

CipherLab Reference Manual

8000 Series Mobile Computer

8000/8001/8020/8021/8061/8062/8071

Version 2.10



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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.

FCC Caution: Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate this equipment.

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 numérique respecte les limites de bruits radioélectriques applicables aux appareils numériques de Classe B prescrites dans la norme sur le matériel brouilleur: "Appareils Numériques," NMB-003 édictée par l'Industrie.

FOR HAND-HELD PRODUCT WITH RF FUNCTIONS

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. End users must follow the specific operating instructions for satisfying RF exposure compliance. To maintain compliance with FCC RF exposure compliance requirements, please follow operation instruction as documented in this manual.

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

- ▶ 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), 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	May 23, 2008	▶ Modified: Specifications – Drop Test 1.2 meters
2.10	Apr. 24, 2008	New Word template applied
2.01	Aug. 10, 2007	▶ Modified: section 1.5.9 Reader – Defaults updated
2.00	Apr. 14, 2007	▶ New release

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INTRODUCTION

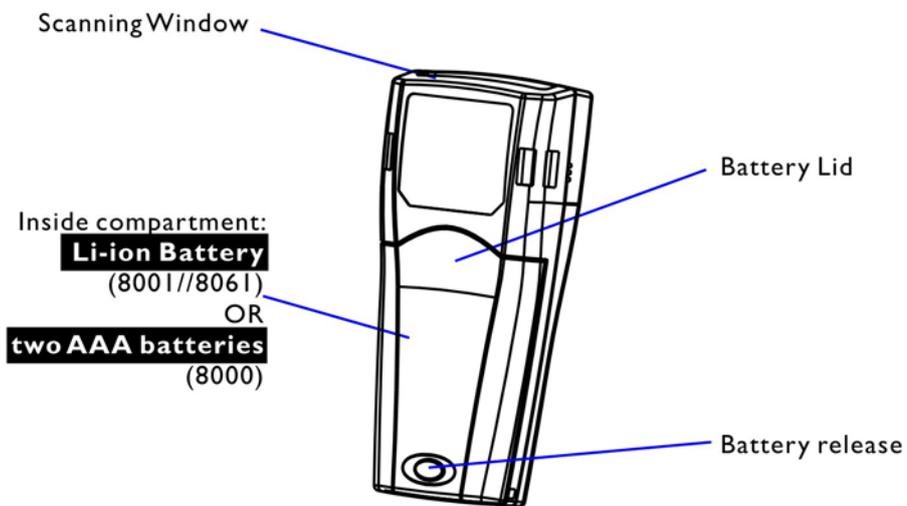
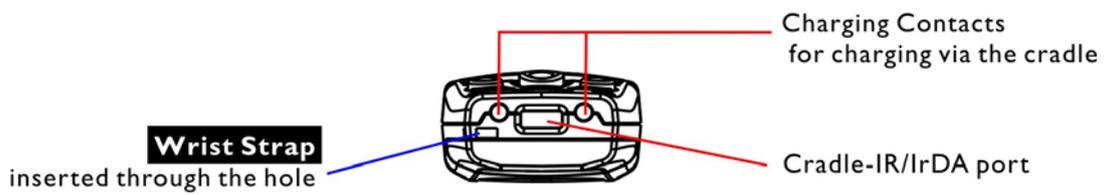
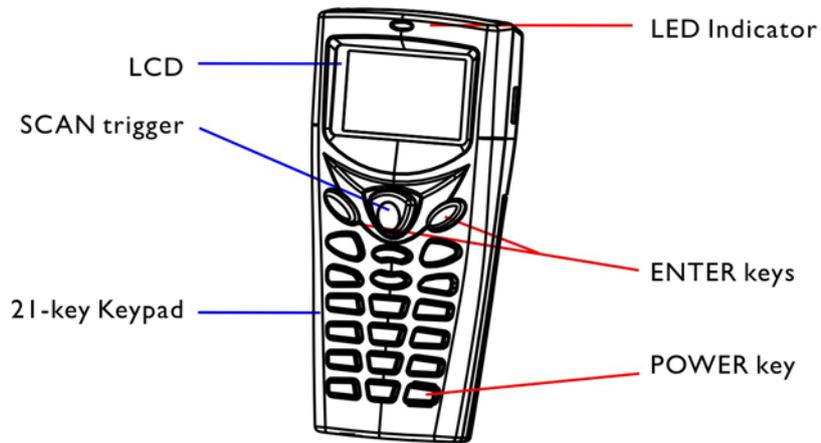
Answering light industrial demands, the 8000 Series Mobile Computer is specifically designed for enterprise logistics use. Small-form-factor and light-weight, it proves to be an ace player in retail and healthcare applications.

This line of product comes with optional Bluetooth and 802.11b/g wireless technologies, enabling real time sharing of performance. The 8000 Series Mobile Computer is bundled with powerful and rich features to ensure success in timely processing of information, and thus, makes an ideal choice for inventory control, shop floor management, warehousing and distribution operations. 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 8000



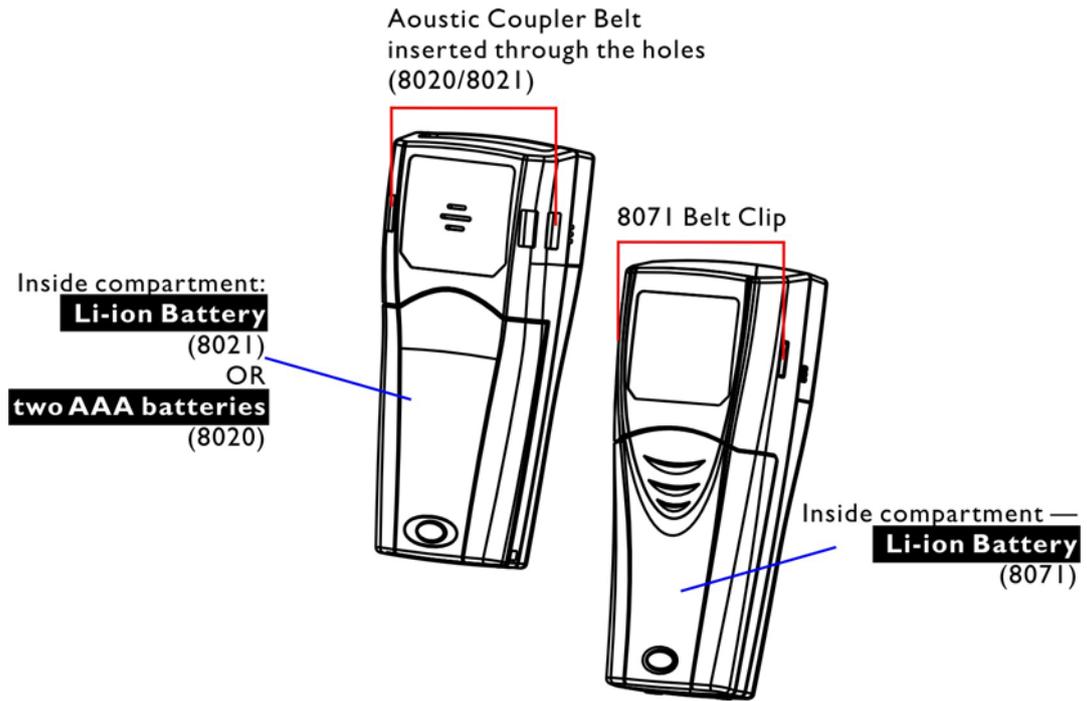


Figure 1: Overview

CHARGING THE BATTERY

You can use a cradle to charge the Mobile Computer, or the 4-Slot Battery Charger to charge up to four batteries. 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.

