

RCI-2950
RCI-2970
AM/FM/SSB/CW
AMATEUR
10 METER
OWNER'S
MANUAL

RANGER
Communications, Inc.



SPECIFICATIONS

GENERAL

Frequency Range	28.0000 - 29.6999 MHz
Tuning Steps	100 Hz, 1 kHz, 10 kHz, 100 kHz, 1 MHz
Emission Types	USB, LSB(A3J), CW(A1), AM(A3), FM(F3)
Frequency Control	Phase-Locked-Loop Synthesizer (PLL)
Freq. Tolerance	0.005%
Freq. Stability	0.001%
Oper. Temp. Range	0° C to 40° C
Antenna Impedance	50Ω
Speaker Impedance	8Ω, 3W [8Ω 2W]
Microphone	400Ω Dynamic PTT
Display	Digital Frequency LCD
Power Requirements	13.8V DC

TRANSMITTER

RF Output Power	USB/LSB 25W [100W] CW/AM/FM 8W [50W]
Spurious Emissions	-50dB
Carrier Supp. (SSB Modes)	-50dB
Antenna Connector	UHF 50Ω
RF Transmit Modes	USB, LSB, CW, AM, FM

RECEIVER

Sensitivity for 10dB SINAD	AM .5uV (50% MOD.) USB/LSB/CW 0.3uV
Sensitivity for 20dB SINAD	FM .5uV
Sensitivity for 12dB SINAD	FM .25uV
Image Rejection Ratio	-65dB
AGC Figure of Merit	SSB/CW/AM 80dB for 50mV for 10dB Change in Audio Output
Audio Output Power	2.5W @ 10% THD

* NOTE: RCI-2970 values appear in [].

INTRODUCTION

Congratulations on your purchase of an RCI-2950/2970 10 meter amateur radio. Your RCI-2950/2970 is designed to provide trouble-free service and state-of-the-art communications, incorporating many useful features and functions in the 10 meter band. To ensure proper performance, please read this manual thoroughly.

IMPORTANT: To operate this radio, you must possess an amateur radio operator's license issued by the FCC. Operation of this unit without proper licensing is ILLEGAL and can result in severe penalties.

UNPACKING

The following items are included with your RCI-2950/2970. Carefully remove and examine all materials from the packing carton. If any items are missing or appear damaged, please contact your dealer immediately. Each unit should include:

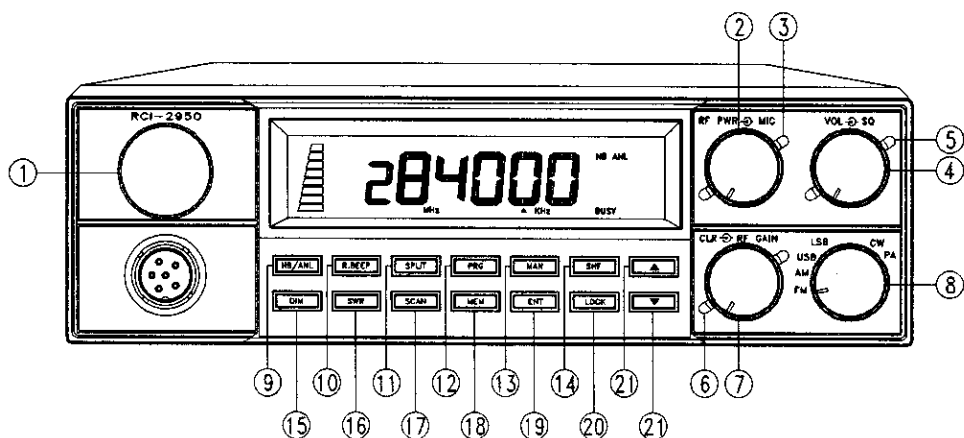
1. RCI-2950/2970 Transceiver
2. Dynamic Microphone w/Frequency Adjustment
3. Power Cord
4. Mounting Bracket & Hardware
5. Installation Hardware
6. Owner's Manual
7. Warranty Registration Card

It is recommended that you save the packing materials for future storage or shipping.

CONTROLS & CONNECTIONS

1. **FREQUENCY SELECTOR:** Used to select the desired transmit and receive frequency, the FREQUENCY SELECTOR allows continuous tuning over the entire range of the transceiver.

2. **RF POWER CONTROL:** This control enables adjustment of the rf power continuously over the range of 1 watt through 25 watts for the RCI-2950 (AM: 1W to 10W; SSB: 10W to 25W), and 8W through 100W for the RCI-2970 (AM: 8W to 50W; SSB: 18W to 100W).



