

CipherLab Reference Manual

CRADLE
4GC-8001
For 8001 Series Mobile Computers

Version 1.00



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IMPORTANT NOTICES

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 adapter. 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 cradle is intended for indoor use only. It may do damage to the cradle ~~when~~ being exposed to extreme temperatures or soaked wet.
- 🧼 When the body of the cradle gets dirty, use a clean and wet cloth to wipe off the dust. DO NOT use/mix any bleach or cleaner. Always keep the cradle dry.
- 🧼 If you shall find the cradle malfunctioning, write down the specific scenario ~~and~~ consult your local sales representative.

FOR USA

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

- 📶 Reorient or relocate the receiving antenna.
- 📶 Increase the separation between the equipment and receiver.
- 📶 Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- 📶 Consult the dealer or an experienced radio/TV technician for help.

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

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

This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

Radiation Exposure Statement:

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

RELEASE NOTES

Version	Date	Notes
1.00	Apr. 10, 2015	Initial release

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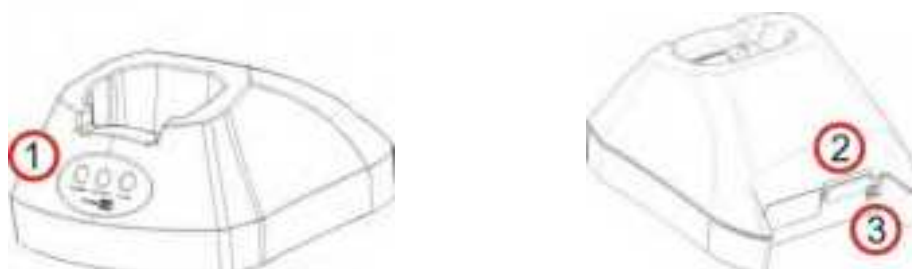
INTRODUCTION

Capable of charging the 3.7 V, 700 mAh Li-ion battery, the 4G Cradle is specifically designed for 8001 Series Mobile Computers to connect to WWAN via 4G data services.

This manual serves to guide you through how to install, configure, and operate the 4G Cradle. We recommend keeping 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!

4G CRADLE



No.	Description	No.	Description
1	LED Indicators (POWER, TX/RX, LAN)	2	SIM Card Slot
3	Power Jack		

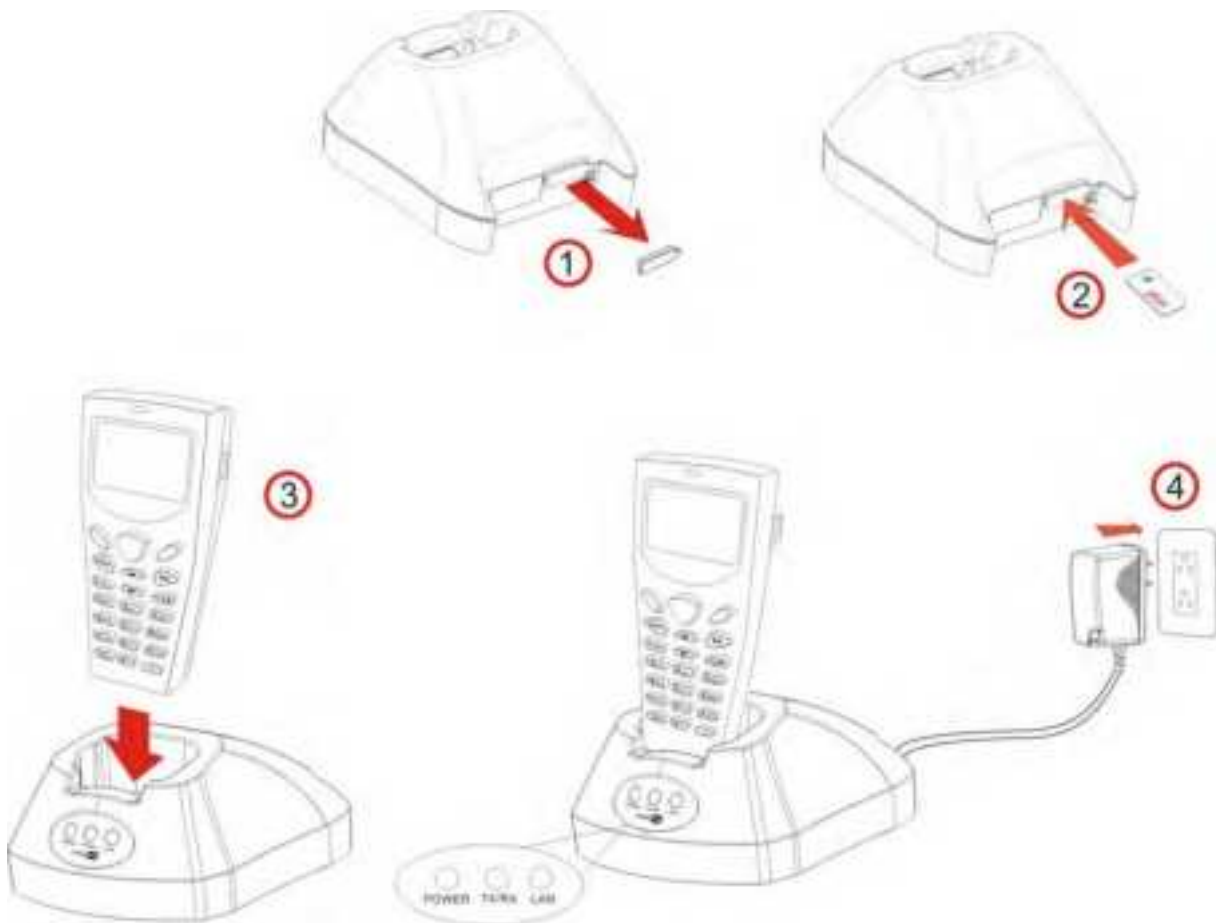
Note: It is recommended that the charging devices be operated at room temperature (18°C to 25°C) for optimal performance. The charging devices will not charge the battery when the temperature drops below 0°C or exceeds 40°C.

INSTALLATION

- 1) Remove the rubber cover at the back of the cradle.
- 2) Insert your SIM card and replace the rubber cover.

The SIM card orientation is as shown in the illustration below, with contacts facing down. Refer to Chapter 3 [Using 8001 to Configure 4G Cradle](#).

