Project Summary

Philips is a healthcare product company based in Cleveland, Ohio and with a location in nearby Reedsville, PA. At this location, The Research and Development department has two cable flex-test machines used to test for impedance flaws in the cables of their ultrasound devices. Although these machines perform identical functions, one is technologically up-to-date and runs with a modern control software application written in LabVIEW, and the other is outdated and runs with an older control software program that can’t work properly on anything newer than Windows 98. For our project, our original goal was to update the hardware-software interface of this older machine so that it could run on a modern operating system and be expandable in the future.

Our original approach was to analyze the newer system to try and emulate it on the older system. We found that the newer hardware contained an National Instruments m-series Data Acquisition Card that interfaced with the LabVIEW program through USB. We decided to order one of these cards in the hope of installing it onto the older machine and allowing the LabVIEW software to work for both with little to no modification.

However, there was an issue with shipping and we never received the card. As a result we had to reconsider our approach and our goals to fit within our time constraints. We decided to analyze the LabVIEW program in greater depth and document its functionality so that a future team can understand it more quickly and complete the project. LabVIEW program is a system-based platform that offers a graphical programming approach. The existing program consists of a bunch of source-code program subroutines or called as Virtual Instruments (VI). We decided to analyze these VIs by studying each of its function and organize them into a hierarchy or a flowchart. For every cable testing, the program acquires data via USB port connected to the machine through NI card, which is taken from the multiplexer card on the machine’s hardware. After the test is completed, the Labview will update the user with plots, fault log information, motor and cycle status, and synchronize the input with the test vector file.

Philips let us decide how we wanted to write the software for the old machine. We decided to start with the same program that is on the new machine. This way both machines will operate the same way. Philips can test cables on both and get the same result. We looked into how the existing program was written and documented how it worked. The next team will know what they have to do to change and test the program. They mainly need to change the input connections in the LabVIEW code. The rest of the program will operate in the same way as in the new machine. The next team will have the NI controller card when they start, so they will be able to fully test the program. Our team did the legwork, so hopefully the next team will be able to get the machine up and running. Our team saved Philips a lot of money from having to hire another contractor. This machine will be compatible with a new operating system, and it will be able to test cables for many years.