# 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 | | | O | O | |

## ↘ Limited Liability

Neither the manufacturer, importers nor dealers is responsible for any accidental damage including bodily injury or any damage resulting from misuse or unsuitable operation by you. The information on this manual is prepared with the current product specifications. The manufacturer, Sena Technologies, Inc., is adding new features to the product and may persistently apply new technologies hereafter. All standards may be changed at any time without notice.

# 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.

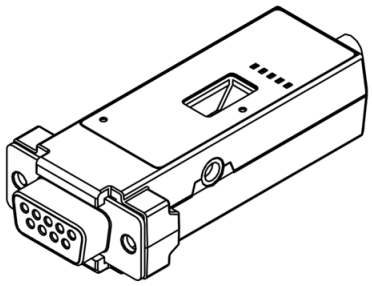
## ↘ Security

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.

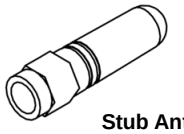
## ↘ Benefits

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

# Components

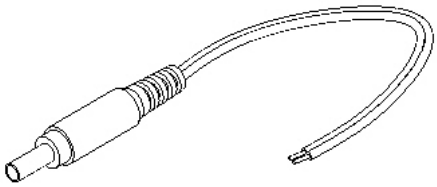


Promi-SD205



Stub Antenna

Special RS232 Cable (Female-Female)
ONLY for PC to PROMI-SD202/205-OA connection
Part no. PSD00-00070

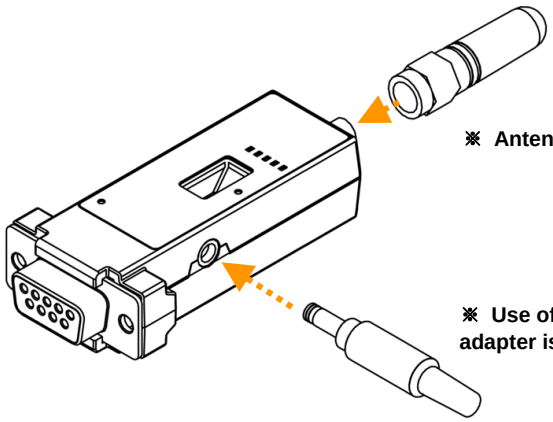


DC 5V Power Cable

**Fig.1-1 Components of Promi-SD**

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



※ Antenna is left-hand threaded.

※ Use of non-authorized power adapter is not recommended.

**Fig.1-2 Assembly of Promi-SD**

# Locating the Controls

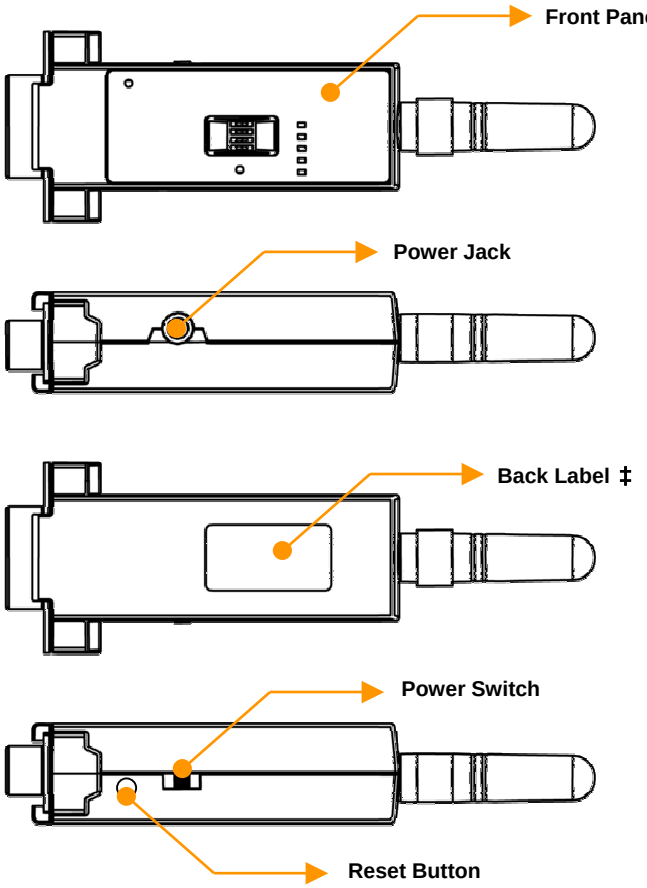
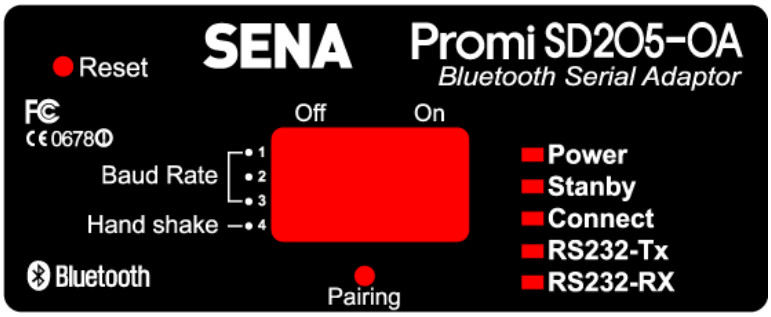



**Fig.1-3 Locating the Controls**

↘

## ↘ 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, [9600], 19200, 38400, 57600, 115200, 230400 |
| Data bit | [8] |
| Parity | [No parity], Even parity, Odd parity |
| Stop bit | [1], 2 |
| Hardware Flow Control | No use |

The values in box are the factory defaults.

### ↘ Data Bit

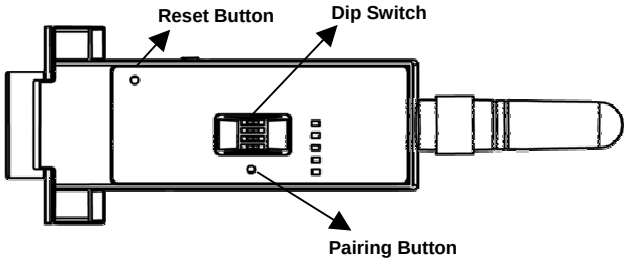
Promi-SD supports only 8 data bit. In the case of 7 data bit, please contact the technical support.

# 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 agian | 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 |

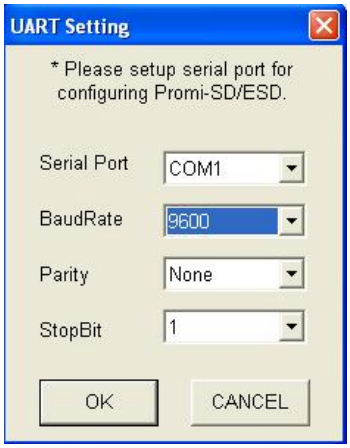
# Configuration Software

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

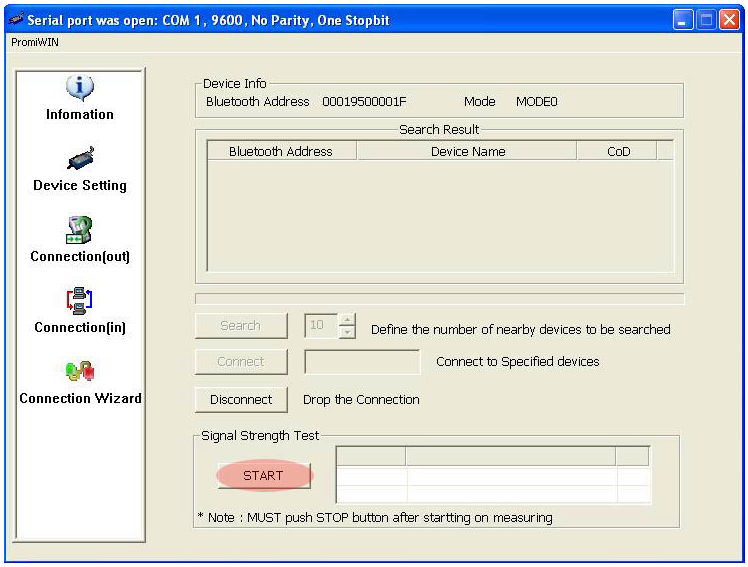
This configuration software comes with the product, which also can be downloaded from http://www.sena.com

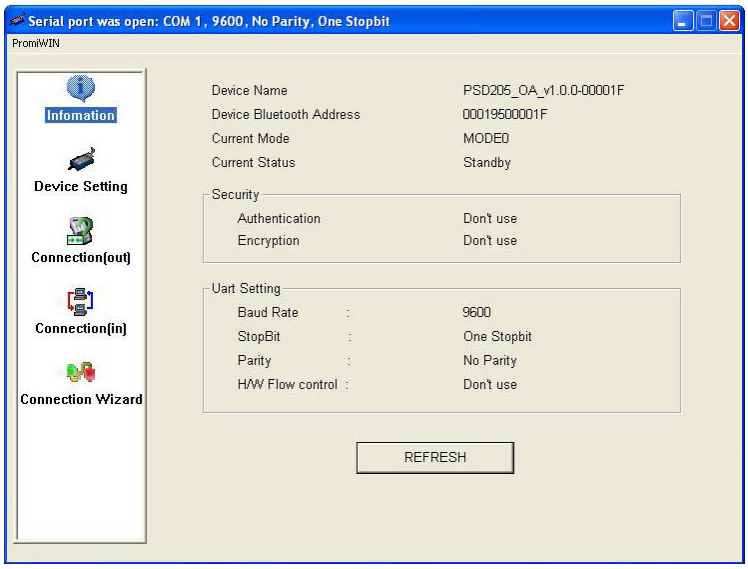
# PromiWIN

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.

