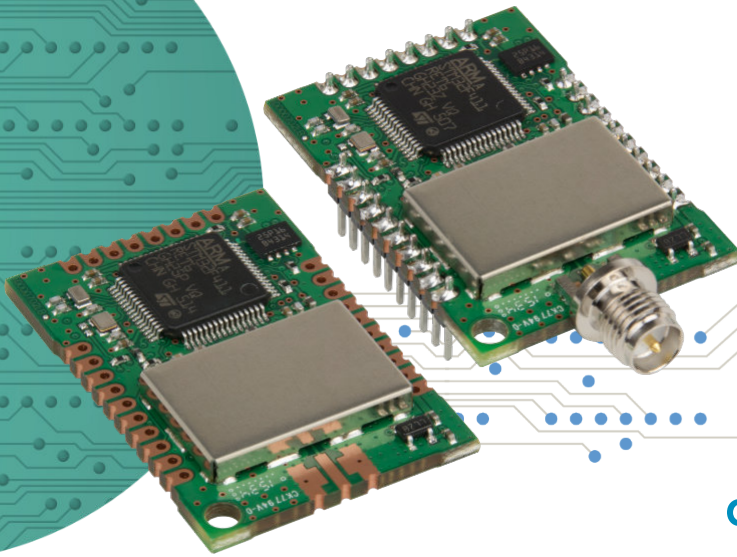




MultiTech mDot™

Long Range LoRa® Module



arm MBED



MultiTech mDot™ is a secure, CE/FCC/RCM/GITEKI 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 mDot is LoRaWAN® 1.0.4 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 and Asia Pacific (AS923).

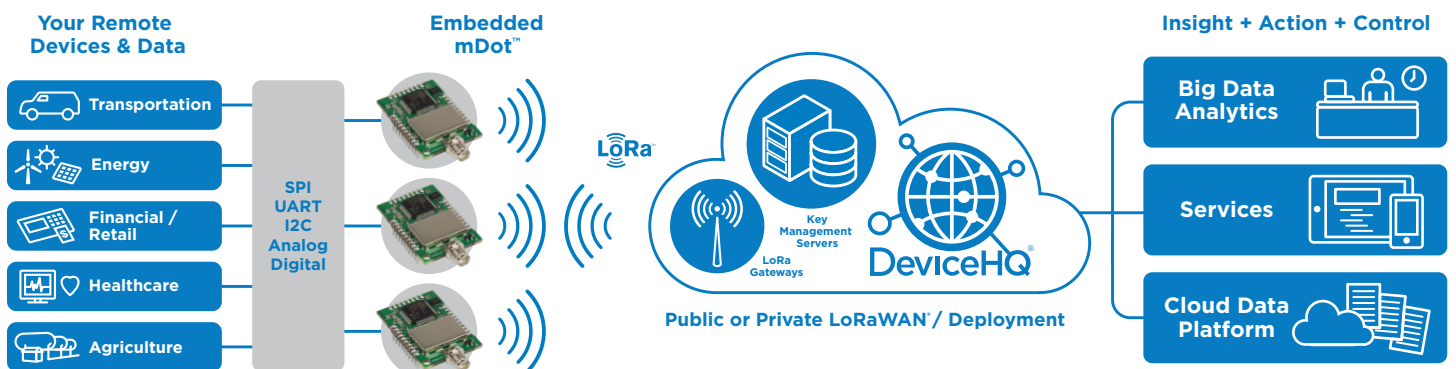
mDots bring intelligence, reduced complexity and a lower overall bill of material cost to the very edge of the network while supporting a variety of electronic interfaces to connect just about any “Thing” for years on battery power.

BENEFITS

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

FEATURES

- FCC/CE/RCM/GITEKI certified for use in North America, Europe, Australia & Japan
- LoRaWAN Certified™
- Unicast & Multicast message support
- Multiple I/O interfaces for most any “Thing”
- Data rates 293 bps- 20 Kbps+ LoRa®



EDGE INTELLIGENCE

As the first Arm® Mbed™ Platform listed on mbed.org that is industry certified and deployment ready, applications can be written and compiled quickly online using developer friendly libraries, downloaded and hosted within the mDot. 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 M2M middleware and security protocols needed to deploy a low touch install.

