CipherLab
Reference Manual

8500 Series Mobile Computer

8500/8570/8580/8590

Version 2.11

CIPHER LAB

IMPORTANT NOTICES

FOR USA

This equipment has been tested and found to comply with the limits for a **Class B** digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

▶ Reorient or relocate the receiving antenna.

▶ Increase the separation between the equipment and receiver.

▶ Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.

▶ Consult the dealer or an experienced radio/TV technician for help.

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

FOR CANADA

This digital apparatus does not exceed the Class B limits for radio noise emissions from digital apparatus as set out in the interference-causing equipment standard entitled "Digital Apparatus," ICES-003 of Industry Canada.

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Cet appareil numerique respecte les limites de bruits radioelectriques applicables aux appareils numeriques de Classe B prescrites dans la norme sur le material brouilleur: "Appareils Numeriques," NMB-003 edictee par l'Industrie.

FOR HAND-HELD PRODUCT WITH RF FUNCTIONS

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance 20 cm between the radiator & your body. It only operated in hand-held used.

If you only transfer data to Host by WLAN/Bluetooth, please keep the minimum distance 20 cm between machine & your body.

FOR PRODUCT WITH LASER

Per FDA and IEC standards, the scan engines described in this manual are not given a laser classification. However, the following precautions should be observed:

CAUTION

This laser component emits FDA / IEC Class 2 laser light at the exit port. Do not stare into beam.

SAFETY PRECAUTIONS

RISK OF EXPLOSION IF BATTERY IS REPLACED BY AN INCORRECT TYPE. DISPOSE OF USED BATTERIES ACCORDING TO THE INSTRUCTIONS.

▶ The use of any batteries or charging devices, which are not originally sold or manufactured by CipherLab, will void your warranty and may cause damage to human body or the product itself.

▶ DO NOT disassemble, incinerate or short circuit the battery.

▶ DO NOT expose the scanner or the battery to any flammable sources.

▶ For green-environment issue, it's important that batteries should be recycled in a proper way.

▶ Under no circumstances, internal components are self-serviceable.

▶ The charging and communication cradle uses an AC power adaptor. A socket outlet shall be installed near the equipment and shall be easily accessible. Make sure there is stable power supply for the mobile computer or its peripherals to operate properly.

CARE & MAINTENANCE

▶ This mobile computer is intended for industrial logistics use. The mobile computer is rated IP 64, however, it may do damage to the mobile computer when being exposed to extreme temperatures or soaked wet.

▶ When the body of the mobile computer gets dirty, use a clean and wet cloth to wipe off the dust. DO NOT use/mix any bleach or cleaner. Always keep the LCD dry.

▶ For a liquid crystal display (LCD) or touch screen, use a clean, non-abrasive, lint-free cloth to wipe dust off the screen. DO NOT use any pointed or sharp object to move against the surface.

▶ If you want to put away the mobile computer for a period of time, download the collected data to a host computer, and then take out the battery pack. Store the mobile computer and battery pack separately.

▶ When the mobile computer resumes its work, the main and backup batteries will take a certain time to become fully charged.

▶ If you shall find the mobile computer malfunctioning, write down the specific scenario and consult your local sales representative.

RELEASE NOTES

Version	Date	Notes
2.11	July 21, 2008	▸ Modified: section 1.3.3 44-key Keypad – "59-key" corrected to "44-key"
2.10	Apr. 24, 2008	New Word template applied
2.01	Aug. 10, 2007	▸ Modified: section 1.5.9 Reader – Defaults updated
		▸ Modified: section 4.1.8.(4) GSM/GPRS Menu> Security
		▸ Modified: section 4.1.8.(4) GSM/GPRS Menu> GPRS Settings
2.00	May 19, 2007	▸ New release
1.07	Oct. 31, 2006	▸ Modified: section 1.5.9 List by standards for RFID tags
		▸ Modified: section 1.5.10 Bluetooth specification
		▸ Modified: section 4.1.7 Bluetooth Menu > Security – max. 16 characters for PIN
1.06	July 27, 2006	▸ Modified: section 1.3.9 Reader – RFID (add ICODE)
		▸ Modified: section 2.5.2 Front Panel (LEDs of cradle)
		▸ New: section 4.1.8(2) System Menu > IR Network Menu
1.05	June 22, 2006	▸ Modified: section 1.3.9 Reader – RFID
		▸ Modified: section 4.1.1 Information – add RFID version
1.04	June 16, 2006	▸ FCC Regulations – Class B statement
		▸ Modified: section 1.3.9 Reader – Symbologies Supported & Enabled
1.03	May 23, 2006	Company name changed to CIPHERLAB CO., LTD. since April 2006
		▸ New: Safety Precaution
		▸ Modified: Care & Maintenance
		▸ Modified: section 1.2.3 Dimensions & Specifications
		▸ Modified: section 1.3.4 Keypad – Screen Icons
		▸ Modified: section 1.3.5 LCD – Screen & Backlight Settings
		▸ Modified: section 1.3.12 Application Software to include AG and CipherNet
		▸ Modified: sections 2, 2.5 ~ 2.7
		▸ Modified: sections 3.1 & 3.3
		▸ Modified: section 4.1.2 Screen Calibration
		▸ Modified: section 4.1.6 Load Program via Bluetooth
1.02	Apr. 4, 2006	▸ Update drawings
		▸ Load Program via Bluetooth
1.00	Mar. 1, 2006	Initial release

CONTENTS

INTRODUCTION

Answering heavy industrial demands for robust, versatile and high performance computers, the 8500 Series Mobile Computer is specifically designed for all-day, everyday use as well as for data-intensive applications in harsh environments.

This line of product comes with built-in Bluetooth wireless technology and allows for optional modules for 802.11b/g as well as GSM/GPRS, enabling all the time, anywhere applications and seamless real time sharing of performance. The 8500 Series Mobile Computer is bundled with powerful and rich features to ensure success in timely processing of information, even in rigorous industrial environments, and thus, makes an ideal choice for a wireless solution in either increasing business flexibility or answering the demanding needs of heavy-duty mobile computers. Being programmable, this handy device can run custom applications or terminal emulation applications.

This manual serves to guide you through how to install, configure, and operate the mobile computer. We recommend you to keep one copy of the manual at hand for quick reference or maintenance purposes. To avoid any improper disposal or operation, please read the manual thoroughly before use.

Thank you for choosing CipherLab products!

GETTING FAMILIARIZED WITH 8500
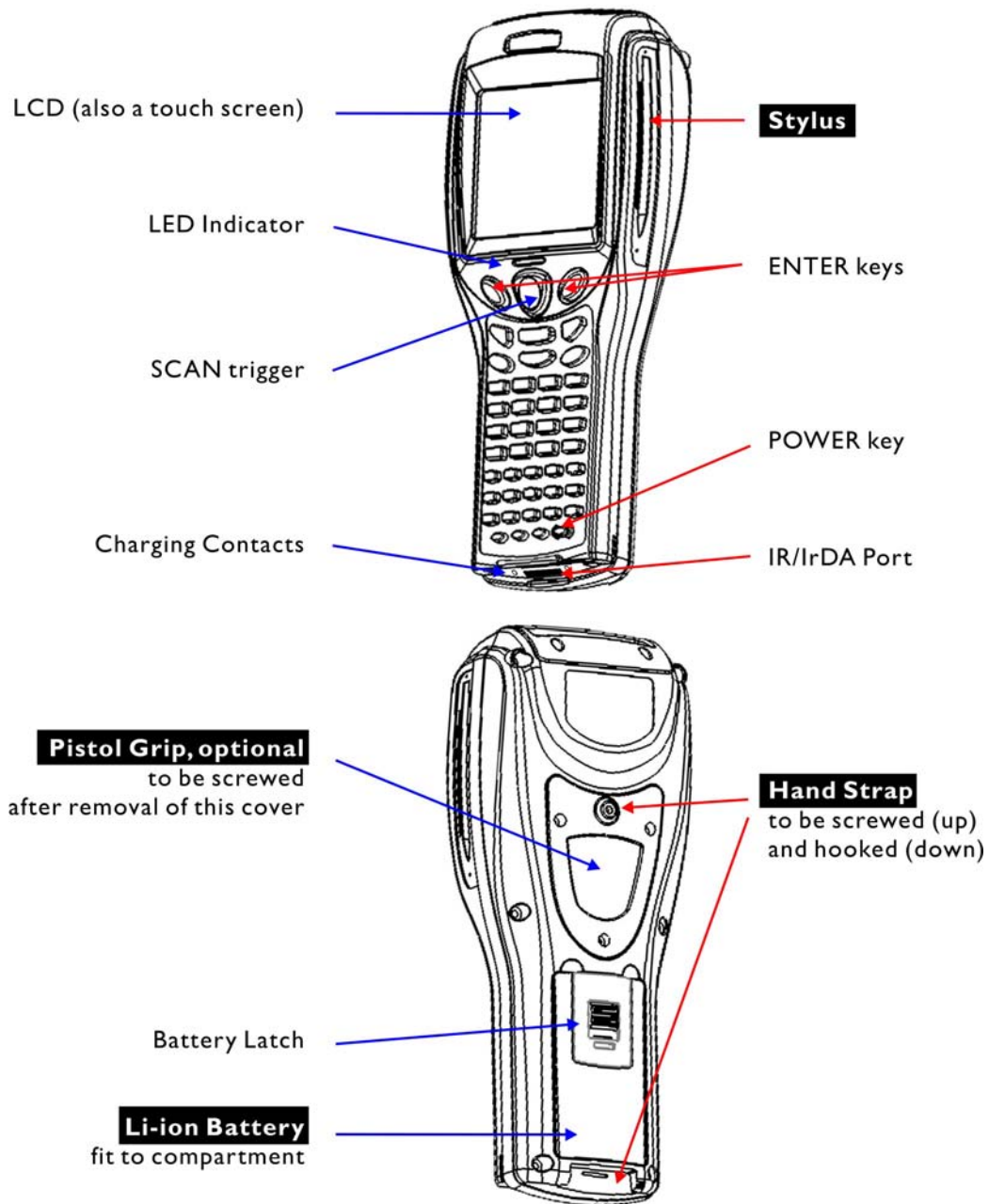
Figure 1: Overview

INSTALLING THE HAND STRAP

The hand strap is ideal for one-handed operation, which requires safe and convenient hold of the mobile computer.

Warning: Always make sure the hand strap is well hooked and screwed to the back of the mobile computer before use.

When the hand strap is desired, install it to the mobile computer by following these steps:

1) Place the mobile computer face down on a flat and clean surface.

2) Screw one end of the hand strap to the back of the mobile computer.

3) Insert and hook the other end of the hand strap to the bottom of the mobile computer.

4) Make sure the hand strap is securely attached to the mobile computer.

5) Adjust the length of the hand strap to suit your handbreadth.
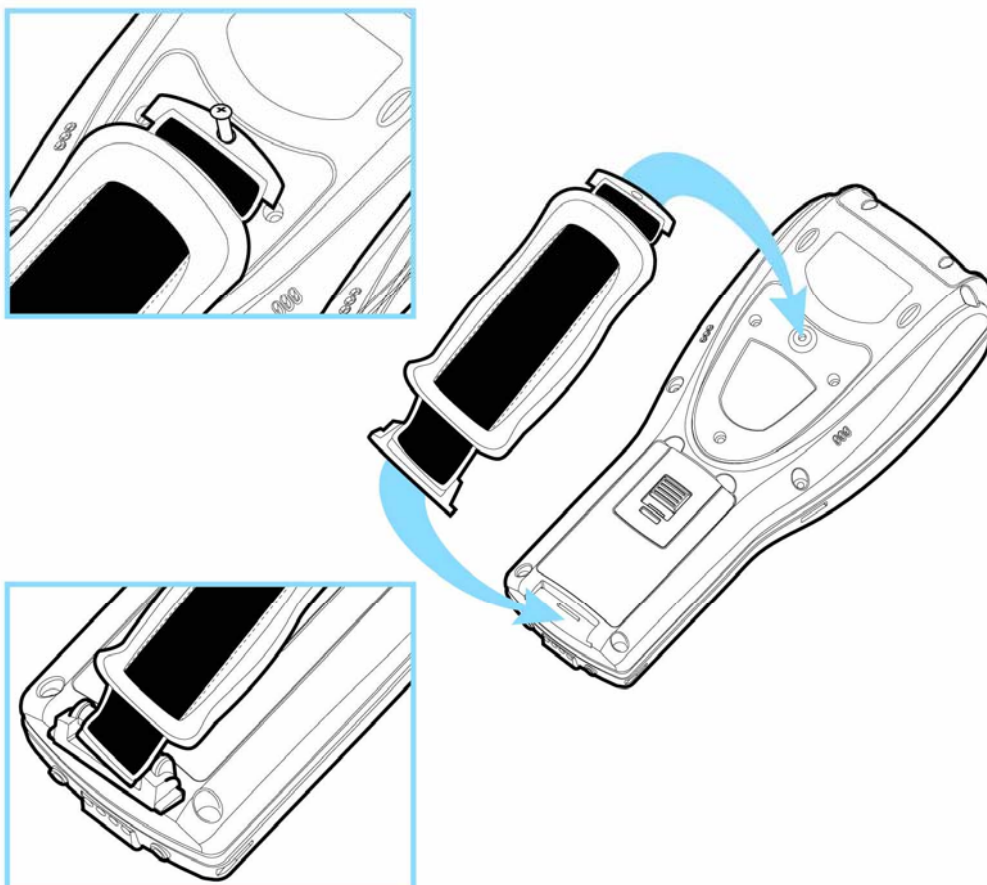
Figure 2: Installing the Hand Strap

INSTALLING THE PISTOL GRIP

This contoured pistol grip enables intuitive trigger-and-scan operation, which is very helpful in scan intensive applications. When the pistol grip is desired, install it to the mobile computer by following these steps:

1) Place the mobile computer face down on a flat and clean surface.

2) Remove the shield-like cover on the back of the mobile computer by unscrewing.

   If the hand strap is installed, remove it first. Keep the cover and screws for future use when the pistol grip is not desired.

3) Connect the power connector from the pistol grip to the receptacle on the mobile computer.

4) Screw the pistol grip to the shield-like cover.

5) Make sure all screws are tightened up.

6) Turn on the mobile computer and test the trigger.
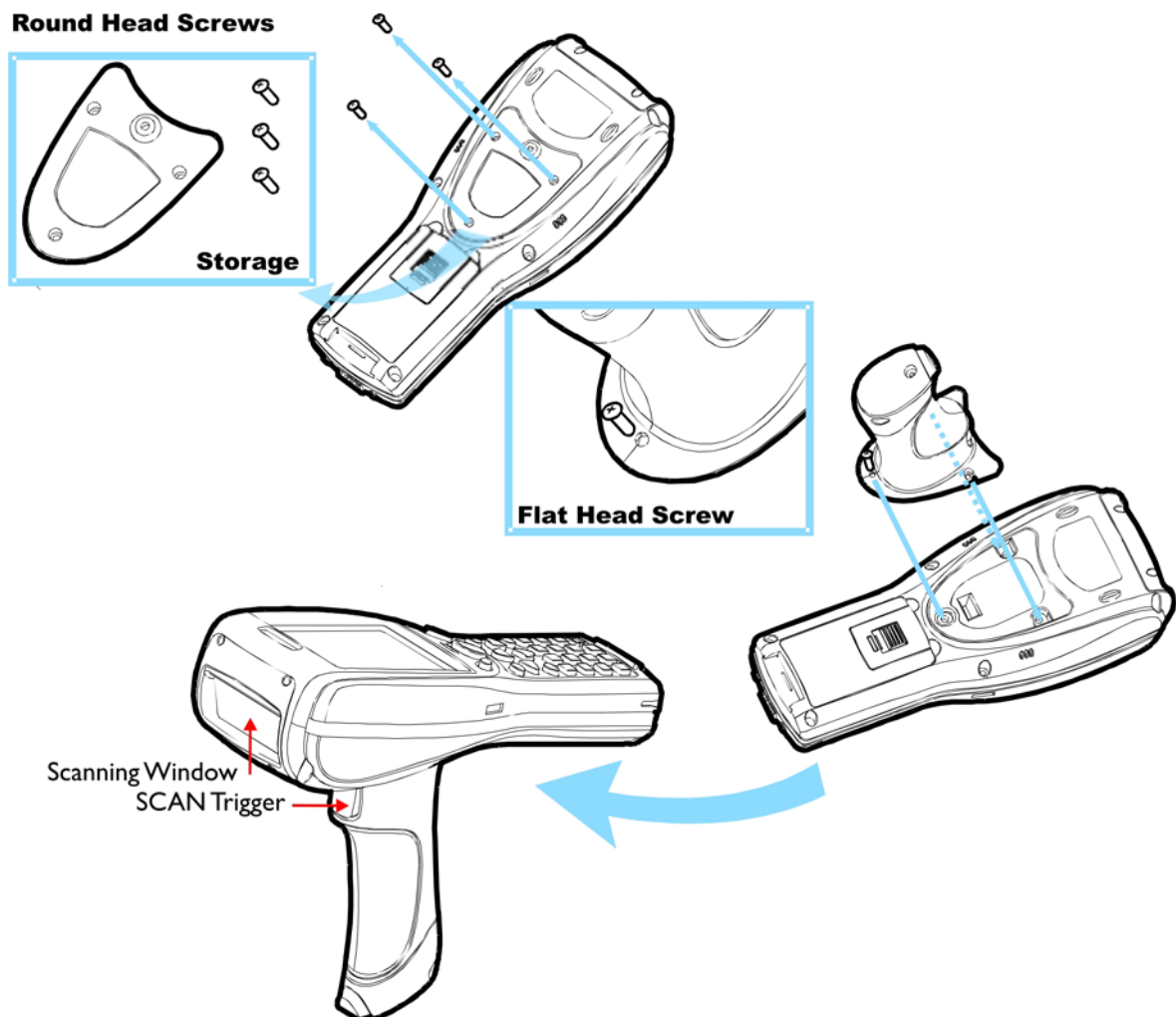
Figure 3: Installing the Pistol Grip

CHARGING THE BATTERY

You can use a cradle or charger to charge the Mobile Computer and/or its battery. Below is the 4-Slot Battery Charger. For the Charging & Communication Cradle, refer to section 1.7 Communications via the Cradle.

Warning: It is recommended that the charging devices be operated at room temperature (18°C to 25°C) for optimal performance. The charging devices will not charge the battery when the temperature exceeds 40°C.

1) The Battery Charger can be mounted on table or wall. Drill two holes (centers spaced 160 millimeters apart), secure the two supplied screws, and mount the Battery Charger by sliding over screws.

2) Slide the battery into the battery compartment at a proper angle, with contacts facing to back.

3) Connect the power supply cord to the power receptacle on the charger.

4) Connect the other end of the power supply cord to a suitable power outlet.

5) Press the power switch on, and the Battery Charger's LED will be red.

6) While charging, the LED of the battery compartment will be red. When fully charged, the LED will be green.
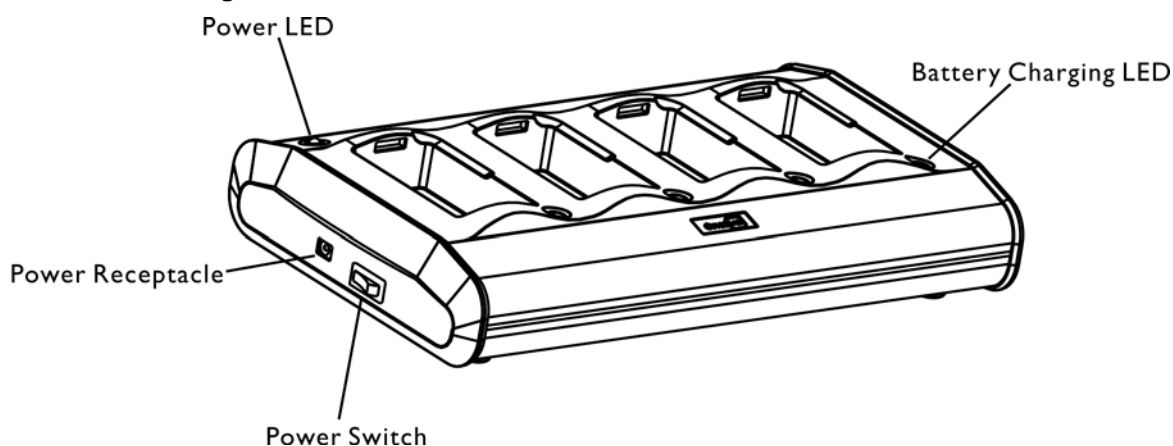
Figure 4: 4-Slot Battery Charger

LED	Status	Meaning
Power	Solid red	Power ON
	Off	Power OFF
Battery Charging	Solid red	Charging battery
	Solid green	Charging done
	Flashing red and green	Error occurs
	Off	Battery not ready

DIMENSIONS
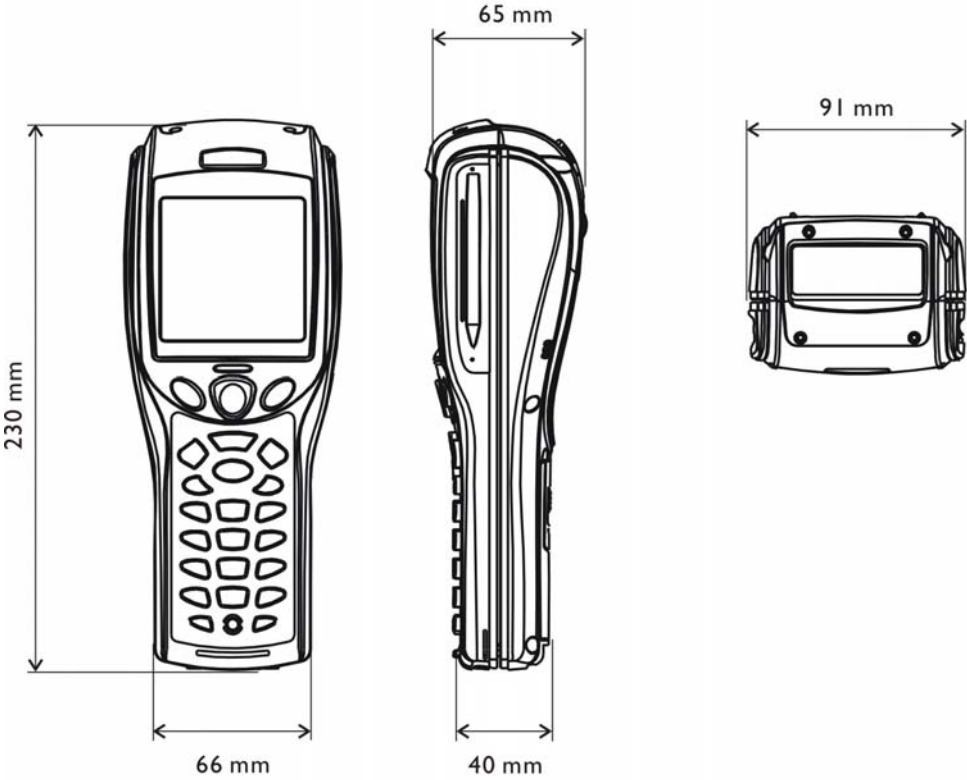
Figure 5: Dimensions

FEATURES

▶ Ergonomic design — ruggedized yet streamlined, with hand strap for secure hold.

