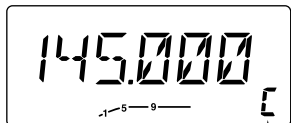
- ① Select the desired bank contents.
  - ➔ Push [MR/CALL] to select memory mode.
  - ➔ Push [BANK/OPTION] then select the desired memory bank via [▲]/[▼].
  - ➔ Push [BANK/OPTION] to select the bank then select the desired contents via [▲]/[▼].
- ② Push [FUNC] then [CLR A(MW)].
  - “M” and bank initial blinks.
- ③ Push [▲]/[▼] to select the desired bank initial to transfer or erase.
  - Select “- -” indication when erasing the contents from the bank.
- ④ Push [CLR A(MW)].
  - “M” and bank initial or “- -” indication blinking stop.
- ⑤ Push [BANK/OPTION] twice to return to regular memory condition.
- ⑥ Repeat steps ① to ⑤ to transferring or erasing an another bank contents.

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## Call channel selection



Push [M/CALL(PRIO)] several times to select the call channel.

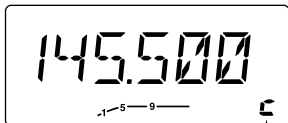


Appears



- ➔ Push [MR/CALL] for 1 sec. to select the call channel.
- Push [MR/CALL] to select memory mode, or push [VFO/LOCK] to select VFO mode.

### ✓ INFORMATION



Small "c" shows VFO was selected from the call channel.

- ➔ Push [M/CALL(PRIO)] several times to select the call channel.
- "C" appears instead of memory channel number.
- Push [M/CALL(PRIO)] once or twice to select memory mode, or push [V/MHz(SCAN)] to select VFO mode.

## Call channel transferring

- ① Push [M/CALL(PRIO)] several times to select the call channel.
  - Large "C" appears.
- ② Push [MW(S.MW)] momentarily, then rotate the tuning dial to select the memory channel to transfer the contents to.
  - To transfer to the VFO, push [MW(S.MW)] for 1 sec.
- ③ Push [MW(S.MW)] for 1 sec. to transfer when a momentary push was used in the previous step.
  - If channel names have been programmed into the call channel, the names also transferred.



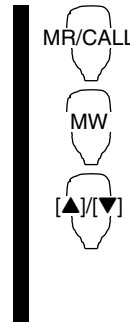
- ① Push [MR/CALL] for 1 sec. to select the call channel.
- ② Push [FUNC], [CLR A(MW)] momentarily, then push [▲]/[▼] to select the memory channel to transfer the contents to.
  - To transfer to the VFO, push [FUNC], then push [CLR A(MW)] for 1 sec.
- ③ Push [FUNC], then [CLR A(MW)] for 1 sec. to transfer when a momentary push was used in the previous step.
- ④ Push [MR/CALL] for 1 sec. to select the call channel.
  - If channel names have been programmed into the call channel, the names also transferred.

## ■ Programming a call channel

In addition to an operating frequency, duplex information, sub-audible to information (ton encoder or tone squelch ON/OFF and its frequency) and an alphanumeric channel names can be programmed into the call channel.

- ① Set the desired frequency in VFO mode.
  - ➔ Push [V/MHz(SCAN)] to select VFO mode.
  - ➔ Set the frequency using the tuning dial.
  - ➔ Set other data as desired.
- ② Push [MW(S.MW)] momentarily.
- ③ Rotate the tuning dial to select the call channel
  - “M” indicator and large “C” blink.

- ④ Push [MW(S.MW)] for 1 sec. to program.
  - 3 beeps sound and return to VFO mode automatically.



- ① Set the desired frequency in VFO mode.
  - ➔ Push [VFO/LOCK] to select VFO mode.
  - ➔ Set the frequency.
  - ➔ Set other data as desired.
- ② Push [FUNC], then [CLR A(MW)] momentarily.
- ③ Select the call channel via [▲] or [▼].
- ④ Push [FUNC] then [CLR A(MW)] for 1 sec. to program.
  - 3 beeps sound and the return to VFO mode automatically.

