MultiConnect® mDot™
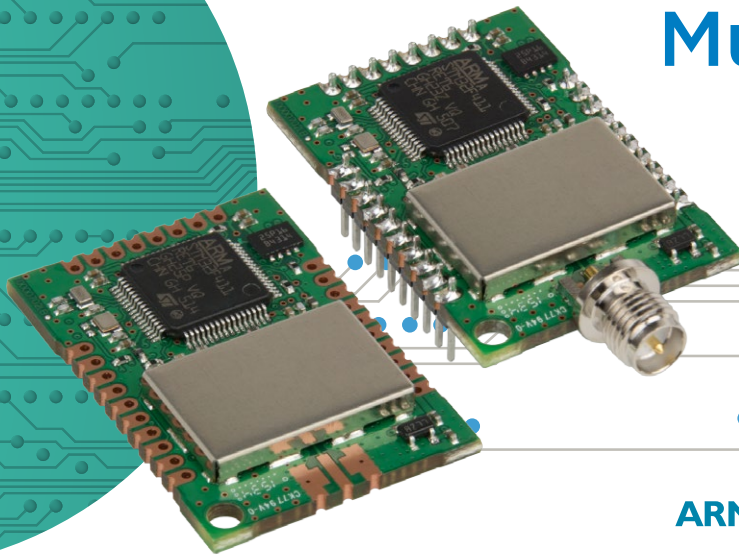
Long Range 868/915 MHz
LoRa® Module

ARM mbed™

LoRa Alliance Certified™

The MultiConnect® mDot™ is a secure, CE/FCC 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 MultiConnect mDot is LoRaWAN™ 1.0.1 compliant, providing bi-directional data communication up to 10 miles / 16 km line-of-sight and 1-3 miles / 2 km into buildings, using sub-GHz ISM bands in North America, Europe and Australia.
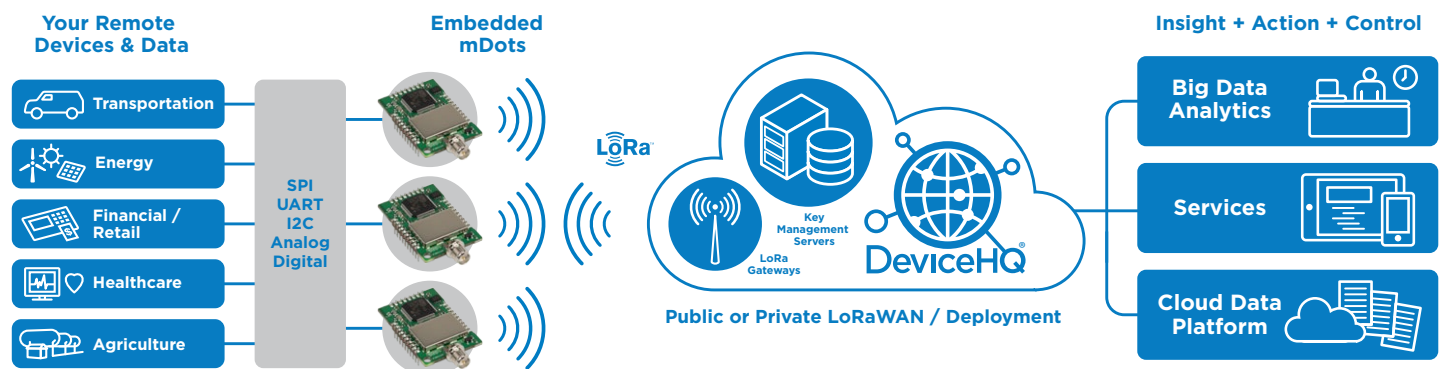
mDots bring intelligence, reduced complexity and a lower overall bill of material cost to the very edge of the network while supporting a variety of electronic interfaces to connect just about any "Thing" for years on battery power.

BENEFITS

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

FEATURES

- FCC/CE/RCM certified for use in North America, Europe & Australia
- LoRa Alliance Certified™
- 2-way duplex communication
- 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™

Key Management Servers

LoRa Gateways

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

MultiConnect® mDot™
Long Range 868/915 MHz LoRa® Module

Applications

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

Operating Modes

- LoRaWAN 1.0.1 compliant
- Developer friendly ARM mbed libraries provides customization capability for specific applications
- Onboard flash and RAM reduces overall Build of Material costs

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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	10	53
Average Current (Amps) at Low Transmit Power Setting (TXP 2)	0.026		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	

SPECIFICATIONS

Model	MTDOT-868	MTDOT-915
Region	Europe	North America / Australia
Communication	LoRaWAN 1.0.1 compliant ARM mbed libraries or AT commands for radio control 868MHz and 900MHz	
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
Max Receive Sensitivity	-137 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

* 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 MT-LORA accessory card.

Max Effective Isotropic Radiated Power (EiRP)	10 dBm	36 dBm
Input Voltage	3.3 - 5VDC ± 5%	
Environmental		
Operating Temperature	-30° C to +70° C (-22° F to 157° F)	
Storage Temperature	-40° to +85° C (-40° to 185° F)	
Relative Humidity	20 to 90% 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.

DEVELOPER KIT

The MTUDK2-ST-MDOT developer kit allows customers to plug in the
MultiConnect mDot module and use it for testing, programming and evaluation.
This kit is designed for use with MultiTech's MultiConnect mDot long range, RF modules.
This developer kit includes an antennas, USB cable, RSMA cable and Quick Start Guide.
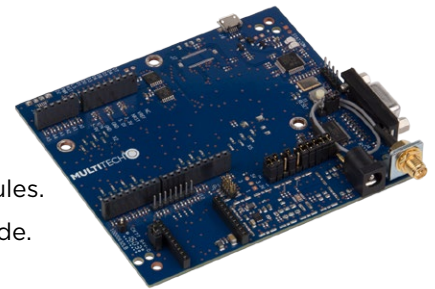
The MTMDK-ST-MDOT micro developer kit is a micro developer and programming board.
This kit is available in the form of a USB dongle, allowing a developer to plug in a MultiConnect
mDot, MultiConnect mDot EVB or MultiConnect mDot Box and start developing their own application.
Its portable design makes it ideal for connecting to a laptop and doing range testing of the LoRa®
network. This developer kit includes a development board, LoRa antenna and Quick Start Guide.

ORDERING INFORMATION

North American Models

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

Australian Models

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

European Models

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

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

Developer Kit and Accessories

Model	Description	Region
MTUDK2-ST-MDOT	Developer Kit, includes SMA antenna & USB cable, (mDots sold separately)	Global
MTMDK-ST-MDOT	MultiConnect 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.

YOU MAY ALSO BE INTERESTED IN: MULTICONNECT® CONDUIT™

MultiConnect® Conduit™ is the industry's most configurable, manageable, and scalable communications gateway for industrial IoT applications. Network connectivity choices to your preferred data management platform include carrier approved 4G-LTE, 3G, 2G and Ethernet. MultiConnect® mCard™ accessory cards deliver FCC/CE/RCM certified LoRaWAN™ 8-channel gateway connectivity and plug directly into the rear of the Conduit gateway, capable of supporting thousands of MultiConnect® mDot™ long range RF modules connected to remote sensors or appliances. Available options include LoRaWAN™ Ready mCards for global ISM-Band coverage of 868 MHz (EU) & 915 MHz, (North America and other regions including AU, NZ, S.Kr, SE Asia[†] and Latin America[†]) with 433MHz (EU & CN), 470 MHz & 780 MHz (CN) coming soon.

[†]Pending certified LoRa Alliance channel plan.

MULTITECH®