

SC Cut Oven-controlled Quartz Oscillator



- Phase noise -110dBc/Hz @ 1Hz (10MHz)
- Phase noise -123dBc/Hz @ 1Hz (5MHz)
- Stability $2 \times 10^{-12}/s$ ($8 \times 10^{-13}/s$ in benign environment) (10MHz)
- Stability $5 \times 10^{-13}/s$ (5MHz)

1...100MHz Distribution Amplifier



- ❑ For NMI applications
- ❑ Exhibits low 1/f AM & PM noise

A Fully Specified, 1–20MHz Low Cost Distribution Amplifier



- ❑ Low cost
- ❑ Comprehensive Specification
- ❑ Excellent Short Term Stability & Phase Noise
- ❑ 1MHz – 20MHz Bandwidth

Fully Specified, Low Cost, Desktop **Distribution Amplifier**



- ❑ Compact Desktop
- ❑ 1MHz–20MHz Bandwidth
- ❑ Comprehensive Specification
- ❑ Excellent Short Term Stability & Phase Noise

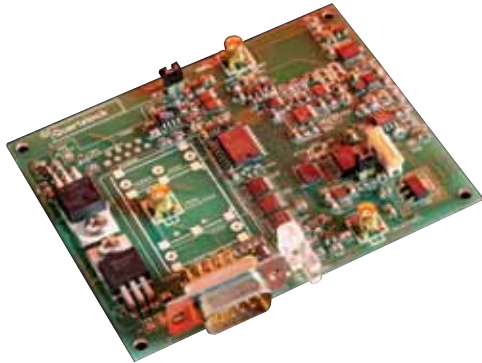
OEM 1PPS Timing Module



Now available as a complete instrument

- ❑ Compact form factor
- ❑ License available
- ❑ Very fast lock to GPS

DPLL, DDS Active Noise Filter



- ❑ 1MHz to 40MHz output frequency
- ❑ 4mHz to 500mHz PLL bandwidths
- ❑ Compact OEM board for a wide range of applications

Active Noise Filter Atomic Clock Clean up Oscillator



- ❑ 1MHz to 40MHz output frequency
- ❑ 4mHz to 500mHz PLL bandwidths
- ❑ Primary reference compatible

Signal Stability Analyzer



- ❑ Very high resolution: <math><50\text{fs}</math> single shot (5 and 10MHz)
- ❑ Very low noise floor: <math><5 \times 10^{-14}</math> @ 1s
- ❑ Selectable filters, resolutions and tau
- ❑ Ultra-fast measurement time
- ❑ 200Hz bandwidth

GPS Timing & Frequency Reference



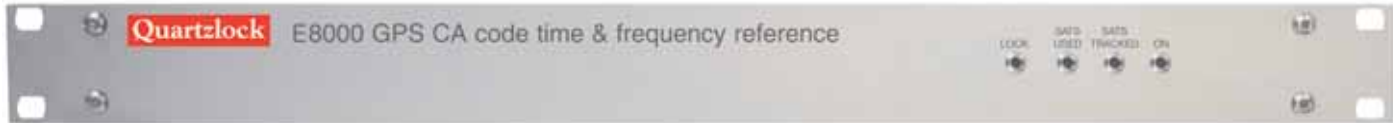
- ❑ Accurate to 25ns RMS UTC
- ❑ No Drift
- ❑ High Stability
- ❑ Internationally Traceable Standard
- ❑ RS232 / USB

GPS Time & Frequency Reference



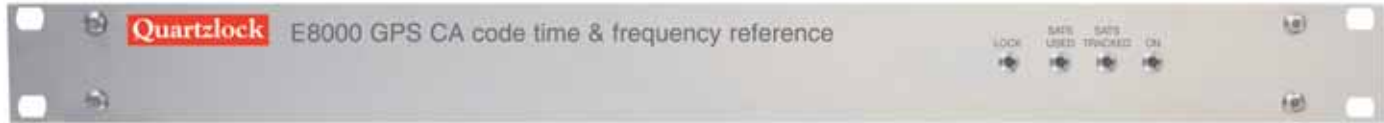
- ❑ -110dBc/Hz @ 1Hz offset Phase Noise
- ❑ Internationally Traceable Standard
- ❑ Accurate to 25ns RMS UTC
- ❑ No Drift
- ❑ RS232 / USB NTP

GPS Master Clock Very Low Noise Frequency & Timing Primary Reference Source



- ❑ Phase Noise is -110dBc/Hz@1Hz offset as standard
- ❑ Stability (AVAR) is $8 \times 10^{-13/s}$ typically
- ❑ Accuracy 25us, 100us/day holdover
- ❑ RS232 / USB NTP multiple outputs and frequency option

GPS Disciplined Rubidium Time & Frequency Reference



- ❑ No drift
- ❑ Internationally traceable standard
- ❑ 110dBc/Hz @ 1Hz phase noise option
- ❑ Accurate to 25 Nanoseconds RMS UTC
- ❑ RS232 / USB NTP multiple outputs and frequency option

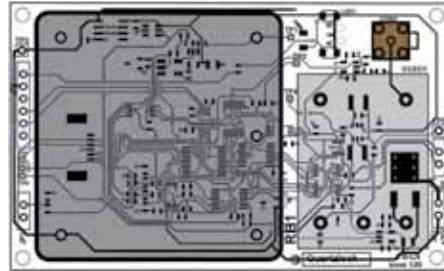
Rubidium Oscillator – \$668

Sub Miniature Atomic Clock (SMAC)



