Via Enrico Fermi, 2
I-25015 Desenzano del Garda (BS) - Italy
Phone: +39 030 7870787
Fax: +39 030 7870777
www.solexy.net

SWA & SWS
Installation & Operation Manual
ATEX - IECEx

The information in this manual is intended to assist with equipment design and ensure proper installation.

READ THIS INSTRUCTION FIRST

To avoid serious or fatal personal injury or major property damage, read and follow all safety instruction in this manual. If you require additional assistance, please contact SOLEXY.

SAFETY INSTRUCTION TO HAZARDOUS AREA INSTALLATION

- It is the responsibility of the installer and the end-user to ensure that the Solexy WA/WS enclosures are installed and maintained according to the suitable standards for electrical application in potentially explosive atmospheres (example IEC/EN 60079-14, IEC/EN60079-17) and any other relevant electrical code.
- Suitably trained personnel shall carry out installation according with applicable code practice.
- Read this first and keep this instruction manual always available.

MARKING

SWA and SWS unit:

Ex I M2 Ex db I Mb (SWS only)
II 2G Ex db IIA/IIB/IIC (1) T6…T4 Gb
II 2D Ex tb IIIC T110°C…T140°C Db

SWA and SWS unit complete of Solexy RX or SX antenna barriers:

Ex I M2(M1) Ex db mb [ia Ma] I Mb (SWS only)
II 2(1)G Ex db mb [ia Ga] IIA/IIB/IIC (1) T6…T5 Gb
II 2(1)D Ex tb IIIC T80°C…T100°C Db

(1) Refer to product marking for gas group details

This instruction refers to certified equipment covered by following certificate:

ATEX: FIDI 20 ATEX 0014
IECEx: IECEx EXA 14.0001

WARNINGS

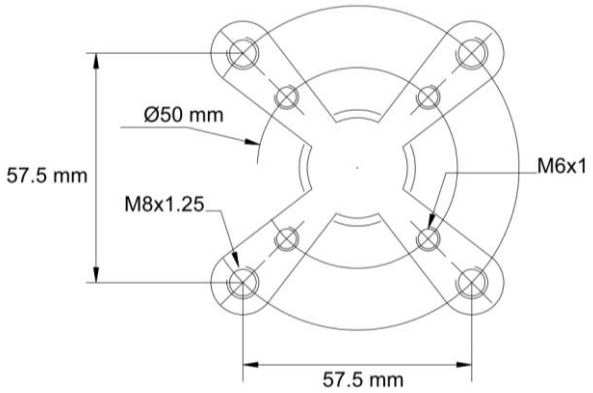
- Warns of hazard that MAY cause serious personal injury, death or major property damage.
- DISCONNECT THE EQUIPMENT FROM THE SUPPLY CIRCUIT BEFORE OPENING. KEEP ASSEMBLY TIGHTLY CLOSED WHEN IN OPERATION.
- DISCONNECT ALL POWER BEFORE SERVICING EQUIPMENT.
- HAZARDOUS VOLTAGE
- DO NOT REMOVE COVER WHEN ENERGISED.
- DO NOT OPEN WHEN AN EXPLOSIVE ATMOSPHERE IS PRESENT.

NOTES

- To avoid the thread cover blocking the thread joint can be protected with greases like Nyogel 760G, Uniflor 8512R, Uniflor 8911 or equivalent compatible with Silicone (VMQ) and Fluorosilicone (FVMQ) gasket.
- The user should not repair this equipment.
- The flameproof joints are not intended to be repaired.
- The user should not modify the unit.
- The unit should not be painted by the user.
- If the equipment is likely to come in to contact with aggressive substances, it is responsibility of the user to take suitable precautions that prevent it from being adversely affected, thus ensuring that the type of protection is not compromised. Aggressive substances: example Acids, liquids, gases with can affected metals.
- The metallic alloy used for the enclosure, in the event of a rare accident, could cause ignition sources due to impact or friction (sparks may occur). This shall be considered when the box is installed in group Ex area.
- Remove plastic plugs or plastic stickers supplied with enclosure before installation. The conduit plugs supplied are for transit purposes only, these components aren't certified.
- Weatherproof levels depend on cable gland and cabling methods used.
- For functionality of device installed inside the enclosure refer to the device's instruction.
- Use only cable glands and plugs that are suitable for the type of protection and maintain the enclosure's environmental protection rating.
- Any unused entries must be filled with appropriate equipment (i.e. plugs) that are suitable for the type of protection and maintain the enclosure's environmental protection rating.

INSTALLATION

1. The unit can be installed in all position.
2. Fix the unit using n° 4 M6x10 or M8x10 bolts



GROUNDING

1. Grounding needs to make according to suitable standards for electrical application in potentially explosive atmospheres and/or other national standards.
2. The electrical devices must be grounded using their internal and external M4 grounding connections.

ELECTRICAL WIRING

1. Remove screw cover, remove protection plugs from cable entries and substitute them with cable glands or conduits or plugs suitable for the type of protection required.
2. Connect terminal strip and/or connector according to device's instruction manual.
3. Check that thread joint were free of foreign matters and deformations check the seal is properly fitted in the slot.
4. Reassemble screw cover and lock it by means of the screw or anti-rotation kit.
5. The cover must be screwed and securely locked to the body.

OPERATION

Refer to the device's instruction manual for set-up and functionality

PRODUCT'S STORAGE

Keep the boxes away from atmospheric agents

MAINTENANCE

- The verification and maintenance of the electrical equipment must be performed according to suitable standards for electrical application in potentially explosive atmospheres and/or other national standards.
- The user should guarantee the keeping of the safety characteristic of the device after maintenance.
- The cover must be securely locked to the body.
- After every opening must check before closing that he thread joint is free of foreign matters and deformations and if necessary lubricate the thread joint in order to avoid cover blocking with greases like Nyogel 760G, Uniflor 8512R, Uniflor 8911 compatible with silicone or fluorosilicone gasket or equivalent according to enclosure temperature range.
- In order to guarantee the weatherproof level, it's necessary that the gasket needs to be in good conditions and it shall be verified after every opening. In case of gasket's damage replace with Solexy spare part.
- The maintenance related to the components used for wiring must be performed according to manufacturer instruction.

DISPOSAL / RECYCLING

Disposal and recycling of the product according to national regulation for waste disposal and recycling.
WARNING: Do not dispose of the product and the components in the environment.

MODEL NOMENCLATURE

X	**XX**	**XXX**	**XX**	**-**	**XX**	**X**	**XX**	**-**	**XXXXX**
1	**2**	**3**	**4**	**-**	**5**	**6**	**7**	**-**	**8**

1 *Family*
S Enclosure supply with the electronic device

2 *Series*
WA aluminum enclosure
WS stainless steel enclosure

3 *Device*
XXX 1 digit for device type installed
2 digit for device version

4 *Antenna barrier*
XX 2 digit for Solexy Antenna Barrier if used (optional components)
00 for unit without Solexy Antenna Barrier

5 *Cable entries*
XX 2 digits for cable entries combination

6 *Color - Brand*
X 1 digit for housing's color and/or brand

7 *Certification Mark*
X0 Atex and IECEx (group II)
M0 Atex and IECEx (group I and group II)
X* Atex and IECEx (group II) + a second standard marking
M* Atex and IECEx (group I and group II) + a second standard marking

8 *Special execution*
XXXXX various, consult Solexy

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SWA & SWS
B10/B11 Series
BLUETOOTH SERIAL ADAPTER
ATEX & IECEx

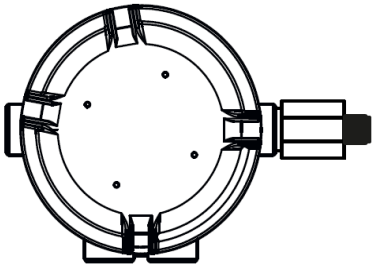
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DESCRIPTION

The SWA & SWS B10/B11 series is a Bluetooth Serial Adapter (Class1 type) that allow to send the RS232 (SD1000) and RS422/RS485 (SD1100) data via Bluetooth

Device version	Model	Bluetooth Port
B10	SD1000 - RS232 Adpater	n° 1
B11	SD1100 - RS422/RS485 Adapter	n° 1

B10 / B11



Layout 2

POWER SUPPLY

Screw terminals = Supply voltage: 5 ~ 12 VDC
Max Power Consumption 80mA@5VDC max

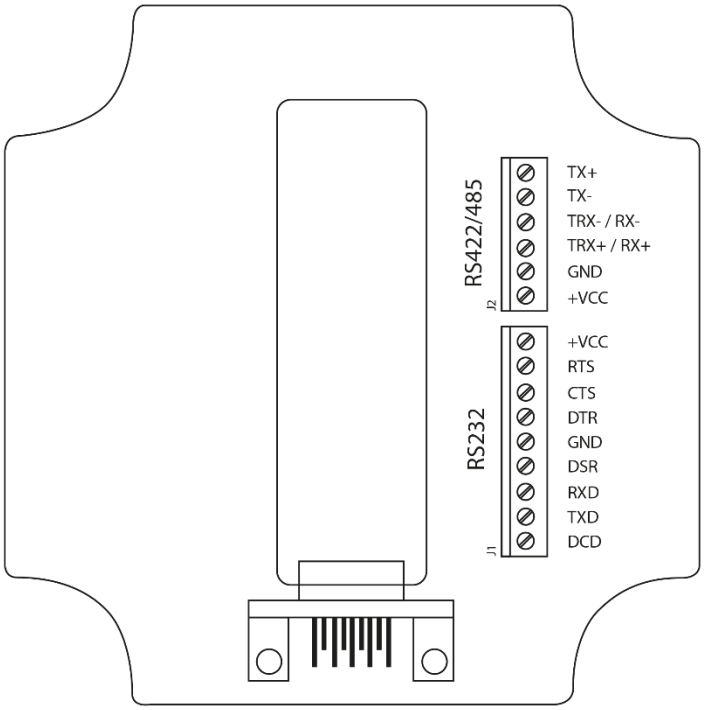
AMBIENT TEMPERATURE RANGE

	Min. ambient temperature	Max ambient temperature	Max surface temperature	T Class
SWAB1x	-40°C	+83°C	+85°C	Gas = T5 Dust = T100°C
SWSB1x	-40°C	+82°C	+85°C	Gas = T5 Dust = T100°C

The unit can reach a surface temperature of 85°C, use cable and cable glands / conduit Ex certified suitable for this temperature.

