HDL®

User Manual

Mesh Gateway

HDL-MCIP-RF.10

buspro

www.hdlautomation.com

INDEX

1. Overview

1.1 General Information

1.1.1 Description

HDL-MCIP-RF.10 is a gateway based on IEEE802.15.4 standard MESH technology. Mesh Wireless Gateway has three communication interfaces: RJ45, HDL Buspro, RF, which can interconnect different media platforms(Ethernet, RS485, RF) of HDL intelligent devices. It's very useful in the renovation projects and in the inconvenient of layout application environment.
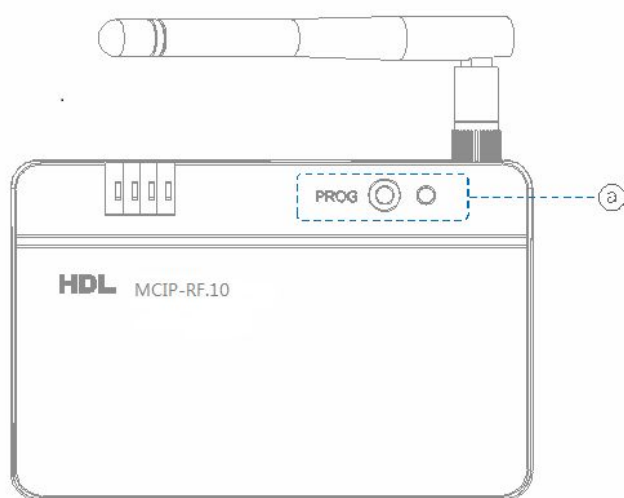
1.1.2 Mounting
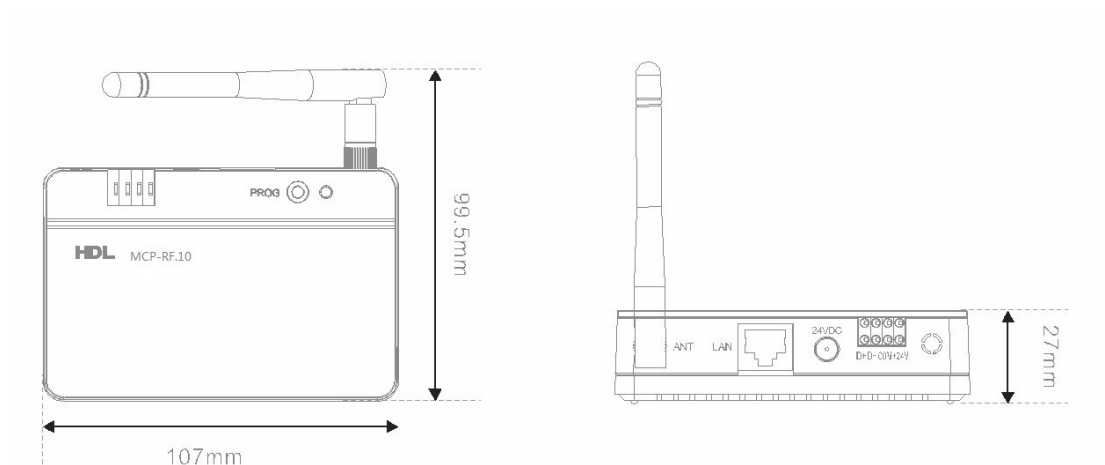
● Desk or Wall Mounted
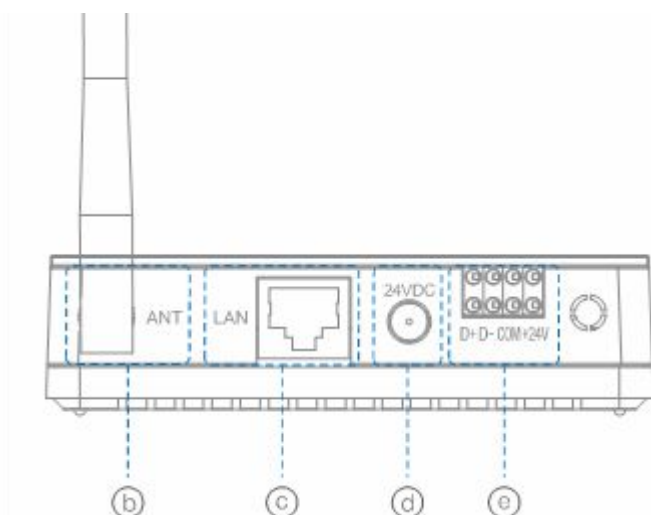
1.2 Functionalities Description

● Can be configured as Mesh mode

● Can be configured as Bridge mode

● Communication data rate is higher than the cable

1.3 Device Description
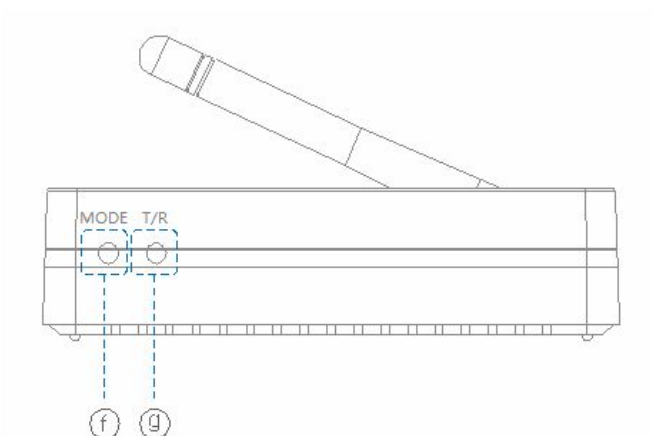

ⓐ . Programming Button:
Long press the 'PROG' button
10s, then its IP and IP MAC will
be reset to the factory settings.

ⓑ . Antenna: transmit and receive
wireless signals
ⓒ . RJ45: Ethernet port RJ45
ⓓ . DC24V: Power Supply, no
need to use it if connected the HDL
Bus interface (the DC power is
provided from it)

ⓕ .MODE LED: RED LED flashing
quickly under wireless setup mode;
GREEN LED flashing when network
jams.
ⓖ . T/R LED: BLUE LED flashing
when transmitting or receiving the
wireless signal.

2. Safety Instructions

● Do not make wrong connection on Bus interface, it will damage the Bus interface of this module.

● Never let liquids get into the module, it will damage this device.

● Do not get AC240V voltage into Bus wire, it will damage all devices in the system.

● Ensure good ventilation.