**[EXAMPLE]:** Programming 145.120 MHz into the call channel via the microphone.

Push **[VFO/LOCK]** to select VFO mode.

Set the frequency.

Push **[FUNC]**, then **[MW CLR A]**.

Push **[▲/▼]** until large “C” appears.

Push **[FUNC]**, then push **[MW CLR A]** for 1 sec. **Beep Beep Beep**

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# 8

## SCAN OPERATION

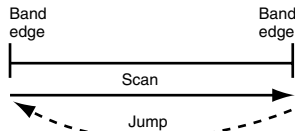
### Scan types

Scanning searches for signals automatically and makes it easier to locate new stations for contact or listening purposes.

There are 3 scan types and 5 resume conditions to suit your operating needs.

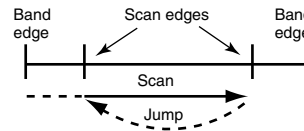
#### FULL SCAN (p. 00)

Repeatedly scans all frequencies over the entire band. Used as the simplest scan without any preliminary settings necessary.



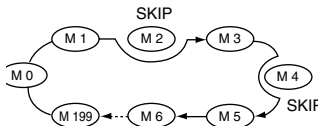
#### PROGRAMMED SCAN (p. 00)

Repeatedly scans between two user-programmed frequencies. Used for checking for frequencies within a specified range such as repeater output frequencies, etc. 3 pairs of scan edges are available.



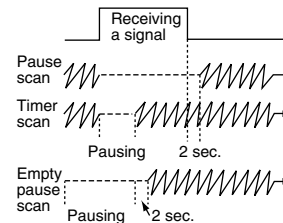
#### MEMORY SCAN (p. 00)

Repeatedly scans memory channels except those set as skip channels. Used for often-called channels and for bypassing normally busy channels such as repeater frequencies.



#### SCAN RESUME CONDITION (p. 00)

5 resume conditions are available: 3 timer scans, pause scan and empty scan. When receiving a signal, pause scan pauses until the signal disappears; timer scans pause for 5, 10 or 15 sec. Empty pause scan pauses until a signal appears.



**NOTE:** A tone scan function is available to search for subaudible tones (e.g. when you want to find a subaudible tone frequency necessary to open a repeater). See p. 00 for details.

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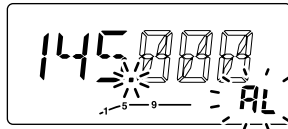
## ■ Scan start/stop

### ◇ Preparation

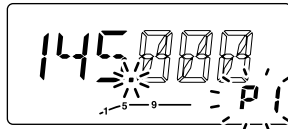
Scan resume condition (p. 00); program the scan edges (p. 00); program 2 or more memory channels (p. 00); set skip settings, if desired (p. 00)

### ◇ Operation

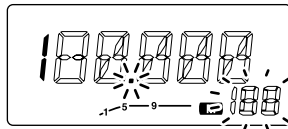
- ① Select VFO mode for full/programmed scan with [V/MHz(SCAN)]; or memory mode for memory scan with [M/CALL(PRIO)].
- ② Set the squelch to the point where noise is just muted.
- ③ Push [V/MHz(SCAN)] for 1 sec. to start the scan.
  - To change the scanning direction, rotate the tuning dial.
  - The memory channel readout blinks the scan type as follows:



During full scan  
Push [SET(LOCK)] to select full or programmed scan in sequence.



During programmed scan  
Indicates scan edge channels.  
• P1 stands for 1A/1b  
• P1 to P3 are available when they are programmed.



During memory scan

- ④ Push [SET(LOCK)] to switch full and programmed scan.
- ⑤ To stop the scan, push [V/MHz(SCAN)].



