Parani100

For Wireless Multi-Serial Communications,
based on Bluetooth Technology

Users Guide

Version 1.1.0

2005-08-29

Copyright Information

Sena Technologies reserves the right to make any changes and improvements to its product without providing prior notice.

THIS DEVICE COMPLIES WITH PART 15 OF THE FCC RULES.

Operation is subject to the following two conditions;

(1) this device may not cause harmful interference, and

(2) this device must accept any interference received, including interference that may cause undesired operation.

CAUTION: Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

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Parani™. is a trademark of Sena Technologies, Inc.

Windows® is a registered trademark of Microsoft Corporation.

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Notice to Users

Proper back-up systems and necessary safety devices should be utilized to protect against injury, death or property damage due to system failure. Such protection is the responsibility of the user.

This device is not approved for use as a life-support or medical system.

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Revision History

Revision	Date	Name	Description
V1.0.0	2005-03-04	D.H. Shin	Initial Release
V1.1.0	2005-08-29	D.H. Shin	Captured Images are replaced. Section *4.1.3 Operation Mode* written as a supplementary explanation. *Appendix C. Using Parani100 with Serial/IP* is added.

Table of Contents

1.Introduction

1.1 Overview

The Parani100 enables multiple Bluetooth devices to connect to the Ethernet network simultaneously and without delay when they are within range. The Parani100 provides Class 1 Bluetooth wireless connectivity to Ethernet/Fast Ethernet. It supports all Bluetooth devices compatible with Bluetooth Profiles for the Serial Port, Dial-up Networking, LAN Access and PAN. Along with the Serial Port Profile support, the Parani100 is the ideal solution for the replacement of the wired serial port application.

The Parani100 supports versatile host modes for various user applications, i.e. TCP Server and Client modes for TCP/IP-Bluetooth replay applications, Vertex mode for multicasting, Repeater mode, Serial Hub mode and RS232 mode.

The Parani100 runs on embedded Linux operating system, with Flash memory for easy software upgrades, and built-in Web server and Web interface for quick installation, and remote configuration and management. The Parani100 uses the RADIUS protocol for user authentication.

Typical application areas of the Parani100 include:

- Truck/Bus monitoring system
- Car Diagnostics
- Wireless POS system
- Wireless Factory monitoringPLC programming
- Wireless machine (healthcare/industrial) monitoring
- Wireless Printing
- Wireless logistics

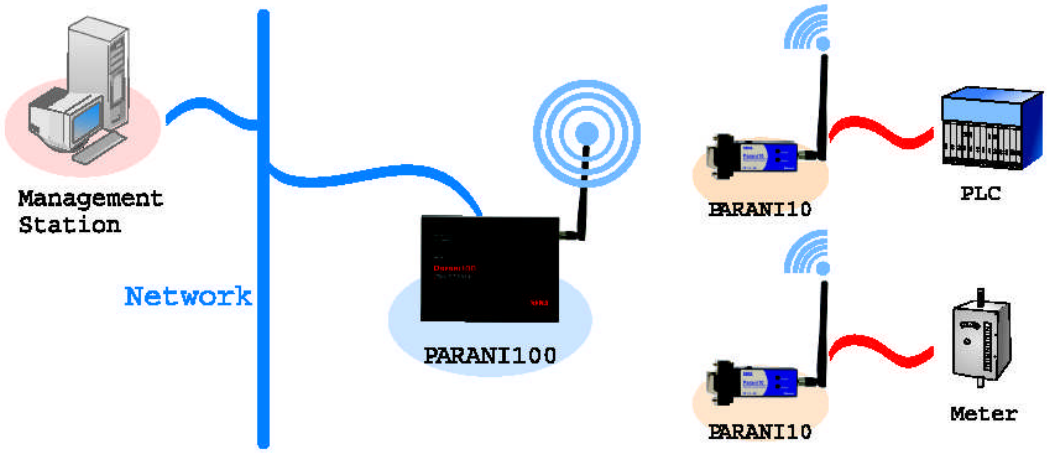


Fig. 1.1.1 Application Diagram

1.2 Package Check List

- DC Power Adapter
- Quick Start Guide
- Serial Data Cable
- Ethernet Cross Cable
- Dipole antenna
- CD-ROM, including the Parani100 Manager Software, COM Port Redirector, Tips_Serial/IP Com Port Redirector and manual

1.3 Product Specification

Ethernet Interface

. 10/100 Base Ethernet with RJ45 connector

. Supports Static IP and Dynamic IP address

Bluetooth Interface:

. Bluetooth v1.1, Class I

. Level - 18dBm

. Profiles

Serial Port, LAN Access, PAN, Dial up Networking

. Working distance: 10m ~ 400m

Network Protocols

. HTTP, FTP, Telnet, DHCP client

. SNMP v1/v2/v3

. PPP server and PPP tunneling

. RADIUS

Management

. Windows Utility

. Web, Telnet, Serial Console

. Modem AT command set

Diagnostic LED

. Power, Status, Error, EXT and INT

Power

5VDC, .2A@ 5V

Environmental

. Operating temperature: 5℃ to 50℃, Storage temperature: -40℃ to 66℃

. Humidity: 90% Non-condensing

Physical properties

. Dimension (L x W x H)

147 x 112 x 32 (mm), 5.8 x 4.4 x 1.3 (in.), 225g

Approvals

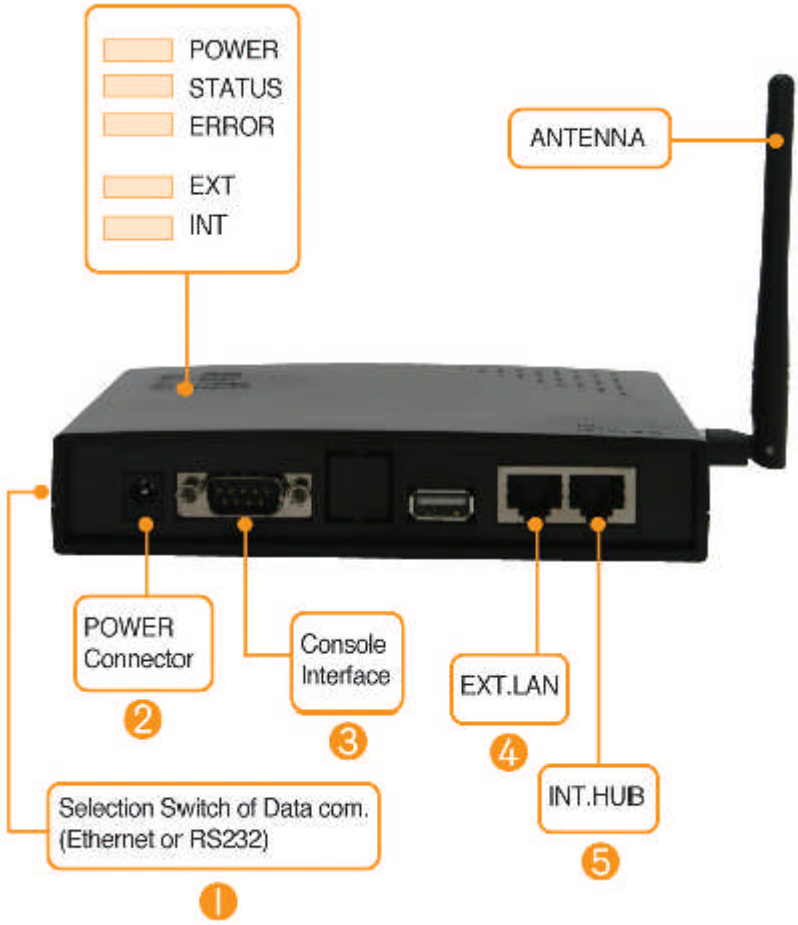
. FCC (A), CE

Warranty

1-year limited warranty

2. Getting Started

2.1 External View



<Fig. 1.3.1> Parani100 external view

(1) DIP Switch

Users may select several different methods of data communication with the Host. Default setting is TCP/IP communication using **no.4 RJ45 marked EXT,** but if users need, data communication by **no.3 RS232 Interface marked "IOIOI"** is also possible.

- If DIP switch is on the side of drawing , Parani100 communicates with Host via Ethernet line (TCP/IP).
- If users want to use RS232 com. please change the direction of switch in the

opposite direction.

(2) Power Port: For Power Adapter connection

(3) RS232 Interface marked "IOIOI":

For Parani100 network configuration via RS232 serial cable - One RS232 serial cable, both ends female DB-9 interfaces, are provided with the Parani100.

This port can be used for both Configuration of Parani100 and Data communication with Host.

(4) RJ45 marked EXT.: For connection to Host or HUB devices. For connection to PC, use a **Crossed cable**; for connection to HUB, use Straight Ethernet cable.

(5) RJ45 marked INT.: For HUB port connection to another Parani100. This is for expansion of connections more than 14.

2.2 LED Indicators

- POWER: POWER ON/OFF Status
- STATUS: Parani100 Status
- ERROR: Error Event Status
- LINE/ACT1, LINE/ACT2: RJ45 connections Status

STATUS LED	ERROR LED	Description
ON	OFF	Normal
Blinking	OFF	Connecting to Station Parani100 (In Repeater Mode)
OFF	ON	Internal Bluetooth module operation malfunction
ON	Blinking	LAN connection Error (Connecting to ADSL or waiting for DHCP server response)
Flashing	Flashing	Upgrading Firmware ***DO NOT turn off Parani100 during firmware upgrade***; turning off Parani100 during firmware update may cause malfunction.

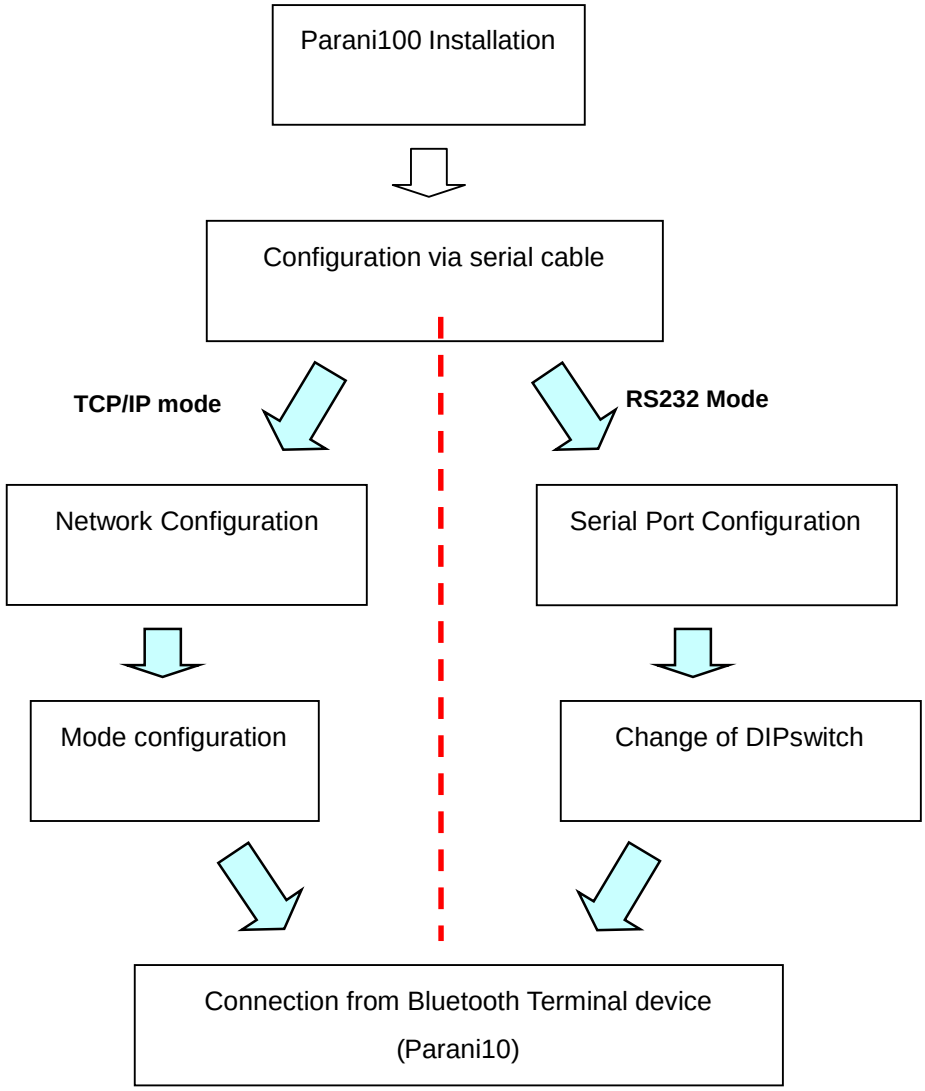
2.3 Connecting Parani100 to host

Step 1: Connect the power jack to the power connector of the Parani100 using DC power adapter included in the package. If power is properly supplied, the LEDs for ‘Power’ and ‘Status’ will maintain a solid green color.

Step 2: Connect the one end of the Ethernet cable to the ‘EXT’ port of the Parani100 and the other to the Ethernet network. If the cable is properly hooked up, the Parani100 will have a valid connection to the Ethernet network by indicating ‘EXT’ LED becomes green and is blinking if there’s any corresponding packet traffic.

Step 3: Only for 1st time installation, attach the serial console cable to the Parani100. You are ready to install the Parani100 using serial console.

3. Installation



3.1 Network Settings

(1) Parani100 power-up; 'POWER' and 'STATUS' LEDs display green

(2) Parani100 network configuration: connect Parani100 to PC via RS232 cable

(3) Open HyperTerminal

(4) Set PC COM port;

Baud rate 115200 / 8 Data bit / non-parity / 1 stop bit / no hardware flow control

(5) Press Enter key; ***the following information as is displayed on a HyperTerminal screen***; If Parani100 prompts Login ID / password, default values are:

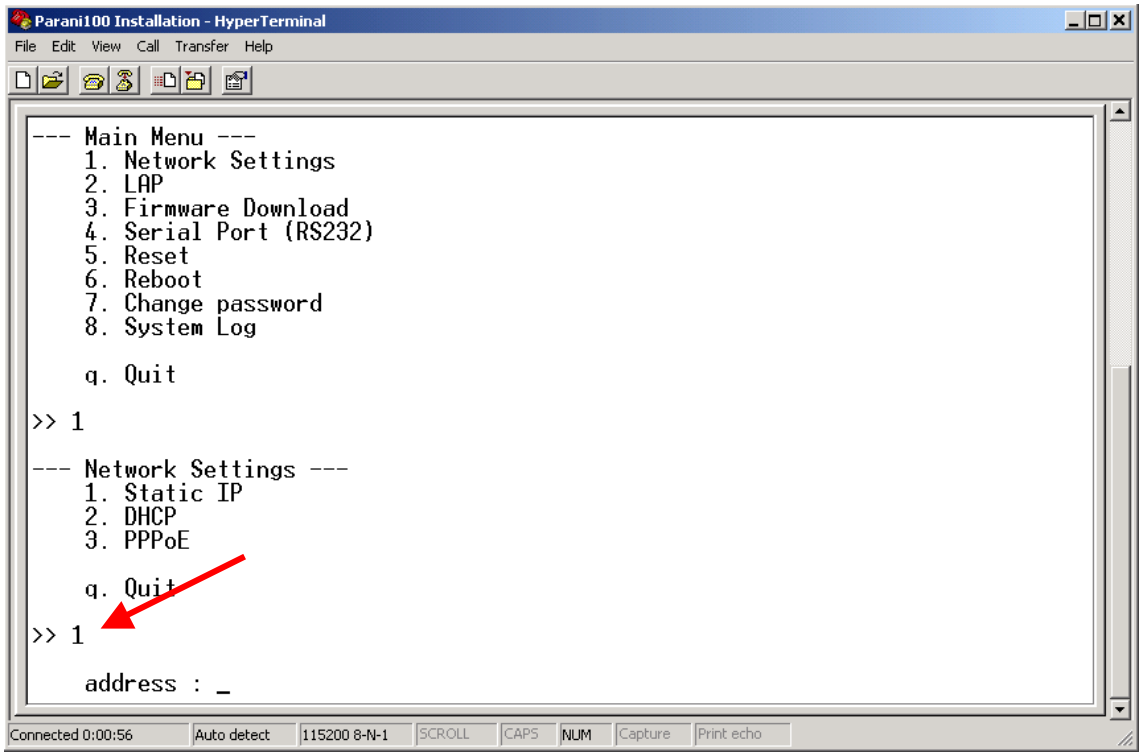
Login: admin

Password: 11111

(6) **Default Parani100 IP address factory setting is 192.168.1.10**. Please revise settings to reflect the user's appropriate networking environment IP address.

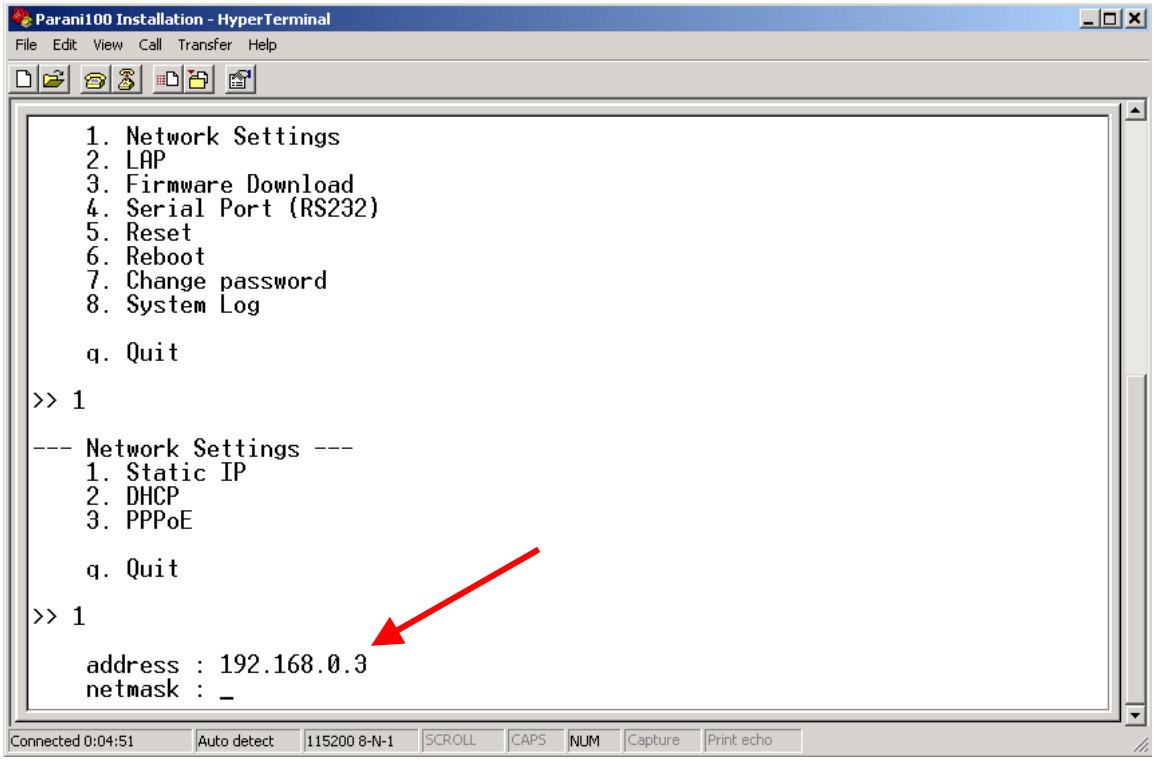
(7) To revise Network Settings, Enter "1" as displayed below.

(8) Network Settings sub menu will be displayed.

