

Hawkeye3 User Manual

Introduction

These are modification instructions for the Wolverine telecine machine with the custom ELP camera that offers much better image quality than the original camera. The modification involves a new camera and some mounting hardware to allow the new camera to replace the original controller. The original controller is mounted at the back of the unit and is used to control the transport and the LED light.



The camera used is the usb ELP model ELP-USBFHD04H series.

<https://www.aliexpress.us/item/3256804451911088.html?gatewayAdapt=glo2usa4itemAdapt>

Select the 12mm lens version and replace the lens with the imaging source 12mm lens.

https://dl-gui.theimagingsource.com/en_US/e50336d5-f5ac-5ef2-8e8b-7b5ad53e928f/

You will have to request a quote for the lens.

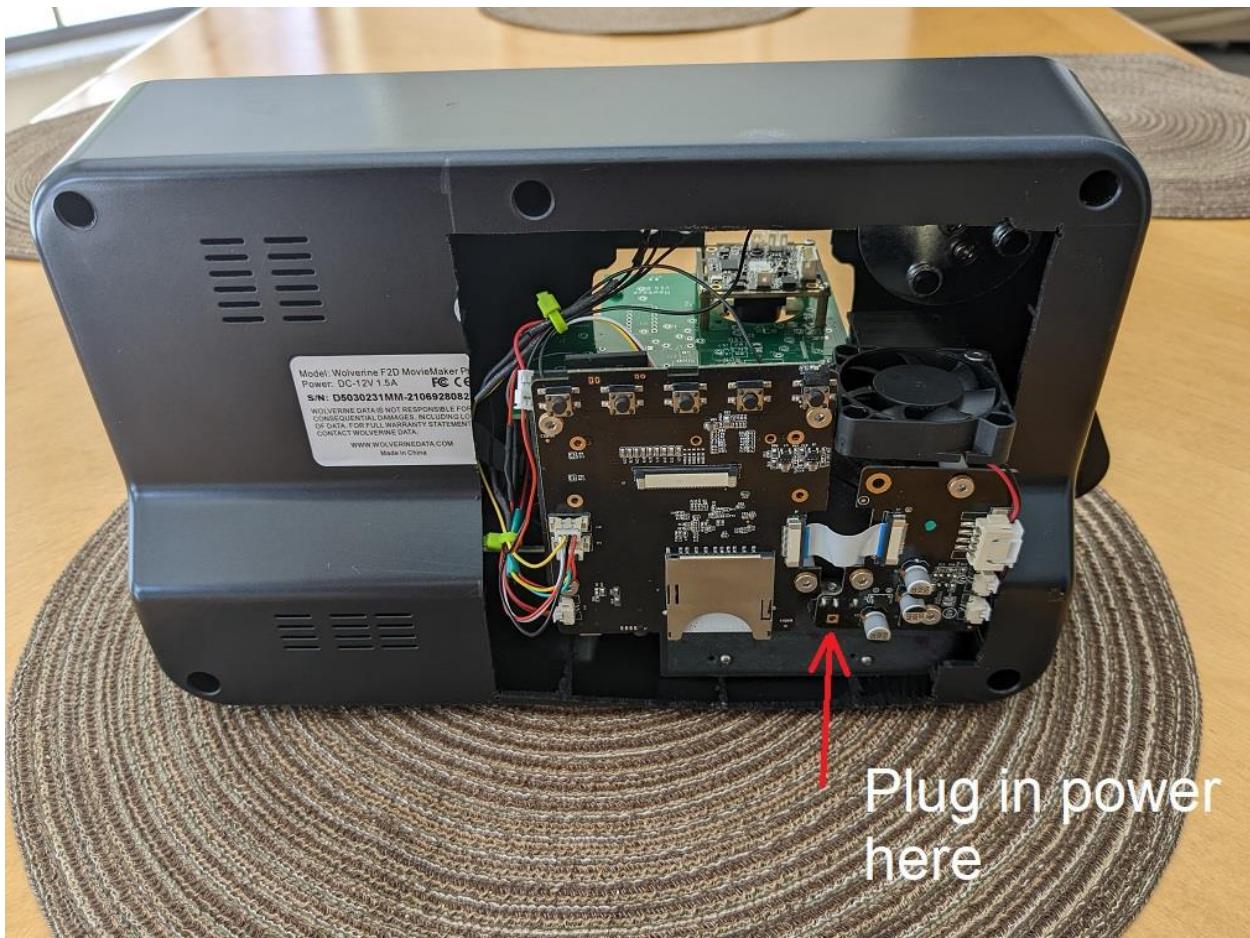
Alternatively the lens can be sourced from oemcameras.com
The camera uses an AR0330 sensor with 1080P resolution. Essentially, that is the same sensor
that the Wolverine model uses but unlike Wolverine this one allows the users full access to the
camera settings. The camera connects to a Windows PC that runs capture software included
here:

<https://github.com/vintagefilmography/WolverineFix/>

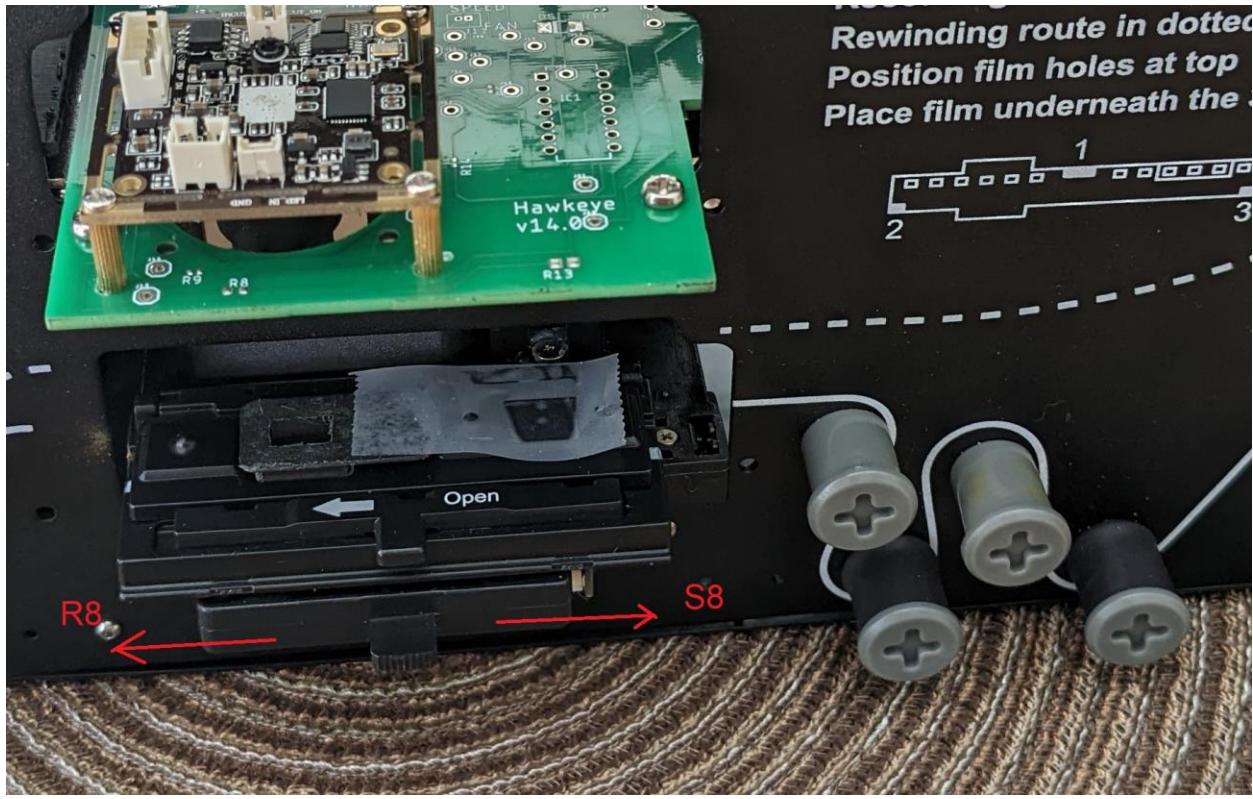
The capture software runs at 15 FPS and creates a video that includes the film transitions. The
transitions can then be removed with post-processing software that is also included in the
above github site.

Operating Instructions

Plug the dc adapter into the unit DC input jack.



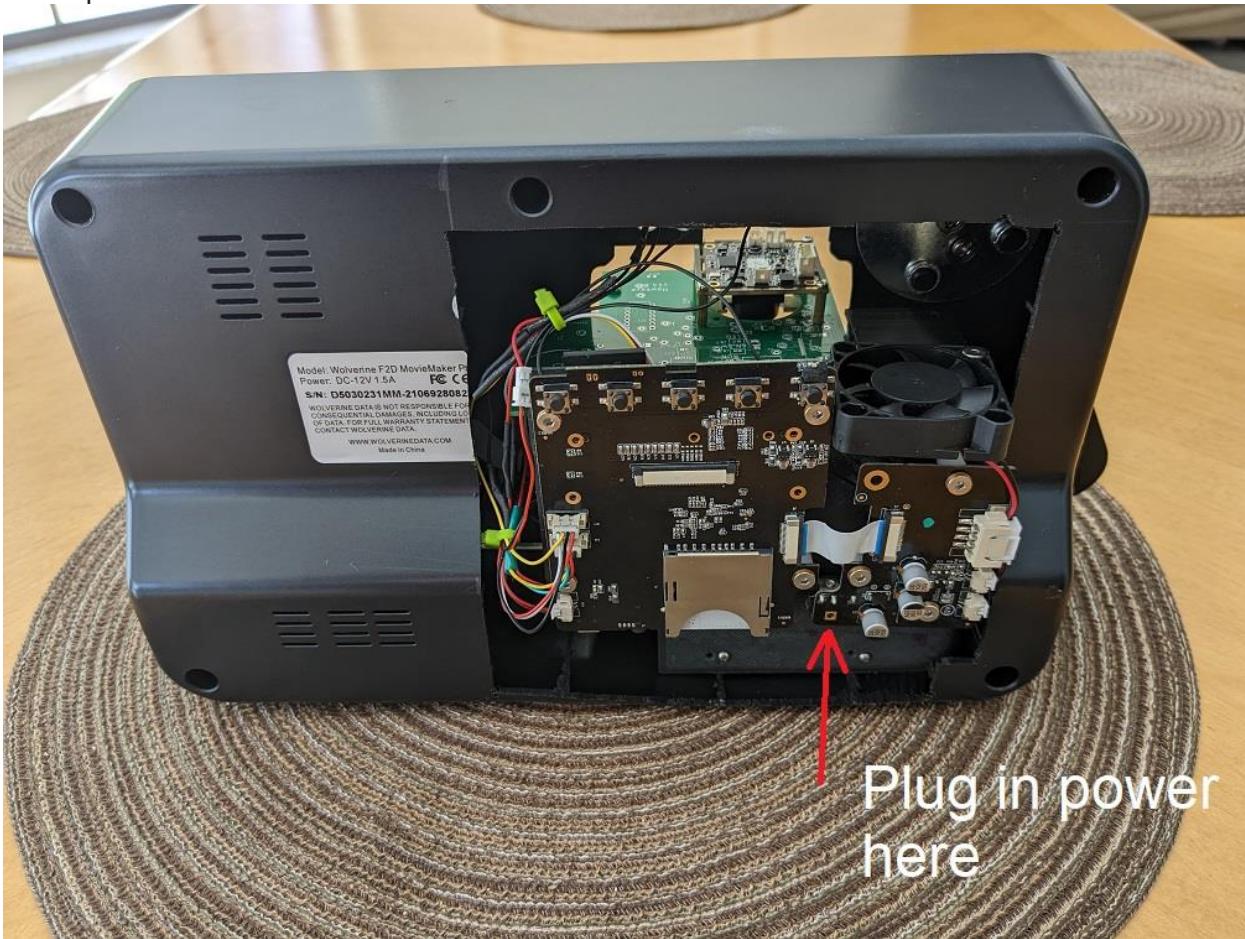
Set the R8/S8 (regular 8 or super 8 film) switch as needed.



Thread the film in. Activate Run switch



Press power button on the Wolverine controller.



The unit should start advancing the film.

Once the film lead is done and the good film section start running through the gate, turn the RUN switch off.

The motor will stop but the light will be still on.

Plug the camera usb cable from the back of the unit into a PC usb connector.

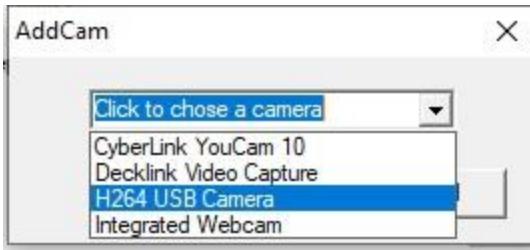
Download CapSample1.exe to your local drive.

Extract it.

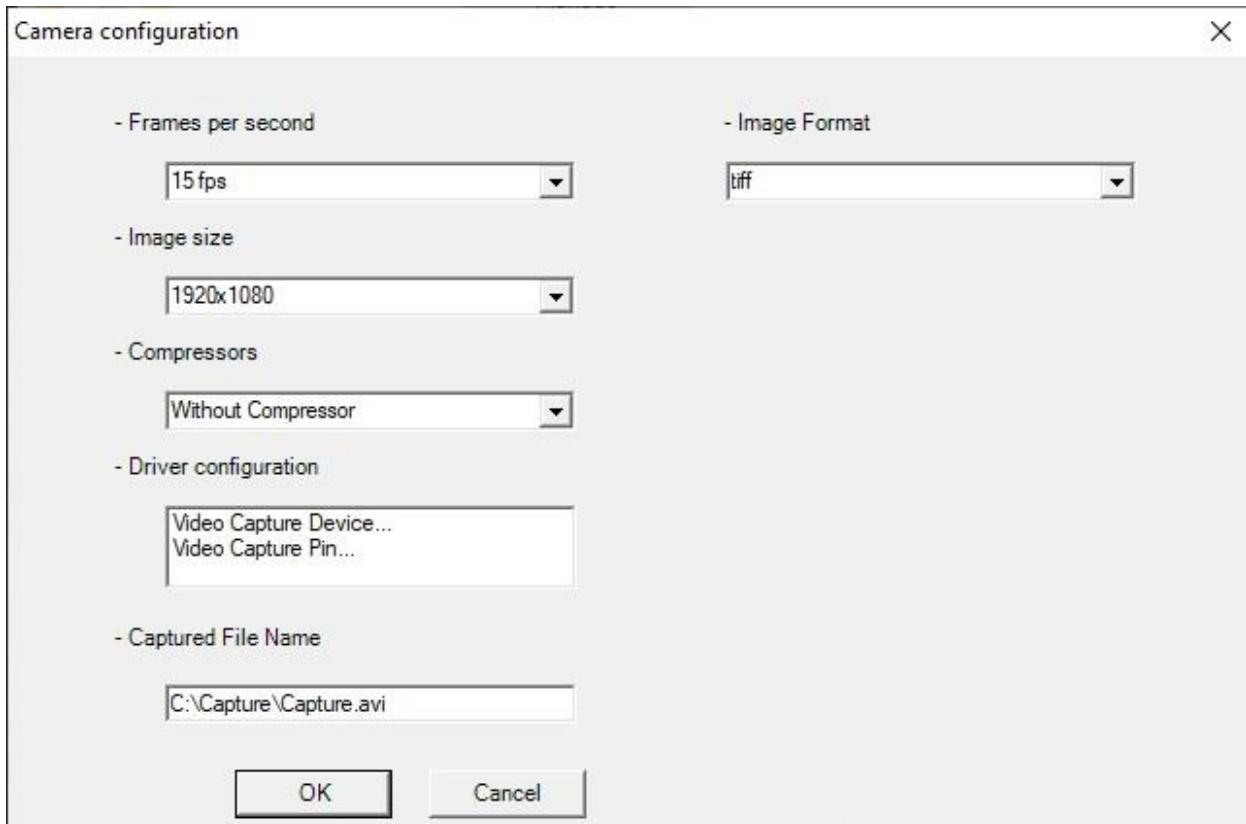
Go to:

..\CapSample1\CapSample\bin directory and run CapSample.exe

Select camera



The config window should pop up



Select 15 FPS

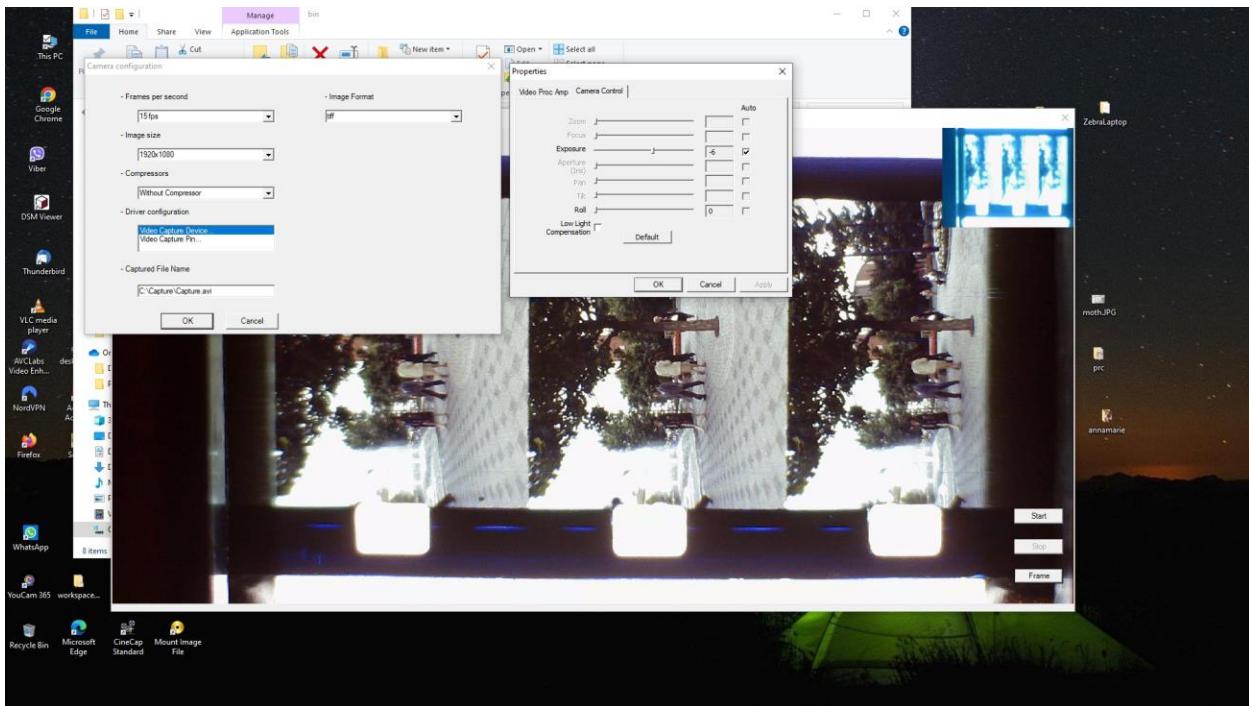
Click OK.

