MT1200X-UG001

MT 1200

User Guide

Version 1.0

NOVATEL WIRELESS

April 16, 2015

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NOVATEL WIRELESS TRADEMARKS AND SERVICE MARKS

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Introduction

Device Description and Label

Designed for simplicity, flexibility and economy, the MT 1200 combines “tried and true” vehicle tracking features with an open platform option and a compact device size to deliver an exciting new tracking solution from Novatel Wireless.

Open Platform

With the open platform option, the compact MT 1200 can host software applications from Telematics Service Providers (TSPs), ideal for aftermarket solution providers to port their proprietary code. This open platform is complemented by the MT 1200’s hardware capabilities, including GPS/GLONASS antenna, digital accelerometer, power management processor, and multiple I/O options.

Smart Agent

First released in 1996, the Novatel Wireless Smart Agent is a powerful software event engine that has been continually enhanced to accommodate newer and more sophisticated M2M devices and to build on experience gained through years of Internet of Things (IoT) support. With the Smart Agent option, the MT 1200 can be programmed to handle precise vehicle tracking needs, such as defining geo-fences over circular or polygonal areas, detecting harsh cornering or rapid acceleration, waking the device out of low power sleep mode, generating trip reports, or enabling and disabling remote starts.

Simple Installation

Installing the MT 1200 vehicle tracking solution is simplified because it comes with preinstalled hardware features that include internal cellular antenna, internal backup battery, and internal GPS/GLONASS antenna (or external antenna connector for hard-to-reach areas). Installation is further simplified when used with the available Smartphone app to assist with field installation or diagnosis.

Cloud management (Optional)

With cloud-enabled N4A™ Device Manager, up to 500,000 MT 1200 devices can be easily managed and monitored around the globe in a cost-efficient and scalable manner. The N4A™ Device Manager features remote management and monitoring from a central location to configure, monitor, manage, and even update MT 1200 all over the air.

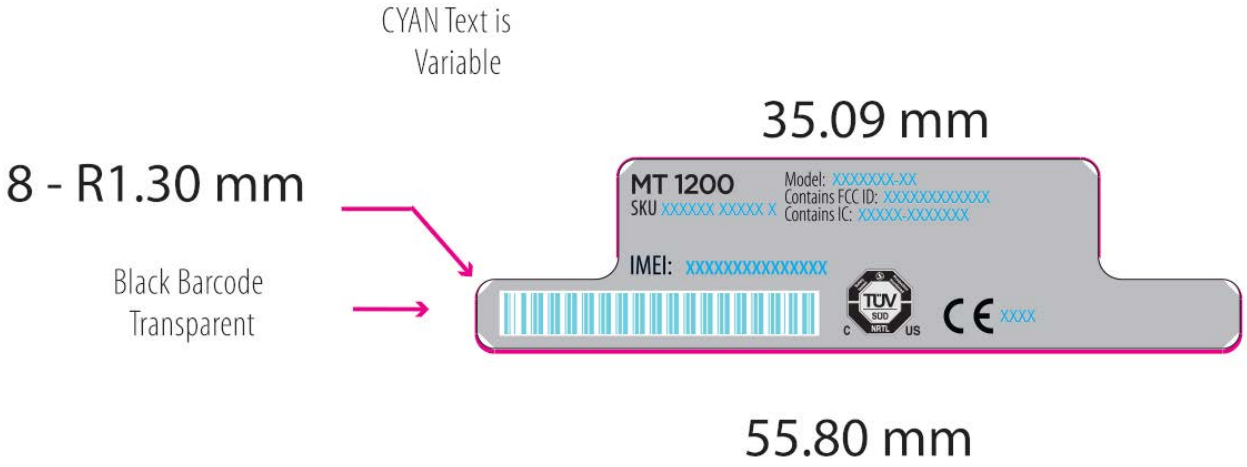
The following image shows the internal and external GPS versions of the MT 1200.

Labels

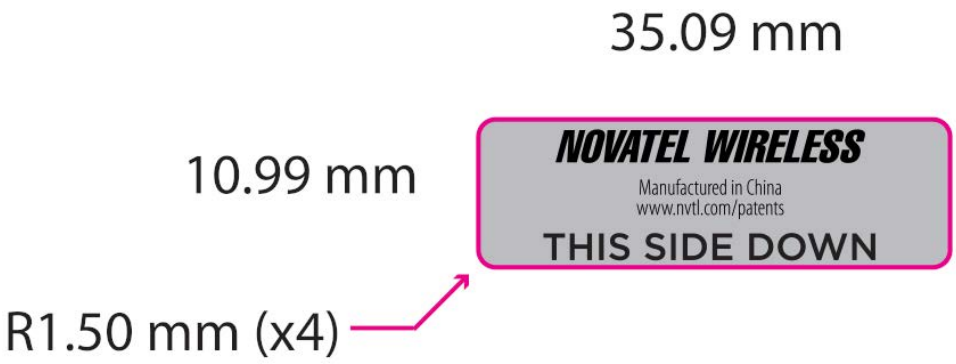
The MT 1200 has two printed labels. The label with device information is adhered to the device above the battery door and smaller logo label is adhered to the battery door.

The following image shows an example of the device information label.

NOTE: The labels shown contain the possible data fields used on the various MT 1200 device models. Generic values are used for variable numbering. The possible certifications are shown with generic numbering and approximate placement. The devices you receive may vary slightly in layout and certification content.



The following image shows an example of the smaller logo label.



Technical Specifications

Case

Dimensions:	(L x W x H) 80 x 61 x 19.9 mm
Weight:	With Battery: 75 g (with internal GPS/GLONASS patch antenna) 70 g (with FAKRA connector for external GPS/GLONASS antenna) Without Battery: 65 g (with internal GPS/GLONASS patch antenna) 60 g (with FAKRA connector for external GPS/GLONASS antenna)
Housing:	Rugged textured plastic enclosure (UL94 Flame Classification V-0)
Mounting Options:	Mounting bracket, tie-wrap

Cellular Technology

	MT 1200 GPRS	MT 1200 1XRTT	MT 1200 HSDPA
Embedded Module	Expedite L10-G	Enabler HS 3001	Enabler HS 3002
Network Technology	Quad-Band GSM/GPRS Radio 850/900/1800/1900 MHz	Dual-Band CDMA2000® 1X Radio 800/1900 MHz	Dual-Band HSDPA (UMTS 3G)Radio NA: 3G: 850/1900 MHz 2G: GPRS/EDGE 850/1900 MHz ROW: 3G: 900/2100 MHz 2G: GPRS/EDGE 900/1800 MHz
Data Speed - Peak Downlink - Peak Uplink	 56.6 Kbps 14.4 Kbps	 153 Kbps 153 Kbps	 3.6 Mbps 384 Kbps
SMS Functionality	Text, PDU, MO/MT, Cell Broadcast	Text, MO/MT	Text, PDU, MO/MT, Cell Broadcast

