# **Conduit IoT Starter Kit for LoRa Technology**

Note: Before getting started, check for an updated version of this document at https://www.multitech.com/brands/multiconnect-conduit-lora-starter-kits.

# **Starter Kit Products**







## **Starter Kit Accessories**







## About this Document

To check for an updated version of this Getting Started Guide, go to https://www.multitech.com/brands/multiconnect-conduit-lora-starter-kits.





**Conduit<sup>®</sup> IOT Starter Kit** for LoRa<sup>®</sup> Technology

### **Getting Started for Ethernet Only Models**

# **Conduit Reset Button Functions**

The Conduit button has three functions as follows:

- Conduit Reboot To do this, hold the reset button for less than 5 seconds.
- Reset to Factory Starter Kit Configuration This resets the original starter kit configuration and retains the device's ability to connect to the IBM cloud. To do this, hold the reset button for 5-29 seconds.
- Clear Starter Kit Configuration This deletes the starter kit configuration. To do this, hold the reset button for more than 30 seconds.

For any of these functions, you need a pin, paperclip, or similar thin object that can fit into the reset hole.

If you accidently delete the starter kit configuration, go to the following URL for steps for restoring the starter kit configuration: https://www.multitech.com/support/resolutionid/5080639

#### Conduit IoT Starter Kit for LoRa Technology

#### Part Number: 82102254L

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The Conduit IoT Starter Kit for LoRa Technology provides everything needed to get your LoRa proof of concept running and connected to the cloud. The Starter Kit enables you to obtain sensor information and display it in the cloud quickly. All major components of the Starter Kit are pre-configured for use with the Conduit platform and select MultiTech cloud partners and only require simple actions to finish set-up.



The Starter Kit includes a Conduit with a pre-installed LoRaWAN<sup>®</sup> mCard capable of supporting thousands of mDot<sup>™</sup> and xDot<sup>®</sup> long range RF modules connected to remote sensors or appliances.

The Conduit is the industry's most configurable, manageable, and scalable cellular communications gateway for industrial IoT applications. For the Starter Kit, the Conduit features an IBM Node-RED graphical, drag-and-drop interface. For more advanced applications, an open mLinux developer platform is available.



The mDot is a secure, Arm<sup>®</sup> Mbed<sup>™</sup> programmable, low power RF module that provides long-range, low bit rate M2M data connectivity to sensors, industrial equipment and remote appliances. LoRaWAN certified, the mDot provides 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 North America, Europe, Australia, and Asia Pacific.



The mDot<sup>™</sup> Box helps you determine if LoRa<sup>®</sup> is the right technology to effectively connect to and manage thousands of assets and sensors in the field to while meeting your company's cost, performance, and strategic needs. The mDot Box pairs an mDot RF module with built in sensors including temperature, ambient light, pressure, electrical current. and a 3-Axis accelerometer. It comes standard with GPS to



The xDot<sup>®</sup> Micro Developer Kit is a USB dongle that allows you to plug in an xDot and start developing your application. As with the mDot, the xDot is a secure, Arm Mbed programmable, low-power RF module that provides long-range, low bit rate M2M data connectivity to sensors, industrial equipment, and remote appliances. It is also LoRaWAN certified, provides 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 ,nd Asia Pacific.

For developing with the mDot, the Starter includes both the mDot Micro Developer Kit and the full-sized mDot Developer Kit. Both options allow you to plug in the mDot and use it for testing, programming, and evaluation. The portable design of the Micro Developer Kit makes it ideal for connecting to a laptop and doing LoRa network doing range testing.

Description	Quantity	Item	Description	Quantity
Ethernet cable	1		Micro USB cables	2
Power supply with one or more changeable blades	1 set	Energiaet.	9 Volt battery	2
Ribbon cable	1	MULTITECH	Screwdriver	1
GPS antenna	1		Getting Started Guide and Legal Notices	2
LoRa antenna	2			

This Getting Started document walks you through setting up the Conduit and mDot Box as well as the basics of sending sensor data to the cloud. This demonstrates a little about platform capabilities, but for developing your proof-of-concept or getting started with the mDot or xDot, and recipes for our Conduit partner's cloud platforms, go to https://www.multitech.com/landing-pages/starter-kit

# **Getting Started with the Conduit**

#### Requirements

In addition to the starter kit contents, you need:

• An Ethernet connection.

