

Elmo 16C iPhone Scanner Operating Instructions

This document provides the instructions on how to set up and operate the iPhone based 16mm scanner.



The scanner is based on the Elmo16CL 16mm scanner modified to be used with the iPhoneX. The iPhones cameras have become very capable and started challenging the industrial cameras that were typically used in this type of application. More specifically, the newer phones are capable of 24 frames per second for cinematic applications which fits perfectly for projects like this one.

iPhoneX also has two cameras capable of 2X magnification that is also use here.



HDMI Recording

There are a few iPhone accessories to be used for HDMI recording.



The HDMI adapter shown above has a lightning connect for phone charging. This way there is no worry that the battery will go low in the middle of scanning. The HDMI connector gets connected to an HDMI audio embedder shown below.



The audio embedder combines the HDMI video from the HDMI adapter and audio from the projector. The embedder HDMI output can be connected to the monitor or optionally to an HDMI recorder, and then to a monitor.

There are many options for HDMI recording available. Here are a few good ones listed:

<https://www.bhphotovideo.com/c/product/1779413-REG>

<https://www.bhphotovideo.com/c/product/1746194-REG>

But it is a good idea to do your own research and pick something that suits your needs.

Use the 3.5mm black audio cable provided to connect audio. Connect the cable one end to the projector audio jack on the top of the unit and the other end to the HDMI adapter 3.5mm jack.

Recording to iPhone Internal Memory

If HDMI recording is not required then there is no need for Audio Embedder and HDMI recorder. If the video and audio are to be recorded internally, then a different type of HDMI adapter is required. The one used for the project is shown here:

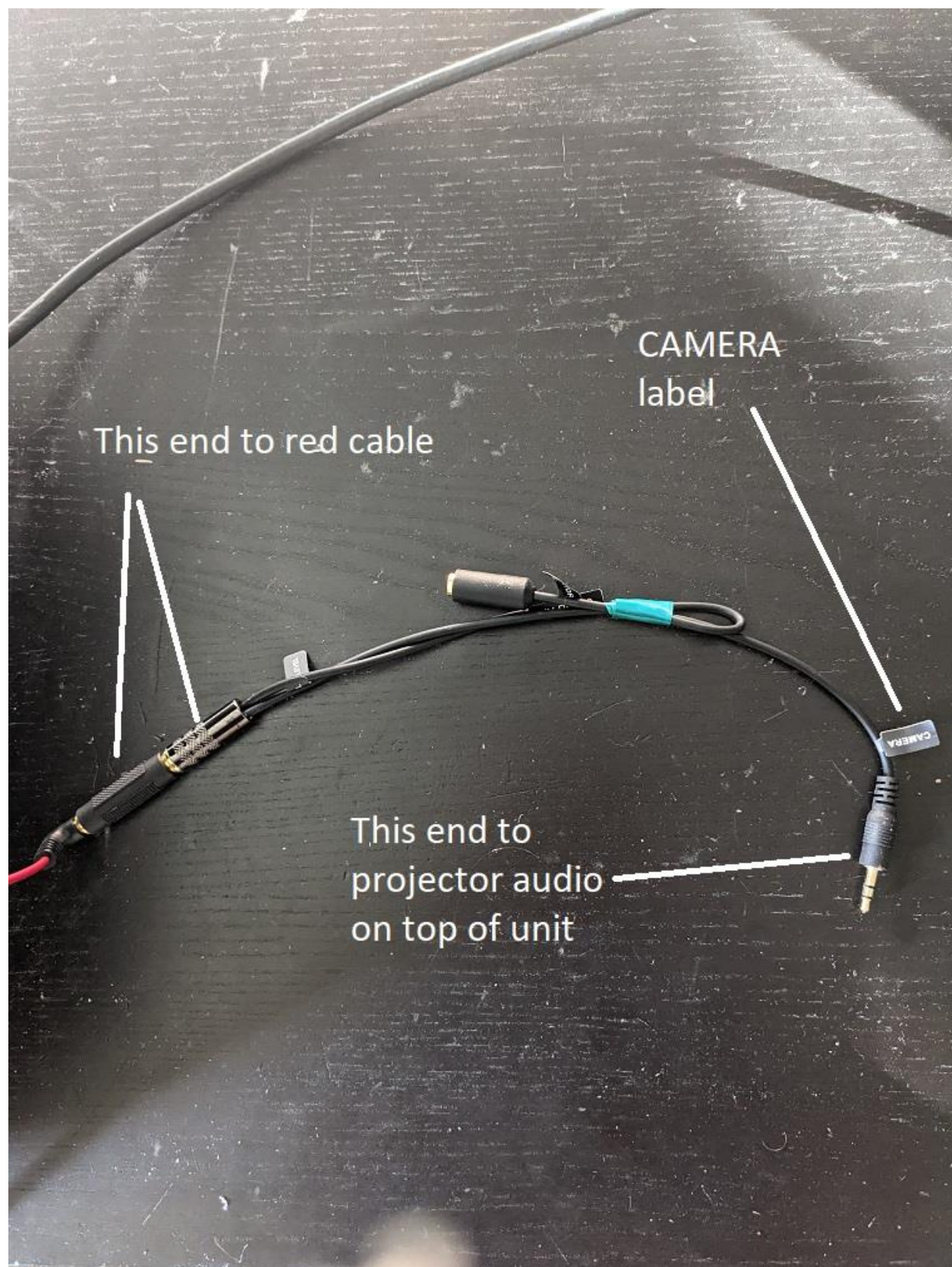


This adapter provides the HDMI signal to the monitor and audio to the Movie Pro iPhone app for recording internally to the device memory. The audio input needs a special cable with 3 rings.



The 3 ring side goes into the HDMI adapter and the 2 ring side to the projector audio output. The lightning cable goes into the phone and the lightning charging port into the charger. With this setup, video plus audio gets recorded internally to the phone. The monitor will display the video preview but no audio.

With this setup the audio may exhibit stuttering effect. This is caused by the HDMI adapter audio output. In order to fix this issue an attenuator cable is provided between the projector audio output and the red audio cable.



This end to red cable

CAMERA
label

This end to
projector audio
on top of unit

Make sure that the iPhone speaker is muted. Check that before running the Movie Pro app.

