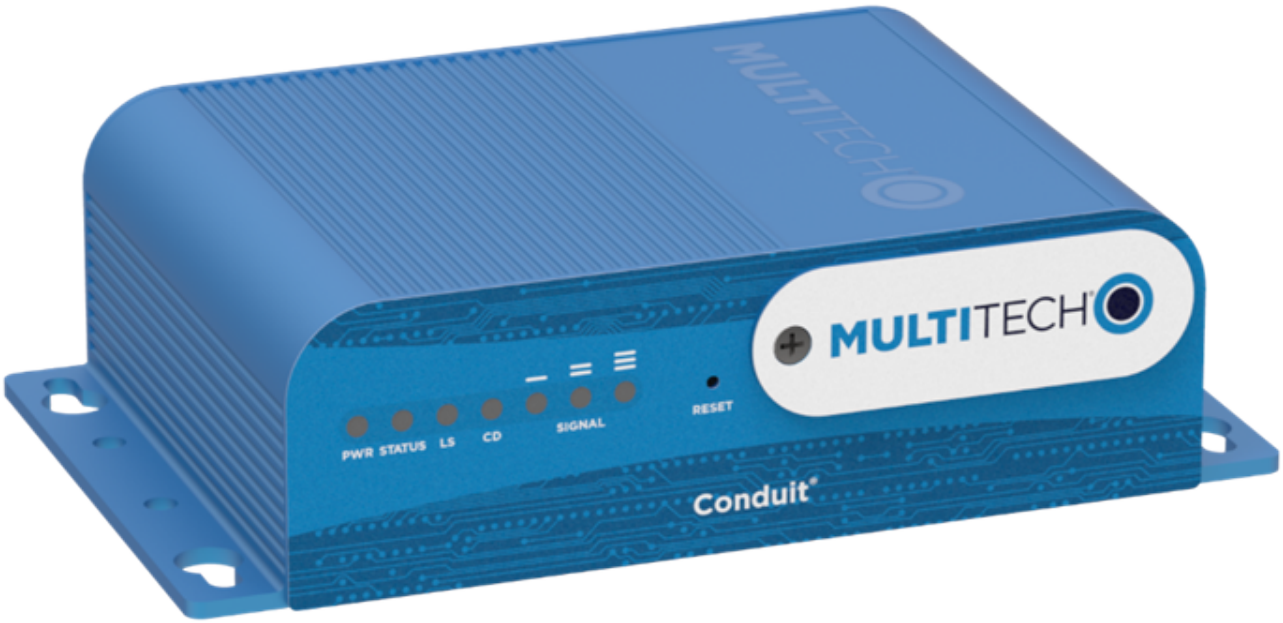


Conduit® Cat 4

MTCDT-L4G1 Hardware Guide

Conduit Hardware Guide Cat 4

Model: MTCDT-L4G1-246, MTCDT-L4G1-247

Part Number: S000787 Rev. 1.7

Copyright

This publication may not be reproduced, in whole or in part, without the specific and express prior written permission signed by an executive officer of Multi-Tech Systems, Inc. All rights reserved. **Copyright © 2023 by Multi-Tech Systems, Inc.**

Multi-Tech Systems, Inc. makes no representations or warranties, whether express, implied or by estoppels, with respect to the content, information, material and recommendations herein and specifically disclaims any implied warranties of merchantability, fitness for any particular purpose and non-infringement.

Multi-Tech Systems, Inc. reserves the right to revise this publication and to make changes from time to time in the content hereof without obligation of Multi-Tech Systems, Inc. to notify any person or organization of such revisions or changes.

Legal Notices

The MultiTech products are not designed, manufactured or intended for use, and should not be used, or sold or re-sold for use, in connection with applications requiring fail-safe performance or in applications where the failure of the products would reasonably be expected to result in personal injury or death, significant property damage, or serious physical or environmental damage. Examples of such use include life support machines or other life preserving medical devices or systems, air traffic control or aircraft navigation or communications systems, control equipment for nuclear facilities, or missile, nuclear, biological or chemical weapons or other military applications ("Restricted Applications"). Use of the products in such Restricted Applications is at the user's sole risk and liability.

MULTITECH DOES NOT WARRANT THAT THE TRANSMISSION OF DATA BY A PRODUCT OVER A CELLULAR COMMUNICATIONS NETWORK WILL BE UNINTERRUPTED, TIMELY, SECURE OR ERROR FREE, NOR DOES MULTITECH WARRANT ANY CONNECTION OR ACCESSIBILITY TO ANY CELLULAR COMMUNICATIONS NETWORK. MULTITECH WILL HAVE NO LIABILITY FOR ANY LOSSES, DAMAGES, OBLIGATIONS, PENALTIES, DEFICIENCIES, LIABILITIES, COSTS OR EXPENSES (INCLUDING WITHOUT LIMITATION REASONABLE ATTORNEYS FEES) RELATED TO TEMPORARY INABILITY TO ACCESS A CELLULAR COMMUNICATIONS NETWORK USING THE PRODUCTS.

The MultiTech products and the final application of the MultiTech products should be thoroughly tested to ensure the functionality of the MultiTech products as used in the final application. The designer, manufacturer and reseller has the sole responsibility of ensuring that any end user product into which the MultiTech product is integrated operates as intended and meets its requirements or the requirements of its direct or indirect customers. MultiTech has no responsibility whatsoever for the integration, configuration, testing, validation, verification, installation, upgrade, support or maintenance of such end user product, or for any liabilities, damages, costs or expenses associated therewith, except to the extent agreed upon in a signed written document. To the extent MultiTech provides any comments or suggested changes related to the application of its products, such comments or suggested changes is performed only as a courtesy and without any representation or warranty whatsoever.

Contacting MultiTech

Sales	Support
sales@multitech.com	support@multitech.com
+1 (763) 785-3500	+1 (763) 717-5863

Website

https://www.multitech.com

Knowledge Base

For immediate access to support information and resolutions for MultiTech products, visit https://www.multitech.com/kb.go.

Support Portal

To create an account and submit a support case directly to our technical support team, visit: https://support.multitech.com.

Warranty

To read the warranty statement for your product, visit https://www.multitech.com/legal/warranty.

World Headquarters

Multi-Tech Systems, Inc.

2205 Woodale Drive, Mounds View, MN 55112

USA

Contents

Chapter 1 – Product Overview

Introduction

Conduit® is a programmable gateway that uses an open Linux development environment to enable machine-to-machine (M2M) connectivity using various wireless interfaces. It also provides an online application store for industrial things as a platform for developers to provision and manage their gateway and associated sensors and devices.

Documentation

Document	Description	Part Number
Hardware Guide	This document provides overview, safety and regulatory information, design considerations, schematics, and general hardware information.	S000787
Software Guide	This document provides instructions and information on how to properly configure your device through its user interface.	S000727
API Developer Guide	You can use the Conduit API to manage configurations, poll statistics, and issue commands. Documentation is available on the MultiTech Developer Resources website at: http://www.multitech.net/developer/software/aep/conduit-aep-api/.	N/A
Quectel AT Commands Reference Guide	Lists AT Commands and parameters used to configure your device. For EC25, EC21, & EG25G (Applies to L4G1 - Cat 4 devices)	N/A

Product Kit Contents

Your Product Kit typically includes the following (varies with model):

Device	1 - MTCDT-Conduit
Power Supply	1 - 100-240V 9V-1.7A power supply with removable blades
	1 - NAM blade/plug
	1 - EURO blade/plug
	1 - UK blade/plug
	1 - AU/NZ blade/plug
Cables	1 - DC Power Cable
	1 - Micro USB Cable
	1 - Ethernet Cable RJ45 6-ft.
Antennas	2 - LTE SMA (for Conduit LTE only), 1 - GPS antenna, 1-LoRa Antenna, and 1 - Wi-Fi/Bluetooth antenna (varies with model)
Customer Notices	Quick Start
	Registration Card
Feet	4 - Clear Adhesive Feet

Product Build Options

Product	Description	Region
MTCDT-L4G1-246A-868-WW	LTE Cat 4 mPower Programmable Gateway 8-channel, 868 MHz, GNSS w/MTAC-LORA-H-868 mCard and Accessory Kit #2	Europe
MTCDT-L4G1-246A-915-WW	LTE Cat 4 mPower Programmable Gateway 8-channel, 915 MHz, GNSS w/MTAC-LORA-H-915 mCard and Accessory Kit #4	North America / Australia / Japan
MTCDT-L4G1-246A-WW	LTE Cat 4 mPower Programmable Gateway, GNSS and Accessory Kit #6 (Global)	Global
MTCDT-L4G1-246L-868-WW	LTE Cat 4 mLinux Programmable Gateway 8-channel, 868 MHz, GNSS w/MTAC-LORA-H-868 mCard and Accessory Kit #2	Europe

Product	Description	Region
MTCDT-L4G1-246L-915-WW	LTE Cat 4 mLinux Programmable Gateway 8-channel, 915 MHz, GNSS w/MTAC-LORA-H-915 mCard and Accessory Kit #4	North America / Australia / Japan
MTCDT-L4G1-246L-WW	LTE Cat 4 mLinux Programmable Gateway, GNSS and Accessory Kit #6 (Global)	Global
MTCDT-L4G1-247A-868-WW	LTE Cat 4 mPower Programmable Gateway 8-channel, 868 MHz, GNSS+WiFi/BT w/MTAC-LORA-H-868 mCard and Accessory Kit #1	Europe
MTCDT-L4G1-247A-915-WW	LTE Cat 4 mPower Programmable Gateway 8-channel, 915 MHz, GNSS+WiFi/BT w/MTAC-LORA-H-915 mCard and Accessory Kit #3	North America / Australia / Japan
MTCDT-L4G1-247A-WW	LTE Cat 4 mPower Programmable Gateway, GNSS+WiFi/BT and Accessory Kit #5 (Global)	Global
MTCDT-L4G1-247L-868-WW	LTE Cat 4 mLinux Programmable Gateway 8-channel, 868 MHz, GNSS+WiFi/BT w/MTAC-LORA-H-868 mCard and Accessory Kit #1	Europe
MTCDT-L4G1-247L-915-WW	LTE Cat 4 mLinux Programmable Gateway 8-channel, 915 MHz, GNSS+WiFi/BT w/MTAC-LORA-H-915 mCard and Accessory Kit #3	North America / Australia / Japan
MTCDT-L4G1-247L-WW	LTE Cat 4 mLinux Programmable Gateway, GNSS+WiFi/BT and Accessory Kit #5 (Global)	Global