- ① Push [VFO/LOCK] to select VFO mode for full/programmed scan; push [MR/CALL] to select memory mode for memory scan.
- ② Set the squelch to the point where noise is just muted.
- ③ Push [SCAN 2(T-SCAN)] to start the scan.
  - Push [▲] or [▼] for 1 sec. also starts the scan.
- ④ Push [SET B(D-OFF)] to switch full and programmed scan.
- ⑤ To stop the scan push [SCAN 2(T-SCAN)] or [CLR A(MW)].

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## 8 SCAN OPERATION

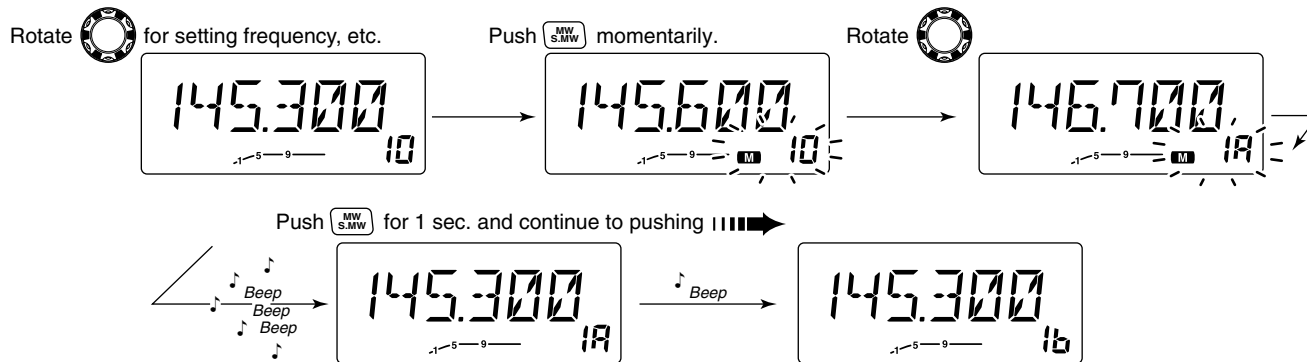
### ■ Scan edges programming

Scan edges can be programmed in the same manner as memory channels. Scan edges are programmed into scan edges, 1A/1b to 3A/3b, in memory channels.

- ① Set the edge frequency of the desired frequency range in VFO mode:
  - ➔ Set the frequency using the tuning dial.
  - ➔ Set other data (e.g. repeater settings, etc.) if desired.
- ② Push [MW(S.MW)] momentarily.
  - "M" indicator and channel number blink.
- ③ Rotate the tuning dial to select one of scan edge channel, 1A, 2A or 3A.

- ④ Push [MW(S.MW)] for 1 sec. to program.
  - 3 beeps sound and the frequency is programmed.
  - Scan edge 1b, 2b or 3b is automatically selected when continuing to push [MW(S.MW)] after programming.
- ⑤ To program a frequency for the other pair of scan edges, 1b, 2b or 3b, repeat steps ③ and ④.
  - If the same frequency is programmed into a pair of scan edges, programmed scan will not function.

[EXAMPLE]: Programming 145.300 MHz and 145.800 MHz into scan edges 1A and 1b, respectively.

