

**ORBCOMM®**

CONNECTING THE  
WORLD'S ASSETS



# GT 1020

## Installation Guide

GT0016, Version 04

Feb 2021

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## ABOUT THIS GUIDE

**IMPORTANT READ ALL INSTRUCTIONS CAREFULLY BEFORE INSTALLING, FAILURE TO DO SO MAY CAUSE PERSONAL INJURY OR DAMAGE TO PRODUCT AND/OR PROPERTY. •**

• Review the product package and contents prior to beginning the installation. Take care when opening the packaging and removing items. If a return is needed you will want to return the product in its original packaging if possible. • This instruction guide is provided as a GENERAL installation guide, some assets vary dimensionally and may require additional steps. • The manufacturer and/or distributors do not accept responsibility for third party charges, labor, and or third part replacement modifications. Some modifications may void the factory warranty. • Exercise due diligence when installing this product. ORBCOMM does not accept any responsibility for asset damage or personal injury resulting from the installation of this product. Careless installation and operation can result in serious injury or equipment damage. • All liability for installation and use rests with the owner/operator. • Always make sure you have a clean, dry, and well-lit work area. • Always ensure products are secure during disassembly and installation. • Always take steps to protect yourself when drilling, cutting, and grinding because this may create flying particles that can cause injury. • Thoroughly inspect the area to be drilled, on both sides of material, prior to modification, and relocate any objects that may become damaged. • Always route electrical cables carefully. Avoid moving parts, parts that may become hot and rough, or sharp edges. • Make sure to fully understand the product, its intended use, and operation prior to use.

### Purpose

This guide contains product information for the GT 1020. The intended audiences for this guide include field support personnel, product evaluators, and certified third-party personnel. It is particularly intended for personnel who are responsible for system installation and activation. In addition, and as is appropriate, this guide may be used for customer training.

### Cautions Concerning Servicing the GT 1020

**CAUTION:** To avoid personal injury, the equipment battery should be disabled by disconnecting the negative terminal cable prior to installation or servicing. Only trained service personnel should perform the procedures outlined in this installation guide. These procedures may allow exposure to high electrical energy that could result in electric shock and injury to untrained personnel during servicing, maintenance, and installation of the device.

**CAUTION:** Be aware of your working environment. Take appropriate steps to ensure that the GT 1020 cable harness and especially its connectors are not exposed to soil, water, or other contaminants that may be present at the installation site.

### Battery Safety Warnings

**CAUTION:** Always follow local disposal guidelines to properly dispose of the Lithium-ion battery and the device.

**CAUTION:** Store in a cool, well ventilated area. Elevated temperatures can result in shortened battery life.

**CAUTION:** DO NOT replace the battery. Changing the battery without ORBCOMM's permission could violate regulatory conformity.

**CAUTION:** DO NOT throw the internal battery or the device into fire.

## 1 OVERVIEW

The following steps outline the overall procedure to follow when installing and field commissioning the GT 1020 cellular terminal:

1. [Gather the required tools and components](#)
2. [Activate the terminal](#)
3. [Determine the mounting location](#)
4. [Mount the terminal](#)
5. [Prepare and connect the cable](#)
  - a. Prepare the cable
  - b. Route the cable
  - c. Connect the cable to the equipment
  - d. Plug the cable into the GT 1020

## 2 GATHER THE REQUIRED TOOLS AND COMPONENTS

### 2.1 Required Tools and System Components

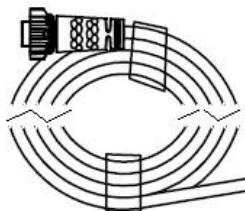
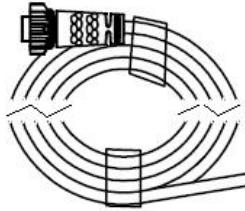
Table 1 lists the tools that are required (customer supplied) for a standard installation.

