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*ZigBee™-Power Socket with Power Consumption Monitoring*

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## **User Manual**

# **Power Socket with Power Consumption Monitoring**

**Model: Z808A**

**Energy Consumption Monitoring Series**

For Home Automation

# Z808A

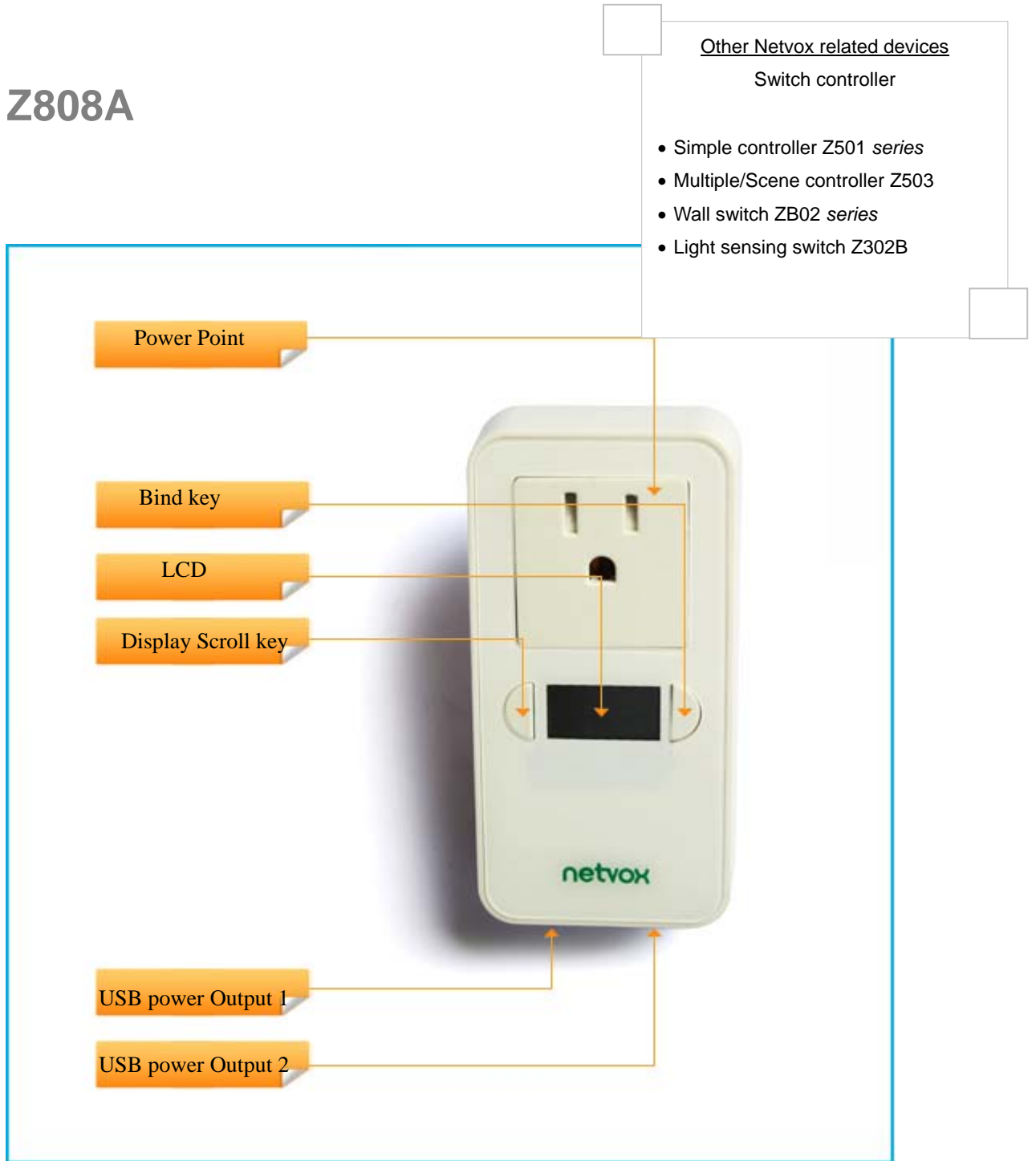


Figure: Z808A (different plug head is provided for different region)

## Introduction

NETVOX Z808A is a ZigBee Home Automation enabled power socket with power/energy/current/voltage consumption monitoring. It acts as a router device in the Home Automation profile network. It can be manually switched through a soft on/off switch or switched wirelessly through a paired remote controller. Consumption reading is displayed on the LCD screen or it can be captured and displayed on ZiG-BUTLER -Netvox application software, or on any 3<sup>rd</sup> party ZigBee enabled in-home display.

### *What is ZigBee?*

ZigBee is a short range wireless transmission technology which defined for a minimum complexity, low power consumption, low data rate, cost effective wireless solution. ZigBee lies in between wireless markup technology and Bluetooth. ZigBee is based on IEEE802.15.4 standard, the mutual co-ordination between thousands of sensors to exchange data. Sensor to sensor or node-to-node communication is achieved through relays of control data between devices with only a fraction of energy use which denoted for highly transmission efficiency.