HIGHLIGHTS

Applications

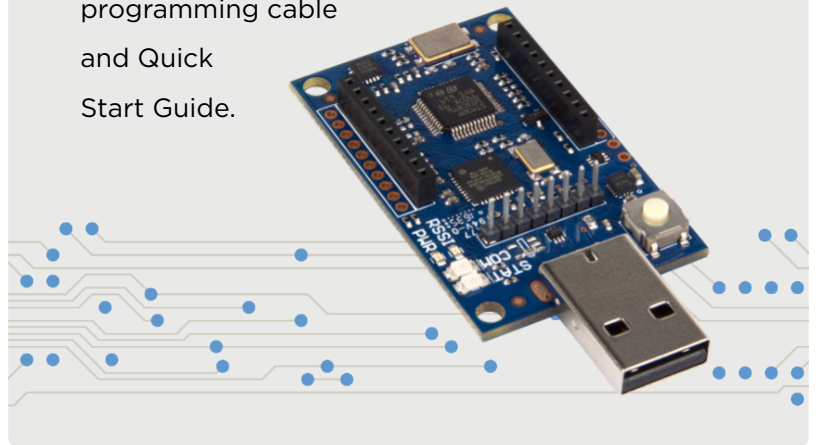
- Manage and harvest sensor data
- Control and monitor remote assets and devices
- Mesh network replacement

Operating Modes

- LoRaWAN 1.0.4 compliant
- Developer friendly Arm Mbed libraries provides customization capability for specific applications
- Onboard flash and RAM reduces overall Build of Material costs

DEVELOPER KIT

The MultiTech mDot (MTMDK-ST-MDOT) Micro Developer Kit is a micro developer and programming board. This kit is available in the form of a USB dongle, allowing a developer to plug in a mDot or MultiTech mDot Box and start developing their own application. Its portable design makes it ideal for connecting to a laptop and doing range testing of the LoRa network. This developer kit includes a development board, LoRa antenna, programming cable and Quick Start Guide.

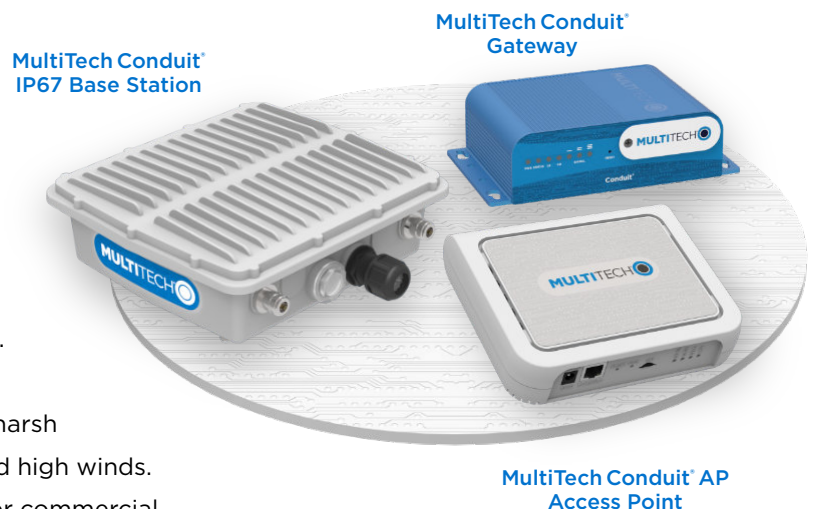


YOU MAY ALSO BE INTERESTED IN: MULTITECH CONDUIT® FAMILY

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.



SPECIFICATIONS

| Models | MTDOT-868 | MTDOT-915 | MTDOT-923 |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------|-------------------|
| Region/Country | Europe | North America / Australia | Asia Pacific |
| Communication | LoRaWAN 1.0.4 compliant, Class A and Class C Arm Mbed libraries or AT commands for radio control | | |
| Interfaces (pin functions are multiplexed) | Up to 21 Digital I/O, Up to 11 Analog Inputs, SPI, I2C, UART (RX, TX, RTS, CTS) | | |
| Physical Dimensions | 1.0" x 1.47" (25.5 X 37.3 mm) | | |
| Radio Frequency | | | |
| Modulation | FSK, GFSK, MSK, GMSK, OOK, LoRa Digital Spread Spectrum | | |
| Frequency | 860-1020 MHz | | |
| Performance | | | |
| CPU | STM32F411RET | | |
| Max Clock | 100 MHz (configurable to power use) | | |
| Flash Memory | 512 KB (400 KB customer usable) | | |
| RAM | 128 KB | | |
| Power | | | |
| Max Transmitter Power Output (TPO) | 14 dBm | 19 dBm | Varies by Country |
| Max Receive Sensitivity | -137 dBm | -130 dBm | Varies by Country |
| Link Budget* | 151 dB Point-to-Multipoint, 147 dB Point-to-Point | 145 dB Point-to-Multipoint, 147 dB Point-to-Point | Varies by Country |
| * Calculation assumes two 0 dBi antennas. North America: Greaterlink budget possible with higher gain antennas. Europe: This is the maximum link budget. Note: Point-to-Multipoint utilizing MultiTech gateway with MTAC-LORA accessory card. | | | |
| Max Effective Isotropic Radiated Power (EIRP) | 16 dBm | 36 dBm | Varies by Country |
| Input Voltage | 3.3 - 5VDC ±5% | | |
| 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 | US: FCC Part 15 Class B. EU: EN 55022 Class B, EN 55024. Canada: ICES-003 | | |
| Radio Compliance | FCC 15.247, IC RSS-210, EU EN 300 220 | | |
| Safety Compliance | UL/cUL 60950-1 2nd Ed., cUL 60950-1 2nd Ed., IEC 60950-1 2nd Ed., AS/NZS 60950.1 | | |
| 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. At this time regulatory approvals are pending. Contact your MultiTech sales representative for more information.

