CipherLab
Reference Manual

Windows CE Mobile Computer

9600

Version 2.15

CIPHER LAB

CIPHERLAB CO., LTD.
Website: http://www.cipherlab.com

IMPORTANT NOTICES

FOR USA

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

▶ Reorient or relocate the receiving antenna.

▶ Increase the separation between the equipment and receiver.

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

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

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

FOR CANADA

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

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

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

FOR HAND-HELD PRODUCT WITH RF FUNCTIONS

9600 serial handheld equipment uses wireless radios that have been designed and manufactured to meet safety requirements for limiting exposure to radio waves. When used in accordance with the instructions set forth in this manual, the equipment has been independently verified to not exceed the emission limits for safe exposure to radio frequency (RF) energy as specified by the FCC of the U.S. Government in 47 CFR §2.1093 and EN50360 of EEC.

These limits are part of comprehensive guidelines and establish permitted levels of RF energy for the general population. The guidelines are based on standards that were developed by independent scientific organization through periodic and thorough evaluation of scientific studies. The standards include a substantial safety margin designed to assure the safety of all persons, regardless of age and health.

The exposure standard for all wireless devices employs a unit of measurement known as the Specific Absorption Rate, or SAR; the SAR limit set by the FCC1 is 1.6W/kg (or CE is 2.0W/Kg).

Tests for SAR on 9600 serial handhelds have been undertaken using the standard operating positions adopted by the FCC that test the device for SAR while it is transmitting at the highest certified power level in all tested frequency bands.

The FCC has granted an Equipment Authorization for this device on the basis that all reported SAR levels have been evaluated to be compliant with the FCC RF exposure guidelines.

SAR information on this device is on file with the FCC and can be found under the Display Grant section of http://www.fcc.gov/oet/fccid after searching on FCC ID: Q3N-9600.

For trunk, the SAR values of the 9600 serial handheld is

USA: MAX 0.153W/Kg
EEC: MAX 0.049W/Kg

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.

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

CARE & MAINTENANCE

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

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

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

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

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

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

RELEASE NOTES

Version	Date	Notes
2.15	Apr. 02, 2012	▶ New: Add backlight and VGA resolution switch note information.
		▶ Modified: Remove AutoRun from microSD card
2.14	Aug 04, 2011	▶ Modified: Chapter 1 battery Spec.
2.13	July 28, 2011	▶ Modified: New 29 Keypad Layout
		▶ Modified: 3.2.2 Understanding Device Configuration - Device ID
2.12	May 04, 2011	▶ Modified: Inside the Package — Add item "LCD Protective Film"
		▶ Modified: 3.5 Upgrading OS Image — Procedures updated
		▶ Modified: Specifications — Backup Battery (3.7 V, 75 mAh)
		▶ Modified: Specifications — Power Adaptor for 4-Slot Battery Charger (6 V, 3.5 A)
2.11	Mar. 18, 2011	▶ Modified: Important Notices — Add RF statement
2.10	Feb. 01, 2011	▶ Modified: 3.3 System Settings — Add items "Auto Backup", "Version Viewer"
		▶ Modified: 3.3 System Settings — "Password" to apply protection to DiskOnChip, permission to change "Date/Time" settings
		▶ Modified: 3.3 System Settings — Rename "External Port" to "Com Port Mapping"
		▶ Modified: 5.9.3 BT-Connect — Add "Enable power save"
		▶ Modified: 6 Using GSM/GPRS — Add support of emergency call, and enable GSM/GPRS at the same time
		▶ Modified: 8.2 Button Assignment Utility — Add "User-defined key code"
		▶ New: 8.5.3 Ephemeris Update Settings
2.03	Nov. 30, 2010	▶ New: Add support of Qwerty keypad
		▶ Modified: Installing Pistol Grip — Procedures updated
		▶ Modified: 4.2.2 Profile Editing — Add types of Encryption and EAP Type
		▶ Modified: 4.2.5 Global Settings — Add properties
		▶ Modified: 4.2.6 Summit System Tray Icon — SCU tray icon behavior
		▶ Modified: 8.3 Screen Control — Remove support of switching screen resolution (VGA to QVGA)
		▶ Modified: Appendix I~III — Add more GS1 DataBar symbologies
2.02	Sep. 10, 2010	▶ Modified: Installing Battery — Turn off the mobile computer before replacing the battery pack
2.01	July 19, 2010	▶ Modified: 2.1.2 Taskbar — GSM icon behavior
		▶ Modified: 6.3.1 Checking GSM Connection — GSM icon behavior

2.00	July 09, 2010	▸ Modified: Using Cradle — Power receptacle on the cable connector is non-functional when using cradle
		▸ Modified: 1.1.2 Power Management — UI updated
		▸ Modified: 1.3 Keypad — Remove 43-key Keypad
		▸ Modified: 1.5.1 Status LED — Red LED flashes while charging error
		▸ Modified: 1.7 Cradles — LED indicators description
		▸ Modified: 2.1.2 Taskbar — UI updated
		▸ Modified: 2.1.3 Start Menu — Remove "Suspend" from Start Menu
		▸ New: 2.5.1 Suspend Mode Modified: 3.1 Application Manager — UI updated
		▸ Modified: 3.3 System Settings — Add "BT Manager", "External Port", and "GSM/GPRS Manager"
		▸ Modified: 3.5.1 SD Download — Downgrading is not allowed Modified: Chapter 5 Using Bluetooth — UI updated
		▸ New: 5.1.1 Bluetooth Profiles Supported
		▸ Modified: Chapter 6 Using GSM/GPRS — UI updated
		▸ Modified: 7.3 RFID Reader Settings — UI updated and rename Tag Type "Mifare Ultralight" with "Mifare" and change the Start Page to "4"
		▸ Modified: 8.4.3 Changing Camera Settings — Remove "240 x 180" pixels resolution and change saving format to HHMMSS_YYMMDD.jpg or HHMMSS_YYMMDD.bmp.
		▸ Modified: Appendix III — Move "Inter-Character Gap" under Codabar and Code 39, and add "ISBT Concatenation" and "ISBT Concatenation Redundancy" for 2D Imager
1.02	Jan. 11, 2010	▸ Modified: 1.3.4 Function Key — Add function key combinations (Home/End/PgUp/PgDn)
		▸ Modified: 7.7 Symbology Settings — Renamed "Pharmacode" with "I/F Pharma." and updated the screenshot
1.01	Jan. 04, 2010	▸ Modified: Installing Battery — Procedures updated
1.00	Dec. 21, 2009	Initial release

CONTENTS

INTRODUCTION

9600 Mobile Computer, running Windows CE 6.0 in palm size, is our new product line of rugged PDA-style Mobile Computer. Light-weight, streamlined and ergonomic, it adds even more powerful and handy tools to delivering the flexibility in customization.

Specifically designed to work as an industrial PDA, 9600 Mobile Computer provides rich options of data collection, voice and data communications, long-lasting working hours, and so on. Its large color transflective TFT display guarantees ease in reading in all lighting conditions. Integrated with Bluetooth and 802.11b/g technologies, you may choose to add the GSM/GPRS module to gain greater speeds and optimal mobility. In particular, an integrated GPS receiver is made available for use with third-party location-based applications.

This manual serves to guide you through how to install, configure, and operate the mobile computer. The Care & Maintenance section is specifically prepared for those who are in charge of taking care of 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!

FEATURES

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

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

▶ Microsoft Windows CE 6.0 operating system, 520 MHz Marvell PXA270 processor

▶ 1 GB NAND flash memory to store OS and software programs

(part of the free space is used as a storage card called DiskOnChip)

▶ 128 MB SDRAM to store and run programs, as well as store program data

▶ One microSD expansion slot for up to 16 GB memory card, and SDHC is supported

▶ Dual mode support — One scan engine (integrated barcode scanner/imager) plus one RFID reader

▶ Ambidextrous side triggers

▶ Total wireless solution — connectivity includes Bluetooth, 802.11b/g and GSM/EDGE/GPRS

▶ A 3.5" color transflective TFT display delivers excellent visibility in all lighting conditions

▶ Programmable feedback includes buzzer, speaker and vibrator

▶ Built-in power tools include Reader Configuration Utility, Backup Utility, etc.

▶ 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 (AG*.exe for desktop PC)

▶ Programming support includes System API (LIB and DLL) and Reader API (DLL)

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

INSIDE THE PACKAGE

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

▸ 9600 Mobile Computer
▸ Rechargeable Li-ion battery pack
▸ Stylus
▸ Hand Strap
▸ USB charging & communication cable
▸ Universal power adaptor
▸ LCD Protective Film
▸ Product CD
▸ Quick Guide

ACCESSORIES

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

▸ Pistol Grip (detachable)
▸ Belt Holster
▸ Protective Cover
▸ Spare rechargeable Li-ion battery
▸ 4-slot Battery Charger
▸ RS-232 charging & communication cable
▸ USB host cable (for connecting external USB device)
▸ Charging & Communication Cradle
▸ Ethernet Cradle (10/100 BASE-T)
▸ Vehicle Cradle
▸ Vehicle Charger

Note: For 9600 as data terminal equipment (DTE), the RS-232 charging & communication cable supports only CTS and RTS control signals. ActiveSync is not allowed.

QUICK START

OVERVIEW

GSM/GPRS Antenna

Buzzer

Touch Panel
(VGA or QVGA)

LED

Side keys, user-definable
(Both serve as SCAN by default)

SCAN key, user-definable

Power key

Keypad
(29-key or Qwerty)

Release Button
(press to slide out battery cover)

Charging Contacts

Headset Jack

Hand Strap

Stylus
(to be tethered)

Digital Camera

External GPS Antenna
(MMCX connector)

Scanning Window

Memory Card Slot
(on this side only!)

Figure 1: Overview

REMOVING HAND STRAP

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

Warning: When in use, make sure the hand strap is well hooked and attached. Adjust the length of the hand strap to suit your handbreadth.

When the hand strap is not desired, remove it from the mobile computer by following these steps:

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

2) Detach the free end of the strap and remove it from the slit.

3) Unhook the other end of the hand strap from the bottom.
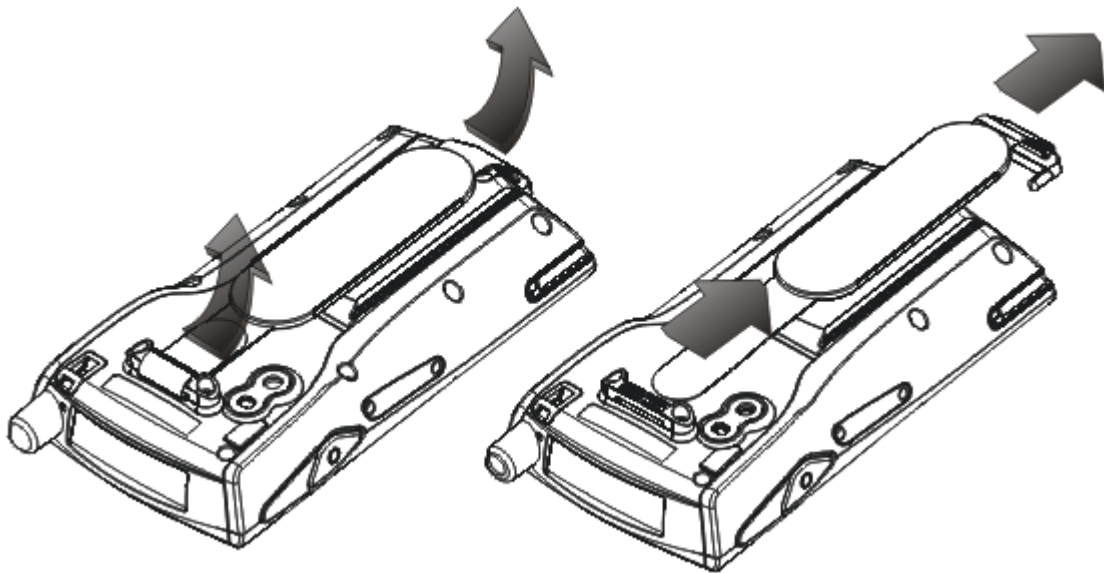
Figure 2: Removing the Hand Strap

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 mobile computer by following these steps:

1) Press the [Power] key for the mobile computer to enter suspend mode.

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

3) Remove the hand strap as well as the side plates as shown below.

4) Press the release latch down on each side of the pistol grip, and slide the release latch aside at the same time.

5) Push the pistol grip to the back of the mobile computer, and then snap the release latch into each side of the pistol grip until you hear a click.

6) Turn on the mobile computer to test the trigger while running ReaderConfig.exe.
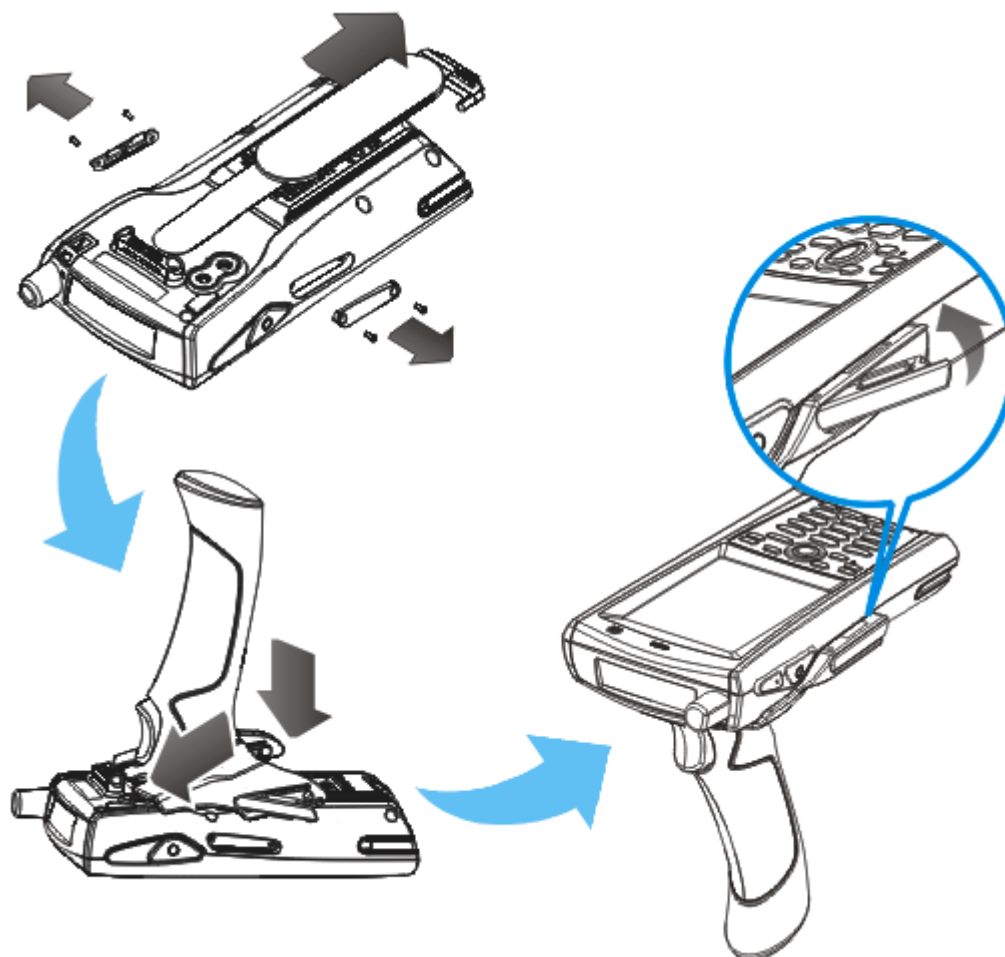
Figure 3: Installing the Pistol Grip

INSERTING MEMORY CARD

If you wish to expand memory, follow these steps to insert your memory card (microSD or microSDHC) to the SD card slot:

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

2) Remove the side plate by unscrewing the two screws (on the right side when you place the mobile computer face down) as shown below.

3) Insert the memory card with contacts facing up. Use the stylus to push it into the slot until you hear a click.

4) Replace the side plate and tighten the screws.
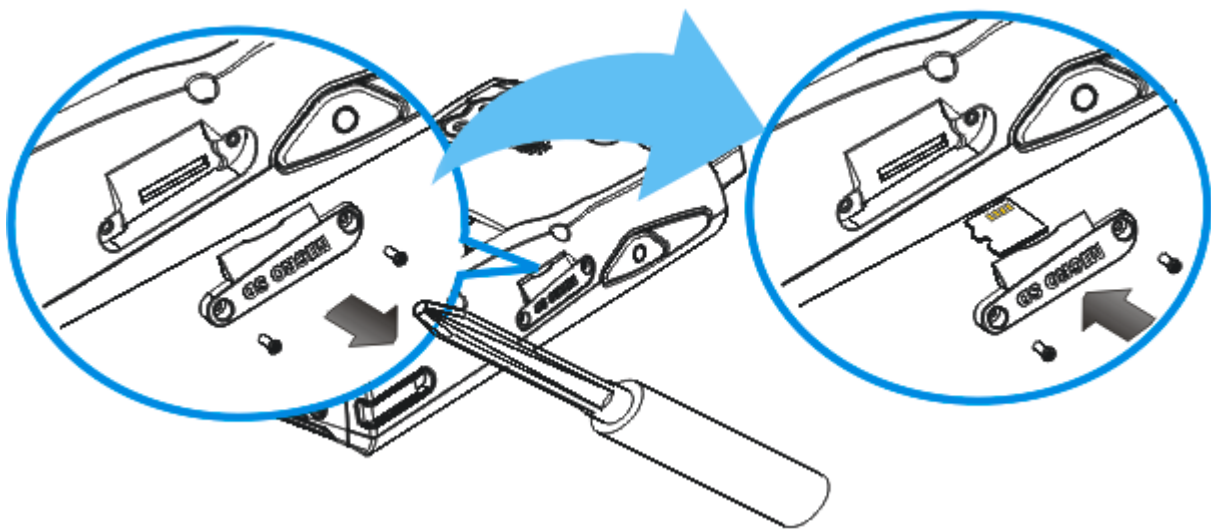
Figure 4: Inserting the microSD Card

REMOVING MEMORY CARD

If you wish to remove the memory card, simply use the stylus to push the card after removing the side plate. It will be rejected automatically.

INSERTING SIM CARD

1) Press the [Power] key for the mobile computer to enter suspend mode.

2) Hold the mobile computer still and remove the hand strap as well as the battery.

3) Use your finger to slide the locking plate towards its hinge to unlock the SIM card holder.

4) Flip up the SIM card holder.

5) Insert the SIM card to the SIM card holder, using the card orientation shown below.

6) Push the SIM card holder down.

7) Slide the locking plate away from its hinge to secure the SIM card holder.
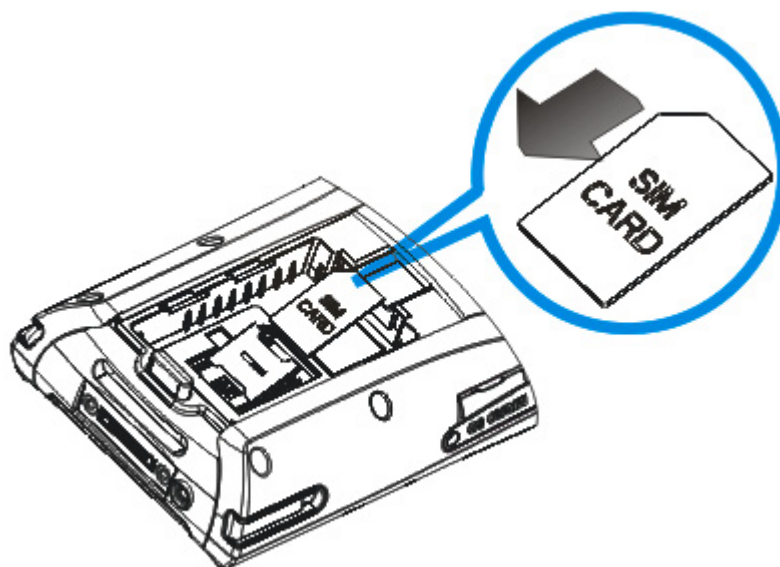
Figure 5: Inserting SIM Card

CONNECTING HEADSET

Connect the headset to the headset jack (2.5 mm DIA) at the bottom of the mobile computer. You can use the headset for audio playback or communication via the phone application, Messenger, etc.

▶ Bluetooth headset is supported, bringing you the freedom of cordless mobility.

INSTALLING BATTERY

When you first receive the package, the rechargeable functionality of the backup battery is turned off. It is controlled by a DIP switch inside the battery compartment as shown below. For shipping and storage purposes, save the mobile computer and the main battery in separate packages, and adjust the DIP switch to the OFF position (bottom). This will keep both batteries in good condition for future use.

1) Remove the hand strap.

2) Hold the mobile computer still and press the release button to unlock the battery cover.

3) Slide off the battery cover.

4) Use the stylus (or a sharp-pointed object, such as a pencil) to adjust the DIP switch to the ON position. (top) Now the internal backup battery can be charged by the main battery.

5) Insert the battery pack into the battery compartment at a proper angle (30°~45°) so that the metal contacts on the battery are met with the charging contacts inside the compartment. Make sure that the battery is snugly fit into the compartment.

6) Slide the battery cover back onto the mobile computer until it clicks into place.

7) If the battery is charged, the mobile computer turns on. If the mobile computer does not turn on, charge the battery.

Note: (1) Any improper handling may reduce the battery life.
(2) When the main battery charge becomes low, you need to charge the battery as soon as possible or replace it with a charged one. While replacing the battery pack, make sure the mobile computer is turned off (= Suspend).

Figure 6: Installing the Main Battery

CHARGING & COMMUNICATIONS

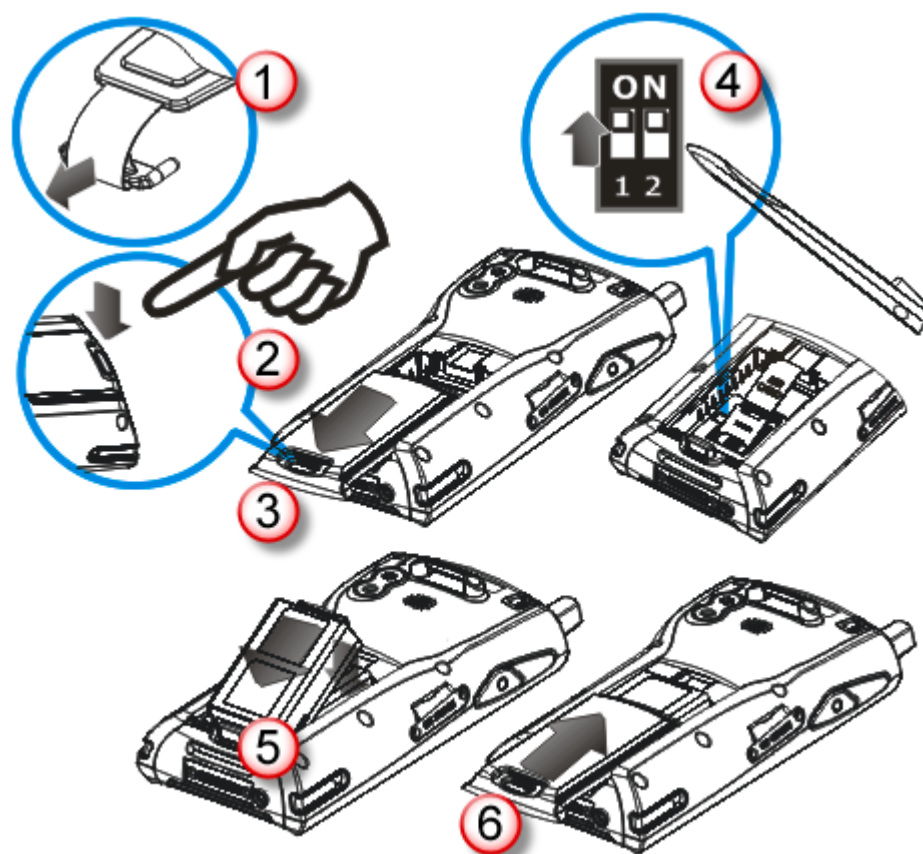The main and backup batteries may not be charged to full for shipment. When you first receive the package, you will need to charge the main battery to full before using the mobile computer. Instead of direct charging, you may use a cradle or charger to charge the Mobile Computer or spare batteries.

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 connecting the mobile computer for direct charging or via cradle. This will have both the main and backup batteries charged at the same time.

Note: To charge the backup battery, make sure that you slide the DIP switch inside the battery compartment to the ON position.

Charging Time

▶ Main battery: It takes approximately 4 hours to charge the main battery to full (from the adaptor). The LED above the screen is red while charging and will turn green when charging is done.

▶ Backup battery: It takes at least 2 hours to charge the backup battery to full. The main battery must be inserted and left inside, whether the mobile computer is in use or not. However, it is not necessary to fully charge the backup battery for the mobile computer to work.

Charging Temperature

▶ It is recommended to charge the battery at room temperature (18°C to 25°C) for optimal performance.

▶ Battery charging stops when the temperature drops below 0°C or exceeds 40°C.

Operation on Battery Power

▶ When 802.11b/g, GSM/GPRS, and BT are all enabled on battery power, the main battery charge will drop down substantially.

▶ In order to prevent a cold boot after the battery is drained out, we suggest that you keep a fresh battery for replacement or connect the mobile computer to an external power.

USING WIRELESS NETWORKS

The mobile computer supports state-of-the-art wireless technologies, Bluetooth and 802.11b/g, so that it is able to send/receive data in real time in an efficient way. You may choose to have the GSM/GPRS module embedded for a total wireless solution for data and voice communications. Refer to the associated utilities.

USING CABLE

1) Connect the USB charging & communication cable.

Note: Tighten the two screw-in connectors to secure the cable.

2) Join the power supply cord to the power receptacle on the cable connector.

3) Connect the other end of the power cord to a suitable power outlet.
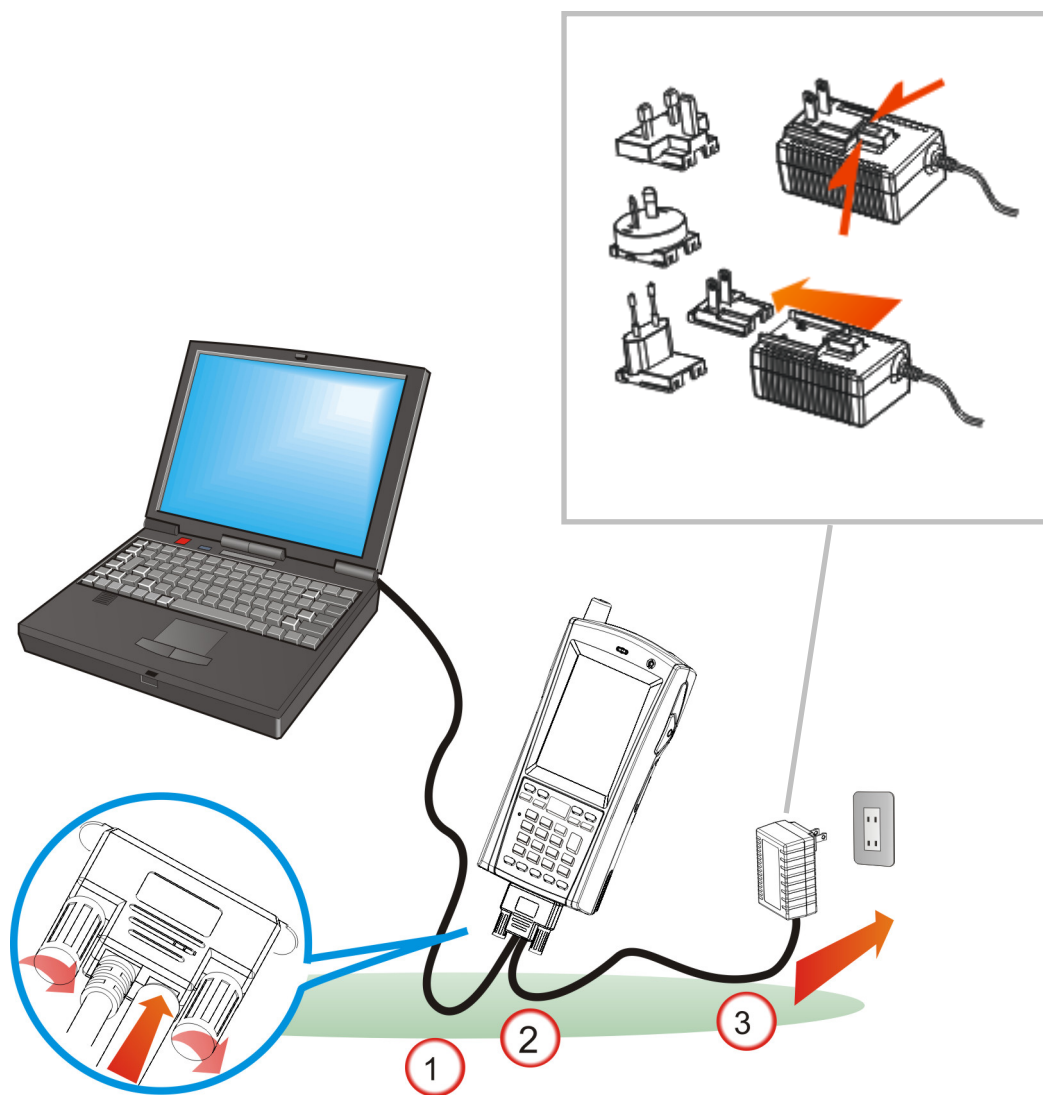
Figure 7: Using Cable

USING CRADLE

1) Seat the mobile computer in the cradle.

2) Connect the power supply cord to the power receptacle on the cradle.

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

4) Connect the USB charging & communication cable if data transmission is required. Refer to Using ActiveSync.

Note: (1) Make sure that you have Microsoft ActiveSync installed on your computer before you connect the cable from the cradle to your computer.
(2) As the mobile computer will be charged via cradle, the power receptacle on the cable connector is non-functional.
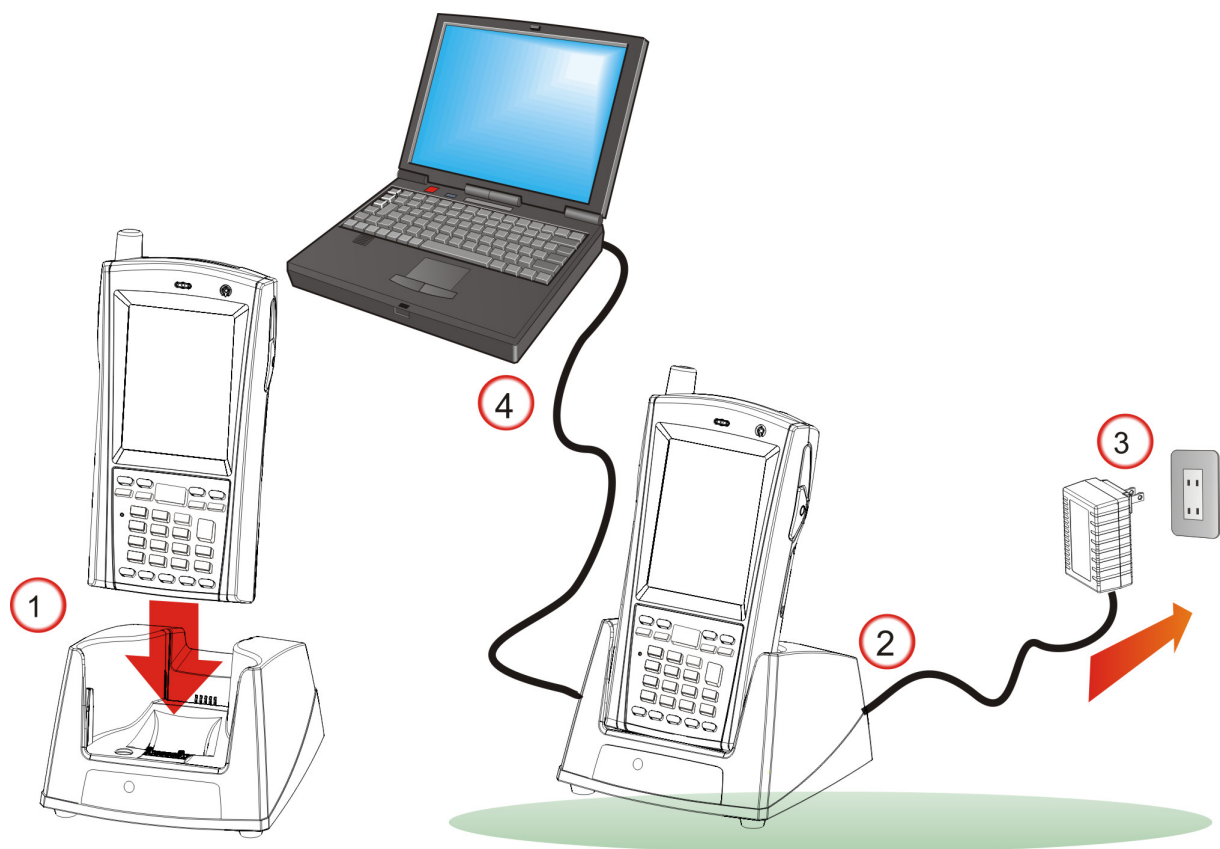
Figure 8: Using Cradle

Chapter 1

USING 9600 MOBILE COMPUTER

This chapter explains the features and usage of 9600 Mobile Computer.

IN THIS CHAPTER

1.1 BATTERY

▶ Main Battery

9600 Mobile Computer is powered by a rechargeable 3.7 V/2700 mAh Li-ion battery pack, and it takes approximately 4 hours to fully charge it. However, the charging time may vary by working condition. During normal operation, the mobile computer can work for up to 10 hours.

▶ Backup Battery

The backup battery on the main board takes charge when the main battery is removed or drained out. When fully charged, the 3.7 V/75 mAh rechargeable Lithium battery helps retain data in SDRAM and maintain the system running in suspend mode for at least 24 hours without the main battery. In the meantime, you have to replace the main battery as soon as possible.

Warning: The battery cover must be in position. If not, the mobile computer cannot turn on and the LED indicator will flash to alert when you press [Power]. 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.

1.1.1 UNDERSTANDING THE BATTERY ICONS

The battery pack is the only power source for the mobile computer to work. It also charges the backup battery on the main board so that the data stored in SDRAM 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 backup important data on a regular basis.

By looking at the battery icon, you can tell battery charge remaining in the main battery – the higher the green level, the more power in the main battery. Double-tap a battery icon so that you can quickly access the [Power Properties] dialog box.

Battery Icons	Description
	External power source is connected and main battery is charging
	External power source is connected but main battery needs no charging
	Main battery level 100% ~ 90%
	Main battery level 89% ~ 70%
	Main battery level 69% ~ 50%
	Main battery level 49% ~ 30%
	Main battery charge becomes low (29% ~ 15%) and needs charging
	Main battery charge becomes very low (14% ~ 6%) and needs charging immediately.
	Backup battery charge becomes low and needs charging.
	Backup battery charge becomes very low and needs charging immediately.

Warning:	(1) Once the battery charge drops below 5%, the mobile computer will automatically enter suspend mode. When being connected to power, the LED indicator becomes red while charging and it takes no more than 10 minutes to charge the battery to 6% in normal condition. However, it may take about half an hour to charge a drained battery. For quick use, you may try another battery instead. (2) Before the battery charge reaches 6%, the mobile computer cannot be turned on and the LED indicator will flash to alert when you press [Power]. (3) Data loss may occur with SDRAM during low battery condition. Always save data before running out of power or keep a fresh battery for replacement.

1.1.2 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.

▸ Bring a second battery pack on the road.
▸ Stop wireless connectivity, Bluetooth, 802.11b/g or GSM/GPRS that is not in use.
▸ Go to **Start** | **Settings** | **Control Panel** and double-tap the **Display** icon. Refer to 1.4.1 Adjusting the Backlight.
▸ Go to **Start** | **Settings** | **Control Panel** and double-tap the **Power** icon.

   I. In the Battery tab, you can always monitor the charging status.
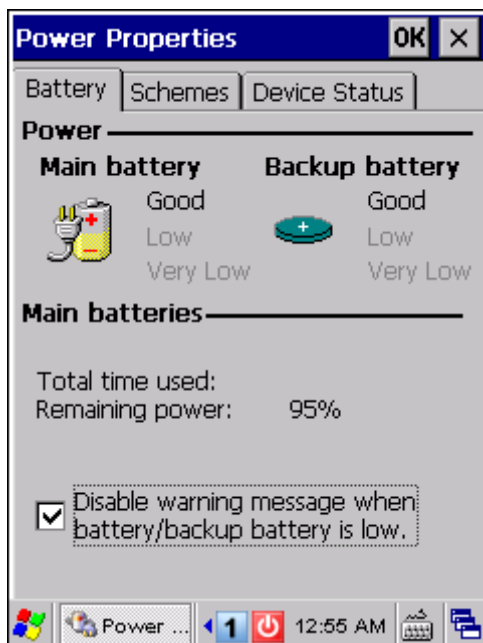
   If you want to be notified of when charging is required, cancel the check box so that a warning message will be displayed when the main battery or backup battery is low.

2. Tap the Schemes tab.
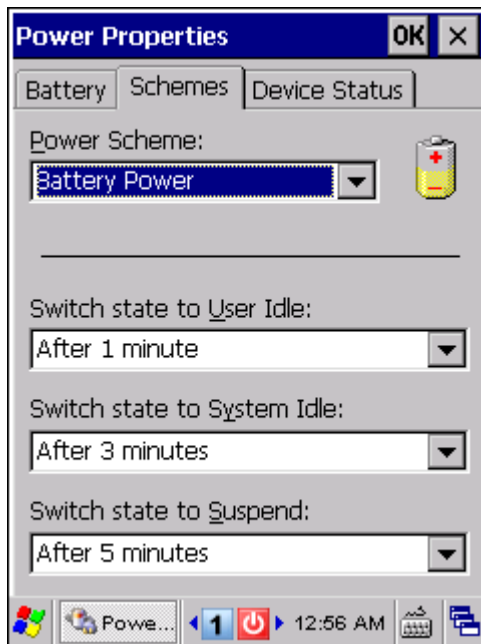
3. Select the desired power scheme and options for suspending operation when not in use. The system can be set to three different states to conserve power:

- User Idle state
- System Idle state
- Suspend state

The time choices represent the amount of time that must pass before the system will switch to the next power conservation state.

If you keep the default settings, 9600 will enter the User Idle state in 1 minute, go to the System Idle state in another 3 minutes, and then the Suspend state in another 5 minutes.

That is, 9600 will switch to Suspend mode after a total of 9 minutes.

1.2 MEMORY

▶ Flash Memory (ROM)

1 GB flash memory for storing OS (Windows CE 6.0) and custom application programs. Yet a portion of the memory is referred to as DiskOnChip, which can store data and programs that you wish to retain even after hardware reset.

▶ Random-access Memory (RAM)

128 MB SDRAM for storing and running programs, as well as storing program data. Its contents will be retained by the backup battery.

▶ Expansion Slot

The mobile computer is equipped with one microSD card slot, which is user accessible. Up to 16 GB high capacity memory card (microSDHC) is supported.

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 SDRAM and maintain the OS in suspend mode for at least 24 hours, 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 backup data and files before putting away the mobile computer!

1.2.2 CHECKING THE STORAGE SPACE

▶ Go to **Start** | **Settings** | **Control Panel** and double-tap the **System** icon.

