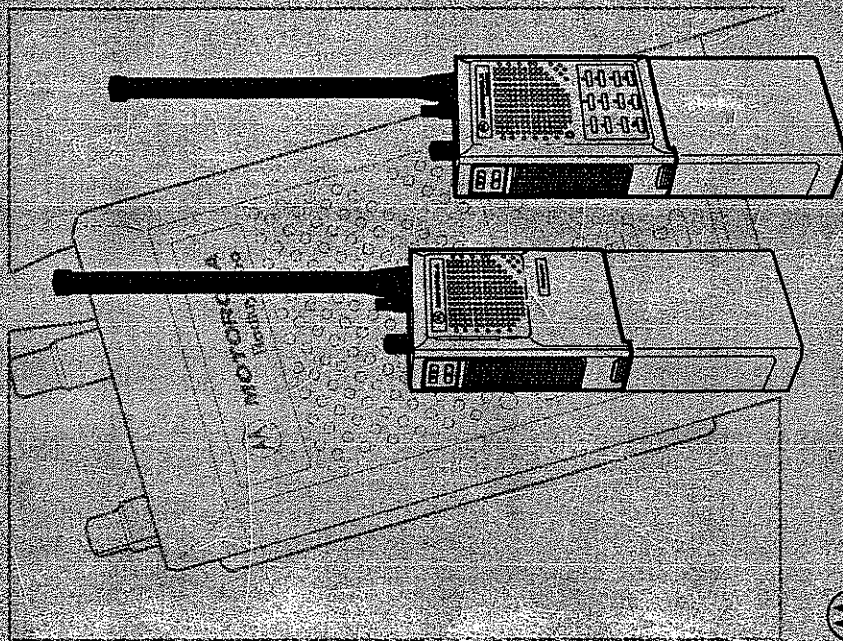


Radius p200™

Portable Radios

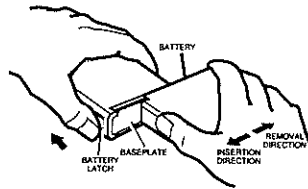
Operating Instructions



 MOTOROLA INC.

QUICK REFERENCE CARD ANTENNA AND BATTERY INSTALLATION

- Attach antenna to the radio by screwing it clockwise into the antenna bushing.
- Install battery by mating the notched end of the battery with the grooved baseplate on the radio. Then slide the battery toward the battery latch until engaged.
- Remove battery by disengaging the battery latch (push and hold latch towards top of radio) and slide battery away from latch.



BASIC OPERATING PROCEDURE TO RECEIVE:

1. Rotate volume control clockwise to turn radio on. Alert tone indicates that radio passes self test of micro-computer.

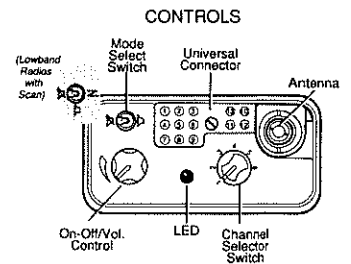
2. Set Channel Selector to the desired channel.
3. For Private-Line (PL) squelch operation set the PL/Squelch toggle to the PL setting (N). LED will flash green if operating channel is busy.
4. For Carrier-Squelch operation set squelch select toggle to the Carrier-Squelch setting (1).
(The squelch sensitivity is factory preset and can be adjusted by any computer-equipped Radius dealer.

TO TRANSMIT:

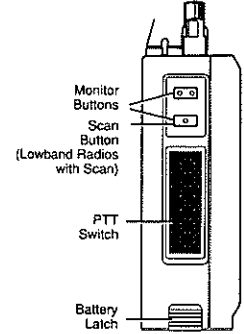
1. Set Channel Selector Switch to desired channel.
2. Monitor the channel (Press one of the monitor buttons if the radio is in PL operation mode). Monitor buttons are inoperable when channel busy light is on.
3. When channel is clear press the PTT switch and speak slowly and clearly into the front speaker grille area. When finished transmitting, release the PTT switch to receive.

ON TRANSMISSION:

- LED will glow continuous red to indicate normal transmission. LED will flash RED to indicate low battery.
4. To turn the radio off rotate volume control fully counterclockwise.



TOP VIEW



SIDE VIEW

WARNING

Certain combinations of chemical environments can adversely affect thermoplastic resins. For this reason lubricants, cleaning agents, solvents or any other material which may come in contact with the finished part should be carefully evaluated for compatibility. We recommend a mild dishwashing soap for cleaning the exterior of the product.

Radius p200™ Portable Radios

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Programming Channel Scan:

Since there is not an LCD on rotary radios to review the scan list, when entering the scan program mode (rotary radios), the entire stored scan list is erased when a channel is programmed in the scan list.

1. Turn radio on and enter scan program mode by pressing and holding the Channel Scan program button (L/S button) and placing mode select switch in scan (Z) position. A continuous alert tone is generated until the L/S program button is released. While the radio is in program mode, all transmit and receive functions are inhibited.
2. Assign channels (one at a time) to program positions (max. six) as follows:
 - One at a time, each of the six scan program positions can be assigned a channel. To do this:
 - Select the channel to be scanned by rotating the channel selector switch to the channel number desired. Program this channel into the scan list by pressing the PTT switch. A momentary alert tone will be generated to indicate that the scan program accepted the entry.

3. Repeat step 2 until all desired channel scan positions are programmed into the scan list. A maximum of six channel scan positions are available.

Exit the program mode by placing mode select switch in either carrier squelch (P) or PL squelch (N) position. A momentary alert tone indicates the scan mode was exited.