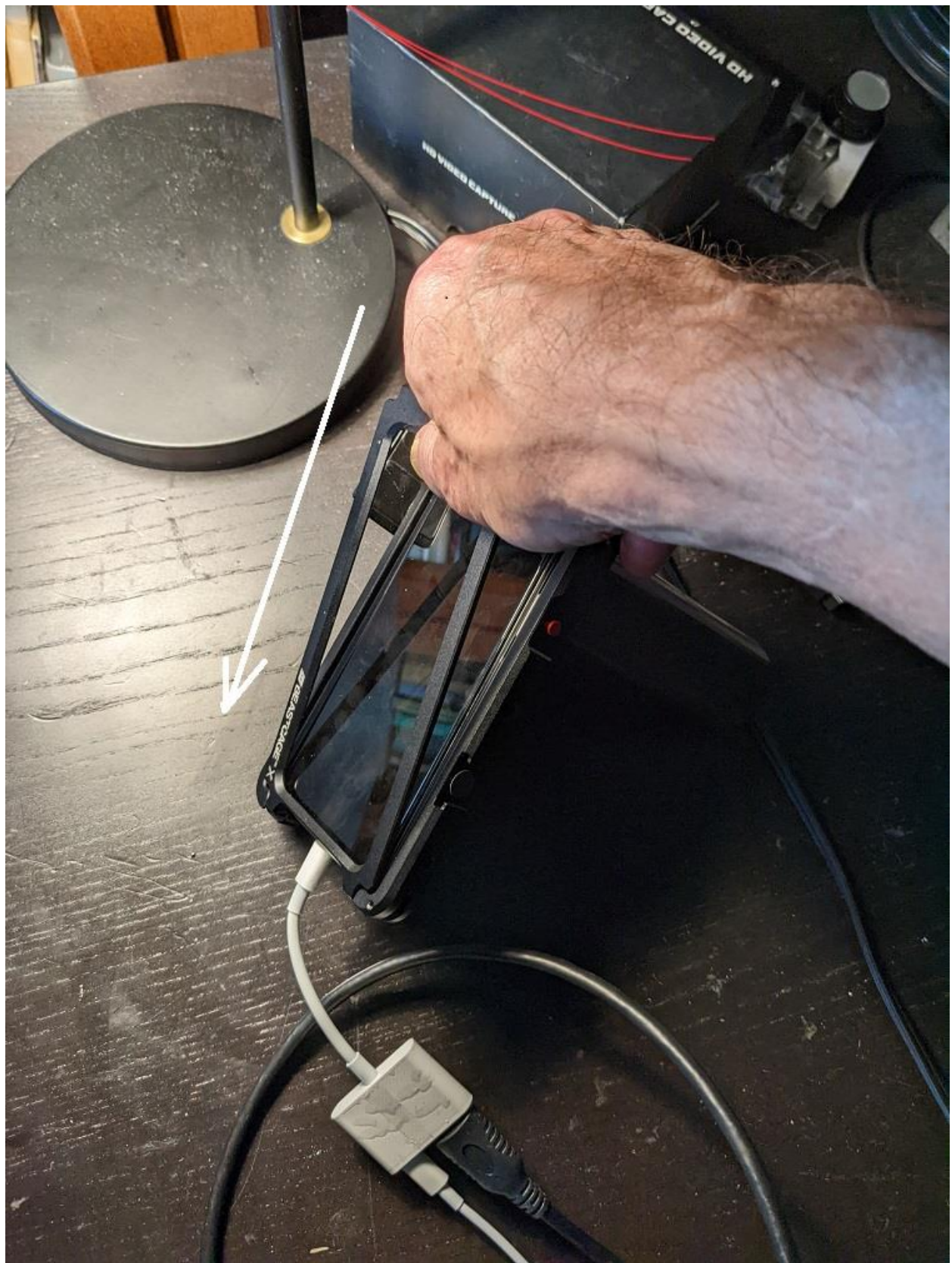
Lens Setup

The iPhone comes installed in the cage and 25mm lens is already mounted on the cage. If you have to remove the iPhone from the cage then press on the latch on top of the cage and push the phone and the cage cover out.



Be careful taking the phone out of the cage. Disconnect the lightning cable and place the phone and its cage on a table because the phone can easily slip out and get damaged.

The same applies during the re-installation. Insert the phone into the cage. Slide the cover hooks into the slots in the bottom of the cage and swing the cover towards the closed position. Make sure the cover is not flipped backwards. When the cover is almost fully closed do not push on it to lock it in place because you can crack the phone glass. Before locking the cover shut. Push on it towards the lightning connector and then snap it in.



Check the lens aperture and makes sure it is wide open.



This is what the lens with aperture closed looks like:



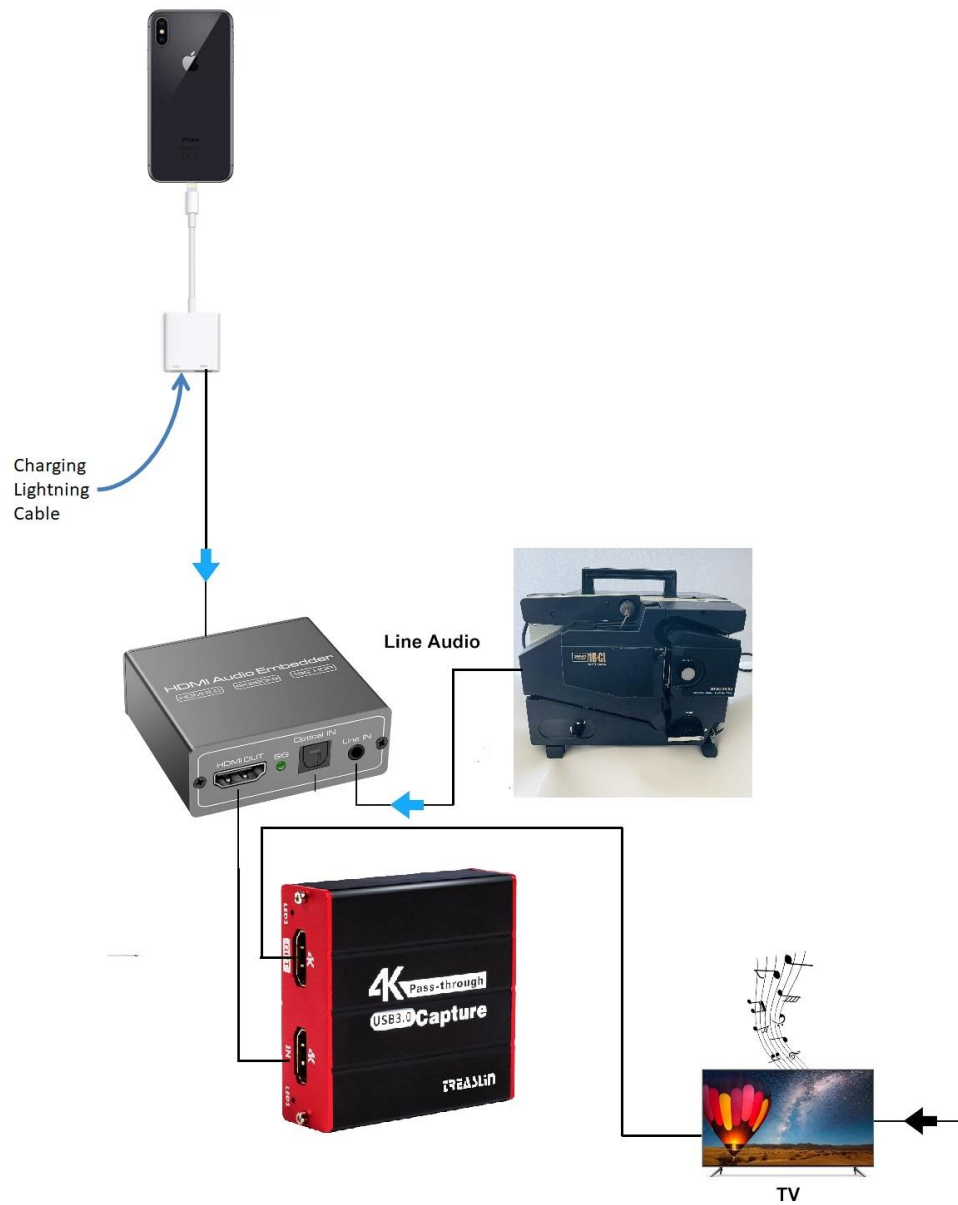
Slide the lens extension tube onto the lens.