I. In the Memory tab, it displays the current capacity and usage of the onboard SDRAM.
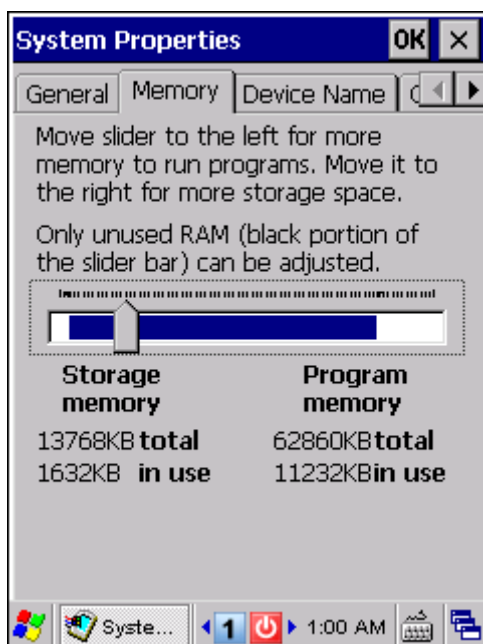
2. You may tap, hold, and drag the slider to re-allocate the memory.

SDRAM	Storage Memory (left)	Program Memory (right)
128 MB onboard	It refers to the memory allocated for file and data storage.	It refers to the memory allocated for running programs.

▶ Double-tap **My Device** on the desktop, and then tap and hold the **DiskOnChip** icon. Select Properties from the pop-up menu. In the Properties tab, it displays the current capacity and usage of DiskOnChip.

Note: The DiskOnChip is part of the onboard 1 GB flash memory. Because the flash memory is non-volatile, data or programs stored in DiskOnChip will not be erased after hardware reset.

▶ Go to **Start** | **Settings** | **Control Panel** and double-tap the **Storage Manager** icon. Here provides information on the DiskOnChip folder or storage card.

1.3 KEYPAD

Silicon rubber has been chosen for their durability and prompt feedback.

Note: Functionality of keys is application-dependent.

The 29-key keypad includes alphanumeric, navigation, function keys, and so on. This keypad is set to numeric mode by default.

Figure 9: 29-key Layout

9600 Mobile Computer Reference Manual

The Qwerty keypad includes alphanumeric, symbol, alphabetic, function and other modifier keys, as well as keys for navigation. This keypad is set to numeric mode by default.

Figure 10: Qwerty Layout

22

1.3.1 KEYPAD SETTINGS

Go to **Start** | **Settings** | **Control Panel** and double-tap the **Keyboard** icon.

The Character Repeat functionality is enabled by default. You may cancel the check box on the Repeat tab to disable it. When enabled, tap, hold, and drag the slider for a desired Repeat Delay and Repeat Rate.

The LED backlight of keypad is turned off by default. It is suggested to turn on the keypad backlight while working in a dark area; however, using backlight while on battery power will substantially reduce battery power.

29-key Operation

Press [⚙] to toggle it from off to on, and vice versa.

Qwerty Operation

It is set to be automatically turned on for 5 seconds when any key is pressed. You may have the keypad backlight always turned off/on on the Backlight tab.

Ignore the Backlight tab when using a 29-key keypad.
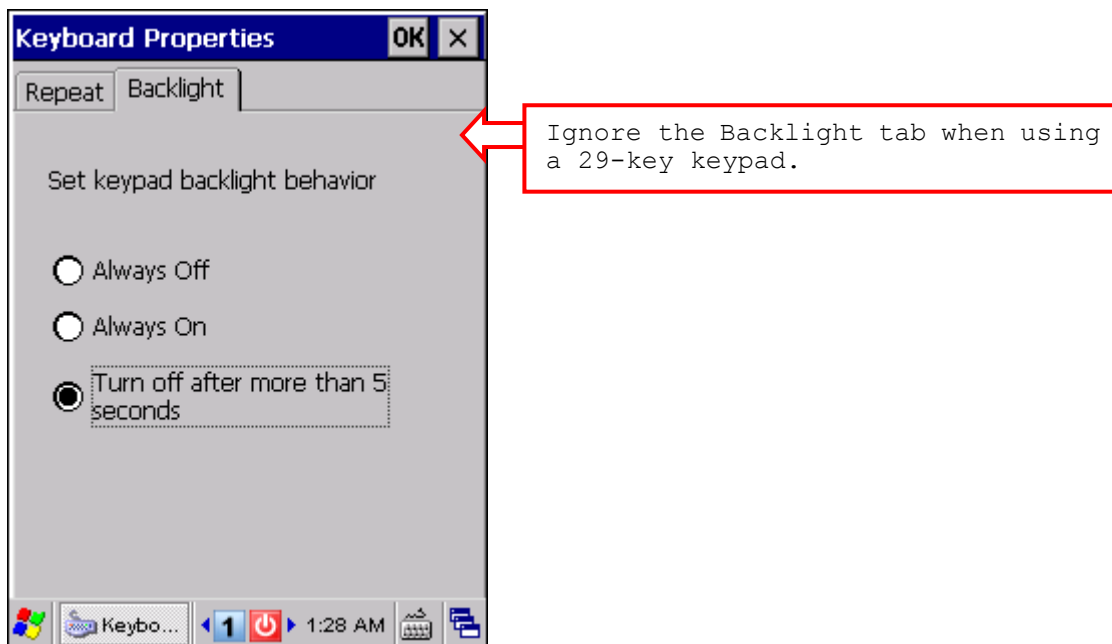
1.3.2 ALPHA KEY

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

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

The alpha icon will appear on the status bar in a sequence as shown below.

29-key Operation		
Status Icon	**Alpha Key**	**Input Mode**
	---	Numbers
	Press [a] one time	Lower-case alphabetic
	Press [a] two times	Upper-case alphabetic
Qwerty Operation		
Status Icon	**Alpha Key**	**Input Mode**
	---	Numbers
	Press [a] one time	Lower-case alphabetic

Note: (1) If you are using the software keypad via SIP, tap CAP (Caps Lock) to toggle between upper case and lower case alphabetic modes.
(2) On Qwerty keypad, use the [Shift] key to enter ALPHA (upper-case alphabetic) mode (or).

1.3.3 SHIFT KEY

29-key Operation		
Status Icon	**Shift Key**	**Input Mode**
⬆	Press [⬆] one time	The Shift key modifies the next key pressed; it will result in different symbols. Refer to Use of Shift (⬆).

Qwerty Operation		
Status Icon	**Shift Key**	**Input Mode**
1 / A	Press [⇧] one time	The Shift key modifies the next key pressed. Depending on the input mode, (1) In numeric mode (1), it will result in different symbols. Refer to Use of Shift (⇧). (2) In alpha (lower-case alphabetic) mode (a), it will produce a single upper-case letter. For example, input letters "ABC", it will produce "Abc". Refer to Use of Alpha (a) & Shift (⇧).
1 / A	Press [⇧] two times (enter Shift Lock Mode)	If you are in Shift Lock Mode, all keys send their shifted values when pressed alone. Depending on the input mode, (1) In numeric mode (1), it will result in different symbols. Refer to Use of Shift (⇧). (2) In alpha (lower-case alphabetic) mode (a), it will produce all upper-case letters (= Caps Lock). For example, input letters "ABC", it will produce "ABC". Refer to Use of Alpha (a) & Shift (⇧).

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

1.3.4 FUNCTION KEY

The function key [Fn] serves as a modifier key, and the functionality of each key combination is application-dependent.

1) To enable this modifier key, press [Fn] on the keypad. Its icon will appear on the status bar.

2) Now press another key on which orange-coded function is printed, to get the value of key combination (say, press [1] to get the value of F1 on 29-key keypad). The icon will go off now.

3) To get the value of another key combination modified by the function key, repeat the above steps.

4) To abort the key modification, press [Fn] again, and the icon will go off.

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

Below is a list of the factory setting for a variety of key combinations.

Key Combination	Action
[Fn], △	Move text up one screenful (Page Up)
[Fn], ▽	Move text down one screenful (Page Down)
[Fn], ◁	Move to the beginning of screen or document (Home)
[Fn], ▷	Move to the end of screen or document (End)

Note: Press the function key first, and then press the second key for a specific function.

1.3.5 PROGRAMMABLE KEYS

The following keys are user-definable. They can be re-defined as another key or to serve as a shortcut key for launching a specific program. Refer to 8.2 Button Assignment Utility.

▸ SCAN
▸ SEND
▸ END
▸ Two side triggers on each side of the touch screen

1.4 TOUCH SCREEN

The mobile computer comes with a 3.5" TFT graphic LCD, 320 by 240 pixels resolution (QVGA) or 640 by 480 pixels resolution (VGA). The LED backlight of screen, which helps ease reading under dim environments, can be controlled manually and automatically.

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 off the mobile computer when not in use.

1.4.1 ADJUSTING THE BACKLIGHT

1) Go to **Start** | **Settings** | **Control Panel** and double-tap the **Display** icon.
2) Tap the Backlight tab. (left below)
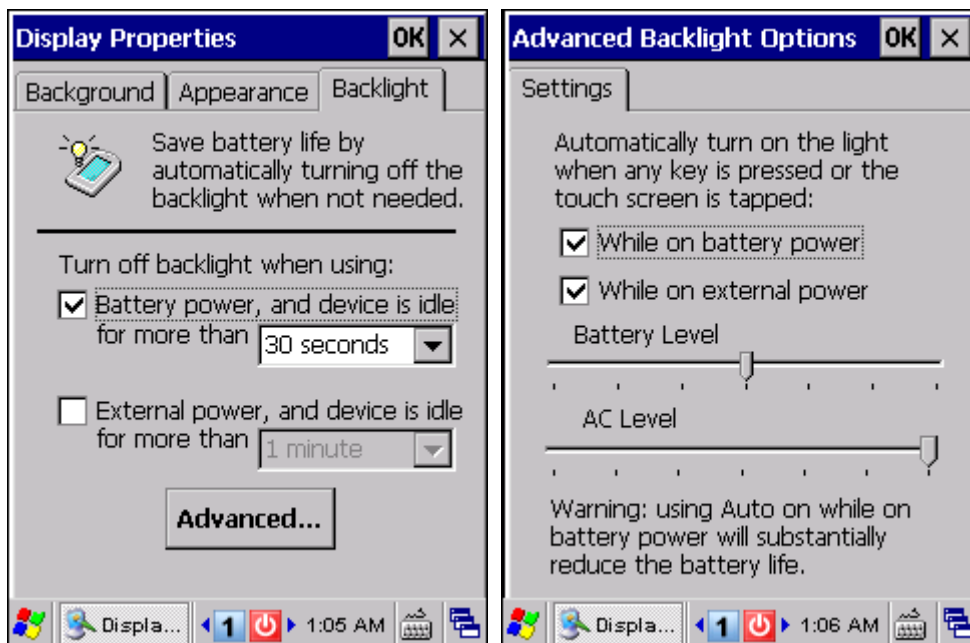
3) Select one or both of the check boxes to automatically turn off the LCD backlight when using batteries or external power. From the appropriate list, select the amount of time the device should be idle before the backlight is turned off.

4) Tap the [Advanced] button.

5) In the Settings tab (right above), you can select the luminosity of backlight when it is set to be automatically turned on by pressing any key or tapping the screen. Tap, hold, and drag the slider for AC and battery powered respectively. For more luminosity, move the slider to the right.

Note: The backlight will turn off after the device is idle for more than the default value 30 seconds upon both the battery with fully charged and even connecting an external power. Device processing is based on the battery.

1.4.2 RE-CALIBRATING THE SCREEN

This LCD is also a touch screen that can be calibrated through screen alignment.

1) Go to **Start** | **Settings** | **Control Panel** and double-tap the **Stylus** icon.

2) Tap the Calibration tab, and then tap the [Recalibrate] button.

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

1.5 NOTIFICATIONS

1.5.1 STATUS LED

The tri-color LED on top is used to provide information on the charging status or wireless power status. The green LED is also used for "Good Read" while collecting data.

Tri-color LED	Status	Description
Red LED	Solid	Charging 9600
	Flashing	Error occurs while charging or powering on[Note]
Green LED	Solid	Charging done
	Solid for 0.5 second	Good Read
Blue LED	Flashing	Bluetooth enabled

Note: (1) Charging error may be caused by the condition when the temperature drops below 0°C or exceeds 40°C. Refer to Charging & Communications.
(2) Power-on error occurs to indicate pressing [Power] cannot turn on 9600 when the battery cover is not properly in position, or the main battery charge drops below 5%. Refer to 1.1 Battery.

1.5.2 AUDIO

▶ Buzzer

The buzzer on the front can be programmed for status feedback. Its frequency and duration are software programmable.

▶ Speaker

The mono speaker on the back is used to play sounds for events in Windows and programs, or play audio files such as .WAV files. In addition, it can be programmed for status feedback. In noisy environments, you may consider connecting a headset instead.

▶ Headset

A headset jack is provided, which is a 2.5 mm DIA stereo earphone jack with microphone input. It is required for phone applications. Bluetooth headset is also supported.

1.5.3 VIBRATOR

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

1.6 DATA CAPTURE

1.6.1 BARCODE & RFID READER

A wide variety of scan engines is available for delivering flexibility to meet different requirements. Depending on the scan engine integrated, the mobile computer is capable of scanning barcodes of a number of symbologies that are enabled by default while running ReaderConfig.exe. If you need to scan barcodes that are encoded in a different symbology, enable the symbology first. Refer to Appendixes for details on scan engine settings.

▸ Appendix I - Scan Engine Settings lists the symbologies and RFID tags supported.

▸ Appendix II - Linear Imager (CCD), Laser (SE950) provides information on the reader settings as well as symbology settings for the CCD or Laser scan engine.

▸ Appendix III - 2D Imager provides information on the reader settings as well as symbology settings for the 2D scan engine.

Note: The mobile computer allows the co-existence of one integrated scan engine and the RFID reader.

1.6.2 DIGITAL CAMERA

An integrated 2 mega-pixel CMOS camera in the mobile computer is specifically designed for collecting image data. We provide an image capture utility that is specifically designed to turn on the camera and capture image.

1.7 CRADLES

1.7.1 CHARGING & COMMUNICATION CRADLE

Item	Description
A	Charging slot for seating the mobile computer
B	Charging slot for spare battery
C	LED Indicator (POWER)
D	Cable Connector (for USB or RS-232)
E	Power Jack
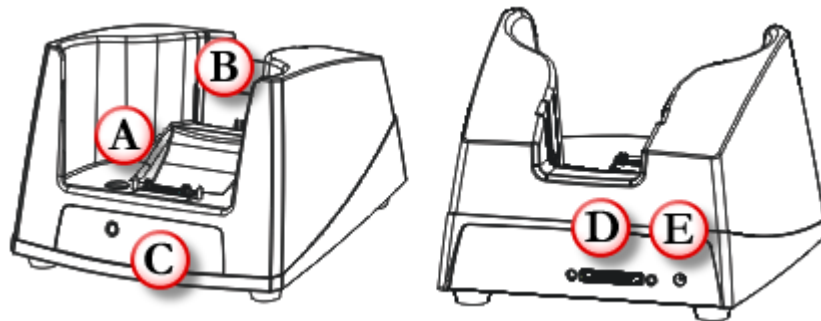
Figure 11: Charging & Communication Cradle

The cradle provides one LED indicator on the front panel to indicate power status.

Indicator	Status	Description
POWER	Off	Power not ready
	Green, solid	Power ready / Charging done
	Red, solid	Charging spare battery
	Red, flashing	Error occurs, e.g. battery not ready[Note]

Note: (1) When error occurs, please try re-position the spare battery in the slot. If it persists, please check battery, adaptor or cradle.
(2) For charging status of the mobile computer, please check the LED on top of the screen. Refer to 1.5.1 Status LED.

1.7.2 ETHERNET CRADLE

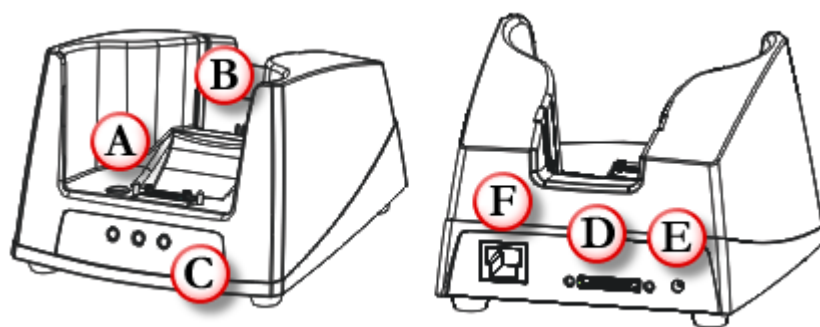| Item	Description
A	Charging slot for seating the mobile computer
B	Charging slot for spare battery
C	LED Indicators (POWER, DATA, READY)
D	Cable Connector (for USB or RS-232)
E	Power Jack
F	Ethernet Port (RJ-45)

Figure 12: Ethernet Cradle

The cradle provides three LED indicators on the front panel to indicate connection status.

Indicator	Status	Description
POWER	Off	Power not ready
	Green, solid	Power ready / Charging done
	Red, solid	Charging spare battery
	Red, flashing	Error occurs, e.g. battery not ready[Note]
DATA	Off	No activity
	Green, flashing	Data transmission
READY	Off	Network unavailable / 10 Mbps network available
	Green, solid	100 Mbps network available

Note: (1) When error occurs, please try re-position the spare battery in the slot. If it persists, please check battery, adaptor or cradle.
(2) For charging status of the mobile computer, please check the LED on top of the screen. Refer to 1.5.1 Status LED.

1.8 BATTERY CHARGER

Below is the 4-Slot Battery Charger for 6V,3.5A.

1) The Battery Charger can be mounted on table or wall. Drill two holes (centers spaced 105 millimeters apart), secure the two supplied screws, and mount the Battery Charger by sliding over screws.

2) Seat batteries with contacts facing to back.

3) Connect the power supply cord to the power receptacle on the charger. Connect the other end of the power supply cord to a suitable power outlet.

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

5) While charging, the LED of the battery compartment will be red. When fully charged, the LED will be green.

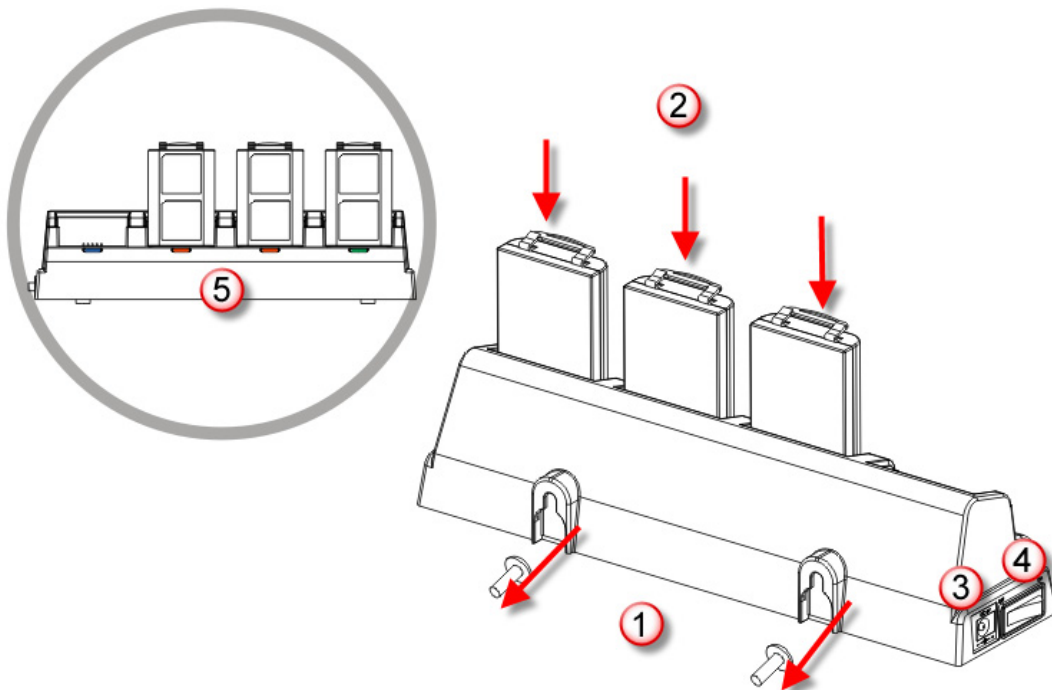

Figure 13: 4-Slot Battery Charger

Indicator	Status	Description
POWER / Battery Charging	Off	Power off
	Blue, solid	Power on
	Red, solid	Charging
	Green, solid	Charging done

LEARNING WINDOWS CE BASICS

This chapter mainly describes the basic skills to work with 9600 Mobile Computer. The add-on utilities for applications regarding data collection, processing, and transmission, are introduced in the following chapters.

9600 Mobile Computer is specifically designed for real-time data collection in the Windows CE 6.0 environment. It won't take long for any Windows user to get familiarized with it. Keep these basic skills in mind and explore this Windows CE device at ease.

▶ Double-tap an item to select it.

▶ Tap and hold an item to see a menu that enables tasks, such as cut, copy, rename, delete, etc.

▶ Tap and drag to select multiple items.

▶ Tap ☒ on the toolbar to close an active window, a dialog box, or a running application.

   If the button is not displayed, press [ESC] on the physical keypad.

▶ Tap OK on the toolbar to save the current settings and exit the application (or minimize the window in some applications).

   If the button is not displayed, press [Enter] on the physical keypad.

IN THIS CHAPTER

2.1 GETTING STARTED

When 9600 Mobile Computer is fully charged, press [Power] for more than 1 second to turn on the mobile computer and wait for the Windows CE desktop to come up. If you are using the mobile computer for the first time, there are a couple of things to do after the desktop comes up.
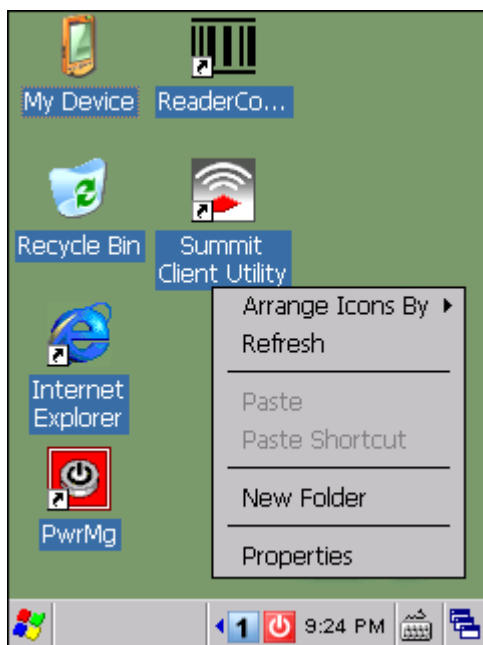
▶ To select your time zone and set the local time: **Start** | **Settings** | **Control Panel** and select **Date/Time**.

2.1.1 DESKTOP

The desktop appears when the mobile computer is turned on.
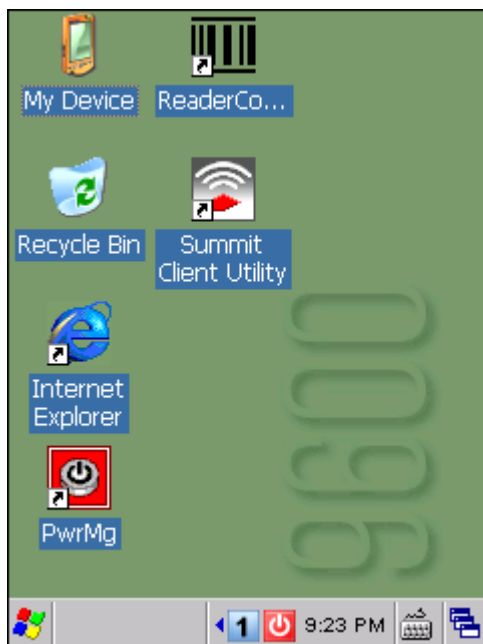
Tap and hold anywhere blank on the screen to manage or configure the desktop.

Alternatively, you may tap [icon] to the right of the taskbar, and then select **Desktop**.

Note: To customize the desktop, tap anywhere blank on the desktop and select **Properties**.

2.1.2 TASKBAR

The taskbar is at the bottom of the screen for displaying the following:

▶ **Start** button

▶ **SIP** button

▶ **Switch Task** button

▶ Status icons for various connections, minimized program windows, and so on.
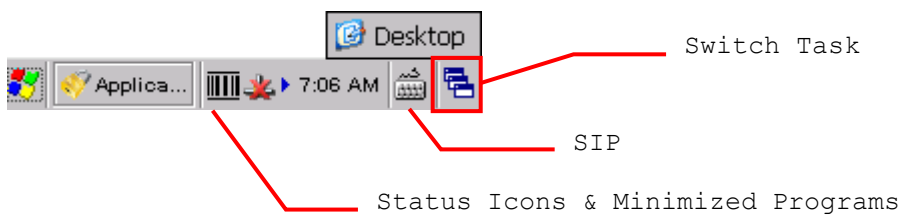
Note: To configure different connections, go to **Start** | **Settings** and select **Network and Dial-up Connections**.

Icon	Description	See Also
	Tap it to switch to desktop or any task, such as a running program or window.	Switch Task
	Tap it to change the input method.	Software Input Panel (SIP)
	It indicates external power source is connected.	1.1.1 Understanding the Battery Icons
	It indicates the amount of battery charge remaining in the main battery. The higher the green level, the more power in the main battery.	
	It indicates the main battery status.	
	It indicates the backup battery status.	
1 a A	It indicates the current input mode of keypad.	1.3.2 Alpha Key
	It indicates Shift is enabled (on 29-key keypad).	1.3.3 Shift Key
1 1	It indicates Shift is enabled (in numeric mode on Qwerty keypad).	
A A	It indicates Shift is enabled (in alpha mode on Qwerty keypad).	
Fn	It indicates Fn is enabled. (= Function mode)	1.3.4 Function Key

	The USB connection for ActiveSync operation is successfully established. ▶ Double-tap it to view status. Tap [Disconnect] if necessary.	3.4 Connection Settings
	It indicates a specific network connection fails (= disconnected). Double-tap it to access the Wireless Information tab if there is any. ▶ Bluetooth PAN connection ▶ 802.11b/g wireless connection ▶ Ethernet connection	Using Bluetooth Using 802.11 Radio
	It indicates a specific network connection has been established successfully. Double-tap it to view or renew IP Information. ▶ Bluetooth PAN connection ▶ 802.11b/g wireless connection ▶ Ethernet connection	
	It provides control of the power to the 802.11b/g, GSM/GPRS, and BT modules. ▶ Tap the icon to configure the power setting.	**Power Management**
	It indicates the Wi-Fi module (802.11b/g) is enabled. The more green bars, the stronger the signal. ▶ See wireless status icons above.	**Summit Client Utility**
	It indicates the GSM/GPRS module is enabled and provides access to GPRS service. ▶ Go to **Start** | **Settings** | **Control Panel** and select **GSM/GPRS Manager** to configure GPRS settings. ▶ The icon means the GSM/GPRS module is initializing or the GPRS connection is disconnected. ▶ The icon means the device is connecting to GPRS network. ▶ The icon means the GPRS connection has been established successfully.	6.2 GPRS Connection
	It indicates the GSM/GPRS module is enabled and provides access to GSM service. ▶ Go to **Start** | **Settings** | **Control Panel** and select **GSM/GPRS Manager** to configure associated settings. ▶ The icon means the GSM/GPRS module is initializing, or GSM signal is bad (one-bar or no signal at all). ▶ The icon means **GSM-Connect** is ready for use.	6.3 Phone Application

(BT icon)	It indicates the BT module is enabled and provides access to Bluetooth services. ▶ Tap the icon to open **BT-Connect**. ▶ Go to **Start | Settings | Control Panel** and select **BT Manager** to configure associated settings.	<u>Using Bluetooth</u>
(barcode icon)	It provides access to the Reader Configuration Utility. ▶ Initially, you need to double-tap the ReaderConfig.exe shortcut on the desktop so that this icon will appear on the taskbar.	(barcode icon)

2.1.3 START MENU

Tap the **Start** button (icon) on the taskbar to open the **Start Menu**.

Start Menu
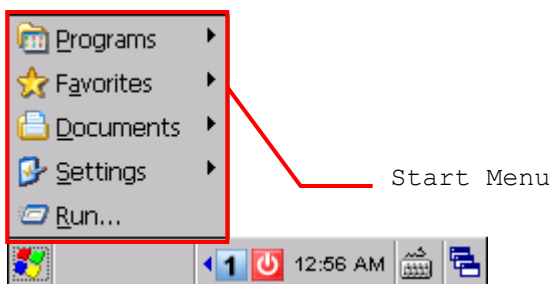
Options	Description
Programs	Provides access to available programs that are stored in the directory: \Windows\Programs
Favorites	Provides access to your favorite links to webpages that are stored in the directory: \Windows\Favorites
Documents	Provides access to recent opened documents in the directory: \Windows\Recent
Settings	Provides access to ▶ Control Panel ▶ Network and Dial-up Connections ▶ Taskbar and Start Menu
Run...	Opens a program or folder or document.

Note: To configure the Start menu and taskbar, go to **Start \| Settings** and select **Taskbar and Start Menu**.

2.1.4 INPUT METHODS

Data entry can be performed by the following methods:

Physical Keypad

Type with the physical keypad.

Data Capture

Scan barcode or RFID tag in applications, e.g. WordPad, CipherLab's FORGE Application Generator, etc.

Software Keypad

Type or write using SIP (Soft Input Panel):

Tap the SIP button [icon] on the taskbar to select a SIP mode or hide the input panel.

In each mode, the characters appear as typed text on the screen.

Options	Description
Keyboard	To type using the virtual keyboard.
Transcriber	To write freely on the screen in applications, such as WordPad.

2.2 MANAGING PROGRAMS

2.2.1 QUICK LAUNCH A PROGRAM

Tap the **Start** button to view the **Start Menu**. To quick launch a program, tap it from the Programs folder.

Note: Alternatively, you may tap **Start** and select **Run** to run a specific program or open a document.
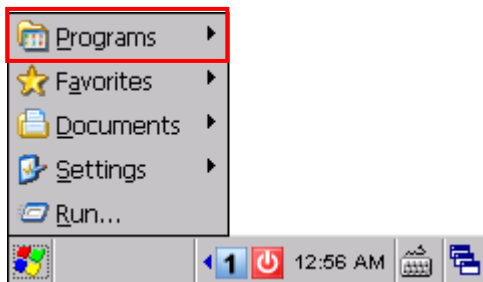
If you wish to quick launch a new program, add it to the Programs folder: **My Device\Windows\Programs**. The program will become available in the **Start Menu**. To add a new program or subfolder to the Programs folder, you can either use **Windows Explorer** or **ActiveSync**.

▸ Windows Explorer: to move the program by [Copy] and [Paste Shortcut].

▸ ActiveSync on the desktop computer: to create a shortcut to the program, and place the shortcut in the Programs folder.

Warning: To avoid making any changes to the program configurations by accident, we recommend you to use [Copy] and [Paste Shortcut] rather than [Cut] and [Paste].

2.2.2 SWITCH AMONG PROGRAMS AND DESKTOP

Tap to the right of the taskbar and select a running program.

2.2.3 EXIT A PROGRAM

In general, the system manages memory automatically, and there is no need to exit a program in order to open another or to conserve memory. However, random access memory (SDRAM) may be used up when running too many programs. As a result, it will slow down the operation or cause program errors. In that case, you should stop one or more running programs to free memory. In order to use memory in a more efficient way, you are recommended to exit a program when it is not desired any longer.

Warning: Always remember to save data or settings before you exit a program.

Tap [×] to close an active window, a dialog box, or a running application. If the button is not displayed on the toolbar, press [ESC] on the physical keypad.

Tap [OK] to save the current settings and exit the application (or minimize the window in some applications). If the button is not displayed on the toolbar, press [Enter] on the physical keypad.

Note: Some programs, such as the Reader Configuration Utility (ReaderConfig.exe), may create an associated icon on the taskbar. You may tap the icon and select [Exit] from the pop-up menu.

2.3 USING ACTIVESYNC

ActiveSync is used to synchronize information between 9600 Mobile Computer and your desktop computer, to install programs on the mobile computer, and to backup and restore the mobile computer.

The Microsoft ActiveSync program has to be installed on your desktop computer first.

▶ To download the up-to-date version of the program, you may need to go to Microsoft's official web site for Windows Mobile devices as shown below.

http://www.microsoft.com/windowsmobile/activesync/activesync45.mspx

▶ After downloading and installation, run the program. For detailed information on the program, you may click the Help menu, and then select the Microsoft ActiveSync Help.

2.3.1 SYNCHRONIZATION WITH YOUR COMPUTER

1) Follow these instructions for initial ActiveSync operation:

   ▶ Connect the USB charging & communication cable from the mobile computer or via a cradle to your computer.

   ▶ Connect the power cable to a nearby power outlet.

   ▶ Turn on the mobile computer or seat it in the cradle.

2) Your computer will automatically detect the USB device.

3) Select which partnership to set up. If you want to synchronize data between the mobile computer and your personal computer, select Standard Partnership; otherwise, select Guest Partnership.

4) Wait a few seconds for the mobile computer to get connected (and synchronized if a Standard Partnership is selected).

Note: For ActiveSync via Bluetooth, refer to Using Bluetooth.

2.3.2 ADD/REMOVE PROGRAMS

Click [Add/Remove Programs] from the Tools Menu so that you can proceed to install a program that is designed to be used on a mobile device running Windows CE. If a user program is no longer desired, you may remove it from the system.

Click [Add/Remove Programs] from the Tools Menu so that you can un-install a program that is designed to be used on a mobile device running Windows CE.
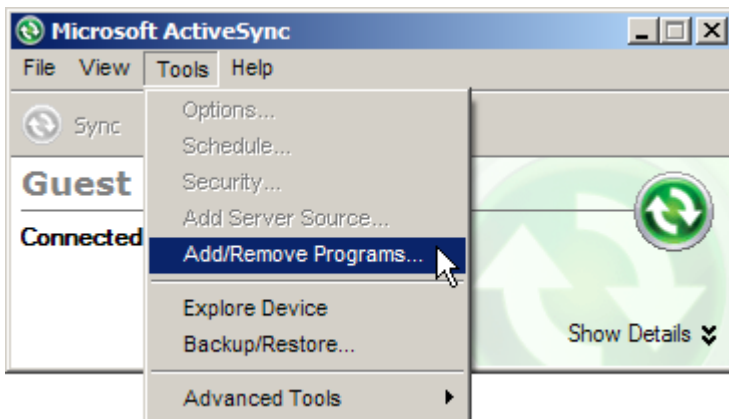
Alternative to Install New Programs (Copy & Paste)

You may install a new program manually.

1. When connected, open the Microsoft ActiveSync window on your desktop computer.

2. Click the Explorer button from the toolbar.

3. Navigate to the target folder, e.g. the Programs folder (\Windows\Programs), depending on where you wish to access the program.

4. Navigate through file folders on your computer to find the new program (.CAB, .EXE, etc.)

5. Right-click the program and select [copy] from the pop-up menu.

6. Back to the target folder in step 3. Right-click anywhere blank and select [Paste] from the pop-up menu.

7. On the mobile computer, go to **Start** | **Programs** and the new program will appear.

Alternative to Remove Programs (Control Panel)

You may un-install a new program manually.

1. Go to **Start** | **Settings** | **Control Panel** and select **Remove Programs**.

2. Tap the name of the program that you want to delete.

3. Tap [Remove].

4. Tap [Yes] to un-install the program.

Note: If the program does not appear in the list of installed programs, you may use Windows Explorer to locate it. Tap and hold the program to select [Delete] from the pop-up menu.

2.3.3 EXPLORE DEVICE

Add a Program to Start Menu

1. When connected, open the Microsoft ActiveSync window on your desktop computer.

2. Click the Explorer button from the toolbar.
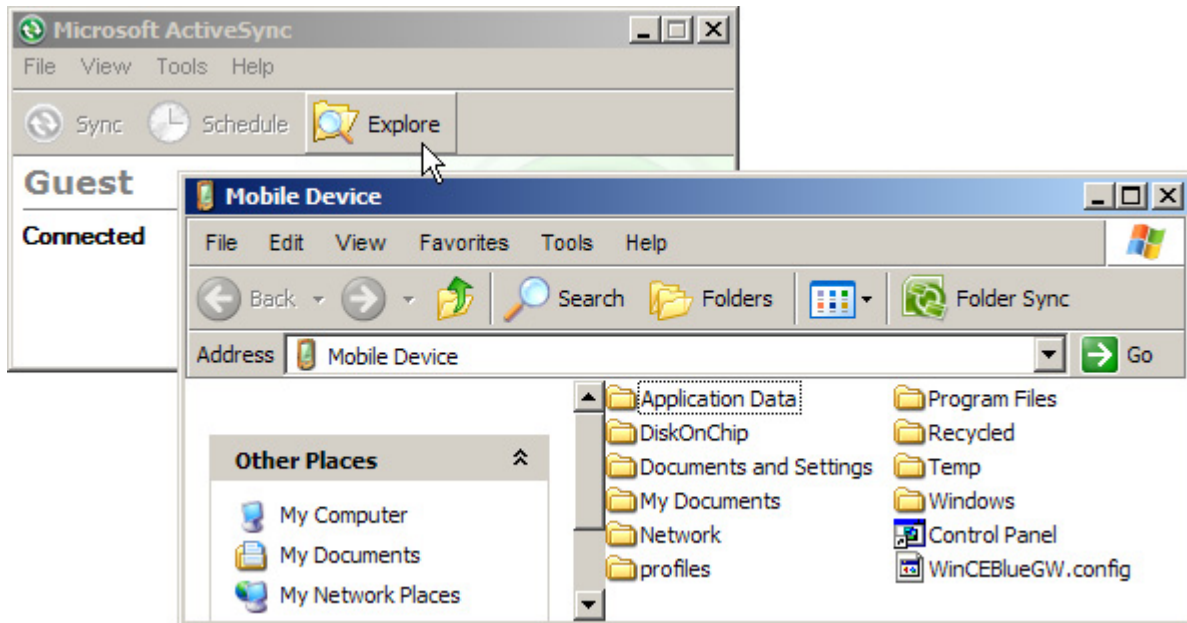
3. Navigate through file folders to find the program you desire.

4. Right-click the program and select [Create Shortcut] from the pop-up menu.

5. Right-click the shortcut and select [Cut] from the pop-up menu.

6. Navigate to the Programs folder – **My Device\Windows\Programs**.

7. Right-click anywhere blank on the window and select [Paste] from the pop-up menu. The new program will be added to the Programs folder.

8. On the mobile computer, go to **Start** | **Programs** and the new program will appear now.

Note: [Create Shortcut], [Cut], and [Paste]: The same result can be performed by [Copy] and [Paste Shortcut].

Create a New Folder

1. When connected, open the Microsoft ActiveSync window on your desktop computer.

2. Click the Explorer button from the toolbar.

3. Navigate to the target folder where you wish to create a new folder.

4. Right-click anywhere blank on the window and select [New Folder] from the pop-up menu. A subfolder will be created.

2.3.4 BACKUP/RESTORE

To best protect your work, you should regularly back up information on your mobile computer. You can perform a backup by during the ActiveSync operation. The backup file is stored on your desktop computer.
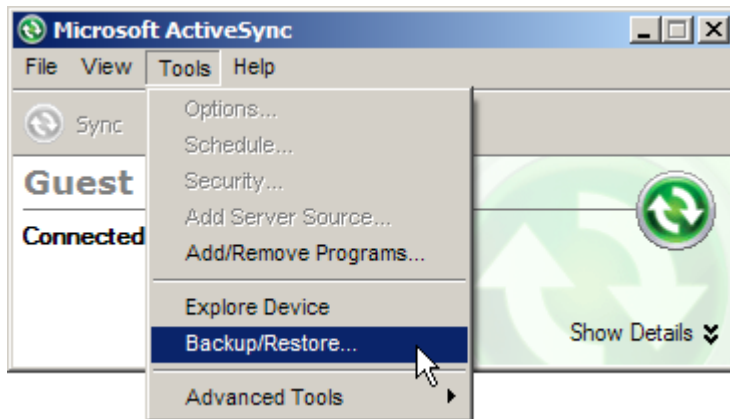
Note: The CipherLab Backup Utility is provided for the same purposes, and will save the backup file to the DiskOnChip folder.