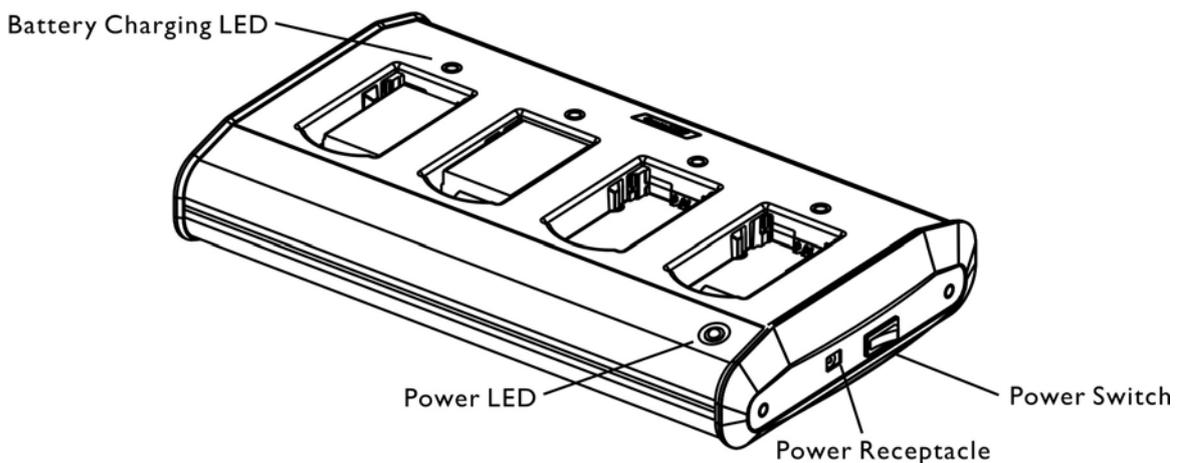


Figure 2: 4-Slot Battery Charger

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

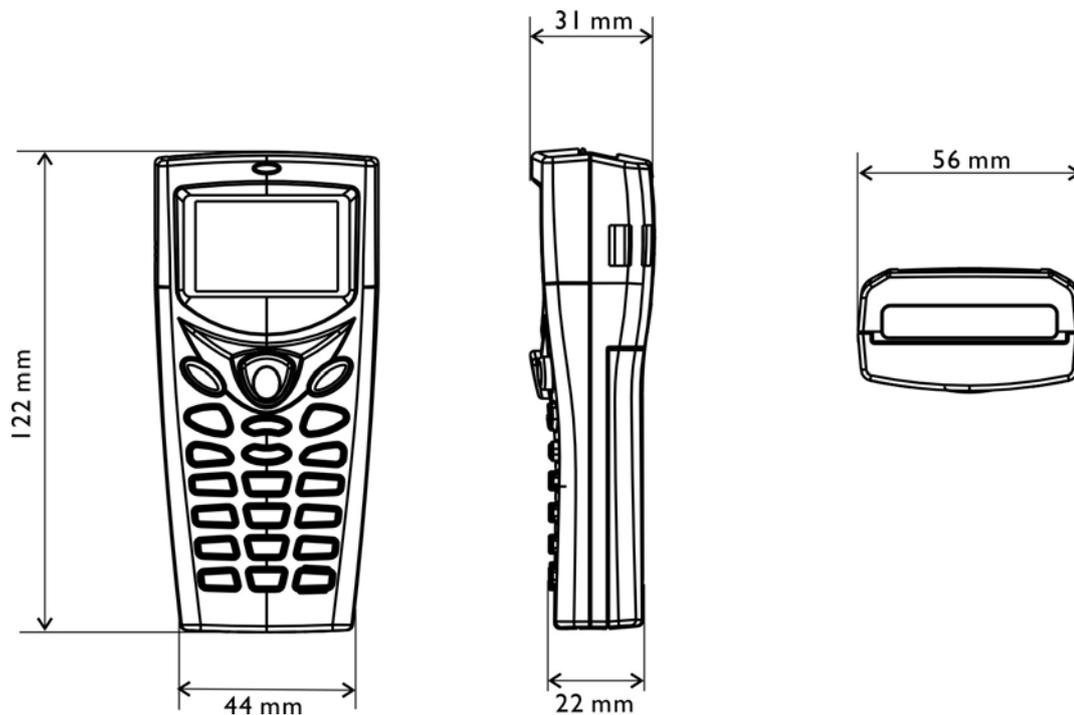


Figure 3: Dimensions

FEATURES

- ▶ Ergonomic design — small-form-factor with wrist strap for secure hold.
- ▶ Built light-weight to enhance mobility and ease data-intensive applications.
- ▶ Flexible wireless solution — IR/IrDA integrated, with connectivity options for Bluetooth, 802.11b/g or both.
- ▶ Acoustic Coupler for US market, ideal for replacement of older style terminals.
- ▶ Graphic monochrome LCD supports double-byte characters and bitmap graphics.
- ▶ Programmable feedback includes buzzer and LED indicator.
- ▶ 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 international AC charging cradle, etc.

INSIDE THE PACKAGE

In addition to the mobile computer, 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.

Items Inside Package	8000	8001	8020	8021	8061/8062	8071
Rechargeable Li-ion battery	–	√	–	√	√	√
Wrist Strap	√	√	–	–	√	√
Acoustic Coupler Belt	–	–	√	√	–	–
Belt Clip	–	–	–	–	–	√
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.

- ▶ Spare rechargeable Li-ion battery
- ▶ 4-slot Battery Charger
- ▶ Communication Cradle
- ▶ Charging & Communication Cradle
- ▶ Modem Cradle
- ▶ Ethernet Cradle
- ▶ 308 USB Virtual COM Interface (convert RS-232 to USB)
- ▶ Bluetooth Access Point

USING 8000 MOBILE COMPUTER

This chapter explains the features and usage of the 8000 Series Mobile Computer. The 8000 family includes:

- ▶ 8000 Batch type (powered by two AAA alkaline batteries)
- ▶ 8001 Batch type (powered by Li-ion battery)
- ▶ 8020 Acoustic Coupler (powered by two AAA alkaline batteries)
- ▶ 8021 Acoustic Coupler (powered by Li-ion battery)
- ▶ 8061 Bluetooth Class 1 (powered by Li-ion battery)
- ▶ 8062 Bluetooth Class 2 (powered by Li-ion battery)
- ▶ 8071 802.11b/g (powered by Li-ion battery)

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1.1 BATTERY

▶ Main Battery

Except that 8000/8020 is powered by two AAA alkaline batteries, 8001/8021/8061/8062/8071 is powered by a rechargeable 3.7 V/700 mAh Li-ion battery pack, and it takes approximately two 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 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 30 days 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 face down in one hand as shown below.
- 2) Press the battery lid release and slide the battery lid.
- 3) Remove the battery lid by the other hand.
- 4) Slide the battery pack into the battery compartment at a proper angle ($30^{\circ}\sim 45^{\circ}$) so that the contacts of the battery are pressed onto the protruding contacts inside the compartment. Make sure that the battery is snugly fit into the compartment.
- 5) Replace the battery lid and lock it firmly.

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.

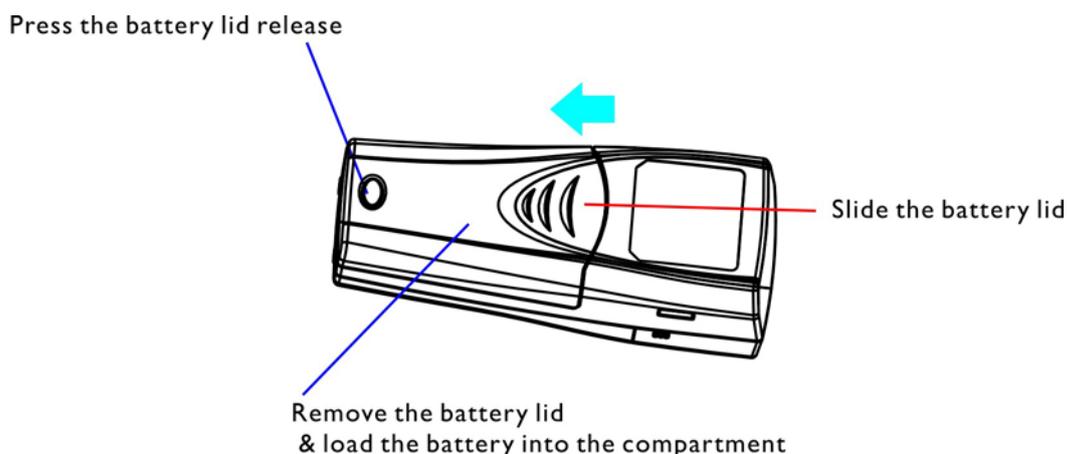


Figure 4: Installing the Main Battery

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 2 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 power source for the mobile computer to work can be alkaline batteries (2*AAA for 8000/8020) or the rechargeable battery pack (for 8001/8021/8061/8062/8071). The alkaline batteries or the battery pack 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 alkaline batteries or the battery pack. For 8001/8021/8061/8062/8071, you may charge the battery pack in the cradle 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 (or 2*AAA for 8000/8020).

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 or 802.11b/g when 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 30 days, 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!

1.3 KEYPAD

The mobile computer is equipped with a keypad of 21 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, 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.

BS (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/ALPHA] three times to enter the function mode, and then, press [1] so that it 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.

13.1 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.

