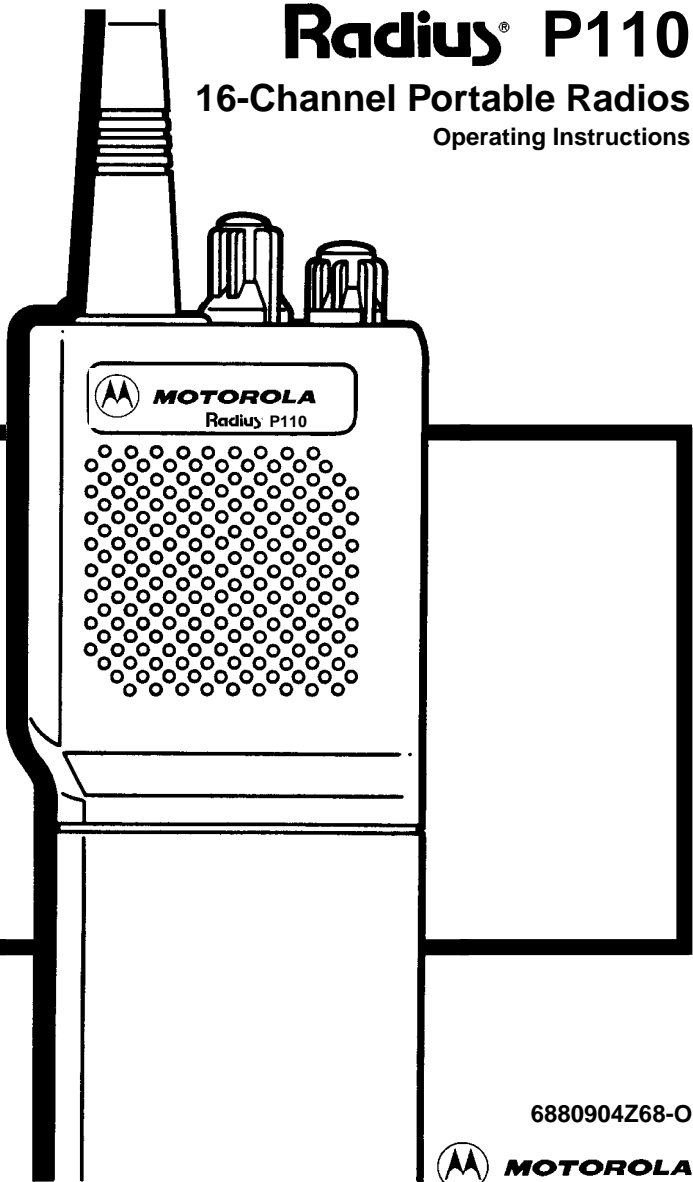


# Radius® P110

## 16-Channel Portable Radios

Operating Instructions



6880904Z68-O



**MOTOROLA**

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# Introduction

## ***Welcome To The Motorola Radius P110 Radio***

The Radius P110 Portable Radio is a sophisticated state-of-the-art unit. It incorporates the latest technology available in two-way radio communications.

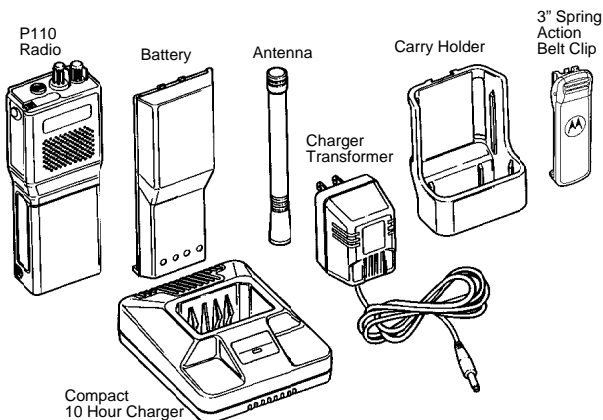
The use of microcomputer technology makes changing radio characteristics such as operating frequencies and squelch codes both economical and fast. Any computer equipped Radius dealer can easily reprogram your radio's operating characteristics, or your radio can be "cloned" from a radio already programmed to your desired frequencies and codes.

The P110 radio meets tough environmental demands while providing cost effective and reliable communications. It meets the U.S. Government Military Standards 810C, D and E for low pressure, high temperature, low temperature, temperature shock, solar radiation, rain, humidity, salt fog, dust, vibration, and shock. The P110 radio also meets the Electronic Industry Association RS316B electrical and mechanical specifications. The Motorola Accelerated Life Test (ALT) assures that possible failures brought on by field stress and abuse are identified and designed out of your radio before it reaches your hands.

All of these features provide for better, yet more cost effective communications for you.

## Inspection

When you receive your packaged P110 radio, inspect the shipping carton for any signs of damage. Next, remove and check the contents of the packing case to be sure that all items ordered have been included. Contents of the packing case may be different from those listed if optional accessories were ordered.

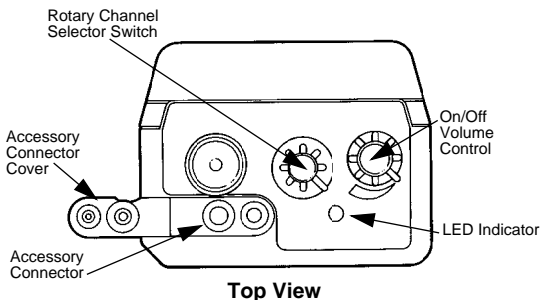


### ***Packaged Model Contents***

- P110 Radio
- Heliflex Antenna (VHF Models) or Flexible Whip Antenna (UHF Models)
- Rapid Charge High Capacity Nickel-Cadmium Battery
- Operating Instructions Manual
- Compact 10 Hour Charger and Transformer
- Carry Holder
- 3-inch Spring Action Belt Clip

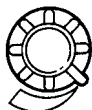
Inspect the equipment thoroughly. If any part of the equipment has been damaged in transit, report the extent of the damage to the transportation company immediately.

