CipherLab

Reference Manual

GPRS Cradle

For 8000 Series Mobile Computers

Version 1.05

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.

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 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.

RELEASE NOTES

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<tr><th>Version</th><th>Date</th><th>Notes</th></tr>
<tr><td>1.05</td><td>Aug. 07, 2008</td><td>▸ Modified: Overview — illustration updated
▸ Modified: Installation — illustration updated
▸ Modified: 1.4 Download Mode — illustration updated</td></tr>
<tr><td>1.04</td><td>July 15, 2008</td><td>▸ Modified: 2 Configuring the 8000 GPRS Cradle – update screenshots by adding a submenu “5. Cradle Settings” to collect information on the current settings of the cradle
▸ New: 2.1.2 View the Current Cradle Settings
▸ Modified: Specifications – Power Consumption</td></tr>
<tr><td>1.03</td><td>June 24, 2008</td><td>▸ New: 4.2.3 ATDT — ATDT[HostName:Port]<CR></td></tr>
<tr><td>1.02</td><td>June 04, 2008</td><td>▸ Modified: 4.2 AT Commands Supported – Extend the max. characters allowed for AT+APN, AT+PSW, and AT+USER
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<tr><td>Maximum characters allowed</td><td>Before</td><td>Now</td></tr>
<tr><td>AT+APN</td><td>20 char.</td><td>128 char.</td></tr>
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INTRODUCTION

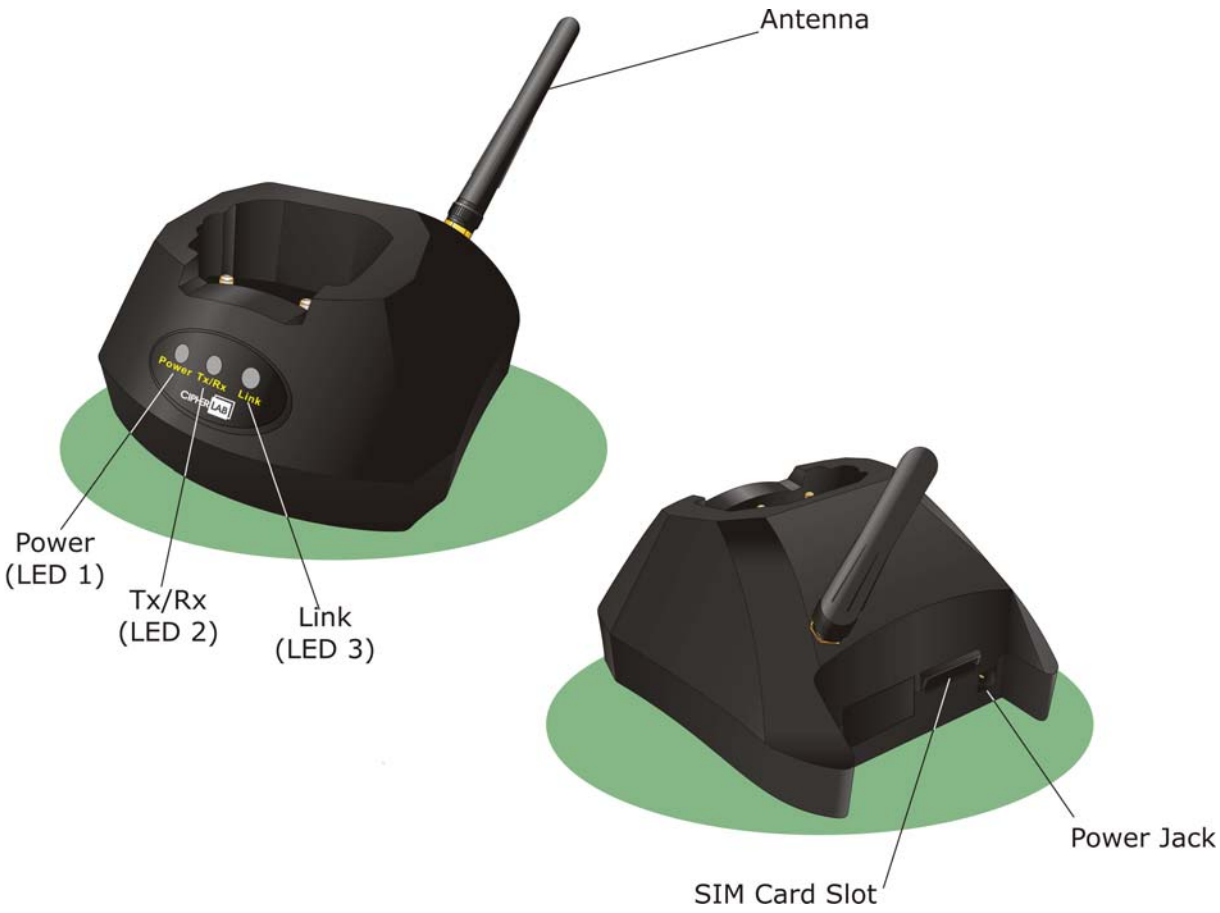
Capable of charging the 3.7 V, 700 mAh Li-ion battery (inside 8001/8061/8071), the 8000 GPRS Cradle is specifically designed for 8000 Series Mobile Computers to connect to WWAN via GPRS or GSM data services.

This manual serves to guide you through how to install, configure, and operate the 8000 GPRS Cradle. 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!

OVERVIEW

The cradle provides three LED indicators on the front panel to indicate connection status. Refer to the flow chart for information on the initialization stages after powering on the cradle.



Front Panel LEDs	Tasks	Indication of Connection Status	
LED 1	Power status	Solid red	Power ON
		Off	Power OFF
LED 2	Tx / Rx status	Flashing green	Transmitting or receiving data
		Off	No activity
LED 3	Link status	Flashing green	Dialing out
		Solid green	Connected
		Off	Disconnected

INSTALLATION

1) Screw the antenna to the cradle.

   For initial configuration, skip steps 2 and 3.

2) Remove the rubber cover at the back of the cradle.

3) Insert your SIM card and replace the rubber cover.

4) Seat the mobile computer in the cradle.

5) Connect the power supply cord to a suitable power outlet, and the cradle's LED will become red (see LED 1). The cradle is ready for charging the mobile computer.

INSERTING SIM CARD

The SIM card orientation is as shown in the illustration above, with contacts facing down. Do not insert your SIM card while resetting the cradle. Refer to Chapter 2 Configuring the 8000 GPRS Cradle.

REMOVING SIM CARD

You will need pliers to take out your SIM card when it is not desired in use. Always disconnect the power supply cord before removing the SIM card.

FEATURES

- Dual-band EGSM900 and GSM1800
- GPRS multi-slot Class 10
- Full PBCCH support
- Comply with GSM phase 2/2+
- Output power — Class 4 (2W) for EGSM900 and Class 1 (1W) for GSM1800
- Power consumption — GSM connection: Typical 900 mA (while charging battery)
  GPRS connection: Typical 1200 mA (while charging battery)

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 cradle.

- 8000 GPRS Cradle, complete set including power adaptor and supply cord
- Antenna
- Quick Installation Guide

Note: This manual is included on Software & Manual CD shipped with CipherLab 8000 Series Mobile Computers.

Chapter 1

USING THE 8000 GPRS CRADLE

The 8000 GPRS Cradle is a charging & communication cradle that is specifically designed for connecting CipherLab 8000 Series Mobile Computers to WWAN via GPRS or GSM data services. Refer to Chapter 4 Programming Your Mobile Computer.

This chapter explains how it works and the three working modes supported by the 8000 GPRS Cradle. Please contact your Internet service provider (ISP) or network operator for information on GPRS 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)

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 2 Configuring the 8000 GPRS Cradle and Chapter 3 Upgrading Firmware.

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

1.1 HOW IT WORKS

Referring to the flow chart on the next page, LED 2 and LED 3 are used to indicate a specific stage of initialization, data connection, as well as firmware download. They are explained below (by number).

1) Initializing

   After powering on, the LEDs of Tx/Rx and Link will flash by turns at the time interval of 0.25 seconds for about 30 seconds, indicating the cradle is in initialization process.

2) Initialization OK

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

3) Initialization NG

   If initialization fails, the LED of Tx/Rx 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 GSM 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 LED of Link will flash at the time interval of 0.3 seconds for about 20 seconds.

5) Connected

   When in Dial mode (ATDT), the LED of Link will be green after successfully establishing a connection.

