GNSS Solutions

Positioning, Navigation and Timing (PNT)

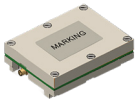
Rakon's crystal oscillators and equipment are at the heart of world's most advanced GNSS applications. We offer a broad spectrum of high-end oscillators and equipment, from NewSpace GNSS Receivers and Hi-Rel ultra-stable oscillators for the space market, to highly stable OCXOs, TCXOs, resonators and filters for ground-based PNT applications such as precision agriculture, autonomous vehicles and GIS mapping.

Space Equipment and Oscillators

- 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 DB and GNSS Receiver Dual are highly integrated pieces of equipment with low power consumption. They are the optimal solution for small and nanosatellites and support up to 448 multi-constellation, multi-band channels.



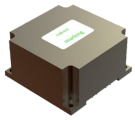
GNSS Receiver DB
55 x 41 x16 mm

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

GNSS Receiver Dual
90 x 96 x15 mm

- Dual GNSS receiver
- Redundancy
- Disciplined oscillator
- High availability in challenging conditions
- Full 3D attitude computation
- Orbit propagation

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



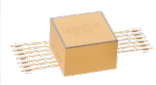
RK409AVNS
60 x 60 x32 mm

The RK409AVNS addresses the growing demand for Low Earth Orbit (LEO) PNT constellations with a critical requirement of highly-accurate frequency output signals. This oscillator 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

Space TCXO

The TE300 is a low power Space TCXO for Transponders, GNSS Receivers, Converters, Synthesizers, FGU and Digital Boards.



TE300
20.6 x 20.6 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

NewSpace TCXO

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

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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. These include:

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

TCXOs – High Stability, Ultra Stable and Hybrid TCXO Solutions for GNSS Positioning

Rakon pioneered the ±0.5 ppm integrated High Stability TCXO which became the world's timing reference standard for global positioning systems, followed by its Ultra Stable TCXO series which offers ±0.1 ppm stability accuracy. Rakon now also has the advanced Mercury+™ Hybrid TCXO series to support GNSS' latest requirements. These hybrid TCXOs achieve ±0.02 ppm stability over -40 to 95°C. Enabling reliable locking conditions, even under weak signal environments. Rakon's products lead the way in providing the highest level of performance for GNSS applications.

High Stability TCXOs

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

- Low Power TCXO: RIT2016C
  (Supply voltage: 1.2 V)

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

Ultra Stable TCXOs

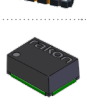
- Ultra Stable TCXO: RPT5032A | RPT7050A
  (FvT: ±0.1 ppm, -40 to 85°C)

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

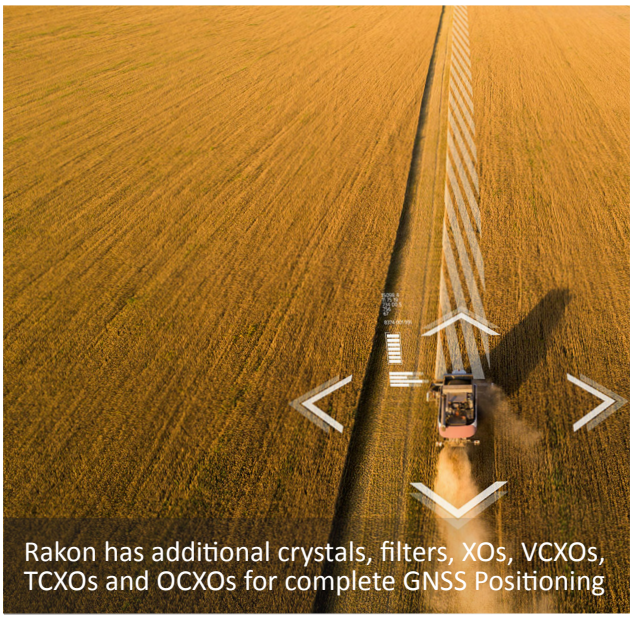
- Ultra Low Noise TCXO: RPT1490LN
  (Phase Noise floor: -175 dBc/Hz, @ 38.4 MHz)

- Emergency Locator Beacons TCXO: RPT7050B
  (MTS: ±0.7ppm/min (ΔT/Δt steady state. LTS 100% tested)

Hybrid TCXOs



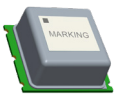
- Mercury+™ Hybrid TCXO: RTH7050PA
  (FvT: ±0.02 ppm, -40 to 95°C)



Rakon has additional crystals, filters, XOs, VCXOs, TCXOs and OCXOs for complete GNSS Positioning

GNSSDOs – 1PPS Disciplined SMART OCXOs for Edge Ground Master

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 to 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: <0.04 ppb/day

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

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