



**HEXAGON**



**GT7800**  
**GNSS Timing Synchronization Receiver**  
**User Manual**

---

## GT7800 Timing Synchronization Receiver User Manual

**Publication Number:** D100789

**Revision Level:** v1A

**Revision Date:** November 2024

**Firmware Version:** 7.09.02 / OM7MR0902RN0000

To download the latest firmware and/or software visit: [novatel.com/support/support-materials/firmware-download](https://novatel.com/support/support-materials/firmware-download).

### Warranty

NovAtel Inc. warrants that its GNSS products are free from defects in materials and workmanship, subject to the conditions set forth on our web site: [novatel.com/products/novatel-warranty-and-return-policies](https://novatel.com/products/novatel-warranty-and-return-policies).

### Return Instructions

To return products, refer to the instructions found at: [novatel.com/products/novatel-warranty-and-return-policies](https://novatel.com/products/novatel-warranty-and-return-policies).

### Proprietary Notice

This document and the information contained herein are the exclusive properties of NovAtel Inc. and/or its affiliates within the Hexagon Autonomy & Positioning division (“Hexagon”).

No part of this document may be reproduced, displayed, distributed, or used in any medium, in connection with any other materials, or for any purpose without prior written permission from Hexagon. Applications for permission may be directed to [contact.ap@hexagon.com](mailto:contact.ap@hexagon.com). Unauthorized reproduction, display, distribution or use may result in civil as well as criminal sanctions under the applicable laws. Hexagon aggressively protects and enforces its intellectual property rights to the fullest extent allowed by law.

This document and the information contained herein are provided AS IS and without any representation or warranty of any kind. Hexagon disclaims all warranties, express or implied, including but not limited to any warranties of merchantability, non-infringement, and fitness for a particular purpose. Nothing herein constitutes a binding obligation on Hexagon.

The information contained herein is subject to change without notice.

NovAtel, OEM7 and VEXXIS are trademarks of Hexagon AB and/or its subsidiaries and affiliates, and/or their licensors. All other trademarks are properties of their respective owners.

© Copyright 2017 – 2024 Hexagon AB and/or its subsidiaries and affiliates. All rights reserved. A list of entities within the Hexagon Autonomy & Positioning division is available at [hexagon.com/company/divisions/autonomy-and-positioning](https://hexagon.com/company/divisions/autonomy-and-positioning).

---

# Table of Contents

**Notices**

**Customer Support**

**Chapter 1 GT7800 Overview**

1.1 GT7800 Connectors ..... 10

1.2 GT7800 Status LEDs ..... 13

1.3 NovAtel User Documentation, PC Software and Drivers ..... 13

**Chapter 2 GT7800 Installation**

2.1 Box Contents ..... 14

2.2 Additional Equipment Required ..... 14

2.3 Installation Overview ..... 15

    2.3.1 Restarting the Receiver ..... 16

**Appendix A GT7800 Technical Specifications**

A.1 GT7800 Performance Specifications ..... 18

A.2 GT7800 Mechanical Specifications ..... 20

A.3 GT7800 Electrical and Environmental Specifications ..... 21

A.4 GT7800 Data Communication Specifications ..... 23

A.5 GT7800 Strobe Specifications ..... 24

A.6 GT7800 Power Cable ..... 25

# Notices

---

## Federal Communications Commission (FCC) and Innovation, Science and Economic Development (ISED) Canada

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with this instruction manual may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at their own expense.

## Conventions

The following conventions are used in this manual:



Information that supplements or clarifies text.



A caution that actions, operation or configuration may lead to incorrect or improper use of the hardware.



A warning that actions, operation or configuration may result in regulatory noncompliance, safety issues or equipment damage.

# Customer Support

---

## NovAtel Knowledge Base

If you have a technical issue, visit the NovAtel Support page at [novatel.com/support](http://novatel.com/support). Through the *Support* page you can contact Customer Support, find papers and tutorials or download the latest firmware. To access the latest user documentation, visit [docs.novatel.com/OEM7](http://docs.novatel.com/OEM7).

## Before Contacting Customer Support

Before contacting NovAtel Customer Support about a software problem, perform the following steps:



If logging data over an RS-232 serial cable, ensure that the configured baud rate can support the data bandwidth (see the **SERIALCONFIG** command). NovAtel recommends a minimum suggested baud rate of 230400 bps.

1. Use the information in the Troubleshooting section on the OEM7 User Documentation Portal ([docs.novatel.com/OEM7](http://docs.novatel.com/OEM7)) to diagnose and troubleshoot your receiver's symptoms.
2. Log the data suggested in the appropriate *Troubleshooting Logs* section to a file on your computer for 15 minutes.
  - *General Troubleshooting Logs* on the next page
  - *Tracking and Interference Troubleshooting Logs* on the next page
  - *RTK Troubleshooting Logs* on page 7
  - *PPP Troubleshooting Logs* on page 8

If using NovAtel Application Suite, log the Troubleshooting message set for 15 minutes.

3. Send the data file to NovAtel Customer Support: [support.novatel@hexagon.com](mailto:support.novatel@hexagon.com)
4. You can also issue a **FRESET** command to the receiver to clear any unknown settings.



