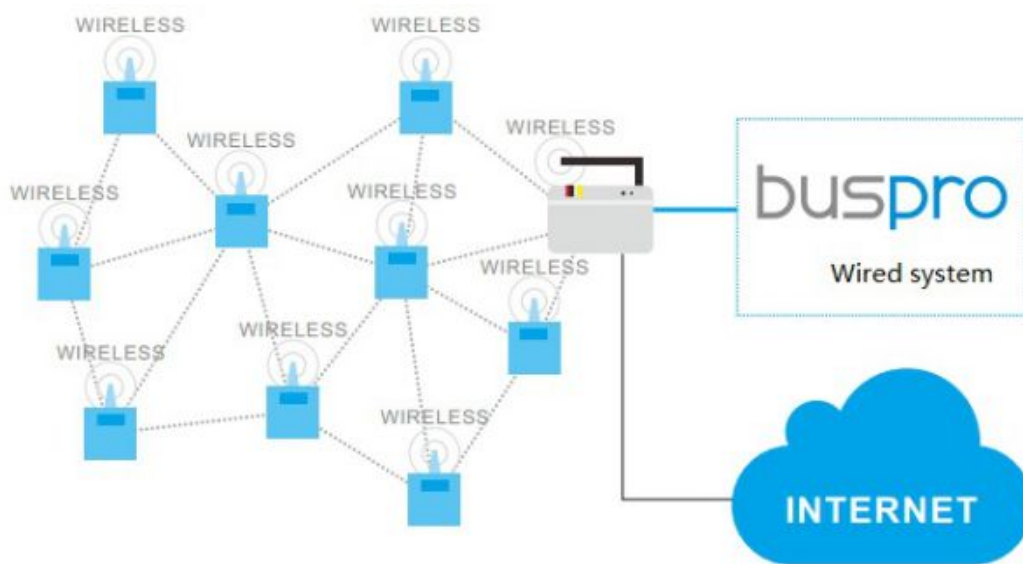




Introduction to the HDL Wireless System



buspro

www.hdlautomation.com

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Document update:

Version	Date	Description
V1.0	2015.11.30	Finish new document
V1.1	2015.12.01	Reformulated information
V1.2	2016.01.05	Proofread

1. Overview

The HDL Buspro Wireless System is based on IEEE802.15.4 standard mesh technology, and provides an ideal solution for retrofit projects, new build projects, or for projects in which the owner wishes to reduce installation time and the costs associated with rewiring.

To manage and configure the wireless system, the HDL-MCIP-RF02.10 wireless gateway is required. Using the gateway, different platforms such as Ethernet, Wired Buspro, RF, and HDL devices can be incorporated into a single system.

Using the wireless mesh network, any connected device will be able to work independently after it has been configured with the same channel frequency and password.

Each wireless device has the ability to automatically find and communicate with the next nearest device, while acting as a repeater until the target device is acquired.

This means that regardless of how large a building is, or how many walls it has, the target device will always receive its data packet.

Communication Distance: Indoor 50m (Without barriers)

Outdoor 80m (Without barriers)

Transmission Power: 10dBm (10mW)

Frequency Channels: WPAN for China (780MHz - 786MHz)

SRD for Europe (864MHz - 870MHz)

ISM for North America (904MHz - 928MHz)

Encryption: AES



Ensure that the correct frequency is used for your area.

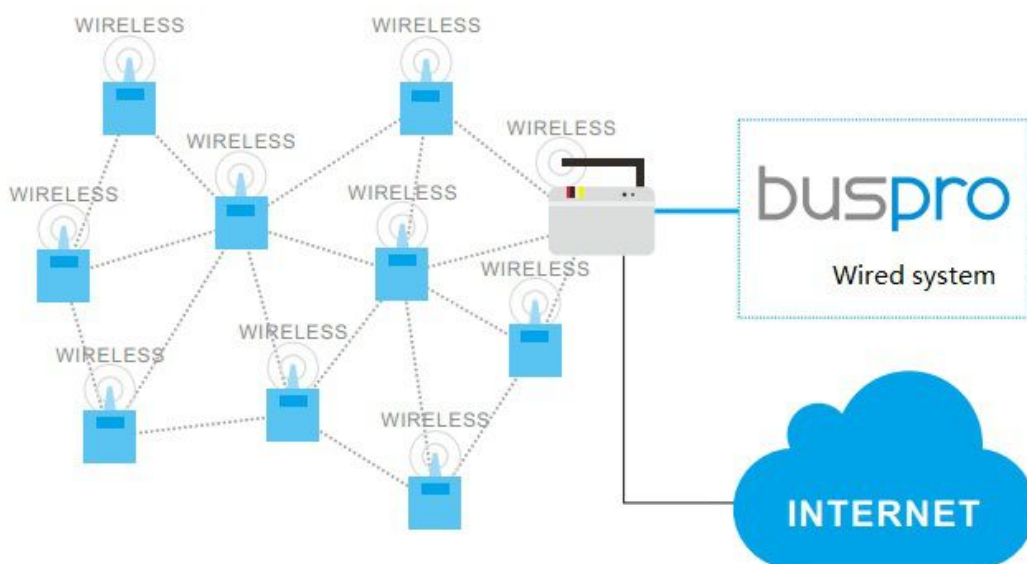
To increase the security of the wireless network, change the default password.