2.4 USING WINDOWS EXPLORER

2.4.1 ADD A PROGRAM TO START MENU

1) Go to **Start | Programs** and select **Windows Explorer**.

2) Navigate through file folders to find the program you desire.

3) Tap and hold the program to select [Copy] from the pop-up menu.
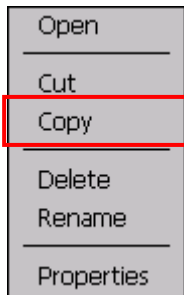
4) Navigate to the Programs folder – **My Device\Windows\Programs**.
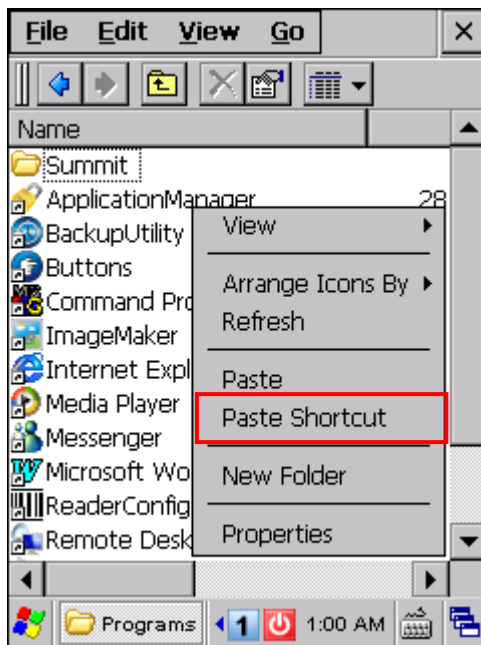
5) Tap and hold anywhere blank on the screen to select [Paste Shortcut] from the pop-up menu. The new program will be added to the Programs folder.

6) Go to **Start | Programs** and the new program will appear now.

2.4.2 CREATE A NEW FOLDER

1) Go to **Start | Programs** and select **Windows Explorer**.

2) Navigate through file folders to find where you wish to create a new folder.

3) Tap and hold anywhere blank on the window and select [New Folder] from the pop-up menu. A subfolder will be created.

2.5 SUSPEND & RESET

Like your PDA, Pocket PC and most handheld devices, 9600 Mobile Computer functions when it is turned on. This is because the Windows CE operating system eliminates the booting process and runs continuously.

You may turn off the mobile computer if necessary or reset the mobile computer when it stops responding to input.

Operation	Wireless Power (Wi-Fi, GSM/GPRS, Bluetooth)
Resume from Suspend	Will maintain the power settings in **Power Management**
After Software Reset	Will go through a power cycle and follow the power settings in **Power Management**
After Hardware Reset	

Warning: Never perform hardware reset unless software reset cannot solve your problems.

2.5.1 SUSPEND MODE

When the mobile computer enters suspend mode, the system is ready for use but not in use. This is referred to as Suspend mode or Standby mode. It means the system is in power-saving status and waiting for user interference.

Turn On (= Resume from Suspend)

Press [Power] for more than 1 second to turn on the mobile computer. Alternatively, you may press the SCAN key.

Turn Off (= Suspend)

Press [Power] for more than 1 second to turn off the mobile computer.

Warning: To save battery power, it is suggested that the mobile computer is set to be automatically turned off when not in use. Refer to 1.1.2 Power Management for more information about saving power.

2.5.2 SOFTWARE RESET (WARM BOOT)

Software reset, also known as a warm boot, will restart the mobile computer and keep all the saved files.

Software Reset (= Warm Boot)

▶ Use the stylus to press the [Reset] button.

▶ During operation, the removal of main battery will start software reset too.

Warning: Data loss may occur when files are not properly closed before software reset.

2.5.3 HARDWARE RESET (COLD BOOT)

Hardware reset, also known as a cold boot, will restart the mobile computer and initializes SDRAM. Data and program files stored in SDRAM will be erased after hardware reset. But you can restore data that is previously synchronized with your computer by performing an ActiveSync operation, or backed up by using CipherLab Backup Utility.

Cold Boot

Press [Power] and [Reset] button at the same time for about 2 seconds.

Warning: Only the files stored in the Flash File System are retained during hardware reset.

2.5.4 DATE/TIME & TIME ZONE AFTER RESET

System Reset	Registry File	Settings After Reset
Software Reset	Date/Time	Keep the current settings (= No restore occurs!)
	Time Zone	Restored from Sysbak folder if backup file is available
		Keep the current settings if backup file is unavailable
Hardware Reset	Date/Time	Restored to system default: ▶ 2010/1/1 00:00
	Time Zone	Restored from Sysbak folder if backup file is available
		Restored to system default if backup file is unavailable: ▶ (GMT-08:00) Pacific Time (US & Canada)

Note: You must manually adjust system date and time after hardware reset. We suggest you to check the time zone as well.

2.6 AUTO RUN

Upon hardware or software reset, the OS shall automatically execute **AutoRun.exe** and/or **AutoRun.ini** if any of the two files can be found in the "\DiskOnChip" folder.

If AutoRun.exe exists

▶ Upon cold boot, the OS shall automatically execute **AutoRun.exe**

▶ Upon warm boot, the OS shall automatically execute **AutoRun.exe**

If AutoRun.ini exists

▶ Upon cold boot, the OS shall automatically check the contents of **AutoRun.ini** and execute them (if there is any).

Any line prefixed with a semicolon ";" is supposed to be a comment line only; otherwise it is an executable file or command and shall be executed (line by line). For example,

```
\DiskOnChip\cerdisp.exe
:\DiskOnChip\ReaderConfig.exe
;\DiskOnChip\RF9600_CE.exe
\DiskOnChip\cerdisp.cab
:\DiskOnChip\ReaderConfig.cab
```

▶ Upon warm boot, the OS shall automatically check the contents of **AutoRun.ini** and execute any line that is prefixed with a colon ":".

Any line prefixed with a semicolon ";" is supposed to be a comment line only. For example,

```
:\DiskOnChip\ReaderConfig.exe
;\DiskOnChip\RF9600_CE.exe
:\DiskOnChip\ReaderConfig.cab
```

Note: Because the cabinet files are designed to install the application, tidy up, and then "self destruct", they will be automatically deleted from your mobile computer after installation. However, **AutoRun.ini** will backup the original files (.cab) while installing cabinet files, and restore them after installation. Consequently, these cabinet files will be automatically re-installed to your mobile computer upon cold boot or warm boot, if specified in **AutoRun.ini**.

Chapter 3

CONFIGURING 9600 MOBILE COMPUTER

In this chapter, a brief on the system settings is provided for your reference. The **Application Manager** is specifically designed for the administrator to manage the accessibility of applications and protect the integrity of the system on the mobile computer. It serves as a portal that allows launching routine application programs automatically upon a reboot, preventing users from running potentially distracting applications, as well as to restricting access to changing device settings.

Note: User settings are stored in SDRAM and will be overwritten by the system defaults after hardware reset. However, you can use the CipherLab Backup Utility to backup the current registry for restore purpose.

IN THIS CHAPTER

3.1 APPLICATION MANAGER

Application Manager has powerful features and is easy to use —

▸ Provides full control over executable files of the Programs folder, desktop and Control (Panel)
▸ Can limit access to essential device settings
▸ Can prevent from potentially distracting applications
▸ Can execute routine application automatically upon a reboot
▸ Provides user name and/or password protection
▸ Allows setting up an administrator account
▸ Supports multiple languages
▸ Supports show/hide taskbar and toolbar
▸ Supports enable/disable taskbar, partially or fully
▸ Distributes user settings at a few clicks

After restarting the mobile computer upon completion of installation, the **Application Manager** automatically starts up with programs and settings made accessible based on the system. If you have logged in as an administrator, you are allowed to manage program accessibility.

Note: For details on the installation and usage, please refer to the separate user guide.

3.2 DEVICE NAME & CONFIGURATION

3.2.1 CHANGING DEVICE NAME

1) Go to **Start** | **Settings** | **Control Panel** and select **System** to obtain essential system information.

2) Select the Device Name tab to change the identification for the mobile computer.
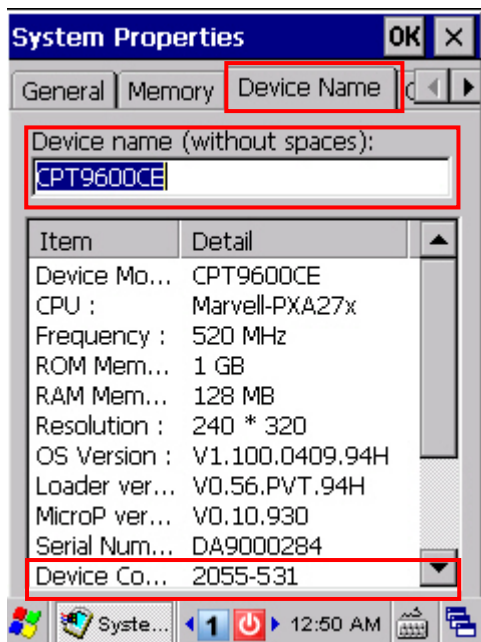
3.2.2 UNDERSTANDING DEVICE CONFIGURATION

The device configuration of 9600 Mobile Computer is displayed in 7 digits: xxxx-xxx

Take the screenshot of System Properties above for example. Its device configuration is "2055-531"; therefore, the mobile computer has the following features –

▸ 29-key, VGA screen
▸ A scan engine that employs Laser scan engine
▸ Integrated communications: Bluetooth, Wi-Fi and GSM/GPRS
▸ Integrated GPS receiver and camera

Device Code	Modular Component	Types
1st digit	Reader module	0= none 1= Linear Imager (CCD) 2= Laser (SE950) 3= 2D Imager
2nd digit	RFID module	0= none 1= RFID reader
3rd digit	Bluetooth, GSM/GPRS	0= none 1= Bluetooth 4= GSM/GPRS 5= Bluetooth + GSM/GPRS
4th digit	Wi-Fi, GPS	0= none 1= Wi-Fi (Summit) 2= Reserved 4= GPS 5= Wi-Fi (Summit) + GPS 6= Reserved
5th digit	LCD, camera	0= QVGA 1= VGA 4= QVGA + Camera 5= VGA + Camera
6th digit	Keypad	0= 29-key 1=43-key 2= Qwerty 3= New 29-key
7th digit	PCB main board	---

3.3 SYSTEM SETTINGS

Go to **Start** | **Settings** | **Control Panel**.

Items	Description
Auto Backup	In the [Auto Backup] dialog box, you may configure how often the mobile computer automatically backups the system registry to "\DiskOnChip\Sysbak\Registry.dat". ▶ By default, the backup interval is set to 10 seconds. ▶ You may select to disable the automatic backup operation, and manually backup the system registry by using CipherLab Backup Utility.
BT Manager	Refer to 5.9 BT Manager.
Certificates	In the [Certificates] dialog box, you may view or modify digital certificates that some application use to establish trust for secure connections.
Com Port Mapping	In the [Com Port Mapping] dialog box, you may configure the physical port for serial data communications. ▶ By default, COM 7 is enabled for data communications via the RS-232 cable. ▶ You may select to disable COM 7 when you need to have an additional virtual COM port. For example, you may use it for BT SPP via programming. The new setting will not take effect until a warm boot is performed.
Date/Time	In the [Date/Time] dialog box, you may change date, time, and time zone settings.

Dialing	In the [Dialing Properties] dialog box, you may configure settings for modem communications, such as GPRS modem.
Display	In the [Display Properties] dialog box, ▶ Background tab: Select an image for the background. ▶ Appearance tab: Select a desired color scheme for windows, dialog boxes, and items. ▶ Backlight tab: Specify for how long the mobile computer is idle and then the backlight will be automatically turned off while on battery power and external power respectively. Tap the [Advanced] button to move the slider and adjust the brightness of the LCD backlight when it is set to be automatically turned on once a key is pressed or you tap the touch screen.
GSM/GPRS Manager	Refer to 6.4 GSM/GPRS Manager.
Input Panel	In the [Input Panel Properties] dialog box, you may configure how the Soft Input Panel (SIP) works.
Internet Options	In the [Internet Options] dialog box, you may configure how the mobile computer connects to the Internet.
Keyboard	Connect an external keyboard to the mobile computer or cradle via USB host cable. In the [Keyboard Properties] dialog box, ▶ Repeat tab: You may configure settings for character repeat. ▶ Backlight tab: You may change the backlight setting for Qwerty keypad.
Network and Dial-up Co...	In the [Network and Dial-up Connections] window, you may configure settings for the mobile computer connects to a network directly or through a modem. Alternatively, you may tap **Start** | **Settings** | **Network and Dial-up Connections**. ▶ USB Connection (ActiveSync via USB cable) ▶ GPRS (through a GPRS modem) ▶ AX88772 (via Ethernet Cradle) ▶ SDCCF10G1 (via 802.11b/g) ▶ BTPAN (via Bluetooth)
Owner	In the [Owner Properties] dialog box, ▶ Identification/Notes tab: Type your contact information or notes. ▶ Network ID tab: Type the user name, password, and domain name used to log on to the remote network.

Password	In the [Password Properties] dialog box, ▶ Password Settings tab: You may apply password protection to the following situations: (1) to limit access to the mobile computer at power-on, or (2) to limit access to the DiskOnChip folder. When password protection is enabled, the access to Control Panel and Password settings is also protected. ▶ Date/Time Setting tab: By default, you are allowed to make changes to the Data/Time settings. To prevent unauthorized users from accidentally changing the settings, cancel the check box after applying password protection.
PC Connection	In the [PC Connection Properties] dialog box, you may disable the direct connection between the mobile computer and a desktop computer. ▶ By default, the mobile computer is allowed to directly connect to a desktop computer via the USB charging & communication cable. Alternatively, you may tap **Start	Settings	Network and Dial-up Connections** and select USB Connection. ▶ You may change to use Bluetooth if ActiveSync via Bluetooth has been enabled in **BT-Connect**.
Power	In the [Power Properties] dialog box, ▶ Battery tab: You may view the current status of main and backup batteries. ▶ Schemes tab: You may configure the power scheme and switching. ▶ Device Status tab: You may view the devices that are consuming power.
Regional Settings	In the [Regional and Language Settings] dialog box, ▶ Region tab: You may customize the appearance and formatting to your geographic region. ▶ Language tab: By default, it is set to English (United States). ▶ Input tab: By default, it is set to English (United States)-US.
Remove Programs	In the [Remove Programs] dialog box, you may remove any program that is installed earlier.
Storage Manager	In the [Storage Properties] dialog box, ▶ Storage Manager tab: Here provides information on the DiskOnChip folder or storage card.
Stylus	In the [Stylus Properties] dialog box, ▶ Double-Tap tab: You may configure and test your double-tap settings. ▶ Calibration tab: You may need to re-calibrate the touch screen if it is not responding properly to your taps.
System	In the [System Properties] dialog box, ▶ General tab: You may view the system information. ▶ Memory tab: You may move the slider and adjust the SDRAM allocation. ▶ Device Name tab: You may type a name and description for identifying the mobile computer. ▶ Copyrights tab: You may view the important statements on copyrights.

Terminal Server Clie...	Client access licenses (CALs) issued by the Terminal Server license server allow clients to connect to the terminal server.
	Use Remote Desktop Connection to log onto a Windows Terminal Server or a computer remotely. You may access all of the programs, files, and network resources on the remote host or terminal server.
CipherLAB Version Viewer	In the [Version Viewer] dialog box, you may view the versions of all CihperLab built-in drivers, services, and additional items in Control Panel, which are currently installed on the mobile computer.
Volume & Sounds	In the [Volume & Sounds Properties] dialog box,
	▶ Volume tab: You may move the slider and adjust the volume and select to play sounds for Events, Applications or Notifications.
	▶ Sounds tab: You may configure sounds for different Windows events.
Wi-Fi	Refer to 4.2 Summit Client Utility.

3.4 CONNECTION SETTINGS

There are two ways to access the connections settings:

▶ Go to **Start | Settings | Control Panel** and select **Network and Dial-up Connections**.

▶ Go to **Start | Settings | Network and Dial-up Connections**.
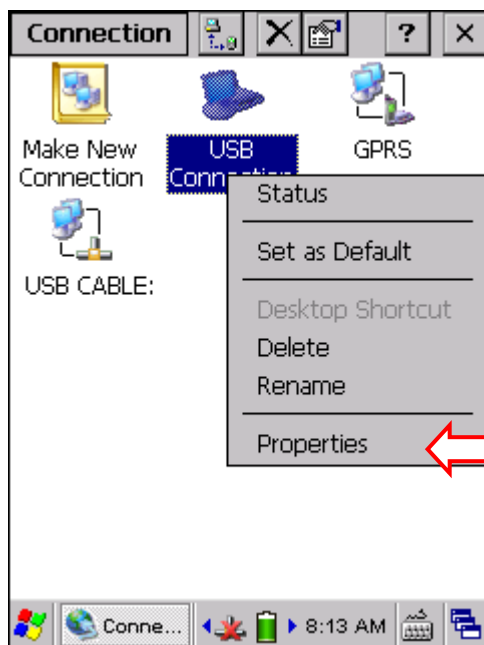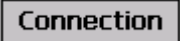
Ignore [Properties] as any changes made will affect ActiveSync connection.

Connections	Description
USB Connection	This is a shortcut to USB Connection, and the selected interface is USB for factory setting. This connection is reflected in the control panel for direct PC connection: **Start | Settings | Control Panel |** PC Connection The USB connection is specifically for performing the ActiveSync operation via the USB charging & communication cable. Generally, it will automatically establish the connection and start the ActiveSync operation when you seat the mobile computer in the cradle. To stop the ActiveSync operation, simply remove the mobile computer. Alternatively, you may double-tap the status icon from the taskbar and tap [Disconnect]. ▶ When connected, the status icon will appear on the taskbar. ▶ When disconnected, this icon will disappear.

USB CABLE:	This is the control of networking over USB cable. It is enabled automatically when the mobile computer is connected to PC via USB cable.
AX887721	This is the control of Ethernet module AX88772. It is enabled automatically when the mobile computer is seated in the Ethernet Cradle. ▶ When available, the connection status icon will appear on the taskbar. ▶ When connected, this icon will become . ▶ When disconnected, this icon will become again.
GPRS	Refer to 6.2 GPRS Connection.
SDCCF10G1	This is the control of 802.11b/g module for wireless local area networking (WLAN) connection, which is not available until the power to 802.11b/g module is turned on through **Power Management** . ▶ When available, the connection status icon will appear on the taskbar. ▶ When connected, this icon will become . ▶ When disconnected, this icon will become again.
BTPAN1	This is the control of BT module for wireless personal area networking (WPAN) connection, which is not available until the power to BT module is turned on through **Power Management** . ▶ When available, the connection status icon will appear on the taskbar. ▶ When connected, this icon will become . ▶ When disconnected, this icon will become again.

Note: By default, DHCP is enabled for networking. Instead of using DHCP, select [Properties] and specify a static IP address to the mobile computer. Only change these settings according to your network administrator's instructions.

Toolbar Items	Description	Remarks
Connection	Tap this button to open the Connection menu. The available options depend on the connection you select.	Tap and hold the icon of a desired connection type. Then, select an option from its associated menu.
	Tap this button to toggle on/off the connection you select. The toggle is used for Enable/Disable or Connect/Disconnect.	
	Tap this button to delete the connection you select.	
	Tap this button to view the properties of the connection you select.	

3.5 UPGRADING OS IMAGE

You can upgrade the OS image on your mobile computer either via microSD card or run the program "DLDR.exe" on the desktop of your computer. Please contact your sales representative for the OS upgrade utility "DLDR.exe".

Note: Before upgrading, it is suggested to delete the "\DiskOnChip\Sysbak" folder.

3.5.1 SD DOWNLOAD

The SD download method only allows upgrading image to a newer version from your microSD storage card.

1) Copy the image file to the root directory of your microSD storage card ("\SD Card"), and rename it to "NK.nb0".

2) Press [Reset] + [Power] to perform hardware reset on 9600, and then immediately press [Alpha] + [Backspace] to enter SD Download mode.

It will take approximately 5 minutes before a message is displayed on the mobile computer to indicate the OS upgrade is completed successfully.

3) Press [Reset] + [Power] to perform hardware reset on 9600 again.

Warning: Do not press any key on the mobile computer while upgrading OS image and make sure the power cord is connected.

3.5.2 RUN DLDR.EXE

1) Install Microsoft ActiveSync on your computer. For initial ActiveSync operation, refer to Using ActiveSync for details.

Now, you must disable the ActiveSync operation as shown below.
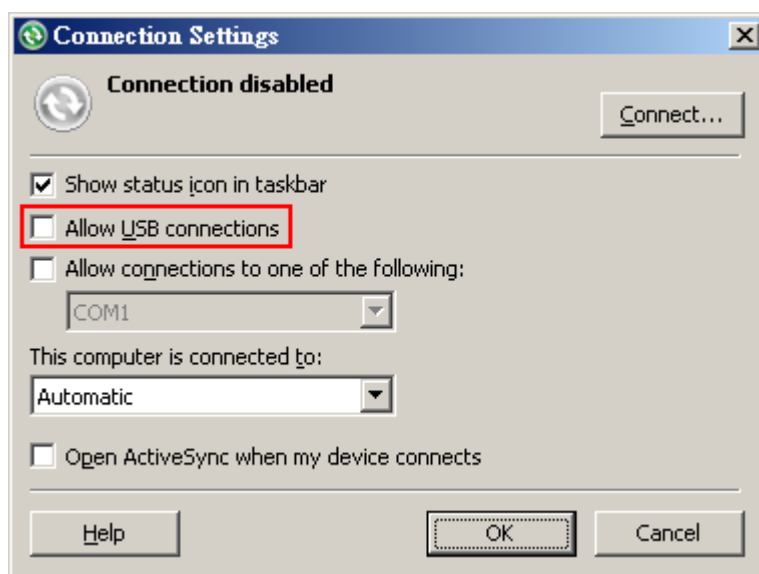
2) Run the Image Tool "DLDR.exe" on your computer.
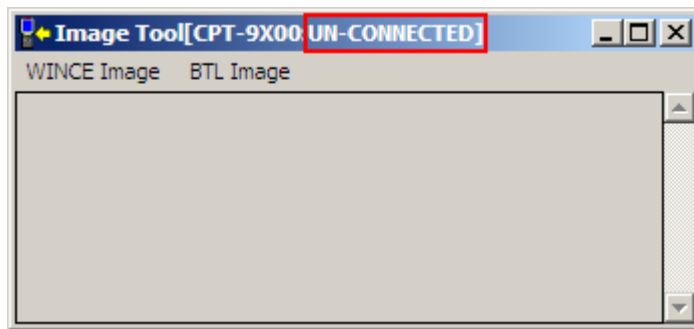
3) Connect 9600 to your computer.

4) Press [Reset] + [Power] to perform hardware reset on 9600, and then immediately press [Alpha] + [ESC] on 9600 to start the download process. It will try to connect to your computer.

Note: On 29-key keypad, you may alternatively press [Alpha] + [⚙] to enter the download process.

5) In the Image Tool, it will show 9600 has been connected successfully.
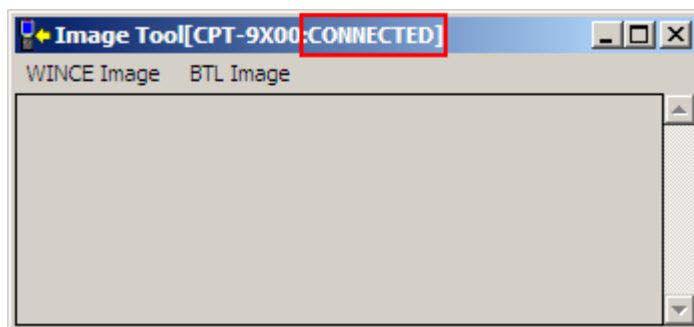
Go to **WINCE Image** | **Download**, and select the desired image file (*.nb0).
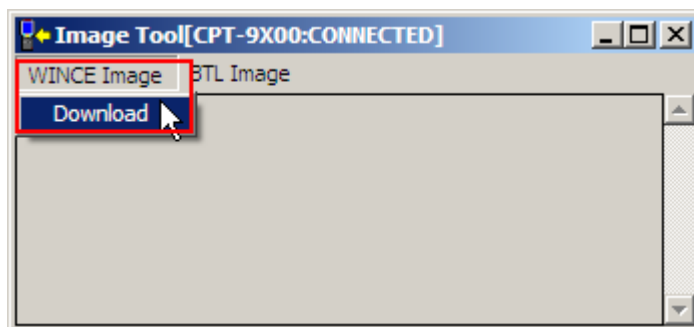
It will take approximately 5 minutes before a message is displayed on the mobile computer to indicate the OS upgrade is completed successfully. It will then perform hardware reset on 9600 automatically.

Warning: Do not press any key on the mobile computer while upgrading OS image and make sure the power cord is connected.

USING 802.11 RADIO

Summit Client Utility, also referred to as SCU, lets you configure and connect to network wirelessly.

IN THIS CHAPTER

4.1 TURN ON WI-FI POWER

1) Tap the icon 🔴 on the taskbar to access **Power Management**.

```
┌─────────────────────────────────────┐
│ Power Management          OK   ×     │
│ ┌──────────────┬────────┐            │
│ │ Wireless Power│ About │            │
│                                      │
│      ☑   Turn on Wi-Fi               │
│                                      │
│      ☐   Turn on GSM/GPRS            │
│                                      │
│      ☐   Turn on BT                  │
│                                      │
│ ⊞        ◀ 1 🔴 9:56 PM  ⌨  ⧉        │
└─────────────────────────────────────┘
```
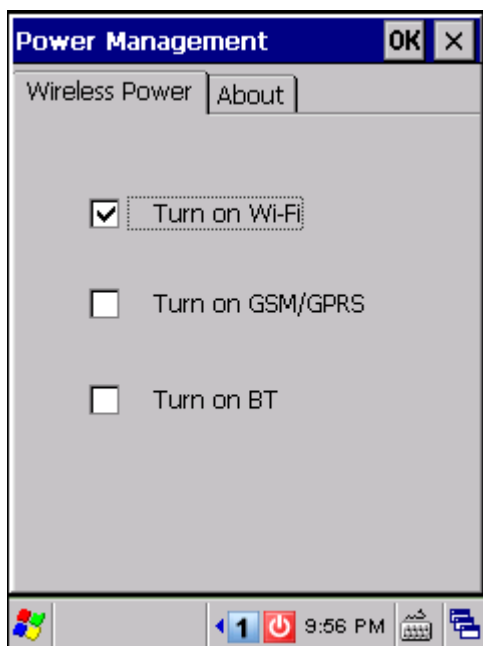
2) Select [Turn on Wi-Fi] and tap **OK**.

3) It takes several seconds to turn on the power to module.

   The Summit system tray icon will appear as shown below:

▣ ▤ ▥ ▦ ▧	▶ The icon indicates that 802.11b/g power is turned on, and the green bars indicate the wireless signal strength. The more the bars, the stronger the signal.
	▶ Double-tap any of these icons to access **Summit Client Utility**.
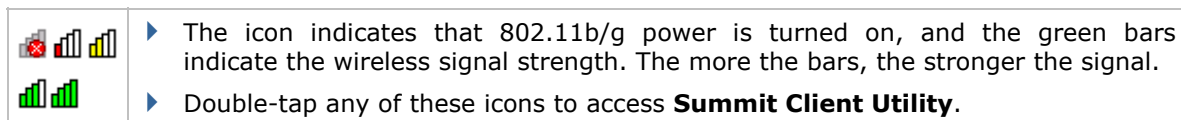
Note: (1) Wi-Fi power is maintained even in suspend mode.
      (2) Because the settings in **Power Management** will be kept after warm or cold boot, it will resume to last wireless power status after the power cycle.

4.2 SUMMIT CLIENT UTILITY

Profile settings are radio and security settings that are stored in the registry as part of a configuration profile. When a profile is selected as the active profile, the settings for the profile become active. You may create, rename, edit, and delete profiles, as well as alter global settings that apply to every profile or to SCU itself. For more detail on the profile settings, please go to http://www.summitdatacom.com/documentation.htm for more documents, such as

http://www.summitdatacom.com/Documents/Summit_Users_Guide_CE_V2.03.html

http://www.summitdatacom.com/Documents/QuickStart_v2_03.pdf

4.2.1 MAIN SETTINGS

Enable/Disable Radio

Tap [Disable Radio] to turn off wireless signal.
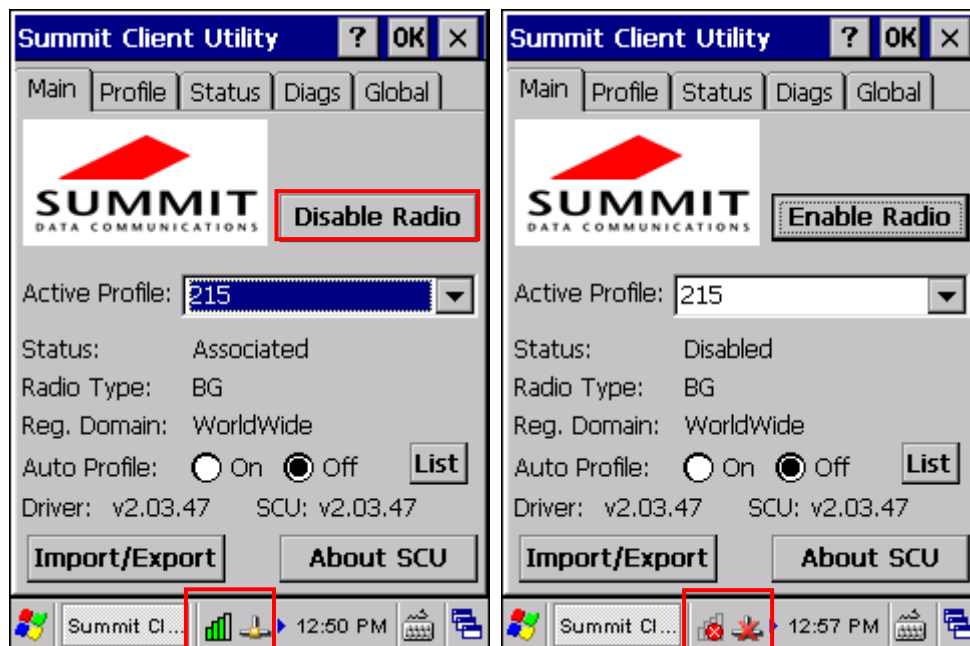
▸ The signal bars ▦ of the Summit Client Utility icon will become ▦ to indicate no signal.

▸ The connection status icon ⚓ will become ✳.

Active Profile

Profile settings are radio and security settings that are stored in the registry as part of a configuration profile. When a profile is selected as the active profile, the settings for the profile become active. Information on the Active Profile is displayed.

Item	Description
Active Profile	Options are "Default", "ThirdPartyConfig", and custom profiles.
Status	Potential values are ▶ Down: not recognized ▶ Disabled ▶ Not Associated ▶ Associated ▶ (EAP type) Authenticated
Radio Type	"BG" means a Summit radio that supports 802.11b and 802.11g.
Regulatory Domain	It indicates the regulatory domain or domains for which the radio is configured by factory. "Worldwide" means that the radio can be used in any domain.
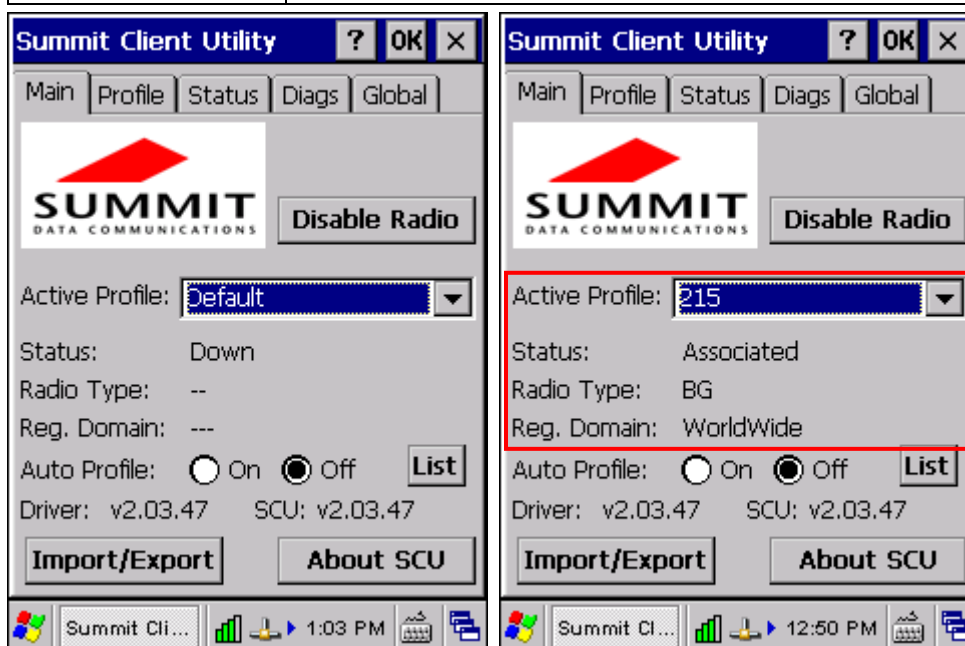
Note: If "ThirdPartyConfig" is selected, after the mobile computer goes through a power cycle, Windows Zero Config (WZC) or another application is used for configuration of all radio and security settings. The Summit Client Utility can only be used to define the Client Name, Power Save, Tx Power, Bit Rate, Radio Mode settings, as well as the global settings.

Auto Profile & List

Activate or deactivate an automatic profile selection facility. It makes use of a list of profiles you created. If such list does not exist, tap [List] to select the profiles in use.

When the facility is active and the radio is not associated to an access point, SCU runs through the list and tries each profile one by one until the radio associates to an access point using the values in a profile. The profile becomes the Active Profile and remains so until the radio disassociates or disconnects from the network.
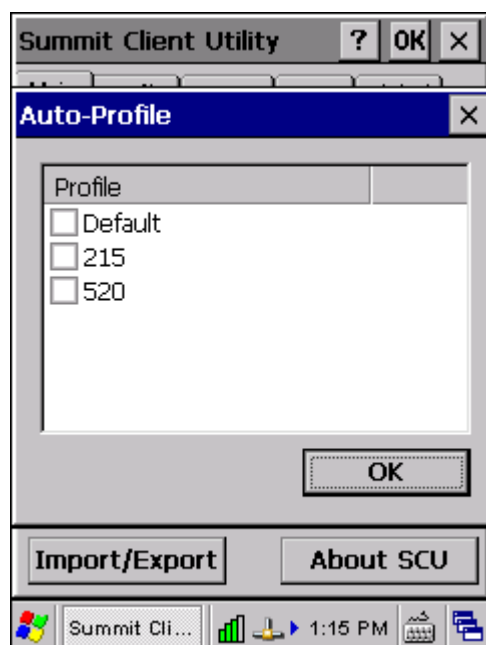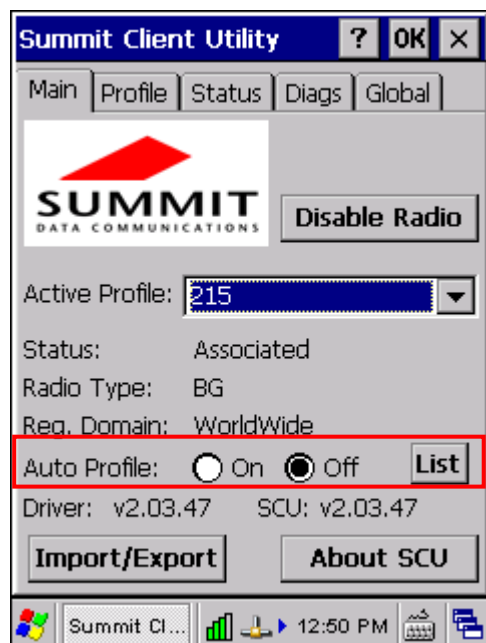
Import/Export

It is made easy to clone the profile(s) and global settings from a master mobile computer to others. Tap [Import/Export] and select the task to perform: "Import from" or "Export to".

▶ By default, the file name is "SummitSettings.sdc".

▶ Export to: Export global settings, all standard SCU profiles, and the special profile "ThirdPartyConfig" from the SCU area of the registry to a file.

▶ Import from: Import global settings, all standard SCU profiles, and the special profile "ThirdPartyConfig" from a file (created using the Export facility above) to the SCU area of registry. If you are importing a file and select [Add to existing], then the imported information will be merged with the information that was in the registry previously. If you select [Replace] instead, then the imported information will overwrite the information that was in the registry previously.

Default and custom profiles are included.
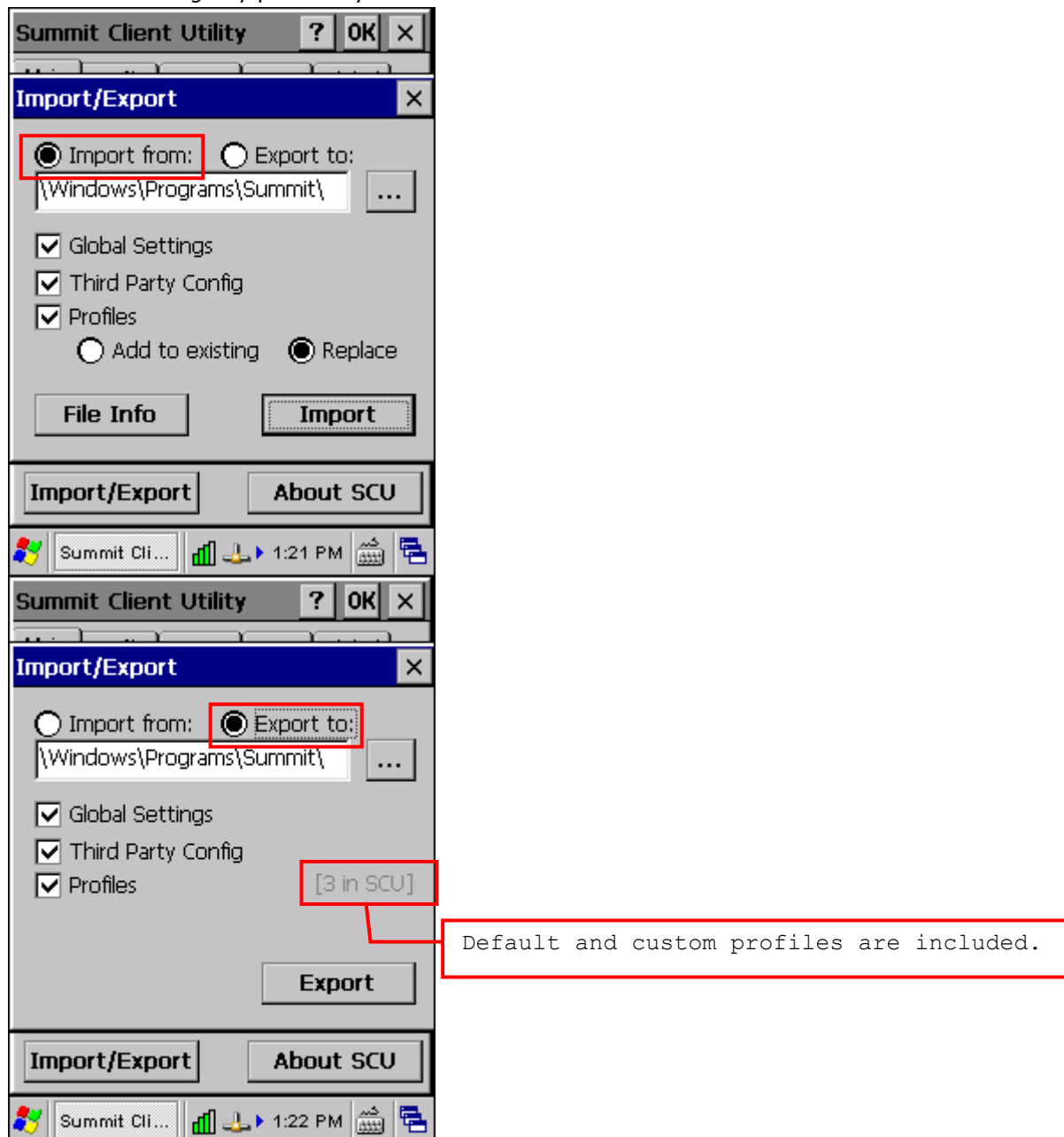
4.2.2 PROFILE EDITING

Any changes made to a profile will not be saved until you tap [Commit].

