

Parani-MSP100

User Guide

[Version 1.0.0](#) (2006.08.20)

For Wireless Multi-Serial Communications,
based on Bluetooth Technology

by Bluetooth

Enabling Wireless Serial Communications

Contents

1. ABOUT PARANI-MSP™	4
1.1 EXTERNAL VIEW	6
1.2 LED INDICATORS	8
2. INSTALLATION	9
2.1 NETWORK SETTINGS	10
2.2 LAN ACCESS PROFILE	13
2.3 FIRMWARE DOWNLOAD	14
2.4 SERIAL PORT	17
2.5 RESET/REBOOT/QUIT	19
3. CONFIGURATION	20
3.1 CONFIGURATION VIA PARANI-MSP SOFTWARE	20
3.1.1 When Parani-MSP is connected to PC directly	20
3.1.2 Log in Parani-MSP software	21
3.1.2 Operation Mode	22
3.1.3 Bluetooth	29
3.1.4 Connections	30
3.1.5 Neighborhoods	31
3.1.6 Repeater	31
3.1.7 MSP information	32
4. OPERATION MODE	34
4.1 SERVER MODE	34
4.2 CLIENT MODE	35
4.3 VERTEX MODE	35
4.4 REPEATER MODE	36
4.5 SERIAL HUB MODE	37
4.6 RS232 MODE	38
5. CONTROL COMMANDS	41
5.1 BASIC COMMANDS	43
5.2 COMMANDS FOR SERVER MODE	43
5.3 COMMANDS FOR CLIENT MODE	45

5.4 COMMANDS FOR VERTEX MODE.....	46
5.5 COMMANDS FOR SERIAL HUB MODE.....	46
5.6 COMMANDS FOR REPEATER MODE.....	47
5.7 COMMANDS FOR BLUETOOTH CONFIGURATION	47
5.8 COMMANDS FOR BLUETOOTH CONNECTION MANAGEMENT	50
5.9 OTHER COMMANDS	53
6. AT COMMAND INTERFACE.....	55
7. CONFIGURATION VIA WEB	59
7.1 MSP CONFIGURATION	59
7.2 MODE CONFIGURATION.....	61
7.3 IP ASSIGNMENT.....	62
7.4 NETWORK SETTING	63
7.5 RESTORE FACTORY SETTING.....	64
8. INTERNET ACCESS VIA PARANI-MSP.....	65
8.1 LAP	65
8.2 PAN	65
8.3 DIAL-UP MODEM EMULATION	65
9. COM PORT REDIRECTOR.....	66
9.1 SERIAL/IP.....	66
10. TECHNICAL SUPPORT.....	69
APPENDIX A - DISCOVERY PROTOCOL.....	70

Revision History: User Manual of Parani-MSP™

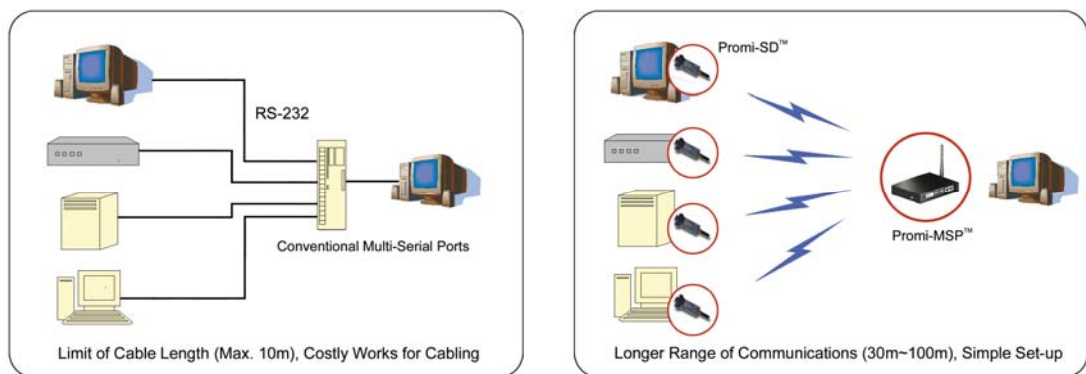
<i>Version</i>	<i>Changed Contents</i>	<i>Date</i>
1.0	First issue	08/20/2006

1. About Parani-MSP™

Parani-MSP™ is a Bluetooth-wireless multiple serial server for minimum 7 to maximum 14 devices; an option to conventional multi-serial ports. Wireless Parani-MSP™ results in dramatic installation cost and time savings.

With Parani-SD™ installed at RS-232 interfaced terminals, Parani-MSP™ affords dependable convenience for a variety of serial communications environments.

Refer to the figure 1.1. below:



<Fig. 1.1>

Parani-MSP™ has Bluetooth protocol stack qualified by Bluetooth SIG, which assures standardized, secure and scalable serial communications. Parani-MSP™ identification of data, per each additional unique Bluetooth SPP enabled device address, prevents data jam.

Bluetooth's 2.4GHz frequency-hopping system is resilient to RF interference from sources such as Wireless LAN. Increased communications security is possible via optional user set-up authentication.

Parani-MSP™ transmits data from each Bluetooth devices to Host PC via TCP/IP Ethernet. Host PC also responds to each Bluetooth devices wirelessly via Parani-MSP™.

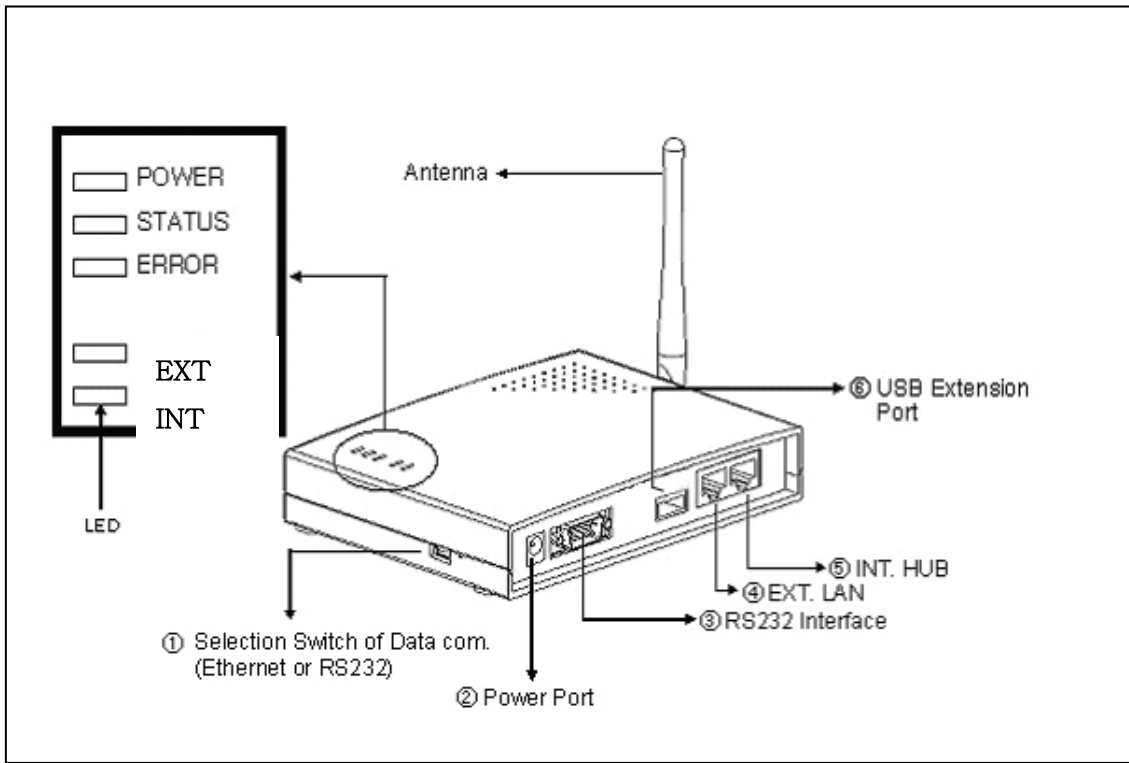
Non-TCP/IP legacy serial applications can make use of Parani-MSP™ without any

modification to the application in thanks to the COM port redirector software, such as Serial/IP. More information can be found in chapter 9.

<Table 1.1> Parani-MSP™

Model	Hardware Interface	Specifications
Parani-MSP100	LAN 10/100 x2, Inclusive Hub function. Ethernet/RS232C com. supported Built-in Bluetooth 1 USB A-type port for USB extension dongle (Max. 7 Bluetooth links)	Coverage : 100m Data rate : Max. 723 Kbps Frequency: 2.4GHz COM port redirector - Serial/IP* Supported Networks HTTP / FTP / Telnet / IP-sharing(NAT) / DHCP /PPP server


1.1 External View



<Fig. 1.2> Parani-MSP100 external view

① DIP Switch

Users may select the way of data communication with host PC. Default setting is TCP/IP communication using no. ④ **RJ45 marked EXT**, but if users need, data communication via no. ③ RS232 Interface marked "IOIOI" is also possible.

* If DIP switch is on the side of drawing , Parani-MSP communicates with Host via Ethernet line (TCP/IP).

* If users want to use RS232 com. please change the direction of switch to the other way. (effective after power-cycling)

② **Power Port**: For Power Adapter connection

③ **RS232 Interface marked "IOIOI"**:

For Parani-MSP network configuration via RS232 serial cable - One RS232 serial cable, both ends female DSUB interfaces, is provided with Parani-MSP. This port can be used for both Configuration of Parani-MSP 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.:** Hub port for connection to another Parani-MSP™. With this, Parani-MSP can be chained without network hub. This is for the better user experience of convenient installation. Use a straight cable for this purpose.

⑥ **USB Extension Port:** For expanding multi-connection beyond 7 devices. A Bluetooth USB extension dongle will be supplied with Parani-MSP100(b) for extension of 7 connections.



<Fig. 1.3> Parani-MSP100 attached with USB extension dongle



NOTE:

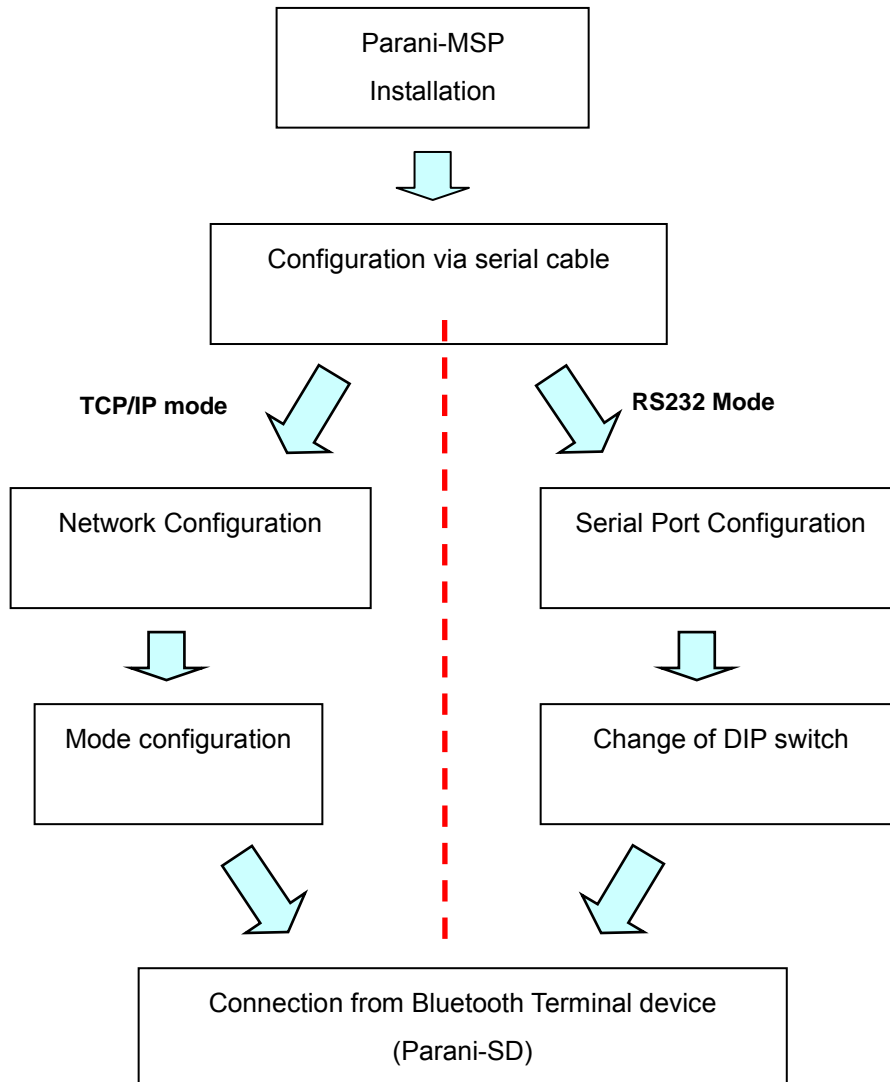
RF Characteristic of USB extension dongles may differ from the built-in Bluetooth module of Parani-MSP.

1.2 LED indicators

- POWER: POWER ON/OFF Status
- STATUS: Parani-MSP™ Status
- ERROR: Error Event Status
- LINE/ACT1, LINE/ACT2: RF45 connections Status

STATUS LED	ERROR LED	Description
ON	OFF	Normal
Blinking	OFF	Connecting to Station MSP (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 <u>DO NOT turn off Parani-MSP during firmware upgrade;</u> turning off Parani-MSP during firmware update may impair operability

2. Installation



TIP

If you are going to use Parani-MSP as RS232 mode – RS232 communication with Host, you don't need to configure Networking settings.

