MULTITECH®
CREATE • CONNECT • COMMUNICATE

MultiConnect® Conduit® IP67 Base Station

16-channel v2.1 Geolocation Reference Design

LoRa Alliance™

MultiConnect® Conduit® IP67 Base Station is a ruggedized IoT gateway solution, specifically designed for outdoor LoRa® public or private network deployments. The product can operate in two modes: standard and geolocation. The standard product operates as a 16-channel, full duplex gateway, supporting both packet-forwarder and built-in network server modes. The geolocation product is based on the Semtech v2.1 reference design, which uses the LoRaWAN™ protocol to perform Time Difference of Arrival (TDoA) calculations to deliver end-node location information in conjunction with a v2.1 LoRa Network Server. This technology provides asset location information that enables a variety of use cases, services and business models that GPS limitations cannot support.

The upgradeable FPGA on the LoRa processor allows customers to deploy in standard operation today for existing LoRaWAN network needs and remotely upgrade to geolocation operation as business needs change. There is no need to send a technician to site to change mode of operation. It can support thousands of LoRaWAN certified end nodes natively, including the MultiConnect® mDot™* and xDot®*, without the need for additional hardware or software upgrades to the end nodes.

*Represents ideal network configuration and equipment set up. Results vary depending on payload amount, transmission frequency, spreading factor used, as well as terrain, RF interference and obstruction type (e.g., metal, cement, etc.)

BENEFITS

- Full duplex communication reduces time and costs of operational management of LoRa end devices
- Increased timing accuracy and Enhanced Security – all geolocation packets are fine timestamped and AES encrypted
- Existing LoRaWAN compliant end nodes can utilize geolocation without extra hardware or software costs
- GPS-free geolocation reduces complexity of locating LoRaWAN end devices

FEATURES

- Semtech v2.1 design is Geolocation enabled by partnering with a v2.1 LoRa Network Server
- Operates as a 16-channel gateway in standard or geolocation operation
- Certified for Europe 868 MHz and North American 915 MHz ISM bands
- Standard operation supports 1PPS packet timestamp; geolocation operation supports finer packet timestamp

IP67 BASE STATION HIGHLIGHTS

Geolocation Applications

There are many IoT use cases that require information on the location of a physical asset, but traditionally have been hampered by technology that either requires additional hardware (e.g., GPS module) and/or has limited capability (e.g., cannot work indoors in wide area applications). With Semtech's v2.1 geolocation solution, new business cases and services in key verticals such as agriculture, health care, logistics, and construction can benefit from location services previously too expensive or impossible to meet utilizing GPS. Whether one wants to locate animals, assets or provide new services cost efficiently, LoRaWAN geolocation is positioned to enable a myriad of use cases that benefit society.

Geolocation with v2.1 LoRa Network Servers

The MultiConnect IP67 Conduit v2.1 base station requires a LoRa Network Server that is capable of processing v2.1 packets. v2.1 packets are not backwards compatible with v1.5 or earlier LoRa Network Servers. Therefore, in order to use geolocation with this new product, a customer must have access to a v2.1 capable LoRa Network Server. Check with your public LoRa operator of choice to see if they have an agreement with Semtech, as MultiTech is compatible with most operators around the world.

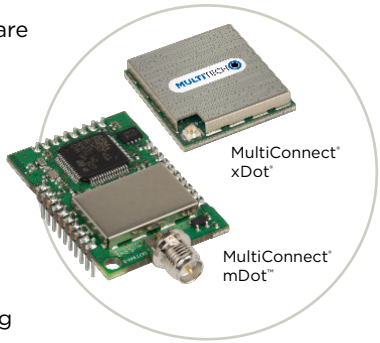
For the Advanced Developer – Open mLinux Development Environment

With a completely open Linux development environment, our mLinux distribution is based on the Open Embedded/Yocto project; providing hundreds of open source packages and extensive language support.

This development path is recommended for those wanting to port existing applications, who have strong language preferences, or who need complete firmware control.

CONNECTING THE "THINGS"

MultiConnect® mDot™ & xDot®



MultiConnect mDot and xDot are secure, regulatory-certified, Arm® Mbed™ programmable, low-power RF modules, providing long-range, low bit rate IoT data connectivity to sensors and actuators.

The mDot and xDot are LoRaWAN compliant, providing bi-directional data communication up to 10 miles line-of-sight and 2-3 miles in buildings, using the global sub-GHz ISM radio bands in North America, Europe, and the APAC regions.

The mDot was the first Arm Mbed platform listed on mbed.org that was deployment ready. The mDot supports applications written and compiled in the mbed online environment using developer friendly libraries. Decision making and control can be done at the edge, reducing the need to optimize RF performance and implement complex IoT middleware.