The preview window should display the camera preview.



Click on video capture device in the config window.

The camera info window should pop up.



Click on Camera Control tab and set the exposure to manual and set the exposure control as needed. The auto exposure works ok sometimes but it can be fooled by the image white areas such as sprocket holes.

Now, you are basically ready to start the capture. The default output directory in the config window is set to C:/Capture. You can leave it like that or change it to some other destination.

It may be better to save the video to your local C: drive to ensure that there are no dropped frames. Once the capture is done it is easy just to copy the video from c: drive to an external drive and postprocess it right there.

Press the start button:



Turn the unit off by pressing the power button in the original controller. Then, turn the run switch on and press the power button again.

The unit should start running and the output will be sent to the C:\Capture directory or whatever directory you selected.

Note that you can adjust the exposure dynamically while the capture is running. It is also possible to adjust other camera parameters if required.

Once done, hit the Stop button in the preview window.

Postprocessing

The video will contain many duplicate frames and transitions.

It is easy to remove the duplicates and the transition frames by using the Avisynth remove_dups_elp.avs script.

The first step in getting the script working is to get Avisynth from:

<https://sourceforge.net/projects/avisynth2/>

Download avisynth and install it.

There is tons of info on avisynth and its usage but you really will not need that for what we are doing here. Here is the avisynth main page just as an FYI.

http://avisynth.nl/index.php/Main_Page

Avisynth does not run as a standalone application. It is a tool that allows video editors and viewers to run the script.

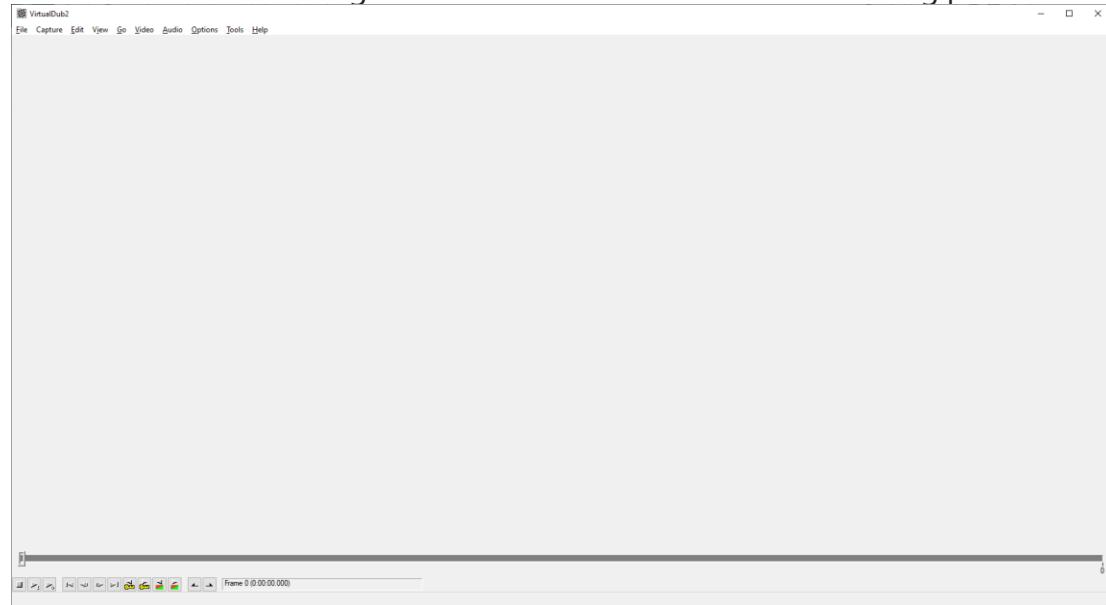
The script is essentially a text file that contains avisynth commands for video processing. One video tool that is very handy for video processing is called VirtualDub.

In addition to basic video processing, VirtualDub can read avisynth script as well.

Download VirtualDub from here:

<https://sourceforge.net/projects/vdfiltermod/files/>

Run VirtualDub. Should get a window that looks like the following picture:



Download the scripts zip from the github site and extract it into your work directory.

Go to the scripts directory and open up remove_dups.avs into any text editor like Notepad or any other text editor.

Change the source path in the script to point to your video. Example:
film = "C:\Capture\capture1.avi"

Once done with the script, save it and then just drag it into the VirtualDub window.
After a short interval, the video first frame will be displayed.

At that point, set the video compression in the video pulldown and save the video.
Once this is completed the resulting video can be brought back into VirtualDub or
DaVinci Resolve to do the final cut.

If the script reports issues with loading certain plugins the most likely reason is that your
window installation is missing some DLLs.

Install Microsoft redistributable package from.

<https://learn.microsoft.com/en-us/cpp/windows/latest-supported-vc-redist?view=msvc-170>

Install [Visual Studio 2015, 2017, 2019, and 2022](#) version.

Here is some more details on missing DLLs.

Run avsmeter.exe. in command window. It is in the scripts directory.

avsmeter remove_dups.avs

avsmeter provides the report and may give you additional info why the script is not
loading properly.

Here is an example of the report: AVSMeter 2.9.9.1 (x86), 2012-2020, (c) Groucho2004
AviSynth 2.60, build:Feb 20 2015 [03:16:45] (2.6.0.5)

Number of frames: 2170

Length (hh:mm:ss.ms): 00:02:00.556

Frame width: 1920

Frame height: 1080

Framerate: 18.000 (18/1)

Colorspace: YV12

Active MT Mode: 0

Frame (current | last): 292 | 2169

FPS (cur | min | max | avg): 10.48 | 0.206 | 16.92 | 7.286

Process memory usage: 617 MiB

Thread count: 4

CPU usage (current | average): 24.7% | 24.5%

Time (elapsed | estimated): 00:00:40.076 | 00:04:57.825

In some cases avsmeter may not be able to help you and it may not give additional info on why a particular DLL is not loading.

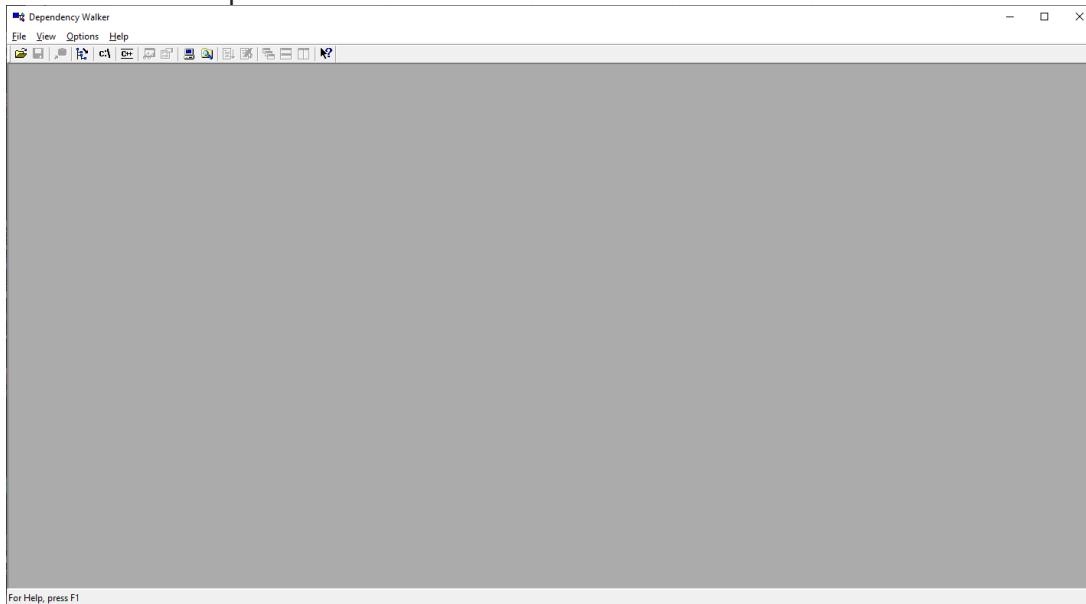
You can then try dependency walker

<https://www.dependencywalker.com/#:~:text=Dependency%20Walker%20is%20a%20free,diagram%20of%20all%20dependent%20modules.>

Download the zip into a local folder and unzip it there.

Run dependds.exe by double clicking on it.

A window will open.



Do File->Open and open the DLL that has issues loading. You will get a bunch of errors.

Most of these are no problem because the tool is old and does not recognize the new calls. Go down to the bottom of the error list and you will notice different types of errors. For example:

HVSFILETRUST.DLL

IESHIMS.DLL

PDMUTILITIES.DLL

You can search for DLL description and where used but most likely these are used by

Microsoft redistributable package that is not loaded on your system.

<https://learn.microsoft.com/en-us/cpp/windows/latest-supported-vc-redist?view=msvc-170>

Install the 2015-2022 version and see if this fixes your issue. Most likely it will.

Some more details are available here:

<https://forum.doom9.org/showthread.php?t=172793>

Once the video is saved it should not have any transitions in it but it will still need to be rotated to the right and cropped.

That can be easily done in VirtualDub by clicking on the Video Tab and opening up Filters. The Filters window should open up and there you can add the rotate and crop filters.

Once done with rotation and crop, save the final video.

You can also select the frame rate and compression from Video Pulldown.

Lagarith is a pretty good compressor. It reduces the video size by 4 to 5x and it is lossless.

DIY Mod Instructions

Before the new camera installation the original controller and camera have to be removed from the unit. Carefully read the following instructions.

Word of advice:

Follow the instructions carefully and do not apply force to any parts during disassembly. Pay attention to fragile small connectors and ribbon cables. Use the right size screwdriver to avoid stripping the screw heads. Make sure the power is disconnected and the SD card is out. Avoid touching the lubricated parts.

Disconnect power, Remove SD card and film reels.



Set the unit on a table with enough work space around it.

Make sure SD card is out and power disconnected.



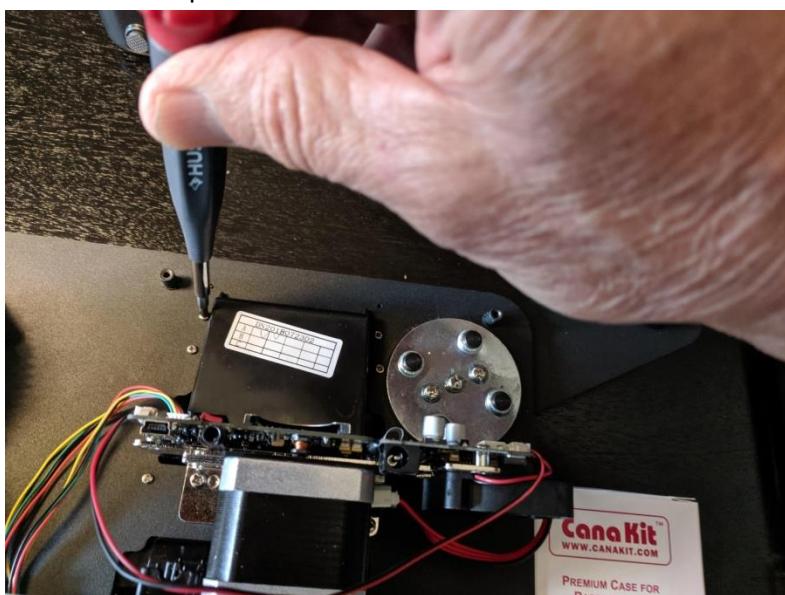
Lay the unit face down on the table. Remove 6 cover screws (the number of screws varies depending on the model). Set the screws on the side in a small container and mark them up. It is important not to mix up the screws because other unit components use the same thread screws but different sizes.

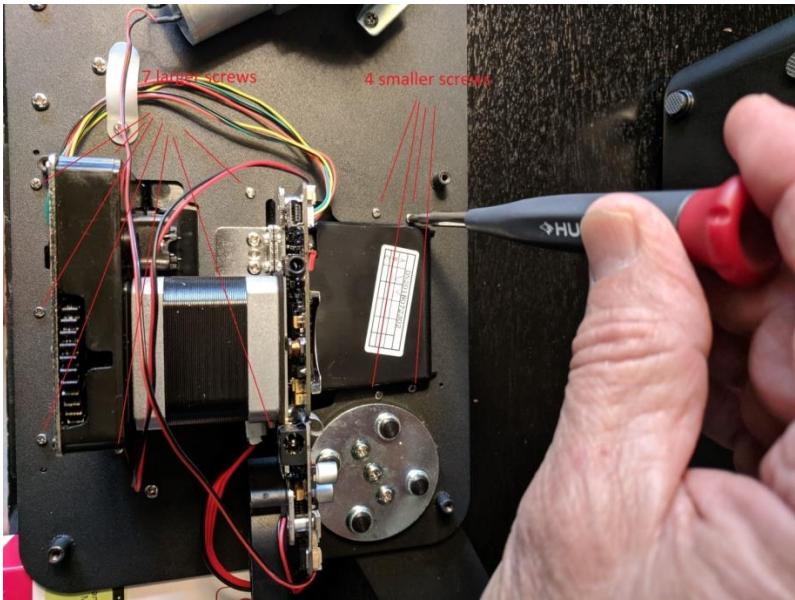


Remove the cover. Observe the greasy areas and avoid touching them.

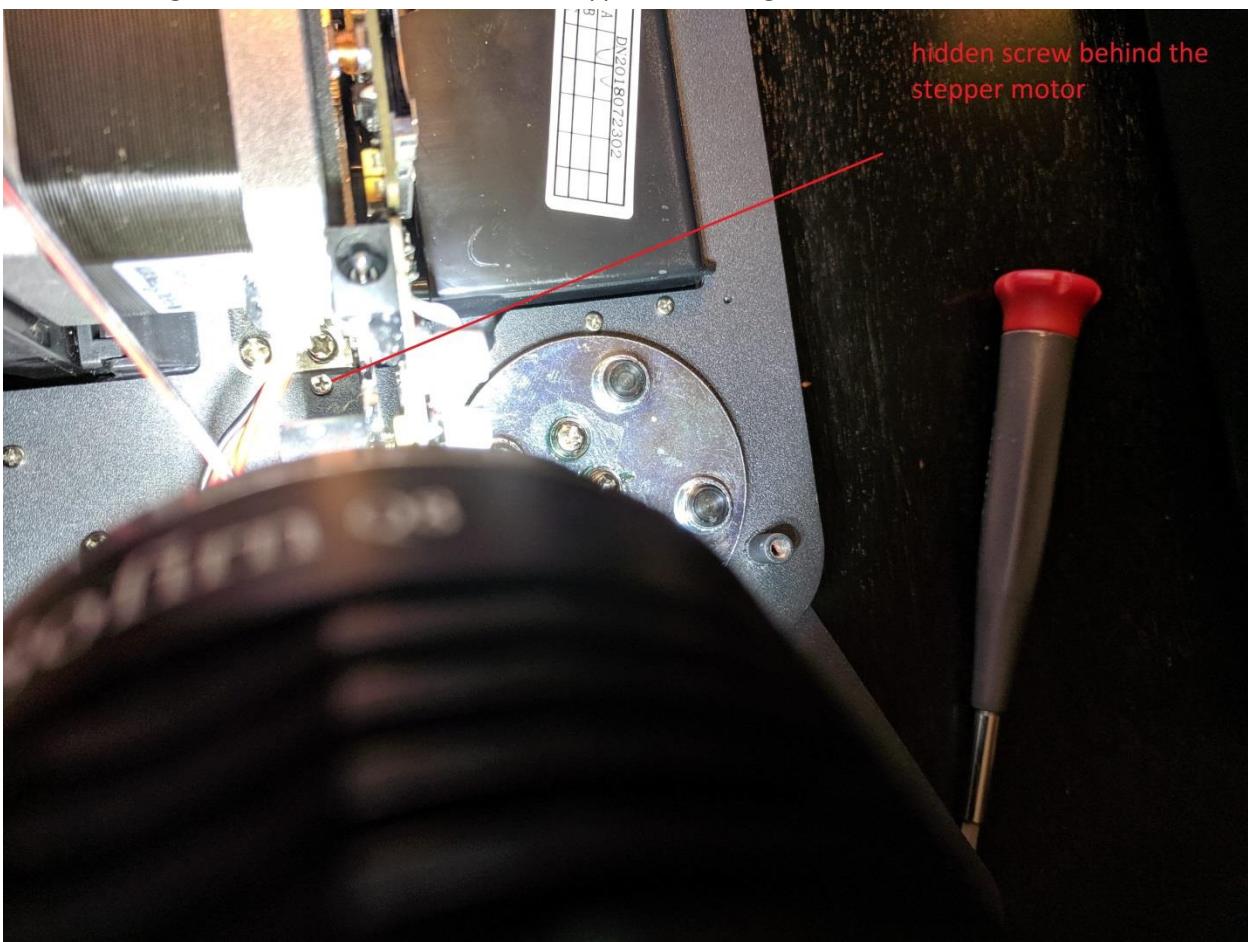


Remove the front cover screws. There are 11 of them, 4 for the top part. These are smaller screws and 7 for the bottom part. Make sure not to mix them.