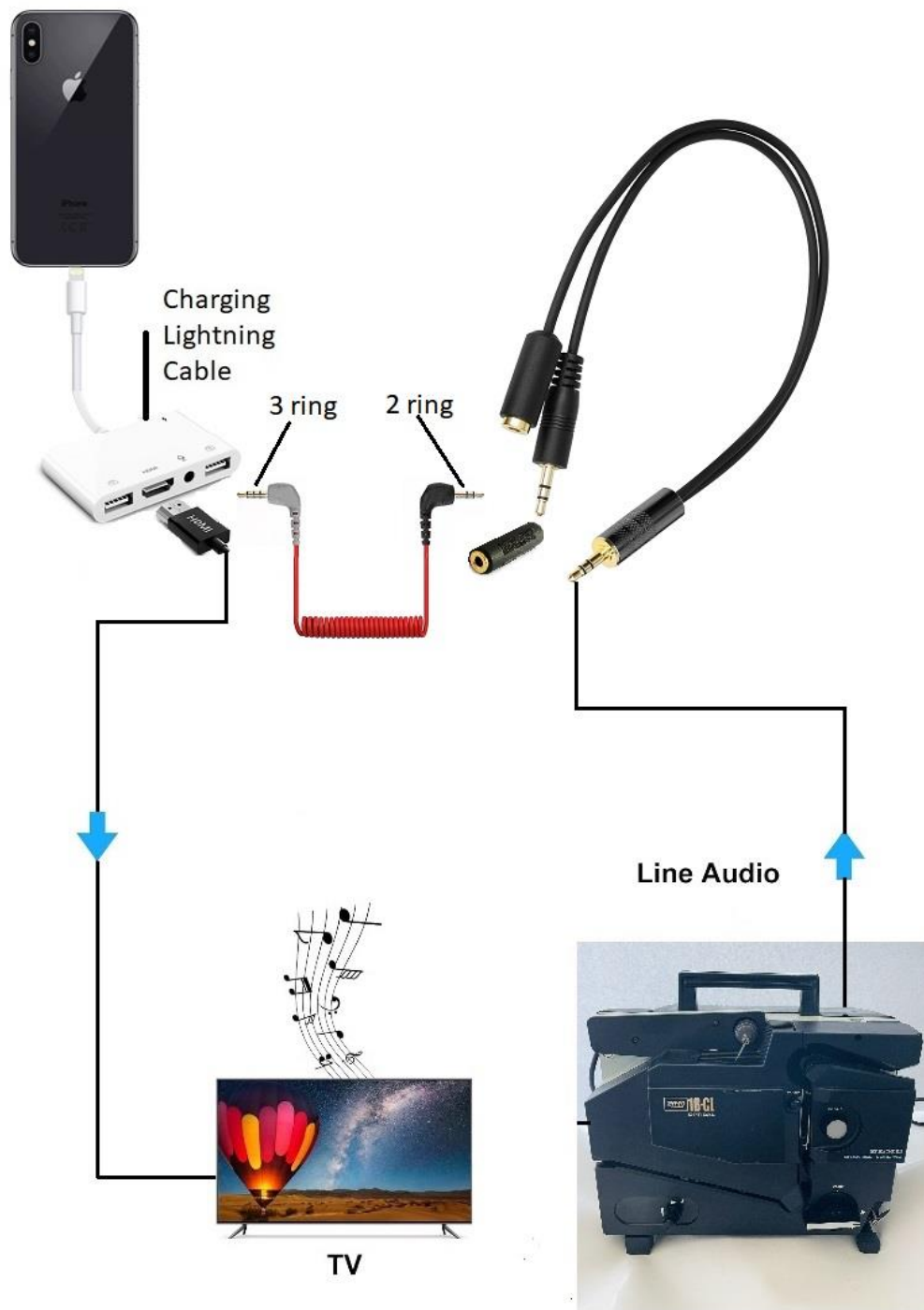
Make sure the extension tube is all the way in. Do not rotate the tube during installation. It could mess up aperture. If rotation is necessary, do it counterclockwise.

Connections

The following diagram shows the connections for HDMI video recording.



The following diagram shows the connections for recording to the internal memory.



Tripod

Use a lightweight tripod such as:

<https://www.ebay.com/itm/225952995607>

The heavier duty ones may not allow you to get close to the projector gate with the iPhone.

Mount the iPhone assembly on the tripod.

iPhone Setup

Run the Movie Pro app.

=====

Add picture here.

=====

Setup the iPhone on the tripod and bring it close the projector. It may be necessary to move the projector all the way close to the edge of the table as far as it can go. Then, move the tripod with the iPhone close to the projector

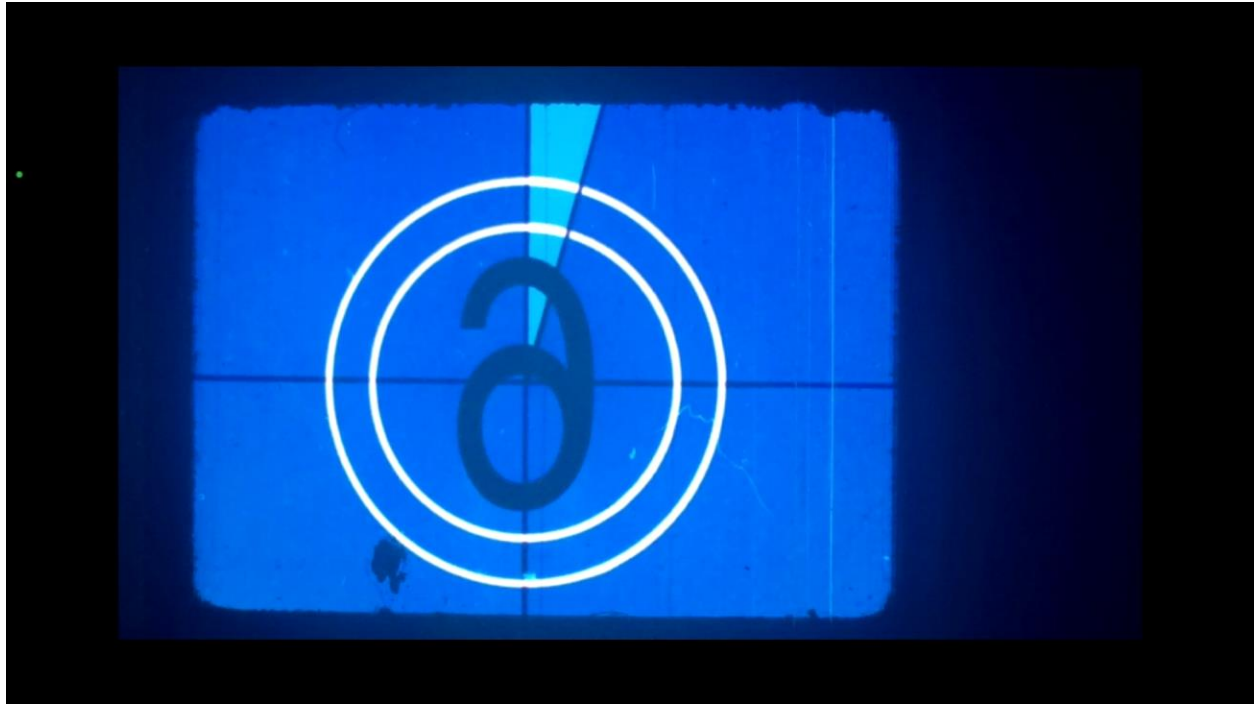


Make sure the projector main switch is in the off position. The lens should be close to the gate. In order to achieve this you may have to adjust the tripod height and tilt but make sure that the lens extinction is pointing straight to the gate. This adjustment is tricky and it takes time.