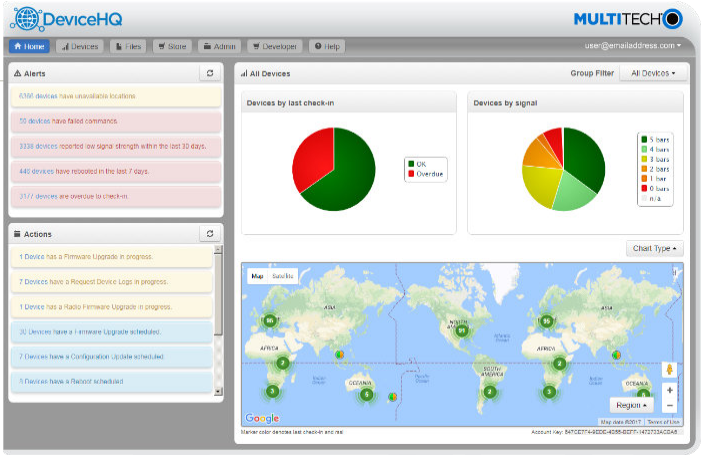
mDots and xDots bring intelligence, reduced complexity and a lower overall bill of material to the edge of the network while supporting a variety of interfaces to connect just about any battery-powered "thing".

The mLinux Distribution Includes:

- Operating System: Linux 4, Yocto 2.2
- Language Support: Python, C/C++ & JavaScript
- Package upgrade support for Java, Perl, Ruby, Mono C#
- Packages: SQLite (Database), Ligttpd (Web Server), BusyBox (Core Utilities)

Easily Deploy and Manage Assets Via DeviceHQ®

MultiTech DeviceHQ is the M2M industry's first IoT online application store to enable customers to easily deploy and scale applications to their connected devices. Drag-and-drop tools easily allow customers to create and manage applications for in-field assets. The DeviceHQ application store gives your business the power to innovate operations management and create value-added services.



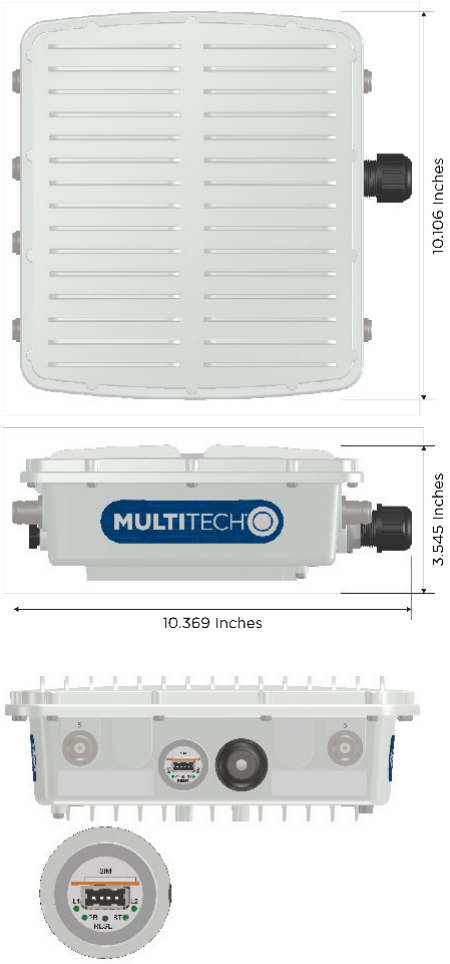
Benefits

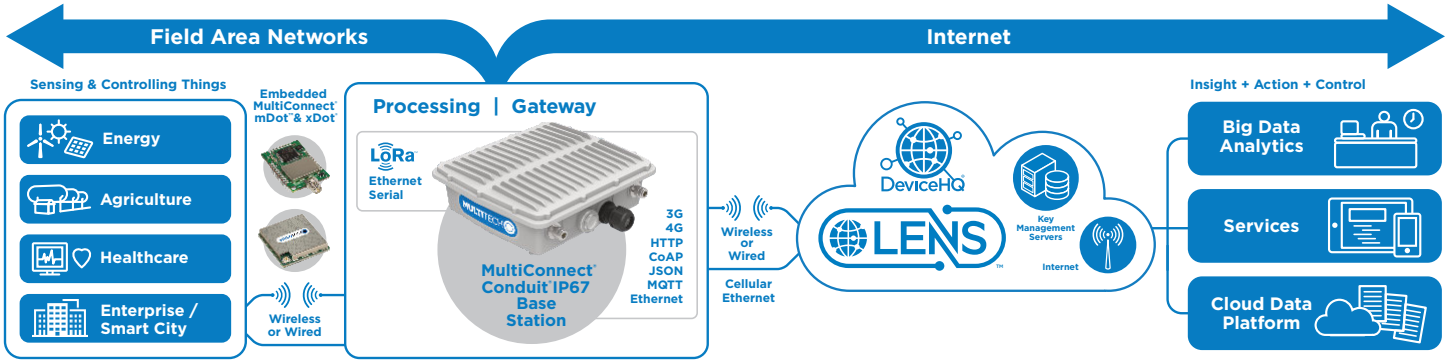
- "Low Touch" asset deployment reduces costs, complexity and time
- Easily scales to your network needs
- Browse and download custom applications tailored to your business needs
- Reduce truck-rolls using remote performance management and asset updates

