TEAM 83

Make it Real CAD Engineering Challenge

Team 83

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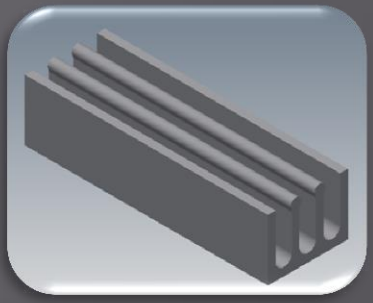
Brief Introduction

- I am Christopher and I have designed a system of two parts to help with wire management.
- I created these parts to solve the issue of wire management. I am a programmer, so wire management is very important if I want to make sure that I have assigned the right sensors to the right ports.
- These parts help to achieve this by providing an easy way to trace wires and cleanly stack and remove individual wires.
- They are an improvement over zip ties and rubber bands because they are easy to work with and are reusable.



Parts Fit in the Robot Design

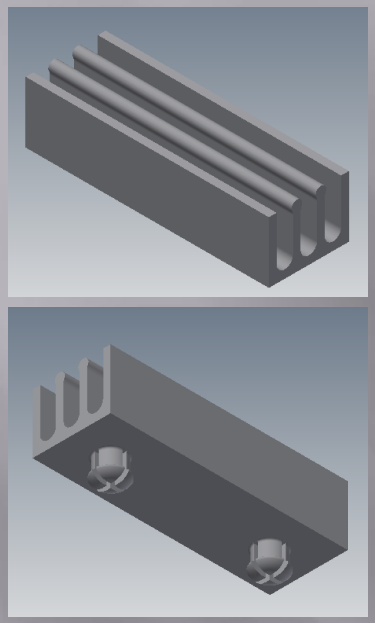
- These parts will be used to:
  - organize wires.
  - help trace wires easily.
  - prevent rat nests.
- These parts fits into the overall design of the robot by:
  - snapping easily into the metal vex pattern.
  - using its modular design to create any wire path.
  - being relatively small and also light.

Parts Designed Using Autodesk Inventor

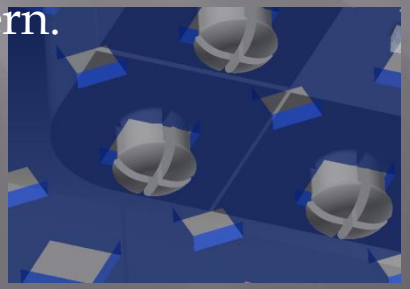
- Inventor was used to make a 3D model of the parts.
  - To make the model, first a simple 2D sketch of a rectangle was made and then expanded into a 3D rectangular prism. Then more rectangles were drawn on top of the box and the same feature was used to cut into it, forming the channels.
  - The snap on piece was made by extruding, or as the process was called above, expanding, a circle outward and cutting a cross into it.
  - The corner piece was made by cutting into a cube and rounding the edges.

CAD Models

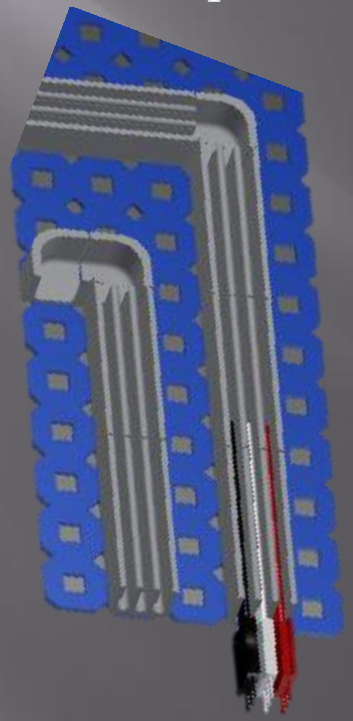
With only two pieces any wire path can be configured.



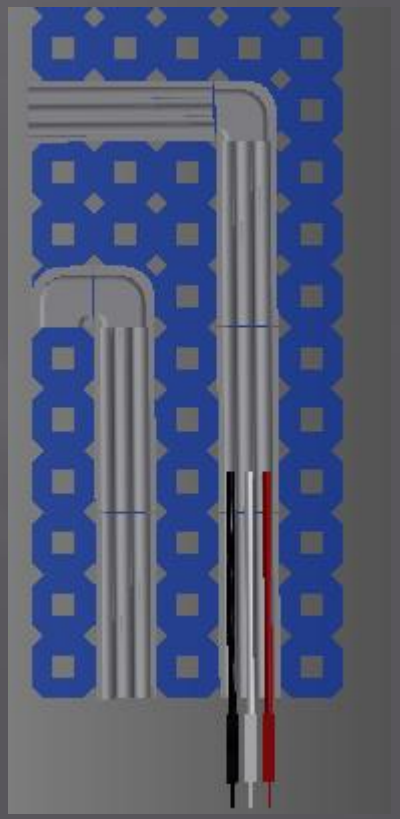
The wire channel snaps easily onto the Vex metal pattern.



