

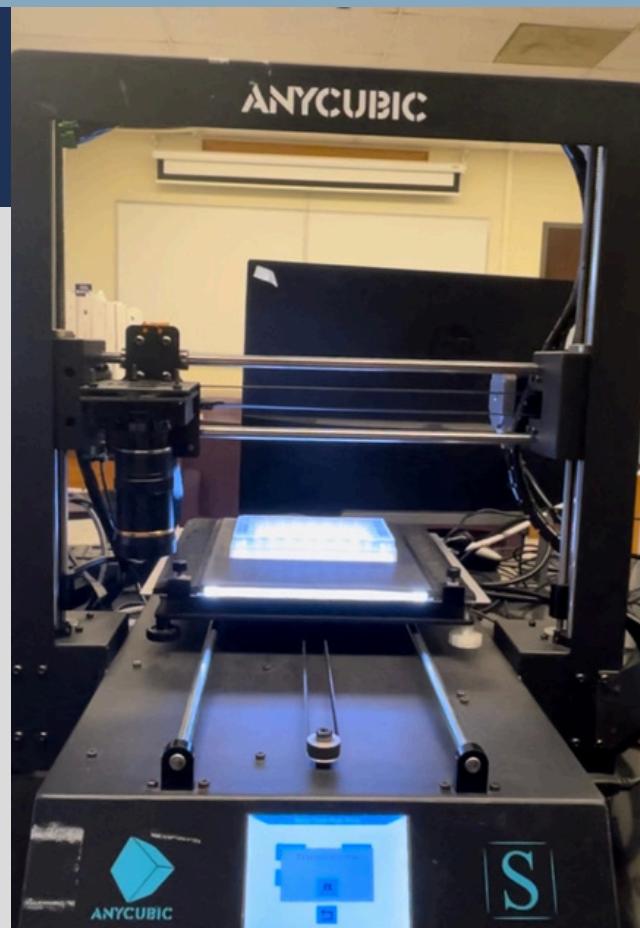


UCSF AND
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FLYCAM MANUAL

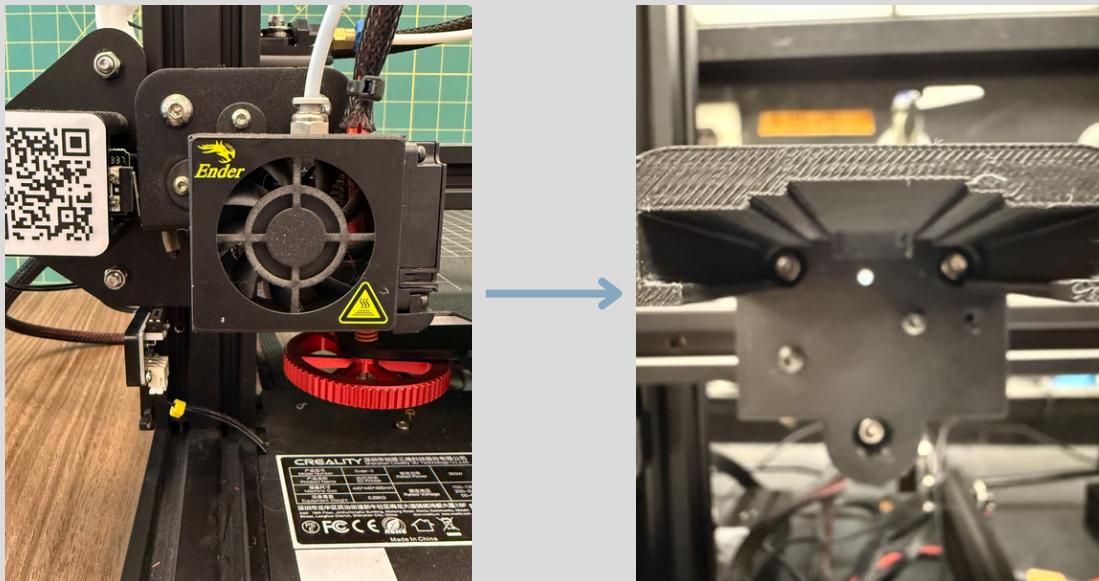
UPDATED 2024

PREPARED BY
Isabella Estevez and Keith
Curry



SECTION 1:

