Dimension 3D Printer - BST 1200es

Training Manual

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Overview

The Dimension 3D Printer BST 1200es is a Stratasys FDM printer that runs on **CatalystEX software**. The material used is **ABS*plus*™**, a production grade thermoplastic that is durable enough to perform virtually the same as production parts, with a variety of color options and breakaway support material. The build envelope is 254 x 254 x 305 mm (**10 x 10 x 12 in.**) and can print a resolution as precise as 0.254 mm (0.010 in). To print, parts must be in .STL format.

Resources

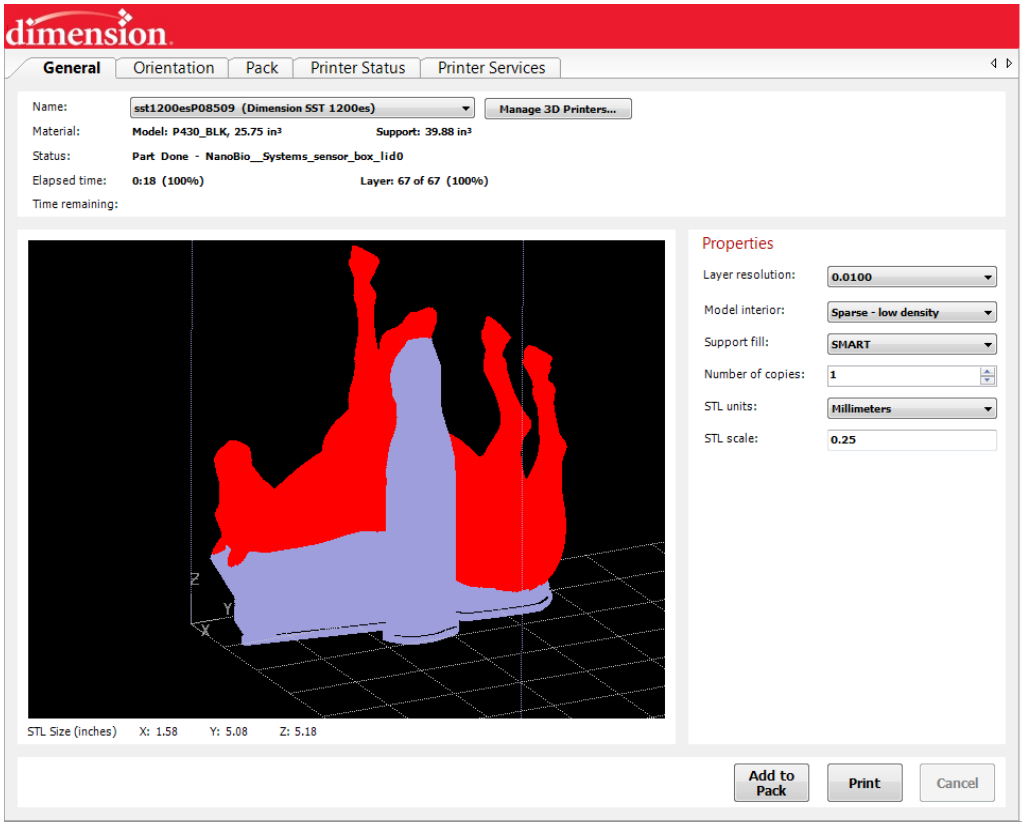
1. You **MUST** watch this video from 2:11 - 10:50 https://youtu.be/zUaFLFlAm3A?t=2m11s
    a. Note: Our printer **only uses ABS**, and you can ignore comments about lab managers.
2. Dimension User Manual https://www.rnd-tech.com/media/fdm-pdfs/dimension-1200-es.pdf
3. Quiz (contact DSTA)

