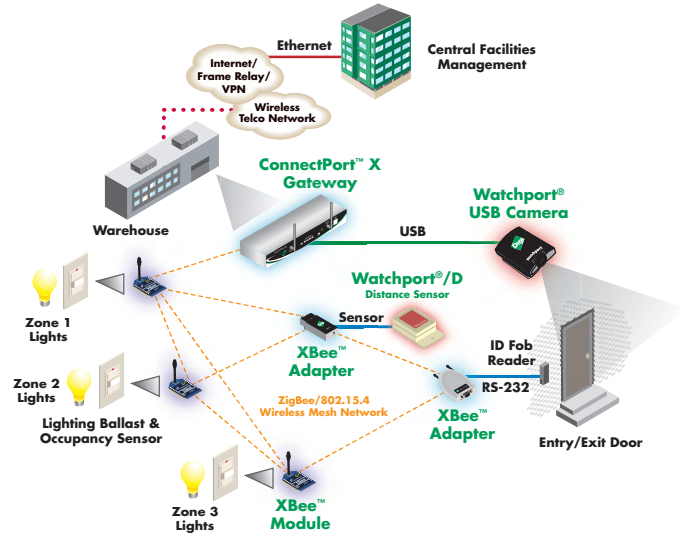


XBee™ Adapters

ZigBee®/802.15.4 Device Adapters for Drop-in Networks

XBee adapters provide easy ZigBee/802.15.4 wireless connectivity to sensors, controllers and other devices used for remote monitoring and control. All XBee adapters can be used with Digi's ConnectPort™ X IP gateways to build wireless Drop-in Networks.



Features/Benefits

- ZigBee/802.15.4 wireless mesh connectivity for all types of end-point devices
- Compatible with Digi's ConnectPort X family of IP gateways for LAN/WAN connectivity
- Multiple interface options provide broad device support: Serial, USB, Sensor, Digital I/O, Analog I/O
- Small form factor for easy handling and installation
- Flexible powering options include external power, N-cell battery or both for power redundancy
- Two versions available: XBee and XBee-PRO™ (longer range)

Overview

ZigBee/802.15.4 technology enables low-cost, low-power networking of sensors, controllers and other such devices in self-configuring, self-healing wireless mesh networks. Digi's XBee adapters are used to retrofit existing devices for ZigBee/802.15.4 connectivity. Available with multiple interface options, these adapters deliver the benefits of ZigBee/802.15.4 mesh networking off-the-shelf, without the development time required when using an embedded solution. As part of Digi's Drop-in Networks product family, XBee adapters can be used with ConnectPort X gateways to "drop-in" end-to-end device networks without the need for a wired network infrastructure.

Contains a ZigBee/802.15.4 wireless module for network connectivity and a physical interface for device connectivity. Available interfaces include RS-232 (powered and power harvesting), RS-485, USB, Sensor (for use with Digi's Watchport Sensors), Digital I/O and Analog I/O. Each is offered in a small form factor with various powering options that include external power supply, N-cell battery, both external and battery power for redundancy, or parasitic power drawn from the connected device. Two performance levels of XBee adapters are available: XBee and XBee-PRO. The PRO version provides greater transmit power and approximately three-times the range of the regular version.

Compatibility Note:

Two sets of XBee and XBee-PRO adapters are offered: Series 1 and Series 2. Though overall performance and product specifications are largely similar, the two series are built on distinct and non-compatible technology platforms. Thus, users must standardize on one series or the other for operability. The same is true for compatibility with the ConnectPort X gateways. Series 1 XBee adapters are compatible only with Series 1 gateways, while Series 2 XBee adapters are compatible only with Series 2 gateways. Series 1 XBee specifications appear on page 2 of this datasheet. Series 2 XBee specifications are on page 3.