Once done with the tripod, unplug the projector. Turn the light on. Set the light control on the top of the projector about half way. The image should now be visible on the monitor. You may have to move the shutter wheel manually if it is covering the gate.

Turn the projector switch to the run position so that the film is clamped in the gate.

Center the image by adjusting the tripod height and tilt and rotation.



If the image is crooked adjust the tripod roll adjustment. Zoom in using the zoom control in the app.

Zoom



Check the zoom number and make sure it is close to 3. The image in here shows 2.2 but that is probably too close to the film gate and will not give the best focus. Back off the tripod a bit until zoom is close to 3.



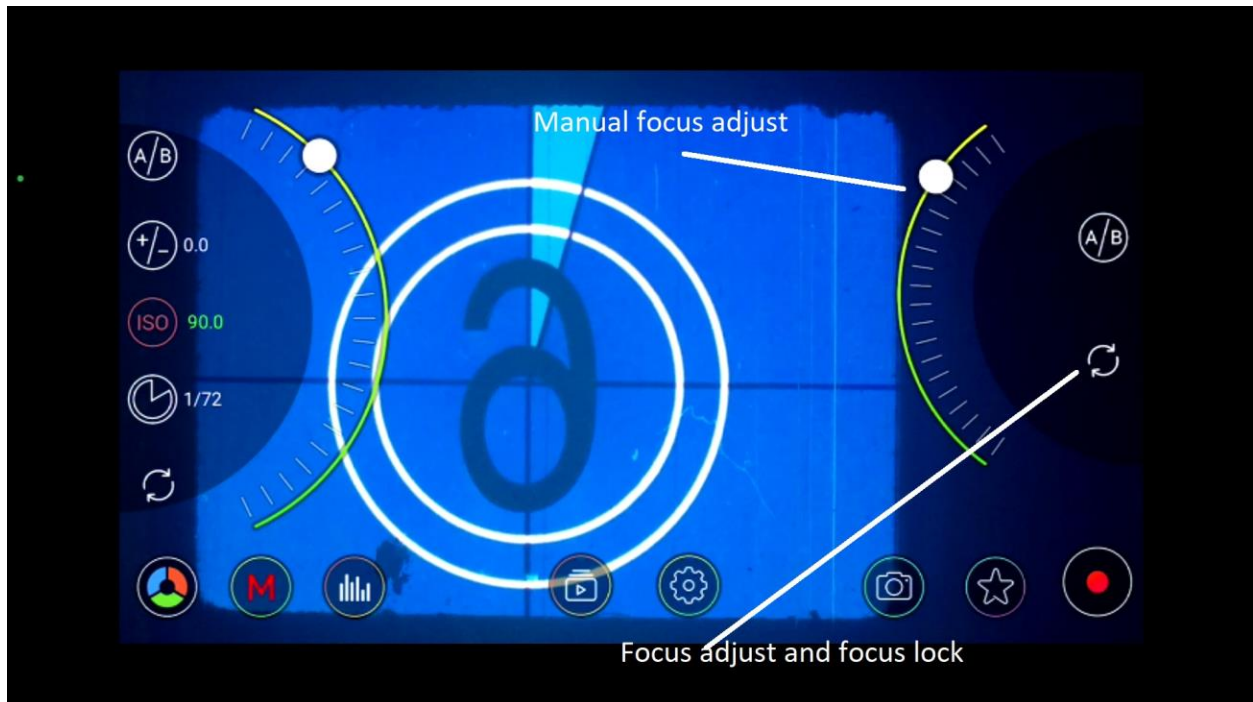
Manual Controls

Press the M button to switch to manual controls mode.



Note that the audio level display and zoom do not work in manual mode. You have to go back to the main display by pressing the M button again in order to see these controls.

Focus

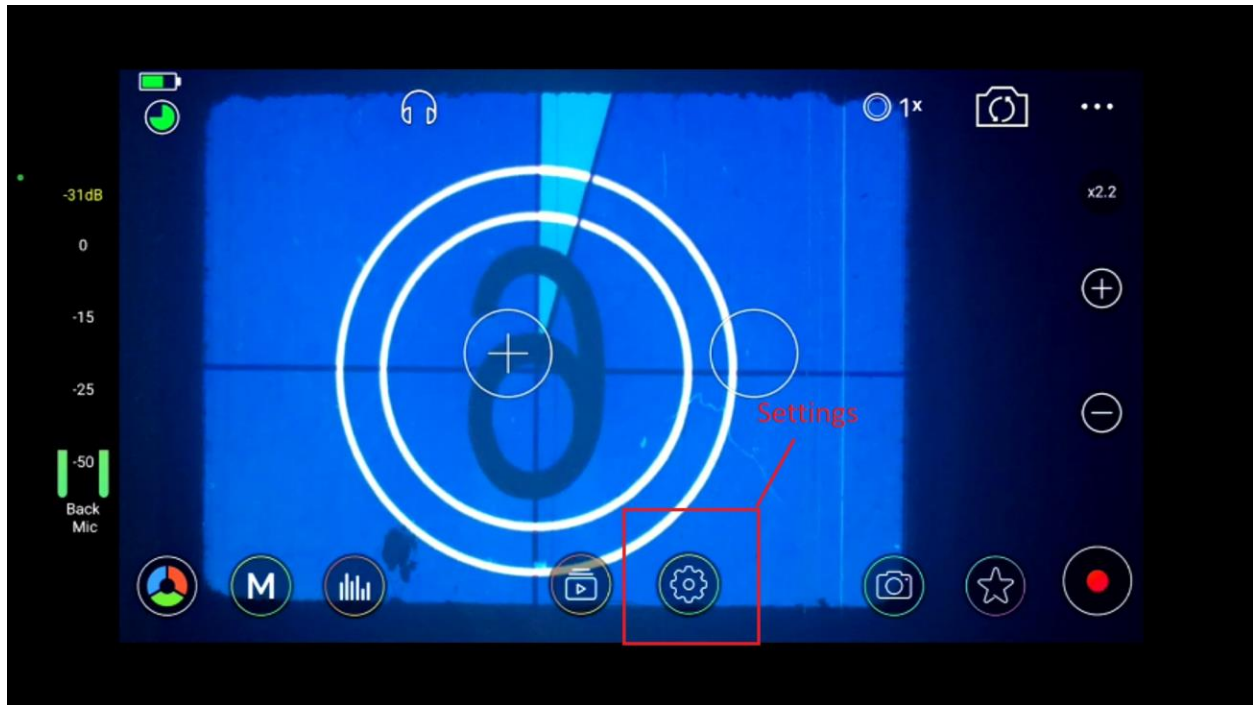


Touch the focus adjust button to set the focus automatically. Touch the focus again and a prompt appears on the top of the screen that focus is locked. Touching again will unlock it. You can repeat this several times observing the monitor making sure the image is sharp focus. Also, it is a good idea to double check the focus periodically and after any time you touch the system.

