

Rapid Prototyping

Instructions for Identification Tag and Part Submission

Summary

All part files submitted for rapid prototyping must have an ID tag as part of the file. You will be using Pro/E to prepare and ID tag part, save it as an .stl file (a common format for rapid prototyping) and then use CatalystEX software to prepare a .cmb from the .stl. Once you have prepared the .cmb file, you will copy it to a shared directory on the T: drive server. The .cmb file will then be used by a Dimension brand Fused Deposition Modeling (FDM) machine to fabricate your part into a prototype part made of ABS plastic.

Instructions

Create an ID Tag

1. Open Pro/E and create new part: Make a small extruded rectangle 8 x 35 mm (0.33 x 1.4 inches) and 1mm thick. If necessary to hold all of the text, the rectangle can be made longer later. The default dimensions in Pro/E are usually inches. You can change this to mm by going to Edit > Setup > Units.
2. Now, write your ID string on the surface of the rectangle. To make text in Pro/E, create a sketch on the surface of the rectangle. In the Sketcher, select the Text tool. The shortcut button looks like and “A”. At the location where you want the text to begin, draw a vertical line to specify the height of the text you want to make. Make the font at least **6mm high** (or 0.25 inches). You should have been given a student number by your GSI. The ID text format is *Class-Student number* (see figure below).
3. Once you have the text written and positioned correctly, close the sketch and extrude the letters to a thickness of 1 mm (0.04 inches).
4. Save this ID tag as a Pro/E part file, to be used whenever you send a part in for rapid prototyping

Combining the ID Tag with a Part

5.

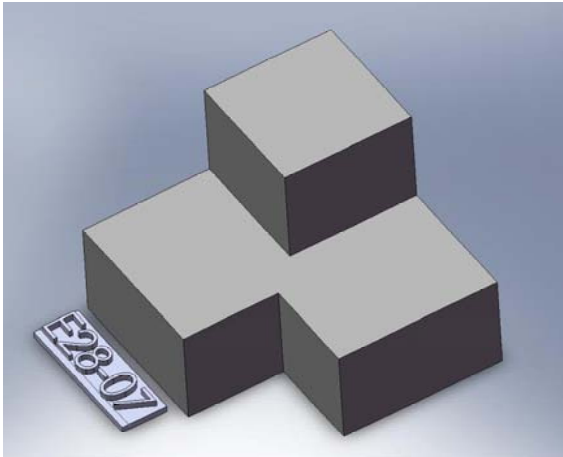


Figure 1 Solid model with ID tag sitting on the same plane as the part. Save the entire assembly as a single .stl file

6. The orientation of your part should be optimal for rapid prototyping (your GSI will discuss this with you), but if it turns out to not be optimal, you will have to repeat steps 6-9 and 11-13 and re-save your .cmb file. You may want to open just your part in CatalystEX (see steps 11-13) and play around with the orientation before completing steps 5-8.
7. Once your part is correctly oriented, place the ID tag next to the part, approximately 2 mm away. For assemblies, create a coincident mate between the bottom of your part and the bottom of the ID tag, so that they both sit on the same plane (See Figure 1).
8. Save a copy of this assembly as an .stl file. **Be sure to click to save all the parts into a single file.** Adjust the chord height and angle control as needed to get the resolution you want. The naming convention of the file should be:

Course-ID number-PartName.stl

For example, a student in E128 with an ID number of 07 making a Salt Shaker would put:

E128-07-Salt_Shaker.stl

Also, if you would like your part to be fabricated with soluble support material, put an “S” before the part name (e.g. E128-07-S-Salt_Shaker). This S will let us know to fabricate your part with the Dimension 768. Otherwise, it will be fabricated with the Dimension 1200 machine (Your GSI will discuss this option).

Making the .cmb file with CatalystEX

9. Open CatalystEX software (listed under Dimension in the Program files) and then open your .stl file (File > Open STL). Catalyst often shows a message that your part is very large or very small and asks you if you want to switch to mm or inches. Generally, choose the units that you used to make the part. The grid that your part appears on is about ten inches across, so if your part is filling up the entire grid, then it's probably too big and you should close the file and start over again. Typically, most of the parts that you will be making should occupy 1-4 grid squares.
10. Go to Tools > Options, select CMB Save Path and choose your H: drive from "My Computer" Your H: drive is listed with your SID number.
11. Choose the density of the model interior (sparse or full) and the density of the support material (sparse).
12. Click the Orientation tab and orient the part with the ID tag facing up. Select the "Bottom" button and then click on the bottom of the part. Check to see that the orientation is correct.
13. Click on "Process STL". The software will automatically place support material where needed around your part and then write a .cmb file to your chosen .cmb path. Fill material is shown in red and support material is shown in gray. This is where you may decide to orient the part differently, for example if you see a different orientation that will use less support material. If you wish to change the orientation of your part, you will have to return to step 6 above.
14. Check to see that the volume of material used is no more than 1 cubic inch. Click "Add to Pack" and then choose the Pack tab. The volume is shown in the upper right of the window. If you are using much more than 1 cubic inch (16.4 cubic cm) of material (model and support combined) then you should scale down your part. Scaling is done in the "General" tab. Also, if your part is much less than that volume, you may want to scale it up. Return to the "General" tab, scale the part, and process the file again. Note that the fabrication time for your part is also shown (hours:minutes) in the "Pack" tab.
15. Once you have a finished making your .cmb file, transfer it to the **3dPrint** folder on the T: drive in "My Computer. Make sure that it is the .cmb file and not the .stl file that you are transferring to the T: drive.