- 3) Seat the mobile computer in the cradle.
- 4) Connect the power supply cord to a suitable power outlet, and the cradle's POWER indicator will become red. The cradle is ready for charging the mobile computer.



Note: You need to take out your SIM card when it is not in use. Always disconnect the power supply before removing the SIM card.

HARDWARE FEATURES

4G Cradle:

 WWAN – 4G


 Supported Bands

- B4 / B12 /B13

Note: Depends on carrier support.

IN 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 cradle.

 4G Cradle, complete set including power adapter and supply cord




 Quick Start Guide

USING 4G CRADLE

The 4G Cradle is a charging & communication cradle, specifically designed for connecting CipherLab 8001 Series Mobile Computers to WWAN via 4G data services.

This chapter explains the working mode supported by the 4G Cradle. For quick deployment, we provide a utility (.SHX) that can be downloaded to your mobile computer and used to configure, test, and upgrade firmware of as many cradles as you have. Refer to Chapter 3 [Using 8001 to Configure 4G Cradle](#) and Chapter 4 [Upgrading Firmware](#).

Please contact your Internet service provider (ISP) or network operator for information on 4G related settings, such as

-  APN (name of access point that connects the mobile network to the Internet)
-  IP address (DHCP or static)
-  User name and password (may be optional, depending on Challenge-Handshake Authentication Protocol)

Note: It is recommended having the charging devices operate at room temperature (18°C to 25°C) for optimal performance. The charging devices will not charge the battery when the temperature drops below 0°C or exceeds 40°C.

1.1 WORKING MODE

1.1.1 MODEM MODE

It works as a 4G modem.

1.2 UNDERSTANDING STATUS INDICATORS

The cradle provides three LED indicators on the front panel to indicate status. Refer to Chapter 2 [How Modem Mode Works](#) for information on the initialization stages after powering on the cradle.

Normally, when the power cord is good and properly connected, the POWER indicator will become solid.

POWER	TX/RX	LAN	STATUS
Solid Red	--	--	Power on
Off	--	--	Power off
Solid Red	Flashing Green	Flashing Green	Initializing
Solid Red	Off	Slow Flashing Green (1s period)	Standby
Solid Red	Flashing Green	Off	Initialization Error
Solid Red	Off	Fast Flashing Green (0.3s period)	Dialing Out
Solid Red	Off	Solid Green	Connected
Solid Red	Flashing Green	Solid Green	Data Transferring

HOW MODEM MODE WORKS

Referring to the flow chart on the next page, the TX/RX and LAN indicators are used to indicate a specific stage of initialization, data connection, as well as firmware download. They are explained below (by number).

1) Initializing

During powering on, the TX/RX and LAN indicators will flash in turn at 0.25-second time intervals for 60 seconds, indicating the cradle is in initialization process.

2) Initialization OK

If initialization is done successfully, the LAN indicator will flash at the time interval of 1 second, waiting for AT commands.

3) Initialization NG

If initialization fails, the TX/RX indicator will flash at the time interval of 0.5 seconds, indicating an error occurs. For example, it might fail to pass PIN authentication, the signal strength is weak for the network, the Access Point name is incorrect, etc. For details on the specific initialization error, use "[AT+ERR?](#)" to get the error code. Although initialization fails, the cradle can still accept AT commands. In case of the "[ATDT](#)" command, it will re-initialize before dialing out.

4) Dialing out

When in Dial mode ([ATDT](#)), the LAN indicator will flash at the time interval of 0.3 seconds for 20 seconds.

5) Connected

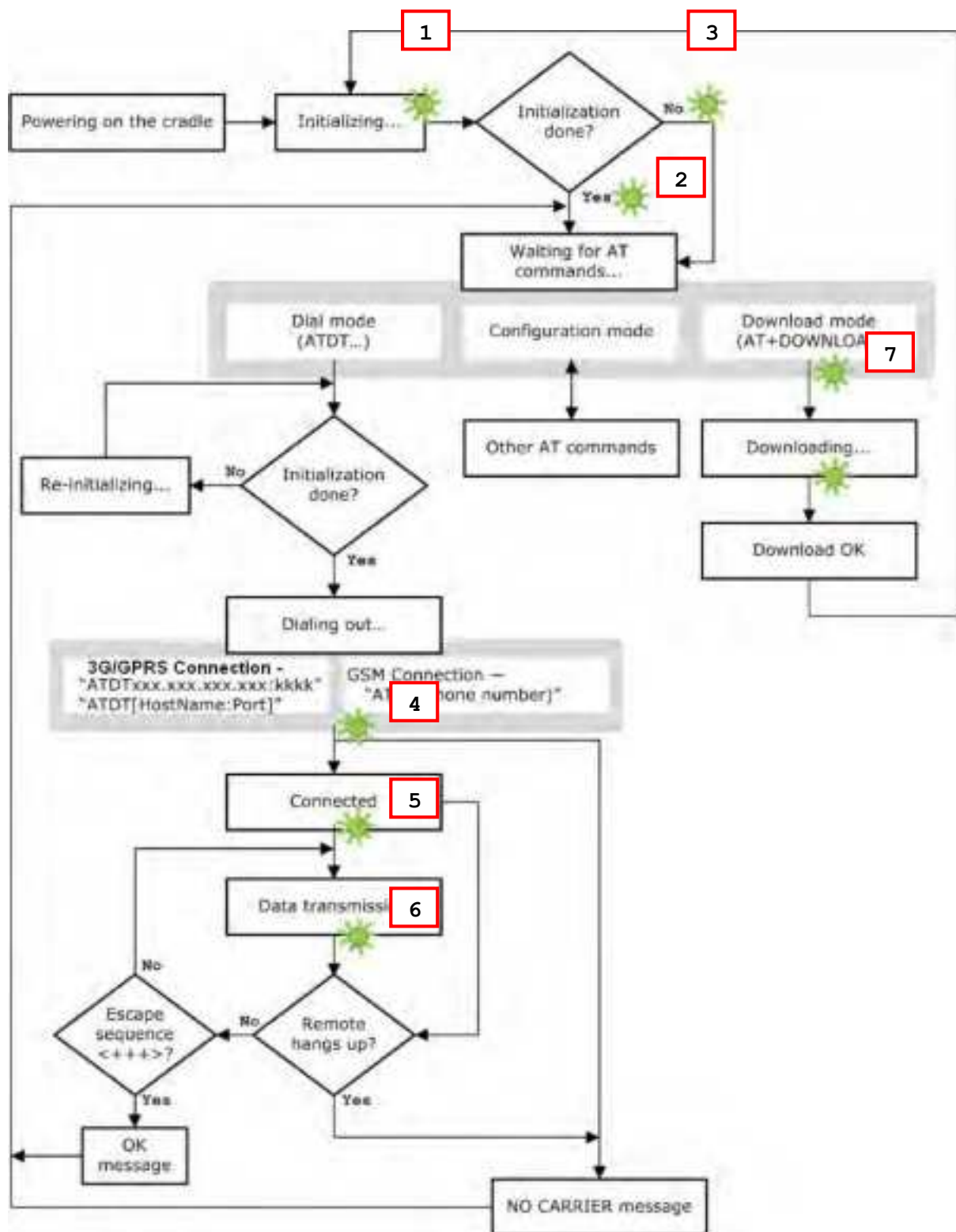
When in Dial mode ([ATDT](#)), the LAN indicator will become green after successfully establishing a connection.

