MultiConnect® microCell

MTCM-LAT3 and -LSP3 User Guide

MultiConnect microCell User Guide

Model: MTCM-LAT3 and MTCM-LSP3

Part Number: S000695 1.4

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Trademarks

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Knowledge Base

The Knowledge Base provides immediate access to support information and resolutions for all MultiTech products. Visit http://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.

Support

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

Country	By Email	By Phone
Europe, Middle East, Africa:	support@multitech.co.uk	+(44) 118 959 7774
U.S., Canada, all others:	support@multitech.com	(800) 972-2439 or (763) 717-5863

Warranty

To read the warranty statement for your product, visit www.multitech.com/warranty.go. For other warranty options, visit www.multitech.com/es.go.

World Headquarters

Multi-Tech Systems, Inc.

2205 Woodale Drive, Mounds View, MN 55112

Phone: (800) 328-9717 or (763) 785-3500

Fax (763) 785-9874

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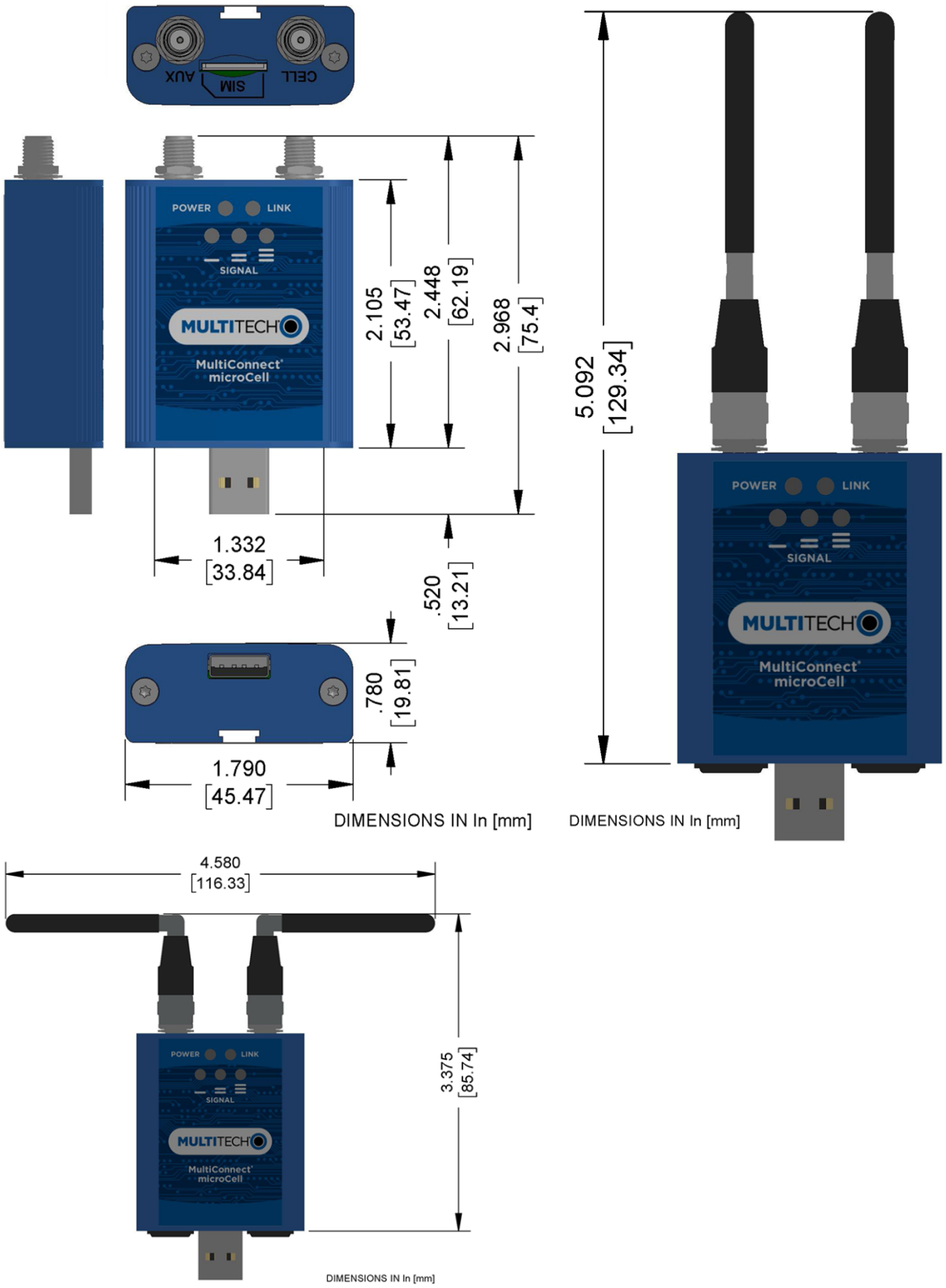
Chapter 1 – Product Overview