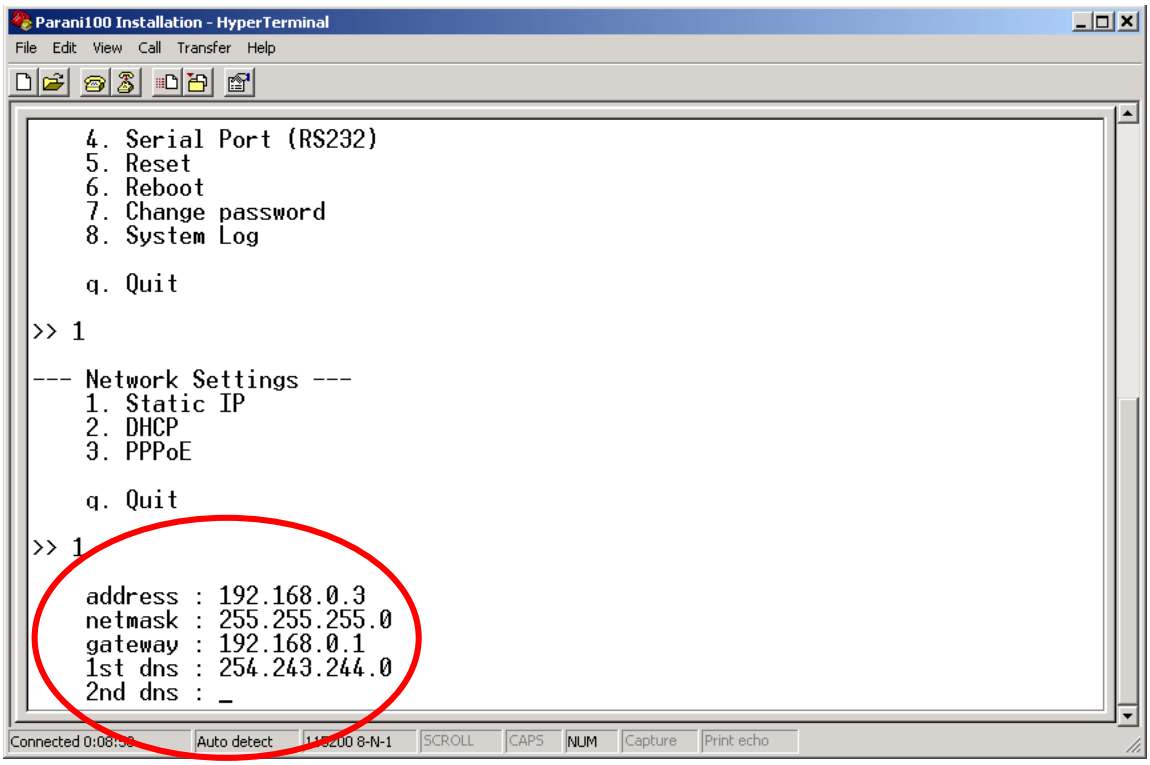


(9) If No.1, Static IP, is selected, the following is displayed on screen:

(10) Enter user Static IP address. In the example below, 192.168.0.3 is entered for the Parani100 IP address. Enter the user appropriate network IP address.



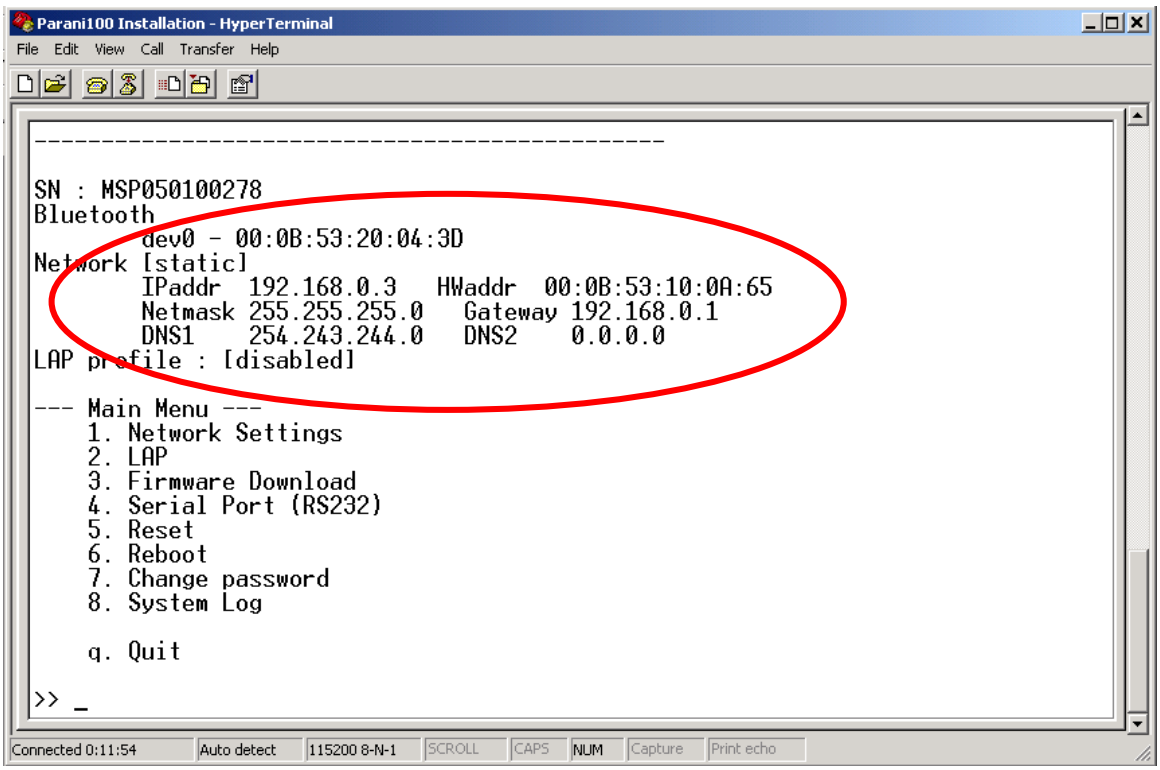
(11) Please enter your Netmask/Gateway/DNS information, as shown below:



(12) Press Enter: Parani100 will prompt reboot request. Enter 'Y' [Yes]; press Enter to reboot Parani100 to apply the revised Network Settings.

(13) Enter Login ID and Password. Default ID: admin, Password: 11111

(14) Revised Network settings are displayed



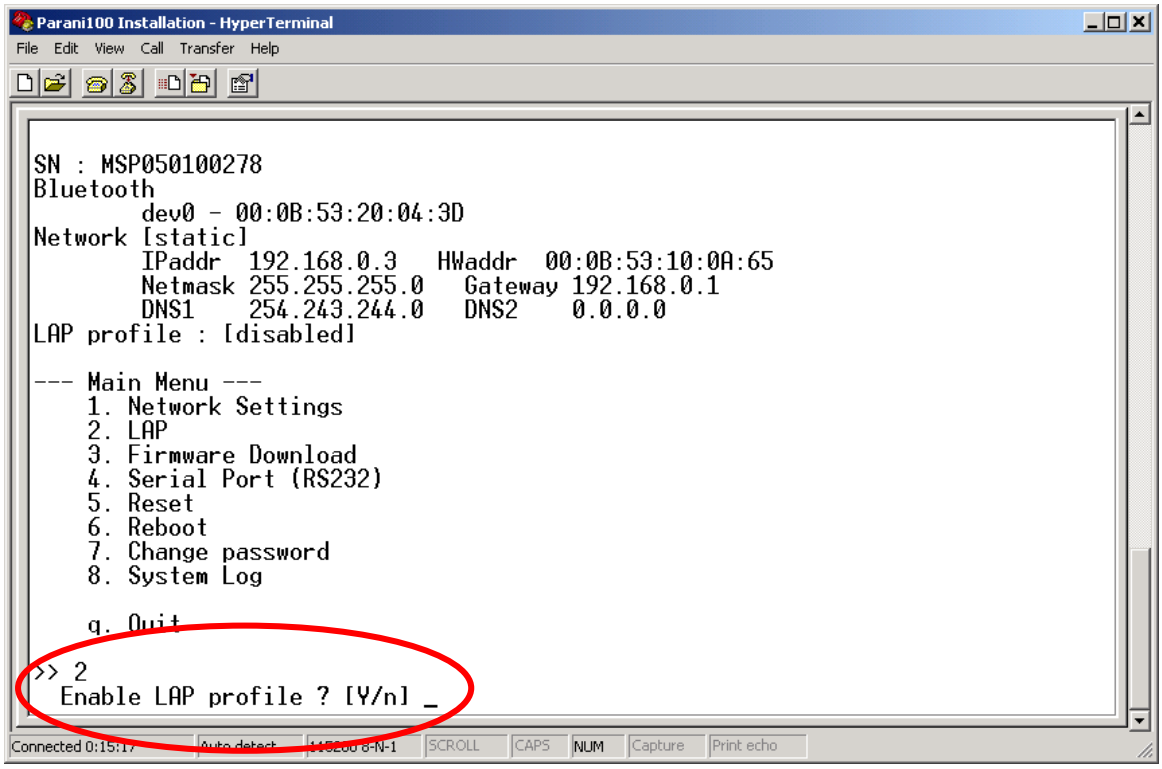
<An example: Revised Network Settings>

(15) Networking configuration is complete. The preceding example shows static IP assignment to Parani100. The user should select static, DHCP or PPPoE IP as needed.

3.2 LAN Access Profile

Parani100 supports LAN Access Profile for Bluetooth networking Access Point. By direct connection of Parani100 to ADSL, the internet is accessible via Bluetooth.

Select menu 2. LAP by entering '2'; Parani100 prompts for LAP profile enable/disable. Select 'Y' [Yes] to enable or 'N' [No] to disable LAP profile.



3.3 Firmware Download

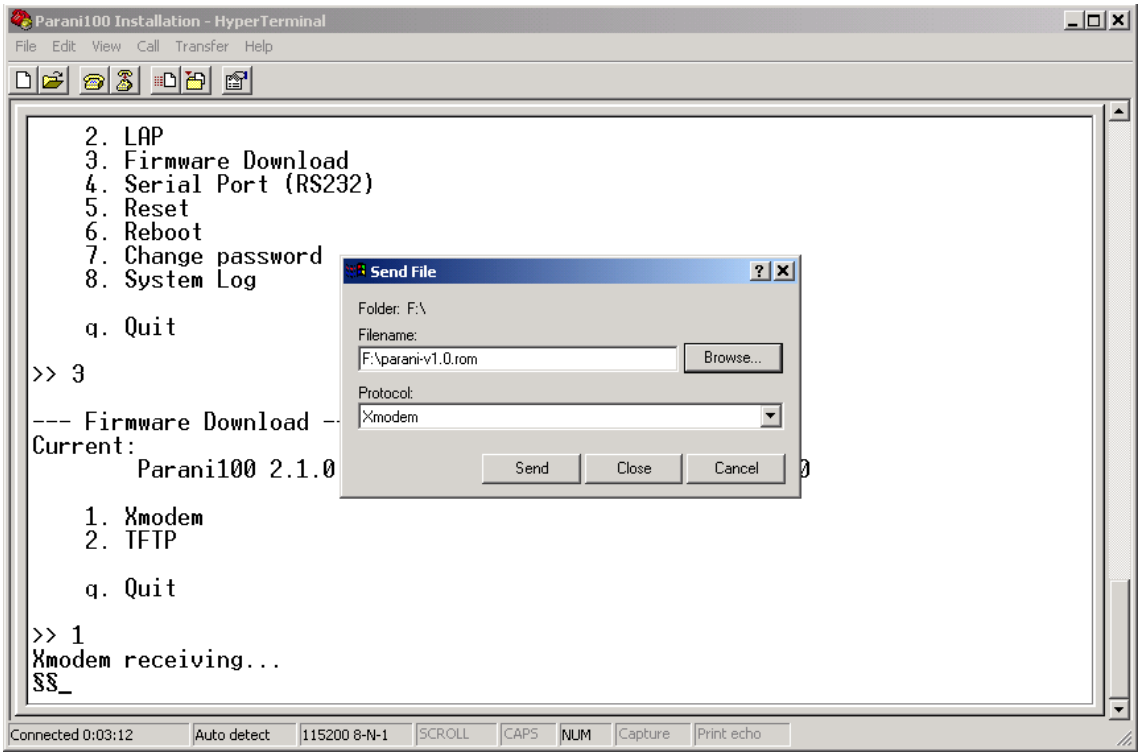
Parani100 enables users to upgrade the firmware. The SENA customer support team offers available firmware upgrades via Xmodem or TFTP user download; menu no. 3. Firmware Download.

During Firmware download, STATUS and ERROR LEDs flash. DO NOT TURN OFF Parani100 during firmware download. Turning off Parani100 during firmware download may result in operation malfunction.

There are two methods of firmware upgrade: 1. Xmodem 2. TFTP.

3.3.1 Firmware Upgrade via Xmodem

Users may upgrade the firmware using Xmodem protocol via RS232 serial cable.



<Upgrade firmware via Xmodem>

3.3.2 Firmware Upgrade via TFTP

- Users may upgrade the firmware using TFTP via Crossed cable.

3. Firmware Download → 2.TFTP

- Then you will get following screen:

```
TFTPd ready. Send firmware using TFTP.
Windows 2000/XP:
 tftp –i 192.168.220.4 put <filename>
```

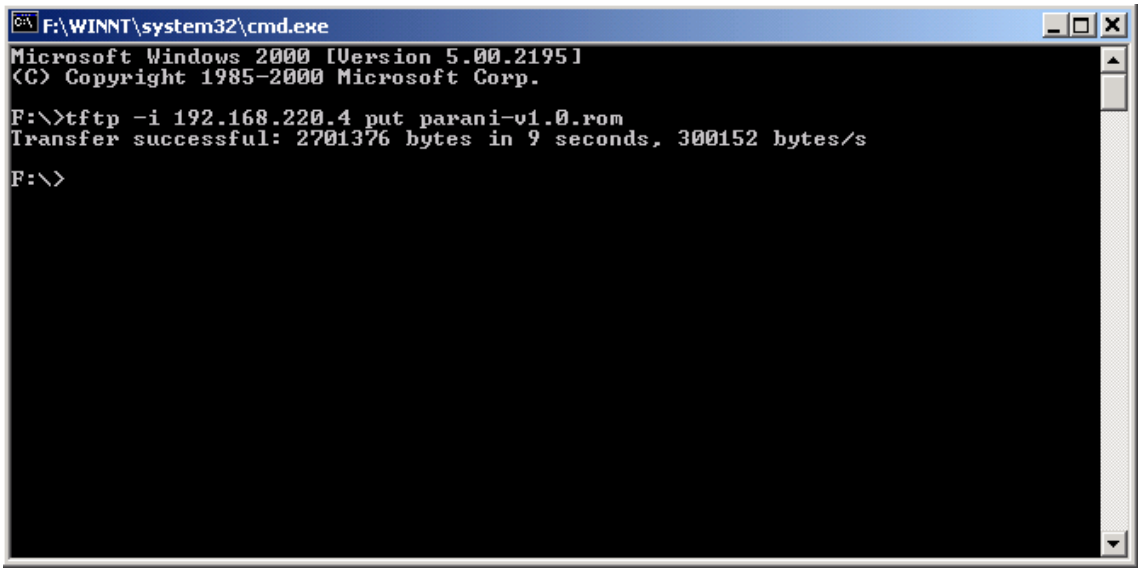
*** Here, a sample IP address, 192.168.220.4 has been assigned to Parani100. User must use your own IP address. User must put your own IP address.**

- **Please keep this serial console connected.**

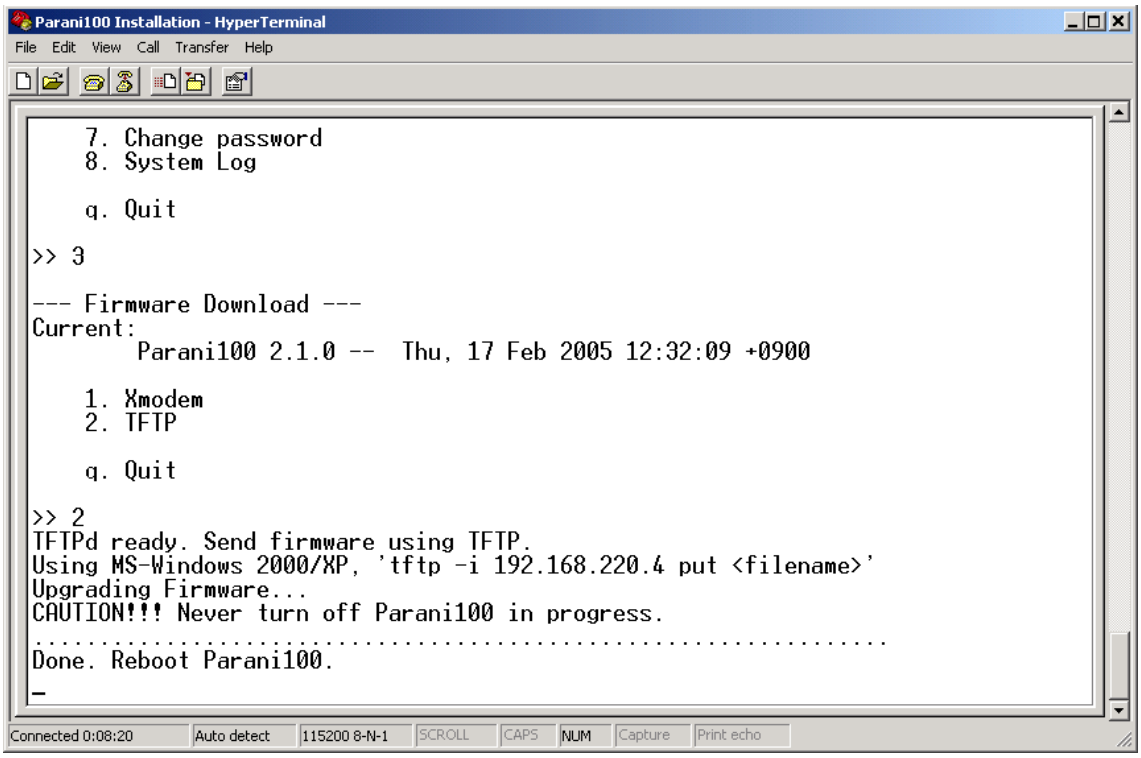
- After you save the Parani100 upgrade ROM file to your PC, please open COMMAND window as in below.

- Users need to make sure that the upgrade ROM file is in the same location or users need to specify the exact location to send the ROM file to the connected Parani100 via Crossed Ethernet cable.

- Below window is showing the procedure of sending ROM file named “parani.rom” to the connected Parani100 via TFTP.