New

Tap [New] and enter a unique name for this profile. Up to 32 characters are allowed. Configure the Radio settings, Encryption, EAP Type, and so on.

▶ Define up to 20 profiles, not including the special profile "ThirdPartyConfig".
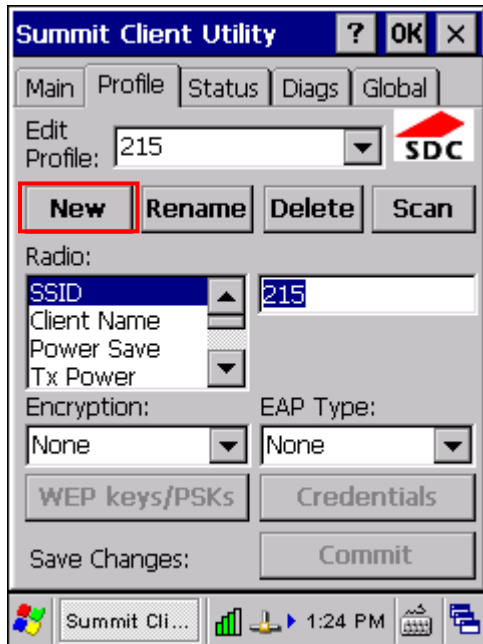
Rename

Select a profile from the drop-down menu and tap [Rename]. Enter a unique name for this profile. Up to 32 characters are allowed.

Delete

Select a profile from the drop-down menu and tap [Delete].

▶ You cannot delete the Active Profile.

Scan

Tap [Scan] to view a list of access points that are broadcasting their SSIDs. You may sort the list by tapping the column headers. Select one and create a profile for it.

Item	Description
SSID	Service Set Identifier (SSID)
RSSI	Received Signal Strength Indication (RSSI)
Secure	It indicates whether data encryption is in use: true or false
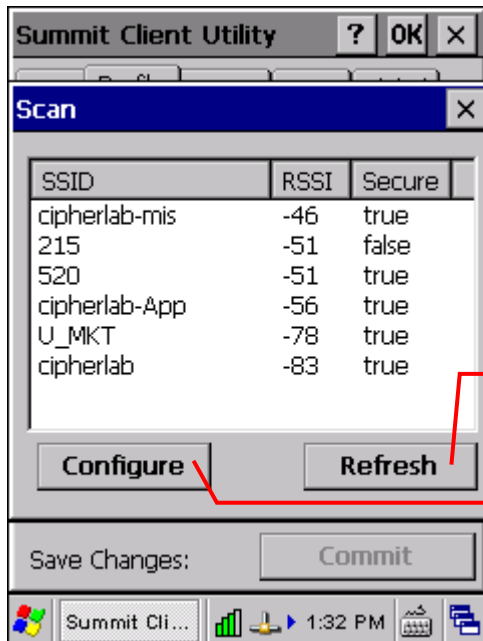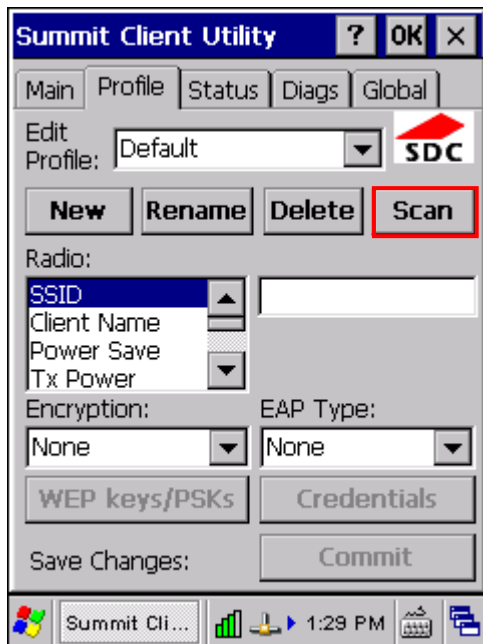
Tap to update the list.

Select one SSID and tap to create a new profile. Enter credentials or keys if necessary.

Edit Profile

By default, information of the profile "Default" is displayed. Select a profile from the drop-down menu and configure the Radio settings, Encryption, EAP Type, and so on. For example, select "SSID" from the Radio list and enter a preferred name for the network.

Radio	Configuration
SSID	Service Set Identifier (SSID) for WLAN to which the radio will connect
	If no SSID is specified, the radio will only associate to an access point that broadcasts its SSID.
	▶ Value: A string of up to 32 characters
	▶ Default: None
Client Name	Name assigned to the mobile computer with Summit radio installed
	▶ Value: A string of up to 16 characters
	▶ Default: None
Power Save	Power save mode for radio
	▶ Value:

CAM	Constantly Awake Mode (CAM) keeps the client adapter powered up continuously so there is little lag in message response time. It consumes the most power but offers the highest throughput. It is recommended when AC power is in use.
Maximum	Max Power Savings (Max PSP) causes the access point to buffer incoming messages for the client adapter, which wakes up periodically and polls the access point to see if any buffered messages are waiting for it. The client adapter can request each message and then go back to sleep. It conserves the most power but offers the lowest throughput.

		It is recommended when battery power is in use.
	Fast	Power Save Mode (Fast PSP) switches between the two modes described above, depending on network traffic. This mode switches to CAM when retrieving a large number of packets and switches back to PSP (= PS-Poll Procedure) after the packets have been retrieved. It is recommended when power consumption is a concern but you need greater throughput than that allowed by Max PSP.
	▸ Default: Fast	
Tx Power	Transmit power that can be overridden by Cisco AP if CCX global setting is ON and AP defines maximum transmit power for client as lower value ▸ Value: Maximum (Maximum power defined for the current regulatory domain) or the specified value in milliwatts (50, 30, 20, 10, 5, 1) ▸ Default: Maximum	
Bit Rate	Bit rate used by the radio when interacting with AP; however, if a specified bit rate is selected, the radio will not connect to an AP unless the specified SSID is configured for only the selected bit rate. ▸ Value: Auto (rate negotiated automatically with AP) or the specified value in megabits per second (1, 2, 5.5, 6, 9, 11, 12, 18, 24, 36, 48, 54) ▸ Default: Auto	
Radio Mode	Use of 802.11b and/or 802.11g when interacting with AP ▸ Value: B rates only, BG rates full, G rates only, BG subset, Ad Hoc ▸ Default: BG rates full	
Auth Type	802.11 authentication type used when associating to AP ▸ Value: Open, Shared (shared-key), LEAP (Network-EAP) ▸ Default: Open	

Encryption & WEP keys/PSKs

Type of encryption (and decryption) used to protect transmitted data

▸ Value:

None	No encryption
WEP	WEP with up to four static keys, 40-bit or 128-bit in ASCII or hex
WEP EAP	WEP with key generated during EAP authentication
CKIP	WEP with up to four static keys, 40-bit or 128-bit in ASCII or hex, plus Cisco TKIP and/or Cisco MIC if configured on AP
CKIP EAP	WEP with key generated during EAP authentication, plus Cisco TKIP and/or Cisco MIC if configured on AP
WPA-PSK	TKIP with PSK, ASCII passphrase or hex PSK
WPA TKIP	TKIP with key generated during EAP authentication
WPA CCKM	TKIP with key generated during EAP authentication and with Cisco key management protocol for fast re-authentication

WPA2-PSK	AES with PSK, ASCII passphrase or hex PSK
WPA2 AES	AES with key generated during EAP authentication
WPA2 CCKM	AES with key generated during EAP authentication and with Cisco key management protocol for fast re-authentication

▶ Default: None

EAP Type & Credentials

Extensible Authentication Protocol type used for 802.1X authentication to AP

▶ Value:

None	
LEAP	Credentials values for LEAP ▶ User: Username or Domain\Username (up to 64 characters) ▶ Password (up to 32 characters)
EAP-FAST	Credentials values for EAP-FAST ▶ User: Username or Domain\Username (up to 64 characters) ▶ Password (up to 32 characters) ▶ PAC Filename (up to 32 characters) ▶ PAC Password (up to 32 characters)
PEAP-MSCHAP PEAP-GTC EAP-TTLS PEAP-TLS	Credentials values for PEAP-MSCHAP, PEAP-GTC, EAP-TTLS, PEAP-TLS ▶ User: Username or Domain\Username (up to 64 characters) ▶ Password (up to 32 characters) ▶ CA Cert: Filename of root certificate authority (CA) digital certificate (up to 32 characters); leave blank if the "Use MS store" checkbox is selected. ▶ "Validate server" checkbox: Select this if using a CA certificate to validate an authenticate server. When selected, enter a certificate filename in the CA Cert field or select the "Use MS store" checkbox. ▶ "Use MS store" checkbox: Select this if the Microsoft certificate store should be used for a CA certificate. This is applicable only when "Validate server" is in use.
EAP-TLS	Credentials values for EAP-TLS ▶ User: Username or Domain\Username (up to 64 characters) ▶ User Cert: Tap the […] button to select a user (or client) certificate from the Microsoft certificate store. You may not enter a filename because the user certificate must reside in the Microsoft certificate store. When you browse for a certificate, the pop-up box shows two fields, "Issued By" and "Issued to". ▶ CA Cert: Filename of root certificate authority (CA) digital certificate (up to 32 characters); leave blank if the "Use MS store" checkbox is selected. ▶ "Validate server" checkbox: Select this if using a CA certificate to validate an authenticate server. When selected, enter a certificate filename in the CA Cert field or select the "Use MS store" checkbox. ▶ "Use MS store" checkbox: Select this if the Microsoft certificate store should be used for a CA certificate. This is applicable only when

		"Validate server" is in use.
▶ Default: None for both EAP type and credentials		

4.2.3 CONNECTION STATUS

View status of the current wireless network connection, information on the access point and the connection established between the two.
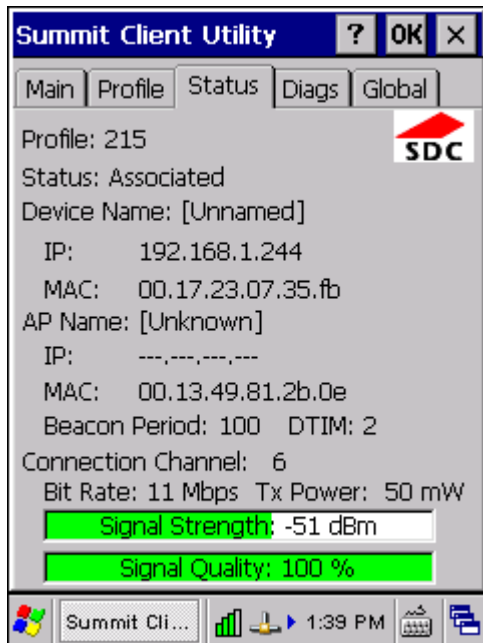
Profile

Name of Active Profile

Status

Potential values are
- ▶ Down: not recognized
- ▶ Disabled
- ▶ Not Associated
- ▶ Associated
- ▶ (EAP type) Authenticated

Device Name, IP, MAC

Information on the mobile computer
- ▶ Device Name is displayed only when Client Name is specified by editing a profile

AP Name, IP, MAC, Beacon Period

Information on the access point to which the radio is associated
- ▶ AP Name and IP may not be displayed if not supported by AP
- ▶ Beacon Period: Amount of time between access point beacons in kilomicroseconds, where one Kμsec equals 1024 microseconds.
- ▶ DTIM: A multiple of the beacon period that specifies how often the beacon contains a delivery traffic indication message (DTIM), which tells power-save client devices that a packet is waiting for them (e.g. a DTIM interval of 3 means that every third beacon contains a DTIM).

Connection Channel, Bit Rate, Tx Power, Signal Strength, Signal Quality

Information on the wireless connection between the radio and access point, including graphic indication of signal strength and quality.

4.2.4 DIAGNOSTICS

Perform troubleshooting and diagnostic tests if necessary.

(Re)connect

Disable and enable the radio, apply or re-apply the current profile, attempt to associate and authenticate to the wireless network, and log all activity in the output area at the bottom.

Release/Renew

Obtain a new IP address through DHCP release/renew, and log all activity in the output area at the bottom.
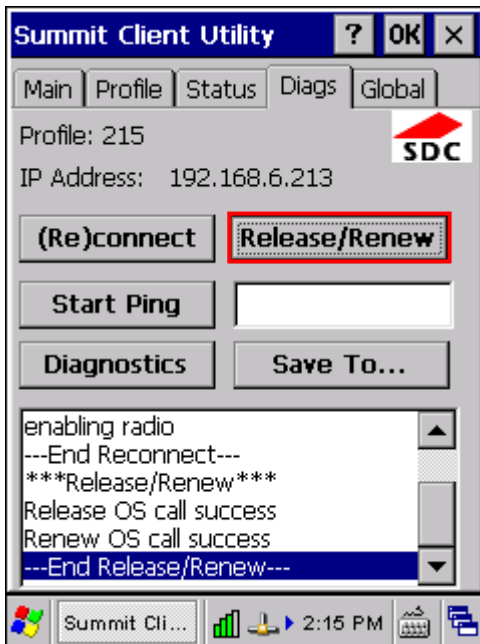
Start Ping

Start a continuous ping to the address in the edit box next to the button. Once the button is tapped, its name and function will change to [Stop Ping]. Pings will continue until you tap the [Stop Ping] button, move to an SCU window other than Diags or Status, exit SCU, or remove the radio. Also, it logs all activity in the output area at the bottom.
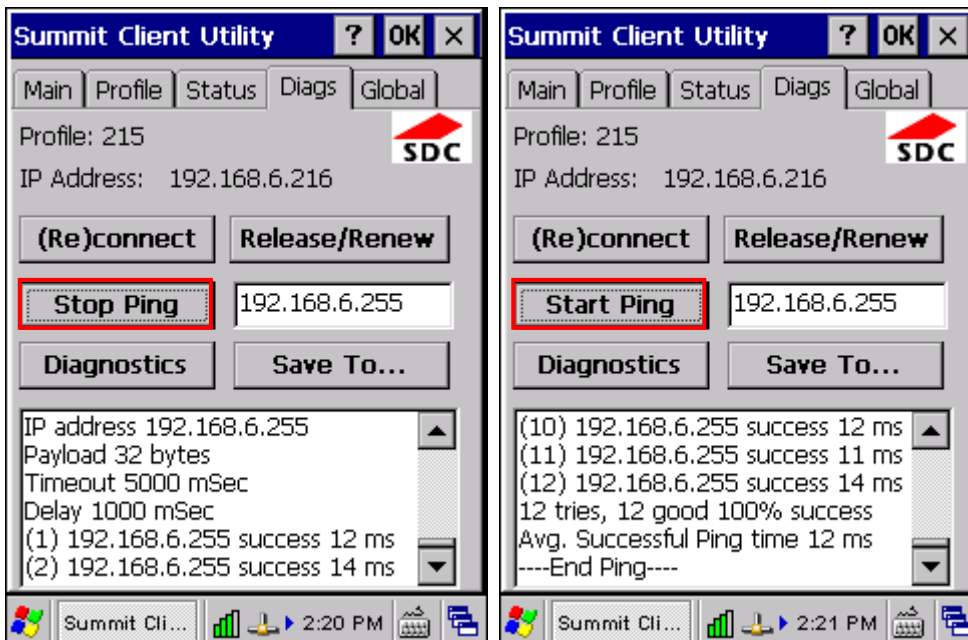
When a ping initiated on the Diags window is active, the Status window displays a ping indicator consisting of two "lights" that take turns to show green (for a successful ping) or red (for an

unsuccessful ping).

Ping Status
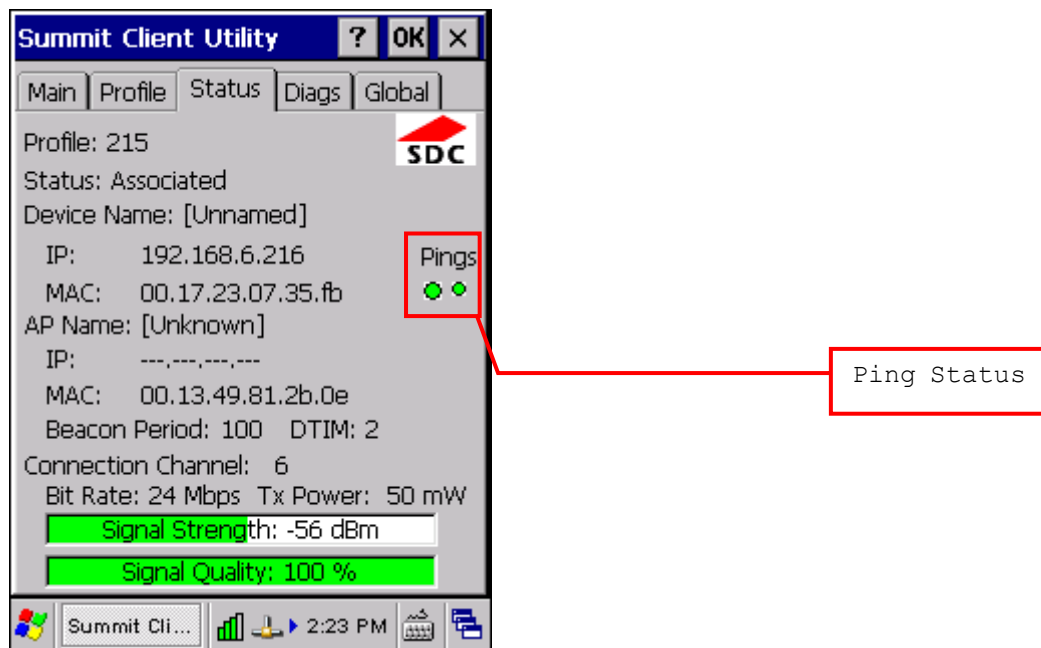
Diagnostics

Attempt to (re)connect to an access point, and provide a more thorough dump of data then is obtained with (Re)connect. The dump will include radio state, profile settings, global settings, and a BSSID list of APs in the area.
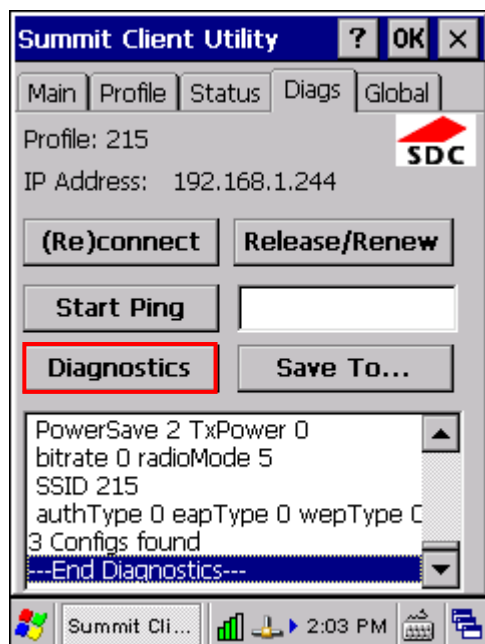
Save to

Save the diagnostics output to a file.

▸ By default, the file name is "sdc_diags.txt".

4.2.5 GLOBAL SETTINGS

Global settings include radio and security settings that apply to all profiles and settings that apply to SCU itself.

Property	Value
Roam Trigger	When the moving average RSSI from the current AP is weaker than Roam Trigger, radio does a roam scan where it probes for an AP with a signal that is at least Roam Delta dBm stronger — ▶ Value: -50, -55, -60, -65, -70, -75, -80, -85, -90 ▶ Default: -70 dBm
Roam Delta	When Roam Trigger is met, a second AP's signal strength (RSSI) must be Roam Delta dBm stronger than the moving average RSSI for the current AP before radio will attempt to roam to the second AP — ▶ Value: 5, 10, 15, 20, 25, 30, 35 ▶ Default: 10 dBm
Roam Period	After association or roam scan (with no roam), radio will collect RSSI scan data from Roam Period seconds before considering roaming — ▶ Value: 5, 10, 15, 20, 25, 30, 35, 40, 45, 50, 55, 60 ▶ Default: 10 (seconds)
BG Channel Set	Defines the 2.4 GHz channels to be scanned when the radio is contemplating a roam and needs to determine what APs are available. ▶ Value: <table><tr><td>Full</td><td>All channels</td></tr><tr><td>1, 6, 11</td><td>The most commonly used 2.4 GHz channels</td></tr><tr><td>1, 7, 13</td><td>For ETSI and TELEC radios only</td></tr></table>

	▶ Default: Full
DFS Channels	N/A
Ad Hoc Channel	The channel to be used for an ad hoc connection if the active profile has a Radio Mode value of "Ad Hoc" — ▶ Value: 	1~14	One of the 2.4 GHz channels	 	36, 40, 44, 48	UNII-1 channels	 ▶ Default: 1
Aggressive Scan	Aggressive scanning complements and works in conjunction with the standard scanning that is configured through the Roam Trigger, Roam Delta, and Roam Period settings. It is recommended that aggressive scanning is enabled unless there is significant co-channel interference because of overlapping coverage from APs that are on the same channel. ▶ Value: On, Off ▶ Default: On
CCX features	Whether to allow the use of three CCX features (AP-assisted roaming, AP-specified maximum transmit power, and radio management) — ▶ Value: Optimized, Full, Off ▶ Default: Optimized
WMM	Whether to allow the use of Wi-Fi Multimedia Extensions (WME) or not — ▶ Value: On, Off ▶ Default: Off
Auth Server	Type of authentication server being used for EAP authentication — ▶ Value: 	Type 1	Cisco Secure ACS or another server that uses PEAPv1 for PEAP with EAP-MSCHAPV2 (PEAP-MSCHAP)	 	Type 2	A different authentication server, such as Juniper Networks Steel Belted RADIUS, that uses PEAPv0 for PEAP-MSCHAP	 ▶ Default: Type 1
TTLS Inner Method	Authentication method used within secure tunnel created by EAP-TTLS — ▶ Value: 	Auto-EAP	Any available EAP method	 	MSCHAPV2		 	MSCHAP		 	PAP		 	CHAP		 	EAP-MSCHAPV2		 ▶ Default: Auto-EAP
PMK Caching	When WPA2 is in use, type of Pairwise Master Key (PMK) caching to use (alternative to WPA2 CCKM) —

	▶ Value: Standard or OPMK (opportunistic PMK) ▶ Default: Standard
TX Diversity	How to handle antenna diversity when transmitting data to AP — ▶ Value: <table><tr><td>Main Only</td><td>Use main antenna only</td></tr><tr><td>Aux Only</td><td>Use auxiliary antenna only</td></tr><tr><td>On</td><td>Use diversity</td></tr></table>▶ Default: On
RX Diversity	How to handle antenna diversity when receiving data from AP — ▶ Value: <table><tr><td>Main Only</td><td>Use main antenna only</td></tr><tr><td>Aux Only</td><td>Use auxiliary antenna only</td></tr><tr><td>On-start on Main</td><td>On startup, use main antenna</td></tr><tr><td>On-start on Aux</td><td>On startup, use auxiliary antenna</td></tr></table>▶ Default: On-start on Main
Frag Thresh	If packet size exceeds threshold, then it is fragmented — ▶ Value: 256 ~ 2346 ▶ Default: 2346 (bytes)
RTS Thresh	Packet size above which RTS/CTS is required on link — ▶ Value: 0 ~ 2347 ▶ Default: 2347 (bytes)
LED	N/A
Tray Icon	Whether to enable the system tray icon or not — ▶ Value: On, Off ▶ Default: On
Hide Passwords	Whether to hide the passwords and other sensitive information, such as WEP keys, in SCU as well as EAP authentication dialog boxes — ▶ Value: On, Off ▶ Default: Off
Admin Password	N/A
Auth Timeout (s)	Specifies how long it will wait for an EAP authentication request to succeed or fail. If authentication credentials are specified in the active profile and the authentication times out, then association will fail. If authentication credentials are not specified in the active profile and the authentication times out, then the user will be required to enter credentials again. ▶ Value: 3 ~ 60 ▶ Default: 8 (seconds)
Certs path	File path where the certificate for EAP authentication is stored — ▶ Value: A valid directory path of up to 64 characters ▶ Default: Depends on device

Ping Payload	The amount of data to be transmitted on a ping —
	‣ Value: 32, 64, 128, 256, 512, 1024
	‣ Default: 32 (bytes)
Ping Timeout (ms)	The amount of time that elapses without a response before ping request is considered a failure —
	‣ Value: 0 ~ 30000
	‣ Default: 5000 (milliseconds)
Ping Delay (ms)	The amount of time that elapses between successive ping requests —
	‣ Value: 0 ~ 7200000
	‣ Default: 1000 (milliseconds)

Note: SCU stores values in the registry. The purpose of "Custom" is to prevent SCU from overriding a change to the registry that was made manually. Selecting "Custom" has no real effect!
(1) If SCU displays a value of "Custom" for a global setting, then the operating system registry has been edited to include a value that is not available for selection on the Global window.
(2) If SCU displays a value other than "Custom" and you select the value of "Custom" and tap [Commit], then SCU reverts to the value that is displayed before you selected "Custom".

4.2.6 SUMMIT SYSTEM TRAY ICON

The Summit system tray icon provides a visual status for the radio and enables the user to launch **Summit Client Utility** by double-tapping the icon. It is only available when all of the following is true:

‣ A Summit radio is present.

‣ The power to the radio is turned on through **Power Management**.

‣ Windows Zero Config (WZC) is NOT active.

‣ The global setting of the SCU Tray Icon is turned ON (the default setting).

Icon	Indication
	The radio is not associated or authenticated to an access point (AP).
	The signal strength (RSSI) for the current AP (to which the radio is associated) is -90 dBm or weaker.
	The RSSI for the current AP is stronger than -90 dBm but not stronger than -70 dBm.
	The RSSI for the current AP is stronger than -70 dBm but not stronger than -50 dBm.
	The RSSI for the current AP is stronger than -50 dBm.

USING BLUETOOTH

9600 Mobile Computer lets you configure Bluetooth settings and manage Bluetooth services provided on the remote devices.

IN THIS CHAPTER

5.1 TURN ON BT POWER

1) Tap the icon on the taskbar to access **Power Management**.
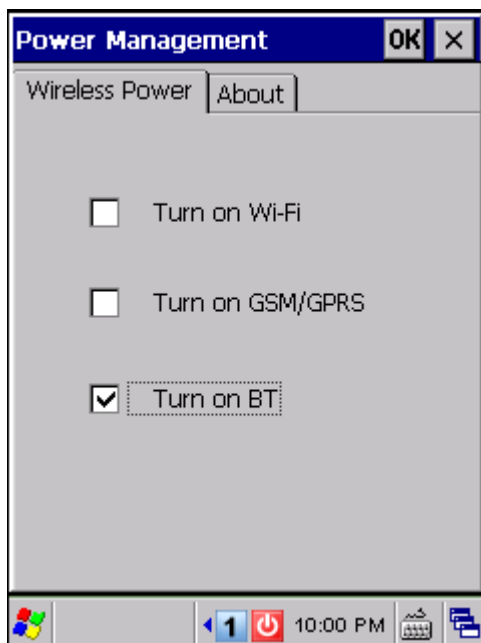
2) Select [Turn on BT] and tap .

3) It takes several seconds to launch **BT-Connect** and enable Bluetooth services. The associated icon will appear on the taskbar. Meanwhile, the LED on the mobile computer will turn blue and flash slowly.

Note: (1) Bluetooth power is maintained even in suspend mode.
(2) Because the settings in **Power Management** will be kept after warm or cold boot, it will resume to last wireless power status after the power cycle.

4) Tap the icon to access the menu that allows you to maximize **BT-Connect**. Refer to 5.9 BT Manager to change the initial settings.
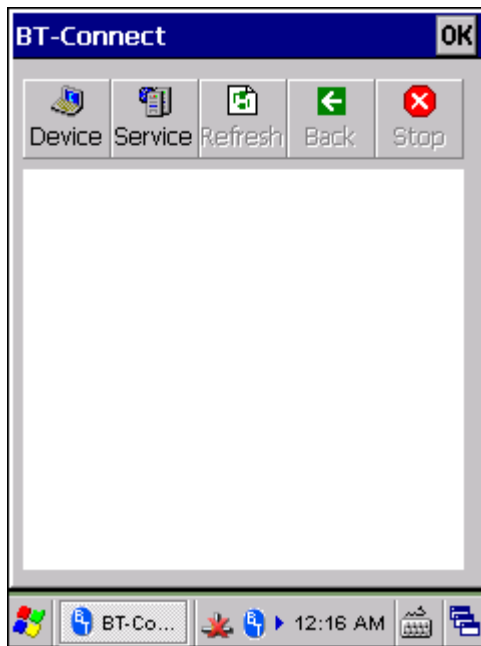
5) To stop Bluetooth connection and exit **BT-Connect**, turn off BT power through **Power Management**. The LED on the mobile computer will go off.

5.1.1 BLUETOOTH PROFILES SUPPORTED

Bluetooth Profiles Supported

Serial Port Profile	(SPP)	supports Server/Client
Object Push Profile	(OPP)	supports Server/Client
File Transfer Profile	(FTP)	supports Server/Client
Dial-Up Networking Profile	(DUN)	supports Client only
Personal Area Networking Profile	(PAN)	
Human Interface Device Profile	(HID)	supports keyboard and mouse without cursor
Headset Profile	(HSP)	
Hands-Free Profile	(HFP)	

Note: For Serial Port Profile, Server/Client connection is allowed one at a time. Yet, you may have COM 7 released for programming. Refer to 3.3 System Settings – Com Port Mapping.

5.1.2 BLUETOOTH TOOLBAR

Buttons	Description
Device	Tap this button to view Bluetooth devices discovered during this session. If you tap the button for the first time, it will start the inquiry process to discover nearby Bluetooth devices.
Service	Tap this button to view Bluetooth services provided on 9600. ▸ By default, File Transfer and Object Push services are made available, and therefore, displayed along with a green indicator. ▸ To change properties of a service, tap and hold it to select [Change Local Path] from the pop-up menu. <table><tr><th>Local Path</th><th>Bluetooth Service on 9600</th></tr><tr><td>\Temp</td><td>File Transfer</td></tr><tr><td>\My Documents</td><td>Object Push</td></tr></table>
Stop	Tap this button to stop inquiring, disconnect connection(s) or unload service(s).
Refresh	Tap this button to refresh the device list or Bluetooth services provided on the remove device once a connection has bees established successfully.
Back	Tap this button to restore the previous window.

5.1.3 SET DISCOVERABLE

1) Tap the icon [icon] and select [Setting] from the pop-up menu to set your device discoverable.
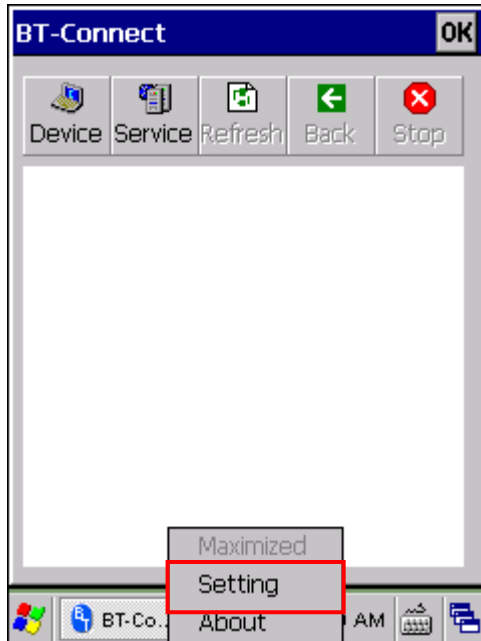
2) Cancel the check box if you want to hide the mobile computer from other Bluetooth devices.
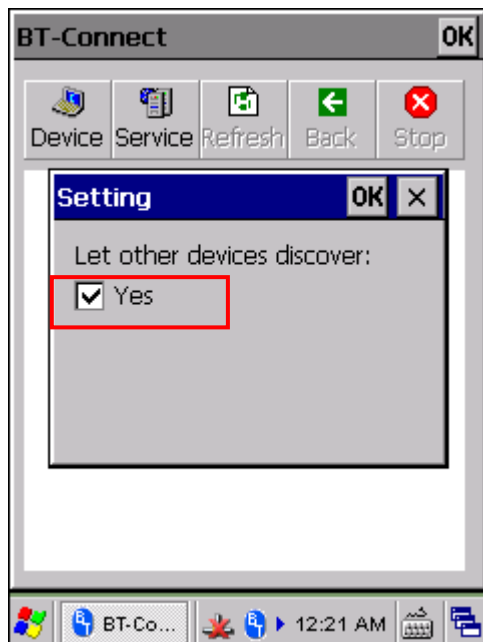
5.2 SEARCH DEVICES

1) Tap to discover nearby Bluetooth devices.
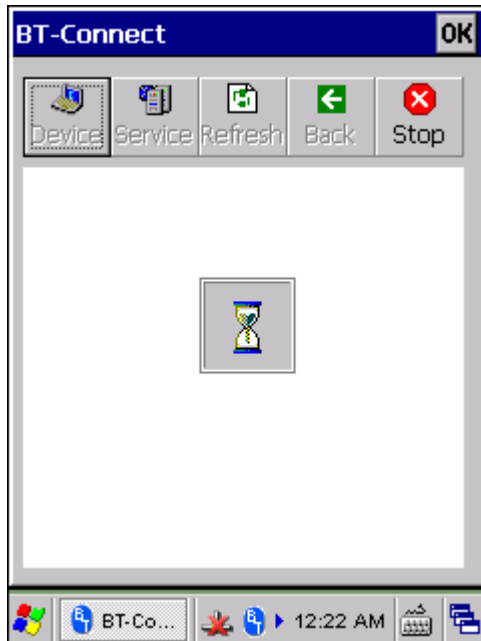
2) Wait for a few seconds, and it will list the discovered devices.
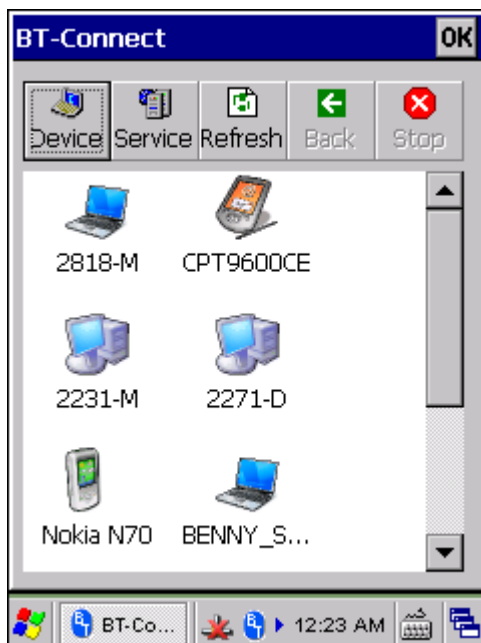
3) If you do not see the device that you want to connect to, make sure it is set discoverable.

    Tap to search again.

5.3 PAIR DEVICES

5.3.1 IDENTIFY REMOTE DEVICE

From the device list, tap and hold the desired device to select [MAC address] from the pop-up menu.
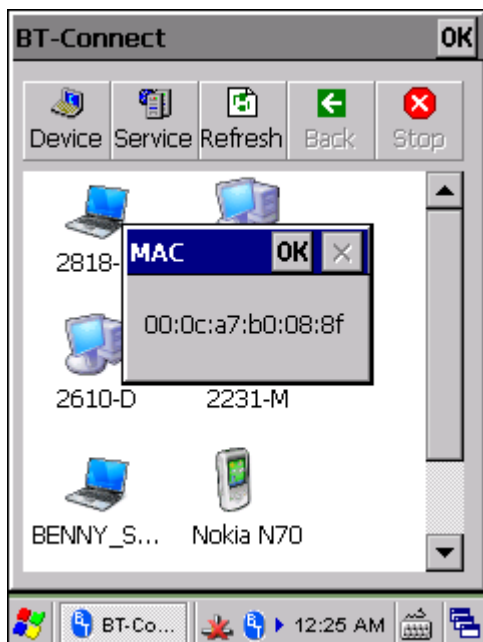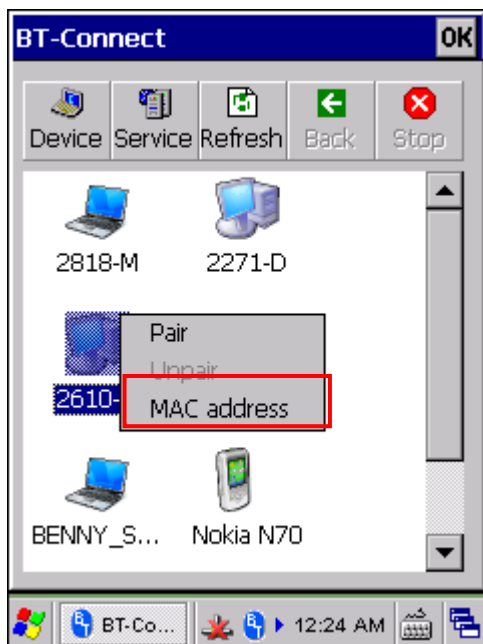
5.3.2 PAIR

When authentication is enabled on the remote device, you will have to exchange a passkey (= pair) with it before starting a connection.

