

To Calibrate: Counters, Frequency Meters, Synthesisers, Communication Systems, Spectrum & Network Analysers

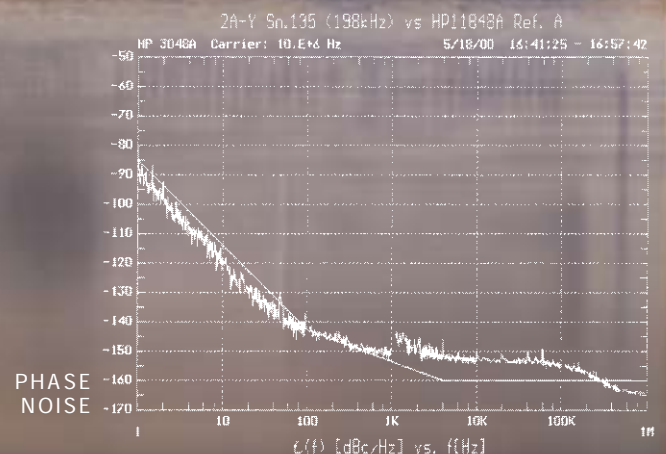
To Reference: VHF-UHF, PMR, Tetra, DTV, DAB & GSM

Better Than GPS\* performance!!!!



- 
- New 2000 Design
- 
- Traceable Performance
- 
- No Drift
- 
- No Warm Time
- 
- First NIST Traceable Company in EC

**Quartzlock** Have NIST traceable standards lab ( $5 \times 10^{13}$ )  
The only commercial lab equipped with Hydrogen Masers ( $5 \times 10^{14}$ )



### 2A-X&Y Tracking Receiver Frequency Standards

These frequency standards are intended for indoor use and operate on LF or VLF frequencies, within the reception range of suitably stable, high-power, long wave transmitters. This range often exceeds 1500 km. The 198 kHz Droitwich Radio 4 transmitter is locked, and is traceable, to well recognised national frequency standards via published data "post facto". The 198 kHz version is standard. Other LF transmissions are being considered.

Output Frequencies	1 MHz, 5 MHz & 10 MHz	1 MHz & 10MHz
Output Waveforms	HCMOS Squarewave	Sinewave
Output Levels	>2V ttl	+10dBm
Output Impedance	50 Ω	Harmonics -64dBc -70dBc
Output Stability $\sigma_y(\tau)$	Measurement ( $\tau$ )	2A-X xo 2A-Y ocxo
	1s	$8 \times 10^{-10}$ $3 \times 10^{-11}$
	10s	$2 \times 10^{-9}$ $8 \times 10^{-11}$
	100s	$4 \times 10^{-10}$ $5 \times 10^{-11}$
	1000s	$3 \times 10^{-11}$ $7 \times 10^{-12}$
Phase Noise dBc/Hz	@10kHz	-150 -153

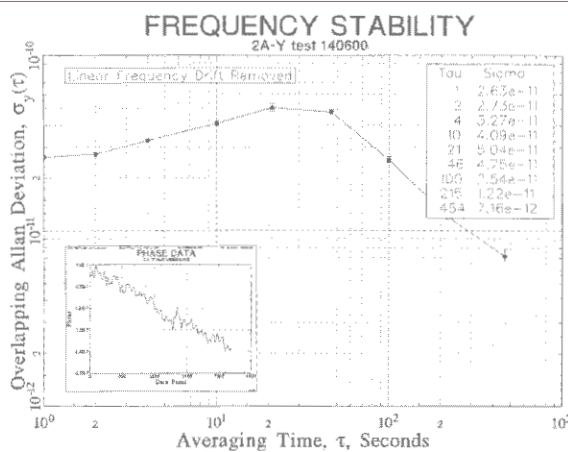
Stability is a measure of the quality of an oscillator, indicating how well an oscillator can produce the same frequency over a given period of time. It is the statistical estimate of the frequency fluctuations of a signal over a given time interval.

Output Accuracy (fractional frequency offset $\Delta f/f$ )	Measurement ( $\tau$ )	2A-X	2A-Y
	1s	$2 \times 10^{-9}$	$6 \times 10^{-11}$
	10s	$8 \times 10^{-10}$	$2 \times 10^{-10}$
	100s	$2 \times 10^{-10}$	$6 \times 10^{-11}$
	1000s	$9 \times 10^{-11}$	$2 \times 10^{-11}$

Frequency offset is a measure of how closely an oscillator produces its nameplate frequency, or how well adjusted the oscillator is. It does not say anything about the inherent quality of an oscillator.