Power

Input Power Range:	12 V or 24 V
Battery (Optional):	240 mAh rechargeable Lithium-ion

Environment

Operating Temperature:	-20° C to 60° C (With battery) -30° C to 70° C (Without battery)
Storage Temperature:	-20° C to 60° C (With battery) -40° C to 85° C (Without battery)
Battery Charge Temperature Range:	0° to +45° C
Relative Humidity:	Up to 95% non-condensing
Vibration Stability:	Operates in accordance with SAE J1211

Antenna

Internal Cellular Technology	
Internal GPS/GLONASS patch antenna:	Tracking sensitivity (measured): -160 dBm Acquisition sensitivity (measured): -149 dBm
FAKRA connector for external GPS/GLONASS antenna:	Tracking sensitivity: depends on antenna used Acquisition sensitivity: depends on antenna used

Interfaces, I/O, and LED

Micro USB
Internal SIM card (not applicable to 1xRTT)
2 Digital Inputs, 1 Digital Output (latched)
1 Serial Interface (RS232)
LED Indicators: Power, Satellite, Cellular

Device Management

Production Environment:	Cloud-based (Optional)
Testing Environment:	Cloud-based; 90-day free access with engineering support
Bulk Provisioning:	Over-the-air or local
Firmware Upgrade:	FOTA (Firmware-over-the-air) or local

Protocols

Host Protocols:	AT Commands, UDP API, FOTA
Internal Protocols:	UDP API, TCP API
API Control/Status:	AT Commands, UDP API, TCP API, AT Commands over SMS

Certifications

NA:	FCC, IC, PTCRB
ROW:	CE, GCF, e-Mark, RoHS2
Applicable Carriers	

Additional Features

FOTA
Smart Agent: Binary Reporting, Timed Reporting, Event Reporting
3-Axis Digital Accelerometer
I/O Control

Models

GSM2508-00 (GPRS)
RTT2241-00 (1xRTT)
UMT2242-00 (HSDPA ROW)
UMT2243-00 (HSDPA NA)

Document References

Guide Number	Guide Title
MT1200X-UG001	MT 1200 User Guide
MT1200X-AT001	MT 1200 AT Command Reference

Guide Number	Guide Title
ENF0000AN003	Accelerometer Guide Application Note
ENF0000AN002	FOTA Application Note
ENF0000CB001	API Reference
ENF0000AN010	MT Decoding NMEA Messages Application Note
ENF0000AN015	Power Saving Techniques Application Note

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Features and Functions

GPS

The MT 1200 incorporates a GPS receiver. The GPS receiver determines the current location of the device and shares this location information with connected devices.

GPS functions include:

- NMEA Packets (ASCII)
- Novatel Wireless Binary Packets
- Buffered GPS Messages
- Geo-fencing: Circular (25) and Polygon (25)
- Virtual Odometer

For more details on NMEA and Binary Packets, please see Novatel Wireless document *MT Decoding NMEA Messages* (ENF0000AN010).

For more details on Virtual Odometer, please see Novatel Wireless document *API Reference* (ENF0000CB001).

Power

The MT 1200 accepts 6 to 32 Volts DC with minimum 2 amps input power. This allows the device to be used on both 12 V and 24 V vehicles per SAE specifications, including protection for jump-starting 24 V vehicles.

The power-related pin assignments on the 8-Pin IO connector are:

- Pin 5 - Power Input
- Pin 4 - Ground

WARNING! All power and ground pins must be connected.

Mode	Current
General Operation	6 to 32 VDC for 12 V and 24 V vehicles

LEDs and Connectors

The MT 1200 has three LEDs to indicate power, satellite, and cellular status. All versions of the MT 1200 have connectors for micro-USB and DC power. The external GPS versions have an additional connector for the GPS cable.

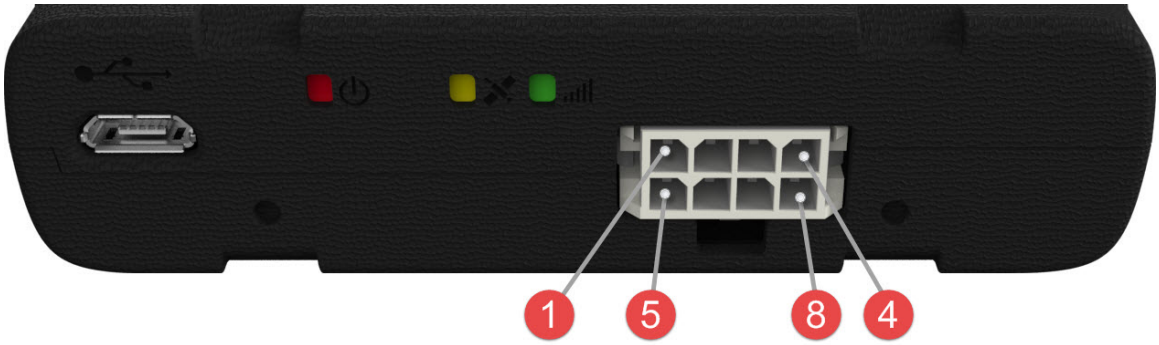
The following image diagram shows the placement of each LED and connector on both the external and internal GPS MT 1200 model-types.

The following table explains each call-out in the image by number.

Number	Icon	Role	Color	Description
1	N/A	Micro USB Connector	N/A	• Connector for Micro USB cable
2		Indicates whether power applied or not	Red	• Blinking – Power is applied; device is initializing • Solid – Power is on • Off – Power is off or device has entered low-power sleep mode
3		Indicates that the GPS receiver has acquired satellite communication	Amber	• Blinking – GPS is on and searching for satellite signal • Solid – GPS lock has been established • Off – Device is receiving invalid or no GPS data
4		Indicates network registration status	Green	• Blinking – Device is trying to connect to the cellular network • Solid – Device has connected to the cellular network • Off – Device is not attempting to register to the cellular network

Number	Icon	Role	Color	Description
5	N/A	8-pin Molex connector	N/A	• Connector for 8-pin I/O cable
6	N/A	External GPS antenna connector	N/A	• FAKRA connector for GPS antenna

The following image diagram shows a closeup of the 8-pin Molex connector with Pin-Outs Identified.