Chapter 2 – Specifications

MTCDT-L4G1 Specifications

Category	Description
General	
Performance	3GPP Rel. 11 LTE
	UMTS/HSPA+
	GSM/GPRS/EDGE
	USB Interface is CDC-ACM compliant
TCP/IP Functions	FTP, SMTP, SSL, TCP, UDP
	LTE FDD: B1/B2/B3/B4/B5/B7/B8/B12/B13/B18/ B19/B20/B25/B26/B28
Frequency Bands (MHz)	LTE TDD: B38/B39/B40/B41
	WCDMA: B1/B2/B4/B5/B6/B8/B19
	GSM: B2/B3/B5/B8
Speed	
Data Speed	LTE FDD: Max 150 Mbps (DL)/Max 50 Mbps (UL)
	LTE TDD: Max 130 Mbps (DL)/Max 35 Mbps (UL)
	UMTS: DC-HSDPA: Max 42 Mbps (DL)
	UMTS: HSUPA: Max 5.76 Mbps (UL)
	UMTS: WCDMA: Max 384 Kbps (DL)/Max 384 Kbps (UL)
	GSM: EDGE: Max 296 Kbps (DL)/Max 236.8 Kbps (UL)
	GSM: GPRS: Max 107 Kbps (DL)/Max 85.6 Kbps (UL)
Physical Description	
Dimensions	See the drawing in *Dimensions*.
Weight	15.6 oz. (442.25 grams) with no accessory cards installed
Connectors	

Category	Description
Connectors	1 USB device micro Type B debug port
	1 RJ-45 Ethernet port
	1 USB 2.0 port
	2 cellular antenna connectors
	1 Wi-Fi/Bluetooth connector (varies with model)
	1 GPS antenna connector
	1 micro SD card slot
	1 Mini SIM 2FF card slot
	2 MTAC Accessory Card slots, and if populated with LoRa card(s), 1 or 2 LoRa (RF) Antenna connectors (varies with model)
Power Requirements	
Input Voltage	9-32 Volts[2]
Power Draw	See Conduit Power Draw
Environment	
Operating Environment	-30° to +70° C [1]
Storage Environment	-40° to +85° C
Relative Humidity	20 to 90% non-condensing
Certifications[3]	
Country Approval	FCC/ IC/ RED (EU)/ RCM (AU)/ KCC (Korea)/ Radio Law (Japan)
Radio & EMC Compliance	FCC Part 15 Class B/IC Class B
	CE Mark, RED (EU)
	EN 55022:2010
	EN 301 489
	KCC
	Radio Law (Japan)
Safety Compliance	UL 60950-1 2nd Ed.
	IEC60950-1(EU)
Telecom Approvals	AT&T / Verizon[4]

[1]UL Listed @ 40° C, limited by AC power supply. UL Recognized @ 65° C when used with DC power cable. UL Certification does not apply or extend to use in outdoor applications.

[2]Optional power must be UL Listed ITE power supply marked LPS or Class 2 rated with rating between 9 -32 Vdc minimum of 1A .

[3]Certification does not apply or extend to voltages outside certified range, and has not been evaluated by UL for operating voltages beyond tested range.

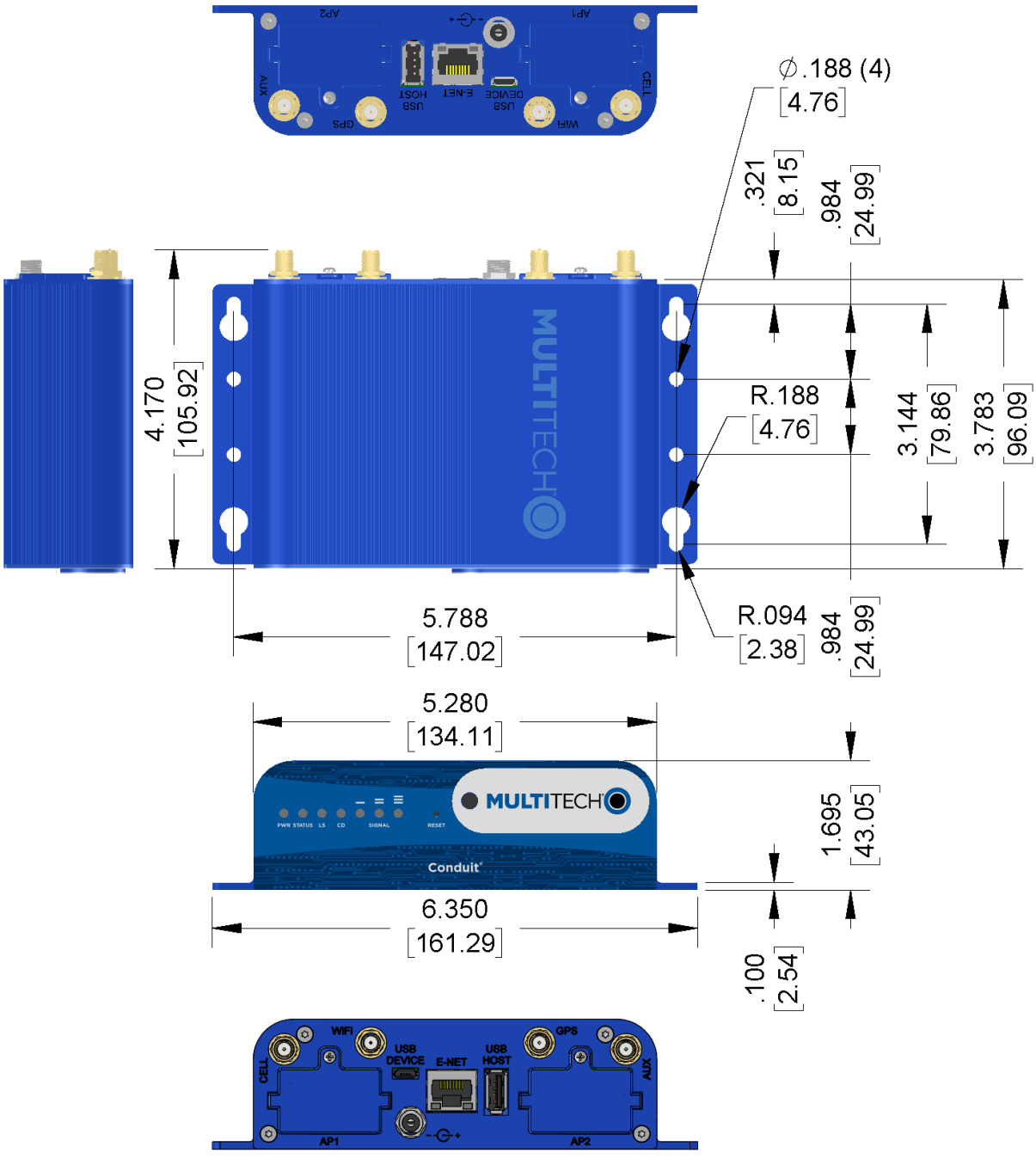
[4]Via carrier approved MTQ-L4G1-B02.

LoRa Specifications

Depending on the model, your device has one or two LoRa radios. If the model number includes -868/2 or -915/2, the device has two LoRa radios.

Category	Description
General	
Standards	LoRaWAN 1.0.3 specifications
Radio Frequency	915/868 MHz ISM (varies with model)
Certifications and Compliance	
EMC and Radio Compliance	FCC Part 15b
	FCC Part 15c
	ICES-003:2020
	RSS 247 Issue 1:2015
Safety Compliance	IEC 62368-1:2014 2nd Ed.
	EN 60950-1 Am.2:2013
	RSS-102 Issue 5:2015

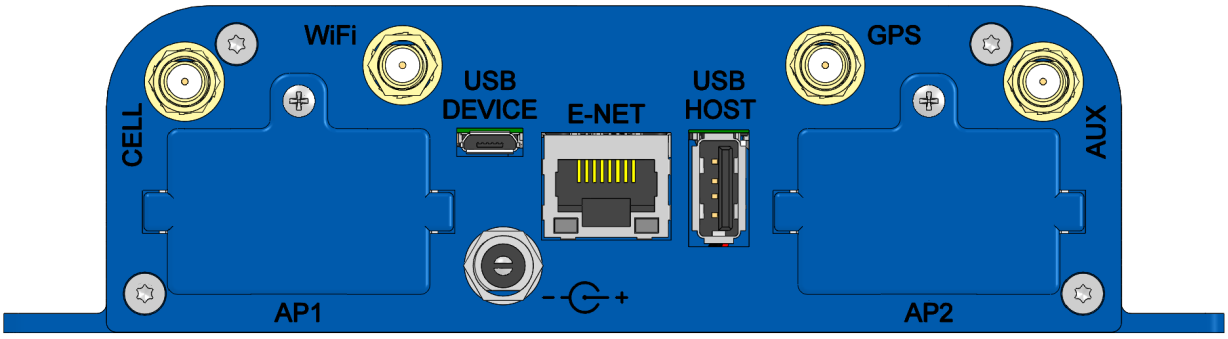
Dimensions



DIMENSIONS IN In [mm]