3. MIC GAIN CONTROL: This feature adjusts the microphone gain in the transmit and PA modes, changing the audio level of the microphone for maximum performance and clarity.

4. ON/OFF VOLUME CONTROL: Turn clockwise to apply power to the radio and to set the desired listening level.

5. SQUELCH CONTROL: This control is used to control or eliminate receiver background noise in the absence of an incoming signal. For maximum receiver sensitivity, it is necessary that the control be adjusted only to the point where the receiver background noise is eliminated. Turn fully counterclockwise and then slowly clockwise until the receiver noise disappears. Any signal to be received must now be slightly stronger than the average received noise. Further clockwise rotation will increase the threshold level which a signal must overcome in order to be heard. Only strong signals will be heard at a maximum clockwise squelch setting.

6. RF GAIN CONTROL: This control is used to reduce the receiver's front-end gain when receiving strong signals.

7. CLARIFIER CONTROL: The CLARIFIER is used to fine tune the received signal for the maximum clarity in SSB or CW mode. It can adjust the receive frequency $\pm 500\text{Hz}$, but does not affect the transmit frequency or the frequency display.

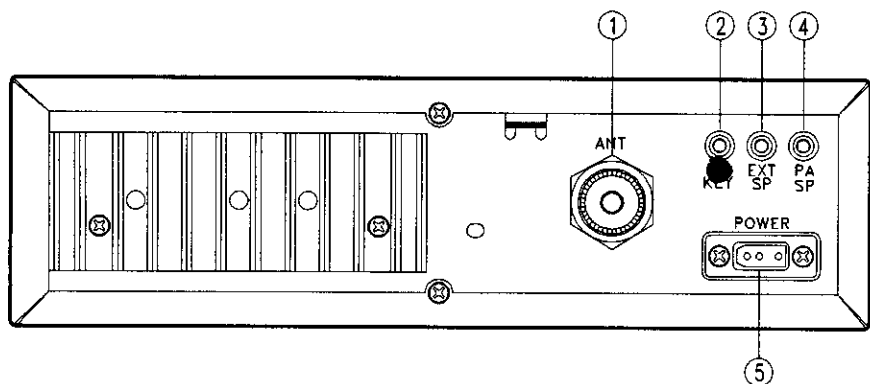
8. MODE SWITCH: This switch allows you to select one of the following six operating modes: FM, AM, USB, LSB, CW and PA.

9. NB/ANL BUTTON (NB/ANL): The noise blanker (NB) is very effective in eliminating repetitive impulse noise such as ignition interference. In the ANL position, the AUTOMATIC NOISE LIMITER within the audio circuits is activated.

- 10. ROGER BEEP BUTTON (R.BEEP):** This button activates the ROGER BEEP circuit when it's function is selected.
- 11. SPLIT BUTTON (SPLIT):** This control enables the offsetting of an operating frequency for FM repeater operation.
- 12. PROGRAM BUTTON (PRG):** This button is used to program operating or scanning frequencies into memory. (See the OPERATION section, p7, for further details.)
- 13. MANUAL BUTTON (MAN):** This is used to return the unit to manual mode.
- 14. SHIFT BUTTON (SHF):** This button selects frequency steps in 100Hz, 1kHz, 10kHz, 100kHz, and 1MHz increments.
- 15. DIM BUTTON (DIM):** This button adjusts the display backlighting in four different steps to best match the ambient light.
- 16. SWR BUTTON (SWR):** This control is used to check SWR.
- 17. SCAN BUTTON (SCAN):** This is used to scan frequencies in each band segment. (The OPERATION segment of this manual on p7 provides detailed information on SCAN control usage.)
- 18. MEMORY BUTTON (MEM):** This button is used to program memory channels. (The OPERATION segment of this manual on p7 provides detailed information on MEMORY usage.)
- 19. ENTER BUTTON (ENT):** This is used to program frequencies in memory. See the OPERATION section of this manual for more information on using this control.
- 20. LOCK BUTTON (LOCK):** Pressing this button enables a lock on a selected frequency, disabling the Frequency Selector Control, up/down buttons on the front control panel, or remote up/down buttons on the microphone. Repressing the switch will unlock the frequency.
- 21. UP/DOWN SELECTORS:** These buttons are used to select the desired frequency.

REAR PANEL CONNECTIONS

- 1. ANTENNA:** This jack accepts a 50 Ω coaxial cable with a PL259-type plug.



2. CW KEY: The CW key is used for Morse Code operation. To operate this mode, connect a CW key to this jack, and place the MODE switch in the CW position.

3. EXTERNAL SPEAKER: This jack accepts a 4-8 Ω 5W external speaker. When the external speaker is connected to this jack, the built-in speaker will be disabled.