*Note: Wireless communication, in some real use cases, can be limited by the signal blockage. Please consult your service provider or place of purchase.*

## Product Specification

- ✓ Fully IEEE 802.15.4 compliant (ZigBee Pro)
- ✓ Utilizes 2.4GHz ISM band, up to 16 channels
- ✓ 100~240VAC, 50/60HZ input power
- ✓ Resistive Load: 15A/250VAC
- ✓ Inductive Load: 1HP(horsepower)/250VAC; 0.5HP/125VAC
- ✓ Standard USB charging port: 5VDC
- ✓ Up to 70 meters non-obstacle wireless transmission distance
- ✓ Simple operation and device configuration

## Setting up the Z808A and network

### **Setting Up Summary**

- (1) Startup and network association
- (2) Bind the device with other device where applicable (i.e. bind it with a ZigBee switch for wireless control).
- (3) It is ready to be used.

### **Step 1. Startup and Network Association**


To allow Z808A to function, it must first join to a ZigBee network. When it is given powered it will automatically start searching for an existed network. So before you give power to Z808A, please make sure it is within the wireless coverage distance (70 meters or less) and make sure **first** you have the **permit-join feature enabled** either on a coordinator or a router device in the network so that when Z808A is powered on Z808A will automatically join to the network.


*\*For how to enable permit-join please refer to the router or coordinator device user manual*

#### **Operation:**

Make sure you have detached any home appliance from Z808A.

Step 1: Make sure you have open up permit-join function (valid for 60 seconds) of a coordinator or a router


Step 2: Now plug in Z808A into AC power socket to power it. Z808A device will start to search for the network within reach. The  icon will flash continuously while searching for network.

Step 3: if joining is successful, the  icon stops flashing. If unsuccessful remove power from the device and repeat the whole procedure again. Make sure that the permit-join of a router or coordinator is enabled first.

## Step 2. Device pairing for On/Off control (binding)

To wirelessly control Z808A, it is required to pair with ZigBee enabled on/off remote controller. If you do not wish to control Z808A with a remote, you may skip this step and go to [How to use Z808A](#).

### Pairing operation:

- 1). Now hold press the binding key for 3 seconds until you see the  icon flash once while it sends binding request to the air and displays '**bind**' on the screen
- 2). Likewise, do the same on the other device to exchange binding. (*refer to the other device user manual for binding details*)
- 3). If pairing is successful, the display shows '**good**' otherwise '**Fail**' is displayed.

**Clear pairing setting:** You may remove the pairing between the two or more devices. *Unbinding procedure is exactly the same as binding operation. When you repeat the binding process, the two devices will remove the binding information stored.*

## How to use Z808A

### *Remote control*

When the device has joined to the network and paired (see [Device pairing](#)) with a remote controller the device is ready to be used. Z808A should now be able to respond to on, off, toggle control command from a wireless remote controller.

**Operation:** If the Z808A device is properly paired with a switch device, you should see Z808A respond to on or off instruction wirelessly.

### *Soft switch*

Z808A can also be switched by a soft switch (binding key) toggle switch attached to it.

**Operation:** short press once. The output would switch between On or Off.



### *Display consumption on the equipped LCD*

Short press on Display Scroll key. On each key press the display would scroll from voltage, current, watt, then to energy.

## Permit other device to join

Z808A is featured to be a router in the network. It permits other devices to join the network. In normal operation, by default the router device Z808A does not permit any device to join to the network to protect the network from unexpected or unauthorized join attempt. You will need to open up the permit-join on Z808A or on other router device to allow new devices (a router or an end device) to join.

### *Operation:*

1. **Press the Binding key and Display Scroll key simultaneously for 1 second** until the  icon flashes once. 'Join' is displayed for 1 second then returns to the consumption display mode; in the same time the  icon flashed showing network unlocked. The permit join is now enabled and will last for 60 seconds.
2. Z808A waits the new device to join in automatically. Please note that the maximum waiting time to join is 60 seconds. Repeat the process if you missed the 60 seconds period.

## Power Consumption Reporting


When the load is attached to the device, the embedded meter reads the supplied current drawn overtime. Z808A reports the readings to a [paired target](#) device normally are an in-home display or consumption data logger. Ensure that you go through [Consumption reporting](#) and also [Configure reporting time interval](#) described in [ZiG-BUTLER](#) page, otherwise Z808A will not sent consumption reading properly when misconfigured. Z808A can report the consumption reading to Netvox's ZiG-BUTLER or to any 3<sup>rd</sup> party in-home display.

Power drawn overtime is measured. Current ([unit mA](#)), Voltage ([unit V](#)), Power ([unit kW](#)) and Energy ([unit kWh](#)). Z808A stores a new value read and updates such value and clears up the previous. User may want to return the reading back to zero when wish. Refer to [Resetting Power Consumption Summation](#) section bellow.

## Resetting Power Consumption Summation

Z808A accumulates and stores energy reading. In some cases user would wish to return the counter to zero.

### Operation:

Hold press Binding Key for 20 seconds, release the key until the  icon flashes its forth time. Within 5 seconds, short press Display Scroll Key. The energy reading on the screen should return to zero kWh.




