



## MultiConnect® microCell

### MTCM2-L6G1 User Guide



## MultiConnect microCell User Guide

Model: MTCM2-L6G1

Part Number: S000752 1.0

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#### Support Portal

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Business Hours: M-F, 8am to 5pm CT

Country	By Email	By Phone
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U.S., Canada, all others:	<a href="mailto:support@multitech.com">support@multitech.com</a>	(800) 972-2439 or (763) 717-5863

#### Warranty

To read the warranty statement for your product, visit <https://www.multitech.com/legal/warranty>. For other warranty options, visit [www.multitech.com/es.go](http://www.multitech.com/es.go).

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# Chapter 1 – Product Overview

## About the MultiConnect microCell Modem

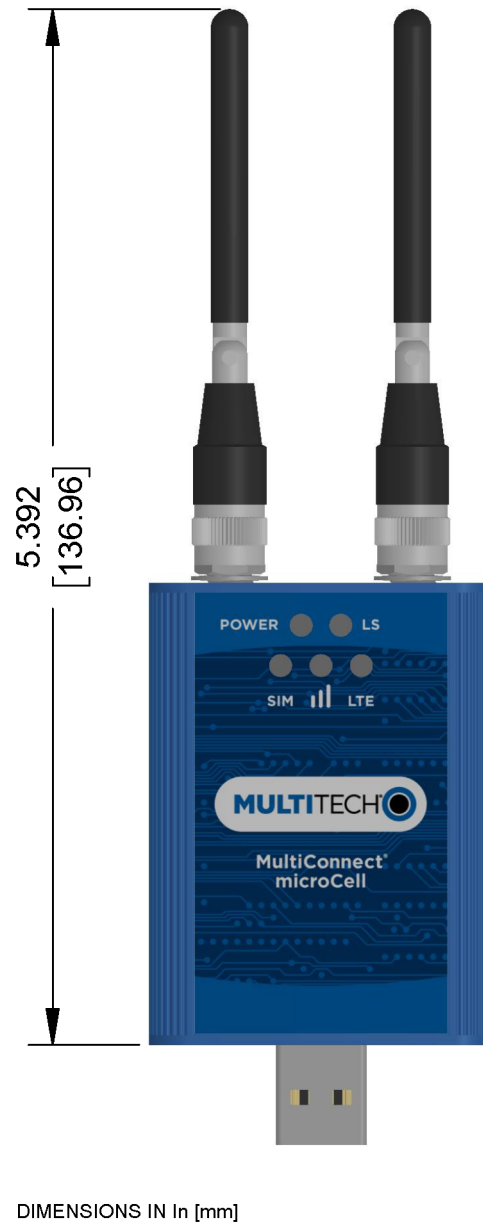
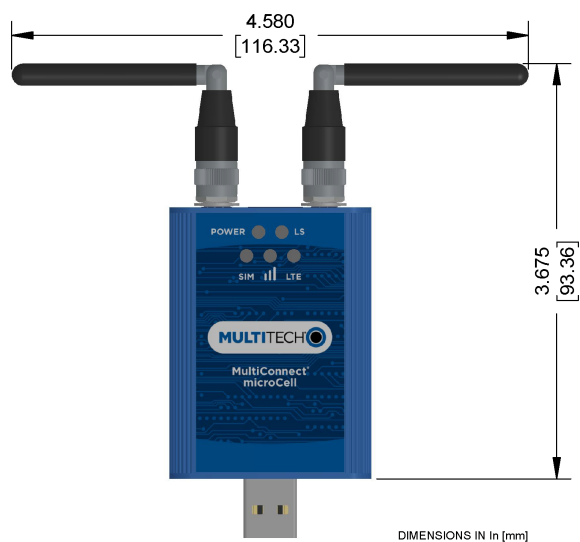
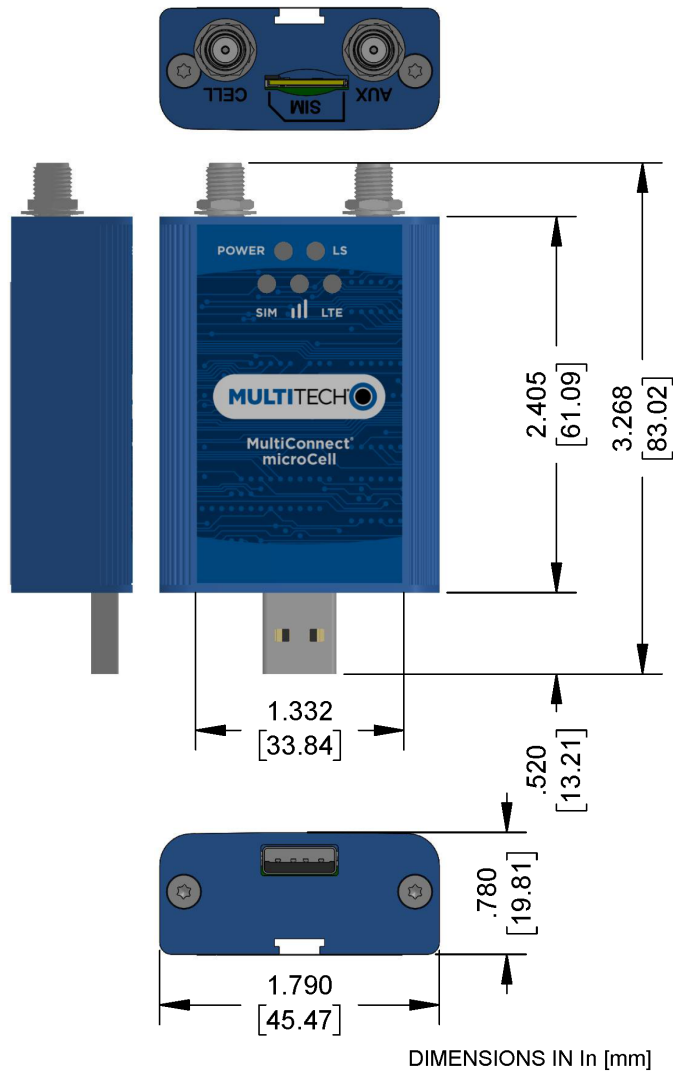
The MultiConnect microCell is a compact and simple communications platform that provides CBRS capabilities for fixed and mobile applications. It is intended for use in settings such as vending, smart parking, medical, smart inventory tracking equipment and commercial applications.