▶ Built tough to survive drop test and sealed against moisture/dust to IP 64.

▶ Upgradeable memory — optional memory card adds up to 10 MB (2 MB onboard + 8 MB) for data storage.

▶ Dual mode support — One barcode scan engine plus the RFID reader

▶ Total wireless solution — IR/IrDA and Bluetooth integrated, with connectivity options for 802.11b/g and/or GSM/GPRS.

▶ Large graphic monochrome LCD touch screen supports double-byte characters and bitmap graphics. The touch screen featuring signature capture can be activated with its stylus or a finger, software programmable.

▶ Programmable feedback includes buzzer, LED indicator, and vibrator.

▶ Quick link to any backend database through Windows-based CipherNet programs for VT100/220 and IBM 5250 emulation.

▶ Easy customization of AG applications through Windows-based Application Generator (AG) programs for preloaded AG Runtime.

▶ Programming support includes BASIC & C compilers.

▶ Accessories and peripherals include pistol grip, international AC charging cradle, etc.

INSIDE THE PACKAGE

The following items are included in the package. Save the box and packaging material for future use in case you need to store or ship the mobile computer.

▶ 8500 Series Mobile Computer

▶ Rechargeable Li-ion battery pack

▶ Stylus

▶ Hand Strap

▶ Software & Manual CD

Note: For battery charging, you need to purchase a charging cradle separately.

ACCESSORIES

Rich choices of optional accessories are available for you to enhance the total performance of the mobile computer.

▶ Pistol Grip (detachable)
▶ Belt Holster
▶ Protective Cover
▶ Memory Card, 4 or 8 MB
▶ Spare rechargeable Li-ion battery
▶ 4-slot Battery Charger
▶ Charging & Communication Cradle
▶ Modem Cradle
▶ Ethernet Cradle
▶ Vehicle Cradle
▶ Travel Charger
▶ Bluetooth Access Point
▶ 802.11b/g Access Point

Chapter 1

USING 8500 MOBILE COMPUTER

This chapter explains the features and usage of the 8500 Series Mobile Computer. The 8500 family includes:

▶ 8500   Bluetooth Class 2
▶ 8570   Bluetooth Class 2 + 802.11b/g
▶ 8580   Bluetooth Class 2 + GSM/GPRS
▶ 8590   Bluetooth Class 2 + 802.11b/g + GSM/GPRS

IN THIS CHAPTER

1.1 BATTERY

▶ Main Battery

The mobile computer is powered by a rechargeable 3.7 V/4000 mAh Li-ion battery pack, and it takes approximately four hours to fully charge it.

For power-saving purpose, always turn off the backlight while working in a well-lit area. When the backlight is on for extended periods of time, the main battery will become low sooner than expected.

The smart battery icon on the LCD screen shows the status of power consumption. There are two ways to monitor a low battery charge or discharged battery from the screen.

    ▸ Examine the level of the 4-bar battery icon

    ▸ Monitor voltage level (see section 3.5 Power)

▶ Backup Battery

The backup battery on the main board takes charge when the main battery is removed or drained out. When fully charged, the 3.0 V/7 mAh rechargeable Lithium button cell helps retain data in SRAM and maintain the running of the real-time clock and calendar for at least one week without the main battery. In the meantime, you have to replace the main battery as soon as possible.

It takes at least twenty-four hours to fully charge the backup battery. However, it is not necessary to fully charge the backup battery for the mobile computer to work.

‣ Monitor voltage level (see section 3.5 Power)

1.1.1 INSERTING THE BATTERY

For shipping and storage purposes, save the mobile computer and the main battery in separate packages. This will keep both batteries in good condition for future use.

Note: Any improper handling may reduce the battery life.

1) Hold the mobile computer still as shown below.
2) Slide the battery pack into the battery compartment at a proper angle (30°~45°) so that the tabs on the bottom of the battery are hooked in the grooves of the compartment. Make sure that the battery is snugly fit into the compartment.
3) Slide the battery latch to lock the battery in the compartment.

Note: For a new battery, make sure it is fully charged before use. Always prepare a spare battery pack, especially when you are on the road.
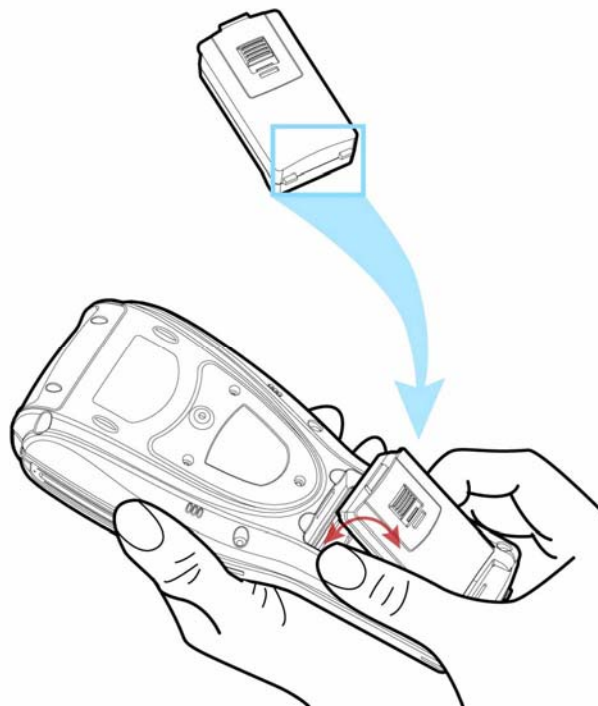
Figure 6: Installing the Main Battery

1.1.2 CHARGING THE BATTERY

The main and backup batteries may not be charged to full for shipment. When you first receive the package, you will need to charge batteries to full before using the mobile computer.

Note: For initial charging, it takes approximately 4 hours to fully charge the main battery.

Because the internal backup battery is constantly charged from the main battery, the initial charging requires inserting the battery pack to the mobile computer and then seating the mobile computer in the cradle for charging. This will have both the main and backup batteries charged at the same time.

Note: For a new battery, make sure it is fully charged before use. Always prepare a spare battery pack, especially when you are on the road.

1.1.3 CAUTION OF LOW BATTERY CHARGE

The battery pack is the only power source for the mobile computer to work. It also charges the backup battery on the main board so that the data stored in SRAM can be retained properly. Therefore, when the main battery charge goes low, you need to replace the battery pack with a charged one or charge it as soon as possible. Most of all, always save data before it is too late; you should upload important data on a regular basis.

Warning: Data loss may occur with SRAM during low battery condition. Always save data before running out of power or keep a fresh battery for replacement.

1.1.4 POWER MANAGEMENT

For any portable device, power management is a critical issue especially when you are on the road. Below are some tips to help you save battery power.

Warning: Using backlight, wireless connectivity, and peripherals while on battery power will substantially reduce battery power.

▶ To speed up charging the mobile computer, turn off the mobile computer and seat it in the cradle.
▶ Bring a second battery pack on the road.
▶ Stop wireless connectivity, Bluetooth, 802.11b/g or GSM/GPRS that is not in use.

1.2 MEMORY

The collected data can be sent back to a host computer immediately over wireless networks, or stored in memory (SRAM) and upload later. The mobile computer is equipped with a calendar chip for accurate time/date logging.

▶ Read-only Memory (ROM)

    2 megabytes flash memory for storing core, OS, application programs, fonts, etc.

▶ Random-access Memory (RAM)

    2 megabytes SRAM for storing data. Its contents will be retained by the backup battery.

1.2.1 CAUTION OF DATA LOSS

When the main battery is removed or drained, the backup battery on the main board is to retain the contents of SRAM and maintain the running of real-time clock and calendar for at least one week, on condition that the backup battery has already been fully charged.

If you want to put away the mobile computer for a couple of days, you should be aware that data loss occurs when both the main and backup batteries discharge completely. Therefore, it is necessary to upload data and files before putting away the mobile computer!

1.2.2 UPGRADEABLE MEMORY

When ordering, you may choose to have up to 10 MB memory — 2 MB onboard + 8 MB memory card.

▶ 4 MB memory card
▶ 8 MB memory card

1.3 KEYPAD

The mobile computer can be equipped with a keypad of 24 keys or 44 keys for system setup, user entry and so on. The keypad comes with programmable LED backlight, like the screen. Refer to section 1.4 LCD for screen & backlight settings.

Silicon rubber has been chosen for their durability and prompt feedback. The key click can be configured through programming or the **System Menu**.

Below briefly describes the functions of common keys on the mobile computer.

SCAN

It will trigger the scan engine to read a barcode, or the RFID reader to read a tag, if the COM port is enabled.

ENTER

Two on each side of the [SCAN] trigger, user-friendly and convenient for either right-handed or left-handed operator to perform general function of the [ENTER] key.

Normally, the [ENTER] key is used for command execution or input confirmation.

ESC (Escape)

Normally, this key is used to stop and exit the current operation.

BkSp (Backspace)

If this key is being held down for more than one second, a `clear` code will be sent.

FN (Function)

This key serves as a modifier key and has to be used together with another key. For example, press [FN] + [1] can produce the result of F1.

POWER

In order to prevent an accidental press of the POWER key, you need to hold down this key for approximately 1.5 seconds to turn ON/OFF the mobile computer.

Note: Functionality of keys is application-dependent.

1.3.1 SCREEN ICONS

When any of the following icons appears on the screen, it indicates a certain mode is activated. It means holding down the specific key is unnecessary.

24-key	Description
A	This icon appears when you press [Alpha] once, indicating it is set to alphabetic mode for typing capital letters.
a	This icon appears when you press [Alpha] twice, indicating it is set to alphabetic mode for typing small letters.
F	This icon appears when you press [FN], indicating it is set to the function mode. Then, press another key ([1] ~ [9]) to produce the result and the icon will go off. ▶ To get the value of another key combination modified by the [FN] key, repeat the above steps. ▶ To exit the function mode, press [FN] again and the icon will go off.

44-key	Description
↑	This icon appears when you press [Shift] to set the alphabetic mode to small letters. ▶ By default, the alphabetic mode is set to capital letters.
F	This icon appears when you press [RED], indicating it is set to the function mode. Then, press another key ([F1] ~ [F12]) to produce the result and the icon will go off. ▶ To get the value of another key combination modified by the [RED] key, repeat the above steps. ▶ To exit the function mode, press [RED] again and the icon will go off.
A	This icon appears when you press [Alt] to enter the special function mode.

Note: When using the Function, Shift or Alt key to modify another key, the system will send the associated key code to the application program, and it is up to the application program to interpret the key code.

1.3.2 24-KEY LAYOUT

The layout of the 24-key keypad is similar to that of a telephone, which consists of an alphanumeric keypad, navigation and function keys, as well as assorted characters.
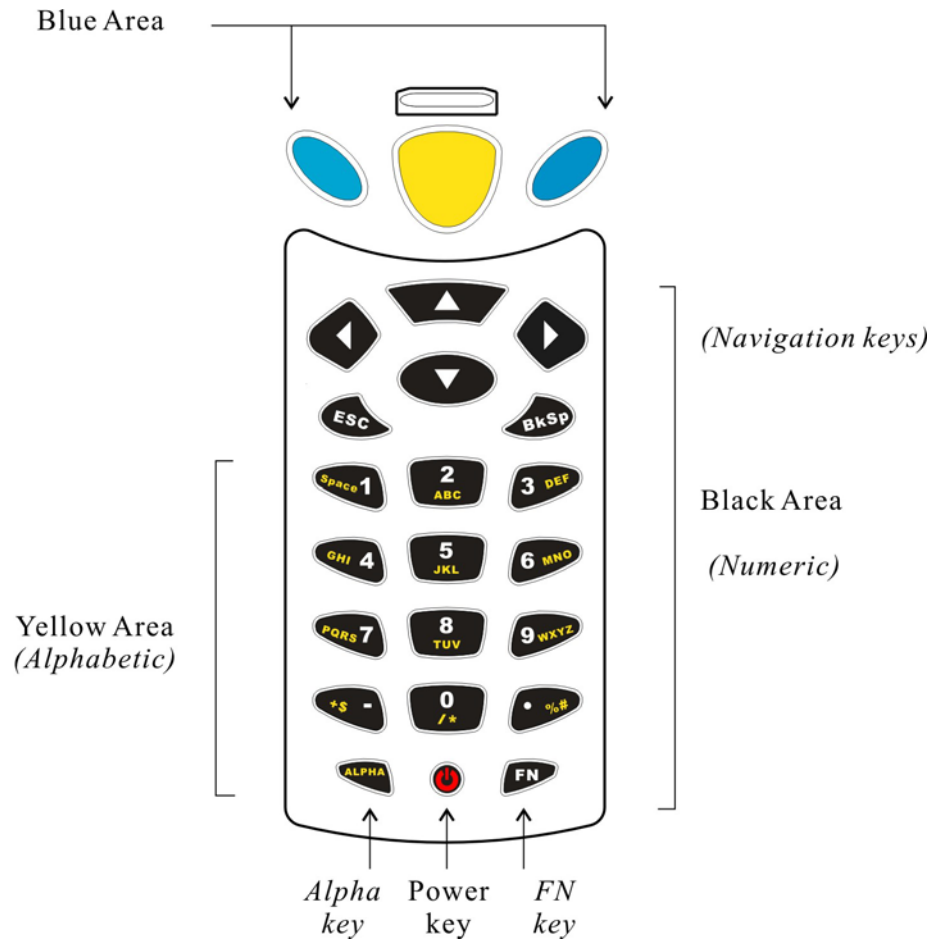
Figure 7: 24-key Layout

This alphanumeric keypad is set to numeric mode by default. The [Alpha] key serves as a toggle among numeric, alpha (lower-case alphabetic), and ALPHA (upper-case alphabetic) input modes.

Note: It is not necessary to hold down the [Alpha] key.

The alpha icon will appear on the lower-left corner of the screen in a sequence as shown below.

Status Icon	Alpha Key	Input Mode
(none)	N/A	Numbers
a	Press the [Alpha] key one time	Small letters
A	Press the [Alpha] key two times	Capital letters

When in alpha mode, it takes turns to show alphabets and number when you keep pressing the same key; each press must not exceed one second. For example, keep pressing the number key [2], it will take turns to show "A", "B", "C" or "2".

▶ When you first press the number key [2], it will product the letter "A" or "a".

▶ When you press the number key [2] twice (the time interval must not exceed one second), it will produce the letter "B" or "b".

▶ When you press the number key [2] three times (the time interval between each press must not exceed one second), it will produce the letter "C" or "c".

▶ When you press the number key [2] four times (the time interval between each press must not exceed one second), it will produce the number "2".

In order to get the desired character, you will need to press the same key, one to four times (the time interval between each press must not exceed one second). Only when you stop pressing the same key for longer than one second or you press another key, will the system send the real key code to the application program.

1.3.3 44-KEY KEYPAD

The layout of the 44-key keypad includes numeric, alphabetic, assorted characters, function and modifier keys.
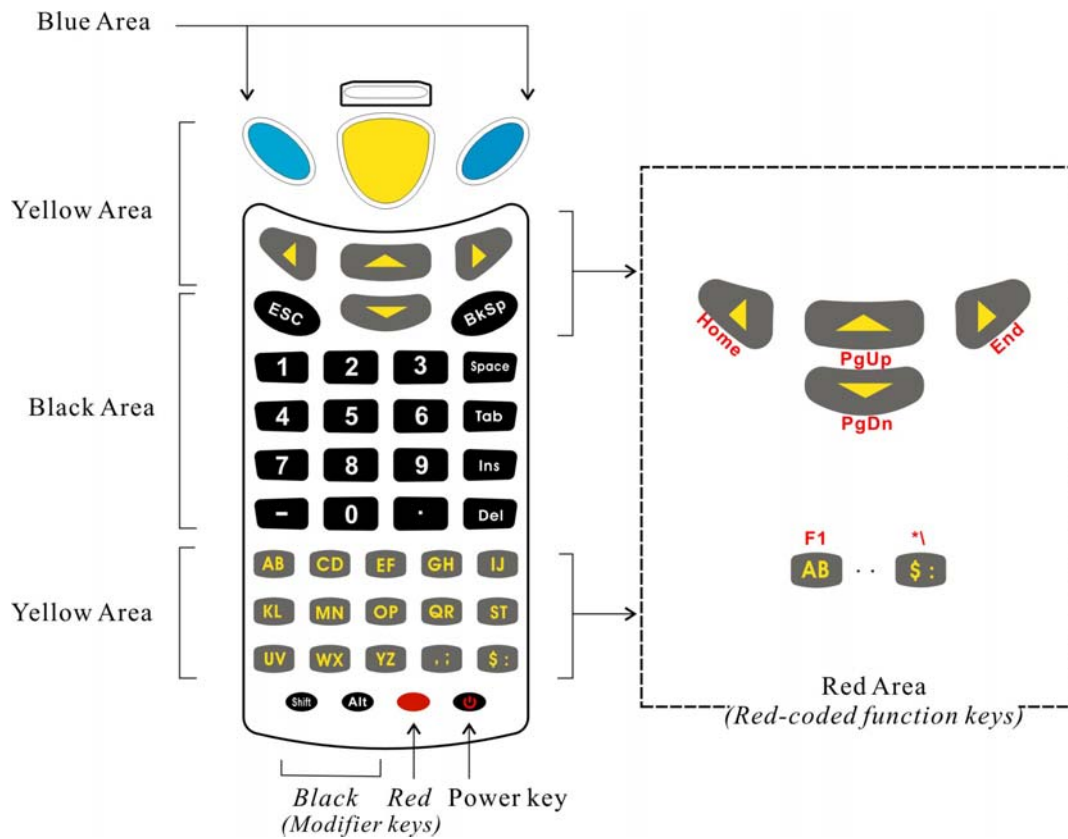
Figure 8: 44-key Layout

For the 44-key keypad, these keys can be categorized into the following groups by color:

Blue Area

▸ Two [ENTER] keys: user-friendly and convenient for either right-handed or left-handed operator to perform general function of a [Enter] key.

▸ It can be used together with [RED] modifier key: [ENTER] + [RED] = alternately turn ON/OFF the backlight of LCD and keypad.

Black Area

▸ [POWER] key

▸ Numeric keys

▸ Modifier keys: [Shift] or [Alt] that modifies its next key. The functionality depends on software application.

▸ Others like [Backspace], [ESC], [Space], [Tab], [Insert], [Delete], [-], [.]

Yellow Area

▸ [SCAN] trigger

▸ Navigation keys for moving the cursor up, down, left, right.

▸ Alphabetic keys

▸ Others like punctuation keys for comma & semi-colon, dollar & colon.

Red Area

▸ [RED] modifier key: the solid red key next to the Power key

▸ [RED] followed by one red-coded key: The [RED] modifier key modifies (activates) the second key. Its functionality is determined by the red-coded key, which is specified by red letters under the navigation keys or on top of alpha keys and some punctuation keys.

1.4 LCD

The mobile computer comes with a 3" FSTN graphic LCD, 160 by 160 pixels resolutions, which can be programmed to display text or graphics, such as specific font and company logo, to meet varying application needs.

Options	Font Size (pixels)	Characters by lines
English font	Font size 6×8 (pixels)	26 characters by 19 lines
	Font size 8×16 (pixels)	20 characters by 9 lines
Chinese font	Font size 16×16 (pixels)	10 characters by 9 lines
Other language fonts, **company logo**...	Programmable	

Note: Normally, the bottom line (ICON_ZONE) is reserved to display status icons, such as the battery icon.