Table 1: Required Tools

5 A blade fuse (Qty. 2)	In-line, blade fuse holders (Qty 2)	Butt splice with heat shrink (several sizes needed)
3/8" lug ring (Qty. 3)	Heavy-duty electric drill/driver	5/16" (8 mm) driver socket
Tie wraps (Qty. 2-4)	T10 Torx driver	Ladder
Wire cutters	Wire crimpers	Wire snake
Flood lamp and appropriate extension cord (optional)		

These items can be ordered from ORBCOMM.

Note: Included hardware parts and quantity subject to change without notice.

	<p>GT 1020</p> <p>Part Number: Various models (GT1020-1100-S, GT1020-1101-S, GT1020-1103-S<sup>1</sup>) with and without BLE. Contact your Account Manager for details.</p> <p>Includes:</p> <ul style="list-style-type: none"> <li>- Qty 4 hex head drilling screws and mounting hardware</li> </ul>
	<p>Full blunt cut cable (3.5 m/11 ft.)</p> <p>Part Number: ST100902-001</p> <p>For use with all terminal models.</p> <p>NOTE: This cable may be optional for some temporary applications.</p>
	<p>3-Wire blunt cut cable (3.5 m/11 ft.)</p> <p>Part Number: ST100907-001</p> <p>For use with models GT1020-1103-S and GT1020-1101-S</p> <p>NOTE: This cable may be optional for some temporary applications.</p>

<sup>1</sup>Does not support Bluetooth.

	<p>VHB Bracket with tether (optional)</p> <p>Part Number: ST100900</p> <p>Includes:</p> <ul style="list-style-type: none"><li>- Qty 4 lock nuts</li><li>- Surface preparation pad</li><li>- Alcohol wipes</li><li>- 3M™ 94 Primer</li><li>- Tether</li></ul>
	<p>Magnet Mount with tether (optional)</p> <p>Part Number: ST100910</p> <p>Used to test terminals without hardware mounting.</p>

## 3 ACTIVATE THE DEVICE

### 3.1 Record the Unique ID and Associate the GT 1020

Each GT 1020 has a unique serial number used by ORBCOMM to register the device. The serial number is located on the bottom of the terminal and on the shipping box. Also record the asset identification number (Asset ID) for association when contacting support.

1. Record this number **before** the device is mounted.
2. Contact Customer Care to active the device and then request that they test its functionality.

As a minimum, you must provide the following information to activate the GT 1020:

- Customer name and contact information
- GT 1020 serial number
- Equipment make, model, and type
- Engine hour meter reading at time of installation (if installing on heavy equipment)
- Asset ID

**Note:** The Asset ID must be communicated to ORBCOMM so that the device appears correctly in the system portal.

- (optional) Equipment voltage (12 or 24 volt)

### 3.2 Remove the Magnet

**Note:** The GT 1020 can be activated at any time, but it is recommended that activation be done shortly before or immediately following installation of the GT 1020.

**Note:** The GT 1020 is shipped in a pre-installation state (shipping mode), which turns off the cellular modem and if applicable, the Bluetooth module.

1. Remove the label on the GT 1020, and then remove the magnet located under the label. This action causes the device to exit shipping mode and activates the device. The LED is solid green for 15 seconds once the magnet is removed.

**Note:** Remember to keep the magnet for later use.



## 4 DETERMINE THE MOUNTING LOCATION

The GT 1020 includes an integral antenna, and an accelerometer for movement detection.

Consider the following guidelines when determining where to mount the GT 1020.