# Controls, Switches, Indicators, and Connectors



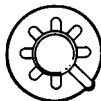
## ***On/Off/Volume Control***

Turns the radio on and off and adjusts the volume level.



## ***Rotary Channel Selector Switch***

Selects the operating channel.



## ***LED Indicator***

A bi-colored light-emitting diode (LED) indicates the radio's operating status.



## ***Accessory Connector***

Provides accessibility for connection to remote accessories such as a remote speaker microphone.



### **NOTE**

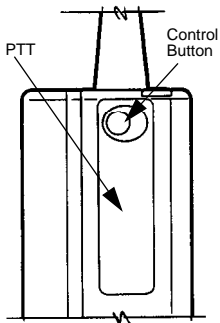
The Accessory Connector Cover protects the Accessory Connector. This cover should remain in place whenever the radio is not being used with an accessory.

## **Push-To-Talk (PTT) Button**

When depressed and held, engages the transmitter and puts radio in the transmit mode. When released, the radio operates in the receive mode.

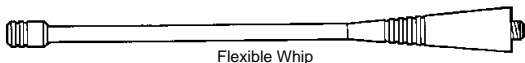
## **Control Button**

This can be programmed as a Monitor, Volume Set (manual monitor), or Scan Nuisance Delete button. If programmed for Monitor or Volume Set, pressing the Control button will monitor the channel for activity. Neither tone nor digital Private-Line (PL/DPL) squelch is active when monitoring. If programmed for Scan Nuisance Delete, pressing the Control button will delete a nuisance channel while in the scan mode.

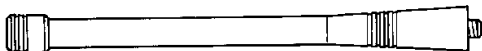


## **Antenna**

Heliflex (VHF models) or a Flexible Whip (UHF models) with threaded base.



Flexible Whip



Heliflex

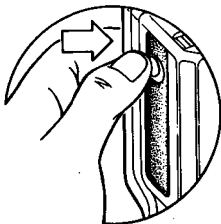
# Alert Tone Indicators

## ***Power-Up***

Each time the radio is turned on, a microcomputer and synthesizer self-test occurs. A high pitched alert tone is generated for approximately 1/8 second to indicate that the microcomputer and synthesizer are functioning properly. A second low pitched tone is generated if the start-up test is not successful.

## ***Transmit on Blank or Receive-Only Channels***

Pressing the PTT button while tuned to a blank or "receive-only" channel causes an alert tone. The tone continues as long as the PTT button is depressed. The radio transmitter is not enabled.

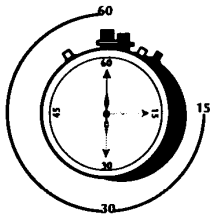


## ***Transmit Inhibition Busy Channel with Busy Channel Lockout***

Pressing the PTT button during a "busy channel" condition (other than your PL/DPL group) generates a continuous busy tone that lasts as long as the button is depressed.

## ***Time-Out Timer***

The time-out timer limits the amount of transmission time to a preset length (off, 30 or 60 seconds). At the end of this time an alert tone indicates that your transmission has been cut off. The alert will continue as long as the PTT switch is depressed.



***Low Battery Alert***

If the battery is low on your radio, an audible alert tone alerts you during transmit or receive mode. During transmit, on the release of the PTT button, the radio emits 2 medium pitched chirps. During receive/standby mode, the radio emits 2 medium pitched chirps. These tones emit approximately every 20 minutes during transmit or receive mode until the battery is completely drained of power.



## Scan and Signalling Alert Tones

### ***Transmit on Radios with PTT-ID***

When the PTT button is depressed a side tone is heard as the unit I.D. is being transmitted. When the tone ends, start your voice message in the standard manner.

### ***Selective Call***

A 2 beep alert tone is generated whenever a Selective Call is received, the radio unsquelches and the callers message is heard.

### ***Call Alert***

A 4 beep alert tone is generated whenever a Call Alert (page) is received. The alert tone repeats until the PTT or monitor button is pressed.

### ***Scan Activate***

A 1 beep alert tone is heard whenever scan is initiated by selecting a preprogrammed rotary scan channel location.

### ***Priority Alert Tone***

A 1 beep alert tone is heard if the radio is scanning and a conversation is initiated on the priority scan channel.

### ***Scan Talkback Tone***

A medium pitched 1 beep alert tone is sounded when you rotate the channel selector knob out of the scan position after the radio has locked on a channel and reaches the last active channel within the channel scan list.

## **Multifunction LED Indicators**

### ***Transmit Mode (PTT Button Pressed)***

- Continuous Red Light - Normal Transmission
- Flashing Red Light - Low Battery

### ***Receive Mode (PTT Button Not Pressed)***

- Flashing Red Light - Channel Busy, indicates the presence of activity on the operating channel
- Continuous Yellow Light (4 seconds) - Channel Monitor Active (PL/DPL Disable)
- Flashing Yellow Light - Selective Call or Call Alert present
- Flashing Green Light - Channel Scan feature active

## Dealer Programmable Functions

### Per Radio Functions

All Alert Tones	Enabled
All LED Indicators	Enabled
Low Battery Alert	Enabled
Time-Out-Timer	Enabled to 60 seconds
Channel Busy Light	Disabled
Battery Saver	Disabled
VOX Operation	Disabled
Monitor Button	Monitor

### Default

### Per Channel Functions

Rx Frequency	Test
Tx Frequency	Test
PL/DPL Decode	Test
PL/DPL Encode	Test
Rx Only Channel	Disabled
Busy Channel Lockout	Disabled

