

User Manual

Wireless Window Door Sensor And Wireless Glass Sensor Model: Z311C

Contact Sensor Series

FW: V1.1

HW: V0.1~V1.0

20130604

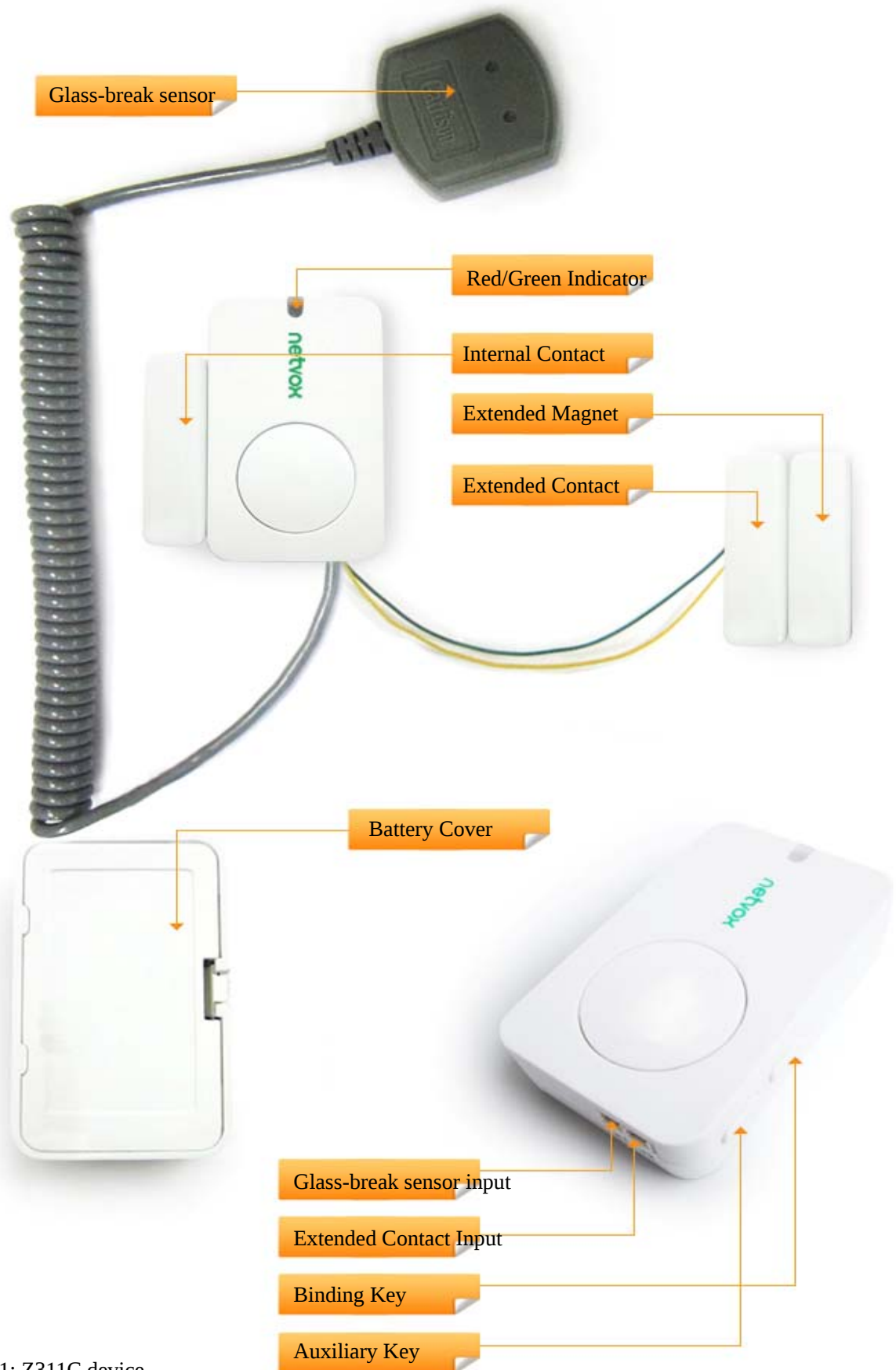


Figure 1: Z311C device

Introduction

In an existing network, Z311C is an end device and does not permit join other devices like router device does.

