

Problem Statement & Objective

PROBLEM STATEMENT:

Arthroscopic debridement is a surgical intervention for articular degradation where damaged articular surfaces (i.e. cartilage and bone) are shaved down to minimize inflammation and pain. Current shavers utilize a rotating drum-shaped shaving head, that when pressed against cartilage or bone, can cause ripples in those surfaces, which results in a suboptimal post-surgical result.

OBJECTIVE:

Our team is driven to optimize arthroscopic debridement by creating a novel arthroscopic smoother that creates smoother articular surfaces which results in a post-surgical joint that provides an improved quality of life for patients.

Electrical System Design

A)



B)



C)

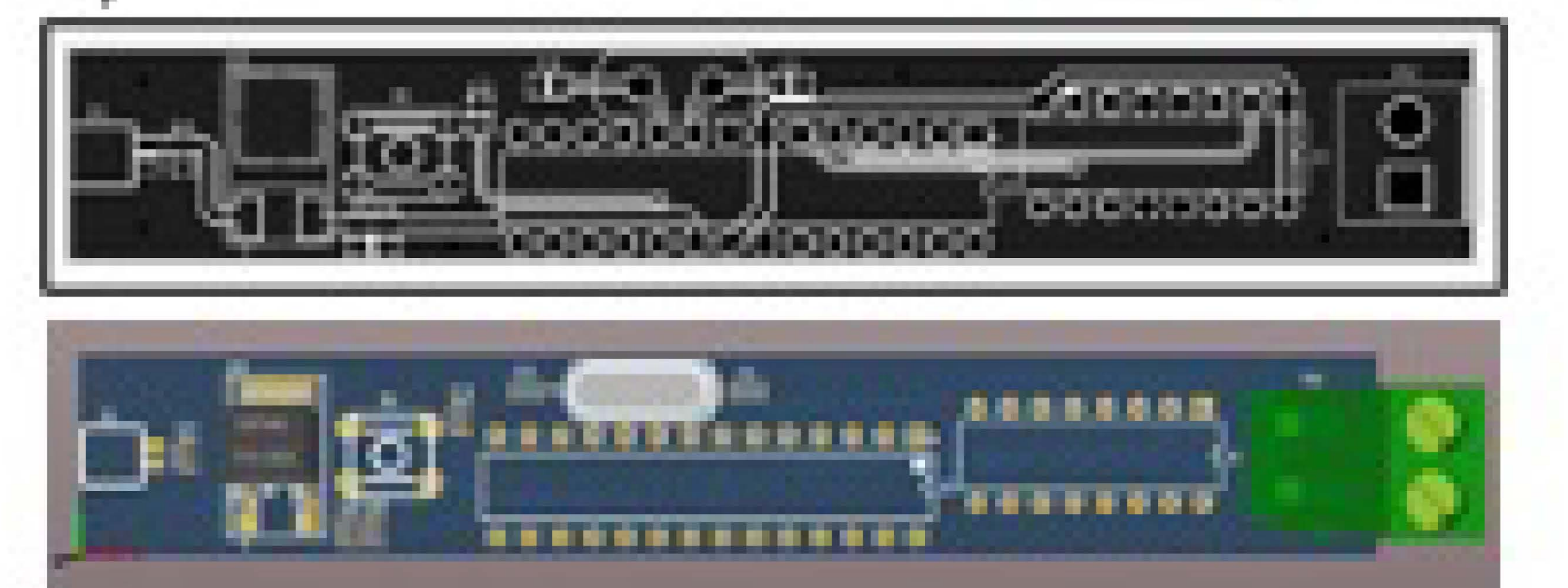
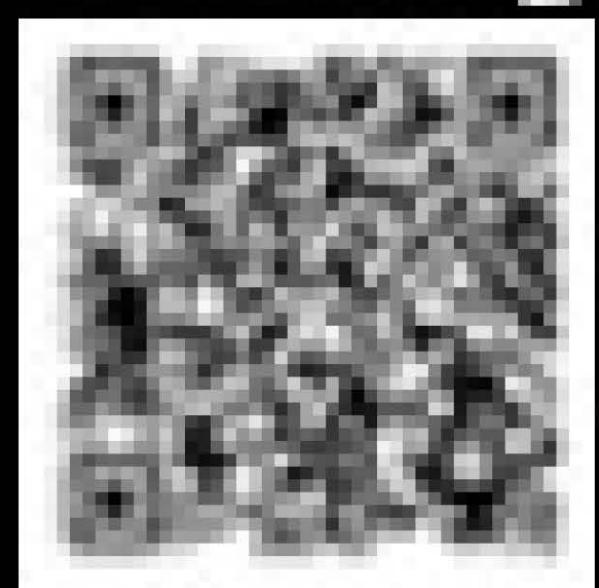