6) Data Transmission

When in Dial mode ([ATDT](#)), the TX/RX indicator will flash as long as data transmission occurs.

7) Download Ready/Downloading

When in Download mode ([AT+DOWNLOAD](#)), the TX/RX and LAN indicators will flash to indicate the cradle is ready for downloading or downloading is in progress.



2.1 DIALING OUT




When the mobile computer is seated in the cradle, it can send the collected data back to a remote server, as well as download lookup files, via 4G .

When dialing out ([ATDT](#)), the LED of LAN will flash at the time interval of 0.3 seconds for 20 seconds. When connected, the LED of LAN will become green after successfully establishing a connection. The LED of TX/RX will flash as long as data transmission occurs.

Note: It is suggested to issue the command "[AT](#)" every five seconds for best practice, in order to check whether the mobile computer is seated in the cradle.
The escape sequence, consisting of three characters "[+++](#)", is used to terminate the data connection.

2.1.2 4G CONNECTION

When initialization is done, issue [ATDT](#)xxx.xxx.xxx.xxx:kkkk or [ATDT](#)[HostName:Port] to establish data connection via 4G . The buffer size of the cradle is 1460 bytes, and data packet will be sent out as long as it satisfies any of the following requirements:

-  buffer is full (= maximum packet size is 1460 bytes)
-  delimiter character is encountered
-  end of transmission timeout (= no transmission for 5 milliseconds)

2.2 CONFIGURING THE CRADLE

Regardless of the result of initialization, you can issue AT commands to configure the cradle, such as

- ☞ Perform the echo test between the mobile computer and the cradle.
- ☞ Write the current settings to flash or load factory defaults.
- ☞ Get the hardware version (Serial Number) or firmware version of the cradle.
- ☞ Set PIN authentication, enable or disable.
- ☞ Change PIN code of SIM card.
- ☞ Send delimiter during data transmission.
- ☞ For 4G connection — Change Access Point name, apply Challenge-Handshake Authentication Protocol (CHAP), and so on.

2.2.1 GENERAL SETTINGS

AT Commands	Description	4G
AT	Get echo from the cradle.	✓
ATF	Load factory defaults.	✓
ATW	Write the current settings to flash.	✓
AT+KVER?	Get the firmware version of the cradle kernel program.	✓
AT+SN?	Get the serial number of the cradle.	✓
AT+VER?	Get the firmware version of the cradle user program.	✓
AT+CGSN?	Get the IMEI number.	✓
錯誤! 找不到參照來源。 =	Set Baud rate	✓

2.2.2 CONNECTION SETTINGS

AT Commands	Description	4G
AT+CLCK=SC, 2	Get the information about whether PIN authentication is applied to the facility lock of SIM card.	✓
AT+CLCK=SC, <Parameter>, <PIN>	Set PIN authentication, enable or disable.	✓
AT+CPIN?	Get the information about whether PIN or PUK code is required.	✓
AT+CPIN=	Set PIN code for authentication.	✓
AT+CPWD=SC	Change PIN code of SIM card.	✓
AT+DLMT?	Get the delimiter check status, as well as the delimiter character if in use.	✓

AT+DLMT=	Set the delimiter check, enable or disable.	✓
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AT+APN?	Get the Access Point Name (APN) currently in use.	✓
AT+APN=	Set the Access Point Name (APN) you want to connect to.	✓
AT+CHAP?	Get the Challenge-Handshake Authentication Protocol (CHAP) setting.	✓
AT+CHAP=	Set the Challenge-Handshake Authentication Protocol (CHAP) setting, enable or disable.	✓
AT+DHCP?	Get the Dynamic Host Configuration Protocol (DHCP) setting.	✓
AT+DHCP=	Set the Dynamic Host Configuration Protocol (DHCP) setting, enable or disable.	✓
AT+IP?	Get the fixed IP address of the cradle.	✓
AT+IP=	Set the fixed IP address of the cradle.	✓
AT+PSW?	Get the password for Challenge-Handshake Authentication Protocol (CHAP).	✓
AT+PSW=	Set the password for Challenge-Handshake Authentication Protocol (CHAP).	✓
AT+USER?	Get the user name for Challenge-Handshake Authentication Protocol (CHAP).	✓
AT+USER=	Set the user name for Challenge-Handshake Authentication Protocol (CHAP).	✓

USING 8001 TO CONFIGURE 4G CRADLE

For deployment engineers, download the runtime program "8000Deploy4G.shx" to the mobile computer, and then use it to deploy a set of standard settings to the cradle, as well as perform functionality testing.

- 1) Run one of the CipherLab download utilities on your desktop computer, for example, "ProgLoad.exe". Choose the correct interface, COM port, baud rate, file type, and browse the file system to locate the utility "8000Deploy4G.shx".
- 2) Press [8]+[Power] on the mobile computer to turn it on and access the Program Manager menu.

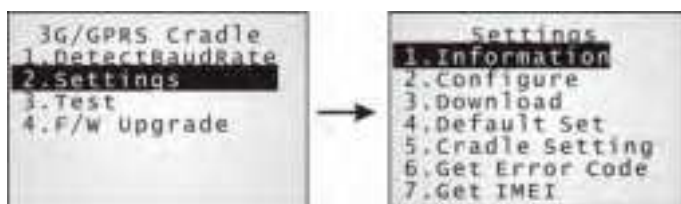
You may download the program directly to the active memory sector "ACT", or to an empty sector and activate the program later. Choose the correct interface and baud rate that match the settings on your desktop computer.

