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To: UVLBI Group
From: Alan E.E. Rogers and Tao Mai
Subject: Temperature coefficient of Agilent E8257D Synthesizer.

The Agilent E8257D is a key component in many millimeter VLBI set-ups since it is used to produce a microwave reference frequency from the 10 MHz output of a hydrogen maser frequency standard. In order to avoid degrading the output of the frequency standard this synthesizer may need to be in a temperature controlled environment.

To access degree of environmental control needed we measured the temperature coefficient of phase at a frequency of 11 GHz. The measurements were obtained using the set-up shown in Figure 1.

We also reversed the roles of each E8257D and found approximately the same coefficient for each synthesizer. While we only measured the temperature coefficient at 11.2 GHz we expect the coefficient to be independent of frequency in the microwave range

The results were as follows

Temperature coefficients for both Agilent E8257D synthesizers were measured roughly by matching a straight line with the plot of delay vs. temperature.

The numbers are approximately:

$-6.5 \pm 3 \text{ ps} / ^\circ\text{C}$ for the MIT-0413840 machine

$-8.8 \pm 3 \text{ ps} / ^\circ\text{C}$ for the MIT-0429607 machine

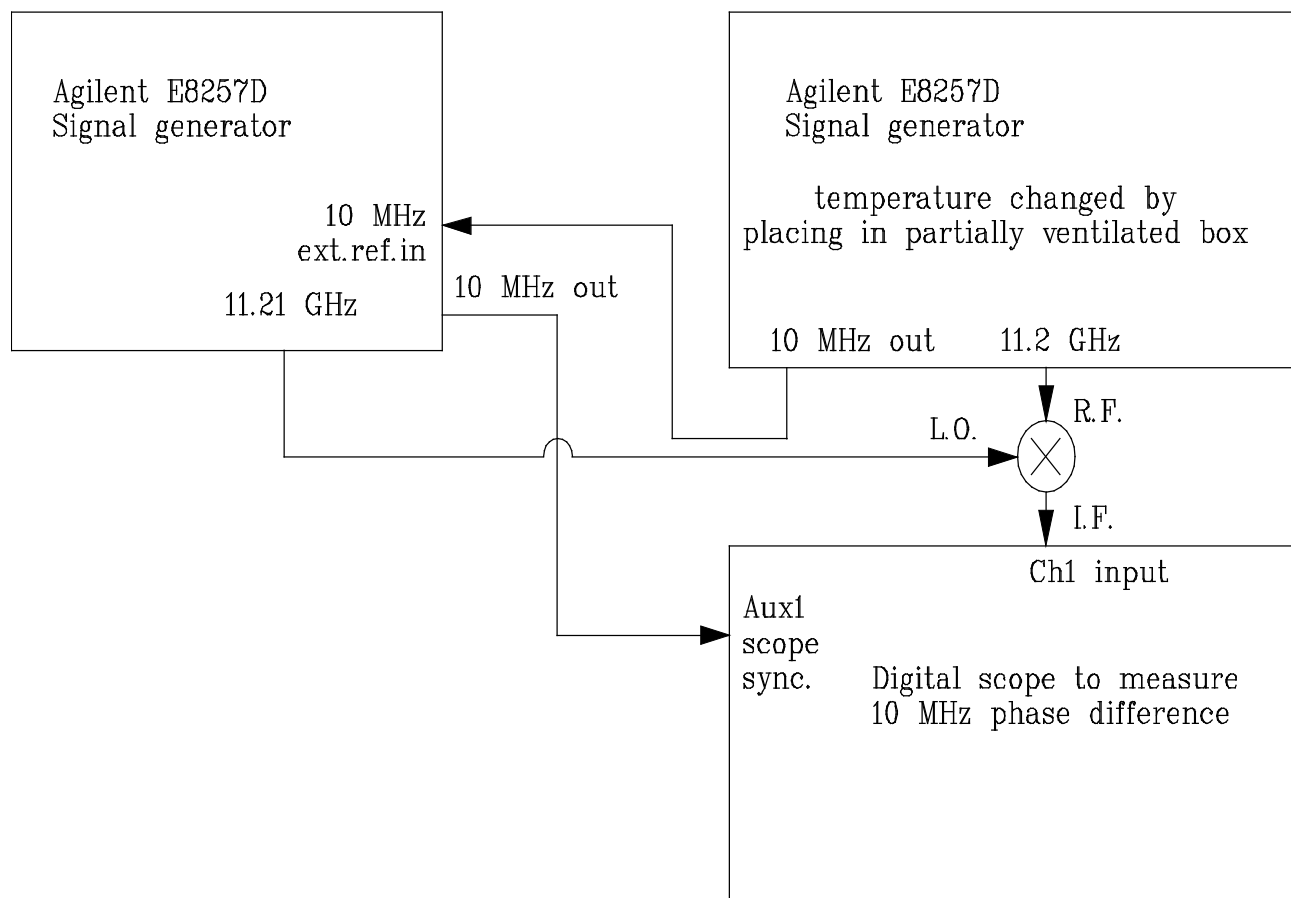


Figure 1. Test set-up for measurement of phase delay change with temperature.