Backpanel Connectors

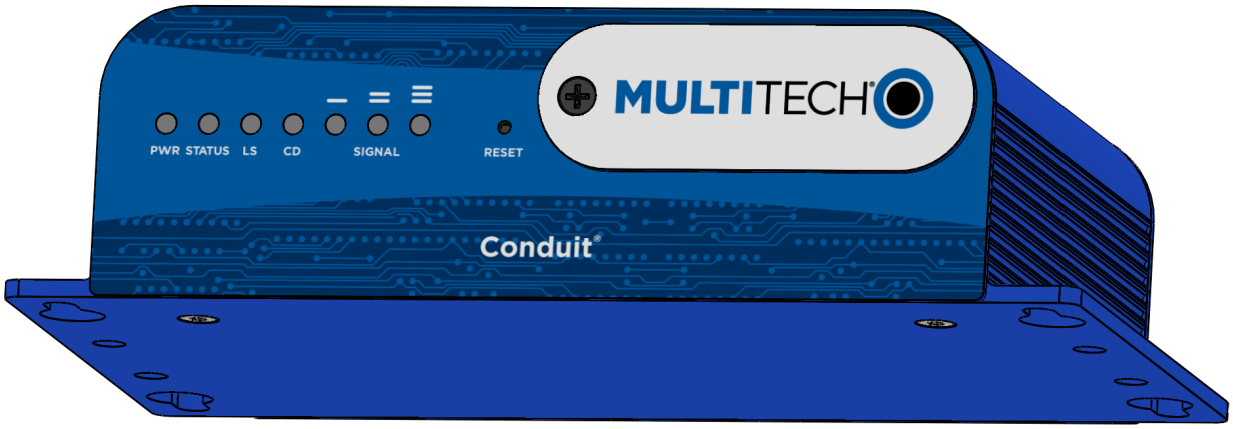
Label	Description
CELL, AUX	Cellular antenna inputs. ■ CELL - Primary. ■ AUX - Diversity.
AP1, AP2	Slots for MultiTech accessory cards. You can install an accessory card in either slot. Both slots can be occupied at one time. An exception is an SDIO (Secure Digital Input/Output) card, which can be used only in the AP1 slot. Your device may ship with one or more accessory cards pre-installed.
USB DEVICE	User-defined, high-speed 480 Mbps, standard USB 2.0 Micro B connector. Use this port to connect the Conduit to a computer or another device. By default, this port is a serial port terminal interface, but you can program it to act as another device such as a mass storage device or an Ethernet port.
E-NET	RJ-45 receptacle for standard Ethernet 10/100 Base-T.
	Caution: Ethernet ports and command ports are not designed to be connected to a public telecommunication network or used outside the building or campus.
USB HOST	High-speed, standard USB 2.0 Type A connector. 500mA maximum current draw. You can plug into the Host port a device such as a flash drive, camera, or printer if the Linux kernel has the appropriate driver.
Power 	9-32 Vdc power receptacle for provided power cord.
GPS	GPS antenna input. (Availability based on model.)
WIFI	Wi-Fi antenna input for 2.4/5.0 GHz antenna. (Availability based on model.)



LED Descriptions

Conduit mLinux Model Front Panel

Conduit mPower Model Front Panel



Label	Name	Description
PWR	Power	Solid (constant) green if unit is on indicating that DC power is present.
STATUS	Power Status	Default condition: LED blinks when mLinux is fully loaded.
LS	Link Status	Varies with radio model.
A-B-C-D	--	These 4 LEDs are user-specified. Present on the Conduit mLinux model only.
CD	Carrier Detect	This LED is on when a cellular data connection is made. Present on the Conduit mPower model only.

Label	Name	Description
Signal	Signal Strength	These 3 LEDs display the strength of the cellular signal. Present on the Conduit mPower model only.

If a cellular radio is installed, the typical LS (Link Status) LED behavior is the following:

- OFF - No power to the cellular radio
- Continuously Lit - Not registered
- Slow Blink (-0.2Hz) - Registered or connected

On the back of the Conduit, the RJ-45 Ethernet LEDs (located at the bottom of the connector) are defined as follows:

- Orange LED (lower-left) indicated activity/link. Blinks when there is transmit and receive on the Ethernet link. It shows a steady light when there is a valid Ethernet connection.
- Green LED (lower-right) indicates link speed. Lit when Ethernet is linked at 100Mbps. If not lit, Ethernet is linked at 10 Mbps.

Power Draw

MTCDT-L4G1 with Modem and an MTAC-LORA-H-915 Accessory Card

Radio Protocol	Cellular Call Box Connection No Data (mA)	Average Measured Current at Max Power (A)[1]	TX Pulse (Avg) Amplitude Current (A)[2]	Total Inrush Charge Measured in MilliCoulombs (mC)[3]	Total Inrush Charge DURATION during Powerup (Inrush Duration) (ms)
9.0 Volts					
WCDMA 1854 Mhz WS46=22	623	1.11	1.22	4.43	9.43
LTE freq Band 1 1950 Mhz	700	1.25	1.37	4.43	9.43
12.0 Volts					
WCDMA 1854 Mhz WS46=22	490	0.914	1.0	5.12	7.62
LTE freq Band 1 1950 Mhz	491	0.952	1.03	5.12	7.62
24.0 volts					
WCDMA 1854 Mhz WS46=22	273	0.488	0.572	4.09	7.43
LTE freq Band 1 1950 Mhz	275	0.505	0.588	4.09	7.43

[1]**Max Power:** The continuous current during maximum data rate with the radio transmitter at maximum power.

[2]**Tx Pulse:** The average peak current during a GSM850 transmission burst period or HSDPA connection. The transmission burst duration for GSM850 can vary, depending on what transmission scheme is being deployed (GPRS Class 8, Class 10, GSM, etc.).

[3]**Total Inrush Charge**: The total inrush charge at power on expressed in Millicoulombs (mC).

Note:

Multi-Tech Systems, Inc. recommends that you incorporate a 10% buffer into the power source when determining product load.

Chapter 3 – Antenna Information

Cellular Antenna

Cellular devices were approved with the following antenna:

Manufacturer:	Wieson
Description:	LTE GY115HT467-017
Model Number:	11320Y11194A1

MultiTech ordering information:

Model	Quantity
ANLTE2-2HRA	1
ANLTE2-10HRA	10
ANLTE2-50HRA	50

Cellular Antenna Specifications

Category	Description
Frequency Range	.069~0.96GHz, 1.71~2.17GHz, 2.3GHz~2.69GHz
Impedance	50 Ohms
VSWR	VSWR should not exceed 3:1 at any point across the bands of operation
Peak Gain	3.8 dBi
Radiation	Omni-directional
Polarization	Linear Vertical

Bluetooth and Wi-Fi Antennas

Manufacturer:	Taoglas Antenna Solutions
Manufacturer's Model Number:	GW.71.5153

Multi-Tech Ordering Information

Model Number	Quantity
ANWF2-1HRA	1
ANWF2-10HRA	10
ANWF2-50HRA	50

Antenna Specifications

Category	Description
Frequency Range	2.4 ~ 2.5 GHz, 4.9 ~ 5.8 GHz
Impedance	50 Ohms
VSWR	VSWR should not exceed 2.0 at 2.4 GHz, and should not exceed 2.1 at 4.9 GHz at any point across the bands of operation
Peak Radiated Gain	3.8 dBi at 2.4 GHz, and 5.5 dBi at 5GHz on azimuth plane
Radiation	Omni-directional
Polarization	Linear Vertical
Connector	RP-SMA(M)

LoRa Antenna

Manufacturer:	PulseLarsen Antenna
Description:	868-928 MHz RP-SMA Antenna, 8"
Model Number:	W1063

MultiTech ordering information:

Ordering Part Number	Quantity
AN868-915A-1HRA	1
AN868-915A-10HRA	10
AN868-915A-50HRA	50

LoRa Antenna Specifications

Category	Description
Frequency Range	868-928 MHz
Impedance	50 Ohms
VSWR	$\leq$ 2.0
Gain	1.0 dBi
Radiation	Omni
Polarization	Vertical

Chapter 4 – Setting up and Configuring the Device

Installing and Connecting Conduit Hardware

To install and cable the device:

Important: If your device came with a non-fused DC power cable and you want to use it for connecting power, you must do one of the following for installation.

- Connect DC cable to an LPS power supply.
- Connect DC cable to a Class II power supply.
- Connect DC cable to a fused circuit. Fuse rating: 32Vdc @ 3 Amps (Fast-Blow)

1. Install a Mini SIM card.
2. Install a Micro SD card (optional).
3. Install a battery (optional).
4. Connect the supplied antenna(s) to the appropriate connector(s) on the back of the device. Connectors may vary with model.
5. Use the Ethernet connector to connect the Conduit to the device used to administer the Conduit.
6. Install any mCard accessory cards into a slot at the back of the device. Refer to Installing an mCard Accessory Card for instructions.
7. Depending on the accessory card type, attach any antennas or cables for use with the card.
8. Connect the power cord to an outlet or power strip and to the power adapter.
9. Connect the power adapter to the barrel jack on the back panel of the device. The Power LED comes on immediately after power is applied. Wait for the Status LED to begin blinking.

