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# USER MANUAL

Version 1.0.0

**Promi-SD™  
205-OA**

**Bluetooth RS232C Serial Adapter**

**by Bluetooth**

**Enabling Wireless Serial Communications**

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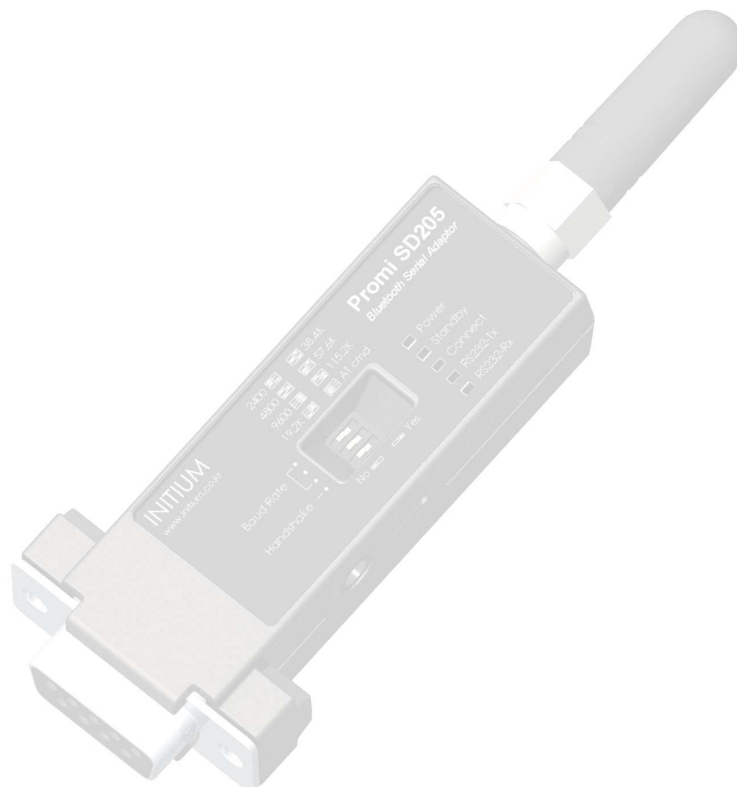
# Before Using the Product

**Welcome**

**Copyrights/Certification/Limited Liability**

**Precautions and Safety**

**General Terms and Conditions of Sale**



get **UNWIRED**, it's easy!

## Welcome

Thank you for purchasing Promi-SD products.

Promi-SD is a terminal device for wireless serial communication using Bluetooth technology, the international standard for short range wireless communications. Its interoperability and credibility delivers the maximum benefits of wireless communication.

This user manual is designed to help you use the Promi-SD series properly. It is important that you read the manual to ensure that you get the most out of your products.

Thank you.

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### ✎ Certification

Promi-	MIC	Bluetooth	CE	FCC	TELEC
SD205_OA			○	○	

### ✎ Limited Liability

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## Precautions and Safety

### ✎ Electricity

- Use only the supplied AC adapter. Use of unauthorized power adapter is not recommended. Electrical shock may result.
- Do not kink or crease the power cable or place heavy objects on the power cable. Fire can result from damaged power cables.
- Do not handle power plug and adapter with wet hands. Electrical shock may result.
- Immediately power off the product and unplug the AC adapter if smoke or odors emit from the product and adapter. Fire can result from improper use.
- Immediately power off the product and unplug the AC adapter if water or other liquids are present. Fire can result from improper use.

### ✎ Product

- Promi-SD meets the RS-232 standards. Do not wire with non-standard products. Damage to your products may result from improper use.
- Do not drop or subject the device to impact. Damage to your products may result from improper use.

- Keep away from harsh environments including humid, dusty, and smoky areas. Damage to your products may result from improper use.
- Do not use excessive force on the buttons or attempt to disassemble the device. Damage to your products may result from improper use.
- Do not place heavy objects on the product. Damage to your products may result from improper use.

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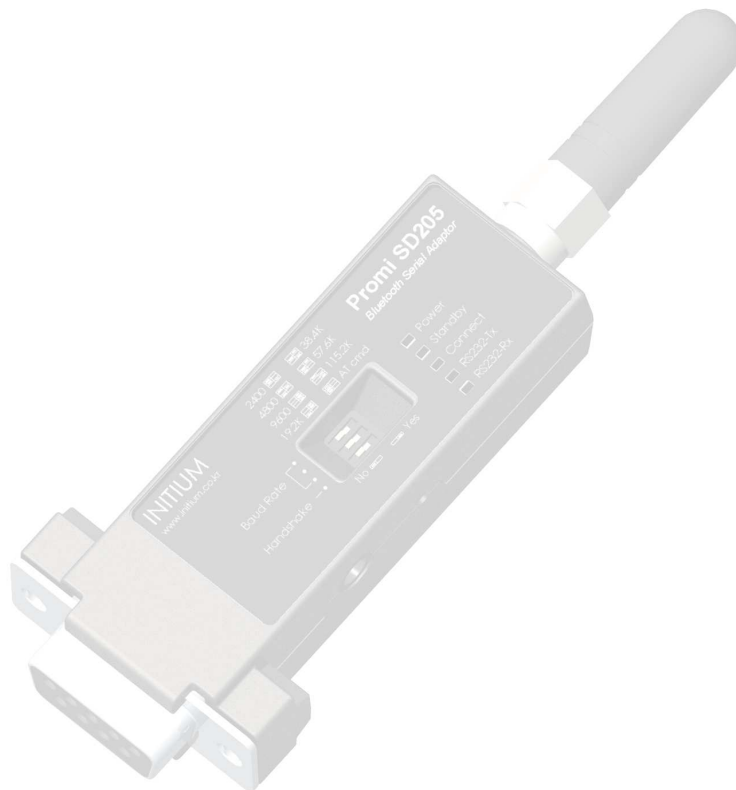
# 1. Getting Started

**Features of Promi-SD**

**Components**

**Assembly**

**Locating the Controls**



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## Features of Promi-SD

### ↳ Reliability and Interoperability

Promi-SD is a terminal device for wireless serial communication using the Bluetooth technology that is international standard of short range wireless communications. Promi-SD accomplishes more reliable wireless communication. As Promi-SD can communicate with other Bluetooth devices, user may construct various communications with it.

