Introduction to the Radiant EDU

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Rev B

January 11, 2008

Summary

Radiant Technologies has created the Radiant EDU, a simple low-cost laboratory instrument with matching ferroelectric capacitor samples, specifically for the purpose of introducing electro-ceramics to science and engineering students. The unit is designed for the study of ferroelectric devices as well as sensors and memories made from these components.

Applications

Non-linear capacitors are an exciting technology used in almost every aspect of society today. Our modern civilization would not function without them. Sonar, medical ultrasound, fire detectors, infrared cameras, accelerometers, medical sensors, mechanical actuators, microphones, energy scavengers, and intrusion detectors are just a few of the devices using non-linear capacitors as the critical operating element. Yet, these very special capacitors are practically unknown by engineers or even physicists and chemists.

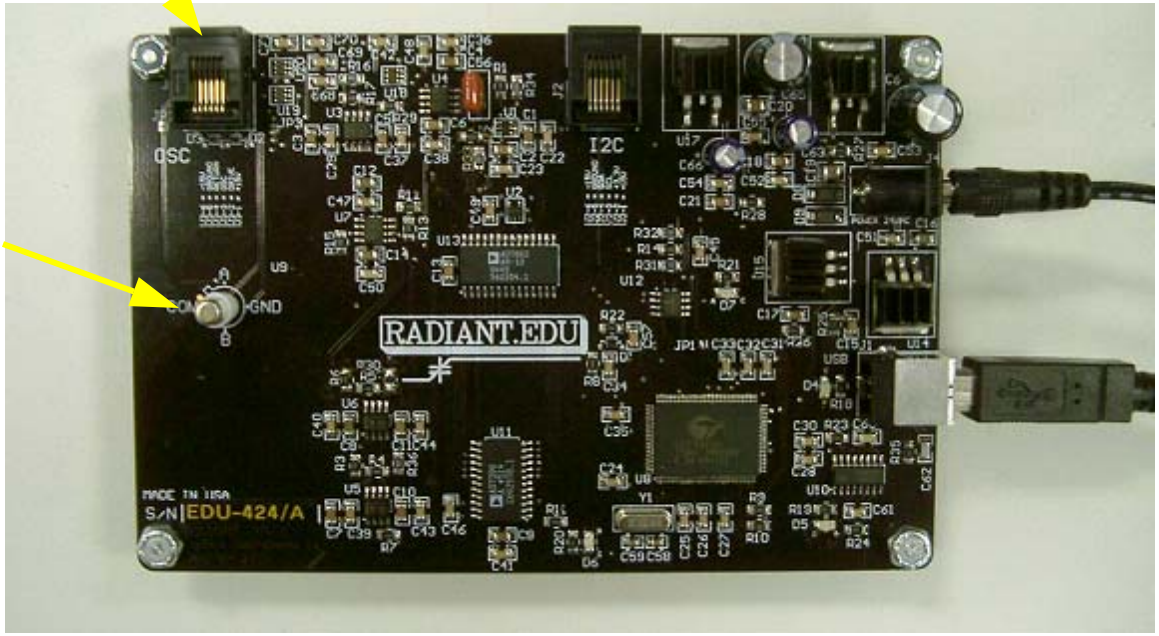
The EDU makes this technology accessible to university students to encourage them to pursue technical careers or create useful applications with these unique devices.

The EDU

The Radiant EDU consists of an arbitrary waveform generator, an electrometer, and an oscilloscope integrated into a single unit controlled by an on-board microprocessor that receives requests from the host computer via USB communications.

Student projects can be operated using the external port.

The EDU measures hysteresis curves on packaged ferroelectric capacitors.



The EDU purposely does not have an enclosure to avoid the perception by students that it is a “black box”.

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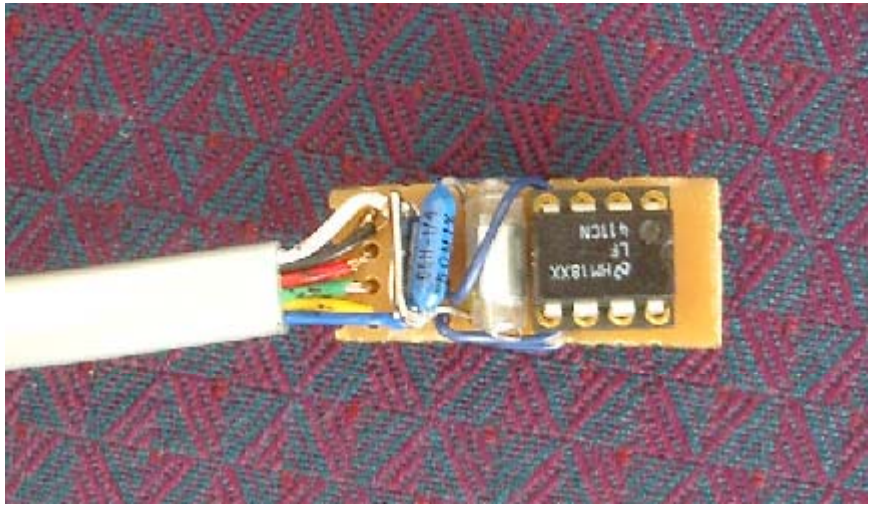
System Functionality

