

# Z-2400-A2R

Wireless Data Links Using ZIGBEE<sup>®</sup>  
For Analogue and Digital Interface.



**FC** FCC ID  
2ACTT-1409

**CE**



**R-NZ**  
E2180

**Installation Guide.**

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**Warning: These products are not designed for use in, and should not be used for patient connected applications. In any critical installation an independent fail-safe back-up system must always be implemented.**

# Z-2400-A2R

Wireless Node For Repeating Z-2400 Signals.

## Description.

The Z-2400-A2 series of units support the communication of analogue and digital signals via a wireless link. The series consists of three separate wireless nodes for: Input, Output and Repeating, and does not require a computer to monitor the wireless network. Built on the ZigBee® protocol, this allows for multiple Z-2400-A2 wireless links to operate side by side at the same time.

The Output node is the base and acts as the master for the entire link. The Input node acts as a wireless remote station and seeks for the Output Base to transmit the input signals to. The Repeater node is the bridge between the Input and Output wireless nodes, and is only used when the distance between them is too large to communicate directly.



## Ordering Information.

- **Z-2400-A2R** Repeater node for Wireless Extension.
- **Z-2400-A2IO** One Wireless Output node and One Input node paired & supplied as a Kit:
  - ⇒ **Z-2400-A2O** Output Base Wireless node. 2x 4~20mA Outputs, 4x Digital I/O.
  - ⇒ **Z-2400-A2I** Input Remote Wireless node. 2x Isolated Universal Inputs, 4x Digital I/O.



Note: The Z-2400-A2 Series require the XU-USB Programming Key for Software Configuration:

<b>XU-USB (Rev 1):</b>	USB Programming Key for programming Z-2400-A2 Series using <b>uP Configure</b> Programming software. (Same Key as used for programming XU Series transmitters, Z-2400-A16, Z-2400-Sleeper, IN-uP4 and uP4-Din.)
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**CAUTION**  
**Risk of electric shock.** Dangerous and lethal voltages may be present on the terminal of the device. Please take appropriate precautions to ensure safety.



**CAUTION**  
**Risk of Danger.** For your safety, please read completely the instructions prior to installation and operation of the Z-2400-A2 Wireless Series. In particular, consult this manual in all cases where hazard symbols are marked on your Z-2400-A2I, Z-2400-A2O and Z-2400-A2R nodes, in order to understand and avoid potential hazards. The safety of any system incorporating these units is the responsibility of the assembler of the system.



**CAUTION**  
**Observe minimum safe distance.** Intech Instruments Z-2400-A2 nodes comply with CFR47, Section 1.1307(b)(1). For your safety, please observe a minimum safe distance of 200mm.

**THE Z-2400-A2 NODES ARE TO BE INSTALLED AND SERVICED BY SERVICE PERSONNEL ONLY.  
NO OPERATOR / USER SERVICEABLE PARTS.**

## Z-2400-A2R Specifications.

### Power:

Supply Voltage	9~36Vdc.
Consumption	2.5VA Max.

### Environment:

Operating Temperature	-20~+55°C.
Storage Temperature	-20~+65°C.
Operating Humidity	0~85%.
Altitude	2000m.

### Transmission:

RF Data Rate	250Kb/s.
RF Frequency	2405~2475MHz.
RF Channels	15.
RF Power	10mW or 100mW ( <i>User Selectable to comply with region wireless standards</i> ).
Spreading Method	Direct Sequence.
Modulation	O-QPSK.
Nodes	1 Output Base, 1 Input Remote, and up-to 15 Repeaters per Mesh network max.
Antenna Connection	RP-SMA.
Tx Range	~4.0Km ( <i>supplied antenna line of sight, Reduces to 50m typical with major obstruction</i> ).
Tx Power	+10dBm or +20dBm ( <i>User Selectable to comply with region wireless standards</i> ).
Rx Sensitivity	-110dBm.
Connection Indication	Toggleing LEDs.
Multiple Mesh Use	Mesh ID 0~255.
Default Mesh ID	1 (1, 2, 3, 4, 5, 6, 7, 8).
Link Connection Time	Time to Connect: Less than 1 Minute (Output node to Repeater node).
	Link Failure: 1 Minute.