Screen Icon	Description
A	This icon appears when you press [FN/ALPHA] once, indicating it is set to alphabetic mode for typing capital letters.
a	This icon appears when you press [FN/ALPHA] twice, indicating it is set to alphabetic mode for typing small letters.
F	This icon appears when you press [FN/ALPHA] three times, indicating it is set to the function mode. Then, press another key ([1] ~ [9]) to produce the result. However, the icon will not go off. <ul style="list-style-type: none">▶ To get the value of another key combination modified by the function key, keep pressing another key ([1] ~ [9]) to produce the result.▶ To exit the function mode, press [FN/ALPHA] again and the icon will go off.

Note: When using the function 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.

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] on the 24-key mobile computer, it will take turns to show "A", "B", "C" or "2".

- ▶ When you first press the number key [2], it will produce 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.

13.2 KEYPAD LAYOUT

The layout of the 21-key keypad is similar to that of a telephone, which consists of an alphanumeric keypad, navigation and function keys, as well as assorted characters.

By default, it is set to numeric mode. Press the [FN/ALPHA] key to enter alpha mode, capital or small letters.

21-key layout

It consists of the following keys:

- ▶ [SCAN] trigger, the yellow one at top
- ▶ two [ENTER] keys, the blue ones next to the trigger
- ▶ two arrow keys for moving the cursor up or down
- ▶ an alphanumeric keypad and assorted characters
- ▶ [POWER] key, the red one at bottom

By default, it is set to numeric mode. The [FN/ALPHA] key serves as a toggle among numeric, alpha (lower-case alphabetic), ALPHA (upper-case alphabetic) input modes, as well as function mode.

Note: It is not necessary to hold down the [FN/ALPHA] key.



Figure 5: Keypad layout

1.4 LCD

The mobile computer comes with a 3" FSTN graphic LCD, 100 by 64 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)	16 characters by 8 lines
	Font size 8×16 (pixels)	12 characters by 4 lines
Chinese font	Font size 16×16 (pixels)	7 characters by 4 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.

14.1 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 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
[FN/ALPHA] + [Enter]	Toggle ON/OFF the backlight
[FN/ALPHA] + [Up]	Turn ON the backlight of LCD and increase its contrast
[FN/ALPHA] + [Down]	Turn ON the backlight of LCD and decrease its contrast

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

1.5 NOTIFICATIONS

1.5.1 STATUS LED

The dual-color LED above the screen 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 8000	---	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.

1.6 DATA CAPTURE

1.6.1 SCAN ENGINE OPTIONS

Delivering flexibility to meet different requirements, the following scan engine options are provided —

- ▶ 1D CCD scan engine
- ▶ 1D Laser scan engine

1.6.2 SYMBOLOGIES SUPPORTED

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.

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.

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
Codabar		Enabled
Code 93		Enabled
MSI		Disabled
Plessey		Disabled
Telepen		Disabled
Code 128	Code 128	Enabled
	EAN-128	Enabled
	ISBT-128	Disabled
Code 2 of 5	Industrial 25	Enabled
	Interleaved 25	Enabled
	Matrix 25	Disabled
Code 3 of 9	Code 39	Enabled
	Italian Pharmacode	Disabled
	French Pharmacode	Disabled

EAN/UPC	EAN-8	Enabled
	EAN-8 Addon 2	Disabled
	EAN-8 Addon 5	Disabled
	EAN-13	Enabled
	EAN-13 & UPC-A Addon 2	Disabled
	EAN-13 & UPC-A Addon 5	Disabled
	ISBN	Disabled
	UPC-E0	Enabled
	UPC-E1	Disabled
	UPC-E Addon 2	Disabled
	UPC-E Addon 5	Disabled
	UPC-A	Enabled
RSS	RSS-14	Disabled
	RSS Limited	Disabled
	RSS Expanded	Disabled

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.
- 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.

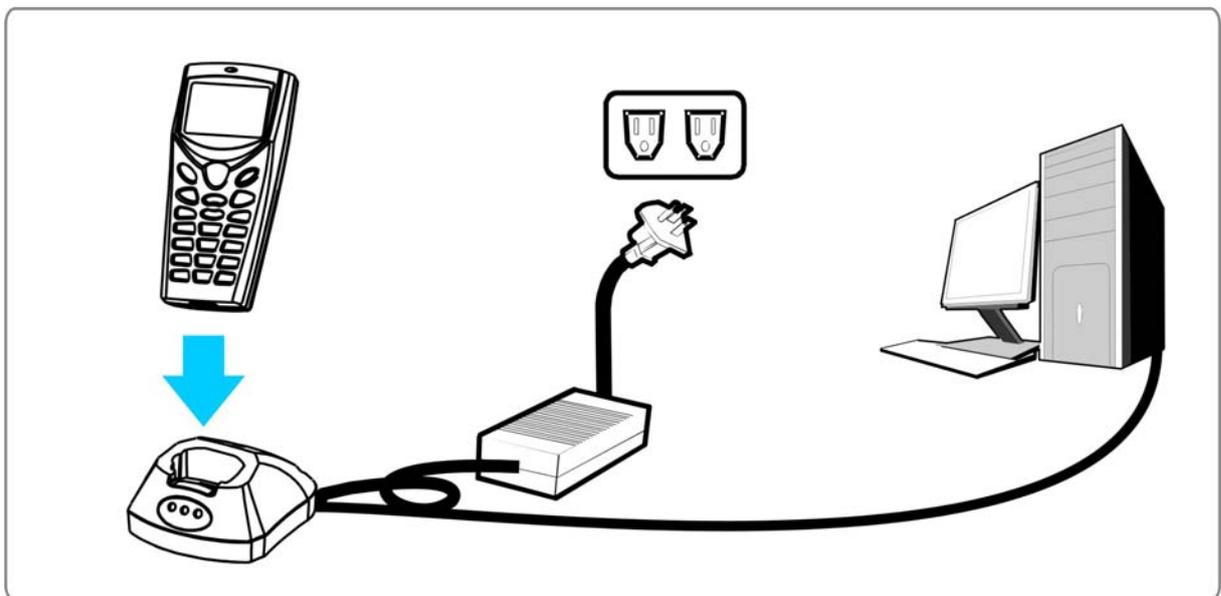


Figure 6: Setting up cradle

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	-	-	√
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.
 (2) Ethernet Cradle — Refer to the Ethernet Cradle manual for more information.

