



Reverse Engineering

# Nerf Rapidstrike CS-18

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By The Pilot G-2's



# Introduction

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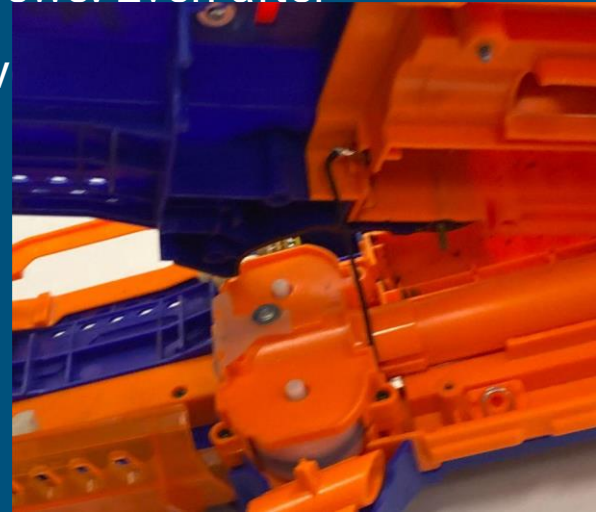
For this project, we chose a nerf gun. More specifically, a Nerf Rapidstrike CS-18. This was chosen because one of the team members already had one that we could disassemble, and it was believed the electronics would be relatively complex.



# The Shell

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The first step in taking apart the gun was to take off the plastic shell. The shell holds all the mechanics. It had a lot of screws, and took a while to open. The shell was made up of two parts that are connected by screws. Even after opening, there were still several wires holding the two halves together.

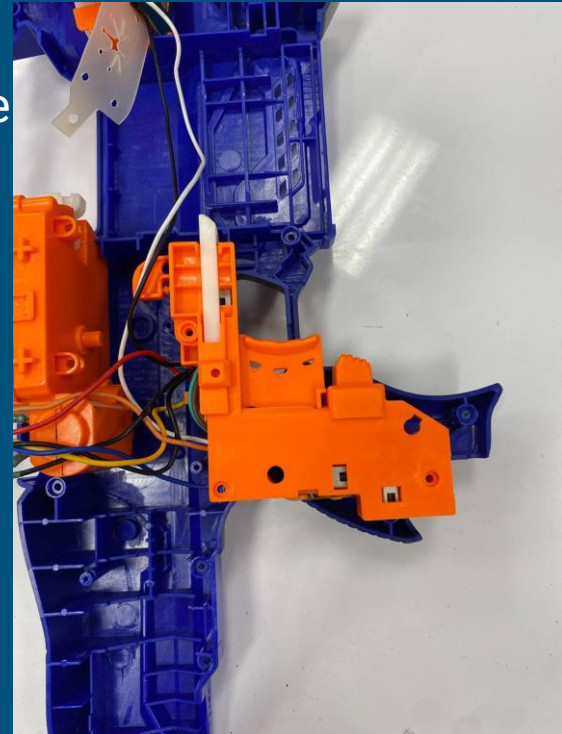


# The Insides

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After opening the gun, the next step was to take everything off of the shells. Not everything was screwed in tho the shells, many peices fell out as the halves came apart. Among these pieces were the jam door, the rings for the sling, and the parts that make up the magazine release system.

Some of the bigger parts, like the flywheel, the dart-pusher, and the trigger mechanism, where screwed in.



# How It Works Part 1: Flywheel and pusher

Some might think that a nerf guns mechanism is super complex, but the truth is, it is actually pretty simple.

The goal of the nerf gun is to fling foam darts at people, and it does this with a flywheel mechanism (fig 1), which spins in opposite directions to fling the darts out of the blaster. Figure 2

The darts don't just magically appear within the flywheel, so you need a pusher mechanism to push the darts out of the magazine, and into the flywheel. (Fig 2)

