

CipherLab Reference Manual

8200 Series Terminal

8200/8230/8260/8231/8201

Version 1.05E



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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.

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. 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 the host wirelessly, please keep the minimum distance 20 cm between machine & your body.

FOR PRODUCT WITH LASER



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.

CARE & MAINTENANCE

- ▶ This Terminal is intended for enterprise logistics use. The Terminal is rated IP 52, however, it may do damage to the Terminal when being exposed to extreme temperatures or soaked wet.
- ▶ When the body of the Terminal 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 Terminal for a period of time, download the collected data to a host computer, and then take out the battery pack. Store the Terminal and battery pack separately.
- ▶ When the Terminal resumes its work, the main and backup batteries will take a certain time to become fully charged.
- ▶ Keep the Terminal away from any magnets and magnetic fields to prevent the laser engine from malfunctioning.
- ▶ If you shall find the Terminal malfunctioning, write down the specific scenario and consult your local sales representative.

RELEASE NOTES

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INTRODUCTION

Answering industrial demands for rugged, light-weight and versatile computers, the 8200 Series Terminal is specifically designed for enterprise logistics use.

This line of product comes with built-in Bluetooth technology and allows for optional module for 802.11b/g/n connectivity, enabling real time sharing of performance.

The 8200 Series Terminal 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 Terminal. 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 8200

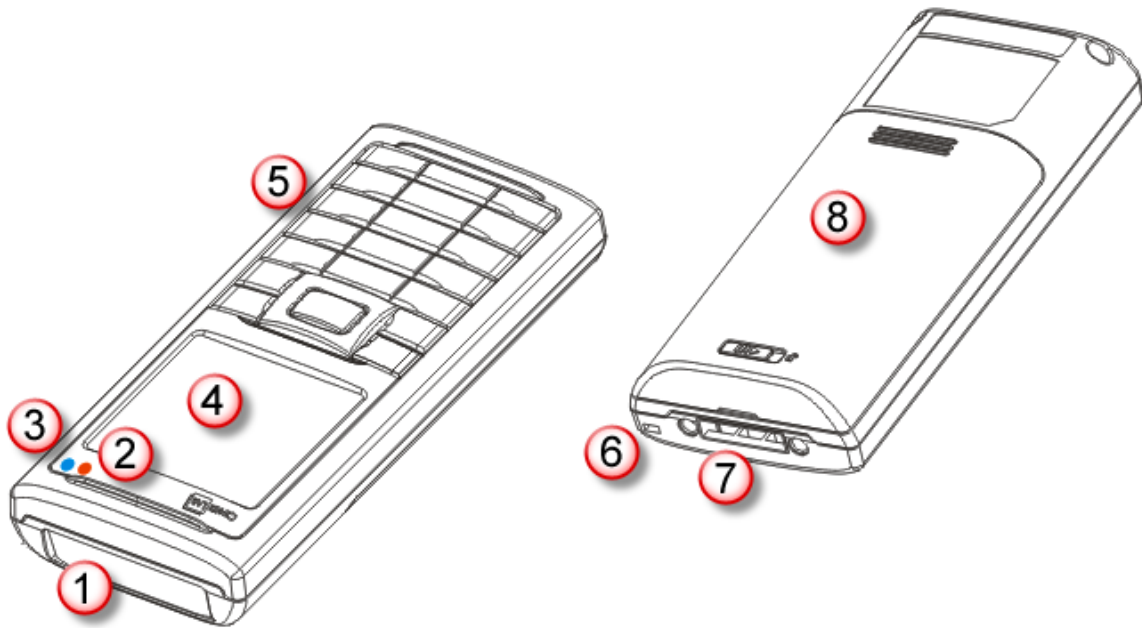


Figure 1: Overview

No.	Description	No.	Description
1	Scanning window	2	LED for Good Read and battery charging
3	LED for wireless communications	4	LCD screen
5	Keypad, 24 keys	6	Wristband
7	Communication/charging port	8	Battery compartment

FEATURES

- ▶ Ergonomic design — ruggedized yet streamlined, with wristband for secure hold
- ▶ Built tough to survive drop test and sealed against moisture/dust to IP 52
- ▶ Rich interface options — USB
- ▶ High capacity memory card (microSDHC) supported
- ▶ Flexible wireless solutions — Bluetooth or 802.11b/g/n
- ▶ FTP client support — 802.11b/g/n
- ▶ Graphic monochrome LCD supports double-byte characters and bitmap graphics
- ▶ Programmable feedback includes speaker, LED indicators and vibrator
- ▶ Quick link to any backend database through MIRROR Emulator programs for VT100/220 and IBM 5250 emulation
- ▶ Easy customization of data collection applications through FORGE Application Generator (AG) programs for preloaded AG Runtime, batch and WLAN versions available
- ▶ Programming support includes BASIC & C compilers
- ▶ Accessories include pistol grip

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 Terminal.

- ▶ 8200 Series Terminal
- ▶ Rechargeable Li-ion battery pack
- ▶ Wristband
- ▶ Standard USB cable
- ▶ Universal power adaptor
- ▶ Product CD
- ▶ Quick Start Guide

ACCESSORIES

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

- ▶ Pistol Grip (detachable)
- ▶ Protective Cover
- ▶ Spare rechargeable Li-ion battery

GETTING STARTED

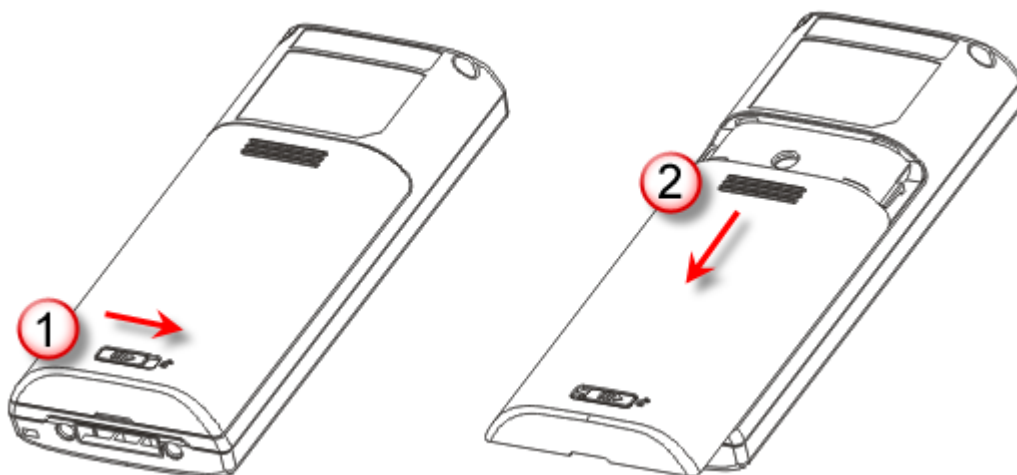
INSERTING BATTERY & MEMORY CARD

For shipping and storage purposes, save the Terminal 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 Terminal still and slide the release latch to the right to unlock the battery cover.
- 2) Slide off the battery cover.
- 3) Use your finger to slide the locking plate towards its hinge to unlock the SD card holder.
- 4) Flip up the SD card holder.
- 5) Insert your memory card (microSD or microSDHC) to the SD card holder.
- 6) Push the SD card holder down.
- 7) Slide the locking plate away from its hinge to secure the card.
- 8) Slide the battery pack into the battery compartment at a proper angle (30°~45°) so that the metal contacts of the battery are met with the charging contacts inside the compartment. Make sure that the battery is snugly fit into the compartment.
- 9) Replace the battery cover.
- 10) Slide the release latch to the left to 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.



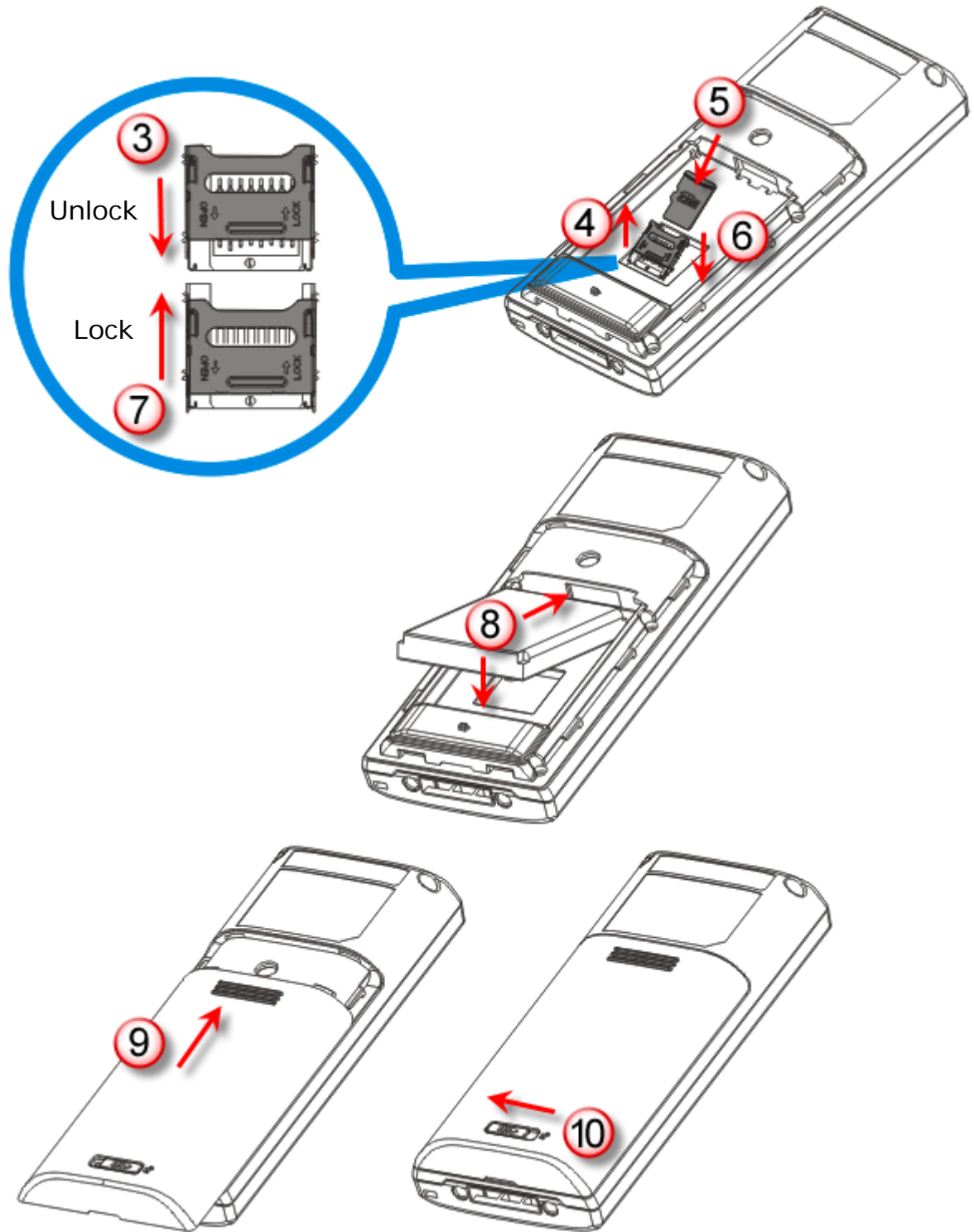


Figure 2: Installing the Main Battery & Memory Card

INSTALLING PISTOL GRIP

This contoured pistol grip enables intuitive trigger-and-scan operation, which is very helpful in scan intensive applications.

When a pistol grip is necessary, install it to the Terminal by following these steps:

- 1) Hold the Terminal still and slide the release latch to the right to unlock the battery cover.
- 2) Slide off the battery cover.
- 3) Insert the pistol grip into place (is like replacing the battery cover).
- 4) Slide the release latch to the left to lock it firmly, and turn on the Terminal to test the trigger.

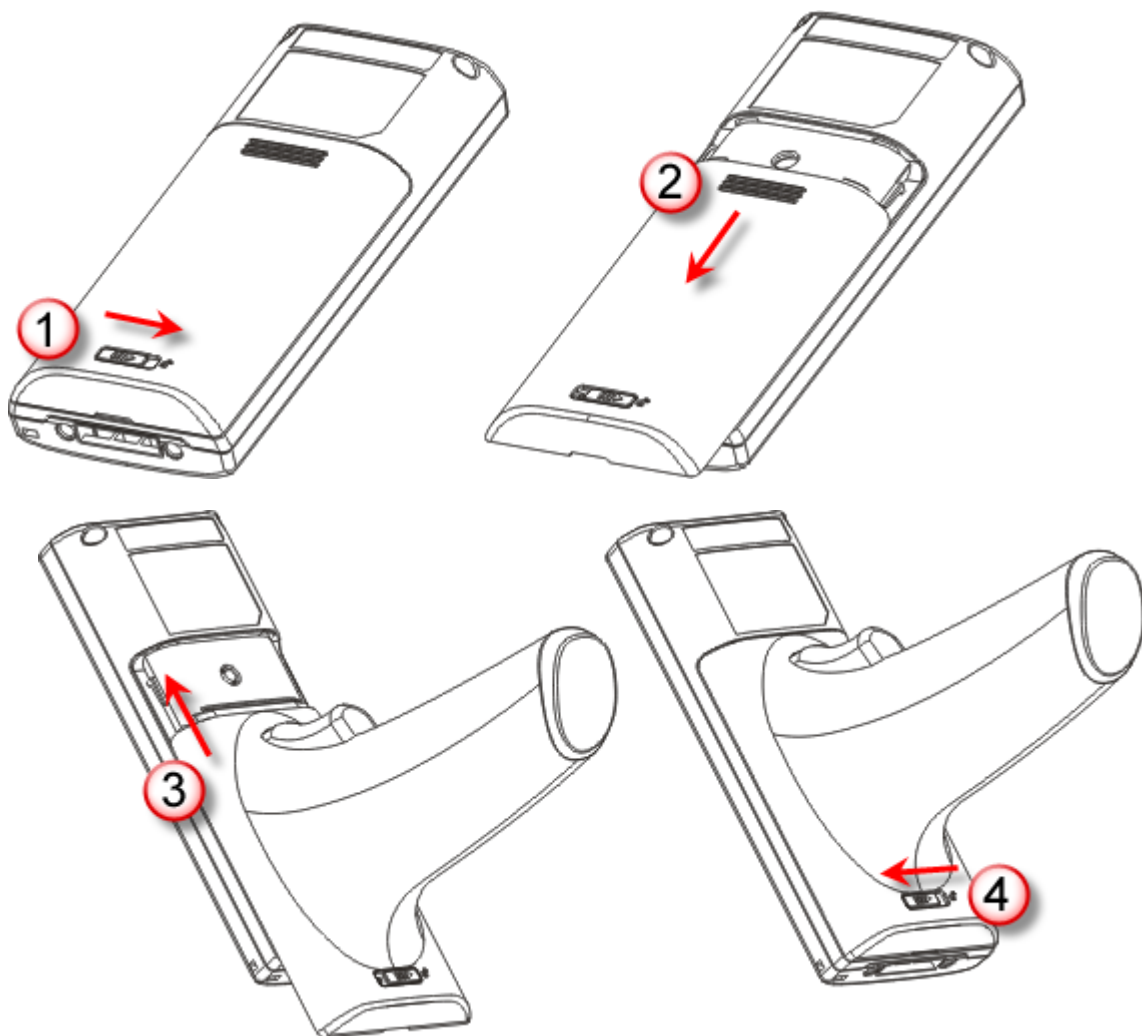


Figure 3: Installing the Pistol Grip

INITIAL CHARGING

The main and backup batteries may not be charged to full for shipment. When you first receive the package, you will need to charge the main battery to full before using the Terminal. Instead of direct charging.