2. Wireless System

2.1 Mesh Mode

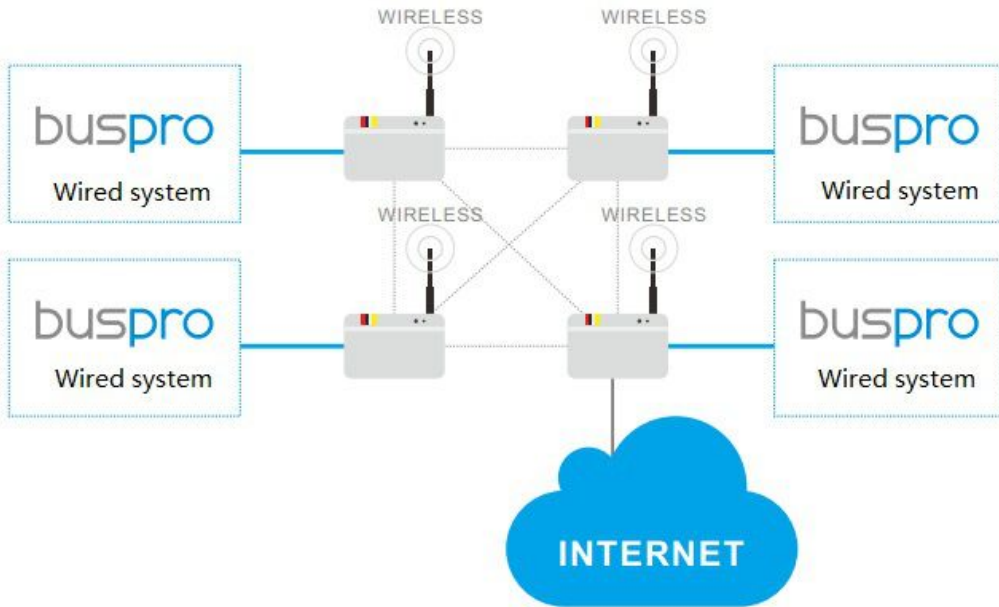
The wireless gateway can be configured to work in mesh mode, in mesh mode each connected device will function as a signal repeater. This increases both the data transmission reliability, and the signal integrity.

Since the wireless gateway has a Buspro interface, a hybrid solution using a Wireless + Wired system can also be created. This is recommended if the project has an existing Buspro system, which a user wishes to incorporate into their new system.



2.2 Bridge Mode

The bridge mode can be used as an alternative to an Ethernet cable, allowing different floors and rooms to be linked.

