NextGen Network Sync Solutions Overview

Trimble offers cost effective and best in class timing product portfolio in the industry. Our portfolio includes a wide selection of Embedded GNSS Timing Modules, Custom GNSS Timing Receiver, GNSS Disciplined Oscillator, Grandmaster and Boundary Clocks, NTP Time Servers, Smart Antenna and standard Antenna products. Trimble is a trusted name for thousands of customers across the globe.

FEATURES

- Cost effective best in class timing product
- Industry's broadest portfolio
- Proven expertise in PNT industry
- Advanced timing technology

BENEFITS

- Off the shelf and Custom design
- Global Reach
- Complimentary clock tree design and review services
- Expert engineering support

APPLICATIONS

- 4G/5G infrastructure
- Enterprise & Industrial Networks
- Datacenters, cloud & MSO infrastructure
- Financial Infrastructure
- Automotive, Calibration and SATCOM

Best in Class GNSS Module

Meeting Industry Standards

Trimble offers an existing line up of GNSS timing modules that provides GNSS receiver and PRTC function to be integrated with network equipment. Trimble's newly added RES720 and ICM720 GNSS receivers provide a dual band multi-constellation secured resilient timing and act as primary reference time clock (PRTC) for precision time distribution in a network. It is the key component to receive and convert the UTC time from GNSS signals. The RES720 GNSS receiver combines PRTC and LNA (low noise amplifier) circuits as an external standalone device or as an internal board or module, and the ICM 720 also offers a programmable 10 MHz frequency output.

Applications

- Cell Site Router/DCSG
- Radio Unit/O-RU/DU
- eNB/gNB
- Passive Radar
- SATCOM Devices

Model Name	Multi-Constellation	Dual Band (L1 & L5)	Accuracy	Frequency Output	Extended Temp (- 40 ° to 85 ° C)
RES 720	GNSS	Yes	5 ns (1 Sigma)	1PPS/PP2S	Yes
RES SMT 360	GNSS	No	15 ns (1 Sigma)	1PPS/PP2S	Yes
ICM SMT 360	GNSS	No	15 ns (1 Sigma)	1PPS/PP2S & 10MHz	Yes

Packet Timing

Meeting NextGen Network Synchronization

Trimble offers both NTP and PTP time servers for packet timing solutions. Precision Time Protocol (PTP) is the standard that guarantees both phase and frequency alignment across the entire packet network. Packet network infrastructure relies on PTP to synchronize timing devices across the network.

Essential components of the synchronization architecture are the grandmaster, slave and boundary clocks. Trimble's Thunderbolt™ GM200 is industry's most cost effective best in class two-in-one that provides both Grandmaster and boundary clock in in half rack size box with unparalleled accuracy with background for NTP based networks.

Applications

- Telecom Networks: 4G/5G xHaul/OpenRAN/O-RAN
- Industrial Networks/ Industrial Automation System
- Autonomous Vehicle/ LiDAR System/Machine Vision
- SmartGrid & SATCOM Infrastructure
- Data Center/ Financial Networks
- MSO/CATV Infrastructure

Model Name	Multi-Constellation	Protocol Support	Accuracy	Holdover	Frequency Output	Extended Temp (-40 ° to 85 ° C)
GM200	GNSS	PTP with NTP client support	15 ns (1 Sigma)	1.5µs over 12 hours	SyncE/1PPS/ 10MHz	Yes
TS200	GNSS	NTP	15 ns (1 Sigma)	1.5µs over 12 hours	1PPS/10MHz	Yes

Disciplined Clock

Best in class primary clock reference GNSSDO

Disciplined Clocks or GNSS Disciplined Oscillators (GNSSDO) are a trusted and accurate source of timing. Even when GNSS signals are unavailable, they continue to output precise time. These powerful devices consist of GNSS receivers that discipline high quality oscillators to provide a highly accurate time source, comparable to expensive atomic frequency standards. Trimble's disciplined clock product lines offer a range of performance choices holdover, phase noise, size and cost, ideally suitable for your application. Thunderbolt E GPS and Mini-T GG are two distinct line of products offering GNSSDO based primary reference clock traceable to UTC.

