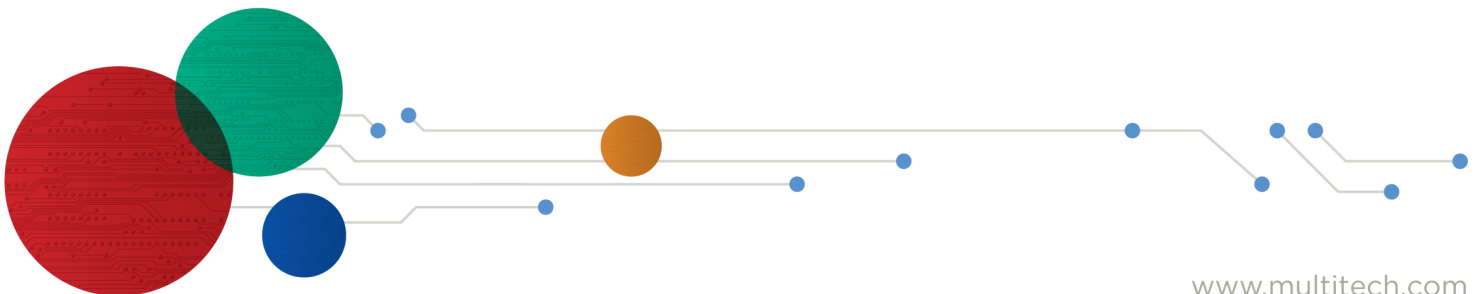




Dragonfly™ Nano

MTQN-MNG3-B01 Device Guide



Dragonfly™ Nano Device Guide

Models: MTQN-MNG3-B01

Part Number: S000712 Rev. 1.6

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Chapter 1 – Product Overview

Overview

The Dragonfly™ Nano (MTQN) cellular System-on-Module (SoM) is a small version of the Dragonfly (MTQ) System-on-Module (SoM). Both embedded devices offer developers the functionality of an on-board cellular radio all-in-one compact design. The Dragonfly Nano provides a practical solution to the market's demand for a smaller, low-power module.

The Dragonfly Nano functions similarly to the Dragonfly and maintains interoperability with legacy systems that use a 40-pin connector and forward mounting hole. All Dragonfly software is open source.

Documentation

The following documentation is available on the product page at <https://www.multitech.com/brands/multiconnect-dragonfly-nano>.

Document	Description	Part Number
MTQN-MNG3-B01 Device Guide	Provides model specifications and developer information regarding the B01 version of MTQN.	S000712
Universal Developer Kit 2.0 Developer Guide.	Provides information for using the developer board with the MTQN.	S000610
ST Microcontroller Data Sheet	Data sheet for processor STM32L471QG: https://www.st.com/en/microcontrollers/stm32l471qg.html	027226 Rev 1
Sara-R4 USB Driver Installation Guide	Provides instructions on how to install Windows USB driver.	N/A
Sara-R4/N4 series, AT Commands Manual (Check radio and manual)	Provides AT commands and parameters used to configure your device.	UBX-17003787

Note: Additional documentation is available on the mbed site at <https://os.mbed.com/platforms/MTS-Dragonfly-Nano/> and at www.multitech.net. See *Chapter 6, Getting Started* for details.

Product Build Options

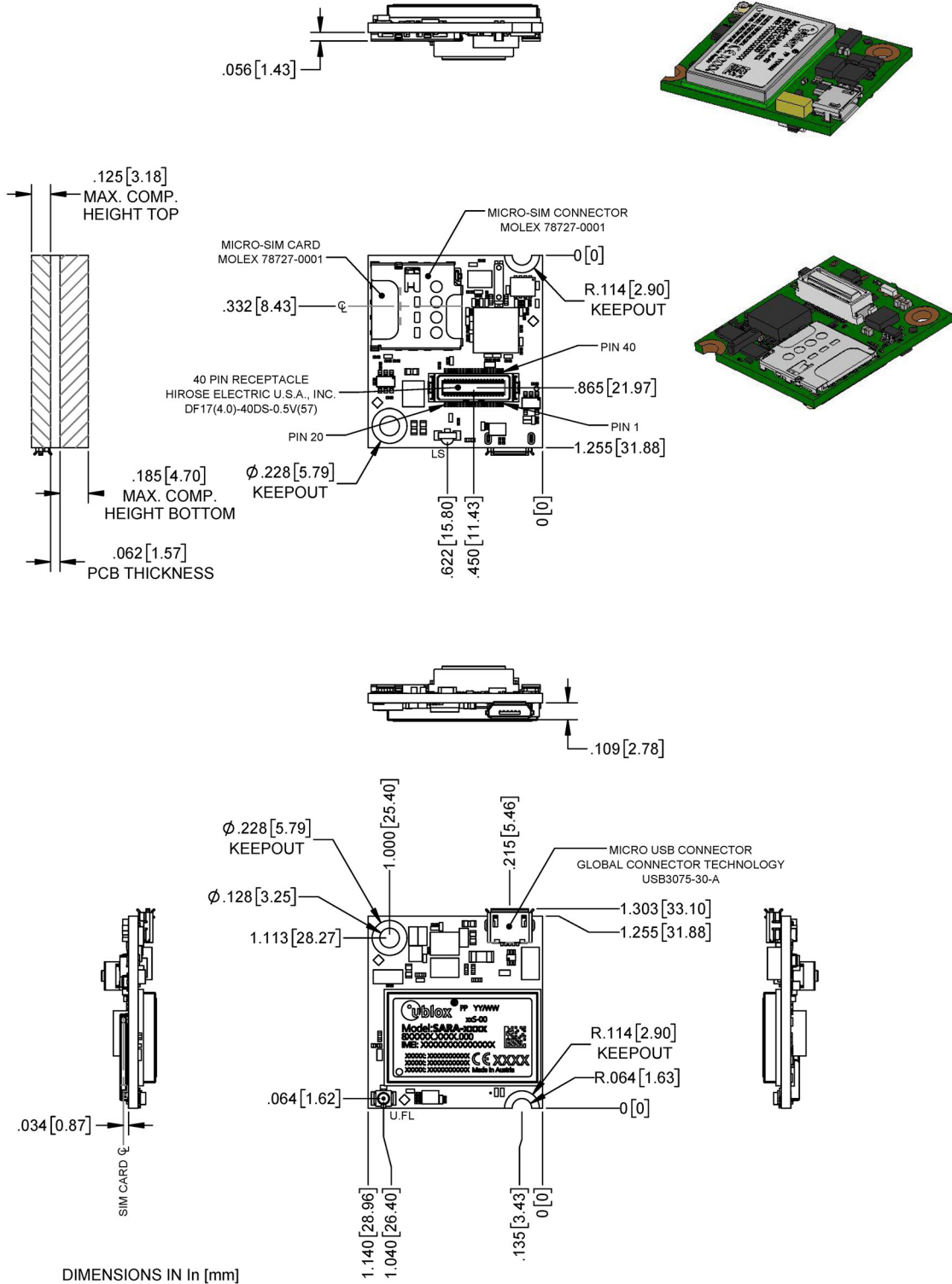
The available Dragonfly™ Nano modules are:

Model	Description	Region
MTQN-MNG3-B01	Embedded LTE Cat M1 and 2G Cellular SoM	EU/UK
Developer Kit		
MTUDK2-ST-CELL	SocketModem® & Dragonfly™ Nano Developer Kit	Global

Note: These units ship without network activation. To connect them to the cellular network, you need SIM cards from your service provider. The complete product code may end in .Rx. For example, MTQN-MNG3-B01.Rx, where R is revision and x is the revision number. All builds can be ordered individually or in 50-packs.

Chapter 2 – Mechanical Drawings

MTQN-MNG3-B01



Chapter 3 – Hardware and Specifications

Specifications

Category	Description
Performance ¹	3GPP Release 13 LTE Cat M1, 3GPP Release 13 LTE Cat NB1, Coverage Enhancement Mode A, Release 12 LTE Power Save Mode, PSM, Rel 13 e-DRX, Cat M1 Half Duplex (Up to 375 kbps downlink and uplink), Cat NB1 Half Duplex (Up to 27.2K kbps downlink and 62.5K kbps uplink), Cat NB1 Non-IP Data Delivery, and 2G GPRS/EGPRS
Frequency Band (MHz)	Europe
	LTE FDD (Cat M1/NB1) 700 MHz (B12), 750 MHz (B13), 800 MHz (B20), 850 MHz (B5), 900 MHz (B8), AWS1700 MHz (B4), 1800 MHz (B3), and 1900 MHz (B2).
	2G GSM 850 MHz , E-GSM 900 MHz, DCS 1800 MHz, and PCS 1900 MHz
Interface	
Connectors	1 UFL (Cellular), 1x Micro USB, 1x 40-Pin Board-to-Board
Host Processor	Cortex-M4 (STM32L471QG) 1 Mbyte Flash and 128 Kbyte SRAM (B01)
I/O	1 x UART, 1 x HS USB, 2 x SPI, 2 x I2C, up to 9 analog inputs and up to 29 digital input/output
SMS	Mobile Terminate/Mobile Originate PDU / Text mode
LED	Link Status, solid = registered, for default setting use AT+UGPIOC 16, 2 (see AT command guide for details and more options)
Physical Description	
Weight	less than 0.3 oz (8.5g)
Dimensions	28.96mm x 32.51mm (1.14 x 1.28 inches). Refer to Mechanical Drawings for details.
Connectors	
Antenna	1 surface mount U.FL: cellular
SIM Holder	1.8 V and 3 V Micro SIM (3FF) card. SIM denotes: Subscriber Identity Module.
Pin header	40-pin female for USB or UART
Environment	
Operating Temperature ²	-40° C to +85° C (-40° F to +185° F)
Storage Temperature	-40° C to +85° C (-40° F to +185° F)
Humidity ³	15%-93% RH, non-condensing

¹Actual performance speeds may be affected by a variety of attributes such as cell tower distance, data loads, packet sizes, etc.

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

³Radio performance may be affected by temperature extremes. This is normal.

The following table defines the remaining specifications for the MTQN-MNG3.

Category	Description
Certifications and Compliance	
EMC Compliance	CE Mark, RED (EU)
Radio Compliance	CE Mark, RED (EU)
Safety Compliance	IEC 60950-1 2nd ED +Am.2
Network	GCF
Carrier	EU Carriers

Mounting Hardware

The board has two mounting holes at the corners. Use #4 or M3 hardware for mounting the Dragonfly Nano to the board. Refer to the Mechanical Drawings for more information.