Promi-SD 202/205 OA provides wireless communication with communication range up to 100m (Promi-SD202, 205) for user's various applications. In terms of noise, Promi-SD delivers better quality of communication than standard RS232 cables.

### ↳ Compact Design

Promi-SD has the most compact design of the same kind devices and can be placed conveniently into any devices or equipments. Its detachable antenna of variety optimizes the quality and distance of wireless communications.

### ↳ Easy Configuration and Adaptation

Promi-SD can be configured and controlled by typical AT commands. User can easily configure Promi-SD on the terminal program such as HyperTerminal and implements the wireless communication without modifying user's existing serial communication program. In addition to the basic AT commands, Promi-SD provides some expanded AT commands for its various functions.

User friendly PromiWizard and PromiWIN are also provided for easy setup on Microsoft Windows.

For Promi-SD205, user can setup the serial port parameters by dip switch without PC.

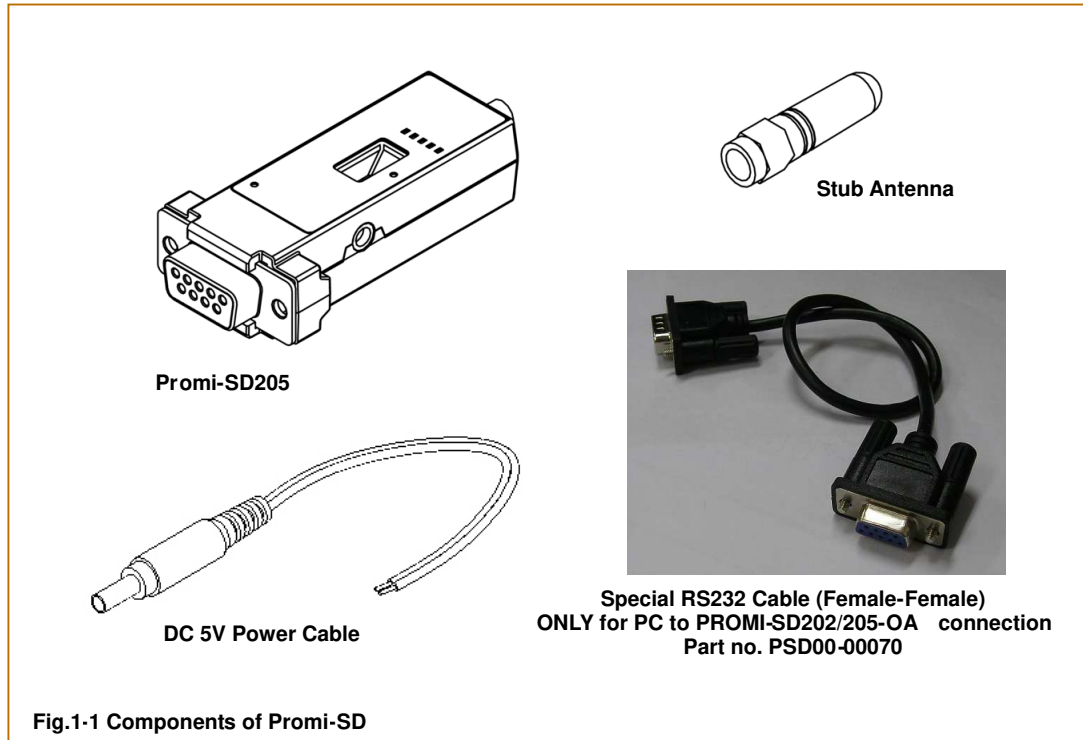
### ↳ Security

The FHSS (Frequency Hopping Spread Spectrum) technique of Bluetooth lets Promi-SD have less radio interference and no danger of hacking in air. Promi-SD also supports authentication and data encryption.

### ↳ Benefits

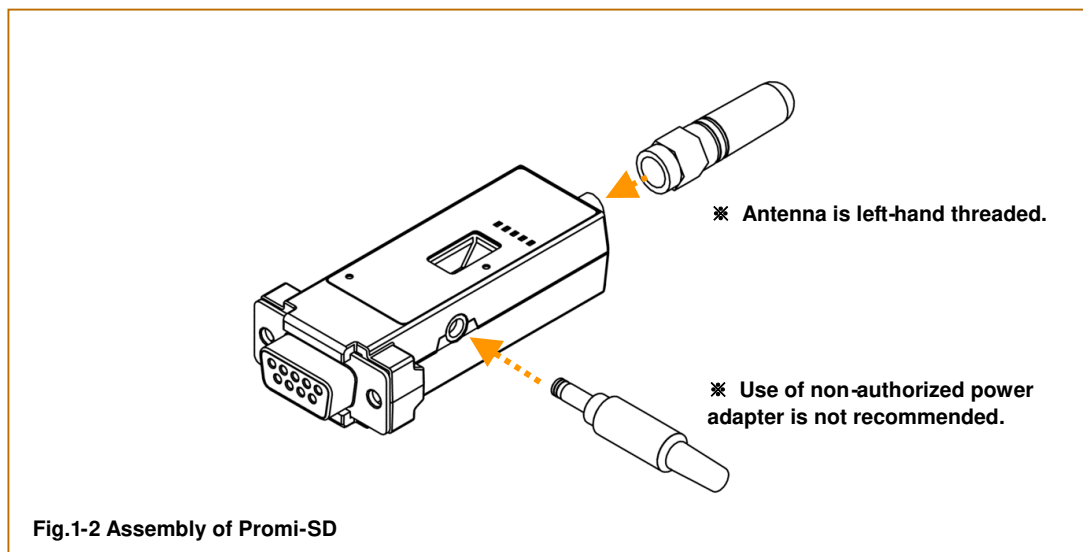
- No cable installation
- Free from the environmental limitations
- Easy relocation
- Simple maintenance

