

# OWNER'S MANUAL

## FRS RADIO

21-1811

### INTRODUCTION

Your RadioShack FRS radio is a portable, easy-to-use, two-way radio that you can carry almost anywhere. Use it at shopping malls, amusement parks, sports events, or at the beach to contact family and friends, or for vital communications in a neighborhood watch.

Your radio has 14 channels and 38 different quiet codes. If someone else is using the channel you selected and you do not want to hear that person, select another channel or use the quiet feature. You can talk with a person who has an FRS radio if both radios are tuned to the same channel and quiet code.

Your radio has auto-squelch, which means you will not hear anything on a channel unless someone is transmitting nearby on the same channel. You can turn off auto-squelch to hear weaker, distant transmissions.

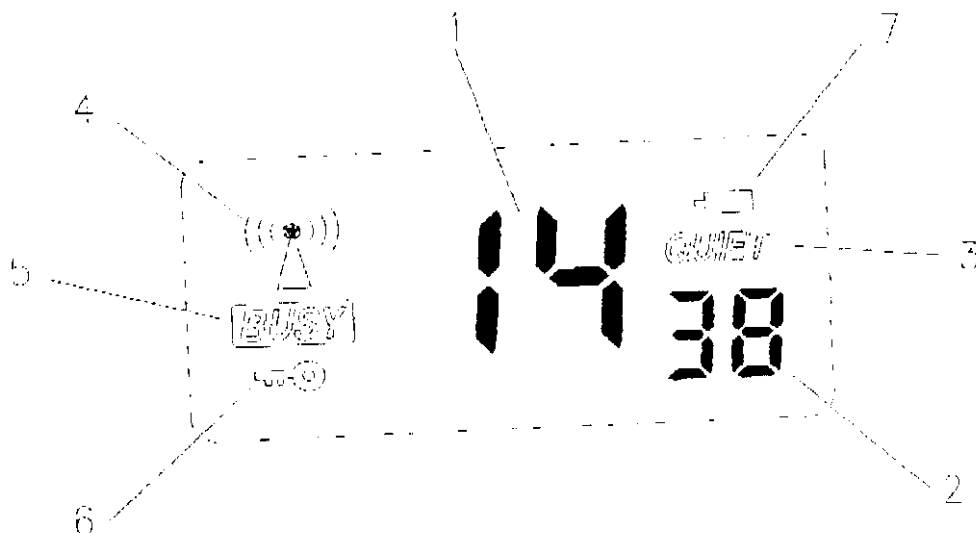
Also, if the radio is idle for 2 hours, the automatic shut off timer turns it off. The radio turns on again when you press PUSH TO TALK.

You can connect an optional speaker/microphone and earphone, charger (not supplied) to the radio. And, the belt clip lets you take your radio almost anywhere.

### USING THE RADIO

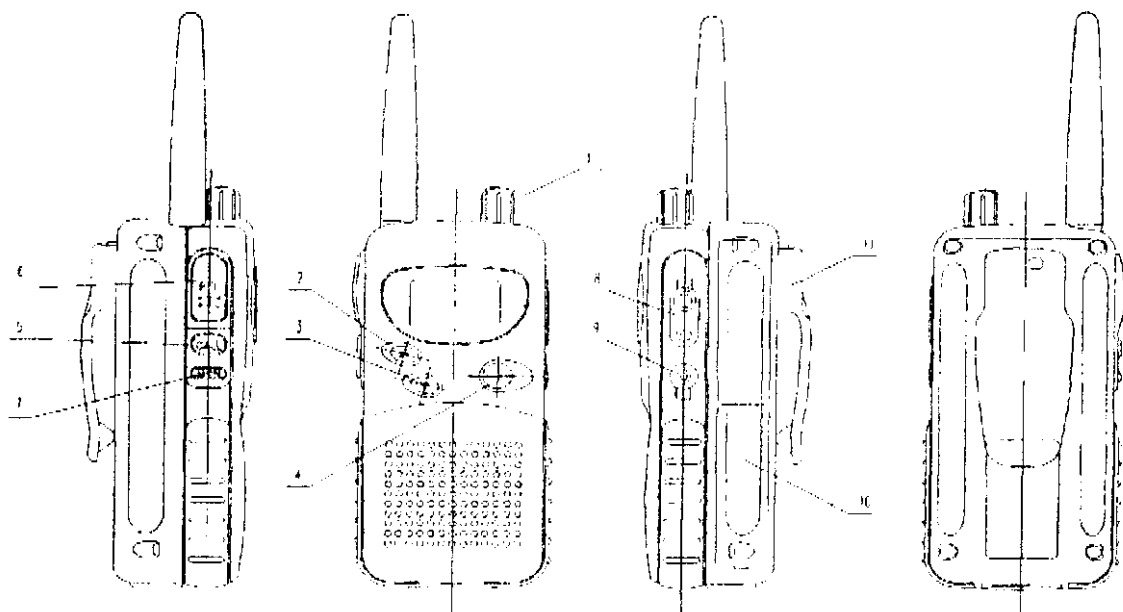
#### A. DISPLAY

Your radio comes with a multifunction backlighted display. By pressing any button except the CALL and PTT, the backlight will illuminate for 7 seconds.