Here are some standoffs that can be used with this product.

Recommended Parts

Manufacturer	Part	Part Number
PEM (Penn Engineering & Manufacturing)	Surface Mount Standoff	SMTSO-M3-6
RAF Electronic Hardware	6mm Hex Female Standoff	1251-3005-S-12-Zinc

Note 1: We recommend grounding the standoffs to the main PCB for better performance.

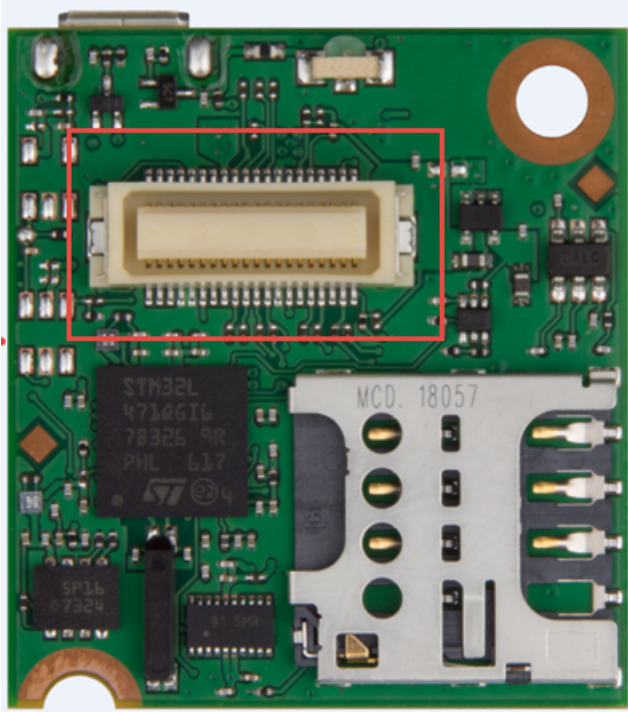
Note 2: For other stacking heights, refer to the Hirose DF17 Series 0.5mm Pitch Board to Board Connector Data Sheet to select the appropriate spacers.

40-Pin Connector Definitions

The Dragonfly™ Nano offers developers an FCC and carrier certified solution that makes connecting sensors and other edge-of-network devices quick and easy.

40-Pin Connector

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
40	39	38	37	36	35	34	33	32	31	30	29	28	27	26	25	24	23	22	21



MTQN-MNG3-B01 Pin Definitions

Note:

To program and use the Dragonfly™ Nano, you will need a UDK2 Developer Kit.

For more pinout information and other details, refer to the STM32L471QG processor manual. In addition to their stated functions, all GPIO pins (PA_*, PB_*, PC_*, PG_*) can also be used as Digital-In and Digital-Out interfaces.

Hardware and Software Pinout Information

Refer to both the hardware and software pinout information on the Multitech Developer Resources site at: http://www.multitech.net/developer/wp-content/uploads/2019/02/MTQN_Pin_Info_02-19.xlsx

40-Pin Connector

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

Use with:

Manufacturer:	Hirose Electric Co LTD
Description:	.5mm 40 pin B.B header MALE
Model Number:	DF17(2.0)-40DP-0.5V(57)

Electrical Characteristics

Operating Conditions

Parameter	Minimum Volts	Maximum Volts
Supply Range - Vcc	3.2	5.25

Absolute Maximum Ratings

Symbol	Description	Conditions	Min.	Max.	Unit
SIM	SIM interface	Input DC voltage at SIM digital interfaces pins	-0.3	3.9	V
P_ANT	Antenna power	Input RF power at ANT pin		-22	dBm
Rho_ANT	Antenna ruggedness	Output RF load mismatch ruggedness at ANT pins		10.1	VSWR
tstg	Storage Temperature		-40	85	°C
V _p	Voltage at any pin	Voltage at any signal pin	-0.3	4	V
V _{DDX} - V _{SS}	External voltage	V _{DDX} , V _{DDA} , V _{DDIO2} , V _{BAT} ¹	-0.3	4	V
V _{IN} ²	Input Voltage	Input voltage on FT_XXX pins	V _{SS} -0.3	min (V _{DD} , V _{DDA} , V _{DDIO2}) + 4.0 ^{3 & 4}	V
		Input voltage on TT_XX pins	V _{SS} -0.3	4.0	V
		Input voltage on BOOT0 pin	V _{SS}	9.0	V
		Input voltage on any other pins	V _{SS} -0.3	4.0	V
ΔV _{DDX}	Variations between power pins	Variations between different V _{DDX} power pins of the same domain	N/A	50	mV
V _{SSX} -V _{SS}	Variations between ground pins	Variations between all the different ground pins ⁵	N/A	50	mV

Data taken from STM32L471QG processor datasheet.

- (1) All main power (V_{DD}, V_{DDA}, V_{DDIO2}, V_{BAT}) and ground (V_{SS}, V_{SSA}) pins must always be connected to the external power
- (2) V_{IN} maximum must always be respected. Refer to Nominal Ratings for the maximum allowed injected current values.
- (3) This formula has to be applied only on the power supplies related to the IO structure described in the pin definition table.
- (4) To sustain a voltage higher than 4 V the internal pull-up/pull-down resistors must be disabled.
- (5) Include VREF- pin.