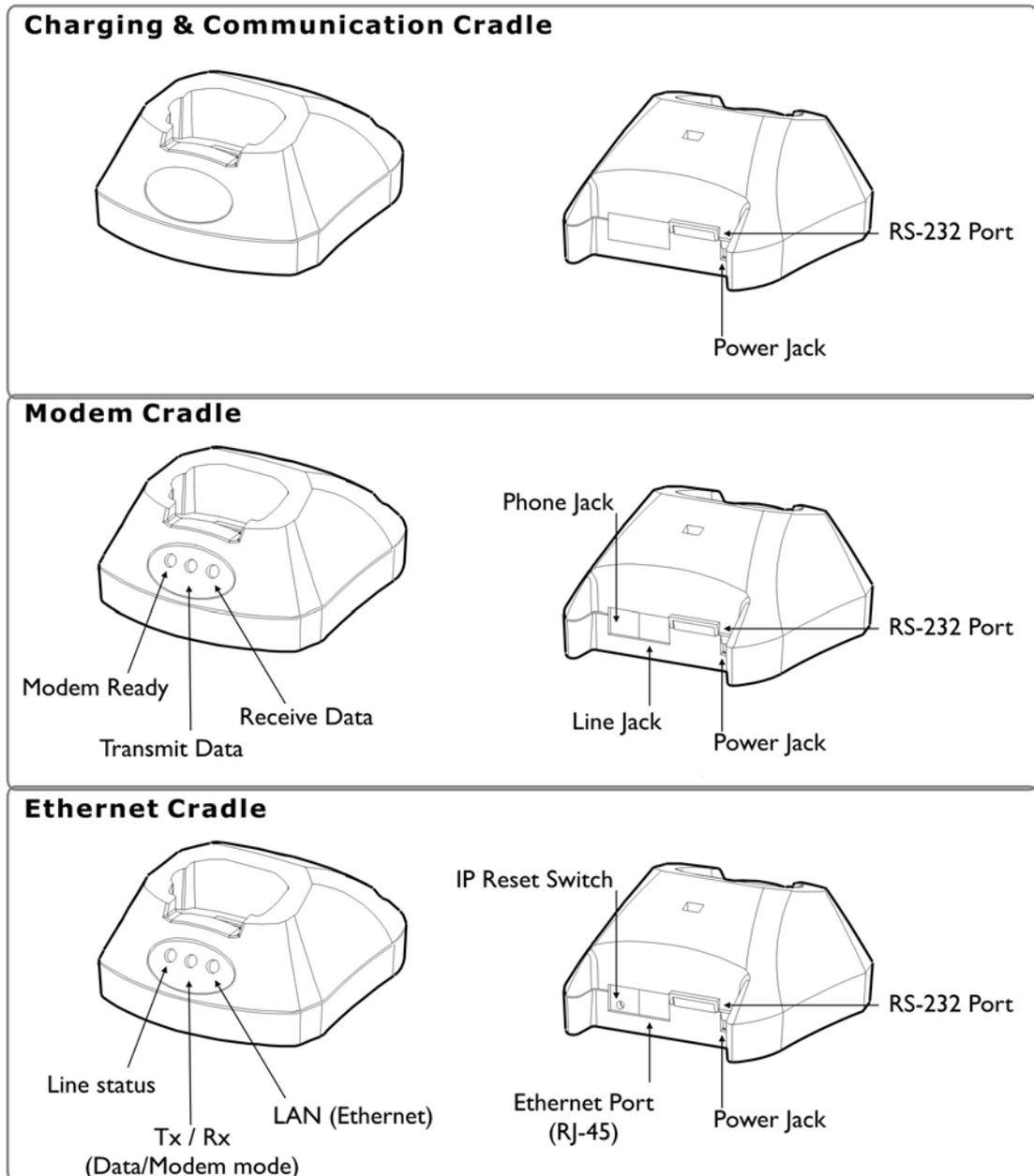


Figure 7: Cradle Options

1.8 COMMUNICATIONS OVER WIRELESS NETWORKS

The 8000 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

Generally, the coverage of each technology can be viewed as follows.

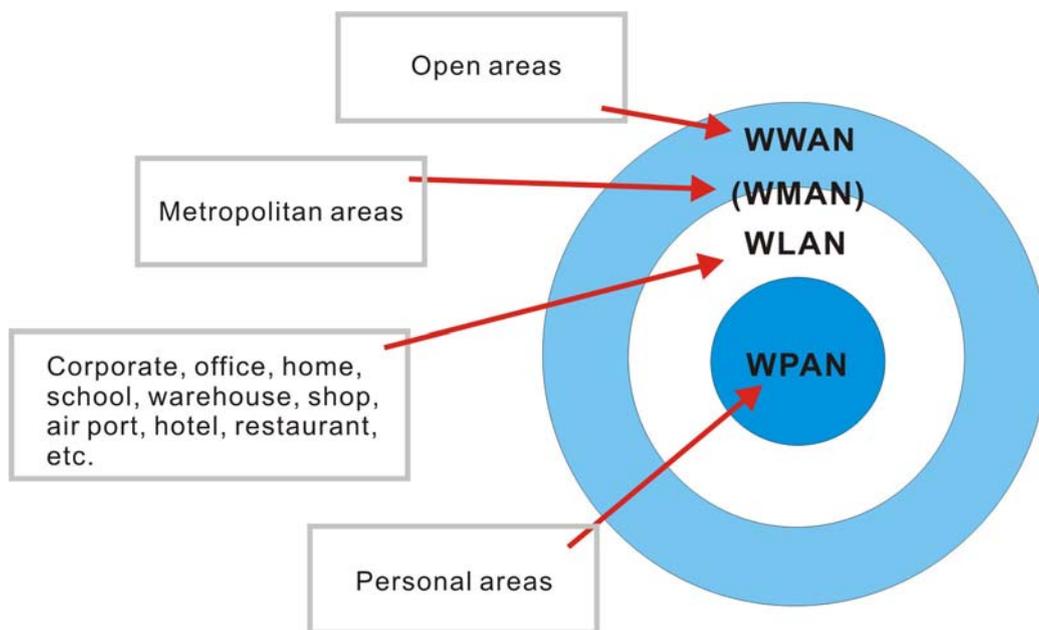


Figure 8: Coverage of Wireless Technologies

18.1 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

18.2 BLUETOOTH

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.

- ▶ 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 1 — 250 meters line-of-sight (8061) Class 2 — 50 meters line-of-sight (8062)
Max. Output Power	Class 1 — 16 mW Class 2 — 1 mW
Spread Spectrum	FHSS
Modulation	GFSK
Standard	Bluetooth version 1.1

1.8.3 IEEE 802.11b/g

The 8071 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.

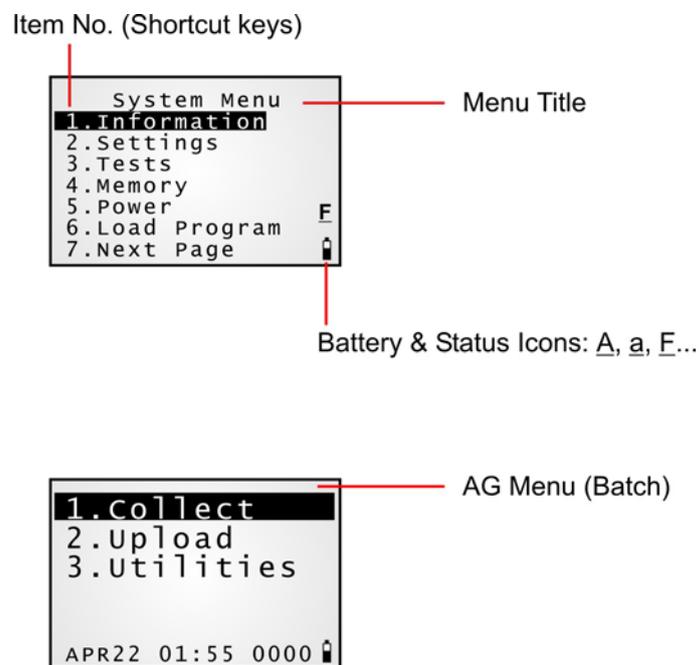
802.11b/g Specification	
Frequency Range	2.4 GHz
Data Rate:	802.11b – 1, 2, 5.5, 11 Mbps 802.11g – 6, 9, 12, 18, 24, 36, 48, 54 Mbps
Connected Devices	1 for ad-hoc mode (No AP) Multiple for infrastructure mode (AP required)
Profiles	IP/TCP/UDP
Coverage	350 meters line-of-sight
Max. Output Power	50 mW (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

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



On each screen, the last column displays status icons, such as:

- ▶ The smart battery icon indicates the current power status.
- ▶ The input mode or function mode, which is controlled by the [FN/ALPHA] key.
- ▶ To return to a previous page or menu, you may press [ESC] or follow the on-screen instructions.

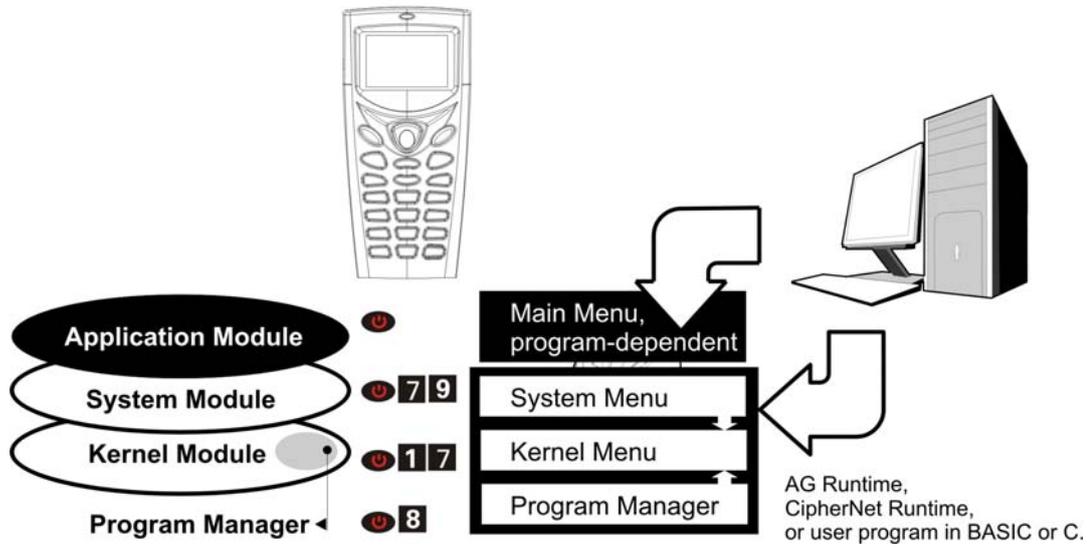


Figure 9: Software Architecture

IN THIS CHAPTER

2.1 Application Module	27
2.2 System Configuration	28

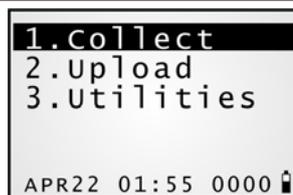
2.1 APPLICATION MODULE

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.