Z311C is an intrusion detect sensor for monitoring door/window and glass window in a security system. The magnetic contacts are to be installed on between the gaps where the door or window closes so that when the door opens the contacts moved away from each other the device triggers the alarm system. With any vibration wave attempts to break the window glass, the sensor triggers the alarm system in the device and notifies to its corresponding enrolled CIE –Control and Indicating Equipment, security system in the network. The CIE reads the information received, updates status changed and indicates siren to sound. For the door/window application when the door is kept open, CIE would receive door open notification and update the status until the door is closed and the CIE will receive an update notification and replace the currently open-status with currently close-status.

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
- ✓ Utilizes 2.4GHz ISM band, up to 16 channels
- ✓ Up to 70 meters non-obstacle wireless distance
- ✓ Two CR2450 button batteries powered
- ✓ Simple operation and device configuration

Setting up the Z311C and network

Setting up Summary

- (1) Device startup and network association
- (2) Alarm system registration
- (3) The device is now ready to be used.

Step 1. Startup and Network Association

When Z311C is powered up, it will search for an existing network and will ask to join the network of the same channel automatically. If it is within a coordinator or other router coverage area with **permit-join feature is open**, Z311C is permitted to join. Normally there is 1 minute of permit-join period.

Network association operation:

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

Step 2: Now turn on the Z311C device (refer to chapter [Turn it on](#) of this manual)

The device will start to search for the network within reach. If there is a network available for join, the green indicator will flash once.

Step 3: The green indicator will **flash 5 times upon join successful**. Otherwise the indicator will not flash. The device will enter to sleep mode after 15 seconds of attempt to join. To wake up the device for another join attempt, please press any key.

Notes:

- a. By default the ZigBee network does not allow any devices to join, this is done this way to prevent any potential unauthorized device join attempt. Make sure Z311C is within the coverage area. You must first enable permit join feature on a router or a coordinator already in the network so that the new device Z311C is permitted to join when it searched the network channel.
- b. On how to enable permit-join feature please refer to the coordinator or the router user

Notice: Before Z311C is powered on ready to join the network, make sure a coordinator or a router that opens permit-join to allow Z311C to join is on. Make sure the device has successfully joined to the network before going to the next step -Enrollment and CIE registering.



Most read Warning: Possible battery drainage

When the device was once joined to a network and by any chance the network is no longer present or it is out of network - it will wake up every 15 minutes to find the network it joined before. It never goes to deep sleep but continues to find its network every 15 minutes. This scenario can consume up to 50 times power more than normal operation. To avoid this unwanted power consumption, you need to manually switch off the sensors when network is off

When the battery is loaded, Z311C enters power off mode. This ensures minimum power losses. Any other button press or contacts will not activate power except binding key.

Turn it on

Please go to Step 2 now before you turn it ON.

To turn it on, **short press binding key once** and you will see the red indicator flashes once. Now the power is on and the device is ready to search for any available network on the air.

Turn it off

At any time when you want it to be off when it will not be used, you can simply short press the binding key once the red indicator will **flashes 10 times for 5 seconds**. Before **5 seconds** expires press the binding key again to turn it off. You will see the red light goes off. If 5 seconds has expired and the key press is not applied within the period, Z311C will return to power on condition.

** It is recommended to power off Z311C when not in use.*

Step 2. Automatic Zone Registration (enrollment)

Z311C is a zone device in the security system. Soon after the network join, the next step is to enroll itself into a CIE (Control and Indicating Equipment) security system device to validate zone alarm feature. The registration will take place automatically soon after the device joined to the network.

*notes: a CIE security system will normally embedded within a device (i.e. a Netvox Z201B) or it could be a stand-alone CIE device.

Observing CIE registration:

To ensure enrollment is successful or not simply read the indicator light flashes:

- (1) Right after the network join, see if red indicator light flashes **twice** indicating that there is no CIE existed or no compatible CIE is on the network.
- (2) If there is CIE and it has enrolled, Z311C will send an enrollment request to it. **If enrollment failed the red indicator flashes 4 times. Flash 6 times if successful.**
- (3) For any reason that Z311C has failed being registered, **press the Auxiliary key** at anytime should initiates the registration process. The LED indicator will flash the same as that described in (2).

