

# Thermal Interface Test Apparatus

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## Abstract

A device to study the effects of heat transfer across a thermal interface material that would simulate real life conditions. This device was designed to function as a test platform that would reduce time and cost of testing out different thermal interface materials that would ultimately go in and function within the Variable Frequency Drives that Danfoss manufactures. This device records all the data it collects and thus can be used to help make better models of what is happening inside of the device when in operation.

## Introduction

Danfoss brought forth to the table a problem with heat management, specifically heat dissipation through a Thermal Interface Material (TIM) within their variable frequency drives (VFD). The thermal test apparatus designed is made to simulate what would happen in a VFD while allowing to find temperature difference across the TIM.

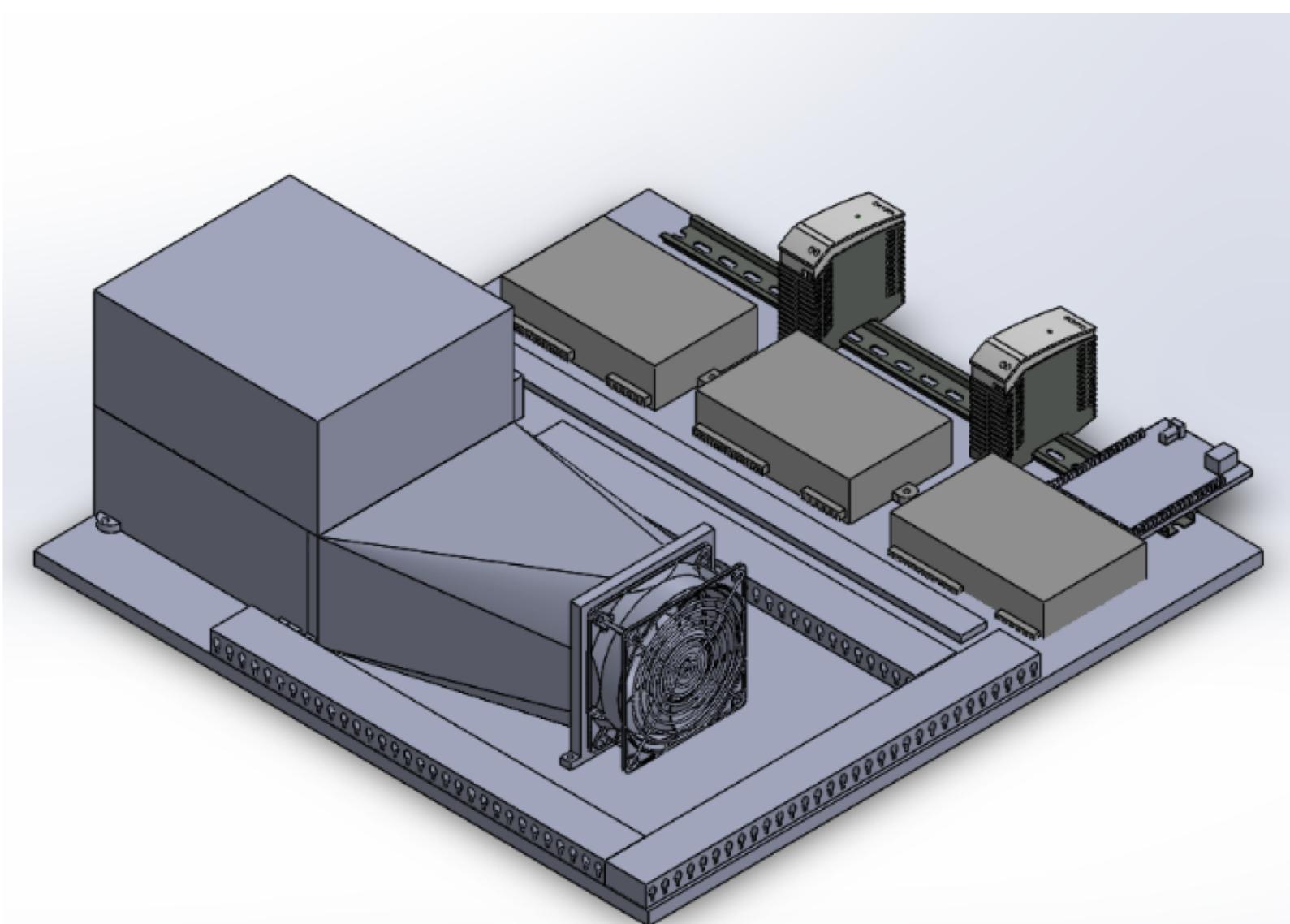


Figure 1: Isometric view of the apparatus

## Methods and Materials

A design was made to best produce what would happen in a VFD. A layout of the apparatus is shown below. A graphical user interface was also designed to easily display data that is collected.