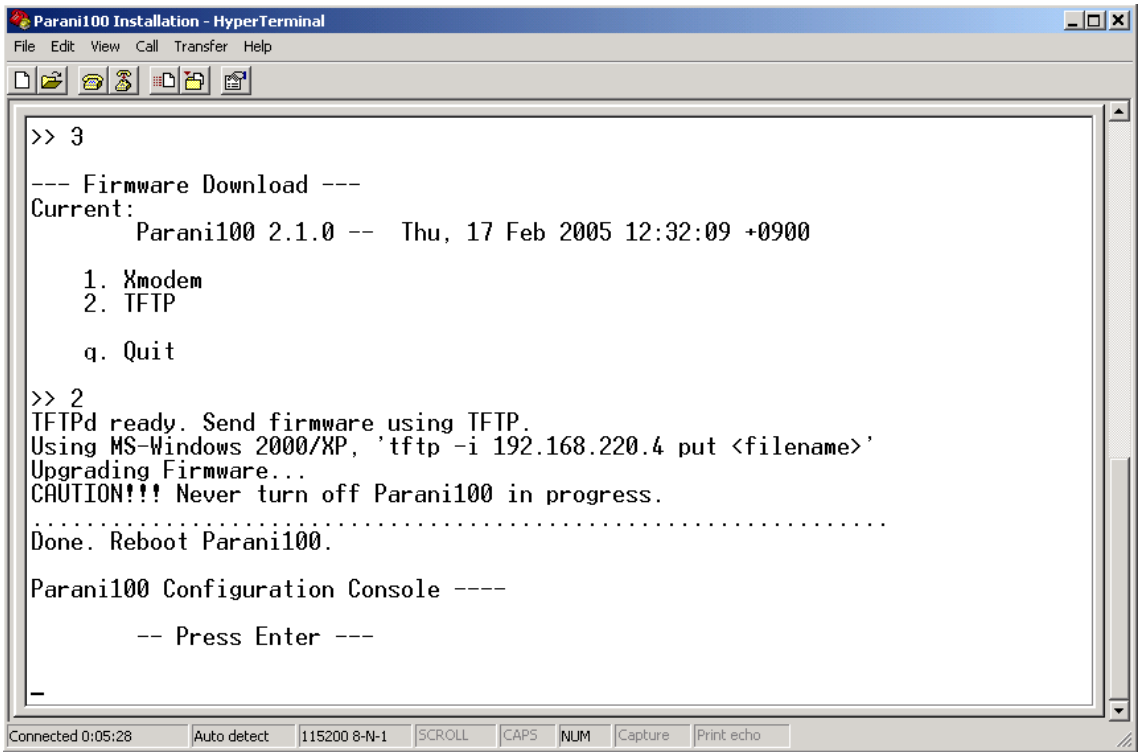
- Users will be able to check the status of firmware upgrade in Serial console.



- During upgrade, LEDs will flashing and users should NOT turn off Parani100 this time. If user cannot send the ROM file, please check the network connection status.

- Once ROM file is delivered to the connected Parani100, the upgrade firmware will be recorded to memory. During this time both STATUS LED and ERROR LED will flashing speedily. NEVER turn off Parani100 during this firmware recording.

- Once finished, please resupply power to Parani100 for applying.

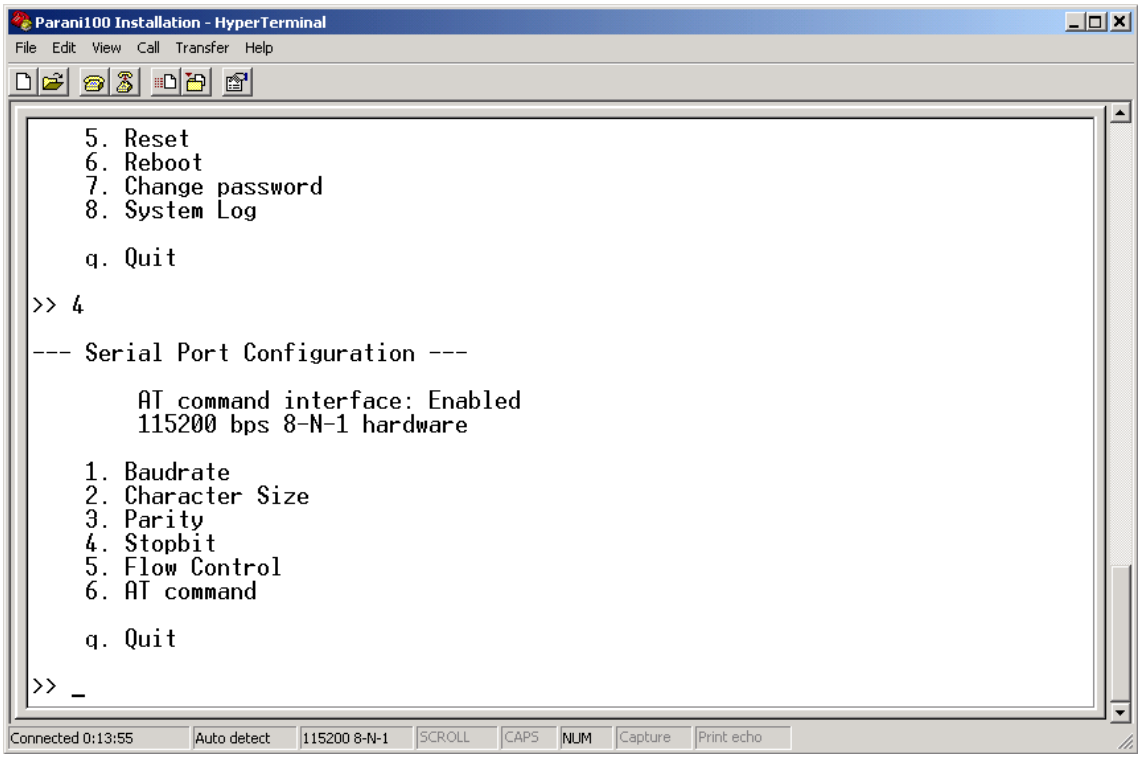


3.4 Serial Port

Serial port of Parani100 can be used for both Configuration and Data communication. For configuration, users need to change the DIPswitch of Parani100 to the right.

Users may set configuration of serial port communication in this menu.

Below figure is showing that '115200 bps 8-N-1 hardware' which means '115200 bps, 8 data bit, None parity, 1 stop bit, hardware flow control (RTS/CTS).



Configurable ranges:

Baud rate	1200 ~ 115200 bps
Character size	8, 7, 6, 5 bits
Parity Check	None / Even / Odd
Stop Bit	1 bit or 2 bits
Flow Control	Hardware (RTS/CTS), Software (XOn/Off), None

For applying changed configuration, please RESUPPLY the power, and then Parani100 will start to operate as RS232 mode.

Advice: If you need to do data communication via RS232 port, you do not need to configure Network settings.

3.5 Reset/Reboot/Quit

Entering no. 5, Parani100 RESET, in the main menu, restores all factory Default value settings.
REBOOT restarts Parani100 for new configuration application.
QUIT instantly aborts current processing.

4. Configuration

Once users are finished configuring network settings using serial console. Users need to select the operation mode of Parani100. Following three (3) ways can be used for selection of operation mode:

1. Via Parani100 configuration software
2. Via Telnet (Control port)
3. Via Web browser (Internet Explorer, etc.)

In this chapter, a guide on usage of the Parani100 configuration software will be introduced.
How to configure via Telnet or Web browser will be introduced in the Appendix.

4.1 Configuration via Parani100 software

4.1.1 When Parani100 is connected to PC directly

If users are going to connect Host PC and Parani100 directly using a crossed cable, network settings as in the chapter 3.1 will not be required.
Parani100 has factory settings: Static IP 192.168.1.10

For communication with Parani100, set the IP of Host PC to have proper address.

If you connected Parani100 to the Network, not to the Host PC, skip this chapter and go to next chapter 4.1.2.

Open your Network Connections and see Property information of Local Network.
Change your IP address to Static:
IP: 192.168.1.11
Subnet: 255.255.255.0

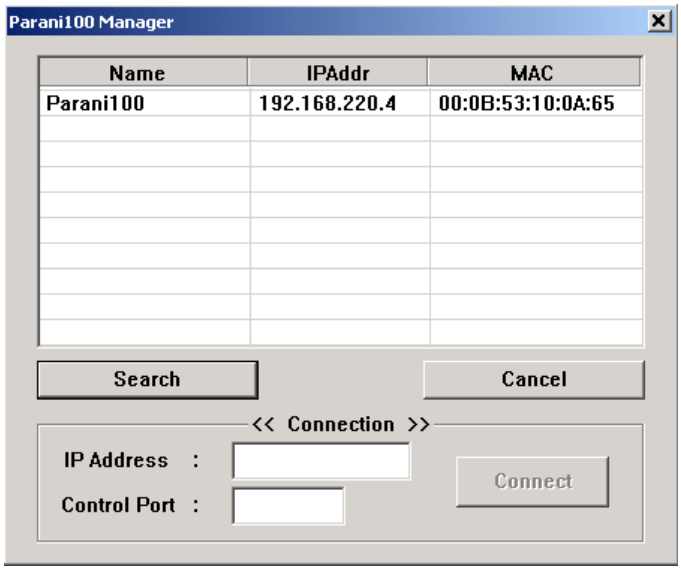
Gateway: 192.168.1.1

These settings for direct communication only with Parani100 connected.

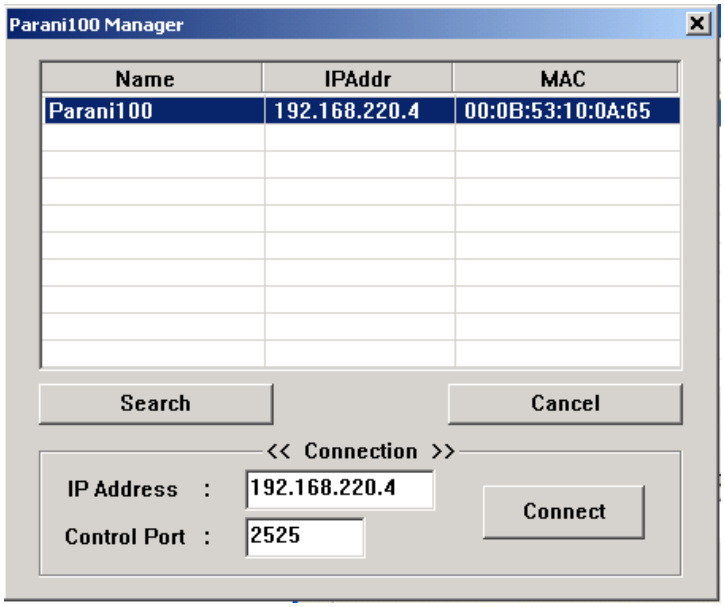
4.1.2 Log in Parani100 software

For easier configuration and **monitoring** on a specific Parani100, which has been installed locally or remotely, users may use Parani100 software.

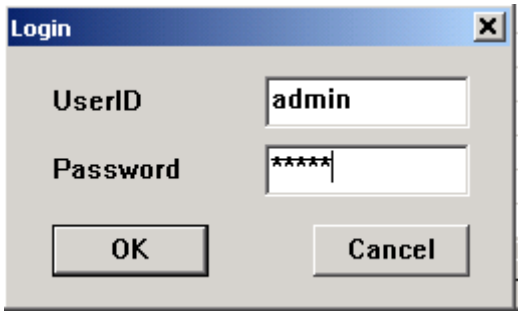
Start Parani100 software, and press “Search” button on the left side.



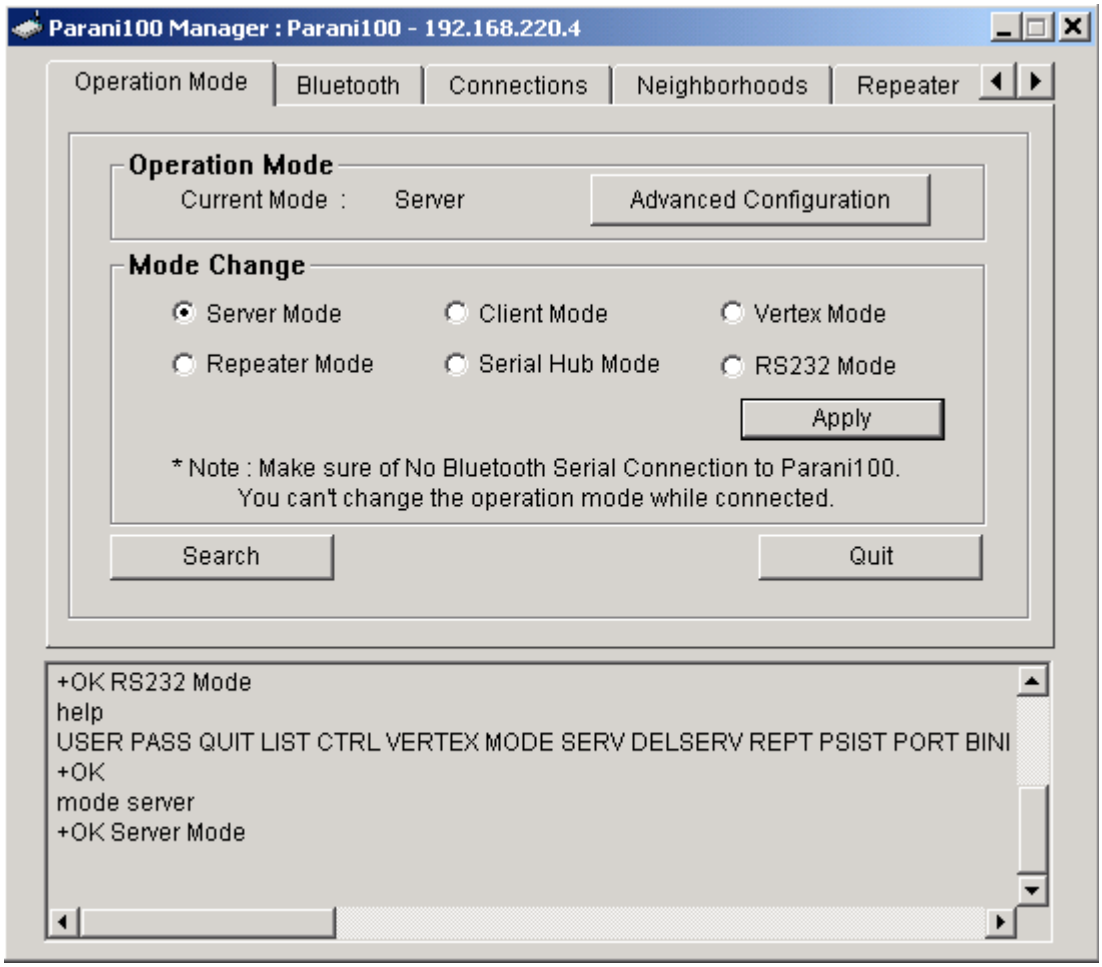
Please select one Parani100 you would like to access and press “Connect” button.”



You will need to enter UserID/Password: admin/11111



4.1.3 Operation Mode



Parani100 may be set to different type of modes, so users may have to select one for its own application. There are 6 types of modes: Server, Client, Vertex, Repeater, Serial Hub, and RS232.

• Operation Mode

This shows current type of Mode.

• Mode Change

Users may change and select the type of Operation.

• Search

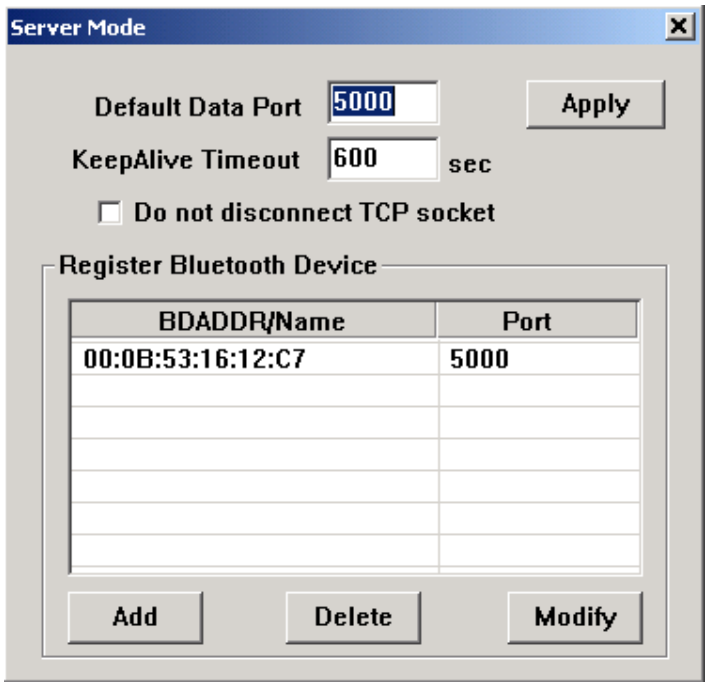
Users may search Parani100 on the network.

Note: While Bluetooth devices are connected to Parani100, mode change is not possible.

A) Server Mode

In Sever Mode, Parani100 will operate as a Server on the network. Host PC will connect to Parani100 via TCP/IP Ethernet and Parani100 will recieve the connection. After connection, full duplexing is possible.

Users need to select the Port number to standby to receive connection from Host PC.



<Configuration of Server Mode>

• Default Data Port

If unregistered device tries to connect to Parani100, Parani100 will assign the port number consecutively from Default Data port.

• KeepAlive Timeout

When TCP connection is stopped unexpectedly (Ex. Power off of Host PC), Parani100 will request NULL during KeepAlive Timeout (second). If there is no response during this Timeout, TCP connection will be finished.

• Do not disconnect TCP socket

In Server Mode, each TCP connection and Bluetooth connection will be matched as point-to-point. When new Bluetooth connection is established, new TCP connection will be established as well.

So, if Bluetooth connection is stopped, TCP connection can be finished.

To prevent this, users may use this option, so does not need to make TCP connection whenever Bluetooth connection is stopped.

• Register Bluetooth Device: Shows the Bluetooth devices registered.

• Add: Add Bluetooth device to register.

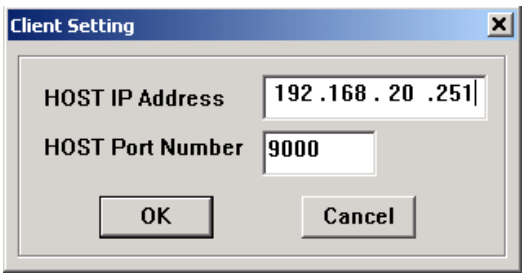
• Delete: Remove Bluetooth device registered.

• Modify: Modify Port of the selected device.

B) Client Mode

In Client Mode, Parani100 will act as a TCP client. When a Bluetooth device connects to Parani100, Parani100 will try to connect to the designated Host PC. So, Host PC should be in standby status.

In Client Mode, please select the IP address and port number of the Host PC to connect.



<Configuration of IP address of Host>

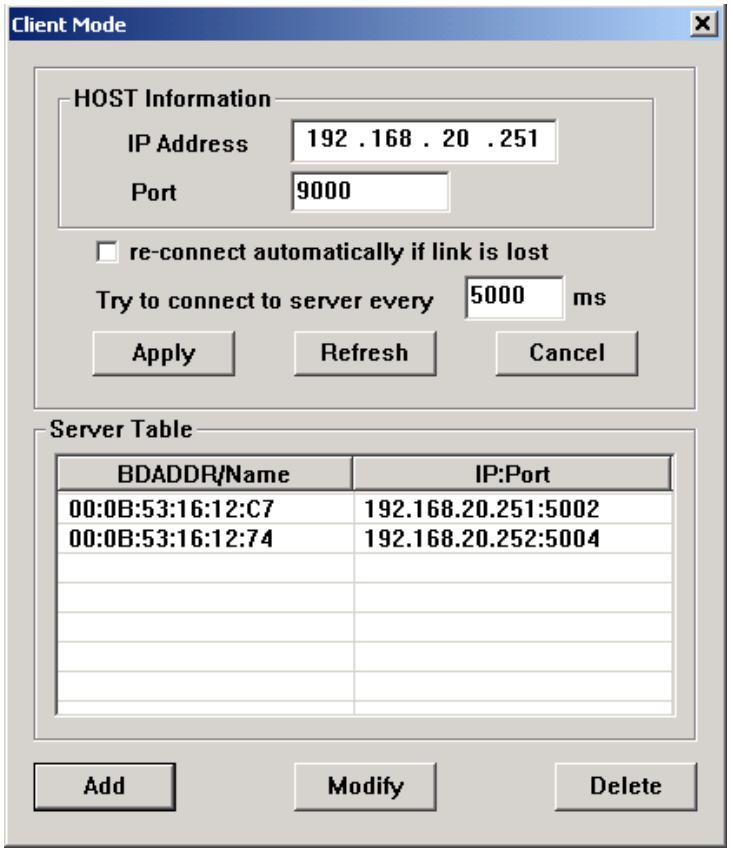
Select “Advanced Configuration” button.

