



ZigBee™ - ZigBee Wearable Presence Tag with Emergency Button

User Manual

ZigBee Wearable Presence Tag with Emergency Button Model: Z308

20131227
FW V2.0 (20131227)
HW V0.1/V0.2

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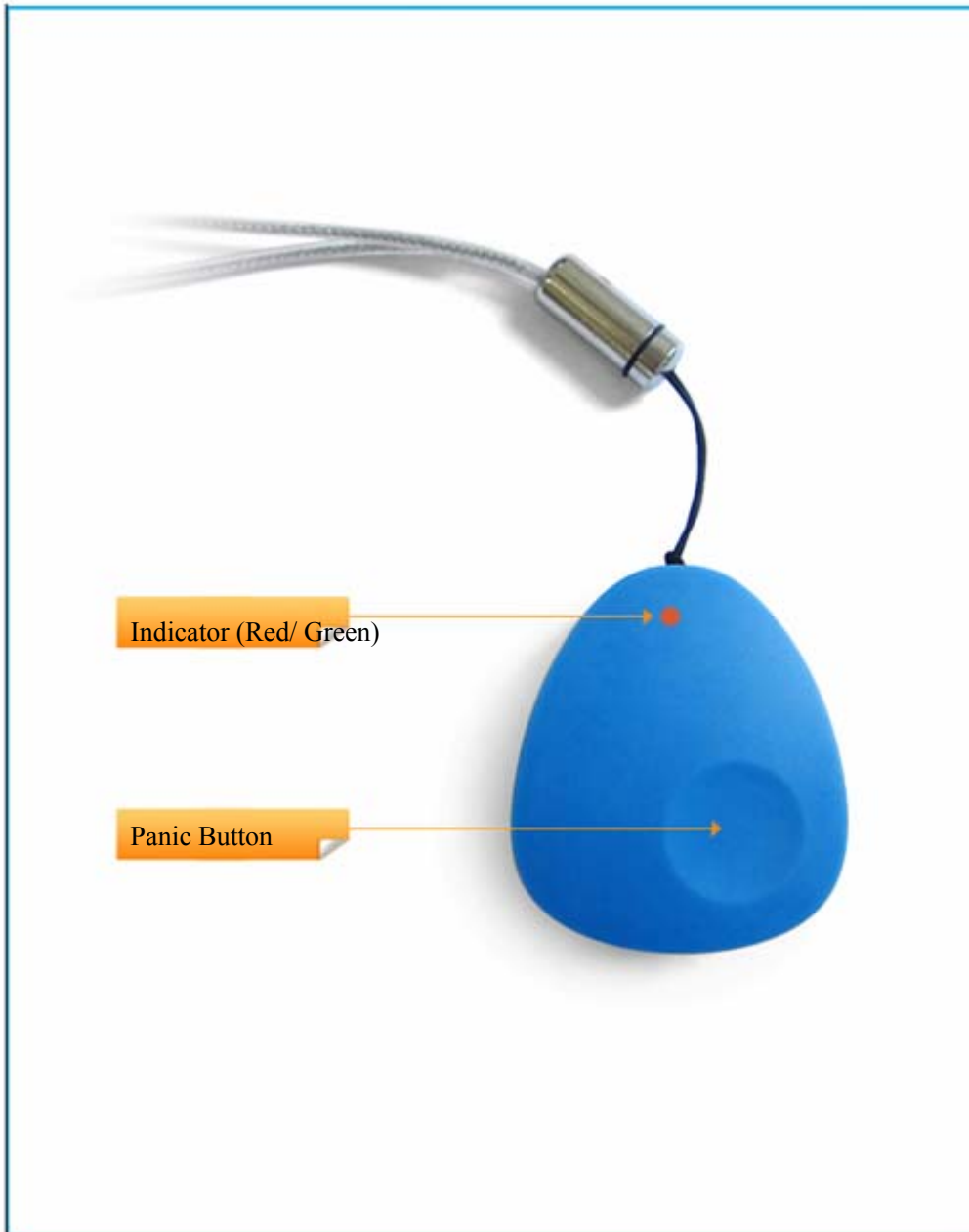
1. Introduction

Z308, a wearable presence tag, acts as an IAS device for minor children/aged-care use. It is an ideal product to detect one's presence within/ out of the network coverage for safety purpose. Z308 periodically sends presence/absence report to keep a close watch on those who wear it. Z308 also works as an emergency button. When users ask for urgent assistance, simply push the button, and Z308 will send the alarm message to the command center. The Warning Device will send out alarm sound or lighting alert for immediate help.