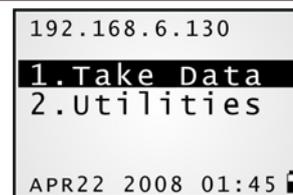
2.1.1 APPLICATION GENERATOR (AG)

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



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	U8000*.SHX	AG8000N.exe
RF AG	U8061*.SHX U8071*.SHX	AG8061RF.exe AG8071RF.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	80xx-VT.SHX	CipherNet-VT.exe
IBM 5250	80xx-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 8000 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.

SYSTEM MENU

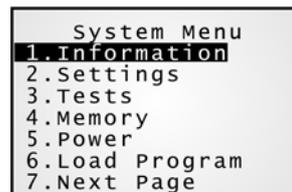
The **System Menu** is generated by a powerful utility, which offers an interface for engineers (programmers or system integrator) to view system information, change the configuration parameters, download programs and run diagnostics.

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].



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3.1 INFORMATION

Here provides important system information to help diagnose the system.



System Menu > 1. Information

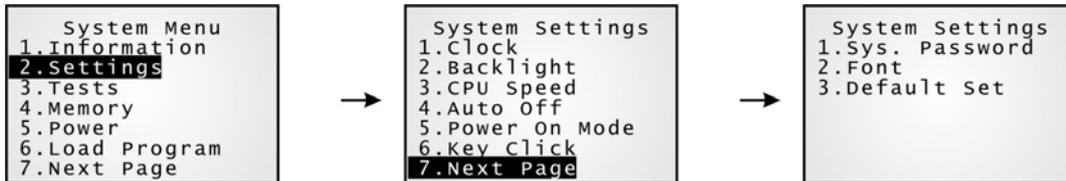
H/W	Hardware version (PCB)
S/N	A serial number assigned to the mobile computer
M/D	Manufacturing date
KNL	Kernel version
LIB	C library version
BSC	BASIC Run-time version, if a BASIC application is downloaded
USR	Application program version
DEV	5-digit code for optional hardware configurations <ul style="list-style-type: none"> ▶ For example, 1410-0 indicates the 21-key mobile computer uses rechargeable Li-ion battery and is equipped with the CCD scan engine as well as the 802.11b/g module for wireless connectivity.

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
2nd digit	Wireless module	0= none (8000/8001) 4= 802.11b/g (8071) 5= Bluetooth (8061/8062) 6= Acoustic Coupler (8020/8021)
3rd digit	Battery type	0= 2*AAA Alkaline batteries 1= Rechargeable Li-ion battery
4th digit	Reserved	0
5th digit	Keypad module	0= 21-key

3.2 SETTINGS

You can change the default settings here.



System Settings	Default Values
Clock	blank
Backlight Period	20 seconds, Level 2
CPU Speed	Full speed
Auto Off	10 minutes
Power On Mode	Program Resume
Key Click	Tone 2
System Password	Open access
Font	System font
Default Set (= Reset to Default)	Load factory settings

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).

3.2.3 CPU SPEED

Set the desired CPU speed — Full, Half, Quarter, Eighth, and Sixteenth.

3.2.4 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.

3.2.5 POWER ON OPTIONS

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

Program Resume

Press [ENTER] to select "Program Resume" or "Program Restart". When selected, the mobile computer will start from the last session of program before it is turned off.

Program Restart

Press [ENTER] to select "Program Resume" or "Program Restart". When selected, the mobile computer will start from the first session of the program.

3.2.6 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.

3.2.7 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.

3.2.8 FONT

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

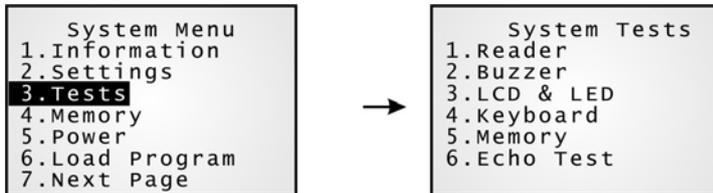
If a multi-language font file is downloaded, you will be able to select a font from the list.

3.2.9 RESET TO DEFAULT

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

3.3 TESTS

Here provides functional tests for key parts.



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 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.

3.4 MEMORY

Here provides information and initialization function of the memory.



3.4.1 SIZE INFORMATION

- ▶ RAM — onboard SRAM for data memory
- ▶ Flash — program memory

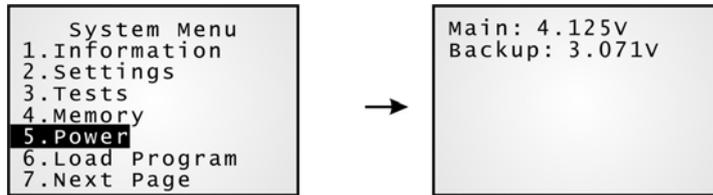
3.4.2 INITIALIZE

Initialize the data memory.

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

3.5 POWER

Here shows current voltage consumption.



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.



.SHX Program

Download one of the following C program files and/or one font file:

Program File

- ▶ AG Runtime (U*.shx)
- ▶ CipherNet Runtime (80xx-5250.shx, 80xx-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: (1) The interface option "Bluetooth" is only available on 8061/8062.

(2) "Load Basic" menu is only available after you have downloaded a BASIC Runtime program.

3.7 SERIAL PPP MENU

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

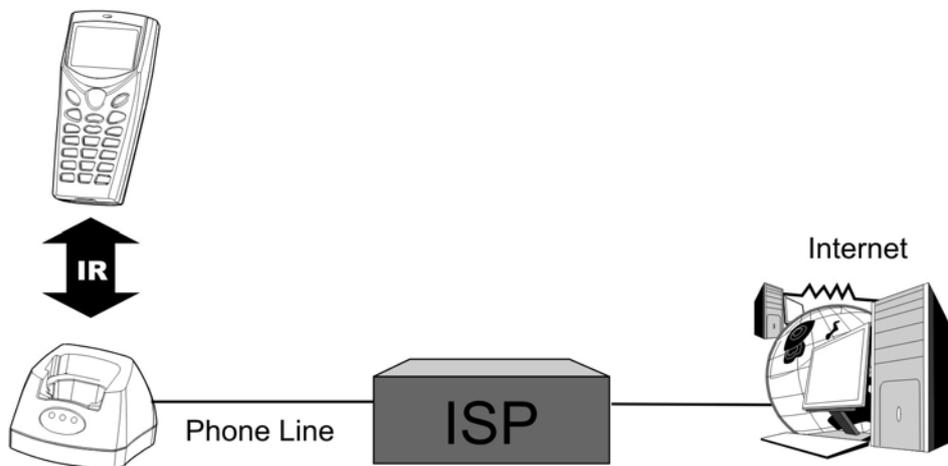


Note: Point-to-Point Protocol (PPP) is a method of connecting the mobile computer to the Internet over serial links. It sends TCP/IP packets to a server that connects to the Internet.

► PPP Connection via IR

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

Note: The version of IR control board on the Modem Cradle must be greater than SV3.01.



3.7.1 INFORMATION

Information of library version can be viewed here.



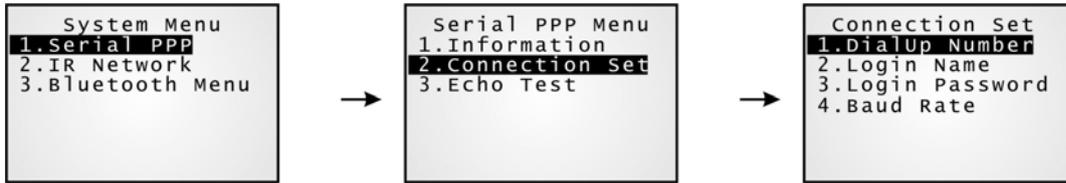
Serial PPP Menu > 1. Information

- LIB** C library version for PPP
- BSC** BASIC Run-time version, if a BASIC application is downloaded.

Below are available libraries that support (1) PPP connection over serial links (2) Ethernet connection – Transparent mode.

Series	Model #	External Libraries
8000	8000 (batch)	80PPP.lib
	8001 (batch)	80PPP.lib
	8061/8062 (Bluetooth)	80PPP.lib OR 80BNEP.lib
	8071 (802.11b/g)	80PPP.lib OR 80WLAN.lib

3.7.2 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.