About the MultiConnect microCell Modem

The MultiConnect microCell is a compact and simple communications platform that provides cellular 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.

Dimensions


AUX
SIM
CELL
POWER
LINK
SIGNAL
MULTITECH
MultiConnect microCell
2.105 [53.47]
2.448 [62.19]
2.968 [75.4]
1.332 [33.84]
.520 [13.21]
.780 [19.81]
1.790 [45.47]
DIMENSIONS IN In [mm]
5.092 [129.34]
DIMENSIONS IN In [mm]
4.580 [116.33]
3.375 [85.74]
DIMENSIONS IN In [mm]

LED Descriptions

The top panel contains the following LEDs:

- Power LED—The Power LED indicates that DC power is present.
- Link LED—The Link LED indicated that it is registered on the network.
- Signal LEDs—Three signal LEDs can display the signal strength level of the wireless connection.

LED Indicators	
POWER	Indicates presence of DC power when lit.
LINK	Off : No power to unit. On: Continuously lit Powered on. Slow blink (-0.2Hz): Registered on network.
SIGNAL	These LEDs display the strength of the cellular signal. **Note:** The three PROGAMMABLE SIGNAL LEDs can be controlled as follows: ■ GPIO2: Controls the LED with a single bar above it. ■ GPIO3: Controls the LED with two bars above it. ■ GPIO4: Controls the LED with three bars above it. For more information on using GPIO to control the LEDs, refer to the AT Command Guide.

MTCM-LAT3 Specifications

Category	Description
General	
Standards	LTE 3GPP Release 9
	HSPA+ 21/GPRS fallback
	USB Interface is CDC-ACM compliant
TCP/IP Functions	FTP, SMTP, SSL, TCP, UDP
Frequency Bands	4G: 700 (B12/B13)/850 (B5)/AWS 1700 (B4)/1900 (B2)
	3G: 850 (B5)/1900 (B2)
Speed	
Data Speed	LTE: 10 Mbps downlink/5 Mbps uplink
	HSPA+: 21 Mbps downlink/5.76 Mbps uplink
Interface	
USB Interface	USB 2.0 high speed 480 Mbps
Physical Description	
Weight	Device only: 2.1 oz. (60 g); With antennas: 2.7 oz. (77 g)
Dimensions	Refer to mechanical drawing for dimensions.
Connectors	
Antenna Connector	2 SMA connector for cellular
SIM	1.8V and 3V SIM holder for micro-SIM (3FF) card
Environment	
Operating Temperature	-40° C to +85° C
Storage Temperature	-40° C to +85° C
Humidity	20%-90% RH, non-condensing
Power Requirements	
Operating Voltage	USB Model: 5 VDC

Category	Description
SMS	
SMS	Point-to-Point messaging
	Mobile-Terminated SMS
	Mobile-Originated SMS
Certifications and Compliance	
EMC Compliance	FCC Part 15 Class B

Category	Description
Radio Compliance	FCC Part 22, 24, 27
Safety Compliance	UL 60950-1 2nd ED
	cUL 60950-1 2nd ED
	IEC 60950-1 2nd ED
Network Compliance	PTCRB
Carrier	AT&T

MTCM-LSP3 Specifications

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General	
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Safety Compliance	UL 60950-1 2nd ED
	cUL 60950-1 2nd ED
	IEC 60950-1 2nd ED
Network Compliance	PTCRB
Carrier	Sprint

Power Measurements

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

MTCM-LAT3 Power Draw

Radio protocol	Sleep mode (mA)	Live idle (mA)	No data (mA)	Max power (mA)[1]	TX pulse (mA) [2]	Inrush charge (mC)[3]
5 Volts						
WDCMA	N/A	63	62	625	680	0.287
LTE	N/A	72	69	457	524	0.287

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 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.).
3. Inrush Charge: The total inrush charge at power on.

