Promi-SD™

User Manual

Version 1.3

by Bluetooth

Enabling Wireless Serial Communications

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Revision History: User Manual of Promi-SD™

Version	Changed Contents	Date
1.1	Draft version	01/02/2003
1.2	Added Technical Specifications/Troubleshooting.	06/14/2003
1.3	Amended Power Consumption data of Promi-SD101/102/202	06/24/2003

Contents

1. Product Description

1.1 About Promi-SD™

Promi-SD™ is developed for long range, easy-to-install, low-cost, wireless serial communications. Provided is point-to-point wireless connection without standard RS232 cables.

For point-to-multipoint connections, please refer to our Promi-MSP™, providing all the features of RS485.

Product line

Model Name	Part No.	Spec.
Promi-SD101	PSD00-10100	Class 2 / Output Power: 2.5mW (4dBm) 5V DC power supply Rechargeable Li-poly Battery, internal w/ Power Adapter w/ Setup Software & manual on CD
Promi-SD102	PSD00-10200	Class 2 / Output Power: 2.5mW (4dBm) 5V/12V DC power supply w/o Battery & Power Adapter w/ Setup Software & manual on CD w/ USB Power Cable & DC Power Cable (Optional: 5V Power Adapter)
Promi-SD202	PSD00-20200	Class 1 / Output Power: 63mW (18dBm) 5V DC power supply w/o Battery & Power Adapter w/ Setup Software & manual on CD w/ USB Power Cable & DC Power Cable (Optional: 5V Power Adapter)

Fig. 1.1.1 A CD-ROM inclusive a setup software (Promi-WIN™) and user manual

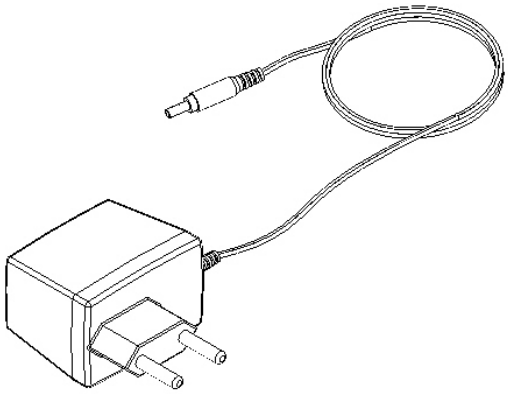


Fig. 1.1.2 Optional Power Adaptor

Part no. PSD00-00010

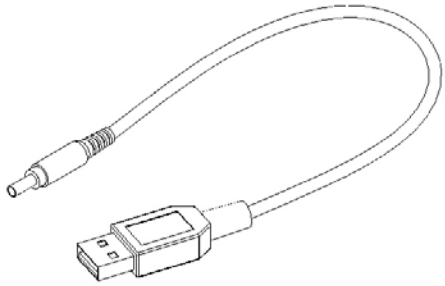


Fig. 1.1.3 USB Power Adaptor

Part no. PSD00-00020

*You may use USB port to supply power to Promi-SD™ using this USB power cable

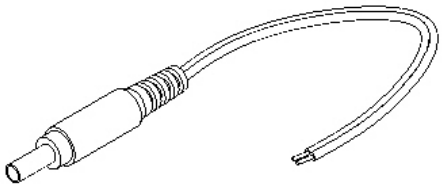


Fig. 1.1.4 DC Power Cable

Part no. PSD00-00030

*Red colored line of DC power cable is for ‘+’

1.2 External View

Promi-SD™

Dimensions: 60 x 26 x 16 (mm)

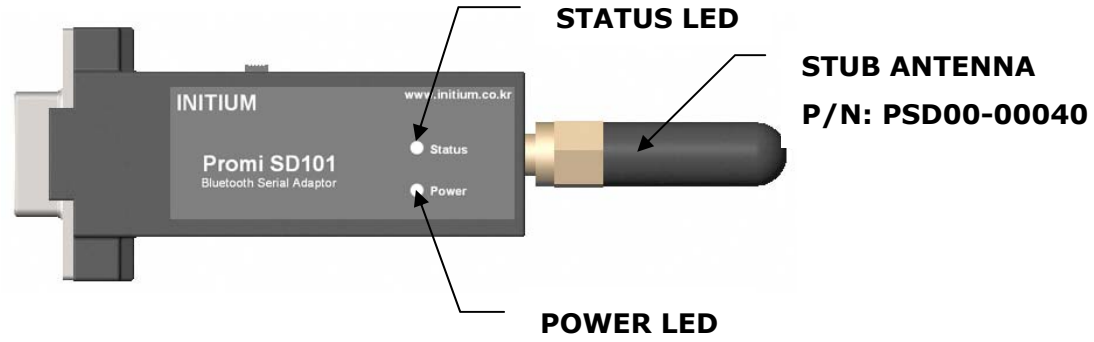


Figure 1.2.1 Promi-SD™ top view

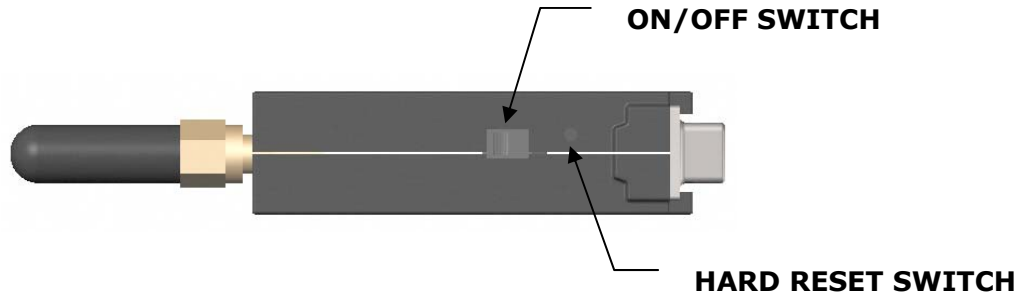


Figure 1.2.2 Promi-SD™ right side view

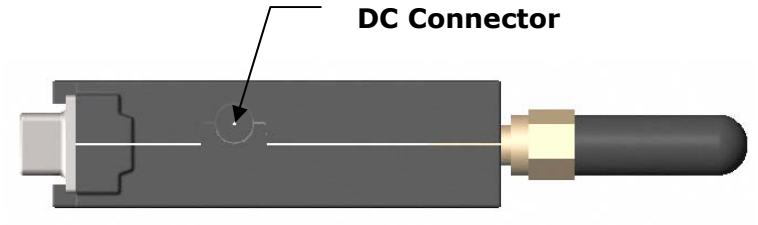


Figure 1.2.3 Promi-SD™ left side view

Please refer to the *1.5 Power Supply* section for Promi-SD™ power options

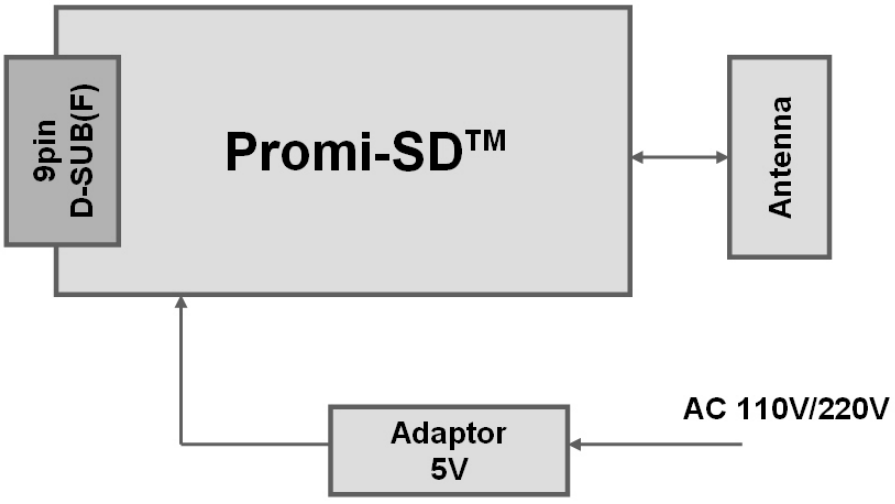
1.3 LED Indicator

The Promi-SD™ STATUS LED indicates the following:

- Amber STATUS LED indicates standard mode on Promi-SD™ power-up.
- Green STATUS LED indicates Promi-SD™ is connected to another Bluetooth device
- Green flashing STATUS LED every second indicates Promi-SD™ INQUIRY operation
- Green flashing STATUS LED every 3 seconds indicates Promi-SD™ INQUIRY SCAN or PAGE SCAN operation

- Amber POWER LED of Promi-SD101 indicates battery is being charged.
- Green POWER LED of Promi-SD101 indicates battery is fully charged.
- Green POWER LED of Promi-SD102 indicates power is being supplied.

1.4 Block Diagram



1.5 Power Supply

Power may be supplied by following ways:

- Power via a standard AC-plug DC-adapter (p/n: PSD00-00010)
- Power via USB power cable (p/n: PSD00-00020)
- Power via DC power cable (p/n: PSD00-00030)
- Power via pin 9 of D-SUB connector.

Promi-SD101 can be recharged by 4 ways above.

Figure 1.5.1. DC plug polarity

Promi-SD101 (Class2): 5V+/-10%, 500mA minimum

Promi-SD102 (Class2): 4V~12V, 100mA minimum

Promi-SD202 (Class1): 4V~12V, 150mA minimum

Current Consumption Data at different speeds of serial communications:

Condition of Baud Rate	Current Consumption		Battery Life
	(Promi-SD101/102)	(Promi-SD202)	(Promi-SD101)
9600bps	35.3 mA	40 mA	5 hrs 20 min
115200bps	40 mA	72 mA	4 hrs 30 min.

1.6 Interface- RS232 / Bluetooth

1.6.1 RS232 Interface

Promi-SD™ has a 9-PIN DSUB (female) connector as shown below in Fig 1.7.1.