1) From the device list, tap and hold the desired device to select [Pair] from the pop-up menu.
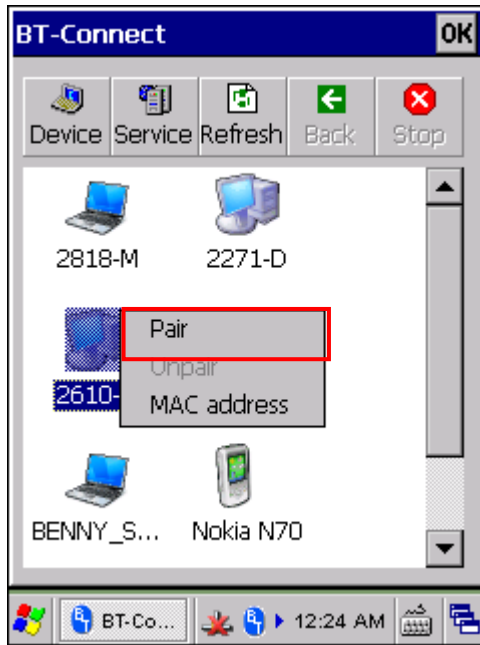
2) Enter the PIN code that is specified on the remote device.
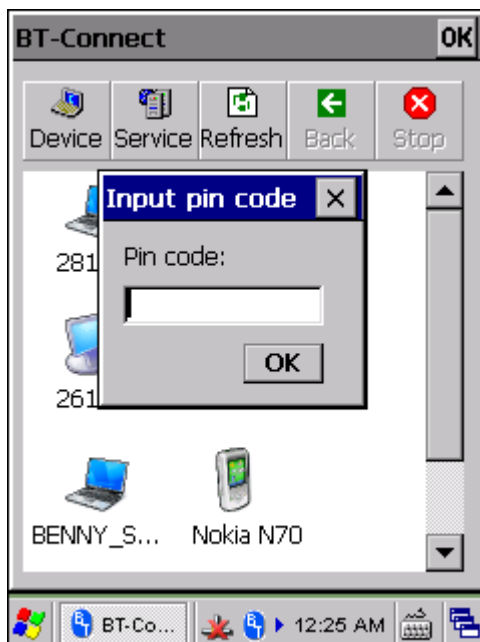
3) Once paired successfully, the paired device will be displayed along with a lock icon 🔒.
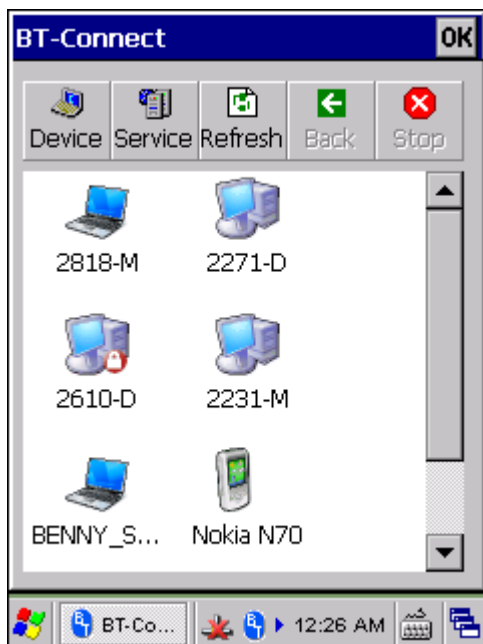
4) Double-tap the remote device to find out the available Bluetooth services.
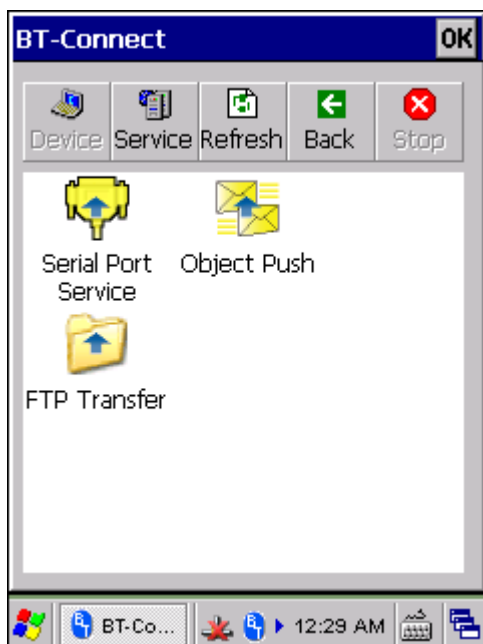
5) Tap and hold a desired Bluetooth service. Refer to the following sections:

5.4 File Transfer: Select [Open] from the pop-up menu.

5.5 Object Push: Select [Push File] from the pop-up menu.

5.6 Serial Port Service: Select [Connect] from the pop-up menu.
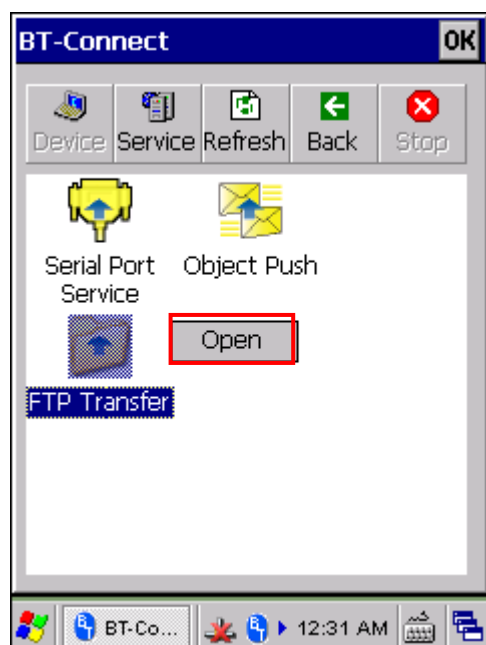
6) Once the connection has been established, the service will be displayed along with a green indicator ⊕. If a disconnection occurs on the remote device, a red indicator ⊕ will be displayed.
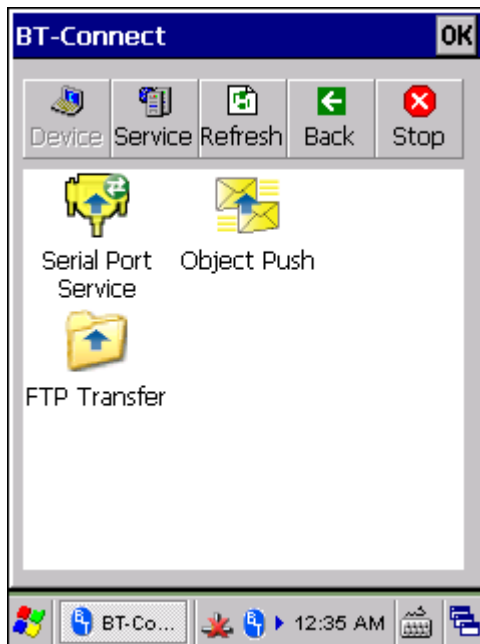
Note: The Bluetooth services that you have ever connected or disconnected will all be kept in BT Manager. Refer to 5.9.2 Preference for details.

7) To end the connection, tap and hold the connected service to select [Disconnect] from the pop-up menu. The indicator ⊕ or ⊕ will be gone, meaning a disconnection occurs on the mobile computer.
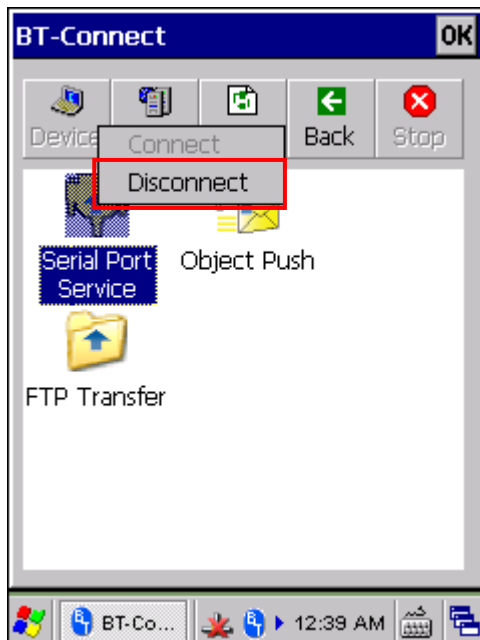
5.3.3 UNPAIR

From the device list, tap and hold the desired device to select [Unpair] from the pop-up menu.
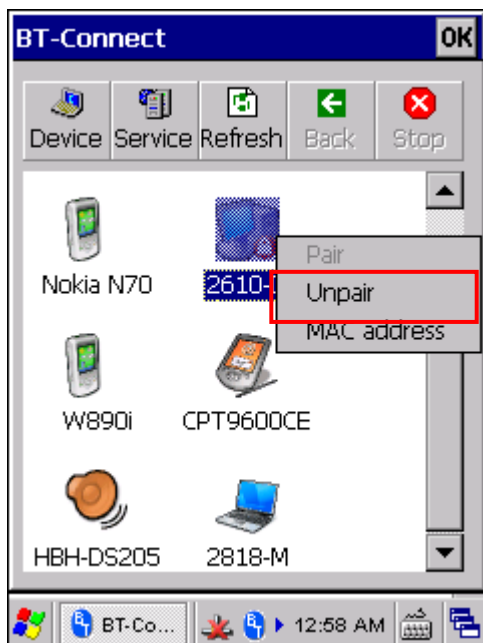
Note: The mobile computer must be unpaired on the remote device as well. For example, remove it from the device list on PC. (Both devices must be unpaired!)

5.4 FILE TRANSFER

1) Tap and hold the File Transfer service.
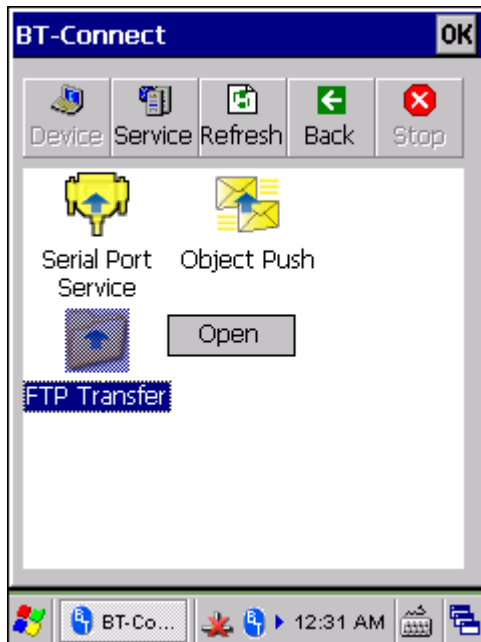
2) Select [Open].

5.4.1 UPLOAD A FILE

3) Tap and hold anywhere blank to select [Put File] from the pop-up menu.
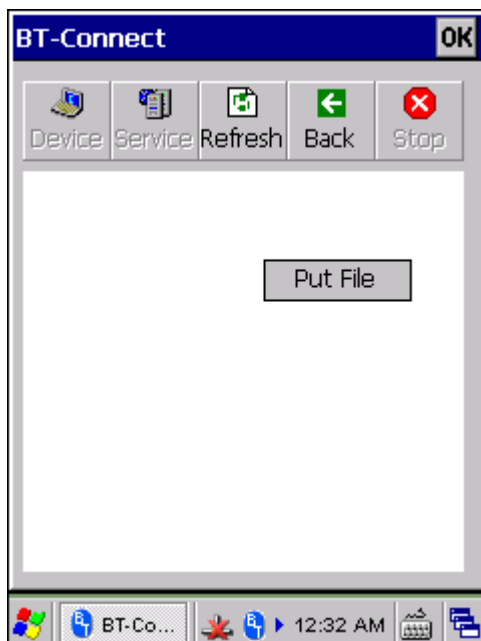
4) Choose the file you wish to upload to the remote device.
5) The mobile computer will start uploading the file to the remote device.

5.4.2 DOWNLOAD A FILE

6) Tap and hold a desired file to select [Get File] from the pop-up menu. The mobile computer will start downloading the file from the remote device.
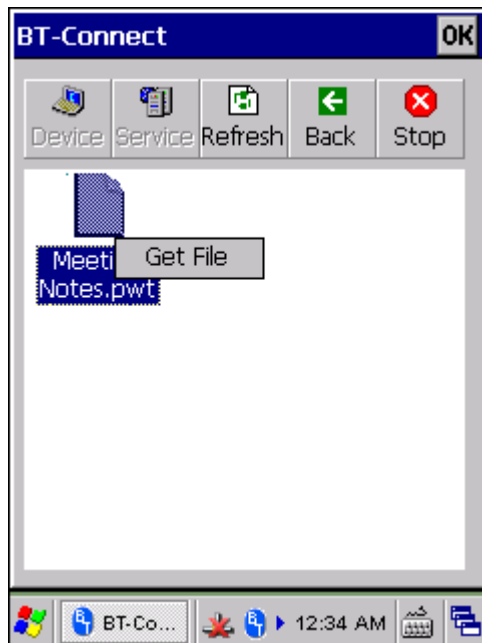
5.5 OBJECT PUSH

1) Tap and hold the Object Push service.
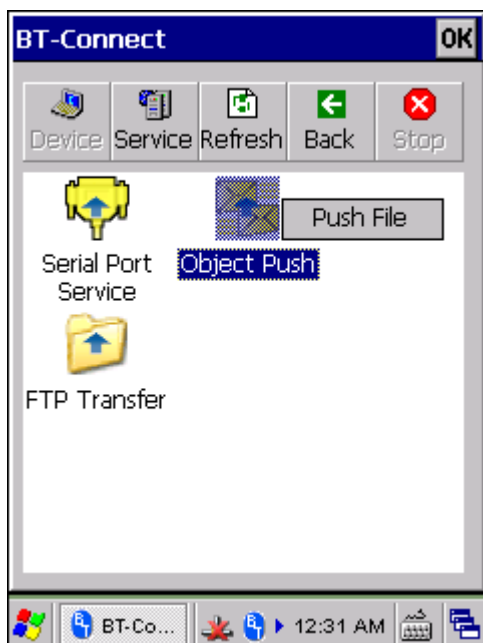
2) Select [Push file] to send a file.

3) Choose a file you wish to send.

4) The mobile computer will start sending the file.
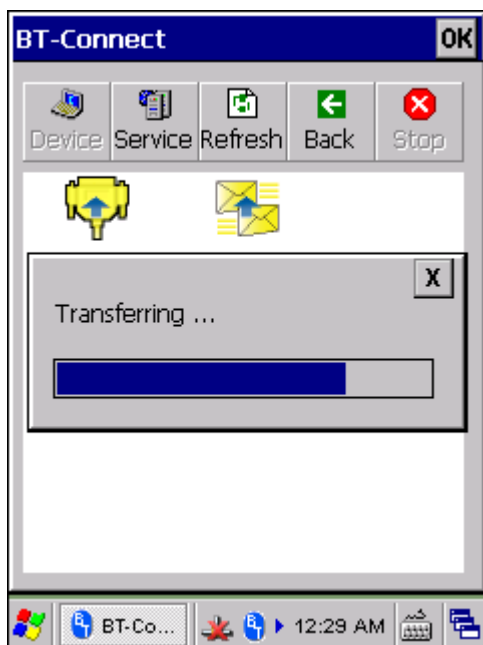
5.6 SERIAL PORT SERVICE

5.6.1 SERIAL PORT SERVICE

1) Tap and hold the Serial Port Service.
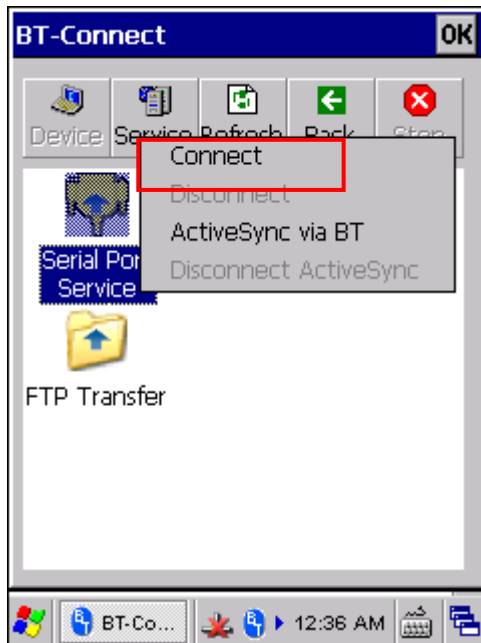
Note: **BT-Connect** allows using the virtual COM port one at a time. Outgoing port is unavailable when incoming port is in use for local SPP service. You must unload the local SPP service first. Please refer to 5.8.3 Serial Port Service.

2) Select [Connect] (and COM 6 is in use).
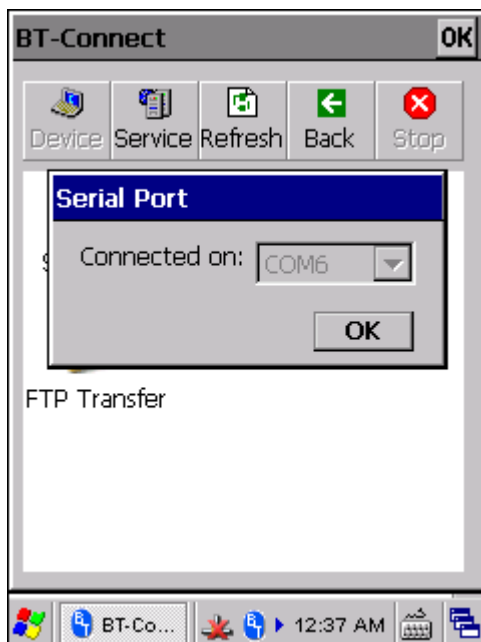
3) Once the connection has been established, the connected service will be displayed along with a green indicator 🔁.
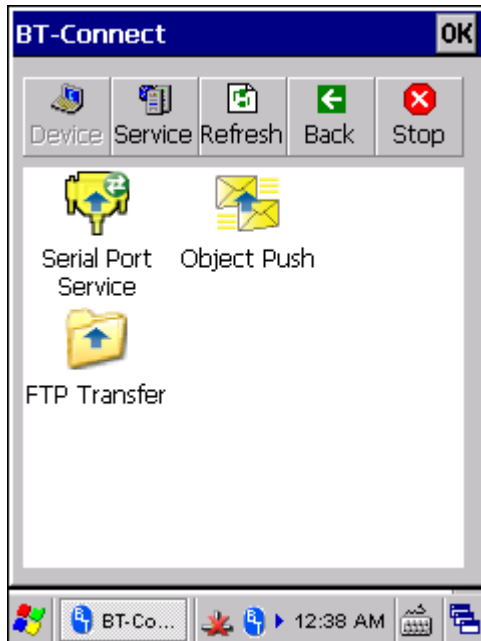
Note: The mobile computer can regularly perform an inquiry on an SPP device. For details on the associated settings, please refer to 5.9 BT Manager.

5.6.2 BLUETOOTH ACTIVESYNC

For ActiveSync via Bluetooth, you must configure Bluetooth settings correctly on your computer first.

1) Configure Bluetooth settings for your computer, such as "Turn discovery on", adding a COM port (Incoming), etc.
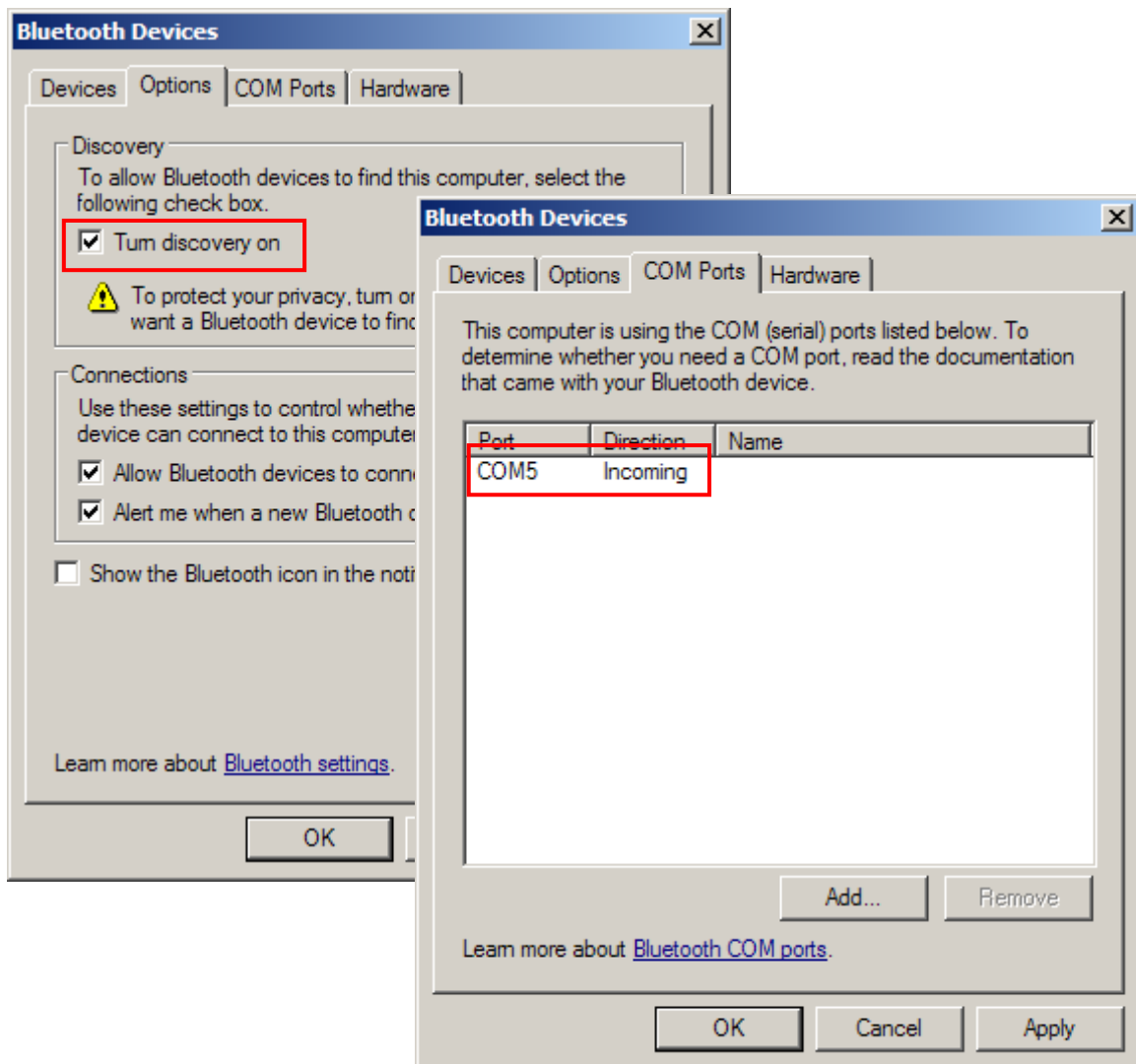
2) Allow connections to the specified COM port in ActiveSync.
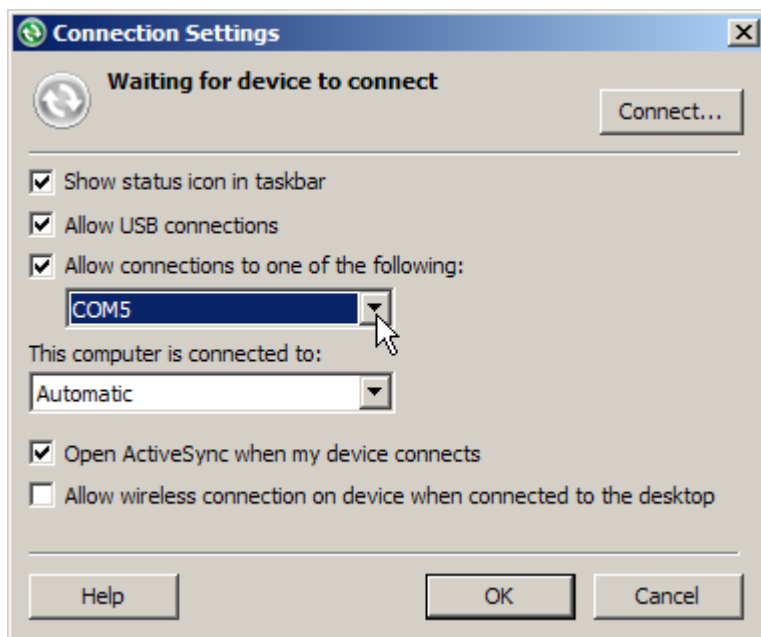
3) Connect the mobile computer to your computer.

4) On the mobile computer, tap and hold Serial Port Service to select [ActiveSync via BT] from the pop-up menu.
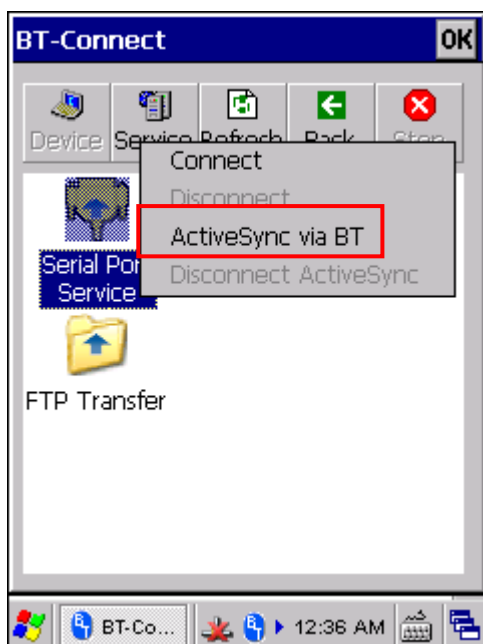
5.7 RE-CONNECT TO REMOTE SERVICES

5.7.1 PREFERRED DEVICE LIST

By default, **BT-Connect** will automatically re-connect to the last service(s) at the next power-on, and then list the preferred device(s) with service(s) kept in BT manager.

Example	Device Status	Connection Settings in BT-Manager
2610-D	The device has been paired with ( ) and at least one service has been re-connected successfully, such as Headset/Handsfree, HID, PAN, or SPP.	Last Connection = "Y" (on the Preference tab)
2818-M	The device has been paired with ( ) but with the following conditions for the remote services, such as Headset/Handsfree, HID, PAN, or SPP: (1) When Last Connection = "N", none of the services requires to be re-connected. (2) When Last Connection = "Y", it fails to re-connect.	Last Connection = "N" or "Y" (on the Preference tab)
CPT9600CE	The device is not paired, yet it has service(s) not required to exchange PIN code and not allowed to be re-connected with, such as DUN, FTP, or OPP.	Last Connection = "N" (on the Preference tab)
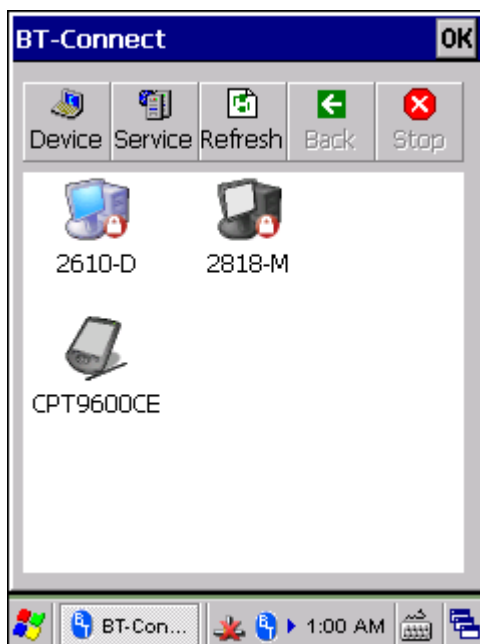
Note: (1) The remote device(s) should be ready for **BT-Connect** to re-connect to.
(2) The re-connection settings are configurable via BT manager. If you want to remove a specific device from the device list, you have to manually delete records of all its Bluetooth services kept on the Preference tab. Refer to 5.9 BT Manager.

5.7.2 PREFERRED SERVICES

Double-tap the preferred device to view the Bluetooth service(s) you have connected/ disconnected last time.

Example	Service Status	Connection Settings in BT-Manager
Serial Port Service	The service is successfully re-connected (🔁).	Last Connection = "Y" (on the Preference tab)
PAN Service	The service is unable to be re-connected with (🚫). That is, disconnection occurs on the remote device.	Last Connection = "Y" (on the Preference tab)
FTP Transfer	The service is not allowed to be re-connected with.	Last Connection = "N" (on the Preference tab)
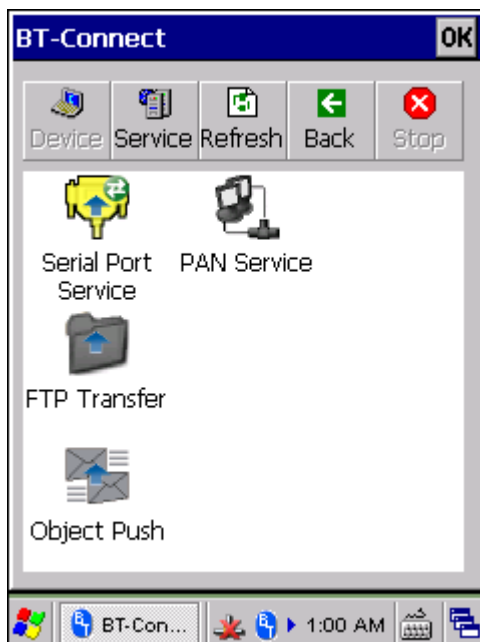
Tap and hold a preferred service and select [Disconnect] or [Connect] from the pop-up menu.

Or tap **Refresh** to find out more services belong to this device.

Note: You can select to re-connect to a specific service or services. Refer to 5.9.2 Preference to configure connection settings for the service(s).

5.8 MANAGE LOCAL SERVICES

By default, File Transfer and Object Push services are made available, and therefore, displayed along with a green indicator .
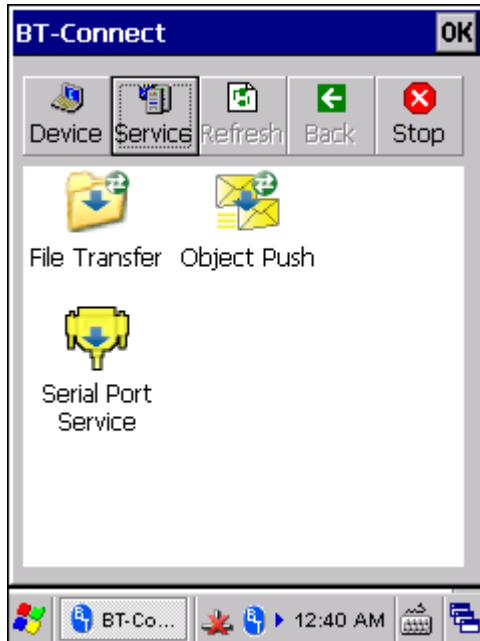
5.8.1 FILE TRANSFER

Change Local Path

You can change the FTP folder. Tap and hold it to select [Change Local Path] from the pop-up menu.
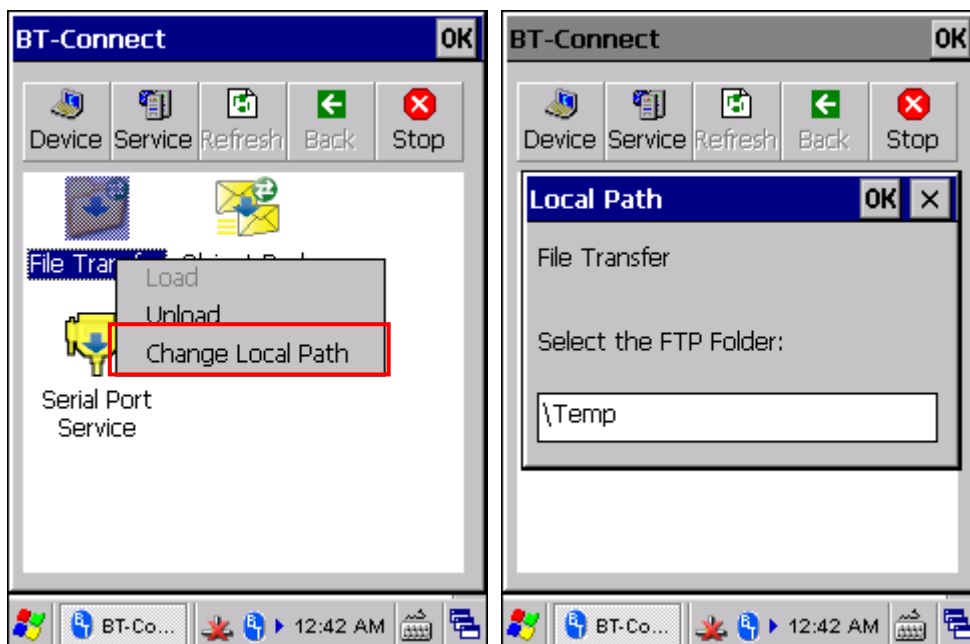
Unload/Load Service

You can unload or re-load the service. When unloaded, both the FTP and OPP services become unavailable to a remote device. If you re-load the service, both the FTP and OPP services will become available again.
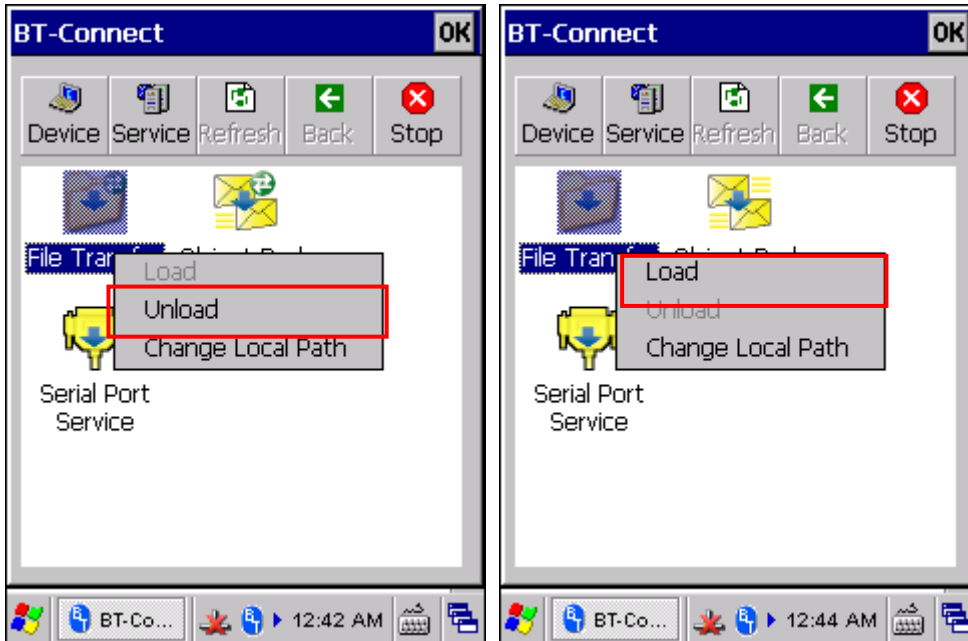
5.8.2 OBJECT PUSH

Change Local Path

You can change the exchange folder for Object Push. Tap and hold it to select [Change Local Path] from the pop-up menu.
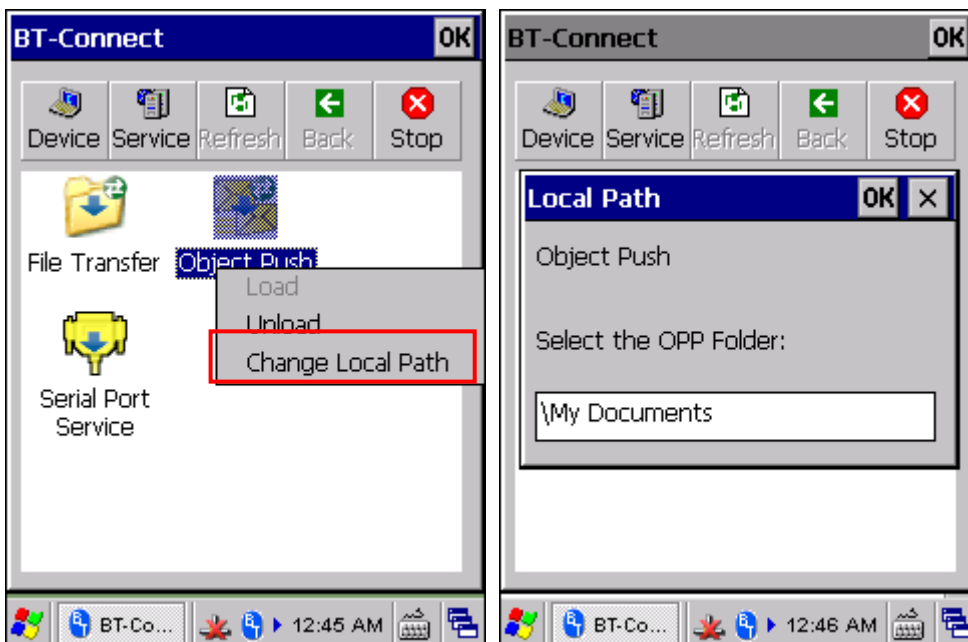
Unload/Load Service

You can unload or re-load the service. When unloaded, both the FTP and OPP services become unavailable to a remote device. If you re-load the service, both the FTP and OPP services will become available again.
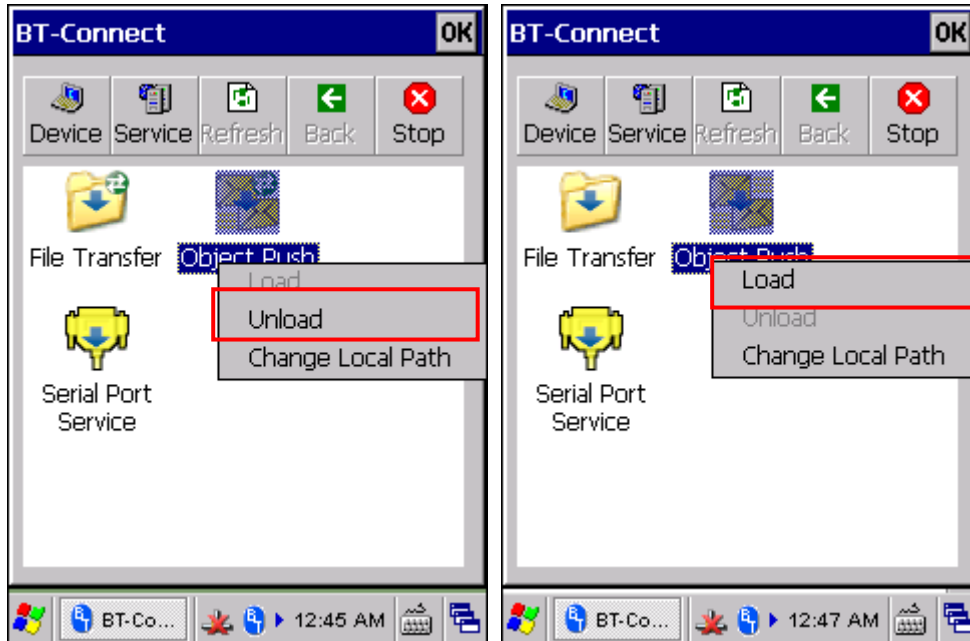
5.8.3 SERIAL PORT SERVICE

Unload/Load Service

You can unload or re-load the service. When unloaded, it becomes unavailable to a remote device.
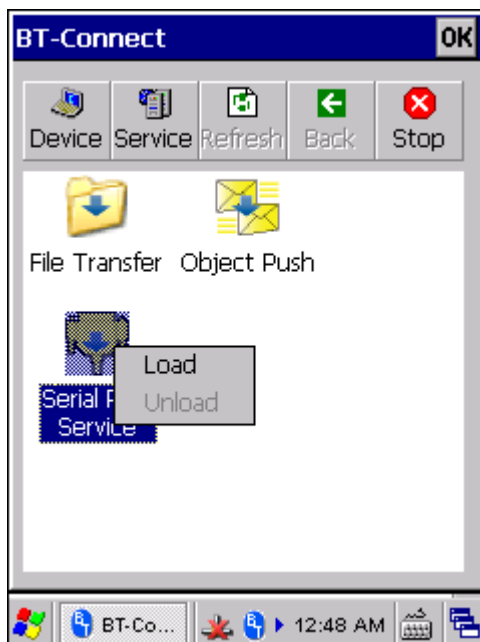
Note: **BT-Connect** allows using the virtual COM port one at a time. Incoming port is unavailable when outgoing port is in use for connecting with service. You must disconnect with service first. Please refer to 5.6.1 Serial Port Service.

5.9 BT MANAGER

Go to **Start** | **Settings** | **Control Panel** and select **BT Manager**.

Note: Make sure the BT power is turned off while configuring the following settings. All settings configured here will not take effect until the BT power is restarted through **Power Management**.

5.9.1 GENERAL SETTINGS

Decide whether to automatically re-connect to all Bluetooth services after the mobile computer resumes from warm or cold boot. Furthermore, when the mobile computer resumes from suspend mode, you can determine whether to maintain all Bluetooth connections and perform an inquiry on a remote device at a regular interval.

▶ Refer to 5.9.2 Preference to configure "Last Connection" and "Auto Inquiry" settings for a specific service.
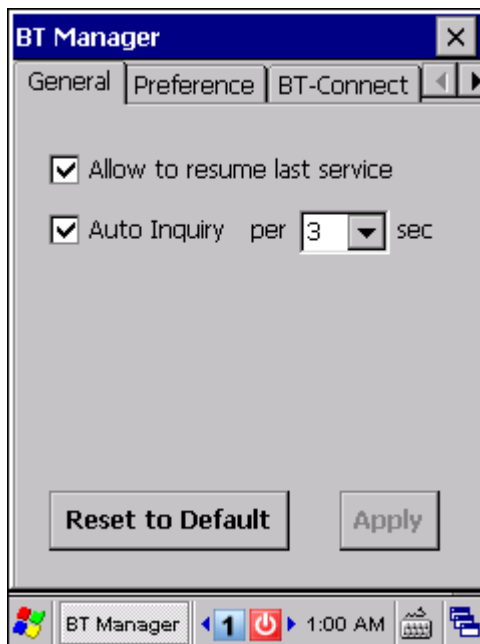
Note: To save the battery power of your mobile computer, we suggest you disable "Auto Inquiry".