The **FRESET** command will erase all user settings. You should know your configuration (by requesting the RXCONFIGA log) and be able to reconfigure the receiver before you send the **FRESET** command.

If you are having a hardware problem, send a list of the troubleshooting steps taken and the results.

## Contact Information

Log a support request with NovAtel Customer Support using one of the following methods:

### Log a Case and Search Knowledge:

Website: [novatel.com/support](http://novatel.com/support)

### Log a Case, Search Knowledge and View Your Case History: (login access required)

Web Portal: [shop.novatel.com/novatelstore/s/login/](http://shop.novatel.com/novatelstore/s/login/)

**E-mail:**

[support.novatel@hexagon.com](mailto:support.novatel@hexagon.com)

**Telephone:**

U.S. and Canada: 1-800-NOVATEL (1-800-668-2835)

International: +1-403-295-4900

## General Troubleshooting Logs

```
LOG RXSTATUSB ONCHANGED
LOG RAWEPHEMB ONNEW
LOG GLORAWEPHEMB ONNEW
LOG BESTPOSB ONTIME 1
LOG RANGE B ONTIME 0.5
LOG RXCONFIGA ONCE
LOG VERSIONA ONCE
LOG LOGLISTA ONCE
LOG PORTSTATSA ONTIME 10
LOG PROFILEINFOA ONCE
LOG HWMONITORA ONTIME 10
```

## Tracking and Interference Troubleshooting Logs

```
LOG VERSIONA ONCE
LOG RXCONFIGA ONCE
LOG CHANCONFIGLISTB ONCE
LOG PASSTROUGH A ONNEW
LOG RXSTATUSB ONCHANGED
LOG CLOCKSTEERINGB ONCHANGED
LOG RAWEPHEMB ONNEW
LOG GLORAWEPHEMB ONNEW
LOG GALINAVRAWEPHEMERISB ONNEW
LOG BDSEPPHEMERISB ONNEW
LOG QZSSEPPHEMERISB ONNEW
LOG NAVICEPPHEMERISB ONNEW
LOG RAWALMB ONNEW
LOG GLORAWALMB ONNEW
LOG GALALMANACB ONNEW
LOG BDSALMANACB ONNEW
LOG QZSSALMANACB ONNEW
LOG NAVICALMANACB ONNEW
LOG IONUTC B ONNEW
LOG GLOCLOCKB ONNEW
LOG GALCLOCKB ONNEW
LOG BDSCLOCKB ONNEW
LOG TRACKSTATB ONTIME 1
LOG RANGE B ONTIME 0.5
LOG BESTPOSB ONTIME 1
LOG SATVIS2B ONTIME 30
LOG ITDETECTSTATUSB ONCHANGED
```

For interference issues add this log:

```
LOG ITPSDDETECTB ONNEW
```

For interference issues, when you have enough datalink bandwidth to handle large logs, add this log:

```
LOG ITPSDFINALB ONNEW
```

## RTK Troubleshooting Logs

```
LOG RXSTATUSB ONCHANGED
LOG RAWEPHEMB ONNEW
LOG GLORAWEPHEMB ONNEW
LOG QZSSRAWEPHEMB ONNEW
LOG BDSRAWNAVSUBFRAMEB ONNEW
LOG GALFNAVRAWEPHEMERISB ONNEW
LOG GALINAVRAWEPHEMERISB ONNEW
LOG RANGE ONTIME 0.5
LOG BESTPOS ONTIME 1.0
LOG RXCONFIGB ONCE
LOG VERSIONB ONCE
LOG TRACKSTATB ONTIME 1.0
LOG RTKPOS ONTIME 1.0
LOG MATCHEDPOS ONNEW
LOG MATCHEDSATSB ONNEW
LOG RTKSATSB ONTIME 1.0
LOG PSRPOS ONTIME 1.0
LOG RAWALMB ONNEW
LOG IONUTCB ONNEW
LOG GLORAWALMB ONNEW
LOG GLOCLOCKB ONNEW
LOG PASSTHROUGHB ONNEW
LOG CLOCKMODELB ONTIME 1.0
LOG REFSTATIONB ONNEW
LOG RTKVELB ONTIME 1.0
```

## PPP Troubleshooting Logs

```
LOG RXSTATUSB ONCHANGED
LOG GPSEPHEMB ONNEW
LOG GLOEPHEMERISB ONNEW
LOG QZSSEPHEMERISB ONNEW
LOG BDSEPHEMERISB ONNEW
LOG BDSBCNAV1EPHEMERISB ONNEW (firmware versions 7.08.03 and 7.08.10 and later)
LOG BDSBCNAV2EPHEMERISB ONNEW (firmware versions 7.08.03 and 7.08.10 and later)
LOG BDSBCNAV3EPHEMERISB ONNEW (firmware versions 7.08.03 and 7.08.10 and later)
LOG GALFNAVEPHEMERISB ONNEW
LOG GALINAVEPHEMERISB ONNEW
LOG RANGE B ONTIME 0.5
LOG BESTPOS B ONTIME 1.0
LOG RXCONFIG B ONCE
LOG VERSION B ONCE
LOG TRACKSTAT B ONTIME 10.0
LOG LBANDTRACKSTAT B ONTIME 1.0
LOG PPPPOS B ONTIME 1.0
LOG PPPSAT B ONTIME 1.0
LOG TERRASTARINFO B ONCHANGED
LOG TERRASTARSTATUS B ONCHANGED
LOG PSRPOS B ONTIME 1.0
LOG ALMANAC B ONNEW
LOG GLOALMANAC B ONNEW
LOG GALALMANAC B ONNEW
LOG BDSALMANAC B ONNEW
LOG QZSSALMANAC B ONNEW
LOG IONUTC B ONNEW
LOG GLOCLOCK B ONNEW
LOG LBANDBEAMTABLE B ONCHANGED
```