One of the larger screws is hidden beside the stepper. Don't forget that one.



Store the screws a container, or a jar or whatever. It is easy to lose them.



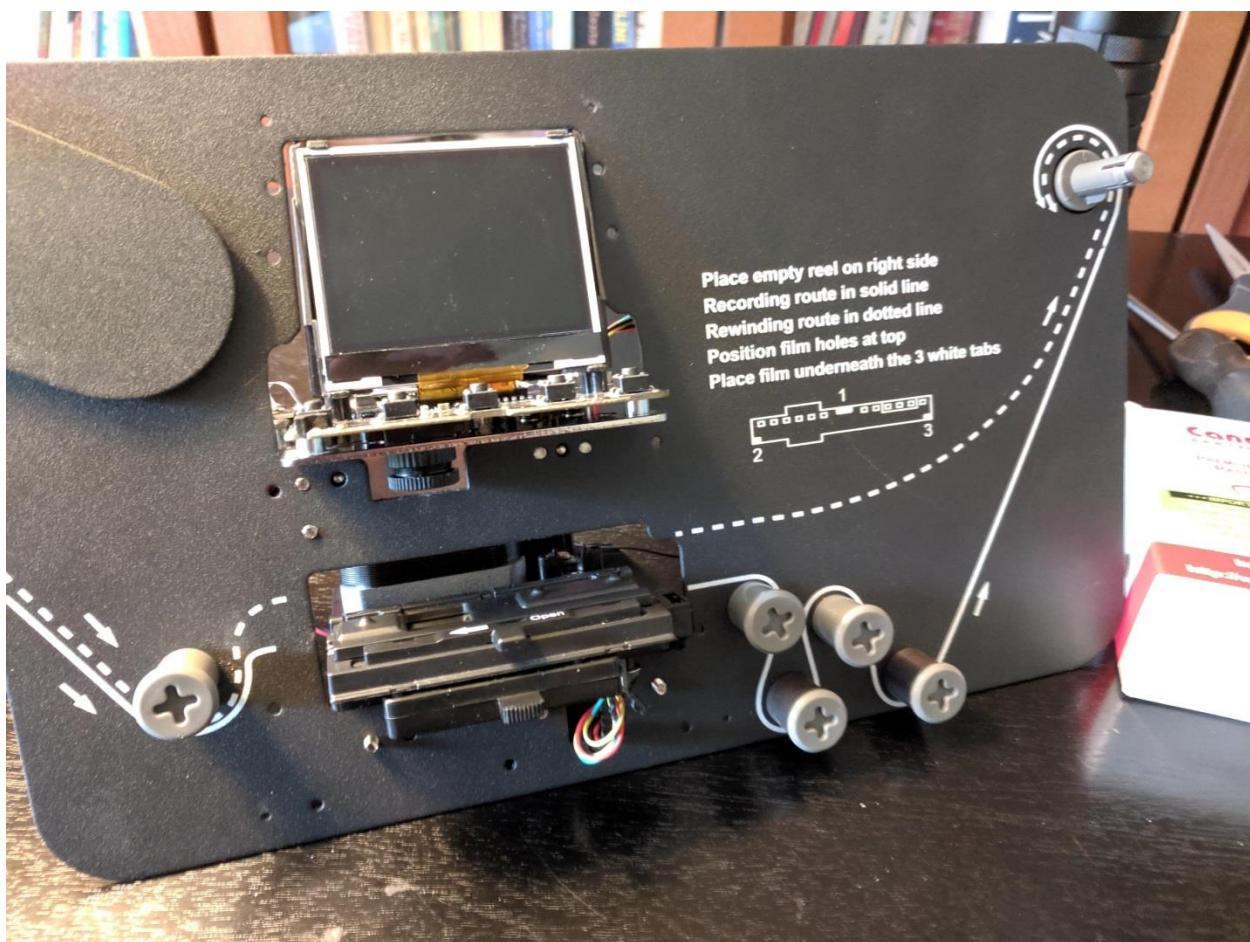
Set the unit upright and leave it supported by the stepper motor bottom. Make sure not to touch the stepper gear. It has grease on it.

Grab the plastic front cover as shown and slightly push upwards and wiggle it out. DO NOT USE FORCE. It may take some time but it will come out. If it does not, make sure that all 11 screws have been removed.

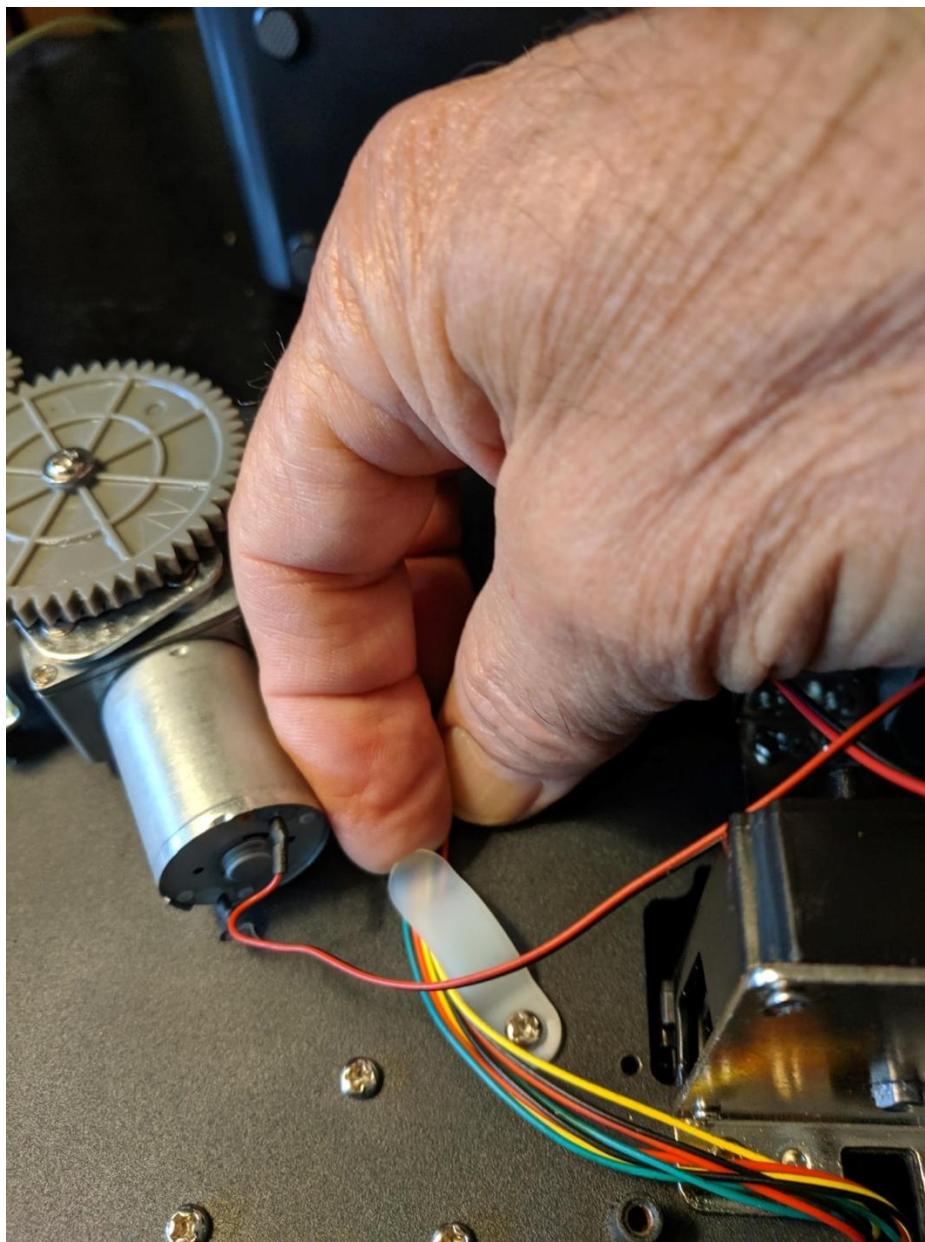
In some units it may be necessary to pry the switch cover and to remove it. It can be done by catching on its edge with a nail and prying up.

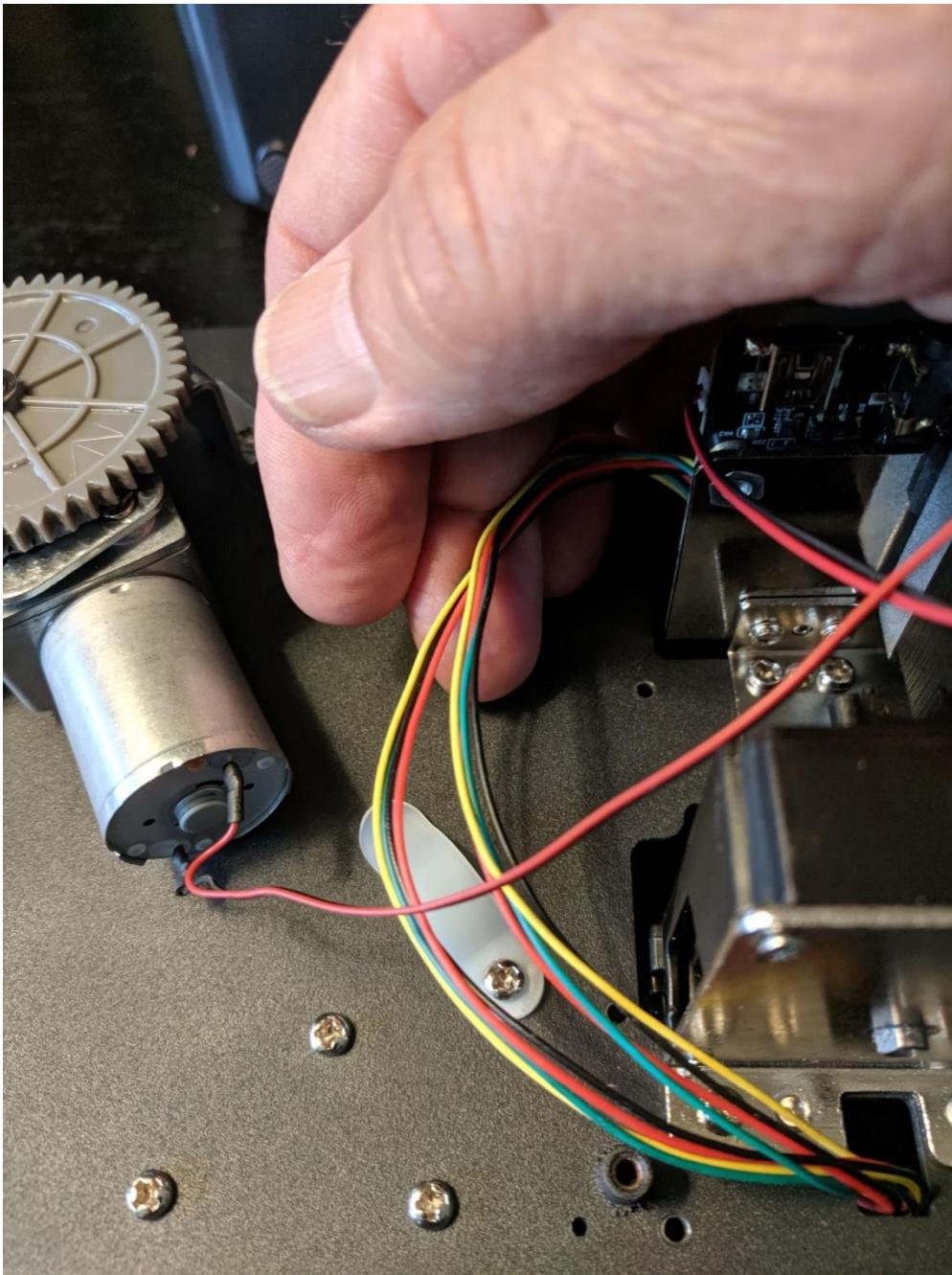


The picture shows the front of the unit with the cover removed.

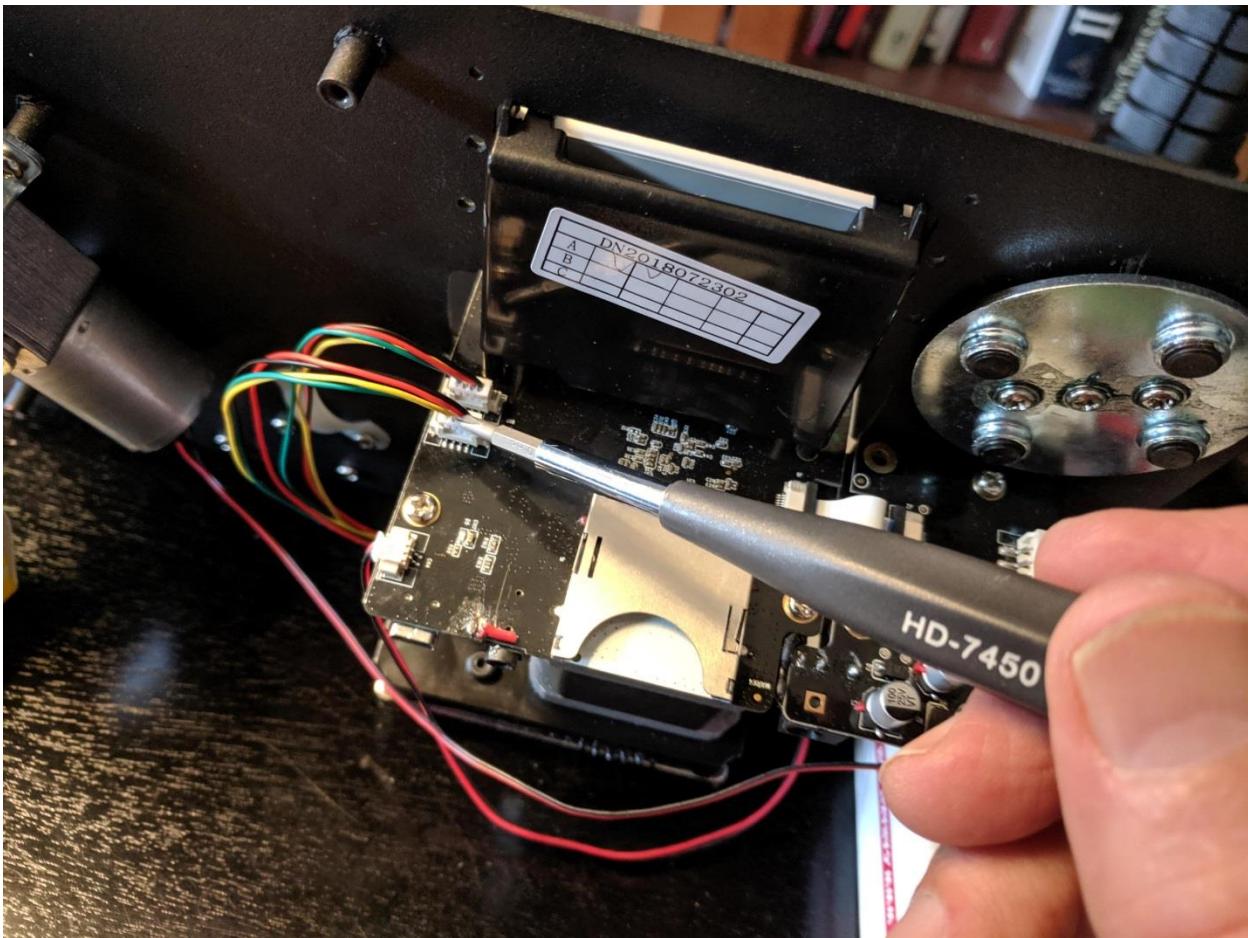


Slide the sync and S8/R8 switch cables from underneath the retainer clip.