6) Data Transmission

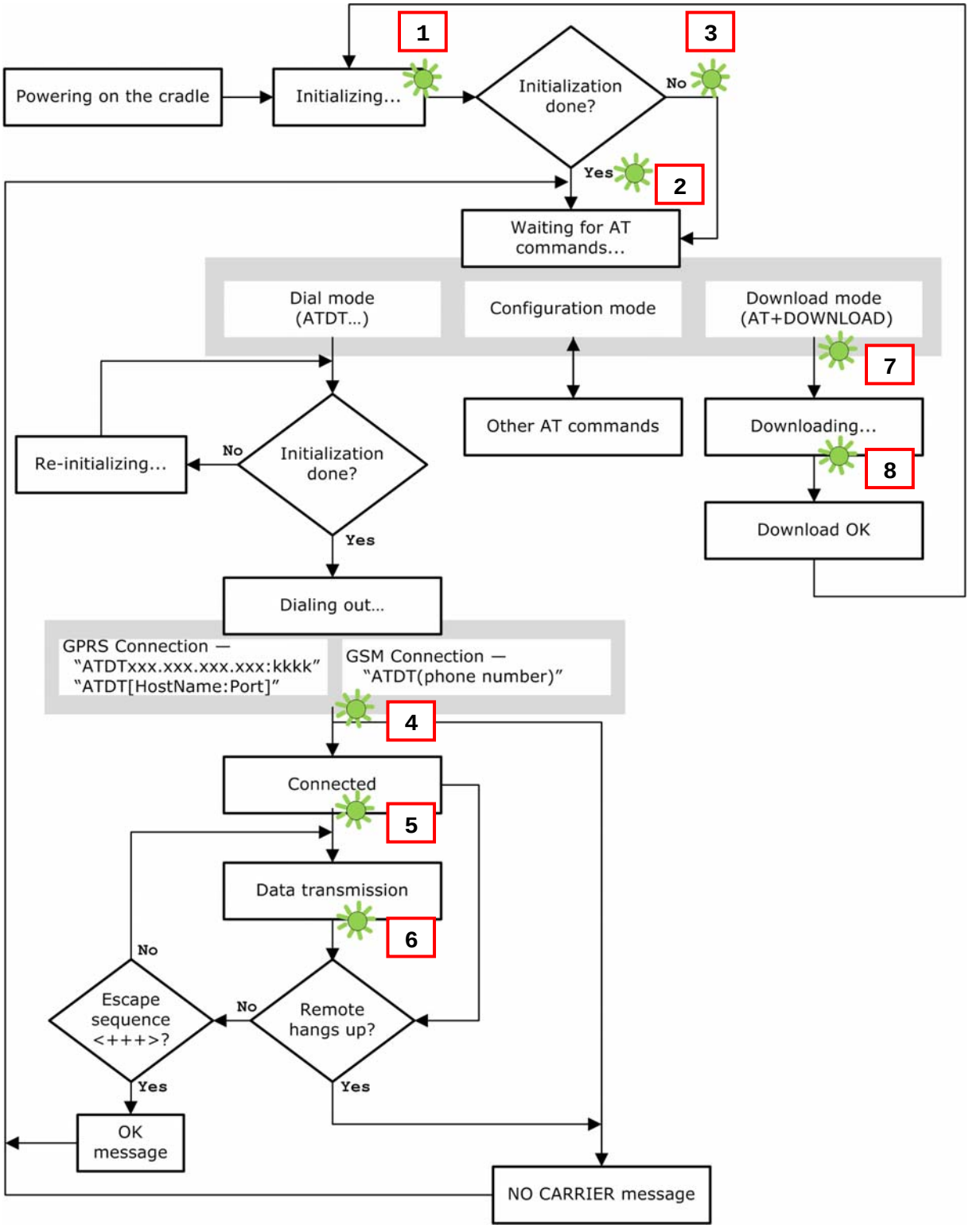
   When in Dial mode (ATDT), the LED of Tx/Rx will flash as long as data transmission occurs.

7) Download Ready

   When in Download mode (AT+DOWNLOAD), the LEDs of Tx/Rx and Link will flash by turns to indicate the cradle is ready.

8) Downloading

   When in Download mode (AT+DOWNLOAD), the LEDs of Tx/Rx and Link will flash simultaneously to indicate downloading is in progress.


1
3
Powering on the cradle
Initializing...
Initialization done?
No
Yes
2
Waiting for AT commands...
Dial mode (ATDT...)
Configuration mode
Download mode (AT+DOWNLOAD)
7
Other AT commands
Downloading...
8
Re-initializing...
No
Initialization done?
Download OK
Yes
Dialing out...
GPRS Connection — "ATDTxxx.xxx.xxx.xxx:kkkk" "ATDT[HostName:Port]"
GSM Connection — "ATDT(phone number)"
4
Connected
5
Data transmission
6
No
Escape sequence <+++>?
No
Remote hangs up?
Yes
Yes
OK message
NO CARRIER message

1.2 DIAL MODES

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 GSM or GPRS.

When dialing out (ATDT), the LED of Link will flash at the time interval of 0.3 seconds for about 20 seconds. When connected, the LED of Link will be 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.

1.2.1 GSM CONNECTION

When initialization is done, issue ATDT(phone number) to establish data connection via GSM.

1.2.2 GPRS CONNECTION

When initialization is done, issue ATDTxxx.xxx.xxx.xxx:kkkk or ATDT[HostName:Port] to establish data connection via GPRS. 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)

Due to the limited memory size, the cradle cannot send three packets at the same time, and therefore, the third packet will be discarded. We suggest you enable the Challenge-Handshake Authentication Protocol (CHAP) setting for best practice.

1.3 CONFIGURATION MODE

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 GPRS connection — Change Access Point name, apply Challenge-Handshake Authentication Protocol (CHAP), and so on.

1.3.1 GENERAL SETTINGS

AT Commands	Description	GSM	GPRS
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.	√	√

1.3.2 CONNECTION SETTINGS

AT Commands	Description	GSM	GPRS
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.	√	√
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).		√

1.4 DOWNLOAD MODE

Regardless of the result of initialization, you can issue "AT+DOWNLOAD" to upgrade to a new firmware version when available. Refer to Upgrading Firmware for downloading updates via the mobile computer.

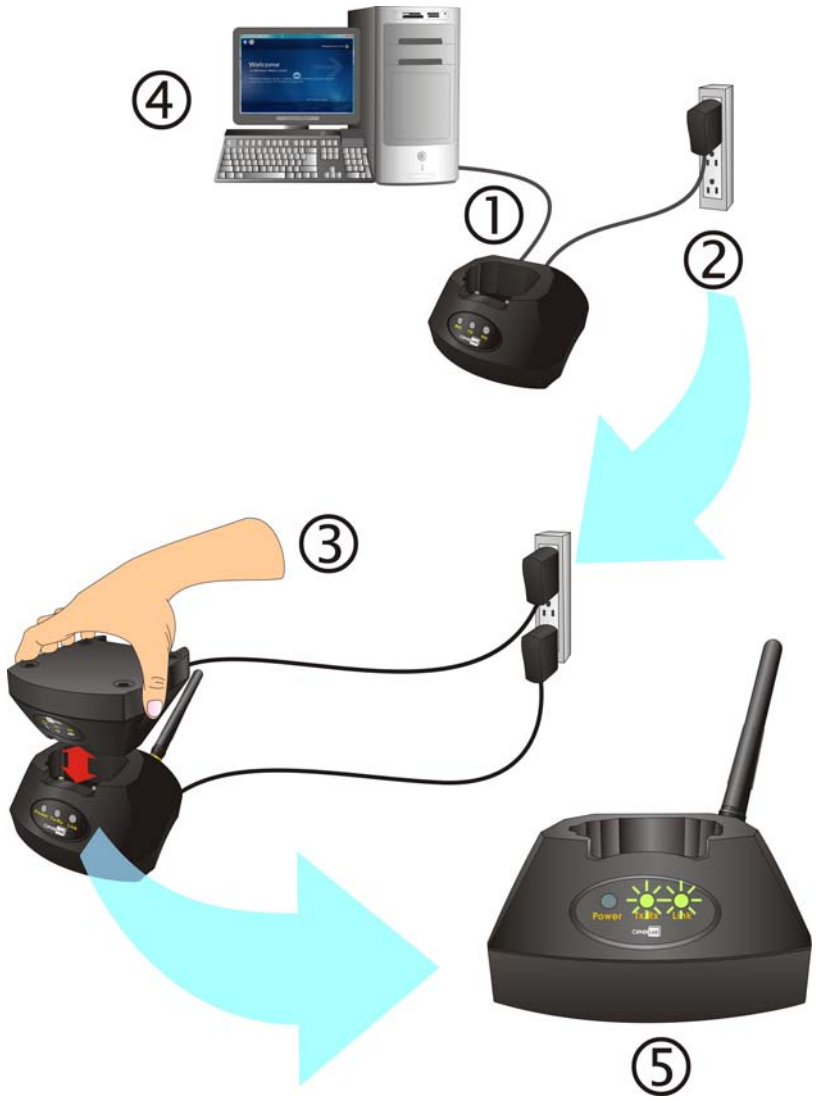
I) Connect a spare 8000 cradle to your computer and make sure its baud rate is 57,600 bps. If not, adjust the DIP switch.

2) Connect the power supply cord of the spare cradle and the 8000 GPRS Cradle to a suitable power outlet separately.

3) Hold the spare cradle upside-down so that its IR port is facing to the IR port of the 8000 GPRS Cradle, as shown in the illustration.

4) Run HyperTerminal on your computer. Type "AT+DOWNLOAD", and press the [ENTER] key.

