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## MULTITECH 100 Series Cellular Modems



## Product Usage Instructions

### Installation and Setup

1. Ensure the xDot device is powered within the specified voltage range.
2. Connect the xDot to your IoT system using the provided UART interface.
3. Configure the device according to your region's LoRaWAN specifications.

### Data Monitoring and Management

1. Monitor your remote devices' data using the xDot's LoRa capabilities.
2. Leverage the AES-128 encryption for secure data transmission.
3. Utilize the available I/O interfaces for connecting sensors or actuators.

### Maintenance and Troubleshooting

1. Regularly update the firmware using FOTA memory for enhanced performance.
2. If facing connectivity issues, check the antenna configuration and placement.
3. Refer to the user manual for detailed troubleshooting steps in case of any issues.

## Product Information

- MultiTech xDot® is a low-power, LoRaWAN® 1.0.4 Certified module designed to enable long-range, low-bandwidth communication for the Internet of Things (IoT) devices. With its ultra-low power consumption, the xDot is perfect for use in a wide

range of IoT applications, including smart cities, agriculture, environmental monitoring, and industrial automation.

- Featuring the latest in LoRaWAN technology, the xDot is capable of reaching more than 22 miles/35 km line-of-sight, making it ideal for remote and hard-to-reach locations, and provides excellent building penetration. Its low power consumption extends sensor and device battery life up to 10 years, making it the most reliable and cost-effective choice for long-term deployments. The xDot easily integrates into existing systems via serial UART AT Commands or you can build your own custom application.
- Cybersecurity is critical to any IoT systems and MultiTech works continuously to ensure its devices are secure. The xDot safeguards IoT devices against the possibility of cyberattacks by following the AES-128 standard via symmetric cryptography and secret keys.
- Both the xDot Essential and Advanced models share identical pins, enabling a straightforward and flexible substitution without the need for costly hardware upgrades or complex software development. The Advanced model provides additional features for more functionality including additional I/O's, 8 Mb flash FOTA memory, trace and UFL antennas, and allows for custom applications.
- MultiTech's proven reliability, established through rigorous testing and time-to-market, provide a global solution for Enterprises around the world. Whether you're looking to deploy a large-scale IoT network or simply need a reliable way to monitor a few remote devices, the MultiTech xDot is the ideal connected solution optimized for both performance and value.

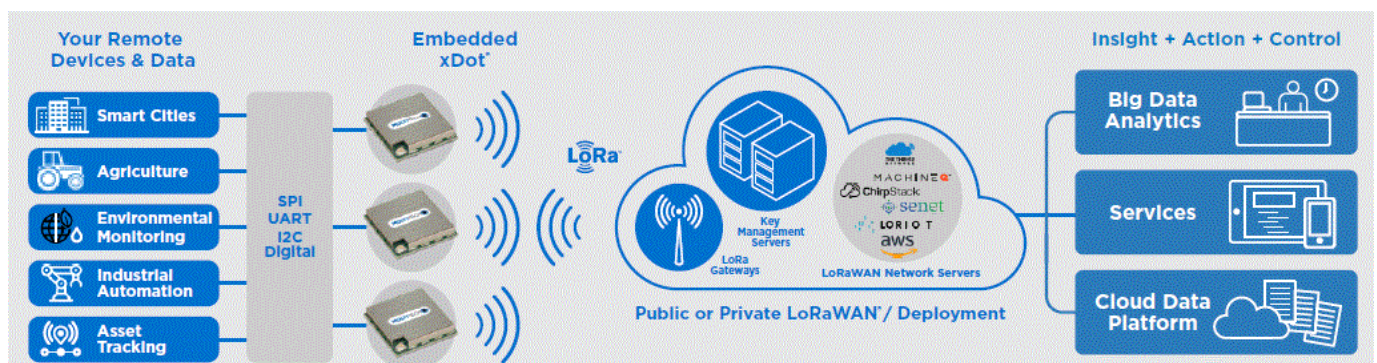
## **BENEFITS**

- High Reliability and Global Scalability
- Meets AES-128 standard via symmetric cryptography and secret keys
- Ultra-low power consumption with Sleep Current = 1.0uA
- LoRaWAN Channel Plans Supported (US915, AS923, AU915, EU868, IN865, KR920, RU864, CN470)

