INSTRUCTION MANUAL

A revised preliminary draft copy of the Users Manual follows:

EXHIBIT 8

CDMA Tarpon Wireless Telephone Basic User's Guide

Preliminary Draft

June 19, 2000

Contents

Contents

Safety Information

Important: Read this information before using your wireless handheld phone.

Exposure to Radio Frequency Signals

Your wireless handheld portable telephone is a low power radio transmitter and receiver. When it is ON, it receives and also sends out radio frequency (RF) signals.

In August 1996, The Federal Communications Commission (FCC) adopted RF exposure guidelines with safety levels for handheld wireless phones. Those guidelines are consistent with safety standards previously set by both U.S. and international standards bodies:

- American National Standards Institute (ANSI) IEEE. C95. 1-1992

- National Council on Radiation Protection and Measurement (NCRP). Report 86

- International Commission on Non-Ionizing Radiation Protection (ICNIRP) 1996

- Ministry of Health (Canada), Safety Code 6

Those standards were based on comprehensive and periodic evaluations of the relevant scientific literature. For example, over 120 scientists, engineers, and physicians from universities,

government health agencies, and industry reviewed the available body of research to develop the ANSI Standard (C95.1).

The design of your phone complies with the FCC guidelines (and those standards). For additional information concerning exposure to radio frequency signals, see the statement by the FDA at the end of this user guide.

To maintain compliance with FCC RF exposure guidelines, if you wear a handset on your body, use the Motorola-supplied or approved carrying case, holster, or other body-worn accessory.

If you do not use a body-worn accessory, ensure the antenna is at least one inch (2.5 centimeters) from your body when transmitting. Use of non-Motorola accessories may violate FCC RF exposure guidelines.

Antenna Care

Use only the supplied or an approved replacement antenna. Unauthorized antennas, modifications, or attachments could damage the phone and may violate FCC regulations.

Phone Operation

Normal Operation

Hold the phone as you would any other telephone, with the antenna pointed up and over your shoulder.

Tips on Efficient Operation

Observe the following guidelines to operate your phone most efficiently.

- Extend your antenna fully, if applicable.

- Do not touch the antenna unnecessarily when the phone is in use. Contact with the antenna affects call quality and may cause the phone to operate at a higher power level than otherwise needed.

Batteries

Caution: All batteries can cause property damage, injury, or burns if a conductive material, such as jewelry, keys or beaded chains, touches exposed terminals. The material may complete an electrical circuit and become quite hot. To protect against such unwanted current drain, exercise care in handling any charged battery, particularly when placing it inside your pocket, purse, or other container with metal objects. When the battery is detached from the phone, your batteries are packed with a protective battery cover; please use this cover for storing your batteries when not in use.

Driving

Check the laws and regulations on the use of wireless telephones in the areas where you drive. Always obey them. Observe the following guidelines when using your phone while driving.

- Give full attention to driving--driving safely is your first responsibility.

- Use hands-free phone operation, if available.

- Pull off the road and park before making or answering a call if driving conditions so require.

Electronic Devices

Most modern electronic equipment is shielded from RF signals. However, certain equipment may not be shielded against the RF signals from your wireless phone.

Pacemakers

The Health Industry Manufacturers Association recommends that a minimum separation of six inches (15 centimeters) be maintained between a handheld wireless phone and a pacemaker to avoid potential interference with the pacemaker. These recommendations are consistent with the independent research by and recommendations of Wireless Technology Research.

Persons with pacemakers:

- should ALWAYS keep the phone more than six inches from their pacemaker when the phone is turned ON

- should not carry the phone in a breast pocket

- should use the ear opposite the pacemaker to minimize the potential for interference

- should turn the phone OFF immediately if you have any reason to suspect that interference is taking place

Hearing Aids

Some digital wireless phones may interfere with some hearing aids. In the event of such interference, you may want to consult your hearing aid manufacturer to discuss alternatives.

Other Medical Devices

If you use any other personal medical device, consult the manufacturer of your device to determine if it is adequately shielded from external RF energy. Your physician may be able to assist you in obtaining this information.

Turn your phone OFF in health care facilities when any regulations posted in these areas instruct you to do so. Hospitals or health care facilities may be using equipment that could be sensitive to external RF energy.

Vehicles

RF signals may affect improperly installed or inadequately shielded electronic systems in motor vehicles. Check with the manufacturer or its representative regarding your vehicle. You should also consult the manufacturer of any equipment that has been added to your vehicle.

Posted Facilities

Turn your phone OFF in any facility where posted notices so require.

Aircraft

Switch OFF your phone before boarding an aircraft. Airline regulations prohibit using your phone while in the air. Check and comply with the policy of your airline regarding the use of your phone while the aircraft is on the ground.

Blasting Areas

To avoid interfering with blasting operations, turn your phone OFF when in a "blasting area" or in areas posted: "Turn off two-way radio." Obey all signs and instructions.

Potentially Explosive Atmospheres

Turn your phone OFF, do not remove your battery when you are in any area with a potentially explosive atmosphere, and obey all signs and instructions. Sparks from your battery in such areas could cause an explosion or fire resulting in bodily injury or even death.

Areas with a potentially explosive atmosphere are often but not always clearly marked. They include: fueling areas such as gasoline stations; below deck on boats; fuel or chemical transfer or storage facilities; areas where fuel odors are present (for example, if a gas/propane leak occurs in a car or home); areas where the air

contains chemicals or particles, such as grain, dust, or metal powders; and any other area where you normally would be advised to turn off your vehicle engine.

For Vehicles Equipped with an Air Bag

An air bag inflates with great force. Do NOT place objects, including both installed or portable wireless equipment, in the area over the air bag or in the air bag deployment area. If in-vehicle wireless equipment is improperly installed and the air bag inflates, serious injury could result.

US021600

Getting Started

Opening the Box

Your digital wireless phone typically comes equipped with a charger and at least one battery. A large selection of accessory options can customize your wireless phone for maximum performance and portability. The following illustration shows the standard package options.
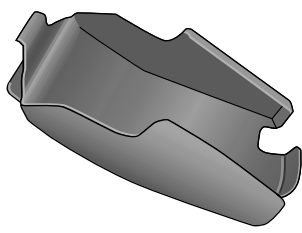
Note: Your phone and accessories may not look exactly as pictured.

Lithium Battery

Motorola
Telephone

Holster

Battery

Before you can use your phone, you will need to install and charge the battery.

We recommend that you use only Motorola Original™ batteries and accessories, and that you store batteries in their protective covers when not in use.
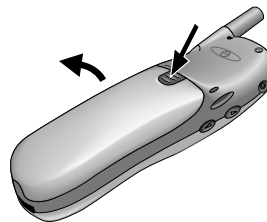
Installing the Battery

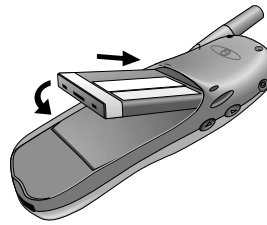| Do This |
| --- |
| Remove the battery's protective cover. |
| Push down the battery door release latch and lift open. |

Do This
Insert the battery, printed arrows first, into the battery compartment and push down.

Replace and close the battery door.

Charging the Battery

Do This
Plug the AC adapter into your phone with the release tab facing up

Illustration to come

Plug the other end of the AC adapter into the appropriate electrical outlet.

Turning On Your Phone

Do This	To
Press and hold ⊙	turn on your phone

Do This	To
Enter your unlock code and press OK ($\oslash$)	unlock your phone, if necessary

Placing a Call

To place a call, your phone must be turned on, be unlocked, and be in contact with the network.

Press	To
keypad keys	enter the phone number
	Tip: If you make a mistake, press DELETE ($\searrow$) to delete the last digit, or press and hold DELETE ($\searrow$) to clear all digits.
$\widehat{\text{SND}}$	place the call

Note: You can enter a phone number up to a maximum of 32 digits, but only the last 24 digits appear in the display.

Ending a Call

Press	To
(END)	end the call

Redialing a Number

If you hear an ordinary busy signal, the phone number you dialed is busy.

Press	To
(END)	hang up
(SND)	redial the busy number

Receiving a Call

To receive a call, your phone must be turned on and be in contact with the network.

When you receive a call, your phone rings and/or vibrates and displays an incoming call message.

