STANDARD®

C158A 144 MHz Band FM Transceiver

OWNER'S MANUAL

STANDARD AMATEUR RADIO PRODUCTS INC.
MANUFACTURED BY MARANTZ JAPAN, INC.

Printed in Japan

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1-800-442-4275

INTRODUCTION

Your Model C158A is a versatile and compact handheld Transceiver that is built and tested to stringent specifications. The latest surface mount and microcomputer technologies are used to provide you with many useful functions, and make it the smallest and lightest unit in its class. The following features are built into your Transceiver:

* Excellent receiver sensitivity (0.158μV).
* Broad band reception (130-169.995MHz).
* Low (350mW), medium (2.5W), and high (5W) RF power output.
* High efficiency operation for long battery life.
* 21 memory frequencies (20 regular memory + 1 Call memory).
* Scans all channels or just your favorite channels.
* Scans full band, or excludes any frequency or range.
* Comprehensive Pause Scan (1-MHz range, full-range, and programmed-range) and Busy Scan (M̄-memory, M-memory, and programmed-memory) functions.
* Smallest and lightest HT in its class.
* Unique Rotary Channel/Frequency selector.
* Function button provides 100 kHz or 1 MHz Speed Steps for the Rotary Channel/Frequency selector.
* Includes CTCSS Board.
* Includes DTMF Board.
* Call memory can be Simplex or Repeater.
* Includes 7.2V, 700mA-h battery and charger.
* Auto Power-Off reduces accidental power drain.

* Battery Saver standby mode reduces power use.

* Code Squelch function mutes stations without the same code-great for hamfests or high RF environments.

* Tone Squelch enables the Transceiver to hear only stations that have the same tone frequency.

* Simultaneous operation of the Code Squelch and Tone Squelch functions.

* Paging functions allows paging single stations or a group by DTMF paging signal.

* Wide 5 to 16 VDC power supply range allows powering directly from most batteries.

* Internal dual frequency watch allows the Transceiver to watch the VFO frequency and up to 20 memory frequencies in sequence.

* Duplex operation permits a semi-duplex QSO using two memory frequencies.

* Pushbutton opens the squelch to check the volume.

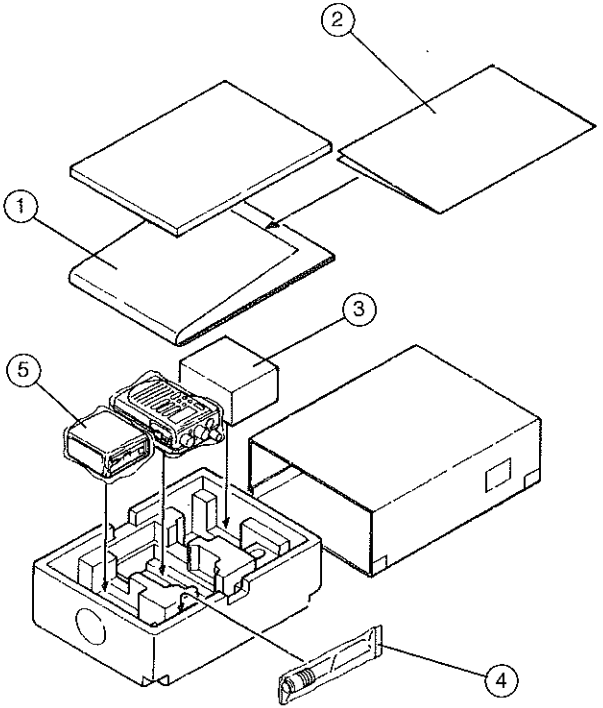
* Frequencies can be entered directly from the keyboard or via a rotary channel switch.

* Frequency and Operating Mode Lock prevents inadvertent changes.

* Push-To-Talk Lock prevents inadvertent transmission.

* DTMF function allows you to control repeaters and make telephone calls through certain repeaters.

Exceptional performance, low power consumption, light weight, and compact size make this Transceiver a handy addition to any amateur radio operator's equipment list.



EQUIPMET SUPPLIED

① Owner's Manual

② Sehematic Diagram

③ Wall charger

④ Antenna

⑤ Nicd Battery

AVAILABLE ACCESSORIES

CMB111	Mobile Bracket.
CMB112	Mobile Bracket.
CMP111	Speaker/Microphone hand-held combination.
CMP115	Speaker/Microphone hand-held combination.
CHP111	Headset with microphone and remote push-to talk button.
CHP150	Headset with PTT/VOX switch and boom microphone (power type).
CHP113	Tie-Pin type microphone and earphone.
CNB150	Small Rechargeable Battery Pack (7.2V, 400mA-h).
CNB151	Standard Rechargeable Battery Pack (7.2V, 700mA-h).
CNB152	High-Power Rechargeable Battery Pack (12V, 600mA-h).
CNB153	Long-Life Rechargeable Battery Pack (7.2V, 1000mA-h).
CSA181	Automatic Quick Charger. Desk-top Charger charges in 1 hour, then switches to trickle charge.
CLC150	Small Soft Carrying Case for Transceivers that have a Model CNB150 Battery Pack.
CLC151	Regular Soft Carrying Case for Transceivers that have a standard Model CNB151 Battery Pack.
CLC152	Large Soft Carrying Case for Transceivers that have a Model CNB152 or CNB153 Battery Pack.
CAW150	Mobile power supply cable -adaptor.
CAW151	Base power supply cable.

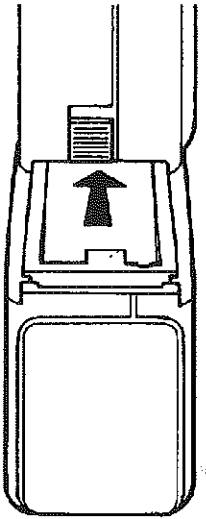
GETTING READY

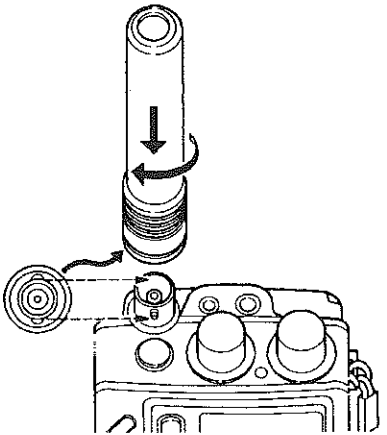
When you first unpack your Transceiver, you will have to perform the following steps to prepare it for operation: .

1. Make sure the battery pack is fully charged. Refer to the Instructions for the CNB150 Series Battery Pack.

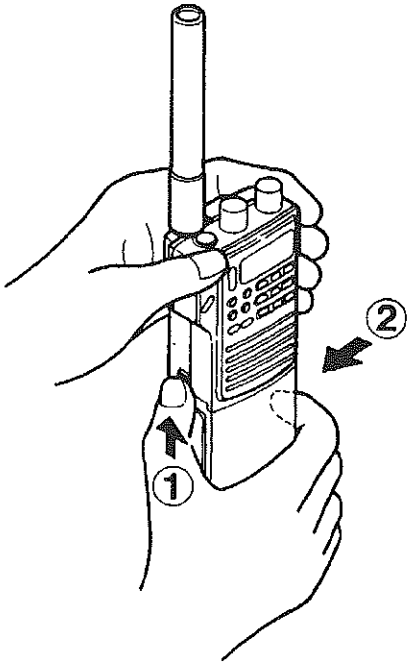
2. Hold the Transceiver in one hand and grasp the battery pack with the other hand. Then slide the battery pack onto the bottom of the Transceiver. The battery pack will fit only in the correct way.

3. Push the end of the antenna onto the Transceiver's antenna connector, making sure to match the locking pin on each side of the connector with the slots in the end of the antenna. Turn the antenna clockwise to lock it into place.

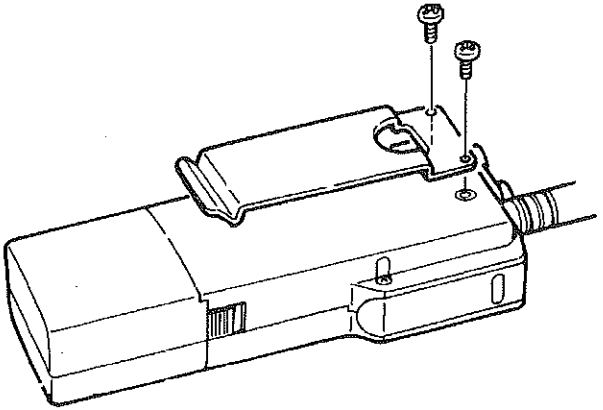




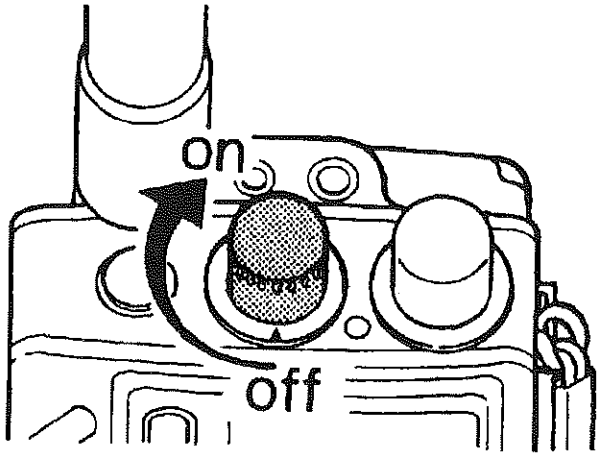
NOTE: To remove the battery pack, push the battery lock button upward with your thumb and carefully pull the battery pack in the direction shown until it sides completely free.



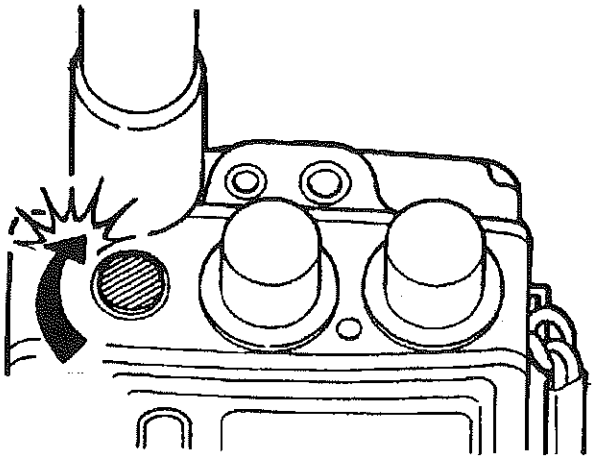
3. Use the two metric screws that were supplied with the Transceiver to mount the belt clip onto the rear cover.



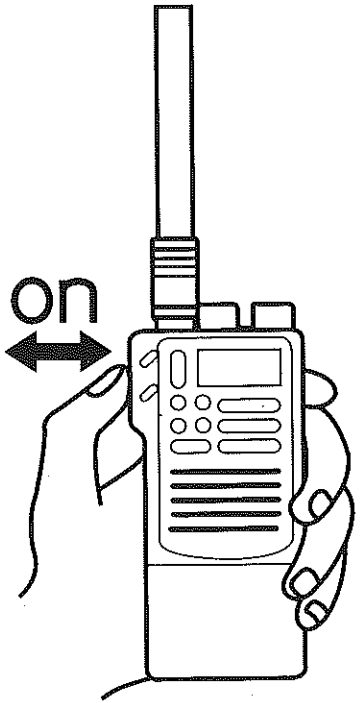
4. Rotate the VOLUME control in a clockwise direction to turn the Transceiver on. Then set the control to the desired volume level. NOTE: If you do not hear noise, hold down the SQL OFF (Squelch Off) button while you adjust the volume.



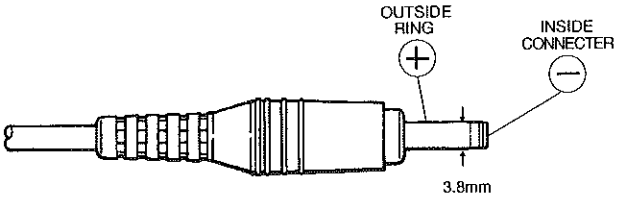
5. Use the end of your finger to rotate the SQUELCH control counterclockwise until you hear noise, if this has not already been done. Then rotate the control clockwise until the noise just disappears. NOTE: Advancing the control further clockwise will reduce the receiver sensitivity.



6. To transmit, push the PTT (push-to-talk) button on the side of the Transceiver. To receive, release the button.



7. If you intend to operate your Transceiver from an external power source, you will need a matching power plug that has a 3.8mm outside diameter. A smaller plug will not operate the battery-disconnect switch that is part of the DC IN socket. Be sure to wire the plug with the proper polarity as shown.



Your Transceiver is now ready for operation.

QUICK START

The following instructions are intended let you try your new Transceiver immediately.

1. To turn your Transceiver on, rotate the ON/OFF/ VOLUME control clockwise to "5." You may not hear any noise.

2. Use the end of your finger to turn the SQUELCH control (the small control on top) counterclockwise until you hear noise. Turn the squelch control clockwise until the noise just disappears.

3. If there is an "M" near the upper left side of the display, press the V/M (VFO/Memory) key until it disappears.

4. Use the number keys to enter a local repeater frequency. To enter 146.72MHz, for instance, press 672. If you want to enter a frequency with an additional (kHz unit) digit, refer to Page 48. A long beep signals that you have completed the frequency entry. If someone is talking on the repeater you will hear them.

5. Enter the repeater offset: hold in the function key (FUNC, on the left side) while you press the 7 key. Do this until the correct offset, - or +, appears at the right of the display. If your repeater has a non-standard offset frequency, refer to Page 67, "ENTERING THE OFFSET FREQUENCY."

6. Try to access the repeater if it is not in use. Press the Push-To-Talk button under the gray rubber finger grip on the left side. You could say:

   "This is (give your call sign) -can anyone on this repeater give me a signal report?" If there is no answer: "This is (give your call sign again) - clear and listening."

You may hear the repeater's "tall" (2-3 seconds of dead carrier noise) each time you release the Push-To-Talk button. The repeater must identify itself every 10 minutes, either in Morse code or voice.

OPERATION

GENERAL

Refer to Figure 1 while you read the following descriptions of the top panel controls.

TRANSMIT/BATTERY LED-Lights in the transmit mode. NOTE: If this LED fails to light in the transmit mode or becomes dim, it indicates that the batteries need to be recharged.

VOLUME -Turns the Transceiver on and off and sets the volume level. Depress the SQL OFF button or turn the SQUELCH control fully counterclockwise while you set the receiver volume to the level you desire.

SQUELCH-Mutes the receiver when no signal is being received. Start with this control set fully counterclockwise; then rotate the control clockwise until the background noise just disappears. NOTE: Further clockwise rotation of this control reduces the receiver sensitivity.

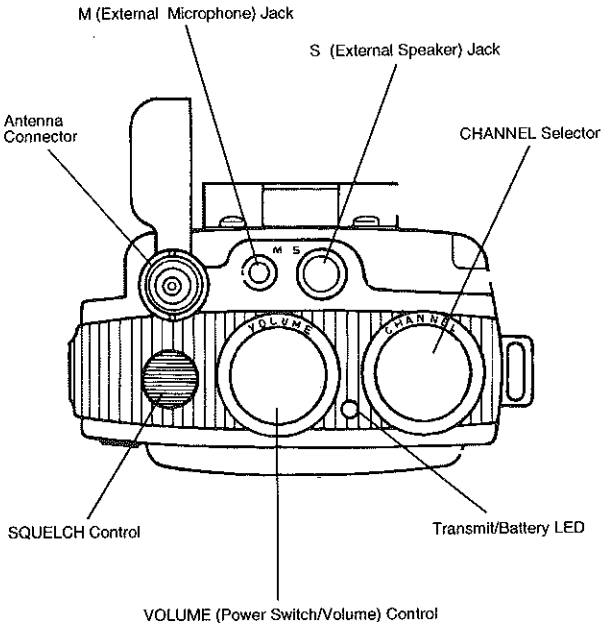


Figure 1

Antenna Connector, standard BNC type-Accepts the flexible antenna, or a 50Ω external mobile or base antenna. Refer to "Getting Ready" for installation.

