MULTITECH®

MultiTech xDot®

Long Range LoRa® Module

arm MBED

LoRaWAN CERTIFIED℠

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® 1.0.4 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 (AU915), Asia Pacific (AS923), India (IN865) and Korea (KR920).

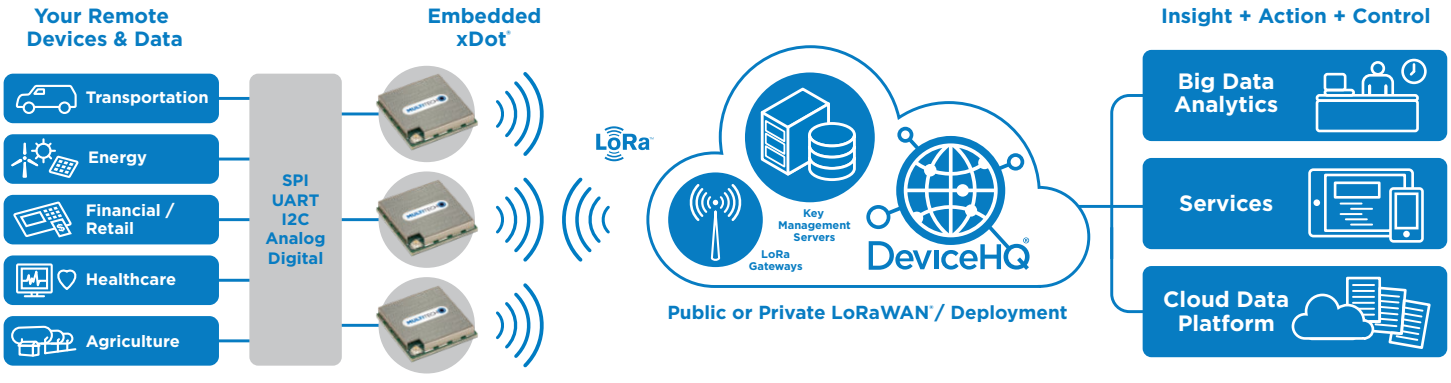
xDots bring intelligence, reduced complexity and a lower overall bill of material cost to the very edge of the network while supporting a variety of electronic interfaces to connect just about any "Thing" for years on battery power.

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



www.multitech.com/xdot

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 1.0.4 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	16 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 1.0.4 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)	16 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

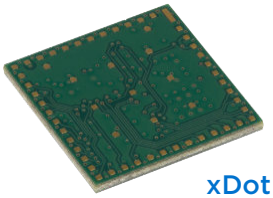
Certifications				
EMC Compliance	EN 55022 Class B, EN 55024 CISPR 22:2008	TELEC, Radio/ Telecom Biz Act, GITEKI	National Radio Research Agency Notice 2018-29	US: FCC Part 15 Class B Canada: ICES-003 Mexico: TBD
Radio Compliance	EN 300 200	Japan Giteki, Radio/ Telecom Biz Act	Ministry of Science and 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



xDot LGA Family Footprint

Applications

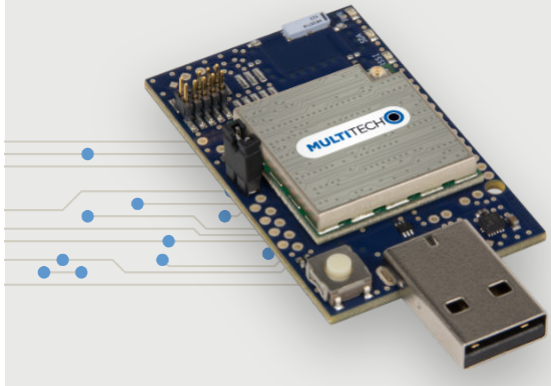
- Securely manage and harvest sensor data
- Control and monitor remote assets and devices
- Low power for 10+ year battery performance

Operating Modes

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

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® Gateway

MultiTech Conduit® IP67 Base Station

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.

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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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