Nominal Ratings

Symbol	Ratings	Max Voltage (mA)
$\Sigma I_{V_{DD}}$	Total current into sum of all VDD power lines (source) ¹	150
$\Sigma I_{V_{SS}}$	Total current out of sum of all VSS ground lines (sink) ¹	150
$I_{V_{DD}(PIN)}$	Maximum current into each VDD power pin (source) ¹	100
$I_{V_{SS}(PIN)}$	Maximum current out of each VSS ground pin (sink) ¹	100
$I_{IO(PIN)}$	Output current sunk by any I/O and control pin except FT_f	20
	Output current sunk by any FT_f pin	20
	Output current sourced by any I/O and control pin	20
$\Sigma I_{IO(PIN)}$	Total output current sunk by sum of all I/Os and control pins ₂	100
	Total output current sourced by sum of all I/Os and control pins ₂	100
$I_{INJ(PIN)}^3$	Injected current on FT_xxx, TT_xx, RST and B pins, except PA4, PA5	-5/+0 ⁴
	Injected current on PA4, PA5	
$\Sigma I_{INJ(PIN)} $	Total injected current (sum of all I/Os and control pins) ⁵	-5/0
		25

Data taken from STM32L471QG processor datasheet.

(1) All main power (V_{DD} , V_{DDA} , V_{DDIO2} , V_{BAT}) and ground (V_{SS} , V_{SSA}) pins must always be connected to the external power, in permitted range.

(2) This current consumption must be correctly distributed over all I/Os and control pins. The total output current must not be sunk/sourced between two consecutive power supply pins referring to high pin count QFP packages.

(3) Positive injection (when $V_{IN} > V_{DDIOX}$) is not possible on these I/Os and does not occur for input voltages lower than the specified maximum value.

(4) A negative injection is induced by $V_{IN} < V_{SS}$. $I_{INJ(PIN)}$ must never be exceeded. Refer to the Absolute Maximum Ratings table for the minimum allowed input voltage values.

(5) When several inputs are submitted to a current injection, the maximum $\Sigma |I_{INJ(PIN)}|$ is the absolute sum of the negative injected currents (instantaneous values).

Power Draw

Voltage	Radio Protocol	Low Power/Sleep Mode (uA)	Live Connection Idle-No Data(μA)	(AVG) Measured Current at Max Power(mA) ¹	TX Pulse ² (AVG) Amplitude Current for Peak Current(mA)	Total Inrush Charge ³ in MilliCoulombs (mC)
5 Volts with Unit In Dev Card	GSM850	8.5	25	201	1,130	0.245
5 Volts USB only, no Dev card	GSM850	292	42	284	1,147	0.281
3.3 Volts with Unit in Dev Card, External DC Supply used	GSM850	7.5	28	N/A	N/A	N/A
5 Volts with Unit In Dev Card	LTE	8.5	42	180	680	0.245
5 Volts USB only, no Dev card	LTE	292	58	238	864	0.281
3.3 Volts with Unit in Dev Card, External DC Supply used	LTE	7.5	55	N/A	N/A	N/A

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 GSM 850 transmission burst period or LTE connection. The transmission burst duration for GSM 850 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 4 – Antennas

Antenna

Devices were approved with the following antenna:

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

MultiTech ordering information:

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

Antenna Specifications

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

Chapter 5 – Safety Information

Handling Precautions

To avoid damage due to the accumulation of static charge, use proper precautions when handling any cellular device. Although input protection circuitry has been incorporated into the devices to minimize the effect of static build-up, use proper precautions to avoid exposure to electronic discharge during handling and mounting the device.

Radio Frequency (RF) Safety

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

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

Sécurité relative aux appareils à radiofréquence (RF)

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

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

General Safety

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

CAUTION: Maintain a separation distance of at least 20 cm (8 inches) between the transmitter's antenna and the body of the user or nearby persons. The device is not designed for or intended to be used in portable applications within 20 cm (8 inches) of the user's body.

Attention: Maintenir une distance d'au moins 20 cm (8 po) entre l'antenne du récepteur et le corps de l'utilisateur ou à proximité de personnes. Le modem n'est pas conçu pour, ou destinés à être utilisés dans les applications portables, moins de 20 cm du corps de l'utilisateur.

Interference with Pacemakers and Other Medical Devices

Potential Interference

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

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

Precautions for pacemaker wearers

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

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

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

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

Vehicle Safety

When using your device in a vehicle:

- Do not use this device while driving.
- Respect national regulations on the use of cellular devices in vehicles.
- If incorrectly installed in a vehicle, operating the wireless device could interfere with the vehicle's electronics. To avoid such problems, use qualified personnel to install the device. The installer should verify the vehicle electronics are protected from interference.
- Using an alert device to operate a vehicle's lights or horn is not permitted on public roads.

- UL evaluated this device for use in ordinary locations only. UL did NOT evaluate this device for installation in a vehicle or other outdoor locations. UL Certification does not apply or extend to use in vehicles or outdoor applications.