M (External Microphone) Jack-Accepts the optional Microphone/Speaker (Model CMP111 or CMP115), or Headset with PTT (Model CHP111), or a Packet TNC (Page 70).

S (External Speaker) Jack - Accepts the optional Microphone/Speaker (Model CMP111 or CMP115), or Headset with PTT (Model CHP111), external 8 - ohm speakers or headphones, or a Packet TNC (Page 70).

Rotary CHANNEL Selector-Enters transmitter and receiver frequencies, tone frequency, channel step rate, and memory channel number. Rotating the knob clockwise increases the frequency. Rotating it counterclockwise decreases the frequency. The available channel step rates are: 5kHz, 10kHz, 12.5kHz, 20kHz, 25kHz, and 50kHz.

Refer to Figure 2 while you read the following descriptions of the front and side controls.

FUNC (Function) Switch-Works together with other buttons to perform special functions.

PTT (Push-To-Talk) Switch-Pressing this switch places the Transceiver in the transmit mode.

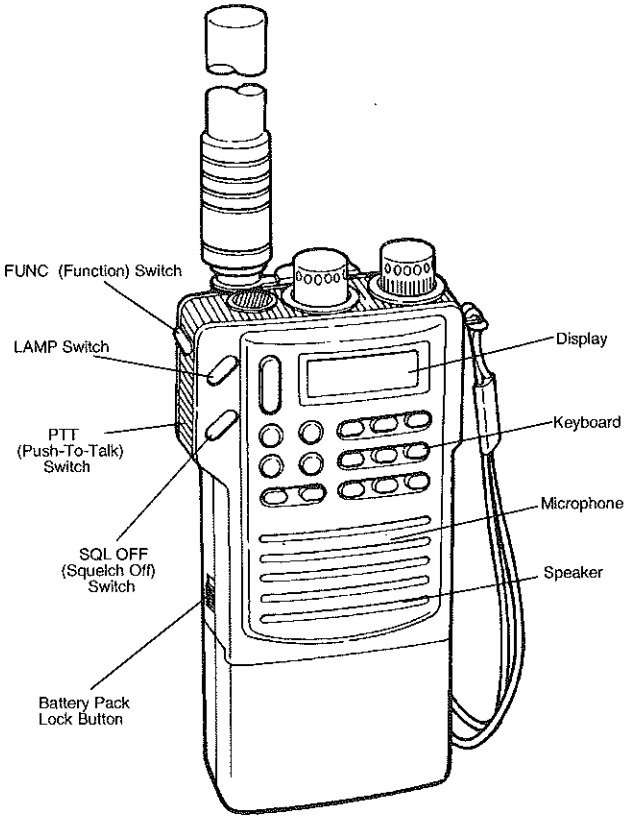
LAMP Switch-Illuminates the display for operation at night.

SQL OFF (Squelch Off) Switch-Unsquelches the receiver while pressed, regardless of the Squelch control setting. This is the same as turning the Squelch control fully counterclockwise.

DC IN (External Power) Connector-Provides a connection for external power.

NOTES:

1. Make sure the Transceiver is OFF when you connect or disconnect from this jack.


FUNC (Function) Switch
LAMP Switch
PTT
(Push-To-Talk)
Switch
SQL OFF
(Squelch Off)
Switch
Battery Pack
Lock Button
Display
Keyboard
Microphone
Speaker

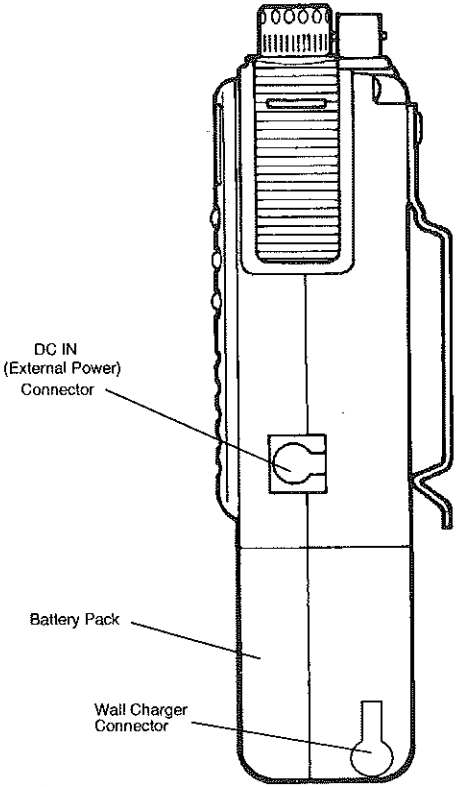
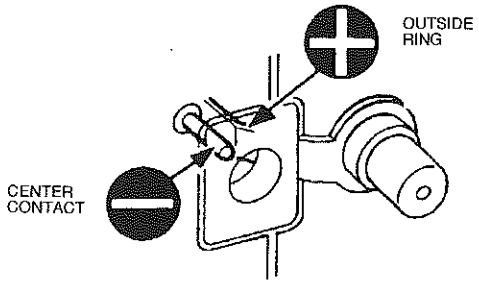

DC IN
(External Power)
Connector
Battery Pack
Wall Charger
Connector

Figure 2

2. Make sure the external source voltage is between 5 and 16 VDC.

3. Be sure to observe the correct polarity.



BATTERY PACK-Standard battery pack. Several different battery packs are available for the Transceiver.

BATTERY PACK LOCK BUTTON-Locks or releases the battery pack. Push the button upward while you slide the battery pack to the left to free it from the Transceiver.

KEYBOARD-Refer the "KEYBOARD CHART" as following.

KEYBOARD CHART

Button	Independent Function	Function with Function button
CALL	Selects call frequency	Selects call frequency
A/LAMP	Light at the display is turned on while held depressed	Turns on/off the light at the display
B/PO/PT.L	Switches the transmit power level	Disables the PTT button
C/SC/M	Starts scanning	Switches the memory channel group M and M̄
D/MS/ MS.M	Turns on/off the memory scan	Sets the MS.M scan frequency and turns on/off the MS.M scan
＊V/M/ENT	Switches the operating frequency, and the memory frequency, and accesses the operating frequency	Stores the frequency in memory
=/MODE/ CODE	Turns on/off and switches the paging and code squelch operation	Recalls the stored code in memory for paging and code squelch operation
0/SET	Inputs "0"	Selects the set mode
1/DUAL	Inputs "1"	Turns on/off the dual-watch
2/DUP	Inputs "2"	Turns on/off the duplex feature
3/STEP	Inputs "3"	Recalls the channel step
4/T.SQ	Inputs "4"	Turns on/off the tone squelch operation
5/SAVE	Inputs "5"	Turns on/off the save function
6/F.L/SS	Inputs "6" • During dial-frequency scanning, switches 1MHz scan, all band scan and programmed scan • During memory frequency scanning, switches M or M̄ memory group scan and all memory scan	Turns on/off the lock function
7/RPT/SB	Inputs "7" • While scanning, switches the pause scan and buzy scan	Turns on/off the repeater operation
8/REV/S▼	Inputs "8" • Scans downwards	Exchanging the transmit and receive frequency during repeater operation
9/SFT/S▲	Input "9" • Scans upwards	Setting a shift frequency

The kEYBOARD buttons are labeled with more than one name. Each key has more than one function, depending on whether the key is pressed in the VFO mode or the Memory mode, and whether it is pressed alone, with the FUNCTION key (marked "FUNC"-it acts like the "shift" key on a computer), or during frequency scanning or transmitting. For brevity and clarity in the rest of this manual, only the pertinent portion of the name will be used to describe a particular function. For example the key named 6/F.L/SS has the following functions:

* Enters a 6, in the VFO mode.

* Selects memory channel 6, in the Memory mode.

* Locks (and unlocks) the frequency to prevent inadvertent frequency changes, when it is pressed with FUNC. The manual instructions for this function read:

  Press F.L (FUNC + F.L).

  (Refer to Page 42.)

* During scanning, a special function switches between scan types. The keys that have special functions are labeled in reverse type (SS, SB, S , and S).

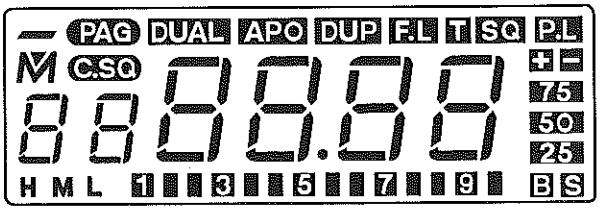
* Transmits the DTMF tones for the number 6.

MICROPHONE-Built-in condenser microphone.

SPEAKER-Built-in speaker. This speaker is automatically disabled when an external speaker is connected.

External DC connector-Accepts the plug from the optional CAW150 (CAW151) power supply cables.

DISPLAY-Indicates frequency, channel step, the status of special functions (such as PAG, DUAL, APO, DUP, F.L, T.SQ, P.L, C.SQ, S.B., and +or -transmitter offset), memory channel number, VFO or Memory mode, scanning, busy scan, signal strength, and transmitter power.

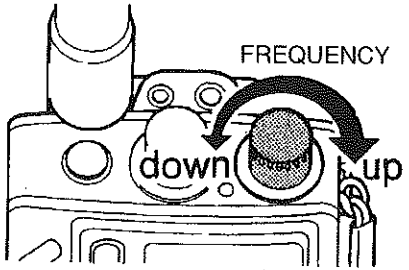


ENTERING A VFO FREQUENCY

You use a frequency by bringing it to the display from memory or by manually entering a new VFO (Variable Frequency Oscillator) frequency using the ROTARY CHANNEL SELECTOR or the KEYBOARD. The VFO frequency is automatically stored by the Transceiver.

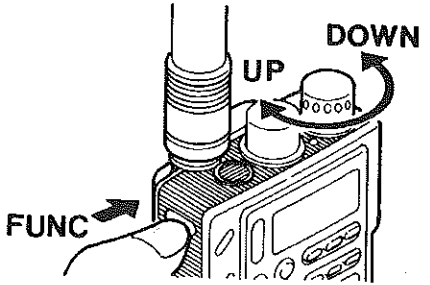
To manually enter a VFO frequency, the Transceiver must first be in the VFO mode (an "M" or a "C" is not present near the left side of the display). Press V/M (VFO/Memory) to toggle between the VFO and Memory modes.

You can turn the ROTARY CHANNEL SELECTOR clockwise or counterclockwise until you obtain the frequency you want. The frequency changes one step at a time with each click of the knob. Refer to "CHANGING THE CHANNEL STEP" on Page 39 for information about selecting a step of 5kHz, 10kHz, 12.5kHz, 20kHz, 25kHz, or 50kHz.



You can use the Fast Channel Step to change the frequency quickly in 100kHz or 1MHz steps. Press FUNC (FUNCtion) while you turn the ROTARY CHANNEL SELECTOR, as shown below. Refer to "Changing the Fast Channel Step" on Page 50 to toggle between a 100kHz and 1MHz Fast Channel Step.

You can also use the KEYBOARD to enter a new VFO frequency by pressing the numeric buttons, beginning with the 1MHz digit. Your Transceiver may be set so that



KEYBOARD entry of the kHz unit digit is disabled. If necessary, see Page 48, "Enabling kHz Unit Digit Entry" and enable it. Then, to enter 146.525 MHz, perform the following steps:

1. Press 6 to enter the 1MHz digit. The display will change to 146. .

2. Press 5 to enter the 100kHz digit. The display will change to 146.5 .

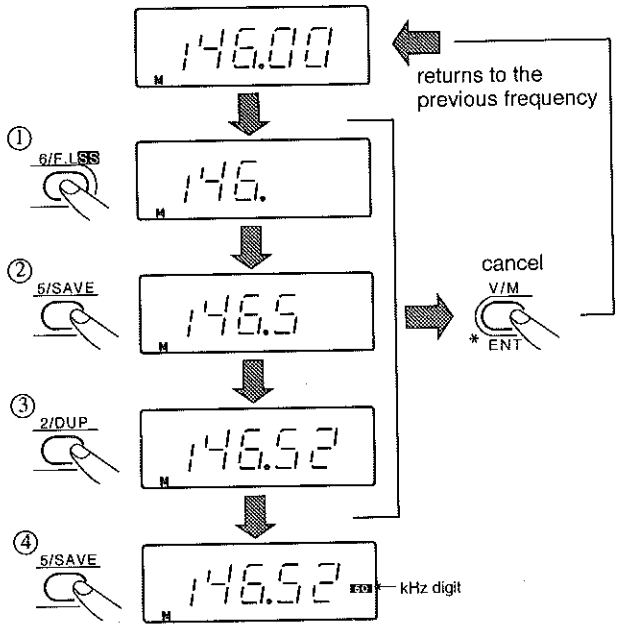
3. Press 2 to enter the 10kHz digit. The display will change to 145.52 .

4. Only a 0 or a 5 can be entered as the kHz unit digit. Press 5 to enter the kHz unit digit for this example. The display will change to 146.52 (the final zero is added automatically; the last two digits are shown in a small box at the right side of the display). A long beep sounds when the frequency entry is complete.

NOTES:

1. Press V/M to cancel a frequency change before you enter the last on the keyboard. The Transceiver will return to the previous VFO frequency.

2. 146.00MHz is used as the initial VFO frequency for the examples in this manual when an initial frequency is not logically carried over from a previous example.



STORING A MEMORY FREQUENCY

Your Transceiver can remember twenty "memory frequencies," in addition to the VFO frequency and the Call frequency. You can easily view, scan, and change these frequencies. The memory frequencies are entered in "memory channels." The twenty memory channels are arranged in two groups -M0 to M9, and $\bar{M}0$ to $\bar{M}9$.

For example you can enter the frequency 146.61MHz in empty memory channel M1 by performing the following steps:

1. Enter 146.61 MHz as the VFO operating frequency (if kHz digit unit entry is enabled, enter 146.610; refer to "ENTERING A VFO FREQUENCY" on Page 16).

2. Press V/M to switch the Transceiver to the Memory mode. The letter : "M," with a channel number underneath it, will appear near the upper left side of the display.

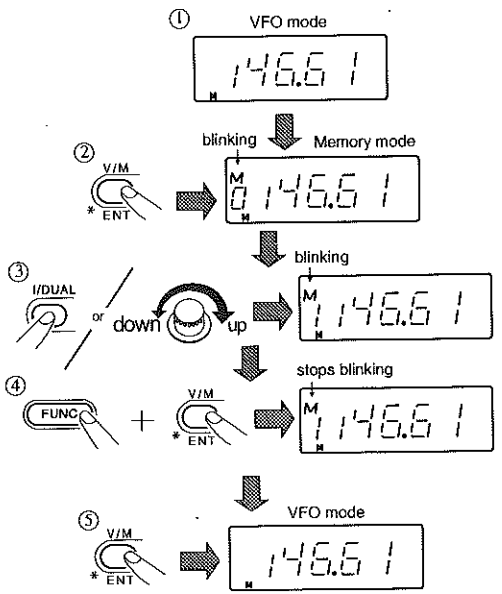
NOTE: When you switch to the Memory mode, the Transceiver will display the last memory channel you selected.

3. Press 1, or turn the ROTARY CHANNEL SELECTOR, to select memory channel M1.

NOTE: When you select a memory channel that is empty (does not contain a frequency), the "M" on the display will blink and the VFO frequency will be displayed.

4. Press ENT (FUNC+ENT). A long beep indicates that the entry is complete. The "M" will remain on the display, indicating that the Transceiver is still in the Memory mode, and it will stop blinking, indicating that the memory channel is filled (contains a frequency).