What is ZigBee?

ZigBee is a short range wireless transmission technology based on IEEE802.15.4 standard and supports multiple network topologies such as point-to-point, point-to-multipoint, and mesh networks. It is defined for a general-purpose, cost-effective, low-power-consumption, low-data-rate, and easy-to-install wireless solution for industrial control, embedded sensing, medical data collection, smoke and intruder warning, building automation and home automation, etc.

2. Product Appearance



3. Specification

- Fully IEEE 802.15.4 compliant
- Utilizes 2.4GHz ISM band; up to 16 channels
- Power supply: 1 x CR2450 3.0V battery
- Operating consumption: Tx $\leq$ 33mA; Rx $\leq$ 28mA
- Standby consumption: $\leq$ 1.3uA
- Up to 70 meters wireless transmission range in non-obstacle space
- Easy installation and configuration

4. Installation

- Z308 is waterproof.



5. Setting up Z308

5-1. Turn On/ Turn Off Z308

To manually turn on or turn off Z308, please use the following instructions:

- A. **Turn it on:** Press and hold the *Panic Button* for 3 seconds. The indicators will flash **once**, and the device is ready to be used.
 - When ZB02C is in a ZigBee network → the indicator will flash **green 5 times**.
- B. **Turn it off:** Press and hold the *Panic Button* for 6 seconds. The indicator will flash **red 10 times** within 5 seconds. Within the 5-second period of time, press the *Panic Button* again to turn it off.

5-2. Join the ZigBee Network

After Z308 is turned on, it will search for an existing ZigBee network and send a request to join the network automatically. While Z308 is under the coverage from a coordinator or a router whose **permit-join feature is enabled**, Z308 will be permitted to join the network.

Step1. Enable the permit-join function (valid for 60 seconds) of a coordinator or a router (please refer to the user manual of the coordinator or the router to enable the permit-join feature).

Step2. Turn on Z308. It will start to search and join the network.

Step3. The indicator will flash **green once** when it finds out a network to join.

Step4. The indicator will flash **green 5 times** after it is joined successfully. Otherwise, the indicator will not flash.

Step5. When Z308 cannot join a network in 25 seconds, it will go into turn-off mode.

- After joining a network, Z308 would try to enroll in the ZigBee security system. Please make sure Z308 and CIE (Control and Indicating Equipment) device have enough power.

5-3. Enroll in the ZigBee Security System

Z308 is a Zone device in the ZigBee security system. Right after Z308 join the ZigBee network, it will automatically find out a CIE (Control and Indicating Equipment) device (i.e. Netvox Z201B) and send a registration request to the CIE device to enroll in the security system. The enrollment has these 3 situations:

- A. There is no CIE device or no compatible CIE device in the network → the indicator flashes **red twice**.
- B. There is a compatible CIE device in the network, but it is failed to enroll → the indicator flashes **red 4 times**. Users can reboot Z308 to initiate the registration.
- C. The enrollment is completed → the indicator flashes **red 6 times**.

NOTE: Users had better NOT enroll multiple Zone devices at the same time to prevent registration failure.

5-4. Sleeping Mode

Z308 is designed to go into sleeping mode for power-saving in some situations:

- A. While the device is in the network → the sleeping period is 5 minutes; it will wake up every 5 minutes to keep online.
- B. Once Z308 was joined to a network and by any chance the network is no longer existed or the device is out of the network → Z308 will wake up every 5 minutes to find the network it joined before.

It never keeps in sleeping mode and continues to find out a network every 5 minutes. This condition would consume up to 30 times power spending compared to normal-operating status. To prevent this unwanted power consumption, we recommend that users turn off the device.