How to Print

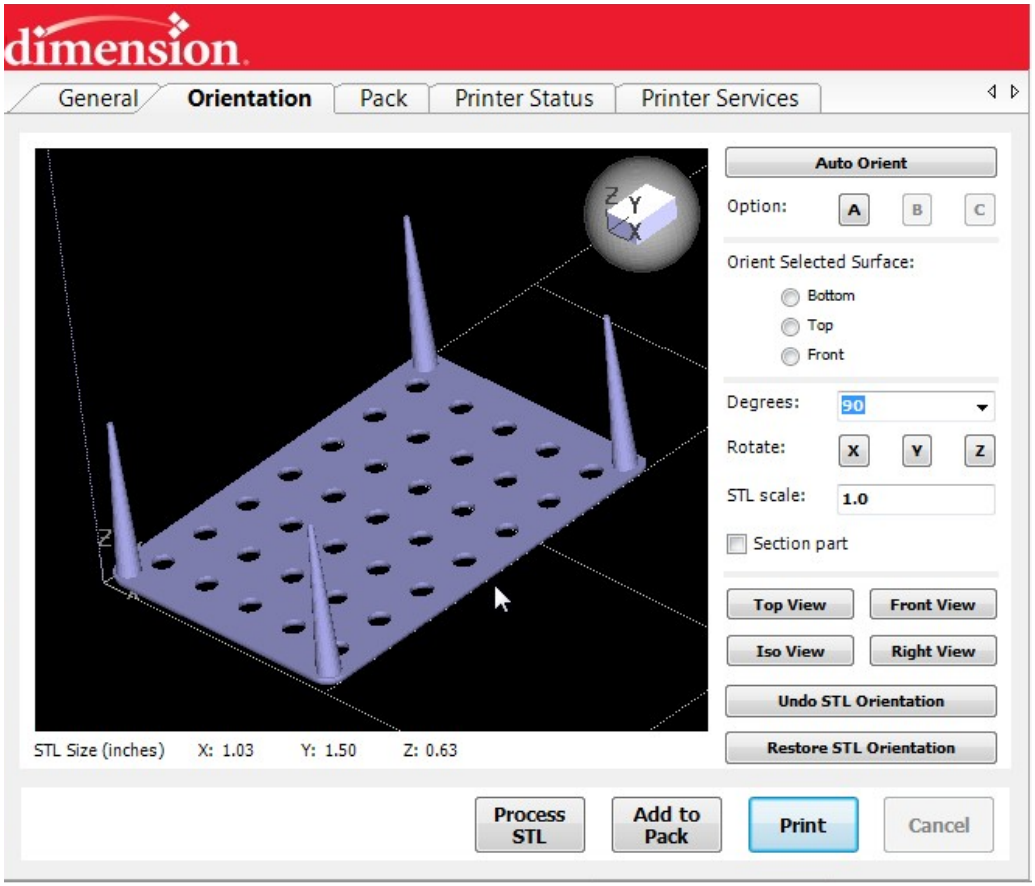
1. Prepare your design as a .STL file using SolidWorks, CREO, or any other 3D modeling program. Save the design on a USB flash drive.
2. Open CatalystEX from the desktop on the computer next to the printer. This software is not available on any other computers in the DS. Drag in the STL file, or **File → Open**

    a. **General Tab**:

i. Adjust layer resolution
    1. A **smaller** resolution will make a finer print while a **larger** resolution will print faster
ii. Model interior
    1. **Solid** can be used for a more durable part, but will increase print time
    2. **Sparse high density** is the default mold interior style to use less material and reduce printing time
    3. **Sparse low density** can be used to further reduce material used and printing time, but will result in decreased part strength
iii. Support fill
    1. **SMART** is ideal
    2. **Basic** may be used for most parts
    3. **Sparse** minimizes the amount of support material
    4. **Minimal** is used for small parts that have small features in need of easily removable supports
    5. **Break-away** is easier to remove than other support styles but builds slower than sparse supports
    6. **Surround** will envelop the entire model
iv. Number of copies
v. Set STL units
vi. Adjust STL scale based on dimensions in the lower left corner

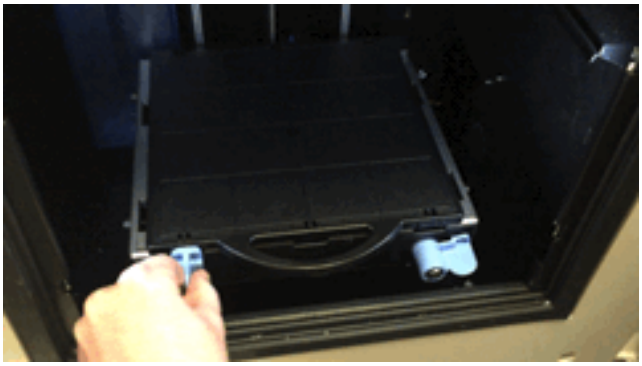


b. **Orientation Tab**:
   i. Generally, **Auto-orient** will be sufficient. However, you may choose to reorient the part manually (see below)
   ii. **Process STL** to see how the part will print
      1. **White** represents the support material
      2. **Red** represents the model material
   iii. Select **Restore STL Orientation** to return to the original orientation
   iv. When you are satisfied with part orientation, select **Add to Pack**
   v. Part positioning:
      1. Minimize the number of layers with combined support and model material (this increases print time)
      2. Minimize the amount of support material required if possible
      3. Orient the part so that curves or sloped surfaces are in the XY plane
      4. Avoid tall, thin features, since parts print the weakest along the Z axis



c. **Pack Tab**:
    i. Place your part as close to the printer head "home" as possible (**upper right corner**). This reduces time spent for the printer head to move to the part location.
    ii. View how much printer **material** will be needed (upper right hand side), how much material is left (upper left hand side), and the estimated print time (upper right hand side).
    iii. Note: Unlike other printers, the Dimension can print until you are completely out of material, replace the material, and your part will continue to print where it left off.
    iv. Click **Print** to add your pack to the queue
d. **Printer Status Tab**:
    i. See printer status and part queue

3. Open the printer door. If it is locked, the printer is still busy. Place a **clean, black tray** with the handle facing towards you on the metal plate. **Be careful of hot surfaces.** When the tray's tab fall into place, push the black tray forward to lock it in place. Turn the blue knobs



to point upwards. A good, clean tray has no residual material and is not damaged or dented. More trays can be found in the black drawer to the left of the printer.

