

Crystal Test Fixture for DG8SAQ VNWA and N2PK VNA

as well as other Vector Network Analyzers.

A redesign by OZ7OU of the K8ZAO Crystal Test Fixture using SMA connectors

Preface:

The K8ZAO Crystal Test Fixture uses BNC connectors and I wanted a version with SMA connectors in addition to have the facility to insert a series capacitor e.g. 30pF to measure the antiparallel resonance frequency of the crystal. This facility allows to measure the resonance frequency if the crystal is oscillating on the parallel resonance frequency as opposed to the series resonance frequency measured with the unmodified fixture.

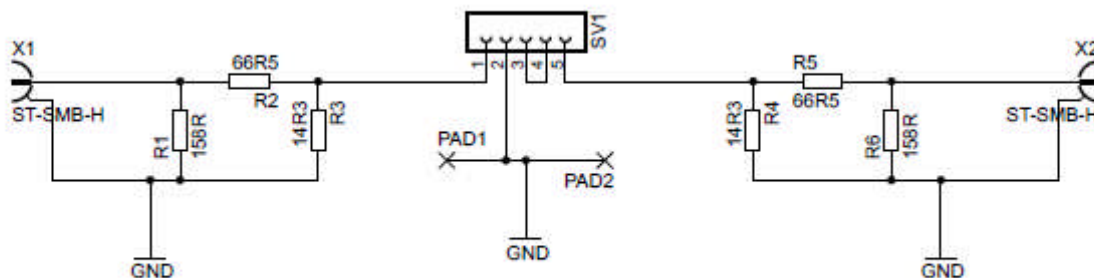
When using this Crystal Test adaptor, the Crystal drive level is so low it prevents heating the Crystal, and thus introducing a frequency shift. The adaptor is well suited for use with the VNWA Tool "Crystal Tester", however please note the "figure of merit" is almost 100 times less without the Test fixture. However the Testadaptor allows Thru measurements which is very educational !.

The frequency range is up to 200MHz and thus covering all practical purposes for a HAM. The frequency limit of 200MHz is due to the two attenuators introduced in the Test Fixture and dynamic range reduced and noise thus too dominant for the VNWA, above said frequency.

Reference is made to the article "Assembly and Usage Notes for the K8ZOA Crystal Test Fixture Revised for Version 1.2 PCB" on following link.:

<http://www.cliftonlaboratories.com/Documents/Assembly%20and%20Usage%20Notes%20for%20Crystal%20Test%20Fixture.pdf> and the article recommended within the document on following link.:

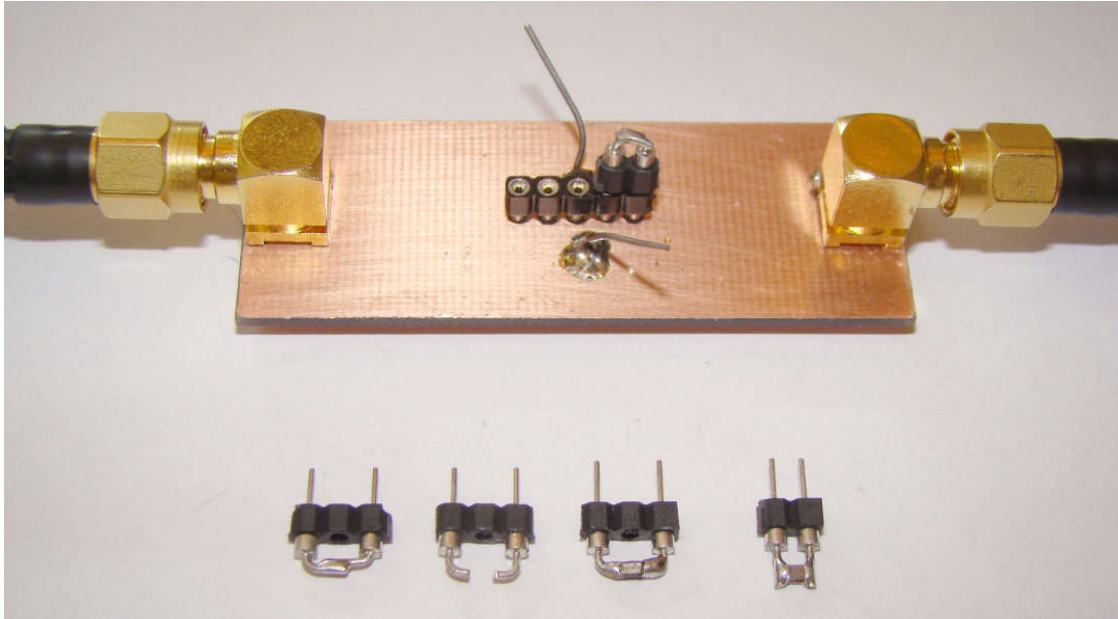
<http://www.cliftonlaboratories.com/Documents/Crystal%20Motional%20Parameters.pdf>



All resistors are SMD 0805 1%

The PCB layout files - made in Eagle - and all the Gerber files, drilling files etc. are to be found in a ZIP files called "X-Tal adaptor_V2" on the VNWA Yahoo Forum.