3. Technical Data

Electric Parameters:	
Working power	12~30VDC
Communication	RJ45, HDL-BUS, RF
Wireless transmit power	+10dbm
Wireless receive sensitivity	-90dbm
Communication distance indoor	50m (barrier free)
Work mode	Mesh mode, Bridge mode
BUS Terminal	Wago 252,0.75-0.85mm Diameter Single Core
Wireless central frequency	
(China) WPAN	780MHz-786MHz
(Europe) SRD	864MHz-870MHz
(North America) ISM	904MHz-928MHz
Environmental Conditions:	
Working Temperature	0℃~45℃
Working relative Humidity	Up to 90%

Storage Temperature	-20℃~+60℃
Storage relative Humidity	Up to 93%
Approve:	
CE	
RoHS	
Production Information:	
Dimension	107×99.5×27（mm）
Weight	103g
Housing material	ABS
Installation	Desk or Wall Mounted
Protection Degree	IP20

4. Installation

4.1 Wiring
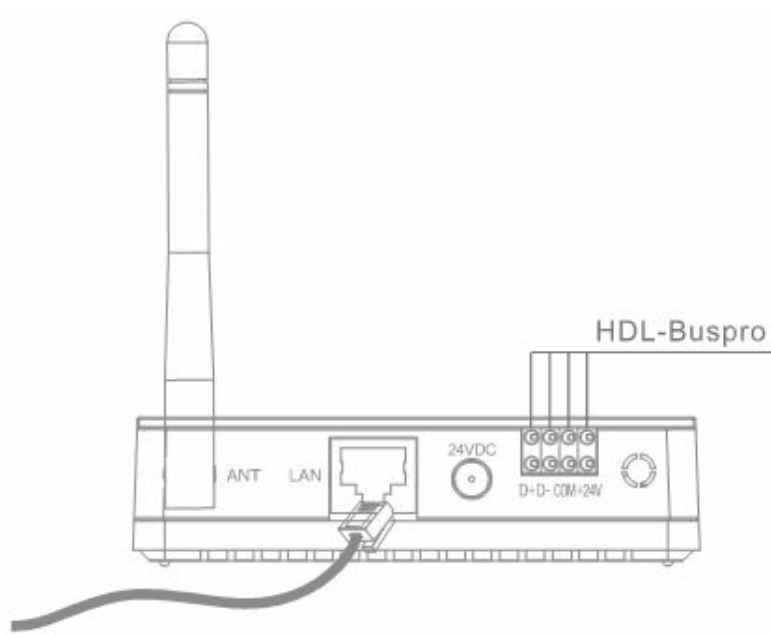
4.2 HDL Bus Pro Description

Connector Information

| buspro	
DC24V	Red
COM	Black
DATA -	White
DATA +	Yellow

5. Wireless System Introduction

In the wireless system, use mesh gateway (HDL-MCIP-RF.10) to manage all the wireless devices, the gateway can work in mesh mode and bridge mode.

5.1 Mesh Mode

5.1.1 Wiring Diagram

The mesh mode can realize the communication between the HDL Buspro devices and the RF devices.

In mesh mode, must set different frequency (RF Channel) for each gateway, each gateway manages a wireless network with same Subnet ID of the RF devices.
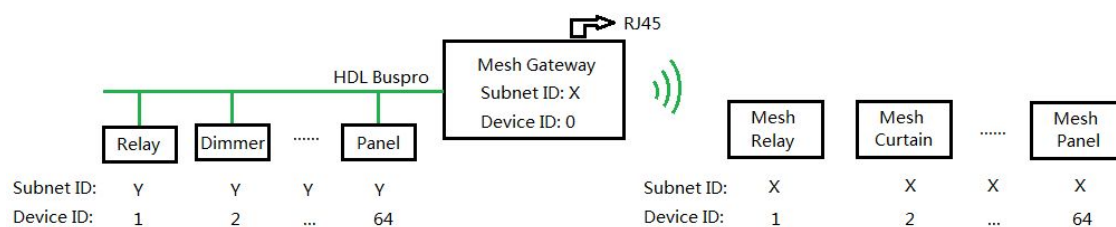
Mesh Mode

Note: Subnet ID X and Y are different, Gateway has the fixed Device ID 0.

5.1.2 Basic Configuration Steps

Basic steps to build up the mesh mode system:

1- Select the free frequency for the gateway, HDL-MCIP-RF.10

For China, select WPAN band, and the range of frequency is 780MHz -786MHz;

For Europe, select SRD band, and the range of frequency is 864MHz – 870MHz;

For North America, select ISM band, and the range of frequency is 904MHz – 928MHz .

2- Set the unique PSK PWD for the gateway

Must set the unique password for your gateway, then even other RF systems use same frequency as yours, but cannot control your system devices because of different PSK PWD.

3- All wireless devices enter the wireless setup mode

The way to enter the wireless setup mode:

Gateway:

Press the 'PROG' button 3 times continuously or enter from HDL BUS software directly, its LED will flash quickly

Curtain:

Press the 'PROG' button 3 times continuously, its LED will flash quickly.

DLP Panel:

Long press the first and eighth buttons at the same time to enter the setting page, select 'WIRELESS', the seventh and eighth buttons' LED will be on.

Normal Panel:

Long press any button of it about 25s (at the 15s, the LED will flash quickly that means it enters the address modify mode), the LED will flash slowly.

4- Set the wireless parameters for normal wireless devices

In the HDL BUS software, set the ID, frequency and PSK PWD for the normal wireless devices (panel, relay, etc) via the mesh gateway. Their Subnet ID, frequency and PSK PWD must be same as the gateway's, otherwise the gateway cannot manage them.

5- All devices exit the wireless setup mode

You are able to search and configure these wireless devices normally via the gateway now.

5.2 Bridge Mode

5.2.1 Wiring Diagram

In bridge mode, RS485 and Ethernet data in multiple gateways can be transmitted via RF, which effectively extends the communication distance. In the inconvenient of layout application environment, different subnets can be interconnected.
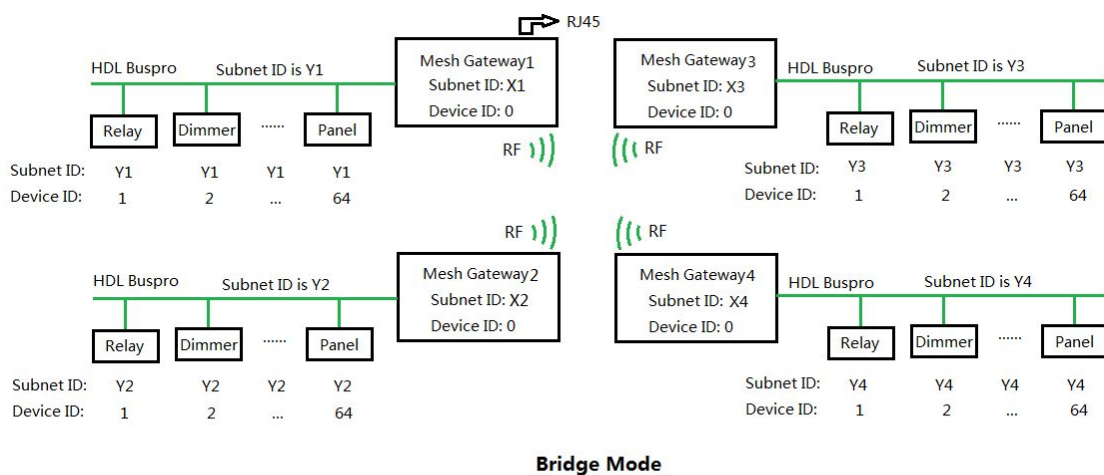
Bridge Mode

