MULTITECH®

CREATE • CONNECT • COMMUNICATE

MultiTech mDot™
Long Range LoRa® Module
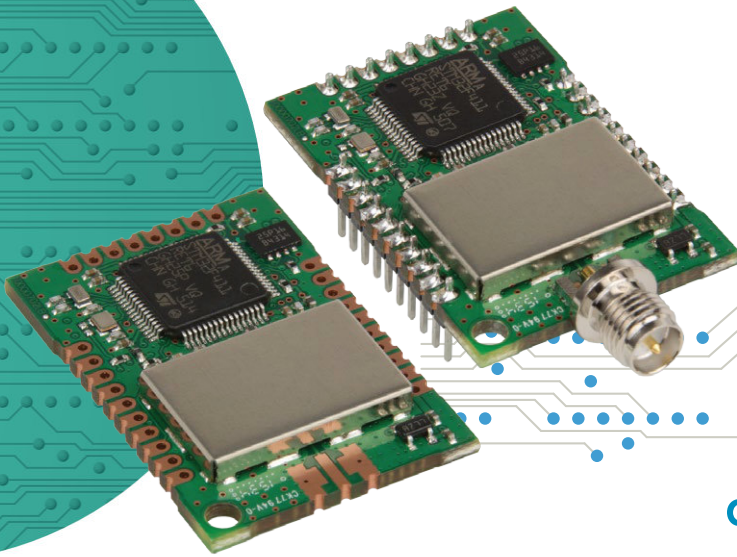
arm MBED

LoRaWAN CERTIFIED℠

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® 1.0.2 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 and Asia Pacific (AS923).
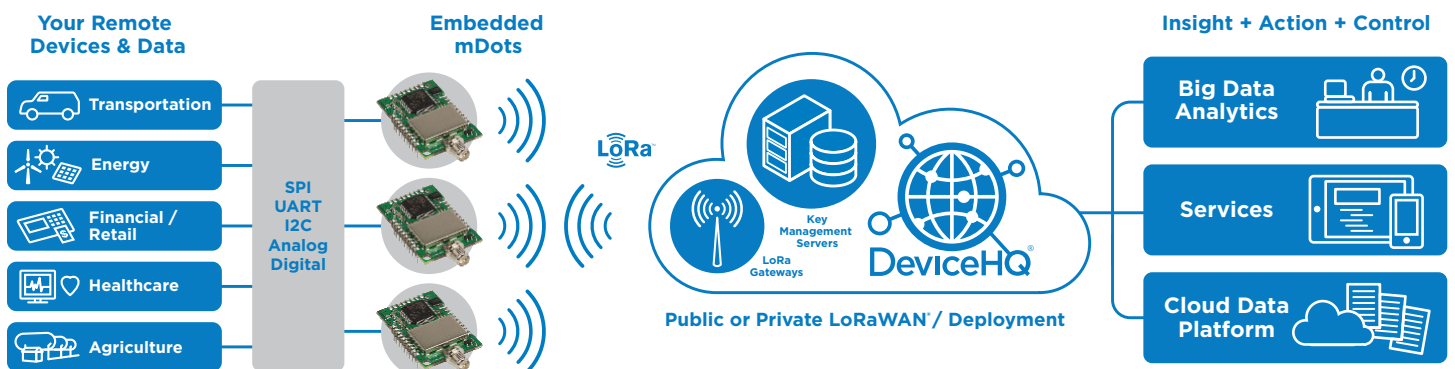
mDots bring intelligence, reduced complexity and a lower overall bill of material cost to the very edge of the network while supporting a variety of electronic interfaces to connect just about any "Thing" for years on battery power.

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®

Your Remote Devices & Data

Transportation

Energy

Financial / Retail

Healthcare

Agriculture

SPI UART I2C Analog Digital

Embedded mDots

LoRa™

LoRa Gateways

Key Management Servers

DeviceHQ®

Public or Private LoRaWAN® / Deployment

Insight + Action + Control

Big Data Analytics

Services

Cloud Data Platform

www.multitech.com/mdot

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 1.0.2 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 (MTUDK2-ST-MDOT) Developer Kit allows customers to plug in the MultiTech mDot module and use it for testing, programming and evaluation. This kit is designed for use with mDot long range, RF modules. This developer kit includes an antennas, USB cable, RSMA cable and Quick Start Guide.

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.
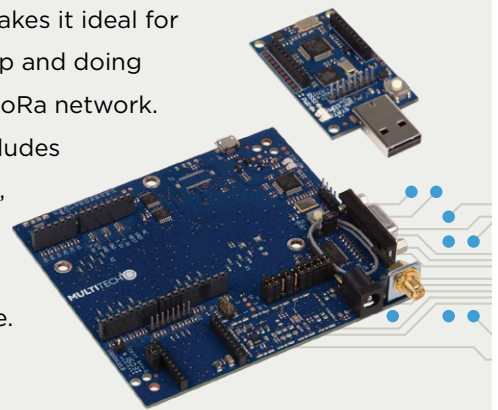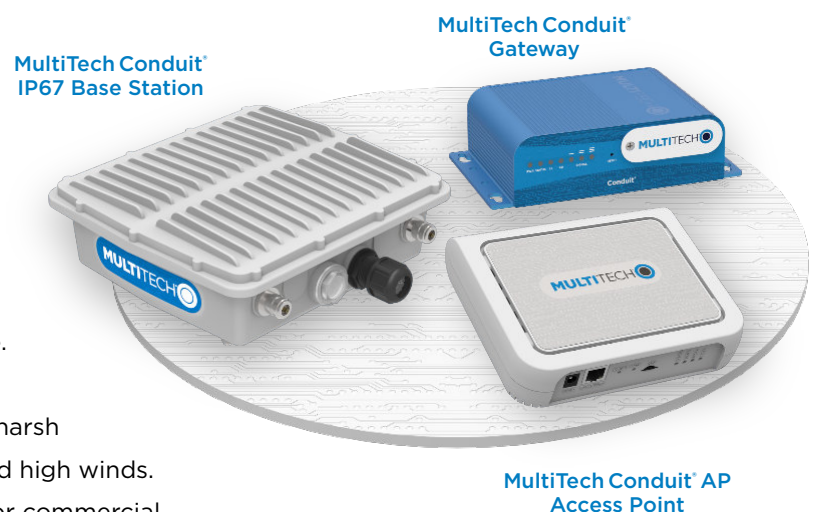
YOU MAY ALSO BE INTERESTED IN: MULTITECH CONDUIT® FAMILY

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.

**MultiTech Conduit®
IP67 Base Station**

**MultiTech Conduit®
Gateway**

**MultiTech Conduit® AP
Access Point**

SPECIFICATIONS

Models	MTDOT-868	MTDOT-915	MTDOT-923
Region/Country	Europe	North America / Australia	Asia Pacific
Communication	LoRaWAN 1.0.2 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)	10 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		0.025
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	