

# Specifications

# Trimble R750 GNSS Modular Receiver



<b>Receiver Name</b>	<b>R750 GNSS Receiver</b>
<b>Configuration Option</b>	Modular
Base and Rover interchangeability	Yes, upgradeable to Rover, Base or Rover and Base
Rover position update rate	1 Hz, 2 Hz, 5 Hz, 10 Hz, 20Hz, 50Hz
Rover maximum range from base	Unrestricted, typical range 2–5 km (1.2–3 miles) without radio repeater
Rover operation within a VRS™ network	Yes
Heading and Moving Base operation	Yes
Internal Memory	9.25 GB logging
<b>General</b>	
Keyboard and display	OLED Display (256 x 64), 32 characters by 4 rows On/Off key for one-button startup Escape and Enter keys for menu navigation 4 arrow keys (up, down, left, right) for option scrolls and data entry
Dimensions (L x W x D)	269 mm (10.6 in) L x 141 mm (5.5 in) W x 61 mm (2.4 in) H
Weight	2.05 kg (4.52 lb)
<b>GNSS Antenna (Recommended)</b>	
Zephyr 3 or Zephyr™ Model 2 series [Base, Rover, Rugged, Geodetic]	Triple-frequency GNSS (GPS, GLONASS, Galileo, BeiDou, QZSS, NavIC) MSS, SBAS
GA830	Triple-frequency GNSS (GLONASS, Galileo, BeiDou, QZSS), MSS, SBAS
<b>Temperature</b>	
Operating[1]	-40 °C to +65 °C (-40 °F to +149 °F)
Storage	-40 °C to +80 °C (-40 °F to +176 °F)
Humidity	93% humidity at 40 °C for a duration of 3 hours (IEC-60945 Method 8.3)
Water Ingress Protection	IP67 for submersion to depth of 1 m (3.3 ft), dustproof
<b>Shock and Vibration</b>	
Pole drop	Designed to survive a 1.1 m (3.6 ft) pole drop onto a hard surface
Shock – Non-operating	To 75 g, 6 ms
Shock – Operating	To 40 g, 10 ms, saw-tooth

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Vibration

IEC 60945 Method 8.7  
Random 6.2 g RMS operating  
9.8g RMS 24-2000 Hz for 1 hrs each axis survival

## GNSS Technology

Advanced Trimble Maxwell™ 7 Custom GNSS Chip  
Constellation Agnostic, flexible signal tracking with ProPoint technology  
Unfiltered, unsmoothed pseudo-range measurements data for low noise, low multipath error, low-time domain correlation, and high-dynamic response  
Trimble EVEREST™ multipath signal rejection  
Trimble IonoGuard technology for mitigation of ionospheric GNSS signal disruptions  
Spectrum Analyser to troubleshoot GNSS jamming  
Anti-spoofing capabilities  
Japanese LTE filtering below 1510 MHz allows usage >100m from LTE cell tower  
Iridium filtering above 1616 MHz allows usage >20m from Iridium transmitter  
Trimble xFill® technology for short gaps in correction messages  
Multi channel GNSS [336 channels]  
GPS: L1 C/A, L1C, L2C, L5, L2E (Trimble method for tracking unencrypted L2P)  
GLONASS: L1-C/A, L2-C/A, L2P, L3  
Galileo: E1, E5A, E5B & E5AltBOC[8], E6.  
BeiDou: B1, B1C, B2, B2A, B2B, B3  
SBAS L1 C/A (EGNOS/MSAS/GAGAN,SDCM), L1 C/A, L5 (WAAS)  
QZSS: L1 C/A, L1C, L1S, L2C, L5, L6D, L6E  
NavIC (IRNSS) L5-C/A  
MSS Band (2-channels): Trimble CenterPoint® RTX correction service and  
Omnistar®/Marinestar® by subscription  
Trimble CentrePoint RTX corrections service is activated and ready to use for the 12 months from activation

## SBAS (WAAS/EGNOS/MSAS) Positioning[3]

Accuracy

Horizontal ± 0.50m (1.6 ft), Vertical ± 0.85m (2.8 ft)

## Code Differential GPS Positioning[2]

Horizontal accuracy

$\pm(0.25m + 1 \text{ ppm})$  RMS  $\pm(0.8 \text{ ft} + 1 \text{ ppm})$   
 $\pm(250+1xDx10^{-6})$  mm [D = distance from base in Km]