How to remove extruder, and
attach Flycam camera seat holder
add-on



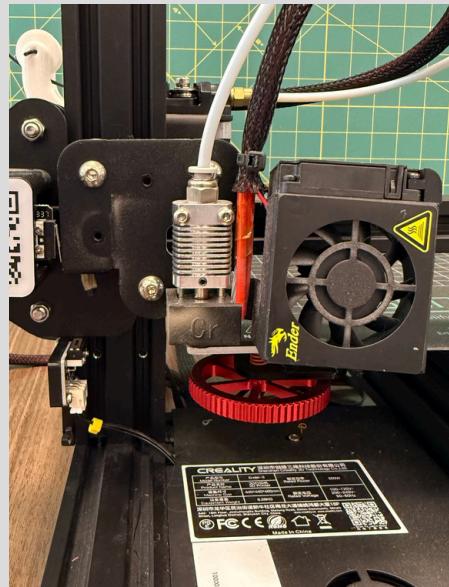
MATERIALS:

- Assembled Ender 3 printer
- 2.5 M allan hex wrench
- Flycam 3D printed camera seat holder

Step 1. Unscrew the two screws using a 2 ½ M allen hex wrench.



Two screws to unscrew

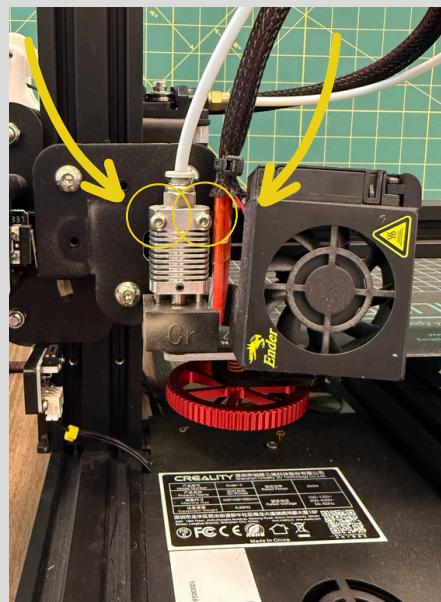


Screws removed

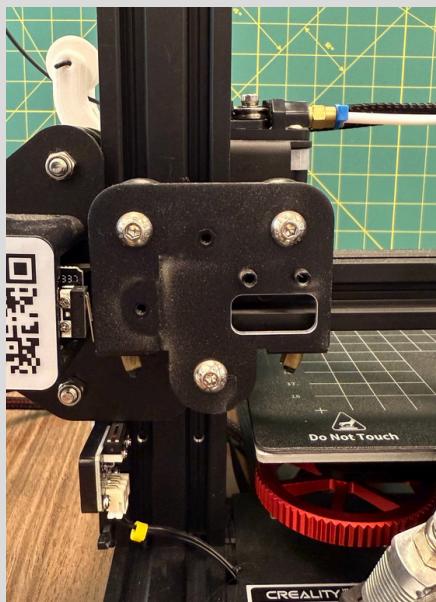


Removed items

Step 2. Unscrew two more screws using a 2 ½ M allen hex wrench. Remove fan and extruder.



