

CipherLab Reference Manual

1800 Series Handheld RFID Reader

CP50/9600/8400/Universal

Version 1.00



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IMPORTANT NOTICES

FOR USA

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

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

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

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
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1.00		Initial Release
0.76	Jun. 29, 2012	Modify: Modify default value of command indicating beep to disable Modify: Modify default value of EPC tag type to "SGTIN96"
0.75	Jun. 26, 2012	Modify: The sequences of Introduce and Quick Start Delete: Reader switcher – wrong switcher configuration related information Delete: USB charging & communication about "charging" wording Modify: 186xconfiguration about HyperTerminal descriptions Modify: 1.1.3 Remove bt_ps related command and descriptions to BT chapter Modify: 1.1.4 Low Battery Alarm: modify batter voltage value with percent specified. Delete: 1.2 Memory – "flash" wording Delete: 1.2.1 Bluetooth connection Modify: 1.2.3 Memory Mode – clear memory Modify: 1.3 Function Key action and PIN code form Modify: 1.4.1 Normal mode – LED form : LED5-Memory status Modify: 1.4.2 Temporary mode – Note descriptions Modify: chapter 2 and 2.2 topic Modify: Remove 3.1 USB Connection to Quick Start Modify: Remove 3.4.3 Restore to default to Quick Start Add: 4.2 descriptions to output data format Remove: 4.3 illustrations Remove: 4.3 Press "Space" key (character) to clear the inputted data description Modify: 4.3.2 RFID power on to UHF Power on and default value=0 Modify: 4.4 Descriptions to Prefix/Suffix Code and delete example 3 Modify: Remove 4.6 Alternate Mode to Chapter 6 Modify: 5.1 Multi-Tag description Delete: 5.2.1 "operation time will not be refreshed when a new timeout is configured." description. Delete: 5.3 RFID Host Mode Modify: 5.3 selected / eliminated to included/excluded Modify: 5.3 Length Max. value to 256 Remove 5.4.3 EPC Encoding Scheme to 5.4.1 Add: 2.3.4 and 2.6.4 Inter-Function Delay, 2.3.5 and 2.6.5 HID Character Transmit Mode
0.70	Jun. 12, 2012	Draft Version
0.60	May. 25, 2012	Draft Version
0.55	May. 10, 2012	Draft Version
0.50	Apr. 20, 2012	Draft Version

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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.

Thank you for choosing CipherLab products!

GETTING FAMILIARIZED WITH RFID READER

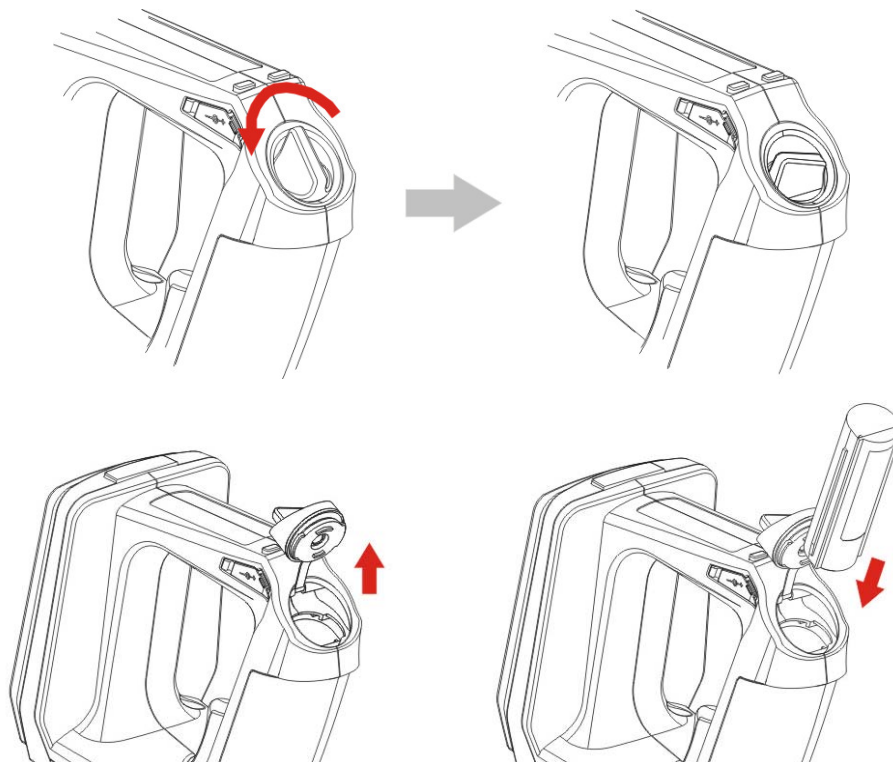
INSTALLING BATTERY TO RFID READER

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.

- 1) Turn the battery latch to unlock position.
- 2) Remove the battery cover.
- 3) 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.

- 4) Shut the battery cover back to the RFID Reader until it clicks into place.
- 5) 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. Then charge the battery to full. It may take approximately 4 hours to charge the battery to full capacity.

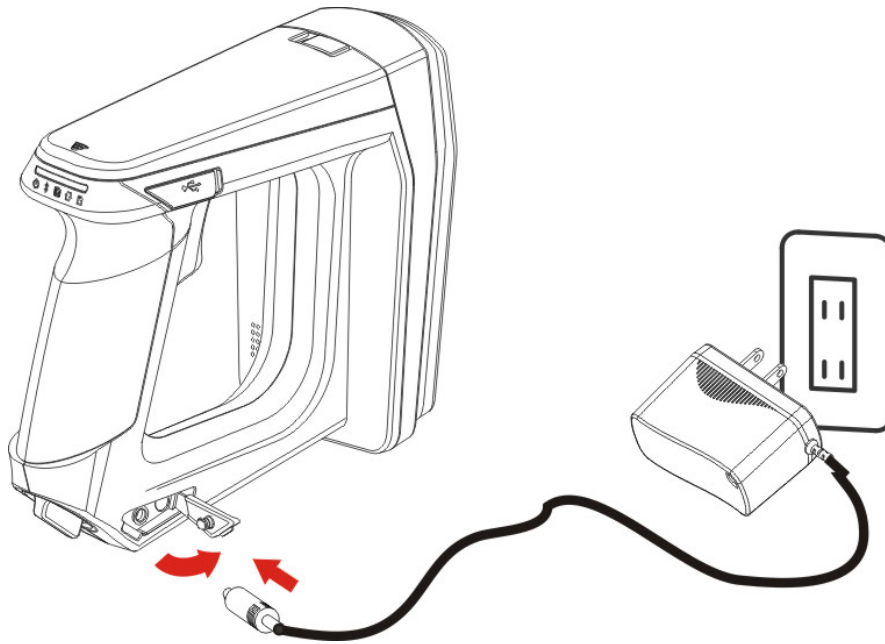
Note: (1) Any improper handling may reduce the battery life.
(2) When the main battery charge becomes low, you need to charge the battery as soon as possible or replace it with a charged one. While replacing the battery, make sure the power is turned off.



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 charge the battery. It takes approximately 3 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 turn off. When charging error occurs, the LED1 will turn solid red. For example, a bad or missing battery.

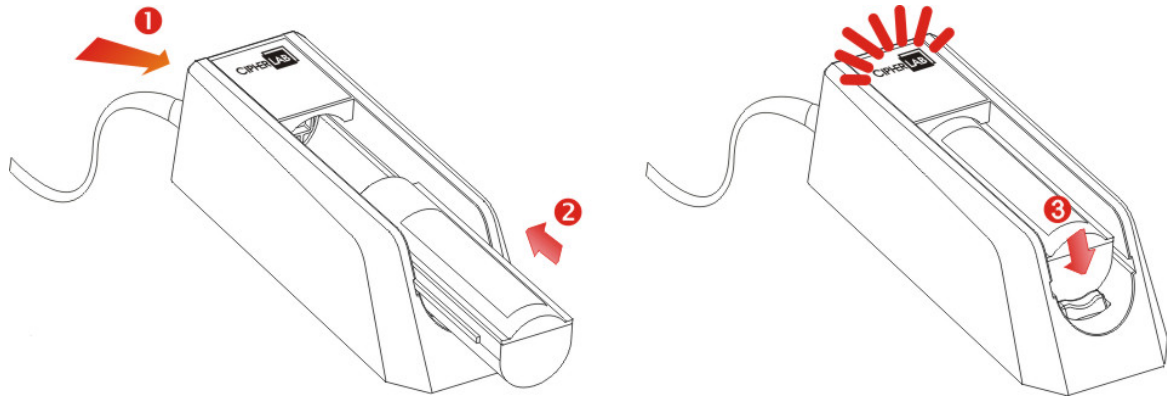


Note: Battery charging stops when the temperature drops below 0°C or exceeds 40°C. It is recommended to charge the battery at room temperature (18°C to 25°C) for optimal performance.

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
- ▶ 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

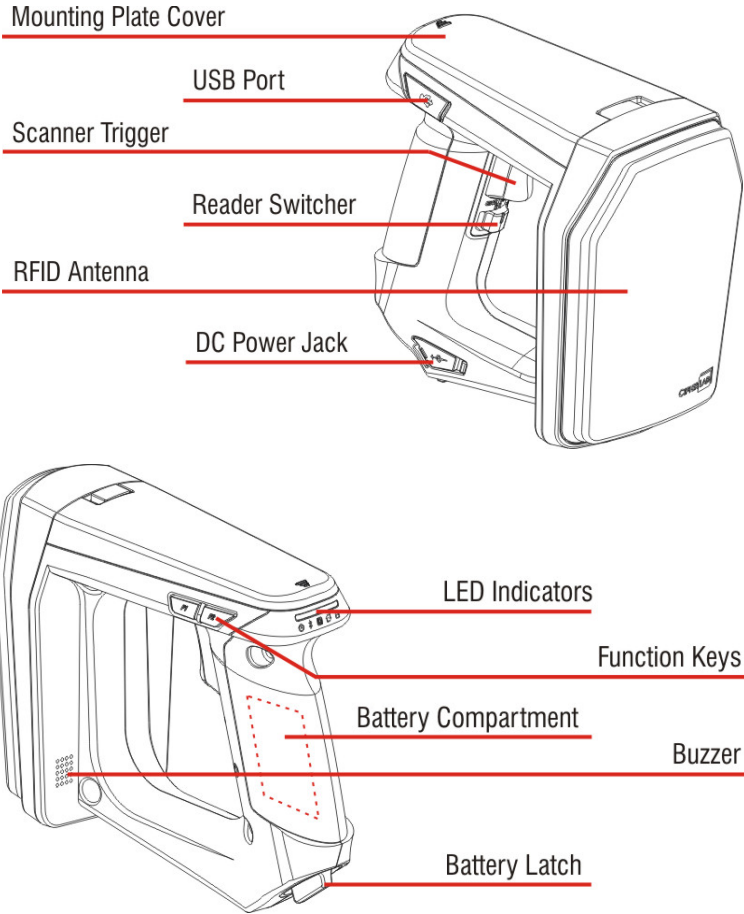
ACCESSORIES

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

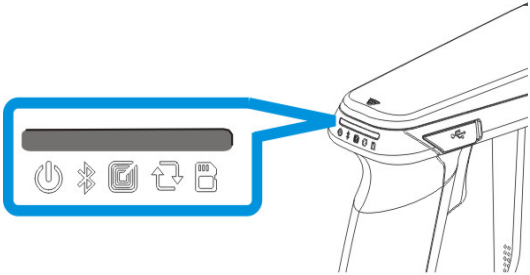
- ▶ Spare Rechargeable Li-ion Battery
- ▶ External Battery Charger
- ▶ Direct USB Cable
- ▶ Power Cable
- ▶ Mobile Computer Mount

QUICK START

OVERVIEW

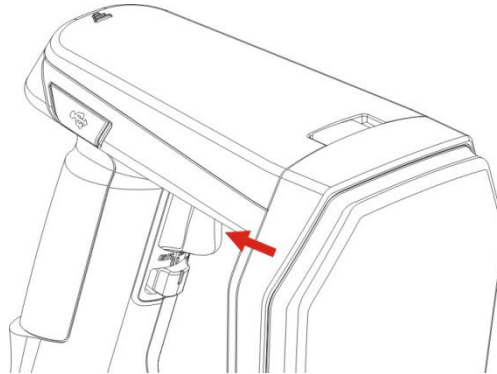


LED Icon	Meaning
	Power
	Bluetooth® Communication
	RFID Tag Access
	Data Transmission
	Reader Indicator/Memory Low



POWER ON RFID READER

Be sure the battery is full charging before you power on the RFID Reader. Press the <Trigger> to power on RFID Reader directly.

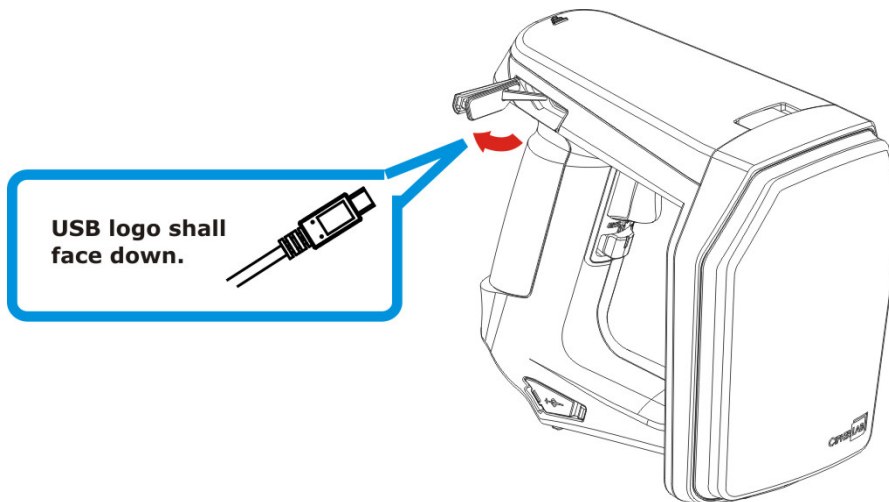


Note: The LED2 will flash blue when you power on the RFID Reader successfully.

CONNECTING USB CABLE

RFID Reader supports a USB port for connecting to the host computer. You can issue commands via an available USB cable.

- 1) Remove the USB port cover.
- 2) Connect the USB communication cable to USB port. (USB logo shall face down)
- 3) Connect the other end of USB cable to the host computer.



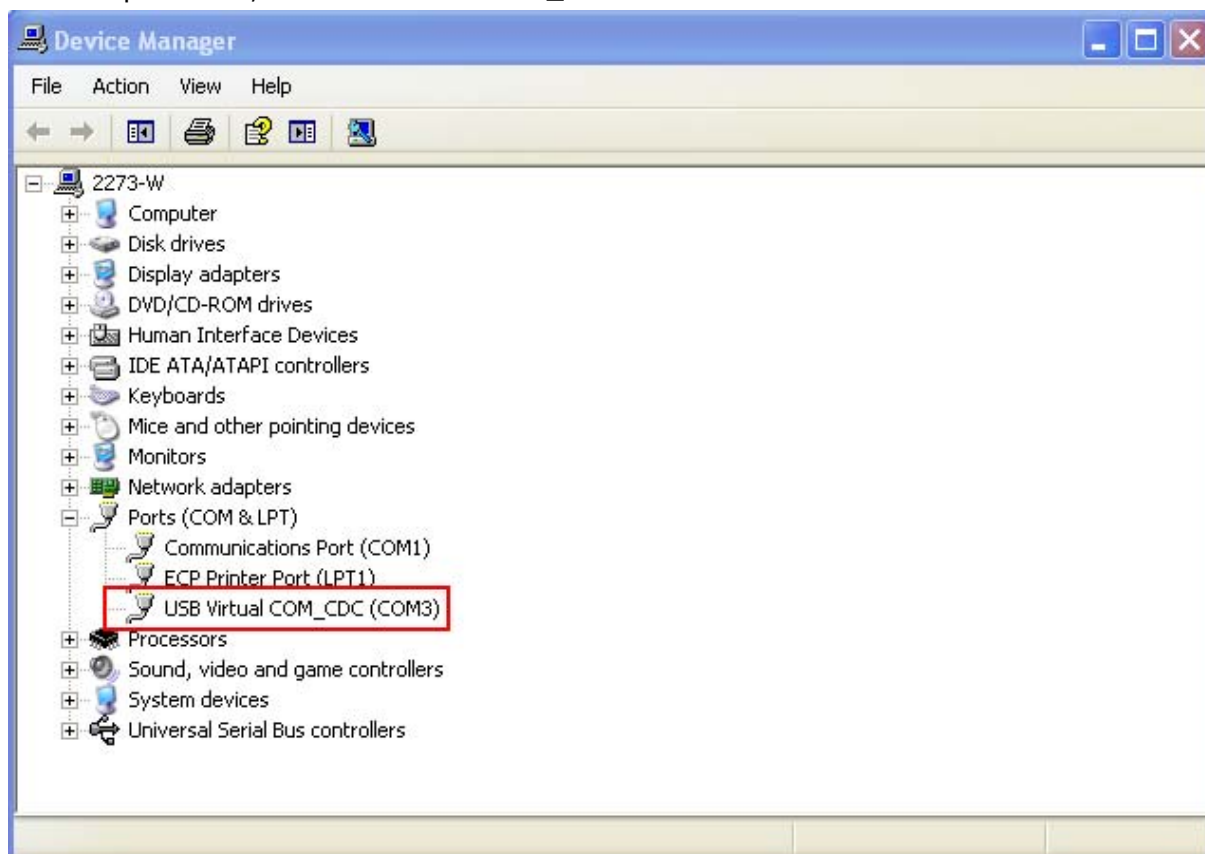
ISSUING COMMANDS VIA USB CONNECTION

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

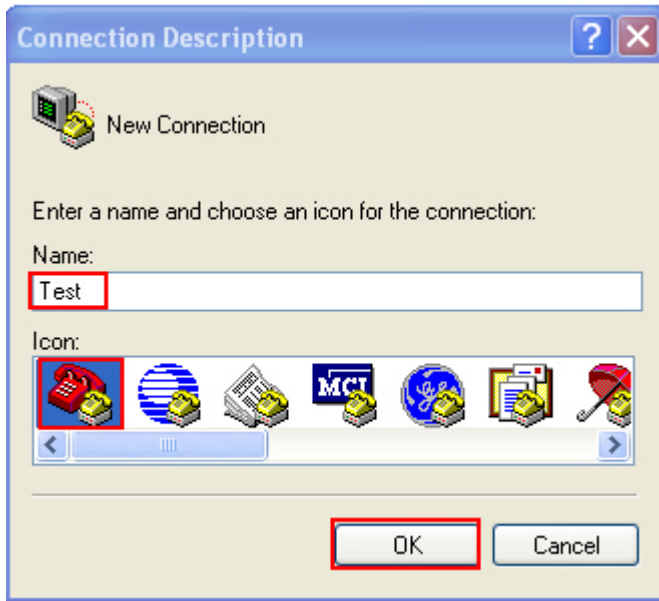
On the host computer:

- 1) 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.

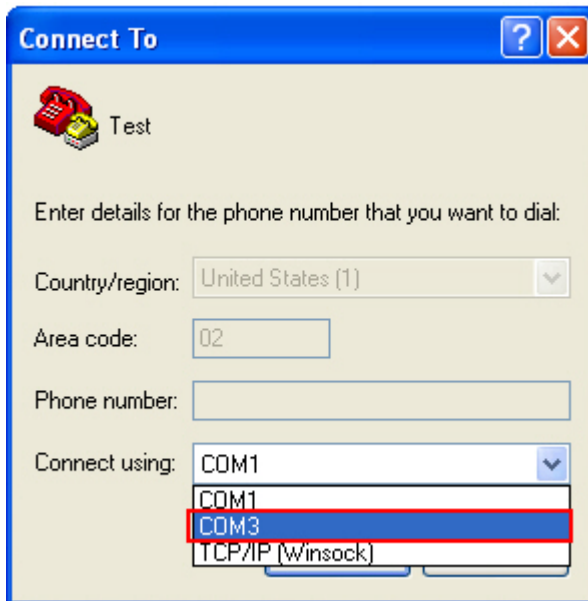


Note: For USB Interface type, the default value is VCOM CDC. Refer to [2.1 USB Interface](#) or [Function Key used for selecting USB type](#) during operation. Before beginning to use RFID Reader, you have to install the available driver on the host computer firstly. The USB virtual COM driver (CDC or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

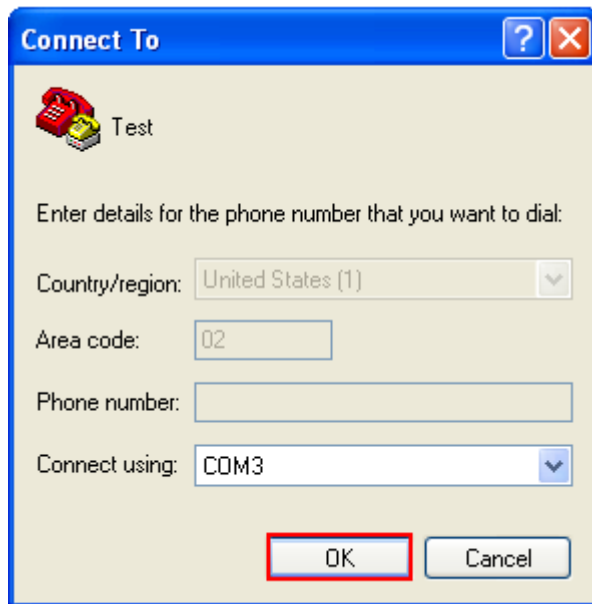
- 2) Use a test application to confirm the connection between host computer and RFID Reader. E.g. HyperTerminal. Open the HyperTerminal on the host computer.
- 3) Enter a name and choose an icon for the connection. Click "OK" to continue.