## **FEATURES**

- Ease of integration

- Protected and Isolated LoRaWAN stack resulting in a reliable and certifiable LoRaWAN solution Software updates over UART and over-the-air for the Advanced version
- LoRaWAN 1.0.4 Certified Product
- End-to-end AES-128 encryption
- Over-the-Air Activation (OTAA) or Activation by Personalization (ABP)
- Certified for use in Australia, Canada, Europe, India, Japan, Korea, New Zealand, United Kingdom, United States
- Check with MultiTech for the latest country-specific support



## SPECIFICATIONS

Models	xDot Essential	xDot Advanced
	MTXDOT-NA1-B15 MTXDOT-T-WW1-B15 MTXDOT-CN1-B15	MTXDOT-NA1-B10 MTXDOT-T-WW1-B10 MTXDOT-CN1-B10
Region/Country	<ul style="list-style-type: none"> <li>• NA1 = Canada, United States</li> <li>• WW = Canada, United States, Asia Pacific, Australia, Europe, India, Japan, Korea, United Kingdom, Russia</li> <li>• CN1 = China</li> </ul>	
LoRaWAN	LoRaWAN 1.0.4 Activation OTAA/ABP Class A, B, C LoRa Point-to-Point	
LoRa Radio	SX1262 sub-GHz RF Transceiver	

LoRa Radio Frequency Plan	<ul style="list-style-type: none"> <li>• NA1 = US915</li> <li>• WW = US915, AS923-1/2/3/4, AU915, EU868, IN865, KR 920, RU864</li> <li>• CN1 = CN470*</li> </ul>
Channel Configurability	Up to 16-channels (regionally dependent)
Listen-Before-Talk (LBT) Enabled	Yes
Host Interface	1x Low Power UART
Module Package/Physical Dimensions	Surface Mount, 47-pin LGA / 23.6 mm X 23.6 mm x 3.51 (.93" x .93" x 0.14")
Packaging	Tape and Reel

## Performance

- Processor ARM® Cortex-M4
- Clock Speed 100 MHz internal clock speed
- Operating System ARM Mbed OS
- Application AT Command AT Command or
- Custom OS Libraries
- System Memory 160KB SRAM
- Flash Memory 384 KB
- FOTA Memory Passthrough Mode Using AT Commands (Requires External Flash) 8 Mb Flash
- Bootloader UART
- Input/Output UART, Wake, Reset, Status PINs 19 Digital I/O 2 UART, I2C, SPI, Wake, Reset
- Security AES 128 LoRaWAN Compliance Standard

## Power

- **Supply Voltage** 2.4 to 3.57V
- **Maximum Transmitter Power Output** (TPO) 21 dBm / Limited by LoRaWAN Regional Specification
- **Maximum Receive Sensitivity** -148 dBm
- **Deep Sleep Current Deep Sleep** = 1.0 uA
- **Maximum Effective Isotropic**
- **Radiated Power** (EiRP) 36 dBm @ 915 MHz / 16 dBm @ 868 MHz / 19 dBm @ 470 MHz

## Antenna Options

**Configuration Trace Antenna** UFL and Trace Antenna

## 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
- **Moisture Level** MSL 3
- **ESD** ANSI/ESD S20.20-1999

## Certifications

- **EMC Compliance**
  - **Australia and New Zealand:** CISPR 22 / Canada: ICES-003 /
  - **Europe and United Kingdom:** EN 55022 Class B, EN 55024, CISPR 22:2008
  - **Japan:** TELEC, Radio/Telecom Biz Act, Giteki /
  - **Korea:** National Radio Research Agency Notice 2018-29 / United States: FCC Part 15 Class B
- **Radio Compliance**
  - **Australia and New Zealand:** 4268:2012 + a1:2013, MPE Standard 2014
  - **Europe and United Kingdom:** EN 300 220-1 V4.1:2012, EN 301 489-03 V1.6.1:2013 Japan: Radio/Telecom Biz Act, Giteki
  - **Korea:** Ministry of Science and ICT Notice 2018-90 United States: FCC 15.247:2015, FCC 15.107:2015, FCC 15.109:2015
- **Safety**

