TERADYNE

Because Testing Matters

Trever Wagenhals | Computer Engineer
Hardware Engineering Co-op | Spring 2016
North Reading, MA

About Teradyne

Teradyne (NYSE:TER) is a leading supplier of automation equipment for test and industrial applications. Teradyne Automatic Test Equipment (ATE) is used to test semiconductors, wireless products, data storage and complex electronic systems, which serve consumer, communications, industrial and government customers. Our industrial automation products include collaborative robots used by global manufacturing and light industrial customers to improve quality and increase manufacturing efficiency.

The Neptune Series Testers provide the ability to automatically test - on demand - a mix of many independent HDD and SSD devices asynchronously.

Job Description

- Resolve component obsolescence issues by qualifying new devices
- Debug HW to the components level
- Troubleshoot HW using Visual Basic SW Tools
- Work on engineering related yield improvements

About Me

I am currently a senior in the Francis College of Engineering for Computer Engineering with a minor in Business Administration. Once completed with my undergraduate, I plan on pursuing my Master's in Computer Engineering though UMASS Lowell's Accelerated Master's Program.

I am also in the Army Reserves, which is a huge part in why I picked UMASS Lowell as my school of choice. The proximity to my Unit, as well as the educational support for service members has made my educational experience more enjoyable.

Teradyne was my first co-op taken. Originally, the co-op was supposed to extend from January to June as a 6-month co-op; however, a lot of unforeseen military obligations came up, including a deployment. Because of this, my co-op was cut down from February to May. Regardless of this, Teradyne was very supportive every step of the way and I anticipate the opportunity to work for them again.

About the Co-op

Unlike the majority of Teradyne's employees that perform semiconductor testing, I was fortunate enough to be placed on the hard drive testing team. This team's focus is to bring fully automated and asynchronous testing machines to market that are capable of testing thousands of drives at once. Primary customers include Western Digital, HGST, and Toshiba.

With hard drives evolving so rapidly, newer form factors and standards are constantly being released. The newest standard of hard drives are considered Non-Volatile Memory express (NVMe) devices, and come in multiple form factors. In order to eventually bring an asynchronous and automated test machine to market, a development station was created in order to establish a better understanding of these new devices. It was my responsible to perform R&D on this system to determine the most efficient method of automating and asynchronously testing the new standard drives, and perform Design Verification on the final product.

TERADYNE

Because Testing Matters

Trever Wagenhals | Computer Engineer
Hardware Engineering Co-op | Spring 2016
North Reading, MA

My Assignments

My primary responsibility was to design a method of safely removing new NVMe drives from a system without having to power cycle. The method had to ensure that system damage and hard drive damage never occurred and the drive was functional even when plugged in after initial boot in both Windows and Linux environments.

Once I had accomplished this task, I took the initiative to create a Graphical User Interface for the functionality to allow user friendly testing in the future. All of my work was expected to be uploaded to GIT and documented for easy use by the next co-op student.

At the end of my co-op, a customer was interested in evaluating our test machine, and so a development system was created where I was in charge of verifying the final design functionality before shipment.

Pictured above is an Add in Card SSD (Top Left), a U.2 SSD (Top Right), and 3 different dimension M.2 SSDS (Bottom).

Teradyne's 3.5" automated test platform, Saturn, allows flexible system configuration to maximize factory layout and density.

What I Learned

- Basic GPIO programming and serial communication methods through a Raspberry Pi, Arduino device, and breakout board.
- I2C, PMBus, and SMBus communication methods in both a Linux and Windows environment
- Hardware communication through reading and writing to registers
- Basic and advanced Linux functionality
- Datasheet and Schematic comprehension
- Python/C programming and Graphical User Interface Design
- API abstraction and debugging methods
- Computer Architecture design and general configuration
- Basic EEPROM programming and firmware flashing
- Proper use of GIT for backup and documentation