Fig. A) Schematic diagram of circuit board
B) PCB diagram created by Altium Designer
C) Finished circuit board in prototype handle manufactured by Advanced Circuits

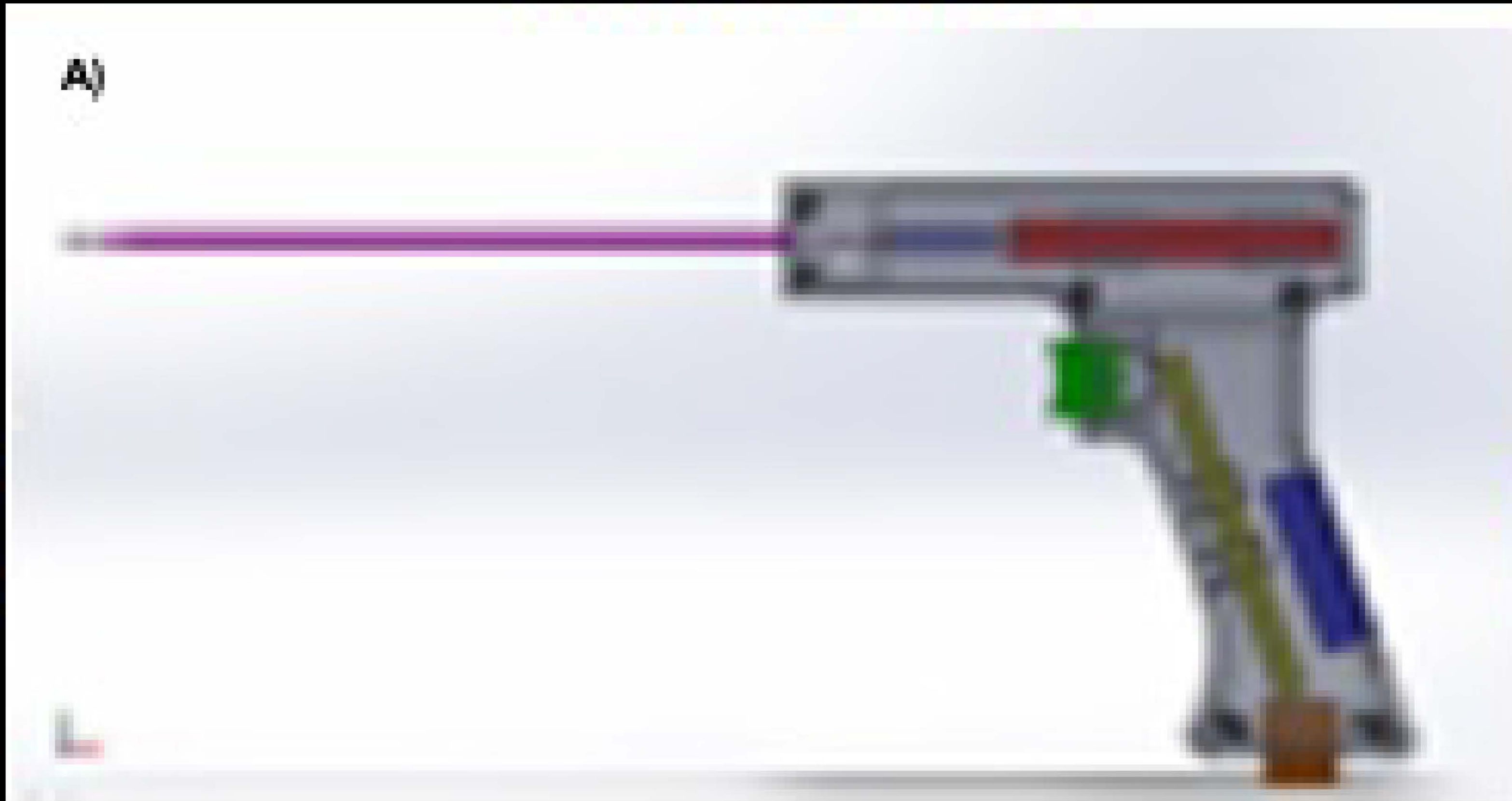


The Scalpel Jockeys



CAD Models

A)



B)