3.7.3 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.



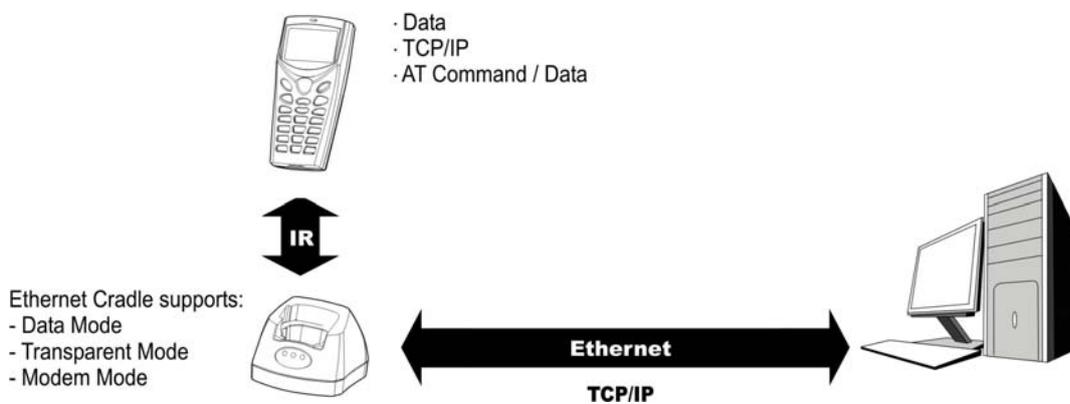
Note: After the "PPP via IR" connection is established properly, run the utility "Echo Test" on your computer (TCP/IP - Server), and then, start this test on your mobile computer.

3.8 IR NETWORK MENU (ETHERNET VIA IR)

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



Note: The Ethernet Cradle is required for establishing Ethernet connection via IR.



3.8.1 INFORMATION

Information of Ethernet network configuration can be viewed here.



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

Note: For Transparent mode, refer to [Serial PPP Menu](#) for available libraries.

3.8.2 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.

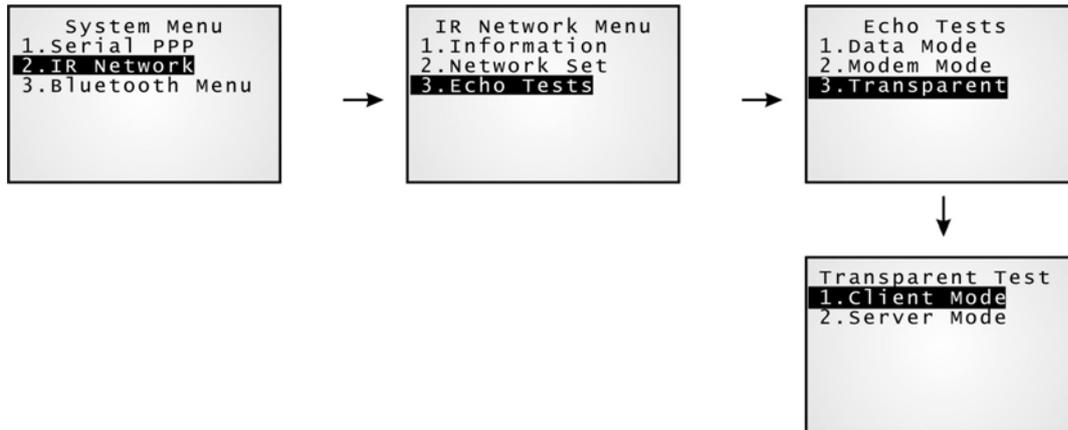
Note: Normally, DHCP is enabled and all of the settings can be obtained from the DHCP server.

3.8.3 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.



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.

3.9 BLUETOOTH MENU – 8061/8062

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



Note: This submenu is generated only when the Bluetooth module is present.

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.

3.9.1 INFORMATION

Information of network configuration can be viewed here.



Bluetooth Menu > 1. Information

LIB	C library version for Bluetooth (BNEP)
MAC	MAC ID of the Bluetooth module
ID	A name given to the mobile computer for identification. <ul style="list-style-type: none"> ▶ By default, it is made up of model No. and the serial number. (Identical to 2. Connect Set > 1. Local Name)
CTY	<ul style="list-style-type: none"> ▶ "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

3.9.2 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.



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.

3.9.3 SECURITY

Set or modify security parameters.



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.

3.9.4 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.



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.

3.9.5 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.



- 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.

3.9.6 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.



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.

3.9.7 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 WI-FI MENU – 8071

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



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.



Wi-Fi Menu > 1. Information

LIB	C library version for WLAN (802.11b/g)
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. <ul style="list-style-type: none"> ▶ 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 from 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.



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



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.



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.

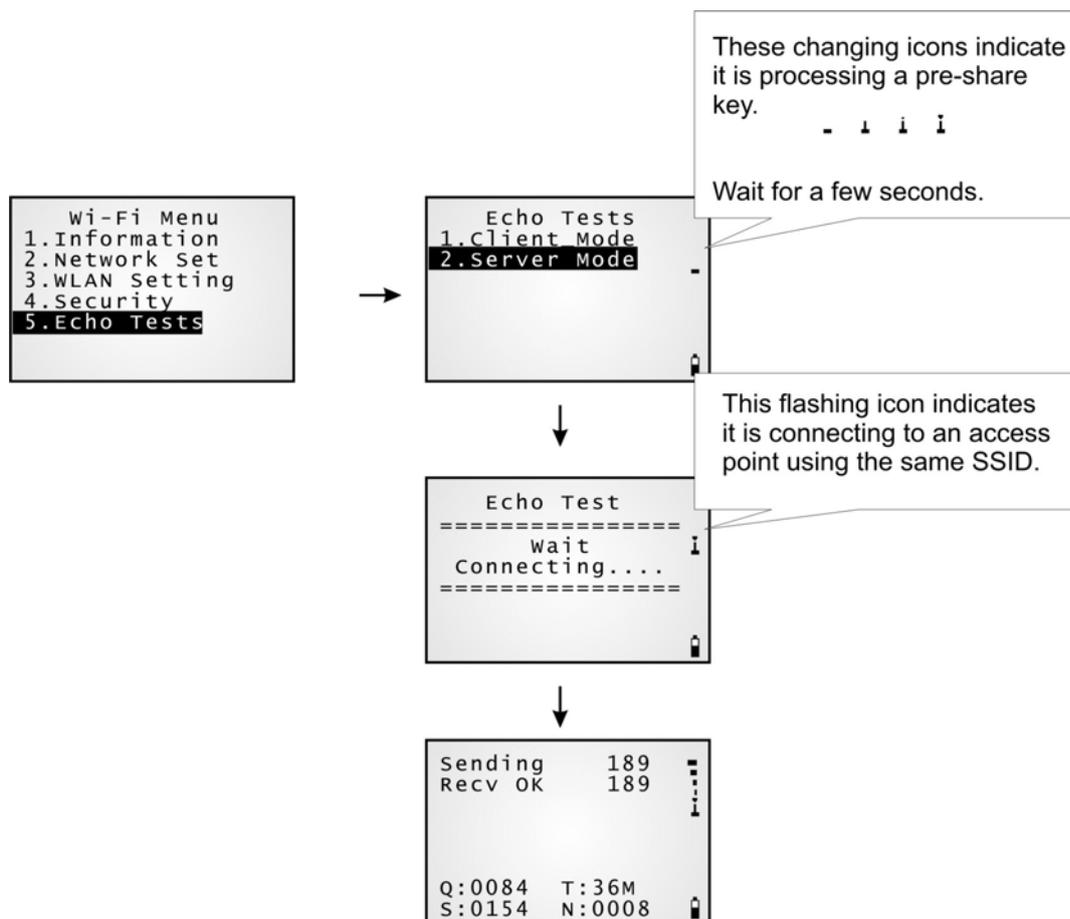
1. Run the Echo Test program on your computer. Associated settings include
 - Select "TCP/IP – Client" for interface.
 - Set Action Mode to "Passive".
2. Start the echo test on both ends.

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.



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.



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				

PROGRAM MANAGER & KERNEL

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

IN THIS CHAPTER

4.1 Program Manager	65
4.2 Kernel	70

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.