**Programming Port:** Programmable via XU-USB Key.

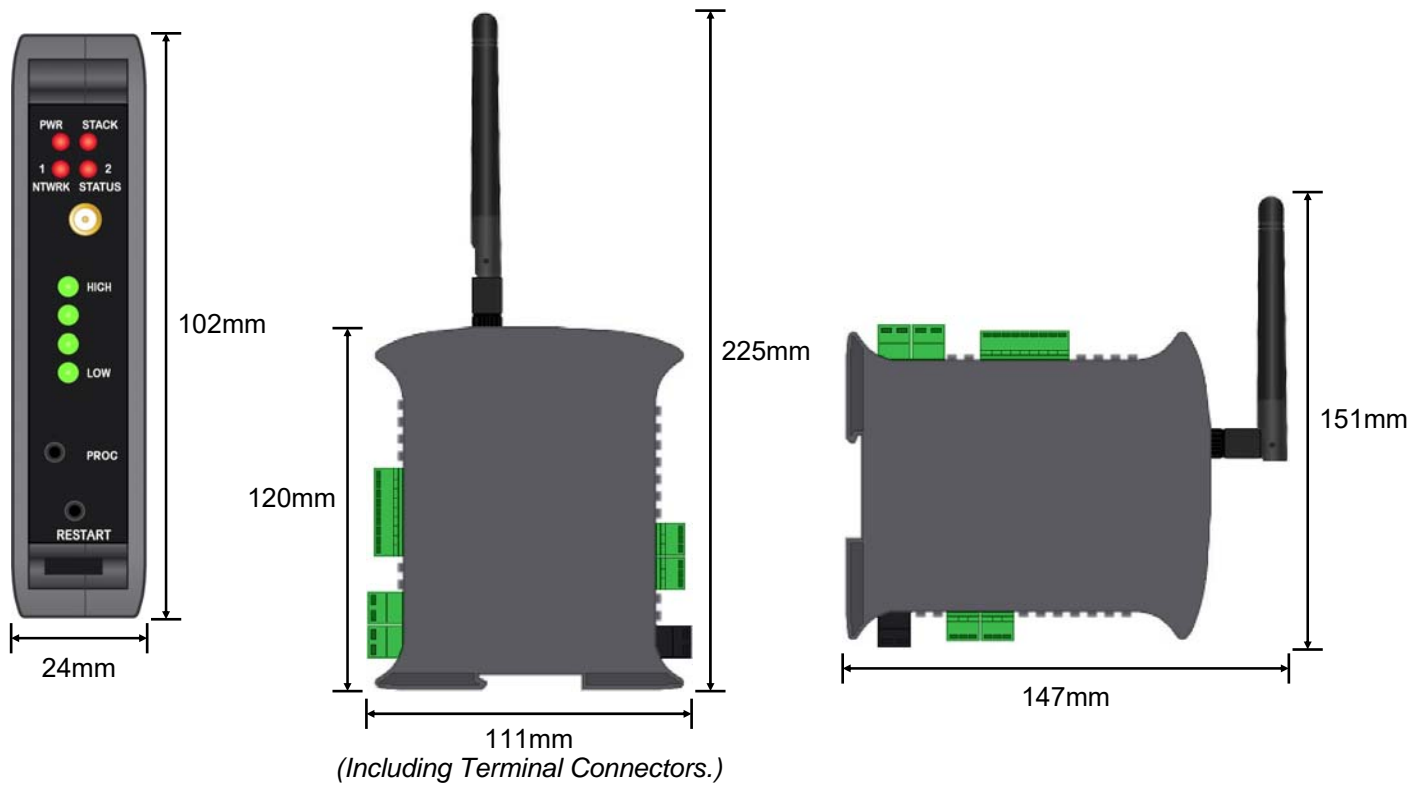
### Compliances:

FCC Regulation	2ACTT-1409.
Radio Equipment and Systems	AS/ANS 4268:2012.
EMC Compliances	ETSI EN 300 440-2, V1.4.1, 2010. EN 301 489-3, V1.6.1, 2013.

**Case:** 35mm DIN Rail Mount.

Enclosure Rating	IP20.
Node Weight	0.10Kg.
Dimensions (No Antenna)	H=104mm, W=24mm, D=120mm.