Device Maintenance

When maintaining your device:

- Do not attempt to disassemble the device. There are no user serviceable parts inside.
- Do not misuse the device. Follow instructions on proper operation and only use as intended. Misuse could make the device inoperable, damage the device and/or other equipment, or harm users.
- Do not apply excessive pressure or place unnecessary weight on the device. This could result in damage to the device or harm to users.
- Do not use this device in explosive or hazardous environments unless the model is specifically approved for such use. The device may cause sparks. Sparks in explosive areas could cause explosion or fire and may result in property damage, severe injury, and/or death.
- Do not expose your device to any extreme environment where the temperature or humidity is high. Such exposure could result in damage to the device or fire.
- Do not expose the device to water, rain, or spilled beverages. It is not waterproof. Exposure to liquids could result in damage to the device.
- Do not place the device alongside computer discs, credit or travel cards, or other magnetic media. The information contained on discs or cards may be affected by the device.
- Using accessories, such as antennas, that MultiTech has not authorized or that are not compliant with MultiTech's accessory specifications may invalidate the warranty.

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

User Responsibility

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

Chapter 6 – Getting Started

Developing with an MTQN in Mbed

The MTQN ships with AT pass-through firmware, which directly connects the cellular radio to a serial port made available via micro USB connector J6 on the MTUDK2-ST-CELL developer board. The firmware:

- Runs at 115200 baud by default to match with the cellular radio's default baud rate.
- Prints debug messages from the debug port at 115200 baud.
- Allows users to increase or decrease the application's baud rate by entering a plus (+) or minus (-) character on the USB debug port. Issuing a plus or minus character on the USB debug port changes the external serial port speed as well as the speed of the link between the processor and the radio. The speed of the USB debug port on reset is always 115200 to match the radio's default regardless of the baud rate used at the time of reset.
- Uses RTS/CTS flow control on the serial connection to the radio and on the external serial connection. Enables RTS/CTS flow control on terminal emulators used with the AT pass-through firmware.

Mbed Documentation

ARM Mbed is a free, open-source platform and operating system for embedded devices using the ARM Cortex-M microcontrollers. The Mbed website provides free software libraries, hardware designs, and online tools for rapid prototyping of products. The platform includes a standards-based C/C++ SDK, a microcontroller HDK, and supported development boards, an online compiler and online developer collaboration tools.

Programming the MTQN Microcontroller

With the MTQN and the MTUDK2-ST-CELL developer board, use the ARM Mbed ecosystem to program the microcontroller. Compile in the cloud or locally, copy the resulting binary file to the Mbed USB drive, and reset the MTQN-MNG3.

MTQN software is open source.

Useful Links

Description	Link
MTQN Mbed page:	https://os.mbed.com/platforms/MTS-Dragonfly-Nano/
Explore Mbed:	https://os.mbed.com/explore/
MTUDK2-ST-CELL developer guides (see Manuals for different versions)	https://www.multitech.com/models/94557065LF
Documentation on Mbed:	https://os.mbed.com/docs/latest
Serial Flash Datasheet (pdf):	http://www.micron.com (refer to P/N M25P16)
Additional Information:	https://www.multitech.com/brands/multiconnect-dragonfly-nano

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).

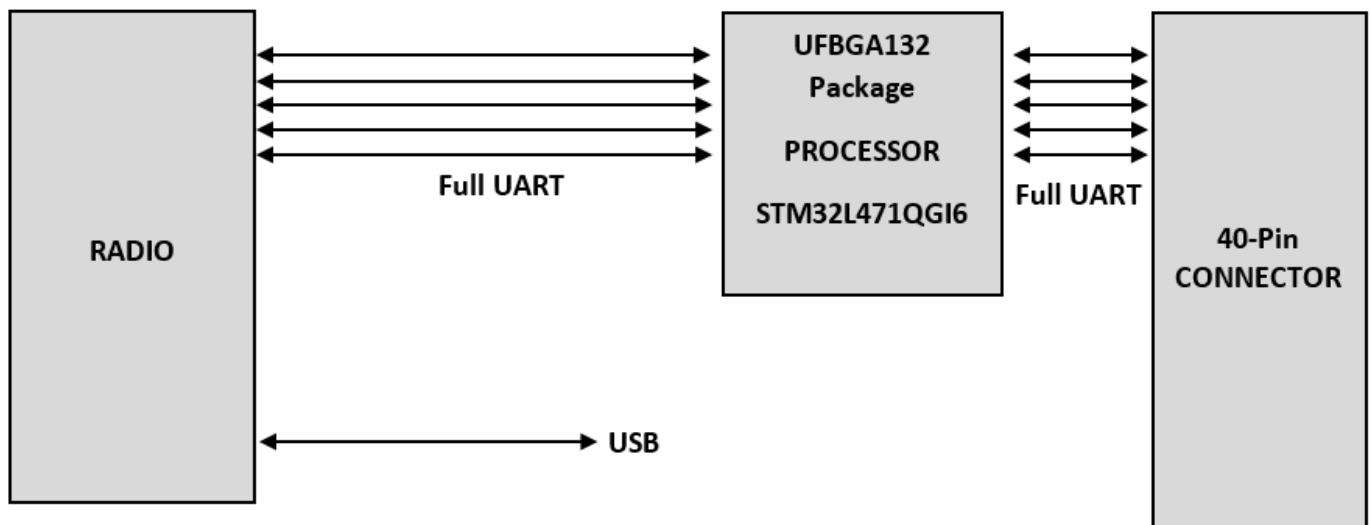
ST Microcontroller STM32L471QG

For the ST microcontroller STM32L471QG reference manual and datasheet, refer to the product page at <https://www.st.com/en/microcontrollers/stm32l471qg.html>.