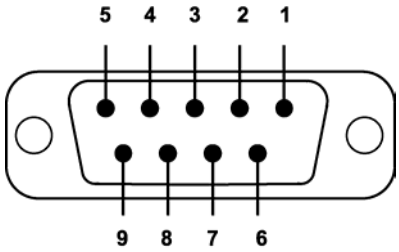


Figure 1.7.1 9-PIN DSUB (Female)

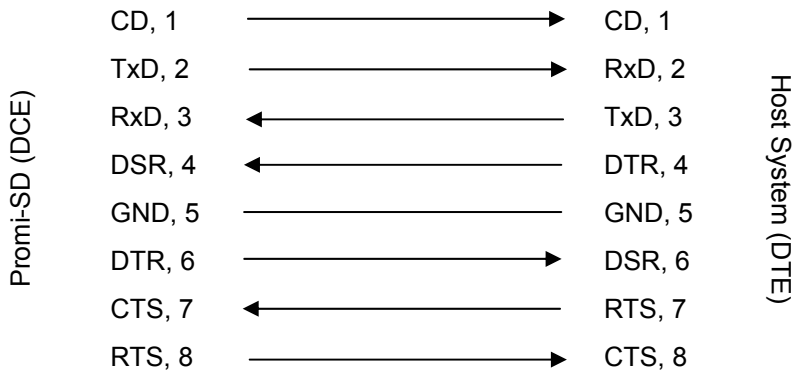
- The serial interface is RS232 DCE configured; a DTE device can be connected.
- Baud rate: 1200~115200 bps
- Hardware flow control (RTS/CTS)

Pin	Signal	Direction
1	CD	Not connected
2	TxD	Output
3	RxD	Input
4	DSR	Input
5	GND	-
6	DTR	Output
7	CTS	Input
8	RTS	Output
9	Vcc	Input

Table 1.7.1. Promi-SD™ 9-PIN Specification

***NOTE: Promi-SD™ series, starting from version no. v2i will include an Automatic Detection Feature of hardware flow control.**

Promi-SD™ is designed to operate as DCE (Data Communications Equipment). To connect to DTE (Data Terminal Equipment), for example a PC or a laptop, a straight cable must be used as in below.



*DTR/DSR of Promi-SD™ of v2i will be functioned for either Loop-back operation or Communications. Users may select a function of DTR/DSR using AT command- ATS14. **Default value of ATS14 is 0.**

- ATS14=1<cr>: Users may use DTR/DSR lines for communications
- ATS14=0<cr>: Users may use DTR/DSR lines for Loop-back only.
- ATS14?: To see current status of ATS14.

1.6.2 Bluetooth Interface

Bluetooth Specification	V 1.1
Level	4 dBm (Promi-SD101/102) 18 dBm (Promi-SD202)
Range	~30m (Promi-SD101/102) ~100m (Promi-SD202)
Bluetooth protocols	RFCOMM, L2CAP, SDP
Supported Profiles	General Access Profile Serial Port Profile

2. Configuration

2.1 Using Promi-WIN™

With Promi™-SD, Bluetooth wireless connections can be made to any Bluetooth device supporting SPP (Serial Port Profile). Especially when using the SD as a cable replacement, take advantage of the Promi™-SD automatic connection feature. Once a pair of SDs is set for this feature, they automatically connect when powered up. A pair of SD units, within their radio range, may be used as a virtual RS-232 cable.

To make wireless connections between two Bluetooth devices, one device should be in *Discoverable* (INQUIRY SCAN) *and Connectable* (PAGE SCAN) as well. Most Bluetooth devices are set to *Discoverable* and *Connectable* in manufacture. However, to maximize internal battery life, SD INQUIRY SCAN and PAGE SCAN are disabled. To make SD respond to the INQUIRY and PAGE operations of other Bluetooth devices, activate INQUIRY SCAN and PAGE SCAN.

Before making the first Bluetooth connection with SD units, be prepared with a pair of SD units and also install the PromiWIN™ program on the CD enclosed in the Promi™-SD product package.

2.1.1 Making the first Promi-SD™/Bluetooth connection

To make Bluetooth wireless connections with SD, first connect the SD to a host computer running PromiWIN™ as instructed below. Then activate SD INQUIRY SCAN and PAGE SCAN from PromiWIN™.

Let's suppose there are 2 Promi-SD™s, SD1 and SD2:

1. Connect the SD1 to a host serial port and turn on the SD.
2. Check the SD1 STATUS LED color. Amber indicates standard mode.

3. Start the PromiWIN™ configuration program by clicking the program icon under **Start/Programs/PromiWIN™**.
4. Select **Promi-SD → Start** in the menu. SD information will be displayed as shown in Figure 1.

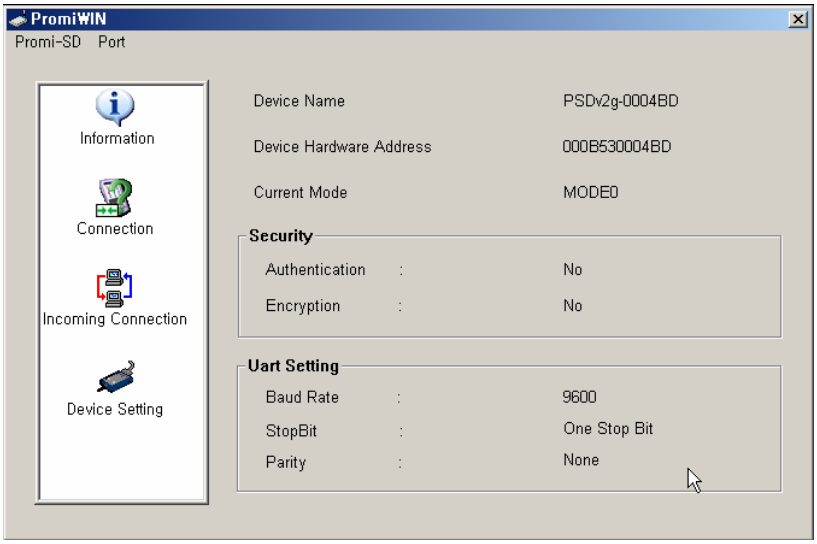


Figure 1.

5. Click the 'Device Setting' icon in the list control box. Set a new device name as shown in Figure 2. Here, 'Promi-SD1' is used for example.

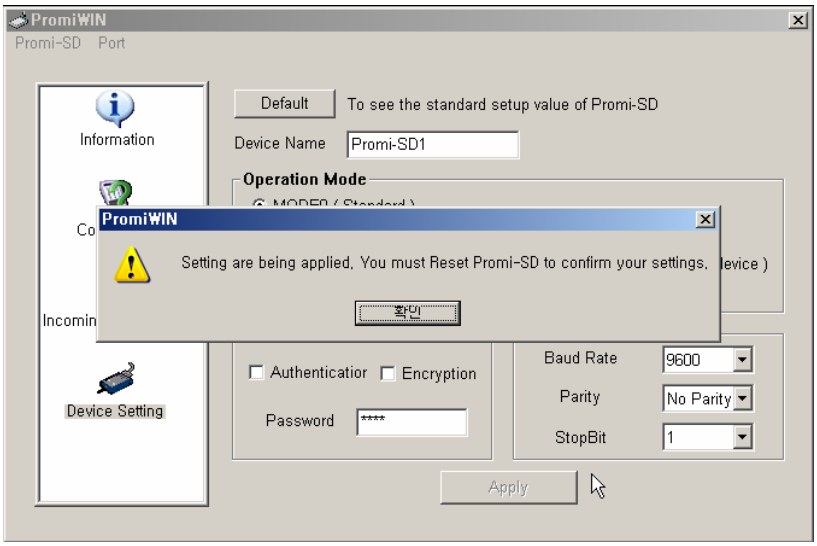


Figure 2.

6. Click the 'Incoming Connection' icon in list control box. Check both options and then click the 'Start' button as shown in Figure 3. The SD1 now starts

INQUIRY SCAN and PAGE SCAN operations. During the operation, the STATUS LED will flash green, twice every 3 seconds.

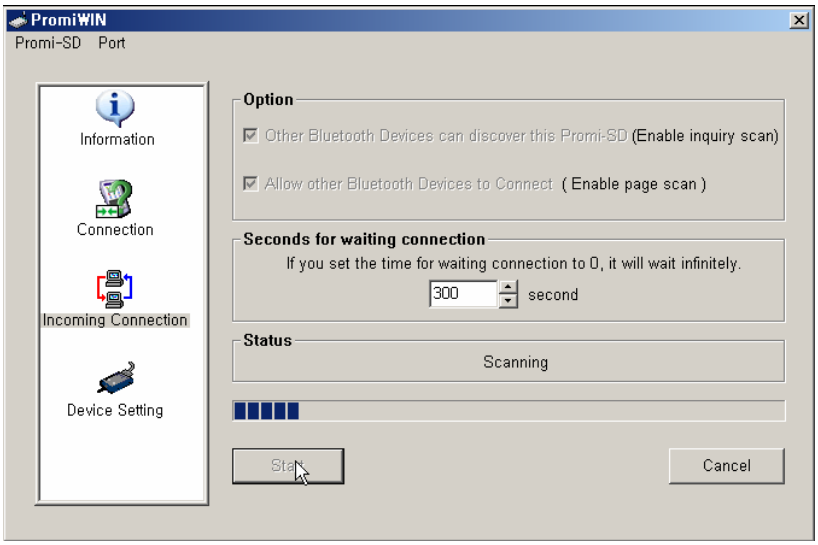


Figure 3.

7. After the INQUIRY SCAN and PAGE SCAN setting of the SD1 is finished another SD, SD2, may be connected to the host.

8. Select PromiWIN™ and repeat the preceding procedure for SD2
9. Select the 'Connection' icon in the list control box and click the search button.
10. Now the additional SD2 enters INQUIRY operation.