Tap [Apply] to save the current settings, or tap [Reset to Default] to restore defaults.

5.9.2 PREFERENCE

BT Manager helps sort out usage preference for all remote services which are previously connected/disconnected. Select a desired service type from the drop-down menu:

- ▶ Headset/Handsfree
- ▶ HID
- ▶ PAN
- ▶ SPP
- ▶ Others – FTP, OPP, and DUN

MANAGING BLUETOOTH SERVICES

You can view Bluetooth services which belong to the selected service type in the content field, including service/device icons, device names, and default connection settings (Last Connection and Auto Inquiry).

- ▶ A colored icon indicates the service is available for use.
- ▶ A grayed icon indicates the service is currently unavailable.
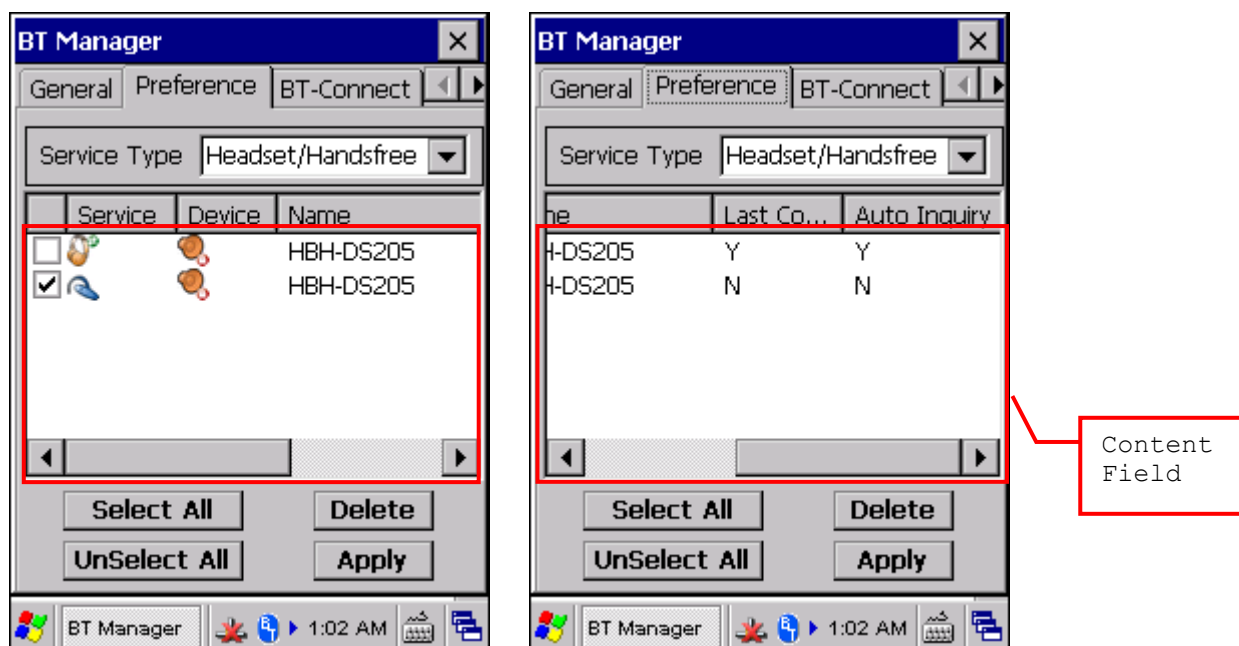
To delete an unwanted service, select the check box of the service and tap [Delete]. You may tap [Select All] or [Unselect All] to make the selection at a time.

Note: You cannot delete a service which is currently in use.

CONFIGURING CONNECTION SETTINGS

You can change the connection preference for a specific service at the next power-on. Tap [Apply] to save the current settings.

▶ For the connection settings to take effect, "Allow to resume last service" and "Auto Inquiry" must be enabled on the General tab. On the other hand, the connection settings will be ignored if the two settings are disabled on the General tab.

Options	Description
Last Connection	Decide whether to re-connect to the last service(s) when the mobile computer reboots. Configurable Bluetooth services are: ▶ Headset/Handsfree ▶ HID ▶ PAN ▶ SPP
Auto Inquiry	Based on the "Last Connection" setting, you may decide whether to detect existence of the device at a specific time interval. For Headset/Handsfree, HID, and PAN services, the value of "Auto Inquiry" will automatically follow the settings configured for "Last Connection". For SPP service, when "Last Connection" is enabled (= "Y"), the value of "Auto Inquiry" can be set to "Y" or "N". ▶ Set the interval for the mobile computer to perform an inquiry on the General tab. Refer to 5.9.1 General Settings.

Note: To save the battery power of your mobile computer, we suggest you disable "Auto Inquiry". When connecting with a printer, we suggest keeping "Auto Inquiry" disabled as well.

5.9.3 BT-CONNECT

On the BT-Connect tab, you may configure the settings for **BT-Connect**.

▶ Minimize BT-Connect: Decide whether to minimize the **BT-Connect** window when it is launched to provide Bluetooth services.

▶ Show icon on taskbar: Decide whether to show the **BT-Connect** icon on the taskbar.

Note: To be able to use the Bluetooth services at any time, we suggest keeping the icon on the taskbar for access.

▶ Enable power save: Decide whether to maintain the Bluetooth connection in a low power consumption mode until a profile becomes active. (= enter Sniff Mode).
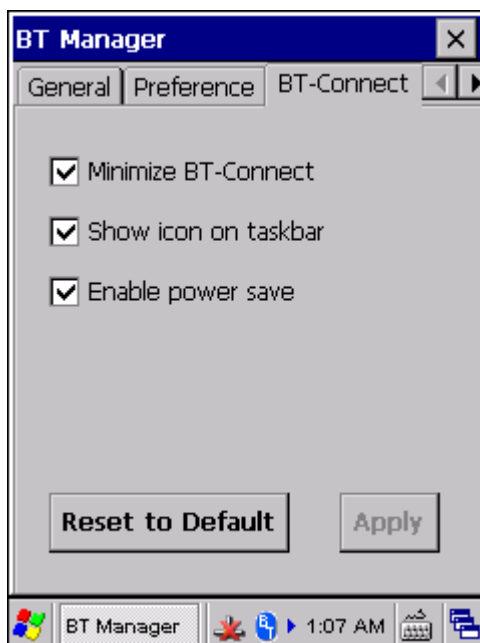
Tap [Apply] to save the current settings, or tap [Reset to Default] to restore defaults.

USING GSM/GPRS

9600 Mobile Computer allows making phone calls and connecting to network over General Packet Radio Service (GPRS). Insert SIM card before turning on the power to GSM/GPRS module. Refer to Inserting SIM Card.

Note: If the SIM card is not in position, you can only make emergency calls.

IN THIS CHAPTER

6.1 TURN ON GSM/GPRS POWER

1) Tap the icon ⏻ on the taskbar to access **Power Management**.
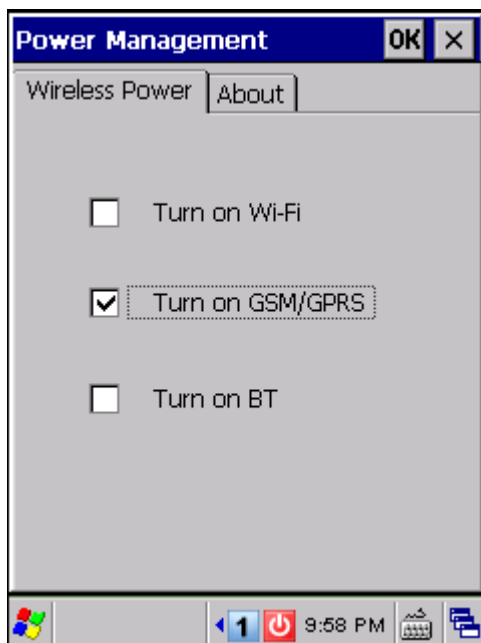
2) Select [Turn on GSM/GPRS] and tap OK.

3) When PIN verification is required on your SIM card, a message will be displayed to indicate GSM/GPRS power cannot be turned on before you entering the PIN code via **GSM/GPRS Manager**.

Tap [OK] to close this message window first. Refer to 6.4.2 Security for details.

4) It takes several seconds to turn on the power to module.

The associated GSM/GPRS icon will appear on the taskbar as shown below to indicate that GSM/GPRS power is turned on and whether GSM/GPRS service is launched successfully:

Icon	Indication
	By default, GSM/GPRS module provides access to GPRS service.
	GSM/GPRS module provides access to GSM service.

6.2 GPRS CONNECTION

6.2.1 CHECKING GPRS CONNECTION

In **GSM/GPRS Manager**, it is set to start GPRS service first by default. Upon turning on the GSM/GPRS power, it takes several seconds to launch **GSM-Connect**. GPRS connection will be established automatically if PIN verification is not required.

If PIN verification or special configuration is required for your network, refer to 6.4 GSM/GPRS Manager for advanced settings.
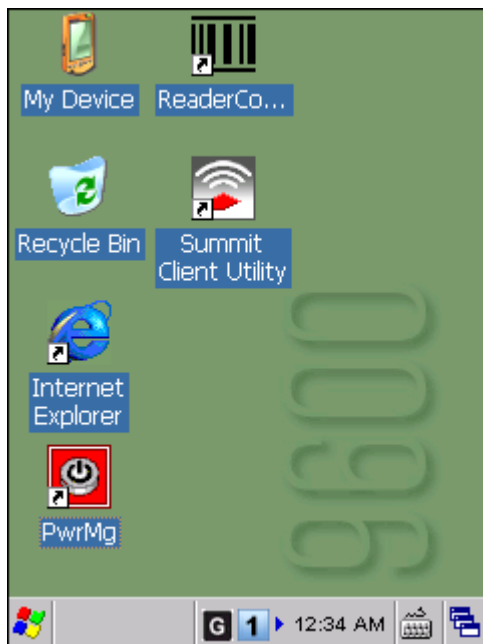
An associated icon will appear on the taskbar to indicate the GPRS connection status.

Icon	Indication
G	Initializing the GSM/GPRS module or the GPRS connection is disconnected
G	Connecting to GPRS network
G	GPRS connection has been established successfully

When the signal strength becomes too weak to maintain the GPRS connection, a warning message will be displayed.

▸ Tap **OK** to re-connect to the GPRS network.

▸ Tap **X** to turn off the power to GSM/GPRS module. Alternatively, you may turn off GSM/GPRS power through **Power Management**.

Note: (1) GSM/GPRS power is maintained even in suspend mode.
(2) Because the settings in **Power Management** will be kept after warm or cold boot, it will resume to last wireless power status after the power cycle.

6.2.2 USING GSM-CONNECT DURING A GPRS SESSION

While you are browsing the Internet or anywhere away from the **GSM-Connect** window, you may press [SEND] or [END] from the keypad to restore the minimized window from the taskbar for phone dialer application. Refer to 6.3 Phone Application.

If a phone call comes in during a GPRS session, the **GSM-Connect** window will be automatically maximized. You may tap the buttons on the screen, or press [SEND] or [END] from the keypad to answer or reject the call. Refer to 6.3.2 Buttons.

▶ Tap the icon **G** to access the menu that allows you to choose to connect/disconnect GPRS, minimize/maximize the **GSM-Connect** window or enter Message Box.
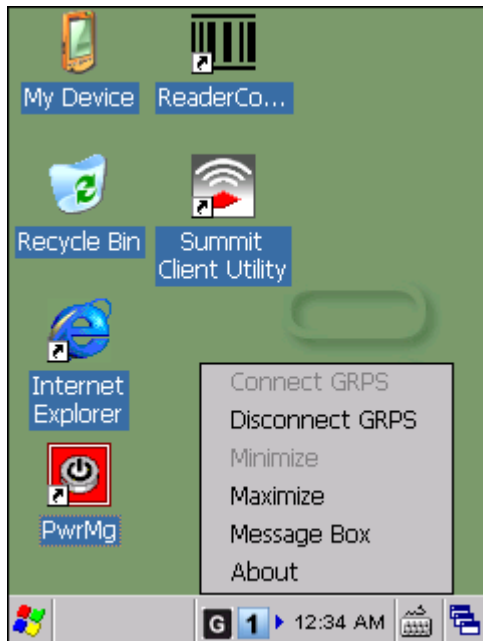
To exit the application, turn off GSM/GPRS power through **Power Management**. Alternatively, you may press [ESC] on the physical keypad and then tap [OK] to exit **GSM-Connect**.

6.3 PHONE APPLICATION

GSM-Connect is a phone dialer application that allows you to –

▶ Make or receive phone calls
▶ Manage your phone book
▶ Assign a Speed Dial number to a contact, 50 numbers are available (1~50)

Note: You are not allowed to make or receive calls via the dialer unless (1) a SIM card is present, (2) a headset is connected to the headset jack or a Bluetooth headset is ready (connected to use "Headset Service" via **BT-Connect**).

6.3.1 CHECKING GSM CONNECTION

If you want it to start GSM service first, change the basic settings in **GSM/GPRS Manager**. Refer to 6.4 GSM/GPRS Manager. Upon turning on the GSM/GPRS power, it takes several seconds to launch **GSM-Connect**.

If PIN verification is required on your SIM card, tap [OK] to close the message window and then input PIN code via **GSM/GPRS Manager**. Refer to 6.4.2 Security.

An associated icon will appear on the taskbar to indicate the GSM connection status.

Icon	Indication
	▶ Initializing the GSM/GPRS module ▶ GSM signal is too weak (one-bar) or no signal
	GSM-Connect is ready for use

Note: (1) GSM/GPRS power is maintained even in suspend mode.
(2) Because the settings in **Power Management** will be kept after warm or cold boot, it will resume to last wireless power status after the power cycle.

The display panel on top of the screen is used to show your service provider's name and the contact name or phone number when making or receiving a call.
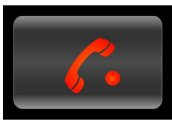
▸ Tap △ ▽ next to the display panel to browse call history, which keeps a record of the phone number that called in or out or you missed.

▸ The signal strength icon indicates whether you are connected to your service provider's network. As the strength of the signal diminishes, so will the number of bars in the icon, ranging from no signal to excellence (four-bars).

▸ You may establish a GPRS connection at the same time. However, when it is engaged with data transmission via GPRS, it is possible that incoming calls will be missed.

Tap the icon to access the menu that allows you to choose to connect/disconnect GPRS, minimize/maximize the **GSM-Connect** window or enter Message Box.
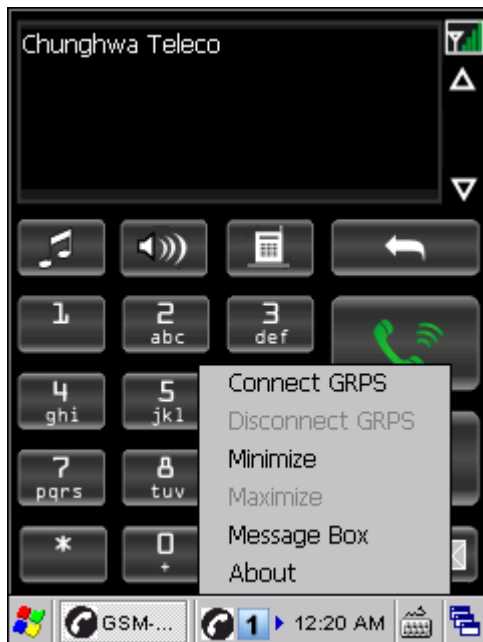
To exit the application, turn off GSM/GPRS power through **Power Management**.

Alternatively, you may press [ESC] on the physical keypad and then tap OK to exit **GSM-Connect**.

6.3.2 BUTTONS

Button	Description
	[Backspace] button allows you to delete the last input.
	Ringtone button (left) allows you to set key sound and change the ringing sound for notifying an incoming call. Tap [Browse] to select a .wav file. ▶ It will become unavailable during a call. (right)
	Speaker button allows you to quickly mute the ringtone or turn it on for incoming calls. ▶ The left one indicates the speaker is turned on. ▶ The right one indicates the speaker is muted.
	Vibrator button allows you to quickly turn on the vibrator or turn it off for incoming calls. ▶ The left one indicates the vibrator is turned off. ▶ The right one indicates the vibrator is turned on.
	[Call / Answer] button (left) allows you to make or receive a call. ▶ It will become unavailable during a call. (right) ▶ Alternatively, you may press [SEND] from the keypad.
	[End / Reject] button allows you to hang up a call. ▶ Alternatively, you may press [END] from the keypad.
	Phone Book button allows you to access your contacts stored on the SIM card. ▶ It will become unavailable during a call.
	Message Box allows you to access your messages received. ▶ It will become unavailable during a call.

Note: For adjusting the volume of the ringtone and dial tone, go to **Start** | **Settings** | **Control Panel** and select **Volume & Sounds**.

6.3.3 MAKING PHONE CALLS

You can make phone calls via the GSM connection in several ways before you tap the green [Call] button.

Dialling out

Using the dial pad on the screen or the physical keypad – simply enter the number you want to call.

From Phone Book

Browse the phone book to find the contact or number you want to call.

Using Speed Dial

Enter the speed dial number of the desired contact.

From Call History

Browse call history via the display panel to pick the number you want to call.

6.3.4 ANSWERING PHONE CALLS
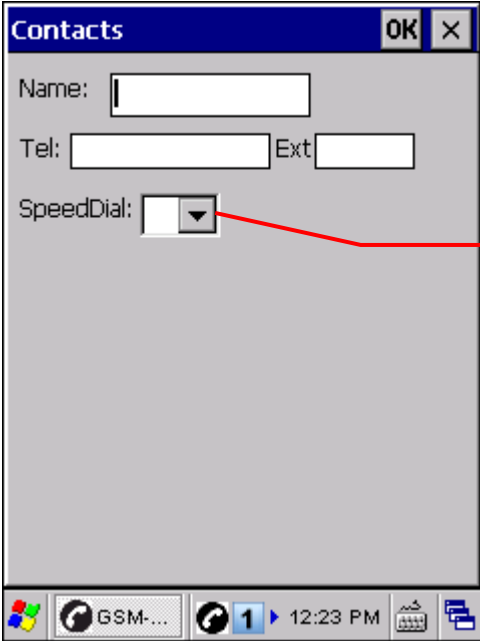
Tap [Call / Answer] to answer an incoming call, or tap [End / Reject] to reject the call and send out the busy tone.

6.3.5 CHANGING THE PHONE VOLUME AND NOTIFICATIONS

Items	Description
Dial tone	Go to **Start** | **Settings** | **Control Panel** and select **Volume & Sounds**, and adjust the volume of the headset, dial tone, and ringtone. If you want to mute the dial tone, cancel the check box of "Applications" so that sounds are disabled.
Ring tone	▶ Go to **Start** | **Settings** | **Control Panel** and select **Volume & Sounds**, and adjust the volume of the headset, dial tone, and ringtone. ▶ Normally, you will be notified of an incoming call by playing the default ringtone "ring.wav". You can change the ringtone if you like. Simply tap [icon] in the dialer. ▶ If you want to mute the ring tone, tap the Speaker button [icon] in the dialer. There will be no ring tone when it becomes [icon].
Vibrate	Whether there is ring tone or not, you can have the vibrator on for notifying an incoming call. Simply tap [icon] in the dialer, it will become [icon] indicating it is in "vibrate" mode. ▶ When you see [icon] and [icon] on the screen, the phone is in "ring & vibrate" mode. ▶ When you see [icon] and [icon] on the screen, the phone is in "vibrate" mode.

6.3.6 EDITING PHONE BOOK

The names and phone numbers stored on the SIM card can be viewed here. You can sort the Phone Book entries by tapping the heading of any column, for example, "Name". The Phone Book entries will be re-arranged by "Name" in alphabetically ascending order.

Button	Description
	Add a new contact You may assign a Speed Dial number for the numbers you call most. Up to 50 Speed Dial numbers are allowed.

![X icon]	**Delete a contact** ![Phone Book screen with Warning dialog: "Delete the selected record." (checked), "Delete all records." (unchecked), with Yes and No buttons] ▸ By default, it allows you to delete the selected record; however, you may choose to delete all records.
![Edit icon]	**Edit a contact** ▸ Select an entry and edit it, for example, change its Speed Dial number.
![Call icon]	**Call a contact** ▸ Select an entry and make a phone call.
![Message icon]	**Send a message** ![Send Messages screen with Phonebook button, text field showing "This is a short message." and a Send button]

	Import data to Phone Book
	▶ Open an existing phone book, such as "Phonebook.txt", the data will be automatically imported to the Phone Book stored on your SIM card. To ensure you are importing the correct data and avoid extra editing, we suggest you to preview the text file in Wordpad on the mobile computer.
	Save Phone Book as…
	▶ The current Phone Book in use is stored on your SIM card. You may save it as a text file, "Phonebook.txt" by default, so that you can copy it to another mobile computer and open it directly in this phone dialer application.

6.3.7 MESSAGE BOX
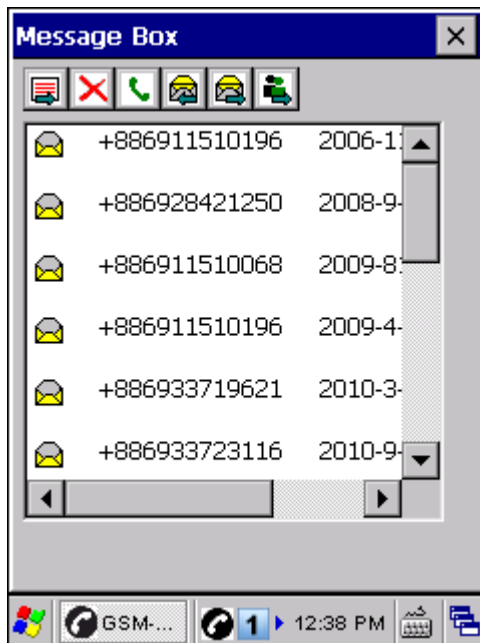
Button	Description
	Create a message
	Select a message entry and tap the [Delete] button to delete it.
	▶ By default, it allows you to delete the selected record; however, you may choose to delete all records.
	Select a message entry and tap the [Call] button to make a phone call.
	Reply
	Forward
	Save to Phone Book

6.4 GSM/GPRS MANAGER

Go to **Start** | **Settings** | **Control Panel** and double-tap **GSM/GPRS Manager**.

Note: Make sure the GSM/GPRS power is turned off while configuring the following settings. All settings configured here will not take effect until the GSM/GPRS power is restarted through **Power Management**.

6.4.1 BASIC SETTINGS

Select to use GSM or GPRS service after turning on the power to the GSM/GPRS module.

When GPRS is selected, available settings on this tab are:

Options	Description
Enable GPRS auto-connection	Decide whether to automatically maintain GPRS connection when the mobile computer resumes from suspend mode.
Retry GPRS connection	Set the number of retry attempts and interval for the mobile computer to connect to a GPRS network till successful connection.

Tap [Apply] to save the current settings, or tap [Reset to Default] to restore defaults.

CONFIGURING ADVANCED GPRS SETTINGS

If you need to change the dial-up settings, tap the [Advanced] button and configure the following items in the GPRS Properties dialog box. Tap [OK] to save the current settings.
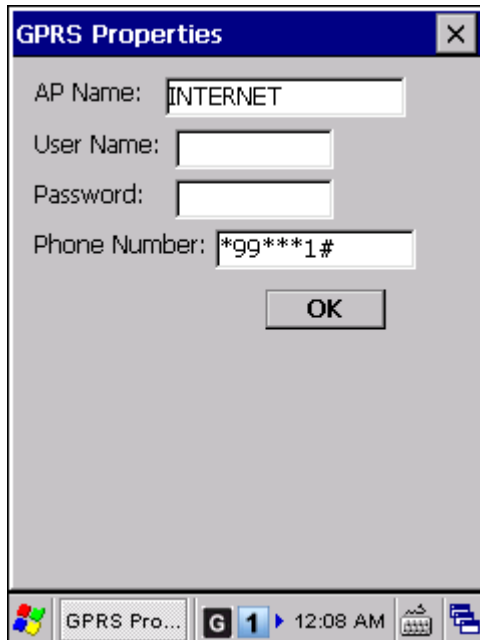
Items	Description
AP Name	Specify the GPRS AP name for the mobile computer to connect to.
User Name	Type user name to log onto a GPRS network.
Password	Type user password to log onto a GPRS network.
Phone Number	Change the dial-up phone number for GPRS connection if necessary.

Note: You must connect to the GPRS modem specified by the mobile phone operator.

6.4.2 SECURITY

This tab is only available when the power to GSM/GPRS module has been turned on. You can find out the security setting and change the PIN code on your SIM card if necessary.
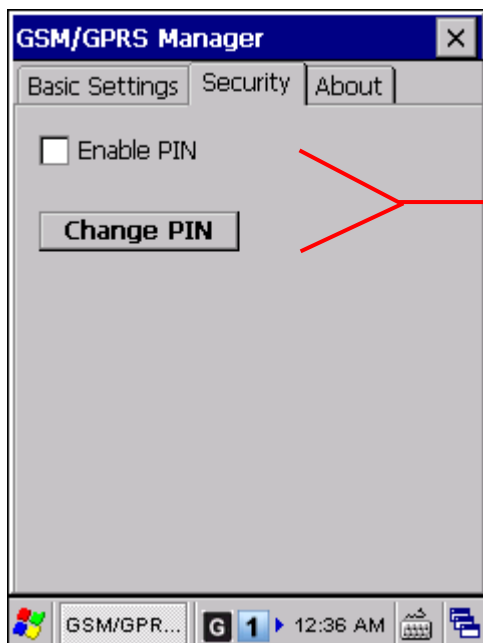
You must restart the GSM/GPRS power for the changes to take effect.

ENABLING SECURITY SETTING

You may select the check box of [Enable PIN] to enable PIN protection against unauthorized use. A dialog box will be displayed asking you to input the PIN code.
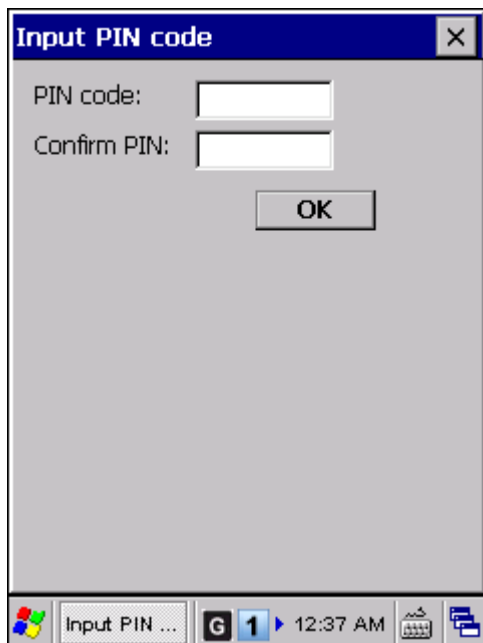
CHANGING PIN CODE

To change the PIN code on your SIM card, tap [Change PIN] and input the old and new PIN codes in the dialog box.

▶ When PIN protection is enabled and a PIN code is required to access the GSM/GPRS service, tap [Change PIN] and enter the old PIN three times to verify your PIN. If you need to change the PIN code, tap [Change PIN] again, and input the old and new PIN codes.

Note: The PIN verification on the mobile computer allows three attempts to input the correct PIN code. If you fail three times, the PIN will be blocked, and you will need to obtain the PUK code from your network operator and unblock the SIM card on your cellular phone.

USING READER CONFIGURATION UTILITY

Reader Configuration Utility is the tool that lets you manage the barcode and RFID readers integrated on the mobile computer.

Note: Before executing the utility, make sure you have closed the program ImageMaker.exe.

IN THIS CHAPTER

7.1 RUN READERCONFIG.EXE

I) Go to **Start | Programs | ReaderConfig** to open the **Reader Configuration Utility**. The associated icon will appear on the taskbar.
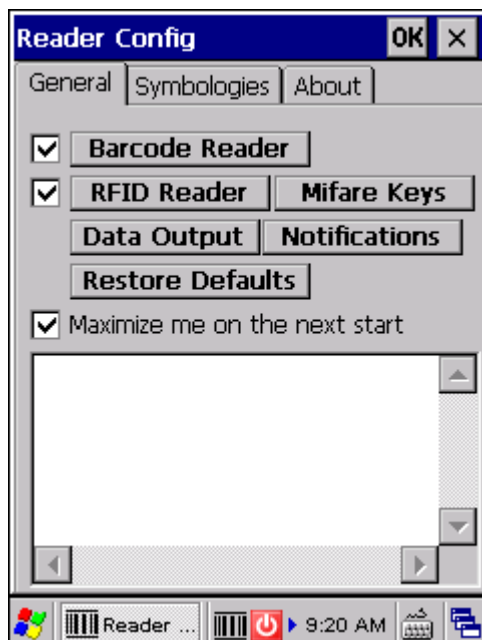
2) Tap the icon to access the menu that allows you to choose and enable one or both of the readers. There will be a check mark in front of the reader if it is enabled.

   If the RFID Reader is installed, the option will be available.
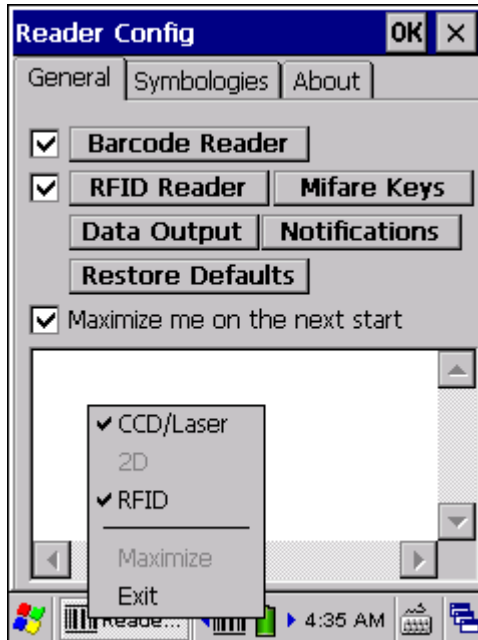
3) To meet your application requirements, proceed to configure associated reader settings as well as barcode settings.

Note: (1) The ReaderConfig.exe utility will automatically detect the reader module(s) that is currently installed in the mobile computer.
(2) If you wish to reload the default settings, delete the ReaderCfgINI.txt file in DiskOnChip before launching the program, or tap [Restore Defaults] on the General tab after launching the program.

7.2 BARCODE READER SETTINGS

The barcode reader configurations depend on the scan engine(s) installed. You can tell which reader is currently in use and make necessary changes on the General tab.
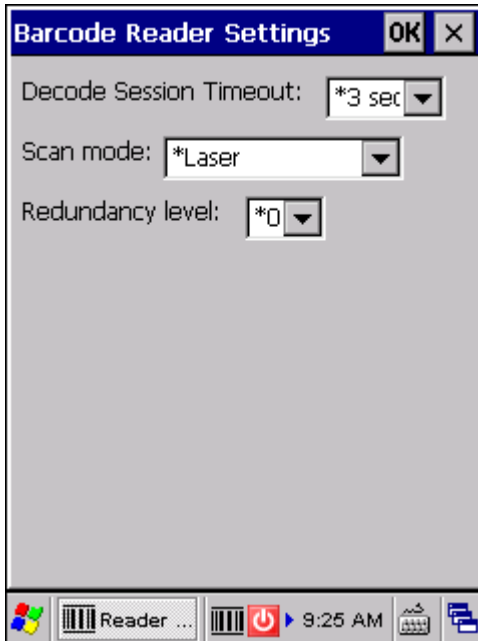
Barcode Reader	Description
CCD/Laser Reader	If installed, tap the [Barcode Reader] button to configure the reader settings for CCD or Laser scan engine.
	▶ Refer to the Reader Settings Table in Appendix II - Linear Imager (CCD), Laser (SE950).
2D Reader	The 2D scan engine is capable of reading linear and 2D barcodes.
	If installed, tap the [Barcode Reader] button to configure the reader settings for 2D scan engine.
	▶ Refer to the Reader Settings Table in Appendix III - 2D Imager.

7.3 RFID READER SETTINGS

If the RFID scan engine is present, configurable options will be displayed.

Note: Because it is possible to read barcode and RFID tag at the same time, it is recommended that only one scan engine is enabled at a time to prevent from misreading.

Some RFID tags support both read/write operations, on a page-by-page basis. You may find it necessary to define your own read/write operation. For reference only, the table below lists the start page for read/write operation on a number of RFID tags.

Start Page	Tag Type	Standard
-1	Start from byte 0 of the default page (see below) for all tags	
4	Mifare	ISO 14443A
4	SR176	ISO 14443B
3	ICODE SLI	ISO 15693
0	LRI512	ISO 15693
3	SRF55VxxP	ISO 15693
0	EM4135	ISO 15693
0	Tag-it HF-I	ISO 15693
0	Others	ISO 15693
5	ICODE	ICODE® (Phillips)
0	Tag-it	Tag-it® (TI)

Note: Please refer to the specifications of your RFID tags for memory organization.

7.3.1 READ OPERATION

Login Key

RFID tags may support authentication for security concerns, such as Mifare Standard 1K/4K and SLE66R35 tags. The security key, Key A or Key B, is used to access a specific RFID tag.

▶ By default, it is set to use "FFFFFFFFFFFF" for a new Mifare tag, regardless of Key A or Key B.

▶ Modify the key string if necessary. It must be a hex string with 12 bytes length.

Read Settings

By default, the RFID tag is read from byte 0 of the default page. However, the default page, amount of bytes and number of pages of each tag may be different. Specify how many bytes of data you want to read from the tag.

Generally, the read data is user data obtained from the user block. If you are sure that the data is to be read from a non-user block, such as the lock block, you need to select the check box of [Display hex values] first.
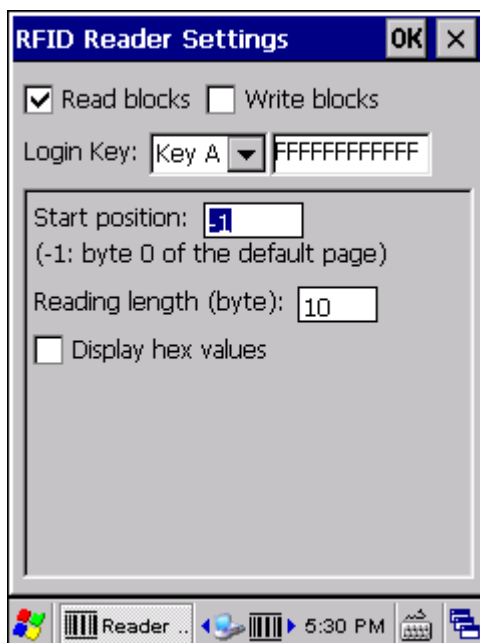
7.3.2 WRITE OPERATION

Login Key

RFID tags may support authentication for security concerns, such as Mifare Standard 1K/4K and SLE66R35 tags. The security key, Key A or Key B, is used to access a specific RFID tag.

▶ By default, it is set to use "FFFFFFFFFFFF" for a new Mifare tag, regardless of Key A or Key B.

▶ Modify the key string if necessary. It must be a hex string with 12 bytes length.

Write Settings

Type the string that you want to write to a tag. By default, the string is written to the tag from byte 0 of the default page. However, the default page, amount of bytes and number of pages of each tag may be different. Therefore, the input string will automatically be truncated to fit into pages, and data may be discarded when it comes to the end of pages available.

Generally, it will write the input string to the user block, which is free for custom use. The string will be displayed as "user data". If you wish to write the string to a non-user block, such as the lock block, you need to select the check box of [Use hex values] first.

Once you have selected to use hex values for the string, the string length must be even. For example, if you want to write 0x0A, 0x0B and 0x00 to a tag, the string you input must be "0A0B00" instead of "AB0".
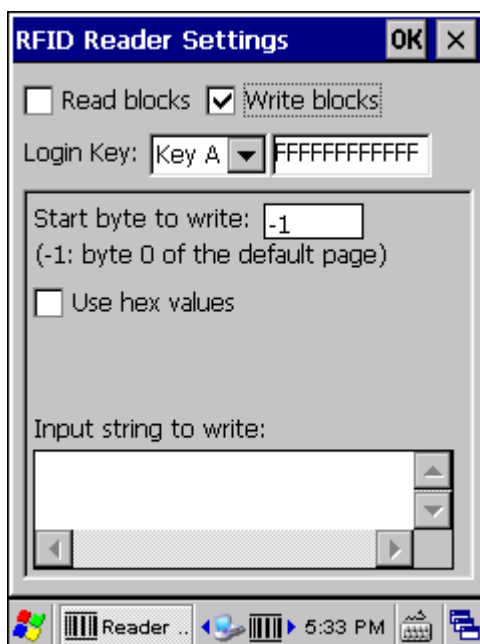
7.4 RFID SECURITY

You may change the security key, Key A and/or Key B, used to access a Mifare tag. In order to change the key or keys, you must provide correct login key first.

▸ By default, it is set to use "FFFFFFFFFFFF" for a new Mifare tag, regardless of Key A or Key B.

▸ Specify strings for Key A and Key B. It must be a hex string with 12 bytes length.
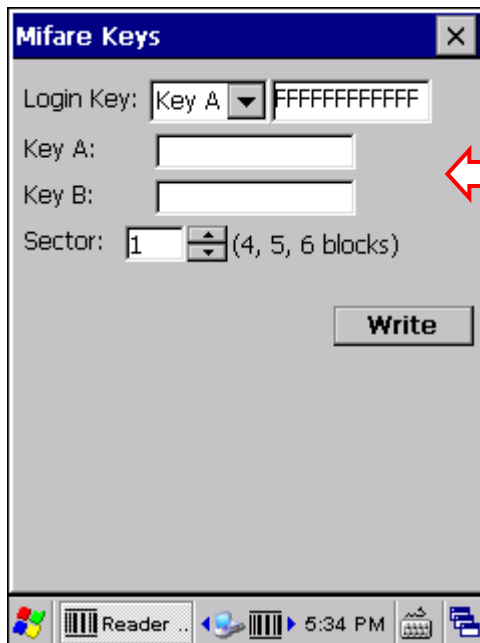
Type your Key A and Key B. If no change is made, you still need to provide the key string currently in use.

7.5 DATA OUTPUT

Tap the [Data Output] button on the General tab to choose from the three options for data output after decoding as well as configure associated settings.

Data Output		Default
Keyboard Emulation	Data is emulated as typed text and sent to the active Window. ▸ When "Local machine" is selected, simply run your application or built-in program, such as WordPad, to start with data collection. ▸ When "RDP server" is selected, run the Remote Desktop Connection program to connect to a remote computer. Note that this option is unable to emulate double bytes, such as Big-5 or Unicode characters on the remote PC.	Local machine
Windows Message	When selected, a Windows message will be broadcasted after decoding. ▸ Intercept the decode message in your application. ▸ Call Windows API (ReadMsgQueue) in your application to retrieve the decoded data.	Disable
Windows Event	When selected, a Windows event will be broadcasted after decoding. ▸ Intercept the decode event in your application. ▸ Call Windows API (ReadMsgQueue) in your application to retrieve the decoded data.	Disable

Note: (1) Refer to 9600 .NET or C/C++ Programming Guide for details on Windows Message and Windows Event. Sample programs are provided by request.

(2) For the use of a different program rather than ReaderConfig.exe, a dynamic-link library (DLL) file is provided.

