MultiConnect® Dragonfly ™

MTQ-L1G2D Device Guide

MultiConnect Dragonfly Device Guide

Models: MTQ-L1G2D-B02

Part Number: S000817 1.0

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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.

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Chapter 1 – Product Overview

Overview

MultiTech Dragonfly™ embedded cellular modem is a complete, ready-to-integrate communications device ideal for customers looking to add 4G-LTE cellular communications to their IoT/M2M solutions. These communications devices enable easy technology transitions and allow developers to add wireless communication to products with a minimum of development time and expense. The MultiTech Dragonfly embedded cellular modems are carrier approved and end-device certified, decreasing time to market while saving customers money.

Product Build Options

Product	Description	Region
MTQ-L1G2D-B02	Embedded LTE Cat 1 Modem w/Fallback & GNSS (Global)	NA, EU, and AU

Note:

These units ship without network activation. To connect them to the cellular network, you need SIM cards from your service provider.

The complete product code may end in .Rx. For example, MTQ-L1G2D-B02.Rx, where R is revision and x is the revision number.

All builds can be ordered individually (-SP) or in 50-packs.

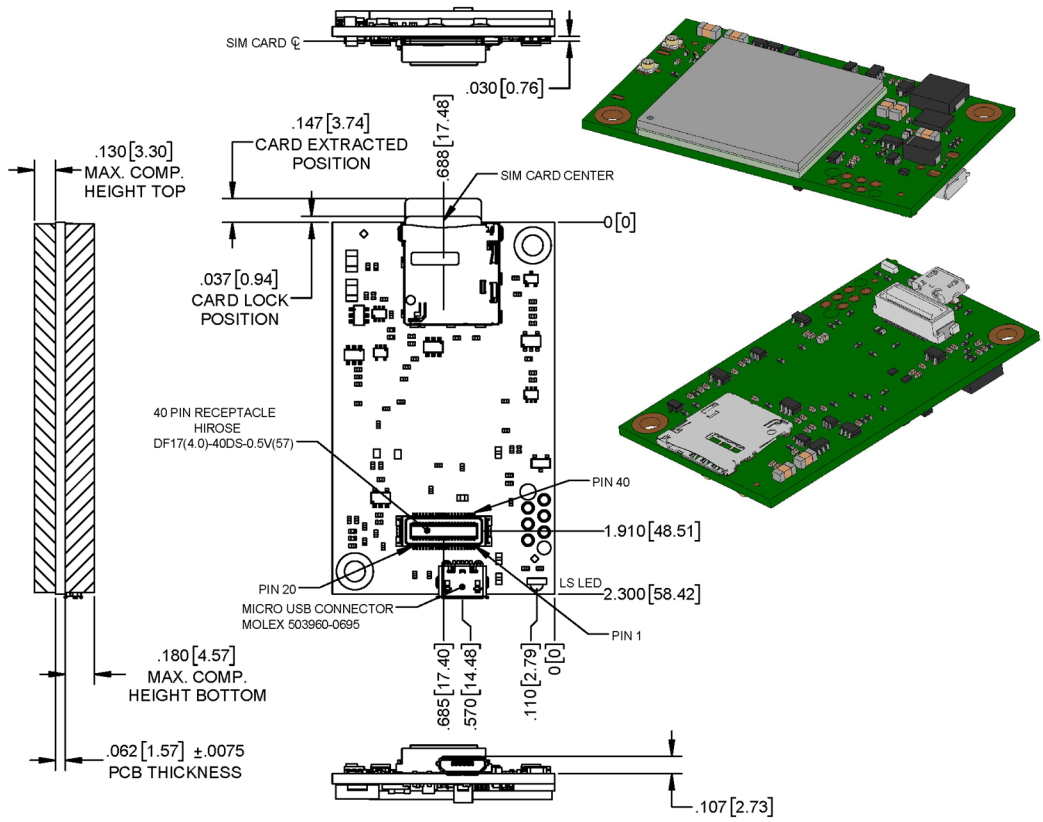
Documentation

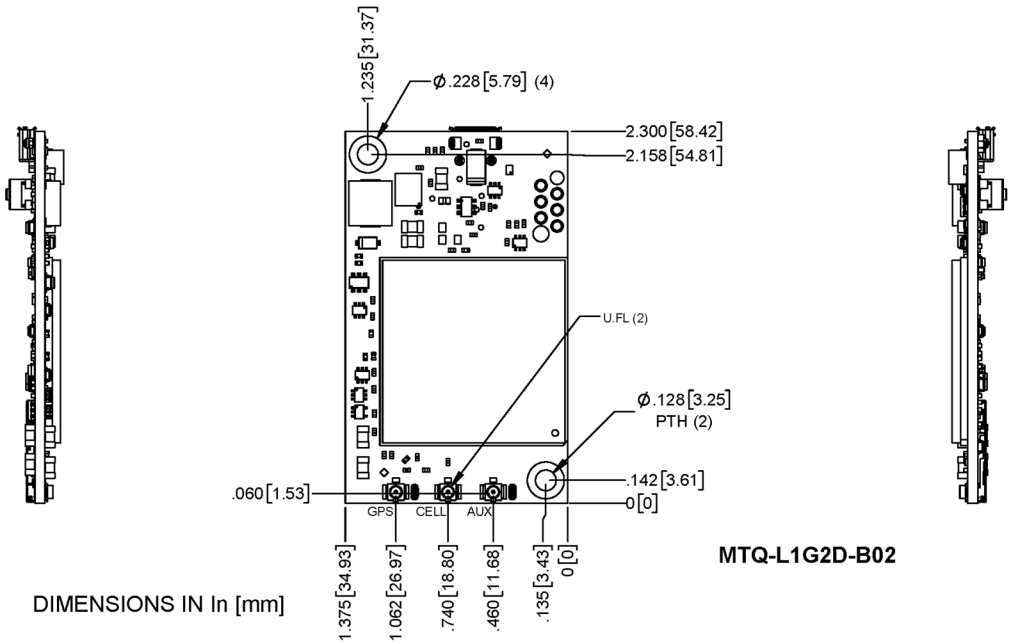
The following documentation is available through www.multitech.com/resources/manuals .

Document	Description	Part Number
Device Guide	This document. Provides model specifications and developer information.	S000817
Universal Developer Kit 2.0 Developer Guide	Information for developing with the MTUDK2-ST-CELL.R1 Developer Kit. Includes an overview, design considerations, schematics, and installation and operation information.	S000799
USB Driver Installation Guide	Provides steps for installing USB drivers.	S000616
Telit LE910 AT Commands Reference Guide	For L1G2D devices, lists AT Commands and parameters used to communicate with your device.	80502ST10950A

Chapter 2 – Mechanical Drawings

MTQ-L1G2D-B02 Models





Chapter 3 – Hardware and Specifications

Specifications

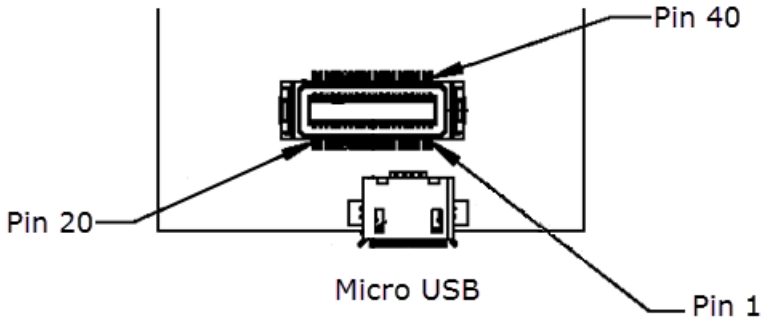
Category	Description
General	
Standards	LTE FDD CAT 1 3GPP Release 10
	HSPA+ 21/GPRS fallback
TCP/IP Functions	FTP, SMTP, TCP, UDP
Frequency Bands	4G: B1, B2, B3, B4, B5, B7, B8, B8_US, B9, B12, B13, B14, B18, B19, B20, B25, B26, B28
	3G: B1, B2, B4, B5, B6, B8, B19
	2G: B2, B3, B5, B8
LED	One, link status
Speed	
Data Speed	LTE: 10 Mbps downlink/5 Mbps uplink
Interface	
USB Interface	Micro USB 2.0 high speed
UART	Full UART
Serial Modem Interface	Up to 115.2 Kbps
Physical Description	
Weight	0.6 oz (17g)
Dimensions	Refer to Mechanical Drawings for details.
Connectors	
Antenna	3 surface mount U.FL: cellular, diversity, and GPS
SIM Holder	1.8 V and 3 V micro
Pin header	40-pin female for USB or UART
Environment	
Operating Temperature[1]	-40° C to +85° C
Storage Temperature	-40° C to +85° C
Humidity	20%-90% RH, non-condensing
Power Requirements	
Operating Voltage	3.3 - 5 VDC +/- 5%, The VIN minimum 2.75V & VIN maximum is 5.5V
Input Current	See Power Draw

Category	Description
Certifications and Compliance	
EMC and Radio Compliance	FCC Part 15 Class B
	FCC Part 22H, 24E, 27, 90
	CE Mark, RED (EU)
	RCM
	UKCA
Safety Compliance	UL 62368-1
	cUL 62368-1
	IEC 62368-1
Network Compliance	PTCRB
Carrier	AT&T/Verizon

[1]Radio performance may be affected by temperature extremes. This is normal.