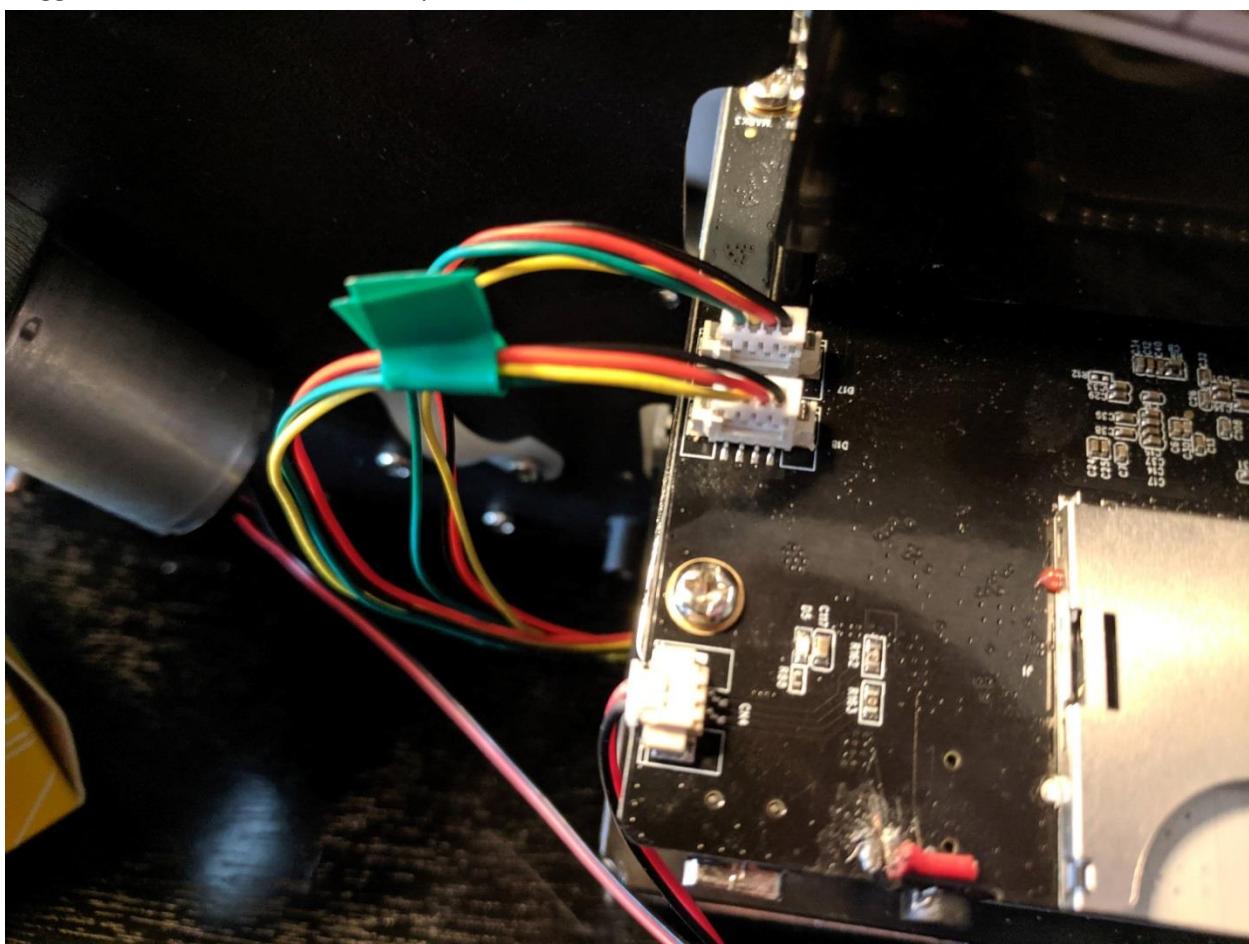


Disconnect sync and super 8 switch cables from the main board.



The connectors are interchangeable so make sure to mark one of the cables. The one towards the front of the unit (that does not have the green tape on it) is the sync cable that you will need later to connect to the RUN switch.

Wiggle the connectors out. Do not pull hard.





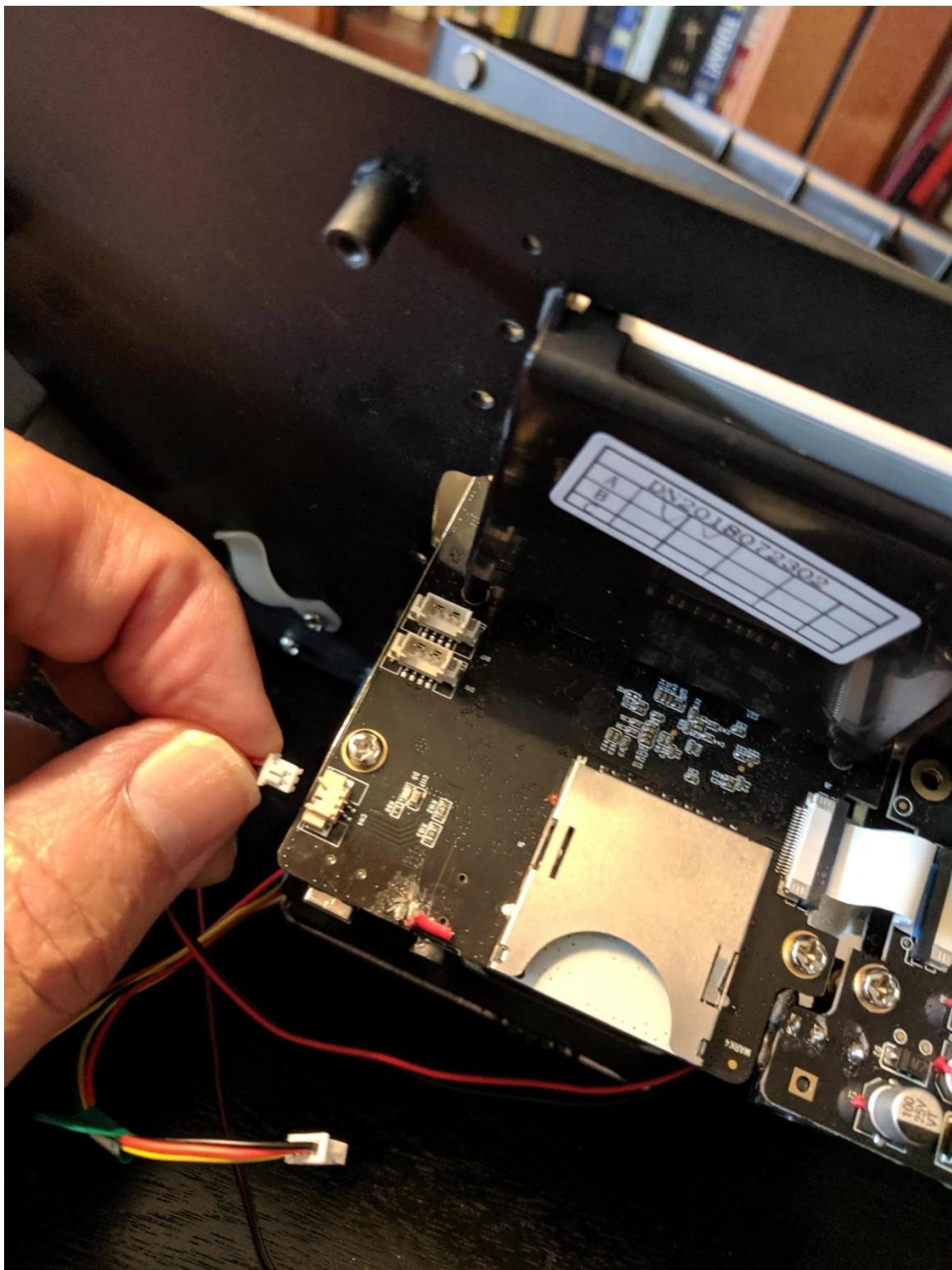




Remove the fan connector from the power supply. Tag this cable because you will be connecting it to the adapter cable provided and then to the new controller. Do the same for the takeup cable.



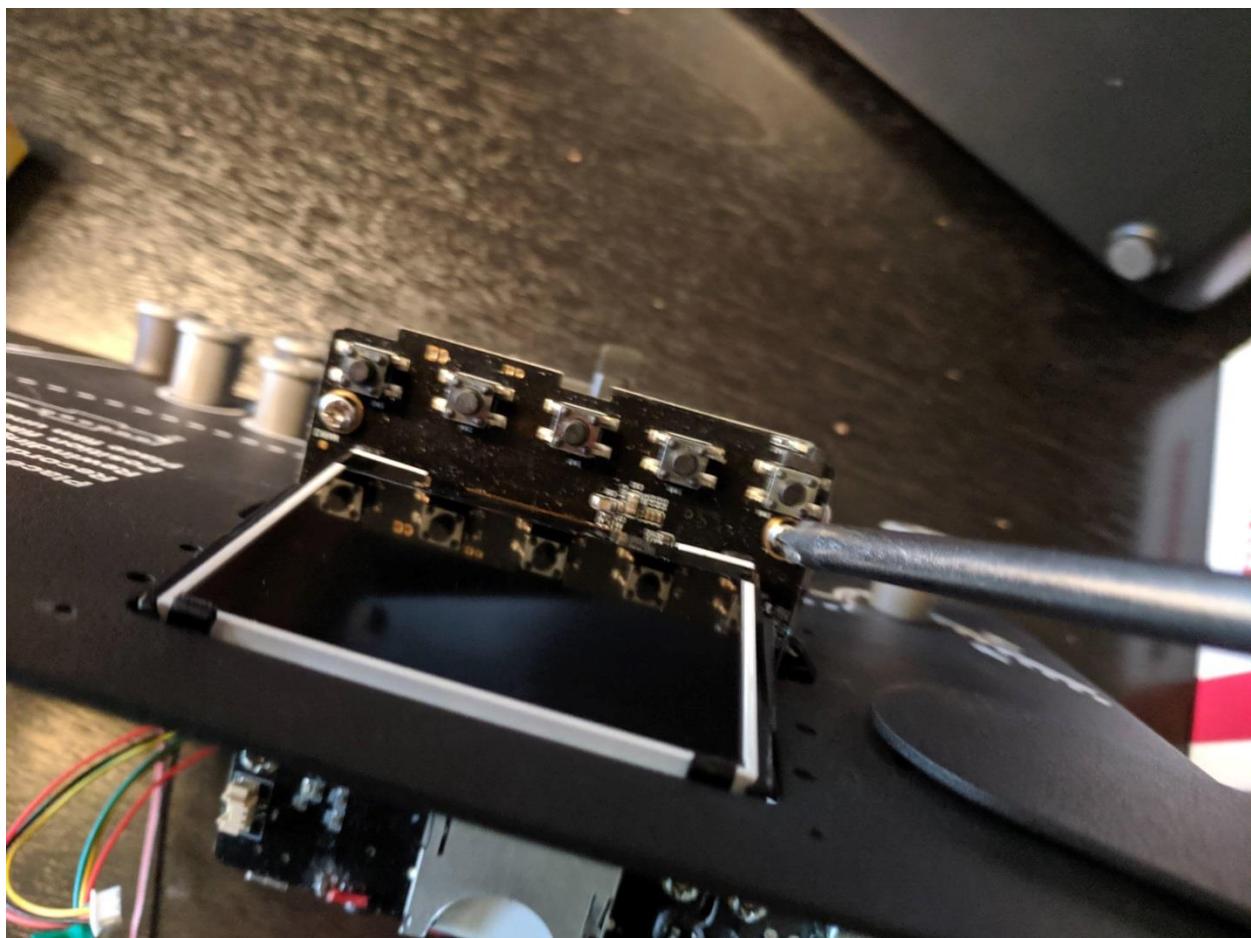
Disconnect the LED connector as shown. You will be connecting this connector back when the unit is assembled. Put a tag on it.



Remove the controller board and power supply screws (qty 7 total) . Note: One screw on the power supply is hard to reach. Slide the feed reel arm about half way up to facilitate the screw access.

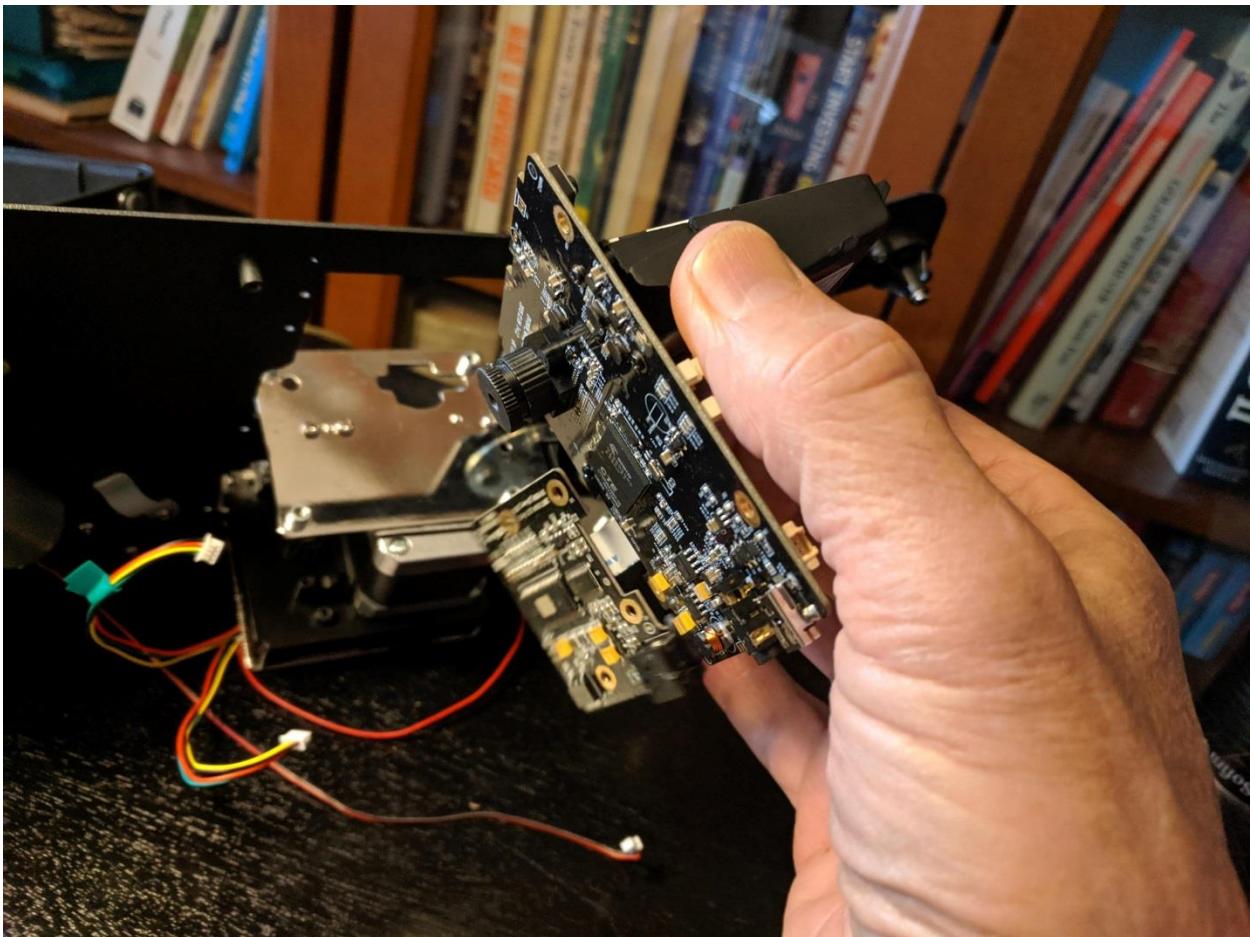
Note: When installing this particular screw back during final assembly use a smaller screwdriver just to start the screw to avoid crossthreading.

Two of the board screws are at the front.





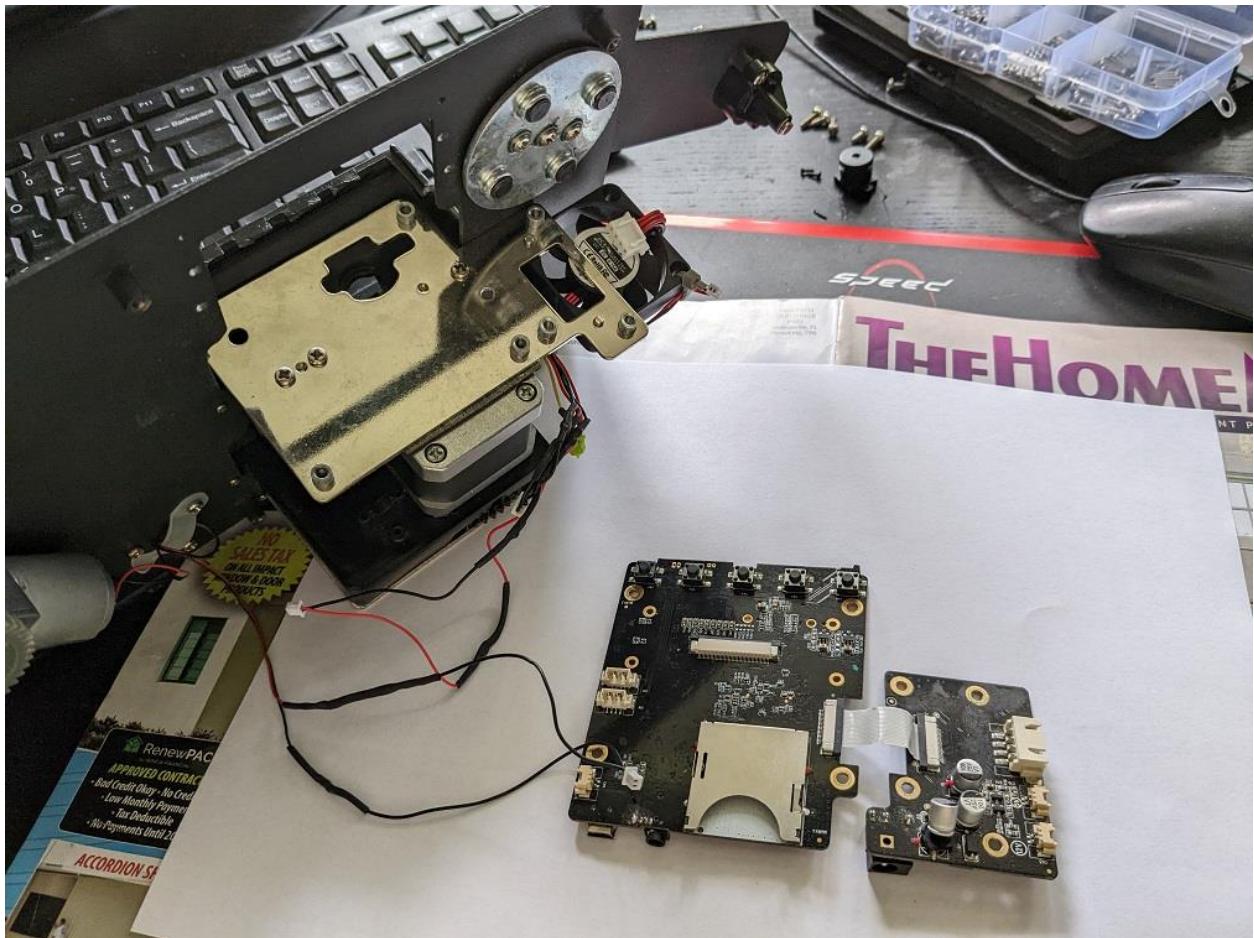
Push lightly onto the display from the front towards the back to dislodge it from the bracket and then lift the controller and power supply assembly up and away. Make sure there are no cables in the way. Be careful not to damage the power board ribbon cable.