## Components

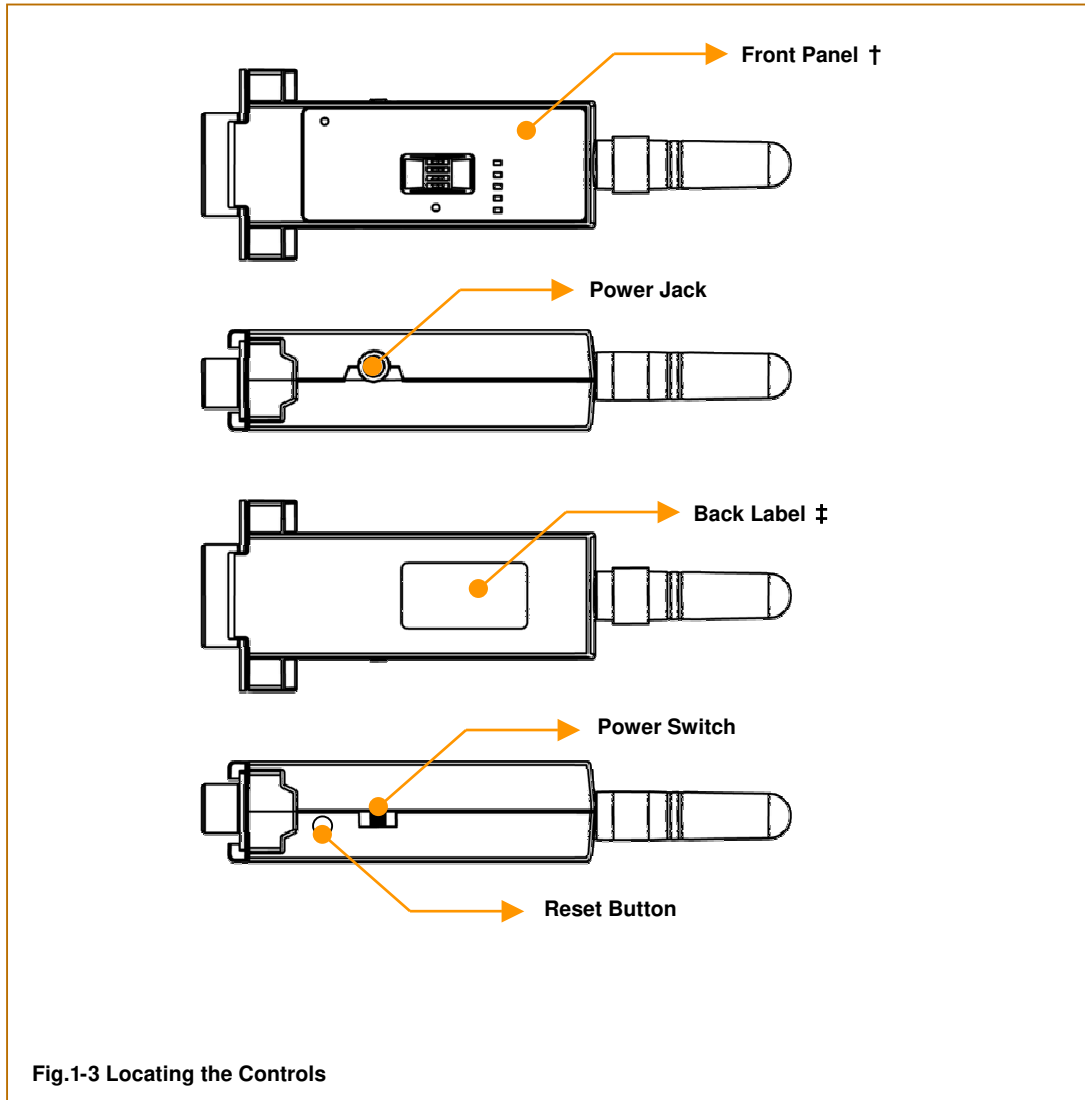


Please check the components of Promi-SD in Fig. 1-1 when purchasing. The picture of product may differ by models. The components of the package may change for improving product capacity or quality without notice.

