

# Frame Drawing Guide

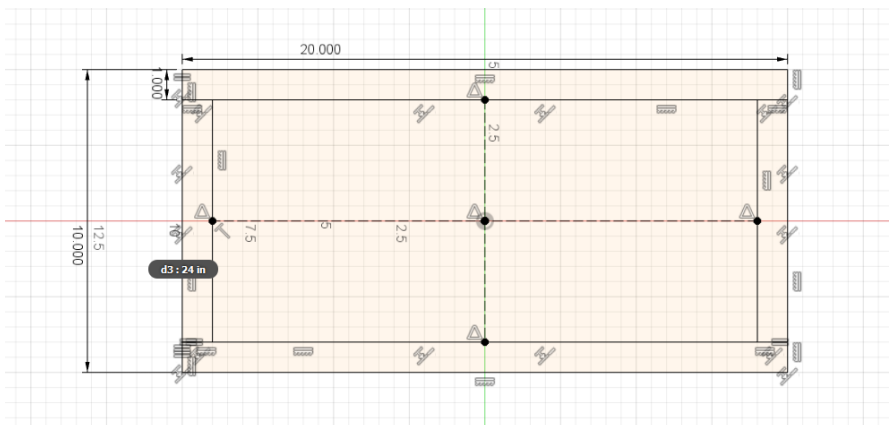
Document #190127b

January 27, 2019

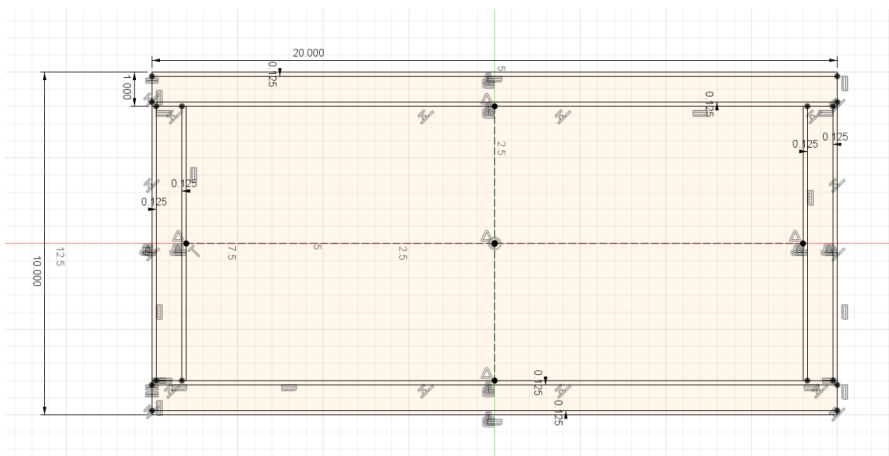


This guide will walk you through the process of drawing framing components. You can think of frames as series of planes that have tubes on them. For example, our 2019 robot frame has 3 planes. One is the horizontal drive base plane, and the other two are vertical planes for the arm support structure. This guide will describe the drawing of one section of frame made from 0.125" thick 1"x2" rectangular tube. See the Tube Lightening Guide to see how to lighten the tubes, and the Gusset Guide to see how to add gussets.

- Use an existing plane or create an offset plane to define the center plane of your new frame section(s).
- Draw your frame by using rectangles (key "R"), colinear constraints to butt the ends of tubes against the sides of another tube, and equals constraints for the ends. Draw in any critical dimensions, especially the tube width (1" in this case).



- Click each long line on the tube, press "O" to create an offset line, then offset the lines by the thickness of the tube (0.125" in this example). Be careful to not offset the entire rectangle, as we do not want to offset the small lines at the end.



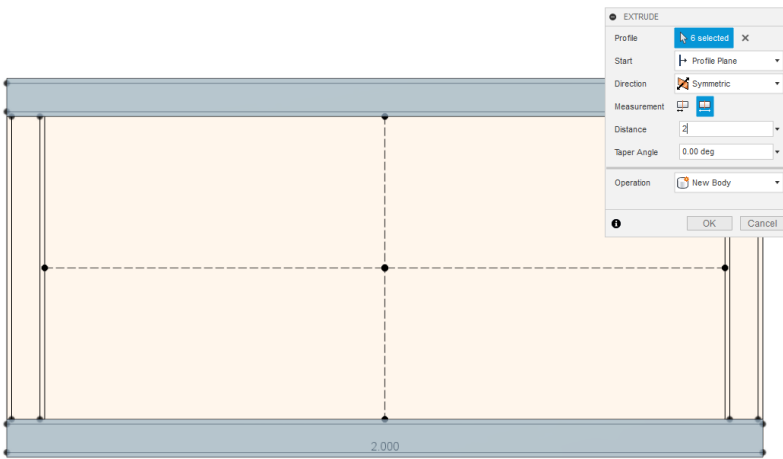
# Frame Drawing Guide

Document #190127b

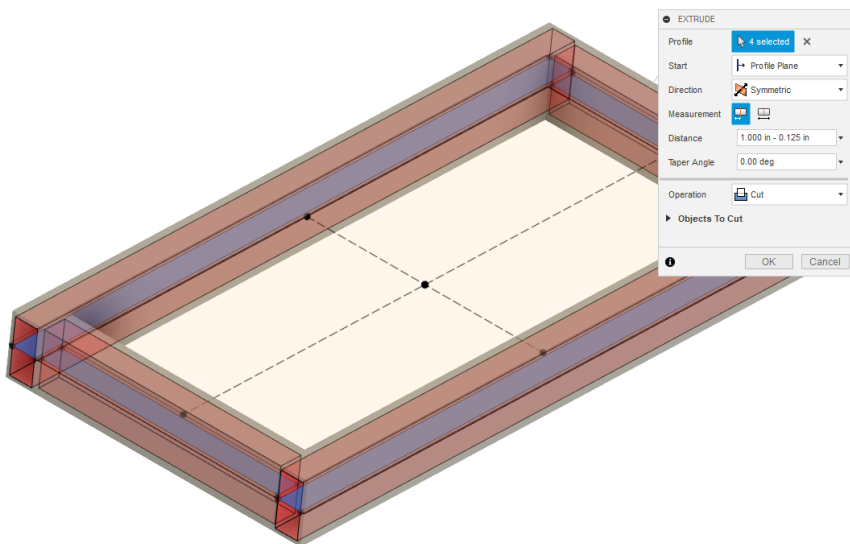
January 27, 2019



- Extrude all the tube rectangles into new bodies or new components. The length of the extrusion is the other dimension of the tube (2" in this case) and ensure it is extruded symmetrically and the dimension is whole length (otherwise the tube will be twice as large as you want). This will likely require multiple extrusions, because extruding two tubes that touch will lead to them being combined into one body.



- Now cut extrude the smaller rectangles inside the larger ones to hollow out the inside of the tubes. Cut symmetrically to the outside of the tube, then subtract the tube's thickness (0.125" in this case). Use half length measurement this time.



## Frame Drawing Guide

Document #190127b

January 27, 2019



- Now your frame is drawn. To add in holes, draw the circles in a midplane sketch for the relevant tube (you may need to create new midplanes for this) and then extrude. For rivet holes, try to pattern them in 0.5" increments, with the last hole being 0.5" from the edge so we can use our standard gussets.

