CipherLab

Reference Manual

1800 Series Handheld RFID Reader

CP Series/8 Series/Universal

Version 1.00

CIPHERLAB

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.

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.

FOR EUROPE

This device complies with the essential requirements of the R&TTE Directive 1999/5/EC. The following test methods have been applied in order to prove presumption of conformity with the essential requirements of the R&TTE Directive 1999/5/EC:

- - EN 60950-1: 2006+A11:2009

Safety of Information Technology Equipment

- - EN 301 908-1 V4.2.1: 2010

Electromagnetic compatibility and Radio spectrum Matters (ERM); Base Stations (BS), Repeaters and User Equipment (UE) for IMT-2000 Third-Generation cellular networks; Part 1: Harmonized EN for IMT-2000, introduction and common requirements, covering essential requirements of article 3.2 of the R&TTE Directive

- - EN 301 908-1 V5.2.1: 2011

Electromagnetic compatibility and Radio spectrum Matters (ERM); Base Stations (BS), Repeaters and User Equipment (UE) for IMT-2000 Third-Generation cellular networks; Part 1: Harmonized EN for IMT-2000, introduction and common requirements, covering essential requirements of article 3.2 of the R&TTE Directive

- - EN 301 489-1 V1.8.1: 2008

Electromagnetic compatibility and Radio Spectrum Matters (ERM); ElectroMagnetic Compatibility (EMC) standard for radio equipment and services; Part 1: Common technical requirements

- - EN 301 489-3 V1.4.1 2002

Electromagnetic compatibility and Radio Spectrum Matters (ERM); ElectroMagnetic Compatibility (EMC) standard for radio equipment and services; Part 3: Specific conditions for Short-Range Devices (SRD) operating on frequencies between 9 kHz and 40 GHz

- - EN 301 489-17 V2.1.1 2009

Electromagnetic compatibility and Radio spectrum Matters (ERM); ElectroMagnetic Compatibility (EMC) standard for radio equipment and services; Part 17: Specific conditions for 2,4 GHz wideband transmission systems and 5 GHz high performance RLAN equipment

- - EN 300 328 V1.7.1: 2006

Electromagnetic compatibility and Radio spectrum Matters (ERM); Wideband Transmission systems; Data transmission equipment operating in the 2,4 GHz ISM band and using spread spectrum modulation techniques; Harmonized EN covering essential requirements under article 3.2 of the R&TTE Directive

- - EN 302 208-1 V1.4.1: 2011

Electromagnetic compatibility and Radio spectrum Matters (ERM); Radio Frequency Identification Equipment operating in the band 865 MHz to 868 MHz with power levels up to 2 W; Part 1: Technical requirements and methods of measurement

- EN 302 208-2 V1.3.1: 2010

Electromagnetic compatibility and Radio spectrum Matters (ERM); Radio Frequency Identification Equipment operating in the band 865 MHz to 868 MHz with power levels up to 2 W; Part 2: Harmonized EN covering essential requirements of article 3.2 of the R&TTE Directive

- EN50371 : 2002

Generic standard to demonstrate the compliance of low power electronic and electrical apparatus with the basic restrictions related to human exposure to electromagnetic fields (10 MHz - 300 GHz) -- General public

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 battery 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 reader or the battery to any flammable sources.
- For green-environment issue, it's important that battery should be recycled in a proper way.
- Under no circumstances, internal components are self-serviceable.
- The charging 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 reader or its peripherals to operate properly.

CARE & MAINTENANCE

- This reader is intended for industrial use. The reader is rated IP64, however, it may do damage to the reader when being exposed to extreme temperatures or soaked wet.
- DO NOT use any pointed or sharp object to move any cover that is included on the reader.
- If you want to put away the reader for a period of time, download the collected data to a host computer, and then take out the battery pack. Store the reader and battery pack separately.
- When the reader resumes its work, the battery will take a certain time to become fully charged.
- If you shall find the reader malfunctioning, write down the specific scenario and consult your local sales representative.

RELEASE NOTES

Version	Date	Notes
1.00	Aug.13, 2012	Initial Release

CONTENTS

INTRODUCTION

1800 Series RFID Reader is designed to be the most flexible and reliable rugged RFID gun with ergonomic form factor on the market. In terms of hardware specifically designed to work as lightweight, ergonomic design, user-friendly LED display, easy snap-on structure, storage capability and aggressive read-and-write range, 1800 Series RFID Reader provides an efficient and complete solution for various applications upon combine with the terminals via mobile computer mount.

Integrated with terminals' functions via USB or Bluetooth to collect a larger data than general reader, you may take diversification application for different user demands or environment. For the environment, 1800 Series RFID Reader is also equipped with IP64 and 1.5m drop resistance features.

This manual serves to guide you through how to install, configure, and operate 1800 Series RFID Reader. 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.

Refer to the following documents to get more information about UHF RFID and EPC standards.

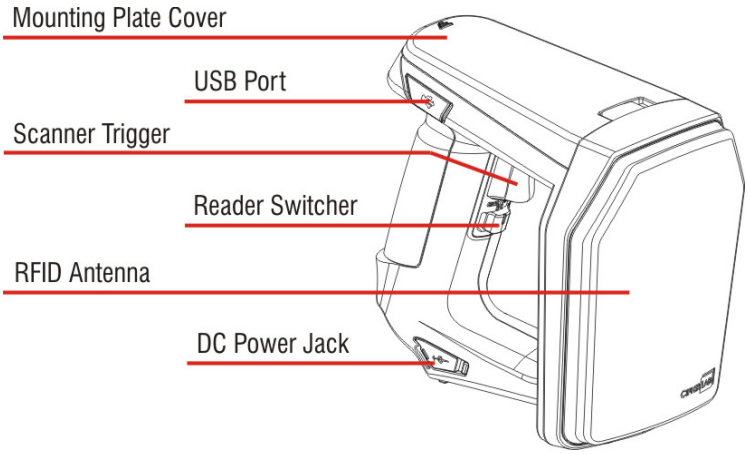
- *EPC™ Radio-Frequency Identity Protocols Class-1 Generation-2 UHF RFID Protocol for Communications at 860 MHz-960MHz Version1.2.0.*
- *EPC™ Tag Data Standards Version1.6.9, September, 2011.*

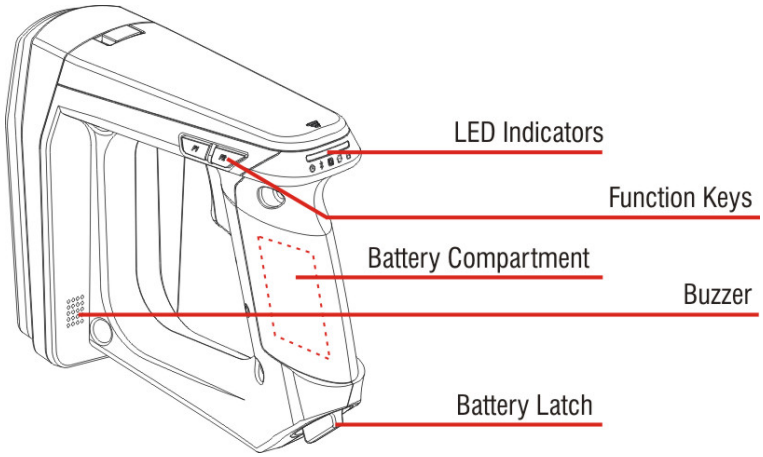
They are available on GS1 organization, http://www.gs1.org.

Thank you for choosing CipherLab products!

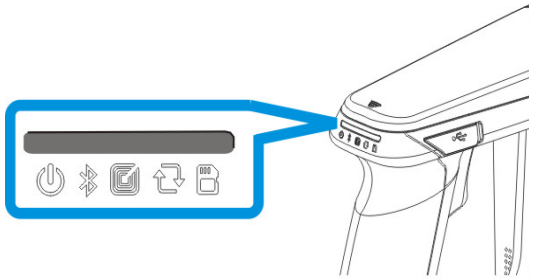
GETTING FAMILIARIZED WITH RFID READER

OVERVIEW





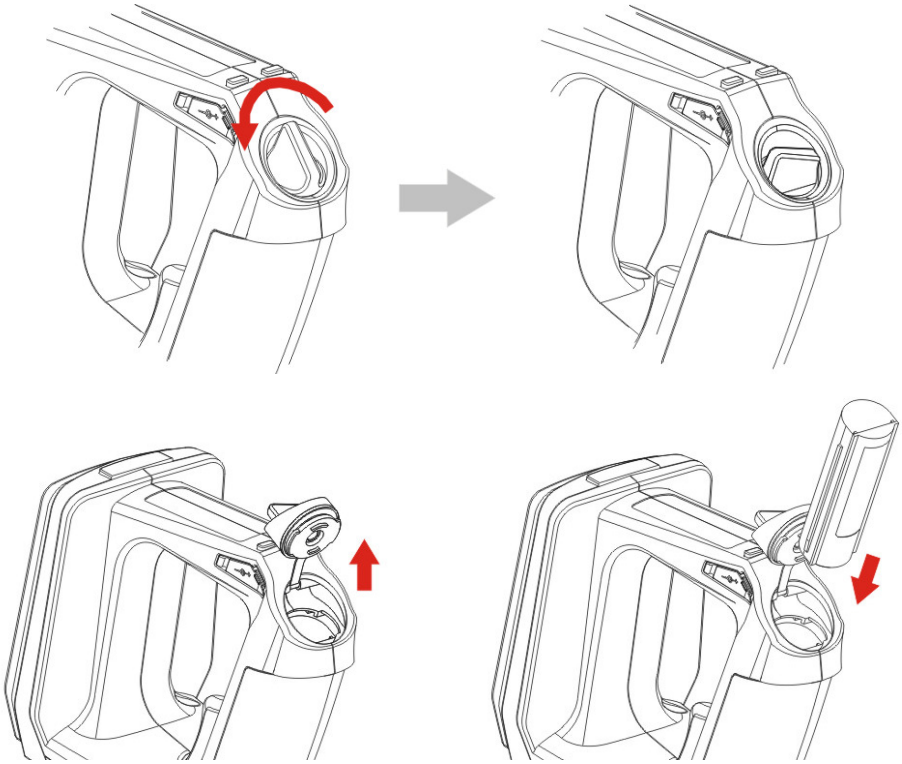
LED	Icon	Meaning
1		Power
2		*Bluetooth*® Communication
3		RFID Tag Access
4		Data Transmission
5		Reader Indicator/Memory Low



INSTALLING BATTERY TO RFID READER

1) This RFID Reader is powered by a removable 2500 mAh Li-ion battery. For intensive data collection, we suggest it is better to purchase a spare battery for non-stop operation.
2) Turn the battery latch to unlock position.
3) Remove the battery cover.
4) Insert the battery into the battery compartment directly 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.
5) Shut the battery cover back to the RFID Reader until it clicks into place.
6) If the battery is charged successfully, press the <Trigger>, RFID Reader will be powered on. If you can not power on the RFID Reader, maybe one of the issues comes from battery.

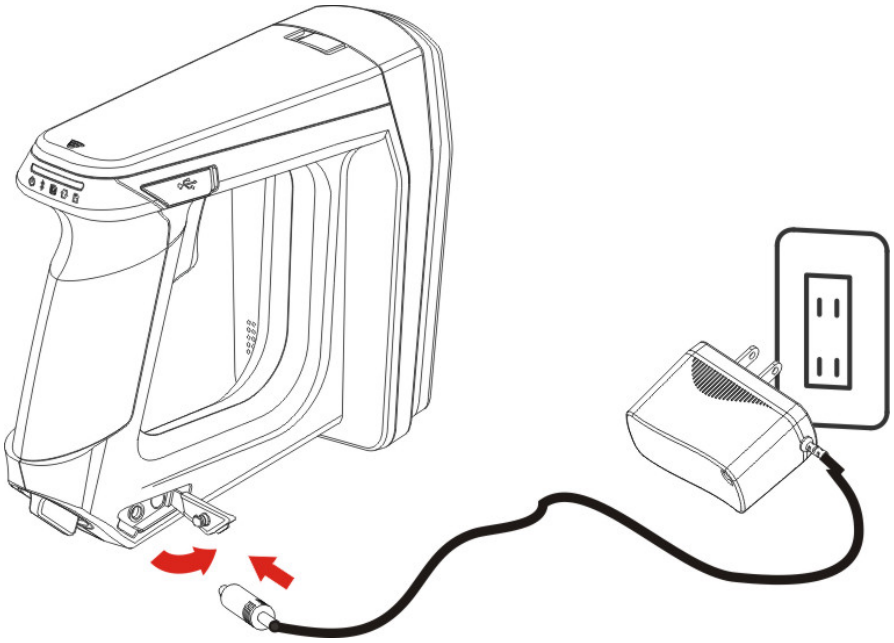
Note: (1) Any improper handling may reduce the battery life.
(2) When the main battery charge becomes low, you need to charge the battery as soon as possible or replace it with a charged one. While replacing the battery, make sure the power is turned off.



CHARGING THE BATTERY FOR RFID READER

The battery may not be charged to full for shipment. When you first receive the package, you will need to charge the battery to full before using the RFID Reader. For RFID Reader, use the adapter to charger the battery. It takes approximately 4 hours to charge the battery to full.

1) Install the battery to RFID Reader.
2) Remove the power cover.
3) Connect the power cord to the power jack.
4) Connect the other end of the power cord to a suitable power outlet.
5) The RFID Reader LED1 will be flashing red during charging. When the charging is done, the LED1 will flash green. When charging error occurs, the LED1 will turn solid red. For example, a bad or missing battery.

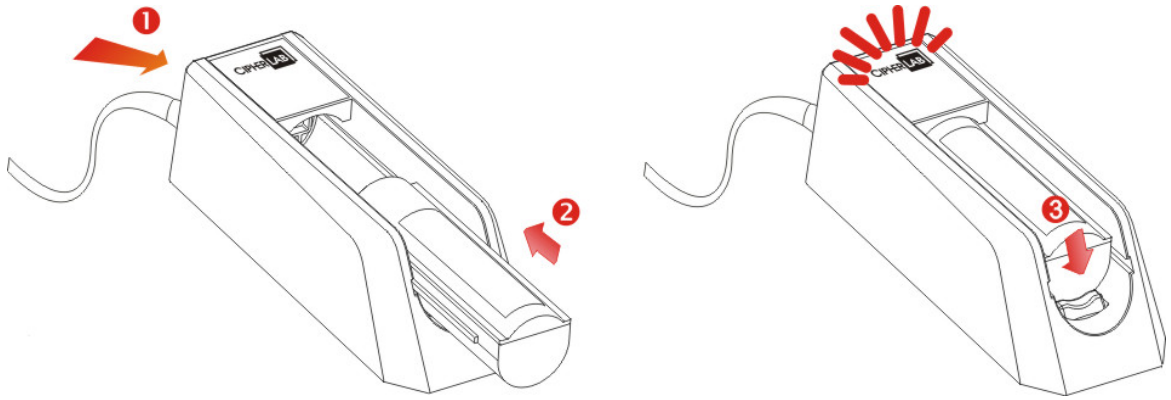


Note: Battery charging stops when the temperature drops below 0°C or exceeds 40°C. It is recommended to charge the battery at room temperature (18°C to 25°C) for optimal performance.

CHARGING THE BATTERY VIA CHARGER

Instead of direct charging with adapter, you may use a charger to charge the battery. However, the charging time may vary by working condition.

1) Connect the power supply cord to the power port located on the back of the charger.
2) Insert the battery to the end.
3) Confirm the lock bolt locks the battery certainly.
4) Connect the other end of the power cord to a suitable power outlet.
5) Once the power and battery are ready, the LED indicator lights.
6) After finishing charge, press down the lock bolt directly to pull out the battery.



Status LED	Meaning
Blue, Solid	Charger power ON
Red, Solid	Charging battery
Green, Solid	Charging done
Blue/Red Ratio 0.5s:0.5s	Error

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

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 device.

- 1800 Series Handheld RFID Reader
- Rechargeable Li-ion Battery
- Direct USB Cable
- Power Adapter
- Product CD
- Quick Guide
- Test Tags

FEATURES

- Ergonomic design - ruggedized yet streamlined, with ergonomics handheld
- Built tough to survive drop test and sealed against moisture/dust to industrial standard IP64
- CipherLab Proprietary operating system
- 4MB flash memory for Memory Mode operation
- Provides up to 2KB SRAM for reserve buffer while getting out of range over a wireless personal area network (WPAN)
- UHF RFID Reader (ISO-18000-6C/EPC Class1 Gen2 Standard)
- Ambidextrous friendly Trigger
- Connectivity includes *Bluetooth*® and USB
- Programmable feedback includes beeper and vibrator
- Support user-friendly LED1~5 display with 3 colors
- Support distance scan up to 100cm reading performance and 50cm writing ability.
- Programming support includes System API, 8/9 and CP Series (LIB and DLL)
- Accessory for single-split-type battery charger

ACCESSORIES

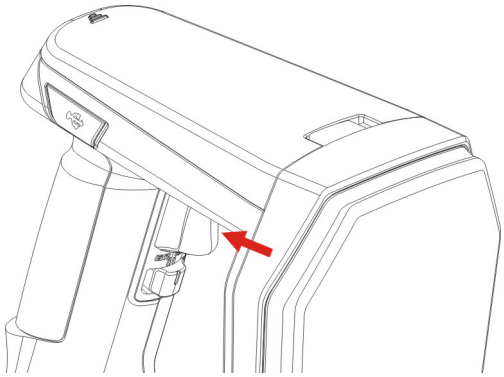
Rich choices of optional accessories are available for you to enhance the total performance of the RFID Reader.

- Spare Rechargeable Li-ion Battery
- External Battery Charger
- Direct USB Cable
- Power Cable
- Mobile Computer Mount

QUICK START

POWER ON RFID READER

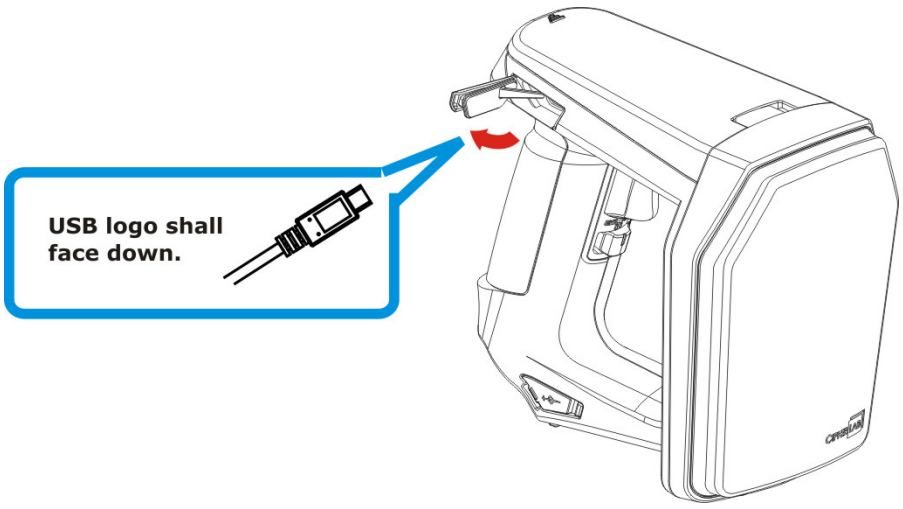
Be sure the battery is full charging before you power on the RFID Reader. Press the <Trigger> for 2 seconds to power on the RFID Reader. The reader will respond with a long beep (high tone), and LED1 will become solid red for 1 second and go off.



Note: The LED2 will flash blue when you power on the RFID Reader successfully.

CONNECTING USB CABLE

1) RFID Reader supports a USB port for connecting to the host computer. You can issue commands via an available USB cable.
2) Remove the USB port cover.
3) Connect the USB communication cable to USB port. (USB logo shall face down)
4) Connect the other end of USB cable to the host computer.



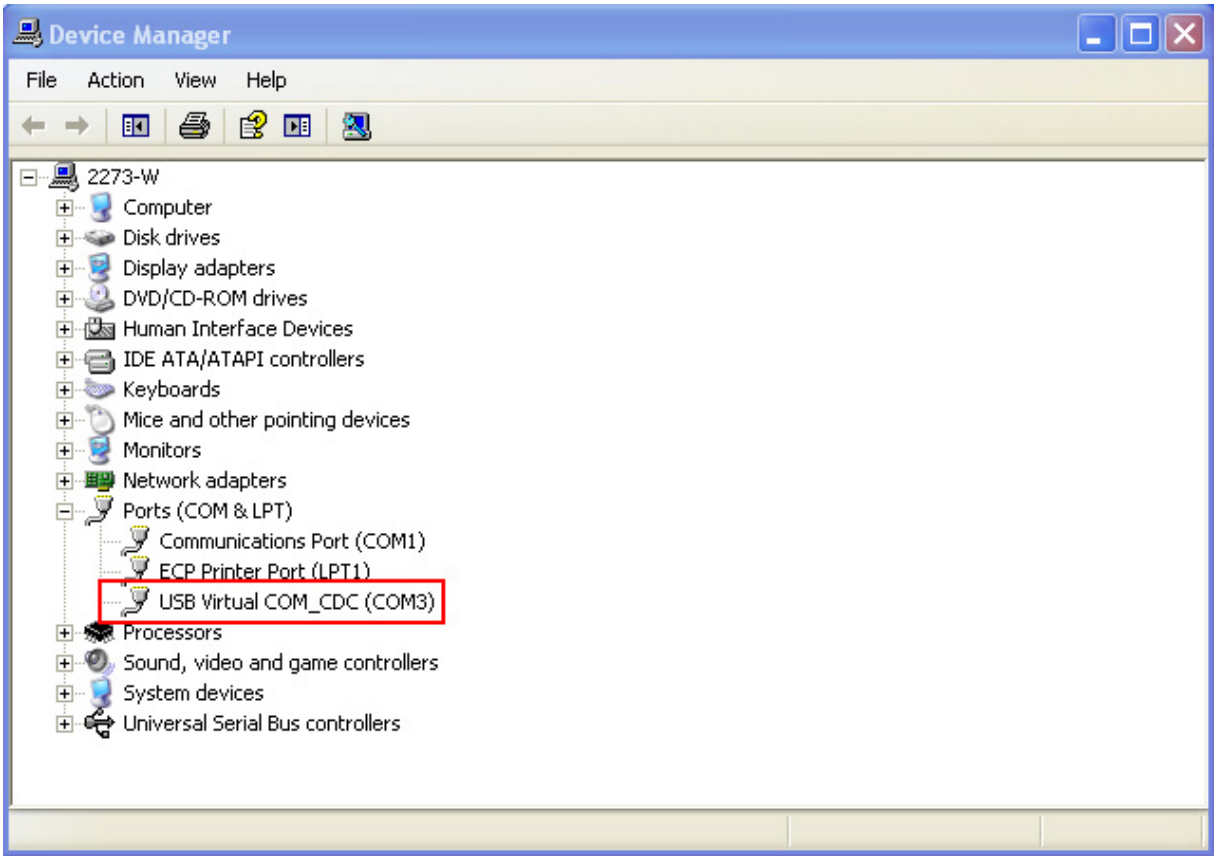
ISSUING COMMANDS VIA USB CONNECTION

USB connection can be used for issuing commands and upload data to host computer. Below are the procedures to create a USB connection before using RFID Reader.

USING HYPERTERMINAL

On the host computer:

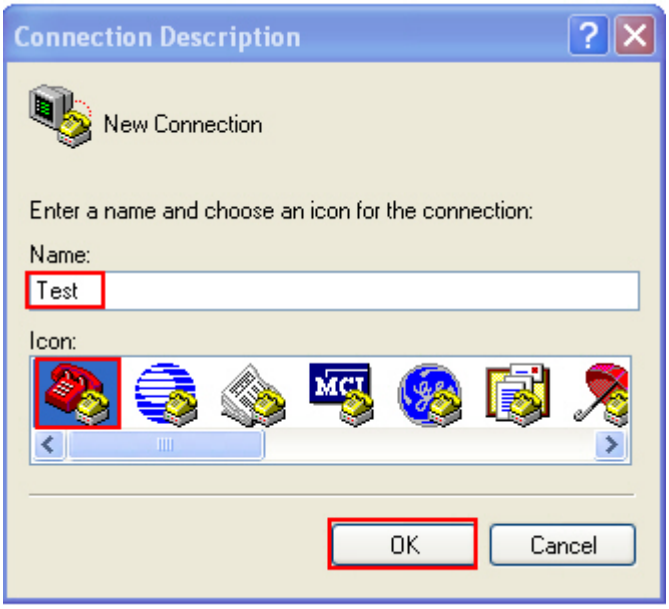
I) Go to the "Device Manager" on the host computer to confirm used COM port. For example below, the USB Virtual COM_CDC - COM3 is used.



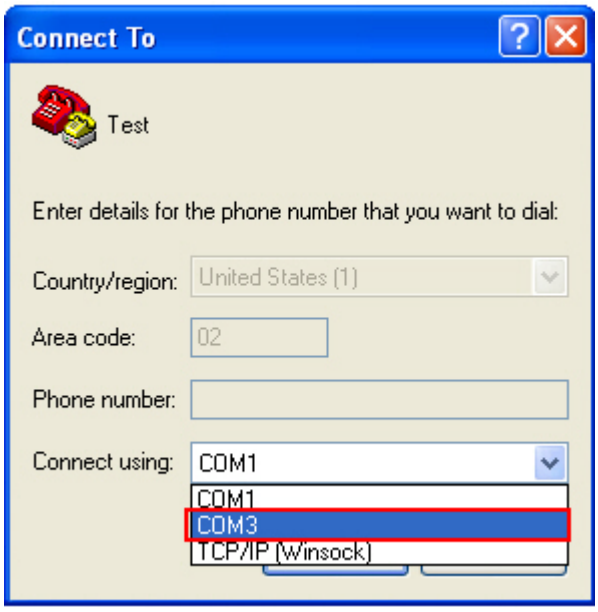
Note: For USB Interface type, the default value is VCOM CDC. Refer to 2.1 USB Interface or Function Key used for selecting USB type during operation. Before beginning to use RFID Reader, you have to install the available driver on the host computer firstly. The USB virtual COM driver (CDC or Silicon) between RFID Reader and host computer must be the same.

2) Use a test application to confirm the connection between host computer and RFID Reader. E.g. HyperTerminal. Open the HyperTerminal on the host computer.

3) Enter a name and choose an icon for the connection. Click "OK" to continue.

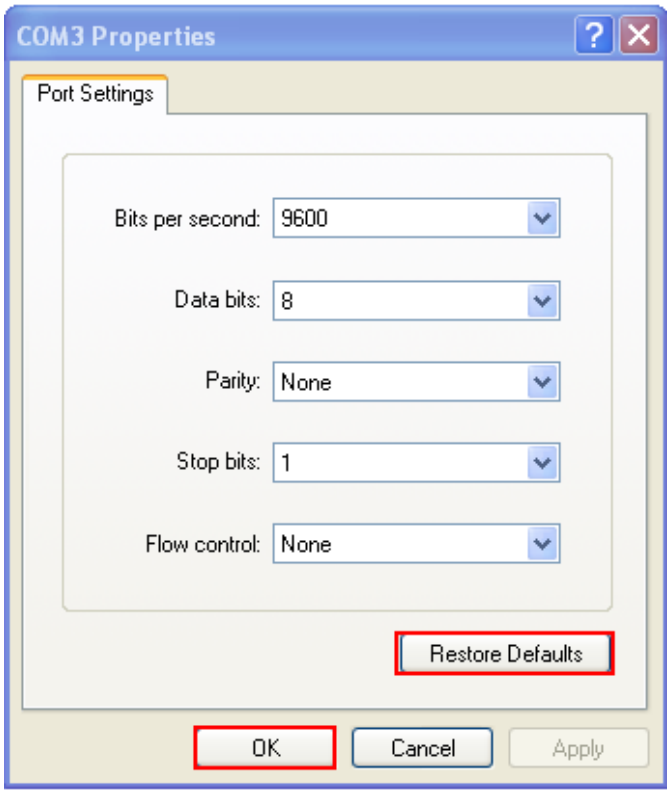


4) According to Step 1 to select the proper connected COM port, e.g. COM3.



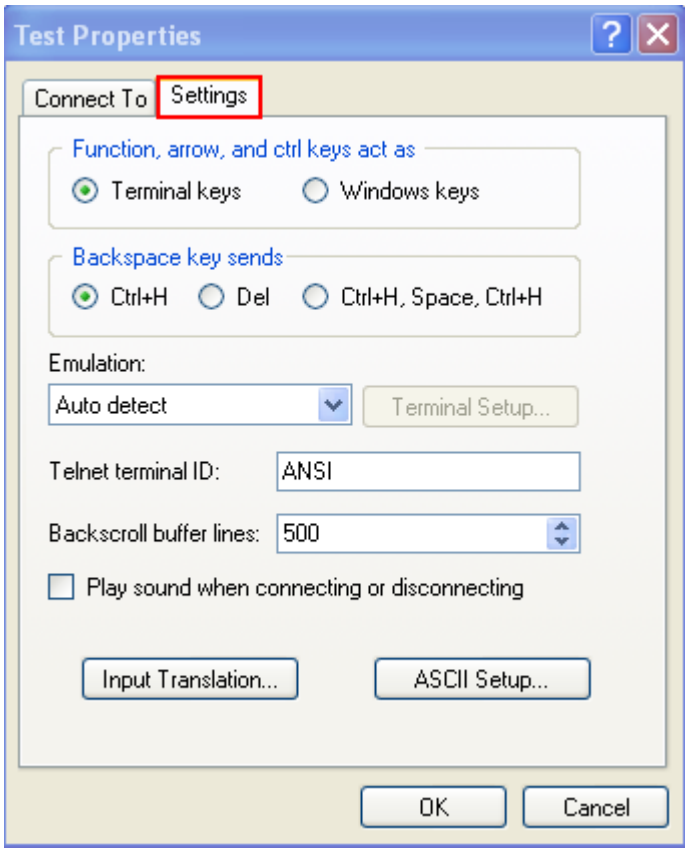
5) Click "OK".

6) In the COM3 Properties window, you can click the "Restore Defaults" to use default values for connection. Then, click "OK".