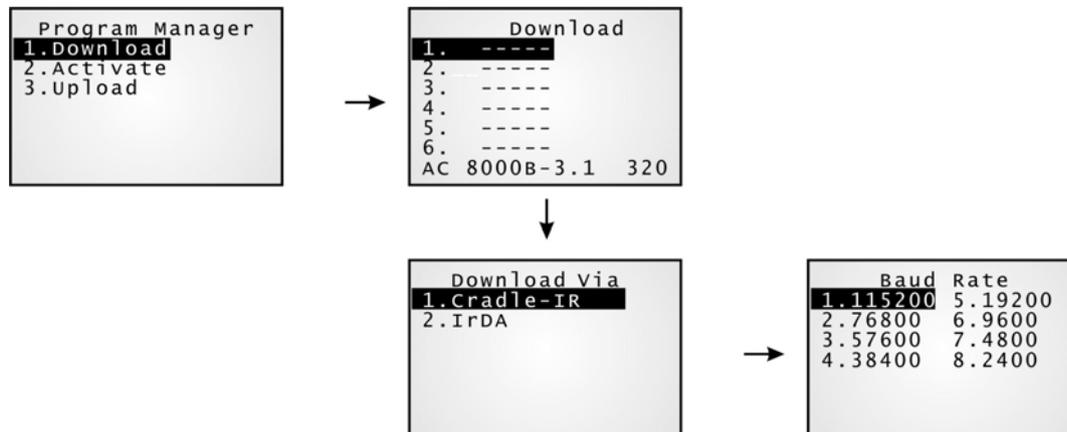
How to access the Program Manager menu?

- 1) Turn off the mobile computer.
- 2) Press [8] + [Power].



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.



The length of program name can be up to 12 characters, however, only 9 characters can be displayed. 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 [FN/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")

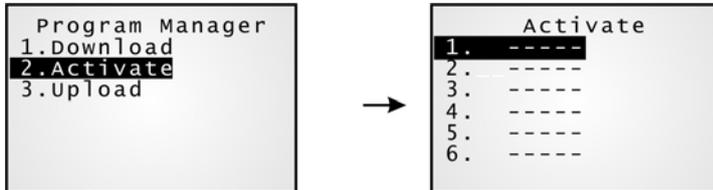
Only the application program, which needs to be activated immediately, can be downloaded to the active memory sector.

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.



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

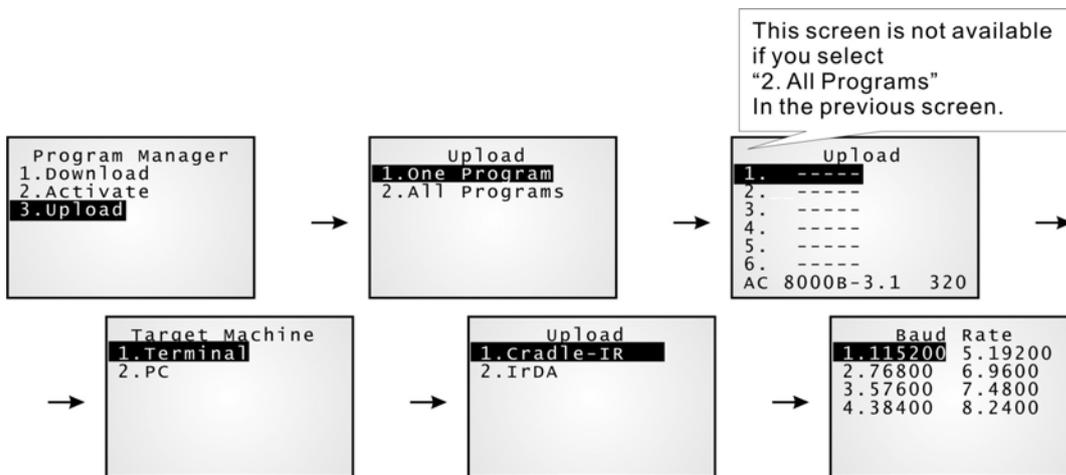
To keep the data, simply press any other key.

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.

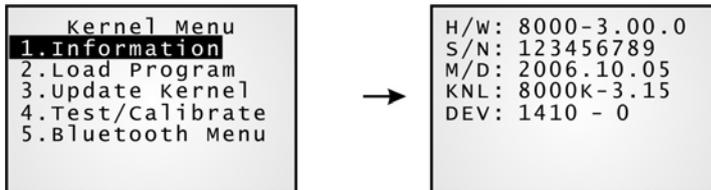
How to access the Kernel Menu?

- 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].

```
Kernel Menu
1.Information
2.Load Program
3.Update Kernel
4.Test/Calibrate
5.Bluetooth Menu
```

4.2.1 KERNEL INFORMATION

Here provides important system information to help diagnose the system.



Kernel Menu > 1. Information

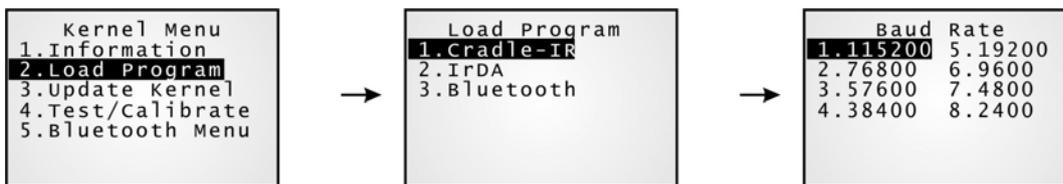
H/W	Hardware version (PCB)
S/N	Serial number of the mobile computer
M/D	Manufacturing date
KNL	Kernel version
DEV	5-digit code for optional hardware configurations Refer to Understanding Device Code .

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

Program File

Download one of the following C program files and/or one font file:

- ▶ AG Runtime (U*.shx)
- ▶ CipherNet Runtime (80xx-5250.shx, 80xx-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 > 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.
-

Note: The interface option "Bluetooth" is only available on 8061/8062.

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!

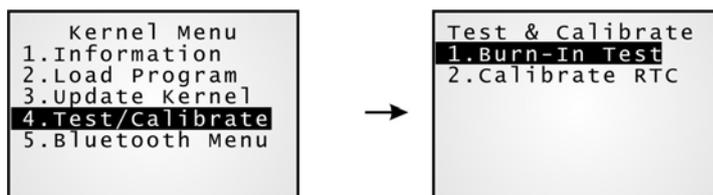


Note: (1) CipherLab software, including download utilities, supports the following baud rate options: 115200/57600/38400/19200/9600 bps.

(2) The interface option "Bluetooth" is only available on 8061/8062.

4.2.4 TEST & CALIBRATE

These tools are provided for manufacturing use.

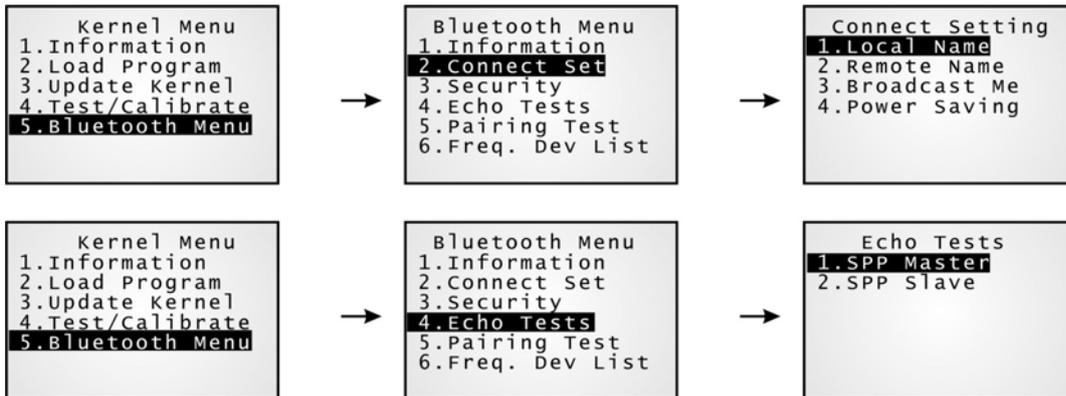


Warning! You should not perform any of these tests.

4.2.5 BLUETOOTH MENU — 8061/8062

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.



Note: This submenu is generated only when the Bluetooth module is present.

