QUADRATURE CRYSTAL OSCILLATOR. A3080 PS/AA/87 – 8

Test and Alignment Procedure.

David Shaw PSAA June 1987

Test Equipment required.

Frequency Counter	HP5308
Spectrum Analyser	HP8566a
DC Voltage Standard	AN3100
Quadrature VCO	A3073
1 to 4kHz for AC	(10 to 30kHz for AA)

1) Apply power and allow the units to warm up for 30 minutes.

2) Connect the Frequency Counter to the **CRYSTAL FREQUENCY** output and measure the frequency.

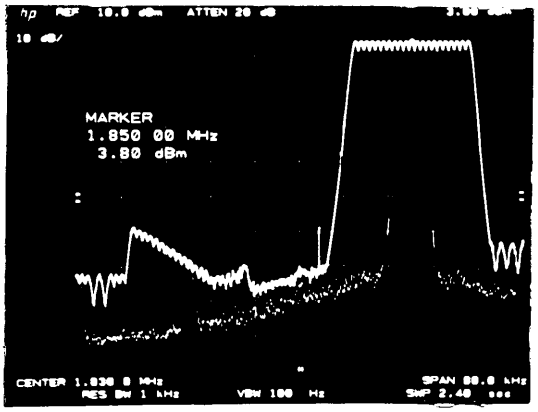
3) Adjust to the exact value using the **FREQ. TRIM** potentiometer. 1586.7kHz for AC.
(1830kHz for AA).

4) Connect the Quadrature VCO to the **COS** and **SIN** inputs of the Crystal Oscillator.
Connect the DC Voltage Standard to the QVCO **INPUT.** Set to 0V output.

5) Connect the Spectrum Analyser to one output , terminating the others in 50Ω.
Set the Spectrum Analyser as follows.

PRESET		
REF	: 10dBm	
CENTER	: 1586.7kHz	(1830kHz for AA)
SPAN	: 10kHz	(80kHz for AA)
RES BW	: 100Hz	(1KHz for AA)

6) The Lower sideband , Carrier and Upper sideband should be seen



AC	1584.2kHz	1586.7kHz	1589.2kHz
AA	1810.0KHz	1830.0kHz	1850.0kHz

7) Adjust the Balance potentiometers **P3** and **P4** to minimise the Carrier feedthrough ≥ − 50dBc.

8) Adjust the filter equalisation components **C8** and **P2** to minimise the Lower sideband spectral line level ≥ − 50dBc.

9) Select the **PEAK HOLD** feature on the Spectrum Analyser . Step the Voltage Standard output from − 10V to + 10V , into the QVCO. Verify that the Lower sideband level remains ≥ 50dB below the Signal output over the whole range.As in the photo above.

10) Check the Signal output level at each of the outputs is +4dBm ±0.5dBm , with 0V dc input to the QVCO.

11) Verify the following spot frequencies are ≥50dB below the Signal output level : (Fc+2Fs) , (Fc+3Fs) , 2Fc , (2Fc±Fs) , (2Fc±2Fs).
Note.[1]

12) Verify that Fs is ≥35dB below the Signal output level.

13) To check for low frequency & line related noise on the output signal. Set the Spectrum Analyser **SPAN** to 500Hz width , and set the **RES BW** to 10Hz filtering.
Verify that the (Fc+Fs)±100Hz sidebands are ≥70dB below the output level.

14) Check generally for any other spurii , ensuring that it is more than 30dB below the output signal level.
Note.[2]

15) Check the Quadrature Crystal Oscillator for frequency drift by monitoring the frequency change over a 24 hour period. $\delta F \geq 0.5$Hz.

16) Label the module , stating it has been checked and adjusted.
Date and sign the label.

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[1] Fc=1586.7kHz Fs=2.5kHz AC. (Fc=1830kHz Fs=20kHz AA).

[2] Some old QVCO's have a tendancy to introduce HF noise approx20 to 40MHz into the QXTAL Osc. This is due to the highly capacitive load that the QXTAL Osc inputs present to the output amplifiers of the QVCO. Can be cured by increasing R96 and R97 values from 56Ω to 100Ω in the QVCO.