GNSS Solutions

Positioning, Navigation and Timing (PNT)

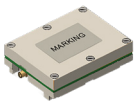
Rakon's high-reliability equipment and oscillators are at the core of the world's most advanced GNSS systems. Our comprehensive product portfolio includes NewSpace GNSS Receivers, GNSS PPS OCXOs, Ultra-Stable Oscillators (USO), Low-Phase Noise and Low-Power OCXOs, and TCXOs. These products are widely deployed in positioning, navigation, and timing applications, including ground-based precision satellite platforms and aerospace payloads worldwide.

Space equipment and oscillator applications

- Real-Time Precise Onboard Orbit Determination
- GEO and LEO communications satellites
- LEO PNT and Satellite-based augmentation system
- LEO IoT satellites
- Earth observation (EO) and Scientific instruments
- Precise frequency and time references
- Satellite payload equipment & oscillators
- Grandmaster timing solutions

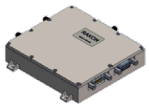
GNSS Receiver for Space applications

The NewSpace GNSS Receiver series, including GNSS Receiver DB, GNSS Receiver Single and GNSS Receiver Dual models, are compact, power-efficient systems designed for small and nanosatellites. Built with rad-hard microcontrollers and proprietary MercuryR™ Space ASIC OCXO RK508NS, they are reliable in space and support up to 448 channels across multiple satellite systems for accurate positioning.



GNSS Receiver DB
55 x 41 x16 mm

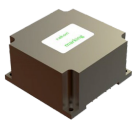
- Multi-constellation, multi-band
- TTFF: Warm start < 20 s, Cold start < 45 s
- Position accuracy < 1.2 m (800 km altitude)
- Precise 1PPS signal output
- Low power consumption: 0.6 to 1.1 W
- Low supply voltage: 3.3 V



GNSS Receiver Single
GNSS Receiver Dual
90 x 96 x15 mm

- Multi-constellation, multi-band
- Single or Dual receiver
- Input/output clock available
- Disciplined oscillator
- Position accuracy < 1.2 m (800 km altitude)
- High availability in challenging conditions
- Full 3D attitude computation
- Orbit propagation

Ultra Stable Oscillators (USO) for Low Earth Orbit (LEO) PNT constellations



RK409AVNS
60 x 60 x32 mm

The RK409AVNS addresses the growing demand for Low Earth Orbit (LEO) PNT constellations with a critical requirement of highly-accurate frequency output signals. This USO delivers excellent Allan Deviation (ADEV) 2.5 x 10^{-13} (typ. tau = 1s).

- Frequency (Fn): 10 and 10.23 MHz
- ADEV: 2.5x 10^{-13} (1s); 3.5x10^{-13} (10s); 5.0x 10^{-13} (100s)
- Radiation: TID 30 krad, No SEL up to LET 43 Mev.cm^2/mg
- FvT: ± 0.2 ppb typ. Over -10 to +60 °C
- Ageing: ≤ ± 0.05 ppb/day; ≤ ± 0.1 ppb/year
- Power supply: 12 V

TCXO for Space applications

The TE300 and TE310 are low power Space TCXOs for Transponders, GNSS Receivers, Converters, Synthesizers, FGUs and Digital Boards.

TE300, TE310
20 x 20 x 13 mm
25 x 25 x 13 mm

- Frequency: 10 to 100 MHz
- FvT: ±0.5 to 5 ppm (-40 to +85°C)
- Low power consumption: 0.15 W
- Radiation: TID 100 kRad, No SEL up to LET 60 Mev.cm^2/mg

TCXO for NewSpace applications

The RK300NS is a cost-effective and low power, low phase noise TCXO developed for the NewSpace market such as smallsats and constellations.

RK300NS
25 x 25 x 13 mm

- Frequency: 80 to 100 MHz
- FvT: ±4 ppm max. (-40 to +85°C)
- Low power consumption: 0.15 W
- Radiation: TID 30 krad, No SEL up to LET 43 Mev.cm^2/mg

Issue: V5, August 2024

GNSS Positioning solutions for non-space applications

Rakon has been at the forefront of Global Navigation Satellite System (GNSS) technology and industry since its commercialisation in the early 1990s. Our technology is designed into many GNSS receivers for location-based services and precision positioning applications.