1.4.1 ADJUSTING THE BACKLIGHT

The backlight of screen and keypad helps ease reading under dim environments. It can be turned on and adjusted decreasingly or increasingly by the following key combinations. Keep pressing the key combination until the luminosity or contrast is decreased or increased to a desired level.

Warning: Using backlight while on battery power will substantially reduce battery power. It is suggested to dim the backlight while working in a well-lit area or automatically turn it off when not in use.

Key Combination		Action
24-key	**44-key**	
[FN] + [Enter]	[RED] + [Enter]	Toggle ON/OFF the backlight
[FN] + [Left]	[RED] + [Left]	Turn ON the backlight of LCD and decrease its luminosity
[FN] + [Right]	[RED] + [Right]	Turn ON the backlight of LCD and increase its luminosity
[FN] + [Up]	[RED] + [Up]	Turn ON the backlight of LCD and increase its contrast
[FN] + [Down]	[RED] + [Down]	Turn ON the backlight of LCD and decrease its contrast

Note: Hold down the [FN] key and press the second key for adjustment.

1.4.2 CALIBRATING THE SCREEN

This LCD is also a touch screen, which enables the use of a stylus for handwriting. It also features signature capture that can save signature as confirmation of receipt when delivering goods to door.

Refer to section 3.2 Settings for screen & contrast calibration.

Warning: DO NOT use any pointed or sharp objects to move against the surface of the screen.

1.5 NOTIFICATIONS

1.5.1 STATUS LED

The dual-color LED above the [SCAN] trigger is used to provide information on the charging status and can be programmed to provide information that helps diagnosing.

For example, if you are using **AG Runtime**, you will be informed of the scanning result immediately. The green LED is used for "Good Read" while collecting data.

Tasks	Green LED	Red LED
Charging 8500	---	On
Charging done	On	---
Good Read	On	---
Error occurs	---	On

1.5.2 AUDIO

The mobile computer has a low power transducer type buzzer. It can be programmed for status feedback. Its frequency and duration are software programmable.

1.5.3 VIBRATOR

The mobile computer is integrated with a vibrator, which is software programmable for feedback. This can be helpful when working in noisy environments.

1.6 DATA CAPTURE

A wide variety of scan engines is available for delivering flexibility to meet different requirements.

- ▶ 1D CCD scan engine
- ▶ 1D Laser scan engine
- ▶ 1D Long Range Laser scan engine
- ▶ 1D Extra Long Range Laser scan engine
- ▶ 2D scan engine
- ▶ RFID reader

Varying by the scan engine installed, the supported symbologies or tag types are listed below.

Note: Instead of running the preloaded AG runtime or terminal emulation program, you can develop your own applications to control the scan engine for data collection.

1.6.1 DUAL-MODE SUPPORT

Options of different scan engine combination are allowed, such as 1D+RFID and 2D+RFID. For each combination, both readers can be initialized and ready for scanning at the same time (dual mode operation). For example, if you press the [SCAN] trigger while running the preloaded AG runtime on the mobile computer, it will read a barcode in position or an RFID tag in proximity depending on which one comes first.

Note: The mobile computer allows the co-existence of one integrated scan engine and the RFID reader. However, you cannot have 1D+2D scan engines installed on the mobile computer because they are both barcode readers!

1.6.2 SYMBOLOGIES SUPPORTED

Depending on the scan engine integrated, the mobile computer is capable of scanning barcodes of a number of symbologies that are enabled by default while running the preloaded AG runtime. Refer to section 3.3.1 Reader for functional test.

If you need to scan barcodes that are encoded in a symbology that is disabled by default, **Application Generator** (AG*.exe) allows configuring symbology settings, as well as reader settings. First, enable the desired symbologies, and then, download application to the mobile computer.

Note: For details on configuring reader and symbology settings, please refer to the documentation of the software you use.

Symbologies Supported: Enable/Disable		CCD, Laser	LR, ELR	2D
Codabar		Enabled	Enabled	Enabled
Code 11		Not supported	Not supported	Enabled
Code 93		Enabled	Enabled	Enabled
Composite Code	CC-A/B	Not supported	Not supported	Disabled
	CC-C	Not supported	Not supported	Disabled
	TCIF Linked Code 39	Not supported	Not supported	Enabled
MSI		Disabled	Enabled	Enabled
Plessey		Disabled	Not supported	Not supported
Postal Codes		Not supported	Not supported	Enabled
Telepen		Disabled	Not supported	Not supported
Code 128	Code 128	Enabled	Enabled	Enabled
	EAN-128	Enabled	Enabled	Enabled
	ISBT-128	Disabled	Disabled	Disabled
Code 2 of 5	Industrial 25 (i.e. Discrete 25)	Enabled	Enabled	Enabled
	Interleaved 25	Enabled	Enabled	Enabled
	Matrix 25	Disabled	Not supported	Not supported
Code 3 of 9	Code 39	Enabled	Enabled	Enabled
	Trioptic Code 39	Not supported	Disabled	Disabled
	Italian Pharmacode (i.e. Code 32)	Disabled	Disabled	Disabled
	French Pharmacode	Disabled	Not supported	Not supported
EAN/UPC	EAN-8	Enabled	Enabled	Enabled
	EAN-8 Addon 2	Disabled	Enabled	Enabled
	EAN-8 Addon 5	Disabled	Enabled	Enabled
	EAN-13	Enabled	Enabled	Enabled
	EAN-13 & UPC-A Addon 2	Disabled	Enabled	Enabled
	EAN-13 & UPC-A Addon 5	Disabled	Enabled	Enabled
	Bookland EAN (i.e. ISBN)	Disabled	Disabled	Disabled
	UPC-E0	Enabled	Enabled	Enabled
	UPC-E1	Disabled	Disabled	Disabled
	UPC-E Addon 2	Disabled	Enabled	Enabled
	UPC-E Addon 5	Disabled	Enabled	Enabled
	UPC-A	Enabled	Enabled	Enabled
RSS	RSS-14	Disabled	Enabled	Enabled
	RSS Limited	Disabled	Enabled	Enabled

	RSS Expanded	Disabled	Enabled	Enabled
2D Symbologies	PDF417	Not supported	Not supported	Enabled
	MicroPDF417	Not supported	Not supported	Enabled
	Data Matrix	Not supported	Not supported	Enabled
	Maxicode	Not supported	Not supported	Enabled
	QR Code	Not supported	Not supported	Enabled

1.6.3 RFID TAGS SUPPORTED

The RFID reader supports read/write operations depending on the tags. The supported labels include ISO 15693, Icode®, ISO 14443A, and ISO 14443B.

Currently, the performance of many tags has been confirmed, and the results are listed below for your reference. Refer to section 3.3.9 RFID for functional test.

Note: You should study the specifications of RFID tags before use.

RFID Module Version 1.0		**UID Only**	**Read Page**	**Write Page**
ISO 14443A	Mifare Standard 1K	✓	✓	✓
	Mifare Standard 4K	✓	✓	✓
	Mifare Ultralight	✓	✓	✓
	Mifare DESFire	✓	---	---
	Mifare S50	✓	✓	✓
	SLE44R35	✓	---	---
	SLE66R35	✓	✓	✓
ISO 14443B	SRIX 4K	✓	✓	✓
	SR176	✓	✓	✓
ISO 15693	ICODE SLI	✓	✓	✓
	SRF55V02P	✓	---	---
	SRF55V02S	✓	---	---
	SRF55V10P	✓	---	---
	TI Tag-it HF-I	✓	✓	✓
ICODE® (Phillips)	ICODE	✓	✓	✓

1.7 COMMUNICATIONS VIA THE CRADLE

1.7.1 SETTING UP THE CRADLE

The cradle is designed for charging and communications at the same time. You may choose a cradle type that best suits your needs.

1) Place the cradle on a flat and clean surface.

2) Connect the power supply cord to the power jack on the back of the cradle, and then connect the other end of the power supply cord to a suitable power outlet. The cradle is ready for charging the mobile computer, as well as the spare battery pack.

3) Seat the mobile computer in the cradle.

   If data communications are desired at the same time, you can establish a proper connection with a computer or remote host. Refer to the Installation Guide of your cradle.
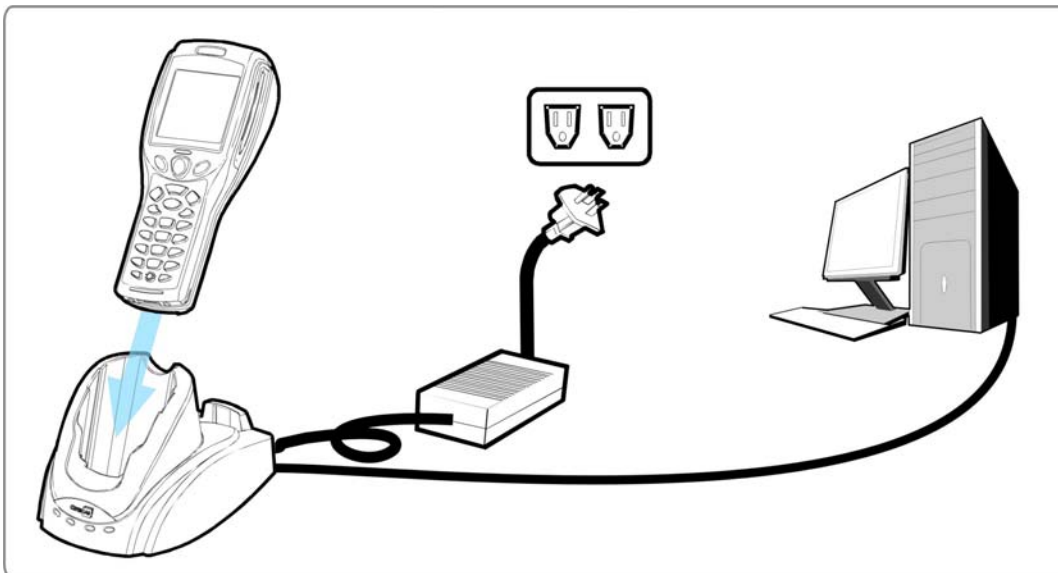
Figure 9: Setting up cradle

1.7.2 CRADLE OPTIONS

The following cradle types are available on order —

Cradle Type	Charging & Comm. Cradle	Modem Cradle	Ethernet Cradle
POWER Jack	√	√	√
RS-232 Port	√	√	√
Line Jack	–	√	–
Phone Jack	–	√	–
RJ-45 Port	–	–	√
DIP Switch	–	√ (RS-232/Modem)	√ (Auto/LAN)
IP Reset Switch	–	–	√

Note: (1) Modem Cradle — Delivering flexibility in making a connection, the Modem Cradle integrates the modem functionality (56 kbps) into the cradle. You may choose to use the modem or RS-232 port by sliding the DIP switch.
(2) Ethernet Cradle — Refer to the Ethernet Cradle manual for more information.
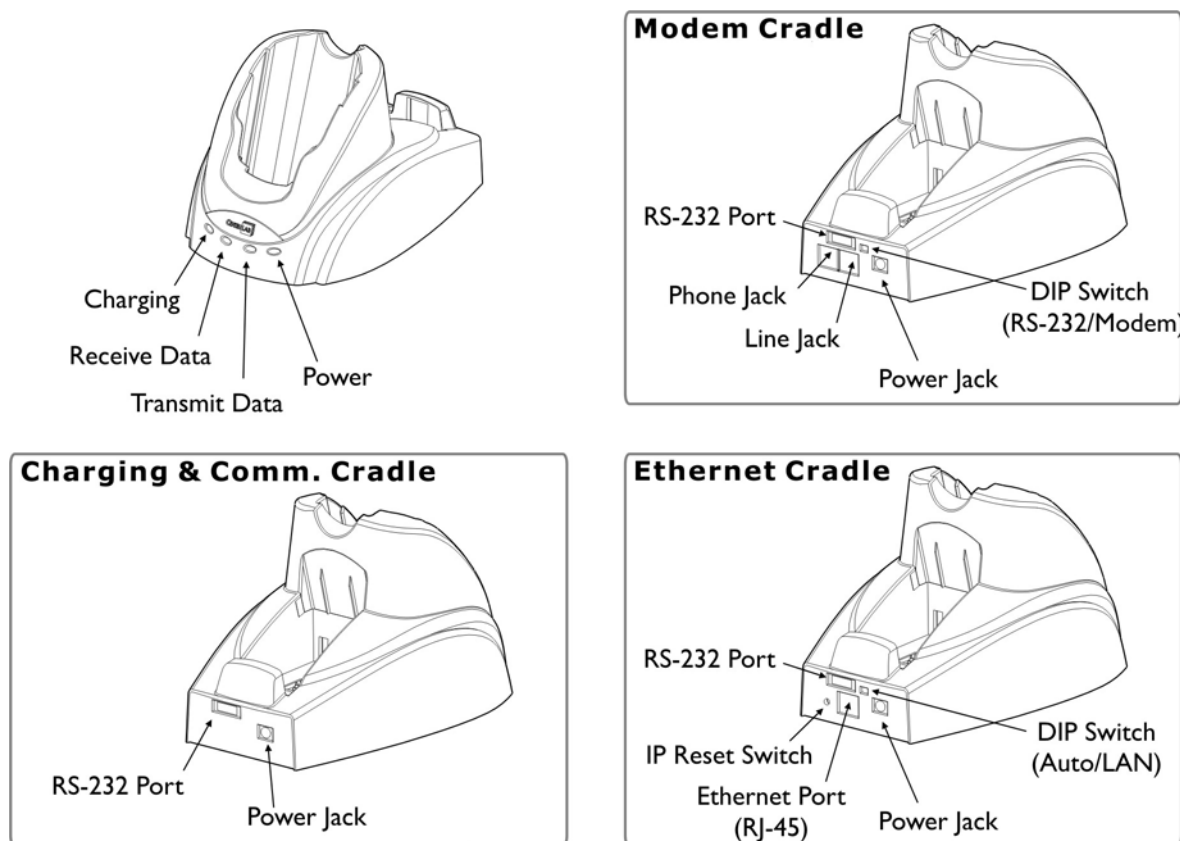
Figure 10: Cradle Options

▶ Modem Cradle: DIP Switch

Modem Connection

▶ To use the modem functionality, slide the DIP switch to right: ■ Modem

▶ When the power cable is properly connected, the LED light of POWER on the front panel will be solid red.

RS-232 Connection

▶ To use the RS-232 port, slide the DIP switch to left: ■ RS-232

▶ When the power cable is properly connected, the LED light of POWER on the front panel will be solid green.

▶ Ethernet Cradle: DIP Switch

Auto-detect Connection

Slide the DIP switch to left: ■ Auto

▶ The RS-232 connection will override Ethernet connection when both are present. However, you can use cradle commands to switch in between the two.

▶ When the power cable is properly connected, the LED light of POWER on the front panel will be solid green.

LAN Connection

Slide the DIP switch to right: ■ LAN

▶ Only the Ethernet connection can be established. However, you can use cradle commands to switch in between the two.

▶ When the power cable is properly connected, the LED light of POWER on the front panel will be solid red.

1.7.3 UNDERSTANDING THE STATUS INDICATORS

For charging status of the loaded battery in the mobile computer, view the device screen.
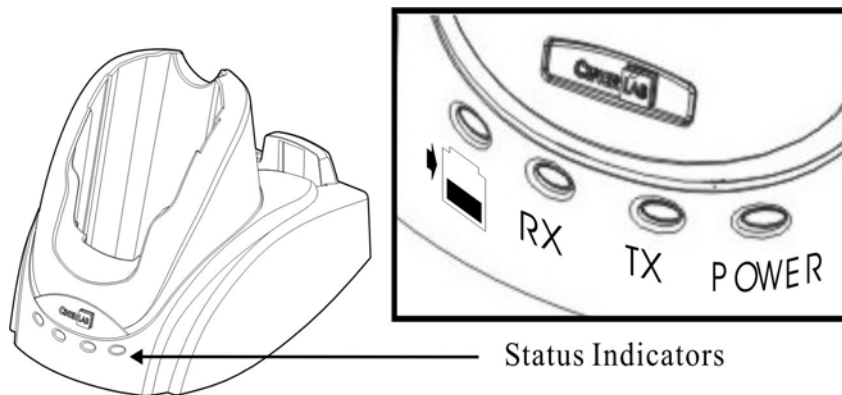
Figure 11: Cradle LEDs

Front Panel LEDs	Tasks	Indication of connection status	
▮■ :	Spare battery charging status	Solid red	Charging
		Solid green	Charging done
		Flashing (red/green)	Error occurs
		Off	Battery not ready
RX:	Receiving status	Solid red	Receiving data from Ethernet or host
		Off	No activity
TX:	Transmitting status	Solid red	Transmitting data to Ethernet or host
		Off	No activity
POWER:	Line status	Solid red	Modem/Ethernet connection
		Solid green	Direct connection via RS-232
		Off	Power off

Warning: Charging error may occur due to a power failure or defected battery contacts.

1.8 COMMUNICATIONS OVER WIRELESS NETWORKS

The 8500 Series Mobile Computer supports state-of-the-art wireless technologies so that it can send/receive data in real time in an efficient way.

▶ WPAN: Infrared (IR/IrDA) technology for data exchange, embedded
▶ WPAN: Bluetooth technology for cable replacement & data exchange, embedded
▶ WLAN: IEEE 802.11b/g for wireless networking, optional
▶ WWAN: GSM/GPRS for short message service, optional

Generally, the coverage of each technology can be viewed as follows.
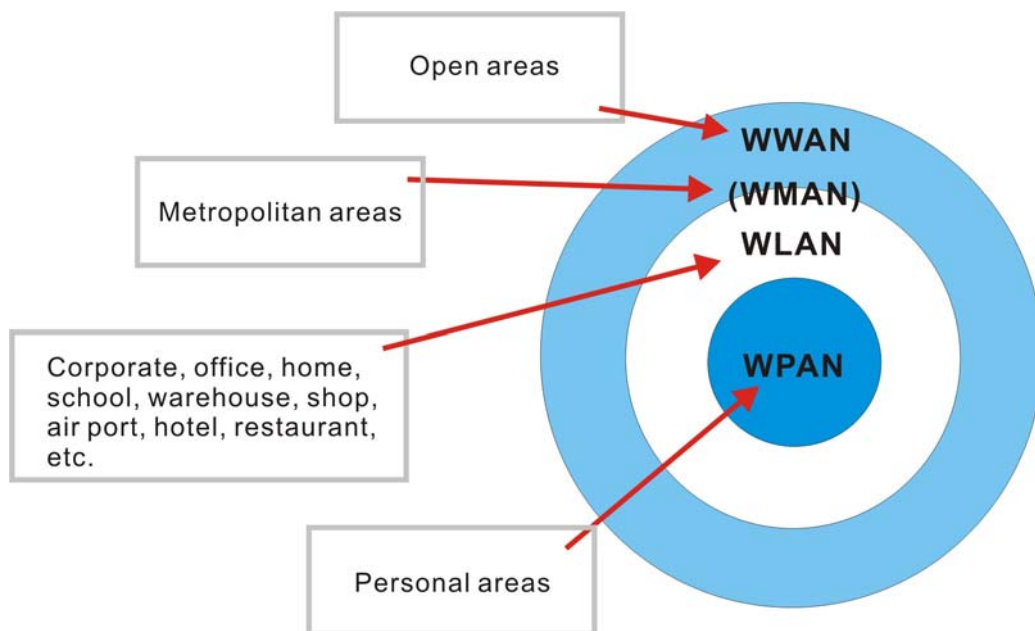
Figure 12: Coverage of Wireless Technologies

1.8.1 IR/IrDA

The mobile computer has an integrated IR port on the bottom, which can directly establish connection with an IR device for printing or data exchange. Simply have the IR port of the mobile computer toward the IR port of the target device.

▸ This IR port supports CipherLab proprietary IR communication protocol and standard IrDA protocol.

▸ IrDA specification defines communications (transmit/receive data) between two IrDA enabled devices within a short range, line-of-sight.

IR/IrDA Specifications	
Infra Red	Optical
Data Rate	Up to 115200 bps
Connected Devices	Peer-to-Peer
Coverage	From contact to 30 cm, line-of-sight
Standard	CipherLab proprietary protocol and IrDA 1.0

1.8.2 BLUETOOTH (CLASS 2)

Bluetooth technology is for cable replacement & data exchange. With built-in Bluetooth module, the mobile computer can directly communicate with any Bluetooth enabled device, not necessarily line-of-sight.

▸ Serial Port Profile (SPP) is for ad-hoc networking, without going through any access point.

▸ Dial-Up Networking Profile (DUN) makes use of a Bluetooth modem or mobile phone as a wireless modem.

  Also, it can be used to activate the GPRS functionality on a mobile phone.

▸ Human Interface Device Profile (HID) allows the mobile computer to work as an input device, i.e. keyboard, for a host computer.

▸ Personal Area Networking Profile (PAN) makes use of Bluetooth Network Encapsulation Protocol (BNEP) for IP networking over Bluetooth. Access points (AP) are required.

