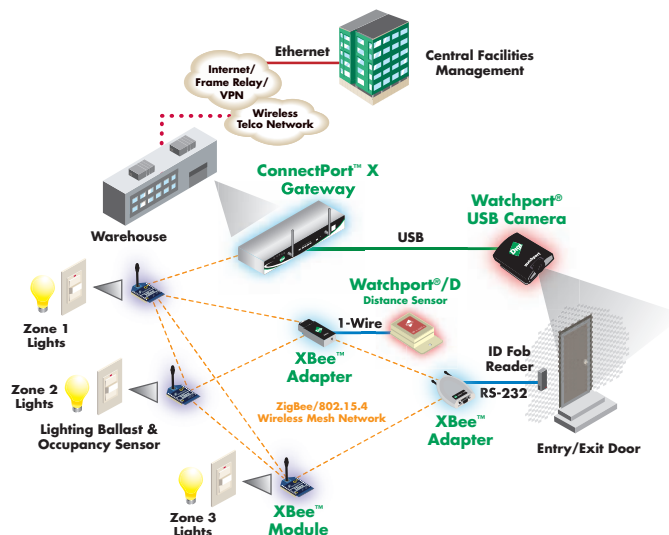


XBee™ Adapters

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™ 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, 1-Wire, 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.

Each Digi XBee adapter contains a ZigBee/802.15.4 wireless module for network connectivity and a physical interface for device connectivity. Available interfaces include RS-232 (powered power harvesting), RS-485, USB, 1-Wire, 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
- 1-Wire (RJ-45)

USB

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

ENVIRONMENTAL

XBee 232, 485, 1-Wire, Analog I/O and Digital I/O

- Operating temperature: Externally powered: -40C to 85C
Battery powered: -18C to 55C

XBee USB

- Operating temperature: -40° C to 85° C

XBee 232PH

- Operating temperature: 0° C to 65° C

DIMENSIONS

XBee 232, 485, 1-Wire, 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, 1-Wire, Analog I/O and Digital I/O

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

XBee USB

- Bus powered: +5V from USB bus
- Power consumption during normal operation:
 - XBee: 70mA
 - 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 RS232c 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 1-Wire	XA-A14-CS1R	XA-A14-CS1P
XBee/XBee-PRO Analog I/O	XA-A14-CS5R	XA-A14-CS5P
XBee/XBee-PRO Digital I/O	XA-A14-CS4R	XA-A14-CS4P
XBee/XBee-PRO USB	XA-A14-CE1R	XA-A14-CE1P
XBee/XBee-PRO RS-232PH (power harvesting)	XA-A14-CE2R	XA-A14-CE2P

* 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

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

- 1-Wire (RJ-45)

USB

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

DIMENSIONS

XBee 232, 485, 1-Wire, 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)

POWER REQUIREMENTS

XBee 232, 485, 1-Wire, Analog I/O and Digital I/O

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

XBee USB

- Bus powered: +5V from USB bus
- Power consumption during normal operation:
 - XBee: 70mA
 - 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 RS232c 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

ENVIRONMENTAL

XBee 232, 485, 1-Wire, Analog I/O and Digital I/O

- Operating temperature: Externally powered: -40C to 85C
Battery powered: -18C to 55C

XBee USB

- Operating temperature: -40° C to 85° C

XBee 232PH

- Operating temperature: 0° C to 65° C

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

MODEL.....PART NUMBERS

Model/Interface

XBee/XBee-PRO RS-485

XBee/XBee-PRO RS-232

XBee/XBee-PRO 1-Wire

XBee/XBee-PRO Analog I/O

XBee/XBee-PRO Digital I/O

XBee/XBee-PRO USB

XBee/XBee-PRO RS-232PH (power harvesting)