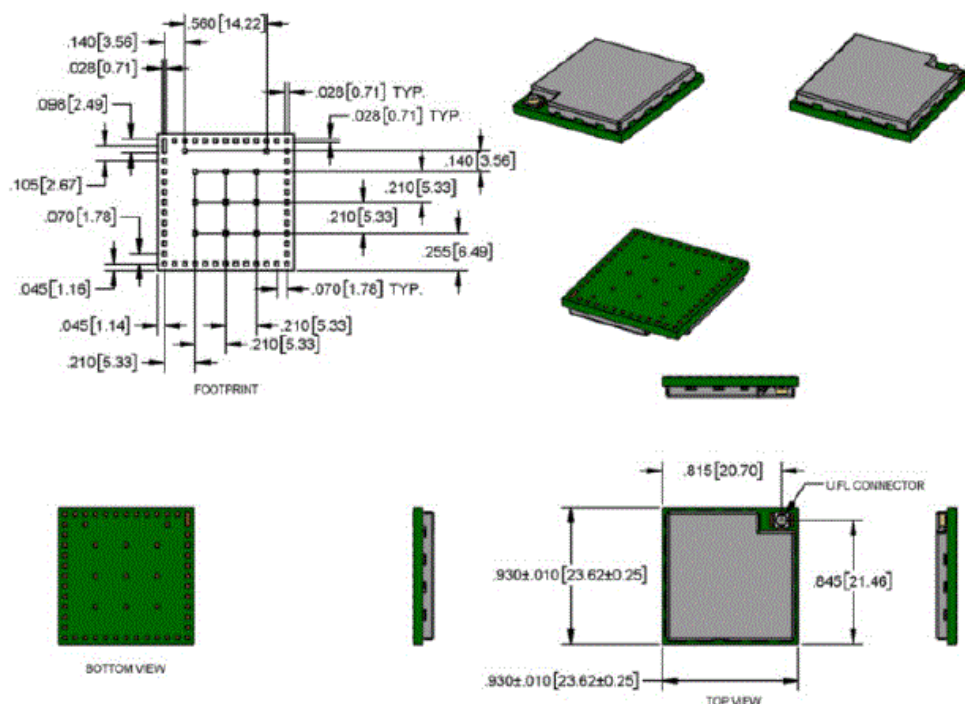
- **Australia and New Zealand:** 62368.1 Canada: cUL 60950-1 2nd Edition, cUL 62368-1 2nd Edition
- **Europe and United Kingdom:** IEC 60950-1 2nd Edition Japan and Korea: IEC 62368-1:2014
- **United States:** UL 60950-1 2nd Edition, UL62368-1 2nd Edition
- **ROHS** Europe and United Kingdom: EN IEC 63000:2018