### Default

### Channel Scan Functions

Channel Scan List	Test
TalkBack Channel Scan	Enabled
Scan Activate Tone	Enabled
Priority Alert Tone	Disabled
TalkBack Channel Tone	Enabled

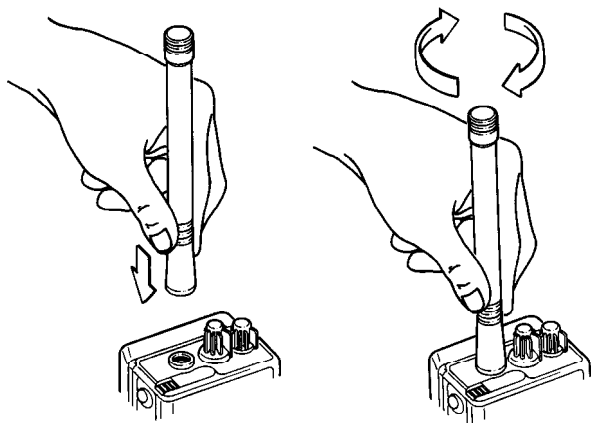
### Signalling Functions

DTMF Signalling	Disabled
Quik-Call II Signalling	Disabled
MDC-1200 Signalling	Test

## Getting Started

### *Antenna Installation*

Fasten the antenna to the radio by placing the threaded end of the antenna into the large threaded antenna bushing on top of the radio. Rotate the antenna clockwise until tightly fastened into place.



## Battery Installation or Replacement

### To Install Battery

1. Align the tabs on the top of the battery to the guide rails on the radio (Figure 2).
2. Press battery and radio together.
3. Slide the battery towards the top of the radio until the battery latches click into place (arrow 1).

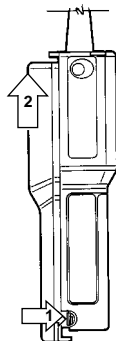


Figure 1.

### To Remove Battery

The basic operation needed for battery removal is illustrated in Figure 2.

1. Disengage both battery latches, located on each side of the bottom of the radio (arrow 1).
2. Move battery down on guide rails about 1/2 inch (arrow 2).
3. Pull the battery away from the guide rails and remove from housing.

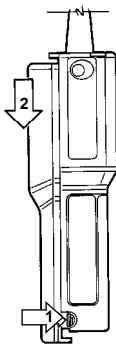


Figure 2.

On page 12 there are two different methods for battery removal.

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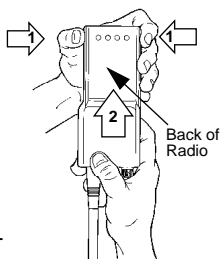
#### NOTE

Before each removal attempt, push battery bottom towards top of radio to properly seat battery. Figures 3 & 4 show right-handed operators, use mirror image of figures for left-handed users.

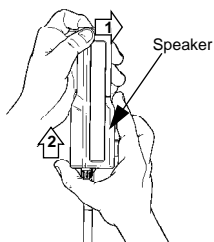
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**Method A:**

1. Hold radio horizontally with speaker side facing down (Figure 3).
2. Pull battery latches, at the same time, towards the front of the radio housing using your thumb and index finger (arrows 1).
3. Use your thumb to slide the battery towards the bottom of the radio about 1/2 inch (arrow 2).
4. Pull the battery away from the guide rails and remove from housing.

**Figure 3. Method A****Method B:**

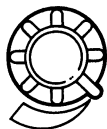
1. Hold radio with the speaker side in the palm of your right hand (Figure 4).
2. Push battery latches, at the same time, towards the front of the radio housing using your thumb and index finger (arrow 1).
3. Use your thumb of your right hand to slide the battery towards the bottom of the radio about 1/2 inch (arrow 2).
4. Pull the battery away from the guide rails and remove from housing.

**Figure 4. Method B**

## Operation

### To Power-Up

Rotate the volume control 1/2 turn clockwise to turn on the radio. A power-up alert tone is generated for approximately 1/8 second to indicate that the radio has passed a self-test of the microcomputer.



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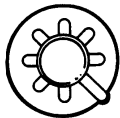
#### NOTE

If the short power-up alert tone is not generated, or if a second low alert tone is generated (indicating corrupted radio programming), turn the radio off, check the battery (charge or replace if necessary), and turn the radio back on again. If the power-up alert tone is still not generated, a fault exists in the radio. Contact your local Motorola Radius dealer.

---

### To Receive

1. Set the channel selector to the desired channel position.
2. Listen for a transmission and adjust the volume control to a comfortable listening level. If no transmission is heard, depress and hold the volume control button to unscquelch the radio and adjust the volume to a comfortable listening level.
3. The radio is now set to receive all calls on the selected frequency.
4. If you wish to monitor a channel (disable PL/DPL) press the side mounted control button. If programmed as a Monitor Button, the LED glows yellow for 4 seconds to confirm that the coded squelch is disabled. Any time the PTT button is pressed when the P110 radio is in the monitor mode (disable PL/DPL), the LED temporarily glows yellow to remind you that this state is active. The radio remains in the monitor mode until the control button is pressed again, to reverse the state.



5. If programmed as a Volume Set Button (manual monitor), the radio has the ability to monitor until the button is released. While pressed, a “rushing noise” will be present which indicates the current level setting of the volume control.

---

**NOTE**

All P110 radio models have an internal squelch setting which is adjusted at the factory. The squelch level setting is not a user-operated control; however, it may be reprogrammed using the Radio Service Software available at your local Motorola Radius dealer.