Note: in Bridge mode, all Subnet ID of gateway are different

5.2.2 Basic Configuration Steps

Basic steps to build up the bridge mode system:

1- All gateways use different Subnet ID
2- All gateways use same frequency
3- All gateways use same PSK PWD

Important Note: RF reliable transmission distance is 50m, obstacles will reduce the transmission distance, the distance decreases 20m if through a wall, so it is better to install mesh wireless devices in empty place and forbid to install near to the metal objects, in order to get a good communication quality, this device is not recommended to install in electric box, if have to, then please add an antenna outside.

6. Software Configuration

6.1 Basic Setting

6.1.1 Change the ID

Set the Subnet ID for the gateway, all the wireless gateways' Device ID is 0, can not be changed.

6.1.2 Change the IP and IP MAC

Change the default IP and IP MAC, to avoid possible conflict

Default IP: 192.168.10.250, Default MAC: H-D-L-85-85-85

6.2 Network Information

6.2.1 Connection Preferences

This gateway supports remote control, and it supports three communication modes, they are: Local Network, P2P and Remote Server.

HDL®

- Local Network

It works as a normal gateway between the RF and local Ethernet. This mode does not have the remote function.

Configuration steps:

1. Change the default IP and IP MAC, to avoid possible conflict.

Default IP: 192.168.10.250, Default IP MAC: H-D-L-85-85-85

2. Select 'Local Network' (all other tables will not be available.) and click Apply.
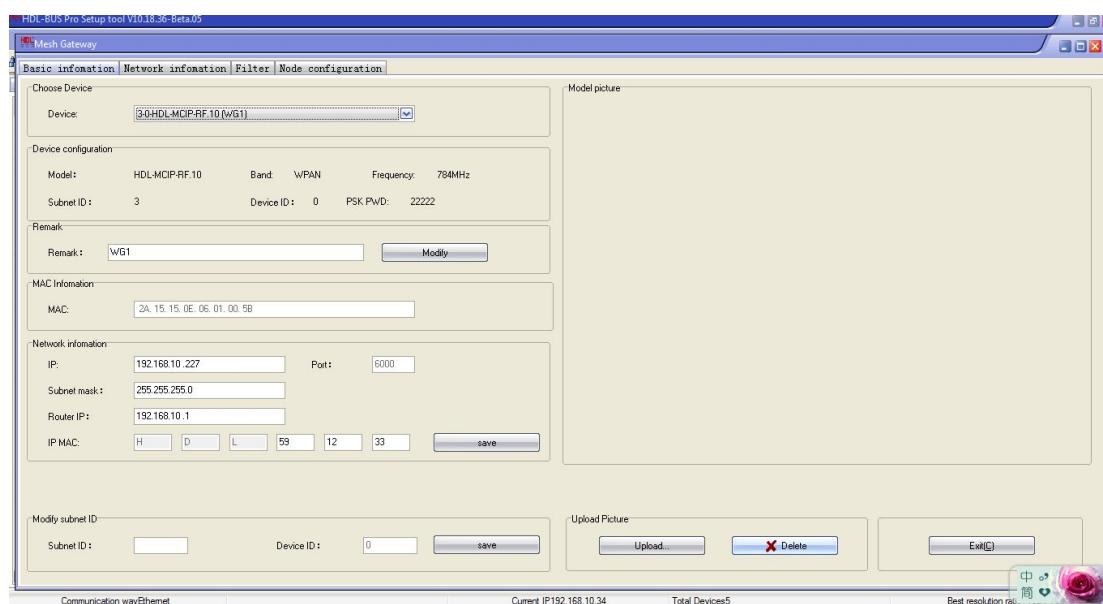
- P2P

In this mode, you are able to access the wireless system directly through Internet, using HDL-BUS Pro software, without any help from HDL server.
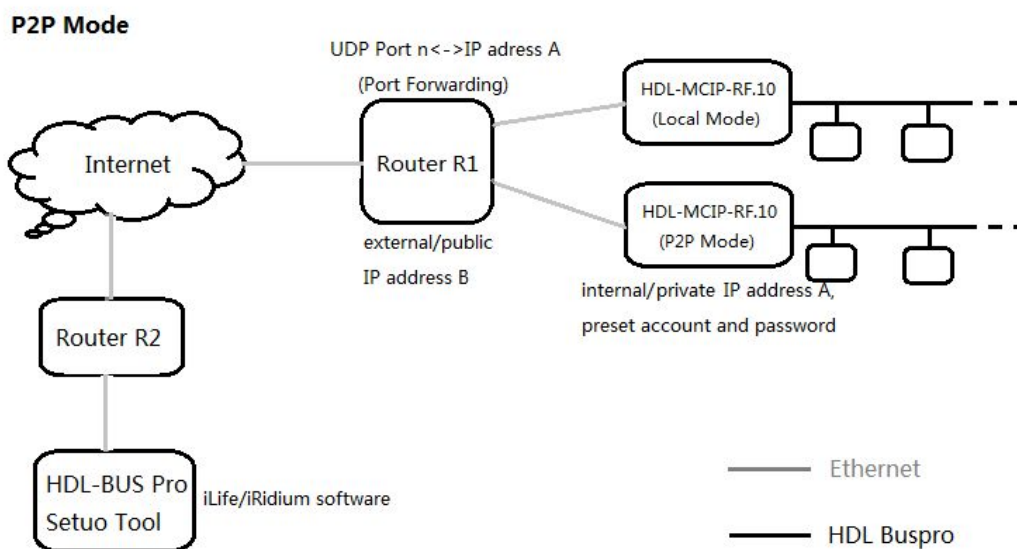
Configuration steps:

1. Change the default IP and IP MAC, to avoid possible conflict.

Default IP: 192.168.10.250, Default IP MAC: H-D-L-85-85-85

2. Select "P2P", fill in "Project Name", "Group Name", "User", "PWD". The "User IP" is the public IP of Router R2 (see diagram above), the "Port" is the one you are going to fill in the Router R2 when setting up port forwarding. Some routers support Internal port and External port mapping, some do not, there is only one port, or you can take it as External port equals Internal port, to simplify, we suggest to use the port 6000 for all ports.
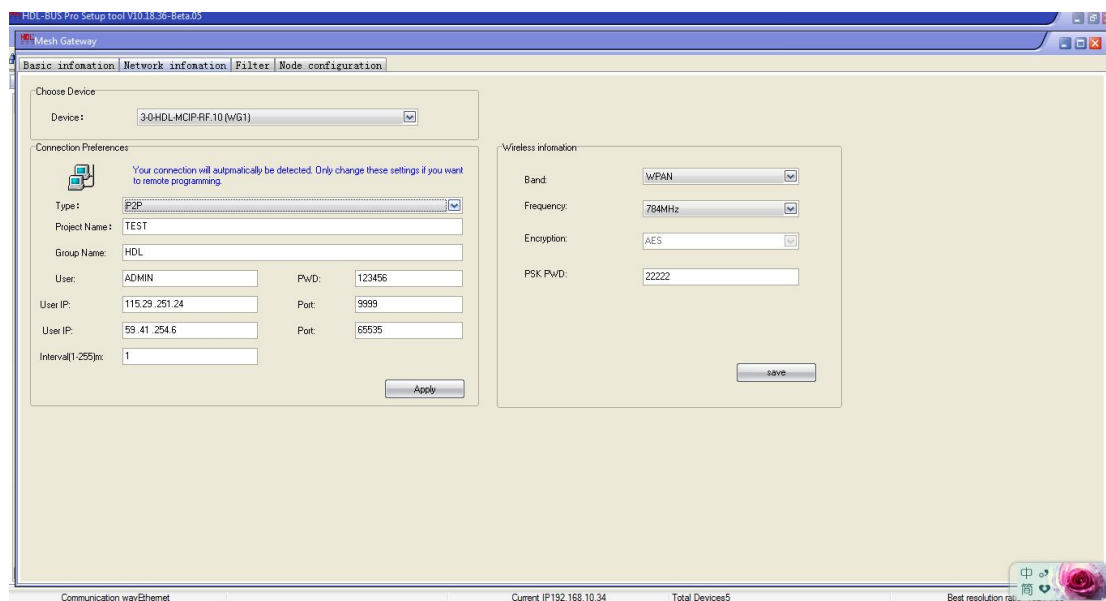
3. Configure port forwarding in Router R1
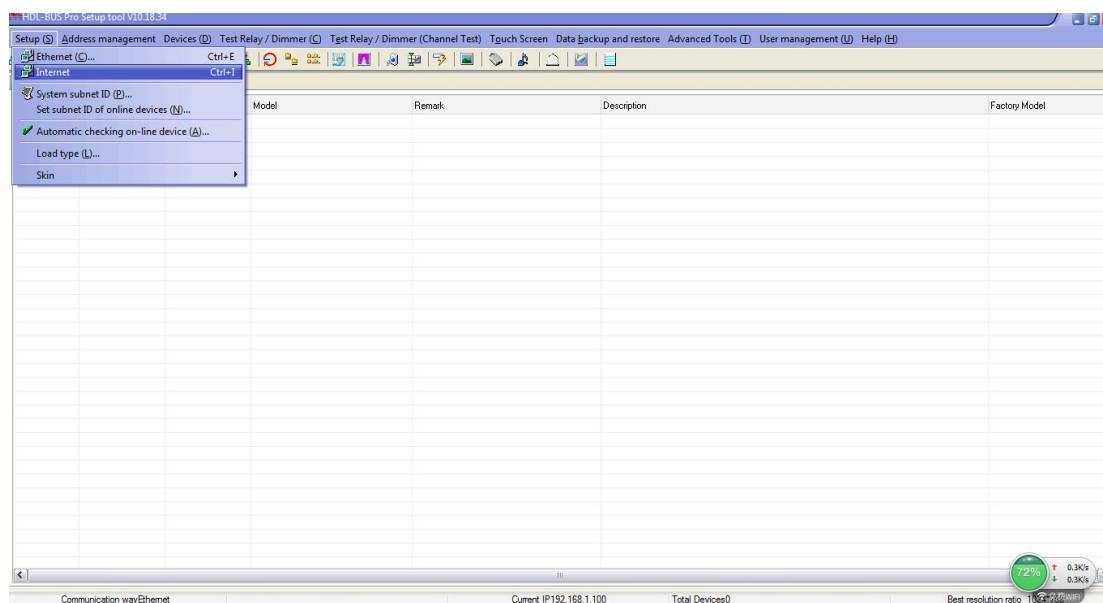
Map UDP port 6000 to the IP of mesh gateway
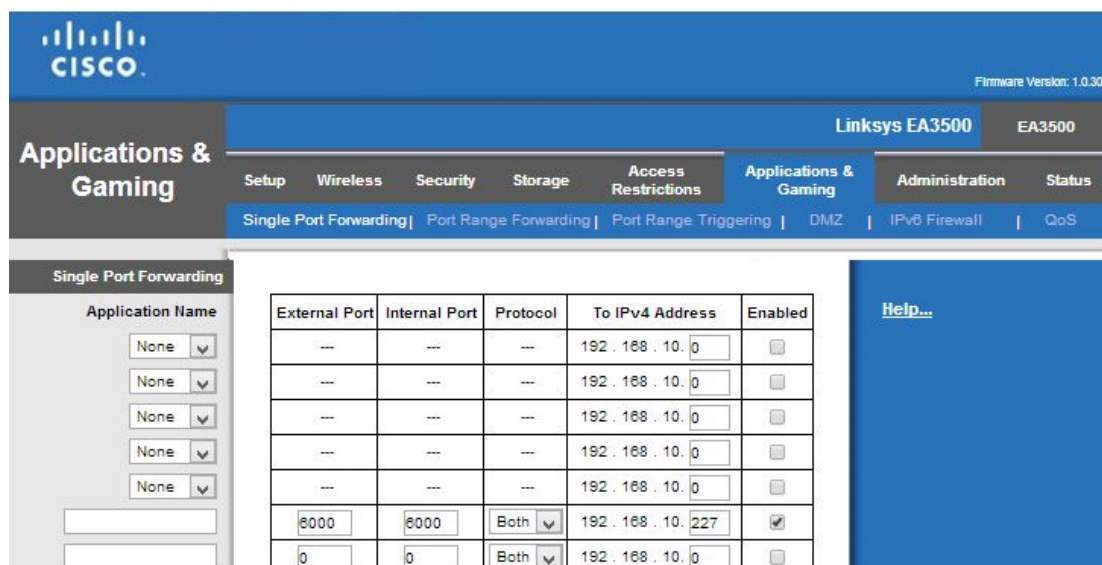
4. Configure port forwarding in Router R2

Map UDP port 6000 to the IP of PC/laptop that runs HDL-BUS Pro Setup Tool.


5. Run HDL-BUS Pro Setup Tool on the PC/laptop with the IP set in the Router R2, in this

doc, it is 192.168.1.100.