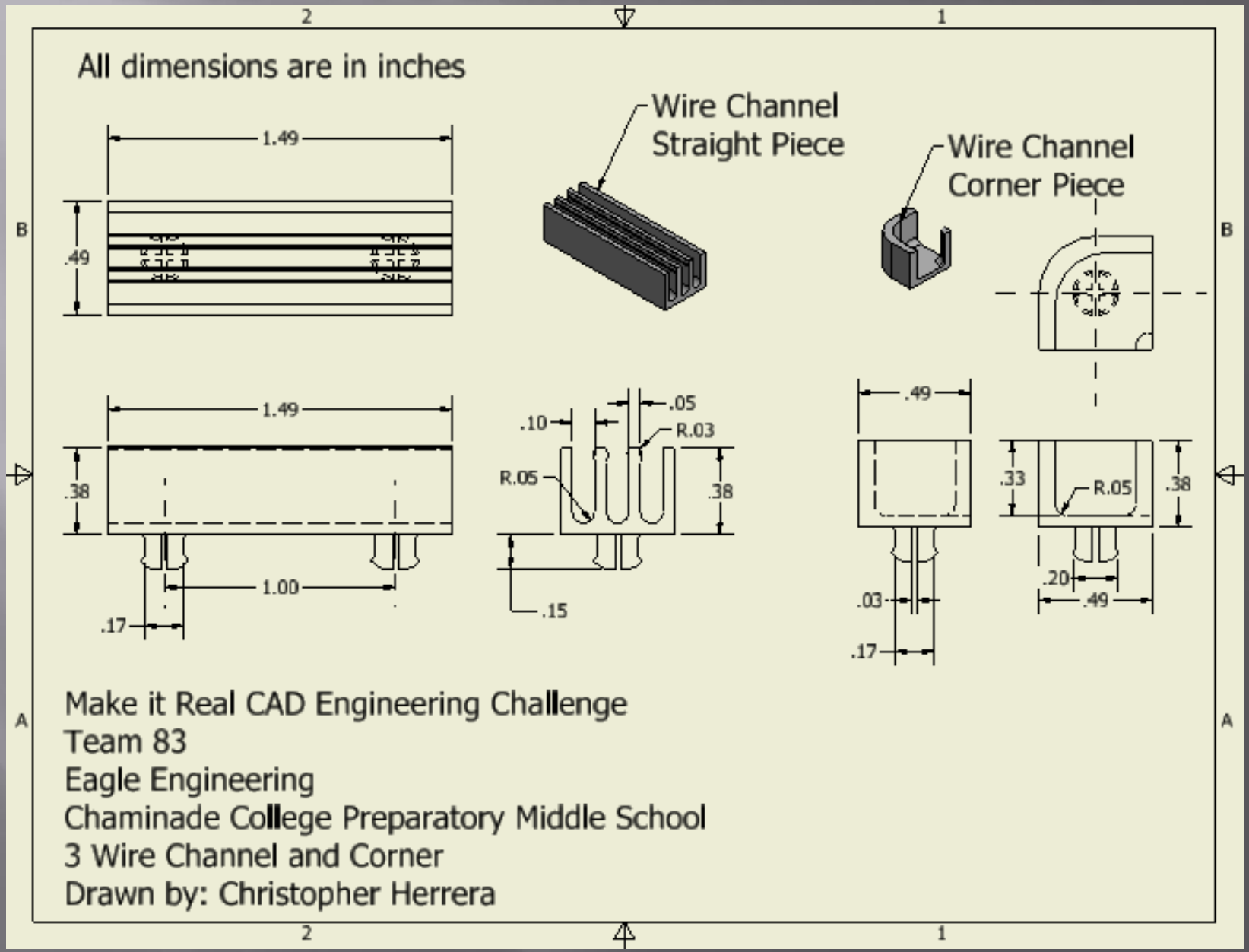
Isometric View of several straight sections and corner pieces



A top view of the wire channel and the corner pieces.