The following table describes each of the pin-outs on the connector.

#	Name	Function	Details	Corresponding Wire in CAB2508-01	Corresponding Wire in CAB2508-02
1	IGN	Ignition Sense	Ignition Input VIH: min 3 V VIL: max 0.5 V	WHITE	WHITE
2	RX	Serial Data In	RS232	---	RED/WHITE
3	TX	Serial Data Out	RS232	---	BROWN/WHITE
4	GND	Ground	0 V	BLACK	BLACK
5	PWR	Power	Range: 6 to 32 V	RED	RED
6	GPIO1	Digital I/O, Default PU, PD Programmable	Max input voltage: 36 V VIH: min 3.0 V VIL: max 0.5 V VOH: typ 3.3 V VOL: max 1.0 V	---	ORANGE
7	GPIO2	Digital I/O, Default PU	Max input voltage: 36 V VIH: min 3.0 V VIL: max 0.5 V VOH: typ 3.3 V VOL: max 1.0 V	---	YELLOW
8	GPO3	Digital Output, Open Drain	Latched Max sink current: 1.1 A VOL: typ 0 V	---	WHITE/RED

Low-Power Sleep Mode

In Low-Power Sleep Mode (LPS), all modem/GPS activity stops, which allows extreme power savings. The auxiliary processor efficiently monitors system inputs based on the configuration assigned and will exit LPS mode when needed.

You can configure the MT 1200 to exit Low-Power Sleep Mode when:

- Ignition detected
- Motion detected
- Input triggered
- Elapsed-time expired

For more details, see Novatel Wireless document *Power Saving Techniques Application Note* (ENF0000AN015).

Accelerometer

The MT 1200 has a three-axis digital accelerometer that provides the following features:

- Motion alert (towing alert)
- Driver behavior reporting
    - Rapid acceleration
    - Harsh braking
    - Harsh cornering

For more information, please refer to Novatel Wireless document *Accelerometer Guide Application Note* (ENF0000AN003).

Device Check-in

The device check-in feature provides connectivity to "configuration-only" servers. The device checks into these servers periodically for configuration updates. A check-in is similar to a wake up message. After UDP connection is established, the server configures the device using AT commands.

The device check-in feature is enabled with the AT$CHKIN command and requires Novatel Wireless N4A DM software version 3.1 or later. For more details on AT commands for device check-in, please see Novatel Wireless document *MT 1200 AT Command Reference* (MT1200X-AT001).

External Antenna

Some configurations of the MT 1200 have an external GPS antenna connector. The MT 1200 supports both GPS and GLONASS satellite positioning systems and the chosen antenna should match both system frequencies.

NOTE: The external GPS antenna connector works with active antennas.

Antenna connector specifications include:

- 50-Ohm impedance
- GPS L1 (1575.42 MHz) and L2 (1227.60 MHz)
- GLONASS L1 (1598.0625 - 1609.3125 MHz) and L2 (1242.9375 - 1251.6875 MHz)
- FAKRA male antenna connector

Backup Battery

Some configurations of the MT 1200 have a backup battery installed. The battery is a 240 mAh rechargeable Lithium-ion.

The primary function of the backup battery in the MT 1200 is to provide notification to a user when there is a loss of power to the device. This can indicate device tampering or battery disconnection or removal.

NOTE: Input Event 63 can be used to trigger an output event that can be configured in the same manner as the other output events. If the modem is off (to save power), this event will be turned on. If GPS data is configured in the output event and the data is not available, the last known position can be configured to be used in the output message.

NOTE: The MT 1200 firmware powers down the internal battery after a specified amount of time. You can use the AT command **AT$BATTIM=x** (where x is the number of seconds) to control the length of time that the MT 1200 runs on the internal battery after the main power has been removed. The default setting is 300 seconds (5 minutes). The maximum time setting is 6000 seconds (100 minutes).

Micro-USB Connector

The MT 1200 includes a Micro USB (2.0) I/O port for input/output to program the application processor. A micro USB cable is required (purchased separately).

WARNING! The Micro USB connector is not intended for general use. This connector should only be used when configuring or upgrading the device. The connector cannot be used to supply power to the device.

WARNING! A standard USB-certified micro USB cable must be used. The use of micro USB cables that belong to cellular phones, MP3 players, or cameras is NOT recommended and could cause serious damage to the MT 1200 device.

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Installation

SIM Installation

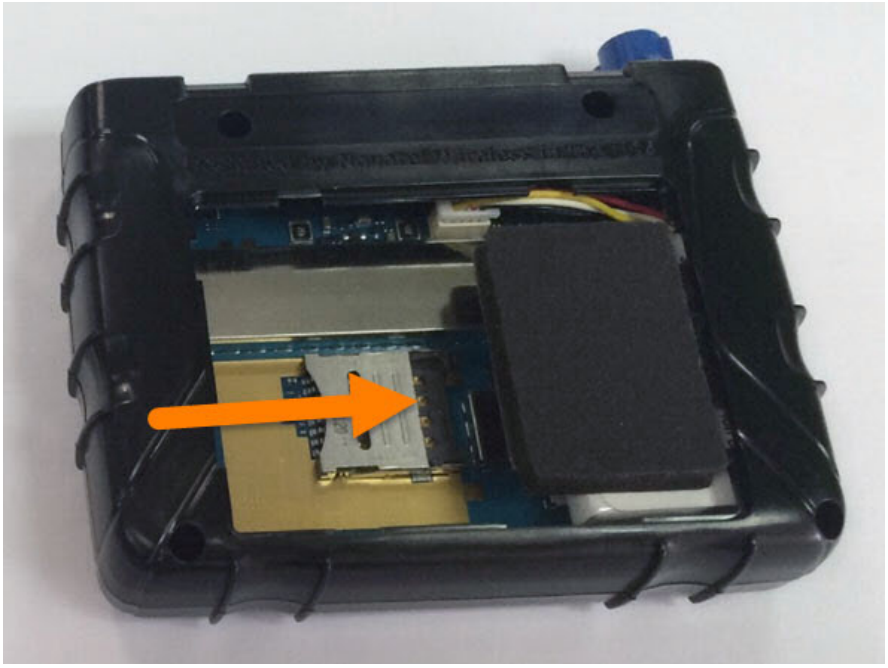
NOTE: The SIM installation section applies only to the GPRS and HSDPA versions.