6. Select 'Internet', in the pop up window below select "P2P" and fill in the "Group Name",

"Project Name", "User", "Password". The "IP" is the public IP of Router R1, the "Port" is the

one set in Router 1, the UDP 6000.
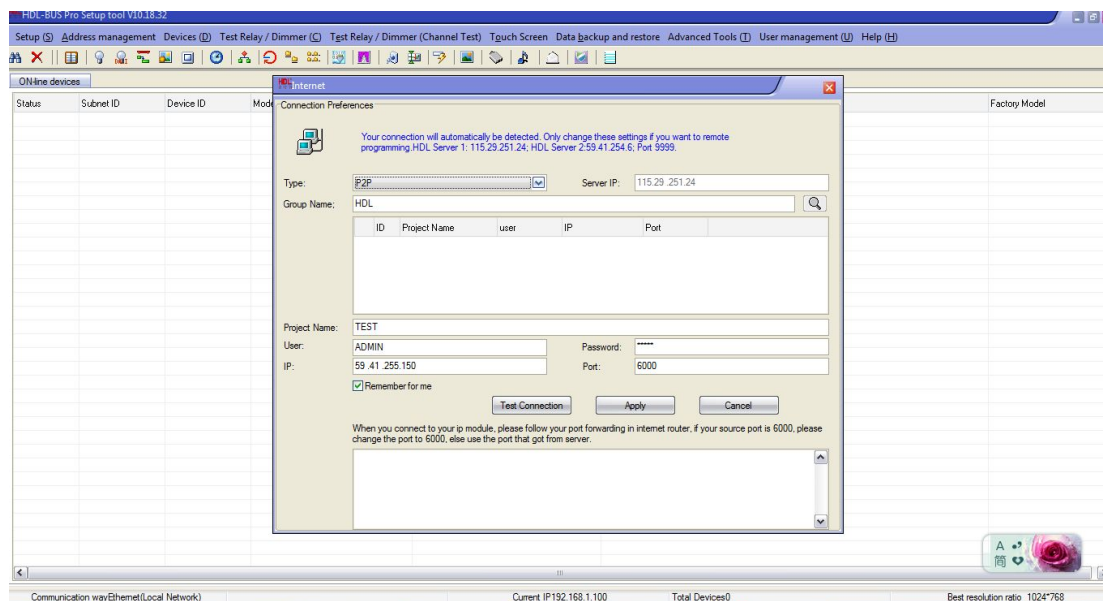
7. Click "Apply", this pop up window will disappear when you connect to the remote SB-DN-1IP successfully, then you can search for devices and configure them as usual.
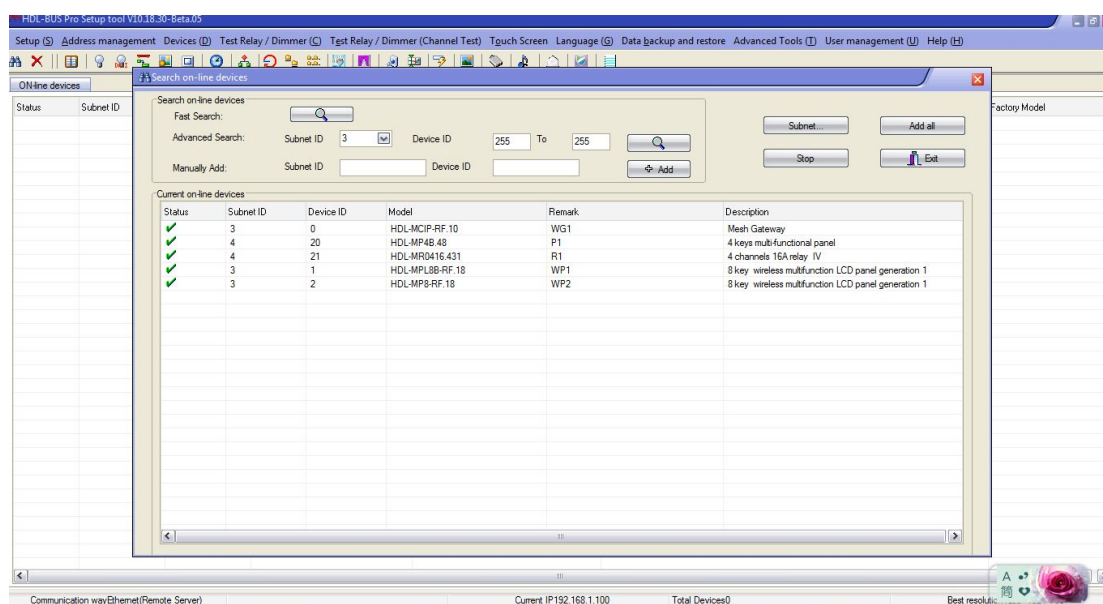
- Remote Server

This mode is suitable for both travelling programmer and end user to configure and control HDL wireless system via Internet. Since a server is getting involved in this mode, no static public IP is needed for HDL wireless system because the HDL-MCIP-RF.10 in Remote Server mode will keep updating itself to the server, programmer and end user can always get info of the remote HDL-MCIP-RF.10 from the server and later access the HDL wireless system directly.

Schematic diagram:
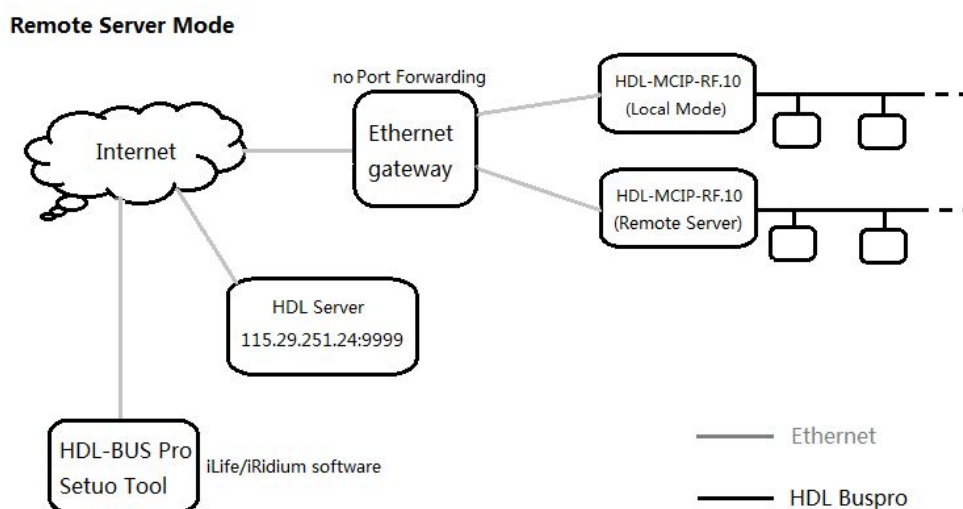
Configuration steps:

1. Change the default IP and IP MAC, to avoid possible conflict.

2. Set your Project Name, Group Name, User, PWD and click Apply.
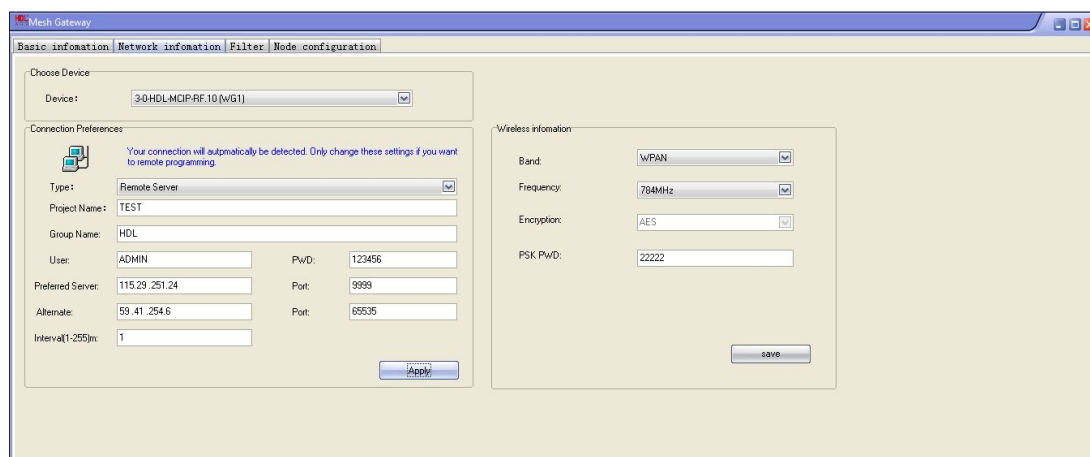
● Server

HDL server has a fixed IP and port, 115.29 .251.24:9999 or 59.41.254.6:9999, do not change it, it is editable because HDL may change the server or help installation companies to build their own servers in the future, in that case, the installation companies can fill in their own servers and ports.

● "Interval(1-255)m "

It is the parameter that decides how long the HDL-MCIP-RF.10 will register its info to the HDL server again, e.g., if we set it as 2 minutes, that means every 2 minutes the HDL-MCIP-RF.10 will register itself to the HDL server (so that HDL server knows where this HDL-MCIP-RF.10 locates even if the public IP of the router is changed or private IP of the HDL-MCIP-RF.10 is changed). Recommend to set it no more than 3 minutes.

Note:

a) 'Enable DHCP' is an option that will be supported in the future.

b) Can have 4 active connections, which means when you are configuring the HDL wireless system, up to 3 people can operate the HDL wireless system from iPad, android pad at the same time.

3. Exit HDL-BUS Pro Setup Tool and find another Internet access that has a different public IP for your PC/laptop, run the HDL-BUS Pro Setup Tool again and select 'Internet'.
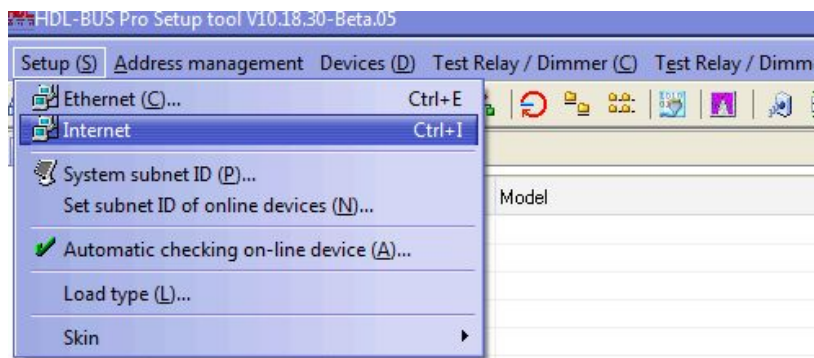
4. Fill the Group Name and sever IP , Click the search button on the pop up window, HDL server will feedback all projects in the same group (An installation company can have many projects in different sites) then select your project and fill in the password.
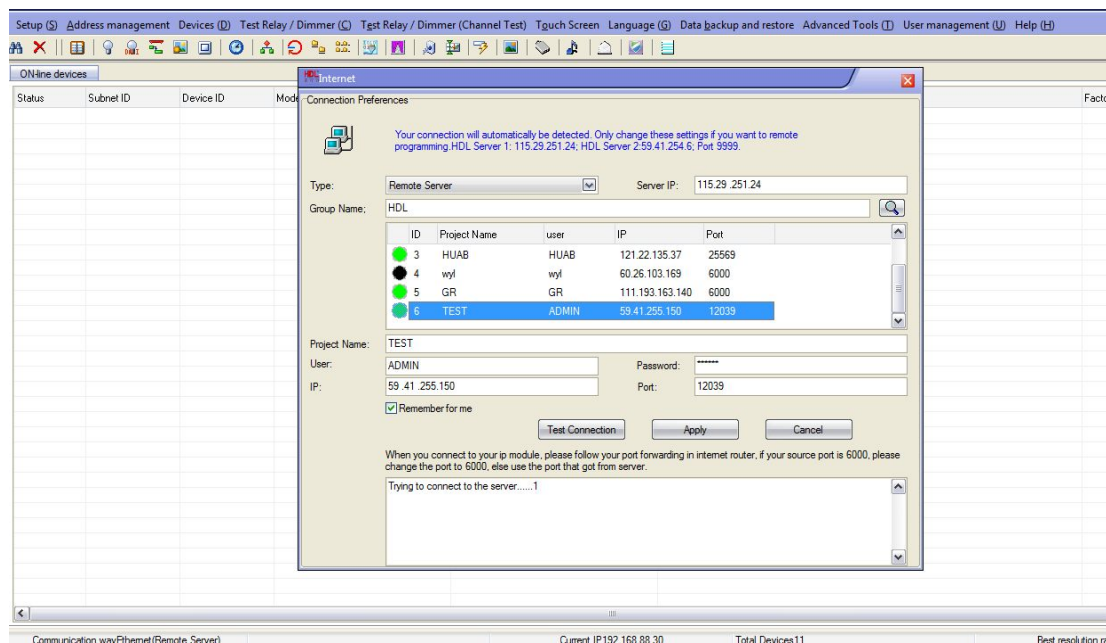
5. Or you can just click the Apply button; this pop up window will exit automatically if it communicates with remote HDL wireless system successfully, now you can get start to program the HDL wireless system.
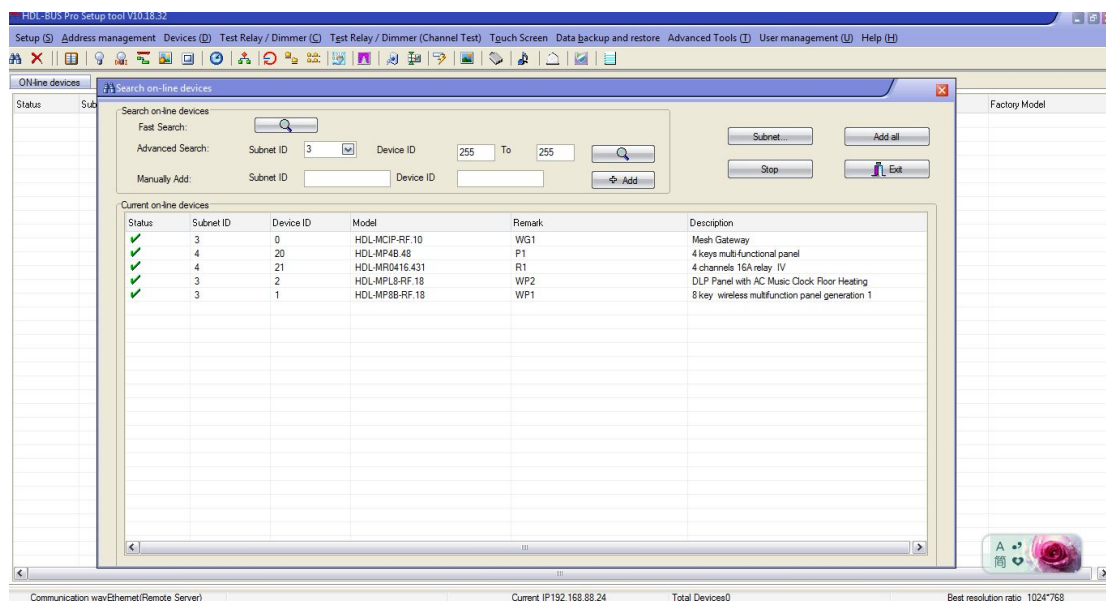
6.2.2 Wireless Information