Screws to remove

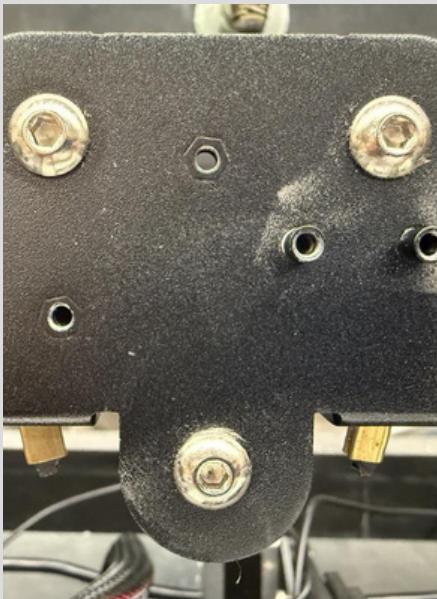


Fan and extruder removed

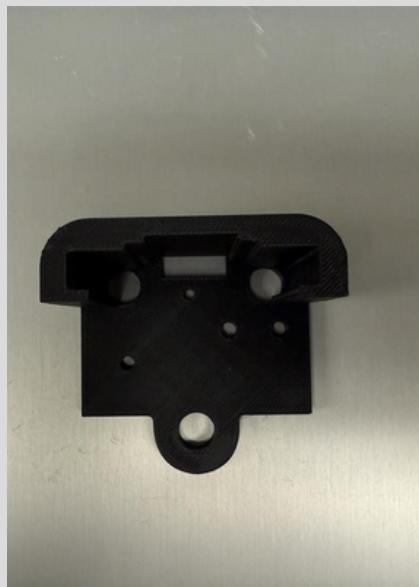


Removed items

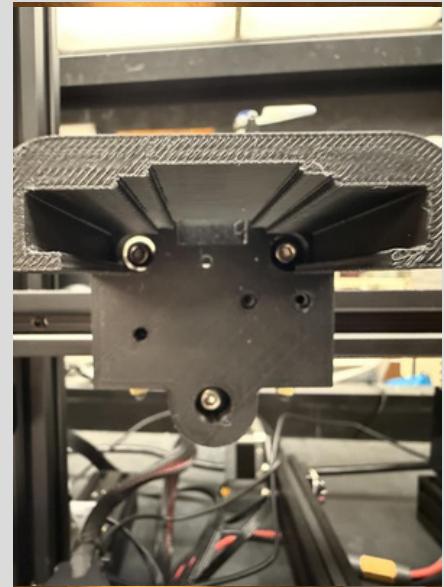
Step 3. Add camera seat holder.



Setup prior to addding
camera seat holder



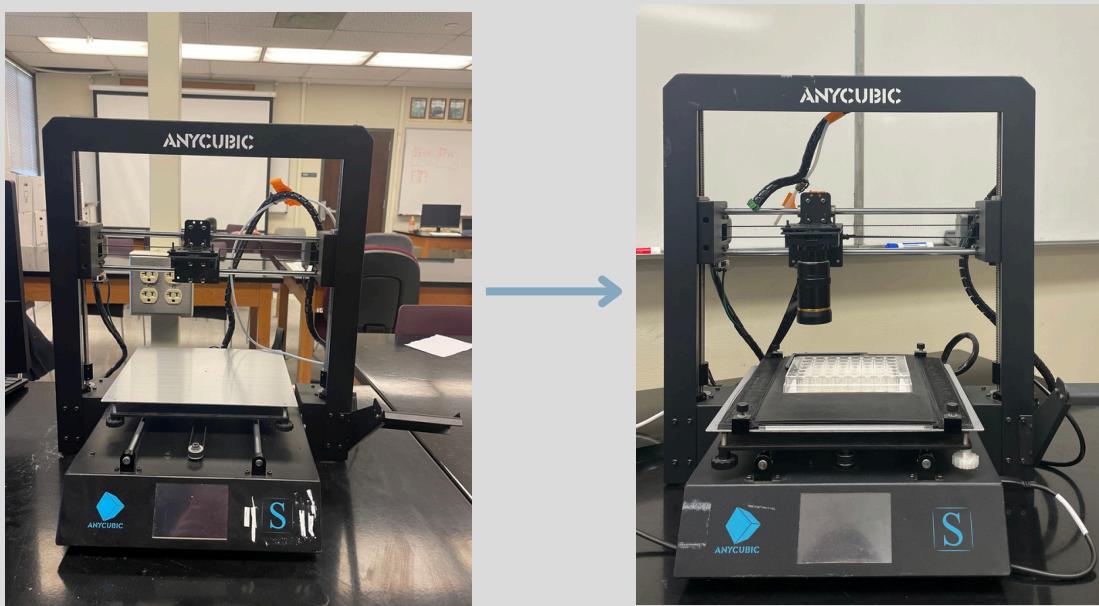
Camera seat holder



Push in camera seat
holder to the E-plate,
connecting the two
pieces (should fit
snuggly)

SECTION 2:

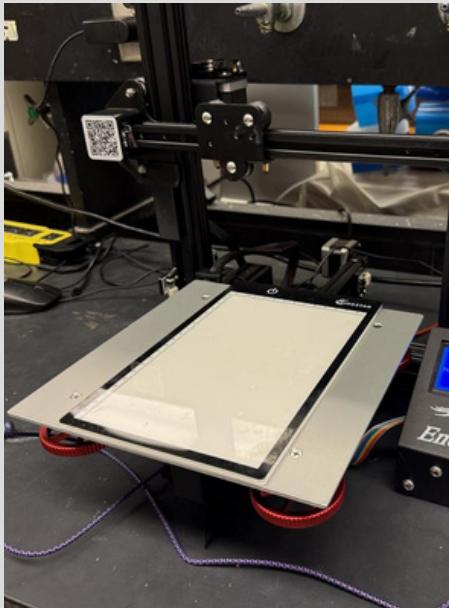
How to set up the rest of Flycam
for use (camera seat, z-stops, pi).



