# Programmable Testing System for *Carlsmed* Surgical Drivers

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## Project Description

The goal of this project is to create a testing system that simulates surgical procedures and conditions to measuring and validate the wear on surgical drivers over multiple cycles. The results will help determine the operational lifetime of Carlsmed drivers used in surgeries.

The testing system operates by using a reprogrammed 3D printer to drive the motor-powered screwdriver which inserts a titanium screw into bone foam material. The torque sensor positioned beneath the bone foam plate records the output torque. Additionally, a load cell measures the axial force applied as the driver presses into the screw.

## Final design



## System Level Diagram



## Design Specifications

- Creality CR-10 Max 3D-Printer
- ATO-LZ-NJY65 Reaction Torque sensor
- ISL Worm Gear Motor
- SawBones PCF 20 Bone Foam
- WWZMDiB 20 kg Load Cell
- Carlsmed Screwdrivers (Lumbar & cervical)
- Carlsmed Titanium Screws
- Arduino UNO 3

## Sponsor

*Carlsmed* is a medical technology company specializing in personalized spine surgery solutions. Carlsmed has designed surgical drivers paired with their own self-tapping screws.
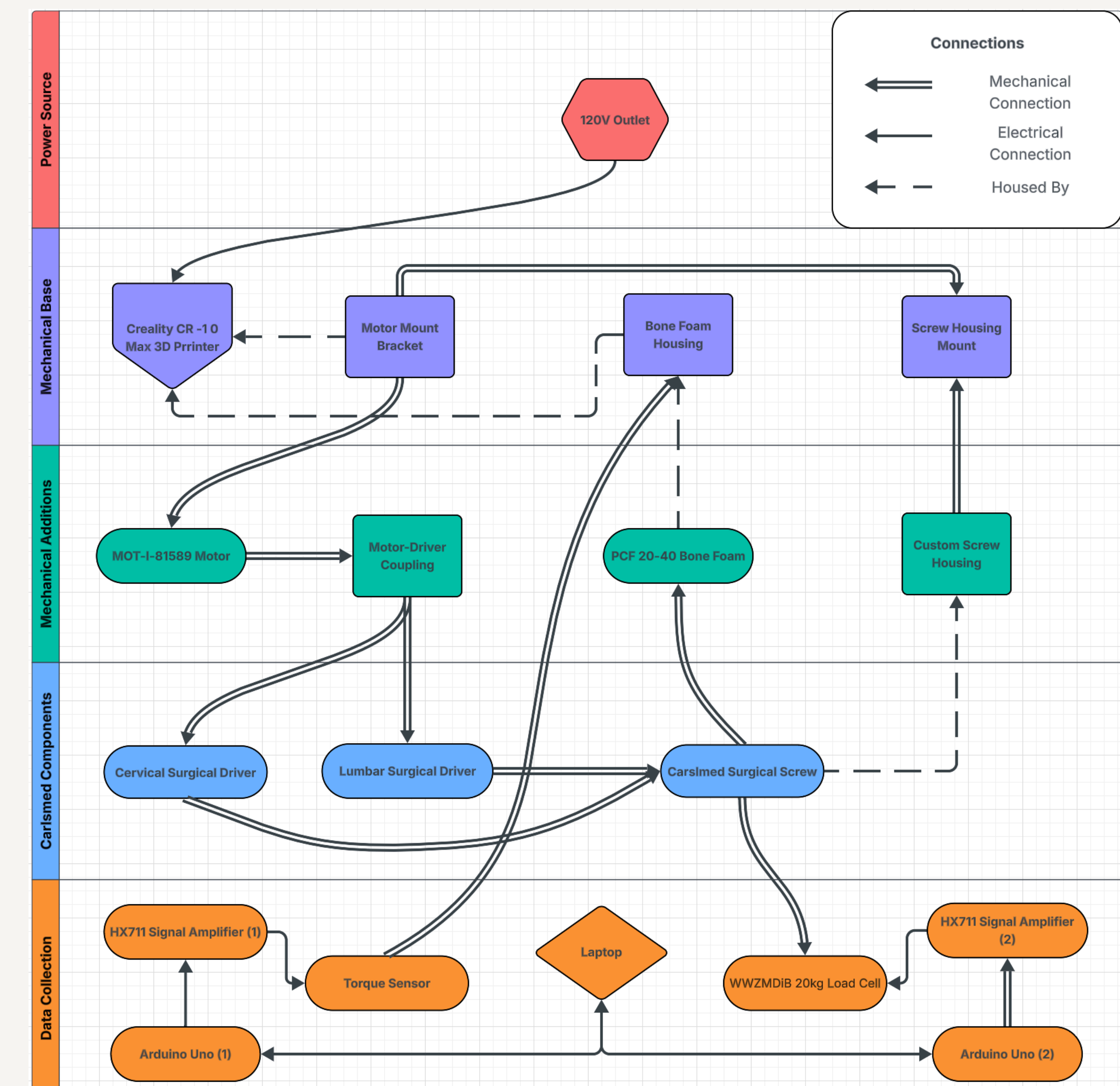
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