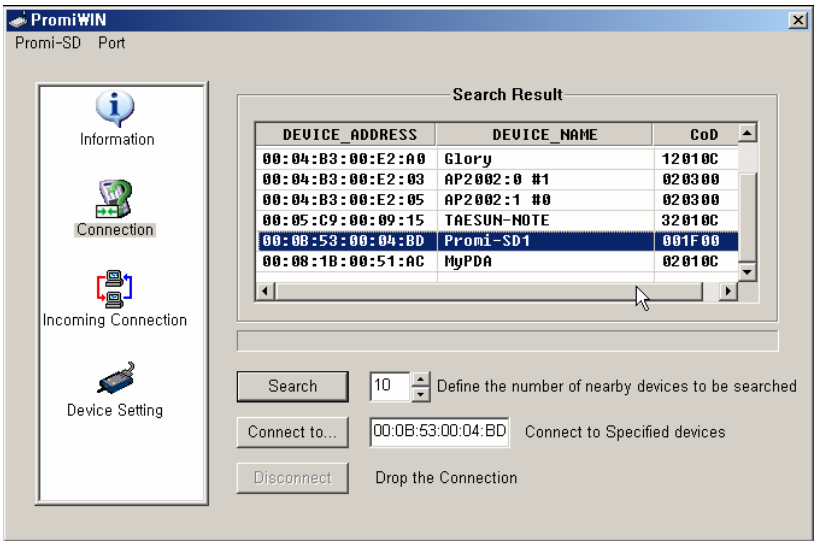


Figure 4.

11. From the ‘Search Result’ menu click the item with ‘Promi-SD1’ as its DEVICE_NAME.
12. Once selected, its BD_ADDR will appear in the dialog box on the right side of the ‘Connect to…’ button.
13. Click the ‘Connect to…’ button and the ‘Connection Complete’ Popup box will appear as shown in Figure 5.

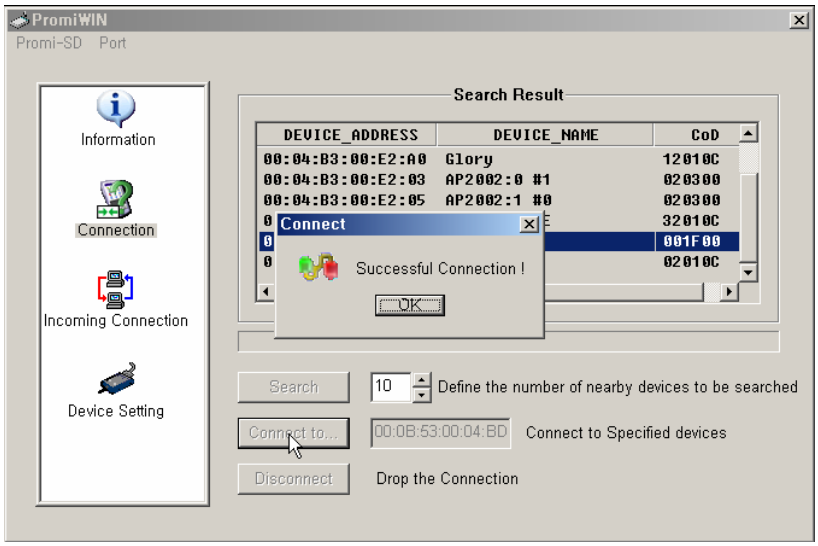


Figure 5.

14. To release the first Bluetooth wireless connection between the SD units click the ‘Disconnect’ button.
15. For automatic connection setup, set SD1 as Mode 2 and SD2 as Mode 1.

To utilize the SD automatic connection feature, make a Bluetooth connection between two SD units. Once connected, one SD stores the 48-bit BD_ADDR of its counterpart.

To expedite the 48-bit BD_ADDR input operation, SD is designed to store the BD_ADDR of its latest counterpart.

2.1.2 Setting Operating Mode for Automatic Connection

New SD units are default set to ‘MODE 0’. For SD automatic connection change the operating mode of an SD to MODE 1 and another to MODE 2. The following simple steps describe the SD operating mode change procedure.

1. After making a Bluetooth wireless connection between two SD units, set the operating mode of one SD to MODE 1, as shown in Figure 6.

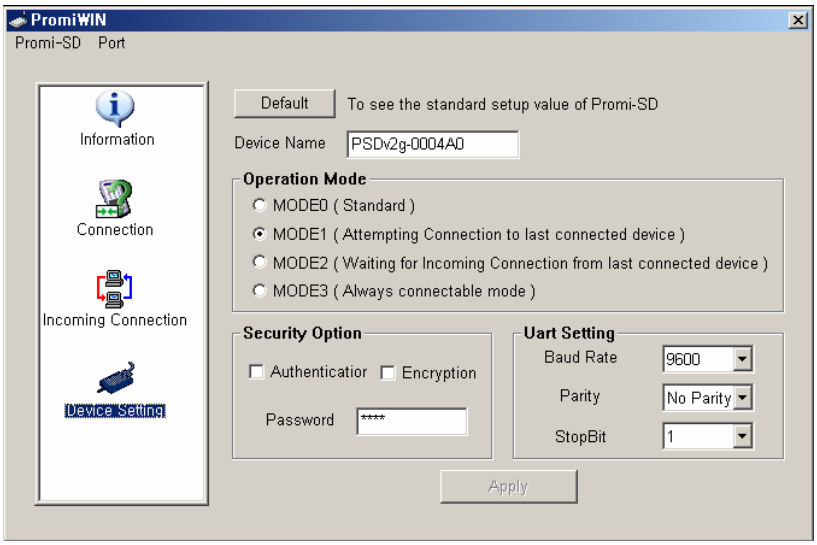


Figure 6.

2. Set the operating mode of another SD to MODE 2 as shown below.

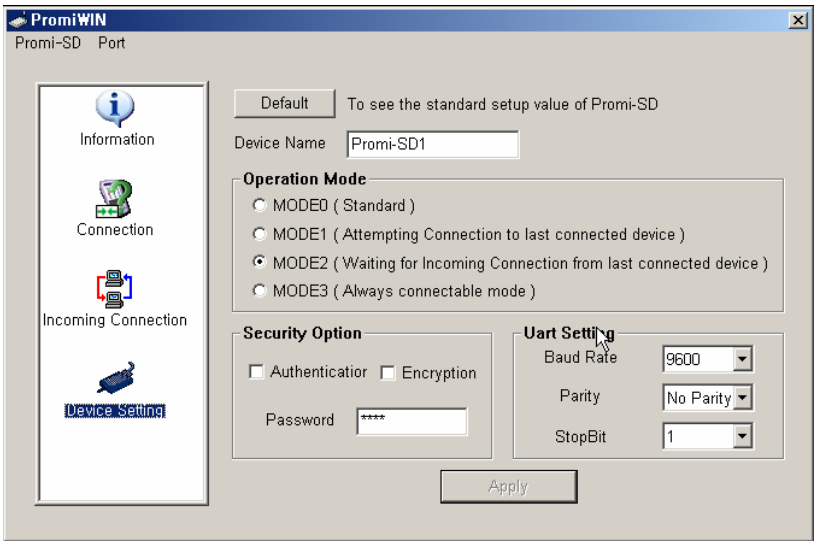


Figure 7.

3. Turn off both SD power supplies. From now, when both SD units are powered up again, they will automatically connect. (To release this feature, reset both SD units. Amber SD STATUS LED indicates successful reset process.)

2.2. Using a Terminal Program

Promi-SD™ units are easily controlled and configured via PromiWIN™ . Likewise functions are accomplished via any terminal program such as HyperTerminal. AT command sets supported by Promi-SD™ add sophistication to Promi-SD™ control.

2.2.1 Connecting Promi-SD™ to host.

For SD use, follow the simple instructions below:

1. Connect an SD to a host serial port. Then, turn on the SD.
2. Check the STATUS LED color. Amber indicates standard mode.
3. Execute any terminal program and activate Local Echo.
4. Configure the host serial port to match the SD unit configuration. The SD default configuration is 9600 bps Baud, 8 Data bit, No Parity, 1 Stop bit and H/W flow control.
5. Enter 'AT' command at the prompt. An SD 'OK' reply indicates proper operation.

2.2.2 Making the first Promi-SD™/Bluetooth connection

As stated before, Bluetooth wireless connections can be made with any other

Bluetooth device supporting Bluetooth SPP (Serial Port Profile). For Bluetooth wireless connections to an SD, first make another SD '*Discoverable*' and '*Connectable*'. In this case, refer to section 3.3 before following the instructions below.

1. First check the status of the SD by entering 'AT+BTINFO?'. The SD response is comprised of BD_ADDR, Device Name, Operating Mode, Operating Status, Authentication and Encryption flags. To make connection to other Bluetooth devices, the operating status of the first SD should be 'STANDBY'. A 'PENDING' operating status of the first SD indicates the unit is busy with another operation. In this case, cancel the ongoing operation by entering the 'AT+BTCANCEL' command.

```
AT+BTINFO?
000B530000A9,PSDv2g-0000A9,MODE0,STANDBY,0,0

OK
```

2. Search other local Bluetooth devices by entering the 'AT+BTINQ?' command.

```
AT+BTINQ?
000B53000080,PSDv2g-000080,001F00

0004B300E205,AP2002:1 #0,020300

OK
```

3. Check the search list. Enter 'ATD' command in the BD_ADDR of any Bluetooth device for connection. During the connection process, the STATUS LED will flash green every second.
4. Connection is indicated by the SD returning a 'CONNECT' message and displaying a green STATUS LED.

```
ATD000B53000080
OK

CONNECT
```

2.2.3 Making Promi-SD™ do INQUIRY SCAN and PAGE SCAN

Unlike many Bluetooth serial dongles, the SD has an internal, rechargeable battery. As stated before, to maximize battery life, the SD INQUIRY SCAN and PAGE SCAN is set to disabled in manufacture. Therefore, to make the SD "*Discoverable"* (INQUIRY SCAN) and "*Connectable"* (PAGE SCAN), these operations must be manually activated.

