DUT
ENGINEERING & SYSTEMS

PRECISE TIME & TIME INTERVAL

PRECISION GNSS SYNCHRONIZATION · HAVE QUICK II · SATURN

RZT289

TIME REFERENCE UNIT

Engineered for mission-critical time synchronization.

Synchronization accuracy: the fundamental element that keeps your frequency-hopping radio network on the air.



TFOM 4	< 100 ns	24 h	1U · 19"
LOCKED TO GNSS	1PPS VS UTC	HOLDOVER TFOM 6 · OX	FANLESS DESIGN

WHY RZT289

No synchronization, no frequency hopping. **With RZT289, your network hops as one.**

HAVE QUICK II and SATURN radios change frequency hundreds of times per second following a common sequence. For two stations to hear each other, both must hop to the same channel at the same instant: synchronization accuracy is, quite literally, the key to the network.

RZT289 derives its reference from the GNSS constellation, disciplines it to nanosecond accuracy and synchronizes all your radios through standard TOD, reporting the true quality of that synchronization at all times through the TFOM indicator.



Nanosecond accuracy

1PPS aligned to UTC within 100 ns and TFOM 4 while tracking GNSS: the margin frequency hopping demands.

Synchronization quality, always declared

TFOM is computed in real time per ICD-GPS-060 and degrades honestly if the signal is lost. Every radio knows exactly how far it can trust its synchronization.

Self-recovery

Continuous supervision of the GNSS receiver: detects data loss, reconfigures and relocks with no operator action.

Disciplined holdover

The internal oscillator learns its own drift while locked and compensates for it to sustain synchronization when the sky is not available.

Status at a glance

Front-panel display with TFOM, phase error, satellites, signal level and UTC. Lock, holdover and alarm indicators.

Rack-ready

19" 1U form factor, sealed and fanless enclosure. Designed for shipboard and shore radio rooms.

TWO MODELS, ONE ACCURACY

Choose how long **it must hold without sky.**

Both models deliver the same synchronization accuracy while tracking GNSS. The difference is the oscillator that sustains it when the signal is lost: through obstruction, indoors or under intentional interference.

STANDARD

RZT289-S

The essential reference to synchronize your network under GNSS coverage. Fast start-up, low power and the best cost per synchronized radio.

- TFOM 4 when locked · 1PPS < 100 ns
- TFOM 6 holdover for 1.5 min
- Operational in under 1 minute
- Power consumption below 3 W