---

**To Transmit**

1. Set the channel selector to the desired channel position.
2. Do not interrupt another user. Listen for activity on your channel. If the channel on which you are transmitting is programmed to receive PL/DPL, momentarily depress the control button to listen for channel activity. The channel must be clear before transmitting.
3. While holding the radio in a vertical position with the speaker-microphone grille two to three inches from your mouth, press the PTT button on the side of the radio and speak slowly and clearly into the grille area. When finished transmitting, release the PTT button to receive. When the PTT button is depressed, the LED glows red and remains on for the entire length of the transmission, and turns off when the PTT button is released.

---

**NOTE**

When the PTT button is depressed (and as long as the PTT button remains depressed), The battery voltage is automatically monitored and if the voltage is low, the LED flashes red to alert you of the low battery condition. In addition, a double alert tone is sounded when the PTT button is released.

---



## Operation with Standard Features

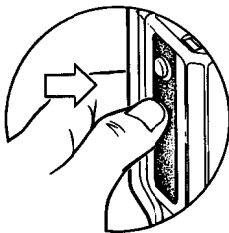
To fit your particular needs, a number of features are available to enhance the operation of your P110 radio. These capability features are described for you in this section.

### ***Time-Out Timer***

The Time-Out Timer (T.O.T) feature alerts you if the transmitter is keyed for a long period. This feature prevents channel tie-up and excess battery drain in case of an inadvertent keying of the transmitter. The radio operates normally in the receive mode with the T.O.T. feature. However, in the transmit mode, a single transmission (uninterrupted depression of the PTT button) “times-out” after 30 or 60 seconds and the radio reverts back to the receive mode, even with the PTT button remaining depressed. After the 30 or 60 second time out, a continuous alert tone is generated in the receive mode until the PTT button is released.

### ***Volume Set***

When programmed as a Volume Set button, the Control button will initiate the volume set feature. This gives the radio the ability to monitor the current radio volume level whenever this button is pressed. A “rushing noise” is present for the duration of the button press that indicates the current level setting of the volume control.



## ***Busy Channel Lockout***

Busy Channel Lockout is a privacy feature that prevents the radio from listening to or transmitting over conversations outside its talkgroup, keeping lines of communication clear. Whenever the radio is not allowed to talk, you will hear busy tone if you attempt to transmit. The radio will be allowed to transmit:

1. when the channel is clear
2. during the group's repeater hang time, until a carrier drop is seen
3. when receiving transmissions from your own group (Common PL/DPL code).

Whenever a channel is programmed for PL/DPL busy channel lockout, pressing the Control button does not put the radio into the carrier squelch mode. This means that the radios with PL/DPL busy channel lockout programmed cannot monitor or listen to the other groups' transmissions. Furthermore, the volume set function is also disabled on any channel that is preprogrammed as a PL/DPL busy channel lockout channel.

On carrier squelch channels, Transmit Inhibit is available to prohibit transmissions when any carrier is present.

## ***Voice Activated Transmission (VOX)***

When hands-free operation is desired, the P110 radio can be activated by voice alone using the VOX feature. The radio has circuitry and software internal to the radio that senses when you speak through an accessory headset and will automatically transmit. You will know you are transmitting when you hear yourself in the headset speaker. Operation is totally automatic; no external controls are required.

### **To Activate the VOX Feature**

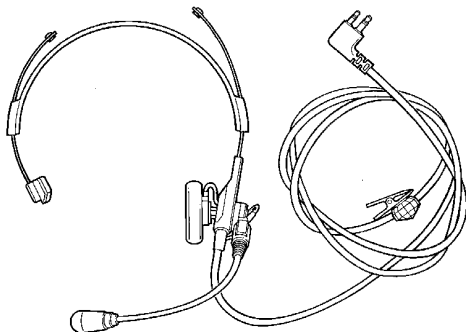
1. Turn the radio off.
2. Insert a headset, without a PTT button, in the accessory connector on a channel programmed for VOX operation.
3. Turn the radio on. The VOX feature will be ready to function. You can operate the radio manually, at any time, by pressing the PTT button.
4. Restart the VOX feature by turning the radio off/on or changing the channel.

---

#### **NOTE**

An external headset accessory must be attached to the P110 radio to activate VOX operation. The radio operates normally, using the PTT button, whenever the headset is not attached.

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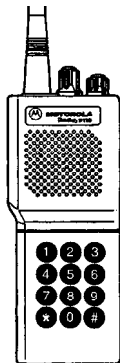
## DTMF Telephone Interconnect

You can encode Dual Tone Multiple Frequency (DTMF) tones through the optional 12 button keypad. The tones are used for:

- access to the landline telephone network
- remote control operation

### ***DTMF Telephone Interconnect Operation***

1. Press and hold the PTT button.
2. Press the desired numeric keys on the DTMF keypad to transmit the tones. As long as the PTT button is held while the digits are pressed, the corresponding DTMF tones are transmitted.



---

#### **NOTE**

After this operation is completed, the PTT button resumes its normal function.

---

# Programmable Feature Enhancements

## *Channel Scan*

This optional feature allows you to monitor a number of channels. The receiver checks each channel in a preprogrammed list for activity (up to 15 channels on the 16 channel model). Two types of channel scan are offered in the P110 radio; non-priority and priority scan. Both types of channel scan are available with PL/DPL operation. To initiate the scan feature, rotate the channel selector switch to the channel in which scan is programmed. If a conversation is initiated on any of the channels that the radio is scanning, the radio stops on the active channel and you can listen to the conversation.

---

### **NOTE**

The P110 scan list is not operator selectable; however, it may be reprogrammed through the Radio Service Software available at your local Motorola Radius dealer.