Vertical accuracy

$\pm(0.50m + 1 \text{ ppm})$  RMS  $\pm(1.6 \text{ ft} + 1 \text{ ppm})$   
 $\pm(500+1xDx10^{-6})$  mm [D = distance from base in Km]

## OmniSTAR Positioning

VBS service accuracy

Horizontal <1 m (3.3 ft)

XP service accuracy

Horizontal 0.2 m (0.66 ft), Vertical 0.3 m (1.0 ft)

HP service accuracy

Horizontal 0.1 m (0.33 ft), Vertical 0.15 m (0.5 ft)

Marinestar G2+ service accuracy

Horizontal 0.02 m (0.06 ft), Vertical 0.06 m (0.20 ft), 95%

## CenterPoint RTX Positioning[7]

Accuracy

Horizontal 2cm (0.06 ft) RMS, Vertical 3cm (0.1 ft) RMS

Convergence time for specified precisions

<1 min [RTX Fast regions], <3 min [Worldwide]

## xFill Positioning

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	xFill accuracy	RTK + 10 mm(0.03 ft)/min Horiz. + 20 mm(0.06 ft)/min Vert. RMS
<b>Real-Time Kinematic Positioning[2]</b>		
	Horizontal accuracy	8 mm + 1 ppm RMS (0.026 ft + 1 ppm RMS) $\pm(8+1xDx10^{-6})$ mm [D = distance from base in Km]
	Vertical accuracy	15 mm + 1 ppm RMS (0.05 ft + 1 ppm RMS) $\pm(15+1xDx10^{-6})$ mm [D = distance from base in Km]
<b>Trimble VRS[6]</b>		
	Horizontal accuracy	3 mm + 0.5 ppm RMS $\pm(3+0.5xDx10^{-6})$ mm [D = distance from base in Km]
	Vertical accuracy	5 mm + 0.5 ppm RMS $\pm(5+0.5xDx10^{-6})$ mm [D = distance from base in Km]
<b>Precise Heading</b>		
	Heading accuracy	With incoming Moving Base CMRx corrections
	2 m antenna separation	0.09° RMS
	10 m antenna separation	0.05° RMS
<b>High Precision Static</b>		
	Horizontal accuracy	3 mm + 0.1 ppm RMS (0.01 ft + 0.1 ppm) $\pm(3+0.1xDx10^{-6})$ mm [D = distance from base in Km]
	Vertical accuracy	3.5 mm + 0.4 ppm RMS (0.011 ft + 0.4 ppm) $\pm(3.5+0.4xDx10^{-6})$ mm [D = distance from base in Km]
<b>Velocity</b>		
	Doppler Horizontal accuracy	H 0.008 m/s RMS, V 0.025 m/s RMS
<b>Initialization Time</b>		
	Regular RTK operation with base station	Single/Multi-base
	Initialization	2-8 seconds
	Initialization reliability[4]	>99.9%
<b>Power</b>		
	Internal	Integrated internal battery 7.26 V, 6700 mAh, Lithium-ion Internal battery operates as a UPS during an ext power source failure Internal battery will charge from USB-PD source or approved AC power supply Integrated charging circuitry
	External	Power input on 7-pin 0-shell Lemo connector is optimized for lead acid batteries with a cut-off threshold of 11.5 V. Max 28 V DC Power input on the 26-pin D-sub connector has a cut-off threshold of 10.5 V Power supply will hot-swap between internal and external sources. USB-PD input from device capable of 15V @ 2A DC external power input with over-voltage protection Receiver automatically turns on when connected to external power
	Power consumption	6.6 W in rover mode with internal receive radio 8.5 W in base mode with internal transmit radio
<b>Operation Time on Internal Battery</b>		
	Rover	7 hrs: CMRx over UHF 7 hrs: VRS/IBSS over LTE (Internal or Controller via BT)
	Base station	

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450 MHz 5.5 hrs (0.5W), 4.8 hrs (2W): CMRx over UHF and LTE  
900 MHz 6.2 hrs: CMRx over UHF and LTE

Adding a USB-PD Powerpack (30,000mAh) to a fully charged internal battery will provide ~13.9 hrs @11.4W for a 450MHz at 2W

## Regulatory Approvals

[Country Compliance Notices](#)