- ❑ Compact rubidium oscillator for a wide range of applications
- ❑ OCXO form factor and pin out
- ❑ Low power operation
- ❑ Ageing 5×10^{-10} /year

Very Low Noise Miniature Rubidium Oscillator Module



Actual size = 91 x 55 x 30mm

- Very low phase noise -110dBc/Hz @ 1Hz
- Low power operation
- Ageing 5×10^{-10} /year
- 10MHz and options

Low Profile Rubidium Oscillator



- ❑ High Performance Reference
- ❑ Three year warranty
- ❑ 24V dc 13W
- ❑ Excellent stability & drift out to 1hr & 1day

Ultra Low Noise Rubidium Oscillator



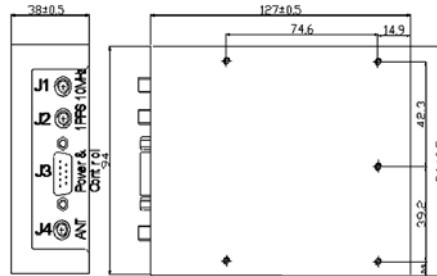
- 10MHz standard version has -110dBc/Hz @ 1Hz phase noise
- Uses Quartzlock Digital PLL DDS Clean-up Loop technology
- 5MHz option has -123dBc/Hz @ 1Hz offset
- 100MHz option has -180dBc/Hz noise floor

Miniature Rubidium Oscillator



- ❑ 1PPS Discipline I/O Sync
- ❑ 12V dc 8W
- ❑ High Performance Reference, exhibits excellent drift per hour and per day

GPS Disciplined Rubidium Oscillator



- ❑ Low Phase Noise
- ❑ High Short Term Stability
- ❑ RS232C Digital Monitor & Control

Rubidium Frequency Reference

A7-MX using A10-MX as reference



A7-MX

A10-MX

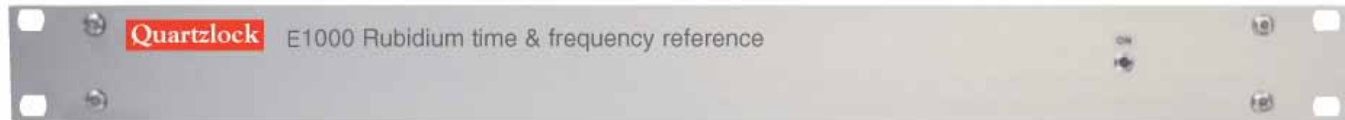
- ❑ Low Phase Noise
- ❑ Ageing $<5 \times 10^{-10}$ /year
- ❑ High Precision Atomic Clock

Rubidium Time & Frequency Reference



- ❑ Low phase noise
- ❑ Ageing $<4 \times 10^{-10}$ /year
- ❑ High Precision Atomic Clock
- ❑ Excellent stability & drift / hour & day

Rubidium Frequency Reference



- Stability (AVAR) $8 \times 10^{-13}/s$ typically
- Low phase noise 110dBc/Hz offset as standard
- Drift $5 \times 10^{-10}/year$

Compact Portable Rubidium Frequency Reference



- ❑ > 2 hours battery operation
- ❑ Operates from car 12vdc output
- ❑ Less than 3 minute warm up
- ❑ Compact form factor 103x55x122mm <500g for a wide range of applications

Compact Desktop Rubidium Frequency Reference



- ❑ Compact light weight portable for a wide range of applications
- ❑ Fast warm time
- ❑ Low power operation
- ❑ 12V dc operation (ac plug top adaptor supplied)

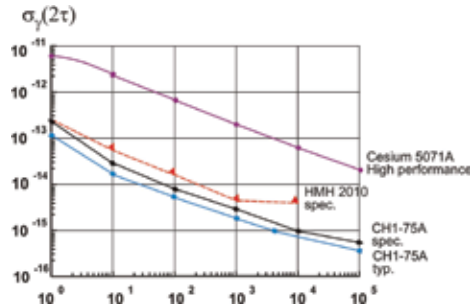
Rubidium Frequency Reference

Low Noise Multiple Outputs



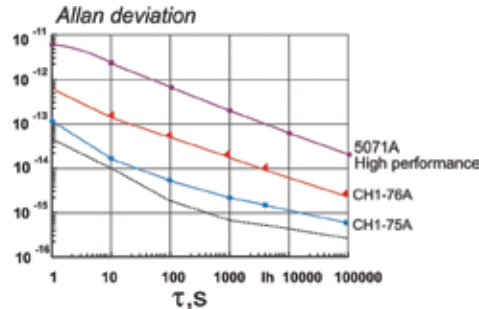
- ❑ Eight outputs
- ❑ -110dBc/Hz @ 1Hz phase noise
- ❑ Compact light weight portable for a wide range of applications
- ❑ Low drift 5×10^{-12} /day

Active Hydrogen Maser



- $<5 \times 10^{-13}$ frequency accuracy
- -100dBc/Hz @ 1Hz
- Autonomous automatic cavity tuning (without a second H-Maser)
- 1.5×10^{-13} @ 1s short term stability
- Same lifetime cost as Cs 5071A

Passive Hydrogen Maser



- $<8 \times 10^{-13}/s$ @ 1s short term stability
- $-100\text{dBc}/\text{Hz}$ @ 1Hz
- Small size and weight
- 15 year lifetime
- Half lifetime cost as Cs 5071A