

Алматы (7273)495-231  
Ангарск (3955)60-70-56  
Архангельск (8182)63-90-72  
Астрахань (8512)99-46-04  
Барнаул (3852)73-04-60  
Белгород (4722)40-23-64  
Благовещенск (4162)22-76-07  
Брянск (4832)59-03-52  
Владивосток (423)249-28-31  
Владикавказ (8672)28-90-48  
Владимир (4922)49-43-18  
Волгоград (844)278-03-48  
Вологда (8172)26-41-59  
Воронеж (473)204-51-73  
Екатеринбург (343)384-55-89

Иваново (4932)77-34-06  
Ижевск (3412)26-03-58  
Иркутск (395)279-98-46  
Казань (843)206-01-48  
Калининград (4012)72-03-81  
Калуга (4842)92-23-67  
Кемерово (3842)65-04-62  
Киров (8332)68-02-04  
Коломна (4966)23-41-49  
Кострома (4942)77-07-48  
Краснодар (861)203-40-90  
Красноярск (391)204-63-61  
Курск (4712)77-13-04  
Курган (3522)50-90-47  
Липецк (4742)52-20-81

Магнитогорск (3519)55-03-13  
Москва (495)268-04-70  
Мурманск (8152)59-64-93  
Набережные Челны (8552)20-53-41  
Нижний Новгород (831)429-08-12  
Новокузнецк (3843)20-46-81  
Новый Брест (3496)41-32-12  
Новосибирск (383)227-86-73  
Омск (3812)21-46-40  
Орел (4862)44-53-42  
Оренбург (3532)37-68-04  
Пенза (8412)22-31-16  
Петрозаводск (8142)55-98-37  
Псков (8112)59-10-37  
Пермь (342)205-81-47

Ростов-на-Дону (863)308-18-15  
Рязань (4912)46-61-64  
Самара (846)206-03-16  
Санкт-Петербург (812)309-46-40  
Саратов (845)249-38-78  
Севастополь (8692)22-31-93  
Саранск (8342)22-96-24  
Симферополь (3652)67-13-56  
Смоленск (4812)29-41-54  
Сочи (862)225-72-31  
Ставрополь (8652)20-65-13  
Сургут (3462)77-98-35  
Сыктывкар (8212)25-95-17  
Тамбов (4752)50-40-97  
Тверь (4822)63-31-35

Тольятти (8482)63-91-07  
Томск (3822)98-41-53  
Тула (4872)33-79-87  
Тюмень (3452)66-21-18  
Ульяновск (8422)24-23-59  
Улан-Удэ (3012)59-97-51  
Уфа (347)229-48-12  
Хабаровск (4212)92-98-04  
Чебоксары (8352)28-53-07  
Челябинск (351)202-03-61  
Череповец (8202)49-02-64  
Чита (3022)38-34-83  
Якутск (4112)23-90-97  
Ярославль (4852)69-52-93

Россия +7(495)268-04-70

Казахстан +7(7172)727-132

Киргизия +996(312)96-26-47

<https://furuno.nt-rt.ru> || [fon@nt-rt.ru](mailto:fon@nt-rt.ru)

## Timing Multi-GNSS Receiver Module Model GT-100/GT-9001/GT-90



The world's highest stability, less than 4.5 ns (1sigma) and lowest degradation of stability in harsh urban environments.

- Unrivalled performance for 5G RAN, Radio Systems, Time servers
- Dual band, supporting all constellations (GT-100)
- Highly precise time & ultra-low jitter 1pps synchronized with UTC
- High Robustness - guaranteed performance even if only L1 or only L5 are used
- Programmable frequency clock outputs synchronized with UTC (GT-9001 & GT-100)
- Excellent performance even in harsh environments

The GT-100, GT-9001 and GT-90 are a new generation of GNSS receiver modules for time synchronization that enable GNSS reception worldwide.

GT-100 is full-featured highly robust model, supporting dual-frequency band reception (L1 and L5).

GT-9001 supports L1 and delivers high stability 1PPS and programmable clocks on three channels.

GT-90 supports L1 and provides a 1 PPS high stability output.

All models feature the world's best-in-class time stability of less than 4.5 ns (1 sigma) and are equipped with Dynamic Satellite Selection™ (DSS). DSS is the leading multipath-resistant algorithm developed by NTT that minimizes degradation of time performance even when the antenna is installed in urban areas or near a window.