SPECIFICATIONS

Models	MTCDT-Lxxx		
Cellular Options	4G-LTE Category 3 3GPP Release 9 (100 Mbps peak downlink/50 Mbps peak uplink)		
	AT&T/T-Mobile	Europe	Verizon
Frequency Band (MHz)	4G: 700(B17)/850(B5)/ AWS1700(B4)/1900(B2) 3G: 850(B5)/1900(B2) 2G: 850/1900	4G: 800(B2)/1800(B3)/2600(B7) 3G: 850(B5)/900(B8)/2100(B1) 2G: 900/1800	4G: 700(B13)/AWS1700(B4)
Processor & Memory	ARM9 processor with 32-Bit ARM & 16-Bit Thumb instruction sets • 400 MHz • 16K Data Cache • 256 MB Flash Memory • 16K Instruction Cache • 128X16M DDR RAM		
Packet Data	Up to 100 Mbps downlink, Up to 50 Mbps uplink		
Radio Frequency	LoRa – a Digital Spread Spectrum technique 16 Channel gateway		
mLinux Software	• Open source embedded Linux distro based on the Yocto Project – 2.2 • Tool chain for creating custom images • Packet forwarder • WAN connection via Ethernet or cellular	• Cellular PPP, DHCP client & server • Firewall configuration via iptables • Full root console access via SSH and serial debug port • Out of the box support for C, C#, C++, Perl, Python, Javascript, Node.js, Ruby	• Five configurable LEDs • opkg package manager with limited package feed • Basic router functionality built-in with Linux • Software configurable USB device port • Lighttpd web server • GNSS
GNSS/GPS Module (when not using geolocation)	72-channel u-blox NEO/LEA-M8T module / Concurrent reception of GPS/QZSS, GLONASS, Galileo, BeiDou / Survey-in and single satellite timing / Time pulse frequency: 0.25 Hz....10 Mhz / Time pulse accuracy: Clear sky ≤ 20 ns / Indoor ≤ 500 ns		
Antennas	LoRa Omni-directional radiation pattern for 360° / 3 dBi gain / Vertical polarization / Weight: 231 grams / Nominal Impedance: 50 Ω / Dimensions: 388.5 mm x 36.9mm / Frequency Range: 806-960/1710-2170 Mhz / N-Male connector / Power withstanding: 20 W / Wind-loading: 125 Mph		
	Cellular Wideband LTE, 4G / 3 dBi gain / HPBW: Horizontal – 360° / Vert – 60° / Linear and vertical polarization / Nominal Impedance: 50 Ω / Dimensions: 178 x 22mm / N Plug connector / Weight: 70 gw / Frequency Range: 690-960/1710-2170/2500-2690 MHz		
	GNSS/GPS Operation Voltage: 3.0 – 5.0V / Polarization: RHCP / Power Consumption: 8+/-3mA@3.0+/-0.1V / Temperature: -40°C to +85°C / Gain: 90°: 2.4 dBic@1575 MHz; 2.85 dBic@1602 Mhz / Connector: N-Plug / Frequency Range: 1575 – 1615 Mhz / Dimensions: 55 (Dia.) mm x 64 (W) / Noise Figure: 2.0 dB typ.		
MTAC LoRa mCard	Listen Before Talk support / SPI interface / LoRaWAN 1.0, 1.0.1 & 1.0.2 support Dimensions – 50.59 mm x 30 mm / 902-928 MHz ISM Band – AS923 MHz compliant		
LoRa Channel Plan	Certified Channel Support: Europe 868 Mhz, North America 915 MHz Radio Frequency Support: AS923 MHz, AU 915 MHz, IN 865 MHz, KR 920 MHz		
LoRaWAN Protocol	LoRaWAN 1.0, 1.0.1 and 1.02 supported / Listen Before Talk support		
Voltage	802.3at Type 2: PoE device with power rating 60W or greater Input power: Power over Ethernet 37-57 Volts DC		
Connectors			
Ethernet	1 RJ-45 Ethernet 10/100 port; RJ-45 for PoE		
USB	1 USB Ports: USB Host (Type-A)		
Cellular (Optional)	Female SMA, 3dBi detachable cellular antennas (Qty 2)		
Antenna	"N" type		
SIM	Micro-SIM Holder (3FF)		
Physical Description			
Dimensions (LxWxH)	262 mm x 91 mm x 257 mm		
Physical Weight	2.75 kg		
Chassis Type	IP67-rated, Aluminum		
Environmental			
Operating Temperature	-30° to +75° C		
Storage Temperature	-40° to +85° C		
Relative Humidity	20% to 90%, non-condensing		
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	UL / cUL 60950-1 2nd Ed., UL / cUL 60950-22, IEC 60950-1 2nd Ed. + A2, IEC 60950-22, RoHS compliant		
Network Approvals	AT&T/T-Mobile, Verizon		
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		