Communications Flow

MTQN-MNG3-B01

The MTQN-MNG3-B01 provides full UART from the cellular radio to the processor as well as the user application. Model B01 provides a direct USB interface connection to the radio, but not through the 40-pin connector.



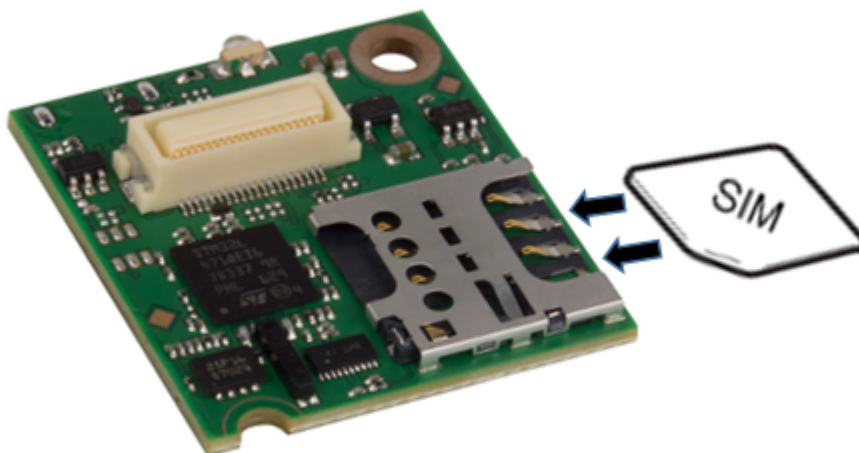
Switching between the USB interface and serial port requires a reset. The cellular radio checks for a USB connection upon reset. If USB is not present, it only uses the serial port. If USB is present upon reset, it only uses USB.

Installing a SIM Card in a Dragonfly Nano

Note: All Dragonfly Nano models require the use of a Micro SIM (3FF) card.

To install the SIM card:

- Refer to the image below.
- Slide the SIM card completely into the SIM holder.



USB Driver Installation

For the Windows USB driver, refer to the SARA-R4 USB Driver Installation Guide on the product page of the MultiTech website. The driver is located under the Downloads section of the product page.

For the Linux USB driver, if your Linux OS does not automatically detect your device, you may need to execute a script. This script adds the MTQN vendor ID and product ID to the USB serial driver. Download the zip file which contains this script and readme file under Downloads on the product page of the website.

USB Cable Recommendations

If your device has a USB connector, to avoid enumeration or power issues:

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

Device Reset

MTQN-MNG3-B01

There are two components to reset.

1. Processor reset: Several reset methods are available and all are documented in the STM32L471QG reference guide.
2. Radio reset: The processor controls the RESET_N and PWR_ON pins to the radio. The functionality of those pins is described in the ublox SARA_R4 data sheet.

Note:

N_RESET of the 40 pin connector is directly connected to NRST of the STM32L471QG processor. The processor controls the PWR_ON(RADIO_ONOFF/PE_4) and RESET_N(RADIO_RESET/PF_3) pins to the radio.

Low Power Modes

NOTE for MNG3: eDRX and PSM modes are not supported in 2G (all modes are supported using Cat M1).

To achieve lowest power consumption, we recommend powering down the radio then configuring RADIO_PWR, VMEM_EN and BUF_EN as analog inputs with no pull resistor. The last step is to place the processor in a low power mode of your choosing.

WARNING: If your application is using the on board flash memory part, make sure any flash accesses are complete before removing power or the memory may be corrupted.

Cellular Radio Low Power

Note: Refer to the U-blox AT command guide for details on AT commands.

1. Powering Down - See Powering Down The Cellular Radio section
2. PSM mode- AT+CPSMS command
3. eDRX- AT+CEDRXS command
4. Device functionality- AT+CEDRXS command

Power to Cellular Radio

After power down, RADIO_PWR can be configured as an analog input with no pull resistor to disable the power supply regulator that powers the radio. There is an on board resistor that sets the RADIO_PWR signal level so that the regulator is disabled.

On Board Flash Memory

After power down, RADIO_PWR can be configured as an analog input with no pull resistor to disable the power supply regulator that powers the radio. There is an on board resistor that sets the RADIO_PWR signal level so that the regulator is disabled.

Level translator

BUF_EN can be configured as an analog input with no pull resistor to disable the level shifter. There is an on board resistor that sets the BUF_EN signal level so power is removed.

STM32L471QG processor

See the STM32L471QG data sheet for low power modes.

Powering Down the Cellular Radio

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

To properly power down the cellular radio, use one of the following methods:

1. Issue command AT+CPWROFF then either wait 40s or until 1.8v from the cellular radio goes low. Processor pin PC5 (Mbed pin name MON_1V8) has 1.8v from the radio connected to it.
2. Hold pin processor PE_4 (Mbed pin name RADIO_ONOFF or MDMPWRON) low for at least 1.5s. 1.8v from the radio should go low.
3. If neither of the above two options are successful, an emergency power down can be performed by holding processor pin PF_3 (mbed pin name RADIO_RESET) low for 10s. As always, power down is confirmed by monitoring 1.8v from the radio.