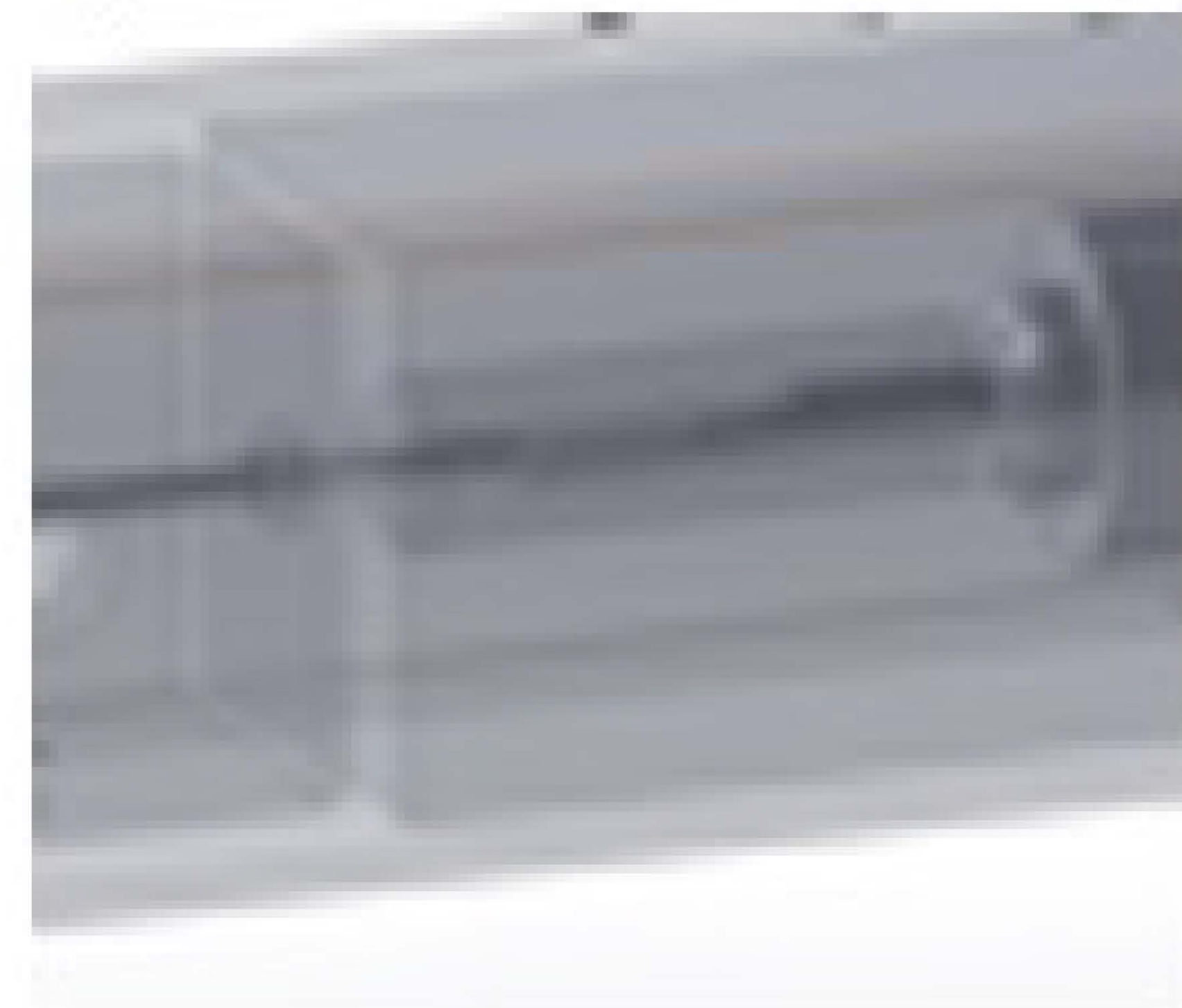


FIG. A) LEGEND

- Inner and Outer Shaft
- Connector Jacket
- Vibrational Motor
- Trigger
- Battery Compartment
- Circuit Board