SPECIFICATIONS

Model Designation		8000	8001	8020	8021	8061 8062	8071	
Wireless Communications	IR/IrDA	√	√	√	√	√	√	
	Bluetooth Class 1	-	-	-	-	√	-	
	802.11b/g	-	-	-	-	-	√	
Wireless Coverage		30 cm	30 cm	30 cm	30 cm	250 m	350 m	
Acoustic Coupler		-	-	√	√	-	-	
Barcode Reader	CCD	<ul style="list-style-type: none"> ▶ Light source: linear imager, 650 nm red LED ▶ Scan rate: 100 scans per second ▶ Reading range*: 3 ~ 29 cm 						
	Laser	<ul style="list-style-type: none"> ▶ Light source: visible laser diode ▶ Scan rate: 100 scans per second ▶ Reading range*: 1 ~ 45 cm (scan angle 47°) 						
Electrical Characteristics	Main Battery	<ul style="list-style-type: none"> ▶ 8000/8020: 2*AAA Alkaline batteries ▶ 8001/8021/8061/8062/8071: Rechargeable Li-ion battery 3.7 V, 700 mAh 						
	Working Time	Laser, one scan per 5 seconds:						
		100 hr	100 hr	-	-	36 hr	20 hr	
Backup Battery	<ul style="list-style-type: none"> ▶ Rechargeable Lithium button cell – 3.0 V, 7 mAh ▶ Data retention – at least 30 days 							
Physical Characteristics	CPU	16-bit Toshiba CMOS type, low power consumption						
	Memory	<ul style="list-style-type: none"> ▶ Program memory – 2 MB flash ▶ Data memory – 2 MB onboard SRAM 						
	Display	Graphic LCD, 100 x 64 pixels, FSTN with LED backlight programmable <ul style="list-style-type: none"> ▶ Font size 6x8: 16 characters by 8 lines ▶ Font size 8x16: 12 characters by 4 lines 						
	Keypad	21 rubber keys, LED backlight programmable						
	Indicators	<ul style="list-style-type: none"> ▶ LED – Dual-color (red/green), programmable ▶ Buzzer – Low power transducer type, 1 KHz to 4 KHz, programmable 						
	Enclosure Material	Rubber & ABS plastic						
	Dimensions (mm)							
(L)	122		122			143		
(W)	56		56			57		

	(H)	26	32				35
	Weight (Laser and battery included)	123 g	120 g	-	-	125 g	166 g
Environmental Characteristics	Temperature	Operating : -10 °C to 60 °C Storage: -20 °C to 70 °C					
	Humidity	Operating : 10% to 90% non-condensing Storage: 5% to 95% non-condensing					
	Impact Resistance	1.2 m, 5 drops per 6 sides					
	Electrostatic Discharge	± 15 kV air discharge, ± 8 kV direct discharge					
	EMC Regulations	<ul style="list-style-type: none"> ▶ 8000/8001: FCC, IC, CE, C-Tick, BSMI ▶ 8061/8062: FCC, IC, CE, C-Tick, TELEC ▶ 8071: FCC, IC, CE, C-Tick, NCC, BSMI, TELEC, MIC, SRMC 					
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		<ul style="list-style-type: none"> ▶ Spare rechargeable battery pack ▶ 4-slot Battery Charger ▶ Communication Cradle ▶ Charging & Communication Cradle ▶ Modem Cradle (56 K) ▶ Ethernet Cradle (10/100 BASE-T) ▶ GPRS Cradle ▶ 308 USB Virtual COM Interface (convert RS-232 to USB) ▶ Bluetooth Access Point ▶ 802.11b/g Access Point 					

Note: The reading range of barcode scan engine depends on barcode resolution, ambient light, etc.

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.

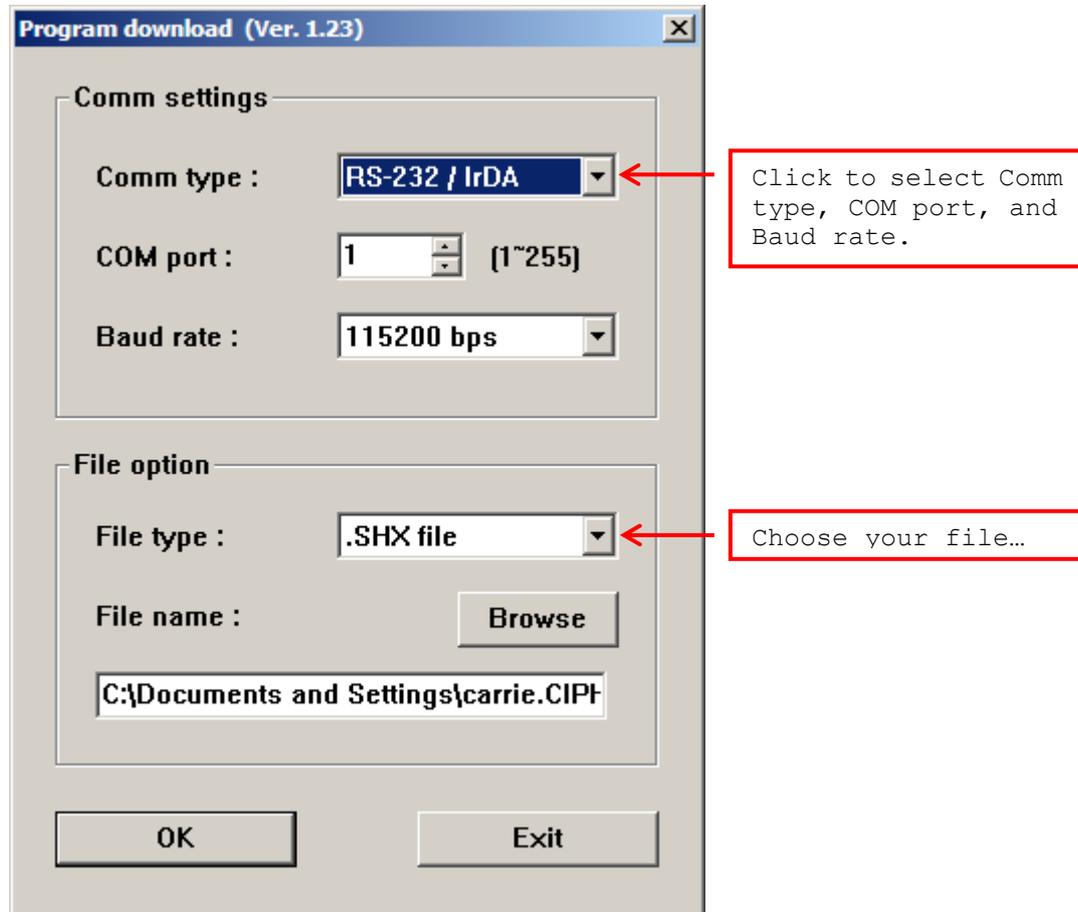
- ▶ Download.exe : to download a *.SHX file
- ▶ IRLoad.exe : to download a *.SHX file
- ▶ SynLoad.exe : to download a *.SYN file

Programs can be as follows —

Program Type		System Menu	Kernel Menu	Program Manager
AG Runtime	U*.SHX	√	√	√
CipherNet Runtime	80xx-VT.SHX 80xx-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!)

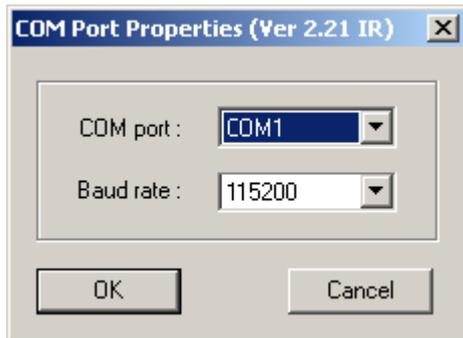
File Type

.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 U8000-114.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.

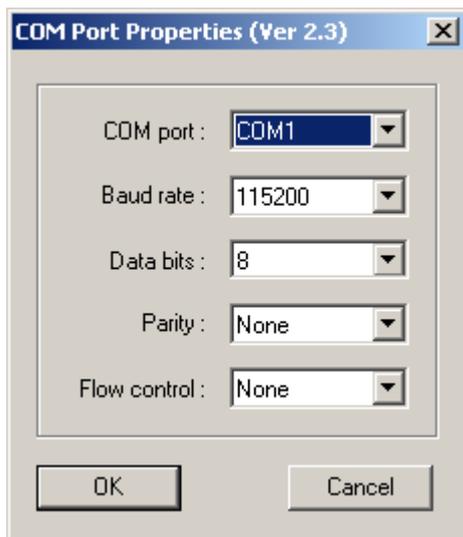
IRLOAD [filename],[COM port],[Baud rate]

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.

- 1) Run the program.
- 2) Choose a .SHX file.
- 3) 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 —

- ▶ Perform the reader test to see if the reader is working. . ([see 3.3.1](#))
- ▶ 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 3.9](#))
- ▶ Check if the connection is working properly. ([see 3.9](#))

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 3.3.6](#))

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 3.3.6](#))

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.