5. Press V/M to switch to the VFO mode.



Use the same procedure to enter the following frequencies:

146.64MHz in M2.	146.67MHz in M3.
146.70MHz in M4.	146.73MHz in M5.

NOTE: Examples in the following sections of this Manual assume that these frequencies are entered as indicated.

In a similar fashion, enter the frequency 147.09 MHz in empty memory channel M1, by performing the following steps:

1. Enter 147.09 MHz as the VFO operating frequency (if kHz digit unit entry is enabled, enter 147.090; refer to "ENTERING A VFO FREQUENCY" on Page 16).

2. Press V/M to switch to the Memory mode. "M5 146.73" will appear on the display.

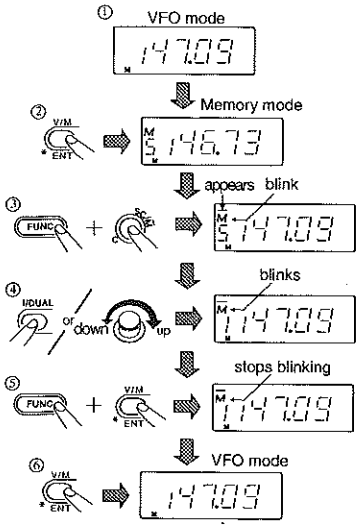
3. Press M (FUNC+M) to switch to the Memory group.

NOTE: When you select a memory channel that is empty (does not contain a frequency), the "M" on the display will blink and the VFO frequency will be displayed.

4. Press 1, or turn the ROTARY CHANNEL SELECTOR, to select memory channel M1.

5. Press ENT (FUNC+ENT). A long beep indicates that the entry is complete. The "M" will stop blinking to indicate that the memory channel is filled.

6. Press V/M to return to the VFO mode.



Use the same procedure to enter the following frequencies:

147.12MHz in M2.	147.15MHz in M3.
147.18MHz in M4.	147.21MHz in M5.

NOTE: Examples in the following sections of this Manual assume that these frequencies are entered as indicated.

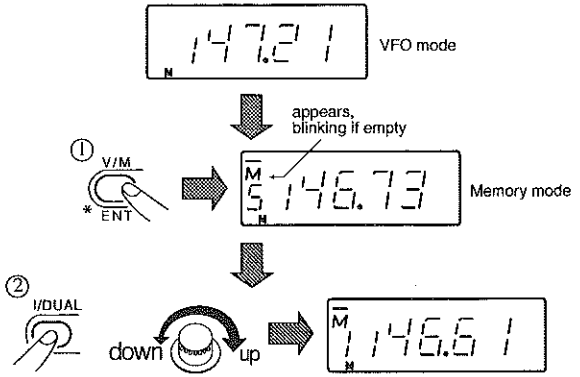
RECALLING A MEMORY FREQUENCY

Any time the Transceiver is in the Memory mode you can recall a memory channel by pressing the corresponding numeric button. The numeric button can select channels only in the group (M or M) that is displayed. To switch memory groups, press M (FUNC+M). However, the ROTARY CHANNEL SELECTOR can select channels from both memory groups in succession.

For example, to recall (for viewing or use) a frequency in memory channel M1, perform the following steps:

1. Press V/M to switch to the Memory mode, if this has not already been done. The memory channel that you selected last will appear on the display.

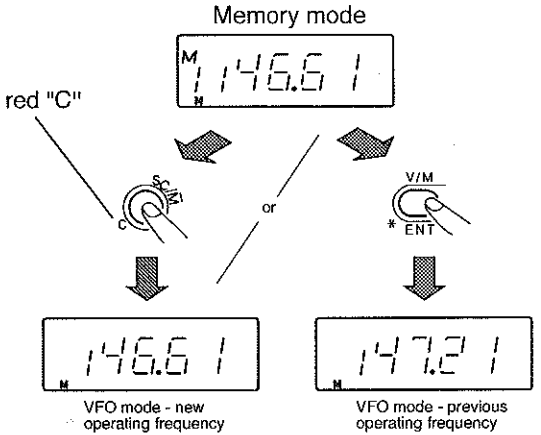
2. Press 1 or turn the ROTARY CHANNEL SELECTOR and switch memory groups if necessary by pressing M (FUNC+M), to select memory channel M1. The frequency that is stored in M1 will appear on the display. If you want to choose a different memory channel, just press another numeric button.



COPYING A MEMORY FREQUENCY TO THE VFO

With the Transceiver in the Memory mode, press the red C (COPY) button to copy the displayed memory frequency to the VFO (Variable Frequency Oscillator). The memory frequency is now also the current VFO frequency.

NOTE: To cancel the frequency change before you have pressed C, press V/M. The Transceiver will revert to the previous VFO frequency.



CHANGING A MEMORY FREQUENCY

When you store a new frequency in a memory channel, the old frequency is deleted.

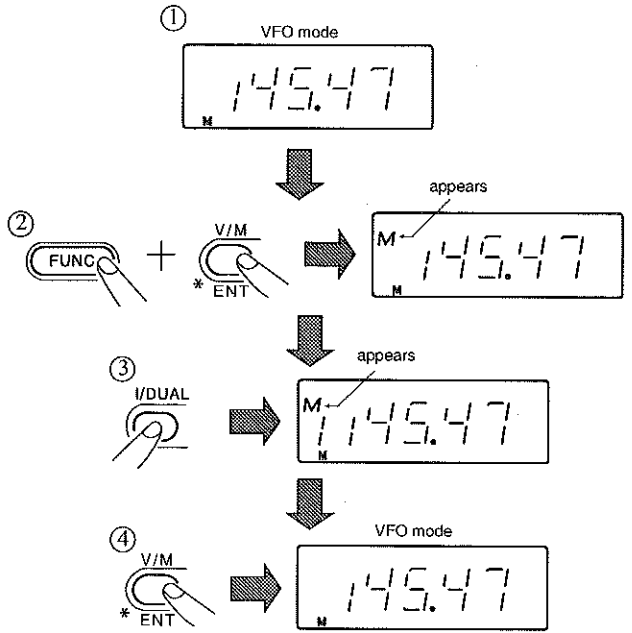
For example, to change the frequency in memory channel M1 from 146.61 to 145.47, perform the following steps:

1. Enter 145.47MHz as the VFO operating frequency (if kHz digit unit entry is enabled, enter 145.470; refer to "ENTERING A VFO FREQUENCY " on Page 16).

2. Press ENT (FUNC+ENT). An "M" will appear on the display. (If you need to switch between the M and M groups, press M (FUNC+M).

3. Press 1 (to change memory channel M1; if you want to change another memory channel, press its number). A long beep indicates that the new frequency has been stored, and a "1" (or the other memory channel number you pressed) appears under the "M."

4. Press V/M to return to the VFO mode.



DELETING A MEMORY FREQUENCY

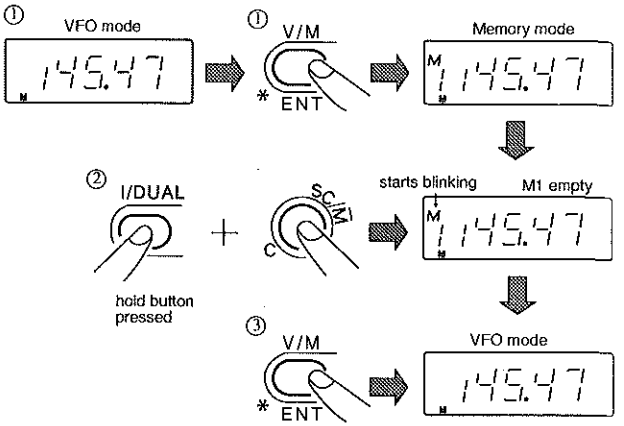
If you want to delete the frequency that is stored in a memory channel (for example ,M1) perform the following steps.

1. Press V/M to switch to the Memory mode. The memory channel that you selected last will appear on the display (if the memory channel is already empty, the "M" will blink).

2. Press the button corresponding with the number of the memory channel you want to delete (1, in this example) and hold while you press the red C button (when a numeric button is held, this stands for Clear). You will hear a long beep. The Transceiver will remain in the Memory mode and the "M" will blink to show that the memory channel is now empty. The current VFO frequency is displayed.

3. Press V/M to return to the VFO mode.

NOTE: Restore 146.61MHz in M1 (see Page 18, "Storing A Memory Frequency ") to agree with the remaining examples in the manual.



ENTERING A CALL FREQUENCY

The call frequency is a convenience frequency that you can access at any time by pressing Call. You enter a new call frequency by copying the VFO frequency. You can copy the current VFO frequency, or you can copy a memory frequency first to the VFO and then to the call memory.

For example, to copy the memory frequency M1 (146.61 MHz) first to the VFO and then to the call memory, perform the following steps:

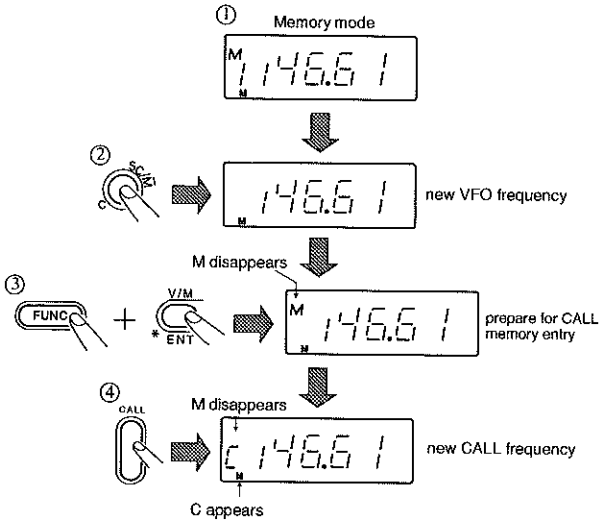
NOTE: If you just want to copy the current VFO frequency to the call memory, perform only steps 3 and 4 below.

1. In the Memory mode use the ROTARY CHANNEL SELECTOR, or Press 1, to select memory channel M1.

2. Press the red C (Copy) button to copy the displayed memory frequency to the VFO. The memory frequency is now the new VFO frequency.

3. Press ENT (FUNC+ENT). A "M" will appear on the display.

4. Press CALL. A long beep indicates that the new call frequency has been entered. The "M" disappears and a "C" (Call) appears.



SCANNING

Your Transceiver can perform either a pause scan or a busy scan and it can scan in the VFO mode or the Memory mode. You can select a 1-MHz-range, full-range, or programmed-range scan in the VFO mode, and a group (M or M), full, or preferred memory scan in the Memory mode.

Pause Scan and Busy Scan -The Transceiver is initially set to perform a pause scan. A pause scan will pause when it detects a signal. Scanning resumes in five seconds, or when the signal ceases, whichever occurs first.

A busy scan will stop as long as it detects a signal, i.e., as long as a channel is "busy;" scanning resumes one second after the signal ceases.

Perform the following steps to become familiar with pause scan and busy scan:

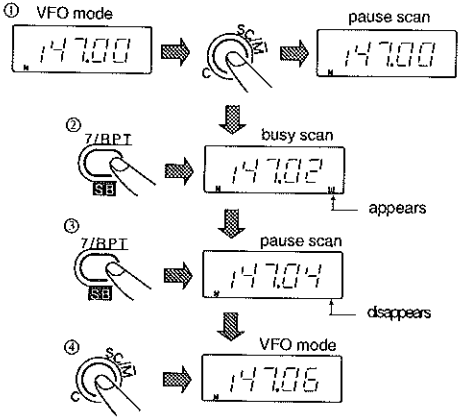
1. Press SC (SCan) in the VFO mode to begin a pause scan. You will hear a short beep and scanning will begin at the frequency on the display and continue within the current 1-MHz range. The decimal point will blink during the scan.

2. Press SB (Scan Busy) during the scan to switch to busy scan. A "B" appears on the display to indicate that busy scan.

NOTE: "B" appears on the display only during an actual scanning operation, even if busy scan is always enabled.

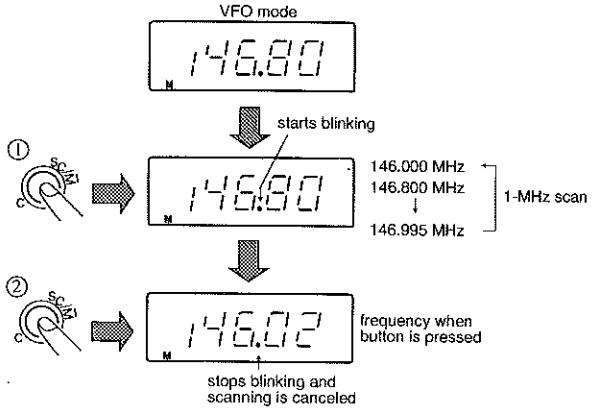
3. Press SB again. The "B" disappears from the display and pause scan resumes.

4. Press SC to stop scanning. The frequency on the display when you press the button will be the new VFO frequency and the decimal point will stop blinking.



VFO Scanning

In the Scanning mode, you can select a 1-MHz-range scan, a full-range scan, or a programmed-range scan. A 1-MHz-range scan searches within the current 1-MHz-range. A full-range scan searches all frequencies within the limits of the Transceiver. A programmed-range scan searches either inside or outside of the range of frequencies from memory channels M8 to M9.



1-MHz-Range Scan -This option causes the Transceiver to scan within a specified 1-MHz range. Refer to the illustration on this page and perform following steps.

1. Enter 146.80 MHz in the VFO mode and press SC. You will hear a short beep and scanning will begin at the frequency on the display and continue within the current 1-MHz range. The decimal will blink during scanning.

2. Press SC again to cancel scanning.

Full-Range Scan -This option causes the Transceiver to scan all of the frequencies within its range. Refer to the illustration on the next page and perform following steps.

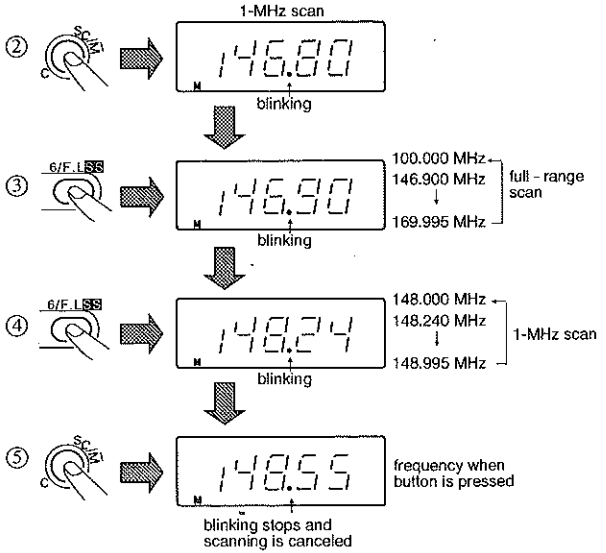
1. Delete the frequencies in memory channels M8 and M9, if they are not already empty. Press V/M to return to the VFO mode.

NOTE: In the scanning mode, pressing SS (Scan Switch) as in step 3 switches between 1-MHz-range and full-range scan, except when M8 and M9 are programmed. In that case pressing SS switches between 1-MHz-range and programmed-range scan (see Page 28, "Programmed-Range Scan).

2. Press SC to begin a 1-MHz scan.

3. Press SS during the 1-MHz scan. You will hear a short beep and the Transceiver will switch to a full-range (all-frequency) scan (M̄8 and M̄9 must be empty).

4. Press SS again to switch back to a 1-MHz scan.



5. Press SC to stop scanning. The frequency on the display when you press the button will be the new VFO frequency and the decimal point will stop blinking.

NOTES:

1. Press S▼ and S▲ during scanning to change direction (to-ward higher or lower frequencies). Press the button for more than 1/2-second to temporarily increase the scanning speed. Release the button to returns to normal speed.