- Battery Charger

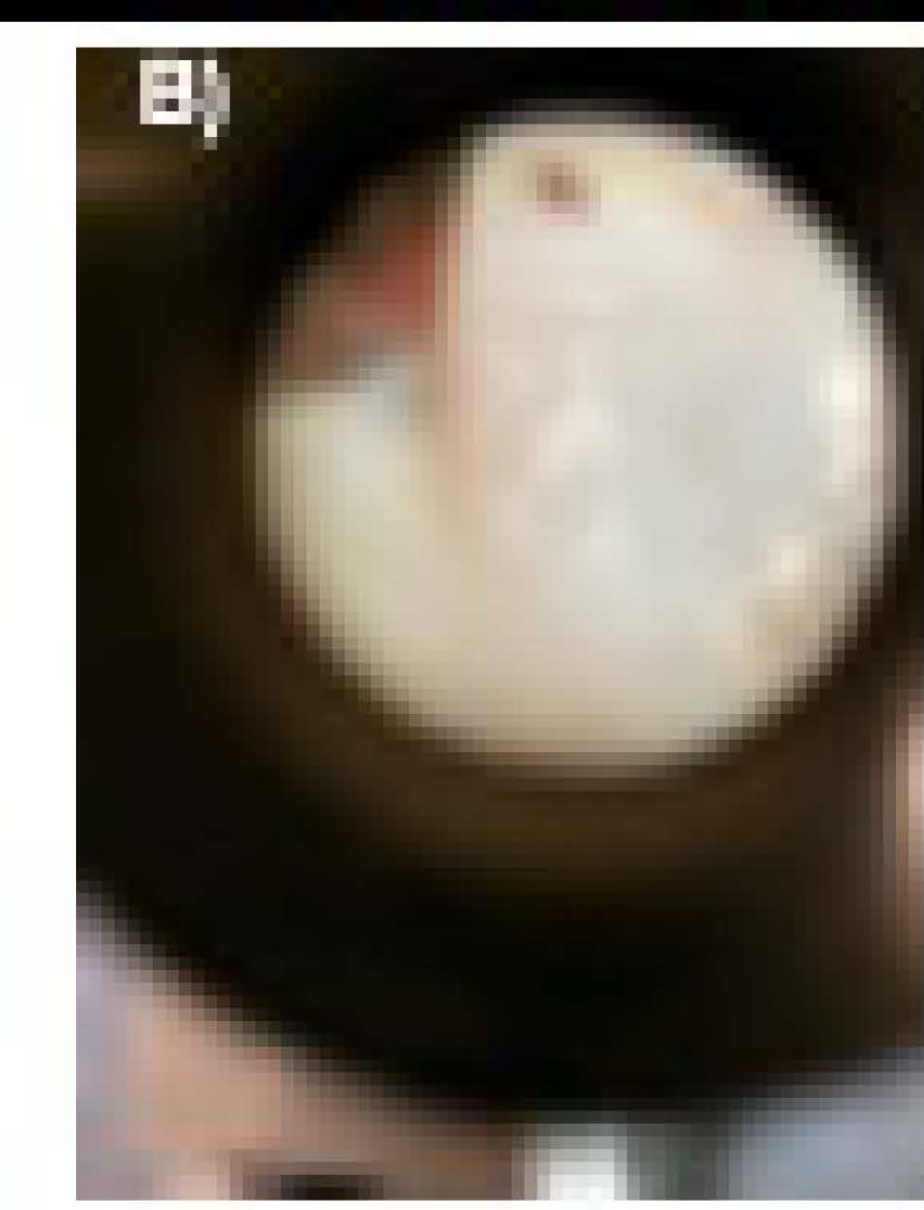
Fig. A) Color coded side view of full assembly with legend B) Close up view of connector jacket.