- **A lineup of three models offering a variety of input and output options for all timing requirements**

Model	Frequency band	Output		Short term holdover	External clock input
		1PPS	Clock		
GT-100	L1 / L5	○	○	○	○
GT-9001	L1	○	○	○	○
GT-90	L1	○	—	—	—

- **Delivers clock outputs and 1PPS synchronized with UTC time**

The GT-100/GT-9001/GT-90 delivers accurate 1PPS synchronized with UTC with high resolution.

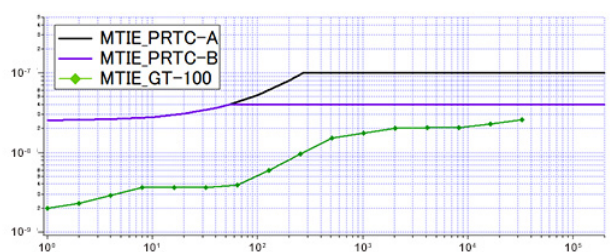
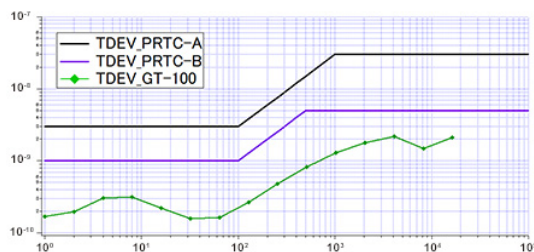
The GT-100/GT-9001 also includes three output clock signals. The three outputs can be arbitrarily assigned to 1PPS and clock.

The GT-100/GT-9001 clock outputs can be set as required to 10MHz, 2.048 MHz, 19.2 MHz, and 30.72 MHz, which are commonly used in wireless communications.

This shortens the time-to-market and contributes to strengthening the customer's competitiveness.

- **The world's highest level of stability of less than 4.5ns (1sigma) under open sky.**
- **Compliant with G.8272 PRTC-A and PRTC-B**

Compliant with TDEV (Time Deviation) /MTIE (Max Time Interval Error). Exceeds the most stringent requirements in 5G networks.



- **Choice of single or dual band for worldwide GNSS support**

Multi constellation capability supporting GPS, GLONASS, Galileo, Beidou, QZSS and SBAS from various countries.

The dual-frequency band GT-100 can also receive India's NavIC (L5) signals.

The GT-100/GT-9001/GT-90 can be used with a selection of positioning satellites or all of them concurrently, making it ideal for globally deployed 5G mobile base stations and network equipment.

- **High robustness with dual-frequency band reception of L1 and L5 (GT-100)**

Dual-frequency band positioning mitigates the effects of ionospheric delays caused by solar flares, etc.

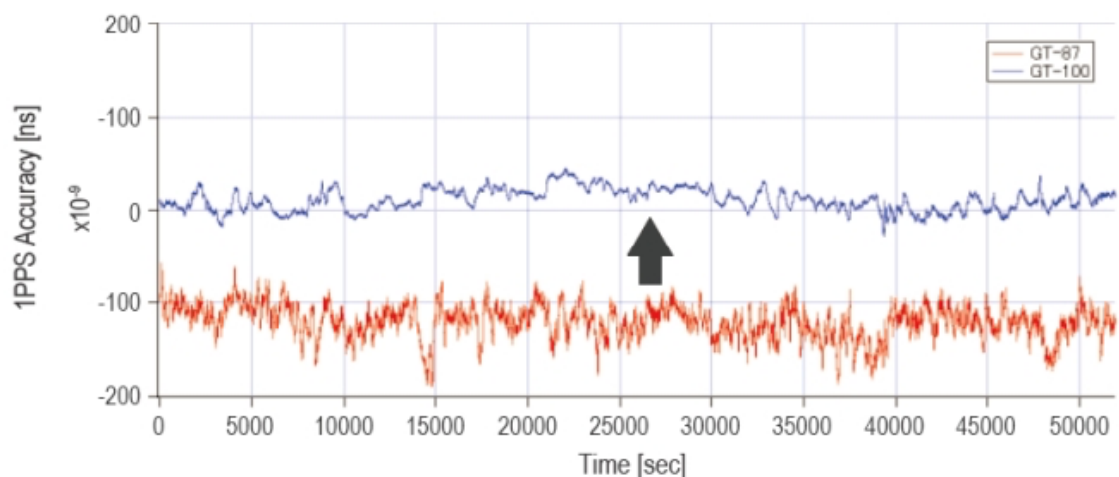
Time stability of less than 4.5ns ( $1\sigma$ ) is achieved even when receiving only L1 or L5.