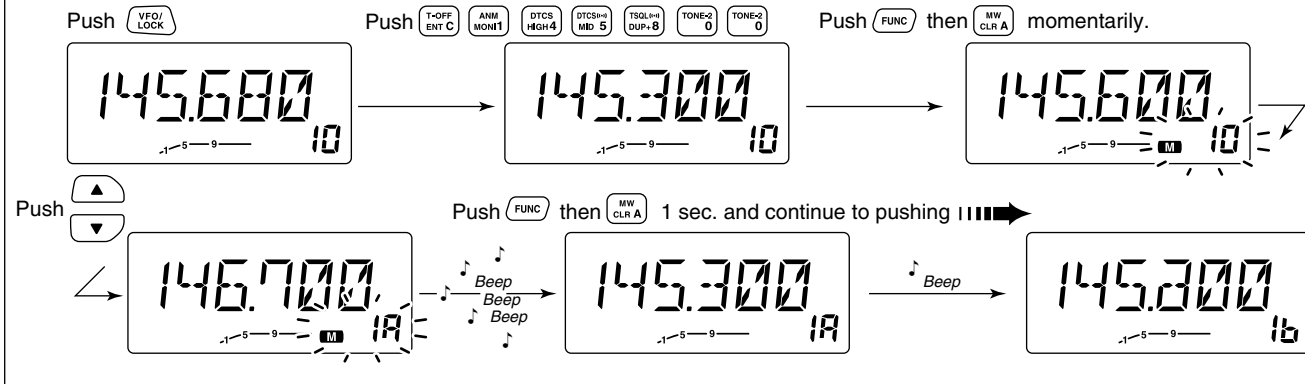


## Scan edges programming via microphone



- 1 Set the desired frequency in VFO mode.
  - ➔ Push [VFO/LOCK] to select VFO mode.
  - ➔ Set the frequency via the keypad or [▲]/[▼].
- 2 Push [FUNC] then [CLR A(MW)] momentarily.
- 3 Push [▲] or [▼] to select scan edge channels, 1A, 2A or 3A.
- 4 Push [FUNC], then push [CLR A(MW)] for 1 sec. to program.
  - 3 beeps may sound and the VFO contents are programmed.
  - Memory channel number advances to the next scan edge channel, 1b, 2b or 3b, when continuing to push [CLR A(MW)] after programming.
- 5 To program a frequency for the other scan edge channel, repeat steps 1 to 4.

**[EXAMPLE]:** Programming 145.300 MHz and 145.800 MHz into scan edges 1A and 1b, respectively.



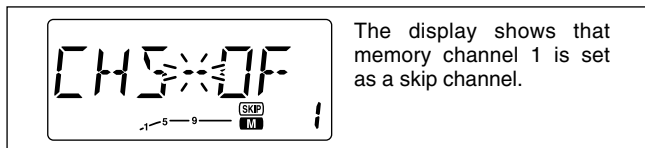
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## 8 SCAN OPERATION

### ■ Skip channel setting

#### USING SET MODE

The memory skip function speeds up scanning by checking only those memory channels not set as skip channels. Set skip channels as follows.



- ① Select a memory channel:
  - ➔ Push [M/CALL(PRIO)] to select memory mode.
  - ➔ Rotate the tuning dial to select the desired channel to be a skip channel.
- ② Push [SET(LOCK)] to enter set mode.
- ③ Push [SET(LOCK)] or [MW(S.MW)] several times until "CHS" appears as shown above.
- ④ Rotate the tuning dial to turn the skip function ON or OFF for the selected channel.
  - "SKIP" appears : The channel is skipped during scan. (CHS-ON)
  - "SKIP" disappears : The channel is scanned during scan. (CHS-OFF)
- ⑤ Push [V/MHz(SCAN)] to exit set mode.



- ① Select a memory channel.
  - ➔ Select memory mode by pushing [MR/CALL].
  - ➔ Push [▲] or [▼] to select the desired channel to be a skip channel.
- ② Push [SET B(D-OFF)] to enter set mode.
- ③ Push [SET B(D-OFF)] or [ENT C(T-OFF)] several times until "CHS" appears as shown at left.
- ④ Push [▲] or [▼] to set or cancel the skip setting.
  - See item ④ at left for skip indicator details.
- ⑤ Push [CLR A(MW)] to exit set mode.

#### NOTES:

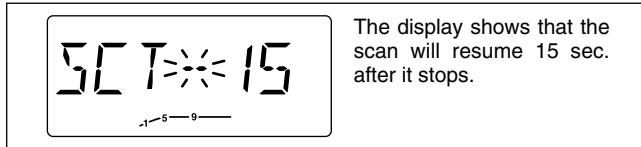
Even through scan edge channels cannot be set as skip channels, the ARE skipped during memory scan.

SET mode cannot be accessed when memory names are displayed. To set the scan resume condition, return to channel number indication by pushing [MONI(ANM)] on the front panel for 1 sec., or push [FUNC] then [MONI 1(ANM)] to cancel the channel name indication, then set as describes above.