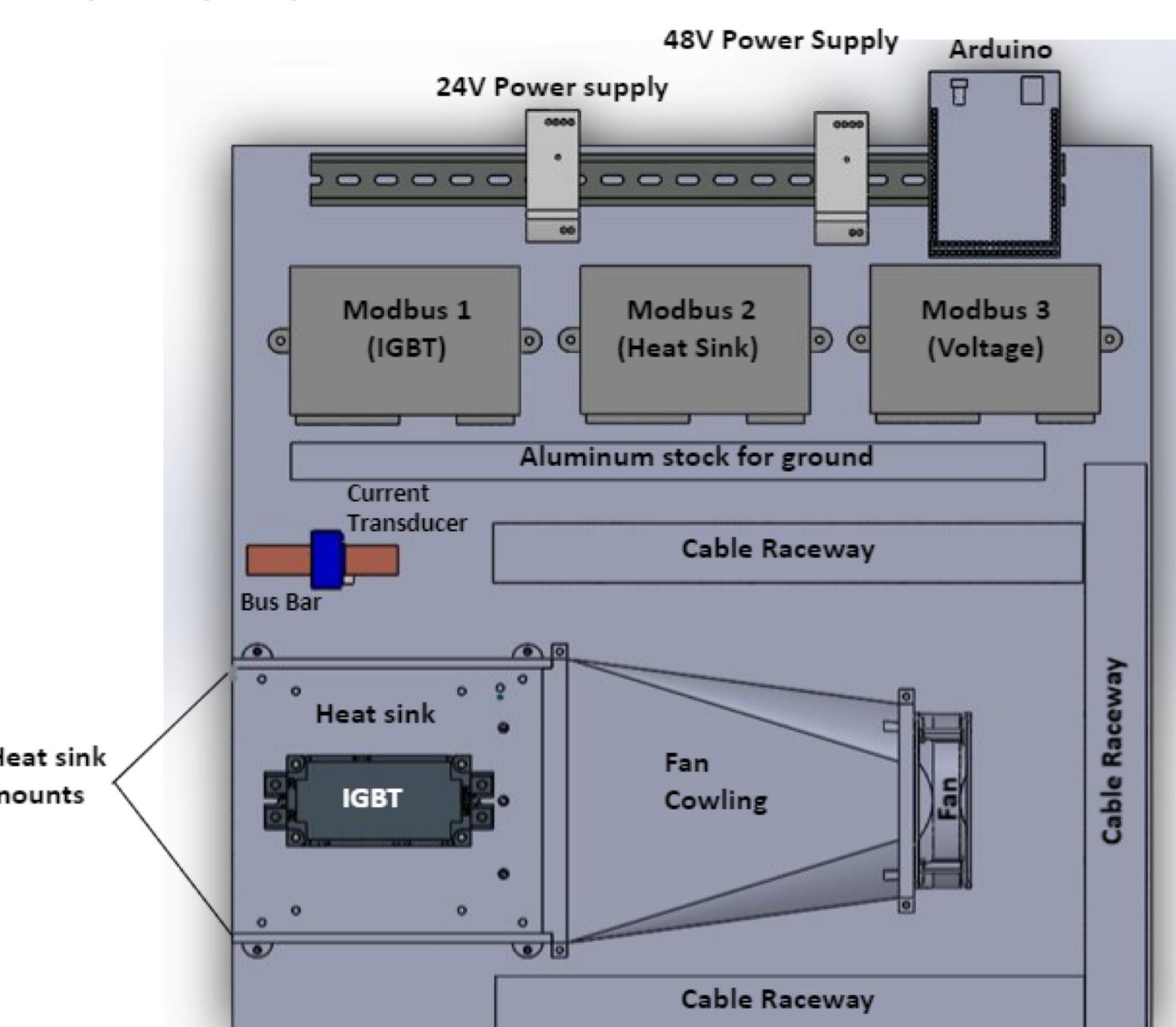


Figure 2: Top down view of the apparatus

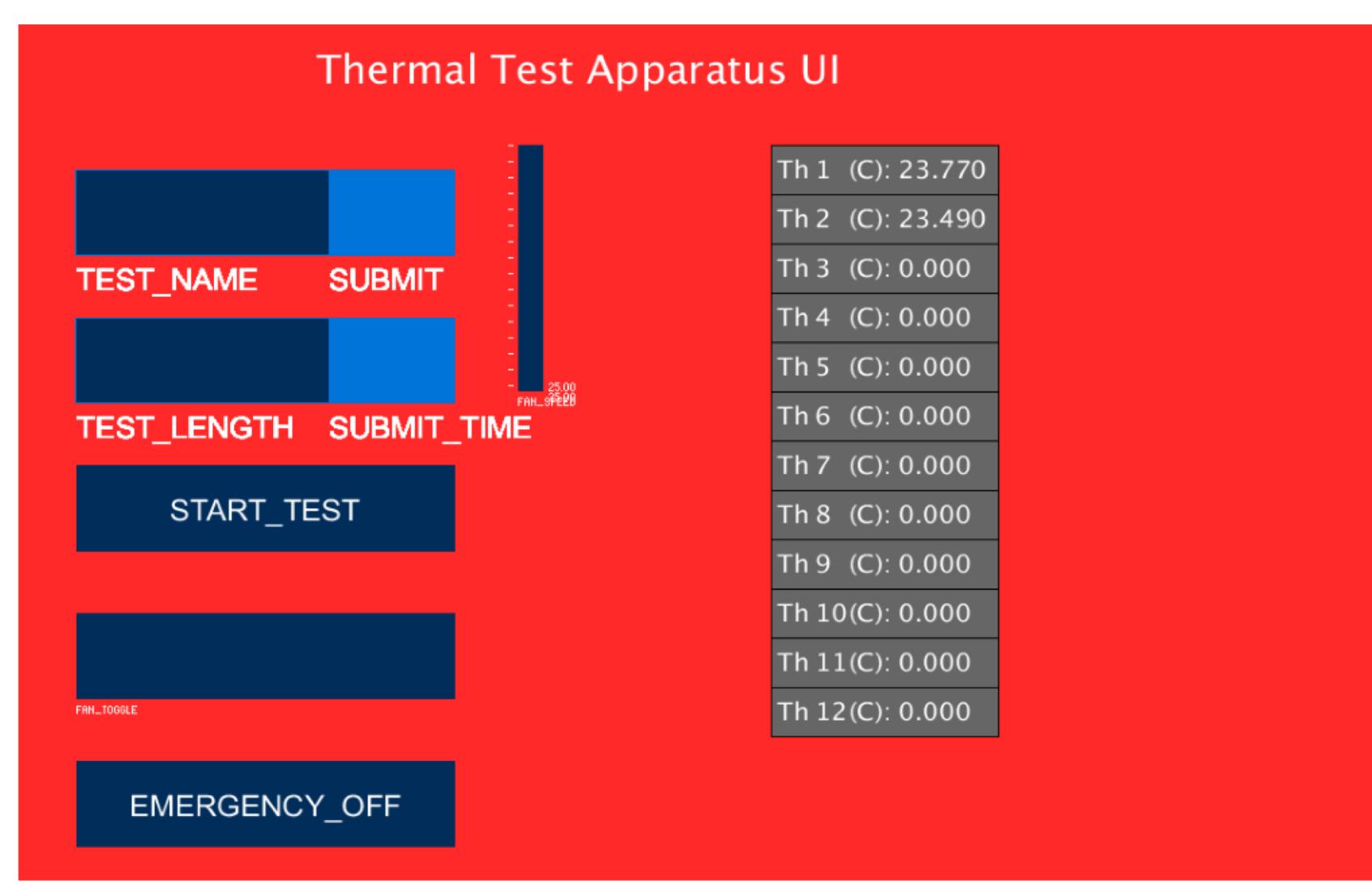


Figure 3: GUI Interface

## Discussion

- Due to the COVID-19 situation we were unable to test the fully assembled apparatus.
- Despite the restrictions, we proved resilient in testing functionality of each system.
- All individual systems were functional and ready for implementation
- Models, wiring schematics, documented code and materials were provided to ensure final completion.

## Conclusions

Overall, this apparatus will allow Danfoss to save a lot of money. This will allow Danfoss to streamline its process of testing thermal interface materials and allow them to best choose a TIM that will serve their needs. Data acquired with the device will allow Danfoss to develop an accurate simulation that will in turn improve the performance of their products.

## Acknowledgements

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