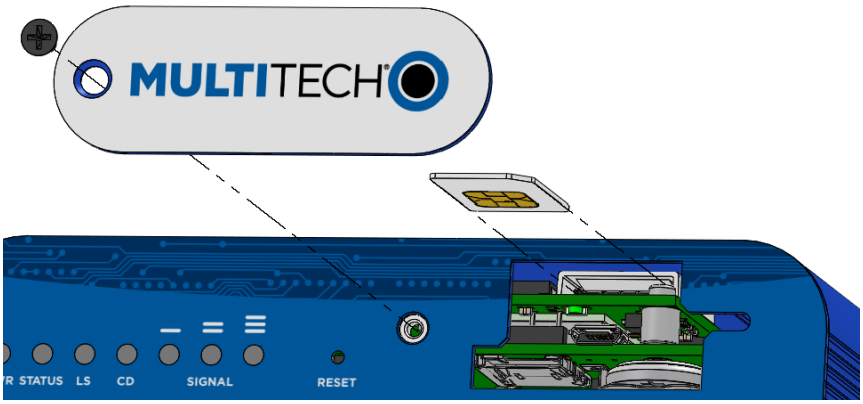
Installing a Mini SIM Card

You need:

- Phillips screwdriver
- Mini SIM card (2FF form factor)

To install or replace the SIM card:

1. Disconnect power to the Conduit, if it is connected.
2. At the front of the Conduit housing, remove the screw that secures the nameplate to the housing and remove the nameplate.
3. Locate the SIM card holder in the upper right corner of the opening. If a SIM card is installed and needs to be removed, slide it out of the SIM card holder.
4. Gently push the new SIM card into SIM card holder face up with the cut corner to the right and the SIM contacts facing toward the Conduit's interior.
5. If not installing a battery or micro SD card, reattach the MultiTech nameplate to the Conduit using the screw removed in Step 2.



Accessory Port (mCard) Interfaces

The accessory card interface on the Conduit base board has the following interface options:

Interface	Description
I2C	Used by all accessory cards. I2C is required for Electronic Identification (EID) support on the accessory card but can be used for other I2C devices. It should supports standard (100 kHz) and/or fast (400 kHz) clock speeds.
	The I2C interface reserves the full block of EEPROM address space for Electronic ID support, so we recommend that you not attach any other EEPROM devices to the interface. We recommend that you use a 24C04 part, because both address bits of the 24C04 are connected to the AP interface allowing you to identify four separate accessory port (AP) cards in a system.
Serial UART	Serial UART with HW flow control used by Serial interface based Accessory Cards
SDIO interface and/or SPI Interface	AP1 has option for SDIO or SPI interface, based on what Accessory Card is installed. AP2 supports only SPI based Accessory Cards.
GPIO	Additional control pins for certain Accessory Cards.
Interrupts	Software defined interrupts. Can also be used as additional control pins.
PPS	GPS generated Pulse-Per-Second signal used for software timing. Default is 1 pulse/sec.
USB 2.0	A standard USB 2.0 High Speed interface for USB based Accessory Cards.
5 VDC 1 Amp supply	Used by all accessory cards.
3.3 VDC 1 Amp supply	Used by all accessory cards.

For accessory card specifications, regulatory content, and installation information, refer to the appropriate product page: www.multitech.com/brands/multiconnect-mcard.

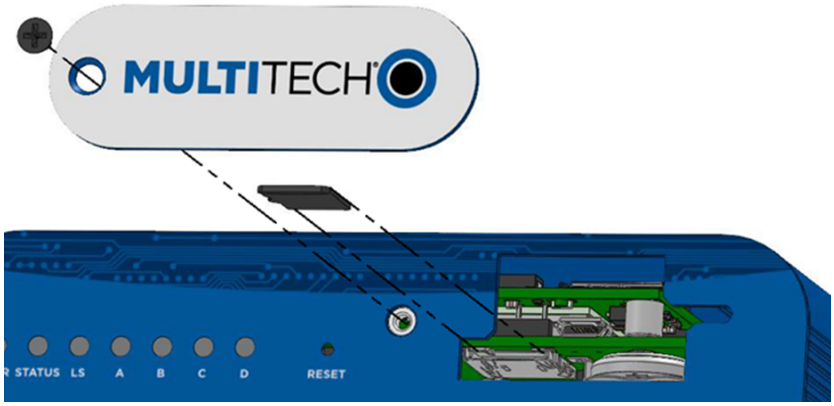
Installing a Micro SD Card

You need:

- Phillips screwdriver
- MicroSD memory card

To install or replace the SD card:

1. Disconnect power to the Conduit, if it is connected.
2. At the front of the Conduit, remove the screw that secures the MultiTech nameplate.
3. Locate the SD card at the left side of the opening on the underside of the PC board.
4. If an SD card is already installed, gently push on the card to release it from its setting and remove it from the housing with your fingers.
5. With the new SD card contacts facing up and toward the interior of the device, gently push the card into the slot to secure it.
6. Reattach the MultiTech nameplate to the housing using the screw removed in step 2.



Installing a Battery

The battery is located in the Conduit housing.

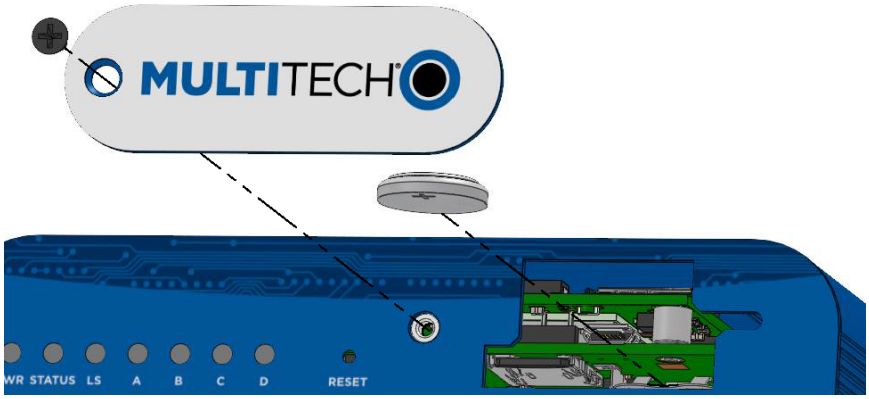
You need:

- Phillips screwdriver
- If replacing a battery, non-metal tweezers or similar object
- CR1632 standard coin lithium battery

To install or replace the battery:

1. If connected, disconnect power to the Conduit.
2. At the front of the Conduit housing, remove the screw that secures the MultiTech nameplate to the housing.

3. The battery holder is located at the right side of the opening on the underside of the PC board. To remove an existing battery, use non-metal tweezers as necessary.
4. Orient the new battery so that the positive (+) pole is facing down. Use your fingers or non-metal tweezers to insert the battery into the holder.
5. Reattach the MultiTech nameplate to the housing using the screw removed in Step 2.



CAUTION: Risk of explosion if this battery is replaced by an incorrect type. Dispose of batteries according to instructions.

Note:

ATTENTION: Risque d'explosion si vous remplacez la batterie par un modèle incompatible. Jetez les piles usagées selon les instructions.

Connecting to the Debug Interface

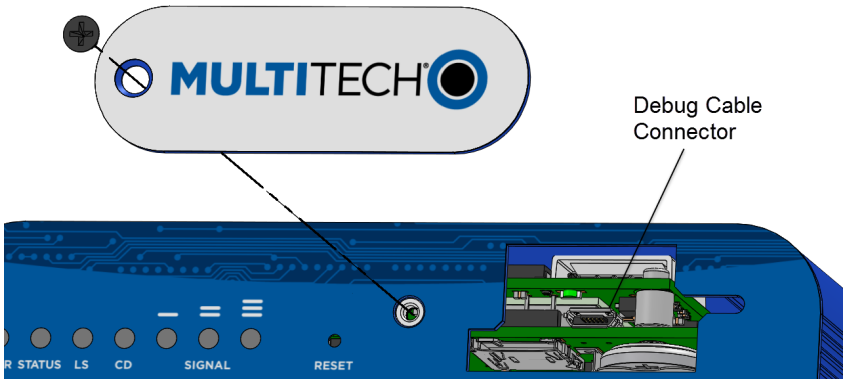
There are two different options for the debug connector: 1) USB Micro B connector or 2) 3-pin connector. Check which debug interface is in your device by using steps 1-3. Once you have the appropriate cable available, proceed with steps 4-7.

NOTE: If you have a 3-pin connector, you must build a cable specifically for your debug interface. See details on how to build the 3-pin cable following these instructions.

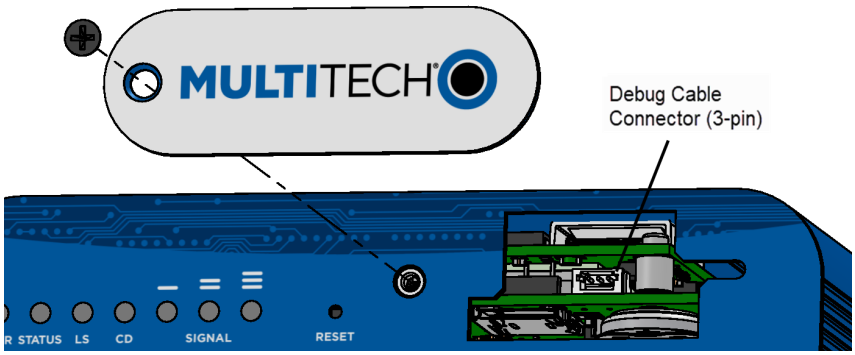
You need:

- Phillips screwdriver
- Standard USB Micro B cable

1. Disconnect power to the Conduit, if it is connected.
2. At the front of the Conduit housing, remove the screw that secures the MultiTech nameplate to the housing.
3. Locate and identify the USB debug cable connector in the center of the opening. Make sure have the appropriate cable available (if you have the 3-pin connector, see cable details below).
4. Connect the appropriate cable to the debug connector.
    a. If you have the USB Micro B connector, connect the USB Micro B cable to the debug connector.



b. If you have the 3-pin connector, connect the 3-pin cable to the debug connector.



5. Connect the Type A end of the USB cable to the host.
6. From the host, use an application such as TeraTerm with a baud rate of 115,200. If the USB driver does not automatically install, do the following:
   a. Unplug the USB cable.
   b. Go to the following web site to download and install the appropriate USB driver: https://www.maxlinear.com/support/design-tools/software-drivers
   c. Plug the USB cable back into the housing.
7. From the host, access the Conduit's USB COM port.

Accessory 3-pin Cable for Debug Interface

The 3-pin Debug Interface cable can be ordered as an accessory from the factory, P/N: 95218134LF, model: CA-MTCDT-DEBUG. Otherwise, you have the option to build it yourself. See details in the following section.