## ■ Scan resume condition

### USING SET MODE

The scan resume condition can be selected as timer, pause or empty pause scan. The empty pause scan is useful for finding unused channels. The selected resume condition is also used for priority watch. (p. 00)



- ① Push [SET(LOCK)] to enter set mode.
- ② Push [SET(LOCK)] or [MW(S.MW)] several times until “SCT” or “SCP” appears as shown above.
  - Cancel the DTMF memory encoder in advance, if necessary. (p. 00)
- ③ Rotate the tuning dial to set the desired timer:
  - “SCT-15” : Scan pauses 15 sec. while receiving a signal.
  - “SCT-10” : Scan pauses 10 sec. while receiving a signal.
  - “SCT-5” : Scan pauses 5 sec. while receiving a signal.
  - “SCP-2” : Scan pauses until the signal disappears and then resumes 2 sec. later.
- ④ Push [V/MHz(SCAN)] to exit set mode.



- ① Push [SET B(D-OFF)] to enter set mode.
- ② Push [SET B(D-OFF)] or [ENT C(T-OFF)] several times until “SCT” or “SCP” appears as shown at left.
  - Cancel the DTMF memory encoder in advance, if necessary. (p. 00)
- ③ Push [▲] or [▼] to select the scan resume condition.
  - See item ③ at left for scan resume condition details.
- ④ Push [CLR A(MW)] to exit set mode.

#### NOTE:

SET mode cannot be accessed when memory names are displayed. To set the scan resume condition, return to channel number indication by pushing [MONI(ANM)] on the front panel for 1 sec., or push [FUNC] then [MONI 1(ANM)] to cancel the channel name indication, then set as describes above.

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## Priority watch types

Priority watch checks for signals on a call channel every 5 sec. while operating on a memory channel. The transceiver has 2 priority watch types to suit your needs. You can transmit on the memory channel while the priority watch operates.

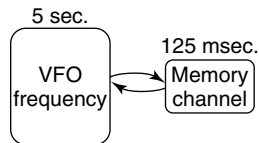
The watch resumes according to the selected scan resume condition. See previous page for details.

### NOTES:

- ▶ If the DTMF memory encoder is activated, it is automatically cancelled when priority watch starts.
- ▶ If the pocket beep function is activated, the transceiver automatically selects the tone squelch function when priority watch starts.

### MEMORY CHANNEL WATCH

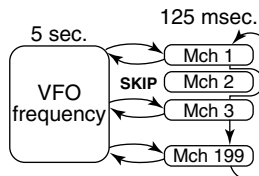
While operating on a VFO frequency, priority watch checks for a signal on the selected memory channel every 5 sec.



### MEMORY SCAN WATCH

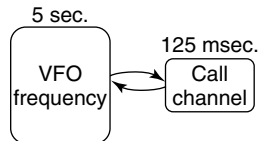
While operating on a VFO frequency, priority watch checks for signals on each memory channel in sequence.

- The memory skip function is useful to speed up the scan.



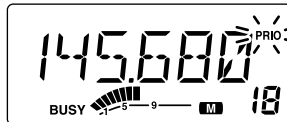
### CALL CHANNEL WATCH

While operating on a VFO frequency, priority watch checks for signals on the call channel every 5 sec.



## ■ Priority watch operation

- ① Select memory mode; then, set an operating frequency.
- ② Set the watching channel(s).
  - For memory channel watch:**  
Select the desired memory channel.
  - For memory scan watch:**  
Select memory mode; then, push [V/MHz(SCAN)] for 1 sec. to start memory scan.
  - For call channel watch:**  
Select the call channel by pushing [M/CALL(PRIO)] once or twice.
- ③ Push [M/CALL(PRIO)] for 1 sec. to start the watch.
  - The transceiver checks the memory or call channel every 5 sec.
  - The watch resumes according to the selected scan resume condition. (p. 00)
  - While the watch is pausing, pushing [M/CALL(PRIO)] resumes the watch manually.
- ④ Push [M/CALL(PRIO)] while the display shows the memory channel to stop the watch.