5-5. Wake up Z308

When users would like to setup or acquire data from the device which is in sleeping mode, we have to wake up the device as the following steps:

- Step1. Press and hold the *Panic Button* for 3 seconds. Release the button when the indicator flashes **red once**.
- Step2. The indicator flashes **green 5 times** when Z308 is online.
- Step3. Z308 will broadcast the device data to the ZigBee network.

Z308 would be in active status for 2 minutes for communication.

5-6. Panic Button

- Z308's Zone Type: Key Fob (ID: 0x0115)
- The value of Alarm2 is 1 when sending alarm message.

Under the circumstances that Z308 has enrolled to the security system, it will send the alarm message to the command center (and the bound devices with ID: 0x0500) after pressing the *Panic Button*. The Warning Device will send out alarm sound or lighting alert for immediate help.

Under the circumstances that Z308 hasn't enrolled to the security system, it will try enroll in a security system after pressing the *Panic Button*. After the enrollment, Z308 will send the alarm message to the command center.

ZoneStatusChange commands: 0x00.

The command list:

Bits: 8	8	8	var
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Frame control	Transaction Sequence number	Command identifier	Frame payload	
			16-Bit Enumeration	8-Bit Enumeration
0x09		0x00	ZoneStatus	ExtendedStatus

(ClusterID: 0x 0500)

Values of the ZoneStatus payload

ZoneStatus Attribute Bit Number	Meaning	Values
0	Alarm1	1 – opened or alarmed 0 – closed or not alarmed
1	Alarm2	1 – opened or alarmed 0 – closed or not alarmed
2	Tamper	1 – Tampered 0 – Not tampered
3	Battery	1 – Low battery 0 – Battery OK
4	Supervision reports	1 – Reports 0 – Does not report
5	Restore reports	1 – Reports restore 0 – Does not report restore
6	Trouble	1 – Trouble/Failure 0 – OK
7	AC (mains)	1 – AC/Mains fault 0 – AC/Mains OK
8-15	Reserved	

Values of the ExtendedStatus payload

ExtendedStatus Attribute Bit Number	Meaning	Values
0-6	ZoneID	
7	ZoneStatusChange Or Heartbeat	1 – HeartBeat 0 – ZoneStatusChange

5-7. Presence Tag

Z308 works as a presence tag. It is an ideal product to detect one's presence within/ out of the network coverage for safety purpose. Z308 periodically sends presence/absence report to keep a close watch on those who wear it. The bound devices (with ID: 0xFE60) could calculate Z308's location based on the RSSI values between Router Devices and Z308.

The command list:

Bits:8	16	8	8	var
Frame	Manufacturer	Transaction	Command	Frame payload

control	code	Sequence number	identifier	Count	NodeID	RSSI	...	NodeID	RSSI
0x05	0x109F		0x5F	Byte	2byte	Signed			

(Clusterid : 0x FE60)

5-8. HeartBeat Technique

In a security system, it is important that Zone devices report the conditions to the central security unit (the CIE device). To meet this need, Netvox came up with a technique called “**HeartBeat**”.

Right after Z308 enrolls to a security system, it sends a HeartBeat signal to the CIE device. Afterward, it will send HeartBeat data every hour by default settings.

5-9. Battery

When the operating voltage is lower than 2.1V, the indicator will flash **red once**. Z308 will send a low-power report to the ZigBee network.

The related data:

- Power configuration cluster (ID:0x0001)
- Battery voltage attribute (ID:0x0020)

5-10. Restore to Factory Setting

To restore it to factory setting, please follow the steps:

Step1. Press and hold the *Panic Button* or 15 seconds.

Step2. Release the button after the indicator shows fast **red** flashes.

Step3. After 10 **red** flashes, it will go into turn-off mode. The indicator will be Off.

6. Home Automation Clusters for Z308

A cluster is a set of related attributes and commands which are grouped together to provide a specific function. A simple example of a cluster would be the On/Off cluster which defines how an on/off switch behaves. This table lists the clusters which are supported by Z308.

1.End Point(s) : 0x01:

2.Device ID : IAS Zone (0x0402)

3.EndPoint Cluster ID

Cluster ID for Z308	
Server side	Client side
EP 0x01 (Device ID: IAS Zone(0x0402))	

Basic(0x0000)	None
Power configuration(0x0001)	
Identify(0x0003)	
IAS zone (0x0500)	
Commissioning(0x0015)	
Poll Control (0x0020)	
Diagnostics (0x0B05)	

This lists the attributes of the basic information.