To revise the scan list: On rotary radios, the entire scan list is erased each time a new channel is programmed. A new list must be entered. For display radios, revise the scan list as follows:

- Enter program mode as described in step 1.
- Press and release L/S program button until channel to be changed is displayed.
- Remove channel from the scan list by pressing PTT switch. A momentary alert tone alerts and LCD displays "00". Program a new channel in this position as described in step 2.
- Exit program mode by placing mode select switch in either carrier squelch (P) or PL squelch (N) position.

OPTIONAL FEATURES:

Time-Out-Timer
(T.O.T., 60 SECONDS) - Transmission is limited to 60 seconds. An alert tone indicates that your transmission has been cut off. The alert tone continues until the PTT switch is released.

QUICK-CALL II
This feature provides the user with talk-back paging capability.

Quick-Call II / Paging Mode:
Set the squelch select switch to the enable position (N), then momentarily depress the monitor switch. When paged, an interrupted alert tone is generated, the radio unsquelches, and the caller's message is heard. If no transmission is made within six seconds, the carrier override auto timer times out, and the radio automatically resets to the Quick-Call II (paging) mode.

If the radio is not paged, to initiate transmission, set the squelch select switch to the carrier squelch (P) position. After transmission the radio will not be in the paging mode. The radio must be reset to the paging mode (by depressing the monitor switch) for the radio to operate as a pager.

Note:
See operators manual for operation of other options.

Ⓜ Motorola, Radius, P200, Private-Line, Digital Private-Line, Touch-Code, and Quick-Call II are trademarks of Motorola Inc.

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Introduction

WELCOME TO THE MOTOROLA RADIUS P200 RADIO

The Radius P200 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 P200 radio meets tough environmental demands while providing cost effective, reliable communications. It meets the U.S. Government Military Standards 810C and 810D for low pressure, high pressure, low temperature, temperature shock, solar radiation, rain, humidity, salt, fog, dust, vibration, and shock. The P200 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 P200 Radio, inspect the shipping carton for any signs of damage. Next, remove and check the contents of the packing case to be certain 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

- P200 Radio
- Heliflex Antenna (Lowband and VHF Models) or Flexible Whip Antenna (UHF Models)
- Rapid Charge High Capacity Nickel-Cadmium Battery
- 3-inch Belt Clip
- Operating Instructions Manual
- Radio Information Sheet
- Compact 16-Hour Charger

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.

Note: A clear protective coating is applied at the factory to the top escutcheon of the radio and may be removed if desired by peeling it off.

Controls, Switches, Indicators, and Connectors

On/Off/Volume Control

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



Push-To-Talk (PTT) Switch

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



Channel Selector Switch

Selects the operating channel.



Monitor / Scan Buttons (Lowband Radios)

When depressed, this monitors the channel for any activity. Neither carrier, tone nor Digital Private-Line™ (PL) squelch is active when monitoring. On VHF and UHF radios, both buttons on the side of the radio above the PTT are monitor buttons. On Lowband Scan radios, the top (2-dot) button is the monitor button and the bottom (1-dot) button is the scan button.



Program Button (Standard DTMF/DTMF ANI Option Only)

When depressed and held, this programs and stores telephone numbers in locations 1 through 9. To store a number, press and hold the program button, enter the telephone numbers via the Touch-Code™ keypad, press the "*" button, and then enter the memory location number (1 through 9). A special programming tool is required with DTMF ANI.



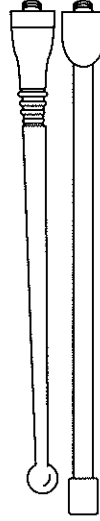
LED Indicator

A bi-color light-emitting diode (LED) indicates normal transmission (continuous red), low battery (flashing red), or channel busy (flashing green - PL application only).



Antenna

Halflex or whip with threaded base.



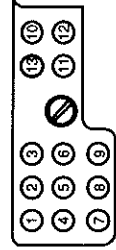
Mode Select Switch

Selects the mode of operation, carrier squelch (N) or PL/DPL squelch (S) in standard models. When equipped with the Quik-Call II™ option, the switch enables Quik-Call operation in the PL (S) position or enables the carrier squelch operation in the carrier squelch (N) position. Channel Scan radios (available with lowband models only) use a 3-position switch to select the mode of operation, carrier squelch (N), PL/DPL squelch (S), and scan (Z).



Universal Connector

Provides accessibility for programming and testing the radio; also allows for connection to remote accessories such as a remote speaker microphone. The universal connector is fitted with a protective cap which should be left in place when the connector is not being used.



Alert Tone Indicators

Power-Up

Each time the radio is turned on, a **microcomputer self-test** occurs. An alert tone is generated for approximately 1/2 second to indicate that the microcomputer is functioning properly. Following the microcomputer self-test, a **synthesizer self-test** occurs. A continuous alert tone is generated if the synthesizer test is not successful.

Transmit on Blank or Receive-Only Channels

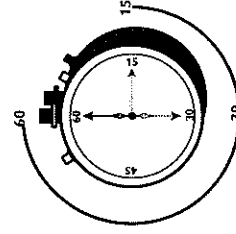
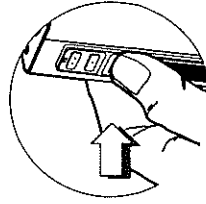
Pressing the PTT switch while tuned to a "receive-only" channel or a blank channel will cause an alert tone. The tone will continue as long as the PTT switch is depressed. The radio transmitter is not enabled and radio-frequency (rf) is not transmitted.

Time-Out-Timer (T.O.T., 60 second)

Transmission time is limited to 60 seconds. An alert tone indicates that your transmission has been cut off. The alert will continue as long as the PTT switch is depressed.

