FDM AND POLYJET BEST PRACTICE:

REMOTE MONITORING SYSTEM

Stratasys® 3D Printers and Production Systems

SOFTWARE/**PRODUCT**/FINISHING

OVERVIEW

Stratasys® 3D Printers provide automated, unattended operation, requiring only periodic checks to determine print status. With the installation of a remote monitoring system, printer users can check the status of a job from their desk or other location. The live video feed eliminates the need to be at the printer to determine its operating status, maximizing productivity.

While almost any off-the-shelf, networked video camera can work, Stratasys has designed a camera mount specialized to the Samsung camera referenced in this document. It can conveniently be printed and mounted on virtually all Stratasys 3D Printers with a flat viewing glass (Figure 1).

Common applications for remote monitoring are:

- Progress monitoring
  - Ensure proper build start
  - Check for unexpected build interruptions
  - Verify expected build progress
  - Validate successful build completion

Reference materials:

- CAD file
  - Camera_Mount.stl
- PDF File
  - Light_Shield.pdf

Figure 1: Remote camera system mounted on a Fortus 400mc™.

1. OPTIONS

The universal camera mount is designed to be compatible with all FDM® and PolyJet™ 3D Printers with flat viewing windows. This includes nearly all the FDM and PolyJet 3D Printer lines.

Notable exceptions are printers with curved or small viewing windows. These printers may require a unique or modified mounting bracket.

2. PROCESS

2.1. 3D Print the Camera Mount (Figure 2).

STEP 1: Produce the camera mount on an FDM or PolyJet 3D Printer.

NOTE: Please see "Section 4: Materials" for recommended materials to produce the mount.

STEP 2: Remove support material from the part.

STEP 3: Printing procedure complete.

Figure 2: Camera mount.

2.2. Make a Light Shield for FDM 3D Printers (optional).

STEP 1: On a 2D paper printer, print a cutting template using "Light_Shield.pdf" (see page 6 of this document for template). When printing, use a 1:1 scale.

STEP 2: Cut a 1 mm (0.04 in) thick opaque plastic sheet to match the dimensions of the viewing window.

STEP 3: Make a small notch at the middle of the top edge (Figure 3), which is used for alignment with the printed template.

STEP 4: Align the centerline of the template printed in STEP 1 with the notch cut in the plastic sheet. Attach the template to the plastic sheet using tape.

NOTE: Ensure that the top edge of the plastic sheet is aligned with the top edge of the document.

Figure 3: Alignment notch cutout.

STEP 5: Using a sharp blade, cut out the areas shaded gray on the template printed in Step 1 (Figure 4).

STEP 6: Allow the light shield to dry.

STEP 7: Light shield procedure complete.

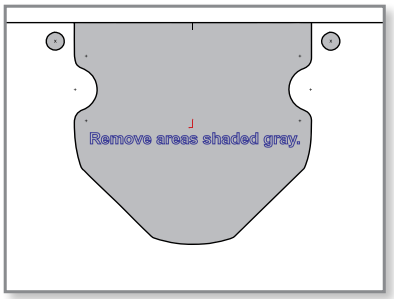

Figure 4: Light shield cutting template. (Not to scale. Please see "Light Shield Template" on page 6 for full scale template.)

2.3. Camera Installation

STEP 1: Clean the bonding surfaces on the camera mount and the 3D printer.

STEP 2: Clean the viewing area on the outer glass window of the FDM or PolyJet printer.

STEP 3: Remove the blue liner from the two large 3M Command™ strips or similar high-strength, double-sided mounting tape and attach to the camera mount, making sure that the strip is aligned with the inset area and that the tab is facing outward (Figure 5).

STEP 4: Insert the camera into the camera mount and tighten the retaining screw.

STEP 5: Remove the “wall side” liner from the Command strips.

STEP 6: Attach the camera assembly to the FDM or PolyJet printer.

- For FDM systems: Align the horizontal “wings” on the camera mount with the black window trim (Figure 6).
- For PolyJet systems: Align the mount so that it is centered across the width of the glass and 92.1mm (3.63 in) between the edge of the glass and the mount (Figure 7).

STEP 7: Apply firm, even pressure to ensure proper adhesion of the camera mount to the printer.

STEP 8: Route the power and Ethernet (if used) cables so that they won’t interfere with the operation of the door (Figure 8). Use zip-ties to help with cable management.

NOTE: An Ethernet cable is required for network connectivity when not using Wi-Fi.

STEP 9: Install the light shield by sliding it between the 3D printer and the camera mount until it locks into place.

NOTE: The installation of the light shield is optional based on user preference. Using the light shield may provide better video quality by reducing glare and reflection from ambient lighting near the 3D printer.