2.1 Network Settings

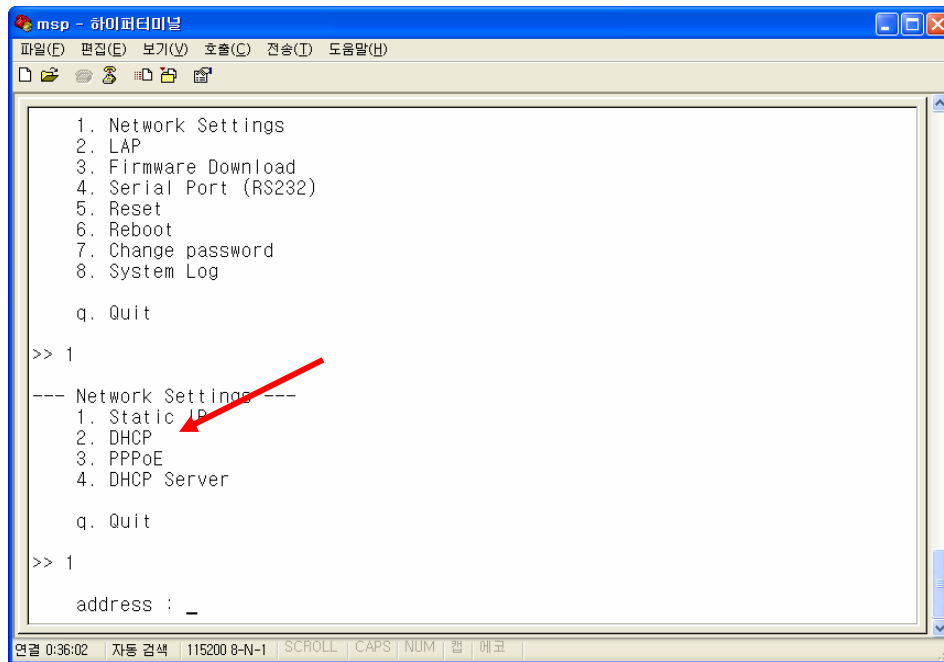
- (1) Parani-MSP™ power-up; 'POWER' and 'STATUS' LEDs display green
- (2) Parani-MSP™ network configuration: connect Parani-MSP™ to PC via RS232 cable
- (3) Open HyperTerminal
- (4) Set PC COM port;
Baud rate 115200 / 8 Data bit / non-parity / 1 stop bit / no hardware flow control
- (5) Press Enter key; ***the following information is displayed on HyperTerminal screen***; If Parani-MSP™ prompts Login ID/password, default values are:

Login: admin

Password: 11111

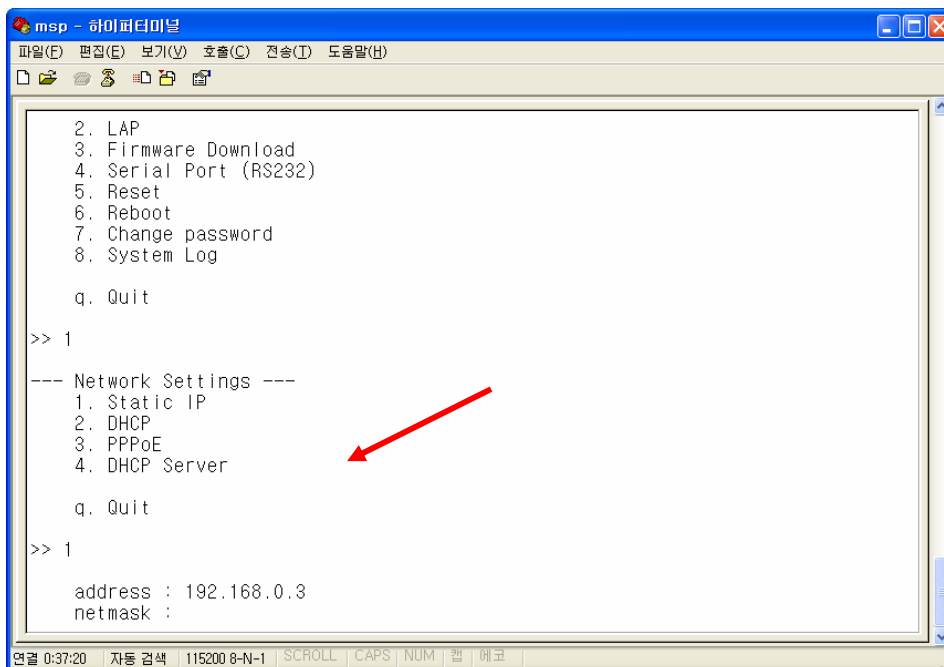
- (6) **Default Parani-MSP™ IP address factory setting is 192.168.1.10.** Revise to user appropriate networking environment IP address
- (7) To revise Network Settings, click main menu Number. Enter "1" as displayed below.
- (8) Network Settings sub menu is displayed.
Description:
 1. Static IP: For Assigning Parani-MSP™ a static IP
 2. DHCP: For Assigning Parani-MSP™ IP using DHCP
 3. PPPoE: For assigning Parani-MSP™ IP using PPPoE
 4. DHCP server: For instant network setting. Parani-MSP assigns temporary IP to PC.

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



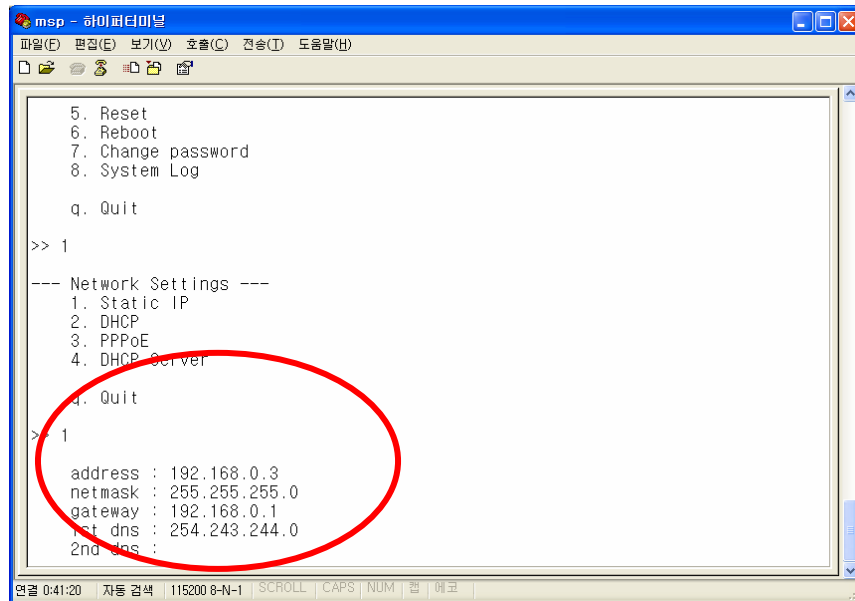
```
mcp - 하이퍼터미널
파일(F) 편집(E) 보기(V) 호출(C) 전송(T) 도움말(H)
[Icons]
1. Network Settings
2. LAP
3. Firmware Download
4. Serial Port (RS232)
5. Reset
6. Reboot
7. Change password
8. System Log
q. Quit
>> 1
--- Network Settings ---
1. Static IP
2. DHCP
3. PPPoE
4. DHCP Server
q. Quit
>> 1
address : _
연결 0:36:02 | 자동 검색 | 115200 8-N-1 | SCROLL | CAPS | NUM | 캡 | 메코
```

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



```
mcp - 하이퍼터미널
파일(F) 편집(E) 보기(V) 호출(C) 전송(T) 도움말(H)
[Icons]
2. LAP
3. Firmware Download
4. Serial Port (RS232)
5. Reset
6. Reboot
7. Change password
8. System Log
q. Quit
>> 1
--- Network Settings ---
1. Static IP
2. DHCP
3. PPPoE
4. DHCP Server
q. Quit
>> 1
address : 192.168.0.3
netmask :
연결 0:37:20 | 자동 검색 | 115200 8-N-1 | SCROLL | CAPS | NUM | 캡 | 메코
```

- (11) Please enter your Netmask/Gateway/DNS information, as in below for example:

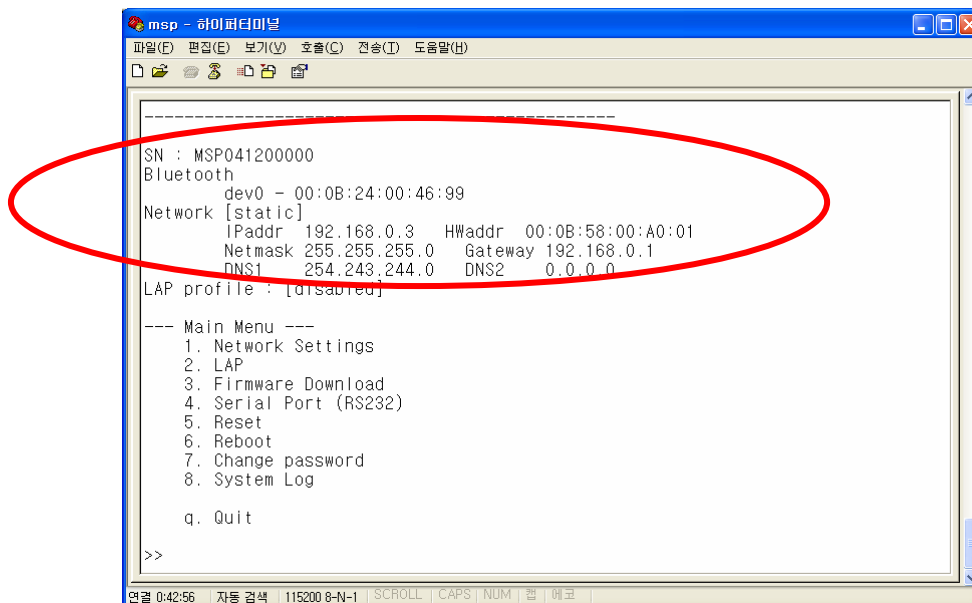


```
msp - 하이퍼터미널
파일(F) 편집(E) 보기(V) 호출(C) 전송(T) 도움말(H)
[Icons]
5. Reset
6. Reboot
7. Change password
8. System Log
q. Quit
>> 1
--- Network Settings ---
1. Static IP
2. DHCP
3. PPPoE
4. DHCP Server
4. Quit
> 1
address : 192.168.0.3
netmask : 255.255.255.0
gateway : 192.168.0.1
1st dns : 254.243.244.0
2nd dns :
```

- (12) Press Enter; Parani-MSP™ will prompt reboot request. Enter 'Y' [Yes]; press Enter to reboot Parani-MSP™ to apply the revised Network Settings.

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

- (14) Revised Network settings are displayed



```
msp - 하이퍼터미널
파일(F) 편집(E) 보기(V) 호출(C) 전송(T) 도움말(H)
[Icons]
-----
SN : MSP041200000
Bluetooth
  dev0 - 00:0B:24:00:46:99
Network [static]
  IPaddr 192.168.0.3  HWaddr 00:0B:58:00:A0:01
  Netmask 255.255.255.0  Gateway 192.168.0.1
  DNS1 254.243.244.0  DNS2 0.0.0.0
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
>>
```

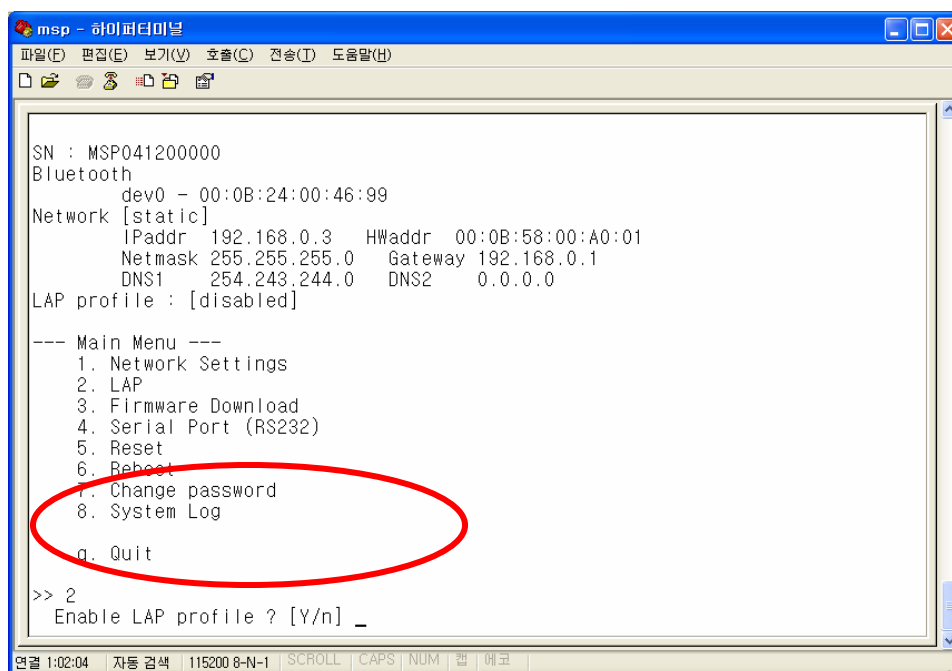
<An example: Revised Network Settings>

- (15) Networking configuration is complete. The preceding example shows static IP assignment to Parani-MSP™. User selects static, DHCP or PPPoE IP as needed.

2.2 LAN Access Profile

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

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



```
msp - 하이퍼터미널
파일(F) 편집(E) 보기(V) 호출(C) 전송(D) 도움말(H)
[Icons]
SN : MSP041200000
Bluetooth
  dev0 - 00:0B:24:00:46:99
Network [static]
  IPaddr 192.168.0.3   HWaddr 00:0B:58:00:A0:01
  Netmask 255.255.255.0   Gateway 192.168.0.1
  DNS1 254.243.244.0   DNS2 0.0.0.0
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
g. Quit

>> 2
  Enable LAP profile ? [Y/n] _
```



TIP:

For Internet connection, both LAP and NAP devices may access to the internet. For more information, please refer to chapter 8.