## Restore to factory setting

Z808A is capable of storing and saving includes network routing information. If you wish to remove Z808A from an exited network, you would need to clear the saved routing information to join to a new network by simply reset the device to restore to the factory setting.

**\*notes: restore Z808A back to factory default will not reset power consumption summation. Please refer to [Resetting Power Consumption Summation](#) section above.**






## Operation

**Step 1.** Hold press binding key for 15 seconds, release the key until the  icon flashes its third time. Within 5 seconds, short press Display Scroll Key to clear stored information and return to factory default setting.

If successful the screen would display a full icon screen similar to the figure bellow. Z808A will then reboot. Soon the device will enter network search to attempt to join to a network. Refer to [network association](#) section of this manual.



## Summary of Key function and corresponding display

Function	Key	Duration key press	Display
Permit Join	Press both keys simultaneously	A short press	one  flash, 
Device Pairing	binding key	Press for 3s	One  flash, 'bind', 'good', 'fail'
Restore to factory setting	Binding key Display Scroll Key	Press for 15s. Within 5s, short press	Three timely  flashes Full icons display
Clear consumption summation	Binding key Display Scroll Key	Press for 20s. Within 5s, short press	Four timely  flashes. kWh return to zero
Soft switch	Binding key	A short press	N/A



[Next Page: Device Attributes Description for developers only]

## Clusters of Home Automation for Z808A

Home Automation device feature is defined by the endpoint which contains functional clusters. Table 1 lists clusters for the endpoint of Z808A

\*For time interval configuration on Z808A, please go through [Consumption Reporting](#) in ZIG-BUTLER section. If only Simple Metering (0x0702) [binding](#) is done and time interval is not configured Z808A will not report as time interval instruction is not given.

Table 1: Clusters supported by the endpoint

Cluster for Z808A	
Device ID: Mains Power Outlet (0x0009)	
EndPoint: 0x0A	
Server side	Client side
Basic (0x0000)	<i>None</i>
Identify (0x0003)	
Groups (0x0004)	
Scenes (0x0005)	
On/Off (0x0006)	
Commission (0x0015)	
Simple Metering (0x0702)	

Attributes of the Basic Device Information attribute set

Identifier	Name	Type	Range	Access	Default	Mandatory / Optional
0x0000	<i>ZCLVersion</i>	8-bit Unsigned integer	0x00 –0xff	Read only	0x03	M
0x0001	<i>ApplicationVersion</i>	8-bit Unsigned integer	0x00 –0xff	Read only	0x0B	O
0x0002	<i>StackVersion</i>	8-bit Unsigned integer	0x00 –0xff	Read only	0x2D	O

Identifier	Name	Type	Range	Access	Default	Mandatory / Optional
0x0003	<i>HWVersion</i>	8-bit Unsigned integer	0x00 –0xff	Read only	0x0A	O
0x0004	<i>ManufacturerName</i>	Character string	0 – 32 Bytes	Read only	netvox	O
0x0005	<i>ModelIdentifier</i>	Character string	0 – 32bytes	Read only	Z808AE3R	O
0x0006	<i>DateCode</i>	Character string	0 – 16 bytes	Read only	20120505	O
0x0007	<i>PowerSource</i>	8-bit Enumeration	0x00 –0xff	Read only	0x01	M
0x0010	<i>LocationDescription</i>	Character string	0 – 16bytes	Read/write	Empty string	O
0x0011	<i>PhysicalEnvironment</i>	8-bit Enumeration	0x00 –0xff	Read/write	0x00	O
0x0012	<i>DeviceEnabled</i>	Boolean	0x00–0x01	Read/write	0x01	O

## Descriptions of Attributes of the Simple Metering Cluster

Z808A utilizes Simple Metering cluster (0x0702) defined within Smart Energy Profile (SEP). Voltage, Current, Power and Energy are Netvox proprietary attributes.

**CurrentSummationDeliver** Attribute of SEP corresponds to **Energy** Attribute of Netvox proprietary. (Unit wh);

**InstantaneousDemand** Attribute of SEP corresponds to **Power** Attribute of Netvox proprietary. (Unit w);

**Current** Attribute of Netvox proprietary. (Unit mA);

**Voltage** Attribute of Netvox proprietary. (Unit V)

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## ZiG-BUTLER

During device installation, you will go through permit join and device pairing. Most of the time you need to physically access a device that is out of your reach. It becomes handy when you can program through software on a PC wirelessly. Our ZiG-BUTLER allows you to do that. Of course, any other 3<sup>rd</sup> party ZigBee enabled software is also applicable.

ZiG-BUTLER software is to be installed on a PC. The system needs a Z103 USB dongle or any other ZigBee to PC hardware interface such as a Z202 gateway to communicate with ZigBee network.

