MULTITECH®

MultiConnect® Cell

MTC Cat M1 User Guide

MultiConnect Cell Series 100 User Guide

Model: MTC-MAT1, MTC-MVW1

Part Number: S000611 1.4

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

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Chapter 1 – Product Overview

About the MultiConnect Cell Modem

MultiConnect Cell 100 Series MTC Cat M1 cellular modems are ready-to-deploy, standalone LTE UE Category M1 modems that provide wireless communication. The MTC Cat M1 is a compact communications platform that provides cellular capabilities for fixed and mobile applications. The device provides low-powered option specifically designed for IOT applications that collect smaller amounts of data or with less frequency. This product is available with RS-232 or USB connectors.

Documentation

This documentation is available on the MultiTech Installation Resources website at www.multitech.com/support.

Document	Description
MultiConnect Cell MTC Cat M1 User Guide	This document provides an overview, safety and regulatory information, schematics, and general device information, P/N S000611.
USB Driver Installation Guide	Instructions for installing USB drivers on Linux and Windows Systems, P/N S000616.
Telit ME910C1 AT Commands Reference Guide	Lists AT Commands and parameters used to configure your device, P/N 80529ST10815A

Product Build Options
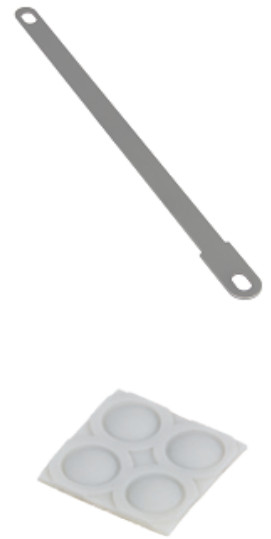
Product	Description	Carrier/Region
MTC-MAT1-B01	LTE UE Category M1 Modem (Serial version)	AT&T/NA
MTC-MAT1-B01-US*	LTE UE Category M1 Modem (Serial version)+ Kit	AT&T/NA
MTC-MAT1-B03	LTE UE Category M1 Modem (USB version)	AT&T/NA
MTC-MAT1-B03-KIT*	LTE UE Category M1 Modem (USB version)+ Kit	AT&T/NA
MTC-MVW1-B01	LTE UE Category M1 Modem (Serial version)	Verizon/NA
MTC-MVW1-B01-US*	LTE UE Category M1 Modem (Serial version)+ Kit	Verizon/NA
MTC-MVW1-B03	LTE UE Category M1 Modem (USB version)	Verizon/NA

Product	Description	Carrier/Region
MTC-MVW1-B03-KIT*	LTE UE Category M1 Modem (USB version)+ Kit	Verizon/NA

*Note: Kits include cellular antenna and other accessories with the specified product.

Package Contents

Your MTC Cat M1 package typically includes the following:

Contents	Description
	1 - Power Supply with Removable Blades (serial version) **OR**
	1 - USB cable (USB version)
	1 - RS-232 cable 6-ft. (serial version)
	1 - Cellular Antenna
Document	MTC Cat M1 Quick Start Guide
	1 - Mounting Tab and Bracket
	4 - Rubber Feet

Note: The above information does not apply purchasing the device only.

Dimensions

Serial

CELL
NORMAL
LOW
POWER
SIM
AUX

.260[6.60]
.300[7.62]
.170[4.32]

.393[9.97] REF.
.187[4.75] REF.

MultiConnect® Cell
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III
II
I
PROG. SIGNAL
LS
CD
TR
POWER

4.925[125.10]
5.415[137.54]
.257[6.53] REF.

.400[10.16]

3.171[80.54]

RS-232

1.163[29.54]

2.450[62.23]
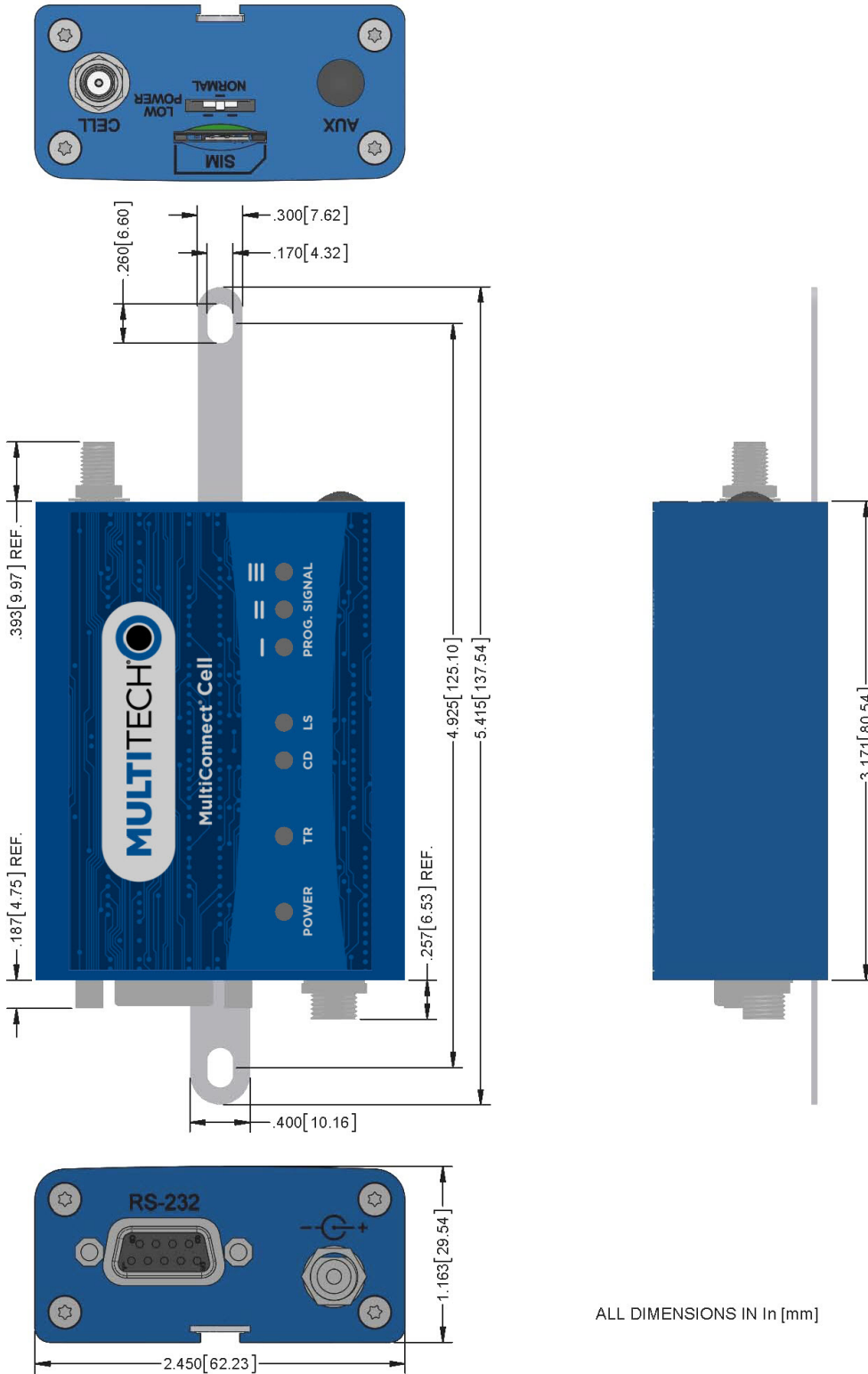
ALL DIMENSIONS IN In [mm]