[2]Device has been tested up to +85° C. UL Recognized @ 85° C.

40-Pin Connector Definitions



MTQ-xx-B02

Pin Minimum and Maximum Voltage

Unless otherwise specified in the Pin Definitions table:

	Minimum High Voltage	Maximum Low Voltage	Maximum Input
Serial Input Signals	2.0V	0.8V	6.5V
Serial Output Signals	2.4V	0.55	--

Pin Definitions

Pin	Signal Name	Logic Level Voltage[1]	Max Voltage	In/Out	Description
1	N/C				
2	N/C				
3	N/C				
4	N/C				
5	GND	GND		GND	Ground Connection
6	USB-DATA+	See USB 2.0 Spec for levels	3.6V	I/O	USB Data+ connection to cellular module
7	USB-DATA-				USB Data- connection to cellular module
8	VCC-IN	2.75V - 5.25V	5.25V	Power Input	Main Power
9	RADIO_RXD	0 - 3V		O	Cellular Radio UART Data Output
10	RADIO_DCD	0 - 3V		O	Cellular Radio UART Data Carrier Detect
11	RADIO_RI	0 - 3V		O	Cellular Radio UART Ring indicator
12	RADIO_CTS	0 - 3V		O	Cellular Radio UART Clear to Send (flow control)
13	GND	GND		GND	Ground Connection
14	SPI_MOSI[1]	0 - 3V	3.3V	O	Cellular Radio MOSI.
15	SPI_SCLK[1]	0 - 3V	3.3V	I	SPI clock.
16	N/C				
17	N/C				
18	N/C				
19	N/C				
20	N/C				
21	N/C				
22	N/C				
23	N/C				
24	N/C				

Pin	Signal Name	Logic Level Voltage[1]	Max Voltage	In/Out	Description
25	SPI_SRDY[1]	0 - 3V		O	Cellular Radio SPI Ready. Open drain outputs with 47K pull up to 3V.
26	SPI_MISO[1]	0 - 3V		O	Cellular Radio MISO. Open drain outputs with 47K pull up to 3V.
27	SPI_CS2[1]	0 - 3V		I	Cellular Radio SPI CS.
28	GND	GND		GND	Ground Connection
29	RADIO_RTS	0 - 3V		I	Cellular Radio UART Request to Send (flow control)
30	RADIO_DSR	0 - 3V		O	Cellular Radio UART Data Set Ready
31	RADIO_DTR	0 - 3V		I	Cellular Radio UART Data Terminal Ready
32	RADIO_TXD	0 - 3V		I	Cellular Radio UART Serial data input from DTE
33	VCC-IN	2.75 - 5.25V		Power Input	Main Power
34	LINK_STATUS	3V		O	Cellular radio link status LED. Open drain outputs with 47K pull up to 3V.
35	RESET	0 - VCC input (VCC-IN)		I	Radio reset. Input has an internal pull-up resistor. Drive with an open drain output. Active low.
36	GND	GND		GND	Ground Connection
37	GND				
38	N/C				
39	N/C				
40	N/C				

[1]SPI pins are for cellular radio, not flash.

40-Pin Connector

Manufacturer:	Hirose Electric Co LTD
Description:	.5MM 40 PN B>B RECEPTACLE
Model Number:	DF17(4.0)-40DP-0.5V(57)

Use with:

Manufacturer:	Hirose Electric Co LTD

Description:	.5mm 40 pin B.B header PLUG
Model Number:	DF17(2.0)-40DP-0.5V(57)

Electrical Characteristics

Operating Conditions

Parameter	Minimum Volts	Maximum Volts
Supply Range - Vcc	2.75	5.25

Absolute Maximum Rating

Parameter	Minimum Volts	Maximum Volts
Voltage at any signal pin	-0.3	5.5

DC Electrical Characteristics

Parameter	Conditions	Minimum Volts	Maximum Volts
Digital signal input low level	CMOS port I_{IO}=+8 mA	-0.3	0.9
Digital signal input high level	CMOS port I_{IO}=+8 mA	2.1	5.5
Output low level voltage for an I/O pin	CMOS port	-	0.4
Output high level voltage for an I/O pin	I_{IO}=+8 mA	V_{DD}-0.4	-
Output low level voltage for an I/O pin	TTL port	-	0.4
Output high level voltage for an I/O pin	I_{IO}=+8 mA	2.4	-
Output low level voltage for an I/O pin	I_{IO}=+20 mA	-	1.3(1)
Output high level voltage for an I/O pin		V_{DD}-1.3(1)	-
Output low level voltage for an I/O pin	I_{IO}=+6 mA	-	0.4(1)
Output high level voltage for an I/O pin		V_{DD}-0.4(1)	-
Output low level voltage for an I/O pin	I_{IO}=+4 mA	-	0.4(2)
Output high level voltage for an I/O pin		V_{DD}-0.4(2)	-
RESET (low active) input low	CMOS port I_{IO}=+8 mA	-	0.99
RESET (low active) input high	CMOS port I_{IO}=+8 mA	2.31	-
RESET (low active) input high	CMOS port I_{IO}=+8 mA	5.00	-

(1) Guaranteed by characterization results, not tested in production.

(2) Guaranteed by design, not tested in production.

Power Draw - MTQ-L1G2D-B02

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

Note:

Maximum Power: The continuous current during maximum data rate with the radio transmitter at maximum power.
Tx Pulse: The average peak current during a GSM850 transmission burst period or HSDPA/LTE connection. The transmission burst duration for GSM850 can vary, depending on what transmission scheme is being deployed (GPRS Class 8, Class 10, GSM, etc.).
Inrush Charge: The total inrush charge at power on.

Radio Protocol	AT#SHDN or Radio On/Off Mode Current (If Applicable)	Cellular Connection Idle (No Data)	(AVG) Measured Current at Max Power	TX Pulse (AVG) Amplitude Current for Peak Current for HSDPA/LTE	Total Inrush Charge measured in millicoulombs	Total Inrush Charge DURATION during Power up (INRUSH Duration)
3.3V with Device on the Developer Board						
GSM 850 WS46=12	22 mA	71 mA	243 mA	927 mA	1.10 mC	675 uS
WCMDA WS46=22	21 mA	46 mA	545 mA	636 mA	1.10 mC	675 uS
LTE BAND 7 WS46=28	21 mA	46 mA	627 mA	712 mA	1.10 mC	675 uS
5V with Device on the Developer Board						
GSM 850 WS46=12	22 mA	65 mA	236 mA	790 mA	.210 mC	1.38 mS
WCMDA WS46=22	23 mA	46 mA	539 mA	628 mA	.210 mC	1.38 mS
LTE BAND 7 WS46=28	23 mA	46 mA	550 mA	568 mA	.210 mC	1.38 mS
5V with Device USB Only						
GSM 850 WS46=12	20 mA	48 mA	280 mA	1.10 A	.010 mC	71.2 uS
WCMDA WS46=22	20 mA	48 mA	706 mA	780 mA	.010 mC	71.2 uS
LTE BAND 7 WS46=28	20 mA	49 mA	684 mA	764 mA	.010 mC	71.2 uS

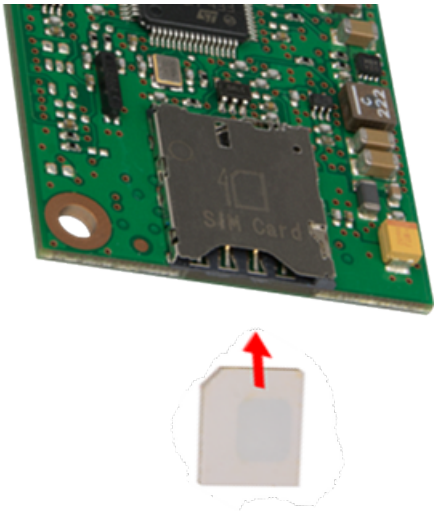
Chapter 4 – Getting Started

Installing a SIM Card on a DragonFly

Note: When using the Dragonfly with a developer board, install the SIM card before mounting the Dragonfly on the developer board.

To install the SIM card:

- With the contact side facing down, align the notched edge as shown on the Dragonfly's SIM holder and slide the SIM card completely into the SIM holder.