1. Check the SD status by entering a 'AT+BTINFO?' command.

```
AT+BTINFO?
000B530000A9,PSDv2g-0000A9,MODE0,STANDBY,0,0

OK
```

2. Enter the 'AT+BTSCAN' command. The SD will start INQURY SCAN and PAGE SCAN operation. During the process, the SD will flash twice every 3 seconds until it is connected to another Bluetooth device.

```
AT+BTSCAN
OK
```

3. Try Bluetooth connection to the SD from the other Bluetooth device. Once connected the first SD will return the 'CONNECT' message and the STATUS LED will display a continuous green without flashing.

```
AT+BTSCAN
OK

CONNECT
```

2.2.4 Releasing the existing Bluetooth connection

Once connected successfully, the SD becomes transparent to any serial applications on hosts. Data may be transferred within the radio range of the SD. According to SD terminology, this operating status is called 'ONLINE STATUS'. In ONLINE STATUS, all AT commands are treated as characters and are ignored by the command interpreter of the SD. Therefore to escape from ONLINE STATUS enter escape string '+++'.

1. Transition from ONLINE STATUS to STANDBY STATUS by entering '+++' string to the SD. Check the current SD status by entering the 'AT+BTINFO?' command. The SD status should display CONNECT STATUS.

```
+++
OK
AT+BTINFO?
000B530000A9,PSDv2g-0000A9,MODE0,CONNECT,0,0

OK
```

2. Release the current Bluetooth connection by entering 'ATH' command. Once disconnected successfully, the SD returns the 'DISCONNECT' message.

```
ATH
OK

DISCONNECT
```

2.2.5 Automatic connection of two Promi-SD™ Units

Two SD units connect automatically when powered up. For automatic SD connection first make a Bluetooth connection between two SD units. Once connected, the SD stores the 48-bit BD_ADDR of its counterpart. To expedite 48-bit BD_ADDR input operation, the SD is designed to store the BD_ADDR of its latest counterpart.

1. Set one SD to do INQUIRY SCAN and PAGE SCAN operation as directed in section 3.3.
2. Set the other SD to connect to the SD in the previous step.
3. Once connected successfully, both SD units store the BD_ADDR of their counterpart in their internal Flash. When desired, release the connection as directed in section 3.4.
4. Set the operating mode of one SD to MODE 1 by entering an ‘AT+ BTMODE’ command as shown below.

```
AT+BTMODE,1
OK
```

5. Set the operating mode of the other SD to MODE 2 by entering an ‘AT+BTMODE’ command as show below.

```
AT+BTCANCEL
OK
AT+BTMODE,2
OK
```

6. Turn both SD units power off. The SD pair will connect automatically when they are powered up again.
7. To release this paring, set them to MODE 0 by entering 'AT+BTMODE, 0'. or reset the units by pressing the RESET button.

```
AT+BTMODE,0
OK
```

2.2.6 AT command vs. Operational Status

The AT command sets listed above can be executed per Promi-SD™ operational status. The following table shows the operational status and executable AT command sets.

AT Command	Standby	Pending	Online
AT<cr>	√	√	
ATZ<cr>	√	√	
AT+BTINQ?<cr>	√[1)]		
ATD112233445566<cr>	√[1)]		
ATD<cr>	√[1)]		
AT+BTSCAN,n<cr>	√[1)]		
AT+BTSCAN,112233445566<cr>	√[1)]		
AT+BTCANCEL<cr>		√	
+++			√
ATO<cr>	√[2)]		
ATH<cr>	√[2)]		

AT+BTAUTH,Auth,Encr<cr>	√[3]	
AT+BTMODE,n<cr>	√[3) 4]	
AT+BTNAME=”Name”<cr>	√[3]	
AT+BTKEY=”nnnn”<cr>	√[3]	
ATS10=0 or ATS10=1		
AT+BTINFO?<cr>	√	√
AT+UARTCONFIG,b,p,s<cr>	√[3) 4]	

1) Effective when Promi-SD™ is not in connection with Bluetooth.
2) Effective when Promi-SD™ is in connection status with Bluetooth.
3) Recommend to be used when Promi-SD™ is not in connections status with Bluetooth
4) To apply new values to Promi-SD™, software reset requires by ATZ command or restart Promi-SD™.

***NOTE: Full AT commands set can be found in Appendix B.**

3. Technical Specifications

3.1 Default Serial Settings

- 9600 Baud, 8 data bits, no parity, 1 stop bit, hardware flow control

3.2 Power Consumption

Condition	Current Consumption		Battery Life 180mA Li-Poly Battery
	(Promi-SD101/102)	(Promi-SD202)	(Promi-SD101)
If NOT connected to Host	3.5 mA	19 mA	49 hrs 30 min.
If connected to Host	13.5 mA	24 mA	13 hrs 10 min
For data communications with Host only	26.5 mA	27 mA	6 hrs 50 min
During INQUIRY mode	62 mA	96 mA	3 hrs 20 min
For Master connection	63 mA	96 mA	3 hrs 10 min
During SCAN (page & inquiry) mode	27 mA	25 mA	6 hrs 30 min.
Park mode	13.8 mA	34 mA	12 hrs 40 min
Non-Park mode	17.8 mA	40 mA	10 hrs

3.3 Environmental

Model No.: Promi-SD101/102

Recommended operating conditions:-10'C~70'C

Humidity: 90% Non-condensing

Model No.: Promi-SD202

Recommended operating conditions: -20'C~70'C

Humidity: 90% Non-condensing

3.4 Serial Interface

Model No.: Promi-SD101

RS232, Female DSUB-9, 1200~115200 baud,

CTS/RTS flow control or no flow control

Model No.: Promi-SD102

RS232, Female DSUB-9, 1200~115200 baud,

Automatic Detection Feature of Hardware flow control

(from version PSD-v2i)

DTR/DSR for loop-back & communications

Model No.: Promi-SD202

RS232, Female DSUB-9, 1200~115200 baud,

Automatic Detection Feature of Hardware flow control

DTR/DSR for loop-back & communications

3.5 Maximum distance between Promi-SD™s

In open space, maximum distances between two Promi-SD units were tested using different types of Optional Antennas. Users may extend wireless link distance up to 1.2Km via Promi-SD202 with Patch Antennas for both sides.

Model no.	Antennas for two Promi-SD units	Max. Distance
Promi-SD101 Promi-SD102	Default Antenna - Default Antenna	30 meters
	Default Antenna - Dipole Antenna	50 meters
	Dipole Antenna - Dipole Antenna	80 meters
	Patch Antenna - Dipole Antenna	150 meters
	Patch Antenna - Patch Antenna	300 meters
Promi-SD202	Default Antenna - Default Antenna	120 meters
	Default Antenna - Dipole Antenna	150 meters
	Dipole Antenna - Dipole Antenna	200 meters
	Patch Antenna - Dipole Antenna	400 meters
	Patch Antenna - Patch Antenna	1,200 meters

For information on optional Antennas, refer to Chapter 5 Optional Antennas.

4. Troubleshooting

*Full FAQ list will be released soon by mid of July, 2003. Below are key information customers need to know using Promi-SD™.

4.1 ON/OFF of Hardware Flow control

Promi-SD101 and Promi-SD102 of version v2g & v2h are designed to use CTS/RTS for handshaking. For equipment which is not using Hardware flow control for serial communications, Promi-SD101/102's firmware should be set to turn OFF hardware flow control (CTS/RTS).
Customers may indicate preferences when ordering or turn off the handshaking by bridging CTS and RTS (no. 7 and no. 8 lines) using a Gender changer.

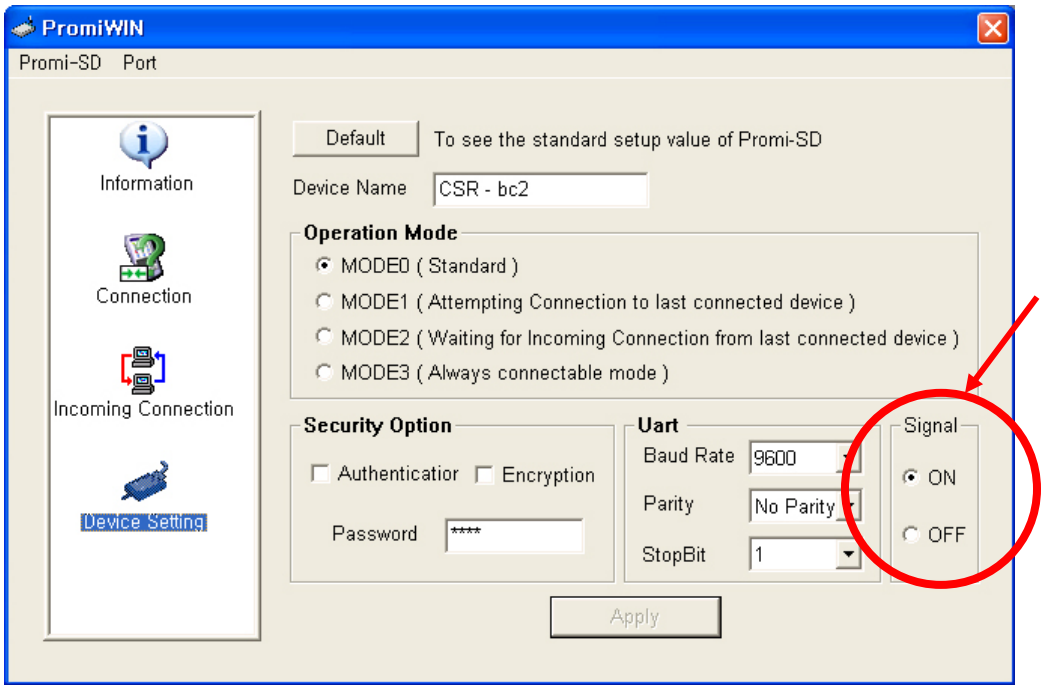
***Starting from next version of models, Promi-SDs of version v2i and higher, will have automatic detection feature of hardware flow control so can be used, WITHOUT a gender changer to control CTS/RTS, for any type of devices/equipments.**

4.2 Enabling/Disabling of Response Signals -OK, CONNECT, DISCONNECT & ERROR

Promi-SD™ will respond to users on the current status, success & failure of connections, and error mode. Both PromiWIN™ and Terminal Programs will receive related response signals from Promi-SD™.