## Documentation Overview

The following documents are available at <https://www.multitech.com/brands/multiconnect-microcell>. Select your model to find the documents specific for that device.

Document	Description	Part Number
MultiConnect microCell MTCM2-L6G1 User Guide	Hardware, regulatory, and getting started information.	S000752
MultiConnect microCell MTCM2-L6G1 Quick Start	Steps for getting started. Ships with the device and is available online.	82105000L
Sequans Cassiopeia AT Commands Manual	Lists AT Commands and parameters used to communicate with your device.	N/A

## Dimensions



## MTCM2-L6G1 Specifications

Category	Description
<b>General</b>	
Standards	3GPP E-UTRA Release 10
	USB Interface is CDC-ACM and CDC-ETHER compliant
TCP/IP Functions	FTP, SMTP, SSL, UDP
Frequency Bands	LTE: B42/B43
	CBRS: B48
<b>Speed</b>	
Data Speed	LTE: Max 200Mbps (DL)/Max 15Mbps (UL)
<b>Physical Description</b>	
Weight	Device only 2.4 oz (66 g); With antennas 2.9 oz (83 g)
Dimensions	Refer to <i>Dimensions</i> for dimensions.
<b>Connectors</b>	
Antenna Connector	2 SMA connectors
SIM	1.8V and 3V SIM holder for micro-SIM (3FF) card
USB	USB 2.0 with High Speed up to 480 Mbps
<b>Environment</b>	
Operating Temperature	-30° C to +60° C*
Storage Temperature	-40° C to +85° C
Operating Humidity	10%-85% RH, non-condensing
Storage Humidity	5%-85% RH, non-condensing
<b>Power Requirements</b>	
Operating Voltage	USB Model: 5 VDC
<b>SMS</b>	
SMS	Point-to-Point messaging
	Mobile-Terminated SMS
	Mobile-Originated SMS
<b>Certifications and Compliance</b>	
EMC and Radio Compliance	FCC Part 15B
	FCC Part 96.47
Safety Compliance	UL/cUL 62368-1

\*UL tested to ambient temperature of +60C.

