

MultiTech xDot[®]

Long Range LoRa[®] Module



arm MBED



MultiTech xDot[®] is a secure, end-certified, Arm[®] Mbed[™] programmable, low-power RF module, that provides long-range, low bit rate M2M data connectivity to sensors, industrial equipment and remote appliances.

The xDot is LoRaWAN[®] 1.0.2 compliant, providing bi-directional data communication up to 10 miles / 15 km line-of-sight and 1-3 miles / 2 km into buildings**, using sub-GHz ISM bands in North America, Europe, Australia (AU915), Asia Pacific (AS923), India (IN865) and Korea (KR920).

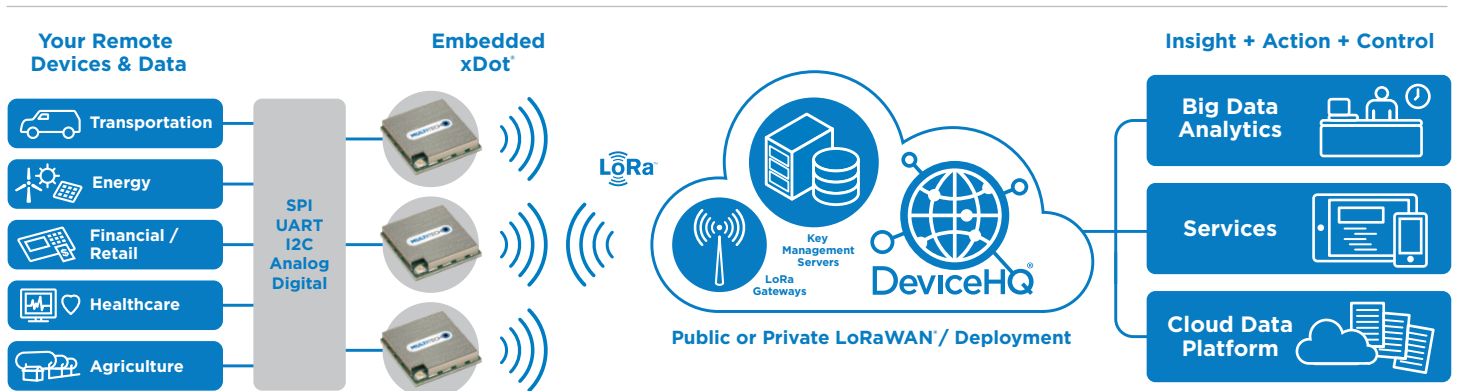
xDots bring intelligence, reduced complexity and a lower overall bill of material cost to the very edge of the network while supporting a variety of electronic interfaces to connect just about any “Thing” for years on battery power.

BENEFITS

- Range of miles
- Deep in-building penetration
- Developer friendly
- Runs for years on batteries

FEATURES

- End-certified for use in North America, Europe, Australia, Japan, Korea & India
- LoRaWAN Certified[™]
- Unicast & Multicast message support
- Multiple I/O interfaces for most any “Thing”
- Data rates 293bps-20Kbps+ LoRa[®]
- Listen-Before-Talk (LBT) enabled in Japan & Korea models