## Assembly

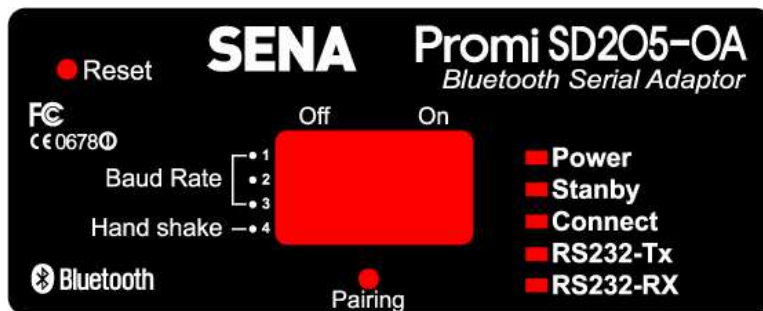


## Locating the Controls



↳

### ↳ Front Panel †





## 2. Configurations

**Operation Modes**

**LED Indicators**

**Serial Ports**

**Reset to Factory Defaults**

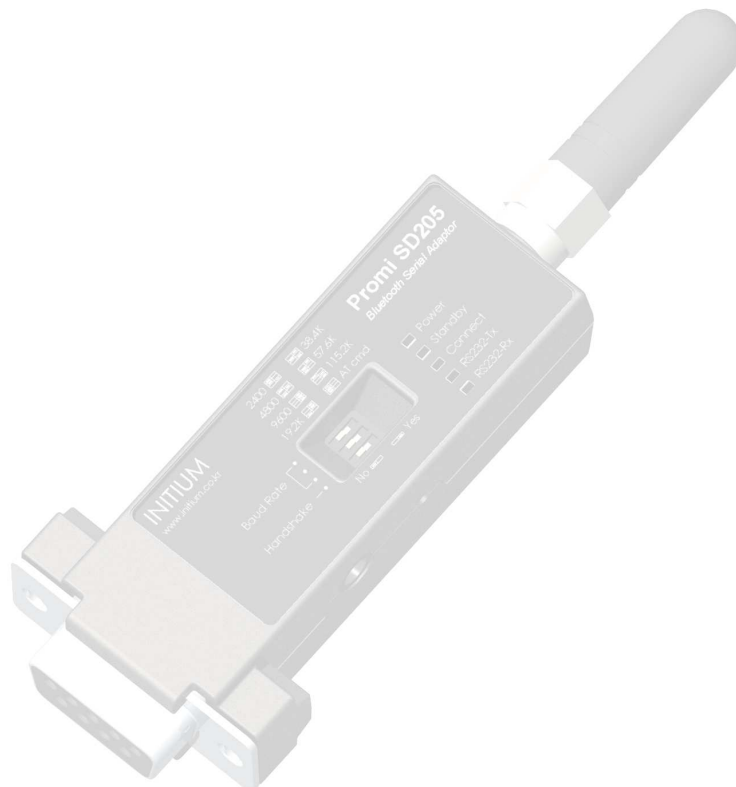
**PromiWizard™**

**PromiWIN™**

**Terminal Program**

**Dip Switch**

**Pairing Button**



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## Operation Modes

In addition to the serial port configurations such as bit/second, data bit, parity, stop bit, flow control, Promi-SD has some configurations for Bluetooth. For getting the most out of Promi-SD, user should understand the following Bluetooth connection schemes.

A Bluetooth device can play a role as a master or slave. Master tries to connect itself to other Bluetooth device, and slave is waiting to be connected from other Bluetooth devices. A Bluetooth connection is always made by a pair of master and slave. A slave can be in two modes, Inquiry Scan or Page Scan mode. Inquiry Scan mode is waiting the packet of inquiry from other Bluetooth devices and Page Scan mode is waiting the packet of connection from other Bluetooth devices. Every Bluetooth device has its unique address, called BD (Bluetooth Device) address, which is composed of 12 hexa-decimal numbers.

Promi-SD has 4 operation modes as follows. Each mode can be identified with LED indicators as illustrated in next section.

### ↳ **Mode0**

Promi-SD must be in Mode0, when it is directly controlled by AT commands.

In this mode, there is no response when power on or software reset, and Promi-SD is just waiting for AT command input. Neither master nor slave is assigned to Promi-SD in mode0. User can change the configurations of Promi-SD in this mode.

The factory default is set to Mode0.

### ↳ **Mode1**

Promi-SD tries to connect the last connected Bluetooth device.

Promi-SD in Mode1 is to be a master and tries to connect the last connected Bluetooth device. Promi-SD always stores the BD address of the Bluetooth device to which Promi-SD has connected last time. When Promi-SD is initially used or after hardware reset, there is no BD address stored in Promi-SD. In this case, Mode1 does not make any sense and mode change from other operation modes to Mode1 is not allowed. The mode change to Mode1 can be made after Promi-SD succeeds to connect to other Bluetooth device in Mode0. Once changed to Mode1, Promi-SD will try to connect automatically the last connected Bluetooth device whenever power on or software reset.

Promi-SD in Mode1 cannot be discovered or connected by other Bluetooth devices.

### ↳ **Mode2**

Promi-SD is waiting for the connection from the last connected Bluetooth device.

Promi-SD in Mode2 is to be a slave and waiting for the connection only from the last connected Bluetooth device. Just like Mode1, if there is no BD address stored in Promi-SD, the mode change from other operation modes to Mode2 is not allowed. Once changed to Mode2, Promi-SD will wait for the connection from the last connected Bluetooth device whenever power on or software reset.

Promi-SD in Mode2 cannot be discovered or connected to Bluetooth devices other than the last connected device.

### ↳ **Mode3**

Promi-SD is waiting for the connection from any other Bluetooth devices.

Promi-SD in Mode3 acts like in Mode2, but allows any connection from other Bluetooth device. Most of general Bluetooth device is set to Mode3.

Promi-SD in Mode3 can be discovered and connected from any other Bluetooth devices.



## LED Indicators

Indicator	Power LED	Standby LED	Connect LED
Mode0	Green	Red	
Mode1	Green		Green (every 1 sec)
Mode2	Green		Green (every 3 sec)
Mode3	Green		Green (every 3 sec)
Connected	Green		Green

RS232-Tx and RS232-Rx LED are blinking accordingly when data is transmitted. For small data transmission, it may be hard to recognize the quick blinking.

## Serial Ports

The applicable settings for serial ports are as follows.

Serial Port Settings	Values
Baud rate	1200, 2400, 4800, <span style="border: 1px solid black; padding: 2px;">9600</span> , 19200, 38400, 57600, 115200, 230400
Data bit	<span style="border: 1px solid black; padding: 2px;">8</span>
Parity	<span style="border: 1px solid black; padding: 2px;">No parity</span> , Even parity, Odd parity
Stop bit	<span style="border: 1px solid black; padding: 2px;">1</span> , 2
Hardware Flow Control	No use

The values in box are the factory defaults.