Press	To
(SND) or ANSWER (⊘)	answer the call

Viewing Your Phone Number
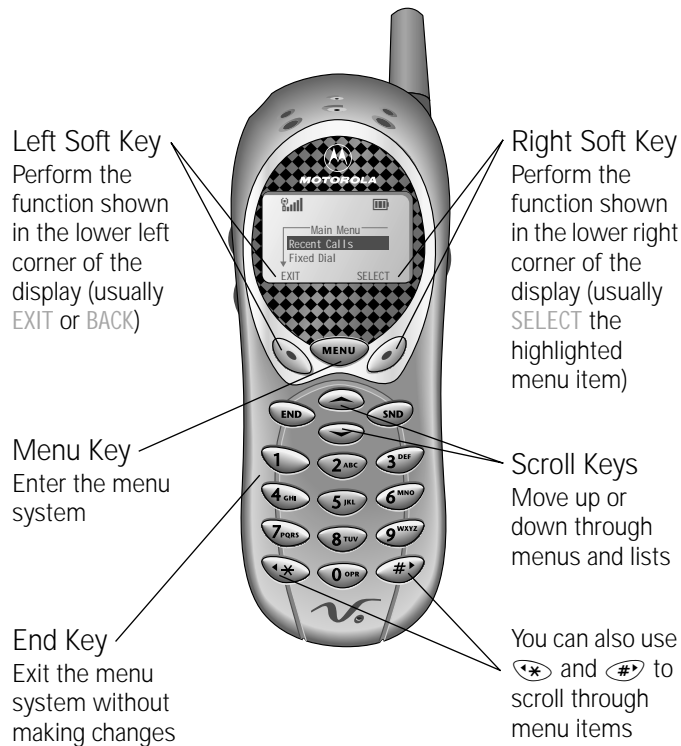
Press	To
(MENU) (#▸)	display your phone number

Learning More Tasks

Navigating to Features

You can access many of your phone's features through a menu system. Use these keys to move through the menu system and find the feature you want:

Left Soft Key
Perform the function shown in the lower left corner of the display (usually EXIT or BACK)

Right Soft Key
Perform the function shown in the lower right corner of the display (usually SELECT the highlighted menu item)

Menu Key
Enter the menu system

Scroll Keys
Move up or down through menus and lists

End Key
Exit the menu system without making changes

You can also use ⟨✱⟩ and ⟨#⟩ to scroll through menu items

Some features that are described in this guide are designated with this logo. These are optional network and subscription-dependent features. Contact your service provider for information about availability.

This guide provides navigation instructions that show you how to get to specific menu features as follows:

Find the Feature   MENU > Recent Calls > Dialed Calls

The > symbol means that you should scroll to and select the indicated feature. To locate and select the Dialed Calls feature as shown in the above example:

Do This

MOTOROLA

12:00

Ready

PH BOOK   M   MESSAGE

MENU

END   SND

1   2 ABC   3 DEF

4 GHI   5   6 MNO

From the idle display, press MENU to enter the menu system

Recent Calls is already highlighted because it is the first item in the menu list

Press SELECT (⊘) to select Recent Calls

Press ⊜ to scroll to Dialed Calls
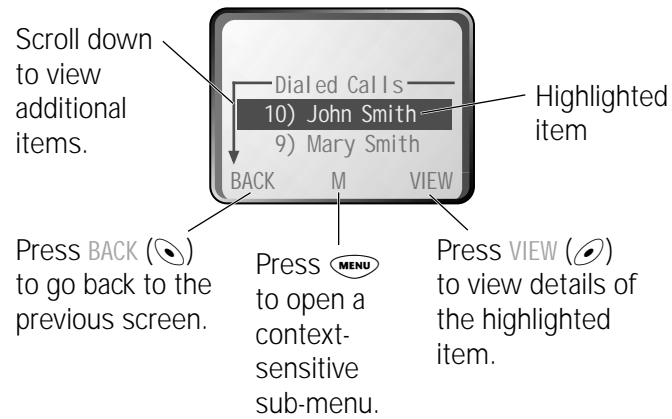
Learning More Tasks

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Do This

Press SELECT (⊘) to select Dialed Calls

Your phone displays the dialed calls list

Using Menu Features

To set or adjust a phone feature, you may have to select an item from a list of options, or use the keypad to enter information.

Some features prompt you to select from a list of items or actions:

Scroll down to view additional items.

Highlighted item

Press BACK (🖋) to go back to the previous screen.

Press ⟨MENU⟩ to open a context-sensitive sub-menu.

Press VIEW (✎) to view details of the highlighted item.

- In a numbered list, press a number key to highlight the item.

- In an alphabetized list, press a key multiple times to cycle through the letters on the key and highlight the closest matching list item.

- If a list item runs off the right side of the display, press ⟨✱⟩ and ⟨#⟩ to scroll and view the entire entry.

Other features, such as the phonebook and datebook applications, require you to enter information in multiple fields:
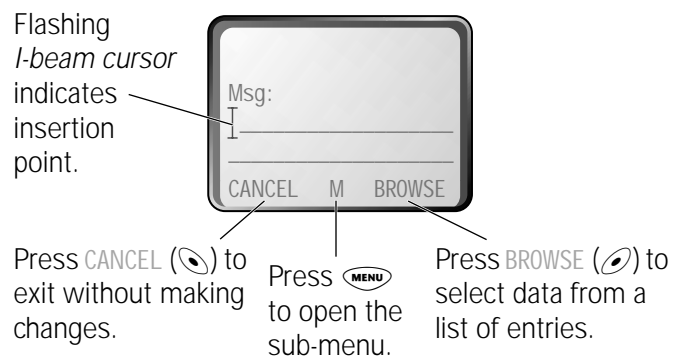
Scroll down to view additional fields.

```
┌──── Entry Details ────┐
│ Name: John Smith      │
│ No. : 2125551212      │
│ CANCEL        CHANGE  │
```

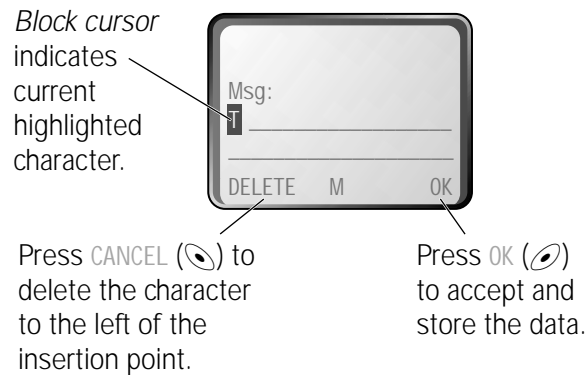Highlighted field

Press CANCEL (✎) to go back to the previous screen and cancel any changes.

Press CHANGE (✐) to edit the information in the field.

- Enter information in an empty field by typing numbers or text from the keypad. (See "Entering Text" on page 22.)

- When a field contains a predefined list of values, press ✳ and # to scroll through and select a value.

The message center application lets you compose and send alphanumeric text messages. A flashing *I-beam cursor* indicates the text insertion point:

Flashing
I-beam cursor
indicates
insertion
point.

Msg:

CANCEL   M   BROWSE

Press CANCEL (✎) to exit without making changes.

Press (MENU) to open the sub-menu.

Press BROWSE (✐) to select data from a list of entries.

When you begin entering data, the I-beam cursor change to a *block cursor* and the soft key functions change appropriately:

Block cursor
indicates
current
highlighted
character.

Msg:

DELETE   M   OK

Press CANCEL (✎) to delete the character to the left of the insertion point.

Press OK (✐) to accept and store the data.

Entering Text

General Text Entry Rules

Use the number keys to enter letters, numbers, and other characters. Press the same key repeatedly to cycle through available characters (see "Character Chart" on page 23):

Press a number key to enter text at I-beam cursor location

Press a number key as many times as necessary to enter the desired character

Press and hold a number key to cycle between uppercase and lowercase characters

Move I-beam cursor up or down one line, change character in block cursor to uppercase or lowercase

Move I-beam cursor to the left or right, change block cursor to I-beam cursor

- If you do not press a key for two seconds, the character in the block cursor is accepted and the cursor moves to the next position.

- The first character of every sentence is capitalized unless you manually override it.

Character Chart

Use this chart as a guide for producing characters. Press and hold a key to cycle between uppercase and lowercase characters.

①	[space] . 1 ? ! , @ _ & : " ( ) ' ¿ ¡ % ₤ $ ¥
②ᴬᴮᶜ	A B C 2 Ä Å à α β Ç
③ᴰᴱᶠ	D E F 3 Δ É è Φ
④ᴳᴴᴵ	G H I 4 Γ ì
⑤ᴶᴷᴸ	J K L 5 Λ
⑥ᴹᴺᴼ	M N O 6 Ñ Ö Ø Ò Ω
⑦ᴾQᴿˢ	P Q R S 7 Π ß Σ
⑧ᵀᵁⱽ	T U V 8 Θ Ü ù
⑨ᵂˣʸᶻ	W X Y Z 9 Ξ Ψ
⓪ᴼᴾᴿ	+ - 0 x * / = > < # §

Using iTAP

iTAP lets you type the letters of a word using only one keypress per letter. To use iTAP, press ⊙ₘₑₙᵤ and select iTAP when you are prompted to enter text.