Identifier	Name	Type	Range	Access	Default	Mandatory / Optional
0x0000	<i>ZCLVersion</i>	Unsigned 8-bit integer	0x00 – 0xff	Read only	0x03	M
0x0001	<i>ApplicationVersion</i>	Unsigned 8-bit integer	0x00 – 0xff	Read only	0x14	O
0x0002	<i>StackVersion</i>	Unsigned 8-bit integer	0x00 – 0xff	Read only	0x33	O
0x0003	<i>HWVersion</i>	Unsigned 8-bit integer	0x00 – 0xff	Read only	0x02	O
0x0004	<i>ManufacturerName</i>	Character string	0 – 32 bytes	Read only	netvox	O
0x0005	<i>ModelIdentifier</i>	Character string	0 – 32 bytes	Read only	Z308E3ED	O
0x0006	<i>DateCode</i>	Character string	0 – 16 bytes	Read only	20131227	O
0x0007	<i>PowerSource</i>	8-bit Enumeration	0x00 – 0xff	Read only	0x03	M
0x0010	<i>LocationDescription</i>	Character string	0 – 16 bytes	Read/write		O
0x0011	<i>PhysicalEnvironment</i>	8-bit Enumeration	0x00 – 0xff	Read/write	0x00	O
0x0012	<i>DeviceEnabled</i>	Boolean	0x00 – 0x01	Read/write	0x01	M

Attributes of the Power Configuration Information

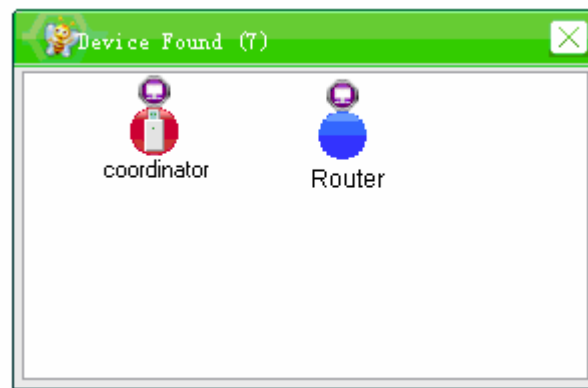
Identifier	Name	Type	Range	Access	Default	Mandatory / Optional
0x0020	<i>Battery voltage</i>	Unsigned 8-bit integer	0x00 – 0xff	Read / write	--	O
0x0031	<i>BatterySize</i>	8-bit Enumeration	0x00 – 0xff	Read / write	2	O
0x0033	<i>BatteryQuantity</i>	Unsigned 8-bit integer	0x00 – 0xff	Read / write	1	O
0x0035	<i>BatteryAlarmMask</i>	Bitmap (8-bits)	0000 000x	Read / write	0000 0000	O
0x0036	<i>BatteryVoltageMinThreshold</i>	Unsigned 8-bit integer	0x00 – 0xff	Read / write	0x15	O
0x0037	<i>BatteryVoltageThreshold1</i>	Unsigned 8-bit integer	0x00 – 0xff	Read / write	0x16	O
0x0038	<i>BatteryVoltageThreshold2</i>	Unsigned 8-bit integer	0x00 – 0xff	Read / write	0x17	O
0x0039	<i>BatteryVoltageThreshold3</i>	Unsigned 8-bit integer	0x00 – 0xff	Read / write	0x18	O
0x003e	<i>BatteryAlarmState</i>	32-bit Bitmap	0x00...x	Read	0x000...0	O

