



Wireless Sensor Network (WSN) is a distributed sensors to monitor physical or environmental conditions such as temperature, sound, pressure, etc. and to cooperatively pass their data through the network to a main location. The development of WSN was motivated by military applications such as battlefield surveillance; today such networks are used in many industrial and consumer applications, such as industrial process monitoring and control, machine health monitoring and so on.

A sensor network consists of multiple detection stations called sensor nodes. Each sensor node is equipped with a transducers. The power of each sensor node is derived from a battery.

Sciencetech 2311W Wireless Sensor Network is designed to pickup Sensor data from field and collect them using ZigBee Wireless Protocol. The collected data will be useful for the behavioral analysis of environment and based on that we can take necessary actions.

Sciencetech 2311W Wireless Sensor Network has one Coordinator and ten End Devices. Using this users can build different topology of wireless networks. Each End Device has four ports on which one can connect different Sensors. All End Devices have inbuilt rechargeable battery which can be charged using USB port of PC. End Devices can be configured as Router to increase range. Sciencetech 2311W comes with enhanced Software by which user can see graph of the collected data, active node topology, battery life and device parameter configuration.

Features

- ▶ **Wireless Network using ZigBee protocol**
- ▶ **No need of complex programming for configuration.**
- ▶ **Wireless data transmission on 2.4 GHz**
- ▶ **Data collection from End Device & rely to coordinator using Router**
- ▶ **Four analog/digital input connector on each node**
- ▶ **Device pair indicator**
- ▶ **Data receive indicator**
- ▶ **Receive signal strength indicator**
- ▶ **Create point to point, star and mesh networks**
- ▶ **MATLAB Interface**
- ▶ **Labview Interface**

- ▶ **Battery charging via mini USB cable**
- ▶ **Battery charging status indicator**
- ▶ **Node configuration connector**
- ▶ **+3.3V & +5V selection switch of node**
- ▶ **Easy installation**
- ▶ **Online Product Tutorials**
- ▶ **2 Years Warranty**

Software Features

- ▶ **Live data table and simultaneous graph plotting of all four sensors of particular node.**
- ▶ **Live monitoring and graph plotting of battery voltages of all connected nodes.**
- ▶ **Topology view of the nodes connected to coordinator.**
- ▶ **Data logging facility over MySQL database.**
- ▶ **Data search facility with resolution option. That is data/second, data/minute, data/hour or data/day.**
- ▶ **User can give name to node and sensor as for his convenience.**
- ▶ **User can apply his own formula for the sensor he is using.**
- ▶ **Modem configuration feature so that user can configure node parameters like baud rate, sleep time, PAN ID, destination address etc.**
- ▶ **This software is password protected so that only authorized user can access or can change the settings.**

Scope of Learning

- ▶ Understanding the concept of Wireless Sensor Network.
- ▶ Study & design Wireless Sensor Network (point to point, star, mesh networks)
- ▶ Study & learn to interface analog/digital sensors.
- ▶ Study & learn to interface Sciencetech 2311W with MATLAB.
- ▶ Study & learn to configure Router or End Device.
- ▶ Study & learn serial interfacing of coordinator with PC.

The Zigbee Protocol defines three types of nodes:

• Coordinators:

- ▶ One coordinator in each network and it is the device that establishes the network.
- ▶ Able to store information about the network, including security keys.
- ▶ The coordinator is responsible for establishing the operating channel and PAN ID for an entire network.
- ▶ Once established, the coordinator can form a network by allowing routers and end devices to join to it.
- ▶ Scientech 2311WB act as a coordinator.



