# How this thing works, A brief overview.

Rev. Jan-28-2021 by Carlin Greenfield

## Using for digitization

1. Log into the iMac and open AJA control room by clicking the icon with a blue arrow pointing into a monitor.

2. Turn on all of the equipment in the digitization rack, if it is not on already.

3. If you are digitizing a digital S tape, tap the Video Input Select button on the grey DVCAM deck until the video input is set to SDI, then tap both the Audio Input Select buttons until both CH-1 and CH-2 Audio Inputs read AES/EBU.
   If you are digitizing a VHS tape, press the Video Input Select button on the grey DVCAM deck until the video input is set to Y-R,B then tap both the Audio Input Select buttons until both CH-1 and CH-2 Audio Inputs read ANALOG.

4. Insert the tape into the relevant player, and rewind to the earliest point in the tape.

5. Type the Label on the tape into the field marked "File Name" near the bottom of AJA Control Room

6. Click the Red box with the white circle on it near the lower left hand corner of AJA Control Room to begin recording. The button will begin blinking.

7. Press play on the tape deck to begin playback, and briefly verify both audio and video playback are working. Once you have verified that the feed is working you may mute the computer – the computer volume does not need to be on during recording.

8. Step away from the computer. Do not use the computer while recording is in process.

9. Check back periodically to see if the tape has ended – the label of the tape may have a runtime listed, in which case you can come back after the listed time has elapsed.

10. Once the episode has ended, stop recording by clicking the record button in AJA Control Room again. The button should stop flashing.

11. Eject the tape from the deck, and put it on the Mac Pro Desk.

12. The output file should appear on the Desktop, copy it onto a shuttle drive, and then take the drive over to the Mac Pro.

13. Move the file from the shuttle drive to the SAN folder called "Digitized Tapes."

14. Once you have verified that the files are saved on the SAN, delete them from the iMac desktop and the shuttle drive if applicable, Then empty the trash on both the iMac and the Mac Pro.

15. If there are multiple episodes on a single tape seperate them into different files, trimming any color bars or black off of the beginning and end of each file. Then save the files with the following naming convention: [the date on the tape in YYYYMMDD format] [The Program Name] [The episode Number and Name if applicable.][1]

---

1   See: Cutting Up Files in Quicktime, below

# Basic Troubleshooting

1. If you are digitizing a VHS and it gives the error "Change of video format detected, stopping capture" open AJA Control Panel by clicking on the icon with a picture of white light switches. Then click FORMAT on the left side of the window, and uncheck the box labled "Follow Input". Be sure to check the box again once you are done digitizing the tape.[2]

2. If you are unable to find the output file click on AJA Control Room in the top menu bar, then click Prefrences. In the popup select Capture on the left hand side, and verify that the capture path is set to "/Users/collegetv/Desktop/". If it is not, click Choose and select the desktop in the popup finder window. There is no need to save the setting once you have entered it, it will be saved when you close the preferences window.

3. If there is insufficient disk space to capture a tape, verify that the recycling bin is empty.

4. Make sure all of the cables on the back of the device are securely attached.

5. Make sure that the UPS on the bottom is plugged into a wall outlet, and that the outlet has power.

6. Restart the iMac. If the AJA looses power it will not reconnect to the iMac until the iMac has also rebooted.

7. Check a different tape, ideally a known good one. If there is an issue with the tape, note it on the case of that tape and inform management.

8. Open up AJA control panel on the iMac, go to the Input Select tab, and make sure that Source is set to SDI 2xHD.

9. If you have tried ALL of the above steps, and none work, consult management.

# Cutting Up Files in Quicktime

It is possible to use quicktime to cut segments out of .mov files without transcoding. Simply open the file using QuickTime Player on an apple computer, then move the cursor to the point where you would like the new file to begin (you can use the left and right arrow keys to move through the file one frame at a time). Then press [⌘]+[Y] to create a cut in the file. A box will pop up in the lower portio of the window with two clips, select the one to the left of the red cursor and tap the [delete] key. Click Done to exit the editor.