When you activate iTAP, the third line of the display becomes a working area that shows a list of the most common words and letter combinations based on the keys you press. The list is updated with each keypress. When you have entered all the letters of a word, press ⊙ and ⊙ to scroll left and right through the list and select the word you want.

For example, to spell the word "act," press ⊙₂ₐᵦ꜀ ⊙₂ₐᵦ꜀ ⊙₈ₜᵤᵥ. The display shows:

I-beam cursor indicates the text insertion point.

Press ⊙ and ⊙ to scroll and view additional word choices in the working area.

Cat Act Bat Abu ▶

DELETE   SELECT

Press DELETE (⊙) to clear the last letter entered.

Press SELECT (⊙) to enter the highlighted word at the insertion point.

If the word you are spelling is not in the iTAP dictionary, an appropriate letter combination may not appear in the word list. Delete one or more characters until you see an accurate letter

combination, then highlight it to lock that portion of the word. Continue entering letters and highlighting letter combinations to spell the word.

- The first word of a sentence is automatically capitalized, with following words in lowercase. Press ⬃ one or more times to force initial character capitalization, all uppercase, or all lowercase characters.

- A space is automatically added after each word. When you add punctuation, the space before the punctuation is removed. Press ① or ⓪ to enter punctuation or special characters as shown in the "Character Chart" on page 23.

- To type a number, enter the first digit and then highlight it in the working area. Following keypresses add digits to the number until you press SELECT (⬭) to enter the number at the insertion point.

Storing an Entry in the Phonebook

You can store a list of names and phone numbers in your phone's electronic phonebook. You can view and dial these entries directly from your phone.
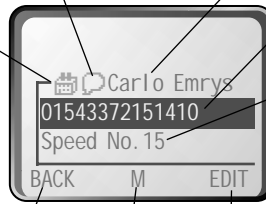
Fields in a Phonebook Entry Form

Voice Name icon indicates a recorded Voice Name. (You can call the entry by saying the name when your phone is idle.)

The title is the entry's **Name** (the name of the person or group) or **Speed Number** (the number you can enter from idle to "speed dial" the entry).

Type icon is the type of phone number

 Work

 Home

 Main

 Mobile

 Fax

 Pager

No. is the phone number.

Speed Number

Carlo Emrys
01543372151410
Speed No. 15

BACK   M   EDIT

Returns to list view

Opens phone menu

Opens entry form

Storing a Phonebook Entry

Note: You can also use the following procedure to store a fixed dial entry by scrolling to and selecting Fixed Dial.

Find the Feature   (MENU) > Phonebook
(MENU) > New

Entering Required Fields

Some fields are required for a phonebook entry.

Press	To
⬆⬇	scroll to Name
Change (⊘)	select Name
keypad keys	enter a name for the phonebook entry (see "Entering Text" on page 22)
OK (⊘)	store the name
⬆⬇	scroll to No.
Change (⊘)	select No.
keypad keys	enter the phone number
OK (⊘)	store the phone number

Recording a Voice Name

You can also optionally record a voice name for a phonebook entry.

Press	To
⬆⬇	scroll to Voice Name
Record (⊘)	record a voice name
	The phone displays Press Voice Key then say name.

Press	To
voice key and say the entry's name (in two seconds)	record the voice name
	The phone displays Press Voice Key then REPEAT name.
voice key and repeat the name	confirm the voice name
	The phone displays Trained: Voice Name.

Entering Optional Fields

Continue by entering some optional fields, if needed.

Press	To
⬆⬇	scroll to Type
Change (⊘)	select Type
⬆⬇	scroll to the type of phone number
Select (⊘)	select the type of phone number
⬆⬇	scroll to Speed No.
Select (⊘)	select Speed No.
	The phone automatically fills in the first available number on a new form.
keypad keys	enter a different speed number if desired
Save (⊘)	save the modified speed number
	If your chosen speed number is already assigned to another entry, you are asked if you want to replace that entry.

Press	To
$\widehat{\smile}$	scroll to More
Select ($\oslash$)	select More if you want to create another entry with the same Name

Using Text Messages

Text messages are brief messages that appear on your phone display. A text message may include phone numbers or URLs. You must set up a text message inbox *before* you can send and receive these messages. Your inbox holds up to 10 messages.

Setting Up the Text Message Inbox

Find the Feature	(MENU) > Messages
	(MENU) > Text Msg Setup

Press	To
$\widehat{\smile}$	scroll to the Service Center No. field
Change ($\oslash$)	open the Service Center No. editor
keypad keys	enter the phone number for the service center that handles your outgoing messages
OK ($\oslash$)	store your service center number
$\widehat{\smile}$	scroll to the Expire After field
Change ($\oslash$)	open the Expire After editor

Press	To
keypad keys	enter the expiration period—the number of days your network tries to send unreceived messages
OK (⊘)	store the expiration period
⊜	scroll to the Reply Type field
Change (⊘)	open the Reply Type editor
⊜	scroll to the type of replies you want to send
Select (⊘)	store the reply type
⊜	scroll to the Cleanup Period field
Change (⊘)	open the Cleanup Period editor
⊜	scroll to the period that messages stay in your inbox
Select (⊘)	store the cleanup period

If you select Custom, continue. Otherwise, the procedure is complete. |
⊜	change the entry in the active Custom field
⚹ and #⟩	switch between the number and label fields
Done (✎)	store the custom cleanup period

Reading Text Messages

Note: You must set up your inbox before reading text messages. See "Setting Up the Text Message Inbox" on page 29.

| **Find the Feature** | (MENU) > Messages > Text Msgs |

Press	To
$\hat{\smile}$	scroll to the message you want (! = unread and urgent, ✓ = read, 🔒 = read and locked)
Read ($\oslash$)	open the message

Dialing Numbers from Text Messages

Note: You must set up your inbox before opening text messages. See "Setting Up the Text Message Inbox" on page 29.

| **Find the Feature** | (MENU) > Messages > Text Msgs |

Press	To
$\hat{\smile}$	scroll to the message with the number
(MENU)	open the text message menu
$\hat{\smile}$	scroll to Call Back
Select ($\oslash$)	dial the number stored with the message

Note: If the phone lists more than one number for the message, press $\hat{\smile}$ to scroll to a number and press Select ($\oslash$) to dial.

Using Voicemail

You can listen to your voicemail messages by calling your network voicemail phone number.

Storing Your Voicemail Number

Store your voicemail number in your phone to make it faster and easier to use voicemail.

Find the   (MENU) > Messages
Feature   (MENU) > VoiceMail Setup

Press	To
keypad keys	enter the phone number for your voicemail
OK (⊘)	store the number

Listening to Voicemail Messages

Note: Store your voicemail number before using this procedure.

Find the   (MENU) > Messages > VoiceMail
Feature

Your phone calls the voicemail number you stored. Contact your service provider for information about your voicemail features.

Locking and Unlocking Your Phone

You can lock your phone manually, or you can set your phone to lock automatically whenever you turn it off.

When you try to use a locked phone, it prompts you for your unlock code. A locked phone still rings or vibrates for incoming calls or messages.

Locking Your Phone Manually

Find the Feature	(MENU) > Settings > Security > Phone Lock > Lock Now

Press	To
keypad keys	enter your four-digit unlock code
Press OK (⊘)	lock the phone

Setting Your Phone to Lock Automatically

Find the Feature	(MENU) > Settings > Security > Phone Lock > Automatic Lock > On

Press	To
keypad keys	enter your four-digit unlock code
Press OK (⊘)	set the phone to lock automatically

Unlocking Your Phone

At the `Enter Unlock Code` prompt:

Press	To
keypad keys	enter your four-digit unlock code
Press `OK` (⊘)	unlock the phone

If You Forget a Code or Password

If you forget a security code (originally set to 000000), contact your service provider.

If you forget your phone's unlock code (originally set to 1234), try the last four digits of your phone number. If that does not work, do the following when you see the `Enter Unlock Code` prompt:

Press	To
(MENU)	display the security code prompt
keypad keys	enter your security code
`OK` (⊘)	bypass the `Unlock Code` prompt

Locking and Unlocking Your Keypad

Press	To
(MENU) (✶)	lock or unlock your keypad

Note: Incoming calls and messages unlock the keypad.