USB Cable Recommendations

To avoid enumeration or power issues:

- Use a high-speed USB cable that is as short as possible.
- Use a well-shielded cable with at least 24 AWG wire pair for power/ground and 28 AWG wire pair for data lines.
- If possible, use a USB port that connects directly to the motherboard rather than a USB port with added cabling inside the computer chassis.
- Use USB 3.0 ports if available. These ports are typically rated for more current.
- The USB cable is available through MultiTech. The part number is CA-USB-A-MICRO-B-3.

Device Drivers

Install drivers on your computer before connecting the device.

To install drivers:

- Use the Connection Manager to install Windows drivers.

OR

- Refer to Linux or Windows driver installation information in the *USB Driver Installation Guide.* For information, refer to Documentation

Communicating with the Device

Following are three options for communicating with the device.

- Install USB drivers and plug into the micro USB connector. No need for a host board.
- Access the device's USB interface via pins 6 and 7 of the 40-pin connector. Data pins 6 and 7 are in parallel with the micro USB connector on the device. There is no connection to pins 6 and 7 on the developer board.
- Establish serial communication using Multitech developer board MTUDK2. See the *Universal Developer Kit 2.0 Developer Guide* (PN S000610) for more information.

Powering Down Your Device

CAUTION: Failing to properly power down the device before removing power may corrupt your device's file system.

To properly power down your device, use the following sequence or pull 3G_ONOFF signal low:

1. Issue the AT#SHDN command.
2. Wait 30 seconds.
3. Power off or disconnect power.

Note: If you send AT#SHDN and do not remove power AND the 3G_ONOFF line is high, the radio restarts after 60 seconds.

Device Reset (Pin 35)

Minimum pulse is 50 ms.

- - If the reset line is held low for >50ms the radio is turned off.
- - When the reset line is released, the radio is turned on.

Chapter 5 – Antennas

External Antenna Option

Antenna

Devices were approved with the following antenna:

Manufacturer:	Wieson
Description:	LTE Antenna with SMA-Male Connector
Model Number	GY115IE002-001

MultiTech ordering information:

Model	Quantity
ANLTE4-1HRA	1
ANLTE4-2HRA	2
ANLTE4-10HRA	10
ANLTE4-50HRA	50

Antenna Specifications

Category	Description
Frequency Range	0.698 - 0.96 GHz 1.710 - 2.170 GHz 2.30 - 2.69 GHz
VSWR	3:1 maximum
Gain	2.06 dBi
Impedance	50Ω nominal
Radiation	Omni-directional
Polarization	Linear, vertical

SMA to U.FL Cables

The developer kit includes three 4.5" SMA to U.FL cables which are preinstalled on the developer board. Consult the mechanical drawings for your device to determine which antenna to connect to which U.FL connector on the device.

Connecting an Antenna through the Developer Board Connectors

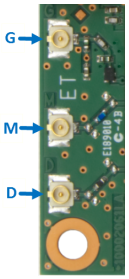
To connect an antenna to the device through the developer board:

1. Determine which SMA connector you want to use for the antenna.
2. Finger tighten the antenna to the SMA connector.
3. Attach the U.FL connector from the cable to the connector on the device.

   G = GPS (may not apply to your device)

   M = Main

   D = Diversity



Antenna Diversity

Antenna diversity uses two receive antennas to improve the downlink connection (cell tower to mobile). It has no effect on the uplink (mobile to cell tower).

Important: Always connect both antennas on devices with antenna diversity.

Antenna diversity is useful in environments where the signal arrives at the device after bouncing off or around buildings or other objects. The bounced signal may be attenuated by going through semi-transparent (to the signal) objects. Each signal alteration can change its magnitude, phase, orientation, or polarization. This complex environment can exist in cities, inside buildings or in traffic. In this environment, signal paths from the cell tower form an interference pattern of peaks and nulls. These peaks and nulls can be very close together.

Antenna diversity provides an advantage in complex environments because if one receive antenna has a poor signal due to an interference null pattern, the other antenna is likely not in the null and has better reception. The radio compares the reception from both receive antennas and uses the one with the strongest signal.

Antenna diversity is unnecessary when the device has an unobstructed signal path from the cell tower, such as in a flat area away from buildings. In good reception environments, the product application might prohibit using two receive antennas.

Using Antenna Diversity

You can use an AT command to turn antenna diversity on and off. When antenna diversity is on and a like or similar antenna is installed on both radio connectors, the radio automatically chooses the antenna with the best reception. To learn about the AT command used to control diversity, see the AT Command Reference guide for your device.

Placing External Antennas

Antennas are usually a quarter wavelength apart from each other. With multiband radios where the quarter wavelengths in each band are diverse from each other, this rule may not be practical. Choose spacing based on the band used most often or the band with connection difficulty. Some environments are harsher on particular bands. Multi-Tech products have antenna connectors at the best spacing for the product size.

Placing antennas in close proximity to each other is not optimal, but you can do it if necessary. It depends on the signal strength to and from each antenna.

Placing GPS Antennas

GPS antennas need access to the sky. Position the GPS antenna so the diversity antennas do not block its access to the sky.

Selecting Antennas

Select an antenna based on your product and application. Typically, both antennas are the same because either can be the main receive antenna. However, if the antenna connectors are too close together, use a similar antenna on a short cable for the second receive only antenna.

Antenna Approvals and Safety Considerations

Note the following:

- PTCRB and the carriers conduct antenna diversity tests.
- There are no EMC concerns about antenna diversity.
- All antennas need to have a minimum flammability rating.
- Safety requirements depend on your final product.
- Antennas are not approved for outdoor use. Do not extend antennas outside of any building.

Diversity and Power Draw

There are no significant power draw differences.

Important: You must deploy with two antennas, unless your carrier has authorized you to deploy with one antenna.

OEM Integration

FCC & IC Information to Consumers

The user manual for the consumer must contain the statements required by the following FCC and IC regulations: 47 C.F.R. 15.19(a)(3), 15.21, 15.105 and RSS-Gen Issue 3, Dec 2010; 7.1.2 and 7.1.3

FCC Grant Notes

The OEM should follow all the grant notes listed below. Otherwise, further testing and device approvals may be necessary.

FCC Definitions

Portable: (§2.1093) — A portable device is defined as a transmitting device designed to be used so that the radiating structure(s) of the device is/are within 20 centimeters of the body of the user.

Mobile: (§2.1091) — A mobile device is defined as a transmitting device designed to be used in other than fixed locations and to generally be used in such a way that a separation distance of at least 20 centimeters is normally maintained between the transmitter's radiating structure(s) and the body of the user or nearby persons.

Actual content pending Grant: *This device is a mobile device with respect to RF exposure compliance. The antenna(s) used for this transmitter must be installed to provide a separation distance of at least 20 cm from all persons, and must not be collocated or operate in conjunction with any other antenna or transmitter except in accordance with FCC multi-transmitter product guidelines. Installers and end-users must be provided with specific information required to satisfy RF exposure compliance for installations and final host devices. (See note under Grant Limitations.) Compliance of this device in all final host configurations is the responsibility of the Grantee.*

Note: Host design configurations constituting a device for portable use (<20 cm from human body) require separate FCC/IC approval.
Note: Only use antennas approved respectively as listed for the unlicensed radios (Bluetooth/Wi-Fi)

Host Labeling

The following statements are required to be on the host label:

Contains FCC ID: {Add the device FCC ID}
Contains IC: {Add the device IC ID}

For device specific FCC and IC ID information refer to the FCC and ID grant information topics in the *Regulatory Information* chapter. For additional labeling requirements and label examples, refer to the *Labels* chapter.

Chapter 6 – Safety Information

Handling Precautions

To avoid damage due to the accumulation of static charge use proper precautions, such as an ESD strap, when handling any cellular device to avoid exposure to electronic discharge during handling and mounting the device.

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.

General Safety

The device is designed for and intended to be used in fixed and mobile applications. Fixed means the device is physically secured at one location and cannot be easily moved to another location. Mobile means the device is used in other than fixed locations.

CAUTION: Maintain a separation distance of at least 20 cm (8 inches) between the transmitter's antenna and the body of the user or nearby persons. The device is not designed for or intended to be used in portable applications within 20 cm (8 inches) of the user's body.
Attention: Maintenir une distance d'au moins 20 cm (8 po) entre l'antenne du récepteur et le corps de l'utilisateur ou à proximité de personnes. Le modem n'est pas conçu pour, ou destinés à être utilisés dans les applications portables, moins de 20 cm du corps de l'utilisateur.

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).

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.

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.

User Responsibility

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

End user must operate product per country laws and rules

Chapter 7 – Labels

Approvals and Certifications

This device is an industry and/or carrier approved modem. In most cases, when integrated and used with an antenna system that was part of the MultiTech modem certification, additional approvals or certifications are not required for the device that you develop as long as the following requirements are met:

- **PTCRB Requirements:** The antenna system cannot be altered. The antenna system must be the same type with similar in-band and out-of-band radiation patterns and maintain the same specifications. Refer to the FCC grant information for details.
- **Model Identification:** The MultiTech model identification allows the carrier to verify the modem as one of its approved models. This information is located on the modem's label below the bar code.

