Low Frequency Crystal Network Analyzer

CNA-LF

Until recently, most crystal resonators at low frequencies between 25-200KHz have been measured by oscillator techniques. These methods are fast, but they are no longer adequate for accurate parameter measurements. As a result, some manufacturers have turned to transmission measurements, using Network Analyzers.

These methods are accurate but slow, because the resonator's current needs time to build up to a constant steady-state value at which the measurement can be taken.
The delay time depends on the resonator parameters. For example, at 25KHz and a Q of 110000 the delay time is approximately 10 seconds.

Since the parameter evaluation requires at least two measurements at different frequencies, the total measurement time is at least 20 seconds. Transat's CNA-LF Network Analyzer is based on proprietary transmission method that reduces the total measurement time for all crystals in the 25-200KHz range to less then 2 seconds.

System Description

The Model CNA-LF is a PC based system that measures crystal frequency, C_0, and all motional parameters. Custom test files can be created, stored, and easily recalled. The CNA-LF can be used as a stand alone production test or can be incorporated into automated test/sort applications. User definable external I/O allows the export/import of various test (PASS/FAIL) data as well as control inputs.

Specifications

Frequency Range	25-200 KHz
Frequency accuracy	+/-1ppm, typical

Parameters measured	Fs, R, L_1, C_1, C_0, Q, F_s phase angle
Drive Power	10uW (max) / 0.01uW (min)
Ext. reference	10 MHz into 50 Ohms @ 50mV (optional)
Power requirements	100/120/200/220/240VAC, 50W, 50/60Hz
Dimensions (CNA-300 only) (LxWxH)	30.5cm x 43.8cm x 13.3cm
Weight (CNA-300 only)	5Kg

Complete system includes:

- Transat Low Frequency Crystal Network Analyzer model CNA-LF
- Period Counter Card
- TFP-6LF Contact Network with pre-amplifier
- System computer and monitor
- Parallel Interface Card
- System cabling