How to use

After Z311C has registered to the security system it is on duty for intrusion monitoring. Any changes in device status will be reported to the CIE security system. For installation please read [the Installation section](#).

Door/window application

When the internal magnetic contact piece is near or attached on the Z311C, the status is normal (Figure A) and is reported to the CIE security system.

When the magnetic contact piece moved away from Z311C, the device changes its status to alarm mode and a zone status change is reported to CIE system. Normally the siren or a silent alarm device in the network will be triggered. In case that the device is not registered to a CIE system, it will try to register first then sent out an alarm notification at once.

Note:

1. CIE device must be always existed elsewhere in the network.
2. It is commended that only one status change within 2 seconds to avoid potential traffic jam of communication.

Glass break detection application

The glass breaking vibration wave would cause the sensor attached on the glass to vibrate which trigger the alarm status of Z311C; following this Z311C would read other two door magnetic contacts conditions. If the door contacts are closed, the normal status is restored and normal status is then reported. If the door contacts are open the alarm status stays –alarm status and no status message is reported. In this case the alarm status is uninterrupted which continues signaling to either siren devices or strobe lighting devices.

In case that somehow Z311C was not registered to the CIE security system, a door close or open; or glass break detection would wakes up the device to initiate registration process and sent status report to CIE device at once. This ensures the up time of the monitoring device. Unregistered situation can be the absence of the CIE device in the network either due to CIE device maintenance reason or a new CIE device introduced.

Assigning Z311C to a preferred CIE system

This feature is only available for user who has the relevant application software or Netvox ZiG-BULTER to do this. Please go to [ZiG-BULTER](#) section in this manual.

Z311C can be paired with a CIE system device (i.e. Z201B). When a change in security status Z311C notifies bound CIE to trigger audible alarm or light strobe signal to notify the user.

Observation:

- (1)** In the case that you are assigning Z311C to *its already-registered CIE* security system, Z311C simply displays **6 red flashed** on its LED indicator when reassignment configuration is completed.
- (2)** In the case that you are assigning Z311C to *a different CIE* security system other than the one registered, after new registration successfully took place Z311C sends **deregistering command** to the *already-registered* CIE security system to remove its Z311C's information. The indicator shows **6 red flashes** upon configuration completed.

For programmer and application developer only:

When doing so, changes of the CIE device IEEE address in the IAS_CIE_Address attribute written in Z311C will take place. A new CIE IEEE address will be assigned to and will be written on Z311C device. You will need software similar to ZiG-BUTLER to perform this configuration.

Overcoming a sleeping device

The device is battery powered and is designed to enter sleep mode when not transmitting to save battery power. Sometimes during system setup you would want to retrieve information (i.e. IEEE address, short address) from the device. The device needs to enter temporal wake mode to stay connected.

Operation:

1. Hold press on auxiliary key and binding key at the same time until you see the indicator **flash in red twice**. Then release the keys.
2. Z311C broadcasts an announce packet with an IEEE address and a short address information to the air. There is **2 minutes of active period** to communicate itself with other device on the network.

Periodical Heartbeat Notification

In a security system, it is important to know the condition of each zone device required by most software or hardware monitoring system or end user. To meet this need, Netvox engineer came up with a mechanism called the heartbeat of a device implemented within the firmware of Z311C and other Netvox security zone devices.

When Z311C had just registered itself to the security CIE system, **it sends the very first heartbeat signal right after a successful registration**. After that it initiates a periodic heartbeat and send to the security CIE system in every one hour by factory default which is configurable through software with heartbeat cluster implemented (for application developer or Netvox ZiG-BUTLER user). The heartbeat contains heartbeat information, low battery power notification and alarm status.