Quick-Call II

An interrupted alert tone is generated whenever a page is received.



LED Display Indicators

Transmit Mode (PTT Switch Depressed)

- Continuous red light – Normal transmission.
- Flashing red light – Low battery.
- No light – Indicates no PTT closure; no rf power being sent to the antenna.

Receive Mode (PTT Switch Not Depressed)

- Flashing green – Channel-Busy Light, indicates the presence of activity on the operating channel when the radio is in the coded squelch (N) mode.

Field Programmable Functions

Field Programmable Functions

Per Radio Functions	
All Alert Tones	Enabled
Power Up Alert Tone	Enabled
Channel Busy Light	Enabled
Transmit Light	Enabled
Battery Saver	Disabled
Per Channel Functions	
RX Freq.	Test
TX Freq.	Test
P/L Decode	Test
P/L Encode	Test
Time-Out-Timer	Disabled
RX Only Channel	Disabled
PAC•RT	Enabled
TX Inhibition Busy Ch.	Disabled
Quick Call Alert	Enabled

Figure 2. Radio Model Information Chart

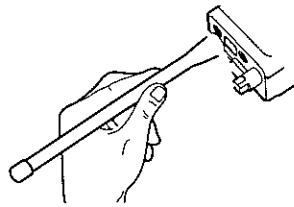
The model number, serial number, and Motorola FCC designation number are all on a label attached to the back of your radio. The rf output power, frequency band, type of squelch, and number of channels can be determined from the model number, as illustrated in Figure 2.

All P200 radio models are synthesized, two- or six-channel universal units that come standard with tone Private-Line (PL) or Digital Private-Line (DPL) coded squelch, which may be enabled/disabled on a per channel basis at time of order. Programming changes can be made by your local Radius dealer.

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 hand tight.



Battery Installation or Replacement

1. Turn off the radio and hold it in the left hand with the front of the radio facing up (see Figure 3).
2. Disengage the battery latch from the battery by pushing and holding the latch towards the top of the radio.
3. With the battery latch disengaged, slide the battery away from the latch to remove it from the baseplate on the bottom of the radio housing.
4. To install the new or freshly charged battery, mate the notched end on the battery with the grooved baseplate, and slide the battery toward the battery latch, onto the baseplate until engaged by the battery latch.

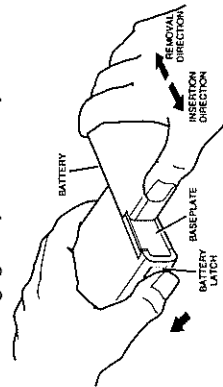


Figure 3. Battery Installation

Note: Nickel-Cadmium batteries should be fully charged before using.

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 one-half second to indicate that the radio has passed a self-test of the microcomputer.



OFF . VOL

Note: If the short power-up alert tone is not generated, or if a continuous alert tone is generated (indicating a synthesizer malfunction), 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 Radius dealer.

To Receive

1. Set the frequency switch 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 monitor button to unsquelch the radio, and adjust the background noise to a comfortable listening level.



Note: All P200 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 at a Radius dealer.

3. The radio is now set to receive all calls on the assigned or selected frequency.
4. For PL receive operation, place the mode select switch in the PL (N) position, and the unit will respond to only those calls with the proper frequency and PL code combination.

Note: When a PL message is received, and for the entire length of the reception, the LED indicator flashes green. The LED also flashes green whenever the channel is active.

To Transmit

1. Set the frequency switch to the desired channel position (1-6).
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 and the squelch switch is in the PL (X) position, momentarily depress the monitor 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 push-to-talk switch on the side of the radio and speak slowly and clearly into the grille area. When finished transmitting, release the push-to-talk switch to receive.

Note:

1. When the push-to-talk switch is depressed, the red LED turns on, remains on for the entire length of the transmission, and turns off when the PTT switch is released.

2. Low Battery Check

When the push-to-talk switch is depressed (and as long as the push-to-talk switch remains depressed), the battery voltage is automatically monitored and if the voltage is low, the red LED flashes to alert the user of the low battery condition.

Operation with Standard Features

To fit your particular needs, a number of features are available to enhance the operation of your P200 radio. These capability features are described for you in this section.

Quik-Call II

The Quik-Call II provides the user with the talk-back pager feature. As in a standard radio, when the unit is turned on, a short power-up alert is generated. The radio then operates in the carrier squelch mode as described in the basic operating procedure. (Also during this power-up period, the Quik-Call decoder is active and will emit an alert tone on detection of a valid code.)

To put the radio in the Quik-Call II (paging) mode, set the squelch select switch to the enable (X) position, then momentarily depress the monitor button. When paged, an interrupted alert tone is generated, the radio is put in the carrier squelch mode and the caller's message is heard.

The radio will remain in the carrier squelch mode for six seconds after the loss of carrier. If the carrier is lost, but for less than six seconds, an auto timer will reset, which permits normal transmit and receive operation as described in the basic operating procedure. If no transmission is made within six seconds, the radio will automatically revert to the Quik-Call II (paging) mode.

To initiate a transmission (radio not paged), set the squelch select switch to carrier squelch (D) position. Then transmit and receive as described in the basic operating procedure. The radio does not automatically reset to the paging mode at the end of the conversation. To reset the radio to the paging mode, set the squelch select switch to the enable (X) position and then momentarily depress the monitor button.

Note that even in the carrier squelch mode the Quik-Call II decoder is active and will respond to a valid Quik-Call II code. The radio will emit an interrupted alert tone on receiving a valid code.