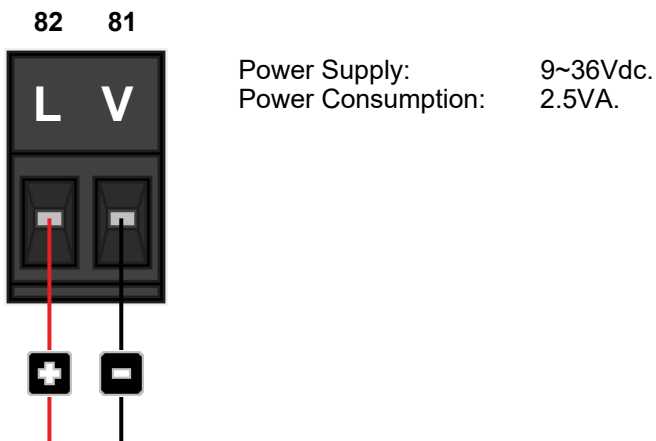
## Physical Layout Z-2400-A2 Series.



### Front Panel Connections and LEDs.

<b>Mounting:</b>	35mm DIN rail.
<b>LED indicators:</b>	PWR - Power status. STACK - Mesh network stack activity. NTWRK STATUS - See <i>Diagnostic LEDs Tables</i> for more information. HIGH / LOW - High to Low Link Quality to next wireless Z-2400-A2 Node.
<b>Aerial:</b>	Screw in to attach. ( <i>Additional High Gain Antennas Available.</i> )
<b>PROG:</b>	USB input to program Analogue Outputs via XU-USB Programming Kit. (Software: <b>uP Configure</b> version 1.2.8.0 or later.)
<b>RESTART:</b>	Button to reboot the Z-2400-A2 node.