The GPRS and HSDPA versions of the MT 1200 include an on-board micro-SIM carrier supporting 1.8/3 V micro-SIM cards. There is no external access to the SIM card.

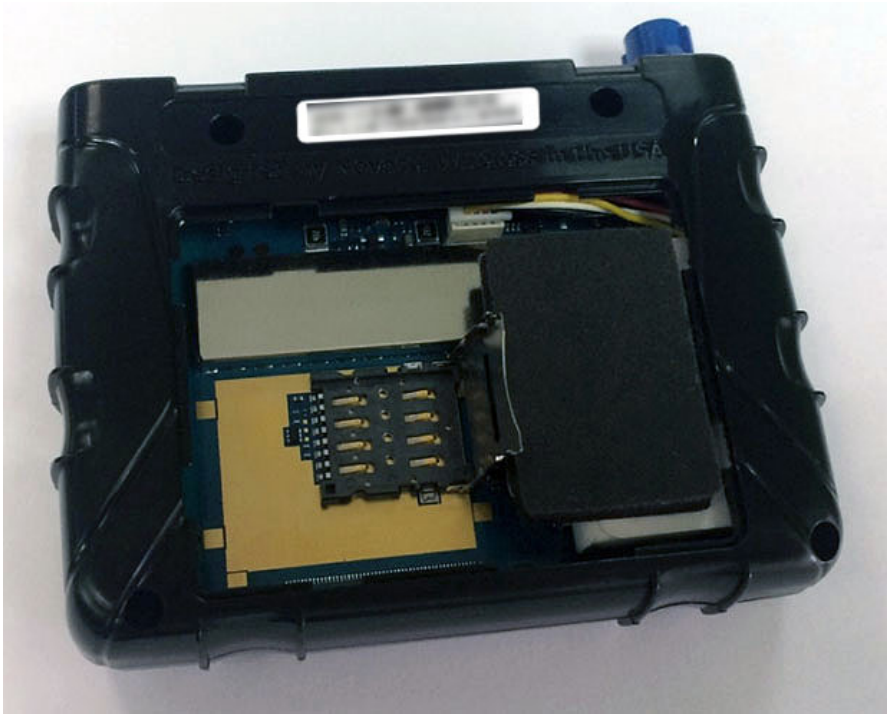
Without the SIM installed, the MT 1200 modem cannot communicate with the network. Obtain a SIM card from your network service provider. The provider must provision the SIM card for the data. Always take care to protect the SIM.

To insert the SIM card:

1. Draw the SIM slide to the right.

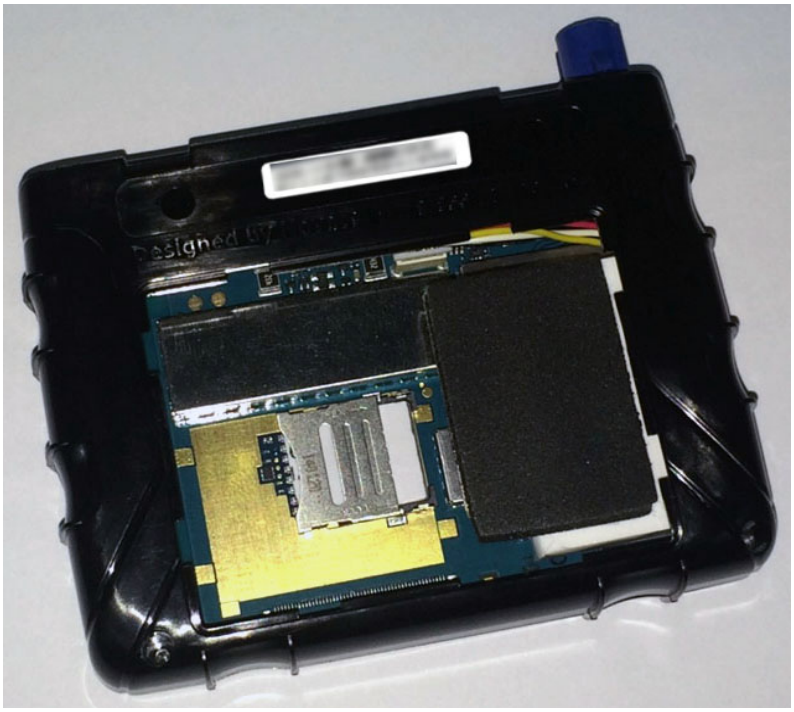


2. Open the SIM holder so that the lid is vertical.

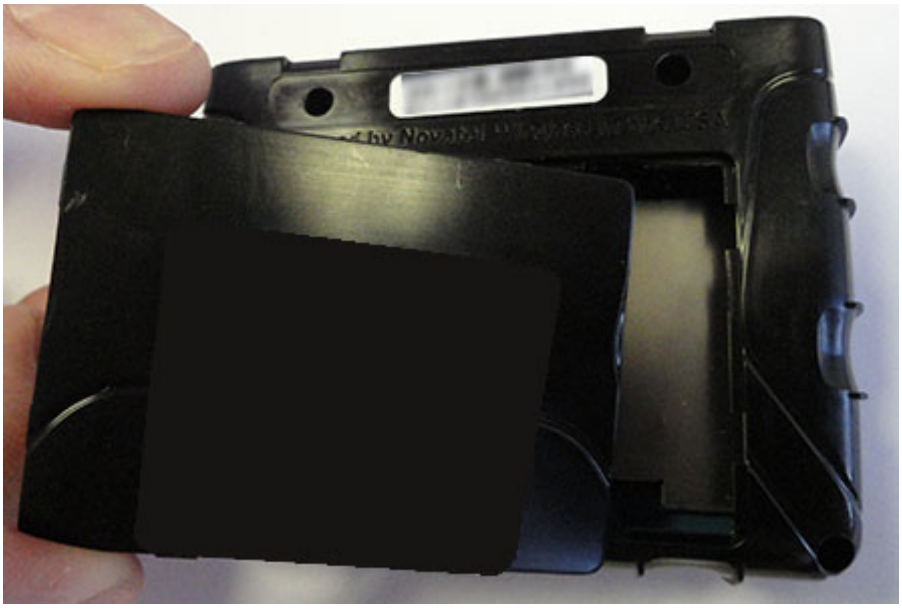


3. Insert the SIM card into the SIM holder.

4. Close the SIM slide, the push the slide to the left and lock it down.



5. Insert the device “door” plate into the opening and snap into place.



SIM installation is complete.

