PT626 - 1000 - GPS

- ***Miniature GPS disciplined 10.000MHz frequency standard; Sine wave and 1PPS outputs***
- ***MTIE Stratum 1 compliance; theoretically approaching the 1 x 10^{-12} long term accuracy of the GPS caesium standard***
- ***Excellent holdover from integrated precision ovened oscillator with very low phase noise***
- ***Military, industrial and commercial applications in synchronization and timing***

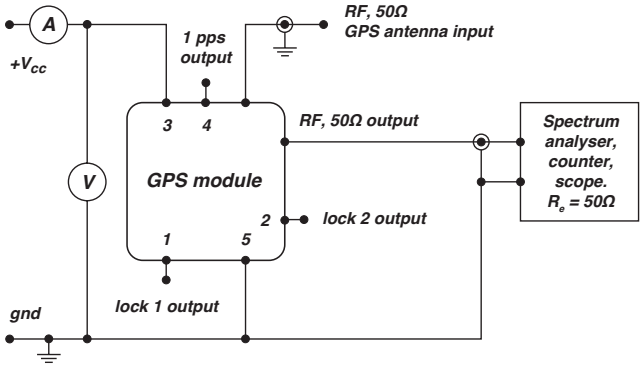
The PT626 - GPS sets a new benchmark for miniature frequency standards. The combination of regulation through the aquisition of GPS data, the storage of control levels, miniature size and integrated OCXO provides a component level module for incorporation into OEM equipment.

Disciplined from satellite data the module exibits near Caesium standard accuracy and excellent holdover accuracy, during periods of GPS unavailability, from its integral low phase noise OCXO.

Available as a 10.000MHz precision reference standard the module may also be supplied to custom frequencies and specifications together with a range of internal oscillator performance variations and supply options.

Applications will include instrument calibration, system synchronisation, portable reference units, telecommuncation base stations and extreme timing accuracy.

Test circuit:



Lock detect status levels; LVCMOS:

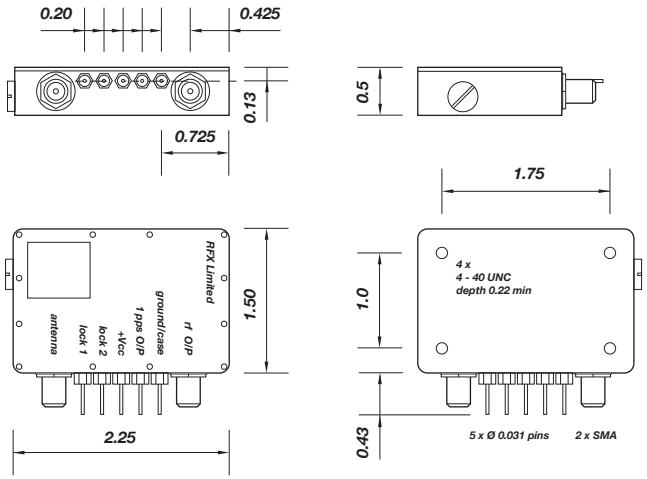
Levels will alternate at 8Hz for the first 4 seconds after turn on or when GPS receiver is not operational

lock 1	lock 2	
Low	Low	No signal being received
High	Low	GPS detect
Low	High	GPS lock
High	High	Reference Lock

1 pps levels LVCMOS

Development conducted with active GPS antenna, gain (+25 ±2)dBm including cable

Dimensions(inches):



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OCXO performance - GPS disciplined

During periods of lock the PT626 - GPS module provides r.f. output accuracy approaching the satellite on-board Caesium standards. Initial lock can be achieved within 15 minutes dependent upon satellite availability. The lock condition is indicated by the status of the lock 1 and lock 2 outputs.

Performance during periods of GPS lock:

r.f. output	*10.000MHz*
long term stability	*theoretically approaching the 1 x 10^{-12} long term accuracy of the GPS caesium standard (Δt = 24 hours)*
short term stability	*1 x 10^{-11} (Δt = 1 sec)*
phase noise*:	
single sideband	*130dBc/Hz, f_o +10Hz*
1Hz bandwidth	*150dBc/Hz, f_o +100Hz*
	155dBc/Hz, f_o +1kHz
	160dBc/Hz, f_o+10kHz

****phase noise is identical to that of the internal precision OCXO except during periods of frequency correction which cause a phase shift and therefore degradation of phase noise performance.***

1PPS accuracy	*±50ns*

OCXO performance - holdover

After initial warm up and GPS lock, and if lock is subsequently lost, the PT626 - GPS module provides r.f. output accuracy from the previously disciplined internal precision OCXO. The retention and application of the discipline data allows the OCXO set accuracy to be maintained and r.f. output is then a function of the OCXO performance. A fast return to disciplined performance is assured when satellite data is again available.