- 3) Upon completion of the download process, you have to activate the program if it is downloaded to an empty sector.
- 4) The program "8000Deploy4G.shx" will start itself in a few seconds.
- 5) Set Baud rate, if necessary (please refer to [3.1 Detect Baud Rate](#)).
- 6) Go to **2. Settings | 2. Configure** to configure cradle settings, such as PIN code, name of access point, etc.



Note: You must input the correct PIN code even though authentication is disabled!

You can check all these settings via **2. Settings | 1. Information**.



Go through the following steps with each cradle:

- 7) Connect the power supply cord to a suitable power outlet.

Note: After powering on, the POWER indicator will become red. The TX/RX and LAN indicators will flash in turn at 0.25-second time intervals for 60 seconds, indicating the cradle is in initialization process. Then, TX/RX indicator will keep on flashing, indicating a failure in initialization due to lack of SIM card. Ignore it!

- 8) Seat the mobile computer in the cradle.

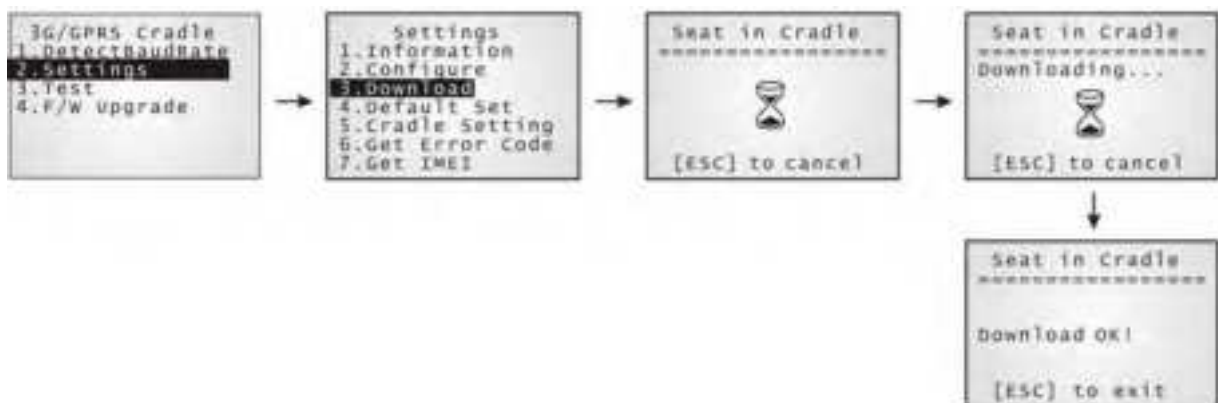
Go to **2. Settings | 4. Default Set** to reset the cradle.



- 9) Disconnect the power supply cord.
- 10) Insert SIM card to the cradle.
- 11) Re-connect the power supply cord.

Note: After powering on, the POWER indicator will become red. The TX/RX and LAN indicators will flash in turn at 0.25-second time intervals for 60 seconds, indicating the cradle is in initialization process. Then, the LEDs will flash differently according to the status: (1) If the TX/RX indicator flashes, it means initialization failed due to incorrect PIN; (2) If the LAN indicator flashes, it means initialization is done successfully, either with correct PIN or PIN not required at all.

- 12) Go to **2. Settings | 3. Download** to download your settings to the cradle.



- 13) Disconnect the power supply cord.
- 14) Re-connect the power supply cord.

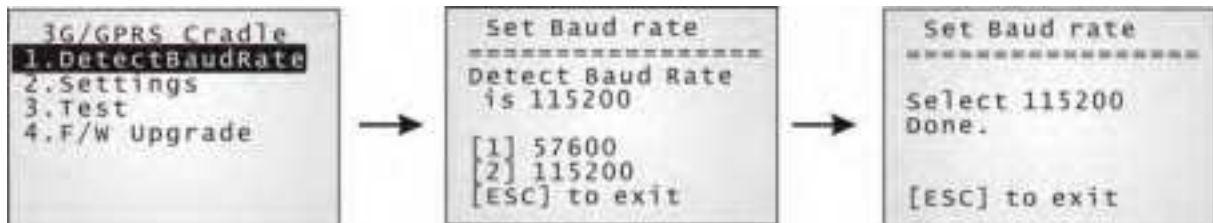
Note: After powering on, the POWER indicator will become red. The TX/RX and LAN indicators will flash in turn at 0.25-second time intervals for 60 seconds, indicating the cradle is in initialization process. Then, the LEDs will flash differently according to the status: (1) If the TX/RX indicator flashes, it means initialization failed due to incorrect PIN; (2) If the LAN indicator flashes, it means initialization is done successfully, either with correct PIN or PIN not required at all.

- 15) Perform echo tests if necessary.

3.1 DETECT BAUD RATE

4G Cradle provides users with the function to switch between Baud rates (57600 or 115200 bps). The default value is 115200bps for greater amounts of data transmission.

Select **1. DetectBaudRate** on the main menu.



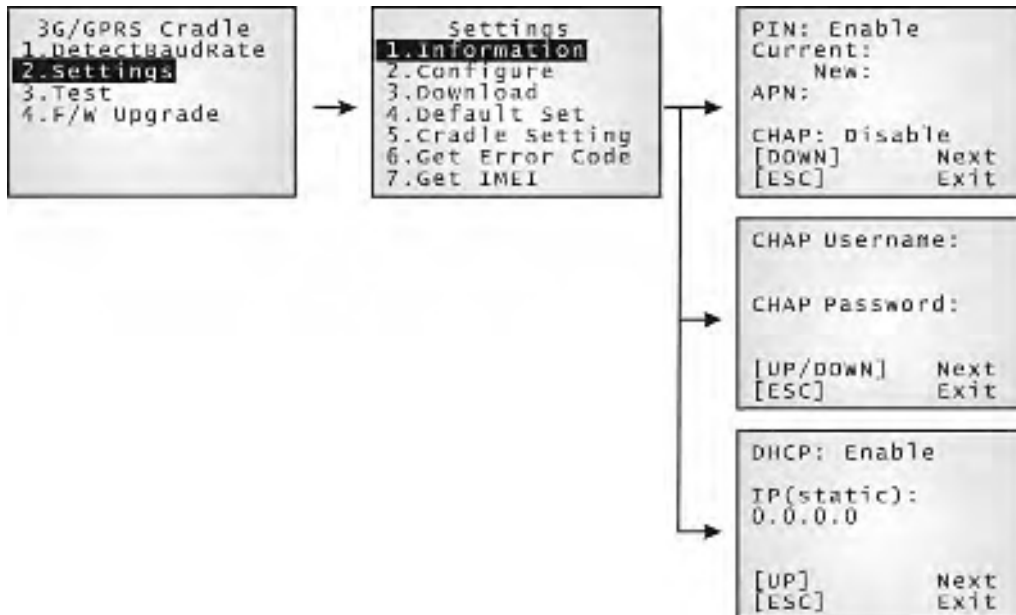
After entering the "DetectBaudRate" item, the mobile computer will detect and display the current Baud rate. Press the [1] or [2] key to select the corresponding Baud rate, or press the [ESC] key to back to the previous menu.

