Quartzlock

A0

1.5x10^{15} Resolution
10^{-14} Stability
Offset 5x10^{-14}
with A8 GPS syc

Precise Frequency & Phase

Generation
Measurement
Distribution

A5 Distribution Amplifier

A6 Frequency Converter

A7 Measurement System

CH1-76 Passive Hydrogen Maser

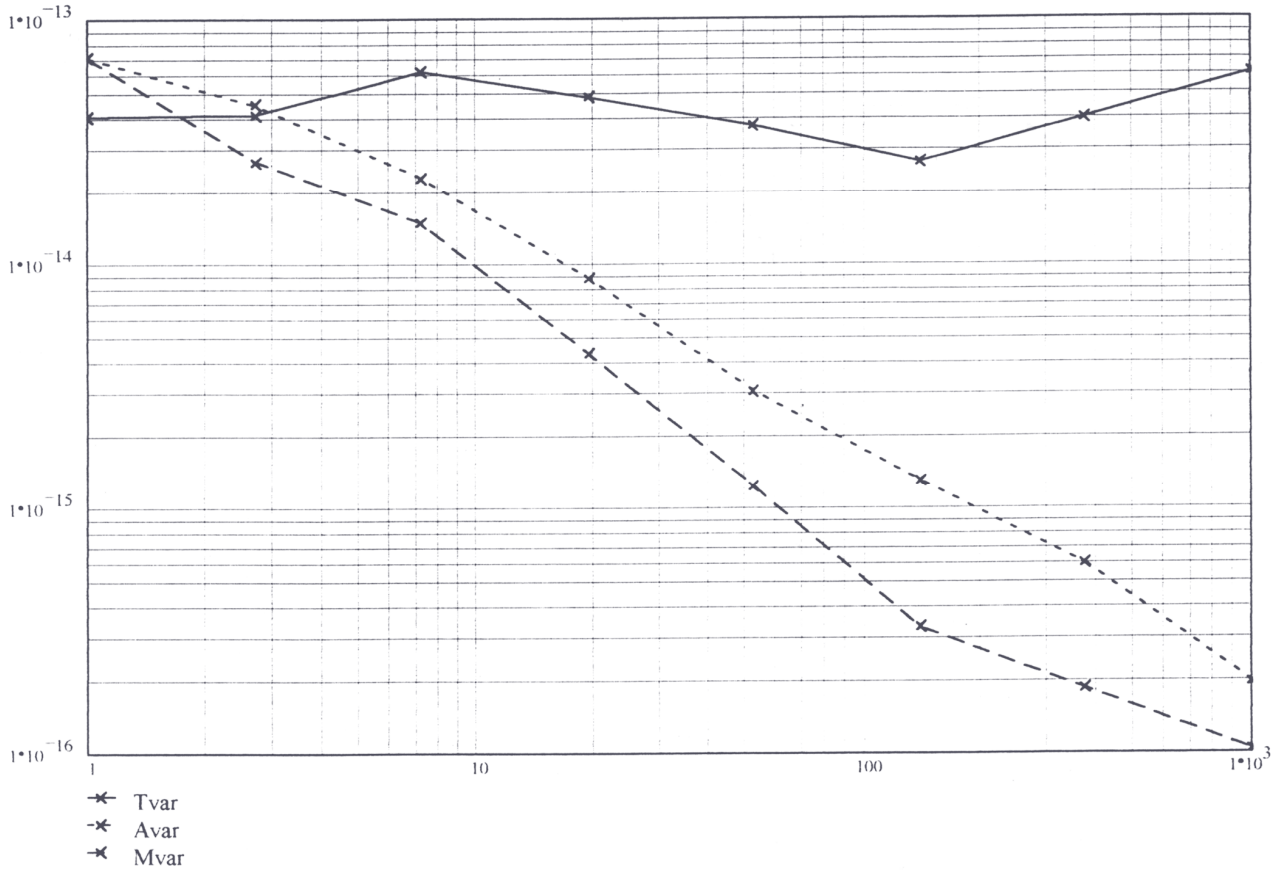
A Passive Hydrogen Maser system with performance compatible comparator & distribution instruments

-165dBc-165dBc/Hz @ 100Hz phase noise
130dB isolation
1 x 10^{-13}/s stability
<10ps/°C phase stability
300f_S time stability

