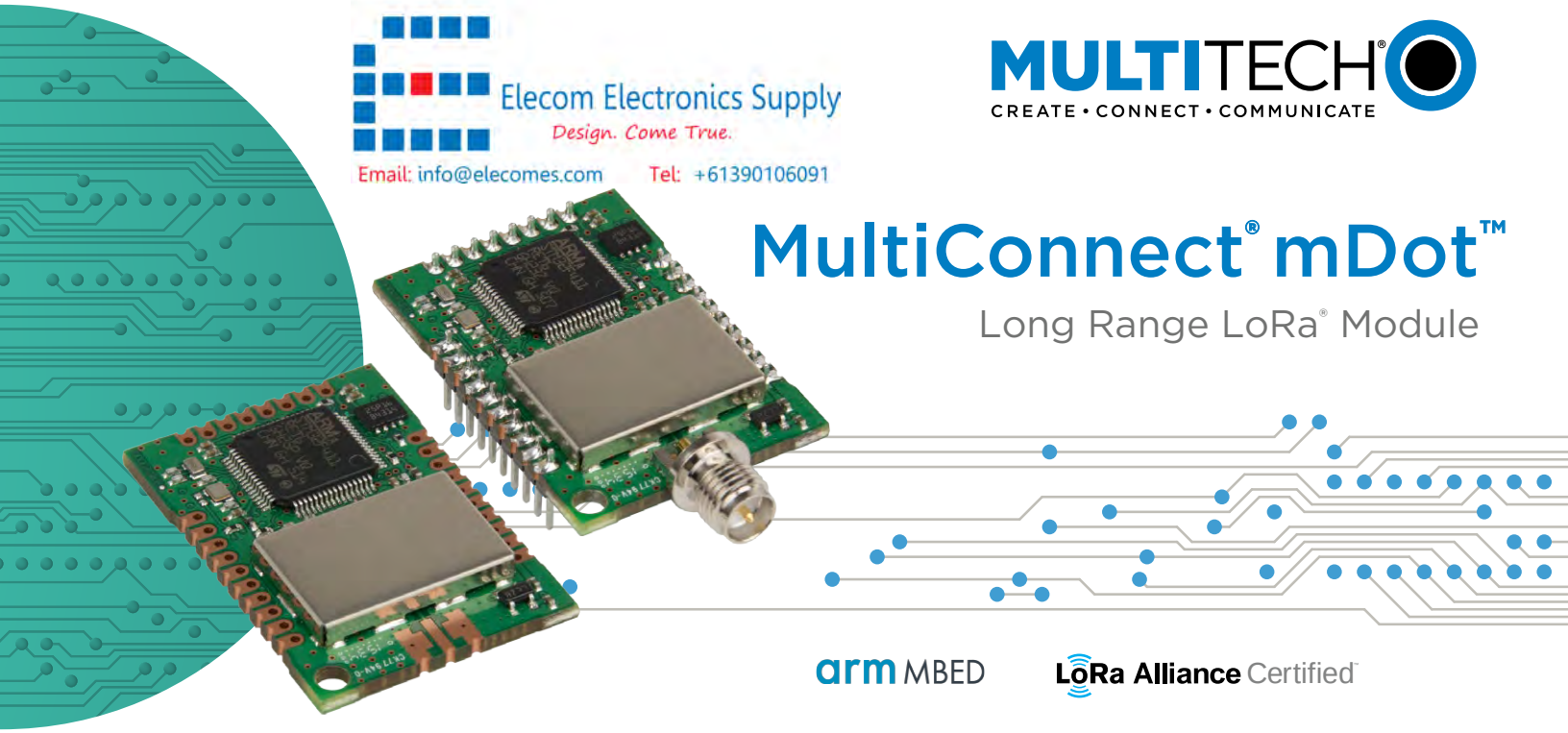
MULTITECH®
CREATE • CONNECT • COMMUNICATE

MultiConnect® mDot™

Long Range LoRa® Module



arm MBED

LoRa Alliance Certified

The MultiConnect® mDot™ is a secure, CE/FCC/RCM 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™ 1.0.2 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).

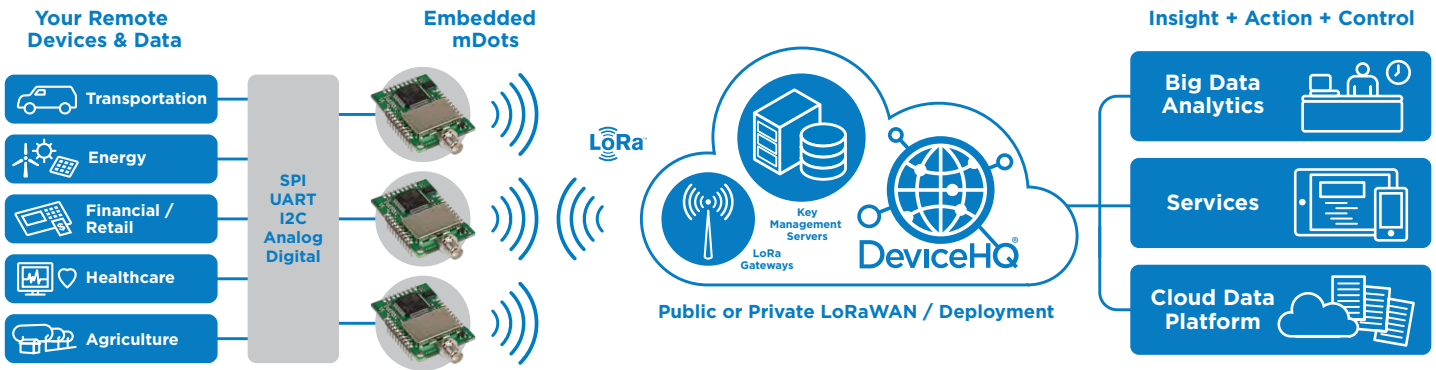
mDots bring intelligence, reduced complexity and a lower overall bill of material cost to the very edge of the network while supporting a variety of electronic interfaces to connect just about any “Thing” for years on battery power.

BENEFITS

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

FEATURES

- FCC/CE/RCM 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®



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 LoRa® Module

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

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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

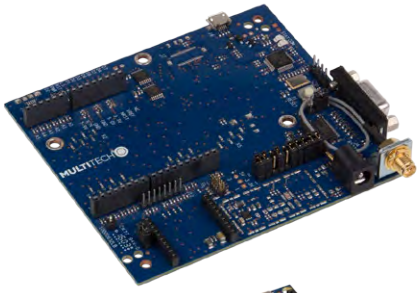
Model	MTDOT-868	MTDOT-915	MTDOT-923
Region	**Europe**	**North America / Australia**	**Asia Pacific**
Communication	LoRaWAN 1.0.2 compliant Arm Mbed libraries or AT commands for radio control		
Interfaces (pin functions are multiplexed)	Up to 21 Digital I/O, Up to 11 Analog Inputs, SPI, I2C, UART (RX, 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 MT-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° to +85° C (-40° to 185° 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.
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.

DEVELOPER KIT



The MultiConnect mDot (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 MultiConnect 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 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, programming cable 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

Asia Pacific Models

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

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.

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.

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.

INSTALLATION SUPPORT

MultiTech's Installation Support Service delivers priority service with the ability to work one-on-one with an experienced MultiTech technical support engineer, to guide you through the installation process for our products.

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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