Building the 3-pin Cable

As an alternative to the accessory cable for the 3-pin debug connector, you can build a custom cable to use the debug interface. The resulting cable should have a USB-A connector for the host end and the 3-pin connector on the device end. See tables under the cable and connector information for specific parts and manufacturers that you can use.

You need:

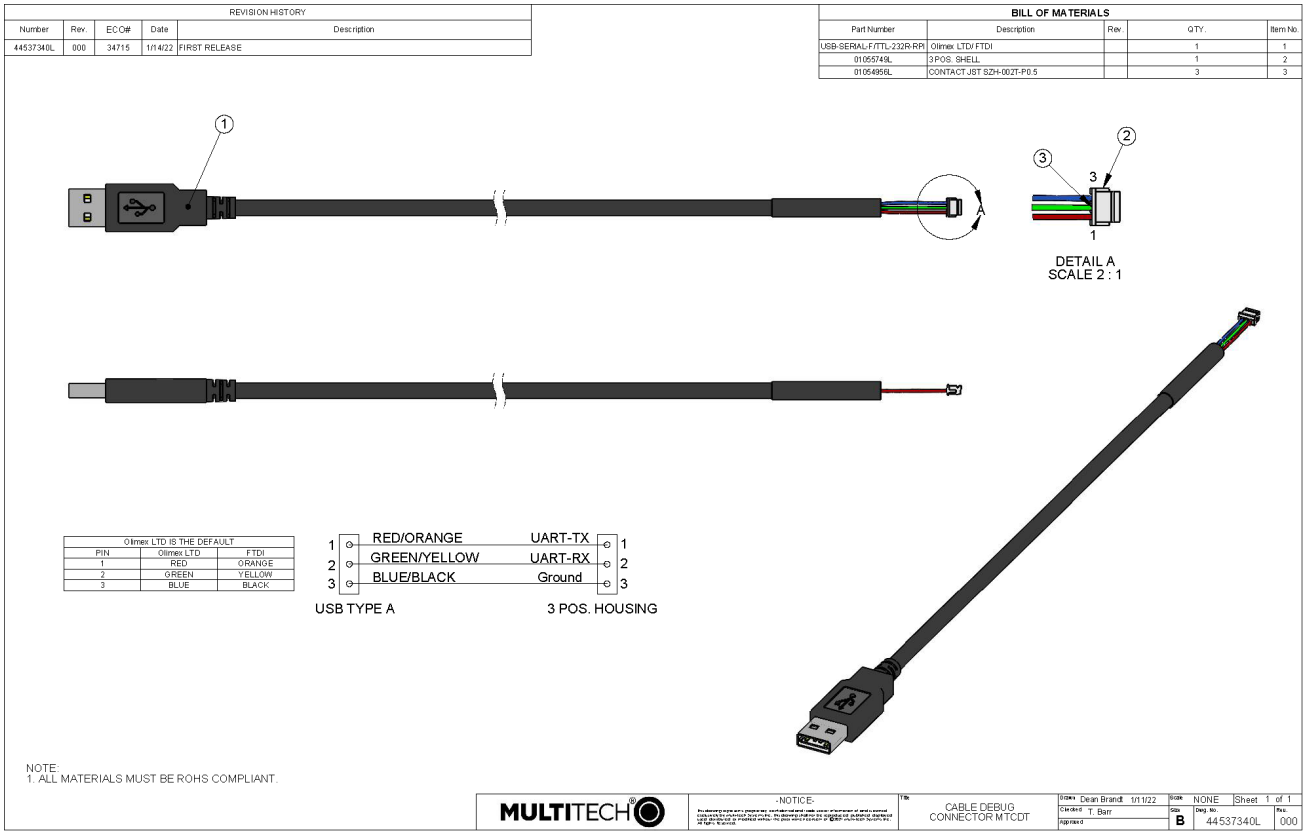
- USB to 3.3V Serial UART cable
- JST-ZHR-3 connector (3-pin connector with crimp-style contacts)
- Custom crimping tool (for use with JST connector only)

1. Purchase a USB to 3.3V Serial UART cable with a USB-A connector for the host end and three leads on the device end. See cable information for details.
2. Purchase a 3-pin connector using crimp-style contacts for the device end of the cable. See connector information for details.
3. Cut the original connectors off the three leads of the device end of the cable.
4. Strip the insulation and crimp the terminals on the wire with a custom crimping tool.
5. Plug the terminals into the connector shell. **Note:** The terminals are very small.

Cable Information

Description	Manufacturer	P/N or Product Number
Olinuxino Serial Console Cable (USB to 3.3V Serial UART cable)	Olimex LTD	USB-SERIAL-F
Debug Cable for Raspberry Pi (USB to 3.3V Serial UART cable)	FTDI	TTL-232R-RPi

Cable Drawing

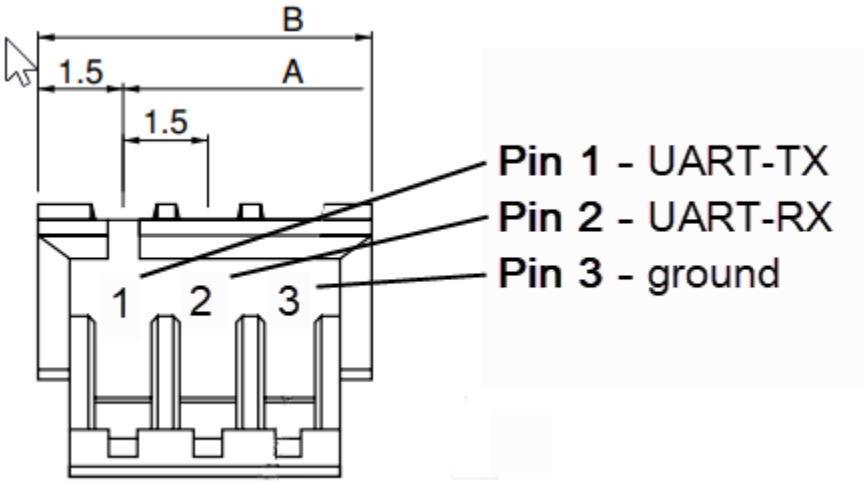


Olimex cable

FTDI Cable

Connector Information

Description	Manufacturer	P/N or Product Number	Contacts
3-pin connector with crimp-style contacts (female socket)	JST	JST-ZHR-3	SZH-002T-P0.5



Restoring User Defined Settings

You need:

- A pin, paperclip, or similar thin object that can fit into the reset hole.

To restore user defined settings for an **mPower device**:

1. Locate the hole in the panel labeled RESET. The reset button is recessed into the housing.
2. Use the pin to press in the button for between 3 to 29 seconds, then release the reset button.
   - If you do not press in the button long enough, the device will reset, but the user defined settings will not be restored.
   - If you hold it too long (30 seconds or longer), factory default settings will be restored.

Note: The RESET button is in the same location on all Conduit models.

Resetting the Device

You need:

- A pin, paperclip, or similar thin object that can fit into the reset hole.

The following is the default condition for the RESET button on the Conduit. You can program a change to the behavior of the button if needed.

To reset the device:

1. Find the hole in the front panel labeled RESET. The reset button is recessed into the case.
2. **For mPower models**: Use the pin to press the RESET button for less than 3 seconds, then release. The device reboots.

For mLinux models: Press and hold the RESET button for less than 5 seconds, then release. Holding it beyond 5 seconds resets an mLinux device to factory defaults.

3. The status LED will keep blinking normally for a couple of seconds until the unit resets. Then the status light will stay solid while the device reboots. Once finished, the status will resume blinking normally.

Powering Up the Device

CAUTION: Use only the power cord provided with the device. Using any other power cord voids the warranty and can damage the device.

To power up the device:

1. Install the desired MultiTech accessory card or cards into the slots at the back of the device. Refer to the appropriate installation documentation for the accessory card.

   Note: Some models already have MTAC cards installed.

2. Connect the power cord to an outlet or power strip and to the power adapter.
3. Connect the power adapter to the barrel jack on the back panel of the device.
4. Verify power.
   - The Power LED comes on immediately after power is applied.
   - The device takes a short time to boot up when you apply power.
5. Connect the device to the controlling device through the Ethernet connector or the USB connector on the back panel.

Chapter 5 – Regulatory & Safety Information

47 CFR Part 15 Regulation Class B Devices

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

Warning: Changes or modifications to this unit not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

FCC Interference Notice

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions:

1. This device may not cause harmful interference, and
2. This device must accept any interference received, including interference that may cause undesired operation.

FCC Notice

The MultiTech Conduit is an open embedded development product. Configurations of this product may optionally contain a sub GHz radio technology which MultiTech has certified for compliance with US and Foreign compliance bodies including FCC, R&TTE and others. (e.g. FCC 15.247:2015 & IC RSS-210:2010).

MultiTech provides software code meant to operate the radio to a level that maintains compliance with the operating modes under which these radio devices were certified. To ensure this level of compliance, the software code is provided in binary form only. Users are prohibited from making any changes that affect the operation of the radio performance. Accessing or controlling the radio through any means other than the provided binary software will require the user to obtain their own intentional radiator license from the certification body governing their locality, as all pre-certification provided withConduit IP67 Series 200 Base Station. Conduit mDot will have been made invalid.