2. The display blinks as the scan passes above 169.99 and cycles back thru the range from 100.00 MHz to approximately 130.00 MHz.

3. The display does not indicate whether the Transceiver is perform a 1-MHz scan or a full-range scan. You can use S or S to determine the type of scan.

4. If you cancel a scan and then want to resume, press SC. The Transceiver will resume the scan.

5. Turning the power off does not cancel a scan. The Transceiver will resume the scan when you turn it on.

Programmed-Range Scan -This option uses the frequencies stored in memory channels M8 and M9 to define a range to scan or to exclude from scanning.

For example, to scan the range from 146.61 MHz to 146.97 MHz, perform the following steps:

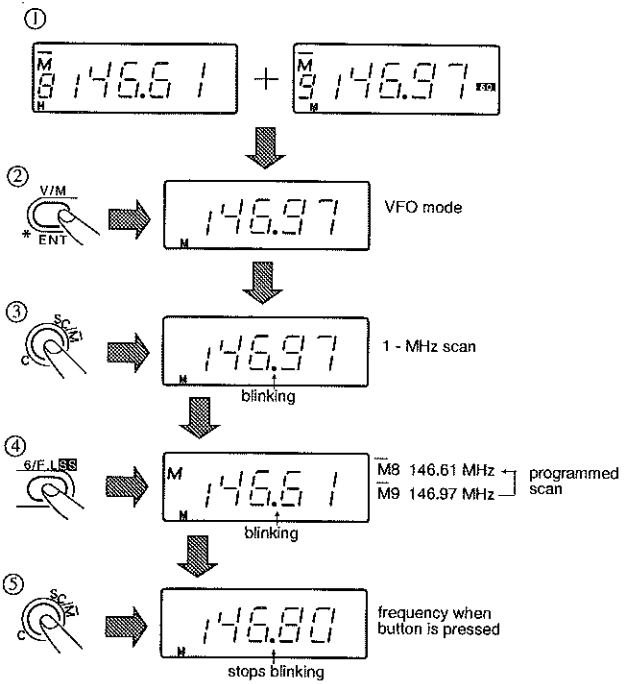
1. If necessary, enable kHz unit digit entry (see Page 48). Then enter 146.61 MHz (the lower limit) in M8. Enter a higher limit of 146.975 MHz (observe that .005 has been added to 146.970) in M9.

2. Press V/M to switch to the VFO mode.

3. Press SC to begin a 1-MHz scan.

4. Press SS during the 1-MHz scan. You will hear a short beep and the Transceiver will start a programmed-range scan between 146.61 MHz and 146.97 MHz.

5. Press SC to stop scanning. The frequency that is displayed when you press the button will become the new VFO frequency and the decimal point will stop blinking.

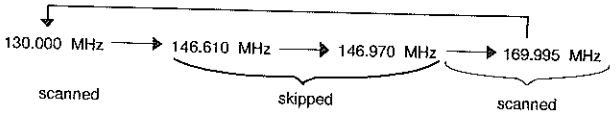


NOTES:

1. Pressing SS during a programmed-range scan causes the Transceiver to resume a 1-MHz scan, starting at the frequency that is displayed when you press the button.

2. Pressing SS switches between a 1-MHz scan and a programmed-range scan only when a frequency is stored in M̄8, M̄9, or both. A full-range scan, as described earlier, is available only when both M̄8 and M̄9 are empty.

You can also exclude a specific range of frequencies while scanning the full range of frequencies, as shown below.



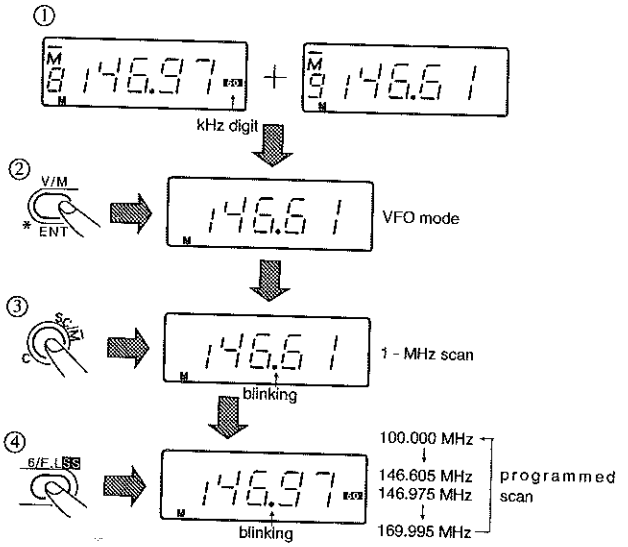
For example, to exclude the frequencies in the range from 146.61 MHz to 146.97 MHz, perform the following steps.

1. If necessary, enable kHz unit digit entry (see Page 48). Then enter a higher limit of 146.975 MHz (observe that .005 has been added to 146.970) in M̄8. Enter 146.61 MHz (the lower limit) in M̄9.

2. Press V/M to enter the VFO mode.

3. Press SC to begin a 1-MHz scan.

4. Press SS during the 1-MHz scan. You will hear a short beep and the Transceiver will scan between 100.00 MHz and 169.995 MHz, while skipping 146.610 MHz thru 146.970 MHz. As noted earlier, the display blinks as the scan passes above 169.99 and cycles back thru the range from 100.00 MHz to approximately 130.00 MHz.



Memory Scanning

Your Transceiver can perform a group ($\overline{M}$ or M), full, or preferred memory scan. The memory channels are scanned at 250 ms intervals. Only memory channels that contain frequencies are scanned. Memory scanning is available while the Battery Saver is enabled.

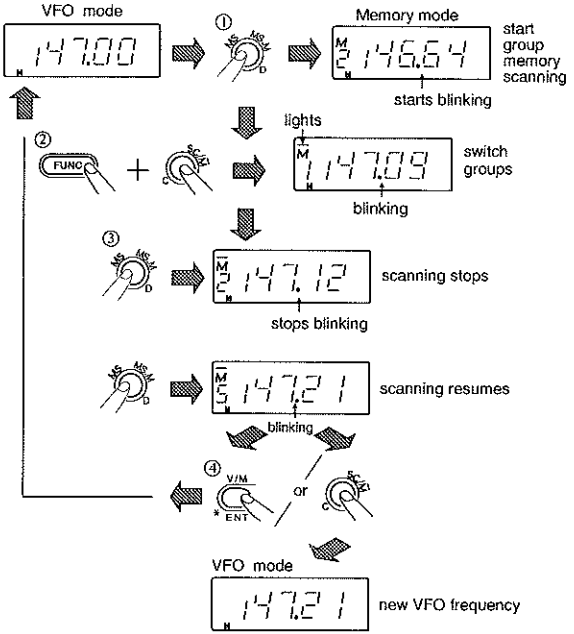
Group Memory Scan -Perform the following steps to scan the M or $\overline{M}$ memory groups:

1. Press MS (Memory Scan) to begin a group memory scan. Scanning will take place in the memory group that you selected last, starting at the memory channel you selected last. The decimal point will blink.

2. Press $\overline{M}$ (FUNC+$\overline{M}$) to switch memory groups.

3. Press MS to toggle memory scanning on and off.

4. Press the red C (Copy) button to copy a memory frequency to the VFO mode, or press V/M to return to the VFO mode at the frequency you selected last.

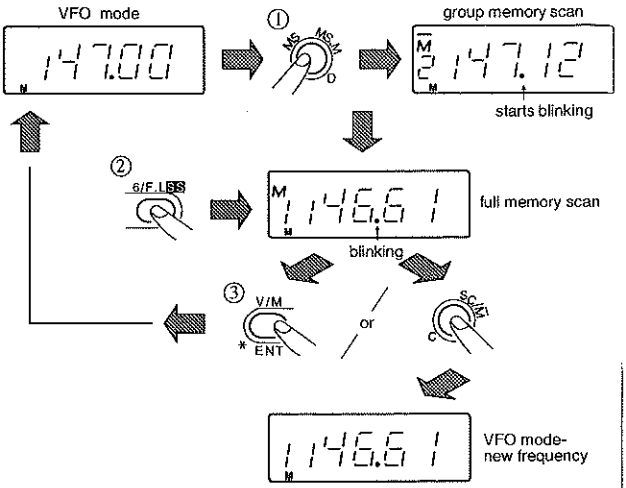


Full Memory Scan -Perform the following steps to scan both memory groups:

1. Press MS to begin memory scanning.

2. Press SS (Scan Switch) to switch between group memory scan and full memory scan.

3. You can press C to copy a memory frequency to the VFO mode, or press V/M to return to the VFO mode at the frequency you selected last.



Preferred Memory Scan -Your Transceiver can scan preferred memory channels ("MS.M" or Memory-Scan Memory channels). A small "▼" mark appears above the "M" on the display of each memory channel that is also a preferred MS. M memory channel.

Perform the following steps to make a memory channel as a preferred MS.M memory channel:

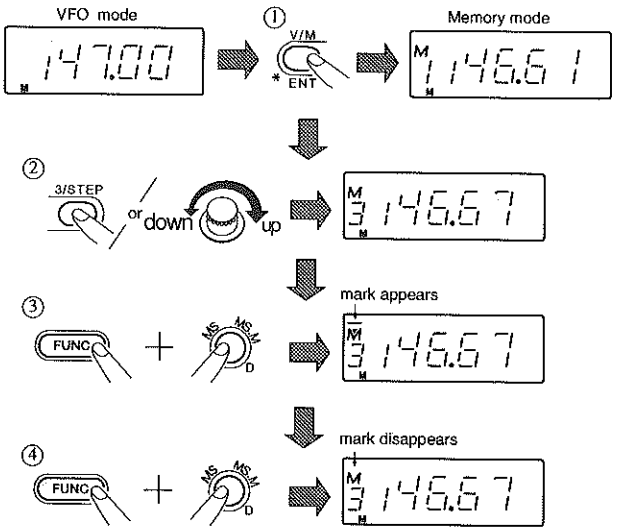
1. Press V/M to switch to the Memory mode.

2. Press a numeric button or turn the ROTARY CHANNEL SELECTOR, to select the memory channel you want to mark.

3. Press MS.M (FUNC+MS.M).A "▼" mark will appear above the "M" on the display to indicate that the channel is an MS.M channel.

To remove a preferred MS.M memory channel:

4. Press MS.M (FUNC+MS.M) again to unmark the channel. The "▼" above the "M" on the display will disappear.



The following steps show you how to scan only the MS.M channels within a group ($\bar{M}$-or M-group MS.M scan), or all the MS.M channels together (full MS.M scan):

1. Press V/M to switch to the VFO mode.

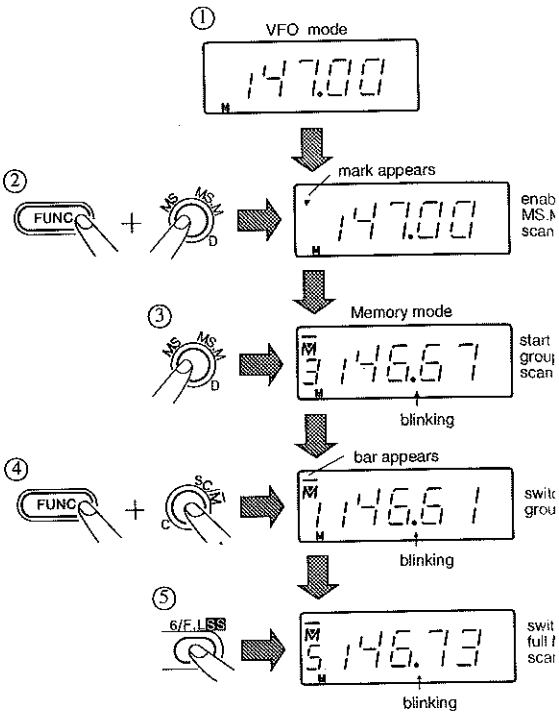
2. Press MS.M (FUNC+MS.M) to enable MS.M scanning. A "▼" mark will appear near the upper left corner of the display. Only the MS.M channels will be scanned. You can toggle MS.M scanning on and off during a scan.

3. Press MS to begin a group MS.M scan. You can toggle the group MS.M scan on and off.

NOTE: MS.M scanning functions only when you have marked one or more memory channels as MS.M channels.

4. Press $\bar{M}$ (FUNC+$\bar{M}$) to switch between memory groups. You can switch during a scan.

5. Press SS during scanning to switch between group MS.M scan and full MS.M scan. When you switch from full to group MS.M scan, the memory group that is displayed when you press SS is the one that will be scanned.



CHANGING THE TRANSMITTER POWER

Your Transceiver has three power levels, with the following battery packs:

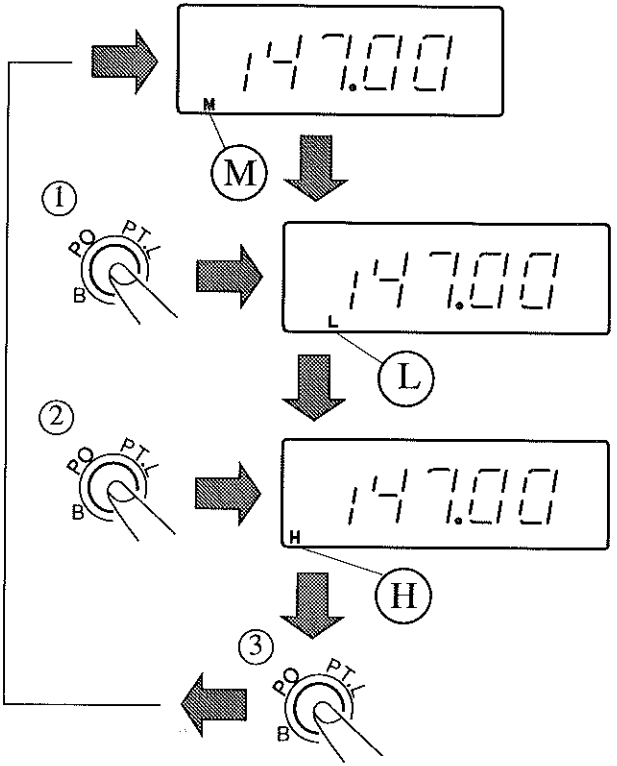
CNB150,151,153 (7.2volts)	CNB152 (12volts)
High.....2.0watts.	High.....5.0watts.
Medium.....2.0watts.	Medium.....2.5watts.
Low.....0.35watts.	Low.....0.35watts.

The following steps show you how to select the transmitter power level (the power is set to medium at the factory).

1. The small "M" near the lower left corner of the display indicates medium power. Press PO (POwer). "M" will disappear and "L" will appear to indicate low power.

2. Press PO again. "L" will disappear and be replaced by "H" to indicate high power.

3. Press PO again to return to medium power.



DUAL FREQUENCY WATCH

During dual frequency watch operation, the VFO frequency is interrupted once every three seconds as the Transceiver switches to the memory mode and displays the memory frequency. Dual frequency watch allows you to:

1. Listen primarily on the VFO frequency and monitor a single memory channel.

2. Listen primarily on the VFO frequency and monitor the memory channels scanned in sequence..

NOTES:

1. The word "DUAL" appears on the display during dual frequency watch.

2. You can change the VFO frequency during dual frequency watch.

3. Dual watch operation pauses at the memory channel when a signal is received there even if a signal is also being received on the VFO frequency.

4. If you want to suspend dual frequency watch temporarily to monitor the memory frequency, turn the Squelch control fully counterclockwise or press and hold SQL OFF.

5. During dual frequency watch, you can transmit only on the VFO frequency. Press the PTT button to transmit just as you would during VFO mode operation. The VFO frequency will appear on the display. Release the PTT button to return to dual frequency watch.