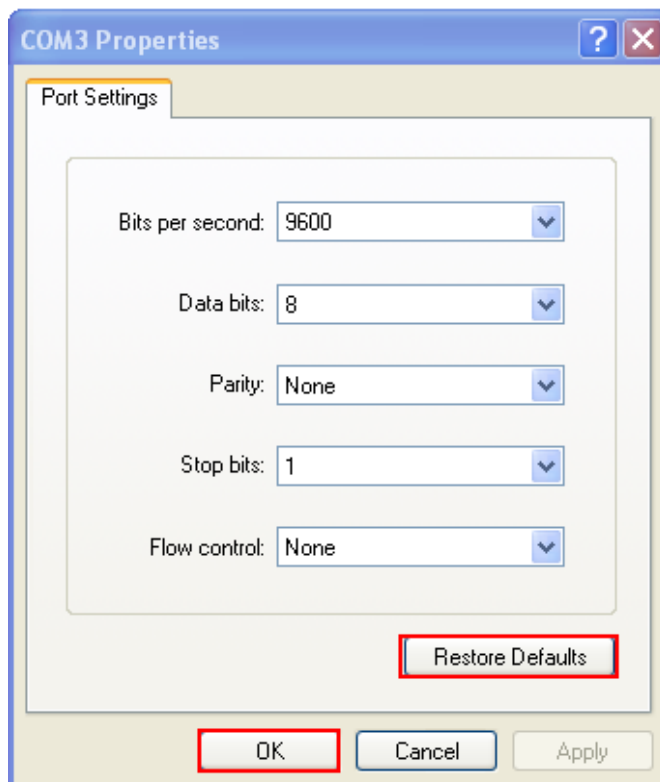
4) According to Step 1 to select the proper connected COM port, e.g. COM3.




5) Click "OK".

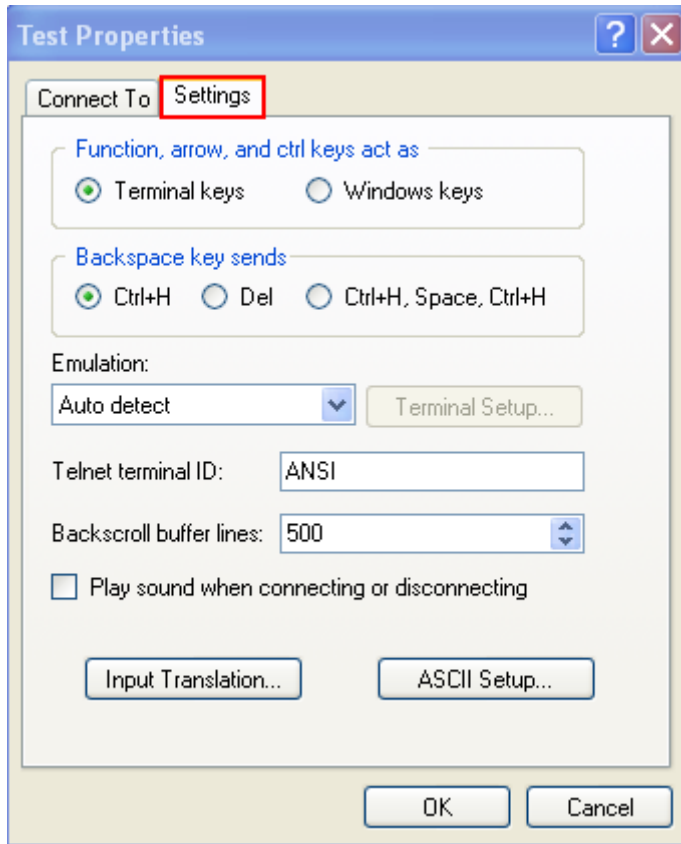


- 6) In the COM3 Properties window, you can click the "Restore Defaults" to use default values for connection. Then, click "OK".

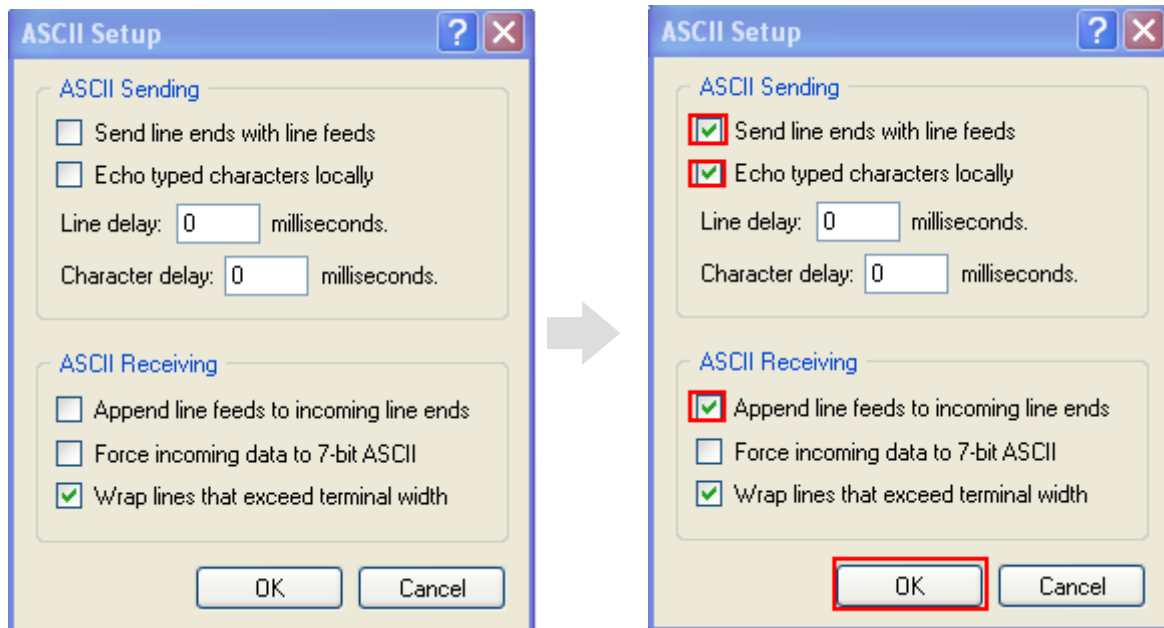


Note: After finishing the COM Properties configuration, the connected icon on the HyperTerminal will be changed from  to  automatically.

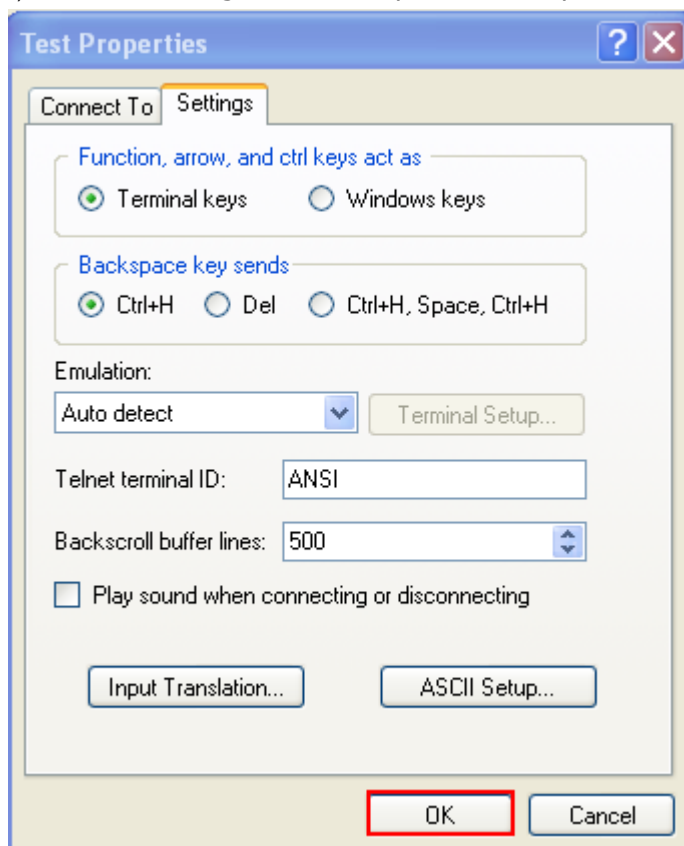
- 7) In the HyperTerminal window, click  on the tool bar to open Properties configuration window, see below. Click "Settings" tab.



- 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".

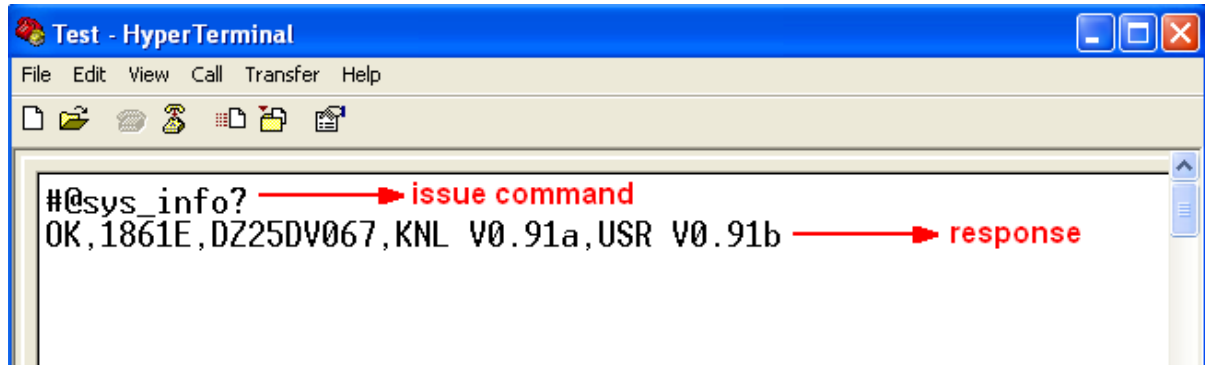


9) After finishing ASCII Setup, in the Properties configuration window, click OK.



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
---------	----------------------

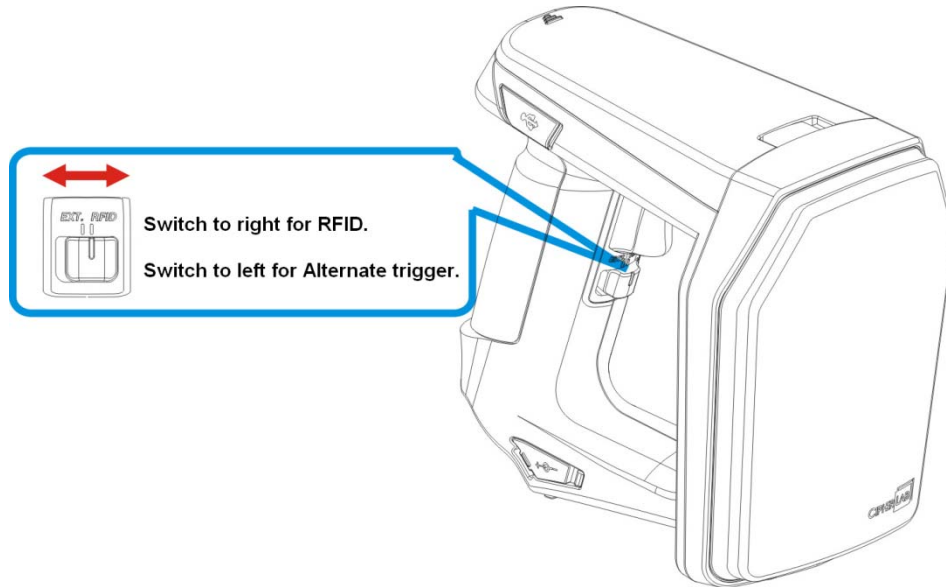
Request	#@sys_ldstbl=[m]\r
	[m]: '0' – Factory Default
	'1' – User Default

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.



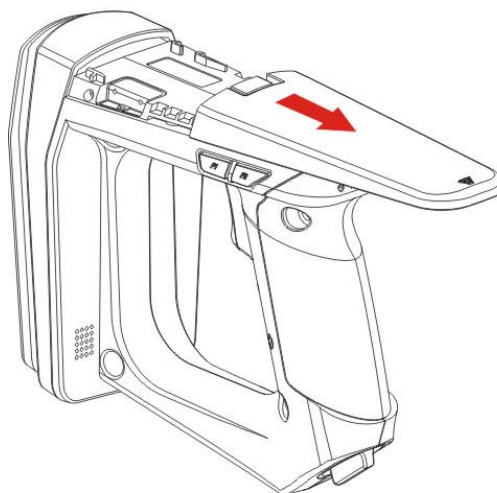
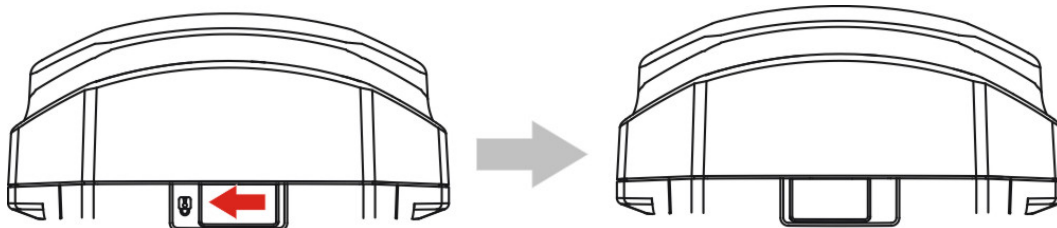
Make sure the reader switcher is set to correct location based on RFID or Alternate mode. For more Alternate mode information, please refer to [Alternate Mode](#).

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.



186XCONFIGURATION

You can configure the RFID Reader by issuing commands or 186xConfiguration Utility.

For HyperTerminal:

You may run HyperTerminal.exe on the host computer to send commands to RFID Reader via USB Cable. The commands are not case sensitive. The example command common format is showed as below:

Example:

```
#@sys_time?<CR>
```

→ Get the system time information.

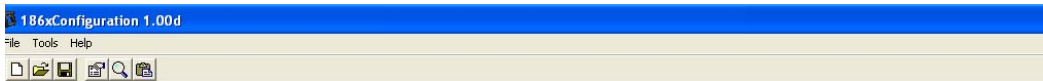
```
#@sys_time=[Y],[M],[D],[h],[m],[s]<CR>
```

→ 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.

For 186xConfiguration Utility:

CipherLab supports a Windows®-based Software Utility to allow you to configure RFID Reader easily. For more information, refer to 186xConfiguration User Guide.



===== 186x DEVICE INFORMATION =====

[Device Type]	NA
[Serial Number]	NA
[Kernel Version]	NA
[User Version]	NA
[BT_MACID]	NA

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 - HyperTerminal
File Edit View Call Transfer Help
#@sys_info?
OK,
MODEL: 1861E
S/N: DZ25DV042
KNL_VER: V1.00
STD_VER: V1.00
BT_MACID: 00:d0:17:a8:ff:d5
```

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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). You can power off the RFID Reader by pressing both <F1>+<F2> keys or issuing command on the host computer described below.

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_off\r

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

#@sys_tpoﬀ?[m]\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

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 prevent the 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

1.1.3 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.

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

#@sys_txben=[m]\r

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

#@sys_txbdly?\r

Purpose Get Transmission Buffer 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 Transmission Buffer 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 key. Refer to [1.4.2 Temporary Mode](#).

#@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

The RFID Reader will respond with two short beeps (high-low tone) as a warning when sending 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
Request	#@sys_memup\r OK,[m]\r [m]: Data string
Response	OK\r 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.

Note: The *bluetooth*[®] connection will be broken once entering the memory mode.

Command:**#@sys_memclr\r**

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

Example:

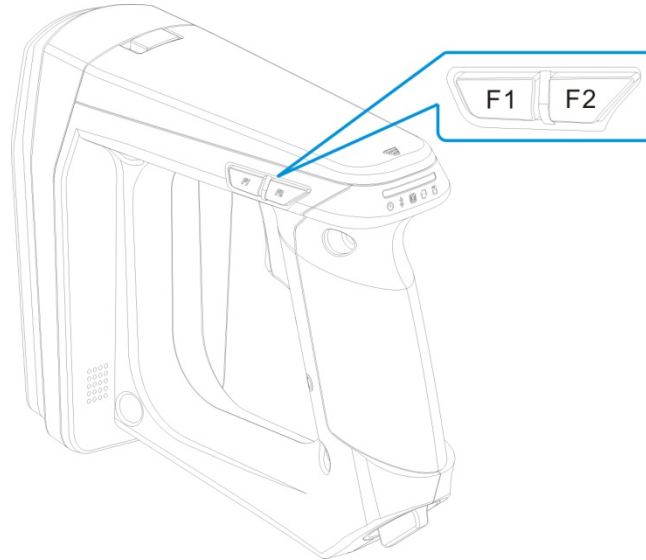
```
Test - HyperTerminal
File Edit View Call Transfer Help

#@sys_memsize? → show the memory size at present
OK,4072
#@sys_memen=1 → enter memory mode
OK
#@sys_memdly=4 → set the delay time of data transmission to 2 sec.
OK
#@sys_memup
1. 2012-04-18 30003430333130303132303030304221 } 2 sec.
2. 2012-04-18 30003430333130303132303030304221 } 2 sec.
3. 2012-04-18 30003430333130303132303030304221 } 2 sec.
4. 2012-04-18 30003430333130303132303030304221 } 2 sec.
5. 2012-04-18 30003430333130303132303030304221 } 2 sec.
6. 2012-04-18 30003430333130303132303030304221 } 2 sec.
OK
#@sys_memclr → clear memory size
OK
```

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

1.3 FUNCTION KEY










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



Keys or Combination	Action
<F1>	Switch status LED or Process configuration
<F2>	Save the PIN CODE (<i>Bluetooth</i> [®] pairing)
<F1>+<F2>	Switch among status LED modes
<F1>+<F2>	Power off system
<Trigger>	<ul style="list-style-type: none"> ▶ Press <Trigger> once to scan ▶ Select Number 1~5 (<i>Bluetooth</i>[®] pairing)
<F1>+<Trigger>	Select number 6~0 (<i>Bluetooth</i> [®] pairing)
<F2>+<Trigger>	<ul style="list-style-type: none"> ▶ Send the PIN code (<i>Bluetooth</i>[®] pairing) ▶ Firmware upgrade, press <F2>+<Trigger> for 3 seconds to power off system
<F1>+<F2>+<Trigger>	Cancel the Pairing (<i>Bluetooth</i> [®] pairing)
Reader Switcher	Used to switch between RFID Reader and External Reader (terminal)

PIN CODE Input for *Bluetooth*[®] Pairing:

Number Input	Key Operation	LEDs Status
--------------	---------------	-------------

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

Note: Here <F2> is specified for saving the PIN CODE. <F2> + <Trigger> is specified as Enter to send the PIN CODE for pairing.

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 NORMAL MODE

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	<ul style="list-style-type: none"> ▶ 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- <i>Bluetooth</i> [®] 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 <i>Bluetooth</i> [®] 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

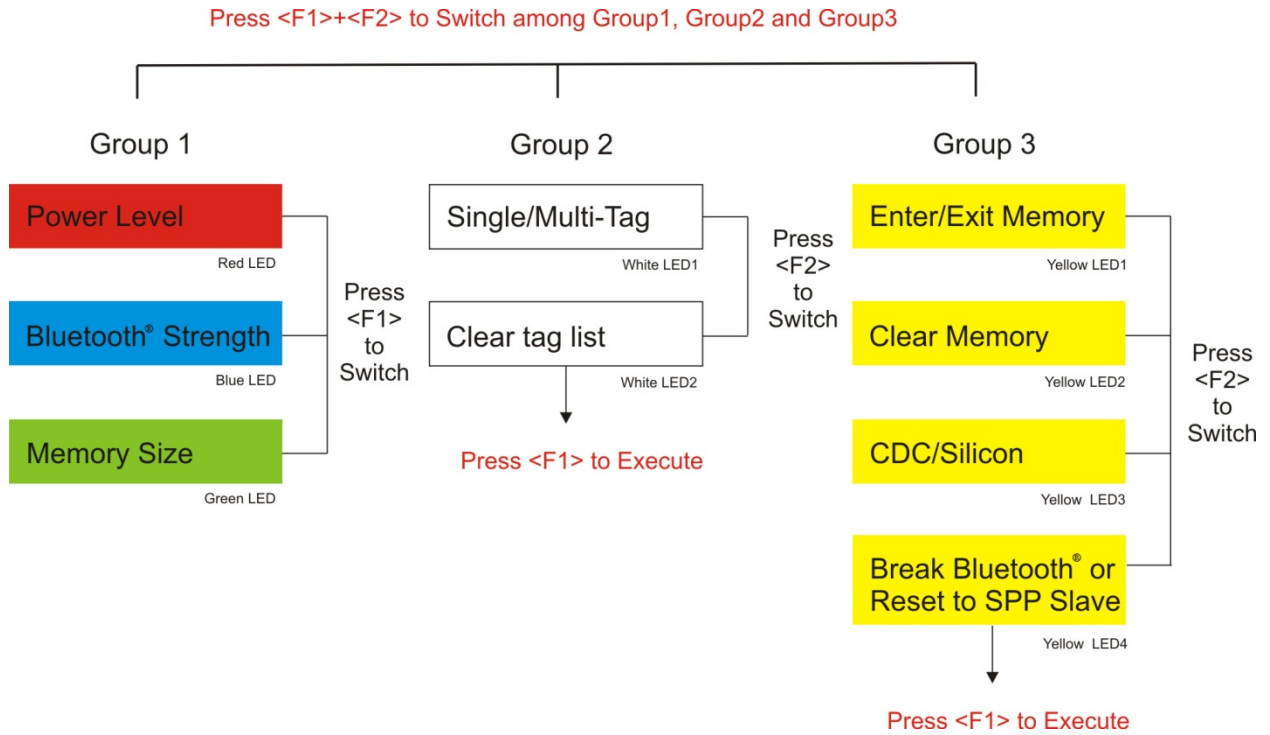
Purpose	Get Good Read LED Duration
Response	OK,[m]\r (Default m= '4') [m]: Duration='1' ~ '254' ERR,[code]\r

#@sys_leddu=[m]\r

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

1.4.2 TEMPORARY MODE

In this mode, combine with five LEDs and function keys, the LED status can be classified into 3 Groups that are described below, also refer to [1.3 Function Key](#).



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 (Green LED1): LED1 LED2 LED3 LED4 LED5

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)



▶ Bluetooth® Strength (RSSI) (Blue LED)



▶ Free Memory Size (Green LED)

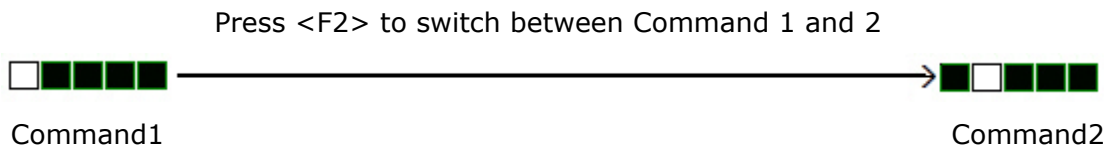


Note: Press <F1> to switch to *Bluetooth*[®] Strength showing upon a *Bluetooth*[®] connection successfully.

Group2 (White LED1): LED1 LED2 LED3 LED4 LED5

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.
- ▶ Command2: Clear repeated tag list for Multi-Tag Scan Mode.



Executing:

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

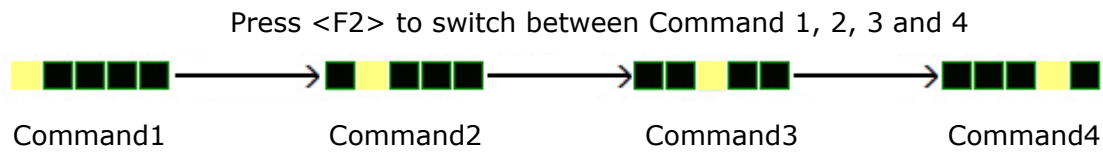
Group3 (Yellow LED1): LED1 LED2 LED3 LED4 LED5

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: Enter/Exit memory mode.
- ▶ Command2: Clear data memory.
- ▶ Command3: Select USB virtual COM driver (CDC or Silicon).

Note: Power on RFID Reader, the default value for USB Virtual COM driver is CDC. Press <F1> one time upon command3 to switch to Silicon type if you are using Silicon 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.



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](#).

1.4.3 BLUETOOTH[®] PAIRING MODE

For *Bluetooth*[®] connection or numeric input required situations; you have to combine Function key and <Trigger> to input numeric code. Refer to [1.3 Function Key](#).

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



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	<ul style="list-style-type: none"> ▶ Good read, with Green LED3 on-off ▶ Enter PIN code ▶ Switch among status LED mode
One short beep, low tone	<ul style="list-style-type: none"> ▶ Select PIN code ▶ Multi_Tag Mode: Get a repeated tag (Default: Disable)
One long beep, low tone	<ul style="list-style-type: none"> ▶ Fail to send data or response <ul style="list-style-type: none"> - Transmit buffer full - Transmit buffer is disabled while <i>Bluetooth</i>[®] is not connected or out of range. ▶ Command fail
Two short beeps, high-low tone	<ul style="list-style-type: none"> ▶ 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	<ul style="list-style-type: none"> ▶ Command success ▶ Send PIN code ▶ Running out of transmit buffer
Two short beeps, high tone	<ul style="list-style-type: none"> ▶ Low battery alarm ▶ Clear PIN code ▶ Power off
Three short beeps, tone ascending from low to high	<ul style="list-style-type: none"> ▶ <i>Bluetooth</i>[®] connection is established ▶ <i>Bluetooth</i>[®] connection is resumed, with LED2 flashing blue
Three short beeps, tone ascending from high to low	<i>Bluetooth</i> [®] 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 - HyperTerminal
File Edit View Call Transfer Help
#@sys_time?
OK,12,05,10,10,36,05 → Date=2012/5/10, Time=10:36 05
#@sys_time=12,06,20,12,50,00 → set system Date
OK                                     and Time to
                                     2012.6.20 12:50 00
#@sys_time?
OK,12,06,20,12,50,21
  
