

# RG-2111

## Redundant GPS Reference Frequency Generator



### Features

- 1U 19" rack mount
- Dual Redundant hot swappable Power Supplies
- Dual GPS Disciplined Modules

The RG-2111 is a redundant reference frequency generator that uses Global Positioning System (GPS) to steer two internal low phase noise OCXO's. Each GPS Disciplined Module provides a set of 3 low phase noise 10 MHz sine waves, 1PPS, monitor and control interface to a user interface output panel. If a failure is sensed in one module the unit will switch outputs to the other GPS Disciplined Module to provide continuous service. These outputs are accurate daily to  $1 \times 10^{-12}$  when slaved to an internal GPS tracking receiver's time. Dual redundant hot swappable power supplies make the RG-2111 perfect for military communications, telecommunications and satcom telecommunications.

The RG-2111 is also able to slave to an external 1PPS signal to steer and hold an internal oscillator and clock system precisely in time. The oscillator maintains its high accuracy of time and frequency information even if no satellites can be tracked. Optional dual network ports support NTP time server functionality. A serial data port is provided to report time, date, position, GPS satellite health and signal strength.



# RG-2111 Specifications

## Inputs

- 2 External 1PPS Reference Signal Input (A, B)
- 2 External GPS Antenna Inputs: (A, B)
- 2 AC Power PSM IEC320 connectors with on/off switch and fuse

Hardware Fault Indication, TTL High = Hardware OK  
GPS Lock Indication, TTL High = GPS Lock

## Internal Oscillators supported

- High stability OCXO (std)
- 5x10-9 0-50 deg/1x10-10/day aging

## Physical

- Size: 19" rack-mount 1RU high (1.72"), 8" deep, 17" width
- Weight: 11lbs nominal

## Outputs

- 1PPS Reference Signal Output
- 0 to +5 Vdc 50 Ohm impedance, BNC-F
- 10 MHz Reference Signal Output, 50 Ohm impedance, BNC-F (3)
- Control/ Alarm Interface for GPS Modules. DB9-F (2)

## Power Supplies

- Dual Hot Swappable Power Supplies
- Dual AC supplies are standard

## GPS Receiver

- Satellite Signal: GPS L1 1575.42 MHz C/A code
- Position Accuracy : <5 m, 1-sigma, <10 m, 2 sigma
- TTFF, Hot (w/ current almanac, position, time and ephemeris) : <30 sec
- TTFF, Warm (w/ current almanac, position, time): <80 sec
- TTFF, Cold (No stored information): <120 sec
- Sensitivity: -173dBW Acquisition, -185dBW Trackin

## Temperature

- Operating 0 to +50C
- Storage -40 to +85C
- Temperature shock during operation without causing permanent damage: -20C to +70C at +/-3C / min per MIL-STD-810F Method 503.4

The GPS receiver sources up to 80mA current at 3.3 VDC nominal for active antenna

## Humidity

- Up to 95% RH (non-condensing)

## Monitor & Control

Individual Monitor and Control (M&C) interfaces are provided for each internal module independently.

## Altitude

- Operating 10,000ft
- Non-operating 50,000ft

M&C interface: RS-232C. This interface includes fault indication for each DOM module independently. Fault messages include the following:

- Output signal level detection
- Dual Power Supply Module (PSM) input level detection
- OCXO current out of range
- FPGA communication error
- GPS communication error

## EMC

- FCC Part 15
- EN55022
- EN55024

| Parameter                       | Specification |         |      | Unit    | Conditions: T=0~+50°C Ambient, V supply = 115VAc unless otherwise specified |
|---------------------------------|---------------|---------|------|---------|---|
|                                 | Min           | Typical | Max  |         |   |
| Nominal Frequency               |               | 10      |      | MHz     |   |
| Output Power (J2)               | 15.0          | 15.0    | 17.0 | dBm     | T=25°C, Load = 50 ohms  |
| Output Power (J3, J4)           | 11.0          | 11.0    | 12.0 | dBm     | T=25°C, Load = 50 ohms  |
| Harmonics                       |               |         | -30  | dBc     | Load = 50 ohms  |
| Spurious                        |               |         | -70  | dB      | Load = 50 ohms  |
| Frequency Accuracy              | -1            |         | 1    | E-12    | 24 hour average when locked to GPS  |
| Short-term stability A          |               |         | 10   | E-12    | @ Tau = 1 sec, after 24 hours   |
| Short-term stability B          |               |         | 20   | E-12    | @ Tau = 10 sec, after 24 hours  |
| Holdover Capability             |               |         | 40   | uSec    | 24 hours, delta T =30°C, after 3 days of power-on time                      |
| Phase Noise @10Hz               |               |         | -108 | dBc/ Hz | T=25°C, Load = 50 ohms  |
| Phase Noise @ 100Hz             |               |         | -138 | dBc/ Hz | T=25°C, Load = 50 ohms  |
| Phase Noise @1kHz               |               |         | -151 | dBc/ Hz | T=25°C, Load = 50 ohms  |
| Phase Noise @10kHz              |               |         | -153 | dBc/ Hz | T=25°C, Load = 50 ohms  |
| Phase Noise @100kHz             |               |         | -155 | dBc/ Hz | T=25°C, Load = 50 ohms  |
| Accuracy to UTC (1 sigma)       | -30           |         | 30   | nSec    | When locked to GPS  |
| 1PPS Output Pulse width         |               | 10      |      | mSec    | Default = 10 mS   |
| High-Level Output Voltage (VOH) | 2.4           |         | 5.0  | V       | Load = 50 ohms  |
| Pulse width                     |               | 10      |      | uSec    | Default = 10 mS   |
| AC Supply Voltage               | 90            | 115     | 265  | VAC     | Auto sensing  |
| Power Consumption               |               |         | 25   | Watts   | T=25°C, During Warm-up  |