The configurable heartbeat period range is between 30 seconds to a maximum of 604800 seconds (7 days) anything bellow or above that range is invalid value. When configuring the heartbeat period, anything above 10 minute will take the step of 10 minute increments. That will be 20 min, 30 min, 40 min, etc. If you give any other number, the Z311C will take the least value. (i.e. as you typed in 35min value, the Z311C will take 30 min value)

**Such heartbeat can be configured via ZiG-BUTLER please go to [ZiG-BULTER](#) section.*

Restore to factory setting

Z311C is capable of data storage on power failure. If Z311C is unable to communicate with its registered CIE device or if you wish to join it to a new network, a restore to factory default is required

Operation:

Hold press auxiliary key and binding key together you should see **2 red flashes** on the indicator but do not release the keys yet at this time until you see another quick flashes followed then release the keys. The device should restore to the factory setting and soon enters **power off mode** automatically to save power.

Battery level reporting

Low power reporting

The working voltage for Z311C is between 2.1~3.6V DC. It performs the first battery level check when the battery is loaded. The device performs battery level check in a period of time. Anything bellow 2.1V, a battery-low report is sent to the network and its enrolled CIE.

Battery Level Notification

Z311C not only reports low power notification to notify the user but also sends battery level in percentage value. This information is placed in Zone Status Change Notification and is sent when the statues of Z311C changes.

Battery disposal

This device uses 2 CR2450 3volt button batteries. When the battery is bellow 2.1V DC, the device will not work and the status indicator will steadily flashing to notify the user to replace it.

Warning: Do not cast battery into the fire. The battery may be explosive and may cause injuries.

The following Information is for the advance user or
developers only

Clusters of Home Automation for Z311C

Home Automation device feature is defined by the endpoint which contains functional clusters. Table 1 lists clusters for the endpoint of Z311C. Zone Type attribute value is 0x0015 as Contact switch.

When the magnetic contact piece is moving away from the body of the device or a detected glass-break, Z311C sends out Zone status attribute as Alarm1 having **the attribute value of 1 for alarmed**.

When the magnetic contact piece is close or attached to it, Z311C sends out Zone status attribute as Alarm1 having **the attribute value of 0 for not alarmed**.

Table 1: Clusters supported by the **Z311C** endpoint 0x01

Cluster ID for Z311C	
Server side	Client side
EP 0x01 (Device ID: IAS Zone(0x0402))	
Basic(0x0000)	None
Power configuration(0x0001)	
Identify(0x0003)	
IAS zone (0x0500)	

|

Attributes of the Basic Cluster 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	0x15	O
0x0002	<i>StackVersion</i>	Unsigned 8-bit integer	0x00 – 0xff	Read only	0x2A	O
0x0003	<i>HWVersion</i>	Unsigned 8-bit integer	0x00 – 0xff	Read only	0x0C	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	Z311CE0ED	O
0x0006	<i>DateCode</i>	Character string	0 – 16 bytes	Read only	---	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
0x0012	<i>DeviceEnabled</i>	Boolean	0x00 – 0x01	Read/write	0x01	M

Installation

The glass break detection is expandable for a large window or multiple windows by connecting the sensors in series to Z311C, as illustrated in the figure bellow. Z311C uses GS-380S glass beak sensor and can be connected in series up to a maximum of 10.

Note: If you do not wish to connect the extended magnetic contacts or/and the glass sensor on the device, please keep the supplied jumper head attached on the pin connection otherwise Z311C will not function properly.

- ✓ Make sure that the glass and magnetic contact sensor should not be swapped. The correct connection configuration is shown in the figure bellow or in the first page.
- ✓ Do not connect glass sensor on the top in where extended magnetic contact should be.
- ✓ Make sure the jumper is connected if the extended magnetic contact cable is detached.