2.3 Firmware Download

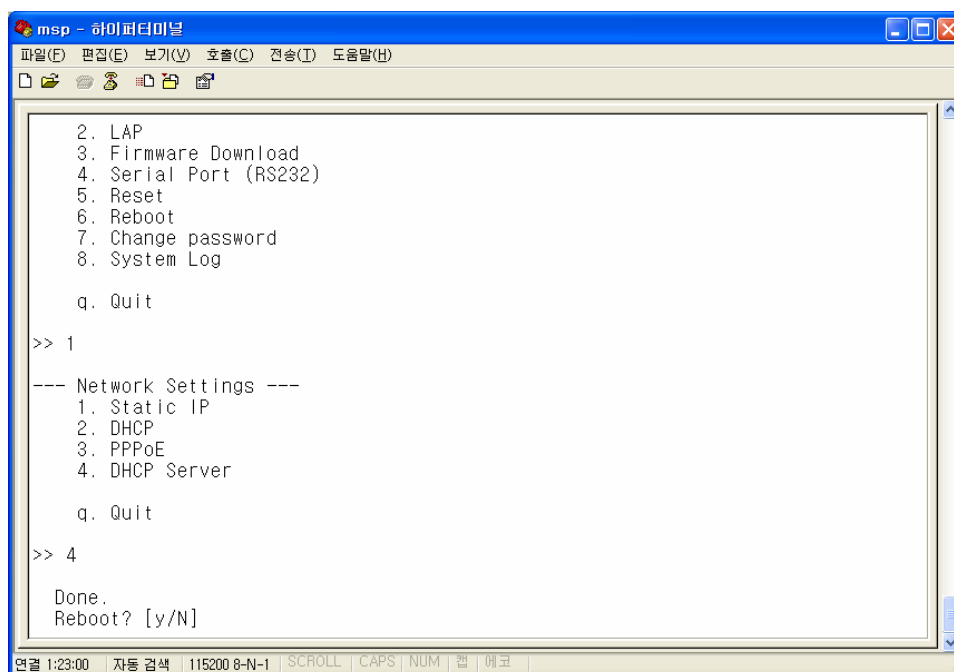
Parani-MSP is upgradeable with the latest firmware. The SENA customer support team offers available firmware, with which user upgrades Parani-MSP by himself via TFTP or Xmodem user download; menu no. 3. Firmware Download.

During Firmware download, STATUS and ERROR LEDs flash. DO NOT TURN OFF Parani-MSP™ during firmware upgrade. Turning off Parani-MSP™ during firmware upgrade may result in irreversible operation malfunction.

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

2.3.1 Firmware Upgrade via TFTP:

- Users may upgrade the firmware using TFTP via crossed LAN cable. Connect Parani-MSP to PC with crossed LAN cable and change network setting to 'DHCP server' as below. Make sure Host PC to be configured using DHCP.

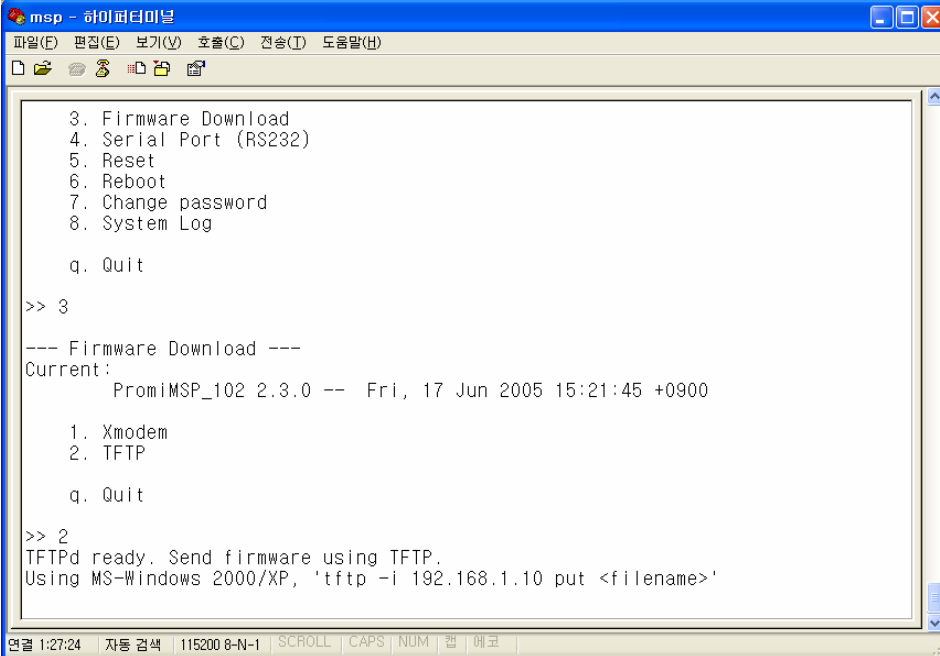


```
mcp - 하이퍼터미널
파일(F) 편집(E) 보기(V) 호출(C) 전송(T) 도움말(H)
[Icons]
2. LAP
3. Firmware Download
4. Serial Port (RS232)
5. Reset
6. Reboot
7. Change password
8. System Log
q. Quit
>> 1
--- Network Settings ---
1. Static IP
2. DHCP
3. PPPoE
4. DHCP Server
q. Quit
>> 4
Done.
Reboot? [y/N]
연결 1:23:00 자동 검색 115200 8-N-1 | SCROLL | CAPS | NUM | 캡 | 에코
```

After rebooting, enter to Firmware Download menu.

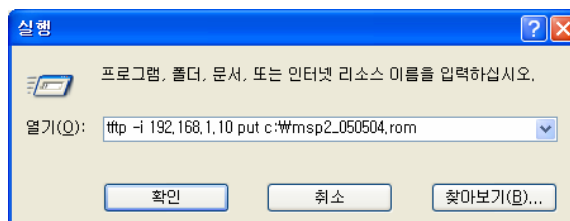
3. Firmware Download → 2.TFTP

- Then you will get following screen:



```
msp - 하이퍼터미널
파일(E) 편집(E) 보기(V) 호출(C) 전송(T) 도움말(H)
3. Firmware Download
4. Serial Port (RS232)
5. Reset
6. Reboot
7. Change password
8. System Log
q. Quit
>> 3
--- Firmware Download ---
Current:
    PromiMSP_102 2.3.0 -- Fri, 17 Jun 2005 15:21:45 +0900
    1. Xmodem
    2. TFTP
    q. Quit
>> 2
TFTPd ready. Send firmware using TFTP.
Using MS-Windows 2000/XP, 'tftp -i 192.168.1.10 put <filename>'
연결 1:27:24 | 자동 검색 | 115200 8-N-1 | SCROLL | CAPS | NUM | 쉼 | 메코
```

- Place the MSP upgrade ROM file which is downloaded from SENA web site to C:\ folder on your PC and run tftp command on [Start] →[Run] as 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 Parani-MSP via crossed ethernet cable.
- Below window is showing the procedure of sending ROM file named “msp2_040906.rom” to the connected Parani-MSP via TFTP.



- Users will be able to check the status of firmware upgrade in Serial console.
- During upgrade, LEDs will flash and users SHOULD NOT turn off Parani-MSP this time. If user cannot send the ROM file, please check the network connection status.
- Once ROM file is delivered to the connected Parani-MSP, the upgrade firmware will be recorded to nonvolatile memory. During this time both STATUS LED and ERROR LED will flash speedily. NEVER turn off Parani-MSP during this firmware recording.

```

msp - 하이퍼터미널
파일(F) 편집(E) 보기(V) 호출(C) 전송(T) 도움말(H)
5. Reset
6. Reboot
7. Change password
8. System Log
q. Quit
>> 3
--- Firmware Download ---
Current:
PromiMSP_102 2.3.0 -- Fri, 17 Jun 2005 15:21:45 +0900
1. Xmodem
2. TFTP
q. Quit
>> 2
TFTPd ready. Send firmware using TFTP.
Using MS-Windows 2000/XP, 'tftp -i 192.168.1.10 put <filename>'
Upgrading Firmware...
CAUTION!!! Never turn off Promi-MSP in progress.
..

```

- Once finished, please resupply power to Parani-MSP for applying.

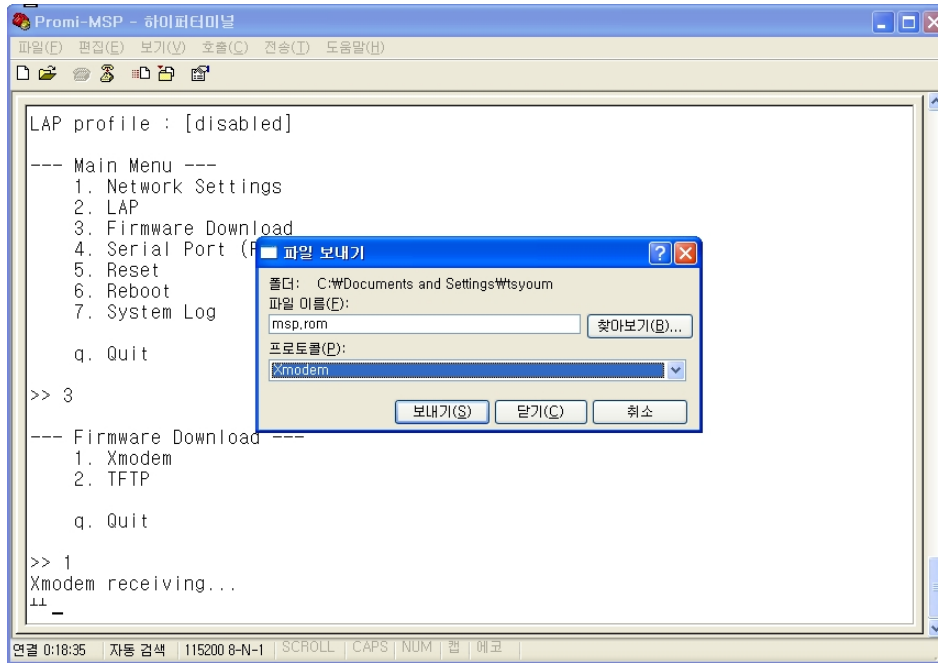


Note:

If you turn off Parani-MSP during firmware upgrade, Parani-MSP may be damaged severely and irreversibly.

2.3.2 Firmware Upgrade via Xmodem:

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



<Upgrade firmware via Xmodem>

2.4 Serial Port

Serial port of Parani-MSP can be used for both Configuration and Data communication. For this, users need to change the DIP switch of Parani-MSP to the right.

 **Note:**

Before to configure the serial port settings, please change the DIP switch 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).

```

msp - 하이퍼터미널
파일(F) 편집(E) 보기(V) 호출(C) 전송(T) 도움말(H)
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
>> -
연결 0:01:08 | 자동 검색 | 115200 8-N-1 | SCROLL | CAPS | NUM | 쉼 | 예코

```

Configurable ranges:

Baudrate	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

If you enable AT command interface, AT commands which are compatible with Parani-SD can be used with Parani-MSP. Please refer to Parani-MSP AT command list in chapter 6.

For applying changed configuration, please RESUPPLY the power, then Parani-MSP will start to operate as RS232 mode.



TIP:

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

2.5 Reset/Reboot/Quit

Entering no. 4, Parani-MSP™ RESET, in the main menu, restores all factory default value settings.

REBOOT restarts Parani-MSP™ for new configuration application.

QUIT makes user leave configuration console for log-in prompt.

3. Configuration

If users finished configuring network settings using serial console, now users need to select the operation mode of Parani-MSP. Following three (3) ways can be used for selection of operation mode:

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

In this chapter, guide to use Parani-MSP configuration software will be introduced. How to configure via Telnet or Web browser will be introduced in Appendix.

3.1 Configuration via Parani-MSP software

3.1.1 When Parani-MSP is connected to PC directly

If users are going to connect Host PC and Parani-MSP directly using a crossed cable, network settings as in the chapter 2.1 will not be required.

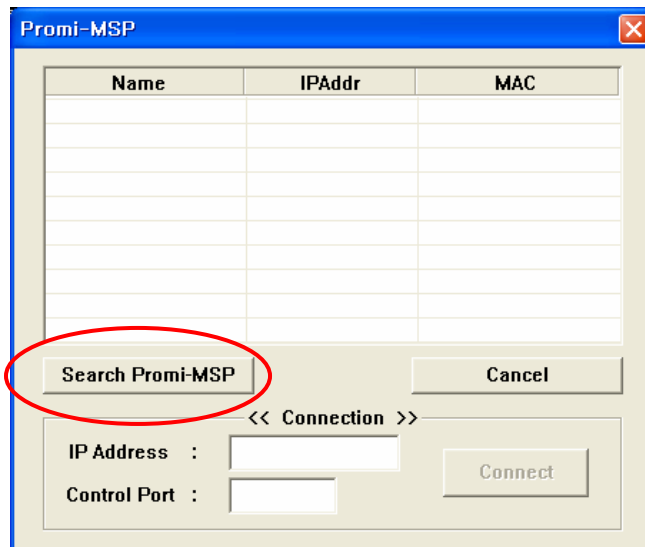
Parani-MSP has factory settings: Static IP 192.168.1.10/24 with DHCP server

For communication with Parani-MSP, just connect Parani-MSP and Host PC with a crossed cable as below. Make sure Host PC to be configured using DHCP.

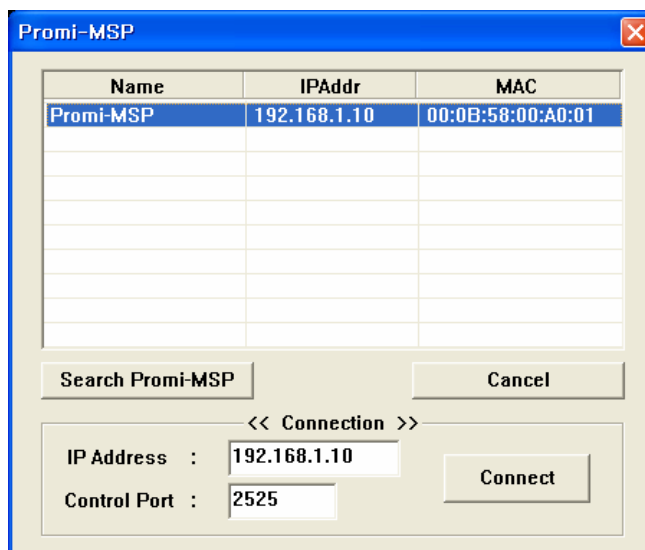
3.1.2 Log in Parani-MSP software

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

Start Parani-MSP software, and press “Search MSP device” button on the left side. (Parani-MSP installed remotely may not be listed even though pressing “Search MSP device” button)



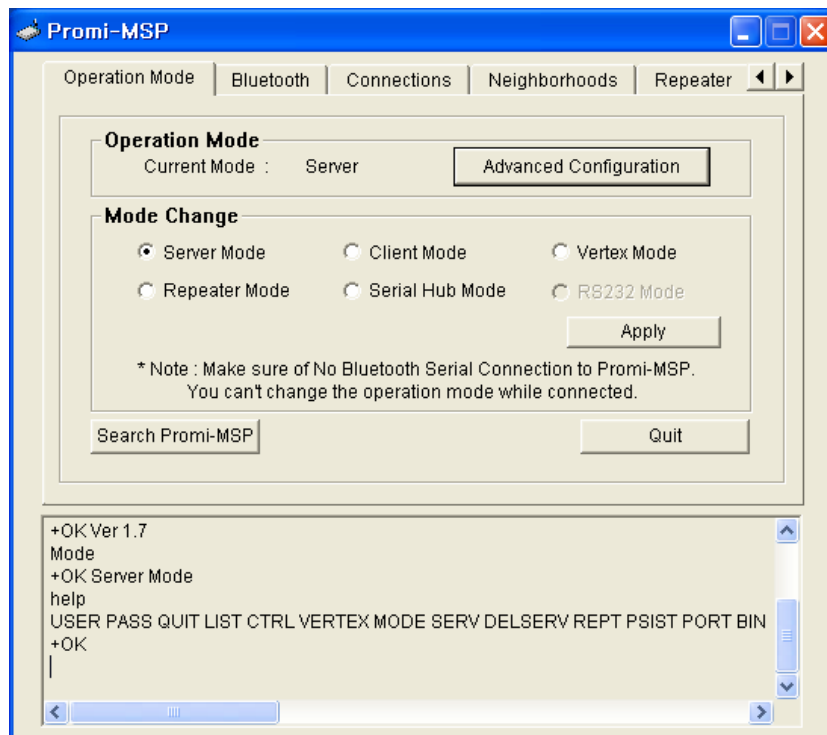
Please select one Parani-MSP you would like to access and press “Connect” button.”



