

Characterization Service for Crystal and Oscillation Circuit

Introduction

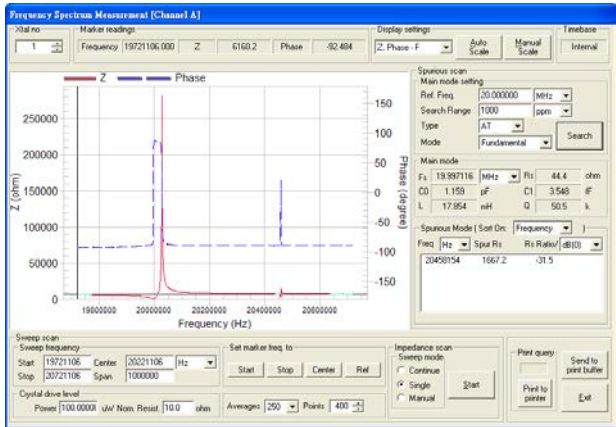
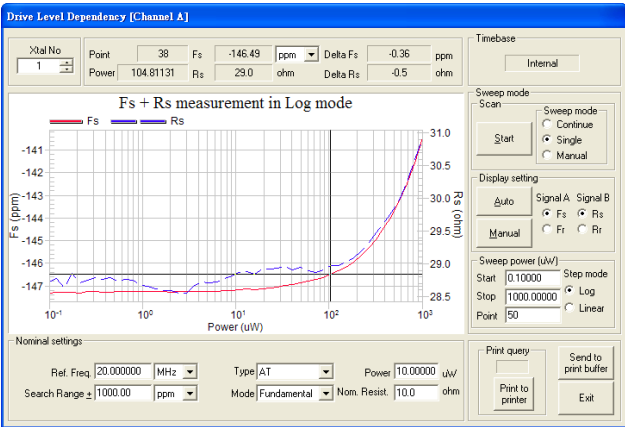
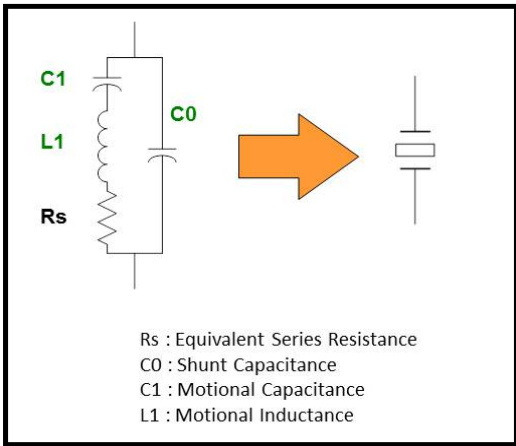
High precision timing reference becomes mandatory in every electronic device in the IoT era. Common wireless applications such as WiFi, Bluetooth and Zigbee require accurate frequency precision down to tens of PPM. Quartz crystal resonators provide excellent precision but only if correct specifications have been established. HKC offers the following services to help characterize a crystal and its oscillation circuit:

- Crystal measurement service
- Circuit board characterization service

Crystal Measurement Service

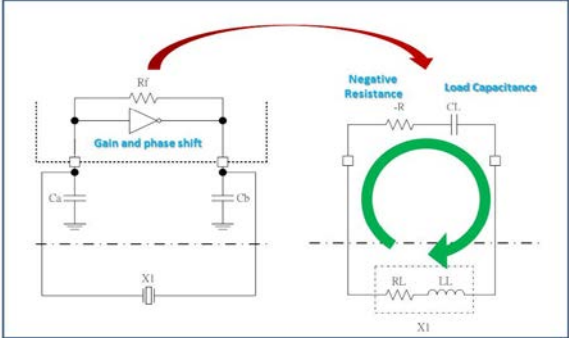
With more than 30 years of experience in crystal industry, HKC is one of the industrial leaders in crystal manufacturing and expertise in crystal measurement. Crystal measurement methods are in compliance with IEC60444 and EIA512 standards.

For every sample crystal that HKC receives, electrical parameters such as FL, ESR, C0, C1, L1, Q, drive level dependence (DLD) and spurious modes will be identified and professional specification sheets will be provided with HKC's Ordering Part Number. The OPN can be referenced in the BOM of any customer's design.



Circuit Board Characterization Service

Crystal oscillation circuits are simple and complex; simple in terms of components count and complex in performance characterization. Most silicon designers use Pierce oscillator as the on chip timing circuit for its low power consumption, least gate count, and “stable performance” – stable only if the crystal has been properly matched. An unmatched chip/caps/crystal combination may result in common problems like frequency inaccuracy, instability, unstable startup, poor aging and low production yield.



Circuit board characterization would include the following measurements and recommendations:

- **Negative resistance (-R):** to describe the start up capability and safety margin of the oscillator.
- **Load capacitance (CL):** to determine the “Loaded Resonant Frequency” of the crystal being used.
- **Drive level/power (DL):** to describe the power dissipation in the crystal.
- **Start up time (ST):** the time to stable oscillation after power up.
- **Wideband frequency spectrum:** to observe if there is any modulation or spurious modes.
- **Circuit modifications** to improve the accuracy and reliability.
- **Recommendation of crystal specification** with HKC ordering part number to match the circuit characteristics.

Ordering Code

13-BDMATCHINGSERVICE01	Characterization service with 1 week lead-time
13-BDMATCHINGSERVICE02	Characterization service with 2 weeks lead-time
13-BDMATCHINGSERVICE03	Characterization service with 3 weeks lead-time
13-BDMATCHINGSERVICE04	Characterization service with 4 weeks lead-time

For additional information, please contact us at support@HongKongCrystal.com