Note: Battery charging stops when the temperature drops below 0°C or exceeds 40°C. It is recommended to charge the battery at room temperature (18°C to 25°C) for optimal performance. For initial charging, it takes approximately 2.5 hours to charge the battery to full (from the adaptor).

Because the internal backup battery is constantly charged from the main battery, the initial charging requires inserting the battery pack to the Terminal for charging. This will have both the main and backup batteries charged at the same time. It takes at least 72 hours to fully charge the backup battery. However, it is not necessary to fully charge the backup battery for the Terminal to work.

Note: In order to charge the backup battery to full, you must insert the main battery and leave it for at least 72 hours, whether the Terminal is in use or not.

SETTING LOCAL TIME

If you need to set your local time, go to **System Menu | 2. Settings | 1. Clock**. Refer to [3.2.1 Clock](#).

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 Terminal, turn off the Terminal and use the charging/communication cable.
- ▶ Bring a second battery pack on the road.
- ▶ Stop wireless connectivity, Bluetooth or 802.11b/g/n that is not in use.
- ▶ Go to **System Menu | 2. Settings | 2. Backlight**, and configure backlight period, luminosity, as well as the shade effect. Refer to [3.2.2 Backlight](#).
- ▶ Go to **System Menu | 2. Settings | 4. Auto Off**, and configure the amount of idle time that must pass before the system will shut down automatically. Refer to [3.2.4 Auto Off](#).

USING 8200 TERMINAL

This chapter explains the features and usage of the 8200 Series Terminal. The 8200 family includes:

- ▶ 8200 Batch type
- ▶ 8231 Bluetooth 2.1+EDR / BLE, Class 2; 802.11b/g/n
- ▶ 8260 Bluetooth 2.1+EDR, Class 2

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1.1 BATTERY

1.1.1 MAIN BATTERY

The Terminal is powered by a rechargeable 3.7 V/1200 mAh Li-ion battery pack. When the Terminal is turned on, it takes approx. 2.5 hours to charge it to full from the power adaptor (using cable) or approx. 4 hours from the USB cable (at 500 mA).

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 [3.5 Power](#))

1.1.2 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/18 mAh rechargeable Lithium button cell helps retain data in SRAM and maintain the running of the real-time clock and calendar for at least 25 days without the main battery. In the meantime, you have to replace the main battery as soon as possible. It takes at least 72 hours to fully charge the backup battery. However, it is not necessary to fully charge the backup battery for the Terminal to work.

- ▶ Monitor voltage level (see [3.5 Power](#))

1.1.3 CAUTION OF LOW BATTERY CHARGE

The battery pack is the only power source for the Terminal 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, 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.

1.2 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 Terminal is equipped with a calendar chip for accurate time/date logging. 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 25 days, on condition that the backup battery has already been fully charged.

If you want to put away the Terminal 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 Terminal!

1.2.1 READ-ONLY MEMORY (ROM)

8 megabytes flash memory for storing core, OS, application programs, font, etc.

1.2.2 RANDOM-ACCESS MEMORY (RAM)

Options include 4 or 8 megabytes SRAM for storing data. Its contents will be retained by the backup battery.

1.2.3 SD CARD

Secure Digital (SD) card is a flash memory data storage device. High capacity memory card (microSDHC) is supported. Refer to [Inserting Battery & Memory Card](#) for how to insert the microSD or microSDHC card. For more details, refer to [1.8 SD Card](#).

Note: (1) When SD card is present, the card icon will appear on the screen and flash while being accessed.

(2) For an SD card that has never been used on 8200, a message like "Found New SD Card" will be displayed allowing users to scan the card for memory check. If the action is canceled then, memory check can still be performed via System Menu — [3.8 SD Card Menu](#).

1.3 KEYPAD

The Terminal is equipped with a keypad of 24 keys for system setup, user entry and so on. The keypad comes with programmable LED backlight, like the screen. Refer to [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 via **System Menu**. Refer to [3.2.6 Key Click](#).

1.3.1 24-KEY LAYOUT

The layout of the 24-key keypad is similar to that of a telephone, which includes alphanumeric, navigation and function keys, as well as assorted characters. Refer to [Appendix III — Key Reference Table](#) for color-coded keys.

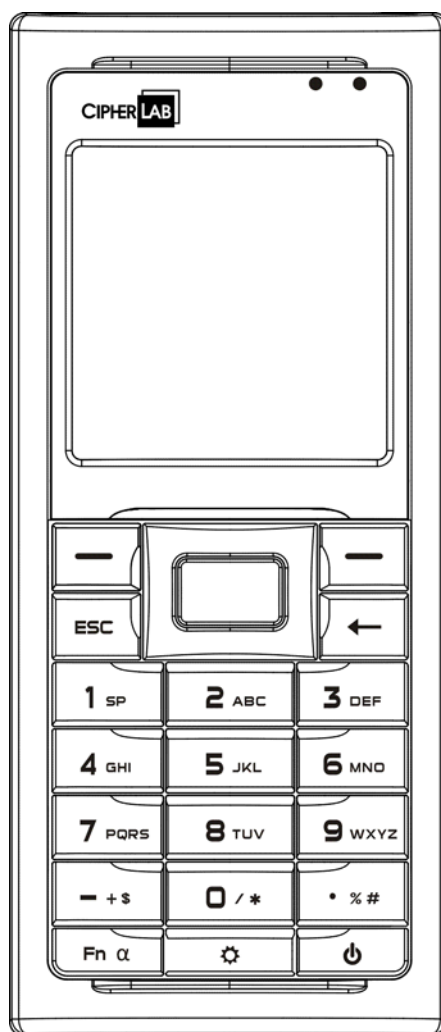


Figure 4: 24-key Layout

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

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

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

Status Icon	Function/Alpha Key	Input Mode
(none)	N/A	Numbers
A	Press [Fn a] one time	Upper-case alphabetic
a	Press [Fn a] two times	Lower-case alphabetic
E	Press [Fn a] three times	Function Mode

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" for upper-case, and "a", "b", "c" or "2" for lower-case.

- ▶ 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.

When in function mode, the [Fn a] key works with a number key. Press the [Fn a] key three times, and its associated icon **E** will be displayed on the screen. Press the second key, say [5], to complete the key combination and access the function [F5]. Press [Fn a] again and the icon **E** will go off.

Below briefly describes the functions of common keys on the Terminal.

SCAN

The yellow key is used to work as the ENTER key by default.

- ▶ When the reader function is enabled, this yellow key is set to trigger the scan engine so that it can read a barcode.

ENTER


The two keys on each upper side of the **SCAN** key are user-friendly and convenient for either right-handed or left-handed operator. Normally, it is used for command execution or input confirmation.

ESC (Escape)

This key is on the left lower side of the **SCAN** key. Normally, it is used to stop and exit the current operation.

Navigation Pad

The 4-way navigation pad around the **SCAN** key is used to move the cursor left, up, down, or right.

- ▶ While pressing [, they can be used to adjust the luminosity and contrast of the screen backlight.

Backspace

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

Function/Alpha Key

This key is a modifier key that requires pressing a second key to get the yellow-coded letter (A-Z) or symbol printed above the second key, or the function (F0-F9) of the second key.

Icon	Description
A	This icon appears when you press the [Fn a] key one time, indicating it is set to alphabetic mode for typing upper-case alphabetic letters.
a	This icon appears when you press the [Fn a] key two times, indicating it is set to alphabetic mode for typing lower-case alphabetic letters.
E	This icon appears when you press the [Fn a] key three times, indicating it is set to the function mode. Then, press another key ([0] ~ [9]) to get the desired function. <ul style="list-style-type: none">▶ To get the value of another key combination modified by the function key, keep pressing another key ([0] ~ [9]) to produce the result.▶ To exit the function mode, press [Fn a] again and the icon will go off.

Backlight Configuration Key

This key is used to turn ON/OFF the backlight of the LCD and keypad. Also, while pressing [⚙️], the navigation keys can be used to adjust the luminosity and contrast of the screen backlight.

Key	Description
[⚙️] + [Right]	Press these keys at the same time to increase the contrast.
[⚙️] + [Left]	Press these keys at the same time to decrease the contrast.
[⚙️] + [Up]	Press these keys at the same time to increase the luminosity.
[⚙️] + [Down]	Press these keys at the same time to decrease the luminosity.

Power Key

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 Terminal.

Note: (1) Functionality of keys is application-dependent. 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.
(2) When a status icon appears on the screen, it indicates a certain mode is activated and it is not necessary to hold down the modifier key.

1.4 LCD

The Terminal comes with a 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 18 lines
	Font size 8×16 (pixels)	20 characters by 9 lines
Chinese font	Font size 12×12 (pixels)	13 characters by 12 lines
	Font size 16×16 (pixels)	10 characters by 9 lines
Other language fonts, company logo...	Programmable	

Note: 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. Alternatively, the luminosity and contrast can be configured through programming or via **System Menu**. Refer to [3.2.2 Backlight](#) and [3.2.3 Contrast](#).

Note: Using backlight while on battery power will substantially reduce battery power. We suggest that you dim the backlight while working in a well-lit area or have it set to be automatically turned off when not in use.

Key Combination	Action
[	Toggle ON/OFF the backlight
[] + [Up]	Turn ON the backlight and increase the luminosity of LCD
[] + [Down]	Turn ON the backlight and decrease the luminosity of LCD
[] + [Right]	Turn ON the backlight and increase the contrast of LCD
[] + [Left]	Turn ON the backlight and decrease the contrast of LCD

Note: Hold down the first key, and keep pressing the second key for adjustment.

1.5 NOTIFICATIONS

1.5.1 STATUS LED

There are two dual-color LED indicators above the screen. Both 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. LED1 is used for "Good Read" and will become solid green upon reading a barcode successfully.

- ▶ LED1 is used to provide information on the charging status and barcode decoding.
- ▶ LED2 is used to provide information on wireless communications.

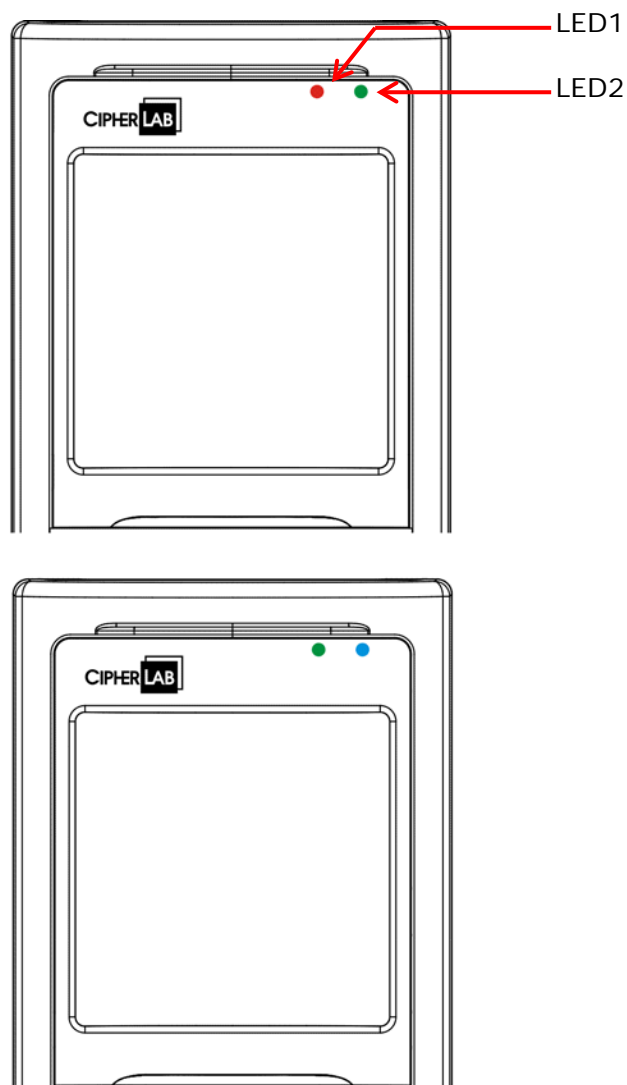


Figure 5: LED Indicators

LED1: Red/Green	Red	Green
User Power ON	User definable	User definable ▶ Solid green for Good Read by default
Power Off, Battery Charging	System default ▶ Flashing red: Charging	System default ▶ Flashing green: Charging done
Charging Error	System default ▶ Flashing red and green: Charging error occurs	
LED2: Blue/Green	Blue	Green
Bluetooth	System default ▶ Flashing blue, quickly: Waiting for connection or connecting ▶ Flashing blue, slowly: Connected	---
Wi-Fi	---	System default ▶ Flashing green, quickly: Waiting for connection or connecting ▶ Flashing green, slowly: Connected

1.5.2 AUDIO

The Terminal has a mono or stereo speaker at the bottom, which can be programmed for status feedback. It is used to play sounds for events in the programs, or play audio files such as .WAV files. Its volume can be configured through programming or via **System Menu**. Refer to [3.2.7 Speaker Volume](#). In particular, its frequency and duration are software programmable for Good Read in the provided terminal emulation programs.

1.5.3 VIBRATOR

The Terminal is integrated with a vibrator, which can be programmed for status feedback. It can be helpful when working in noisy environments. In particular, the vibrator is software programmable for Good Read in the provided terminal emulation programs.