Auto ENTER	This function can spare you the trouble of pressing the [Enter] key on the mobile computer to confirm each scan. It will automatically add an ENTER character in front or to the end of one scan. ▶ No ▶ Scan + ENTER ▶ ENTER + Scan	Scan + ENTER
Auto ENTER Character	*Auto ENTER must be enabled. ▶ None ▶ Carriage Return ▶ Tab ▶ Space ▶ Comma ▶ Semicolon	Carriage Return
Prefix String	0~10 characters	NULL
Suffix String	0~10 characters	NULL
Display Code Type	Select the check box to prefix the code type to barcode data after decoding a barcode.	Disabled
Display Code Length	Select the check box to suffix the code length to barcode data after decoding a barcode.	Disabled
Display RFID UID	Select the check box to display UID after decoding an RFID tag.	Enabled
Display RFID User Data	Select the check box to display user data after decoding an RFID tag.	Disabled
Field Delimiter	Decide whether or not to use a delimiter to separate data fields after decoding a barcode or an RFID tag — ▶ Code type, barcode data, and code length if more than one field is displayed ▶ UID and user data if both are displayed	' , ' (comma)

7.6 NOTIFICATIONS (FOR GOOD READ)

Tap the [Notifications] button on the General tab to configure how you want to be notified of a successful decoding.
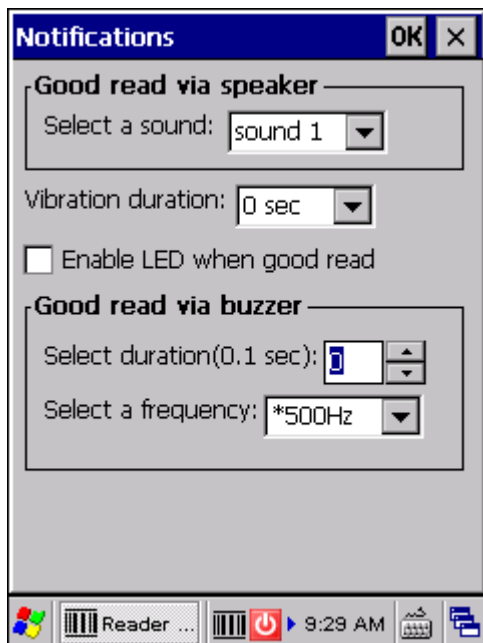
Sound / Vibration		Default
Good Read via speaker	Mute, or Sound 1~9	Sound 1
Good Read via buzzer	Specify frequency and duration ▶ Duration 0~255 (0.1 sec.); 0 = Disable the buzzer	0 (= Disable)
Good Read via vibrator	0~5.0 (sec.) ▶ 0 = Disable the vibrator	0 (= Disable)
Good Read LED	Select the check box to enable Good Read LED. The LED will become green to indicate a successful decoding.	Disable

7.7 SYMBOLOGY SETTINGS

For barcode settings, tap the Symbologies tab.
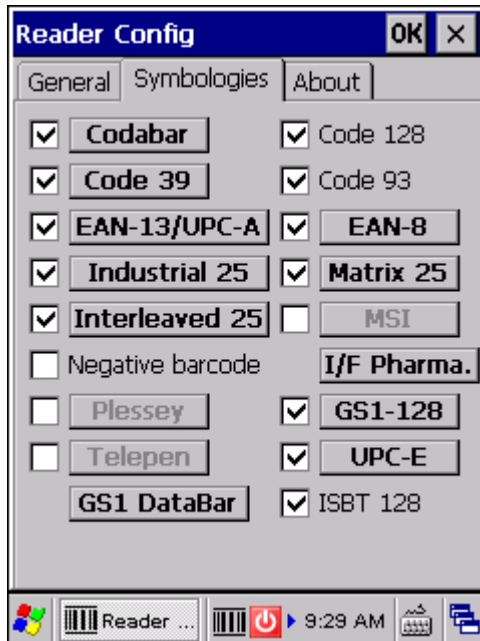
▶ Refer to **Appendix I - Scan Engine Settings** for the symbologies or RFID tags supported by a scan engine.

▶ Refer to the Symbology Settings Table in **Appendix II - Linear Imager (CCD), Laser (SE950)**.

▶ Refer to the Symbology Settings Table in **Appendix III - 2D Imager**.

MORE APPLICATIONS

9600 Mobile Computer provides more utilities and applications which are made accessible from **START | Programs**.

▶ **Backup Utility** lets you manipulate the way to backup programs and data.

▶ **Button Assignment Utility** lets you assign a specific button as a hot key for launching a program or performing a certain action.

▶ **Screen Control Utility** lets you change the screen orientation.

▶ **Image Capture Utility** allows you to view image files and acquire images from the built-in camera.

▶ **GPS Viewer** allows you to use the integrated GPS receiver with third-party location-based applications.

IN THIS CHAPTER

8.1 BACKUP UTILITY

The **CipherLab Backup Utility** is provided to help you easily make copies of data and restore your mobile computer's specific registry settings, install applications, user data, etc. You may use the backups (.bkp) for these purposes:

▶ Full Restore Operation

Backup all necessary files here (you don't have to select "Registry") so that you can restore your mobile computer to an operational state following a disaster.

▶ Partial Restore Operation

Backup a few specific files here so that you can restore small numbers of files after you have deleted them by accident or found them corrupted.

▶ Easy Cloning

Backup everything (including "Registry") necessary for cloning settings to other 9600 Mobile Computers.

8.1.1 MANAGING THE REGISTRY

Go to **Start | Programs | BackupUtility** to open the **CipherLab Backup Utility**. If you are using this backup utility for the first time, you must manually save the system registry to the DiskOnChip folder first! Tap [Save] now to save the current system registry to "\DiskOnChip\Sysbak\Registry.dat".
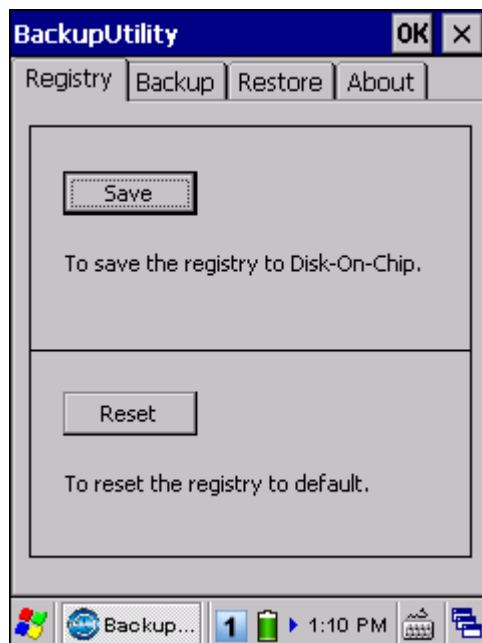
| Warning: | As long as you make any changes to the system configurations and settings, you must tap [Save] to update the system registry here. Otherwise, it will reload the old registry values in use after a cold boot. |

If you wish to reset the current system configurations and settings to defaults, tap [Reset] to delete the current system registry "\DiskOnChip\Sysbak\Registry.dat". It will then reload the default registry values after a cold boot.

8.1.2 PREPARING FOR BACKUP

Tap the Backup tab and it will automatically start scanning the file system. Within a few minutes, it will generate a list for the backup operation.
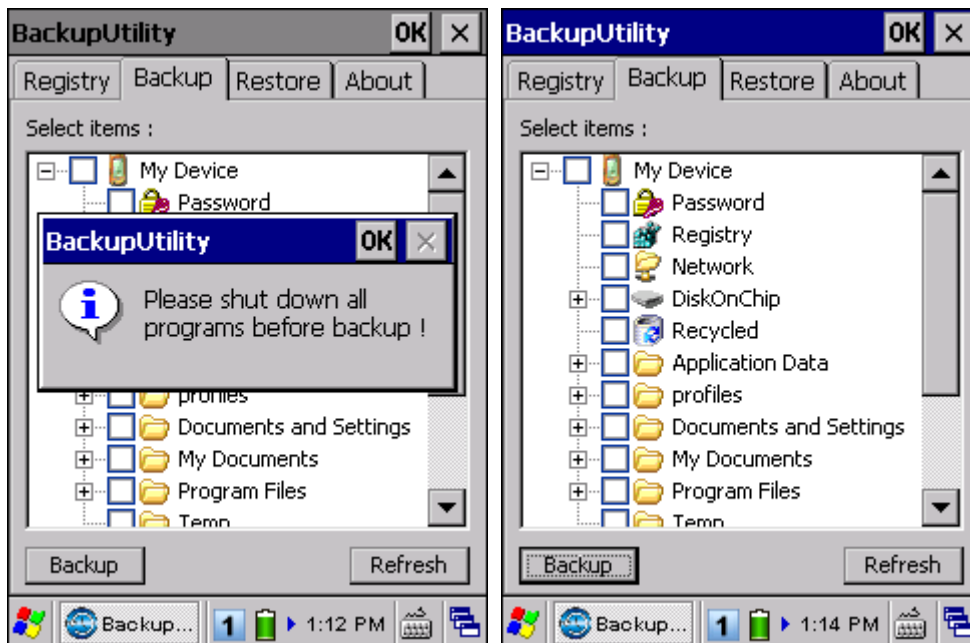
If the items "Password" and "Registry" are not listed, it means no Password.dat and Registry.dat are found in "\DiskOnChip\Sysbak\". Take necessary steps before you tap [Refresh] to refresh the list of available items.

▶ Password – Go to **Start** | **Settings** | **Control Panel** | **Password**, and then apply password protection at power-on or to the DiskOnChip folder if necessary.

▶ Registry - Go to the Registry tab and tap [Save].

Warning: You may not be able to backup all data when programs are still running! It is suggested that you exit all the applications before backup.

8.1.3 BACKING UP FILES

1) Select the items you wish to backup, and tap [Backup].

2) Tap [...] if you need to save the backup to a different directory or file name (.bkp).

   By default, it will save the selected items to the DiskOnChip folder by the current date - the format of filename is "Backup_(4-digit year)(2-digit month)(2-digit date)".
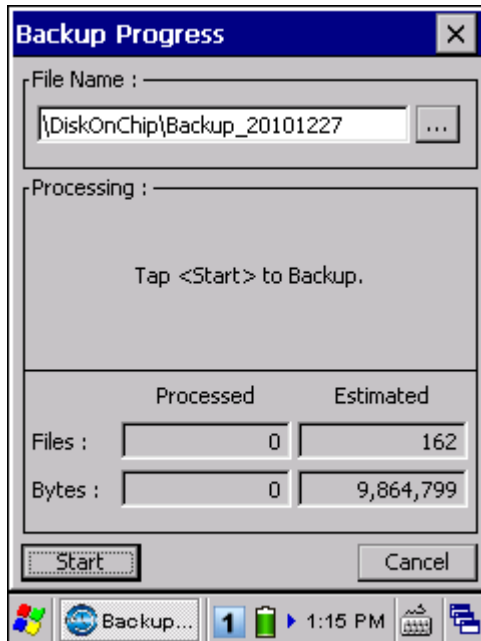
3) Tap [Start] to pack all the selected items into one .bkp file.
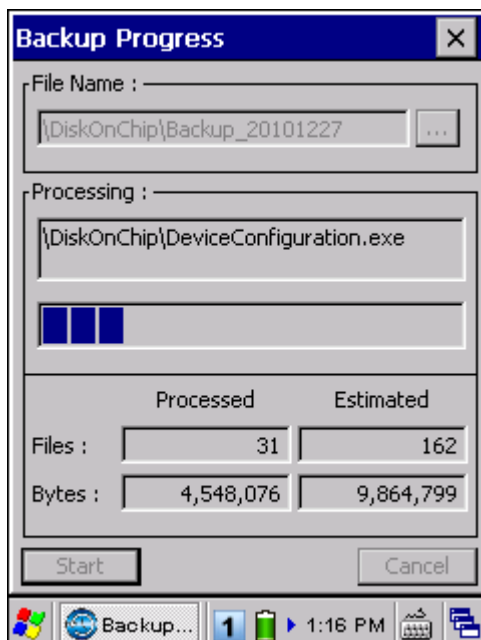
4) Once the backup process is completed, tap [Report] to view the log file if necessary.

5) Tap [OK] to close the current window.
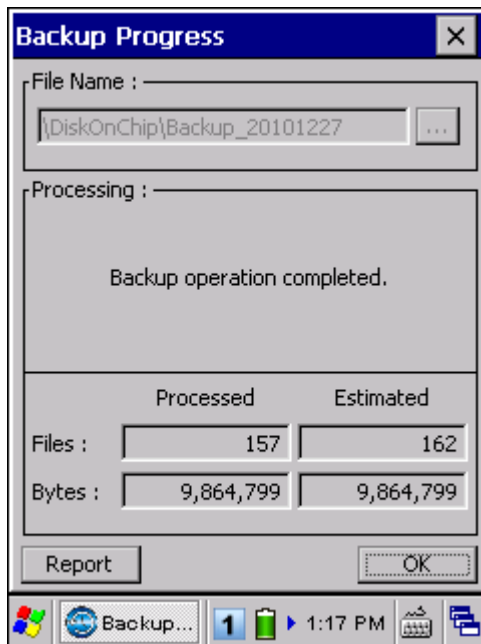
Note: If you wish to backup files to this new directory or file name in future runs, you must tap **OK** on the toolbar to save the current settings and exit the application.

8.1.4 USING BACKUPS FOR RESTORE

After the backup operation, tap the Restore tab and it will automatically start scanning for any .bkp files. Specify how to use these backups for automatic or manual restore operation.
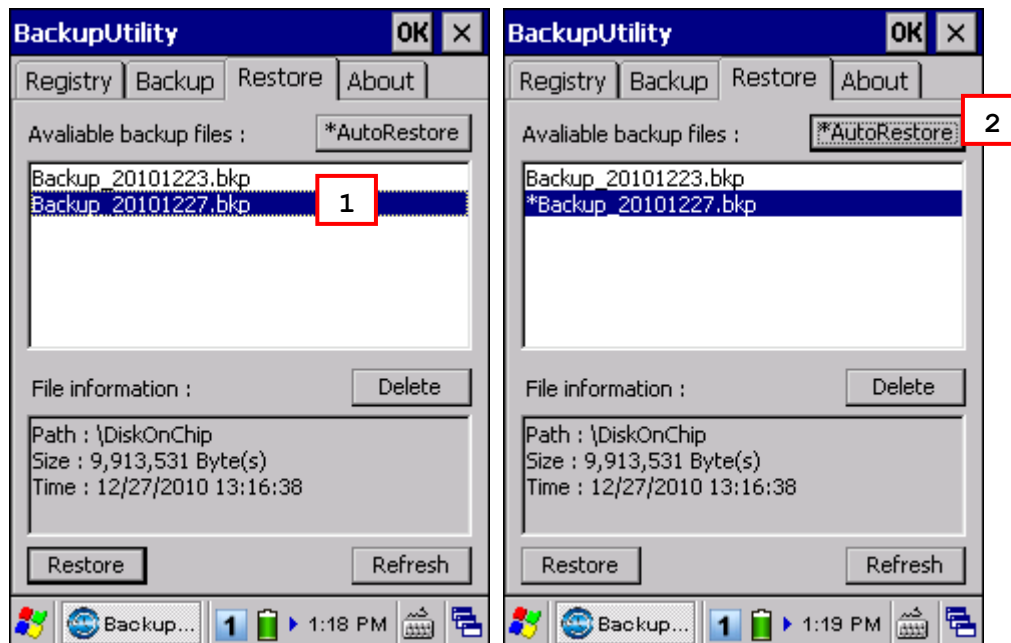
If a backup file has been selected for Auto Restore in your last operation, it will be prefixed with an asterisk on the list.

▶ File Manipulation

Tap [Refresh] to refresh the list of available backups. If a backup file is not desired any more, select it and tap [Delete].

▶ Auto Restore

Select a desired backup file from the list and tap [AutoRestore]. It will prefix an asterisk to the selected file, indicating the specific file will be used in the restore process that starts automatically right after a cold boot.

During Auto Restore, the slider position indicating the system storage space (**Start** | **Settings** | **Control Panel** | **System**: Memory tab) will be automatically restored as well.

Warning: For the Auto Restore setting to take effect, you must tap **OK** on the toolbar to save the current settings and exit the application.

▶ Manual Restore

Depending on specific requirements, you may perform a full or partial restore manually.

Full Restore Operation

1. Select a desired backup file from the list.

2. Tap [Restore].

3. Tap [Start] to run the restore process.

4. Once the restore process is completed, you will be asked to perform a warm boot. Tap [No] if you wish to warm boot later. You may tap [Report] to view the log file if necessary.

Partial Restore Operation

1. Double-tap a desired backup file from the list.

2. Select the desired items.

3. Tap [Restore].

4. Tap [Start] to run the restore process.

5. Once the restore process is completed, you will be asked to perform a warm boot. Tap [No] if you wish to warm boot later. You may tap [Report] to view the log file if necessary.

Warning:	(1) You must perform a warm boot after the restore operation! (2) You may encounter insufficient memory for the restore operation and be asked to check memory space on the system (SDRAM), DiskOnChip or microSD card. If you insist on restoring it without deleting files, data loss or incomplete restore may occur.

8.2 BUTTON ASSIGNMENT UTILITY

The **CipherLab Button Assignment Utility** allows the following keys to be re-defined to another key or serve as a shortcut key for launching a specific program.

▸ SCAN key

▸ Side triggers on each side of the touch screen

▸ SEND key

▸ END key

Note: By default, the two side triggers are programmed to serve as SCAN keys.

Go to **Start | Programs | Buttons** to open the **CipherLab Button Assignment Utility**.
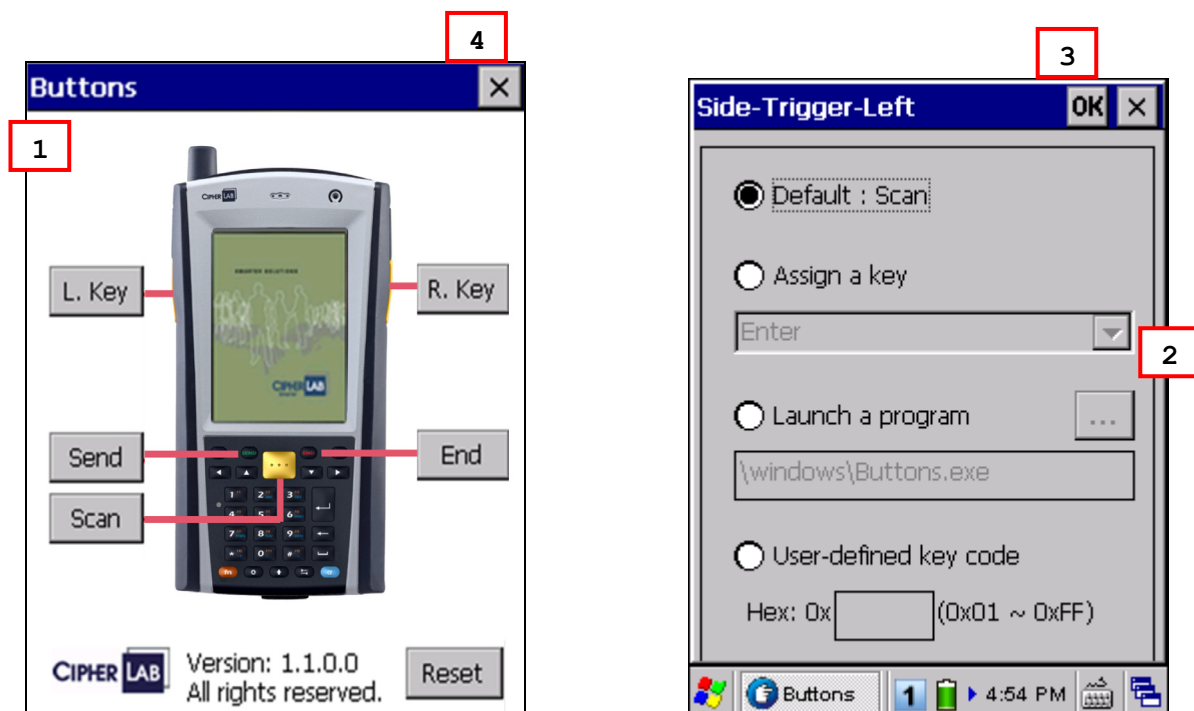
1) Tap the label of one of these keys.

For example, tap [L. Key] to configure the side trigger on the left.

2) You may input a hex value or assign one of the following key values to the left side trigger or have it serve as a shortcut key to launch a specific program.

▸ Enter

▸ Scan

▸ Esc

▸ Delete

▸ Backspace

- ▸ Space
- ▸ Tab
- ▸ F1 ~ F12
- ▸ Start Menu
- ▸ Alt
- ▸ OEM_Key1 (0xE9)
- ▸ OEM_Key2 (0xEA)
- ▸ OEM_Key3 (0xEB)
- ▸ OEM_Key4 (0xEC)
- ▸ OEM_Key5 (0xED)
- ▸ OEM_Key6 (0xEE)
- ▸ OEM_Key7 (0xEF)
- ▸ OEM_Key8 (0xF0)
- ▸ OEM_Key9 (0xF1)
- ▸ OEM_Key10 (0x2A)

3) Tap ⊞OK for the change to take effect and save the current settings.

You may tap [Reset] to restore defaults.

4) Tap ⊠ on the toolbar to exit the application.

8.3 SCREEN CONTROL

Screen Control lets you change the orientation of the screen. Go to **Start** | **Programs** | **ScreenControl** to open the **Screen Control** utility.
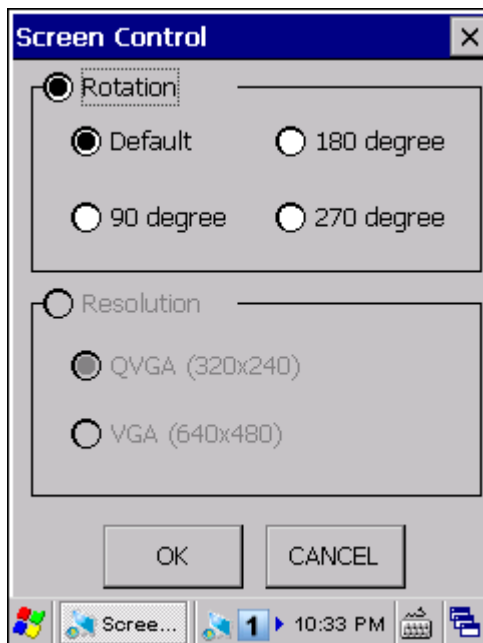
▶ You can change the screen orientation from portrait at zero degrees (default) to 90, 180, and 270 degrees.

Note: The mobile computer comes with VGA (640 by 480 pixels) will not support Resolution Switch function.

8.4 IMAGE CAPTURE UTILITY

The **ImageMaker** utility allows acquiring images from the built-in camera and viewing images stored on the mobile computer. Go to **Start** | **Programs** | **ImageMaker** to open the image capture program. Upon execution of the program, it takes approximately 3 seconds to turn on the camera.

Note: Before executing the utility, make sure you have closed the program ReaderConfig.exe.

Exit and turn off the camera.

Workspace
    a) to display an image by opening the file
    b) to capture an image in preview mode
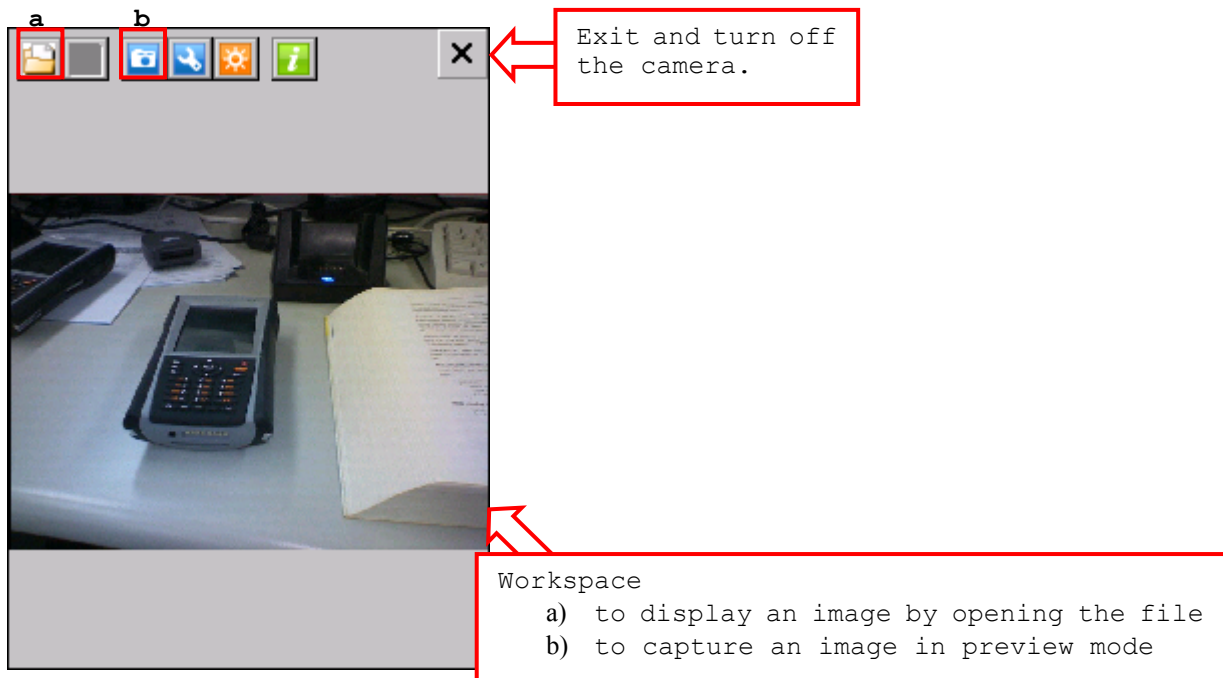
The icons on the toolbar, from left to right, are for these functions —

Button	Description
	Open an image. Any existing file in the following formats can be viewed —
	▶ JPEG
	▶ Bitmap
	▶ PNG
	▶ GIF
	Save the opened image to a different file name or format.
	Take a picture.
	Configure camera settings if necessary.
	Turn on/off the auxiliary LED light in preview mode.
	Version information about the program.

149

8.4.1 VIEWING A PICTURE

1) Tap [icon] to open an image file and it will be displayed.
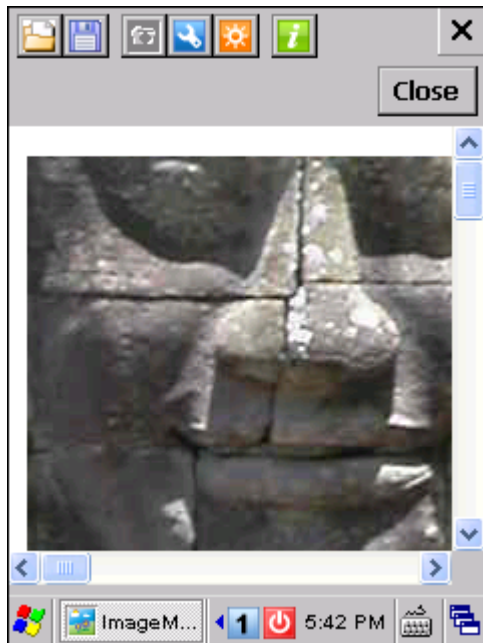
2) If you want to rename it or save it to a different format, tap [icon].

   If this is not the image you need, tap [icon] to open another image file.

3) Tap [Close] to return to the Camera Preview Mode for taking pictures.

8.4.2 TAKING A SNAPSHOT

1) In the Camera Preview Mode, a preview will be displayed.
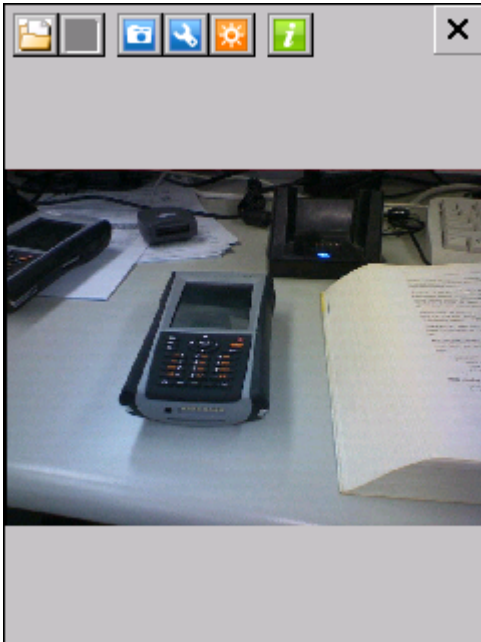
2) Hold still and take aim at the object you want to take a picture.

3) Tap [icon] to turn on the auxiliary LED light if necessary.

4) Tap [icon] to take pictures.

Each will be automatically saved under the directory "\DiskOnChip\pics" in the format of HHMMSS_YYMMDD.jpg or HHMMSS_YYMMDD.bmp, as shown below.

 ‣ YY: 2-digit year

 ‣ MM: 2-digit month

 ‣ DD: 2-digit date

 ‣ HH: 2-digit hour

 ‣ MM: 2-digit minute

 ‣ SS: 2-digit second

5) Tap [icon] to turn off the camera and exit the program.

8.4.3 CHANGING CAMERA SETTINGS

Tap [icon] to configure camera settings if necessary.
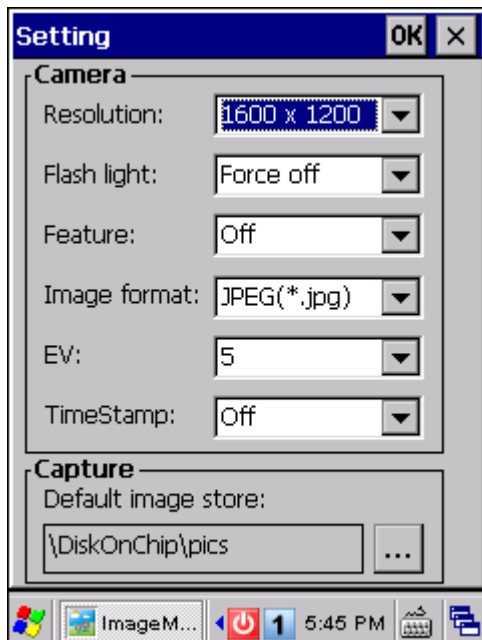
Camera/Capture Settings	Options
Resolution	By default, "1600 x 1200" pixels resolution is in use. ▶ "800 x 600" pixels resolution is supported.
Flash Light	By default, the flash light is "Force off". ▶ Force on, Force off and Auto are supported. If you want to save battery power or ambient light is enough, you may turn it off.
Feature	By default, no special effect is applied. ▶ Monochrome, Sepia, Negative, Solarize (with unmodified UV), and Solarize 2 (with UV) are supported.
Image Format	By default, the captured image will be saved in JPEG format. ▶ Bitmap format is supported.
EV	By default, the exposure value is 5. ▶ The exposure value is for the camera to determine the exposure factors. The greater the value is, the brighter the pictures becomes. You may choose a value from 0~9.
Time stamp	By default, no time stamp is applied. When applied, information on date and time will be added on top of the captured image in the format of YYYY/MM/DD HH:MM:SS, such as 2010/01/04 11:13:13.
Default image store	By default, the captured image is stored under the directory "\DiskOnChip\pics" in the format of HHMMSS_YYMMDD.jpg or HHMMSS_YYMMDD.bmp. ▶ If you want to change the directory, tap [...].

8.5 GPS VIEWER

The Global Positioning System (GPS) provides location and time information to anyone with a GPS receiver. Cipherlab GPS Viewer provides a straight-forward way to check if the integrated GPS receiver is working. It tracks up to 12 satellites to compute and update information with built-in antenna. In case you receive very poor signal in tough circumstances, you may purchase an external MMCX antenna. Since the mobile computer does not come with any preinstalled navigation software, you may need to purchase third-party navigation software separately.

Go to **Start** | **Programs** | **GPSViewer** to open the **CipherLab GPS Viewer**. In order to speed up start-up times, we suggest you to download the ephemeris information for initial setup.
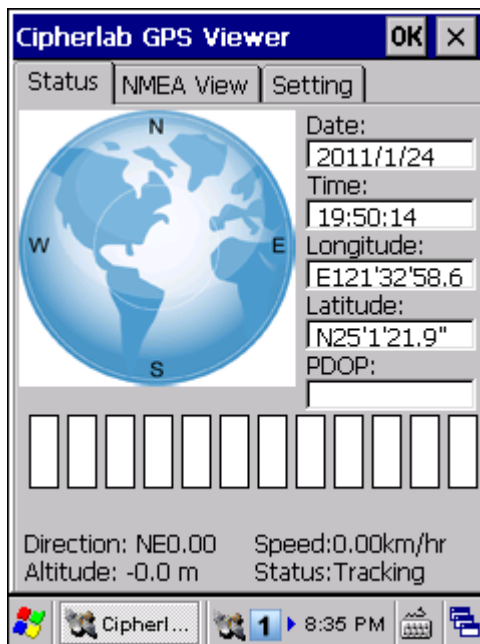
Note: Time To First Fix (TTFF) relies on environmental factors. Normally, it takes approximately 40 seconds for the receiver to locate the first satellite. However, it may take longer when satellite signals are blocked by tall vertical objects, such as buildings or trees.

8.5.1 RECEIVING GPS INFORMATION

The receiver will automatically start to scan available satellites, synchronize time, and get the current location. Information on time, location, the quality of the signal, and so on, will be displayed if available. On the satellite position graph (= the earth marked with N, E, S, W indicators for North, East, South and West), satellites in view are displayed in red and flash to get signal. Below the satellite position graph is the signal strength chart for each satellite in view. It provides visual indication and a numeric reading for reference.

▸ Red for no signal   (< 9 dB)
▸ Green for fair signal strength   (10 ~ 29 dB)
▸ Blue for strong signal strength   (30 ~ 50 dB)

Item	Description
Date, Time	Information of the current date and time
Longitude, Latitude, Altitude	Your location on earth by latitude and longitude coordinates, plus altitude
PDOP	Position (3-D) Dilution of Precision, a separate measurement of DOP
Direction	Your direction when heading toward a target
Speed	Your speed when heading toward a target (relative speed)
Status	The progress of the receiver acquiring and tracking signals from above three satellites to compute its three dimensional position (X, Y, Z). When the Status message "Tracking" is changed to "2D Fixed" or "3D Fixed", your latitude, longitude and altitude can then be calculated by comparing receiver's distance from satellites.

8.5.2 DATA OF NMEA FORMAT

The serial interface protocol is based on the national Marine Electronics Association's NMEA 0183 ASCII interface specification. For details, please refer to NMEA 0183 Version 3.01, which may be obtained from NMEA, www.nmea.org. You may save the NMEA codes as a text file and import it in a third-party application.

Leave it blank if log file is not desired
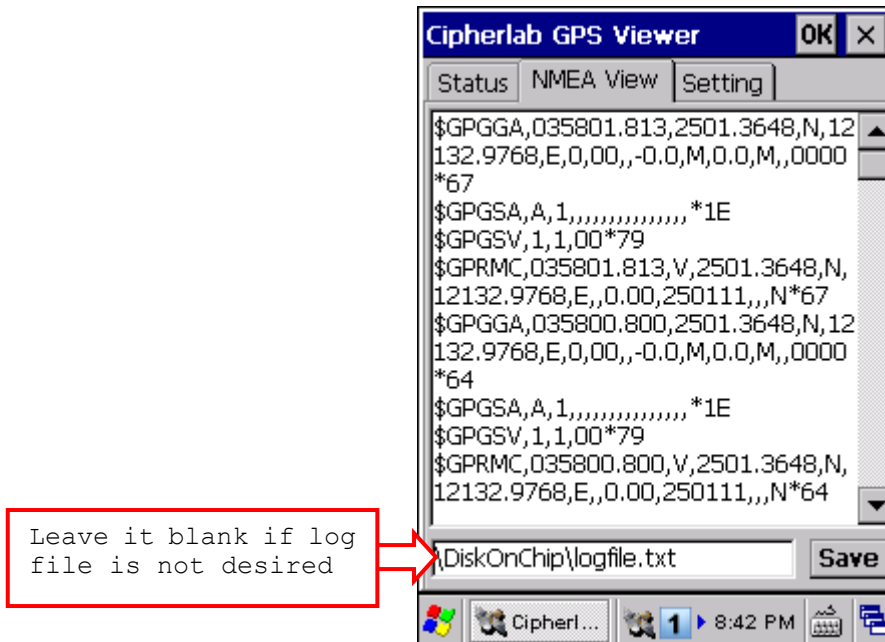
8.5.3 EPHEMERIS UPDATE SETTINGS

After initial setup, the ephemeris information stored on the mobile computer is valid for seven days according to the system date and time. You may acquire the most updated ephemeris data on a regular basis, which can improve start-up times.

Choose how you want to update ephemeris data when the program is executed. The date of last update will be displayed at the bottom of the screen, which is used as a check point for the program to send notifications or automatically update data once a week. However, despite these options, you may tap [Update Now!] to update ephemeris at any time.

Options	Description
No update	Will not notify the user to update or automatically update ephemeris
Notify user to update	Will show a message to notify the user to update ephemeris
Auto update	Will update ephemeris automatically
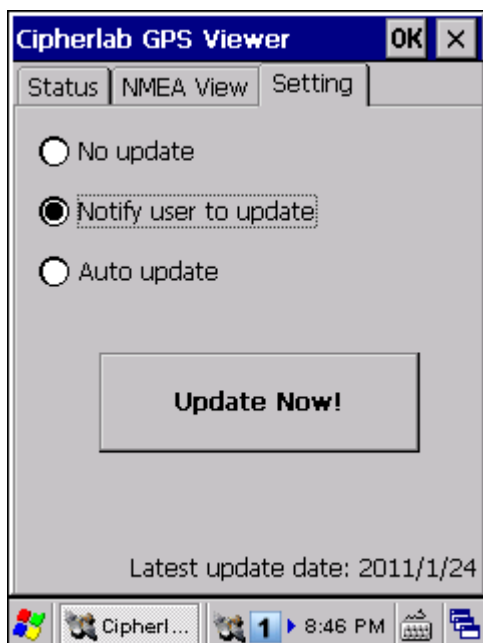
SPECIFICATIONS

PLATFORM, PROCESSOR & MEMORY

Operating System & CPU

Windows Version	Microsoft Windows CE 6.0
CPU	Marvell PXA270 at 520 MHz

Memory

ROM	1 GB non-volatile NAND flash memory
RAM	128 MB on-board SDRAM memory
Expansion Slot	One microSD card slot
	▶ Up to 16 GB, SDHC supported

COMMUNICATIONS & DATA CAPTURE

Communications

USB Host/Client	USB 1.1 Specification
WPAN	Built-in module for Bluetooth version 2.0 + EDR Class 2 connectivity
WLAN	Built-in module for 802.11b/g networking
	▶ Wi-Fi certified Summit radio, also certified for Cisco Compatible Extensions (CCX) version 4
WWAN	Ordering Option - built-in module for GSM/GPRS/EDGE
	▶ Quad-Band - 900, 1800 MHz (Europe); 850, 1900 MHz (U.S.)