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WIRING



J1 – RS232 connection *(Device B10 only)*

Label	***Description***
+VCC	Power supply + (5 ~ 12 VDC)
GND	Power supply - (5 ~ 12 VDC)
RTS	RS232 Ready To Send
CTS	RS232 Clear To Send
DTR	RS232 Data Terminal Ready
DSR	RS232 Data Set Ready
RXD	RS232 Received Data
TXD	RS232 Transmitted Data
DCD	RS232 Bluetooth Connect Detect

J2 – RS485/RS422 connection *(Device B11 only)*

Label	***Description***
+VCC	Power supply + (5 ~ 12 VDC)
GND	Power supply - (5 ~ 12 VDC)
TX+	RS422 TX+ line
TX-	RS422 TX- line
TRX-/RX-	RS422 RX- line / RS485 TRX- (B)
TRX+/RX+	RS422 RX+ line / RS485 TRX+ (A)

Step 1 – ANTENNA CONNECTION

Connect the antenna before to turn on the device.

WARNING : use antenna only with 50Ω impedance and with operating frequency in according to technical data listed into the above paragraph “RF information”.
The device must be set according to limitation listed at paragraph MAXIMUM PERMITTED RF THRESHOLD POWER (Pth) for installation in Hazardous Location and the national regulation rules.

Step 2 – POWER SUPPLY CONNECTION

WARNING : DO NOT WIRED POWER SUPPLY WHEN AN EXPLOSIVE ATMOSPHERE IS PRESENT.
FOR SAFETY REASONS WIRING MUST BE MADE ACCORDING TO WA & WS INSTALLATION AND OPERATION MANUAL IM0009

The device can be powered by terminal strip (J1 5 ~ 12 VDC for B10 or J2 5 ~ 12 VDC for B11).

The device has ON/OFF switch. By default is turned on. Check that the Mode led turn on B10 or Power led on B11.

DEVICE CONFIGURATION

FACTORY SETTINGS:

- Baud rate : 9600
- Data byte : 8
- Parity : No parity
- Stop bit : 1
- Hardware Flow Control : No Use
- Bluetooth mode : Mode 0 (In this mode, there is no response when power on or software reset, and Parani SD1x00 is just waiting for AT command input. Neither master nor slave is assigned to Parani SD1000 in mode0. User can change the configuration parameters of Parani SD1x00 in this mode. Parani SD1000 must be in Mode0, when it is directly controlled by AT commands.)

Quick Pairing between the Parani devices
Parani-SD provides Pairing Button for instant configuration without a PC to make an automatic connection between two Parani-SDs. We will refer to the two Parani-SDs as SD1 and SD2, respectively. In pairing status, SD changes IAC value automatically.

Step 1
Turn on SD1 and SD2, then Press the Factory Reset Button respectively.
Step 2
Press the Pairing Button of SD1 for 2 seconds until Mode LED blinks 3 times every 3 seconds. Keep the power ON.
Step 3
Press the Pairing Button of SD2 for 2 seconds until Mode LED blinks 3 times every 3 seconds. Now press the Pairing Button again for 2 seconds until Mode LED blinks every second.
Step 4
Wait for SD1 & SD2 to connect to each other until the Connect LED's of SD1 and SD2 blink every 1 second. It takes about 10 seconds to make a connection. If there are many Bluetooth devices nearby, it may take longer.
Step 5
Turn SD1 off and on. Mode LED blinks 3 times in green every 3 seconds.
Step 6
Turn SD2 off and on. Mode LED blinks in green every second.

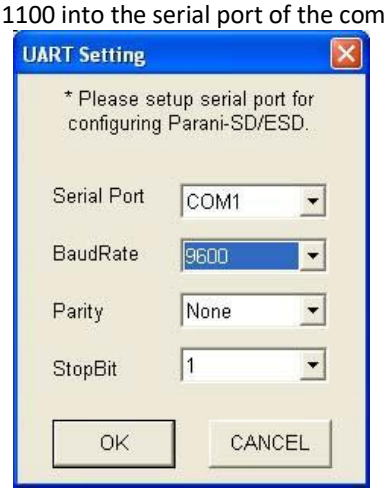
Now SD1 and SD2 are configured to make automatic connection to each other, whenever they are powered on.

Configuration using software
If users want to configure and to connect step by step with diagnosis messages, then they may use either ParaniWin or Hyper terminal program. The Parani-SD1000 supports AT command set for versatile operations.
Parani-SD1000 default configuration is 9600 bps Baud, 8 Data bits, No Parity, 1 Stop bit and Hardware flow control.

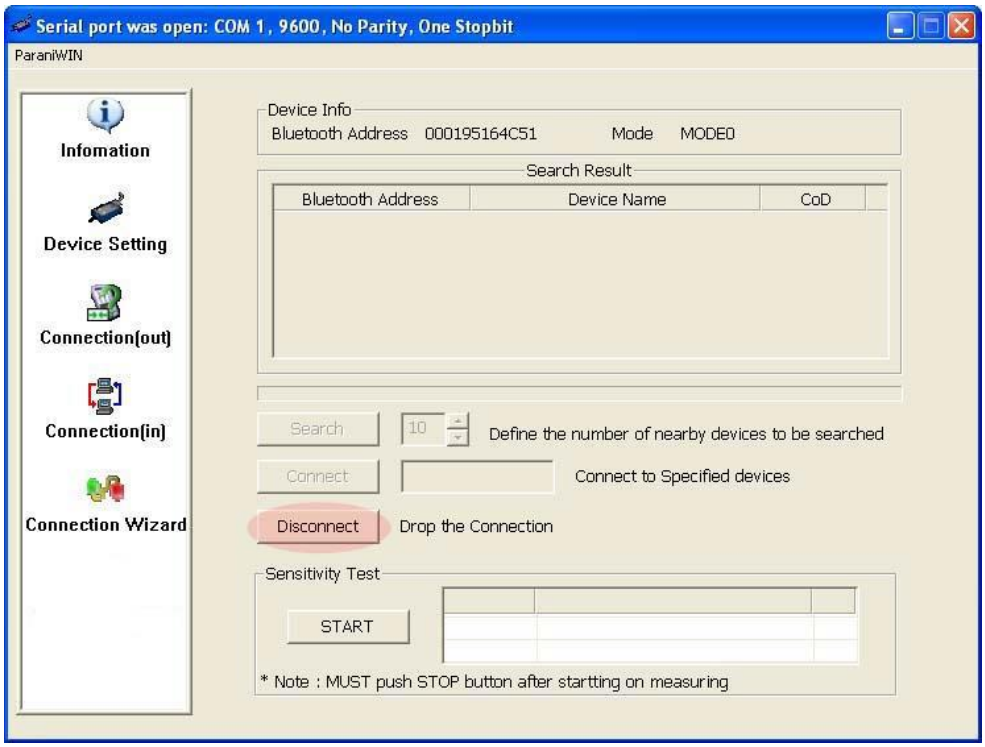
You may download the ParaniWin and User Manual on Sena website at http://www.sena.com/support/downloads/

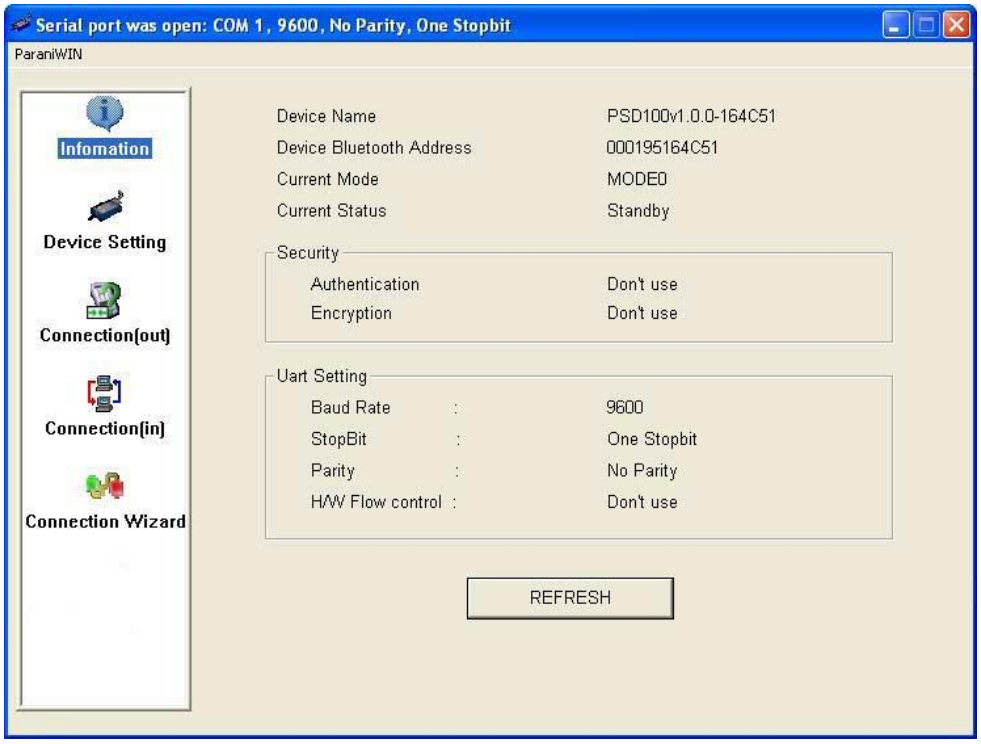
PARANI WIN

ParaniWIN is a program that runs on Microsoft Windows for the configuration of Parani SD1000/SD1100. Install ParaniWIN on your computer. Connect the Parani SD1000/SD1100 into the serial port of the computer and turn on the power. Run ParaniWIN.