7. ZiG-BUTLER

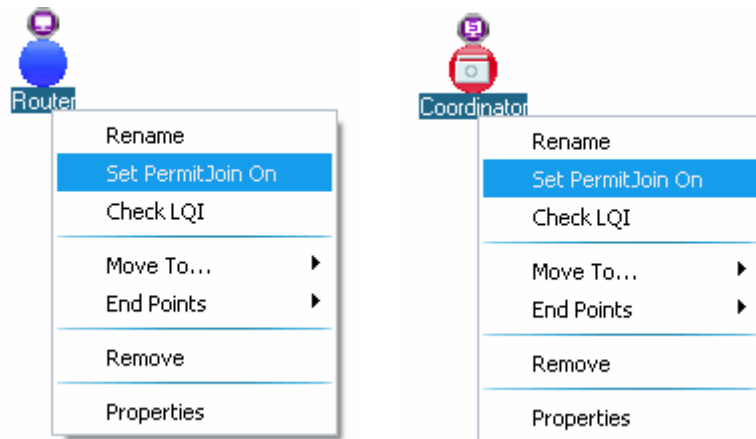
ZiG-BUTLER is an exclusive program which allows users to easily control the devices, such as enable permit-join feature, wirelessly through computer or laptop. Of course, any other 3rd party ZigBee enabled software is also applicable. The system needs a Z103 USB dongle or a Z202 ZigBee gateway to communicate with the ZigBee network.

7-1. Join Z308 into the network

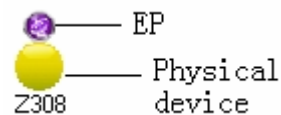
When ZiG-BUTLER sees a coordinator or a router device, it will show the icon.



Right click on the icon of the coordinator or the router and choose **Set Permit Join On**.

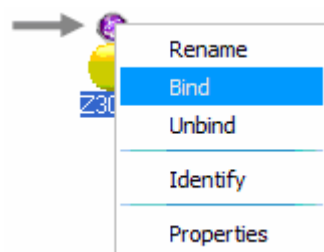


After Z308 has successfully joined, the Z308 icon will be appeared in ZiG-BUTLER.