### ➤ Data Bit

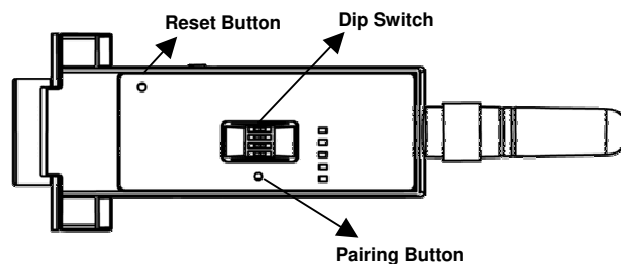
Promi-SD supports only 8 data bit. In the case of 7 data bit, please contact the technical support.

## Reset to Factory Defaults

To turn back all the configurations to its factory settings, press the reset button depicted in Fig. 1-3. Press the reset button with a narrow pointed tool like paper clip longer than 1 second. Reset works only when power is on.

## Dip Switch (Promi-SD205 OA)

This feature is only on Promi-SD205 OA. With the combination of 4 slot dip switches, baud rate can be set simply without host computer.



Upper 3 dip switches are used for setting baud rate. If the baud rate needs to be set out of the range given below, PromiWIN or terminal program should be used for extended AT commands. At this time combination of dip switches must be complied with AT cmd. Then baud rate will go back to 9600 as default.

Baud Rate	2400	4800	9600	19.2K	38.4K	57.6K	115.2K	AT cmd
Hardware Flow Control Handshaking	No use	No use						

## Pairing Button

Promi-SD205-OA provides Pairing Button for instant configuration without PC to make an automatic connection between two Promi-SDs. For convenience sake, name two Promi-SDs as SD1 and SD2 respectively.

Turn off all the nearby Promi-SD

Turn on SD1 and SD2 and hardware reset both of them by pressing Reset Button.

Press the Pairing Button of SD1 for 2 seconds until Standby LED turns off and Connect LED blinks 3 times every 2 seconds. Keep the power ON.

Press the Pairing Button of SD2 for 2 seconds until Standby LED turns off and Connect LED blinks 3 times every 2 seconds. Now press again the Pairing Button for 2 seconds until Connect LED blinks every 0.5 second.

Wait for SD1 & SD2 to be connected for a while until Connect LED's of SD1 and SD2 is lit in green. It takes about 10 seconds to make a connection. If there are many Bluetooth devices nearby, it will take a little bit more.

Turn SD1 off and on. Connect LED blinks twice in green every 3 seconds.

Turn SD2 off and on. Connect LED blinks once in green every 1 second.

Now a pair of Promi-SD is configured to make automatic connection, whenever power off and on.

Just use this pair of Promi-SD like virtual serial cable.

\* Note: While pairing is progressing through the pairing buttons, the Command Response doesn't operate automatically. Then, the response messages such as OK, Connect, Disconnect and so on are not sent by Promi-SD.

SD 1	status	LED	SD 2	status	LED
1. hard reset	Mode0	Standby LED turn on.	1. hard reset	Mode0	Standby LED turn on.
2. push pairing button	Mode3	Connect LED blinks 3 times every 2 sec.	2. push pairing button	Mode3	Connect LED blinks 3 times every 2 sec.
3.			3. push pairing button again	Mode1	Connect LED blinks every 0.5 sec.
4. connected	Slave	Connect LED is lit in green	4. connected	Master	Connect LED is lit in green

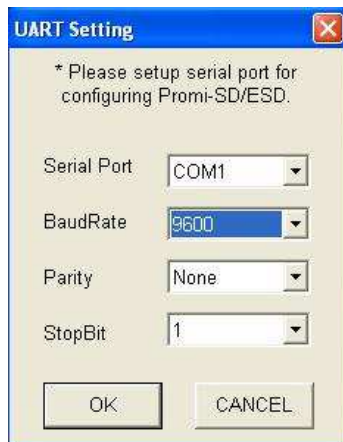
## Configuration Software

Configuration Software	Usage	Operating Platform
PromiWIN	Individual setup of Promi-SD	MS Windows 98SE or higher
PromiUpdater	Firmware Update	MS Windows 98SE or higher

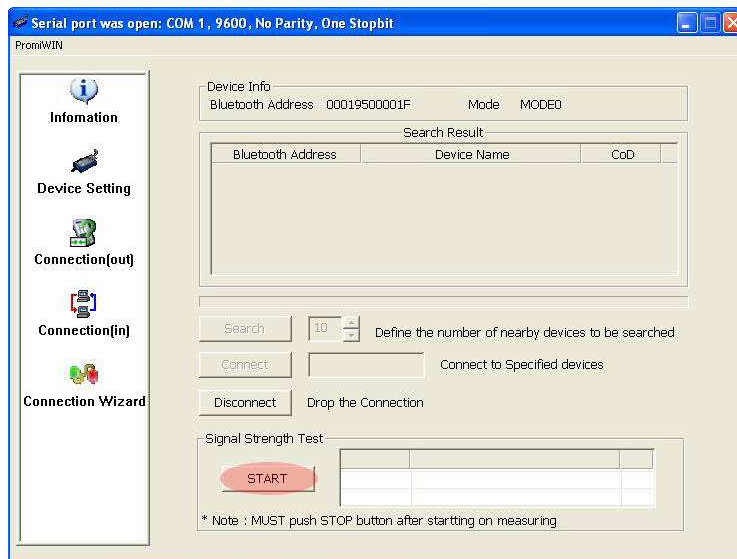
This configuration software comes with the product, which also can be downloaded from <http://www.sena.com>

## PromiWIN

PromiWIN is a program running on Microsoft Windows for the configuration of Promi-SD. Install PromiWIN on your computer. Plug a Promi-SD into the serial port of the computer and turn on the power. Run PromiWIN.



Set each option properly and click [Confirm]. If the settings are different from the host computer, error message will pop up. If the Promi-SD is in the status of connection, warning message will pop up. Then the current connection can be cancelled by [Disconnect] button on the main window.