## Chapter 1 GT7800 Overview

The GT7800 is a GNSS Timing Synchronization Receiver that uses the OEM729 receiver from Hexagon | NovAtel to provide highly precise timing when used on its own or connected to an external oscillator. Standard interfaces are provided through conventional connectors, eliminating the need for hard to find and expensive custom cables. The GT7800 also features advanced Ethernet support for remote configuration and access to receiver data.

Capable of tracking all present and upcoming Global Navigation Satellite System (GNSS) constellations and satellite signals, the GT7800 is a simple to use system that is software upgradable to provide the custom performance required for your application.

Figure 1: GT7800 Enclosure



## 1.1 GT7800 Connectors

Figure 2: GT7800 Connectors

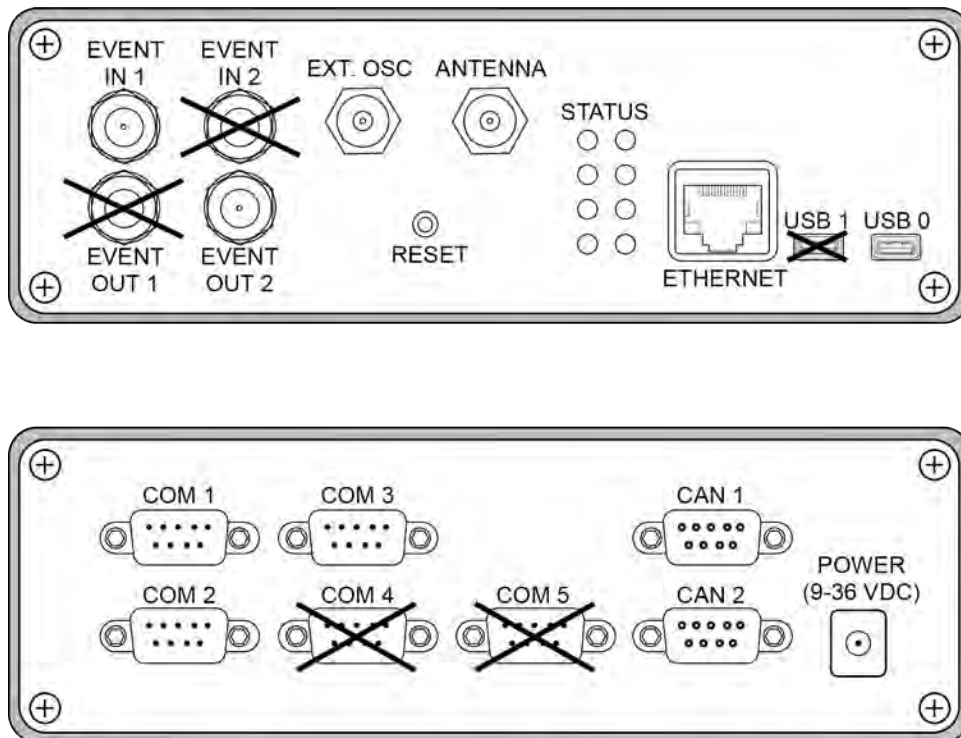


Table 1: GT7800 Connectors

Port Name	Connector	Description
ANTENNA	TNC	Connects to a GNSS antenna.
EXT. OSC	BNC	Connects to an external oscillator. Some applications require greater precision than is possible with the OEM7 VCTCXO. For these applications, connect the GT7800 to an external high-stability oscillator, which may run at either 5 MHz or 10 MHz. See <i>Table 11: GT7800 External Oscillator Input</i> on page 22 for the external oscillator requirements.
EVENT IN 1	BNC	Connects to the external device that sends the Event Input 1 (MARK1) signal. See <i>GT7800 Strobe Specifications</i> on page 24 for Event Input specifications.
EVENT IN 2	BNC	Not active
EVENT OUT 1	BNC	Not active
EVENT OUT 2	BNC	Connects to the external device that uses the Event Out signal. See <i>GT7800 Strobe Specifications</i> on page 24 for Event Output specifications.