GNSS Positioning applications

- Agriculture
- Aircraft, UAV/Drones
- Automotive
- Defence
- DU and CU systems
- Emergency beacons (EPIRB, ELT, PLB)
- Front-haul switches NIC time cards
- GNSS modules
- Grand Masters
- IoT
- Location based services
- Long term holdover modules
- Maritime
- Mobile communications
- PND, personal survival
- Precision agriculture
- Real Time Kinematic (RTK)
- Small Cell solutions and Remote Radio Heads
- Surveying
- Tracking
- Test equipment

High Stability, Ultra Stable and Hybrid TCXOs for GNSS Positioning

In 2001, Rakon launched the first ±0.5 ppm high-stability, small form factor TCXO, which became the world's timing reference standard for global positioning systems. Building on this innovation, Rakon introduced the Ultra Stable TCXO (USTCXO) series, offering ±0.1 ppm stability accuracy. Today, Rakon continues to advance GNSS technology with the Mercury+™ Hybrid TCXO (HTCXO) series, which delivers ±10 ppb stability over a temperature range of-40 to 105°C. This high level of stability ensures reliable locking conditions, even in weak signal environments. Rakon remains at the forefront of providing the highest performance for GNSS applications.

High Stability TCXOs

- High Stability TCXO: RST2016A | RST2520A | RST3225A | RST1612A
  FvT: ±0.5 ppm, -40 to 85°C

- Low Power TCXO: RST2016AL | RST1612AL
  Supply voltate: 1.2 V

- High Temperature TCXO: RST2016H | RST2520H | RST3225H | RST2016HC RST2520HC | RST3225HC
  Operating temperature: -40 to +105°C

Ultra Stable TCXOs

- Niku™ TCXO: RTN5032A | RTN7050A
  FvT: ±0.1 ppm, -55 to 105°C, 0.2 ppb/g typ.

- Pluto+™ TCXO: RPT5032A | RPT7050A
  FvT: ±0.28 ppm, -55 to 105°C

- Low g-Sensitivity TCXO: RPT7050D | RPT7050LG | RPT7050GP
  g-Sensitivity achieves: 0.1 ppb/g typ.

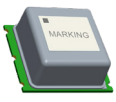
- Emergency Beacons: RFPT100 | Second GenerationBeacons: RPT7050B
  MTS[1]: ±0.7 ppb/min *LTS[2]: ±1.5 ppm/10 years*
  [1] Medium term stability *[2] Long term stability*
  Note: RFPT100 and RPT7050B undergo Cospas-Sarsat compliance testing.

Hybrid TCXOs

- Mercury+™ series: RTH7050PA | MercuryX™ series: RTH7050X
  FvT: ±20 ppb, -40 to 95°C *FvT: ±10 ppb, -40 to 105°C*

1PPS Disciplined SMART OCXOs for Edge Ground Masters

The high performance 1PPS GNSS SMART OCXOs deliver long holdover from 24 to 48 hours (1.5 µs, 4°C/5°C temperature windows) and provide ideal solution for GNSS modules on DU, CU and servers.



ROD2525S2
ROD2522S2H
25 x 22 x 12 mm

- Frequency (Fn): 10, 12.8 and 20 MHz
- 24-hour holdover (1.5 µs, 4°C temp windows)
- FvT: 0.5 ppb pk-pk typ. over -40 to +85 °C
- Ageing: <0.2 ppb/day
- Compensated ageing: <0.004 ppb/day
- I²C bus device status and commands

ROD5242T1
52 x 42 x 14 mm

- Frequency (Fn): 10 to 20 MHz
- 48-hour holdover (1.5 µs, 5°C temp windows)
- FvT: 0.05 ppb pk-pk typ. over -40 to +85 °C
- Ageing: <0.1 ppb/day
- Compensated ageing: <0.0075 ppb/day
- I²C bus device status and commands

Issue: V5, August 2024