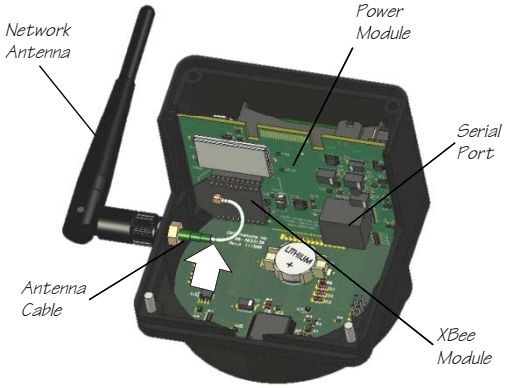
Network Guide

AeroMate™ WSC
(Wireless Sensors and Controls)

Bluetooth 802.15.4
Point-to-Point Network

Network Components



XBee and XBee-Pro

XBee Series 1 wireless modules plug into the power module as shown above. These modules are factory configured for use as a Coordinator or End Device function. Coordinator and End Device functions are interchangeable within the AeroMate units, however Coordinators require more power than End Devices.

Coordinator

A Point-to-Point network consists of one Coordinator, up to ten (10) End Devices and an unlimited number of "Listener Devices". A network Coordinator (Master) manages and coordinates all interaction between network End Devices (Slaves) and Listener Devices (Slaves).

End Device

End Devices or "sleeping nodes" are used with discrete sensor and control units joined through the Point-to-Point network and managed by a single Coordinator. End Devices send data to and receive data from the network Coordinator.

Listener Device

Listener Devices are also "sleeping nodes" that "listen only" to shared data passing through the Point-to-Point network and initiate actions based on the shared network data. Listener Devices are "Output Only" controls such as digital and analog routers or solenoid operated pneumatic valves. Up to 64 Listener Devices may be added to the wireless network.

Network Setup

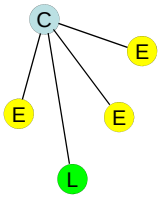
A network status display provides network connection status. In order for a new device to join the PAN, simply power up the new device within range of and with the same Network Channel ID as the Coordinator. No two devices can have the same MY Id number.

Wireless device type, signal strength and link status.

DEV	RSS	Link
ED	- 74	YES

Network Topology

Point-to-Point

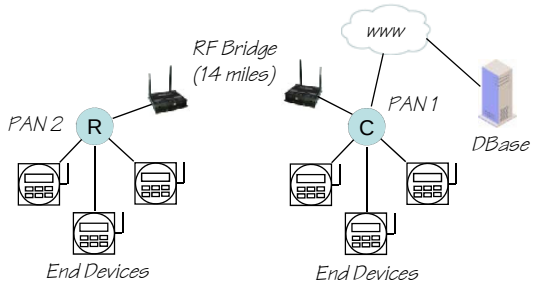


The simplest network topology is Point-to-Point (802.15.4) with one Coordinator linking up to ten End Devices. The network may also contain up to 64 Listener Devices that receive data only. Distance from a Coordinator to the network devices can be up to 4000 ft. (1 km) line of sight (LOS).

C = Coordinator *E = End Device* *L = Listener*

Beyond The PAN

A Personal Area Network (PAN) is just one of the many ways to establish a network connection. The PAN Coordinator may also be connected to a cellular gateway for direct access to the internet via the World Wide Web (www) and from there to a database center or PC computer. Tag data are contained in structured Modbus packets (coils and registers) that may be encapsulated or wrapped in TCP/IP packets for transport over the internet. Each Modbus packet has a unique slave identification and packet checksum.



For medium range network extensions, a PAN router may be used to link devices to the network up to 14 miles distant. As shown above, an RF bridge can provide a seamless and transparent connection between a local PAN and a remote PAN connected to other End Devices.

Data Log Retrieval

A convenient way to interact with XBee enabled devices at a range of up to 3000 ft. (1 km) LOS is with a laptop PC computer. The XBee-Pro USB adapter plugs into and is powered by the laptop PC's USB port. The XBee-Pro USB adapter may then be used to monitor, modify settings or download log data from within a nearby vehicle.

XBee-Pro USB

XBee Adapters

RS-232
RS-485
1-Wire
USB

Digi International provides a wide range of XBee adapters that allow non-AeroMate units to join the PAN and monitor vTagNet data packets. Adapters include serial RS-232, serial RS-485, 1-Wire sensor and USB to XBee converters. Adapters are sold as individual units and are approved for use in Class 1, Division 2 hazardous locations. Wireless range for these adapters are the same as with the standard XBee network modules.

Drop-In Networking

Part Number	*Accessory Description*
1980-2401500	XBee-Pro PKG-U USB. Maxstream 2.4 GHz USB Adapter. 4000 ft.(1km) Line of Sight range.
1980-2410232	XBee / RS-232 Adapter. Maxstream 2.4 GHz Zigbee DB-9M, 9-30 VDC, Class 1 Div 2
1980-2410485	XBee / RS-485 Adapter. Maxstream 2.4 GHz Zigbee 6-Position Block, 9-30 VDC, Class 1 Div 2
1980-2410199	XBee / 1-Wire Temperature Sensor. Maxstream 2.4 GHz Zigbee RJ-45, 9-30 VDC, Class 1 Div 2
1980-2411100	XBee / USB Adapter. Maxstream 2.4 GHz Zigbee USB 2.0, Bus Powered, Class 1 Div 2
1980-2410900	Xtender / XBee RF Bridge. 900 MHz, 24. GHz Zigbee 14 mi. (22 km) Line of Sight Range
1980-2411801	ConnectPort x4 Gateway. Cellular CDMA/GPRS, 2.4 GHz Zigbee Python Language Programmable