While pausing or receiving a signal on the memory or call channel, "PRIO" blinks.



- ① Select memory mode; then, set an operating frequency.
- ② Set the watching channel(s).
  - For memory channel watch:**  
Push [MR/CALL] then [▲] or [▼] to select the desired call channel.
  - For memory scan watch:**  
Push [MR/CALL], then push [SCAN 2] to start the memory scan.
  - For call channel watch:**  
Push [MR/CALL] for 1 sec. to select the call channel.
- ③ Push [PRIO 3(PTT-M)] to start the watch.
  - The transceiver checks the memory or call channel every 5 sec.
  - The watch resumes according to the selected scan resume condition. (p. 00)
  - To resume the watch manually when paused, push [PRIO 3(PTT-M)] or [CLR A(MW)].
- ④ To stop the watch, push [CLR A(MW)] once (or twice while watch is paused).

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# 10 DTMF MEMORY ENCODER

## ■ Programming a DTMF code

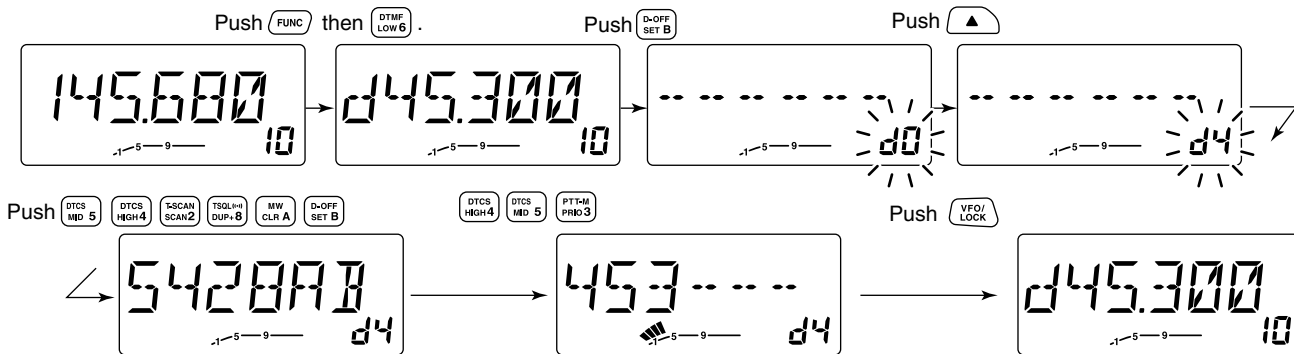
DTMF codes are used for autopatching, controlling other equipment, etc. The transceiver has 10 DTMF memory channels (d0–d9) for storage of often-used DTMF codes of up to 24 digits.



- 1 Push [FUNC] then [LOW 6(DTCS)] to turn the DTMF encoder ON.
  - “d” appears in place of the 100 MHz digit.
- 2 Push [SET B(D-OFF)] to enter the DTMF memory programming condition.
- 3 Push [▲] or [▼] to select the desired DTMF memory channel.

- 4 Push the desired digit keys.
  - When the first digit is input, previous memory contents are cleared automatically.
  - “E” stands for “\*” and “F” stands for “# .”
  - Push [▲]/[▼] and repeat this step if you make a mistake.
  - The S/R/F indicator shows the digit group. The indication increases every 6 digits.
- 5 Push [VFO/LOCK] to exit the programming condition.
  - The [CLR A(MW)] key cannot be used to exit. If pushed, code “A” is input and the previously programmed data is erased. Reprogram in such a case.

[EXAMPLE]: Programming “5428A98” into DTMF memory channel “d4.”