Testing

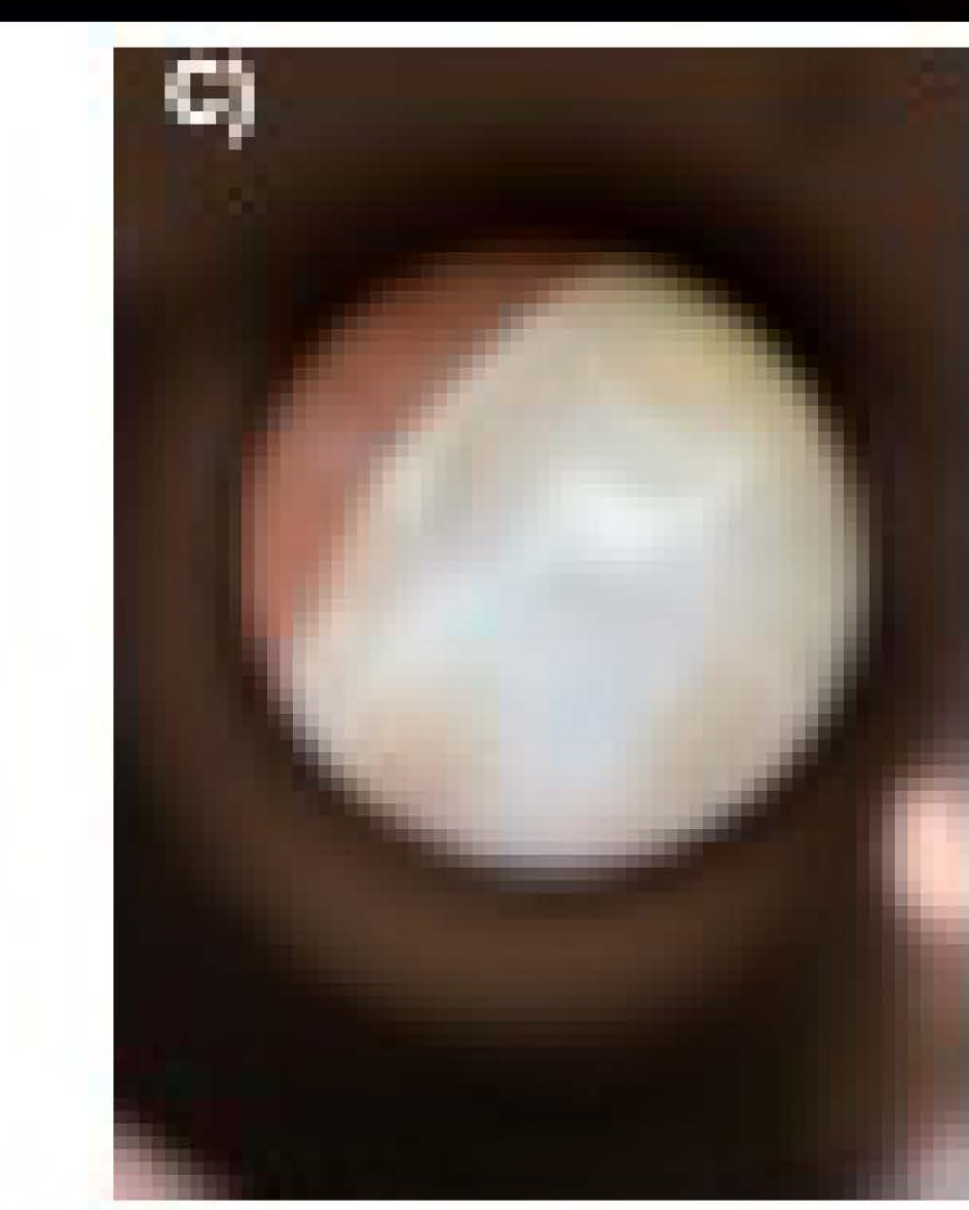
A)