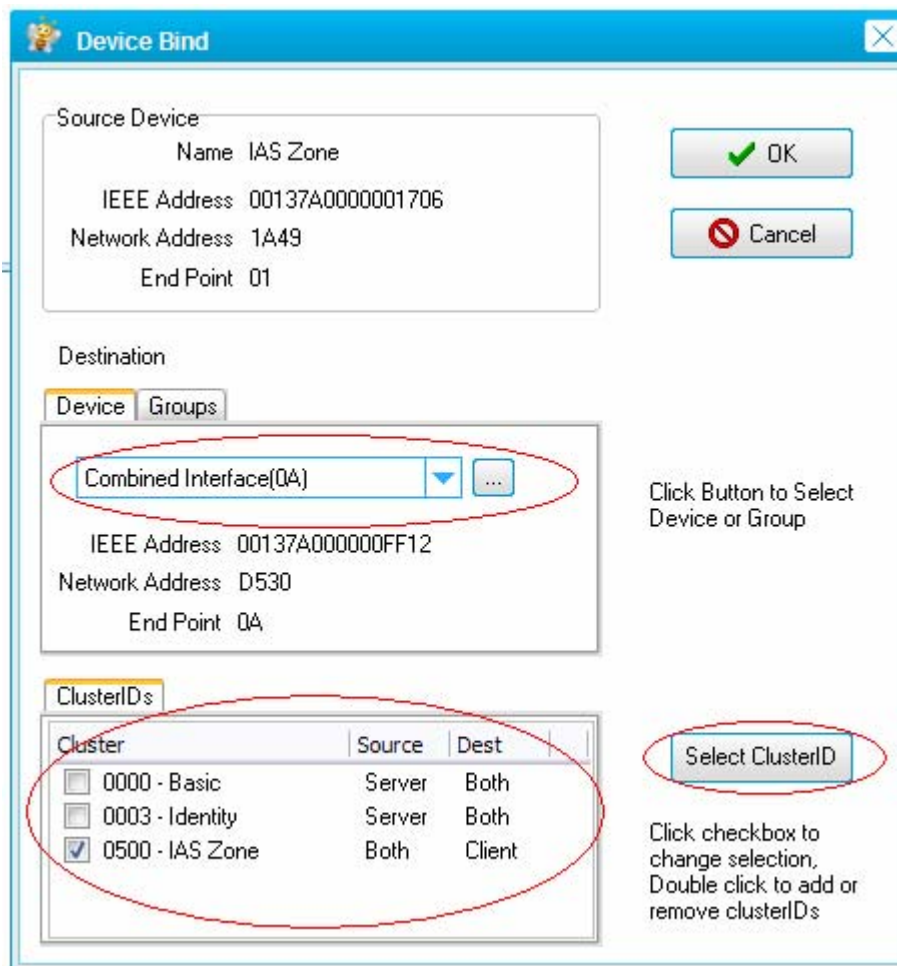


7-2. Bind Z308

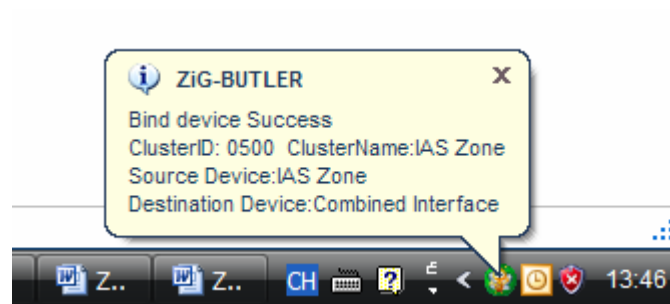
Right click on the End Point of Z308 and select **Bind**.



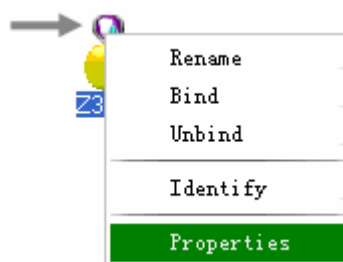
On the Device tab, select the device to which you would like to bind. Next, click **Select ClusterID**, choose the Cluster, and click **OK**.

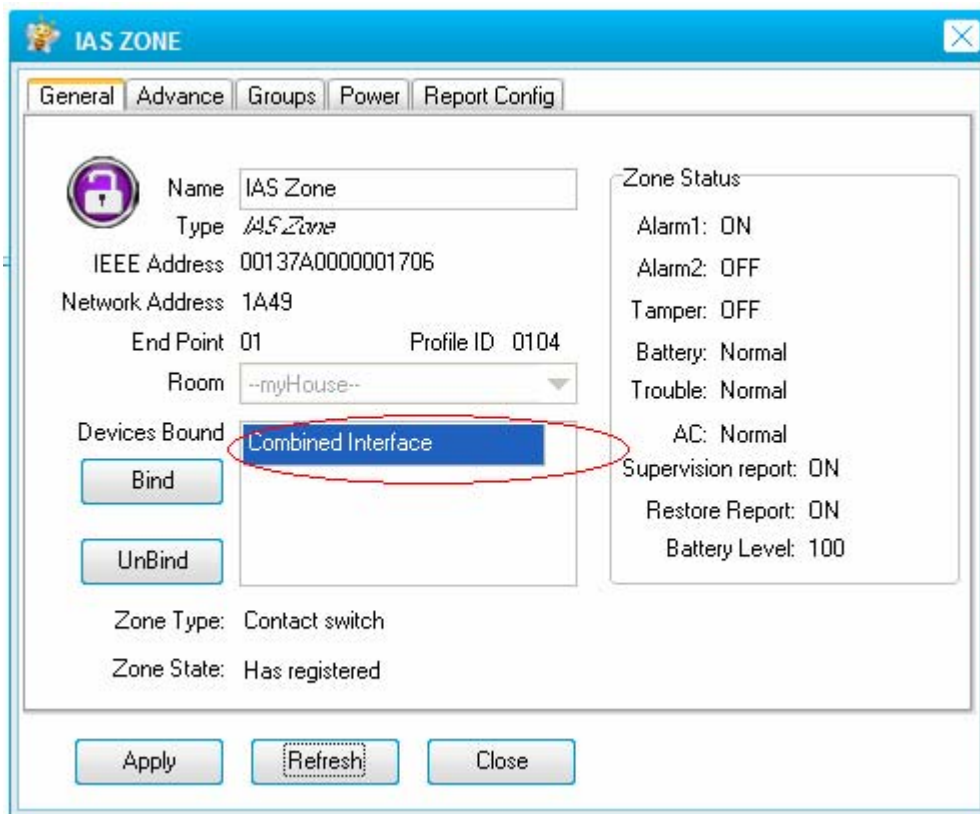


The information would be pop-up after the binding is completed.