MTCM-LSP3 Power Draw

Radio protocol	Sleep mode (mA)	Live idle (mA)	No data (mA)	Max power (mA)[1]	TX pulse (mA) [2]	Inrush charge (mC)[3]
5 Volts						
LTE	N/A	63	86	605	668	0.133

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 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.).
3. Inrush Charge: The total inrush charge at power on.

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 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.

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 and Using the Device

Installing 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.

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:

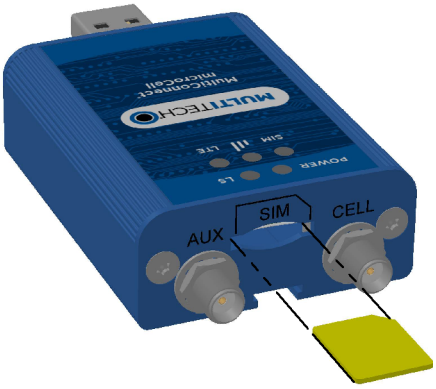
1. Issue the AT#SHDN command.
2. Wait 30 seconds.
3. Power off or disconnect power.

Note: If you send AT#SHDN and do not remove power, the control chip on the device turns the radio back on after 60 seconds.

Installing a SIM Card

This model requires a 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.

Mounting Device to Flat Surface

1. Locate the groove on the bottom of the device.
2. Slide the mounting bracket through the groove.
3. To secure the bracket to the desired surface, place and tighten two screws in the holes on either end of the mounting bracket. The dimensions illustration in this guide shows the mounting bracket, as well as the dimensions for placement of the screws.

Chapter 4 – Antenna and Activation 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 Cellular Devices

The cellular/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.

Cellular and LTE Antenna

Manufacturer:	2J
Manufacturer's Model Number:	2JW1024
Multi-Tech Systems:	45009891L

Antenna Specifications

Category	Description
Frequency Range	698 - 960 MHz
	1710 - 2170 MHz
	2500 - 2700 MHz
Impedance	50 Ohms
VSWR	VSWR should not exceed 2.0:1 at any point across the bands of operation
Peak Radiated Gain	~0.1 dBi
	~2.9 dBi
	~4.6 dBi
Radiation	Omni-directional
Polarization	Linear
Connector	SMA(M)

Device Phone Number

Every device has a unique phone number. Your service provider supplies a phone number when you activate your account, or if your device has a SIM card, the phone number may be on it. Wireless service provider implementation may vary. Consult with your service provider to get the phone number for your device.

Adding APN value

After properly setting up your account with your carrier and activating and installing your SIM card, you need to add your carrier's APN (Access Point Name) into the device before the cellular modem is ready for use.

To add your APN value:

1. Establish a terminal session with the device. If Verizon is your carrier, configure the device for the Verizon network as described in *Dual Carrier Firmware for Cellular Radio*.
2. If you are not on the Verizon network, program your network provider's Access Point Name (APN) into the device. To do this, issue:

   ```
   AT+CGDCONT=1,"IPV4V6","APN_Name"
   ```

   (where APN_Name is the APN provided by your wireless carrier).
   - Your wireless carrier assigns the APN. If you don't know the APN, contact your wireless carrier.

Your device should now be activated on the carrier's network and ready for use. To check operation issue the command: AT+CEREG? The modem should respond with +CEREG: 0,1 showing registration.

Sprint Activation and OMA-DM Commands (LSP3)

All applications interacting with Sprint approved MultiTech devices must be written in a manner where they do not interfere/interrupt the Sprint Hands-Free Activation (HFA) process or OMA-DM processes.

If the MultiTech device will be co-located with any other transmitters you will be required to submit your device to an FCC approved lab for additional testing.

If the Sprint approved MultiTech device/circuit board is embedded into another device/circuit board be aware you must perform EMC and safety testing on your end device.

For additional information refer to:

- *S000729 Telit Sprint OMA-DM AT Commands* available at www.multitech.com/documents/publications/reference-guides/S000729_Telit_Sprint_DG_OMADM-AT_commands.pdf
- For mLinux models, go to: http://www.multitech.net/developer/software/mlinux/using-mlinux/mlinux-cellular-connection/lsp-device-sprint-lte-activation/

Chapter 5 – Configuring and Communicating with Your Device

Before Using the Device

Before using the device:

- Install any drivers. Refer to the separate driver installation guide for your device.
- Power up your device and ensure it is connected to your computer that issues AT commands.