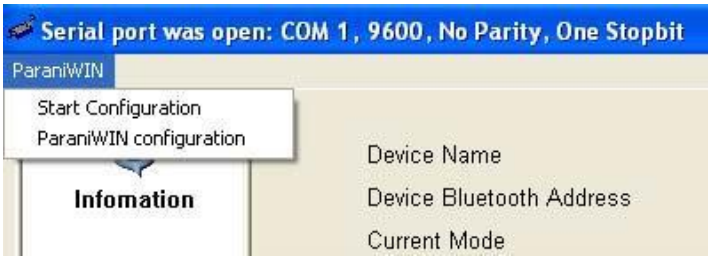


Set each option properly and click [Confirm]. If the settings of the Parani SD1000/SD1100 are different from the ParaniWin, an error message will pop up. If the Parani SD1000 is in the status of connection, warning message will pop up. Then the current connection can be cancelled by [Disconnect] button on the main window.

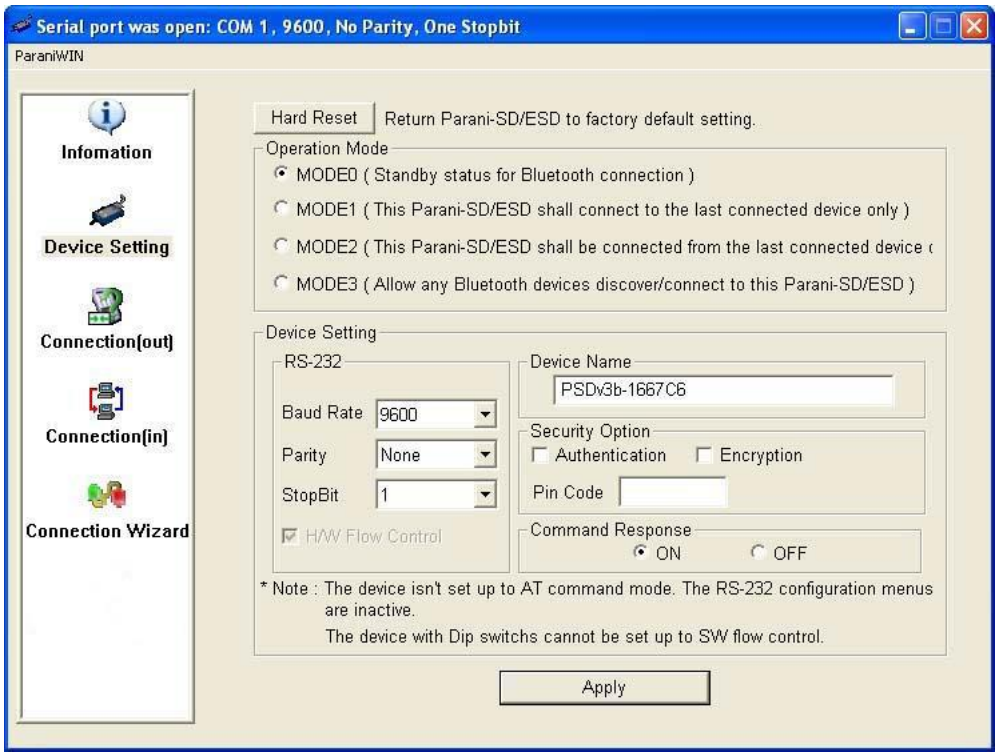




Serial port settings can be changed by <Start Configuration> and <ParaniWIN Configuration> of ParaniWIN in the menu bar at upper left corner of the window without re running the ParaniWIN program.

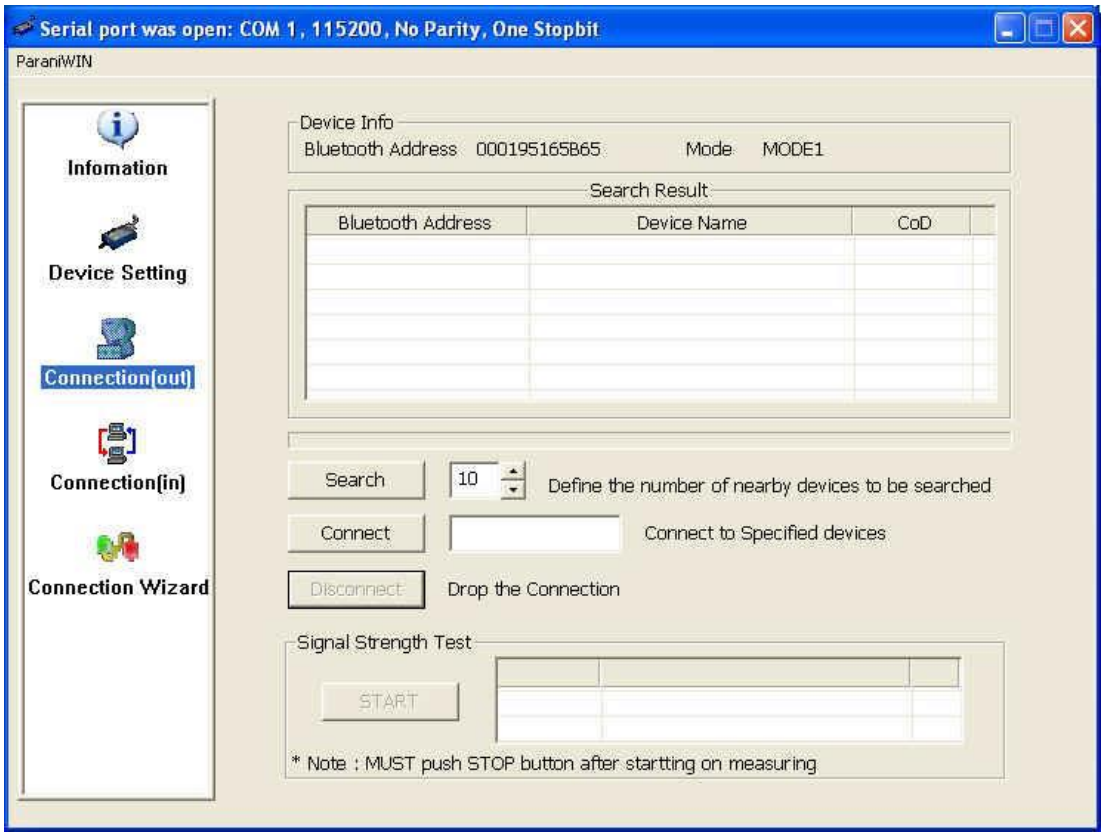


When the ParaniWin software is able to access the Parani SD1000/SD1100 properly, the icons in the left side window come will become available for use.
In device configuration window, hardware reset can be executed or operation mode and RS232 can be configured as well. Security option also can be configured in this window.

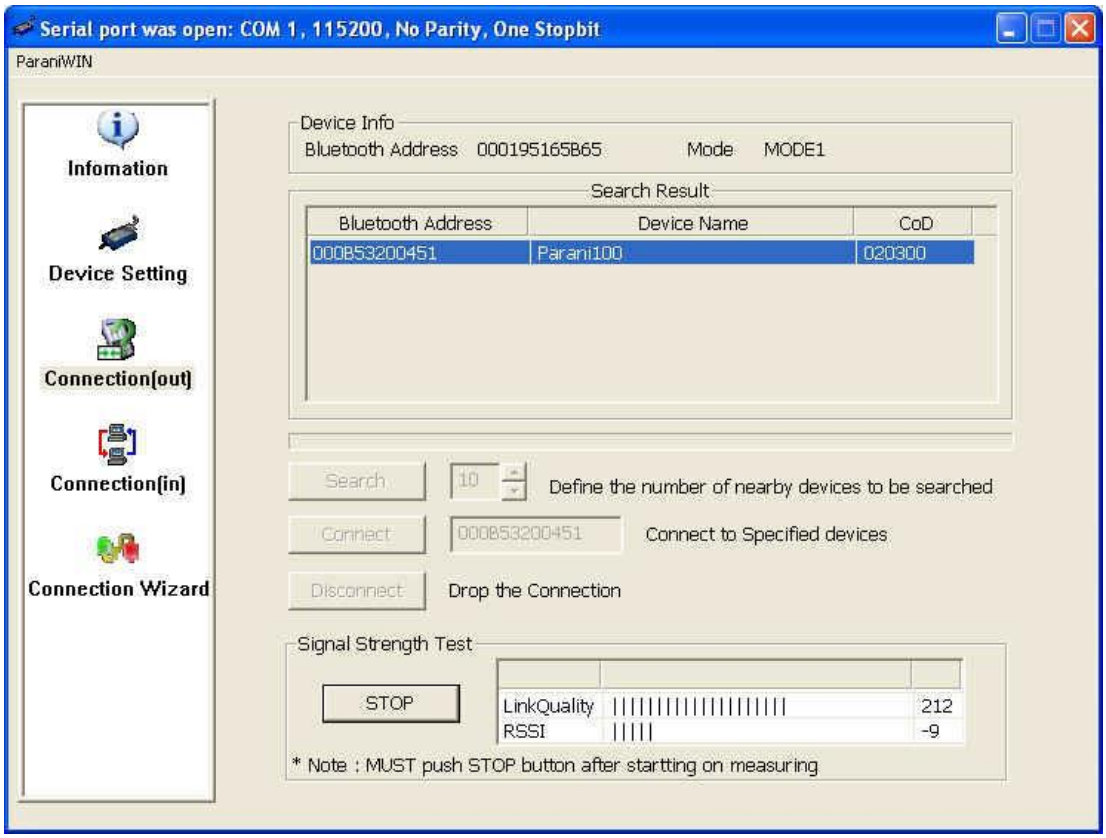


Parani-SD1000/SD1100 supports two security options, Authentication and Encryption. If you enable the Authentication option, you must also enter a Pin Code value. If the authentication is enabled, the connection, between the Master and Slave device must share the same Pin Code. In case that Parani-SD1000/SD1100 connects to another Bluetooth device, that requires authentication, you must know the other device's Pin Code. In genera l, most Bluetooth devices have a pincode of 1234 or 0000. If you check Encryption option, the Parani-SD1000/SD1100 will encrypt packets and sent to the device. The Encryption options works well in case that only one of the devices between Master and Slave use the options works well in case that only one of the devices between Master and Slave use the Encryption Encryption option.