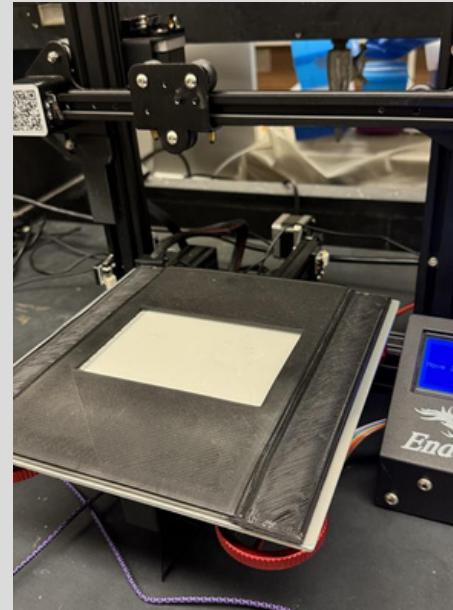
MATERIALS:

- Ender 3 printer
- Screw on clamps (X4)
- Light pad
- Flycam 3D printed stage
- Flex cable
- Flycam 3D printed camera seat
- Flycam 3D printed Z-stop extender
- Pi/camera (we use version 3B here)
- Power source cord
- Monitor cord
- Mouse
- Portable drive (here we use a 5 terabyte version)
- 3D printer cable

Step 1. Place light pad on 3D printer stage, position well plate holder on top of pad. Twist 4 clamps to secure the items onto the build.



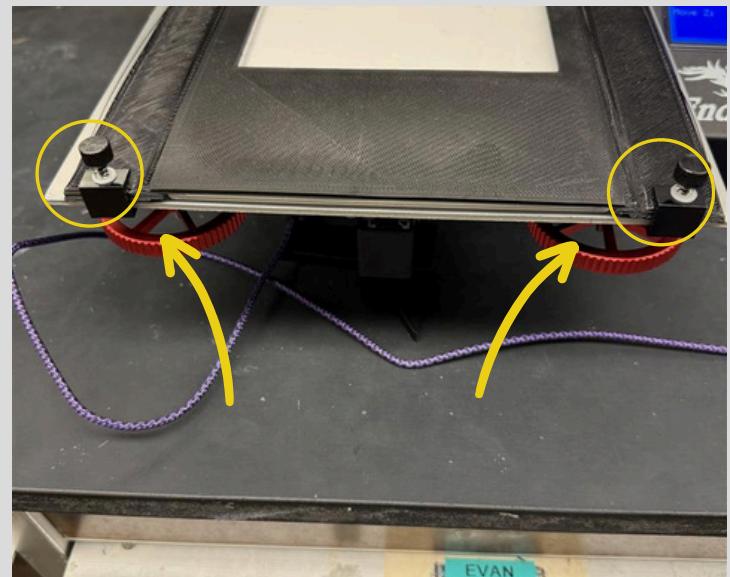
Place light pad on stage



Place well plate holder onto pad



Clamps used to secure items



Setup after clips are added

Step 2. Locate Z-axis endstop screws on a side of the printer, under the print bed. Slide on the Z-stop extender. Repeat on second Z-axis endstop.



