

Test-Setup - Sources

- 1) PPS signal from Trimble Thunderbolt receiver.
- 2) HP3326A in pulse mode, generating a 1000Hz square wave with 5% duty cycle and 3V amplitude.
- 3) Trigger level for all instruments manually set at 0.5V and rising edge.
- 4) Both channels (start,stop) set at 50 Ohm impedance.

Test-Setup - Configuration

All the instruments measure the delay due to a 90ft RG58A/U. The signal from the source is applied to the start input and the cable. The stop input is connect to the other end of the cable.

The cable delay measured with a Tektronix DSA602A was $\sim 139\text{ns}$, or 5ns/m , which is within the specification of the RG58A/U.

The cable is in a spool kept together by several cable ties and in a metallic box.

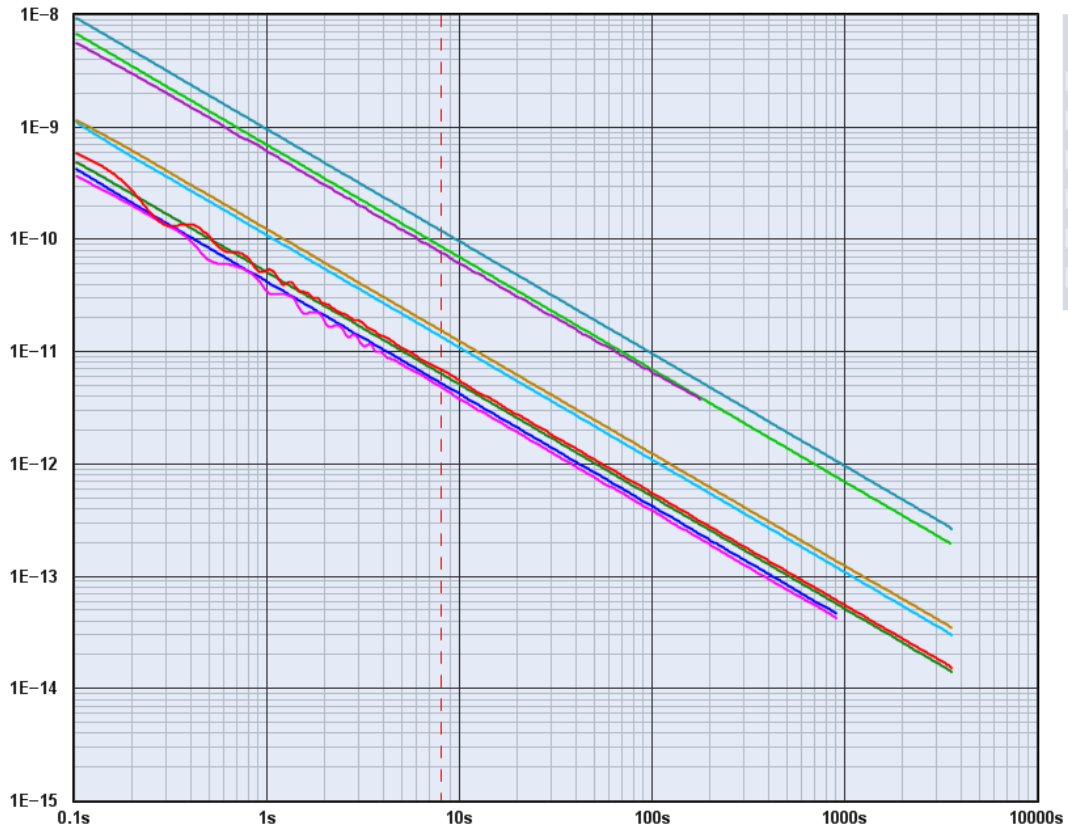
Instruments Tested

- 1) HP5335A in time interval mode. 10MHz TB external reference.
- 2) HP51131A in time interval mode. 10MHz TB external reference.
- 3) HP5370A in time interval mode. Internal reference.
- 4) HP5370B #1 in time interval mode. Internal reference.
- 5) HP5370B #2 in time interval mode. Internal reference.

Notes

- HP5370A and HP5370B #1 show an Adev at one second of $\sim 41.7 \cdot 10^{-12}$ and $\sim 51 \cdot 10^{-12}$ both comparable to what John Ackerman measured ($39.17 \cdot 10^{-12}$).
- HP5370B #2 had a somewhat larger Adev at one second $100 \cdot 10^{-12}$. It is not clear to me if this still meets specifications or if this particular instrument is in need of calibration.
- HP51131A has an Adev at one second of $\sim 700 \cdot 10^{-12}$ that I believe is within the time interval specifications for this instrument.
- HP5335A has an Adev at one second of $\sim 1000 \cdot 10^{-12}$ or 10^{-9} . I believe that in this case the measured value is within specifications.
- The wiggles for the HP5370A and HP5370B #1, when driven, by TB PPS signal seem to be due to some type of interference.

Allan Deviation $\sigma_y(\tau)$



Tau	Sigma(Tau)
1s	4.17E-11
2s	2.11E-11
4s	1.05E-11
8s	5.26E-12
10s	4.23E-12
20s	2.11E-12
40s	1.05E-12
80s	5.26E-13
100s	4.23E-13
200s	2.09E-13
400s	1.05E-13
800s	5.30E-14

Trace	Notes	Input Freq	Sample Interval	ADEV at 8s	Duration	Acquired	Instrument
HP5370A Int. REF	Source HP3326A	1000 Hz	0.100 s	5.26E-12	1h 0m 0s	36000 pts	HP 5370A
HP5370A Int. REF	Source TB PPS	1 Hz	0.100 s	4.86E-12	1h 0m 0s	36000 pts	HP 5370A
HP5370B1 Int. REF	Source HP3326A	1000 Hz	0.100 s	6.40E-12	4h 0m 0s	144000 pts	HP 5370B1
HP5370B1 Int. REF	Source TB PPS	1 Hz	0.100 s	6.92E-12	4h 0m 0s	144000 pts	HP 5370B1
HP5370B Int. REF	Source HP3326A	1000 Hz	0.100 s	1.37E-11	4h 0m 0s	144000 pts	HP 5370B2
HP5370B Int. REF	Source TB PPS	1 Hz	0.100 s	1.55E-11	4h 0m 0s	144000 pts	HP 5370B2
HP53131A TB REF	Source HP3326A	1000 Hz	0.100 s	8.68E-11	4h 0m 0s	144000 pts	HP53131A
HP53131A TB REF	Source TB PPS	10 MHz	0.100 s	7.63E-11	3 h	7413 pts	HP53131A
HP5335A TB REF	Source HP3326A	1000 Hz	0.100 s	1.20E-10	4h 0m 0s	144000 pts	HP 5335A