

# HKC Technical Support

To facilitate crystal users to properly specify crystal units, so as to achieve a higher yield in the mass production, Hong Kong X'tals offers the following services to our valuable customers.

- Crystal measurement service
- Crystal application circuit measurement service

## ***Crystal Measurement Service***

With over 10 years of experience in crystal measurement, and with equipment complying with EIA 512 and IEC 444 international standards, HKC is capable of measuring all crystal parameters with the highest accuracy available.

## **Identifying Production Problems**

Measuring crystal units accurately will help identifying / isolating production problems when the crystal units being used are suspicious.

In such event, if the user can classify the crystals as good and bad ones, number each crystal and remark what is the corresponding symptom, this would further help HKC engineering to analyze the crystal samples. A minimum of 10 pieces each of good and bad ones are required.

These crystals will be fully tested including : all electrical parameters at room temperature, over temperature characteristics, drive level dependency, and spurious response.

## **Identifying Second Source**

Due to the fact that most crystal users do not have equipment to test crystal units, some crystal makers play a marketing game. The specification sheet may not be describing the crystal units being delivered. As a result, when the crystal user issue the specification sheet to a second source for producing samples, the new samples though meet the written specification, could not pass the engineering IQC or the production test.

An accurate measurement on the crystal units currently being used will help avoiding these situations and save sample production time. A minimum of 10 pieces of crystal units currently being used are required.

However, in such event, testing crystal samples is not the best solution. Any sample size, no matter how large, could not reveal information on large volume spread and average values of parameters. We strongly recommend to measure the actual application circuit, this will give more detail information so as to decide an optimum specification.

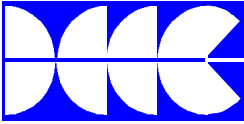
## ***Crystal application circuit measurement service***

With an actual application circuit ( physical PCBA with components, together with schematic diagram ) detail circuit characteristic can be measured to determine : maximum ESR, operating drive level, nominal CL ( or series ), and nominal C1 values.

Other room temperature tolerance and over temperature tolerance will have to be derived basing on these data and the applications tolerance budget.

Measuring the actual circuit is the best way of identifying the specification of the crystal required.

The following is a check list of information required by HKC engineer before such measurement could be performed.



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### **Requisites for Detail engineering evaluation of Crystal / oscillator characteristic 1st April 1993.**

#### **Subject : Crystal specification evaluation for Customer provided circuit**

For detail analysis to be performed, the followings must be prepared :

- a. At least one working sample of the user oscillator :
  - On the sample please label clearly the power supply points and voltage required.
  - If there is any variable setting that might affect frequency of the oscillator, please set all of them to their center/normal position ( such setting may include VC, variable capacitor, IF transformer, inductor etc. ).
- b. Circuit diagram of the oscillator, with values of the components in the oscillator part.
- c. Specification sheets of the active components in the oscillator part, such as IC, or transistors, etc.
- d. Required oscillator amplitude, and the reference point at which to measure this amplitude.
- e. Required oscillator output wave form, such as square, sine, or don't care, etc.
- f. If the circuit has been previously using some other crystals, please have them on board in its respective positions for measurement verification.
- g. If the application requires to pull ( changing ) the crystal frequency ( such as PLL, VCXO or FM applications ) please provide required frequency range, maximum and minimum voltages for pulling and the circuit point to which the pulling voltage is applied.

Please note that the above evaluation is the best way to identify the suitable crystal specification for the circuit. In case only crystal samples are provided, then due to limited sample size, usually the evaluation could not be conclusive.

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