SPECIFICATIONS

| Models | MTXDOT-AS1 | MTXDOT-AU1 | MTXDOT-EU1 |
|---|---|---|---|
| Region/Country | Asia Pacific (**) | Australia | Europe |
| LoRa Radio Frequency Plan | AS920-923 ("AS1") | AU915-928 | EU863-870 |
| Listen-Before-Talk (LBT) Enabled | No | | |
| Channel Capacity | 8-channels | | |
| Range | Up to 10 miles (15 km) line of sight 1 - 3 miles (2km) into buildings | | |
| Communication | LoRaWAN 1.0.2 compliant, Class A and Class C Arm Mbed libraries or AT commands for radio control | | |
| Interfaces | Up to 19 Digital I/O, 10 Analog Inputs, 2 DAC Outputs, I2C, SPI, Wake Pin, Reset Pin, Full UART, MBED / simple UART (RX & TX only), MBED Programming Interface | | |
| Physical Dimensions | 23.6 mm X 23.6 mm x 3.51 (.93" x .93" x 0.14") | | |
| Performance | | | |
| CPU | ST Micro ST32L151CCU6 (ARM® Cortex®-M3) 32 MHz | | |
| Max Clock | 32 MHz | | |
| Flash Memory | 256 KB, with xDot library 136 KB available; with AT firmware, 56 KB available | | |
| EEPROM | 8 KB, available 6 KB | | |
| SRAM | 32 KB | | |
| Backup Register | 128 byte, available 88 bytes | | |
| Power | | | |
| Max Transmitter Power Output (TPO) | 19 dBm | 19 dBm | 14 dBm |
| Max Receive Sensitivity | -130 dBm | -130 dBm | -137 dBm |
| Link Budget (*) | 145 dB Point-to-Multipoint 147 dB Point-to-Point | 145 dB Point-to-Multipoint 147 dB Point-to-Point | 151 dB Point-to-Multipoint 147 dB Point-to-Point |
| Deep Sleep Current | < 2uA | | |
| Max Effective Isotropic Radiated Power (EIRP) | 36 dBm | 36 dBm | 10 dBm |
| (*) Calculation assumes two 0 dBi antennas. North America: Greater link budget possible with higher gain antennas. Europe: This is the maximum link budget. Note: Point-to-Multipoint utilizing MultiTech Conduit Gateway with MTAC-LORA accessory card. | | | |
| Antenna Connector Options | | | |
| -A00 Models | U.FL and Trace (ULF/TRC) | | |
| -A01 Models | Trace only (TRC) | | |
| Environmental | | | |
| Operating Temperature | -40° C to +85° C (-40° F to +185° F) | | |
| Storage Temperature | -40° C to +85° C (-40° F to +185° F) | | |
| Relative Humidity | 20% to 90% RH noncondensing | | |
| Certifications | | | |
| EMC Compliance | Contact MultiTech | AS/NZS CISPR 22 | EN 55022 Class B, EN 55024 CISPR 22:2008 |
| Radio Compliance | Contact MultiTech | AS/NZS 4268:2012 + a1:2013 MPE Standard 2014 | EN 300 220-2 V2.4.1:2012 EN 301 489-03 V1.6.1:2013 |
| Safety | Contact MultiTech | AS/NZS 60950.1:2015 | IEC 60950-1 2nd ED AM1 + AM2 |
| Quality | MIL-STD-810G: High Temp, Low Temp, Random Vibration. SAE J1455: Transit Drop & Handling Drop, Random Vibration, Swept-Sine Vibration. IEC68-2-1: Cold Temp. IEC68-2-2: Dry Heat | | |

(**) Actual performance speeds may be affected by a variety of attributes such as distance from gateway, data loads, packet sizes, etc.
 Note: AS923 models are for use in many Asia Pacific countries. Contact your MultiTech sales representative for more information.

SPECIFICATIONS

| Models | MTXDOT-EU1-IN1 | MTXDOT-JP1 | MTXDOT-KR1 | MTXDOT-NA1 |
|---|--|---|---|---|
| Region/Country | India | Japan | Korea | North America |
| LoRa Radio Frequency Plan | IN865-867 | AS920-923 ("AS1") | KR920-923 | US902-928 |
| Listen-Before-Talk (LBT) Enabled | No | Yes | | No |
| Channel Capacity | 8-channels | | | |
| Range | Up to 10 miles (15 km) line of sight 1 - 3 miles (2km) into buildings | | | |
| Communication | LoRaWAN 1.0.2 compliant, Class A and Class C Arm Mbed libraries or AT commands for radio control | | | |
| Interfaces | Up to 19 Digital I/O, 10 Analog Inputs, 2 DAC Outputs, I2C, SPI, Wake Pin, Reset Pin, Full UART, MBED / simple UART (RX & TX only), MBED Programming Interface | | | |
| Physical Dimensions | 23.6 mm X 23.6 mm x 3.51 (.93" x .93" x 0.14") | | | |
| Performance | | | | |
| CPU | ST Micro ST32L151CCU6 (ARM® Cortex®-M3) 32 MHz | | | |
| Max Clock | 32 MHz | | | |
| Flash Memory | 256 KB, with xDot library 136 KB available; with AT firmware, 56 KB available | | | |
| EEPROM | 8 KB, available 6 KB | | | |
| SRAM | 32 KB | | | |
| Backup Register | 128 byte, available 88 bytes | | | |
| Power | | | | |
| Max Transmitter Power Output (TPO) | 14 dBm | 19 dBm | 19 dBm | 19 dBm |
| Max Receive Sensitivity | -137 dBm | -130 dBm | -130 dBm | -130 dBm |
| Link Budget (*) | 151 dB Point-to-Multipoint 147 dB Point-to-Point | 145 dB Point-to-Multipoint 147 dB Point-to-Point | 145 dB Point-to-Multipoint 147 dB Point-to-Point | 145 dB Point-to-Multipoint 147 dB Point-to-Point |
| Deep Sleep Current | < 2uA | | | |
| Max Effective Isotropic Radiated Power (EIRP) | 10 dBm | 36 dBm | 36 dBm | 36 dBm |

(*) Calculation assumes two 0 dBi antennas.

North America: Greater link budget possible with higher gain antennas.

Europe: This is the maximum link budget.

