brandywine communications

RG-2111

Redundant GPS Reference Frequency Generator with Dual NTP ports

Features

- **1U 19" rack mount**

- **Dual Redundant hot swappable Power Supplies**

- **Dual GPS Disciplined Modules**

- **Dual NTP Output Ports**

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 1×10^{-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. The dual network ports support NTP time server functionality. Ethernet ports are available on a full time basis and are not switched in a failure mode. A serial data port is provided to report time, date, position, GPS satellite health and signal strength.

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RG-2111 Specifications

Inputs
2 External 1PPS Reference Signal Input
- Module A
    - 0 to +5 Vdc 50 Ohm, BNC-F
- Module B
    - 0 to +5 Vdc 50 Ohm, BNC-F
2 External GPS Antenna Inputs:
    - Module A: BNC-F
    - Module B: BNC-F
2 AC Power PSM IEC320 connectors with on/off switch and fuse

Internal Oscillators supported

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

Accuracy (std HSOCXO)
- Time Accuracy GPS <30ns
    - Modulated Time Code <5us
    - DCLS time code <1us
    - Ext 1PPS <30ns
- Holdover <1us/hr

Network Interface

Interface Type	10BaseT
Protocols	TCP/IP, UDP, NTPv3, HTTP, SNMP v1

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)

GPS Receiver
- Satellite Signal : GPS L1 1575.42 MHz
- Satellite Code : C/A code 1.023 MHz
- 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 Tracking

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

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

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

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

Hardware Fault Indication, TTL High = Hardware OK
GPS Lock Indication, TTL High = GPS Lock
Manual Holdover Input: Active Low

Physical

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

Environmental Conditions

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

Humidity   Up to 95% RH (non-condensing)

Altitude   Operating 10,000ft

          Non-operating 50,000ft

EMC FCC Part 15

- EN55022
- EN55024

Ordering Information: Part Number 001-0230

Parameter	Specification			Unit	Conditions : T=0~+50°C Ambiant, 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, ΔT=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)	-50		50	nSec	When locked to GPS
Pulse width		10		mSec	Default = 10 mSec
High-Level Input Voltage (VIH)	2.4		5.0	V	Load = 50 ohms
Pulse width		10		uSec	Default = 10 mSec
AC Supply Voltage	90	115	265	VAC	Auto sensing
Power Consumption			25	Watts	T=25°C, During Warm-up