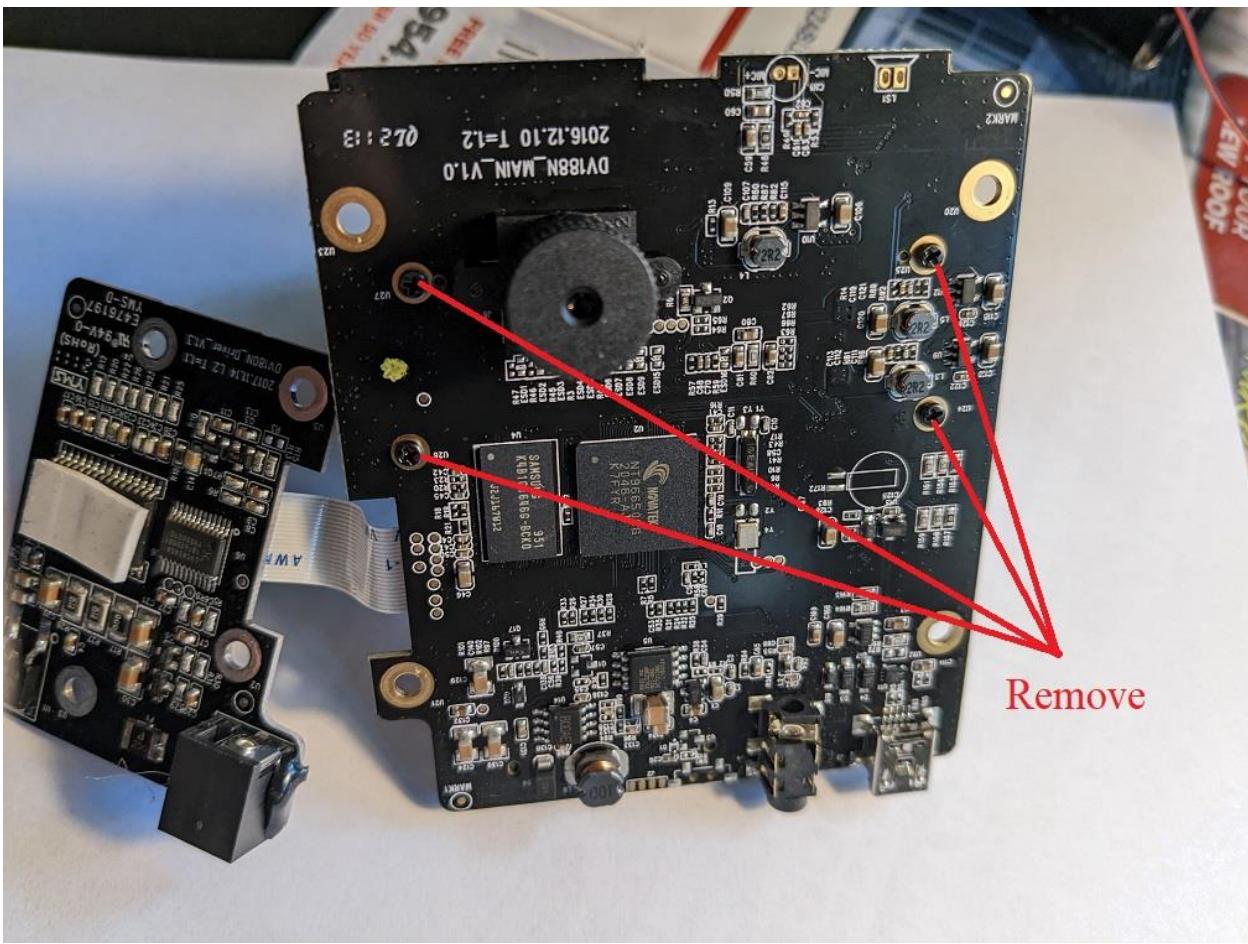


Remove Wolverine Camera Lens Assembly

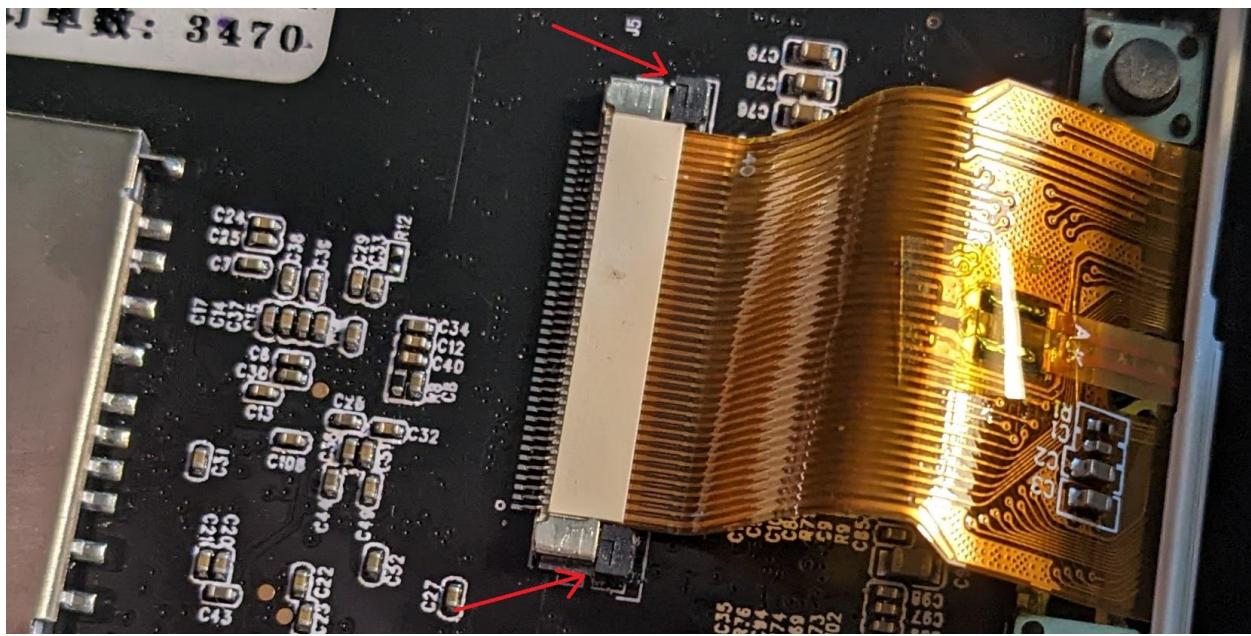
Set the camera and power supply assembly on a flat surface.



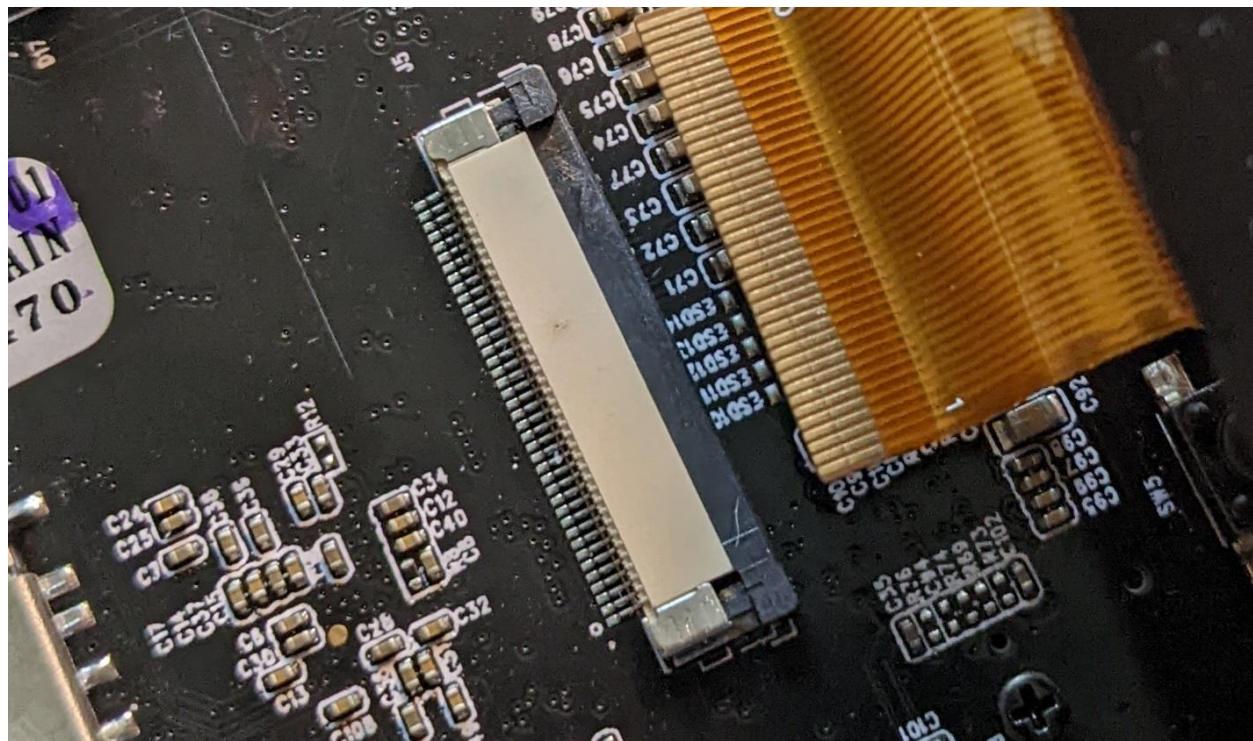
Remove display screws.



Unlock the display flex by gently pushing onto connector lock tabs as shown:

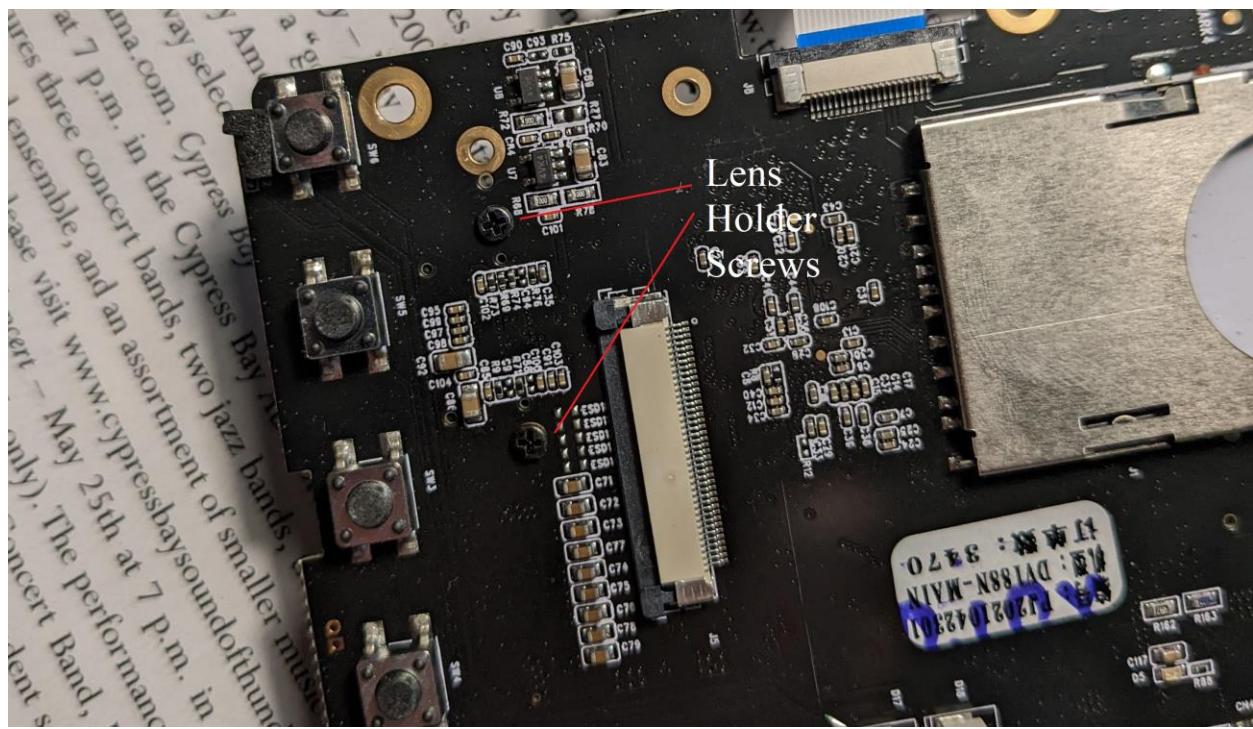


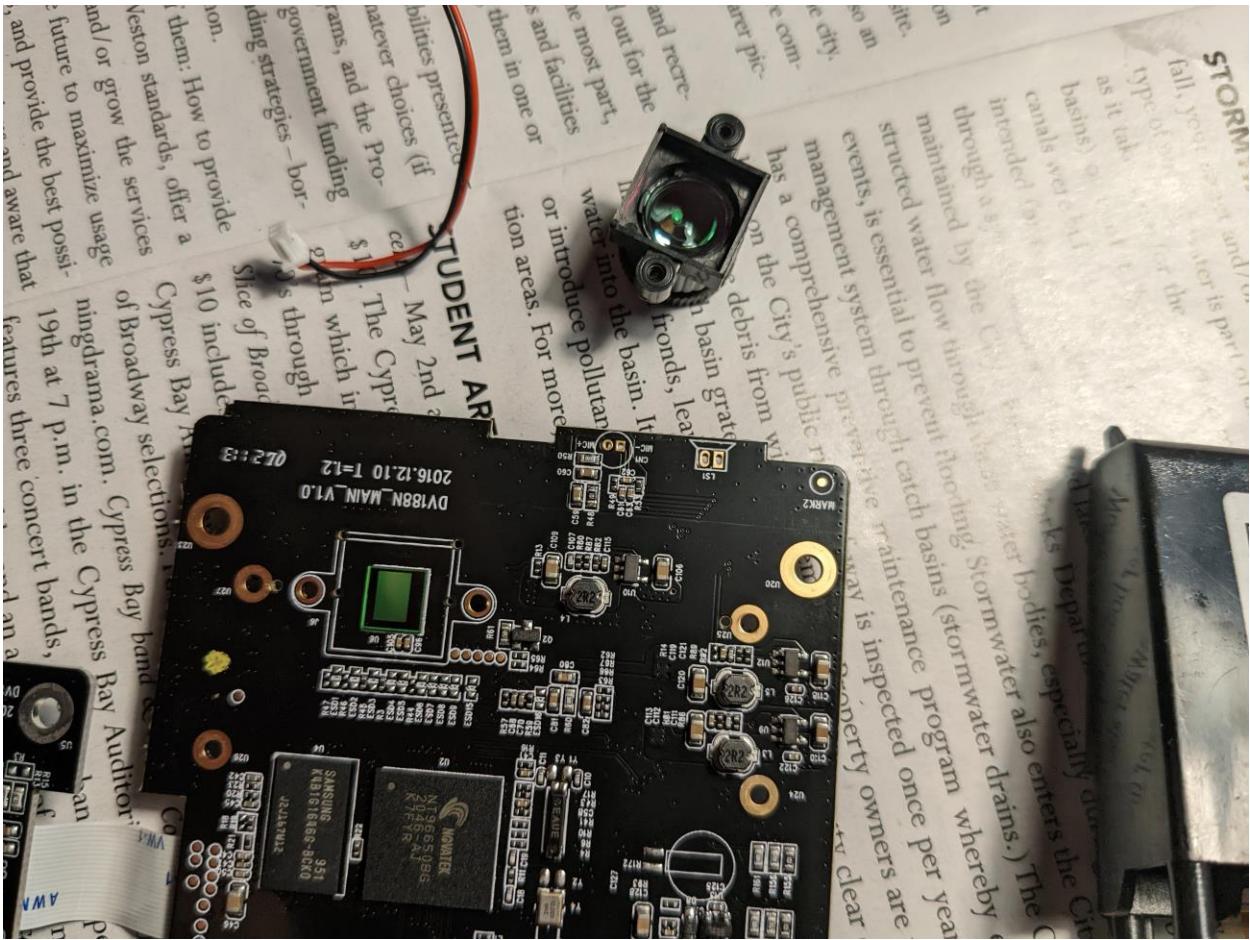
The image below shows what the connector looks like with the tabs unlocked.