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## ■ Transmitting a DTMF code

### ◇ Automatic transmission (DTMF memory)



- 1 Push [FUNC] then [LOW 6(DTMF)] to turn the DTMF encoder ON.
  - “d” appears in place of the 100 MHz digit.
- 2 Push [SET B(D-OFF)] to enter the DTMF memory programming condition.
- 3 Push [▲] or [▼] to select the desired channel.
- 4 Push [PTT] to transmit the selected memory.
  - Exit the programming condition automatically.
  - Each push of [PTT] transmits the DTMF code.
- 5 Push [FUNC] then [SET B(D-OFF)] to cancel the DTMF encoder.
  - When the DTMF encoder is turned ON continuously, each push of the PTT transmits the previously selected DTMF code.

### ◇ Manual transmission



- 1 Push [DTMF-S] to turn the DTMF memory direct selection ON.
  - The function indicator (microhpne) lights green.
- 2 Push one of “A” to “F” key momentarily, then push the desired DTMF keys.
  - A: [CLR A(MW)]                      B: [SET B(D-OFF)],
  - C: [ENT C(T-OFF)]                D: [SQL▲ D(MUTE)],
  - E: [\* (TONE-1)]                    F: [SQL▼ # (16KEY-L)]
  - Automatically transmits without pushing PTT.
  - The first code, one of “A” to “F”, does not transmitted. DTMF code transmission started from the 2nd code.
- 3 Push [DTMF-S] again to deactivate the DTMF meory direct selection.

### ◇ Transmitting a DTMF memory directly



- 1 Push [DTMF-S] to turn the DTMF memory direct selection ON.
  - The function indicator (microhpne) lights green.
- 2 Push the desired DTMF channel number.
  - “0” to “9” are available for channel numbers.
  - Automatically transmits the selected DTMF code.

**NOTE:** When no DTMF code programmed channel number is pushed, transmits for 1 sec. without DTMF code.
- 3 Push [DTMF-S] again to deactivate the DTMF meory direct selection.

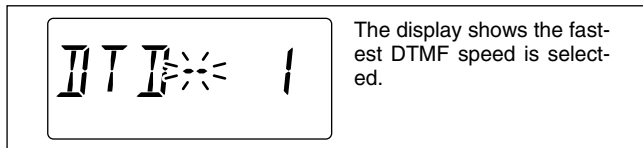
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## 10 DTMF MEMORY ENCODER

### ■ DTMF speed

USING INITIAL SET MODE

The rate at which DTMF memories send individual DTMF characters can be set to accommodate operating needs.



- ① Push [PWR] for 1 sec. to turn power OFF.
- ② While pushing [SET(LOCK)], push [PWR] for 1 sec. to turn power ON and enter initial set mode.
- ③ Push [SET(LOCK)] or [MW(S.MW)] several times to select the “DTD” display as shown above.
- ④ Rotate the tuning dial to select the desired speed as shown in the table below.
- ⑤ Push [PWR] to exit initial set mode.

DISPLAY	INTERVAL	SPEED
DTD-- 1	100 msec.	5.0 cps
DTD-- 2	200 msec.	2.5 cps
DTD-- 3	300 msec.	1.6 cps
DTD-- 5	500 msec.	1.0 cps

cps=characters/sec

## ■ Pocket beep operation

This function uses subaudible tones for calling and can be used as a “common pager” to inform you that someone has called while you were away from the transceiver.

### ◇ Waiting for a call from a specific station

- ① Set the operating frequency.
- ② Push [SET(LOCK)] to enter set mode.
- ③ Push [SET(LOCK)] or [MW(S.MW)] several times until “Ct” for tone squelch or “dt” for DTCS squelch appears.



Tone squelch frequency setting



DTCS code setting

- ④ Rotate the tuning dial to select the desired tone squelch frequency or DTCS code and polarity.
- ⑤ Push [V/MHz(SCAN)] to exit set mode.
- ⑥ Push [TONE(T-SCAN)] several times to indicate “ ” for tone squelch or “ ” for DTCS squelch in the function display.
- ⑦ When a signal with the matched tone is received, the transceiver emits beep tones and flashes “ ”.
  - Beep tones sound for 30 sec and “ ” flashes. To stop the beeps and flashing manually, push any key. When the beep tones are not stopped manually, “ ” continues flashing until step ⑧.
- ⑧ Push [PTT] to answer.
- ⑨ Push [TONE(T-SCAN)] several times to cancel the func-

tion.