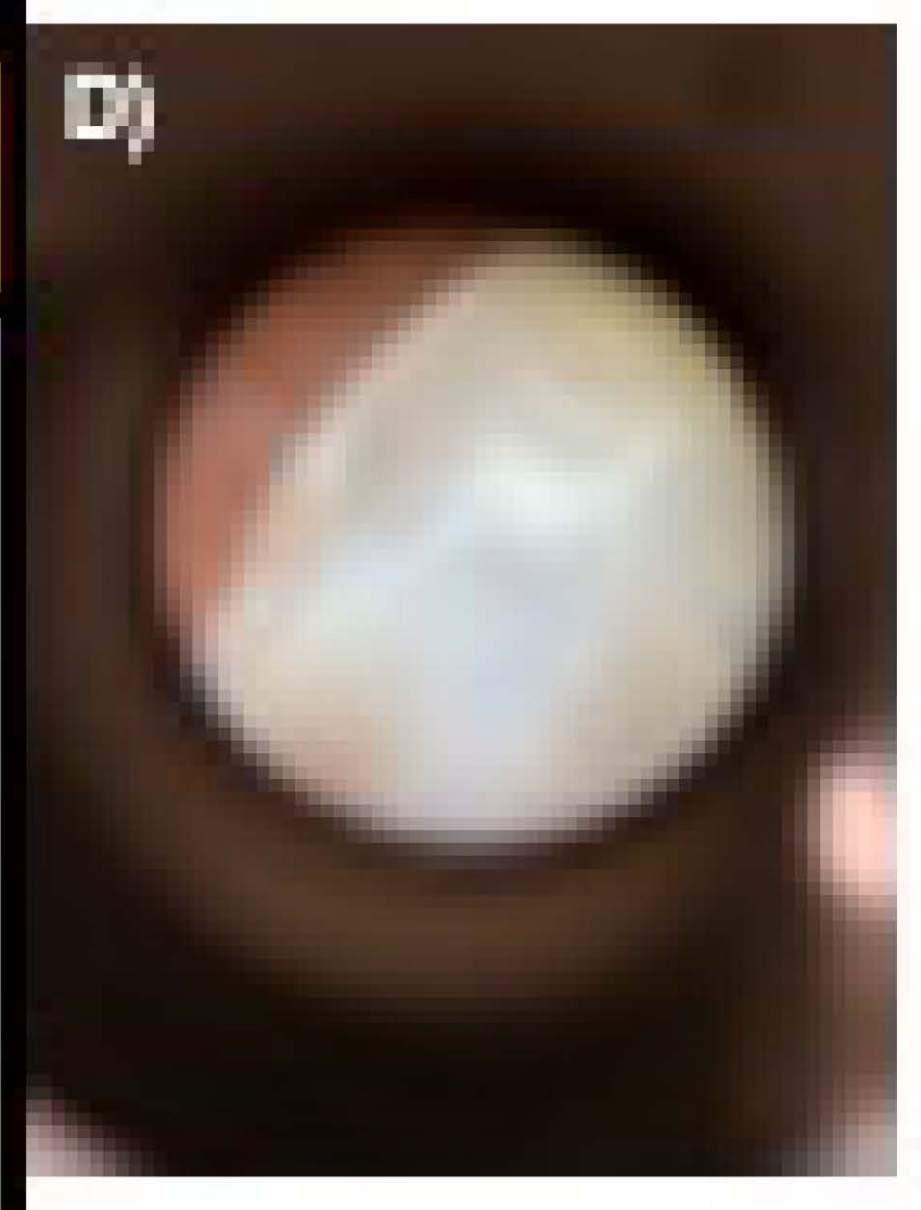
B)