USB
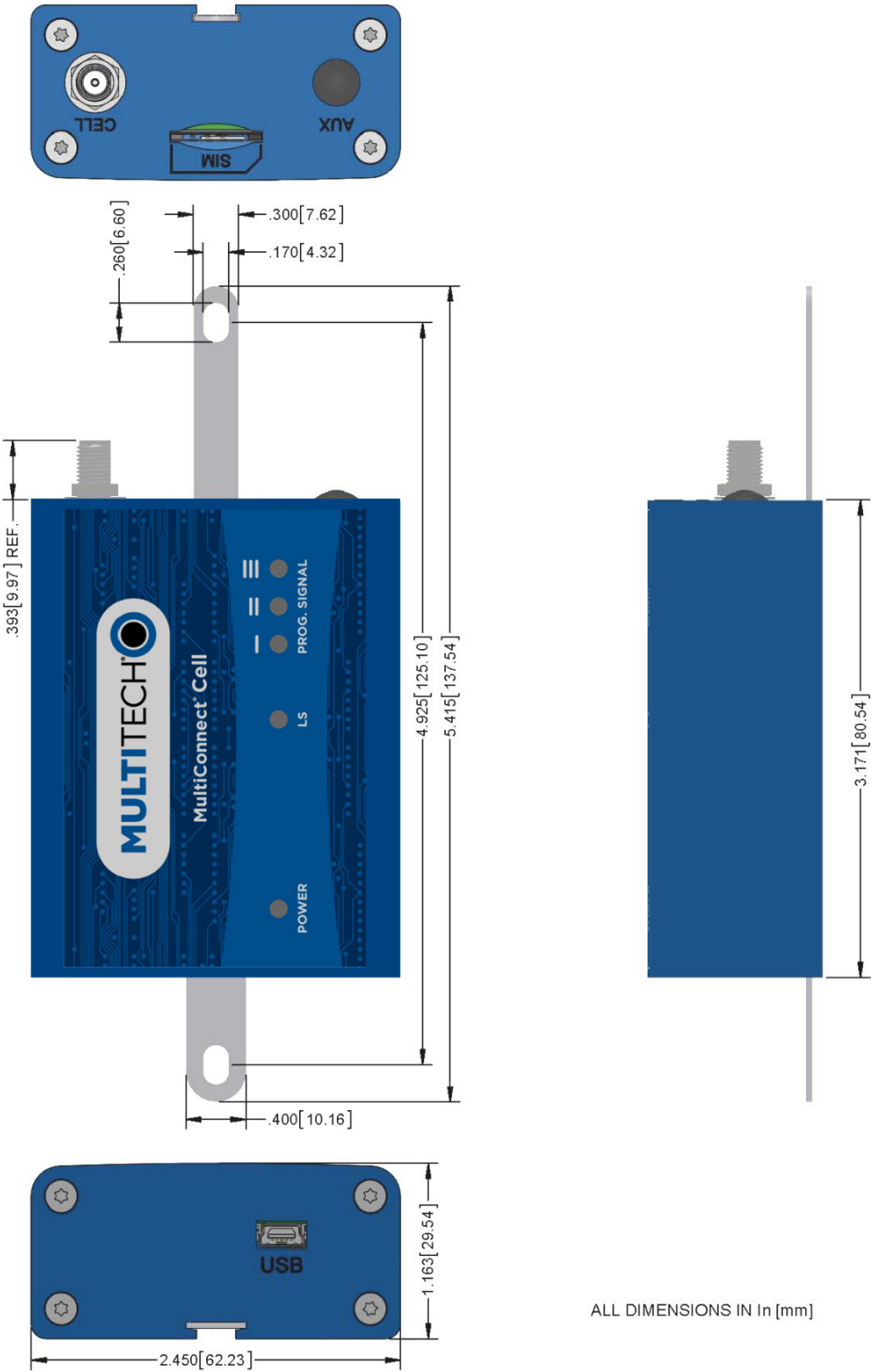
ALL DIMENSIONS IN In [mm]

LED Descriptions

The top panel contains the following LEDs:

- Power and Terminal Ready LEDs—The Power LED indicates that DC power is present and the TR LED blinks when the unit is functioning normally.
- Modem LEDs—Two modem LEDs indicate carrier detection and link status (for serial units only).
- Prog. Signal LEDs—Three programmable signal LEDs can display the signal strength level of the wireless connection if coded by the user.

LED Indicators	
POWER	Indicates presence of DC power when lit.
TR	Terminal Ready. When lit, indicates connection to terminal emulation. When not lit, indicates no terminal is present. (for serial only)
CD	Carrier Detect. Indicates established data connection when lit. (for serial only)

PROG. SIGNAL	These LEDs do not function by default and require the user to write code in order to control them. If programmed, they display the strength of the cellular signal.
	 Note: The three PROG. 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.

Side Panels

The device has connectors on either side. The figures that follow show the side panels.
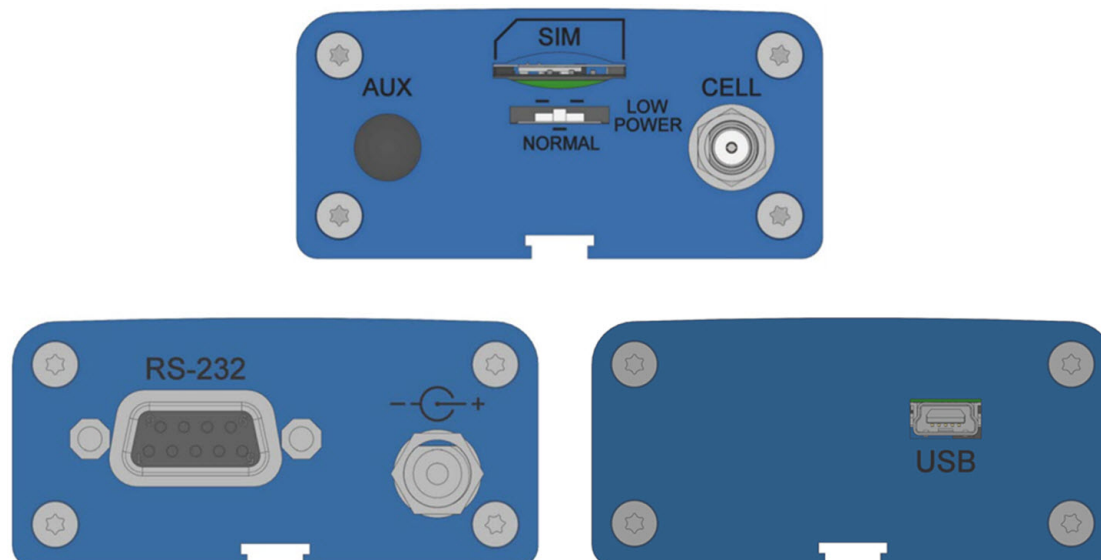
MTC-MAT1 Specifications