To set the end of the new file move to the point where you would like the file to end, and again press [⌘]+[Y] to create a cut in the file. This time however, delete the segment to the **right** of the red cursor.

Now that you have trimmed the file press [⌘]+[S] to save the file, and save it with the filename convention described above.

---

2   When there are issues with the tape sometimes the player will output a signal that is interpreted somewhere along the signal chain as being a different sized video, by unchecking this box we tell the AJA to ignore that signal and stay in the same format the whole time. Rechecking the box makes it so that any tape you insert should be digitized in its native resolution.

# System Explanation (for nerds)

This system can digitize three types of tapes -  VHS, DV-CAM, and Digital-S. The VHS deck feeds into the black DV-CAM deck, which trans codes the signal, and then feeds into the grey DV-CAM deck, which digitizes the signal and sends it to the io-XT. The Digital-S deck also feeds into the grey DV-CAM dekc. Only one of the tape decks can be used for digitization at a time. The only external connections on the system are the power cord from the uninterruptible power supply, which should be plugged into wall power, and the lightning cable from the io-XT, which should be plugged into the computer being used for digitization. All devices on the cart are powered from the uninterruptible power supply. Below is a signal flow diagram for the system, and a verbal explanation.
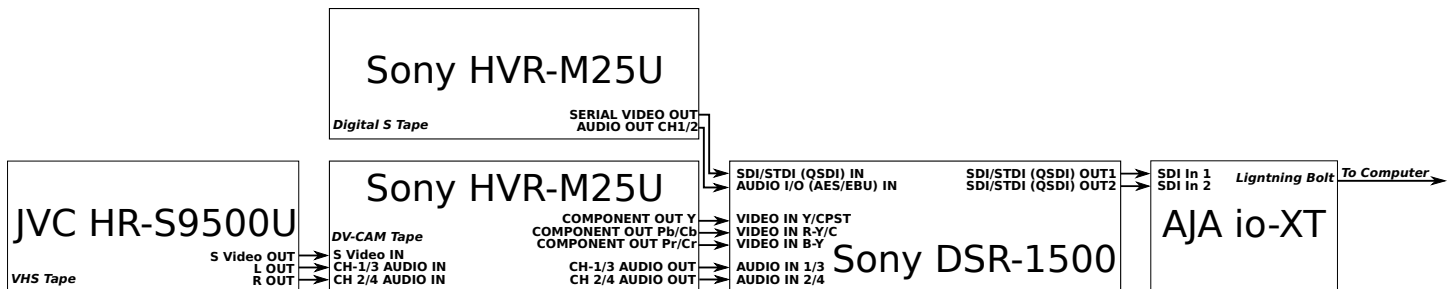


The JVC HR-S9500U reads VHS tapes, and sends video and audio to the Sony HVR-M25U. The video is sent over an S-video cable, from **S Video OUT**. Stereo audio is sent from **L** and **R OUT** over an RCA cable The **VIDEO OUT** RCA is not used, because the HVR-M25U does not have an RCA input for video. It's possible that a BNC to RCA adaptor would work, but I had the S Video Cable handy, and I'm not certain the signals are compatible.

The Sony HVR-M25U converts the video received in the **S VIDEO IN** port to YRB component, and sends it out of the **COMPONENT OUT** BNC jacks, to the Sony DSR-1500.  Stereo audio is passed from the **CH 1/3** and **CH 2/4 AUDIO** RCA inputs to the **CH-1/3** and **CH 2/4** RCA outputs. This unit has a screen on the front which can be used to monitor the video signal as that the unit is receiving from the JVC or an internal DV-CAM tape. This unit can be used for DV-CAM playback, but I don't recommend it because playing tapes in the DSR-1500 will result in less transcoding in the signal path.

