

World leader in **Ferroelectric Technology**

Multiferroic 100V and/or 200V Test System

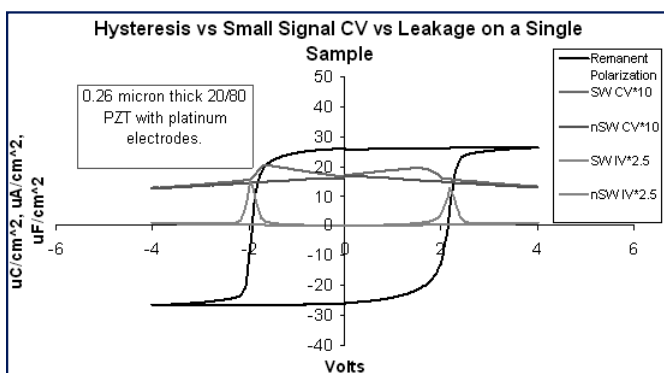
Radiant Technologies, Inc.

The Precision Multiferroic tester is an advanced modification of the Premier II to allow 30kHz measurements using the 200V internal amplifier and 50kHz measurements using the 100V internal amplifier. The standard Premier II is limited to 5kHz and 10kHz respectively for those measurements above 10V using the same internal amplifiers.



Multiferroic Performance Summary:

The Precision Multiferroic tester below 10V is capable of executing a single pass hysteresis loop in 100 μ s with no interlacing of the data acquisition. Using its 40MHz clock, the Multiferroic will interlace multiple loops to generate an effective capture rate of 10MHz for a total loop period of 10 μ s. The 100V Multiferroic system will execute up to the 20 μ s limit. The 200V will execute up to a 30 μ s minimum hysteresis period. The system uses 18bit ADCs with 2MHz acquisition rates. The interlace hysteresis measurement is compatible with the loops measured by all of the Precision testers made by Radiant. The Multiferroic executes a PUND pulse measurement with pulse widths ranging from 1 μ s up to 1s below 10V on capacitors with areas ranging from 0.5 μ m² up to multiple square centimeters. The minimum pulse



Additional Multiferroic Specifications include:

- 16-bit Arbitrary Waveform Generator output
- 100 points in 100 μ s direct capture
- 100 points in 10 μ s using interlace feature
- 1000 points in 30 seconds
- Pulse Widths down to 1 μ s and up to 1s
- 2 COMM channels for controlling high voltage amplifiers.
- 2 external 18-bit, \pm 10V SENSOR voltage inputs.

width increases to 20 μ s for the 100V version and 30 μ s for the 200V version of the Multiferroic test system. The Multiferroic will run all of the other measurement

Vision Software Operating System:

Vision can construct complex programs with any number of tests to characterize all aspects of the sample in one execution while keeping track of the measurement results and the history of the sample being tested. Each Radiant tester is an extension of Vision and can execute any of the measurement tasks in the Vision Library. The type of tester determines the range of voltages, frequencies, and sample sizes that Vision may characterize with that tester. Only with a Radiant Precision tester can the researcher produce the plot below, executed in one hour on a Multiferroic. The data shows the relationship in a single sample between the remanent polarization state and the values of its small signal capacitance and leakage.

Only with a Radiant Precision tester can the researcher produce the plot shown to the left, executed in a few hours on a Premier II

The Vision Task Library Includes:

Hysteresis, Leakage, Charge, Retain, Resist, Fatigue, C(V), PUND, Imprint and Leakage Current

Link multiple tasks to create a custom program

Networking features allow researcher to share data from anywhere in the world

Continuously variable pulse widths and hysteresis periods.

Hardware Specifications

Dimensions:

Width-17" x Depth-13" x Height-4"

Weight 20lbs

Tester Parameter	Multiferroic
Voltage Range (no external amp)	±200V
Voltage Range (w/external amp)	±10KV
Number of ADC Bits	18
Minimum Charge Resolution	0.8fC
Minimum Area Resolution (assuming 1 ADC bit = 1μC/cm ²)	0.08μ ² *
Maximum Charge Resolution	5.26mC
Maximum Area Resolution (assuming saturation polarization = 100μC/cm ²)	52.6cm ²
Max Charge Resolution w/HVI	526mC
Maximum Area Resolution (assuming saturation polarization = 100μC/cm ²)	>100cm ²
Max Hysteresis Frequency	100KHz
Min Hysteresis Frequency	0.03Hz
Minimum Pulse Width	1.0μs
Minimum Pulse Rise Time (5V)	400ns
Max Pulse Width	1s
Max Delay between Pulses	40ks
Internal Clock	25ns
Minimum Leakage Current (assuming maximum current integration period = 20 seconds)	2pA
Maximum Small Signal Cap Freq.	1MHz
Minimum Small Signal Cap Freq	1Hz
Output Rise Time Control	10 ⁵ scaling
Input Capacitance	~60fF
Electrometer Input	Yes

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*Minimum Area under actual test conditions will be higher