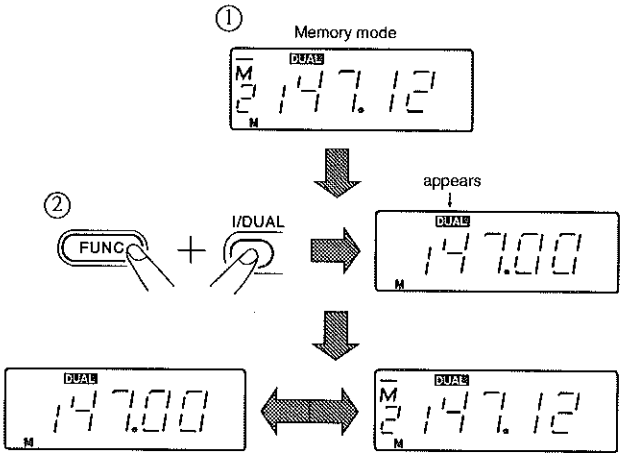
6. If a station calls you on the memory frequency, you can communicate on the memory frequency only by first stopping dual frequency watch.

To begin a dual frequency watch of the VFO frequency and memory channel M2, for example, perform the following steps:

1. Press V/M to switch to the Memory mode. Then press 2 or turn the ROTARY CHANNEL SELECTOR to select memory channel M2.

2. Press DUAL (FUNC+DUAL) to begin dual frequency watch. The word "DUAL" will appear on the display. The display will show the VFO frequency and the memory frequency alternately.

NOTE: If no frequency has been stored in memory channel M2, you will hear a short low-pitched beep when you press DUAL (FUNC+DUAL), indicating an incorrect entry.

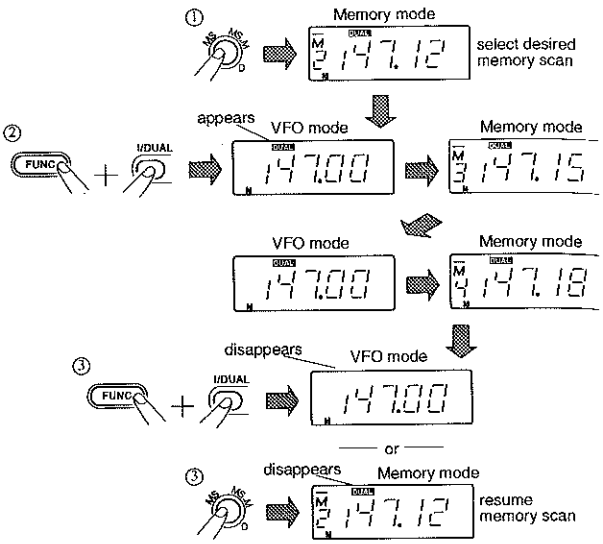


To begin dual frequency watch of the VFO frequency and scanned memory frequencies, perform the following steps:

1. Press MS and select the memory scan you want (See "Memory Scanning," Page 30).

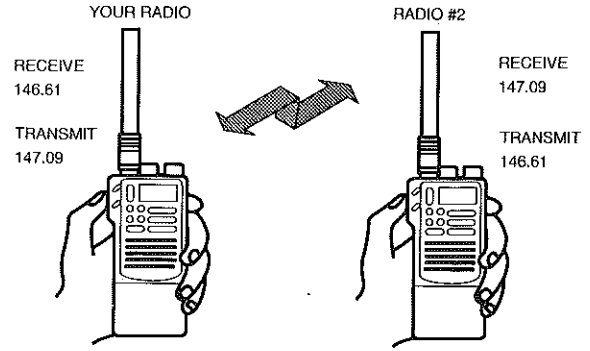
2. Press DUAL (FUNC+DUAL) to begin dual frequency watch. The word "DUAL" will appear on the display. The display will alternately show the VFO frequency and the next memory frequency in the scan sequence.

3. Press DUAL (FUNC+DUAL) (or SC, or V/M) to cancel dual frequency watch and return to the VFO mode. As an alternative, you can press MS to cancel dual frequency watch and return to the memory scan.



DUPLEX OPERATION

Your Transceiver can operate in duplex (use different frequencies for receiving and transmitting). The receiving and transmitting frequencies of one of the radios must be transposed for the radios to communicate. Refer to step 4.



To enable duplex operation, perform the following steps:

NOTE: Press V/M to switch to the Memory mode. Duplex operation is not available in the VFO mode.

1. Enter the two frequencies you want to use in memory channels with the same number, one in each memory group ($\bar{M}$1 and M1, in this example).

NOTE: These memory channels must be simplex. If an offset sign (+ or -) appears on the display, press RPT (FUNC+RPT) until it disappears (see Page 65, REPEATER OPERATION).

2. Press DUP (FUNC+DUP), "DUP" will appear on the display to indicate duplex operation.

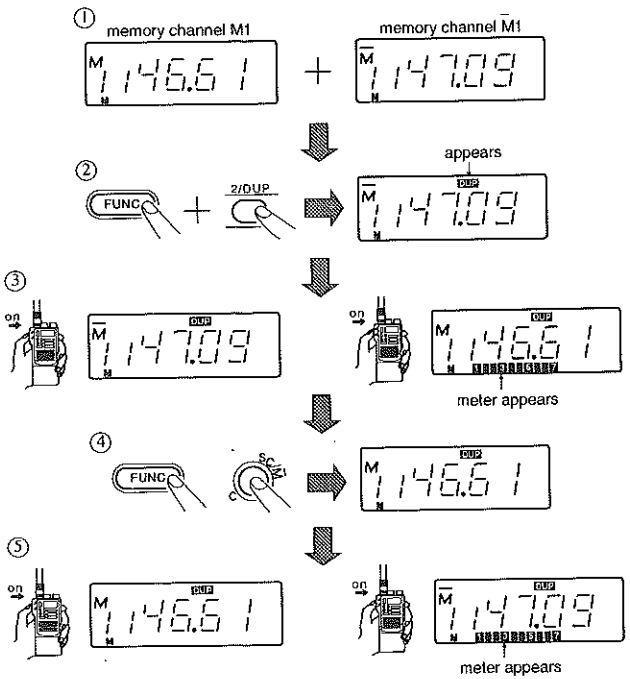
3. Press and hold the PTT (Push To Talk) button to transmit. The transmitting frequency will appear on the display. When you release the PTT button, the display will show the receiving frequency.

4. Press $\bar{M}$ (FUNC+$\bar{M}$) to interchange the transmitting and receiving frequencies. The memory channel entries are not changed; just the PTT action is reversed.

5. Press and hold the PTT button to transmit. The transmitting and receiving frequencies are interchanged.

BEFORE		INTERCHANGED	
Receive	Transmit	Receive	Transmit
146.61 MHz(M1)	147.09 MHz($\bar{M}$1)	147.09 MHz($\bar{M}$1)	146.61 MHz(M1)

6. Press DUP (FUNC+DUP) to cancel duplex operation.



CHANGING THE CHANNEL STEP

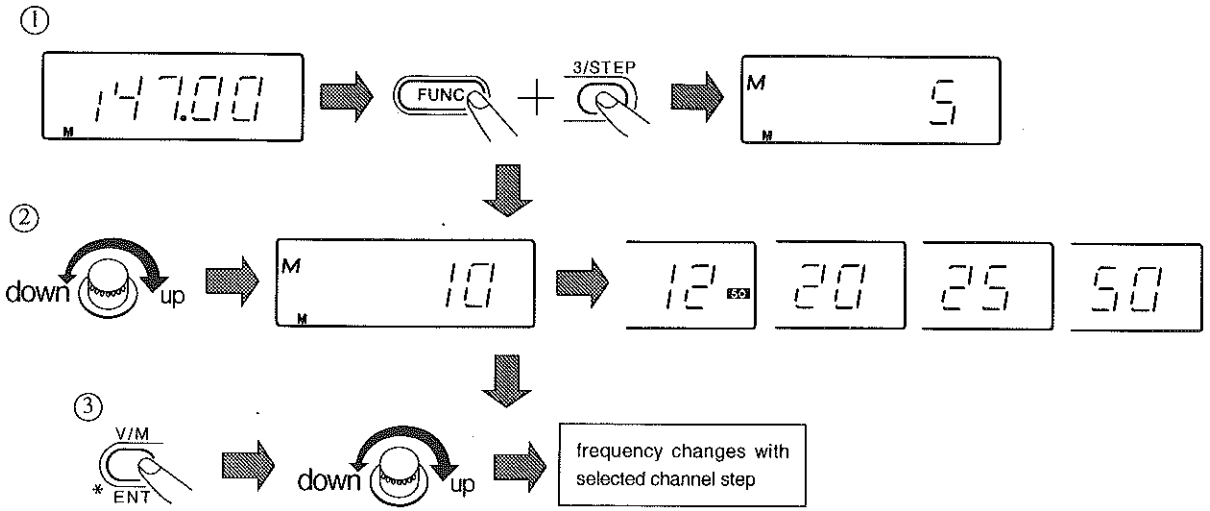
You have the option setting your Transceiver's channel step (the amount the frequency is changed with each click of the Rotary Channel Selector) to 5 kHz (factory setting), 10 kHz, 12.5 kHz, 20 kHz, 25 kHz, or 50 kHz. A fast channel step of either 100 kHz or 1MHz is also available (see Page 50). To change the channel step:

1. Press STEP (FUNC+STEP). The display will change to show the current channel step.

2. Turn the Rotary Channel Selector until you get the step you want.

NOTE: When you set the step to 5 or 12.5 kHz, the final digits of the frequency are shown in a small black box at the right side of the display.

3. Press V/M to register the change and return to the VFO mode. Turn the Rotary Channel Selector. The VFO frequency changes by the amount of the current channel step with each click of the knob.


①
147.01
M
FUNC
+
3/STEP
M
5
M
②
down
up
M
10
12
20
25
50
③
V/M
* ENT
down
up
frequency changes with
selected channel step

BATTERY SAVER

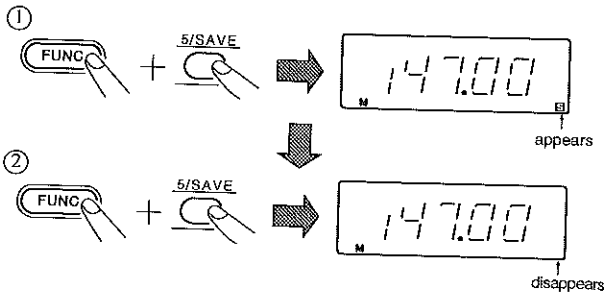
This feature saves the battery by putting the Transceiver in a standby mode. The receiver is activated briefly once each second. The current drain on standby is reduced to 1/3.

NOTE: The Battery Saver is disabled during dual watch operation and VFO scanning.

Perform the following steps to enable the Battery Saver.

1. Press SAVE (FUNC+SAVE). An "S" will appear on the display to indicate that the Battery Saver is enabled.

2. Press SAVE (FUNC+SAVE) again to disable the Battery Saver.



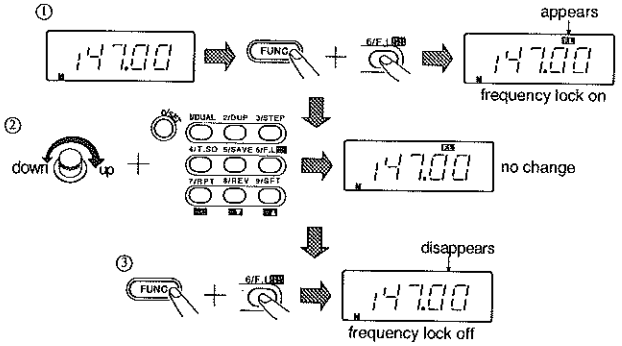
FREQUENCY LOCK

This feature allows you to lock the frequency and operating mode so they are not accidently changed. You can use this feature during scanning and dual watch operation to prevent unwanted operation. To use the frequency lock:

1. Press F/L (FUNC+F.L). "F.L" will appear on the display to indicate that the frequency lock is on.

2. Turn the Rotary Channel Selector and press the keyboard buttons. There is no change in the display.

3. Press F.L (FUNC+F.L) again to turn off the frequency lock. "F.L" disappears from the display.



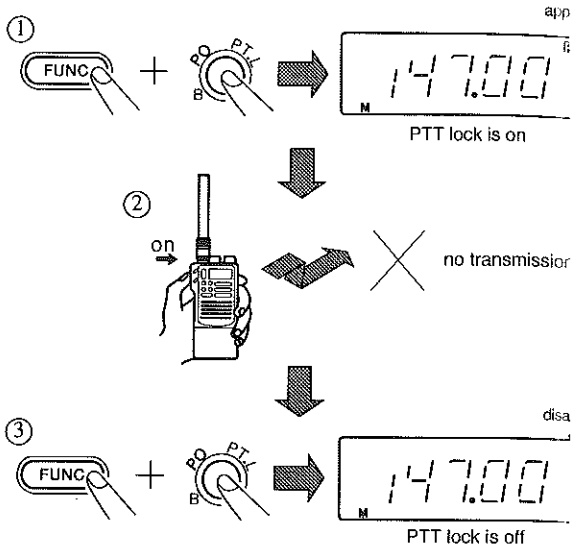
PTT LOCK

This feature disables the PTT (Push To Talk) button to reduce the chance of accidental transmission. To use the PTT lock:

1. Press PT.L (FUNC+PT.L). "P.L" will appear on the display to indicate that the PTT lock is on.

2. Press the PTT button. Note that it has no effect.

3. Press PT.L (FUNC+PT.L) again to turn off the PTT lock. "P.L" disappears from the display.



TONE SQUELCH

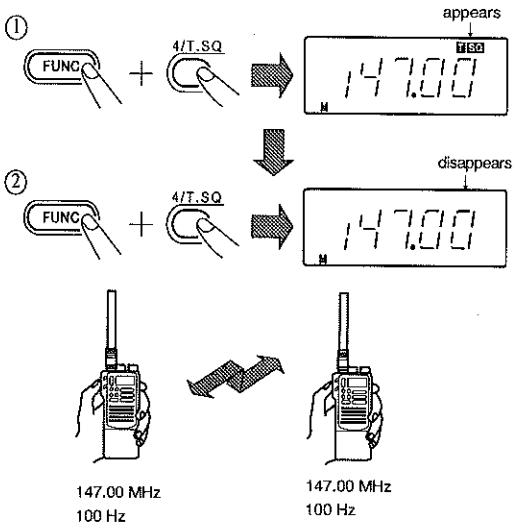
The CTCSS (Continuous-Tone-Coded Squelch System) tone squelch feature allows the receiver in your Transceiver to remain silent except when certain stations call you. In addition it allows you to use repeaters that require a tone for access.

NOTE: When you enable tone squelch, you cannot communicate with stations that do not have tone squelch capability, or stations that use different tone frequencies. You must select the correct tone frequencies before you attempt tone squelch operation.

To use tone squelch during non-repeater operation:

1. Press T.SQ (FUNC+T.SQ) again. Both "T" and "SQ" will appear on the display to indicate that tone squelch is enabled.

2. Press T.SQ (FUNC+T.SQ) again to disable tone squelch operation. The "T" and "SQ" will disappear from the display.



When you use the Transceiver with a repeater, the tone encoder and tone squelch functions are still available. To use tone squelch will repeaters:

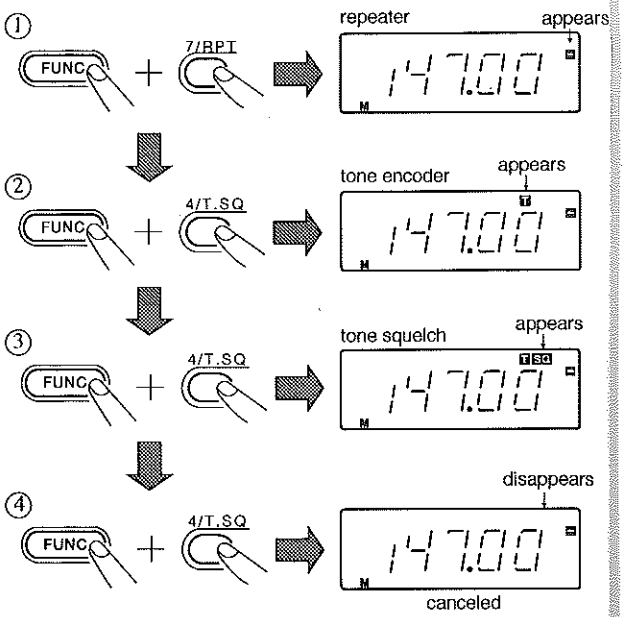
1. Press RPT (FUNC+RPT) to enable repeater operation.