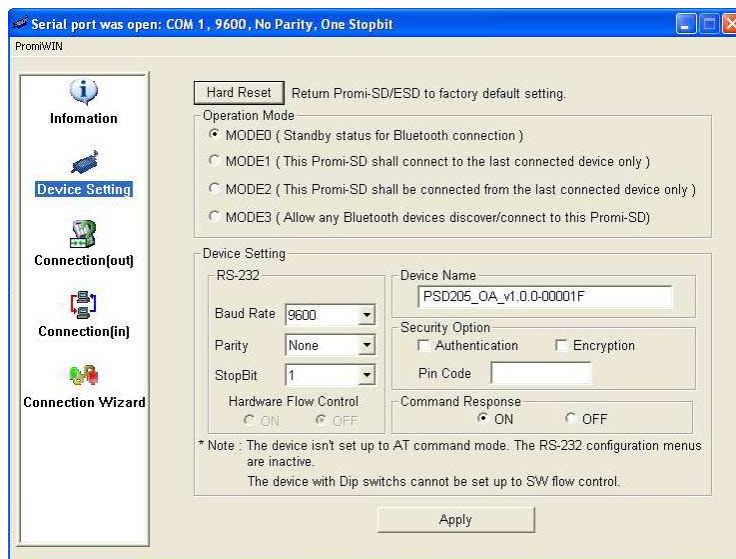


Serial port settings can be changed by <Start Configuration> and <PromiWIN Configuration> of PromiWIN in the menu bar at upper left corner of the window without re-running the PromiWIN program.



The icons in the left side window come to the corresponding windows.

In device configuration window, hardware reset can be executed or operation mode and RS232 can be configured as well. Security option also can be configured in this window.



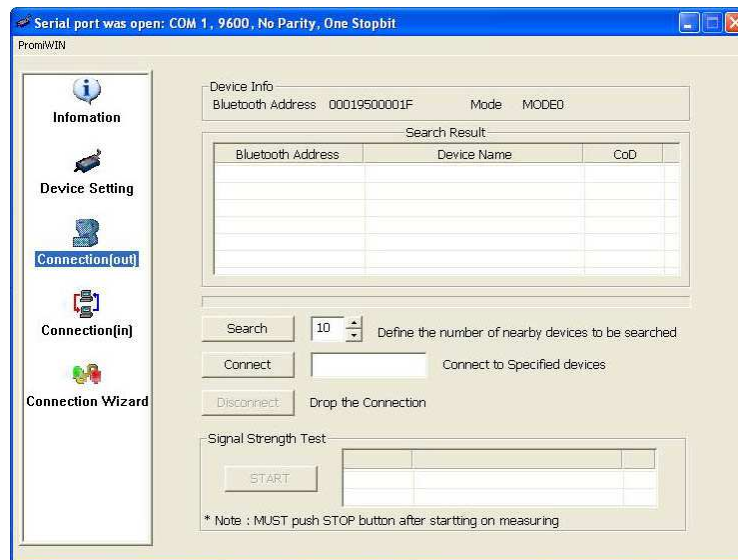
Promi-SD supports two security options, Authentication and Encryption. If you check the Authentication option, you must also enter the Pin Code value. If the authentication is activated, the connection, only between the Master and Slave device that share the same Pin Code, is established. In case that Promi-SD connects to other Bluetooth device, you must enter the other device's Pin Code in Promi-SD. In general Bluetooth devices, 1234 or 0000 is used as a default value. If you check Encryption option, the Promi-SD encrypts packets and sends them. The Encryption options works well in case that only one between Master and Slave uses this option.

Promi-SD has 4 response messages, 'OK', 'ERROR', 'CONNECT', and 'DISCONNECT'. In some cases, these responses can affect the host system unexpectedly. To prevent this, user can set the Command response to ON or OFF.

For Promi-SD205 OA pin 4 and pin 5 are connected in the hardware to disable hardware flowcontrol. Thus H/W Flow Control option will not work in this case. When the dip switch value isn't ATcommand mode, the RS-232 menu is disabled.

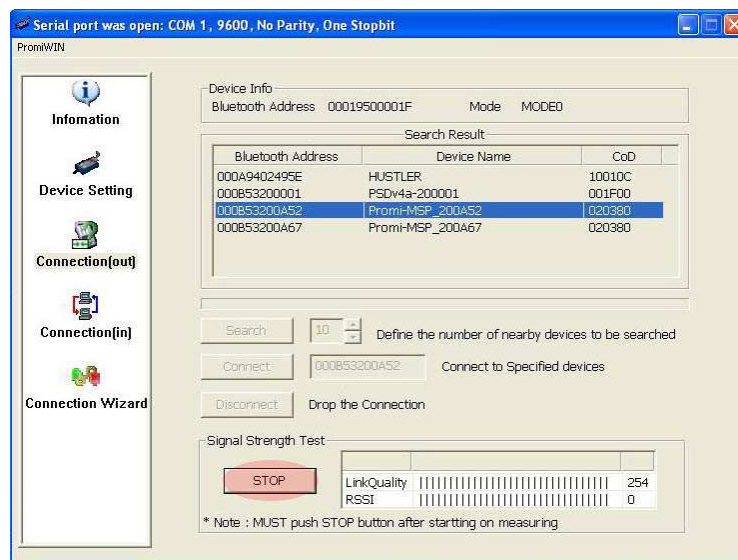
Click [Apply] button to reflect the given options to Promi-SD actually.

Connect(out) icon will show the following window to search and connect other Bluetooth devices.