Here, users may configure which Bluetooth device will connect to which Host, as they need.

Bluetooth device “00:0B:53:16:12:C7” will connect to Host “192.168.20.251”, port no. 5002.

Bluetooth device “00:0B:53:16:12:74” will connect to Host “192.168.20.252”, port no. 5004.

Bluetooth devices, which are not configured to connect to a specific Host, will connect to Default Host in Host information.



<Configuration of Client Mode>

• Host IP Address

For network Host Server IP address entry

• Host Port Number

For Server Host port no. entry

• Re-connect automatically if link is lost.

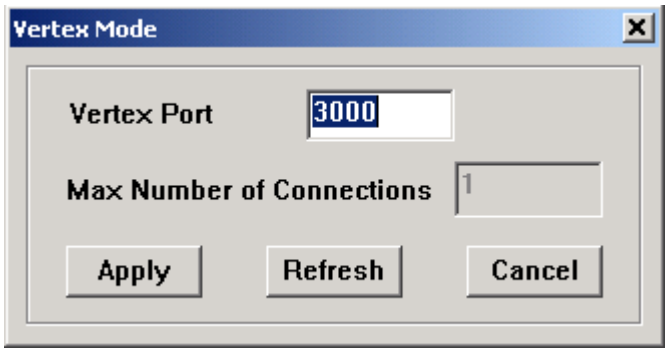
For Host connect retry, if failed. Retry frequency is set in the preceding function.

• Try to Connect to Server every [] ms

When Parani100 fails to open a data channel connecting to Host, enter the connection retry frequency. Entering 0 [zero] obtains retry abort.

C) Vertex Mode

Parani100 Vertex Mode avails Wireless RS485 multidrop service when assigned at this site.



<Configuration of Vertex Mode>

• Vertex Port

For Parani100 Vertex port no. entry.

• Max Number of Connections

For entering the number of Hosts connectable to Parani100.

D) Repeater Mode

In Repeater Mode, Parani100 will act as a Repeater to expand the coverage of Bluetooth. Let's call the Parani100 that will act as Repeater, "Repeater", and call the Parani100 of normal operation as "Station".

In Repeater Mode, configuration required is only the Address of the Station Parani100.

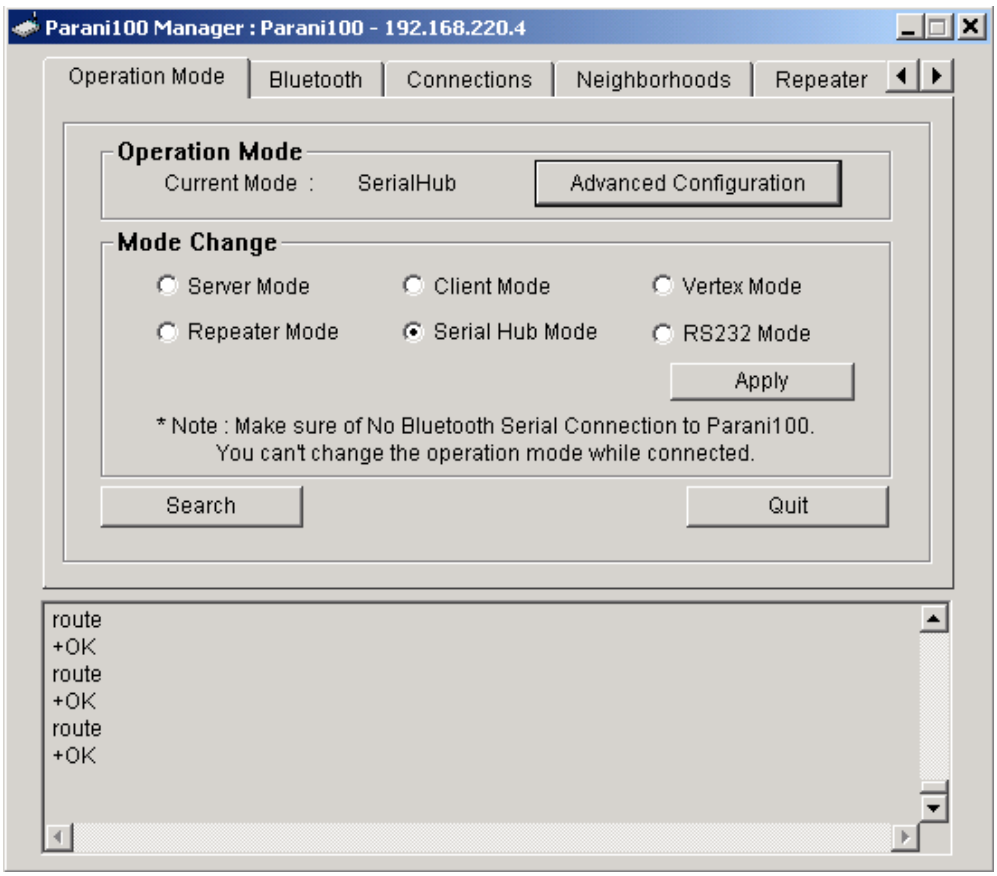
When Repeater is connecting the Station, Status LED of Repeater is blinking.

E) Serial Hub Mode

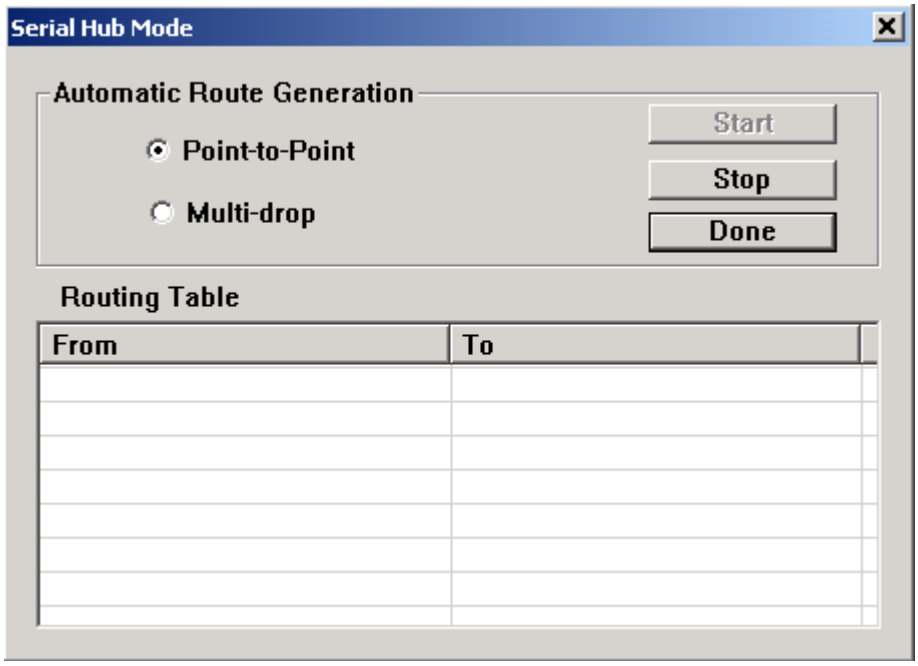
Users may transmit/receive data via Parani100 in Serial Hub mode (Serial Hub).
Serial Hub will deliver the data from a Bluetooth device to another connected Bluetooth device.
Users may configure the Parani100's Serial Hub settings in the Advanced Configuration section of the Parani100 software.

• Point-to-Point

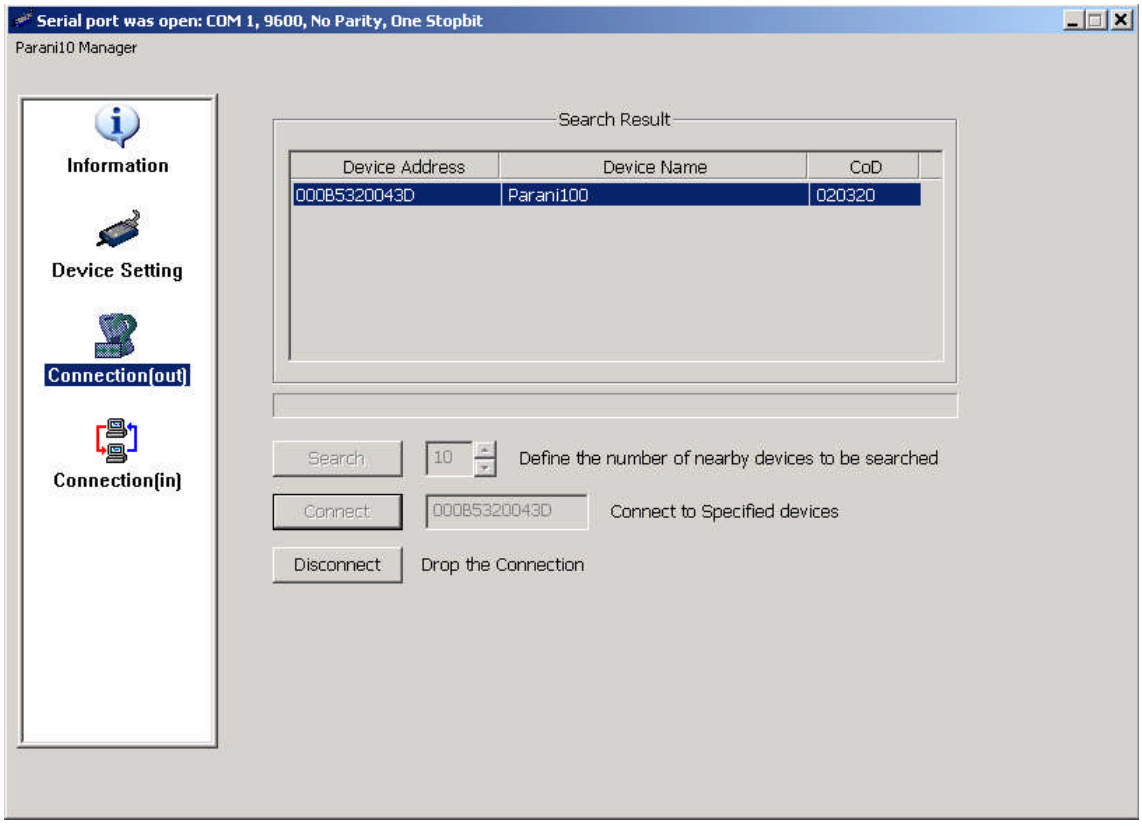
- Select the "Serial Hub Mode" and click on the Apply button.
- Next, to configure Serial Hub mode setting, click the Advanced Configuration button.



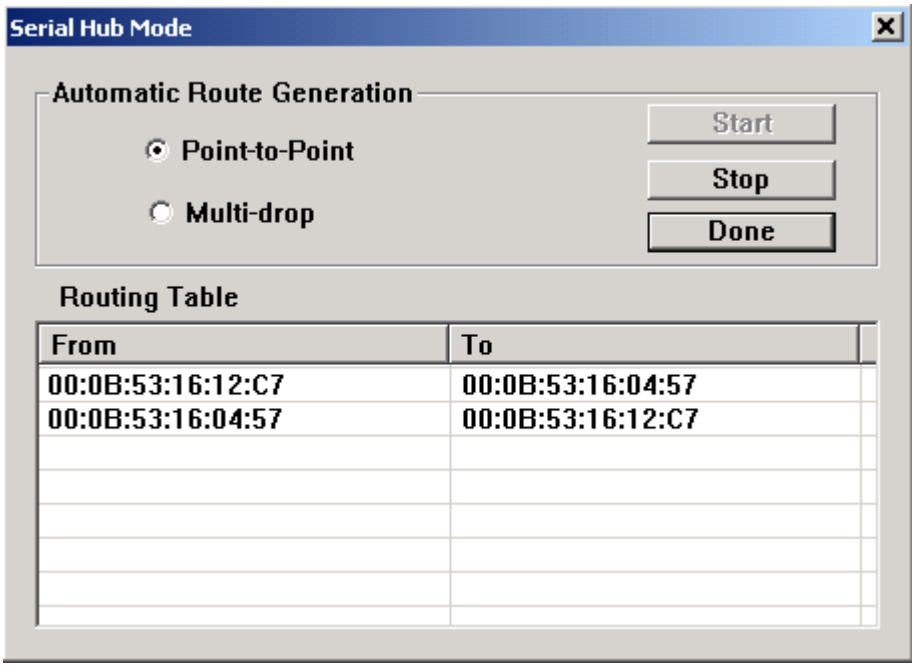
- Select “Point-to-Point” radio button and press Start Button.



- Then make a connection from each Parani10 to the Parani100. You will have two Parani10s, and the Parani100 will act as a Serial Hub to expand the range.



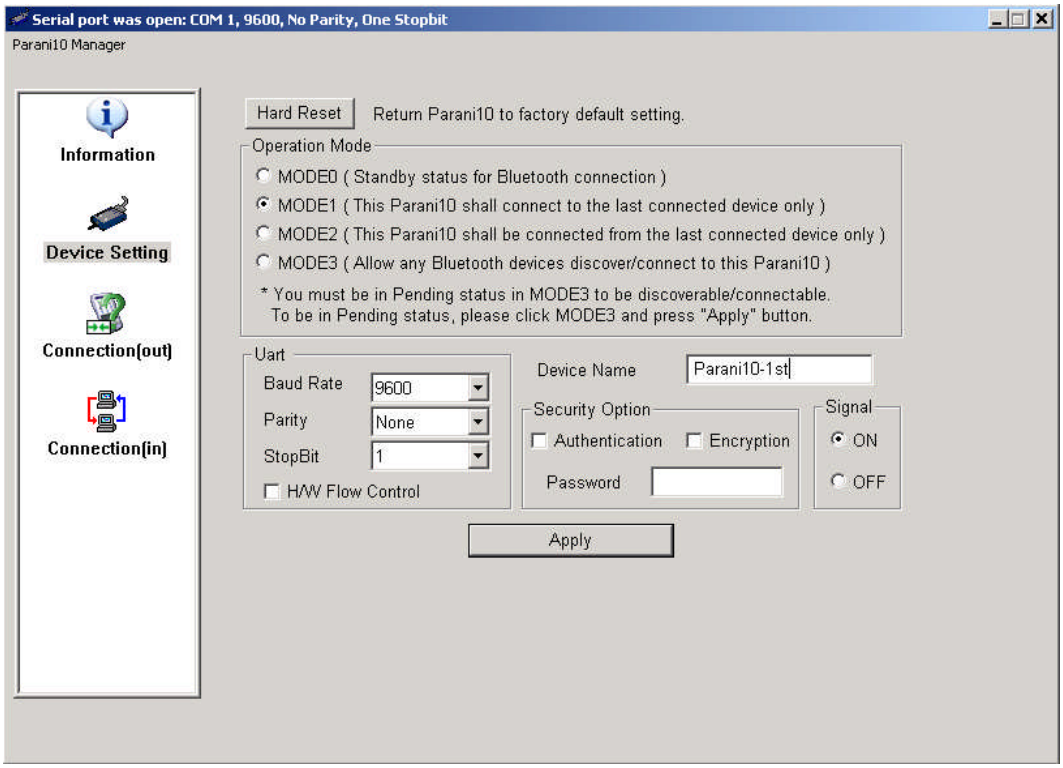
- At first, the Parani10 that you connected will be shown in the FROM column and then Parani10 that you connected to Parani100 will be shown in the TO column like below. (Using Parani100 manager)

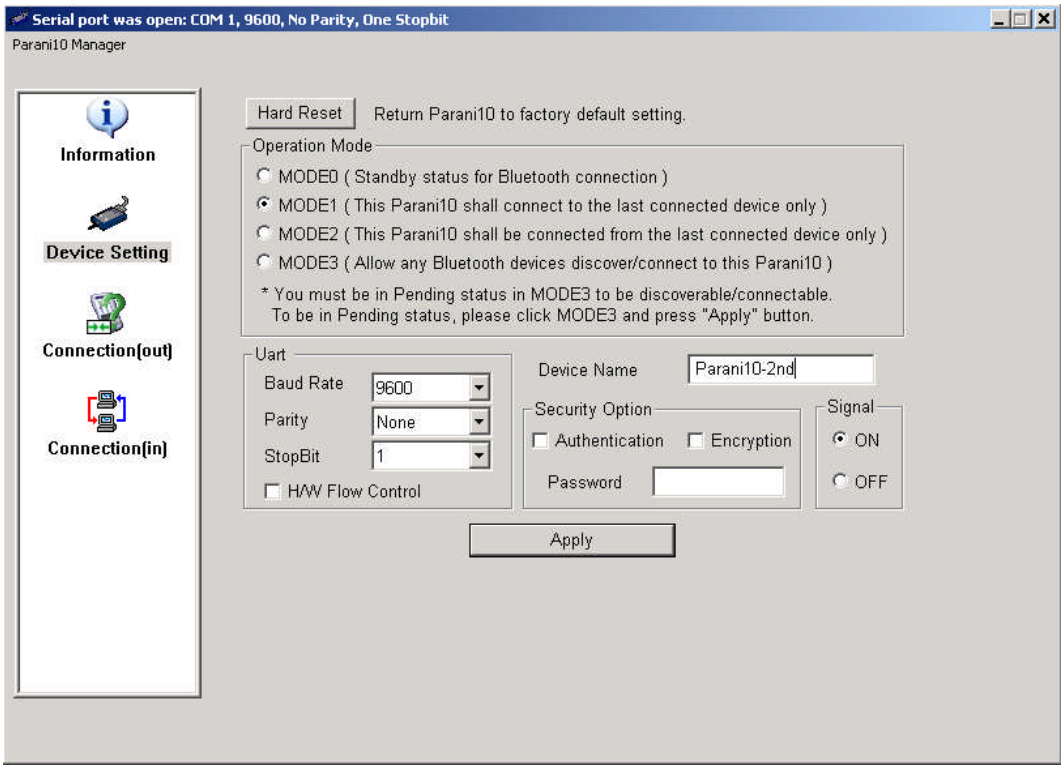


- Press [Stop] button and [Done] button.
- Press [Disconnect] button in the connection window of Parani10 Manager.

*** NOTE: Using Serial Hub mode is not limited to connections with the Parani10, you may also use similar techniques with any Bluetooth Device that supports the Serial Port Profile (SPP), please refer to your Bluetooth Devices documentation on similar connection techniques as discussed above.**

- Please view the Device Setting window in the Parani10 Manager and set operation mode as MODE1 as shown below.



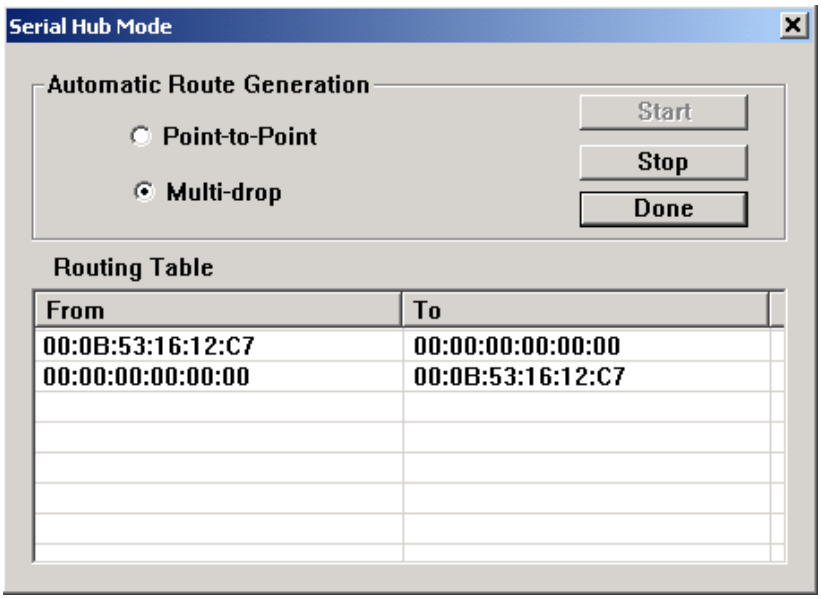


- By setting Two Parani10's to MODE 1, this will allow the Parani10's to communicate via Serial Hub Parani100 without having to manually connect to the Parani100 each time the Parani10 is powered on.