1.6 DATA CAPTURE

A wide variety of scan engines is available for delivering flexibility to meet different requirements. Depending on the scan engine integrated, the Terminal is capable of scanning barcodes of a number of symbologies that are enabled by default while running the preloaded AG runtime. Refer to [3.3.1 Reader](#) for functional test.

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

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

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

- ▶ 1D CCD scan engine
- ▶ 1D Laser scan engine
- ▶ 2D scan engine

Note: In AG or CipherNet runtime, not all of the symbologies are enabled by default. Instead of running any of them, you can develop your own applications to control the scan engine for data collection.

Symbologies Supported (Default Setting: Enable/Disable)		CCD/Laser	2D
Codabar		Enabled	Enabled
Code 11			Disabled
Code 93		Enabled	Enabled
Composite Code	CC-A/B		Disabled
	CC-C		Disabled
	TCIF Linked Code 39		Enabled
MSI		Disabled	Disabled
Plessey		Disabled	
Postal Codes			Enabled
Telepen		Disabled	
Code 128	Code 128	Enabled	Enabled
	GS1-128 (EAN-128)	Enabled	Enabled
	ISBT 128	Enabled	Enabled
Code 2 of 5	Industrial 25 (Discrete 25)	Enabled	Enabled
	Interleaved 25	Enabled	Enabled
	Matrix 25	Disabled	Disabled

	Chinese 25		Disabled
	Coop 25	Disabled	
Code 3 of 9	Code 39	Enabled	Enabled
	Trioptic Code 39		Disabled
	Italian Pharmacode (Code 32)	Disabled	Disabled
	French Pharmacode	Disabled	
EAN/UPC	EAN-8	Enabled	Enabled
	EAN-8 Addon 2	Disabled	Disabled
	EAN-8 Addon 5	Disabled	Disabled
	EAN-13	Enabled	Enabled
	EAN-13 & UPC-A Addon 2	Disabled	Disabled
	EAN-13 & UPC-A Addon 5	Disabled	Disabled
	Bookland EAN (ISBN)	Disabled	Disabled
	UPC-E0	Enabled	Enabled
	UPC-E1	Disabled	Disabled
	UPC-E Addon 2	Disabled	Disabled
	UPC-E Addon 5	Disabled	Disabled
	UPC-A	Enabled	Enabled
GS1 DataBar (RSS)	GS1 DataBar Omnidirectional (RSS-14)	Disabled	Enabled
	GS1 DataBar Truncated	Disabled	Enabled
	GS1 DataBar Stacked	Disabled	Enabled
	GS1 DataBar Stacked Omnidirectional	Disabled	Enabled
	GS1 DataBar Limited (RSS Limited)	Disabled	Enabled
	GS1 DataBar Expanded (RSS Expanded)	Disabled	Enabled
	GS1 DataBar Expanded Stacked	Disabled	Enabled
2D Symbologies	PDF417		Enabled
	MicroPDF417		Enabled
	Data Matrix		Enabled
	Maxicode		Enabled
	QR Code		Enabled

1.7 CHARGING & COMMUNICATIONS

Normally, the Terminal ships with a USB cable for charging and communications.

- ▶ If you are using USB Virtual COM for the first time, you must install its driver from the CD-ROM. Driver version 5.3 or later is required. Please remove older versions! The virtual COM port will not be assigned until the USB port is in use.
- ▶ If you are using USB Virtual COM_CDC for the first time, you must install its driver from the CD-ROM. USB CDC driver installer is available in the “Windows” folder, which will copy a vendor-supplied INF file to Windows.
- ▶ For Standard USB cable, it will release COM port in the following conditions:
 - (i) Detach the cable from the Terminal directly.
 - (ii) The Terminal is turned off.
 - (iii) No application is running on the Terminal, or COM port is shut down.

USB Interface Cable

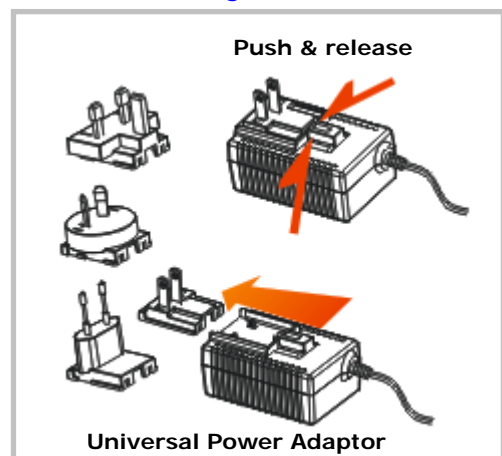
Task	USB Cable
Charging	USB direct charging <ul style="list-style-type: none"> ▶ 500 mA: USB icon ▶ 100 mA: Highlighted USB icon ▶ 0 mA: Disable charging for 8200 5 V charging from the adaptor (Plug icon)
Communications	USB Virtual COM — If using FORGE Application Generator software, you may use a download utility to receive data on your computer; otherwise, run HyperTerminal.exe to receive data directly. USB HID — Run a text editor on your computer to receive data directly. USB Virtual COM_CDC — If using FORGE Application Generator software, you may use a download utility to receive data on your computer; otherwise, run HyperTerminal.exe to receive data directly.

Note: Battery charging stops when the temperature drops below 0°C or exceeds 40°C. It is recommended to charge the battery at room temperature (18°C to 25°C) for optimal performance.

1.7.1 INTERFACE CABLE OPTIONS

For charging via the USB cable, the standard charging current is 500 mA. However, we recommend you to connect the power adaptor to speed up charging the battery.

- ▶ If you connect the Terminal to a USB hub, the charging current may be insufficient. In that case, change the charging current to 100 mA after connecting the USB cable. It will take a longer time to charge to full. Refer to [3.2.9 USB Charge Current](#).



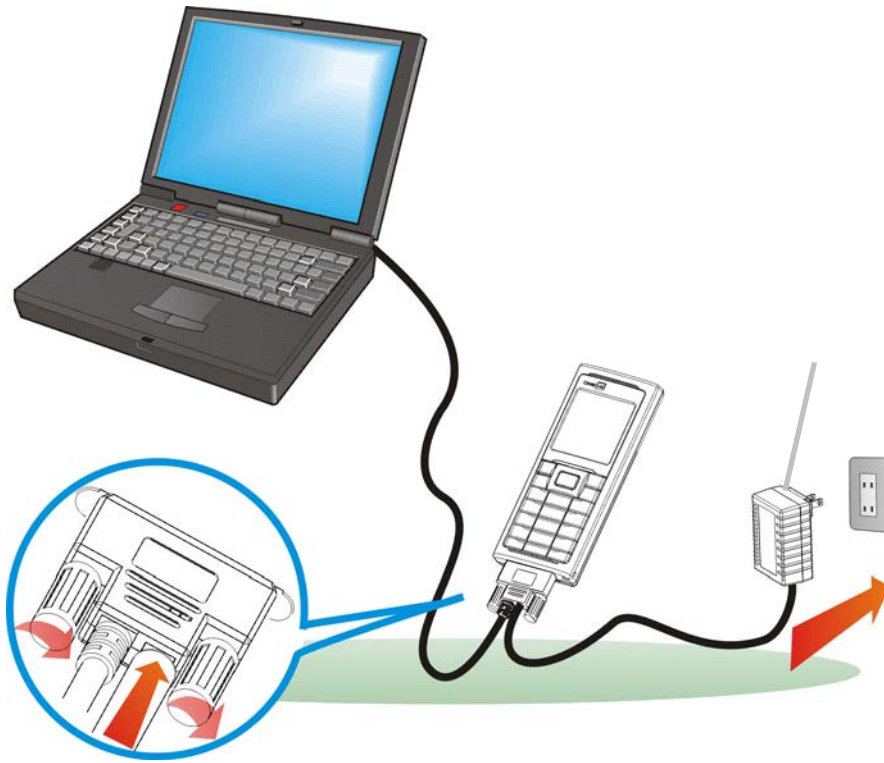


Figure 6: Using USB/RS-232 cable

Warning: The Terminal is not allowed to function when it is solely on USB power and without a battery loaded. It will display a warning message "Battery Missing" along with an audible alert. In that case, you should install the battery before restarting.

1.8 SD CARD

SD card can be accessed directly by using the provided functions in user application. Yet, when 8200 is equipped with SD card and connected to your computer via the USB cable, it can be treated as a removable disk (USB mass storage device) as long as it is configured properly through programming or via **System Menu | 8. Next Page | 1. SD Card Menu | 1. Run As USB Disk**. Refer to [3.8 SD Card Menu](#).

Note: While running BASIC application, the size of DAT files on SD card can be calibrated. Go to **System Menu | 8. Next Page | 1. SD Card Menu | 2. Access SD Card | 4. Check File Size** to refresh the size of "A:\BASICRUN\TXACTn.DAT" (n=1~6).

1.8.1 FILE SYSTEM

For 8200 Series, it supports FAT12/FAT16/FAT32 and allows formatting the card through C programming or via **System Menu | 8. Next Page | 1. SD Card Menu | 2. Access SD Card**. Based on the capacity of the card, it will automatically decide the FAT format:

Card Capacity	FAT Format	Sectors per Cluster
≤ 32 MB	FAT12	32
≤ 1 GB	FAT16	32
≤ 2 GB	FAT16	64
≤ 8 GB	FAT32	8

1.8.2 DIRECTORY

Unlike the file system on SRAM, the file system on SD card supports hierarchical tree directory structure and allows creating sub-directories. Several directories are reserved for particular use.

Reserved Directory	Related Application or Function	Remark
\Program	<ul style="list-style-type: none"> ▶ System Menu Load Program ▶ Program Manager Download ▶ Program Manager Activate ▶ Kernel Menu Kernel Update ▶ UPDATE_BASIC() 	Store programs to this folder so that you can download them to 8200: <ul style="list-style-type: none"> ▶ C program — *.SHX ▶ BASIC program — *.INI and *.SYN
\BasicRun	BASIC Runtime	Store DAT and DBF files that are created and accessed in BASIC runtime to this folder. Their permanent filenames are as follows:

		DAT Filename	
	DAT file #1	TXACT1.DAT	
	DAT file #2	TXACT2.DAT	
	DAT file #3	TXACT3.DAT	
	DAT file #4	TXACT4.DAT	
	DAT file #5	TXACT5.DAT	
	DAT file #6	TXACT6.DAT	
		DBF Filename	
	DBF file #1	Record file	F1.DB0
		System Default Index	F1.DB1
		Index file #1	F1.DB2
		Index file #2	F1.DB3
		Index file #3	F1.DB4
	DBF file #2	Record file	F2.DB0
		System Default Index	F2.DB1
		Index file #1	F2.DB2
		Index file #2	F2.DB3
		Index file #3	F2.DB4
	DBF file #3	Record file	F3.DB0
		System Default Index	F3.DB1
		Index file #1	F3.DB2
		Index file #2	F3.DB3
		Index file #3	F3.DB4
	DBF file #4	Record file	F4.DB0
		System Default Index	F4.DB1
		Index file #1	F4.DB2
		Index file #2	F4.DB3
		Index file #3	F4.DB4
	DBF file #5	Record file	F5.DB0
		System Default Index	F5.DB1
		Index file #1	F5.DB2
		Index file #2	F5.DB3
		Index file #3	F5.DB4

\AG\DBF \AG\DAT \AG\EXPORT \AG\IMPORT	Application Generator (a.k.a. AG)	Store DAT, DBF, and Lookup files that are created and/or accessed in Application Generator to this folder.
--	-----------------------------------	--

1.8.3 FILE NAME

A file name must follow 8.3 format (= short filenames) — at most 8 characters for filename, and at most three characters for filename extension. The following characters are unacceptable: " * + , : ; < = > ? | []

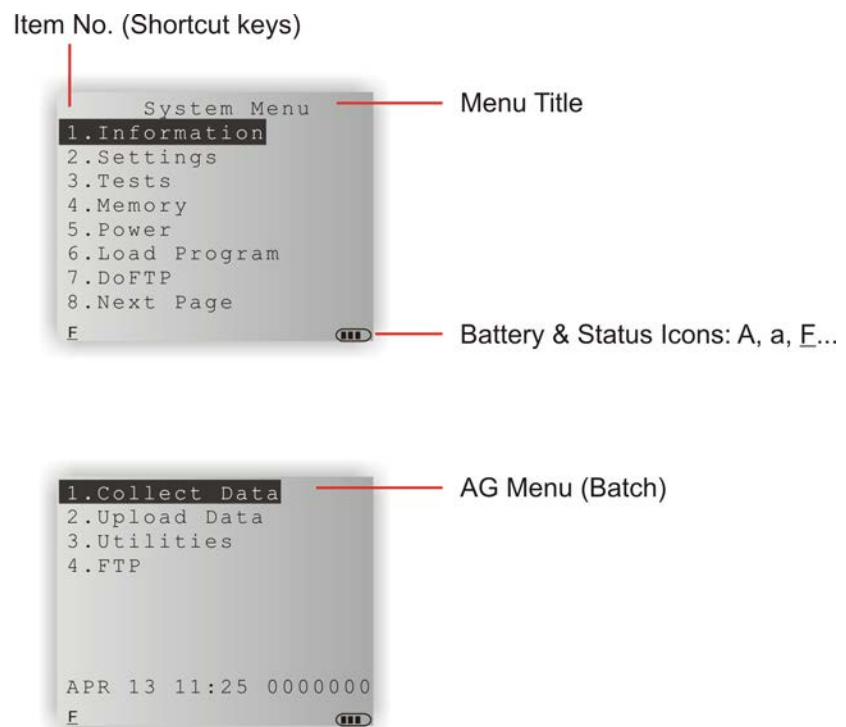
- ▶ On 8200 Series, it can only display a filename of 1 ~ 8 characters (the null character not included), and filename extension will be displayed if provided. If a file name specified is longer than eight characters, it will be truncated to eight characters.
- ▶ Long filenames, at most 255 characters, are allowed when using 8200 equipped with SD card as a mass storage device. For example, you may have a filename "123456789.txt" created from your computer. However, when the same file is directly accessed on 8200, the filename will be truncated to "123456~1.txt".
- ▶ If a file name is specified other in ASCII characters, in order for 8200 to display it correctly, you may need to download a matching font file to 8200 first.
- ▶ The file name is not case-sensitive.

LEARNING SOFTWARE ARCHITECTURE

This chapter mainly describes the software inside the Terminal. 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:

- ▶ Press the arrow keys [Up] and [Down] to move the highlight bar.
- ▶ Press the number key that corresponds to the item number.
- ▶ Follow the on-screen instructions to change a specific setting, or press [ESC] to return to a previous page or menu.