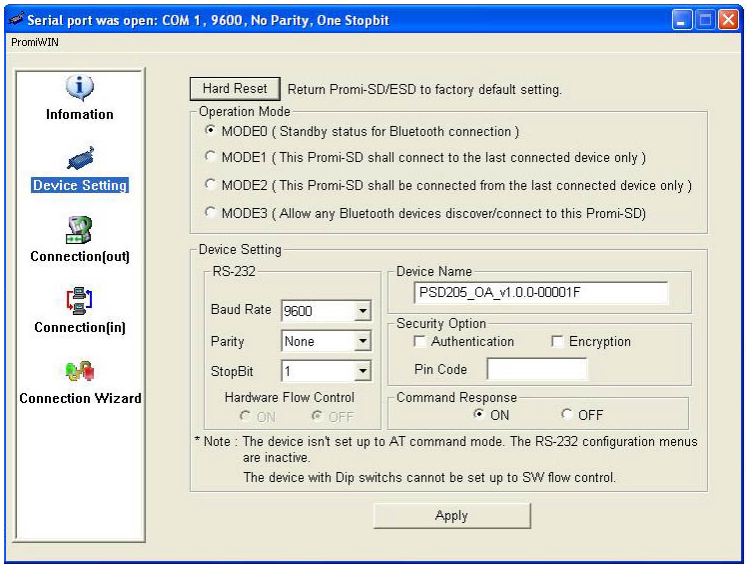






Serial port settings can be changed by <Start Configuration> and <PromiWIN Configuration> of PromiWIN in the menu bar at upper left corner of the window without re-running the PromiWIN program.


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.



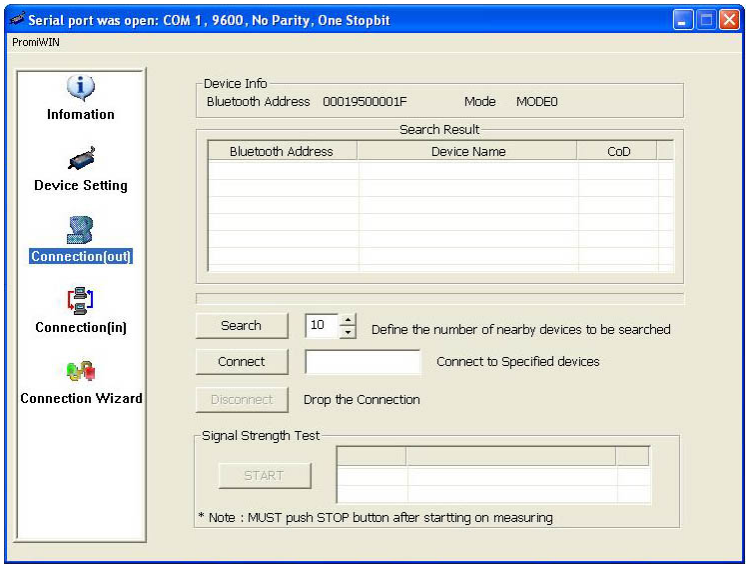

Promi-SD supports two security options, Authentication and Encryption. If you check the Authentication option, you must also enter the Pin Code value. If the authentication is activated, the connection, only between the Master and Slave device that share the same Pin Code, is established. In case that 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.

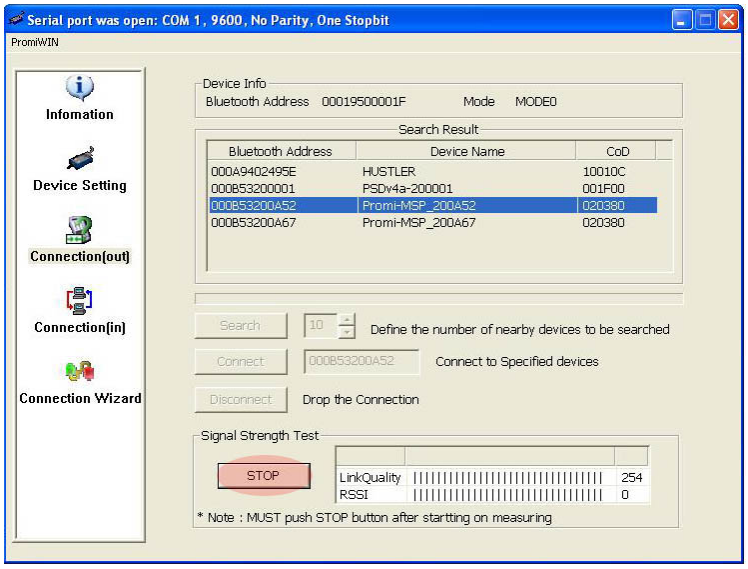
Click [Apply] button to reflect the given options to Promi-SD actually.

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



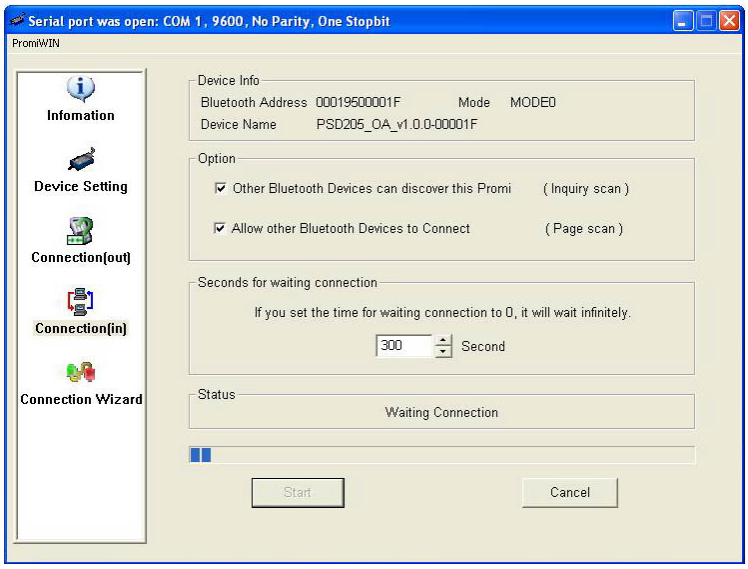

Click [Search] button to search nearby Bluetooth devices. The maximum number of devices to be searched can be controlled. Select one of the devices searched and click [Connect] button. The selected Bluetooth device must be in Page scan mode. Click [Disconnect] button to cancel the connection normally.

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

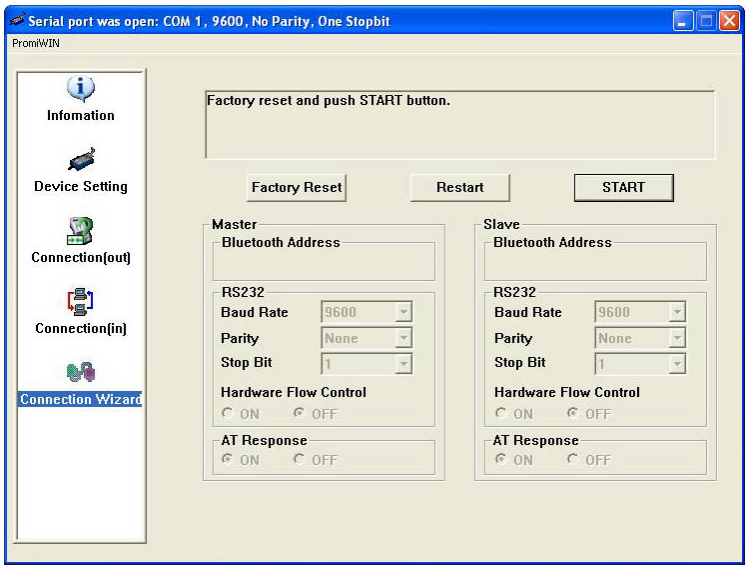



The sensitivity test shows LInkQuality and RSSI values. If the LinkQuality approaches to 255 and RSSI approaches to 0, the sensitivity is good. In general, when the distance is 10 meters, the sensitivity is the best. You can push the STOP button in order to terminate the sensitivity test. The sensitivity test will continue until the STOP button is puished. If you close the 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.

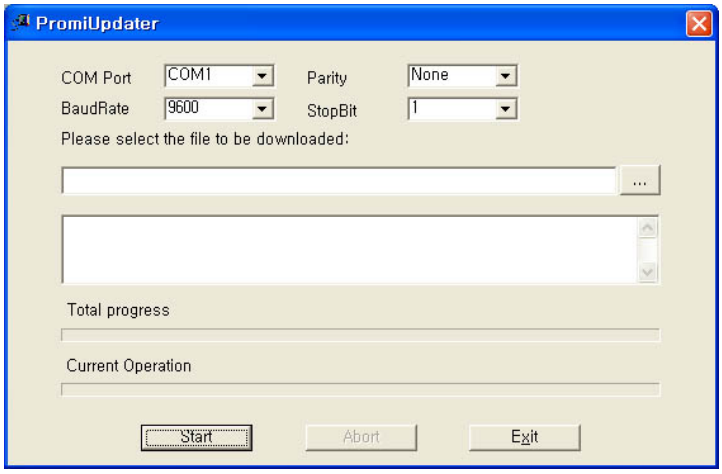
2. Disconnect the first SD, connect the second ESD and then push the Next button after setting up Slave configuration. At this time, the dip switch value should be ATcommand mode.

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.

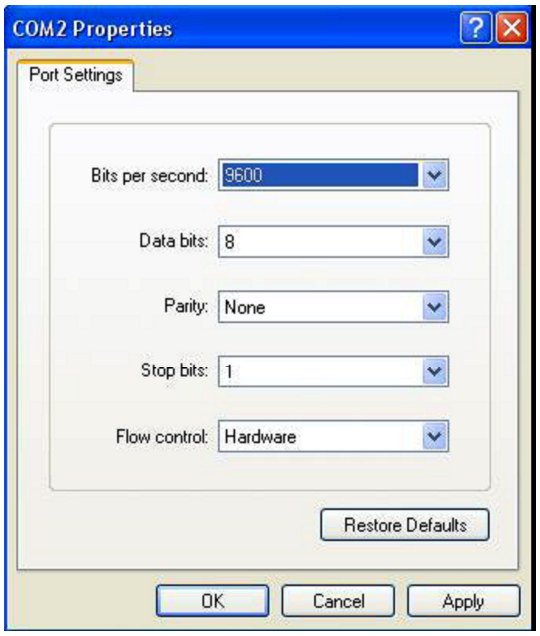
This manual will explain the method using HyperTerminal. If you need to install HyperTerminal, click start>setting>control panel>add/remove programs. For more precise information, please refer to Help of Microsoft Windows.