Bluetooth Specification	
Frequency Range	2.4 GHz
Data Rate	433 kbps
Connected Devices	1 for DUN mode
	Up to 7 for SPP or PAN mode (AP required)
Profiles	SPP, DUN, HID, PAN
Coverage	Class 2 — 10 meters line-of-sight
Max. Output Power	Class 2 — 6 mW
Spread Spectrum	FHSS
Modulation	GFSK
Standard	Bluetooth version 1.1

1.8.3 IEEE 802.11b/g

The 8570/8590 mobile computer can easily connect to legacy networks through access points (APs). Roaming among different networks is possible.

IEEE 802.11b/g is an industrial standard for Wireless Local Area Networking (WLAN), which enables wireless communications over a long distance. The speed of connection between two wireless devices will vary with range and signal quality. To maintain a reliable connection, the data rate of the 802.11b/g system will automatically fallback as range increases or signal quality decreases.

802.11b/g Specification	
Frequency Range	2.4 GHz
Data Rate:	802.11b – 1, 2, 5.5, 11 Mbps
	802.11g – 6, 9, 12, 18, 24, 36, 48, 54 Mbps
Connected Devices	1 for ad-hoc mode (No AP)
	Multiple for infrastructure mode (AP required)
Profiles	IP/TCP/UDP
Coverage	350 meters line-of-sight
Max. Output Power	50 mW (802.11b)
Spread Spectrum	DSSS
Modulation	802.11b — DBPSK (1 Mbps), DQPSK (2 Mbps), CCK (5.5 & 11 Mbps)
	802.11g — OFDM
Standard	IEEE 802.11b/g, interoperable with Wi-Fi devices

1.8.4 GSM/GPRS

The 8580/8590 mobile computer is capable of data communications over free air, right on the road.

▶ GSM and GPRS are industrial standards for Wireless Wide Area Networking (WWAN), which enables wireless communications over free air.

▶ "GSM" is an abbreviation of Global System for Mobile Communications.

▶ "GPRS" is an abbreviation of General Packet Radio Service.

▶ GPRS, a packet-switched technology based on GSM (circuit-switched), allowing information to be transmitted or received more quickly, immediately and efficiently across the mobile network. GPRS Class B mobile devices can be attached to both GSM and GPRS services, using one service at a time.

Take the following steps to insert your SIM card when GSM/GPRS networking is desired —

1)   Turn off the mobile computer.

2)   Hold the mobile computer still and unscrew the four screws of the top enclosure.

3)   Take out the GSM/GPRS card from the mobile computer.

4)   Check the card orientation and insert the SIM card to the SIM card holder on the GSM/GPRS card.

5)   Put the GSM/GPRS card back to the mobile computer.

6)   Screw the top enclosure tightly.
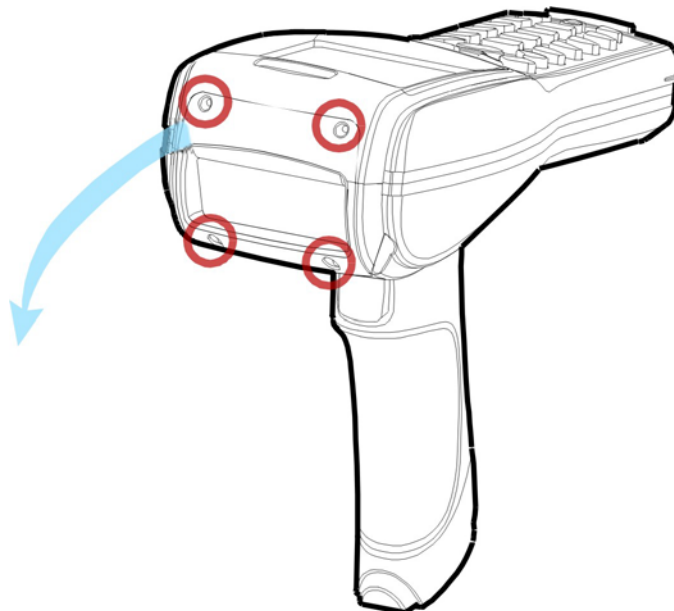
Figure 13: Inserting the SIM Card

Chapter 2

LEARNING SOFTWARE ARCHITECTURE

This chapter mainly describes the software inside the mobile computer. It consists of three modules — Kernel, System, and Application; each has a function menu.

When a menu is displayed, you may select an item by either of the following ways:

▸ using the [UP] and [DOWN] keys to move the highlight bar
▸ pressing the number key that corresponds to the item number
▸ using the stylus to touch that item or the item number

Item No. (Shortcut keys)
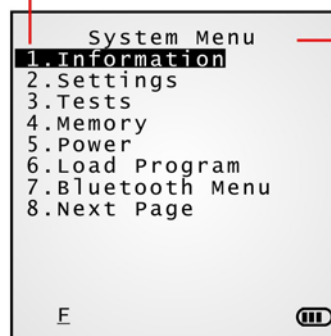
```
      System Menu              ——— Menu Title
1.Information
2.Settings
3.Tests
4.Memory
5.Power
6.Load Program
7.Bluetooth Menu
8.Next Page



  F                  ⬛      ——— Battery & Status Icons: A, a, F...
```

```
                            ——— AG Menu (Batch)
1.Collect Data
2.Upload_Data
3.Utilities




APR 21,  16:40 00000
  F                  ⬛
```
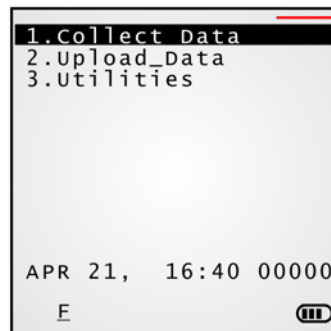
On each screen, the bottom line displays status icons, such as:

▶ The 4-bar battery icon indicates the current power status.

▶ The input mode or function mode, which is controlled by the [Alpha] key and [FN] key separately.

▶ When a turn-page icon (⟲) is displayed, it indicates there is a previous page or menu.

To return to a previous page or menu, you may press [ESC], touch the menu title, or follow the on-screen instructions.
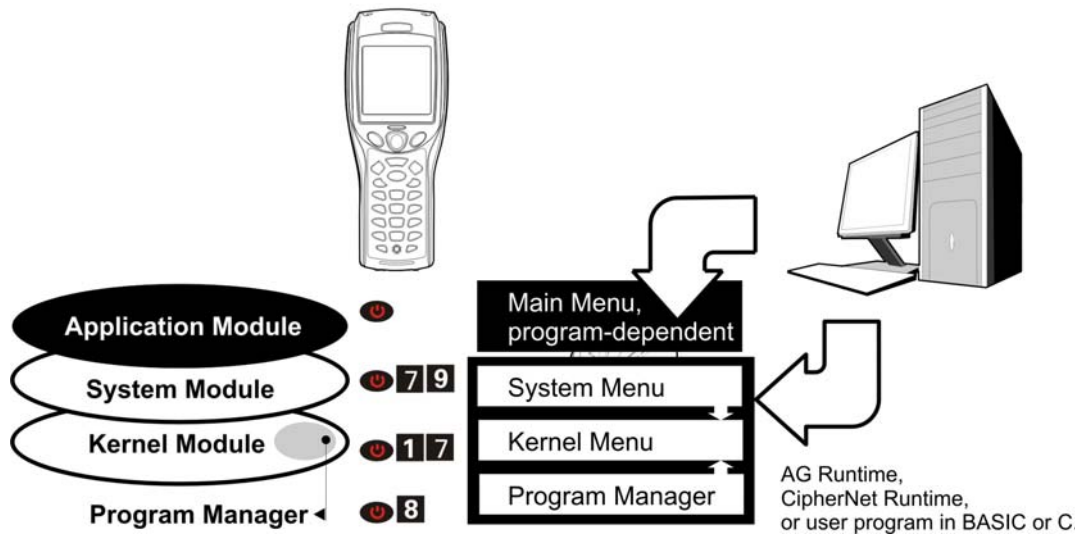
Figure 14: Software Architecture

IN THIS CHAPTER

2.1 APPLICATION MODULE

For easy development of applications, the mobile computer ships with development tools on the CD-ROM. It includes Windows-based programs **Application Generator** (batch and WLAN), **CipherNet** (VT and 5250), download utilities, etc.

2.1.1 APPLICATION GENERATOR (AG)

The mobile computer is preloaded with **AG Runtime**. When you turn on the mobile computer, it displays the Main Menu of AG application, as shown below.

Batch AG

RF AG

```
1.Collect Data
2.Upload_Data
3.Utilities




APR 21,  16:40 00000
```

```
IP: 0.0.0.0

1.Take Data
2.Utilities




APR 21,  16:40 00000
```
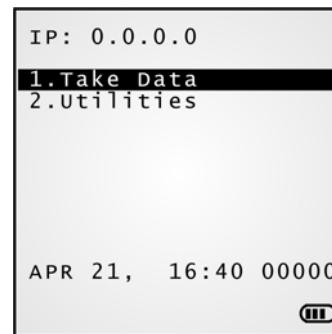
Before using the mobile computer to collect data, you need to configure the application with the companion tool on your computer. This time-saving development tool helps create application templates on your computer.

For details on the AG application, please refer to separate user manual.

Application Generator	AG Runtime	Companion Tool on PC End
Batch AG	U8500*.SHX	AG8500.exe
RF AG	U85WLAN*.SHX	AG8500WLAN.exe

Note: The Application Generator (AG) software package includes
(1) a companion tool for quickly developing your application, i.e. AG or RF AG;
(2) several download utilities to make it versatile in use.

2.1.2 CIPHERNET

The mobile computer supports VT100/220 and IBM 5250 terminal emulation for accessing a backend database. Instead of using **Application Generator**, you may download the terminal emulation program, i.e. **CipherNet Runtime**, to the mobile computer. Refer to section 3.6 Load Program. Then, run individual companion tool on your computer.

For details on the **CipherNet** application, please refer to separate user manual.

Terminal Emulation	CipherNet Runtime	Companion Tool on PC End
VT100/220	85xx-VT.SHX	CipherNet-VT.exe
IBM 5250	85xx-5250.SHX	CipherNet-5250.exe

2.1.3 USER PROGRAM

You may need to develop your own application program. For developing custom applications, CipherLab provides BASIC and C compilers through licensing. For detailed information, please contact your sales representative.

2.2 SYSTEM CONFIGURATION

For managing system configurations and multiple programs, each mobile computer comes with the **System Menu**, **Kernel**, and **Program Manager**. Refer to the following chapters on how to configure the 8500 Series Mobile Computer, regarding system configurations and program download.

2.2.1 SYSTEM MENU

The System Menu is bundled with BASIC Runtime or user programs that are written in "C". It is for system configuration, functionality testing, downloading font file and program.

2.2.2 KERNEL

Kernel is the innermost core of the OS. It provides services for downloading the active application program or font file, updating the kernel or the active application program, and configuring Bluetooth settings.

2.2.3 PROGRAM MANAGER

The Program Manager is part of the kernel. You may download as many as seven application programs, or six programs plus one font file.

Chapter 3

SYSTEM MENU

The **System Menu** is generated by a powerful utility, which offers an interface for engineers (programmers or system integrator) to view system information, change the configuration parameters, download programs and run diagnostics.

This menu is designed for engineering tests and maintenance ONLY. For this reason, the **System Menu** provides password protection to prevent unauthorized users from accidentally changing system settings.

Warning!　　The System Menu is NOT for the use of any end users. The system password helps ensure system safety and integrity.

How to access the System Menu?

1) Turn off the mobile computer.

2) Press [7] + [9] + [Power].

```
      System Menu
1.Information
2.Settings
3.Tests
4.Memory
5.Power
6.Load Program
7.Bluetooth Menu
8.Next Page
```
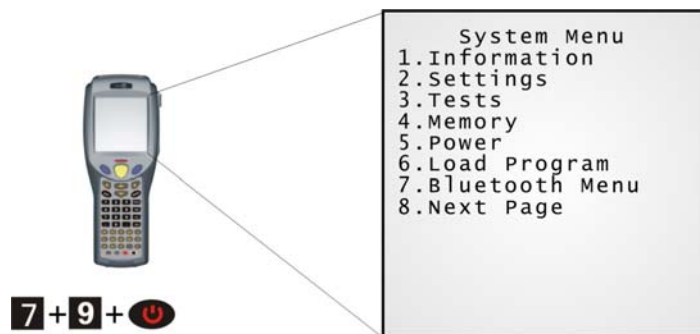
IN THIS CHAPTER

3.1 INFORMATION

Here provides important system information to help diagnose the system.

```
      System Menu              H/W: 8500-5
 1.Information                 S/N: EU7000001
 2.Settings                    M/D: 2006.01.18
 3.Tests                       KNL: 8500K-2.00
 4.Memory                      LIB: 8500L-2.00
 5.Power                       USR: AG8500-1.14.0
 6.Load Program        →       DEV: 1710 - 1
 7.Bluetooth Menu              RFID:V1.0
 8.Next Page
```

System Menu > 1. Information

H/W	Hardware version (PCB)
S/N	A serial number assigned to the mobile computer
M/D	Manufacturing date
KNL	Kernel version
LIB	C library version
BSC	BASIC Run-time version, if a BASIC application is downloaded
USR	Application program version
DEV	5-digit code for optional hardware configurations
	▶ For example, 1710-1 indicates the 44-key mobile computer is equipped with CCD scan engine, RFID reader, and 802.11b/g and GSM/GPRS connectivity.
RFID	RFID module version if present; the 3rd digit of the above Device Code must be 1

3.1.1 UNDERSTANDING DEVICE CODE

Device Code	Modular Component	Types
1st digit	Reader module	0= none 1= CCD scan engine 2= Laser scan engine 3= 2D scan engine 4= Long Range Laser scan engine 5= Extra Long Range Laser scan engine
2nd digit	Wireless module	3= Bluetooth + GSM/GPRS (8580) 4= Bluetooth + 802.11b/g (8570) 5= Bluetooth only (8500) 7= Bluetooth + GSM/GPRS + 802.11b/g (8590)
3rd digit	RFID module	0= none 1= RFID reader
4th digit	Reserved	0
5th digit	Keypad module	0= 24-key 1= 44-key

3.2 SETTINGS

You can change the default settings here.

```
  System Menu                System Settings             System Settings
1.Information              1.Clock                     1.Screen Calibration
2.Settings                2.Backlight Period          2.Reset to Default
3.Tests                    3.Auto Off                  3.Reset Reader
4.Memory                   4.Power On Options          4.LCD Heater
5.Power                    5.Key Click
6.Load Program             6.Sys. Password
7.Bluetooth Menu           7.Font
8.Next Page                8.Next Page
```

System Settings	Default Values
Clock	blank
Backlight Period	20 seconds, Level 2
Auto Off	10 minutes
Power On Options	Program Resume
Key Click	Tone 2
System Password	Open access
Font	System font
Reset to Default	Load factory settings
Reset Reader	Load factory settings of 2D or (Extra) Long Range Laser scan engine
LCD Heater	Disabled

3.2.1 CLOCK

Set date and time for Real Time Clock. Enter two digits for the year, i.e. 04 for 2004.

3.2.2 BACKLIGHT PERIOD

Set the backlight duration for the keypad and LCD.

▶ Enter a value between 0 and 9999 (second).
▶ Use the [UP] and [DOWN] keys to adjust the backlight level.

3.2.3 AUTO OFF

The mobile computer will be turned off automatically when no operation is taking place during a specified period of time. Enter a value between 0 and 999 (minute).

Note: To disable this function, enter 0.

3.2.4 POWER ON OPTIONS

Set the startup screen once the mobile computer is turned on:

▸ When "[0] Program Resume" is selected, the mobile computer will start from the last session of program before it is turned off.

▸ When "[1] Program Restart" is selected, the mobile computer will start from the first session of the program.

3.2.5 KEY CLICK

The system will produce an audible signal when any key on the keypad is pressed. The current value is highlighted. Select a desired tone for the buzzer or mute it.

3.2.6 SYSTEM PASSWORD

Set a password to control user access to the **System Menu**. The password can be up to eight alphanumeric characters.

Note: The password is case-sensitive. To disable a previous password, enter blank on the "Input new password" and "Verify password" screens.

3.2.7 FONT

Font version information can be viewed here. It displays System Font if there is no custom font file.

If a multi-language font file is downloaded, you will be able to select a font from the list.

3.2.8 SCREEN CALIBRATION

The cross mark will appear on the four corners of the screen for alignment. Use the tip of the stylus to tap at the center of the cross mark firmly and accurately.

To start with contrast calibration, press [1]+[9] simultaneously. Refer to section 1.4 LCD for screen & backlight settings.

Warning: DO NOT use any pointed or sharp object to move against the screen.

3.2.9 RESET TO DEFAULT

Reset system settings to the default values, except for the reader settings.

3.2.10 RESET READER

You may reset the reader settings to the default values when one of the following scan engines is installed for use:

▶ 2D scan engine

▶ Long Range Laser scan engine

▶ Extra Long Range Laser scan engine

3.2.11 LCD HEATER

Set the heater functionality. When enabled, it will start to heat when the environmental temperature falls below -10 Celsius degrees.

3.3 TESTS

Here provides functional tests for key parts.

```
   System Menu          System Tests          System Tests
1.Information        1.Reader              1.Echo Test
2.Settings           2.Buzzer             2.RFID
3.Tests              3.LCD & LED
4.Memory             4.Keyboard
5.Power              5.Memory
6.Load Program       6.Touch Screen
7.Bluetooth Menu     7.Vibrator
8.Next Page          8.Next Page
```
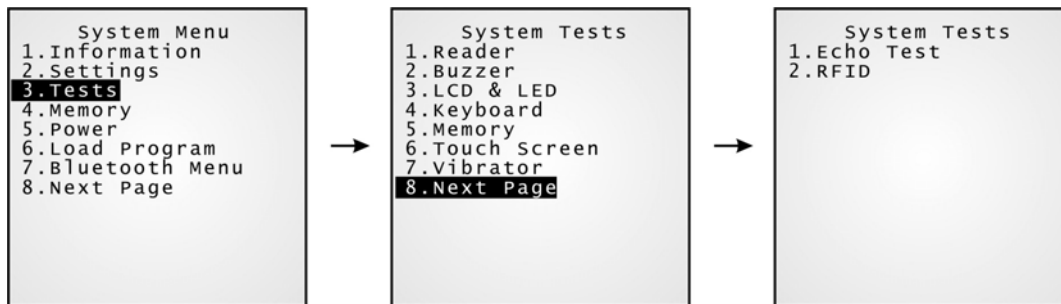
3.3.1 READER

The supported symbologies depend on the scan engine you use. Refer to section 1.6 Data Capture for symbologies that are enabled by default. For symbologies that are disabled by default, they must be enabled through programming.

▶ Test the reading performance of the scanner. Press [SCAN] to start.

▶ To stop and exit the test, press any key.

3.3.2 BUZZER

Test the buzzer with different frequency/duration combinations. Press [Enter] to start. To stop and exit the test, press any key.

3.3.3 LCD & LED

Test the LCD display and LED indicator. Press [Enter] to start. To stop and exit the test, press any key.

3.3.4 KEYBOARD

Test the rubber keys. Press any key and its corresponding character will be shown on the screen. To stop and exit the test, press [ESC].

3.3.5 MEMORY

Test the data memory (SRAM), and the results will be shown on the screen. To stop and exit the test, press [ESC].

Warning!   The contents of the data memory (SRAM) will be wiped out after test.

3.3.6 TOUCH SCREEN

Test signature capture by using the stylus for handwriting. Press [Enter] to start. To stop and exit the test, press [ESC].

3.3.7 VIBRATOR

Test the vibrator. To stop and exit the test, press [ESC].

3.3.8 ECHO TEST

After a physical connection is established properly, run the utility "Echo Test" on your computer and start this test on your mobile computer. Select a desired baud rate. To stop and exit the test, press [ESC].

IR (Cradle-IR)

This echo test is to verify connectivity via IR between the mobile computer and any cradle.

MODEM

This echo test is to verify connectivity via modem. A telephone line must be connected to the Modem Cradle.

Note: For the Modem Cradle, any value other than 57600 bps (default) must be configured through the DIP switch on the IR control board.

3.3.9 RFID

Refer to section 1.6 Data Capture for the supported RFID tags.

▸ Test the reading performance of the RFID reader when a proximity card is present.
▸ To stop and exit the test, press [ESC].

3.4 MEMORY

Here provides information and initialization function of the memory.

```
     System Menu
1.Information
2.Settings
3.Tests
4.Memory
5.Power
6.Load Program
7.Bluetooth Menu
8.Next Page
```
→
```
        Memory
1.Size Information
2.Initialize
```
→
```
Base RAM    : 2048 KB
Memory Card: 8192 KB
Flash       : 2048 KB
```

3.4.1 SIZE INFORMATION

▶ Base RAM   — onboard SRAM for data memory
▶ Memory Card   — data memory
▶ Flash   — program memory

3.4.2 INITIALIZE

Initialize the data memory, Base RAM or Memory Card.

Warning!   The contents of the data memory (SRAM) will be wiped out after memory initialization.