In some cases, various equipment may regard these four response signals incorrectly and react inappropriately. To avoid these possible errors, users may disable the response signals via PromiWIN™ or AT commands at Terminal.

1) By Promi-WIN™, check OFF at Signal pane at Device Setting panel to disable 4 response signals from Promi-SD™.



2) By AT commands at your Terminal program.

ATS10=1 : Enabling/ON 4 signals

ATS10-0 : Disabling/OFF 4 signals

ATS10? : To see current status

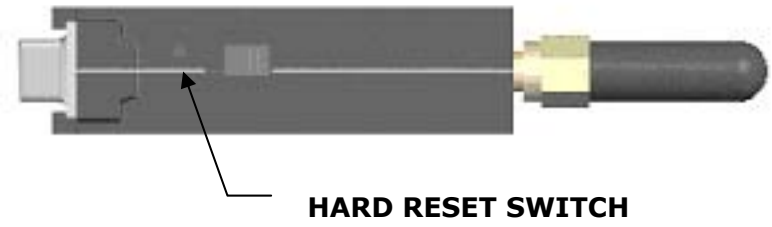
4.3 How to use a Gender Changer

Promi-SD™ is twisted Rx/Tx-ready for direct DTE connection. For equipments with female RS232 interface, please use a 1:1 Gender changer, not twisted one.

<Promi-SD™ version v2g/v2h>

4.4 Hardware Reset

For Hardware reset, press the button on the right side of the Promi-SD™ unit with a narrow tool such as a ball-point pen.



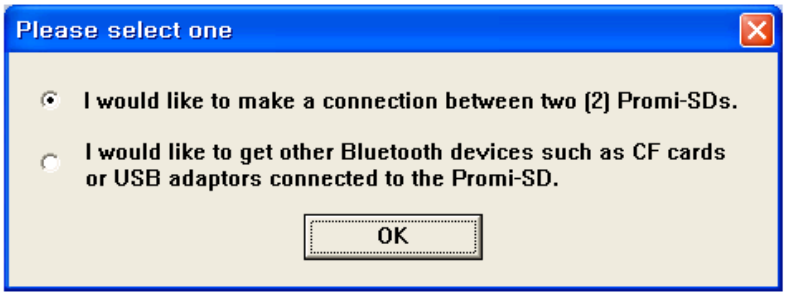
4.5 How to get Bluetooth CF cards connected to Promi-SD

If you are using Bluetooth CF cards or USB adaptors from other manufacturers, please use PromiWIN™ software of latest version, which will be more familiar to consumers.

PromiWIN™ can be downloaded from our website at:

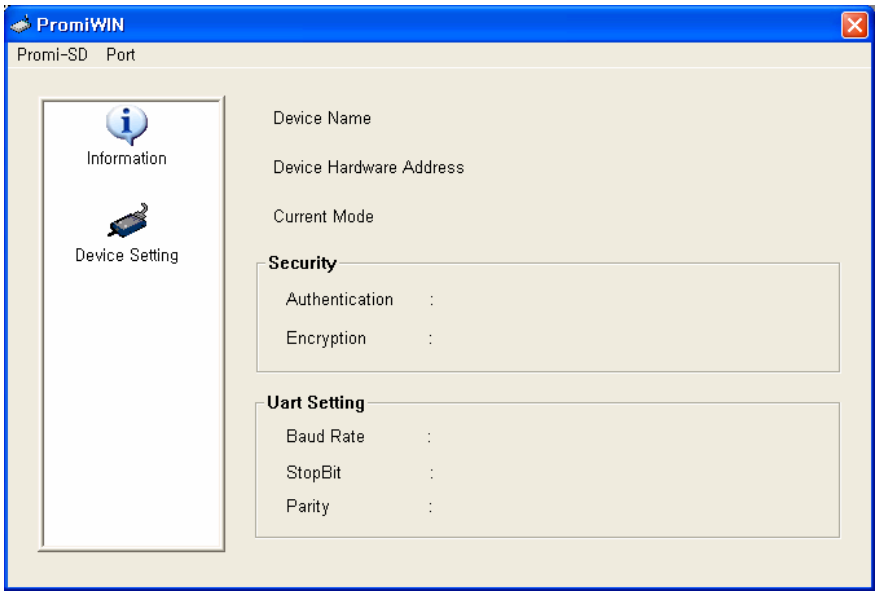
http://www.initium.co.kr/english/download.html

1) When you open the PromiWIN version2, you will get message as in below:

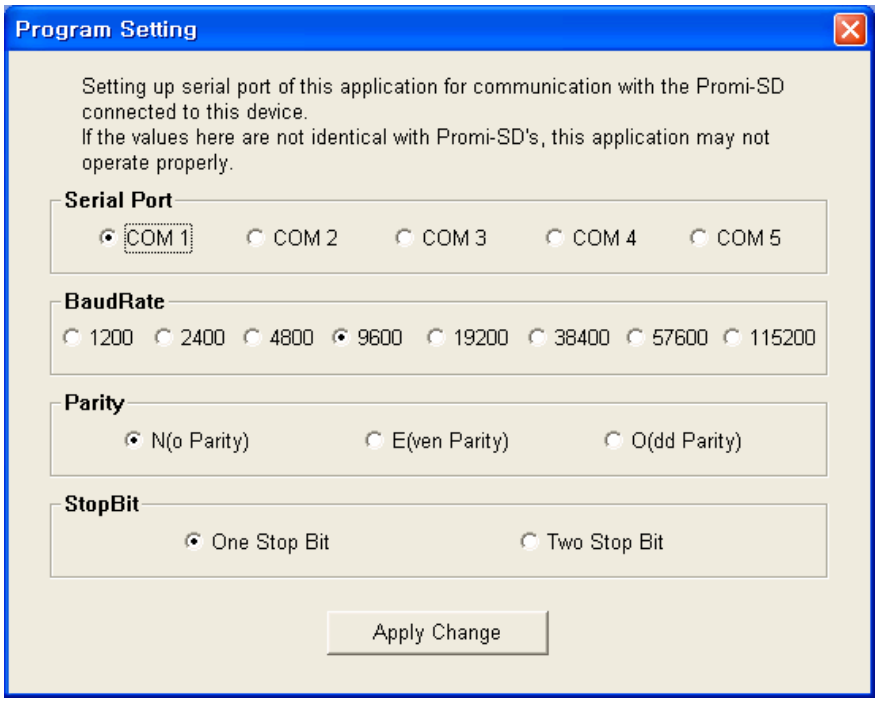


2) If you are going to use Promi-SD with other Bluetooth devices such as CF cards or USB adaptors, please select 2nd option "**I would like to get other Bluetooth devices such as CF cards or USB adaptors connected to the Promi-SD**"

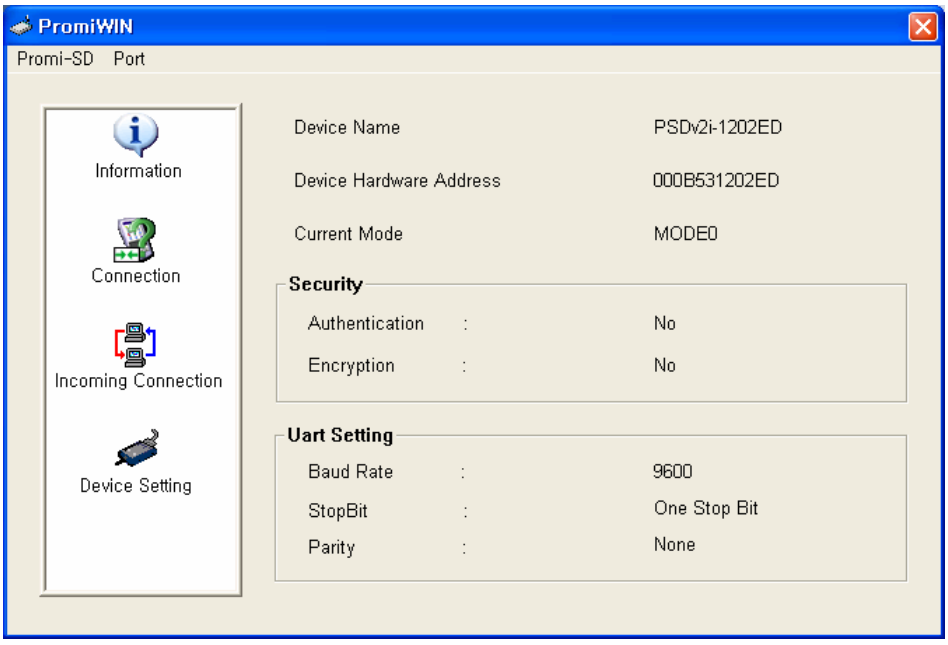
3) You will see main page as in below:



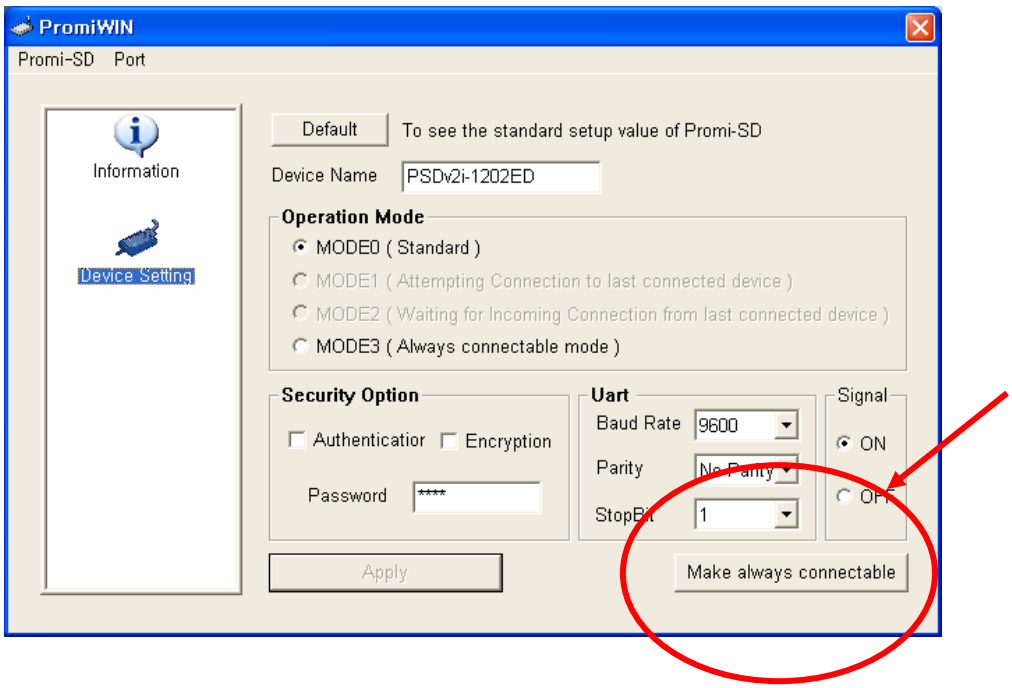
4) Please check the Port setting information by selecting Port>Port setting menu.
Default settings of Promi-SD: 9600bps/No parity/One stop bit



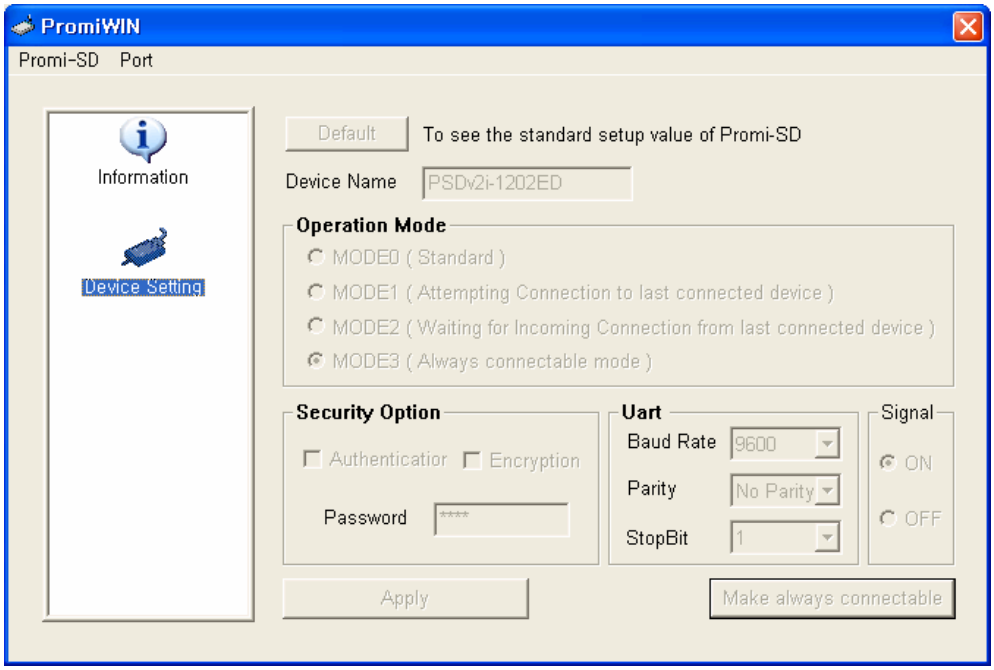
5) Please select Promi-SD>Start menu, so you can get the device information from Promi-SD.



6) Please press the button written “Make always connectable”

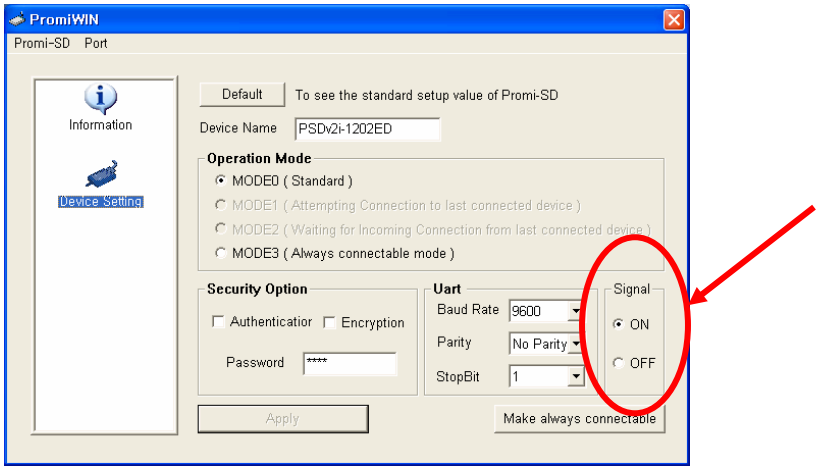


7) The screen of main pages will become inactive.



8) At this stage, Promi-SD™ is DICOVERABLE & CONNECTABLE MODE **Get your Bluetooth CF cards or USB adaptors connected to this Promi-SD™ now.** Then you finish to connect your Bluetooth devices to Promi-SD. Open you COM port of Serial Communication program to verify communication status.

9) If your equipments or machines Promi-SD™ is plugged in may confuse the Response signal from Promi-SD™ such as OK, CONNECT, DISCONNECT, & ERROR, please turn off the Signal message. More information on the Response messages can be found on Chater 4.1.



5. Optional Antennas

(1) Dipole Antenna

	Part No.: PSD00-00050 20dBi Connector: SMA Size: 10cm

(2) Patch Antenna (w/ RF extension cable & wall-attachable nails)

	Part No.: PSD00-00060 Including a 30cm RF extension cable
	Longer RF extension cable Part No.: PSD00-00061: 1m length Part No.: PSD00-00063: 3m length Part No.: PSD00-00061: 5m length SMA connector

	Part No. : PSD00-00062 Anchor Support *This will be needed if there is a need to attach the Patch antenna to the wall.

*Distance Data between Promi-SD™s when Optional Antennas are used:

Model no.	Antennas for two Promi-SD units	Max. Distance
Promi-SD101 Promi-SD102	Default Antenna - Default Antenna	30 meters
	Default Antenna - Dipole Antenna	50 meters
	Dipole Antenna - Dipole Antenna	80 meters
	Patch Antenna - Dipole Antenna	150 meters
	Patch Antenna - Patch Antenna	300 meters
Promi-SD202	Default Antenna - Default Antenna	120 meters
	Default Antenna - Dipole Antenna	150 meters
	Dipole Antenna - Dipole Antenna	200 meters
	Patch Antenna - Dipole Antenna	400 meters
	Patch Antenna - Patch Antenna	1,200 meters

6. About New Products

6.1 Promi-SD202

Promi-SD202 (part no. PSD00-20200), released from June 1, 2003, and will include the following upgraded features:

1) Promi-SD202 will include Class 1 Bluetooth chip, default distance: 100m; maximum distance, via Patch antenna: 1.2Km.
2) Automatic Hardware flow control setting
3) Promi-SD202 uses Pin 1 (CD) to display Bluetooth connection status.
   Pin 1 is ON if connection is active, Pin 1 is OFF if non-active.
4) Host system can automatically indicate Promi-SD202 operation status, by Pin 4 (DTR) and Pin 6 (DSR) instead of by AT commands, as Promi-SD202 loops back status data to Host. When Host turns on DTR signal, Promi-SD202 returns Active DSR signal to Host indicating Active operation status.
   AT commands may also be used for operation status check.
5) Using Pin 4 (DTR) signal, Host may disconnect Bluetooth connections, without AT commands. When Host changes the DTR signal to Non-active, Promi-SD202 will drop the connection. AT commands may also be used for disconnect.

Full specification of Promi-SD202 will be released soon.

7. For Multi-Serial Connections

7.1 Promi-MSP™

For multiple serial connections, we recommend Promi-MSP™. Promi-MSP™ has 7 default Bluetooth connections and can be expanded to up to 35 connections.

More information on Promi-MSP™ can be found in its User Manual at www.initium.co.kr

<Fig. 7.1.1 Promi-MSP™>

8. Legal Notice

About this Document

This document provides introductory instructions on how to set up and manage Promi-SD™ within your networking environment. Should you require more information, please refer to Initium website at http://www.initium.co.kr.

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Limited Warranty

Promi-SD™

Initium Co., Ltd. warrants the original owner that the products delivered will be free from defects in material and workmanship for 90 days following the date of purchase. This warranty dose not cover any damage attributable to erroneous installation of the product.

INITIUM'S TOTAL LIABILITY IS LIMITED TO THE PRICE/LICENSE FEE ACTUALLY

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This warranty does not cover replacement of products damaged by abuse, accident, misuse, neglect, alteration, repair, disaster, improper installation or improper testing.

9. About this Manual

This manual is available in a printable PDF version on-line and on the CD enclosed in the Promi-SD™ product package.

For additional support related to Promi-SD™ and this document, contact INITIUM via:

HANTZ + PARTNER GMBH

Gewerbestrasse 37, D-79194 Gundelfingen

Germany

Tel: +49-761-592100

Fax: +49-761-5921039

OR

www.BluetoothUpgrades.de

OR

Email: info@hantz.com

Appendix A: Power Adaptor Specification

Manufacturer: Anam Instruments Inc.