## MTCM2-L6G1 Power Draw

**Note:** MultiTech recommends that you incorporate a 10% buffer into your power source when determining product load.

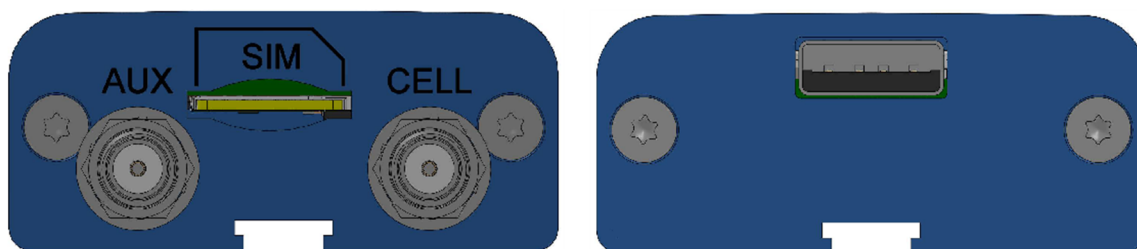
Radio Protocol	3G On/Off Mode Current or Sleep Mode	Live Connection, Idle Current	Average Measured Current at Max Power <sup>1</sup>	TX Pulse Amplitude Current for Peak Current <sup>2</sup>	Total Inrush Charge <sup>3</sup>	Total Inrush Duration During Power Up
<b>5 Volts USB</b>						
<b>LTE Band 43 (3700Mhz)</b>	N/A	N/A	477 mA	784 mA	0.135 mC	22.1 uS
<b>LTE Band 42 (3500Mhz)</b>	N/A	N/A	482 mA	792 mA	0.135 mC	22.1 uS
<b>LTE Band 48 (3625Mhz)</b>	N/A	173 mA	473 mA	768 mA	0.135 mC	22.1 uS

**Note:**

1. Maximum Power: The continuous current during maximum data rate with the radio transmitter at maximum power.
2. TX Pulse: The average peak current during an LTE connection.
3. Inrush Charge: The total inrush charge at power on.

## Side Panels and Connectors

### Side Panels



### Connectors

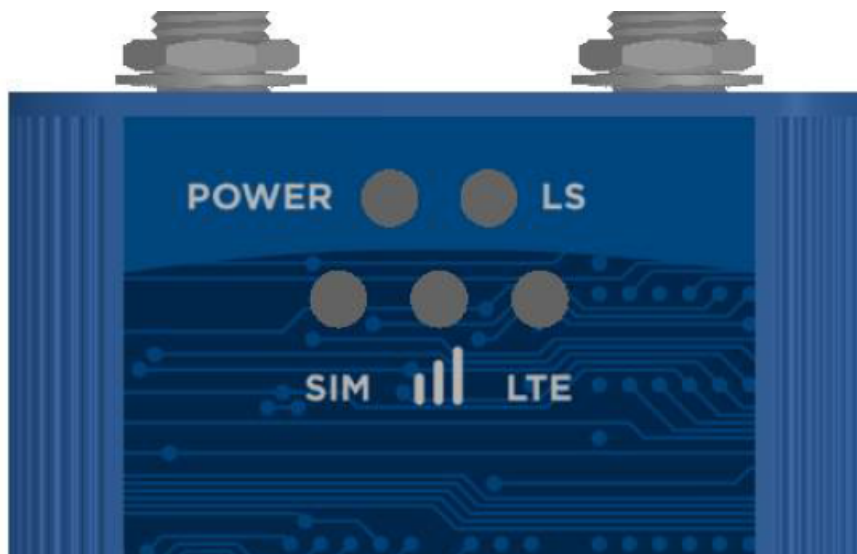
The device has the following connectors:

- **USB** 1 USB connector
- **SMA** 2 female SMA connectors, labeled CELL and AUX
- **SIM** 1 micro-SIM slot, between the SMA connectors




## LED Descriptions

The MTCM2 has the following LEDs:



**Note:**

- Slow is 1 second on 1 second off
- Fast is 200 milliseconds on 200 milliseconds off

LED	Status	Description
Power	On	Device has power
	Off	Device does not have power
Link Status (LS)	On	Radio is not registered
	Flash Slow	Registered
	Off	Radio is turned off, in PSM mode, receiving a firmware update, or SIM is not inserted.
LTE	On	LTE
	Off	SIM not inserted or radio technology unknown
SIM	On	Ready
	Flash Slow	Other
	Off	SIM not inserted
Signal Strength 	On	Good
	Flash Fast	Fair
	Flash Slow	Poor
	Off	Too low for communication or SIM not inserted.