---

- **Non Priority Channel Scan**  
With this type of scan operation, no one scan channel has priority over another. The scanner stops on the first scan channel with activity, and when the activity is over and a 3-second "hang-time" has expired, proceeds to the next scan channel.
- **Priority Channel Scan**  
Any one of the radio's programmed channels may be designated as the priority channel. Whenever activity occurs on the priority channel, the scanner automatically stops there and the priority alert tone is heard. Even if you are listening to another channel in the scan list, the radio automatically goes to the priority channel when there is activity.
- **PL/DPL Channel Scan**  
Private-Line operation is offered with priority and non-priority channel scan. With this mode of scanning operation, the scanner stops on only the scan channels coded with the proper PL/DPL tone if PL/DPL signalling is active when you initiate scan.

---

### **NOTE**

If the monitor mode is not active when the scanning feature is initiated, the radio performs a PL type of scan. If the monitor mode is active when the scanning feature is initiated, the radio performs a CSQ type of scan.

---

- **Talkback Scan**

This is an option of the channel scan features listed on page 20 that is used when the PTT button is pressed when scanning has stopped on a channel. When transmit or receive activity ceases on a scan channel, a "hang time" of approximately 3 seconds occurs prior to the radio resuming scan for other channel activity. This "hang time" gives you time to receive or respond to a call before scanning resumes. The "hang-time" is programmable through the Radio Service Software available at your local Motorola Radius Dealer.

- **Designated Channel Scan (Home Revert)**

Pressing the PTT button while the radio is scanning causes the radio to transmit on the preprogrammed designated channel location. This channel location is programmable through the Radio Service Software available at your local Motorola Radius Dealer.

---

**NOTE**

If both Designated Channel Scan and Talkback Scan are selected, the radio transmits on the active channel. If however, there are no active channels, the radio transmits on the Designated Channel.

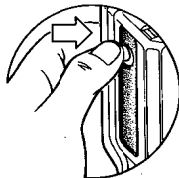
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- **Scan Talkback Tone**

The Scan Talkback Tone feature enables you to find the last active channel received during scan mode. A beep is emitted when the channel selector knob is rotated to the last channel received during scan.

- **Scan Nuisance Delete**

When a conversation occurs and it is not your priority channel or designated scan channel, you can temporarily eliminate this channel from the scan list by pressing the side Control button (if the Control button is programmed for Scan Nuisance Delete). To add the deleted channel back to the pre-programmed scan list, you must exit and reenter the scan function.



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**NOTE**

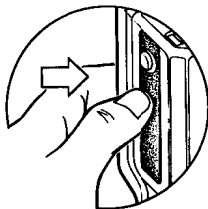
The Volume Set feature is replaced whenever the side control button is programmed to operate the Scan Nuisance Delete feature.

---

# Programmable Signalling Enhancements

## ***PTT ID (Encode)***

When on a channel with the PTT ID feature, the radio transmits an identification code (unit ID) to the base station, indicating which portable is in operation. This code is sent whenever the PTT button is depressed. A sidetone is heard as the ID is being transmitted; when the tone ends, start your voice message in the standard manner. The LED glows red during the time that the ID is sent out.



## ***Call Alert (Decode)***

Call Alert works similarly to tone-only pagers. When a Call Alert (page) is received, a series of 4 beep decode tones are heard while the LED flashes yellow. The LED continues flashing yellow and the alert tone continues until the call alert is acknowledged by the radio. If you transmit by pushing the PTT button or change the rotary channel selector while a Call Alert signal is in progress, the LED stops flashing and the Call Alert tone is disabled.

## ***Voice Selective Call (Decode)***

This feature operates like a standard pager providing a one-time voice message. When a Voice Selective Call is received by the radio, a one-time 2 beep decode tone is heard while the LED flashes yellow. The radio unmutes and the voice message is heard. The LED continues flashing yellow while the voice message is heard. The Voice Selective Call feature does not require any action to acknowledge the message and after the transmission is completed, the radio returns to normal operation.

## ***Signalling and Channel Scan***

Signalling and channel scan are compatible in the P110 radio. However, during scan operation, a Voice Selective Call on a particular channel could be missed since the radio may not be checking that channel when the Voice Selective Call is being sent.

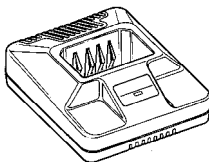
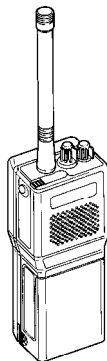
It is recommended that priority scan be selected and the signalling channel be designated the priority channel to improve the likelihood that the Voice Selective Call is received.

## Battery Information

The P110 radio receives its power (7.5V DC) from a rechargeable nickel-cadmium battery as listed in the accessories section. These batteries, designed specifically for use in the P110 radio, are a safe, dependable power source. Proper care of the battery will ensure its effectiveness and allow for peak performance of the radio.

### **Recharging Nickel-Cadmium Batteries**

Recharge the battery before use to ensure optimum capacity and performance. The battery was designed to be used only with a Motorola P110 charger. Charging in non-Motorola equipment may lead to battery damage and void the battery warranty.



---

#### **NOTE**

When charging a battery that is attached to a radio, always turn the radio off to ensure a full charge.

---

### **Charging Temperature**

The battery should be about 77° (room temperature) whenever possible. Charging a cold battery (below 50°F) may result in leakage of electrolyte, and ultimately, in failure of the battery. Charging a hot battery (about 95° F) results in reduced discharge capacity, affecting the performance of the radio. P110 rapid rate battery chargers contain a temperature sensing circuit to ensure that





the battery is charged within these temperature limits. If the charger is not performing a rapid rate charge, the charger's LED flashes red to indicate that the battery is being charged at a slow trickle rate. For additional information on batteries and battery charging, refer to the battery charger information in the service manual.