  Note: Wait 10 seconds after power-up before issuing any AT commands.

- Install terminal software that can communicate with the device, such as HyperTerminal, Tera Term, Kermit, or Putty.

For additional information, refer to the AT command guide and any related documentation for your device. The AT command guide describes command formatting, syntax, and other basic information.

Using Command Mode and Online Data Mode

Modems have two operation modes, command and online data. After power up, the modem is in command mode and ready to accept AT commands.

Use AT commands to communicate with and configure your modem. These commands establish, read, and modify device parameters and control how the modem works. The device also generates responses to AT commands that help determine the modem's current state.

If the modem is in online data mode, it only accepts the Escape command (+++).

To send the modem AT Commands from terminal emulation software, set the software to match the modem's default data format, which is:

- Speed: 115,200 bps
- Data bits: 8
- Parity: none
- Stop bit: 1
- Flow control: hardware

To confirm communication with the device:

- Type **AT** and press **Enter**.

If the device responds with OK, it is properly communicating.

Verifying Signal Strength

To verify the device signal strength, enter:

```
AT+CSQ
```

The command indicates signal quality, in the form:

```
+CSQ:     <rssi>,<sq>
```

Where:

<rssi>		Received signal strength indication.
	0	(-113) dBm or less
	1	(-111) dBm
	2-30	(-109) dBm - (-53) dBm / 2 dBm per step
	31	(-51) dBm or greater
	99	Not known or not detectable
<sq>		LTE - RSRQ (in dBm):
	0	-4 to -3
	1	-6 to -5
	2	-8 to -7
	3	-10 to -9
	4	-13 to -11
	5	-15 to -14
	6	-17 to -16
	7	-19 to -18
	99	Not known or not detectable

Note: Signal strength of 10 or higher is needed for successful packet data sessions.

Example

A example response to AT+CSQ:

```
+CSQ: 15,1
```

Checking Network Registration

Before establishing a packet data connection, verify the is device registered on the network. To do this enter the network registration report read command:

```
AT+CEREG?
```

If the device returns:

```
+CEREG: 0,1
```

or

```
+CEREG: 0,5
```

The device is registered.

If the device returns:

```
+CEREG: 0,2
```

The device is in a network searching state.

If the device returns:

```
+CEREG: 0,3
```

The registration is denied.

If the device returns:

```
+CEREG: 0,0
```

The device is not currently attempting to register to a network.

Sending and Receiving Data

Connecting Device to TCP Server as TCP Client

To send data through a connect socket:

1. **Define PDP Content (APN for SIM)**

   Enter

   ```
   AT+CGDCONT=1,"IPV4V6","APN_NAME"
   ```

   where APN_NAME is the APN your cellular provider assigned to your SIM card.

   The device responds with OK

2. **Bring up Data Connection Using Internal IP stack**

   Enter:

   Verizon:

   ```
   AT#SGACT=3,1
   ```

   Other Networks:

   ```
   AT#SGACT=1,1
   ```

   The device responds with the IP Address the cellular provider assigned to the device on connection, followed by OK. For example:

   ```
   #SGACT: 25.194.185.116
   OK
   ```

3. **Create Client Connection to TCP Server on Port 500**

   Enter:

   ```
   AT#SD=1,0,500,"###.##.###.##"
   ```

   where ###.##.###.## is the TCP server IP Address.

   The device responds with OK. The device can send or receive data now without entering additional commands.

Closing the Socket and the Connection

To close the socket:

1. Enter the escape sequence:
   `+++`
2. To close Socket 1, enter:
   `AT#SH=1`

To close the data connection:

Enter:

Verizon:

```
AT#SGACT=3,0
```

Other Networks:

```
AT#SGACT=1,0
```

The device responds with OK.