After the [1] or [2] key is pressed, the message shows up indicating Baud rate setting is done. Once the Baud rate setting is changed, system will immediately have the setting take effect and save it. Next time the device will power up with the new setting.

3.2 VIEW THE SETTINGS

3.2.1 PREVIEW THE NEW SETTINGS

In order to double-check the cradle configuration you are working on, information of the new settings can be previewed here. Press the Up or Down key to turn pages.



PIN (for authentication)

When enabled, it means you need to provide PIN code for authentication while connecting the cradle to a 4G network. If the current and new PIN codes are blank, you have to input the PIN code via the Configure menu.

When disabled, it means authentication is disabled; however, you still have to input the correct PIN code as the current one in use.

APN

Name of access point that connects the mobile network to the Internet — For establishing a 4G connection, you have to provide the access point name.

CHAP

Challenge-Handshake Authentication Protocol — When enabled, user name and password are required.

DHCP

When enabled, DHCP server is in use.

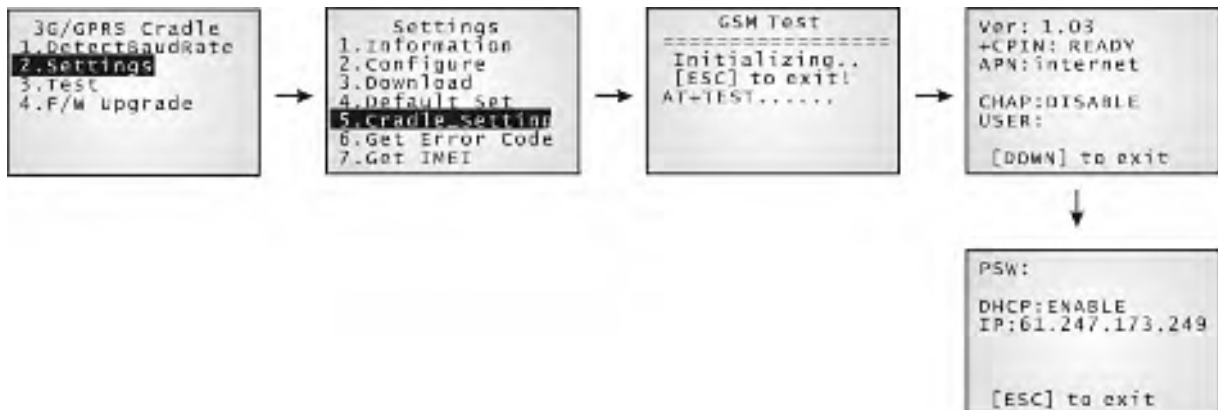
When disabled, you have to specify a static IP address for the cradle.

Note: You must input the PIN code even though authentication is disabled!

The default PIN, APN, CHAP, as well as IP settings should be obtained from your Internet service provider (ISP) or network operator.

3.2.2 VIEW THE CURRENT CRADLE SETTINGS

You may like to find out the current cradle settings, before or after configuring the cradle. Such information is especially helpful when you fail to configure the cradle.



Ver: (version number)

The current firmware version of user program and cradle kernel program. Refer to [錯誤! 找不到參照來源。](#) and [錯誤! 找不到參照來源。](#).

+CPIN: (status)

The current PIN code status. Refer to [錯誤! 找不到參照來源。](#).

APN: (access point name of ISP)

The current access point you are connecting to. Refer to [錯誤! 找不到參照來源。](#).

CHAP: (status), USER & PSW

The current status of Challenge-Handshake Authentication Protocol (CHAP). Refer to [錯誤! 找不到參照來源。](#). When CHAP is enabled, user name and password are required.

DHCP & IP

The current status of DHCP server. Refer to [錯誤! 找不到參照來源。](#).

IP address assigned to the cradle is displayed in the second line:

- dynamic IP address when DHCP server is enabled
- static IP address when DHCP server is disabled

3.2.3 VIEW IMEI INFORMATION

You may need to identify the cradle by the IMEI number.



3.3 CONFIGURE SETTINGS

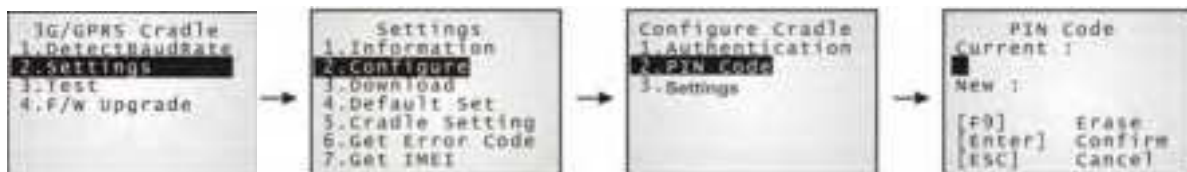
3.3.1 AUTHENTICATION

Set or modify the security setting of your SIM card. When enabled, PIN code is required.



3.3.2 PINCODE

Set or change the PIN code used for authentication.



Note: You must input the correct PIN code even though authentication is disabled!

3.3.3 SETTINGS

The access point name, CHAP, and IP settings should be the same as obtained from your Internet service provider (ISP) or network operator.