Time-Out-Timer (60 second)

The Time-Out-Timer (T.O.T.) feature alerts the user 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. Operation is exactly the same as a standard model in the receive mode. In the transmit mode, however, a single transmission (uninterrupted depression of the PTT) times out after 60 seconds and the radio reverts back to the receive mode, even with the PTT switch remaining depressed. After the 60 second time out, a continuous alert tone is generated in the receive mode until the PTT switch is released.

Omit Alert Tones

Transmit and receive functions are normal, except that all alert tones (power-up, transmit, inhibit, and T.O.T.) are muted.

Omit Power-Up Alert Tone

Transmit and receive functions are normal, except that the power-up alert tone is muted.

LED Disable

Transmit and receive functions are normal, except that all LED indicators (low battery, normal transmission, and channel busy) are disabled.

Channel Scan (Lowband Models Only)

This option allows you to monitor a number of channels; the receiver checks each channel in a continuous cycle for activity. The channels to be scanned are user programmable. Channel scan is offered in two modes of operation, non-priority and priority scan. Both modes of channel scan are available with PL.

The scan option is selected by placing the mode select switch in the scan position (Z).

Note: When entering a new scan channel, the entire previously stored scan list is erased and a new list must be entered.

All scan alert tones will be disabled if the omit alert tone option is enabled.

- **Non priority Channel Scan**

With this type of scan operation, up to six channels can be scanned. 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 "dwell 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 will automatically stop there, even if the radio had been locked onto a non-priority scan channel signal.

- **PL 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 those scan channels coded with the proper PL tone. However, on a priority channel scan radio, the priority channel is scanned for carrier activity only.

- **Talk-Back Scan**

This is a standard feature of the channel scan options listed above. When transmit or receive activity ceases on a scan channel, a "dwell time" of approximately three seconds occurs prior to the radio resuming scan for other channel activity. This "dwell time" gives you time to receive or respond to a call before scanning resumes. The "dwell time" is programmable through the Radio Service Software available at your local Motorola Service Shop.

- **Disable Talk-Back Scan**

This option disables the talkback feature on priority, non-priority, and PL channel scan. When disabled, pressing the PTT switch allows you to transmit on the channel selected when in the scan mode.

- **Fixed Priority**

This option enables:

- a fixed priority channel on Priority Channel Scan
- a fixed transmit channel on Priority or Non-Priority Channel Scan when ordered with the Disable Talk-Back option.

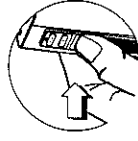
The procedure for **programming channel scan** is as follows:

1. Turn the radio on.
2. To enter the program mode, press and hold the "Channel Scan" program button, and while keeping the button depressed, place the mode select switch (3-position switch) in the scan () position. A continuous alert tone will be generated and remain alerting until the L/S program button is released. This alert tone indicates that the radio is in the program mode and that transmit and receive functions are inhibited.

3. **Note:** The radio will **not** erase the stored scan list when you are entering the scan program mode unless a new channel is programmed.

One at a time, each of the six scan program positions can now be assigned to a channel. To do this:

- Select the channel to be scanned by rotating the channel selector switch to the channel number desired.
- Program this channel into the scan list by pressing the PTT switch. A momentary alert tone will be generated to indicate that the scan program accepted the entry.



4. Repeat step 3 until all desired channel scan positions are programmed into the scan list. A maximum of six channel scan positions are available.

Note: P200 Lowband radios with the scan option are not shipped programmed with scan channels. The scan list is programmed by the user. The user programming feature may be disabled and programming allowed through the radio service software.

Exit from the channel scan program mode by placing the mode select switch in either the carrier squelch () or the PL squelch () position. A momentary alert tone will be generated to indicate that the scan program mode has been exited.

To revise the scan list: The entire scan list is erased each time a new scan channel is programmed. A new list must be entered.

- Enter the program mode as described in step 2 (programming channel scan).
- Exit the program by placing the mode select switch in either the carrier squelch () or the PL squelch () position.

Operation with Options

In addition to the standard features, a number of options are also available to enhance the operation of your P200 radio. These options are described for you in this section.

Touch-Code™ Dual Tone Multiple Frequency (DTMF)

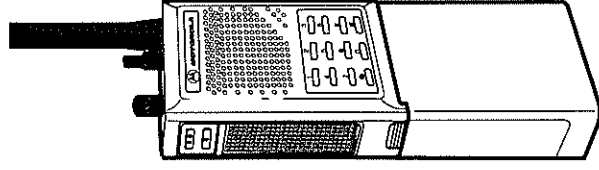
Three different DTMF options are available with the P200 radio:

- Standard DTMF
- Continuous Tone DTMF
- DTMF with Automatic Number Identification (ANI)

Standard DTMF

Manual Dialing (Encoding)

Turn the radio on, depress and hold the PTT switch down for at least one second, and then press the appropriate Touch-Code key buttons. To dial a "*" or "#" the corresponding key must be pressed twice.



Storage of Touch-Code Numbers in Memory (Program Mode)

Press and hold the program button firmly. Then push the Touch-Code key buttons that correspond to the numbers to be stored. A beep tone should be heard with each keystroke. After the entire number sequence to be stored has been entered, press the "*" key button followed by the memory location (1-9). Continue to hold down the program button for one second after the memory location has been entered to allow time for memory storage. A maximum of 16 characters can be stored in each memory location.

Note: To store or manually dial the Touch-Code tones for "*" or "#" in memory, the corresponding button ["*" or "#"] must be pushed twice ("* *" or "# #").

It is necessary to hold the program button for one second after the storage command, otherwise an error may occur.