Port Name	Connector	Description
ETHERNET	RJ-45	Connects to a computer network. See <i>GT7800 Data Communication Specifications</i> on page 23 for port specifications.
USB 0	Micro-A/B	Connects to a computer USB port. See <i>GT7800 Data Communication Specifications</i> on page 23 for port specifications.
USB 1	Micro-A/B	Not active
COM 1	DB9 male	Connects to an RS-232 or RS-422 serial communication device. See <i>Table 2: COM Ports</i> on the next page for connector pin outs. See <i>GT7800 Data Communication Specifications</i> on page 23 for port specifications.
COM 2	DB9 male	Connects to an RS-232 serial communication device. See <i>Table 2: COM Ports</i> on the next page for connector pin outs. See <i>GT7800 Data Communication Specifications</i> on page 23 for port specifications.
COM 3	DB9 male	Connects to an RS-232 serial communication device. See <i>Table 2: COM Ports</i> on the next page for connector pin outs. See <i>GT7800 Data Communication Specifications</i> on page 23 for port specifications.
COM 4	DB9 male	Not active
COM 5	DB9 male	Not active
CAN 1	DB9 female	Connects to a CAN bus. See <i>Table 3: CAN Ports</i> on the next page for connector pin outs. See <i>GT7800 Data Communication Specifications</i> on page 23 for port specifications.
CAN 2	DB9 female	Connects to a CAN bus. See <i>Table 3: CAN Ports</i> on the next page for connector pin outs. See <i>GT7800 Data Communication Specifications</i> on page 23 for port specifications.
Power	DC coax jack	Input for the DC power source. See <i>Table 9: GT7800 Power Requirements</i> on page 21.

**Table 2: COM Ports**

Pin	COM 1 (RS-232)	COM 1 (RS-422)	COM 2 (RS-232)	COM 3 (RS-232)
1	No connection	No connection	No connection	No connection
2	RxD1	RxD1+	RxD2	RxD3
3	TxD1	TxD1+	TxD2	TxD3
4	No connection	No connection	No connection	No connection
5	Ground	Ground	Ground	Ground
6	No connection	No connection	No connection	No connection
7	RTS1	TxD1-	RTS2	No connection
8	CTS1	RxD1-	CTS2	No connection
9	No connection	No connection	No connection	No connection

**Table 3: CAN Ports**

Pin	CAN 1	CAN 2
1	No connection	No connection
2	CAN_L	CAN_L
3	Ground	Ground
4	No connection	No connection
5	Ground	Ground
6	Ground	Ground
7	CAN_H	CAN_H
8	No connection	No connection
9	12 V CAN power	12 V CAN power

## 1.2 GT7800 Status LEDs

**Table 4: GT7800 Status LEDs**

Left LED Stack from Top			Right LED Stack from Top		
LED Name	Color	Description	LED Name	Color	Description
N/A	Not used		N/A	Not used	
STATUS GRN	Not used		M.E. READY	Not used	
STATUS RED	Not used		POS. VALID	Green	Lights when the receiver has computed a valid position.
ERROR	Red	Lights when there is an error on the receiver.	POWER	Red	Lights when the receiver has power.

**Table 5: Ethernet LEDs**

LED	Description
Green LED	Link/activity
Yellow LED	Not used

## 1.3 NovAtel User Documentation, PC Software and Drivers

The complete suite of NovAtel OEM7 user documentation can be found at: [docs.novatel.com/OEM7](https://docs.novatel.com/OEM7).

Download the latest version of NovAtel Application Suite and the NovAtel USB drivers from: [novatel.com/support/support-materials/software-downloads](https://novatel.com/support/support-materials/software-downloads).

## Chapter 2 GT7800 Installation

---

This chapter provides instructions to install the GT7800 and create a GNSS receiver system.

### 2.1 Box Contents

The following is provided with your NovAtel GT7800 receiver:

- GT7800 receiver enclosure
- DC power cable assembly (PN: 01019538)
- 2 metre USB cable type A to micro B (PN: 60723119)

### 2.2 Additional Equipment Required

Depending on the application, some or all of the following will be required:

- A 50  $\Omega$  coaxial cable with a TNC (male) connector for connecting to the Antenna port
- A 50  $\Omega$  coaxial cable with a BNC (male) connector for connecting to the External Oscillator port
- A null modem cable with a DB-9 female connector (such as PN: 01017658, may contain DEHP) to connect to COM 1, COM 2 or COM 3.