### Join the device into the network

If your ZiG-BUTLER sees a coordinator or a router device, you should be able to see the icon similar to the one below:

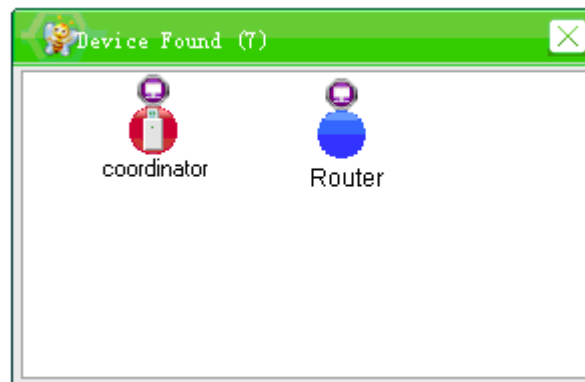


Figure A

-point your mouse to either the coordinator or router device icon and right click. From the menu select **Set PermitJoin On**.

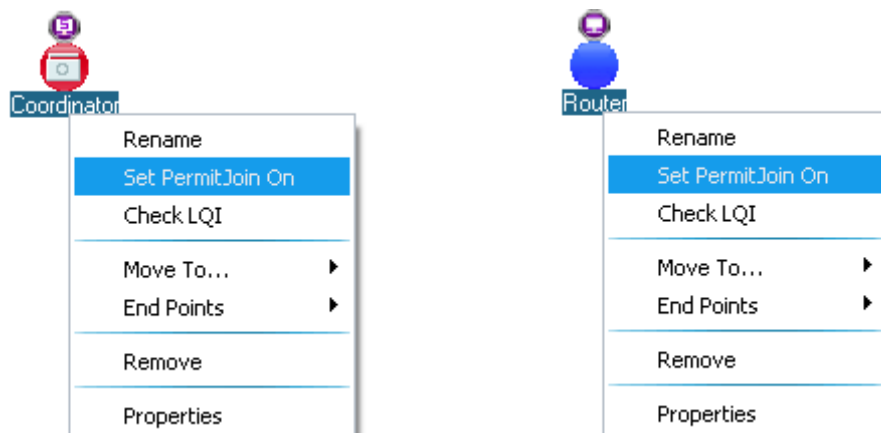


Figure B

*\*Note that the 6 routers and 14 end-devices rule. (Refer to the user manual of the router device)*

When the device has successfully joined, you should see the device icon appeared in ZiG-BUTLER.

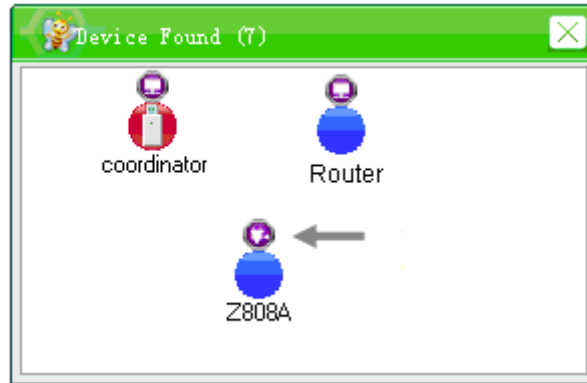


Figure C



## Device Pairing -for on/off control

To control Z808A from a wireless remote *ON/OFF device* pairing between them is needed. This is the same procedure as that described in [Step 2](#) in the beginning of this manual. However ZiG-BUTLER allows you to do the same from your PC.

For energy consumption reporting, please go through the [Consumption Reporting](#) section to setup reporting time.

First, make sure the remote controller device to be paired with Z808A is in the network and that ZiG-BUTLER sees it.

-Move your mouse to the circle on top of the **remote controller device** icon (not the Z808A device at this time yet).

Then right click your mouse should display menu and select **Bind**.