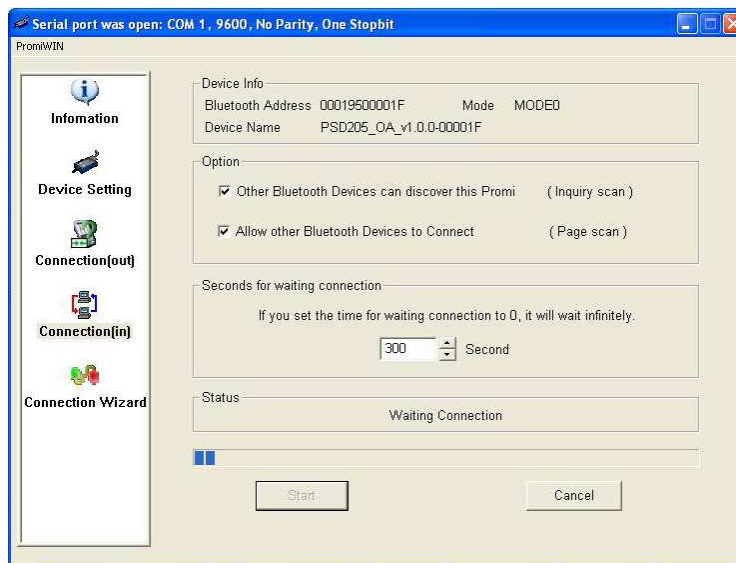
Click [Search] button to search nearby Bluetooth devices. The maximum number of devices to be searched can be controlled. Select one of the devices searched and click [Connect] button. The selected Bluetooth device must be in Page scan mode. Click [Disconnect] button to cancel the connection normally.

After the connection is established, you can test sensitivity through the START button.

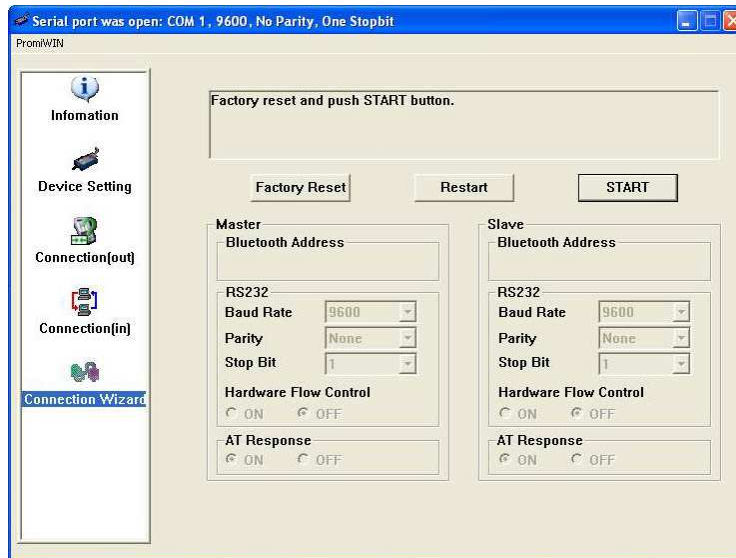


The sensitivity test shows LinkQuality and RSSI values. If the LinkQuality approaches to 255 and RSSI approaches to 0, the sensitivity is good. In general, when the distance is 10 meters, the sensitivity is the best. You can push the STOP button in order to terminate the sensitivity test. The sensitivity test will continue until the STOP button is pushed. If you close the PromiWin without pushing the STOP button, you must restart SD to terminate the test.

Connection(in) icon will show the following window to make Promi-SD wait to a connection from the other Bluetooth device. The waiting time in seconds can be controlled. With 0 input for this waiting time, Promi-SD keeps waiting for connection until [Cancel] button is clicked.



If the Connection Wizard icon is clicked, an easy pairing menu to use appears as follows:



This menu help pairing configuration of Promi-ESD that hasn't pairing button. Although this menu can be used to pairing configuration of Promi-SD that has pairing button, pairing configuration through pairing button is recommended. To use this menu, follow next steps.

1. Connect the first SD and then push the START button.
2. Disconnect the first SD, connect the second ESD and then push the Next button after setting up Slave configuration. At this time, the dip switch value should be ATcommand mode.
3. Disconnect the second SD, once again connect the first ESD and then push the Finish button. The pairing configuration finished. Make sure that each SD's connect LED is on. From now, when the SD restarts the pairing connection will be established automatically.

## PromiUpdater

Promi-SD supports firmware updates. You can download new firmware images for the Promi-SD at <http://www.sena.com>. With the PromiUpdater, you can update the firmware of Promi-SD by selecting the firmware image file and pushing Start button.

\* Note: DO NOT power off Promi-SD while the firmware update is progressing, this may damage the Promi-SD.



## Terminal Program

A terminal program is an application that will enable a PC to communicate directly with a modem. If you are using Windows 98SE or higher version of Windows, HyperTerminal program as it is included as part of the operating system. Promi-SD provides some extended AT commands for its configurations on terminal program.

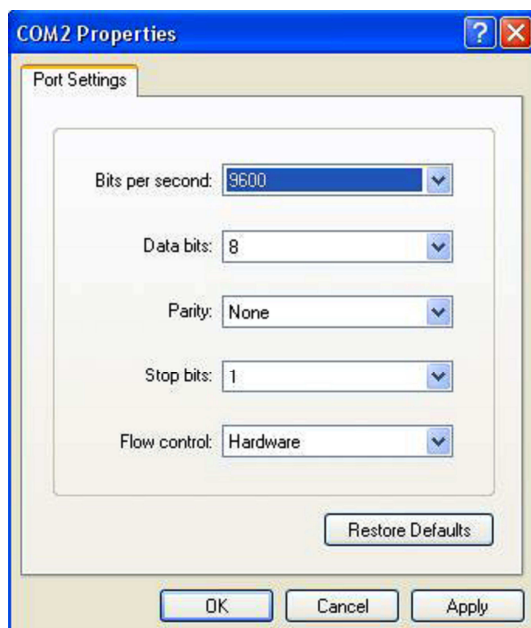
This manual will explain the method using HyperTerminal. If you need to install HyperTerminal, click start>setting>control panel>add/remove programs. For more precise information, please refer to Help of Microsoft Windows.