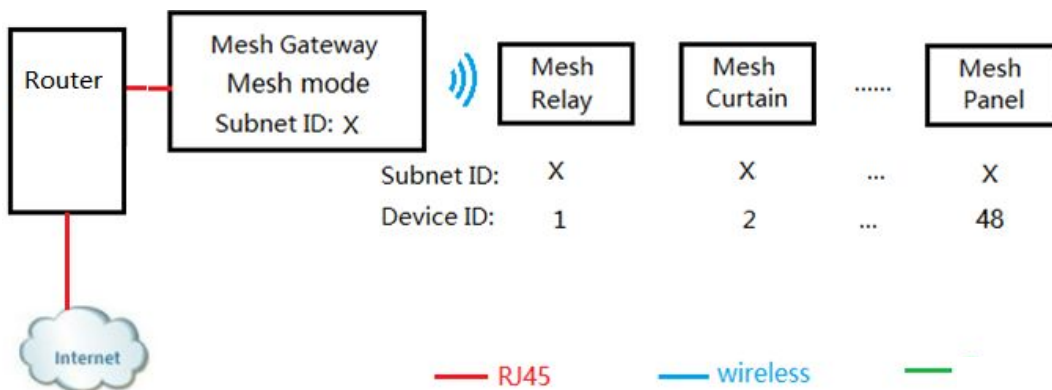


3. Application

3.1 Example Project

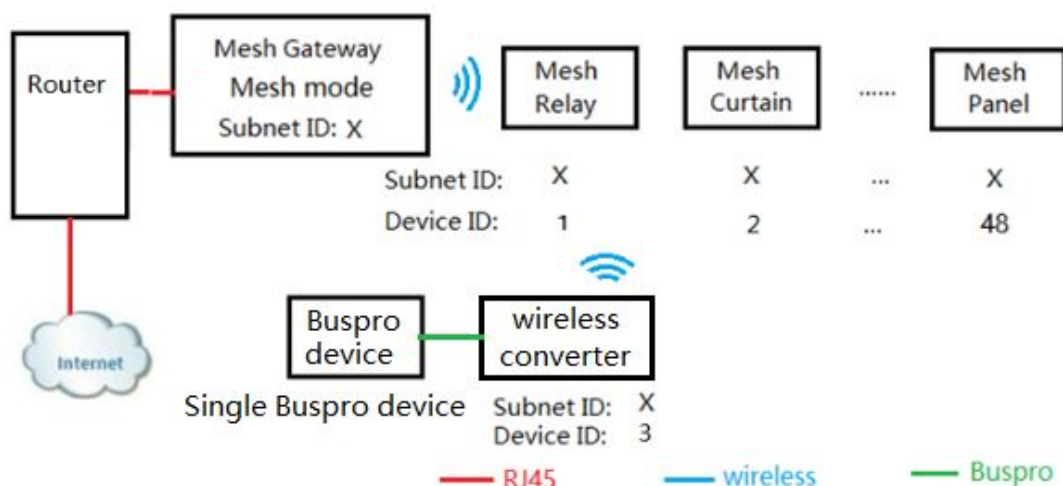
In the example shown below, the devices are communicating via RF. To configure all the functions in this network, the wireless gateway should be used.

The wireless gateway should be kept in the project as it serves as an interface between the Mobile App and the Wireless System, while enabling user remote access to the system via the internet.



3.2 Example Project using a Wireless Converter

The wireless converter was specifically developed to enable wired Buspro devices to communicate through RF. The wireless converter is used for when you wish to integrate wired Buspro devices into a wireless system.



The Wireless Converter has one Buspro port, and is capable of outputting both RF and 100mA 24DC power. Note only one Buspro device can be connected to the Wireless Converter.

3.3 Large Scale Example Project

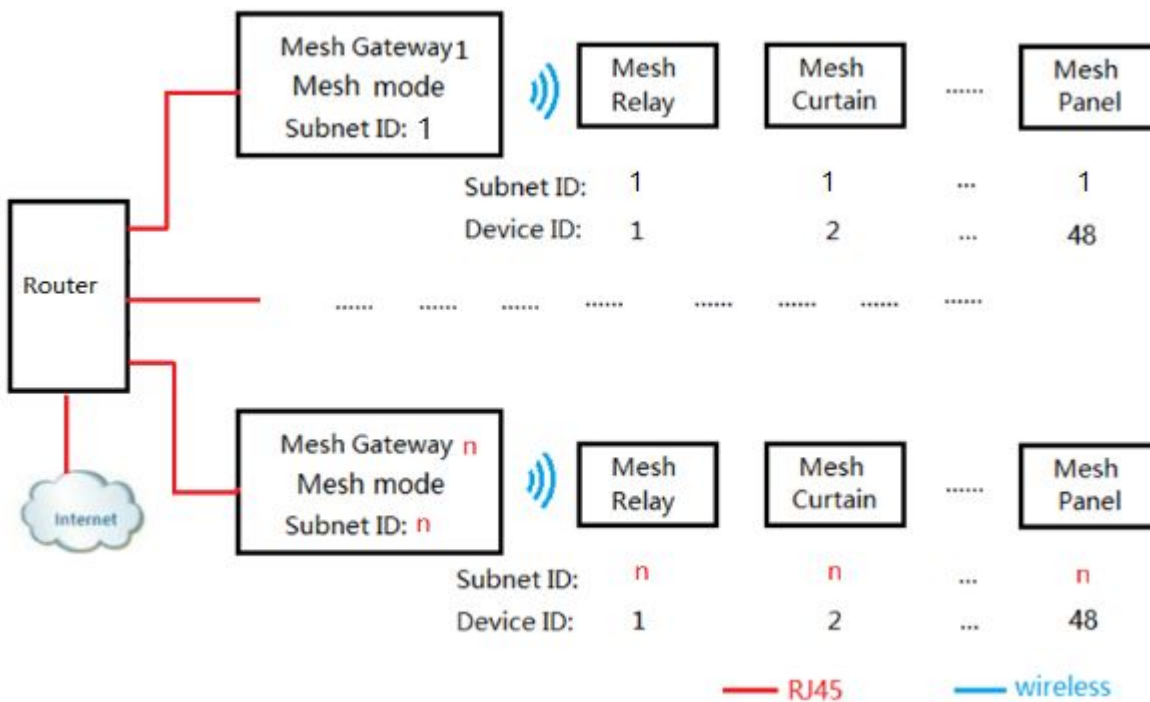
If a large scale project such as a villa or mansion is to be automated with the Wireless System, it will be necessary to treat the installation as several “Simple Projects”.