Category	Description
General	
Standards	LTE UE Category M1
	3GPP release 13
	USB 2.0 HS / Serial port multiplexer 3GPP TS27.010
TCP/IP Functions	FTP, SMTP, SSL, TCP, UDP, TLS
Frequency Bands	4G: 700 (B12)/AWS 1700 (B4)/1900 (B2)
Speed	
Data Speed	LTE Category M1: 300 kbps downlink/375 kbps uplink
Interface	
USB Interface	USB 2.0 high speed compatible
UART Interface	RS-232 levels
Physical Description	
Weight	0.4 oz. (10 g)
Dimensions	Refer to mechanical drawing for dimensions.
Connectors	
Antenna Connector	1 surface mount SMA connector for cellular
SIM	1.8V and 3V SIM holder for mini-SIM card
Environment	
Operating Temperature	-40° C to +85° C

Category	Description
Storage Temperature	-40° C to +85° C
Humidity	20%-90% RH, non-condensing
Power Requirements	
Operating Voltage	USB Models: 5 VDC
	Serial Models: 5-32 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
Radio Compliance	FCC Part 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

MTC-MVW1 Specifications

Category	Description
General	
Standards	LTE UE Category M1
	3GPP Release 13
	USB 2.0 HS / Serial port multiplexer 3GPP TS27.010
TCP/IP Functions	FTP, SMTP, SSL, TCP, UDP, TLS
Frequency Band	4G: 700 MHz (B13)/AWS 1700 (B4)
Speed	
Data Speed	LTE Category M1: 300 kbps downlink/375 kbps uplink
Interface	
USB Interface	USB 2.0 high speed compatible
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Environment	
Operating Temperature	-40° C to +85° C
Storage Temperature	-40° C to +85° C
Humidity	20%-90% RH, non-condensing
Power Requirements	
Voltage	USB Models: 5 VDC
	Serial Models: 5-32 VDC
SMS	
SMS	Point-to-Point messaging
	Mobile-Terminated SMS
	Mobile-Originated SMS
Certifications and Compliance	
EMC Compliance	FCC Part 15 Class B
Radio Compliance	FCC Part 24, 27
Safety Compliance	UL 60950-1 2nd ED
	cUL 60950-1 2nd ED
	IEC 60950-1 2nd ED
Carrier	Verizon

RS-232 9-Pin Female Connector
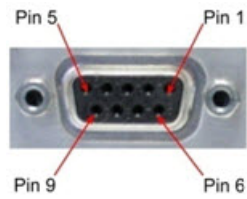
Pin	Abbreviation	Description	In/Out
1	CD	Carrier Detect	O
2	RX	Receive	O
3	TX	Transmit	I
4	DTR	Data Terminal Ready	I
5	GND	Ground	--
6	DSR	Data Set Ready	O
7	RTS	Request to Send	I
8	CTS	Clear to Send	O
9	RI	Ring Indicator	O

Power Measurements

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

MTC-MAT1 Power Draw

Serial model (B01)

Radio protocol	Sleep mode (mA)[1]	Power save mode (mA)	Live idle (mA)[2]	No data (mA)[3]	Max power (mA)[4]	TX pulse (mA) [5]	Inrush charge (mC)[6]	Inrush duration (ms)[7]
9 Volts								
LTE 1900 MHz	9	7	26	42	84	152	0.756	9.56
12 Volts								
LTE 1900 MHz	7	6	24	34	67	136	0.743	7.53
24 Volts								
LTE 1900 MHz	5	4	15	24	45	116	1.32	15.4

USB model (B03)

Radio protocol	Sleep mode (mA)[1]	Power save mode (mA)	Live idle (mA)[2]	No data (mA)[3]	Max power (mA)[4]	TX pulse (mA) [5]	Inrush charge (mC)[6]
5 Volts							
LTE	N/A	6	36	35	125	212	0.596

Note:

[1]Sleep mode: Sleep mode current, connected to wireless (milliamps).

[2]Live idle: Live Connection Idle Current (milliamps).

[3]No data: Cellular call box connection, no data (milliamps).

[4]Max Power: Average measured current (milliamps) at maximum power. The continuous current during maximum data rate with the radio transmitter at maximum power.

[5]TX pulse: Average TX pulse amplitude current (milliamps). The average peak current during a transmission burst period.

[6]Inrush charge: Total inrush charge (millicoulombs). The total inrush charge or input current at power up, or reset.

[7]Inrush duration: Total inrush charge duration during power-up (milliseconds).

MTC-MVW1 Power Draw

Serial model (B01)

Radio protocol	Sleep mode (mA)[1]	Power save mode (mA)	Live idle (mA)[2]	No data (mA)[3]	Max power (mA)[4]	TX pulse (mA) [5]	Inrush charge (mC)[6]	Inrush duration (ms)[7]
9 Volts								
LTE 700 MHz	9	20	26	25	70	132	0.762	9.0
12 Volts								
LTE 700 MHz	7	19	24	24	58	124	0.768	7.4
24 Volts								
LTE 700 MHz	4	10	14	14	41	108	1.16	23.0

USB model (B03)

Radio protocol	Sleep mode (mA)[1]	Power save mode (mA)	Live idle (mA)[2]	No data (mA)[3]	Max power (mA)[4]	TX pulse (mA) [5]	Inrush charge (mC)[6]
5 Volts							
LTE	N/A	6	36	35	125	212	0.596

Note:

[1]Sleep mode: Sleep mode current, connected to wireless (milliamps).

[2]Live idle: Live Connection Idle Current (milliamps).

[3]No data: Cellular call box connection, no data (milliamps).

[4]Max Power: Average measured current (milliamps) at maximum power. The continuous current during maximum data rate with the radio transmitter at maximum power.

[5]TX pulse: Average TX pulse amplitude current (milliamps). The average peak current during a transmission burst period.

[6]Inrush charge: Total inrush charge (millicoulombs). The total inrush charge or input current at power up, or reset.

[7]Inrush duration: Total inrush charge duration during power-up (milliseconds).

Chapter 2 – Carrier Specific Notice

Firmware Over the Air (FOTA) Script

Verizon Requirement: Firmware Over The Air (FOTA) - Scripting

At times, your device may require a critical update to radio firmware for devices connecting to the network. To stay compliant to Verizon's LTE requirements you must implement FOTA. Failure to perform a critical update could result in losing access to the Verizon network.

MultiTech has developed a script for customers to use in order to initiate a FOTA update from the (the customer's) local host processor (pull FOTA).

In an upcoming release, MultiTech LTE Category M1, devices for Verizon, will allow the customer to initiate a FOTA update from a remote server (push FOTA) as required and communicated by Verizon.

If your device does not include local processing capabilities, you will be required to upgrade when that release becomes available.