Configuring Device as UDP Listener to Accept UDP Client Connections

To configure the device as a UDP client:

1. **Check signal strength.**
   Enter:
   `AT+CSQ`
2. **Verify device is registered on the cellular network.**
   Enter:
   `AT+CEREG?`
   Should return:
   `+CEREG: 0,1 or +CEREG: 0,5`
   `OK`
3. **Configure socket parameters**
   Enter:
   `AT#SCFG=1,3,300,240,600,50`
4. **Activate context one**
   Enter:
   Verizon:
   `AT#SGACT=3,1`
   Other Networks:
   `AT#SGACT=1,1`
5. **Set firewall rule to accept connections:**
   `AT#FRWL=1,"###.##.###.#","###.##.###.#"`
   where ###.##.###.# represents the IP range. For example:
   `AT#FRWL=1,"204.26.122.1","204.26.122.255"`

6. **Set connection ID 1 for UDP listening mode on port 7000.**

   Enter:

   AT#SLUDP=1,1,7000

   The device responds with and unsolicited indication that a host is trying to connect to connection ID 1 on port 7000.

   SRING: 1

7. **Accept incoming connection ID 1**

   Enter:

   AT#SA=1

   The device indicates a client successfully established a listener connection.

   CONNECT

   The device can send and receive data now.

Exit Data Mode and Close Connection

To exit data mode and close the socket:

1. Enter the escape sequence:
   +++
2. To close Socket 1, enter:
   AT#SH=1
3. To close the data connection, enter:
   Verizon:
   AT#SGACT=3,0
   Other Networks:
   AT#SGACT=1,0
   The device responds with OK.

Configuring Device as UDP Client to Connect to UDP Server

Configure and Connect the Device

To configure the device as a UDP client:

1. **Check signal strength.**

   Enter:

   AT+CSQ

2. **Verify device is registered on the cellular network.**

   Enter:

   AT+CEREG?

   Should return:

   +CEREG: 0,1 or +CEREG: 0,5

   OK

3. **Configure socket parameters**

   Enter:

   AT#SCFG=1,3,300,240,600,50

4. **Activate context one**

Enter:

Verizon:

```
AT#SGACT=3,1
```

Other Networks:

```
AT#SGACT=1,1
```

5. **Create UDP connection to Server port**

   Enter:

   ```
   AT#SD=1,1,####,"###.##.###.##"
   ```

   where #### is the server port and ###.##.###.## is the IP number.

The device responds with OK, which indicates a successful connection for sending and receiving data through the socket connection.

Exit Data Mode and Close Connection

To exit data mode and close the socket:

1. Enter the escape sequence:

   ```
   +++
   ```

2. To close Socket 1, enter:

   ```
   AT#SH=1
   ```

3. To close the data connection,enter:

   Verizon:

   ```
   AT#SGACT=3,0
   ```

   Other Networks:

   ```
   AT#SGACT=1,0
   ```

   The device responds with OK.

Transferring FTP File to FTP Server

To connect to FTP server and upload files:

1. **Check signal strength.**

   Enter:

   ```
   AT+CSQ
   ```

2. **Verify device is registered on the cellular network.**

   Enter:

   ```
   AT+CEREG?
   ```

   Should return:

   ```
   +CEREG: 0,1 or +CEREG: 0,5
   OK
   ```

3. **Activate context**

   Enter:

   Verizon:

   ```
   AT#SGACT=3,1
   ```

   Other Networks:

   ```
   AT#SGACT=1,1
   ```

4. **Set FTP operations timeout to 10 seconds**

Enter:

```
AT#FTPTO=1000
```

5. **Configure FTP server IP address with username and password.**

   Enter:

   ```
   AT#FTPOPEN="###.##.###.#","username","password",0
   ```

   where ###.##.###.# is the IP address and the username and password for the FTP server.

6. **Configure file transfer type.**

   Enter:

   ```
   AT#FTPTYPE=#
   ```

   where # is 0 for binary or 1 for ASCII.

7. **Enter the file name to be sent to the FTP server and initiate connection.**

   Enter:

   ```
   AT#FTPPUT="file.txt"
   ```

   The device responds with:

   ```
   CONNECT
   ```

8. Send the file through the device.

Closing the FTP Data Connection

After the file is sent:

1. **Enter the escape sequence.**

   Enter:

   ```
   +++
   ```

   The device responds with:

   ```
   NO CARRIER
   ```

2. **Close the FTP connection.**

   Enter:

   ```
   AT#FTPCLOSE
   ```

3. **Close the PPP data connection.**

   Enter:

   Verizon:

   ```
   AT#SGACT=3,0
   ```

   Other Networks:

   ```
   AT#SGACT=1,0
   ```

   The device responds with OK.