- **World's lowest accuracy degradation in harsh urban multipath environments**

The use of GNSS receivers for time synchronization is growing vastly into urban areas where multipath signals are mixed and cause severe degradation of timing accuracy. Our proprietary "Dynamic Satellite Selection™\*" technology, which appropriately chooses only the high quality satellite signals, minimizes degradation of time synchronization performance in poor reception environments.

This technology can be used safely even at base stations installed in urban areas.

\* Multipath resistance technology based on an algorithm developed by NTT



- **Protecting GNSS Reception (Anti-Jamming, Anti-Spoofing)**

The GT-100/GT-9001/GT-90 mitigate the effects of jamming signals automatically and to provide real-time notification to the user of the jamming signal frequency and signal strength.

The modules enhance receiver security and identify the source of jamming during the operational phase of a customer's system.

The GT-100/GT-9001/GT-90 also implement a detailed algorithm to verify the correctness of GNSS signals and can detect and eliminate spurious signals that are not broadcast from the satellites.

The GT-100, which supports dual-frequency band reception, also has the ability to operate only on L5 if L1 is jammed, or only on L1 if L5 is jammed.

- **Short term holdover (GT-100/GT-9001)**

Interruption of GNSS satellite signals is a major concern during operation of critical infrastructure systems.

GT-100 & GT-9001 support short term holdover, which maintains constant performance even if GNSS satellite signals are interrupted for a short period of time.

- **External clock input (GT-100/GT-9001)**

GT-100 & GT-9001 accept an external time reference input (1PPS, clock) that is different from that of the GNSS satellites. The input can be derived from an external clock, enabling the modules to continue to provide service even in the unlikely event of loss of signal from the GNSS satellites.

- **Carrier Grade Quality. Suitable for critical infrastructure applications**

Compared to conventional GNSS receivers for time synchronization, Furuno's new GNSS receivers are substantially more robust (i.e., they are not affected by most disruptions and thus ensure continuous service).

Such enhanced features give users a high level of confidence in fields that require high reliability, such as 5G mobile base stations, financial transactions, and power grids.

**White Paper: Countermeasure for GNSS receiver failure**

- **Sophisticated built-in security**

Including secure boot and secure firmware update ensures maximum protection against tampering.

# Specifications

---

## GENERAL

### GNSS Reception Capability

---

[GT-100]

GPS L1C/A, GLONASS L1OF, Galileo E1B/E1C, BeiDou B1I /B1C, QZSS L1C/A, SBAS L1C/A

GPS L5, Galileo E5a, BeiDou B2a, QZSS L5, NavIC L5

[GT-9001、GT-90]

GPS L1C/A, GLONASS L1OF, Galileo E1B/E1C, BeiDou B1I /B1C, QZSS L1C/A, SBAS L1C/A

---

## GNSS Reception

---

[GT-100]  
62 channels

[GT-9001、GT-90]  
32 channels

---

## Sensitivity

---

Acquisition :  $\geq -147$  dBm

Tracking :  $\geq -165$  dBm

\*Measurement environment using GNSS simulator

---

## ITU-T Recommendation

---

Compliant with G.8272 PRTC-A and PRTC-B

\*Compliant with TDEV (Time Deviation) /MTIE (Max Time Interval Error)

---

## 1PPS Stability

---

$< 4.5$  ns ( $1\sigma$ )

\*Open sky

---

## 1PPS Accuracy

---

$< \pm 40$  ns (vs UTC)

\*Open sky

---

## 1PPS Resolution

---

$< \pm 0.2$  ns

---

## Clock Output

---

[GT-100 and GT-9001 only]

1 MHz to 40 MHz

Stability : < 0.5 ppb (1 $\sigma$ )

Short Term Stability (Root Allan variance ( =1s)) : <  $5 \times 10^{-10}$

Long Term Stability (24h average) : <  $\pm 1 \times 10^{-12}$

---

## TTFF (Typical)

---

Hot Start: 2 sec(Typ)