If the technique of multiple simple projects is used, the overall system stability and performance will be increased dramatically.

An Ethernet framework consisting of a router and network switches is necessary to connect to all of the gateways through the RJ45 cable.

All of the Wireless Gateways must have different parameter settings, as an example:

- Subnet ID
- Frequency Channel
- Password



1) A different Subnet ID must be set for each wireless gateway.



2) Each floor of the building should have its own wireless gateway.

3) Each wireless device on the same floor, must use the same Subnet ID as the wireless gateway on that floor.

4) Each Wireless Gateway can manage 48 wireless devices.

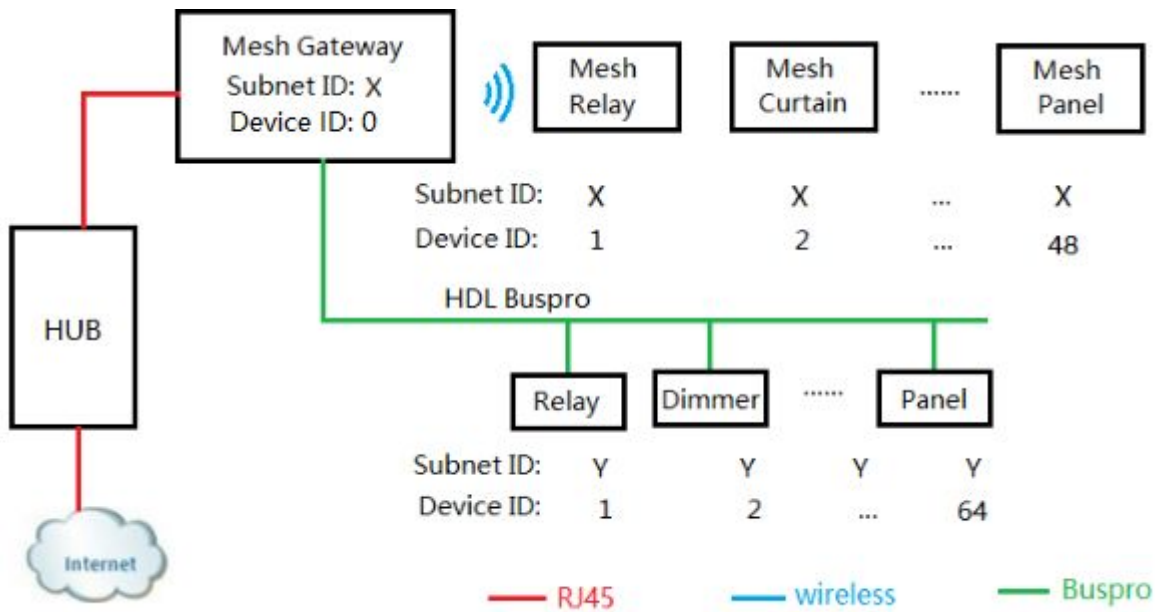
5) Each "Simple Project" must have a different channel frequency and password, to avoid interference.

3.4 Example of a Hybrid Project

Through using either the Buspro port or the Ethernet port, a hybrid solution can be created which is able to incorporate both wireless and wired Buspro systems.

This provides installers with a flexible control solution which can meet the needs of any install location.

A hybrid project of this type will also enable remote access control from the internet, via a mobile app.