Caller ID

The *Calling line identification* (caller ID) feature lets you see who is calling before you answer.

- If the caller's name is stored in your phonebook, the name is displayed.

- If the name is not in your phonebook, the caller's phone number is displayed.

- If caller ID information is not available, your phone displays the message Incoming Call.

Automatic Redial

You may be unable to complete a call if the wireless system is busy. When this happens, the system transmits a fast busy signal, and your phone displays the message Call Failed along with the reason for the failure.

WIth automatic redial, your phone repeats the call attempt over the next four minutes.

Press	To
SND or RETRY (✐)	activate automatic redial

When the call goes through, your phone rings or vibrates one time, displays Redial Successful, and then connects the call.

Call Waiting

If you subscribe to call waiting, you may hear a tone while you are on a call. This tone indicates that you have received a second call.

To place the first call on hold while you answer the second call:

Press	To
(SND)	answer the new call
(SND) (analog mode)	switch back to the first call
or	
SWITCH (⊘) (digital mode)	

To end the first call and answer the second call:

Press	To
(END)	end the current call
	Your phone rings to signal the new call.
(SND)	answer the new call

Unanswered Calls

When you cannot answer a call, your phone keeps a record of your unanswered calls and displays the ℗ (missed calls) icon and the

message Missed Calls (or Unknown if caller ID information is not available).

Press	To
VIEW (✐)	view the unanswered calls list
⊜	scroll through the list and select a call that you want to return
SND	dial the number

Dialing Emergency Numbers

Your service provider programs one or more emergency phone numbers that you can dial even if your phone is locked or restricted.

Press	To
any keypad key	display the enter code or locked prompt
keypad keys	enter the emergency number (such as 911)
SND	dial the emergency number

Additional Dialing Features

In addition to simply dialing numbers on your keypad, you can insert numbers or characters and dial calls in a variety of ways.

To insert numbers or characters:

Do This	To Insert
Press ⓪ᵒᵖʳ for two seconds and enter rest of number	international access code for country from which you are calling
Press (MENU) and then scroll to and select one of the following: • Insert Pause (to insert a p) • Wait (to insert a w) • Insert 'n' (to insert an n)	special character when making a calling card call: • **Pause** tells your phone to wait until the call connects before it dials the next digit in a series • **Wait** tells your phone to wait until the call connects, then prompt you before it sends the remaining digits • **'n'** tells your phone to stop and prompt you for a number before it continues dialing
Press (MENU) > Attach	digits to precede the number to call
Press (MENU) > Add Digits	digits at the end of the number to call

To dial a call:

Do This	To Dial
Press the two-digit phonebook index number of the entry	speed dial number

Learning More Tasks

Do This	To Dial
Press and hold the single-digit phonebook index number	one-touch dialing number
Press voice key and say the name (in two seconds)	voice dial number
Press ⬭MENU⬭ > Recent Calls > Received Calls or Dialed Calls > *entry to call*	missed or recent call

Using In-Call Features

While you are on a call, you can perform the following tasks:

Do This	To
Press ⬭MENU⬭ > Hold	place a call on hold
Press ⬭MENU⬭ > Mute	mute a call
Press ⬭MENU⬭ > Spkrphone On	activate the speakerphone (hands-free mode)
Press ⬭MENU⬭ > My Tel. Number	View your phone number
Press ⬭MENU⬭ > Send Tones	Send digits as DTMF tones, for example for credit card dialing or password entry

Phone Fundamentals

Phone Diagram

Earpiece
Ultra-compact
phone speaker

**Power Key &
Status Light**
Turn the phone
on and off, view
call, service, and
message status

Display
(see "Display
Indicators")

Voice Key
Record VoiceNotes,
phonebook and
datebook entries

Headset Jack
Connect an
optional headset

Menu Key
Enter the menu
system

Volume Keys
Adjust earpiece
and ringer volume

Send Key
Place and answer
calls

Soft Keys
Perform functions
identified by
display prompts

Scroll Keys
Scroll through
menu features,
move the cursor
when entering
text

End Key
End phone calls

**Accessory
Connector Port**
Connect the battery
charger and
accessories

Microphone

40

Display

The top section of the display shows phone status indicators. Text and number messages, keypad input, and menu options appear in the middle of the display. Text labels at the bottom of the display identify the current soft key and menu key functions.

Display Indicators

❷ In Use Indicator

❸ Roam Indicator

❹ Message Waiting Indicator

❶ Signal Strength Indicator

❺ Voice Message Waiting Indicator

❻ Battery Level Indicator

❽ Digital/ Analog Signal Indicator

12:00

❼ Alert Indicator   Clock
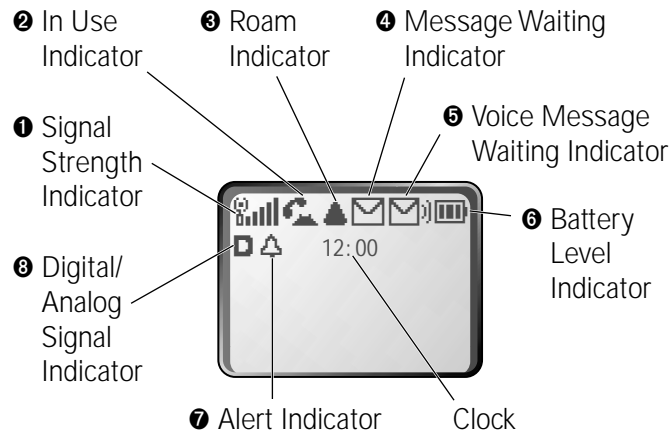
❶ **Signal Strength Indicator** Shows the strength of your phone's connection with the local wireless system.

Strong   No signal

You cannot make or receive calls when the no signal indicator is displayed.

❷ **In Use Indicator** Appears when a call is in progress.

❸ **Roam Indicator** Appears when your phone accesses a wireless system outside your home network. When you leave your wireless service area, your phone *roams* or seeks another service area.

❹ **Message Waiting Indicator** Displayed when your phone receives a text message.

❺ **Voice Message Waiting Indicator** Displayed when your voicemail receives a message.

❻ **Battery Level Indicator** Shows the amount of charge left in your battery. The more segments visible, the greater the charge.

High   ▥   ▤   ▢   ▢   Empty

Recharge your battery as soon as possible when you see the Low Battery warning message.

❼ **Alert Indicator** Indicates the current selected alert. The default alert is a ringer.

    △   Ringer on
    ⁞⁞ ⁞⁞   Vibrate on
   (add)   Vibrate then ring
    ⁞△⁞   Ring then vibrate

🔔 Silent

🔔 Vibrate with all tones off

🔔 All Alerts off

❽ Digital (□) or Analog (A) Signal Indicator
Indicates whether you are receiving a digital or analog signal.

Status Light

The status light provides information regarding your type of service, and incoming call or message status.

Status light

The status light changes color and flashes or remains on to indicate different states:

Indication	State
alternating red/green	incoming call
flashing green	in service, home-type system
flashing yellow	roaming, non-home-type system
flashing red	no service
alternating red/service color (green, yellow, or red)	text message or voicemail message received

Volume Keys

Use the upper and lower volume keys to adjust your phone's earpiece and ringer volume.
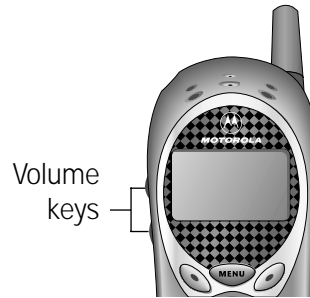
Volume
keys

When	Press	To
During a call	volume keys	increase or decrease earpiece speaker volume
When you are not on a call	volume keys	increase or decrease ringer volume

Battery Use

Caution: To prevent injuries or burns, do not allow metal objects to contact or short-circuit the battery terminals.

Maximizing Battery Life

To ensure that you enjoy maximum battery life and use your battery to its fullest capacity:

- Always use Motorola approved batteries and battery chargers.

- Maintain the battery at or near room temperature when charging.

- New batteries or batteries that have been stored for long periods of time may not rapid charge properly. In these instances, the battery requires an overnight charge.

- When you do not intend to use a battery for a while, store it uncharged in a cool, dark, dry place, such as a refrigerator.

- To prolong the life of your batteries, do not expose them to temperatures below -10°C (14°F) or above 45°C (113°F). Always take your phone with you when you leave your car.

- Over extended periods of time, batteries gradually wear down and require longer charging times. This is normal. If you charge your battery regularly and notice a decrease in talk time or an increase in charging time, then it is probably time to purchase a new battery.