Locate Z-stop extender piece

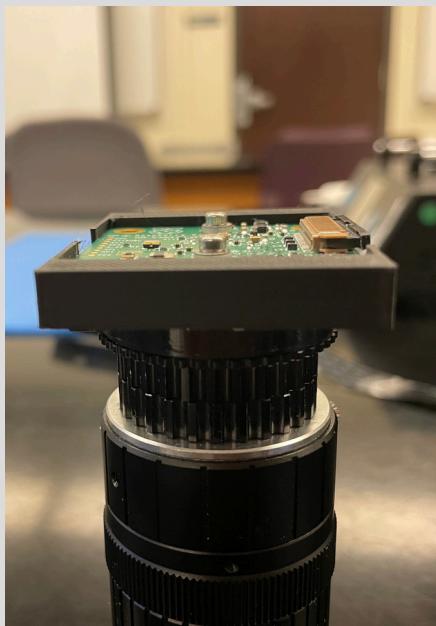


Sliding on Z-stop extender



Z-stop extender seat added

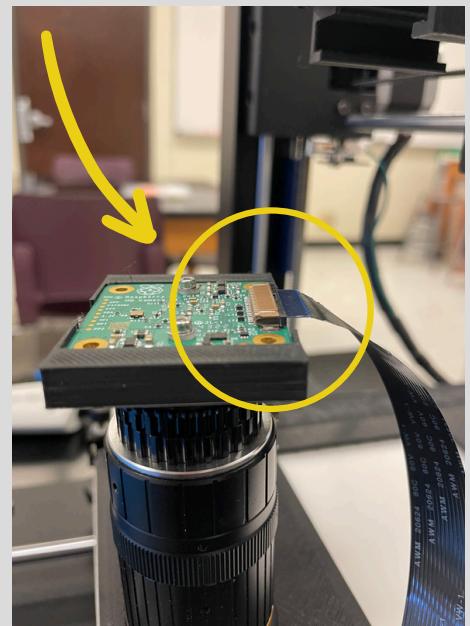
Step 3. Obtain your Pi camera, connected to the camera seat fly-cam attachment. Place the flex cable into the CSI port (Gently push the clamp on the CSI port loose, slide the flex cable in with the metal side sticking down. Once added, gently clamp the CSI port closed.



Setup of pi camera inside of camera seat attachment

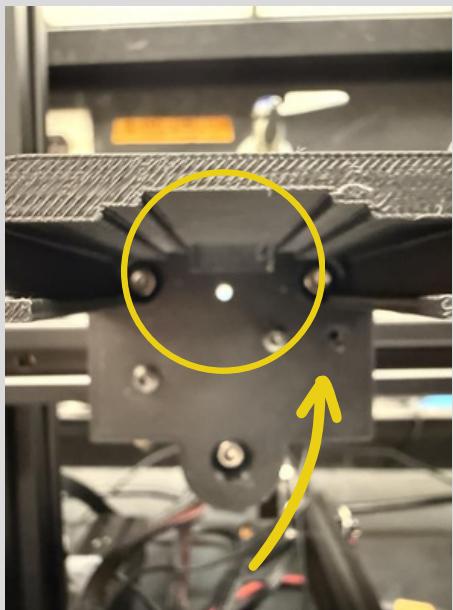


flex cable inserted into pi camera



Setup after flex cable is connected to pi camera

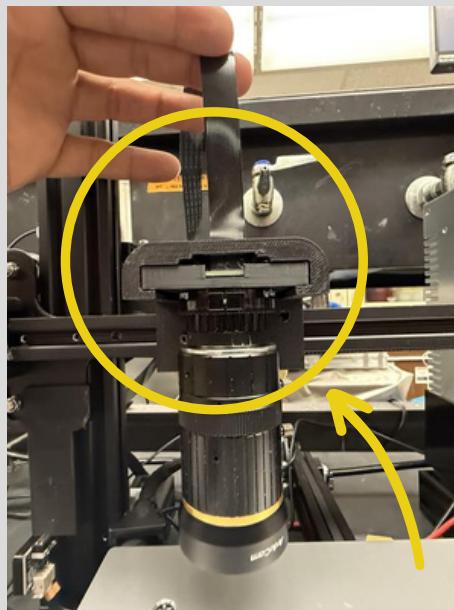
Step 4. Bring the flex cable into the slot at the back of the extruder platform, and pull it through. Slide the camera seat holder into the camera seat.