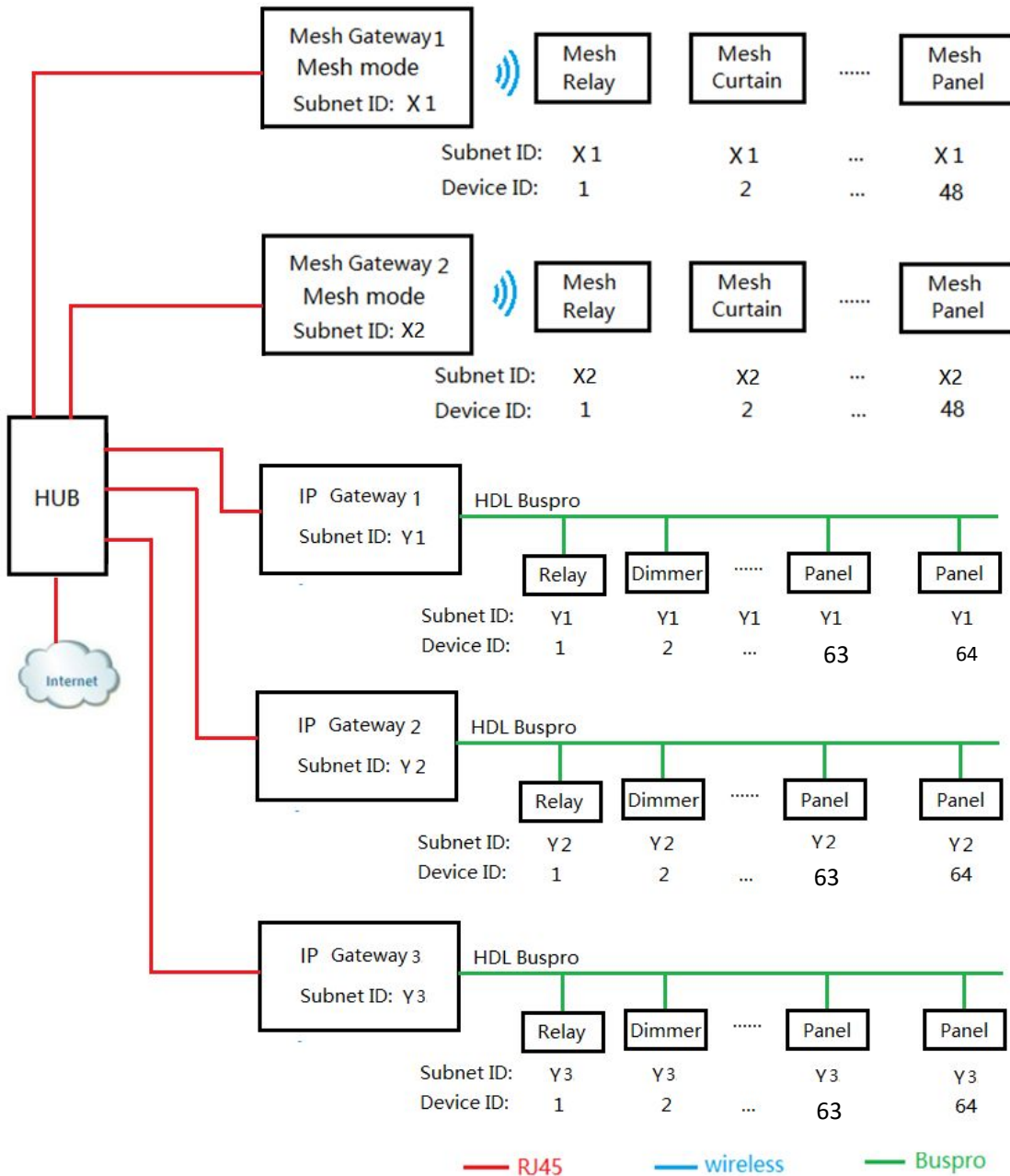
1) The Wireless Gateway is a dual port IP module, one port for the wired system and one port for the wireless system.



2) A different subnet ID is needed to connect wired devices to the Buspro port. If the Wireless Subnet is X, the Wired Subnet must be Y.

3.5 Example of a Large Scale Hybrid Project

If a large scale project like a building or office employs different systems for different floors, a unifying Ethernet framework should be created to link the hybrid building system together.



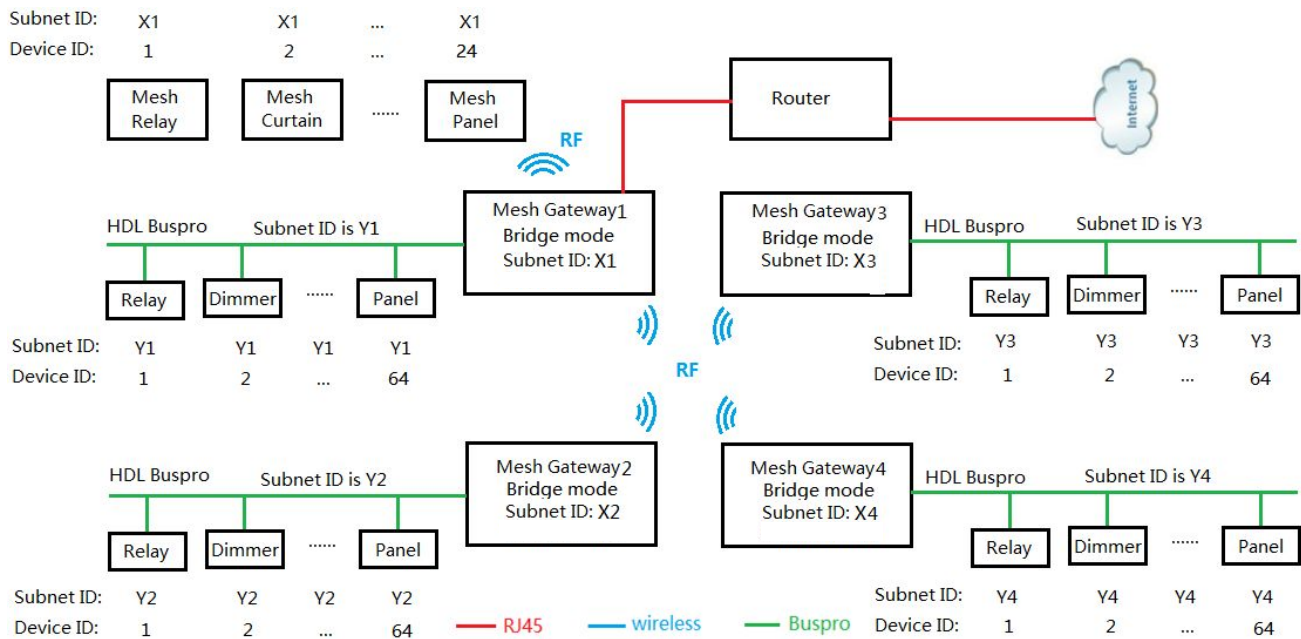
- 1) The wireless system should be set to mesh mode.
- 2) Each wireless gateway will need to work individually, and have differing frequencies.