Disposing of Batteries

To dispose of batteries, check with your local recycling center for a battery recycler near you. Never dispose of batteries in a fire.

When You're Ready to Do More

Menu Map

This is the standard menu layout. Your service provider may have modified the menu structure or changed some feature names. And, you can change the menu structure, as well. Not all features may be available for all users.

- **Recent Calls**
  - Received Calls (53)
  - Dialed Calls (52)
  - Notepad (53)
  - Call Times (52)
- **Phonebook** (51)
- **Datebook** (47)
- **Quick Dial** (52)
- **Radio** (52)
- **Messages** (48)
- **Info on Demand** (48)
- **Shortcuts** (54)
- **VoiceNotes** (54)
- **Browser** (47)
- **Settings**
  - **Ring/Vibrate**
    - Alert (53)
    - Detail (53)
  - **Phone Status**
    - My Tel. No. (51)
    - Phone: Line 1/2 (51)
    - Battery Meter (51)
    - Credit Info (51)
    - Other Information (51)

- **Settings (continued)**
  - **Connection**
    - IrDA Link (47)
  - **In Call Setup**
    - In Call Timer (48)
    - Answer Options (47)
    - Call Waiting (48)
  - **Security**
    - Phone Lock (54)
    - Lock Keypad (53)
    - Lock Application (53)
    - Restrict Calls (54)
    - New Passwords (54)
  - **Other**
    - Personalize (50)
    - Initial Setup (49)
    - Network (50)
    - Car Settings (49)
    - Headset (49)

Menu Feature Descriptions

BROWSER Access Web pages and run Web-based applications.

The Browser delivers WAP (Wireless Application Protocol) pages from your wireless service provider directly to your phone. These pages give you current information on selected topics.

CONNECTION You can connect your phone to a computer or fax machine to send and receive fax and data calls on the connected machine. You can connect your phone using a cable and PCMCIA card, a cable only, or an *Infrared Data Association* (IrDA) link.

IrDA Link Set up a wireless infrared connection. Your phone must be within one meter of the linking device.

DATEBOOK Schedule appointments in the datebook calendar.

You can display events for the week, a day, or details for a specific event. See "Datebook" on page 59.

IN CALL SETUP Customize settings that provide information during a phone call, such as timers and call-answering options.

Answer Options Turn call answering options on or off:

Multi-Key   answer by pressing any key

Call Waiting Activate and deactivate call waiting.

When another call arrives while you are already on a call, call waiting can play a tone to notify you of the new call.

In Call Timer Adjust call timer settings.

You can set the following options for your display:

Time   displays the elapsed time for the current call

Off   no in-call display for the timer

INFO ON DEMAND Request and receive information from your service provider.

MESSAGES Listen to voicemail, send and receive text messages.

Your *voicemail* records voice messages from people who call you when you are unavailable. Voicemail messages are stored on the network rather than on your phone. When you receive a voicemail message, your phone displays New VoiceMail ✉🔊. See "Using Voicemail" on page 32.

Your phone can also receive *text* and *information services* messages which may include text, phone numbers, and URLs.

• Text messages are brief messages that you can enter, send, and receive (such as "Where are we meeting?").

- Information services messages are broadcast or browser messages that you can only receive (such as stock updates or other news).

When you receive a new message, your phone displays New Message ✉ and gives an alert. You must set up your message inboxes before you can use text or information services messages. See "Using Text Messages" on page 29.

OTHER

Car Settings Adjust hands-free car kit settings.

When your phone is connected to a car kit or headset, it can automatically answer calls after two rings. You can route your calls directly to a connected car kit or headset.

Headset Adjust headset settings.

Initial Setup Set several basic phone options:

Animation	switches on and off smooth scrolling within and between text fields (off conserves the battery)
Auto PIN Dial	automatically dials your PIN
Battery Save	conserves power (if available)
Auto Redial	automatically redials calls that fail due to network conditions
Backlight Display	changes the backlight display, which usually changes based on the amount of ambient light

DTMF	switches DTMF tones to long or short form
Language	sets the language for phone menus
Master Clear	performs master reset and clears all user-selectable options, resettable timer, recent call lists, and phonebook
Master Reset	resets all options back to their original factory settings *except* for the unlock and security codes
Scroll	tells the cursor to stop or wrap around when it reaches the top or bottom of a list in the display
Status Light	turns the status light off (to conserve battery power) and on
Time and Date	set the phone's time and date
Zoom	switches to three or four lines of display

Network View and adjust your phone's network settings.

Your service provider registers your phone to a network. You may need to change the network registration to do things like connecting to a TTY device or using your phone as a wireless modem.

Personalize Set several personal phone options:

Banner	changes the text displayed in the idle state

Greeting	changes the text displayed when you turn on your phone
Keys	changes the functions of the soft keys in the idle state (see "Customizing the Soft Key Functions" on page 66)
Main Menu	changes the order of the main menu (see "Customizing the Order of Menu Items" on page 65)
Quick Dial	changes quick dial numbers

PHONE STATUS

Battery Meter View a detailed battery charge meter.

Credit Info Prepay users can view current credit information.

If you use a prepay option, you can view the credit available, its expiration date, and the date of the last deposit.

My Tel. No. Change the way your phone number displays.

Other Information view specifications for your phone's features (if available).

Phone: Line 1/2 Change the active phone line (on dual line phones) to place or receive calls from either of the available numbers.

PHONEBOOK Open the phonebook list, where you can dial or store numbers.

To store names and phone numbers in your phonebook, see "Storing an Entry in the Phonebook" on page 25.

You can dial phonebook entries by selecting them from the phonebook list. You can also perform several other tasks:

- check your phonebook's capacity to see how many entries you have used and how many more are available

- tell your phone to sort your phonebook list by speed dial number (the standard), name, or Voice Dial

- use PIM (Personal Information Management) software to synchronize your phone with a computer, so you can edit phonebook entries on your phone and on the computer

QUICK DIAL Dial pre-programmed customer service numbers.

Your wireless service provider may program one or more quick dial numbers into your phone. These numbers usually include the customer service number, and you can dial them by selecting them from the quick dial list.

Note: Your service provider may use a different name for this feature.

RADIO Tune, store presets, and listen to AM/FM radio stations.

RECENT CALLS

Call Times View call timers.

You can view five timers that track time spent on dialed calls, received calls, and all calls. See "Call Timers" on page 66.

Dialed Calls View a list of recently dialed calls.

Your phone keeps a list of phone numbers from calls you recently dialed (even if the calls did not connect). The list is

sorted from newest to oldest. Each entry tells you the person's name and number (if available) and whether or not the call connected.

Notepad Call or store the last number entered from the keypad.

You can use this notepad to view the last number you entered, even if you did not call the number.

Received Calls View a list of recently received calls.

Your phone keeps a list of the numbers from calls you recently received (even if you did not answer). The list is sorted from newest to oldest. Each entry tells you the person's name and number (if available) and whether or not the call connected.

RING/VIBRATE See "Ring/Vibrate" on page 62.

Alert Select a type of ring or vibration alert for incoming calls and messages.

Detail Change details about the type of ring or vibration alert you select.

SECURITY

Lock Application Lock and unlock specific phone applications (such as phonebook and datebook) so that users must enter the unlock code to use them.

Lock Keypad Lock and unlock your keypad. See "Locking and Unlocking Your Phone" on page 33.

New Passwords Change your unlock code (originally set to 1234) or your security code (originally set to 000000).

Phone Lock Lock and unlock your phone. See "Locking and Unlocking Your Phone" on page 33.

Restrict Calls Restrict incoming and outgoing calls.

You can stop all outgoing or incoming calls, or you can restrict them to the numbers stored in your phonebook.

SHORTCUTS Create keypad or voice shortcuts to menu features.

See "Shortcuts" on page 64.

VOICENOTES Record messages and phone calls using your voice key. See "VoiceNotes" on page 55.

You can view, play back, lock, and delete VoiceNotes in your VoiceNote list.

Conference Call

To talk to more than one person on a call, you can make a conference call. Call the first person, call the second person, then link the two calls together.

Press	To
keypad keys	enter the first person's number
SND	dial the call
keypad keys	enter the next person's number

Press	To
(SND)	dial the call
	Your phone displays 📞 next to the active call and ☎ next to the first call (on hold).
Link (✎)	connect the two calls
(END)	end the entire call

VoiceNotes

VoiceNotes allow you to record personal messages or phone calls. You can play them back at any time.

