

A preliminary draft copy of the user manual follows.

MC-9100 USER'S MANUAL

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1. Summary and electrical performance

1-1. Introduction

Motorola digital cellular phone MC-9100 is a very small sized and lightweight mobile station carrying easily which features spectral efficiency, economical efficiency, and low cost based on CDMA(Code Division Multiple Access) technique. CDMA is one of the various multiple access methods, adopting a spread spectrum modulation primarily utilized in military communication equipments in the past for solving the problems like call drop and security in dense residence with a few effective ways such as soft/softer handoff, hard handoff, and dynamic power control.

Besides, CDMA can be helpful in enhancing the capacity which is coming big issue as the customer is increased in modern mobile communication by using the frequency reuse technique.

CDMA digital cellular network is composed of several components such as MSO(Mobile Switching Office), BSC(Base Station Controller), BTS(Base Station Transmission System), and MS(Mobile Station) and the interface between the mobile station and the base station is designed to be compatible with the standard of the IS-95A in north america and the domestic TTA standard "interface of digital mobile phone in 800 MHz frequency range".

The related standard with respect to mobile phone is as follows:

- IS-95A (Common Air Interface) : regulation of protocol used between the mobile station and the base station
- IS-98 : a minimum required standard related to H/W of the mobile station.

1-2. Primary features

- Folding type design with very small size
- Adoption of EVRC
- Korean SMS function loaded.
- Adoption of menu/LCD displayed in korea
- Excellent call sensitivit
- 3 Line display
- Refined design with city-life sense

1-3 Main functions

- Reception of voice and SMS written b korea
- Turbo dial function supported
- One touch dial function for international call supported
- One touch connection for voice mail supported

- Etiquette function
- One touch lock supported
- Auto-transmit function of the phone number when calling the pager.
- Restricted use supported
- Alert call, alarm function supported
- Bell/ melody/vibration selection function supported
- Auto dial of regional number, worldwide clock display supported.
- Electronic dial function using memory and pause
- Melody download supported
- Ear-microphone function supported

1-4. Standard specification

The technical specification of MC-9100 digital cellular phone is as follows.

Items	Standard	Remarks
Type of radio wave	G7W	
Range of operating temp.	-20 ~ 50 °C	
Tx frequency range	824.64 MHz ~ 848.37 MHz	
Rx frequency range	869.64 MHz ~ 893.37 MHz	
Tx IF frequency	130.38 MHz	
Rx IF frequency	85.38 MHz	
Local frequency range	955.02 MHz ~ 978.75 MHz	
Waveform quality	Above 0.944	
Time response	Within $\pm 1 \mu\text{s}$	
Reception Sensitivity	- 104 dBm	within FER= 0.5 %
Dynamic range	-104 ~ - 25 dBm	within FER= 0.5%
Tx power (Max power)	320 mw (25 dBm)	
Tx freq. Offset	Within $\pm 300 \text{ Hz}$	
Occupied bandwidth	Below 1.32 MHz	
Conducted spurious (Tx)	900 kHz, below -42dBc/30kHz 1.98MHz, below -54dBc/30kHz	
Minimum controlled output pwr.	Below -50 dBm	

Open loop control (at -25 dBm)	- 48 ± 9. dBm	
Open loop control (at -65 dBm)	- 8 ± 9.5 dBm	
Open loop control (at -104 dBm)	+18 ~ +30 dBm	
Exterior gauge	46mm x 20.2mm x 87mm	
Exterior gauge with small type battery.	81g	
Exterior gauge with standard type battery.	88g	
Power supply	3.6V ± 10%	
Power supply (based on slot 2 with small type battery)	Standby 53 hours	
Power supply (based on slot 2 with standard type battery)	Standby 92 hours	
Power supply with small type battery	85 minutes.	
Power supply with standard type battery	165 minutes.	

* All technical standards not shown above follow the standard of IS-95A and IS-98.

1-5. Safety information

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.

International agencies have set standards and recommendations for the protection of public exposure to RF electromagnetic energy.

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

Verband Deutscher Elektrotechniker (VDE) DIN-0848

United States Federal Communications Commission, Radio Frequency Exposure Guidelines (1996)

National Radiological Protection Board of the United Kingdom, GS 11, 1988

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

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

Department of Health and Welfare Canada. Safety Code 6

These standards are based on extensive scientific review. For example, over 120 scientists, engineers, and physicians from universities, government health agencies, and industry reviewed the available body of research to develop the updated ANSI standard.

The design of your phone complies with these standards when used normally.

Antenna Care

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

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 (6") 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

Airline regulations prohibit using your phone while in the air.

Switch OFF your phone before boarding an aircraft.