4. Close the printer door. On the Dimension screen, select **Start Model.** The printer display will show the model name, as well as the model and support material remaining. Wait for the printer to calibrate and being building before you leave. If the printer cannot calibrate, try another tra

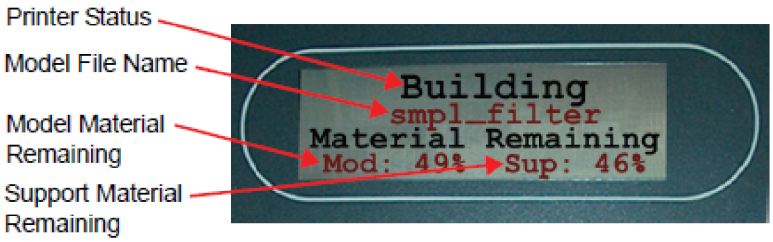


***Figure 2**: Display panel while a part is printing.*

5. When the print is complete, the panel will display **Completed Build.** When reaching in the machine, **be careful of hot surfaces** (gloves in bottom printer cabinet if needed). Open the

printer door, release the tray by turning the blue latches on the front, and pull the modeling tray out towards you.

6. Insert a new tray and close the printer door. The display will ask **Part Removed?**. Select **Yes**, and the display will show **Ready to Build**.
7. Remove completed part from the tray. Flex the tray diagonally to remove the part. If the part is difficult to remove, carefully scrape it off.
    a. If the part has cooled and is difficult to remove, try warming it in the printer chamber to ease removal.
    b. If needed, *lightly* tap a chisel with a mallet to remove the part from the tray.
8. Remove support material from the part. Gently twist of scrape the support material away from the part. Use needle-nose pliers if necessary.

Printing Rules

1. Do NOT skip other parts in the queue unless your print is extremely quick.
2. If your print is longer than 7 hours, you must print after 8pm on weekdays or over the weekend.
3. If you print is longer than 12 hours, you must print over the weekend.

Colors Available

Ivory and black model colors are available. **If a special color is desired please contact Dr. Logsdon.**

Changing Material & Maintenance

Change material cartridge either to change colors or replace an empty cartridge.

*Note: If the material cartridge is low this printer will print a partial part, and **continue to build after replacing with a second cartridge**. Make note of the material remaining when you print in case this occurs and your print needs to stop for new material, but please **use the materials in their entirety.***

Unloading Material Cartridge

1. From **Idle** or **Ready To Build**, Press **Load Material**.
    a. The panel displays **Load Material** and prompts with, **Replace model?**
        i. Press **Yes** to unload the Model Material or **No** if you do not.
2. The panel then prompts with, **Replace support?**
    a. Press **Yes** to unload the Support Material or **No** if you do not wish to unload the support material.
3. After you have made the above choices, the panel displays **Unloading** for approximately 2 minutes (the selected materials will be unloaded from the extrusion head).
4. When unloading is complete, the panel will prompt you to remove the cartridge(s).
    a. Push cartridge forward gently and then pull it out of slot.

i. Roughly 213 cm (7 feet) of filament will be pulled out of the system. Trim it off **leaving 2-3 cm exposed.**
ii. Wrap tape around the exposed end to prevent the filament from retracting back into the cartridge.

5. Write the **percent of material remaining** and the **date** on the label to keep track of the full, partially used, and empty cartridges.

Loading Material Cartridge

1. When loading an unused cartridge, start by removing the red sealing plug from the cartridge.
    a. Turn the plug a quarter turn counter clockwise.
    b. Lift up the plug to remove it from the cartridge.
2. Pull filament out of cartridge about 20 cm to ensure the filament fill feed freely from the spool.
3. Cut the filament flush with the end of the cartridge.
4. If the printer is in **Idle**, press the **Load Material** button, which will be blinking.
5. Insert material cartridges into their appropriate slot from the front of the printer.
    a. Model cartridge goes in the top slot
    b. Support material goes in the bottom slot
6. The panel will display **Material Load - Ready To Load**. Press **Load** to load model material and display with show percentage of material left in cartridge.
    a. During model cartridge loading watch the appropriate extrusion tip (see Figure X) for the material extruding or purging after loading. The panel will then ask **Did Model/Support Material Purge?**
        i. Press the appropriate **Yes/No** button or press **Purge Again** if you are unsure.