Example Labels

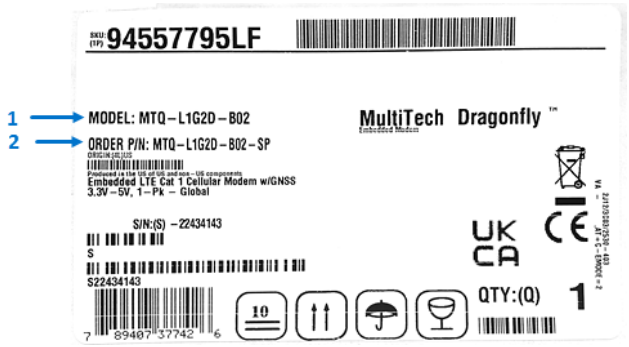
Note: Actual labels vary depending on the regulatory approval markings and content.

The label shown is not the actual size.

1 - MultiTech Model Identification
2 - MultiTech Ordering Part Number
3 - IMEI

Device Label

Package Label



Chapter 8 – Regulatory 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 Grant Information

FCC Identifier:	RI7LE910CXWWX
Equipment Class:	Part 15 Class B Computing Device Peripheral
Notes:	4G/3G/2G Module
Modular Type:	Single Modular
FCC Rule Parts:	15B

FCC Identifier:	RI7LE910CXWWX
Equipment Class:	PCS Licensed Transmitter
Notes:	4G/3G/2G Module
Modular Type:	Single Modular
FCC Rule Parts:	9, 22H, 24E, 27,

Rule Parts	Frequency Range	Power Output	Frequency Tolerance	Emission Designator
27	699-716 MHz	157 mW	2.5 ppm	9M04G7D
27	699-716 MHz	124 mW	2.5 ppm	9M04W7D
27	777-787 MHz	167 mW	2.5 ppm	9M01G7D
27	777-787 MHz	133 mW	2.5 ppm	9M04W7D
9	788-798 MHz	174 mW	2.5 ppm	9M01G7D
9	788-798 MHz	142 mW	2.5 ppm	9M03W7D
9	814-824 MHz	207 mW	2.5 ppm	8M99G7D
9	814-824 MHz	162 mW	2.5 ppm	8M97W7D
22H, 9	821.5 MHz	206 mW	2.5 ppm	13M5G7D
22H, 9	821.5 MHz	158 mW	2.5 ppm	13M5W7D
22H	824-849 MHz1	193 mW	2.5 ppm	13M5G7D
22H	824-849 MHz	168 mW	2.5 ppm	13M5W7D
22H	826.4-846.6 MHz	214 mW	2.5 ppm	4M14F9W
27	897.5-900.5 MHz	143 mW	2.5 ppm	2M73G7D
27	897.5-900.5 MHz	117 mW	2.5 ppm	2M73W7D
27	1.71-1.755 GHz	387 mW	2.5 ppm	17M9G7D
27	1.71-1.755 GHz	308 mW	2.5 ppm	17M9W7D
27	1.7124-1.7526 GHz	412 mW	2.5 ppm	4M14F9W
24E	1.85-1.915 GHz	361 mW	2.5 ppm	18M0G7D
24E	1.85-1.915 GHz	284 mW	2.5 ppm	18M0W7D
24E	1.8502-1.9098 GHz	1.394 W	2.5 ppm	246KGXW

Rule Parts	Frequency Range	Power Output	Frequency Tolerance	Emission Designator
24E	1.8502-1.9098 GHz	580 mW	2.5 ppm	243KG7W
24E	1.8524-1.9076 GHz	398 mW	2.5 ppm	4M14F9W
27	2.5-2.57 GHz	365 mW	2.5 ppm	18M0G7D
27	2.5-2.57 GHz	291 mW	2.5 ppm	18M0W7D

Single Modular Approval. Output power listed is conducted. The antenna(s) used for this transmitter must be installed to provide a separation distance of at least 20 cm from all persons and must not be co-located or operating in conjunction with any other antenna or transmitter, except in accordance with FCC multi-transmitter evaluation procedures as documented in this filing. This device is to be used only for mobile and fixed application. This grant is valid only when the module is sold to OEM integrators and must be installed by the OEM integrators. OEM integrators must ensure that end-users are not provided with the module installation instructions. OEM integrators and end-users must be provided with transmitter operating conditions for satisfying RF exposure compliance. The highest antenna gain including cable loss, must not exceed 8.51 dBi for Band 2 and Band 25, 5.5 dBi for Band 4, 6.91 dBi for Band 5 and Band 26, 9.91 dBi for Band 8, 9.7 dBi for Band 12, 9.91 dBi for Band 13 and 14, and 9.01 dBi for Band 7. This device supports 1.4 MHz, 3 MHz, 5 MHz, 10 MHz, 15MHz and 20 MHz bandwidth modes for LTE Bands 2/4/25; 1.4 MHz, 3 MHz, 5 MHz, 10 MHz and 15MHz bandwidth modes for LTE Band 26; 1.4 MHz, 3 MHz, 5 MHz and 10 MHz bandwidth modes for LTE Bands 5/12; 5 MHz, 10 MHz, 15MHz and 20 MHz bandwidth modes for LTE Bands 7; 1.4 MHz and 3 MHz for LTE Band 8; 5 MHz and 10 MHz bandwidth modes for LTE Bands 14/13. 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.

Canadian Limitations

Notice: This equipment meets the applicable Industry Canada Terminal Equipment Technical Specifications. This is confirmed by the registration number. The abbreviation, IC, before the registration number signifies that registration was performed based on a Declaration of Conformity indicating that Industry Canada technical specifications were met. It does not imply that Industry Canada approved the equipment.

Notice: The REN assigned to each terminal equipment provides an indication of the maximum number of terminals allowed to be connected to a telephone interface. The termination on an interface may consist of any combination of devices subject only to the requirement that the sum of the Ringer Equivalence Numbers of all the devices does not exceed five.

Limitations canadiennes

Avis: Cet équipement respecte les spécifications techniques des équipements terminaux d'Industrie Canada. Cette conformité est confirmée par le numéro d'enregistrement. L'abréviation IC précédant le numéro d'enregistrement signifie que l'enregistrement a été effectué conformément à une Déclaration de Conformité indiquant que les spécifications techniques d'Industrie Canada ont été respectées. Ceci n'indique pas que cet équipement a été approuvé par Industrie Canada.

Avis: L'IES (indice d'équivalence de la sonnerie) attribué à chaque terminal fournit une indication du nombre maximal de terminaux pouvant être connectés à une interface téléphonique. La terminaison d'une interface peut être constituée de n'importe quelle combinaison d'appareils à la seule condition que la somme des indices d'équivalence de sonnerie de l'ensemble des appareils ne dépasse pas cinq.

Industry Canada Grant Information

Company Number/Numéro de compagnie:	5131A
Company Name/Nom de compagnie::	Telit Communications S.p.A.
Certification Number/Numéro d'homologation:	5131A-LE910CXWWX
Approval Date/Date d'approbation:	Mon Nov 22 16:45:45 EST 2021
Hardware Version Identification Number (HVIN)/Numéro d'identification de la version du matériel (NIVM):	LE910C1-WWXD
Product Marketing Name (PMN)/Nom de marque du produit (NMP):	LE910C1-WWXD
Equipment Description/Description de l'équipement:	Data Terminal Module
Type of Radio Equipment/Genre d'équipement radio:	Cellular Network - Other Mobile Device

RF Exposure Results/Résultats d'exposition humaine aux RF

Type	Value/Valeur	Compliance Distance/Distance de conformité
RF	1.59 W/m2	200 mm

Emissions

Specification	Issue Number	Frequency Range		Emission Designator	Power	
		From	To		Min.	Max.
RSS130	2	699.7 MHz	715.3 MHz	1M11W7D	123.0 mW	123.0 mW
RSS130	2	699.7 MHz	715.3 MHz	1M11G7D	154.0 mW	154.0 mW
RSS130	2	700.5 MHz	714.5 MHz	2M72W7D	122.0 mW	122.0 mW
RSS130	2	700.5 MHz	714.5 MHz	2M72G7D	150.0 mW	150.0 mW
RSS130	2	701.5 MHz	713.5 MHz	4M53W7D	116.0 mW	116.0 mW
RSS130	2	701.5 MHz	713.5 MHz	4M57G7D	152.0 mW	152.0 mW
RSS130	2	704.0 MHz	711.0 MHz	9M04W7D	124.0 mW	124.0 mW
RSS130	2	704.0 MHz	711.0 MHz	9M04G7D	157.0 mW	157.0 mW
RSS130	2	779.5 MHz	784.5 MHz	4M54W7D	133.0 mW	133.0 mW
RSS130	2	779.5 MHz	784.5 MHz	4M55G7D	166.0 mW	166.0 mW
RSS130	2	782.0 MHz	782.0 MHz	9M04W7D	131.0 mW	131.0 mW
RSS130	2	782.0 MHz	782.0 MHz	9M01G7D	167.0 mW	167.0 mW
RSS132	3*	824.2 MHz	848.8 MHz	242KG7W	711.0 mW	711.0 mW
RSS132	3*	824.2 MHz	848.8 MHz	247KGXW	2352.0 mW	2352.0 mW