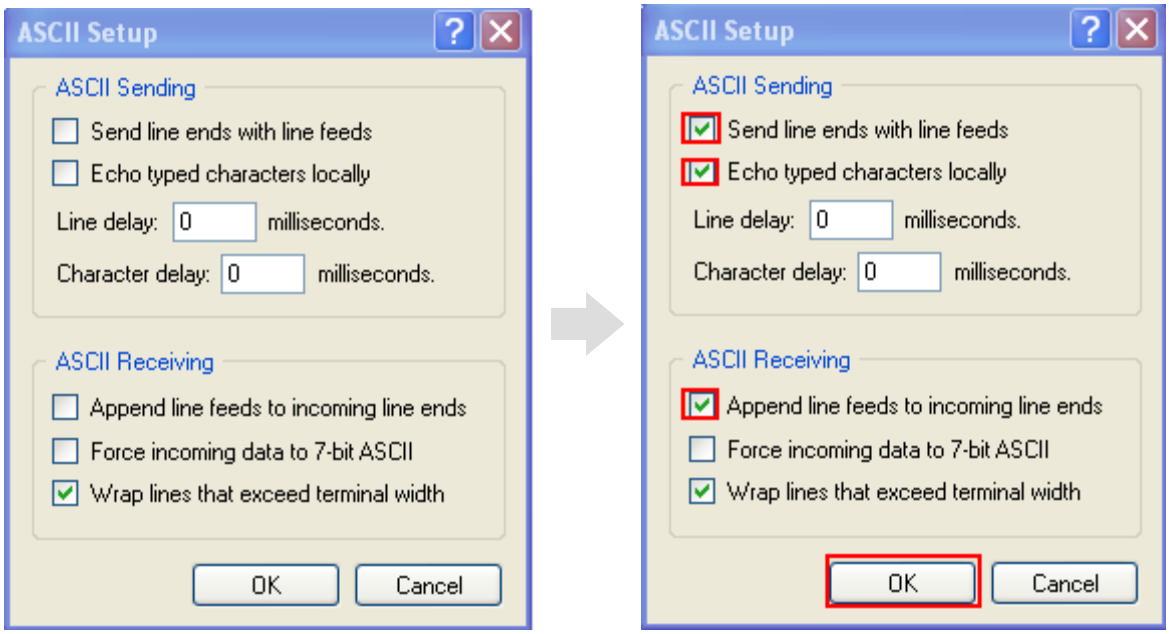


Note: After finishing the COM Properties configuration, the connected icon on the HyperTerminal will be changed from  to  automatically.

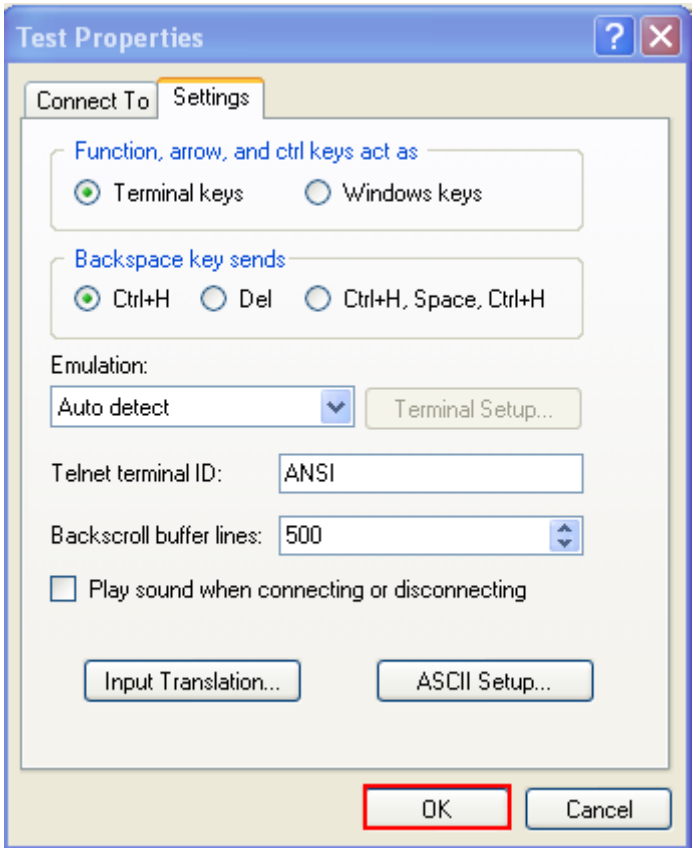
7) In the HyperTerminal window, click  on the tool bar to open Properties configuration window, see below. Click "Settings" tab.



8) Click [ASCII Setup] to open ASCII Setup window and some check boxes need to be selected for normalized issuing commands, see below. Click "OK".

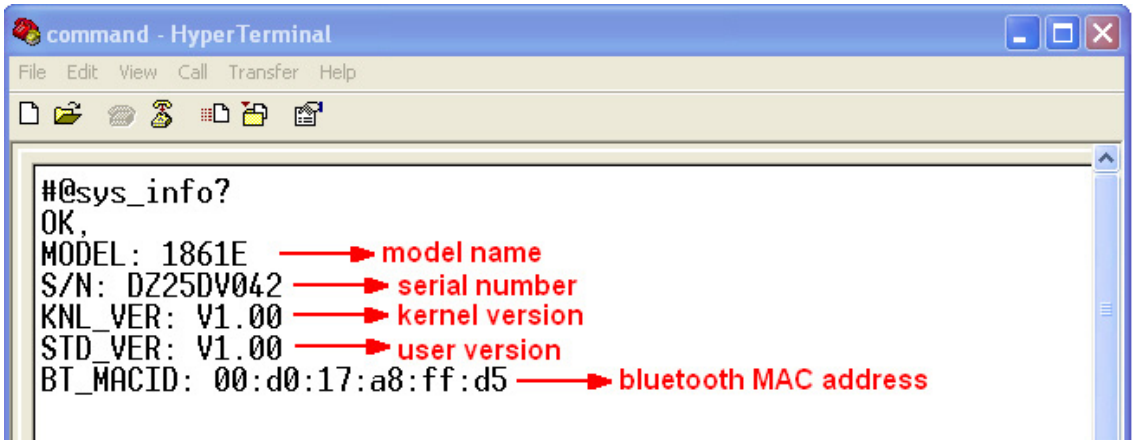


9) After finishing ASCII Setup, in the Properties configuration window, click "OK".



CONFIRMING THE USB CONNECTION

Now, it begins to issue commands between the host computer and RFID Reader. For example, you can issue "#@sys_info?" command for testing. If the connection is successfully, the HyperTerminal will take a response.



Note: If the connection fails, check the USB Interface type whether configured correctly, the default value is '127' for virtual COM CDC. Refer to 2.1 USB Interface.

DEFAULT SETTINGS

SAVE USER SETTINGS AS DEFAULTS

For the RFID Reader to keep the customized settings as user defaults, you must issue "#@sys_svusrtbl" command.

Note: After issuing the command, the current settings will be saved as user defaults.

Command:

#@sys_svusrtbl\r

Purpose	Save User Defined Setting
Response	OK\r
	ERR,[code]\r

RESTORE USER/FACTORY DEFAULTS

For the RFID Reader to restore the User Defaults, which you have saved earlier, you must issue "#@sys_ldstbl=1" command. Alternatively, you can also issue "#@sys_ldstbl=0" command to restore Factory Default.

Command:

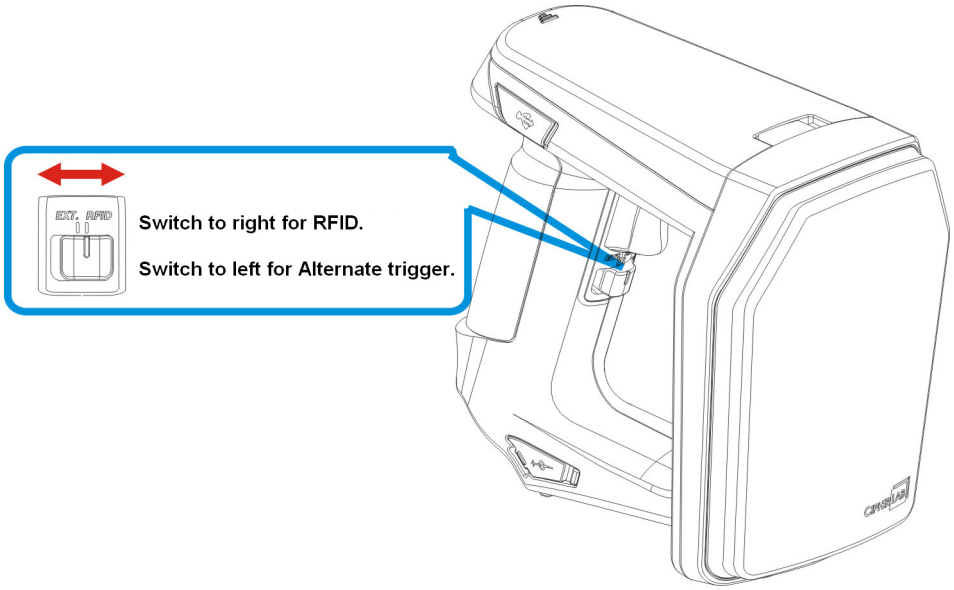
#@sys_ldstbl=[m]\r

Purpose	Load Default Setting
Request	#@sys_ldstbl=[m]\r
	[m]: '0' – Factory Default
	'1' – User Default
Response	OK\r
	ERR,[code]\r

Note: Restore the default values will discount the *Bluetooth*® connection and erase all connected devices.

READER SWITCHER

RFID Reader supports a switcher that is used to switch between RFID Reader and Alternate trigger scan. Switch to right for RFID and left for Alternate trigger.

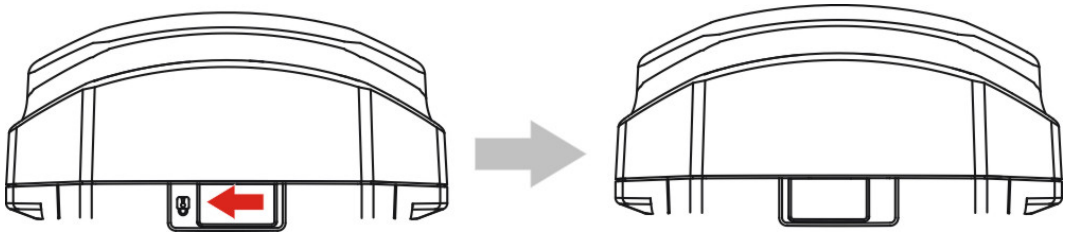


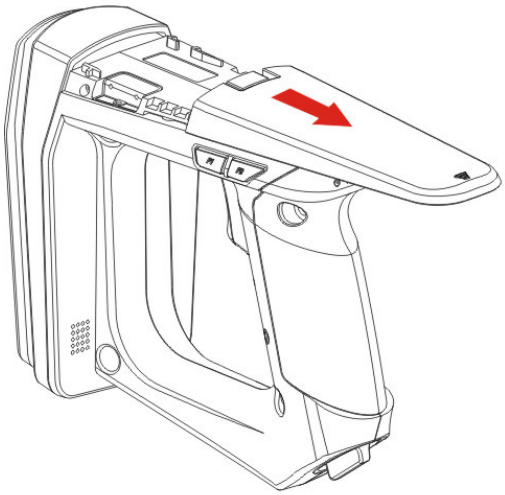
Make sure the reader switcher is set to correct location based on RFID or Alternate mode. For more Alternate mode information, please refer to Alternate Mode.

COMBINING WITH A TERMINAL

If you wish to combine with a terminal, you have to remove the mounting plate cover and install the mobile computer mount, follow these steps to remove the mounting plate cover:

1) Place the RFID Reader erectly on a flat and clean surface.
2) Slide the mounting plate cover latch to unlock position.
3) Remove the mounting plate cover.





1800 CONFIGURATION

You can configure the RFID Reader by issuing commands or 1800Configuration Utility.

Serial Command:

You may run HyperTerminal.exe on the host computer to send commands to RFID Reader via USB virtual COM or *Bluetooth*® SPP. The commands are not case sensitive. The example command common format is showed as below:

Example:

#@sys_time?<CR>

→ Get the system time information.

#@sys_time=[Y],[M],[D],[h],[m],[s]<CR>

→ Set the system time. [Y],[M],[D],[h],[m],[s] are the parameters of system time.

Note: A serial command consists of Prefix, Text and Suffix. The prefix consists of "#" and "@". "?" or "=" is specified to suffix. \r or <CR> is specified for the "Enter" of your keyboard. As a normal command event, it will response with "OK" or "ERR". About "ERR", please refer to Status Code for more information.

1800Configuration Utility:

CipherLab supports a Windows®-based Software Utility to allow you to configure RFID Reader easily. For more information, refer to 1800Configuration User Guide.

Chapter 1

UNDERSTANDING RFID READER

This chapter explains the features and usage of RFID Reader. Before configuring RFID Reader, you have to understand the information by issuing "#@sys_info?" command firstly.

Command:

#@sys_info?\r

Purpose	Get System Information
Response	OK,[m]\r[n]\r[o]\r[p]\r[Q]\r
	[m]: string that indicates model name
	"1861E" – Basic UHF type Europe Band
	"1861U" – Basic UHF type US Band
	"1861J" – Basic UHF type Japan Band
	[n]: string that indicates serial number
	[o]: string that indicates kernel version
	[p]: string that indicates user version
	[q]: string that indicates BTMACID
	ERR,[code]\r

Example:

Command	
#@sys_info?	
Response (s)	
OK,	
MODEL: 1861E	→ model name
S/N: DZ25DV042	→ serial number
KNL_VER: V1.00	→ kernel version
STD_VER: V1:00	→ user version
BT_MACID: 00:d0:17:a8:ff:d5	→ *Bluetooth*® MAC address

IN THIS CHAPTER

1.1 POWER

RFID Reader is powered by a rechargeable 3.7V/2500mAh Li-ion battery pack, and it takes approximately 4 hours to fully charge it via charger or adapter. However, the charging time may vary by working condition. During normal operation, the RFID Reader can work for up to 10 hours.

Warning: The battery cover must be in position. If not, the RFID Reader cannot turn on. For a new battery, make sure it is fully charged before you begin to use it. Always prepare a spare batter, especially when you are working on a non-stop operation.

1.1.1 POWER ON

After installing the battery, press the <Trigger> for 2 seconds. The RFID Reader will respond with a long beep (high tone), and LED1 will become solid red for 1 second and go off.

1.1.2 POWER OFF

The RFID Reader will stay active at power-on, which may be followed by a transition from full CPU speed to low CPU speed (Power-Saving) to auto shutdown (Auto Power Off).

Auto Power Off (1~254 min.; 0= Disable): By default, it is set to automatically shut down after idling 10 minutes. If this feature is not desired, set it to 0.

Command:

#@sys_tpoff?\r

Purpose	Get the Delay Time of System Shutdown
Response	OK,[m]\r (Default m= '10')
	[m]: '0' ~ '254' (Unit=minute)
	ERR,[code]\r

#@sys_tpoff=[m]\r

Purpose	Set the Delay Time of System Shutdown
Response	OK\r
	ERR,[code]\r

Press <F1>+<F2> keys for 3 seconds with two short beeps, high tone and then release both keys to force power off the RFID Reader. Alternatively you can also issue command on the host computer described below to power off the RFID Reader.

Command:

#@sys_off\r

Purpose	System Shutdown
Response	OK\r
	ERR,[code]\r

1.1.3 POWER SAVING MODE

Power Saving (1~254 min.; 0= Disable): By default, it is set to idle at full-speed for 2 minutes before it enters power saving mode. If this feature is not desired, set it to 0. However, the Power Saving setting will not take effect when data is transmitting via *Bluetooth*® HID or SPP.

Command:

#@sys_tps?\r

Purpose	Get the Delay Time of Power Saving Mode
Response	OK,[m]\r (Default m= '2')
	[m]: '0' ~ '254' (Unit=minute)
	ERR,[code]\r

#@sys_tps=[m]\r

Purpose	Set the Delay Time of Power Saving Mode
Response	OK\r
	ERR,[code]\r

Note: Power Saving will not take effect when one of the following conditions is met:
(1) RFID Reader is in the configuration mode.
(2) The scanning mode is set to Test Mode.
(3) The setting value of Power Saving is greater than Auto Power Off.

If you want to keep system always alive, you can issue "#@sys_kalive" command. If the delay time for system shutdown and power saving mode are not zero, this command will re-count time for 1800 RFID Reader from entering the power saving mode or shutting down itself.

Command:

#@sys_kalive\r

Purpose	Keep the System Alive
Response	OK\r
	ERR,[code]\r

1.1.4 LOW BATTERY ALARM

By default, the battery alarm will beep when the battery charge gets low. In order to prevent data loss, it is advised to replace the battery immediately when hearing two short beeps (high tone).

Command:

#@sys_battery?\r

Purpose	Get Voltage of Battery
Response	OK,[m]\r
	[m]: battery voltage. (e.g. 100%)
	ERR,[code]\r

#@sys_lbalarm?\r

Purpose	Get Low Battery Alarm
Response	OK,[m]\r (Default m= '1')
	[m]: '0' – Disable
	'1' – Enable
	ERR,[code]\r

#@sys_lbalarm=[m]\r

Purpose	Set Low Battery Alarm
Response	OK\r
	ERR,[code]\r

Warning: Using *Bluetooth*® connection will substantially reduce battery power. Disable the *Bluetooth*® function when it is uselessly.

1.2 MEMORY

- Memory Mode

  4MB memory for Memory Mode data access.

- Transmit Buffer Memory

  2KB buffer while getting out of range over a wireless personal area network (WPAN)

The collected data can be sent back to a host computer one by one via the *Bluetooth*® connection or stored in memory when RFID Reader is set to Memory mode.

1.2.1 TRANSMIT BUFFER

By default, transmit buffer is enabled for using when the RFID Reader is out of range. Upon reading a tag successfully within range, the RFID Reader responds with one short beep (high tone) and LED3 indicator becomes solid green and goes off. However, the host computer may not receive the data immediately if getting out of range. With the 2KB transmit buffer, the RFID Reader can ignore the transmission range and keep on reading tags until the buffer is full.

When transmit buffer is enabled...

If the RFID Reader is out of range, it will respond with two short beeps, high-low tone, upon reading a tag successfully.

When transmit buffer is full, the RFID Reader will respond with one long beep (low tone). You are advised to get back to range.

When transmit buffer is disabled...

If the RFID Reader is out of range, it will respond with one long beep (low tone). You are advised to get back to range.

Command:

#@sys_txben?\r

Purpose	Get Transmit Buffer Status
Response	OK,[m]\r (Default m= '1')
	[m]: '0' – Disable
	'1' – Enable
	ERR,[code]\r

#@sys_txben=[m]\r

Purpose	Set Transmit Buffer Status
Response	OK\r
	ERR,[code]\r

#@sys_txbdly?\r

Purpose	Get Transmit Buffer Data Delay
Response	OK,[m]\r (Default m= '0')
	[m] Send TX Buffer Delay

'0'	0 ms
'1'	250 ms
'2'	500 ms
'3'	1 sec
'4'	2 sec
'5'	3 sec
'6'	5 sec
'7'	8 sec

ERR,[code]\r

#@sys_txbdly=[m]\r

Purpose	Set Transmit Buffer Data Delay
Response	OK\r
	ERR,[code]\r

1.2.2 MEMORY MODE

The RFID Reader keeps 4MB memory for memory mode operation. When the RFID Reader is in memory mode with green LED5 flashing and blue LED2 off that means any real-time connection established with the host is disabled.

Warning: No real-time connection is allowed unless the memory mode is disabled.

STATUS

You have to disable the memory mode to allow a real-time connection. And confirm the memory size by issuing "#@sys_memsize?" command.

Command:

#@sys_memen?\r

Purpose	Get Memory Mode Status
Response	OK,[m]\r (Default m= '0')
	[m]: '0' – Disable
	'1' – Enable
	ERR,[code]\r

#@sys_memen=[m]\r

Purpose	Set Memory Mode
Response	OK\r
	ERR,[code]\r

Note: You can also enter/exit memory mode by pressing function keys. Refer to 1.3.1.2 Functions.

#@sys_memsize?\r

Purpose	Get Free Memory Size
Response	OK,[m]\r (Default m is 4072)
	[m]: Free Memory Size string in KB
	ERR,[code]\r

DATA DELAY

You may set a delay time between each data record while transmitting data back to the host computer.

Command:

#@sys_memdly?\r

Purpose: Get Data Transmission Delay

Response: OK,[m]\r (Default m= '0')

[m]: '0'~'7'

Data Transmission Delay

Value	Delay
'0'	0 ms
'1'	250 ms
'2'	500 ms
'3'	1 sec
'4'	2 sec
'5'	3 sec
'6'	5 sec
'7'	8 sec

ERR,[code]\r

#@sys_memdly=[m]\r

Purpose: Set Data Transmission Delay

Response: OK\r

ERR,[code]\r

SEND DATA

You are advised to send data to the host computer immediately by issuing "#@sys_memup" command. The RFID Reader will restore the previous connection with the host computer temporarily so that you can transmit data to the host computer.

Command:

#@sys_memup\r

Purpose	Upload Memory Data
Response	#@sys_memup\r
	[m]\r
	OK
	[m]: Data string
	ERR,[code]\r

CLEAR MEMORY

Even though data has been sent back to the host, the flash memory is still occupied unless you erase the memory by issuing "#@sys_memclr" command to clear memory.

Command:

#@sys_memclr\r

Purpose	Clear Memory
Response	OK\r
	ERR,[code]\r

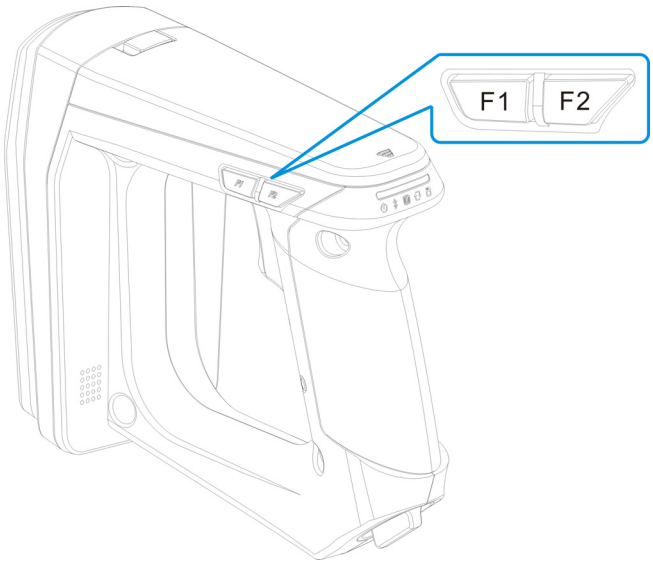
Example:

Command	
#@sys_memsize?	→ get current memory size
Response (s)	
OK, 4072	
Command	
#@sys_memen=1	→ enter memory mode
Response (s)	
OK	
Command	
#@sys_memdly=4	→ set the delay time of data transmission to 2 sec.
Response (s)	
OK	
Command	
#@sys_memup	→ upload memory data
Response (s)	
1. 2012-04-18 300034303331303031323030304221 2. 2012-04-18 300034303331303031323030304221 3. 2012-04-18 300034303331303031323030304221 OK	] → 2sec.] → 2sec.
Command	
#@sys_memclr	→ clear memory size
Response (s)	
OK	

Note: You can disable the COM port or disconnect the USB cable to end the data transmission upon memory mode.

1.3 FUNCTION KEYS

The function keys serve as a modifier key, and the functionality of each key combination is application-dependent.



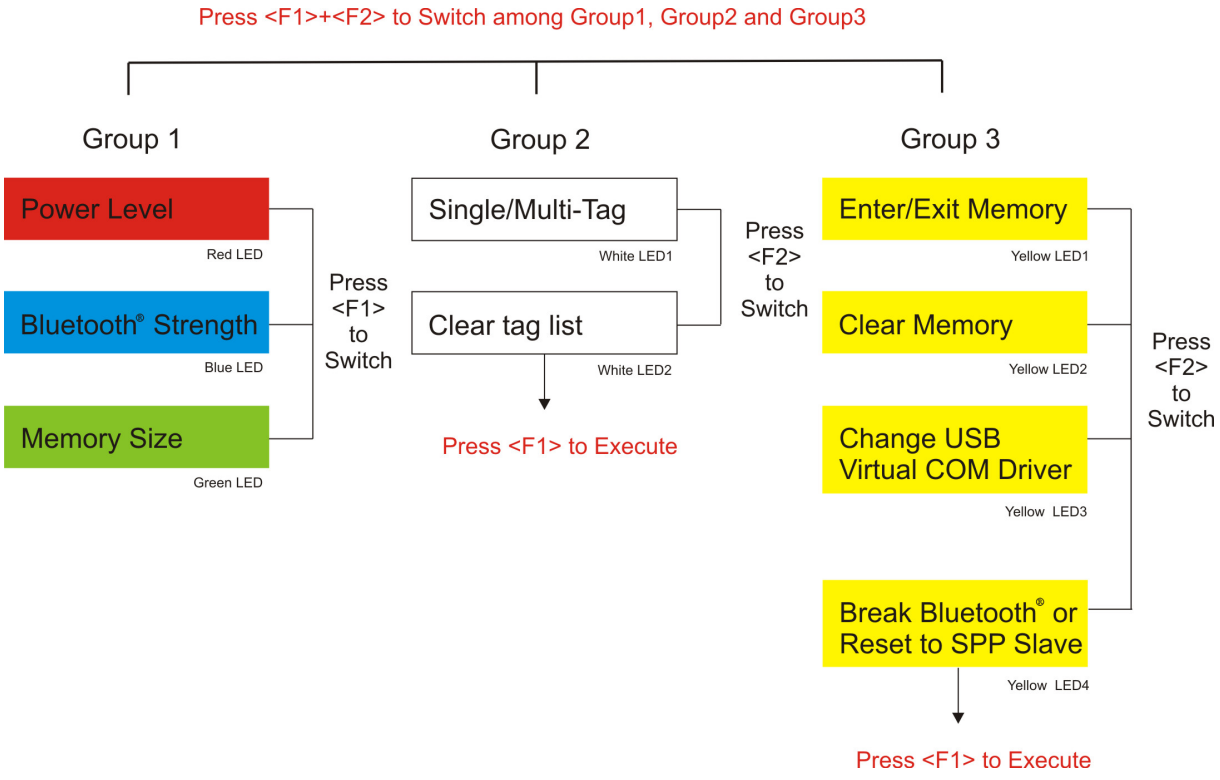
Keys	Action	Mode
<Trigger>	Scan Tag	Normal
	Select number 1~5	*Bluetooth*® Pairing
	Send string	Alternate
<F1>	Execute special function	Normal
	Switch the LED status between power level, BT signal level, data memory space level	Normal
	Send string	Alternate
<F2>	Select special function	Normal
	Send string	Alternate
	Put selected number to PIN Code buffer	*Bluetooth*® Pairing
<F1>+<F2>	Power off the system	Normal, Alternate
	Switch among special command group	Normal
	Erase PIN Code	*Bluetooth*® Pairing
<F1>+<Trigger>	Select number 6~0	*Bluetooth*® Pairing
	Send string	Alternate
<F2>+<Trigger>	Send PIN Code to paired BT device	*Bluetooth*® Pairing
	Send string	Alternate
	Firmware Upgrade	Refer to Firmware Upgrade
<F1>+<F2>+<Trigger>	Cancel the pairing	*Bluetooth*® Pairing
Reader Switcher	Used to switch the RFID and Alternate mode	

1.3.1 NORMAL MODE

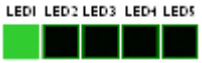
1.3.1.1 FUNCTION KEY FOR POWER OFF

Press <F1>+<F2> keys for 3 seconds with two short beeps, high tone and then release both keys to power off the RFID Reader.

1.3.1.2 FUNCTIONS



Note: Press <F1>+<F2> to switch Group1, Group2 or Group3. The 3 Groups function key commands are only available upon RFID mode. In the Alternate mode, the function keys are only used for keypad output strings.

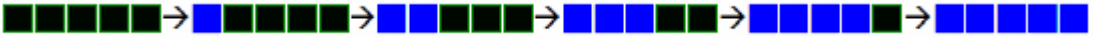
Group1 System Status (Green LED1): 

Press <F1>+<F2> to enter Group1 with Green LED1. In the Group1, you can press <F1> to switch among Battery Status, *Bluetooth*® Signal Quality and Data Memory Space. After idling 3-seconds timeout, the LED status will return to normal mode.

- Power Level (Red LED)

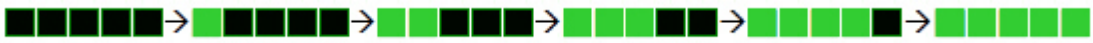
Exhaustion Low Battery Full Battery

- *Bluetooth*® Strength (RSSI) (Blue LED)



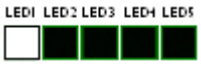
Poor Very good

- Free Memory Size (Green LED)



Empty Full

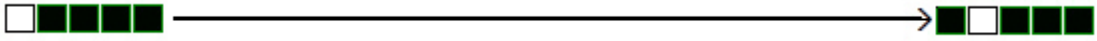
Note: Press <F1> to switch to *Bluetooth*® Strength showing upon a *Bluetooth*® connection successfully.

Group2 RFID Assistance (White LED1): 

Press <F1>+<F2> to switch to Group2 with White LED1. The Group2 is defined to 2 commands (Command1 and 2). Press <F2> to switch between Command1 and Command2 or press <F1> to execute the command directly. The LED status will return to normal mode when you idle about 3 seconds during configuration.

- Command1: Set Single or Multi-Tag Scan Mode.
  (As serial commands: "#@rf_scan=6" and "#@rf_scan=9")
- Command2: Reload Counter for Multi-Tag Scan Mode.
  (As serial command: "#@rf_mtagcnt=")

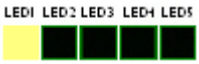
Press <F2> to switch between Command 1 and 2



Command1 Command2

Executing:

Function	Key Operation	LEDs Status
Command1	<F1>+<F2> → <F1: Executing>	
Command2	<F1>+<F2> → <F2> → < F1: Executing>	

Group3 Others (Yellow LED1): 

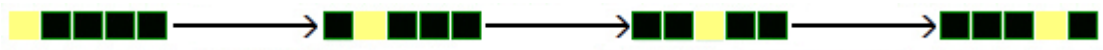
Press <F1>+<F2> to switch to Group3 with Yellow LED1. The Group3 is defined to 4 commands. Press <F2> to switch among the Commands or press <F1> to execute the command. The LED status will return to normal mode when you idle about 3 seconds during configuration.

