# Wireless Transceiver Selection

### Technology and Technical approach Considerations

The wireless transceiver is used to communicate between the controller box and the control panel. A mesh networking structure is used to allow each of the control panels to communicate with the controller box and with each other in an effort to extend the range of the system. Use of the existing wi-fi wireless network was considered. However the mesh network architecture eliminates any need for a separate wireless network infrastructure and is considerably more affordable. A standard n network interface is 2-4 times the price of the chosen mesh network protocol, the IEEE 802.15.4 standard. This standard was chosen to ensure compatibility with the largest number of products. Although there are products with proprietary technology that expand the functionality of the wireless transceiver, the standard protocol was elected. The Xbee product by Digi has been selected as a product that meets all of our requirements, including the ease with which it can be integrated with the microcontroller using a simple serial interface, the affordability and the flexibility provided.

### Testing requirements considerations

There are a number of tests that must be performed. The unit must be tested to ensure basic functionality, range, and reliability. The most basic test would be to test basic functionality to ensure the unit can properly transfer data bytes. Then the transceiver’s range must be tested. This must be done in the product’s intended environment. A variety of environmental factors must be tested, including having a transceiver that needs to reliably communicate up to 3 rooms away. Incorporated into the range tests will be a test of reliability, with reliability being measured as the percentage of the transmitted bytes that were received by each transceiver as a function of the range.

### Security considerations

The Xbee includes built-in security features. These security features include the addressing method used by the transceiver. There are over 65,000 unique addresses that can be set for each transceiver. The source and destination of each message is addressed. The system also has the ability to encrypt the sent data using 128-bit AES (Advanced Encryption Standard). This will help secure information sent over the wireless serial link between the control panel and the controller box. Even though the Xbee does an excellent job of securing data when configured properly, the system is designed so that the data being transmitted wirelessly is not very sensitive to intrusion. The two pieces of data that will be sent though the transmitter are the current temperature of the room to be used to complete the feedback loop of the control algorithm and the user’s preference.

# References

"XBee® & XBee-PRO® 802.15.4 OEM RF Modules - Digi International." *Digi International - Making Wireless M2M Easy*. Web. 25 Sept. 2010. <http://www.digi.com/products/wireless/point-multipoint/xbee-series1-module.jsp#overview>.