3.5 POWER

Here shows current voltage consumption.

```
      System Menu
1.Information
2.Settings
3.Tests
4.Memory
5.Power
6.Load Program
7.Bluetooth Menu
8.Next Page
```

→

```
    Battery Voltage
Main: 3.888v

Backup: 3.233v
```
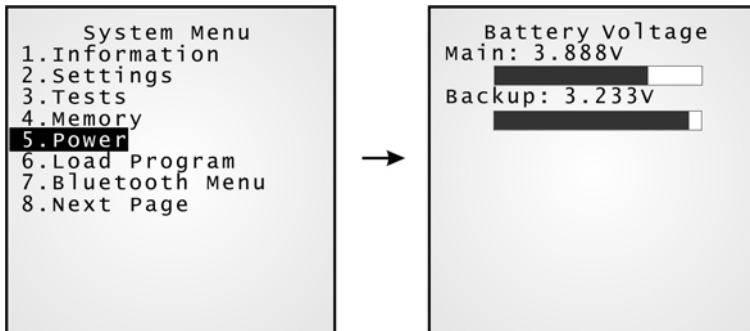
Main (battery)

It shows dynamic status of the battery pack, which is used as the main power source.

Backup (battery)

It shows dynamic status of the button cell, which is used to retain data in SRAM.

Warning!   Always examine the battery icon on the device screen so that you will be alerted for a low battery condition.

3.6 LOAD PROGRAM

Here you can access the Load Program service provided by the kernel. Because the kernel will take over the job, you will not be able to return to the **System Menu** by pressing [ESC]. After downloading, restart the mobile computer to activate the new program.
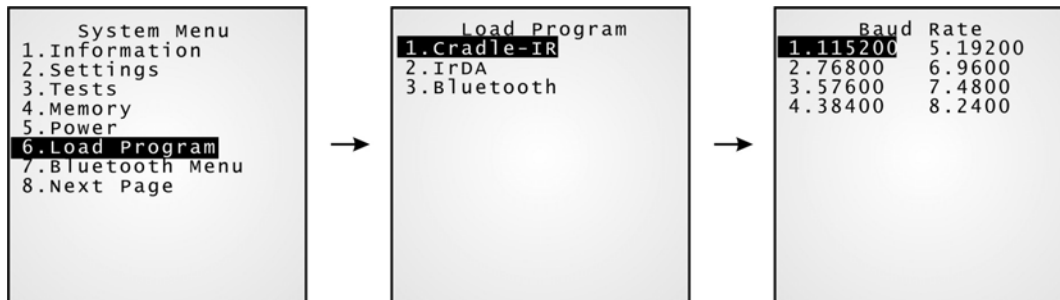
```
      System Menu
1.Information
2.Settings
3.Tests
4.Memory
5.Power
6.Load Program
7.Bluetooth Menu
8.Next Page
```
→
```
    Load Program
1.Cradle-IR
2.IrDA
3.Bluetooth
```
→
```
      Baud Rate
1.115200   5.19200
2.76800    6.9600
3.57600    7.4800
4.38400    8.2400
```

.SHX Program	Download one of the following C program files and/or one font file:	
Program File	▶ AG Runtime	(U*.shx)
	▶ CipherNet Runtime	(85xx-5250.shx, 85xx-VT.shx)
	▶ BASIC Runtime*	(BC*.shx)
	▶ User program	
Font File	Refer to the Font Files folder on CD-ROM.	

If you have downloaded a BASIC Runtime program, the next time you enter the Load Program submenu you will be able to select whether to download a C program (.SHX) or BASIC program (.SYN).

Note: "Load Basic" menu is only available after you have downloaded a BASIC Runtime program.

3.7 BLUETOOTH MENU

This submenu is for the built-in Bluetooth module to work with other Bluetooth enabled devices. You must configure these parameters correctly.

Bluetooth Settings	Default Value	SPP	DUN	PAN
Connect Setting		**Items Need to Be Checked**		
Local Name	Model no. + Serial no.	v	v	v
Remote Name	---	v	v	v
Broadcast Me	Enabled	v	v	v
Power Saving	Enabled	v	v	v
BT-GPRS AP Name	---	---	(v)*	---
Security				
Authentication	Disabled	v	v	v
PIN Code	---	v	v	v
Network Setting				
DHCP	Enabled	---	---	v
SubNet Mask	255.255.128.0	---	---	v
Local IP Address	0.0.0.0	---	---	v
Default Gateway	0.0.0.0	---	---	v
DNS Server	0.0.0.0	---	---	v
Domain Name	---	---	---	v

Note: GPRS AP name is ONLY required for DUN-GPRS mode.

3.7.1 INFORMATION

Information of network configuration can be viewed here.

```
    System Menu              Bluetooth Menu          LIB:8500L-2.00
1.Information            1.Information           MAC:000b6b1aa747
2.Settings              2.Connect Set           IAM:8500000079230
3.Tests                 3.Security              CTY:Normal
4.Memory                4.Echo Tests           DHCP:Enable
5.Power                 5.Pairing Test         IP:   0.0.0.0
6.Load Program          6.Freq. Dev List       Mask:255.255.128.0
7.Bluetooth Menu        7.Network Setting      Gate:0.0.0.0
8.Next Page
```

Bluetooth Menu > 1. Information

LIB	C library version
MAC	MAC ID of the Bluetooth module
IAM	A name given to the mobile computer for identification.
	▶ By default, it is made up of model No. and the serial number. (Identical to 2. Connect Set > 1. Local Name)
CTY	▶ "Normal" means all 79 channels are available for frequency-hopping
	(There are bandwidth limitations for 2.4 GHz ISM band in some countries. For example, only 23 RF channels are defined instead of 79 RF channels in Japan, Spain and France.)
DHCP	DHCP server in use or not
IP	IP address of the mobile computer
Mask	Subnet Mask
Gate	Default Gateway

3.7.2 CONNECT SETTING

A basic Bluetooth system can be configured as (1) point to point - DUN mode, and (2) point to multi-point - SPP or PAN mode.

Set the following parameters if necessary.

```
    System Menu              Bluetooth Menu            Connect Setting
1.Information            1.Information             1.Local Name
2.Settings              2.Connect Set             2.Remote Name
3.Tests                 3.Security               3.Broadcast Me
4.Memory                4.Echo Tests             4.Power Saving
5.Power                 5.Pairing Test           5.BT-GPRS AP Name
6.Load Program          6.Freq. Dev List
7.Bluetooth Menu        7.Network Setting
8.Next Page
```

Local Name

Enter a name for identifying the mobile computer.

▶ By default, it is made up of model No. and the serial number.

Remote Name

Enter a name for making a specific connection.

▶ The remote name must be one of those in the Freq. Dev. List. Otherwise, the mobile computer will fail to make a connection with any device without pairing.

▶ DO NOT specify any remote name when roaming across different groups of APs is required.

Broadcast Me

Options - Enable or Disable

▶ For initial connection, broadcasting must be enabled so that other Bluetooth devices can discover the mobile computer.

▶ For security concerns, you may disable it in future use to hide the mobile computer from other Bluetooth devices.

Power Saving

This refers to the low power consumption mode.

Options - Enable or Disable (Only the Sniff mode is supported.)

BT-GPRS AP Name

For DUN-GPRS mode, enter the AP name for connecting to the content server.

3.7.3 SECURITY

Set or modify security parameters.

```
    System Menu              Bluetooth Menu              Security
1.Information           1.Information              1.Authentication
2.Settings              2.Connect Set              2.PIN Code
3.Tests                 3.Security
4.Memory                4.Echo Tests
5.Power                 5.Pairing Test
6.Load Program          6.Freq. Dev List
7.Bluetooth Menu        7.Network Setting
8.Next Page
```

Authentication

Options - Enable or Disable

PIN Code

Define the encryption key values.

▸ Up to 16 characters, using ASCII code.

Note: When authentication is enabled without providing a pre-set PIN code, the mobile computer supports dynamic input of PIN code during pairing.

3.7.4 ECHO TESTS

These echo tests are used for verifying connectivity to make sure the mobile computer is within coverage. Press [ESC] to stop and exit the test.

In PAN mode, the echo test helps measure the coverage of the range, estimate the number of APs and mobile computers needed, and determine the topology of deploying APs.

▸ SPP: Serial Port Profile

      It is used for ad hoc networking, without going through any access point.

▸ DUN: Dial-Up Networking Profile

      DUN Modem - It makes use of a Bluetooth modem or mobile phone as a wireless modem.

      DUN GPRS – It makes use of a mobile phone with GPRS functionality and connects to GPRS AP.

▸ BNEP: Bluetooth Network Encapsulation Protocol

      It is used by Personal Area Networking Profile (PAN) for IP networking over Bluetooth.

```
    System Menu              Bluetooth Menu              Echo Tests
1.Information            1.Information             1.SPP Master
2.Settings              2.Connect Set             2.SPP Slave
3.Tests                 3.Security                3.DUN Modem
4.Memory                4.Echo Tests              4.DUN GPRS
5.Power                 5.Pairing Test            5.BNEP Client
6.Load Program          6.Freq. Dev List          6.BNEP Server
7.Bluetooth Menu        7.Network Setting
8.Next Page
```

SPP Master

Set the mobile computer as a master device.

1. Pairing with your computer (slave) must be completed first.

2. Run the Echo Test program on your computer. Associated settings include

   - Select "RS-232" for interface.

   - Use the Bluetooth COM port that has been paired.

   - Set Action Mode to "Passive".

3. Start the echo test on both ends. The mobile computer will try to connect to PC (slave).

SPP Slave

Set the mobile computer as a slave device.

1. Enable Authentication and set your PIN code on the mobile computer.

2. Run the Echo Test program on your computer. Associated settings include

   - Select "RS-232" for interface.

- Use the Bluetooth COM port that has been configured as "outgoing".

- Set Action Mode to "Passive".

3. Start the echo test on both ends.

4. The mobile computer will wait for PC (master) to start the connection.

5. Enter the preset PIN code for authentication on your computer.

DUN Modem

The mobile computer will try to connect to a Bluetooth modem or mobile phone.

1. Pairing with your mobile phone must be completed first.

   Select "DialUp Network" for Target Machine options.

2. Run the Echo Test program on your computer. Associated settings include

   - Select "Modem" for interface.

   - Set Action Mode to "Passive".

3. Start the echo test on both ends.

4. The mobile computer will connect to your mobile phone that dials up to your computer.

DUN GPRS

The mobile computer will try to connect to a mobile phone with GPRS functionality.

1. Pairing with your mobile phone must be completed first. Select "DialUp Network" for Target Machine options.

2. Run the Echo Test program on your computer. Associated settings include

   - Select "TCP/IP – Server" for interface.

   - Set Action Mode to "Passive".

3. Start the echo test on both ends.

4. Enter the server IP on the mobile computer.

5. The mobile computer will connect to your mobile phone that dials up a GPRS AP, and finally connect to your computer (server) through the GPRS AP.

BNEP Client

Set the mobile computer as a client. Enter the IP address of a server with which a connection is desired. Then, it will try to connect to an AP.

1. Pairing with an AP must be completed first. Select "Access Point" for Target Machine options.

   Note that you must disable Authentication and clear the preset PIN code when connecting to Bluetooth AP (3560).

2. Run the Echo Test program on your computer. Associated settings include

   - Select "TCP/IP – Server" for interface.

   - Set Action Mode to "Passive".

3. Start the echo test on both ends.

4. Enter the server IP and port number on the mobile computer.

BNEP Server

Set the mobile computer as a server. It will try to connect to an AP.

1. Pairing with an AP must be completed first. Select "Access Point" for Target Machine options.

   Note that you must disable Authentication and clear the preset PIN code when connecting to Bluetooth AP (3560).

2. Run the Echo Test program on your computer. Associated settings include

   - Select "TCP/IP – Client" for interface.

   - Enter Remote IP and port number.

   - Set Action Mode to "Passive".

3. Start the echo test on both ends.

3.7.5 PAIRING TEST

The pairing procedure is for the creation and exchange of a link key between two Bluetooth-enabled devices. The devices use the link key for future authentication when exchanging information.

```
    System Menu
1.Information
2.Settings
3.Tests
4.Memory
5.Power
6.Load Program
7.Bluetooth Menu
8.Next Page
```
→
```
    Bluetooth Menu
1.Information
2.Connect Set
3.Security
4.Echo Tests
5.Pairing Test
6.Freq. Dev List
7.Network Setting
```
→
```
====================
    Inquiry...
    Please wait

====================
```

1) The mobile computer will start with making an inquiry so that the system can generate a list of device(s) that has been discovered nearby.

2) Select a desired target device.

3) Select a Bluetooth service from the "Target Machine" menu. To stop and exit the test, press [ESC].

   ‣ Serial Port (SPP)

   ‣ Access Point (PAN)

   ‣ DialUp Network (DUN)

   After pairing successfully, the target device will be added to the Frequent Device List for quick connection in the future.

Note: During the initial setting of Bluetooth wireless network, the pairing procedure must be carried out before the Echo tests.

3.7.6 FREQ. DEV. LIST

The Frequent Device List is used to store a list of target device(s) that the mobile computer has been connected to lately. After each successful pairing, the system will update the list.

Note: To unpair any device, simply delete the device from this list.

```
    System Menu            Bluetooth Menu          No Device
1.Information          1.Information            in List!!
2.Settings            2.Connect Set
3.Tests               3.Security
4.Memory              4.Echo Tests
5.Power               5.Pairing Test
6.Load Program        6.Freq. Dev List
7.Bluetooth Menu      7.Network Setting
8.Next Page
```

This list can show information of up to eight target devices that provides different Bluetooth services.

▶ It can list only one device that provides the Bluetooth Serial Port service. (SPP)

▶ It can list up to eight APs that provide the Bluetooth Personal Area Networking service. (PAN)

▶ It can list only one device that provides the Bluetooth Dial-Up Networking service. (DUN)

Note: During roaming (for PAN only) or re-establishing the connection, the mobile computer will automatically connect to the listed AP(s) or target device without going through the pairing procedure.

3.7.7 NETWORK SETTING

Set parameters for IP networking.

```
   System Menu              Bluetooth Menu           Network Setting
1.Information            1.Information            1.DHCP
2.Settings              2.Connect Set           2.SubNet Mask
3.Tests                 3.Security              3.Local IP Address
4.Memory                4.Echo Tests           4.Default Gateway
5.Power                 5.Pairing Test         5.DNS Server
6.Load Program          6.Freq. Dev List       6.Domain Name
7.Bluetooth Menu        7.Network Setting
8.Next Page
```

DHCP

Options - Enable or Disable

Subnet Mask

Enter a new Mask IP, if necessary.

Local IP Address

Enter a new address for the mobile computer, if necessary.

Default Gateway

Enter a new address for the default Gateway, if necessary.

DNS Server

Enter a new address for the DNS server, if necessary.

Domain Name

The domain name of the host is displayed when DHCP server is enabled.

Note: Normally, DHCP is enabled and all of the settings can be obtained form the DHCP server.

3.8 SERIAL PPP MENU

This submenu is for establishing a PPP connection via the Modem Cradle. You must configure these parameters correctly.

```
      System Menu                    System Menu              Serial PPP Menu
1.Information              1.Serial PPP Menu          1.Information
2.Settings                2.IR Network Menu          2.Connection Set
3.Tests                   3.Wi-Fi Menu               3.Echo Test
4.Memory                  4.GSM/GPRS Menu
5.Power
6.Load Program
7.Bluetooth Menu
8.Next Page
```

Note: Point-to-Point Protocol (PPP) is a method of connecting the mobile computer to the Internet over serial links. It sends TCP/IP packets to a server that connects to the Internet.

3.8.1 INFORMATION

Information of library version can be viewed here.

```
      System Menu              Serial PPP Menu            LIB:8500L-2.00
1.Serial PPP Menu       1.Information
2.IR Network Menu       2.Connection Set
3.Wi-Fi Menu            3.Echo Test
4.GSM/GPRS Menu
```

Serial PPP Menu > 1. Information

LIB   C library version

‣ Identical to **System Menu** > **1. Information**

3.8.2 CONNECTION SET
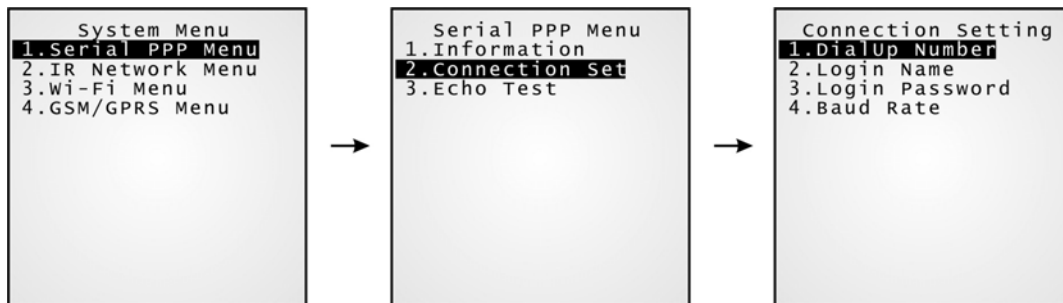
DialUp Number

Enter the number provided by your ISP.

Login Name

Enter the login name provided by your ISP.

Login Password

Enter the login password provided by your ISP.

Baud Rate

Select a desired baud rate.

Note: By default, the baud rate is set to 57600 bps on the Modem Cradle.
For any other value, such as 115200/38400/19200/9600, you must configure
through the DIP switch on the IR control board.

3.8.3 ECHO TEST

This echo test is used for verifying connectivity via Point-to-Point Protocol. For the Modem Cradle, its physical connectivity can be verified in **System Menu > Tests > Echo Test > IR or MODEM**.

Enter the IP address of a server with which a PPP connection is desired. Then, it will try to connect to the server.

```
    System Menu
1.Serial PPP Menu
2.IR Network Menu
3.Wi-Fi Menu
4.GSM/GPRS Menu
```
→
```
   Serial PPP Menu
1.Information
2.Connection Set
3.Echo Test
```
→
```
      Echo Test
====================
Server IP:
62.64.64.0
```
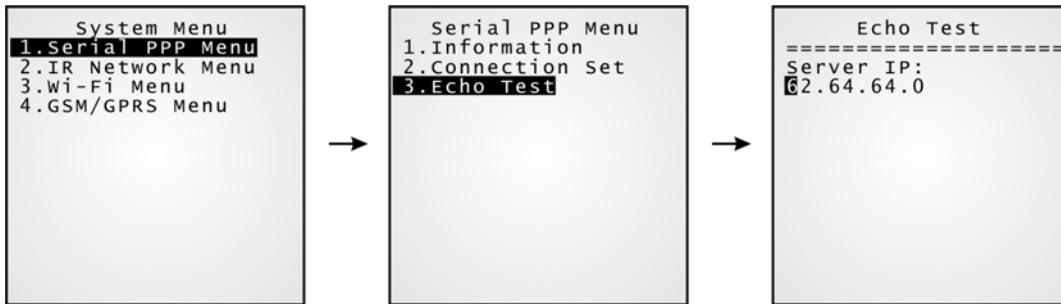
Note: After the "PPP via IR" connection is established properly, run the utility "Echo Test" on your computer (TCP/IP – Server), and then, start this test on your mobile computer.

3.9 IR NETWORK MENU (ETHERNET VIA IR)

This submenu is for Ethernet connection via IR networking. You must configure these parameters correctly.

```
    System Menu
1.Information
2.Settings
3.Tests
4.Memory
5.Power
6.Load Program
7.Bluetooth Menu
8.Next Page
```
→
```
    System Menu
1.Serial PPP Menu
2.IR Network Menu
3.Wi-Fi Menu
4.GSM/GPRS Menu
```
→
```
   IR Network Menu
1.Information
2.Network Setting
3.Echo Tests
```
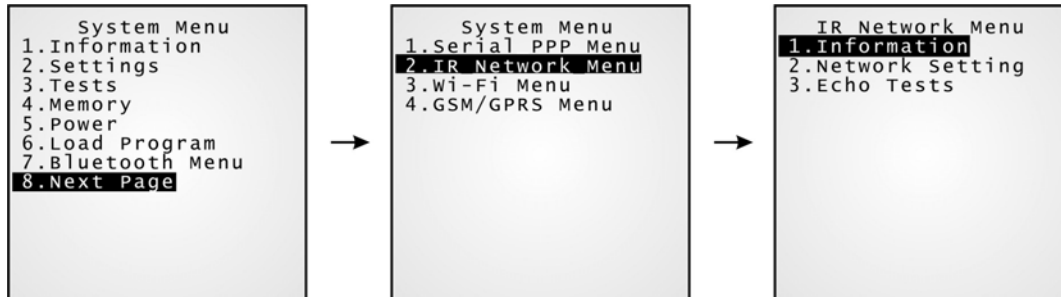
Note: The Ethernet Cradle is required for establishing Ethernet connection via IR.

3.9.1 INFORMATION

Information of Ethernet network configuration can be viewed here.

```
    System Menu
1.Serial PPP Menu
2.IR Network Menu
3.Wi-Fi Menu
4.GSM/GPRS Menu
```
→
```
   IR Network Menu
1.Information
2.Network Setting
3.Echo Tests
```
→
```
DHCP: Enable
IP  : 0.0.0.0
Mask: 255.255.128.0
Gate: 0.0.0.0
```
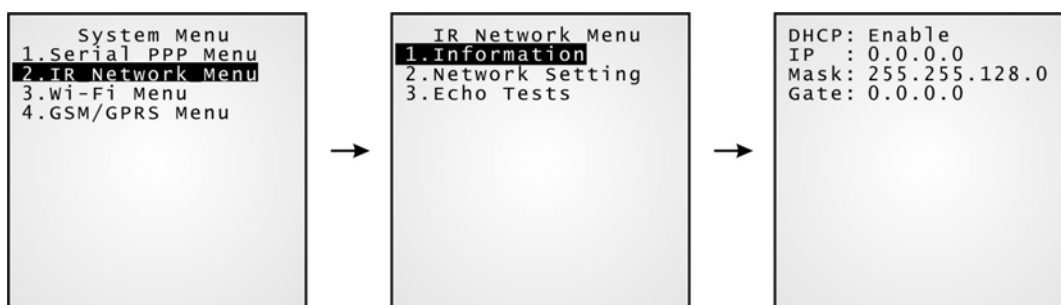
IR Network Menu > 1. Information

DHCP	DHCP server in use or not
IP	IP address of the mobile computer
Mask	Subnet Mask
Gate	Default Gateway

3.9.2 NETWORK SETTING

Set parameters for IP networking.