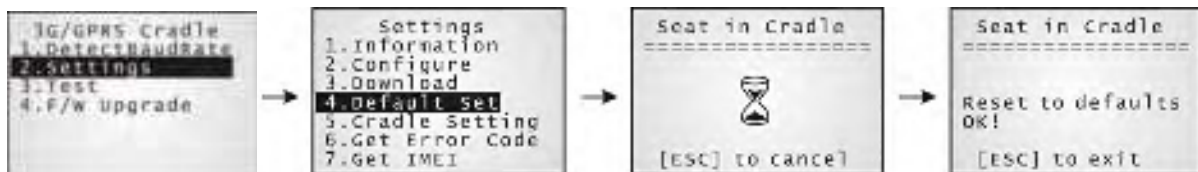


3.4 DOWNLOAD SETTINGS

3.4.1 DOWNLOAD OK

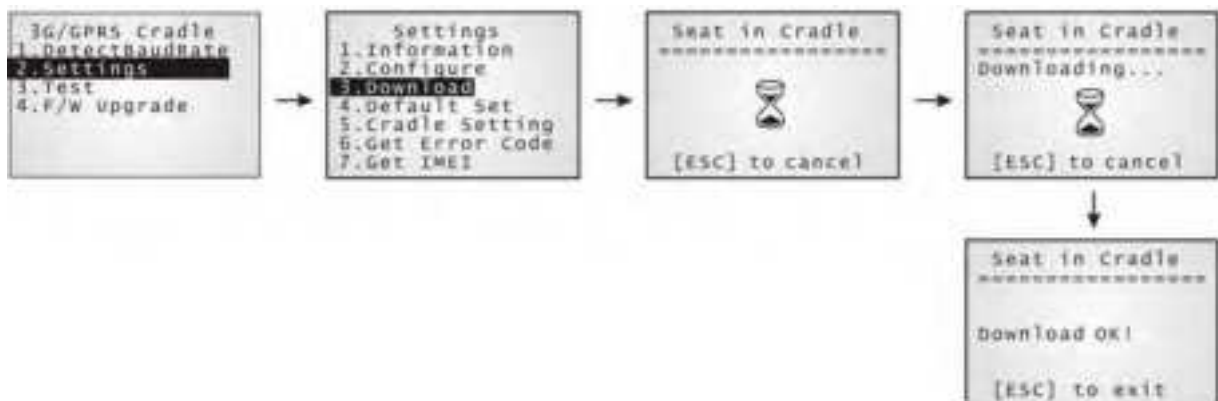
After configuring settings, download new connection settings to the cradle, or the cradles one by one.

- 1) On your mobile computer, go to **Settings | Default Set.**
- 2) Seat your mobile computer in the cradle.



Note: For initial downloading, you are advised to load the default settings to the cradle first.

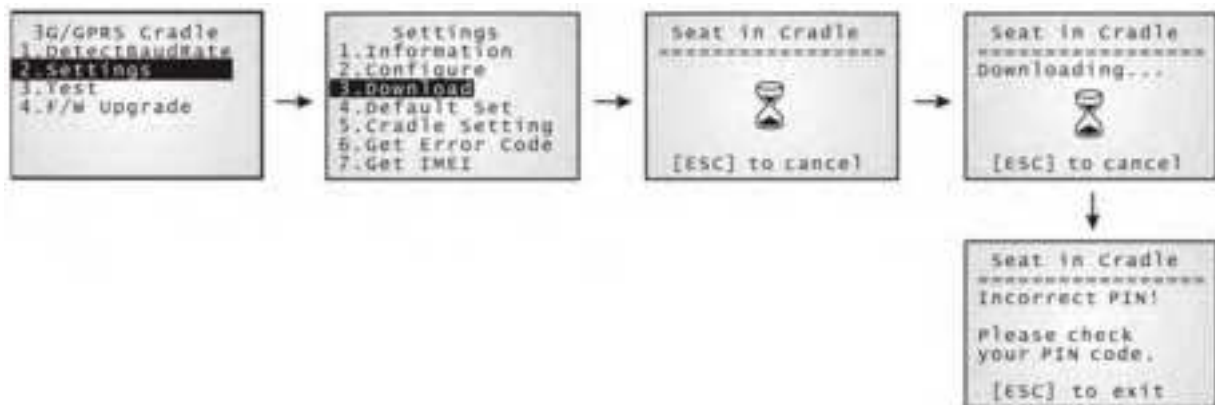
- 3) Disconnect the power supply cord.
- 4) Re-connect the power supply cord.
- 5) On your mobile computer, go to **Settings | Download.**
- 6) Seat your mobile computer in the cradle.



- 7) Disconnect the power supply cord.
- 8) Re-connect the power supply cord.

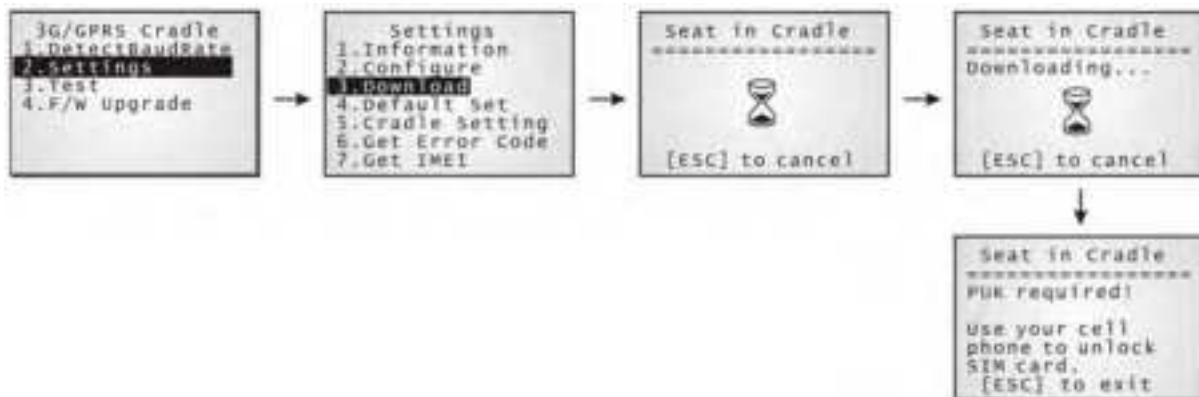
3.4.2 DOWNLOAD FAIL – INCORRECT PIN

This error message is displayed due to the incorrect PIN. You are required to provide the correct one while re-configuring settings.