STEP 10: Camera installation procedure complete.

Figure 5: Back side of the mount with adhesive strips attached.

Figure 6: Horizontal “wings” aligned with black window trim.

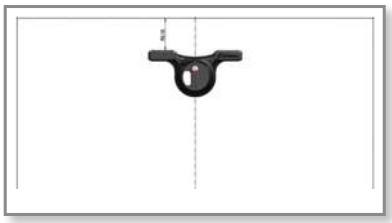

Figure 7: Aligned mount attached to a PolyJet system.

Figure 8: Remote camera mounted with neatly routed wires.

2.4. Camera Setup

STEP 1: Follow the Samsung Easy Guide (see link in Section 3 – Tools and Supplies).

STEP 2: Camera setup procedure complete.

3. TOOLS & SUPPLIES

3.1. Required items:

- 3D printer (for printing camera mount)
- Samsung camera (SNH-P6410BN)
- Samsung Smart Cam Easy Guide (click the link below or type/copy and paste the URL into a web browser):
  - https://www.samsungsmartcam.com/web/cmm/05_ST/EasyGuide.do?_menu=1_1&_product=SNH-P6410BN
  - CAD file: Camera_Mount.stl
  - 3M Command outdoor medium and large clear strips (17615CLRAW-ES)

3.2. Optional items:

- Samsung Smart Cam App.
- Light Shield Template (see actual template on page 6 of this document)
- 1 mm (0.04 in) thick plastic sheet (opaque black)

NOTE: Other materials may be used as long as they have an HDT (heat deflection temperature) above 40°C

- Water soluble adhesive (glue stick)
- Sharp blade
- Ethernet cable
- Extension cord
- Zip ties

4. MATERIALS

4.1. All FDM materials

- Any FDM material is well suited for the application.

4.2. Rigid PolyJet materials

- Digital ABS™ is recommended for its superior strength, but any rigid PolyJet material should be sufficient for production of the camera mount.

NOTE: VeroClear™ is not suitable for this application because of light transmission through the material.

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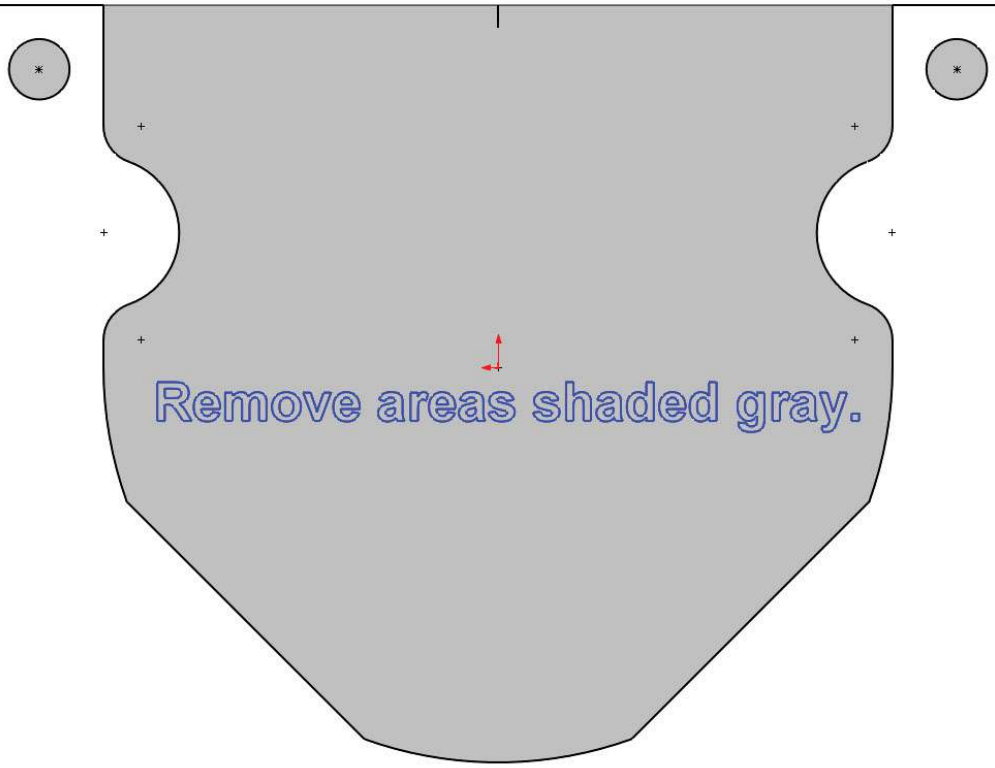
LIGHT SHIELD TEMPLATE