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

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# 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;

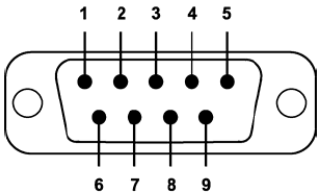
http://www.camiresearch.com/Data_Com_Basics/RS232_standard.html

### ↘ 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 |

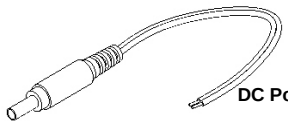
# Power Supply

Promi-SD can be supplied power through the power jack and through pin 6 of DB9 connector.

## ↘ Through Power Jack

DC 5 ~ 12V, Min. 150mA power should be supplied through DC power cable. Red cable is positive and black one is negative.

**Electrical Polarity**

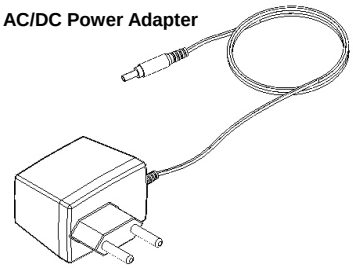


**DC Power Cable**

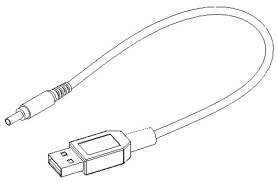
**Red +**
**Black -**

AC/DC power adaptor and USB power cable are also available to supply power.

**AC/DC Power Adapter**



**USB Power Cable**



## ↘ Through Pin 9 of DB9 connector

The power can be supplied through pin 9 of DB9 connector. Because Promi-SD does not have any protection circuit from surge, it must be constant voltage of 5 ~ 12V. Because SD have a Reset-Chip, when the power is not adequate SD will restart.

**Special RS232 Cable (Female-Female)**
**ONLY for PC to PROMI-SD202-OA and PROMI-SD205-OA connection**
**Part no. PSD00-00070**

# 4. Trouble Shooting

## No Data Transmission

## Data Loss or Malfunctioning

## Transmission Delay

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# No Data Transmission

### ↘ COM Port Settings

Check whether the Baud rate of Promi-SD is same as that of its host equipment. If you do not know the current Baud rate of Promi-SD, initialize it to 9600 by pressing Reset Button. Note that in case of SD the baudrate setting does not change after reset.

Check whether the Data bit is set to 8. Promi-SD supports only 8 Data bit. If your host equipment uses 7 Data bit and even or odd parity, it can work as if it uses 8 Data bit and No parity. This is valid only when both DCE devices are Promi-SD. In this case, set both Promi-SDs to 8 Data bit and No parity. If one of DCE devices is other Bluetooth device such as Bluetooth USB dongle, please contact Technical Support.

Check whether the Parity and Stop bit of Promi-SD are same as those of its host equipment. Promi-SD supports No parity, Even parity and Odd parity, 1 and 2 Stop bit.

Promi-SD does not support RS-232 break signal.

### ↘ Pin Assignment

Promi-SD is DCE device. If your host equipment is DTE, plug Promi-SD directly to the host equipment or use straight RS-232 cable. If your host equipment is DCE, use cross over RS-232 cable (Null modem cable).

# Data Loss or Malfunctioning

### ↘ Hardware Flow Control

When transmitting large data with No use of Hardware Flow Control, Promi-SD will clear the data buffer unexpectedly. This possibility goes higher as the RF transmission environment is bad.

### ↘ SD Response

The messages of SD response may affect the function of host system. Set ATS10=0 not to send SD response to host system and try again. Refer Appendix B. for details.

# Transmission Delay

### ↘ RF Processing Delay

It takes 30msec approximately for a Promi-SD to complete the data transmission to the other side Bluetooth device. This time delay cannot be reduced and would be bigger as the RF transmission environment is bad. Do not use Promi-SD If your applications cannot allow this time delay.

### ↘ RF Transmission Environment

If there are lots of Bluetooth device working in a small area and/or the RF communication distance is too long and/or there are some obstacles affecting RF performance, Promi-SD repeats the transmission packet by packet due to interferences and/or low RF performance. This leads the transmission time delay.

# 5. Specifications

**Bluetooth Interface**

**Serial Interface**

**Power**

**Mechanical Dimensions**

**Environmental**

**Default Antenna**

**Power Consumption**

**Wireless Coverage**




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## ↘ Bluetooth Interface

- Bluetooth 1.2 specification compatible and qualified
- Protocol: RFCOMM, L2CAP, SDP
- Profiles: Serial Port Profile, Generic Access Profile, Service Discovery Profile
- Radio Frequency: 2.4 ~ 2.4738GHz
- Number of Channels: 79
- Transmission Power Class 2 (Promi-SD200)
- Data Transmission Rate: 380Kbps Max.

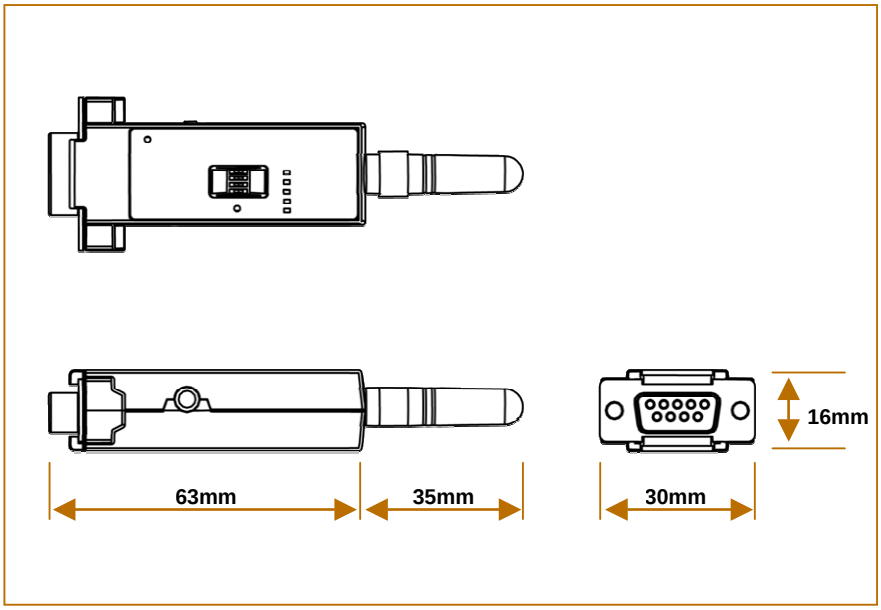
## ↘ Serial Interface

- EIA RS232C Standard
- Connector: DB9 female
- Data Transmission Rate: 1,200 ~ 230,400bps
- Hardware Flow Control: Off

## ↘ Power

- DC 5 ~ 12V Constant Voltage
- Supply: DC Jack or Pin 6 of DB9

## ↘ Mechanical Dimensions




## ↘ Environmental

- Recommended Operational Temperature: -20℃ ~ 70℃
- Recommended Operational Humidity: 90% Max. Non-condensing

## ↘ Default Antenna

- Type: Helical
- Frequency: 2,400 ~ 2,485GHz
- Gain: Max. 1dBi ±1
- Impedance: 50Ω
- size: 30mm×9mm (W×D)
- weight: 3.5g

## ↘ Power Consumption

The power consumption varies according to the operation status of Promi-SD. The table below shows the average measuring results in different operation modes with 1m communication distance.

| Operation Status | Consumption<br>Promi-SD205 OA |
|---|---|
| Not plugged into Serial port | 17mA |
| Plugged into Serial port | 31mA |
| Inquiry Scan | 106mA |
| Page Scan | 106mA |
| Inquiry & Page Scan | 64mA |
| Connected as Master device | 60mA |
| Connected as Slave device | 37mA |
| Connected in Park mode as Master device | 33mA |
| Connected in Park mode as Slave device | 32mA |
| Connected and Transmitting Data at 9600bps | 66mA |
| Connected and Transmitting Data at 115200bps | 80mA |

The power consumption will be increased as the communication distance is getting longer, but never exceeds 106㎃ in any case.

## ↘ Wireless Coverage

The table below shows the average measuring results in open space. These results can vary according to the environmental conditions.

| Antennas for two Promi-SD units | Maximum Distance<br>(SD205 OA) |
|---|---|
| Stub Antenna – Stub Antenna | 100m |
| Stub Antenna - Dipole Antenna | 150m |
| Dipole Antenna - Dipole Antenna | 200m |
| Patch Antenna - Dipole Antenna | 400m |
| Patch Antenna - Patch Antenna | 1,000m |

# Appendix A. AT Commands

## Terminology

## Command Category

## Command Description

## Command Validity

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# Terminology

## ↘ AT Command

AT command set is the .de facto standard.. .language. for controlling .modems.. The AT command set was developed by .Hayes. and is recognized by virtually all .personal computer. modems. Promi-SD provides the extended AT command set to control and configure the serial parameters and Bluetooth connection.

## ↘ AT Response

Promi-SD replies to AT commands with 4 kinds of message, 'OK', 'ERROR', 'CONNECT' and 'DISCONNECT'.