DHCP

Options - Enable or Disable

Subnet Mask

Enter a new Mask IP, if necessary.

Local IP Address

Enter a new address for the mobile computer, if necessary.

Default Gateway

Enter a new address for the default Gateway, if necessary.

DNS Server
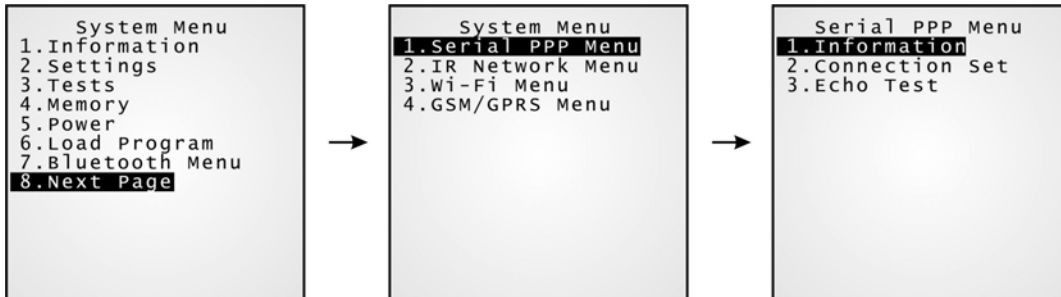
Enter a new address for the DNS server, if necessary.

Domain Name

The domain name of the host is displayed when DHCP server is enabled.

Note: Normally, DHCP is enabled and all of the settings can be obtained form the DHCP server.

3.9.3 ECHO TESTS
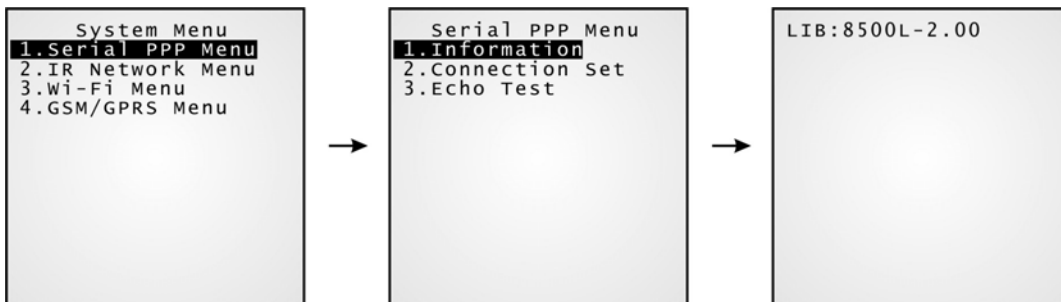
The Ethernet Cradle supports three working modes:

▶ Data Mode

▶ Modem Mode

▶ Transparent Mode

These echo tests are used for verifying connectivity via the Ethernet Cradle. For details, refer to the Ethernet Cradle manual.

```
    System Menu
1.Serial PPP Menu
2.IR Network Menu
3.Wi-Fi Menu
4.GSM/GPRS Menu
```

→

```
   IR Network Menu
1.Information
2.Network Setting
3.Echo Tests
```

→

```
    Echo Tests
1.Data Mode
2.Modem Mode
3.Transparent Mode
```

↓

```
    Echo Tests
1.Client Mode
2.Server Mode
```

Data Mode

Set the Ethernet Cradle in Data mode. The mobile computer works as a client.

Modem Mode

Set the Ethernet Cradle in Modem mode. The mobile computer works as a client.

Transparent Mode

1. Client Mode - Set the mobile computer as a client.

   Enter the IP address of a server with which a connection is desired.

2. Server Mode - Set the mobile computer as a server that waits for other devices to connect to.

Note: After the "Ethernet via IR" connection is established properly, run the utility "Echo Test" on your computer (TCP/IP – Server or Client), and then, start this test on your mobile computer.

3.10 WI-FI MENU

This submenu is for 802.11b/g wireless networking. You must configure these parameters correctly.

```
    System Menu          System Menu           Wi-Fi Menu
1.Information        1.Serial PPP Menu     1.Information
2.Settings           2.IR Network Menu     2.Network Setting
3.Tests              3.Wi-Fi Menu          3.WLAN Setting
4.Memory             4.GSM/GPRS Menu       4.Security
5.Power                                    5.Echo Tests
6.Load Program
7.Bluetooth Menu
8.Next Page
```
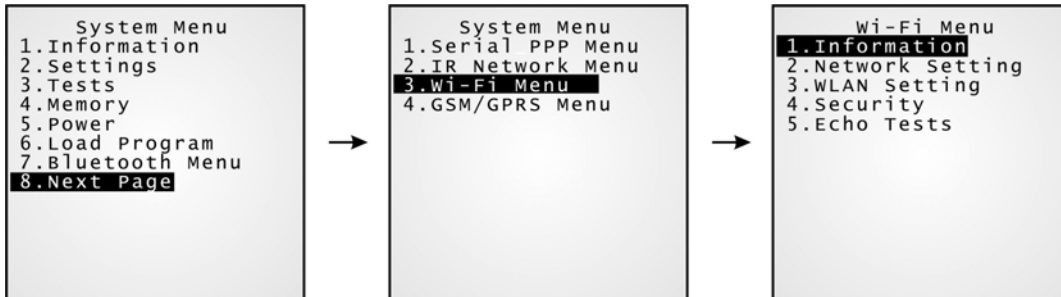
Note: This submenu is generated only when the Wi-Fi module is present.

Wi-Fi Settings	Default Value	Ad-hoc	Infrastructure
Network Setting		**Items Need to Be Checked**	
DHCP	Enabled	---	v
SubNet Mask	255.255.128.0	v	v
Local IP Address	0.0.0.0	v	v
Default Gateway	0.0.0.0	---	v
DNS Server	0.0.0.0	---	v
Domain Name	---	---	v
WLAN Setting			
Local Name	Model no. + Serial no.	v	v
SS ID	---	---	v
System Scale	Medium	---	v
Power Saving	Enabled	---	v
Preamble	Long	---	v
Ad-Hoc	Disabled	v	---
Security			
Authentication	Open System	---	v
WEP Menu	Disabled	---	v
EAP Menu	Disabled	---	v
WPA Menu	Disabled	---	v

3.10.1 INFORMATION

Information of network configuration can be viewed here.

```
    System Menu
1.Serial PPP Menu
2.IR Network Menu
3.Wi-Fi Menu
4.GSM/GPRS Menu
```

```
     Wi-Fi Menu
1.Information
2.Network Setting
3.WLAN Setting
4.Security
5.Echo Tests
```

```
Ver:0.00
MAC : 000b6b1aa747
ID  : 8500cipherlab
DHCP: Enable
IP  : 0.0.0.0
Mask: 255.255.128.0
Gate: 0.0.0.0
```

Wi-Fi Menu > 1. Information

Ver	Firmware version of the module chipset
MAC	MAC ID of the 802.11b/g module
ID	A name given to the mobile computer for identification.
	▶ By default, it is made up of model No. and the serial number. (Identical to 3. WLAN Setting > 1. Local Name)
DHCP	DHCP server in use or not
IP	IP address of the mobile computer
Mask	Subnet Mask
Gate	Default Gateway

3.10.2 NETWORK SETTING

Set parameters for IP networking.

DHCP

Options - Enable or Disable

Subnet Mask

Enter a new Mask IP, if necessary.

Local IP Address

Enter a new address for the mobile computer, if necessary.

Default Gateway

Enter a new address for the default Gateway, if necessary.

DNS Server

Enter a new address for the DNS server, if necessary.

Domain Name

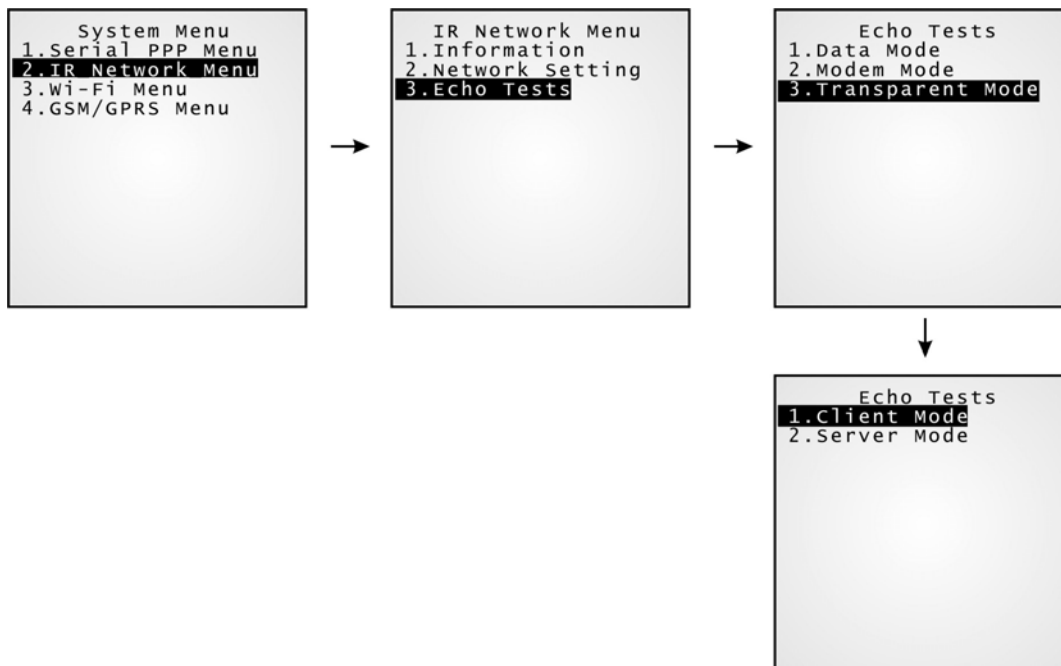The domain name of the host is displayed when DHCP server is enabled.

Note: Normally, DHCP is enabled and all of the settings can be obtained form the DHCP server.

3.10.3 WLAN SETTING

Wireless networking can operate in two modes – (1) Ad-hoc mode: peer-to-peer, and (2) Infrastructure mode: point to multi-point through access points.

Set the following parameters.

```
   System Menu              Wi-Fi Menu              WLAN Setting
1.Serial PPP Menu      1.Information           1.Local Name
2.IR Network Menu      2.Network Setting      2.SS ID
3.Wi-Fi Menu           3.WLAN Setting         3.System Scale
4.GSM/GPRS Menu        4.Security             4.Power Saving
                       5.Echo Tests           5.Preamble
                                              6.Ad-Hoc

        →                      →
```

Local Name

Enter a name for identifying the mobile computer.

▶ By default, it is made up of model No. and the serial number.

SS ID

This refers to Service Set ID or Identifier.

▶ The mobile computer can ONLY communicate with access points that have the same SS ID.

System Scale

This refers to Access Point Density.

Options - [1] Low [2] Medium [3] High

▶ The value you set must match that set for the access point.

▶ "Low / Medium / High" means the mobile computer will search for other APs only when data transmission rate is below "1 / 2 / 5" Mbps individually.

Power Saving

This refers to the low power consumption mode.

Options - Enable or Disable

▶ The value you set must match that set for the access point.

Preamble

Options - [1] Long [2] Short [3] Both

▶ The value you set must match that set for the access point.

Ad-Hoc

This refers to peer-to-peer mode, without going through access points.

Options - Enable or Disable

3.10.4 SECURITY

Set or modify security parameters.

▶ WEP: Wired Equivalent Privacy

▶ EAP: Extensible Authentication Protocol

▶ WPA: Wi-Fi Protected Access

```
    System Menu              Wi-Fi Menu               Security
1.Serial PPP Menu       1.Information          1.Authentication
2.IR Network Menu       2.Network Setting      2.WEP Menu
3.Wi-Fi Menu            3.WLAN Setting         3.EAP Menu
4.GSM/GPRS Menu         4.Security             4.WPA Menu
                        5.Echo Tests
```

Authentication

[1] Open System	▶ Default authentication type
[0] Share Key	▶ This requires implementing WEP key.

WEP Menu

WEP Setting	▶ Enabled (For Share Key, it must be enabled!)
	▶ Disabled (default)
WEP Key Length	▶ 64 bits
	▶ 128 bits (default)
Default Key	WEP KEY1
WEP Key	Enter WEP Keys 1 ~ 4 in one of the following input data type:
	▶ ASCII (up to 13 characters)
	▶ Hexadecimal (up to 26 characters)

EAP Menu

EAP Setting	▶ Enabled
	▶ Disabled (default)
EAP ID	Enter a user name (up to 32 characters)
EAP Password	Enter a password (up to 32 characters)

WPA Menu

WPA Setting	▶ Enabled
	▶ Disabled (default)
WPA Passphrase	Enter a phrase as your password (8 ~ 63 characters)

3.10.5 ECHO TESTS

This function is used to measure the coverage of the range, estimate the number of APs and mobile computers needed, and determine the topology of deploying APs.

```
     System Menu
1.Serial PPP Menu
2.IR Network Menu
3.Wi-Fi Menu
4.GSM/GPRS Menu
```
→
```
      Wi-Fi Menu
1.Information
2.Network Setting
3.WLAN Setting
4.Security
5.Echo Tests
```
→
```
      Echo Tests
1.Client Mode
2.Server Mode
```

Client Mode

Set the mobile computer as a client. Enter the IP address of a server with which a connection is desired. Then, it will try to connect to an AP.

1. Run the Echo Test program on your computer. Associated settings include

    - Select "TCP/IP – Server" for interface.

    - Set Action Mode to "Passive".

2. Start the echo test on both ends.

3. Enter the server IP and port number on the mobile computer.

Server Mode

Set the mobile computer as a server. The mobile computer will try to connect to an AP.
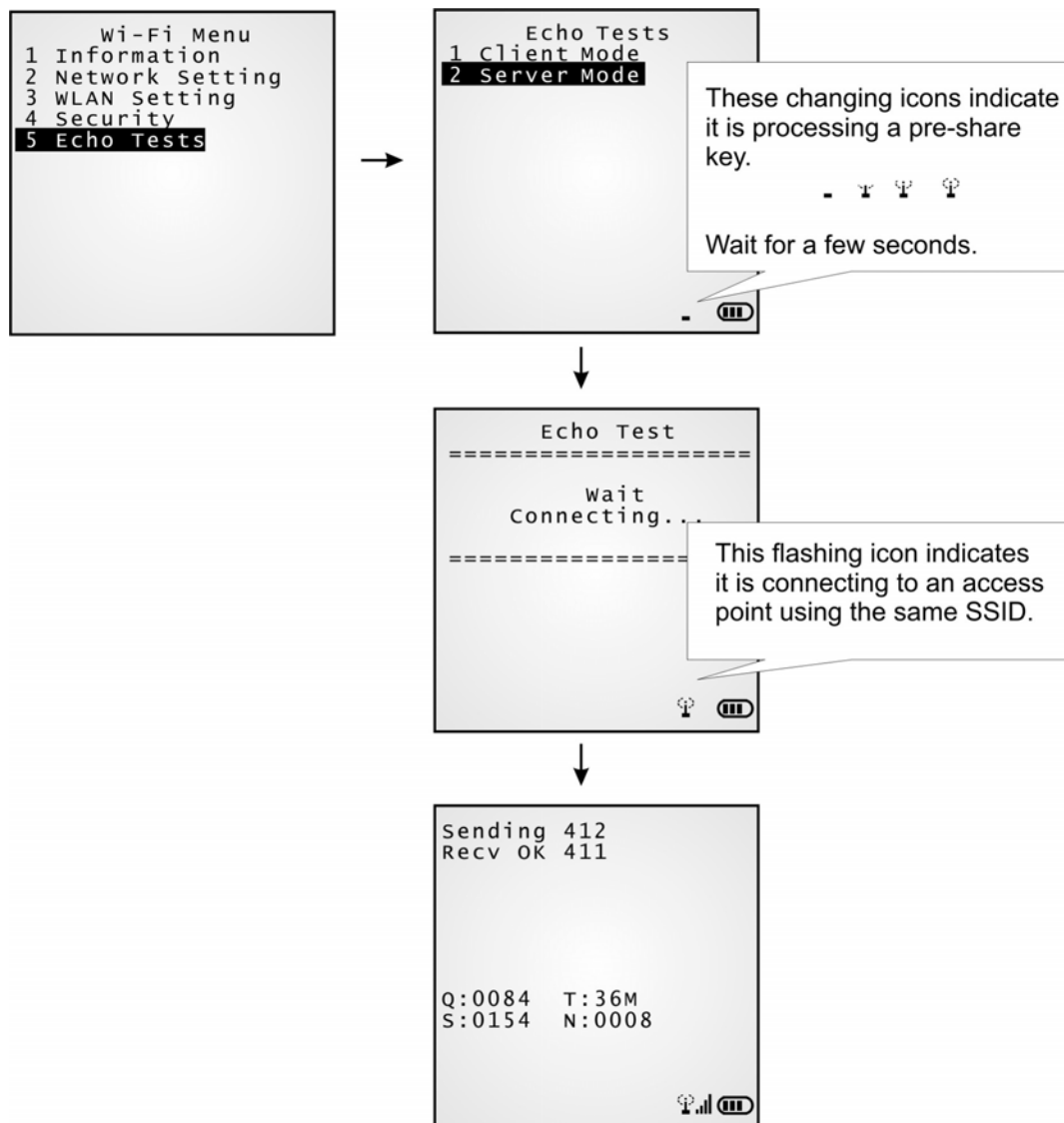
1. Run the Echo Test program on your computer. Associated settings include

    - Select "TCP/IP – Client" for interface.

    - Set Action Mode to "Passive".

2. Start the echo test on both ends.

Note: Run the utility "Echo Test" on your computer (TCP/IP – Server or Client), and start this test on your mobile computer.

While running echo tests, if WPA setting is enabled for security, the SSID and Passphrase will be processed to generate a pre-share key.

Note: If you change the SSID or Passphrase, it will have to re-generate a pre-share key.

1) For initial association with an access point, you will see an antenna icon developing on the screen to indicate that the mobile computer is processing a pre-share key.

2) After having generated the pre-share key, the mobile computer proceeds to establish a connection with an access point, and you will see the whole antenna is flashing.

3) When the mobile computer has been connected to the access point successfully, you will see the whole antenna and the indication of wireless signal strength.

```
      Wi-Fi Menu
1 Information
2 Network Setting
3 WLAN Setting
4 Security
5 Echo Tests
```

```
      Echo Tests
1 Client Mode
2 Server Mode
```

These changing icons indicate it is processing a pre-share key.

Wait for a few seconds.

```
      Echo Test
====================
         Wait
   Connecting....

================
```

This flashing icon indicates it is connecting to an access point using the same SSID.

```
Sending  412
Recv OK  411




Q:0084   T:36M
S:0154   N:0008
```

Note: If you are programming in C or BASIC, be aware that these icons will appear on the device screen after NetInit() or START TCPIP() is called. (WPA must be enabled first!)

Once the connection of echo test is established, the details will be displayed as illustrated below. Link Quality ("Q") will be the most important element while the others are for your reference.

```
Sending 412
Recv OK 411




Q:0084   T:36M
S:0154   N:0008


              ⊻.ⅈⅼ ⅢⅠ
```

| Q (Link Quality)		T (Transmit Speed)		S (Signal Level)		N (Noise Level)	
0 ~ 10	Very Poor	1	Mbps	0 ~ 10	Weak	1	Weak
10 ~ 15	Poor	2	Mbps	30 ~ 60	Moderate	2 ~ 3	Moderate
15 ~ 30	Good	5.5	Mbps	Over 60	Strong	4 ~ 5	Strong
50 ~ 80	Very Good	11	Mbps				
		6	Mbps				
		9	Mbps				
		12	Mbps				
		18	Mbps				
		24	Mbps				
		36	Mbps				
		48	Mbps				
		54	Mbps				

3.11 GSM/GPRS MENU

This submenu is for GSM/GPRS networking. You must configure these parameters correctly. The required information must be obtained from your GSM/GPRS network operator.

▶ GSM:

Data services of GSM, including SMS (Short Message Service) and data call, are provided for receiving and sending data.