### Z-2400-A2R Power Supply Connection.

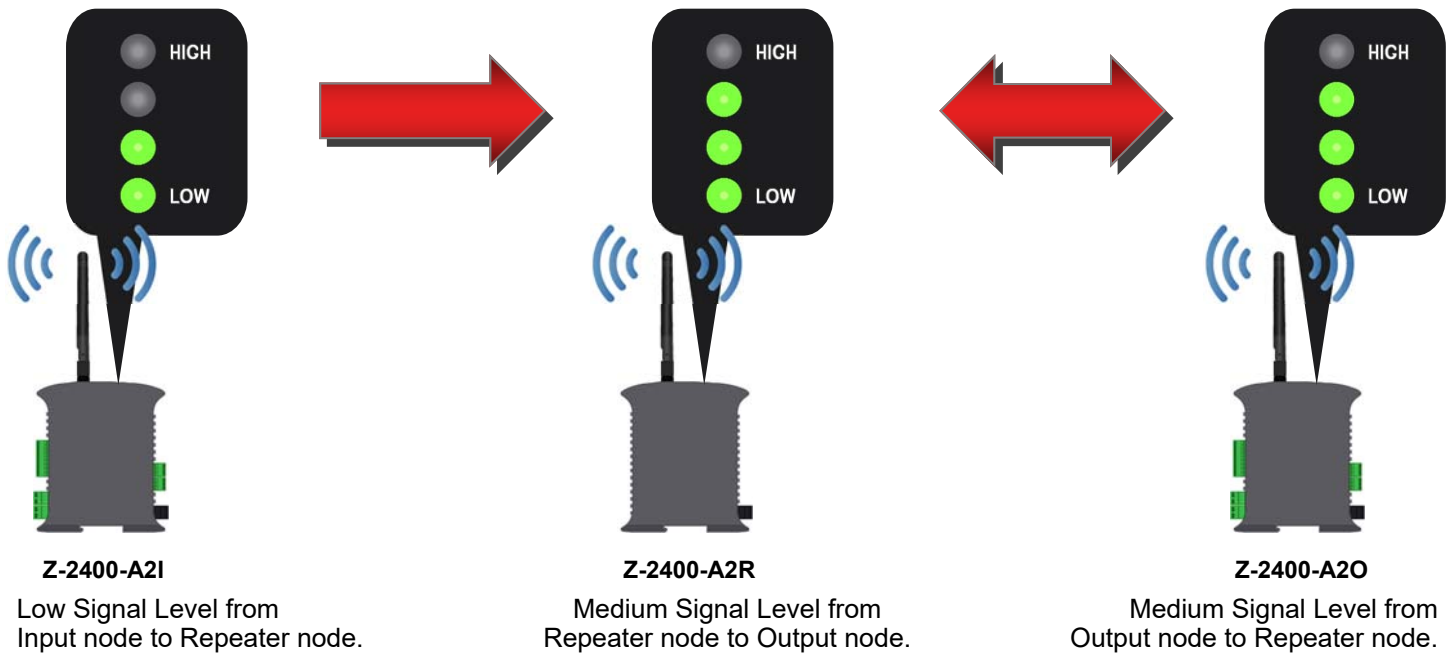


## Diagnostic LEDs.

### RF Signal Strength LED indication.

Each LED corresponds to the measured signal quality levels:

- One illuminated LED indicates very weak or no signal.
- Two illuminated LED's indicates low signal level.
- Three illuminated LED's indicates medium signal level.
- Four illuminated LED's indicate high signal level.



### Output, Input and Repeater Node Network Status LED Definitions.

	Z-2400-A2 node is not running.		Z-2400-A2 node is faulty.
	<b>Output</b> node is booting.		<b>Input / Repeater</b> node is booting.
	<b>Output</b> node is forming the network.		<b>Input / Repeater</b> node is searching for the network.
	<b>Output</b> node has reached maximum repeater node capacity in network.		<b>Input / Repeater</b> node can not detect the network.
	<b>Output</b> node has formed network and is ready to receive a transmission.		<b>Input / Repeater</b> node found the network and are ready to transmit.

OFF   
 ON   
 Flashing   
 Toggling

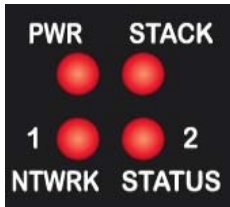
#### Output Network Status:

1 = ON, 2 = OFF      Output node starting up.  
 1, 2 Toggle      Network formed ready to connect.

#### Input Network Status:

2 = ON/Flashing, 1 = OFF      Input / Repeater node starting up.  
 1, 2 Toggle      Input / Repeater node connected to network.  
 1, 2 Flash at same time      Input / Repeater node NOT connected.  
 (Output not running, or no signal getting through or wrong Mesh ID set.)

## Power and ZigBee Network LED indication.



PWR	ON indicates power supplied connected.
STACK	Flashes to indicate ZigBee® communications active.
NTWRK STATUS 1, 2	See previous table.

## ZigBee Mesh ID.

The reason for Mesh IDs is to allow for multiple wireless Bases (Z-2400-A2O, Z-2400-RB & Z-2400-TCP) and therefore networks to be used in the same location where the mesh signals will overlap. You can program the Mesh ID of the Repeater node via the 'uP Configure' software. The Input and Output nodes are supplied paired with a unique ID.

## Programming the Z-2400-A2 Series.

### uP Configure Software.



The 'uP Configure' software is free to download from Intech's website:  
[www.intech.co.nz/downloads](http://www.intech.co.nz/downloads)

**uP Configure** (version 1.2.8.0 or later) offers a smart, no-fuss setup experience for your Z-2400-A2 wireless nodes.

It allows you to:

- Set up the analogue input types of the Z-2400-A2I (Default input is 4~20mA).
- Configure the digital inputs and outputs between Z-2400-A2I and Z-2400-A2O nodes.
- Set unique ZigBee Mesh ID networks to pair your Z-2400-A2 devices. (The Input and Output nodes are supplied paired to each other with a unique Mesh ID, however the Z-2400-A2R Repeater will always need to be paired to the unique Mesh ID.)
- Configure the RF output to comply with the wireless standards of your region.

If you are programming the Z-2400-A2I for a MicroScan installation, then you must use 'XU Setup' software, refer to the 'Z-2400-A2I Installation Guide'.

