

# MultiTech Conduit<sup>®</sup> IP67 Base Station

16-channel v2.1 Geolocation  
US915 for North America



**MultiTech Conduit<sup>®</sup> IP67 Base Station** is a ruggedized IoT gateway solution, specifically designed for outdoor LoRa<sup>®</sup> 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<sup>®</sup> 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 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 the site to change mode of operation. The Conduit IP67 can support thousands of LoRaWAN certified end nodes natively, including the MultiTech mDot<sup>™</sup>\* and xDot<sup>™</sup>\*, 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 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.

## CONNECTING THE "THINGS"

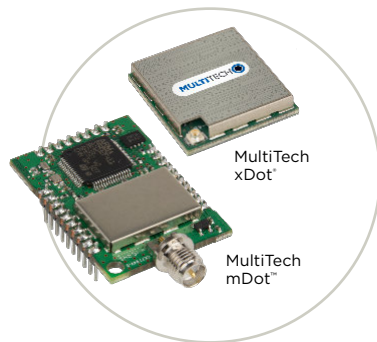
### MultiTech mDot™ & xDot™

MultiTech 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".



## Geolocation with v2.1 LoRa Network Servers

The MultiTech 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 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.

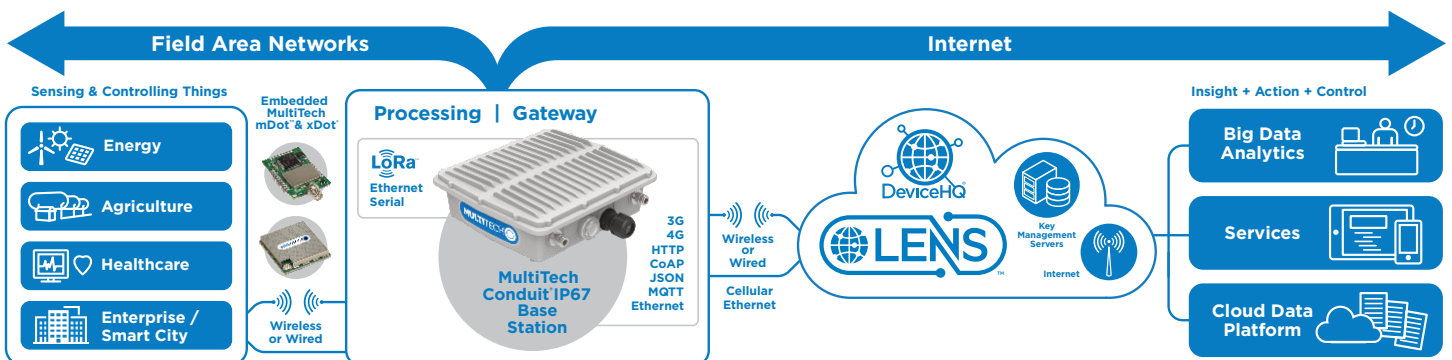
## mLinux Software

mLinux is an open source embedded Linux distribution. It's built using the open source Yocto Project which uses the OpenEmbedded-Core build framework. A pre-built Linux image ships with each Conduit Base Station as well as the source code and build system for creating your own custom image.

- Open source embedded Linux distribution based on Yocto project - 2.2
- Linux version (Linux 4.9), including access to over 500 resolved Common Vulnerabilities and Exposures (CVE)
- Hardware support for cellular, LoRaWAN, WiFi/BT, and GNSS/GPS
- LoRa packet forwarder
- Tool chain for creating custom images
- WAN connection via Ethernet or cellular
- Cellular PPP, DHCP client and server
- Firewall configuration via iptables
- Full root console access via SSH and serial debug port
- Language support: Python, C, C++, Javascript
- Package upgrade support: Java, Perl, Ruby, Mono C#
- opkg package manager with limited package feed
- Basic router functionality with built-in Linux
- Software configurable USB device port
- Lighttpd web server

Detailed information about getting started and using mLinux can be found at:

<http://www.multitech.net/developer/software/mlinux/>



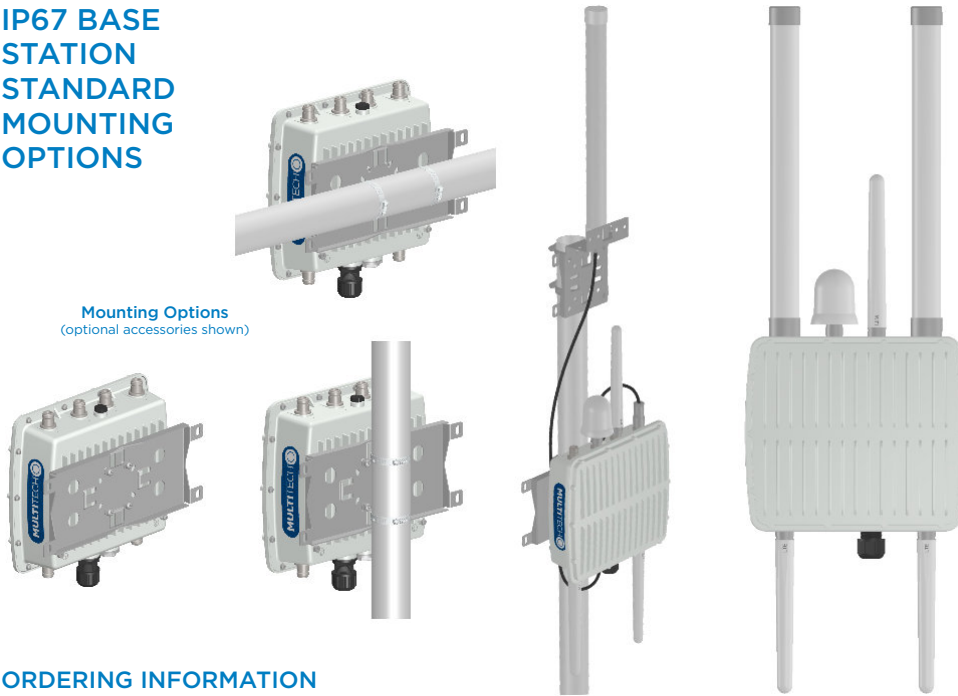
## SPECIFICATIONS

| Models                            | MTCDTIP-L4N1   | MTCDTIP-LAT1  | MTCDTIP-LVW2                     |
|-----------------------------------|--|---|----------------------------------|
| Mobile Network Operator           | AT&T & Verizon   | AT&T  | Verizon                          |
| Cellular Performance              | 4G-LTE Category 4  | 4G - LTE Category 3   |                                  |
| Cellular Fallback                 | 3G - HSPA+ (AT&T only)   | 3G - HSPA+  | No Fallback                      |
| Frequency Band (MHz)              | <b>AT&amp;T: 4G:</b> B2(1900), B4(AWS1700), B5(850), B12 (700a), B14(700 FirstNet), B66(AWS-3 1700)<br><b>3G:</b> B2(1900), B4(AWS1700), B5(850)<br><b>Verizon: 4G:</b> B4(AWS1700), B13(700c)<br><b>Other Bands Supported:</b><br>B71 (600) | <b>4G:</b> B2(1900), B4(AWS1700), B5(850), B17(700)<br><b>3G:</b> B2(1900), B5(850) | <b>4G:</b> B4(AWS1700), B13(700) |
| Packet Data (LTE FDD)             | Up to 150 Mbps peak downlink<br>Up to 50 Mbps peak uplink  | Up to 100 Mbps peak downlink<br>Up to 50 Mbps peak uplink                           |                                  |
| Input Voltage                     | Ethernet Input Power: 37 - 57 VDC.<br>Provided by PSE injector with power rating of 60W or greater   |   |                                  |
| Processor & Memory                | ARM9 processor with 32-Bit ARM & 16-Bit Thumb instruction sets<br>• 400 MHz • 16K Data Cache • 16K Instruction Cache • 128X16 MB DDR RAM • 256 MB Flash Memory   |   |                                  |
| Wi-Fi / Bluetooth (-275 models)   | WiFi: 802.11abng (2.4 & 5 Ghz)<br>Bluetooth: Classic 4.1 and BLE   |   |                                  |
| GPS/GNSS                          | GNSS for LoRa Packet Time Stamping<br>Concurrent GNSS connections: 3<br>GNSS Systems Supported: (default: concurrent GPS/QZSS/SBAS and GLONASS)  |   |                                  |
| LEDs (*)                          | PR (Power), ST (Status, user-programmable), L1 (user-defined), L2: (user-defined)  |   |                                  |
| <b>LoRa Specifications</b>        |  |   |                                  |
| LoRa Frequency Band               | 915 MHz  |   |                                  |
| LoRa Channel Plan                 | US915  |   |                                  |
| Channel Capacity                  | 16-channels (full-duplex)  |   |                                  |
| LoRa Power Output                 | 27 dBm maximum output power before antenna   |   |                                  |
| <b>Connectors</b>                 |  |   |                                  |
| Ethernet                          | RJ45 Ethernet jack (10/100 port) (POE)   |   |                                  |
| USB HOST (*)                      | USB 2.0 Type A connector   |   |                                  |
| SIM (*)                           | 3FF Micro SIM  |   |                                  |
| Antennas                          | Cellular, GPS, LoRa: female SMA / LoRa: reverse polarity female SMA  |   |                                  |
| <b>Physical Description</b>       |  |   |                                  |
| Dimensions (LxWxH)                | 262 mm x 91 mm x 257 mm  |   |                                  |
| Physical Weight                   | 2.75 kg  |   |                                  |
| Chassis Type                      | IP67-rated, Aluminum   |   |                                  |
| <b>Environmental</b>              |  |   |                                  |
| Operating Temperature             | -30° to +75° C   |   |                                  |
| Storage Temperature               | -40° to +85° C   |   |                                  |
| <b>Certifications</b>             |  |   |                                  |
| EMC Compliance                    | US: FCC Part 15 Class B<br>Canada: ICES-003 Class B  |   |                                  |
| Radio Compliance                  | US: FCC Part 22, 24, 27<br>Canada: ISED  |   |                                  |
| Safety                            | UL/cUL 60950-1   UL/cUL 62368-1  |   |                                  |
| Mobile Network Operator Approvals | PTCRB, AT&T, Verizon<br>Pending: Rogers, Bell, Telus, T-Mobile   | PTCRB, AT&T<br>Pending: Rogers, Bell, Telus, 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  |   |                                  |
| Warranty                          | 2-Years - <a href="http://www.multitech.com/legal/warranty">www.multitech.com/legal/warranty</a>   |   |                                  |