- Command1: Enabel/Disable memory mode.
  (As serial command: "#@sys_memen=1/0")
- Command2: Clear data memory.
  (As serial command: #@sys_memclr)
- Command3: Select USB virtual COM driver (Switch between CDC and SiliconLab).
  (As serial command: #@usb_type=127/128)

Note: Power on RFID Reader, the default value for USB Virtual COM driver is CDC. Press <F1> one time upon command3 to switch to SiliconLab type if you are using SiliconLab drive as a Virtual COM connection. Wrong VCOM type selection will make disconnection.

- Command4:
  a. Break the current connection when *Bluetooth*® is connected.
  b. Reset the connection type to default – SPP slave when *Bluetooth*® is not connected.
  (As serial commands: "#@bt_disc and #@bt_reset")

Press <F2> to switch between Command 1, 2, 3 and 4



Command1 Command2 Command3 Command4

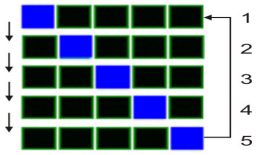
Note: Except for function keys, you can also issue command to break or reset the *Bluetooth*® connection. Refer to 3.3.1 Break a Connection and 3.3.2 Reset a Connection.

1.3.2 *BLUETOOTH*® PAIRING MODE

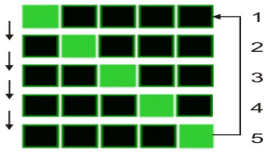
For *Bluetooth*® connection or numeric input required situations; you have to combine Function key and <Trigger> to input numeric code.

Various numeric input will show you different LED status illustrated below:

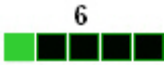
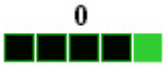
No.1~5



No.6~0



PIN CODE Input for *Bluetooth*® Pairing:

Number Input	Key Operation	LEDs Status
Number 1	<Trigger> once → <F2>	
Number 2	<Trigger> twice → <F2>	
Number 3	<Trigger> three times → <F2>	
Number 4	<Trigger> four times → <F2>	
Number 5	<Trigger> five times → <F2>	
Number 6	<F1+Trigger> once → <F2>	
Number 7	<F1+Trigger> twice → <F2>	
Number 8	<F1+Trigger> three times → <F2>	
Number 9	<F1+Trigger> four times → <F2>	
Number 0	<F1+Trigger> five times → <F2>	
Send PIN Code	<F2>+<Trigger>	
Erase the PIN Code	<F1>+<F2>	
Cancel the Pairing	<F1>+<F2>+<Trigger>	

1.3.3 ALTERNATE MODE

In this mode is only used for sending key signal to host. For more information, please refer to Chapter 6 Alternate Mode.

Note: You can press <F1>+<F2> keys for 3 seconds to power off RFID reader upon alternate mode.

1.4 LED INDICATORS

The five LEDs on the RFID Reader are used to provide a feedback to user about the behavior comes from RFID Reader. For example, the LED1 becomes solid red and goes off upon powering on.

The LED indicators status can be divided into 3 parts — Normal, Temporary Status and *Bluetooth*® Pairing Modes.

1.4.1 SYSTEM STATUS

Normal mode shows you the normal LED status without any advanced configuration.

LED	Color	Status	Description
LED1-Power	Red	On-Off	Power on, with one long beeps (high tone, LED1 on for 1 second and then off.)
	Red	On	▸ Charging Fail ▸ Power Off (Press F1+F2 to power off simultaneously, until both of the function keys are released)
	Red	Flashing	Charging (On/Off ratio 0.5s:0.5s)
	Green	Flashing	Charging Done (On/Off ratio 0.5s:0.5s)
LED2-*Bluetooth*® Communication	Blue	Flashing	On/Off ratio 0.5s:0.5s for two minutes indicates the RFID Reader is waiting for connection, and goes off if no connection is established.
			On/Off ratio 0.1s:0.1s indicates the RFID Reader receives a PIN code request from host (flashing more quickly than waiting connection)
			On/Off ratio 0.02s:3s indicates the RFID Reader has established a *Bluetooth*® connection successfully.
LED3-RFID Tag Access	Green	On-Off	Good Read/Write with one short beeps (high tone). The pitch and duration are programmable.
LED4-Data Transmission	Green	Flashing	Indicate the data is transmitted between RFID Reader and host. The speed of flashing varies with data rate.
LED5-Memory Status	Green	Flashing	Flashing ((On/Off ratio 0.02s:3s) indicates Free memory size > 10% ** Only for memory mode
	Red	Flashing	Flashing (On/Off ratio 0.02s:3s) indicates memory under 10% ** Only for memory mode

Note: You can configure the good read LED3 status (disable/enable) and duration (ranging from 1 to 254 in units of 10 milliseconds) by command. When you set the LED3 feedback as disable, the LED3 will always off for each good read.

GOOD READ LED STATUS

You may configure the LED3 status for a feedback about good read.

Command:

#@sys_leden?\r

Purpose	Get Good Read LED Status
Response	OK,[m]\r (Default m= '1')
	[m]: '0' – Disable
	'1' – Enable
	ERR,[code]\r

#@sys_leden=[m]\r

Purpose	Set LED Good Read Status
Response	OK\r
	ERR,[code]\r

GOOD READ LED DURATION

For a good read for LED3, you may configure the duration time.

Command:

#@sys_leddu?\r

Purpose	Get Good Read LED Duration
Response	OK,[m]\r (Default m= '4')
	[m]: Duration='1' ~ '254'
	ERR,[code]\r

#@sys_leddu=[m]\r

Purpose	Set LED Duration
Response	OK\r
	ERR,[code]\r

1.4.2 FUNCTION KEY STATUS

Combine with five LEDs and function keys, the LED status can be classified into 3 Groups refer to 1.3.1.2 Function.

1.4.3 *BLUETOOTH*® PAIRING STATUS

The LED status can be specified for *Bluetooth*® pairing status, refer to 1.3.2 *Bluetooth*® Pairing Mode.

1.5 BUZZER

The RFID Reader has a buzzer to provide feedback in various operating conditions.

Beeping	Meaning
One long beep, high tone	Power on, with Red LED1 on (1 second) and off
One short beep, high tone ▸ Programmable, default to 4KHz	▸ Good read, with Green LED3 on-off ▸ Enter PIN code ▸ Switch among status LED mode
One short beep, low tone	▸ Select PIN code ▸ Multi_Tag Mode: Get a repeated tag (Default: Disable)
One long beep, low tone	▸ Fail to send data or response - Transmit buffer full - Transmit buffer is disabled while *Bluetooth*® is not connected or out of range. ▸ Command fail
Two short beeps, high-low tone	▸ Data saved to buffer when transmit buffer is enabled and the RFID Reader is out of range ▸ Memory Mode: Memory full
Two short beeps, low-high tone	▸ Command success ▸ Send PIN code ▸ Running out of transmit buffer
Two short beeps, high tone	▸ Low battery alarm ▸ Clear PIN code ▸ Power off
Three short beeps, tone ascending from low to high	▸ *Bluetooth*® connection is established ▸ *Bluetooth*® connection is resumed, with LED2 flashing blue
Three short beeps, tone ascending from high to low	*Bluetooth*® connection out of range or suspended
Six short beeps, low-mid-high-low-mid-high	Multi_Tag Mode: Tag list is full (scan session completes) (Default: Disable)
Continual beeps	▸ Low voltage (under 5%) with warning continual beeps ▸ The battery is removed during charging

When the battery voltage is under 5%, it will continual beeps. We suggest it is better to charge the battery immediately before the RFID Reader is powered off. You can get the voltage information by issue "sys_battery?" command.

The commands below describe the buzzer related configurations:

VOLUME

There are four volume levels defined to beeping setting.

Command:

#@sys_bpvol?\r

Purpose	Get Beeper Volume
Response	OK,[m]\r (Default m= 'High')
	[m]: Volume

'0'	Mute
'1'	Low
'2'	Medium
'3'	High

ERR,[code]\r

#@sys_bpvol=[m]\r

Purpose	Set Beeper Volume
Response	OK\r
	ERR,[code]\r

COMMAND BEEP

By default, this function is enabled.

Command:

#@sys_cmdbp?\r

Purpose	Get Status of Command Indicating Beep
Response	OK,[m]\r (Default m= '0')
	[m]: '0' – Disable
	'1' – Enable
	ERR,[code]\r

#@sys_cmdbp=[m]\r

Purpose	Set Command indicating Beep
Response	OK\r
	ERR,[code]\r

GOOD READ

You have to enable the buzzer beeping function when you want to get a feedback from RFID Reader.

Command:

#@sys_grdbp?\r

Purpose	Get Status of Good-Read Beep
Response	OK,[m]\r (Default m= '1')
	[m]: '0' – Disable
	'1' – Enable
	ERR,[code]\r

#@sys_grdbp=[m]\r

Purpose	Set Status of Good-Read Beep
Response	OK\r
	ERR,[code]\r

FREQUENCY

By default, the frequency for a buzzer is configured to 4KHz. This function is upon Good-Read beep is enabled.

Command:

#@sys_grdbf?\r

Purpose	Get Beeper Frequency
Response	OK,[m]\r (Default m= '1')
	[m]: Frequency

'0'	8 kHz
'1'	4 kHz
'2'	2 kHz
'3'	1 kHz

ERR,[code]\r

#@sys_grdbf=[m]\r

Purpose	Set Beeper Frequency
Response	OK\r
	ERR,[code]\r

DURATION

You can configure the beeping duration to shortest, short, longer or longest. This function is upon Good-Read beep is enabled.

Command:

#@sys_grdbdu?\r

Purpose	Get Beeper Duration
Response	OK,[m]\r (Default m= 'Shortest')
	[m]: Duration

'0'	Shortest
'1'	Short
'2'	Longer
'3'	Longest

ERR,[code]\r

#@sys_grdbdu=[m]\r

Purpose	Set Beeper Duration
Response	OK\r
	ERR,[code]\r

Note: When you set the volume of beeper to mute, the feedback from RFID Reader will be mute.

1.6 VIBRATOR

The RFID Reader has a built-in vibrator, which can be issued command for feedback. This can be helpful when working in noisy environments.

For good read/write, the vibrator will make the duration of 1 second feedback with on-off vibrating. The vibrating and duration are programmable.

STATUS

RFID Reader supports a good feedback with mute vibrator, you can enable/disable by issuing "#@sys_viben=" command.

Command:

#@sys_viben?\r

Purpose	Get Vibrator Status
Response	OK,[m]\r (Default m= '0')
	[m]: '0' – Disable
	'1' – Enable
	ERR,[code]\r

#@sys_viben=[m]\r

Purpose	Set Vibrator Status
Response	OK\r
	ERR,[code]\r

DURATION

By default, the good reader vibrator stays on for 1 second. Specify a value, ranging from 1 to 254 in units of 100 milliseconds.

Command:

#@sys_vibdu?\r

Purpose	Get Vibrator Duration
Response	OK,[m]\r (Default m= '10')
	[m]: Duration='1' ~ '254'
	ERR,[code]\r

#@sys_vibdu=[m]\r

Purpose	Set Vibrator Duration
Response	OK\r
	ERR,[code]\r

1.7 RTC

RFID Reader supports a system clock to keep track of the current time.

Command:

#@sys_time?\r

Purpose	Get System Clock
Response	OK,[Y],[M],[D],[h],[m],[s]\r
	[Y]: '00' ~ '99'
	[M]: '01' ~ '12'
	[D]: '01' ~ '31'
	[h]: '00' ~ '23'
	[m]: '00' ~ '59'
	[s]: '00' ~ '59'
	ERR,[code]\r

#@sys_time=[Y],[M],[D],[h],[m],[s]\r

Purpose	Set System Clock
Response	OK\r
	ERR,[code]\r

Example:

Command	
#@sys_time?	→ get current system time
Response (s)	
OK,12,05,10,10,36,05	→ date=2012/5/10, time=10:36 05
Command	
#@sys_time=12,06,20,12,50,00	→ set system date and time to 2012.6.20 12:50 00
Response (s)	
OK	

Chapter 2

COMMUNICATION INTERFACE

Follow the sections below for output interfaces supported to establish USB and WPAN connection with RFID Reader. Refer to the table as below:

1800 Communication Interface:

Interface		Configuration	RFID Data Out	Upload Memory Data
Bluetooth®	SPP Slave	v	v	v
	SPP Master	v	v	v
	HID		v	
	3610 Virtual COM	v	v	v
	3610 HID		v	
USB	Virtual COM Windows CDC Driver/SiliconLab Driver	v		v

IN THIS CHAPTER

Note: By default, the output interface is set to "SPP Slave".

2.1 USB INTERFACE

Create a connection between RFID Reader and host computer; you have to select the available USB interface type by "#@usb_type=" command. Wrong USB interface type setting will make disconnection. You can also use the function key to switch the USB interface type, refer to 1.3.1.2 Functions.

Command:

#@usb_type?\r

Purpose	Get USB Interface Type
Response	OK,[m]\r (Default m='127')
	[m]: USB Type
	'127' – Virtual COM CDC
	'128' – Virtual COM (Silicon Lab driver)
	ERR,[code]\r

#@usb_type=[m]\r

Purpose	Set USB Interface
Response	OK\r
	ERR,[code]\r

2.2 *BLUETOOTH*® CONNECTION TYPE

Based on the connection type, you have to select the proper *Bluetooth*® type. By default, the connection type is configured to "SPP Slave".

Command:

#@bt_type?\r

Purpose	Get *Bluetooth*® Interface Type
Response	OK,[m]\r (Default m= '0')
	[m]: *Bluetooth*® TYPE

Bluetooth® Type	Description	Read only / R/W
'0'	SPP Slave	R/W
'3'	SPP Master	R/W
'5'	HID	R/W
'6'	3610	Read only

ERR,[code]\r

#@bt_type=[m]\r

Purpose	Set *Bluetooth*® Interface Type
Response	OK\r
	ERR,[code]\r

2.3 *BLUETOOTH*® HID

For *Bluetooth*® HID connection, issue the "#@bt_type=" command to parameter '5' on the HyperTerminal to change the output interface to *Bluetooth*® HID. Refer to Using HyperTerminal for related connection settings. To capture the data run any text editor on host computer and the scanned data will be transmitted to the host computer.

HID Settings	Defaults
Keyboard Type	PCAT (US)
Alphabets Layout	Normal
Numeric Layout	Normal
Capital Lock Type	Normal
Capital Lock State	Off
Alphabets Transmission	Case-sensitive
Numeric Transmission	Alphanumeric keypad
Inter-Character Delay	0 (ms)

2.3.1 ACTIVATE *BLUETOOTH*® HID & SELECT KEYBOARD TYPE

When *Bluetooth*® HID interface is activated, you will have to select a keyboard type to complete this setting. By default, *Bluetooth*® HID is activated with PCAT (US) type on the RFID Reader.

Bluetooth® HID

The following keyboard types are supported —

No.	Keyboard Type	No.	Keyboard Type
64	PCAT (US) (Default)	71	PCAT (Belgium)
65	PCAT (French)	72	PCAT (Spanish)
66	PCAT (German)	73	PCAT (Portuguese)
67	PCAT (Italy)	74	PS55 A01-2 (Japanese)
68	PCAT (Swedish)	75	Reserved
69	PCAT (Norwegian)	76	PCAT (Turkish)
70	PCAT (UK)	77	PCAT (Hungarian)

Command:

#@bt_hididx?\r

Purpose Get *Bluetooth*® HID Parameter

Response OK,[m]\r

[m]: Parameter

[m]	Description	Valid Parameters
'0'	HID KBD Type	'64'~ '77' (Default m='64')
'3'	Inter-function Delay	'0' ~ '254' (Default m='0')
'4'	Inter-character Delay	'0' ~ '254' (Default m='0')
'5'	Caps Lock State	'0' – OFF (Default m='0') '1' – ON '2' – Auto
'7'	Alphabets Transmission	'0' – Case Sensitive '1' – Ignore Case
'8'	Digits Transmission	'0' – Alpha Numeric Keypad '1'– Numeric Keypad
'9'	Digits Position	'0' – Normal '1'– Lower Row '2'– Upper Row
'10'	Keyboard Layout	'0' – Normal '1' – AZERTY '2' – QWERTZ
'12'	HID Character Transmit Mode	'0' – Batch Processing '1' – By Character

ERR,[code]\r

#@bt_hididx=[m]\r

Purpose Set *Bluetooth*® HID Parameter

Response OK\r\r

ERR,[code]

#@bt_hidpr?\r

Purpose	Get *Bluetooth*® HID Parameter
Response	OK,[m]\r
	[m]: Parameter
	ERR,[code]\r

#@bt_hidpr=[m]\r

Purpose	Set *Bluetooth*® HID Parameter
Response	OK\r
	ERR,[code]\r

Example:

Command	
#@bt_type=5	→ change connected interface to BT HID
Response (s)	
OK	
Command	
#@bt_hididx=0	→ enter HID KBD type configuration
Response (s)	
OK	
Command	
#@bt_hidpr=64	→ set PCAT (US) for KBD type
Response (s)	
OK	

2.3.2 KEYBOARD SETTINGS

- Alphabets Layout
- Numeric Layout
- Capital Lock Setting
- Alphabets Transmission
- Numeric Transmission

ALPHABETS LAYOUT

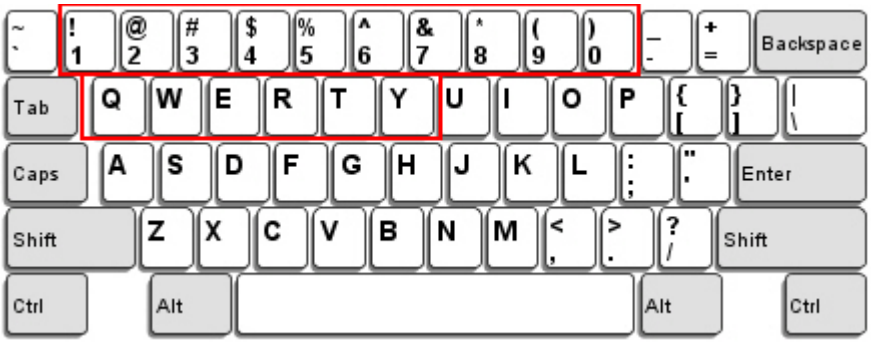
By default, the alphabets layout is set to normal mode, also known as the standard English layout. Select French or German keyboard layout if necessary. The RFID Reader will make adjustments when sending the "A", "Q", "W", "Z", "Y", and "M" characters according to this setting.

Options	Parameter	Description
Normal (Default)	'0'	US keyboard.
AZERTY	'1'	French keyboard.
QWERTZ	'2'	German keyboard.

Note: This setting only works when the keyboard type selected is US keyboard, such as PCAT (US). The Alphabets Layout and Numeric Layout setting must match your keyboard.

US KEYBOARD STYLE – NORMAL

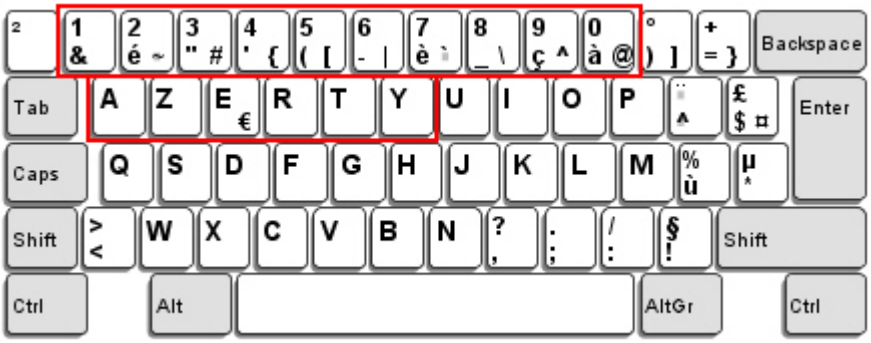
QWERTY layout, which is normally used in western countries.



- Select "Lower Row" for the "Numeric Layout" setting for the upper row is for special characters.

FRENCH KEYBOARD STYLE – AZERTY

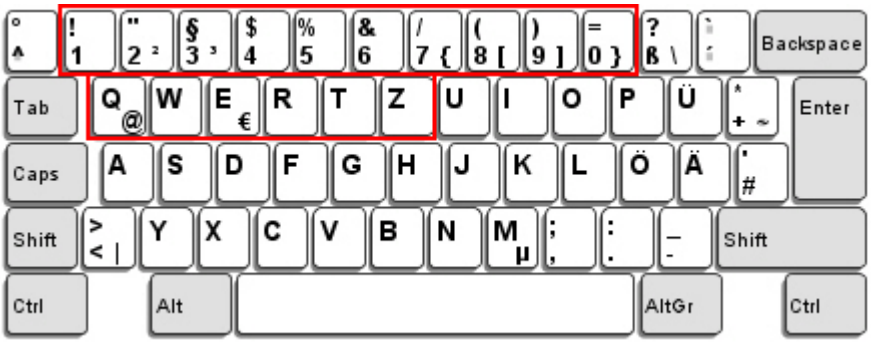
French layout; see below for French Keyboard Style.



- Select "Upper Row" for the "Numeric Layout" setting for the lower row is for special characters.

GERMAN KEYBOARD LAYOUT – QWERTZ

German layout; see below for German Keyboard Style.



- Select "Lower Row" for the "Numeric Layout" setting for the upper row is for special characters.

NUMERIC LAYOUT

Select a proper layout that matches the alphabets layout. The RFID Reader will make adjustments according to this setting.

Options	Parameter	Description
Normal (Default)	'0'	Depend on the [Shift] key or [Shift Lock] setting.
Lower Row	'1'	For QWERTY or QWERTZ keyboard.
Upper Row	'2'	For AZERTY keyboard.

Note: This setting is to be used with the Character Substitution setting when support to certain keyboard types (languages) is unavailable but required.

CAPITAL LOCK SETTING

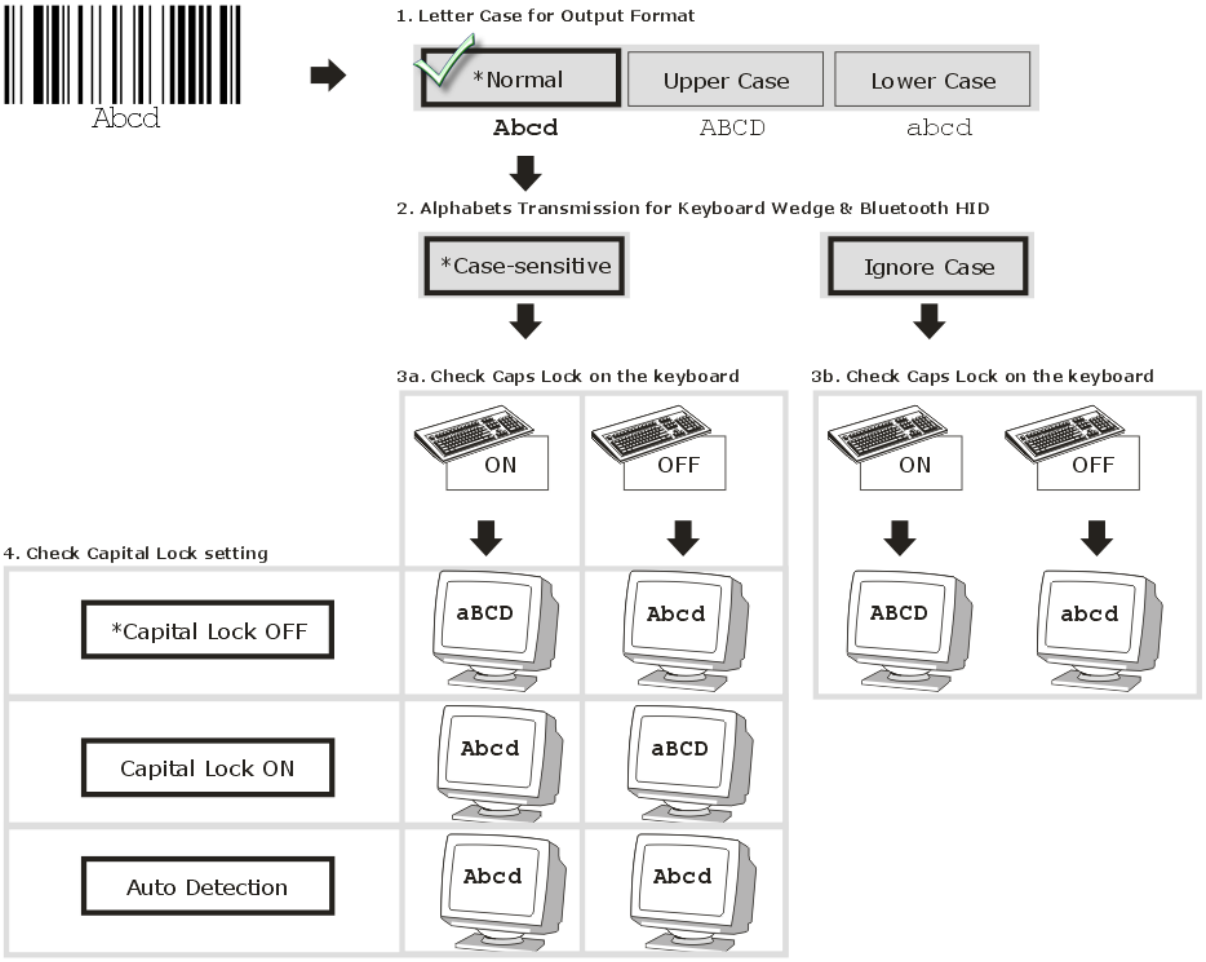
In order to send the alphabets with correct case, the RFID Reader needs to know the status of Caps Lock on the keyboard. Incorrect settings may result in reversed case of the alphabets being transmitted.

Options	Parameter	Description
Capital Lock OFF (Default)	'0'	Assuming that the status of Caps Lock on the keyboard is OFF, transmitted characters are exactly the same as in the tag (when "case-sensitive" is selected for Alphabets Transmission).
Capital Lock ON	'1'	Assuming that the status of Caps Lock on the keyboard is ON, transmitted characters are exactly the same as in the tag (when "case-sensitive" is selected for Alphabets Transmission). ▸ Refer to the Capital Lock Type above.
Auto Detection	'2'	The RFID Reader will automatically detect the status of Caps Lock on the keyboard before data is transmitted; transmitted characters are exactly the same as in the tag (when "case-sensitive" is selected for Alphabets Transmission).

ALPHABETS TRANSMISSION

By default, the alphabets transmission is case-sensitive, meaning that the alphabets will be transmitted according to their original case, the status of Caps Lock on the keyboard, as well as the Capital Lock setting. Select [Ignore Case] to have alphabets transmitted according to the status of Caps Lock on the keyboard only.

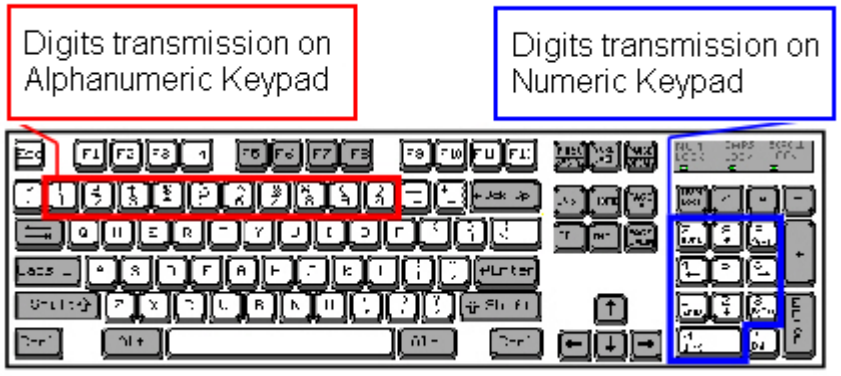
Options	Parameter	Description
Case Sensitive (Default)	'0'	Alphabets will be transmitted according to the original case.
Ignore Case	'1'	Alphabets will be transmitted according to the status of Caps Lock on the keyboard only.



NUMERIC TRANSMISSION

By default, the alphanumeric keypad is used for transmitting numeric. Select "Numeric Keypad" if you wish to use the numeric keypad.

Options	Parameter	Description
Alphanumeric Keypad (Default)	'0'	Alphanumeric Keypad will be used for transmitting numeric.
Numeric Keypad	'1'	Numeric Keypad will be used for transmitting numeric.



2.3.3 INTER-CHARACTER DELAY

By default, the inter-character delay is set to zero. Specify a value, ranging from 0 to 254 in units of millisecond, to match the computer response time of the keyboard interface. Such delay time is inserted between every character being transmitted. The longer the delay time is, the slower the transmission speed will be.

Options	Parameter	Description
'0' (Default)	'0'~'254'	The range is from 0 to 254 in units of millisecond.

2.3.4 INTER-FUNCTION DELAY

By default, the inter-function delay is set to zero. Specify a value, ranging from 0 to 254 in units of milliseconds, to match the computer response time of the keyboard interface. Such delay time is inserted between every function code (0x01 ~ 0x1F) being transmitted. The longer the delay time is, the slower the transmission speed will be.

Options	Parameter	Description
'0' (Default)	'0'~'254'	The range is from 0 to 254 in units of millisecond.

2.3.5 HID CHARACTER TRANSMIT MODE

By default, HID interface sends data to the host in batch. You may configure the RFID Reader to "By Character" to process data one character at a time.

Options	Parameter	Description
Batch Processing (Default)	'0'	Process data by Batch.
By Character	'1'	Process data by Character

Note: "By Character" transmit mode is required when working with iPhone or iPad.

2.4 *BLUETOOTH*® SPP SLAVE

For *Bluetooth*® SPP Slave, issue the "#@bt_type=" to parameter '0' for output interface. Then, refer to Set Up a WPAN Connection for related connection settings. By default, RFID Reader connection type is configured to "SPP Slave".

Example:

Command	
#@bt_type?	→ get current *Bluetooth*® type
Response (s)	
OK,0	→ default *Bluetooth*® type is '0' for SPP Slave
Command	
#@bt_type=0	→ set *Bluetooth*® type to SPP Slave
Response (s)	
OK	

2.5 *BLUETOOTH*® SPP MASTER

As a SPP master device, RFID Reader will be able to resume connection with the host computer upon powering on again, as long as the host application is running. If RFID Reader fails to resume connection, it will try every 5 seconds to re-connect to the host computer unless you issue the "#@bt_reset" or "#@sys_ldstbl=" command.

For *Bluetooth*® SPP Master Connection, refer to 3.1.4 *Bluetooth*® SPP Master.

