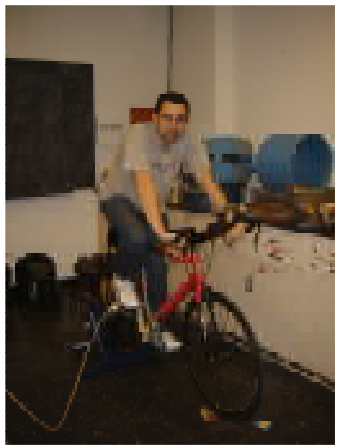
Challenges

Part of every project is encountering and overcoming challenges, and our team has had no shortage of them. Establishing communication with the Garmin unit via the ANT+ chip has in itself generated many obstacles. While these challenges set our project back, they were a necessary step in development procedure. The problems our group faced have been documented well so that future IPRO 324 teams do not run into the same issues.

Looking Forward

Our team has gained valuable experience which will help future IPRO 324 teams and us as individuals. We have taken measures to ensure that this knowledge is preserved.

Our team has documented all of our findings in an organized fashion using iGroups. We have also simplified all of our results and research so that future IPRO 324 groups will have an easier time understanding the underlying principles of the power measurement system.



Team

Preston Andrews
Michael Dvorscak
Michael Fabian
Libby Frebes
James Lee
Jerry Wisniewski

Advisors

Sheldon Mostovoy
Dietmar Rempfer

Special Thanks To:
Kai Hansen at the Machine Shop in E1 basement

iitorque

Integrated Intelligent Torque Measurement System

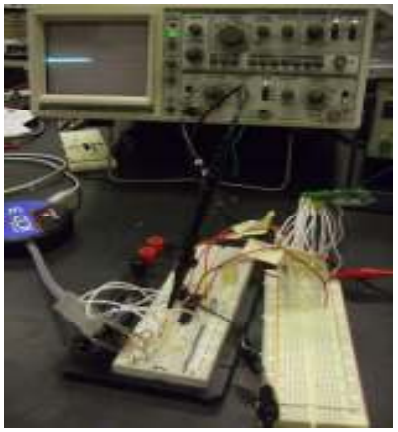
No Strain, No Gain

IPRO 324

Our Mission

Several power measurement solutions currently exist but these solutions are very expensive and special crank sets must be purchased instead of using an existing one.

Our mission is to provide cyclists with an accurate, affordable, and universal solution to measure their power output without having to replace their very expensive merchandise.



Circuit testing

Objectives

- Establish communication between circuit board and Garmin unit via ANT+
- Design new universal housing unit
- Develop a high level interface for current software
- Install a port for future firmware or software updates

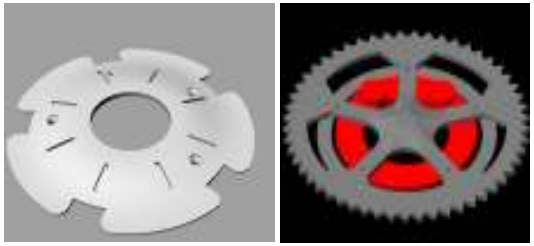
Organization

Electrical Team

The electrical team consisting of James Lee and Jerry Wisniewski focused on adding a micro processor to the current circuit. The addition of this microprocessor is essential to the functioning of the unit as a whole and is basically the center of the circuit.

The microprocessor is responsible for receiving power data from the strain gauge circuit, calculating the power output and transmitting that data to the ANT+ chip. The ANT+ chip then sends the data to the Garmin unit.

The electrical team started by creating new circuit diagrams that incorporated the microprocessor. From there they built the circuit on a breadboard and began testing. The team continues to test the circuit, trying to establish communication between the microprocessor and ANT+ chip before building a PCB board.



Models of the housing unit

Mechanical Team

The mechanical team, Libby Frebes, was tasked with redesigning the housing for the strain gauges. This housing unit helps protect the strain gauge wires and is necessary for power data collection.

The mechanical team worked on many different revisions of the housing design seeking something that will be universal to all crank sets. The design they came up with is displayed below and works on most crankshafts now.

Programming Team

The programming team, Preston Andrews, Michael Dvorscak, and Michael Fabian, worked in conjunction with the electrical team to establish communication with the Garmin unit. This involved evaluating the existing code and then using the new microprocessor to communicate with the ANT+ chip and then the Garmin Unit.

The programming team also decided to clean and reorganize code from a previous semester eliminating numerous bugs and improving the documentation.

A considerable amount of code was also altered during testing working towards communication between the microprocessor and ANT+ chip.