### **Registering a DeviceHQ Account**

**IMPORTANT:** When the Conduit restarts during initial configuration, a new IP address is assigned to it via WAN. You need this value to access the Conduit's web administration interface. Particularly for Ethernet-only models, DeviceHQ offers quick access to the new IP address. If you don't have a DeviceHQ Account:

- 1. Open an web browser window and go to www.devicehg.com. If you have an account, login, and skip to Step 3.
- 2. If you don't have a DeviceHQ account, click Register Account and complete the registration form. Your email will be your user name. MultiTech sends a link to activate your account. Click the link to log in.
- 3. On the DeviceHQ dashboard, click your email address in the upper right corner and select **Account Info**. Highlight and copy the value in the Key field. You will need this to complete the steps in Configuring the Conduit.

## **Preparing Conduit Hardware**

To prepare the Conduit:

- 1. Attach a LoRa antenna to the LoRa mCard's RF connector in the AP2 slot on back of the Conduit as shown (right). Finger-tighten the antenna.
- 2. Attach the power supply blades for your country to the power supply.
- 3. Plug one end of the Ethernet cable into your computer and the other into the E-NET port on the Conduit.
- 4. Connect the power supply to the Conduit and plug it in to an electric outlet. The PWR, STATUS, and LS LEDs turn on. After 90-120 seconds, STATUS starts blinking.



### **Configuring the Conduit**

#### To log in and configure the Conduit:

- 1. Open an Internet browser and enter the device's default address: https://192.168.2.1
  - A screen appears telling you the connection is not private or not secure. This occurs because the device is self-signed. Note: You may need to manually configure your IP address and subnet mask into the Network settings on your PC.

To continue to the login page:

- If using Internet Explorer, select Continue to this website.
- If using Chrome, click ADVANCED and then click Proceed to 192.168.2.1
- If using Firefox, click Advance and then click Add Exception. Click Confirm Security Exception
- 2. Enter the default Username and Password and click Login. After up to 30 seconds, the First-Time Setup Wizard launches.
  - Username: admin
  - Password: MTCDT-<serial-no of the conduit>
- 3. Click Next and step through the Wizard screens to set the following.

Tip: Do not click Finish until you have entered these settings. If you accidently exit the wizard, click Administration and select Initial Setup to reopen it.

- Password (Setting a new password is recommended)
- Date and time
- On IP Setup eth0, set Direction to WAN and Mode to DHCP Client.
- On Access Configuration under HTTP Redirect, check the box next to Via WAN. Also check Via WAN under HTTPS.
- Click Finish.

Click Administration and select Access Configuration. Under Node-Red, check the box for Via WAN. Click Continue to close the pop-up. Click Submit.

- 5. Click Administration, and select Remote Management. Under Remote Server, select Enabled and paste the key copied from DeviceHQ in the Account Key field (from *Registering a DeviceHQ Account* Step 3 or the email sent by MultiTech). Click **Submit**.
- 6. Click Save and Restart. Wait for 2 minutes for the device to restart.
- 7. Remove the Ethernet cord from your computer and connect it to a router or LAN allowing the Conduit to access the Internet.
- 8. Power cycle the Conduit (disconnect and then reconnect the power supply), so it gets an IP
- Address from the router and checks into DeviceHQ. Wait 2 minutes for the device to complete this process before going to Step 9.
- 9. In an Internet browser, go to www.devicehg.com and log in. Click Devices, then click on your device listing (not the check box for the device). A pop-up window opens showing device details. The new IP Address the Conduit acquired via WAN appears under Ethernet. Record the new IP address.
- 10. Open a new browser tab and enter the new IP address to access the Conduit's interface.