Note: Point-to-Multipoint utilizing MultiTech Conduit Gateway with MTAC-LORA accessory card.

Antenna Connector Options

-A00 Models U.FL and Trace (ULF/TRC)

-A01 Models Trace only (TRC)

Environmental

Operating Temperature -40° C to +85° C (-40° F to +185° F)

Storage Temperature -40° C to +85° C (-40° F to +185° F)

Relative Humidity 20% to 90% RH noncondensing

Certifications

| | | | | |
|----------------|--|---|---|--|
| EMC Compliance | EN 55022 Class B, EN 55024 CISPR 22:2008 | TELEC, Radio/ Telecom Biz Act, GITEKI | National Radio Research Agency Notice 2018-29 | US: FCC Part 15 Class B Canada: ICES-003 Mexico: TBD |
|----------------|--|---|---|--|

| | | | | |
|------------------|------------|---|--|---|
| Radio Compliance | EN 300 200 | Japan Giteki, Radio/ Telecom Biz Act | Ministry of Science and ICT Notice 2018-90 | FCC 15.247:2015 FCC 15.109:2015 FCC 15.107:2015 |
|------------------|------------|---|--|---|

| | | | | |
|--------|---------------------------------|---------------------------------|---------|---|
| Safety | IEC 60950-1 2nd Ed AM1 & AM2 | IEC 60950-1 2nd Ed AM1 & AM2 | 62368-1 | US: UL 60950-1 2nd ED Canada: cUL 60950-1 2nd ED Mexico: TBD |
|--------|---------------------------------|---------------------------------|---------|---|

| | | | | |
|---------|---|--|--|--|
| Quality | MIL-STD-810G: High Temp, Low Temp, Random Vibration. SAE J1455: Transit Drop & Handling Drop, Random Vibration, Swept-Sine Vibration. IEC68-2-1: Cold Temp. IEC68-2-2: Dry Heat | | | |
|---------|---|--|--|--|

(**) Actual performance speeds may be affected by a variety of attributes such as distance from gateway, data loads, packet sizes, etc.

Note: AS923 models are for use in many Asia Pacific countries. Contact your MultiTech sales representative for more information.

EDGE INTELLIGENCE

The MultiTech xDot® is Arm® Mbed™ compatible meaning applications can be written and compiled quickly online using developer friendly libraries, downloaded and hosted within the xDot. Decision making and control is distributed to the edge, enabling data to be more actionable without the heavy lift required to optimize RF performance, implement complex IoT middleware and security protocols needed to deploy a low touch install. In addition, xDots come from the factory with AT command firmware preloaded. This means you can use the xDot as an AT command driven LoRa modem. No custom software development for the xDot is needed when operating in this mode.

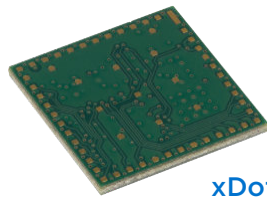
HIGHLIGHTS

Applications

- Securely manage and harvest sensor data
- Control and monitor remote assets and devices
- Low power for 10+ year battery performance

Operating Modes

- Developer friendly Arm Mbed libraries provides customization capability for specific applications
- Comprehensive AT command instruction set



xDot LGA
Family Footprint

DEVELOPER KIT

The MultiTech xDot (MTMDK-XDOT) Micro Developer Kit is a USB dongle that allows a developer to plug in a MultiTech xDot (MTXDOT-XXX) and start developing their application. Its portable design makes it ideal for connecting to a laptop and doing range testing of the LoRa network. This kit includes a development board, xDot, integrated LoRa antenna and Quick Start Guide.



YOU MAY ALSO BE INTERESTED IN: MULTITECH CONDUIT® FAMILY

MultiTech Conduit® family of products is the industry's most configurable, manageable, and scalable cellular communications gateways for industrial IoT applications. Network engineers can remotely configure and optimize their Conduit performance through DeviceHQ®, the world's first IoT Application Store and Device Management platform.

The award-winning Conduit series comes in three variants designed to address specific IoT gateway use cases:

- **MultiTech Conduit:** Indoor industrial gateway, ideal for environments that require metal casing for protection against particles and debris and require an industrial temperature range.
- **MultiTech Conduit IP67 Base Station:** Outdoor IP67-rated gateway ideal suited for performing in harsh environments such as rain, snow, extreme heat, and high winds.
- **MultiTech Conduit AP:** Indoor access point ideal for commercial environments (e.g., hotels, offices, retail facilities) to deepen LoRa coverage in difficult to reach places where cell tower or rooftop deployments may not perform as well.

