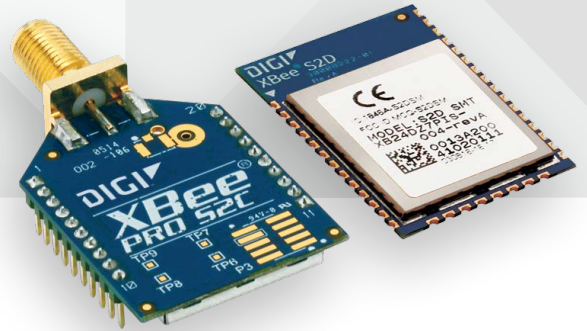# DIGI XBEE® AND DIGI XBEE-PRO® ZIGBEE

## Embedded ZigBee modules provide OEMs with a simple way to integrate mesh technology into their application

Digi XBee and Digi XBee-PRO ZigBee RF modules provide cost-effective wireless connectivity to electronic devices. They are interoperable with other ZigBee PRO feature set devices, including devices from other vendors*.

Digi XBee and Digi XBee-PRO ZigBee modules are ideal for applications in the energy and controls markets where manufacturing efficiencies are critical. The Serial Peripheral Interface (SPI) provides a high-speed interface and optimizes integration with embedded microcontrollers, lowering development costs and reducing time to market.

Products in the Digi XBee family require little to no configuration or additional development. Programmable

versions of the Digi XBee and Digi XBee-PRO ZigBee module make customizing applications easy. Programming directly on the module eliminates the need for a separate processor. Because the wireless software is isolated, applications can be developed with no risk to RF performance or security.
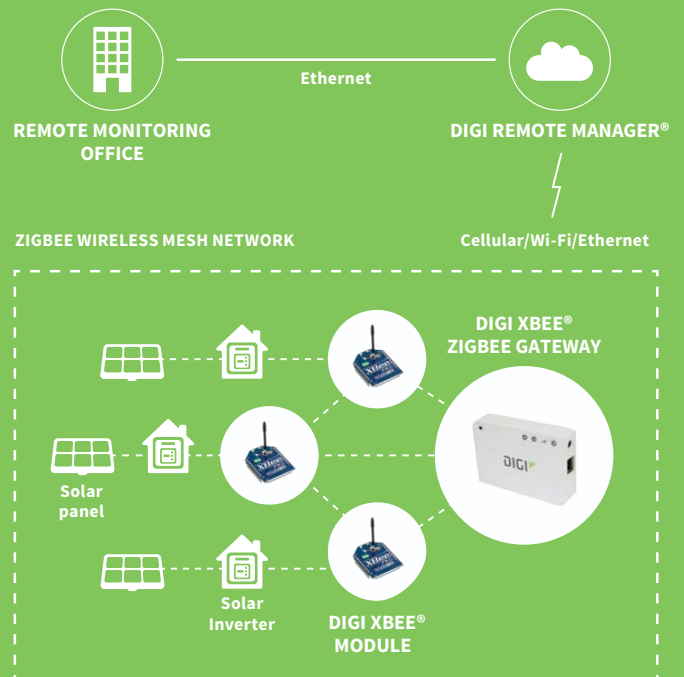
Digi's ZigBee compatible module is based on the Ember EM35x (EM357 and EM3587) system on chip (SoC) radio ICs from SiliconLabs, utilizing 32-bit ARM Cortex™ M3 processor. The S2D EM3587 version has a larger memory footprint for customers who may want to upgrade to Thread, an IPv6 based networking stack.

*Interoperability requires the ZigBee Feature Set or ZigBee PRO Feature Set to be deployed on all devices. Contact Digi Support for details.

## BENEFITS

– Programmable versions with on-board microprocessor enable custom ZigBee application development

– Through-Hole and Surface Mount form factors enable flexible design options

– Link budgets of 110 dB for Digi XBee and 119 dB for Digi XBee-PRO

– Industry-leading sleep current

– Firmware upgrades via UART, SPI or over the air (OTA)