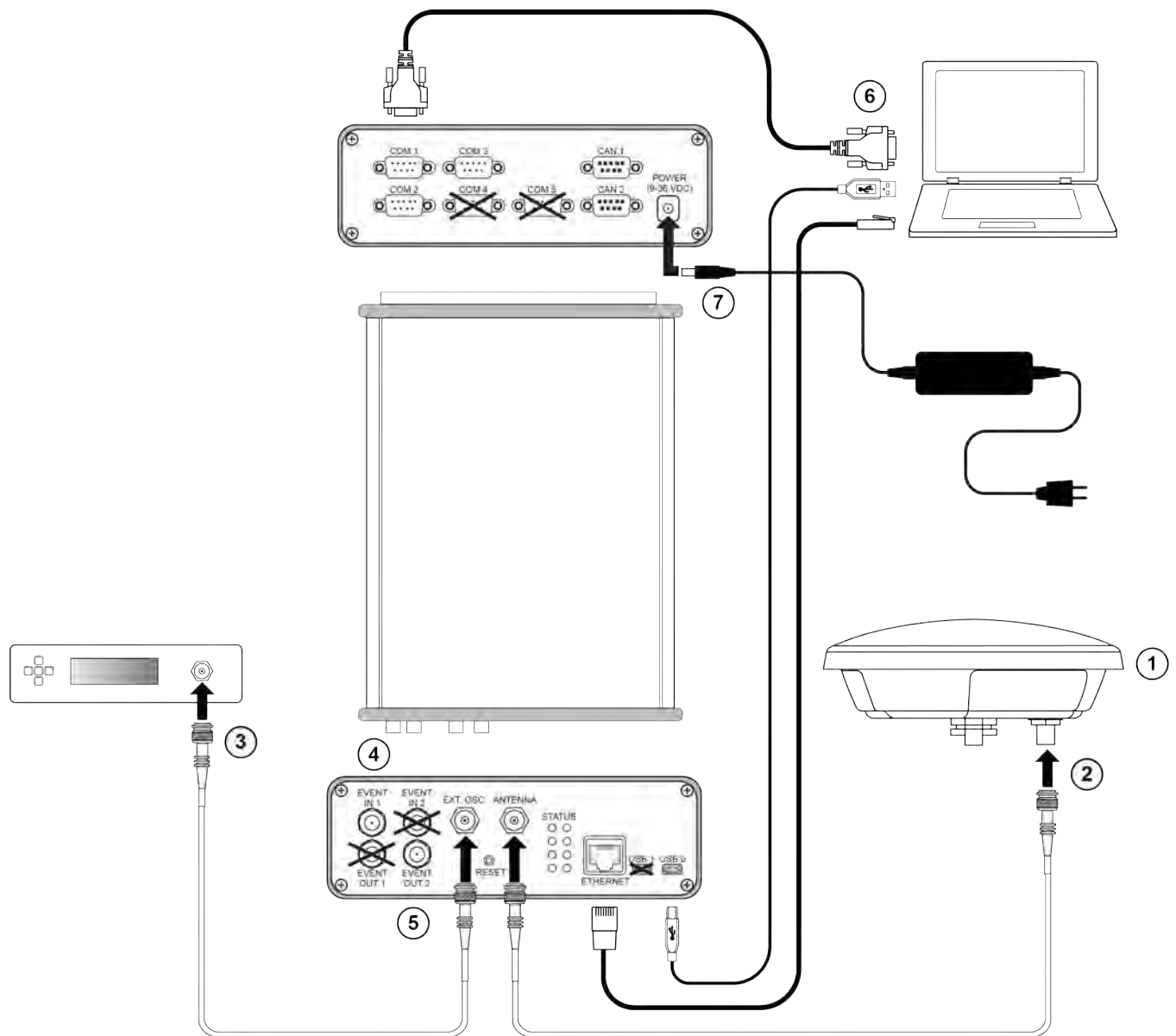
User provided cables for COM 1-RS422, CAN 1 and CAN 2 connection, as necessary.

- A Microsoft® Windows® compatible computing device with a RS-232 DB-9 port, USB port or 10/100BASE-T Ethernet port
- A +9 to +36 VDC power supply, capable of supplying at least 10 W
- A quality antenna, such as a NovAtel VEXXIS GNSS-500 or GNSS-800 series antenna or a fixed reference GNSS-750 wideband choke ring antenna. Refer to our web site at [novatel.com/products/gps-gnss-antennas](http://novatel.com/products/gps-gnss-antennas)

## 2.3 Installation Overview

Use the following steps to install and power the GT7800.

Figure 3: GT7800 Installation Example



1. Install a quality GNSS antenna in a location with an unobstructed view of the sky.
2. Connect a coaxial cable from the antenna to the **Antenna** port.
3. If using an external oscillator, connect a coaxial cable from the external oscillator to the **EXT. OSC** port.
4. If using an Event Input signal, connect a coaxial cable between the device and the **EVENT IN 1** port.
5. If using an Event Output signal, connect a coaxial cable between the device and the **EVENT OUT 2** port.



The signal on EVENT OUT 2 is controlled by the MARK1 option of EVENTOUTCONTROL (e.g. EVENTOUTCONTROL MARK1 ENABLE).

6. Connect the communications equipment to the GT7800 communication ports.  
For an RS-232 serial connection, use the **COM 1**, **COM 2** or **COM 3** port.  
For a USB connection, use the **USB 0** port.  
For an Ethernet connection, use the **ETHERNET** port.  
For an RS-422 serial connection, use the **COM 1** port.  
Note, use the **SERIALPROTOCOL** command to change the serial port protocol of COM 1 to RS-422.
7. Connect the DC power cable between the **Power** port and the external power supply.
8. Turn on the external power supply.

### **2.3.1 Restarting the Receiver**

The GT7800 can be restarted using the **RESET** command or the **RESET** button.

To restart the GT7800 using the **RESET** button, use a tool, such as an unbent paper clip, to press and release the button.



## Appendix A GT7800 Technical Specifications

---

**Table 6: GT7800 Physical Description**

Size	160 mm x 190 mm x 62.5 mm
Weight	500 grams

See the following sections for more information about the GT7800:

- *GT7800 Performance Specifications* on the next page
- *GT7800 Mechanical Specifications* on page 20
- *GT7800 Electrical and Environmental Specifications* on page 21
- *GT7800 Data Communication Specifications* on page 23
- *GT7800 Strobe Specifications* on page 24
- *GT7800 Power Cable* on page 25

## A.1 GT7800 Performance Specifications

All specifications are subject to GNSS system characteristics.