Specification	Issue Number	Frequency Range		Emission Designator	Power	
		From	To		Min.	Max.
RSS132	3*	824.7 MHz	848.3 MHz	1M11W7D	245.0 mW	245.0 mW
RSS132	3*	824.7 MHz	848.3 MHz	1M11G7D	299.0 mW	299.0 mW
RSS132	3*	825.5 MHz	847.5 MHz	2M71W7D	257.0 mW	257.0 mW
RSS132	3*	825.5 MHz	847.5 MHz	2M71G7D	317.0 mW	317.0 mW
RSS132	3*	826.4 MHz	846.6 MHz	4M14F9W	352.0 mW	352.0 mW
RSS132	3*	826.5 MHz	846.5 MHz	4M52W7D	251.0 mW	251.0 mW
RSS132	3*	826.5 MHz	846.5 MHz	4M56G7D	308.0 mW	308.0 mW
RSS132	3*	829.0 MHz	844.0 MHz	9M01W7D	261.0 mW	261.0 mW
RSS132	3*	829.0 MHz	844.0 MHz	9M01G7D	317.0 mW	317.0 mW
RSS133	6	1850.2 MHz	1909.8 MHz	243KG7W	580.0 mW	580.0 mW
RSS133	6	1850.2 MHz	1909.8 MHz	246KGXW	1394.0 mW	1394.0 mW
RSS133	6	1850.7 MHz	1909.3 MHz	1M11W7D	269.0 mW	269.0 mW
RSS133	6	1850.7 MHz	1909.3 MHz	1M10G7D	345.0 mW	345.0 mW
RSS133	6	1850.7 MHz	1914.3 MHz	1M11W7D	269.0 mW	269.0 mW
RSS133	6	1850.7 MHz	1914.3 MHz	1M10G7D	345.0 mW	345.0 mW
RSS133	6	1851.5 MHz	1908.5 MHz	2M72W7D	275.0 mW	275.0 mW
RSS133	6	1851.5 MHz	1908.5 MHz	2M72G7D	351.0 mW	351.0 mW
RSS133	6	1851.5 MHz	1913.5 MHz	2M72W7D	275.0 mW	275.0 mW
RSS133	6	1851.5 MHz	1913.5 MHz	2M72G7D	351.0 mW	351.0 mW
RSS133	6	1852.4 MHz	1907.6 MHz	4M14F9W	398.0 mW	398.0 mW
RSS133	6	1852.5 MHz	1907.5 MHz	4M54W7D	284.0 mW	284.0 mW
RSS133	6	1852.5 MHz	1907.5 MHz	4M59G7D	353.0 mW	353.0 mW
RSS133	6	1852.5 MHz	1912.5 MHz	4M54W7D	284.0 mW	284.0 mW
RSS133	6	1852.5 MHz	1912.5 MHz	4M59G7D	353.0 mW	353.0 mW
RSS133	6	1855.0 MHz	1905.0 MHz	9M00W7D	277.0 mW	277.0 mW
RSS133	6	1855.0 MHz	1905.0 MHz	9M01G7D	361.0 mW	361.0 mW
RSS133	6	1855.0 MHz	1910.0 MHz	9M00W7D	277.0 mW	277.0 mW
RSS133	6	1855.0 MHz	1910.0 MHz	9M01G7D	361.0 mW	361.0 mW
RSS133	6	1857.5 MHz	1902.5 MHz	13M5W7D	282.0 mW	282.0 mW
RSS133	6	1857.5 MHz	1902.5 MHz	13M5G7D	355.0 mW	355.0 mW
RSS133	6	1857.5 MHz	1907.5 MHz	13M5W7D	282.0 mW	282.0 mW

Specification	Issue Number	Frequency Range		Emission Designator	Power	
		From	To		Min.	Max.
RSS133	6	1857.5 MHz	1907.5 MHz	13M5G7D	355.0 mW	355.0 mW
RSS133	6	1860.0 MHz	1900.0 MHz	18M0W7D	265.0 mW	265.0 mW
RSS133	6	1860.0 MHz	1900.0 MHz	18M0G7D	323.0 mW	323.0 mW
RSS133	6	1860.0 MHz	1905.0 MHz	18M0W7D	265.0 mW	265.0 mW
RSS133	6	1860.0 MHz	1905.0 MHz	18M0G7D	323.0 mW	323.0 mW
RSS139	3*	1711.5 MHz	1753.5 MHz	2M72W7D	293.0 mW	293.0 mW
RSS139	3*	1711.5 MHz	1753.5 MHz	2M72G7D	367.0 mW	367.0 mW
RSS139	3*	1712.4 MHz	1752.6 MHz	4M14F9W	412.0 mW	412.0 mW
RSS139	3*	1712.5 MHz	1752.5 MHz	4M53W7D	282.0 mW	282.0 mW
RSS139	3*	1712.5 MHz	1752.5 MHz	4M58G7D	348.0 mW	348.0 mW
RSS139	3*	1715.0 MHz	1750.0 MHz	9M01W7D	293.0 mW	293.0 mW
RSS139	3*	1715.0 MHz	1750.0 MHz	9M01G7D	370.0 mW	370.0 mW
RSS139	3*	1717.5 MHz	1747.5 MHz	13M5W7D	308.0 mW	308.0 mW
RSS139	3*	1717.5 MHz	1747.5 MHz	13M4G7D	387.0 mW	387.0 mW
RSS139	3*	1720.0 MHz	1745.0 MHz	17M9W7D	306.0 mW	306.0 mW
RSS139	3*	1720.0 MHz	1745.0 MHz	17M9G7D	372.0 mW	372.0 mW
RSS140	1	790.5 MHz	795.5 MHz	4M54W7D	132.0 mW	132.0 mW
RSS140	1	790.5 MHz	795.5 MHz	4M58G7D	174.0 mW	174.0 mW
RSS140	1	793.0 MHz	793.0 MHz	9M03W7D	142.0 mW	142.0 mW
RSS140	1	793.0 MHz	793.0 MHz	9M01G7D	174.0 mW	174.0 mW
RSS199	3	2502.5 MHz	2567.5 MHz	4M51W7D	256.0 mW	256.0 mW
RSS199	3	2502.5 MHz	2567.5 MHz	4M52G7D	353.0 mW	353.0 mW
RSS199	3	2505.0 MHz	2565.0 MHz	9M02W7D	286.0 mW	286.0 mW
RSS199	3	2505.0 MHz	2565.0 MHz	8M99G7D	365.0 mW	365.0 mW
RSS199	3	2507.5 MHz	2562.0 MHz	13M5W7D	291.0 mW	291.0 mW
RSS199	3	2507.5 MHz	2562.5 MHz	13M5G7D	357.0 mW	357.0 mW
RSS199	3	2510.0 MHz	2560.0 MHz	18M0W7D	272.0 mW	272.0 mW
RSS199	3	2510.0 MHz	2560.0 MHz	18M0G7D	351.0 mW	351.0 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

Chapter 9 – 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

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

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

Chapter 10 – Using Connection Manager

Use Connection Manager to:

- Install the latest device drivers.
- Connect your device to your carrier's network.

Note: Connection Manager can install drivers and connect your device regardless of your cellular network; however, activation is only supported with Verizon, Aeris, and some regional carriers. I

- Switch the firmware in your device to a different carrier (if supported by your device).
- Manage cellular connection and automatically reconnect with the keep-alive feature.
- View device details.
- View line charts of signal level and data rates.
- Use a terminal window for communicating with and troubleshooting the device.

Note: If you have an older version of Connection Manager, uninstall it before installing a new version. For details, refer to Uninstalling Connection Manager.

Installing Connection Manager

Connection Manager installs the appropriate drivers for USB devices along with the application. Serial devices do not require drivers.

Note: Attempting to plug in the device before the appropriate drivers are installed can cause the connection to fail.

To install Connection Manager and the device drivers:

1. Go to https://www.multitech.com/support/connection-manager.
2. Click **Connection Manager**.
3. Open or unzip the **Connection Manager** file and run the installer (.msi file).
4. On the MultiTech Connection Manager Setup Wizard Welcome Panel, click **Next.**
5. Read the end-user license agreement and check **I accept the terms in the License Agreement**. Click **Next**.
6. Click **Next** to have the installer automatically disable the native WWAN AutoConfig service in Windows.