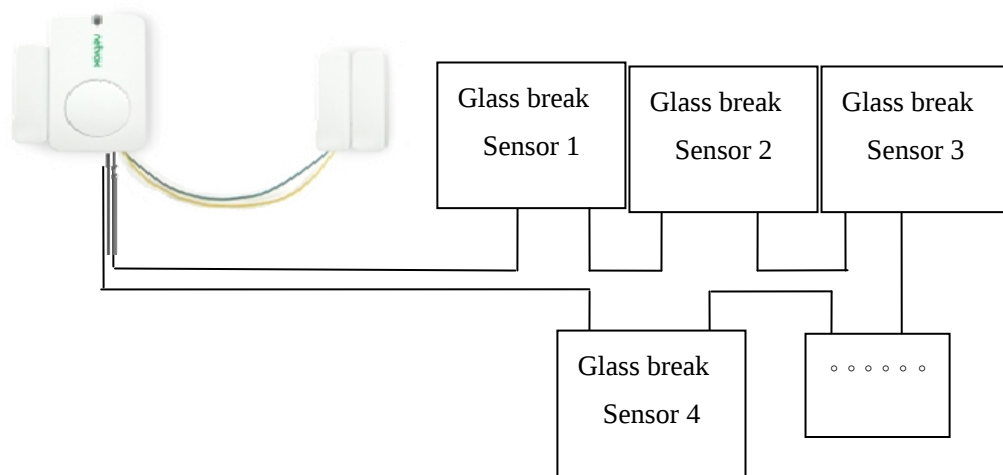


Figure 3: Installation guide

Glass Break Sensor Specification

Model	GS-380S from SENGATE
Power	The sensor does not required external power connection other than connection to Z311C
Noise proof	GS-308 can effectively detect vibration generated from glass breaking. It resists to any vibration from wind friction against the glass, considered to produce false alarm giving Z311C a more stable zone device.
Detection Range	Radius of 180 cm
Detection Method	Piezoelectric
Alarm Period	0.5sec.~6 sec
Alarm Output	Semiconductor style switch, polarity, DC24V/40mA Resistance at 13 ohm (max.) when normal. Resistance at 10M ohm and more on alarm.
Operating Temperature	-20°C to +55° C (-4°F to +131°F)
Mounting Position	Indoor, surface of glass materials
Weight	26 g (0.92 oz)
Dimensions (inches/mm)	36.5mm diameter x 11mm
Cable length	Curling wire 120 cm (stripped bare wire)
Sensor extension	10 sensors maximum in series Cable length in series: any

ZiG-BUTLER

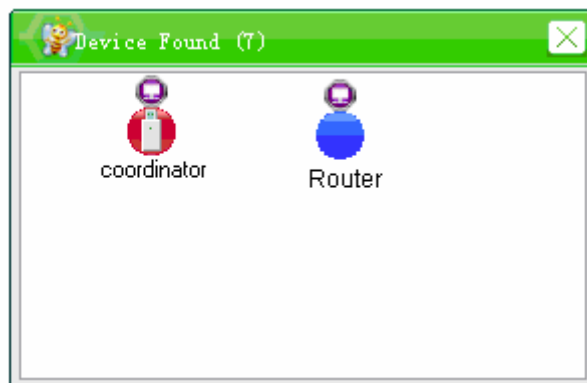
**This section is for ZiG-BUTLER software user only*

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

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

Join Z311CA 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 bellow:



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

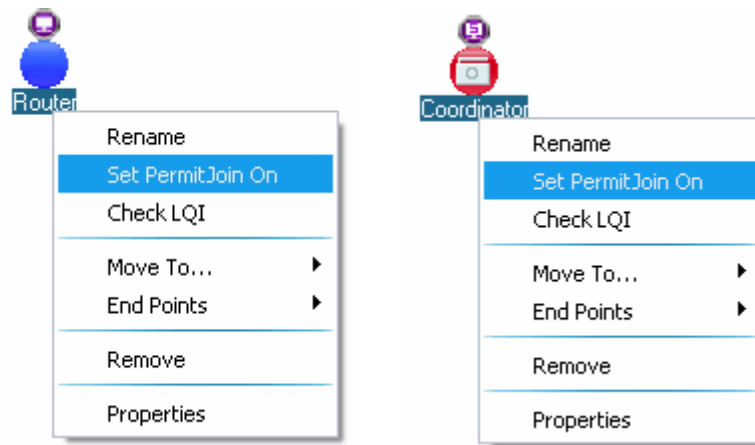


Figure A

When Z311C has successfully joined, you should see the Z311C device icon appeared in ZIG-BUTLER.