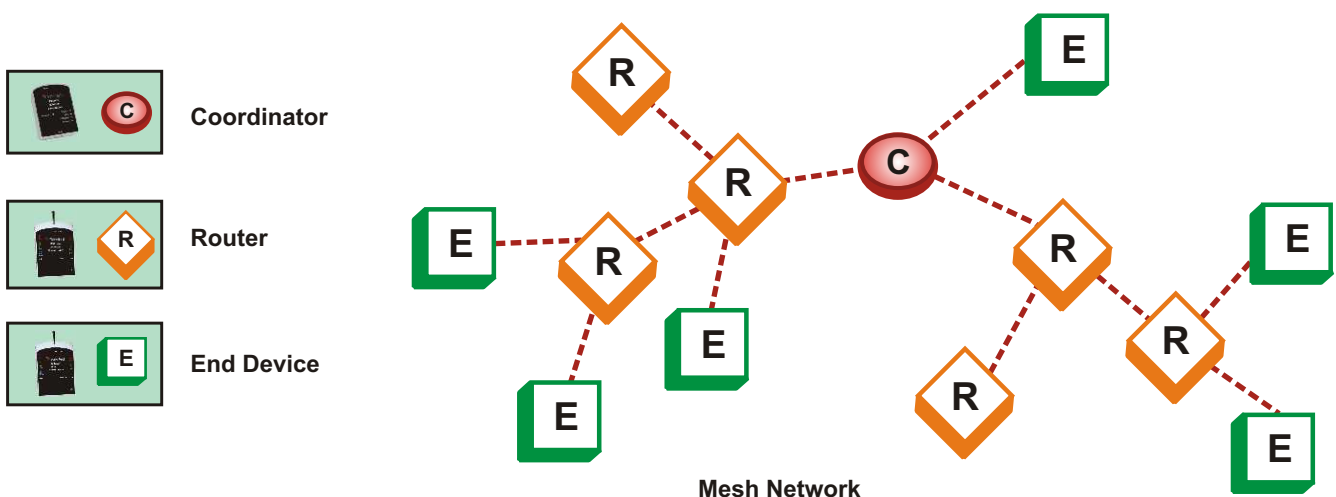
• Routers:

- ▶ It acts as a intermediate nodes, relaying data from other devices (End Device).
- ▶ It creates/maintains network information and uses this information to determine the best route for a data packet.
- ▶ A router must join a network before it can allow routers and end devices to join to it.
- ▶ A router can participate in routing packets and is intended to be a mains-powered node.
- ▶ Scientech 2311WN can be configured as router or as an end device.



• End Devices:

- ▶ Low-power / battery-powered device.
- ▶ Sufficient functionality to talk to their parents (either the coordinator or a router)
- ▶ End devices must always interact with their parent to receive or transmit data.
- ▶ Intended to sleep periodically and therefore have no routing capacity.
- ▶ Several end devices can operate in one PAN ID.
- ▶ Scientech 2311WN is an end device.



Technical Specifications

Sciencetech 2311WB:

Communication	: USB
Operating Voltage	: +2.8 to +3.7V
LED	: +3.3V
Baud rate	: 115200bps (default)
Frequency	: 2.4 GHz

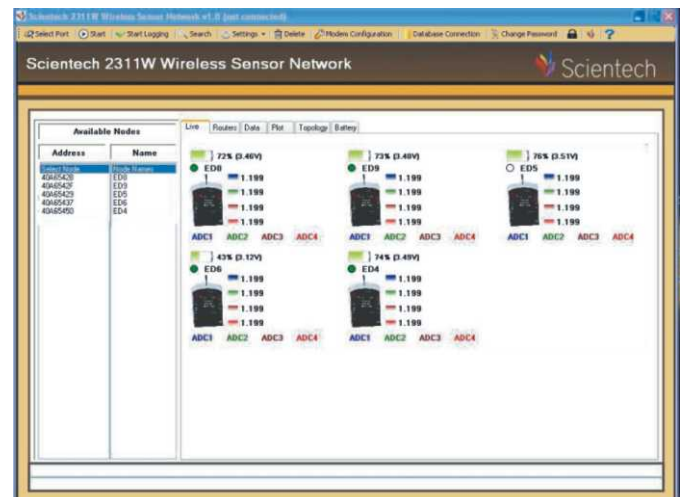
Sciencetech 2311WN:

ADC/Digital IO Pins	: 4
ADC Resolution	: 10 Bit
ADC reference voltage	: 1.2V
Boost Voltage	: +5V
Boost Cut-Off Voltage	: +2.9V
Supply for Battery Charging	: +5V
Baud Rate	: 115200bps (default)
Battery	: NI-MH 3.7V/3000 mAh
Sleep mode time	: 1000ms (default)
Wake up time	: 20ms (default)
Indoor/Urban Range	: up to 60m
Outdoor RF line-of-sight range	: up to 1500m
Transmit Power Output	: 60 mW
RF Data Rate	: 250 Kbps
Supply Voltage	: +2.8 to +3.6 V
Transmit Current (typical)	: 205 mA (@ 3.3 V)
Idle/Receive Current (typical)	: 50 mA (@ 3.3 V)
Frequency	: ISM 2.4 GHz
Antenna	: Wire
Network Topologies	: Point to Point, Star, Mesh network
Product Tutorials	: Online (Theory, procedure, reference results etc)
Dimensions (mm) Sciencetech 2311WN	: W 50 x D 25 x H 94
Weight (Single End Device)	: 225gm (approximately)
Dimensions (mm) Sciencetech 2311WB	: W 50 x D 25 x H 70
Weight (Single Base Station)	: 100gm (approximately)
Dimensions (mm) Sciencetech 2311W	: W 465 x D 350 x H 150
Total Weight	: 4.6kg (approximately)

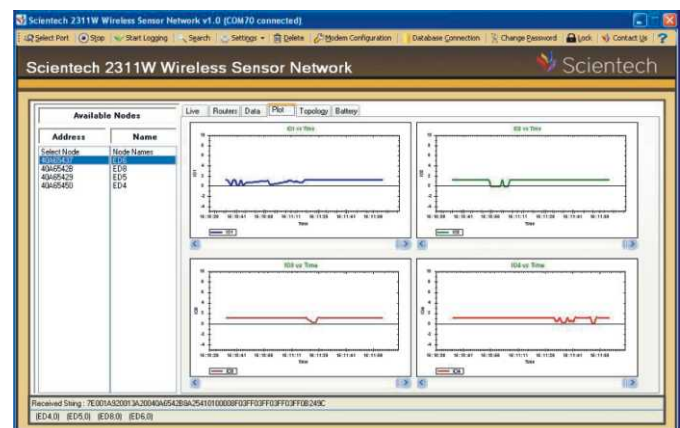
Included Accessories:

B Type USB Cable	: 1 no.
Sciencetech 2311WB	: 1 no.
Sciencetech 2311WN	: 10 nos.
Configuration adaptor	: 1 no.
Mini USB Cable	: 5 no.
Sensor LM35, RTD, LDR	: 1 no. each

Software Window

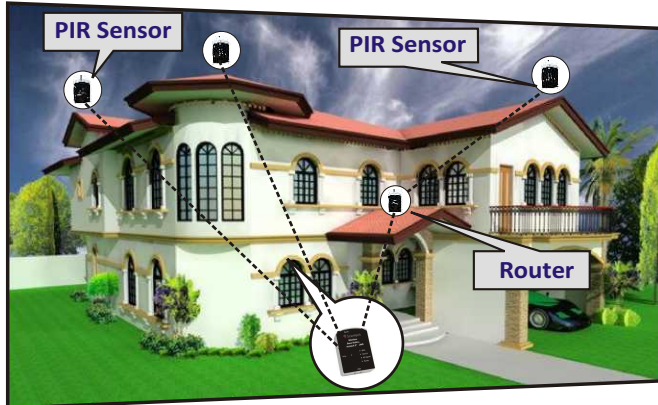


Analysis Window

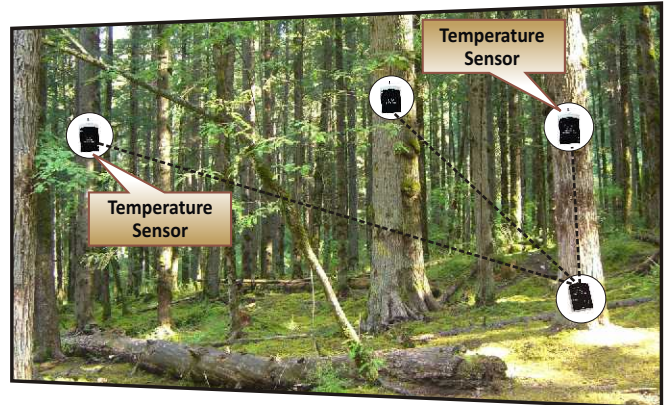


Application:

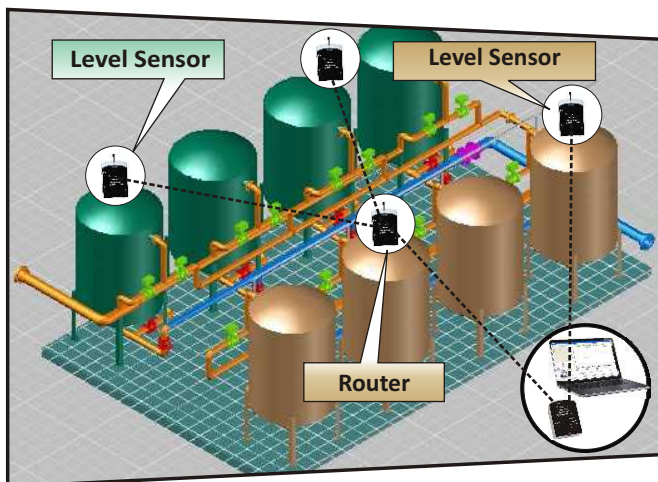
- Agriculture management
- Forest monitoring
- Vehicle monitoring
- Water management
- Building automation
- Machine monitoring
- Land Slide monitoring
- Animal monitoring
- Weather monitoring



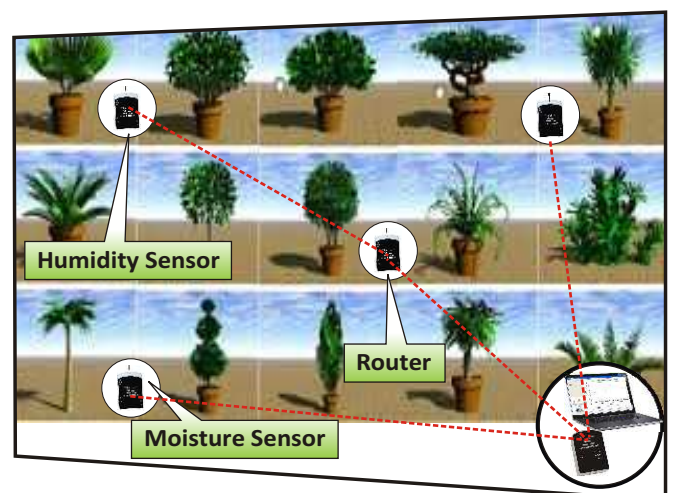
Building Automation



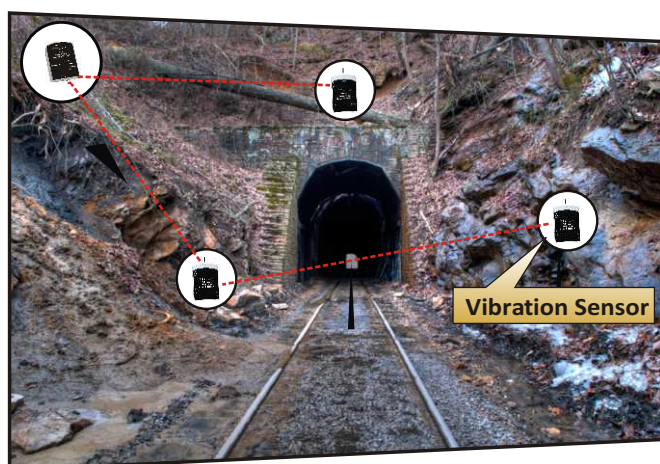
Forest Monitoring



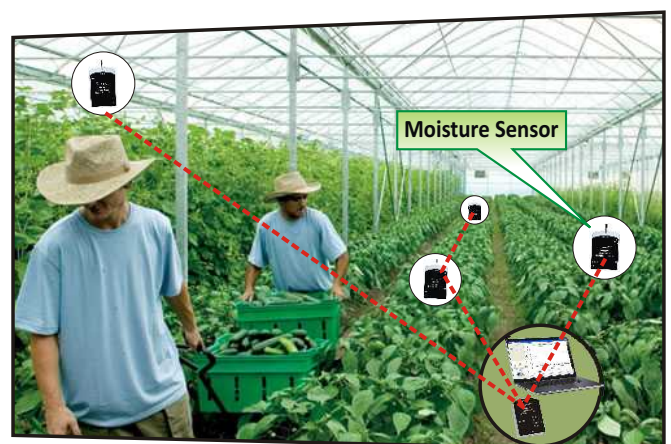
Water Plant Management



Plantation Management



Land Slide Monitoring



Agriculture Management

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