

VariCam LT and Odyssey Setup: Quick Notes

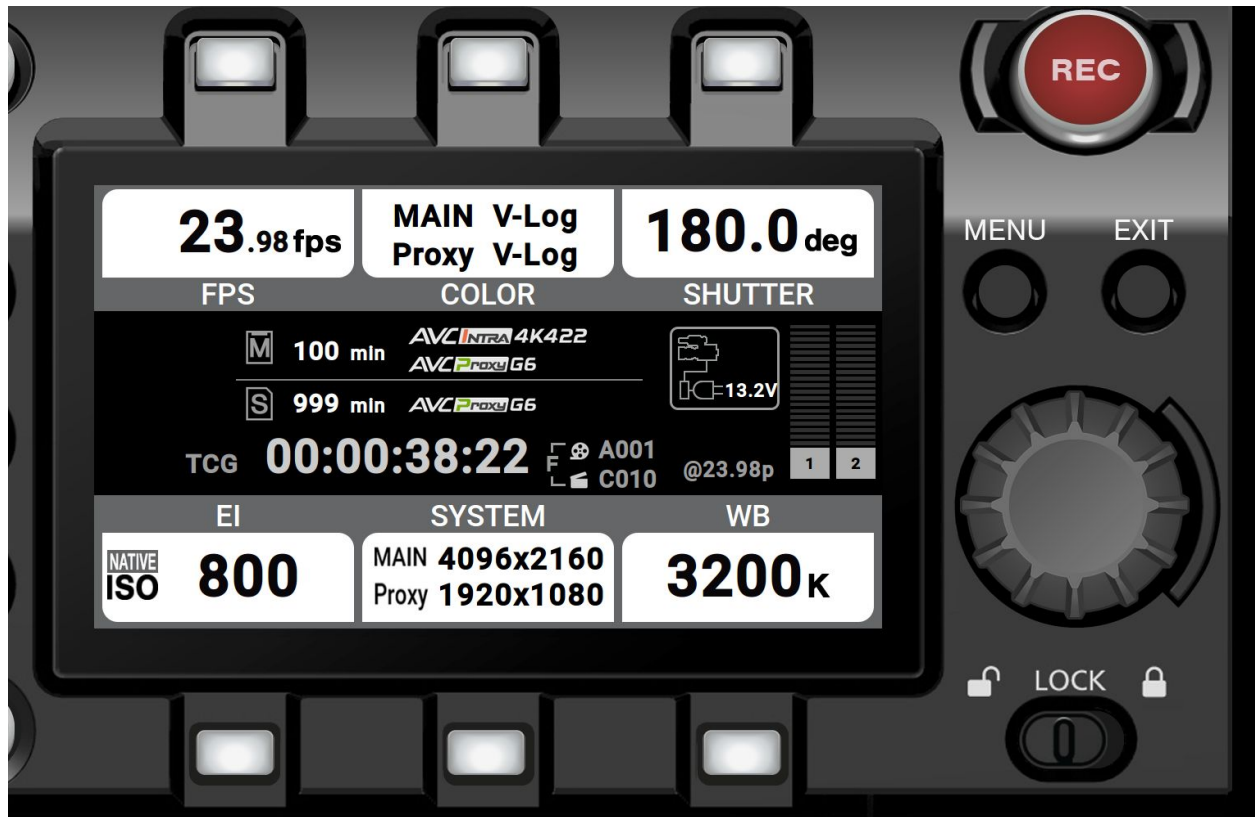
The VariCam LT menu interface can be daunting to navigate when used for outputting RAW to the Odyssey7Q+. Below are some helpful notes to help assist in setup. Convergent Design suggests that users take time to sit down with the VariCam LT and Odyssey7Q+ together before use on a production.

VariCam LT Control Panel

First off, a quick overview of the buttons on the menu, and what is relevant or not. The entire menu system can be simulated on Panasonic's website:

http://pro-av.panasonic.net/en/vcs/simulator_lt/index.html

(note on this simulator: pressing the "home" button has the same effect as restarting the camera)



FPS -> FPS Changes Primarily for VFR mode operations: NOT how you change the camera to different modes.

COLOR -> Color grading This doesn't apply to RAW as that is always V-LOG. Sub menu options are disabled because of this.