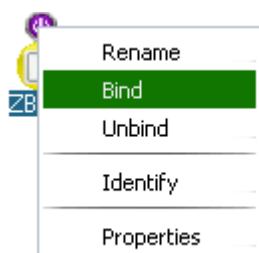


Figure D

Device binding configuration box will appear similar to the one bellow

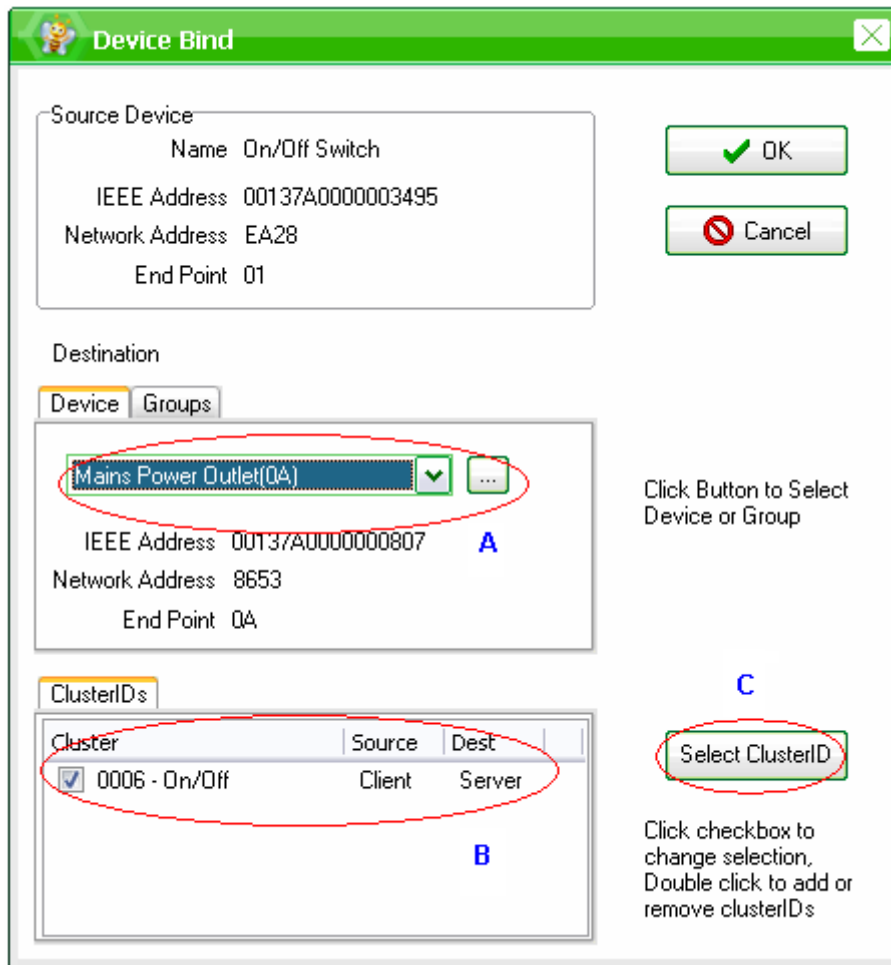


Figure E

Under the Device tab (label A) select the device to be paired (normally a lighting device or a power outlet device). Under Cluster column (label B) look for **0006-On/Off**. Make sure the empty box next to must be ticked.

If you do not see **0006-On/Off**, you can obtain it from a pool of *Cluster ID* by a mouse click on **Select ClusterID** button (label C).

Cluster ID configuration box will appear similar to the one bellow



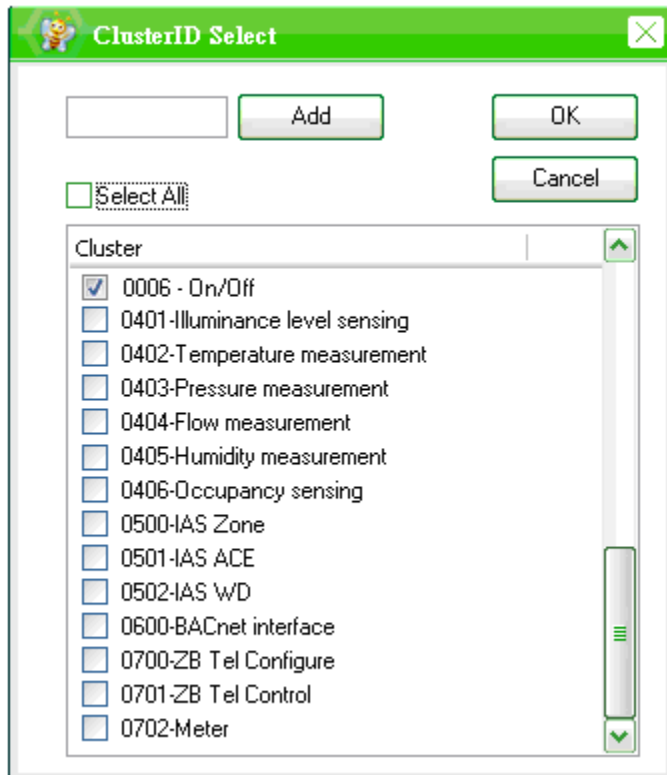


Figure F

-check the box next to **0006-On/Off**,

Then click **OK** to confirm the setting.

-Click **OK** (Figure E) and the system will pair the two devices. Remote controller device is ZigBee end-device which normally sleeps. So before you click on **OK in Figure E**, you need to wake it up so it can receive the pairing command (refer to remote controller's user manual)

*\*ZigBee knowledge:* ZigBee device has specific feature given by their cluster type such as 0006-On/Off cluster

Windows notification will pop up like so in figure G-1 & G-2

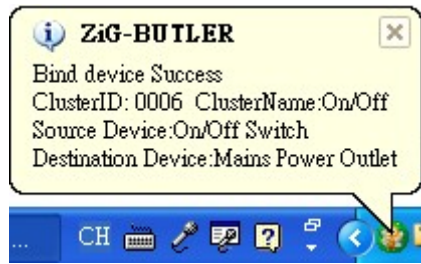


Figure G-1: Pairing successful

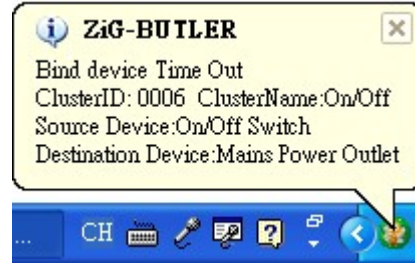


Figure G-2: Pairing unsuccessful


When device pairing is done correctly, from the network view display you should be able to see a **red line** between the two devices. If not then click on the  icon, this should bring up the pairing display. Please also refer to [View Device Pairing Configuration](#).