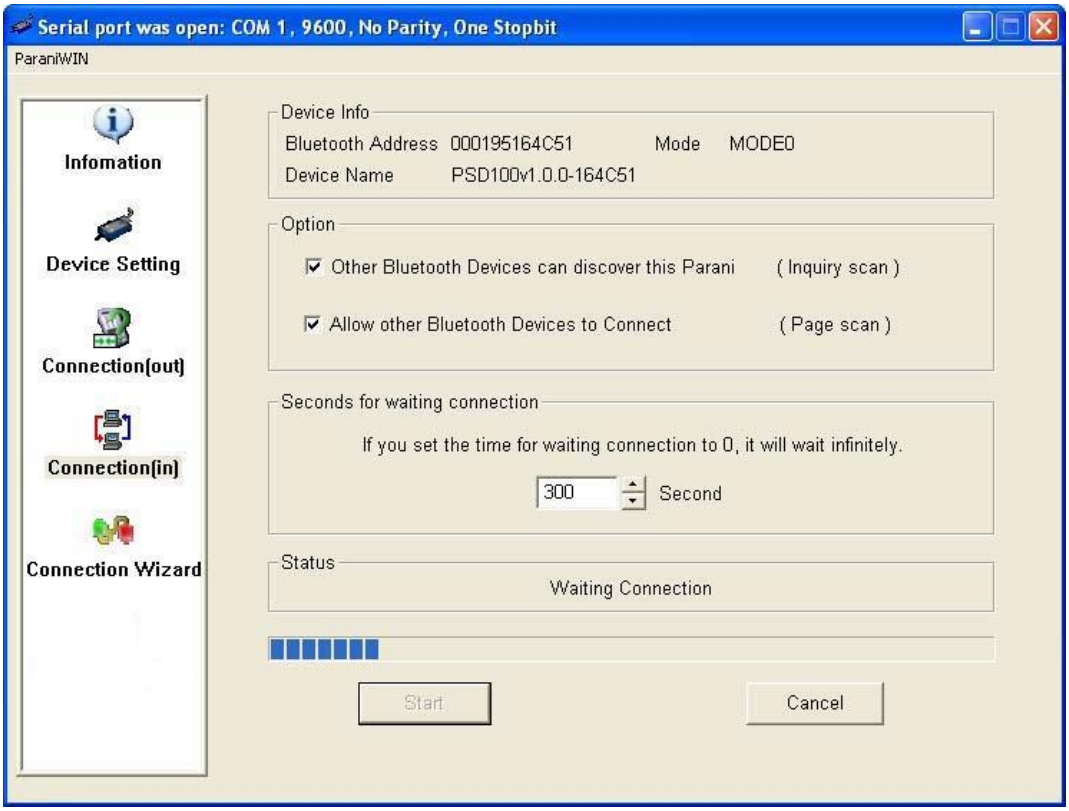
Parani-SD1000 has 4 response messages, 'OK', 'ERROR', 'CONNECT', and 'DISCONNECT'. In some cases, these responses can affect the host system unexpectedly. To prevent this, user can set the Command response to ON or OFF.
For Parani-SD1000, hardware flow control can be configured only by dip switch. And parity, stop bit can be configured only SW config mode. Thus H/W Flow Control option will not work in this case. When the dipswitch value isn't ATcommand mode, the Baud Rate menu will be disabled.
Click [Apply] button to apply any changes made to the Parani-SD1000.
Connection(out) icon will show the following window to search and connect other Bluetooth devices.

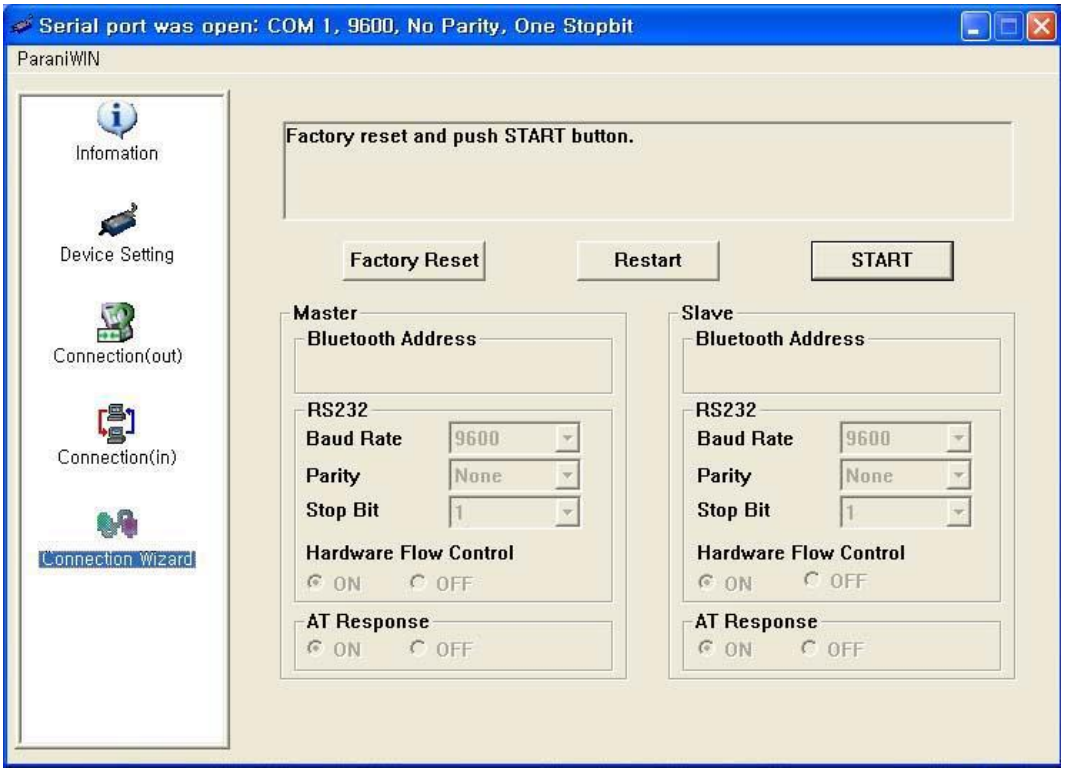


Click [Search] button to search nearby Bluetooth devices. Once several Bluetooth devices has been found, select one of the devices and click the [Connect] button. The selected Bluetooth device must be discoverable and connectable. Click [Disconnect] button to cancel the connection.
After the connection has been established, you will be able to test signal strength by pushing the START button.



The signal strength test shows LinkQuality and RSSI values. The closer LinkQuality is to 255 and RSSI is to 0, this means the Parani-SD1000 has a good connection to the connected Bluetooth device. In general, the wireless connectivity is at its best within 10 meters. You can push the STOP button at anytime in order to terminate the signal strength test. The signal strength test will continue until the STOP button is pushed. If you close the ParaniWIN Window without pushing the STOP button, you must restart Parani-SD1000 to terminate the test.
Connection(in) icon will show the following window, which enables the Parani SD1000 to wait for a connection from another Bluetooth device. If the waiting time is set to 0, Parani SD1000 will continually wait for connection until [Cancel] button is clicked.
If the Connection Wizard icon is clicked, an easy to use pairing menu will appear:





In this example we will refer to the two Parani-SD1000/SD1100 as SD1 and SD2 respectively. To use this menu, please do the following:

Step 1. Connect SD1 and then push the START button.

Step 2. Disconnect SD1, connect SD2 and then push the Next button after setting up Slave configuration. At this time, the dip switch value should be AT cmd mode. The flow control setting can be changed only through dip switch.

Step 3. Disconnect SD2, once again connect SD1 and then push the Finish button. The pairing configuration should be completed. Make sure that each Parani SD1000's connect LED is on. At this point, when both Parani SD1000's restart the connection will be established automatically.

For more details consult Parani SD1000/SD1100 User Guide.

TROUBLESHOOTING AND LED DEFINITION

None of the LED indicators turn ON

- Verify the power supply (voltage, cabling)

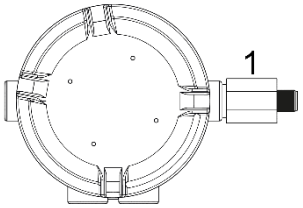
LED Definition SD1000

LED	Function
Mode	Show the mode of parani SD1000 Mode 0 : always on Mode 1 : 1 blink every 1 sec Mode 2 : 2 blink every 3 sec Mode 3 : 3 blink every 3 sec
Connect	Blink every 1 sec when there's a connection
RS232-Tx/Rx	LED will flash accordingly when data is transmitted/received.

LED Definition SD1100

LED	Function
Power	On : power on Off : power off
Standby	Red : when in mode 0 Off : other modes
Connect	On : connected Mode 1 : 1 blink every 1 sec Mode 2 : 2 blink every 3 sec Mode 3 : 3 blink every 3 sec
Serial Rx/Tx	LED will flash accordingly when data is transmitted/received.