- ① Set the operating frequency.
- ② Program the CTCSS tone frequency or DTCS code in set mode.
  - See p. 18 for programming details.
- ③ Push [FUNC] then [ SQL ((•))] to turn the pocket beep ON.
- ④ When a signal with the matched tone is received, the transceiver emits beep tones for 30 sec. and flashes “((•))”.
- ⑤ Push [PTT] to answer or push [clr A(MW)] to stop the beeps and flashing.
  - Tone squelch is automatically selected.
  - Pushing [FUNC] then [ SQL] also selects the tone squelch.
- ⑥ To cancel the function, push [FUNC] then [©T-OFF].

### ◇ Calling a waiting station using pocket beep

A subaudible tone matched with the station’s CTCSS tone frequency or 3-digit DTCS code with polarity is necessary. Use the tone squelch on the next page or a subaudible tone encoder (pgs. 00, 00)

## ■ Tone squelch operation

The tone squelch opens only when receiving a signal with the same pre-programmed subaudible tone.


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## 11 POCKET BEEP AND TONE SQUELCH

- ① Set the operating frequency.
  - ② Program the CTCSS tone frequency or DTCS code in set mode.
    - See p. 18 for programming details.
  - ③ Push [TONE(T-SCAN)] several times. “T SQL” appears in the function display.
  - ④ When a signal with the matched tone is received, the squelch opens and the signal can be heard.
    - When the received signal includes an unmatched tone, the squelch does not open. However, the S/RF indicator shows the received signal strength.
    - To open the squelch manually, push [MONI(ANM)].
  - ⑤ Operate the transceiver in the normal way (push [PTT] to transmit; release [PTT] to receive).
  - ⑥ To cancel the tone squelch, push [TONE(T-SCAN)].
    - “T SQL” disappears from the function display.
- ① Set the operating frequency.
  - ② Program the CTCSS tone frequency or DTCS code in set mode.
    - See p. 18 for programming details.
  - ③ Push [FUNC] then [⑨T SQL] to turn the tone squelch ON.
  - ④ When a signal with the matched tone is received, the squelch opens and the signal can be heard.
    - When the received signal includes an incorrect tone, the squelch does not open. However, the S/RF indicator shows the received signal strength.
    - To open the squelch manually, push [①MONI].
  - ⑤ Operate the transceiver in the normal way (push [PTT] to transmit; release [PTT] to receive).
  - ⑥ To cancel the tone squelch, push [FUNC] then [③T-OFF].

## ■ Tone scan

By monitoring a signal that is being operated with pocket beep or tone squelch function, you can determine the tone frequency necessary to open a squelch.

- ① Set the channel to be checked for a tone frequency.
  - ② Push [(TONE)T-SCAN] for 1 sec. to start the tone scan.
    - To change the scanning direction, rotate the tuning dial.
  - ③ When the CTCSS tone frequency or 3-digit DTCS code is matched, the squelch opens and the tone frequency is temporarily programmed into the selected mode such as memory or call channel.
    - The tone scan pauses when a CTCSS tone frequency or 3-digit DTCS code is detected.
    - The decoded CTCSS tone frequency or 3-digit DTCS code is used for the tone encoder or tone encoder/decoder depending on the tone squelch ON/OFF setting.
  - ④ Push [V/MHz(SCAN)] to stop the scan.
- ① Set the channel to be checked for a tone frequency.
  - ② Push [F-2] for 1 sec. to start the tone scan.
  - ③ When the tone frequency is matched, the squelch opens and the tone frequency is programmed into the selected mode such as memory or call channel.
  - ④ Push [clr A(MW)] to stop the scan.
-  **NOTE:** The decoded tone frequency is programmed temporarily when a memory or call channel is selected. However, this will be cleared when overwriting the memory/call channel.

**Count on us!**

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