## Additional Signal LED Information

Signal LED is based on +CESQ RSRP and RSRQ:

	RSRP	RSRQ
On	-90	-10+
Fast	-105	-11 to -15
Slow	-120	-16 to -19
Off	< -120	< -19

## Chapter 2 – Safety Warnings

### 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 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 network, and is illegal. Failing to observe this restriction may lead to suspension or denial of 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. 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. S'il ne respecte pas cette consigne, le responsable peut voir son accès aux services 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 3 – Installing Drivers

### Installing on Linux

The MTCM2-L6G1 is plug-and-play on Linux systems.

- Linux Ubuntu 12.04 LTS and 14.04 LTS
- Linux Ubuntu 14.04 LTS

After modem hardware is installed, Linux system should show these ports:

- One com port = CDC\_ACM (/dev/ttyACM0)
- Two ethernet ports = CDC\_ether (eth1 and eth2)

Use Linux commands below to start cellular connection after modem is setup, configured and registered:

```
ifconfig eth1 up (cellular IP)
ifconfig eth2 up (debug interface)
udhcpc -i eth1
udhcpc -i eth2
ifconfig eth1 (check if cellular IP address is assigned successfully to this ethernet interface)
```

You need to setup and configure routing, DNS and default gateway so the system has access over the private LTE network via the Ethernet cellular IP address interface

### Installing Windows Drivers

**CAUTION:** If you connected the device before installing the drivers, Windows may install drivers automatically. Your device may not operate correctly with these drivers. Uninstall the drivers before proceeding.

The driver supports the following Windows versions:

- Windows 10
- Windows 8
- Windows 7

Before connecting your device.

1. Click on your model's page at <https://www.multitech.com/brands/multiconnect-microcell>
2. Under **Downloads**, select the sqn\_setup\_LR4.2.2.0-48388-usb-drivers.exe.
3. Double-click the exe file to launch the installer.
4. Click **Yes** and then click **Next**.
5. Read the license agreement. Select **I accept the agreement** and then click **Next**.
6. Select the **Installation Directory** and click **Next**. To change the default directory:
  - a. Click **Browse**.
  - b. Select a directory.
  - c. Click **OK**.
7. Select the **Start Menu Folder** name. To change the default folder:
  - a. Click **Browse**.

- b. Select a directory.
  - c. Click **OK**.
- 8. Click **Install**.  
Depending your Windows version, you see a Windows Security window. Check **Always trust software from Sequans Communications** and then click **Install**.
- 9. Click **Finish**.

### Uninstall driver before installing update

**Note:** If you previously installed USB drivers for this device, uninstall them before installing or re-installing this driver. Uninstall all existing drivers for this device. Refer to [Uninstall Windows Drivers](#) for details.

#### Windows 10

To uninstall drivers from Windows 10:

1. Open the Start Menu and click **Settings**.
2. Click **System**.
3. Click **Apps & Features**.
4. In the Apps & Features pane, scroll down to **Sequans 4G solution ##**, where ## is the version number, and click **Uninstall**. Confirm that you want to uninstall the driver.

#### Windows 8 or 8.1

To uninstall drivers from Windows 8 or 8.1:

1. Open Windows **Programs and Features**.
2. Scroll to **Sequans 4G solution ##**, where ## the version number, and click Uninstall. Confirm that you want to uninstall the driver.

#### Windows 7

To uninstall drivers from Windows 7:

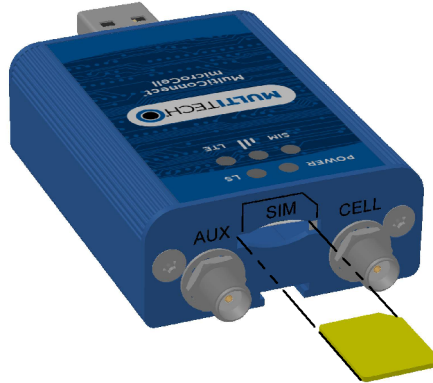
1. Open **Programs and Features** from the Windows Control Panel.
2. Scroll to **Sequans 4G solution ##**, where ## the version number, and click Uninstall. Confirm that you want to uninstall the driver.