3.4.3 DOWNLOAD FAIL – PUK REQUIRED

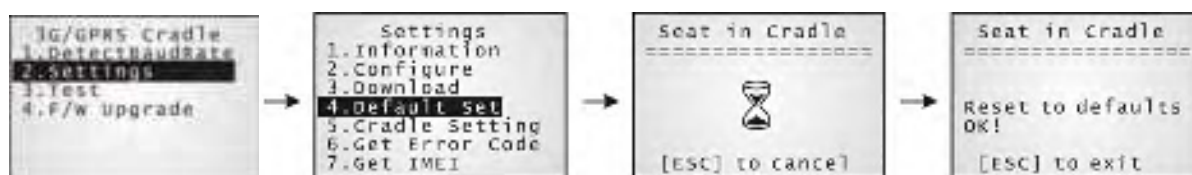
This error message is displayed due to PUK issue. You are required to use your cellular phone to unlock the SIM card, with the PUK code provided by the network operator.



3.4.4 RESET TO DEFAULTS

For initial downloading, or in case the cradle malfunctions, you are advised to load the default settings to the cradle first.

- 1) On your mobile computer, go to **Settings | Default Set**.
- 2) Seat your mobile computer in the cradle.



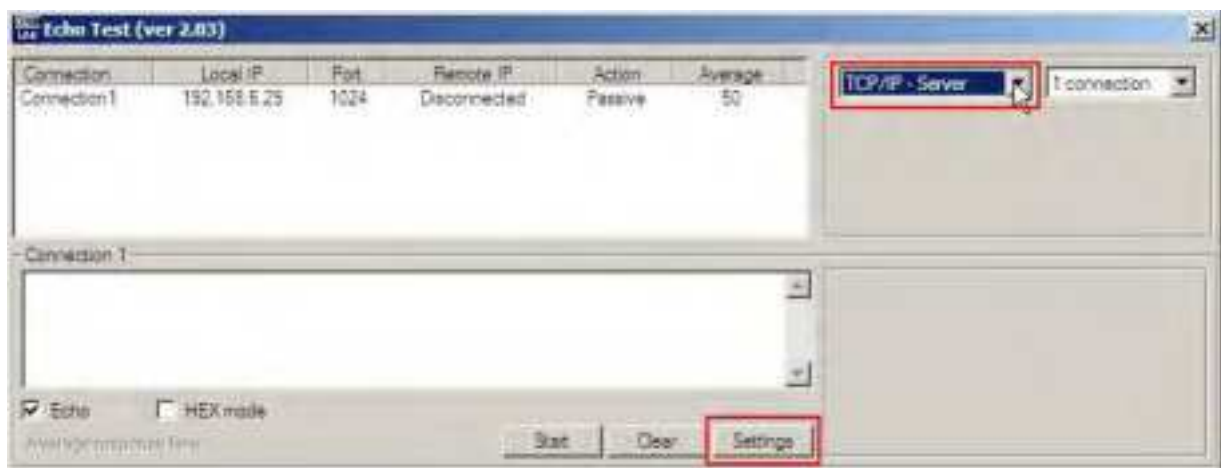
3.5 TESTING

You may find it necessary to test the basic functionalities of the cradle. Seat your mobile computer in the cradle and run the Echo Test utility on your desktop computer.

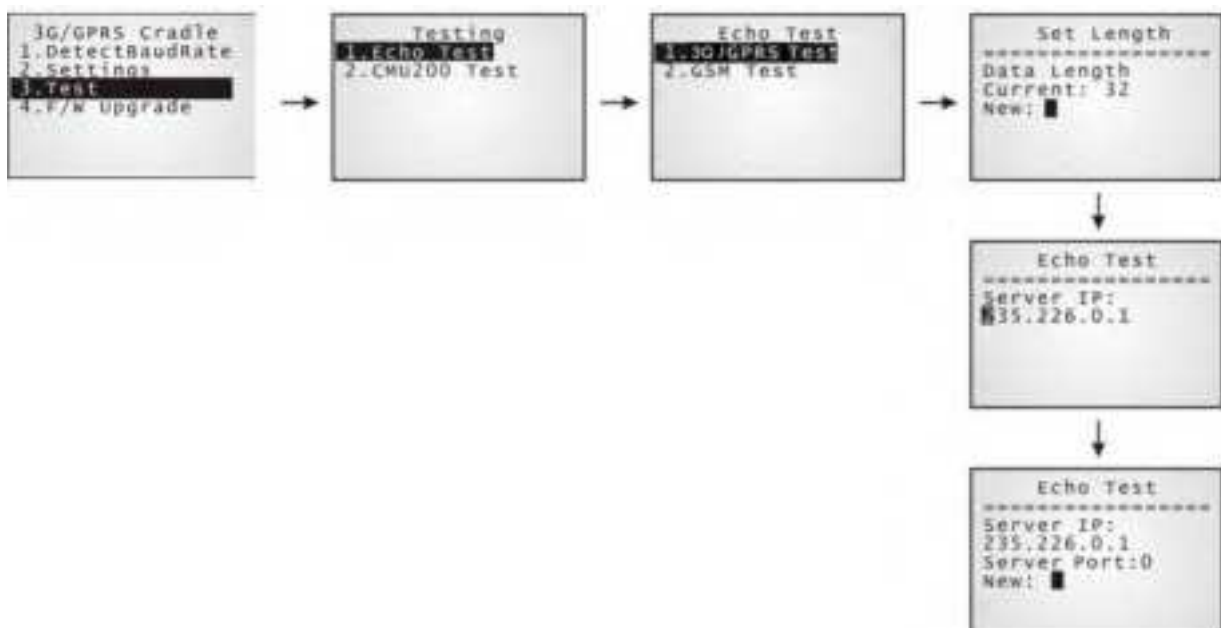
Note: (1) Echo Test – Dial 4G are for internal testing. (2)
CMU200 Test is for manufacturing use.
(3) Signal Level – Show you the signal quality presently.

3.5.1 4G TEST

On your desktop computer, select [TCP/IP - Server] and change settings if necessary. Then, click [Start].



On your mobile computer, go to **Test | Echo Test | 4G Test**.



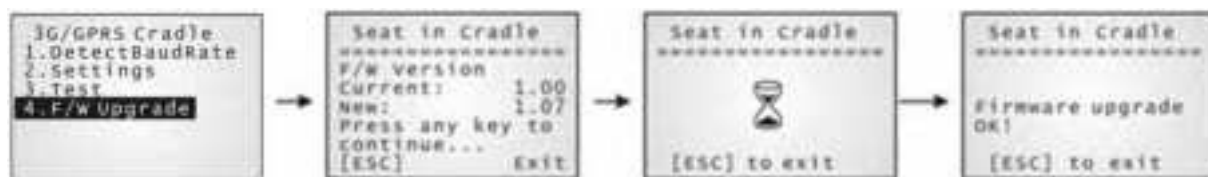
UPGRADING FIRMWARE

4.1 DOWNLOAD VIA MOBILE COMPUTER

The 4G Cradle allows you to upgrade firmware via the mobile computer. When firmware upgrade is available, download the utility "8000Deploy4G.shx" to your mobile computer.