3.6 Example of a Bridge Mode Project

Some wired installations will not have an Ethernet backbone available, making it impossible for them to be linked via an Ethernet cable.

To enable a link to be created all of the wireless gateways must be set to bridge mode, and have the

same frequency and password. When this is done the wireless gateways will be linked via RF.



- 1) When the bridge mode is active, the wireless gateway can manage 24 wireless devices.
- 2) Wireless Gateways which are linked by Bridge Mode communicate with each other via RF.
- 3) Each Wireless Gateway must have an independent Subnet ID to manage its own Wireless devices.
- 4) Each of the Wired Buspro devices must have an independent Subnet ID.



4. Configuration

The wireless gateway RF frequency and password must be configured before any wireless devices are connected to it.

To successfully configure wireless gateway:

1) Search for the Wireless Gateway in the HDL Buspro software

Ensure the PC and the Wireless Gateway have the same IP segment.

- The default IP address of the Wireless Gateway is "192.168.10.250".

2) Select the correct Frequency for the Wireless Gateway

For China, select WPAN band, with a frequency range of 780MHz -786MHz

For Europe, select SRD band, with a frequency range of 864MHz - 870MHz

For North America, select ISM band, with a frequency range of 904MHz - 928MHz

- Each floor requires a different frequency and subnet ID

2) Unique Password

The entire project can be protected from tampering by applying a password.

- The default password is "HDL-SecurityKey0"

It is recommended that each client is issued with a unique password.

3) Enter Setup Mode

The setup mode can be enabled or disabled manually, or via the HDL Buspro software.

Manually:

To enable manual setup, press the "PROG" button located on the wireless gateway 3 times, within 3 seconds. To disable the manual setup process, press the "PROG" button a fourth time.

Software:

Select the Node Configuration tab, and then click on the Enter Setup Mode button. To disable the configuration process, press the Exist Setup Mode Button.

- When the setup mode is enabled, the wireless gateway LED will flash rapidly, indicating that it is able to broadcast its wireless parameters (Frequency & Password) to other wireless devices.

4) Connect the Wireless devices to the wireless gateway

As some devices have a "PROG" button and others don't, two different connection procedures exist.

For modules with a "PROG" button, press the "PROG" button 3 times, within 3 seconds. The modules LED will then flash rapidly indicating the device is ready to be connected.

If the wireless gateway successfully connects to the module, the wireless modules LED will return to its normal state after 5 seconds.

Below the connection method for modules which do not have a “PROG” button are explained.

DLP Panel:

Press the 1st and 8th buttons at the same time to enter the setting page, and then select the ‘WIRELESS’ option. The LED indication for the 7th and 8th buttons will then turn on, indicating that the DLP panel is in setup mode, and ready to connect to the wireless gateway. When the DLP panel has successfully connected to the wireless gateway, the LED button indication will turn off.

Standard Panel with single color LED:

Long press any button for 25 seconds, this will cause the LED to flash once per second indicating that the panel is now in setup mode, and ready to connect to the wireless gateway.

When the panel has successfully connected to the wireless gateway, the LED will turn off.

- When the button is pressed for 15 seconds the LED will flash rapidly, this indicates the address modification state is enabled.

Touch panel with RGB LED:

Long press any button for 25 seconds, this will cause the LEDs to flash green once per second, indicating that the panel is now in setup mode and ready to connect to the wireless gateway.