On each screen, the bottom line displays status icons, such as:

- ▶ The 4-bar battery icon indicates the current power status.
- ▶ The status icon of input mode or function mode is controlled by the [Fn a] key.

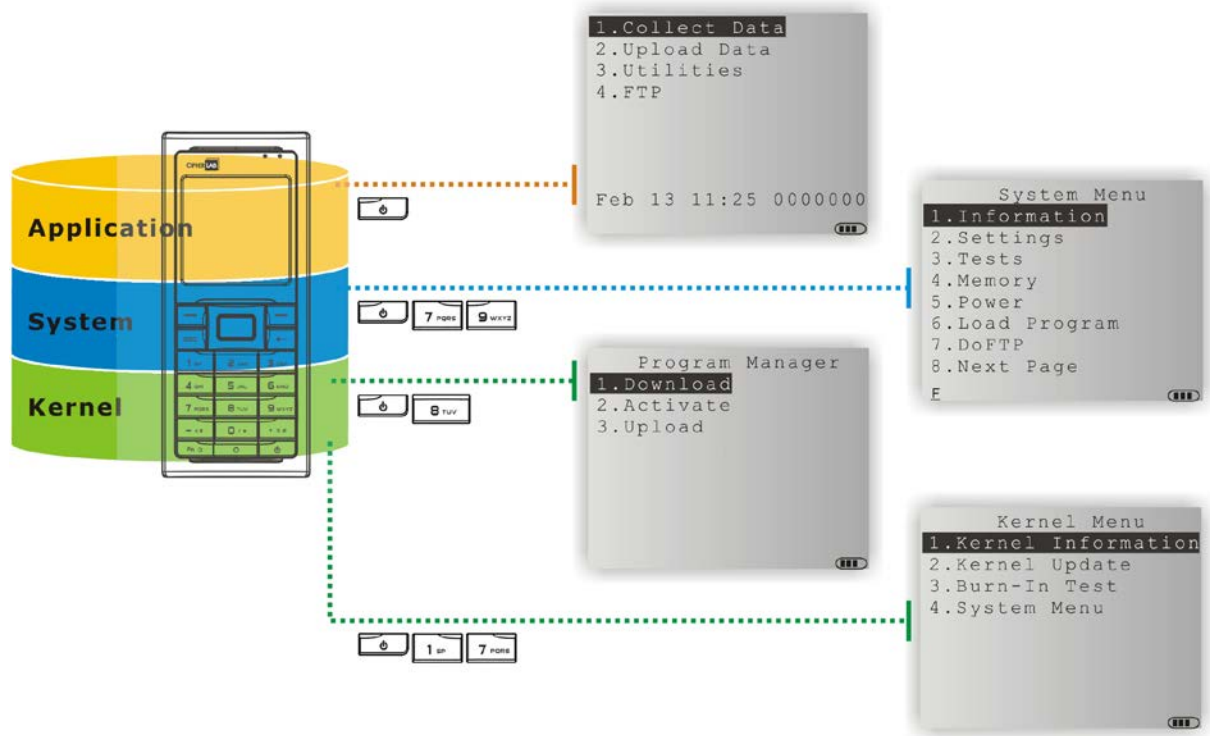


Figure 7: Software Architecture

IN THIS CHAPTER

2.1 Application Module 29
 2.2 System Configuration & Core..... 30

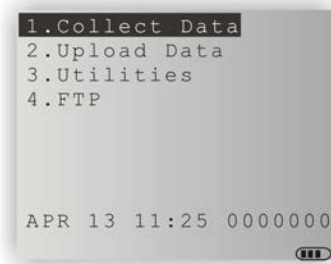
2.1 APPLICATION MODULE

The Terminal ships with software package on the CD-ROM. It includes **FORGE Application Generator** (batch and WLAN versions), **MIRROR Emulator** (VT and 5250 versions), download utilities, etc.

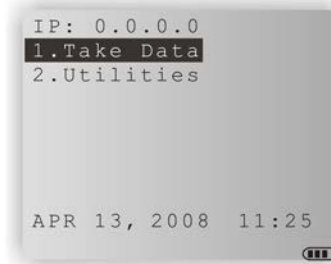
2.1.1 FORGE APPLICATION GENERATOR (AG)

For easy development of applications, the Terminal is preloaded with AG runtime. When you turn on the Terminal, it displays the Main Menu of AG application, as shown below.

Batch AG



WLAN AG



Note: Batch AG supports automatically uploading data to a host computer when the upload interface is properly configured. Once the Terminal is connected via the RS-232 or USB Virtual COM cable, there will be a moving hourglass icon displayed on the upper-right corner of the screen, indicating the Terminal is ready for auto upload.

Before using the Terminal 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	U8200.SHX	ForgeAG.exe
WLAN AG	WU8200.SHX	AG8200WLAN.exe

Note: FORGE Application Generator (AG) software package includes
 (1) a companion tool for quickly developing your application — Batch or WLAN AG;
 (2) several download utilities to make it versatile in use.

2.1.2 MIRROR EMULATOR (CIPHERNET)

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

For details on the **MIRROR Emulator** application, please refer to separate user manuals.

Terminal Emulation	CipherNet Runtime	Companion Tool on PC End
VT100/220	82xx-VT.SHX	CipherNet-VT.exe
IBM 5250	82xx-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 & CORE

For managing system configurations and multiple programs, each Terminal comes with **System Menu**, **Program Manager**, and **Kernel Menu**. Refer to the following chapters on how to configure the 8200 Series Terminal, regarding system configurations and program download.

2.2.1 SYSTEM MENU

[System Menu](#) is bundled with BASIC Runtime or user programs that are written in “C”. It is provided 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 updating the kernel and bootloader, and repairing the system.

2.2.3 PROGRAM MANAGER

[Program Manager](#) is part of the kernel. You may download as many as seven application programs.

SYSTEM MENU

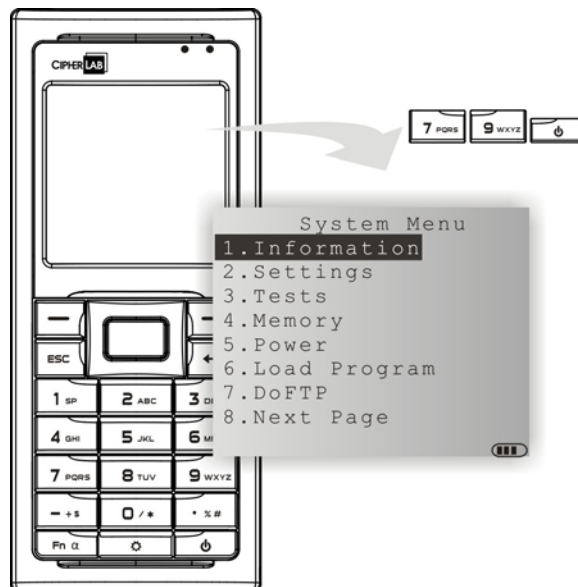
System Menu is generated by a powerful utility, which offers an interface for engineers (programmers or system integrator) to view system information, change the configuration parameters, download programs and run diagnostics.

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

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

How to access System Menu?

- 5) Turn off the Terminal.
- 6) Press [7] + [9] + [Power].

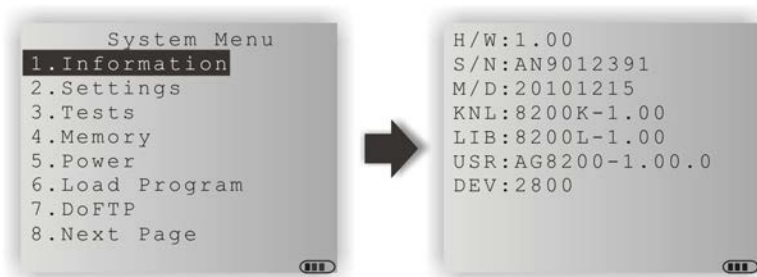


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3.10 Serial PPP Menu	錯誤! 尚未定義書籤。
3.11 Bluetooth Menu	51
3.12 Wi-Fi Menu	60

3.1 INFORMATION

Here provides important system information to help diagnose the system.



System Menu | 1. Information

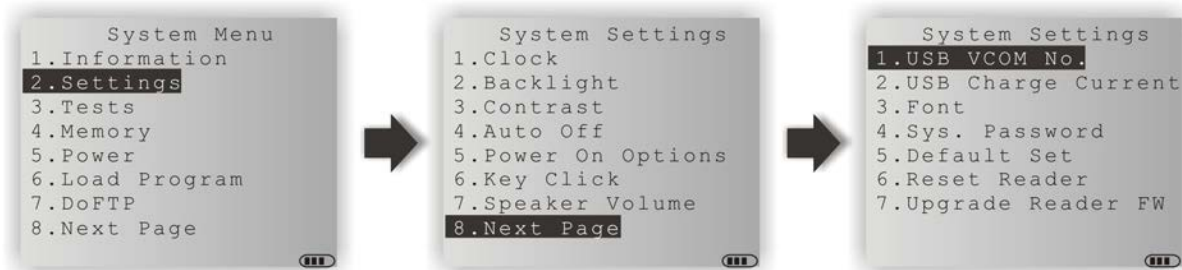
H/W	Hardware version
S/N	A serial number assigned to the Terminal
M/D	Manufacturing date
KNL	Kernel version
LIB	C library version
BSC	BASIC Run-time version, if a BASIC application is downloaded
USR	Application program version
DEV	4-digit code for optional hardware configurations <ul style="list-style-type: none"> ▶ For example, 2800 indicates the Terminal is equipped with Laser scan engine and combo module for wireless connectivity (Bluetooth + 802.11b/g/n).

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
2nd digit	Wireless module	0= none (8200) 5= Bluetooth only (8260) 8= Bluetooth + 802.11b/g/n (8231)
3rd digit	Reserved	0
4th digit	Reserved	0

3.2 SETTINGS

You can change the default settings here.



System Settings	Default Values
Clock	Current time
Backlight	20 seconds at level 2, backlight shade enabled
Contrast	Level 4
Auto Off	10 minutes
Power On Options	Program Resume
Key Click	Tone 2
Speaker Volume	High volume level
USB VCOM No.	Fixed
USB Charge Current	500 mA
System Password	Open access
Font	System font
Default Set (=Reset to Default)	Load factory settings
Reset Reader	Restore default reader settings
Upgrade Reader FW	Upgrade 2D reader firmware (For maintenance use only)

3.2.1 CLOCK

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

3.2.2 BACKLIGHT

Set the backlight duration for the keypad and LCD.

- ▶ Enter a value between 0 and 9999 (second).
- ▶ Press the arrow keys [Up] and [Down] to adjust the backlight level (4 levels).
- ▶ Press the [Left] key to adjust the shade effect.

3.2.3 CONTRAST

Set the contrast level for the LCD.

- ▶ Press the arrow keys [Up] and [Down] to adjust the contrast level.

3.2.4 AUTO OFF

The Terminal 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 (& WAKEUP EVENT) OPTIONS

Set the startup screen once the Terminal is turned on, and specify which events will wake up the Terminal:

Power On Options

Press the arrow keys [Up] and [Down] to select “Program Resume” or “Program Restart”, and then press [ENTER].

- ▶ Program Resume: When selected, the Terminal will start from the last session of program before it is turned off.
- ▶ Program Restart: When selected, the Terminal will start from the first session of the program.

WakeUp Events

The specified events can wake up the Terminal when the conditions are met. Press the arrow keys [Up] and [Down] to select a specific event, and press [ENTER] to determine when it is treated as a wake-up event or not.

- ▶ PwrKey: If yes, it will wake up the Terminal upon pressing the Power key.
- ▶ USB: If yes, it will wake up the Terminal upon connecting the USB cable.
- ▶ Charged: If yes, it will wake up the Terminal upon completion of charging.
- ▶ Alarm: If yes, it will wake up the Terminal upon the alarm time is up. Alarm can be set up through programming only.

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 speaker or mute it.

3.2.7 SPEAKER VOLUME

Set the speaker volume.

- ▶ Press the arrow keys [Up] and [Down] to adjust the volume level (3 levels) or mute it.

3.2.8 USB VCOM NO

By default, it is set to use one virtual COM port for all (=FIXED), regardless of how many 8200 Terminals are connected to PC when USB Virtual COM is in use. This setting requires you to connect one 8200 at a time, and will facilitate configuring a great amount of 8200 Terminals via the same virtual COM port (for administrators' or factory use). If necessary, you can have it set to use variable virtual COM port (=Change by Serial Number), which will vary by the serial number of each different 8200.

- ▶ Press the arrow keys [Up] and [Down] to select between "Fixed" and "Change by Serial Number".

3.2.9 USB CHARGE CURRENT

By default, the USB charging current is set to 500 mA. For direct charging via the USB cable without supplying a power adaptor, the standard charging current is 500 mA. If you connect the Terminal to a USB hub, the charging current may be insufficient. In that case, change the charging current to 100 mA after connecting the USB cable. It will take a longer time to charge to full.

- ▶ Press the arrow keys [Up] and [Down] to select between "500 mA" and "100 mA".
- ▶ To disable charging for 8200, select "0 mA".

Note: (1) USB direct charging, 500 mA: USB icon
(2) USB direct charging, 100 mA: Highlighted USB icon
(3) 5V charging from the adaptor: Plug icon

3.2.10 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.

3.2.11 SYSTEM PASSWORD

Set a password to control user access to **System Menu**, **Program Manager** and **Kernel 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.

3.2.12 DEFAULT SET

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

3.2.13 RESET READER

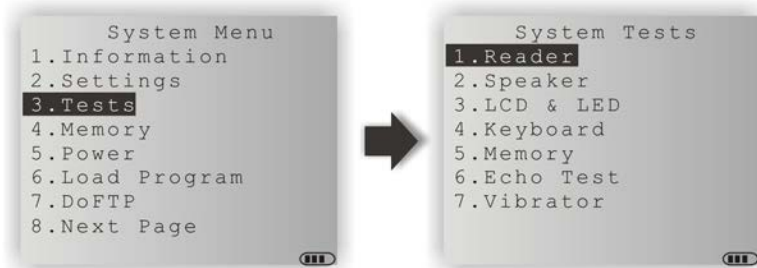
Reset reader settings to the default values.

3.2.14 UPGRADE READER FW

Upgrade 2D reader firmware if necessary.

3.3 TESTS

Here provides functional tests for key parts.