Device Installation

There are several considerations for mounting and installing the MT 1200 device such as determining the mounting location within the vehicle, the type of mounting method to use, and best device position and orientation. This section covers each of these considerations and includes installation steps along with precautions and guidelines.

Precautions and Guidelines

As you determine the mounting location and prepare to install the device, be sure to heed the following precautions and guidelines:

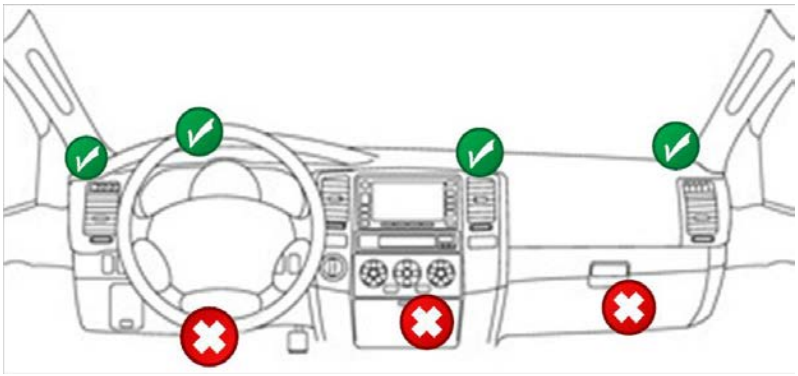
- Use a qualified Automotive Electronics Installer to perform the installation.
- Perform a basic vehicle functionality check before starting the installation.
- Mount all components properly or attach to the vehicle in a way that does not interfere with the normal operation of the vehicle.
- Never mount the MT 1200 in the engine compartment, directly on top of the AM/FM radio, by any moving parts, or in a location that would be exposed to the elements.
- Choose a location where metal or cable bundles do not shield the device.
- Do not mount the device near or in the path of the vehicle's airbag.
- Route all device cabling away from vehicle components where it could cause RF interference, such as radio, speakers and speaker wires, and GPS.
- Choose a location where the device can be positioned so that the correct side has the best unobstructed path to the sky (see label instructions).
- Protect cabling through the vehicle chassis against spurs and nicks.
- Do not mount the device where any excessive heat is generated by the vehicle or vehicle components.
- Solder all splice connections to ensure optimum reliability.
- Make all I/O connections prior to connecting the device to vehicle power.

CAUTION! If the device is already connected to vehicle power, remove the in-line fuse on the MAIN POWER (+V) wire of the device power cable before connecting any of the IO.

- For added security as an indicator against tampering, use torque/tamper seal on Molex, ground and fuse connections.

Mounting Locations

When mounting the device, the Novatel Wireless logo (GPS antenna side) must be facing up or out with a clear view of the sky. Select the best location for mounting the device within the vehicle, such as one of the following locations:



- Above the air vents
- Above the steering wheel
- Above the instrument cluster
- Above the glove box

NOTE: Avoid locations identified with a red X.

CAUTION! Both the cellular and GPS antennas are internal to the device (depending on the model). Therefore, it is critical to get the device mounted as high on the dashboard as possible with minimal obstructions above it.

Mounting Methods

Mounting Bracket Used

The preferred method for mounting and securing the MT 1200 inside a vehicle is to use the recommended Mounting Bracket Assembly (70015024). The bracket allows for mounting the device so that the label location conforms to the installation location.

The bracket can be installed using two #6 screws (preferred method) or with double-sided tape.

CAUTION! If double-sided tape is used (or another method not described in this guide), note the following precautions.

- Excessive force in the middle of the device may cause damage to the device.
- If using rigid mounting hardware, apply pressure only to the ends of the device. Limit the mounting pressure only to the amount needed to secure the device.

Mounting Bracket Not Used

If a mounting bracket is not used, you can mount the device using cable ties by fastening it directly to the vehicle. The MT 1200 case includes molded channels, as shown in the following image, to help secure it to a stable structure or wire bundle. The recommended cable tie size is 0.19" wide (4.75 mm).

MT 1200 Cable Tie Channels

Device Orientation

The MT 1200 has an accelerometer auto-calibration procedure that orients the device to the vehicle's direction of travel.

NOTE: For the accelerometer to operate properly, you must mount the MT 1200 securely. The accelerometer may report inaccurate results if you mount the device to cable runs or other structures that may shift the device's orientation.

For more information, see Novatel Wireless document *Accelerometer Guide Application Note* (ENF0000AN003).

Mounting and Installing the Device

Prior to performing the installation, ensure that each of the following prerequisites have been met.

- Engage the services of a qualified Automotive Electronic Installer.
- Read the entire *MT 1200 User Guide*.
- Perform a basic vehicle functionality check and note any pre-existing issues.
- Obtain the required cables to connect the device to the vehicle. See the **Optional Accessories** section for more information.

WARNING! While performing these steps, do not apply excessive force to the retention legs or snap feature prior to inserting the device as this may deform the mounting bracket.

To mount and install the device:

1. In the chosen location, secure mounting bracket to the mounting surface using one of the following methods:
   - Two (2) # 6 screws (preferred method)
   - Double-sided tape
2. After securely attaching the mounting bracket, snap the device into the bracket with the connector end at the mount opening.

   NOTE: You can insert the device with the label side up or down. Position the device so that the label side has the best unobstructed path to the sky. See notation on the device label.
3. Take the Installation Cable and attach each of its three connectors (Red, White, and Black) to connection points within the vehicle (Battery, Ignition (NOT accessory), and Ground) using standard wiring placement and techniques.
   a. Make Battery and Ignition connections at the vehicle's ignition harness using the "poke and wrap" technique or solder only. Then wrap the connection with electrical tape and secure with a zip-tie.
   b. Connect Ground with a Star Ring Terminal and Tech Screw to a metallic surface of the vehicle chassis. Scratch off a small area of paint where you are going to place the ground connection screw.

      NOTE: Do not use of T-taps, Scotch-locks, Fuse taps and Butt connectors.
4. Proceed to Testing and Verifying the Installation.

Testing and Verifying the Installation

After you have completed the MT 1200 installation, Novatel Wireless recommends that you test and verify that the device .

To perform testing and verification:

1. After the installation, with the vehicle ignition switch in the OFF position, wait at least five minutes for the device to acquire a signal.
2. When all three (3) LEDs have illuminated, turn the ignition key to the ON position and leave it in that position for 30 seconds.
3. Turn the ignition key back to the OFF position and wait 10 seconds.
4. Repeat steps 2 and 3.