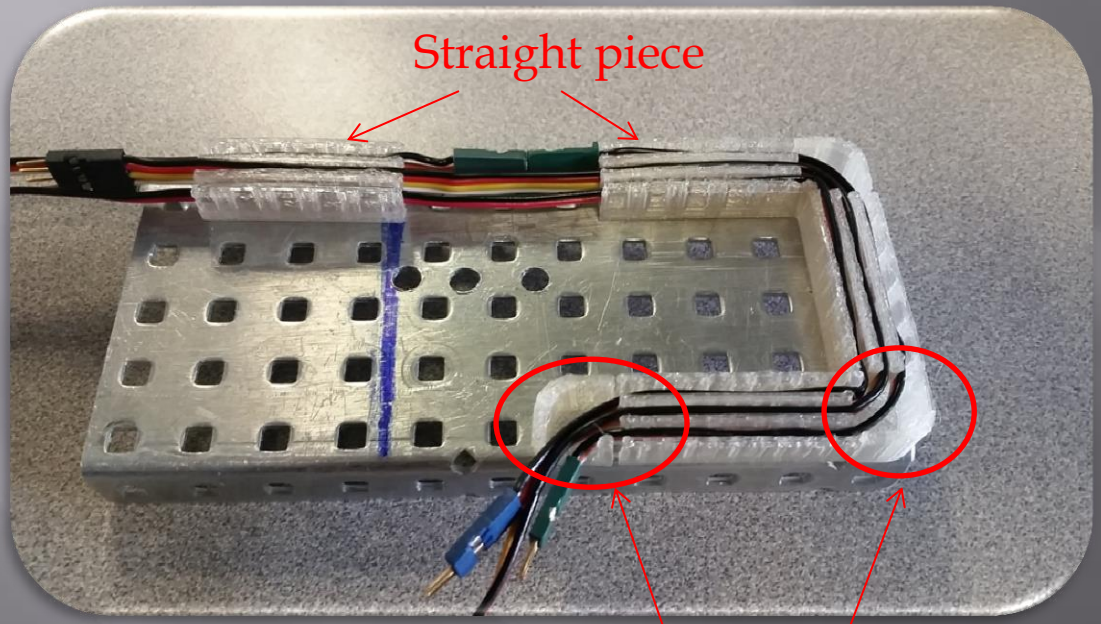


Parts' Mechanical Details



3D Printed Parts

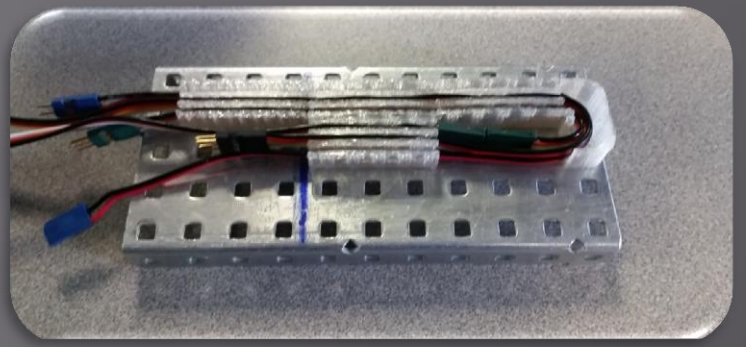
Wire channels on a metal plate.

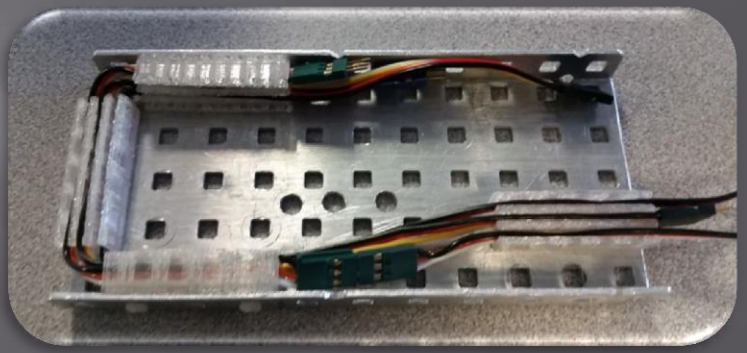


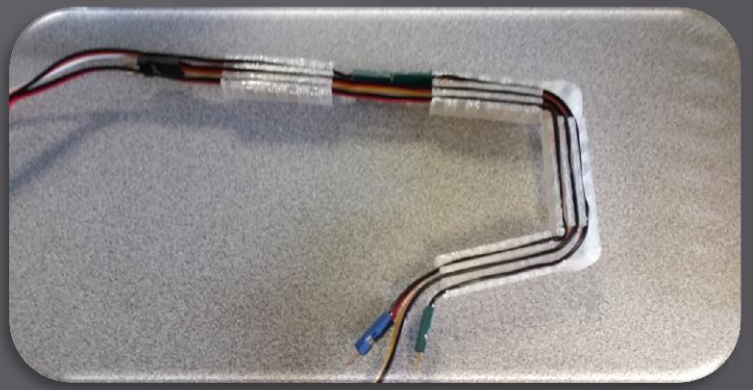
Wire channels snap om easily.

Other Possible Uses

- Many different arrangements can be made.
- The pieces can be used in vertical orientation.
- The wire channels can even be taken completely off of the metal as a harness.







Brief conclusion:

- What did you learn from this project?
  - Simple projects are more likely to succeed than large, complex projects that are poorly planned.
- Will you use Inventor in the future? If so, what for?
  - I most likely will use Inventor in the future. I plan on joining robotics in high school, so I will have to use inventor to model parts for my team in the future.
- How does Inventor help you if you are on a competitive robotics team?
  - Inventor helps to simulate future changes to our robot and test them, such as how hard it would be to make the changes and how much time it would take.
- Will learning 3D design software help you in your career path? If so, how?
  - Learning 3D design software will help because, with 3D printing technology advancing, there will be more of a demand for 3D models that can be used to make physical parts. I might go into a career where this is important, in which case it will be important to know this skill. In fact, learning 3D design software has already helped me: my dad has access to 3D printers, and I used Inventor to make some pieces for a 7th grade project.

Future plans

- I plan on designing some sort of cap that keeps wires in place.
- One improvement would be to find a way to fit the wire connectors in the channel. Since they are wider than the wires, they don't currently fit.