▶ GPRS:

Through Access Points of GPRS, the mobile computer can establish a connection with the content server that connects to the Internet. Only client-initiated connection is supported.
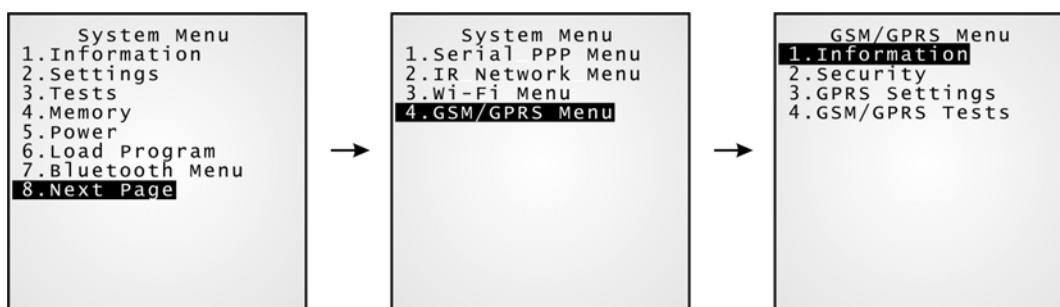
Note: This submenu is generated only when the GSM/GPRS card is present.

3.11.1 INFORMATION

Information of GSM/GPRS configuration can be viewed here.

GSM / GPRS Menu > 1. Information

GSM Network	Undefined.
PIN	Personal Identity Number of SIM card for security check.
APN	Access Point Name of your GPRS operator.
DHCP	DHCP server in use or not
IP	IP address of the mobile computer

3.11.2 SECURITY

In order to decide whether to apply security check, you must type the correct PIN code and press [Enter]. You may change the PIN code if necessary.

```
   System Menu
1.Serial PPP Menu
2.IR Network Menu
3.Wi-Fi Menu
4.GSM/GPRS Menu
```
→
```
   GSM/GPRS Menu
1.Information
2.Security
3.GPRS Settings
4.GSM/GPRS Tests
```
→
```
   Security Check

Enter PIN Code:
█
```
↓
```
        Security
1.PIN Code Facility
2.PIN code
```
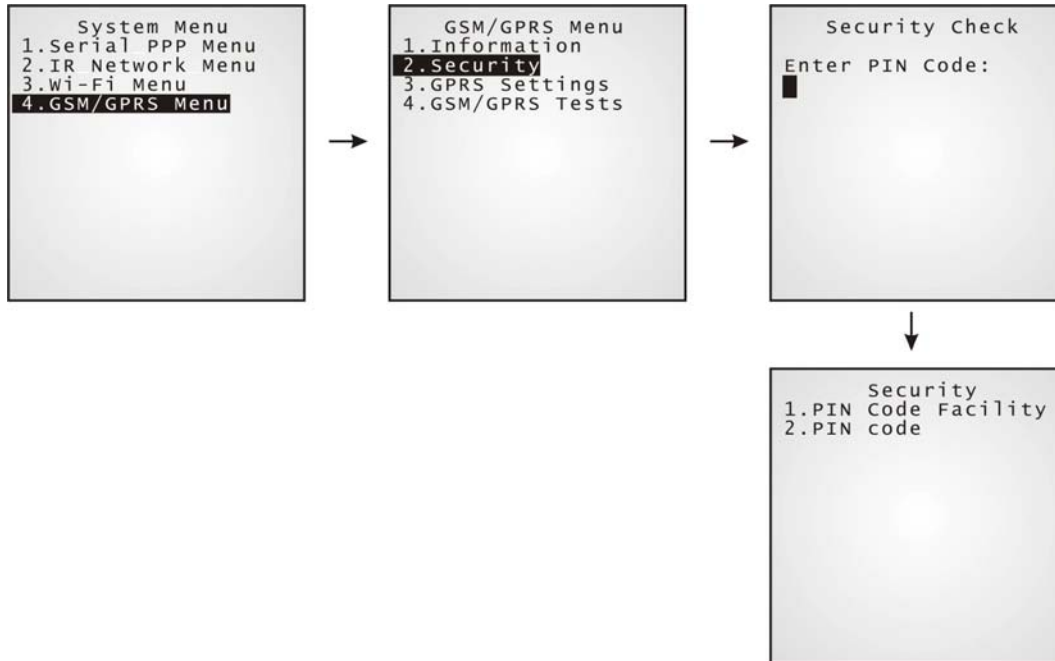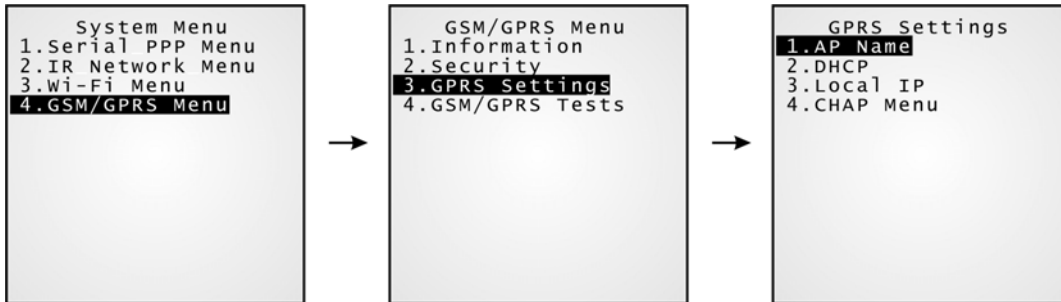
PIN Code Facility

▶ Enabled (PIN Code check)

▶ Disabled (default)

PIN Code

Change PIN code of SIM card.

3.11.3 GPRS SETTING

AP Name
Enter the AP name of your GPRS operator.

DHCP
Options – Enable (default) or Disable

Local IP
Enter a new address for the mobile computer, if necessary.

CHAP Menu

Setting	▶ Enabled
	▶ Disabled (default)
User Name	Enter a user name (up to 32 characters)
Password	Enter a password (up to 32 characters)

3.11.4 GSM/GPRS TESTS

GSM SMS Test

This GSM Sending Test is used to verify connectivity for Short Message Service. Enter a receiver telephone number on the mobile computer.

GSM Modem Echo

The mobile computer will try to connect to a GSM modem.

1. Run the Echo Test program on your computer. Associated settings include

   - Select "Modem" for interface.

   - Set Action Mode to "Passive".

2. Start the echo test on both ends.

3. Enter a receiver telephone number on the mobile computer.

4. The mobile computer will connect to the GSM modem that dials up your computer.

GPRS Client Mode

The mobile computer will try to connect to your GPRS service provider.

1. Run the Echo Test program on your computer. Associated settings include

   - Select "TCP/IP – Server" for interface.

   - Set Action Mode to "Passive".

2. Start the echo test on both ends.

3. Enter the server IP on the mobile computer.

4. The mobile computer will dials up to a GPRS AP, and finally connect to your computer (server) through the GPRS AP.

Note: Run the utility "Echo Test" on your computer (TCP/IP – Server or Client) or "TcpServer.exe" for GPRS Client Mode. Then, start this test on your mobile computer.

Chapter 4

PROGRAM MANAGER & KERNEL

This chapter explains **Program Manager** and **Kernel** that manage multiple programs and firmware upgrade.

IN THIS CHAPTER

4.1 PROGRAM MANAGER

The mobile computer supports multiple applications and languages. In the menu of **Program Manager**, it allows storing up to seven programs and has one activated for the current use.

If there is no application program exists, the **Program Manager** will be displayed after you turn on the mobile computer.

Warning!   The Program Manager menu is provided for managing programs in an administrative level.

How to access the Program Manager menu?

1) Turn off the mobile computer.

2) Press [8] + [Power].


```
Program Manager
1.Download
2.Activate
3.Upload
```
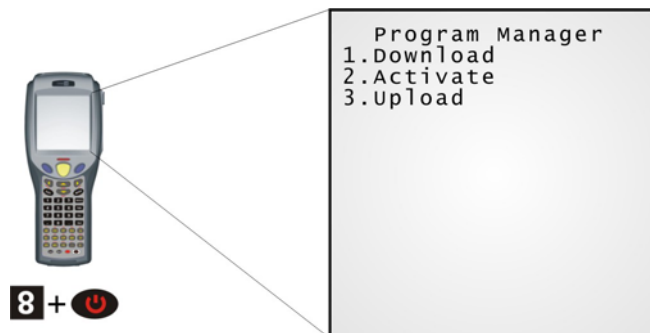
4.1.1 DOWNLOAD

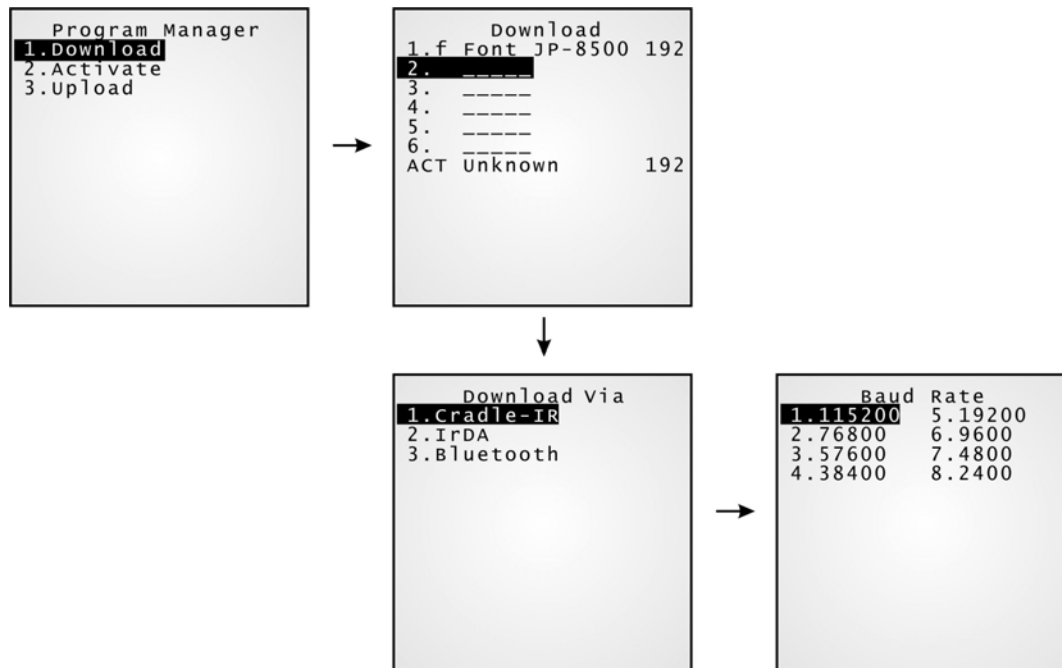Here provides a full list of programs that are currently stored on the mobile computer with size information. Multiple application programs can be downloaded through a variety of interfaces. Upon completion of downloading, you are allowed to input a name for the program. If there is no need to rename the program, simply press [ENTER] to leave as it is.

```
   Program Manager
 1.Download
 2.Activate
 3.Upload
```

→

```
        Download
 1.f Font JP-8500 192
 2.    _____
 3.    _____
 4.    _____
 5.    _____
 6.    _____
 ACT Unknown        192
```

↓

```
     Download Via
 1.Cradle-IR
 2.IrDA
 3.Bluetooth
```

→

```
      Baud Rate
 1.115200   5.19200
 2.76800    6.9600
 3.57600    7.4800
 4.38400    8.2400
```

The length of program name can be up to 12 characters. Program size is in kilo bytes.

A suffix letter after the memory sector (1 ~ 6) indicates the file type of program.

▸ "b" for BASIC program   (.SYN)
▸ "c" for C program   (.SHX)
▸ "f" for font file   (.SHX)

Note: In addition to the system font, there can be only one font file downloaded to the mobile computer. The custom font file needs to be downloaded through the System Menu or Kernel Menu.

SPARE MEMORY SECTORS (1 ~ 6)

Additional program files can be directly downloaded to these sectors.

Download a program file to an empty sector:

1. Select an empty sector by pressing the corresponding number and then [Enter].

2. Select a desired baud rate for downloading.

3. Connect the RS-232 cable and wait for a few seconds to establish a connection…

4. To abort the action, press [ESC]. Then press [ESC] again to return to the menu.

Download a program file to an occupied sector:

If no available sectors, you'll have to replace one program with the new one.

1. Select a program that you want to delete by pressing the corresponding number and then [Enter].

2. The program information is displayed on the screen.

   Press [Alpha] to enter the Alpha mode, and then press [C].

3. Select a desired baud rate for downloading.

4. Connect the RS-232 cable and wait for a few seconds to establish a connection…

5. To abort the action, press [ESC]. Then press [ESC] again to return to the menu.

   From the menu, you'll find the program is deleted but no new program is present.

If you simply want to delete a program, press [D] in step 2.

Note: [C], [D] are NOT case-sensitive.

ACTIVE MEMORY SECTOR ("ACT")

Only the application program, which needs to be activated immediately, can be downloaded to the active memory sector.

Download to Memory Sector "ACT":

1. Press the [Down] key to select the memory sector "ACT" (may be unoccupied), and then press [Enter].

2. Connect the RS-232 cable and wait for a few seconds to establish a connection…

3. If the active memory sector has already been occupied by an application program, the newly downloaded program will replace the currently active program and come into effect immediately.

4.1.2 ACTIVATE

The list shows the entire spare programs stored on the mobile computer. From the list, you can select from 1 to 6 and activate one of them. The selected program will be copied to the active memory sector and replace the current one.

```
   Program Manager              Activate Program
 1.Download                   1.f Font JP-8500 192
 2.Activate                   2.  _____
 3.Upload                     3.  _____
                        →     4.  _____
                              5.  _____
                              6.  _____
```
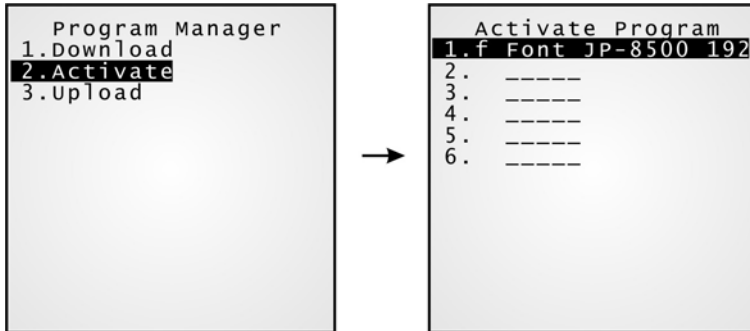
Note: A font file cannot be activated.

TO CLEAR FILE SYSTEM

When `<New Program Start>` screen appears, "Press [ESC] to clear file" means the file system in the SRAM will be cleared out by pressing [ESC]. Then there will be no data (transactions, settings, etc.) stored on the mobile computer when the new program comes into effect.

TO KEEP FILE SYSTEM

To keep the data, simply press any other key.

4.1.3 UPLOAD

You may duplicate one or all of the programs from the mobile computer to a host computer or another mobile computer. This can be used to clone software on mobile computers.

Note: To clone all of the programs, the target mobile computer cannot have any other program downloaded except the active one; that is, Memory Sectors 1~6 must be empty!

The procedures are similar to those for downloading programs.
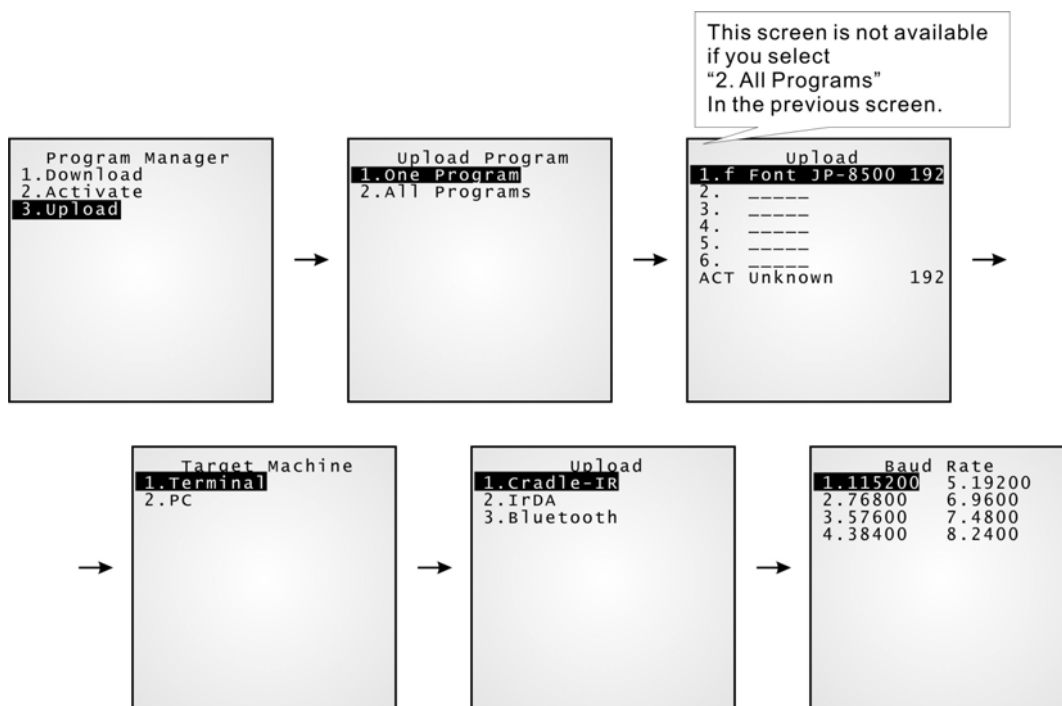
4.2 KERNEL

The kernel resides in the innermost core of the system. It has the highest security and is always protected by the system. When the application program is corrupted and the **System Menu** fails, the **Kernel Menu** provides an access to fix the system.

Warning!   The Kernel Menu is NOT for the use of any end users.

How to access the Kernel Menu?

1) When the last session is in the **System Menu** or **Program Manager**, simply turn off the mobile computer. Otherwise, you must reload the battery pack.

2) Press [1] + [7] + [Power].

4.2.1 KERNEL INFORMATION

Here provides important system information to help diagnose the system.
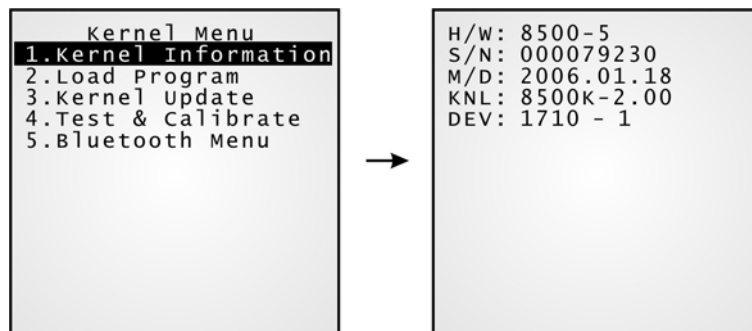
Kernel Menu > 1. Information

H/W	Hardware version (PCB)
S/N	Serial number of the mobile computer
M/D	Manufacturing date
KNL	Kernel version
DEV	5-digit code for optional hardware configurations
	Refer to <u>Understanding Device Code</u>.

4.2.2 LOAD PROGRAM

You can download one program file to the active memory sector, as well as one font file to the memory address assigned by the system. After downloading, restart the mobile computer to activate the new program.

▶ New application program or program update

▶ And/or one font file, i.e. multi-language font

If you are using a custom font file rather the system font and you want to download another font file, it is necessary to delete the current font file from the program list displayed by the Program Manager first. Otherwise, downloading new font file is not allowed.
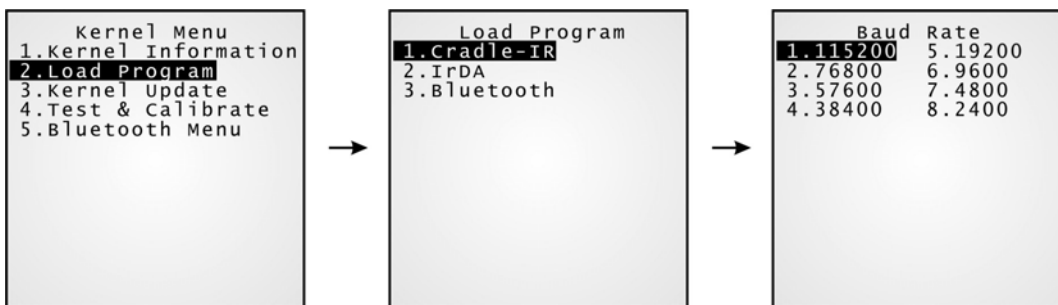
.SHX Program	Download one of the following C program files and/or one font file:	
Program File	▶ AG Runtime	(U*.shx)
	▶ CipherNet Runtime	(85xx-5250.shx, 85xx-VT.shx)
	▶ BASIC Runtime*	(BC*.shx)
	▶ User program	
Font File	Refer to the Font Files folder on CD-ROM.	

If you have downloaded a BASIC Runtime program, the next time you access the Load Program service through the **System Menu**, you will be able to select whether to download a C program (.SHX) or BASIC program (.SYN).

Note: To download a BASIC program (*SYN), go to **System Menu > 6. Load Program > 2. Load Basic**.

SETTINGS

Interface

Cradle-IR (Serial IR)	Proceed to configure baud rate settings on your computer and the mobile computer.
IrDA	Point to the target IrDA device.
Bluetooth	Approach the target Bluetooth enabled device.

Baud Rate

115200 (bps)	Supported on CipherLab software, including download utilities.
76800 (bps)	N/A
57600 (bps)	Supported on CipherLab software, including download utilities.
38400 (bps)	Supported on CipherLab software, including download utilities.
19200 (bps)	Supported on CipherLab software, including download utilities.
9600 (bps)	Supported on CipherLab software, including download utilities.
4800 (bps)	N/A
2400 (bps)	N/A

Note: If you select to use Serial IR of the Modem Cradle, any value other than 57600 bps (default) must be configured through the DIP switch on the IR control board.