FCC Grant Information

FCC Identifier:	XMR201903EG25G
Equipment Class:	PCS Licensed Transmitter
Notes:	LTE Module
Modular Type:	Single Modular

FCC Rule Parts:	22H, 24E, 27, 90

Rule Parts	Frequency Range	Output Watts	Frequency Tolerance	Emission Designator
22H	824.2 - 848.8	1.8493	0.1 PPM	247KGXW
22H	824.2 - 848.8	0.4797	0.1 PPM	245KG7W
24E	1850.2 - 1909.8	1.3335	0.1 PPM	249KGXW
24E	1850.2 - 1909.8	0.6012	0.1 PPM	249KG7W
24E	1852.4 - 1907.6	0.3524	0.1 PPM	4M15F9W
27	1712.4 - 1752.6	0.3819	0.1 PPM	4M14F9W
22H	826.4 - 846.6	0.2512	0.1 PPM	4M13F9W
24E	1860.0 - 1900.0	0.4198	0.1 PPM	17M9G7D
24E	1860.0 - 1900.0	0.2259	0.1 PPM	17M9W7D
24E	1850.7 - 1909.3	0.2547	0.1 PPM	1M09W7D
27	1720.0 - 1745.0	0.4887	0.1 PPM	17M9G7D
27	1720.0 - 1745.0	0.2612	0.1 PPM	17M9W7D
27	1710.7 - 1754.3	0.2877	0.1 PPM	1M09W7D
22H	829.0 - 844.0	0.2333	0.1 PPM	8M93G7D
22H	829.0 - 844.0	0.1703	0.1 PPM	8M93W7D
22H	825.5 - 847.5	0.235	0.1 PPM	2M70G7D
22H	824.7 - 848.3	0.1936	0.1 PPM	1M09W7D
27	2510.0 - 2560.0	0.4864	0.1 PPM	17M9G7D
27	2510.0 - 2560.0	0.3177	0.1 PPM	17M9W7D
27	2502.5 - 2567.5	0.3192	0.1 PPM	4M49W7D
27	704.0 - 711.0	0.3475	0.1 PPM	8M93G7D
27	704.0 - 711.0	0.2183	0.1 PPM	8M93W7D
27	699.7 - 715.3	0.2472	0.1 PPM	1M09W7D
27	782.0 - 782.0	0.4217	0.1 PPM	8M91G7D
27	782.0 - 782.0	0.2911	0.1 PPM	8M91W7D
27	779.5 - 784.5	0.4395	0.1 PPM	4M48G7D
27	779.5 - 784.5	0.309	0.1 PPM	4M49W7D
24E	1860.0 - 1905.0	0.3516	0.1 PPM	17M9G7D
24E	1860.0 - 1905.0	0.2489	0.1 PPM	17M9W7D
24E	1855.0 - 1910.0	0.4111	0.1 PPM	8M91G7D
24E	1850.7 - 1914.3	0.2429	0.1 PPM	1M09W7D
90	819.0 - 819.0	0.2198	0.1 PPM	8M91G7D

Rule Parts	Frequency Range	Output Watts	Frequency Tolerance	Emission Designator
90	819.0 - 819.0	0.1738	0.1 PPM	8M91W7D
90	814.7 - 823.3	0.2455	0.1 PPM	1M09G7D
90	814.7 - 823.3	0.1972	0.1 PPM	1M09W7D
22H	831.5 - 841.5	0.2582	0.1 PPM	13M5G7D
22H	831.5 - 841.5	0.1828	0.1 PPM	13M4W7D
22H	826.5 - 846.5	0.1945	0.1 PPM	4M49W7D
27	2580.0 - 2610.0	0.3926	0.1 PPM	17M8G7D
27	2580.0 - 2610.0	0.2799	0.1 PPM	17M8W7D
27	2575.0 - 2615.0	0.3936	0.1 PPM	8M91G7D
27	2506.0 - 2680.0	0.4842	0.1 PPM	17M9G7D
27	2506.0 - 2680.0	0.342	0.1 PPM	17M9W7D
27	2501.0 - 2685.0	0.4853	0.1 PPM	8M91G7D
27	2498.5 - 2687.5	0.3451	0.1 PPM	4M50W7D

Single Modular Approval. Power listed is ERP for part 22 and part 27 below 1 GHz, EIRP for part 24 and part 27 above 1 GHz. Approval is limited to OEM installation only. Compliance of this device in all final host configurations is the responsibility of the Grantee. This device is to be used only for mobile and fixed applications. OEM integrators must be provided labeling requirements for finished products. This grant is valid only when the device is sold to OEM integrators and the OEM integrators are instructed to ensure that the end user has no manual instructions to remove or install the device. Separate approval is required for all other operating configurations, including portable configurations with respect to 2.1093 and different antenna configurations. The module antenna(s) must be installed to meet the RF exposure compliance separation distance of 20 cm and any additional testing and authorization process as required. Co-location of this module with other transmitters that operate simultaneously are required to be evaluated using the FCC multi-transmitter procedures. The antenna installation and operating configurations of this transmitter, including any applicable source-based time-averaging duty factor, antenna gain, and cable loss must satisfy MPE categorical Exclusion Requirements of Part 2.1091. Users must be provided with instructions and transmitter operating conditions for satisfying RF exposure compliance. RF exposure compliance may need to be addressed at the time of licensing, as required by the responsible FCC bureau(s), including antenna co-location requirements of Part 1.1307(b)(3). This module can only be used with a host antenna circuit trace layout design in strict compliance with the OEM instructions provided. This device supports: LTE of 1.4, 3, 5, 10, 15, and 20MHz bandwidth modes for LTE Band 2, 4 and 25; and LTE of 1.4 , 3, 5 and 10MHz bandwidth modes for LTE Band 5,12 and 26 (814-824MHz),LTE of 5, 10, 15 and 20MHz bandwidth modes for LTE Band 7, 38 and 41; LTE of 5 and 10 MHz bandwidth modes for LTE Band 13; LTE of 1.4, 3, 5,10 and 15MHz bandwidth mode for LTE Band 26(824-849MHz).

The allowed maximum antenna gain including cable loss in a mobile-only exposure condition must not exceed: 8dBi in WCDMA Band 2/LTE Band 2/7/25/38/41; 5dBi in WCDMA /LTE Band 4, and 8.6dBi in GSM850;10.19dBi in PCS1900; 9.42dBi in WCDMA Band 5; 9.41dBi in LTE Band 5; 8.7dBi in LTE Band 12; 9.16dBi in LTE Band 13; 9.36dBi in LTE Band 26(814-824); 9.41dBi in LTE Band 26(824-849).

This device contains functions that are not operational in U.S. Territories. This filing is only applicable for U.S. operations.

Industry Canada Class B Notice

This Class B digital apparatus meets all requirements of the Canadian Interference-Causing Equipment Regulations.

Cet appareil numérique de la classe B respecte toutes les exigences du Reglement Canadien sur le matériel brouilleur.

This device complies with Industry Canada license-exempt RSS standard(s). The operation is permitted for the following two conditions:

1. the device may not cause interference, and
2. this device must accept any interference, including interference that may cause undesired operation of the device.

Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes:

1. l'appareil ne doit pas produire de brouillage, et
2. l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

Industry Canada Grant Information

Company Number/Numéro de compagnie:	10224A
Company Name/Nom de compagnie::	Quectel Wireless Solutions Co.,Ltd
Certification Number/Numéro d'homologation:	10224A-201903EG25G
Approval Date/Date d'approbation:	Wed Apr 03 00:00:00 EDT 2019
Hardware Version Identification Number (HVIN)/Numéro d'identification de la version du matériel (NIVM):	EG25-G
Product Marketing Name (PMN)/Nom de marque du produit (NMP):	Quectel EG25-G
Equipment Description/Description de l'équipement:	LTE Module
Type of Radio Equipment/Genre d'équipement radio:	PCS Mobile (1850-1910 MHz)
	Cellular Telephones Employing New Technologies (824-849 MHz)
	Broadband Radio Service (2500-2690 MHz)
	Mobile Broadband Service (MBS) Equipment (698-756/777-787 MHz)
	Advanced Wireless Services Equipment (1710-1780 MHz and 2110-2180 MHz)
	Modular Approval
	Cellular Mobile GSM (824-849 MHz)

RF Exposure Results/Résultats d'exposition humaine aux RF

Type	Value/Valeur	Compliance Distance/Distance de conformité
RF	5.6 W/m2	200 mm

Specification/Cahiers des charges	Issue Number/Numéro de la version	Frequency Range/Gamme de fréquence		Emission Designator/Désignatif d'émission	Power/Puissance		Field Strength/Intensité de champ	Dist.
RSS132	3	From/De	To/À	Min.	Max.			
RSS132	3	825.5 MHz	847.5 MHz	2M69W7D--	137.0 mW	170.0 mW	--	--
RSS132	3	829.0 MHz	844.0 MHz	8M93W7D--	139.0 mW	170.0 mW	--	--
RSS132	3	824.7 MHz	848.3 MHz	1M09W7D--	139.0 mW	194.0 mW	--	--
RSS132	3	826.5 MHz	846.5 MHz	4M49W7D--	145.0 mW	195.0 mW	--	--
RSS132	3	831.5 MHz	841.5 MHz	13M4W7D--	150.0 mW	183.0 mW	--	--
RSS130	2	829.0 MHz	844.0 MHz	8M93G7D--	175.0 mW	233.0 mW	--	--
RSS130	2	699.7 MHz	715.3 MHz	1M09W7D--	175.0 mW	247.0 mW	--	--
RSS133	6	704.0 MHz	711.0 MHz	8M93W7D--	178.0 mW	218.0 mW	--	--
RSS133	6	1850.7 MHz	1909.3 MHz	1M09W7D--	180.0 mW	255.0 mW	--	--
RSS132	3	1860.0 MHz	1905.0 MHz	17M9W7D--	183.0 mW	249.0 mW	--	--
RSS133	6	831.5 MHz	841.5 MHz	13M5G7D--	186.0 mW	258.0 mW	--	--
RSS133	6	1860.0 MHz	1900.0 MHz	17M9W7D--	187.0 mW	226.0 mW	--	--
RSS133	6	1850.7 MHz	1914.3 MHz	1M09W7D--	196.0 mW	273.0 mW	--	--
RSS133	6	1855.0 MHz	1910.0 MHz	8M91G7D--	198.0 mW	411.0 mW	--	--
RSS139	3	1860.0 MHz	1905.0 MHz	17M9G7D--	203.0 mW	352.0 mW	--	--