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



3.1.2 Operation Mode



Parani-MSP may be set to different type of Mode, so users may select one for its own implementation. There are 6 types of Mode: Server, Client, Vertex, Repeater, Serial Hub, and RS232.

- MSP Operation Mode
This shows current type of Mode.

- Mode Change

Users may change and select the type of Operation mode.

***Note:** While Bluetooth devices are connected to Parani-MSP, mode change is not allowed.

- Search Parani-MSP

Users may search Parani-MSP on the same network. Firewall installed on PC may prevent Host PC from searching Parani-MSP.

a) Server Mode

In Sever Mode, Parani-MSP will operate as a TCP server on the network. Host PC will connect to Parani-MSP via TCP/IP Ethernet, and Parani-MSP get the connection. After connection, full duplexing is possible.

Users may adjust the TCP port number where Parani-MSP waits for the connection from Host PC.

Server Mode

Default Data Port

KeepAlive Timeout sec

Do not disconnect TCP socket

Register Bluetooth Device

BDADDR/Name	Port
00:0B:53:12:03:70	8000

<Configuration of Server Mode>

- Default Data Port

If unregistered device tries to connect to Parani-MSP, Parani-MSP will assign the port number consecutively from default data port number (5000).

- KeepAlive Timeout

When TCP connection is stalled unexpectedly (Ex. Power off of Host PC), Parani-MSP will send beacons during KeepAlive Timeout (second). If there is no response during this Timeout, TCP connection will be closed.

- 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, when Bluetooth connection is stopped, TCP connection would be closed.

If this behavior annoys your application, users may use this option. With this option enabled, TCP network connection remains established regardless of Bluetooth connection.

- Register Bluetooth Device :

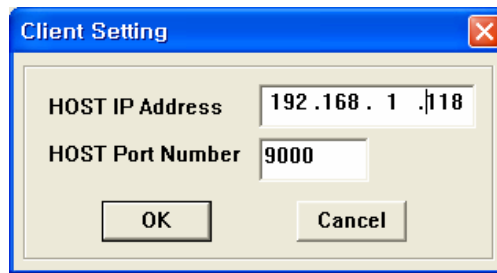
Shows the Bluetooth devices registered.

- Add : Add Bluetooth device to register.
- Delete : Remove Bluetooth device registered.
- Modify : Modify Port of the selected device.

b) Client Mode

In Client Mode, Parani-MSP will act as a TCP client. When a Bluetooth device connects to Parani-MSP, Parani-MSP will try to connect to the designated Host PC. So, Host PC should be TCP server.

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.

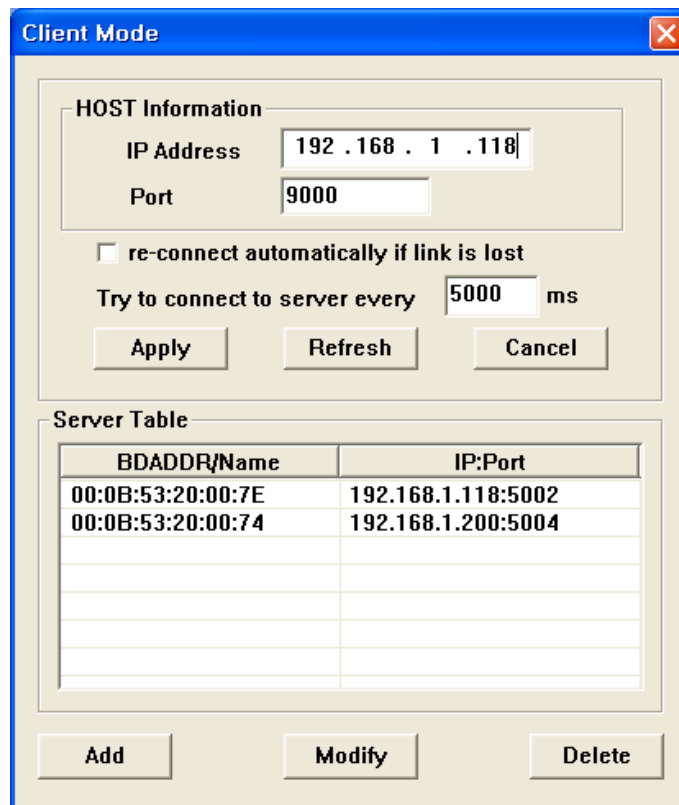
Here, users may configure which Bluetooth device will connect to which Host as they need.

Server Table has priority over default Host Information.

Bluetooth device “00:0B:53:20:00:7E” will connect to Host “192.168.1.118”, port no. 5002.

Bluetooth device “00:0B:53:20:00:74” will connect to Host “192.168.1.200”, port no. 5004.

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



<Fig 0-1> Client Mode

- Host IP Address

For network Server IP address entry

- Host Port Number

For network port no. entry

- re-connect automatically if link is lost.

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

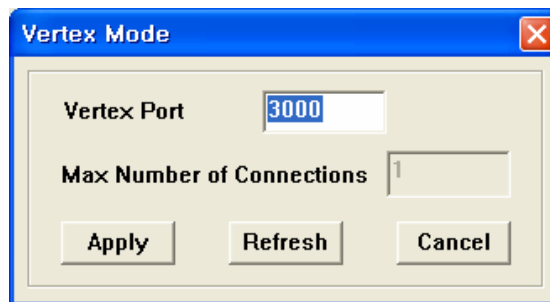
- Try to Connect to Server every [] ms

When Parani-MSP™ fails to connect to Host, it will retry. Enter the connection retry frequency here. Entering 0 [zero] means no retry.

c) Vertex Mode

In Vertex Mode, Host and Bluetooth devices communicate each other via Parani-MSP™ in multi-drop manner, which is similar to RS485 way.

Parani-MSP acts as TCP server like server mode. It waits for connection from Host on Vertex Port.



<Fig 0-2> Vertex Mode

- Vertex Port

For Parani-MSP™ Vertex port no. entry.

- Max Number of Connections

For entering the number of Hosts connectable to Parani-MSP™ concurrently.

d) Repeater Mode

In Repeater Mode, Parani-MSP will act as a Repeater to expand the coverage of existing Parani-MSP. Let's call the Parani-MSP which will act as Repeater, "Repeater", and call the Parani-MSP of normal operation as "Station".

In Repeater Mode, the Bluetooth address of the Station is all you need to configure.

When Repeater is trying to connect to the Station, Status LED of Repeater is blinking.

Repeater and Bluetooth devices connected to the repeater are displayed in 'Repeater' tab in software.



Note:

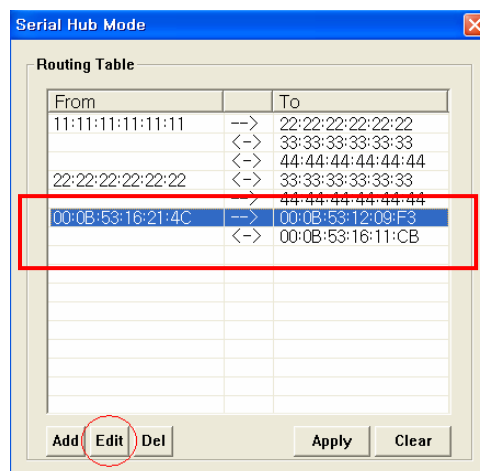
**When using repeater, overall data throughput can be lowered.
Multi-level repeater is not allowed.**

e) Serial Hub Mode

Users may transmit/receive data via Parani-MSP in Serial Hub mode (Serial Hub).

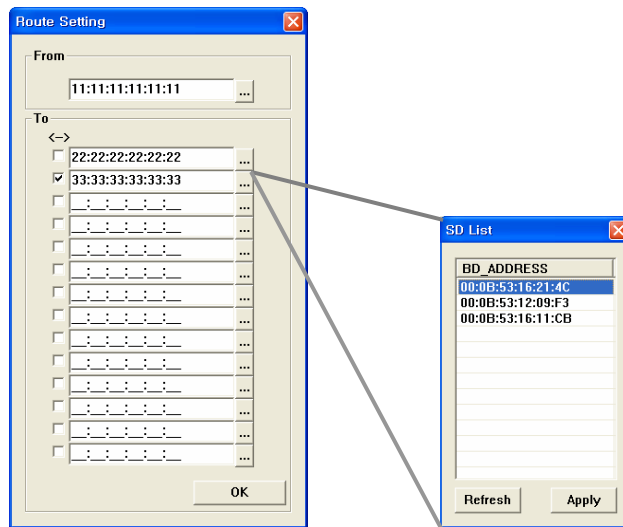
Parani-MSP in serial hub mode relay the data from a Bluetooth device to another Bluetooth device connected to Parani-MSP. No network host is involved.

Users may configure Parani-MSP how to handle data from Bluetooth devices in advanced configuration of Parani-MSP software.



Routing table shows paths that data will follow. Arrow shows direction of data flow. In the above example, data coming from 00:0B:53:16:21:4C will be sent to 00:0B:53:12:09:F3 and 00:0B:53:16:11:CB and data coming from 00:0B:53:16:11:CB will be sent 00:0B:53:16:21:4C in the reverse direction, but data coming from 00:0B:53:12:09:F3 will be dismissed because it has no path in the route table.

Press Add to add route entry. Following dialog will appear.



To select Bluetooth device, press '.', then Bluetooth devices connected currently will be displayed in another dialog or enter bluetooth device address manually.

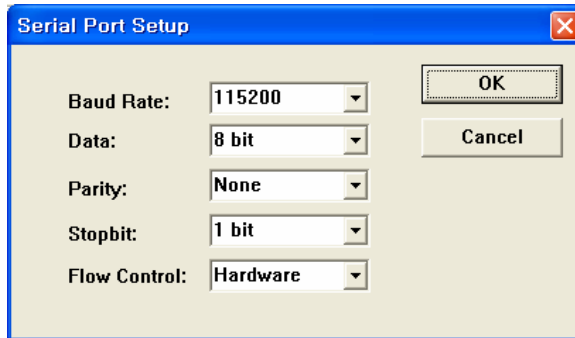
If you mark checkbox, opposite direction route will be also registered.

f) RS232 Mode¹

In RS232 Mode, Parani-MSP may communicate with other Bluetooth device via RS232 serial cable.

As RS232 port has been configured to be used as Configuration as factory setting, users need to change the switch on the left side of Parani-MSP to data communication mode.

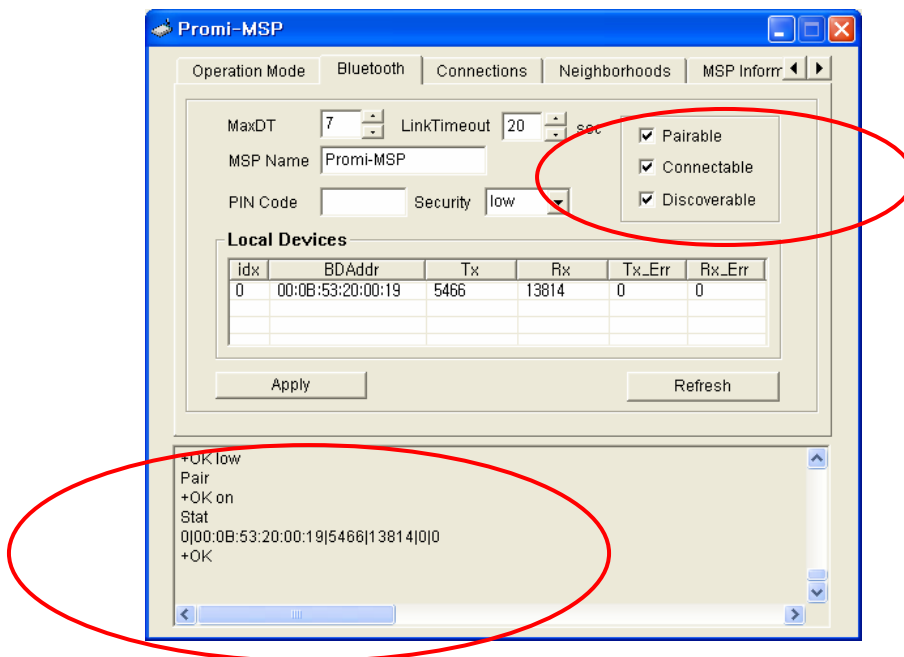
¹ Available only with Parani-MSP100.



If you enable AT command interface in RS232 configuration console, AT commands which are compatible with Parani-SD can be used with Parani-MSP. Please refer Parani-MSP AT command list.

3.1.3 Bluetooth

In this page, users can find current status of Parani-MSP.