Must select free RF frequency for different countries:

For China, select WPAN band, and the range of frequency is 780MHz - 786MHz;

For Europe, select SRD band, and the range of frequency is 864MHz - 870MHz;

For North America, select ISM band, and the range of frequency is 904MHz - 928MHz.

Users could set new wireless transmission password before installation, here we set the PSK PWD as '22222'

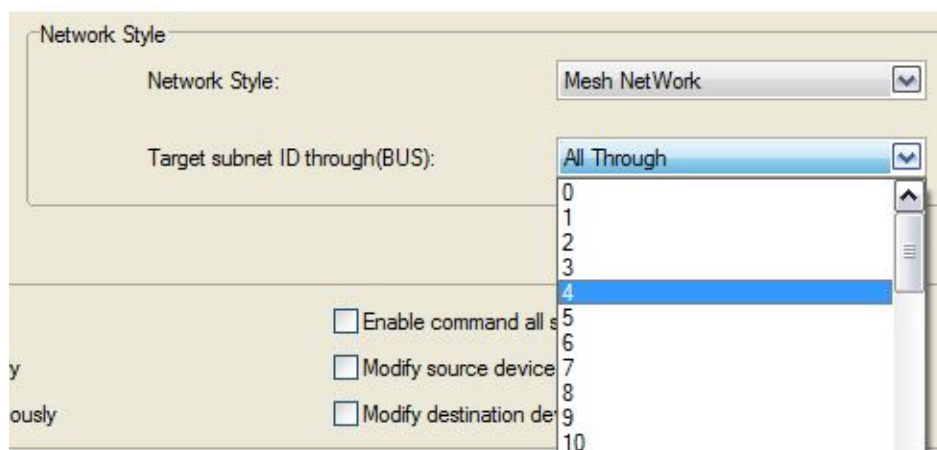## 6.3 Filter

6.3.1 Network Style

Network Style

Set the working mode for the gateway, mesh mode or bridge mode.

Target subnet ID through (BUS)

This option is used to allow the mesh gateway to transmit the commands from the

specified Subnet ID device in HDL BUS system. It's white list. E.g. if select 4 for it, the gateway will filter all other devices' commands except the Subnet 4's, then to reduce the communication burden of Subnet 4.

For the beginning to configure the system, normally select 'All Through' for it; after that, better to select the specified Subnet ID for the mesh gateway according to the situation.

Note: Only the mesh mode displays this option.

6.3.2 Options of RF Filter

Those RF devices' commands which enabled in below table will be filtered by the gateway. The limitation can be specific to Source address, Command and Destination address. It's black list.


Note: Only the mesh mode displays this option.

6.4 Node Configuration

This page is used to set the wireless parameters for the normal wireless devices via the gateway, all wireless devices need to enter the wireless setup mode. It's the preparatory work before user can manage the wireless system, after that can start to search and configure them as usual.

Take the wireless DLP panel as an example:

1- Click 'Search' button
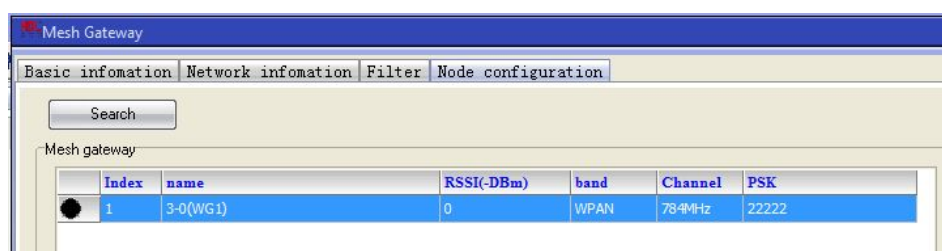
2- You will be able to find the connected mesh gateway in 'Mesh' list, and the right side displays the information of it (Band, Frequency and PSK PWD).
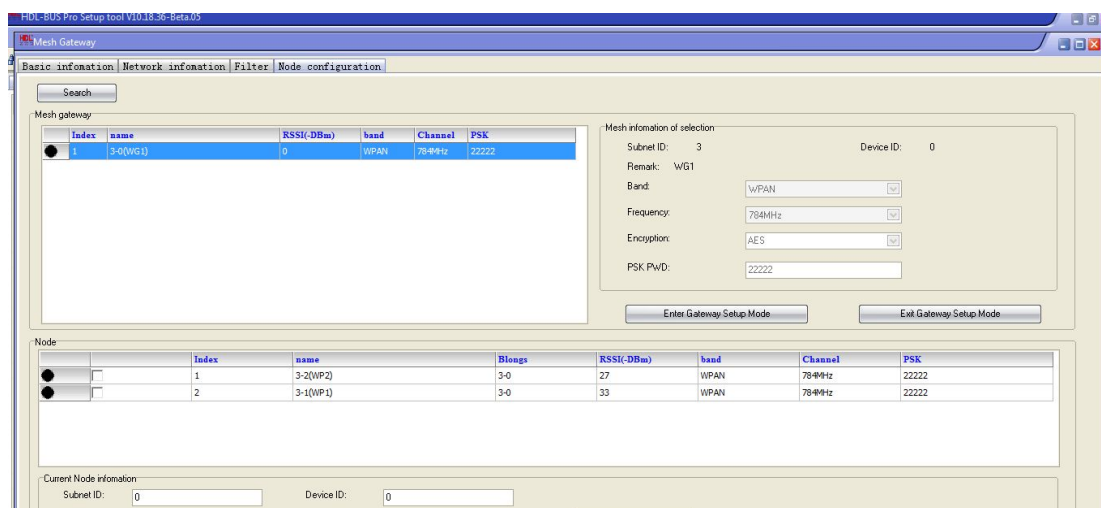

3- Click 'Enter Gateway Setup Mode' (or press the 'PROG' button 3 times continuously), the RED LED will flash quickly that means the gateway enters the wireless setup mode.