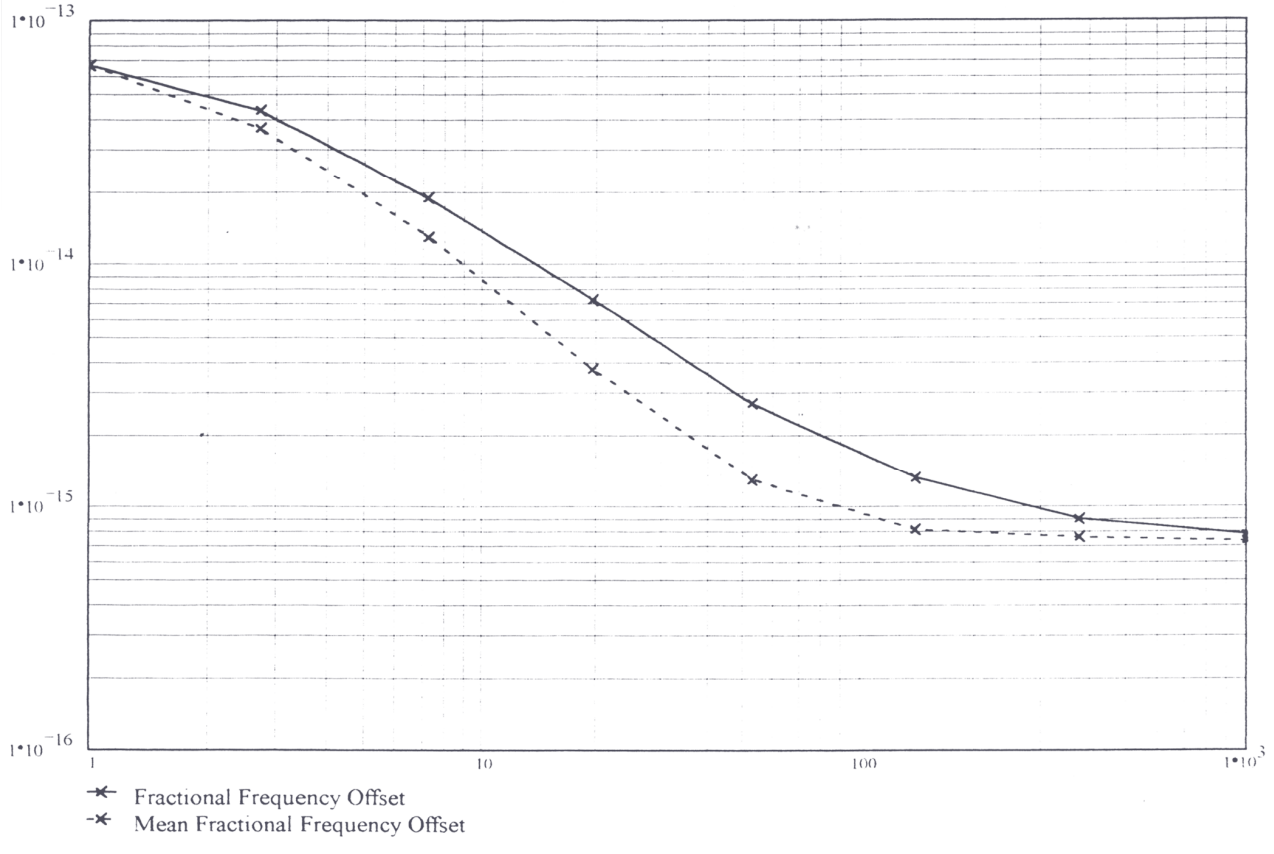
JULY 1998

ISO 9001

Quartzlock model A7 zero drift short term stability



Model A7 zero drift



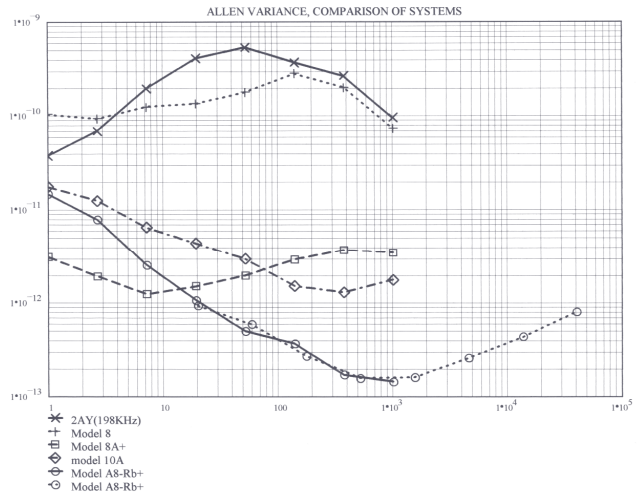
Graph drawing

a := READPRN(trace1) b := READPRN(trace2) c := READPRN(trace3) d := READPRN(trace4)

i := 0.. rows(a) – 1 e := READPRN(trace5)