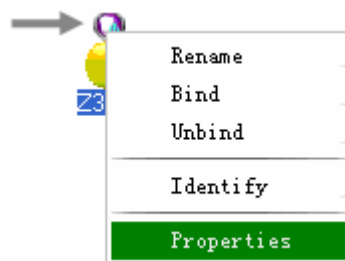
Right click on the End Point of Z308 and select **Properties** to view the binding information.



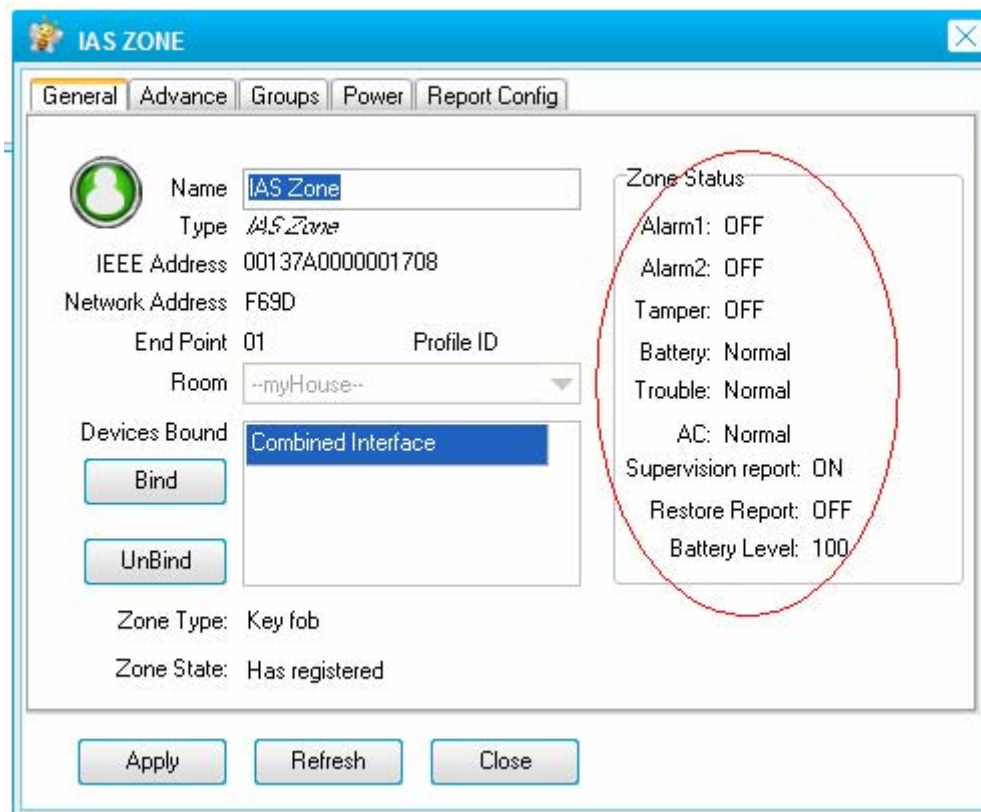


7.3. View Zone Status

Right click on the End Point of Z308 and select **Properties**.



Zone status will be shown as below.



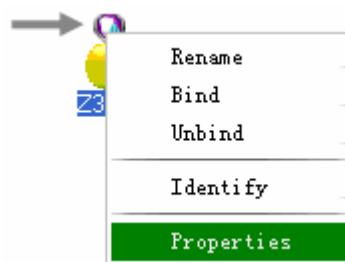
On the **General** tab, the Zone Status shows the device information.