The focus can also be adjusted manually with the slider if you have a large monitor.

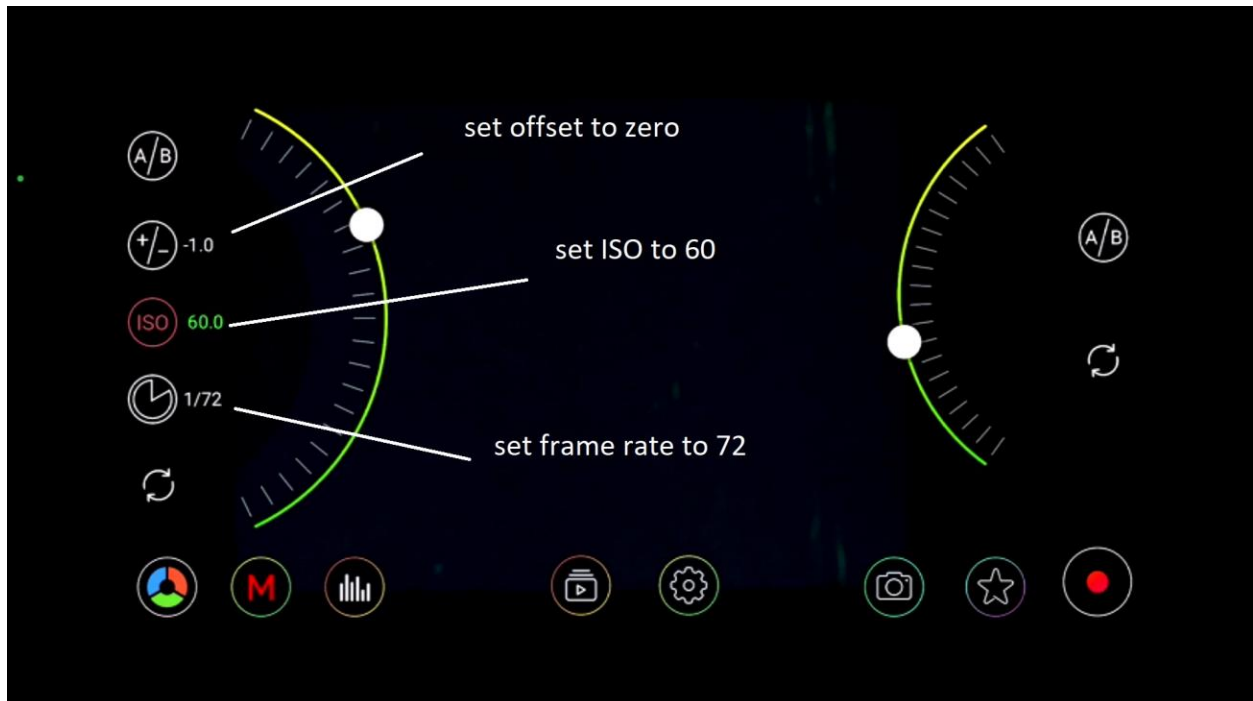
Exposure

Open up the Movie Pro settings.



Set frame rate to 24FPS.

Set resolution to whatever needed. 1920x1080 recommended for HDMI recording.



Set frame rate to 72 and ISO to 60. Set offset to 0 not -1.0 as shown above. Set the LED lamp on top of the projector brightness about half way.

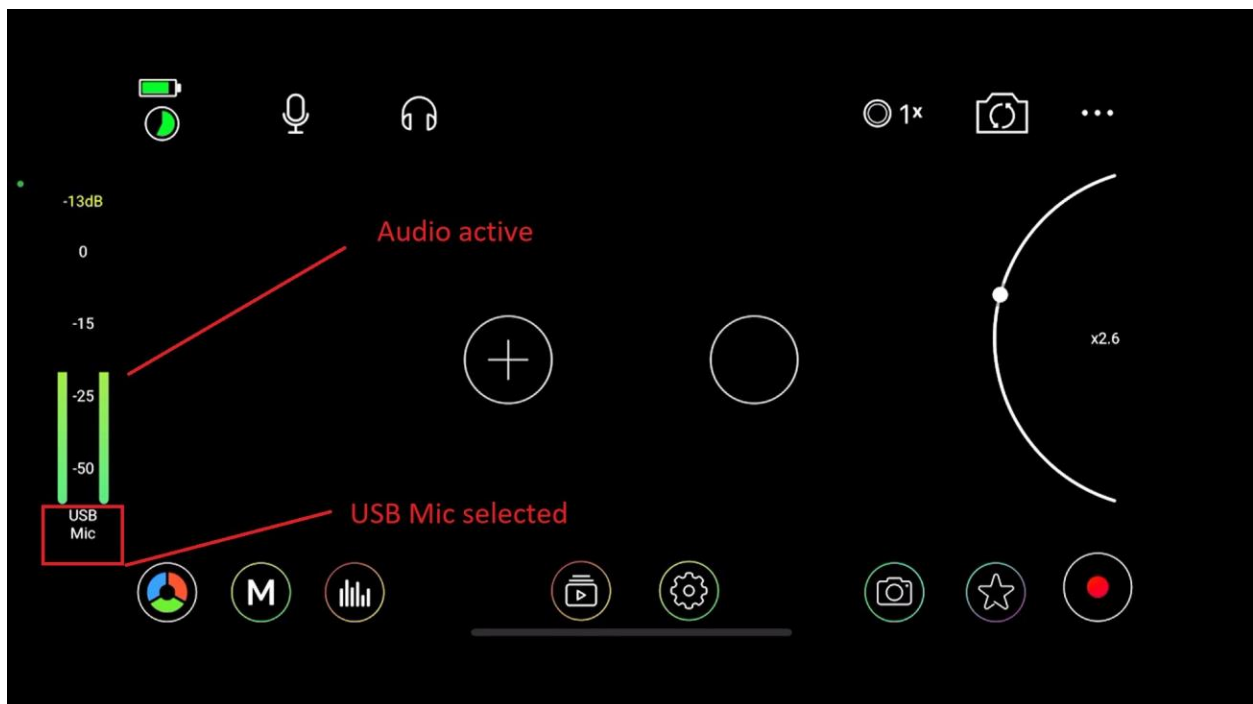
To adjust above settings, touch the icon on the left first to select it and then use the slider to set the value.

Sound

The iPhone volume control has to be turned down all the way to zero (muted) to prevent acoustic feedback. When the audio cables are properly connected and the projector is running with the projector volume cranked up to the max and the exciter lamp on, the Movie Pro app should display the sound level bars.