Cold Start: 35 sec(Typ)

\*Measurement platform with recommended active antenna

---

## Supply Voltage

---

3.3 VDC

---

## Power Consumption

---

55 mA

\*Tracking Satellite outdoor

---

## Operating Temperature

---

-40°C to +85°C

---

## Package

---

47Pin LCC (Leadless Chip Carrier)

18.0mm × 17.8mm × 3.11mm

---

## Protocol

---

PFEC (NMEA 0183 Standard Ver 4.11)

---

## Security

---

Secure boot, Secure FW update

---

## Interfaces

---

[GT-100, GT-9001 and GT-90]  
UART, Time pulse (1PPS)

[GT-100 and GT-9001 only]  
Clock, External clock input

---

## Functions

---

[GT-100, GT-9001 and GT-90]  
Anti-Jamming (8CW), Multipath Mitigation (Dynamic Satellite Selection™),  
Anti-Spoofing, T-RAIM, Antenna Detection Circuit.

[GT-100 and GT-9001 only]  
Holdover

---

Алматы (7273)495-231  
Ангарск (3955)60-70-56  
Архангельск (8182)63-90-72  
Астрахань (8512)99-46-04  
Барнаул (3852)73-04-60  
Белгород (4722)40-23-64  
Благовещенск (4162)22-76-07  
Брянск (4832)59-03-52  
Владивосток (423)249-28-31  
Владикавказ (8672)28-90-48  
Владимир (4922)49-43-18  
Волгоград (844)278-03-48  
Вологда (8172)26-41-59  
Воронеж (473)204-51-73  
Екатеринбург (343)384-55-89

Иваново (4932)77-34-06  
Ижевск (3412)26-03-58  
Иркутск (395)279-98-46  
Казань (843)206-01-48  
Калининград (4012)72-03-81  
Калуга (4842)92-23-67  
Кемерово (3842)65-04-62  
Киров (8332)68-02-04  
Коломна (4966)23-41-49  
Кострома (4942)77-07-48  
Краснодар (861)203-40-90  
Красноярск (391)204-63-61  
Курск (4712)77-13-04  
Курган (3522)50-90-47  
Липецк (4742)52-20-81

Магнитогорск (3519)55-03-13  
Москва (495)268-04-70  
Мурманск (8152)59-64-93  
Набережные Челны (8552)20-53-41  
Нижний Новгород (831)429-08-12  
Новокузнецк (3843)20-46-81  
Ноябрьск (3496)41-32-12  
Новосибирск (383)227-86-73  
Омск (3812)21-46-40  
Орел (4862)44-53-42  
Оренбург (3532)37-68-04  
Пенза (8412)22-31-16  
Петрозаводск (8142)55-98-37  
Псков (8112)59-10-37  
Пермь (342)205-81-47

Ростов-на-Дону (863)308-18-15  
Рязань (4912)46-61-64  
Самара (846)206-03-16  
Санкт-Петербург (812)309-46-40  
Саратов (845)249-38-78  
Севастополь (8692)22-31-93  
Саранск (8342)22-96-24  
Симферополь (3652)67-13-56  
Смоленск (4812)29-41-54  
Сочи (862)225-72-31  
Ставрополь (8652)20-65-13  
Сургут (3462)77-98-35  
Сыктывкар (8212)25-95-17  
Тамбов (4752)50-40-97  
Тверь (4822)63-31-35

Тольятти (8482)63-91-07  
Томск (3822)98-41-53  
Тула (4872)33-79-87  
Тюмень (3452)66-21-18  
Ульяновск (8422)24-23-59  
Улан-Удэ (3012)59-97-51  
Уфа (347)229-48-12  
Хабаровск (4212)92-98-04  
Чебоксары (8352)28-53-07  
Челябинск (351)202-03-61  
Череповец (8202)49-02-64  
Чита (3022)38-34-83  
Якутск (4112)23-90-97  
Ярославль (4852)69-52-93

Россия +7(495)268-04-70

Казахстан +7(7172)727-132

Киргизия +996(312)96-26-47

<https://furuno.nt-rt.ru> || [fon@nt-rt.ru](mailto:fon@nt-rt.ru)