Note: In SPP Master Mode, RFID Reader has to connect within the specified period of time (2 minutes by default). During the connection, the RFID Reader will enter to Power Saving Mode to save power. It will automatically power off when the time is up. Refer to 1.1 Power.

2.5.1 ACTIVATE *BLUETOOTH*® SPP MASTER MODE

How to connect with the target machine?

There are two parameters for "#@bt_target=" command to SPP Master target machine. One is *Bluetooth*® targe – SPP Master and another is the symbolical No. of target machine.

Command:

#@bt_target?\r

Purpose	Get *Bluetooth*® Target Machine
Response	OK,[m],[n]\r
	[m]: *Bluetooth*® Type, '0' – SPP Master, '1' – 3610
	[n]: MACID of target Machine or S/N of 3610
	ERR,[code]\r

#@bt_target=[m],[n]\r

Purpose	Set *Bluetooth*® Target Machine
Response	OK
	ERR,[code]

Exit SPP Master Mode

To stop such re-connection, you can issue the "#@bt_reset" command so that the current connection record (= MACID) will be cleared. Then, the RFID Reader will restart itself automatically. Go through the whole process in Set Up a WPAN Connection to establish a new WPAN connection.

2.6 USB VCOM AND HID VIA 3610

For USB VCOM and HID via 3610, connect 3610 to the USB port of host computer, and then connect RFID Reader to 3610 via *Bluetooth*®. Configure the interface to USB VCOM and HID via 3610 by issuing the "#@bt_type=" command to parameter '6'.

To capture the data run any text editor on host computer. The scanned data will be transmitted to the host computer.

Note: As above for a read only interface, you can not issue "#@BT_TYPE=" command to change the *Bluetooth*® interface to 3610 directly by command.

How to connect with the 3610?

There are two parameters for "#@bt_target" command to 3610. One is *Bluetooth*® target – 3610 and another is the serial No. of 3610.

Command:

#@bt_target?\r

Purpose	Get *Bluetooth*® Target Machine
Response	OK,[m],[n]\r
	[m]: *Bluetooth*® Type, '0' – SPP Master, '1' – 3610
	[n]: MACID of target Machine or S/N of 3610
	ERR,[code]\r

#@bt_target=[m],[N]\r

Purpose	Set *Bluetooth*® Target Machine
Response	OK\r
	ERR,[code]\r

Example:

Command	
#@bt_target=1,BS9001346	→ set target to 3610 with S/N:BS9001346
Response (s)	
OK	

HID Settings	Defaults
Keyboard Type	PCAT (US)
Alphabets Layout	Normal
Numeric Layout	Normal
Capital Lock Type	Normal
Capital Lock State	Off
Alphabets Transmission	Case-sensitive
Numeric Transmission	Alphanumeric keypad
Inter-Character Delay	0 (ms)

2.6.1 ACTIVATE USB VCOM AND HID & SELECT KEYBOARD TYPE

When USB VCOM and HID via 3610 interface is activated, you have to select a keyboard type from parameter '097' to '110' so that you can complete this setting. Parameter '096' is for USB VCOM via 3610 connection.

USB VCOM and HID via 3610 TYPE

The following keyboard types are supported —

No.	Keyboard Type	No.	Keyboard Type
096	USB VCOM via 3610	104	3610 PCAT (Belgium)
097	3610 PCAT (US)	105	3610 PCAT (Spanish)
098	3610 PCAT (French)	106	3610 PCAT (Portuguese)
099	3610 PCAT (German)	107	3610 PS55 A01-2 (Japanese)
100	3610 PCAT (Italy)	108	Reserved
101	3610 PCAT (Swedish)	109	3610 PCAT (Turkish)
102	3610 PCAT (Norwegian)	110	3610 PCAT (Hungarian)
103	3610 PCAT (UK)		

Command:

#@bt_aclidx?\r

Purpose Get *Bluetooth*® 3610 Parameter

Response OK,[m]\r

[m]: Parameter

[m]	Description	Valid Parameters
'0'	3610 Type	'096' ~ '110'
'3'	Inter-function Delay	'0' ~ '254' (Default m='0')
'4'	Inter-character Delay	'0' ~ '254'
'5'	Caps Lock State	'0' – OFF '1' – ON '2' – Auto
'7'	Alphabets Transmission	'0' – Case Sensitive '1' – Ignore Case
'8'	Digits Transmission	'0' – Alpha Numeric Keypad '1'– Numeric Keypad
'9'	Digits Position	'0' – Normal '1'– Lower Row '2'– Upper Row
'10'	Keyboard Layout	'0' – Normal '1' – AZERTY '2' – QWERTZ
'12'	HID Character Transmit Mode	'0'– Batch Processing '1'– By Character

ERR,[code]

#@bt_aclidx=[m]\r

Purpose Set *Bluetooth*® 3610 Parameter

Response OK\r

ERR,[code]\r

#@bt_aclpr?\r

Purpose Get *Bluetooth*® 3610 Parameter

Response OK,[m]\r

[m]: Parameter

ERR,[code]\r

#@bt_aclpr=[m]\r

Purpose	Set *Bluetooth*® 3610 Parameter
Response	OK\r
	ERR,[code]\r

#@bt_aclact\r

Purpose	Activate *Bluetooth*® 3610 Setting
Request	#@bt_aclact\r
	[m]: Parameter
Response	OK\r
	ERR,[code]\r

2.6.2 HID KEYBOARD SETTINGS

- Alphabets Layout
- Numeric Layout
- Capital Lock Setting
- Alphabets Transmission
- Numeric Transmission

ALPHABETS LAYOUT

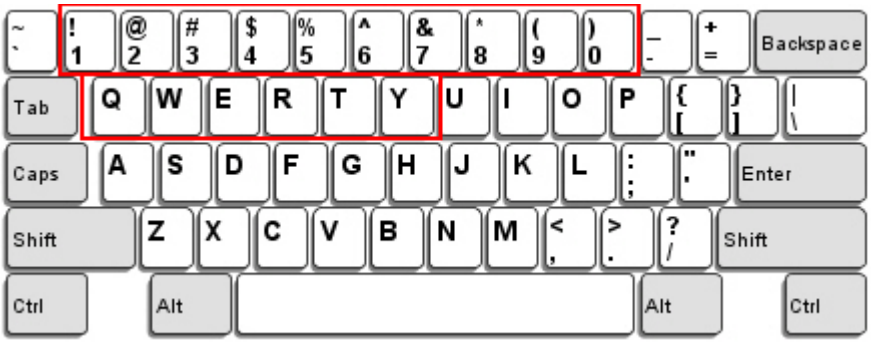
By default, the alphabets layout is set to normal mode, also known as the standard English layout. Select French or German keyboard layout if necessary. RFID Reader will make adjustments when sending the "A", "Q", "W", "Z", "Y", and "M" characters according to this setting.

Options	Parameter	Description
Normal (Default)	'0'	US Keyboard Style
AZERTY	'1'	French Keyboard Style
QWERTZ	'2'	German Keyboard Style

Note: This setting only works when the keyboard type selected is US keyboard, such as PCAT (US). The Alphabets Layout and Digits Layout setting must match your keyboard.

US KEYBOARD STYLE – NORMAL

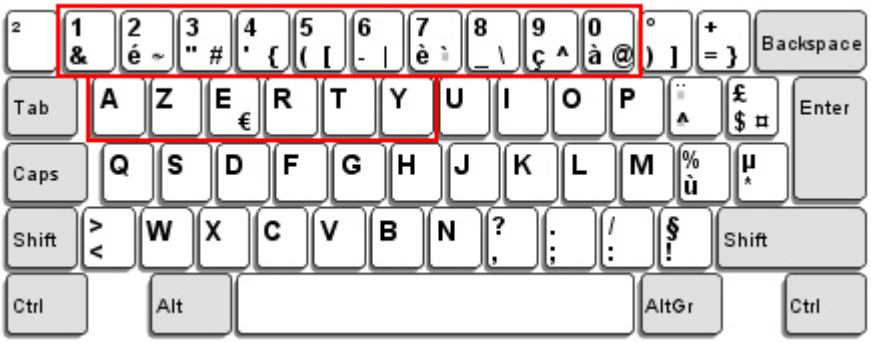
QWERTY layout, which is normally used in western countries.



- Select "Lower Row" for the "Numeric Layout" setting for the upper row is for special characters.

FRENCH KEYBOARD STYLE – AZERTY

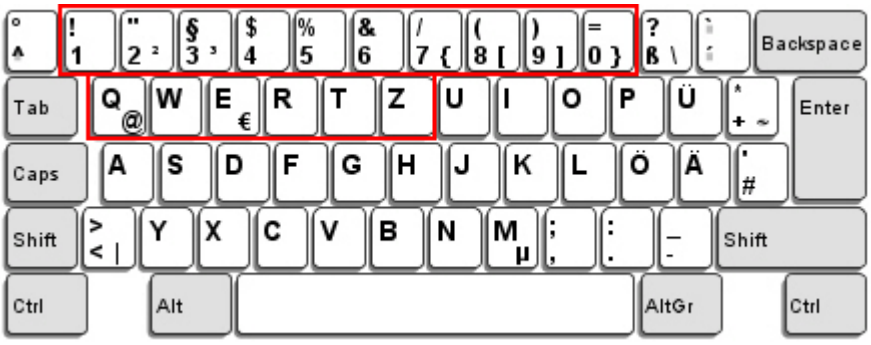
French layout; see below for French Keyboard Style.



- Select "Upper Row" for the "Numeric Layout" setting for the lower row is for special characters.

GERMAN KEYBOARD LAYOUT – QWERTZ

German layout; see below for German Keyboard Style.



- Select "Lower Row" for the "Numeric Layout" setting for the upper row is for special characters.

NUMERIC LAYOUT

Select a proper layout that matches the alphabets layout. RFID Reader will make adjustments according to this setting.

Options	Parameter	Description
Normal (Default)	'0'	Depends on the [Shift] key or [Shift Lock] setting
Lower Row	'1'	For QWERTY or QWERTZ keyboard
Upper Row	'2'	For AZERTY keyboard

Note: This setting is to be used with the Character Substitution setting when support to certain keyboard types (languages) is unavailable but required.

CAPITAL LOCK SETTING

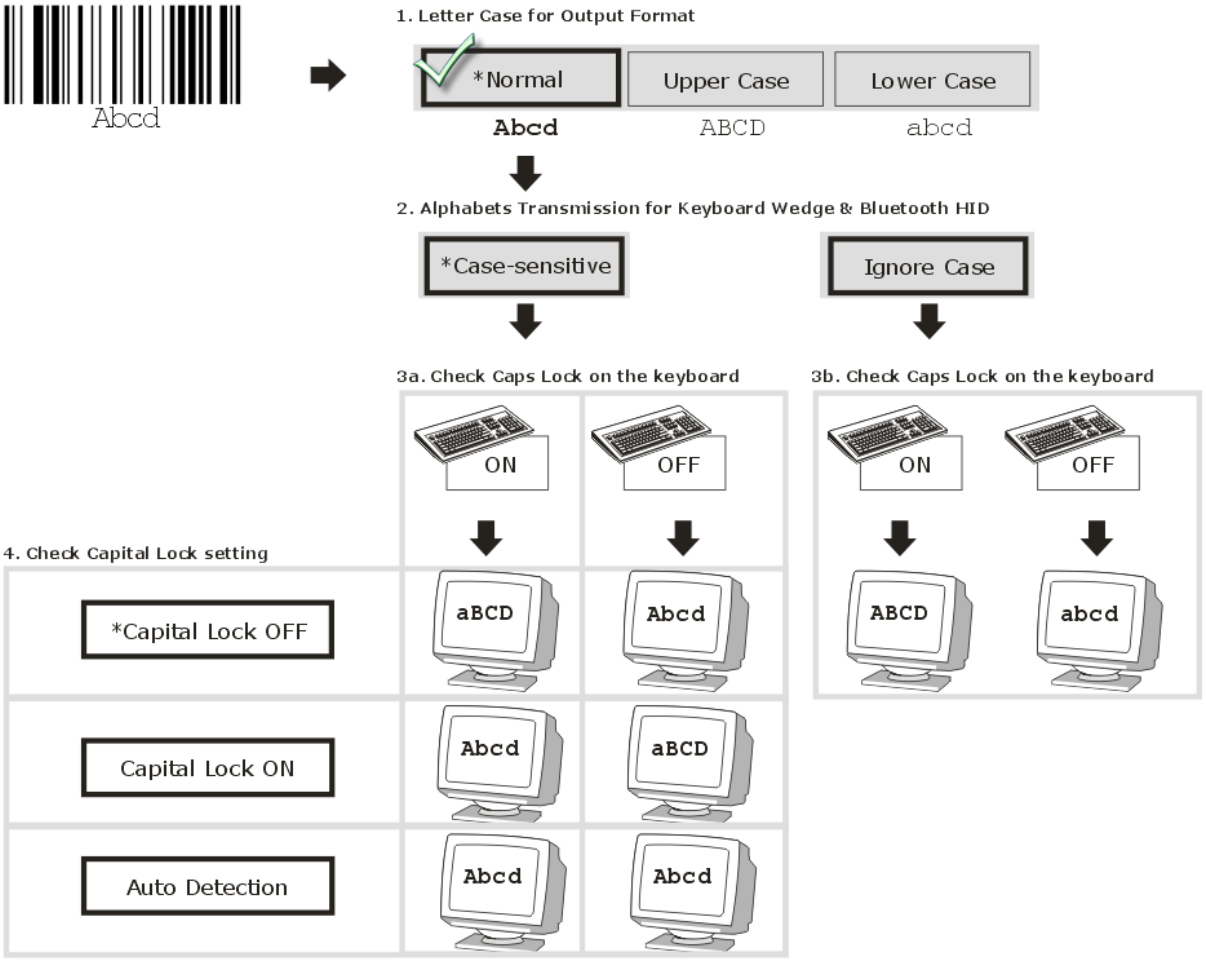
In order to send the alphabets with correct case, RFID Reader needs to know the status of Caps Lock on the keyboard. Incorrect settings may result in reversed case of the alphabets being transmitted.

Status Options	Parameter	Description
Capital Lock OFF (Default)	'0'	Assuming that the status of Caps Lock on the keyboard is OFF, transmitted characters are exactly the same as in the tag (when "case-sensitive" is selected for Alphabets Transmission).
Capital Lock ON	'1'	Assuming that the status of Caps Lock on the keyboard is ON, transmitted characters are exactly the same as in the tag (when "case-sensitive" is selected for Alphabets Transmission). ▸ Refer to the Capital Lock Type above.
Auto Detection	'2'	RFID Reader will automatically detect the status of Caps Lock on the keyboard before data is transmitted; transmitted characters are exactly the same as in the tag (when "case-sensitive" is selected for Alphabets Transmission).

ALPHABETS TRANSMISSION

By default, the alphabets transmission is case-sensitive, meaning that the alphabets will be transmitted according to their original case, the status of Caps Lock on the keyboard, as well as the Capital Lock setting. Select [Ignore Case] to have alphabets transmitted according to the status of Caps Lock on the keyboard only.

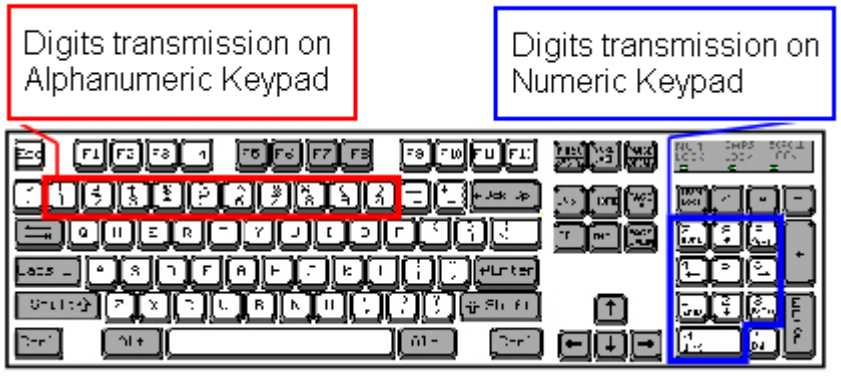
Options	Parameter	Description
Case Sensitive (Default)	'0'	Alphabets will be transmitted according to the original case.
Ignore Case	'1'	Alphabets will be transmitted according to the status of Caps Lock on the keyboard only.



NUMERIC TRANSMISSION

By default, the alphanumeric keypad is used for transmitting digits. Select "Numeric Keypad" if you wish to use the keys on the numeric keypad.

Options	Parameter	Description
Alphanumeric Keypad (Default)	'0'	Alphanumeric Keypad will be used for transmitting numeric.
Numeric Keypad	'1'	Numeric Keypad will be used for transmitting numeric.



2.6.3 INTER-CHARACTER DELAY

By default, the inter-character delay is set to zero. Specify a value, ranging from 0 to 254 in units of millisecond, to match the computer response time of the keyboard interface. Such delay time is inserted between every character being transmitted. The longer the delay time is, the slower the transmission speed will be.

Options	Parameter	Description
'0' (Default)	'0'~'254'	The range is from 0 to 254 in units of millisecond.

2.6.4 INTER-FUNCTION DELAY

By default, the inter-function delay is set to zero. Specify a value, ranging from 0 to 254 in units of milliseconds, to match the computer response time of the keyboard interface. Such delay time is inserted between every function code (0x01 ~ 0x1F) being transmitted. The longer the delay time is, the slower the transmission speed will be.

Options	Parameter	Description
'0' (Default)	'0'~'254'	The range is from 0 to 254 in units of millisecond.

2.6.5 HID CHARACTER TRANSMIT MODE

By default, HID interface sends data to the host in batch. You may configure the RFID Reader to "By Character" to process data one character at a time.

Options	Parameter	Description
Batch Processing (Default)	'0'	Process data by Batch.
By Character	'1'	Process data by Character

Chapter 3

SET UP A WPAN CONNECTION

RFID Reader can be configured to send data to a host computer wirelessly via the *Bluetooth*® and 3610. Upon powering up, RFID Reader will be ready to establish a WPAN connection.

To establish a connection via *Bluetooth*® dongle after pairing...

Interface Option	Reference
Bluetooth® HID	2.3 *Bluetooth*® HID
Bluetooth® SPP (Slave/Master)	2.4 *Bluetooth*® SPP Slave, 2.5 *Bluetooth*® SPP Master

To establish a connection via 3610 after finishing relative configurations...

Interface Option	Reference
USB VCOM and HID via 3610	2.6 USB VCOM and HID via 3610

IN THIS CHAPTER

3.1 CONNECTING VIA *BLUETOOTH*® DONGLE

3.1.1 CHANGE INTERFACE

Once the USB connection between host computer and RFID Reader is successfully, you have to change the connected interface type before establishing a WPAN connection via *Bluetooth*® dongle.

In the HyperTerminal window, issue "#@bt_type=" command to change the connected interface and issue "#@bt_type?" command to confirm the used interface at present.

- "Activate *Bluetooth*® HID", the parameter is '5'.
- "Activate *Bluetooth*® SPP Slave Mode", the parameter is '0'.
- "Activate *Bluetooth*® SPP Master Mode", the parameter is '3'.

For example, if you want to use SPP Slave for a connection type, see below:

Command	
#@bt_type=0	→ set connected interface to '0' for SPP Slave Mode
Response (s)	
OK	

3.1.2 CONFIGURE RELATED SETTINGS

BROADCASTING

RFID Reader can be configured to hide itself from other devices equipped with *Bluetooth*® wireless technology. Simply disable the device name broadcasting setting so that it won't be discovered by any other computer. However, broadcasting must be enabled for establishing an initial connection with RFID Reader. For example, disable device name broadcasting after successfully connecting RFID Reader to one WorkStation. Such connection will be maintained automatically unless RFID Reader is removed from the paired device list (called unpairing) by the WorkStation or any changes made to authentication and the PIN code. If you want another WorkStation to connect to RFID Reader, you have to enable device name broadcasting firstly.

Command:

#@bt_visible?\r

Purpose	Get *Bluetooth*® Parameter
Response	OK,[m]\r (Default m= '1')
	[m]: Discoverable
	'0' – Disable
	'1' – Enable
	ERR,[code]\r

#@bt_visible=[m]\r

Purpose	Set *Bluetooth*® Parameter
Response	OK\r
	ERR,[code]\r

Note: By default, device name broadcasting is enabled (which is required for initial connection).

BT POWER SAVING

By default, this feature is enabled, meaning the RFID Reader will listen to the wireless network at a reduced rate.

Command:

#@bt_ps?\r

Purpose	Get *Bluetooth*® Power Saving
Response	OK,[m]\r (Default m= '1')
	[m]: Power Saving
	'0' – Disable
	'1' – Enable
	ERR,[code]\r

#@bt_ps=[m]\r

Purpose	Set *Bluetooth*® Power Saving
Response	OK\r
	ERR,[code]\r

Note: When connecting more than two devices to a notebook computer with *Bluetooth*® wireless technology, we suggest that you disable the *Bluetooth*® Power Saving function for a more reliable connection.

AUTHENTICATION

When the authentication and PIN code are changed on the RFID Reader, you have to remove the RFID Reader from the paired device list (called unpairing) and go through the whole process to re-establish the connection.

Command:

#@bt_secure?\r

Purpose	Get *Bluetooth*® Authentication
Response	OK,[m]\r (Default m= '0')
	[m]: Authentication
	'0' – Disable
	'1' – Enable
	ERR,[code]\r

#@bt_secure=[m]\r

Purpose	Set *Bluetooth*® Authentication
Response	OK\r
	ERR,[code]\r

PIN CODE

RFID Reader allows up to 16 characters for a PIN code. If the PIN or passkey is incorrect, any connection requirement will be rejected by RFID Reader. See step 8 in 3.1.3 *Bluetooth*® HID and SPP Slave. By default, the PIN code value is "0000".

Command:

#@bt_pin?\r

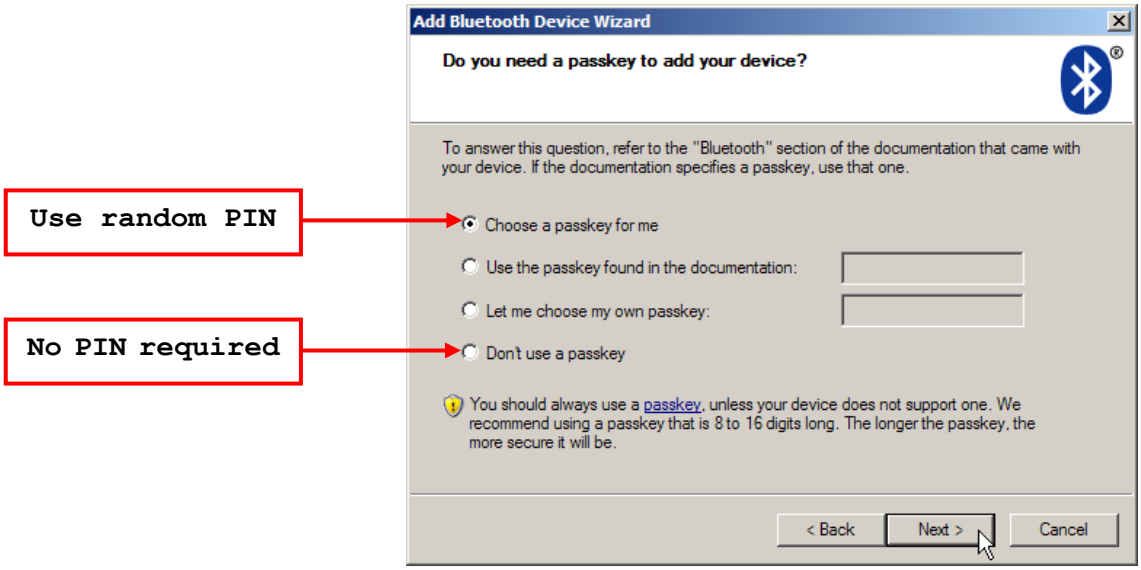
Purpose	Get Bluetooth® PIN Code
Response	OK,[m],[n]\r (Default m= '0000', n= '4')
	[m]: length of PIN '0' ~ '16', '0' means no PIN

[n]: PIN, 1~16 characters, only exists when [m]!= '0' (m≠0)

ERR,[code]\r

#@bt_pin=[m],[n]\r

Purpose	Set *Bluetooth*® PIN Code
Response	OK\r
	ERR,[code]\r



Note: When using *Bluetooth*® HID, some device driver may not support pre-defined PIN code for authentication. In this case, make sure you have RFID Reader set to "No PIN or use random PIN" before pairing. While pairing, the host PIN code will be displayed on the host computer. Have RFID Reader to input the matching PIN code for connection. Refer to 1.3.2 *Bluetooth*® Pairing Mode.

Secure Simple Pairing

Command:

#@bt_ssp?\r

Purpose	Get *Bluetooth*® Parameter
Response	OK,[m]\r
	[m]:SSP Mode
	'0' – Didable

'1' – Enable (Default)

ERR, [code]\r

#@bt_ssp=[m]\r

Purpose	Set *Bluetooth*® Parameter
Response	OK\r
	ERR,[code]\r

Note: SSP feature is only available for iOS currently. We suggest it is better to enable SSP function when using iOS.

3.1.3 *BLUETOOTH*® HID AND SPP SLAVE

The procedure goes through associating devices for establishing a WPAN connection, which is pretty much the same except for the software you are using. If your computer is running Microsoft® Windows® XP (SP1 to SP3), Windows Vista® Service Pack 1 (SP1) and Windows 7, you can use the software support that Windows® includes, or you can use the driver that the device manufacturer provides. Now, let's try using the software support that Windows® XP Service Pack 2 includes.

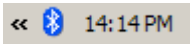
BLUETOOTH® HID

By default, the keyboard type of *Bluetooth*® HID is set to PCAT (US). When *Bluetooth*® HID is re-activated, you have to select a keyboard type to complete this setting. Refer to 2.3.1 Activate *Bluetooth*® HID & Select Keyboard Type.

Refer to steps 1~11 below for a *Bluetooth*® connection.

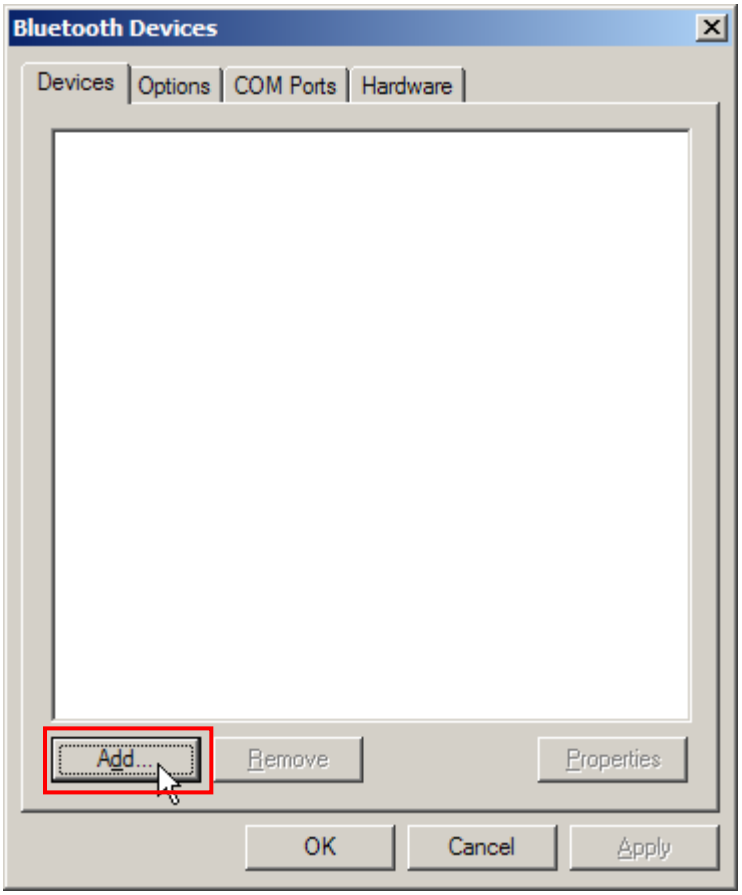
BLUETOOTH® SPP SLAVE

1) Enable the *Bluetooth*® function on host computer. (Windows® XP only)

2) Double-click the *Bluetooth*® icon located on the lower right of the taskbar. 

Alternatively, you may go to **Control Panel** > ***Bluetooth*** **Devices**.

3) Click [Add] to search devices nearby.



4) Turn on RFID Reader with correct WPAN settings, such as select *Bluetooth*® SPP Slave or HID, broadcasting enabled, authentication enabled, and PIN code specified, etc if you want to use a passkey. Select "My device is set up and ready to be found" check box on the "Add *Bluetooth*® Device Wizard" window.

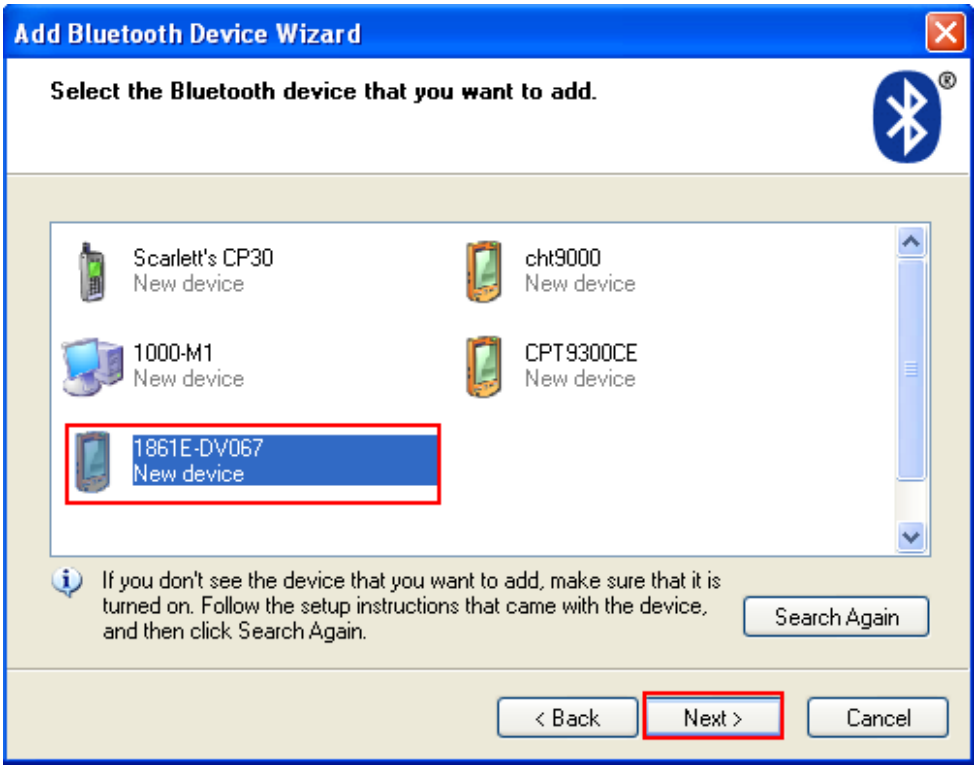
5) Click [Next].