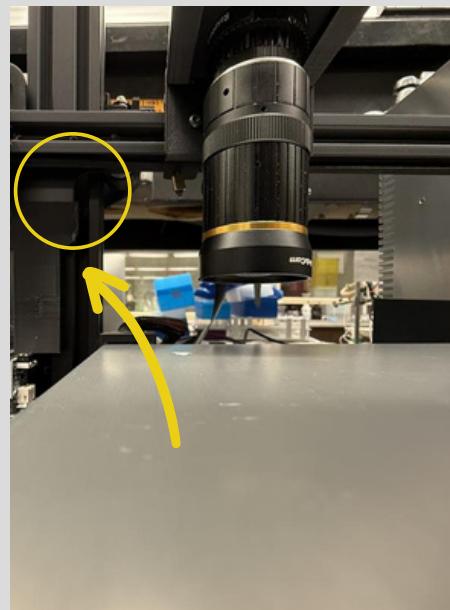
Setup prior to flex cable



Pull flex cable through the slot



Push camera seat into the camera seat holder

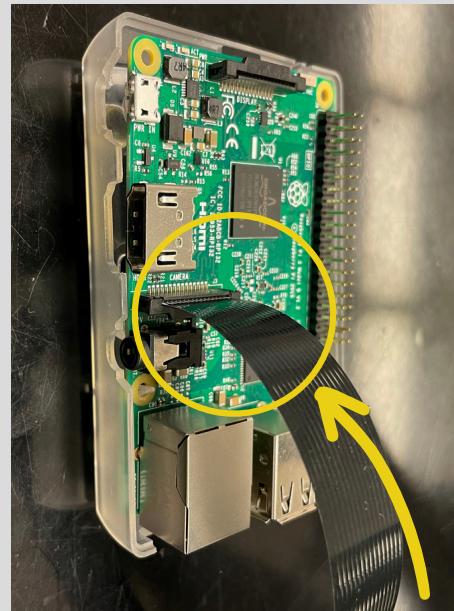


Setup with camera mount completed (ensure Z-stop extender always on when in use)

Step 5. Connect flex cable to your pi CSI port. Then, attach all required cables.