3.3.1 READER

Test the reading performance of the scanner. The supported symbologies depend on the scan engine you use. Refer to [1.6 Data Capture](#) for symbologies that are enabled by default. For symbologies that are disabled by default, they must be enabled through programming.

- ▶ Press [SCAN] to start. To stop and exit the test, press any key.

3.3.2 SPEAKER

Test the speaker with different volume levels.

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

3.3.3 LCD & LED

Test the LCD display and LED indicators.

- ▶ 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 a test utility on your computer and start the test on your Terminal. Select a desired baud rate if necessary.

- ▶ To stop and exit the test, press [ESC].

Interface	Description	Test Utility
USB	<p>This echo test is to verify connectivity via the USB cable between the Terminal and a host computer.</p> <ul style="list-style-type: none"> ▶ USB VCOM Echo — The Terminal works as a generic USB device. ▶ USB HID — The Terminal works as an input device; select keyboard type and Caps Lock status for running a test. ▶ USB VCOM_CDC Echo — The Terminal works as a generic USB device. 	<p>EchoTest.exe for Virtual COM</p> <p>Any text editor for HID</p> <p>EchoTest.exe for Virtual COM</p>

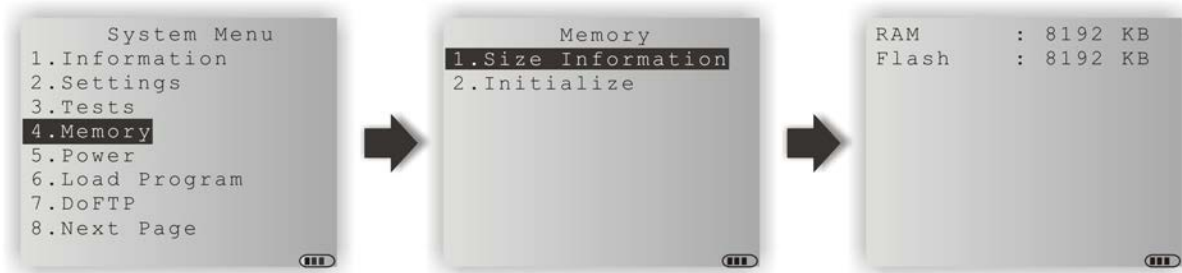
3.3.7 VIBRATOR

Test the vibrator.

- ▶ To stop and exit the test, press [ESC].

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

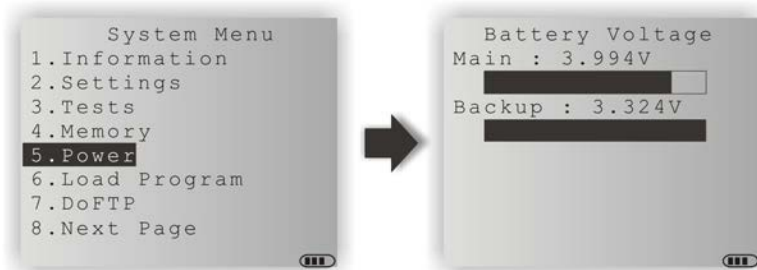
3.4.2 INITIALIZE

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.

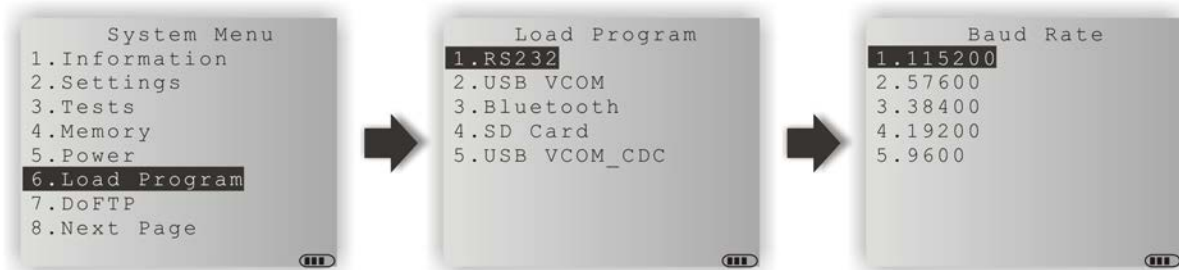
Backup (battery)

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 **System Menu** by pressing [ESC]. After downloading, restart the Terminal to activate the new program. Refer to [Appendix I Download Utility](#).



Note: The Terminal will stay in download mode for approximately 30 seconds.

.SHX Program	Download one of the following C program files and/or font file:	
Program File	▶ AG Runtime:	U8200.shx (Batch AG) WU8200.shx (WLAN AG)
	▶ CipherNet Runtime:	82xx-5250.shx (CipherNet-5250) 82xx-VT.shx (CipherNet-VT)
	▶ BASIC Runtime ^{Note} :	B8200.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) "Load Basic" menu is only available after you have downloaded a BASIC Runtime program.
(2) In addition to the system font, there can be only one font file downloaded to the Terminal.

SETTINGS**Interface**

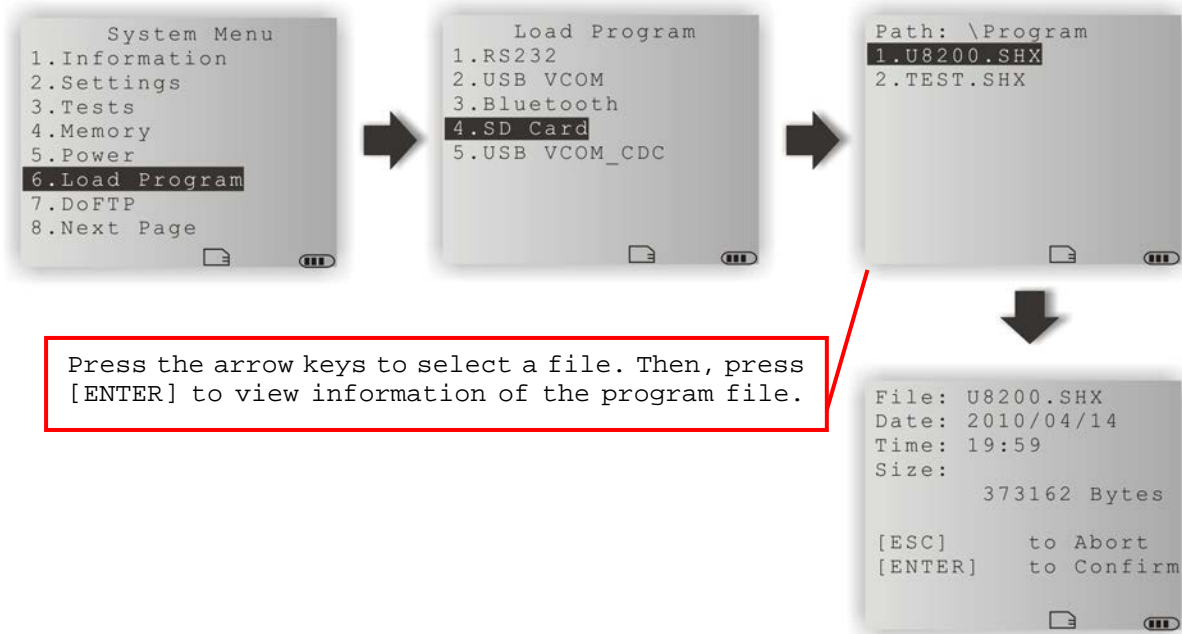
Options	Description
USB VCOM	Connect the USB cable between your computer and the Terminal.
Bluetooth	Approach the target Bluetooth enabled device.
SD Card	This option is available only when the memory card is present.
USB VCOM_CDC	Connect the USB cable between your computer and the Terminal.

Baud Rate

Available baud rate options: 115200/57600/38400/19200/9600 bps

LOAD PROGRAM VIA BLUETOOTH

- 1) Go to **System Menu** | **8. Next Page** | **5. 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 the download utility: ProgLoad.exe
 - Select interface RS-232 for using Bluetooth SPP.
 - Select COM port properties that match with the serial port settings used on your computer.

LOAD PROGRAM VIA SD CARD

Press the arrow keys to select a file. Then, press [ENTER] to view information of the program file.

- 1) If you have copied the desired program file(s) to your SD card, go to **System Menu** | **6. Load Program** and select SD Card. You will see a list of all the files under the directory “\Program”, as shown above.
- 2) Press the arrow keys [Up] and [Down] to select a file.
- 3) Press [ENTER] to view information of the program file.
- 4) Press [ENTER] to confirm downloading the program file to the Terminal.
Press [ESC] to abort the download task.

3.7 DOFTP MENU

This submenu is for the FTP client connection. It will log the Terminal into an FTP server via Wi-Fi for the following tasks.

- ▶ Execute and/or update the script file "FTP.dat"
- ▶ Download the program update(s)



.SHX Program	Download one of the following C program files and/or font file, firmware file:	
Program File	▶ AG Runtime:	U8200.shx (Batch AG) WU8200.shx (WLAN AG)
	▶ CipherNet Runtime:	82xx-5250.shx (CipherNet-5250) 82xx-VT.shx (CipherNet-VT)
	▶ BASIC Runtime:	B8200.shx
	▶ User program	
Font File	Refer to the Font Files folder on CD-ROM.	
Firmware File	▶ Kernel update:	K8200.shx
	▶ Bootloader update:	BL8200.shx

Note: (1) When more than one program files of the same type are specified in the script file, only the last program file is used for update.
 (2) The system will restart itself right after successful update and the downloaded file(s) will then be removed.

3.7.1 LOCAL

Depending on the script file "FTP.dat" saved on the Terminal, you may update the script file or download any program update from FTP server, if necessary.

SETTING

Interface

Options Supported	Description
Wi-Fi	Connect the Terminal to an access point.

Note: This setting is available only when the Wi-Fi module is present.

3.7.2 MANUAL

You may log into an FTP server manually, and follow the script file on the server and update programs. However, this script file will not be kept after execution, nor replace the existing one on the Terminal, if there is any.

SETTINGS

Server IP

Specify the IP address or name of the FTP server.

Server Port

Specify the remote port number.

- ▶ By default, TCP port 21 is used on the server for the control connection.

Login Name

Specify the user name for logging onto FTP server.

Login Password

Specify the password for logging onto FTP server.

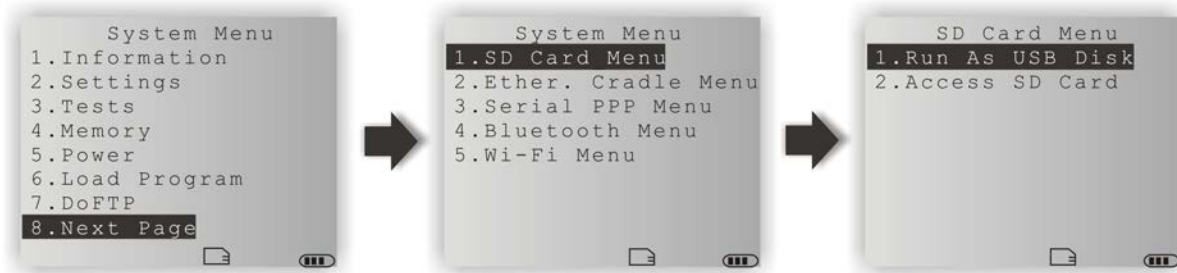
Interface

Options Supported	Description
Wi-Fi	Connect the Terminal to an access point.

Note: This setting is available only when the Wi-Fi module is present.

3.8 SD CARD MENU

This submenu is for using the Terminal equipped with SD card as a removable disk, as well as for directly accessing files on SD card.



Note: When SD card is present, the card icon will appear flashing while being accessed. If the Terminal is preloaded with Batch AG runtime, it will automatically create two working directories “\AG\IMPORT” and “\AG\EXPORT” on SD card.

3.8.1 RUN AS USB DISK

When the Terminal is equipped with SD card and connected to your computer via the USB cable, it can be treated as a removable disk (USB mass storage device) as long as it is configured properly through programming or via selecting [Run as USB Disk].

Note: The SD card must be properly configured through programming or user menu before use.

3.8.2 ACCESS SD CARD

Edit the file system or format the SD card.

Edit Files

View and edit the file system on SD card.

Format

If the file system is not desired any more, you may format the SD card.

- ▶ If the capacity is 32 MB or under, the file system will be FAT12.
- ▶ If the capacity is 32 MB~2 GB, the file system will be FAT16.
- ▶ If the capacity is larger than 2 GB, the file system will be FAT32.

Warning! The contents on SD card will be wiped out after formatting.

Check Memory

For an SD card that has never been used on 8200, a message like "Found New SD Card" will be displayed allowing users to scan the card for memory check. If the action is canceled then, memory check can still be performed here.

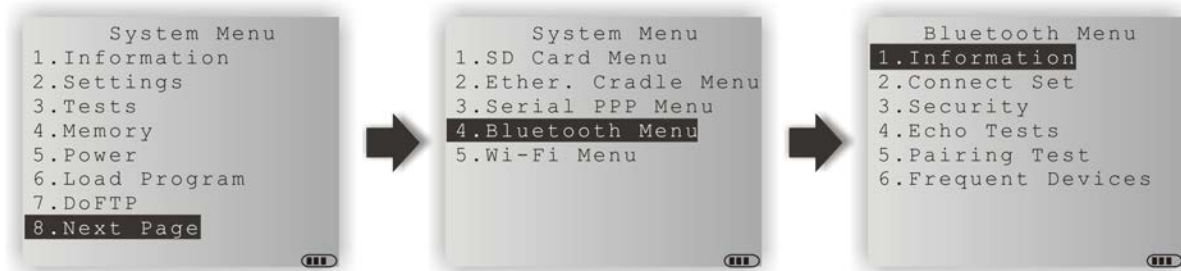
Check File Size

You may calibrate the size of DAT files on SD card while running BASIC application, and it will refresh the size of "A:\BASICRUN\TXACTn.DAT" (n=1~6).

Note: "Check File Size" is only available after you have downloaded the BASIC Runtime.