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



TIP:

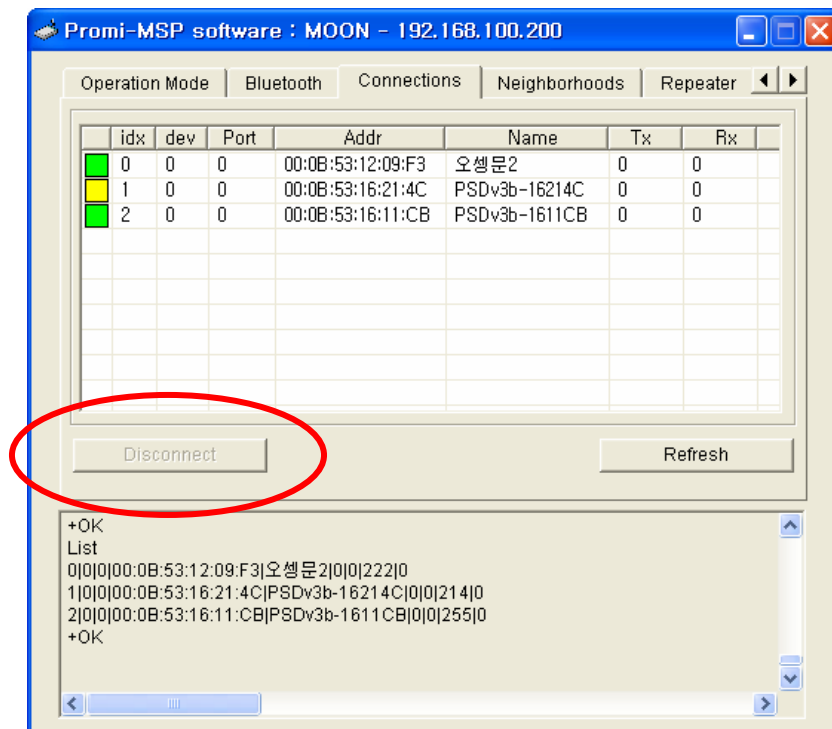
For 14 connections in Parani-MSP100, please change the MaxDT to 14 above, after installing USB extension dongle provided.

3.1.4 Connections

In this page, users may MONITOR the connection status of devices to Parani-MSP.

Now, three Bluetooth devices have been connected for Wireless serial communications as below.

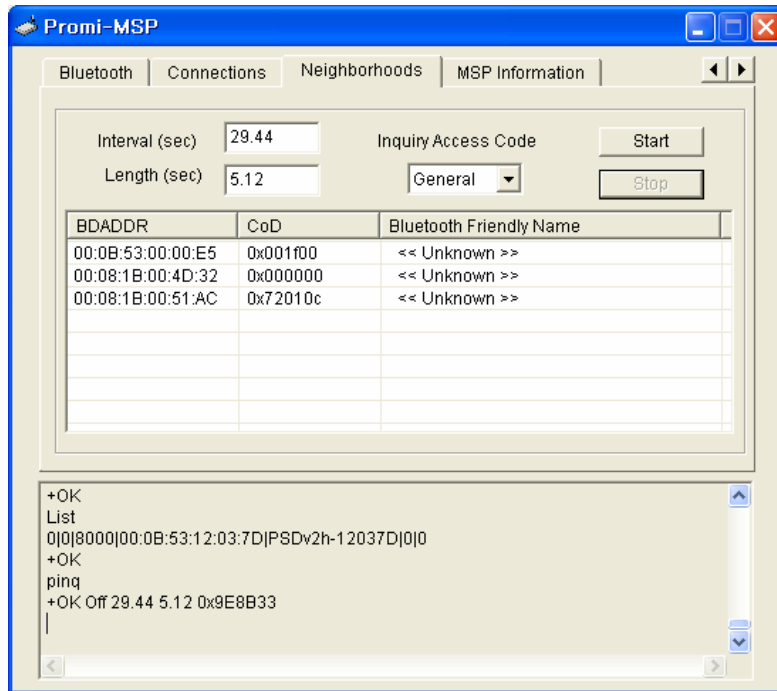
Left square shows quality of connection. Green square is good, red square is poor quality.



If you want to disconnect a Bluetooth terminal, you can do the job using DICONNECT button on the left.

3.1.5 Neighborhoods

This page is to search nearby Bluetooth devices, every Interval, during the Length.



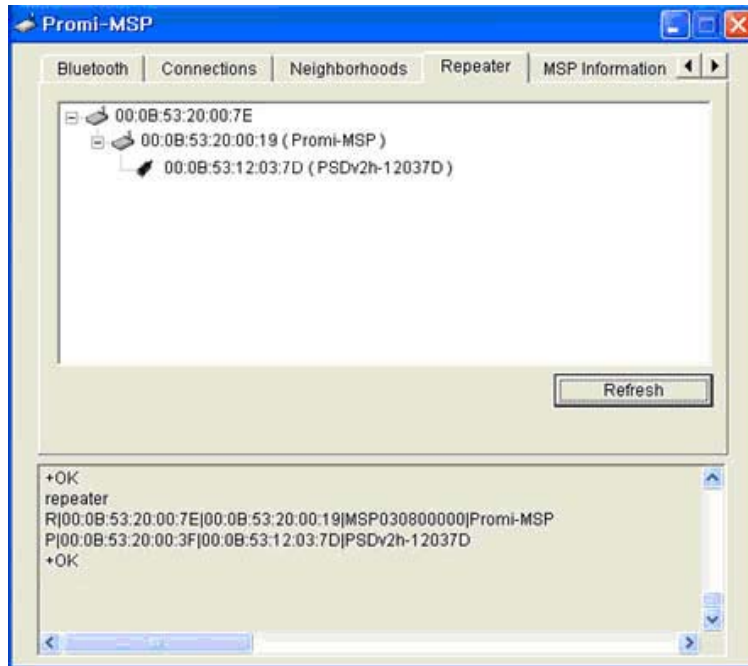
< Neighborhoods >

Bluetooth Friendly Names of only ever-connected devices will be appeared. Otherwise '<< Unknown >>'' will be shown instead.

3.1.6 Repeater

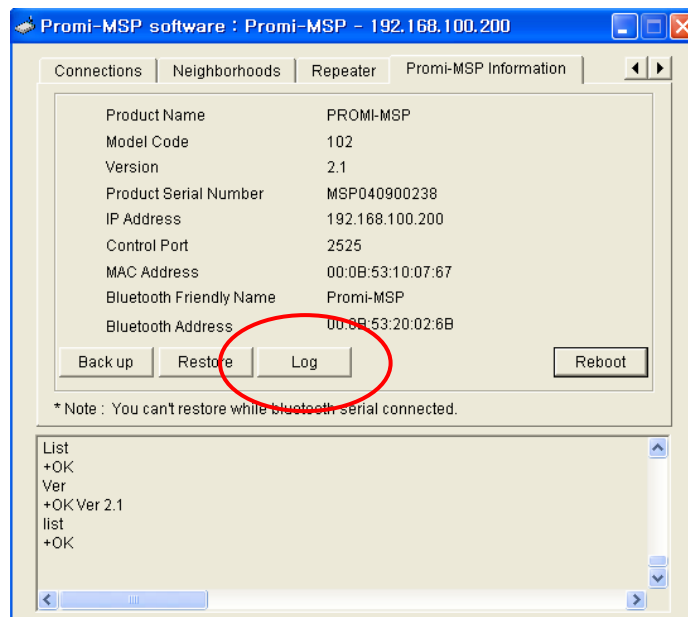
This page shows tree-structure how Repeater MSP and terminal devices are connected to the Station MSP. If user's MSP is in Repeater Mode, nothing will be showed.

In the window below, Repeater MSP is connected to a Station MSP and a Parani-SD is connected to Repeater (00:0B:53:20:00:19).



3.1.7 MSP information

Users may see Parani-MSP information currently accessing.



Pressing 'Log' button, system log messages will appear in notepad. System log is the source of invaluable information when the problems occur during operation.



```
<46>Jan 1 00:00:08 syslogd started: BusyBox v1.00 (2005.02.04-04:48
<30>Jan 1 00:00:09 msp: Promi-MSP ver 2.1 started
<30>Jan 1 00:00:09 msp: Loading configurations...
<30>Jan 1 00:00:09 msp: Maximum number of bluetooth devices: 15
<30>Jan 1 00:00:09 msp: Bluetooth link supervision timeout: 20000 m
<30>Jan 1 00:00:09 msp: Operation mode: hub
<30>Jan 1 00:00:09 msp: Connection try interval (Client mode): 5000
<30>Jan 1 00:00:09 msp: Automatic network reconnection (Client mode
<30>Jan 1 00:00:09 msp: Base port (Server mode): 5000
<30>Jan 1 00:00:09 msp: Control port: 2525
<30>Jan 1 00:00:09 msp: Vertex port: 55555
<30>Jan 1 00:00:09 msp: Maximum concurrent vertex connections: 0
<30>Jan 1 00:00:09 msp: Preserve network connection: false
<30>Jan 1 00:00:09 msp: Station: 11:11:11:11:11:11
<30>Jan 1 00:00:09 msp: Frame-buffering: false
<30>Jan 1 00:00:09 msp: TCP Keepalive time: 700 secs
<30>Jan 1 00:00:09 msp: TCP Keepalive interval: 10 secs
<30>Jan 1 00:00:09 msp: TCP Keepalive probes: 4 times
<30>Jan 1 00:00:09 msp: RS232 mode 0
<30>Jan 1 00:00:09 msp: bt_set_max_connections: 15
<30>Jan 1 00:00:10 btman: Initialize bt0...
<30>Jan 1 00:00:10 btman: bt0: setting scan mode INQUIRY PAGE
<30>Jan 1 00:00:10 btman: bt0: security mode high
<30>Jan 1 00:00:10 btman: bt0: encryption enabled
<30>Jan 1 00:00:10 btman: bt0: Class of Device 0x020300
<30>Jan 1 00:00:10 btman: bt0: Bluetooth friendly name "Promi-MSP"
<30>Jan 1 00:00:10 btman: bt0: Configured.
<30>Jan 1 00:00:10 btman: bt0: Security manager started. (00:00:53:
<30>Jan 1 00:00:10 btman: Chip Rev. 0x008a
<30>Jan 1 00:00:10 btman: Build: HCI 10.2
<14>Jan 1 00:00:10 syslog: SDP Server starting
<30>Jan 1 00:00:10 watchdog: Watchdog started
<30>Jan 1 00:00:11 thttpd[83]: thttpd/2.04 10aug98 starting on port
<26>Jan 1 00:00:11 thttpd[83]: started as root without requesting cl
+OK
```

4. Operation Mode

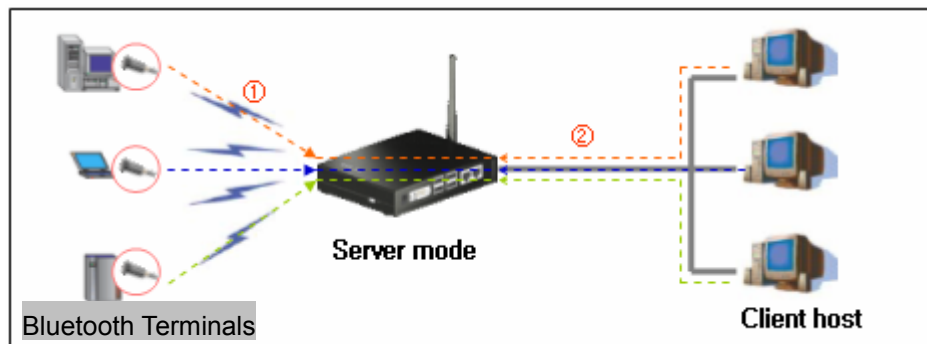
With Parani-MSP™, users may configure the mode of operation to meet each application.

Total 6 kinds of different modes can be selected. By selecting the appropriate mode, users may minimize cost and time for developing new solution.

4.1 Server Mode

In Server Mode, Parani-MSP will act as TCP server. If a Bluetooth device is connected to Parani-MSP, corresponding TCP port for the Bluetooth device will wait for connection for as Host. The Host may connect to the terminal via this port of Parani-MSP.

Please refer to the drawing below for your better understanding.



<Fig. 4.1> Server Mode

If a Bluetooth device has been registered to Parani-MSP, the Bluetooth device will communicate with client host via the designated port at Parani-MSP.

If not registered, Parani-MSP will assign arbitrary port number to connect.

Pre-registered Bluetooth devices are distinguishable by the different port numbers at Parani-MSP.

4.2 Client Mode

In a Client mode, Parani-MSP™ will act as a “TCP client”.

When a Bluetooth device connects to Parani-MSP, Parani-MSP will send TCP connection request to the designated Host. Once TCP connection is established, Bluetooth devices and a Host may communicate via Parani-MSP, same as in Server mode.

Only difference from Server mode is that the initiator is now Parani-MSP. Please refer to the drawing below for your better understanding.

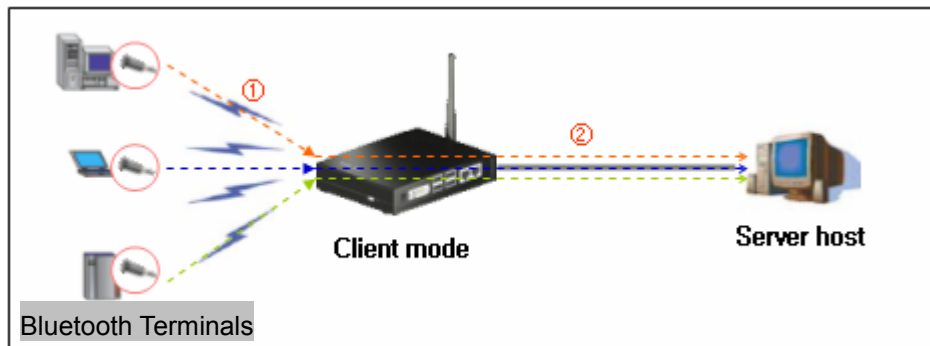


Fig. 4.2 Client Mode

4.3 Vertex Mode

Vertex Mode is similar to Server Mode. Only difference is that, in Vertex Mode, data from a Host are sent to all of connected Bluetooth devices, like Multi-drop. This mode can be a replacement of RS485/RS422 multi-drop.