Last Number Redial

P200 automatically stores the numbers last entered in the scratchpad memory. To automatically dial this number, depress and hold the PTT switch down and press "*", then 0. Release the PTT switch after the last tone is heard.

Note: The last number entered will be altered whenever the Touch-Code keys are pressed while the radio is on.

Scratchpad Memory

Feature gives you the ability to store a number in the **last number redial memory** or in standard memory while receiving someone else on the radio. For example, you are communicating with John (portable-to-portable) and he gives you a phone number to call later. Scratchpad memory lets you store the number

immediately by simply entering the numbers from the keypad. When the phone number is entered, it is automatically stored in the **last number redial memory** (location 0). To store the number in another location, press the program button and press "*" followed by the desired memory location. After entering the storage command, hold down the program button for one second and then release.

To Automatically Dial Numbers Stored in Memory

Depress and hold the PTT switch down and press "*" followed by the number corresponding to the desired memory location (0-9). For example, to dial the number stored in location 5, depress and hold the PTT switch down, press "*", then press 5. Release the PTT switch after the last tone is heard.

IMPORTANT

Numbers in memory will be erased or altered if the battery is removed from the radio and left off for more than two minutes.

Indefinite Pause

May be programmed in memory to allow for storage of more than one number sequence per memory location. For example, if you want to store a repeater access code and phone number in the same memory location, depress and hold the program button while you do the following:

1. Enter the access code
2. Press "**"
3. Press "#"
4. Enter the phone number
5. Press "*" and the desired memory location (1-9)

To dial this sequence, depress and hold the PTT switch down, press "*", then press the proper memory location (1-9). The access code will be transmitted followed by a pause. The pause gives the system time to check the access code and send out a dial tone. After you receive the dial tone, the phone number may be dialed by holding the PTT switch down again and pressing any digit (not "*" or "#").

Continuous Tone DTMF

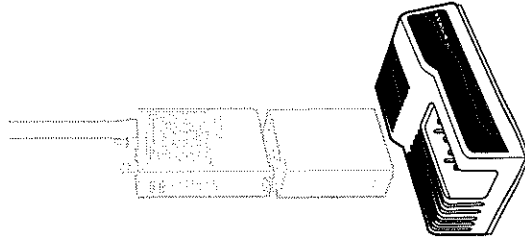
This option is identical to the standard DTMF option, except that no memory features are available and the tones generated by the depression of a keypad button are not of a fixed duration. Instead, the tones will continue for as long as a button is depressed.

DTMF with ANI

With this option installed in your radio, the memory contains pre-stored telephone numbers and is not available for manual storage or erasure of telephone numbers by the radio operator. A special fixture is required for changing preprogrammed numbers. The **last number redial** and **automatic dialing** features are still functional.

Caution: DTMF with ANI is in a volatile memory. If the battery is removed for more than two minutes, the programmed information may be lost, and reprogramming with the ANI fixture would be required.

Another transmission may be initiated immediately after releasing the PTT switch by depressing the PTT switch again. If the PTT switch is released before the 60 second time out, the radio operates as normal (reverts to the receive mode with no alert tone).



Battery Information

Battery Types

The P200 radio gets its power (10Vdc) from a rechargeable nickel-cadmium battery as listed in the accessories section. These batteries, designed specifically for use in the P200 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 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. P200 rapid rate battery chargers contain a temperature sensing circuit to ensure that the battery is charged within these temperature limits.



For additional information on batteries and battery charging, refer to the battery charger information in the maintenance 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)

May be caused by continuous overcharging for long periods of time or by repetitive shallow cycling.

If the battery is lightly or infrequently used and is allowed to charge over a long period (30-60 days), it may develop memory effect. That is, the voltage may be sufficiently lower on the first discharging cycle to reduce the effectiveness of radio transmission.

A more common type of memory effect is induced by uniform shallow cycling. For example, if the battery is operated so that it repeatedly delivers 50% of its full capacity, it can temporarily become inactive, and when current demand is increased, it may show a sharp decrease in its ability to deliver proper terminal voltage.

Any nickel-cadmium battery that shows early signs of reduced capacity should be checked for memory effect before it is returned under warranty or discarded. If the battery is exhibiting memory effect, memory can be easily eliminated by completely discharging the battery (deep discharge), and recharging again.

One or two deep discharge cycles are usually sufficient to restore the battery to full capacity.

WARNING

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



Battery Chargers Operating Instructions

1. Plug the charger into the appropriate ac power outlet.
2. Insert the battery, with or without the radio, into the charger pocket (**BE SURE THE RADIO IS TURNED OFF**). When the battery is fully inserted, the red charging light will turn on.
Note: You can turn the radio on while it is in the charger and it will 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.**
3. **For Single-Unit and Multi-Unit Rapid-Charge Battery Chargers Only:** When charging a P200 battery, the green light will turn on when charging is complete. If both lights flash when the battery is inserted in the charger, there is an open or short circuit in the battery. Be sure both the charger and battery contacts are clean.
4. If the red light does not come on when the battery is inserted in 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 Motorola Inc., Radius Products Division Customer Service at 1-800-356-1520.

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:

NAB6061A Heliflex (30 - 36MHz), color coded **green**
 NAB6062A Heliflex (36 - 42MHz), color coded **blue**
 NAB6063A Heliflex (42 - 50MHz), color coded **red**

Each Radius P200 lowband radio is shipped from the factory with an antenna kit. The antenna kit includes an uncut antenna, an antenna cap, and a cut chart, which supplies information that describes what length to cut the antenna for a specific customer frequency. Like factory orders, replacement antennas are uncut and supplied in a kit along with antenna cap and cut chart.

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) before the antenna is cut to match a specific customer frequency.