Downloading File from FTP Server

To connect to an FTP server and download files:

1. **Check signal strength.**

   Enter:

   ```
   AT+CSQ
   ```

2. **Verify device is registered on the cellular network.**

   Enter:

```
AT+CEREG?
```

Should return:

```
+CEREG: 0,1 or +CEREG: 0,5
OK
```

3. **Activate context one**

   Enter:

   Verizon:

   ```
   AT#SGACT=3,1
   ```

   Other Networks:

   ```
   AT#SGACT=1,1
   ```

4. **Set FTP operations timeout to 10 seconds**

   Enter:

   ```
   AT#FTPTO=1000
   ```

5. **Configure FTP server IP address with username and password.**

   Enter:

   ```
   AT#FTPOPEN="###.##.###.#","username","password",0
   ```

   where ###.##.###.# is the IP address and the username and password for the FTP server.

6. **Configure file transfer type.**

   Enter:

   ```
   AT#FTPTYPE=#
   ```

   where # is 0 for binary or 1 for ASCII.

7. **If required, change the working directory to "folder1".**

   Enter:

   ```
   AT#FTPCWD="folder1"
   ```

8. **Enter the file name.**

   Enter:

   ```
   AT#FTPGET="filename.txt"
   ```

   where filename.txt is the file to download.

   The device responds with:

   ```
   CONNECT
   ```

   The file is received through the device. The device responds with:

   ```
   NO CARRIER
   ```

   The data connection closes automatically when the file sending ends.

Closing the FTP Data Connection

After the file is sent:

1. **Close the FTP connection.**

   Enter:

   ```
   AT#FTPCLOSE
   ```

2. **Close the PPP data connection.**

   Enter:

   Verizon:

   ```
   AT#SGACT=3,0
   ```

Other Networks:

```
AT#SGACT=1,0
```

The device responds with OK.

Reading, Writing and Deleting Messages

Sending Text Messages

To send a text message in text mode:

1. **Check signal strength.**

   Enter:

   ```
   AT+CSQ
   ```

2. **Verify device is registered on the cellular network.**

   Enter:

   ```
   AT+CEREG?
   ```

   Should return:

   ```
   +CEREG: 0,1 or +CEREG: 0,5
   OK
   ```

3. **Put the device in text mode.**

   Enter:

   ```
   AT+CMGF=1
   ```

   The device responds.

   ```
   OK
   ```

4. **Enter the recipient's number and your message.**

   Enter:

   ```
   AT+CMGS="##########"
    >Your message here
   ```

   where ########## is the recipient's number.

5. **Send the message.**

   Enter CTRL+Z.

   The device responds:

   ```
   +CMGS: #
   OK
   ```

   where # is the reference number of the sent message.

For example:

```
AT+CMGF=1
OK
AT+CMGS="0001112222"
> How are you?  <CTRL+Z to send>
+CMGS: 255
OK
```

Where 0001112222 is the phone number.

Reading Text Messages

NOTE: For CAT M1 devices, you can only send/receive SMS messages from other CAT M1 devices on the same network.

To read a text message in text mode:

1. **Send a message to the phone number of the currently installed SIM.**
2. **Put the device in text mode.**
   Enter:
   `AT+CMGF=1`
3. **Read message.**
   Enter:
   `AT+CMGR=1`

Example response:

```
+CMGR: "REC UNREAD","0001112222","","20161006135126"
How are you?
OK
```

Where 0001112222 is the recipient phone number and 20161006135126 is received data in the format YYYYMMDDHHMMSS.

Deleting Messages

To delete one text message, enter:

`AT+CMGD=1,#`

where 1 is the index in the select storage and # is the delflag option. Enter:

0	Deletes message in the specified index.
1	Deletes all read messages. Leaves unread messages and stored device-originated messages.
2	Deletes all read and sent device-originated messages. Leaves unread messages and unsent device-originated messages.
3	Deletes all read messages and sent and unsent device-orginated messages. Leaves unread messages.
4	Deletes all messages.

For example:

```
AT+CMGD=1 (delete message at index 1)
AT+CMGD=2 (delete message at index 2 )
AT+CMGD=1,0
AT+CMGD=1,1
AT+CMGD=1,2
AT+CMGD=1,3
AT+CMGD=1,4
```

Chapter 6 – Regulatory Information

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.