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 and do not remove your battery when you are in any area with a potential explosive atmosphere. 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.

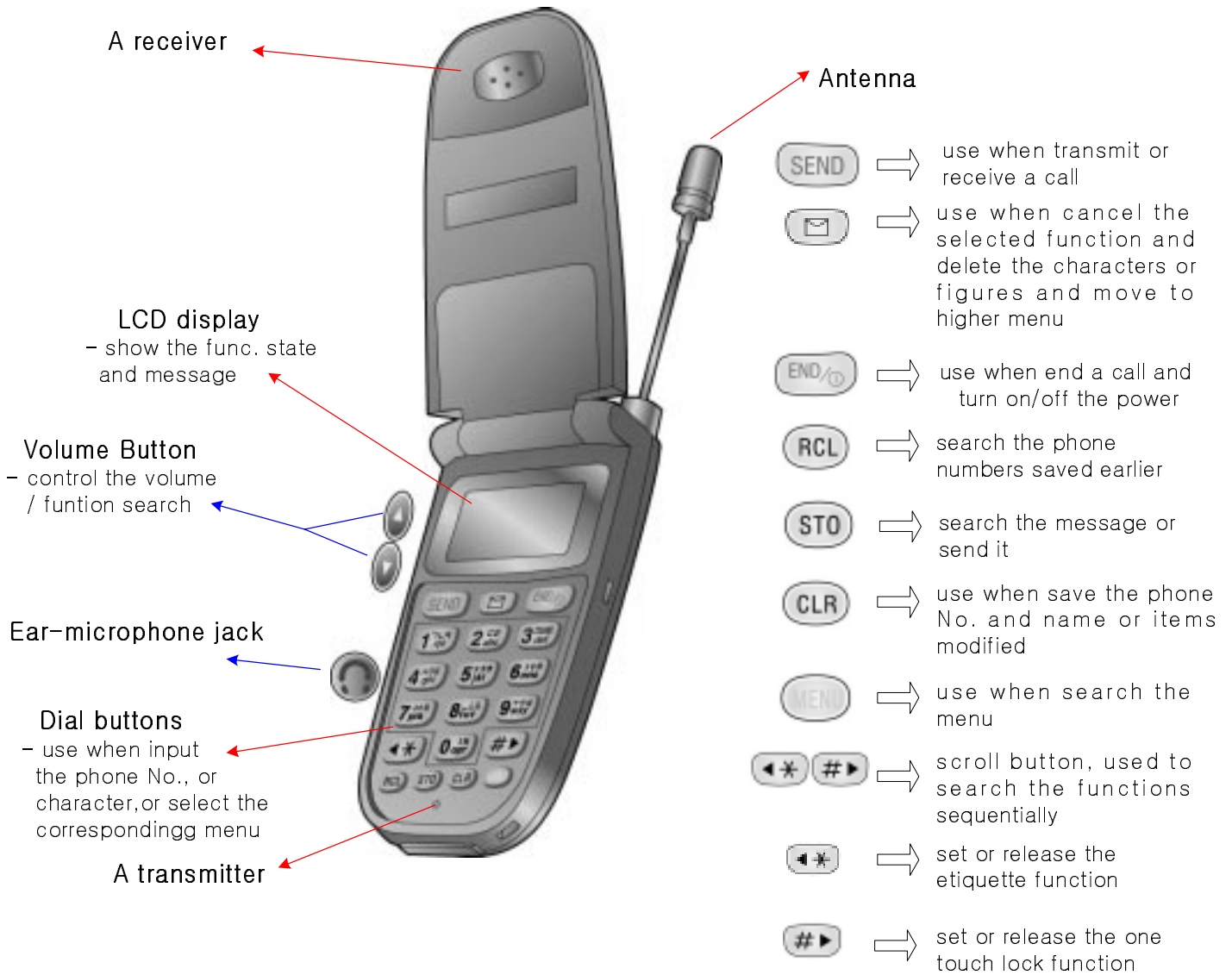
Areas with a potentially explosive atmosphere are often but not always clearly marked. They include, but are not limited to: fueling areas such as gasoline stations; below deck on boats; fuel or chemical transfer or storage facilities; areas where fuel odors are present (for example, if a gas/propane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