Antennas:

(Color codes on antenna stud)
 NAD6541 Heliflex (136 - 150.799MHz), color coded **yellow**
 NAD6542 Heliflex (150.8 - 161.999MHz) color coded **black**
 NAD6543 Heliflex (162 - 174MHz) color coded **blue**
 NAE6521 S.M.A. Antenna (400 - 440MHz)
 NAE6522 S.M.A. Antenna (440 - 470MHz)
 NAE6511 Heliflex (403 - 437.999MHz) color coded **red**
 NAE6512 Heliflex (438 - 469.999MHz) color coded **green**
 NAE6500 Flexible Whip (403 - 512MHz)
 NKN6419 Mobile Antenna Cable
 NTN5632 Mobile Antenna Adapter

Batteries:

NTN5531 Nickel-Cadmium Medium Capacity, Rapid Charge
 NTN5545 Nickel-Cadmium High Capacity, Rapid Charge
 Intrinsically Safe/Factory Mutual Approved
 NTN5521 Nickel-Cadmium High Capacity, Rapid Charge
 NTN5570 Alkaline Battery
 NTN5561 Nickel-Cadmium Medium Capacity, Rapid Charge
 Intrinsically Safe/Factory Mutual Approved

Belt Clip Installation Instructions

To facilitate installation, refer to the following diagram while performing the following steps:

1. Make sure the radio is turned off, actuate the Battery Release button, and slide the battery off the radio.
2. Remove the two belt clip/front cover attaching screws from the back of the radio. Save the screws.
3. Install the two rubber spacers into the holes vacated by the removal of the screws in step 2.
4. Engage the lower attachment hook of the belt clip with the lower attachment hook slot in the radio and line up the belt clip attaching screw holes with the belt clip/front cover attaching screw holes in the back of the radio.
5. Install the two belt clip/front cover attaching screws removed in step 2 and tighten the screws firmly but not so tight as to strip the threads.
6. Reinstall the battery by sliding it on to the bottom of the radio far enough so that the battery release fully engages the battery pack. This completes the installation.

INSERT GAEPS-47312-0

Nickel-Cadmium Battery Chargers:

- NTN5538 Single-Unit Desk-Top (Rapid Rate 117V)
- NTN5539 Single-Unit Desk-Top (Rapid Rate 220V) with European Plug
- NTN5540 Compact (110V)
- NTN5541 Compact (220V) with European Plug
- NTN5536 Six Unit Rapid Rate Charger (117V)
- NTN5537 Six Unit Rapid Rate Charger (220V/240V)

Carrying Accessories:

- NTN5546 Velcro Patch Pin Attachment
- NTN5542 2" Belt Clip
- NTN5547 Belt Clip Carry Holder
- NTN5533 3" Belt Clip
- NTN5548 Carry Case (Medium)
- NTN5549 Carry Case with Swivel (Medium)
- NTN5550 Carry Case (Large)
- NTN5551 Carry Case with Swivel (Large)
- NTN5552 DTMF Access, Long (Swivel Only)
- NTN5593 Carry Case (Lanyard)
- NTN5573 T-Strap (Urethane)/Carry Holder
- NTN5582 Carry Case Spacer
- NTN5583 T-Strap (Nylon) Leather Cases

Audio Accessories:

- NKN6410 Cloning Cable
- NMN6153 Remote Speaker Microphone
- NTN5557 Earpiece Jack Adapter
- NTN5558 Earpiece w/Volume Control
- NTN5560 Universal Connector Adapter
- NSNB056 Lapel Speaker
- NMN6168 Remote Microphone with Earphone Jack (2.5mm jack). (When ordering the above microphone, earpiece NSNB057 is required.)
- NSNB057 Earpiece without Volume Control (if ordered alone for use without NMN6168 microphone, earpiece does require adapters, NTN5557, see below, and order 58-80378B84, through Communications Parts Division).
- NTN5559 Public Safety Remote Speaker Microphone (UHF Models Only) requires antenna NAE5511 or NAE5512 and Velcro Patch Pin Attachment NTN5546.

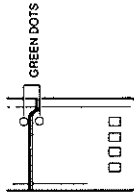
For Use in Hazardous Atmospheres

Factory Mutual Non-Incendive and Intrinsically Safe Approved Models

The P200 Portable Radios properly equipped with:

- The H236/H753 Option is approved by Factory Mutual (FM) Corporation as intrinsically safe for use in Classes I, II, and III Division 1, Groups C, D, E, F, and G.
- The H757 Option is approved by Factory Mutual (FM) Corporation as non-incendive for use in Class 1, Division 2, Groups A, B, C, and D.

These options provide a radio label which lists the Class/Division/Group, and verifies the radio as being FM approved. In addition, matching green dots will be visible on the back of the radio and on the battery to insure proper identification of FM approved units.



The intrinsically safe rating by Factory Mutual states that electrical equipment is incapable of releasing sufficient electrical or thermal energy, under normal or abnormal operating conditions, to cause ignition of specific hazardous atmospheres designated on the radio label.

WARNING

SUBSTITUTION OF COMPONENTS MAY IMPAIR THE INTRINSIC SAFETY OF THE RADIO.

Note: Radios must ship from the Motorola factory equipped with the hazardous atmosphere options; they **cannot** be modified in the field.

Failure to use the radio with the approved battery will negate the FM approval. P200 Factory Mutual approved radios can be used

in those applications requiring reliable, two-way hand-held radios in the listed specific hazardous atmospheres. Motorola approved equipment and accessories are listed in the approval guide published yearly by Factory Mutual Corporation.