```


COMMUNICATION INTERFACE

Follow the sections below for output interfaces supported to establish a WPAN connection with RFID Reader.

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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 [1.4.2 Temporary Mode](#).

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

<i>Bluetooth</i> [®] 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	User-defined table
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]\rPurpose Set *Bluetooth*[®] HID Parameter

Response OK\r\r

ERR,[code]

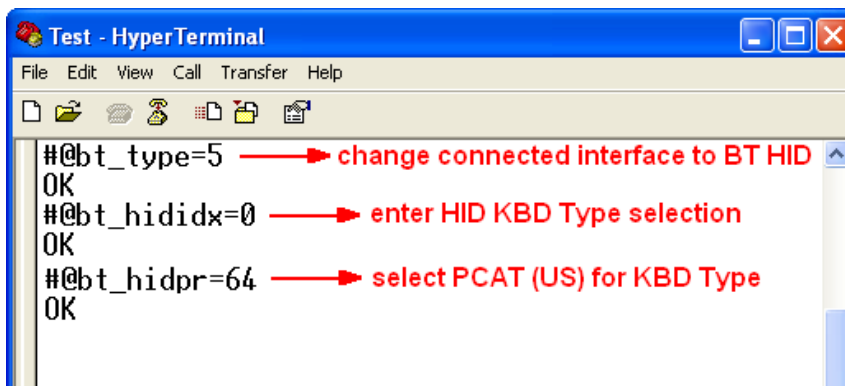
#@bt_hidpr?\r

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:



2.3.2 KEYBOARD SETTINGS

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

ALPHABETS LAYOUT

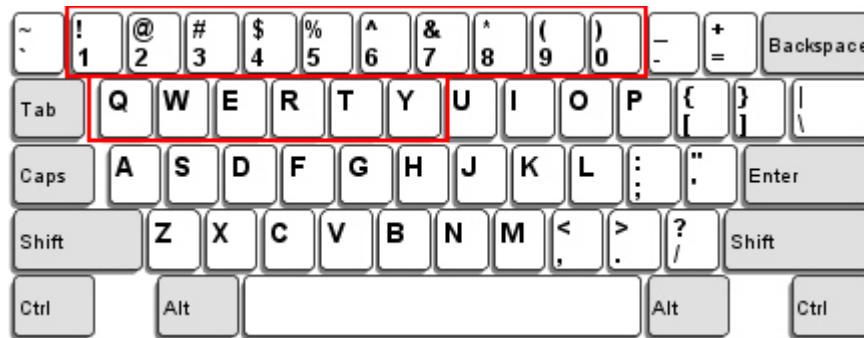
By default, the alphabets layout is set to normal mode, also known as the standard English layout. Select French or German keyboard layout if necessary. The RFID Reader will make adjustments when sending the "A", "Q", "W", "Z", "Y", and "M" characters according to this setting.

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

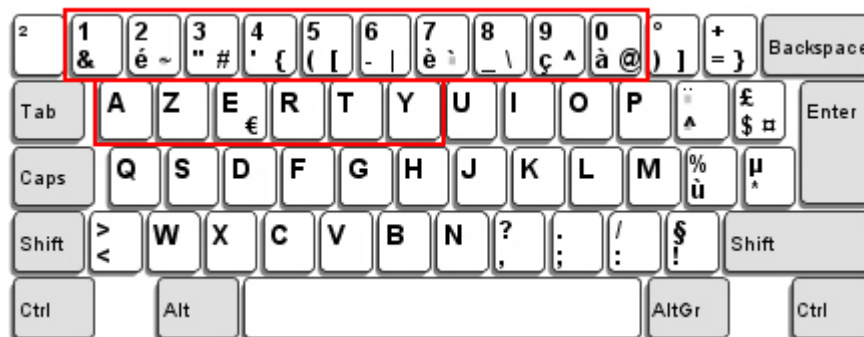
QWERTY layout, which is normally used in western countries.



- ▶ 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

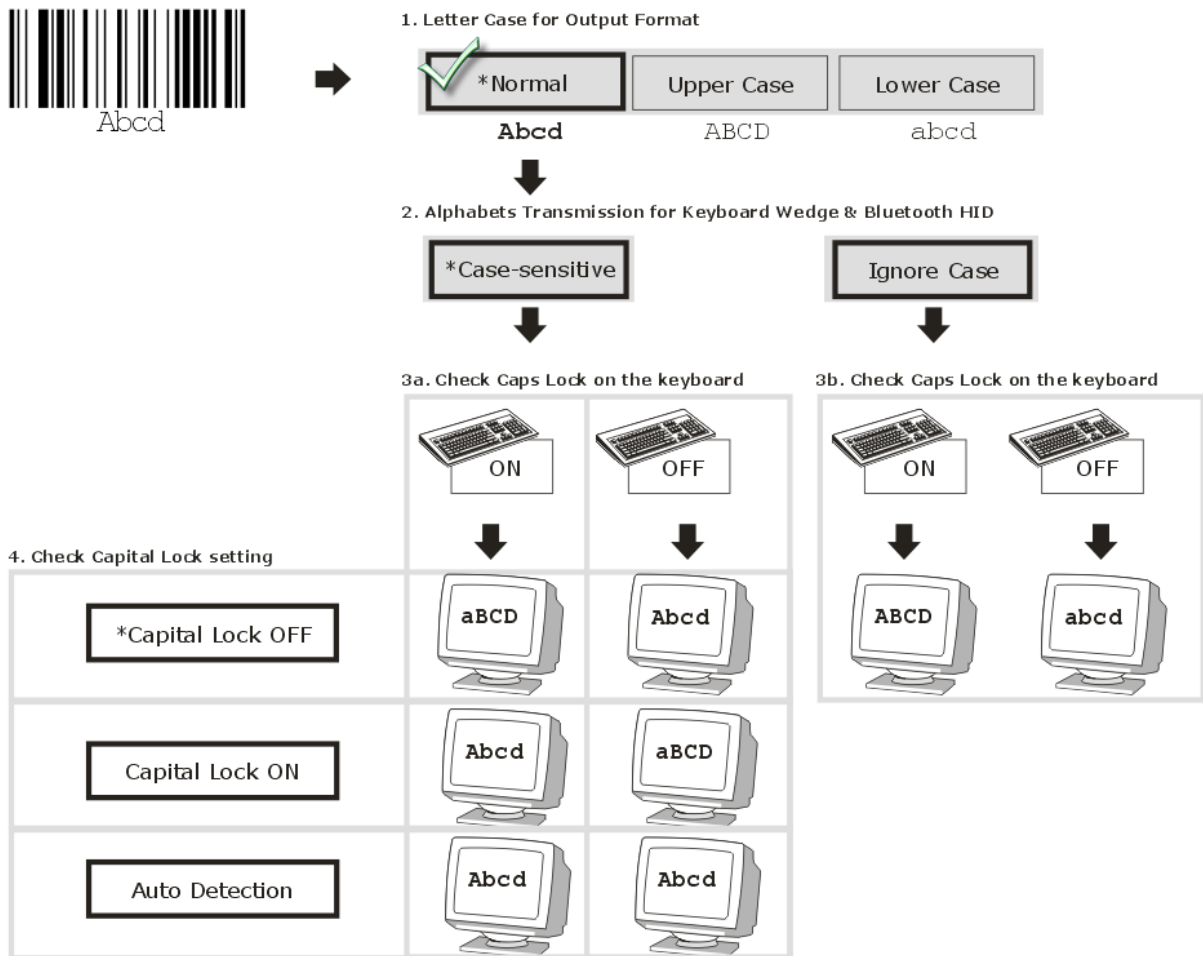
In order to send the alphabets with correct case, the RFID Reader needs to know the status of Caps Lock on the keyboard. Incorrect settings may result in reversed case of the alphabets being transmitted.

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.

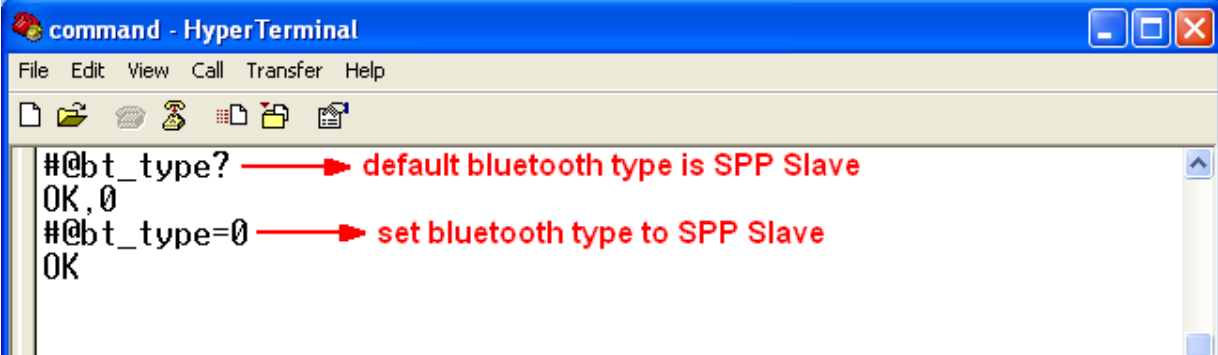
Options	Parameter	Description
Batch Processing (Default)	'0'	Process data by Batch.
By Character	'1'	Process data by Character

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 - HyperTerminal
File Edit View Call Transfer Help
#@bt_type? —————> default bluetooth type is SPP Slave
OK, 0
#@bt_type=0 —————> set bluetooth type to SPP Slave
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

Configure the output interface to SPP Master by issuing the “bt_type=” and to parameter ‘3’.

How to connect with the target machine?

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

Command:

#@bt_target?\r

Purpose	Get <i>Bluetooth</i> ® Target Machine
Response	OK,[m],[n]\r [m]: <i>Bluetooth</i> ® 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 <i>Bluetooth</i> ® Target Machine
Response	OK ERR,[code]

Exit SPP Master Mode

To stop such re-connection, you can issue the “#@bt_reset” or “#@sys_ldstbl=” 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 HID VIA 3610

For USB 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 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 <i>Bluetooth</i> [®] Target Machine
Response	OK,[m],[n]\r [m]: <i>Bluetooth</i> [®] 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 <i>Bluetooth</i> [®] Target Machine
Response	OK\r ERR,[code]\r

Example:

```

Test - HyperTerminal
File Edit View Call Transfer Help
#@bt_target?
OK,0,000000000000
#@bt_target=1.BS9001346
OK
set target to 3610 with S/N:BS9001346

```

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 HID & SELECT KEYBOARD TYPE

When USB 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 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	3610 User-defined table
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]\rPurpose Set *Bluetooth*[®] 3610 Parameter

Response OK\r

ERR,[code]\r

#@bt_aclpr?\rPurpose Get *Bluetooth*[®] 3610 Parameter

Response OK,[m]\r

[m]: Parameter

ERR,[code]\r

#@bt_aclpr=[m]\rPurpose 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 KEYBOARD SETTINGS

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

ALPHABETS LAYOUT

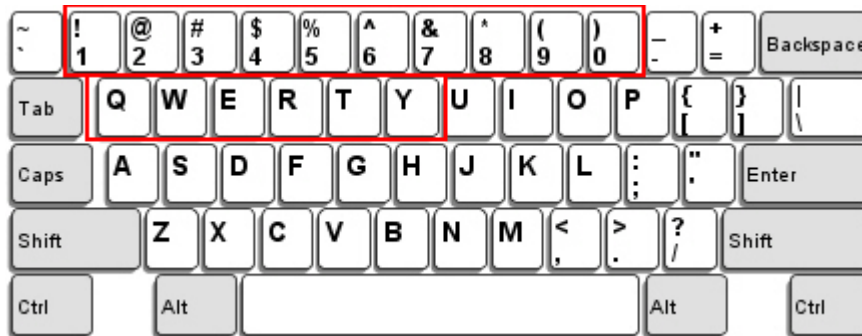
By default, the alphabets layout is set to normal mode, also known as the standard English layout. Select French or German keyboard layout if necessary. RFID Reader will make adjustments when sending the "A", "Q", "W", "Z", "Y", and "M" characters according to this setting.

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

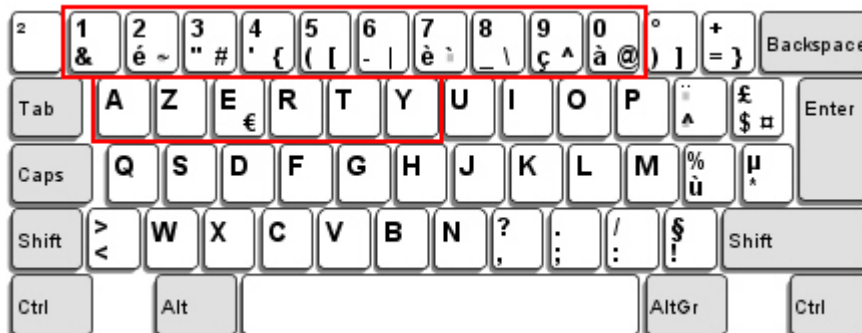
QWERTY layout, which is normally used in western countries.



- ▶ 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

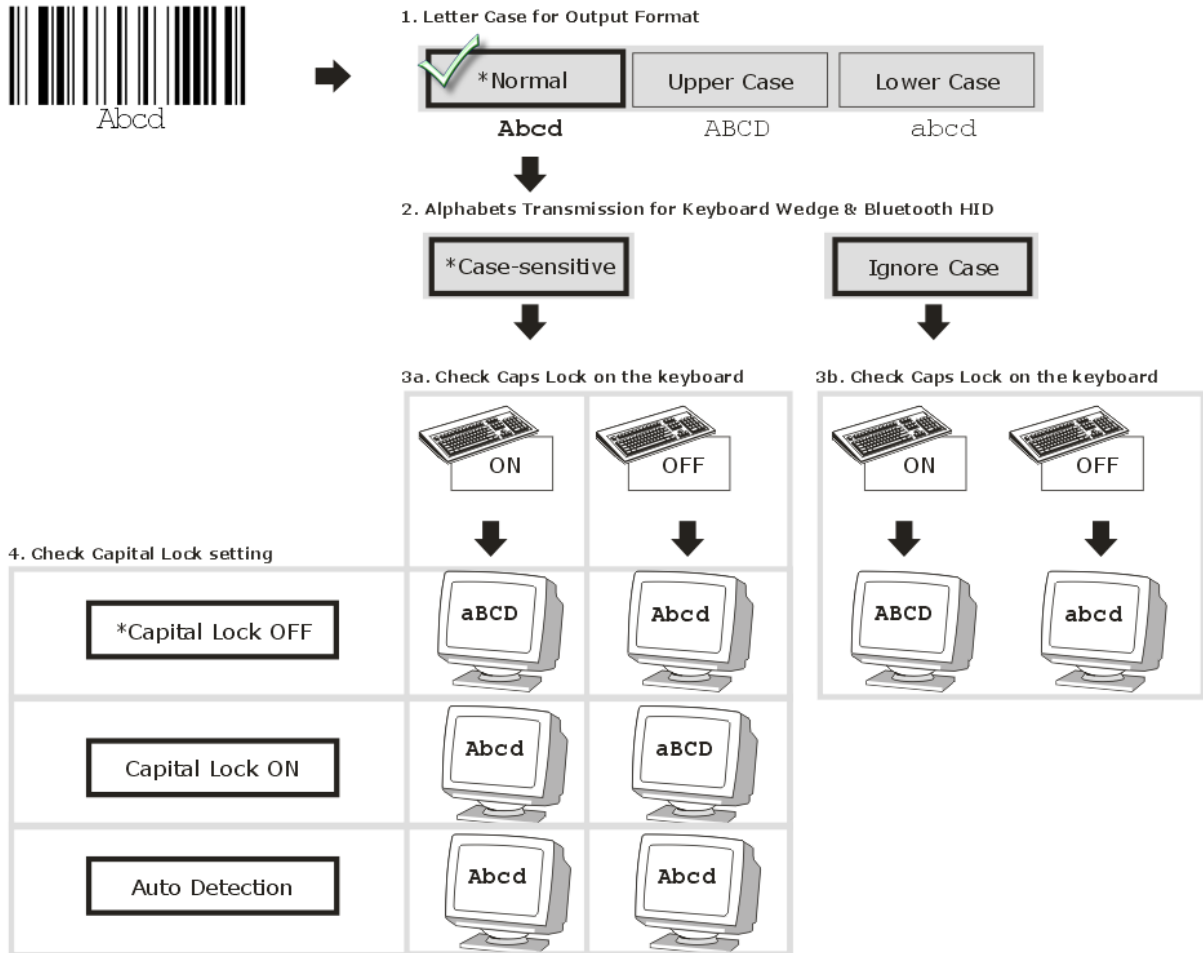
In order to send the alphabets with correct case, RFID Reader needs to know the status of Caps Lock on the keyboard. Incorrect settings may result in reversed case of the alphabets being transmitted.

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

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

2.7 USB VCOM VIA 3610

Connect 3610 to the USB port of host computer, and then connect RFID Reader to 3610 via *Bluetooth*[®]. Configure the output interface to USB VCOM via 3610 by issuing the “#@bt_type=” command to parameter ‘6’. You may run HyperTerminal.exe on the host computer to view and capture the data transmission from RFID Reader.

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*[®] type and another is the serial No. of 3610.