Below is an example of a FOTA process for the ME910C1-NV cellular module you could implement in your host system. You may implement the process below or implement your own FOTA solution.

In the example below, your host system application periodically accesses a file placed on an FTP server of your choosing and reads file contents to determine if a firmware update is required.

Cellular Module FOTA Script Example Process

1. Set up an FTP server to contain a folder for future module firmware files.
2. Assign a unique username/password to access the FTP server.
3. Create and place a file on your FTP server named firmwarecheck.csv to be downloaded and read by ME910C1-NV FTP client host application. Include the following types of information in the file. You can include additional information as needed.

   a. The firmware version and build your ME910C1-NV device should currently be using.
   b. Path on current FTP server where firmware update file resides.
   c. The date/time interval at which the host application should next perform a FOTA check in.
   d. FTP server IP address which the host application should access during next FOTA check in.
   e. Credentials for the FTP server where host application should next perform a FOTA check in.

4. Before deploying devices with an ME910C1-NV, create code in the host system code to perform the following sequence at a defined interval (nightly, weekly, daily, monthly).

   a. Issue following command to Telit ME910C1-NV to configure socket connection settings:
      ```
      AT#SCFG=1,3,300,90,600,50
      ```
   b. If data APN has not previously been programmed, issue the following command:
      ```
      AT+CGDCONT=3,"IPV4V6","CorrectAPNForAccount"
      ```
      If the data APN has been previously programmed, go to Step 4.c.
   c. Issue the following command to check for signal presence:
      ```
      AT+CSQ
      ```
   d. Issue the following command to check for registration presence:

```
AT+CEREG?
```

e. If signal and registration are present, issue the following command to establish data connection:

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

If signal and registration are not present, check antenna for proper connection and SIM for correct orientation.

f. Issue following command to create FTP session:

```
AT#FTPOPEN="204.26.122.49","username","password",1,3
```

g. Have the host application issue the following command to download the firmwarecheck.csv file, read its contents, and take actions based on those contents:

```
AT#FTPGET="firmwarecheck.csv
```

h. Have host system issue the following command to Telit ME910C1-NV to determine current firmware file version and firmware build:

```
AT+GMR
AT#CFVR
```

i. If version/build indicated in responses are the same as indicated in firmwarecheck.csv: **Go to Step 4.s.**

j. If current firmware version is older than version indicated in firmwarecheck.csv: **Continue to next step.**

k. Issue the following command to Telit ME910C1-NV to download the file indicated in the firmwarecheck.csv file and wait for OK response (which indicates the file has been downloaded):

```
AT#FTPGETOTA="Name-Of-Firmware-File-Here.bin",0
```

l. After file is downloaded issue following command to Telit ME910C1-NV to close FTP session:

```
AT#FTPCLOSE
```

m. After closing FTP, issue following command to Telit ME910C1-NV to disconnect data session:

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

n. After closing data session, issue following command to Telit ME910C1-NV to apply downloaded file:

```
AT#OTAUP=0
```

o. Before continuing, wait for ME910C1-NV to reset a total of three times and/or wait a fixed period of time to ensure module has enough time to apply downloaded firmware. The time needed varies depending on the size of your firmware file.

p. Issue the following command to Telit ME910C1-NV to determine current firmware version.

```
AT+GMR
```

q. If version matches value indicated in firmwarecheck.csv: **Go to Step 4.t.**

If version does not match value indicated in firmwarecheck.csv issue, appropriate commands listed earlier as needed in order to attempt to download and process the firmware file again.

r. Issue following command to Telit ME910C1-NV to close FTP session:

```
AT#FTPCLOSE
```

s. Issue following command to Telit ME910C1-NV to close data session:

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

t. End Process

Note:

■ Before deploying the device, thoroughly test your chosen FOTA implementation for functionality.

- Before performing any module firmware update to devices in the field, first thoroughly test the new module firmware to ensure compatibility with your existing application.

- In the above example you might consider placing on the FTP server one file for every IMEI you deploy. Then have host application read module IMEI to determine which IMEI file on the FTP server to read. This would allow you to control which specific IMEIs you want to update by changing the contents of the file on server for the device IMEI.

FOTA Client Example Session Log

Example of updated from firmware version 30.00.001-B026 to version 30.00.001-B026_FOTA

```
[Tue Jan 09 13:18:18.344 2018] AT+GMM
[Tue Jan 09 13:18:18.437 2018] ME910C1-NV
[Tue Jan 09 13:18:18.437 2018]
[Tue Jan 09 13:18:18.437 2018] OK
[Tue Jan 09 13:18:18.952 2018] AT+GMR
[Tue Jan 09 13:18:19.046 2018] 30.00.001-B026
[Tue Jan 09 13:18:19.046 2018]
[Tue Jan 09 13:18:19.046 2018] OK
[Tue Jan 09 13:18:19.560 2018] AT#SCFG=1,3,300,90,600,50
[Tue Jan 09 13:18:19.950 2018] OK
[Tue Jan 09 13:18:20.465 2018] AT+CGDCONT=3,"IPV4V6","VZWINTERNET"
[Tue Jan 09 13:18:21.120 2018] OK
[Tue Jan 09 13:18:21.635 2018] AT+CSQ
[Tue Jan 09 13:18:21.729 2018] +CSQ: 25,3
[Tue Jan 09 13:18:21.729 2018]
[Tue Jan 09 13:18:21.729 2018] OK
[Tue Jan 09 13:18:22.243 2018] AT+CEREG?
[Tue Jan 09 13:18:22.384 2018] +CEREG: 0,1
[Tue Jan 09 13:18:22.384 2018]
[Tue Jan 09 13:18:22.384 2018] OK
[Tue Jan 09 13:18:22.899 2018] AT#SGACT=3,1
[Tue Jan 09 13:18:23.101 2018] #SGACT:
100.82.36.41,38.0.16.20.176.102.243.25.0.0.0.2.116.124.129.1
[Tue Jan 09 13:18:23.101 2018]
[Tue Jan 09 13:18:23.101 2018] OK
[Tue Jan 09 13:18:23.616 2018]
AT#FTPOPEN="204.26.122.49","USERNAME","PASSWORD",1,3
[Tue Jan 09 13:18:24.942 2018] OK
[Tue Jan 09 13:18:25.457 2018] AT#FTPGET="firmwarecheck.csv"
[Tue Jan 09 13:18:26.159 2018] CONNECT
[Tue Jan 09 13:18:26.237 2018] 30.00.001-B026_FOTA,30.00.001-
B026_FOTA.bin,2017-01-31,204.26.122.49,USERNAME,PASSWORD
[Tue Jan 09 13:18:26.253 2018] NO CARRIER
[Tue Jan 09 13:18:26.767 2018] AT+GMR
[Tue Jan 09 13:18:26.861 2018] 30.00.001-B026
[Tue Jan 09 13:18:26.861 2018]
[Tue Jan 09 13:18:26.861 2018] OK
[Tue Jan 09 13:18:27.742 2018] AT#CFVR
[Tue Jan 09 13:18:27.750 2018] #CFVR: 1
[Tue Jan 09 13:18:27.750 2018]
[Tue Jan 09 13:18:27.750 2018] OK
```

```
[Tue Jan 09 13:18:32.430 2018] AT#FTPGETOTA="30.00.001-B026_to_B026-
FOTA.bin",0
[Tue Jan 09 13:18:37.001 2018] OK
[Tue Jan 09 13:18:37.516 2018] AT#FTPCLOSE
[Tue Jan 09 13:18:37.843 2018] OK
[Tue Jan 09 13:18:38.358 2018] AT#SGACT=3,0
[Tue Jan 09 13:18:38.545 2018] OK
[Tue Jan 09 13:18:39.060 2018] AT#OTAUP=0
[Tue Jan 09 13:18:39.388 2018] OK
[Tue Jan 09 13:21:23.977 2018] AT+GMR
[Tue Jan 09 13:21:27.456 2018] 30.00.001-B026_FOTA
[Tue Jan 09 13:21:27.456 2018]
```

Chapter 3 – 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).