XBee

XA-B14-CS3R

XA-B14-CS2R

XA-B14-CS1R

XA-B14-CS5R

XA-B14-CS4R

XA-B14-CE1R

XA-B14-CE2R

XBee-PRO

Available Sep 07

Available Sep 07

Available Sep 07

Available Sep 07

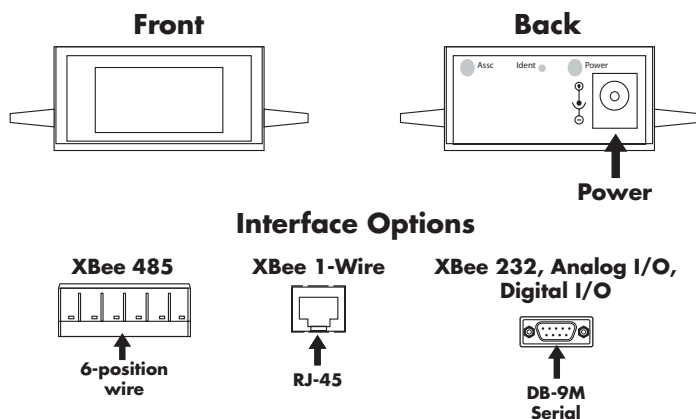
Available Sep 07

Available Sep 07

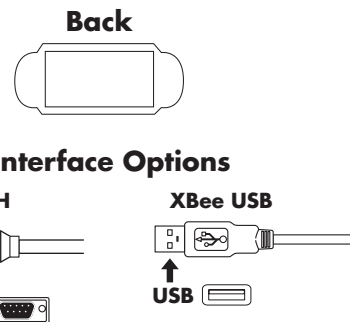
Available Sep 07

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

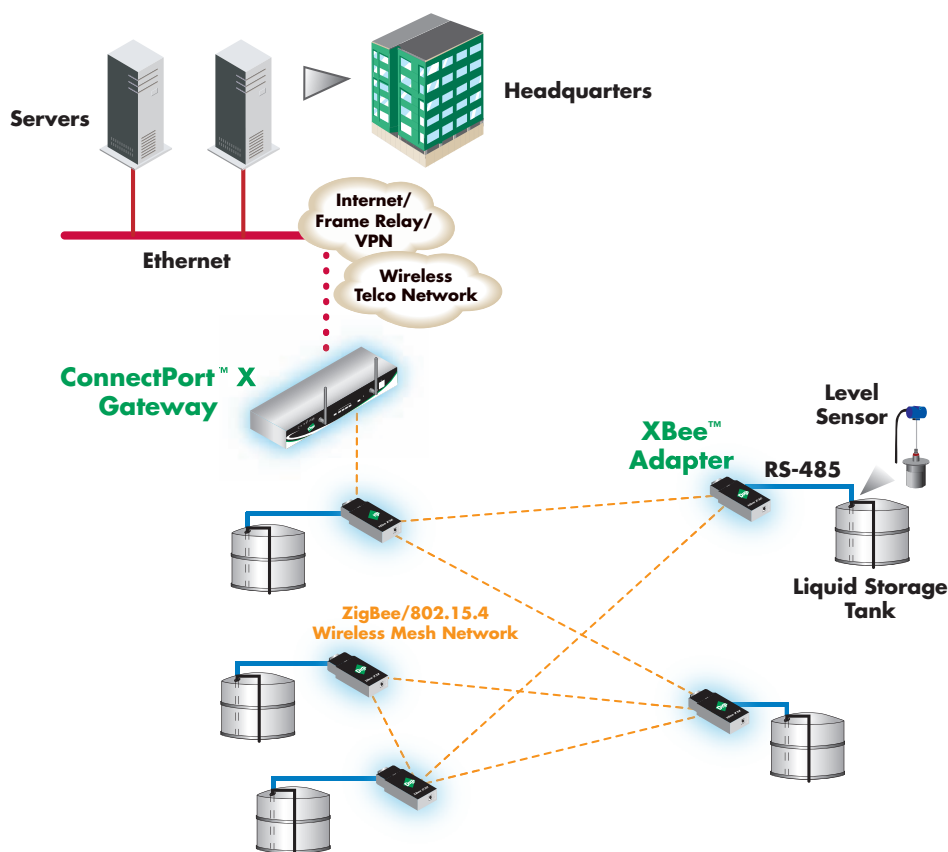
XBee 232, 485, 1-Wire, Analog I/O, Digital I/O



XBee USB, 232PH



Drop-in Network for Tank Level Monitoring



DIGI SERVICE AND SUPPORT - You can purchase with confidence knowing that Digi is here to support you with expert technical support and a strong five-year warranty. www.digi.com/support

**WHEN
RELIABILITY
MATTERS™**

Digi International

11001 Bren Road E.
Minnetonka, MN 55343
U.S.A.
PH: 877-912-3444
952-912-3444
FX: 952-912-4952
email: info@digi.com

Digi International France

31 rue des Poissonniers
92200 Neuilly sur Seine
PH: +33-1-55-61-98-98
FX: +33-1-55-61-98-99
www.digi.fr

Digi International KK

NES Building South 8F
22-14 Sakuragaoka-cho,
Shibuya-ku
Tokyo 150-0031, Japan
PH: +81-3-5428-0261
FX: +81-3-5428-0262
www.digi-intl.co.jp

Digi International (HK) Limited

Suite 1703-05, 17/F,
K Wah Centre
191 Java Road
North Point, Hong Kong
PH: +852-2833-1008
FX: +852-2572-9989
www.digi.cn

Digi International, the leader in device networking for business, develops reliable products and technologies to connect and securely manage local or remote electronic devices over the network or via the web. With over 20 million ports shipped worldwide since 1985, Digi offers the highest levels of performance, flexibility and quality.

www.digi.com

© 2007 Digi International Inc.

All rights reserved. Digi, Digi International, the Digi logo, the When Reliability Matters logo, ConnectPort, Watchport, XBee and XBee-PRO are either trademarks or registered trademarks of Digi International Inc. in the United States and other countries worldwide. Microsoft, Windows and the Windows logo are trademarks or registered trademarks of Microsoft Corporation in the United States and/or other countries. All other trademarks are the property of their respective holders.

91001420
A1/607