5) When the cradle is ready to download a new program, the LEDs of Tx/Rx and Link will flash by turns.



6) Exit HyperTerminal.

7) Run CipherLab download utility, such as ProgLoad.exe, on your computer.

8) While downloading, the LEDs of Tx/Rx and Link will flash simultaneously.

9) The 8000 GPRS Cradle will restart itself automatically upon completion of program download.

Chapter 2

CONFIGURING THE 8000 GPRS CRADLE

For deployment engineers, you can download the utility "8000DeployGPRS.shx" to your mobile computer, and then use it to deploy a set of standard settings to the cradles, as well as perform light 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 "8000DeployGPRS.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 "AC", 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.

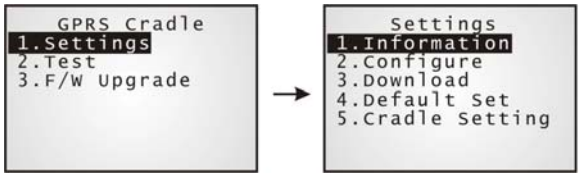
3) Upon completion of the download process, you will have to activate the program if it is downloaded to an empty sector.

4) The utility "8000DeployGPRS.shx" will start itself in a few seconds.

5) Go to **1. Settings > 2. Configure** to configure GPRS 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 **1. Settings > 1. Information**.



Go through the following steps on each cradle.

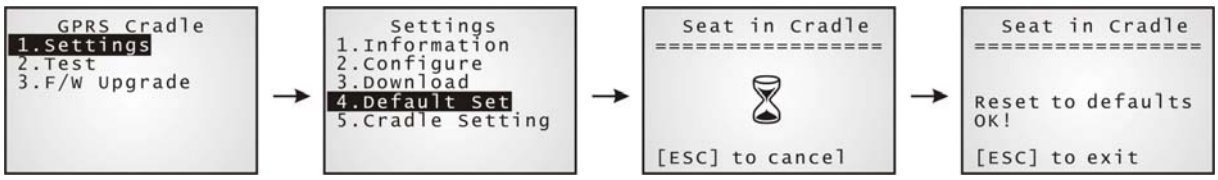
6) Screw the antenna to the cradle.

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

Note: The cradle's LED will be red (see LED 1). The LEDs of Tx/Rx and Link will flash by turns at the time interval of 0.25 seconds for about 30 seconds, indicating the cradle is in initialization process. Then, the LED of Tx/Rx will flash, indicating initialization failed due to lack of SIM card. Ignore it.

8) Seat the mobile computer in the cradle.

Go to **1. Settings > 4. Default Set** to reset the cradle.

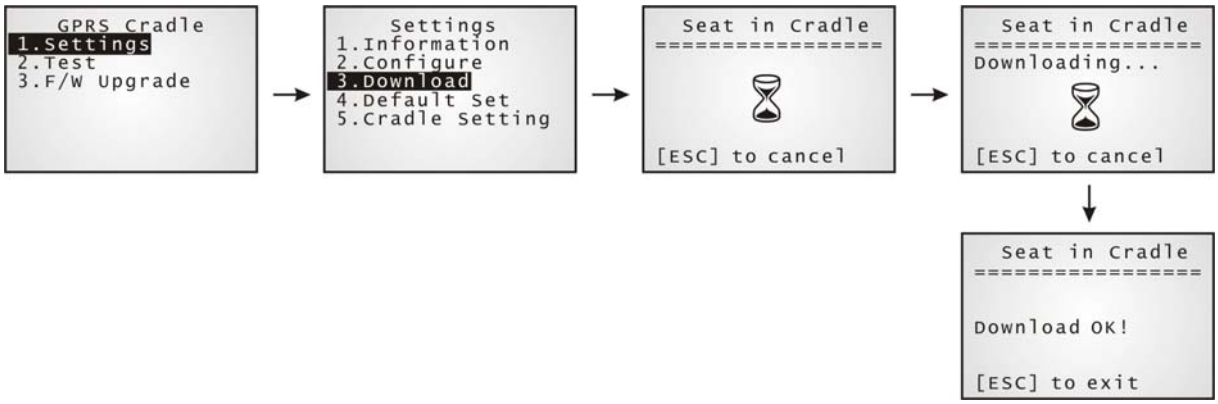


9) Disconnect the power supply cord and insert your SIM card. Refer to Inserting SIM Card.

10) Re-connect the power supply cord.

Note: The cradle's LED will be red (see LED 1). The LEDs of Tx/Rx and Link will flash by turns at the time interval of 0.25 seconds for about 30 seconds, indicating the cradle is in initialization process. Then, two conditions are encountered: (1) If the LED of Tx/Rx flashes, it means initialization fails due to incorrect PIN; (2) If the LED of Link flashes, it means initialization is done successfully – correct PIN or PIN not required.

11) Go to **1. Settings > 3. Download** to download your settings to the cradles.



12) Disconnect the power supply cord.

13) Re-connect the power supply cord.

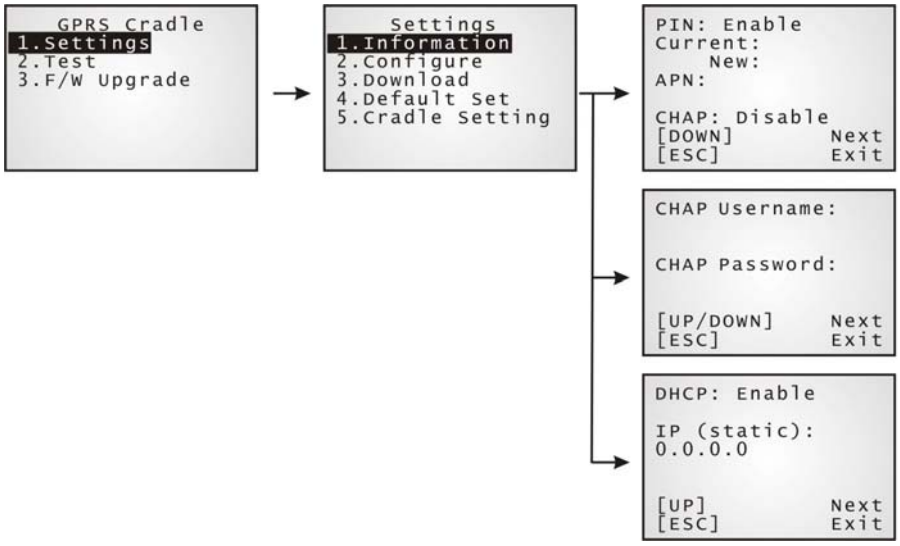
Note: The cradle's LED will be red (see LED 1). The LEDs of Tx/Rx and Link will flash by turns at the time interval of 0.25 seconds for about 30 seconds, indicating the cradle is in initialization process. Then, two conditions are encountered: (1) If the LED of Tx/Rx flashes, it means initialization fails due to incorrect PIN; (2) If the LED of Link flashes, it means initialization is done successfully – correct PIN or PIN not required.

14) Perform echo tests if necessary.

2.1 VIEW THE SETTINGS

2.1.1 PREVIEW THE NEW SETTINGS

In order to double-check the GSM/GPRS 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 GSM or GPRS network. If the current and new PIN codes listed below this entry are blank, you will have to input them 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 GPRS connection, you will have to provide the access point name.

CHAP

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

DHCP

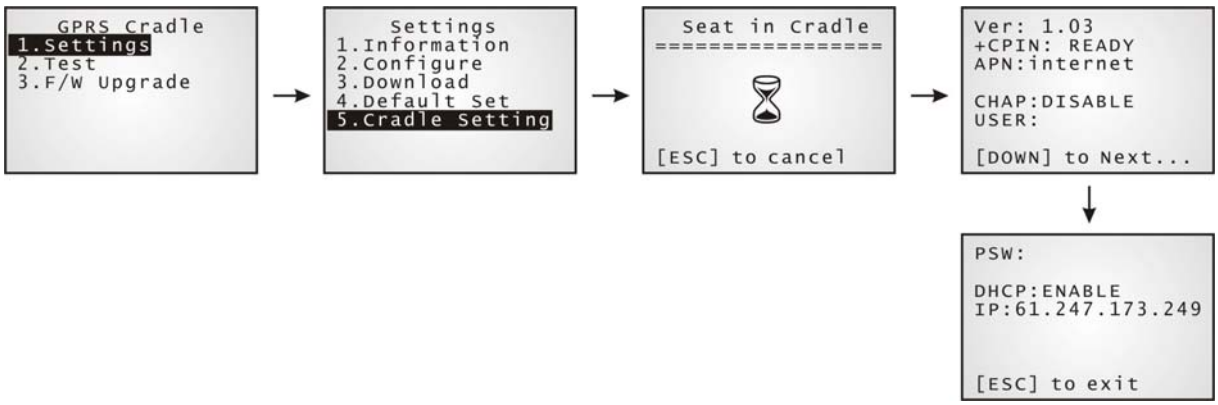
When enabled, DHCP server is in use.