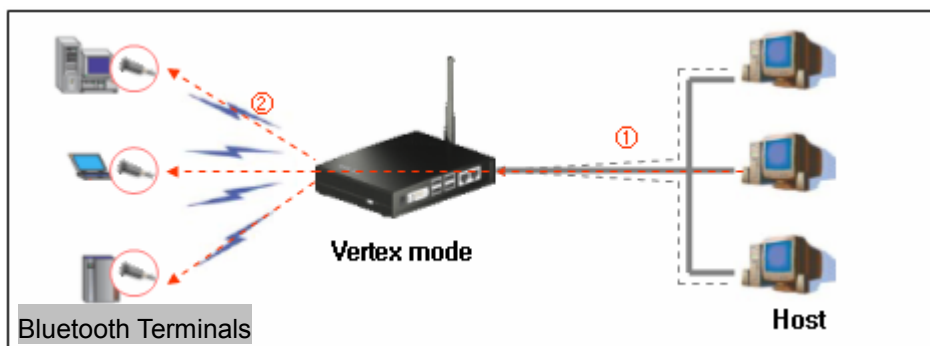
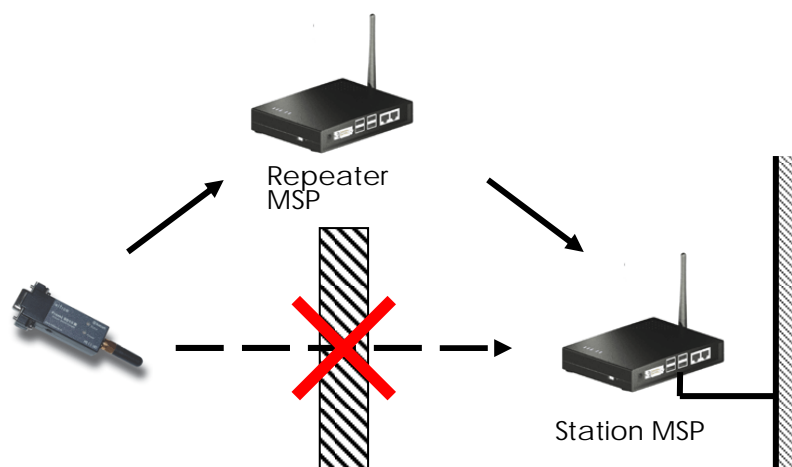


Fig. 1.3.1 Vertex Mode

Default data port number in Vertex mode is 3000. If you need to use other port number, please change the configuration using Parani-MSP software->Advanced configuration.

4.4 Repeater Mode

Parani-MSP in Repeater Mode can be used to function as a Repeater to extend the range of Bluetooth network or avoid obstacles between Parani-MSP and Bluetooth devices. Please refer to the drawing below.



Multiple Repeater Parani-MSPs up to 7 can be connected to one Station Parani-MSP, but Repeater-to-Repeater connection (Multi-level repeater) is not allowed. Parani-MSP may operate as “Station MSP” while it is either Server/Client/Vertex/Serial Hub/RS232 mode.

All you need to configure in Repeater is only Bluetooth device address of Station MSP and repeater doesn't need to have any network connectivity (Just power-supply).

⚠ Note:
When using repeater, overall data throughput can be lowered.
Multi-level repeater is not allowed.

4.5 Serial Hub Mode

In Serial Hub Mode, Parani-MSP relays data communication between Bluetooth devices. With Parani-SD only 1:1 cable replacement is possible, however, incorporating Parani-MSP multiple Parani-SDs can communicate each other, 1:N multi-serial with Parani-SD.

In Serial Hub mode, Parani-MSP handles data according to Route Table, which shows which data frame should go where. Route Table needs to be configured in advance using Parani-MSP software.

In-Band Command

In addition to Route Table, user can specify the destination of the frame they send by inserting extra frame called 'In-Band Command'. Inserted frame will be processed by Parani-MSP and not be transferred to destination device.

```
**INI+DST,<dst1>,<dst2>,...**
```

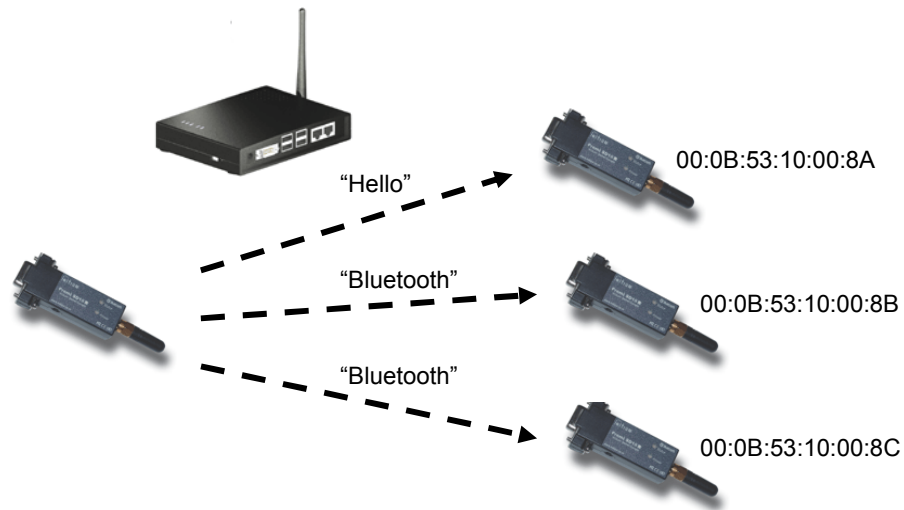
where, dstX means Bluetooth address of destination.

ex)

```
**INI+DST,00:0B:53:10:00:8A**Hello**INI+DST,00:0B:53:10:00:8B,00:0B:53:10:00:8C**Bluetooth
```

For example, if you send preceding frame to Parani-SD, 00:0B:53:10:00:8A device will receive 'Hello' and the other devices will get 'Bluetooth' as below figure.

All Parani-SD should be connected to Parani-MSP.



As Serial Hub mode does not need TCP/IP network connectivity, users do not need to configure network settings. Only power-supply needed.

4.6 RS232 mode

Multi-drop

If users set Parani-MSP to RS232 mode, Parani-MSP may act as 1:N multi-serial port by its RS232 port. In RS232 mode, Parani-MSP will send data to external serial port, not via Ethernet network.

In RS232 mode, Parani-MSP handles data in Multi-drop way, so data written to RS232 interface of Parani-MSP will be delivered to all of connected Bluetooth devices. So, in RS232 mode, "Polling" method- a master device schedules slave devices- is recommended to use.

Users may configure Serial settings in configuration console or Advance configuration dialog of Parani-MSP software.

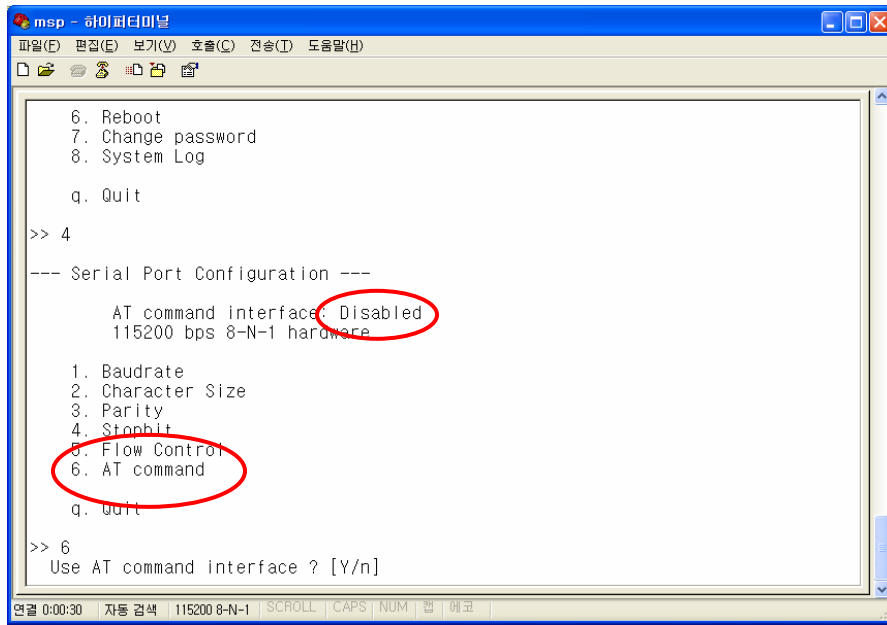
Baudrate	1200 ~ 115200 bps
Character size	5,6,7,8 bit
Parity	None, Odd, Even
Stop bit	1 bit, 2 bits
Flow Control	None, XOn/Off, Hardware (CTS,RTS)
DTR/DSR	not used
RI	not used
Auto probe	not supported

As default, RS232 interface of Parani-MSP is configured for configuration console. In order to use RS232 interface for the data communication purpose, user needs to change the Console switch to data mode. Changes will be effective after power-cycling of Parani-MSP. Please restart Parani-MSP.

AT Commands

AT command is very familiar with the legacy serial application developers. So, AT command interface of Parani-SD eases a lot of efforts to develop their own application from developers. So does Parani-MSP. Moreover, AT commands of Parani-MSP are so similar to one of Parani-SD that developers who have experiences with Parani-SD can make use of multi-serial functionality in no time.

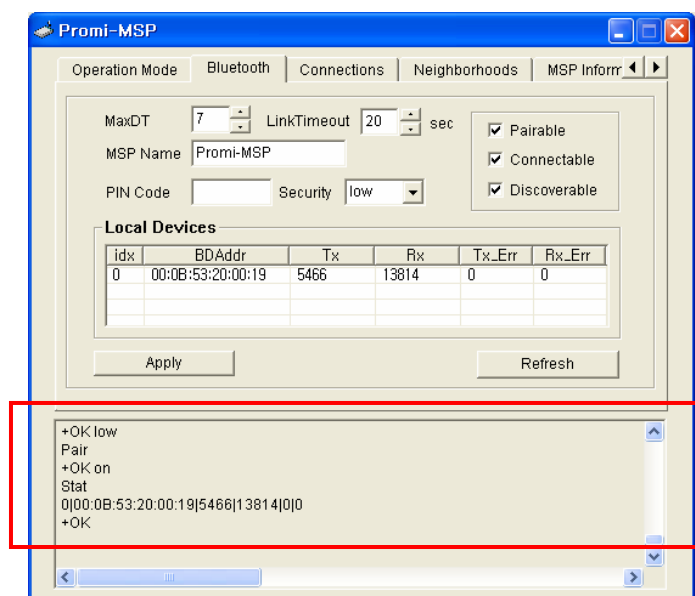
By default, AT command parser is disabled. You can enable AT command feature on configuration console as below.



Please refer to AT command List for its usage.

5. Control Commands

Parani-MSP is configurable and controllable by Control commands through control TCP port. Prom-MSP software is the GUI version of Control commands for easy use by customers. As all of the control commands, in Parani-MSP software, are listed in the bottom window, it gives users insight how each commands work.



Using control TCP port, users can make their own application control Parani-MSP 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. Parani-MSP™ is cost-effective and time-saving solution for users.

By using telnet program, users may use Control commands easily. Rich-featured telnet software like "PuTTY" can be also useful.

PuTTY Download:

<http://www.chiark.greenend.org.uk/~sgtatham/putty/download.html>

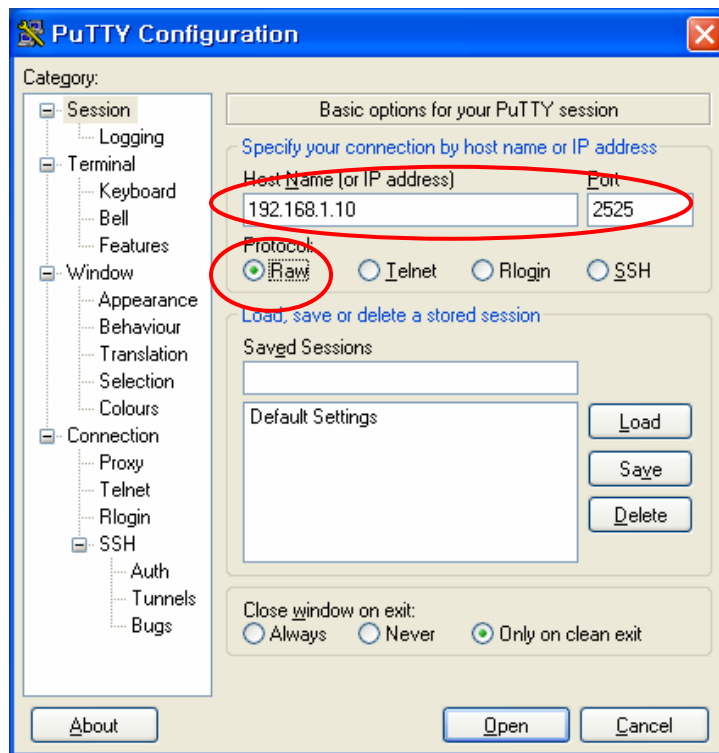
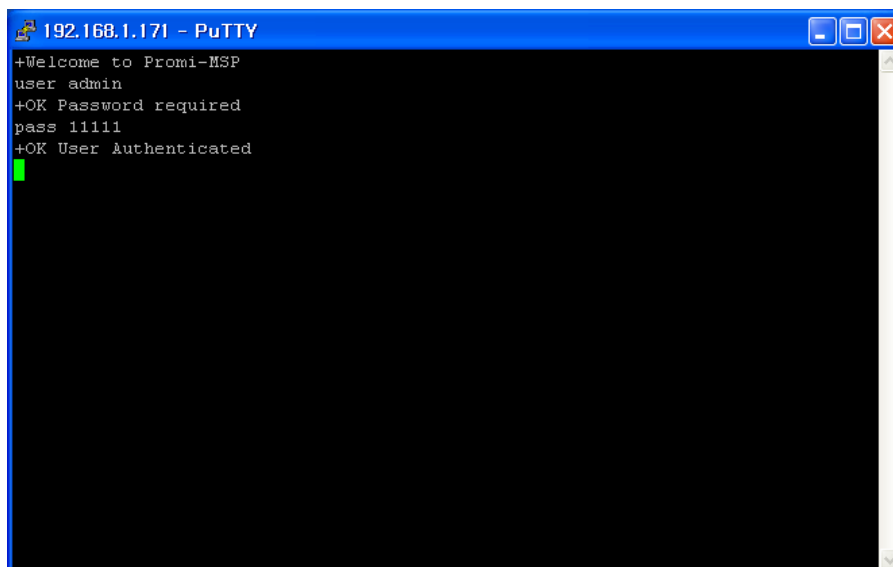


Fig. 2.1.1 PuTTY

Press 'Open', then following telnet session will be opened.

Enter 'user admin' and 'pass 11111' to access Parani-MSP via Control Commands.