### ***Short Circuit***

Care should be taken to avoid external short-circuiting of the battery.

---

#### **CAUTION**

A sustained high rate discharge (e.g., a paper clip placed accidentally across the battery contacts) may permanently damage the battery, void the battery warranty, and create a burn or fire hazard.

---

### ***Memory Effect (Reduced Charge Capacity)***

The Memory Effect was a phenomenon which caused a temporary loss in battery capacity or voltage due to repetitive shallow discharging or low term overcharging. This Memory Effect has been virtually eliminated in Motorola batteries with the use of the latest in cell technology from our selected cell suppliers.

### ***Nickel-Cadmium Battery Disposal***

For disposition, Nickel-cadmium sealed rechargeable batteries should be delivered to an authorized metals reclamation dealer (refer to inside front cover of this manual).



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#### **WARNING**

**DO NOT DISPOSE OF ANY BATTERIES IN A FIRE AS THEY MAY EXPLODE!**

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# Battery Charger

## Operating Instructions (P110)

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**NOTE**

THE BATTERY IS SHIPPED FROM THE FACTORY UNCHARGED AND MUST BE CHARGED BEFORE USE.

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**WARNING**

TO REDUCE RISK OF INJURY, CHARGE ONLY MOTOROLA NICKEL- CADMIUM TYPE RECHARGEABLE BATTERIES LISTED. OTHER TYPES OF BATTERIES MAY BURST, CAUSING PERSONAL INJURY AND DAMAGE.

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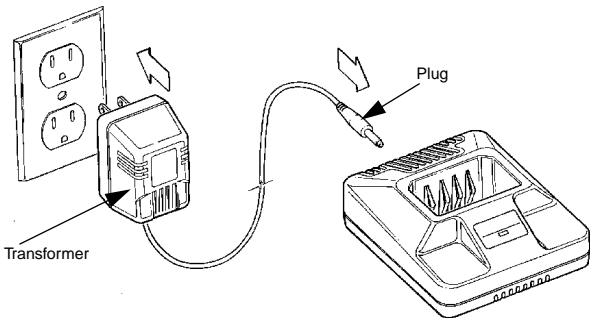
- Do not expose charger to rain or snow.
- Use of an attachment not recommended or sold by Motorola may result in a risk of fire, electric shock, or injury to persons.
- To reduce risk of damage to electric transformer and cord, pull by the transformer rather than the cord when disconnecting charger.
- Position cord so that it will not be stepped on, tripped over, or otherwise subjected to damage or stress.
- An extension cord should not be used unless absolutely necessary. Use of an improper extension cord could result in a risk of fire and electric shock. If an extension cord must be used make sure:
  - (1) That pins on plug of extension cord are the same number, size and shape as those on transformer,
  - (2) That extension cord is properly wired and in good condition, and

(3) The cord size is 18AWG for lengths of up to 100 feet, and 16AWG for lengths up to 150 feet.

- Do not operate charger with damaged cord or plug — replace them immediately.
- Do not operate charger if it has received a sharp blow, been dropped, or otherwise damaged in any way; take it to your local Motorola Radius technician.
- Do not disassemble charger; take it to your local Motorola Radius dealer when service or repair is required. Incorrect reassembly may result in risk of electric shock or fire.
- To reduce risk of electric shock, unplug charger from outlet before attempting any maintenance or cleaning. Turning off controls will not reduce this risk.

### **To Operate Charger**

1. Insert the battery, with or without the radio, into the charger pocket. (Be sure that the radio is off).
2. Insert plug into the charger and plug the transformer into the appropriate AC power outlet.
3. When the battery is fully inserted, the LED glows red. The LED continues to glow red while the battery is charging.



- 4a. For Single-Unit Standard Rate Battery Chargers only: When a standard-charge battery reaches full charge, no change in the LED occurs (red glow remains). The battery fully charges in 10 hours.

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**NOTE**

You can turn the radio on while it is in the charger and have it receive normally. However, allow at least 25% more time for the battery to reach full capacity. **DO NOT TRANSMIT WHILE THE RADIO IS IN THE CHARGER.**

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- 4b. For Single-Unit and Multi-Unit Rapid-Charge Battery Chargers only: When charging a rapid-charge battery, the LED glows green indicating CHARGE COMPLETE when the battery reaches full charge. This LED also indicates that the battery is now charging at a trickle rate. A LED flashes red indicating that the battery may be out of "rapid charge range". The rapid charge automatically begins when the battery is within the correct range. Typical charge times for Rapid-Charge Battery Chargers are as follows:

60-90 Minutes for High Capacity Battery

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**NOTE**

A new battery or one which has not been used for several months may cause a premature fully charged indication. These batteries should be trickle charged overnight before putting them into service.

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5. If the LED does not glow red when the battery is inserted into the charger, check the battery and charger contacts to be sure they are clean. There are no user serviceable parts in the charger. If the charger fails to operate, contact your local Motorola Radius dealer.

## Accessories

Radius offers several accessories to increase communications efficiency. Many of the accessories available are listed below, but for a complete list, consult your Radius dealer.

### Antennas:

NAD6502 — Black	146-174 MHz VHF Antenna (Standard With Unit)
HAD9338 — Yellow	136-162 MHz VHF Antenna
HAD9742 — Black	136-162 MHz VHF Stubby Antenna
HAD9743 — Blue	162-174 MHz VHF Stubby Antenna
HAD9934 — pink	174-195 MHz VHF Antenna
HAD9935 — Purple	195-208 MHz VHF ANtenna
NAE6483 — None	403-520 MHz UHF Antenna (Standard With Unit)
NAE6521 — Red	400-440 MHz UHF Stubby Antenna
NAE6522 — Green	438-470 MHz UHF Stubby Antenna
NAE6523 — Black	470-520 Mhz UHF Stubby Antenna
HAD9728 — None	Tunable Antenna Kit (VHF)

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### NOTE

Each of the color coded antennas listed is designed to cover only the frequency split indicated. Therefore, it is important to order the correct antenna (frequency split) to match a specific customer frequency.