ANTENNA LAYOUT

Device version	Model		
B1003 **B1103**	Bluetooth Serial Adapter		Antenna 1 Bluetooth

RF INFORMATION

Device version	
B10 **B11**	Radio Frequency range: 2.402 – 2.480 GHz Number of Frequency Channel: 79 channels Transmission method: FHSS (Frequency Hopping Spread Spectrum) Modulation method: GFSK (Gaussian-filtered Frequency Shift Keying) Pi/4 DQPSK (pi/4 rotated Differential Quaternary Phase Shift Keying) 8DPSK (8 phase Differential Phase Shift Keying) Radio output power: +18 dBm Receiving Sensitivity: -88 dBm

Solexy Antenna KIT	Antenna	Antenna Gain
KA-B03U	N° 1 ANH72	2 dBi

MAXIMUM PERMITTED RF THRESHOLD POWER (Pth)

The RF threshold power (Pth), sometimes called the effective isotropic radiated power (EIRP), as defined in IEC/EN 60079-0, is the product of the effective output power of the transmitter multiplied by the antenna gain. The maximum threshold powers for each equipment group as defined by Table 4 in IEC/EN 60079-0 are provided below.

Because most antennas list the gain relative to an isotropic radiator (dBi) instead of the raw power gain, it is often easier to simply add the antenna gain in dBi to the radio output power in decibel-milliwatts (dBm). Any added cable loss between the RF output and the antenna may also be factored in.

$$Pth_{(dBm)} = \text{RF output power}_{(dBm)} + \text{Antenna gain}_{(dBi)} - \text{Coax cable loss between RF output and Antenna}_{(dB)}$$

The resulting threshold power calculated by the above formula MUST be below the threshold power for the operating area group rating below.

Equipment for	Threshold Power (W)	Threshold Power (dBm)
Group I	6	37.7
Group IIA	6	37.7
Group IIB	3.5	35.4
Group IIC	2	33.0
Group III	6	37.7

The above threshold level refer to installation in classified area Ex according to IEC/EN 60079-0 standard.
The use of device differs from one region and/or country to another. The user of the device must take care that the device is operated only according to local rules and standard or without the permission of the local authorities on frequencies other than those specifically reserved and intended for use without a specific permit. More detailed information is available at the local frequency management authority.

MAXIMUM JOULES CALCULATION IN CASE OF COAX CABLE INSTALLATION

In case of use of a coax cable installation for antenna installation the adding cable need to be evaluating to ensure that the maximum energy stored on cable not exceeded the value allowable per IEC/EN 60079-11:

Max energy (Joules) allowed per IEC/EN 60079-11	
Group I	1500 µJ
Group IIA	950 µJ
Group IIB	250 µJ
Group IIC	50 µJ

The calculation can be done according to following equation:

$$E = \frac{1}{2} * \left\{ (C_1 + C_2) * \left[\left(1.5 * (\sqrt{R * P})\right]^2 \right\} \right.$$

Where:
E = Energy
C_1 = Antenna Barrier Capacitance (18 pF)
C_2 = Coax cable capacitance
R = Impedance (50Ω)
P = RF power output (18 dBm, 63 mW)
1.5 = Safety Factor

Example:

Antenna cable capacitance = 1195 pF

$$E = \frac{1}{2} * \{(18pF + 1195pF) * 7.08\}$$
$$= 0{,}00858\mu J$$

Answer = 0,00858 µJ acceptable for any Group

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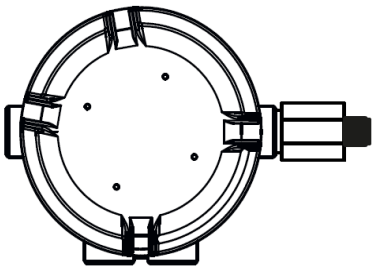
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DESCRIPTION

The SWA & SWS B13 series is a Bluetooth Serial Adapter (Class1 type) that allow to send the RS232 and RS422/RS485 data via Bluetooth.

Device version	Model	Bluetooth Port
B13	SD1000 - RS232/RS485/RS422 Adapter	n° 1

B13



Layout 2

POWER SUPPLY

Screw terminals = Supply voltage: 9 ~ 36 VDC
Max Power Consumption 100mA@9VDC max

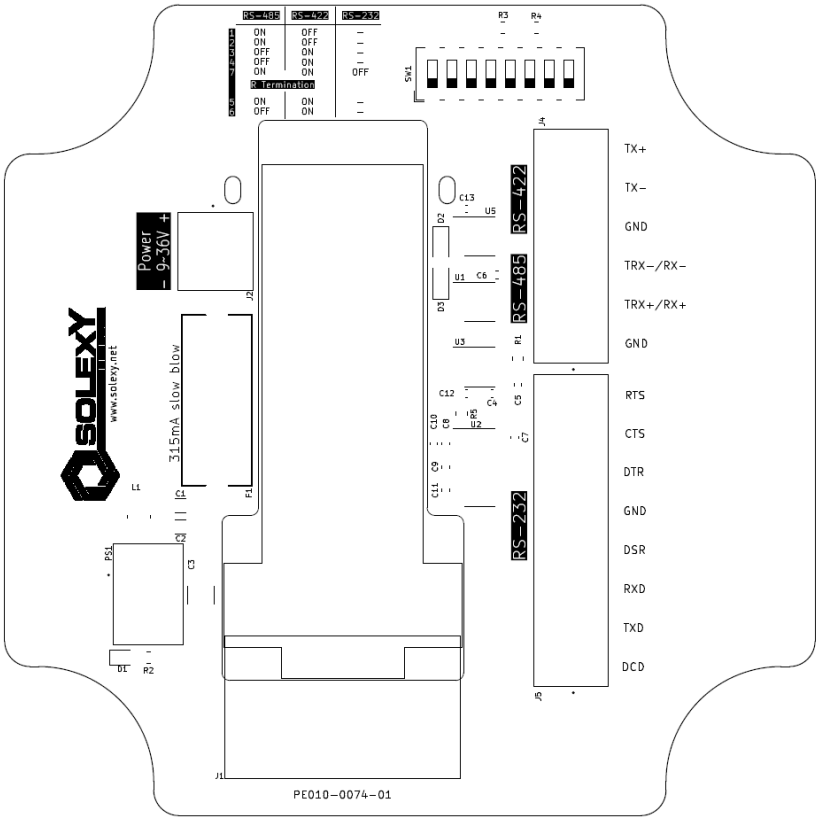
AMBIENT TEMPERATURE RANGE

	Min. ambient temperature	Max ambient temperature	Max surface temperature	T Class
SWAB1x	-40°C	+83°C	+85°C	Gas = T5 Dust = T100°C
SWSB1x	-40°C	+82°C	+85°C	Gas = T5 Dust = T100°C

The unit can reach a surface temperature of 85°C, use cable and cable glands / conduit Ex certified suitable for this temperature.

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WIRING



J2 – Power Supply (9~36 Vdc)

Label	***Description***
+	Power supply +
-	Power supply –

J5 – RS232 Connection

Label	***Description***
RTS	RS232 Ready To Send
CTS	RS232 Clear To Send
DTR	RS232 Data Terminal Ready
GND	RS232 Ground
DSR	RS232 Data Set Ready
RXD	RS232 Received Data
TXD	RS232 Transmitted Data
DCD	RS232 Bluetooth Connect
Detect	

J4 – RS485/RS422 connection

Label	***Description***
TX+	RS422 TX+ line
TX-	RS422 TX- line
GND	RS422/RS485 Ground
TRX-/RX-	RS422 RX- line / RS485 TRX- (B)
TRX+/RX+	RS422 RX+ line / RS485 TRX+ (A)
GND	RS422/RS485 Ground

Step 1 – ANTENNA CONNECTION

Connect the antenna before to turn on the device.

WARNING : use antenna only with 50Ω impedance and with operating frequency in according to technical data listed into the above paragraph “RF information”.
The device must be set according to limitation listed at paragraph MAXIMUM PERMITTED RF THRESHOLD POWER (Pth) for installation in Hazardous Location and the national regulation rules.

Step 2 – POWER SUPPLY CONNECTION

WARNING : DO NOT WIRED POWER SUPPLY WHEN AN EXPLOSIVE ATMOSPHERE IS PRESENT.
FOR SAFETY REASONS WIRING MUST BE MADE ACCORDING TO WA & WS INSTALLATION AND OPERATION MANUAL IM0009

The device is powered by terminal strip (J2 9 ~ 36 Vdc).

The device has an ON/OFF switch. By default, is turned on. Check that the Led D1 on the board and the Mode led turn on the Bluetooth module.

BOARD DIP SWITCH CONFIGURATION

Setting in RS485 Mode:

SW1	RS485
1	ON
2	ON
3	OFF
4	OFF
7	ON

Setting Termination resistor in RS485 mode:

SW1	RS485
5	ON
6	OFF

Setting in RS422 Mode:

SW1	RS422
1	OFF
2	OFF
3	ON
4	ON
7	ON

Setting Termination resistors in RS422 mode:

SW1	RS422
5	ON
6	ON

Setting Termination resistors in RS232 mode:

SW1	RS422
7	OFF

DEVICE CONFIGURATION

FACTORY SETTINGS:

- Baud rate: 9600
- Data byte: 8
- Parity: No parity
- Stop bit: 1
- Hardware Flow Control: No Use
- Bluetooth mode: Mode 0 (In this mode, there is no response when power on or software reset, and Parani SD1x00 is just waiting for AT command input. Neither master nor slave is assigned to Parani SD1000 in mode0. User can change the configuration parameters of Parani SD1x00 in this mode. Parani SD1000 must be in Mode 0, when it is directly controlled by AT commands.)