• Multi-drop

A Multi-drop connection is when one Master Bluetooth device needs to communicate with multiple Slave Bluetooth devices.

First connected Bluetooth device act as a Master, any device connected after the master will act as a Slave.



F) RS232 Mode

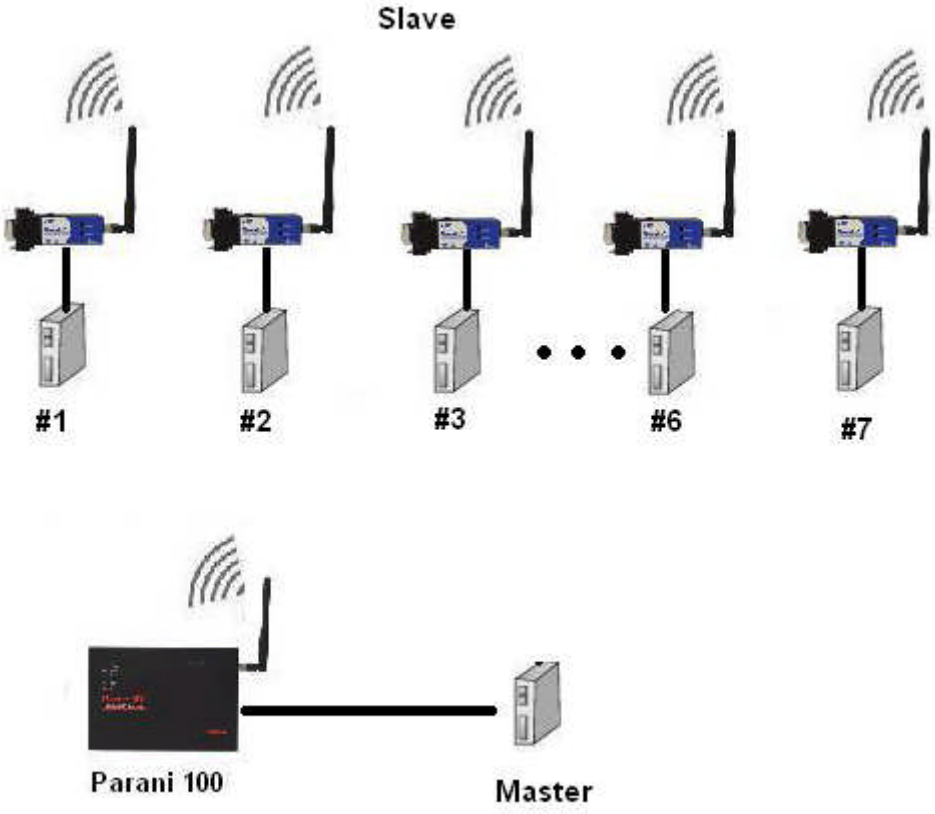
In RS232 Mode, Parani100 may communicate with other Bluetooth devices via a RS232 serial cable.

Users can communicate point to multi point communication via Parani100 with Parani10. In this case, the master is the serial port of the Parani100 and slaves are the Parani10 units.

RS232 Mode works very similar to a 485 multi-drop connection, where the Parani100 is a master unit and each Parani10 will act as the slaves. When data is transmitted to the serial port of the Parani100, Parani100 transmits the same data to each of the parani10

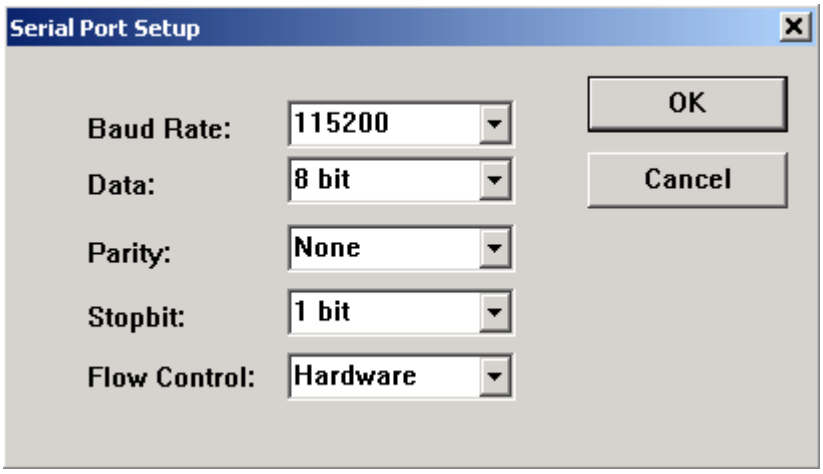
units. If one of the Parani10 units transmit data, only Parani100 serial port will receive that data.

In the RS232 Mode, Parani100 transmits the serial port data to all of the Parani10 units at the same time. Consequently, if some slaves transmit data to parani100 at the same time then serial data to the Parani100 will be blended together.



i) Set the serial configuration of Parani100

As RS232 port has been configured to be used as a Configuration port, which allows users to access the configuration utility of the Parani100. When the Parani100 is set to RS232 Mode, users will need to change the Switch on the left side of Parani100 to the Data position to allow for proper data communication to occur.



- Login the console of Parani100 (Default: 115200-N-8-1-Flowcontrol None)
- Select menu #4. Serial Port (RS232)
- Set the serial parameters like below.

```
Parani100 Configuration Console ----

      -- Press Enter ---



login: admin
Password: *****


Parani100 ver 210.76 -----------------------------
     Copyright (C) 2005 Sena Technologies
------------------------------------------------

SN : 050510003
Bluetooth
      dev0 - 00:0B:53:20:04:51
Network [dhcp]
      IPaddr  192.168.222.16   HWaddr  00:01:95:00:00:32
      Netmask 255.255.0.0   Gateway 192.168.1.1
      DNS1    168.126.63.1   DNS2    168.126.63.2
LAP profile : [disabled]

--- Main Menu ---
   1. Network Settings
   2. LAP
```

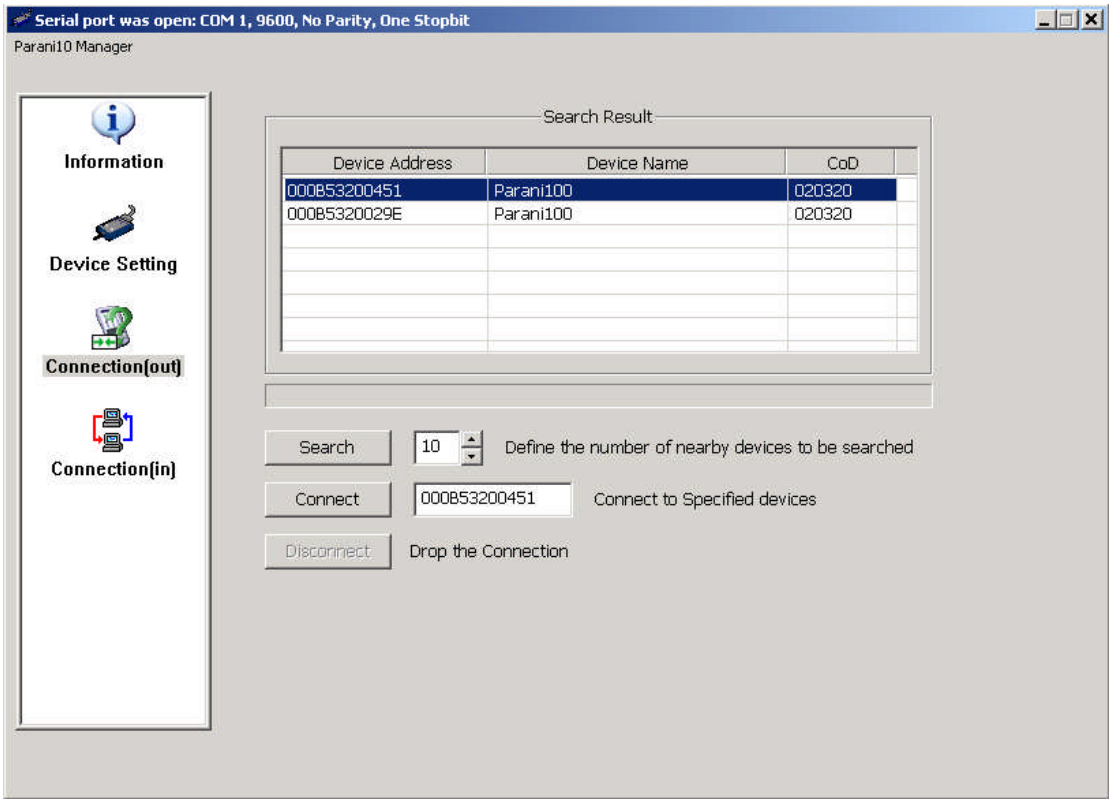
```
   3. Firmware Download
   4. Serial Port (RS232)
   5. Reset
   6. Reboot
   7. Change password
   8. System Log

   q. Quit

>> 4

--- Serial Port Configuration ---

       AT command interface: Disabled
       115200 bps 8-N-1 hardware

   1. Baudrate
   2. Character Size
   3. Parity
   4. Stopbit
   5. Flow Control
   6. AT command

   q. Quit

>>
```

- Logout the console (q.Quit)
- To apply changes to the configuration, turn off the Parani100.
- Users will need to move the Switch on the left side of Parani100 to right side position for Data communication.
- Turn on the Parani100, and then Parani100 will start operating in RS232 mode.

Please note that if you need to make use of data communication via RS232 port, you will not need to configure Network settings.

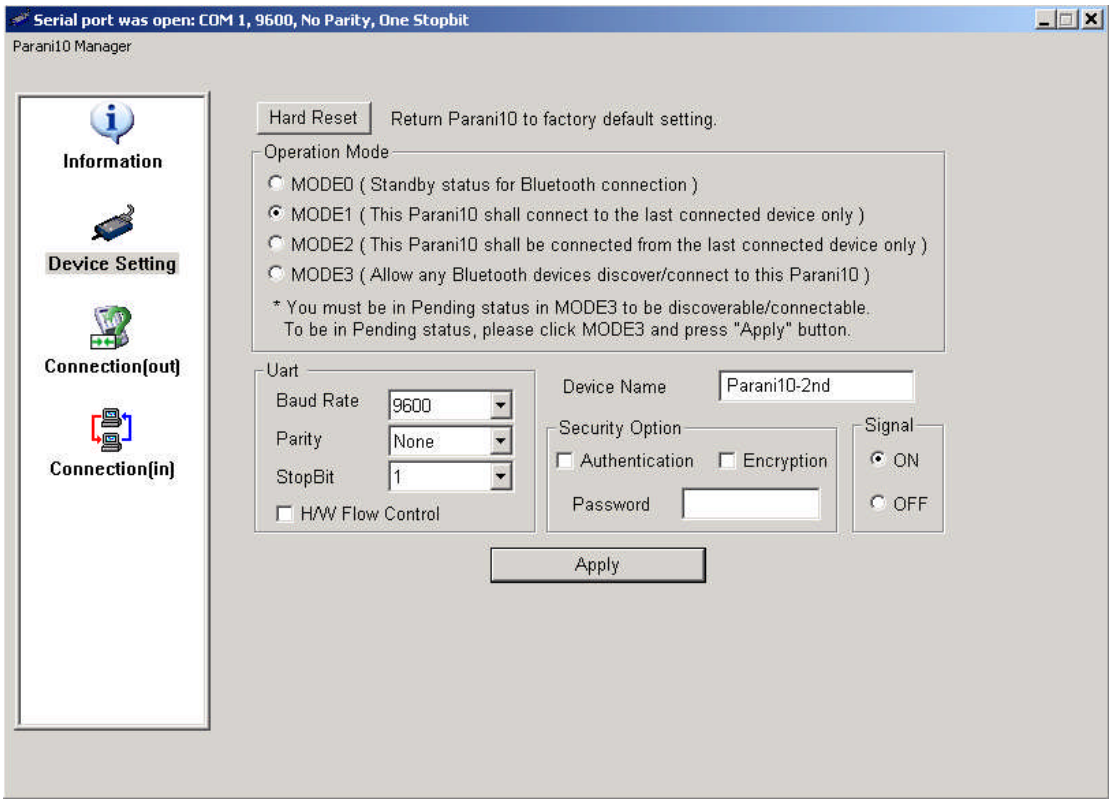
ii) Set the Parani10 configuration

- Make connection from Parani10 to the Parani100.



- Press [Disconnect] button in the connection window of Parani10 Manager.

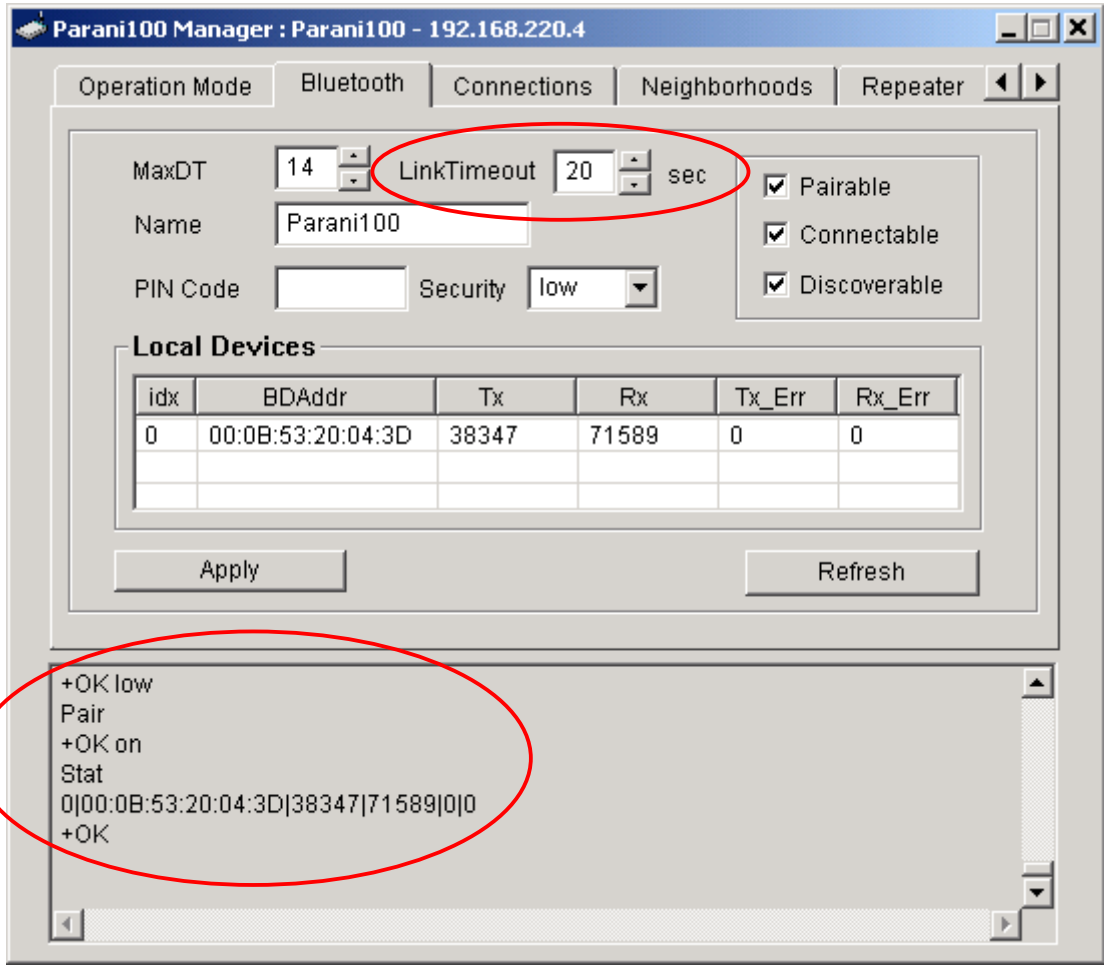
- See the Device Setting window in the Parani10 Manager and set operation mode as MODE1 like below.



- For configuration of mulitple Parani10's please use the connection techniques as described above.

4.1.4 Bluetooth

In this page, users can find current status of Parani100.

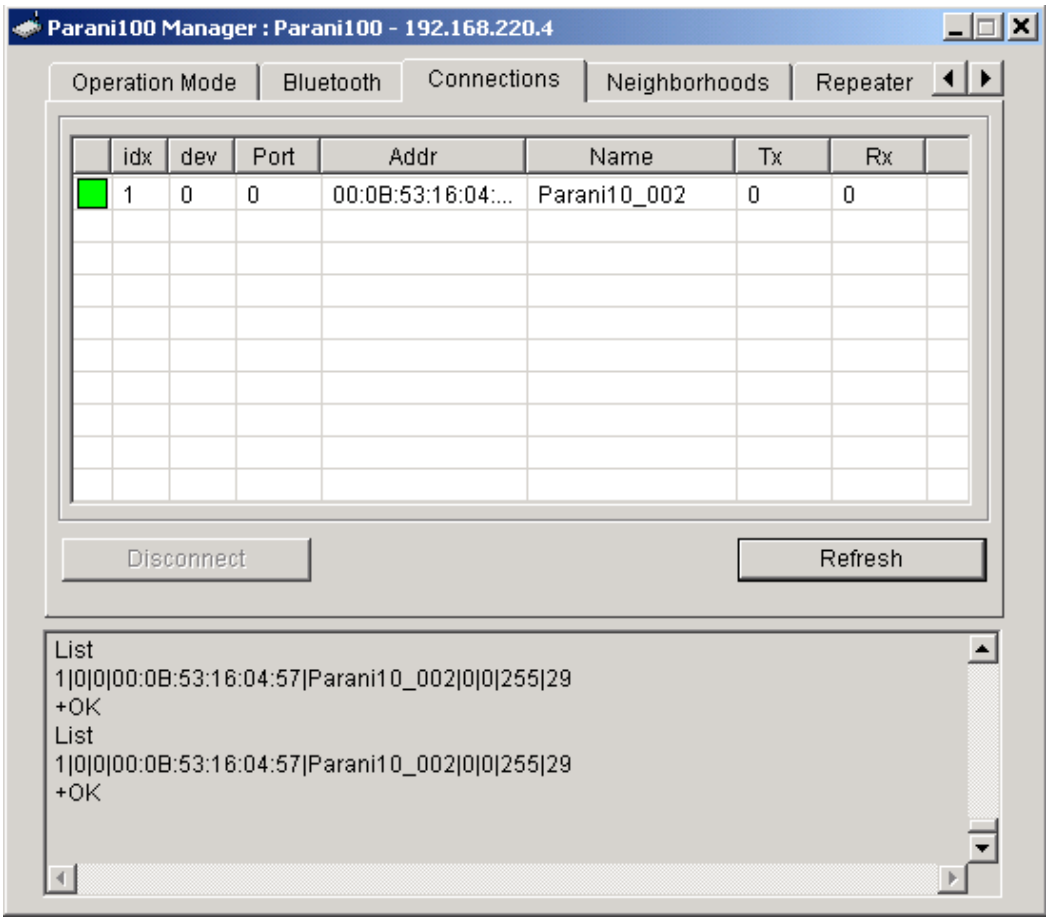


You can see the process of command at the bottom of each page as in Red circle above.