1. Shows the selected channel number.
2. Shows the selected privacy code number.
3. "QUIET": Displayed when the QUIET mode is enabled.
4. "((( )))": Displays when your radio is transmitting or the CALL button is pressed.
5. "BUSY": Displays when a call is being received.
6. "🔑": Displays when the keypad lock has been activated.
7. "🔋": When this symbol is visible, it indicates the batteries are low. Replace the batteries after this indicator is on.

## B. FUNCTION AND LOCATION OF THE CONTROLS



### 1. "ON/OFF" Volume Control.

In "OFF" position, your transceiver is off. Rotate this control clockwise to turn on your radio and adjusts the volume, until you get a comfortable listening level.

### 2. CH ▲ button

Press CH ▲ to move one channel higher. Press and hold CH ▲ for two seconds allows you to move up several channels. Release when you reach the desired channel.

### 3. CH ▼ / Automatic Shut Off Button

Press CH ▼ to move one channel down. Press and hold CH ▼ to move down several channels. Release when you reach the desired channel.

Press and hold the CH ▼ while turning on the radio will enable or disable the automatic shut off timer. The display will show "ON" when the timer is activated, or "OF" when deactivated. The timer automatically turns off the unit when it is idle for 2 hours.

### 4. QUIET Button

Press QUIET button to enable or disable the CTCSS privacy mode operation.

- a) Hold down QUIET button for 2 seconds until QUIET is displayed and the quiet code

flashes.

- b) Repeatedly press (or hold down) **CH ▲** or **CH ▼** until you see the code number you want to use.
- c) Press **QUIET** button to store the code.

To turn on the quiet feature, press **QUIET**. **QUIET** appears. To turn off the feature, press **QUIET** until **QUIET** disappears.


**Note:** We recommend that you select a quiet code from the range 7-30. If you select a code below or above that range, you must wait 1 to 2 seconds after holding down **PUSH-TO-TALK** before you start talking.

## 5. CALL/MCU Reset Button

You can cause a ringer sound on all radios tuned to the same FRS channel and/or the privacy code as your radio. To send a page, press and hold down the **CALL** button.

Hold down the **CALL** button while turning on the radio will resume your radio's MCU and the quiet code will be reset to number 12, CTCSS privacy mode operation is deactivated, the automatic shut off timer disabled, keypad lock disabled, backlight switched off and channel setting will go to number 1.

## 6. Push-To-Talk button

To talk, hold down the **Push-To-Talk**. Speak into the microphone in a normal tone of voice when the  icons is displayed. When you finish speaking, release the **Push-To-Talk** button.

## 7. MON Button

To hear everything happening on a channel, including weak transmission, hold down **MON** button. Release the **MON** button to turn the auto-squelch back on.

## 8. Ni-Cd/Alkaline Switch (inside the battery compartment)

When you use Ni-Cd batteries and begin to recharge your batteries, the switch on the battery compartment should be set to the position of Ni-Cd. Open the battery door, and you will find this switch as shown as following:



**Warning:** Do not put the switch to the position of Ni-Cd when Alkaline batteries are used. It may cause the radio to burst and cause personal injury when you recharge the batteries.

### 9. External Mic/Spk Jack

Connect an optional speaker/microphone or earphone in this jack.

### 10. Charger Jack

You can recharge Ni-Cd batteries using an optional battery charger (not supplied). Plug the charger's barrel plug into the CHRG jack on the side of the unit, then connect the charger to a standard AC outlet.

### 11. Battery Compartment

Press and push back the battery door to release.

### 12. Belt Clip

To attach the belt clip, place it over the locking pin and align the screw hole. Tighten the screw.

You can also lock your radio setting to avoid accidental pressing of keys by activating the keypad lock. Press and hold the MON button, then press the CALL button to activate or deactivate the keypad lock.

## C. OPERATION

1. Your radio uses four AA batteries for power. We recommend alkaline batteries. However, you can use rechargeable batteries in the radio.
2. To start using your radio, insert four AA batteries into the battery compartment, noting the polarities.
3. Rotate **ON/OFF** volume control to turn on the radio and adjust the volume.
4. Select the desired channel and/or quiet code.
5. Press the **Push-To-Talk** button to transmit and the **CALL** button to cause a ringer.
6. To receive, simply release the **Push-To-Talk** button.

**Note:** You can only communicate with another radio that is using the same channel and/or the same quiet code as your radio.