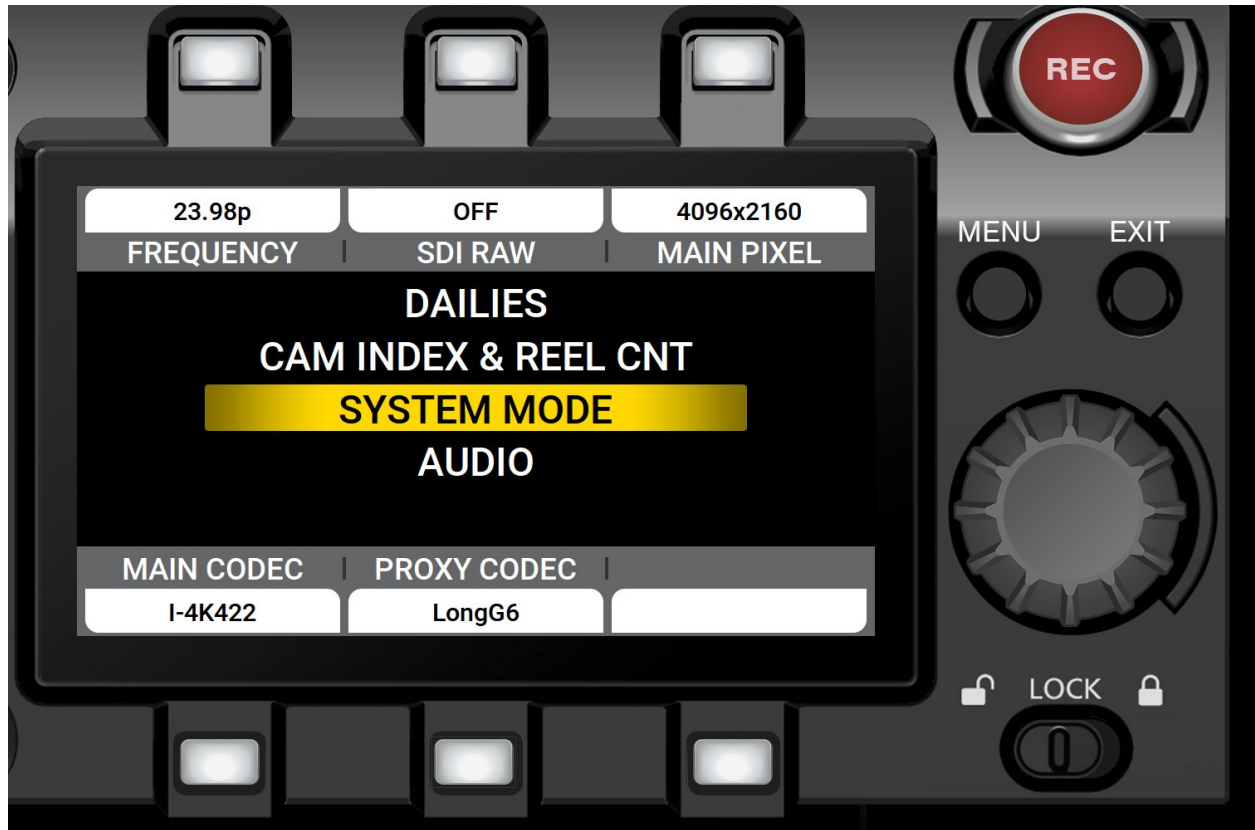
SHUTTER -> Shutter speed Angle (or time) adjustments.

EI -> Exposure and ISO adjustments The VariCam LT base ISO can be set to 800 or 5000. Other sensitivity levels can be set as offsets to the two base ISOs.

SYSTEM -> Main system select menu Where major mode changes are selected (see below).

WB -> White balance settings

System Select submenu:



FREQUENCY: This is very important: THIS IS THE PROJECT RATE. Selections of certain project rates will restrict menu availability on the SDI RAW output setting and internal codec settings. Not to be confused with Frame Rate, which is the SDI Link Rate. More on this later.

SDI RAW: This is the RAW format selection. 4K or UHD, 10-bit or 12-bit, or OFF.

MAIN PIXEL: Internal recording resolution. 1920x1080, 2048x1080, 3840x2160, or 4096x2160. As this is for internal recording modes, it has no effect on output other than whether it's UHD or 4K. The output is dominated by the mode selection.

MAIN CODEC: Applies to internal recording only. Codec selection can be vital in accessing certain modes of the camera, but generally can be set to OFF if only recording RAW on Odyssey.

PROXY CODEC: Applies to internal recording of proxy files to an SD card only. If internal recording is desired, you need both a P2 card and an SD card, with both a primary and proxy codec selected, for proxy to work.

Next, an explanation of settings changes on the VariCam LT. There is a Power On/Off switch on the operator side of the camera that needs to be toggled when a major setting is changed. However, it is not necessary to do this individually for each change. For example, you can adjust all of the settings under the System select submenu (explained above) and then cycle power. The VariCam LT menu display will prompt when a power cycle is required for changes to take effect. One setting that can't be changed in the System Select menu is whether the SDI connection to the Odyssey7Q+ is single-link or dual-link (more on this below).

Project Rate v. SDI Link Rate

Frequency = Project Rate

Frame Rate = SDI Link Rate

The VariCam LT has many modes in which the Project Rate differs from the SDI Link Rate.

The following are the only valid Project Rates output by the camera:

23.98p, 24.00p, 25.00p, 29.97p, 50.00p, 59.94p

However the SDI Link Rates possible out of the camera include:

23.98p, 24.00p, 25.00p, 29.97p, 30.00p, 50.00p, 59.94p, 60.00p

How is this possible? Project Rate is paramount on the VariCam LT. VariFrame Recording (VFR) can add complications to the frame rate options. Audio (when not disabled by VariFrame) and timecode all follow the Project Rate. When recording VariCam LT RAW the Project Rate selection on the Odyssey7Q+ is locked to FOLLOWS INPUT to reduce complications. As long as the correct Project Rate is selected on the VariCam LT the Odyssey7Q+ will compensate accordingly, no matter the SDI Link Rate.

