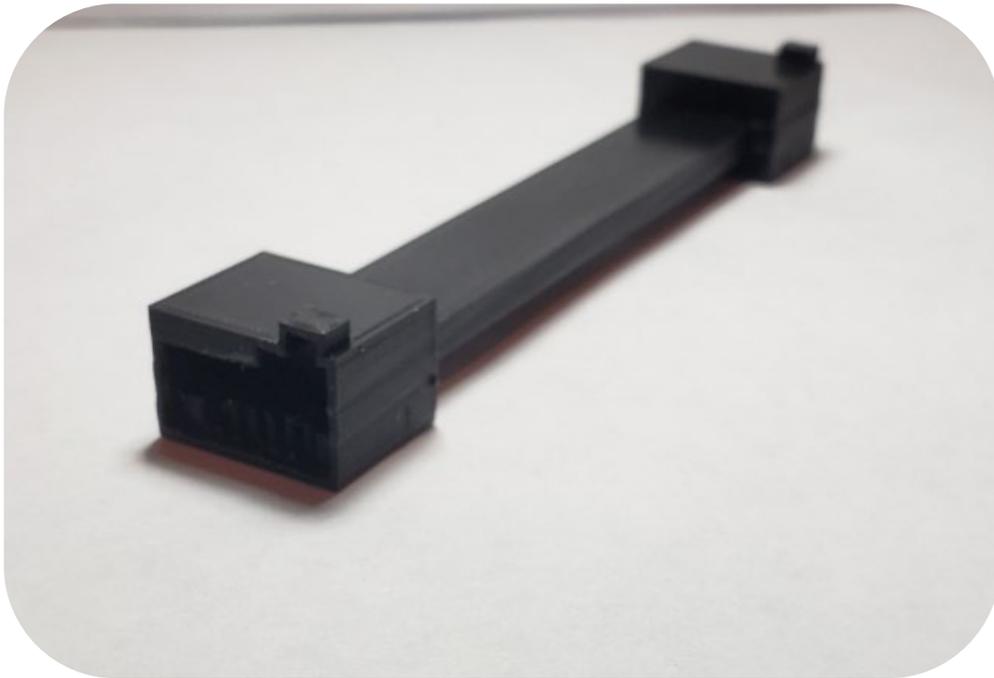




# **VEX IQ Challenge “Make It Real” CAD Engineering Challenge Sponsored by Autodesk®**

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My name is Michael Leung from Great Neck New York. I am 13 years old and in 8th grade. I attend Richard S. Sherman-Great Neck North Middle School and I have always loved robotics.



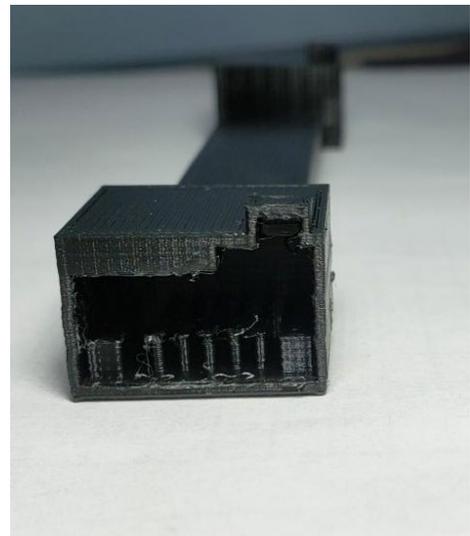
In order to come up with an idea for the “Make It Real” CAD Challenge, my team mates and I had brainstorming sessions to figure out what some of the challenges we have faced in the past when working on our robot. After these sessions, we determined that one of the most pressing issues that we faced was wiring. To help solve this issue, I created a wire extender part using Tinkercad, version 4.10 with the latest updates.

In most of our experiences, we have found that some Smart Cable wires are often too short. Even if wires can be replaced by longer wires, they are sometimes too long and that leads to its own set of problems. A couple of these