POWER DRAW

| Voltage | 3.3V | | 5.0V | |
|-------------------------------------------------------------------|--------|-------|--------|-------|
| Sleep Mode (Version 0.1.2 or newer) | 40.0µA | | | |
| Idle Current Average (Amps) | 0.032 | | | |
| Packet Size (Bytes) | 10 | 53 | 19 | 53 |
| Average Current (Amps) at Low Transmit Power Setting (TXP 2) | 0.026 | | | |
| Average Current (Amps) at Default Transmit Power Setting (TXP 11) | 0.028 | 0.029 | 0.028 | |
| Average Current (Amps) at Maximum Transmit Power Setting (TXP 20) | 0.031 | 0.041 | 0.032 | 0.042 |
| Total Inrush Charge Measured in Millicoulombs (mC) | 1.14 | | 1.79 | |
| Total Inrush Charge Duration during Powerup (InRush Duration) | 661µS | | 1.24mS | |

ORDERING INFORMATION

MultiTech mDot™ European Models

| Model | Description | Region |
|-------------------|------------------------------------------|--------|
| MTDOT-868-X1-SMA | 868 MHz X1 LoRa SMA | Euro |
| MTDOT-868-X1P-SMA | 868 MHz X1 LoRa SMA w/Programming Header | Euro |
| MTDOT-868-X1-UFL | 868 MHz X1 LoRa UFL | Euro |
| MTDOT-868-M1-UFL | 868 MHz SMT LoRa UFL | Euro |
| MTDOT-868-M1-TRC | 868 MHz SMT LoRa RF Pad | Euro |

MultiTech mDot™ North American Models

| Model | Description | Region |
|-------------------|------------------------------------------|--------|
| MTDOT-915-X1-SMA | 915 MHz X1 LoRa SMA | NAM |
| MTDOT-915-X1P-SMA | 915 MHz X1 LoRa SMA w/Programming Header | NAM |
| MTDOT-915-X1-UFL | 915 MHz X1 LoRa UFL | NAM |
| MTDOT-915-M1-UFL | 915 MHz SMT LoRa UFL | NAM |
| MTDOT-915-M1-TRC | 915 MHz SMT LoRa RF Pad | NAM |

MultiTech mDot™ Australia/New Zealand Models

| Model | Description | Region |
|----------------------|--------------------------------------------|--------|
| MTDOT-915-AU-X1-SMA | AU915 MHz X1 LoRa SMA | AU/NZ |
| MTDOT-915-AU-X1P-SMA | AU915 MHz X1 LoRa SMA w/Programming Header | AU/NZ |
| MTDOT-915-AU-X1-UFL | AU915 MHz X1 LoRa UFL | AU/NZ |
| MTDOT-915-AU-M1-UFL | AU915 MHz SMT LoRa UFL | AU/NZ |
| MTDOT-915-AU-M1-TRC | AU915 MHz SMT LoRa RF Pad | AU/NZ |

MultiTech mDot™ Asia Pacific Models

| Model | Description | Region |
|-----------------------|--------------------------------------------------|--------|
| MTDOT-923-AS1-X1P-SMA | AS923 MHz X1 LoRa SMA w/Programming Header | APAC |
| MTDOT-923-AS1-X1-UFL | AS923 MHz X1 LoRa UFL | APAC |
| MTDOT-923-AS1-M1-UFL | AS923 MHz SMT LoRa UFL | APAC |
| MTDOT-923-JP1-X1P-SMA | AS923 MHz X1 LoRa SMA w/Programming Header w/LBT | Japan |

Note: All mDots listed above available in single, 50 or 100-pack depending on model

MultiTech mDot™ Developer Kits & Accessories

| Model | Description | Region |
|-----------------|------------------------------------------------------------|--------|
| MTMDK-ST-MDOT | MultiTech mDot Micro Developer Kit (mDots sold separately) | Global |
| 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

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