Pull the flex out and install the mounting screws back onto it in case you want to reuse it in the future.

Remove the camera lens holder screws.





Put some tape over the camera sensor to protect it in case you wanted to convert the unit back to its original form.

Install the mounting screws back onto the lens holder and save the holder for possible future use.

The new camera already has the 12mm lens holder. The 12mm lens supplied with the camera is not good enough for film scanning and a new 12mm lens has to be purchased from Imagingsource.com:

https://dl-gui.theimagingsource.com/en_US/e50336d5-f5ac-5ef2-8e8b-7b5ad53e928f/

A quote request has to be sent to them for the item.

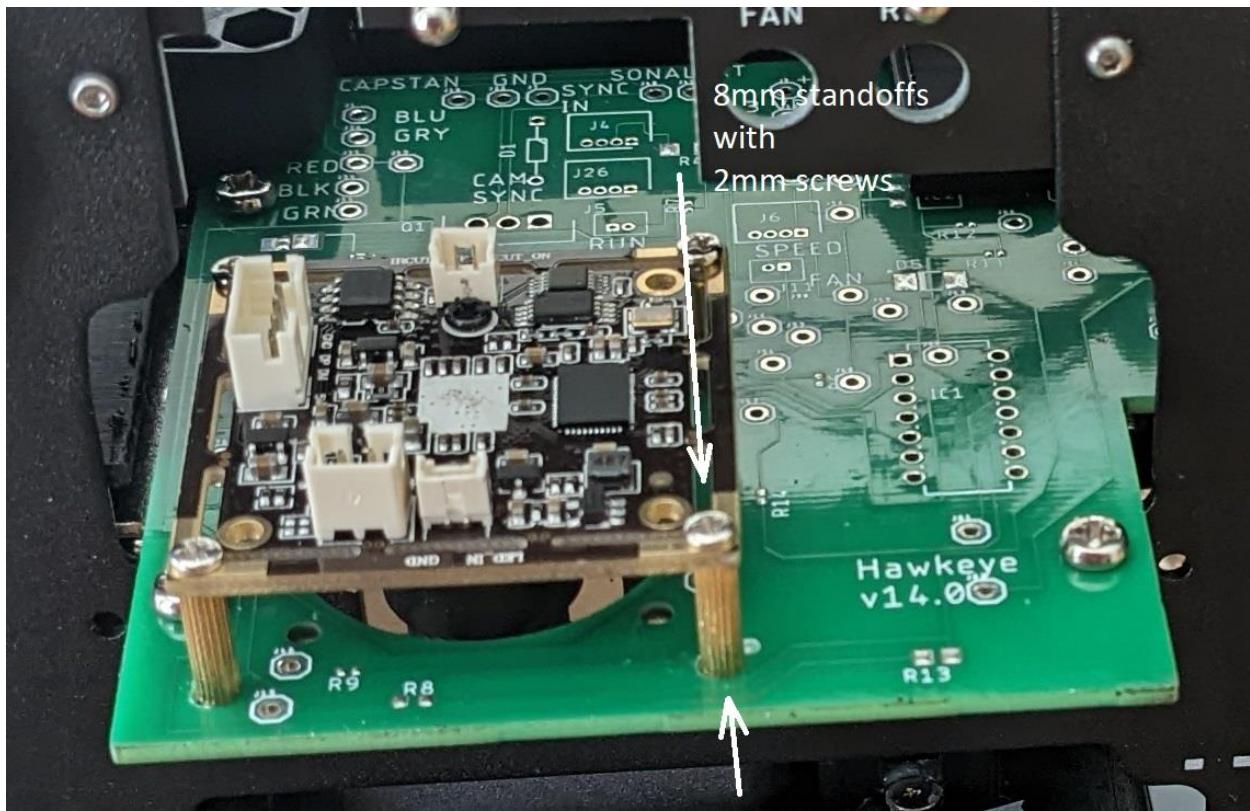
Alternatively, the lens can be purchased from [oemcameras](http://oemcameras.com):

<https://www.oemcameras.com/lens-tbl-12-2c-5mp.htm?search=TBL%2012-2%20C>

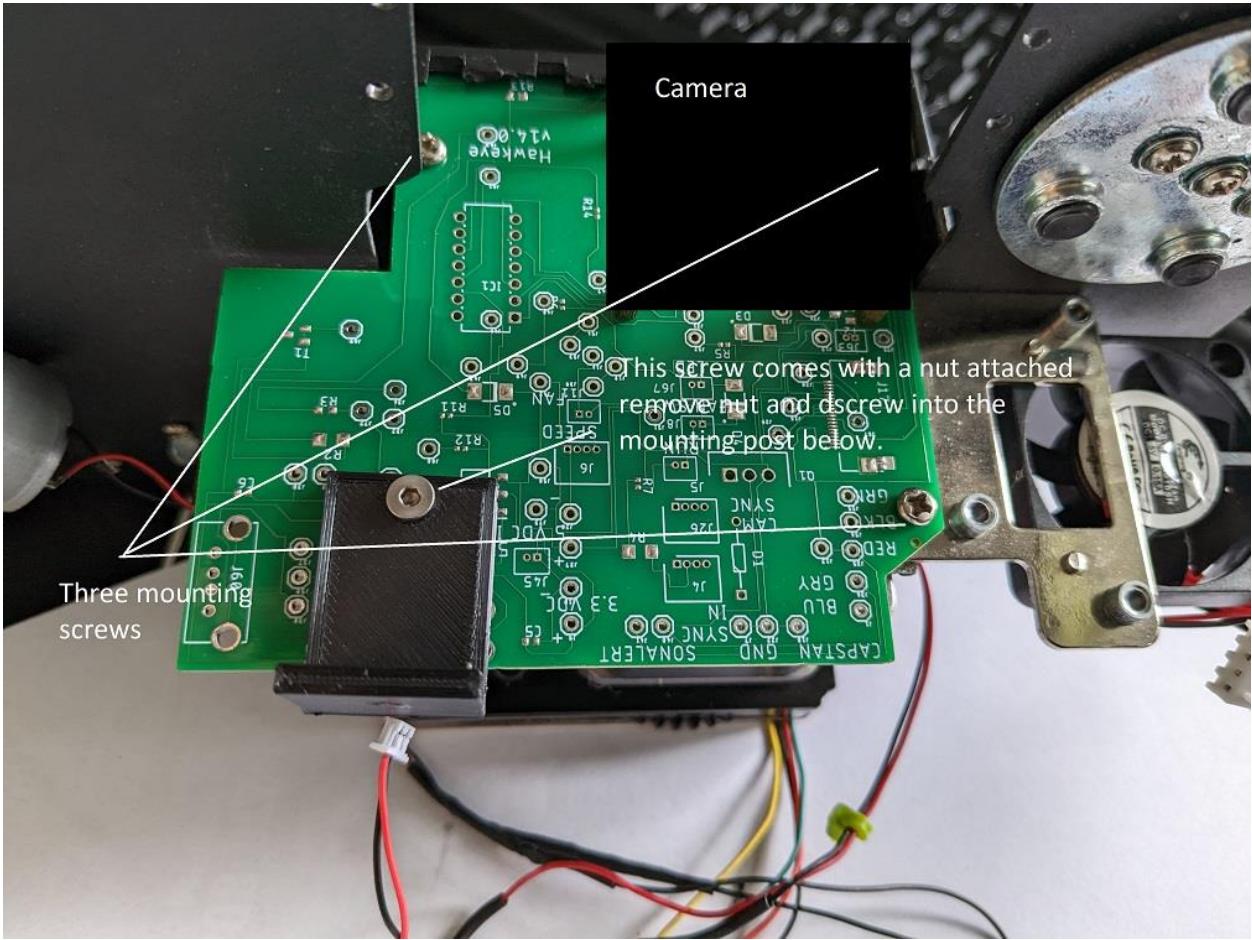
The camera can be purchased from:

<https://www.aliexpress.us/item/2251832236711118.html?gatewayAdapt=glo2usa4itemAdapt>

Mount the camera to the adapter board using 8mm standoffs and 2mm screws.

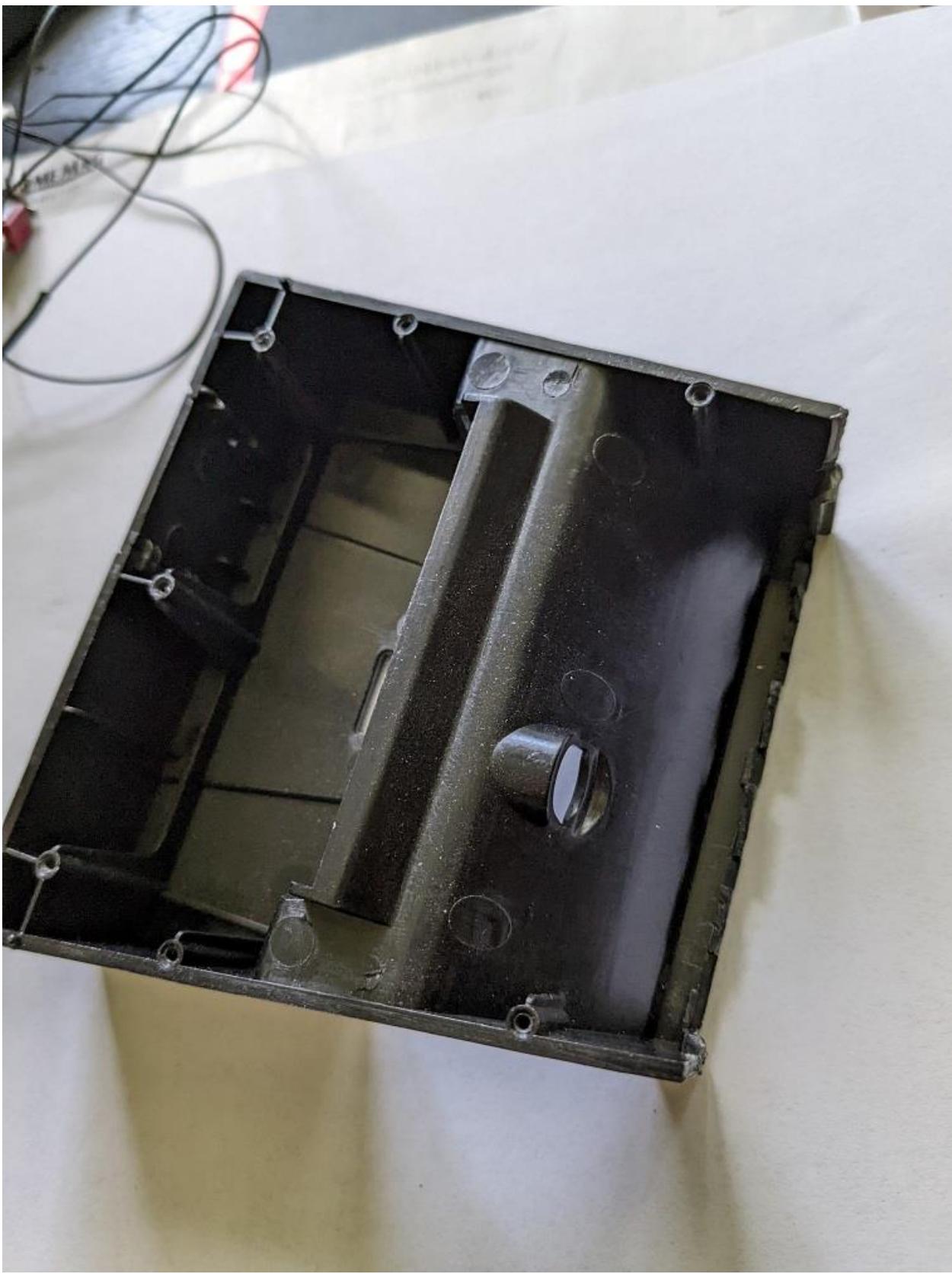


Mount the camera and adapter board inside the unit and secure with 4 screws. Note that one of the screws has a support bracket on it.

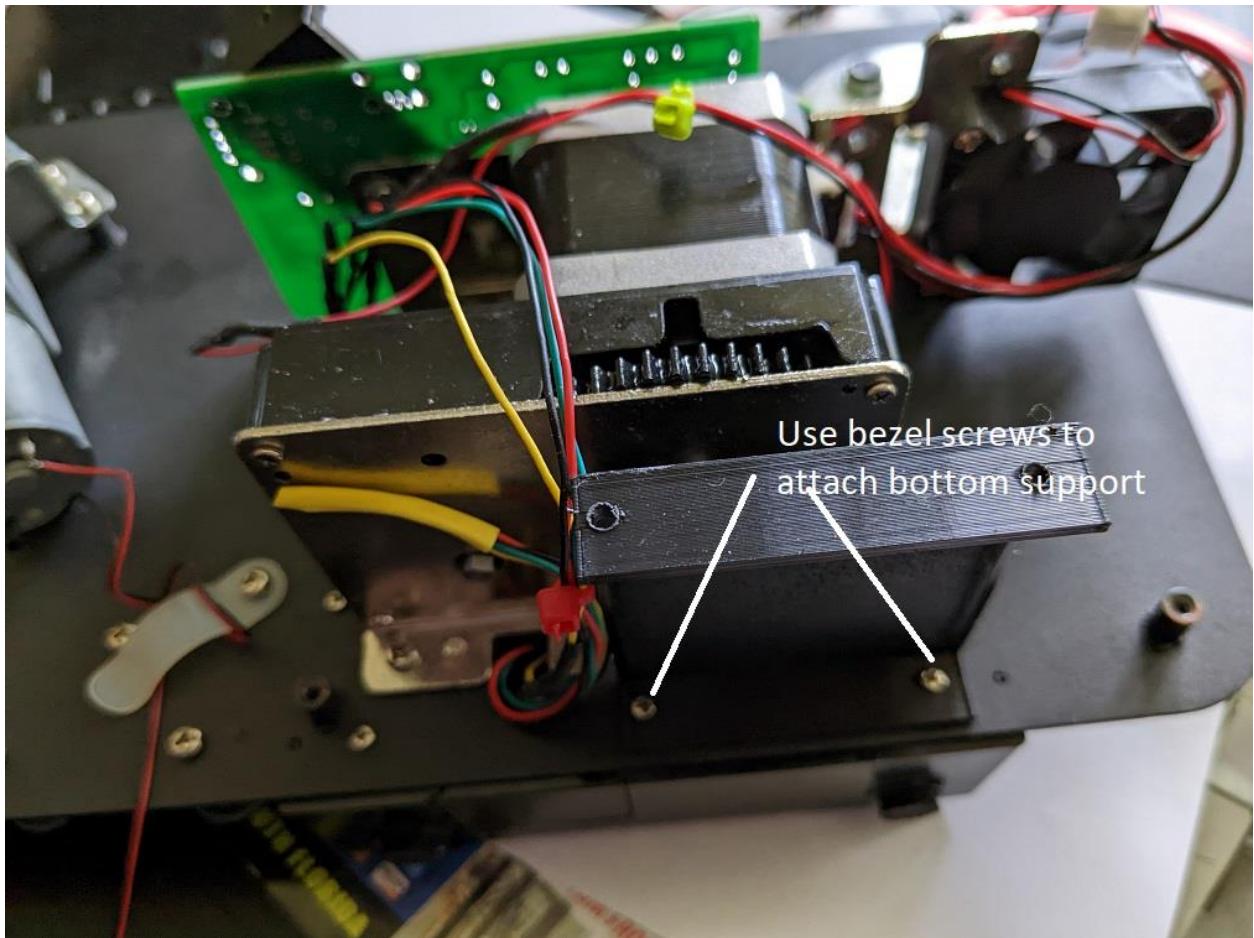


Mount the bottom support bracket onto the unit.