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.

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[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

Environmental considerations:

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

[1]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) 标准一中华人民共和国《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。

Chapter 7 – Using Connection Manager

Use Connection Manager to:

- Install the latest device drivers.
- Activate and 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, Sprint, and some regional carriers. If you cannot activate your device with Connection Manager, refer to *Account Activation for Cellular Devices.*
- MTD-H5 models use SIM-based activation. If you do not have a SIM card, contact your carrier.

- 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.

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. In the MultiTech Connection Manager Setup Wizard, read the end-user license agreement and check **I accept the terms in the License Agreement**.
5. 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 only on Windows 10.

6. If a MultiTech device is connected to the computer, disconnect it and click **Next**.
7. 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.

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

   A separate wizard opens for installing Telit drivers. Some MultiTech devices use embedded modules from Telit Wireless Solutions to provide cellular connectivity; these devices require Telit drivers.

10. Select **Complete** setup type.
11. When the drivers are installed, click **Finish**.
12. In the Setup Wizard, click **Finish**.

    Note:

    - To open Connection Manager after installation, check **Start the MultiTech Connection Manager when the installation is finished**.
    - After the drivers are installed, you need to restart your computer if prompted by Windows.

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.

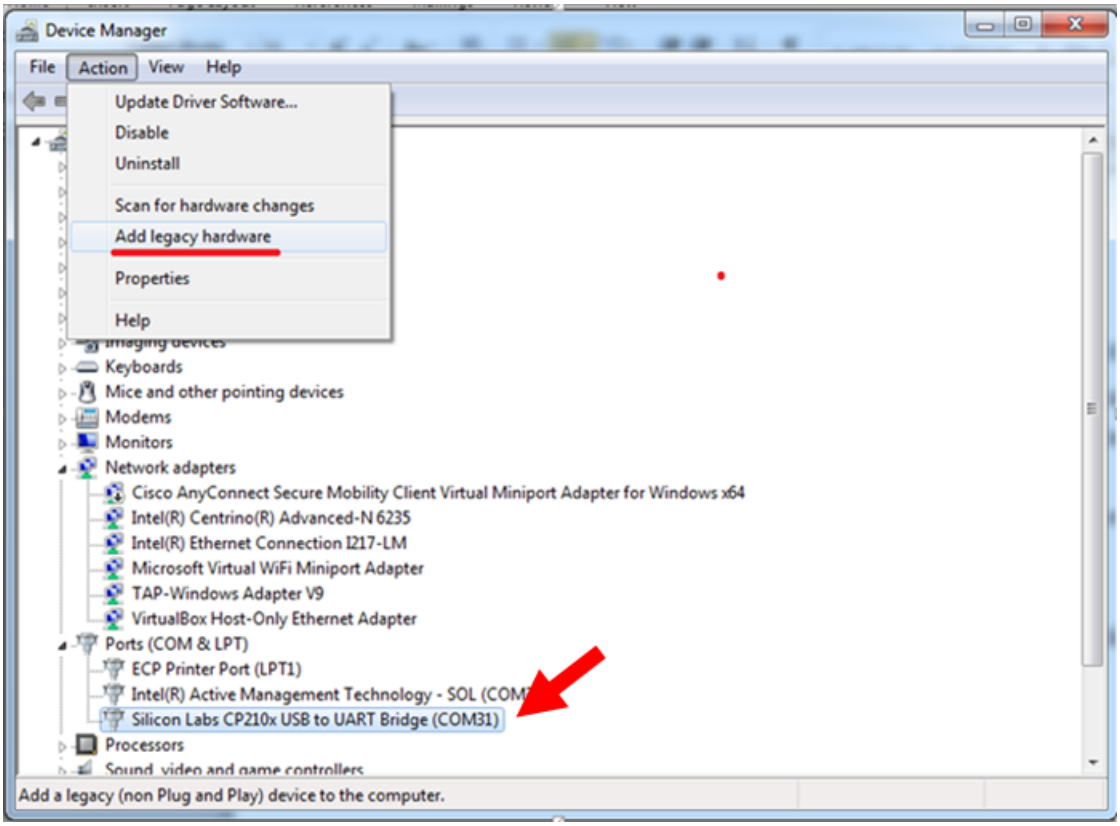
Setting Up a Serial Device in Windows Device Manager

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.
- 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.

