Sensor Connection Process Feasibility

Team M5, LIKE A G6

Thermal Subsystem:
The top half of our assembly is the thermal subsystem. The thermal subsystem only consists of two main parts, the attachment to the heat staking machine (purple plate) and the insertion heater housing. The insertion heater housing holds an insertion heater which supplies the necessary heat to bond the substrate. There is a small hole on the side for a thermistor to read the temperature readings at the tip.

Problem Statement:
Dexcom uses an anisotropic conductive film to bond their sensors with sensor wires. The current efficiency of successful sensors vs total sensors is lower than what is wanted. Our task is to figure out what combination of temperature, pressure, and time will result in the best efficiency.

Introduction to our Project:
The problem listed above at first had a simple solution. That solution was solely based on large amount of trial and error. It was based on testing and solving the current issue, but not preparing for any future issues that may be encountered. Our assembly makes any future problems approachable. Pictured above is the final assembly for the sensor bonding. While still using Dexcom’s current setup, our design can be easily added or removed from their heat staking machine. Additionally, there are two microcontrollers. One controls an insertion heater and another displays the pressure outputs from a force sensitive resistor. The setup enables the user to figure out the most optimal temperature and pressures needed for sensor bonding.

Pressure Subsystem:
The bottom half of the assembly contains the pressure subsystem. Underneath the top plate shown, is a Force Sensitive Resistor (FSR). The FSR has been programmed and calibrated to read the pressure readings as the machine perform the bonding process. The orange and green plate show above, are currently apart of Dexcom’s sensor bonding process. The additional grey plates make it easier for our system to be added or removed from the setup.

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System Level Diagram

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