Recording a VoiceNote

There are no pre-recorded VoiceNotes on your phone when you receive it. To record a VoiceNote:

Find the Feature   (MENU) > VoiceNotes

Do This	Result
Press the voice key and hold for one second.	A tone sounds in the earpiece and the phone displays the recording message.
Continue holding the voice key, and speak your voice message into the phone.	The phone records the message and displays a recording timer.

Do This	Result
Release the voice key to stop recording.	The phone displays the VoiceNotes list number and the total recording time.

Viewing the VoiceNotes List

The VoiceNotes list shows all your VoiceNotes along with other important information and features.

Find the   (MENU) > VoiceNotes
Feature

Scroll
through list

Time/Date
Received

Locked
VoiceNote

```
┌---VoiceNotes--┐
🔒 4) 2:20pm 23-Mar
   3) 4:05pm 22-Mar
EXIT      M      PLAY
```

To previous
screen

To VoiceNotes
sub-menu

Plays the
selected
VoiceNote
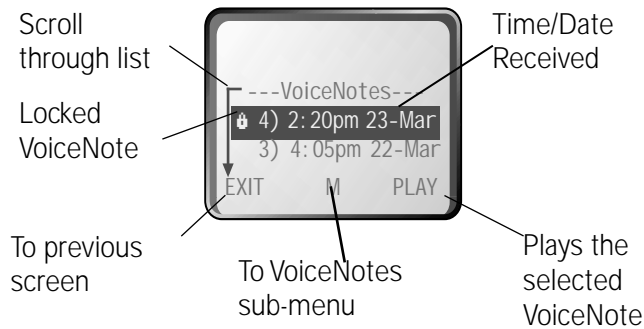
New VoiceNote appears at the end of the list or by itself if no VoiceNotes are stored. Select New VoiceNote to view instructions on how to record a new VoiceNote.

Playing a VoiceNote

To play a recorded VoiceNote:

Find the Feature	(MENU) > VoiceNotes

Press	To
⬆⬇	highlight VoiceNote for playback
PLAY (⬮)	play a VoiceNote

Tip: You can play a VoiceNote while taking a call. It won't be transmitted to the other party.

Playback Screen

While the VoiceNote is playing, the playback screen is displayed.

Indicates % played
VoiceNote number
Locked VoiceNote
Rewind
Fast forward
To previous screen
To VoiceNotes menu
Erases VoiceNote

VoiceNote 3

SAVE   M   DELETE
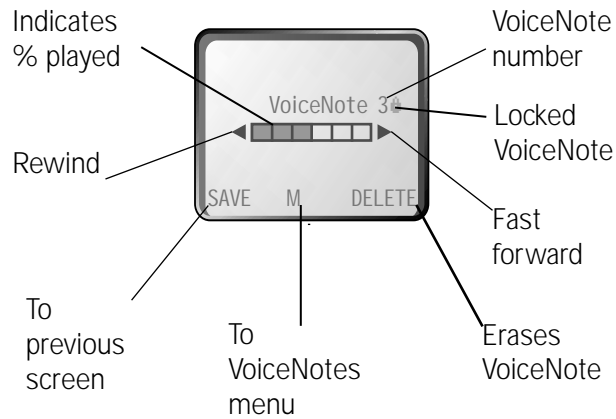
VoiceNote Keys

While playing back a VoiceNote, use these keys to do the following:

Stop playback and go to VoiceNotes menu

Stop playback and return to VoiceNotes list

Stop playback and scroll up/ down to next VoiceNote

Rewind three seconds, resume playing

Press and hold to rewind to the beginning

When playback is complete, press to restart

GRAPHIC FOR PLACEMENT ONLY

VoiceNote Unlocked: Stop playback and display Delete VoiceNote ?

VoiceNote Locked: Stop playback and unlock VoiceNote

Number keys alternately stop and start playback

Fast forward three seconds, resume playing

Press and hold to fast forward to end

Datebook

The datebook lets you schedule and organize appointments and keeps track of special events. It can display events for the week, a day, or details for a specific event.

Open the datebook to schedule or see events.

Find the   (MENU)   > Datebook
Feature

Datebook Views

When you open the datebook, your phone displays a calendar for the week.

Untimed events

End of week

12 hour window

Day of week

Event

Return to previous screen

Display menu

Go to specific day

15 NOV–21 NOV
S M T W T F S

EXIT   M   VIEW
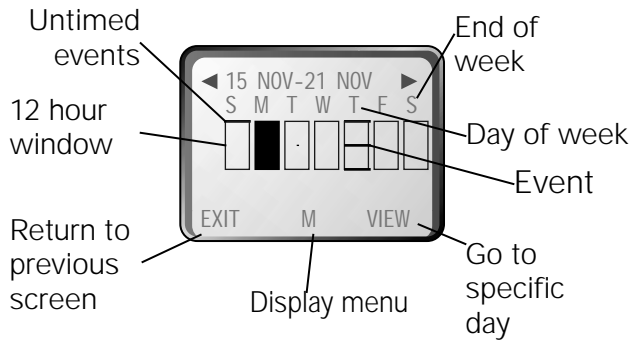
Lines or filled in boxes under each day indicate that events have been scheduled.

Press	To
⦅＊⦆ or ⦅＃⦆	scroll left or right to past or future days
⬦	scroll up or down
VIEW (⌾)	to open a specific day
⦅MENU⦆	to display the datebook sub-menu

Day View

Press View (⌾) to view the day's events. You can store, edit, view, copy, and delete any event from the day view.

Untimed events

Day of week

Down scroll arrow

```
THU 19-NOV        ▶
•Joe's B-day

9:00🕐 Marie,mtg


BACK      M      VIEW
```

Event

Alarm

Return to previous screen

Display menu

Display event details
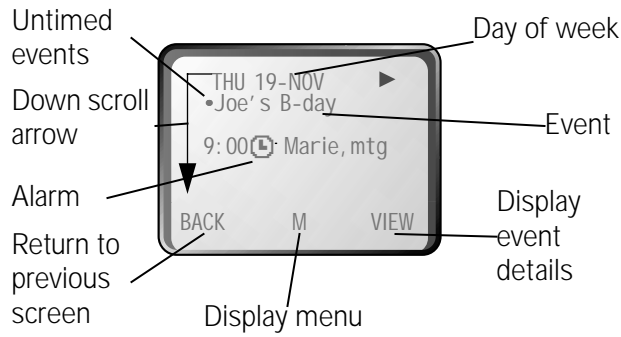
Event View

Press View (⊘) to open the detailed event view. You can edit, copy, and delete events from the event view. Event details include call alerts, times, days, and other event data.

Down scroll arrow

Alarm

Event date and time

Event details

Return to previous screen

Display event edit form

Display menu

```
  ⏰ THU 12:00 pm ▶

  9:00 Marie, new
  product meeting

BACK        M        EDIT
```
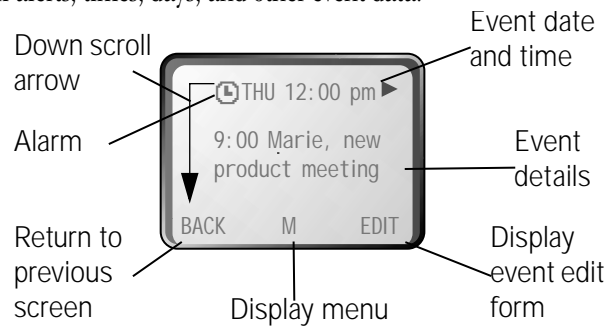
Storing a New Event

Find the Feature	(MENU) > Datebook > New

Press	To
SELECT (⊘)	open the event entry form
keypad keys	enter the event name
⌃⌄	move from one entry field to the next
	Once you reach a field, complete the event details. A title is required. Other fields include time, duration, date, repeating events, and alarms.

Press	To
DONE (◐)	store the new event and return to the week view

Configuring Settings

You can adjust a wide variety of phone settings and configure the phone to suit your needs.

Ring/Vibrate

Your phone rings or vibrates when you have incoming calls or other events. You can customize the ring and apply it to all events or select different ring styles for specific events.

Selecting a Ring/Vibration for All Events

Find the Feature	(MENU) > Setting > Ring/Vibrate > Alert

Press	To
⬍	scroll to and select a ring or vibration
SELECT (◯)	select a type
	The phone displays the Changed: Alert message.

Selecting a Ring/Vibration for Specific Events

When you select a ring/vibration type for a *specific* event, it overrides the ring set for *all* events.

Find the Feature	(MENU) > Settings > Ring/Vibrate > *alert type* Detail

Press	To
⇕	scroll to the event that should have a special alert
SELECT (⊘)	select the event
	The phone displays the Alert menu.
⇕	scroll to the alert you want
SELECT (⊘)	select the alert
	The phone displays the Changed: *event alert* message.