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

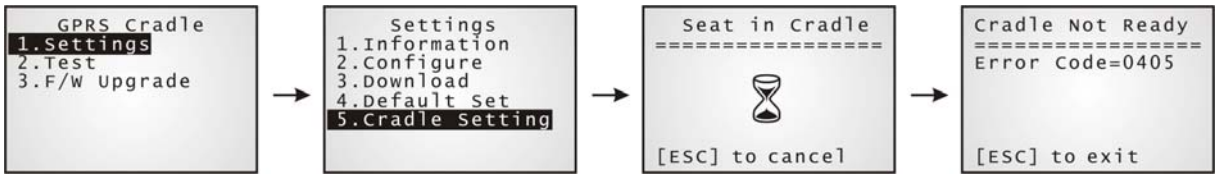
Note: You must input the PIN code even though authentication is disabled!
The default PIN, APN, CHAP, as well as IP settings should be obtained from your Internet service provider (ISP) or network operator.

2.1.2 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.



When it fails to collect information on the current settings of the cradle, the LED of Tx/Rx will flash to indicate the cradle is not ready. A warning message is displayed along with the error code, as shown below. Refer to 4.3 Error Code.



Ver: (version number)

The current firmware version of the cradle. Refer to 4.2.20 AT+VER.

+CPIN: (status)

The current PIN code status. Refer to 4.2.9 AT+CPIN.

APN: (access point name of ISP)

The current access point you are connecting to. Refer to 4.2.6 AT+APN.

CHAP: (status), USER & PSW

The current status of Challenge-Handshake Authentication Protocol (CHAP). Refer to 4.2.7 AT+CHAP. When CHAP is enabled, user name and password are required.

DHCP & IP

The current status of DHCP server. Refer to 4.2.11 AT+DHCP.

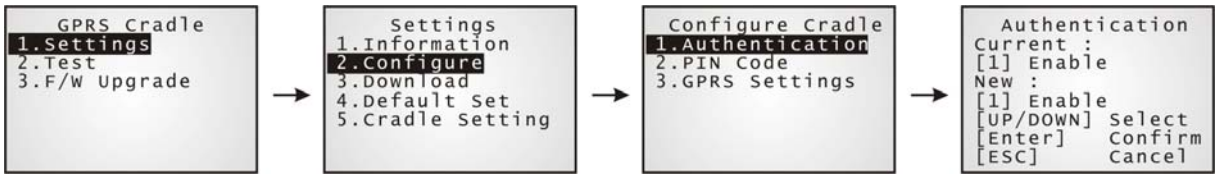
IP address assigned to the cradle is displayed in the second line:

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

2.2 CONFIGURE SETTINGS

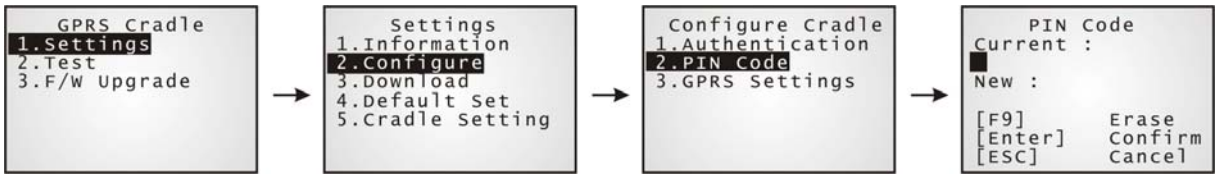
2.2.1 AUTHENTICATION

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



2.2.2 PIN CODE

Set or change the PIN code used for authentication.



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

2.2.3 GPRS SETTINGS

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

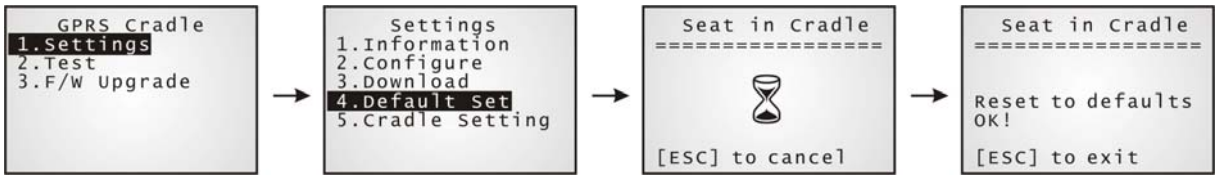
2.3 DOWNLOAD SETTINGS

2.3.1 DOWNLOAD SETTINGS

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**.

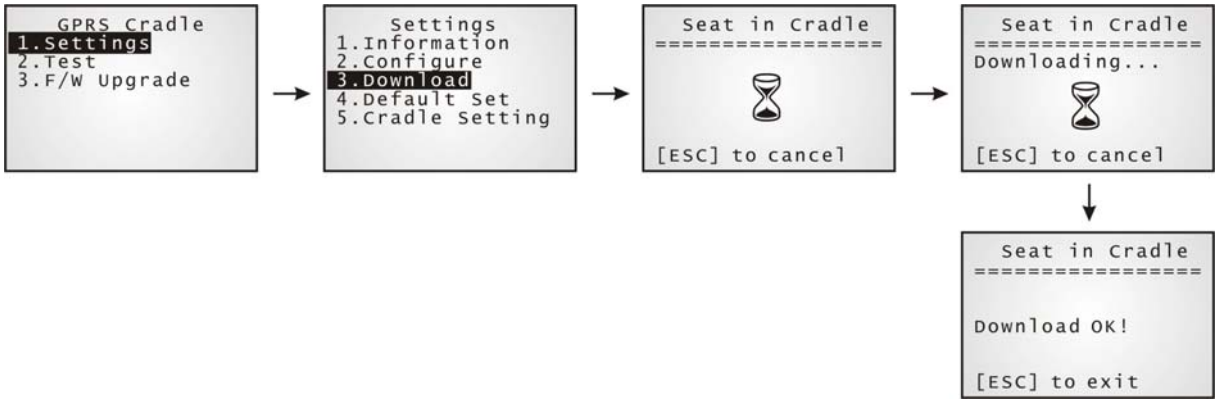
2) Seat your mobile computer in the cradle.



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

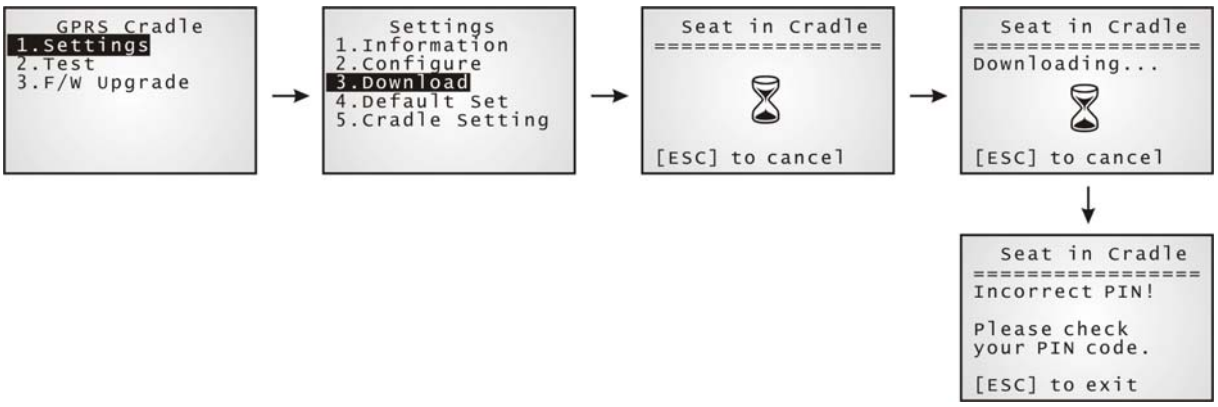
3) On your mobile computer, go to **Settings > Download**.

4) Seat your mobile computer in the cradle.

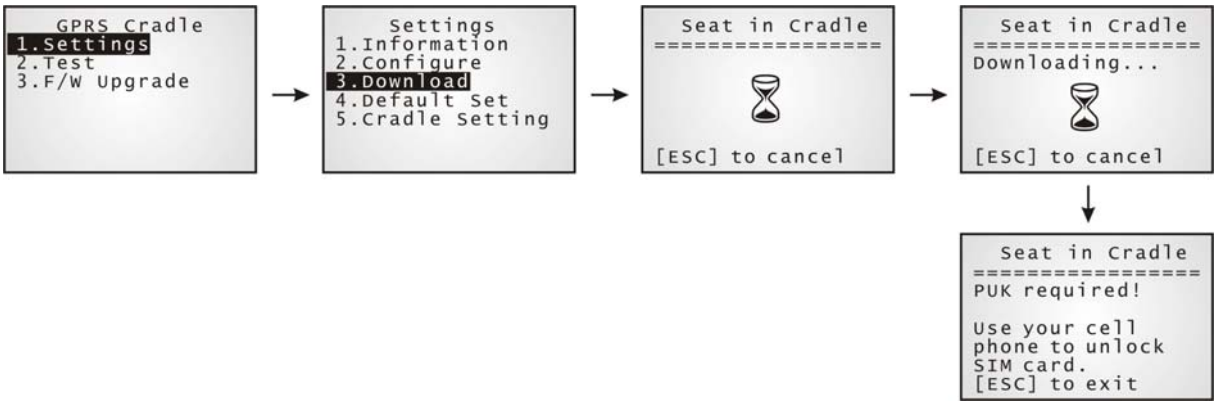


Below are two common errors when it fails to download.