6) Wait for a few seconds for the Wizard to search available devices nearby.

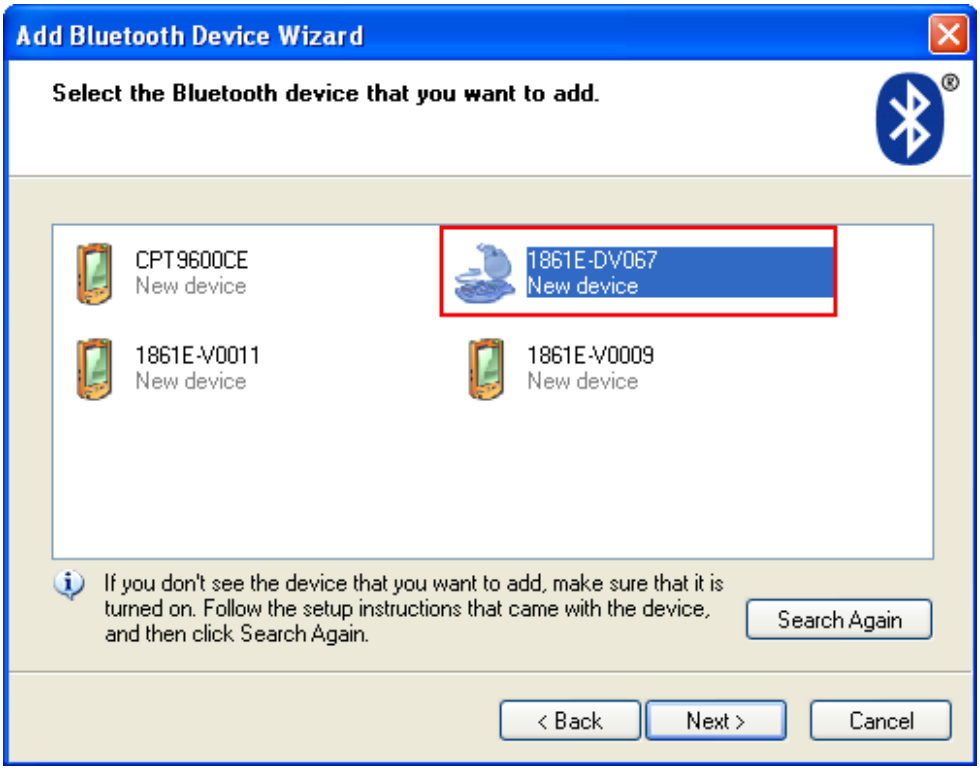
All available devices will appear on the search window. Select the device (e.g. RFID Reader) that you want to connect.

If the target device does not appear on the list, click [Search Again] to refresh the list. The RFID Reader might enter power-saving mode during an idling time (=discoverable), and you can press the <Trigger> to have it active again. It will then stay active for a specified period of time (2 minutes by default) and wait for the host computer to establish a connection.

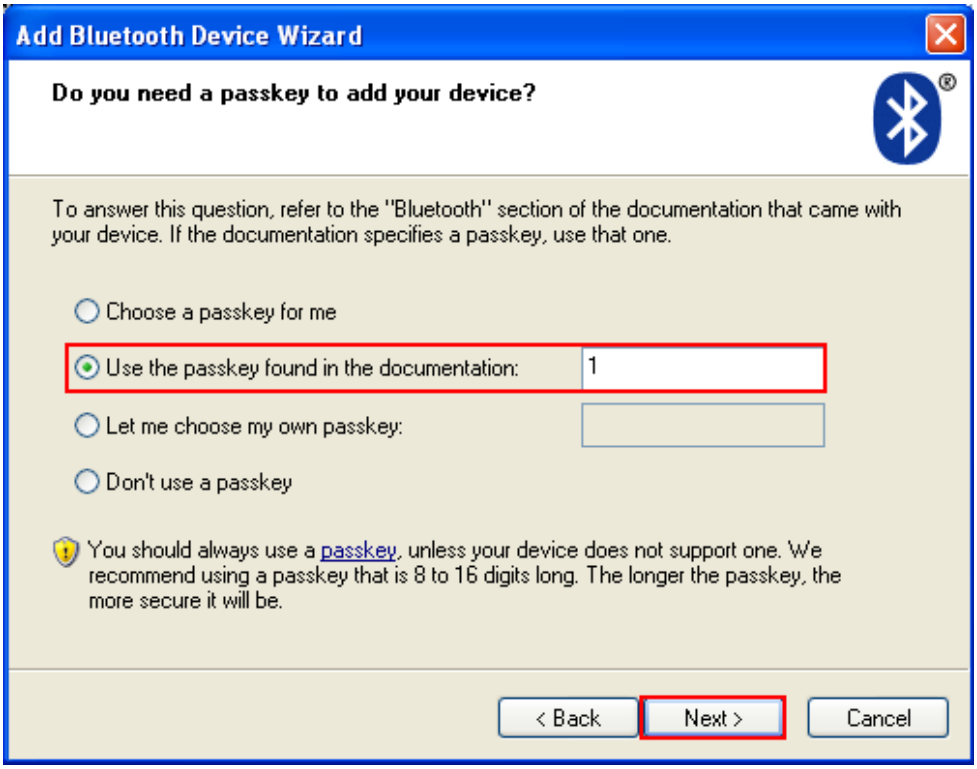
7) See SPP Slave connection below, click [Next].



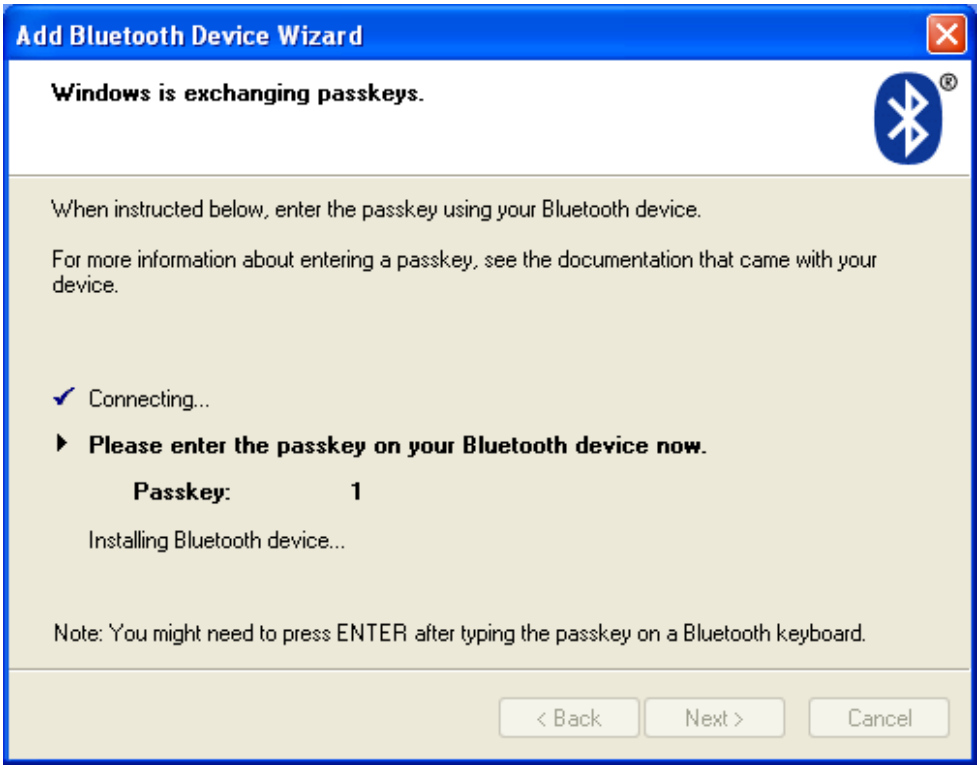
See BT HID connection below, click [Next].



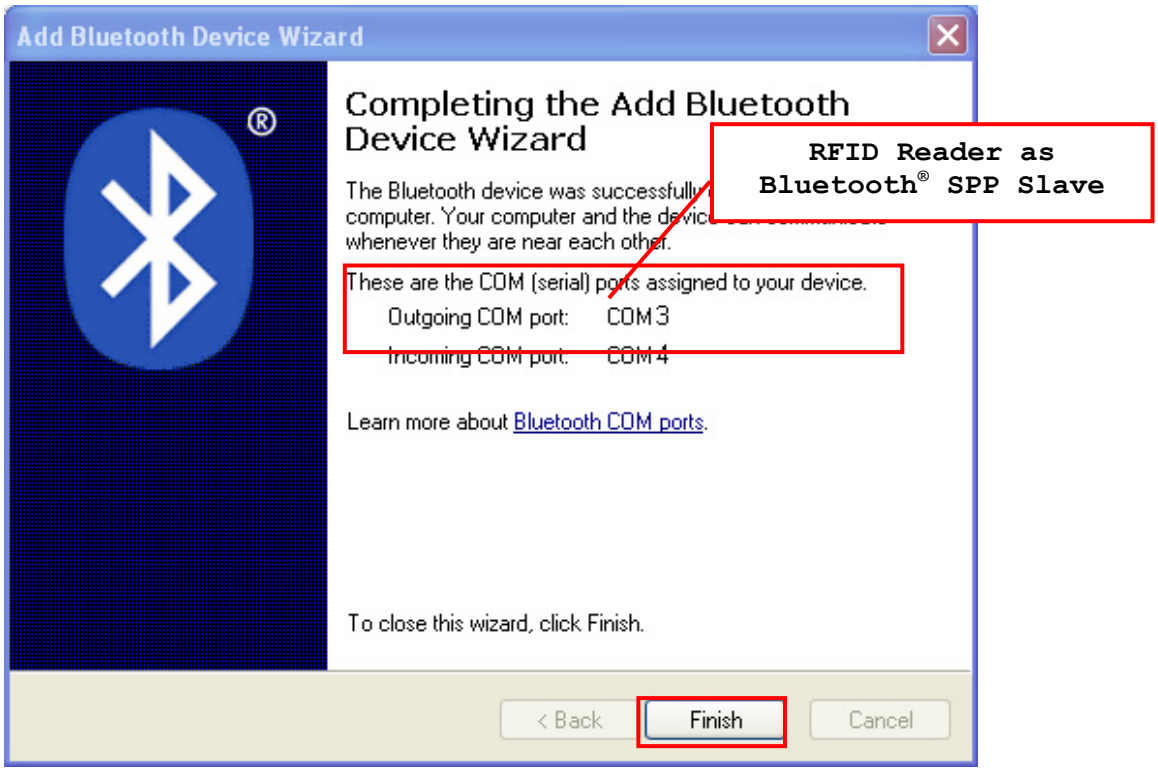
8) Enter the passkey for authentication, which must be exactly the same as configured for RFID Reader. Click [Next].



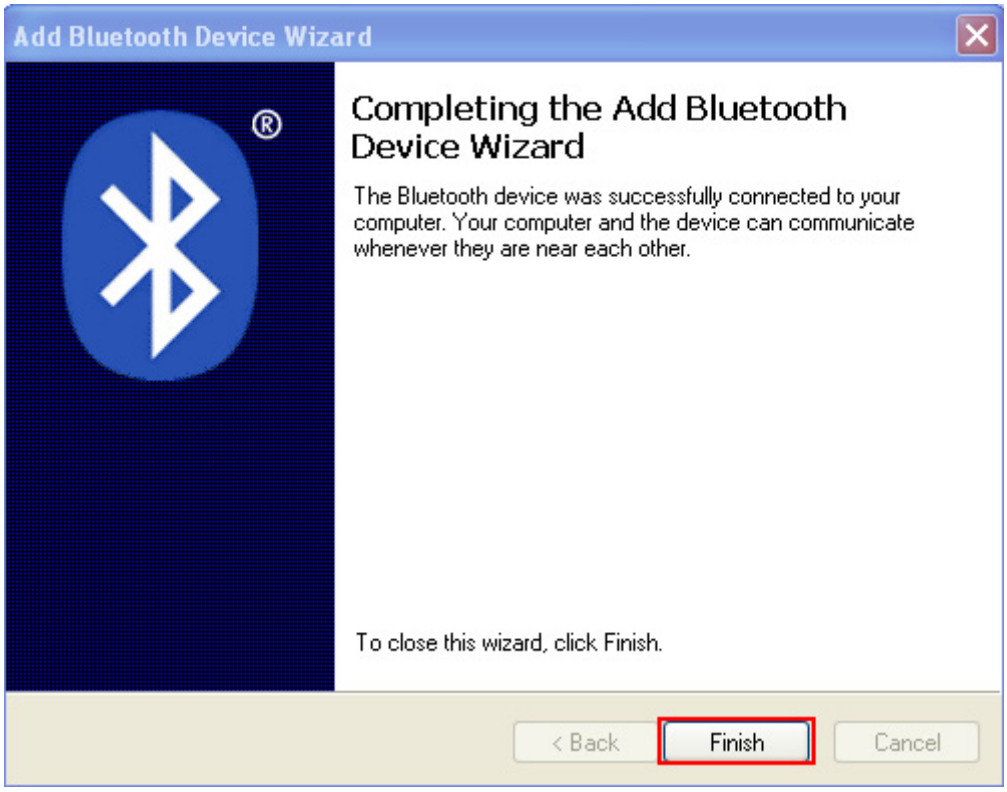
9) Wait for a few seconds for Windows to confirm the Passkey.



10) See SPP Slave connection below, click [Finish].

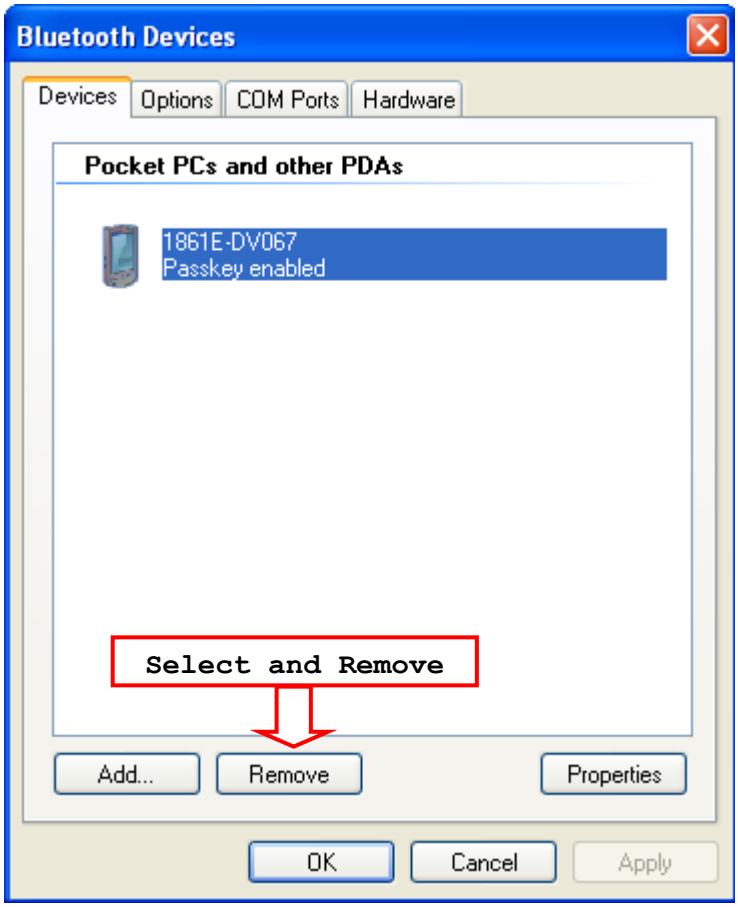


See BT HID connection below, click [Finish].



Note: When *Bluetooth*® security is enabled without providing a pre-set PIN code, the random of PIN code is supported.

11) Now the RFID Reader will be listed as shown below.



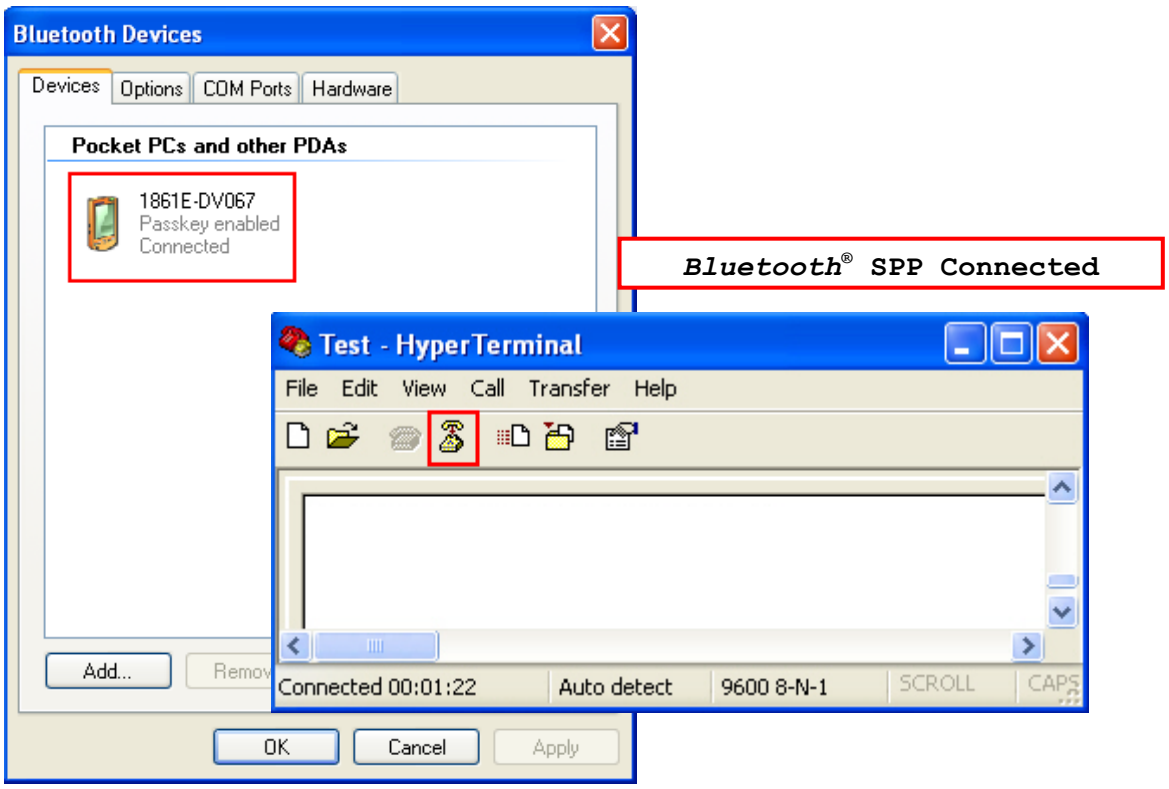
Note: When any changes are made to authentication and PIN code on the RFID Reader, or you want to change RFID Reader to use *Bluetooth*® HID, it is suggested to remove the connected RFID Reader from the paired device list (called unpairing) firstly and go through the whole process to re-establish the connection.

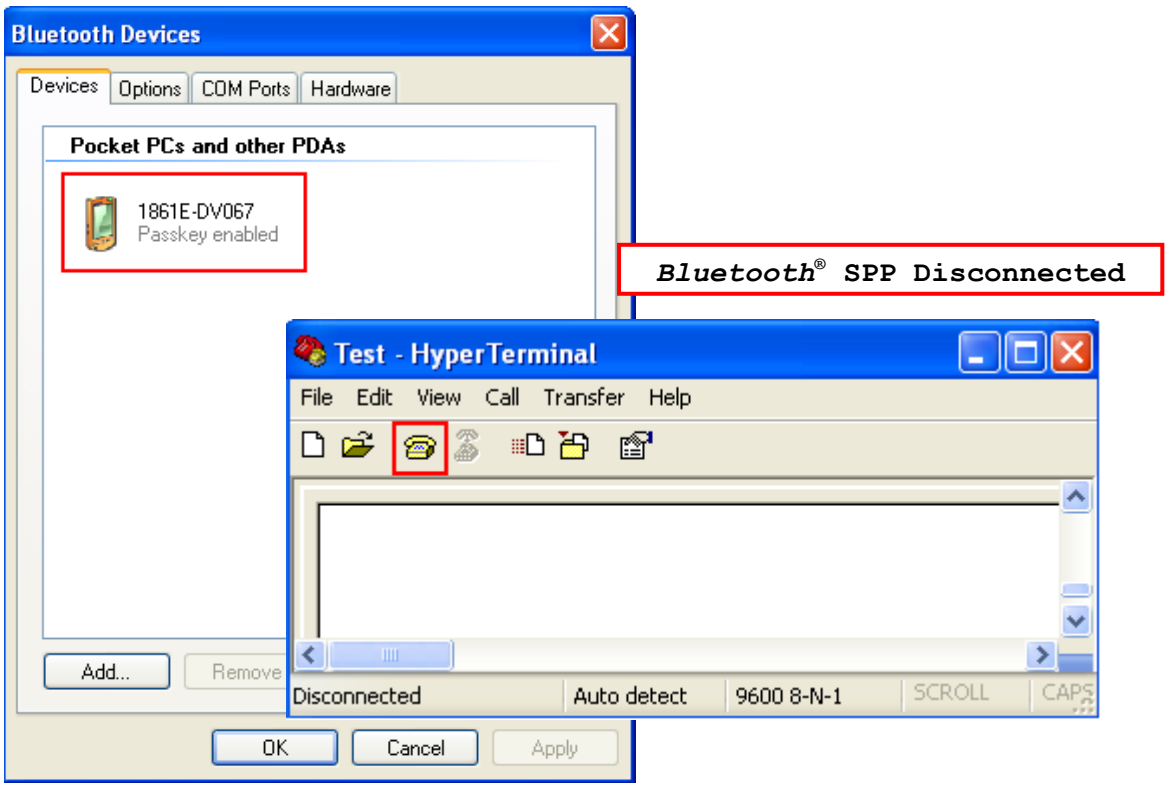
12) Run the desired application on your computer, such as HyperTerminal.exe if using *Bluetooth*® SPP or Notepad.exe if using *Bluetooth*® HID.

Once the desired application is configured completely, the status of the RFID Reader listed on the device list will be showed as "Connected", indicating the WPAN connection is established successfully via the outgoing COM port if using *Bluetooth*® SPP Slave.

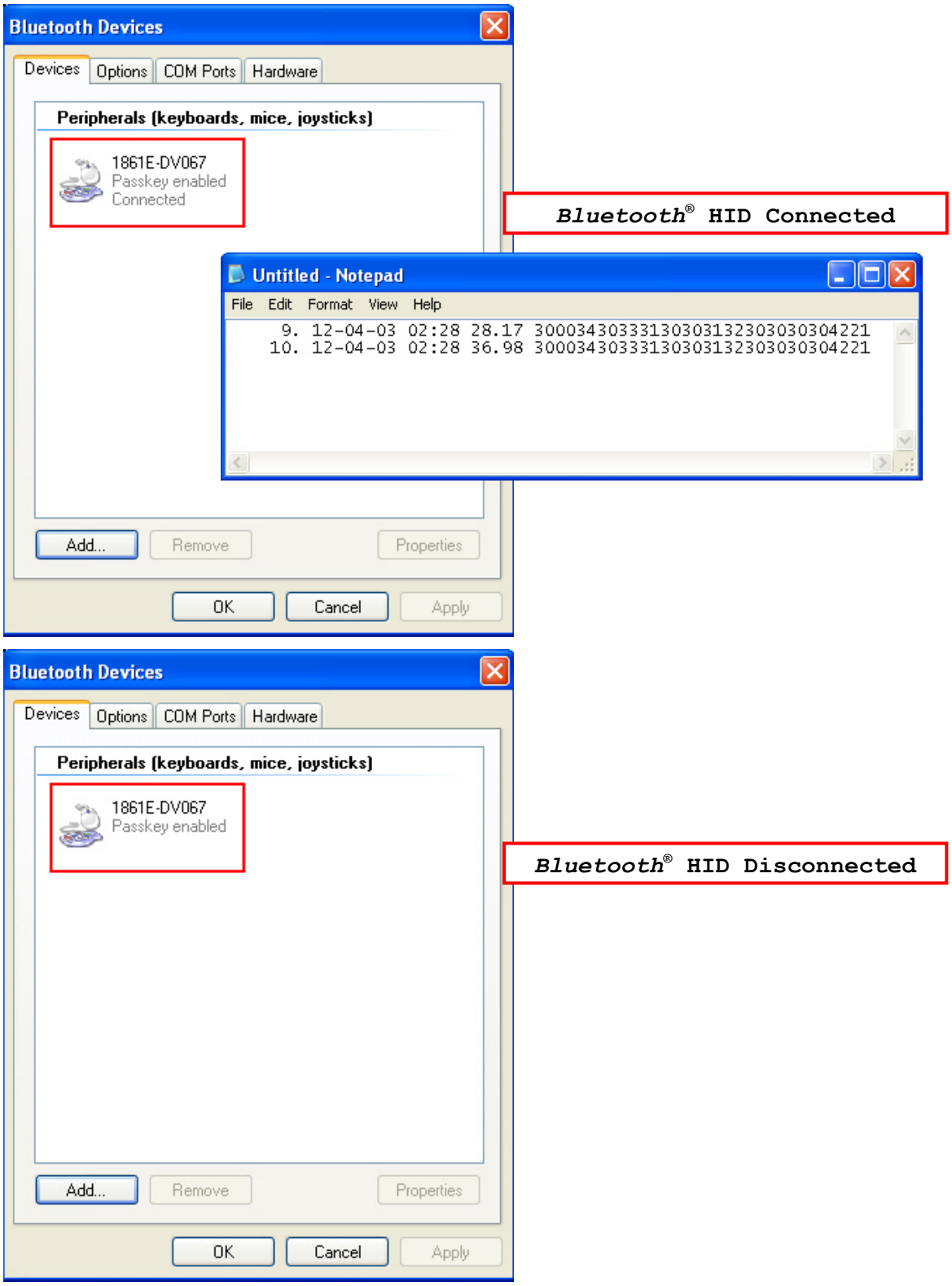
Note: Even though the RFID Reader is connected to the host with authentication disabled (= no PIN code required), the host may still request a PIN code while the application is opening COM port. A random PIN code is supported so that you can input a matching PIN code on the RFID Reader. Refer to 3.1.2 Configure Related Settings.

See the comparisons between *Bluetooth*® SPP and HyperTerminal below, for HyperTerminal configurations; refer to Using HyperTerminal.



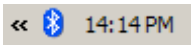


See the comparisons between *Bluetooth*® HID and Notepad below:

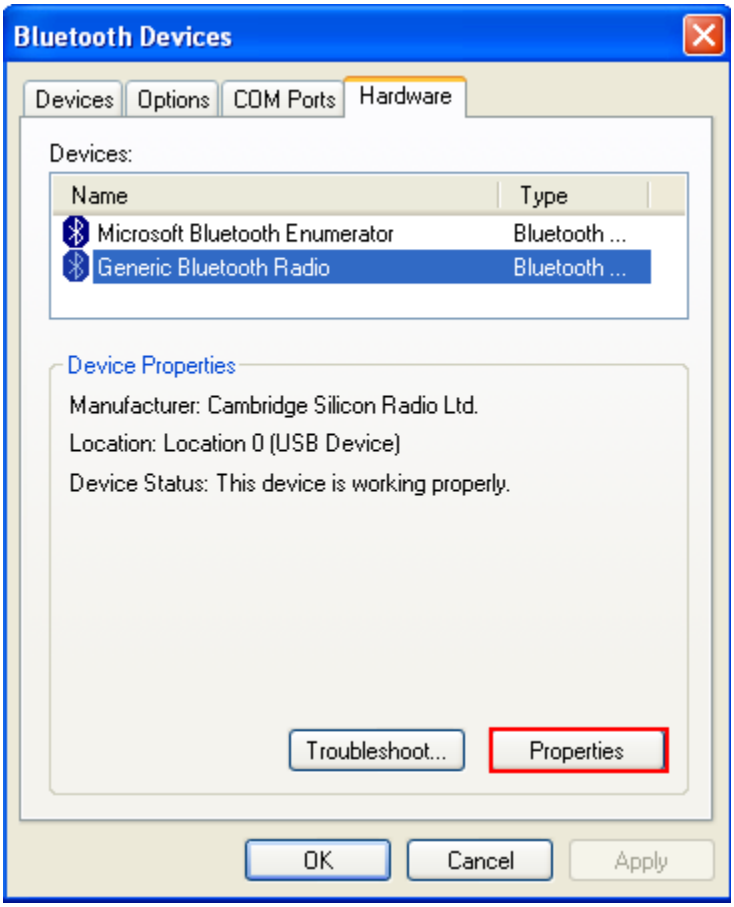


3.1.4 *BLUETOOTH*® SPP MASTER

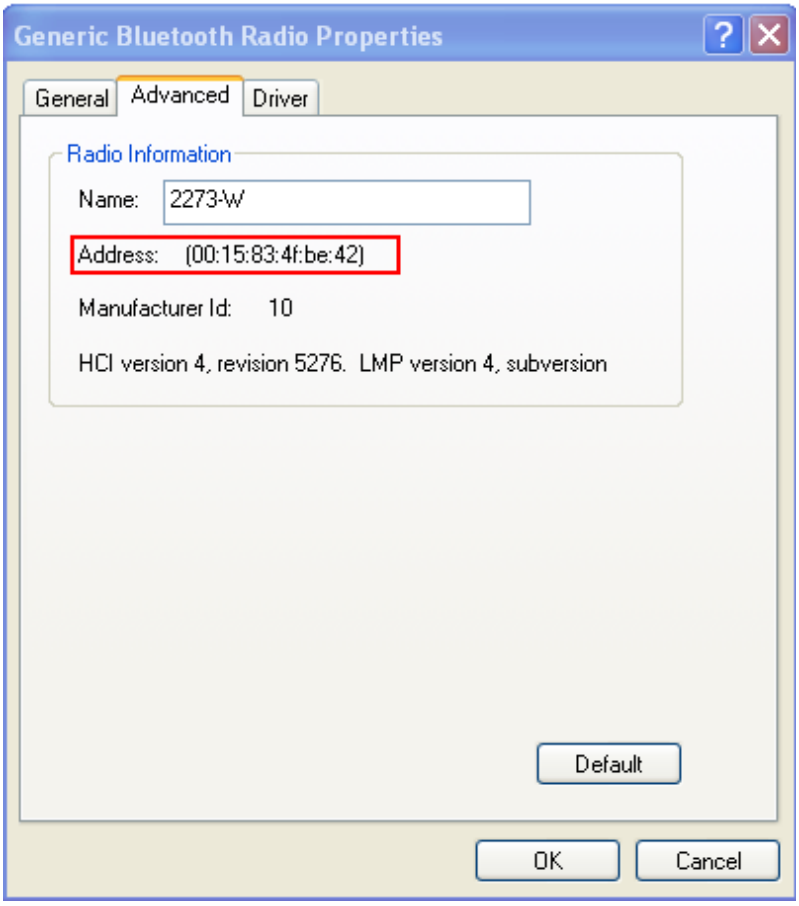
BLUETOOTH® SPP MASTER

1) Enable the *Bluetooth*® function on the host computer.
2) Double-click the *Bluetooth*® icon located on the lower right of the taskbar. 