Figure H: Pairing view



## View Device Pairing Configuration

Move your mouse to the circle on top of **remote controller device** icon (not the Z808A device), then right click your mouse should display menu and select **Properties**. A device information dialog screen appears, similar to the one below.

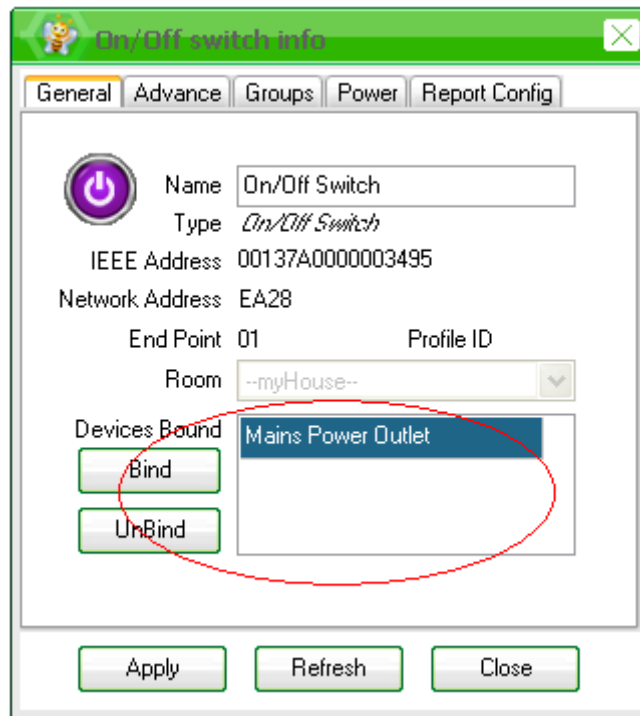


Figure I: Bind

In this example the list displays the paired device is mains power outlet and this should be your Z808A device. If nothing appears, wake up [the remote controller device](#) and quickly click on **Refresh** button. If still not appear, see if the remote controller can control Z808A. If not, please go through again the [Device Pairing for on/off control](#) section.



## Consumption Reporting

You are able to read consumption information from ZiG-BUTLER. Z808A is able to report consumption to the target device at your preference. **Target device pairing** for reporting and **reporting interval** setting is required. You may remove the reporting later. After **target device pairing** is done please proceed to the next sub-section on **Configure reporting time interval**.

Follow the procedure bellow.

-Move your mouse to the circle on top of the Z808A device icon.

**Note:** **target device pairing** must be done from Z808A side instead of from in-home display device, meaning that operate binding from the Z808A device icon rather than from the in-home display device icon within ZiG-BUTLER.

Then right click your mouse should display menu and select **Bind**.

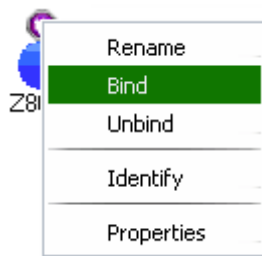


Figure J

Device binding configuration box will appear similar to the one bellow.