MultiTech Conduit®
IP67 Base Station

MultiTech Conduit®
Gateway



MultiTech Conduit® AP
Access Point

ORDERING INFORMATION

MultiTech xDot® Asia Pacific Models

| Model | Description | Region |
|----------------|----------------------------|--------|
| MTXDOT-AS1-A00 | AS923 MHz SMT LoRa UFL/TRC | APAC |
| MTXDOT-AS1-A01 | AS923 MHz SMT LoRa TRC | APAC |

MultiTech xDot® Australia Models

| Model | Description | Region |
|----------------|----------------------------|--------|
| MTXDOT-AU1-A00 | AU915 MHz SMT LoRa UFL/TRC | AU |
| MTXDOT-AU1-A01 | AU915 MHz SMT LoRa TRC | AU |

MultiTech xDot® European Models

| Model | Description | Region |
|----------------|--------------------------|--------|
| MTXDOT-EU1-A00 | 868 MHz SMT LoRa UFL/TRC | Euro |
| MTXDOT-EU1-A01 | 868 MHz SMT LoRa TRC | Euro |

MultiTech xDot® India Models

| Model | Description | Region |
|--------------------|----------------------------|--------|
| MTXDOT-EU1-IN1-A00 | IN865 MHz SMT LoRa UFL/TRC | India |

MultiTech xDot® Japan Models

| Model | Description | Region |
|----------------|----------------------------------|--------|
| MTXDOT-JP1-A00 | AS923 MHz SMT LoRa UFL/TRC w/LBT | Japan |

MultiTech xDot® Korea Models

| Model | Description | Region |
|----------------|----------------------------------|--------|
| MTXDOT-KR1-A00 | KR920 MHz SMT LoRa UFL/TRC w/LBT | Korea |

MultiTech xDot® North American Models

| Model | Description | Region |
|----------------|--------------------------|--------|
| MTXDOT-NA1-A00 | 915 MHz SMT LoRa UFL/TRC | NAM |
| MTXDOT-NA1-A01 | 915 MHz SMT LoRa TRC | NAM |

Note: All models available as 1 Pack or 100 Pack

MultiTech xDot® Developer Kits

| Model | Description | Region |
|------------------------|--|--------|
| MTMDK-XDOT-AS1-A00 | AS923 MHz Developer Kit, includes a AS923 MHz xDot | APAC |
| MTMDK-XDOT-AU1-A00 | AU915 MHz Developer Kit, includes a AU915 MHz xDot | AU |
| MTMDK-XDOT-EU1-A00 | 868 MHz Developer Kit, includes a 868 MHz xDot | Euro |
| MTMDK-XDOT-EU1-IN1-A00 | IN865 MHz Developer Kit, includes a IN865 MHz xDot | India |
| MTMDK-XDOT-KR1-A00 | KR920 MHz Developer Kit, includes a KR920 MHz xDot w/LBT | India |
| MTMDK-XDOT-JP1-A00 | AS923 MHz Developer Kit, includes a AS923 MHz xDot w/LBT | Japan |
| MTMDK-XDOT-NA1-A00 | 915 MHz Developer Kit, includes a 915 MHz xDot | NAM |

Developer kits include:
Developer board (with xDot and integrated antenna) and Quick Start Guide.

MultiTech xDot® Accessories

| Model | Description | Region |
|-----------------|---|--------|
| AN868-915A-1HRA | 868-915 MHz RP-SMA Antenna, 8" (3.0dBi) | Global |
| CARSMA-UFL | Reverse SMA-to-UFL Coax RF Cable, 6" | Global |

Go to www.multitech.com for detailed product model numbers.

The LoRa® name and associated logo are trademarks of Semtech Corporation or its subsidiaries.

Services & Warranty

MultiTech's comprehensive Support Services programs offer a full array of options to suit your specific needs. These services are aimed at protecting your investment, extending the life of your solution or product, and reducing total cost of ownership. Our seasoned technical experts, with an average tenure of more than 10 years, can walk you through smooth installations, troubleshoot issues and help you with configurations.

Technical Support Services

At MultiTech, we're committed to providing you personalized attention and quality service while providing you a quick response to your product support needs. We have several options of support for you to choose from.

For additional information on Support Services as well as other service offerings, please contact your MultiTech representative or visit www.multitech.com/support.go

World Headquarters

Multi-Tech Systems, Inc.
2205 Woodale Drive
Mounds View, MN 55112 U.S.A.
Tel: 763-785-3500
Toll-Free: 800-328-9717
Email: sales@multitech.com
www.multitech.com

EMEA Headquarters

Multi-Tech Systems (EMEA)
Strata House
264-270 Bath Road
Harlington UB3 5JJ
United Kingdom
Tel: +(44) 118 959 7774
Email: sales@multitech.co.uk
www.multitech.co.uk

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MULTITECH 

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