While you perform steps 2 and 3 two times in succession (if properly scripted), the device sends four messages (2-ignition ON and 2-ignition OFF) to the host server. Later you can verify that the host server received this communication. For your convenience, the following table contains the LED activity descriptions.

Icon	Role	Color	Description
	Indicates whether power is applied	Red	• Blinking – Power is applied; device is initializing • Solid – Power is on • Off – Power is off or device has entered low-power sleep mode
	Indicates that the GPS receiver has acquired satellite communication	Amber	• Blinking – GPS is on and searching for satellite signal • Solid – GPS lock has been established • Off – Device is receiving invalid or no GPS data
	Indicates network registration status	Green	• Blinking – Device is trying to connect to the cellular network • Solid – Device has connected to the cellular network • Off – Device is not attempting to register to the cellular network

NOTE: Upon initial power connection (when power is first applied), the power LED may flash rapidly for 5 to 10 seconds as the internal processor initializes.

5. If the LEDs do not function as stated, try the following:

   a. Check the connections using a multimeter to verify Power, Ignition, and Ground at the Molex System Connector.

   b. Perform a power reset. To do this, unplug the Molex Connector from the MT 1200, wait 30 seconds, and then reconnect it.

   NOTE: If this is a device with an internal back up battery, turn the battery off, and then turn it back on to complete the reset.

   NOTE: If the device has an internal backup battery, you must turn the battery switch off, then back on to complete the reset.

6. After successfully completing steps 2 and 3 twice, ideally while still at the vehicle, verify that the host server has received the messages.

   NOTE: Be prepared to provide the necessary information to complete the validation process such as MEID, Serial Number, and Mobile Number.

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Optional Accessories

Optional Accessories List

The following optional accessories are available from Novatel Wireless for the MT 1200:

Part Name	Part Number
3-Wire installation cable	CAB2508-01
Advanced Integration Cable, All interfaces populated (Requires CAB2200-27)	CAB2508-02
Accessories to Integration Cable: 12 VDC Relay with Socket	CAB2200-25
Accessories to Integration Cable: 24 VDC Relay with Socket	CAB2200-26
Accessories to Integration Cable: RS-232 Serial Interface for UART1	CAB2200-27
Mounting Bracket	70015024

Cables

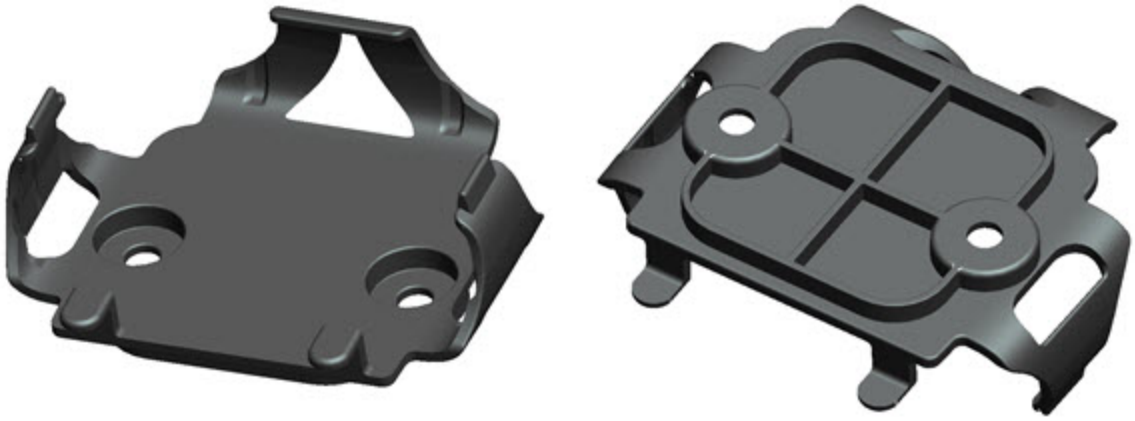
The following cables are available for the MT 1200:

Part Name	Part Number	Description	Sample Photo
3-Wire Installation Cable	CAB2508-01	• One power wire (RED, in-line 2A fuse, unterminated partial strip • One ignition sense wire (WHITE, in-line 2A fuse, unterminated, partial strip • One ground wire (BLACK, unterminated, partial strip)	
Advanced Integration Cable, All interfaces populated	CAB2508-02	• One power wire (RED, in-line 2A fuse, unterminated, partial strip) • One ignition sense wire (WHITE, in-line 2A fuse, unterminated, partial strip) • One ground wire (BLACK, unterminated, partial strip) • 5-pin connector for UART1 (2-wire RS-232 UART) • 2-pin connector for starter interrupt relay connection (GPO3) • 2 GPI wires (GPI1 - orange, GPI2 - yellow; unterminated, heat shrink cap)	
Accessories to Integration Cable: 12 VDC Relay with Socket	CAB2200-25	• Sealed Waterproof Relay • Includes internal negative spike suppression • Includes pre-wired relay socket • For 12 Volt DC applications • Typical use case: Starter Inhibit	

Part Name	Part Number	Description	Sample Photo
Accessories to Integration Cable: 24 VDC Relay with Socket	CAB2200-26	• Sealed Waterproof Relay • Includes internal negative spike suppression • Includes pre-wired relay socket • For 24 Volt DC applications • Typical use case: Starter Inhibit	
Accessories to Integration Cable RS-232 Serial Interface for UART1	CAB2200-27	• Serial Interface Cable for UART1 • Typical use case: Programming and Debugging Third-Party Device Connectivity	

Mounting Bracket

Use the Mounting Bracket (PN #70015024) to securely mount the device. For more information on mounting, see the Device Installation section.



5

Compliance and Regulatory

General Disclaimer

TERMS OF USE OF NEW MATERIALS - PLEASE READ CAREFULLY

From time to time, Novatel Wireless, in its sole discretion, may make available for download on its website (www.novatelwireless.com), or may transmit via mail or email, updates or upgrades to, or new releases of, the firmware, software or documentation for its products (collectively, 'New Materials'). Use of such New Materials is subject to the terms and conditions set forth below, and may be subject to additional terms and conditions as set forth in Novatel Wireless's Technical Support Policy (posted on its website) and/or any written agreement between the user and Novatel Wireless.