$\tau_a := a^{\langle 2 \rangle}$ $\tau_b := b^{\langle 2 \rangle}$ $\tau_c := c^{\langle 2 \rangle}$ $\tau_d := d^{\langle 2 \rangle}$ f := READPRN(trace6)

$\tau_f := f^{\langle 2 \rangle}$ $\tau_e := e^{\langle 2 \rangle}$

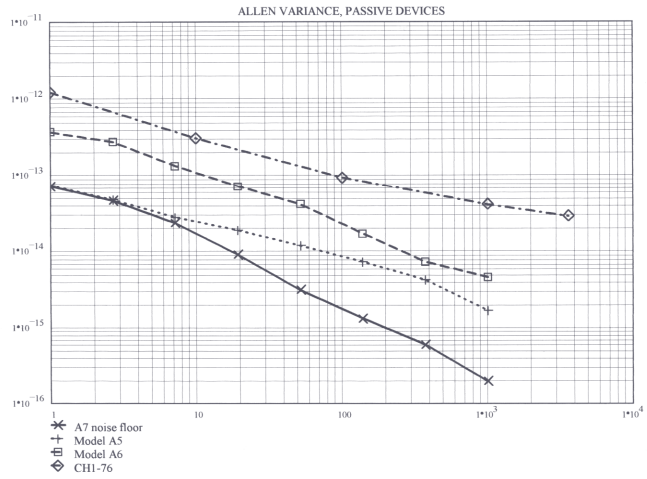


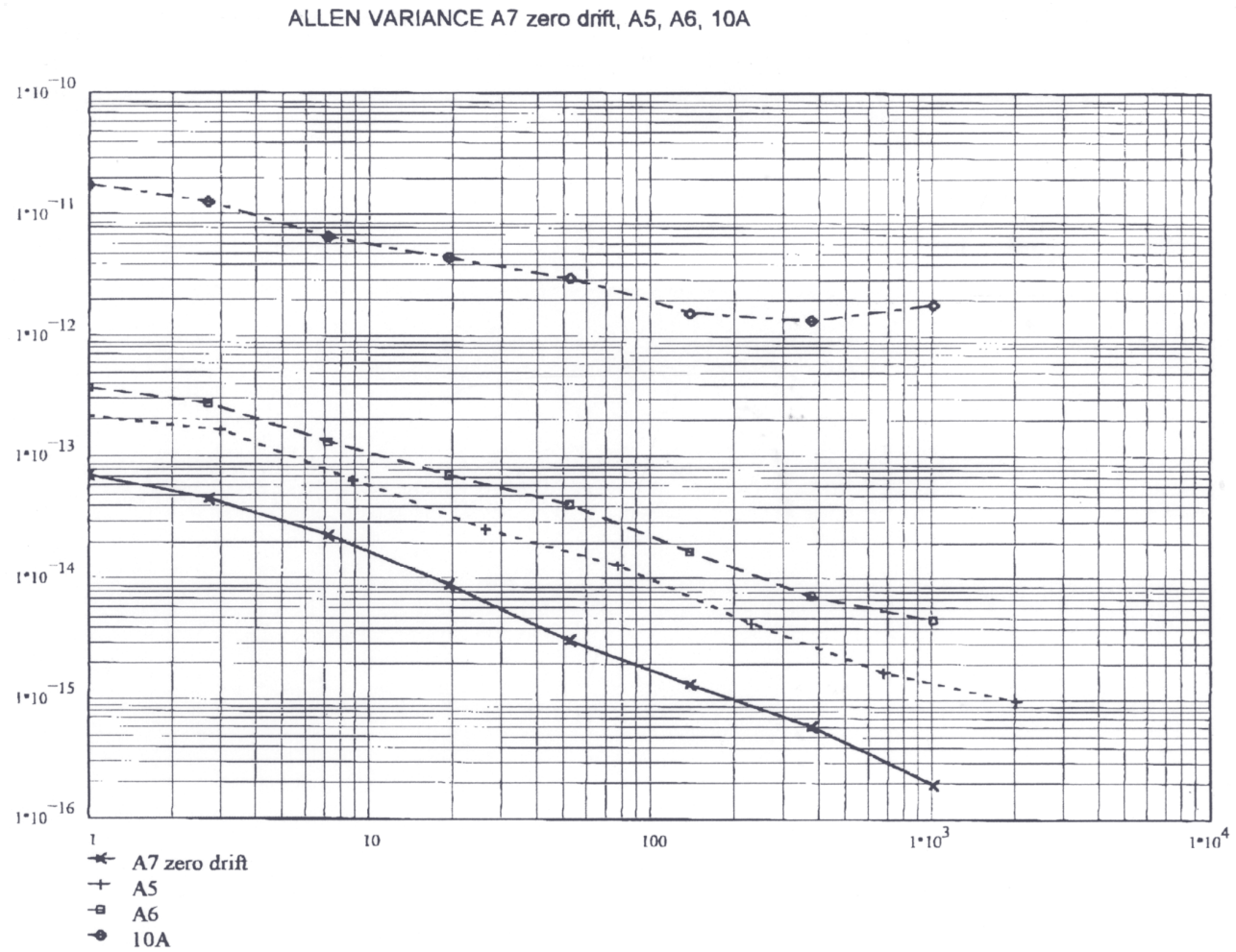
Graph drawing

a := READPRN(trace1) b := READPRN(trace2) c := READPRN(trace3) d := READPRN(trace4)

i := 0.. rows(a) – 1

$\tau_a := a^{\langle 2 \rangle}$ $\tau_b := b^{\langle 2 \rangle}$ $\tau_c := c^{\langle 2 \rangle}$ $\tau_d := d^{\langle 2 \rangle}$





FREQUENCYSTANDARD COMPARISON (Typical Results)											
Standard	**2A**	**2A-X/Y**	**A5**	**A6**	**A7**	**A8**	**8(A)+**	**8A**	**8A-Rb**	**10A**	**PHM**
	198	162 198									
Measurement Time t sec	Off Air & Tracking Receivers		Distribution Amplifier	Frequency Converter	Frequency Phase Comparator	Temp Controlled GPS Rb	GPS Disciplined OCXOFreq & Time Standards		GPS Disciplined Rubidium	Rubidium Frequency Standard	Passive Hydrogen Maser
1	5.10^{9}	$3.10^{9}/7.10^{10}$ $2.10^{-10}/6.10^{11}$	10^{-14}	10^{-13}	10^{-14}	2.10^{-11}	$<5.10^{-12}$	1.10^{10}	2.10^{-11}	2.10^{-11}	1.10^{-12}
10	3.10^{9}	$3.10^{9}/2.10^{9}$ $7.10^{-10}/3.10^{-10}$	10^{-14}	10^{-13}	10^{-14}	2.10^{-12}	$<2.10^{-12}$	1.10^{-10}	5.10^{-12}	6.10^{-12}	3.10^{-13}