Sometimes the app misbehaves and will not record the sound. It is hard to know if it is working or not and by the time the film is done it is too late. One way around this issue is to check the sound bars with the projector main switch in disengaged position (pointing up). Turn the volume control very low or off. The audio level bars should be jumping up and down. The bottom of the bars should display "Usb Mic".

If the bars are not moving or moving very slightly, unplug the red cable from the HDMI dongle and plug it back in. Recheck the sound again.



Running the Setup

Once everything is set up as per the instructions above, you are ready to run the projector. It is recommended to run a test clip first.

For HDMI recording, start up the external HDMI recorder and then run the projector. Observe the audio level and make sure that it is pulsing up and down. If not, check the audio connections and make sure everything is plugged in properly.

For internal recording, the red cable may have to be unplugged and plugged back in. The mic should switch to USB at the bottom of the audio bar automatically.

Once happy with the test run, touch the iPhone screen momentarily. The controls will disappear and the screen will show video only which is necessary for external recording. To get the controls back, touch the screen again.

For internal recording, press the red record button once. Pressing the red button again will stop internal recording.

It is to be noted that no monitor audio is available during internal recording.

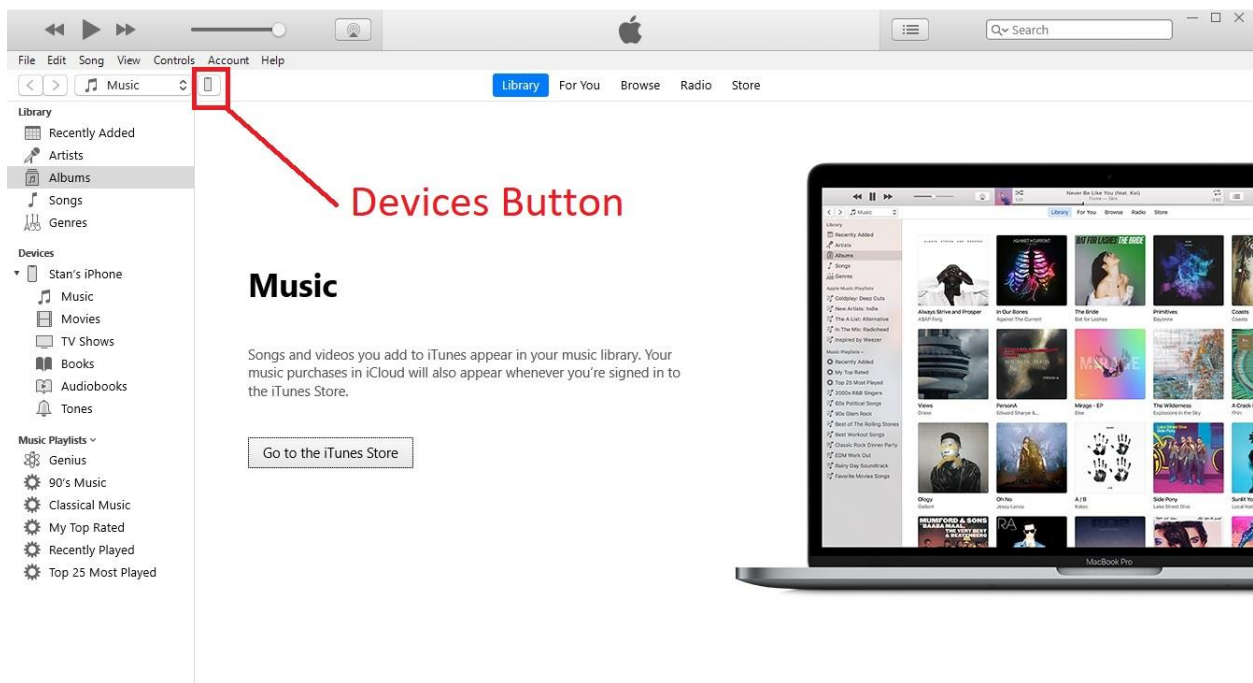
Retrieving Saved Videos

There are several ways of getting the saved videos. The easiest one is with iTunes. Shown here is the iTunes procedure on a PC.

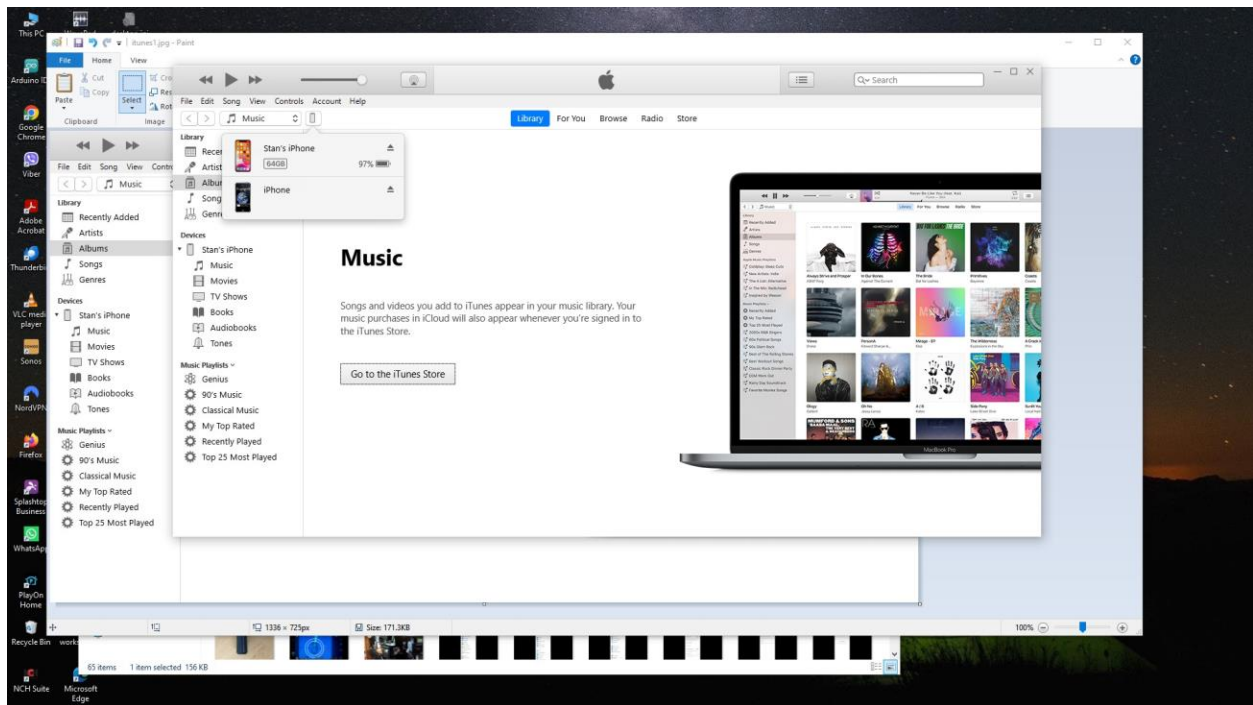
Install and run iTunes.

Connect the iPhone to the PC using the USB data cable.