Command:

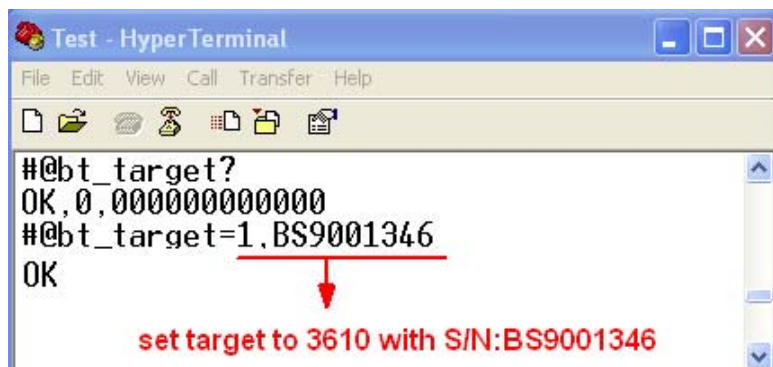
#@bt_target?\r

Purpose	Get <i>Bluetooth</i> [®] Target Machine
Response	OK,[m],[n]\r [m]: <i>Bluetooth</i> [®] 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 <i>Bluetooth</i> [®] Target Machine
Response	OK\r ERR,[code]\r

Example:



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 before installing new ones!

For a COM Port connection, you have to configure the USB interface type firstly by “#@usb_type=” command. Wrong USB interface type configured will make disconnection. Refer to [2.1 USB Interface](#).

Options	Parameter	Description
VCOM - CDC (Default)	'127'	Use CDC for a virtual com output interface.
VCOM - Silicon	'128'	Use Silicon for a virtual com output interface.

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
<i>Bluetooth</i> [®] HID	2.3 <i>Bluetooth</i>[®] HID
<i>Bluetooth</i> [®] SPP (Slave/Master)	2.4 <i>Bluetooth</i>[®] SPP Slave , 2.5 <i>Bluetooth</i>[®] SPP Master

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



Interface Option	Reference
USB HID via 3610	2.6 USB HID via 3610
USB VCOM via 3610	2.7 USB VCOM via 3610

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3.3 Disconnection.....	92

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:



The screenshot shows a HyperTerminal window titled "Test - HyperTerminal". The window contains the following text:

```
#@BT_TYPE=3 —————> change connected interface
OK
#@BT_TYPE? —————> confirm used interface
OK, 3
```

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 <i>Bluetooth</i> [®] Parameter
Response	OK,[m]\r (Default m= '1')
	[m]: Discoverable
	'0' - Disable
	'1' - Enable
	ERR,[code]\r

#@bt_visible=[m]\r

Purpose	Set <i>Bluetooth</i> [®] Parameter
Response	OK\r
	ERR,[code]\r

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

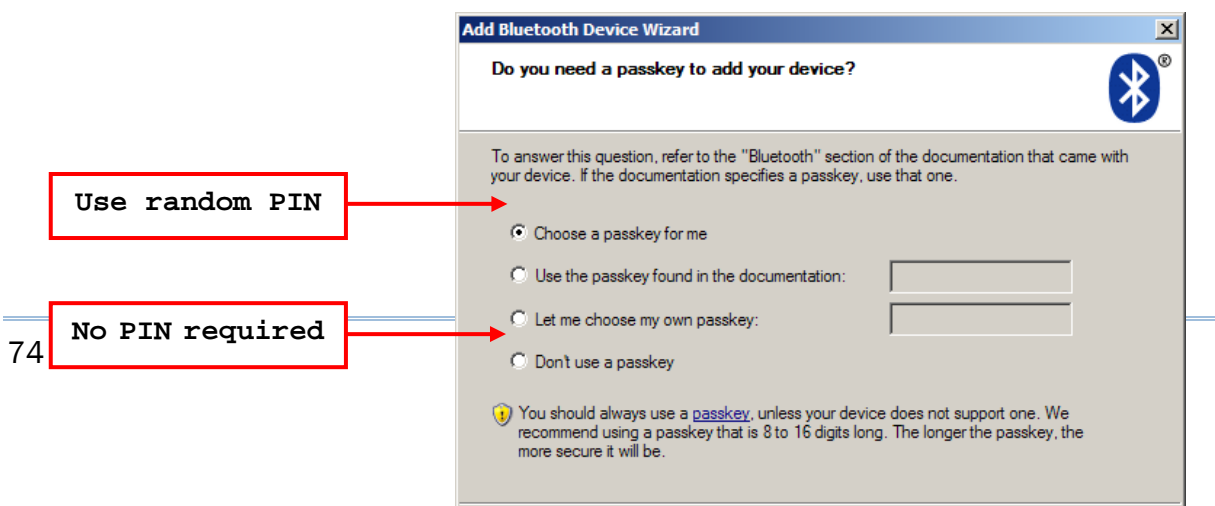
Command:

#@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 [1.4.3 Bluetooth[®] Pairing Mode](#).

Bluetooth Simple Security Pairing Mode

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 <i>Bluetooth</i> [®] Parameter
Response	OK\r ERR,[code]\r

Note: SSP feature is only for iOS currently.

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.

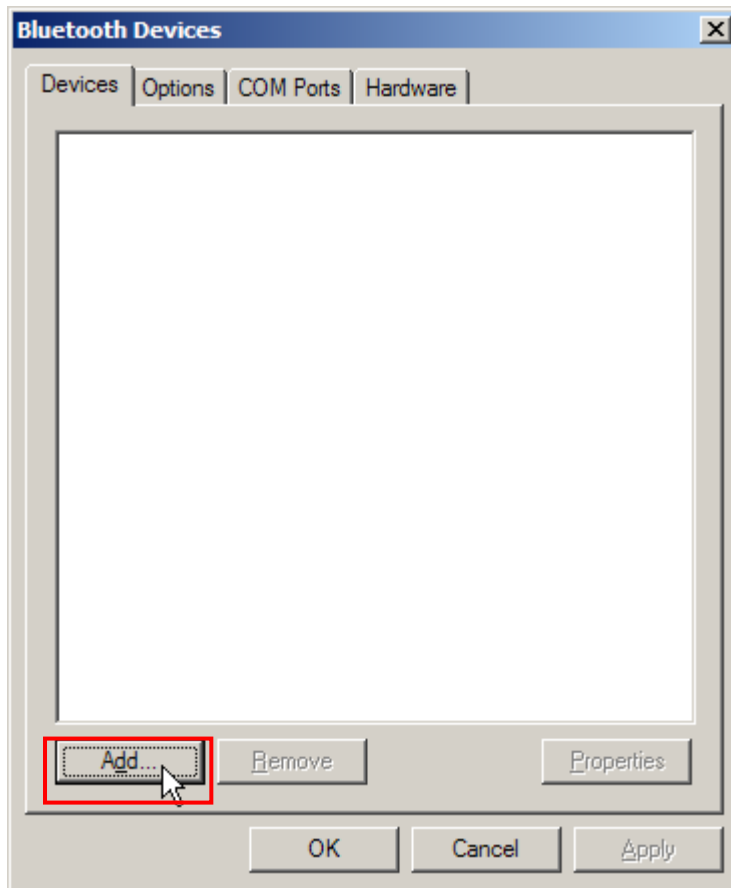
BLUETOOTH[®] HID

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.

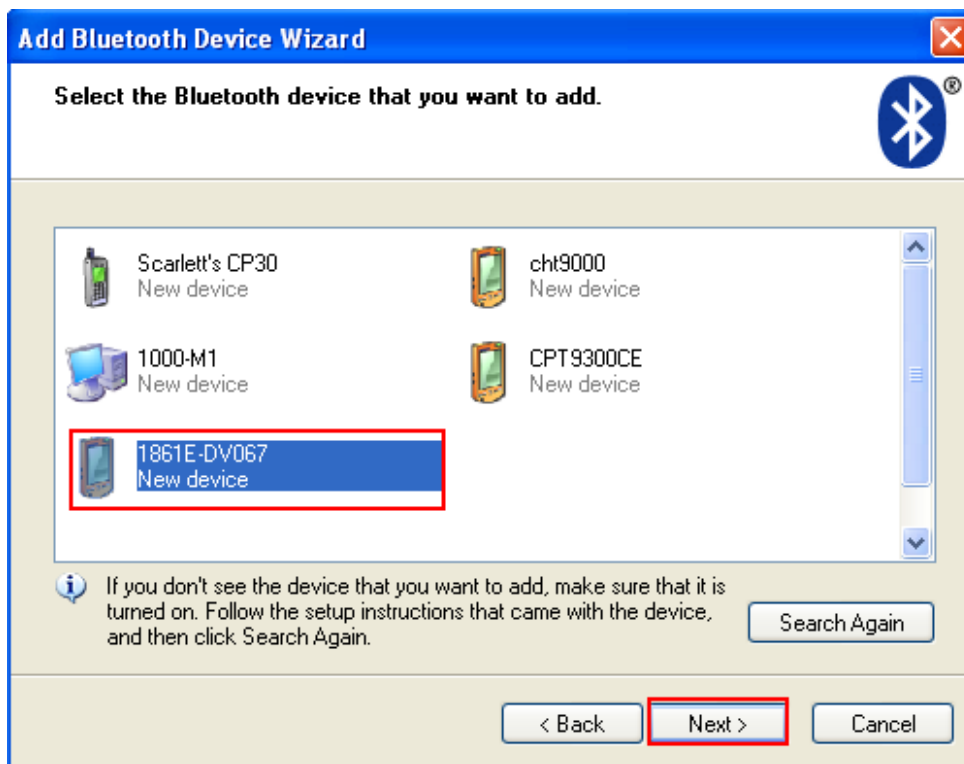


- 4) Turn on RFID Reader with correct WPAN settings, such as select *Bluetooth*[®] SPP Slave or HID, broadcasting enabled, authentication enabled, and PIN code specified, etc if you want to use a passkey. Select "My device is set up and ready to be found" check box on the "Add *Bluetooth*[®] Device Wizard"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

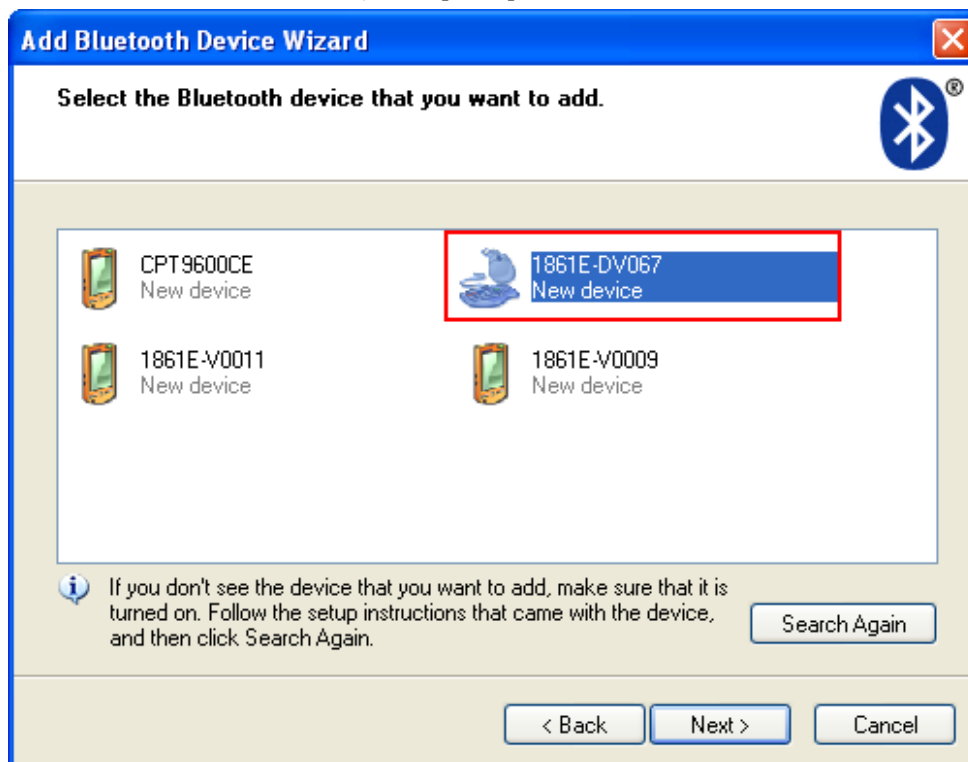


- 6) Wait for a few seconds for the Wizard to search available devices nearby. All available devices will appear on the search window. Select the device (e.g. RFID Reader) that you want to connect. If the target device does not appear on the list, click [Search Again] to refresh the list. The RFID Reader 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.

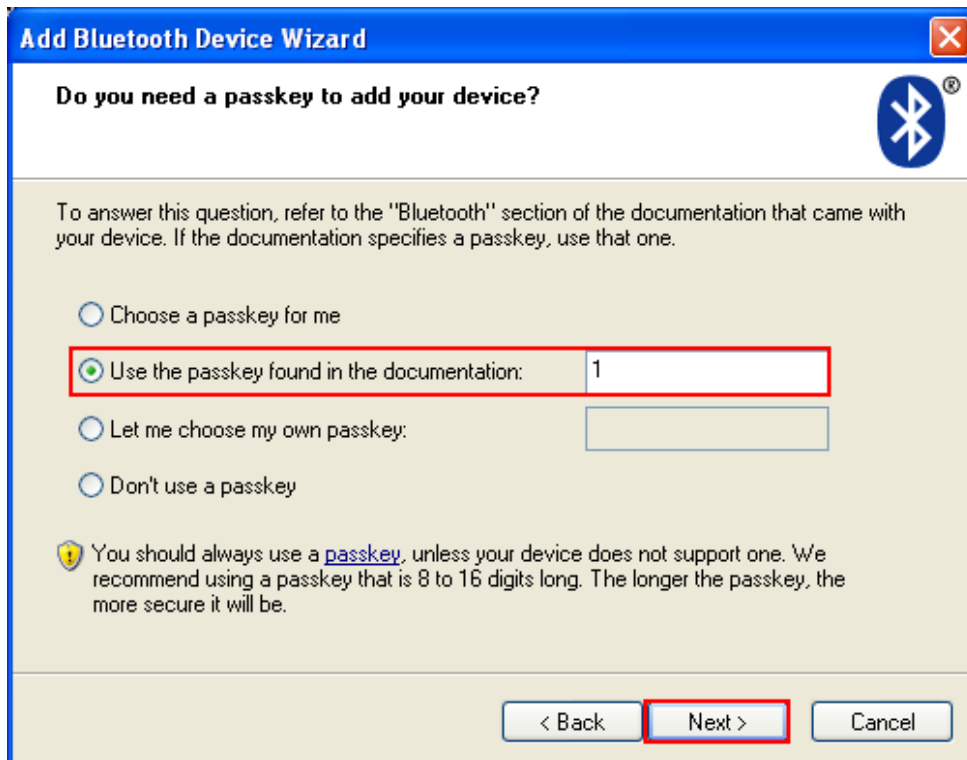
- 7) See SPP Slave connection below, click [Next].



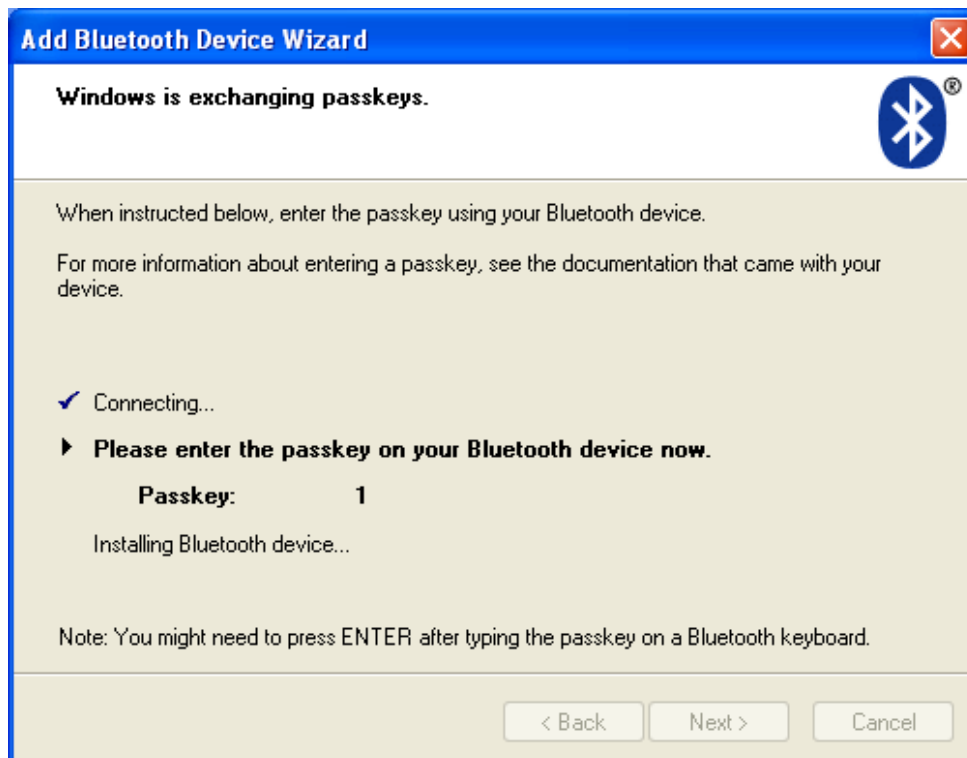
See BT HID connection below, click [Next].



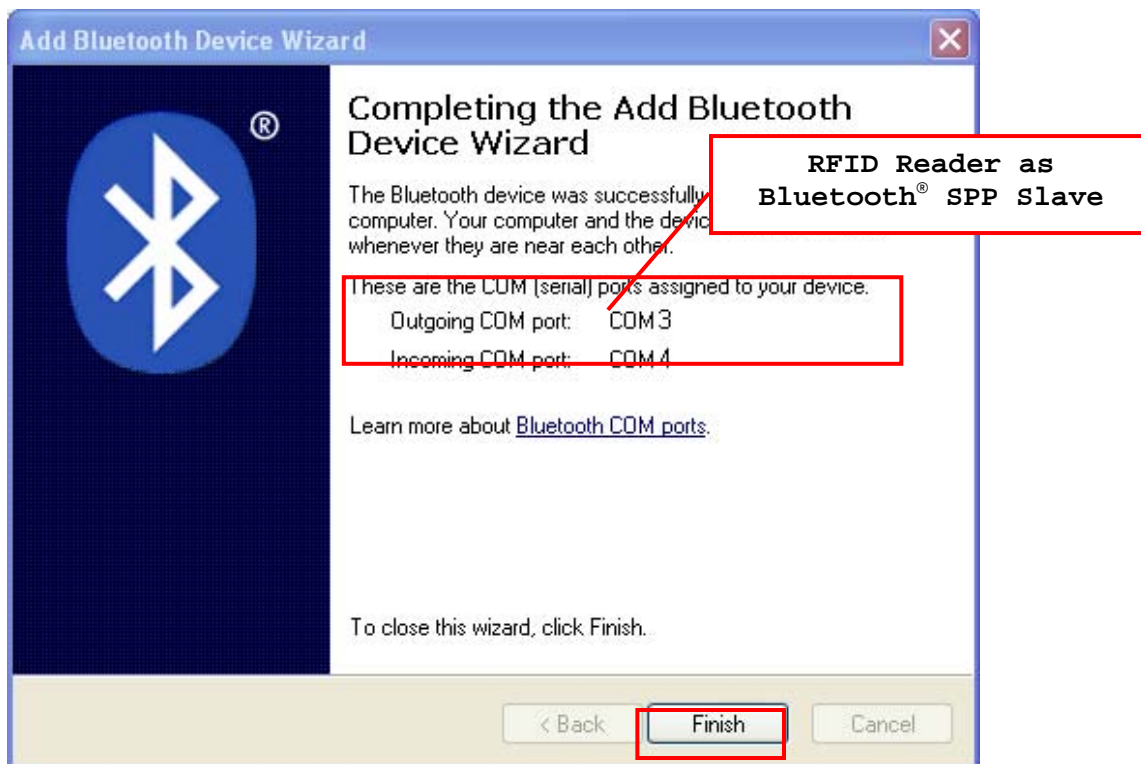
- 8) Enter the passkey for authentication, which must be exactly the same as configured for RFID Reader. Click [Next].



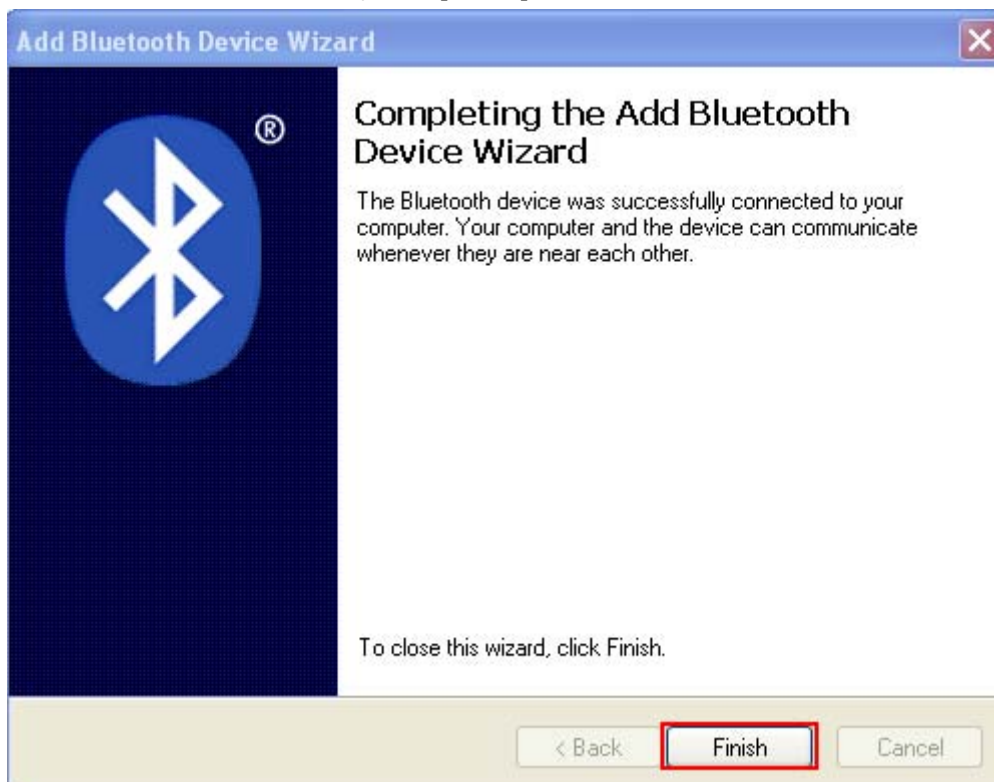
- 9) Wait for a few seconds for Windows to confirm the Passkey.