4. PA SPEAKER: An 8 Ω 4W PA speaker may be connected to this jack for PA operation. Place MODE selector in PA position for this feature.

5. POWER: This accepts a 13.8 VDC power cable with built-in fuse. The power cord provided with the radio consists of a black wire (negative) and a red wire (positive).

MICROPHONE

1. PTT SWITCH: Use the Push-to-Talk (PTT) switch to control the transmit and receive of the radio. Push to transmit and release to receive.

2. REMOTE UP/DOWN SWITCH: An operating frequency can be stepped up or down simply by pushing either of these buttons.

INSTALLATION

The RCI-2950/2970 is easy to install. All necessary parts (less the antenna and cable) have been included to facilitate installation.

TRANSCIVER MOUNTING

Choose a suitable location for the transceiver that will allow easy access to the front panel as well as proper air circulation to the back of the unit. If you are installing the unit in a vehicle, attach the mounting bracket first, then attach the transceiver to the mounting bracket using the hardware provided. Before making any electrical connection, ensure that the transceiver is turned off and the vehicle's battery is disconnected.

POWER CONNECTION

The transceiver operates off of any regulated 13.8 VDC negative or positive ground source.

NOTE: The condition of a vehicle's electrical system can affect the operation of your RCI-2950/2970. A low battery, worn generator/alternator, or poor voltage regulator will impair performance of the unit as well as the vehicle. (High noise generation or low voltage delivery can result from these conditions.)

If an AC power supply is used with your radio, it must be regulated and rated for at least 7 amps continuous for the RCI-2950 & 20 amps continuous for the RCI-2970. Low voltage while under load will reduce receiver gain and transmitter output.

CAUTION: Voltage above 15 VDC will damage the unit. Be sure to check the source voltage before connecting the power cord.

RCI-2950/2970 OPERATION

FREQUENCY SELECTION

Frequency selection for the RCI-2950/2970 is simple. Select the desired operating frequency by rotating the Frequency Selector, or using the up/down buttons on the front panel of the microphone. Press the LOCK button to lock the selected frequency. This will disable the Frequency Selector and the up/down buttons on the front panel of the microphone. Repressing the LOCK button unlocks the frequency.

Use the SHF button to set the step frequency in either 100Hz, 1kHz, 10kHz, 100kHz or 1MHz increments. The frequency step is indicated by a small triangle directly under the corresponding digit on the frequency display.

MODE SELECTION

To select an operating mode on your RCI-2950/2970, simply rotate the **MODE** selector, and place it in the desired operating mode position. The **PTT** switch on the microphone controls the transmit and receive of your radio.

FM/AM/USB and **LSB** mode are for voice communications. At **CW** position, you can transmit **CW** if you have connected an external key to the accessory plug provided on the back of the radio. At **PA** position the radio can be used as a **PA** amplifier. Before operating in **PA** mode, you must first connect a **PA** speaker (8Ω 4W) to the jack provided on the back of the radio.

RF POWER CONTROL

This feature allows the adjustment of the rf output power continuously over the range of 1W through 25W for the RCI-2950 (**AM**, 1W to 10W; **SSB**, 10W to 25W), and 8W through 100W for the RCI-2970 (**AM**: 8W to 50W; **SSB**: 18W TO 100W).

PROGRAMMING

FREQUENCY SELECTION

Frequency selection in the RCI-2950/2970 can be accomplished using any three of the following methods:

1. The first method of frequency selection uses the **SHF** (Shift) key and the Up and Down arrows. To accomplish this, first press the **SHF** button until the cursor arrow is positioned under the digit of the frequency that is to be changed. Then use the Up arrow to increase the number. If a decrease in frequency is desired, press the Down arrow. Perform the steps described above for each digit of the frequency until the desired frequency is displayed in the LCD display window.
2. The second method of frequency selection is performed using the **SHF** button and the frequency select knob located above the microphone jack. Use the **SHF** button in the manner described above to select the digit to be changed. Then rotate the frequency select knob clockwise to increase the frequency and counterclockwise to decrease the frequency.
3. The third method of frequency selection is through the use of the **SHF** button and the channel Up and Down button located on the microphone. Frequency selection by this method is accomplished in the

same manner as with the Up and Down arrows on the key pad. The only difference is that the channel Up and Down buttons on the microphone are used.

Once a signal has been detected on a particular frequency while in receive mode, it may be necessary to slightly change the frequency to provide the best audio. This is accomplished by rotating the clarifier control, varying the frequency by ± 0.5 kHz. After fine tuning, press the **LOCK** button to lock in the frequency at the point of best reception.