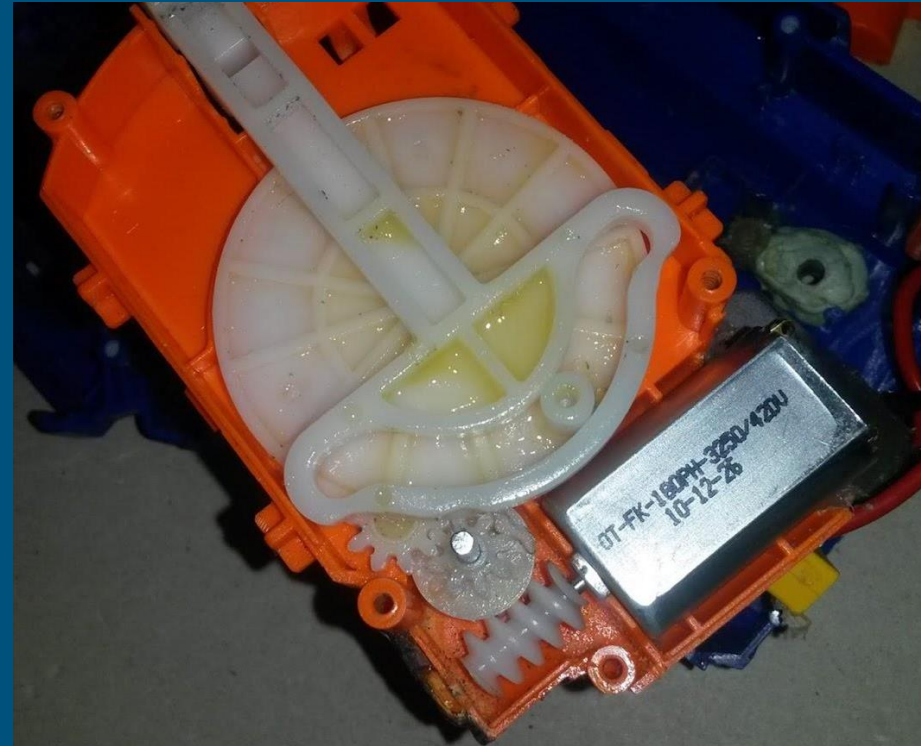
Figure 1



# Pusher Mechanism ctd.

The pusher mechanism works by using a nifty scotch yoke, where the pusher has a slight interval between firing (larger in the retracted position), caused by the curved part of the design.

there are multiple gears here, which serve to rotate the motion of the motor sideways, as the motor would not fit within the blaster otherwise. They also alter the gear ratio.



# Trigger

The trigger mechanism works by sensing when the trigger has been pushed, and sending signals to the other parts of the gun, telling them to turn on. It also has sensors to tell if both the magazine is in the gun, and the rev switch is being pressed, to know when to fire. It the trigger should be able to be pulled.

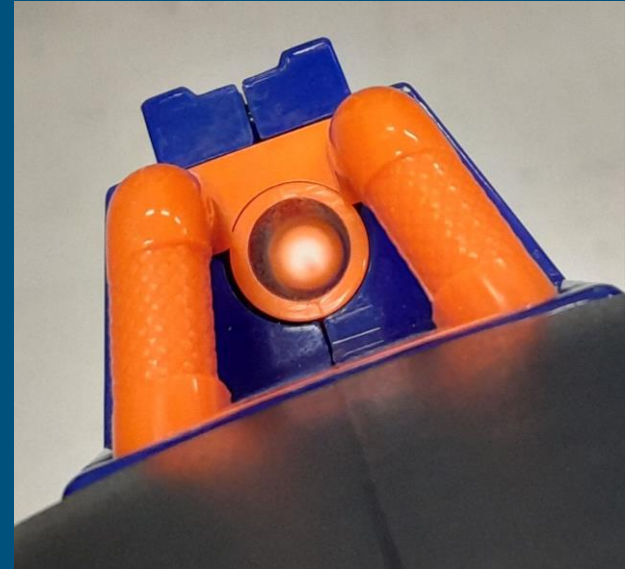


# Other parts

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Here are some of the parts that we didnt feel like they needed a huge explanation. The Sling mounts -These are the rings that you can connect straps, or other objects to the gun with. They are held onto the shell by internal pegs, and could be removed by disassembling the blaster.

The Sight- The sight is made up of three pieces, the two inside cylinders that give a smooth inside of the gun to look through, and the sight, which is at the end of the gun. Aligning these three pieces creates a sight picture, which is more than adequate for the range and accuracy of the blaster in question.





# Conclusion

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There were many lessons learned during this project. The team learned to take their time coming up with a plan for doing something before starting. Overall, we really enjoyed the process of taking a nerf gun apart, and will probably do this again in the future.