Technical Bulletin No.9

Fil-Tech Quality Crystals 100% Testing and Inspection Fil-Tech 100% tests and inspects all crystals to insure they are in accordance with our specifications. In order to insure our customer the finest Quality Crystals®, and insure long crystal life, Fil-Tech measures the following for each crystal. We use sophisticated test equipment to measure the electrical parameters and cosmetic criteria below. All tests are based on physical measurements - they are not derived.

Fil-Tech also employs a unique data logging system and lot number program that records the complete history of our deposition process. With this log, we can trace, via lot number, the deposition process on a real time basis for every crystal produced and shipped.

Electrical Inspection:

- 1. Frequency;
- 2. Contact Resistance;
- 3. Activity equivalent series resistance (ESR), which is a function of film adhesion and surface roughness;
- 4. Capacitence;
- 5. Inductance; and
- 6. Parallel Resonance Frequency.

Cosmetic Inspection:

- 1. Electrode pattern must be centered:
- 2. Electrode pattern must be clear of distortions;
- 3. Surface must be free of dust particles, fingerprints, metallic splatters, and other visible surface contamination:
- **4.** Quartz must be free of twinning; and
- **5.** Surface must be free of scratches, chips and markings.