**Table 7: GT7800 Receiver Performance**

Signals Tracked	GPS	L1 C/A, L1C, L2C, L2P, L5
	GLONASS	L1 C/A, L2 C/A, L2P, L3
	BeiDou	B1I, B1C, B2I, B2a, B2b, B3I
	Galileo <sup>1</sup>	E1, E5 AltBOC, E5a, E5b, E6
	QZSS	L1 C/A, L1C, L1S, L2C, L5, L6
	NavIC (IRNSS)	L5
	SBAS	L1, L5
	L-Band <sup>2</sup>	Up to 5 channels
Position Accuracy <sup>3</sup>	Single point L1	1.5 m RMS
	Single point L1/L2	1.2 m RMS
	SBAS <sup>4</sup>	60 cm RMS
	DGPS	40 cm RMS
	TerraStar-L <sup>5</sup>	40 cm RMS
	TerraStar-C PRO <sup>5</sup>	2.0 cm RMS
	TerraStar-X <sup>5</sup>	2.0 cm RMS
	RTK	1 cm + 1 ppm RMS
Time to First Fix	Hot: <20 s (Almanac and recent ephemeris saved and approximate position and time entered) Cold: <34 s (No almanac or ephemeris and no approximate position or time)	
Signal Reacquisition	<0.5 s L1 (typical) <1.0 s L2 and L5 (typical)	
Data Rates	Measurements	up to 100 Hz
	Position	up to 100 Hz

<sup>1</sup>E1bc and E6bc support only.

<sup>2</sup>Currently the receiver can track up to 3 L-Band channels.

<sup>3</sup>Typical values under ideal, open sky conditions.

<sup>4</sup>GPS-only.

<sup>5</sup>Requires a TerraStar subscription which is available direct from NovAtel [novatel.com/products/gps-gnss-correction-services/terrestar-correction-services](http://novatel.com/products/gps-gnss-correction-services/terrestar-correction-services).

Time Accuracy <sup>1</sup>	<5 ns RMS			
Velocity Accuracy	<0.03 m/s RMS			
Measurement Precision <sup>2</sup>			Code	Carrier
	GPS	L1 C/A	4 cm	0.5 mm
		L2 P(Y)	8 cm	1.0 mm
		L2C	8 cm	0.5 mm
		L5	3 cm	0.5 mm
	GLONASS	L1 C/A	8 cm	1.0 mm
		L2 P	8 cm	1.0 mm
		L2 C/A	8 cm	1.0 mm
	Galileo	E1	3 cm	0.5 mm
		E5a	3 cm	0.75 mm
		E5b	3 cm	0.75 mm
		E5 AltBOC	3 cm	0.75 mm
		E6	3 cm	0.75 mm
	BeiDou	B1I	4 cm	0.5 mm
		B1C	3 cm	0.5 mm
		B2I	4 cm	0.5 mm
		B2a	3 cm	0.5 mm
		B2b <sup>3</sup>	3 cm	0.5 mm
		B3I	4 cm	0.5 mm
Velocity Limit <sup>4</sup>	600 m/s			

<sup>1</sup>Time accuracy does not include biases due to RF or antenna delay.

<sup>2</sup>Measurement precision should be compared with measurements using the same correlator spacing.

<sup>3</sup>Under good CN0 conditions, e.g. 44 dBHz.

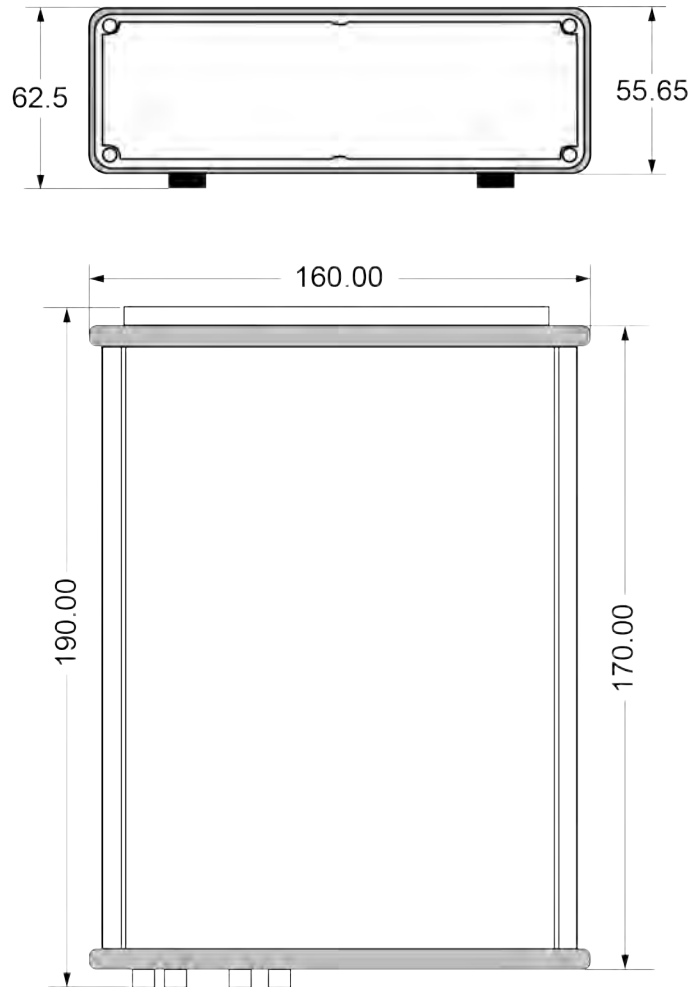
<sup>4</sup>Export licensing restricts operation to a maximum of 600 m/s, message output impacted above 585 m/s.