Specification/Cahiers des charges	Issue Number/Numéro de la version	Frequency Range/Gamme de fréquence		Emission Designator /Désignatif d'émission	Power/Puissance		Field Strength/Intensité de champ	Dist.
RSS132	3	From/De	To/À	Min.	Max.			
RSS139	3	1720.0 MHz	1745.0 MHz	17M9W7D--	208.0 mW	377.0 mW	--	--
RSS199	3	1710.7 MHz	1754.3 MHz	1M09W7D--	212.0 mW	288.0 mW	--	--
RSS133	6	2580.0 MHz	2610.0 MHz	17M8W7D--	215.0 mW	280.0 mW	--	--
RSS130	2	1860.0 MHz	1900.0 MHz	17M9G7D--	218.0 mW	420.0 mW	--	--
RSS130	2	704.0 MHz	711.0 MHz	8M93G7D--	224.0 mW	348.0 mW	--	--
RSS199	3	779.5 MHz	784.5 MHz	4M49W7D--	230.0 mW	309.0 mW	--	--
RSS130	2	2502.5 MHz	2567.5 MHz	4M49W7D--	238.0 mW	319.0 mW	--	--
RSS132	3	782.0 MHz	782.0 MHz	8M91W7D--	244.0 mW	291.0 mW	--	--
RSS199	3	826.4 MHz	846.6 MHz	4M13F9W--	246.0 mW	251.0 mW	--	--
RSS139	3	2510.0 MHz	2560.0 MHz	17M9W7D--	254.0 mW	318.0 mW	--	--
RSS199	3	1720.0 MHz	1745.0 MHz	17M9G7D--	262.0 mW	489.0 mW	--	--
RSS199	3	2575.0 MHz	2615.0 MHz	8M91G7D--	273.0 mW	394.0 mW	--	--
RSS199	3	2580.0 MHz	2610.0 MHz	17M8G7D--	274.0 mW	393.0 mW	--	--
RSS130	2	2510.0 MHz	2680.0 MHz	17M9W7D--	278.0 mW	348.0 mW	--	--
RSS130	2	782.0 MHz	782.0 MHz	8M91G7D--	302.0 mW	422.0 mW	--	--
RSS199	3	779.5 MHz	784.5 MHz	4M48G7D--	303.0 mW	440.0 mW	--	--
RSS133	6	2510.0 MHz	2560.0 MHz	17M9G7D--	313.0 mW	486.0 mW	--	--
RSS199	3	1852.4 MHz	1907.6 MHz	4M15F9W--	343.0 mW	352.0 mW	--	--

Specification/Cahiers des charges	Issue Number/Numéro de la version	Frequency Range/Gamme de fréquence		Emission Designator /Désignatif d'émission	Power/Puissance		Field Strength/Intensité de champ	Dist.
RSS132	3	From/De	To/À	Min.	Max.			
RSS139	3	2510.0 MHz	2680.0 MHz	17M9G7D--	349.0 mW	488.0 mW	--	--
RSS132	3	1712.4 MHz	1752.6 MHz	4M14F9W--	366.0 mW	382.0 mW	--	--
RSS133	6	824.2 MHz	848.8 MHz	245KG7W--	462.0 mW	480.0 mW	--	--
RSS133	6	1850.2 MHz	1909.8 MHz	249KG7W--	532.0 mW	601.0 mW	--	--
RSS132	3	1850.2 MHz	1909.8 MHz	249KGXW--	1194.0 mW	1334.0 mW	--	--
		824.2 MHz	848.8 MHz	247KGXW--	1714.0 mW	1849.0 mW	--	--

EMC, Safety, and Radio Equipment Directive (RED) Compliance

CE

The CE mark is affixed to this product to confirm compliance with the following European Community Directives:

> Council Directive 2011/65/EU on the restriction of the use of certain hazardous substances in electrical and electronic equipment;
> and
> Council Directive 2014/53/EU on radio equipment and telecommunications terminal equipment and the mutual recognition of their conformity.

MultiTech declares that this device is in compliance with the essential requirements and other relevant provisions of Directive 2014/53/EU. The declaration of conformity may be downloaded at https://www.multitech.com/red

Korea Regulatory Information

위 기기는 "전파법" 제 58 조의 2 제 3 항에 따라 등록되었음을 증명합니다.

It is verified that foregoing equipment has been registered under the Clause 3, Article 58-2 of Radio Waves Act.

Certificate for Type Certification in Japan

Conduit L4G1 Japan Approvals

The following models have been approved for use in Japan:

- MTCDT-L4G1-246A-915-WW 94557658LF (Cellular, LoRa)
- MTCDT-L4G1-246L-915-WW 94557659LF (Cellular, LoRa)
- MTCDT-L4G1-247A-915-WW 94557666LF (Cellular, LoRa, WiFi)
- MTCDT-L4G1-247L-915-WW 94557667LF (Cellular, LoRa, WiFi)

Approval Codes for the respective models:

- Cellular (Radio): 201-1900133
- Cellular (Telecom): AD 19 0040 201
- LoRa (Radio): 001-A11880
- LoRa (Telecom): D170037019
- WiFi: 005-101228

Note: The above certified equipment are RF components that can be used with the Conduit device.

Regulatory Compliance Mark (RCM) for Australia

This product complies with the requirements of the Regulatory Compliance Mark (RCM) for Electrical Regulatory Authorities Council (ERAC), Electrical Equipment Safety System (EESS), and the Australian Communications and Media Authority (ACMA) for Electromagnetic Compatibility (EMC).

Lithium Battery

- A lithium battery (3V, coin cell, CR1632) located within the product provides backup power for the timekeeping. If the device is left powered off, the battery lasts approximately 90 days.
- When this battery starts to weaken, the date and time may be incorrect.
- Battery is not user replaceable. If the battery fails, the device must be sent back to MultiTech Systems for battery replacement.
- Lithium cells and batteries are subject to the Provisions for International Transportation. Multi-Tech Systems, Inc. confirms that the Lithium batteries used in the MultiTech product(s) referenced in this manual comply with Special Provision 188 of the UN Model Regulations, Special Provision A45 of the ICAO-TI/IATA-DGR (Air), Special Provision 310 of the IMDG Code, and Special Provision 188 of the ADR and RID (Road and Rail Europe).

CAUTION: Risk of explosion if this battery is replaced by an incorrect type. Dispose of batteries according to instructions.
Attention: Risque d'explosion si vous remplacez la batterie par un modèle incompatible. Jetez les piles usagées selon les instructions.

User Responsibility

Respect all local regulations for operating your wireless device. Use the security features to block unauthorized use and theft.

Power Supply Caution

CAUTION: Do not replace the power supply with one designed for another product; doing so can damage the modem and void your warranty. Adapter shall be installed near the equipment and shall be easily accessible.

CAUTION: Pour garantir une protection continue contre les risques d'incendie, remplacez les fusibles uniquement par des fusibles du même type et du même calibre. L'adaptateur doit être installé à proximité de l'appareil et doit être facilement accessible.

Device Maintenance

Do not attempt to disassemble the device. There are no user serviceable parts inside.

When maintaining your device:

- Do not misuse the device. Follow instructions on proper operation and only use as intended. Misuse could make the device inoperable, damage the device and/or other equipment, or harm users.
- Do not apply excessive pressure or place unnecessary weight on the device. This could result in damage to the device or harm to users.
- Do not use this device in explosive or hazardous environments unless the model is specifically approved for such use. The device may cause sparks. Sparks in explosive areas could cause explosion or fire and may result in property damage, severe injury, and/or death.
- Do not expose your device to any extreme environment where the temperature or humidity is high. Such exposure could result in damage to the device or fire. Refer to the device specifications regarding recommended operating temperature and humidity.
- Do not expose the device to water, rain, or spilled beverages. It is not waterproof. Exposure to liquids could result in damage to the device.
- Using accessories, such as antennas, that MultiTech has not authorized or that are not compliant with the device's accessory specifications may invalidate the warranty.

If the device is not working properly, contact MultiTech Technical Support.

Vehicle Safety

When using your device in a vehicle:

- Do not use this device while driving.
- Respect national regulations on the use of cellular devices in vehicles.
- If incorrectly installed in a vehicle, operating the wireless device could interfere with the vehicle’s electronics. To avoid such problems, use qualified personnel to install the device. The installer should verify the vehicle electronics are protected from interference.
- Using an alert device to operate a vehicle’s lights or horn is not permitted on public roads.
- UL evaluated this device for use in ordinary locations only. UL did NOT evaluate this device for installation in a vehicle or other outdoor locations. UL Certification does not apply or extend to use in vehicles or outdoor applications.

Notice regarding Compliance with FCC, EU, and Industry Canada Requirements for RF Exposure

The antenna intended for use with this unit meets the requirements for mobile operating configurations and for fixed mounted operations, as defined in 2.1091 of the FCC rules for satisfying RF exposure compliance. This device also meets the European RF exposure requirements of EN 62311. If an alternate antenna is used, consult user documentation for required antenna specifications.

Compliance of the device with the FCC, EU and IC rules regarding RF Exposure was established and is given with the maximum antenna gain as specified above for a minimum distance of 20 cm between the devices radiating structures (the antenna) and the body of users. Qualification for distances closer than 20 cm (portable operation) would require re-certification.

Wireless devices could generate radiation. Other nearby electronic devices, like microwave ovens, may also generate additional radiation to the user causing a higher level of RF exposure.

Radio Frequency (RF) Safety

Due to the possibility of radio frequency (RF) interference, it is important that you follow any special regulations regarding the use of radio equipment. Follow the safety advice given below.