   The WWAN AutoConfig service manages mobile broadband connections. Connection Manager requires that this service be disabled.

   Note: This page appears in Windows 10 and Windows 1.

7. If any Multichannel device is connected to the computer, disconnect it and click **Next**.
8. If you use a USB device, check **Install the modem driver**.

   CAUTION: Unless you are certain that the drivers for your USB device are already installed on the computer, make sure that you check **Install the modem driver**. Failure to do this will cause the application to incorrectly detect your device or not detect the device at all.

   Note: Because serial devices do not require drivers, it does not matter if you check or uncheck **Install the modem driver** for a serial device.

9. To specify a folder for Connection Manager, use the default folder or click **Change** to browse to the folder you want to use. Click **Next.**

10. Click **Install**. Windows may prompt you to allow the installer to make changes to your computer. Click **Yes**.
11. In the Setup Wizard, click **Finish**.

Note: To open Connection Manager automatically after installation, check **Start the MultiTech Connection Manager when the installation is finished**.

If using a USB device, you can connect the device to the carrier's network with Connection Manager. Refer to Connecting a Device.

If using a serial device, you need to set up the device in Windows Device Manager before connecting the device. Refer to Setting Up a Serial Device in Windows Device Manager.

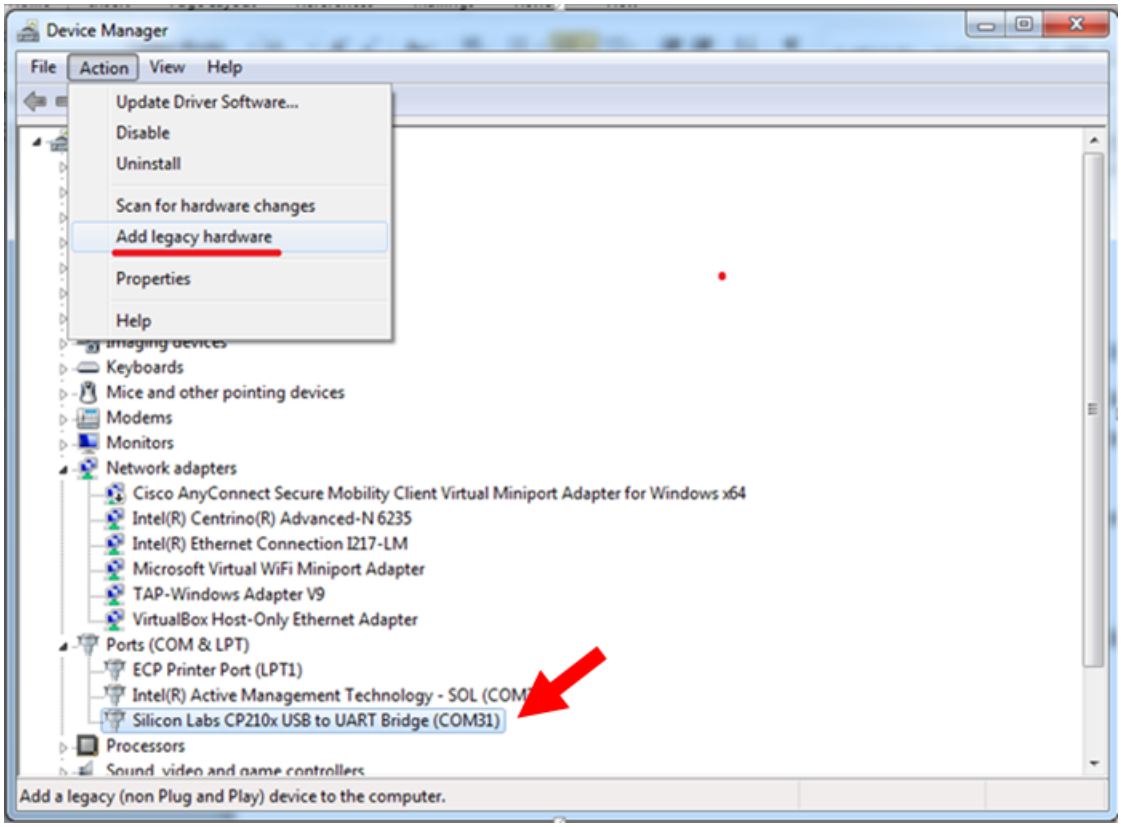
Setting Up a Serial Device in Windows Device Manager

To set up the device in Windows Device Manager:

1. Make sure that your desired COM port for the serial device is available.
2. Connect the serial device to the PC.
3. Go to **Control Panel** > **Device Manager**. Make a note of the COM port number for the connected device (in **COM Ports**).

   Example: The COM port is **COM31**.

4. Go to **Action** > **Add legacy hardware**.



5. In the **Add Hardware Wizard**:

   a. Click **Next**.

b. Select **Install the hardware that I manually select from a list**, then click **Next**.
c. Select **Modems**, then click **Next**.
d. Check **Don't detect my modem; I will select it from a list**, then click **Next**.
e. Select **Standard Modem Types**, then select **Standard 33600 bps Modem** on the right.

   Important: Make sure that you select *only* **Standard 33600 bps Modem**. Selecting another model may cause your device to work incorrectly or fail.

f. Select your COM port, then click **Next**.
g. Click **Finish**.
h. Go to **Device Manager** > **Modems** and confirm that the device is added.

6. To verify that the device is set up correctly, query the device:

   a. Go to **Device Manager** > **Modems**, right-click **Standard 33600 bps Modem**, and select **Properties**.
   b. On the **Diagnostics** tab, click **Query Modem**.

      Note: The device cannot be queried if the Connection Manager is running and using the device's port.

If the device is ready, diagnostic information from the device appears in the box above.

To connect the device to your carrier's network, refer to Connecting a Device.

Connecting a Device

Before You Begin

- Make sure that your device is connected to the computer where Connection Manager is installed.
- If you have a serial device, set up the device in Device Manager. Refer to Setting Up a Serial Device in Windows Device Manager.

To connect your device to the carrier's network:

1. Open Connection Manager.

   Connection Manager automatically detects the connected device, and the **Detect** button on the **Main** tab changes to **Connect**. If the application cannot detect the device automatically, click **Detect** to initiate device detection manually.

2. If you are connecting the device to this computer for the first time, on the **Connection** dialog box, provide values for the connection settings, such as the dial number and access point name (APN).

   You may need to ask the carrier for these settings.

   a. To monitor Internet connectivity, have Connection Monitor send periodic pings to a host, check **Enable keep-alive** and enter the IP address or host name to ping in the **Host to ping** box. For example, you can enter the host name google.com or IP address **8.8.8.8**.

      If the keep-alive check fails, Connection Manager automatically reconnects. When the keep-alive feature is enabled, the Connection Manager's **Main** tab displays the keep-alive check status and when the last ping response was received.

   b. If your device supports dual carriers, switch the firmware to the desired carrier by selecting the carrier in the **MNO Firmware** list. For example, if your device can switch the firmware between AT&T and Verizon, select **Verizon** in the list.

      Note:

      - The **MNO Firmware** list doesn't appear if your device doesn't support carrier firmware switching.
      - When you change the carrier firmware, the modem automatically restarts to apply the selected firmware.

   c. To save the settings, click **Apply**.

      You can change the connection settings on the **Connection** tab. The **Dial number**, **APN**, **User name**, and **Password** cannot be changed after the device is connected.

3. On the **Settings** tab, select **USB Modem** or **Serial Modem** depending on whether you are connecting a USB or serial device.
4. If you are connecting a serial device, provide the serial settings on the **Settings** tab:

   a. In the **Modem type** list, select the appropriate modem type.
   b. For the other settings, provide the values that match the serial-port settings for the device in Device Manager.

      For **Port**, expand **Ports** and notice the COM port number next to the device name. Right-click the device name, select **Properties**, and find the values for the other settings on the **Port Settings** tab.

   c. To save the settings, click **Apply**.

Note:

- Settings displayed for a USB device on the **Settings** tab are determined automatically and cannot be changed.
- To set the application to run during Windows startup, check **Run application at Windows startup**.
- To automatically connect to the Internet, check **Connect to the Internet automatically**.

Selecting **Run application at Windows startup** and **Connect to the Internet automatically** is useful in scenarios where Connection Manager is running on a remote computer. If a power failure occurs on the computer, these settings ensure the application will restart and reconnect to the Internet when power is restored.

5. On the **Main** tab, click **Connect**.

   When a connection is established, the **Main** tab displays the download and upload speeds, the amount of traffic sent and received, **Connected** status, and the signal strength percentage and bars. The statistics on connection speeds and traffic are available only during a current connection session.

Note:

- For serial modems, the signal strength is available only when the device is *not* connected to the carrier's network. When connection to the network is established, the last signal strength value is displayed.
- View the details for the current connection on the **Details** tab.

