RADIANT TECHNOLOGIES, INC.

Precision PiezoMEMS Analyzer

Radiant Technologies' Precision PiezoMEMS Analyzer integrates digital, analog, and communications circuit functions with the existing non-linear materials measurement capabilities of the Precision Multiferroic Non- linear Materials Tester, all supervised by Radiant's Vision programmable test environment. The PiezoMEMS Analyzer not only measures piezoelectric properties of actuator and sensor elements of a commercial product, it will communicate with the product's electronic logic, talk to embedded microprocessors, supply asynchronous voltages and pulses, and measure sensor frequencies. The pMEMS Analyzer combines the following capabilities*:

The Precision PiezoMEMS Analyzer is driven by Vision Software. Vision has four interconnected units:

- A Library of 155 measurement, analysis, plotting, program control, and documentation tasks.
- An Editor to arrange multiple tasks together from the Library into a Test Definition.
- An Execution Engine to read and execute the Test Definition
- An amorphous database engine to Archive everything that happens in every Test Definition.

Radiant Testers are 10 times cheaper to operate for simple measurements than are testers operated manually or with scripts.

Radiant's PiezoMEMS Analyzer running under the Vision Materials RDP Operating System reduces Cost of Test by a factor greater than 10 over any other ferroelectric tester.

- ☑ **True LCR**
- ☑ **Digital I/O**
- ☑ **I2C communications**
- ☑ **DC Voltage Source for powering circuits**
- ☑ **Frequency Counter**
- ☑ **Asynchronous Pulse Generator**
- ☑ **Asynchronous 16-bit Voltage Measurement**

For More Information on the Precision PiezoMEMS Analyzer contact Radiant Technologies, Inc at 505.842.8007

High-Resolution Angstrom-level Platform-PiezoMEMS Analyzer, VibroOne Laser and Temperature Stage -196 to 600C. Bundle measures piezoelectric coefficients and temperature

Vision is the only software package available for ferroelectric testers that provides exceptional freedom to design, conduct and review all procedures associated with any material experiment. Vision dramatically increases the productivity of the researcher, reducing the time required to acquire data in an experiment. Vision's enhanced productivity directly reduces cost of test. Vision dramatically increases the complexity of the research that may be accomplished by allowing researchers to combine different measurement tasks with environmental controls into an automated test procedure managed by programmable logic embedded with automated data collection, analysis and plotting tools.

APPLICATIONS

All hardware functions of the piezoMEMS Analyzer are available as independent tasks in Vision's Library. By constructing complex test definitions using combination of tasks in the Library, an engineer can:

1). Independently test specialized non-linear components using non-linear materials.

2). Design build, and communicate with digital, analog, and microprocessor circuits surrounding the non-linear component.

3). Include portals in the circuit to allow direct electrical, piezoelectric, pyroelectric, or magnetoelectric analysis of the non-linear while it remains embedded in the circuitry.
This single capability is the absolute necessity to understand and predict the reliability of the embedded component and its surrounding circuit.

4). Characterize the performance of the combined circuit/non-linear component system.

5). Control the thermal, atmospheric, magnetic environment around the system from within a test definition using ovens, cryogenic chambers, vibrating sample magnetometers, or magnetic coils.

6). Qualify the short-term performance limits and long-term reliability of the system under test.

ADDITIONAL HARDWARE SPECIFICATIONS:

- A fully functional, high speed, non-linear ferroic properties tester ranging up to +/-200 volts capable of Hysteresis, PUND, Leakage, CV, piezoelectric displacement, thermal, and magnetoelectric measurements.

- Asynchronous/semi-synchronous ±10V arbitrary analog pulse generator with programmable delay.

- An asynchronous 16-bit, ±10V, 10^{12} ohm input-impedance voltage measurement port.

- Independent ±10V 25mA DC bias generator.

- 60 MHz frequency counter for measuring oscillator circuits.

- [15 Out x 8 In/Out] parallel digital port for setting, controlling, and reading digital ICs or communicating with microprocessors.

- Arbitrary I2C custom programmable I/O for communicating with I2C capable microprocessors and logic circuits.

- Built in LCR impedance measurement port.
  Frequency Range: 10 kHz

- **Output Range +/-100V or +/-200V expandable to 10kV**
  - » 16-bit Arbitrary Waveform Generator output
  - » 270KHz @ +/-100V and 100KHz @+/-200V built-in
  - » Accuracy 0.5% or Better
  - » Maximum Data Points 32000
  - » Minimum Pulse Widths down to 0.5µs
  - » Maximum Pulse Widths down to 1µs and up to 1s
  - » Vision controlled output ramp for maximum accuracy

- **Polarization Measurement under AC & DC Magnetic Fields**
  - » 18-bit Resolution (analog to digital converters)
  - » 0.5µs capture rate with 0.1µs interlace facility
  - » Polarization, output voltage and SENSORs captured simultaneously
  - » Minimum charge sensitivity -> 0.80fC
  - » Minimum PZT capacitor area -> 0.5u2
  - » Maximum Area Resolution 52.6mC
  - » Maximum Area Resolution >130cm2 w/o HVI attached)
  - » Maximum hysteresis loop frequency ->270KHz
  - » Minimum hysteresis loop frequency -> 1/30th Hz 2 externals ±10V SENSOR inputs
    1 I2C COMM channel

- **Requires a desktop or laptop computer with USB 1.0 Port or better**

- **Includes Vision Software**

Specifications subject to change

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