RECEIVE SCANNING

The receive scanning feature allows you to locate active frequencies in the entire band segment. To begin scanning, slowly turn the Squelch control clockwise until the receiver noise disappears. Next, press the Scan button. The unit should start scanning from the lower to the higher frequencies. Pressing the Scan button again will change the direction of scanning. When the Scan button is pressed, "SCAN+ " or "SCAN-" will be displayed on the LCD display. The scan will stop on any active frequency for the duration of the transmission. When the transmission stops, the RCI-2950/2970 will wait approximately 3 seconds before it resumes scanning. If you want to deactivate Scan mode while it's scanning, press the MAN (manual) button or turn the Squelch control counterclockwise until you hear the receiver noise. The Manual button will disable the Scan function. (See FREQUENCY SCANNING, p9, for more information.)

SPLIT FUNCTION

This function enables you to split the transmit and receive frequencies for FM repeater operation. To split frequencies, press the MAN button and the Split button to select + split frequency. If you want - split frequency, press the Split button again. If + split is selected, the transmit frequency will be higher than the receiver frequency. If - split is selected, it will be lower than the receive frequency. (See OFFSET FREQUENCY OPERATION, p10, for more information.)

MEMORY FUNCTION

The RCI-2950/2970 can store up to 10 channels (from 0 to 9). To program a frequency into memory, follow the procedure described below:

1. Press the MAN button.
2. Press the PRG button.

3. Press the MEM button. ("MEMORY" and "0" should appear on the left-hand side of the LCD display. Pressing the MEM button will advance the channel number from "0" to "9.")

4. Select the desired frequency you wish to store in memory.

5. Press the ENT button.

6. Repeat the procedure to program other memory channels.

MEMORY CHANNEL SCANNING

You can scan and select any of the 10 programmed frequencies by following the procedure described below:

1. Press the MAN button.

2. Press the MEM button.

3. Slowly turn the Squelch knob clockwise until the receiver noise disappears.

4. Press the Scan button. The unit will scan from lower to higher frequencies. Pressed again, the unit will scan from higher to lower frequencies.

5. To stop scanning a certain channel, press the MAN button, or turn the Squelch knob counterclockwise until you hear the receiver noise.

METERING

The meter built into your RCI-2950/2970 on the left hand side of the LCD display provides the following information:

1. **S/R Meter:** In transmit mode it provides a visual indication of transmit rf output power and received signal strength on the receive mode.

2. **SWR Meter:** This meter enables you to check SWR. To use this function, set the unit to AM mode and push the SWR button on the front panel while holding down the PTT switch on the microphone. The bars on the meter will indicate antenna matching. If there is no bar, your antenna system is perfectly matched. If several bars appear, the antenna needs adjustment. The fewer the bars, the better the match.

FREQUENCY SCANNING

Frequency scanning can be achieved using one of two methods: the first method involves scanning of pre-programmed memory channels; the second method permits the user to scan all frequencies between a pre-set upper and lower scan limit. Both methods of frequency scanning follow.

ALL-FREQUENCY SCANNING

To allow All-Frequency Scanning, the user must first program the upper and lower scanning limits. The scan limits are simply the highest and lowest frequencies that will be scanned. To program these limits, perform the following steps:

1. Press the **PRG** (Program) key.
2. Press the **SCAN** key. ("**PRG SCAN +** " should appear in the lower right hand corner of the display window.)
3. Using the **SHF** key and the Up and Down arrows, select the upper scan limit, then press **ENT**.
4. Press the **SCAN** key again. ("**SCAN -** " should appear in the display window.)
5. Using the **SHF** key and the Up and Down arrows, select the lower scan limit, then press **ENT**.

The upper and lower scan limits have now been programmed. To activate the scan feature, return the radio to manual operation and press the **SCAN** button. If the display shows "**SCAN +** ", the radio will scan from the lower limit to the upper limit. If "**SCAN -** " is displayed, the unit will scan from the upper limit to the lower limit. To change from "**SCAN +** " to "**SCAN -** " or vice versa, press **SCAN**.

NOTE: When programmed, the upper and lower scan limits will also act as the upper and lower operating limits of the radio. The radio cannot now be programmed to operate above or below the scan limits.

MEMORY SCANNING

The RCI-2950/2970 has 10 non-volatile (i.e., memory resident) memory locations which can be programmed with any available frequency within the operating band of the radio. The scan function of the unit can be programmed to scan these memory channels. The radio will then scan only those memory channels which have been programmed.