When the panel has successfully connected to the wireless gateway, the LED will turn off.

- When the button is pressed for 15 seconds the blue LEDs will flash rapidly, this indicates the address modification state is enabled.

6) Configuring the system

After all the Wireless devices have been attached to the Wireless Gateway, exit the setup mode to search all of the wireless devices present in the HDL Buspro software.

5. Power Interfaces

There are two types of power Interfaces:

- L
- L+N

Both (L) and (L+N) power interfaces are considered as an electronic switch capable of turning lighting on or off without dimming.

For both power interfaces channel 1 is for MOSFET dimming (trailing edge), and is suitable for resistive and capacitive loads.

The interfaces can be used for:

- Incandescent Lamps
- Electronic Transformers
- LED Drivers



Never connect an inductive load to Channel 1, ex: Fan, Transformer, Inductive Ballast or Motor.

Channels 2 and 3 are for TRIAC dimming (leading edge), and are suitable for resistive and inductive loads.

All Channels (1, 2 and 3) have a small amount of current leakage, this may cause flickering in LED and energy efficient lamps when they are turned off.

To eliminate this flickering, a constant current module (Bypass module) is needed so that the lights can be connected in parallel ensuring that the errant current is eliminated.



Always turn OFF the AC Power from the Power Interface before changing any FUSES or loads.

In order to protect Channels 2 and 3 from short-circuit, a (aR type) fuse must be used.

5.1 Power Interface (L)

To enable the power interface to detect a signal from channel 1, connect a load or bypass module.



The Power Interface has an internal AC/DC converter so that the correct current is supplied to the switch Panel.

Change the Max Output to a lower value, ex:

- Channel 1, 2 or 3 = 90% Max Output

This measure is to supply more current to the AC/DC converter in case all channels are ON. Having a total of 40W, there will not be enough current to supply the AC/DC converter.

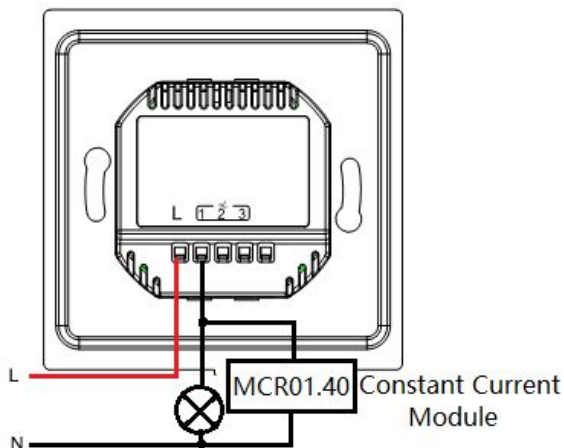


If there is not enough current to the AC/DC converter, the Panel will reset when turning ON all channels.

For a correct maximum level channel output, test the channels consumption beforehand.

If connected in parallel, connect one constant current module (Bypass module) to the channel 1 output and Neutral (N).

This will ensure that enough current is supplied to the Power Interface from the AC/DC converter.



5.2 Power Interface (L+N)

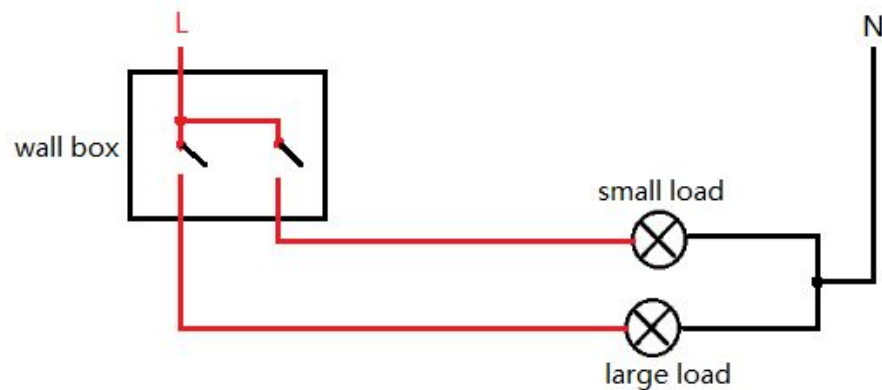
The difference between (L) and the (L+N) version is that there is no minimum load requirement for the L+N power interface. This means that the maximum output of the 3 channels can be set to 100%.