Emerald B/D 7F, 1042, Hogea-dong, Dongan-gu, Anyang, Korea

Tel.: +82-31-347-6140

Fax: +82-31-347-7019

www.anamic.co.kr

Manufacturer's Model Name: AP1015

1. STANDARD FEATURES
    1.1. 10WATT AC/DC SWITCHING MODE ADAPTOR
    1.2. WALL MOUNT DESIGN
    1.3. 100~240Vac UNIVERSAL VOLTAGE INPUT
    1.4. 5V 2A REGULATED OUTPUT
    1.5. SHORT CIRCUIT PROTECTION
    1.6. DESIGN TO MEET CLASS B LIMIT OF EN55022 AND FCC PART 15
    1.7. VACUUM IMPREGNATED TRANSFORMER
    1.8. 100% BURN-IN PROCESS
2. ELECTRICAL CHARACTERISTCS
    2.1 INPUT CHARACTERISTICS
        2.1.1. AC INPUT VOLTAGE
            2.1.1.1. Nominal input voltage : 110 / 220 Vac
            2.1.1.2. Rated input voltage range : 100 to 240 Vac
            2.1.1.3. Operating input voltage range : 90 to 264 Vac
        2.1.2. AC INPUT FREQUENCY
            2.1.2.1. Nominal input frequency : 50 / 60 Hz
            2.1.2.2. Rated input frequency : 47 - 63 Hz
        2.1.3. AC INPUT CURRENT : MAX 0.3 A (RMS) at 90 Vac
    2.2 OUTPUT CHARACTERISTICS
        2.2.1. DC OUTPUT

OUTPUT VOLTAGE	LOAD			OUTPUT RANGE	OUTPUT RIPPLE
	MIN	MAX	PEAK		
5 VDC	0.2 A	2 A	-	4.75 ~ 5.25 V	50 mVpp

2.2.1.1. Specified output regulation limit includes line regulation and load regulation.

2.2.1.2. Continuous output shall not exceed 10 W.

2.2.1.3. Ripple and noise is measured at the end of output connector with 20MHz oscilloscope bandwidth.

2.2.1.4. A 22uF Electrolytic capacitor and a 0.22uF Ceramic capacitor should be connected in parallel with output load..

2.2.2. EFFICINCY : Minimum 70 % at 2A load condition.

2.2.3. SHORT CIRCUIT PROTECTION : CYCLING

2.2.4. NO LOAD OPERATION : NO DAMAGE

2.2.5. DI-ELECTRIC WITHSTANDING VOLTAGE

2.2.5.1. Primary to Secondary : 3 KV, 1 Second

2.2.5.2. Cut-Off Current : 10mA

2.2.6. EMI

2.2.6.1. Shall be designed to meet CLASS B Limit of FCC part 15.

2.2.6.2. Shall be designed to meet EN 55022

2.2.7. SAFETY

2.2.7.1. UL & cUL : UL1950

2.2.7.2. TUV - CE : EN60950

2.2.7.3. ek-mark : K60950

2.2.7.4. CB / QAS / CCIB / PSE

2.3. GENERAL CHARACTERISTICS

2.3.1. OPERATING TEMPERATURE RANGE : 0'C to 35'C at 100% Load condition. 0’C to 40’C at 90% Load condition.

2.3.2. OPERATING HUMIDITY : 15 to 80% RELATIVE HUMIDITY

2.3.3. STORAGE TEMPERATURE : -20'C to 85'C

2.3.4. STORAGE HUMIDITY : 90 % RELATIVE

2.3.5. BURN-IN PROCESS

2.3.5.1. All unit shall be subjected to burn-in process of mass production.

2.3.5.2. TEMPERATURE : 30 +/-5'C

2.3.5.3. LOAD CONDITION : 2 A

2.3.5.4. INPUT VOLTAGE : 110 / 220 Vac

3. MECHANICAL CHARACTERISTICS

3.1. DIMENSIONAL SIZE

LENGTH : 66 mm

WIDTH : 48.5 mm

HIGHT : 35 mm

3.2. OUTPUT CABLE

CABLE LENGTH : 1850 +/- 50

Appendix B: AT command sets

The following AT command sets are supported by Promi™-SD. Here <cr> represents carriage return of ASCII Code (0x0D) and <lf> represents line feed of ASCII Code (0x0A).

AT<cr>

Function : Check the presence of your SD.

Response : <cr><lf>OK<cr><lf> or
<cr><lf>ERROR<cr><lf>

Description : In standard mode, you can check whether your SD is connected to a host correctly by using this AT command.

ATZ<cr>

Function : Do soft-reset

Response : <cr><lf>OK<cr><lf> or
<cr><lf>ERROR<cr><lf>

Description : You can do soft-reset by using this AT command. When your SD is already connected to the other device, it disconnects the connected device. You can halt the current ongoing operation by using this command.

AT&F<cr>

Function : Restore the default configuration of your SD.

Response : <cr><lf>OK<cr><lf> or
<cr><lf>ERROR<cr><lf>

Description : You can restore the default configuration of your SD by executing this AT command.

AT+BTINQ?<cr>

Function : Search (INQUIRY) other Bluetooth devices nearby.

Response : <cr><lf>BD_ADDR, Device Name , Class of Device<cr><lf>
<cr><lf>BD_ADDR, Device Name , Class of Device<cr><lf>
…
<cr><lf>BD_ADDR, Device Name , Class of Device<cr><lf>
<cr><lf>OK<cr><lf>

Description : This command is used to inquiry other Bluetooth devices nearby. The INQUIRY process is carried out during the predefined time duration (30

seconds). The maximum number of INQUIRY result is 10.

ATD BD_ADDR <cr>

Function : Make connection with the given BD_ADDR.

Response : <cr><lf>OK<cr><lf>
<cr><lf>CONNECT<cr><lf>
or
<cr><lf>OK<cr><lf>
<cr><lf>ERROR<cr><lf>.

Description : After getting BD_ADDRs, you can make connection to other Bluetooth device by using this AT command. Once you input this command, SD tries to connect the Bluetooth device with the given BD_ADDR for 5 minutes. The connection failure happens when a Bluetooth device with the given BD_ADDR is not in PAGE SCAN mode or is already connected to other Bluetooth device.

ATD<cr>

Function : Make connection with a Bluetooth device connected most recently.

Response : <cr><lf>OK<cr><lf>
<cr><lf>CONNECT<cr><lf>
or
<cr><lf>OK<cr><lf>
<cr><lf>ERROR<cr><lf>.

Description : If you execute this AT command, your SD make connection with a Bluetooth device which your SD connect most recently. To make this AT command work successfully, there should be at least one successful connection to the other Bluetooth you want to connect.

AT+BTSCAN <cr>

Function : Make your SD do INQUIRY SCAN and PAGE SCAN alternately.

Response : <cr><lf>OK<cr><lf>
<cr><lf>CONNECT<cr><lf>

Description : You can force your SD to do INQUIRY SCAN or PAGE SCAN alternately with this AT command. Your SD does INQUIRY SCAN and PAGE SCAN until it has a connection from other Bluetooth device. Once connected, your SD returns ‘CONNECT’ message. You can use ‘AT+BTCANCEL’ to cancel this operation. This AT command has the same effect of ‘AT+BTSCAN,3,0’.

AT+BTSCAN, n, to<cr>

Function : You can force your SD to do INQUIRY SCAN or PAGE SCAN.

Response : <cr><lf>OK<cr><lf>
<cr><lf>CONNECT<cr><lf>
or
<cr><lf>OK<cr><lf>
<cr><lf>ERROR<cr><lf>

Description : To make SD to be *Discoverable* and *Connectable* from other Bluetooth devices, you should set its INQUIRY SCAN and PAGE SCAN. To make your SD do INQUIRY SCAN only, you should set n as 1. To make your SD do PAGE SCAN only, you should set n as 2. When n is set to 3, your SD does INQUIRY SCAN and PAGE SCAN alternately. Here, 'to' indicates the time out interval of INQUIRY SCAN and PAGE SCAN operations. If you set 'to' to '0', your SD does INQUIRY SCAN and PAGE SCAN until it has a connection from other Bluetooth device. Your SD returns 'CONNECT' message when it is connected from other Bluetooth device within the given time out intervals. Otherwise, it returns 'ERROR' message.

AT+BTSCAN, BD_ADDR, to<cr>

Function : Wait Bluetooth connection from a device with given BD_ADDR.

Response : <cr><lf>OK<cr><lf>
<cr><lf>CONNECT<cr><lf>
or
<cr><lf>OK<cr><lf>
<cr><lf>ERROR<cr><lf>

Description : Once you enter this AT command, your SD does PAGE SCAN. However, it waits a connection from a Bluetooth device with the given BD_ADDR. This process lasts during 'to' time interval. Especially when 'to' has value of '0', your SD waits connection infinitely.

AT+BTCANCEL<cr>

Function : Cancel currently ongoing operation of your SD.

Response : <cr><lf>OK <cr><lf>

Description : This AT command works only when your SD is busy in doing 'AT+BTSCAN', 'ATD' or 'AT+BTINQ?'. Once canceled successfully, your SD will become

STANBY STATUS'.

+++

Function : Make transition from ONLINE STATUS to STANDBY STATUS.

Response : <cr><lf>OK <cr><lf>.

Description : If you input '+++' string to your SD in ONLINE STATUS, your SD goes into STANBY STATUS. Once SD enters into STANDBY STATUS, you can use any AT command sets supported by Promi™-SD.

ATO<cr>

Function : Make transition from STANBY STATUS to ONLINE STATUS.

Response : None

Description : This AT command is the counter operation of '+++". You can change the operating status to ONLINE STATUS again by using this command. In ONLINE STATUS, the data can be transferred between two hosts. The existence of your SD becomes transparent to any host applications which use serial ports.

ATH<cr>

Function : Release the current Bluetooth connection.

Response : <cr><lf>OK<cr><lf>
<cr><lf>DISCONNECT <cr><lf>.

Description : This AT command can be used for disconnecting the existing Bluetooth connection.

AT+BTSEC, Authentication, Encryption <cr>

Function : Set Bluetooth authentication or encryption features selectively.

Response : <cr><lf>OK<cr><lf>.