Features/Specifications - Series 1 XBee Adapters

FEATURES

General

- Frequency: 2.4 GHz (ISM)
- Antenna options: Integrated whip antenna

Performance: XBee

- Indoor/Urban range: Up to 100 ft (30 m)
- Outdoor RF line-of-sight range: Up to 300 ft (100 m)
- Transmit power output: 1 mW (0 dBm)
- RF data rate: 250,000 bps
- Receiver sensitivity: -92 dBm (1% PER)

Performance: XBee-PRO

- Indoor/Urban range: Up to 300 ft (100 m)
- Outdoor RF line-of-sight range: Up to 1 mile (1.6 km)
- Transmit power output: 60 mW (18 dBm)*, 100 mW EIRP*
- RF data rate: 250,000 bps
- Receiver sensitivity: -100 dBm (1% PER)

Networking and Security

- Network topologies: Point-to-Point, Point-to-Multipoint, Peer-to-Peer, Mesh
- Number of channels:
 - XBee: 16 - 5 MHz channels (Direct Sequence Spread Spectrum)
 - XBee-PRO: 12 Direct Sequence Channels (software selectable)
- Filtration options: PAN ID, Channel, Source/Destination Addresses

LEDs

- Power: Glows green when external power is supplied (not active when battery powered to limit power drain)
- Associate: Glows when unit is connected and associated on an RF network

Controls

- Device reset (internal push button)
- Identification (internal push button): Relays identification to ConnectPort X gateway

INTERFACES

Serial

- RS-232 (DB-9M)
- RS-232PH (DB-9M); power harvesting version
- RS-485 (6-position wire terminal block)
 - Switch selectable between RS-422 half duplex, RS-422 full duplex and RS-485
- Sensor (RJ-45)

USB

- USB 2.0 Full Speed (with ESD protection); connects to host via captive 2-meter cable

ENVIRONMENTAL

XBee 232, 485, Sensor, USB, Analog I/O and Digital I/O

- Operating temperature: -40° C to 70° C
- Powering options
 - Battery: -18° C to 55° C
 - External power: 0° C to 40° C
 - External power (hardened): -35° C to 74° C

XBee 232PH

- Operating temperature: 0° C to 65° C

DIMENSIONS

XBee 232, 485, Sensor, Analog I/O and Digital I/O

- Width: 1.68 in (4.26 cm)
- Height: 0.99 in (2.53 cm)
- Length: 3.87 in (9.84 cm)
- Weight: 2.29 oz (6.50 g)

XBee USB and 232PH

- Width: 1.80 in (4.57 cm)
- Height: 0.83 in (2.10 cm)
- Length: 2.87 in (7.29 cm)
- Weight: 1.60 oz (45.36 g)

REGULATORY APPROVALS

- FCC Part 15.247 - Pending
- Industry Canada (IC) - Pending
- Europe (CE) - Pending
- EN55022, Class A - Pending
- UL60950 - Pending
- CAN/CSA C22.2 No. 60950 - Pending
- EN60950 - Pending
- RoHS compliant

POWER REQUIREMENTS

XBee 232, 485, Sensor, Analog I/O and Digital I/O

- Externally powered: 9-30VDC, locking connector
- Battery powered: 3 internal N-cell batteries

XBee USB

- Bus powered: +5V from USB bus
- Power consumption during normal operation:
 - XBee: 70 mA
 - XBee-PRO: 70 mA (Rx) and 250 mA (Tx)
- Power consumption during suspend mode:
 - XBee and XBee-PRO: 200 uA

XBee 232PH

- Internal battery provides power when unit is operating and recharges from the serial port when in sleep mode
- Requires a sleep/wake duty cycle as part of its normal operation.
- Requires a fully functional serial port conforming to the RS-232C standard for optimal operation.
- Sleep/wake duty cycle requirements will vary based on the current output of serial port
- Serial ports with more than 14VDC output (rare) are not supported and may cause malfunction
- Serial ports that provide hard power of 5 to 14VDC on one or more pins will allow the device to operate continually without a sleep/wake cycle