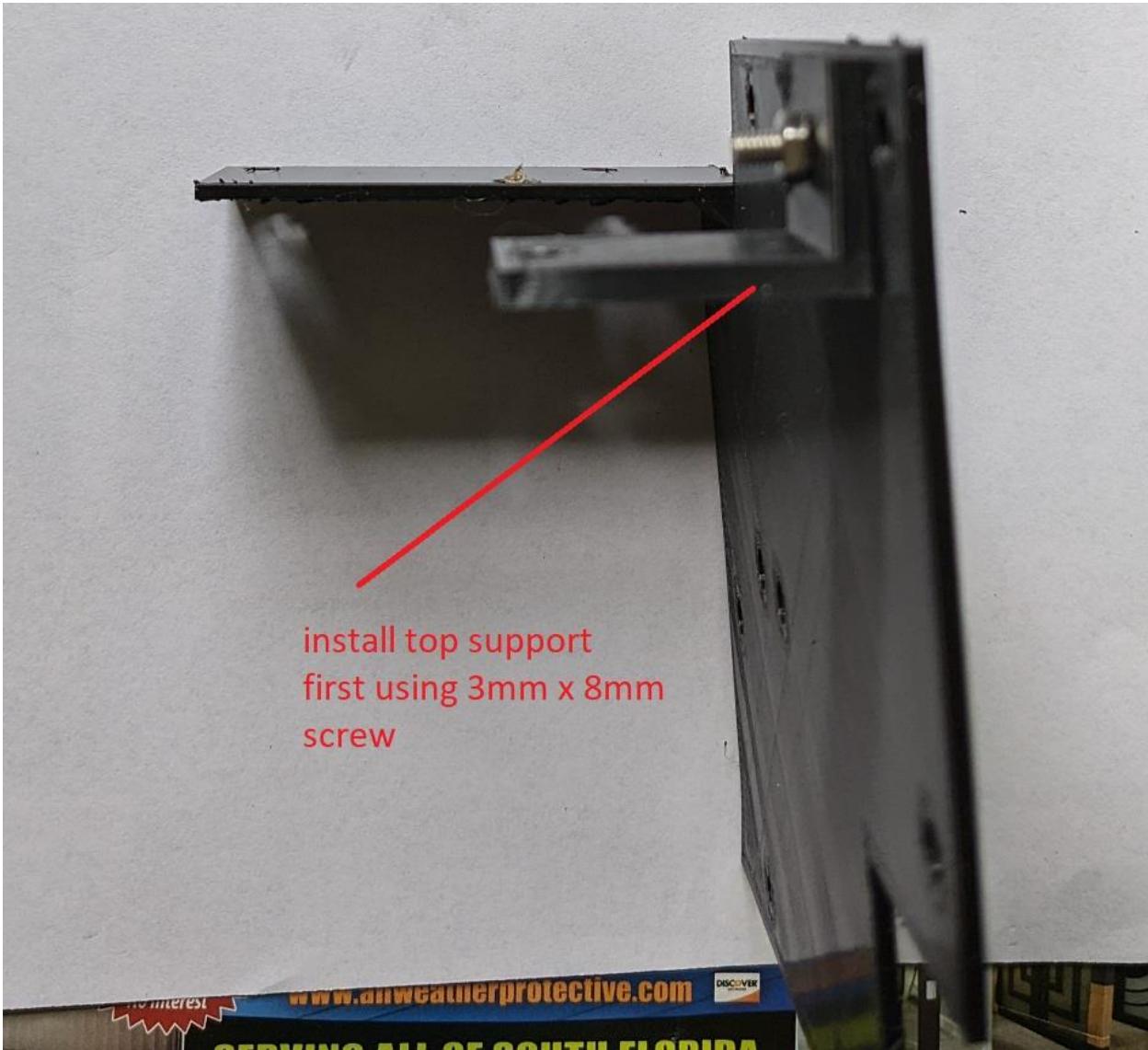
One option is to reuse the Wolverine bezel to mount the bracket. The bezel has to be shortened as shown.



Place the shortened bezel in place and attach the bottom support bracket using the original bezel screws. As shown.



Install top support using M3 x 12mm screws.



install top support
first using 3mm x 8mm
screw

Use M3 x 20mm screws

<https://www.amazon.com/gp/product/B076J3W7R4/>

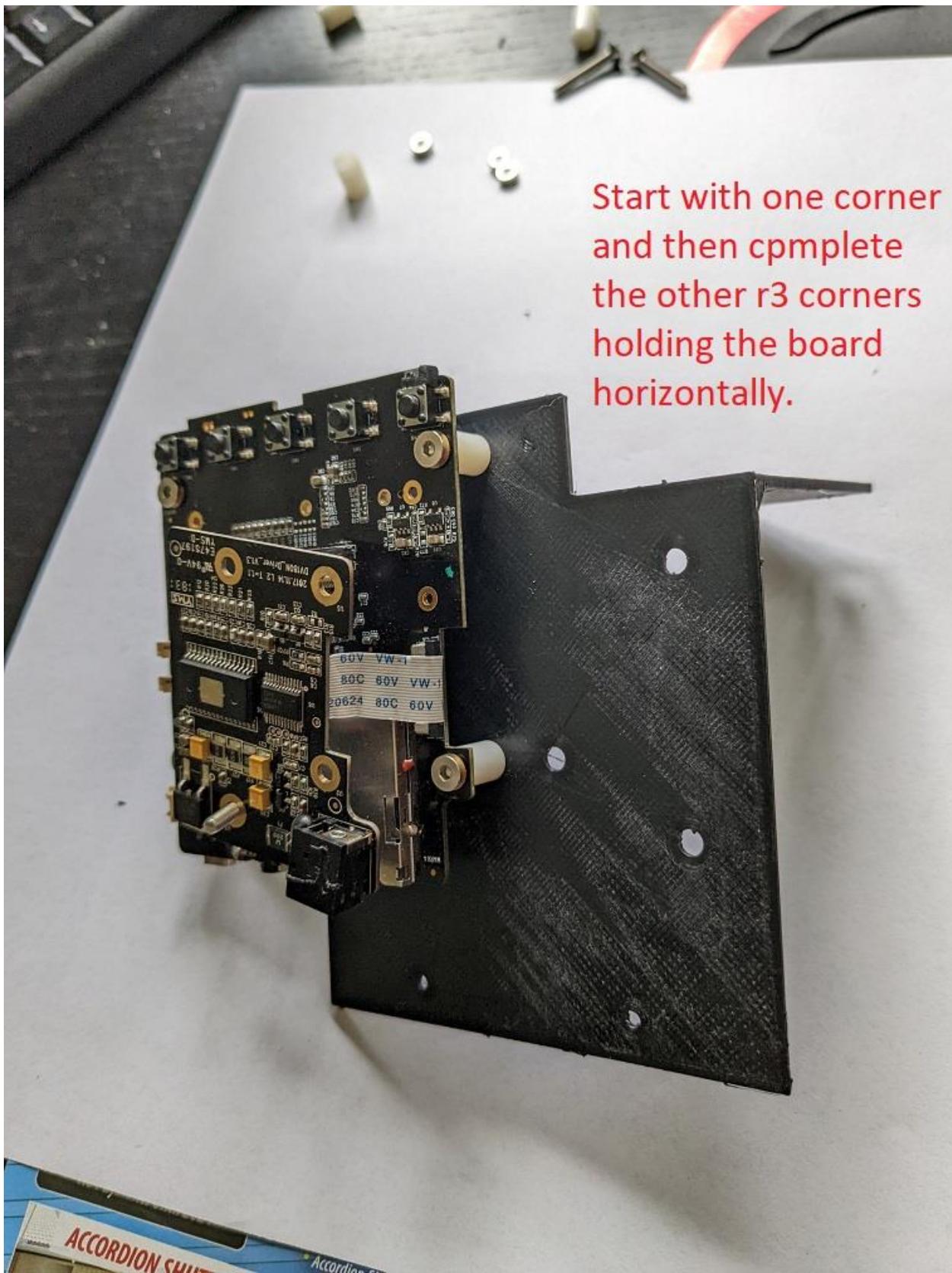
And 10mm nylon standoffs

<https://www.amazon.com/gp/product/B014KISXAG/>

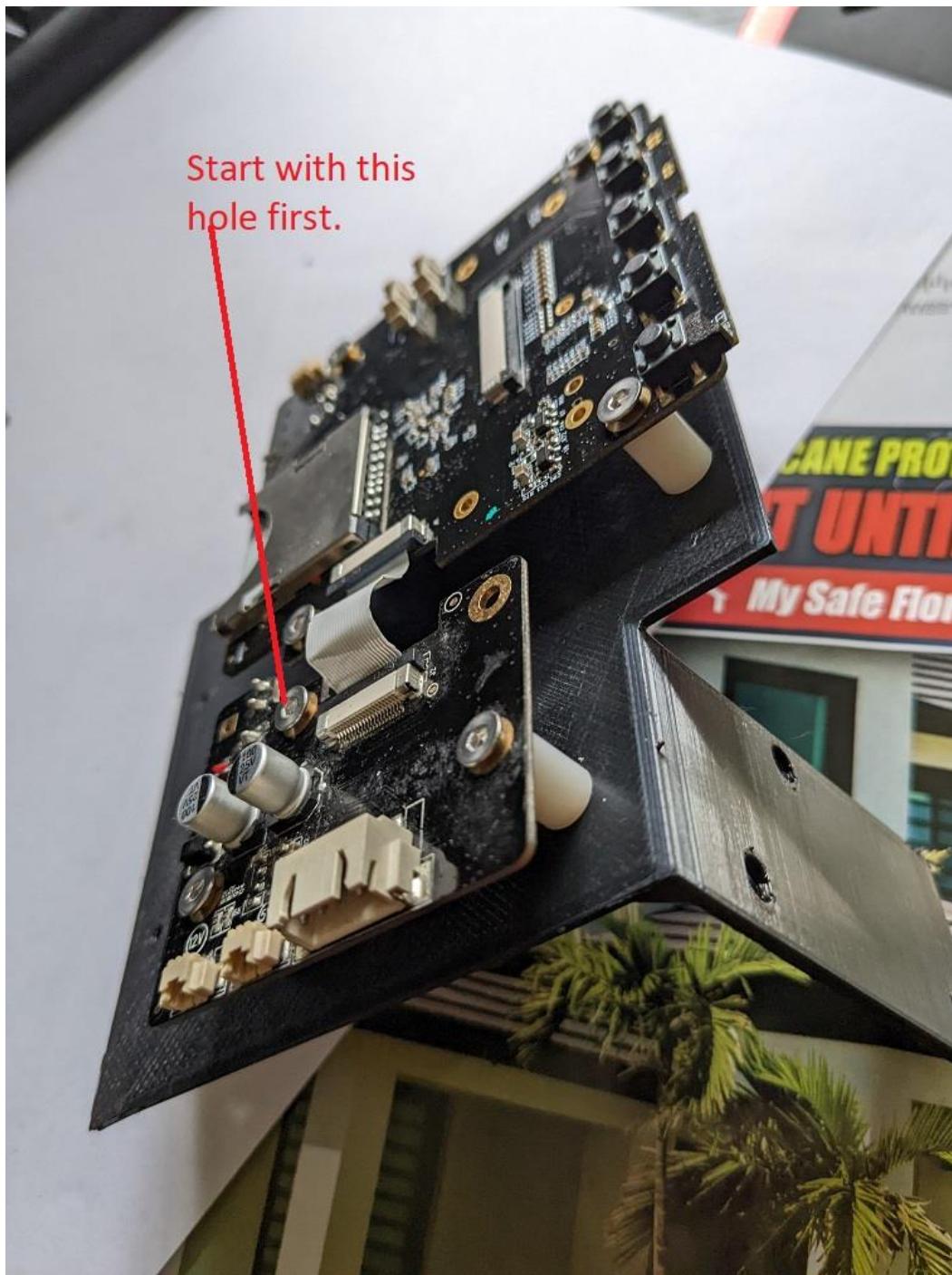
To mount the controller and the power supply onto the adapter bracket.

Start with the controller first but fixing one far corner and tightening the screw.

Start with one corner
and then complete
the other 3 corners
holding the board
horizontally.



Install the power supply next by inserting the spacer with one hand and use the other hand to insert the 3mm screw from the top and then position the power supply over the adapter bracket so that the M3 screw goes through the hole in the adapter bracket. Secure it with the 3mm nut and complete the other 2 holes.

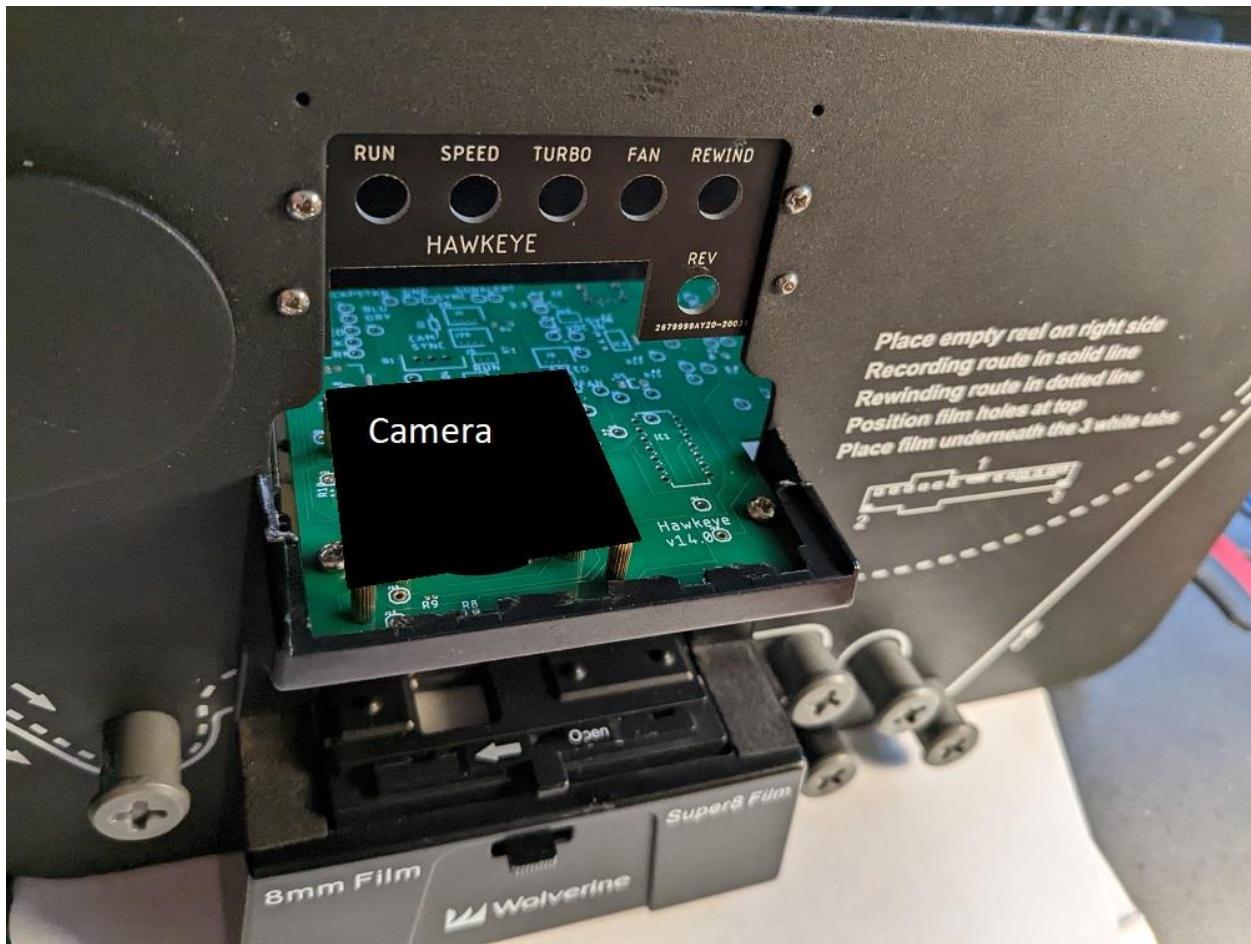


This completes the controller assembly.

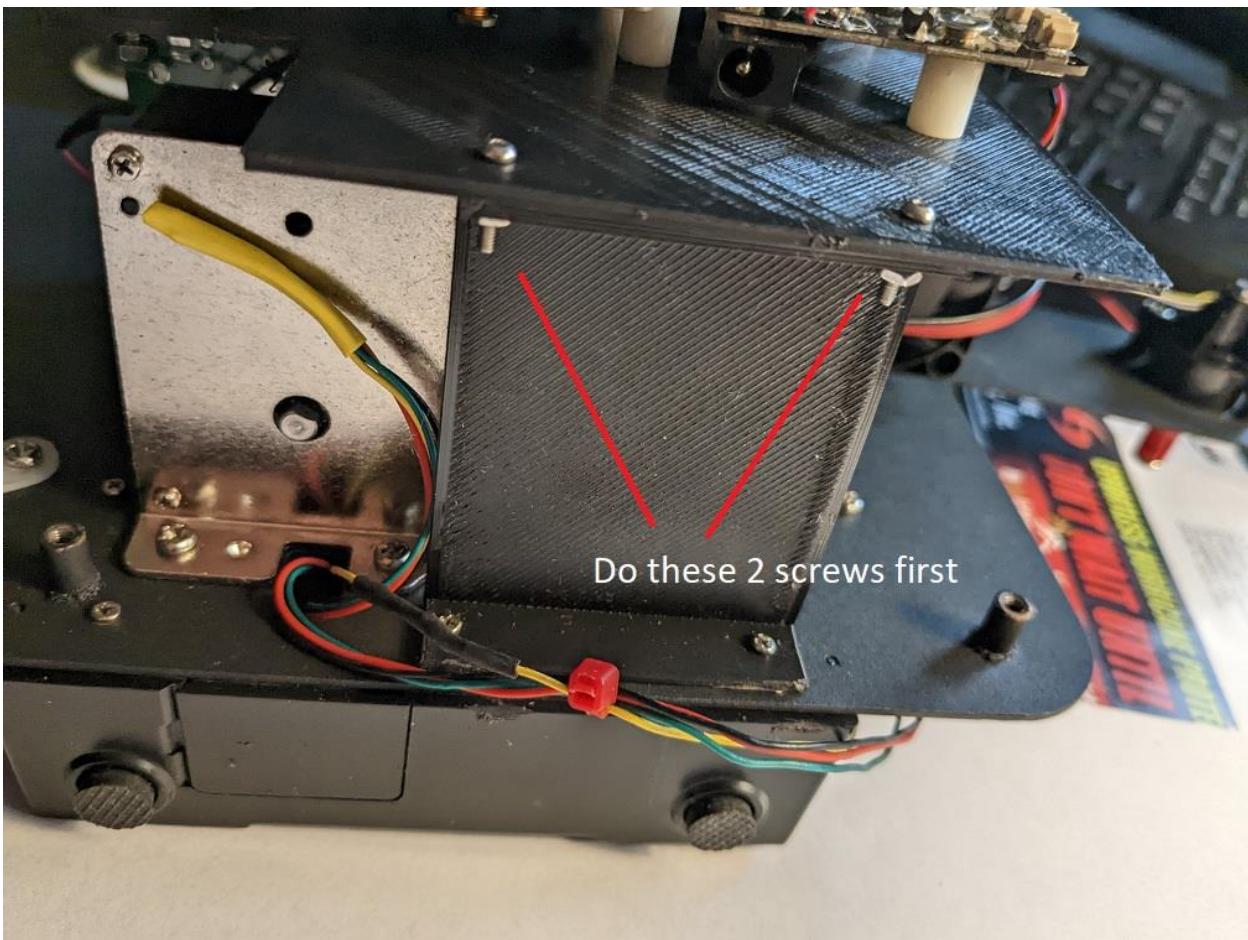
Switch panel mounting

Mount the switch panel to the unit using the 2mm screws provided in the kit. The screws can also be purchased from Amazon.