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



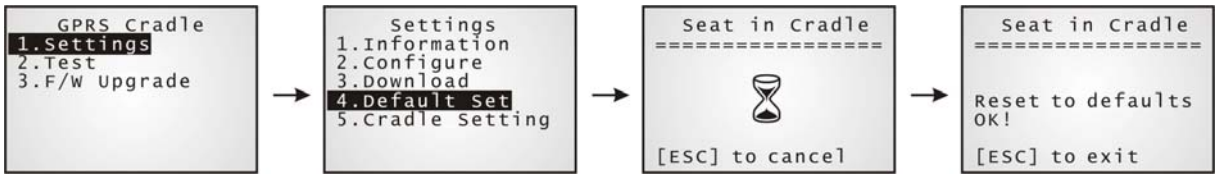
- This error message is displayed due to PUK issue. You are required to use your cellular phone to unlock the SIM card, with the PUK code provided by the network operator.



2.3.2 RESET TO DEFAULTS

For initial downloading, or in case the cradle is malfunctioning, 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.



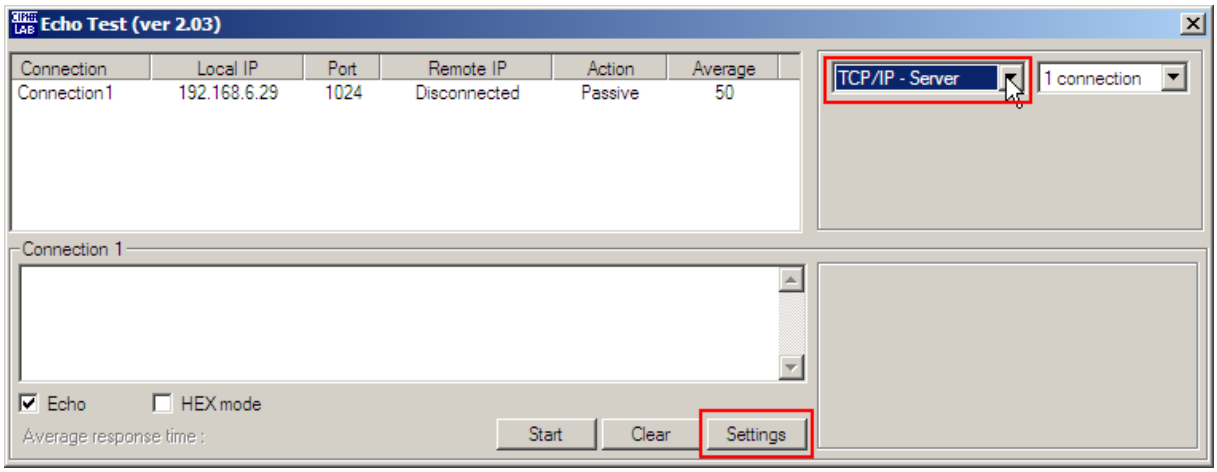
2.4 TEST

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.

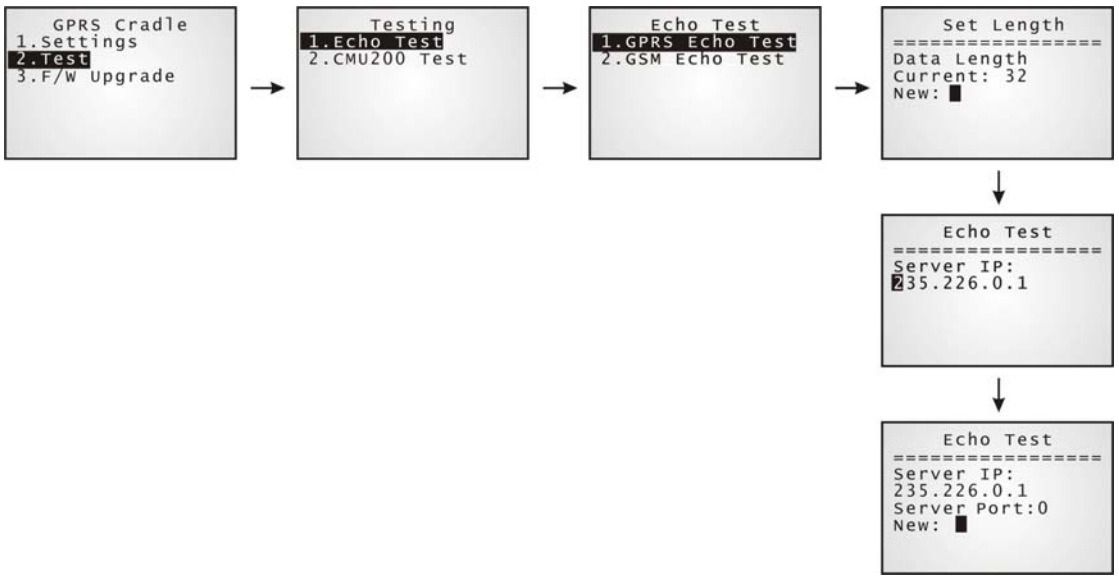
Note: (1) Echo Test – Dial Test and Dial GPRS are for internal testing.
(2) CMU200 Test is for manufacturing use.

2.4.1 GPRS TEST

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

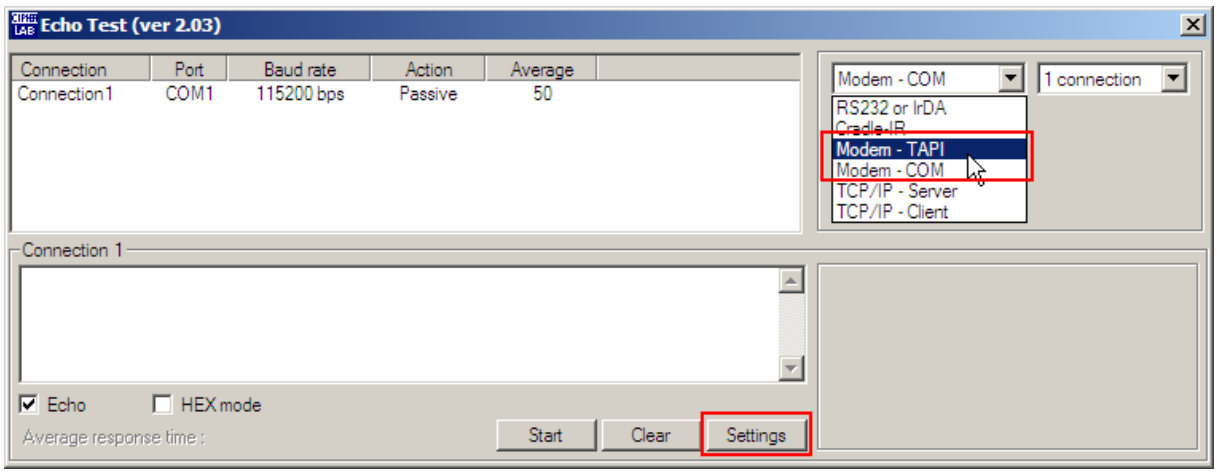


On your mobile computer, go to **Test > Echo Test > GPRS Echo Test**.

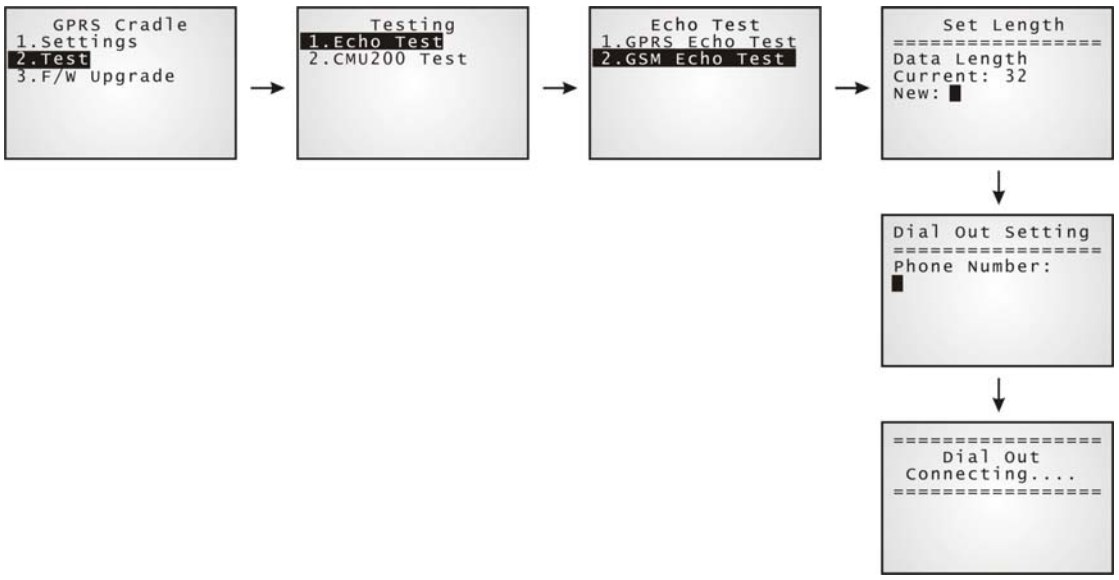


2.4.2 GSM TEST

On your desktop computer, select [Modem - TAPI] and change settings if necessary. For an external modem device, select [Modem – COM] and change settings if necessary. Then, click [Start].