MODEL.....PART NUMBERS

Model/Interface	XBee	XBee-PRO
XBee/XBee-PRO RS-485	XA-A14-CS3R	XA-A14-CS3P
XBee/XBee-PRO RS-232	XA-A14-CS2R	XA-A14-CS2P
XBee/XBee-PRO Sensor	XA-A14-CS1R	XA-A14-CS1P
XBee/XBee-PRO Analog I/O	Available Oct 07	Available Oct 07
XBee/XBee-PRO Digital I/O	Available Oct 07	Available Oct 07
XBee/XBee-PRO USB	XA-A14-CE1R	XA-A14-CE1P
XBee/XBee-PRO RS-232PH (power harvesting)	Available Oct 07	Available Oct 07
Accessories		
Batteries (N-cell, 3-pack)	XA-ACC-BATT	XA-ACC-BATT
External Power Supply	76000734	76000734
External Power Supply, Hardened (Extended Temp)	76000752	76000752

* When operating in Europe: XBee-PRO adapters must be configured to operate at a maximum TX power output level (power output level is set using the PL command). Additionally, European regulations stipulate an EIRP power maximum of 12.86 dBm (1 mW).

Series 1 XBee Adapters are compatible only with Series 1 ConnectPort X gateways.

Features/Specifications - Series 2 XBee Adapters

FEATURES

General

- Frequency: 2.4 GHz (ISM)
- Antenna options: Integrated whip antenna

Performance

- Indoor/Urban range: Up to 100 ft (30 m)
- Outdoor RF line-of-sight range: Up to 300 ft (100 m)
- Transmit power output: 1 mW (0 dBm)
- RF data rate: 250,000 bps
- Receiver sensitivity: -95 dBm (1% PER)

Networking and Security

- Network topologies: Point-to-Point, Point-to-Multipoint, Peer-to-Peer, Mesh
- Number of channels: 16 - 5 MHz channels (Direct Sequence Spread Spectrum)
- Filtration options: PAN ID, Channel, 2⁶⁴ (64-bit) addresses

LEDs

- Power: Glows green when external power is supplied (not active when battery powered to limit power drain)
- Associate: Glows when unit is connected and associated on an RF network

Controls

- Device reset (internal push button)
- Identification (internal push button): Relays identification to ConnectPort X gateway

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- CAN/CSA C22.2 No. 60950 - Pending
- EN60950 - Pending
- RoHS compliant

MODEL.....PART NUMBERS

Model/Interface	XBee	XBee-PRO
XBee/XBee-PRO RS-485	XA-B14-CS3R	Available Jan 08
XBee/XBee-PRO RS-232	XA-B14-CS2R	Available Jan 08
XBee/XBee-PRO Sensor	XA-B14-CS1R	Available Jan 08
XBee/XBee-PRO Analog I/O	Available Oct 07	Available Jan 08
XBee/XBee-PRO Digital I/O	Available Oct 07	Available Jan 08
XBee/XBee-PRO USB	XA-B14-CE1R	Available Jan 08
XBee/XBee-PRO RS-232PH (power harvesting)	Available Oct 07	Available Jan 08
Accessories		
Batteries (N-cell, 3-pack)	XA-ACC-BATT	XA-ACC-BATT
External Power Supply	76000734	76000734
External Power Supply, Hardened (Extended Temp)	76000752	76000734

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XBee 232PH

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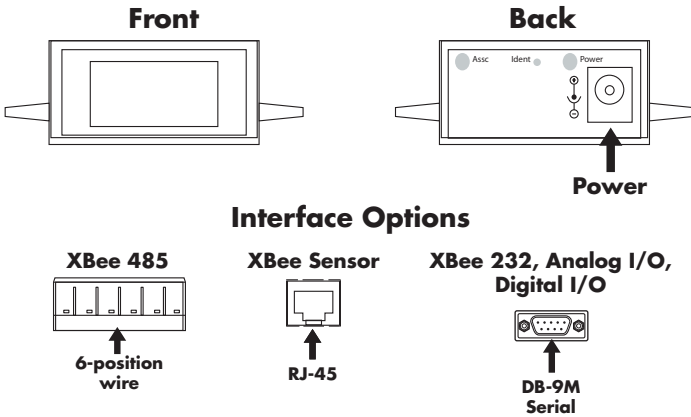
XBee 232PH