## A.2 GT7800 Mechanical Specifications



In the following diagrams, the dimensions are in millimetres.

**Figure 4: GT7800 Dimensions**




## A.3 GT7800 Electrical and Environmental Specifications

**Table 8: GT7800 Environmental Specifications**

Operating Temperature	0°C to +55°C
Storage Temperature	-40°C to +75°C
ESD	IEC 61000-4-2

**Table 9: GT7800 Power Requirements**

Voltage	+9 to +36 VDC
Power Consumption	2.0 W typical  Typical values using serial port communication without interference mitigation and external oscillator disabled.

**Table 10: GT7800 RF Input/LNA Power Output**

Antenna Connector	TNC, 50 $\Omega$ nominal impedance		
Cascaded antenna LNA gain (before receiver)	Firmware 7.04 and later	HDR disabled	+15 dB to +55 dB, 26 dB typical
		HDR enabled	+20 dB to +55 dB, 30 dB typical
	Firmware before 7.04	HDR disabled	+15 dB to +40 dB, 26 dB typical
		HDR enabled	+20 dB to +40 dB, 30 dB typical

RF Input Frequencies	GPS L1:	1575.42 MHz
	GPS L2:	1227.60 MHz
	GPS L5:	1176.45 MHz
	GLONASS L1:	1593-1610 MHz
	GLONASS L2:	1237-1254 MHz
	GLONASS L3:	1202.025 MHz
	Galileo E1:	1575.42 MHz
	Galileo E5a:	1176.45 MHz
	Galileo E5b:	1207.14 MHz
	Galileo E5:	1191.795 MHz
	Galileo E6:	1278.75 MHz
	BeiDou B1I:	1561.098 MHz
	BeiDou B1C:	1575.42 MHz
	BeiDou B2I:	1207.14 MHz
	BeiDou B2a:	1176.45 MHz
	BeiDou B2b:	1207.14 MHz
	BeiDou B3I:	1268.52 MHz
	L-Band:	1545 to 1560 MHz <sup>1</sup>
LNA Power	+5.0 VDC $\pm$ 5%, 0 mA to 200 mA (supplied by receiver through center conductor of RF connector).	

Table 11: GT7800 External Oscillator Input

External Oscillator Connector	BNC
External Clock input	Refer to the <b>EXTERNALCLOCK</b> command
Frequency	5 MHz or 10 MHz
Input Impedance	50 $\Omega$ nominal
Input VSWR	<2:1
Signal Level	0 dBm minimum to +13.0 dBm maximum
Frequency Stability	$\pm$ 0.5 ppm maximum
Wave Shape	Sinusoidal

<sup>1</sup>For hardware releases 1.10 and later. For earlier hardware versions, the L-Band RF Input Frequency is 1525 to 1560 MHz.

## A.4 GT7800 Data Communication Specifications

**Table 12: Data Communications Interfaces**

COM 1	
Connector	DB9 male
Electrical format	RS-232/RS-422
Data rates <sup>1</sup>	2400, 4800, 9600 (default), 19200, 38400, 57600, 115200, 230400 or 460800 bit/s.
Signals supported	RS-232: TxD1, RxD1, RTS1, CTS1 RS-422: TxD1+, TxD1-, RxD1+, RxD1-
COM 2	
Connector	DB9 male
Electrical format	RS-232
Data rates <sup>1</sup>	2400, 4800, 9600 (default), 19200, 38400, 57600, 115200, 230400 or 460800 bit/s.
Signals supported	TxD2, RxD2, RTS2, CTS2
COM 3	
Connector	DB9 male
Electrical format	RS-232
Data rates <sup>1</sup>	2400, 4800, 9600 (default), 19200, 38400, 57600, 115200, 230400 or 460800 bit/s.
Signals supported	TxD3, RxD3
CAN 1 Bus	
Connector	DB9 female
Electrical Format	ISO 11898-2
Data rates	1 Mbps maximum. CAN Bus throughput is determined by slowest device on the bus
CAN 2 Bus	
Connector	DB9 female
Electrical Format	ISO 11898-2
Data rates	1 Mbps maximum. CAN Bus throughput is determined by slowest device on the bus

<sup>1</sup>Data rates higher than 115200 bit/s are not supported by standard PC hardware. Special PC hardware may be required for higher rates, including 230400 bit/s and 460800 bit/s.

USB 0	
Connector	Micro A/B
Electrical format	Conforms to USB 2.0
Data rates	Full-speed (12 Mb/s)
Signals supported	USB D (+), USB D (-)
ETHERNET	
Connector	RJ45
Physical layer	10BASE-T/100BASE-TX

## A.5 GT7800 Strobe Specifications

The GT7800 strobe signals are available on the EVENT BNC connectors.