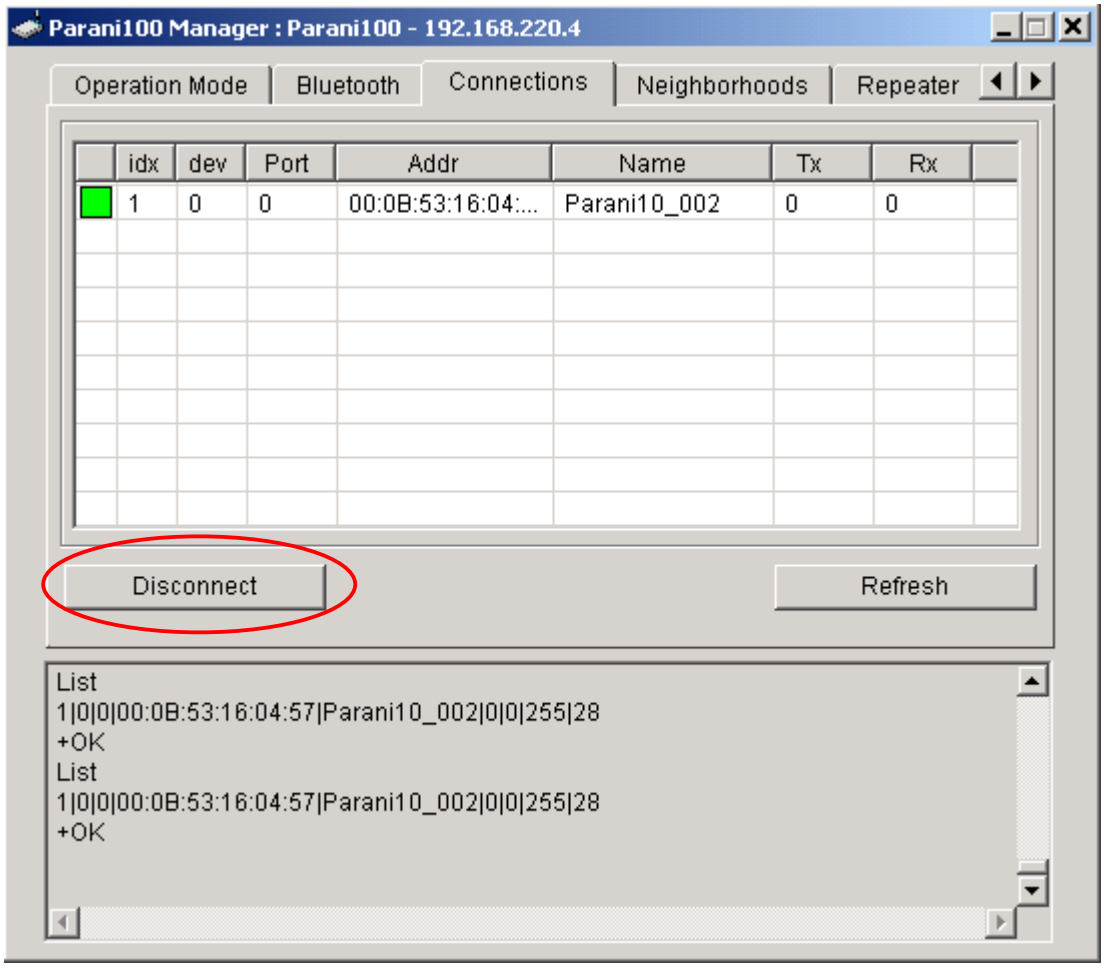
4.1.5 Connections

In this page, users may MONITOR the connection status of devices to Parani100.

Now, a Bluetooth device named Parani10_002 has been connected for Wireless serial communications as shown below.

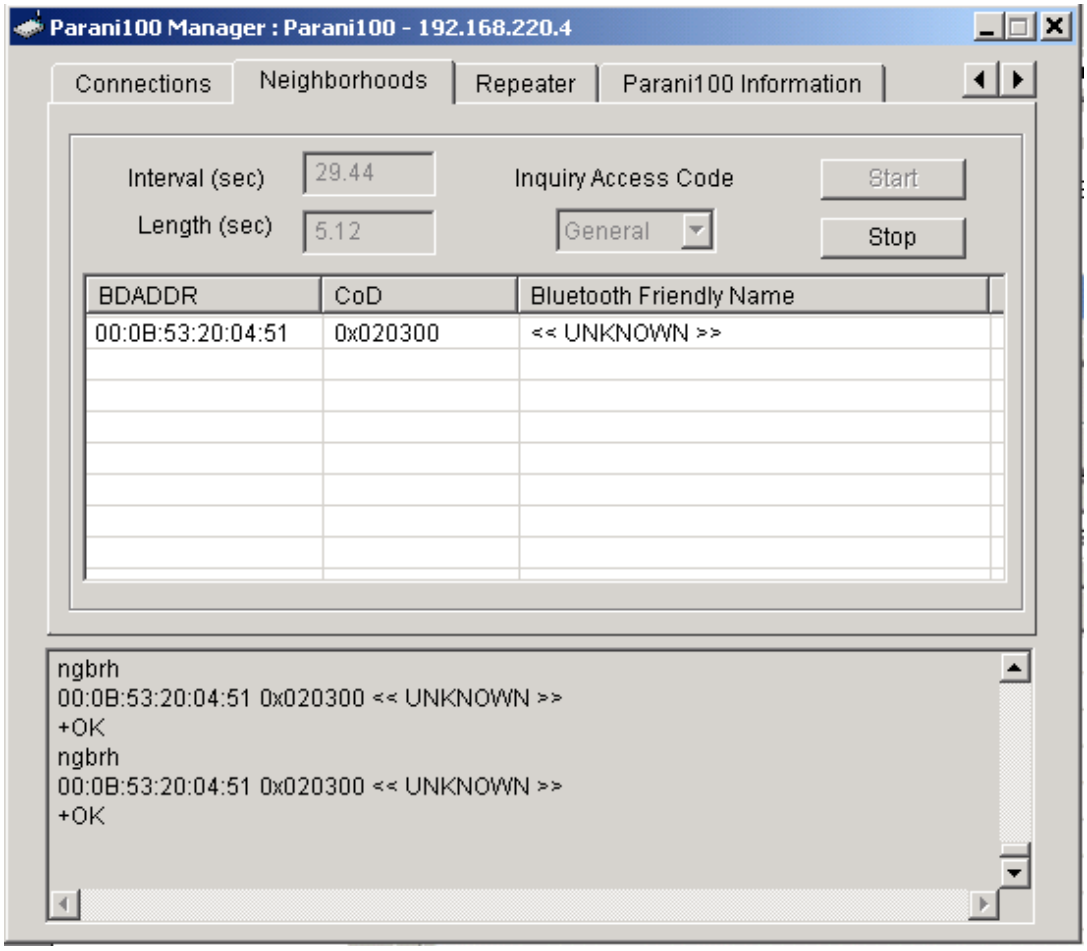


If you want to disconnect a Bluetooth terminal, you can do so by using the DISCONNECT button on the left.



4.1.6 Neighborhoods

This page is used to search nearby Bluetooth devices, configuration of search Interval, and the Length.



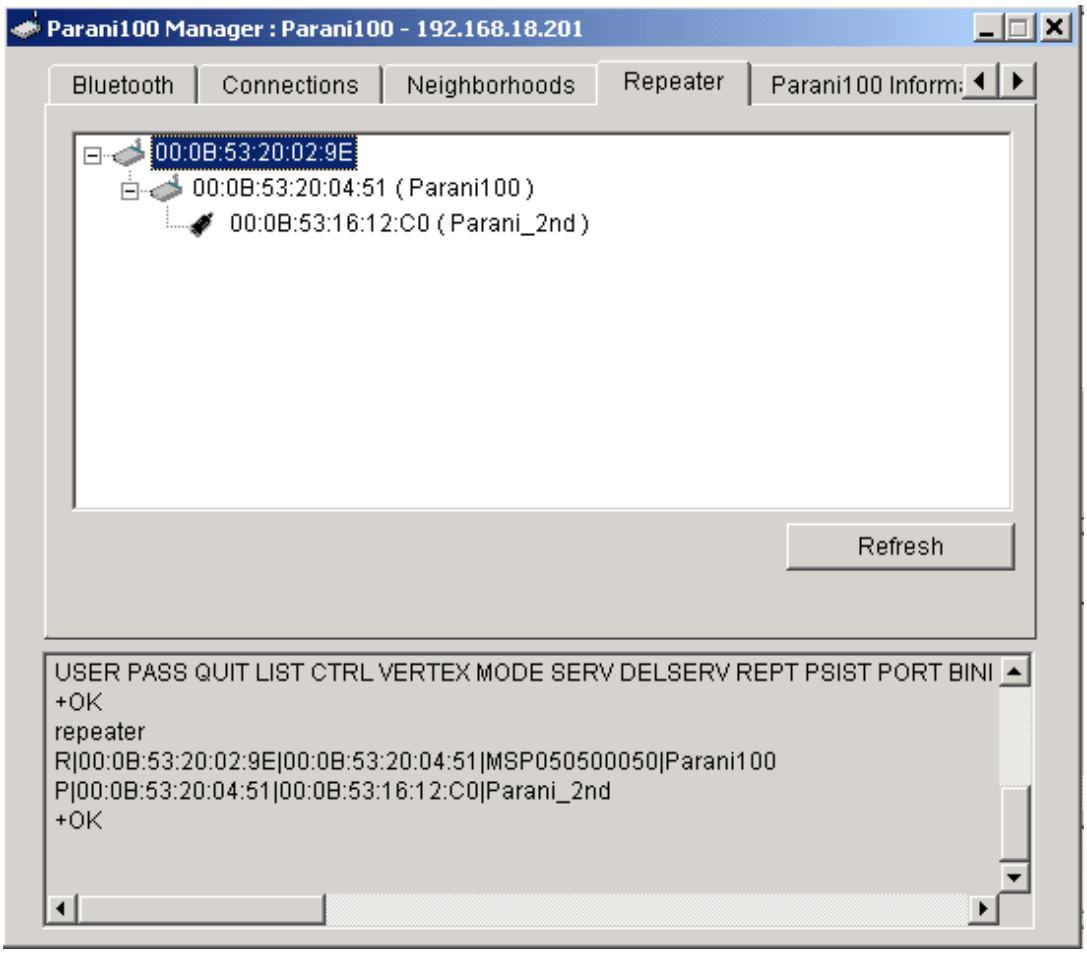
< Neighborhoods>

Bluetooth Friendly Name of devices that were connected previously will appear in the Bluetooth Friendly name box.

4.1.7 Repeater

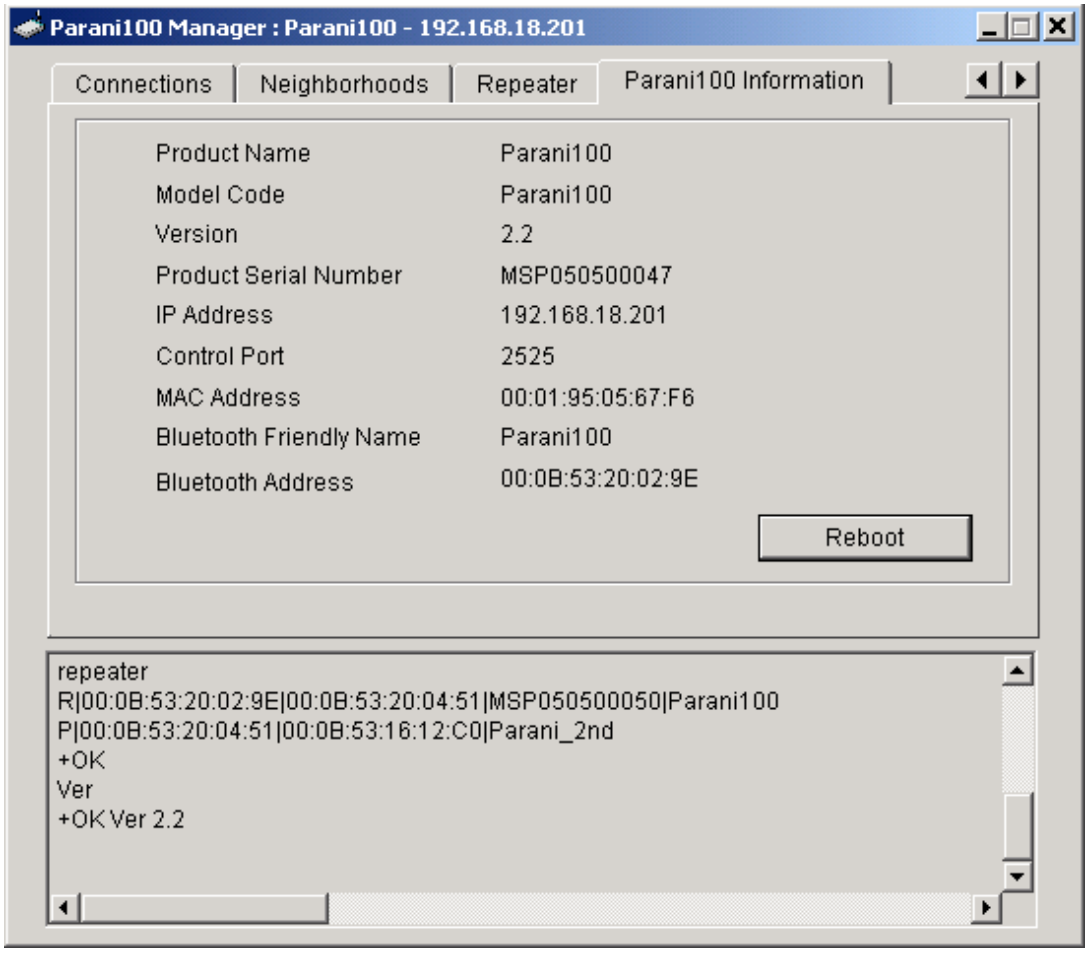
This page shows tree-structure how Repeater Parani100 and terminal devices are connected to the Station Parani100. If user's Parani100 is in Repeater Mode, nothing will be showed.

In the captured window below, Repeater Parani100 is connected to a Station Parani100 and a Parani10 is connected Repeater (00:0B:53:20:04:51).



4.1.8 Parani100 information

Users may see Parani100 information currently in use. LIST command in bottom box.



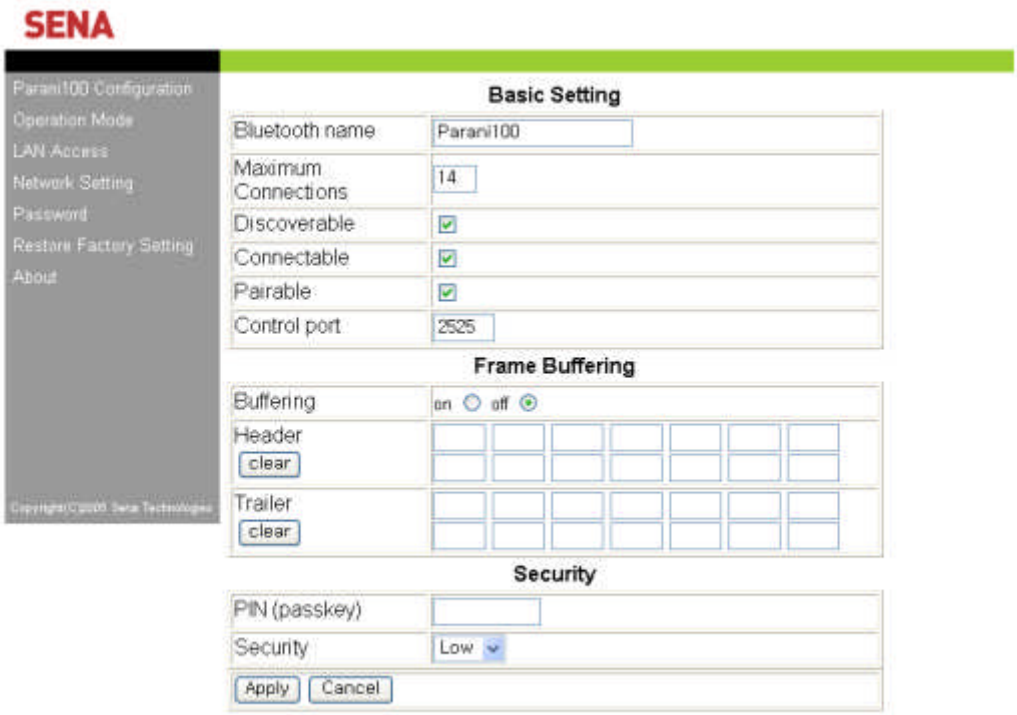
4.2 Configuration via WEB

Parani100 configuration access is available via Telnet or a local Web browser.

SENA provides Web user interface to expedite Parani100 configure/manage and current status check functions. To access Parani100 via Web interface, open a web browser and enter the Parani100 IP address in the address area.

Here is shown the 192.168.222.7 address assigned to Parani100 in the preceding configuration example.

Enter the default ID: admin, Password: 11111.



4.2.1 Parani100 Configuration

- **Basic Setting**

(1) Bluetooth name: For user Parani100 name revision

(2) Maximum Connection: For configuring the maximum number of Bluetooth devices connectable to Parani100. Default maximum is 7.

(3) Discoverable: When checked, Parani100 is in INQUIRY mode, discovering in-range Bluetooth devices.

(4) Connectable: When checked, Parani100 is in PAGE mode, connecting to Bluetooth devices.

(5) Pairable: For Pairing mode enable/disable. When in need of high security, set Pairable option to UNCHECKED, enabling High Security. When this option is NOT checked, other Bluetooth devices, except those previously connected to Parani100, cannot connect to Parani100, even via PIN code. (6) Control port: For control port number entry. Default value is 2525.

- **Buffering**

  (1) Buffering: For Buffering function enable/disable

  *** Firstly set Header and Trailer, secondly turn on Buffering option.**

  (2) Header: For buffer frame header entry. Enter alphabet or HexaCode.

  (3) Trailer: For buffer frame trailer entry. Enter alphabet or HexaCode.

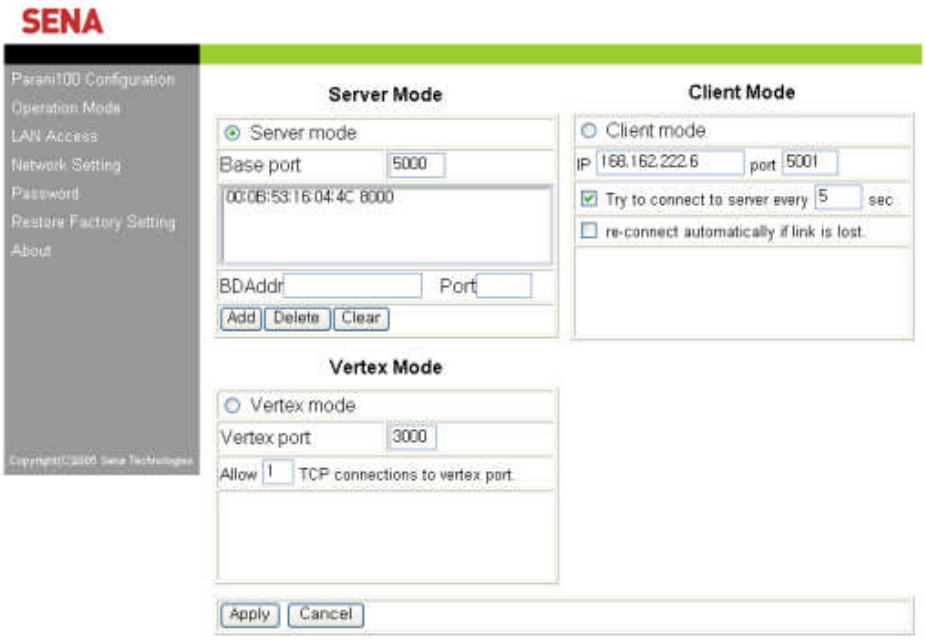
- **Security**

  (1) Pin code: For Bluetooth Pin code entry

  (2) Security: For security level entry

4.2.2 Operation Mode

Parani100 accesses 3 types of operation modes. Select according to user requirement and application.