2. Press T.SQ (FUNC+T.SQ). A "T" will appear on the display to indicate that the tone encoder is enabled.

3. Press T.SQ (FUNC+T.SQ) again. Both "T" and "SQ" will appear on the display to indicate that tone squelch is enabled.

4. Press T.SQ (FUNC+T.SQ) a third time to disable tone encoder and tone squelch operation. The "T" and the "SQL" will disappear from the display.

NOTE: The tone frequency is set to 100 Hz at the factory. However, you can select any one of thirty-eight tones. Refer to "Entering the Tone Frequency" on Page 51.



USING THE SET FUNCTIONS

SET (FUNC+SET) allows you to perform special functions when you press it before you press the button shown in Table 2

See the pages following the table for information on how to use each SET function.

NOTES:

1. An "M" is shown on the display when you press SET (FUNC+SET), but there are no display indications of the status of the functions. You must use a function to determine its status.

2. Each of the SET functions has a toggle action; to return to the previous function status, repeat the button sequence.

Table 2

Button	Special Mode Function
0	Mutes the buzzer.
1	Toggles kHz unit digit entry (on and off).
2	Toggles the repetition of the paging alarm (1 or 5 times).
3	Selects the fast channel step (100kHz or 1MHz).
4	Initiates tone frequency entry.
5	Toggles Auto Power-Off (on and off).
6	Toggles use the Rotary Channel Selector (during Frequency Lock) (on and off).
7	Frequency Range Setting.
8	10MHz Column Input.
9	None

Disabling the Buzzer

Your Transceiver produces the following alarm tones:

Long beep .....Indicate completion of operation.
Beeping alarm ..... Generated during Auto-Power Off operation and when signals are received during paging operation.
Low-tone beep ..... Indicates improper key entry.
High-tone short beep ..... Indicates improper key entry.

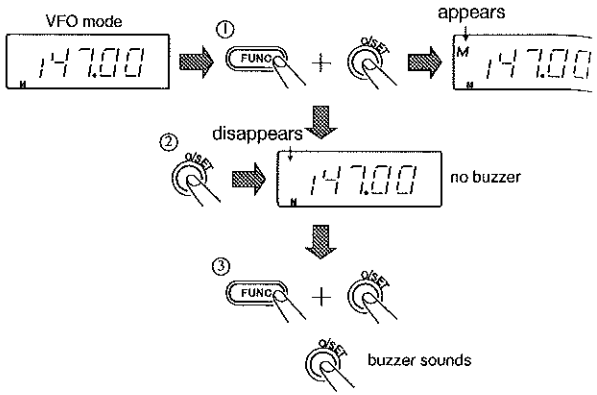
Use the following procedure to disable the buzzer.

1. Press SET (FUNC+SET). An "M" will appear on the display.

2. Press 0. The buzzer is now disabled and pressing a button will not generate any sounds. The "M" disappears from the display.

NOTE: The beeping alarm will remain active when the buzzer is disabled.

3. To enable the buzzer, press SET (FUNC+SET) to en the set mode. Then press 0.



NOTE: The buzzer status is not indicated on the display

Enabling kHz Unit Digit Entry

This function enables and disables the keyboard entry of the kHz unit digit (this must be either 0 or 5). When kHz unit digit entry is disabled, the last digit you can enter is the 10 kHz digit (146.46 MHz). When it is enabled, you can enter the kHz unit digit (146.4650 MHz). The final zero is added automatically-the last two digits are shown in a small box at the right side of the display.

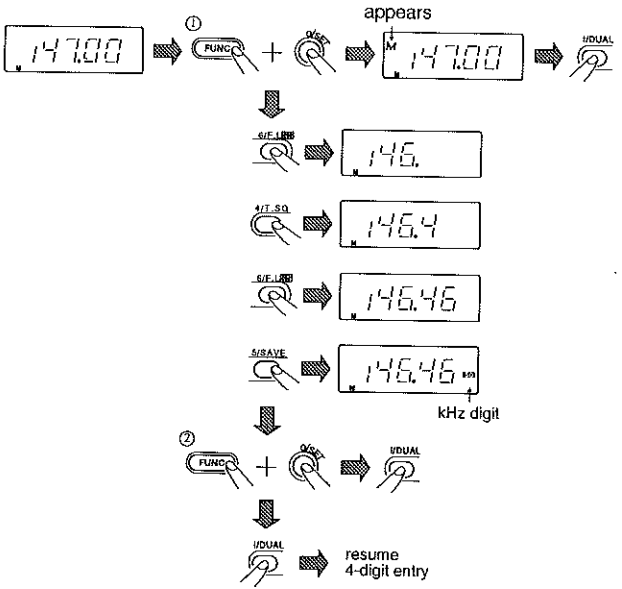
NOTE: You can always use the ROTARY CHANNEL SELECTOR to enter the kHz digit if your channel step is set to 5, 12.5, or 25 kHz.

Use the following procedure to enable kHz unit digit keyboard entry:

1. Press SET (FUNC+SET). An "M" will appear on the display.

2. Press 1. Now you can enter the kHz unit digit (must be either 0 or 5). The "M" disappears from the display.

3. To disable kHz unit digit entry, Press SET (FUNC+SET), and then press 1.



NOTE: The kHz unit digit entry status is not displayed. Enter a frequency with the numeric buttons to see if you can enter the kHz unit digit.

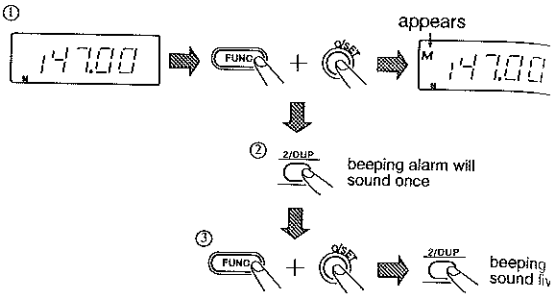
Changing the Paging Alarm

The alarm is normally repeated five times when a signal is received during pager operation. To switch to a one-beep alarm, perform the following steps:

1. Press SET (FUNC+SET). An "M" will appear on the display.

2. Press 2. The alarm will now sound only once when a paging signal is received. The "M" disappears from the display.

3. To revert to the five-beep alarm, press SET (FUNC+SET). Then press 2.



NOTE: The alarm status is not displayed. You can c
by receiving a signal and listening for the number of

Changing the Fast Channel Step

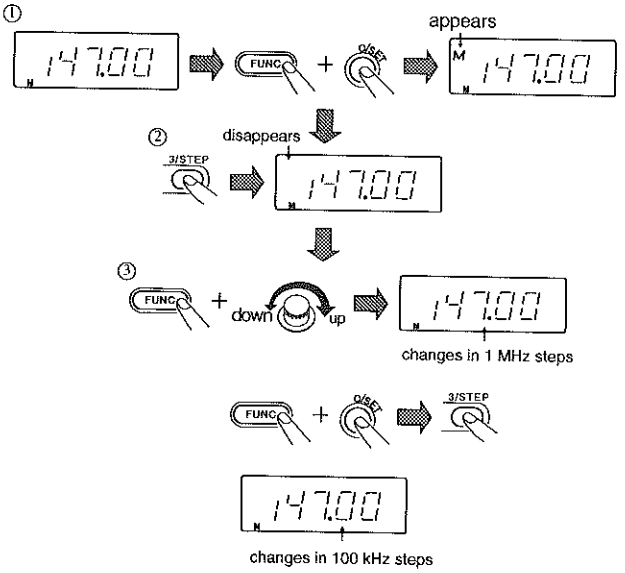
Your Transceiver is initially set so that the frequency changes in 100 kHz steps when you press FUNC (FUNCtion) and turn the ROTARY CHANNEL SELECTOR. To change to 1 MHz steps:

1. Press SET (FUNC+SET). An "M" will appear on the display.

2. Press 3. The frequency will now change in MHz steps when you press FUNC and turn the ROTARY CHANNEL SELECTOR. The "M" disappears from the display.

3. To return to 100 kHz steps, press SET (FUNC+SET). Then press 3.

NOTE: The fast channel step status is not displayed. You can check it by pressing FUNC while you turn the ROTARY CHANNEL SELECTOR.



Entering the Tone Frequency

You can select any three of the 38 tones in Table 3 and store them in memory.

Table 3

AVAILABLE TONE FREQUENCIES (in Hz)			
67.0	97.4	136.5	192.8
71.9	100.0	141.3	203.5
74.4	103.5	146.2	210.7
77.0	107.2	151.4	218.1
79.7	110.9	156.7	225.7
82.5	114.8	162.2	233.6
85.4	118.8	167.9	241.8
8 8.5	123.0	173.8	250.3
91.5	127.3	179.9	
94.8	131.8	186.2	

NOTE: You can enter a total of three tone frequencies, o for each of the following groups of frequency chann

Group 1: VFO frequency; Call frequency; M0,M3-M9; M0,M3,-M9.
Group 2: $\bar{M}1$ and M1.
Group 3: $\bar{M}2$ and M2.

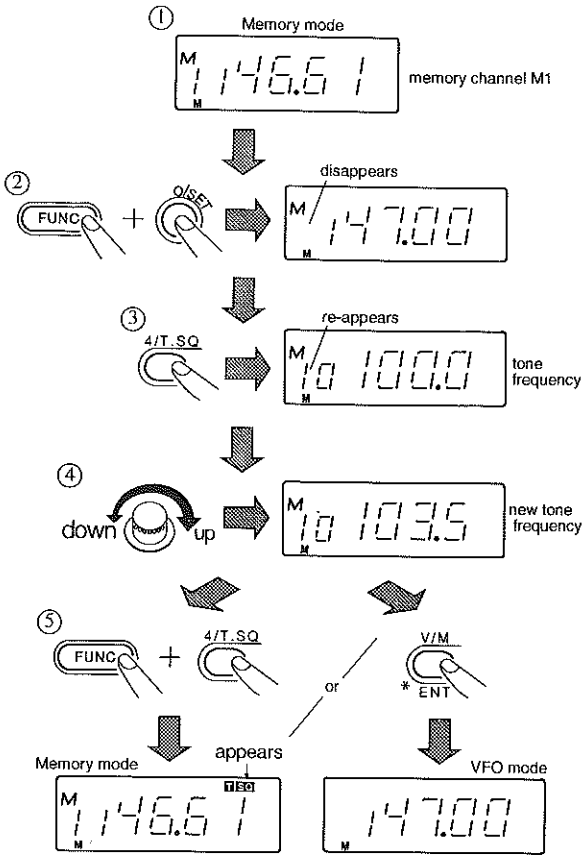
NOTE: When no frequencies have been entered i memory channels M1, $\bar{M}1$, M2, and $\bar{M}2$, independent t frequencies cannot be entered for groups 2 and 3. If you this, all the groups will be changed to the new entry.

For example, to enter a tone frequency for mem channels $\bar{M}1$ and M1, use the following procedure:

1. Select memory channel M1 or $\bar{M}1$.

2. Press SET (FUNC+SET). The 1 under the disappears.

3. Press 4. The display will show a tone frequency (y Transceiver was set to 100 Hz at the factory). The 1 appears under the "M".



4. Turn the ROTARY CHANNEL SELECTOR until the display shows the tone frequency you want.

5. Press V/M to store the tone frequency and return to the VFO mode, or press T.SQ (FUNC+T.SQ) to enable tone squelch and remain in the Memory mode.

Auto Power-Off

Your Transceiver has an auto power-off (APO) feature that reduces power consumption to approximately 5 mA. When enabled, this feature automatically takes effect whenever the keyboard, PTT buttons, and Squelch buttons have not been operated, and the Transceiver has not received a signal, for 30 minutes. First, the Transceiver's buzzer will sound a beep. One minute later the Transceiver will enter an APO "sleep" mode. Only "APO" will appear on the display, the receiver and transmitter will be disabled, and only the SC button is active.

NOTE: Even though power is reduced to a minimum when auto power-off occurs, be sure to turn the Transceiver off whenever you finish using it.

Perform the following steps to familiarize yourself with the auto power-off feature:

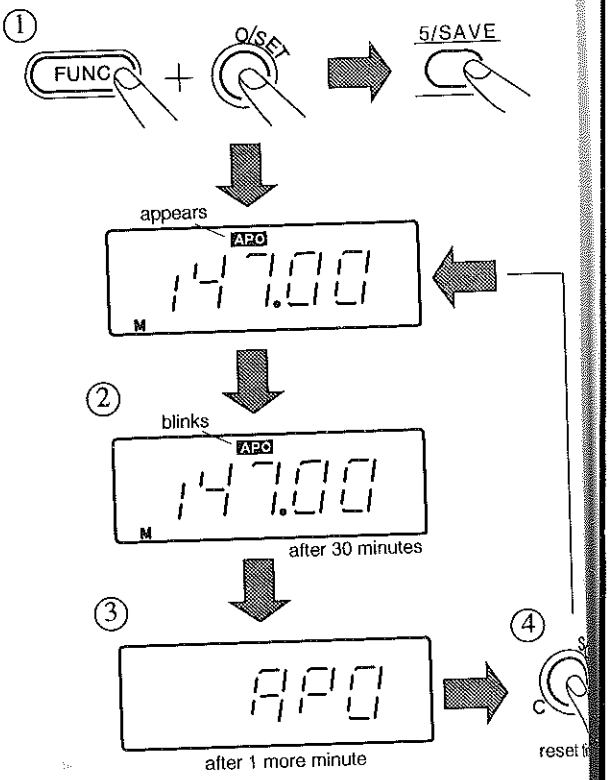
1. Press SET (FUNC+SET) and then press 5. "APO" will appear in a small box on the display to indicate that auto power-off is enabled.

2. When you have not operated the buttons and the Transceiver has not received a signal for 30 minutes, the Transceiver will sound a beep and "APO" will blink in the small box.

3. One minute after the beep, most of the display will disappear to reduce power consumption. "APO" will appear in larger letters on the display to indicate the APO sleep mode.

4. Press SC when you want to switch back to the VFO mode. The auto power-off timer will reset for another 30 minutes.

5. Press SET (FUNC+SET) and then press 5 to disable auto power-off.



Changing the Frequency While it is Locked

When you turn on the frequency lock, described on Page 42, both the frequency and mode (VFO or Memory) are locked. However, the following steps enable you to use the ROTARY CHANNEL SELECTOR to change the frequency even when the frequency lock is on.

NOTE: If "F.L" is indicated on the display, first press F.L (FUNC+F.L) to turn the frequency lock off.

1. Press SET (FUNC+SET) and then press 6, to enable rotary frequency changing.

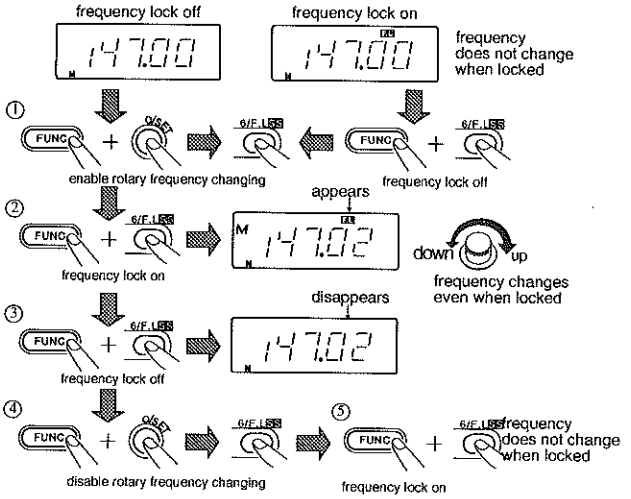
2. Press F.L (FUNC+F.L). "F.L" will appear on the display to indicate that the frequency lock is on, but the ROTARY CHANNEL SELECTOR can change the frequency.