### Installing uP Configure.

**Note: You must install uP Configure before connecting a Z-2400-A2 wireless node to your computer. If you have already connected the wireless node using the XU-USB key, please disconnect it before continuing.**

1. Download the latest version of uP Configure from [www.intech.co.nz](http://www.intech.co.nz) >> **downloads** >> **uP Configure**. For ease of access, we recommend saving the install file on your desktop. If you cannot locate the install file, check whether your browser has saved it in your Downloads folder.
2. Extract the install file from the zip folder. Right-click on the zip folder and choose 'Extract All', (or extract the file using another extraction utility of your choice).
3. Double-click on the extracted 'uPConfigure.msi' install file. This will launch the uP Configure installer. Depending on your security settings, a 'Security Warning' dialogue may appear. If you see the security message, click 'Run'. A Windows User Account Control window may also appear. Click 'Yes' to continue.

**Note:** uP Configure requires **Microsoft .NET 2.0** to be installed first. If .NET 2.0 is not already installed, a prompt will advise this so you can install online.

**Note:** An Administrator account or password will be required for installation. Contact your IT support for this if needed.

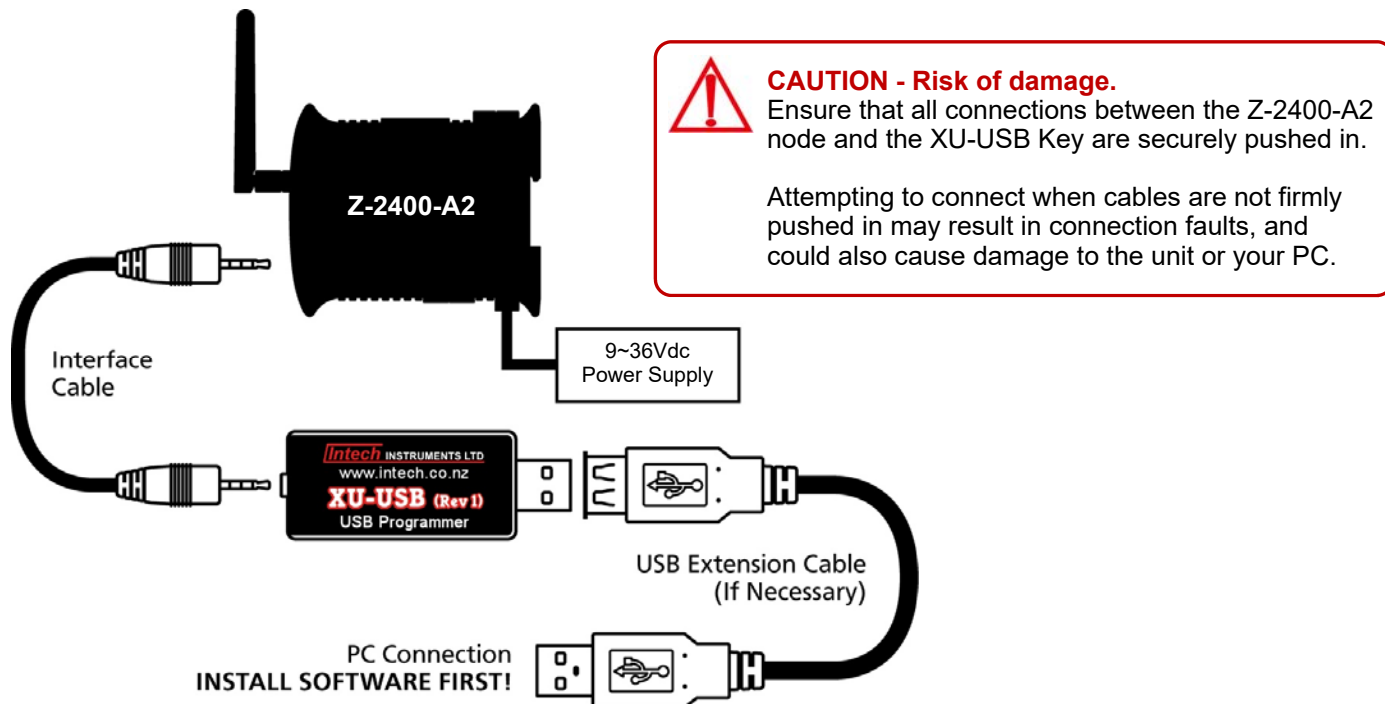
4. Follow the on screen instructions to complete the installation of uP Configure.