On your mobile computer, go to **Test > Echo Test > GSM Echo Test**.



Chapter 3

UPGRADING FIRMWARE

The 8000 GPRS Cradle allows for firmware upgrade via the mobile computer. When firmware upgrade is available, download the utility “8000DeployGPRS.shx” to your mobile computer.

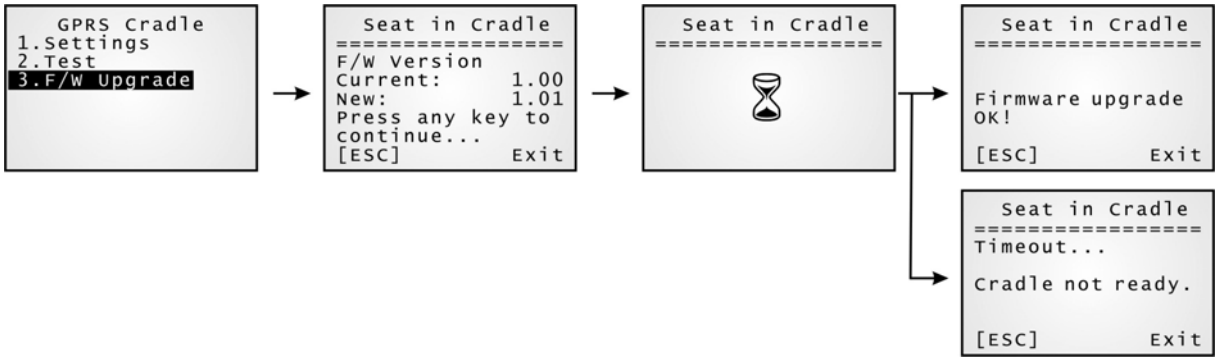
Warning:	DO NOT upgrade firmware unless the version of new firmware is greater than that of your cradle. For information of the current firmware version, check AT commands.

I) Download the utility “8000DeployGPRS.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.



Warning:	Before the download process is completed, do not disconnect the power to the cradle or remove the mobile computer from the cradle!

Chapter 4

PROGRAMMING YOUR MOBILE COMPUTER

You may write your own code for the mobile computer to communication with the 8000 GPRS Cradle via the Cradle-IR interface.

4.1 PROGRAMMING IN C LANGUAGE

An example is provided below. Refer to CipherLab C Programming Guide for details.

```
char c;
SetCommType(1,COMM_IR);                          /*Set COM1 for IR*/
open_com(1,BAUD_57600|DATA_BIT8|PARITY_NONE|HANDSHAKE_NONE);
…
clear_com(1);
write_com(1,” AT\r” );                  /* Send string or char to COM1*/
while (!com_eot(1));
while (1) {
      if (read_com(1,(void*)&c) )
                        /*read COM1 buffer data and save it in the C*/
      {
      …
      }
…
}
…
```

Note: If you are programming in BASIC language, make sure the default delimiter 0x0d (CR) is in use; otherwise, call COM_DELIMITER().

4.2 AT COMMANDS SUPPORTED

The table below lists the AT commands supported for establishing a connection via GSM or GPRS separately. You may click the desired command to view details.

AT Commands	Description	GSM Mode	GPRS Mode
AT	Get echo from the cradle.	√	√
ATDT	Dial out to establish a data connection via GSM or GPRS.	√	√
ATF	Load factory defaults.	√	√
ATW	Write the current settings to flash.	√	√
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+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+DHCP?	Get the Dynamic Host Configuration Protocol (DHCP) setting.		√
AT+DHCP=	Set the Dynamic Host Configuration Protocol (DHCP) setting, enable or disable.		√
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.	√	√
AT+DOWNLOAD	Download firmware to the cradle.	√	√
AT+ERR?	Get the last 4 digits of error code for the initialization procedure.	√	√
AT+IP?	Get the fixed IP address of the cradle.		√
AT+IP=	Set the fixed IP address of the cradle.		√
AT+KVER?	Get the firmware version of the cradle kernel program.	√	√

AT+PSW?	Get the password for Challenge-Handshake Authentication Protocol (CHAP).		√
AT+PSW=	Set the password for Challenge-Handshake Authentication Protocol (CHAP).		√
AT+SN?	Get the serial number of the cradle.	√	√
AT+USER?	Get the user name for Challenge-Handshake Authentication Protocol (CHAP).		√
AT+USER=	Set the user name for Challenge-Handshake Authentication Protocol (CHAP).		√
AT+VER?	Get the firmware version of the cradle user program.	√	√
"+++"	The escape sequence, consisting of three characters "+++", is used to terminate the data connection. The time interval between each character should be less than one second, and the guard time periods before (leading) and after (trailing) should be longer than one second separately.	√	√

4.2.1 AT COMMAND SYNTAX

The "AT" or "at" prefix must be set at the beginning of each command line. To terminate a command line, enter <CR>. Commands are usually followed by a response that includes "<CR><LF><response><CR><LF>".

- Parameter [...]

  Specify user-definable parameter values, which may be <text> or <number>.

- (ERR_STR)

  If a connection fails, the response may include a string after the message “NO CARRIER”, providing further information on the connection error.

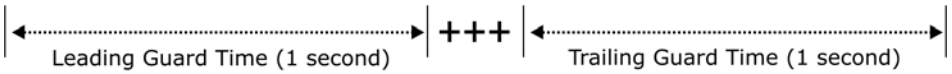
- [ERR_CODE]

  If a connection fails, the response will always include a 6-digit hexadecimal number (always starting with “0x”). Refer to the Error Code table for detailed information.

Note: If you are programming in BASIC language, the delimiter 0x0d (CR) is in use by default. Refer to COM_DELIMITER().

The escape sequence consists of three characters “+++”. Once a connection has been established, type the escape sequence to return to command state. When entering the next command after an escape sequence, always wait to receive “\r\nOK\r\n”. An escape attempt in the interval may fail because the modem is not in on-line data state. There are equal guard time periods before (leading) and after (trailing).

The “+++” timing for this escape sequence is as illustrated below.



If the escape sequence is not followed by another command within 1 second (trailing guard time), the cradle will hang up immediately. Normally, the mobile computer will receive the message “OK” unless the line is abnormally busy.

Note: The escape sequence will break the connection. The Guard Time is 1 second and cannot be changed.

4.2.2 AT

Execution Command	Response
AT<CR>	<CR><LF>OK<CR><LF>

Example

AT

0K

Remarks

This command is to do the echo test between the mobile computer and the cradle. 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.

See Also

Back to the Supported AT Commands.

4.2.3 ATDT

Execution Command – GSM	Response
ATDT[Phone_Number]<CR>	<CR><LF>CONNECT(INFO)<CR><LF> <CR><LF>NO CARRIER<CR><LF>(ERR_STR) <CR><LF>[ERR_CODE]<CR><LF>

Execution Command – GPRS	Response
ATDT[IP:Port]<CR> ATDT[HostName:Port]<CR>	<CR><LF>CONNECT(INFO)<CR><LF> <CR><LF>NO CARRIER<CR><LF>(ERR_STR) <CR><LF>[ERR_CODE]<CR><LF>

Example

ATDT0286471166 NO CARRIER [0x0b01]	▸ Make a GSM data call but the remote party hangs up.
ATDT0286471166 CONNECT 9600	▸ Make a GSM data call and the remote party answers the call.
ATDT192.168.2.1:1024 CONNECT	▸ Connect to a remote host successfully, via the GPRS access point.
ATDT192.168.6.176:21 NO CARRIER [0x8005]	▸ Cannot connect to a remote host via GPRS access point.
ATDTgprs.Cipherlab.com.tw:20009 CONNECT	▸ Connect to a remote host by host name successfully, via the GPRS access point.
ATDTdynamicIP.xyznet.org.tw:20000 NO CARRIER [0x9011]	▸ Cannot connect to a remote host by host name via GPRS access point.

Remarks

This command is to dial out for a data connection via GSM or GPRS (see examples above).

- If successful, the response may include a string after the message “CONNECT”, providing more information on the connection, such as baud rate, and so on.
- If a connection fails, the response may include a string after the message “NO CARRIER”,

providing further information on the connection error, and it will always include a 6-digit error code. Refer to the Error Code table for detailed information.