Performance during holdover:

r.f. output	*10.000MHz*
holdover stability	*±0.02ppm max.(-40+70)°C, after 30 days continuous operation*
short term ageing	*±2 x 10^{-10} max. per day after 30 days continuous operation*
long term ageing	*±0.05ppm max. per year after 30 days continuous operation*
against V_{cc} change	*±0.002ppm max. for V_{cc} ±5%*
phase noise:	
single sideband	*130dBc/Hz, f_o +10Hz*
1Hz bandwidth	*150dBc/Hz, f_o +100Hz*
	155dBc/Hz, f_o +1kHz
	160dBc/Hz, f_o+10kHz

Generic specification:

power supplies:	
supply voltage	*+12Vd.c.*
start up current	*450mA max. -40°C*
quiescent current	*250mA max. +25°C*
output level	*Sine wave; +10dBm ±3dBm, 50Ω*
harmonics	*<-50dBc*
spurious	*<-90dBc*
PPS output	*LVCMOS*
lock 1 levels	*LVCMOS*
lock 2 levels	*LVCMOS*
OCXO warm up time	*5 minutes max. to within ±0.1ppm of nominal*
insulation resistance	*500MegΩ min., 100Vd.c.*
calibration trim	*±1ppm typical, if fitted*
operating temperature	*(-40 +70) °C*
storage temperature	*(-40 +125)°C*
marking	*part number, frequency, date code, serial number*

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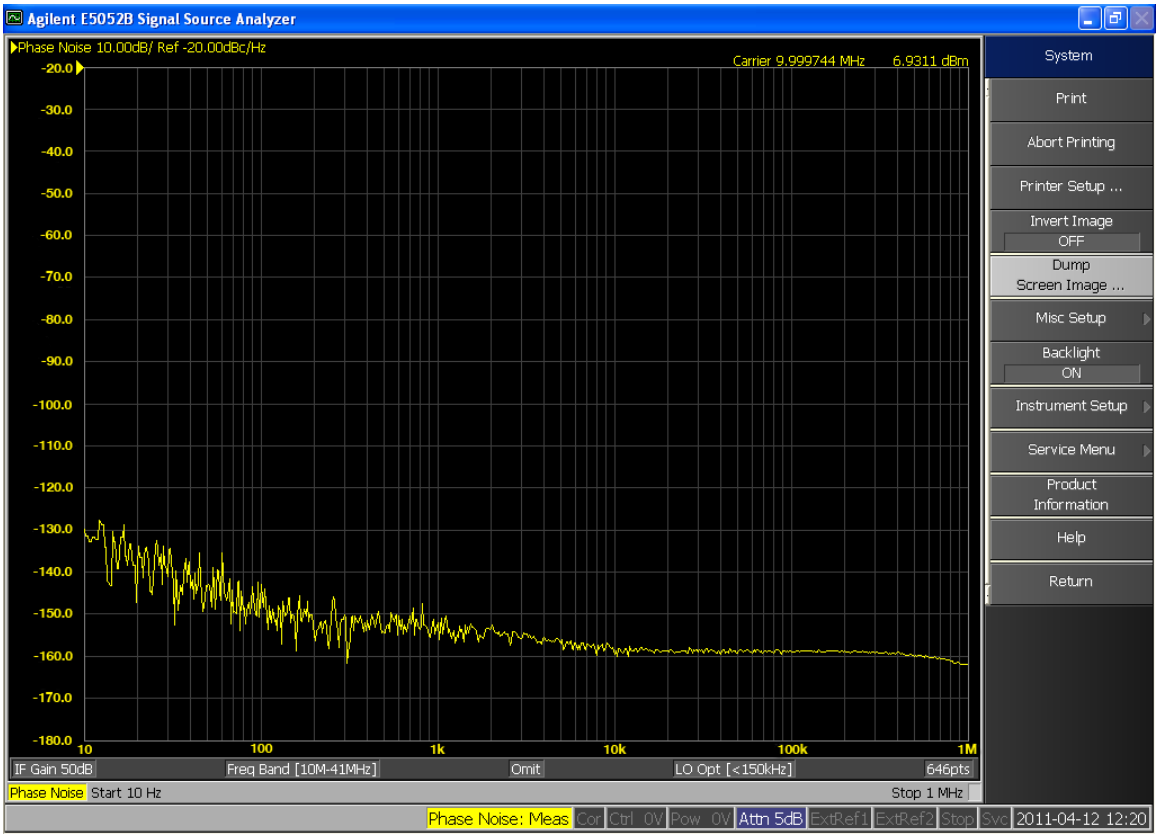
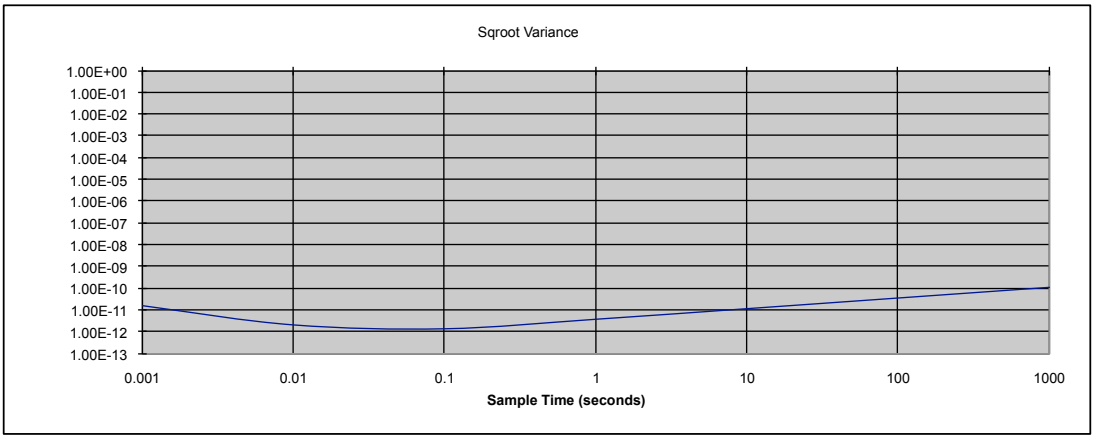
Typical 10.000MHz internal OCXO phase noise performance



Allan Variance calculation from typical internal OCXO phase noise



Ref: David W. Allen, "Time and Frequency (Time-Domain) Characterization, Estimation, and Prediction of Precision Clocks and Oscillators"

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