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.

Chapter 4 – Installing and Using the Device

Installing the Device

1. Connect suitable antenna(s) to the antenna connector(s).
2. If your device is the serial version:

   Connect the DE9 male connector (9-pin) of the RS-232 cable to the RS-232 connector on the device, then connect the other end to the serial port on the other desired device.

   Screw-on the power lead from the power supply module into the power connection on the device.

   Plug the power supply into your power source.
3. If your device is the USB version:

   For information about the USB cable that helps power your device, see the section "USB Cable Recommendations."

   The USB cable uses power from the USB power line. Connect one end of the USB cable to your computer or other USB high power device, such as a hub.

   Connect the other end to the device's USB connector.
4. The POWER LED lights after the device powers up.

Placing Serial Devices in Power Save Mode

The serial devices offer a low power mode (sleep or power save mode) using the power save switch (below the SIM card slot) on the device to change from normal or low power mode. The low power mode is intended for battery or solar-powered, IoT applications such as outdoor remote sensors.

There are other techniques to place the device into low power mode. This example uses data terminal ready (DTR) and the AT command +CFUN=5. For other techniques, review the AT command guide for your device, as described in the Documentation section of this guide.

The device also wakes up from sleep mode by using the wake-on-ring feature. See the following example using the ring indicator line to wake the host processor when the radio receives an incoming call or SMS message. Your application then needs to act on the ring indication and wake up the device by asserting DTR.

Using Low Power Mode

Here are some different configuration options for low power mode:

- To turn on low power mode, set the power-save switch to LOW.
- On the RS-232 interface, ensure your application controls DTR and makes it active (on). To configure the device for DTR control, issue either AT&D1 or AT&D2 for DTR control. The &D0 command does not allow low power to operate.
- To configure the device to enter low power (sleep) mode, issue AT+CFUN=5 to the radio.
- To configure the device to wake from low power mode by using the wake-on-ring feature, issue AT#E2SMSRI=1000. This configures the ring indicator to go active for 1000 ms when an SMS message is received.
- To have the device enter sleep mode, set DTR to inactive (off) on the RS-232 interface. The clear to send (CTS) signal is off when the device is in sleep mode.

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 radio restarts after 60 seconds.

Applications with Risk of Power Surge

Recommend Adding Power Surge Protection

Along with using the proper shutdown procedure, we recommend adding power surge protection for power up especially with applications where a potential for power surge exists or the power source is not reliable. Appropriate power surge protection equipment can safeguard your device. The device itself does not include power surge protection. For these cases, failure to do so can run the risk of damage to your device.

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 down as shown. When the SIM card is installed, it locks into place.
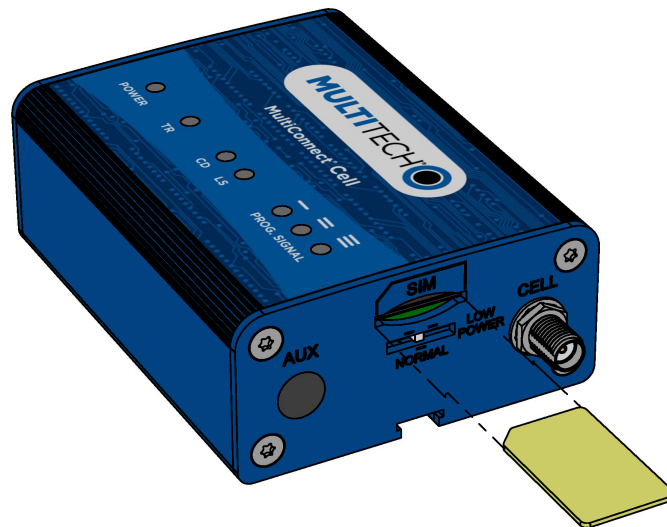
Removing a SIM Card

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 5 – 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. If changes are made to the device's certified antenna system, then recertification will be required by specific network carriers.

LTE Cat M1/Cat 4 Antenna

Devices were approved with the following antenna or for alternate antennas meeting the given specifications:

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
	1710 - 2170 GHz
	2.30 - 2.69 GHz
VSWR	3:1 maximum
Gain	2.06 dBi
Impedance	50Ω nominal
Radiation	Omni-directional
Polarization	Linear, vertical

Account Activation for Cellular Devices

Some MultiTech devices are pre-configured to operate on a specific cellular network. To use the device, you must set up a cellular data account with your service provider. Each service provider has its own process for adding devices to their network.

Device Phone Number

Every device has a unique phone number. Your service provider supplies a phone number when you activate your account. Wireless service provider implementation may vary. Consult with your service provider to get the phone number for your device.

Adding APN value (MAT1 only)

NOTE: This applies to **MAT1 models only** (not for MVW1 models).

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.
2. Enter the command:

   ```
   AT+CGDCONT=1,"IP","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.

Chapter 6 – 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.

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:

```
AT+CEREG?: 0,1
```

or

```
AT+CEREG?: 0,5
```

The device is registered.

If the device returns:

```
AT+CEREG?: 0,2
```

The device is in a network searching state.

Sending and Receiving Data for MAT1

Connecting Device to TCP Server as TCP Client

1. `AT+CGDCONT=1,"IPV4V6","apnname"`
   where apnname is the APN your cellular provider assigned to your SIM card.

2. **Bring up Data Connection Using Internal IP stack**
   Enter:
   `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:

```
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:

   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:

   ```
   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:
   ```
   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:

   ```
   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:
   ```
   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 one**

   Enter:

   `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:

   `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:

`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:

`AT#SGACT=1,0`
The device responds with OK.