7.4. Configure HeartBeat Interval

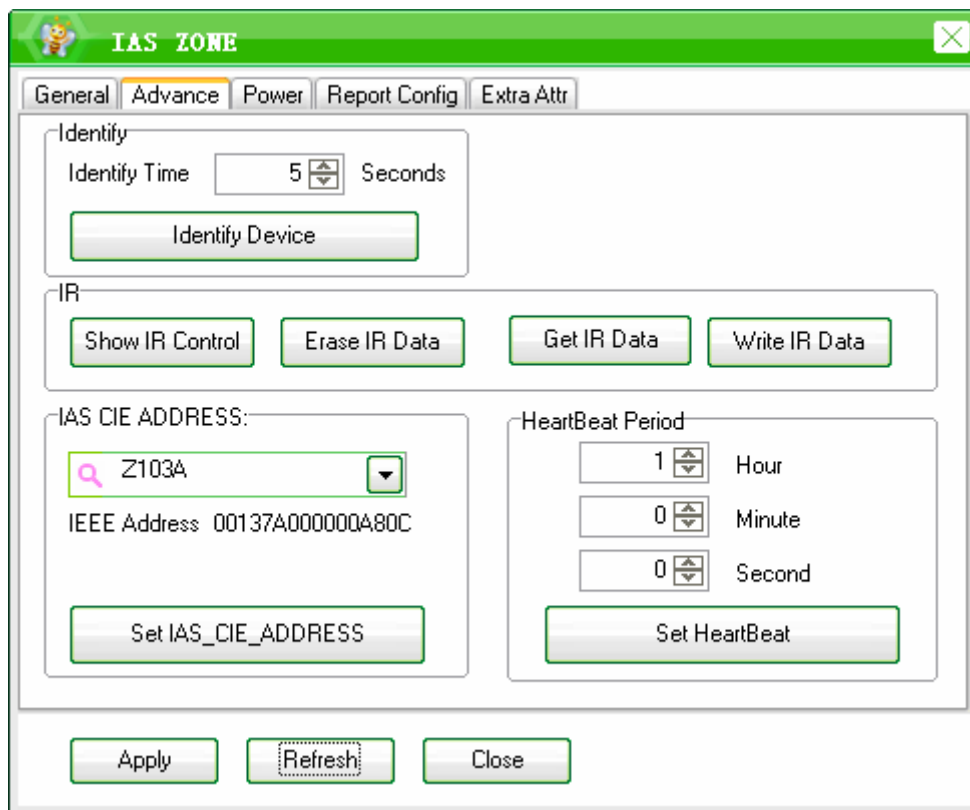
In a security system, it is important that Zone devices report the conditions to the central security unit (the CIE device). To meet this need, Netvox came up with a technique called “**HeartBeat**”. By default settings, Z308 reports HeartBeat every hour. Users can configure the period of time by the following steps:

Wake up Z308 first (please refer to [5.5. Wake up Z308](#)).

Right click on the End Point of Z308 and select **Properties**.



On the **Advance** tab, set up the HeartBeat period (30 seconds~168 hours) and click **Set HeartBeat** to complete the setting.



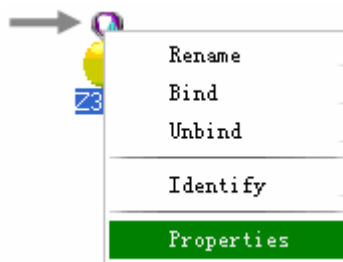
Click **Refresh** to confirm the settings.

7.5. Assign Z308 to a Preferred CIE Device

Through ZiG-BUTLER, users are able to assign Z308 to a preferred CIE device using the tips below:

Wake up Z308 first (please refer to [5.5. Wake up Z308](#)).

Right click on the End Point of Z308 and select **Properties**.



On the **Advance** tab, select the device in IAS CIE ADDRESS and click **Set IAS_CIE_ADDRESS** to complete the setting.

8. Important Maintenance Instructions

- Please keep the device in a dry place. Precipitation, humidity, and all types of liquids or moisture can contain minerals that corrode electronic circuits. In cases of accidental liquid spills to a device, please leave the device dry properly before storing or using.
- Do not use or store the device in dusty or dirty areas.
- Do not use or store the device in extremely hot temperatures. High temperatures may damage the device or battery.
- Do not use or store the device in extremely cold temperatures. When the device warms to its normal temperature, moisture can form inside the device and damage the device or battery.
- Do not drop, knock, or shake the device. Rough handling would break it.
- Do not use strong chemicals or washing to clean the device.
- Do not paint the device. Paint would cause improper operation.

Handle your device, battery, and accessories with care. The suggestions above help you keep your device

operational. For damaged device, please contact the authorized service center in your area.

FCC Statement:

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

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.

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