## Z-2400-A2 USB Connection.

To connect a Z-2400-A2 node to your PC requires the **XU-USB** Programming Key.  
(Same Key as used for programming XU Series transmitters, 2400-A16, Z-2400-Sleeper, IN-uP4 and uP4-Din.)

### BEFORE YOU CONNECT:


- Ensure that you have a **XU-USB** Programming Key and a low voltage power supply (9~36Vdc).
- Install the uP Configure software before connecting the XU-USB to your computer (see page 8). uP Configure may not be able to detect your Z-2400-A2 node if it was already connected to your computer at the time of installation.



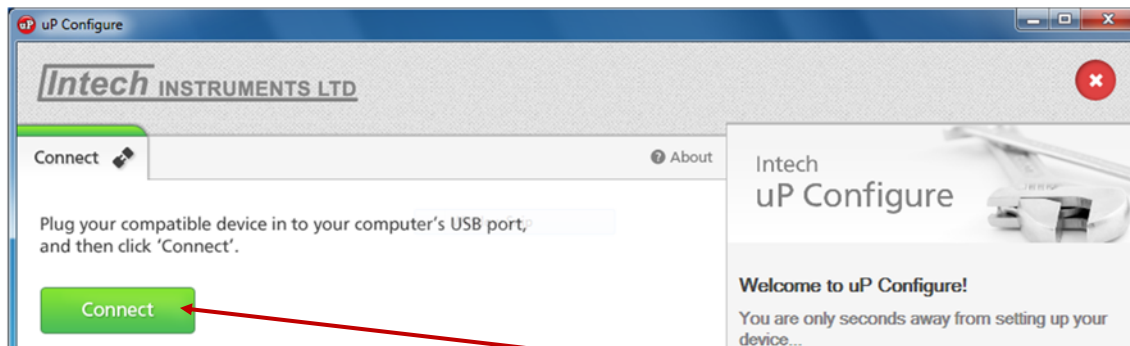
### Connecting up:

- Connect the XU-USB key to your computer's USB port and the other end of the cable to the programming port on the Z-2400-A2 front panel (see page 5), ensuring that the cable between the XU-USB programming key and the Z-2400-A2 node are firmly 'pushed in'. Failure to do so could cause damage to your computer.
- Connect your Z-2400-A2 node to a low voltage power supply (9~36Vdc, Wiring diagram on page 5).
- Confirm the node is working by checking the 'PWR' LED is lit.

## Using the uP Configure Software - version 1.2.8.0 or later.

To run uP Configure, double click on the icon on your desktop. 

### uP Configure Home Screen



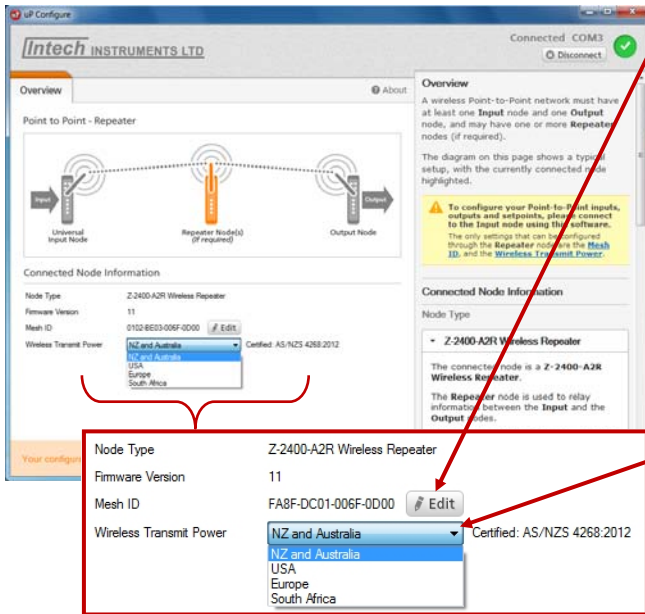
With your Z-2400-A2R connected to your computer via the XU-USB programming key, Click on the Connect button. The next screen that comes up is the 'Overview' of the Z-2400-A2 node connected.