– Thread updatable on the S2D EM3587 variant for maximum flexibility

## APPLICATION EXAMPLE



REMOTE MONITORING OFFICE — Ethernet — DIGI REMOTE MANAGER®

ZIGBEE WIRELESS MESH NETWORK

Cellular/Wi-Fi/Ethernet

DIGI XBEE® ZIGBEE GATEWAY

Solar panel

Solar Inverter

DIGI XBEE® MODULE

## RELATED PRODUCTS



Digi XBee Gateways

Modules

Network Extenders

Development Kits

Digi Remote Manager®

| SPECIFICATIONS | Digi XBee® S2C ZigBee | | Digi XBee-PRO® S2C ZigBee | | Digi XBee® S2D ZigBee Thread Ready |
| | Standard | Programmable | Standard | Programmable | Standard |
| --- | --- | --- | --- | --- | --- |
| **PERFORMANCE** | | | | | |
| TRANSCEIVER CHIPSET | Silicon Labs EM357 SoC | | | | Silicon Labs EM3587 Soc |
| DATA RATE | RF 250 Kbps, Serial up to 1 Mbps | | | | |
| INDOOR/URBAN RANGE* | Up to 200 ft (60 m) | | Up to 300 ft (90 m) | | Up to 200 ft (60 m) |
| OUTDOOR/RF LINE-OF-SIGHT RANGE* | Up to 4000 ft (1200 m) | | Up to 2 miles (3200 m) | | Up to 4000 ft (1200 m) |
| TRANSMIT POWER | 3.1 mW (+5 dBm) / 6.3 mW (+8 dBm) boost mode | | 63 mW (+18 dBm) | | 3.1 mW (+5 dBm) / 6.3 mW (+8 dBm) boost mode |
| RECEIVER SENSITIVITY (1% PER) | -100 dBm / -102 dBm boost mode | | -101 dBm | | -100 dBm / -102 dBm boost mode |
| **FEATURES** | | | | | |
| SERIAL DATA INTERFACE | UART, SPI | | | | |
| CONFIGURATION METHOD | API or AT commands, local or over-the-air (OTA) | | | | |
| FREQUENCY BAND | ISM 2.4 GHz | | | | |
| FORM FACTOR | Through-Hole, Surface Mount | | | | Surface Mount |
| INTERFERENCE IMMUNITY | DSSS (Direct Sequence Spread Spectrum) | | | | |
| ADC INPUTS | (4) 10-bit ADC inputs | | | | |
| DIGITAL I/O | 15 | | | | |
| ANTENNA OPTIONS | Through-Hole: PCB Antenna, U.FL Connector, RPSMA Connector, or Integrated Wire<br>SMT: RF Pad, PCB Antenna, or U.FL Connector | | | | |
| OPERATING TEMPERATURE | -40º C to +85º C | | | | |
| DIMENSIONS (L X W X H) AND WEIGHT | Through-Hole: 0.960 x 1.087 in (2.438 x 2.761 cm)<br>SMT: 0.866 x 1.33 x 0.120 in (2.199 x 3.4 x 0.305 cm) | | Through-Hole: 0.960 x 1.297 in (2.438 x 3.294 cm)<br>SMT: 0.866 x 1.33 x 0.120 in (2.199 x 3.4 x 0.305 cm) | | SMT: 0.866 x 1.33 x 0.120 in (2.199 x 3.4 x 0.305 cm) |
| **PROGRAMMABILITY** | | | | | |
| MEMORY | N/A | 32 KB Flash / 2 KB RAM | N/A | 32 KB Flash / 2 KB RAM | N/A |
| CPU/CLOCK SPEED | N/A | HCS08 / up to 50.33 MHz | N/A | HCS08 / up to 50.33 MHz | N/A |
| **NETWORKING AND SECURITY** | | | | | |
| PROTOCOL | ZigBee PRO 2007, HA-Ready with support for binding/multicasting | | | | |
| ENCRYPTION | 128-bit AES | | | | |
| RELIABLE PACKET DELIVERY | Retries/Acknowledgements | | | | |
| IDS | PAN ID and addresses, cluster IDs and endpoints (optional) | | | | |
| CHANNELS | 16 channels | | 15 channels | | 16 channels |
| **POWER REQUIREMENTS** | | | | | |
| SUPPLY VOLTAGE | 2.1 to 3.6V | | 2.7 to 3.6V | | 2.1 to 3.6V |
| TRANSMIT CURRENT | 33 mA @ 3.3 VDC / 45 mA boost mode | 47 mA @ 3.3 VDC / 59 mA boost mode | 120 mA @ 3.3 VDC | 120 mA @ 3.3 VDC | 33 mA @ 3.3 VDC / 45 mA boost mode |
| RECEIVE CURRENT | 28 mA @ 3.3 VDC / 31 mA boost mode | 42 mA @ 3.3 VDC / 45 mA boost mode | 31 mA @ 3.3 VDC | 45 mA @ 3.3 VDC | 28 mA @ 3.3 VDC / 31 mA boost mode |
| POWER-DOWN CURRENT | <1 µA @ 25º C | 1.5 µA @ 25º C | <1 µA @ 25º C | 1.5 µA @ 25º C | <3 µA at 25º C |
| **REGULATORY APPROVALS** | | | | | |
| FCC, IC (NORTH AMERICA) | Yes | | Yes | | Yes |
| ETSI (EUROPE) | Yes | | No | | Yes |
| RCM (AUSTRALIA AND NEW ZEALAND) | Yes | | Yes | | No (Coming Soon) |

*Range figure estimates are based on free-air terrain with limited sources of interference. Actual range will vary based on transmitting power, orientation of transmitter and receiver, height of transmitting antenna, height of receiving antenna, weather conditions, interference sources in the area, and terrain between receiver and transmitter, including indoor and outdoor structures such as walls, trees, buildings, hills, and mountains.