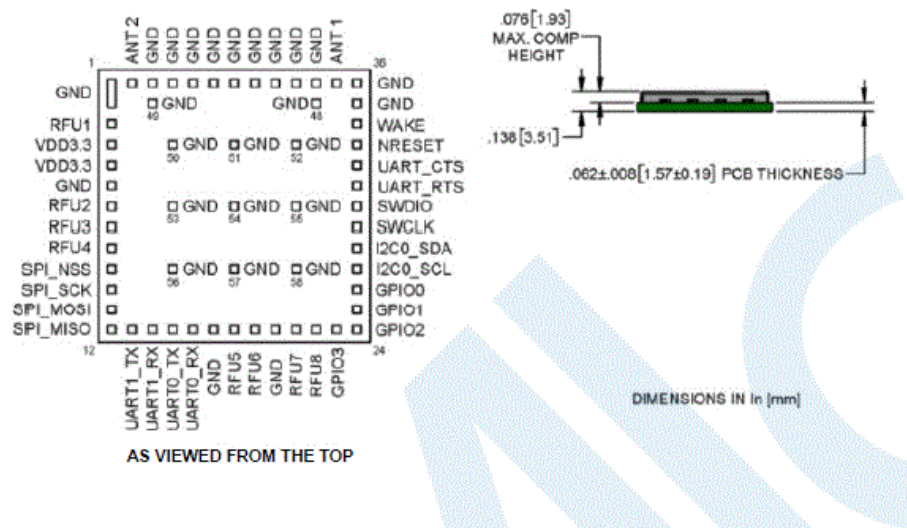
## Safety

- **Australia and New Zealand:** 62368.1 Canada: cUL 60950-1 2nd Edition, cUL 62368-1 2nd Edition
- **Europe and United Kingdom:** IEC 60950-1 2nd Edition Japan and Korea: IEC 62368-1:2014
- **United States:** UL 60950-1 2nd Edition, UL62368-1 2nd Edition
- **ROHS** Europe and United Kingdom: EN IEC 63000:2018

Contact MultiTech for details related to China CN470 certifications

## Hardware Overview & Pin Layout





## HIGHLIGHTS

### Applications

- Smart cities
- Smart meters
- Supply chain and logistics
- Building automation
- Agricultural sensors
- Retail store sensors
- Asset tracking
- Street lights
- Parking sensors
- Environmental sensors
- Healthcare
- Safety and security sensors
- Remote control applications

### Operating Modes

- Provides customization capability for specific applications
- Comprehensive
- AT command instruction set

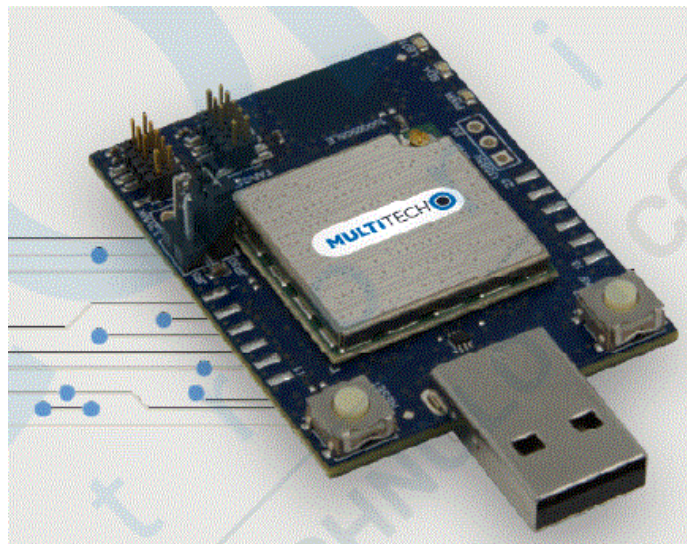
## EDGE INTELLIGENCE



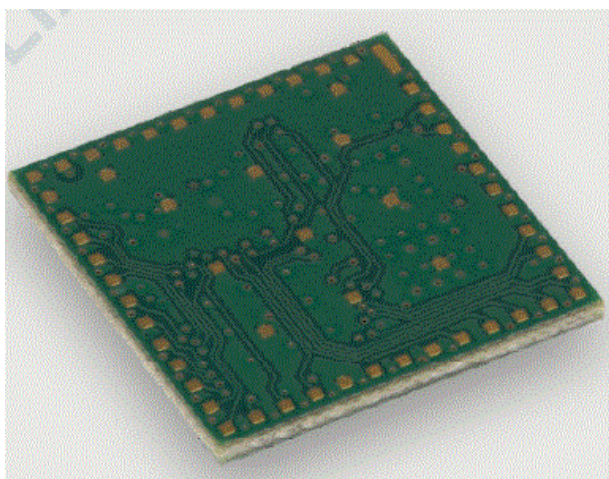
- The MultiTech xDot® applications can be written and compiled quickly online using developer friendly libraries, downloaded and hosted within the xDot. Decision making and control is distributed to the edge, enabling data to be more actionable without the heavy lift required to optimize RF performance, 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.