Attach Promi-SD to serial port of PLC and power on. Check Status LED (Promi-SD202/205 OA) or Standby LED (Promi-SD205) is lit in green.

Launch HyperTerminal. It can be found in start >programs >accessories >communication >HyperTerminal. Select the Serial port that Promi-SD will be connected to.

Input the same settings into Serial port configuration window as Promi-SD settings.

The settings need to be set correctly, otherwise, error message may be shown up on the screen or cause malfunctioning of Promi-SD.



Choose the settings in File->Properties->Settings->ASCII setup that let you turn echo on in HyperTerminal; this will show the response Promi-SD sends on the screen.

You now get the HyperTerminal window where you are able to control Promi-SD with AT commands. For expanded AT commands that Promi-SD provides, please refer to Appendix A. AT commands.

Example of AT commands:

```
AT+BTINFO?  
000B53000509,PSDv3b-000509,MODE0,STANDBY,0,0,HWFC
```

```
OK
```

```
AT+BTINQ?  
000B5320007E,PSDv2a-20007E,001F00
```

```
0004B300E205,AP2002:1 #0,020300
```

```
OK
```

```
ATD000B53000509
```

```
OK
```

```
CONNECT 000B53000509
```

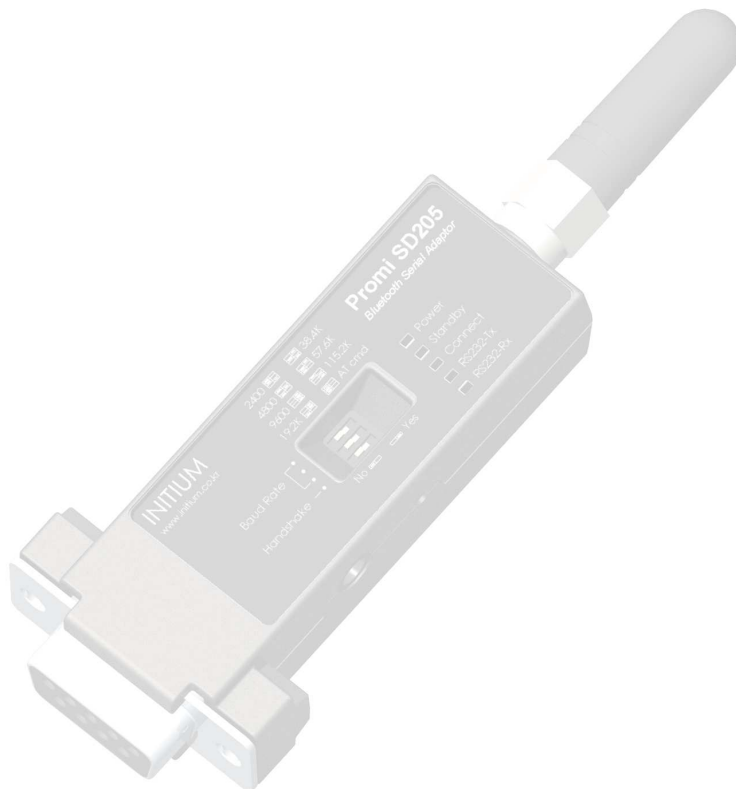


## 3. Connections

**RS232 Interface**

**Pin Assignment**

**Power Supply**



get **UNWIRED**, it's easy!

## RS232C Interface

### ↳ RS232C

In the early 1960s, a standards committee, today known as the Electronic Industries Association, developed a common interface standard for data communications equipment. At that time, data communications was thought to mean digital data exchange between a centrally located mainframe computer and a remote computer terminal, or possibly between two terminals without a computer involved. These devices were linked by telephone voice lines, and consequently required a modem at each end for signal translation. While simple in concept, the many opportunities for data error that occur when transmitting data through an analog channel require a relatively complex design. It was thought that a standard was needed first to ensure reliable communication, and second to enable the interconnection of equipment produced by different manufacturers, thereby fostering the benefits of mass production and competition. From these ideas, the RS232 standard was born. It specified signal voltages, signal timing, signal function, a protocol for information exchange, and mechanical connectors. Refer the following site for details;

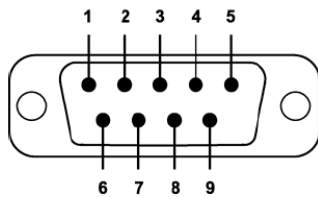
[http://www.camiresearch.com/Data\\_Com\\_Basics/RS232\\_standard.html](http://www.camiresearch.com/Data_Com_Basics/RS232_standard.html)

### ↳ DTE/DCE

If the full EIA232 standard is implemented as defined, the equipment at the far end of the connection is named the DTE device (Data Terminal Equipment, usually a computer or terminal), has a male DB9 connector. Equipment at the near end of the connection (the telephone line interface) is named the DCE device (Data Circuit-terminating Equipment, usually a modem), has a female DB9 connector. The cable linking DTE and DCE devices is a parallel straight-through cable with no cross-overs or self-connects in the connector hoods. If all devices exactly followed this standard, all cables would be identical, and there would be no chance that an incorrectly wired cable could be used.

### ↳ DB9 Male

Promi-SD is a DCE device compatible with RS232 standard, having DB9 male interface.



## Pin Assignment

Pin #	Signal	Direction	Description
1	N/A	-	
2	RxD	Input	Received Data
3	TxD	Output	Transmitted Data
4	N/A	-	
5	N/A	-	
6	Vcc	Input	Ring Indicator
7	N/A	-	
8	N/A	-	
9	GND	-	Signal Ground