Radiation Pulse Analyzer

Progress Report

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# Progress Report

The original intent of the software program was to be able to capture and analyze a radiation pulse from a pin diode exposed to a pulsed electron beam. Upon working with the hardware it was quickly discovered that data collected via high-sample rate (5 GS/s) oscilloscopes was in a binary format instead of an ASCII format. Rather than being able to take radiation exposure data and import into LabView directly this project evolved into a LabView program to extract the waveform data from the Tektronix digitizing oscilloscope.

During testing of electronic parts a setup of 4 oscilloscopes are used to digitize voltage and current data from several sources: Device Under Test (DUT) and pin diode measuring a voltage drop when exposed to radiation. This LabView project narrowed in scope to the creation of a LabView program that is designed to interface with the Tektronix DPO4000 series oscilloscope to extract captured data for display and reconstruction using a MATLAB program. This MATLAB program is used to analyze the raw waveform data to determine test condition tolerances and qualification for test parameters.

What was learned upon interfacing with the Tektronix devices is that the data stored must be queried using an intrinsic programming language instead of an expected output of data. This required learning how to pass data commands and receive specific queried data to store into arrays. Ultimately this project program will be used as a sub-vi for a more elaborate LabView program to reconstruct a visual representation of the fast pulse waveform in a more pleasant user interface. The author is anticipating adding this capability as part of his Master’s Project.

# Conclusion

This project was able to offer an extensive insight into how to utilize the power of LabView to interface with modern laboratory hardware in a commercial testing environment for Single Events Effects testing of integrated circuits. As the radiation effects on electronics is receiving renewed interest in the areas of aerospace vehicles it is important to update established techniques to use modern hardware and software.