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

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.

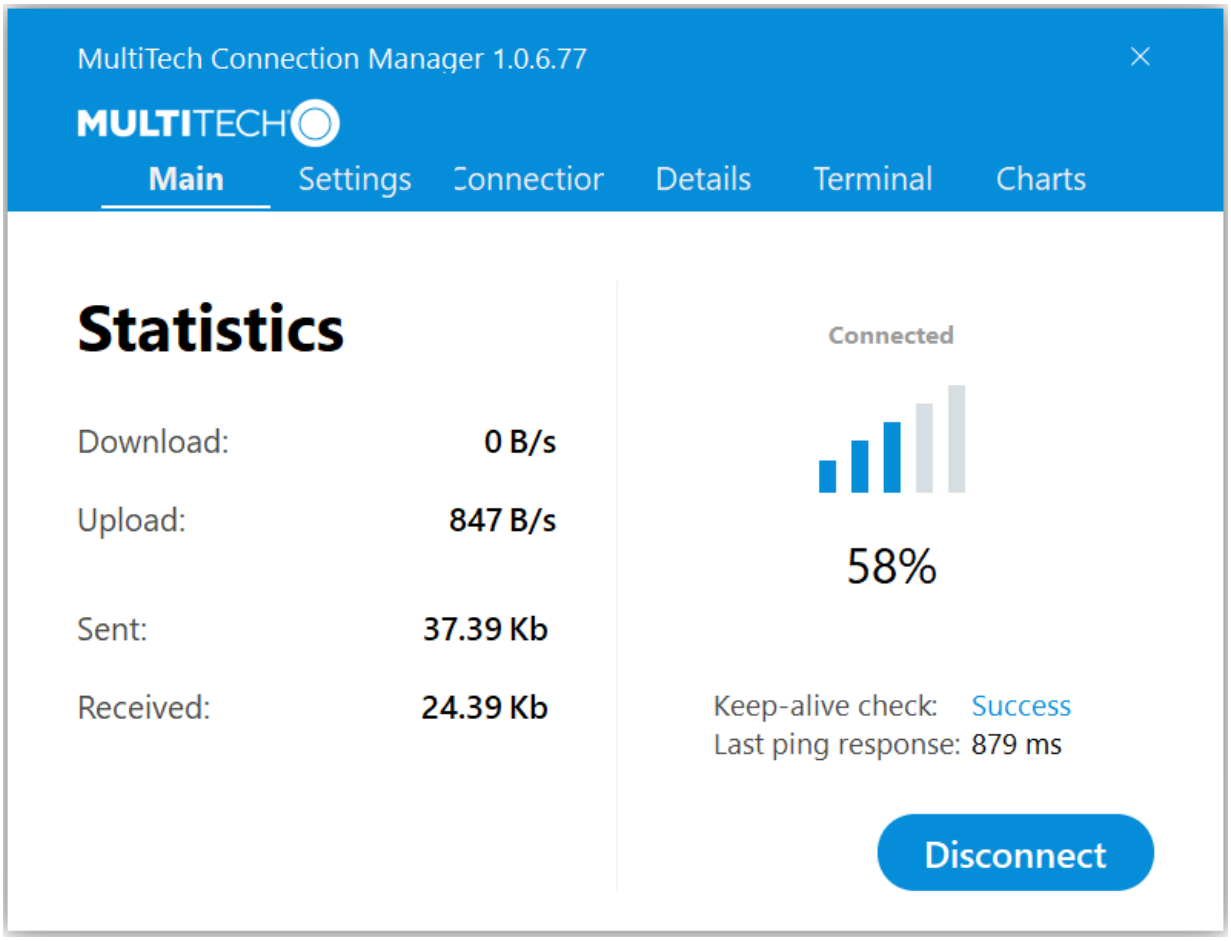
Note: The steps above describe how to uninstall Connection Manager using Control Panel. You can also uninstall the application by using the installer file (.msi). Double-click the file, in the MultiTech Connection Manager Setup Wizard, click **Next**, and then select **Remove** on the next two pages.

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.

MultiConnect Cell USB Modem is not detected

1. Check the Power and LS LEDs 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.