C)



D)



E)

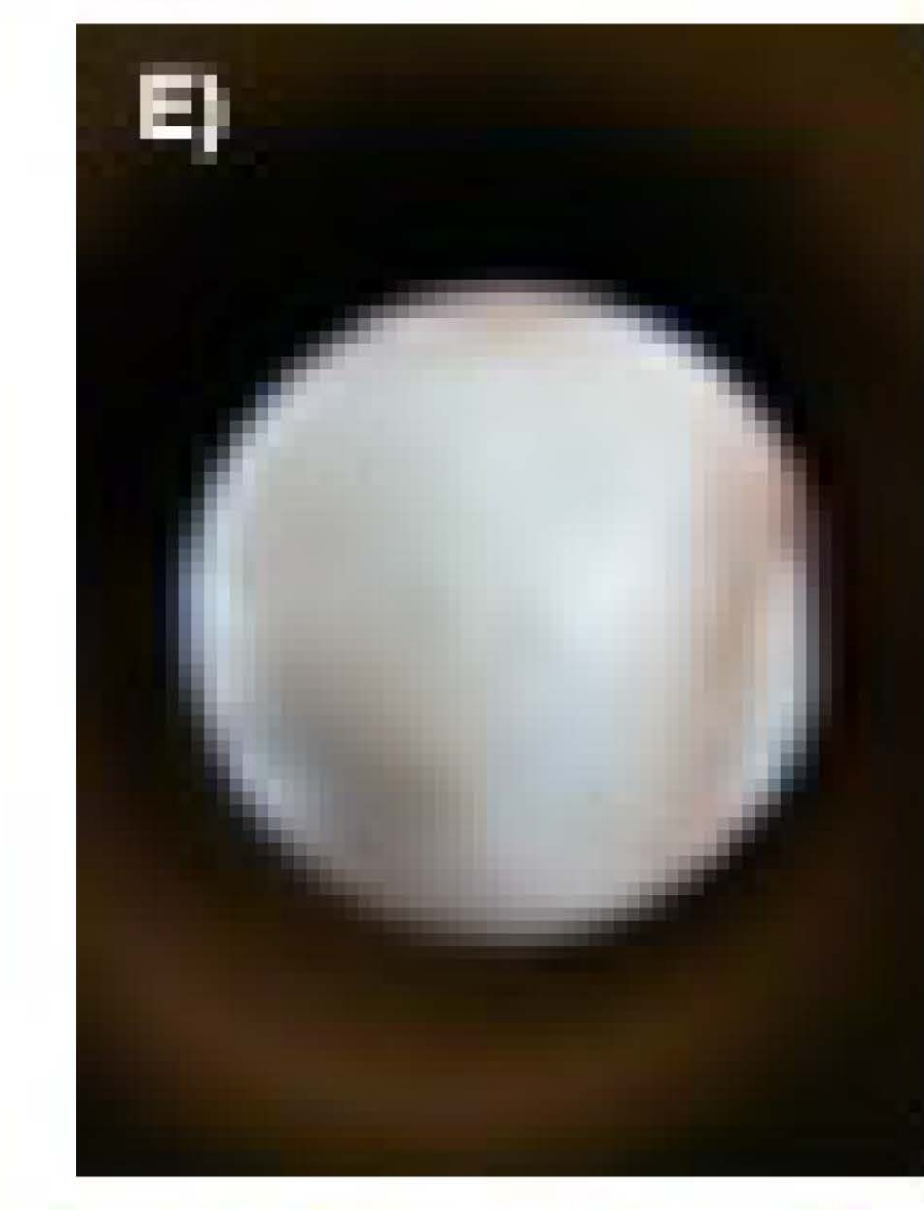


Fig. A) A representation of a healthy knee joint using femoral condyles from a chicken as an animal model B) 40 grit sandpaper was used to simulate articular cartilage injury C) 120 grit paper smoothing test D) 220 grit paper smoothing test E) 300 grit paper smoothing test, this was the grit we chose