Alternatively, you may go to **Control Panel** > ***Bluetooth*** **Devices**.
3) Select Hardware tab and click [Properties].



4) In the Generic *Bluetooth*® Radio Properties window, select Advanced tab to see the *Bluetooth*® MACID of host computer.

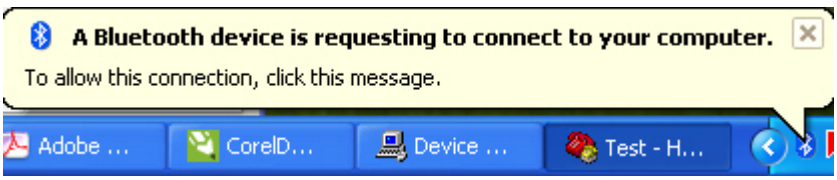


5) Enable HyperTerminal on the host computer and configure all the pre-processing about *Bluetooth*® SPP Master connection.

Command	
#@bt_target=0,0015834fbe42	→ configure the type and MACID of connected device
Response (s)	
OK	

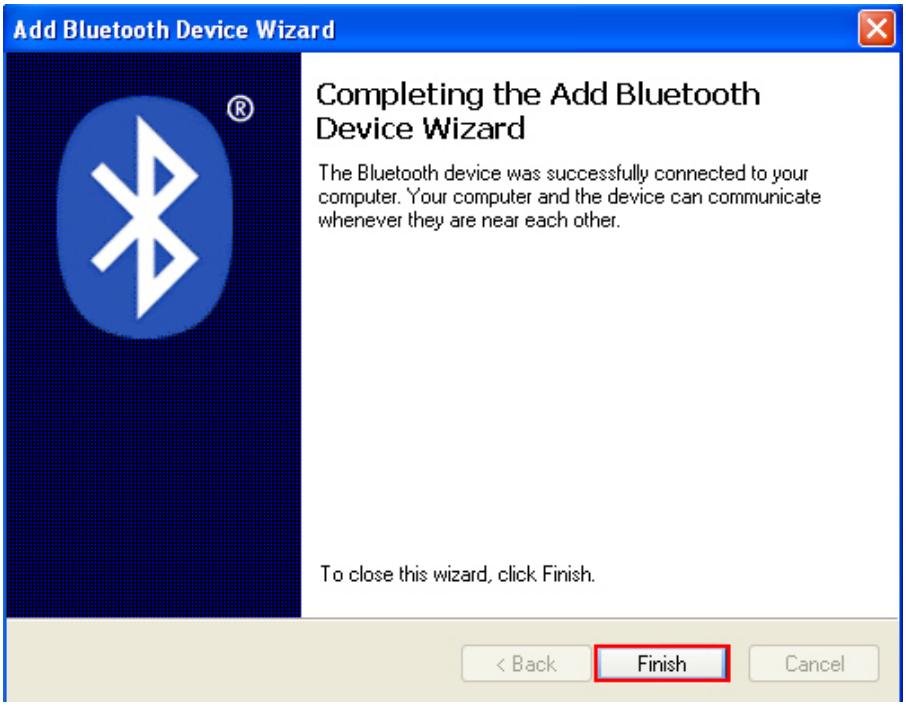
Note: When any changes are made to *Bluetooth*® type, it is suggested to reset the *Bluetooth*® connection by "#@bt_reset" command. Refer to 3.3.2 Reset a Connection.

6) On the host computer, a *Bluetooth*® connection information box will pop-up on the lower right of the taskbar. Click it.

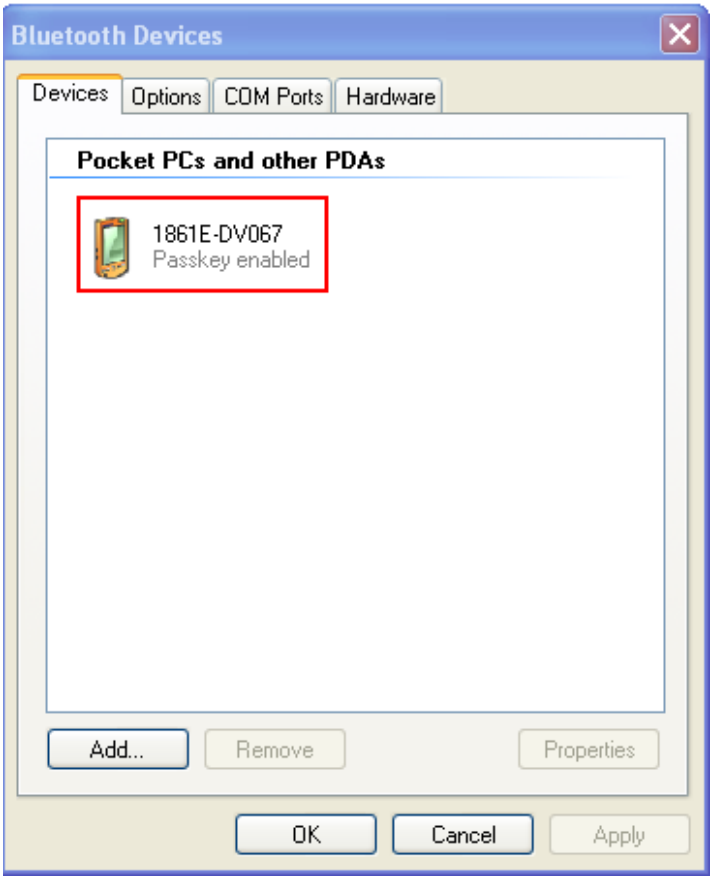


7) In the Add *Bluetooth*® Device Wizard window, key in the passkey that is the same as you have entered on the RFID Reader. The default value is 0000. Click [Next].

8) Click [Finish].



9) In the *Bluetooth*® Devices configured window will show you connected Device.



Note: When any changes are made to authentication and PIN code on the RFID Reader, or you want to change to use *Bluetooth*® HID, it is suggested to remove the connected RFID Reader from the paired device list (called unpairing) firstly and go through the whole process to re-establish the connection.

10) Run the desired application on host computer, such as HyperTerminal.exe if using *Bluetooth*® SPP or Notepad.exe if using *Bluetooth*® HID.

Once the desired application is configured completely, the status of the RFID Reader listed on the device list will be showed as "Connected", indicating the WPAN connection is established successfully.

3.2 CONNECTING VIA 3610

Before 3610 connection, you have to configure the pre-processing about 3610 relative configurations by issuing command firstly. Refer to 2.6 USB VCOM and HID via 3610.

Note: If you are using USB VCOM for the first time, you must install its driver from the CD-ROM. Driver version 5.4 or later is required. Please remove older versions! Refer to 2.1 USB Interface.

3.2.1 CONNECT TO 3610

After Pre- processing, the RFID Reader will stay active for a specified period of time (2 minutes by default) trying to connect to the 3610 while the LED2 is flashing blue (On/Off ratio 0.5 s: 0.5 s). Once connected, the RFID Reader will respond with three beeps (tone ascending from low to high), and the LED2 flashes blue (On/Off ratio 0.02 s: 3 s). When out of range, the RFID Reader will respond with three short beeps (tone descending from high to low).

Note: The 3610 settings will overwrite the interface-related settings on RFID Reader that are currently connected to 3610.

3.2.2 USB HID VIA 3610 CONNECTION

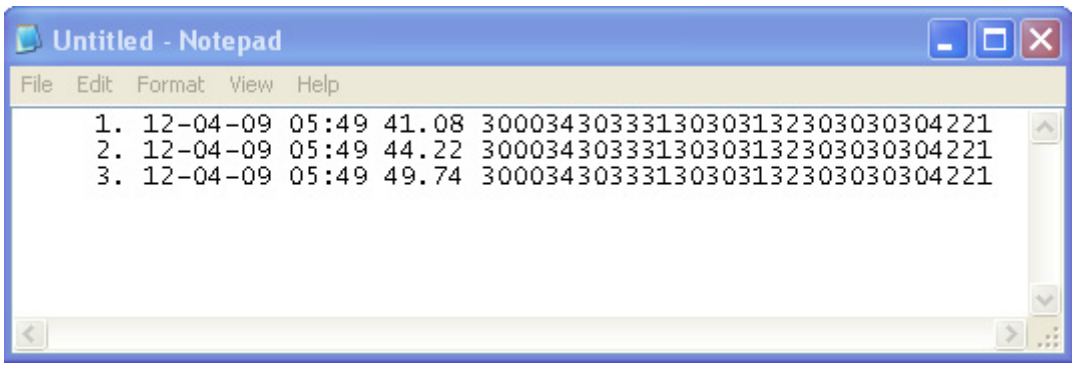
If you want to change the USB HID via 3610 interface, use one of the connected RFID Reader to configure the interface-related settings and it will pass the new settings to 3610, which will then initialize and pass the settings to any other connected device.

1) Power on RFID Reader.
2) Connect RFID Reader to host computer with a USB cable.
3) Enable HyperTerminal on the host computer for issuing commands.
4) Follow Using HyperTerminal to make a USB connection between the host computer and RFID Reader for changing *Bluetooth*® type to 3610.
5) Within two minutes, follow 2.6 USB VCOM and HID via 3610 to connect 3610 to the USB port of host computer.
6) Configure related settings as below.

Command	
#@bt_aclidx=0	→ enter 3610 type configuration
Response (s)	
OK	
Command	
#@bt_aclpr=97	→ set to 3610 PCAT US
Response (s)	
OK	
Command	
#@bt_aclidx=4	→ enter inter-character delay setting
Response (s)	
OK	
Command	
#@bt_aclpr=10	→ set keyboard inter-character delay time to 10ms
Response (s)	
OK	
Command	
#@bt_aclact	→ make settings above effect
Response (s)	
OK	

7) For USB HID via 3610 connection, you can capture the data run any text editor e.g. NotePad on host computer.

8) Once the connection successfully, the scanned data will be transmitted to the NotePad.



3.2.3 USB VCOM VIA 3610 CONNECTION

If you want to change the USB VCOM via 3610 interface, use one of the connected RFID Reader to configure the interface-related settings and it will pass the new settings to 3610, which will then initialize and pass the settings to any other connected devices.

1) Power on RFID Reader
2) Connect RFID Reader to host computer with a USB cable.
3) Enable HyperTerminal on the host computer for issuing commands.
4) Follow Using HyperTerminal to make a USB connection between the host computer and RFID Reader for changing *Bluetooth*® type to 3610.
5) Within two minutes, follow 2.6 USB VCOM and HID via 3610 to connect 3610 to the USB port of host computer. For USB VCOM, you need to install its driver first! Refer to 2.1 USB Interface.
6) Configure related settings as below.

Command	
#@bt_aclidx=0	→ enter 3610 type configuration
Response (s)	
OK	
Command	
#@bt_aclpr=96	→ set to 3610 VCOM
Response (s)	
OK	
Command	
#@bt_aclact	→ make settings above effect
Response (s)	
OK	

7) After the RFID Reader resumes connection with 3610, it will pass the interface-related settings to 3610.
8) Upon receipt of the new settings, 3610 will initialize itself.
9) Updated with new settings, 3610 will pass the settings to other connected devices.

3.2.4 CONFIGURE RELATED SETTING

BT POWER SAVING

By default, this feature is enabled, meaning the RFID Reader will listen to the wireless network at a reduced rate.

Command:

#@bt_ps?\r

Purpose	Get *Bluetooth*® Power Saving
Response	OK,[m]\r (Default m= '1')
	[m]: Power Saving
	'0' – Disable
	'1' – Enable
	ERR,[code]\r

#@bt_ps=[m]\r

Purpose	Set *Bluetooth*® Power Saving
Response	OK\r
	ERR,[code]\r

Note: When connecting more than two devices to a notebook computer with *Bluetooth*® wireless technology, we suggest that you disable the *Bluetooth*® Power Saving function for a more reliable connection.

3.3 DISCONNECTION

You can follow the methods as below to break a connection between RFID Reader and host computer:

1) Issue #@bt_disc" to disconnect from current connected deivce.
2) Issue "#@bt_type" to change the connection type. Current connection will be broken.
3) Issue "#@bt_reset" to clear the information of remote device. Current connection will be broken and connection type will resume to SPP slave.
4) Use Function key to break the connection, refer to 1.4.2 Function Key Status.

3.3.1 BREAK A CONNECTION

You can force the RFID Reader to break a *Bluetooth*® connection with host computer by issuing command.

Command:

#@bt_disc\r

Purpose	Break Current *Bluetooth*® Connection
Response	OK\r
	ERR,[code]\r

3.3.2 RESET A CONNECTION

For *Bluetooth*® connection, you can only have the RFID Reader connected to one computer at a time. If you want to connect the RFID Reader to another host computer, you have to issue "#@bt_reset" command to break the current connection. Simultaneously all of previous records will also be cleared. Go through the whole process in Set Up a WPAN Connection to establish a new connection.

Command:

#@bt_reset\r

Purpose	Reset *Bluetooth*® Connection
Response	OK\r
	ERR,[code]\r

Note: The issues as below will also make an unexpected disconnection:
1) Entering power saving mode, refer to 1.1.3 Power Saving Mode.
2) System power off automatically, refer to 1.1.2 Power OFF.
3) Break the connection by terminal device.

Chapter 4

RFID SCAN

RFID Reader supports a switcher allows you to switch between RFID and Alternate Mode. You can get the status between RFID and Alternated mode by issuing "#@rf_switch?" command.

Command:

#@rf_switch?\r

Purpose	Get the Status between RFID and Alternate Mode
Response	OK,[m]\r (Default m= '1')
	[m]: Status of RFID/EXT Switch
	'0' – EXT Mode (Alternate Mode)
	'1' – RFID Mode
	ERR,[code]\r

IN THIS CHAPTER

4.1 SCAN MODE

RFID Reader scan modes are divided into Single, Test and Multi-Tag mode described below.

Scan Mode	Description	
Single Mode	Read Tag by pressing <Trigger> key. 1. Condition to start the operation: Press and hold the <Trigger> key. 2. Condition to stop the operation: (1) A tag is read (2) <Trigger> key is released. (3) "Scan Session Timeout" expires while no Tag data is received (4) New scan mode is set. 3. Release <Trigger> key and press it again to start a new operation cycle. Scanning Timeout will be refreshed.	
Multi-Tag Mode	Multi-Tag counter=0	Press and hold the <Trigger> key to read Tag continuously. Repeated Tags will be accepted. 1. Conditions to start the operation: Press and hold the <Trigger> key. 2. Conditions to stop the operation: (1) <Trigger> key is released. (2) New scan mode is set. 3. Scanning speed is controlled by Scanning Delay.
	Multi-Tag counter≠0	Press and hold the <Trigger> key to read Tag continuously. Repeated Tags will be ignored and new tag's EPC will be taken down, then counter is increased. 1. Conditions to start/continue the operation: Press and hold the <Trigger> key. 2. Conditions to suspend the operation: (1) Release <Trigger> key. 3. Conditions to stop the operation: (1) The amount of new Tag is equal to Multi-Tag counter. (2) New Multi-Tag Counter is set. (3) New scan mode is set. 4. The counter of read tag can be reset by command and function key. 5. Scanning speed is controlled by Scanning Delay.
Test Mode	Read Tag continuously without pressing the <Trigger> when the RFID Reader is in a limited range. Capable of decoding the same tag repeatedly for testing purpose. 1. Conditions to start the operation: Scan mode is set to "Test mode" 2. Conditions to stop the operation: New scan mode is set. 3. Scan Session Timeout, Scanning Delay, Multi-Tag Counter and EPC filter parameters are no effect in this mode.	

	4. If RFID Function=Write Tag Memory, the RFID Reader can not be set to Test Mode.

Command:

#@rf_scan?\r

Purpose	Get Scan Mode
Response	OK,[m]\r (Default m= '6') [m]: Scan Mode '6' – Single Mode '7' – Test Mode '9' – Multi – Tag Mode, refer to 4.4 Multi-Tag. ERR,[code]\r

#@rf_scan=[m]\r

Purpose	Set Scan Mode
Response	OK\r ERR,[code]\r

4.2 SCAN TIME

4.2.1 TIMEOUT

You have to specify the scanning timeout interval (0~254 sec.; 0= Disable) when the scan mode is set to Single Mode.

- Operation will stop if the operation time = Scan Session Timeout and No Tag data is received.
- The range of timeout is 0~254 second. When the timeout is set to '0', the operation will not stop.

Command:

#@rf_tscan?\r

Purpose	Get Scan Session Timeout
Response	OK,[m]\r (Default m= '0')
	[m]: Timeout, '0' ~ '254'
	ERR,[code]\r

#@rf_tscan=[m]\r

Purpose	Set Scan Section Timeout
Response	OK\r
	ERR,[code]\r

Note: This command is available for Single Mode. If you set the "#@rf_tscan" value to 5, the waiting time is over to 5 sec. upon pressing <Trigger>. And no tag data is received, the operation will stop.

4.2.2 DELAY TIME

You can set the RFID Reader always scanning or make an interval between each decoding. Specify the scanning delay time when the scan mode is set to Multi-Tag Mode:

Command:

#@rf_scandly?\r

Purpose	Get Scan Delay
Response	OK,[m]\r (Default m= '0')
	[m]: Scan Delay

'0'	100ms
'1'	200ms
'2'	400ms
'3'	800ms
'4'	1 sec
'5'	2 sec
'6'	3 sec
'7'	5 sec

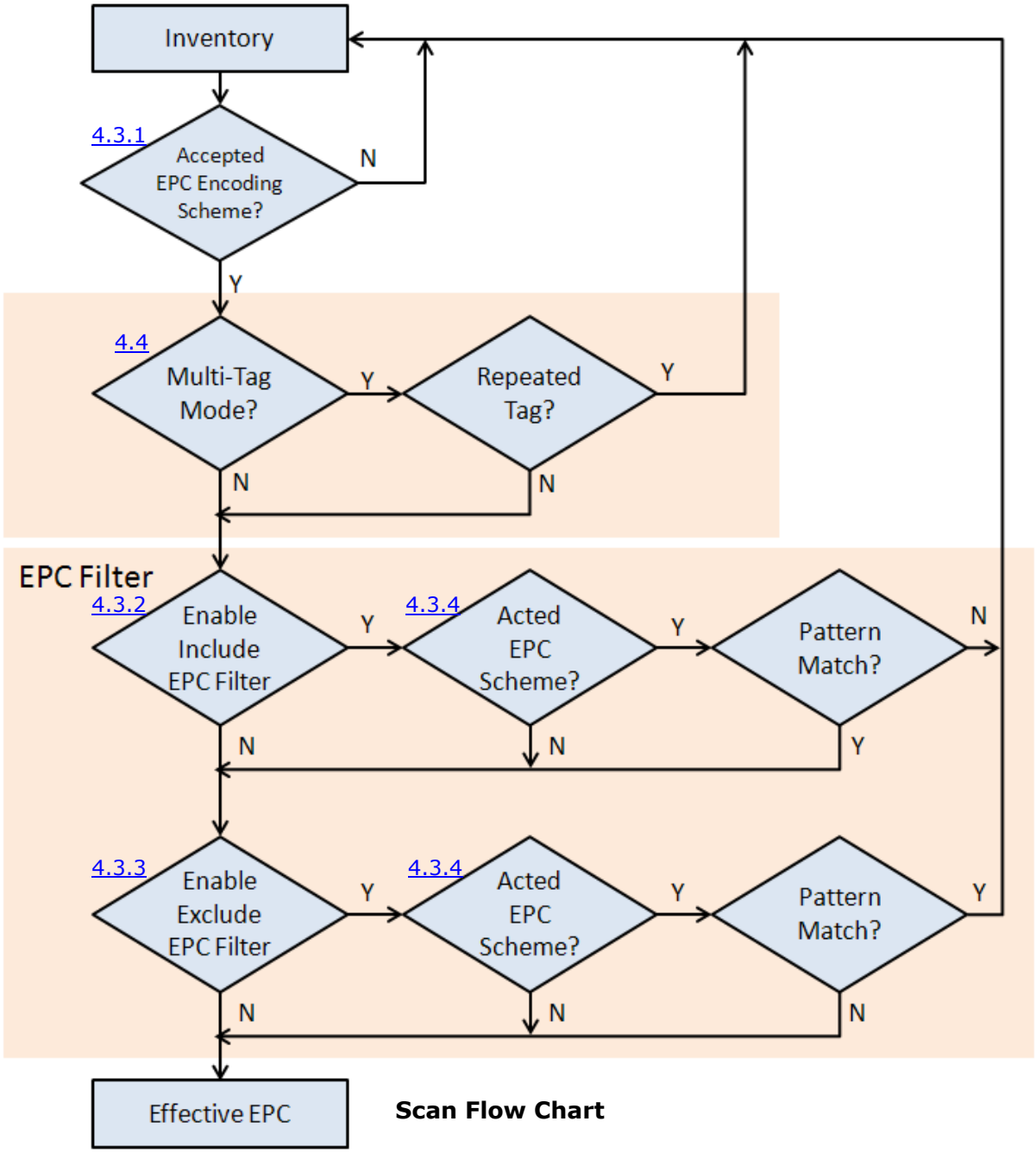
ERR,[code]\r

#@rf_scandly=[m]\r

Purpose	Set Scan Delay
Response	OK\r
	ERR,[code]\r

4.3 FILTER

The Flow Chart as below is the procedure of scanning tag about EPC:



Scan Flow Chart

4.3.1 EPC ENCODING SCHEME

This function will decide which kind of tags can be read.

Accepted EPC Encoding Scheme – Group 1

Command:

#@rf_epctype1?\r

Purpose Get EPC Scheme – Group1

Response OK,[m]\r (Default = '11111111')

[m]: EPC Scheme – Group1

8 character series composed by value 0 and 1 indicating the state of supported 8 EPC Schemes.

'0' – to deny the tag which EPC is encoded by this scheme.

'1' – to accept the tag which EPC is encoded by this scheme.

Character	EPC encoding scheme
1 (Left)	GDTI96
2	GSRN96
3	DoD96S
4	SGTIN96
5	SSCC96
6	GLN96
7	GRAI96
8(Right)	GIAI96

e.g. [m]="10011000" means only to accept the tags which EPC is encoded by GDTI96, SGTIN96,SSCC96

ERR,[code]\r

#@rf_epctype1=[m]\r

Purpose Set EPC Scheme – Group1

Response OK\r

ERR,[code]\r

Accepted EPC Encoding Scheme – Group 2

Command:

#@rf_epctype2?\r

Purpose Get EPC Scheme – Group2

Response OK,[m]\r (Default = '11111111')

[m]: EPC Scheme – Group2

8 character series composed by value 0 and 1 indicating the state of supported EPC Schemes.

0 →to deny the tag which EPC is encoded by this scheme.

1 →to accept the tag which EPC is encoded by this scheme.

Character	EPC encoding scheme
1 (Left)	GID96
2	SGTIN198
3	GRAI170
4	GIAI202
5	SGLN195
6	GDTI113
7	ADI
8(Right)	Reserved Always read and write as 1

ERR,[code]\r

#@rf_epctype2=[m]\r

Purpose	Set EPC Scheme – Group2
Response	OK\r
	ERR,[code]\r

Note: If both EPC Scheme Group 1 and 2 are set to "11111111", it means with accepting all tags without checking EPC encoding schemes.

4.3.2 INCLUDED EPC

Filter is used in order to define a pattern of the tag where should the same as selected part of EPC. The selected part of EPC that have to fit for the requirements then can be accepted.

Note: Tags that fit to the defined configurations will be accepted.

Start

Define the acceptable start bit of EPC that you want to filter.

Command:

#@rf_sepcsb?\r

Purpose	Get Included EPC Start Bit
Response	OK,[m]\r (Default m= '0')
	[m]: Start bit of EPC. Max 255 and sum of start bit and pattern length bit cannot be more than 256.
	ERR,[code]\r

#@rf_sepcsb=[m]\r

Purpose	Set Included EPC Start Bit
Response	OK\r
	ERR,[code]\r

Length

The Max. value is 256. Sum of star bit and pattern length bit can not be more than 256.

- A value from 0 to 256 can be specified.
- EPC filter is useless when the length is set to '0'.

Command:

#@rf_sepcl?\r

Purpose	Get Included EPC Length
Response	OK,[m]\r (Default m= '0')
	[m]: Pattern length bits. Max 256 and sum of start bit and pattern length bit cannot be more than 256.
	ERR,[code]\r

#@rf_sepcl=[m]\r

Purpose	Set Included EPC Length
Response	OK\r
	ERR,[code]\r

Pattern

Define the hexadecimal pattern that is used to be compared.

Command:

#@rf_sepcpt?\r

Purpose	Get Included EPC Pattern
Response	OK,[m]\r (Default m= '00')
	[m]: EPC pattern in hexadecimal value.
	ERR,[code]\r

#@rf_sepcpt=[m]\r

Purpose	Set Included EPC Pattern
Response	OK\r
	ERR,[code]\r

#@rf_sepcpt2?\r

Purpose	Get Included EPC2 Pattern
Response	OK,[m]\r (Default m= '00')
	[m]: EPC pattern in hexadecimal value.
	ERR,[code]\r

#@rf_sepcpt2=[m]\r

Purpose	Set Included EPC2 Pattern
Response	OK\r
	ERR,[code]\r

State

Disable or Enable Included EPC Filter function. When the value is set to '1', Tag EPC will be accepted upon fitting the required pattern. If the value is set to '2', Tag EPC will be accepted between pattern and pattern2. (Pattern<=Tag EPC<=Pattern2).

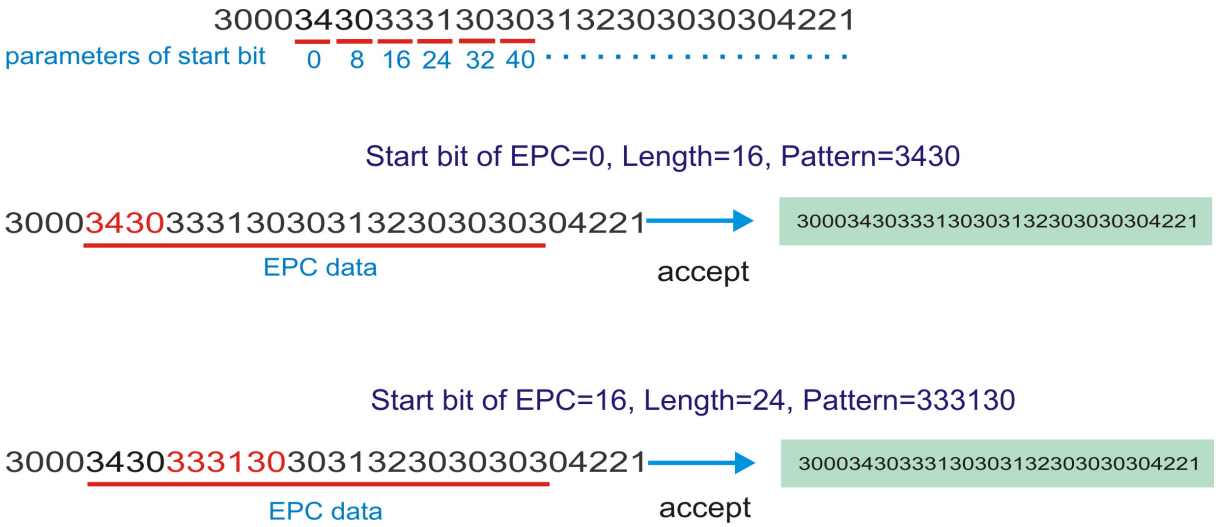
Command:

#@rf_sepcen?\r

Purpose	Get Included EPC State
Response	OK,[m]\r (Default m= '0')
	[m]: '0' – disable, '1' – enable, '2' – enable range filter
	ERR,[code]\r

#@rf_sepcen=[m]\r

Purpose	Set Included EPC State
Response	OK\r
	ERR,[code]\r



Note: The pattern must be consistent with length so that you can filter the transmitted data and accept it.

Example:

Command	
#@rf_sepcsb=64	→ set filter started from bit 64 of the EPC
Response (s)	
OK	
Command	
#@rf_sepc1=8	→ set filter length to 8 bits
Response (s)	
OK	
Command	
#@rf_sepcpt=06	→ set filter pattern as 0x06
Response (s)	
OK	
Command	
#@rf_epcfcode=31	→ filter works on SSCC-96
Response (s)	
OK	
Command	
#@rf_sepcen=1	
Response (s)	
OK	
Tag1 EPC=3110AFEC2B0BEBC205000000	→ reject
Tag2 EPC=3110AFEC2B0BEBC206000000	→ accept
Tag3 EPC=3110AFEC2B0BEBC207000000	→ reject
Tag4 EPC=3030AFEC2B09C44000000005	→ accept. It's not SSCC-96 .bypass!

4.3.3 EXCLUDED EPC

For an excluded EPC filter, it is unacceptable once the selected part of EPC is fitted for the requirements.

Note: Tags that fit to the defined configurations will not be accepted.

Start

Define the unacceptable start bit of EPC that you want to filter.

Command:

#@rf_xepcsb?\r

Purpose	Get Excluded EPC Start Bit
Response	OK,[m]\r (Default m= '0')
	[m]: Start bit of EPC. Max 255 and sum of start bit and pattern length bit cannot be more than 256.
	ERR,[code]\r

#@rf_xepcsb=[m]\r

Purpose	Set Excluded EPC Start Bit
Response	OK\r
	ERR,[code]\r

Length

The Max. value is 256. Sum of star bit and pattern length bit can not be more than 256.