- Operating your device close to other electronic equipment may cause interference if the equipment is inadequately protected. Observe any warning signs and manufacturers' recommendations.
- Different industries and businesses restrict the use of cellular devices. Respect restrictions on the use of radio equipment in fuel depots, chemical plants, or where blasting operations are in process. Follow restrictions for any environment where you operate the device.
- Do not place the antenna outdoors.
- Switch OFF your wireless device when in an aircraft. Using portable electronic devices in an aircraft may endanger aircraft operation, disrupt the cellular network, and is illegal. Failing to observe this restriction may lead to suspension or denial of cellular services to the offender, legal action, or both.
- Switch OFF your wireless device when around gasoline or diesel-fuel pumps and before filling your vehicle with fuel.
- Switch OFF your wireless device in hospitals and any other place where medical equipment may be in use.

Sécurité relative aux appareils à radiofréquence (RF)

À cause du risque d'interférences de radiofréquence (RF), il est important de respecter toutes les réglementations spéciales relatives aux équipements radio. Suivez les conseils de sécurité ci-dessous.

- Utiliser l'appareil à proximité d'autres équipements électroniques peut causer des interférences si les équipements ne sont pas bien protégés. Respectez tous les panneaux d'avertissement et les recommandations du fabricant.
- Certains secteurs industriels et certaines entreprises limitent l'utilisation des appareils cellulaires. Respectez ces restrictions relatives aux équipements radio dans les dépôts de carburant, dans les usines de produits chimiques, ou dans les zones où des dynamitages sont en cours. Suivez les restrictions relatives à chaque type d'environnement où vous utiliserez l'appareil.
- Ne placez pas l'antenne en extérieur.
- Éteignez votre appareil sans fil dans les avions. L'utilisation d'appareils électroniques portables en avion est illégale: elle peut fortement perturber le fonctionnement de l'appareil et désactiver le réseau cellulaires. S'il ne respecte pas cette consigne, le responsable peut voir son accès aux services cellulaires suspendu ou interdit, peut être poursuivi en justice, ou les deux.
- Éteignez votre appareil sans fil à proximité des pompes à essence ou de diesel avant de remplir le réservoir de votre véhicule de carburant.
- Éteignez votre appareil sans fil dans les hôpitaux ou dans toutes les zones où des appareils médicaux sont susceptibles d'être utilisés.

Interference with Pacemakers and Other Medical Devices

Potential interference

Radio frequency energy (RF) from cellular devices can interact with some electronic devices. This is electromagnetic interference (EMI). The FDA helped develop a detailed test method to measure EMI of implanted cardiac pacemakers and defibrillators from cellular devices. This test method is part of the Association for the Advancement of Medical Instrumentation (AAMI) standard. This standard allows manufacturers to ensure that cardiac pacemakers and defibrillators are safe from cellular device EMI.

The FDA continues to monitor cellular devices for interactions with other medical devices. If harmful interference occurs, the FDA will assess the interference and work to resolve the problem.

Precautions for pacemaker wearers

If EMI occurs, it could affect a pacemaker in one of three ways:

- Stop the pacemaker from delivering the stimulating pulses that regulate the heart's rhythm.
- Cause the pacemaker to deliver the pulses irregularly.
- Cause the pacemaker to ignore the heart's own rhythm and deliver pulses at a fixed rate.

Based on current research, cellular devices do not pose a significant health problem for most pacemaker wearers. However, people with pacemakers may want to take simple precautions to be sure that their device doesn't cause a problem.

- Keep the device on the opposite side of the body from the pacemaker to add extra distance between the pacemaker and the device.
- Avoid placing a turned-on device next to the pacemaker (for example, don’t carry the device in a shirt or jacket pocket directly over the pacemaker).

Chapter 6 – Environmental Notices

Waste Electrical and Electronic Equipment Statement

Note: This statement may be used in documentation for your final product applications.

WEEE Directive

The WEEE Directive places an obligation on EU-based manufacturers, distributors, retailers, and importers to take-back electronics products at the end of their useful life. A sister directive, ROHS (Restriction of Hazardous Substances) complements the WEEE Directive by banning the presence of specific hazardous substances in the products at the design phase. The WEEE Directive covers all MultiTech products imported into the EU as of August 13, 2005. EU-based manufacturers, distributors, retailers and importers are obliged to finance the costs of recovery from municipal collection points, reuse, and recycling of specified percentages per the WEEE requirements.

Instructions for Disposal of WEEE by Users in the European Union

The symbol shown below is on the product or on its packaging, which indicates that this product must not be disposed of with other waste. Instead, it is the user's responsibility to dispose of their waste equipment by handing it over to a designated collection point for the recycling of waste electrical and electronic equipment. The separate collection and recycling of your waste equipment at the time of disposal will help to conserve natural resources and ensure that it is recycled in a manner that protects human health and the environment. For more information about where you can drop off your waste equipment for recycling, please contact your local city office, your household waste disposal service or where you purchased the product.

July, 2005

Restriction of the Use of Hazardous Substances (RoHS)

Multi-Tech Systems, Inc.

Certificate of Compliance

2015/863

Multi-Tech Systems, Inc. confirms that its embedded products comply with the chemical concentration limitations set forth in the directive 2015/863 of the European Parliament (Restriction of the use of certain Hazardous Substances in electrical and electronic equipment - RoHS 3).

These MultiTech products do not contain the following banned chemicals[1]:

- Lead, [Pb] < 1000 PPM
- Mercury, [Hg] < 100 PPM
- Cadmium, [Cd] < 100 PPM
- Hexavalent Chromium, [Cr+6] < 1000 PPM
- Polybrominated Biphenyl, [PBB] < 1000 PPM
- Polybrominated Diphenyl Ethers, [PBDE] < 1000 PPM
- Bis(2-Ethylhexyl) phthalate (DEHP): < 1000 ppm
- Benzyl butyl phthalate (BBP): < 1000 ppm
- Dibutyl phthalate (DBP): < 1000 ppm
- Diisobutyl phthalate (DIBP): < 1000 ppm

REACH-SVHC Statement

Registration of Substances

Multi-Tech Systems, Inc. confirms that none of its products or packaging contain any of the Substances of Very High Concern (SVHC) on the REACH Candidate List, in a concentration above the 0.1% by weight allowable limit.

For the current REACH-SVHC statement, refer to additional regulatory documents at: https://www.multitech.com/support/support

Refer to the following for the most current candidate list of substances: https://echa.europa.eu/candidate-list-table.

Information on HS/TS Substances According to Chinese Standards (in Chinese)

依照中国标准的有毒有害物质信息

根据中华人民共和国信息产业部 (MII) 制定的电子信息产品 (EIP) 标准—中华人民共和国《电子信息产品污染控制管理办法》（第 39 号），也称作中国 RoHS, 下表列出了 Multi-Tech Systems, Inc. 产品中可能含有的有毒物质 (TS) 或有害物质 (HS) 的名称及含量水平方面的信息。

有害/有毒物质/元素

成分名称	铅 (PB)	汞 (Hg)	镉 (CD)	六价铬 (CR6+)	多溴联苯 (PBB)	多溴二苯醚 (PBDE)
印刷电路板	O	O	O	O	O	O
电阻器	X	O	O	O	O	O
电容器	X	O	O	O	O	O
铁氧体磁环	O	O	O	O	O	O
继电器/光学部件	O	O	O	O	O	O
ICs	O	O	O	O	O	O
二极管/晶体管	O	O	O	O	O	O
振荡器和晶振	X	O	O	O	O	O
调节器	O	O	O	O	O	O
电压传感器	O	O	O	O	O	O
变压器	O	O	O	O	O	O
扬声器	O	O	O	O	O	O
连接器	O	O	O	O	O	O
LEDs	O	O	O	O	O	O
螺丝、螺母以及其它五金件	X	O	O	O	O	O
交流-直流电源	O	O	O	O	O	O
软件/文档 CD	O	O	O	O	O	O
手册和纸页	O	O	O	O	O	O
底盘	O	O	O	O	O	O

X 表示所有使用类似材料的设备中有害/有毒物质的含量水平高于 SJ/Txxx-2006 限量要求。
O 表示不含该物质或者该物质的含量水平在上述限量要求之内。

Information on HS/TS Substances According to Chinese Standards

In accordance with China's Administrative Measures on the Control of Pollution Caused by Electronic Information Products (EIP) # 39, also known as China RoHS, the following information is provided regarding the names and concentration levels of Toxic Substances (TS) or Hazardous Substances (HS) which may be contained in Multi-Tech Systems Inc. products relative to the EIP standards set by China's Ministry of Information Industry (MII).

Hazardous/Toxic Substance/Elements

Name of the Component	Lead (PB)	Mercury (Hg)	Cadmium (CD)	Hexavalent Chromium (CR6+)	Polybrominated Biphenyl (PBB)	Polybrominated Diphenyl Ether (PBDE)
Printed Circuit Boards	O	O	O	O	O	O
Resistors	X	O	O	O	O	O
Capacitors	X	O	O	O	O	O
Ferrite Beads	O	O	O	O	O	O
Relays/Opticals	O	O	O	O	O	O
ICs	O	O	O	O	O	O
Diodes/ Transistors	O	O	O	O	O	O
Oscillators and Crystals	X	O	O	O	O	O
Regulator	O	O	O	O	O	O
Voltage Sensor	O	O	O	O	O	O
Transformer	O	O	O	O	O	O
Speaker	O	O	O	O	O	O
Connectors	O	O	O	O	O	O
LEDs	O	O	O	O	O	O
Screws, Nuts, and other Hardware	X	O	O	O	O	O
AC-DC Power Supplies	O	O	O	O	O	O
Software /Documentation CDs	O	O	O	O	O	O
Booklets and Paperwork	O	O	O	O	O	O
Chassis	O	O	O	O	O	O

X Represents that the concentration of such hazardous/toxic substance in all the units of homogeneous material of such component is higher than the SJ/Txxx-2006 Requirements for Concentration Limits.
O Represents that no such substances are used or that the concentration is within the aforementioned limits.