Canceling the Ring or Vibrate Alert

While the phone is ringing:

Press	To
(END) or IGNORE (◌)	cancel the ring or vibrate alert

Depending on your phone configuration and the type of subscription you have with your service provider, the call may be forwarded or the calling party may receive a busy signal.

Shortcuts

You can create shortcuts to mark frequently used menu items. There are no default shortcuts.

Setting Up Shortcuts

You can set up a shortcut from any highlighted item on the phone, except for items in a context-sensitive menu or items that are grouped together in a form.

Available Shortcuts

Type	Example
data object	Phonebook entry or text message
list	alarm setting options
highlighted item	Voicemail menu item
meter	Battery Meter
editors	time or date editor
form	blank form, such as new Phonebook entry
value	time setting for the backlight
browser service	web page
SIM Toolkit applications	SIM Toolkit initial screen

Creating Shortcuts

Find the Feature	MENU > *the item to which you want to assign a shortcut*

Do This	Result
Press and hold MENU.	The phone displays: Assign Shortcut "***Item***" to key no: *#*? where ***Item*** is the name of the item you selected, and *#* is the number of the next available shortcut.
Press OK (⊘).	The phone confirms the new shortcut.

Customizing the Order of Menu Items

You can customize the order of the items in your phone's main menu, depending upon your usage.

Find the Feature	MENU > Settings > Other Settings > Personalize > Main Menu

Press	To
SELECT (⊘)	open the main menu
⌃⌄	scroll to the menu item you want to want to move
GRAB (⊘)	grab the menu item you want to move
⌃⌄	move the item up or down the menu

Press	To
INSERT (✐)	insert the item in the new location

Customizing the Soft Key Functions

When your phone is idle, you can relabel the soft keys (✎ and ✐) to access any of three main menu items: Messages, Recent Calls, or Phonebook.

Find the Feature	(MENU) > Settings > Other Settings > Personalize > Keys

Press	To
SELECT (✐)	display the key editor
⌄⌃	scroll to Left, Right, or Smart
SELECT (✐)	open the key editor
⌄⌃	scroll to the new key function
SELECT (✐)	confirm the new function
	The soft key label will reflect the new selection whenever the phone is idle.

Call Timers

Network connection time is the elapsed time, in one-minute intervals, from the moment you connect to your service provider's network to the moment you end the call by pressing (END). The time includes busy signals and ringing.

You can view the approximate network connection time elapsed during the following calls:

Timer	Records time spent on
Last Call	your last call
Dialed Calls	dialed calls since last reset
Received Calls	received calls since last reset
All Calls	all calls since last reset
Lifetime	all calls

Note: The amount of network connection time you track on your resettable timer may not equal the amount of time for which you are billed by your wireless service provider. For billing information, please contact your service provider directly.

Find the Feature   (MENU) > Recent Calls > Call Times

To view the timer:

Press	To
⬍	scroll to the timer
Select (⊘)	display the timer

To reset the timer:

Press	To
Reset (⊘)	reset the time (if available)
Yes (⊘)	confirm the reset

Troubleshooting

Question	Answer
I pressed the power button, but nothing happened. What's wrong with my phone?	Be sure to press and hold the power key until the display appears and you hear an audible alert. If nothing still happens, check that a charged battery is installed. For more information about battery, see "Battery" on page 11.
The display says, "Locked." How do I unlock my phone?	Enter the factory-preset unlock code, 1234, or the last four digits of your wireless number. Also see "Locking and Unlocking Your Phone" on page 33. If all else fails, call your service provider (the company that sends you your monthly wireless bill).

Question	Answer
My battery didn't last as long as I expected. What can I do to extend battery life?	Your battery's "talk time" and "standby time" are relative measurements of the battery's capacity. The more you talk on the phone, the less standby time you have, and vice versa.
	To get the most from your battery, allow it to charge fully. To charge the battery to 100% of its capacity, leave it in the charger for an extra hour after the charger's light turns green.
	You can also turn off the status light to extend battery life.
	Use only Motorola approved batteries that are compatible with your phone.
	Exposing your battery to extreme temperatures—below -10°C (14°F) or above 45°C (113°F)—can shorten battery life. Batteries are especially sensitive to high temperatures. As a good rule, always take your phone with you when you leave your car.

Question	Answer
I tried to place a call and received a fast busy signal.	The wireless system did not process your call. For example, the wireless system may be overloaded with call attempts. To redial, press ⓔⓝⓓ before ending your call attempt, or press ⓢⓝⓓ and try the call again later. See "Redialing a Number" on page 14.
I tried to place a call and received an alternating high/low tone.	Your call did not reach the wireless system. You may have dialed the number too soon after turning the phone on. Wait until the phone display says Ready before placing a call.

An alternating tone may also indicate that your phone's signal is blocked. Make sure you are clear of any obstructions such as bridges, parking garages, or tall buildings. |

Question	Answer
I plugged the data cable into my phone but my phone did not beep. How do I know if the data cable is ready to go?	(This text was used in the TDMA Kool 99 user guide. Does it apply to synergy?) The beep indicates that you are setup correctly. If you did not hear the beep, the first thing to check is that your phone is data capable. To do so, see "Using Data Features" on page xx. Next, make sure that both ends of the data cable are connected—the smaller end to your phone and larger to your computer. Also, check the model number of the cable to be sure you have the right one. Look for SYN7464 printed on the cable. If all of the above checks out, your computer may have deactivated the port to save power. Try opening an application that uses the port, like a fax or dial-up application, and your computer will automatically activate the port.
My phone was stolen. What should I report and to whom?	Report a stolen phone to the police and to your service provider—the company that sends you your monthly wireless service bills.

Question	Answer
My phone beeped when I attached the data cable but my fax and data applications don't work at all. What's wrong?	(This text was used in the TDMA Kool 99 user guide. Does it apply to synergy?) You must be in an area with digital coverage. Check your phone's display for the digital icon ▫ to be sure you're in a digital coverage area. Some wireless networks may not support data or fax transmission. If you see the digital indicator, but you are roaming on an unfamiliar network, this may be the case. Also, remember that data and fax transmission usually requires a subscription. Call your service provider for more information.
When sending data with the data cable, why does the computer show a connection rate of 19200 Kbps?	(This text was used in the TDMA Kool 99 user guide. Does it apply to synergy?) 19200 is the rate of the connection between your computer and the phone. The rate of the connection between your phone and the network is displayed on your phone, and will be either 14400 or 9600.

Question	Answer
I can't end my data call by closing the application on my computer. What can I do?	(This text was used in the TDMA Kool 99 user guide. Does it apply to synergy?) If necessary, try pressing (SND) on the phone. Also try disconnecting the cable or turning off the phone. If possible, always close the connection through your computer. These alternative methods may disrupt the application on your computer.
I launched the Browser but the display says: Service Not Available. What is wrong?	(This text was used in the TDMA Kool 99 user guide. Does it apply to synergy?) You are in an area without service. If you have wireless service, look in the display for the Digital indicator. If you don't see it, you may have only Analog service or no service at all. If you do see the Digital indicator, you may be connected to digital network that does not support Internet access.
I launched the Browser but the display says: Data Server Unavailable. What is wrong?	(This text was used in the TDMA Kool 99 user guide. Does it apply to synergy?) Try again in a few minutes. The servers may be temporarily busy.

The U.S. Food and Drug Administration's Center for Devices and Radiological Health Consumer Update on Mobile Phones

FDA has been receiving inquiries about the safety of mobile phones, including cellular phones and PCS phones. The following summarizes what is known—and what remains unknown— about whether these products can pose a hazard to health, and what can be done to minimize any potential risk. This information may be used to respond to questions.

Why the concern?

Mobile phones emit low levels of radio frequency energy (i.e., radio frequency radiation) in the microwave range while being used. They also emit very low levels of radio frequency energy (RF), considered non-significant, when in the stand-by mode. It is well known that high levels of RF can produce biological damage through heating effects (this is how your microwave oven is able to cook food). However, it is not known whether, to what extent, or through what mechanism, lower levels of RF might cause adverse health effects as well. Although some research has been done to address these questions, no clear picture of the biological effects of this type of radiation has emerged to date. Thus, the available science does not allow us to conclude that mobile phones are absolutely safe, or that they are unsafe. However, the available scientific evidence does not demonstrate any adverse health effects associated with the use of mobile phones.

What kinds of phones are in question?