See Also

AT+DLMT (GSM) AT+APN, AT+CHAP, AT+DHCP, AT+DLMT (GPRS), Escape Sequence <+++>

Back to the Supported AT Commands.

4.2.4 ATF

Execution Command	Response
ATF<CR>	<CR><LF>OK<CR><LF>

Example

ATF

0K

Remarks

This command is to load factory defaults, as shown below.

Parameters	Defaults	Description
unsigned char PINCode[9]	'0000'	PIN (Personal Identity Number) of SIM card; an access code of 4~8 digits
unsigned char GPRSAccessPoint[21]	internet	AP name for GPRS
GPRS_FLAG Flag		See GPRS_FLAG structure below.
unsigned int Reserved:14	---	---
unsigned int DelimEnable:1	0	Enable checking the delimiter character 0:Disable 1:Enable
unsigned int CHAPEnable:1	0	Challenge Handshake Authentication Protocol 0:Disable 1:Enable
char CHAPPassword[33]	Null	Password for Challenge Handshake Authentication Protocol (CHAP)
char CHAPUserName[33]	Null	User name for Challenge Handshake Authentication Protocol (CHAP)
char DelimiterChar	0x0d	Delimiter Character
int DhcpEnable	1	0: Disable DHCP 1: Enable DHCP
unsigned char IpAddr[4]	0,0,0,0	Static IP address for the cradle

See Also

ATW

Back to the Supported AT Commands.

4.2.5 ATW

Execution Command	Response
ATW<CR>	<CR><LF>OK<CR><LF>

Example

ATW

OK

Remarks

This command is to write the current settings to flash.

See Also

ATF

Back to the Supported AT Commands.

4.2.6 AT+APN

Read Command	Response
AT+APN?<CR>	<CR><LF>[AP_Name]<CR><LF>

Example

AT+APN? internet	▸ GPRS Access Point “internet” is in use.

Write Command	Response
AT+APN=[AP_Name]<CR>	<CR><LF>OK<CR><LF>

Example

AT+APN=emome OK	▸ Change to Access Point “emome”.

Remarks

The Read command is to get the Access Point Name (APN) currently in use.

The Write command is to set the Access Point Name (APN) you want to connect to.

[AP_Name] is a string for the name of a GPRS access point, maximum 128 characters.

See Also

ATDT, AT+CHAP, AT+DHCP, AT+DLMT (GPRS)

Back to the Supported AT Commands.

4.2.7 AT+CHAP

Read Command	Response
AT+CHAP?<CR>	<CR><LF>DISABLE<CR><LF> <CR><LF>ENABLE<CR><LF>

Example

AT+CHAP? DISABLE	▸ CHAP is currently disabled.

Write Command	Response
AT+CHAP=[Parameter]<CR>	<CR><LF>OK<CR><LF> <CR><LF>ERROR<CR><LF>

Example

AT+CHAP=1 OK	▸ Enable CHAP successfully.

Remarks

The Read command is to get the Challenge-Handshake Authentication Protocol (CHAP) setting.

The Write command is to set the Challenge-Handshake Authentication Protocol (CHAP) setting, enable or disable.

[Parameter] is a character that determines whether CHAP is enabled —

- Parameter =0: Disable CHAP
- Parameter =1: Enable CHAP

See Also

ATDT, AT+APN, AT+DHCP, AT+DLMT, **AT+PSW, AT+USER** (GPRS)

Back to the Supported AT Commands.

4.2.8 AT+CLCK=SC

Read Command	Response
AT+CLCK=SC,2<CR>	<CR><LF>+CLCK:[Parameter]<CR><LF>

Example

AT+CLCK=SC,2 +CLCK:0	▸ PIN authentication is disabled.

Write Command	Response
AT+CLCK=SC,[Parameter],[PIN]<CR>	<CR><LF>OK<CR><LF> <CR><LF>+CME ERROR<CR><LF>

Example

AT+CLCK=SC,1,0000 OK	▸ Enable PIN authentication, using PIN code “0000”
AT+CLCK=SC,2, +CME ERROR	▸ Command syntax is incorrect!

Remarks

The Read command is to get the information about whether PIN authentication is applied to the facility lock of SIM card.

The Write command is to set PIN authentication, enable or disable.

[Parameter] is a character that determines whether PIN authentication is enabled —

- Parameter =0: Disable PIN authentication
- Parameter =1: Enable PIN authentication

[PIN] is a string for the PIN code.

- PIN (Personal Identity Number) is a 4~8 digit access code which can be used to secure your SIM card from use. If the wrong PIN is entered in more than three times, the SIM card will be locked.

See Also

AT+CPIN, AT+CPWD=SC

Back to the Supported AT Commands.

4.2.9 AT+CPIN

Read Command	Response
AT+CPIN?<CR>	<CR><LF>+CPIN:READY<CR><LF> <CR><LF>+CPIN:SIM PIN<CR><LF> <CR><LF>+CPIN:SIM PUK<CR><LF>

Write Command	Response
AT+CPIN =[PIN]<CR>	<CR><LF>OK<CR><LF>
AT+CPIN =[PUK],[New_PIN]<CR>	<CR><LF>ERROR<CR><LF>

Example

```
AT+CPIN?
+CPIN: READY
AT+CPIN=0000
ERROR
```

- PIN code has already been entered successfully, or the PIN authentication is disabled.

```
AT+CPIN?
+CPIN: SIM PIN
AT+CPIN=0000
OK
```

- PIN code is required.
- Enter PIN code “0000”.

```
AT+CPIN?
+CPIN: SIM PUK
AT+CPIN=12345678,1111
OK
```

- PUK code is required.

Remarks

The Read command is to get the information about whether PIN or PUK code is required.

The Write command is to set the PIN code for authentication.

[PIN] is a string for the PIN code, [New_PIN] is a string for the new PIN code, and [PUK] is a string for the PUK code.

- PIN (Personal Identity Number) is a 4~8 digit access code which can be used to secure your SIM card from use. If the wrong PIN is entered in more than three times, the SIM card will be locked.
- PUK (Personal Unblocking Key) is an 8-digit code used to unlock the PIN code if your SIM card is blocked. Contact your service provider for PUK. If the wrong PUK is entered ten times in a row, the device will become permanently blocked and unrecoverable, requiring a new SIM card.

See Also

AT+CLCK=SC, AT+CPWD=SC

Back to the Supported AT Commands.

4.2.10 AT+CPWD=SC

Write Command	Response
AT+CPWD=SC,[Old_PIN],[New_PIN]<CR>	<CR><LF>OK<CR><LF> <CR><LF>ERROR<CR><LF>

Example

```
AT+CPWD=SC,0000,2008
OK
```

- Change PIN code “0000” to “2008”

```
AT+CPWD=SC,2008
ERROR
```

- Command syntax is incorrect!

Remarks

The Write command is to change PIN code of SIM card.

[Old_PIN] is a string for the current PIN code, and [New_PIN] is a string for the new PIN code.

- PIN (Personal Identity Number) is a 4~8 digit access code which can be used to secure your SIM card from use. If the wrong PIN is entered in more than three times, the SIM card will be locked.

See Also

AT+CLCK=SC, AT+CPIN

Back to the Supported AT Commands.

4.2.11 AT+DHCP

Read Command	Response
AT+DHCP?<CR>	<CR><LF>ENABLE<CR><LF> <CR><LF>DISABLE<CR><LF>

Example

AT+DHCP? ENABLE	▸ DHCP is currently enabled.

Write Command	Response
AT+DHCP=[Parameter]<CR>	<CR><LF>OK<CR><LF> <CR><LF>ERROR<CR><LF>

Example

AT+DHCP=0 OK	▸ Disable DHCP successfully.

Remarks

The Read command is to get the Dynamic Host Configuration Protocol (DHCP) setting.

The Write command is to set t the Dynamic Host Configuration Protocol (DHCP) setting, enable or disable. [Parameter] is a character that determines whether DHCP is enabled —

- Parameter =0: Disable DHCP
- Parameter =1: Enable DHCP

See Also

ATDT, AT+APN, AT+CHAP, AT+DLMT, **AT+IP** (GPRS)

Back to the Supported AT Commands.

4.2.12 AT+DLMT

Read Command	Response
AT+DLMT?<CR>	<CR><LF>ENABLE:[HEX]<CR><LF> <CR><LF>DISABLE<CR><LF>

Example

AT+DLMT? ENABLE:0x0d	▸ Delimiter check is applied, and the character "0x0d" is currently in use.
AT+DLMT? DISABLE	▸ No delimiter check.

Write Command	Response
AT+DLMT=[Parameter](,HEX)<CR>	<CR><LF>OK<CR><LF> <CR><LF>ERROR<CR><LF>

Example

AT+DLMT=1,0x0a OK	▸ Enable delimiter check successfully, and the character "0x0a" is in use.
AT+DLMT=1 ERROR	▸ Command syntax is incorrect!
AT+DLMT=0 OK	▸ Disable delimiter check successfully.

Remarks

The Read command is to get the delimiter check status. [HEX] is a character in hexadecimal, with the prefix "0x".