Sending and Receiving Data for MVW1

Connecting Device to TCP Server as TCP Client

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

   Enter:

   `AT#SGACT=3,1`

   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
   ```

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

   Enter:

   `AT#SD=1,3,500,"###.##.###.##"`
   where ###.##.###.## is the TCP server IP Address.

   The device responds with OK. The device can now send or receive data 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`

The device responds with OK.

To close the data connection:

- Enter:

`AT#SGACT=3,1`

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:

   Should return:

   ```
   AT+CEREG? 0,1
   OK
   ```

3. **Configure socket parameters**

Enter:

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

4. **Activate context one**

Enter:

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

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
   ```
   The device responds with OK.
3. To close the data connection, enter:
   ```
   AT#SGACT=3,1
   ```
   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:

```
AT+CEREG?: 0,1
OK
```

3. **Configure socket parameters**

   Enter:

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

4. **Activate context one**

   Enter:

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

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
   ```
   The device responds with OK.

3. To close the data connection, enter:
   ```
   AT#SGACT=3,1
   ```
   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. **Activate context one**

   Enter:

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

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

   Enter:

   ```
   AT#FTPTO=1000
   ```

4. **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.

---

5. **Configure file transfer type.**

Enter:

```
AT#FTPTYPE=#
```
where # is 0 for binary or 1 for ASCII.

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

Enter:

AT#FTPPUT="file.txt"

The device responds with:

```
CONNECT
```

7. 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:

```
AT#SGACT=3,1
```
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. **Activate context one**

Enter:

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

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

Enter:

```
AT#FTPTO=1000
```

4. **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.

5. **Configure file transfer type.**

Enter:

```
AT#FTPTYPE=#
```
where # is 0 for binary or 1 for ASCII.

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

   Enter:

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

7. **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:

   ```
   AT#SGACT=3,1
   ```
   The device responds with OK.

Reading, Writing and Deleting Messages

Reading Text Messages

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.

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.

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 7 – 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.

Industry Canada and FCC

This device complies with Industry Canada licence-exempt RSS standard(s) and part 15 of the FCC rules. Operation is subject to the following two conditions:

(1) this device may not cause interference, and

(2) this device must accept any interference, including interference that may cause undesired operation of the device.

Cet appareil est conforme avec Industrie Canada RSS exemptes de licence standard (s) et la partie 15 des règles de la FCC. Son fonctionnement est soumis aux deux conditions suivantes:

1. l'appareil ne doit pas produire de brouillage, et

2. l'utilisateur de 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

2011/65/EU

Multi-Tech Systems, Inc. confirms that its embedded products comply with the chemical concentration limitations set forth in the directive 2011/65/EU 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] < 1000 PPM
- Hexavalent Chromium, [Cr+6] < 1000 PPM
- Cadmium, [Cd] < 100 PPM
- Polybrominated Biphenyl, [PBB] < 1000 PPM
- Polybrominated Diphenyl Ether, [PBDE] < 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－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 8 – Using Connection Manager

Use Connection Manager to install device drivers and connect your device to your carrier's network.

Connection Manager can install drivers and connect your device regardless of your CDMA network, however, activation is only supported with Verizon, Aeris, Sprint, and some CDMA Regional Carriers. If you cannot activate your device with Connection Manager, refer to *Account Activation for Cellular Devices.*

Connection Manager supports the following Windows versions:

- Windows 7 and 8 and Windows 10, both 32-bit and 64-bit versions

Installing Connection Manager and Connecting a Device

Follow these steps in order. Attempting to plug in the device before the appropriate drivers are installed can cause the connection to fail.

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. If installing a **USB** device, follow the prompts to install the Telit drivers. **Make sure that the Telit drivers are fully installed before plugging in the device.**
5. If installing a serial device, refer to *Setting Up a Serial Device.*
6. Once the drivers are installed, plug in the device and click **Next** in the **Connection Manager** installation window.