An RCA – XLR and an XLR cable carry the audio signal for Channel 1/3, and an RCA-XLR converter, XLR cable, and XLR turnaround carry the signal for Channel 2/4. These cables were chosen because of availability, there is no reason to believe a single conversion would not work. The audio from the JVC HR-S9500U is not directly connected to the Sony DSR-1500 to avoid AV sync issues, though the signals should be compatible.

The Sony DSR-1500 is the point where the signal paths for VHS, DV-CAM and Digital-S tapes converge. In order to digitize VHS or Digital-S tapes the correct audio and video inputs must be selected from the front of the device. The video input is selected but tapping the Video Input Select button, and the audio is selected for channel 1/3 and 2/4 independently using the respective Audio Input Select buttons. For Digital S tapes the video input should be SDI, and both audio inputs should be AES/EBU. For VHS tapes the video input should be set to Y-R,B and the audio inputs should be sent to ANALOG. When working with DV-CAM tapes played directly in the machine the input doesn't matter, as the device should default to outputting the tape's signal.

In all modes The DSR-1500 sends HD SDI out of the **SDI/STDI (QSDI) OUT1** and **OUT 2** to the AJA io-XT. This contains both the video and audio signal. When digitizing VHS tapes it receives stereo audio over the

**AUDIO IN** XLR ports, using both channels **1/3** and **2/4**, from the HVR-M25U. It also receives YRB component video on the **VIDEO IN Y/CPST**, **R-Y/C** and **B-Y** ports, using three seperate BNC cables. When working with Digital S tapes it receives SDI in the **SDI/STDI (QSDI) IN** BNC port, and digital audio in the **AUDIO I/O (AES/EBU) IN** BNC port from the Sony HVR-M25U.

While the Sony HVR-M25U will accept VHS tapes, it will not play them. When playing Digital-S tapes the deck will output video from the **SERIAL VIDEO OUT** BNC port, and will output digital audio from the **AUDIO OUT CH1/2** Port. No audio runs over the video signal. Both the **VIDEO INPUT** and **AUDIO INPUT** switches on the front of the device must be set to DIG or the video and audio will not be in sync.

The AJA io-XT recieves HD SDI over the **SDI In 1** and **SDI In 2** ports, and connects with AJA ControlPanel running on a computer via the lightning cable. Note that while the lightning cable will fit into a Mini DisplayPort port, the device will not work if it is plugged into Mini Display Port, only lighting ports (designated by the lighting symbol next to the port) will correctly carry the signal. If the cable is plugged into a Mini DisplayPort port, AJA control room will say "Unsupported AJA Device" on the upper left hand corner of the info screen.

AJA ControlPanel is used to manage the AJA io-XT from the connected computer. If it is not connected to ControlPanel the AJA's capability is roughly equal to that of a doorstop, it will not detect signals or automatically route them through. In the Input Select tab, the source is chosen, for this setup it should be SDI 2xHD. If the device is not appearing in control room and there is a possibility the installation of control room failed, see the attached documentation from AJA, or go to [aja.com/support/item/7129](aja.com/support/item/7129).

 AJA Control Room is the software that is actually used to record the output from the io-XT. The correct format is **MOV | ProRes 422 | 10b**, with **24b LE PCM** audio. You can change the video or audio settings by clicking on the settings to the left of where it says video or audio respectively, in the bottom-center portion of the window. This is also where you select the output file name, but not the output file path (see below). Also note that by default Control Room will save all 16 channels of audio input to the MOV, you can disable that by clicking on a stereo pair in the lower right corner of the window to trigger it on or off. Channels which are being recorded will be lighter than those which are not.

To change the output file path go to **AJA Control Room > Preferences > Capture** and click Choose at the bottom of the dialogue box. The path listed under capture path is where the captured files will be saved. To save changes simply close the dialog box, there is no Apply or confirm button. I usually record directly to Mac HD because I've had stability issues with recording directly to the shuttle drive, though it is theoretically possible. Generally I start recording on Control Room, then I start playing the tape from the deck, and I use Quicktime to cut off the head and tail of the tape, but it may be possible to control the tape decks from Control Room.