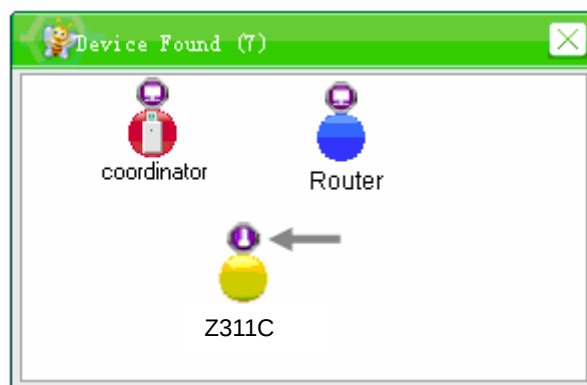


Figure B

View Zone Status

Move your mouse to the circle on top of Z311C icon (Figure B), then right click your mouse should display menu and select **Properties**.

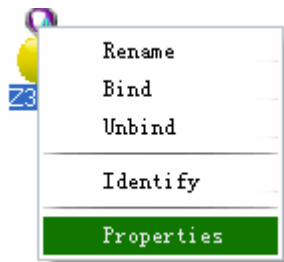


Figure C

A device information dialog screen appears, similar to the one bellow.

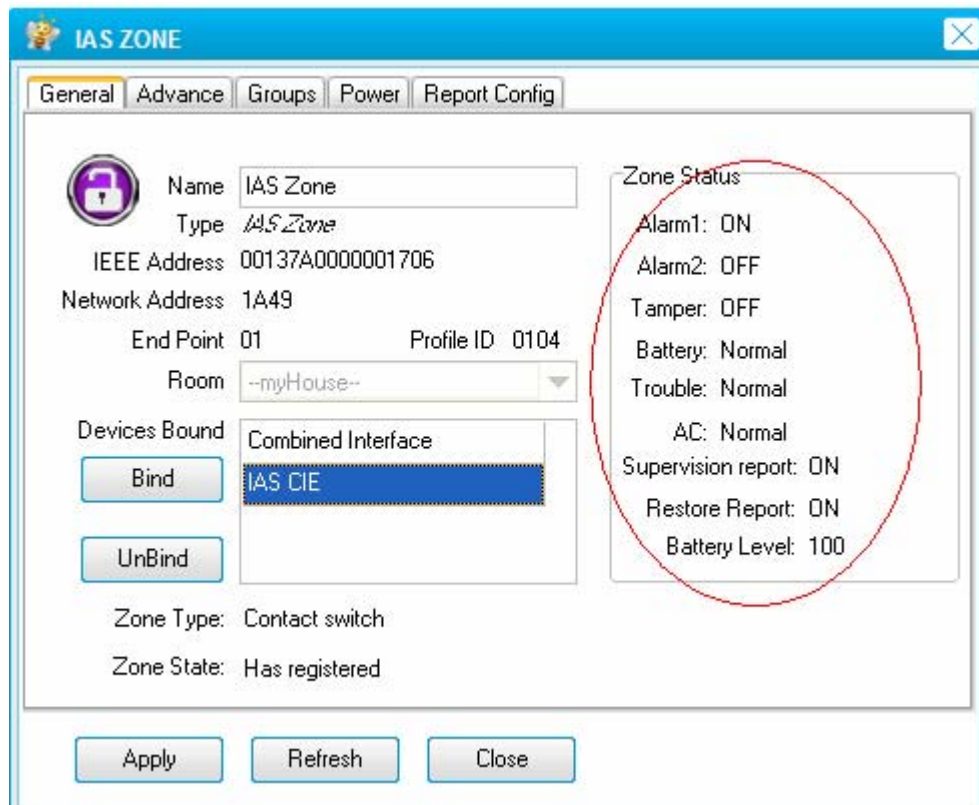


Figure D

In the **General** tab, the red circle area is the information of status. Alarm1 shows “ON” meaning door open is been detected. The door status is currently open.

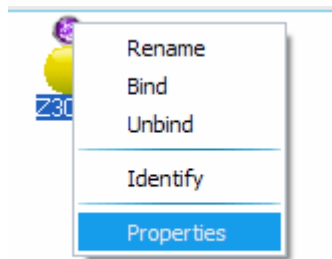
Configuring Heartbeat of Z311C

Move your mouse to the featured icon of the Z311C device.