## Configuring the Z-2400-A2R:

With the Z-2400-A2R repeater node, there are only two parameters to configure: the 'Mesh ID' and the 'Wireless Transmit Power'. Because the repeater is sold separate to the Input & Output nodes, it requires the Mesh ID pairing with your Input/Output Z-2400-A2 wireless set.

### Z-2400-A2R Overview



**Mesh ID:** This step will require you to copy the unique Mesh ID from your Z-2400-A2O Output node. This can be found by Connecting the Output node to the uP Configure software and copying the 16 digit Mesh ID number from the 'Overview' screen (as shown on page 10 of the Z-2400-A2IO Installation Guide). After you have then properly connected the repeater node to your PC and have the 'Overview' screen up, click on the 'Edit' button next to the Mesh ID number, and then type in the Mesh ID number exactly as you have copied down from the Output node.

### Wireless Transmit Power:

Next click on the drop down menu as shown and select your region. **This setting is important and must be set to comply with the wireless standards of your area.**



Remember to **ALWAYS** click the 'Apply' button after you change any settings, this will program the new settings to your Z-2400-A2R node.



To disconnect the Z-2400-A2R node from your computer, click on 'Disconnect?' in the top right corner of the screen.

## Troubleshooting.

It is possible that the ZigBee® wireless nodes will fail to communicate if they are in too close a proximity to each other. It is highly recommended to do a bench test before you commission on site; make sure the distance between the Z-2400 wireless nodes is more than one metre apart.

1. Check the Output wireless node is powered up and PWR LED is lit.
2. Check the Output node network status LEDs are toggling 1, 2 then 2, 1.
3. If you are using a wireless Repeater, check the node is powered up and PWR LED is lit.
4. Check the repeater node network status LEDs are toggling 1, 2 then 2, 1. If these LEDs flash 1 & 2 at the same time it means the Repeater cannot connect to the Mesh either because:
  - a) The Output node is not powered up.
  - b) The ZigBee signal strength is too weak to connect (also check the Signal Quality LEDs).
  - c) A wrong Mesh ID has been programmed into the node.
5. Check the input wireless node is powered up and PWR led is lit.
6. Check the Input node network status LEDs are toggling 1, 2 then 2, 1. If these LEDs flash 1 & 2 at the same time it means the Input node cannot connect to the Mesh either because:
  - a) The Base node is not powered up.
  - b) The ZigBee signal strength is too weak to connect.
  - c) A wrong dip switch has been set.
7. After the power supply of the Output and Input nodes have been switched on, the Input node may take up to 1 minute to re-establish a wireless connection.

If you are using the uP Configure software and an error message comes up: 'No devices were discovered'.

1. Close uP Configure completely, unplug the XU-USB from your PC's USB port, and turn the power supply off to the Z-2400-A2 node.
2. Connect up the Z-2400-A2 node again as per the instructions on page 8, re-run the uP Configure software from the icon on your desktop, and try to connect again.

## Considerations & Limitations for Z-2400 Network Systems.

The ZigBee® system does not offer 100% connectivity, even when all the precautions are taken into account no one can guarantee a good link, as there are many factors that cause problems. With the Z-2400-A2 Series, additional repeaters can be used in between the Input and Output wireless nodes (particularly good when transmitting through solid walls). Instead of, or in addition to the use of repeaters, higher gain antennas can be used to extend the wireless range further.

## Antenna Options for Z-2400-A2 Wireless Series.

MODEL	DESCRIPTION
ZB-ANT-02	2.4GHz 2dBi Whip Antenna Can be used either outdoor or indoor.
ZB-ANT-05	2.4GHz 5.5dBi Rubber Duck Antenna. Designed for indoor use.
ZB-ANT-08	2.4GHz 8dBi Omni Directional Antenna. (Mounting brackets included.) Can be used either outdoor or indoor.
ZB-ANT-14	2.4GHz 14.5dBi Directional Yagi Antenna. (Mounting brackets included.) Designed for outdoor use.
ZB-ANT-19	2.4GHz 19dBi Parabolic Grid Directional Antenna. (Mounting brackets included.) Designed for outdoor use.



For more information on wireless antenna options and distances, see the 'Z-2400-Turbo Antenna Range - Brochure.



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