The following radios and accessories are approved as Intrinsically Safe by Factory Mutual. Refer to the radio label for intrinsic safety ratings and required batteries. Only the accessories and antennas listed below may be used on approved radios.

Lowband P200	VHF P200	UHF P200
H41RFU7160AN	H43RFU7120BN	H44RFU7120BN
	H33RFU7160BN	H34RFU7160BN
	H43RFU7160BN	H44RFU7160BN

Models

ANTENNAS	
NAB6061A	30-36 MHz Heliflex
NAB6062A	36-42 MHz Heliflex
NAB6063A	42-50 MHz Heliflex
NAD6541A	136-150.8 MHz Helical
NAD6542A	146-162 MHz Helical
NAD6543A	157-174 MHz Helical

NAB6061A	NAB6051A	30-36 MHz Heliflex
NAB6062A	NAB6052A	36-42 MHz Heliflex
NAB6063A	NAB6053A	42-50 MHz Heliflex
NAD6541A	NAD6282A	136-150.8 MHz Helical
NAD6542A	NAD6283A	146-162 MHz Helical
NAD6543A	NAD6284A	157-174 MHz Helical

BATTERIES

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 Radius dealer.

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

General Radio Care

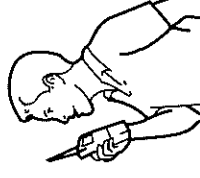
1. Avoid physical abuse of your radio such as carrying it by the antenna or remote microphone.
2. Wipe the battery contacts with a lint-free cloth to remove dirt, grease, or other material which may prevent good electrical connections.
3. The antenna jack is fitted with a protective cap which should be left in place when the jack is not being used.
4. When not in use, keep the universal jack covered with the protective cap.
5. Clean the radio exterior using a cloth moistened with water. See **Caution**.

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

Safety Information

The Federal Communications Commission (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 very close to, or touching exposed parts of the body, especially the face or eyes while transmitting. The radio will perform best if the microphone is two or three inches away from the lips and the radio is vertical.



DO NOT hold the transmit (PTT) switch 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.

Computer Software Copyrights

The Motorola products described in this manual may include copyrighted Motorola computer programs stored in semiconductor memories or other media. Laws in the United States and other countries preserve for Motorola certain exclusive rights for copyrighted computer programs, including the exclusive right to copy or reproduce in any form, the copyrighted computer program. Accordingly, any copyrighted Motorola computer programs contained in the Motorola products described in this manual may not be copied or reproduced in any manner without the express written permission of Motorola. Furthermore, the purchase of Motorola products shall not be deemed to grant, either directly or by implication, estoppel or otherwise, any license under the copyrights, patents or patent applications of Motorola, except for the normal non-exclusive royalty-free license to use that arises by operation of law in the sale of a products.

Battery Chargers

Kit Information

Charger Type	Kit Number		Battery Type	Charge Time
	110 Volts	220 Volts		
Single-Unit Compact	NTN5540	NTN5541	All	16 hours
Single-Unit Rapid	NTN5538	NTN5539	All	1 hour
Multi-Unit Rapid	NTN5536	NTN5537	All	1 hour

Batteries

Kit Number	Capacity	Charge Type
NTN5531, NTN5561	Medium	Rapid
NTN5521, NTN5545	High	Rapid

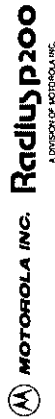
Battery Chargers Operating Instructions (P200)

1. Plug the charger into the appropriate ac power outlet (see "Kit Information" for the correct voltage for your charger kit number).
2. Insert the battery, with or without the radio, into the charger pocket (**BE SURE THE RADIO IS TURNED OFF**). When the battery is fully inserted, the red charging light will turn on.

Note: You can turn the radio on while it is in the charger and it will 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.**

3. **For Single-Unit and Multi-Unit Rapid-Charge Battery Chargers only:** When charging a rapid-charge battery, the green CHARGE COMPLETE light will turn on when the battery reaches full charge. When a standard-charge battery reaches full charge, no change in the light will occur (red light remains on). **If both lights flash** when the battery is inserted in the charger, there is an open or short circuit in the battery. Be sure both the charger and battery contacts are clean.

4. If the red light does not come on when the battery is inserted in 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 Motorola Inc., Radius Products Division Customer Service at 1-800-356-1520.



FCC Licensing Information

Your Radiusp radio operates on FM radio communication frequencies and is subject to the Rules and Regulations of the Federal Communications Commission (FCC). The FCC requires that all operators using Private Land Mobile or General Mobile Radio frequencies obtain a radio license before operating their equipment. Application for your FCC license is made on FCC Form 574 for low band, high band, and UHF frequencies. For a license in the 800 MHz band, you must complete the Form 574 and 574-A Supplement form. These forms as well as a booklet entitled "Form 574 Instructions" can be obtained from the FCC Supply Section, Administrative Services Division, 1919 M St., NW, RM B-10, Washington DC 20554; telephone 202-632-7272.

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, see FCC Rules and Regulations, Part 90. The following subparts describe general eligibility requirements:

- Subpart B: Public Safety Radio Services
- Subpart C: Special Emergency Radio Services
- Subpart D: Industrial Radio Services, which include, among others, Business Manufacturers and Special Industrial Services
- Subpart E: Land Transportation Radio Service

Eligibility for use of the General Mobile Radio Service frequencies is found under Part 95 of the Rules and Regulations, 47 C.F.R. 94, subpart A.

Frequency coordination is now required for operation on most frequencies in the Private Land Mobile Radio Services. Once the license application form is completed it must be forwarded to the appropriate frequency. The coordination agency assigns a frequency or frequency pair to the application and forwards it on to the FCC for final processing. There is a frequency coordination fee which must be included with the license application. Current fee charges can be obtained by calling your appropriate frequency coordination agency. See listing on the reverse side of this sheet.