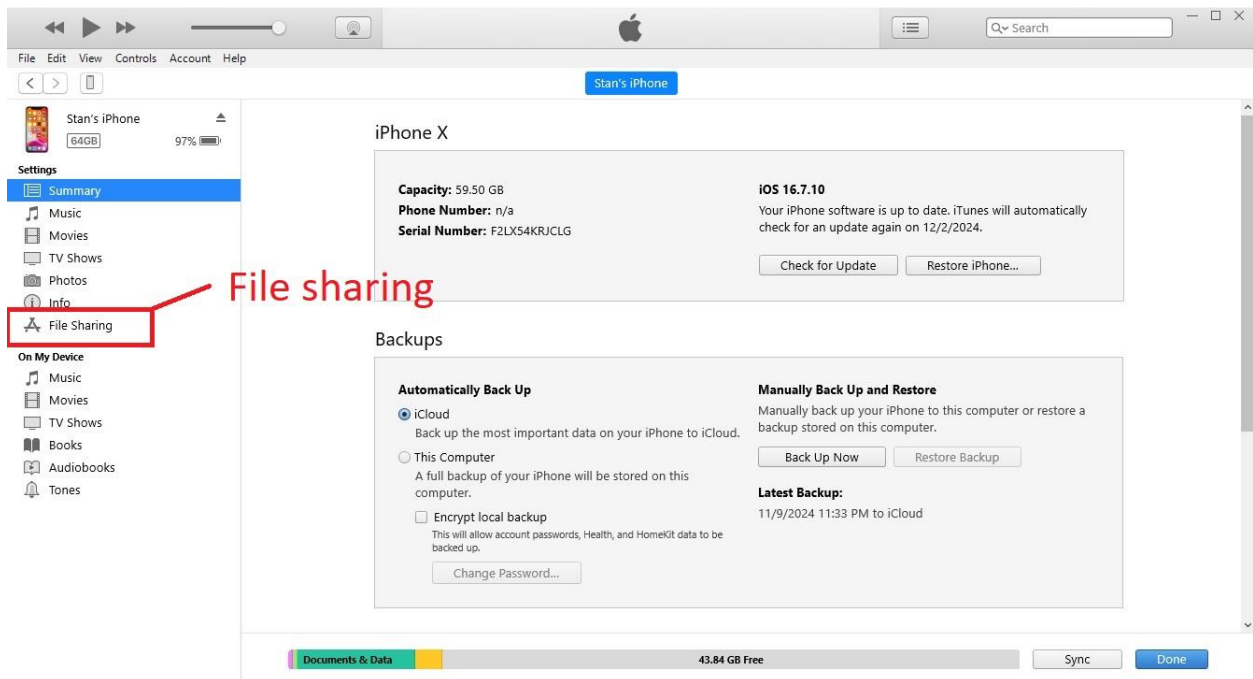
The main iTunes window pops up. Cancel any login requests. Do not need to log in.



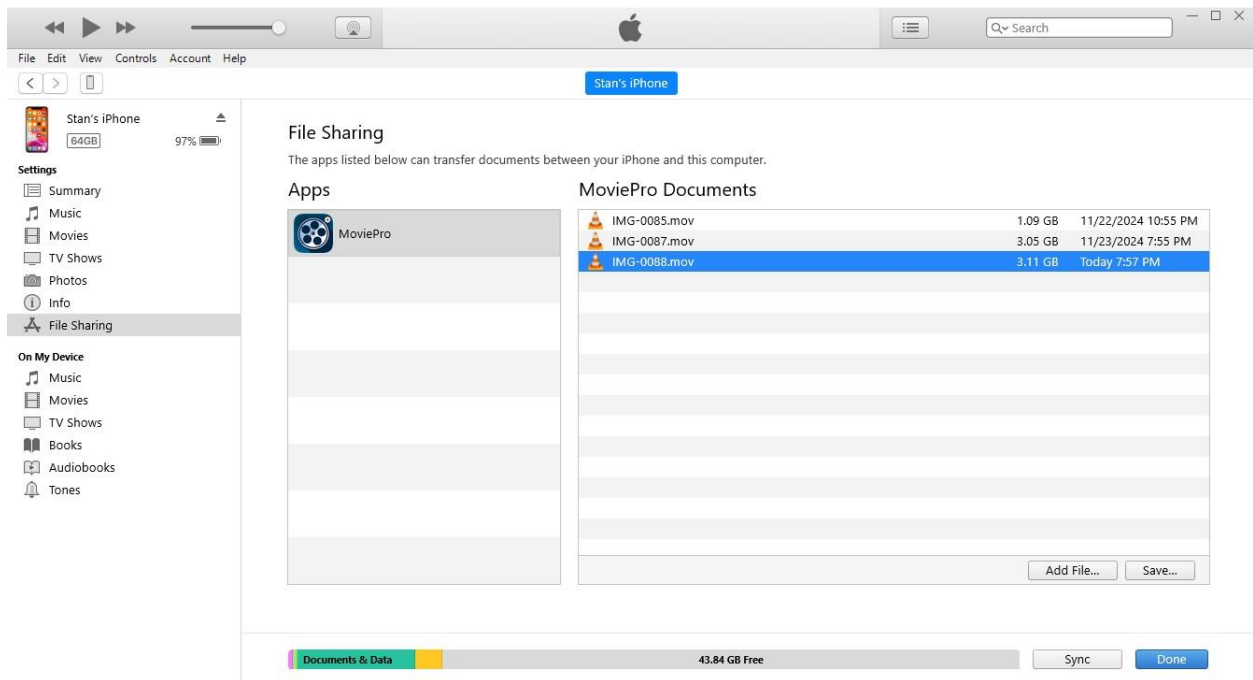
Click the devices button.



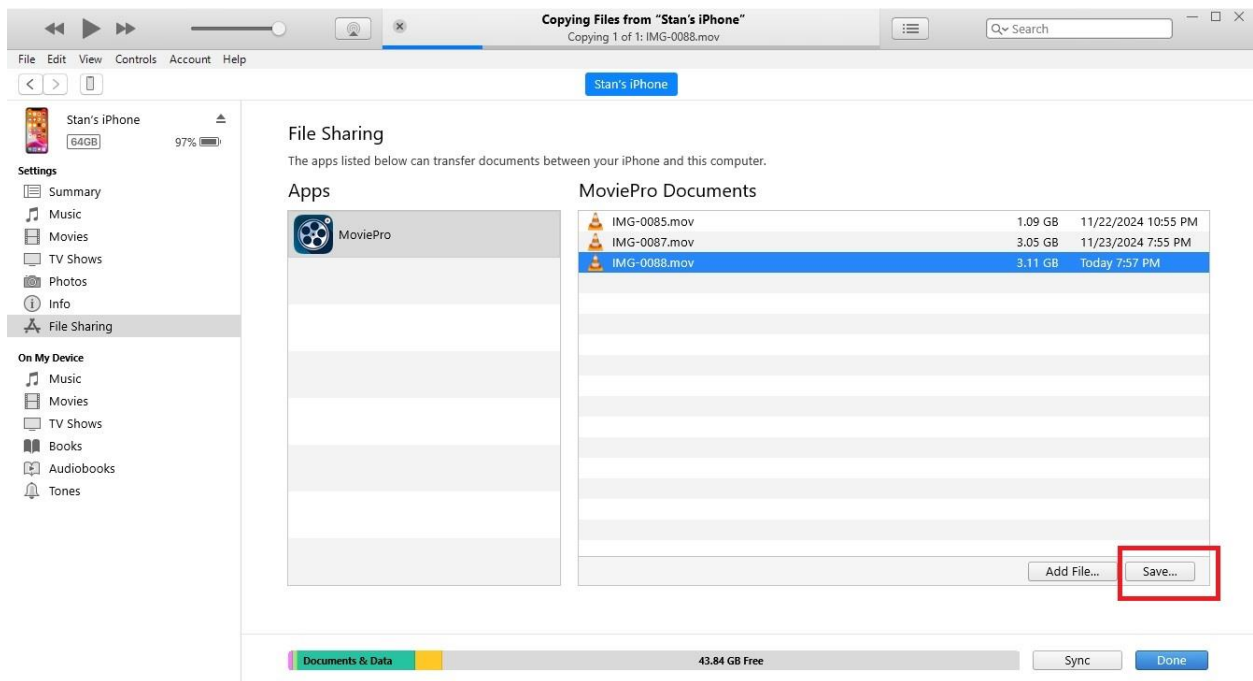
Select Stan's phone.