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

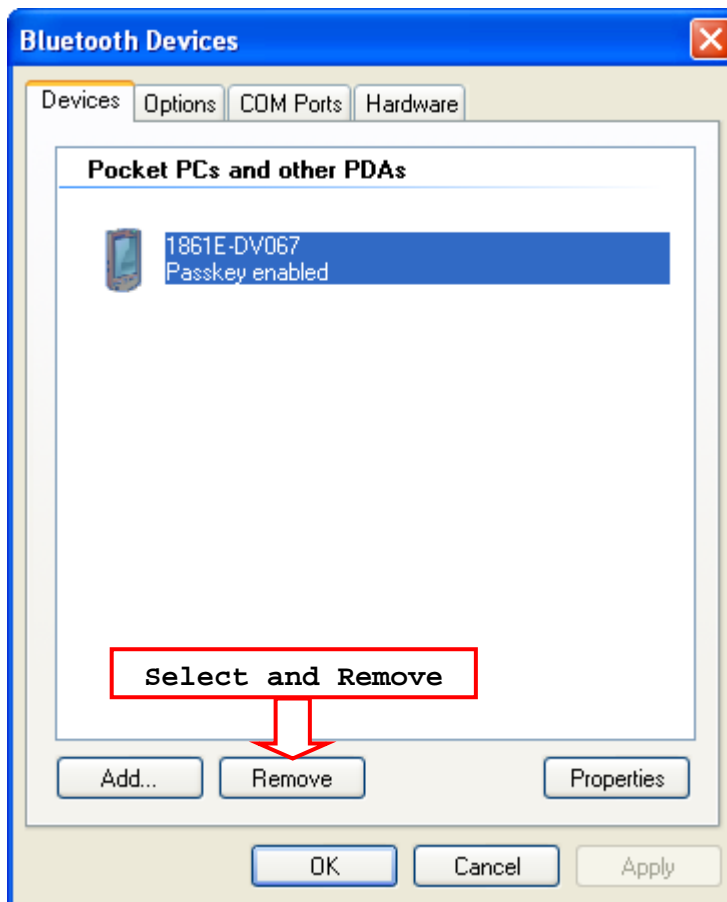


See BT HID connection below, click [Finish].



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.



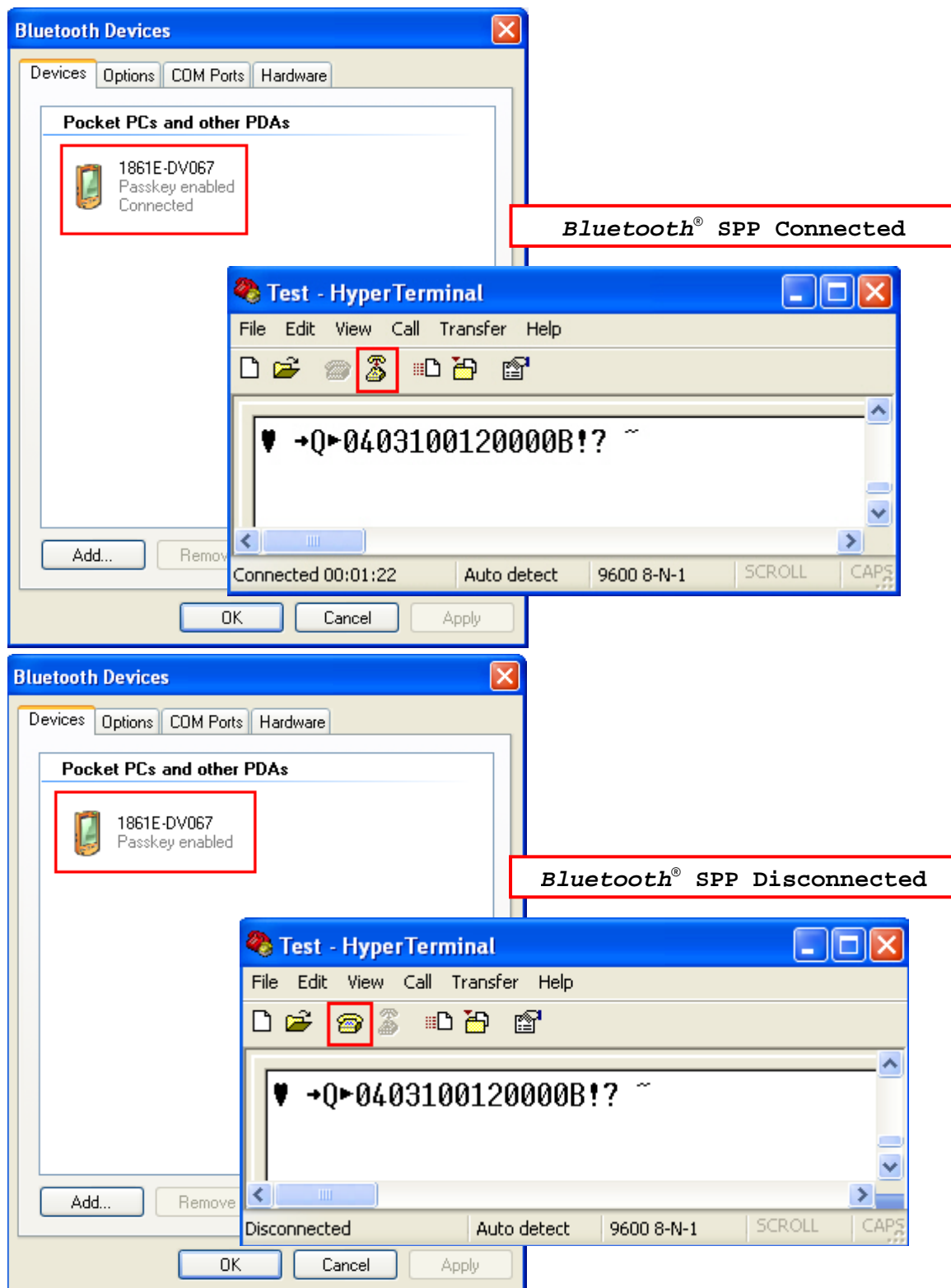
Note: When any changes are made to authentication and PIN code on the RFID Reader, or you want to change RFID Reader to use *Bluetooth*[®] HID, it is suggested to remove the connected RFID Reader from the paired device list (called unpairing) firstly and go through the whole process to re-establish the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

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

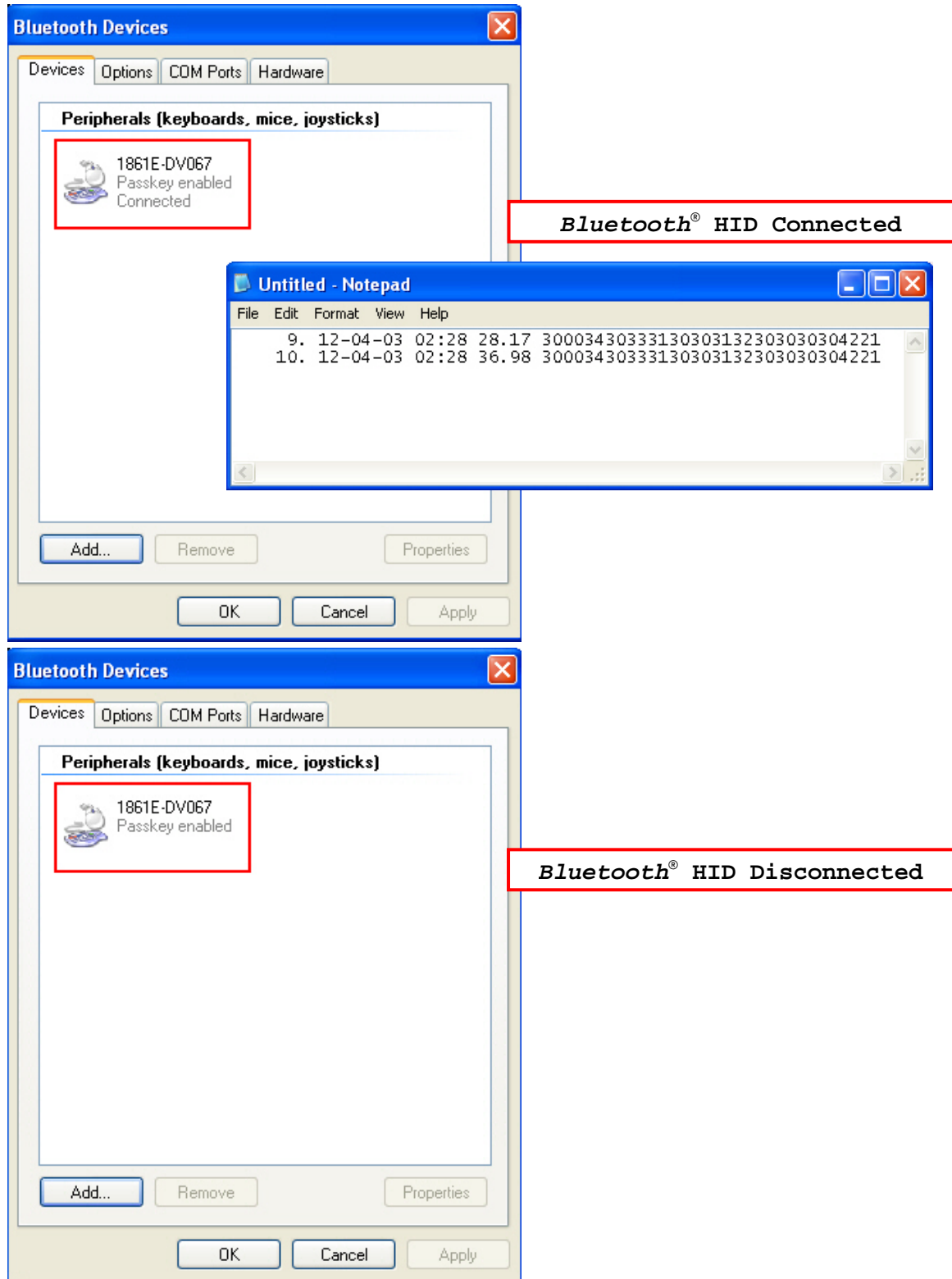
Once the desired application is configured completely, the status of the RFID Reader listed on the device list will be showed as "Connected", indicating the WPAN connection is established successfully via the outgoing COM port if using *Bluetooth*[®] SPP Slave.

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](#).



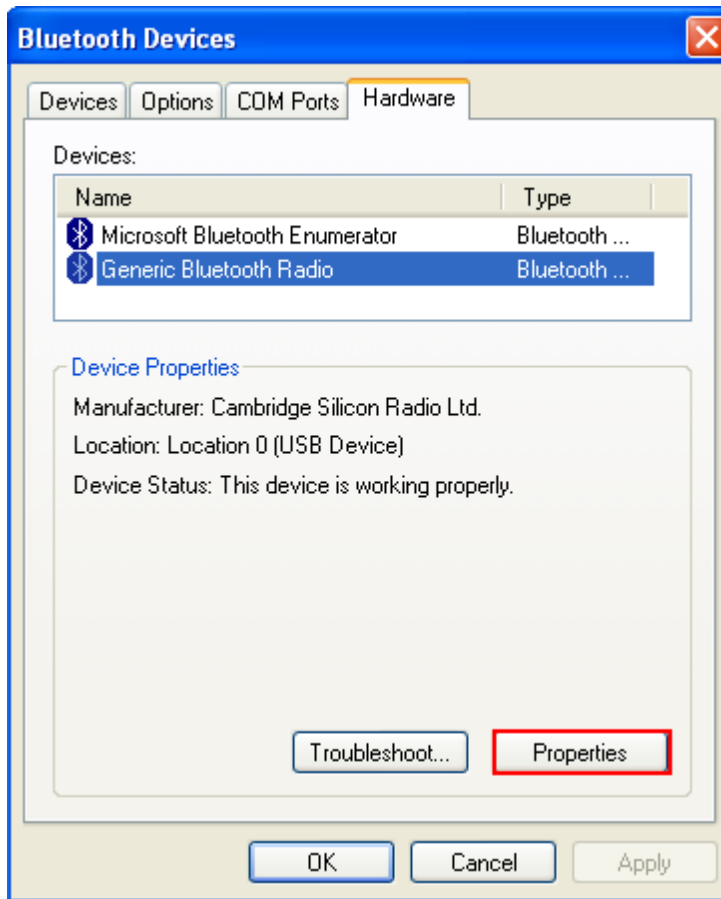
See the comparisons between *Bluetooth*® HID and Notepad below:



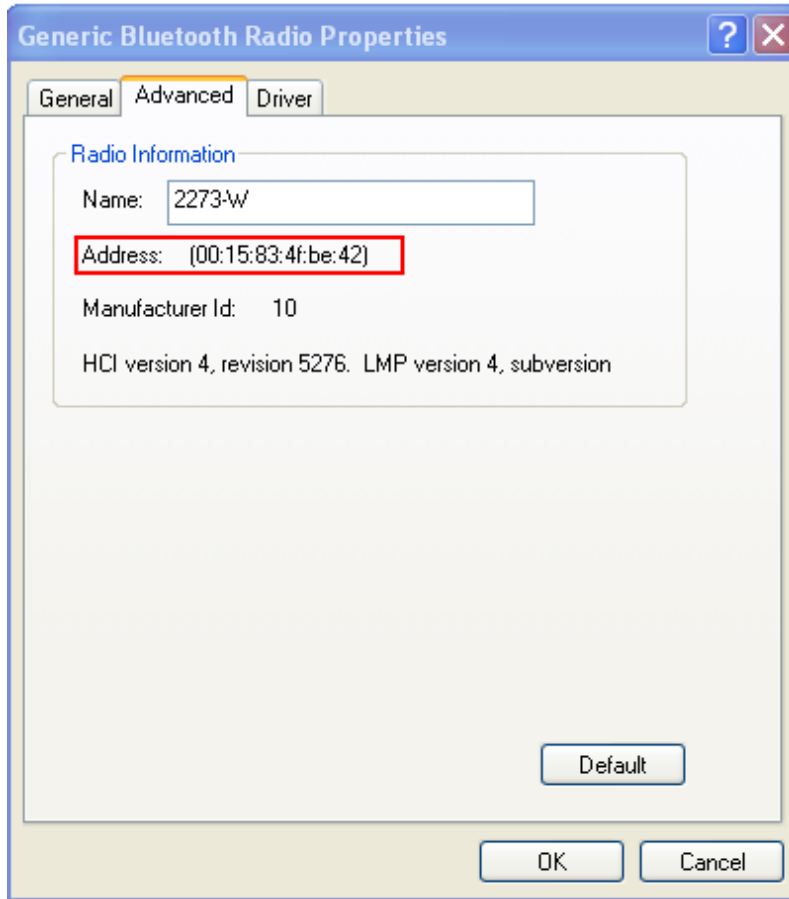
3.1.4 BLUETOOTH® SPP MASTER

BLUETOOTH® SPP MASTER

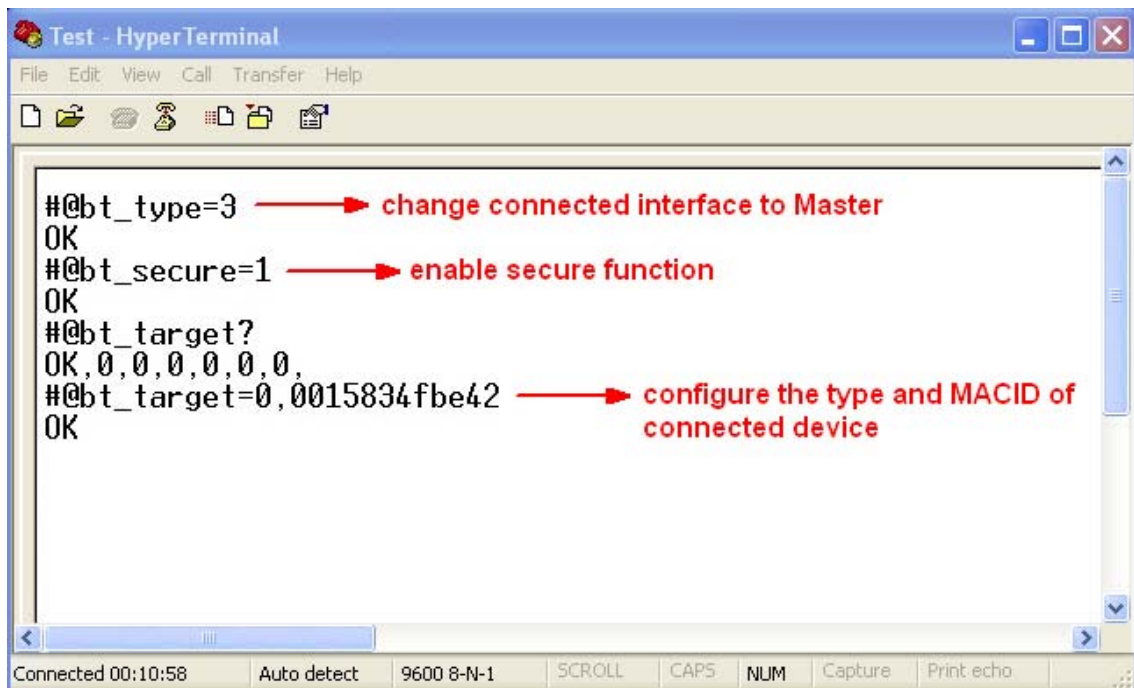
- 1) Enable the *Bluetooth*® function on the host computer.
- 2) Double-click the *Bluetooth*® icon located on the lower right of the taskbar. Alternatively, you may go to **Control Panel** > **Bluetooth Devices**.
- 3) Select Hardware tab and click [Properties].



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



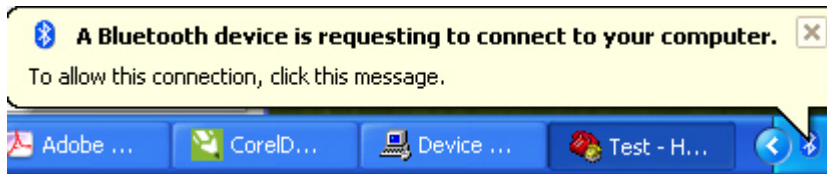
- 5) Enable HyperTerminal on the host computer and configure all the pre-processing about *Bluetooth*[®] SPP Master connection.



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.

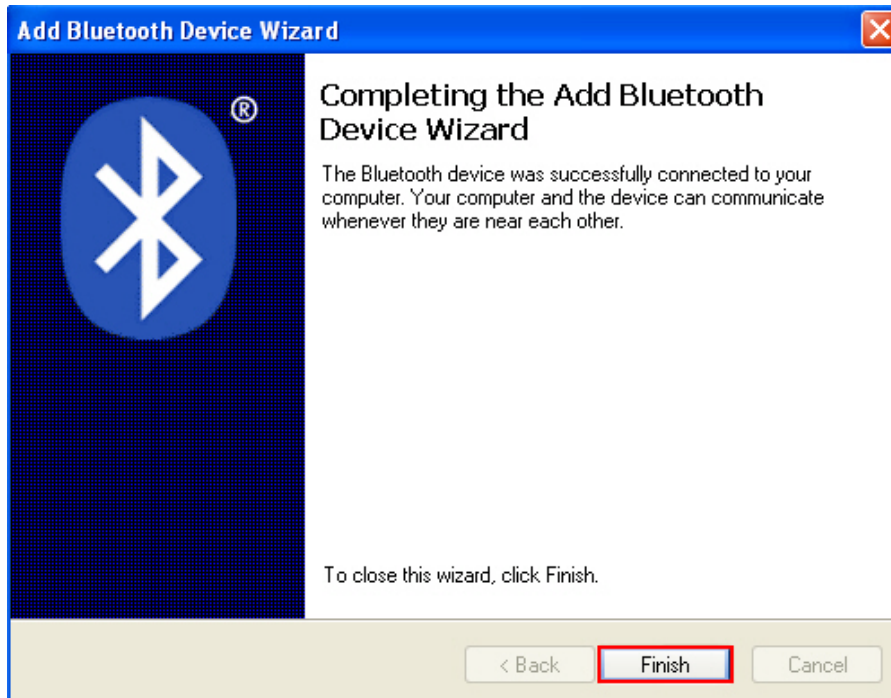
- 6) On the host computer, a *Bluetooth*[®] connection information box will pop-up on the lower right of the taskbar. Click it.