<https://www.amazon.com/gp/product/B014KJX65W/>

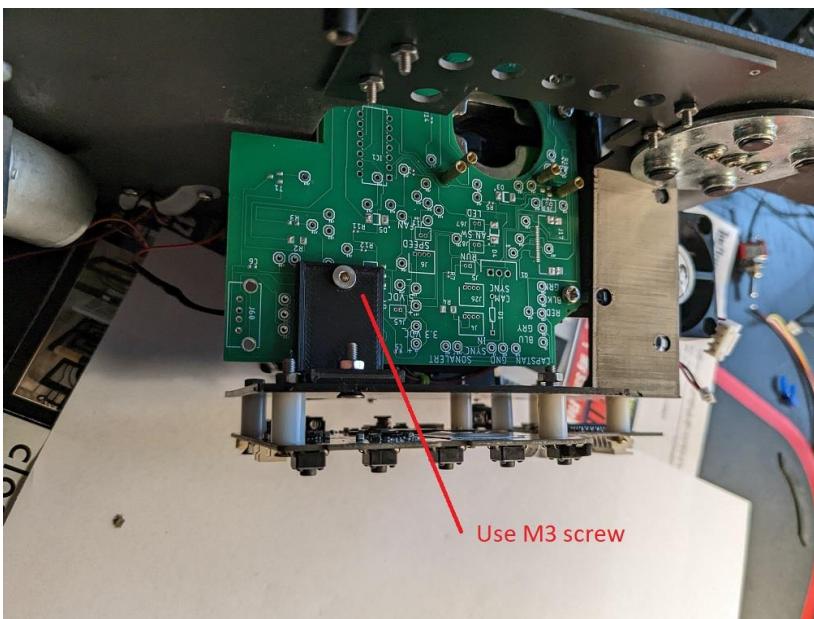


Mount the controller assembly onto the unit. Do the bottom bracket screws first.



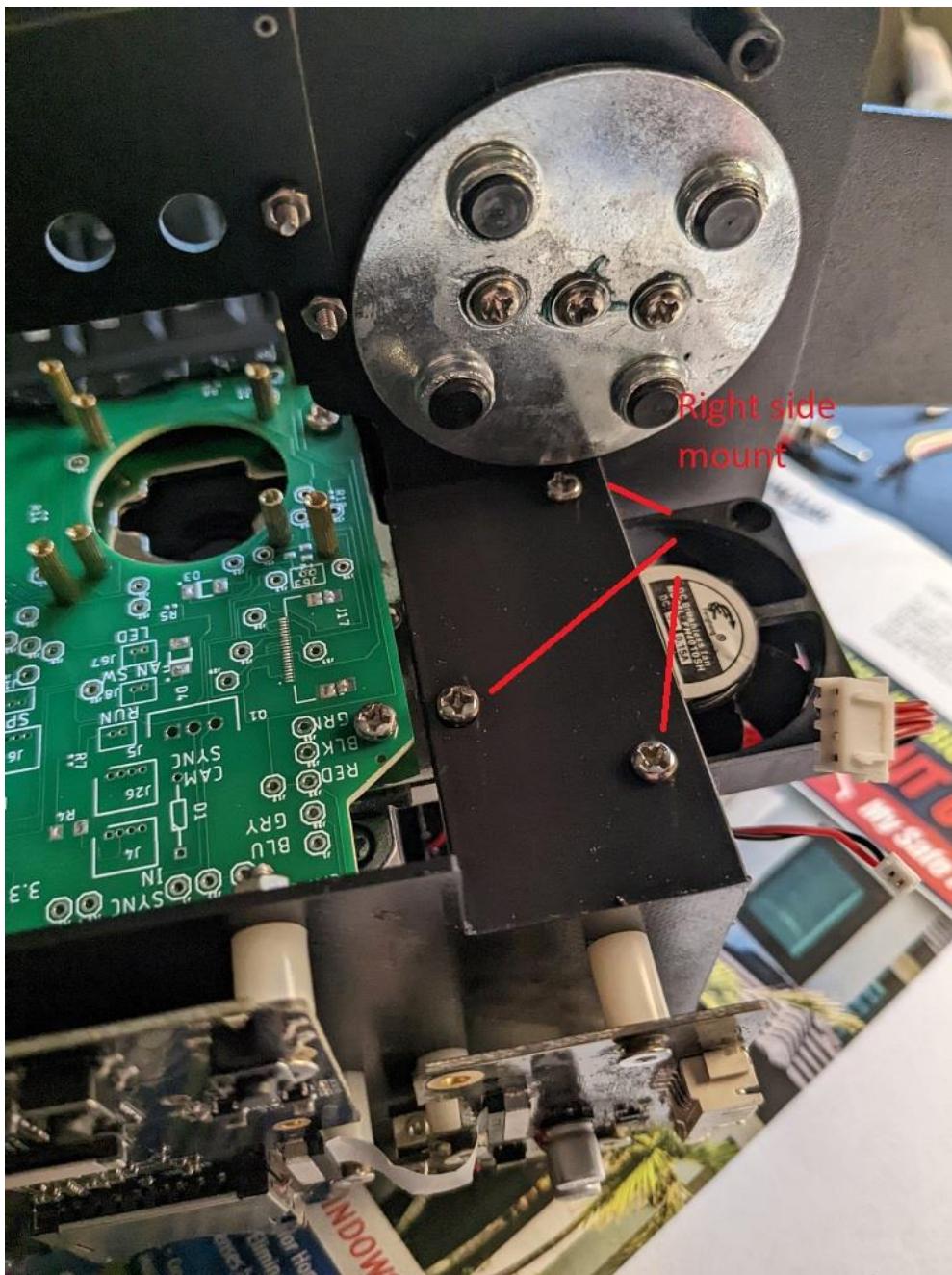
Do these 2 screws first

Then fix the top bracket using the M3 screw provided.

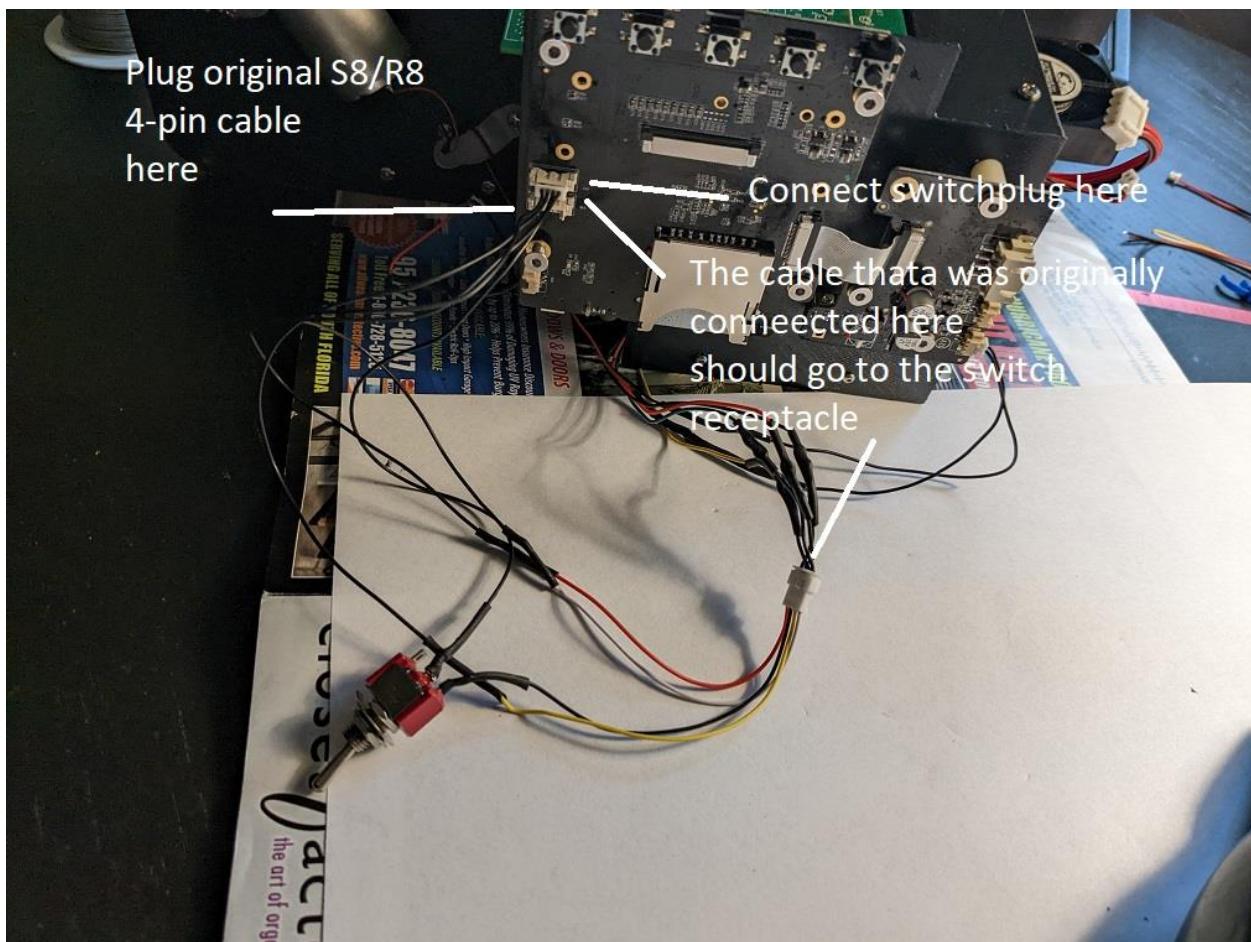


Use M3 screw

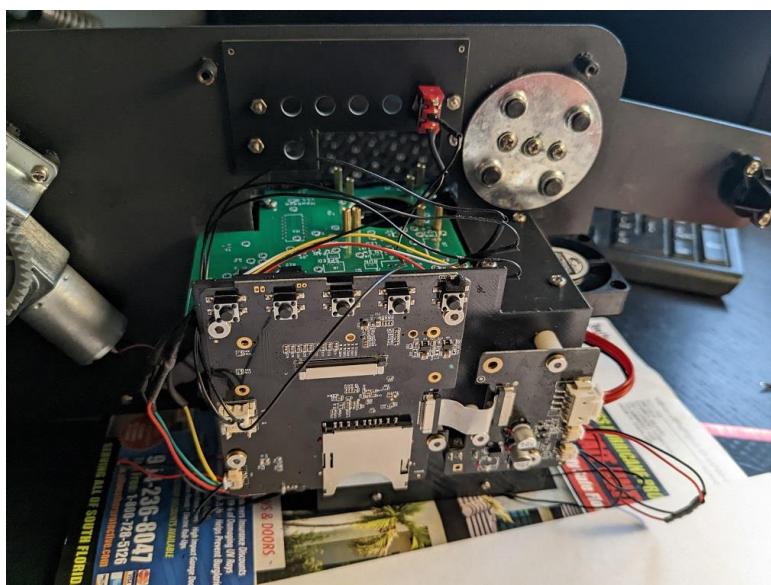
Finally, use the original power supply screws to attach the right side of the assembly in the original power supply mount location. Make sure the feed reel arm is up halfway to make the installation easier. One of the screws close to the front panel may be hard to install and can be easily crossthreaded. Use a smaller screwdriver and go slowly until the screw is seated properly.



Connect the RUN switch cable as shown in the picture below.

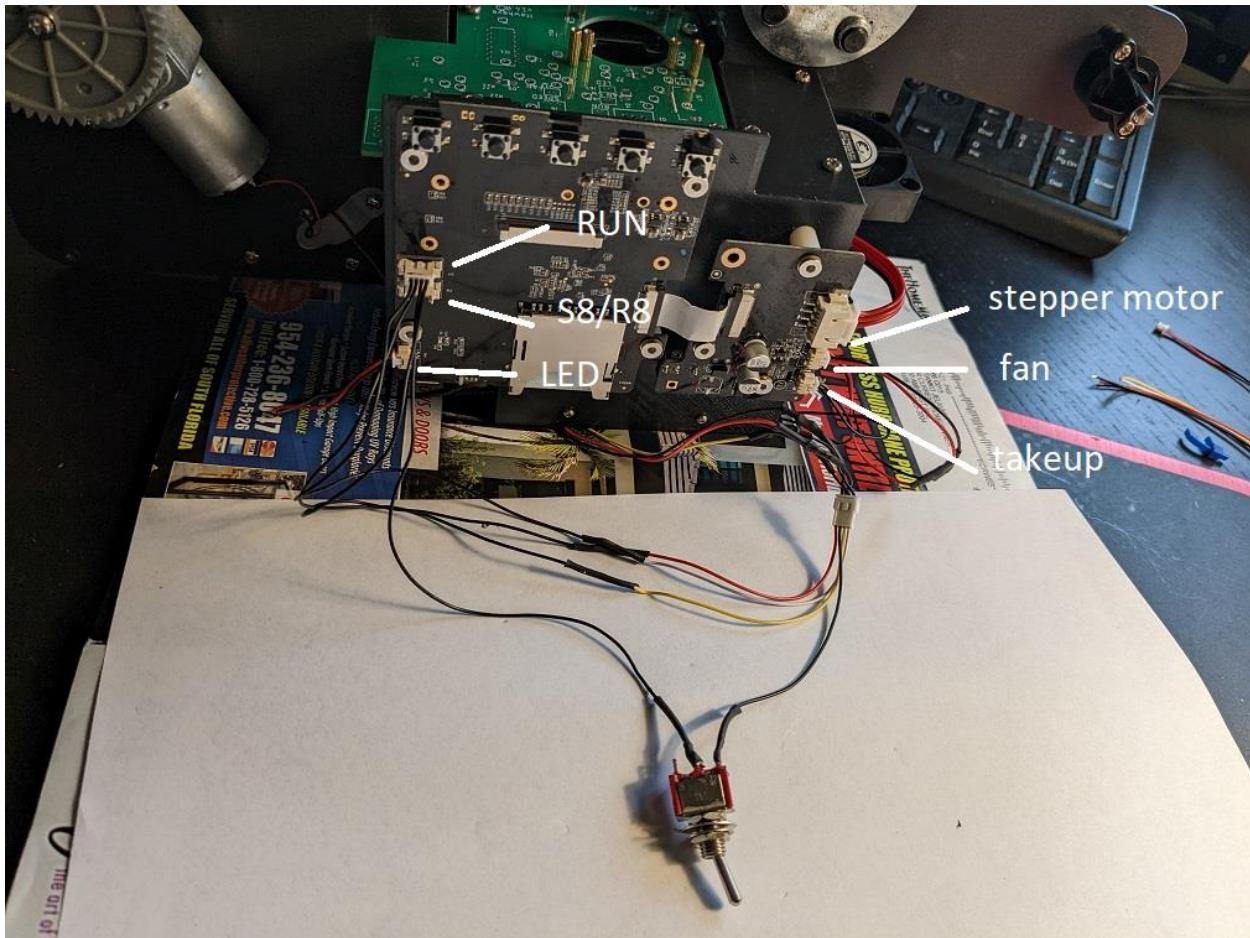


Mount the switch on the switch panel in the RUN hole.



Finish the rest of the interconnects.

- LED
- Takeup – use extender cable if needed
- Fan – use extender cable
- Stepper connector



This completes the installation. Go back to the Introduction and test the unit.

Additional Video Processing

Open up option4.avs file in the scripts directory in notepad.

Change the video path in the script and save it after that.

```
# 8mm film restoration script by videoFred.
# www.super-8.be
# info@super-8.be

# version 01.A with frame interpolation
# release date: june 20, 2012
#=====

# august 2010: added removerdirtMC() as suggested by John Meyer
# october 2010: auto sharpening parameters

# march 2011: new autolevels.dll by Jim Battle
# www.thebattles.net/video/autolevels.html

# june 2012: improved stabilisation

#=====

# cleaning, degraining, resizing, stabilizing, sharpening, auto-levels and auto-white balance.
#=====

#film= "C:\Users\stan\Documents\8mm_video_transfer\Wolverine\Videos\Hawkeye\test11.avi"
# source clip, you must specify the full path here
#film= "D:\Hawkeye\video\canada_raw.avi" # source clip, you must specify the full path here
#film= "C:\Users\stan\Documents\8mm_video_transfer\stan_8mm\4a.avi"

film= "E:\Hawkeye\canada\12_raw.avi"
```