- A value from 0 to 256 can be specified.
- EPC filter is useless when the length is set to '0'.

Command:

#@rf_xepcl?\r

Purpose	Get Excluded EPC Length
Response	OK,[m]\r (Default m= '0')
	[m]: Pattern length bits. Max 256 and sum of start bit and pattern length bit cannot be more than 256.
	ERR,[code]\r

#@rf_xepcl=[m]\r

Purpose	Set Excluded EPC Length
Response	OK\r
	ERR,[code]\r

Pattern

Define the hexadecimal pattern that is used to be compared.

Command:

#@rf_xepcpt?\r

Purpose	Get Excluded EPC Pattern
Response	OK,[m]\r (Default m= '00')
	[m]: EPC pattern in hexadecimal value
	ERR,[code]\r

#@rf_xepcpt=[m]\r

Purpose	Set Excluded EPC Pattern
Response	OK\r
	ERR,[code]\r

#@rf_xepcpt2?\r

Purpose	Get Excluded EPC2 Pattern
Response	OK,[m]\r (Default m= '00')
	[m]: EPC pattern in hexadecimal value.
	ERR,[code]\r

#@rf_xepcpt2=[m]\r

Purpose	Set Excluded EPC2 Pattern
Response	OK\r
	ERR,[code]\r

State

Disable or Enable Excluded EPC Filter function. When the value is set to '1', Tag EPC will be eliminated upon fitting the required pattern. If the value is set to '2', Tag EPC will be eliminated between pattern and pattern2. (Pattern<=Tag EPC<=Pattern2).

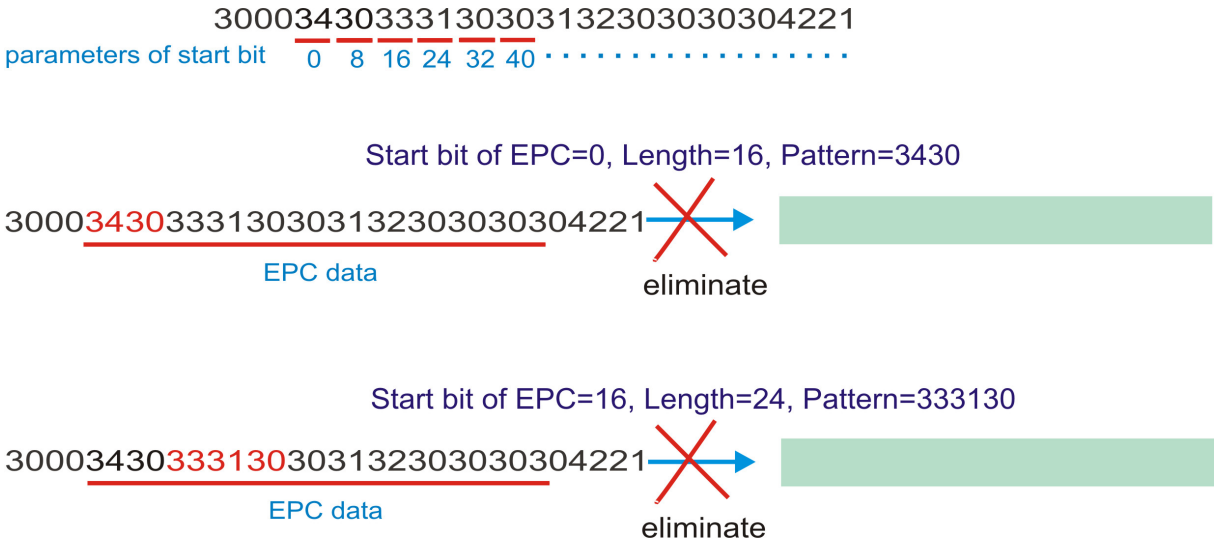
Command:

#@rf_xepcen?\r

Purpose	Get Excluded EPC State
Response	OK,[m]\r (Default m= '0')
	[m]: '0' – disable, '1' – enable, '2' – enable range filter
	ERR,[code]\r

#@rf_xepcen=[m]\r

Purpose	Set Excluded EPC State
Response	OK\r
	ERR,[code]\r



Note: The pattern must be consistent with length so that you can filter the transmitted data and eliminate it.

Example:

Command	
#@rf_xepcsb=64	→ set filter started from bit 64 of the EPC
Response (s)	
OK	
Command	
#@rf_xepc1=8	→ set filter length to 8 bits
Response (s)	
OK	
Command	
#@rf_xepcpt=06	→ set filter pattern as 0x06
Response (s)	
OK	
Command	
#@rf_epcfcode=31	→ filter works on SSCC-96
Response (s)	
OK	
Command	
#@rf_xepcen=1	
Response (s)	
OK	
Tag1 EPC=3110AFEC2B0BEBC205000000	→ accept
Tag2 EPC=3110AFEC2B0BEBC206000000	→ reject
Tag3 EPC=3110AFEC2B0BEBC207000000	→ accept
Tag4 EPC=3030AFEC2B09C44000000005	→ accept. It's not SSCC-96 .bypass!

4.3.4 AFFECTED TAG OF INCLUDED/EXCLUDED EPC FILTER

Command:

#@rf_epcfcode?\r

Purpose Get Tag type that EPC filter works on

Response OK,[m]\r (Default='30')

[m]: Acted Scheme for EPC Filter* Tag encoding type

[m]	EPC Encoding Scheme
'2C'	GDTI-96
'2D'	GSRN-96
'2F'	USDoD-96
'30'	SGTIN-96(Default)
'31'	SSCC-96
'32'	SGLN-96
'33'	GRAI-96
'34'	GIAI-96
'35'	GID-96
'36'	SGTIN-198
'37'	GRAI-170
'38'	GIAI-202
'39'	SGLN-195
'3A'	GDTI-113
'3B'	ADI

ERR,[code]\r

#@rf_epcfcode=[m]\r

Purpose Set Tag type that EPC filter works on

Response OK\r

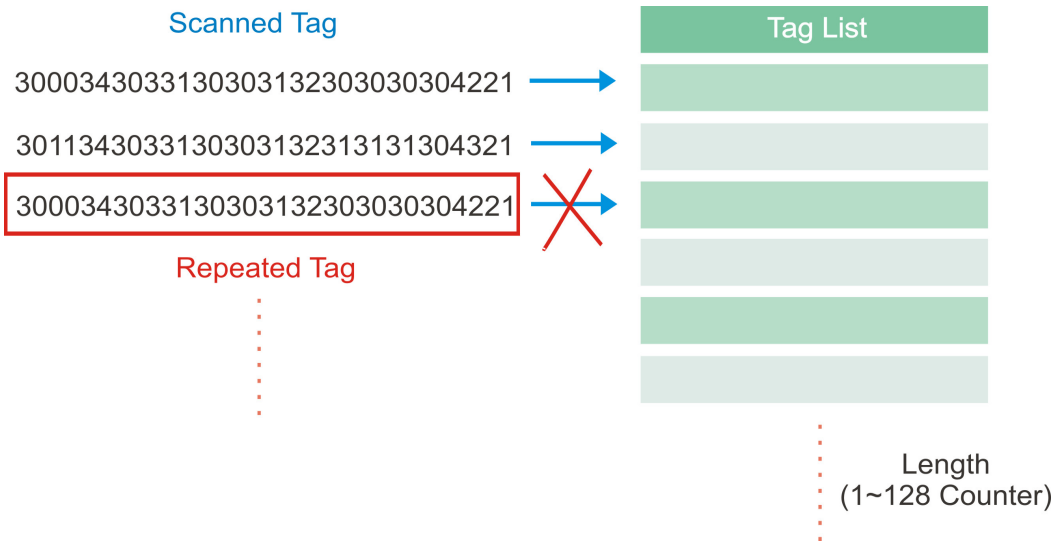
ERR,[code]\r

Note: 1) EPC Encoding Scheme can be used for multi kind of tags, refer to 4.3.1 EPC Encoding Scheme. But for EPC filter encoding scheme allows you only to filter one kind of tags. The others unfiltered tags will be pass directly.
2) The Encoding Scheme is available for included and excluded EPC filter. When both included and excluded EPC filter are enabled, they are effective applied to one kind of tags.

4.4 MULTI-TAG

4.4.1 COUNTER

The scanned data of Multi-Tag mode will be kept for a fast compared process. Set a non-zero Multi-Tag Counter will create a tag list in the RFID Reader. If the scan mode is Multi-Tag, any received individual tag will be compared and stored to the counter of the list (up to 128 counters can be configured to a tag list). Any repeated EPC tag will not be accepted and stored to the list. Instead of that, it will be ignored. When a tag list is full, the scan action will stop and no any respond by pressing <Trigger>. You have to restart the scan session by issuing the command or via function key.



Note: The Multi-Tag Counter command is used to set counter amounts of a tag list. If the value is set to '0', any received tag will be accepted including repeated tags.

Counter

Command:

#@rf_mtagcnt?\r

Purpose	Get Multi-Tag Counter
Response	OK,[m]\r (Default m= '128')
	[m]: Multi-Tag Counter, '0', '1' ~'128'
	ERR,[code]\r

#@rf_mtagcnt=[m]\r

Purpose	Set Multi-Tag Counter
Request	#@rf_mtagcnt=[m]\r
	[m]: Multi-Tag Counter
Response	OK\r
	ERR,[code]\r

Multi-Tag List Type

Command:

#@rf_mtaglist?\r

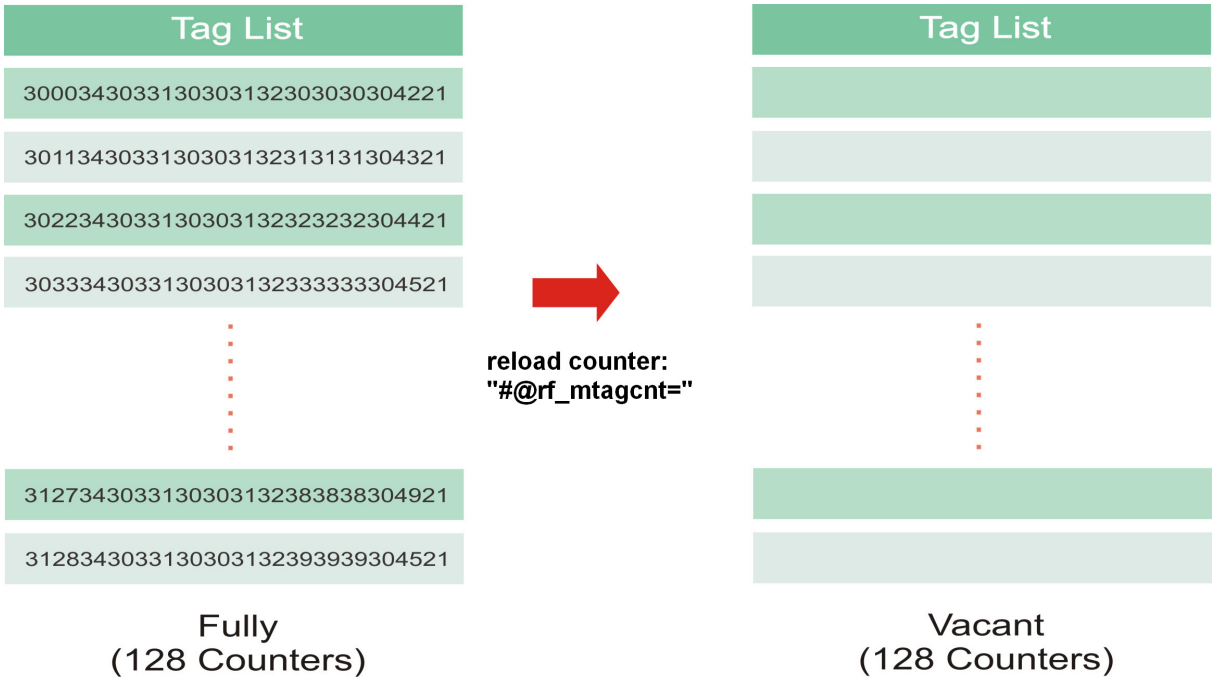
Purpose	Get Multi-Tag List Type
Response	OK,[m]\r (Default m= '0')
	[m]: Multi-Tag List Type
	'0' – EPC
	'1' TID
	ERR,[code]\r

#@rf_mtaglist=[m]\r

Purpose	Set Multi-Tag List Type
Response	OK\r
	ERR,[code]\r

4.4.2 COUNTER RELOAD

You have to clear a full tags list upon Multi-tag mode by issuing "#@rf_mtagcnt=" command with the same counter value again so that you can start another new scan session.



4.4.3 MULTI-TAG BEEP

For any behavior about Multi-Tag counter, RFID Reader supports you beep feedback to know the status.

- Get a new tag: one short beep, high tone
- Get a repeated tag: one short beep, low tone
- Full Tag List (Scan Session Completed): six short bee, low-mid-high-low-mid-high

Beeping Status

There are two parameters will be specified here. One is the repeated tag beeping another is the full Tag List beeping.

Command:

#@rf_mtagbeep?\r

Purpose	Get Multi-Tag Beeping
Response	OK,[m],[n]\r (Default m= '0', n= '1')
	[m]: Repeated Tag Beeping
	[n]: Tag List Full Beeping
	ERR,[code]\r

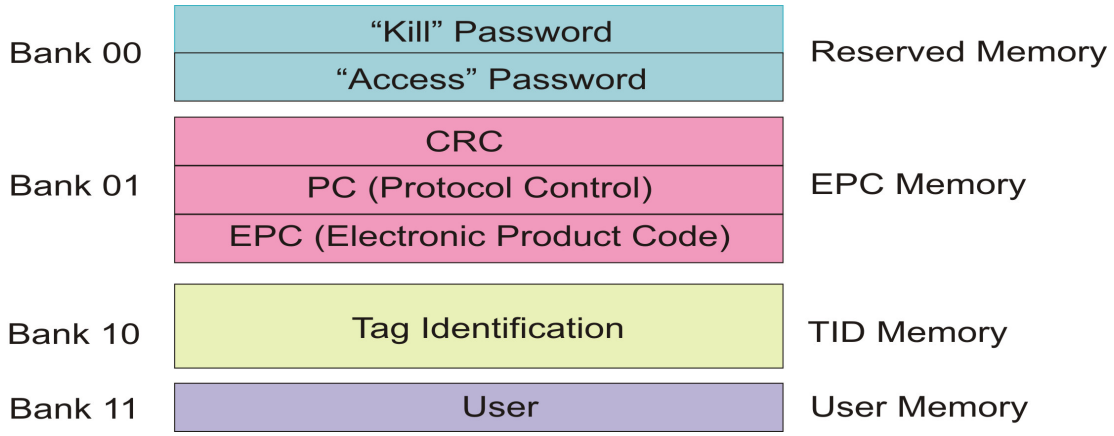
#@rf_mtagbeep=[m],[n]\r

Purpose	Set Multi-Tag Beeping
Request	#@rf_mtagbeep=[m],[n]\r
	[m]: Repeated Tag Beeping. '0' – Disable, '1' – Enable
	[n]: Tag List Full Beeping. '0' – Disable, '1' – Enable
Response	OK\r
	ERR,[code]\r

4.5 ACCESS TAG

4.5.1 TAG MEMORY

A tag memory is divided into 4 banks as below:



Reserved Memory:

This area of memory holds the tag's passwords:

- A 32-bit **"Kill"** password that allows a Tag to be permanently silenced.
  - The default Kill password value is zero.
  - The **Kill** command will only execute if the password has been set, i.e. is nono-zero.
- A 32-bit "Access" password that allows the Tag to transition to the **Secured** state.
  - A Tag in the **Secured** state can executed all **Access** commands, including writing to locked blocks.

Reserved memory can be read-locked.

EPC Memory:

This memory includes three partitions:

- A 16-bit CRC
  - The actual data is the 1's complement of the published CRC-16 definition.
- A 16-bit Protocol Control (PC)
  - 5 bits is for the length of PC + EPC.
  - 2 bits is RFU (00_2).
  - 9 bits is for a numbering system ID (NSI), which may contain an EPCglobal™ header or an AFI as defined in ISO 15961.
- An EPC (includes Header, General Manager Number, Object Class and Serial Number)
  - The electronic product code of the object to which the Tag is attached.

TID Memory:

This memory includes:

- An 8 bits ISO 15963 allocation class identifier
  - For EPCglobal™ Tags as 0xE2.
- A 12 bits Tag mask-designer ID
- A 12 bits Tag model number
- Allow to add other information if required e.g. Tag serial number

User Memory:

This optional area of memory contains user specific data.

4.5.2 READ/WRITE TAG

By default, the RFID Reader access mode is set to Inventory to get EPC of a tag. If you want to read all data stored in a tag, you would issue "#@rf_func=1" command that allows you to read reserved, EPC, TID or User bank.

RFID Function

Command:

#@rf_func?\r

Purpose	Get RFID Function
Response	OK,[m]\r (Default m= '0')
	[m]: RFID Function
	'0' – Inventory
	'1' – Read Tag Memory
	'2' – Write Tag Memory
	ERR,[code]\r

#@rf_func=[m]\r

Purpose	Set RFID Function
Response	OK\r
	ERR,[code]\r

Access

Command:

#@rf_rwidx?\r

Purpose Get Access Parameter

Response OK,[m]\r

[m]: Access Parameter

[m]	Meaning	Value Parameters
'0'	Access Password	'xxxxxxxx' Access Password, 4Bytes, shown in Hexadecimal value. e.g. String '30313233' indicates 0x30, 0x31, 0x32, 0x33. Default= '00000000'
'1'	Memory Bank	'0' – EPC

		'1' – TID '2' – User Default= '0'
'2'	Starting Address	'0', '2', '4' … '32' Only even number is valid. Default= '0'
'3'	Data Length	'0', '2', '4' … '32' Only even number is valid. Default= '0' (Unit=byte)

ERR,[code]

#@rf_rwidx=[m]\r

Purpose	Set Access Parameter
Response	OK\r
	ERR,[code]\r

#@rf_rwpr?\r

Purpose	Get Access Parameter
Response	OK,[m]\r
	[m]: Access Parameter
	ERR,[code]\r

#@rf_rwpr=[m]\r

Purpose	Set Access Parameter
Response	OK\r
	ERR,[code]\r

Write

You can configure RFID Reader to write data into tag memory by issuing "#@rf=wbuf" command.

Command:

#@rf_wbuf?\r

Purpose	Get Data in Buffer
Response	OK,[m]\r (Default m= '0000') [m]: Data in buffer. Shown in hexadecimal value
	[m]: Data will be stored into buffer.
	Buffer size = 32 Bytes
	Input data in hexadecimal value.
	The length of data must be even number.

To clear the buffer, [m]= '0000'

e.g. '41'=>0x41= 'A' (2 Bytes NULL)

The length of data must be even number.

ERR,[code]\r

#@rf_wbuf=[m]\r

Purpose	Set Data in Buffer
Response	OK\r
	ERR,[code]\r

Example (Read Tag Memory):

Command	
#@rf_rwidx=1	
Response (s)	
OK	
Command	
#@rf_rwpr=2	→ to read TID bank
Response (s)	
OK	
Command	
#@rf_rwidx=2	
Response (s)	
OK	
Command	
#@rf_rwpr=0	→ start from byte 0 of TID bank
Response (s)	
OK	
Command	
#@rf_rwidx=3	
Response (s)	
OK	

Command	
#@rf_rwpr=0	→ to read the whole bank
Response (s)	
OK	
Command	
#@rf_func=1	→ set scan function to read tag memory
Response (s)	
OK	

Example (Write Tag Memory):

Command	
#@rf_rwidx=1	
Response (s)	
OK	
Command	
#@rf_rwpr=3	→ to write User bank
Response (s)	
OK	
Command	
#@rf_rwidx=2	
Response (s)	
OK	
Command	
#@rf_rwpr=0	→ start from byte 0 of User bank
Response (s)	
OK	
Command	
#@rf_rwidx=3	
Response (s)	
OK	

Command	
#@rf_rwpr=8	→ to write 8 bytes data
Response (s)	
OK	
Command	
#@rf_wbuf=3132333435363738	
Response (s)	
OK	
Command	
#@rf_func=2	→ set scan function to write tag memory
Response (s)	
OK	

Chapter 5

DEFINE OUTPUT FORMAT

You may configure the format of the collected data output to the host computer. Tags read by the RFID Reader can be configured below –

1) Decide the output format.
2) Define the data fields for Time stamp, Data Count and Data sections.
3) Set the separators to each section.
4) Define output length to the data.
5) Add Prefix Code and Suffix Code before transmission.
6) Decide the output sequence of Time stamp, Data Count and Data sections.

IN THIS CHAPTER

5.1 OUTPUT FORMAT

You have to define the output data format firstly before capturing the data transmission from RFID Reader. There are three output formats specified to various *Bluetooth*® interface.

BT SPP/USB VCOM via 3610

The output formats for *Bluetooth*® SPP/USB VCOM via 3610 are specified to Packet Data, Hexadecimal and Raw Data. The default value is Packet Data.

BT HID/USB HID via 3610

The output formats for *Bluetooth*® HID/USB HID via 3610 are specified to Hexadecimal and Raw Data. The default value is Hexadecimal.

Note: *Bluetooth*® HID or USB HID via 3610 interface does not support Packet Data as an output format.

Command:

#@dat_fmt?\r

Purpose: Get Current Output Data Format

Response: OK,[m]\r (Default m= '0')

[m]: Output Data Format

[m]	BT SPP / USB VCOM via 3610	BT HID / USB HID via 3610
'0'	Packet Data	Hexadecimal
'1'	Hexadecimal	
'2'	Raw Data	Raw Data

ERR,[code]\r

#@dat_fmt=[m]\r

Purpose: Set New Output Data Format

Response: OK\r

ERR,[code]\r

Example:

Packet Data:

In order to reduce the data loss during transmission, Header and checksum are added before transmitting. This is normal used for Terminal API.

Hexadecimal:

The output data is consisted of 16 unique symbols, the numbers 0 to 9 and the letters A to F. Specified for every byte (8 bits) as two consecutive hexadecimal digits. It is easier for users to read hexadecimal numbers than binary numbers.

Command	
#@dat_fmt=1	→ set output data format to Hexadecimal Data
Response (s)	
OK 1. 12-04-11 23:56 44.46 3000343033313030313230303030422 1 → Hexadecimal Data	

Raw Data:

This is as know as source data without processing in order to be displayed in any sort of presentable form. Just like binary code, sometime it can be nothing more than a series of numbers specified for important information. Host computer may interpret this information and give a readout that then may make sense to the RFID Reader.

Command	
#@dat_fmt=2	→ set output data format to Raw Data
Response (s)	
OK 2. 12-04-12 00:03 10.49 040310012000030B! → Raw Data	

5.2 FORMAT EDITING FOR HEXADECIMAL AND RAW DATA

When the data format is specified for Hexadecimal or Raw Data, you can configure the data sections described as below:

- Each section can be enabled or disabled.
- Each section has individual prefix and suffix.
- The sequence for each section can be adjusted.

Default Format:

Section 1			Section 2			Section 3		
prefix	Data Counter	suffix	prefix	Timestamp	suffix	prefix	UHF Data	suffix

Command:

#@dat_seq?\r

Purpose	Get the Setting of Output Data Sequence
Response	OK,[m],[n],[o]\r (Default m= '1', n= '2', o= '3')
	[m]: Section in sequence 1
	[n]: Section in sequence 2
	[o]: Section in sequence 3
	Data section will be one of the following:

[m]/[n]/[o]	Section
'0'	Disable this section
'1'	Count section
'2'	Time Stamp section
'3'	RFID Data section

ERR,[code]\r

#@dat_seq=[m],[n],[o]\r

Purpose	Set Output Data Sequence
Response	OK\r
	ERR,[code]\r

Example 1:

- Sequence 1 : Counter Section
- Sequence 2 : Timestamp Section
- Sequence 3 : UHF Data Section

Command	
#@dat_seq?	→ get output data sequence default sequence: Counter, Timestamp, UHF data
Response (s)	
OK,1,2,3	

Example 2:

- Sequence 1 : UHF Data Section
- Sequence 2 : Disabled
- Sequence 3 : Disabled

Command	
#@dat_seq=3,0,0	→ set to show UHF data section only
Response (s)	
OK 3000343033313030313230303030422 1	

Example 3:

- Sequence 1 : Timestamp Section
- Sequence 2 : UHF Data Section
- Sequence 3 : Disabled

Command	
#@dat_seq=2,3,0	→ set to show 1. Timestamp and 2. UHF data
Response (s)	
OK 2012-04-16 Mon 00:08 37.08 3000343033313030313230303030422 1 sequence 1 sequence 2	

5.2.1 DATA COUNT SECTION

Define a serial number to output data. The serial number would be specified into 6 digits beginning from 000001. When the counter is up to 999999, it will be renewed from 000001.

Default Format:

Prefix	Field	Suffix
'\0' (0x00)	Counter	',' (0x2E)

Reset Counter Event

There are three events supported to reset the counter. When the parameter is '1', the output data will be counted from the beginning for each event happen.

Command:

#@dat_rstcnt?\r

Purpose: Get the Setting of Reset Counter Event

Response: OK,[m],[n],[o]\r (Default m= '1', n= '0', o= '1')

	Reset Event	Enable	Disable
[m]	Get Reset Counter Command	'1'	'0'
[n]	UHF Power On	'1'	'0'
[o]	New *Bluetooth*® connection	'1'	'0'

ERR,[code]\r

#@dat_rstcnt=[m],[n.],[o]\r

Purpose: Set Counter Reset Event

Response: OK\r

ERR,[code]\r

#@dat_rstcnt\r

Purpose: Reset Data Counter

Response: OK\r

ERR,[code]\r

Note: Data Counter will always be reset when system power up.

Example:

Command	
#@dat_rstcnt?	→ get the values of reset counter events
Response (s)	
OK,1,1,1 26. 04-13-2012 3000343033313030313230303030422 1	
Command	
#@dat_rstcnt	→ reset counter command
Response (s)	
OK 1. 04-13-2012 3000343033313030313230303030422 1 → re-count 2. 04-13-2012 3000343033313030313230303030422 1 3. 04-13-2012 3000343033313030313230303030422 1	

Counter Padding

You can define the padded character as a prefixed counter. Characters to be padded before data counter, shown in Hexadecimal value. Refer to ASCII Table. The default value is 0x20 (space) for 20.

Command:

#@dat_cntpad?\r

Purpose	Get the Setting of Pad Counter Character
Response	OK,[m]\r (Default m= '20' - 0x20 space)
	[m]: Character to be padded before data counter, shown in Hexadecimal value.
	ERR,[code]\r

#@dat_cntpad=[m]\r

Purpose	Set the Character to be Padded before Counter
Response	OK\r
	ERR,[code]\r

Example:

Command	
#@dat_cntpad?	→ get counter padding
Response (s)	
OK,20	→ 20 is for 'space' referred to ASCII table '0x20'
10. 04-13-2012	300034303331303031323030303042 21
Command	
#@dat_cntpad=2a	→ set counter padding to 20a as '*' referred to ASCII table '0x2a'
Response (s)	
OK	
**** 11. 04-13-2012	300034303331303031323030303042 21

5.2.2 TIME STAMP SECTION

You can specify individual field to each section. Time Stamp section is divided into 7 fields as year, month, day, weekday, hour, minute and second. Separators can be defined among fields to make more clear presentation. It is up to 6 separators can be specified to Time Stamp section.

Default Format:

Prefix	Field1	Sep1	Field2	Sep2	Field3	Sep3	Field4	Sep4	Field5	Sep5	Field6	Sep6	Field7	Suffix
'' (0x2D)	Year	'' (0x2D)	Month	'' (0x2D)	Day	' ' (0x20)	Disable	' ' (0x20)	Hour	':' (0x3A)	Minute	' ' (0x20)	Second	'' (0x2D)

Time Stamp Sequence

Issue "#@dat_tseq=" command to configure the fields of Time Stamp section. You can set the parameter to '0' to disable the field.

Command:

#@dat_tseq?\r

Purpose: Get the Sequence Settings of Time Stamp Section

Response: OK,[m],[n],[o],[p],[q],[r],[s]\r (Default m= '1', n= '2'', o= '3', p= '0', q= '5', r= '6', s= '7')

[m]: Time Data Type in Field 1

[n]: Time Data Type in Field 2

[o]: Time Data Type in Field 3

[p]: Time Data Type in Field 4

[q]: Time Data Type in Field 5

[r]: Time Data Type in Field 6

[s]: Time Data Type in Field 7

[m]~[s]	Field
'0'	Disable this Field
'1'	Year
'2'	month
'3'	day
'4'	weekday
'5'	Hour
'6'	Minute
'7'	second

ERR,[code]\r

#@dat_tseq=[m],[n],[o],[p],[q],[r],[s]\r

Purpose	Set the Sequences of Field in Time Stamp Section
Response	OK\r [m]: Time Data Type in Field 1. Default = '1' [n]: Time Data Type in Field 2. Default = '2' [o]: Time Data Type in Field 3. Default = '3' [p]: Time Data Type in Field 4. Default = '0' [q]: Time Data Type in Field 5. Default = '5' [r]: Time Data Type in Field 6. Default = '6' [s]: Time Data Type in Field 7. Default = '7' ERR,[code]\r

Example:

Command	
#@dat_tseq=1,2,3,0,0,0,0	→ set to show year, month and day only
Response (s)	
OK 24. 2012-04-12 300034303331303031323030303042 21	
Command	
#@dat_tseq=2,3,1,0,0,0,0	→ change the sequences of year, month and day
Response (s)	
OK 25. 04-13-2012 300034303331303031323030303042 21	

Note: If the parameter for field is set to '0', the separator will also be ignored.

Time Stamp Separators

You can configure the separator between field and field with hexadecimal or character. Refer to ASCII Table.