4- Long press the DLP first and eighth buttons at the same time to enter the setting page,

![HDL logo]

select 'WIRELESS', then it will enter the wireless setup mode

5- Click the 'Search' button again, this panel will be found in the 'Node' list.

❖ RSSI: normal range is 0-90, the smaller the better. If it's larger than 90, that means the signal is too weak so need to change its installation place, near to other wireless devices.
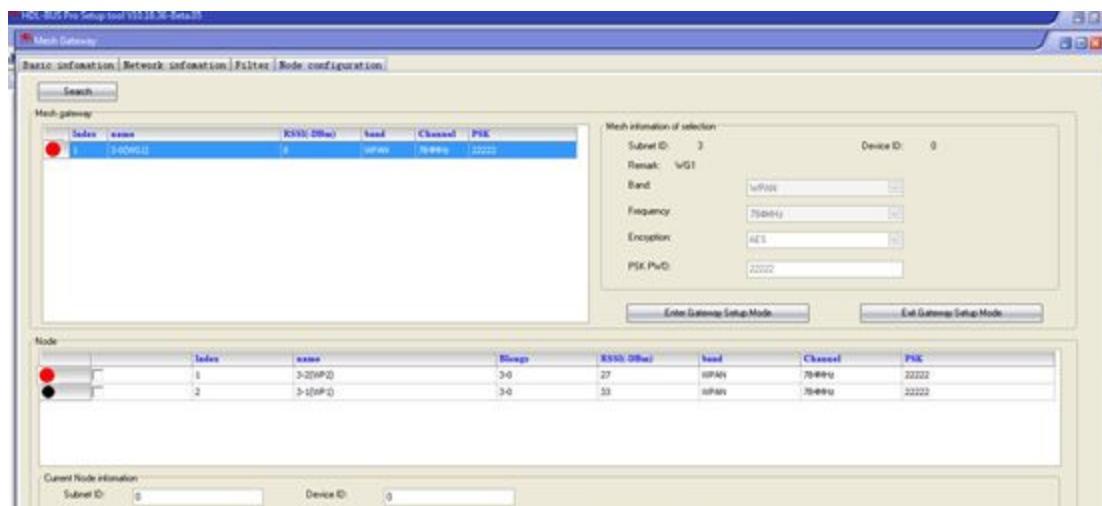

6- Select the node, change its ID and remark it, click Save. (the Subnet ID must be same as the gateway's)
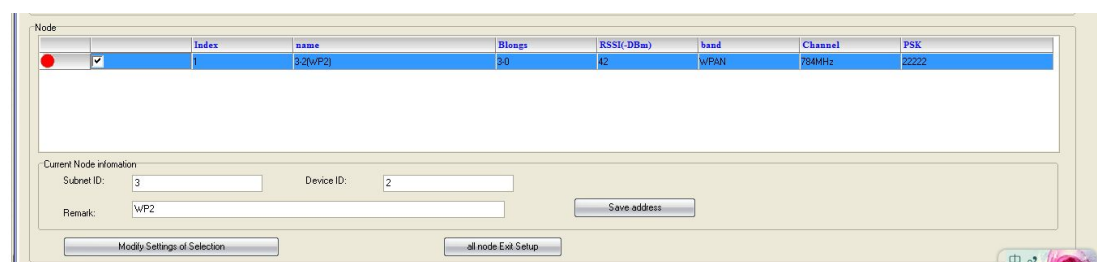
7- Click 'Modify Settings of Selection', and it will show 'configure successfully ', then all its wireless parameters will follow the gateway's (Band, Frequency and PSK).

8- Click 'all Node Exit Setup', then the gateway and the panel will exit the wireless setup mode.

9- Go to the HDL BUS setup tool's main interface to search and add the wireless devices,

start to configure them via the gateway.
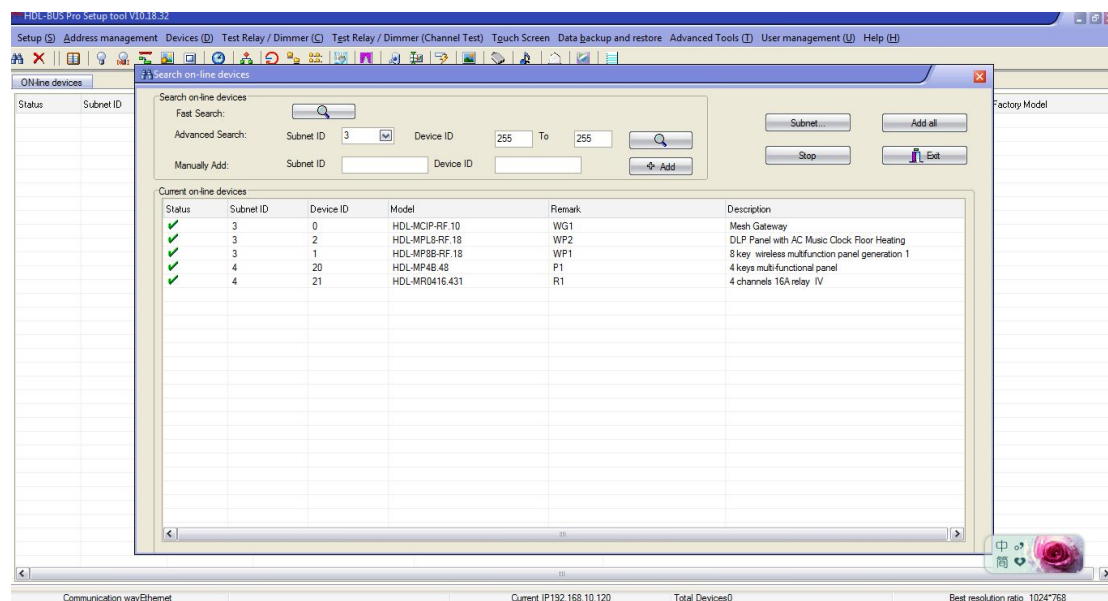
Document updates:

Version	Data	Description
V1.0	2015.02.10	Create new document

7. Note