## ↘ Operation Mode

- Mode0: Waiting for AT commands
- Mode1: Attempting to connect to the last connected Bluetooth device
- Mode2: Waiting for the connection from the last connected Bluetooth device
- Mode3: Waiting for the connection from any other Bluetooth devices

## ↘ Operation Status

- Standby: Waiting for AT commands
- Pending: Executing tasks
- Connect: Transmitting data

## ↘ Security

- Authentication: Pin code (or Pass key)
- Encryption: Data encryption

## ↘ Symbols

The symbols are used for the description of command syntax as follows:

| Symbol | Meaning | ASCII Code |
|---|---|---|
| ↵ | Carriage return | 0x0D |
| ↙ | Line feed | 0x0A |
| ↯ | Carriage return + Line feed | |
| 112233445566 | Bluetooth device address | |
| n or m | One digit decimal number | |
| to | Timeout in second | |

# Command Category

| Command Category | | Index | AT commands |
|---|---|---|---|
| RESET | | 1 | ATZ |
| | | 2 | AT&F |
| SERIAL PORT | | 3 | AT |
| | | 4 | AT+UARTCONFIG,b,p,s |
| | | 5 | AT+USEDIP? |
| BLUETOOTH | Information | 6 | AT+BTINFO? |
| | | 7 | AT+BTINQ? |
| | | 8 | AT+BTLAST? |
| | | 9 | AT+BTVER? |
| | | 10 | AT+BTRSSI,n |
| | Mode | 11 | AT+BTMODE,n |
| | Status | 12 | +++ |
| | | 13 | AT+SETESC,nn |
| | | 14 | ATO |
| | | 15 | AT+BTCANCEL |
| | | 16 | AT+BTSCAN |
| | | 17 | AT+BTSCAN,n,to |
| | | 18 | AT+BTSCAN112233445566,to |
| | Connection | 19 | ATD |
| | | 20 | ATD112233445566 |
| | | 21 | ATH |
| | Security | 22 | AT+BTKEY=$string |
| | | 23 | AT+BTSD? |
| | | 24 | AT+BTCSD |
| | | 25 | AT+BTFP,n |
| | | 26 | AT+BTSEC,a,e |
| | Miscellaneous | 27 | AT+BTNAME=$string |
| | | 28 | AT+BTLPM,n |
| | Firmware Update | 29 | AT+DFU |
| S-REGISTER | | 30 | AT&V |
| | | 31 | ATSnn? |
| | | 32 | ATSnn=mm |

# Command Description

## 1 ATZ↵

| | |
|---|---|
| SD Response | ↯OK↯ |
| Purpose | Software Reset |
| Description | This is the same effect as power off and on.<br>This command disconnects Bluetooth device, and stops ongoing task. After rebooting, the status is decided by the preset operation mode.<br>Some AT commands need ATZ to take effect. |
| Reference | AT&F, AT+BTCSD, AT+UARTCONFIG |

## 2 AT&F↵

| | |
|---|---|
| SD Response | ↯OK↯ |
| Purpose | Hardware reset |
| Description | This is the same effect as initialization by reset button.<br>All parameters are initialized to factory defaults. The storage of Promi-SD is cleared completely. |
| Reference | ATZ |

## 3 AT↵

| | |
|---|---|
| SD Response | ↯OK↯ |
| Purpose | Check the connection status with host equipment |
| Description | Check if the connection to host equipment is normal. The serial parameters of Promi-SD must be same as those of host equipment. If not, SD response is none or 'ERROR' or abnormal sequence of strings. |
| Reference | AT+UARTCONFIG, ATZ, AT&F |

## 4 AT+UARTCONFIG,Baudrate,Parity,Stopbit

| | |
|---|---|
| SD Response | ↯OK↯ |
| Purpose | Set Serial parameters |
| Parameters | *Baudrate*=1200/2400/9600/14400/19200/38400/57600/115200/230400 (Default=9600)<br>*Parity*=N/E/O (Default=N)<br>*Stopbit*=1/2 (Default=1)<br>Hwfc = use dipswitch. |
| Description | The Serial parameters can be set or changed. The factory default is 9600, N, 1.<br>To take effect of this command, ATZ or power off and on. |
| Reference | AT, ATZ, AT&F, ATS |
| Example | AT+UARTCONFIG,9600,N,1 |

## 5 AT+USEDIP?

| | |
|---|---|
| SD Response | ↯*m*↯ |
| Purpose | Check the Baud rate set by dip switch |
| Description | *m*=0: Set to 'AT cmd'<br>*m*=1: Set to other than 'AT cmd' |
| Reference | AT, ATZ, AT&F, ATS |

## 6 AT+BTINFO? ↵

| | |
|---|---|
| SD Response | ↯112233445566,DeviceName,Mode,Status,Auth,Encryp,FlowControl↯<br>↯OK↯ |
| Purpose | Display Bluetooth settings |
| Description | The current Bluetooth settings are displayed including BD address, Device name, Operation mode, Operation status, Authentication, Data Encryption, and Hardware Flow Control. The initial value of Device name is 'PSD100v1.0.0-445566'. PSD stands for Promi-SD, v1.0.0 for the version of firmware, and 445566 for the last 6 digits of BD address.<br>Mode=MODE0/MODE1/MODE2/MODE3<br>Status=STANDBY/PENDING/CONNECT<br>Auth=0/1 (Authentication is not activated when 0)<br>Encrypt=0/1 (Encryption is not activated when 0)<br>FlowControl=HWFC/NoFC |
| Reference | AT+BTNAME, AT+BTMODE, AT+BTSEC, ATS14? |
| Example | ↯000B530011FF,SENA,MODE0,PENDING,1,1,HWFC↯ |

## 7 AT+BTINQ? ↵

| | |
|---|---|
| SD Response | ↯112233445566,FriendlyName,CoD↯<br>↯112233445566,FriendlyName,CoD↯<br>↯112233445566,FriendlyName,CoD↯<br>↯OK↯ |
| Purpose | Search Bluetooth devices nearby |
| Description | The Bluetooth devices in Inquiry scan mode nearby are displayed with their BD addresses, Device names, and Class of device.<br>Maximum 10 devices are scanned for 30 seconds. |
| Reference | AT+BTSCAN, ATD, AT+BTINFO? |

## 8 AT+BTLAST? ↵

| | |
|---|---|
| SD Response | ↯112233445566↯<br>↯OK↯ |
| Purpose | Display the BD address of the last connected device |
| Description | The Bluetooth device connected to this Promi-SD last time is displayed with its BD address. |
| Reference | AT+BTSCAN, ATD, AT+BTINFO?, AT+BTINQ? |

## 9 AT+BTVER? ↵

| | |
|---|---|
| SD Response | ↯SD100v1.0.0↯ |

| | |
|---|---|
| | ↯OK↯ |
| Purpose | Display device firmware version |
| Description | Display device firmware version |
| Reference | AT+BTINFO? |

## 10 AT+BTRSSI,n ↵

| | |
|---|---|
| SD Response | ↯OK↯<br>↯0,255,0,0↯(repeat) |
| Purpose | Set operation mode |
| Parameters | *n*=0: Start sensitivity test<br>*n*=1: Stop sensitivity test |
| Description | When Bluetooth connection is established, you can use this command in Stanby status. The sensitivity will be displayed repeatedly in order of Status, LinkQuality, Status, RSSI. If the LinkQuality is close to 255 and RSSI is close to 0, the sensitivity is not bad. |
| Example | +++<br>AT+BTRSSI,1<br>↯OK↯<br>0,255,0,0 |

## 11 AT+BTMODE,*n*↵

| | |
|---|---|
| SD Response | ↯OK↯ |
| Purpose | Set operation mode |
| Parameters | *n*=0: MODE0 (Default)<br>*n*=1: MODE1<br>*n*=2: MODE2<br>*n*=3: MODE3 |
| Description | When the operation status is 'Pending' currently, change the status to 'Standby' with AT+BTCANCEL prior to this command.<br>To take effect of this command, ATZ or power off and on. |
| Reference | AT+BTINFO? |
| Example | AT+BTMODE,2<br>↯OK↯<br>ATZ |

## 12 +++

| | |
|---|---|
| SD Response | ↯OK↯ |
| Purpose | Convert the operation status of 'Connect' to 'Standby' |
| Description | In 'Connect' status, data from host is transmitted to the other side Bluetooth device, and any AT command is not accepted but this command, which is not echoed on the screen.<br>When Promi-SD encounters a character '+' from host, it stops the data transmission and waits for next 2 characters. If the next 2 characters aren't both '+', it restart to transmit data including the first '+' as well. If not, it converts the operation status to 'Standby'.<br>If the data from host includes '+++', it will convert the operation status to 'Standby' unexpectedly. Notice that Promi-SD holds data transmission when it encounters '+', until receiving next character. |

| | |
|---|---|
| | '+' is an escape sequence character by default, which is changeable by AT+SETESC. |
| Reference | AT+SETESC, ATO, AT+BTCANCEL |

## 13 AT+SETESC,*nn*↵

| | |
|---|---|
| SD Response | ↯OK↯ |
| Purpose | Change the escape sequence character |
| Parameters | *nn*=Decimal number of ASCII code (Default=43) |
| Description | Escape sequence character set to '+' by default is changeable.<br>The parameter *nn* must be a printable character. |
| Reference | +++, ATO |
| Example | AT+SETESC,42 |

## 14 ATO↵

| | |
|---|---|
| SD Response | None |
| Purpose | Convert the operation status of 'Standby' to 'Connect' |
| Description | You can convert the operation status of 'Standby' to 'Connect' ready to transmit data. |
| Reference | +++, AT+SETESC |

## 15 AT+BTCANCEL↵

| | |
|---|---|
| SD Response | ↯OK↯ |
| Purpose | Terminate a current executing task |
| Description | This terminates a current executing task, such as Inquiry scan and Page scan, then converts the operation status to 'Standby'. |
| Reference | AT+BTSCAN, ATD, AT+BTINQ? |

## 16 AT+BTSCAN↵

| | |
|---|---|
| SD Response | ↯OK↯<br>↯CONNECT 1122334455661↯ |
| Purpose | Wait for inquiry and connection from other Bluetooth devices |
| Description | This allows the inquiry and connection from the other Bluetooth devices. The operation status will be in 'Pending' after this command. When connection is made and released, the operation status is back to 'Pending'. To convert the operation status to 'Standby' AT+BTCANCEL must be used.<br>This has the same effect as AT+BTSCAN,3,0.<br>When connection is made with other Bluetooth device, SD response will be 'CONNECT' with its BD address. |
| Reference | ATD, AT+BTINQ?, AT+BTCANCEL |