LOAD PROGRAM VIA BLUETOOTH

1) Go to **System Menu** > **7**. **Bluetooth Menu** > **3**. **Security**, and configure the following Bluetooth settings first.

   ‣ Authentication

   ‣ PIN code

2) Go to **System Menu** > **6**. **Load Program** and select Bluetooth.

3) Start the pairing procedure from your computer, for example, click [Pair Device] and/or [Connect Bluetooth Serial Port].

4) Run any of the download utilities: ProgLoad.exe or Download.exe

   - Select interface RS-232/IrDA for using Bluetooth SPP.

   - Select COM port properties that match with the serial port settings used on your computer.

4.2.3 KERNEL UPDATE

The kernel might need to be updated to improve performance or due to other considerations.

▶ To download a kernel update (K*.shx), the procedure is the same as that for downloading a program.

▶ Any attempt to download an older version will be rejected.

▶ The system will restart itself right after downloading.
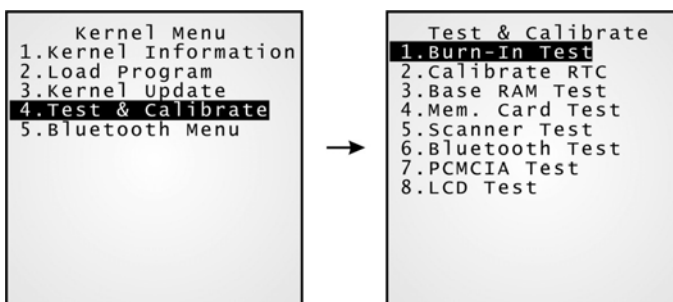
Warning: Do not turn off the mobile computer while downloading a kernel update or re-starting the mobile computer. Otherwise, it will crash the kernel forever. There is no way to recover it!

```
     Kernel Menu              Kernel Update              Baud Rate
1.Kernel Information     1.Cradle-IR            1.115200   5.19200
2.Load Program          2.IrDA                 2.76800    6.9600
3.Kernel Update         3.Bluetooth            3.57600    7.4800
4.Test & Calibrate                             4.38400    8.2400
5.Bluetooth Menu
```
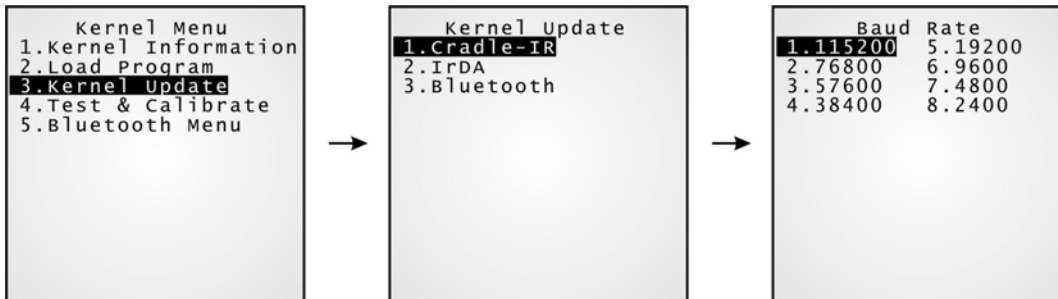
Note: CipherLab software, including download utilities, supports the following baud rate options: 115200/57600/38400/19200/9600 bps.

4.2.4 TEST & CALIBRATE

These tools are provided for manufacturing use.

```
     Kernel Menu              Test & Calibrate
1.Kernel Information     1.Burn-In Test
2.Load Program          2.Calibrate RTC
3.Kernel Update         3.Base RAM Test
4.Test & Calibrate      4.Mem. Card Test
5.Bluetooth Menu        5.Scanner Test
                        6.Bluetooth Test
                        7.PCMCIA Test
                        8.LCD Test
```
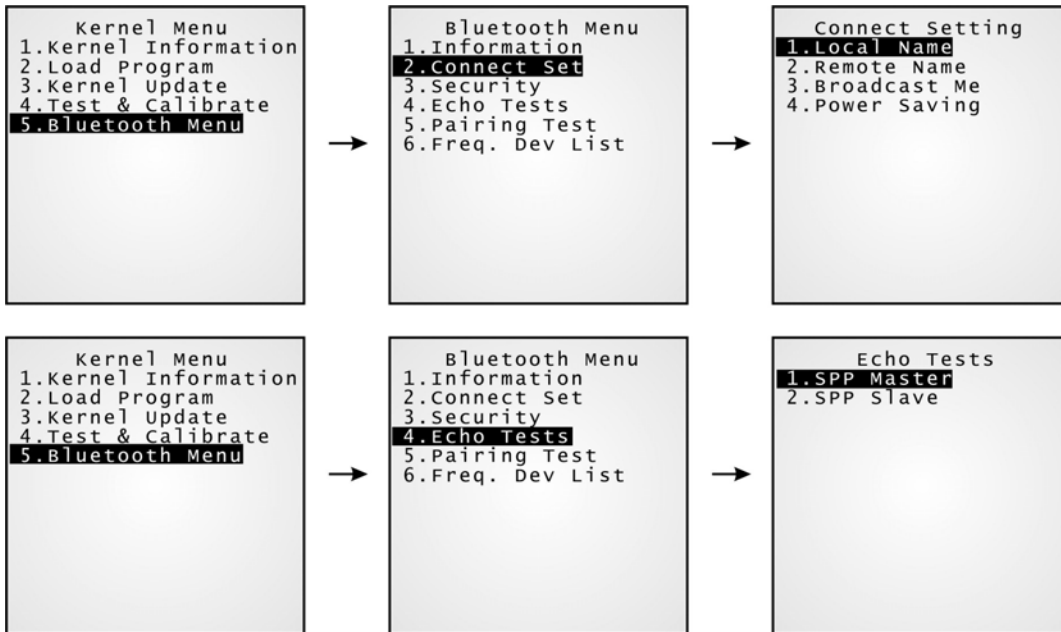
Warning!   You should not perform any of these tests.

4.2.5 BLUETOOTH MENU

This submenu is the same as the one under the **System Menu** except for the following items:

▶ "2. Connect Set > 5. BT-GPRS AP Name" is not provided.
▶ "4. Echo Tests" is provided with SPP options only.
▶ "7. Network Setting" is not provided.

```
     Kernel Menu                 Bluetooth Menu              Connect Setting
1.Kernel Information        1.Information               1.Local Name
2.Load Program              2.Connect Set               2.Remote Name
3.Kernel Update             3.Security                  3.Broadcast Me
4.Test & Calibrate          4.Echo Tests                4.Power Saving
5.Bluetooth Menu            5.Pairing Test
                            6.Freq. Dev List
           →                              →
```

```
     Kernel Menu                 Bluetooth Menu                 Echo Tests
1.Kernel Information        1.Information               1.SPP Master
2.Load Program              2.Connect Set               2.SPP Slave
3.Kernel Update             3.Security
4.Test & Calibrate          4.Echo Tests
5.Bluetooth Menu            5.Pairing Test
                            6.Freq. Dev List
           →                              →
```

SPECIFICATIONS

Model Designation		8500	8570	8580	8590
Wireless Communications	IR/IrDA	√	√	√	√
	Bluetooth Class 2	√	√	√	√
	802.11b/g	–	√	–	√
	GSM/GPRS	–	–	√	√
Readers	Barcode Reader	▶ CCD (linear imager) ▶ Standard Laser ▶ Long Range Laser ▶ Extra Long Range Laser ▶ 2D Imager			
	RFID Reader	Frequency 13.56 MHz			
Electrical Characteristics	Main Battery	Rechargeable Li-ion battery – 3.7 V, 4000 mAh			
	Working Time	Laser, one scan per 5 seconds, with backlight on: ▶ 400 hours in batch mode ▶ 32 hours in Wi-Fi mode			
	Backup Battery	▶ Rechargeable Lithium button cell – 3.0 V, 7 mAh ▶ Data retention – at least 7 days			
Physical Characteristics	CPU	32-bit Toshiba CMOS type, 40 MHz			
	Memory	▶ Program memory – 2 MB flash ▶ Data memory – 2 MB onboard SRAM, upgradeable (4 MB/ 8 MB memory card)			
	Display	Graphic LCD, 160 x 160 pixels, 3" FSTN with LED backlight programmable ▶ Font size 6x8: 26 characters by 19 lines ▶ Font size 8x16: 20 characters by 9 lines Also a touch screen allows for the use of stylus for control and signature capture.			
	Keypad	24 or 44 rubber keys, LED backlight programmable			
	Indicators	▶ LED – Dual-color (red/green), programmable ▶ Buzzer – Low power transducer type, 1 KHz to 4 KHz, programmable			
	Vibrator	9000 ± 2000 RPM, Max. 50 dB, programmable			
	Enclosure Material	Rubber & ABS plastic			
	Dimensions	230 mm (L) 91 mm (W) 65 mm (H)			
	Weight	Approx. 600 g **(Laser and battery included)**			

Environmental Characteristics	Temperature	Operating :	-20 °C to 60 °C (8500)
			-10 °C to 60 °C (8570/8580/8590)
		Storage:	-30 °C to 70 °C
	Humidity	Operating :	10% to 90% non-condensing
		Storage:	5% to 95% non-condensing
	Impact Resistance	1.5 m, 5 drops per 6 sides	
	Splash / Dust Resistance	IP 64	
	Electrostatic Discharge	± 15 kV air discharge, ± 8 kV direct discharge	
	EMC Regulations	FCC, IC, CE, C-Tick, NCC, BSMI, TELEC, MIC	
Programming	Development Tools	C and BASIC	
	Software & Utilities	Windows-based Application Generator (AG), AG utilities;	
		Windows-based CipherNet for VT100/220, IBM 5250 emulation;	
		Download utilities, testing tools, etc.	
Accessories		▶ 4 or 8 MB Memory Card	
		▶ Pistol Grip	
		▶ Belt Holster	
		▶ Protective Cover	
		▶ Spare rechargeable battery pack	
		▶ 4-slot Battery Charger	
		▶ Charging & Communication Cradle	
		▶ Modem Cradle (56 K)	
		▶ Ethernet Cradle (10/100 BASE-T)	
		▶ Vehicle Cradle	
		▶ Travel Charger	
		▶ Bluetooth Access Point	
		▶ 802.11b/g Access Point	

DOWNLOAD UTILITIES

For easy development of applications, the mobile computer ships with development tools on the CD-ROM. It includes Windows-based **Application Generator** programs, batch and WLAN, as well as download utilities.

The download utilities are provided for you to download a program (*.SHX or *.SYN) to the mobile computer. Currently, the program ProgLoad.exe has replaced several previously released utilities as shown below.

▶ Download.exe   : to download a *.SHX file
▶ IRLoad.exe   : to download a *.SHX file
▶ SynLoad.exe   : to download a *.SYN file

Programs can be as follows —

Program Type		System Menu	Kernel Menu	Program Manager
AG Runtime	U*.SHX	√	√	√
CipherNet Runtime	85xx-VT.SHX 85xx-5250.SHX	√	√	√
BASIC Runtime	BC*.SHX	√	√	√
BASIC program	*.SYN	√	–	–
Font file	For example, Font-Multi-Language. SHX	√	√	–
Kernel update	K*.SHX	–	√	–

PROGLOAD.EXE

This all-in-one utility supports all the file types and communications interfaces. Run the program on your computer. The following dialog box pops up.
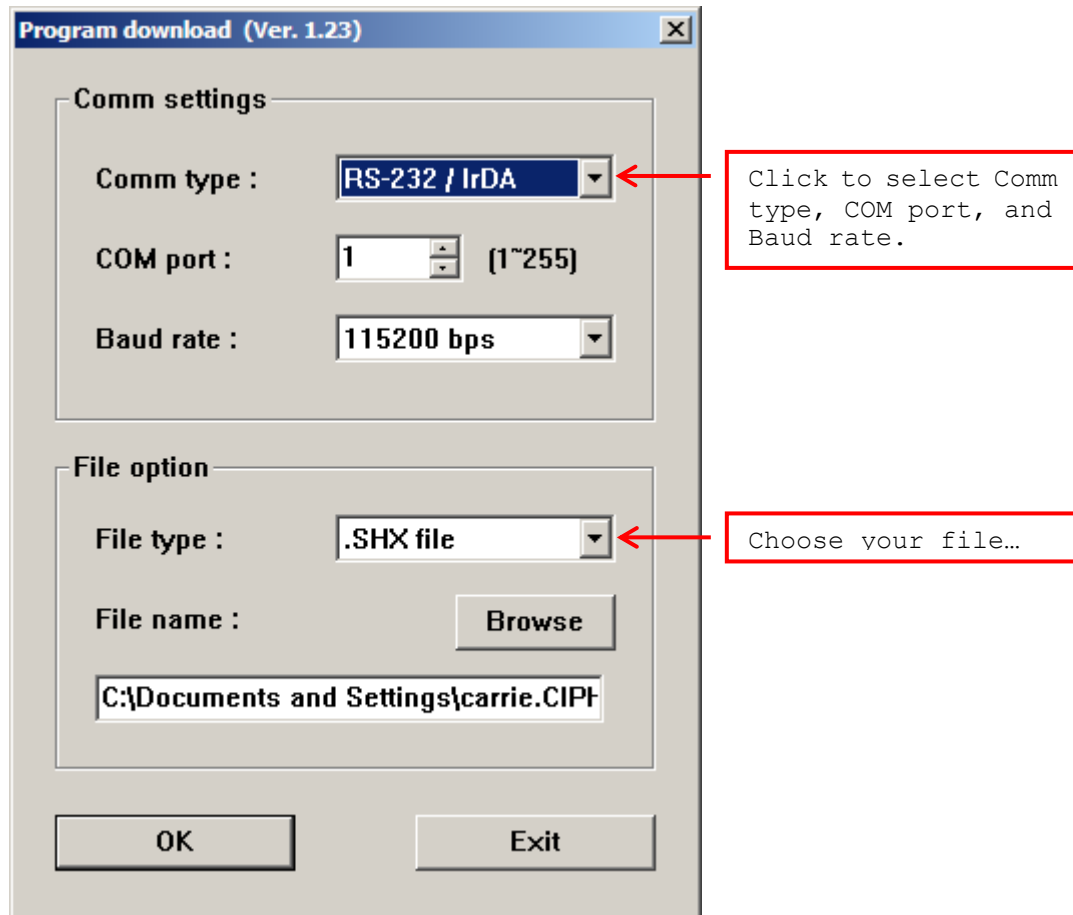
Communication Type

|	
RS-232/IrDA	Connection via direct RS-232 cable, IrDA port, or Bluetooth SPP (= Download.exe)
Serial IR	Connection via cradle (= IRLoad.exe)
TCP/IP	Connection over networks (Not supported currently!)

File Type

.SHX file	Any C program, such as AG Runtime, Basic Runtime, font file, etc.
.SYN file	Any Basic program after Basic Runtime has been installed first.

IRLOAD.EXE

This utility is provided when you establish a connection via the cradle.

1) Run the program on your computer.

2) Choose a .SHX file.

3) Select COM port properties.
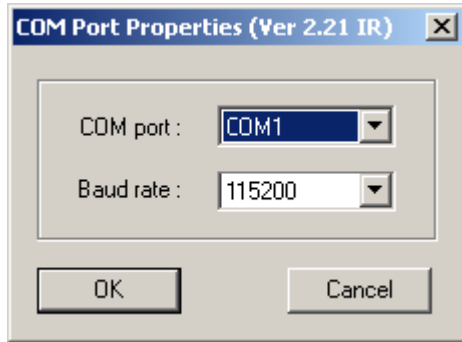
COMMAND LINE

It also supports command line arguments. For example,

IRLOAD U8500-114.SHX,2,1//COM2,115200 bps

If command line arguments are not given, the user can select appropriate parameters from the pop-up dialog box.

IRLOAD [filename],[COM port],[Baud rate]

File name:	The file name of the program that is to be downloaded.		
COM port:	1 ~ 8		Default: 1
Baud rate:	1 ~ 5	1 for 115200 bps	Default: 1
		2 for 57600 bps	
		3 for 38400 bps	
		4 for 19200 bps	
		5 for 9600 bps	

DOWNLOAD.EXE

This utility is provided when you establish a connection via serial interface, such as a direct RS-232 cable, IrDA port, or Bluetooth SPP.

4)   Run the program.

5)   Choose a .SHX file.

6)   Select COM port properties.
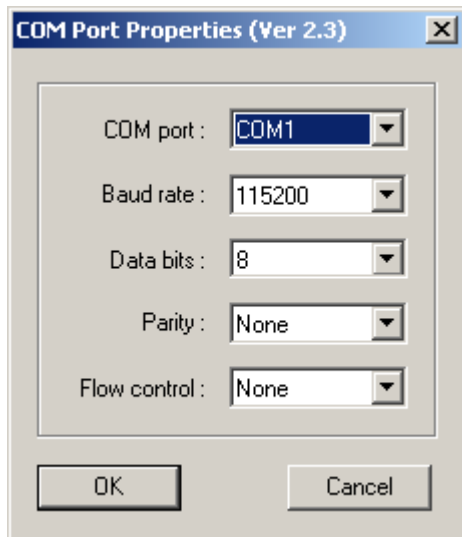
COMMAND LINE

It also supports command line arguments.

TROUBLESHOOTING

The mobile computer cannot be turned on when you press the POWER key...

▸ Make sure the battery pack is installed properly.

▸ Re-charge the battery inside the mobile computer and monitor the charging status. ([see 3.5](#))

▸ If the battery is faulty, replace it with a fresh and fully charged battery then.

Charging error...

▸ Make sure the power cord is well connected between the cradle/charger and an outlet.

▸ Check if the battery contacts of the battery itself and the battery compartment are clean.

▸ Try to re-charge the battery and monitor the charging status.

Warning!   Only use batteries or charging device manufactured by CipherLab. The use of wrong battery or charging device could result in damage to human body or the product itself, and will void your warranty.

The keyboard input seems not working properly...

▸ Perform the keyboard test. ([see 3.3.4](#))

▸ If the problem persists, slide the battery latch to reload the battery pack. Then perform the test again.

The reader does not scan...

Low battery —

▸ Check if the battery icon on the screen indicates a low battery status. If so, replace it with a fresh battery then.

▸ If the problem persists, check if the battery contacts get dirty or the battery pack does not fit to the compartment.

Regarding the barcode or RFID reader —

▸ Perform the reader test to see if the reader is working. ([see 3.3.1](#) or [3.3.9](#))

▸ If the problem persists, slide the battery latch to reload the battery pack. Then perform the test again.

The reader does not decode after scanning...

Unreadable barcode —

▶ Check if the barcode is defaced. A defaced barcode may not be readable.

Un-programmed to read —

▶ Check if the scanner is programmed to read the symbologies (types of barcode) that you are trying to read.
▶ Try scanning a test barcode of the symbology you are trying to read.

Dirty scan window —

▶ Check if the scan window gets dirty. Wipe it with a clean and dry cloth, and try again.

Out of scanning range —

▶ Try adjusting the scanning distance from the scanner to the barcode.

The mobile computer cannot transmit/receive data to/from a host computer or other devices...

Over IR port —

▶ Make sure the mobile computer's infrared port is pointed directly to the infrared port of another IR device. The distance between the mobile computer and a target device is within proper range, and no obstacles in between. Try to establish connection again.

Via Bluetooth —

▶ Make sure the distance between the mobile computer and a target device is within proper range. Try to establish connection again.
▶ Check if the relevant settings are correct. (see 3.7)
▶ Check if the connection is working properly. (see 3.7)

Over RS-232 port via cradle —

▶ Check if the RS-232 connection is correct and secured.
▶ Make sure the serial port parameters on the host are configured to match the serial parameters on the mobile computer. Try to establish connection again.
▶ Make sure the mobile computer is well seated inside the cradle. DO NOT remove the mobile computer or disconnect the cradle before communications are done.
▶ If the problem persists, run the IR Echo Test to check the IR interface between the mobile computer and the cradle. (see 3.3.8)

Over MODEM port via cradle —

▶ Check if the modem connection is correct and secured.

▶ Make sure the modem parameters are configured to match the parameters on the mobile computer. Try to establish connection again.

▶ Make sure the mobile computer is well seated inside the cradle. DO NOT remove the mobile computer or disconnect the cradle before communications are done.

▶ If the problem persists, run the IR Echo Test to check the IR interface between the mobile computer and the cradle. (see 3.3.8)

About abnormal response...

The LED or LCD seems not working properly —

▶ Perform the LCD & LED test. (see 3.3.3)

▶ If the problem persists, reload the battery pack and perform the test again.

The buzzer seems not working properly —

▶ Perform the buzzer test. (see 3.3.2)

▶ If the problem persists, reload the battery pack and perform the test again.

The mobile computer seems not working properly —

▶ First upload all data to a computer, and then perform the memory test. (see 3.3.5)

▶ If the problem persists, reload the battery pack and perform the test again.

The touch screen seems not working properly —

▶ Perform the touch screen test. (see 3.3.6)

▶ If the problem persists, reload the battery pack and perform the test again.

The vibrator seems not working properly —

▶ Perform the vibrator test. (see 3.3.7)

▶ If the problem persists, reload the battery pack and perform the test again.