This data launches the new 2A-X&Y products in the U.K for calibration, external reference of spectrum analysers, microwave network analysers, counter timers, radio communication monitors, TETRA radio test system, GSM and CDMA BTS commissioning and VHF/UHF PMR base station referencing. Recent tests prove good results at 2000km range!



#### History of 2A

The 2A and 2A-01 evolved over 25 years to a level where only a complete redesign could produce such a step change in performance. Externally, the new 2A series is identical to the older models, but circuitry is entirely new. This has brought the 2A series into the 21st century and will continue to make it the attractive choice for low cost, medium performance applications.

#### Active Loop Antenna (Patent 'H' Field, active indoor 0.9mØ)

A loop antenna supplied with all units is the best available for this application, achieving excellent temperature performance with no significant phase effects. In comparison, ferrite rod aerials (previously used) are temperature sensitive and contribute significantly to phase noise. Frequency response is from 30....300kHz enabling use at 40kHz (Japan) 60kHz USA/UK, 77.5kHz Germany, 162kHz France & 198kHz (Droitwich) U.K.

This antenna will find many communications & surveillance applications (30kHz-30MHz option available).

#### RUBIDIUM COMPONENTS

- 1x10<sup>10</sup> year aging • 10MHz + 7dBm
- No heat sink required • 3x10<sup>10</sup>/100s
- Low harmonic & spurious • Voltage tune
- LPRO & FRS second source • Low phase noise
- GSM Cellular, GPS & BTS, CDMA
- Frequency standard for calibration, metrology & telecoms



TX REF TELECOMS

#### RUBIDIUM BENCH/RACKMOUNT

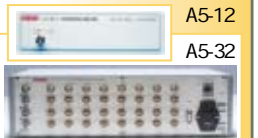
- 1, 5 & 10MHz outputs & 1pps
- Six outputs any single frequency
- 10MHz + 7dBm output • 14 outputs
- Sine & squarewave • EI & TI options
- ac and dc supply inputs • Low phase noise • GPS sync lock input
- Frequency standard for calibration, metrology & telecoms



CAL TELECOMS QA

#### DISTRIBUTION AMPLIFIERS

- 1....4 inputs • 4....48 outputs (6 models) (0.1....20MHz Pulse & Squarewave version available)
- Hydrogen Maser compatible performance
- 1....100MHz frequency range
- +13dbm output • 10ps/C phase stab



CAL TELECOMS QA

#### GPS-Rb (GPS + GLONAV soon)

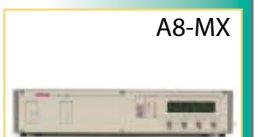
- Frequency & time standard engine for calibration, metrology & telecoms
- <math>5 \times 10^{-11}</math>/5....33days • 5ns accuracy
- 1x10<sup>13</sup>/1000s • Up to 12 outputs
- Replaces Cesium at only 15% of Cs price!
- Costs less than 30% of Cs physics package alone!
- Unique carrier phase tracking (we do not use a navigation engine)



CAL TELECOMS QA

#### GPS-BVA

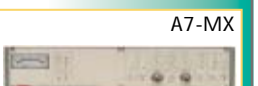
- Top frequency standard for calibration, metrology & telecoms stratum 1
- No Cesium wear-out physics pack
- Lower cost & 10/100 times more stable than high performance Cs
- 2x5MHz & 1pps outputs (10MHz & 10.23MHz options)
- Stability 1x10<sup>-14</sup>d, 3x10<sup>-14</sup>h, 5x10<sup>-11</sup>/1000s 3x10<sup>-15</sup>/100s



METROLOGY TELECOMS

#### COMPARATOR/CALIBRATOR

- Drift <math>5</math>ps/hour •  $\Delta t$  resolution 0.3ps
- 1.5 x 10<sup>-16</sup>(100s) Resolution
- The world's best comparator
- Automatic, ATE, PC controlled
- A7, tic & analysis software supplied - Stable 32
- World's highest resolution and fastest measurement time



METROLOGY CALIBRATOR