## 17 AT+BTSCAN,*n,to*↵

| | |
|---|---|
| SD Response | ↯OK↯<br>↯CONNECT 1122334455661↯ |

| | |
|---|---|
| | or<br>↯OK↯<br>↯ERROR↯ |
| Purpose | Wait for inquiry and connection from other Bluetooth devices for a given duration |
| Parameters | *n*=1: Allows Inquiry scan<br>*n*=2: Allows Page scan<br>*n*=3: Allows both of Inquiry scan and Page scan<br>*to* = Time duration in seconds |
| Description | For the given *to*, Promi-SD is waiting for the inquiry and connection from other Bluetooth devices. If the parameter of *to* is 0, it will wait forever.<br>When connection is made with other Bluetooth device, SD response will be 'CONNECT' with its BD address. If there is no connection made within this time duration, SD response is 'ERROR' and the operation status becomes to 'Standby'. |
| Reference | ATD, AT+BTINQ?, AT+BTCANCEL |
| Example | AT+BTSCAN,2,30 |

## 18 AT+BTSCAN112233445566,*to*↵

| | |
|---|---|
| SD Response | ↯OK↯<br>↯CONNECT 112233445566↯<br>or<br>↯OK↯<br>↯ERROR↯ |
| Purpose | Wait for connection by the Bluetooth device with given BD address |
| Parameters | 112233445566=BD address<br>*to* = time duration in seconds |
| Description | For the given *to*, Promi-SD is waiting for the connection from the Bluetooth device with the given BD address. If the parameter of *to* is 0, it will wait forever.<br>When connection is made with the Bluetooth device, SD response will be 'CONNECT' with its BD address. If there is no connection made within this time duration, SD response is 'ERROR' and the operation status becomes to 'Standby'. |
| Reference | ATD, AT+BTINQ?, AT+BTCANCEL |
| Example | AT+BTSCAN000B530011FF,30 |

## 19 ATD↵

| | |
|---|---|
| SD Response | ↯OK↯<br>↯CONNECT 112233445566↯<br>or<br>↯OK↯<br>↯ERROR↯ |
| Purpose | Connect to the last connected Bluetooth device |
| Description | Promi-SD saves the BD address of the Bluetooth device most recently connected. ATD can make connection to it without input its BD address.<br>If it fails to make connection, SD response is 'ERROR'. |
| Reference | AT+BTINQ?, AT+BTSCAN |

## 20 ATD112233445566↵

| | |
|---|---|
| SD Response | ↯OK↯<br>↯CONNECT 1122334455665↯<br>or<br>↯OK↯<br>↯ERROR↯ |
| Purpose | Connect to the Bluetooth device with given BD address |
| Parameters | 112233445566=BD address |
| Description | Promi-SD attempts to connect to the Bluetooth device with the given BD address. To make successful connection, the Bluetooth device must be in Page scan. This attempt continues for 5 minutes.<br>If it fails to make connection, SD response is 'ERROR'. |
| Reference | AT+BTINQ?, AT+BTSCAN |
| Example | ATD000B530011FF |

## 21 ATH↵

| | |
|---|---|
| SD Response | ↯OK↯<br>↯DISCONNECT↯ |
| Purpose | Release the current connection |
| Description | The current Bluetooth connection is released normally. It takes about 30 seconds to detect an abnormal disconnection such as power off and moving out of service range. |
| Reference | ATD, AT+BTSCAN |

## 22 AT+BTKEY=*$string*↵

| | |
|---|---|
| SD Response | ↯OK↯ |
| Purpose | Change pin code |
| Parameters | *$string*= New pin code (Default=" 1234" ) |
| Description | Pin code is a string, which allows 16 alpha-numeric characters maximum. Based on this pin code, Promi-SD generates a link key which is used in actual authentication process. |
| Reference | AT+BTCSD, AT+BTFP, AT+BTSD?, AT+BTSEC, ATZ, AT&F |
| Example | AT+BTKEY=" apple" |

## 23 AT+BTSD? ↵

| | |
|---|---|
| SD Response | ↯1122334455665↯<br>↯OK↯ |
| Purpose | Display the list of Bluetooth devices sharing the pin code |
| Description | Once a connection is made with pin code, Promi-SD saves the Bluetooth device with its link key generated by pin code. The connection to a device listed in Promi-SD can be made automatically without authentication process. The maximum number of the list is 5. |
| Reference | AT+BTCSD, AT+BTFP, AT+BTKEY, AT+BTSEC, ATZ, AT&F |

## 24 AT+BTCSD↵

| | |
|---|---|
| SD Response | ↯OK↯ |

| | |
|---|---|
| Purpose | Clear the list of Bluetooth devices sharing the pin code |
| Description | This clears the list of Bluetooth devices with link key in flash memory. To take effect of this command, ATZ or power off and on because the main memory still has the list. |
| Reference | AT+BTFP, AT+BTKEY, AT+BTSD?, AT+BTSEC, ATZ, AT&F |

## 25 AT+BTFP,*n*↵

| | |
|---|---|
| SD Response | ↯OK↯ |
| Purpose | Set generation of link key every time of connection |
| Parameters | *n*=0: Inactivate (Default)<br>*n*=1: Activate |
| Description | If *n* is set to 1, Promi-SD asks pin code every time of connection. This is used to level up the security. |
| Reference | AT+BTCSD, AT+BTKEY, AT+BTSD?, AT+BTSEC, ATD, ATZ, AT&F |

## 26 AT+BTSEC,Authentication,Encryption↵

| | |
|---|---|
| SD Response | ↯OK↯ |
| Purpose | Set authentication and data encryption |
| Parameters | *Authentication*=0: Inactivate (Default)<br>Authentication=1: Activate<br>*Encryption*=0: Inactivate (Default)<br>*Encryption*=1: Activate |
| Description | If the authentication is activated, the pin code must be set by AT+BTKEY command. Data encryption cannot be used when authentication is not activated, i.e. *Authentication*=0 and *Encryption*=1 is not valid. |
| Reference | AT+BTCSD, AT+BTFP, AT+BTSD?, AT+BTSD?, ATZ, AT&F |

## 27 AT+BTNAME=*$string*↵

| | |
|---|---|
| SD Response | ↯OK↯ |
| Purpose | Change device name |
| Parameters | *$string*= New device name (Default=”PSDv3b-445566”) |
| Description | Promi-SD can have a user friendly name to identify easily. The name allows 30 alpha-numeric characters maximum. |
| Reference | AT+BTINFO?, AT+BTINQ? |
| Example | AT+BTNAME=”My-Promi-SD” |

## 28 AT+BTLPM,*n*↵

| | |
|---|---|
| SD Response | ↯OK↯ |
| Purpose | Set low power mode |
| Parameters | *n*=0: Inactivate (Default)<br>*n*=1: Activate |
| Description | During no data transmission, Promi-SD can be in low power mode to save the power consumption. It takes a few seconds to wake up Promi-SD in low power mode. |

## 29 AT+DFU↵

| | |
|---|---|
| SD Response | (Display garbage messages repeatedly) |
| Purpose | Device firmware update |
| Description | DO NOT use this command in console. Because the SD enter into firmware update mode, garbage messages will appear. This command is used by PromiWin's firmware update menu. |

## 30 AT&V↵

| | |
|---|---|
| SD Response | ↯S0:m0;S1:m1; …Sn:mn↯<br>↯OK↯ |
| Purpose | Display all the S-register |
| Description | All parameters are stored at S-register in flash memory. These values are sustained until hardware reset. |
| Reference | ATS |

## 31 ATS*nn*? ↵

| | |
|---|---|
| SD Response | ↯value↯<br>↯OK↯ |
| Purpose | Display a given S-register |
| Parameters | *nn*= Address of S-register |
| Description | A specific S-register is displayed. |
| Reference | AT&V |

## 32 ATS*nn*=*mm*↵

| | |
|---|---|
| SD Response | ↯OK↯ |
| Purpose | Change S-register value |
| Parameters | nn= Address of S-register<br>mm= New value of S-register |
| Description | Some S-registers are optimized for the overall performance and protected from an arbitrary change by user. When users try to change these S-registers, SD response is 'ERROR'.<br>For details of S-register, refer Appendix. B. |
| Reference | AT&V |
| Example | ATS10=0 |

# Command Validity

| AT Command | Operation Status | | |
|---|---|---|---|
| | Standby | Pending | Connect |
| AT | ○ | ○ | |
| ATZ | ○ | ○ | |
| AT&F | ○ | ○ | |
| AT+BTINQ? | ◎ | | |
| ATD112233445566 | ◎ | | |
| ATD | ◎ | | |
| AT+BTSCAN | ◎ | | |
| AT+BTSCAN,n,to | ◎ | | |
| AT+BTSCAN112233445566,to | ◎ | | |
| AT+BTCANCEL | | ○ | |
| +++ | | | ○ |
| AT+SETESC | ◎ | | |
| ATO | ● | | |
| ATH | ● | | |
| AT+BTSEC,Auth,Encr | ◎ | | |
| AT+BTLAST? | ○ | ○ | |
| AT+BTMODE,n | ◎ | | |
| AT+BTNAME="Name" | ◎ | | |
| AT+BTKEY="nnnn" | ◎ | | |
| AT+BTINFO? | ○ | ○ | |
| AT+BTLPM,n | ◎ | | |
| AT+BTSD? | ○ | ○ | |
| AT+BTCSD | ◎ | | |
| AT+BTFP,n | ◎ | | |
| AT+UARTCONFIG,b,p,s (SD205) | ◎ | | |
| AT+USEDIP? | ○ | ○ | |
| AT+BTVER? | ○ | ○ | |
| AT+DFU | ◎ | ◎ | |
| AT+BTRSSI,n | ● | | |

◎ Valid only when Promi-SD is not connected to other Bluetooth device.

● Valid only when Promi-SD is connected to other Bluetooth device.

# Appendix B. S-Register




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# S-Register

S-registers contain 46 parameters of Promi-SD. These are stored in flash memory and sustained the values unless hardware reset is executed. The value of S-register can be accessed and changed with ATS command by user. Some S-registers not shown below are set to maximize the performance of Promi-SD. Thus it is not recommended to change these S-registers.

Change the value of S-register only in Standby status.