**Table 13: GT7800 Strobes Description**

Strobes	Input/Output	Factory Default	Comment
EVENT_IN1	Input Leading edge triggered	Active low	Input mark for which a pulse greater than 150 ns triggers certain logs to be generated. (Refer to the MARKPOS log, MARK1TIME log, and ONMARK trigger.) Polarity is configurable using the <b>EVENTINCONTROL</b> command. 50 $\Omega$ nominal impedance 1 GHz maximum
EVENT_OUT2	Output	Active low	Programmable variable frequency outputs ranging from 0 Hz to 50 MHz (refer to the <b>EVENTOUTCONTROL</b> command).



EVENT IN 2 and EVENT OUT 1 are not active.

**Table 14: GT7800 Strobe Electrical Specifications**

Strobe	Symbol	Min (V)	Max (V)	Current (mA)
EVENT_IN1	V <sub>IL</sub>	-	0.8	<±1 mA
	V <sub>IH</sub>	2.0	6.0	
EVENT_OUT2	V <sub>OL</sub>	-	0.4	±6 mA
	V <sub>OH</sub>	2.0	3.3	



All signal I/O are at LVCMOS levels.

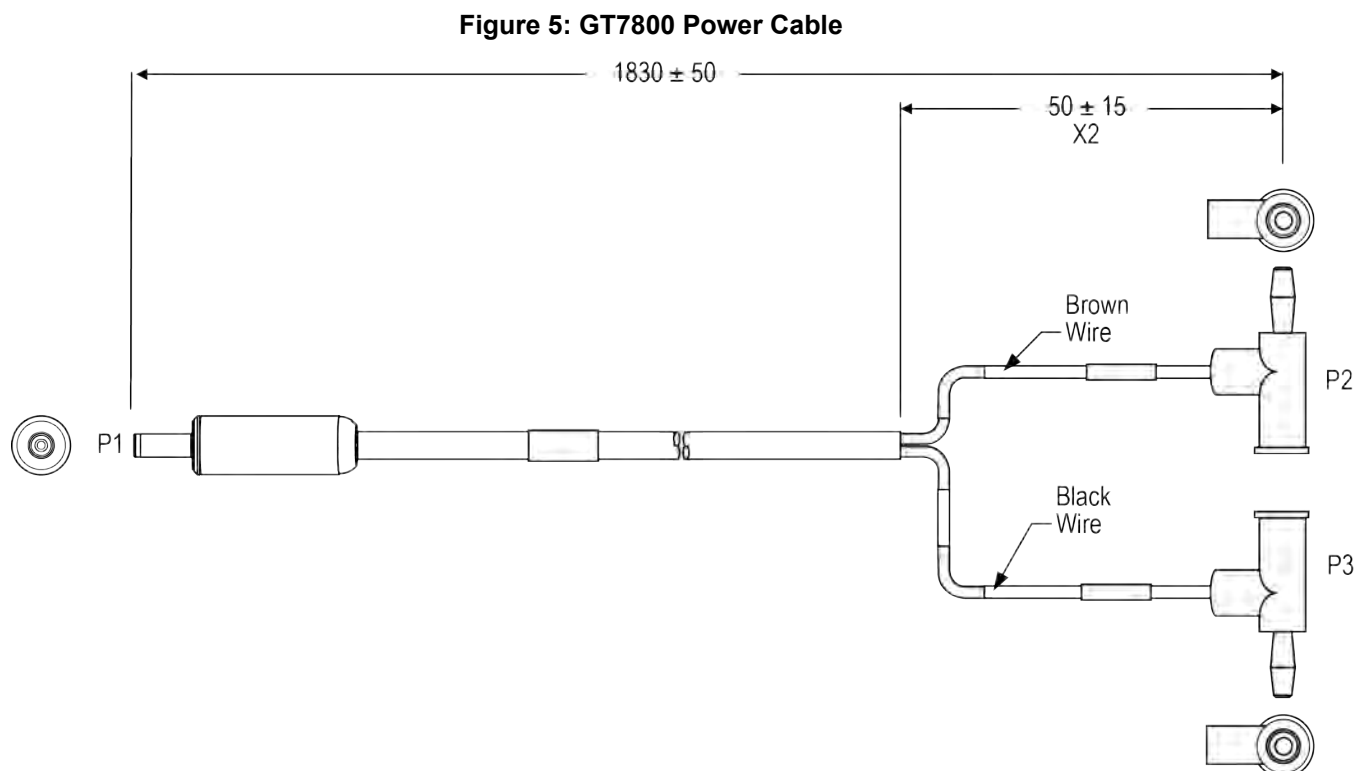


## A.6 GT7800 Power Cable

The NovAtel part number for the GT7800 DC Power Cable is 01019538. This cable provides power to the receiver from an external power supply.



In the following diagram, the dimensions are in millimetres.



**Table 15: GT7800 DC Power Connector**

Connector	Part Number	Mating Plug Requirements
DC barrel jack	Switchcraft RAPC732X	Inner diameter = 1.3 mm Outer diameter = 3.5 to 4.1 mm Barrel length = 9.5 mm Center conductor = positive