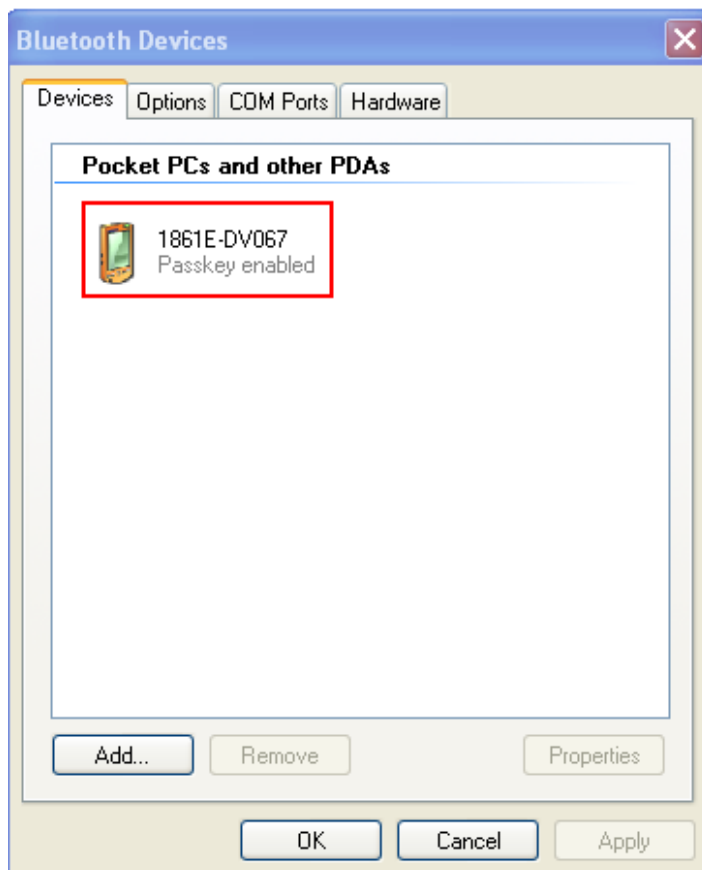
- 7) In the Add *Bluetooth*[®] Device Wizard window, key in the passkey that is the same as you have entered on the RFID Reader. The default value is 0000. Click [Next].



- 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 HID via 3610](#) or [2.7 USB VCOM 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](#).

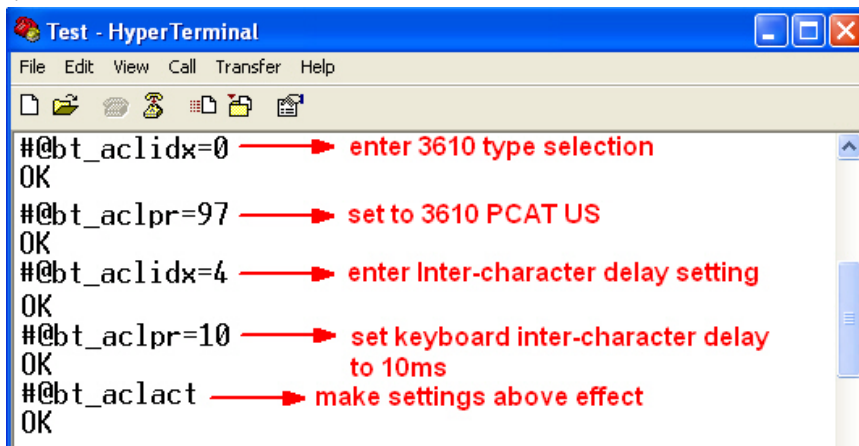
After configuring, the RFID Reader will stay active for a specified period of time (2 minutes by default) trying to connect to the 3610 while the LED2 is flashing blue (On/Off ratio 0.5 s: 0.5 s). Once connected, the RFID Reader will respond with three beeps (tone ascending from low to high), and the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

3.2.1 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 HID via 3610](#) to connect 3610 to the USB port of host computer.
- 6) Configure related settings as below.

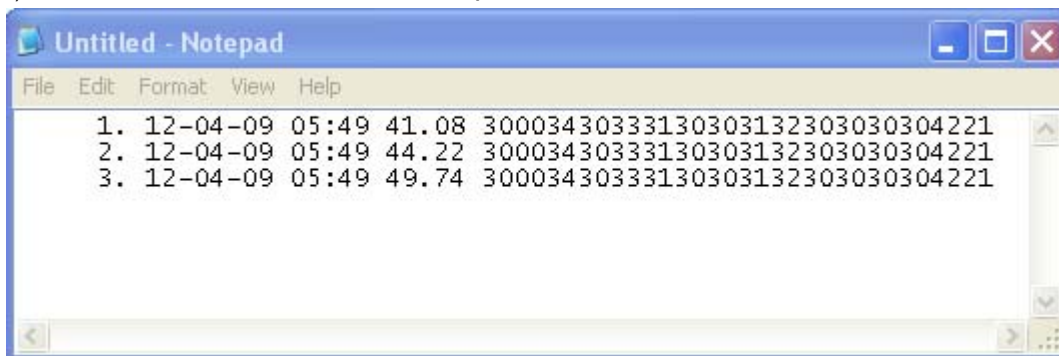


```

Test - HyperTerminal
File Edit View Call Transfer Help
#@bt_aclidx=0 → enter 3610 type selection
OK
#@bt_aclpr=97 → set to 3610 PCAT US
OK
#@bt_aclidx=4 → enter Inter-character delay setting
OK
#@bt_aclpr=10 → set keyboard inter-character delay
to 10ms
#@bt_aclact → make settings above effect
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.



```

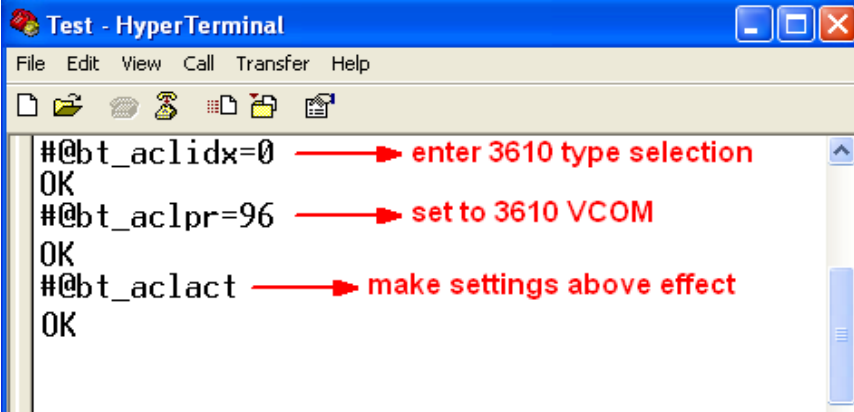
Untitled - Notepad
File Edit Format View Help
1. 12-04-09 05:49 41.08 30003430333130303132303030304221
2. 12-04-09 05:49 44.22 30003430333130303132303030304221
3. 12-04-09 05:49 49.74 30003430333130303132303030304221

```

3.2.2 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 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.



```
Test - HyperTerminal
File Edit View Call Transfer Help
#@bt_aclidx=0 —————▶ enter 3610 type selection
OK
#@bt_aclpr=96 —————▶ set to 3610 VCOM
OK
#@bt_aclact —————▶ make settings above effect
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.

3.3 DISCONNECTION

You can break a connection between RFID Reader and host computer by pressing <F1> + <F2> directly to shut down the RFID Reader. Or issue commands described as below sections to make a disconnection. By default, it is set to automatically shut down after idling 10 minutes. Refer to [1.1.2 Power OFF](#).

Note: The condition between RFID Reader and host computer will also be broken once the RFID Reader enters power saving mode. By default, it is set to idle at full-speed for 2 minutes before it enters power saving mode. Refer to [1.1.3 Power Saving Mode](#).

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 <i>Bluetooth</i> [®] 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. Then, the RFID Reader will restart itself automatically. Go through the whole process in [Set Up a WPAN Connection](#) to establish a new connection.

Command:

```
#@bt_reset\r
```

Purpose	Reset <i>Bluetooth</i> [®] Connection
Response	OK\r ERR,[code]\r

Warning: Once resetting *Bluetooth*[®] connection, it will be the same as entering power saving mode, the *Bluetooth*[®] will be disconnected.

3.4 BLUETOOTH[®] POWER SAVING

Once the *Bluetooth*[®] is connected upon no data transmitted, The RFID Reader will have LED2 flashing blue to wait data transmitting. Once enabling the *Bluetooth*[®] power saving function, *Bluetooth*[®] connection will be disconnected and the LED2 will go off. Press the <Trigger> to wake up the RFID Reader and make the *Bluetooth*[®] connection go back to standby mode with LED2 flashing.

Command:**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 <i>Bluetooth</i> [®] 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 <i>Bluetooth</i> [®] 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.

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

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4.2 Output Format.....	96
4.3 Data Output	97
4.4 Prefix/Suffix Code	110
4.5 Section Sequence	113

4.1 LETTER CASE (HID MODE ONLY)

By default, the alphabetic transmission is case-sensitive, meaning that the alphabet will be transmitted according to their original case. Ignoring the original letter case, select [Upper Case] to output data in upper case only; otherwise, select [Lower Case] to output data in lower case only. Refer to [2.3.1 Activate Bluetooth® HID & Select Keyboard Type](#) or [2.6.1 Activate USB HID & Select Keyboard Type](#).

4.2 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

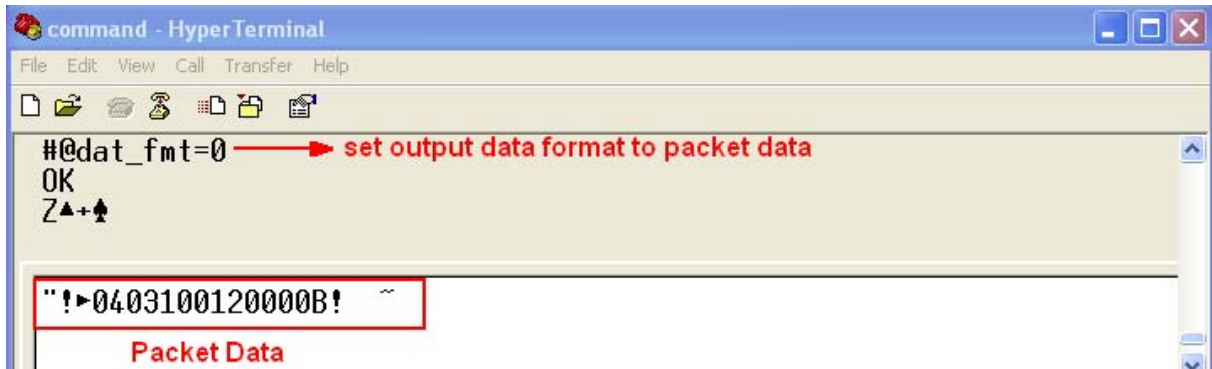
Purpose Set New Output Data Format

Response OK\r
ERR,[code]\r

Example:

Packet Data:

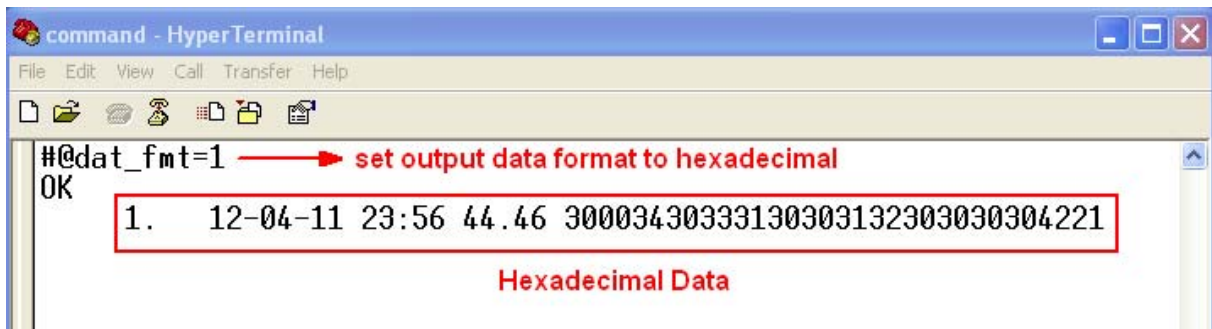
In order to transmit data quickly, the system may break the data into small chunks as packet data. This data will be presented as below format.



The screenshot shows a HyperTerminal window titled "command - HyperTerminal". The menu bar includes File, Edit, View, Call, Transfer, and Help. The toolbar contains icons for file operations. The terminal text shows the command "#@dat_fmt=0" with a red arrow pointing to the text "set output data format to packet data". Below the command, the terminal displays "OK" and "Z▲+▲". A red box highlights the output data: "!▶0403100120000B!". Below the box, the text "Packet Data" is written in red.

Hexadecimal:

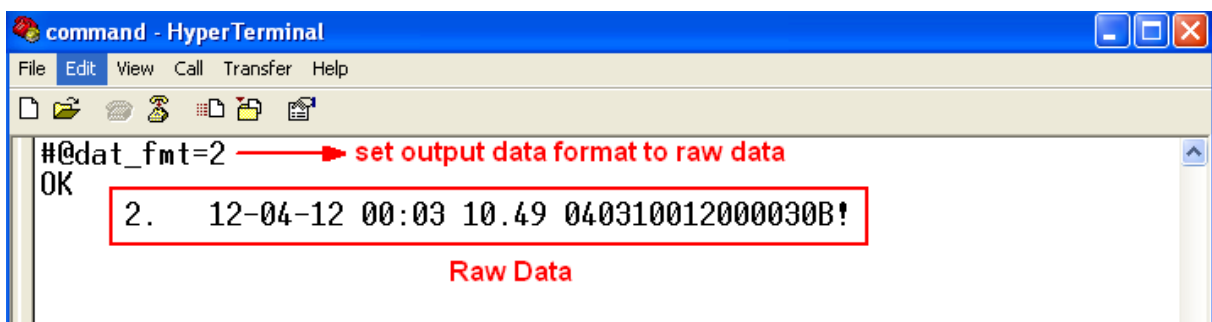
The output data is consisted of 16 unique symbols, the numbers 0 to 9 and the letters A to F. Specified for every byte (8 bits) as two consecutive hexadecimal digits. It is easier for users to read hexadecimal numbers than binary numbers.



The screenshot shows a HyperTerminal window titled "command - HyperTerminal". The menu bar includes File, Edit, View, Call, Transfer, and Help. The toolbar contains icons for file operations. The terminal text shows the command "#@dat_fmt=1" with a red arrow pointing to the text "set output data format to hexadecimal". Below the command, the terminal displays "OK". A red box highlights the output data: "1. 12-04-11 23:56 44.46 30003430333130303132303030304221". Below the box, the text "Hexadecimal Data" is written in red.

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.



The screenshot shows a HyperTerminal window titled "command - HyperTerminal". The menu bar includes File, Edit, View, Call, Transfer, and Help. The toolbar contains icons for file operations. The terminal text shows the command "#@dat_fmt=2" with a red arrow pointing to the text "set output data format to raw data". Below the command, the terminal displays "OK". A red box highlights the output data: "2. 12-04-12 00:03 10.49 040310012000030B!". Below the box, the text "Raw Data" is written in red.

4.3 DATA OUTPUT

A data output would be divided into three sections:

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

4.3.1 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.

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 - HyperTerminal
File Edit View Call Transfer Help
#@dat_tseq=1,2,3,0,0,0,0 —————> show the year, month and day only
OK
24. 2012-04-12 30003430333130303132303030304221
#@dat_tseq=2,3,1,0,0,0,0 —————> change the sequences of year, month and day
OK
25. 04-12-2012 30003430333130303132303030304221

```

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 between field1 and field2. Default= '2D' ('-') [n]: separator between field2 and field3. Default= '2D' ('-') [o]: separator between field3 and field4. Default= '20' (' ')

[p]: separator between field4 and field5. Default= '20' (' ')
[q]: separator between field5 and field6. Default= '3A' (':')
[r]: separator between field6 and field7. 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 between field1 and field2 [o]: separator between field2 and field3 [p]: separator between field3 and field4 [q]: separator between field4 and field5 [r]: separator between field5 and field6 [s]: separator between field6 and field7
Response	OK\r ERR,[code]\r

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

Example:


```

command - HyperTerminal
File Edit View Call Transfer Help

#@dat_tseq=1,2,3,4,5,6,7 → enable all fields
OK
19. 2012-04-12 Thu 23:04 08.34 30003430333130303132303030304221

#@dat_tsprh? → show the separators with hexadecimal format
OK, 2d, 2d, 20, 20, 3a, 20

#@dat_tspr? → show the separators with character format
OK, -, -, , , :,

#@dat_tspr=0, 3a, 3a, 00, 00, 00, 00 → reset the separators with hexadecimal
format, e.g. 3a is specified for ':'
OK
20. 2012:04:12Thu230557.61 30003430333130303132303030304221

#@dat_tspr=1, /, /, /, /, / → reset the separators with character format,
e.g. / is specified for '/'
OK
21. 2012/04/12 Thu/23/06/34.71 30003430333130303132303030304221

```

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:

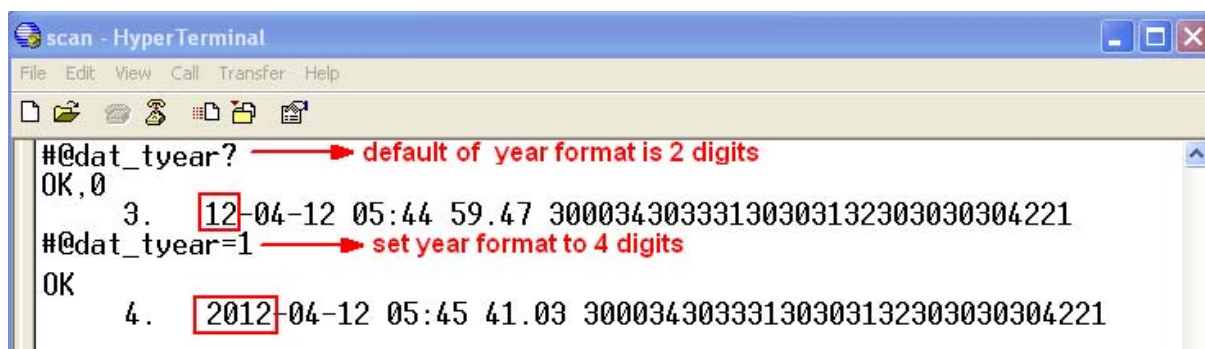
#@dat_tyear?\r

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:



Millisecond

Enable this function to active millisecond field.

Command:

#@dat_tms?\r

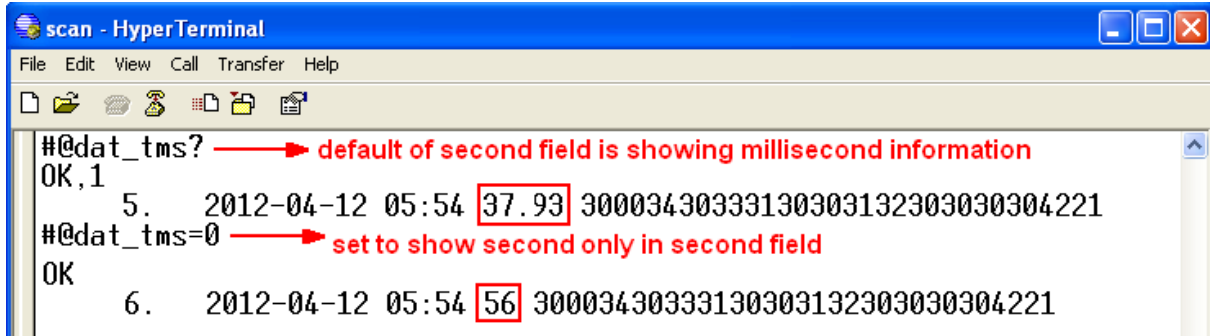
Purpose Get the Setting of Millisecond
 Response OK,[m]\r (Default m= '1')
 [m]: Show millisecond in second field.
 0 – Disable, 1 – Enable

ERR,[code]\r

#@dat_tms=[m]\r

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

Example:



4.3.2 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.

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= '0', n= '0', o= '1')

	Reset Event	Enable	Disable
--	-------------	--------	---------

[m]	Get Reset Counter Command	'1'	'0'
[n]	UHF Power On	'1'	'0'
[o]	New <i>Bluetooth</i> [®] connection	'1'	'0'

ERR,[code]\r

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

Purpose Set Counter Reset Event

Response OK\r
ERR,[code]\r

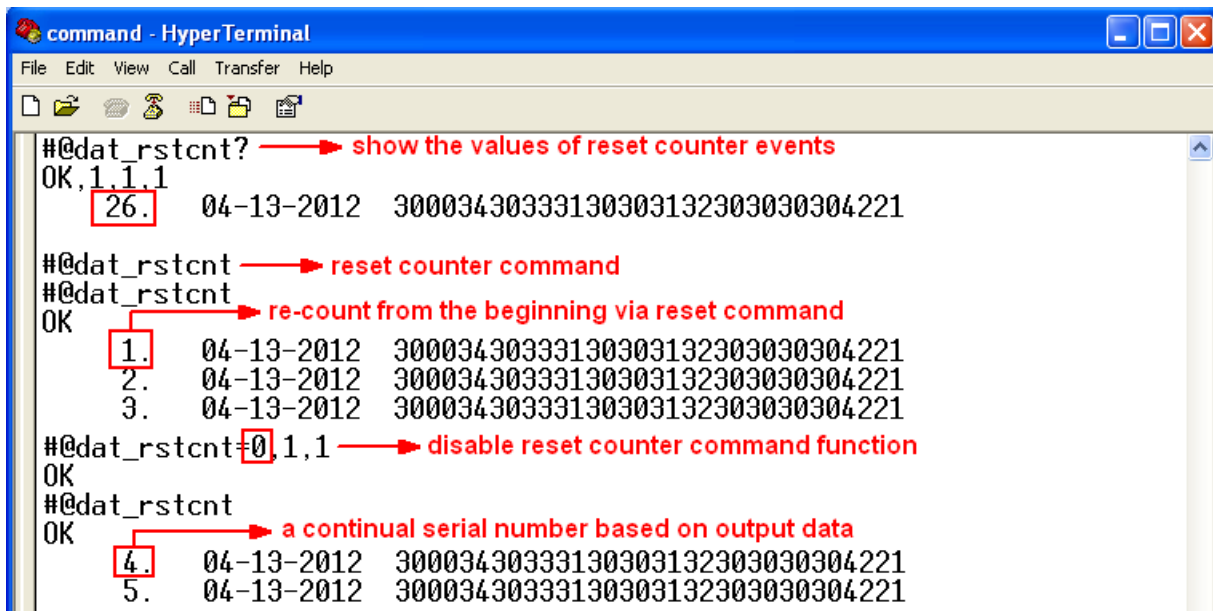
#@dat_rstcnt\r

Purpose Reset Data Counter

Response OK\r
ERR,[code]\r

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

Example:



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 - HyperTerminal
File Edit View Call Transfer Help
#@dat_cntpad? → show counter padding
OK,20 → 20 is for 'space' referred to ASCII table '0x20'
10. 04-13-2012 30003430333130303132303030304221

#@dat_cntpad=2a → set counter padding to 2a as * referred to ASCII table '0x2a'
OK
****11. 04-13-2012 30003430333130303132303030304221

```

4.3.3 DATA SECTION

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.