3.11 BLUETOOTH MENU

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

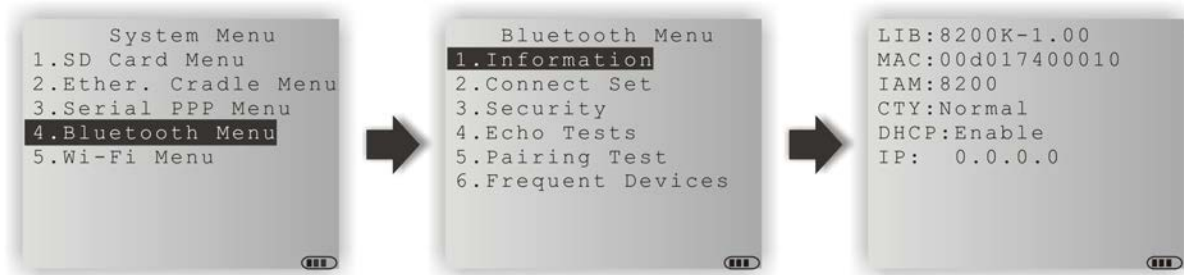


Bluetooth Settings	Default Value	HID, SPP, FTP Client	DUN
Connect Setting		Items Need to Be Checked	
Local Name	Model no. + Serial no.	v	v
Remote Name	---	---	---
Broadcast Me	Enable	v	v
Power Saving	Enable	v	v
BT-GPRS AP Name	---	---	(v) ^{Note}
DHCP	Enable	---	(v) ^{Note}
Local IP Address	0.0.0.0	---	(v) ^{Note}
Security			
Authentication	Disable	v	v
PIN Code	---	v	v

Note: BT-GPRS AP Name, DHCP and local IP Address are required for DUN-GPRS mode only.

3.11.1 INFORMATION

Information of network configuration can be viewed here.



Bluetooth Menu | 1. Information

LIB	Kernel version <ul style="list-style-type: none"> ▶ All user libraries reside in Kernel; no external libraries are required.
MAC	MAC address of the Bluetooth module
IAM	A name given to the Terminal for identification <ul style="list-style-type: none"> ▶ By default, it is made up of model number and the serial number. (Identical to 2. Connect Set 1. Local Name)
CTY	"Normal" means all 79 channels are available for frequency-hopping <ul style="list-style-type: none"> ▶ 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 <ul style="list-style-type: none"> ▶ It will automatically become enabled while connecting to a BT-GPRS AP.
IP	IP address of the Terminal

3.11.2 CONNECT SETTING

Set the connection parameters if necessary.



Local Name

Enter a name for identifying the Terminal.

- ▶ By default, it is made up of model number and the serial number.

Remote Name

Leave it empty unless you want to make a specific connection.

Broadcast Me

Options — Enable or Disable

- ▶ For initial connection, broadcasting must be enabled so that other Bluetooth devices can discover the Terminal.
- ▶ For security concerns, you may disable it in future use to hide the Terminal 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.

DHCP

Options - Enable or Disable

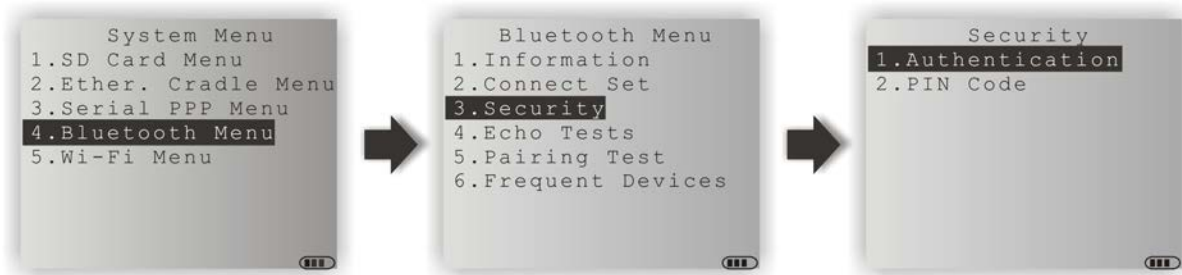
Local IP Address

Enter a new address for the Terminal, if necessary.

Note: BT-GPRS AP Name, DHCP and local IP Address are required for DUN-GPRS mode only.

3.11.3 SECURITY

Set or modify security parameters.



Authentication

Options — Enable or Disable

PIN Code

Define the encryption key values.

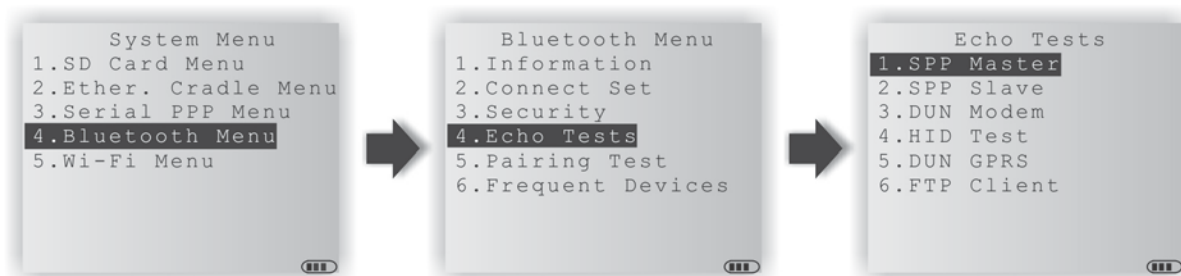
- ▶ Up to 16 characters, using ASCII code.

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

3.11.4 ECHO TESTS

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

- ▶ SPP: Serial Port Profile
It is used for ad hoc networking.
- ▶ 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.
- ▶ HID: Human Interface Device Profile
It is used for the Terminal to work as an input device, i.e. keyboard, for a host computer.
- ▶ FTP client: File Transfer Protocol Profile (FTP)
It is used for the Terminal to connect to a file server for file transfer.



SPP Master

Set the Terminal as a master device.

1. Pairing with your computer (slave) must be completed first.
2. Run the utility "EchoTest.exe" 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 Terminal will try to connect to PC (slave).

SPP Slave

Set the Terminal as a slave device.

1. Enable Authentication and set your PIN code on the Terminal.
2. Run the utility "EchoTest.exe" 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 Terminal will wait for PC (master) to start the connection.
5. Enter the preset PIN code for authentication on your computer.

DUN Modem

The Terminal 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 utility "EchoTest.exe" 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 Terminal will connect to your mobile phone that dials up to your computer.

HID Test

Set the Terminal as an input device.

1. The Terminal will wait for PC to start the connection.
It is suggested to disable Authentication on the Terminal.
2. Run a text editor on your computer.
3. Start to input data via the keypad on the Terminal.

DUN GPRS

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

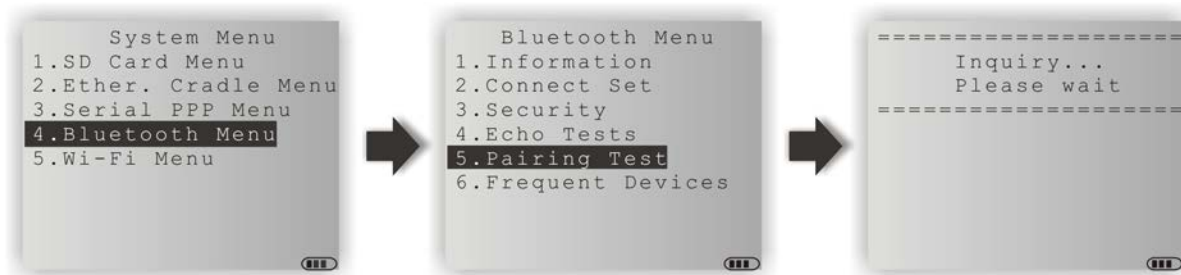
FTP Client

The Terminal (as a client) will try to connect to an FTP server.

1. Pairing with your FTP server must be completed first.
Select "FTP Server" for Target Machine options.
2. The Terminal will try to connect to PC (server).
3. Enter the FTP Test submenu for FTP function test.
 - ▶ Change Directory: Change the current working directory.
 - ▶ Get Folder Listing: View a list of all the folder(s) and file(s) of the current working directory.
 - ▶ Download File: Download a file from PC. The filename will be converted to "BTFTP01" for testing.
 - ▶ Upload File: Upload a file (i.e. BTFTP01) to PC.
 - ▶ Disconnect: Disconnect with the FTP server.

3.11.5 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 Terminal 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.
For the device name, it can only display a maximum length of 11 characters. When the device name is too long, it will be truncated automatically.
- 3) Select a Bluetooth service from the "Target Machine" menu. To stop and exit the test, press [ESC].
After pairing successfully, the target device will be added to the Frequent Devices list for quick connection in the future.

Note: For the initial use of Bluetooth networking, the pairing procedure must be done before the Echo tests.

3.11.6 FREQUENT DEVICES

Here is a list of devices that the Terminal has been connected to lately. After each successful pairing, the system will update it.

This list can show information of one device that provides any of the following services:

- ▶ Serial Port (SPP)
- ▶ Dial-Up Networking (DUN)
- ▶ Human Interface Device (HID)
- ▶ FTP Server (FTP)

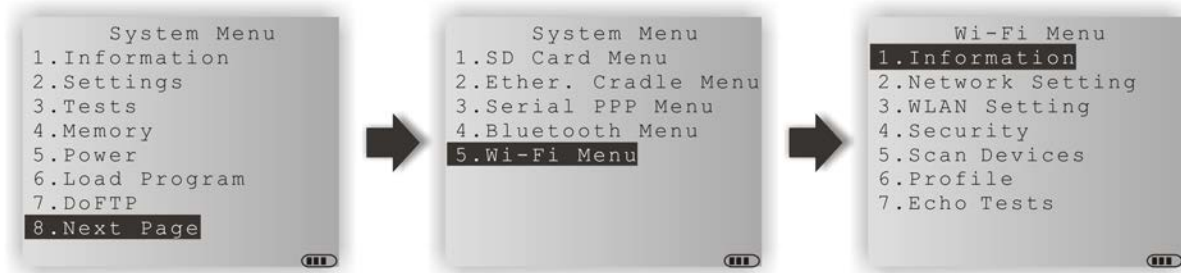
For the device name, it can only display a maximum length of 11 characters. When the device name is too long, it will be truncated automatically.



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

3.12 WI-FI MENU

This submenu accesses the settings of 802.11b/g/n wireless networking. You must configure these parameters correctly to be able to make the connection.

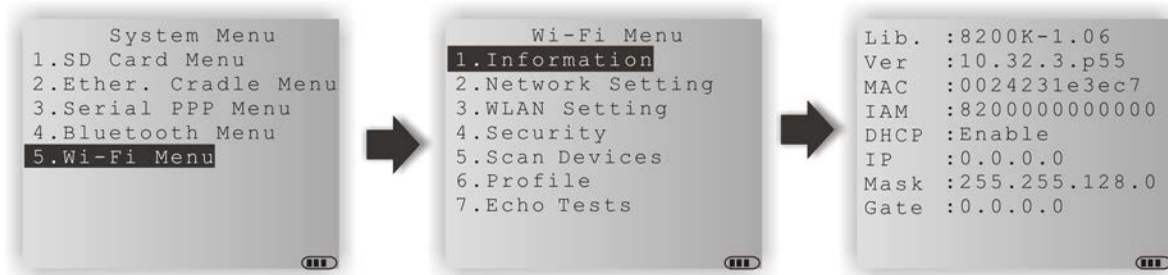


Note: The menu is available only when the Wi-Fi module is present.

Wi-Fi Settings	Default Value	Ad-hoc	Infrastructure
Network Setting		Items Need to Be Checked	
DHCP	Enable	---	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	Enable	---	v
Preamble	Long	---	v
Ad-Hoc	Disable	v	---
Fixed BSSID	000000000000	---	v
Security			
Authentication	Open System	---	v
WEP Menu	Disable	---	v
EAP Menu	Disable	---	v
WPA Menu	Disable	---	v

3.12.1 INFORMATION

Information of network configuration can be viewed here.

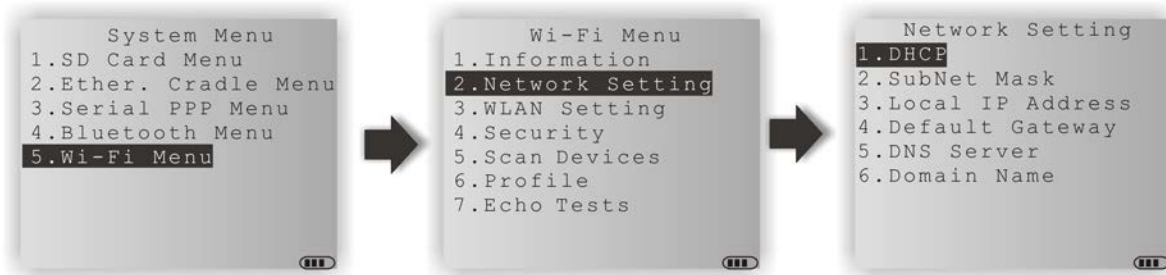


Wi-Fi Menu | 1. Information

Lib	Kernel version <ul style="list-style-type: none"> ▶ All user libraries reside in Kernel; no external libraries are required.
Ver	Firmware version of the Wi-Fi module
MAC	MAC address of the Wi-Fi module
IAM	A name given to the Terminal for identification. <ul style="list-style-type: none"> ▶ By default, it is made up of model number and the serial number. (Identical to 3. WLAN Setting 1. Local Name)
DHCP	DHCP server in use or not
IP	IP address of the Terminal
Mask	Subnet Mask
Gate	Default Gateway

3.12.2 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 Terminal, 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

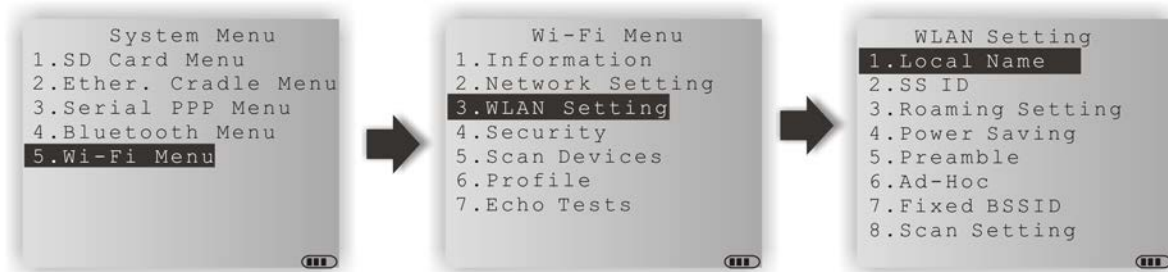
The domain name of the host is displayed when DHCP server is enabled.

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

3.12.3 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 Terminal.

- ▶ By default, it is made up of model number and the serial number.

SS ID

This refers to Service Set Identifier or AP name, which is used for remote device association.

- ▶ The Terminal can ONLY communicate with access points that have the same SS ID.

Roaming Setting

This refers to Access Point Density.