Quick Pairing between the Parani devices
Parani-SD provides Pairing Button for instant configuration without a PC to make an automatic connection between two Parani-SDs. We will refer to the two Parani-SDs as SD1 and SD2, respectively. In pairing status, SD changes IAC value automatically.

Step 1
Turn on SD1 and SD2, then Press the Factory Reset Button respectively.
Step 2
Press the Pairing Button of SD1 for 2 seconds until Mode LED blinks 3 times every 3 seconds. Keep the power ON.
Step 3
Press the Pairing Button of SD2 for 2 seconds until Mode LED blinks 3 times every 3 seconds. Now press the Pairing Button again for 2 seconds until Mode LED blinks every second.
Step 4
Wait for SD1 & SD2 to connect to each other until the Connect LED's of SD1 and SD2 blink every 1 second. It takes about 10 seconds to make a connection. If there are many Bluetooth devices nearby, it may take longer.
Step 5
Turn SD1 off and on. Mode LED blinks 3 times in green every 3 seconds.
Step 6
Turn SD2 off and on. Mode LED blinks in green every second.

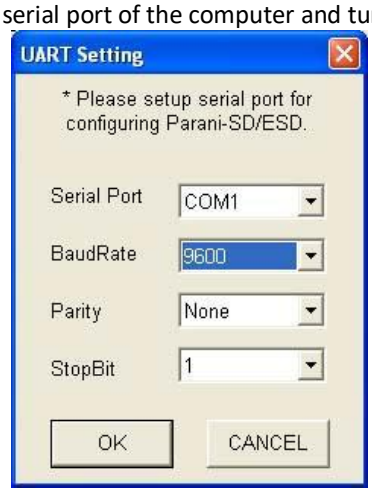
Now SD1 and SD2 are configured to make automatic connection to each other, whenever they are powered on.

Configuration using software:
If users want to configure and to connect step by step with diagnosis messages, then they may use either ParaniWin or Hyper terminal program. The Parani-SD1000 supports AT command set for versatile operations.
Parani-SD1000 default configuration is 9600 bps Baud, 8 Data bits, No Parity, 1 Stop bit and Hardware flow control.

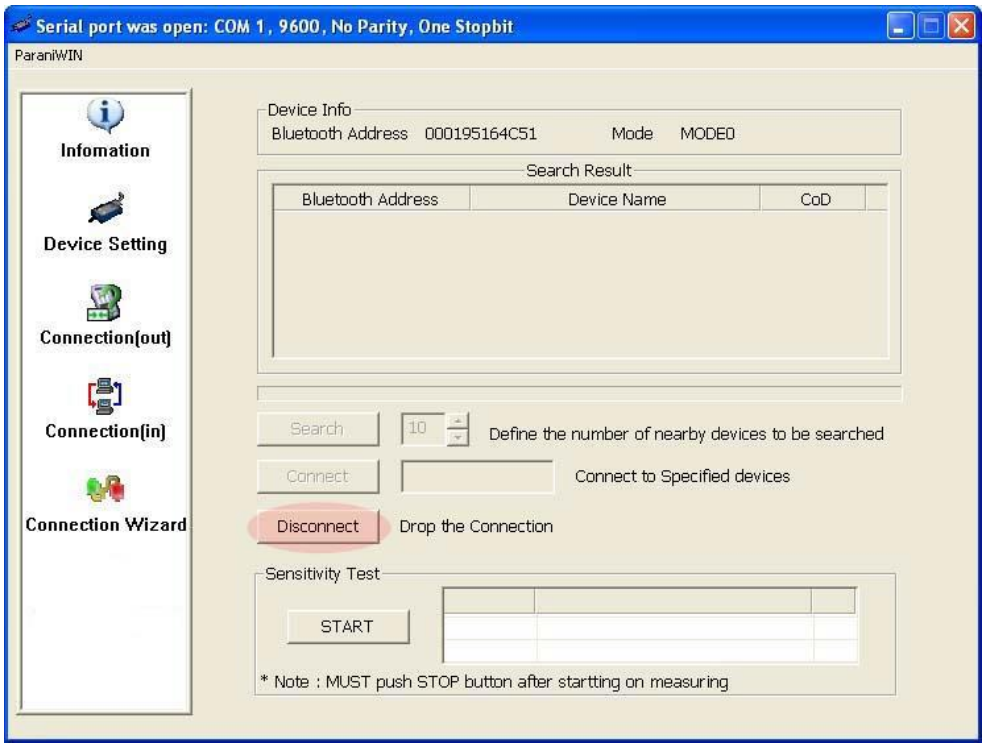
You may download the ParaniWin and User Manual on Sena website at http://www.senanetworks.com/sd1000-01.html .

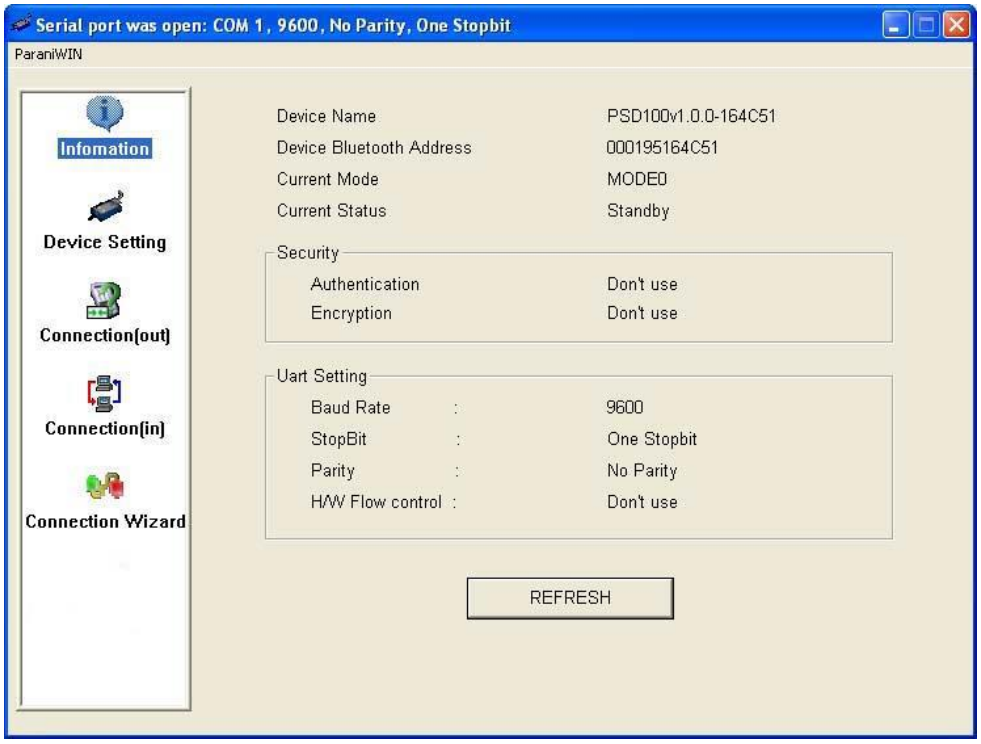
PARANI WIN

ParaniWIN is a program that runs on Microsoft Windows for the configuration of Parani SD1000. Install ParaniWIN on your computer. Connect the Parani SD1000 into the serial port of the computer and turn on the power. Run ParaniWIN.

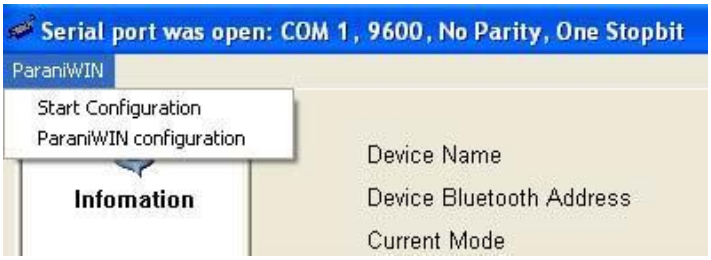


Set each option properly and click [Confirm]. If the settings of the Parani SD1000 are different from the ParaniWin, an error message will pop up. If the Parani SD1000 is in the status of connection, warning message will pop up. Then the current connection can be cancelled by [Disconnect] button on the main window.

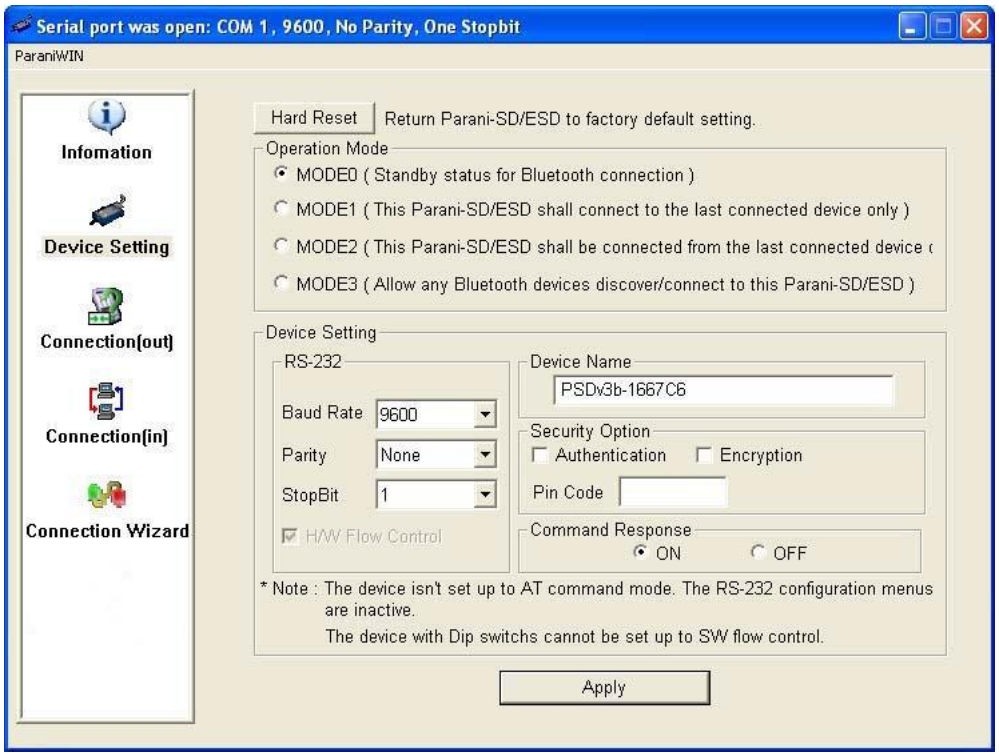




Serial port settings can be changed by <Start Configuration> and <ParaniWIN Configuration> of ParaniWIN in the menu bar at upper left corner of the window without rerunning the ParaniWIN program.