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 RFID Data Section

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

[m]: RFID Data in Field 1

[n]: RFID Data in Field 2

[o]: RFID Data in Field 3

[p]: RFID Data in Field 4

[q]: RFID 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 RFID Section
 Response OK\r
 ERR,[code]\r

Example:

The screenshot shows a HyperTerminal window titled "command - HyperTerminal" with a menu bar (File, Edit, View, Call, Transfer, Help) and a toolbar. The terminal displays the following text:

```
#@rf_func? —→ show RFID function is inventory, memory data will not be appeared
OK,0

18. 2012-04-13 Fri 04:00 55.95 30003430333130303132303030304221

#@dat_rfseq? —→ show the sequence of RFID Data
OK,2,3,1,4,0

19. 2012-04-13 Fri 04:01 37.55 30003430333130303132303030304221
                                PC+          EPC          +CRC

#@dat_rfseq=3,2,1,4,0 —→ change the sequence between PC and EPC
OK

20. 2012-04-13 Fri 04:02 24.53 34303331303031323030303030004221
                                EPC          +PC +CRC
```

Red annotations in the original image include arrows pointing to the command prompts and their descriptions, and red boxes highlighting the sequence values (0, 2,3,1,4,0) and the EPC data (343033313030313230303030) in the output lines.

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 RFID Data Section
Request	<code>#@dat_rfsprh?\r</code> //Response data will be shown in Hexadecimal value <code>#@dat_rfspr?\r</code> //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 between field1 and field2 [n]: separator between field2 and field3 [o]: separator between field3 and field4 [p]: separator between field4 and field5 ERR,[code]\r

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

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

If field n (n=1~4) is disabled, separator n is also ignored.

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

Example:


```

command - HyperTerminal
File Edit View Call Transfer Help
# @dat_rfsprh? → show the separators with character format
OK,
# @dat_rfsprh? → show the separators with hexadecimal format
OK,00,00,00,00
    21. 2012-04-13 Fri 04:30 57.47 34303331303031323030303030004221
# @dat_rfsprh=0,2d,2d,2d,2d → reset the separators with hexadecimal format,
OK                                e.g. 2d is specified for '.'
    22. 2012-04-13 Fri 04:35 36.09 343033313030313230303030303000-4221-
# @dat_rfsprh=1,/,/,/,/ → reset the separators with character format,
OK                                e.g. / is specified for '/'
    23. 2012-04-13 Fri 04:39 34.75 343033313030313230303030303000/4221/

```

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 RFID Data, EPC and memory data.

Command:

#@dat_rflen?r

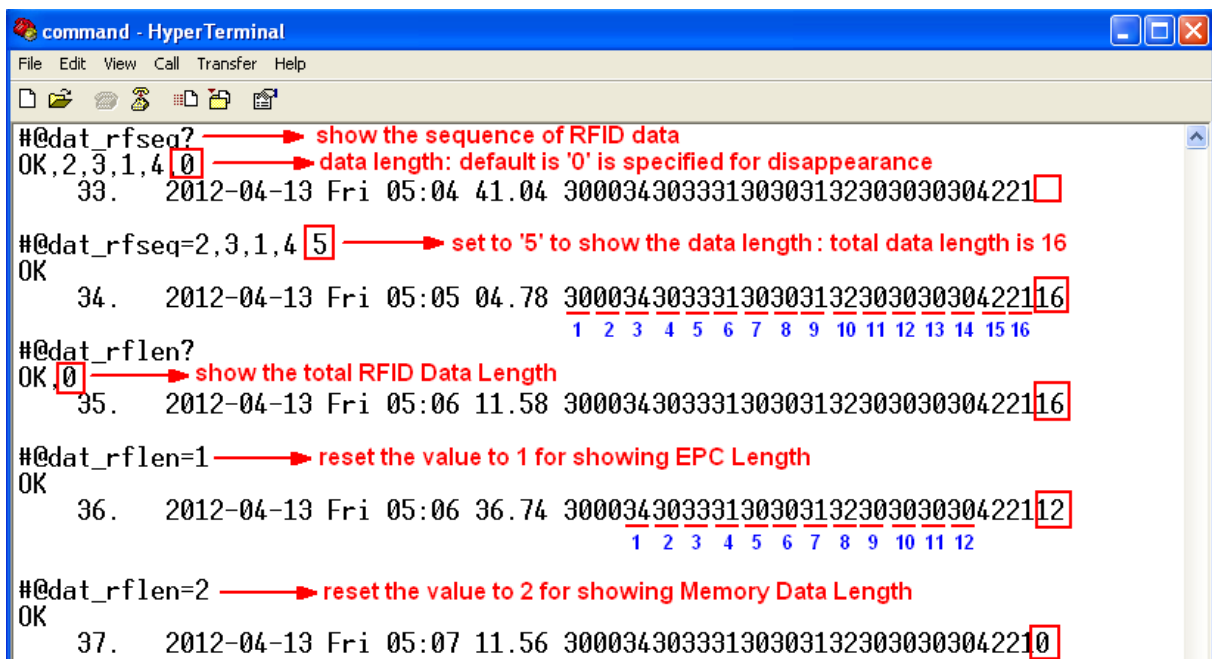
Purpose Get the Setting of RFID Data Length

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

#@dat_rflen=[m]\r

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

Example:



4.4 PREFIX/SUFFIX CODE

By default, there is no prefix code configured to Counter and RFID Data Section, and [ENTER] or [CR] (Carriage Return) is configured to be suffix code for RFID 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_Test30003430333130303132303030304221". If the specified content is longer than 8 bytes, it will be truncated.

Prefix/Suffix Section

For a prefix or suffix parameter, 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 Parameter

Response OK,[m]\r
[m]: Prefix / Suffix Parameter

[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 RFID Data Section
'6'	Suffix of RFID Data Section

ERR,[code]\r

#@dat_pfxidx=[m]\r

Purpose Set Prefix Parameter

Response OK\r
ERR,[code]\r

Prefix/Suffix PARAMETER

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

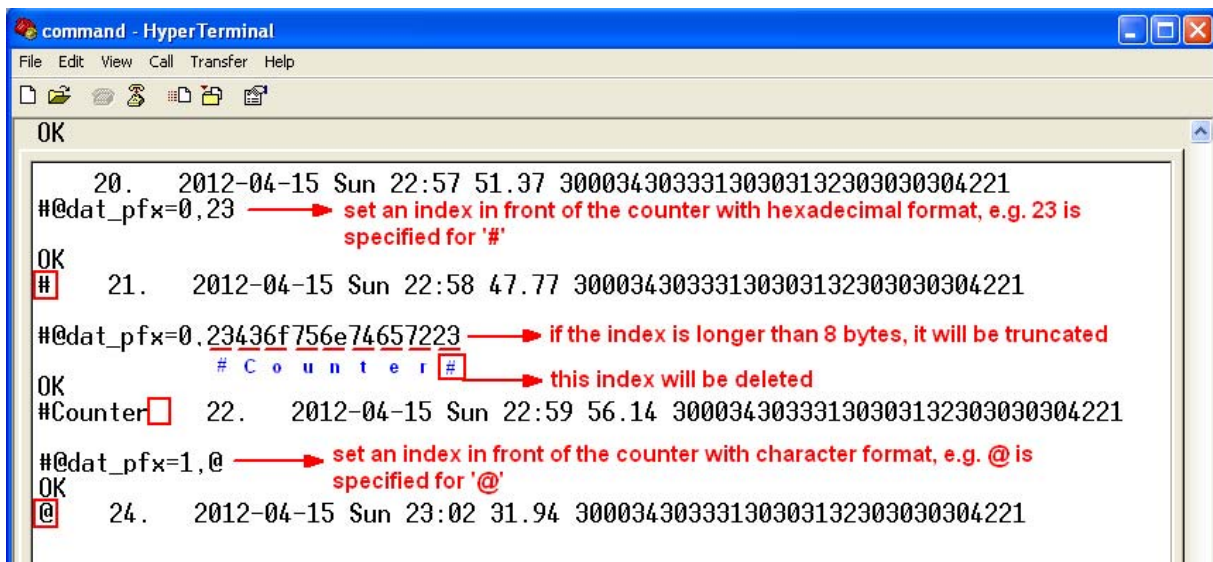
Response OK,[m]\r
[m]: input data format, '0'- in Hexadecimal, '1'- in character
[n]: data to be stored in Prefix / Suffix buffer
ERR,[code]\r

#@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):



Example2 (Suffix):

```

command - HyperTerminal
File Edit View Call Transfer Help
#@dat_pfxidx=6 —————> set to '6' for the suffix of RFID data configuration
OK
#@dat_pfx=0,454e440d —————> add 'END' index to the back of RFID data section then Enter
OK
      E N D CR CR is sprcified for 'Enter'
29.  2012-04-15 Sun 23:43 37.56 30003430333130303132303030304221END

```

4.5 SECTION SEQUENCE

After finishing all section configurations, you can adjust the sequence or disable the section.

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

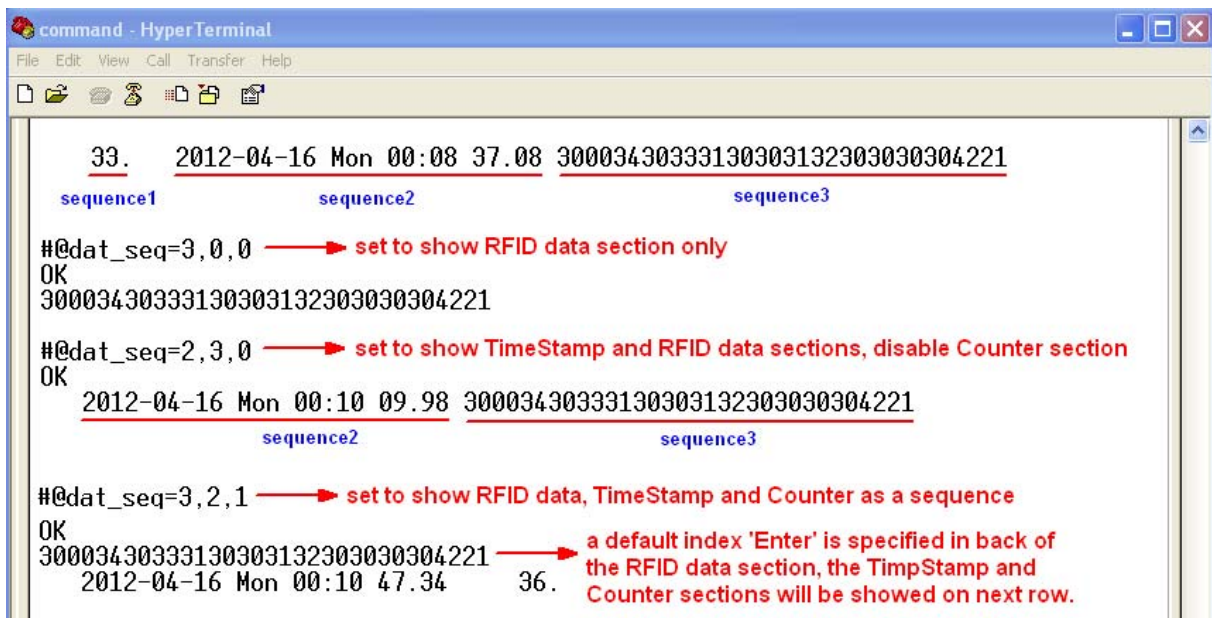
ERR,[code]\r

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

Purpose Set Output Data Sequence

Response OK\r
 ERR,[code]\r

Example:



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

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5.1 SCAN MODE

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

Scan Mode	Description
Single Mode	<p>Read Tag by pressing <Trigger> key.</p> <ol style="list-style-type: none"> Condition to start the operation: Press and hold the <Trigger> key. Condition to stop the operation: <ol style="list-style-type: none"> A tag is read <Trigger> key is released. "Scan Session Timeout" expires while no Tag data is received New scan mode is set. Release <Trigger> key and press it again to start a new operation cycle. Scanning Timeout will be refreshed.
Multi-Tag Mode	<p>Multi-Tag counter=0</p> <p>Press and hold the <Trigger> key to read Tag continuously. Repeated Tags will be accepted.</p> <ol style="list-style-type: none"> Conditions to start the operation: Press and hold the <Trigger> key. Conditions to stop the operation: <ol style="list-style-type: none"> <Trigger> key is released. New scan mode is set. Scanning speed is controlled by Scanning Delay.
	<p>Multi-Tag counter≠0</p> <p>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.</p> <ol style="list-style-type: none"> Conditions to start/continue the operation: Press and hold the <Trigger> key. Conditions to suspend the operation: <ol style="list-style-type: none"> Release <Trigger> key. Conditions to stop the operation: <ol style="list-style-type: none"> The amount of new Tag is equal to Multi-Tag counter. New Multi-Tag Counter is set. New scan mode is set. The counter of read tag can be reset by command and function key. Scanning speed is controlled by Scanning Delay.
Test Mode	<p>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.</p> <ol style="list-style-type: none"> Conditions to start the operation: Scan mode is set to "Test mode" Conditions to stop the operation: New scan mode is set. Scan Session Timeout, Scanning Delay, Multi-Tag Counter and EPC filter parameters are no effect in this mode. 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

ERR,[code]\r

#@rf_scan=[m]\r

Purpose Set Scan Mode

Response OK\r

ERR,[code]\r

5.2 SCAN TIME

5.2.1 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.

5.2.2 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_scandy?\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_scandy=[m]\r

Purpose Set Scan Delay

Response OK\r
ERR,[code]\r

5.3 FILTER

5.3.1 EPC ENCODING SCHEME

Accepted EPC Encoding Scheme - Parameter 1

Command:

`#@rf_epctype1?\r`

Purpose Get EPC Scheme Parameter 1

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

[m]: EPC Scheme parameter 1.

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 Parameter 1

Response OK\r

ERR,[code]\r

Accepted EPC Encoding Scheme - Parameter 2

Command:

`#@rf_epctype2?\r`

Purpose Get EPC Scheme Parameter 2

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

[m]: EPC Scheme parameter 2.

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 Parameter 2

Response OK\r
ERR,[code]\r

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

5.3.2 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_sepceb?\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_sepceb=[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.

The length must include prefix, suffix and length code, etc.

- ▶ A value from **0 to 256** can be specified.
- ▶ When zero is given, the RFID Reader will not perform the length qualification.

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.

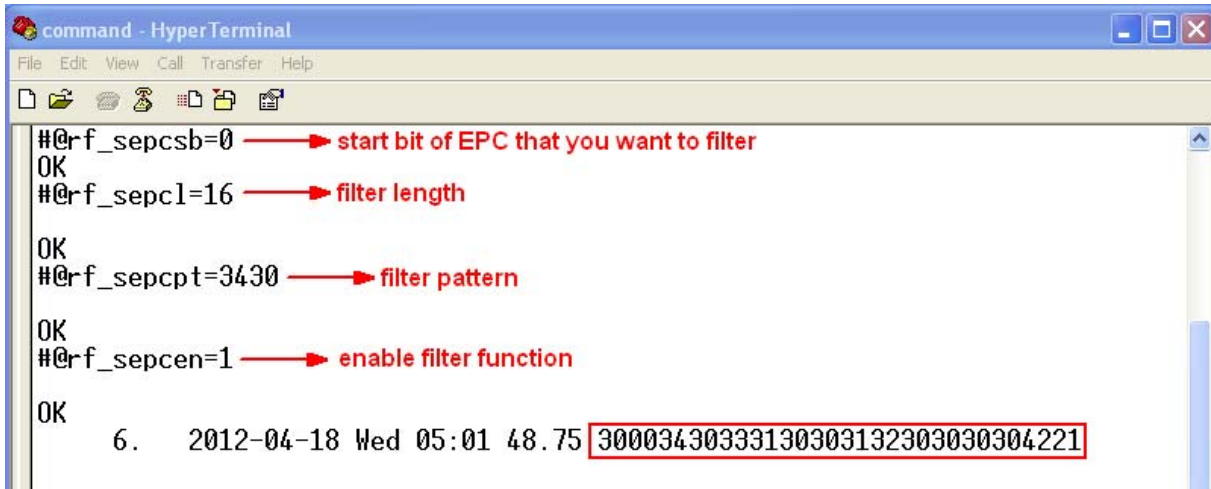
Command:**#@rf_sepcen?\r**

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

Example:



30003430333130303132303030304221
parameters of start bit 0 8 16 24 32 40

Start bit of EPC=0, Length=16, Pattern=3430

30003430333130303132303030304221 → 30003430333130303132303030304221
EPC data accept

Start bit of EPC=16, Length=24, Pattern=333130

30003430333130303132303030304221 → 30003430333130303132303030304221
EPC data accept

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

5.3.3 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.

The length must include prefix, suffix and length code, etc.

- ▶ A value from 0 to **256** can be specified.
- ▶ When zero is given, the RFID Reader will not perform the length qualification.

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.

Command:

#@rf_xepcen?\r

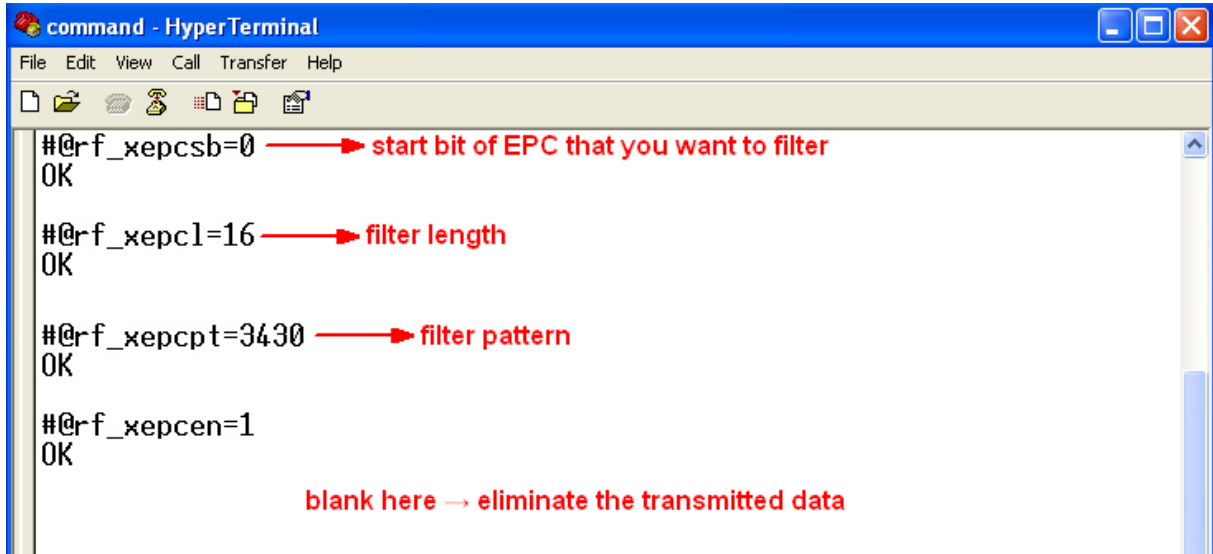
Purpose Get **Excluded** EPC State
Response OK,[m]\r (Default m= '0')
[m]: '0' – disable, '1' – enable, **'2' – enable range filter**
ERR,[code]\r

#@rf_xepcen=[m]\r

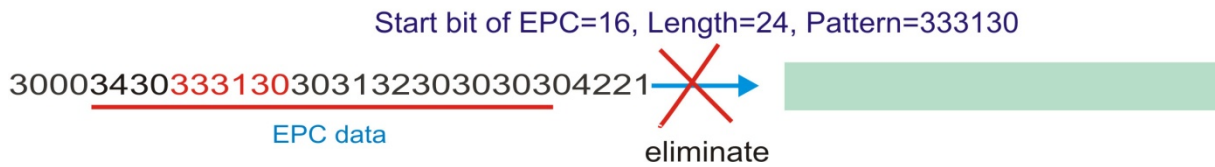
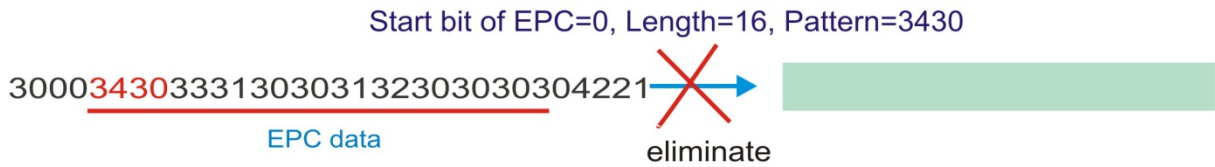
Purpose Set **Excluded** EPC State
Response OK\r

ERR,[code]\r

Example:



30003430333130303132303030304221
 parameters of start bit 0 8 16 24 32 40



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

5.3.4 EPC ENCODING

Acted Encoding Scheme for **Included/Excluded** EPC Filter

Command:

#@rf_epcfcodes?\r

Purpose Get Acted Scheme for EPC Filter

Response OK,[m]\r (Default='2C')
[m]: Acted Scheme for EPC Filter*

[m]	EPC Encoding Scheme
'2C'	GDTI-96(Default)
'2D'	GSRN-96
'2F'	USDoD-96
'30'	SGTIN-96
'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_epcfcodes=[m]\r

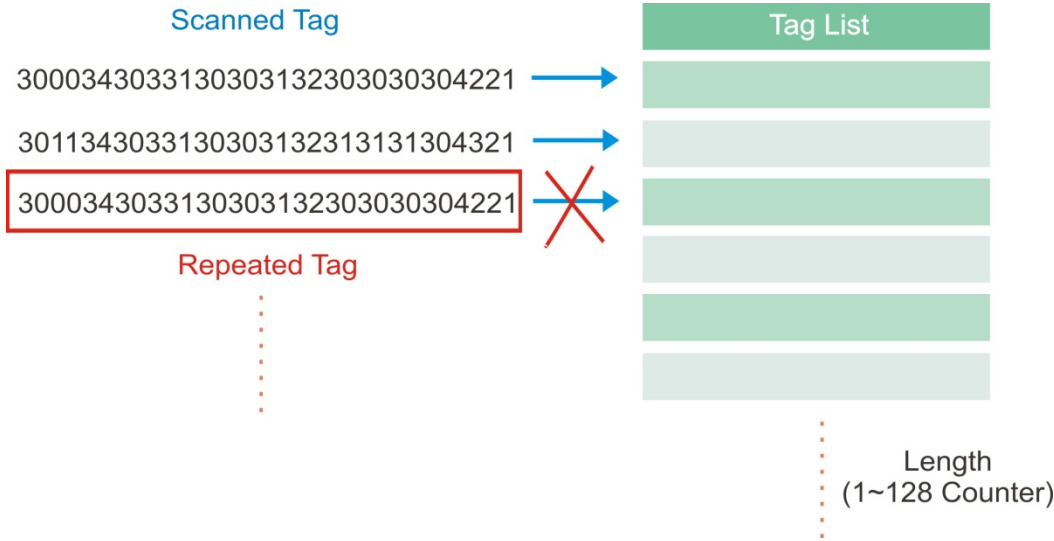
Purpose Set Acted Scheme for EPC Filter

Response OK\r
ERR,[code]\r

5.4 MULTI-TAG

5.4.1 COUNTER

The scanned data of Multi-Tag mode will be saved in On-chip RAM 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 clear the list via function key or issue command so that you can active the scan action.