Questions have been raised about hand-held mobile phones, the kind that have a built-in antenna that is positioned close to the user's head during normal telephone conversation. These types of mobile phones are of concern because of the short distance between the phone's antenna—the primary source of the RF—and the person's head. The exposure to RF from mobile phones in which the antenna is located at greater distances from the user (on the outside of a car, for example) is drastically lower than that from hand-held phones, because a person's RF exposure decreases rapidly with distance from the source. The safety of so-called "cordless phones," which have a base unit connected to the telephone wiring in a house and which operate at far lower power levels and frequencies, has not been questioned.

How much evidence is there that hand-held mobile phones might be harmful?

Briefly, there is not enough evidence to know for sure, either way; however, research efforts are on-going. The existing scientific evidence is conflicting and many of the studies that have been done to date have suffered from flaws in their research methods. Animal experiments investigating the effects of RF exposures characteristic of mobile phones have yielded conflicting results. A few animal studies, however, have suggested that low levels of RF could accelerate the development of cancer in laboratory animals. In one study, mice genetically altered to be predisposed to developing one type of cancer developed more than twice as many such cancers when they were exposed to RF energy compared to

controls. There is much uncertainty among scientists about whether results obtained from animal studies apply to the use of mobile phones. First, it is uncertain how to apply the results obtained in rats and mice to humans. Second, many of the studies that showed increased tumor development used animals that had already been treated with cancer-causing chemicals, and other studies exposed the animals to the RF virtually continuously—up to 22 hours per day.

For the past five years in the United States, the mobile phone industry has supported research into the safety of mobile phones. This research has resulted in two findings in particular that merit additional study:

1. In a hospital-based, case-control study, researchers looked for an association between mobile phone use and either glioma (a type of brain cancer) or acoustic neuroma (a benign tumor of the nerve sheath). No statistically significant association was found between mobile phone use and acoustic neuroma. There was also no association between mobile phone use and gliomas when all types of types of gliomas were considered together. It should be noted that the average length of mobile phone exposure in this study was less than three years.

   When 20 types of glioma were considered separately, however, an association was found between mobile phone use and one rare type of glioma, neuroepithelliomatous tumors. It is possible with multiple comparisons of the same sample that this association occurred by chance. Moreover, the risk did

not increase with how often the mobile phone was used, or the length of the calls. In fact, the risk actually decreased with cumulative hours of mobile phone use. Most cancer causing agents increase risk with increased exposure. An ongoing study of brain cancers by the National Cancer Institute is expected to bear on the accuracy and repeatability of these results.[1]

2. Researchers conducted a large battery of laboratory tests to assess the effects of exposure to mobile phone RF on genetic material. These included tests for several kinds of abnormalities, including mutations, chromosomal aberrations, DNA strand breaks, and structural changes in the genetic material of blood cells called lymphocytes. None of the tests showed any effect of the RF except for the micronucleus assay, which detects structural effects on the genetic material. The cells in this assay showed changes after exposure to simulated cell phone radiation, but only after 24 hours of exposure. It is possible that exposing the test cells to radiation for this long resulted in heating. Since this assay is known to be sensitive to heating, heat alone could have caused the abnormalities to occur. The data already in the literature on the response of the micronucleus assay to RF are conflicting. Thus, follow-up research is necessary.[2]

FDA is currently working with government, industry, and academic groups to ensure the proper follow-up to these industry-funded research findings. Collaboration with the Cellular Telecommunications Industry Association (CTIA) in particular is

expected to lead to FDA providing research recommendations and scientific oversight of new CTIA-funded research based on such recommendations.

Two other studies of interest have been reported recently in the literature:

1. Two groups of 18 people were exposed to simulated mobile phone signals under laboratory conditions while they performed cognitive function tests. There were no changes in the subjects' ability to recall words, numbers, or pictures, or in their spatial memory, but they were able to make choices more quickly in one visual test when they were exposed to simulated mobile phone signals. This was the only change noted among more than 20 variables compared.[3]

2. In a study of 209 brain tumor cases and 425 matched controls, there was no increased risk of brain tumors associated with mobile phone use. When tumors did exist in certain locations, however, they were more likely to be on the side of the head where the mobile phone was used.

   Because this occurred in only a small number of cases, the increased likelihood was too small to be statistically significant.[4]

In summary, we do not have enough information at this point to assure the public that there are, or are not, any low incident health problems associated with use of mobile phones. FDA continues to work with all parties, including other federal agencies and industry, to assure that research is undertaken to

provide the necessary answers to the outstanding questions about the safety of mobile phones.

What is known about cases of human cancer that have been reported in users of hand-held mobile phones?

Some people who have used mobile phones have been diagnosed with brain cancer. But it is important to understand that this type of cancer also occurs among people who have not used mobile phones. In fact, brain cancer occurs in the U.S. population at a rate of about 6 new cases per 100,000 people each year. At that rate, assuming 80 million users of mobile phones (a number increasing at a rate of about 1 million per month), about 4800 cases of brain cancer would be expected each year among those 80 million people, whether or not they used their phones. Thus it is not possible to tell whether any individual's cancer arose because of the phone, or whether it would have happened anyway. A key question is whether the risk of getting a particular form of cancer is greater among people who use mobile phones than among the rest of the population. One way to answer that question is to compare the usage of mobile phones among people with brain cancer with the use of mobile phones among appropriately matched people without brain cancer. This is called a case-control study. The current case-control study of brain cancers by the National Cancer Institute, as well as the follow-up research to be sponsored by industry, will begin to generate this type of information.

What is FDA's role concerning the safety of mobile phones?

Under the law, FDA does not review the safety of radiation-emitting consumer products such as mobile phones before marketing, as it does with new drugs or medical devices. However, the agency has authority to take action if mobile phones are shown to emit radiation at a level that is hazardous to the user. In such a case, FDA could require the manufacturers of mobile phones to notify users of the health hazard and to repair, replace or recall the phones so that the hazard no longer exists.

Although the existing scientific data do not justify FDA regulatory actions at this time, FDA has urged the mobile phone industry to take a number of steps to assure public safety. The agency has recommended that the industry:

- support needed research into possible biological effects of RF of the type emitted by mobile phones

- design mobile phones in a way that minimizes any RF exposure to the user that is not necessary for device function

- cooperate in providing mobile phone users with the best possible information on what is known about possible effects of mobile phone use on human health

At the same time, FDA belongs to an interagency working group of the federal agencies that have responsibility for different aspects of mobile phone safety to ensure a coordinated effort at the federal level. These agencies are:

- National Institute for Occupational Safety and Health

- Environmental Protection Agency

- Federal Communications Commission

- Occupational Health and Safety Administration

- National Telecommunications and Information Administration

The National Institutes of Health also participates in this group.

In the absence of conclusive information about any possible risk, what can concerned individuals do?

If there is a risk from these products—and at this point we do not know that there is—it is probably very small. But if people are concerned about avoiding even potential risks, there are simple steps they can take to do so. For example, time is a key factor in how much exposure a person receives. Those persons who spend long periods of time on their hand-held mobile phones could consider holding lengthy conversations on conventional phones and reserving the hand-held models for shorter conversations or for situations when other types of phones are not available.

People who must conduct extended conversations in their cars every day could switch to a type of mobile phone that places more distance between their bodies and the source of the RF, since the exposure level drops off dramatically with distance. For example, they could switch to:

- a mobile phone in which the antenna is located outside the vehicle

- a hand-held phone with a built-in antenna connected to a different antenna mounted on the outside of the car or built into a separate package

- a headset with a remote antenna to a mobile phone carried at the waist

Again, the scientific data do not demonstrate that mobile phones are harmful. But if people are concerned about the radio frequency energy from these products, taking the simple precautions outlined above can reduce any possible risk.

Where can I find additional information?

For additional information, see the following websites:

Federal Communications Commission (FCC) RF Safety Program (select "Information on Human Exposure to RF Fields from Cellular and PCS Radio Transmitters"):
`http://www.fcc.gov/oet/rfsafety`

World Health Organization (WHO) International Commission on Non-Ionizing Radiation Protection (select Qs & As): `http://www.who.int/emf`

United Kingdom, National Radiological Protection Board: `http://www.nrpb.org.uk`

Cellular Telecommunications Industry Association (CTIA): `http://www.wow-com.com`

U.S. Food and Drug Administration (FDA) Center for
Devices and Radiological Health:
`http://www.fda.gov/cdrh/consumer/`

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4. Hardell, L, Nasman, A, Pahlson, A, Hallquist, A and Mild, KH. Use of cellular
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Patent Information

Manufactured under one or more of the following U.S. patents:

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Other patents pending.