The first step in utilizing the memory scan function is programming the desired frequencies into the radio memory. This can be accomplished by performing the following steps:

1. With the radio operating in the manual mode, press the **PRG** (Program) key.
2. Press the **MEM** key. "**PRG**" should be displayed in the lower right-hand corner of the LCD display. In the upper left portion of the display, "**MEM**" should be displayed. Directly below **MEM**, a number between 0 and 9 will be displayed. This number represents the memory location currently being displayed. Pressing the **MEM** key will increase the memory counter to the next memory location and the contents of that memory location will be displayed.
3. Using the **SHF** key and the Up and Down arrows, enter the frequency to be stored in the memory location displayed. After the desired frequency has been entered, press **ENT**.
4. Repeat steps 2 and 3 for all of the memory locations to be programmed.
5. After all desired memory locations have been programmed with frequencies, return the unit to the manual mode of operation by pressing the **MAN** key.
6. To initiate memory scanning, press **MEM** and then press **SCAN**. As previously discussed, the display will show "**SCAN +**" or "**SCAN -**" to indicate whether the radio is scanning from the lowest to the highest memory location or vice versa. To return the radio to normal (non-scanning) operation, press the **MAN** key.

OFFSET FREQUENCY OPERATION

The RCI-2950/2970 has an offset- or split-frequency feature that permits the radio to be operated in a half-duplex mode. This allows the user to talk on FM repeaters operating in the 10 meter band. (NOTE: FM repeaters may require that a sub-audible (CTCSS) tone be transmitted to gain access to the repeater. The RCI-2950/2970 is not factory-equipped with a CTCSS encoder/decoder.) The split frequency function offsets the transmitter frequency either above or below the receive frequency by a user-programmable amount. In the following example, the programming of a 100kHz offset will be described. Before attempting to program the offset frequency, ensure that the radio is operating in the manual mode

by pressing the **MAN** key.

1. Press the **PRG** (Program) key.
2. Press the **SPLIT** key. The LCD display window will display "**00000**" with "**PRG**" and "**SPLIT**" being displayed in the lower left-hand corner.
3. Using the **SHF** key and the Up and Down arrows as described earlier, program the display to read "**01000**."
4. Press **ENT**. A 100kHz offset has now been programmed into the radio.
5. Return the radio to manual operation by pressing the **MAN** key.
6. Using the **SHF** key and the Up and Down arrows as described previously, set the radio for the desired receive frequency.
7. Press **SPLIT**. In the lower right corner of the display, either "**SPLIT +**" or "**SPLIT -**" will be displayed. If "**SPLIT +**" is displayed, the transmitter will be offset 100kHz above the receive frequency when keyed. If "**SPLIT -**" is displayed, the transmitter will be offset 100kHz below the receive frequency.

NOTE: When the transmitter is keyed, the frequency display will change to show the frequency being transmitted.

LIMITED WARRANTY

Ranger Communications, Inc. (Ranger) warrants to the original purchaser **ONLY** this product against defects in material or workmanship, as follows:

1. Ranger warrants the product to be free of defects in material or workmanship for a period of one (1) year from the original date of purchase as shown on the original purchaser's bill of sale, receipted invoice, or other proof of purchase. Labor to perform warranty services will be provided without charge for the first ninety (90) days of the warranty period. After this period, the original purchaser must pay for any labor at the prevailing rates either at an authorized Ranger warranty repair facility or at the factory. In addition, Ranger will supply, at no charge, new or rebuilt replacements for defective parts during the warranty period.

2. In the event of a defect during the warranty period, Ranger shall, at its option, repair or replace the defective product, or refund the purchase price of the product. Such action shall constitute the purchaser's exclusive remedy under this warranty.

3. A Return Authorization Number must be obtained from the Ranger Customer Service Department before any returns for warranty repair will be accepted. Send the defective product postage-paid, along with proof of the date of purchase (photocopy of the original invoice or receipt), to:

Ranger Communications, Inc.
3377 Carmel Mountain Road
San Diego, CA 92121
(800) 334-6475 FAX (619) 259-0437

4. This warranty does not cover cosmetic damage or damage due to acts of God, accident, misuse, abuse, negligence, improper installation, **UNAUTHORIZED MODIFICATION**, or any action in violation of the product's instruction manual. This warranty is valid **ONLY** in the United States of America.

5. This warranty valid **ONLY** if the serial number appears on the product.

6. Ranger reserves the right to void a warranty or make reasonable charges for the repair of a product which displays evidence of misuse, abuse, neglect, accident, or modification of the basic design.

7. Warranties give you, the buyer, specific legal rights. You may also have other rights which may vary from state to state. This warranty is extended only to Ranger products purchased and shipped to locations in the United States of America or its possessions.