Data & Image Capture

Digital Camera	2 mega-pixel CMOS type	
Barcode Reader	Ordering options include	▶ Linear imager (CCD)
		▶ Laser (SE950)
		▶ 2D Imager
RFID Reader	Frequency 13.56 MHz	

ELECTRICAL CHARACTERISTICS

Batteries

Main Battery Pack	Rechargeable Li-ion battery – 3.7 V, 2700 mAh
Backup Battery	Rechargeable Lithium battery – 3.7 V, 75 mAh
	Data retention for at least 24 hours

Power Adaptor

Power Supply Cord with	Input	AC 100~240 V, 50/60 Hz
Universal Power Adaptor	Output	DC 6 V, 3.5 A for 4-Slot Battery Charger
		DC 5 V, 3 A for Charging & Comm. Cradle
Vehicle Charging Cable for	Input	DC 12~24 V
Vehicle Charger/Cradle	Output	DC 5 V, 2 A

Working Time (Laser, one scan per 5 seconds)

Wi-Fi Mode with 50% backlight	10 hours (Wi-Fi in power-saving mode)

PHYSICAL CHARACTERISTICS

Color Touch Screen Display

Display	3.5" Transflective TFT-LCD, 65536 colors
Resolution	240 (W) x 320 (L) QVGA size
	▶ Ordering Option – 480 (W) x 640 (L) VGA size

Keypad

Layout	29 keys for alphanumeric layout
	▶ Ordering Option – Qwerty layout
Backlight	White LED backlight for display and keypad

Notifications

Status LED	Triple-color LED – Red / Green / Blue
Audio	Integrated with one mono speaker (front) and buzzer (back)
	Headset jack – 2.5 mm DIA stereo earphone jack with microphone input
	▶ Bluetooth headset supported
Vibrator	0.5G

Enclosures

Materials	Plastic & metal
Dimensions	170 mm (L) 90 mm (W) 38 mm (H)
Weight	Approx. 400 g (configuration-dependent)

ENVIRONMENTAL CHARACTERISTICS

Temperature

Operating	-10 °C to 50 °C
Storage	-20 °C to 60 °C

Humidity

Operating	10% to 90%, non-condensing
Storage	5% to 95%, non-condensing

Resistance

Impact Resistance	1.5 m, 5 drops per 6 sides
Tumble Test	1000 times at 100 cm
Splash/Dust Resistance	IP 64
Electrostatic Discharge	± 15 kV air discharge, ± 8 kV contact discharge

PROGRAMMING SUPPORT

Development Environment & Tools

Integrated Development Environment	Visual Studio 2008
	Visual Studio 2005
Software Development Kit	9600 SDK
	System API (LIB and DLL) for system configuration
	Reader API (DLL) for reader configuration

Software & Utilities

Cipherlab software package	▸ Reader Configuration Utility
	▸ MIRROR Emulator (CipherNet) for VT100/220 or IBM 5250 emulation
	▸ FORGE Application Generator
	▸ STREAM Wireless Studio
	▸ MIRROR Browser for web application
Third-party software	▸ SOTI MobiControl for remote device control
	▸ Naurtech CETerm – Terminal emulator (3270, 5250, VT) and industrial web browser

ACCESSORIES

Accessory Options

- Pistol Grip
- Belt Holster
- Protective Cover
- Spare rechargeable battery pack
- 4-Slot Battery Charger
- RS-232 charging & communication cable
- USB host cable (for connecting external USB device)
- Charging & Communication Cradle
- Ethernet Cradle (10/100 BASE-T)
- Vehicle Cradle
- Vehicle Charger

Appendix I

SCAN ENGINE SETTINGS

The **Reader Configuration Utility** (ReaderConfig.exe) allows configuring the following reader types, depending on the module equipped on your mobile computer:

▶ 1D Linear Imager (CCD)
▶ 1D Laser (SE950)
▶ 2D Imager
▶ RFID reader

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

Note: (1) You cannot have 1D+2D scan engines installed on the mobile computer because they are both barcode readers!
(2) You can run only one utility or application at a time to control the reader(s). For example, while running ReaderConfig.exe, you should not run FORGE Application Generator, STREAM Wireless Studio, MIRROR Browser, or any other application that uses ReaderDLL.

SYMBOLOGIES SUPPORTED

Varying by the scan engine installed, the supported symbologies or tag types are listed below. For details on configuring associated settings, please refer to each Appendix separately.

		CCD, Laser	2D
Codabar		✓	✓
Code 11		✗	✓
Code 93		✓	✓
Composite Code		✗	✓
MSI		✓	✓
Plessey		✓	✗
Postal Codes		✗	✓
Telepen		✓	✗
Code 128	Code 128	✓	✓
	GS1-128 (EAN-128)	✓	✓
	ISBT 128	✓	✓

Code 2 of 5	Industrial 25 (Discrete 25)	✓	✓
	Interleaved 25	✓	✓
	Matrix 25	✓	✓
	Chinese 25	✗	✓
Code 3 of 9	Code 39	✓	✓
	Trioptic Code 39	✗	✓
	Italian Pharmacode (Code 32)	✓	✓
	French Pharmacode	✓	✗
EAN/UPC	EAN-8	✓	✓
	EAN-13	✓	✓
	Bookland EAN (ISBN)	✓	✓
	UPC-E0	✓	✓
	UPC-E1	✓	✓
	UPC-A	✓	✓
GS1 DataBar (RSS)	GS1 DataBar Omnidirectional (RSS-14)	✓	✓
	GS1 DataBar Truncated	✓	✓
	GS1 DataBar Stacked	✓	✓
	GS1 DataBar Stacked Omnidirectional	✓	✓
	GS1 DataBar Limited (RSS Limited)	✓	✓
	GS1 DataBar Expanded (RSS Expanded)	✓	✓
	GS1 DataBar Expanded Stacked	✓	✓
2D Symbologies	PDF417	✗	✓
	MicroPDF417	✗	✓
	Data Matrix	✗	✓
	Maxicode	✗	✓
	QR Code	✗	✓
	MicroQR	✗	✓
	Aztec	✗	✓

RFID TAGS SUPPORTED

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

Currently, the performance of some tags has been confirmed, and the results are listed below for your reference.

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

ID_MOD_MP_RFID		UID Only	Read Page	Write Page
ISO 14443A	Mifare Standard 1K	✓	✓	✓
	Mifare Standard 4K	✓	✓	✓
	Mifare Ultralight	✓	✓	✓
	Mifare DESFire	✓	---	---
	Mifare S50	✓	✓	✓
	SLE44R35	✓	✓	✓
	SLE66R35	✓	✓	✓
ISO 14443B	SR176	✓	✓	✓
ISO 15693	ICODE SLI	✓	✓	✓
	SRF55V02P	✓	✓	✓
	SRF55V02S	✓	✓	✓
	SRF55V10P	✓	✓	✓
	TI Tag-it HF-I	✓	✓	✓
	ST LRI512	✓	✓	✓

LINEAR IMAGER (CCD), LASER (SE950)

The tables below list reader settings as well as symbology settings for the Linear Imager (CCD) or Laser (SE950) scan engine.

READER SETTINGS TABLE

CCD/Laser Engine	Description	Default
Time-out		**3 sec.**
1~9 (second)	Set the maximum time for decoding to continue during a scan attempt. It applies to the following scan modes only – ▸ Laser mode ▸ Auto Off mode	
Scan Mode		**Laser mode**
Continuous Mode	Non-stop scanning ▸ To decode the same barcode repeatedly, move away the scan beam and target it at the barcode for each scanning.	
Test Mode	Non-stop scanning ▸ Capable of decoding the same barcode repeatedly	
Alternate Mode	Press the scan trigger to start with scanning. ▸ The scanning won't stop until you press the trigger again.	
Laser Mode	Hold down the scan trigger to start with scanning. ▸ The scanning won't stop until (a) a barcode is read, (b) the preset timeout expires, or (c) you release the trigger.	
Auto Off Mode	Press the scan trigger to start with scanning. ▸ The scanning won't stop until (a) a barcode is read or (b) the preset timeout expires.	
Redundancy Level		**None**
None	No redundancy means one successful decoding will make the reading valid and induce the "READER Event".	
One time, Two times, or Three times	The higher the reading security is (that is, the more redundancy the user selects), the slower the reading speed gets. ▸ If "Three Times" is selected, it will take a total of four consecutive successful decodings of the same barcode to make the reading valid.	

SYMBOLOGY SETTINGS TABLE

CCD/Laser Engine	Description	Default
Codabar		**Enable**
Select Start/Stop Characters	If "Transmit Start/Stop Characters" is desired, select one set: ▶ abcd / abcd ▶ abcd / tn*e ▶ ABCD / ABCD ▶ ABCD / TN*E	abcd / abcd
Transmit Start/Stop Characters	Decide whether to include the start/stop characters in the data being transmitted.	No
Code 128		**Enable**
GS1-128 (EAN-128)		**Enable**
Transmit Code ID	Decide whether to include Code ID ("]C1") will be included in the data being transmitted.	No
Replace Field Separator	Decide whether to replace the field separator. If the barcode contains Field Separator "0x1D", it will be changed to the desired Field Separator. For example, type the desired character ";" (semicolon) as the new field separator. Then if the barcode contains Field Separator "0x1D", it will be changed to ";".	No
ISBT 128		**Enable**
Industrial 25 (Discrete 25)		**Enable**
Start/Stop Selection	This decides the readability of all 2 of 5 symbology variants. For example, flight tickets actually use an Industrial 25 barcode but with Interleaved 25 start/stop pattern. In order to read this barcode, the start/stop pattern selection parameter of Industrial 25 should set to "Interleaved 25".	Industrial 25
Verify Check Digit	Decide whether to verify the check digit. If the check digit is incorrect, the barcode will not be accepted.	No
Transmit Check Digit	Decide whether to include the check digit in the data being transmitted.	Yes
Select Length	▶ One or two fixed lengths ▶ Range	4~127
Interleaved 25		**Enable**
Start/Stop Selection	Refer to Industrial 25.	Interleaved 25
Verify Check Digit	Decide whether to verify the check digit. If the check digit is incorrect, the barcode will not be accepted.	No
Transmit Check Digit	Decide whether to include the check digit in the data being transmitted.	Yes

Select Length	▶ One or two fixed lengths ▶ Range	4~127
Matrix 25		**Enable**
Start/Stop Selection	Refer to Industrial 25.	Matrix 25
Verify Check Digit	Decide whether to verify the check digit. If the check digit is incorrect, the barcode will not be accepted.	No
Transmit Check Digit	Decide whether to include the check digit in the data being transmitted.	Yes
Select Length	▶ One or two fixed lengths ▶ Range	4~127
French Pharmacode		**Disable**
Transmit Check Digit	Decide whether to include the check digit in the data being transmitted.	Yes
Italian Pharmacode (Code 32)		**Disable**
Transmit Check Digit	Decide whether to include the check digit in the data being transmitted.	Yes

Note: For French/Italian Pharmacode, "Transmit Start/Stop Character" is not provided in UI but it is controlled by the same setting of Code 39.

Code 39		Enable
Transmit Start/Stop Character	Decide whether to include the start/stop characters "*" in the data being transmitted.	No
Verify Check Digit	Decide whether to verify the check digit. If the check digit is incorrect, the barcode will not be accepted.	No
Transmit Check Digit	Decide whether to include the check digit in the data being transmitted.	Yes
Code 39 Full ASCII	Code 39 Full ASCII includes all the alphanumeric and special characters.	Disable
Code 93		**Enable**
MSI		**Disable**
Verify Check Digit	Select one of the three calculation formulas to verify the check digit. If the check digit is incorrect, the barcode will not be accepted. ▶ Single Modulo 10 ▶ Double Modulo 10 ▶ Modulo 11 & 10	Single Modulo 10
Transmit Check Digit	Decide whether to include the check digit in the data being transmitted. ▶ Last digit not transmitted ▶ Both digits transmitted ▶ Both digits not transmitted	Both digits transmitted

Select Length	▶ One or two fixed lengths ▶ Range	4~127
Negative Barcode		**Disable**
Plessey		**Disable**
Convert to UK Plessey	When applied, each occurrence of the character "A" in the barcode data will be replaced by the character "X".	No
Transmit Check Digit	Decide whether to include the two check digits in the data being transmitted.	Yes
Telepen		**Disable**
Original Telepen (Numeric)	The original Telepen includes numeric characters.	Yes
AIM Telepen (Full ASCII)	AIM Telepen (Full ASCII) includes all the alphanumeric and special characters.	No
GS1 DataBar-14 (RSS-14)		**Disable**
GS1 DataBar-14 is short for GS1 DataBar Omnidirectional. This group consists of (1) GS1 DataBar Omnidirectional, (2) GS1 DataBar Truncated, (3) GS1 DataBar Stacked, and (4) GS1 DataBar Stacked Omnidirectional.		
Transmit Code ID	Decide whether to include Code ID ("]e0") will be included in the data being transmitted.	Yes
Transmit Application ID	Decide whether to include the Application ID ("01") in the data being transmitted.	Yes
Transmit Check Digit	Decide whether to include the check digit in the data being transmitted.	Yes
GS1 DataBar Limited (RSS Limited)		**Disable**
Transmit Code ID	Refer to RSS-14.	Yes
Transmit Application ID	Refer to RSS-14.	Yes
Transmit Check Digit	Refer to RSS-14.	Yes
GS1 DataBar Expanded (RSS Expanded)		**Disable**
This group consists of (1) GS1 DataBar Expanded, and (2) GS1 DataBar Expanded Stacked.		
Transmit Code ID	Refer to RSS-14.	Yes
EAN-8		**Enable**
Convert to EAN-13	The EAN-8 barcode will be expanded into EAN-13, and the next processing will follow the settings configured for EAN-13.	No
Transmit Check Digit	Decide whether to include the check digit in the data being transmitted.	Yes
Addon 2 / Addon 5	Decide whether to decode EAN-8 with addons.	No
EAN-13 / UPC-A		**Enable**
ISBN Conversion	The EAN-13 barcode starting with 978 and 979 will be converted to ISBN.	No
ISSN Conversion	The EAN-13 barcode starting with 977 will be converted to ISSN.	No

GTIN for EAN-13	The EAN-13 barcode will be expanded into 14-digit Global Trade Item Number (GTIN).	No
Transmit Check Digit	Decide whether to include the check digit in the data being transmitted.	Yes
Addon 2 / Addon 5	Decide whether to decode EAN-13/UPC-A with addons.	No
(UPC-A) Convert to EAN-13	The UPC-A barcode will be expanded into EAN-13, and the next processing will follow the settings configured for EAN-13.	Yes
(UPC-A) Transmit Check Digit	Decide whether to include the UPC-A check digit in the data being transmitted.	Yes
(UPC-A) Transmit System Number	Decide whether to include the UPC-A System Number in the data being transmitted.	Yes
UPC-E		**Enable**
UPC-E0 / UPC-E1	Decide whether to decode the UPC-E0 barcodes only or both UPC-E0 and UPC-E1 barcodes.	UPC-E0 only
Convert to UPC-A	The UPC-E barcode will be expanded into UPC-A, and the next processing will follow the settings configured for UPC-A.	No
Transmit Check Digit	Decide whether to include the UPC-E check digit in the data being transmitted.	Yes
Transmit System Number	Decide whether to include the UPC-E System Number in the data being transmitted.	No
Addon 2 / Addon 5	Decide whether to decode UPC-E with addons.	No

Note: UPC-E1 is supported with decoder version 1.02 or later.

2D IMAGER

The tables below list reader settings as well as symbology settings for the 2D scan engine.

2D Engine	Description	Default
Decode Time-out	Set the maximum time for decoding to continue during a scan attempt. ▸ 1~9 (second)	**3 sec.**
Decode Illumination	Decide whether to flash illumination on every barcode capture to aid decoding. ▸ Turn On (Internal LED) ▸ Turn Off	**On**
Aiming Pattern	Decide whether to project the aiming pattern during barcode capture. ▸ Turn On ▸ Turn Off	**On**
Redundancy Level		**Level 1**
Level 1	The following barcodes must be successfully read twice before being decoded: | Barcode Types	Code Length
---	---
Codabar	8 characters or less
MSI	4 characters or less
Industrial 25 (Discrete 25)	8 characters or less
Interleaved 25	8 characters or less		
Level 2	All barcodes must be successfully read twice before being decoded.	
Level 3	All barcodes except for the following barcodes must be successfully read twice before being decoded. The following barcodes must be read three times: | Barcode Types "Excluded"	Code Length
---	---
Codabar	8 characters or less
MSI	4 characters or less
Industrial 25 (Discrete 25)	8 characters or less
Interleaved 25	8 characters or less		

Level 4	All barcodes must be successfully read three times before being decoded.	
Security Level	Select a decode security level appropriate for the barcode quality when reading delta barcodes such as Code 128, Code 93, UPC/EAN. ▶ Security Level 0 – This default setting allows the scan engine to operate in its most aggressive state, providing sufficient security in decoding most "in-spec" barcodes. ▶ Security Level 1 – Select this option if misdecodes occur. This level should eliminate most misdecodes. ▶ Security Level 2 – Select this option if Security Level 1 fails to eliminate misdecodes. ▶ Security Level 3 – Select this option if Security Level 2 also fails to eliminate misdecodes. However, selecting this option impairs the decoding ability of the scan engine. If this level of security is necessary, try to improve the barcode quality.	**Level 0**

SYMBOLOGY SETTINGS TABLE

1D SYMBOLOGIES

2D Engine	Description	Default
Codabar		**Enable**
CLSI Editing	When applied, the CLSI editing strips the start/stop characters and inserts a space after the first, fifth, and tenth characters of a 14-character Codabar barcode. ▸ The 14-character barcode length does not include start/stop characters.	No
NOTIS Editing	Decide whether to include the start/stop characters in the data being transmitted. ▸ NOTIS Editing is to strip the start/stop characters, which equals to "Disable Transmit Start/Stop Characters".	No
Select Length	▸ One or two fixed lengths ▸ Range (1~55)	4~55
Intercharacter Gap Size	The Code 39 and Codabar symbologies have an intercharacter gap that is typically quite small. Due to various barcode printing technologies, this gap can grow larger than the maximum size allowed, preventing the scan engine from decoding a barcode. If this problem occurs, set it to "Large Intercharacter Gaps" to tolerate these out-of-specification barcodes. ▸ Normal intercharacter gaps ▸ Large intercharacter gaps	Normal
Code 128		---
Code 128	Read standard Code 128 barcodes (= without leading FNC1 character).	Enable
GS1-128 (UCC/EAN-128)	Read GS1-128 barcodes with leading FNC1 character.	Enable
ISBT 128	Read ISBT 128 barcodes.	Enable
ISBT Concatenation	Decide whether to decode and concatenate pairs of ISBT barcodes. ▸ Disable ▸ Enable – When this option is selected, there must be two ISBT barcodes for the scanner to decode and perform concatenation. ▸ Auto-discriminate – When this option is selected, the scanner decodes and concatenates pairs of ISBT barcodes immediately. If only a single ISBT barcode is present, the scanner must decode 10 times before transmitting its data to confirm that there is no additional ISBT barcode.	Disable

ISBT Concatenation Redundancy	When "Auto-discriminate" is applied, decide the concatenation redundancy (2~20 times).	10 times
Industrial 25 (Discrete 25)		**Enable**
Select Length	▶ One or two fixed lengths ▶ Range (1~55)	4~55
Interleaved 25		**Enable**
Convert to EAN-13	Convert a 14-character barcode into EAN-13 if the following requirements are met: ▶ The barcode must have a leading 0 and a valid EAN-13 check digit. ▶ "Verify Check Digit" must be disabled.	No
Verify Check Digit	Decide whether to verify the check digit. If desired, select one of the algorithms below. If the check digit is incorrect, the barcode will not be accepted. ▶ No ▶ USS algorithm ▶ OPCC algorithm	No
Transmit Check Digit	Decide whether to include the check digit in the data being transmitted.	No
Select Length	▶ One or two fixed lengths ▶ Range (1~55)	4~55
Matrix 25		**Enable**
Redundancy	Decide whether to enable decode redundancy.	Disable
Verify Check Digit	Decide whether to verify the check digit. If the check digit is incorrect, the barcode will not be accepted.	No
Transmit Check Digit	Decide whether to include the check digit in the data being transmitted.	No
Select Length	▶ One or two fixed lengths ▶ Range (1~55)	4~55
Chinese 25		**Enable**
Code 39		**Enable**
Convert to Code 32	Convert to Italian Pharmacode.	No
Code 32 Prefix	Prefix character "A" to Code 32 barcodes.	No
Verify Check Digit	Decide whether to verify the check digit. If the check digit is incorrect, the barcode will not be accepted.	No
Transmit Check Digit	Decide whether to include the check digit in the data being transmitted. ▶ "Verify Check Digit" must be enabled.	No
Code 39 Full ASCII	Code 39 Full ASCII includes all the alphanumeric and special characters.	Disable

Trioptic Code 39	Decide whether to decode Trioptic Code 39. ▶ Trioptic Code 39 is a variant of Code 39 used in the marking of computer tape cartridges. It always contains six characters.	Disable
Select Length	▶ One or two fixed lengths ▶ Range (1~55)	4~55
Intercharacter Gap Size	The Code 39 and Codabar symbologies have an intercharacter gap that is typically quite small. Due to various barcode printing technologies, this gap can grow larger than the maximum size allowed, preventing the scan engine from decoding a barcode. If this problem occurs, set it to "Large Intercharacter Gaps" to tolerate these out-of-specification barcodes. ▶ Normal intercharacter gaps ▶ Large intercharacter gaps	Normal
Code 93		**Enable**
Select Length	▶ One or two fixed lengths ▶ Range (1~55)	4~55
MSI		**Enable**
Verify Check Digit	If Two Check Digits option is selected, an additional verification is required to ensure integrity. Select one of the algorithms below. If the check digit is incorrect, the barcode will not be accepted. <table><tr><td>Check Digit</td><td>Algorithm</td></tr><tr><td>One Check Digit</td><td>Single Modulo 10</td></tr><tr><td>Two Check Digits</td><td>▶ Mod 10/Mod 11 ▶ Mod 10/Mod 10</td></tr></table>	Single Modulo 10
Transmit Check Digit	Decide whether to include the check digit in the data being transmitted.	No
Select Length	▶ One or two fixed lengths ▶ Range (1~55)	4~55
GS1 DataBar (RSS)		**---**
GS1 Databar-14	GS1 DataBar-14 is short for GS1 DataBar Omnidirectional. This group consists of (1) GS1 DataBar Omnidirectional, (2) GS1 DataBar Truncated, (3) GS1 DataBar Stacked, and (4) GS1 DataBar Stacked Omnidirectional.	Enable
GS1 Databar Limited		Enable
GS1 Databar Expanded	This group consists of (1) GS1 DataBar Expanded, and (2) GS1 DataBar Expanded Stacked.	Enable

Convert RSS to UPC/EAN	"Convert to UPC/EAN" only applies to GS1 Databar-14 and GS1 Databar Limited barcodes not decoded as part of a Composite barcode. **Convert to EAN-13** Strip the leading "010" from barcodes. ▶ "01" is the Application ID and must be followed by a single zero (the first digit encoded) **Convert to UPC-A** Strip the leading "0100" from barcodes. ▶ "01" is the Application ID and must be followed by two or more zeros (but not six zeros)	No
EAN-8		**Enable**
Convert to EAN-13	The EAN-8 barcode will be expanded into EAN-13, and the next processing will follow the settings configured for EAN-13.	No
Addon 2 / Addon 5	Refer to UPC/EAN Addon setting.	
EAN-13		**Enable**
Bookland EAN (ISBN)	The EAN-13 barcode starting with 978 will be converted to ISBN.	Yes
Addon 2 / Addon 5	Refer to UPC/EAN Addon setting.	
UPC-A		**Enable**
Transmit Check Digit	Decide whether to include the UPC-A check digit in the data being transmitted.	Yes
Transmit Preamble	Decide whether to include the UPC-A preamble System Number (and Country Code) in the data being transmitted.	System Number
Addon 2 / Addon 5	Refer to UPC/EAN Addon setting.	
UPC-E0		**Enable**
Transmit Check Digit	Decide whether to include the UPC-E0 check digit in the data being transmitted.	Yes
Transmit Preamble	Decide whether to include the UPC-E0 preamble System Number (and Country Code) in the data being transmitted.	System Number
Addon 2 / Addon 5	Refer to UPC/EAN Addon setting.	
Convert to UPC-A	The UPC-E0 barcode will be expanded into UPC-A, and the next processing will follow the settings configured for UPC-A.	No
UPC-E1		**Disable**
Transmit Check Digit	Decide whether to include the UPC-E1 check digit in the data being transmitted.	Yes
Transmit Preamble	Decide whether to include the UPC-E1 preamble System Number (and Country Code) in the data being transmitted.	System Number
Addon 2 / Addon 5	Refer to UPC/EAN Addon setting.	

Convert to UPC-A	The UPC-E1 barcode will be expanded into UPC-A, and the next processing will follow the settings configured for UPC-A.	No
UCC Coupon Extended Code		**Disable**
Read UPC-A barcodes starting with digit "5", EAN-13 barcodes starting with digits "99", and UPC-A/GS1-128 Coupon Codes. ▸ UPC-A, EAN-13, and GS1-128 must be enabled first! ▸ Use "Addon Redundancy" to control auto-discrimination of the GS1-128 (right half) of a coupon code.		
UPC/EAN Addon		**---**
Addon 2 / Addon 5	Decide whether to decode EAN-8, EAN-13, UPC-E0, UPC-E1, UPC-A with addons. ▸ Ignore Addons ▸ Decode Only With Addons ▸ Auto-discriminate	Ignore...
Addon Redundancy	When "Auto-discriminate" is applied, decide the number of times of supplementary decoding for the same barcode to make a valid reading.	10 times
Code 11		**Enable**
Verify Check Digit	Decide whether to verify the check digit. If the check digit is incorrect, the barcode will not be accepted. ▸ No verification ▸ One Check Digit ▸ Two Check Digits	No
Transmit Check Digit	Decide whether to include the check digit in the data being transmitted. ▸ "Verify Check Digit" must be enabled.	No
Select Length	▸ One or two fixed lengths ▸ Range (1~55)	4~55
Postal Codes		**---**
US Postnet		Enable
US Planet		Enable
Transmit US Postal Check Digit	US Postnet or US Planet must be enabled first!	Enable
UK Postal		Enable
Transmit UK Postal Check Digit	UK Postal must be enabled first!	Enable
Japan Postal		Enable
Australian Postal		Enable
Dutch Postal		Enable

Composite Codes		---
Composite CC-C		Enable
Composite CC-A/B		Disable
Composite TLC-39		Disable
GS1-128 Emulation Mode for UCC/EAN Composite Codes	Transmit UCC/EAN Composite Code data as if it was encoded in GS1-128 barcodes.	Disable
UPC Composite Mode	UPC barcodes can be "linked" with a 2D barcode during transmission as if they were one barcode. **UPC Never Linked** Transmit UPC barcodes regardless of whether a 2D barcode is detected. **UPC Always Linked** Transmit UPC barcodes and the 2D portion. If the 2D portion is not detected, the UPC barcode will not be transmitted. ▸ CC-A/B or CC-C must be enabled! **Auto-discriminate UPC Composites** Transmit UPC barcodes as well as the 2D portion if present.	UPC Always Linked

2D SYMBOLOGIES

2D Engine	Description	Default
2D Symbologies		**---**
PDF417		Enable
MicroPDF417		Disable
MicroPDF417 Code 128 Emulation	Transmit data from certain MicroPDF417 barcodes as if it was encoded in Code 128 barcodes. ▸ Transmit AIM Code Identifier in **Miscellaneous Options** must be enabled first! When applied, the MicroPDF417 barcodes are transmitted with one of these prefixes: **The first codeword of MicroPDF417 is 903-907, 912, 914, 915:** The original Code ID "]L3" will be changed to "]C1". **The first codeword of MicroPDF417 is 908 or 909:** The original Code ID "]L4" will be changed to "]C2". **The first codeword of MicroPDF417 is 910 or 911:** The original Code ID "]L5" will be changed to "]C0".	Disable
Data Matrix		Enable
Data Matrix Inverse	Decide whether to decode Data Matrix Inverse. **Regular Only** Decode regular Data Matrix barcodes only. **Inverse Only** Decode inverse Data Matrix barcodes only. **Autodetect** Decode both regular and inverse Data Matrix barcodes.	Regular Only
Maxicode		Enable
QR Code		Enable
QR Code Inverse	Decide whether to decode QR Code Inverse. **Regular Only** Decode regular QR Code only. **Inverse Only** Decode inverse QR Code only.	Regular Only

	Autodetect	
	Decode both regular and inverse QR Code.	
MicroQR		Enable
Aztec		Enable
Aztec Inverse	Decide whether to decode Aztec Inverse.	Regular Only
	Regular Only	
	Decode regular Aztec barcodes only.	
	Inverse Only	
	Decode inverse Aztec barcodes only.	
	Autodetect	
	Decode both regular and inverse Aztec barcodes.	
2D Symbologies - Macro PDF		---
Macro PDF is a special feature for concatenating multiple PDF barcodes into one file, known as Macro PDF417 or Macro MicroPDF417.		
Transmit/Decode Mode	Decide how to handle Macro PDF decoding.	Passthrough All Symbols
	Buffer All Symbols / Transmit Macro PDF When Complete	
	Transmit all decoded data from an entire Macro PDF sequence only when the entire sequence is scanned and decoded. If the decoded data exceeds the limit of 50 symbols, no transmission because the entire sequence was not scanned!	
	Transmit Any Symbol in Set / No Particular Order	
	Transmit data from each Macro PDF symbol as decoded, regardless of the sequence.	
	Passthrough All Symbols	
	Transmit and decode all Macro PDF symbols and perform no processing. In this mode, the host is responsible for detecting and parsing the Macro PDF sequences.	
ESC Characters	When enabled, it uses the backslash "\" as an Escape character for systems that can process transmissions containing special data sequences. It will format special data according to the Global Label Identifier (GLI) protocol, which only affects the data portion of a Macro PDF symbol transmission. The Control Header, if enabled, is always sent with GLI formatting.	None

Note: When printing barcodes, keep each Macro PDF sequence separate, as each has a unique identifier. Do not mix barcodes from several Macro PDF sequences, even if they encode the same data. When you scan Macro PDF sequences, scan the entire Macro PDF sequence without interruption!

IMAGE CAPTURE & MISCELLANEOUS

2D Engine	Description	Default
Image Capture		**Disable**
Image Capture Illumination	Decide whether to flash illumination on every image capture to aid decoding. ▶ Turn On (Internal LED) ▶ Turn Off	On
Image Capture Autoexposure	Decide whether to manually specify the gain and exposure time (only recommended for advanced users with difficult image capture situations).	On
Exposure Time	Only applies when Image Capture Autoexposure is disabled. ▶ Exposure Time controls the amount of time the CCD is allowed to collect light, much like the shutter speed for a camera. Generally, the brighter the environment, the lower the exposure time. Increasing the exposure time past 20 ms in a handheld application increases the risk of blurring the image due to hand jitter. ▶ Set the manual exposure time in the range of 1 ms, 10 ms, 20 ms, 30 ms, 40 ms, 50 ms, 60 ms, 70 ms, 80 ms, 90 ms, 100 ms.	1 ms
Snapshot Aiming Pattern	Decide whether to project the aiming pattern while capturing an image.	On
Image Resolution	Decide how to alter image resolution before compression. Multiple pixels are combined to one pixel, resulting in a smaller image containing the original content with reduced resolution. ▶ 752×480 (Full resolution) ▶ 376×240 (Half resolution) ▶ 188×120 (= 1/4 resolution)	752×480
Image Format	Decide in which file format the image is saved. ▶ JPEG file format ▶ BMP file format	JPEG
Optimized for JPEG Quality	Decide whether JPEG images are optimized for quality. ▶ Cancel the check box so that JPEG images are optimized for size.	Enable
Select JPEG Quality	Set a value from 5 to 100, where "100" represents the highest quality image.	65

Select JPEG Size	Set a value from 5 to 150, which represents the file size in multiples of 1024 bytes (1K). For example, setting this value to 8 permits the file size to be as large as 8192 bytes.	40
Bits per Pixel	Select the number of significant bits per pixel (BPP) to use when capturing an image. ▸ 1 bit per pixel (for black and white images) ▸ 4 BPP (to assign 1 of 16 levels of grey to each pixel) ▸ 8 BPP (to assign 1 of 256 levels of grey to each pixel)	8
Default image store	By default, the captured image is stored under the directory "\DiskOnChip\images" in the format of YYMMDD HHMMSS.jpg or YYMMDDHHMMSS.bmp. ▸ If you want to change the directory, tap [Browse].	\DiskOnChip\ images

Note: (1) For JPEG files, these BPP settings are ignored for it always uses 8 bits per pixel!
(2) When the image capture feature is enabled, press the [SCAN] button and it will capture an image instead of reading a barcode.

Miscellaneous Options		---
Transmit Code ID	Decide whether to include AIM Code ID in the beginning of data. Each AIM Code ID contains the three-character string "**]cm**" – ▸] = Flag Character (ASCII 93) ▸ c = Code Character (see below) ▸ m = Modifier Character (see below)	Disable

AIM CODE ID – CODE CHARACTERS

Code Character	Code Type
A	Code 39, Code 39 Full ASCII, Code 32
C	Code 128, Coupon (Code 128 portion)
d	Data Matrix
E	UPC/EAN, Coupon (UPC portion)
e	GS1 DataBar (RSS)
F	Codabar
G	Code 93
H	Code 11
I	Interleaved 25
L	PDF417, Macro PDF417, Micro PDF417
M	MSI
Q	QR Code
S	Industrial 25 (Discrete 25), IATA 2 of 5
U	Maxicode
X	Code 39 Trioptic, Bookland EAN, US Postnet, US Planet, UK Postal, Japan Postal, Australian Postal, Dutch Postal

AIM CODE ID – MODIFIER CHARACTERS

Code Type	Option Value	Option
Code 39	0	No check character or Full ASCII processing.
	1	Check digit has been verified.
	3	Check digit has been verified and stripped.
	4	Full ASCII conversion has been performed.
	5	Result of option values 1 and 4.
	7	Result of option values 3 and 4.
Code 128	0	Standard data packet. No Function Code 1"FNC1" in the first character position.
	1	Function Code 1"FNC1" in the first character position.
	2	Function Code 1"FNC1" in the second character position.
Interleaved 25	0	No check digit processing.
	1	Check digit has been verified.
	3	Check digit has been verified and stripped.
Codabar	0	No check digit processing.
Code 93	0	Always transmit 0.

MSI	0	Modulo 10 check digit verified and transmitted.
	1	Modulo 10 check digit verified but not transmitted.
Industrial 25 (Discrete 25)	0	Always transmit 0.
UPC/EAN	0	Standard data packet in full EAN country code format, which is 13 digits for UPC-A and UPC-E (not including addons).
	3	Standard data packet with two-digit or five-digit addons.
	4	EAN-8 data packet.
	A UPC-A with Addon 2 barcode, 012345678905-10, is transmitted to the host as a 18-character string, `]E30`01234567890510.	
Bookland EAN	0	Always transmit 0.
Trioptic Code 39	0	Always transmit 0.
Code 11	0	Single check digit (has been verified.)
	1	Two check digits (has been verified.)
	3	Check digit has been verified but not transmitted.
GS1 DataBar (RSS)	0	Always transmit 0.
	RSS-14 and RSS Limited will be transmitted with an Application Identifier "01". For example, an RSS-14 barcode, 10012345678902, is transmitted as `]e00`110012345678902.	

Note: In GS1-128 emulation mode, RSS is transmitted using Code 128 rules (= "`]C1`").

EAN.UCC Composites (RSS, GS1-128, 2D portion of UPC composite)	Native mode transmission	
	0	Standard data packet
	1	Data packet containing the data following an encoded symbol separator character.
	2	Data packet containing the data following an escape mechanism character. The data packet does not support the ECI protocol.
	3	Data packet containing the data following an escape mechanism character. The data packet supports the ECI protocol.
	GS1-128 emulation	
	1	Data packet is a GS1-128 barcode (= data is preceded with "`]JC1`").

Note: UPC portion of composite is transmitted using UPC rules.

PDF417, Micro PDF417	0	Scan engine is set to conform to protocol defined in 1994 PDF417 symbology specifications.
		▶ When this option is transmitted, the receiver cannot reliably determine whether ECIs have been invoked or whether data byte 92_{DEC} has been doubled in transmission.

	1	Scan engine is set to follow the ECI protocol (Extended Channel Interpretation). All data characters 92_{DEC} are doubled.
	2	Scan engine is set for Basic Channel operation (no escape character transmission protocol). Data characters 92_{DEC} are not doubled. ▸ When decoders are set to this mode, unbuffered Macro symbols and symbols requiring the decoder to convey ECI escape sequences cannot be transmitted.
	3	The barcode contains a GS1-128 symbol, and the first codeword is 903-907, 912, 914, 915.
	4	The barcode contains a GS1-128 symbol, and the first codeword is in the range 908-909.
	5	The barcode contains a GS1-128 symbol, and the first codeword is in the range 910-911.
	A PDF417 barcode, ABCD, with no transmission protocol enabled, is transmitted as]L2ABCD.	
Data Matrix	0	ECC 000-140, not supported.
	1	ECC 200.
	2	ECC 200, FNC1 in first or fifth position.
	3	ECC 200, FNC1 in second or sixth position.
	4	ECC 200, ECI protocol implemented.
	5	ECC 200, FNC1 in first or fifth position, ECI protocol implemented.
	6	ECC 200, FNC1 in second or sixth position, ECI protocol implemented.
Maxicode	0	Mode 4 or 5
	1	Mode 2 or 3
	2	Mode 4 or 5, ECI protocol implemented.
	3	Mode 2 or 3, ECI protocol implemented in secondary message.
QR Code	0	Model 1
	1	Model 2, ECI protocol not implemented.
	2	Model 2, ECI protocol implemented.
	3	Model 2, ECI protocol not implemented, FNC1 implied in first position.
	4	Model 2, ECI protocol implemented, FNC1 implied in first position.
	5	Model 2, ECI protocol not implemented, FNC1 implied in second position.
	6	Model 2, ECI protocol implemented, FNC1 implied in second position

KEY REFERENCE TABLES

29-KEY KEYPAD

USE OF ALPHA (α) / FUNCTION (fn)

Key	Alpha key pressed once	Alpha key pressed twice	Key	Function key pressed once	Function key pressed twice
1	null	null	1	F1	1
2	ABC	abc	2	F2	2
3	DEF	def	3	F3	3
4	GHI	ghi	4	F4	4
5	JKL	jkl	5	F5	5
6	MNO	mno	6	F6	6
7	PQRS	pqrs	7	F7	7
8	TUV	tuv	8	F8	8
9	WXYZ	wxyz	9	F9	9
0	/_	/_	0	F11	0
*	-+	-+	*	F10	*
#	.\	.\	#	F12	#

USE OF SHIFT (⬆)

Key	Shift key pressed once
1	!
2	@
3	#
4	$
5	%
6	^
7	&
8	?
9	(
0	)
*	<
#	>

QWERTY KEYPAD

USE OF ALPHA (α) & SHIFT (⇧)

Alpha Mode

Key	Alpha key pressed once	Alpha key pressed twice	Key	Shift key pressed once	Shift key pressed twice
#	q	#	#	Q	Q
1	w	1	1	W	W
2	e	2	2	E	E
3	r	3	3	R	R
(	t	(	(	T	T
)	y	)	)	Y	Y
/	u	/	/	U	U
*	i	*	*	I	I
-	o	-	-	O	O
+	p	+	+	P	P
!	a	!	!	A	A
4	s	4	4	S	S
5	d	5	5	D	D
6	f	6	6	F	F
<	g	<	<	G	G

Key	Alpha key pressed once	Alpha key pressed twice	Key	Shift key pressed once	Shift key pressed twice
>	h	>	>	H	H
\	j	\	\	J	J
^	k	^	^	K	K
%	l	%	%	L	L
=	$	=	=	$	$
7	z	7	7	Z	Z
8	x	8	8	X	X
9	c	9	9	C	C
?	v	?	?	V	V
:	b	:	:	B	B
;	n	;	;	N	N
,	m	,	,	M	M
.	@	.	.	@	@
0	&	0	0	&	&

USE OF SHIFT (⇧)

Numeric Mode

Key	Shift key pressed once
1	!
2	@
3	#
4	$
5	%
6	^
7	&
8	*
9	(
0	)

USE OF FUNCTION (Fn)

Key	Function key pressed once	Function key pressed twice
F1	F11	F1
F2	F12	F2
F3	F13	F3
F4	F14	F4
F5	F15	F5
F6	F16	F6
F7	F17	F7
F8	F18	F8
F9	F19	F9
F10	F20	F10