The redesign



SHORT OPEN LOAD 50 ohm 30pF adaptor

SHORT OPEN and LOAD adaptors used for SOL calibration. The 50ohm load consist of two 100ohm 0.1% SMD 0805 resistors, soldered into the gap of an OPEN adaptor.

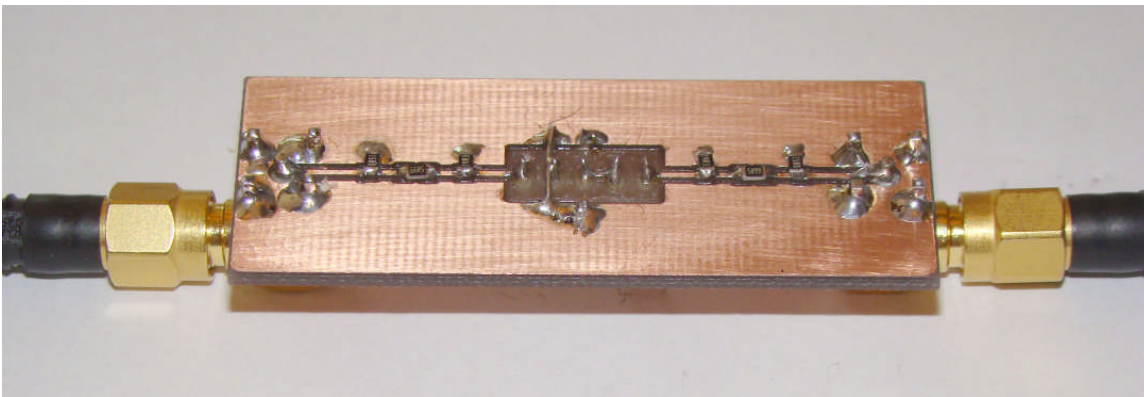
The OPEN adaptor is not used when calibrating for testing Crystals, but might be relevant when testing a SMD component soldered into an open "gap" adaptor.

Please note the 2 position SHORT adaptor, already fitted into the 5 positions socket terminal, to the right. This is the position where the 30 pF series capacitor is fitted in stead of the 2 position SHORT.

The Adaptors resistor and capacitor might be mechanically stabilized by a drop of epoxy.

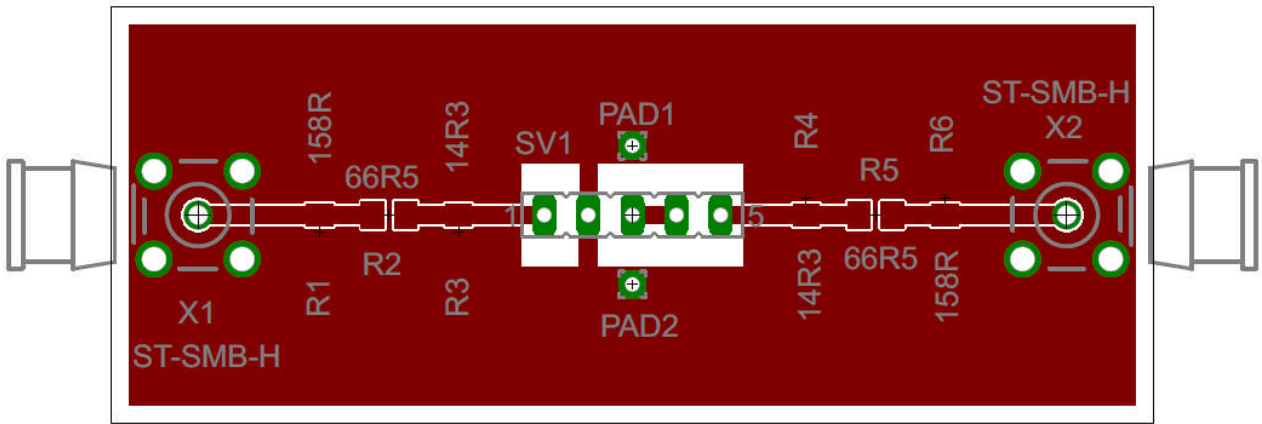
IMPORTANT NOTE:

During calibration for Crystal testing and S11 and S21 measurements is is important to calibrate the CrossTalk in addition to Thru and Thru Match as this eliminates the small parasitic capacitor in the Test Fixture (see the K8ZAO notes about this parasitic capacitor).



In the PCB layout the shorting to ground of pin 2 in the 5 position socket is done. He shown as a wire strap.

(The PCB shown is milled not etched and thus trace width not fully identical to the layout)



NB not to scale