# .II MultiConnect® MTCDT. PPP

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DNS

# Preparing the mDot Box



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## Using IBM Cloud

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### **Next Steps**

## Mbed

## **Need Help?**







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Account Info

#### To get started with the mDot Box:

1. Attach a LoRa antenna to antenna connector on the mDot Box and finger-tighten.

2. Remove the battery cover on the back of the mDot Box. Remove the protective cap from a 9-volt battery included in the starter kit and connect the battery to the mDot Box's 9-volt connector. Put the battery in the bat-

- tery slot and replace the cover
- Note: Battery life is limited. Power off device when not in use.
- 3. Power up mDot Box by sliding the switch on the left side.
- 4. Select your region based on your channel plan. Press SW2 to scroll through the options and press SW1 to select. The device performs a GPS detect, which may take a few minutes.
- When **Select Mode** appears, the selection arrow (=>) indicates **LoRa Demo** by 5. default. Press SW1 to select.
- 6. Press SW2 for Interval. This periodically sends sensor data to the Conduit.

By default the mDot Box sends data across the LoRa network every 10 seconds. To change the Interval, press SW1.

The screen displays the sensor data. For more information on the mDot Box, refer to the enclosed mDot Box Quick Start or go to http://www.multitech.net/developer/software/dot-box-andevb-software/

Sending	Data	to	the	IBM	Cloud

Note: For secure data submission, create an IBM account and sign in. When not logged in, data submitted to the IBM Quickstart page is not private and can be accessed by any party possessing your Conduit's machine address.

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- To send data from the mDot Box to the Cloud:
- 1. On your computer, use a web browser to go to <a href="https://quickstart.internetofthings.ibmcloud.com/">https://quickstart.internetofthings.ibmcloud.com/</a>
- 2. Check to accept IBM's Terms of Use.
- 3. Find the Conduit's NODE ID, which is on the product label on the bottom.
- NODE ID is formatted as: 00:08:00:XX:XX:XX.
- 4. On the IBM Quickstart page, enter the Conduit's NODE ID in the Device ID field, using hyphens instead of the colons, for example 00-08-00-4A-01-3E.
- 5. Click Go. After a short delay, your data appears in the graphs.

Click on datapoint fields (temperature, light, etc.) below the chart to view corresponding charts. Creating an IBM Cloud account allows you to create a personalized application with safe data stor-

An IBM Cloud account also gives you access to a variety of data storage and analytic tools. After creating an account on IBM Cloud for data storage, access the Conduit's Node-RED application and create a new output node to send data to your IBM Cloud account. Learn more about using Node-RED on the Conduit: www.multitech.net/developer/wp-content/uploads/2015/08/ DeviceHQ Dev User Guide.pdf.



Developer resources and product documentation for the Starter Kit products are available at www.multitech.net.

- Developer forums are available at http://www.multitech.net/developer/forums
- Video demonstrations are available at:
  - LoRa videos: <u>https://www.youtube.com/results?search\_query=MultiTech+MultiConnect%C2%AE+mDot</u>
  - mDot & xDot: <u>https://www.youtube.com/watch?v=w9ixiSduqxo</u>
  - Conduit install: https://www.youtube.com/watch?v=H18pVF8gIaY
  - mDot Box: https://www.youtube.com/watch?v=r7ez4pd9N2c

Cloud platform recipes for our Conduit service solution partners are available at: <u>https://www.multitech.com/landing-pages/starter-kit</u>

ARM<sup>®</sup> Mbed<sup>™</sup> is a free, open-source platform and operating system for embedded devices using the ARM Cortex-M microcontrollers. The Mbed website provides free software libraries, hardware designs, and online tools for rapid prototyping of products. The platform includes a standards-based C/C++ SDK, a microcontroller HDK, and supported development boards, an online compiler and online developer collaboration tools.

- MultiConnect mDot and Developer Kits: <u>https://developer.mbed.org/platforms/MTS-mdot-f411/</u>
- MultiConnect xDot and Developer Kit: <u>https://os.mbed.com/platforms/MTS-xDot-L151CC/</u>
- MultiConnect mDot Box: https://developer.mbed.org/platforms/mdotevb/
- Getting started with Mbed: <u>https://os.mbed.com/getting-started</u>

Our sales engineers focus on Starter Kit support; answering getting started and specific questions. Submit your questions through the Support Portal. To register for a Support Portal account go to: <u>https://support.multitech.com/support/signup.html</u>

If you already have an account, log in at https://support.multitech.com/support