Applications

- Telecom Networks infrastructure
- Industrial Networks/ Industrial Automation System
- SmartGrid and other utility networks
- SATCOM Infrastructure
- Financial Networks & Passive Perimeter Defense
- Calibration Services & Scientific Labs

Model Name	Constellation	Type	Accuracy	Frequency Output	Extended Temp (-40 ° to 85 ° C)
Thunderbolt E GPS	GPS	External Standalone	< 8 µs over 24 hours	1PPS and 10MHz outputs	Yes
Thunderbolt E GPS	GPS	Module	< 8 µs over 24 hours	1PPS and 10MHz outputs	Yes
Mini-T GG	GNSS	Module	±5us over 24 hours @ room temperature	1PPS and 10MHz outputs	Yes

Smart GNSS Antenna

The Trimble® Acutime™ 360 Multi-GNSS smart antenna is the latest generation Acutime product of integrated GNSS technology in a rugged and weatherproof self-contained unit. The Acutime 360 is an integrated pipe thread-mounted multi-GNSS receiver, antenna and power supply solution in a single environmentally sealed easy to install enclosure.

The Acutime 360 multi-constellation smart antenna design continues Trimble's line of GPS smart antennas, which have been in production since 1991.

This antenna is the perfect solution for precise timing and network synchronization needs, including broadband wireless applications. It provides an extremely cost-effective and independent (within the firewall) timing source for any application, such as fault detection systems and synchronization of wireless networks.

GNSS Antenna

A GNSS Antenna is the main interface through which GNSS receivers take external UTC input and provide UTC traceability information through its output signals in the form of 1PPS, 10MHz and TOD. Trimble provides a wide selection of GNSS antennas, including high gains for timing applications. Trimble's Bullet and Bullet 360 series of antennas are hardened with advanced technology filtering capabilities to provide reliable performance in hostile RF jamming environments. The Bullet series of antennas offer customers the flexibility and choices of constellations and configurations, and unmatched reliability.

Model Name	Constellation	Type	Gain	Frequency	Extended Temp (-40 ° to 90 ° C)
Bullet™ GPS	GPS	Radome weather resistance pole mountable	28dB ± 3dB to 30dB ± 3dB	GPS L1 1575.42 ±1.023MHz	Yes
Bullet™ GG Antenna	GPS & GLONASS	Yes	30dB to 32dB ± 3dB	1588 ± 3MHz	Yes
Bullet™ L1 L2 Antenna	GPS dual band	Yes	32dB to 36dB ± 3dB	L1 1575.42 ± 3MHz L2 1227.60 ±3MHz	Yes
Bullet™ 360 Antenna	GPS, Galileo, Beidou & GLONASS	Yes	26dB to 28dB 3dB (GPS)	GPS L1 1575.42 ±3MHz BDS B1 1561±3MHz GLO G1 1602 ±3MHz	Yes
Bullet™ 40dB Antenna	GPS	Yes	38dB to 40dB ± 3dB (GPS)	GPS L1 1575.42 ±3MHz	Yes
Bullet™ GB Antenna	GPS and Beidou	Yes	26dB to 28dB ± 3dB (GPS)	GPS L1 1575.42 ±1.024MHz BDS B1 1561 ±2.046MHz	Yes

Starter Kits

Kick start your targeted development with a superior out of box experience.

- It helps you easily evaluate performance with our PC tool.
- Allows you to evaluate antenna to optimize the overall solution.
- Verify PRTC input performance for timing module to isolate integration issues

Custom Timing Solutions

Trimble designs custom synchronization solutions for companies around the world. Allow us to introduce you to our highly efficient and competitive timing technologies that can be created in a custom product that will meet your specific time and frequency requirement. Trimble's unsurpassed record of reliability positions us as value leaders in the industry.

Our timing experts can provide a custom solution—based on our proven frequency output (FreqOut™) architecture—to meet your price-point needs for virtually any stability, frequency or PPS output requirement, in a variety of form factors.
Whatever form your solution takes, you can be sure it will feature Trimble's traditional superior performance, innovation, proven quality, and reliability.

We would love to chat with you to understand what you're looking for and how we can help. Let's talk!

Learn more, visit **https://timing.trimble.com**

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