The Write command is to set the delimiter check, enable or disable. [Parameter] is a character that determines whether a delimiter character is applied —

- Parameter =0: Disable delimiter
- Parameter =1: Enable delimiter

When Parameter =1, [HEX] is a character in hexadecimal, with the prefix "0x". For example, "0x0d" for Carriage Return (CR).

See Also

ATDT

Back to the Supported AT Commands.

4.2.13 AT+DOWNLOAD

Execution Command	Response
AT+DOWNLOAD<CR>	<CR><LF>OK<CR><LF>

Example

```
AT+DOWNLOAD

OK
```

Remarks

This command is to upgrade firmware, either downloading a user program or kernel program to the cradle. After replying with the message “OK”, the cradle will enter the Download Mode.

The two LEDs to the right of the front panel (Tx/Rx and Link) will flash by turns to indicate the cradle is ready, and will flash simultaneously while downloading.

See Also

AT+KVER, AT+VER

Back to the Supported AT Commands.

4.2.14 AT+ERR

Read Command	Response
AT+ERR?<CR>	<CR><LF>[dddd]<CR><LF>

Example

AT+ERR?

0b00

Remarks

This Read command is to get the error code for the initialization procedure.

[dddd] is the last 4 digits of the error code, which is a hexadecimal number starting with “0x”. Refer to the Error Code table for detailed information.

See Also

AT+KVER, AT+VER

Back to the Supported AT Commands.

4.2.15 AT+IP

Read Command	Response
AT+IP?<CR>	<CR><LF>[IP]<CR><LF>

Example

AT+IP? 192.168.1.2	▸ The fixed IP assigned to the cradle is 192.168.1.2

Write Command	Response
AT+IP=[IP]<CR>	<CR><LF>OK<CR><LF> <CR><LF>ERROR<CR><LF>

Example

AT+IP=192.168.2.100 OK	▸ Assign 192.168.2.100 to the cradle successfully.
AT+IP=192.168.8 ERROR	▸ The dotted-decimal notation is incorrect!

Remarks

The Read command is to get the fixed IP address of the cradle.

The Write command is to set the fixed IP address of the cradle.

[IP] is a string in dot-decimal for IP address xxx.xxx.xxx.xxx

See Also

AT+DHCP (GPRS)

Back to the Supported AT Commands.

4.2.16 AT+KVER

Read Command	Response
AT+KVER?<CR>	<CR><LF>[Kernel_Version]<CR><LF>

Example

AT+KVER?

KV-1.00

Remarks

This Read command is to get the firmware version of the cradle kernel program.

[Kernel_Version] is a string that identifies the kernel; it will be updated after having downloaded a different kernel program to the cradle.

See Also

AT+DOWNLOAD, AT+VER

Back to the Supported AT Commands.

4.2.17 AT+PSW

Read Command	Response
AT+PSW?<CR>	<CR><LF>[Password]<CR><LF>

Example

AT+PSW?	▸ The current CHAP password is “123456”.
123456	

Write Command	Response
AT+PSW=[Password]<CR>	<CR><LF>OK<CR><LF>

Example

AT+PSW=123456	▸ Set “123456” for CHAP password.
OK	

Remarks

The Read command is to get the password for Challenge-Handshake Authentication Protocol (CHAP).

The Write command is to set the password for Challenge-Handshake Authentication Protocol (CHAP).

[Password] is a string for the CHAP password, maximum 64 characters.

See Also

AT+CHAP, AT+USER (GPRS)

Back to the Supported AT Commands.

4.2.18 AT+SN

Read Command	Response
AT+SN?<CR>	<CR><LF>[Serial_Number]<CR><LF>

Example

AT+SN?

EK8001024

Remarks

This Read command is to get the serial number of the cradle.

[Serial_Number] is a read-only string that identifies the hardware.

See Also

AT+KVER, AT+VER

Back to the Supported AT Commands.

4.2.19 AT+USER

Read Command	Response
AT+USER?<CR>	<CR><LF>[UserName]<CR><LF>

Example

AT+USER?

Vodafone

- The current CHAP user name is “Vodafone”.

Write Command	Response
AT+USER=[UserName]<CR>	<CR><LF>OK<CR><LF>

Example

AT+USER=Vodafone

OK

- Set “Vodafone” for CHAP user name.

Remarks

The Read command is to get the user name for Challenge-Handshake Authentication Protocol (CHAP).

The Write command is to set the user name for Challenge-Handshake Authentication Protocol (CHAP).

[UserName] is a string for the CHAP user name, maximum 64 characters.

See Also

AT+CHAP, AT+PSW (GPRS)

Back to the Supported AT Commands.

4.2.20 AT+VER

Read Command	Response
AT+VER?<CR>	<CR><LF>[UserProgram_Version]<CR><LF>

Example

AT+VER?

```
Ver: 1.00
```

Remarks

This Read command is to get the firmware version of user program.

[UserProgram_Version] is a string that identifies the firmware; it will be updated after having downloaded a different user program to the cradle.

See Also

AT+DOWNLOAD, AT+KVER

Back to the Supported AT Commands.

4.3 ERROR CODE

The provision of error code is to assist engineers debugging the firmware. Please contact your sales representative to submit your request for interpretation of an error code.

An error code is a 6-digit hexadecimal number (always starting with "0x"). Refer to the Error Code table for detailed information.

Error Code		Description
0x	0101	GSM/GPRS module failure
0x	0201	Hardware error
0x	0301	Disable network registration information error
0x	0401	Get PIN/PUK authentication state timeout
0x	0402	Get PIN/PUK authentication State error
0x	0404	PUK code required to unblock the SIM card
0x	0405	SIM card error or no SIM card inserted
0x	0501	Get the number of remaining PIN attempts timeout
0x	0502	Get the number of remaining PIN attempts error
0x	050a	Initialization procedure broken due to invalid remaining PIN attempts
0x	0601	Set PIN for authentication timeout
0x	0602	Set PIN for authentication failed
0x	0701	Disable new message indication timeout
0x	0702	Disable new message indication failure
0x	0801	Automatically register to the home operator timeout
0x	0802	Automatically register to the home operator failure
0x	0901	Specify Packet Data Protocol Context timeout
0x	0902	Specify Packet Data Protocol Context failure
0x	0a01	Attach GPRS timeout
0x	0a02	Attach GPRS failure
0x	0b01	Dialing out timeout
0x	0b02	Dialing out failure
0x	0c01	Read International Mobile Equipment Identity timeout
0x	0c02	Invalid International Mobile Equipment Identity
0x	0e0b	Fatal error as disconnecting the existing call/connection
0x	0f01	Query the SIM security lock state timeout
0x	0f02	Query the SIM security lock state error
0x	8003	Negotiation with the GPRS network timeout
0x	8011	No buffer space for link control packets
0x	8012	Unable to transmit link control packets

0x	8021	No buffer space for password authentication packets
0x	8022	Unable to transmit password authentication packets
0x	8031	No buffer space for IP control packets
0x	8032	Unable to transmit IP control packets
0x	8074	Connection terminated during link control negotiation
0x	8084	Connection terminated during IP control negotiation
0x	8095	CHAP authentication failure
0x	9001	Connect to the remote IP timeout
0x	9004	Connection terminated while connecting to the remote IP
0x	9010	Host name is too long.
0x	9011	DNS server is no response.
0x	9012	There is no IP information in the response message of DNS.
0x	9013	The resource type is not correct.
0x	9014	The resource class is not correct.
0x	a002	Connection terminated by the GPRS network
0x	a003	TCP/IP Connection error
0x	--ff	Disconnected by DCD line pulled high

SPECIFICATIONS

Processor & Memory		
CPU	16-bit CMOS, low power consumption	
Memory	Firmware upgradeable	
Power Adapter		
Input	AC 100~240 V, 50/60 Hz	
Output	5V DC	
Power Consumption		
Standby	225 mW	: 45 mA for cradle only
	400 mW	: 80 mA when battery is charged to full
	2950 mW	: 590 mA while charging
	3400 mW	: 680 mA while charging with backlight on
Operating (dial-out & transmission)	1650 mW	: 330 mA when battery is charged to full
	3350 mW	: 670 mA while charging
	3850 mW	: 770 mA while charging with backlight on
Peak	10000 mW	: 2000 mA, 577µs
Enclosures		
Materials	ABS plastic	
Dimensions	110 mm (L) × 100 mm (W) × 60 mm (H)	
Weight	Approx. 220g	
Notifications		
Status Indicators	3 LEDs for connection status	
Communications		
Data Call via GSM	▸ Frequency bands - Dual-band EGSM900 and GSM1800 ▸ Compliant to GSM Phase 2/2+	
IP Packet via GPRS	▸ GPRS multi-slot Class 10 ▸ GPRS mobile station Class B ▸ Transmit power – Class 4 (2W) at EGSM 900; Class 1 (1W) at GSM 1800	
Temperature		
Operating	-10 °C to 60 °C	

Storage	-20 °C to 70 °C
Humidity	
Operating	10% to 90%, non-condensing
Storage	5% to 95%, non-condensing
Regulations	
EMC Regulations	CE, SRMC, MII