Configuring u-blox Cellular Radio

This MNG3 device uses a cellular radio that can operate on different carrier networks (not simultaneously).

You must configure your module based on your carrier network and application. This includes setting the applicable MNO profile (based on carrier), RAT (type of technology you wish to use such as Cat M1), and LTE bands intended for the application device within regulatory compliance. The module is not intended be used in the factory-default setting.

Depending on your MNO profile, certain elements may or may not be available. Refer to the table for details.

Updates to MNO profile version:

MNO	Version	System Selection	LTE Bands	PSM ¹	eDRX ²	URAT ³	UBANDMASK ⁴
AT&T	v 7.2	M1->2G	2, 4, 5, 12	yes	no	yes	yes
Deutsche Telekom	v 7.1	M1->NB1->2G	3, 8, 20	yes	yes	yes	yes
Standard Europe	v 7.1	M1->NB1->2G	3, 8, 20	yes	yes	yes	yes
T-Mobile USA	v 7.1	NB1->2G	2, 4, 5, 12	no	no	yes	yes
Vodafone	v 7.1	NB1->2G->M1	3, 8, 20	yes	no	yes	yes
SW default	N/A	M1->NB1->2G	2, 3, 4, 5, 8, 12, 20	no	no	no	no

- Note 1: +CPSMS
- Note 2: +CEDRXS
- Note 3: +URAT
- Note 4: +UBANDMASK

If your carrier network is not on the supported list of MNOs, you must set to Cat M1 mode and follow the instructions per that scenario below.

The MNG3 model has regulatory approval to operate in the EU/UK. We continue to work for approval on other networks. Refer to the Sara-R4/N4 series AT Commands Manual for the list of supported MNOs and other details.

Note: If your device is on +UMNOPROF: 0 (SW default), you do not have a network defined yet and must set one.

To set or switch carrier networks:

1. Deregister the module from the network or perform an AT+CFUN=0 cycle:
AT+CFUN=0

2. Set the carrier network (refer to the list of +UMNOPROF values):

To Vodafone:

```
AT+UMNOPROF=19
```

To Standard Europe:

```
AT+UMNOPROF=100
```

3. Reboot the module in order to apply the new configuration:

```
AT+CFUN=15
```

If the APN is known and will not change: We recommend hard-coding the MNO and setting the PDP context manually. The following example of an AT command sequence is for Vodafone.

```
AT+CFUN=0
```

```
AT+UMNOPROF=19
```

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

```
AT+CFUN=15
```

If the MNO is not listed: the following command sequence is recommended.

NOTE: We recommend changing +UMNOPROF separately before +UBANDMASK.

```
AT+CFUN=0
```

```
AT+UMNOPROF=0
```

```
AT+CFUN=15
```

```
AT+CFUN=0
```

```
AT+CGDCONT=.
```

```
AT+UBANDMASK=.
```

```
AT+CFUN=15
```

To configure the supported radio bands: Use the +UBANDMASK command if your MNO is not listed by the +UMNOPROF command. Refer to your specific carrier regarding available bands.

USB Driver Installation

For the Windows USB driver, refer to the SARA-R4 USB Driver Installation Guide on the product page of the Multitech website. The driver is located under the Downloads section of the product page.

For the Linux USB driver, if your Linux OS does not automatically detect your device, you may need to execute a script. This script adds the MTQN vendor ID and product ID to the USB serial driver. Download the zip file which contains this script and readme file under Downloads on the product page of the website.

Chapter 7 – Labels

Approvals and Certifications

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

- **PTCRB Requirements:** The antenna system cannot be altered.
- **Model Identification:** The MultiTech model identification allows the carrier to verify the modem as one of its approved models. This information is located on the modem's label below the bar code.

Example Labels

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

This device complies with EU rules (RED compliance). 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.

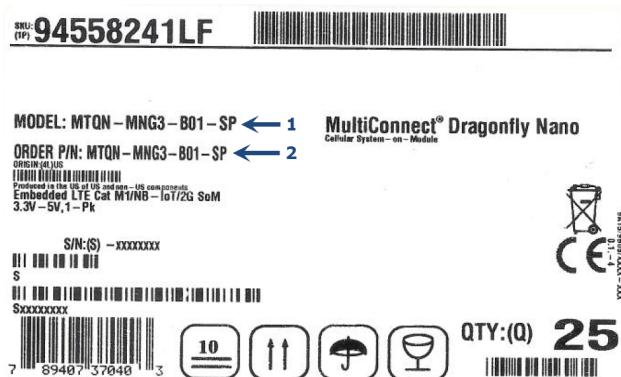
The label shown is not the actual size.

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

Device Label



Package Label



Chapter 8 – Regulatory Information

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



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

Council Directive 2011/65/EU on the restriction of the use of certain hazardous substances in electrical and electronic equipment;

and

Council Directive 2014/53/EU on radio equipment and telecommunications terminal equipment and the mutual recognition of their conformity.

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

Chapter 9 – Environmental Notices

Waste Electrical and Electronic Equipment Statement

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

WEEE Directive

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

Instructions for Disposal of WEEE by Users in the European Union

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

July, 2005



Restriction of the Use of Hazardous Substances (RoHS)

Multi-Tech Systems, Inc.