## Communications

Serial 1 (COM1)	7-pin 0S Lemo, Serial 1, 3-wire RS-232
Serial 2 (COM2)	26-pin D-sub, Serial 2, 5-wire RS232, using adaptor cable (Selectable) 26-pin D-sub, Serial 2, 4-wire RS422, using adaptor cable (Selectable)
Serial 3 (COM3)/CAN	26-pin D-sub, Serial 3, 3-wire RS232, using adaptor cable (Selectable) 2 wire CAN Output [NMEA 2000] (Selectable)
Serial 4 (COM4)	26-pin D-sub, Serial 4, 4-wire RS422, using adaptor cable (Selectable)
1PPS (1 Pulse-per-second)	Supported on both Lemo and 26-pin D-sub
Event In	Supported on Lemo
USB	USB v2 (Supports USB-PD charging)
Ethernet	Through a multi-port adaptor (PN 57168)
Wi-Fi	Fully-integrated, fully-sealed 2.4 GHz Wi-Fi module Simultaneous Access Point (AP) and Client modes
Bluetooth® wireless technology	Fully-integrated, fully-sealed 2.4 GHz Bluetooth module[5]
Cellular	Fully-integrated, fully-sealed LTE compliant module Bands 1:2:3:4:5:7:8:12:18:19:20:28 [Verizon not supported]

## Network Protocols

HTTP (web browser GUI)	HTTP, HTTPS
NTP Server	Yes
TCP/IP or UDP	Yes
NTRIP	NTRIP v1 and v2, Client, Server and Caster modes
mDNS/uPnP Service discovery	Yes
Dynamic DNS	Yes
eMail alerts	Yes

## Integrated radio [Hardware dependant]

Fully-integrated, fully-sealed internal 403-473 MHz or 902-928 MHz; Rx/Tx

450 MHz	12.5 kHz or 25 kHz spacing available
Sensitivity	-114 dBm (12 dB SINAD)
Transmit power (450 MHz)	0.5 W, 2.0 W (2.0 W available only in certain countries)
900 MHz	Fully-integrated, internal 900 MHz; Tx/Rx [1.0 W]
Frequency approvals (902-928 MHz)	USA/Canada/Australia/NZ
Frequency approvals (403-473 MHz)	Worldwide and depending on the local required licensing.

## Internal MSS Demodulator (L-Band)

Channels	2
Frequency range	1525-1559 MHz
Correction Services	Trimble CenterPoint® RTX, OmniSTAR® and Fugro MarineStar

## Cellular support

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Internet-based correction streams: (IBSS, VRS, NTRIP)	Internal LTE modem Connected smartphone Connected Trimble Controller [SiteWorks, Trimble Access™] Bands 1:2:3:4:5:7:8:12:18:19:20:28 [Verizon not supported]
Carriers	Using DynDNS and appropriate service
Remote Access	
<b>Input/Output</b>	
Correction data	CMR™, CMR+™, CMRx™, RTCM 2.x, RTCM 3, RTCM 3.3(MSM)
Data outputs	NMEA 0183, NMEA 2000, GSOFF, 1PPS Time Tags, RT17, RT27
Data inputs	Event
Maximum data rate	50Hz (depending on data type)
<b>Features and Upgrades</b>	
Standard Options [8]	RTX Rover, GPS, GLN, BDS, GAL, QZSS, SBAS, 3F, XFill, NMEA, Wi-Fi, Logging, Field Radio, Moving Base
Raw data logging (*.T02, *.T04)	9.25 GB Internal
Precision upgrades	Precise Base, Precise Rover with Base as backup, Rover 10/2, Rover 10/10
Signal / Constellation upgrades	All constellations and signals are included as standard
Feature upgrades	Programmatic interface
<b>Notes</b>	
<i>1 Operating up to +65 °C ambient when the device is powered by external DC supply and the battery is fully charged or is not being charged. Operating up to +30 °C ambient when the battery is being charged by an external DC supply Operating up to +48 °C ambient when the device is powered by a USB-PD battery or charger.</i>	
<i>2 Accuracy and reliability may be subject to anomalies such as multipath, obstructions, satellite geometry, interference and atmospheric conditions. Always follow recommended survey practices.</i>	
<i>3 Depends on SBAS system performance.</i>	
<i>4 May be affected by atmospheric conditions, signal multipath, and satellite geometry. Initialization reliability is continuously monitored to ensure highest quality.</i>	
<i>5 Bluetooth type approvals are country specific. For more information, contact your local Trimble office or representative.</i>	
<i>6 Networked RTK PPM values are referenced to the closest physical base station</i>	
<i>7 Receiver accuracy and convergence time varies based on GNSS constellation health, level of multipath, and proximity to obstructions such as large trees and buildings.</i>	
<i>8 Standard options are dependent on country compliance for WiFi and LTE</i>	
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