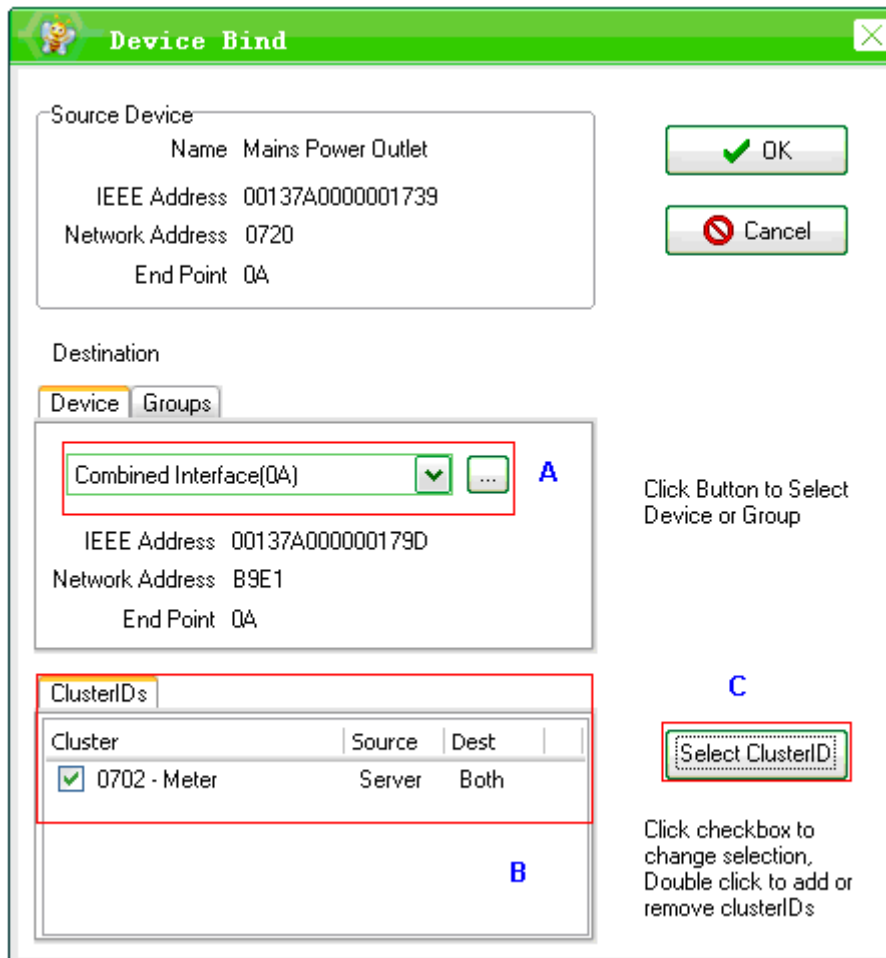
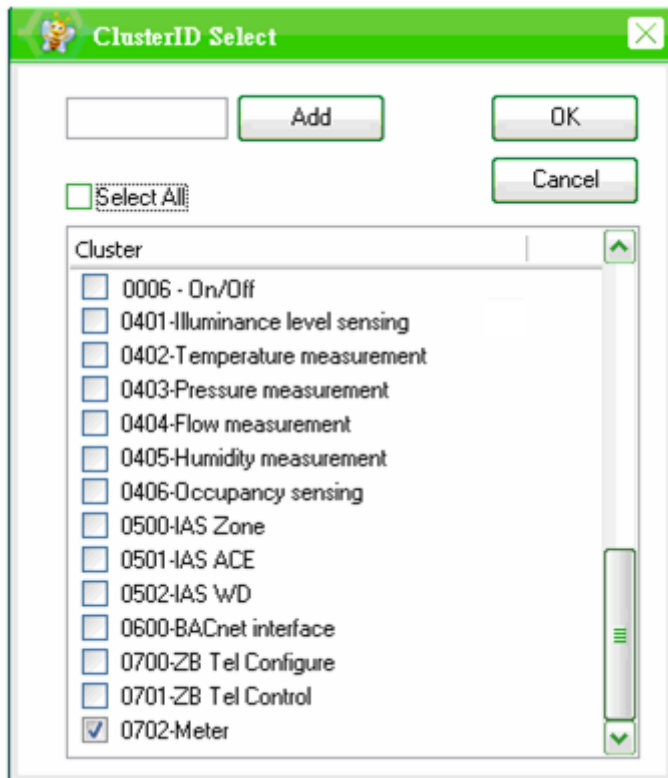


Figure K

Under the Device tab (label A) select the device to be paired (normally a lighting device or a power outlet device). Under Cluster column (label B) look for **0702-Meter**. Make sure the empty box next to must be ticked.

If you do not see **0702-Meter**, you can obtain it from a pool of *Cluster ID* by a mouse click on **Select ClusterID** button (label C).

Cluster ID configuration box will appear similar to the one bellow



If you still don't see 0702-Meter in the list, all you need to do is type in the number '0702' in the empty box near **Add** button, then click on **Add** button to add. You should then see the '0702' appear in the list as shown in the figure.

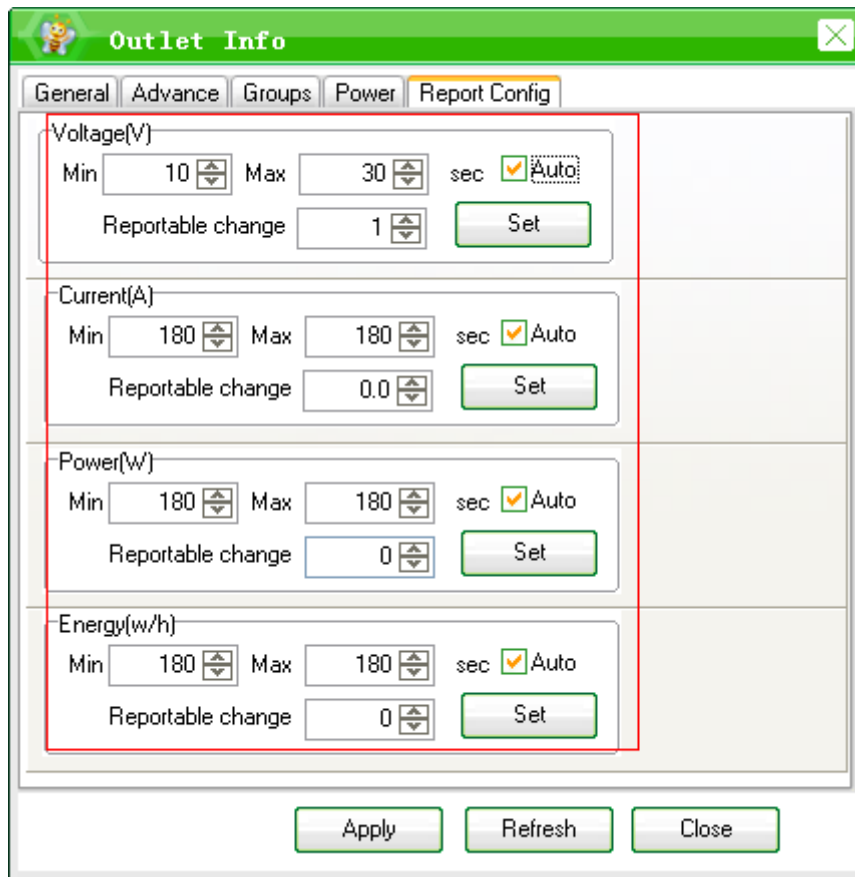
Figure L

- check the box next to **0702-Meter**,
- Then click **OK** to confirm the setting.
- Click **OK** (Figure K) and the system will pair the two devices.