7. Open **Connection Manager**.
8. In the Settings tab, select **USB Modem** or **Serial Modem** for your device.
9. If you are connecting a serial device, confirm that the serial settings match those listed for the device under **Device Manager** > **Comm Ports**.
10. If desired, set the application to load during Windows startup and automatically connect to the internet:

    a. Click **Settings** and check the boxes for **Run application at Windows startup** and **Connect to the Internet automatically**.

    b. Click **Apply**.

11. If desired, set Connection Manager to re-connect when a connection is lost:

    a. Click **Connection** and check **Enable keep-alive**.

    b. Enter an address to ping in the **Host to ping** box (for example, 8.8.8.8 which is www.google.com).

       Note: If the keep-alive fails, Connection Manager automatically reconnects. When you start the computer, Connection Manager launches and establishes a connection.

12. In the **Connection** tab, enter the **Dial number** and **APN** if different from the default. The dial number and APN is provided by the carrier for the SIM card.
13. Click **Apply** to save settings.
14. Click **Main**, then click **Connect** to start your connection.

    Note: The dial number and APN settings cannot be modified after the device is connected.

15. Browse to a website to confirm the device has Internet access.

Setting Up a Serial Device

1. Connect the serial device to the PC.

2. Navigate to **Control Panel** > **Device Manager**. Make note of the COM port number for the connected device (in COM Ports).

   Example: COM port is **COM31**.

3. In the **Action** drop-down menu, select **Add legacy hardware** to add a new device.
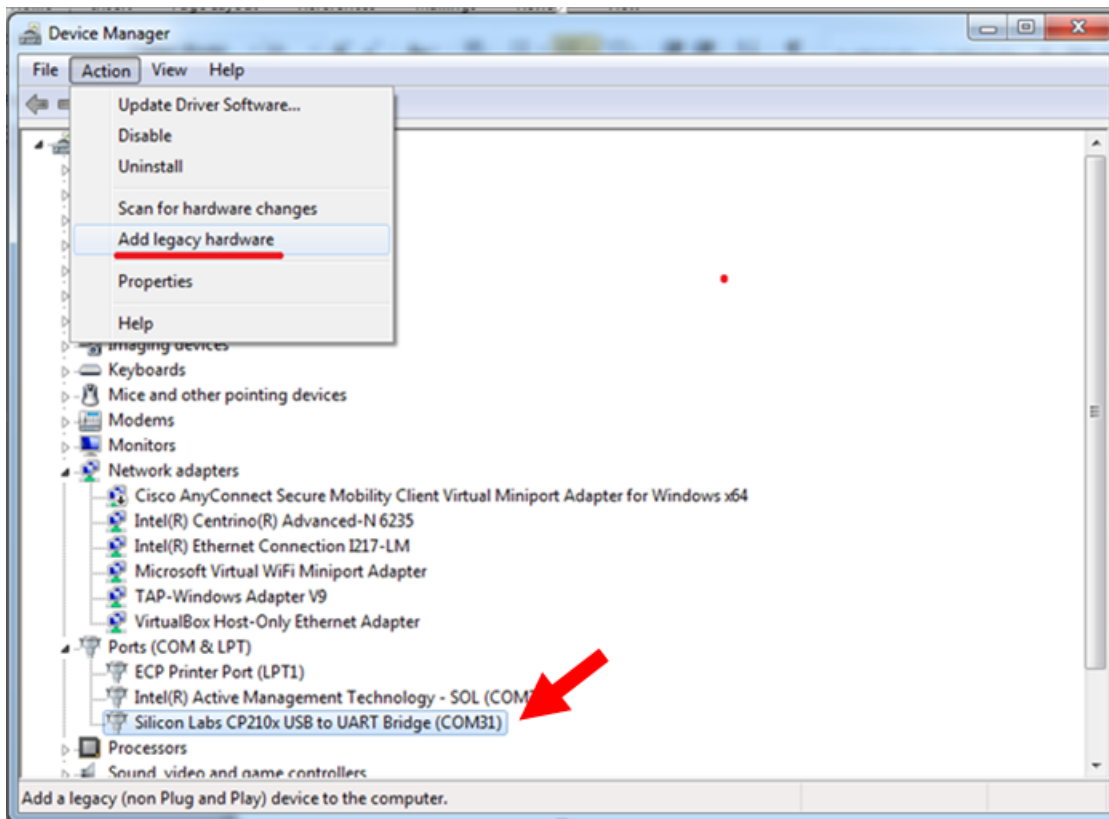
4. Navigate through **Add Hardware Wizard**.

   a. Click **Next** on the Welcome page.

   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 **Have Disk**, then click **Next**.
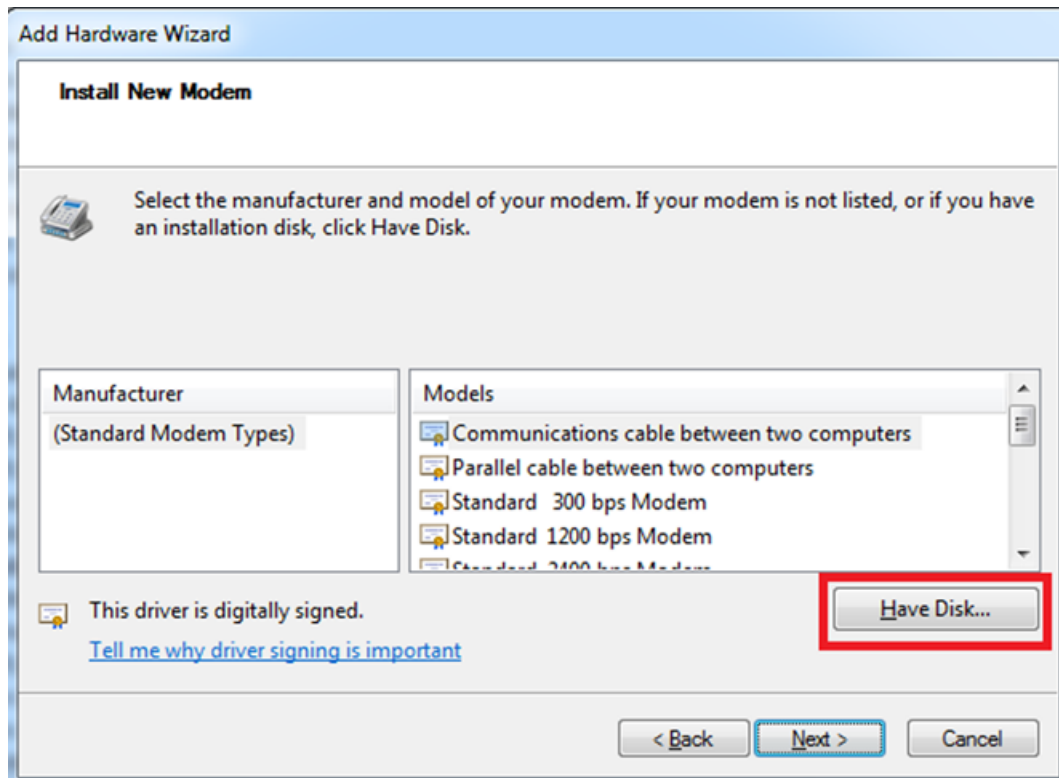
f.   Click **Browse** and select the installation folder.

Example: C:\Program Files (x86)\Multi-Tech Systems\Multi-Tech Connection Manager.

g.   The list of available TELIT models appears. Select the model number for your device, then click **Next**.
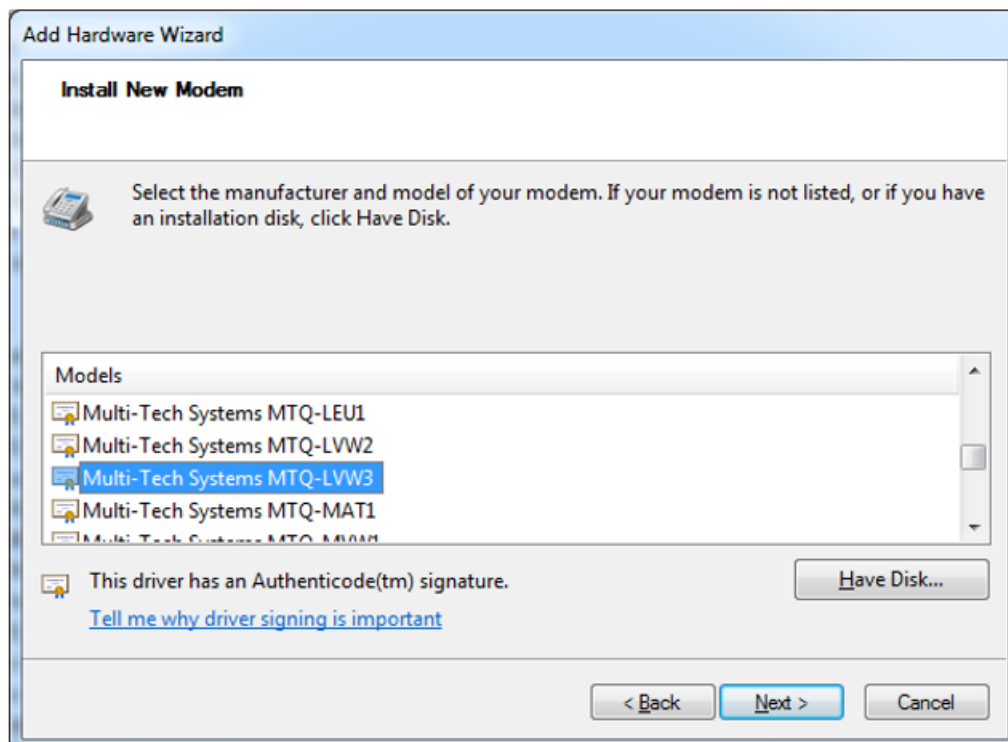
    h.   Select the COM port that you noted from COM ports, then click **Next**.

    i.   Click **Finish** to exit the Wizard.

    j.   Navigate to **Device Manager** > **Modems** and confirm that the device is added.
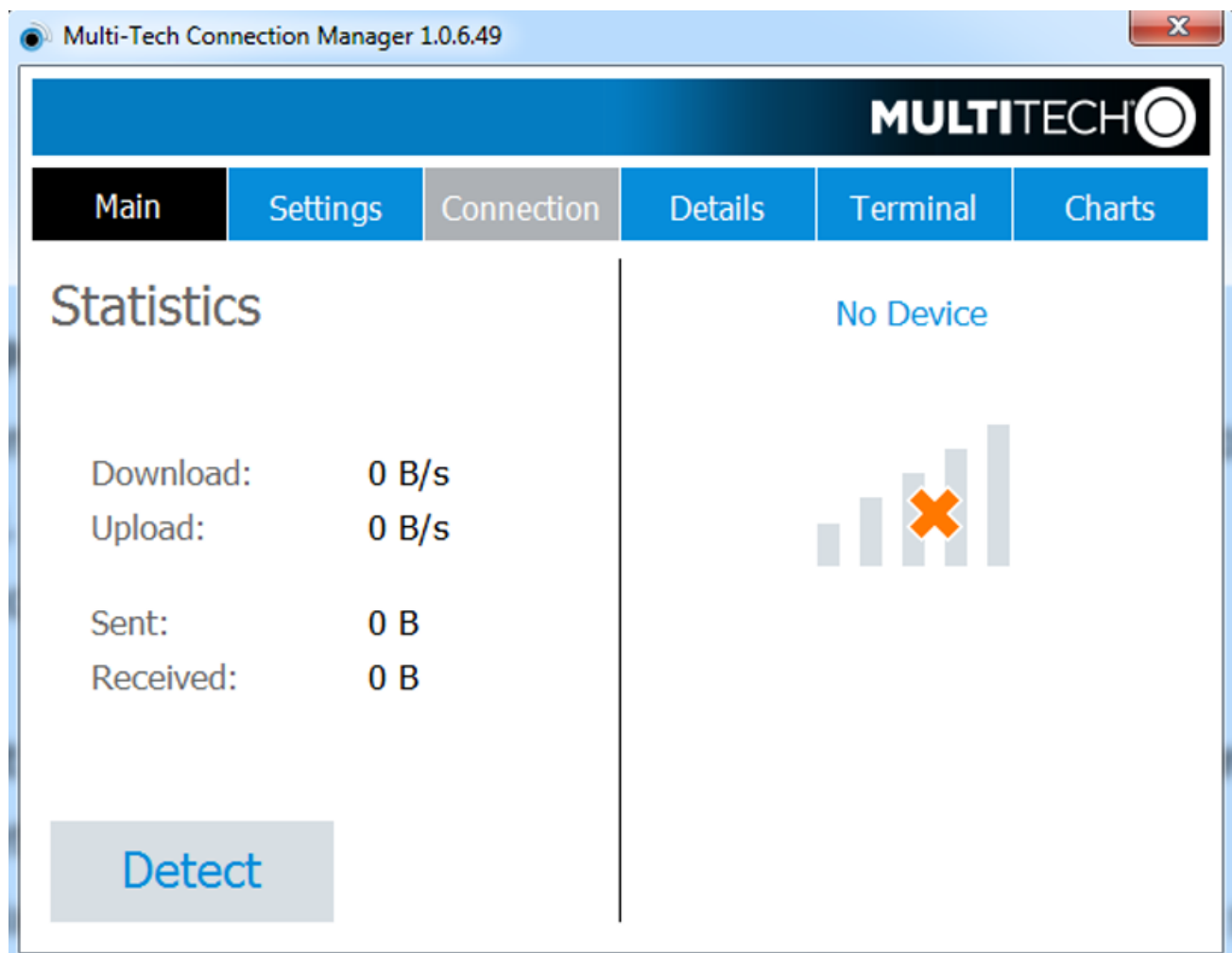
Troubleshooting

Serial COM port is not available in the Serial Modem Settings

This can happen if the modem was installed while Connection Manager was running.

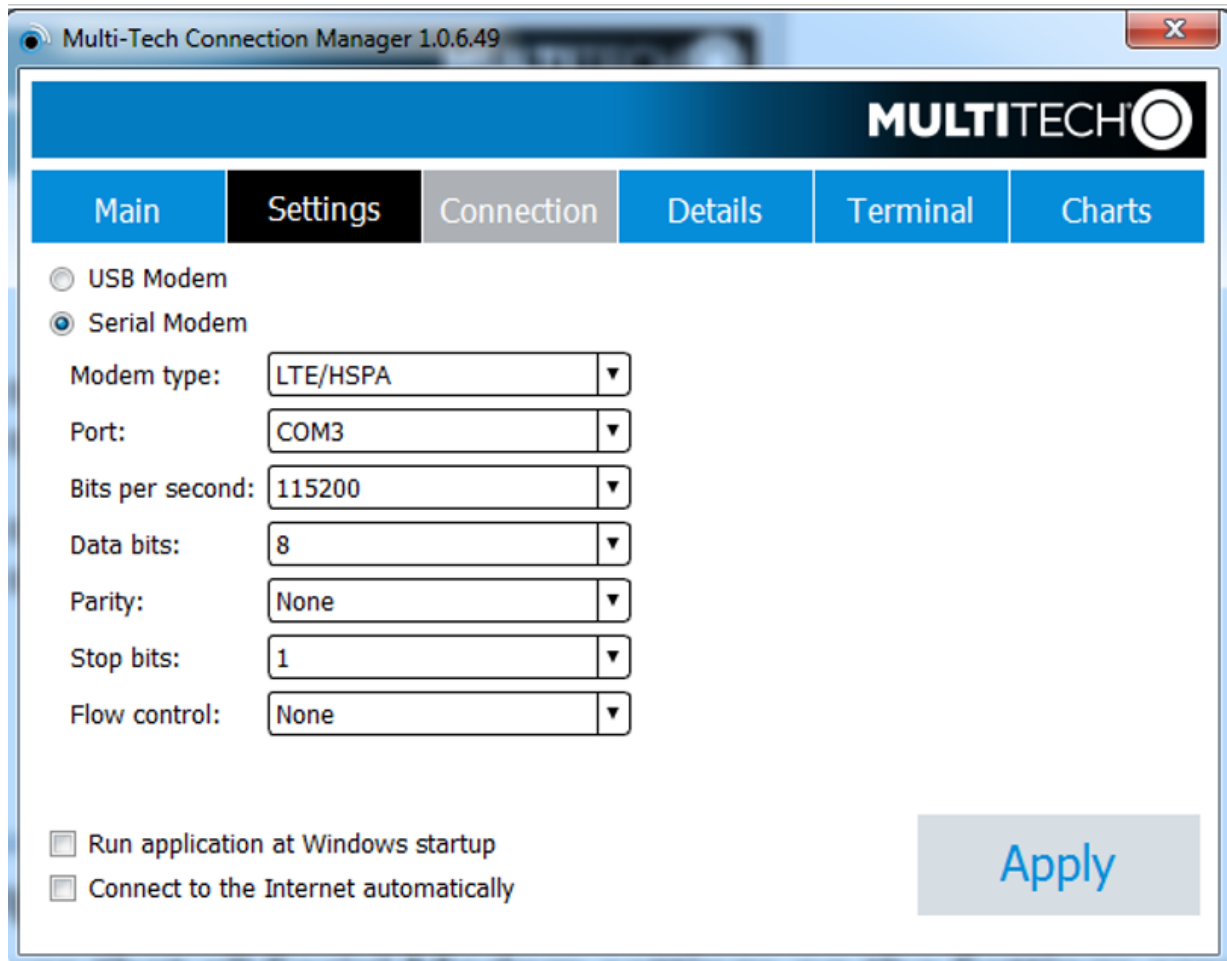Close Connection Manager and reopen it.

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.