3. Press F.L (FUNC+F.L) to turn off the frequency lock.

4. Press SET (FUNC+SET) and then press 6, to disable rotary frequency changing.

5. Press F.L (FUNC+F.L). "F.L" will appear on the display to indicate that the frequency lock is on. The ROTARY CHANNEL SELECTOR cannot change the frequency.

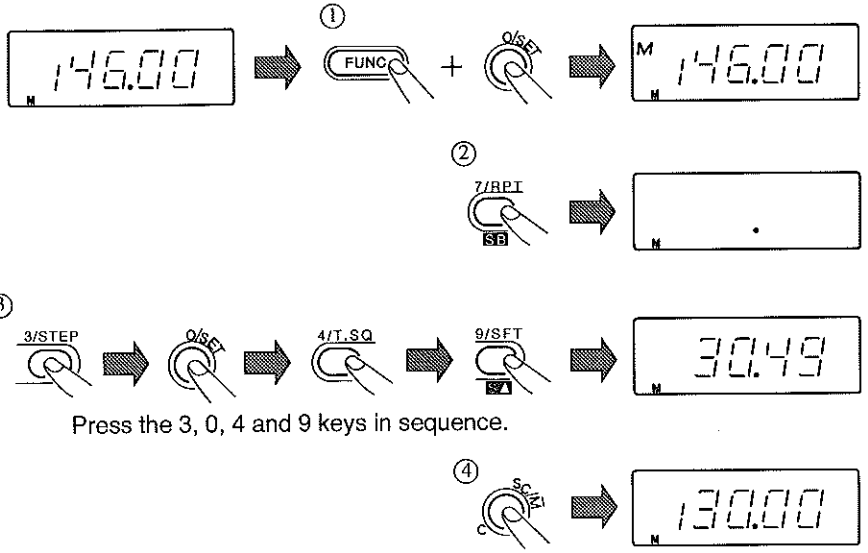
NOTE: The sequence in steps 1 and 4 acts as a toggle.



Frequency Range Setting

It is possible to set upper and lower limits for the frequency indications that appear on the display.

Example: Specifying a frequency range of 130.00 - 149.995

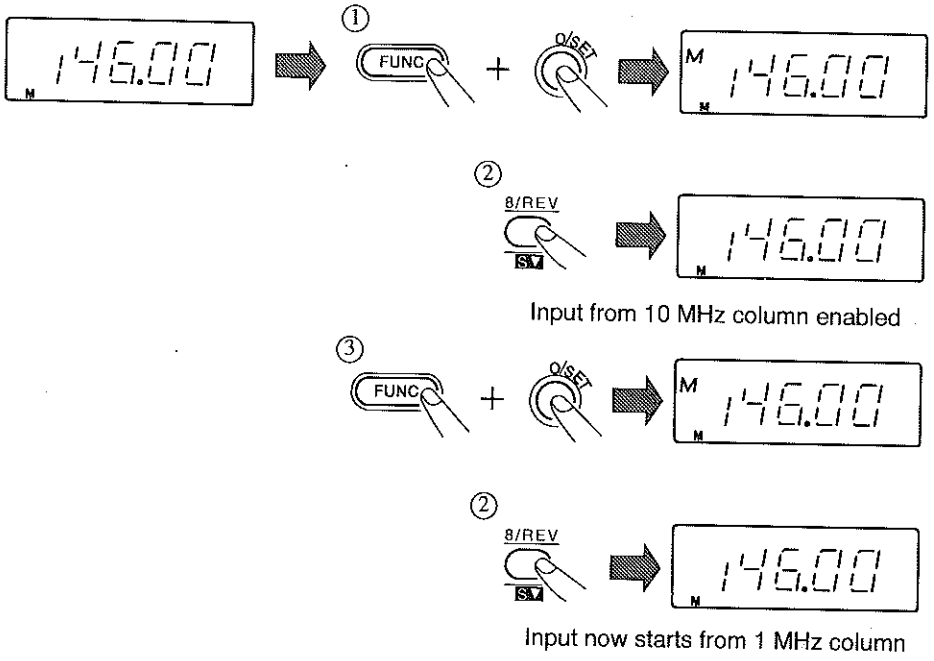


Press the 3, 0, 4 and 9 keys in sequence.

Now frequencies between 130.00 and 149.995 can be displayed.

10 MHz Column Input

When inputting frequencies using the numeric keys, it is usual to begin with the 1 MHz column. When this function is turned on, however, you can input frequencies beginning with the 10 MHz column.



PAGING AND CODE SQUELCH

This feature allows you to use the DTMF tones of your Transceiver to page one specific station (individual paging), or all the stations in a group (group paging).

NOTE: Be sure to enter both an individual code and a group code at each station, as described on the following pages, before you attempt to use this feature.

The following procedures assume that Stations A through D have the individual codes and group codes shown in Figure 3.

Overview

To call all stations from Station A, recall the group code and press the PTT button. A beep will sound at Stations B through D, and "$^{M}_{2}$C100" will appear on their displays to indicate that they have been paged as a group.

To call only Station B from Station A, enter the individual code for Station B in address number M1 and press the PTT button. A beep will sound at Station B, and "$^{M}_{2}$C001" appear on its display to indicate that Station A is pagin

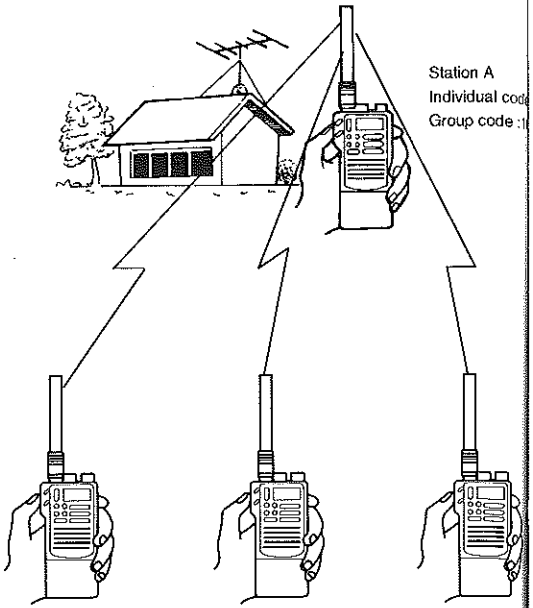


Figure 3

Entering Individual and Group Codes

NOTES:

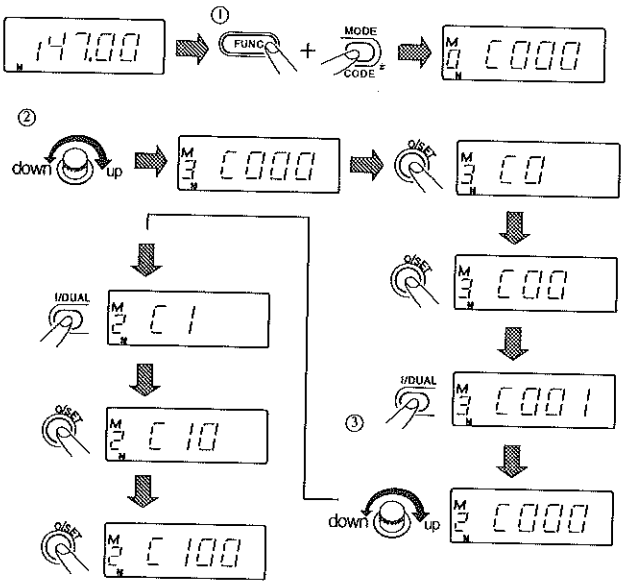
1. Memory channels M1 through M3 are used by the paging function as shown in Table 4 (on Page 59). You can display these in succession by turning the ROTARY CHANNEL SELECTOR.

2. Individual and group codes must consist of three digits. The group code must be the same for all members of the group.

For example, to enter group code 100 in memory channel M2 and individual code 001 in memory channel M3:

1. Press CODE (FUNC+CODE). The display will show "M0C000".

2. Turn the ROTARY CHANNEL SELECTOR until M3 appears on the display. Then press the numeric buttons 0,0, and 1. When you enter the last digit, you will hear a long beep to indicate that entry of the individual code is complete.



3. Turn the ROTARY CHANNEL SELECTOR until M2 appears on the display. Then press the numeric buttons 1,0, and 0. When you enter the last digit, you will hear a long beep to indicate that entry of the group code is complete.

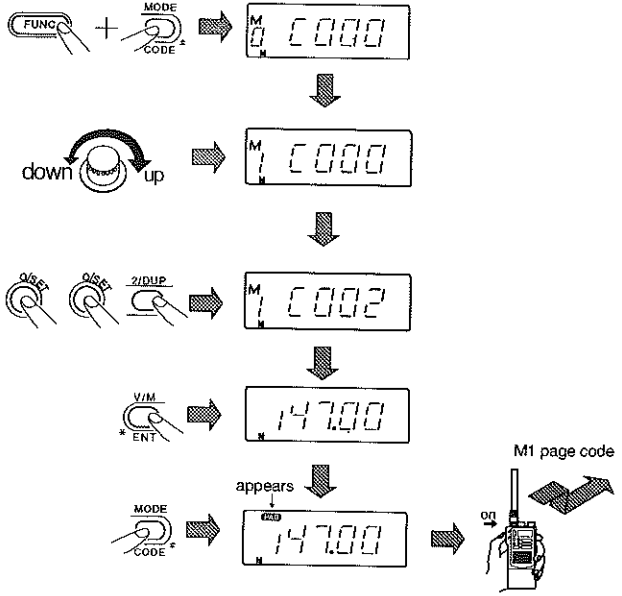
Table 4

Code Memory Channel:	Contains:
M0	Code of any station paging you is inserted in M0. Just press PTT to page the paging station back.
M1	Enter any station's individual code. Used when you page an individual station.
M2	Your group code. Used when you transmit or receive a group page.
M3	Your individual code. Used when you receive an individual page.

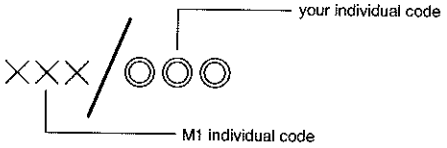
How To Page a Station

Use the following procedure to page an individual sta
The operating frequency, group code, and individual co
should already have been entered by all stations.
example, to page station B (individual code 002):

1. Press CODE (FUNC+CODE).
2. Turn the ROTARY CHANNEL SELECTOR to c
   memory channel M1.
3. Press 002. A long tone indicates that the code is ente
4. Press V/M to return to the VFO mode.
5. Press MODE to enable paging. "PAG" will appear
   small box on the display.



6. Press the PTT button. The M1 paging code (a DTMF signal composed of the M1 individual code following by your individual code) is transmitted automatically.



NOTE: You will hear the M1 paging code at it is being transmitted. It will not appear on the display.

How To Page a Group

Use the follow procedure to page all the station in a group. The operating frequency, group code, and individual codes should already have been entered by all stations.

1. Press CODE (FUNC+CODE).

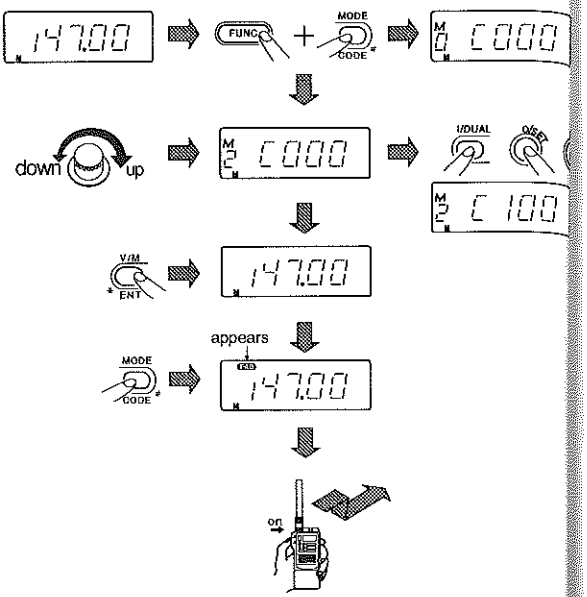
2. Turn the ROTARY CHANNEL SELECTOR to memory channel M2. Then use the numeric buttons to enter the group code.

3. Press V/M to return to the VFO mode.

4. Press MODE to enable paging. "PAG" will appear on the display.

5. Press the PTT button. DTMF signals, composed of the destination code followed by your own code, will be transmitted automatically.

NOTE: You will hear the DTMF code as it is being transmitted.



How To Answer a Page

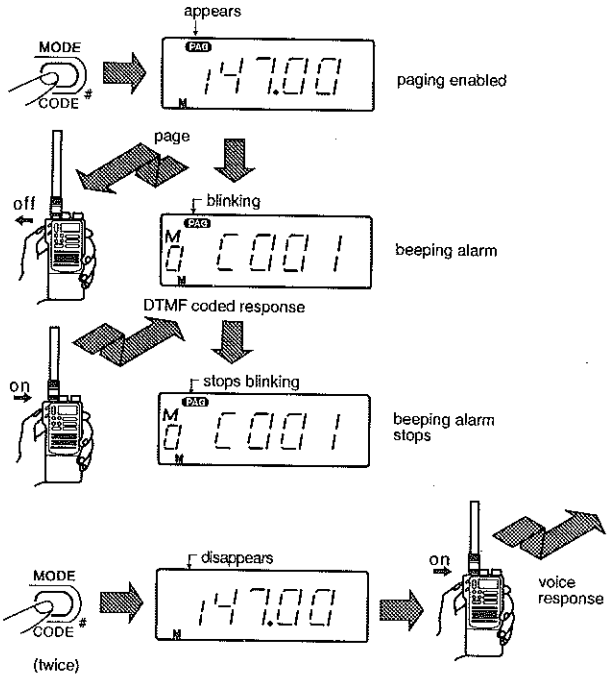
Use the following procedure when your station has been individually paged. The operating frequency, and your individual and group codes will already have been entered, and MODE pressed to enable paging.

NOTE: When your Transceiver receive a code that is identical to its own, you will hear a beep and "PAG" will blink in a small box on the display to indicate that you have been paged. The display will show the paging station's individual code in memory channel M0 in the format: "M0CXXX."

1. Press the PTT button to respond to the page. Your Transceiver will transmit DTMF tones to the paging station.

2. Press MODE twice to disable paging (the paging station will do the same).

3. Press the PTT button to transmit voice.



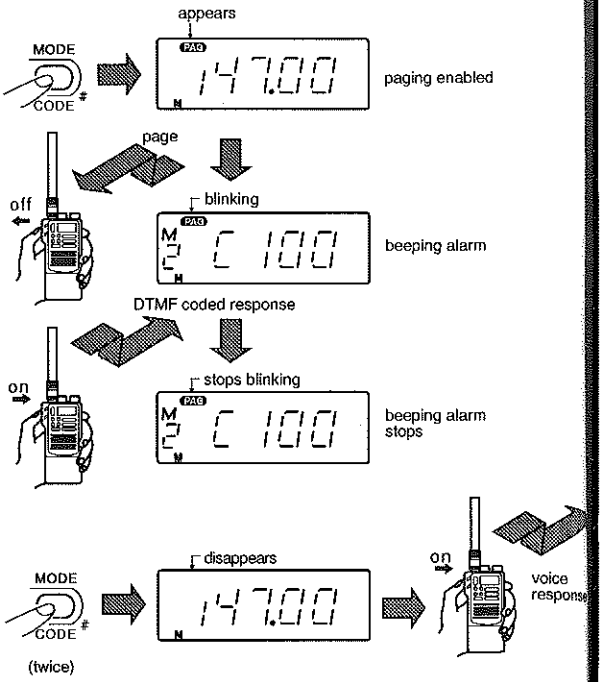
Use the follow procedure when your station receives a group page. The operating frequency will already have been selected, your individual and group codes entered, and MODE pressed to enable paging.