To disconnect the device from the carrier's network, click **Disconnect**.

Important: Disconnect the device in Connection Manager before disconnecting a device from the computer.

Uninstalling Connection Manager

Along with uninstalling Connection Manager, the installed device drivers are also removed.

Before You Begin

Make sure that Connection Manager is not running.

To uninstall Connection Manager:

1. In Windows, go to **Control Panel > Programs > Programs and Features**.
2. Right-click **MultiTech Connection Manager** and select **Uninstall**.
3. Click **Yes** to confirm that you want to uninstall Connection Manager.

   The native Windows WWAN AutoConfig service is automatically enabled.

4. When the message "Are you sure you want to uninstall this product?" appears, click **Yes**.

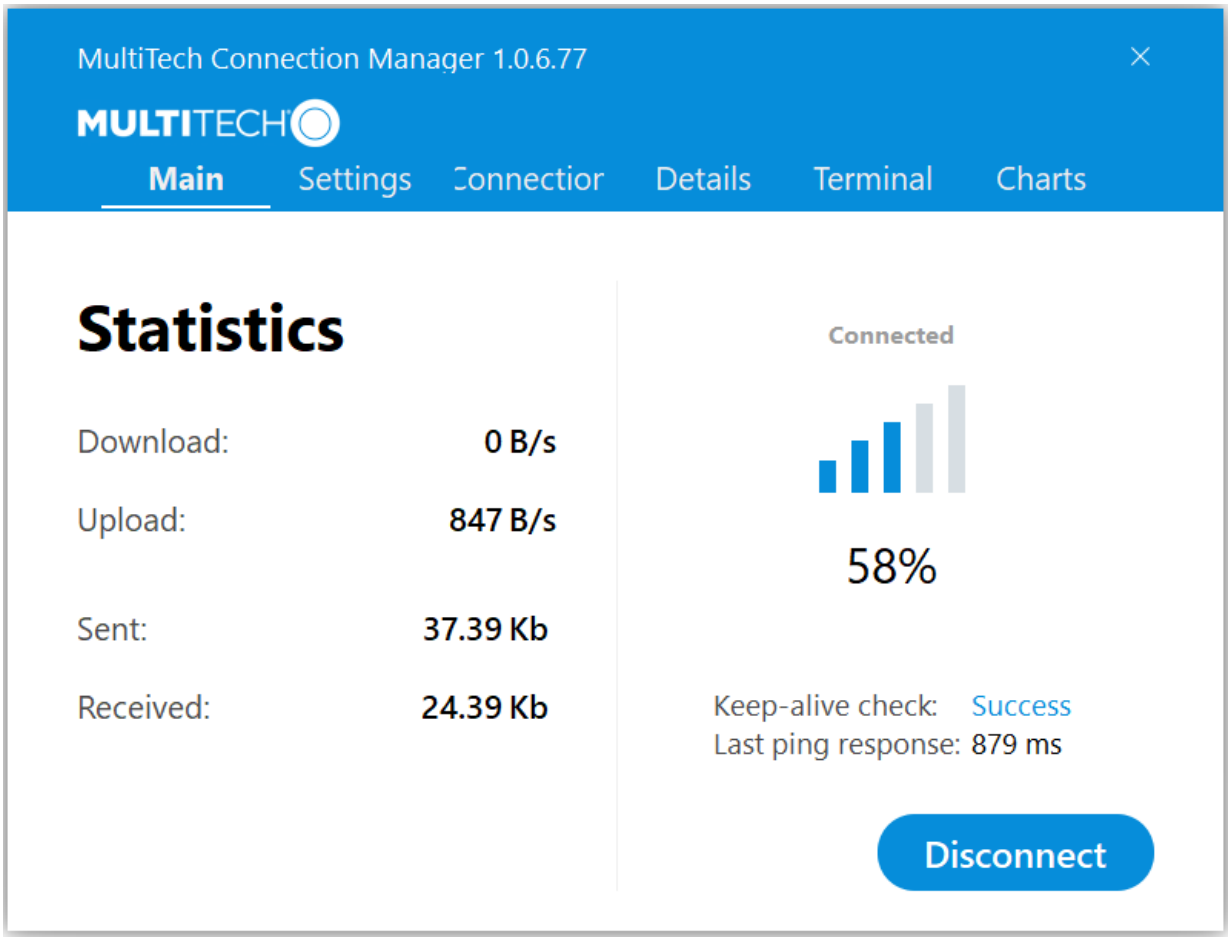
Connection Manager and the installed drivers are removed from the computer.

Note: The steps above describe how to uninstall Connection Manager using Control Panel. You can also uninstall the application by using the installer file (.msi). Double-click the file, in the MultiTech Connection Manager Setup Wizard, click **Next**, and then select **Remove** on the next two pages.

Connection Manager User Interface

Connection Manager consists of the following tabs:

- Main
- Settings
- Connection
- Details
- Terminal
- Charts



Main tab

The **Main** tab displays the following:

- Status of device connection: Searching, Connecting, Connected, Disconnecting, or Disconnected
- The action button, which changes according to the current device connection status: **Detect**, **Connect**, or **Disconnect**
- Signal strength bars and percentage indicator (only when connection to the carrier's network is established)

  Note: The signal strength is displayed for a serial device only when the device is not connected to the carrier's network.

- Connection statistics: download and upload speeds, amount of traffic sent and received (only when connection to the carrier's network is established)
- The keep-alive check status and when the last ping response was received if **Enable keep-alive check** is checked on the **Connection** tab.

Settings tab

Use the **Settings** tab to specify the type of device: **USB Modem** or **Serial Modem**.

- If **USB Modem** is selected, the tab displays USB settings. These settings cannot be edited.
- If **Serial Modem** is selected, the tab displays the serial settings that match the serial-port settings for the device. You can edit these settings.

The **Settings** tab also contains the **Run application at Windows startup** and **Connect to the Internet automatically** options.

- Check **Run application at Windows startup** to open Connection Manager when Windows starts.
- Check **Connect to the Internet automatically** to set Connection Manager to connect to the carrier's network automatically each time the application opens.

Connection tab

The **Connection** tab displays the following:

- The carrier-provided connection settings.
- The **Enable keep-alive check** box. Check this box to monitor connectivity to the Internet. Check **Enable keep-alive check** and enter the IP address or host name to ping in the **Host to ping** box. Connection Monitor will send periodic pings to the host. If the keep-alive feature fails, Connection Manager will automatically reconnect.
- The **MNO firmware** list. If your device supports dual carriers, you can switch the firmware to the other carrier by selecting the carrier in this list.

  Note: The **Connection** tab isn't available if Connection Manager doesn't detect a device.

Details tab

The **Details** tab displays the modem details when a device is detected and the connection details when a connection is established.

Terminal tab

The **Terminal** tab contains a terminal window to communicate with the connected device by entering AT commands. For details, refer to the AT Commands reference guide for your device.

Note: When a serial device is connected to the carrier's network, the terminal window isn't available.

Charts tab

The **Charts** tab contains line charts that graphically represent signal strength and download and upload speeds for the 2-hour interval.

Troubleshooting

Serial COM port is not available in the Serial Modem Settings

Close Connection Manager and reopen it.

Device is not detected ("No Device")

After following the steps to activate your device, the **Main** tab still indicates "No Device."

Try the following steps:

1. Click the **Settings** tab and make sure that the appropriate modem type is selected: USB or Serial.
2. If you are connecting a serial device, make sure that all serial modem settings correspond to the serial modem and serial port configuration.
3. Restart Connection Manager.
4. Disconnect and reconnect the device.

USB Modem is not detected

1. Check the LS LED and Power LED (if available) on the device.

   If they are not continuously lit, then the problem is with the power supply. Check the cable and connections.
2. USB device: Make sure that the device is connected to the PC and that the correct USB cable is in use.

Connection Manager is not working, and a device connected to the computer is not detected

Connection Manager cannot detect a connected device because the required drivers are not installed. The most likely cause is that **Install the modem drivers** was not checked during the installation.

Uninstall and re-install Connection Manager. During the installation, make sure that you check **Install the modem driver**. Refer to Uninstalling Connection Manager and Installing Connection Manager.