## ↘ S1: Force to Reconnect (default 1)

S1=0, Promi-SD in Mode1 does not try reconnection when disconnected.

S1=1, Promi-SD in Mode1 keeps trying reconnection when disconnected.

## ↘ S2: UART_FLOWCONTROL (default 0)

S2=0, Promi-SD's hardware flow control is off.

## ↘ S3: Stream UART Policy (default 0)

S3=0, the priority of UART streaming is throughput.

S3=1, the priority is latency, which minimizes the delay of data transmission. This is useful in case of transmiting very small data quickly.

This value decides the way of handling stream data from UART. When this value is 1, in order that SD minimizes the latency, SD sends the received data immediately. When this value is 0, in order that SD maximizes throughput, SD stores received data for a short time and sends a large packet. If the packet length is less than100 bytes, latency-oriented way is better. But if the packet length is more than 100 bytes, throughput-oriented way is recommended. Also if you want to use high baudrate, throughput-oriented way is more effective. Just for reference, the buffer length for receiving is 2 Kbytes.

## ↘ S4: Enable Remote Name Query (default 1)

S4=0, Promi-SD inquires only BD address. This speeds up the inquiry process.

S4=1, Promi-SD inquire BD address, device name and class of device.

This value decides whether SD finds friendly name of Bluetooth device or not. When this value is 1, SD finds not only BD address but also friendly name. When this value is 0, SD finds only BD address. Without finding friendly name, a searching is quick to respond. If you want to search the other Bluetooth devices quickly, set this value to 0. In case of using pairing button, finding friendly name will be omitted automatically.

## ↘ S6: Enable Low Power Mode (default 0)

S10=0, deactivate Low Power Mode.

S10=1, activate Low Power Mode.

This value decides whether SD works in Low Power Mode or not. When this value is 0, SD works only in active power mode. When SD works in Low Power mode, delay in transferring data may occur.

## ↘ S10: Enable SD Response (default 1)

S10=0, Promi-SD does not send SD responses to host system.

S10=1, Promi-SD send SD responses to host system.

This value decides whether SD sends response messages such as OK, ERROR, CONNECT, DISCONNECT or not. When this value is 0, SD sends no response messages. If the response messages cause troubles in host programs or devices that is connected to SD, change this value to 0.

## ↘ S11: Enable Escape (default 1)

S11=0, Promi-SD does not allow escape sequence character. The operation status of Connect cannot be changed to Standby. As Promi-SD skips the process detecting escape sequence character, the more efficient data transmission is expected.

S11=1, Promi-SD allow escape sequence character. Whenever it is needed, the Connect status can be changed to Standby.

### ↘ S12: Clear Data Buffer When Disconnected (default 0)

S12=0, Promi-SD does not clear the data buffer received from host system when disconnected.

S12=1, Promi-SD clears the data buffer when disconnected.

### ↘ S14: Enable DTR Transfer (default 1)

S14=0, DTR/DSR signal is transferred to loop-back.

S14=1, DTR signal is transferred to DSR of remote device.

### ↘ S15: Enable Disconnect by DTR (default 0)

S15=0, DTR signal cannot release the connection.

S15=1, The Bluetooth connection can be released when DTR signal is off.

This value decides whether Bluetooth connection is released when DTR signal drops or not. If this value is 1, you can use DTR signal in order to disconnect Bluetooth connection.

### ↘ S22: Fast Connect (default 0)

S22=0, none

S22=1, page scan

S22=2, inquiry scan

S22=3, page/inquiry scan

### ↘ S24: Maximum Number of Inquiry Result (default 10)

The maximum number of inquiry list can be controlled. This value is up to 15,

### ↘ S28: Escape Sequence Character (default 43)

The decimal number of the ASCII code of escape sequence character can be controlled. The initial value is 43, the ASCII code of '+'.

### ↘ S31: Page Timeout (default 300)

This is the timeout in seconds to attempt connection with ATD command. After this timeout expires, the SD will restart automatically. If this value is 0, SD will attempt to connect without restarting

### ↘ S33: Inquiry Timeout (default 30)

This is the timeout in seconds to execute inquiry scan.

### ↘ S37: Supervision Timeout (default 16000)

This is the timeout in 625μsec to presume disconnection, which is set to 16000 initially. 16000×625μsec=10sec)

The smaller the value becomes, the more quickly Promi-SD can detect an abnormal disconnection. But when the communication is suspended for some environmental reasons, it may be regarded as disconnection.

### ↘ S46: BD Address of Last Connected Device

This saves the BD address of the Bluetooth device connected most recently.

# Appendix C. Technical Support




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

Use this form to request technical support for Promi-SD. Individual form should be filled out for each Promi-SD in question. Referring to the example on separate sheet, please provide as much information as possible so we may resolve and respond to your inquiry promptly. When you have finished, submit this form by e-mail to support@sena.com or by fax to +82 2 573-7710.

*NOTE: Before you contact technical support, please have a look at our FAQ. Chances are, you will find an instant answer to your problem.*

✓ indicates a required field.

↘ **User Contact Information**

| | |
|---|---|
| Name ✓ | |
| Company | |
| E-mail ✓ | |
| Phone ✓ | |
| Fax ✓ | |

↘ **Overall Hardware Setup** ✓

| |
|---|
| *(Depict or describe actual hardware connections)* |

↘ **Host Device** ***(to which Promi-SD is attached)***

| | | | | |
|---|---|---|---|---|
| Description ✓ | | | | |
| Serial Port Setup | *Port* | | *Parity* ✓ | |
| | *Baud Rate* ✓ | | *Stop Bits* ✓ | |
| | *Data Bits* ✓ | | *Flow Control* ✓ | |
| Comments | | | | |

↘ **Promi-SD**

| | | | |
|---|---|---|---|
| Model Name ✓ | | BD Address*✓ | |
| S-Register** ✓ | | | |

* BD Address is the 6-digit number labeled on the product.

** As for S-Register, the values are shown by "AT&V" command on a PC running Serial Port program (e.g. HyperTerminal). See the User's Manual for details.

↘ **Pin Assignment to Promi-SD**

| Promi-SD205-OA | | | | Host Device | | |
|---|---|---|---|---|---|---|
| Direction | Signal | Pin # | | Pin # | Signal | Direction |
| – | N/A | 1 | ↔ | | | |
| In | RxD | 2 | ↔ | | | |
| Out | TxD | 3 | ↔ | | | |
| – | N/A | 4 | ↔ | | | |
| – | N/A | 5 | ↔ | | | |
| In | Vcc | 6 | ↔ | | | |
| – | N/A | 7 | ↔ | | | |
| – | N/A | 8 | ↔ | | | |
| – | GND | 9 | ↔ | | | |

↘ **Bluetooth Connection: This Promi-SD is connected to (*mark one*)**

| | | |
|---|---|---|
| ☐ an another Promi-SD | | |
| ☐ a Promi-ESD | | |
| ☐ a Promi-MSP | | |
| ☐ others | Model ✓ | |
| | Manufacture | |
| | Application S/W | |

↘ **Environment for RF Communication**

| | |
|---|---|
| Distance* ✓ | |
| Obstacles** ✓ | |

↘ **Problems you have**

| |
|---|
| |

* Distance is a linear distance between Promi-SD and the other side Bluetooth device.
** Obstacles are things affecting RF performance in the middle of Promi-SD and the other side Bluetooth device, such as walls, partitions, other equipments, etc.

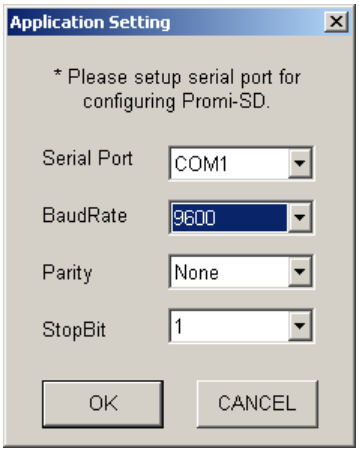
# Appendix D. Connection to Omron PLC




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

## Configure the Pomi-SD205 OA for PC to PLC connection by Bluetooth?

Connect the Promi-SD205 OA to a COM port with the serial cable (PROMI-SD205-OA cable) and power it with 5V




Start PromiWin

Data bits are fixed to 8

Select the correct COM port from the drop down list

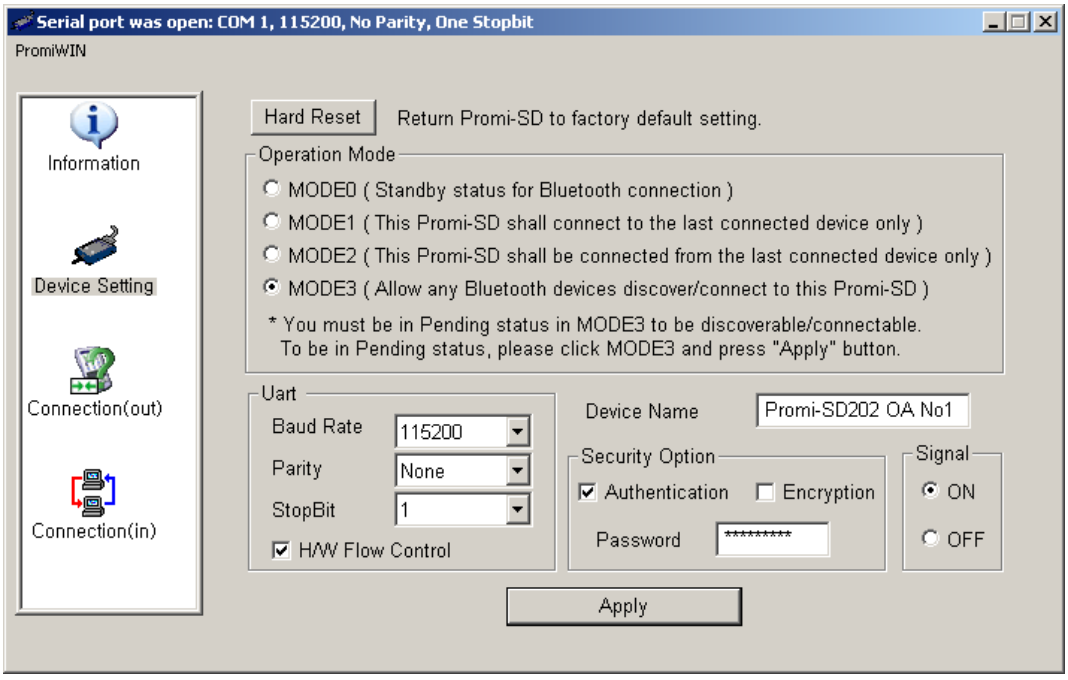
Select the correct baud rate (factory default is 9600)

Select the correct parity (factory default is None)

Select the correct stop bits (factory default is 1)

Press the OK button

Select **the Device setting icon**.