- **Server Mode**

(1) Base port: For Parani100 Server mode default port configuration
(2) List: For assessment of currently connected Bluetooth devices
(3) Bdaddr/btname: Enter address or preferred name of Bluetooth device/s to BIND.
(4) Port no: Enter a specific port no. to assign to the Bluetooth device selected in no. 3.
(5) vBIND buttons: Add/Delete/Clear

To delete more than one device from the bound list, press Shift or Ctrl key while using the left-click button on your computer mouse.

- **Client Mode**

In Client Mode, Parani100 operates as client; Host PC becomes a server.

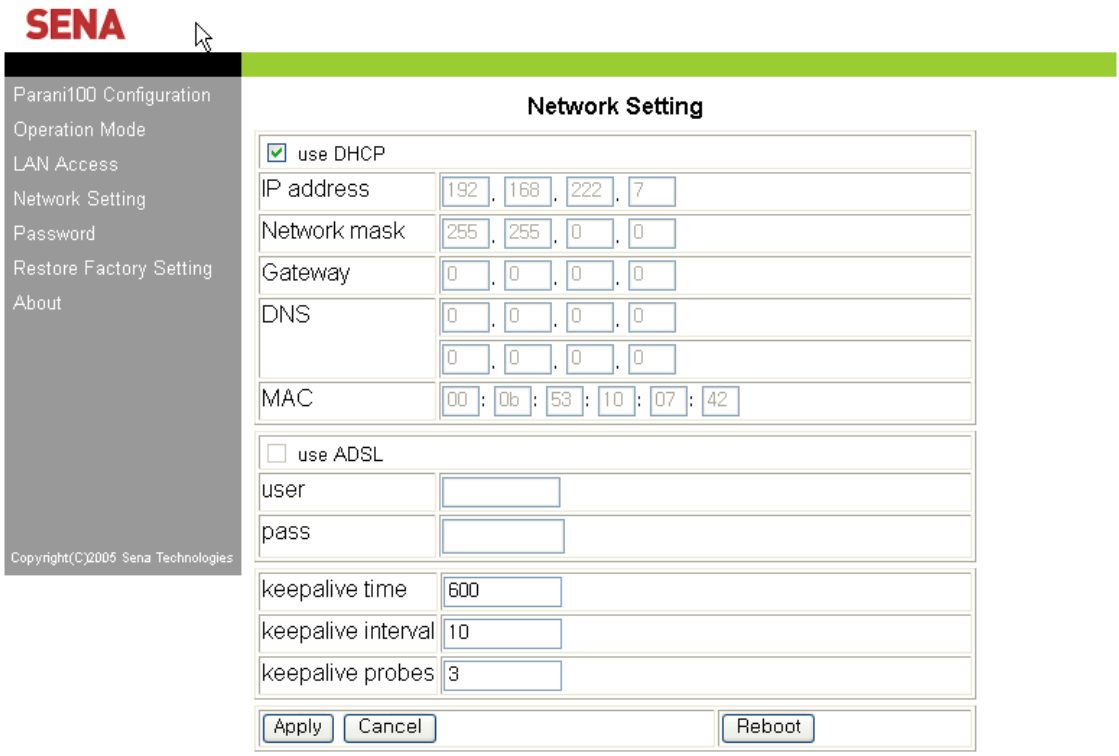
(1) IP: For network Host Server IP address entry
(2) Port: For Server Host port no. entry
(3) [] Try to connect to server every [] ms:
When Parani100 fails to open a data channel connecting to Host, enter the connection retry frequency. Entering 0 [zero] obtains retry abort.
(4) [] Re-connect automatically if link is lost.
For Host connect retry, if failed. Retry frequency is set in the preceding function.

- **Vertex Mode**

Parani100 Vertex Mode avails Wireless RS485 multidrop service when assigned at this site.

(1) Vertex port: For Parani100 Vertex port no. entry.
(2) Allow [] TCP connections to vertex port:
For entering the number of Hosts connectable to Parani100.

4.2.3 Network Setting



For user Parani100 network setting.

(1) [] use DHCP: When checked, Parani100 receives IP address from DHCP server.

(2) IP address/Network mask/Gateway/DNS: Enter appropriate data to assign static IP address for Parani100.

(3) MAC: Displays MAC Parani100 address; non-user entry

(4) [] use ADSL: Select this option when ADSL networking

(5) User/Pass: Enter ID/password data for ADSL login.

4.2.4 Restore Factory Setting

To reset to Parani100 default factory settings, click the 'Restore' button.

Appendix A. Control Commands

Parani100 can be configured/controlled by Control commands through control TCP port. Parani100 software is the GUI version of Control commands for ease of use by customers. As all of the control commands, in Parani100 software, are listed in the bottom window, users may see and understand how each of the commands is used.

Using control TCP port, users may develop software to control Parani100 by themselves. This means users do not need to equip expensive Bluetooth development kit but may develop Bluetooth solution to meet each needs by simple commands. Parani100 is cost-effective and timesaving solution for users.

A .1 Basic Commands

USER <username>

: To enter Log in Name

Ex.: **USER admin**
+OK Password required

PASS <password> [new password]

: To enter or change the Password for logging in.

Below Example shows how to change Password from '11111' to '1234'

Ex: **PASS 11111**
+OK User Authenticated
PASS 11111 1234
+OK

QUIT

: To quit the communication with Parani100

Ex.: **QUIT**
+OK
Disconnected

MODE [server|client|vertex|hub|repeater|rs232]

: To check or change the current Operation MODE of Parani100.

If any of Bluetooth devices are connected to Parani100, MODE change is

not possible. Before changing the MODE, please drop all of Bluetooth connections first.

Ex.: **MODE**
+OK Server Mode
MODE CLIENT
+OK Client Mode

A .2 Commands for Server Mode

PORT [port no.]

: To configure default PORT number of Server Mode Parani100.
If a Bluetooth terminal, which is not pre-registered by Parani100 software (BIND command), port numbers will be assigned automatically by Parani100. Users may check the PORT numbers used by LIST command.

Ex.: **PORT**
+OK PORT 5000
PORT 6000
+OK PORT 6000

BIND <bdaddr|name> <port>

: A static Port no. may be assigned to a designated Bluetooth device via BIND command. A BD address is optional to a user-friendly named.

Response: +OK index|name|bdaddr|port

Ex.: **BIND 00:0B:53:00:00:01 8000**
+OK
BIND Parani10 8001
+OK
BIND
0||00:0B:53:00:00:01|8000
1|Parani10||8000
+OK

RELE <port no.>

: If users do not need to use a bound port number, RELE command can be used to release the port number.

Ex.: **RELE 8000**
+OK

PRSV <on|off>

: A TCP data port is created as a Bluetooth connection is made. So, as a Bluetooth connection is disconnected, the corresponding TCP port is closed. If users want to open the corresponding TCP port even after disconnection of Bluetooth, PRSV command can be used.

During PRSV is on, users do not need to make TCP connection each time even if the Bluetooth connection has stopped temporarely.

Ex.: **PRSV on**
+OK

KATO <time> <probe> <interval>

: To configure 'TCP Keep Alive Time'

When the Host, which is communicating (TCP) Parani100, is stopped unintentionally, Parani100 is not aware this unexpected disconnection. Accordingly, Parani100 sends packets to check the response and connection status when there is no data communication for certain time.

When there is no data communication for <time>, Parani100 will send data packet to check the connection <probe> times, by each <interval>, before to finalize or continue the connection. Below example means when there is no communication for 10 min., Parani100 will send checking packets 3 times by 10 seconds interval.

Ex.: **KATO 600 3 10**
+OK KATO 600 3 10

A .3 Commands for Client Mode

SERV <IP Address: Port> [bdaddr|name]

: To assign IP address of Host and port number Client Mode MSP may access. If you enter BD address of Device name of the Bluetooth terminal, you may configure different Host address for each Bluetooth terminals.

Response: index|name|bdaddr|server_IP: port

Ex.: **SERV 192.168.1.11:9000**
+OK
SERV 192.168.1.11:9001 Parani10
+OK
SERV
0|Parani10||192.168.1.11:9001
+OK 192.168.1.11:9000

DELSERV <bdaddr|name>

: To delete Host information stored by SERV command.

Ex.: **DELSERV Parani10**
+OK

REPT <interval>

: When connection to Host is fails, users may configure a connection retrial period. Unit: millisecond, Default value: 5000 ms
If the value is '0', Parani100 will not try to connect after first failure.

Ex.: **REPT 3000**
+OK REPEAT every 3000 ms

PSIST <on|off>

: In Client mode, in the event of TCP disconnect, Parani100 automatically attempts Host PC reconnect when PSIST is set to ON, in the period of pre-defined ms by REPT command.

Ex.: **PSIST ON**
+OK PERSIST on

A .4 Commands for Vertex Mode

VERTEX <port no.> [number of clients]

: Default VERTEX mode displays current status.

Parani100Vertex Mode avails Wireless RS485 multidrop service when assigned at this site.

Port for use and maximum number of wireless multidrop Host Servers are assigned at this site

Ex.: **VERTEX 4000 1**
+OK PORT 4000 MAX 1

A .5 Commands for Serial Hub Mode

ROUTE <add> <src> <dst>

<del> <src> <dst>

<ptp|multi|manual>

: To configure Routing table for Repeater Mode.

Src: BD address of Sender device

Dst: BD address of Receiver device

Response: src > dst

Ex.: **ROUTE**
00:0B:53:12:03:A8 > 00:00:00:00:00:00
00:00:00:00:00:00 > 00:0B:53:12:03:A8
+OK

A .6 Commands for Bluetooth Configuration

BTNAME <name>

: BTNAME command audits or revises Parani100Device Names detectable by other Bluetooth devices.
Default BTNAME displays current value.

Ex.: **BTNAME My Parani100**
+OK
BTNAME
+OK My Parani100

PIN <pin-code>

: PIN command revises the Bluetooth PIN code. Max.: 16 bytes, ASCII code only.

Ex.: **PIN 1234**
+OK

SECU <low|high>

: SECU command revises the security level. Low obtains no security; High obtains Enabling Security. Default SECU displays current security level.

Ex.: **SECU high**
+OK
SECU
+OK high

PAIR <on|off>

: For Pairing mode enable/disable. In High security levels, when Paring mode is set to off, only Bluetooth devices sharing Link Key (see LKEY command) connect with Parani100 (non-pairable mode)

Ex.: **PAIR off**
+OK
PAIR
+OK off

LKEY

: For auditing currently paired Bluetooth devices sharing Parani100. LinkKey.

Response: local bdaddr|remote bdaddr

Ex.: **LKEY**
00:0B:53:20:00:63|00:08:1B:00:52:72
+OK

SCAN [inquiry] [page] [noscan]

: For Parani100SCAN mode assignment. INQUIRY set to ON activates search mode. PAGE set to ON activate connect mode. Default SCAN displays current status.

Ex.: **SCAN page**
+OK
SCAN
+OK page

STAT

: Displays current Bluetooth device status
If being used, it will show [PENDING].

Response: idx|bdaddr|tx_byte|rx_byte|err_tx|err_rx

Ex.: **STAT**
0|00:0B:53:20:00:63|1710|3513|0|0
+OK

A .7 Commands for Bluetooth Connection Management

LIST

: To see connected Bluetooth device list

Response: idx|dev_id|port|bdaddr|name|tx_byte|rx_byte

Ex.: **LIST**
0|0|5000|00:0B:53:00:00:8A|SDv3b-00008A|0|0
+OK

CONN <bdaddr> [channel]

: Parani100 may try to CONNECT to Bluetooth terminals. If you specify a channel, Parani100 will try connection directly without SDP (Service Discovery Protocol) process.
Each terminal should be in discoverable/ connectable mode.

Ex.: **CONN 00:0B:53:00:00:8A**
+OK

DISC <idx>

: Parani100 may DISCONNECT forcibly by DISC command, giving INDEX value in LIST command.

Ex.: **LIST**
0|0|5000|00:0B:53:00:00:8A|SDv3b-00008A|0|0
+OK
DISC 0
+OK
LIST
+OK

LINKTO <timeout>

: When a Bluetooth terminal is disconnected by turning off its power, Parani100 has default time out of 20 seconds in finally disconnecting the connection. You may assign the time out from 1 second up to 30 seconds.

Ex.: **LINKTO 20**
+OK

MAXDT <number of max. connections>

: Assigns maximum Bluetooth devices connectable to Parani100. Default value is 7. Each additional USB extension module equals 7 Parani100connectable Bluetooth devices.

Ex.: **MAXDT 7**
+OK

PINQ <on|off> <interval> <length> <IAC>

: If PINQ (periodic inquiry) is ON, Parani100 will periodically make an inquiry to nearby Bluetooth devices, by each <interval> seconds, for <length> time.
Inquires results can be checked by NGBRH command.
<IAC>: Inquiry Access Code. Users may inquire the device with same IAC code. In Bluetooth specification, there are General IAC (0x9E8B33) and Limited IAC (0x9E8B00).

Ex.: **PINQ on 20 5 0x9E8B33**
+OK

NGBRH

: To see the inquired device list by PINQ command.

Response: bdaddr CoD name

Ex.: **NGBRH**
00:0B:53:00:00:E5 0x001f00 PSDv3b-0000E5
00:0B:53:20:00:79 0x020300 Parani100
+OK

A .8 Other Commands

DUMP [idx] [bin]

: This command can be used for monitoring with a Bluetooth terminal.
[idx]: To select a specific device to monitor. (255 means all of devices)
[bin]: To send the monitored data in binary format.
Format: <dir:1><idx:1><length:2><timestamp:4><data… :length>
Timestamp: in milliseconds

Ex.: **DUMP**
> line 0 len 4 timestamp 1413986
61 62 63 64 abcd
< line 0 len 4 timestamp 1414056
4F 4B 0D 0A OK..

+OK

HELP

: HELP command displays all control commands available.

Ex.: **HELP**
+OK

VER

: To see software version no. of Parani100

Ex.: **VER**
+OK Ver 1.7

CTRL <port no.>

: Control port default value is '2525'. CTRL command assigns new control port number. Revised control port no. is applied after Parani100restart. Default CTRL displays current control port number value.

Ex.: **CTRL 3500**
+OK

CANCEL

: To cancel current operation

Ex.: **CANCEL**
+OK

RSET

: To restore to factory settings.

Ex.: **RSET**
+OK

REBOOT

: To reboot Parani100

Ex.: **REBOOT**
+OK Rebooting…

Appendix B. Discovery Protocol

UDP Broadcast on 9097 port

Magic Number (4 bytes)

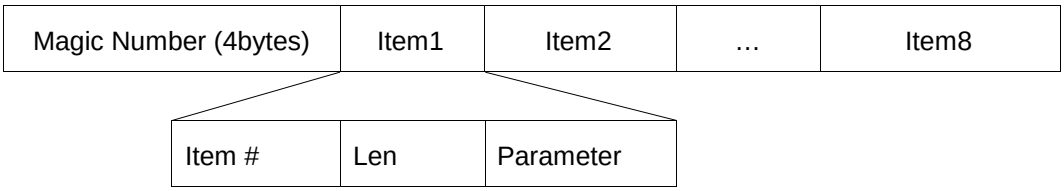
Searching

FA	05	21	EA

Response

FA	05	21	EF

Format



Item list

Item #	Length	Parameter	Example
0x01	Var.	Product Name	PARANI100
0x02	Var.	Model Code	101
0x03	Var.	Product Serial Number	MSP030403287
0x04	4	IP Address	C0 A8 01 0A
0x05	2	Control port (big endian)	09 DD
0x06	6	MAC address	00 0B 52 10 00 36
0x07	Var.	Bluetooth Friendly Name	Parani100
0x08	6	Bluetooth Address	21 04 00 52 0B 00

<An Example>

0	8	16	24 32
Magic1 (=FAh)	Magic2 (=05h)	Magic3 (=21h)	Magic4 (=EFh)
Item1 (=01h)	Len1 (=09h)	P	R
O	M	I	-
M	S	P	Item2 (=02h)
Len2 (=03h)	1	0	1
Item3 (=03h)	Len3 (=0Ch)	M	S
P	0	3	0
4	0	3	2
8	7	Item4 (=04h)	Len4 (=04h)
C0h	A8h	01h	0Ah

…

Appendix C. Using Parani100 with Serial/IP

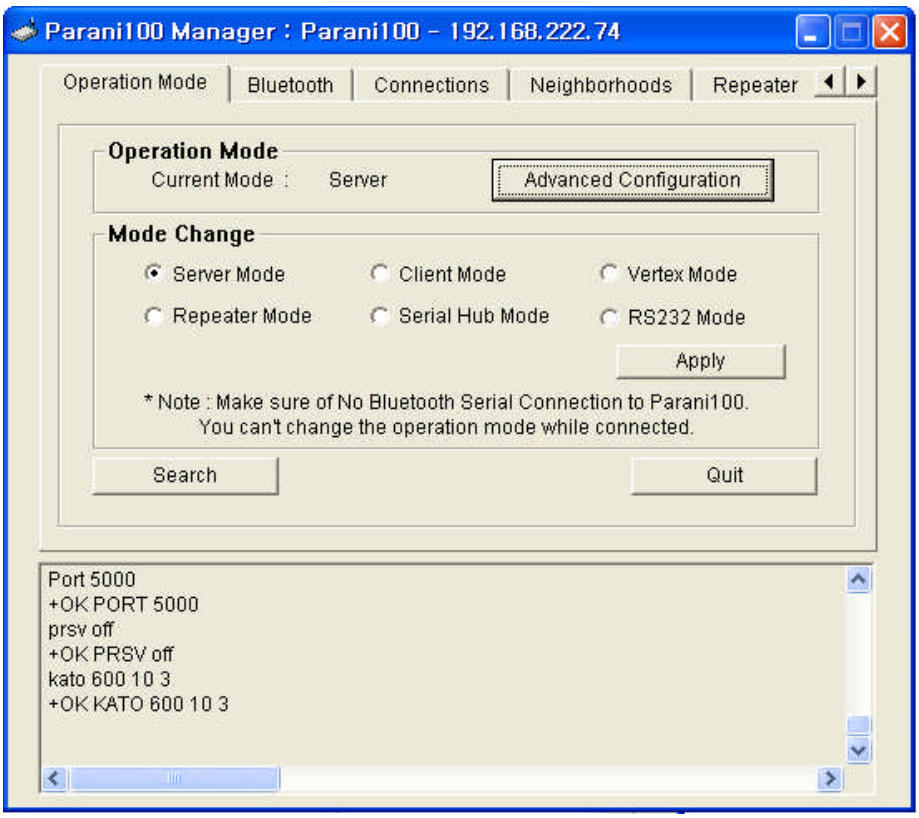
The Parani100 supports the use of Serial/IP COM Port redirection software. The Serial/IP allows COM port based applications to be used with TCP/IP based networks. By using virtual COM ports created by the Serial/IP software, Com port based applications can use the Parani100's network port or serial ports as if they were local serial ports.

Serial/IP can be used with the Parani100's server and client modes. However, Parani100 and Parani10 should be connected in advance so that Serial/IP can be used.