## Chapter 4 – Installing the Device

### Installing a SIM Card

This model requires a CBRS SIM card, which is supplied by your service provider. To install the SIM card:

1. Locate the SIM card slot on the side of the modem. The slot is labeled SIM.
2. Slide the SIM card into the SIM card slot with the contact side facing up as shown. When the SIM card is installed, it locks into place.



### Removing a SIM Card

To remove the SIM card, push the SIM card in. The device ejects the SIM card.

### Installing the Device

**Important:** Install drivers on your computer before connecting the device.

1. Connect antennas to the antenna connectors.
2. Connect the USB connector to your computer or other USB high power device, such as a hub.
3. The POWER LED lights after the device powers up.

### Connecting to a CBRS Network

After the POWER LED lights up:

- By default auto connect is enabled so if no APN is required it will connect automatically.

If APN is Required:

1. Log into a terminal program, such as PuTTY.
2. Go to AT command port and enable echo with ATE1 by default it is disabled.
3. Set APN using AT+CGDCONT=1,"IP","APN#", where APN# is the APN for your device.

### Basic AT Commands

Use terminal program, such as PuTTY, and AT command to query modem information and status

Check SIM status

```
AT+CIMI  
AT+CPIN?
```

Setup and check APN using command

```
AT+CGDCONT=1,"IP","apn name"  
AT+CGDCONT?  
AT+CGCONTRDP
```

Check signal strength

```
AT+CESQ
```

Check network registration

```
AT+CEREG?  
AT+COPS?
```

Check modem setting for auto network connection

```
AT+SQNAUTOCONNECT?  
AT^AUTOATT?
```

## Troubleshooting the Connection

If the device does not connect to your network:

- Check the SIM card. Verify it is activated and allowed to connect to private LTE network.
- Does SIM card require specific APN setting? Set APN using AT commands.
- Check LED SIM to insure SIM card is detected.
- Check LED signal strength to insure network signal is available.
- Check LED LS to insure network registered.



## Chapter 5 – Antenna Information

### Antenna

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 and 1.1307 of the FCC rules for satisfying RF exposure compliance. If an alternate antenna is used, consult user documentation for required antenna specifications.

### Antenna System Devices

The wireless performance depends on the implementation and antenna design. The integration of the antenna system into the product is a critical part of the design process; therefore, it is essential to consider it early so the performance is not compromised. Devices were approved with the following antenna(s) and for alternate antennas meeting the given specifications.

The antenna system is defined as the UFL connection point from the device to the specified cable specifications and specified antenna specifications.

### CBRS Antenna

Manufacturer: 2J  
 Manufacturer's Model Number: 2JW1024

### Antenna Specifications

Category	Description
Parameters	CBRS
Standards	CBRS
Band (MHz)	3700 MHz
Frequency Range	3550-3700 MHz
Return Loss (dB)	~-10.1
Efficiency (%)	~50.2
Impedance	50 Ohms
VSWR	VSWR should not exceed 2.0:1 at any point across the bands of operation
Peak Gain (dBi)	~0.1
Average Gain (dB)	~-3.0
Radiation	Omni-directional
Polarization	Linear
Max Input Power (W)	10
Connector	SMA(M) Standard

## Chapter 6 – Regulatory Information

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### 47 CFR Part 15 Regulation Class B Devices

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.

### 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 Règlement 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.

## 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



## REACH 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

The latest **197** substances restricted per the REACH Regulation were **last updated January 2019**. Refer to the following for the most current candidate list of substances: <http://echa.europa.eu/candidate-list-table>.

## 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).

These MultiTech products do not contain the following banned chemicals<sup>1</sup>:

- 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

Environmental considerations:

- Moisture Sensitivity Level (MSL) =1
- Maximum Soldering temperature = 260C (in SMT reflow oven)

<sup>1</sup>Lead usage in some components is exempted by the following RoHS annex, therefore higher lead concentration would be found in some modules (>1000 PPM);

- Resistors containing lead in a glass or ceramic matrix compound.

## 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.

## 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。