- Right click on the **featured icon**.



In the drop down menu, select **Properties**



A configuration box should appear similar to the one bellow.

-Click on **Advance** tab

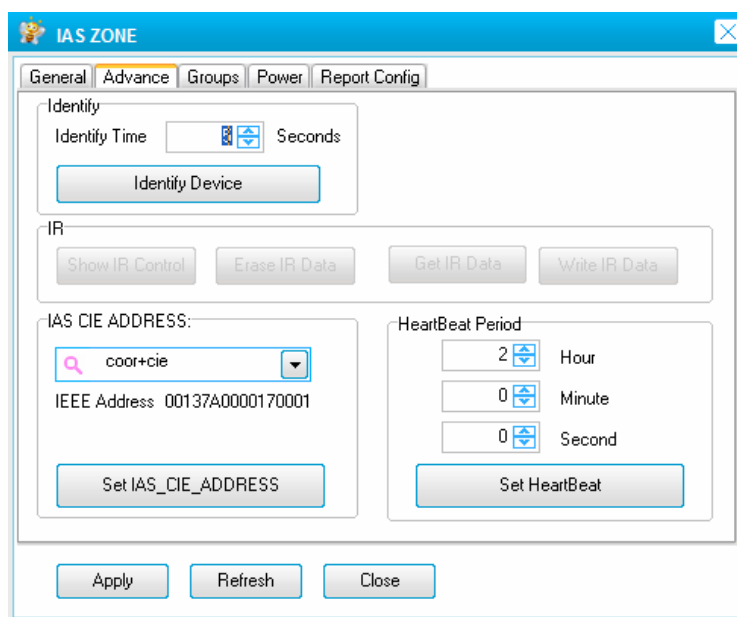


Figure 4: Advance tab (IAS Zone)

Enter your desirable Heartbeat period in Hour, in Minute and in Second. Set anything between 30 seconds to 168 hours

Then Click **Set Heartbeat** when done to sent this configuration to the remote Z311C.

*Notice: Z311C is an end device which runs on battery power. It is normally at sleep mode when idle except at each heartbeat cycle. So before you click **Set Heartbeat**, make sure you wake up the sleeping device so that it will be up and listening. On how to wake up Z311C please go to [Overcoming a sleeping device](#) section.

Assigning Z311C to a preferred CIE system

Assigning the preferred CIE settings please follow the [Configuring Heartbeat of Z311C](#) in the previous section. In Figure 4 if Z311C has registered in a CIE system, the CIE system device IEEE address will be displayed otherwise it will be blank.

Click on the dropdown arrow next to the IAS CIE ADDRESS and select a preferred CIE system device.

*Now make sure you have wake up Z311C device which normally go to sleep when idle. On how to wake up Z311C please go to [Overcoming a sleeping device](#) section.

-Now click on the **Set IAS_CIE_ADDRESS** to send the setting to Z311C device.

Important Maintenance Instructions

As the device is not water proof it is recommended to keep the device in a dry place. Liquid and heavy moisture contains minerals that may oxidize the electronic circuitry. In case of liquid spill, please leave the device to completely dry before storing or using.

- Do not use or store the device in a dusty area. Dust may cause electronic parts to destroy.
- Do not use or store the device in an over heated place. Store in a hotter temperature than the suggested maximum temperature may shorten the life span of the device; and may damage the battery and causing the housing to deform.
- Do not use or store the device in a very cold place than the suggested minimum temperature. The water can be condensed inside the device when moving to an area that is higher in temperature. This can severely damage the PCB board and circuitry. This may shorten the life span of the device; damage the battery and cause the housing to deform.
- Do not throw or strongly vibrate the device. This may damage connectivity of the electronic parts and other sensitive components on the PCB board.
- Do not use any strong chemical or washing to cleanse the device.
- Do not use any coloring materials on any removable parts which may cause poor connections and may keep the device from function properly.

All the above applies to the purchased products, battery and other packaged items. If any unusable or damaged items are found please return the product to your nearest authorized repairing center.

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.