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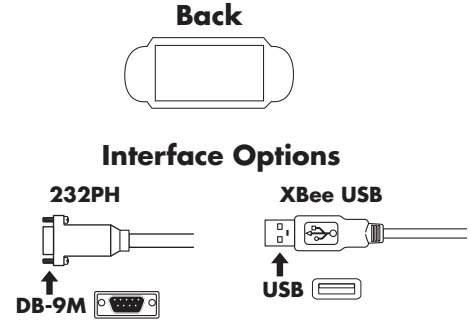
Series 2 XBee Adapters are compatible only with Series 2 ConnectPort X gateways.

Line Art/Application Diagram

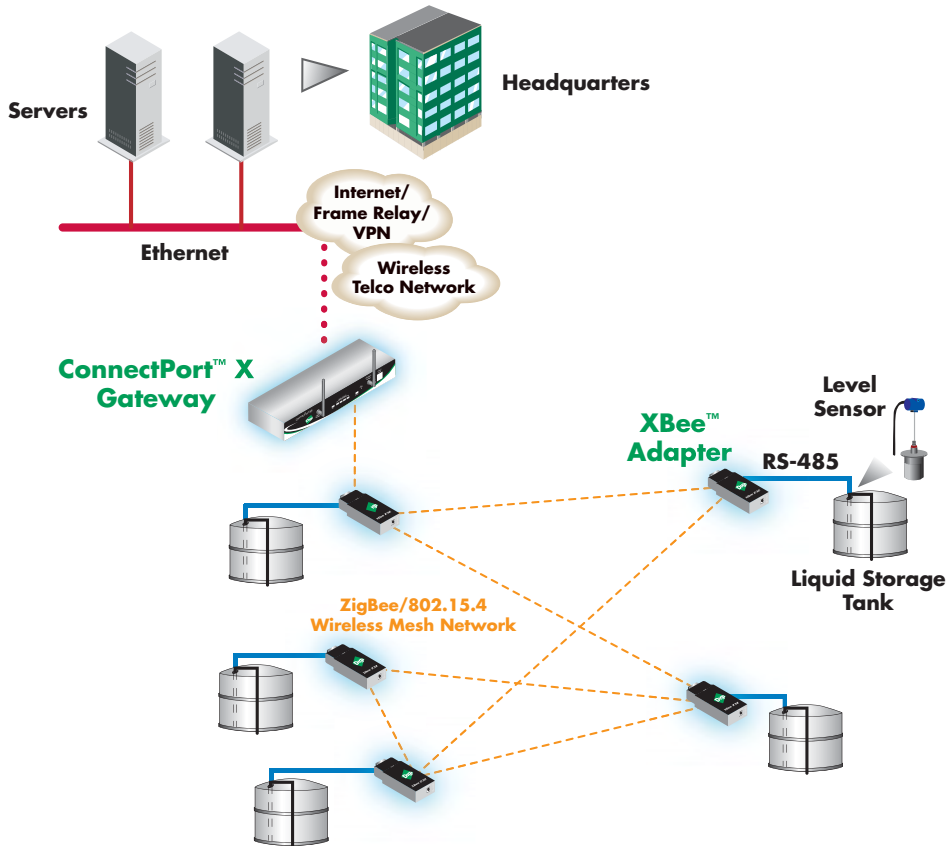
XBee 232, 485, Sensor, Analog I/O, Digital I/O



XBee USB, 232PH



Drop-in Network for Tank Level Monitoring



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