Warning: DO NOT upgrade firmware unless the version of firmware is newer than that your cradle has. For information of the current firmware version, check AT commands.

- 1) Download the utility "8000Deploy4G.shx" to your mobile computer.
The mobile computer will display a selection menu.
- 2) On your mobile computer, select **F/W Upgrade**.
- 3) Seat the mobile computer in the cradle.



- 4) You may see this error message when the mobile computer is not properly seated in the cradle. Please try again!

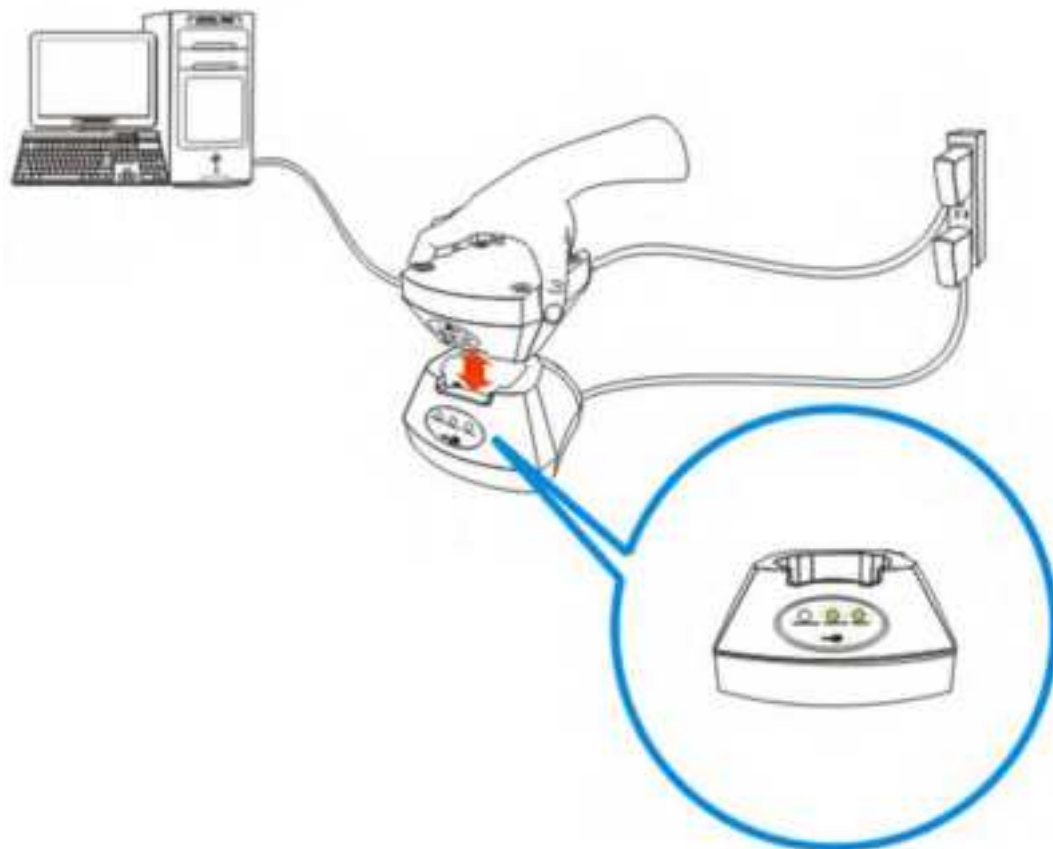


Warning: Before completing the download, do not disconnect the power cord or remove the mobile computer from the cradle!

4.2 CRADLE DOWNLOAD MODE

Regardless of the result of initialization, you can issue "[AT+DOWNLOAD](#)" to upgrade to a new firmware version when available.

- 1) Connect a spare IR cradle to your computer and make sure the cradle baud rate is 115,200 bps (best suggestion).
- 2) Connect the power supply cords of the spare cradle and the 4G Cradle to a suitable power outlet separately.
- 3) Hold the spare cradle upside-down so that its IR interface is facing to the IR interface of the 4G Cradle, as shown as the illustration.
- 4) Run HyperTerminal on your computer. Type "AT+DOWNLOAD", and press the [ENTER] key.
- 5) When the 4G Cradle is ready to download a new program, the TX/RX and LAN indicators will flash.




- 6) Exit HyperTerminal.
- 7) Run CipherLab download utility, such as ProgLoad.exe, on your computer.
- 8) During downloading, the TX/RX and LAN indicators will flash.
- 9) The 4G Cradle will restart itself automatically upon completion of program download.

SPECIFICATIONS

4G CRADLE

Processor & Memory		
CPU	32-bit MCU	
Memory	Firmware Upgradeable	
Power Adapter		
Input	AC 100~240 V, 50/60 Hz	
Output	5V DC 2000mA	
Power Consumption		
Standby	80 mA	: Cradle only, no terminal
		: Established connection
		: No communication
Operating (dial-out transmission) &	250 mA	: Dial-out, data transmission
		: Terminal is beeping
		: Terminal’s backlight is turned off
		: Terminal’s battery is full
Charging	700 mA	: Terminal powered off
Full Power	1000 mA	: Dial-out, data transmission
		: Terminal is beeping
		: Terminal Backlight is turned on
		: Terminal’s battery is charging
Enclosures		
Materials	ABS plastic	
Dimensions	111mm (L) × 101 mm (W) × 57 mm (H)	
Weight	Approx. 220g	
Notifications		
Status Indicators	3 LEDs for connection status	
Communications		

Frequency Bands	 LTE (B4 / B12 / B13)				
Power Class		Radio Mode	Band	Power Class	
		LTE	4 / 12 /13	3	
IR	Baud rate = 115200 bps (default) or 57600 bps				
Temperature					
Operating	-10 °C to 60 °C				
Storage	-20 °C to 70 °C				
Humidity					
Operating	90% RH, non-condensing at 60 °C				
Storage	95% RH, non-condensing at 70 °C				

Note: Power consumption depends on network coverage in the real world.