Your PC notification will pop up a message to show binding successful or failed.

### Configure reporting time interval

- First, please make sure you have detached any home appliances from Z808A.
- Move your mouse to the circle on top of the Z808A device icon. Then right click your mouse should display menu and select **Properties**. Then go to Report Config tab.



First, check the box near **Auto** to enable the feature or to uncheck it to disable. Enter the minimum, maximum time and the difference in value.

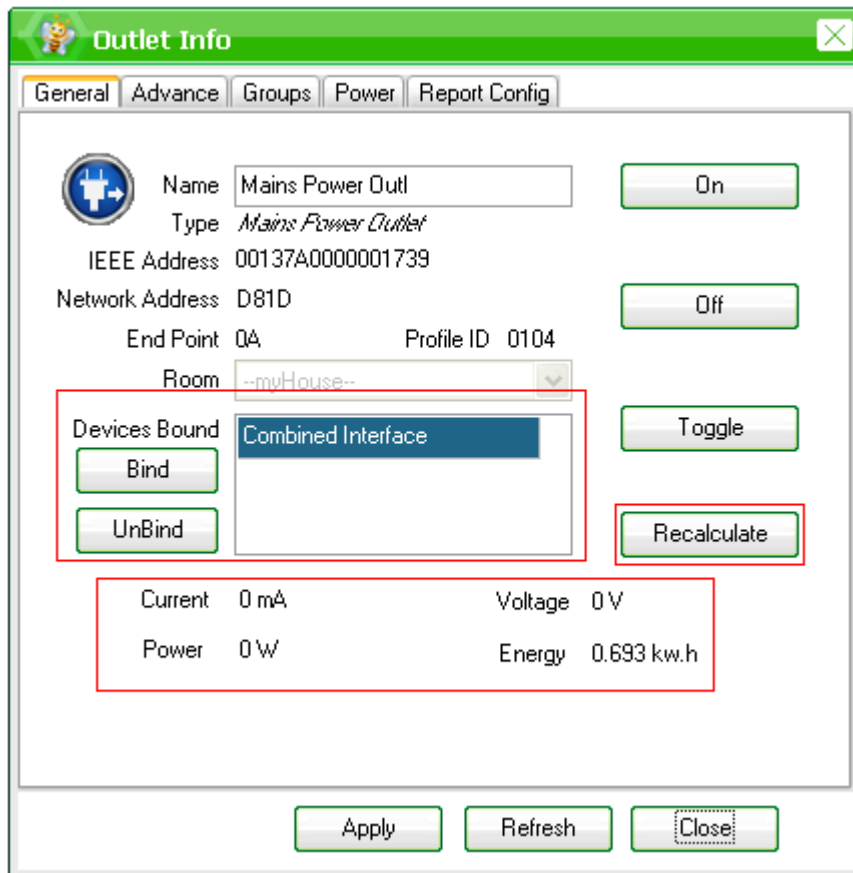
**Minimum reporting time interval (Min)** –this is the minimum reporting time, in seconds.  
**Maximum reporting time interval (Max)** –this is the maximum reporting time, in seconds.  
*If it is set to 65535, the device will not report the value in which **Max** is configured.*

**Reportable change** – this is the minimum change in value (voltage, current or power or energy) between the previous and the last detected. If the difference *is greater than* the set **Reportable Change** consumption value (i.e. 2wh), the device issues a report at the **Min** -minimum reporting time. If the change *is less than* it will not report until the time reaches to the **Max** -maximum reporting time.

Then click **Set** to send the configured information to the Z808A device.

## Return-Zero the consumption reading

You may clear the consumption reading displayed by clicking on **Recalculate** button.



The screenshot shows a software window titled "Outlet Info" with a close button in the top right corner. The window has several tabs: "General" (selected), "Advance", "Groups", "Power", and "Report Config".

Under the "General" tab, the following information is displayed:

- Name: Mains Power Outl
- Type: *Mains Power Outlet*
- IEEE Address: 00137A0000001739
- Network Address: D81D
- End Point: QA
- Profile ID: 0104
- Room: --myHouse--

There are several control buttons on the right side of the window:

- On
- Off
- Toggle
- Recalculate

A section labeled "Devices Bound" contains a dropdown menu showing "Combined Interface". Below this dropdown are "Bind" and "UnBind" buttons.

At the bottom of the window, there is a table of current readings:

Current	0 mA	Voltage	0 V
Power	0 W	Energy	0.693 kw.h

At the very bottom of the window, there are three buttons: "Apply", "Refresh", and "Close".



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