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Version Verification

Please ensure you have the latest version of this document by downloading it from www.novatelwireless.com

Warranty Information

This warranty applies to (a) products sold directly by Novatel Wireless, unless a different warranty is specified in a written agreement between Novatel Wireless and the purchaser; and (b) products sold to end users through a distributor authorized by Novatel Wireless, but only where the authorized distributor does not provide a separate warranty on such products, and Novatel Wireless has agreed to provide this warranty to such end users. If you purchased the product from an authorized distributor, please check whether this warranty from Novatel Wireless, or a separate warranty from the distributor, applies to your purchase. This warranty does not apply to any (i) accessories or batteries for the products; or (ii) demonstration samples or prototypes of the products. Unless otherwise provided in a written agreement between Novatel Wireless and the purchaser, all such accessories, batteries, samples or prototypes are provided by Novatel Wireless AS IS without any warranty of any kind.

Novatel Wireless warrants to the original purchaser of the product from Novatel Wireless or its authorized distributor (as applicable) that, for a period of one (1) year from the date of shipment of the product from Novatel Wireless, the product hardware will be substantially free from defects in material or workmanship under normal operation, and the product firmware will perform substantially in accordance with the product documentation provided by Novatel Wireless. Novatel Wireless does not warrant that (a) the product hardware or firmware will meet the purchaser's requirements; (b) the operation of the product hardware or firmware will be uninterrupted or error-free; or (c) the product, when integrated in, or combined with, other products or software not supplied by Novatel Wireless, will continue to perform substantially in accordance with the product documentation. This limited warranty is for the benefit of the original purchaser, and is not transferable.

During the warranty period, Novatel Wireless, at its expense and in its sole discretion, will repair the product, or replace the product with a corresponding or equivalent product, if it is determined to have a covered defect, provided that the purchaser first notifies Novatel Wireless (directly or through its authorized distributor from which the product was purchased) of any such defect, furnishes Novatel Wireless with a proof of purchase (if required), requests and obtains a return merchandize authorization (RMA) number from Novatel Wireless, and returns the product under that RMA to Novatel Wireless (or, at Novatel Wireless's option, to its authorized distributor), with the shipping charges being prepaid by purchaser. If, upon reasonable examination of the returned product, Novatel Wireless does not substantiate the defect claimed by purchaser, or determines that the defect is not covered under this limited warranty, Novatel Wireless will not be required to repair or replace the product, but may instead reship the product to the purchaser (or, at Novatel Wireless's option, to its authorized distributor where the product can be made available to purchaser), in which case the purchaser shall be responsible for paying Novatel Wireless's cost for reshipping the product to purchaser (or to Novatel Wireless's authorized distributor), and Novatel Wireless's usual charges for unpacking, testing, and repacking the product for reshipment to purchaser (or to Novatel Wireless's authorized distributor). Purchaser shall bear the risk of loss or damage in transit to any product returned by purchaser to Novatel Wireless, or any returned product not found to be defective or covered under this warranty, and reshipped by Novatel Wireless to purchaser (or to Novatel Wireless's authorized distributor). In the event Novatel Wireless repairs or replaces a defective product covered by this limited warranty, the repaired or replacement product will be covered under this limited warranty for the remainder of the original

warranty period on the defective product, or a period of ninety (90) days, whichever is longer. If Novatel Wireless is unable to repair or replace a defective product covered by this limited warranty, Novatel Wireless will provide to purchaser a credit or a refund (at Novatel Wireless's option) of the original purchase price (excluding taxes and shipping charges). Any returned and replaced product, or any product for which Novatel Wireless has furnished a credit or a refund, becomes the property of Novatel Wireless.

Novatel Wireless shall not have any obligation to provide any firmware bug fixes, upgrades or new releases except as may be necessary to correct any covered defect of which purchaser notifies Novatel Wireless in writing during the warranty period. Novatel Wireless, from time to time and in its sole discretion, may make available for download on its website (www.nvtl.com), or may provide via email, certain firmware bug fixes, upgrades or new releases for the product. Download and use of any such bug fixes, upgrades or new releases is subject to all of the applicable terms and conditions of Novatel Wireless's technical support policy as posted and updated on its website. Novatel Wireless shall have no obligation under this limited warranty for (a) normal wear and tear; (b) the cost of procurement of substitute products; or (c) any defect that is (i) discovered by purchaser during the warranty period but for which purchaser does not request an RMA number from Novatel Wireless, as required above, until after the end of the warranty period, (ii) caused by any accident, misuse, abuse, improper installation, handling or testing, or unauthorized repair or modification of the product, (iii) caused by use of any materials not supplied by Novatel Wireless, or by use of the product other than in accordance with its documentation, or (iv) the result of electrostatic discharge, electrical surge, fire, flood or similar causes. The purchaser (or its customers, as applicable) shall be solely responsible for the proper configuration, testing and verification of the Novatel Wireless product prior to deployment in the field, and for ensuring that any end user product or system into which the Novatel Wireless product is integrated or incorporated operates as intended and meets the requirements of purchaser (or its customers). Novatel Wireless shall have no responsibility whatsoever for the integration, configuration, testing, verification, installation, upgrade, support or maintenance of any such end user product or system, or for any liabilities, damages, costs or expenses associated therewith.

NOVATEL WIRELESS'S SOLE RESPONSIBILITY AND PURCHASER'S SOLE REMEDY UNDER THIS LIMITED WARRANTY SHALL BE FOR NOVATEL WIRELESS TO REPAIR OR REPLACE THE PRODUCT (OR IF REPAIR OR REPLACEMENT IS NOT POSSIBLE, PROVIDE A CREDIT OR REFUND OF THE PURCHASE PRICE) AS PROVIDED ABOVE. NOVATEL WIRELESS EXPRESSLY DISCLAIMS ALL OTHER WARRANTIES OF ANY KIND, EXPRESS OR IMPLIED, INCLUDING WITHOUT LIMITATION ANY IMPLIED WARRANTIES OF NON-INFRINGEMENT, MERCHANTABILITY, SATISFACTORY PERFORMANCE AND FITNESS FOR A PARTICULAR PURPOSE. IN NO EVENT SHALL NOVATEL WIRELESS BE LIABLE FOR ANY INDIRECT, SPECIAL, EXEMPLARY, INCIDENTAL OR CONSEQUENTIAL DAMAGES (INCLUDING WITHOUT LIMITATION LOSS OR INTERRUPTION OF USE, DATA, REVENUES OR PROFITS) RESULTING FROM A BREACH OF THIS WARRANTY OR BASED ON ANY OTHER LEGAL THEORY, EVEN IF NOVATEL WIRELESS HAS BEEN ADVISED OF THE POSSIBILITY OR LIKELIHOOD OF SUCH DAMAGES.