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### Carrying Accessories:

HLN9985	Waterproof Bag
HLN8153	Nylon Carry Case
HLN9076	Molded Carry Holder With Belt Clip
HLN8255	Replacement 3" Spring Action Belt Clip
HLN9012	Leather Carry Case With Belt Loop
HLN9013	Leather Carry Case With Swivel
HLN9014	DTMF Leather Carry Case With Swivel
HLN9015	Replacement Strap For Leather Carry Case
HLN9084	Replacement Strap for Molded Carry Holder (HLN9076)
HLN9149	Swivel Belt Loop Adapter (for use with HLN8153 and HLN9012)
HLN8052	Wrist Strap
HLN8414	Chest Pack Carry Holder
NTN5243	Shoulder Strap (for all carry carry cases)
NTN5629	Replacement 3" Swivel Belt Loop
HLN9035	Replacement 2-1/2" Swivel Belt Loop

### Vehicular Accessories:

HLN9719	Vehicular Charger 1 Hour/12 Volt
NDN4014	Vehicular Battery Eliminator

**Nickel-Cadmium Battery Chargers:**

HTN9630	Charger 1 Hour/120 Volt
HTN9802	Charger 1 Hour/220 Volt
HTN9803	Charger 1 Hour/240 Volt
HTN9167	Charger 90 Minute/120 Volt
HTN9168	Charger 90 Minute/220 Volt
HTN9702	Charger 10 Hour/120 Volt
HTN9804	Charger 10 Hour/220 Volt
HTN9805	Charger 10 Hour/240 Volt
HTN9748	Charger Multi 6 Unit 1 Hour/120 Volt
HTN9811	Charger Multi 6 Unit 1 Hour/220 Volt
HTN9812	Charger Multi 6 Unit 1 Hour/240 Volt
HTN9164	Charger Multi 6 Unit 90 Minute/120 Volt
HTN9165	Charger Multi 6 Unit 90 Minute/220 Volt
HLN9405	Charger Conversion Kit Multi 6 Unit/120 Volt
HLN9406	Charger Conversion Kit Multi 6 Unit/220 Volt
HLN9407	Charger Conversion Kit Multi 6 Unit/240 Volt
HLN9944	Wall Mounting Bracket For Multi Unit Charger (for use with HTN9748, HTN9811 and HTN9812)
HLN9293	Wall Mounting Bracket For Multi Unit Charger (for use with HTN9748, HTN9164 and HTN9165)

**Batteries:**

HNN8148	1200 mAh High Capacity Battery
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**Audio/RF Accessories:**

HMN9787	Light Weight Headset With Swivel Boom Mic
HMN9013	Lightweight Headset II With Swivel Boom Mic
BDN6647	Medium Weight Headset With Swivel Boom Mic
BDN6648	Heavy Duty Headset With Swivel Boom Mic
HMN9021	Medium Weight Dual Muff Headset (over the head)
HMN9022	Medium Weight Dual Muff Headset (behind the head)
HMN9725	Remote Speaker Microphone
HMN9754	2 Piece Surveillance Microphone
BDN6646	Ear Microphone With PTT Interface
BDN6706	Ear Microphone With VOX Interface
HMN9752	Earpiece With Volume Control
HMN9727	Earpiece Without Volume Control
HLN9756	BNC Adapter
HLN8096	Audio Accessory Security Clamp
HLN3139	DTMF Retrofit for 16 Channel Models Only
BDN6720	Flexible Ear Receiver - Earpiece w/o Volume Control (Flexible Plastic Earloop, Speaker rests External to Ear)

*Prices and Availability Subject to Change Without Notice*

## Troubleshooting

If you experience difficulty, check the following items before requesting service.

1. Review steps under OPERATION.
2. Be sure the frequency select switch is set to the correct channel.
3. Replace or recharge the battery.
4. If reception is poor, check the antenna. It must be undamaged and operated in the vertical position for best reception.
5. Try several different operating locations, especially when operating the radio inside buildings.
6. Check transmitter by transmitting to another portable radio or communications receiver. If the receiver has a signal strength ('S') meter, make comparison readings against another portable radio. Also check the antenna.

## Service

Because this unit contains a radio transmitter, Federal law prohibits anyone from making any internal adjustments to the transmitter unless specifically licensed to do so by government regulations. If any operational difficulties should arise, report them to your local Motorola Radius dealer.

Proper repair and maintenance will assure efficient operation and long life for this radio.



## General Radio Care

1. Avoid physical abuse of your radio such as carrying it by the antenna or remote microphone.
2. Wipe the battery contacts with a lint-free cloth to remove dirt, grease, or other material which may prevent good electrical connections.
3. When not in use, keep the accessory jack covered with the protective cap.
4. Clean the radio exterior using a cloth moistened with water. See inside front cover.

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### CAUTION

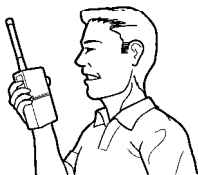
Use of chemicals such as detergents, alcohol, aerosol spray, and/or petroleum products may be harmful and damage the radio housing and cover.

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## Safety Information

The Federal Communications (FCC) with its action in General Docket 79-144, March 13, 1985 has adopted a safety standard for the human exposure to radio frequency (RF) electromagnetic energy emitted by FCC-regulated equipment. Proper operation of this radio will result in user exposure substantially below the FCC recommended limits.