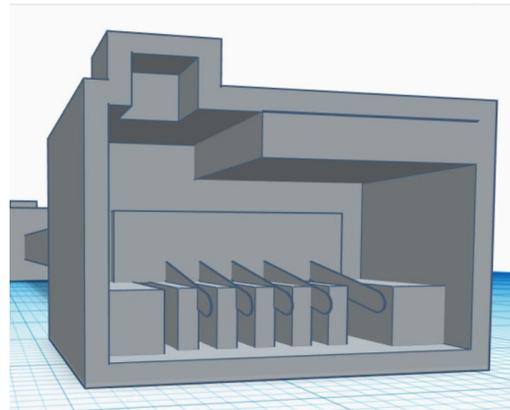
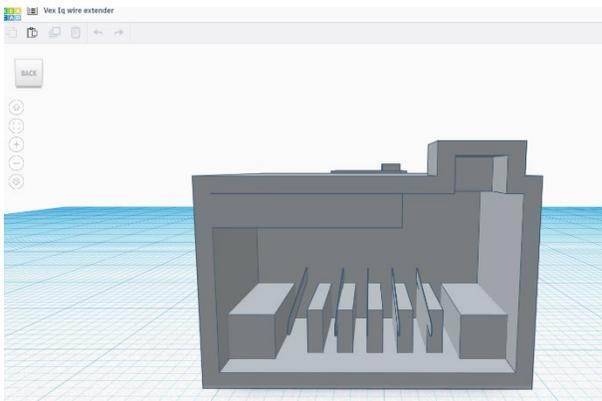
problems is that the wires of the robot becomes hard to organize because of the loose wires and sometimes the long wires extend out of the robot. Sometimes the wires extend out so much that it violates the tournament robot size rules. Another issue we sometimes had was the long wires getting stuck inside moving mechanism such as geartrains.

This wire extender part would solve these problems by providing different sized extenders. Because we 3D printed the part, it would not work as is since it is all plastic and plastic is an insulator. The wire extender would also have all the necessary components like conductors or wires so electricity can flow. There would also be an end cap that would fit around the existing Smart Cables. That would let you connect two wires, with one on each side. Then, the wire would be extended to your preferences which lets it be better equipped and more customized to a robot.

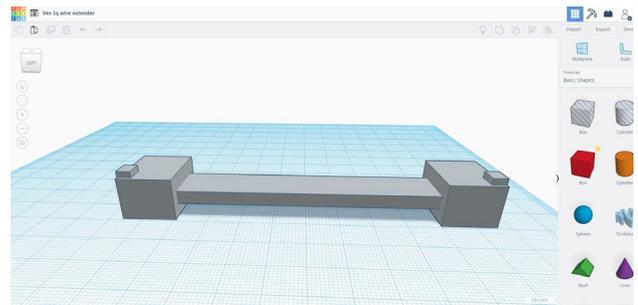


Some future improvements that could possibly happen are more wire extender sizes, new types of wires, and new ways to implement this into a robot. That would let the wire have more capabilities and more applications letting it be a greater product. Another cool feature that could be added in the future is to have a connection part similar to the Smart Cable Anchor. This way it would be a two-in-one part with a wire extender and connecting holes.

To make this part, I used TinkerCAD. I never had to use TinkerCAD to make something for our robot before, so it was a new experience. The first thing I did was to look at a picture of a VEX IQ wire. My whole team is working remotely so we can only look at pictures or communicate with online tools. The next thing I did was to look at some of the devices that the wire can plug into, such as a motor, bumper switch, gyro sensor, and of course the Brain. After analyzing the pictures of these different parts, I sketched my idea on paper. Then I sketched a few more ideas. After sketching, I shared my ideas with my team and we decided what the best one would be.



While in TinkerCAD, I created the wire extender by using the preset shapes and then modifying them. I broke the part into different sections to make it easier to model. I used the box part to make the part where the wire enters, and then used holes to hollow out the insides. I then used more shapes to create the finer details inside the port. I then used the mirror tool to mirror the port part. Then I connected the two parts with a block that symbolized a wire. It was very difficult to create an actual flowing wire because of the limited capabilities of TinkerCAD.



In this project, I learned that there are many solutions to the problems that you may encounter. I came up with many ideas on problems to fix and many types of solutions that I could use to fix them then narrowed it down to one idea. I believe that I will use 3D designing softwares to build things. I find it really useful to fix problems you have or create ideas just by creating it on a software. If I continue to experiment, then I may find new ideas and possibly create something that could help better the future of people other than me.

Adding on to my 3D modeling abilities will help me in a competitive robotics team by improving my problem solving, and by letting me be more creative. If I can work to create my own ideas and parts, then I can certainly do the same for my team. That means I'll be a better teammate and improve my technical skills. It will also help me be more creative by allowing me to create more things and figure out how I can make things work through those softwares. I think that 3D design softwares will help me in future jobs. I believe that learning these skills will eventually help in almost every job. Jobs in the future continue to advance when it comes to technology. 3D modeling

could possibly be used for basically any job. It could be used to map out problems, create solutions, and help people communicate their ideas. Making models on the computer also saves time and it is helpful for our team because we do not need to be all together in order to brainstorm and be creative. Ultimately, I believe that my part that I created through TinkerCAD would be extremely useful for the robotics field. 3D modeling most definitely will be useful in many situations whether it be for jobs, extracurriculars or everyday life.