Some jurisdictions may require a longer warranty period than specified above and, accordingly, for products sold in those jurisdictions the applicable warranty period shall be extended as required under the laws of those jurisdictions. Furthermore, some jurisdictions may not allow the disclaimer of implied warranties or the exclusion or limitation of incidental or consequential damages, so the above disclaimer, limitation or exclusion may not apply to products sold in those jurisdictions. This limited

warranty gives the purchaser specific legal rights and the purchaser may have other legal rights that vary from jurisdiction to jurisdiction. This limited warranty shall be governed by the laws of the State of Texas, United States of America, without regard to conflict of laws principles. This limited warranty shall not be governed in any respect by the United Nations Convention on Contracts for the International Sale of Goods.

Regulatory Compliance

FCC

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.

This equipment has been tested and found to comply with the limits pursuant to Part 15 Subpart B. FCC Part 22 & Part 24 is covered by the "modular approval" process for the embedded wireless module. This approach, described by FCC Public Notice DA 00-131407 released June 26, 2000, is intended to afford relief to equipment manufacturers by eliminating the requirement for obtaining a new equipment authorization for the same transmitter when installed in a new device.

These limits are designed to provide reasonable protection against harmful interference in an appropriate installation. This equipment generates, uses, and can radiate radio frequency energy and, if not used in accordance with instructions, can cause harmful radiation to radio communication. However, there is no guarantee that interference will not occur in a particular installation.

RF EXPOSURE

Your device is a radio transmitter and receiver. It is designed and manufactured not to exceed the emissions limits for exposure to radio frequency (RF) energy set by the Federal Communications Commission (FCC) of the U.S. Government. These limits are part of comprehensive guidelines and establish permitted levels of RF energy for the general population. These guidelines are based on the safety standards previously set by the U.S. and international standards bodies. The standards include a substantial safety margin designed to assure the safety of all persons, regardless of age and health.

The exposure standard for wireless RF devices, such as the device, employs a unit of measurement known as the Specific Absorption Rate, or SAR. The SAR limit set by the FCC is 1.6W/kg. SAR values at or below that limit are considered safe for the general public.

Before a wireless RF device is made available for sale to the Public, it must be tested and certified to the FCC that it does not exceed the SAR limits established by the FCC. Tests for SAR are conducted using the positions and locations (e.g., at the ear or worn on the body) as required by the FCC for each device model.

In order to use this device without additional FCC certification approvals, the installation must meet the following conditions:

For the transmitter to meet the MPE categorical exclusion requirements of 2.1091, the ERP must be less than 1.5 watts for personnel separation distance of at least 20 cm (7.9 in). Therefore, the maximum antenna gain cannot exceed +3.3dBi. If greater than 1.5 watts exists, then additional testing and FCC approval is required.

R&TTE CE

This device has been fully tested and complies with the requirements of EN301 489-1, EN301 489-3, EN301 489-7, EN60950-1, IEC60950-1, EN62311, and EN300 440-2. Compliance to EN301 511 has been demonstrated through testing performed on this device and the embedded wireless module. RF exposure levels are below the recommended levels at distances of 6.7 cm between the antenna and user.

Novatel Wireless hereby declares that this device is in compliance with the essential requirements and other provisions of the Directive 1999/5/EC.

A full copy of the declaration of conformity can be found at http://documentation.nvtl.com.

Industry Canada

This device complies with Industry Canada licence-exempt RSS standard(s). 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 aux normes d'Industrie Canada exempts de license(s) RSS. Son fonctionnement est soumis aux deux conditions suivantes : (1) cet appareil ne doit pas provoquer d'interférences, et (2) cet appareil doit accepter toute interférence, y compris les interférences pouvant provoquer un fonctionnement indésirable de l'appareil.

ROHS COMPLIANCE

This device has been designed to comply with the European Union Restriction of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment (RoHS) Directive (2002/95/EC), effective since July 1, 2006.

DISCLAIMER

The information and instructions contained within this publication comply with all FCC, GCF, PTCRB, R&TTE, IMEI and other applicable codes that are in effect at the time of publication. Novatel Wireless disclaims all responsibility for any act or omissions, or for breach of law, code or regulation, including local or state codes, performed by a third party. Novatel Wireless strongly recommends that all installations, hookups, transmissions, etc., be performed by persons who are experienced in the fields of radio frequency technologies. Novatel Wireless acknowledges that the installation, setup and transmission guidelines contained within this publication are guidelines, and that each installation may have variables outside of the guidelines contained herein. Said variables must be taken into consideration when installing or using the product, and Novatel Wireless shall not be responsible for installations or transmissions that fall outside of the parameters set forth in this publication.

Battery Information and Safety Requirements

Failure to comply with all of the following precautions could:

- Cause personal injury or property damage
- Cause abnormal chemical reactions which would make the battery overheat, smoke, distort, leak, or catch on fire
- Destroy internal protections built into the battery
- Shorten battery life
- Reduce battery performance

Precautions

- Read this entire manual and the label on the exterior of the battery.
- Keep the battery away from sources of excessive heat such as fire, stoves, or direct sunlight.
- Keep the battery away from sources of high voltage or static discharge.
- Do not use or store the battery with other batteries or where it could touch metal.
- Do not put the battery into a microwave oven.
- Do not allow the battery to be crushed.
- Keep the battery away from children.
- Do not drop the battery.
- Do not allow anything to touch any of the battery contacts
- Do not connect two or more of the contacts.
- Do not disassemble, destroy, or attempt reassembly of the battery.
- Do not place or leave the battery in a damp or wet environment.
- Do not allow water to touch the battery.
- Do not wrap the battery with conductive material.
- Properly dispose of the battery.
- Do not incinerate or burn the battery.
- Do not leave or discard the battery where it could get wet or become submerged in water.
- Do not damage the battery.

- Do not weld or solder anything to the battery, the attached wires, or the connector.
- Do not use this battery in any device other than supplied.
- Use of this battery in other devices could result in unsafe conditions.
- Risk of explosion if battery is replaced by an incorrect type.
- Do not touch a leaking battery or materials that may have leaked from a battery. Do not allow it to touch your skin or clothes. If touched, immediately rinse affected areas thoroughly with water. Leaked materials may cause skin irritation. Seek medical attention if irritation persists. If it contacts your eyes, do not rub your eyes. Rinse the eyes thoroughly with water, and see a doctor immediately.