

### HC49/S CRYSTAL TESTING

Frequency	Measurements		ERRORS (Hz)	
	HW-7	HW-16	HW-7	HW-16
<b>HC49/S in FT243</b>				
7.122000	7.12147	7.12208	-530	80
7.030000	7.02988	7.03012	-120	120
7.055000	7.05460	7.05500	-400	0
			<b>-350</b>	<b>67</b> Average Hz

<b>Old FT243 crystals</b>				
7.050	7.05012	7.05028	120	280
7.129	7.12934	7.12984	340	840
			<b>230</b>	<b>560</b> Average Hz

**Results: Mixed. FT243 appears always higher in frequency. The HC49/S depends. However, the HC49/S crystals in the HW-16 are almost spot on.**

Frequency	Measurements		ERRORS (Hz)		Colpitts Cs = 100pF
	Colpitts	Pierce	Colpitts	Pierce	
<b>HC49/S</b>					
7.122000	7.12109	7.12166	-910	-340	
7.030000	7.02920	7.02987	-800	-130	
7.055000	7.05417	7.05483	-830	-170	
<b>AVERAGE</b>			<b>-847</b>	<b>-213</b>	
<b>HC49/U</b>					
7.030	7.02818	7.02950	-1820	-500	
7.040	7.03780	7.03939	-2200	-610	
7.055	7.05284	7.05444	-2160	-560	
<b>AVERAGE</b>			<b>-2060</b>	<b>-556.67</b>	

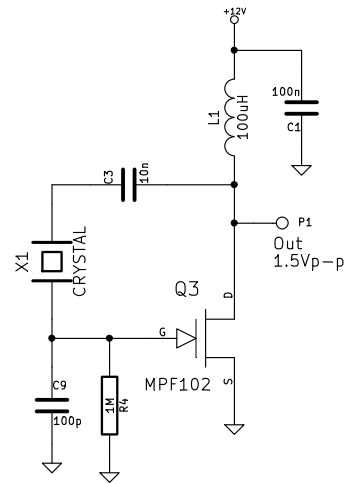
**Results: HC49/S crystals have a lower error offset**

Bend Test		HC49/U	HC49/S
Cs	Cp	Fout	Fout
10pF	none	7.03108	7.03063
22pF	none	7.02951	7.02983
47pF	none	7.02870	7.02944
100pF	none	7.02819	7.02920
200pF	none	7.02797	7.02910
200pF	10pF	7.02788	7.02906
200pF	22pF	7.02780	7.02903
200pF	47pF	7.02769	7.02898
200pF	100pF	7.02757	7.02893
<b>Total Bend Hz</b>		<b>3510</b>	<b>1700</b>

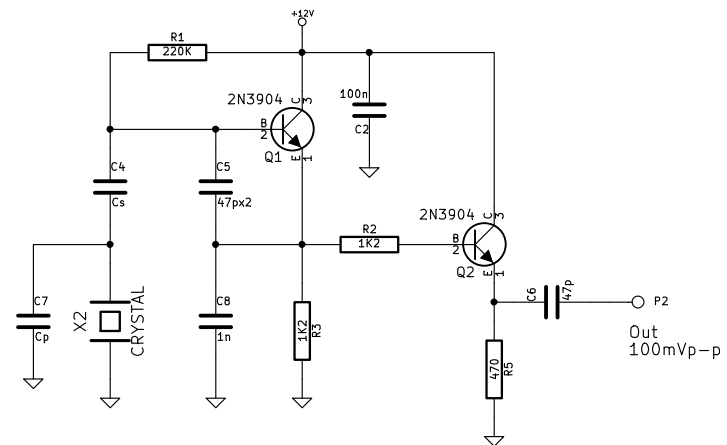
**Results: HC49/S do not bend as much (as predicted in readings)**

**Specifications:**

Holder	HC49S
Load Capacitance	18pF
Temperature	-20/+70C
Tolerance	30ppm
Stability	50ppm



Pierce Oscillator



Colpitts Oscillator

Default Values:  
 Cs = 100pF  
 Cp = Not Connected

kc9on jwC	
<b>3rd Planet Solar</b>	
File: Crystal-Testing.sch	
Sheet: /	
<b>Title: Crystal Oscillator Testing</b>	
Size: USLetter	Date: 23 jan 2015
KiCad E.D.A. eeschema (2013-07-07 BZR 4022)-stable	<b>Rev: 1</b>
	Id: 1/1