NOTE: When your Transceiver receivers a group code that is identical to its own, you will hear a beep and "PAG" will blink in a small box on the display to indicate that you have been paged. The display will show the group station code in memory channel M2 in the format: "$\frac{M}{2}$CXXX."

1. Press the PTT button to respond to the page. Your Transceiver will transmit DTMF tones to the paging station.

2. Press MODE twice to disable paging (the paging station will do the same).

3. Press the PTT button to transmit voice.



NOTES:

1. When "PAG" appears on the display and blinks, you can press any button to make it stop blinking and remain turned on.

2. Refer to "Disabling the Buzzer" on Page 50 if you want to disable the beep alarm. Press FUNC during beeping to stop it immediately.

3. A group code will be transmitted when you press the PTT button while code memory address M3 (your own individual code) is selected.

4. When "APO" is displayed instead of the operating frequency because the Transceiver is in the sleep mode, press the red C (Clear) button to turn the power on and disable auto power-off. If you were paged while the Transceiver was in the sleep mode, "PAG" will blink.

5. If reception is incomplete and the individual code of the paging station is not clear, an "E" and the previous code will be displayed. If this happens, you cannot identify the paging station.

Code Squelch Operation

Press MODE twice to enable code squelch. "C.SQ" will appear in a small box on the display.

NOTES:

1. The Transceiver will remain silent until it receives a group code that matches its own. You can communicate any time after the 0.3-second group code has been transmitted.

2. The roup code in code memory address M2 is used for the code squelch function.

3. Only memory channel M2 is active in the code squelch mode, regardless of the memory channel shown on the display.

REPEATER OPERATION

The following steps show you how to set up the Transceiver for repeater operation. During repeater operation, your receiver and transmitter operate on different frequencies. The "offset" is the shift between your receiver and transmitter frequencies. It is denoted by a sign (direction) and a frequency.

Preparation

Your Transceiver was initially set for a 5 MHz offset frequency. Refer to "Entering the Offset Frequency" on Page 67 if you want to change this. To change the offset sign use the following procedure:

1. Set the VFO operating frequency of the Transceiver to the output frequency of the repeater you want to use. You will receive on this frequency.

2. Press RPT (FUNC+RPT). A - or + will appear in a small box on the display to show the offset sign-whether the transmitter frequency will be lower (-), or higher (+) than the receiver frequency.

3. If you want to change the offset sign, pres (FUNC+RPT) until the correct offset sign is sh the display.

4. To return to simplex (non-repeater) operation, pre (FUNC+RPT) until the offset sign disappears.

NOTE: If you set the offset and the receiver frequency so the transmitter frequency is outside amateur band, the PTT button will be disabled a display will indicate "OFF."

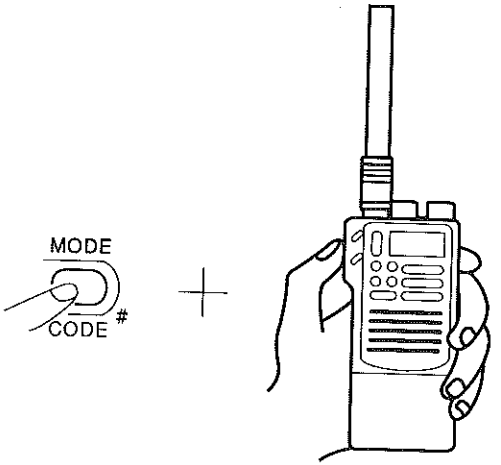
Paging Through a Repeater

To page another station through a repeater prepare your Transceiver for repeater operation as described above and then use the following procedure:

Press MODE to select either the PAG or the C.SQ mode. Then press the PTT button.

NOTE: During simplex paging, the DTMF signals are transmitted for approximately 0.25 seconds when you press the PTT button. During repeater operation, however, there is a 0.45-second time lag to allow the repeater to key up before the DTMF signal is transmitted.

Some repeaters may still not have enough time to key up for pager operation. If this happens, enabling the Auto Power-Off function will extend the lag to 0.75 second.



EXCHANGING THE TRANSMITTER AND RECEIVER FREQUENCIES DURING REPEATER OPERATION

Use the following procedure to reverse the transmitter and receiver frequencies.

NOTE: This feature is handy for listening to the other station without going through a repeater. However, it is available only when the reversed transmitter frequency remains within the amateur band.

1. Prepare the Transceiver for repeater operation.

2. Press REV (FUNC+REV). The - or + in the small box on the display will blink and the transmitter and receiver frequencies will be reversed.

3. To return to repeater operation, press REV (FUNC+REV) again. The - or + on the display will stop blinking and the transmitter and receiver frequencies will again be reversed.

ENTERING THE OFFSET FREQUENCY

You can enter a total of three independent offs frequencies (from 0.00 to 39.99 MHz), one for each of following groups of frequency channels:

Group 1:	VFO frequency; Call frequency; M0, M3 - M9; $\bar{M}0$, $\bar{M}3$ - $\bar{M}9$.
Group 2:	M1 and $\bar{M}1$.
Group 3:	M2 and $\bar{M}2$.

NOTES:

1. When no frequencies have been entered into mem channels M1, $\bar{M}1$, M2, and $\bar{M}2$, independent off frequencies cannot be entered for group 2 and 3. If y do this, all the groups will be changed to the new ent

2. If CTCSS option is installed, the same groups are use store CTCSS tones.

For example, to enter an offset frequency for Group 2, perform the following steps:

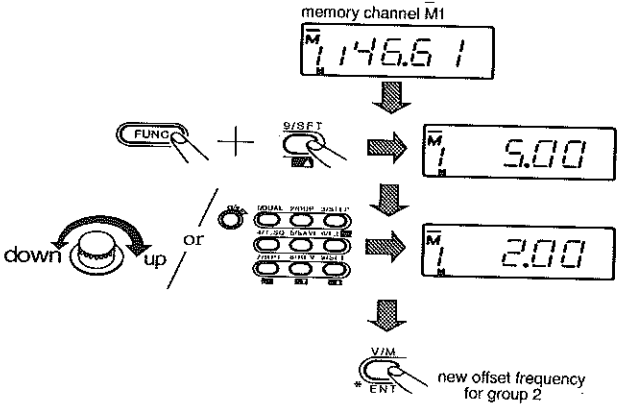
1. Select memory channel M1, a member of Group 2.

2. Press SFT (FUNC+SFT). The current offset frequency will be displayed.

NOTE: The offset frequency was set to 5.00 MHz at the factory.

3. Use the ROTARY CHANNEL SELECTOR or the numeric buttons to select the new offset frequency.

4. Press V/M enter the new offset frequency and return to the VFO mode.



INTERNAL BATTERY AND RESET

Your Transceiver contains an internal lithium-type battery (separate from the removable battery pack) that preserves the contents of the memory even when the Transceiver is turned off.

Typically, a new battery will last about five years, depending upon how often you use your Transceiver.

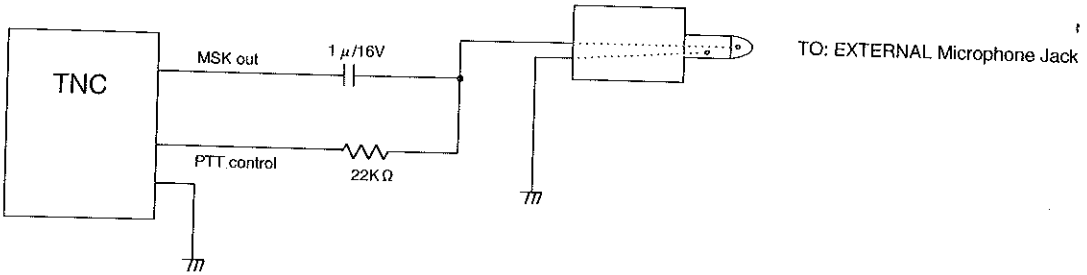
NOTES:

1. If the display is not correct when turn the Transceiver on, the internal lithium battery needs to be replaced. Refer to the Technical Manual for the C158A, available separately.

2. After you replace the battery, hold down the FUNCTI button while you turn the Transceiver on. This will re the Transceiver to its default parameters. You will have reprogram the memories and re-enter any oth operating changes you have made. See Page 46 review "Using The SET Functions."

3. Do not dispose of the lithium battery in a fire.

CONNECTING THE PACKET TNC



IN CASE OF DIFFICULTY

CONDITION	POSSIBLE CAUSE
Dim frequency display.	1. Low battery voltage. Recharge the battery pack.
Transceiver resets to initial setup when it is turned off and back on.	1. Weak lithium (internal) battery.
Cannot receive any signals.	1. The receiver circuit are not operating. Press the SQL OFF but to check the receiver circuits. 2. SQUELCH control is set too far clockwise. 3. Tone squelch operation is enabled. 4. VOLUME control is fully counterclockwise. 5. Paging or code squelch operation is enabled.
Can only receive storing signals.	1. Antenna is incorrectly installed. 2. SQUELCH control is set too far clockwise.
Cannot transmit. Check for transmit/battery indicator LED lighting.	1. PTT lock is on (check for "P.L" on display). Press P (FUNC+PT.L) to release the PTT lock. 2. Weak batteries.

(cont'd)

CONDITION	POSSIBLE CAUSE
Transceiver does not transmit at the display frequency.	1. Duplex operation is enabled. Press DUP (FUNC+DUP) to release duplex operation.
Cannot change the frequency.	1. Frequency lock is enabled (check for "F.L" on the display). Press F.L (FUNC+F.L) to release the frequency lock.
No buzzer sounds.	1. Buzzer is displayed. Press SET (FUNC+SET) to enter the setup mode. Then press SET by itself to re-enable the buzzer.

ABOUT BATTERY PACK

CAUTIONS ON USING THE BATTERY PACK

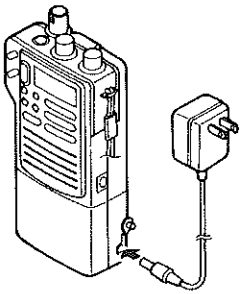
1) NEVER solder lead wires or connection terminals directly to the nickel-cadmium battery's output terminal.
2) NEVER short-circuit the nickel-cadmium battery's input and output terminals with an electrically conductive object such as a piece of metal as this could result in a large current and cause burns.
3) Do not get water on the nickel-cadmium battery or expose it to flames.
4) Do not repeatedly charge an already charged nickel-cadmium battery as this could reduce the battery's performance.
5) The charger and the nickel-cadmium battery will be somewhat hot during charging or directly after charging is completed. This is normal.
6) NEVER take a nickel-cadmium battery apart.
7) NEVER charge with a charger other than one of those indicated as this could result in damage.
8) Never apply voltages other than those specified to the nickel-cadmium battery, as this may cause battery fluid to leak and could be dangerous.

THE DISPOSE OF BATTERY PACKS PROPERLY

The nickel-cadmium battery must be recycled or disposed properly. For requirements in your area, check with t Dealer from whom you purchased your radio. The symb shown below is a reminder that the battery packs a recyclable.

Ni-Cd

CHARGING



SPECIFICATIONS FOR NICKEL-CADMIUM BATTERY

1) Rated output
   Voltage.....7.2V Capacity.....700mA
2) Charging time .....Approx....13 hrs
3) Usage temperature range.....-20℃ to +60℃
4) Charge.....+10℃ to +40℃

The above times are for when the nickel-cadmium battery is completely discharged.

SPECIFICATIONS

GENERAL

Frequency Range	Receive: 130.000 to 169.995 MHz Approximate. Transmit: 144.000 to 147.995 MHz.
Modulation Type	F3.
Microphone Input Impedance	600Ω.
Speaker Impedance	8Ω.
Power Requirements	7.2V, nominal. 12V for high power operation.
External Input Voltage	5.0 to 16.0 VDC.
Size (excluding knobs and antenna)	5-1/4" H x 2-3/16" W x 1-1/4" D (13.3 x 5.5 x 3.2cm), with standard battery pack.
Weight (including antenna and batteries)	10.6oz. (300g).

Specifications are guaranteed within U.S. Amateur 2-Meter Band

RECEIVER

type.....Double-conversion superheterodyne.

First Intermediate Frequency.....21.8MHz.

Second Intermediate Frequency.....455kHz.

Sensitivity (within the amateur bands).....0.158μV for 12dB SINAD＊.

Signal-to-noise ratio for 0.5μV.....30dB or better.

Squelch Sensitivity.....0.1μV.

Audio Output Power.....250mW into 8Ω (10% distortion).

RX Power Consumption.....35mA,approximate.

Standby (Battery Saver) Power Consumption.....13mA, approximate.

Auto-Power Off Consumption.....5mA, approximate.

$$\text{＊SINAD} = \frac{\text{Signal+Noise+Distortion}}{\text{Noise+Distortion}}$$

TRANSMITTER

RF Output Power.....2W with standard 7.2 VDC battery pack.

2W with standard 7.2 VDC battery pack.

2W with optional 7.2 VDC CNB151battery pack.

2W with optional 7.2 VDC CNB150 compact battery pack.

2W with optional 7.2 VDC CNB153 long-life battery pack.

5W (high) with optional 12 VDC CNB152 high-power battery pack.

2.5W (medium) with optional 12 VDC CNB152 high-power battery pack.

0.35W (low).

Spurious Signal Ratio.....Better than -60dB.

Maximum Frequency Deviation.....±5kHz.

Frequency Modulation System.....Reactane modulation.

TX Power Consumption (approximate)

With 13.8 VDC.....1300mA at 5 W RF output (high).

950mA at 2.5W RF output (medium).

480mA at 0.35W RF output (low).

With 7.2 VDC.....900mA at 2 W RF output (high). *

900mA at 2 W RF output (medium).

480mA at 0.35 W RF output (low).

* Using the 7.2 VDC battery packs, the high power setting produces the same RF output power as the medium power setting.

ONE YEAR LIMITED WARRANTY

Standard Amateur Radio warrants this product to be free from defects in workmanship and material under normal use and conditions for a period of one year from the date of original purchase.

Should service be required by reason of any defect or malfunction during the warranty period, Standard Amateur Radio will repair or in its discretion replace this product during the one year period provided that the defective unit is returned to Standard Amateur Radio with a copy of the original sales invoice as proof of purchase.

In-warranty repairs must be done by Standard Amateur Radio or by a service center specifically authorized to repair Standard Amateur Radio products.

Except as set forth above, Standard Amateur Radio disclaims all warranties of any nature whatsoever, including, without limitation, any implied warranty, of merchantability, fitness for a particular purpose, or otherwise and any express warranty. In no even shall Standard Amateur Radio be liable for any loss, inconvenience or damage whether direct, incidental, consequential or otherwise resulting from breach of any express or implied warranty, of merchantability, fitness for a particular purpose, or otherwise, with respect to the product, except as set forth herein. Some states do not allow limitations on how long an implied warranty lasts and some states do not allow the exclusion or limitation of consequential damages, so the above limitation or exclusions may not apply to you.

In the event the remedy set fourth in the first paragraph fails of its essential purpose to remedy a breach of the express warranty set fourth in the first paragraph, the sole remedy will be limited to return of the purchase price paid for the product.

This warranty does not cover damage which results from modification, accident, misuse, abuse, fire, flood, lightning or other acts of God or damage resulting from repairs or alterations performed other than by Standard Amateur Radio.

This warranty gives you specific legal rights, and you may also have other rights which vary from state to state.

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