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= '0')
[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

#@rf_mtagbeep?\r

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

Multi-Tag List Type

Command:

#@rf_mtaglist?\r

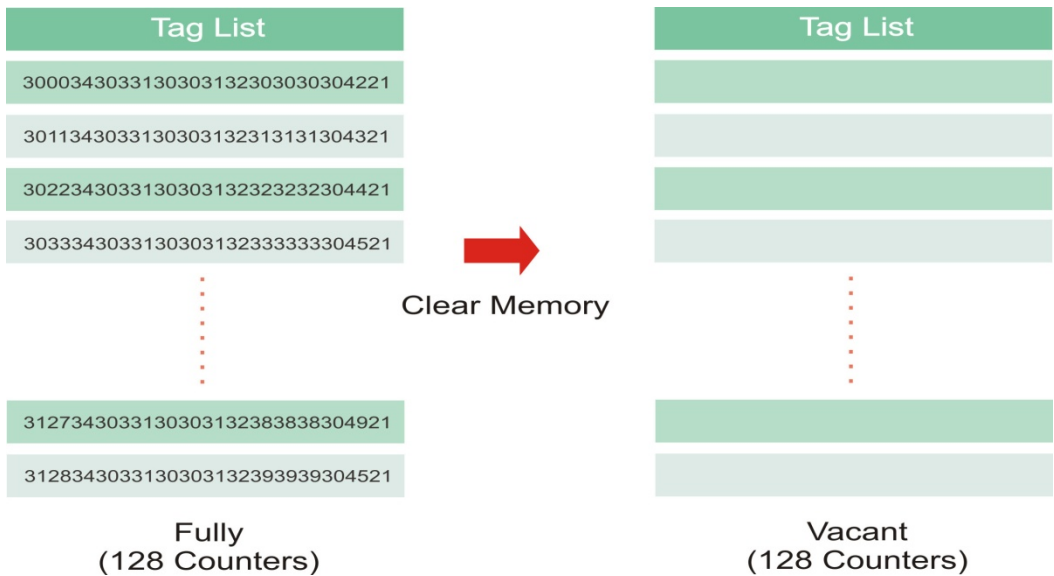
Purpose Get Multi-Tag List Type
Response OK,[m]\r (Default m= '0')
[m]: Multi-Tag List Type
'0' – EPC
'1' TID
ERR,[code]\r

#@rf_mtaglist=[m]\r

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

5.4.2 COUNTER RELOAD

You have to clear a full tags list upon Multi-tag mode so that you can start another new scan session.



5.4.3 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

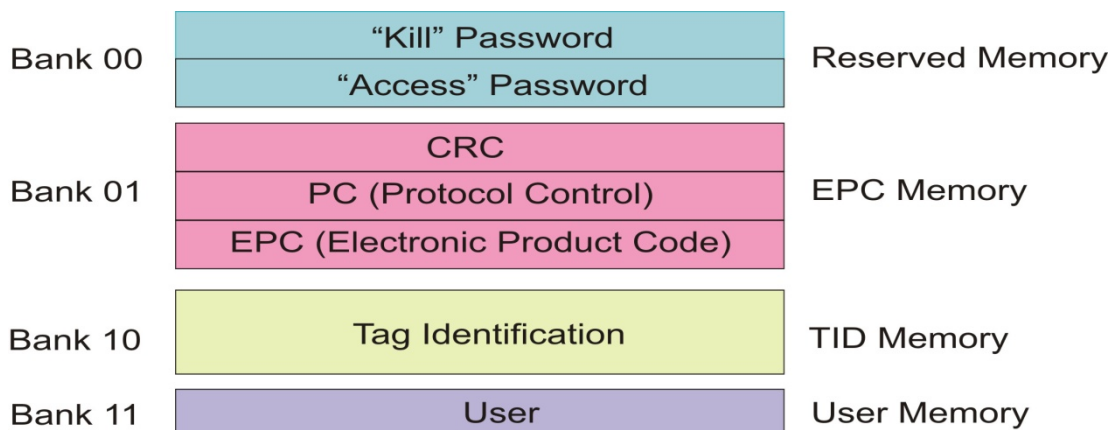
#@rf_mtagbeep=[m],[n]\r

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

5.5 ACCESS TAG

5.5.1 TAG MEMORY

A tag memory is divided into 4 banks as below:



Generally speaking, RFID Reader allows you to configure the access password, memory bank, starting address and data length of a accessed tag.

Reserved Memory:

An EPC GEN 2 tag has two separate passwords – a Kill Password and an Access Password. Each password is 32 bits and is stored in the reserved bank (bank 00) of a tag memory.

For security, the target between Kill Password and Access Password are different. Active Kill Password will erase all the functions to make security for limiting access. The RFID Reader then can not read the tag. Use Access Password will make the tag to enter secure mode for accessing.



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 (00₂).
 - 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.

5.5.2 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	'xxxxxxx' 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 (Default m= '00000000')

[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:

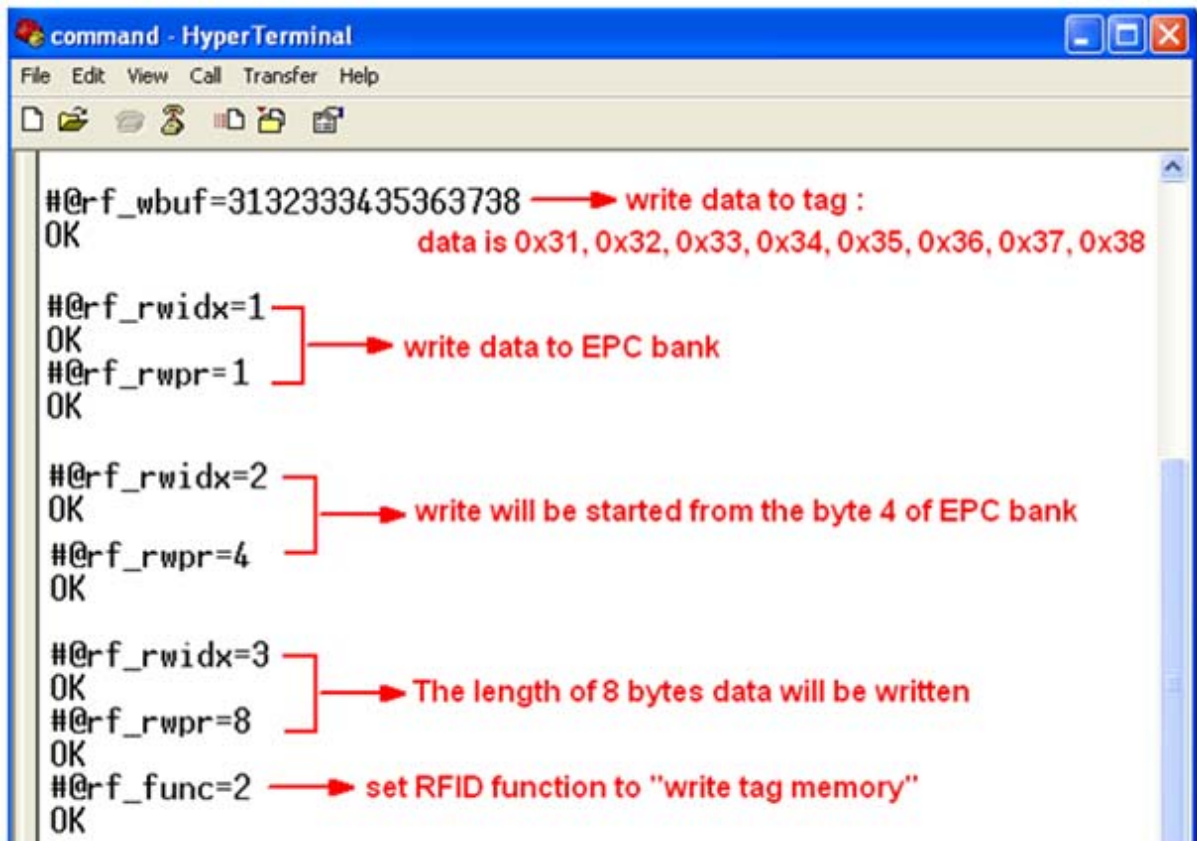
#@rf_wbuf?\r

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

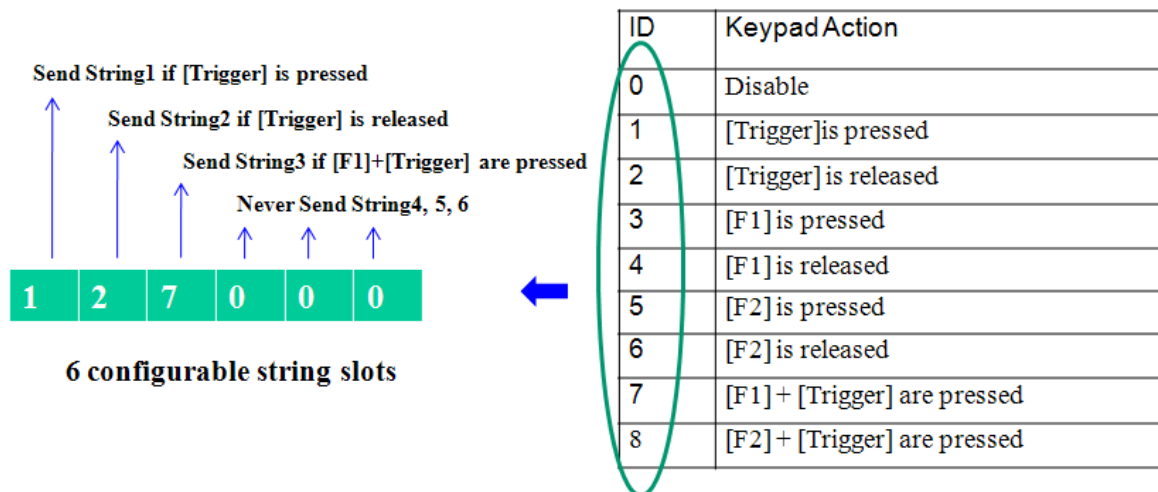
Purpose Set Data in Buffer
 Response OK\r
 ERR,[code]\r

Example:



ALTERNATE MODE

Here you can define up to 6 output strings to terminal for noticing upon alternate mode. Combine with Function Key and <Trigger>; there are 9 kinds of actions specified individually for each string.



Note: Function keys are used to send key signal in the alternate mode.

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

#@dat_ostridx=[m]\r

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

Key Action

Command:

#@dat_ostrkey?\r

Purpose Get Key Action of Output String
 Response OK,[m]\r (Default m= '1')
 [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
 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]: output data format, '0'- in Hexadecimal, '1'- in character [n]: Data to be stored in buffer Data is stored in buffer. ERR,[code]\r

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

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

	Default
String 1	'#@TRIGON\r'
String 2	'#@TRIGOFF\r'
String 3	0x00(NULL)
String 4	0x00(NULL)
String 5	0x00(NULL)
String 6	0x00(NULL)
KEY1	'1'
KEY2	'2'
KEY3	'0'
KEY4	'0'
KEY5	'0'
KEY6	'0'

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

Example:

```
command - HyperTerminal
File Edit View Call Transfer Help
#@dat_ostridx=3 — set to string 3
OK
#@dat_ostrkey=3 — set to use key action '3' (press F1)
OK
#@dat_ostr=1,F1_ON — define the output string 3 data with character format
OK
#@dat_ostr?
OK F1_ON — show the output string 3 data with character format
#@dat_ostrh?
OK,46315f4f4e — show the output string 3 data with hexadecimal format
  F 1 _ O N
```

SPECIFICATIONS

SYSTEM

Operating System & CPU

Operating System	CipherLab Proprietary Operation System
CPU	ARM Cortex-M3 32bit Toshiba TMPM366DFG

Memory

Memory Mode	4MB
Transmit Buffer	2KB

Clock

RTC	Operating tolerance: ± 10 sec./30 days Calibrated by PC application via USB or <i>Bluetooth</i> [®]
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COMMUNICATIONS

USB	Micro USB 2.0
<i>Bluetooth</i> [®]	Built-in module for <i>Bluetooth</i> [®] version 2.1 + EDR Class 2 connectivity <ul style="list-style-type: none">▶ Antenna: Internal▶ <i>Bluetooth</i>[®] Type: SPP Master/Slave, 3610

UHF RFID

Reader	PHYCHIPS PR9000, the size is the same as GM-102
Protocol	EPC global UHF Gen2, ISO 18000-6c
Operating Frequency	<ul style="list-style-type: none">▶ 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	<ul style="list-style-type: none">▶ Max. 28dbm (Europe)▶ Max. 20.05dbm (US)
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

3hrs 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	<ul style="list-style-type: none">▶ RFID Reader SDK▶ C#/.Net Programming for 9 Series▶ C Programming for 8 Series

Software & Utilities

Cipherlab software package	<ul style="list-style-type: none">▶ 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

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.

Note: 1. Ensure the RFID reader has a fully charged battery prior to attempting a firmware upgrade.
2. 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 UPGRADING

Before firmware upgrade, you have to configure the upgrade interface with “#@sys_dlfw” command firstly.

Command:

`#@sys_dlfw=[m]\r`

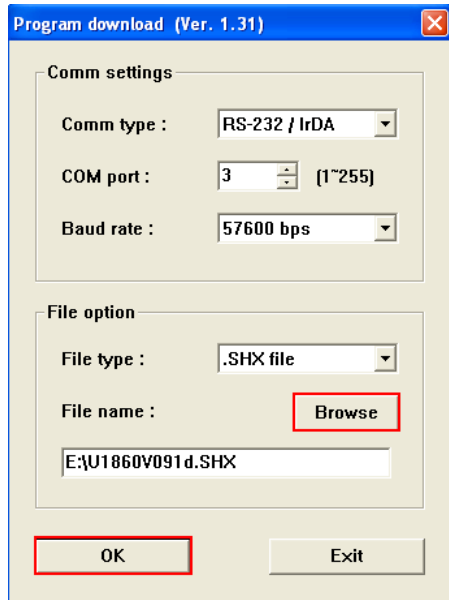
Purpose	Load Default Setting
Request	<code>#@sys_dlfw=[m]\r</code> [m]: `0` – Current interface `1` – BT `2` – USB
Response	OK\r ERR,[code]\r

HOW TO UPGRADE FIRMWARE

USE 3610

- 7) Connect 3610 to the USB port of host computer after installing its driver.
- 8) Refer to [3.2 Connecting via 3610](#) for connecting to 3610.

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

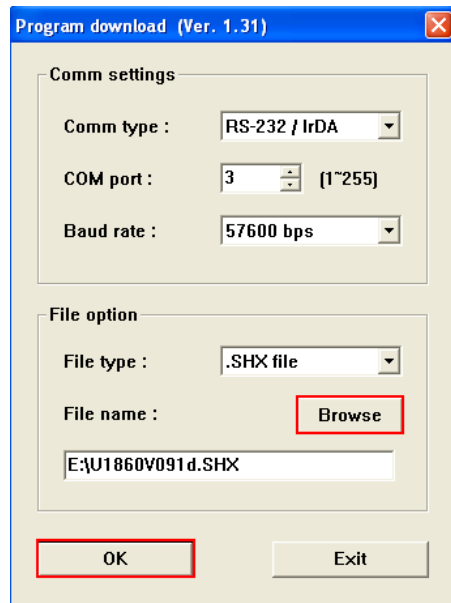


- ▶ For the communication settings, select "RS-232/IrDA" and the correct COM port for USB Virtual COM interface.
- ▶ Ignore the baud rate setting.
- ▶ For the file option, click [Browse] to select the target file e.g. U1860V*.SHX for firmware update.
- ▶ Click [OK].

- 12) After upgrading, RFID Reader will restart automatically.

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

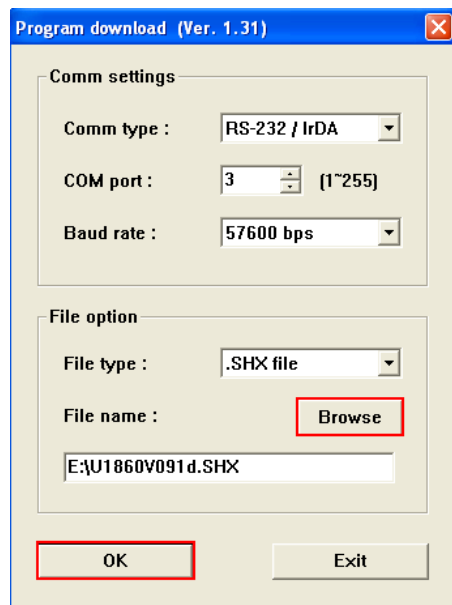


- ▶ For the communication settings, select "RS-232/IrDA" and the correct COM port for Direct USB Virtual COM interface.
- ▶ Ignore the baud rate setting.
- ▶ For the file option, click [Browse] to select the target file e.g. U1860V*.SHX for firmware update.
- ▶ Click [OK].

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) After making a connection between *Bluetooth®* dongle and RFID Reader. Power off RFID Reader.
- 3) Press <F2>+<Trigger> for 3 seconds to enter Firmware Upgrade Mode with LED1 flashing red, continual beeping.
- 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 <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.

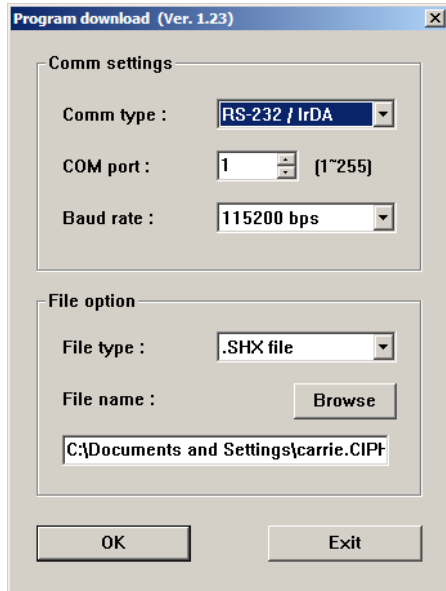
HOW TO UPGRADE 3610 FIRMWARE

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



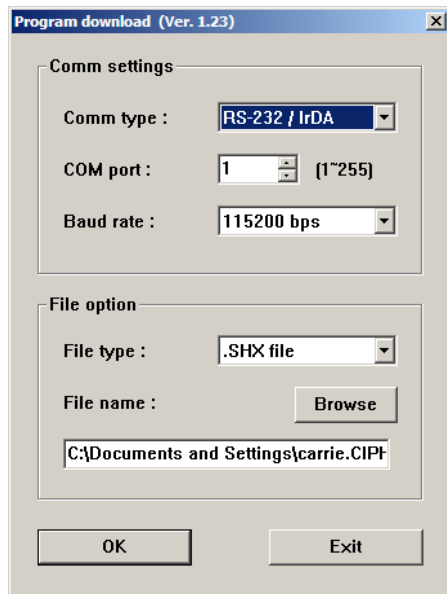
- ▶ For the communication settings, select "RS-232/IrDA" and the correct COM port for USB Virtual COM interface.
- ▶ Ignore the baud rate setting.
- ▶ For the file option, click [Browse] to select the target file e.g. STD3610_V*.SHX for firmware update.
- ▶ Click [OK].

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.

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 <i>Bluetooth</i> [®] type (The parameter of <i>Bluetooth</i> [®] type is not consistent with connected device.)
0xDD	Fail to configure the parameter of USB HID via 3610