Every command responds with +OK if successful, otherwise -ERR.

5.1 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 Parani-MSP

Ex.: **QUIT**
+OK
Disconnected

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

: To check or change the current Operation MODE of Parani-MSP.

If any of Bluetooth devices are connected to Parani-MSP, MODE change is not allowed. Before changing the MODE, please drop all of Bluetooth connections first.

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

5.2 Commands for Server Mode

PORT [port no.]

: To configure default data port number of Server Mode Parani-MSP.

If a Bluetooth device, which is not pre-registered to Parani-MSP, has

connected to Parani-MSP, port number will be assigned automatically by Parani-MSP. 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 number may be assigned to a designated Bluetooth device using BIND command. A Bluetooth device can be specified by either friendly name or Bluetooth address.

Response: +OK index|name|bdaddr|port

Ex.: **BIND 00:0B:53:00:00:01 8000**
+OK
BIND Parani-SD 8001
+OK
BIND
0||00:0B:53:00:00:01|8000
1|Parani-SD||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 opened as a Bluetooth connection is made. So, when Bluetooth connection is closed, the corresponding TCP port is also closed. If this behavior interferes with your usage scenario, this option will help. When this option is enabled, TCP connection remains regardless of Bluetooth connection. Users do not need to make TCP connection each time whenever Bluetooth connection is closed for a while.

Ex.: **PRSV on**
+OK

KATO <time> <probe> <interval>

: To configure 'TCP Keep Alive Time'

When Host, which is communicating with Parani-MSP via network, is stalled unintentionally, Parani-MSP cannot aware this unexpected disconnection. Accordingly, Parani-MSP sends beacon packets to monitor connection status when there is no data communication for certain time.

When there is no data communication for <time>, Parani-MSP will send beacon packet <probe> times to monitor the connection, by each <interval>, before closing the connection. Below example means when there is no communication for 10 min., Parani-MSP will send beacon packets 3 times by 10 seconds interval.

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

5.3 Commands for Client Mode

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

: To assign IP address and port number of server host where Parani-MSP will send connection request in client mode. If you enter either bluetooth address or friendly name of the Bluetooth device, you may configure different host addresses and port numbers for each Bluetooth devices.

Response: index|name|bdaddr|server_IP:port

Ex.: **SERV 192.168.1.11:9000**
+OK
SERV 192.168.1.11:9001 Parani-SD
+OK
SERV
0|Parani-SD||192.168.1.11:9001
+OK 192.168.1.11:9000

DELSERV <bdaddr|name>

: To delete Host information stored by SERV command.

Ex.: **DELSERV Parani-SD**
+OK

REPT <interval>

: When connection to Host is failed, users may configure Retrial period of connection. Unit: millisecond, Default value: 5000 ms
If the value is '0', Parani-MSP will try to recover connection only once.

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

PSIST <on|off>

: In Client mode, in the event of TCP disconnection, Parani-MSP™ automatically attempts to recover TCP connection when PSIST is set to ON, in the period of pre-defined ms by REPT command.

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

5.4 Commands for Vertex Mode

VERTEX <port no.> [number of clients]

: To assign port number where Parani-MSP waits for connection in Vertex mode.

Parani-MSP™ Vertex Mode avails Wireless RS485 multi-drop service when assigned at this site.

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

5.5 Commands for Serial Hub Mode

ROUTE <add> <src> <dst>

** <src> <dst>**

<ptp|multi|manual>

: To configure Routing table for Repeater Mode.

src: Bluetooth address of source device

dst: Bluetooth address of destination 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

5.6 Commands for Repeater Mode

STATION <bdaddr>

: To configure Bluetooth address of station Parani-MSP.

In repeater mode Parani-MSP will try to connect to this device.

Ex.: **STATION 00:0B:53:00:00:01**

+OK

REPEATER

: Display all of repeaters and Bluetooth devices connected currently.

Entry starting with R is repeater and one with P is Bluetooth device.

Response: R|station|repeater|repeater_name

P|mosp|peer|peer_name

Ex.: **REPEATER**

R|00:0B:53:00:00:01|00:0B:53:00:00:02|Parani-MSP_001002

P|00:0B:53:00:00:02|00:0B:53:00:00:10|PSDv3b-000010

+OK

5.7 Commands for Bluetooth Configuration

BTNAME <name>

: BTNAME command audits or revises Parani-MSP™ Device Names exposed to other Bluetooth devices.

If configured with default name (i.e., Parani-MSP), lower part of Bluetooth address will be appended to the name.

Ex.: **BTNAME My Parani-MSP**
+OK
BTNAME
+OK My Parani-MSP

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 Pairable mode enable/disable. In High security levels, when Paring mode is set to off, only Bluetooth devices already sharing Link Key (see LKEY command) can connect with Parani-MSP™ (non-pairable mode)

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

LKEY

: For auditing currently paired Bluetooth devices sharing Parani-MSP™. Link Key.

Response: local bdaddr|remote bdaddr

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

TEMPKEY <on|off>

: Some Bluetooth device doesn't save their link key and makes new link key on every connection. This behavior causes Parani-MSP's flash memory to wear out in the long period. With TEMPKEY on, Parani-MSP won't save link key neither and protects itself.

If you see tons of 'Replacing hci0 link key xx:xx:xx:xx:xx:xx ...' messages on System Log, you should turn this option on.

Ex.: **TEMPKEY on**
+OK
TEMPKEY
+OK on

SCAN [inquiry] [page] [noscan]

: For Parani-MSP™ scan mode assignment. INQUIRY set to ON activates discoverable mode. PAGE set to ON activates connectable mode. Default SCAN displays current scan mode.

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

STAT

: Displays current Bluetooth device status
If any background task running, 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

AFH [channel] ...

: This command will activate 802.11b Wi-Fi Combo mode, in which Parani-MSP doesn't make use of the ranges of frequencies where co-existing

802.11b Wi-Fi devices work.

Specify channel 0(zero) to disable combo mode.

When enabled, overall throughput will be reduced.

Ex.: **AFH 10 11**
+OK
AFH
+OK AFH 10 11
AFH 0
+OK

5.8 Commands for Bluetooth Connection Management

LIST

: To see connected Bluetooth device list.
Higher link quality, better link status. Zero rssi means the most efficient RF condition (so called 'Golden Range').
With link quality lower than 200, throughput may be affected or link may be lost.

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

Ex.: **LIST**
0|0|5000|00:0B:53:00:00:8A|SDv3b-00008A|0|0|255|0
+OK

CONN <bdaddr> [channel]

: Parani-MSP may try to CONNECT to Bluetooth devices. If you specify a channel, Parani-MSP will try connection directly skipping SDP (Service Discovery Protocol) process.

Each device to connect should be in connectable mode.

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



Note:

Parani-MSP normally acts as an acceptor. Do not use CONN command in operating sequence as Parani-MSP will freeze during CONN operation.

If using with Parani-SD, please configure Parani-SD as Mode 1 and make it initiate connection to Parani-MSP

DISC <idx>

: Parani-MSP 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 device is disconnected by turning off its power, Parani-MSP has default time out of 20 seconds in finally closing the connection. You may assign the time out from 1 second up to 30 seconds.

Ex.: **LINKTO 20**
+OK

MAXDT <number of max. connections>

: To assign maximum Bluetooth devices concurrently connectable to Parani-MSP™. Default value is 7. Each additional USB extension module adds up to 7 more Parani-MSP™ connectable Bluetooth devices.

Ex.: **MAXDT 7**
+OK

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

: If PINQ (periodic inquiry) is ON, Parani-MSP will inquire nearby Bluetooth devices periodically, by each <interval> seconds, for <length> time. Inquired result 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 Parani-MSP
+OK

DTINFO <on|off>

: The information of the corresponding data terminal is sent from Parani-MSP prior to any data transmission when TCP socket connected. It consists of Bluetooth address and name in fixed length with NULL padding following.

Available in server mode or client mode.

Response: bdaddr,name<null-padding> (64bytes fixed-length)
000B53123456,PSDv3b-123456

Ex.: **DTINFO on**
+OK

FWDT <tx_timeout> <rx_timeout> [init]

: Reboot itself if no change in TX bytes for more than <tx> seconds, or in RX bytes for more than <rx> seconds after [init] seconds from booting. If init is not specified, timer won't start till any data transaction.

These values accept 0 for disabling each function. [init] can be just omitted to disable the function.

Ex.: **FWDT 0 10**
+OK

5.9 Other Commands

DUMP [idx] [bin]

: This command shows data that flows between Host and Bluetooth devices.

[idx]: To select a specific device to monitor. (255 means all of devices)

[bin]: To display 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

LOG [line]

: LOG displays system logs. If line number specified, only latest <line> rows will be displayed.

Ex.: **LOG**
<30>Jan 1 00:00:09 msp: Parani-MSP ver 2.3 started
<30>Jan 1 00:00:09 msp: Loading configurations...
...
+OK

HELP

: HELP command displays all control commands available.

Ex.: **HELP**
+OK

VER

: To see software version no. of Parani-MSP

Ex.: **VER**
+OK Ver 2.3

CTRL <port no.>

: Control port default value is '2525'. CTRL command assigns new control port number. Revised control port number is effective after Parani-MSP™ restart. Default CTRL displays current control port number value.

Ex.: **CTRL 3500**
+OK

CANCEL

: To cancel current background operation.

Ex.: **CANCEL**
+OK

RSET

: To restore to factory settings.

Ex.: **RSET**
+OK

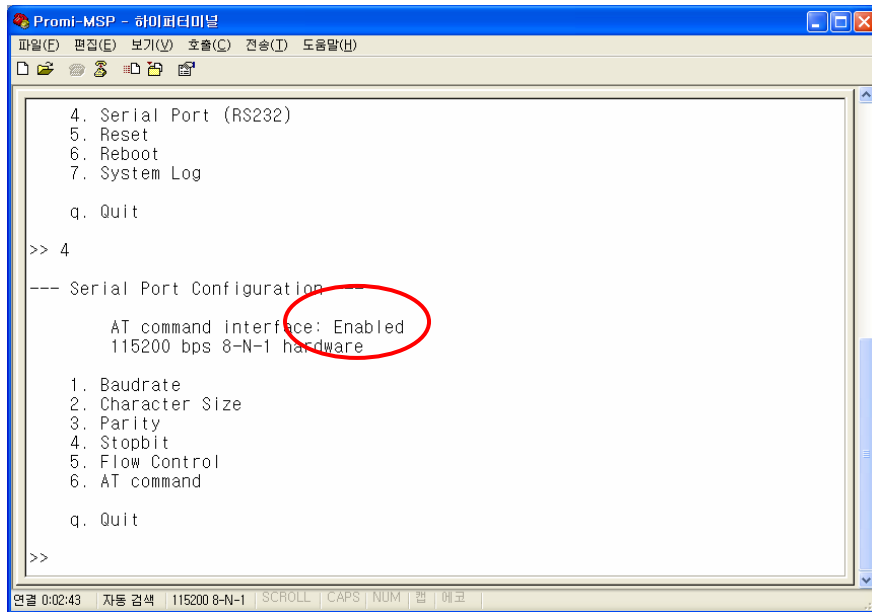
REBOOT

: To reboot Parani-MSP

Ex.: **REBOOT**
+OK Rebooting...

6. AT Command Interface

Parani-MSP supports user friendly AT commands. Make sure this feature enabled in configuration console in order to use AT commands.



Most of them are compatible with Parani-SD but some have differences in their usage and some commands are appended for Parani-MSP exclusive use.

Supported AT commands and their differences from AT command of Parani-SD are summarized as below. Please refer to Parani-SD userguide for more information.

Command	Description	Example
AT	compatible with Parani-SD	
ATZ	"	
AT&F	"	
ATD	Connectable up to 7 devices concurrently	
ATH	Device to disconnect can be specified.	ath000b53123456<cr>
ATO	Device to communicate can be specified. Without specified device, lately communicated device will be selected.	ato000b53123456<cr> CONNECT 000B53123456

	Parani-MSP responds with CONNECT.	
AT+BTSCAN	Scan mode can be specified. 1: Discoverable 2: Connectable 3: Discoverable and Connectable	at+btscan,3<cr>
AT+BTINQ?	compatible with Parani-SD	
AT+BTINFO?	"	
AT+BTNAME	"	
AT+BTKEY	"	
AT+UARTCONFIG	"	
AT+BTCANCEL	"	
AT+SETESC	"	
AT+BTLAST?	"	
AT+BTSEC	"	
AT+BTSD?	"	
AT+BTCSD	"	
AT+BTMODE	Support only Mode 1 and Mode 2. You can register Mode 1 devices by using AT+BTREG.	

※ S-registers are not supported.

Following commands are appended to Parani-MSP.

Command	Description	Example
AT+BTCHAN?	Show currently selected device. Parani-MSP only communicates with selected device.	AT+BTCHAN? 000B53123456 OK
AT+BTCONN?	Show all connected devices.	AT+BTCONN? 000B53123456,PSDv3b-123456 000B53112233,PSDv3b-112233 OK
AT+BTREG	Register Mode 1 device. In Mode 1, all connections with registered devices will be recovered after power-up.	AT+BTREG,000b53123456

AT+BTUNREG	Remove registered Mode 1 device.	AT+BTUNREG,000b53123456
AT+BTLIST?	Show registered Mode 1 devices.	AT+BTLIST? 000B53123456 000B53112233 OK

Multi Serial Communication via RS232 interface

Parani-MSP can communicate with Parani-SDs up to 14 devices via RS232 interface, while Parani-SD can be only used as 1:1 cable replacement.

Even though Parani-MSP supports multiple serial connections, because RS232 interface is inherently 1:1 communication protocol, user should communicate with serial devices sequentially. Data coming from non-selected Parani-SD is buffered on Parani-MSP and retrieved when corresponding Parani-SD is selected by ATO command.

If link is lost with currently selected device, one of connected devices will be selected arbitrarily.

Accepting new incoming connection

When incoming connection is established in command mode, Parani-MSP responds with **CONNECT** message and enters to online mode.

When incoming connection is established in online mode, **CONNECT** message is not printed and selected device with which Parani-MSP communicates won't be changed.

You can check out all connected devices by **AT+BTCONN?** command in command mode.

Disconnecting device

You can disconnect Bluetooth device by **ATH** command in command mode. With specified device address, any connected device, selected or not, can be disconnected.