Connection Manager displays "Device Error" status for a serial device

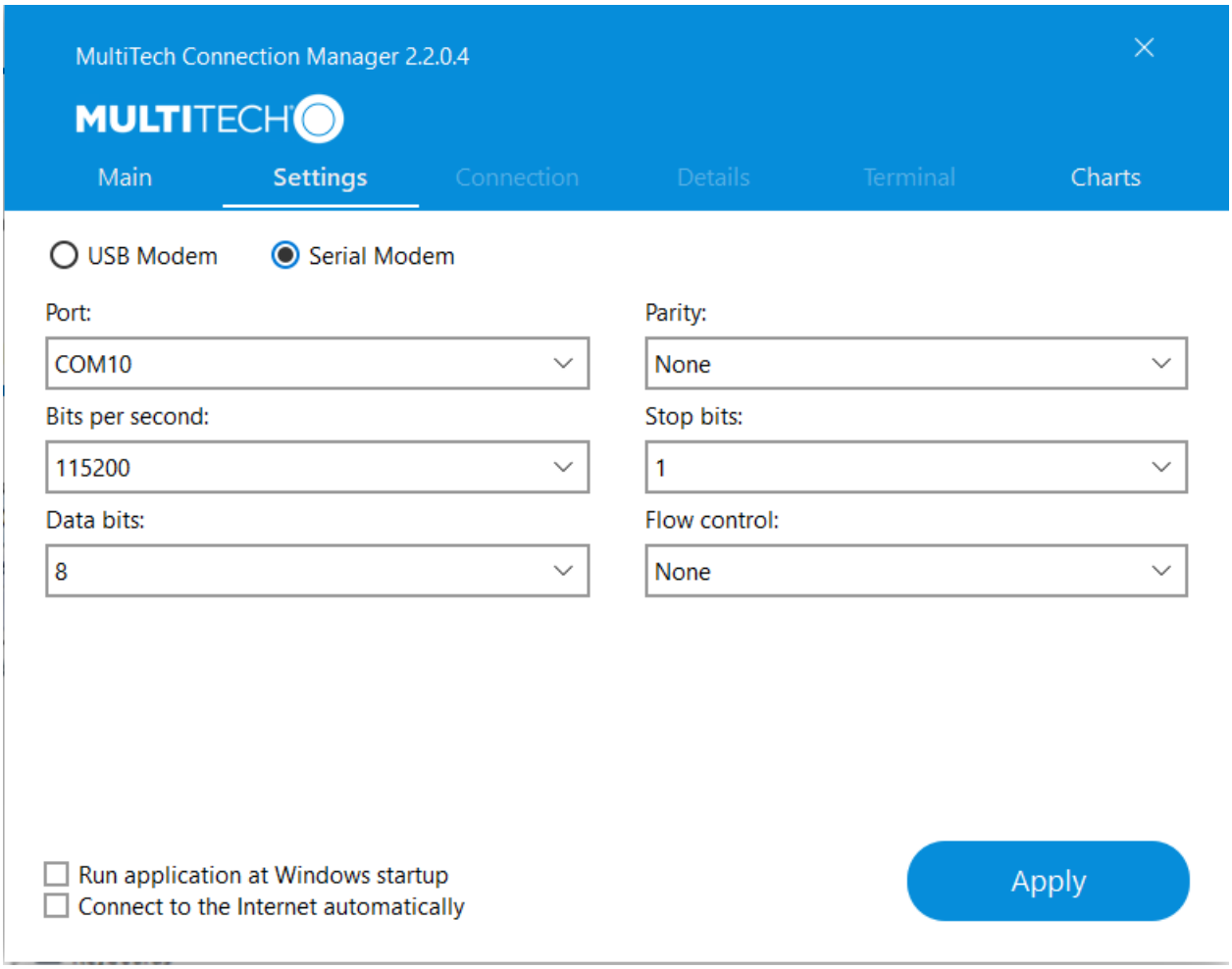
This error has the following causes and solutions.

Cause	Solution
Connection Manager cannot open the COM port that the device was installed on because the port is being used by another program.	If possible, free up the COM port for the device.
The wrong COM port is specified for the device on the **Settings** tab.	On the **Settings** tab, select the COM port that matches the port that the device is installed on and click **Apply**. You can look up the port in Device Manager in Windows. In Device Manager, expand **Modems**, right-click the name of your device, and select **Properties**. Note the port on the **Modem** tab.

System Cannot Connect to Serial Device

If your system cannot establish a connection with a serial device, verify Connection Manager settings match modem and serial port settings on the computer.

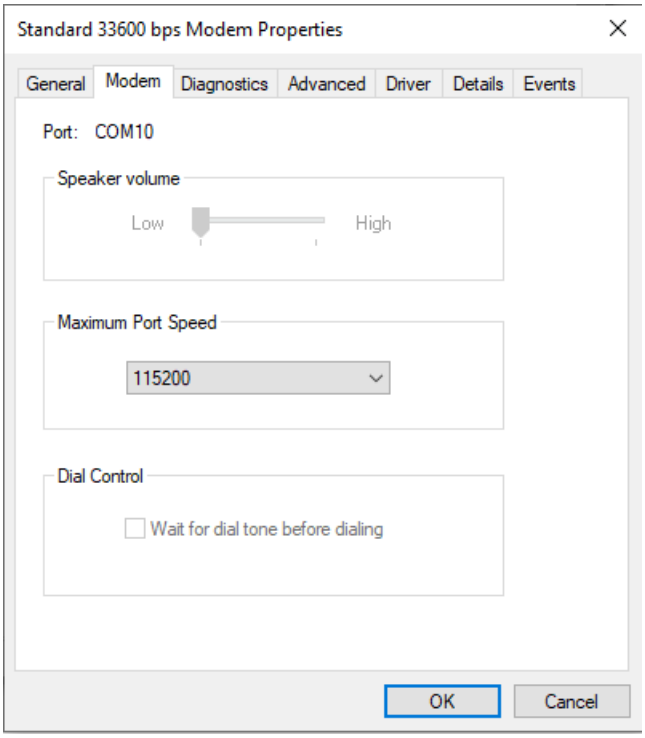
In **Connection Manager**, click on the **Settings** tab.



In **Device Manager**, open **Modems** and then right-click on your device and select open the **Properties**.

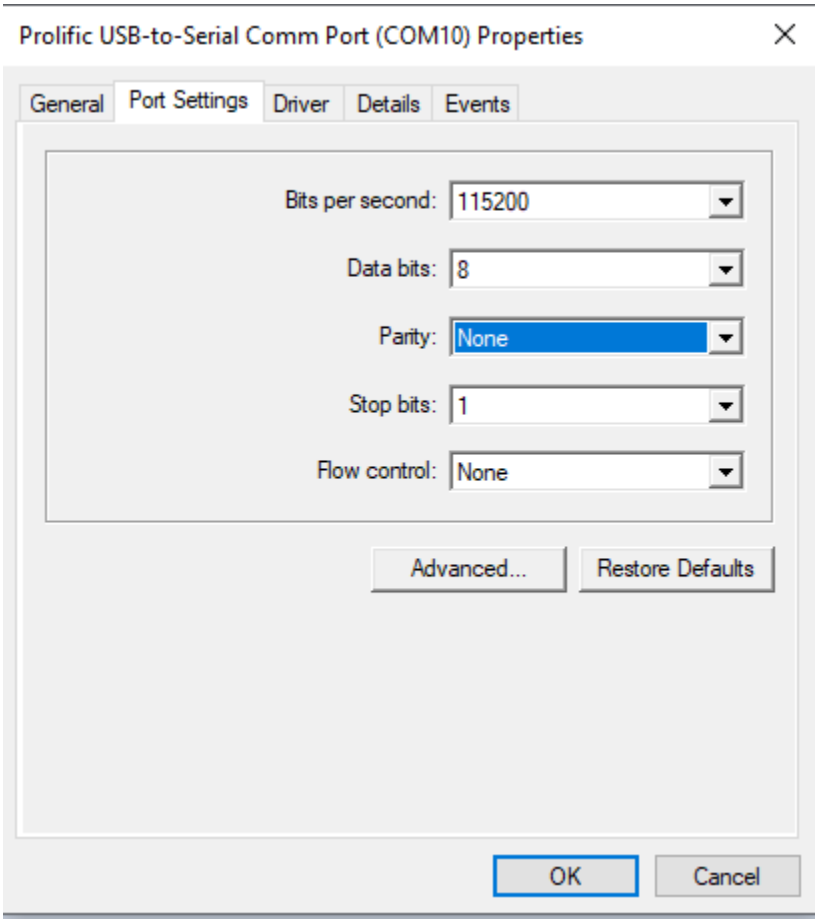
> **Note:** If Modems and Ports don't appear in Device Manager, open the **View** Menu and select **Show hidden devices**.

Click on the **Modem** tab to confirm the **Maximum Port Speed** matches Bits per second setting in Connection Manager.



In **Device Manager**, open **Ports (COM & LPT)** and then right-click on the Com Port used by your device and select **Properties.**

Click on the Port Settings tab to confirm the **Bits per second, Date bits, Parity, Stop bits** and **Flow control** match those settings in Connection Manager.


Prolific USB-to-Serial Comm Port (COM10) Properties
General
Port Settings
Driver
Details
Events
Bits per second:
115200
Data bits:
8
Parity:
None
Stop bits:
1
Flow control:
None
Advanced...
Restore Defaults
OK
Cancel

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