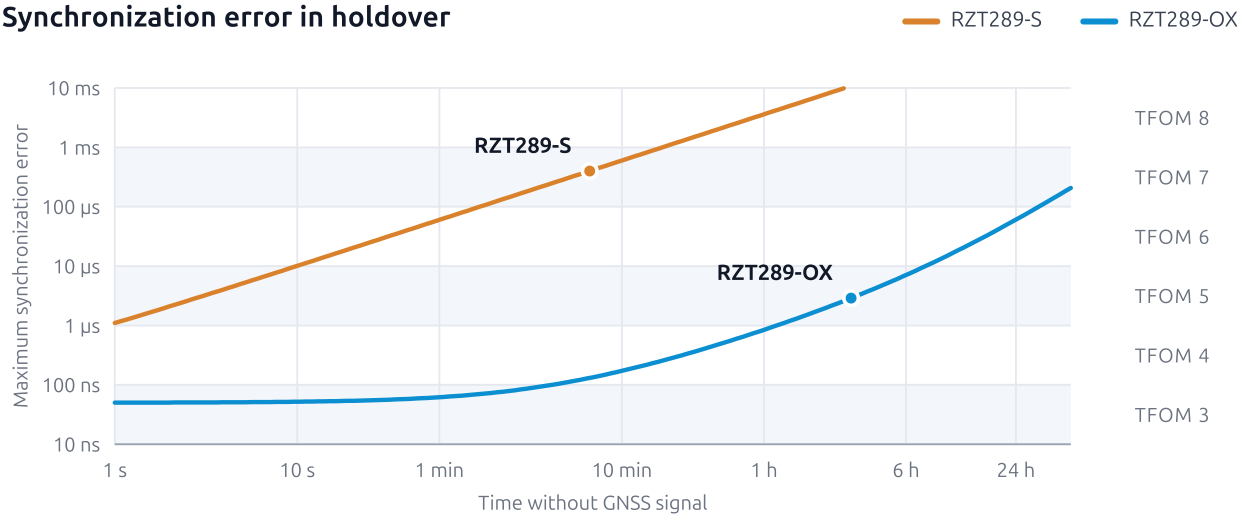
HIGH STABILITY

RZT289-OX

Disciplined oven-controlled crystal oscillator. Keeps the network synchronized for hours without GNSS, with warm-up measured in minutes, not hours.

- TFOM 4 when locked · 1PPS < 100 ns
- TFOM 4 holdover for 1 h · TFOM 6 for 24 h
- Full stability in under 10 minutes
- Power consumption below 8 W

Synchronization error in holdover



Maximum expected error from loss of GNSS signal, after at least 24 h of continuous lock at stable temperature (±5 °C). Bands show the TFOM the unit declares to the radio at each moment.

4	5	6	7	8	9
100 ns – 1 µs	1 – 10 µs	10 – 100 µs	0.1 – 1 ms	1 – 10 ms	> 10 ms

TFOM (Time Figure of Merit) scale per ICD-GPS-060: estimated error of the delivered synchronization relative to UTC.

TECHNICAL SPECIFICATIONS

Datasheet

	RZT289-S	RZT289-OX
PERFORMANCE LOCKED TO GNSS		
1PPS accuracy to UTC	< 100 ns (1σ)	
Declared TFOM	4 (100 ns – 1 µs)	
Frequency stability (locked)	$< 1\times10^{-8}$ (1 day)	$< 1\times10^{-11}$ (1 day)
HOLDOVER (NO GNSS)		
TFOM 4 · error ≤ 1 µs	—	1 h
TFOM 5 · error ≤ 10 µs	10 s	7 h
TFOM 6 · error ≤ 100 µs	1.5 min	24 h
TFOM 7 · error ≤ 1 ms	15 min	> 4 days
COMPATIBILITY AND OUTPUTS		
Frequency-hopping systems	HAVE QUICK II (STANAG 4246) · SATURN (STANAG 4372)	
Time of Day	Standard ICD-GPS-060 TOD · 1 frame/s · Manchester 600 µs/bit · HCMOS 0–5 V	
1PPS	STANAG 4430 · 10 V into 50 Ω · 20 µs width · rising edge on the UTC second	
TOD content	Hour, minute, second, day of year, year and TFOM · Hamming (8,4)	
GNSS RECEIVER		
Constellations	GPS L1 C/A · BeiDou B1I · concurrent reception	
Acquisition	Cold start < 35 s · hot start < 2 s (open sky)	
Antenna	Active, powered by the unit · SMA female connector · open/short antenna detection	
OPERATION AND ENVIRONMENT		
Front-panel indications	Display with TFOM, phase error, satellites, signal and UTC · lock, holdover and alarm LEDs	
Time to operation	< 1 min	< 10 min (oscillator warm-up)
Power supply	100–240 VAC · 50/60 Hz	
Power consumption	< 3 W	< 8 W (steady state)
Form factor	19" rack, 1U · sealed, fanless enclosure	
Operating temperature	–20 °C to +60 °C	

Preliminary specifications, subject to change without notice. Holdover values after 24 h of continuous lock at stable temperature. HAVE QUICK and SATURN are designations of the corresponding military radio standards; their mention indicates interface compatibility.

DUT

ENGINEERING & SYSTEMS

Engineered for mission-critical time synchronization.

CONTACT

dut@dut.cl

www.dut.cl