System Scale options — [1] Low [2] Medium [3] High [4] Custom –Tx Rate [5] Custom -Rssi

- ▶ The value you set must match that set for the access point.
- ▶ “Low / Medium / High” means the Terminal will search for other APs only when data transmission rate drops below “1 / 2 / 5” Mbps individually.
- ▶ “Custom –Tx Rate” lets you set data rate for the Terminal to search for other APs when data transmission rate drops below the specified value —
802.11b: 1, 2, 5.5, 11 Mbps
802.11g: 1, 2, 5.5, 11 Mbps & 6, 9, 12, 18, 24, 36, 48, 54 Mbps
- ▶ “Custom –Rssi” lets you set the conditions for the Terminal to search for other APs —
RSSI Threshold: options including -50, -55, -60, ..., -85, -90 dBm. When the current AP signal strength (RSSI) goes below the specified value, the Terminal starts to search for other APs.
RSSI Delta: options including 0, 5, 10, 15, and 20. Compare the signal strength between the current AP and the new one. If the signal differential between them is equal to or higher than the specified value, the Terminal will connect to the new AP.

Roaming Period options — 3 ~ 10 seconds

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

Fixed BSSID

This refers to the use of a specific AP's MAC address as the fixed Basic Service Set Identifier.

- ▶ The Terminal can ONLY communicate with this one and only access point.

Scan Setting

Specify the scan time period and channels.

Scan Time options — 60, 70, 80, 90, 100, 110 ms; and Disable or Enable "Double the time" (for example, when scan time is set to 60 with Double the time enabled, the scan time period for each channel will be 120 ms)

Scan Channel options — 1 ~ 14 channel (multiple selection)

3.12.4 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 | ▶ Enable (For Share Key, it must be enabled!) |
| | ▶ Disable (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 (for associating to Cisco access points)

- | | |
|--------------|---|
| EAP Setting | ▶ Enable |
| | ▶ Disable (default) |
| EAP ID | Enter a user name (up to 32 characters) |
| EAP Password | Enter a password (up to 32 characters) |

WPA Menu (WPA-PSK)

- | | |
|----------------|---|
| WPA Setting | ▶ Enable |
| | ▶ Disable (default) |
| WPA2 Setting | ▶ Enable |
| | ▶ Disable (default) |
| WPA Passphrase | Enter a phrase as your password (8 ~ 63 characters) |

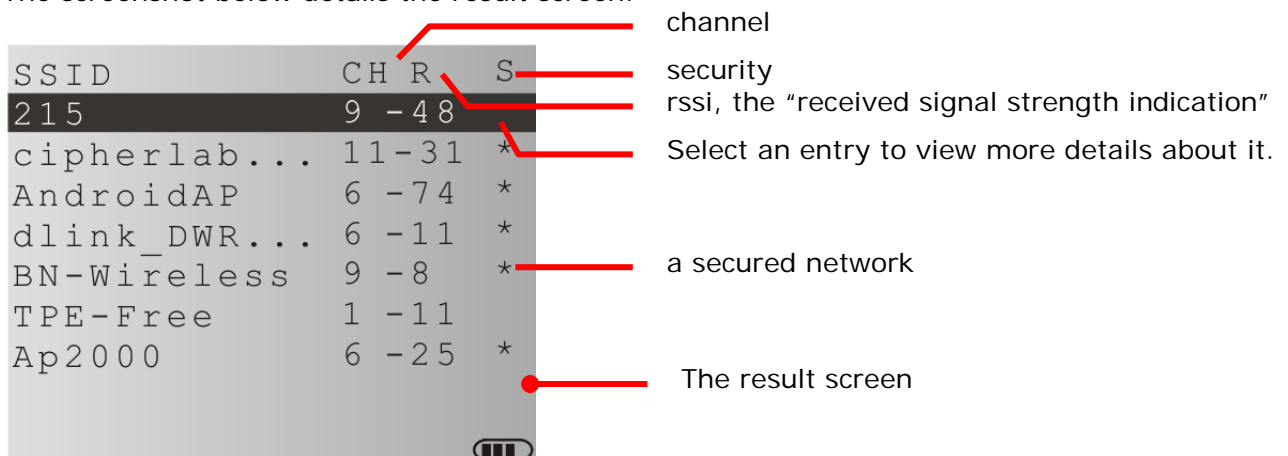
3.12.5 SCAN DEVICES

Select this command to launch the scanning for the Wi-Fi hotspots within range. The Terminal will first produce a scanning screen and then a result screen that displays all the WiFi hotspots discovered whether open or secured.

Select an entry on the result screen to see more details about it including the BSSID, BSS Type, and the security framework it applies.



The screenshot below details the result screen:



Label	Description	Function
CH	channel	Delivers the channel (frequency range) in use by the network.
R	rssi	Delivers the "Received Signal Strength Indication". See 3.12.7 Echo Tests to know how signal strength is rated by numbers.
S	security	Delivers the security of the network. A secured network goes with an asterisk sign (*) while an open network doesn't.

3.12.6 PROFILE

Up to 4 profiles can be used to save Wi-Fi connection options.



3.12.7 ECHO TESTS

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



Client Mode

Set the Terminal 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 utility "EchoTest.exe" 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 Terminal.

Server Mode





Set the Terminal as a server. The Terminal will try to connect to an AP.

1. Run the utility "EchoTest.exe" 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.

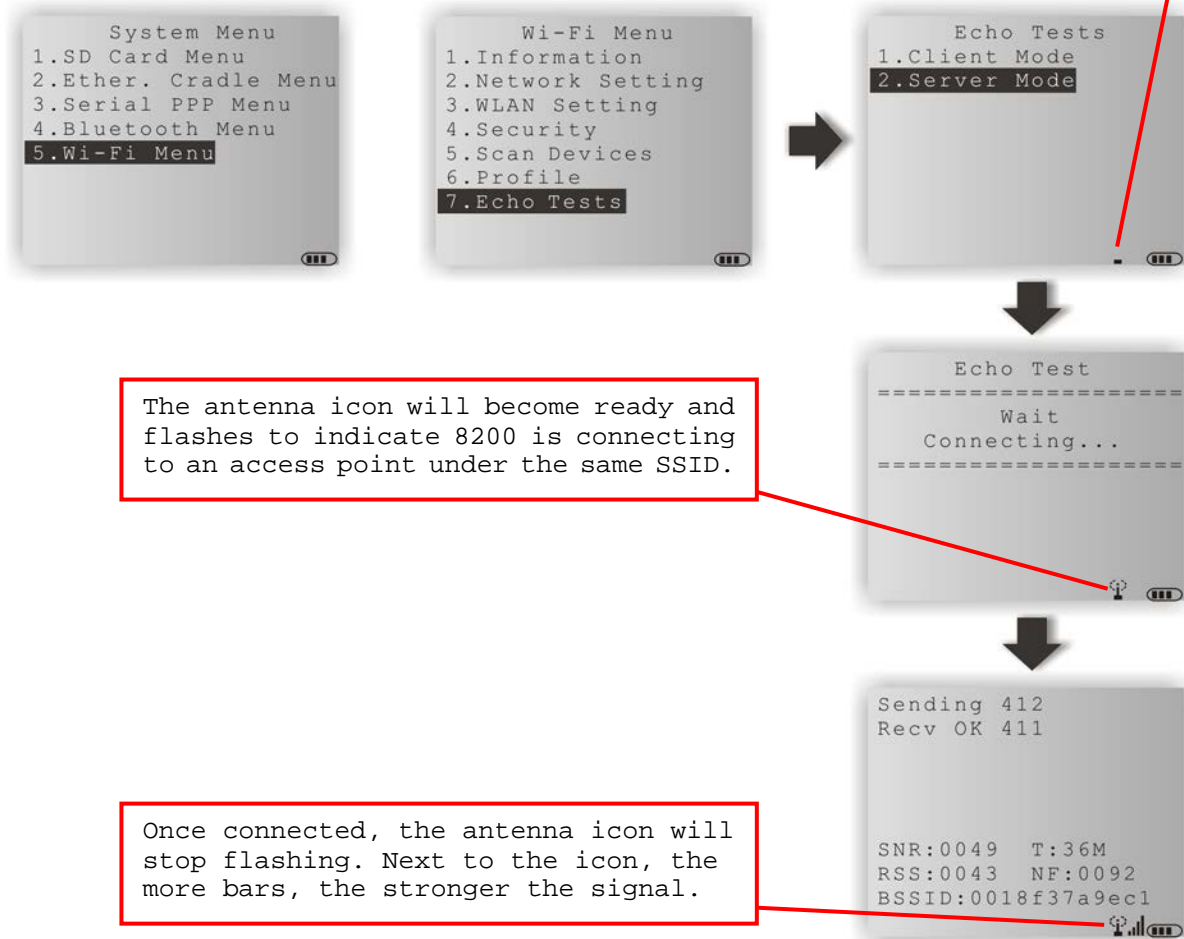
While running echo tests, if WPA setting is enabled for security, the SSID and Passphrase will be processed to generate a pre-share key.

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 Terminal is processing a pre-share key.
- 2) After having generated the pre-share key, the Terminal proceeds to establish a connection with an access point, and you will see the whole antenna is flashing.
- 3) When the Terminal has been connected to the access point successfully, you will see the whole antenna and the indication of wireless signal strength.

The changing icon -     indicates 8200 is processing a pre-share key.

Wait for a few seconds.



Note: If you are programming in C or BASIC, be aware that the antenna icon 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.



SNR (dB)	T	RSS (-dBm)	NF (-dBm)
(Signal to Noise ratio)	(Transmit Speed)	(Received Signal Strength Level)	(Noise Floor Level)
0 ~ 10 Very Poor	1 Mbps	0 ~ 60 Strong	0 ~ 92 Strong
10 ~ 20 Poor	2 Mbps	60 ~ 75 Moderate	92 ~ 98 Moderate
20 ~ 30 Fair	5.5 Mbps	over 75 Weak	over 98 Weak
30 ~ 40 Good	11 Mbps		
over 40 Very Good	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	71
4.2 Kernel	76

4.1 PROGRAM MANAGER

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

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

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

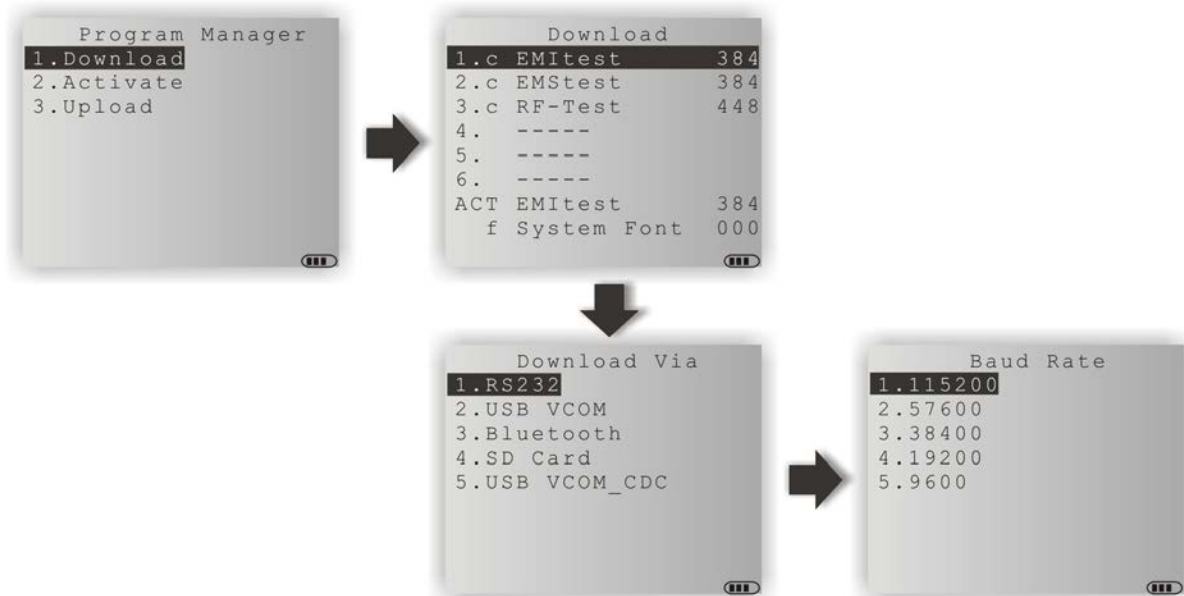
How to access Program Manager?

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



4.1.1 DOWNLOAD

Here provides a full list of programs that are currently stored on the Terminal 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. Program size is in kilobytes.

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)

The last line starting with a prefix letter "f" is reserved to display the font file (.SHX) in use on the Terminal.

Note: For a custom font file (.SHX) or a BASIC program (.SYN), it can only be downloaded via **System 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. Press the arrow keys [Up] and [Down] to select an empty sector, and then press [ENTER].
2. Select a desired interface for downloading.
3. Connect the interface cable if required, 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. Press the arrow keys [Up] and [Down] to select a program that you want to delete, and then press [ENTER].
2. The program information is displayed on the screen.
Press the [Fn α] key to enter the Alpha mode:
 - ▶ Press the capital letter [C] and follow the steps below to download a program file.
 - ▶ Press the capital letter [D] if you simply want to delete the program.
3. Select a desired interface for downloading.
4. Connect the interface cable if required, 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 see the program has been deleted but no new program is present (because you have canceled the download action).

ACTIVE MEMORY SECTOR ("ACT")

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

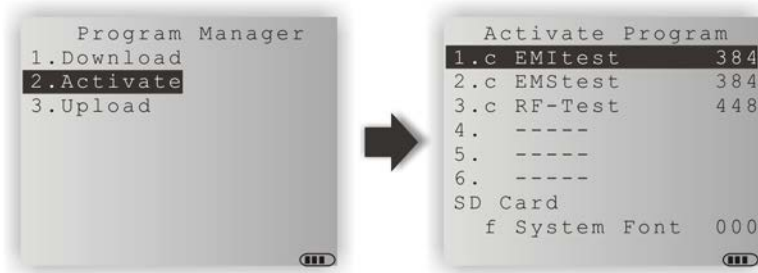
Download to Memory Sector "ACT":

1. Press the arrow key [Down] to select the memory sector "ACT" (may be unoccupied), and then press [ENTER].
2. Select a desired interface for downloading.
3. Connect the interface cable if required, and wait for a few seconds to establish a connection...

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 Terminal. From the list, you can select from the memory sector (1 ~ 6) or SD card. 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 Terminal when the new program comes into effect.