- Mount the terminal on a stable, flat surface. It is preferable to mount the GT 1020 horizontally, with the LED visible. Less desirable but acceptable, you can mount the GT 1020 on a vertical surface.
- Mount the terminal in a location that allows maximum view of the sky. This helps to optimize cellular communications and GNSS (for example, GPS) performance. If an installation must be covert, the GT 1020 may be installed under/behind plastic, fiberglass, wood, or glass surfaces with some degradation of performance, with the level of degradation depending on the material.
- The GT 1020 may be mounted under/behind non-metallic structures such as plastic, fiberglass, wood, or glass. These materials may introduce some degradation of performance depending on the material and material thickness. These structures should NOT be painted with metallic or metal-flake paints.
- Mount the terminal as far as physically possible from any other antennas that may be present on the asset. Note that some antennas may be embedded, so some knowledge of the asset is helpful. Mounting the GT 1020 closer than 1 meter to other antennas may allow interference to hinder or block the GT 1020 from proper operation.
- If the vehicle roof is non-metallic, the GT 1020 can be mounted above the headline, but under the roof. Ensure that the terminal is at least 8 in. (20 cm) away from humans.
- Check that the terminal's cable reaches the power source and sensor locations.

**CAUTION: Check that the terminal's cable reaches the power source before you drill any mounting holes.**

- **DO NOT** mount the terminal in a location that will exceed +140°F (+60°C) for extended periods of time. The hardware is capable of operating at +167°F (+75°C), but the internal battery is shut off for safety reasons at temperatures above +140°F (+60°C).
- **DO NOT** mount the terminal where water may build-up or collect.
- **DO NOT** install the GT 1020 in a location routinely within 8 in. (20 cm) of humans.
- **DO NOT** mount the terminal close to an exhaust pipe due to the excessive heat and the potential for the exhaust pipe causing satellite blockage.
- **DO NOT** mount the terminal close to air horns or any tractor roof hardware (for example, emergency lights) that could interfere with communications.
- **DO NOT** install the terminal inside the truck under the roof liner.
- **DO NOT** mount in areas that are exposed to falling debris.

## 5 MOUNT THE TERMINAL

- Mount without a bracket (Section 5.1)
- Mount with a bracket (Section 5.2)

### 5.1 Mount the GT 1020 without a Bracket

1. Prior to mounting, check that the terminal's cable reaches the power source and sensor locations.
2. Remove any debris from the mounting location.
3. Mark the location of the GT 1020 mounting holes on the installation surface.
4. Place the GT 1020 in the mounting location.
5. Use the driver with the supplied 5/16" hex head screws and directly mount the GT 1020 to the surface.

**CAUTION:** Be careful not to strip the holes.

**CAUTION:** Do not apply excessive torque as this may strip the hole threads.

### 5.2 Mount the GT 1020 with a Bracket

In some installations, a separately orderable mounting bracket may be required.

1. Mark the location of the bracket on the mounting surface.
2. Remove one of the nuts on the GT 1020.

**Note:** You can attach the tether to any of the nuts on the GT 1020.



3. Place the small eyelet of the tether over the exposed stud, with the crimp facing up.



4. Reassemble the nut over the tether, and secure the nut, but do not overtighten.



5. Place the terminal in the approximate area to be installed to ensure the tether reaches the edge of the trailer. Ensure that the surface is flat, otherwise select another location on the trailer.
6. Faster the tether to the roof rail of the trailer with the supplied screw.



7. Use the supplied surface preparation pad to lightly scratch the mounting surface where you plan to place the bracket.
8. Use the supplied alcohol pad to clean the mounting surface. Ensure that the area is clear of any dirt or particles.
9. Use the supplied primer to apply the primer to the surface of the bracket where the VHB tape will sit.
10. Attach the GT 1020 to the mounting bracket, and then use the supplied lock nuts to secure the GT 1020 to the bracket. Torque the lock nuts to  $14\pm0.5$  in-lbs ( $1.6\pm0.6$  N-m).

**CAUTION: Do not apply excessive torque as this may strip the hole threads.**



11. Remove the paper from the adhesive/VHB backing<sup>1</sup>.

**Note:** The ideal application temperature range for the VHB tape is 70°F to 100°F (21°C to 38°C). If installing on a surface below this ideal, warm the installation surface to the recommended temperature range to ensure adequate adhesion.



12. Ensure the tether is taut before mounting the bracket to the surface.
13. Firmly press the bracket to the mounting surface. Apply pressure to the ends and center of the bracket for at least 60 seconds.

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<sup>1</sup>Actual hardware not as shown in this figure.