100	7.10^{10}	$2.10^{9}/3.10^{10}$ $7.10^{10}/3.10^{-10}$	10^{-14}	10^{-14}	10^{-15}	4.10^{-13}	$<3.10^{-12}$	2.10^{-10}	2.10^{-13}	2.10^{-12}	9.10^{-14}
1000	5.10^{10}	$7.10^{11}/4.10^{11}$ $2.10^{10}/5.10^{11}$	10^{-15}	10^{-15}	10^{-16}	2.10^{-13}	$<5.10^{-12}$	8.10^{-11}	10^{-13}	2.10^{-12}	4.10^{-14}
10^{4}						4.10^{-13}	1.10^{-11}		10^{-13}		3.10^{-14}
10^{5}						2.10^{-13}			2.10^{-13}	10^{-13}	9.10^{-16}
LTS average offset(GPS)						$<5.10^{-14}$			5.10^{-14}		5.10^{-15}

Typical Allan Variance Frequency Stability Comparison

KVARZ HYDROGEN MASERS					QUARTZLOCK		
τ_1^{sec}	CH1-75	CH1-76	CAESIUM HIGH PERF.	CAESIUM STD	GPS-Rb typ A	GPS-Rb typ B	GPS-Rb typ C
1	2.10^{-13}	$1.5.10^{-12}$	$5x10^{-12}$	$5.6x10^{-11}$	$x10^{-12}$	$6x10^{-12}$	$x10^{-11}$
10	3.10^{-14}	5.10^{-13}	$3.5x10^{-12}$	$2.3x10^{-11}$	$2x10^{-12}$	$4x10^{-12}$	$x10^{-11}$
100	5.10^{-15}	$1.5.10^{-13}$	$8.5x10^{-13}$	$5.6x10^{-12}$	$4x10^{-13}$	$5x10^{-13}$	$x10^{-12}$
1h	1.10^{-15}	3.10^{-14}	$2.7x10^{-13}$	$1.8x10^{-13}$	$2x10^{-13}$	$5x10^{-13}$	$x10^{-12}$
1k	5.10^{-15}	1.10^{-14}	$4x10^{-14}$	$2x10^{-13}$	$5x10^{-14}$		
$k	175	65	65/100	50	20	15	10
					A8-RB		
					A	B	

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