## TECHNICAL SPECIFICATIONS

RX Frequency.....	462-467 MHz
Channels.....	14
Modulation type.....	FM
Antenna impedance.....	50 Ohm
Microphone.....	condenser type
Power supply.....	4 × AA Alkaline
Sensitivity at 12dB Sinad.....	0.5μV
Adjacent Channel Rejection.....	45dB
Audio Squelch.....	Auto
Audio output power.....	250mW @ 8 Ohm
Audio Distortion.....	5%
RF Output Power.....	500 mW EIRP @6VDC
Harmonic Emissions.....	more than 50dB
Dimensions(HWD).....	110.0 × 50.0 × 35.0mm
Weight(without batteries).....	168g

## CHANNEL FREQUENCIES

Frequency: MHz

01=462.5625	05=462.6625	09=467.5875	13=467.6875
02=462.5875	06=462.6875	10=467.6125	14=467.7125
03=462.6125	07=462.7125	11=467.6375	
04=462.6375	08=467.5625	12=467.6625	

## CTCSS PRIVACY CODES

Frequency: Hz

01: 67.0	11: 97.4	21: 136.5	31: 192.8
02: 71.9	12: 100.0	22: 141.3	32: 203.5
03: 74.4	13: 103.5	23: 146.2	33: 210.7
04: 77.0	14: 107.2	24: 151.4	34: 218.1
05: 79.7	15: 110.9	25: 156.7	35: 225.7
06: 82.5	16: 114.8	26: 162.2	36: 233.6
07: 85.4	17: 118.8	27: 167.9	37: 241.8
08: 88.5	18: 123.0	28: 173.8	38: 250.3
09: 91.5	19: 127.3	29: 179.9	
10: 94.8	20: 131.8	30: 186.2	

APPENDIX 6  
TRANSMITTER ALIGNMENT

TWO (2) PAGE ALIGNMENT PROCEDURE FOLLOWS THIS SHEET

TRANSMITTER TUNE-UP PROCEDURE  
FCC ID: AAO21-1811

APPENDIX 6

## **ALIGNMENT PROCEDURES**

**Important:** The FCC requires that any frequency adjustment on a radiophone must be done by authorized person, who is the holder of a current first or second class radiotelephone license.

This unit has been fully aligned at the factory before shipment and does not normally require further adjustment. When necessary, however, the unit may be aligned as indicated below.

Do not adjust any circuit in this radiotelephone unless you understand the circuit operation and have experience adjusting radiotelephone. Tampering with the radiotelephone may upset the alignment and lower its performance.

### **Test Equipment Required**

The following equipment is required for the alignment.

Regulated DC power supply, 0~12V, 1A or higher; or 8.4V, 1A

Audio signal generator, 10Hz~2KHz

Digital multimeter

Deviation meter

Frequency counter, 0~500MHz high impedance

Oscilloscope

RF power meter, 5W

High frequency standard generator, >160MHz

Tracking generator, >160MHz

Distortion analyzer

Audio level meter

T-coupler

Alignment drivers, etc.

## **DISASSEMBLY INSTRUCTIONS**

To remove the front and rear panels from the main chassis:

1. Remove the four screws from the rear panel of the unit and remove the battery compartment.
2. Remove the two screws from the PCB board.



STEP	ADJUSTMENT	PROCEDURE
1	VC101	Adjust VC101 to obtain demanded TX frequency.
2	L115 L117 L118 L119	Adjust L115, L117, L118, L119 obtain demanded TX power.
3	VR102	<ol style="list-style-type: none"> <li>1. Inject an audio frequency (AF) -20dBm.</li> <li>2. Adjust VR102 to obtain maximum TX deviation £2.5KHz.</li> <li>3. Check MIC modulation sensitivity, and it should be 2.5~10mV.</li> </ol>
4	VR102	<ol style="list-style-type: none"> <li>1. Set CTCSS 01, CTCSS 12 or CTCSS 38.</li> <li>2. Adjust VR102 to obtain TX deviation with 0.55~0.8KHz.</li> </ol>
5	L101 L103 L104 L105 L106 L107 L108 L109	Adjust L101, L103, L104, L105, L106, L107, L108 and L109 to obtain demanded receive sensitivity.
6	L101 L103 L104 L105 L106 L107 L108 L109	Adjust L101, L103, L104, L105, L106, L107, L108 and L109 to obtain demanded image frequency.
7	VR101	Adjust VR101 to obtain demanded squelch sensitivity.

APPENDIX 7

CIRCUITS AND DEVICES TO STABILIZE FREQUENCY

SYNTHESIZER

A phase locked loop (PLL) circuit establishes and stabilizes operating frequency.

The data for producing necessary frequencies is established by the CPU on the digital board.

The frequency stability of the Tx/Rx is maintained by the TCXO, which generates a stable frequency of 12.8 MHz.

APPENDIX 8

CIRCUITS TO SUPPRESS SPURIOUS RADIATION  
AND LIMIT MODULATION

Circuitry to Suppress Spurious Emissions

A low pass filter consisting of L118, C163, C164, L119, C165, C108, L101, C106 and C107 attenuates spurious emission.

Circuitry to Limit Modulation and Audio Low Pass Filter

Microphone signal is amplified by IC103, limited to prevent deviation over 2.5 kHz, and applied to a 3 kHz low-pass filter.

CIRCUITS TO SUPPRESS SPURIOUS  
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FCC ID: AAO21-1811  
APPENDIX 8