An exception to the requirement for frequency coordination in the Private Land Mobile Radio Services is licensing for use of itinerant frequencies. Itinerant operation is defined by the FCC as operation of a radio station at unspecified locations for varying periods of time. Those applications do not need frequency coordination and may be sent directly to the FCC. Frequency coordination is also NOT required for licenses in the General Mobile Radio Service and these applications are also sent to the FCC. See the reverse side for these FCC addresses.

The FCC charges a processing fee of \$30.00 for all new, modified or renewal license applications. This fee is payable by check or money order made out to the "Federal Communications Commission" and MUST be enclosed with the application. Any application without a check will be returned. (Exception: Applicants who are governmental entities and all applicants in any Public Safety or Special Emergency Radio Service are exempt from the FCC license fee.) Applications requiring coordination must have the FCC check, as well as the coordinator's check, attached when mailed to the coordinating agency. The coordinating agency will remove their check and will forward the coordinated application and FCC check on to the FCC Licensing Division. Upon grant, the FCC will mail your radio station license to the address shown on your application Form 574.

If your eligibility is within the Business Radio Service, contact the National Association of Business and Educational Radio (NABER) for the NABER fee schedule and supplemental form to be completed and forwarded with Form 574 to:

NABER Frequency Coordination
1502 Duke St., Suite 200
Alexandria, VA 22314
Tel. 703-739-0300

If your eligibility is within the Special Industrial Radio Service, contact the Special Industrial Radio Service Association (SIRSA) for the SIRSA fee schedule. Complete Form 574 and send to:

SIRSA Frequency Coordination Dept.
1700 N. Monroe St., Suite 910
Rosslyn, VA 22209
Tel. 703-526-5115

If your eligibility is within the Manufacturer Radio Service, contact Manufacturers Radio Frequency Advisory Committee (MRFAC) for the MRAC fee schedule and supplemental form to be completed and forwarded with Form 574 to:

MRFAC Inc.
8269 Leesburg Pike, Suite 304
Falls Church, VA 22044
Tel. 703-532-7459

The Business Radio Service, itinerant frequencies are 27.49 MHz, 464.500, 469.500 MHz pair and 464.550, 469.550 MHz pair. Complete Form 574 and send to:

FCC-Business Radio Service
PO Box 360373-M
Pittsburgh, PA 15251-6373
Tel. 717-337-1212

The Special Industrial Radio Service itinerant frequencies are 43.04 MHz, 151.505 MHz, 158.400 MHz, and 451.800, 456.800 MHz pair. Complete Form 574 and send to:

FCC-Other Industrial Services
PO Box 360354-M
Pittsburgh, PA 15251-6354
Tel. 717-337-1212

If you want to operate on General Mobile Radio Service frequencies, complete Form 574 and send to:

FCC-General Mobile Radio Service
PO Box 360373-M
Pittsburgh, PA 15251-6373
Tel. 717-337-1212

For information on other frequency coordinating agencies or additional licensing information, contact the FCC, 2025 M St. NW, Washington, DC 20554; telephone 202-632-7272.

NOTICE

To insure optimum performance the Nickel Cadmium Battery must be recharged before operating your unit.

Refer to "Commercial Warranty for Nickel-Cadmium Batteries" on reverse side

Notes

44 Notes

COMMERCIAL WARRANTY FOR NICKEL-CADMIUM BATTERIES

Nickel-cadmium batteries sold by Motorola are warranted to be free from defects in workmanship and material for a period of 18 months from the date of shipment. This express warranty is extended by The Radius Division, Motorola Inc. to the original purchaser only, and only to those purchasing for purpose of leasing or solely for commercial industrial, or governmental use.

THIS WARRANTY IS GIVEN IN LIEU OF ALL OTHER WARRANTIES EXPRESSED OR IMPLIED WHICH ARE SPECIFICALLY EXCLUDED, INCLUDING WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. IN NO EVENT SHALL MOTOROLA BE LIABLE FOR INCIDENTAL OR CONSEQUENTIAL DAMAGES TO THE FULL EXTENT SUCH MAY BE DISCLAIMED BY LAW.

Batteries sold for use in CB or Marine products are excluded from this warranty buy may carry their own separate limited warranty.

NICKEL-CADMIUM Batteries will be replaced without cost during this 18-month period if:

- (1) the battery capacity falls below 80% of rated capacity, or
- (2) the battery develops leakage.

Purchaser shall be responsible for all charges incurred in returning batteries to Motorola. Motorola will be responsible for all charges incurred in shipping replacement batteries to the purchaser.

Replacement batteries are warranted only for the remaining unexpired warranty period of the original battery. This warranty becomes void if:

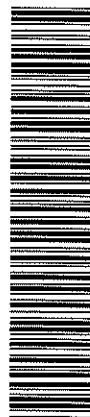
- (a) the batteries are charged by other than Motorola approved battery chargers specified for the charging of the battery;
- (b) any of the seals on the battery enclosure or cells are broken or show evidence of tampering.
- (c) the battery is used in equipment or service other than the radio equipment for which it is specified.

In order to obtain performance of this warranty, purchaser must contact a Radius Dealer.

This warranty applies only within the United States.

NOTICE

TO INSURE OPTIMUM PERFORMANCE THE NICKEL-CADMIUM BATTERY MUST BE RECHARGED BEFORE OPERATING IN YOUR UNIT.



68P81059C05-C

Motorola Inc.
Radius Division
1411 E. Washington St.
Mt. Pleasant, IA 52641