## DEVELOPER KIT

- The MultiTech xDot (MTMDK-XDOT) Developer Kit is a USB dongle engineered to simplify application development. Its portability facilitates easy laptop integration, enabling developers to effortlessly run
- AT commands or design custom Mbed-based applications.
- This kit includes a development board with an xDot, an integrated LoRa antenna and Quick Start Guide.



## xDot LGA Family Footprint



## **ORDERING INFORMATION**

### **MultiTech xDot® Essential Models**

#### **Model Description Region**

- MTXDOT-NA1-B15-TR-400 xDot Essential with Trace Antenna and Tape and Reel Packaging. (400 quantity) United States/Canada
- MTXDOT-CN1-B15-TR-400 xDot Essential with Trace Antenna and Tape and Reel Packaging. (400 quantity) China
- MTXDOT-WW1-B15-TR-400 xDot Essential with Trace Antenna and Tape and Reel Packaging. (400 quantity) Global\*

### **MultiTech xDot® Advanced Models**

#### **Model Description Region**

- MTXDOT-NA1-B10-TR-400 xDot Advanced with UFL and Trace Antenna and Tape and Reel Packaging. (400 quantity) United States/Canada
- MTXDOT-CN1-B10-TR-400 xDot Advanced with UFL and Trace Antenna and Tape and Reel Packaging. (400 quantity) China
- MTXDOT-WW1-B10-TR-400 xDot Advanced with UFL and Trace Antenna and Tape and Reel Packaging. (400 quantity) Global\*

### **MultiTech xDot® Essential Developer Kits**

#### **Model Description Region**

- MTMDK-XDOT-NA1-B14 xDot Essential Developer Kit (3 Pk) (US915) United States/Canada
- MTMDK-XDOT-CN1-B14 xDot Essential Developer Kit (3 Pk) (CN470) China
- MTMDK-XDOT-WW1-B14 xDot Essential Developer Kit (3 Pk) (US915, AS923-1/2/3/4, AU915, EU868, IN865, KR920, RU864) Global\*

## **MultiTech xDot® Advanced Developer Kits**

### **Model Description Region**

- MTMDK-XDOT-NA1-B10 xDot Advanced Developer Kit (3 Pk)(US915) United States/Canada
- MTMDK-XDOT-CN1-B10 xDot Advanced Developer Kit (3 Pk) (CN470) China
- MTMDK-XDOT-WW1-B10 xDot Advanced Developer Kit (3 Pk) (US915, AS923-1/2/3/4, AU915, EU868, IN865, KR920, RU864) Global\*

**Global Region:** Australia, Canada, Europe, India, Japan, Korea, Russia, United Kingdom, United States

## **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](http://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](http://www.multitech.com/support.go)

## Features and specifications are subject to change without notice.

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## Frequently Asked Questions

- **Q: What are the different models of the xDot available?**
  - A: The xDot is available in two models – xDot Essential and xDot Advanced, each catering to specific requirements.
- **Q: How can I ensure secure communication with the xDot?**
  - A: Utilize the AES-128 encryption standard and manage secret keys for secure

data transmission.

- **Q: Can I use the xDot in multiple regions with varying LoRaWAN specifications?**
  - A: Yes, the xDot supports different LoRaWAN frequency plans allowing usage in various regions globally.

## Documents / Resources

	<a href="#">MULTITECH 100 Series Cellular Modems [pdf]</a> User Guide Essential, Advanced, 100 Series Cellular Modems, 100 Series, Cellular M odems, Modems
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## References

- [User Manual](#)

100 Series, 100 Series Cellular Modems, Advanced, Cellular Modems, Essential, Modems,

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