Final Prototype

A)



B)



C)

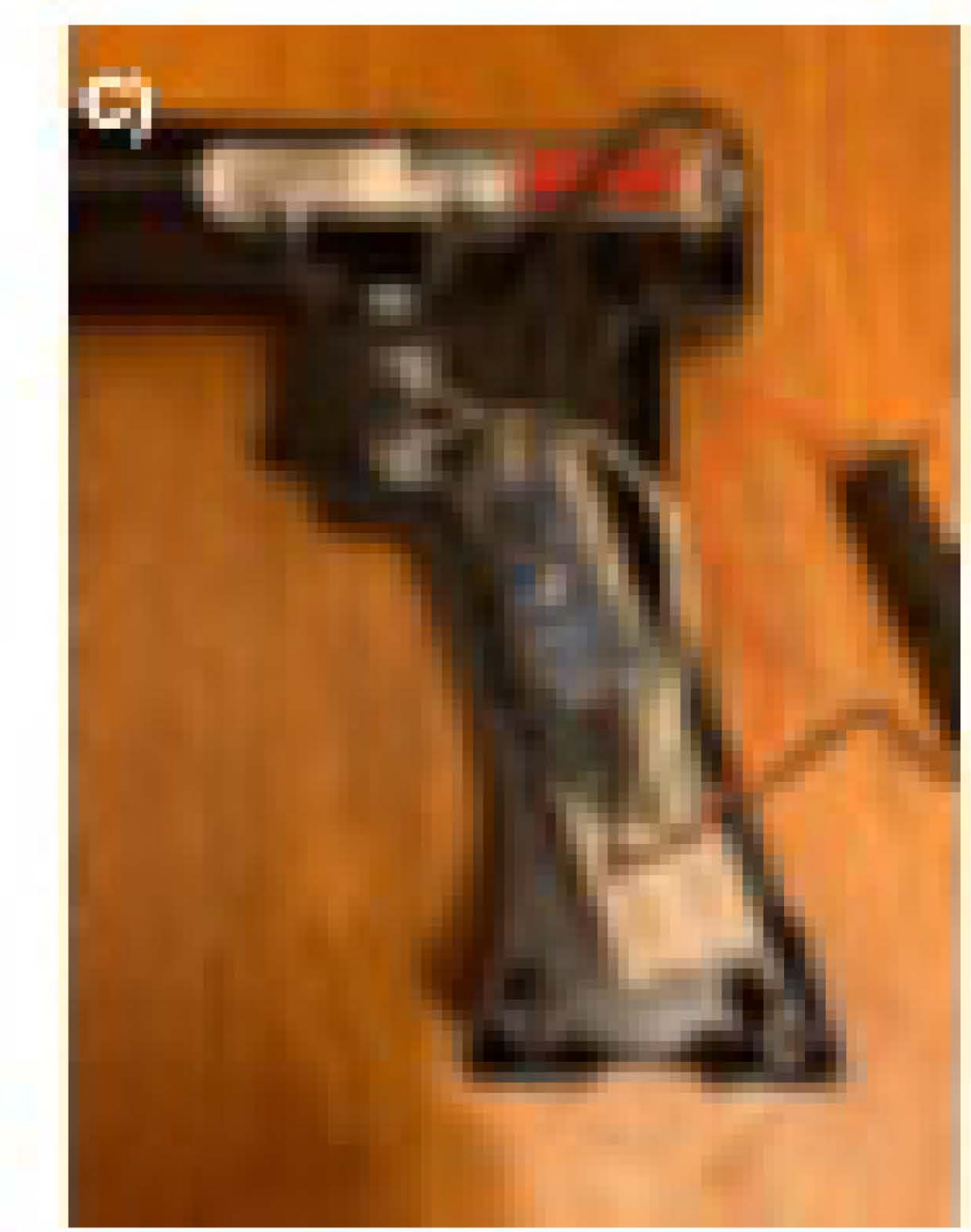


Fig. A) Final prototype with inner components showing B) Final prototype enclosed C) Final prototype circuit board connections

Acknowledgments

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