## 6 PREPARE AND CONNECT THE CABLE

The GT 1020 cable is installed when charging from an asset's power source and connecting to sensors.

Some customer applications charge the GT 1020 prior to temporary installation and do not require the cable.

### 6.1 Prepare the Cable

1. Prepare the blunt cut end of the cable using the details below.

Figure 1: GT 1020 Blunt Cub Cable (3.5 m/11 ft.)

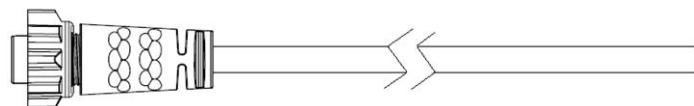
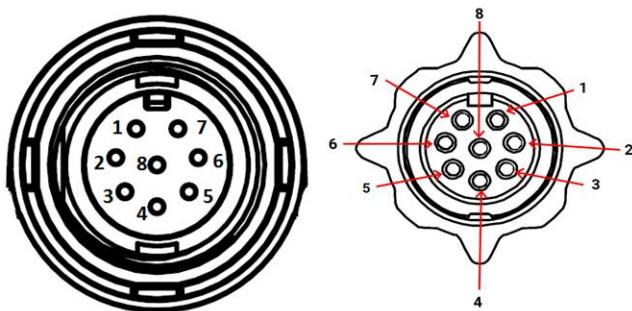


Figure 2: Cable Connector



Terminal View

Connector View

Table 2: Pin Descriptions

Pin #	Cable Connector	Color - 9 Wire Cable <sup>1</sup>	Color - 3 Wire Cable
1	Reserved	-	n/a
2	CANL	Green/White	n/a
3	CANH	White/Gray	n/a
4	I/O_1 Out	White with drain wire	White with drain wire
5	Ext_Power	Red	Red
6	RS232_Rx	Yellow	n/a

<sup>1</sup>This cable has 9 wires, but 8 pins. Two of the wires connect to the same pin.

Pin #	Cable Connector	Color - 9 Wire Cable <sup>1</sup>	Color - 3 Wire Cable
7	RS232_Tx	Brown	n/a
8	GND	Black	Black
	GND	Black/White	Black

## 6.2 Route the Cable

1. Route the cable from the GT 1020 to a power source and secure it along the way.

**CAUTION: Do not connect power to the GT 1020 at this time.**

**CAUTION: Cable management and connector strain relief must be incorporated in the installation. Secure the cable at regular intervals along its length as part of the installation to prevent cable wear and eliminate strain on the terminal connector. Damage to the terminal connector interface or cable may otherwise result leading to hardware failure.**

## 6.3 Connect the Cable to the Equipment

For heavy equipment, there are three connections needed between the GT 1020 and the monitored equipment: ignition (IGN); power (PWR); and ground (GND). The ignition input is required to determine when the equipment is running. Power is used to power the terminal and charge the battery. Ground is needed to provide a reference and reduce the possibility of electrical shock.

There are a few possible methods to wire the GT 1020 to provide the needed connections. Refer to the sections below for more details.

To install the 3-wire solution, the materials and tools outlined in the [tools](#) section are recommended.

Table 3: Connections for the 3-Wire Solution

Pin #	Wire Color	Function
4	White	Ignition (Engine hours)
5	Red	Power
8	Black	Ground

If the input is not associated with the ignition of a vehicle, for example, a tire pressure monitoring system on a chassis, record the name of the input (in this example, a name such as "TPMS") and details about its state (for example, what a high or low voltage state means).

Table 4: Electrical Pin Assignment

Pin	Signal	GT 1020-1100	GT 1020-1101	GT 1020-1103
1	Reserved	✓	-	-
2	CANL	✓	-	-

<sup>1</sup>This cable has 9 wires, but 8 pins. Two of the wires connect to the same pin.