Description : By using this AT command, you can set authentication or encryption feature of your SD during Bluetooth connection process. Once you set authentication or encryption features, your SD stores its status. To release authentication or encryption features you set, you should use this AT commands or do soft-reset. To enable authentication or encryption, set authentication or encryption parameter as 1. Otherwise set either of them as 0.

AT+BTLAST?<cr>

Function : Return BD_ADDR of the Bluetooth device to your host which your SD is connected most recently.

Response : <cr><lf>BD_ADDR<cr><lf>
<cr><lf>OK< cr><lf>

Description : You can use this AT command if you need to refer the BD_ADDR of most recently connected Bluetooth device.

AT+BTMODE, n<cr>

Function : Set the operating mode of your SD.

Response : <cr><lf>OK<cr><lf>

Description : Your SD has 4 different operating mode. According to the current operating mode you set, your SD behavior differently.

- n=0 : This means your SD is in MODE 0. MODE 0 is the default configuration.
- n=1 : In MODE 1, your SD will try to make connection to most recently connected Bluetooth device.
- n=2 : In MODE 2, your SD will wait connection from most recently connected Bluetooth device.
- n=3 : IN MODE 3, your SD does INQUIRY SCAN and PAGE SCAN alternately.

AT+BTNAME=”FriendlyName”<cr>

Function : Assign user friendly device name to your SD.

Response : <cr><lf>OK<cr><lf>

Description : You can assign your SD user friendly name by using this AT command. With the assigned name, you can distinguish your SD easily from other Bluetooth devices. Up to 32 characters are permitted as user friendly name.

AT+BTKEY=”nnnn”<cr>

Function : Change the passkey.

Response : <cr><lf>OK<cr><lf>

Description : When the authentication is enabled in your SD, you should assign passkey. Two Bluetooth devices which are to be connected should have the same passkey. The default passkey of your SD is ‘1234’. You can assign maximum 16 alphanumeric characters as a passkey.

AT+BTINFO?<cr>

Function : Return the internal status of your SD.

Response : <cr><lf>BD_ADDR,Name,Mode,Status,Auth,Encryp<cr><lf>
<cr><lf>OK<cr><lf>

Description : When you enter this AT commands at a host terminal, your SD returns its device information and status to a host. It encompasses BD_ADDR, user friendly name, operating mode, operating status and authentication/encryption status. Especially when the operating status is PENDING, it means your SD is busy in processing 'AT+BTINQ?', 'ATD' or 'AT_BTSCAN'. When Authentication or Encryption feature is activated, the corresponding parameter has value of '1'.

AT+BTLPM,n<cr>

Function : Set Bluetooth Low power consumption mode.

Response : <cr><lf>OK<cr><lf>

Description : To minimize power consumption, your SD supports Bluetooth PARK mode. When you set n as 1, your SD uses PARK mode. Using PARK mode might cause extra data transmission delay in some cases.

AT+BTSD?<cr>

Function : Return the list of secured devices.

Response : <cr><lf>BD_ADDR<cr><lf>
<cr><lf>BD_ADDR<cr><lf>
…
<cr><lf>BD_ADDR<cr><lf>
<cr><lf>OK<cr><lf>

Description : Your SD can pair up to 5 Bluetooth devices. Upon receiving this AT command, your SD returns all the BD_ADDRs of the previously paired Bluetooth devices.

AT+BTCSD<cr>

Function : Delete the info of all the paired devices stored in your SD.

Response : <cr><lf>OK<cr><lf>

Description : This AT command just deletes the info of paired devices stored on SD's Flash memory. To delete the same info resides on SD's RAM, you have to do software reset or hardware reset.

AT+BTFP,n<cr>

Function : Force your SD to generate passkey automatically.

Response : <cr><lf>OK<cr><lf>

Description : Once paired, your SD uses the stored link key. By using this AT command, you can make Bluetooth connection with a new link key. When n is set to 1, your SD newly generates a link key during connection process.

AT+UARTCONFIG, baudrate, parity, stopbit<cr>

Function : Configure the serial port of your SD.

Response : <cr><lf>OK<cr><lf>

Description : By using this AT command, you can reconfigure the serial port of your SD. You can set baudrate, parity, stopbit . To make this command result active, you should do soft-reset or turn off/on your SD. The following values are permitted for each parameter.

- Baudrate = 9600, 19200, 38400, 57600 or 115200.
- Parity = N (No parity), E (Even parity) or O (Odd parity).
- Stopbit = 1 or 2.

Full AT commands set

No.	Command	Response	Comments
1)	AT<cr>	<cr><lf>OK<cr><lf>	
2)	ATZ<cr>	<cr><lf>OK<cr><lf>	Drops all connections, disable Inquiry and Page scans. Reset the bluetooth module.
3)	AT&F<cr>	<cr><lf>OK<cr><lf>	Reset to factory default state
4)	AT+BTINQ?<cr>	<cr><lf>112233445 5,FriendlyName,Co D<cr><lf> <cr><lf>112233445 5,FriendlyName,Co D<cr><lf> <cr><lf>112233445 5,FriendlyName,Co D<cr><lf> <cr><lf>OK<cr><lf>	Inquiry nearby devices. The OK at the end means end of inquiry.
5)	ATD112233445566<cr>	<cr><lf>OK<cr><lf> <cr><lf>CONNECT <cr><lf> or <cr><lf>ERROR<cr ><lf>	Connect to the specified device. If you want to enable Authentication and Encryption, just set variable as 1.
6)	ATD<cr>	<cr><lf>OK<cr><lf> <cr><lf>CONNECT <cr><lf> or <cr><lf>ERROR<cr ><lf>	Connect to the device that last succefully connected.
7)	AT+BTSCAN<cr>	<cr><lf>OK<cr><lf>	Enable inquiry and page scans with timeout of infinity.
8)	AT+BTSCAN,n,to<cr>	<cr><lf>OK<cr><lf>	Enable inquiry or Page scans. If n=1, disable page and enable inquiry. If n=2, enable page and disable inquiry. If n=3, enable both page and inquiry.

			Scan will be performed during <to> seconds.
9)	AT+BTSCAN112233445566,to<cr>	<cr><lf>OK<cr><lf>	Will scan of only specifed device.
10)	AT+BTCANCEL<cr>	<cr><lf>OK<cr><lf>	cancel the current pending operation when the device is inquirying, paging or scanning mode.
11)	+++	<cr><lf>OK<cr><lf>	Drop from online mode to command mode.
12)	ATO<cr>	<cr><lf>OK<cr><lf>	Return to online mode if currently being connected.
13)	ATH<cr>	<cr><lf>OK<cr><lf>	Drop the connection.
14)	AT+BTAUTH,Authentication,Encryption<cr>	<cr><lf>OK<cr><lf>	Sets the authentication and encryption features of device. Possible value is 1 or 0.
15)	AT+BTSEC,Authentication,Encryption<cr>	<cr><lf>OK<cr><lf>	Same as AT+BTAUTH
16)	AT+BTLAST?<cr>	<cr><lf>OK<cr><lf>	Query the bd-address of last connected device
17)	AT+BTMODE,n<cr>	<cr><lf>OK<cr><lf>	Sets the mode of device. If n=0, device operates at Standart mode which accepts all AT commaned supported. If n=1, device operates at Master mode which try to connect peer device. If n=2, device operates at Slave mode which waiting for connection. If n=3, device operates at always connectable mode.
18)	AT+BTNAME="FriendlyName"<cr>	<cr><lf>OK<cr><lf>	Sets the friendly name of this unit.
19)	AT+BTKEY="nnnn"<cr>	<cr><lf>OK<cr><lf>	Sets the Passkey of this unit. Up to 16 characters.
20)	AT+BTINFO?<cr>	<cr><lf>112233445566,FriendlyName,Mode,State,Authenti	Retrieve local device information including BD address, Friendly name, mode of device, internal operation

		cation,Encryption<cr><lf> <cr><lf>OK<cr><lf>	state and status of authentication and encryption features.
21)	AT+BTLPM,n<cr>	<cr><lf>OK<cr><lf>	Enable or disable the low power mode of dongle. n = 1 or 0
22)	AT&V<cr>	<cr><lf>S0: m0;S1: m1; … Sn: mn<cr><lf> <cr><lf>OK<cr><lf>	View all the values of internal S-registers
23)	AT+BTSD?<cr>	<cr><lf>bdaddr of secured device 1<cr><lf> <cr><lf>bdaddr of secured device 1<cr><lf> <cr><lf>OK<cr><lf>	Query the bd-addresses of secured devices
24)	AT+BTCSD<cr>	<cr><lf>OK<cr><lf>	Clear the list of secured devices
25)	AT+BTFP,n<cr>	<cr><lf>OK<cr><lf>	Force paring when connecting as master
26)	AT+UARTCONFIG,baudrate,parity,stopbit<cr>	<cr><lf>OK<cr><lf>	Sets the configuration of UART interface. Possible values are; baudrate =1200,4800,9600,19200,38400,57600 or 115200. parity = N(o parity), E(ven parity) or O(dd parity). stop = 1 or 2.
27)	ATS10=1<cr> : Enabling all of the response messages- OK, CONNECT, DISCONNECT, and ERROR. ATS10=0<cr> : Disabling all of the response messages- OK, CONNECT, DISCONNECT, and ERROR. ATS10?<cr> : To see current status of ATS10		

28)	ATS14=1<cr>: Users may use DTR/DSR lines for communications ATS14=0<cr>: Users may use DTR/DSR lines for Loop-back only. Default value of ATS14 is 0. ATS14?: To see current status of ATS14.
29)	ATS15=1<cr>: If users set ATS15=1, users may use DTR signal to disconnect Bluetooth connection. If ATS15=1, and DTR signal is changed from state ON to OFF, your connection will be disconnected. ATS15=0<cr>: If ATS15=0, users may NOT use DTR signal to disconnect the Bluetooth connection. ATS15?: To see current status of ATS15.