Magic Lantern and the Canon 70D

The initial install of Magic Lantern firmware was already completed on all Cinema Studies 70D cameras. However, in some instances you may need to run the firmware again. This document will review installation and some basic use of features.

Basic Instructions:

1) Go here and download the zip folder containing the ML firmware.
2) Place a formatted SD card into the computer (you must format it in the 70D or with another device). Unzip the ML file and put the contents on the root/top level of your SD card (the 3 files are autoexec.bin, ML-SETUP.FIR, and the ML folder). It should look like this:

![File Structure](image)

***It’s important to note the ML lives on your SD card. So, if you shoot onto numerous SD cards, you will need to put these 3 files on ALL cards. All custom settings that you utilize in ML will transfer from camera to camera. So, if you shoot w/ the Cinemascope mask or use the waveform monitor, because these settings live on your SD card, they should transfer between cameras.

3) Eject the card and place it into the camera. Turn on the camera and open up the MENU. Go to the 4th Wrench menu and and scroll down to the Firmware Ver. Press set and then OK on the next menu. The ML firmware will start running.

4) That’s it, it is installed. You will get a screen that says “Please Restart Your Camera.” Turn it off, wait a few seconds, and turn the camera back on. I want to state that you may only have to do this ONCE. In fact, all you may need to do is put that card in the camera and press the trashcan to bring up the ML options. But, if you put in the card and the ML options don’t come up, follow the steps in #3 to install the firmware.
Basic Use:

With ML, you can still use the Canon operating system. ML can also override some of the Canon settings. Basically, this is like having a Mac OS and Windows on your computer; ML runs on top of the Canon OS. To bring up ML, press the **INFO** button until ML comes up on the LCD (pressing INFO on the 70D goes through the different screen display options on the 70D...ML is the one after the histogram. Press info 3 times).

To bring up the ML menus, you press the **trashcan** button. For the 70D, the **SET** button turns a menu option on/off. The **Quick Menu (Q)** opens up items in the menu option and also closes that option and will go back to the previous menu. In the ML menu, use the **Main Dial** to scroll across menus; use the **Quick Control Dial** to scroll within a menu. Once you enter a menu option, to adjust the option use the main dial.

The last menu is a **HELP** menu. If you hit **INFO** on an option in the menu it will bring up a help menu on the options in the menu. The help options may be clunky since this is currently a deep beta version of ML for the 70D.

In order to use the trashcan button to enter the ML menus, you MUST have ML on the LCD screen. If you’re in the Canon OS, it will not work for you; when you press the trashcan you will enter the ML menus but they are greyed out and will not work. If your on the ML screen and enter into the menu and it’s still greyed out go to the OVERLAY menu and turn on Global Draw.

Simply by entering the ML screen you can see some information that you cannot see in the Canon OS. On the top you have Audio VU meters, your current file name that will record (i.e. MV_90009), your framerate, and how much recording space you have left on your SD card. On the bottom it says your focal length, f/, shutter (notice it says 1/48), ISO, white balance setting, your focus distance in CM, your focus setting (MF), and remaining battery time. One thing to note, is that while in ML if you have press the shutter button it will give you an exposure reading using the Canon meter.

**Formatting Card:**

For 70D: When you go to format your card you want to do a **Low Level Format**. This will keep ML on your card, which you need to do (remember, ML lives on your SD card). When you’re in the format menu simply hit the trash can button and you will see that it checks the Low Level Format box. You should only have
to do this every time you format your card (but, just check to see that box is checked). This will erase all the video files but keep the ML software. If you ever fully format your card, simply put the ML firmware files back onto the card.

**Some Useful Features:**

There is a lot of “stuff” in ML. I will point out what I find most useful.

**OVERLAY:**

**Zebras:** you can turn this on and it will show you, using colored lines, overexposed parts of your image (don't worry, the lines don't record). Set color space to LUMA, and overexposure to 90% or so. Color/light clips at 99% or 100%. If you do not want this on when recording, set to hide in that option.

**Focus Peaking:** dots appear around what is in focus. This will come on when you adjust the focus ring. You can customize it as well. Set filter bias to Balanced, set color to Red (or another color not in your frame)

**Magic Zoom:** when your shooting in live view there is a box like the focus assist that is always up or that comes up when you adjust the focus so you can get critical focus. The box will focus on where the white box is; to move it use the Focus Assist and reposition the box.

**Cropmarks:** Open this and set the Bitmap to CINECSCO2.BMP. This will give you cinemascope croplines for framing (please note that the image will still be recorded in 16:9, but in post you will have to drop the cinemascope croplines on the image once your edit is complete).

**Spotmeter:** The Canon exposure meter is evaluative, in that it takes an average of the whole frame. If you use the spot meter, you can get a percentage reading wherever the focus assist box is. This is useful if you have a very contrasty scene, say film noir type hard lighting, and want to measure the exposure on only part of the image. The spot meter gives you a percentage reading. 0% is all black, 100% is all white, and yep 50% is grey.

**Waveform:** Probably the best way to check exposure. Turn this on, and try setting the size to small or large. To read the traces on the meter, the pink line is grey, the top is your highlights, and the bottom is your shadows. You want the majority of your trace to be between the blue lines. If you black is all the way at the bottom you are crushing your blacks and won't have shadow detail; if your whites are all the way at the top then you are clipping your highlights and will lose detail.

**Ghost Image:** Take a picture of your set or of framing you're trying to copy. Turn on the ghost image setting. Press the play button, find the image you want to make an overlay for, then press the start/stop button and it will save the overlay. When the camera goes back into video mode you will see an opaque ghost image of the photo you selected.

**SHOOT:**
**Intervalometer:** pretty cool. You can turn on and shoot a time lapse video!

**PREFS:**

**Config Files:** go in here and turn Config Autosave to ON. This will save all your ML settings.

***There are LOTS of other features. I don't find most of them useful.

One very cool feature is that if you have a very fast SD card, you can record RAW! See me about this. Take a look at this video about shooting in RAW. What is RAW and the advantage? Simply put, less compression, more color and light information and thus more dynamic range, which gives you far more control in color correction and grading. The 70d shoot compressed jpeg images; that is, at 24fps the camera captures 24 jpeg images per second. RAW is 24 uncompressed images per second. RAW are images right from the camera's sensor while jpegs go from the sensor and through a compression process.

This sounds great, but it takes on a different workflow. You need fast and large SD cards, bigger eternal drives, and more patience in post.

The key is that you CANNOT EDIT RAW VIDEO in Premiere or FCPX until you convert RAW image files to RAW video. You need to do some research on all this if you want to do it. Your RAW video files are huge; a 5 second video could be around 1.5GB (a jpeg file of 5 seconds would be about 150mb).