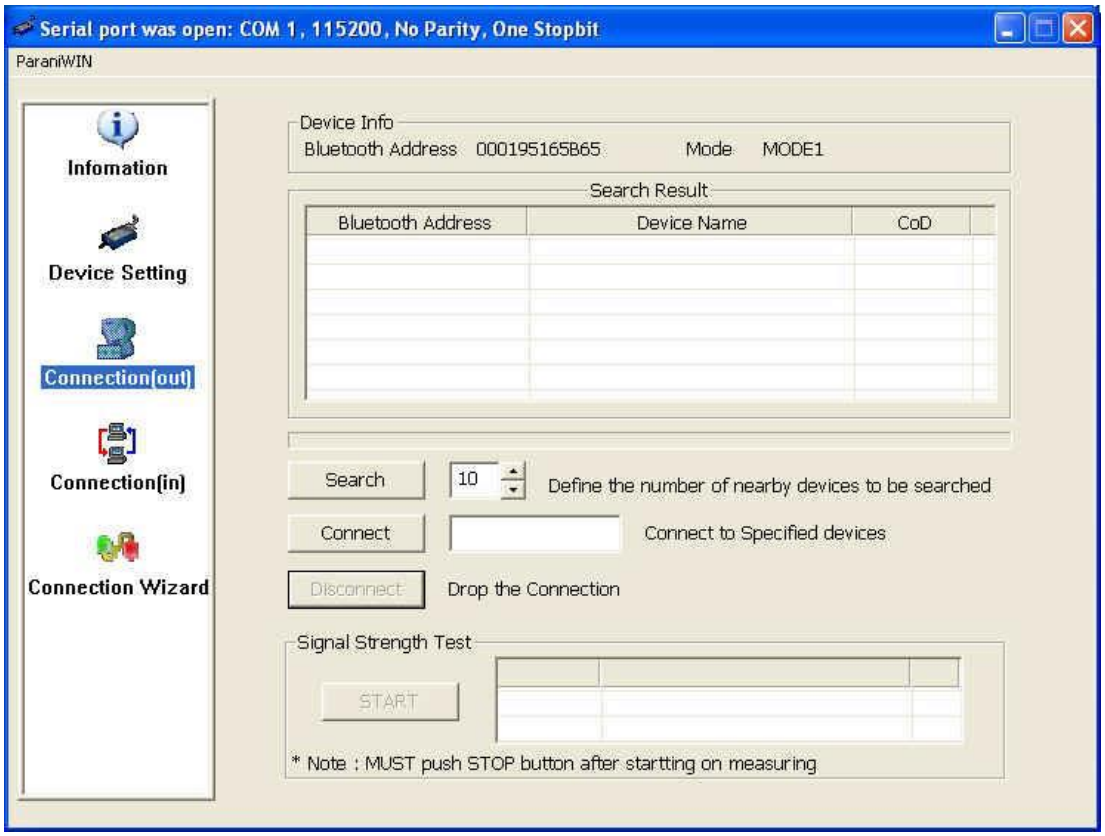


When the ParaniWin software is able to access the Parani SD1000 properly, the icons in the left side window come will become available for use.
In device configuration window, hardware reset can be executed or operation mode and RS232 can be configured as well. Security option also can be configured in this window.

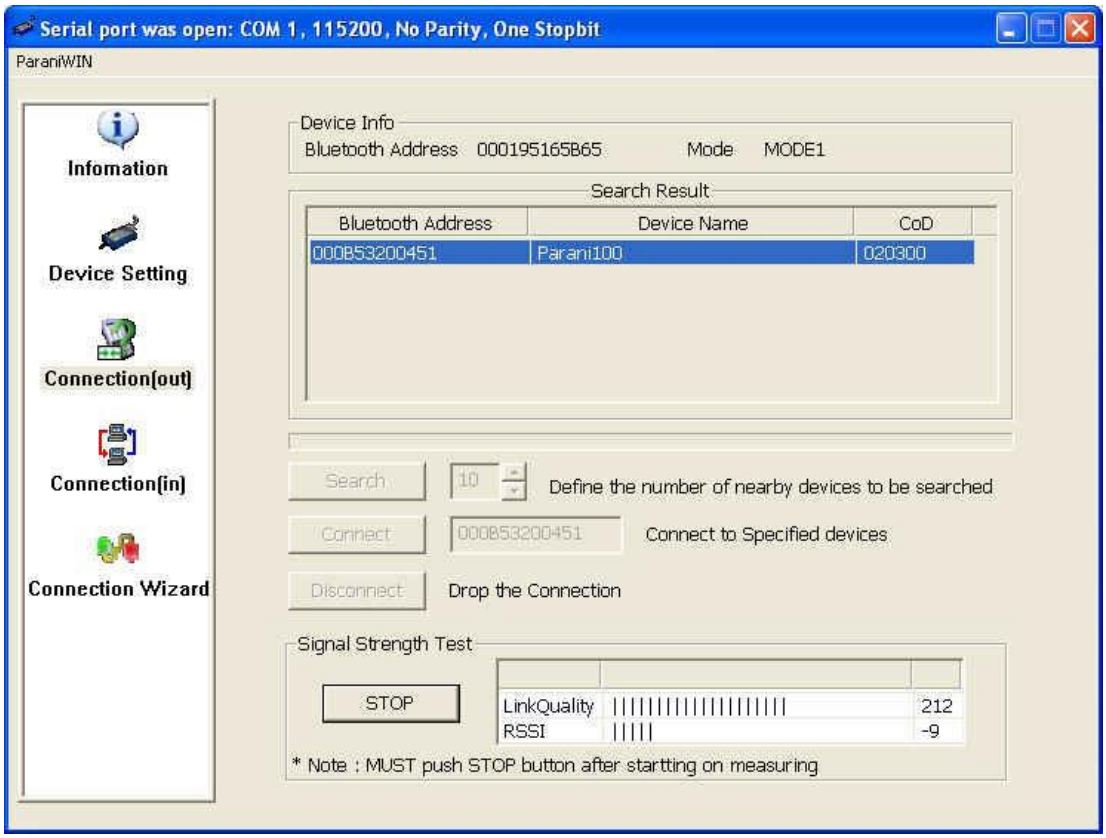


Parani-SD1000 supports two security options, Authentication and Encryption. If you enable the Authentication option, you must also enter a Pin Code value. If the authentication is enabled, the connection, between the Master and Slave device must share the same Pin Code. In case that Parani-SD1000 connects to another Bluetooth device, that requires authentication, you must know the other device's Pin Code. In genera l, most Bluetooth devices have a pin code of 1234 or 0000. If you check Encryption option, the Parani-SD1000 will encrypt packets and sent to the device. The Encryption options works well in case that only one of the devices between Master and Slave use the options works well in case that only one of the devices between Master and Slave use the Encryption Encryption option.

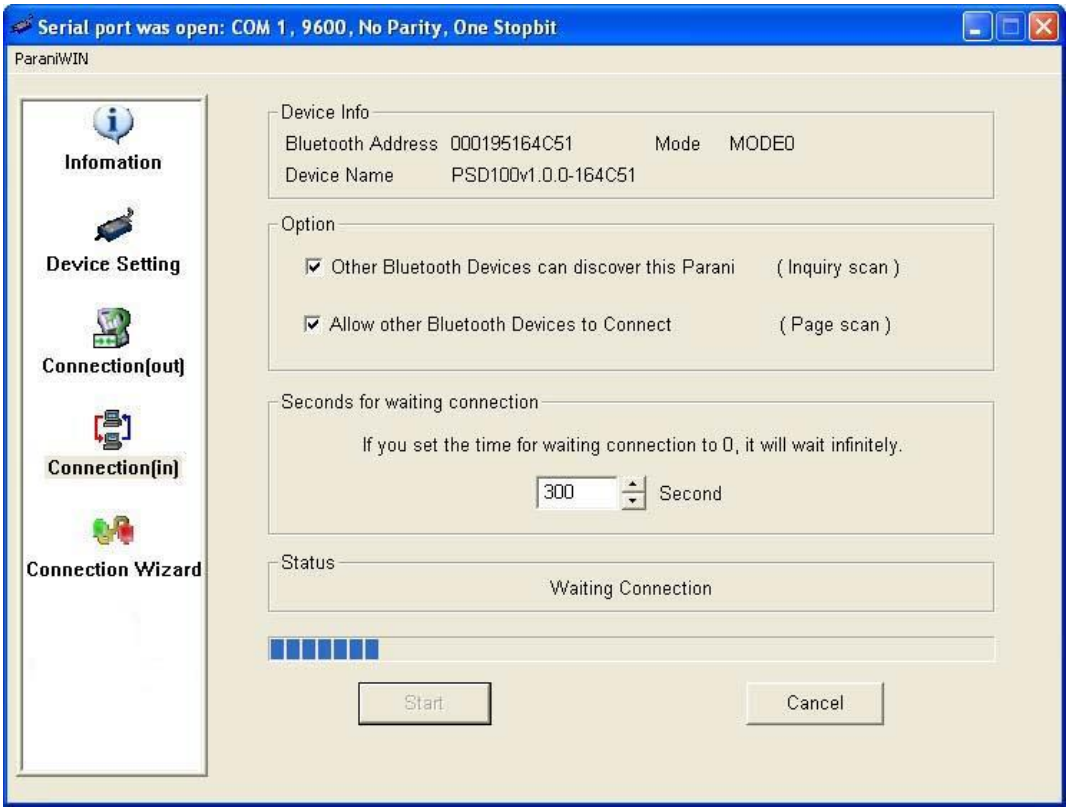
Parani-SD1000 has 4 response messages, 'OK', 'ERROR', 'CONNECT', and 'DISCONNECT'. In some cases, these responses can affect the host system unexpectedly. To prevent this, user can set the Command response to ON or OFF.
For Parani-SD1000, hardware flow control can be configured only by dip switch. And parity, stop bit can be configured only SW config mode. Thus H/W Flow Control option will not work in this case. When the dipswitch value isn't AT command mode, the Baud Rate menu will be disabled.
Click [Apply] button to apply any changes made to the Parani-SD1000.
Connection(out) icon will show the following window to search and connect other Bluetooth devices.