Select MODE3 by selecting the radio button

Set the Baud Rate, Parity and StopBit

(H/W Flow Control is not applicable for the Promi-SD205OA)

Set a Device Name (16 characters max)

Tick the Authentication tickbox and set a Password (caption sensible)

*Note: Password is only saved if the tickbox Authentication is ticked*

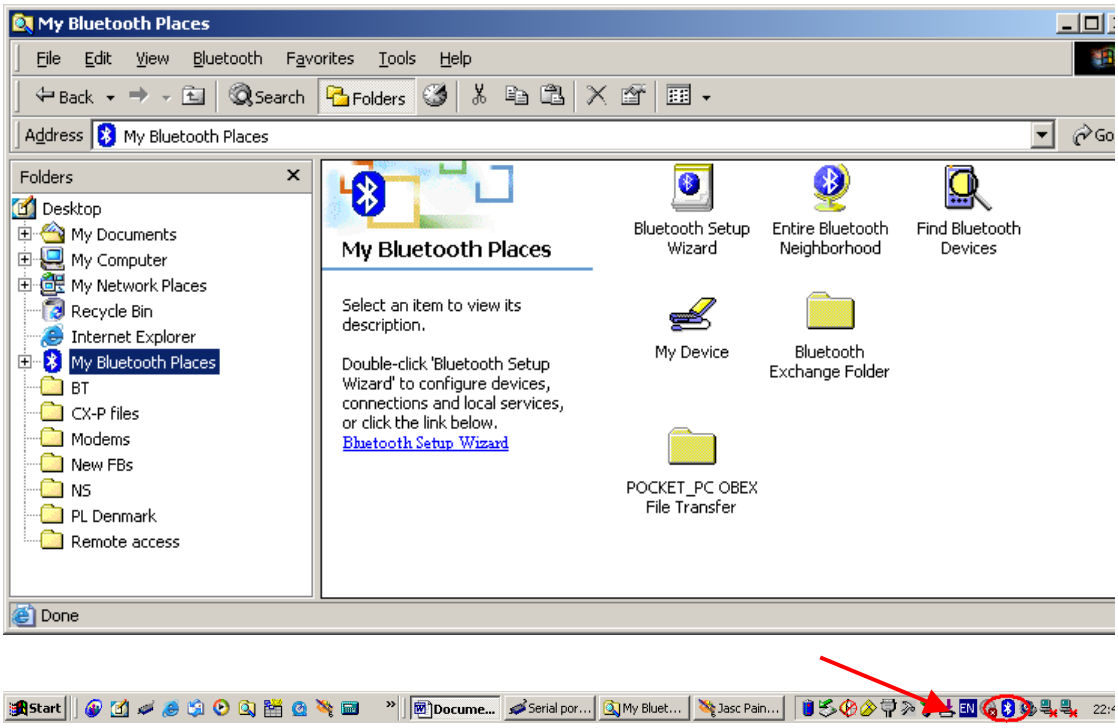
Tick the Encryption tickbox (if preferred)

Click the Apply button to store all the settings in the Promi-SD205 OA

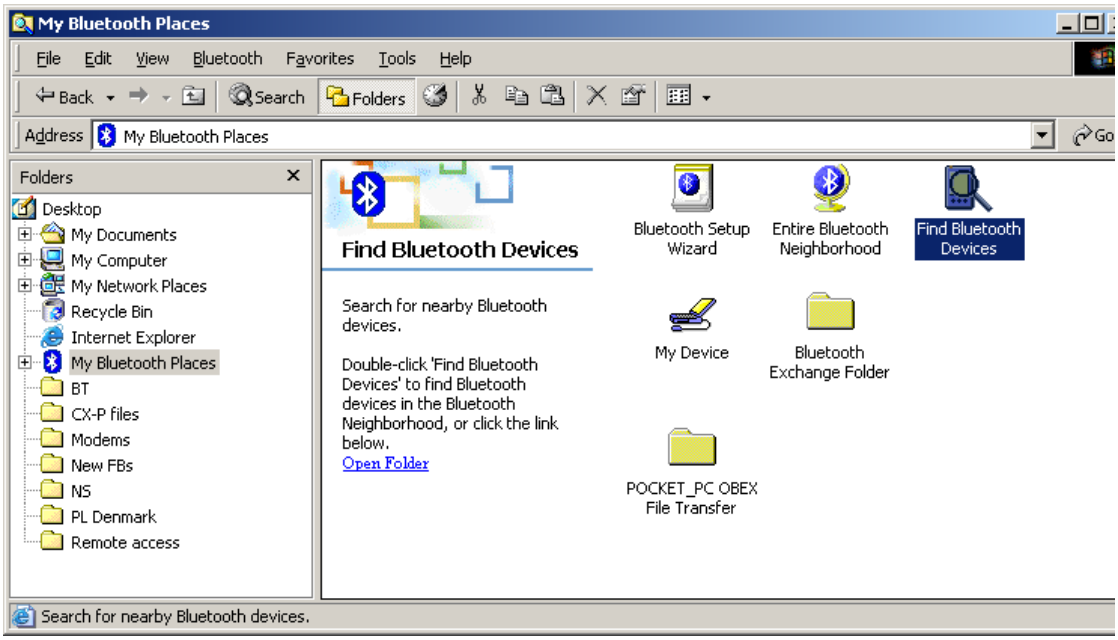
Close PromiWin

Power off the Promi-SD205 OA and power it on again

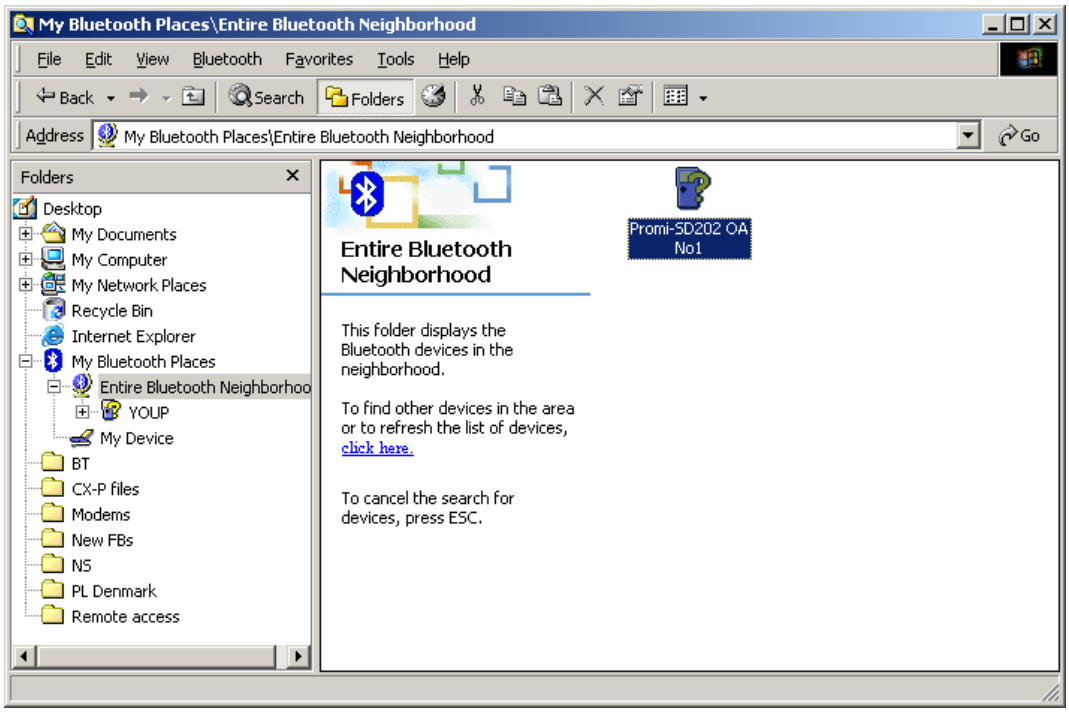
Select My Bluetooth places in Windows Explorer or in the taskbar



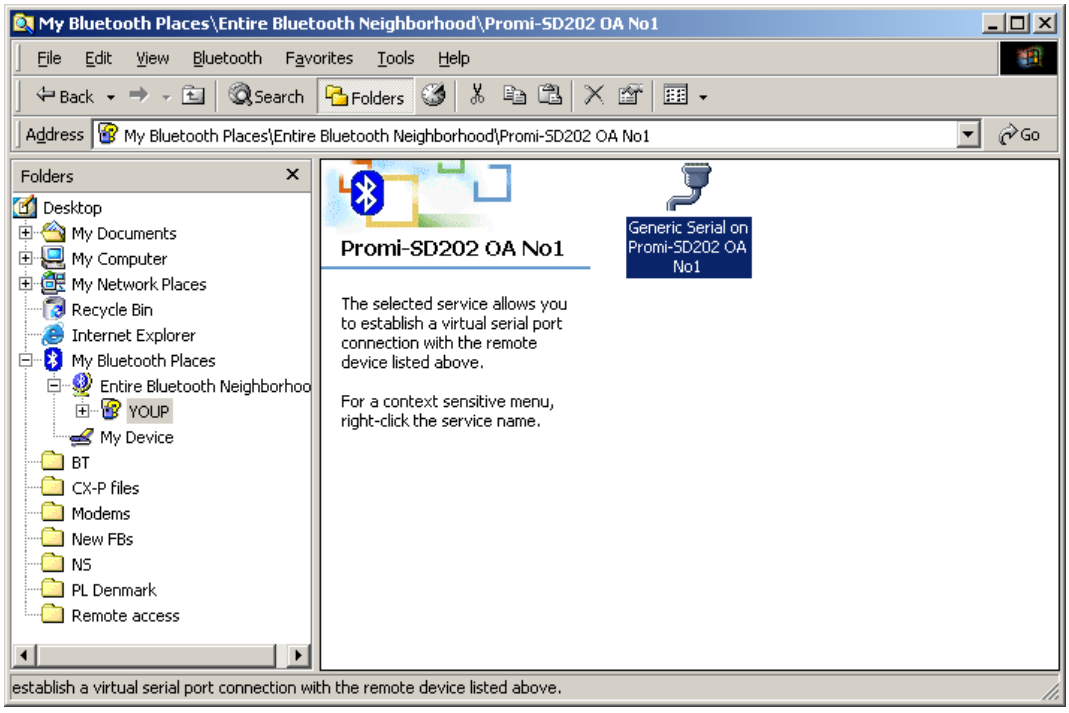
Double click on the **Find Bluetooth Devices** icon