(\*) SIM, LEDs, and USB port accessible under IP67-rated bottom cap cover

# IP67 BASE STATION STANDARD MOUNTING OPTIONS

Mounting Options (optional accessories shown)



## ORDERING INFORMATION

### MultiTech Conduit® IP67 Geolocation Base Station

| Model                 | Description  | Region    |
|-----------------------|--|-----------|
| MTCDTIP-L4N1-270L-915 | LTE Cat 4 mLinux Conduit IP67 Geolocation Base Station 16-channel, 915 MHz, with GNSS and Accessory Kit (AT&T/Verizon) | US/Canada |
| MTCDTIP-LAT1-270L-915 | LTE Cat 3 mLinux Conduit IP67 Geolocation Base Station, GNSS with Accessory Kit (AT&T)                                 | US/Canada |
| MTCDTIP-LVW2-270L-915 | LTE Cat 3 mLinux Conduit IP67 Geolocation Base Station, GNSS with Accessory Kit (Verizon)                              | US/Canada |

Accessory Kit Includes: Mounting bracket kit, 2 LoRa antennas, 2 cellular antennas, GNSS antenna

### MultiTech Conduit® IP67 Geolocation Base Station with Wi-Fi/BT/BLE Support

| Model                 | Description   | Region    |
|-----------------------|---|-----------|
| MTCDTIP-L4N1-275L-915 | LTE Cat 4 mLinux Conduit IP67 Geolocation Base Station 16-channel, 915 MHz, with GNSS + Wi-Fi/BT and Accessory Kit (AT&T/Verizon) | US/Canada |
| MTCDTIP-LAT1-275L-915 | LTE Cat 3 Conduit IP67 Geolocation Base Station, GNSS with Wi-Fi/BT and Accessory Kit (AT&T)                                      | US/Canada |
| MTCDTIP-LVW2-275L-915 | LTE Cat 3 Conduit IP67 Geolocation Base Station, GNSS with Wi-Fi/BT and Accessory Kit (Verizon)                                   | US/Canada |

Accessory Kit Includes: Mounting bracket kit, 2 LoRa antennas, 2 cellular antennas, GNSS antenna, Wi-Fi/BT antenna

## RECOMMENDED ACCESSORIES

### MultiTech mDot™

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

### MultiTech xDot®

| Model            | Description                               | Region |
|------------------|---|--------|
| MTXDOT-NA1-A00-1 | 915 MHz LoRa Module UFL/TRC (Single Pack) | NAM    |

### Developer Kit & Accessories

| Model             | Description  | Region |
|-------------------|--|--------|
| MTKIT-IP67-MF     | IP67 Accessory Kit w/Mounting Bracket, 5' Coax Cable N Type, Male/Female Connectors & Lightning Arrester | Global |
| LGT-ARRST-1       | Conduit IP67 Base Station Lightning Arrester (1 Pack)  | Global |
| LGT-ARRST-5       | Conduit IP67 Base Station Lightning Arrester (5 Pack)  | Global |
| CA-NTYPE-MF-1     | Outdoor Coax Cable, N Type Male & Female connectors, 5 feet (1 Pack)                                     | Global |
| CA-NTYPE-MF-5     | Outdoor Coax Cable, N Type Male & Female connectors, 5 feet (5 Pack)                                     | Global |
| MB-ANT-IP67-1     | Conduit IP67 Antenna Mounting Bracket, Mounts One Antenna (1 Pack)                                       | Global |
| MB-ANT-IP67-5     | Conduit IP67 Antenna Mounting Bracket, Mounts 1 Antenna (5 Pack)   | Global |
| AN868-915A-1-IP67 | IP67 LoRa Antenna, 15.3" (4.5 dBi) (1 Pack)  | Global |
| AN868-915A-5-IP67 | IP67 LoRa Antenna, 15.3" (4.5 dBi) (5 Pack)  | Global |
| ANLTE5-1-IP67     | IP67 LTE Antenna, 7" (3.5 dBi) (1 Pack)  | Global |
| ANLTE5-5-IP67     | IP67 LTE Antenna, 7" (3.5 dBi) (5 Pack)  | Global |

Go to [www.multitech.com](http://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](http://www.multitech.com/support.go)

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