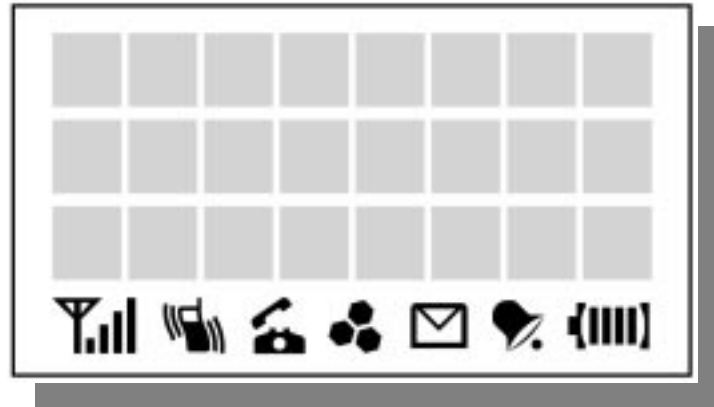
An air bag inflates with great force. Do NOT place objects, including both installed or portable wireless equipment, in the area over the air bag or in the air bag deployment area. If in-vehicle wireless equipment is improperly installed and the air bag inflates, serious injury could result.

3. Functional Specification and Description

2-1 External appearance & Explanation



2-2 Functional Description of LCD Display



Strength of received signal
show the strength of signal in service area (4 stage)



State of the incoming call
set to vibration state and if set bell or lamp, it's not displayed.



Display the call state
show the state of conversation but not displayed in standby.



Roaming
displayed when located in other service area depending on the service providers.



Messages
displayed when receive a voice or simple message.



Alarm
displayed when alarm is set on.



Battery state
show the battery amount in use.



⇒ display shortage of battery.



⇒ need to be charged immediately.



Etiquette func. is set on
displayed in upper right area of LCD.



Auto-locked state
when autolocked is set on, displayed in upper right area.




Call using earmicrophone
When use earmicrophone, displayed in upper right area.

2-3 Effective Usage

Basic functions


- Turn on the power

Press the END button  for a moment (beyond one second).

After the phone is turned on, initial message is displayed with individual phone number.

The date and time may not be displayed in case of area not being serviced.

- Turn off the power


Press the END button  until the phone is completely turned off.

If you turn on again, please do it after about five seconds.

- Start the call


First, be sure to input the appropriate regional number with the desired phone number even if you call the same region where you are located.


However, if you set on the function like the auto-dial of regional number, you don't have to press regional number.


After input the phone number with the correct regional number, press SEND button .

If succeeding in connecting the base station, you will listen to brief signal tone with calling time displayed. If fail, the phone will perform redialing automatically.


The fee for a telephone call is counted from starting the conversation with the other party.

When you bring a call to end, you just have only to close the folder or press the END button .

If you want to call again, after ending a call, just press SEND button .

If you press the STO button  when the calling time is blinked on the display, the phone number you dialed is saved automatically.


You can also modify the number you saved or dialed by following the next procedures.

If you want to delete number one by one, just press the CLR button  briefly and if you want to

delete all numbers, press it for a while.

- Receive the call

When the phone is ringing, you begin a call through opening the folder. If you adjust the phone to lamp or vibration state, lamp or vibration is activated when call is incoming.




When you bring a call to end, you just have only to close the folder or press the END button .

- Display of unanswered call during absence

When the user did not answer to the incoming call, the number of unanswered call will be displayed on the LCD.

Main functions

- How to use the menu



First after the MENU button  in the initial display, move to the appropriate items on menu using DIAL button. If you want to move to the upper menu, use CL button while get out of menu press CLR button  for a while or END button  briefly. Please, be ware of not pressing the END button long because it causes the phone to be turned off.

- Adjusting the sound level

1. Control the bell volume

This function can be used to control the volume of bell when the call is incoming.

① First, press the Menu button  with [1], [1], and [1] sequentially.



② Select the desired level using side volume key or scroll button  .

③ Press the STO button .

2. Control the button volume

This function can be used to control the volume of button which sounds when press the each of the button and can be adjusted not to sound.

① First, press the Menu button  with [1], [1], and [3] sequentially.



② Select the desired level using side volume key or scroll button  .

③ Press the STO button .

• Selection of sound or vibration

This function can be used to determine the mode between the bell and vibration.

① First, press the Menu button  with [1] and [2] sequentially



② Select the desired sound using side volume key or scroll button  .

③ Press the STO button .

• How to choose the wanted bell or melody

Any bell or sound can be selected according to the customer's liking.


① Press the Menu button  with [1] and [3] sequentially.


② Select the desired sound or melody using side volume key or scroll button  .

③ Press the STO button .

❖ Etiquette function

This function is aimed for cutting off the sound of phone to avoid the disfavor which is incurred by sound of phone in public place such as theater and a lecture meeting, etc.

If you set this function to be effective, press the left arrow button  in standby for a while and you

will see the mark  in the right upper area of LCD panel with a specific message showing vibration mode is set on. When want to release this function, just repeat procedure mentioned earlier.