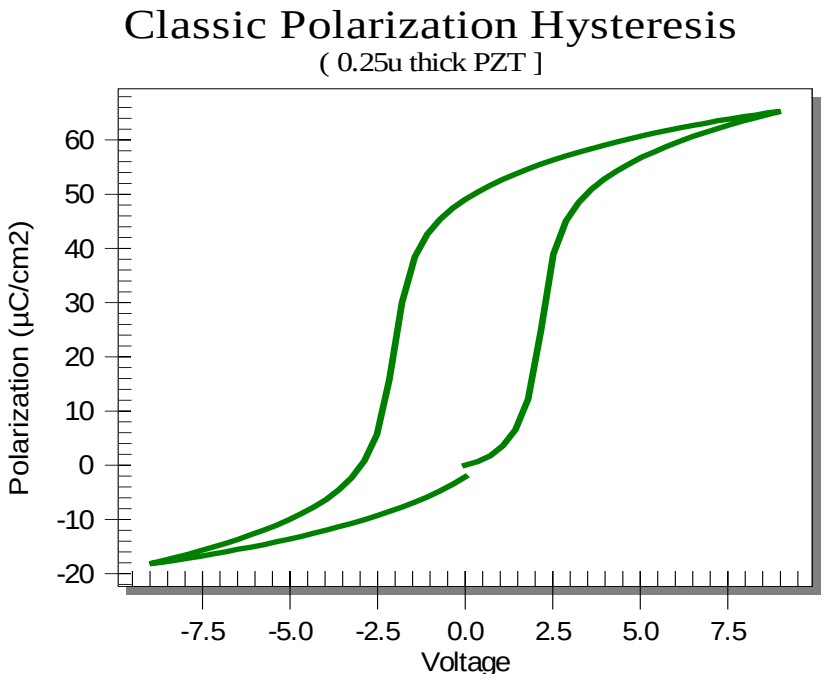
An external port on the unit gives access to the AWFG stimulus signal, the electrometer input, and the oscilloscope input so students can fabricate their own experiments or design and test their own sensors.



A homemade force sensor for the EDU built at Radiant.

Ferroelectricity

Ferroelectric materials, like Lead Zirconate Titanate (PZT) or Barium Titanate, are complex oxides with highly non-linear properties. They exhibit polarization hysteresis and sensitivity to force, displacement, and temperature changes. They are useful as memory materials and as sensors.



Radiant supplies packaged PZT capacitors with which the student can explore the principles of capacitance, the electrical properties of materials, memory, and sensors.

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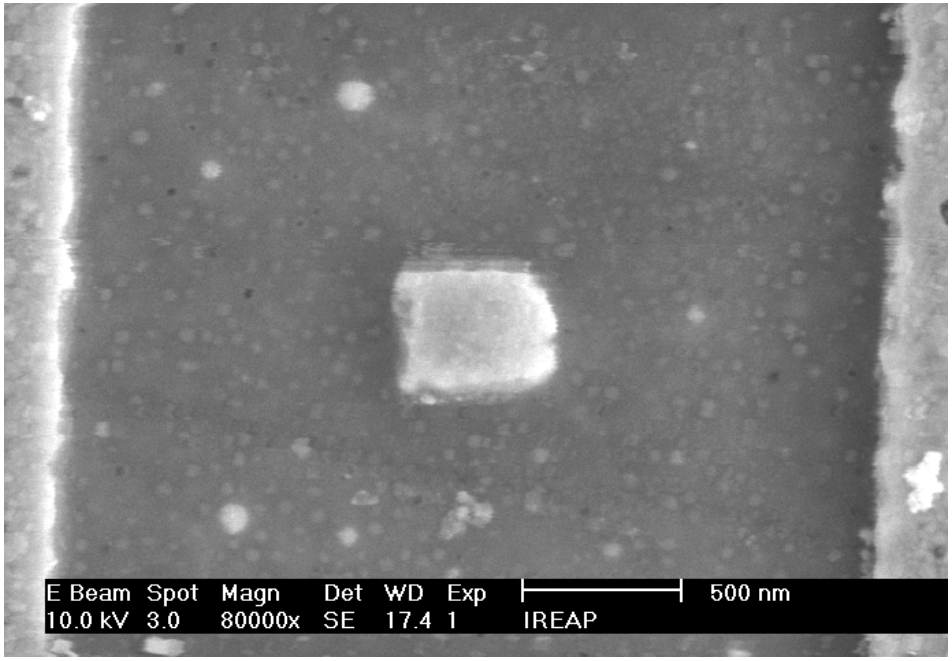
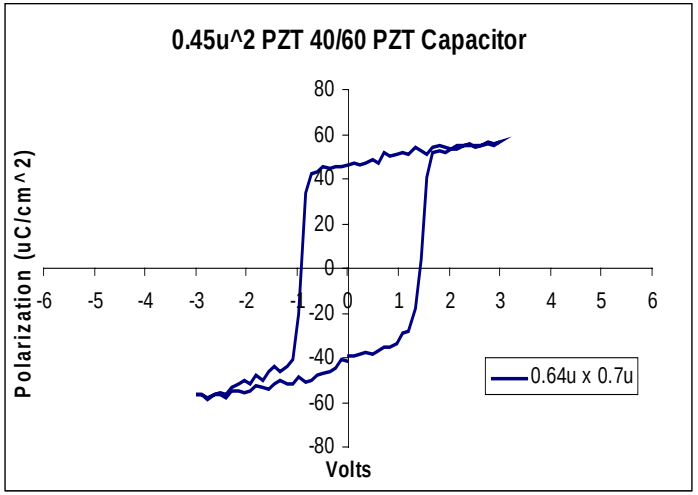
Radiant Technologies, Inc. is the world's leading manufacturer of test equipment for electro-ceramics. Our test systems can actuate large ten-kilovolt devices or measure the hysteresis of a thin ferroelectric film capacitor having dimensions less than a square micrometer.



A submicron PZT capacitor courtesy of the University of Maryland.



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Read More!

For a narrative on the EDU and its applications, click on the link below.

Primer on the Radiant EDU

Please contact us with questions or recommendations for the EDU and/or new ferroelectric-based components.

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