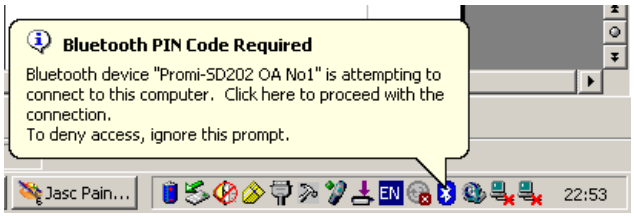
Double click on the device you want to connect to



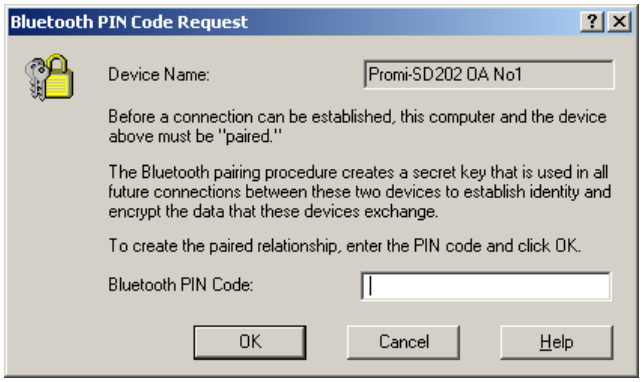

Double click on the **General Serial on** ..... icon



Select the call out box that appears

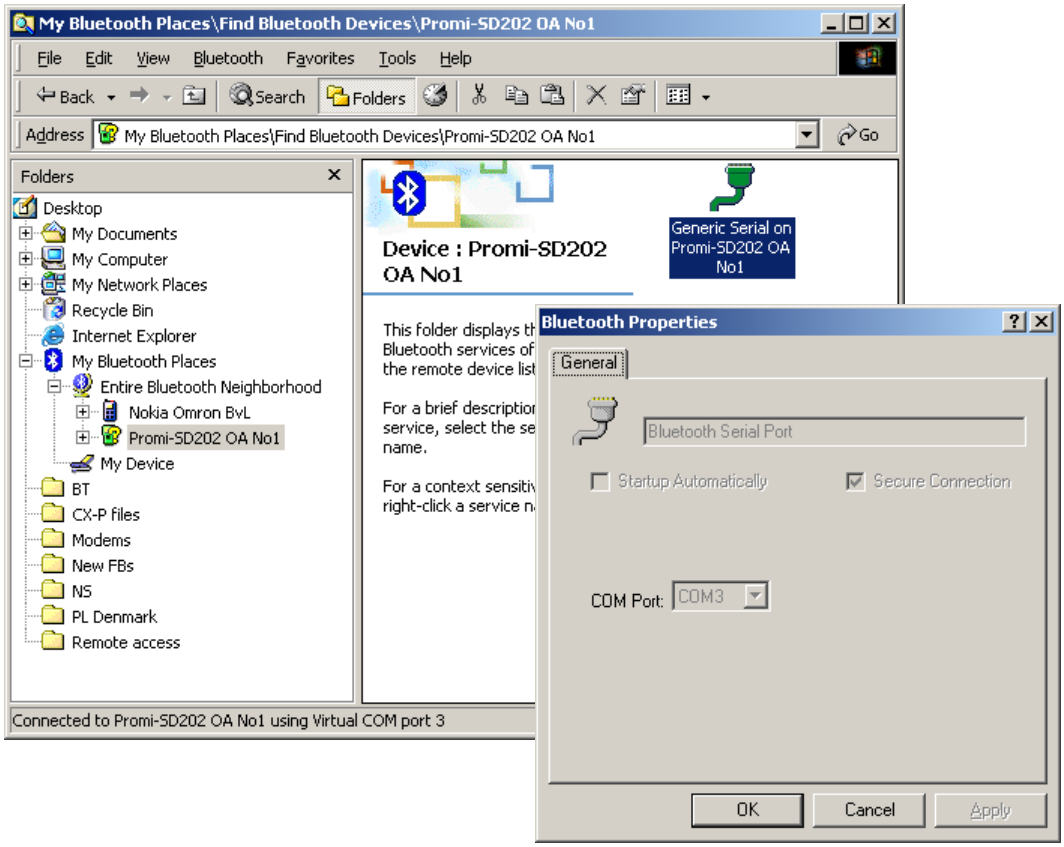



Enter the Password (caption sensible)




Connection is established

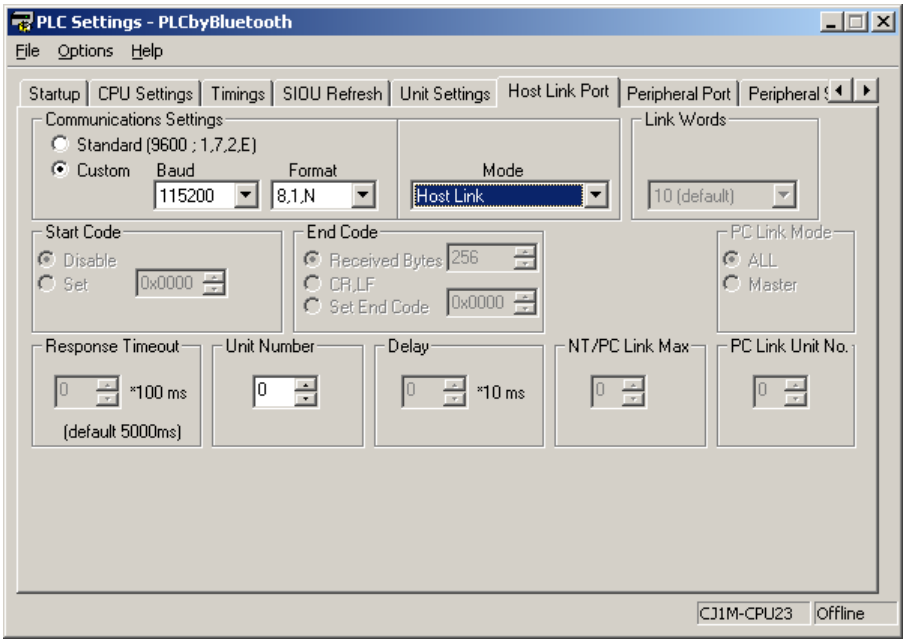
A message is shown what virtual COM port is used for the Bluetooth connection or double click on the generic serial icon and select the properties tab.



# Configure the PLC for PC to PLC connection by Bluetooth?

Start CX-Programmer and set the PLC settings the same as settings of the

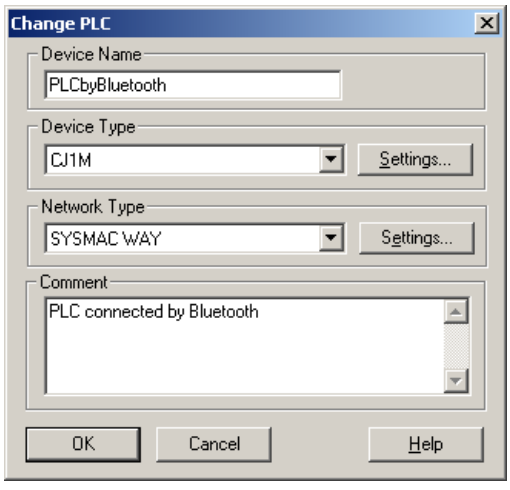
Promi-SD205-OA via the PLC settings in CX-P.



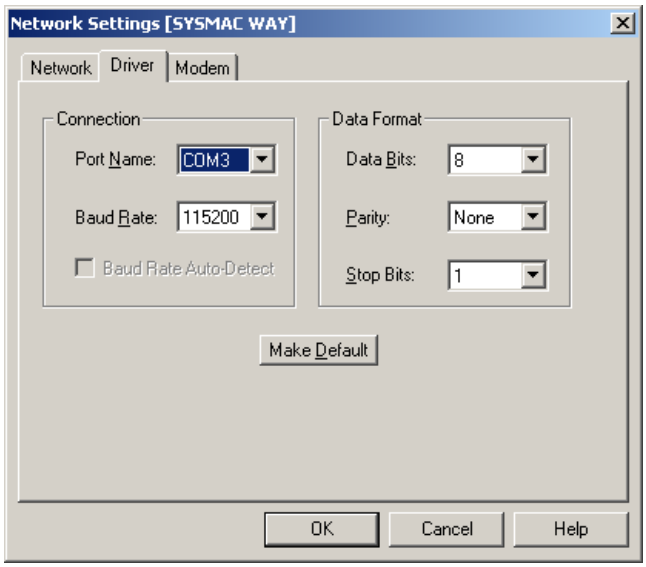

Transfer the settings to the PLC

Disconnect from the PLC

Change the settings of the PLC to the settings of the Bluetooth device



Select the virtual com port for Bluetooth and the correct data format




Go online with the PLC, you succeed in establishing connection to an Omron PLC with Bluetooth!!!!