AT command usage example is provided below.

```
OK
AT+BTINFO?
000B2431FB14,Parani-MSP,MODE0,STANDBY,0,0,HWFC
OK
ATD000B53000001
OK
CONNECT 000B53000001
... ← connected to 000b53000001
+++
OK
ATO
CONNECT 000B53000001
+++
OK
ATD000B53000002 ← making new connection to 000B53000002
                    while connected with 000B53000001
OK
CONNECT 000b53000002
... ← connected and routed to 000B53000002
+++
OK
AT+BTCNN?
000B53000001,PSDv3b-000001
000B53000002,PSDv3b-000002
OK
ATO000B53000001 ← changing route back to 000B53000001
CONNECT 000b53000001
... ← communicating with 000B53000001
```

7. Configuration via WEB

Parani-MSP™ configuration access is available via Telnet or Web browser.

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

Here is shown the 192.168.0.3 address assigned to Parani-MSP™ in the preceding configuration example.

Enter the default ID: admin, Password: 11111.

The screenshot displays the web configuration interface for Parani-MSP™. On the left is a navigation menu with the following items: MSP Configuration, MODE Configuration, IP Assignment, Network Setting, Status, User/Pass, Restore Factory Setting, and About. The main content area is titled "Basic Setting" and contains the following fields:

MSP name	Promi-MSP
Max DT	7
Discoverable	<input checked="" type="checkbox"/>
Connectable	<input checked="" type="checkbox"/>
Pairable	<input checked="" type="checkbox"/>
Control port	2525

Below the Basic Setting section is the "Buffering" section, which includes a "Buffering" toggle set to "on" (radio button selected), and two rows of hexadecimal values:

Header	0x01	0x61					
Trailer	0x62	?	0x03				

The "Security" section contains the following fields:

Pin code	1234
Security	Low

At the bottom of the configuration area are "Apply" and "Cancel" buttons.

7.1 MSP Configuration

- **Basic Setting**
 - (2) MSP name: For user Parani-MSP name revision

- (3) Max DT: For configuring the maximum number of Bluetooth devices connectable to Parani-MSP™. Default maximum is 7.
- (4) Discoverable: When checked, Parani-MSP™ is in inquiry scan mode, in which other Bluetooth devices may discover Parani-MSP.
- (5) Connectable: When checked, Parani-MSP™ is in page scan mode, in which other Bluetooth devices may connect to Parani-MSP.
- (6) Pairable: For Pairable 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 that already share link key with Parani-MSP™, cannot connect to Parani-MSP™, even via PIN code.
- (7) Control port: TCP port number for control port. Default value is 2525.

- **Buffering**

- (1) Buffering: For Frame Buffering function enable/disable
 - * **Firstly set Header and Trailer, secondly turn on Buffering option.**
- (2) Header: Heading characters in the frame. Enter alphabets or hexadecimal ASCII codes.
- (3) Trailer: Trailing characters in the frame. Enter alphabets or hexadecimal ASCII codes.

- **Security**

- (1) Pin code: For Bluetooth Pin code entry
- (2) Security: For security level entry

7.2 Mode Configuration

Parani-MSP™ accesses 3 types of operation modes. Select according to user requirement and applications.

The screenshot displays the configuration interface for Parani-MSP, divided into three main sections: Server MODE, Client MODE, and Vertex MODE. A sidebar on the left contains navigation options: MSP Configuration, MODE Configuration, IP Assignment, Network Setting, Status, User/Pass, Restore Factory Setting, and About.

- Server MODE:** Includes a radio button for 'Server mode', a 'Base port' field set to 5000, a list box containing 'IGSDv1b-AC 5003' with a 'List' link below it, and two input fields for 'bdaddr/btname' and 'port,no'. Below these are 'Add', 'Delete', and 'Clear' buttons.
- Client MODE:** Includes a radio button for 'Client mode', an 'IP' field set to 192.168.1.30 and a 'port' field set to 4000. It also has two checked checkboxes: 'Try to connect to server every 5 ms' and 're-connect automatically if link is lost'.
- Vertex MODE:** Includes a radio button for 'Vertex mode', a 'Vertex port' field set to 3000, and a checkbox for 'Allow TCP connections to vertex port.' which is currently unchecked.

At the bottom of the configuration area are 'Apply' and 'Cancel' buttons.

- **Server Mode**

- (1) Base port: For Parani-MSP™ 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) BIND buttons: Add/Delete/Clear

To delete more than one device from the bound list, press Shift or Ctrl key while using the computer mouse.

- **Client Mode**

In Client Mode, Parani-MSP™ operates as client initiating TCP connection request. 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 Parani-MSP™ 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**

In Vertex Mode, data from a Host are sent to all of connected Bluetooth devices, like Multi-drop.

- (1) Vertex port: For Parani-MSP™ Vertex port no. entry.
- (2) Allow [] TCP connections to vertex port:

For entering the number of Hosts connectable to Parani-MSP™.

7.3 IP Assignment

IP Assign	
Number of IP	25
Start IP	192 . 168 . 2 . 100
Netmask	255 . 255 . 255 . 0
<input type="button" value="Apply"/> <input type="button" value="Cancel"/>	

Parani-MSP™ LAP service use renders assignable IP numbers for LAN access

service Bluetooth devices configuration. Set IP address and subnet mask Start number; Parani-MSP™ automatically assigns IP to connected Bluetooth devices.

7.4 Network Setting

Network Setting	
<input type="checkbox"/> use DHCP	
IP address	192 . 168 . 1 . 10
Network mask	255 . 255 . 255 . 0
Gateway	192 . 168 . 1 . 1
DNS	168 . 126 . 63 . 1 168 . 126 . 63 . 2
MAC	00 : 3f : 8e : 55 : 0c : a1
<input type="checkbox"/> use ADSL	
user	
pass	
Apply	Cancel
Reboot	

For user Parani-MSP™ network setting.

- (1) use DHCP: When checked, Parani-MSP™ receives IP address from DHCP server.
- (2) IP address/Network mask/Gateway/DNS: Enter appropriate data to assign static IP address for Parani-MSP™.
- (3) MAC: Displays MAC Parani-MSP™ address; non-user entry
- (4) use ADSL: Select this option when ADSL networking
- (5) User/Pass: Enter ID/password data for ADSL login.

7.5 Restore Factory Setting

To reset to Parani-MSP™ default factory settings, click the 'Restore' button.



8. Internet Access via Parani-MSP

Parani-MSP may operate as conventional Bluetooth AP to provide Bluetooth devices Internet connectivity.

Following 3 standard ways of Bluetooth internet connections are supported.



Note:

If Internet Access Service is NOT needed, please disable this feature for the security concerns.

8.1 LAP

8.2 PAN

8.3 Dial-Up Modem Emulation

9. COM port redirector

9.1 Serial/IP



NOTE:

Serial/IP is bundled with Parani-MSP since July, 2005.

Customers prior to July, 2005 should pay additional cost to use Serial/IP.

Serial/IP is a serial port emulator enabling to use your legacy serial communication application with Parani-MSP. Serial/IP provides virtual COM port, which is redirected to TCP socket connection to Parani-MSP.

SENA provides licensed Serial/IP programs to customers purchasing Parani-MSP™ since July, 2005. Users who purchased Parani-MSP™ before July, 2005 may download a 30day-trial version from <http://www.tacticalsoftware.com> after filling out simple forms for testing. The trial version Serial/IP does not require Serial Number for installation.

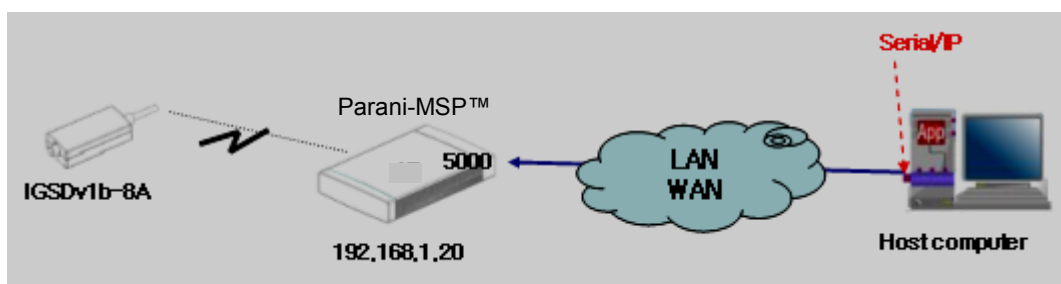


Fig. 9.1. Relationship between Serial/IP and Parani-MSP™

Firstly, Install Serial/IP which can be found on Installation CD-ROM.



Fig. 9.2. Installation of Serial/IP

After installing Serial/IP, you can find Serial/IP tray icon. Right mouse clicking the Serial/IP icon on the right side of the Windows Tray activates “Configure...,” “Trace Window...,” and “Port Monitor...” menu display.

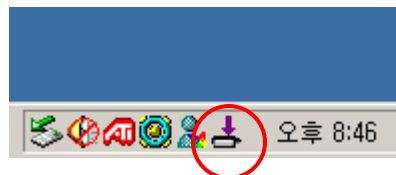


Fig. 9.3. Windows Tray after installation of Serial/IP

Click “Configure...” menu, and select the COM port to redirect to Serial/IP as in the left picture in Fig. 9.3 below. Enter IP address and Port number to meet Parani-MSP configuration as in the right picture in Fig. 9.3.

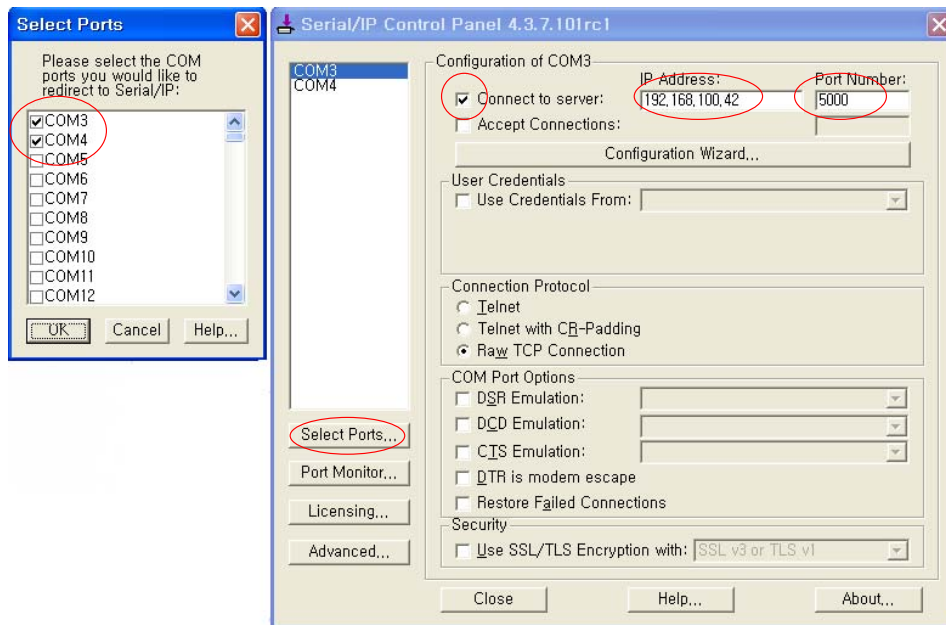


Fig 9.4 COM port configuration

Parani-MSP™ is ready for use without revising Serial Port Applications. Connect Parani-SD to Parani-MSP™ and see if data channel established between Parani-SD and Serial/IP COM port.

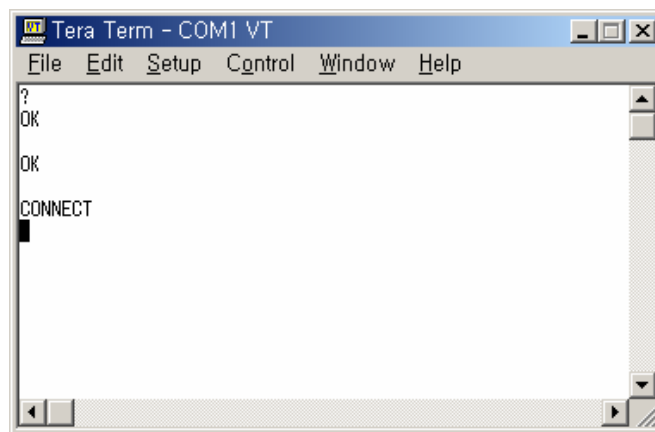


Fig. 9.5. Connection Configuration

10. Technical Support

FCC Compliance Statement

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: This device may not cause harmful interference, and This device must accept any interference received, including interference that may cause undesired operation

Information to User

This equipment has been tested and found to comply with the limits for a Class B digital device, Pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation.

This equipment generates, uses and can radiate radio Frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications.

However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

RF Exposure Statement

The equipment complies with FCC RF radiation exposure limits set forth for an uncontrolled environment. This device and its antenna must not be co-located or operation in conjunction with any other antenna or transmitter.

Do not

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

User manual of Parani-MSP100 series will be updated on to make up the undocumented part and to be much easier guide.

If you have any questions using Parani-MSP series, please contact:

Sena Technologies, Inc.

210 Yangjae-dong, Seocho-gu

Seoul 137-130, Korea

Tel : (+82-2)-573-5422

Fax : (+82-2) 573-7710

E-Mail : support@sena.com

Website : <http://www.sena.com>

Manufacturing company : INITIUM Co.,Ltd.

Appendix A - Discovery Protocol

UDP Broadcast on 9097 port

Magic Number (4 bytes)

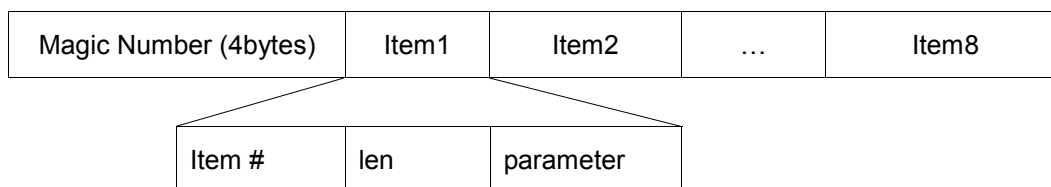
Searching

FA	05	21	EA
----	----	----	----

Response

FA	05	21	EF
----	----	----	----

Format



Item list

Item #	length	Parameter	Example
0x01	Var.	Product Name	PARANI-MSP
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	Parani-MSP
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	

...