Command:

#@dat_tsprh?\r, #@dat_tspr?\r	
Purpose	Get the Separators of Field in Time Stamp Section
Request	#@dat_tsprh?\r //Response data will be shown in Hexadecimal value.
	#@dat_tspr?\r //Response data will be shown in character.
Response	OK,[m],[n],[o],[p],[q],[r]\r
	[m]: separator follows field1. Default= '2D' ('-')
	[n]: separator follows field2. Default= '2D' ('-')
	[o]: separator follows field3. Default= '20' (' ')
	[p]: separator follows field4. Default= '20' (' ')
	[q]: separator follows field5. Default= '3A' (':')
	[r]: separator follows field6. Default= '20' (' ')
	ERR,[code]\r

#@dat_tspr=[m],[n],[o],[p],[q],[r],[s]\r	
Purpose	Set the Separators of Field in Time Stamp Section
Request	#@dat_tspr=[m],[n],[o],[p],[q],[r],[s]\r
	[m]: input data format, '0'- in Hexadecimal, '1'- in character
	[n]: separator follows field1
	[o]: separator follows field2
	[p]: separator follows field3
	[q]: separator follows field4
	[r]: separator follows field5
	[s]: separator follows field6
Response	OK\r
	ERR,[code]\r

Note: Input '00' (hexadecimal) to clear the inputted data.

Example:

Command	
#@dat_tseq=1,2,3,4,5,6,7	→ enable all fields
Response (s)	
OK 19. 2012-04-12 Thu 23:04 08.34 300034303331303031323030303042 21	
Command	
#@dat_tsprh?	→ get the separators with hexadecimal format
Response (s)	
OK,2d,2d,20,20,3a,20	
Command	
#@dat_tspr?	→ get the separators with character format
Response (s)	
OK,-,-, , ,:,	
Command	
#@dat_tspr=0,3a,3a,00,00,00,00	→ reset the separators with hexadecimal format
Response (s)	
OK 20. 2012:04:12Thu230557.61 300034303331303031323030303042 21	
Command	
#@dat_tspr=1,/,/, ,/,/,/	→ reset the separators with character format
Response (s)	
OK 20. 2012/04/12 Thu/23/06/34.61 300034303331303031323030303042 21	

Note: There will be 7 fields for a Time stamp data output and 6 separators will be defined. The default value for weekday field is disabled; remember enabling it before you begin to configure the separators to all fields clearly.

Year

For year output field, you can define it as 2 digits or 4 digits.

Command:

#@dat_tyear?\r

Purpose	Get the Setting of Year Field
Response	OK,[m]\r (Default m= '0'.)
	[m]: Year format. 0 – 2 digits, 1 – 4 digits (shown as '20xx').
	ERR,[code]\r

#@dat_tyear=[m]\r

Purpose	Set the Year Field
Response	OK\r
	[m]: Year format. m= '0' is for 2 digits, m= '1' is for 4 digits (shown as '20xx').
	ERR,[code]\r

Example:

Command	
#@dat_tyear?	→ default format for year is 2 digits
Response (s)	
OK,0 3. 12-04-12 05:44 59.47 30003430333130303132303030304221	
Command	
#@dat_tyear=1	→ set year format to 4 digits
Response (s)	
OK 4. 2012-04-12 05:44 59.47 30003430333130303132303030304221	

Millisecond

Enable this function to show the millisecond when second field is enabled.

Command:

#@dat_tms?\r

Purpose	Get the Setting of Millisecond
Response	OK,[m]\r (Default m= '1')
	[m]: Show millisecond in second field.
	0 – Disable, 1 – Enable
	ERR,[code]\r

#@dat_tms=[m]\r

Purpose	Set to Display Millisecond
Response	OK\r
	ERR,[code]\r

Example:

Command	
#@dat_tms?	→ default format for second is showing millisecond
Response (s)	
OK,1 5. 2012-04-12 05:44 59.47 300034303331303031323030303042 21	
Command	
#@dat_tms=0	→ set to show second only in second field
Response (s)	
OK 6. 2012-04-12 05:44 59 300034303331303031323030303042 21	

5.2.3 UHF DATA SECTION

UHF Data Section is divided into 5 fields as CRC, PC, EPC, Memory Data and Data Length. Separators can be defined among fields to make more clear presentation. It is up to 4 separators can be specified to Data section.

Default Format:

Prefix	Field1	Sep1	Field2	Sep2	Field3	Sep3	Field4	Sep4	Field5	Suffix
'\0' (0x00)	PC	'\0' (0x00)	EPC	'\0' (0x00)	CRC	'\0' (0x00)	Memory Data	'\0' (0x00)	Disable	'\r' (0x0D)

UHF Data Sequence

By default, data sequence is PC, EPC, CRC, Memory Data and Data Length. Just because the Data Length parameter is set to '0', it will not be appeared during data output.

Command:

#@dat_rfseq?\r

Purpose: Get the Sequence Setting of UHF Data Section

Response: OK,[m],[n],[o],[p],[q]\r (Default m= '2', n= '3', o= '1', p= '4', q= '0')

[m]: UHF Data in Field 1

[n]: UHF Data in Field 2

[o]: UHF Data in Field 3

[p]: UHF Data in Field 4

[q]: UHF Data in Field 5

[m]~[q]	Description
'0'	Disable this Field
'1'	CRC
'2'	PC
'3'	EPC
'4'	Memory Data This field only appears when RFID function is set to "Read Tag Memory"
'5'	Data Length

ERR,[code]\r

#@dat_rfseq=[m],[n],[o],[p],[q]\r

Purpose: Set the Sequence of Each Field in UHF Data Section

Response: OK\r

ERR,[code]\r

Example:

Command	
#@rf_func?	→ get RFID function Default is inventory, memory data will disappear.
Response (s)	
OK,0 18. 2012-04-12 Fri 04:00 55.95 300034303331303031323030303042 21	
Command	
#@dat_rfseq?	→ get the sequence of RFID Data Default sequence is PC, EPC and then CRC
Response (s)	
OK,2,3,1,4,0 19. 2012-04-12 Fri 04:00 55.95 3000 343033313030313230303030 4221 PC + EPC + CRC	
Command	
#@dat_rfseq=3,0,0,0,0	→ only show EPC
Response (s)	
OK 20. 2012-04-12 Fri 04:00 55.95 343033313030313230303030 EPC	

UHF Data Separators

You can configure the separator between field and field with hexadecimal or character. Refer to ASCII Table.

Command:

#@dat_rfsprh?\r, #@dat_rfspr?\r

Purpose	Get the Separators of Each field in UHF Data Section
Request	#@dat_rfsprh?\r Response data will be shown in Hexadecimal value
	#@dat_rfspr?\r Response data will be shown in character
Response	OK,[m],[n],[o],[p]\r (Default m= '00', n= '00', o= '00', p= '00', '00' is for NULL)
	[m]: separator follows field1
	[n]: separator follows field2
	[o]: separator follows field3

[p]: separator follows field4

ERR,[code]\r

#@dat_rfspr=[m],[n],[o],[p],[q]\r

Purpose	Set the Separators of Each field in UFH Data Section
Response	OK\r
	ERR,[code]\r

Note: Input '00' (hexadecimal) to clear the inputted data.

Example:

Command	
#@dat_rfspr?	→ get the separators with character format
Response (s)	
OK,	
Command	
#@dat_rfsprh?	→ get the separators with hexadecimal format
Response (s)	
OK,00,00,00,00 21. 2012-04-12 Fri 04:00 55.95 34303331303031323030303030004221	
Command	
#@dat_rfsprh=0,2d,2d,2d,2d	→ reset the separators with hexadecimal format e.g. 2d is specified for '-'
Response (s)	
OK 22. 2012-04-12 Fri 04:00 55.95 34303331303031323030303030-3000-4221-	
Command	
#@dat_rfsprh=0,/,/,/,/	→ reset the separators with character format e.g. / is specified for '/'
Response (s)	
OK 23. 2012-04-12 Fri 04:00 55.95 34303331303031323030303030/3000/4221/	

Note: If the parameter for field is set to '0', the separator will also be ignored.

Data Length

Enable the Data Length function to show the length for UHF Data, EPC and memory data.

Command:

#@dat_rflen?\r

Purpose	Get the Setting of UHF Data Length
Response	OK,[m]\r (Default m= '0')
	[m]: Data Length Type
	'0'- Total UHF Data Length. Separators are not included.
	'1'- EPC Length
	'2'- Memory Data Length
	ERR,[code]\r

Note: UHF data length is not related to the appearance of fields.

#@dat_rflen=[m]\r

Purpose	Set the RFID Data Length
Response	OK\r
	ERR,[code]\r

Example:

Command	
#@dat_rfseq?	→ get the sequence of RFID data
Response (s)	
OK,2,3,1,4,0	→ default data length is '0' specified for disappearance
33. 2012-04-12 Fri 04:00 55.95 34303331303031323030303030004221	
Command	
#@dat_rfseq=2,3,1,4,5	→ set to '5' to show data length: total length is 16
Response (s)	
OK,2,3,1,4,5	
34. 2012-04-12 Fri 04:00 55.95 343033313030313230303030303000422116	

Command	
#@dat_rflen?	→ get the total RFID Data length
Response (s)	
OK,0 35. 2012-04-12 Fri 04:00 55.95 343033313030313230303030300042211 6	
Command	
#@dat_rflen=1	→ reset the value to 1 for showing EPC Length
Response (s)	
OK,2,3,1,4,5 36. 2012-04-12 Fri 04:00 55.95 3000343033313030313230303030422112	
Command	
#@dat_rflen=2	→ reset the value to 2 for showing Memory Data length
Response (s)	
OK 37. 2012-04-12 Fri 04:00 55.95 300034303331303031323030303042210	

5.3 PREFIX/SUFFIX CODE

By default, there is no prefix code configured to Counter and UHF Data Section, and [ENTER] or [CR] (Carriage Return) is configured to be suffix code for UHF Data Section. Up to 8 characters can be configured, for example, "Tag_Test", and you will have the string appeared in front of the tag read, like this – "Tag_Test300034303331 30303132303030304221". If the specified content is longer than 8 bytes, it will be truncated.

Prefix/Suffix Index

For a prefix or suffix index, you have to specify for which one section (e.g. Data Counter, Time Stamp or RFID Data) you want to define firstly.

Command:

#@dat_pfxidx?\r

Purpose Get Prefix/Suffix Index

Response OK,[m]\r

[m]: Prefix / Suffix Index

[m]	Description
'1'	Prefix of Data Counter Section
'2'	Suffix of Data Counter Section
'3'	Prefix of Time Stamp Section
'4'	Suffix of time Stamp Section
'5'	Prefix of UHF Data Section
'6'	Suffix of UHF Data Section

ERR,[code]\r

#@dat_pfxidx=[m]\r

Purpose Set Prefix/Suffix Index

Response OK\r

ERR,[code]\r

Prefix/Suffix

Command:

#@dat_pfxh?\r, #@dat_pfx?\r

Purpose	Get Prefix/Suffix
▸ Request	▸ #@dat_pfxh?\r Response data will be shown in Hexadecimal value ▸ #@dat_pfx?\r Response data will be shown in character
Response	OK,[m]\r [m]: input data format, '0'- in Hexadecimal, '1'- in character [n]: data to be stored in Prefix / Suffix buffer ERR,[code]\r

#@dat_pfxh= [m]\r, #@dat_pfx=[n]\r

Purpose	Set Prefix/Suffix
Response	OK\r ERR,[code]\r

	Default
Prefix of Counter Section	'00' (NULL)
Prefix of Time Stamp Section	'20' (SPACE)
Prefix of RFID Data Section	'00' (NULL)
Suffix of Counter Section	'2E' (.)
Suffix of Time Stamp Section	'20' (SPACE)
Suffix of RFID Data Section	'0D' (CR)

Example1 (Prefix):

Command	
#@dat_pfx=0,23	→ set index to the counter with hexadecimal format e.g. 23 is specified for '#'
Response (s)	
OK # 39. 2012-04-12 Fri 04:00 55.95 3000343033313030313230303030422112	
Command	
#@dat_pfx=0.23436f756e74657223	→ if the index is longer than 8 bytes, it will be truncated e.g. 23 is specified for '#' and will be deleted
Response (s)	
OK #Counter 40. 2012-04-12 Fri 04:00 55.95 3000343033313030313230303030304221	
Command	
#@dat_pfx=1,@	→ set index to the counter with character format e.g. @ is specified for '@'
Response (s)	
OK @ 41. 2012-04-12 Fri 04:00 55.95 3000343033313030313230303030304221	

Example2 (Suffix):

Command	
#@dat_pfxidx=6	→ set '6' to suffix configuration
Response (s)	
OK	
Command	
#@dat_pfx=0,454e440d	→ add 'END' + <CR> to RFID data suffix CR is specified for 'Enter'
Response (s)	
OK 42. 2012-04-12 Fri 04:00 55.95 3000343033313030313230303030304221END	

Chapter 6

ALTERNATE MODE

Switch the Reader Switcher to EXT., 1800 RFID reader will enter Alternate mode. In Alternate mode, 1800 RFID reader cannot read tags by pressing <Trigger>. Function keys described in 1.3.1 Normal Mode are useless, either. Alternatively, key signals are sent to terminal with strings.

You can transmit the specified key actions to host via *Bluetooth*® upon Alternate mode. Here it supports up to 6 output strings and 8 key actions for user to select or edit.

Index	Key Action	String (10Byte)
1	1 (Press Trigger)	#@TRIG_ON\r
2	2 (Release Trigger)	#@TRIG_OFF\r
3	0 (Disable)	NULL
4	0 (Disable)	NULL
5	0 (Disable)	NULL
6	0 (Disable)	NULL

Table 6.1: Output string and key action combination table

Output String

Before specifying the action to each string, you have to define which string wants to be defined firstly.

Command:

#@dat_ostridx?\r

Purpose	Get Output String index
Response	OK,[m]\r (Default m= '1')
	[m]: String Buffer Parameter 1~6
	ERR,[code]\r

#@dat_ostridx=[m]\r

Purpose	Set Output String index
Response	OK\r
	ERR,[code]\r

Key Action

Command:

#@dat_ostrkey?\r

Purpose Get Key Action of Output String

Response OK,[m]\r

[m]: Key Action

[m]	Action
'0'	Disable
'1'	Trigger key is pressed
'2'	Trigger key is released
'3'	F1 is pressed
'4'	F1 is released
'5'	F2 is pressed
'6'	F2 is released
'7'	F1+ Trigger key are pressed
'8'	F2 + Trigger key are pressed

ERR,[code]\r

#@dat_ostrkey=[m]\r

Purpose	Set Key Action of Output String, refer to Table 6.1
Response	OK\r
	ERR,[code]\r

Output String Data

There are two parameters will be specified here. One is the input data format – Hexadecimal or Character, another is the data that will be stored in buffer with 10 bytes. If the specified data are longer than 10 bytes, it will be truncated.

Command:

#@dat_ostrh?\r, #@dat_ostr?\r

Purpose	Get Output String
Request	#@dat_ostrh?\r Response data will be shown in Hexadecimal value
	#@dat_ostr?\r Response data will be shown in character
Response	OK,[m]\r
	[m]: Data is stored in buffer.
	ERR,[code]\r

#@dat_ostr=[m],[n]\r

Purpose	Set Output String, refer to Table 6.1
	[m]: output data format, '0'- in Hexadecimal, '1'- in character
	[n]: Data to be stored in buffer
Response	OK\r
	ERR,[code]\r

Note: Input '00' (hexadecimal) to clear the inputted data.

Example:

Command	
#@dat_ostridx=3	→ set to string 3
Response (s)	
OK	
Command	
#@dat_ostrkey=3	→ set to use key action '3' (press F1)
Response (s)	
OK	
Command	
#@dat_ostr=1,F1_ON	→ define the output string 3 data with character format
Response (s)	
OK	
Command	
#@dat_ostr?	
Response (s)	
OK, F1_ON	→ get the output string 3 data with character format
Command	
#@dat_ostrh?	
Response (s)	
OK, 46315f4f4e	→ show the output string 3 data with hexadecimal format

SPECIFICATIONS

SYSTEM

Operating System & CPU

Operating System	CipherLab Proprietary Operation System
CPU	ARM Cortex-M3

Memory

Memory Mode	4MB
Transmit Buffer	2KB

Clock

RTC	▸ Operating tolerance: ±10sec./30 days ▸ Calibrated by PC application via USB or *Bluetooth*®

COMMUNICATIONS

USB	Micro USB 2.0
Bluetooth®	Built-in module for *Bluetooth*® version 2.1 + EDR Class 2 connectivity ▸ Antenna: Internal ▸ *Bluetooth*® Type: SPP Master/Slave, 3610

READER

UHF RFID

Protocol	EPC global UHF Gen2, ISO 18000-6c
Operating Frequency	▸ 865 – 868MHz ETSI (Europe) ▸ 902 – 928MHz US, Canada, South America , include 908.5 – 914MHz Korea ▸ 952 – 954MHz Japan
Antenna Module Type	▸ Tuning for fitting the regions individually
Output Power	Max. 28dbm
Read Range	▸ Up to 100cm Depend on the tag and environment; the read range will be changed.
Write Range	▸ Up to 50cm Depend on the tag and environment; the read range will be changed.

ELECTRICAL CHARACTERISTICS

Battery

Rechargeable Li-ion battery – 2500mAh

Charging Time

4hrs by adapter.

Working Time

10 hours, 5 sec./scan, one tag at 1m distance

Consumption

Standby	90mW
Power Off	100uW

PHYSICAL CHARACTERISTICS

Notifications

Status LED	LED – Red / Green / Blue / Yellow / White
Beeper	▸ 85 db at 10cm, 4KHz
Vibrator	0.5G

Enclosures

Materials	Plastic
Dimensions	163.5 mm (L) 83.3 mm (W) 142.85 mm (H)

ENVIRONMENTAL CHARACTERISTICS

Temperature

Operating	-20 °C to 60 °C
Storage	-30 °C to 70 °C

Humidity

10% to 95%, non-condensing

Resistance

Impact Resistance	1.5 m (Single Reader)
Tumble Test	500 times at 100 cm
Splash/Dust Resistance	IP64
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	▸ RFID Reader SDK ▸ C#/.Net Porgramming for 9 Series ▸ C Programming for 8 Series

Software & Utilities

Cipherlab software package	▸ 186xConfiguration Utility ▸ 8 Series Configuration Utility ▸ 9 Series Configuration Utility

ACCESSORIES

Accessory Options

- Spare Rechargeable Li-ion Battery
- External Battery Charger
- Direct USB Cable
- Power Cable
- Mobile Computer Mount

Appendix I

FIRMWARE UPGRADE

Upgrade firmware to one RFID reader at a time. For example, turn off each of the rest RFID reader when there is more than one RFID reader connected to host computer.

BEFORE UPGRADING

- Ensure the RFID reader has a fully charged battery prior to attempting a firmware upgrade.
- In order to avoid the data loss during firmware upgrade. Please save or upload all the data from the flash memory before beginning firmware upgrade.
- Before firmware upgrade, you have to configure the upgrade interface with "#@sys_dlfw" command firstly.

Command:

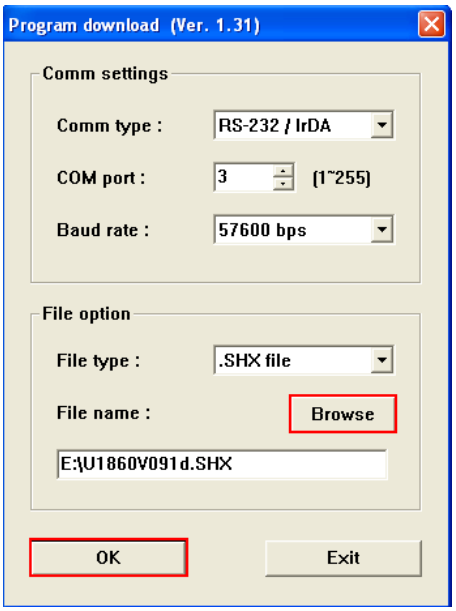
Purpose	Download Firmware
Request	#@sys_dlfw=[m]\r
	[m]: '0' – Current interface
	'1' – BT
	'2' – USB
Response	OK\r
	ERR,[code]\r

Note: When the 'OK' response is appeared: (1) End HyperTerminal. (2) Run the ProgLoad.exe to begin firmware upgrade.

HOW TO UPGRADE FIRMWARE

USE USB VIRTUAL COM

1) Use the provided USB cable to connect RFID Reader to the USB port of host computer. You will need to install USB cable driver firstly.
2) Refer to Using HyperTerminal for connecting with USB cable.
3) Issue "#@sys_dlfw=0" command.
4) End HyperTerminal.
5) Run the download utility "ProgLoad.exe" on the host computer.

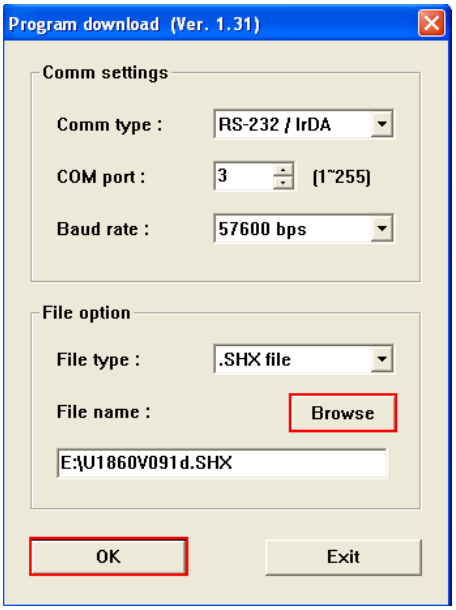


- For the communication settings, select "RS-232/IrDA" and the correct COM port for Direct USB Virtual COM interface.
- Ignore the baud rate setting.
- For the file option, click [Browse] to select the target file e.g. U1860V*.SHX for firmware update.
- Click [OK].

6) After upgrading, RFID Reader will restart automatically.

USE *BLUETOOTH*® DONGLE

1) Refer to 3.1.3 *Bluetooth*® HID and SPP Slave for the connection with *Bluetooth*® dongle.
2) Issue "#@sys_dlfw=0" command.
3) End HyperTerminal.
4) Run the download utility "ProgLoad.exe" on host computer.

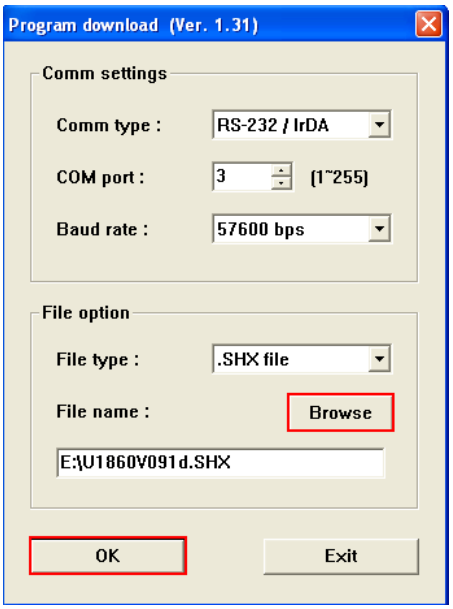


- For the communication settings, select "RS-232/IrDA" and the correct COM port for *Bluetooth*® SPP interface.
- Ignore the baud rate setting.
- For the file option, click [Browse] to select the target file e.g. U1860V*.SHX for firmware update.
- Click [OK].

5) After upgrading, RFID Reader will restart automatically.

USE 3610

1) Connect 3610 to the USB port of host computer after installing its driver.
2) Refer to 3.2 Connecting via 3610 for connecting to 3610.
3) Issue "#@sys_dlfw=0" command.
4) End Hyperterminal.
5) Run the download utility "ProgLoad.exe" on the host computer.



- For the communication settings, select "RS-232/IrDA" and the correct COM port for USB Virtual COM interface.
- Ignore the baud rate setting.
- For the file option, click [Browse] to select the target file e.g. U1860V*.SHX for firmware update.
- Click [OK].

6) After upgrading, RFID Reader will restart automatically.

USE <F2>+<TRIGGER>

1) Power Off RFID Reader.
2) Press and hold the <F2>+<Trigger> for 3 seconds to enter download mode.
3) Use USB cable to connect RFID Reader and host computer.
4) Run the download utility "ProgLoad.exe" on host computer to upgrade the firmware.

Note: <F2>+<Trigger> firmware upgrade only supports CDC driver. Refer to 2.1 USB Interface to configure USB type.

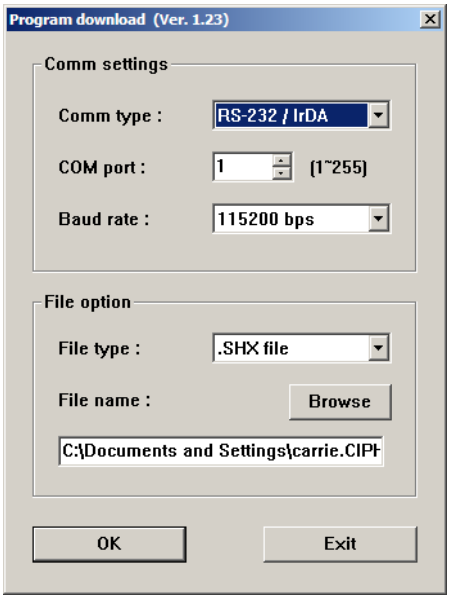
HOW TO UPGRADE 3610 FIRMWARE

Connect 3610 to the USB port of host computer after installing its driver.

UPGRADE 3610 CPU FIRMWARE

1) After making a connection between 3610 and RFID Reader. Power off RFID Reader.
2) Press <F2>+<Trigger> for 3 seconds to enter Firmware Upgrade Mode with LED1 flashing red, continual beeping.
3) Run the download utility "ProgLoad.exe" on the host computer.

Kernel Program	User Program
K3610_V*.shx	STD3610_V*.shx



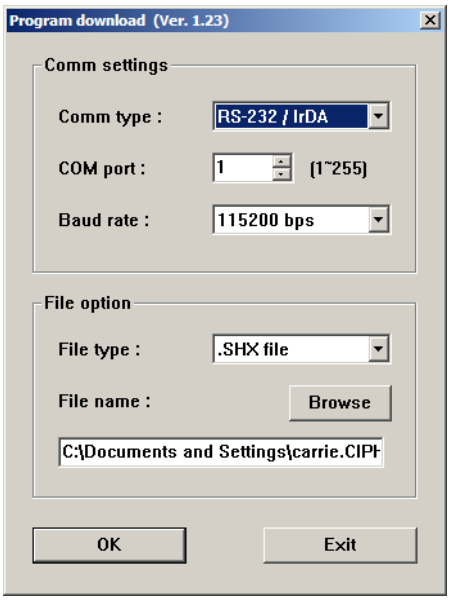
- For the communication settings, select "RS-232/IrDA" and the correct COM port for USB Virtual COM interface.
- Ignore the baud rate setting.
- For the file option, click [Browse] to select the target file e.g. STD3610_V*.SHX for firmware update.
- Click [OK].

4) The 3610 will automatically restart when upgrading firmware is completed successfully.

UPGRADE 3610 USB BRIDGE FIRMWARE

1) After making a connection between 3610 and RFID Reader. Power off RFID Reader.
2) Press <F2>+<Trigger> for 3 seconds to enter Firmware Upgrade Mode with LED1 flashing red, continual beeping.
3) Run the download utility "ProgLoad.exe" on the host computer.

Kernel Program	User Program
K3610Bridge_V*.shx	STD3610Bridge_V*.shx



- For the communication settings, select "RS-232" and the correct COM port for USB Virtual COM interface.
- Ignore the baud rate setting.
- For the file option, click [Browse] to select the target file for firmware update.
- Click [OK].

4) The 3610 will automatically restart when upgrading firmware is completed successfully.

Appendix II

ASCII TABLE

	0	1	2	3	4	5	6	7
0		DLE	SP	0	@	P	`	p
1	SOH	DC1	!	1	A	Q	a	q
2	STX	DC2	"	2	B	R	b	r
3	ETX	DC3	#	3	C	S	c	s
4	EOT	DC4	$	4	D	T	d	t
5	ENQ	NAK	%	5	E	U	e	u
6	ACK	SYN	&	6	F	V	f	v
7	BEL	ETB	'	7	G	W	g	w
8	BS	CAN	(	8	H	X	h	x
9	HT	EM	)	9	I	Y	i	y
A	LF	SUB	*	:	J	Z	j	z
B	VT	ESC	+	;	K	[	k	{
C	FF	FS	,	<	L	\	l	|
D	CR	GS	-	=	M	]	m	}
E	SO	RS	.	>	N	^	n	~
F	SI	US	/	?	O	_	o	DEL

Appendix III

SCAN CODE

	00	10	20	30	40	50	60	70	80	90	A0	B0	C0	D0	E0	F0
00	00	10	20	30	40	50	60	70	80	90	A0	B0	C0	D0	E0	F0
01	01	11	21	31	41	51	61	71	81	91	A1	B1	C1	D1	E1	F1
02	02	12	22	32	42	52	62	72	82	92	A2	B2	C2	D2	E2	F2
03	03	13	23	33	43	53	63	73	83	93	A3	B3	C3	D3	E3	F3
04	04	14	24	34	44	54	64	74	84	94	A4	B4	C4	D4	E4	F4
05	05	15	25	35	45	55	65	75	85	95	A5	B5	C5	D5	E5	F5
06	06	16	26	36	46	56	66	76	86	96	A6	B6	C6	D6	E6	F6
07	07	17	27	37	47	57	67	77	87	97	A7	B7	C7	D7	E7	F7
08	08	18	28	38	48	58	68	78	88	98	A8	B8	C8	D8	E8	F8
09	09	19	29	39	49	59	69	79	89	99	A9	B9	C9	D9	E9	F9
0A	0A	1A	2A	3A	4A	5A	6A	7A	8A	9A	AA	BA	CA	DA	EA	FA
0B	0B	1B	2B	3B	4B	5B	6B	7B	8B	9B	AB	BB	CB	DB	EB	FB
0C	0C	1C	2C	3C	4C	5C	6C	7C	8C	9C	AC	BC	CC	DC	EC	FC
0D	0D	1D	2D	3D	4D	5D	6D	7D	8D	9D	AD	BD	CD	DD	ED	FD
0E	0E	1E	2E	3E	4E	5E	6E	7E	8E	9E	AE	BE	CE	DE	EE	FE
0F	0F	1F	2F	3F	4F	5F	6F	7F	8F	9F	AF	BF	CF	DF	EF	FF

Appendix IV

STATUS CODE

value	Meaning
0xFF	Invalid op code for command without "?" or "="
0xFE	Reserved
0xFD	Invalid parameter
0xEF	RFID Fail (Unable to configure RFID module upon Q value and Module Power Level Command configurations.)
0xEE	Conflict in Scan Mode and RFID Function (Write Tag Memory function is only available in Test Mode.)
0xDF	Fail to set system time (Real Time Clock cannot be configured.)
0xDE	Incorrect *Bluetooth*® type (The parameter *of Bluetooth*® type is not consistent with connected device.)
0xDD	Fail to configure the parameter of USB HID via 3610