Pi before any connections



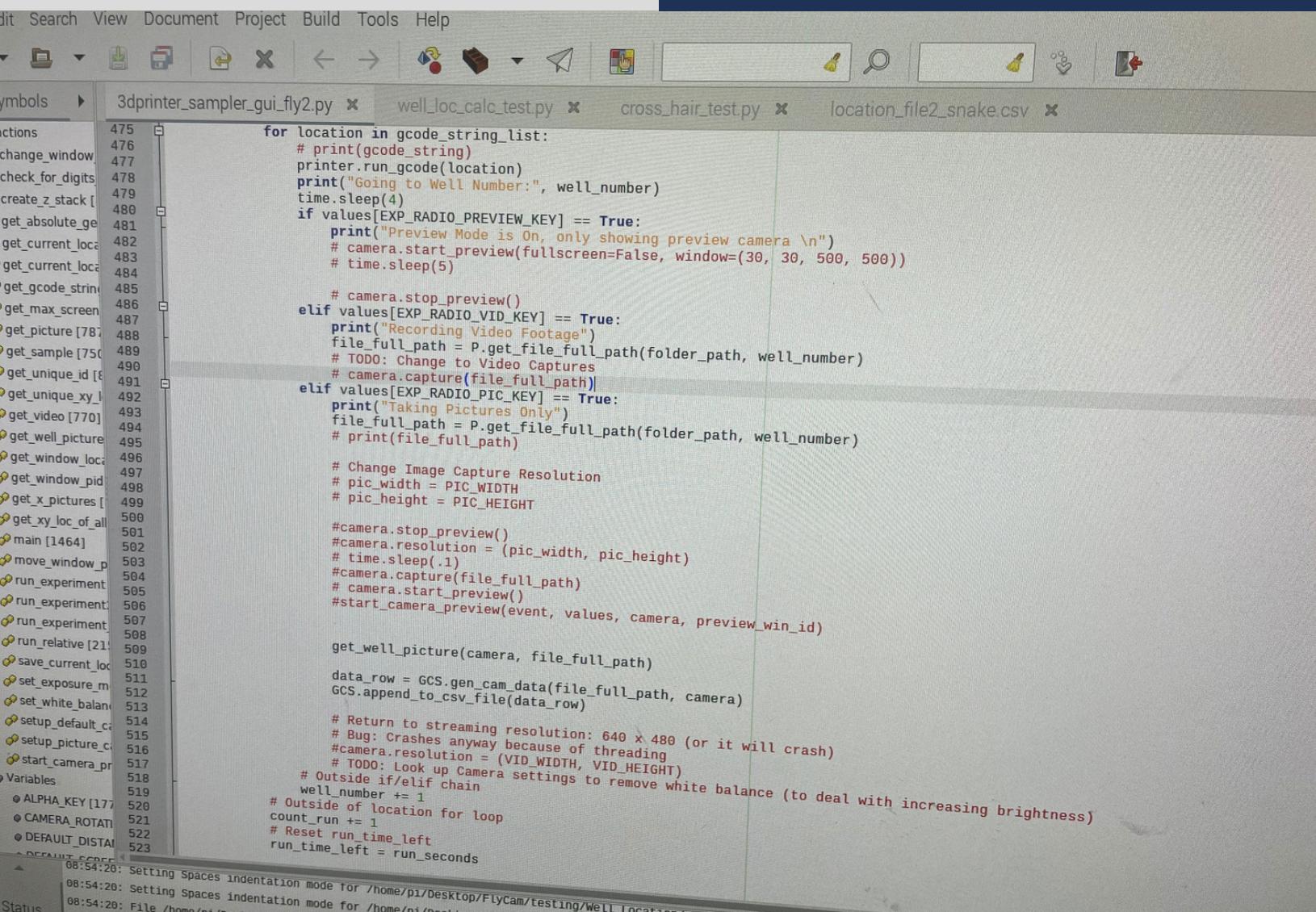
Pi after flex cable connected



Pi with power source, monitor, mouse, portable drive (here we use a 5 terabyte version), and the 3D printer attached

THANK YOU FOR YOUR INTEREST!

For information on FlyCam V1 operational software, please see informational videos on YouTube.



The screenshot shows a software interface with a toolbar at the top and several windows open. The central window is a code editor displaying Python code for a script named `3dprinter_sampler_gui_fly2.py`. The code handles various camera and printer operations based on user input keys. Other tabs visible in the background include `well_loc_calc_test.py`, `cross_hair_test.py`, and `location_file2_snake.csv`. The status bar at the bottom shows log messages related to file paths and indentation mode.

```
475     for location in gcode_string_list:
476         # print(gcode_string)
477         printer.run_gcode(location)
478         print("Going to Well Number:", well_number)
479         time.sleep(4)
480         if values[EXP_RADIO_PREVIEW_KEY] == True:
481             print("Preview Mode is On, only showing preview camera \n")
482             # camera.start_preview(fullscreen=False, window=(30, 30, 500, 500))
483             # time.sleep(5)
484
485             # camera.stop_preview()
486         elif values[EXP_RADIO_VID_KEY] == True:
487             print("Recording Video Footage")
488             file_full_path = P.get_file_full_path(folder_path, well_number)
489             # TODO: Change to Video Captures
490             # camera.capture(file_full_path)
491         elif values[EXP_RADIO_PIC_KEY] == True:
492             print("Taking Pictures Only")
493             file_full_path = P.get_file_full_path(folder_path, well_number)
494             # print(file_full_path)
495
496             # Change Image Capture Resolution
497             # pic_width = PIC_WIDTH
498             # pic_height = PIC_HEIGHT
499
500             #camera.stop_preview()
501             #camera.resolution = (pic_width, pic_height)
502             # time.sleep(.1)
503             #camera.capture(file_full_path)
504             # camera.start_preview()
505             #start_camera_preview(event, values, camera, preview_win_id)
506
507             get_well_picture(camera, file_full_path)
508
509             data_row = GCS.gen_cam_data(file_full_path, camera)
510             GCS.append_to_csv_file(data_row)
511
512             # Return to streaming resolution: 640 x 480 (or it will crash)
513             # Bug: Crashes anyway because of threading
514             #camera.resolution = (VID_WIDTH, VID_HEIGHT)
515             # TODO: Look up Camera settings to remove white balance (to deal with increasing brightness)
516             # Outside if/elif chain
517             Well_number += 1
518
519             # Outside of location for loop
520             count_run += 1
521             # Reset run_time_left
522             run_time_left = run_seconds
523
08:54:20: Setting Spaces indentation mode for /home/pi/Desktop/FlyCam/testing/Well Locations...
08:54:20: Setting Spaces indentation mode for /home/pi/Desktop/FlyCam/testing/Well Locations...
08:54:20: File /home/pi/Desktop/FlyCam/testing/Well Locations...
```



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