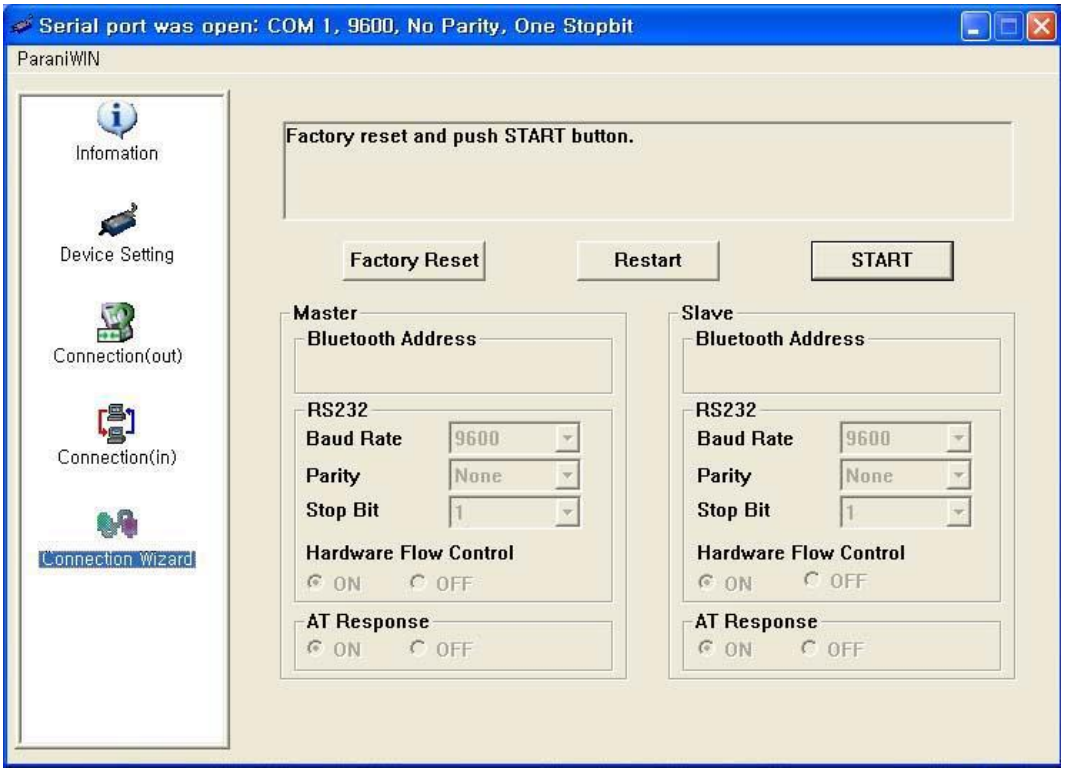


Click [Search] button to search nearby Bluetooth devices. Once several Bluetooth devices has been found, select one of the devices and click the [Connect] button. The selected Bluetooth device must be discoverable and connectable. Click [Disconnect] button to cancel the connection.
After the connection has been established, you will be able to test signal strength by pushing the START button.



The signal strength test shows LinkQuality and RSSI values. The closer LinkQuality is to 255 and RSSI is to 0, this means the Parani-SD1000 has a good connection to the connected Bluetooth device. In general, the wireless connectivity is at its best within 10 meters. You can push the STOP button at any time in order to terminate the signal strength test. The signal strength test will continue until the STOP button is pushed. If you close the ParaniWIN Window without pushing the STOP button, you must restart Parani-SD1000 to terminate the test.
Connection(in) icon will show the following window, which enables the Parani SD1000 to wait for a connection from another Bluetooth device. If the waiting time is set to 0, Parani SD1000 will continually wait for connection until [Cancel] button is clicked.
If the Connection Wizard icon is clicked, an easy-to-use pairing menu will appear:





In this example we will refer to the two Parani-SD1000 as SD1 and SD2 respectively. To use this menu, please do the following:

Step 1. Connect SD1 and then push the START button.

Step 2. Disconnect SD1, connect SD2 and then push the Next button after setting up Slave configuration. At this time, the dip switch value should be AT cmd mode. The flow control setting can be changed only through dip switch.

Step 3. Disconnect SD2, once again connect SD1 and then push the Finish button. The pairing configuration should be completed. Make sure that each Parani SD1000's connect LED is on. At this point, when both Parani SD1000's restart the connection will be established automatically.

For more details consult Parani SD1000 User Guide.

TROUBLESHOOTING AND LED DEFINITION

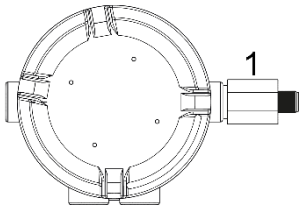
None of the LED indicators turn ON

- Verify the power supply (voltage, cabling)

LED Definition SD1000

LED	Function
Mode	Show the mode of parani SD1000 Mode 0 : always on Mode 1 : 1 blink every 1 sec Mode 2 : 2 blink every 3 sec Mode 3 : 3 blink every 3 sec
Connect	Blink every 1 sec when there's a connection
RS232-Tx/Rx	LED will flash accordingly when data is transmitted/received.

ANTENNA LAYOUT

Device version	Model		
B13	Bluetooth Serial Adapter		Antenna 1 Bluetooth

RF INFORMATION

Device version	
B13	Radio Frequency range: 2.402 – 2.480 GHz Number of Frequency Channel: 79 channels Transmission method: FHSS (Frequency Hopping Spread Spectrum) Modulation method: GFSK (Gaussian-filtered Frequency Shift Keying) Pi/4 DQPSK (pi/4 rotated Differential Quaternary Phase Shift Keying) 8DPSK (8 phase Differential Phase Shift Keying) Radio output power: +18 dBm Receiving Sensitivity: -88 dBm

Solexy Antenna KIT	Antenna	Antenna Gain
KA-B03U	N° 1 ANH72	2 dBi

MAXIMUM PERMITTED RF THRESHOLD POWER (Pth)

The RF threshold power (Pth), sometimes called the effective isotropic radiated power (EIRP), as defined in IEC/EN 60079-0, is the product of the effective output power of the transmitter multiplied by the antenna gain. The maximum threshold powers for each equipment group as defined by Table 4 in IEC/EN 60079-0 are provided below.

Because most antennas list the gain relative to an isotropic radiator (dBi) instead of the raw power gain, it is often easier to simply add the antenna gain in dBi to the radio output power in decibel-milliwatts (dBm). Any added cable loss between the RF output and the antenna may also be factored in.

$$\text{Pth}_{(dBm)} = \text{RF output power}_{(dBm)} + \text{Antenna gain}_{(dBi)} - \text{Coax cable loss between RF output and Antenna}_{(dB)}$$

The resulting threshold power calculated by the above formula MUST be below the threshold power for the operating area group rating below.

Equipment for	Threshold Power (W)	Threshold Power (dBm)
Group I	6	37.7
Group IIA	6	37.7
Group IIB	3.5	35.4
Group IIC	2	33.0
Group III	6	37.7

The above threshold level refer to installation in classified area Ex according to IEC/EN 60079-0 standard.
The use of device differs from one region and/or country to another. The user of the device must take care that the device is operated only according to local rules and standard or without the permission of the local authorities on frequencies other than those specifically reserved and intended for use without a specific permit. More detailed information is available at the local frequency management authority.

MAXIMUM JOULES CALCULATION IN CASE OF COAX CABLE INSTALLATION

In case of use of a coax cable installation for antenna installation the adding cable need to be evaluating to ensure that the maximum energy stored on cable not exceeded the value allowable per IEC/EN 60079-11:

Max energy (Joules) allowed per IEC/EN 60079-11	
Group I	1500 µJ
Group IIA	950 µJ
Group IIB	250 µJ
Group IIC	50 µJ

The calculation can be done according to following equation:

$$E = \frac{1}{2} * \left\{ (C_1 + C_2) * \left[\left(1.5 * (\sqrt{R * P})\right]^2 \right\} \right.$$

Where:
E = Energy
C_1 = Antenna Barrier Capacitance (18 pF)
C_2 = Coax cable capacitance
R = Impedance (50Ω)
P = RF power output (18 dBm, 63 mW)
1.5 = Safety Factor

Example:

Antenna cable capacitance = 1195 pF

$$E = \frac{1}{2} * \{(18pF + 1195pF) * 7.08\}$$
$$= 0{,}00858\mu J$$

Answer = 0,00858 µJ acceptable for any Group