6. Installation

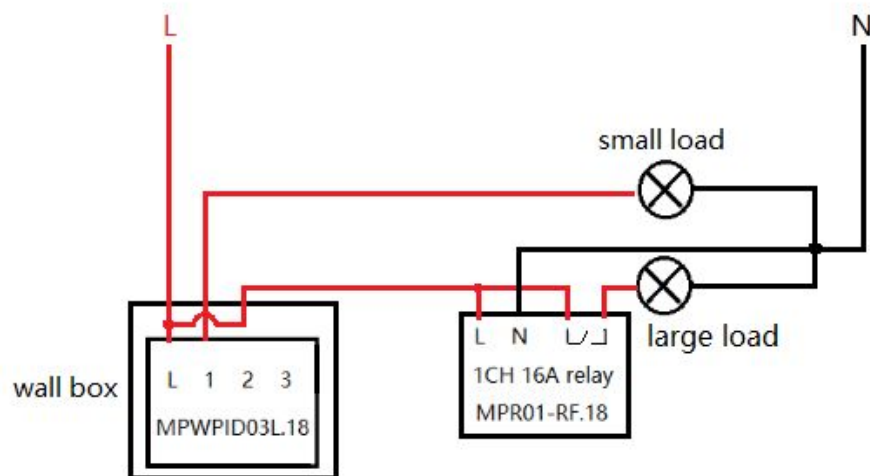
6.1 Roof Installation

Some wall boxes may have channels with high power loads which cannot be controlled via the power interface. If this is the case a wireless relay or dimmer should be installed in the roof.

traditional way :



intelligent way :



6.2 Limitations of the Wireless System

Obstacles such as walls and interference will reduce the transmission distance, and in extreme cases the wireless signal may be lost causing a communication breakdown.

- Install a wireless repeater between devices which have poor communication.



Avoid installing wireless devices in metal containers/boxes, if absolutely necessary ensure the device antenna is outside of the metal container.

7. Firmware Upgrades

In normal operation, the firmware will be periodically upgraded automatically. If the automatic upgrade cannot be completed, it will be necessary to perform a manual upgrade.

During the manual upgrade process, the wireless devices will return to their default frequencies & passwords. To enable communication with the wireless devices, the wireless gateway must be set to 'Setup Mode'.

8. Wireless Devices

System components		
S/N	Brief Description	Model Number
(A) Gateway		
1	Wireless Gateway	HDL-MCIP-RF02.10
(B) Panel Power Interface (LN Type) (It must work in conjunction with panel)		
1	Wireless Power Interface (LN)	HDL-MPWPID00LN.18
2	Power Interface with 1ch dimmer (LN)	HDL-MPWPID01LN.18
3	Power Interface with 3ch dimmer (LN)	HDL-MPWPID03LN.18
4	Power Interface with 1CH relay &Temperature (LN)	HDL-MPWPIR01T.18
5	Wireless Power Interface (L+N Type) with 1 channel relay	HDL-MPWPIR01.18
(C) Panel Power Interface (L Type) /(It must work in conjunction with panel)		
1	Power Interface with 1ch dimmer (L)	HDL-MPWPID01L.18
2	Power Interface with 3ch dimmer (L)	HDL-MPWPID03L.18

Actuators		
(A) Dimmer		
1	1 channels dimmer	HDL-MPDO1-RF.18
(B) Relay		
1	1 channel relay actuator	HDL-MPR01-RF.18
2	2 channels relay actuator	HDL-MPR02-RF.18
(C) Curtain controller		
3	1 channel curtain actuator	HDL-MPC01-RF.18
4	Master Curtain Control Motor	HDL-MWM70-RF.12
User Interface		
(A) DLP Modern		
1	Modern DLP EU	HDL-MPL8-RF.18
(B) iFlex Series Panel		
1	iFlex 2 Button EU	HDL-MP2B-RF.18
2	iFlex 4 Button EU	HDL-MP4B-RF.18
3	iFlex 6 Button EU	HDL-MP6B-RF.18
4	iFlex 8 Button EU	HDL-MP8B-RF.18
(C) iTouch Series Panel		
1	iTouch 1 Button EU	HDL-MPT1-RF.18
2	iTouch 2 Button EU	HDL-MPT2-RF.18
3	iTouch 3 Button EU	HDL-MPT3-RF.18
4	iTouch 4 Button EU	HDL-MPT4-RF.18
(D) iSense Series Panel		
1	iSense 1 Button EU	HDL-MP01R-RF.18
2	iSense 2 Button EU	HDL-MP02R-RF.18
3	iSense 3 Button EU	HDL-MP03R-RF.18
4	iSense 4 Button EU	HDL-MP04R-RF.18
(E) Wireless Signal Transmitter		
1	2 Button Wireless Signal Transmitter	WS200-2X

Sensor		
(A) Wireless Detector		
1	Ultrasonic and PIR Sensor	HDL-MSPU05-RF.1C
(B) Wireless Dry controller		
1	4CH dry contact	HDL-MPS04-RF.18