Certificate of Compliance

2015/863

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

These MultiTech products do not contain the following banned chemicals¹:

- 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)

¹Lead 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.

REACH Statement

Registration of Substances

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

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

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

依照中国标准的有毒有害物质信息

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

有害/有毒物质/元素

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

X 表示所有使用类似材料的设备中有害/有毒物质的含量水平高于 SJ/Txxx-2006 限量要求。

O 表示不含该物质或者该物质的含量水平在上述限量要求之内。

Information on HS/TS Substances According to Chinese Standards

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

Hazardous/Toxic Substance/Elements

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

X Represents that the concentration of such hazardous/toxic substance in all the units of homogeneous material of such component is higher than the SJ/Txxx-2006 Requirements for Concentration Limits.

O Represents that no such substances are used or that the concentration is within the aforementioned limits.

Chapter 10 – Using Connection Manager

Use Connection Manager to:

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

Note:

- Connection Manager can install drivers and connect your device regardless of your cellular network; however, activation is only supported with Verizon, Aeris, Sprint, and some regional carriers. If you cannot activate your device with Connection Manager, refer to *Account Activation for Cellular Devices*.
- 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](#).

Note: The –L6G1 radio establishes a connection automatically as soon as the device is plugged into a PC with Windows OS. No configuration or connection steps are required with this device.

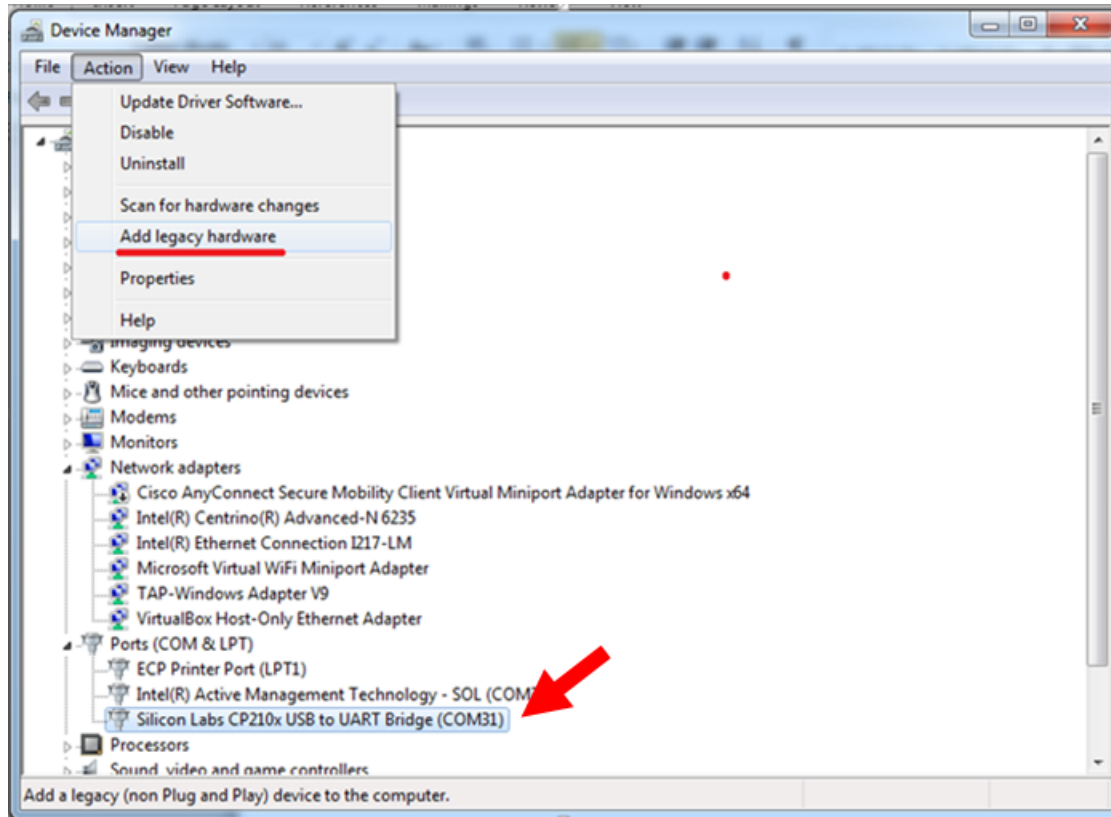
Setting Up a Serial Device in Windows Device Manager

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](#).

Note: The –L6G1 radio establishes a connection automatically as soon as the device is plugged into a PC with Windows OS. No configuration or connection steps are required with this device.

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.

Note: For –L6G1 radios, dial number is disabled.

- 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.

Note: For –L6G1 radios, dial number is disabled.

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

MultiTech Connection Manager 1.0.6.77

MULTITECH

Main Settings Connector Details Terminal Charts

Statistics

Download:	0 B/s
Upload:	847 B/s
Sent:	37.39 Kb
Received:	24.39 Kb

Connected

58%

Keep-alive check: Success
Last ping response: 879 ms

Disconnect

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 LS LED and Power LED (if available) on the device.
If they are not continuously lit, then the problem is with the power supply. Check the cable and connections.
If the LS LED is not blinking, 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.

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