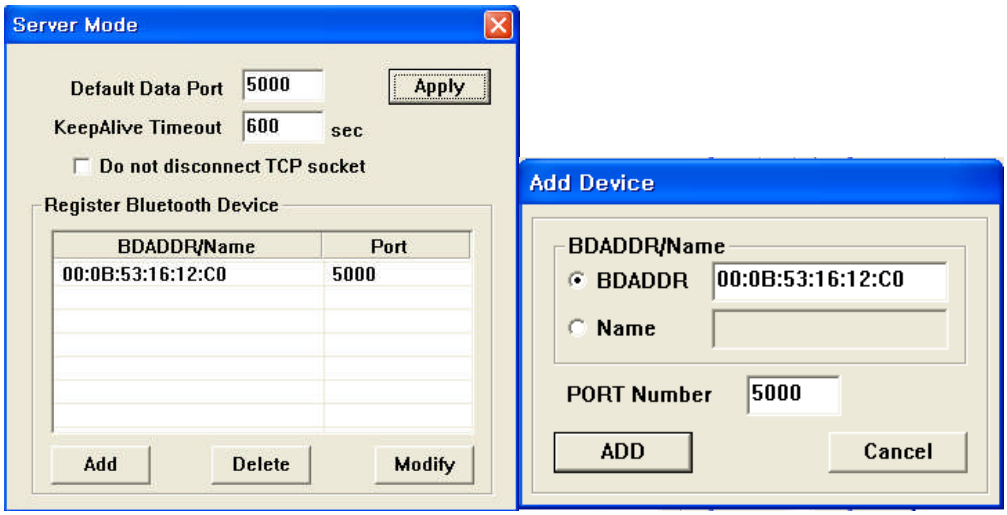
The following are examples of the Parani100 being used in-conjunction with Serial/IP:

C.1 Configuration when working with Serial/IP and Parani100 in Server Mode

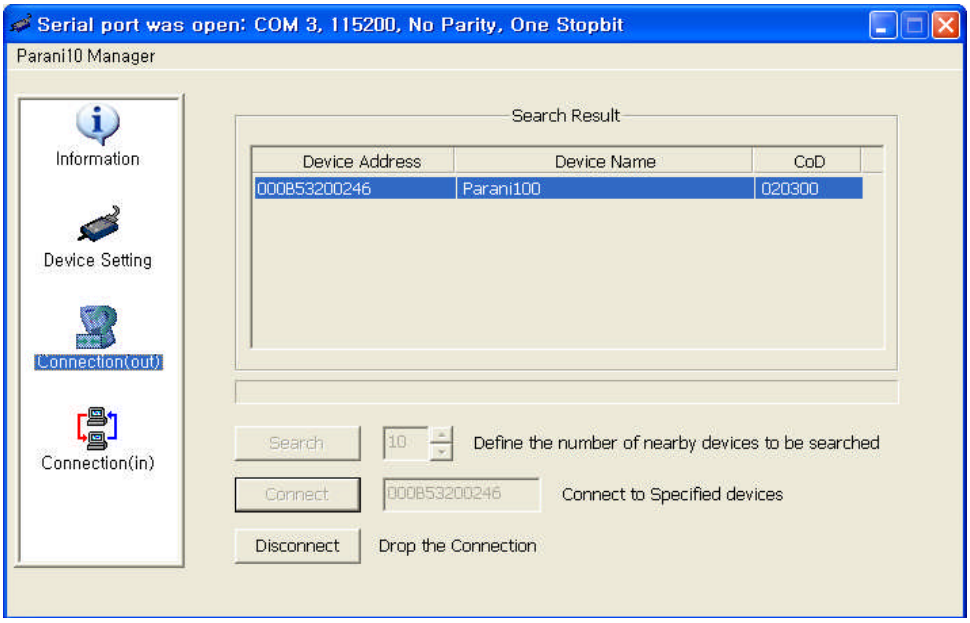
Step1. Set the Operation Mode of Parani100 as “Server Mode”



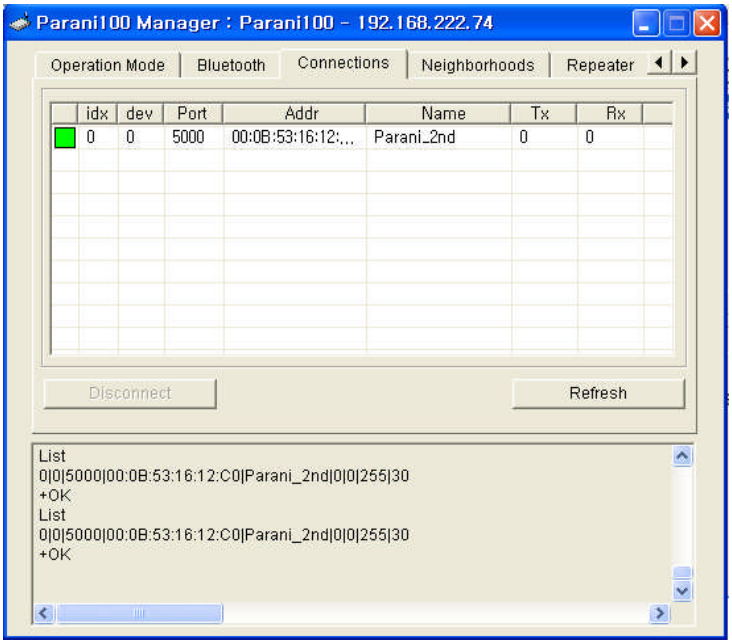
Step2. Set the Parani100 data port number and input the BD address of Parani10 by clicking the “Advanced Configuration” button.



Step3. Connect the Parani10 to Parani100

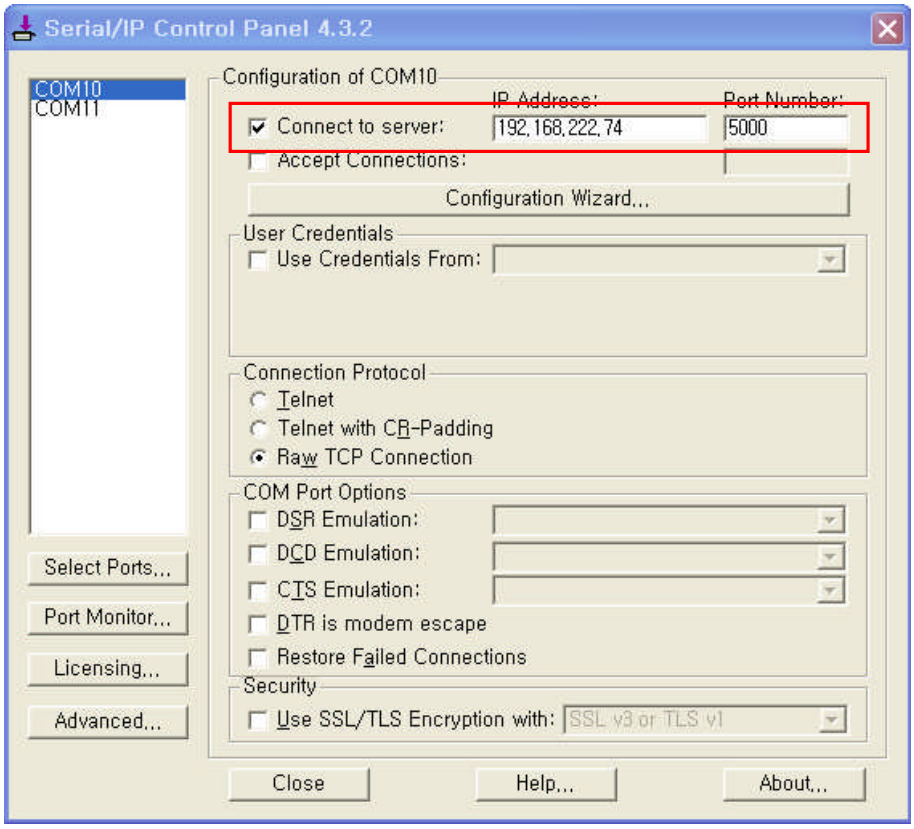


Go to the connection tab in the Parani100 Manager and make sure that Parani10 and Parani100 are connected (The connection will be denoted by a solid green square).

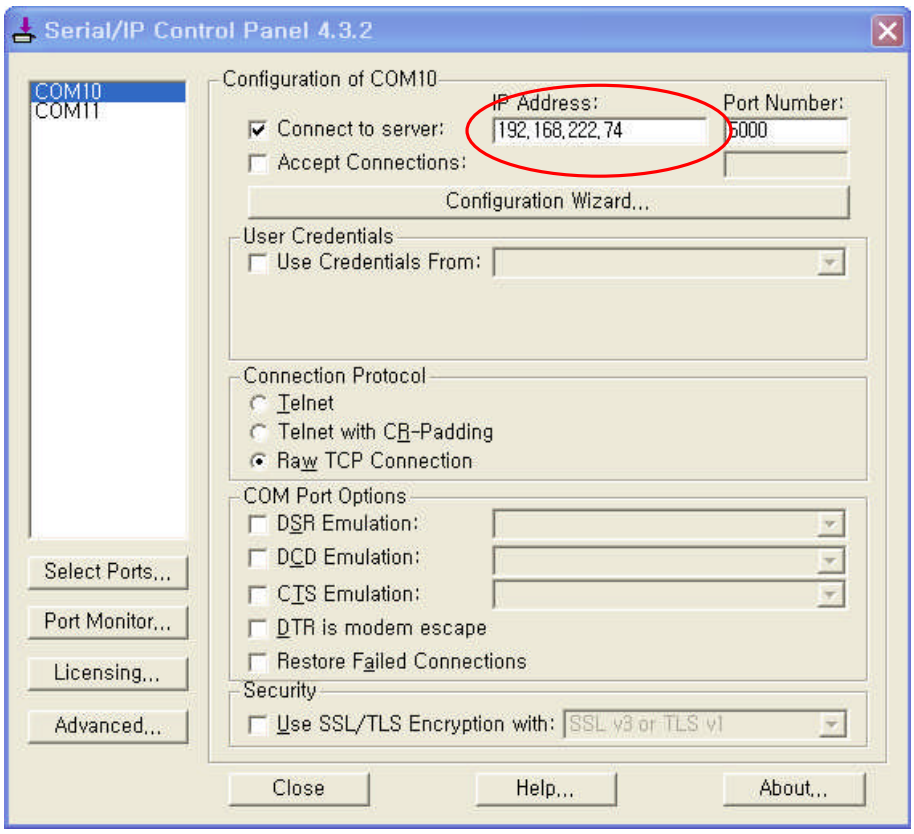


Step4. Check the “Connect to Server” in Serial/IP.

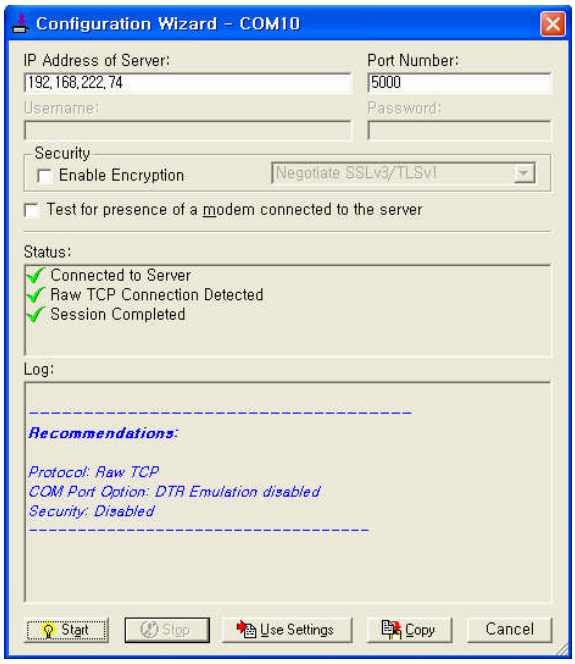
Step5. Set the IP address and Port number of the Parani100 in Serial/IP.



Step6. Open the configuration wizard of Serial/IP.



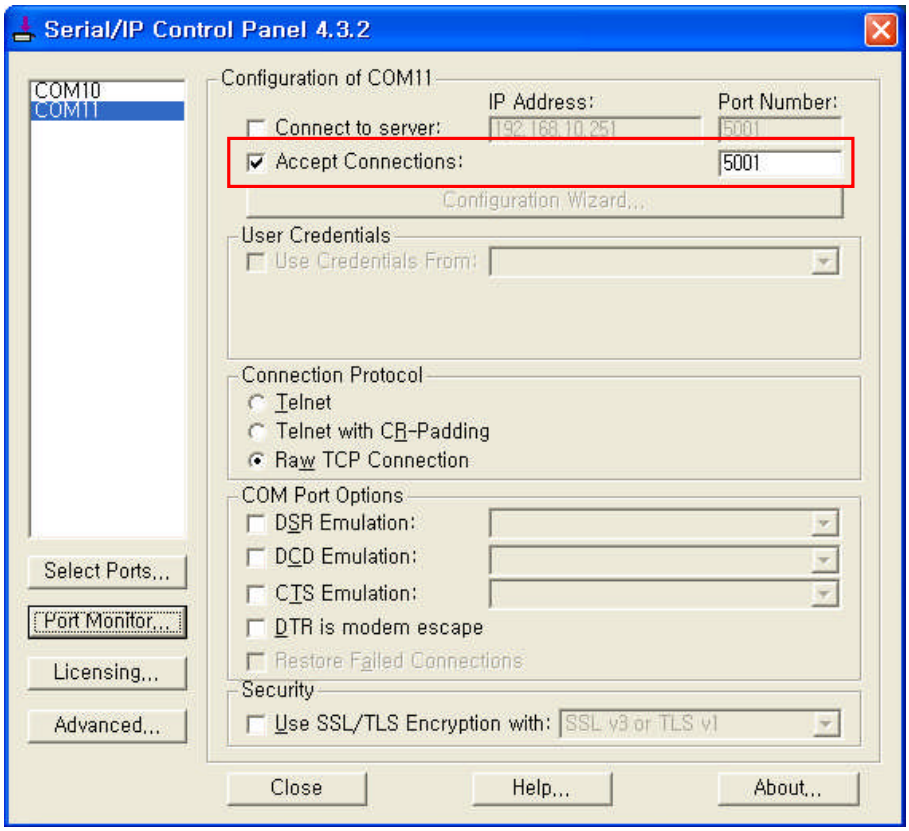
Step7. Click on the [Start] button in the Configuration Wizard so that Virtual COM port will be created.



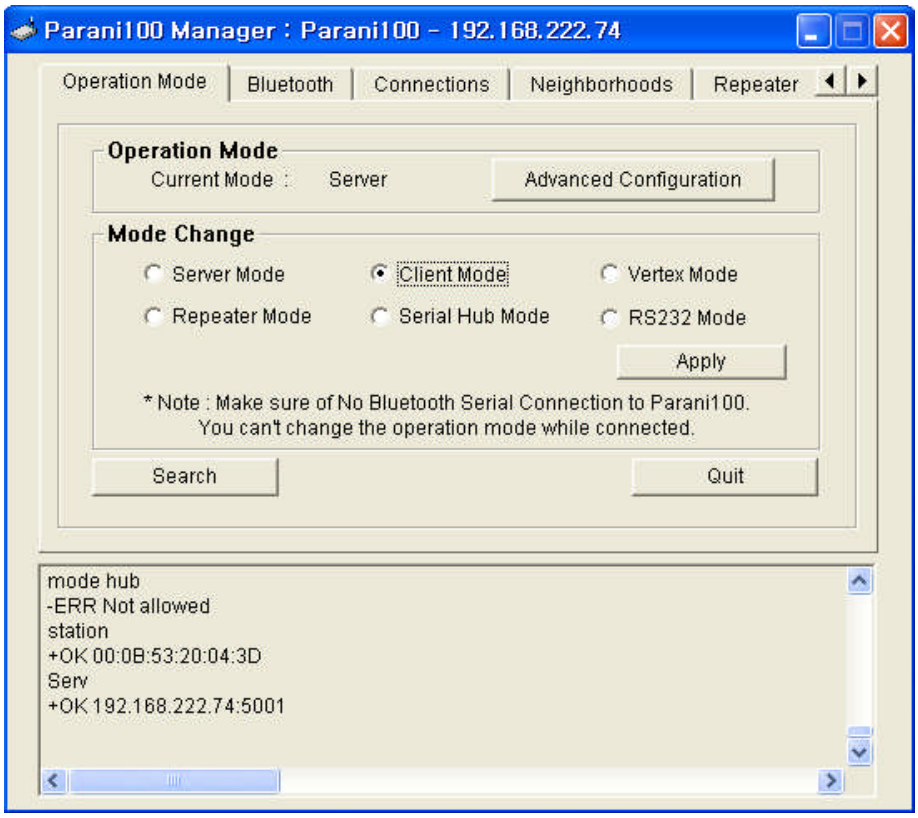
C.2 Configuration when working with Serial/IP and Parani100 in Client Mode

Step1. Check the “Accept Connections” in Serial/IP

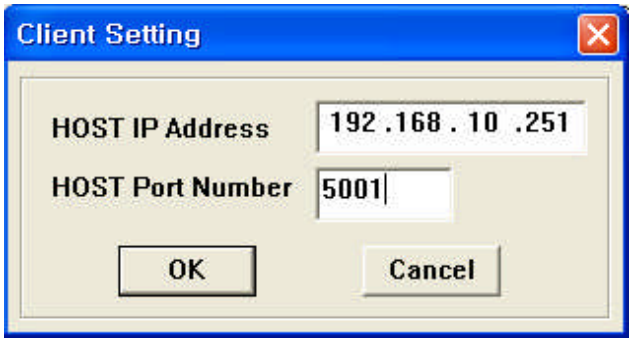
Step2. Set Port number in Serial/IP.



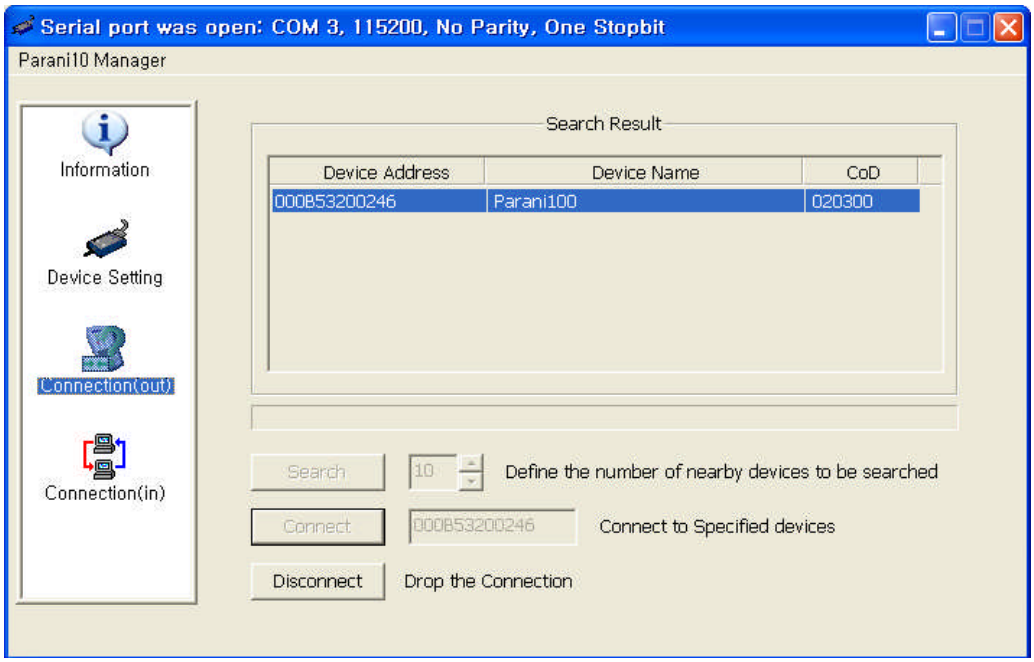
Step3. Set the operation mode of Parani100 as “Client Mode”



Step4. Input the TCP Server’s (PC running Serial/IP) IP address and Port number (refer to Step2 for the Port number).



Step5. Connect the Parani10 to Parani100



Go to the connection tab in the Parani100 Manager and make sure that Parani10 and Parani100 are connected (The connection will be denoted by a solid green square).