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| PART NUMBERS | DESCRIPTION |
|---|---|
| **S2C MODULES** | |
| XB24CZ7PIT-004 | Digi XBee ZigBee Through-Hole, PCB Antenna |
| XB24CZ7WIT-004 | Digi XBee ZigBee Through-Hole, Wire Antenna |
| XB24CZ7UIT-004 | Digi XBee ZigBee Through-Hole, U.FL |
| XB24CZ7SIT-004 | Digi XBee ZigBee Through-Hole, RPSMA |
| XB24CZ7PITB003 | Programmable Digi XBee ZigBee Through-Hole, PCB Antenna |
| XB24CZ7WITB003 | Programmable Digi XBee ZigBee Through-Hole, Wire Antenna |
| XB24CZ7UITB003 | Programmable Digi XBee ZigBee Through-Hole, U.FL |
| XB24CZ7SITB003 | Programmable Digi XBee ZigBee Through-Hole, RPSMA |
| XB24CZ7PIS-004 | Digi XBee ZigBee SMT, PCB Antenna |
| XB24CZ7RIS-004 | Digi XBee ZigBee SMT, RF Pad |
| XB24CZ7UIS-004 | Digi XBee ZigBee SMT, U.FL |
| XB24CZ7PISB003 | Programmable Digi XBee ZigBee SMT, PCB Antenna |
| XB24CZ7RISB003 | Programmable Digi XBee ZigBee SMT, RF Pad |
| XB24CZ7UISB003 | Programmable Digi XBee ZigBee SMT, U.FL |
| XBP24CZ7PIT-004 | Digi XBee-PRO ZigBee Through-Hole, PCB Antenna |
| XBP24CZ7WIT-004 | Digi XBee-PRO ZigBee Through-Hole, Wire Antenna |
| XBP24CZ7UIT-004 | Digi XBee-PRO ZigBee Through-Hole, U.FL |
| XBP24CZ7SIT-004 | Digi XBee-PRO ZigBee Through-Hole, RPSMA |
| XBP24CZ7PITB003 | Programmable Digi XBee-PRO ZigBee Through-Hole, PCB Antenna |
| XBP24CZ7WITB003 | Programmable Digi XBee-PRO ZigBee Through-Hole, U.FL |
| XBP24CZ7SITB003 | Programmable Digi XBee-PRO ZigBee Through-Hole, RPSMA |
| XBP24CZ7PIS-004 | Digi XBee-PRO ZigBee SMT, PCB Antenna |
| XBP24CZ7RIS-004 | Digi XBee-PRO ZigBee SMT, RF Pad |
| XBP24CZ7UIS-004 | Digi XBee-PRO ZigBee SMT, U.FL |
| XBP24CZ7PISB003 | Programmable Digi XBee-PRO ZigBee SMT, PCB Antenna |
| XBP24CZ7RISB003 | Programmable Digi XBee-PRO ZigBee SMT, RF Pad |
| XBP24CZ7UISB003 | Programmable Digi XBee-PRO ZigBee SMT, U.FL |
| **S2D MODULES** | |
| XB24DZ7PIS-004 | Digi XBee ZigBee – Thread Ready SMT, PCB Antenna |
| XB24DZ7RIS-004 | Digi XBee ZigBee – Thread Ready SMT, RF Pad Antenna |
| XB24DZ7UIS-004 | Digi XBee ZigBee – Thread Ready SMT, U.FL Antenna |
| **S2C KIT** | |
| XKB2-Z7T-WZM | Digi XBee ZigBee Mesh Kit, worldwide |
| **S2D KIT** | |
| XKB2-Z7T-WTZM | Digi XBee ZigBee Mesh Kit, worldwide |

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**DIGI INTERNATIONAL WORLDWIDE HQ**
877-912-3444 / 952-912-3444 / www.digi.com

**DIGI INTERNATIONAL GERMANY**
+49-89-540-428-0

**DIGI INTERNATIONAL JAPAN**
+81-3-5428-0261 / www.digi-intl.co.jp

**DIGI INTERNATIONAL SINGAPORE**
+65-6213-5380

**DIGI INTERNATIONAL CHINA**
+86-21-50492199 / www.digi.com.cn

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