**DO NOT** hold the radio such that the antenna is too close to, or touching exposed parts of the body, especially the face or eyes while transmitting. The radio performs best if the microphone is two or three inches away from the lips and the radio is vertical.



**DO NOT** hold the transmit (PTT) button on when not actually desiring to transmit.

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

**DO NOT** operate a portable transmitter near unshielded electrical blasting caps or in an explosive atmosphere unless it is a type especially qualified for such use.

**DO NOT** operate the portable with a headset or other audio accessories at high volume levels. Hearing experts advise against continuous high volume operation. If you experience a ringing in your ears, reduce volume level or discontinue use.

## Computer Software Copyrights

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## Licensing Information

Your Radius radio operates on FM radio communication frequencies and is subject to the Rules and Regulations of the Local Communications Governing Agencies. These agencies may require that all operators using Private Land Mobile or General Mobile Radio frequencies obtain a radio license before operating their equipment. The operator receives a license for use of the radio equipment under a specific eligibility and on a particular frequency or set of frequencies. To determine eligibility for use of Private Land Mobile Service frequencies contact your local communications governing agency. They are able to supply information required to properly obtain and complete the license application form.

### **In Mexico contact:**

Secretaria De Comunicaciones Y Transportes  
Direccion General De Politicas  
Y Normas De Comunicaciones  
Av. Eugenia No. 197-5o. Piso  
Mexico, D.F. 06700

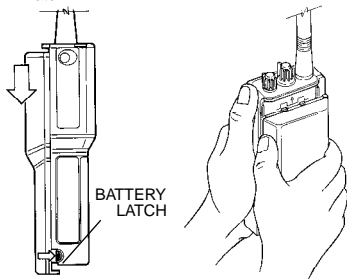
In other countries, please contact your Radius dealer for local licensing procedures.



## Quick Reference Card

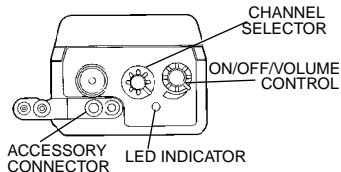
### Battery Installation or Replacement

1. Turn off the radio and hold it with the back of the radio facing up.
2. Disengage the battery latch on the bottom of the radio by pushing and holding the latch towards the front of the radio.
3. While holding the battery latch, slide the battery down from the top of the radio about 1/2 of an inch. Once the battery is free from the control rails, lift it directly upward to remove.
4. To install a fresh battery, align the belt clip end of the battery with the control rails on the radio. Slide the battery toward the top of the radio until it is fully engaged by the battery latch



### Antenna Installation

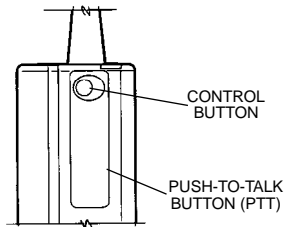
Rotate the antenna clockwise until hand tight into the antenna connector on the top of the radio.



### To Receive

1. Turn the radio on and rotate the CHANNEL SELECTOR to the desired channel position.
2. Listen for a transmission or hold the CONTROL BUTTON to hear background noise (when the CONTROL BUTTON has been programmed for Volume Set). Adjust the VOLUME CONTROL to a comfortable listening level.

3. To monitor a channel (disable PL/DPL) press the side mounted CONTROL BUTTON (when the CONTROL BUTTON has been programmed for Monitor). The LED glows yellow for 4 seconds to confirm that the coded squelch is disabled. To reverse the monitor status, press this button again.



## To Transmit

1. Turn the radio on and rotate the CHANNEL SELECTOR to the desired channel position.
2. Press the MONITOR BUTTON to listen for activity on your channel.
3. While holding the radio two to three inches from your mouth, press the PTT button on the side of the radio and speak. The LED glows red to indicate transmit status. When finished transmitting, release the PTT button to receive.

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### NOTE

When the PTT button is pressed, the LED flashes red if there is a low battery condition. In addition, a double alert tone is sounded when the PTT button is released.

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## Time-Out-Timer (T.O.T)

The T.O.T feature ends a transmission which is over 60 seconds in length. After time out, a continuous alert tone sounds until the PTT button is released.

## Voice Activated Transmission (VOX)

To activate the VOX feature, insert a headset in the accessory connector on a channel programmed for VOX. You can gain manual control of the radio by pressing the PTT button at any time. In order to restart the VOX feature, the radio must be turned off/on or the channel must be changed.

## Programmable Feature Enhancements

### *Channel Scan*

The CONTROL BUTTON must be programmed for Channel Scan for this feature to be functional. To initiate the scan feature, rotate the CHANNEL SELECTOR to the location with the scan list programmed to it. The radio will stop on any active channel and you will be able to hear the conversation. To locate the last active scan channel, rotate the CHANNEL SELECTOR and the radio beeps when that channel is reached. To temporarily eliminate a channel from the scan list, press the side NUISANCE DELETE BUTTON while the nuisance channel is active.

## *PTT ID (Encode)*

Every time the PTT button is pressed, the radio automatically transmits a unit identification (ID) number. While holding the PTT button, a tone may be heard while the unit ID number is being sent out.

## *Call Alert (Decode)*

When a Call Alert is received, the monitor LED flashes yellow and a series of 4 alert tones sound. A Call Alert "leaves a message" for the mobile operator. The monitor LED continues to flash yellow, and the alert tones repeat every 10 seconds until the PTT or any other button is pressed. The radio then returns to normal operation.

## *Voice Selective Call (Decode)*

When a Voice Selective Call is received, a one-time 2 beep alert tone sounds, the monitor LED flashes yellow and the radio emits a voice message. After the transmission is completed, the radio returns to normal operation.