Pin	Signal	GT 1020-1100	GT 1020-1101	GT 1020-1103
3	CANH	✓	-	-
4	Configurable I/O	✓	✓	✓
5	VIN	✓	✓	✓
6	RS-232 Tx (Main)	✓	✓	✓
7	RS-232 Rx (Main)	✓	✓	✓
8	Ground	✓	✓	✓

### 6.3.1 Ignition Connection

In this example, pin 4 (White) on the cable connects to a source of engine hours. An alternate source could be the hour meter, if present. The goal in this connection is to locate a source that is *high* when the equipment is running and *low* when it is not.

**Note:** If ignition is not used, connect pin 4 to ground.

**CAUTION:** The WHITE wire is wrapped in a shield.

Leave this shield unterminated. It should NOT be connected to the black wire. Grounding at both ends will create a ground loop that could introduce noise.

Figure 3: Ignition Connection



Lug Ring

Butt Splice

Cable

### 6.3.2 Power Connection

Connect power to the positive terminal of the battery.

**CAUTION:** Do not connect to power at this time.

Figure 4: Power Connection



Lug Ring

Fuse/Fuse Holder

Butt Splice

Cable

### 6.3.3 Ground Connection

A connection to the chassis provides the best possible ground. Connect the ground connection at the same time or before applying power.

Figure 5: Ground Connection



Lug Ring

Cable

### 6.3.4 CAN Bus Connection

Every CAN bus must be terminated with a 120 Ohm resistor at each end of the bus between the signals CAN high (CAN\_H) and CAN low (CAN\_L). The GT 1020 does not contain any CAN bus termination. Please refer to your vehicle/equipment literature to locate CAN high, CAN low, and ground signal.

### 6.3.5 RS-232 Connection

RS-232 is currently reserved for ORBCOMM diagnostic testing.

## 6.4 Plug the Cable into the GT 1020

1. Connect the blunt cut cable connector to the terminal by aligning the corresponding connector key slot, and gently squeeze together.

**CAUTION: Do not force the connector pins to mate because this may damage the pins.**

2. Tighten the cable connector with hand pressure by rotating the locking collar on the cable connector clockwise. **Do not use a wrench.** A tactile click is felt when the collar is properly engaged.

**Note:** If the GT 1020 battery is fully depleted, the LED turns blue briefly (1-2 seconds), and then green for 15 seconds. If you see this flash rate now, you will not see it again later when the magnet is removed.

## APPENDIX A FAQS

**Q: How do I reset the GT 1020?**

**A:** Follow the procedure below while observing the LED lighting sequence (the GT 1020 has a single tri-color LED indicator):



1. Place the magnet over the magnet sensor on the GT 1020, and observe the following sequence:
  - a. Blinks yellow for about 3 seconds.
  - b. Blinks green for about 4 seconds.
  - c. Blinks yellow for about 48 seconds.
  - d. Starts blinking blue
2. Once you see the LED blinking blue, remove the magnet to start the reset.
  - a. The LED is solid blue for about 10 seconds confirming the GT1020 is restarting.
  - b. The LED turns off briefly, and then briefly turns blue again.
  - c. Then the LED is solid green for about 15 seconds to indicate the end of the reset sequence. When the reset is complete the LED turns off.

**Q: When power is first connected to the GT 1020, how do I tell what the state of charge is on the GT 1020 battery?**

**A:** If the GT 1020 is configured to indicate the state of charge when external power is applied, the following LED patterns that repeat every 5 seconds indicate the GT 1020 battery state of charge.

State of Change	LED Pattern
0 to 25%	One red pulse
26 to 50%	One red pulse followed quickly by one blue pulse
51 to 75%	One blue pulse
76 to 99%	One blue pulse followed quickly by one green pulse
100%	One green pulse

**Q: When the GT 1020 is not connected to power, how do I know when it needs charging?**

**A:** If the GT 1020 is configured to indicate whether it requires charging when not connected to an external power source, the LED pulses red once every minute indicating the battery requires charging.

**Q: How do I configure the GT 1020 LEDs to indicate the state of battery charge?**

**A:** [Contact Support](#) or your Account Manager.