

# A Review on XBEE Technology

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**Abstract – From the past few years there are rapid development in the wireless technologies. The wireless networks has more application than that of wire technology, which has more complex city than wireless networking which has the more installation cost and maintenance cost also it required more man power for handling it. The more wireless network has used now days for the wireless monitoring control application of industry and domestic environment which has longer in life which has lower data rate and less complex city than the older network. There are wireless network like Wi-Fi and Bluetooth used for the data transmission. For such application the Zigbee alliances invented network by using the Zigbee. Zigbee has IEEE standard 802.15.4 and it has band of 2.4 Ghz ISM. This paper include application , advantages and about the Zigbee data module**

**Index Terms – Wireless Networks , Zigbee, IEEE 802.15.4, Bluetooth, Wi-Fi.**

## 1. INTRODUCTION

The XBee RF Modem from Digi International is a wireless transceiver. The XBee uses a fully implemented protocol for data communications that provides features needed for robust network communications in a wireless sensor network (WSN). Features such as addressing, acknowledgements and retries help ensure safe delivery of data to the intended node. The XBee also has additional features beyond data communications for use in monitoring and control of remote devices. XBee can substitute one XBee for another, depending upon dynamic application needs, with minimal development, reduced risk and shorter time. XBee 802.15.4 RF modules are ideal for applications requiring low latency and predictable communication timing. Providing quick, robust communication in point-to-point, peer-to-peer and multipoint/star configurations, XBee 802.15.4 products enable robust end-point connectivity with ease. Whether deployed as a pure cable replacement for simple serial communication, or as part of a more complex hub-and-spoke network of sensors, XBee 802.15.4 RF modules maximize performance and ease of development. XBee 802.15.4 modules seamlessly interface with compatible gateways, device adapters and range extenders. The 802.15.4. XBee in real-time biological

monitoring, citrus vibration monitoring during harvest, and other monitoring and control systems—such as robotics.

## 2. WHAT IS ZIGBEE

ZigBee was developed by the ZigBee Alliance, a world-wide industry working group that developed standardized application software on top of the IEEE 802.15.4 wireless standard. So it is an open standard.

The power measurement application encompasses many services and appliances within the home and workplace, all of which need to be able to communicate with one another. Therefore, open standards architecture is essential. Open standards provide true interoperability between systems. Open standards also help to future-proof investment made by both utilities and consumers. Using an open protocol typically reduces costs in implementing; there are no interoperability problems to solve, and manufacture costs tend to be lower. ZigBee also provides strong security capabilities to prevent mischief, and is extremely tolerant of interference from other radio devices, including Wi-Fi and Bluetooth. ZigBee-enabled meters form a complete mesh network so they can communicate with each other and route data reliably. And the ZigBee network can be easily expanded as new homes are built or new services need to be added.

The Xbee RF module has divided into two types

1. Coordinator
2. End Device
3. Router

### 2.1 Coordinator

A device is configured as a Coordinator by setting the CE (Coordinator Enable) parameter to "1". Coordinator power-up is governed by the A2 (Coordinator Association) parameter. In a Coordinator system, the Coordinator can be configured to use direct or indirect transmissions. If the SP (Cyclic Sleep Period) parameter is set to "0", the Coordinator will send data immediately. Otherwise, the SP parameter determines the length of time the Coordinator will retain the data before

discarding it. Generally, SP (Cyclic Sleep Period) and ST (Time before Sleep) parameters should be set to match the SP and ST settings of the End Devices. Coordinator is used as the transmitter by which the data is send to the receiver or coordinator which is connect with the valid transmitter.

### 2.2 End Device

End Device power-up is governed by the A1 command. On Device is Associated and the Associate LED will blink rapidly (2 times per second). The LED is solid if the End Device has not associated. The data is send by the end device to the coordinator.

### 2.3 Router

While the selecting the transmitter and receiver to Xbee module command is given as router as the transmitter which is sending data to coordinator . After the giving command to coordinator and to router from the computer by using the Xcut software then they will communicating with each other and data transfer will be possible.

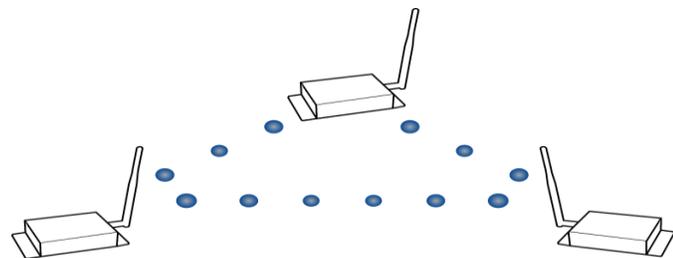
## 3. NETWORK OF XBEE TECHNOLOGY

The Xbee are works in various networks, in that networks they are works as the master and slave, then they will works as coordinator and end device. Xbee network is called as PAN (personal area network) .Each network have only one coordinator. The Xbee network are divided into two types of networks that are given as below

- Peer to Peer Network
- Star Network

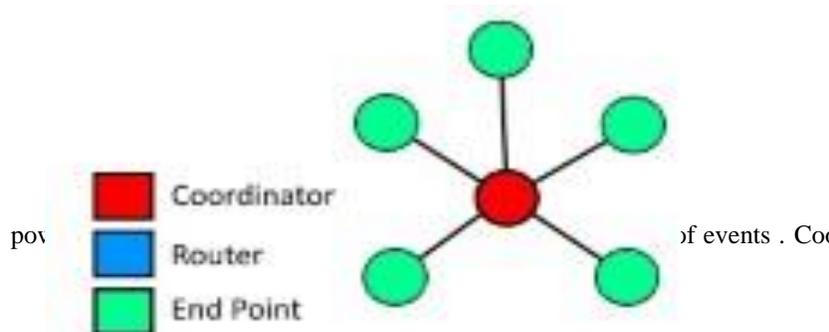
### 3.1. Peer to Peer Network

In the peer to peer network all devices are communicating with each other as long as the range of the xbee module by using this networks it is very complicated to the formation of network like the mesh topology.



### 3.2. Star Network

To form the star network the coordinator must have its own PAN id for operating that type of channel networks. After the establishing the networks the coordinator and end device will be communicating with the other devices (router or end device) to join and the send the data.



All the sub topics should be numbered as shown above. Numbering should be made correctly.

## 4. ADVANTAGES OF XBEE

1. No wires involved in the proposed system. Hence we can avoid power and data loss.
2. It can be operated in any environment condition.
3. No wires involved in this system. Hence we can avoid power and data loss.
4. as point-to-point, point-to-multipoint and mesh networks.
5. It has low duty cycle which provides long battery life..
6. Xbee has Low latency.
7. Direct Sequence Spread Spectrum (DSSS) is used in Xbee technology.
8. Xbee has ability to use up to 65,000 nodes per network.
9. 128-bit AES (Advanced Encryption Standard) encryption for secure data connections are used in it.
10. Collision avoidance, retries and acknowledgements are one of the most efficient features of Xbee.

## 5. CONCLUSION

The Xbee has various advantages it consist of data transfer, controlling node operation. By using xbee for the wireless communication it is very easy to handling than the other devices. The main advantage of using Xbee protocol is that the nodes require very less amount of power so it can be operated from battery. Each node is measuring the power, which is being consumed by the appliance by using xbee. Xbee is a kind of low power-consuming communication technology for coverage area surrounded by 200m, with a data rate ranging from 20Kbps to 250Kbps, it is appropriate for use in home area networks, mainly for the remote control in industry and household application .

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