*UL Listed @ 40° C, limited by AC power supply. UL Recognized @ 70° C when used with the fused DC power cable, part number FPC-532-DC. Installation in outdoor locations or ambient temperature above 40° C or 70° C has not been evaluated by UL. UL Certification does not apply or extend to use in outdoor applications. Optional power must be UL Listed ITE power supply marked LPS or Class 2 rated 12VDC, 5A. Certification does not apply or extend to voltages outside certified range, and has not been evaluated by UL for operating voltages beyond tested range.





WHAT'S INCLUDED WITH YOUR IP67 BASE STATION

The IP67 Base Station includes the following:

- 1 - MultiTech Conduit IP67 Gateway with MTAC-LORA mCard installed
- 1 - LoRa IP67-rated antenna
- 2 - Cellular antennas (if equipped with Cell Backhaul)
- 1 - GNSS antenna
- 1 - Mounting Bracket Kit with screws and hose clamp (can mount to pole, wall, tower)
- 1 - Installation guide for setting up IP67 chassis and inserting SIM card

Mounting Options
(optional accessories shown)

ORDERING INFORMATION

MultiConnect Conduit IP67 Geolocation Base Station

Model	Description	Region
MTCDTIP-LEU1-270L-868	LTE Cat 3 Conduit IP67 Geolocation Base Station, GNSS w/Accessories	Europe
MTCDTIP-LAT1-270L-915	LTE Cat 3 Conduit IP67 Geolocation Base Station, GNSS w/Accessories (AT&T)	US/Canada
MTCDTIP-LVW2-270L-915	LTE Cat 3 Conduit IP67 Geolocation Base Station, GNSS w/Accessories (Verizon)	US
	With Wi-Fi/BT/BLE Support	
MTCDTIP-LEU1-275L-868	LTE Cat 3 Conduit IP67 Geolocation Base Station, GNSS w/Wi-FI/BT and Accessories	Europe
MTCDTIP-LAT1-275L-915	LTE Cat 3 Conduit IP67 Geolocation Base Station, GNSS w/Wi-FI/BT and Accessories (AT&T)	US/Canada
MTCDTIP-LVW2-275L-915	LTE Cat 3 Conduit IP67 Geolocation Base Station, GNSS w/Wi-FI/BT and Accessories (Verizon)	US

RECOMMENDED ACCESSORIES

MultiConnect mDot

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
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

MultiConnect xDot

Model	Description	Region
MTXDOT-NA1-A00-1	915 MHz LoRa Module UFL/TRC (Single Pack)	NAM
MTXDOT-EU1-A00-1	868 MHz LoRa Module UFL/TRC (Single Pack)	EMEA
MTXDOT-AU1-A00-1	AU915 MHz LoRa Module UFL/TRC (Single Pack)	Australia

Developer Kit & Accessories

Model	Description	Region
MMTKIT-IP67-MF	Conduit IP67 Accessory Kit (includes antenna mounting bracket, coax cable, two clamps and lightning arrestor)	Global
LGT-ARRST-x	Lightning Arrestor (Single or 5 pack)	Global
CA-NTYPE-MF-x	Outdoor Coax Cable, N Type Male & Female (Single or 5 pack)	Global
MB-ANT-IP67-x	Antenna Mounting Bracket, Mounts 1 Antenna (Single or 5 pack)	Global
PS-56V-POE-NAM-x	Single Port Power over Ethernet Transformer w/NAM Power Cord (Single or 5 pack)	NAM
PS-56V-POE-EU-x	Single Port Power over Ethernet Transformer w/EU Power Cord (Single or 5 pack)	EMEA
PS-56V-POE-GB-x	Single Port Power over Ethernet Transformer w/UK Power Cord (Single or 5 pack)	GB/IE

Go to www.multitech.com for detailed product model numbers.

Produced in the U.S. of U.S. and non-U.S. components. Features and specifications are subject to change without notice.

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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.

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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