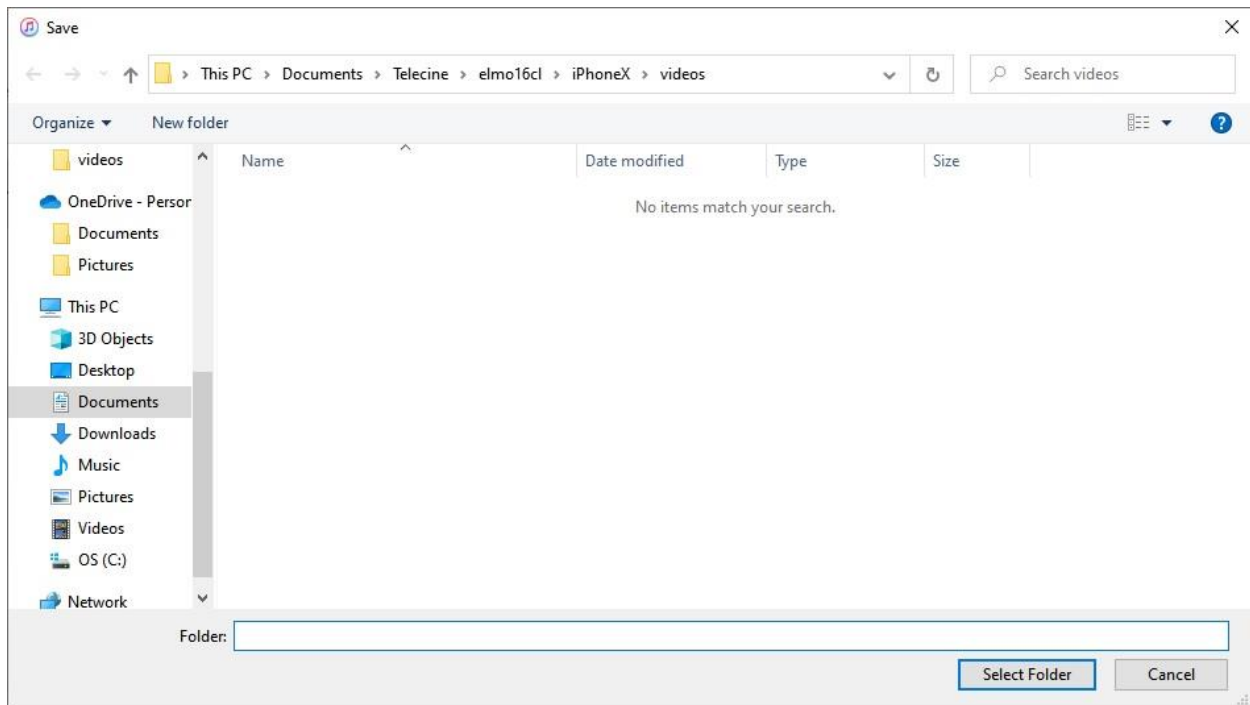
File sharing will appear on the left side. Click it.



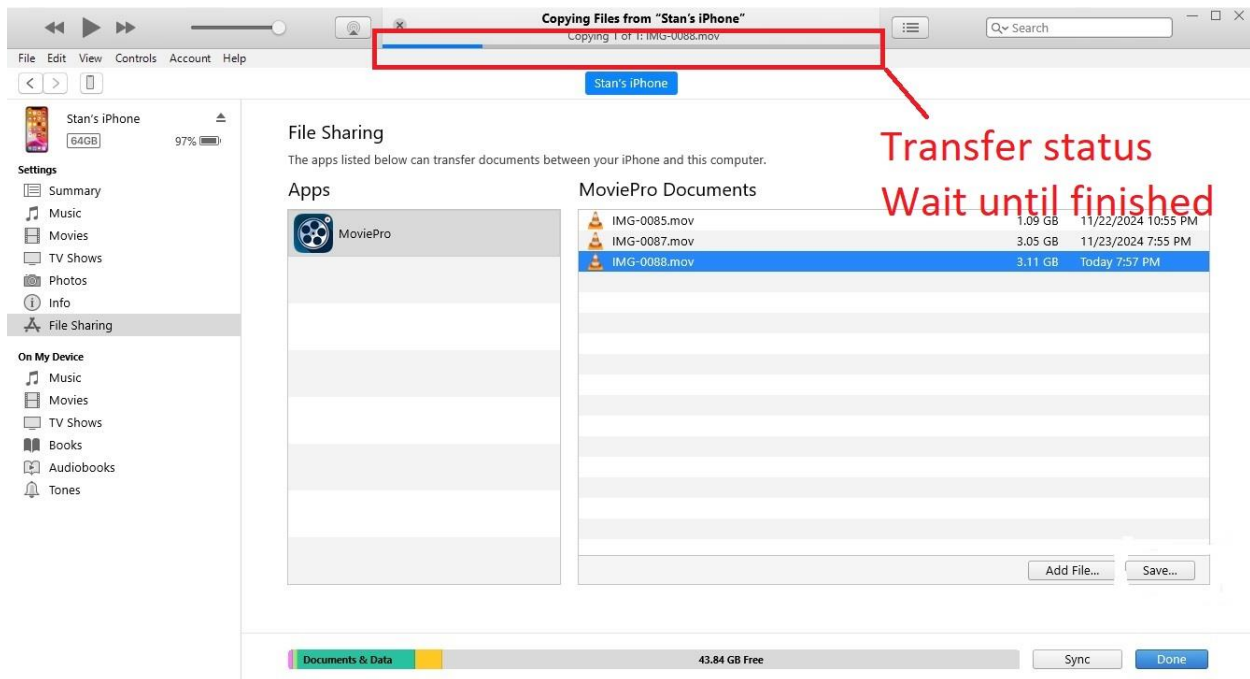
A list of files will be displayed. Select the file that you want transferred.



Click Save.



Select the destination folder and click on Select Folder .



Wait until finished.

Postprocess with Movie Maker. There you can flip the video and add the titles.