TO KEEP FILE SYSTEM

To keep the data, simply press any other key.

4.1.3 UPLOAD

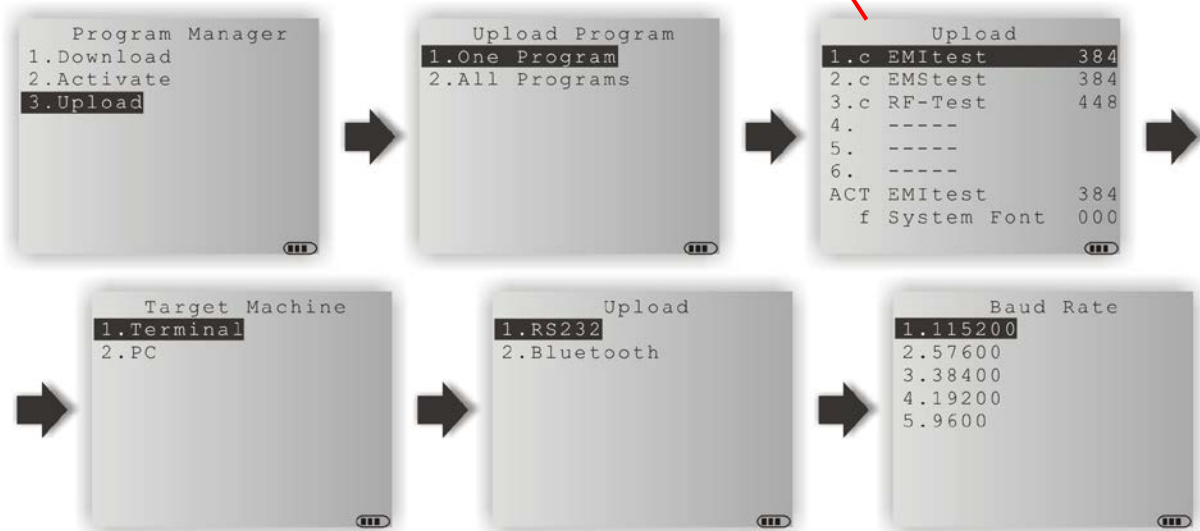
You may duplicate one or all of the programs from the Terminal to a host computer or another Terminal. This can be used to clone software on Terminals.

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

The procedures are similar to that for downloading programs.

- ▶ If the target is "Terminal", the interface options "USB Virtual COM", "SD Card" and "USB Virtual COM_CDC" are unavailable.
- ▶ If the target is "PC", the interface option "SD Card" is unavailable.

This screen is not available if you select "2.All Programs" from the previous screen.



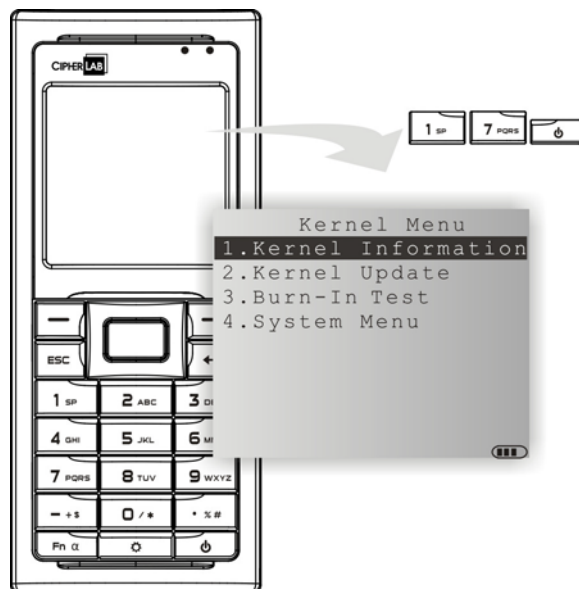
4.2 KERNEL

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 **System Menu** fails at the same time, **Kernel Menu** provides an access to fix the system.

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

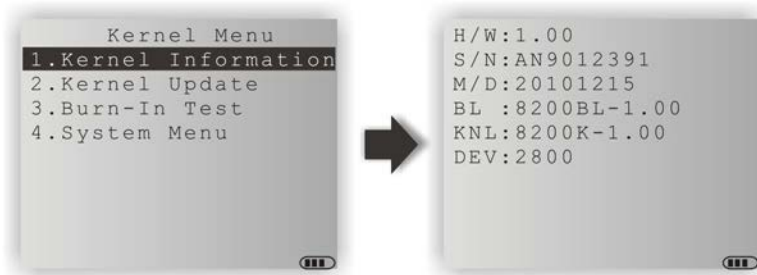
How to access Kernel Menu?

- 1) When the last session is in **System Menu** or **Program Manager**, simply turn off the Terminal. 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

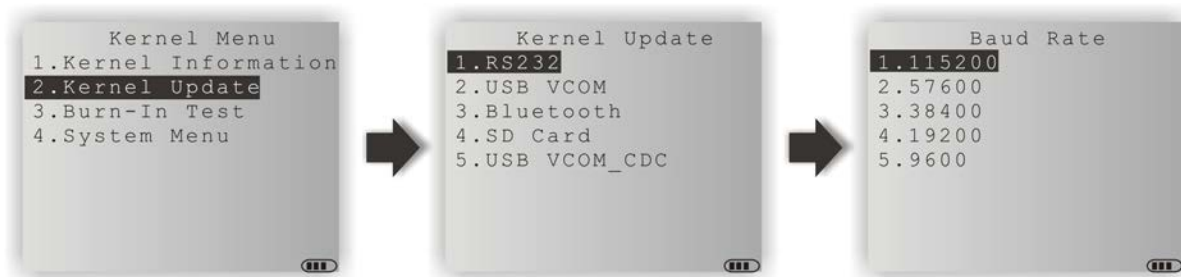
H/W	Hardware version
S/N	Serial number of the Terminal
M/D	Manufacturing date
BL	Bootloader version
KNL	Kernel version
DEV	4-digit code for optional hardware configurations Refer to Understanding Device Code .

4.2.2 KERNEL UPDATE

The kernel and bootloader might need to be updated to improve performance or due to other considerations. Refer to [Appendix I Download Utility](#).

- ▶ To download a kernel (K8200.shx) or bootloader (BL8200.shx) update, the procedure is the same as that for downloading a program.
- ▶ Any attempt to download an older version of bootloader will be rejected.
- ▶ The system will restart itself right after downloading.

Warning: Do not turn off the Terminal while downloading a kernel update or re-starting the Terminal. Otherwise, it will crash the kernel forever.



Note: The Terminal will stay in download mode for approximately 30 seconds.

.SHX Program

Download one of the following firmware files:

Firmware File

- ▶ Kernel update: K8200.shx
- ▶ Bootloader update: BL8200.shx

SETTINGS

Interface

Options	Description
USB VCOM	Connect the USB cable between your computer and the Terminal.
Bluetooth	Approach the target Bluetooth enabled device.
SD Card	This option is available only when the memory card is present.
USB VCOM_CDC	This option is available only when USB Virtual COM_CDC is in use.

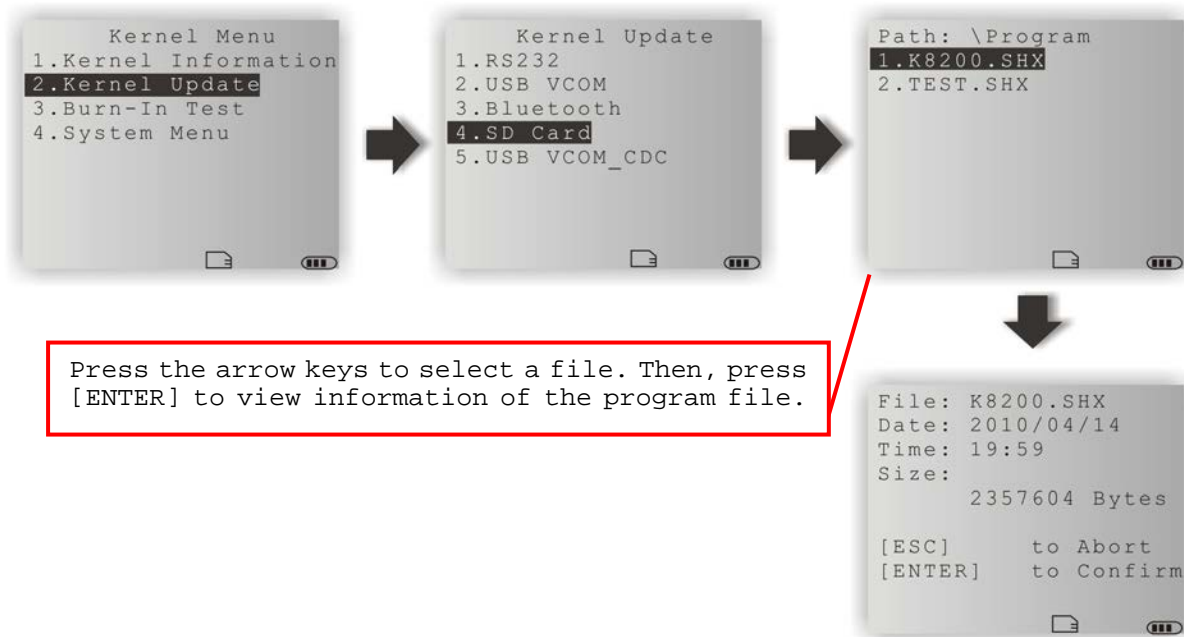
Baud Rate

Available baud rate options: 115200/57600/38400/19200/9600 bps

KERNEL UPDATE VIA BLUETOOTH

- 1) Go to **Kernel Menu** | **4. System Menu** | **8. Next Page** | **5. Bluetooth Menu** | **3. Security**, and configure the following Bluetooth settings first.
 - ▶ Authentication
 - ▶ PIN code
- 2) Go to **Kernel Menu** | **2. Kernel Update** and select Bluetooth.
- 3) Start the pairing procedure from your computer, for example, click [Pair Device] and/or [Connect Bluetooth Serial Port].
- 4) Run the download utility: ProgLoad.exe
 - Select interface RS-232 for using Bluetooth SPP.
 - Select COM port properties that match with the serial port settings used on your computer.

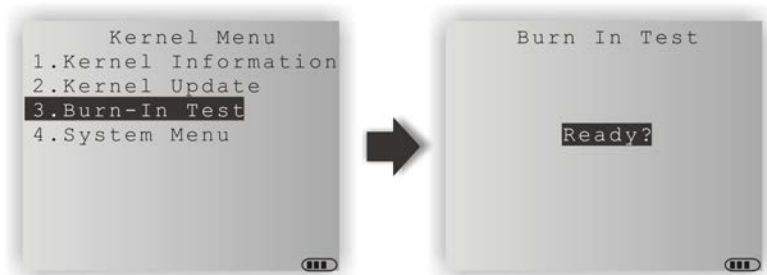
KERNEL UPDATE VIA SD CARD



- 1) If you have copied the desired program file(s) to your SD card, go to **Kernel Menu** | **2. Kernel Update** and select SD Card. You will see a list of all the files under the directory "\Program", as shown above.
- 2) Press the arrow keys [Up] and [Down] to select a file.
- 3) Press [ENTER] to view information of the program file.
- 4) Press [ENTER] to confirm downloading the program file to the Terminal.
Press [ESC] to abort the download task.

4.2.3 BURN-IN TEST

This tool is provided for manufacturing use.



Warning! You should not perform this test.

4.2.4 SYSTEM MENU

Refer to [System Menu](#) for details. This submenu is the same as **System Menu** for system configuration.

SPECIFICATIONS

Model Designation		8200/8201	8231/8230	8260	
Wireless Communications	Bluetooth 2.1+EDR / BLE dual mode, Class 2	–	√	–	
	Bluetooth 2.1+EDR, Class 2	–	–	√	
	802.11b/g/n	–	√	–	
Readers	Barcode Reader	<ul style="list-style-type: none"> ▶ CCD (linear imager) ▶ Standard Laser ▶ 2D Imager 			
Electrical Characteristics	Main Battery	Rechargeable Li-ion battery – 3.7 V, 1200 mAh			
	Working Time	Laser, one scan per 5 seconds, without backlight: <ul style="list-style-type: none"> ▶ 124 hours in batch mode ▶ 40 hours in Bluetooth mode (8260 in power saving mode) ▶ 20 hours in Wi-Fi mode (1 broadcast packet per second) 			
	Backup Battery	<ul style="list-style-type: none"> ▶ Rechargeable Lithium button cell – 3.0 V, 18 mAh ▶ Data retention – at least 25 days 			
	Power Adaptor	<ul style="list-style-type: none"> ▶ Input: AC 100~240 V, 50/60 Hz ▶ Output: DC 5 V, 2 A ▶ Operating Temperature: 0 °C to 40 °C 			
Physical Characteristics	CPU	32-bit Toshiba CMOS type, 60 MHz			
	Memory	<ul style="list-style-type: none"> ▶ Program memory – 8 MB flash ▶ Data memory – onboard SRAM, options include 4 or 8 MB 			
	Display	Graphic LCD, 160 x 160 pixels, FSTN with LED backlight programmable <ul style="list-style-type: none"> ▶ Font size 6x8: 26 characters by 18 lines ▶ Font size 8x16: 20 characters by 9 lines ▶ Font size 12x12: 13 characters by 12 lines ▶ Font size 16x16: 10 characters by 9 lines 			
	Keypad	24 rubber keys, LED backlight programmable			
	Indicators	Two dual-color LEDs – red/green and blue/green, programmable			
	Vibrator	0.45G, programmable			
	Audio	Integrated with one mono or stereo speaker			

	Expansion Slot	microSDHC supported
	Enclosure Material	Rubber & ABS plastic
	Dimensions	CCD: 136 mm (L) 58 mm (W) 25 mm (H) Laser/2D: 136 mm (L) 58 mm (W) 32 mm (H)
	Weight	Approx. 150 g (Laser, battery included)
Environmental Characteristics	Temperature	Operating: -10 °C to 55 °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
	Tumble Test	1000 times at 1 meter
	Splash / Dust Resistance	IP 52
	Electrostatic Discharge	± 15 kV air discharge, ± 8 kV contact discharge
Programming	Development Tools	C and BASIC
	Software & Utilities	FORGE Application Generator (AG), AG utilities; MIRROR Emulator (CipherNet) for VT100/220, IBM 5250 emulation; Download utilities, testing tools, etc.
Accessories		<ul style="list-style-type: none"> ▶ Pistol Grip ▶ Spare rechargeable battery pack ▶