Here is an example that can appear confusing. If the VariCam LT internal recording codec selected is I4K-LT (note you can't access this example mode without this codec), and the Project Rate is 24.00p, the Odyssey Record Status display will indicate "60.00p* VARIFRAME". This is because the camera's internal codec recording forces 24p into a VariFrame encoding across a 60p base. However the VariCam LT's Frequency display will read "30.00p, VFR" and audio will be disabled. The Odyssey7Q+ reads the VariFrame flags and appropriately adjusts, so tapping the Input/Output Status button on the Upper Toolbar shows the project rate correctly as 24.00p. The RAW recording on the Odyssey7Q+ will be RAIDed across two SSDs, primarily

because the VariFrame speed can be adjusted on the VariCam LT up to 60p on the fly during recording. Because such high frame rates require recording to two SSDs simultaneously we must anticipate this possibility. In the metadata on the recorded clips the Project Rate format will be identified as 24.00p and the timecode will be 24.00p based. This same case can happen for 23.98p or 29.97p over 59.94p. Note that recording is far simpler if internal recording is switched off and 4K 12-bit is selected, as that limits the top available frame rate.

Single-Link v. Dual-Link SDI

Another point of confusion can be the VariCam LT's tendency to default to dual-link SDI connection to the Odyssey7Q+. Due to the data load, dual-link SDI is required for all 12-bit recording and for 10-bit above 29.97p. Most users are likely going to start with 23.98p or 24.00p in 4K/UHD in either 10-bit or 12-bit.

12-bit is the simplest because VFR is disabled completely and it is always dual-link. The Odyssey7Q+ will alert if it doesn't see both links or if the links are connected backwards.

In 10-bit the VariCam LT will tend to start out as outputting dual-link, i.e. 50/59/60p SDI rates. The camera is trying to use the VFR flag to output 23.98p over 59.94p. causing the Odyssey7Q+ to indicate the need for dual-link to handle the high frame rate. If the desired recording is standard 10-bit 23.98p, then it is best to switch out of VFR and dual-link mode. This can be done in the VariCam LT menu without cycling power:

MENU -> OUTPUT SETTINGS -> SDI OUT -> (single, or dual)

Changing the setting to single, the Odyssey7Q+ will alert if two links are present when only one is required. The Odyssey7Q+ display will indicate that the SDI input is 10-bit. If the input frame rate is 24.00p then the Odyssey7Q+ will display "30.00p* VARIFRAME" and if the input frame rate is 23.98p then the display will show "29.97p* VARIFRAME". Changing the frame rate to 29.97p will then make the SDI rate match the Project Rate, and the "* VARIFRAME" indication will no longer be present. The correct Project Rate will always appear in the Odyssey7Q+ Input/Output Menu.

High frame rates v. VariFrame rates

With the VariCam LT set in I4K-LT mode, the Project Rate can be set to 50.00p or 59.94p. The Odyssey7Q+ will record the RAW signal as a RAID across two SSDs (odd frames on SSD1, even frames on SSD2, to be merged in post using the CD Clip Merge utility). RAID-noting timecode is used on the Odyssey7Q+ when in true RAID Project Rates, but not when the RAID is only the data transport mechanism (23.98p/24.00p/25.00p/29.97p over 50p/59.94p/60.00p).

Omitted Menu Selections

Instead of greying out certain menu items when not in an appropriate mode, the VariCam LT menu omits them from the display. Examples:

- At 4K 24.00p (10-bit or 12-bit), there is no option to switch to UHD because 24.00p is not available in UHD. Switching the Frequency to 23.98p then offers the option for UHD resolution.
- At 4K/UHD 50.00p/59.94p 10-bit, there is no option to switch to 12-bit because 12-bit top frame rate is 29.97p. Switching the Frequency to 29.97p or lower then offers the option of 12-bit recording.
- In modes that require dual-link SDI (i.e. I4K-LT or 12-bit), single-link is not available in the main menu.
- In modes where VFR is not available (such as 12-bit), pressing the VFR menu button does nothing.
- In modes that VFR has a restricted range (such as I4K-LT, which goes from 30-60 in 24/23/29, 25-50 in 25, or 1-60 if 59.94), invalid VFR selections are greyed out.
- If the codec for internal recording is set to OFF, when changing to a different mode the VariCam LT automatically defaults to an active codec.

Project Rate / Frame Rate Chart

The attached chart from Panasonic is an overview of all the complex combinations available with the VariCam LT and the Odyssey7Q+. Convergent Design highly recommends users spend time with the VariCam LT and Odyssey7Q+ along with this chart to best learn the quirks and possibilities of the combination. Remember, Frequency = Project Rate, Frame Rate = SDI Link Rate.

Chart Notes:

Signal Format (3G Level A v. Level B):

Level A is strictly for 50/59/60p SDI operations. Level B can be any rate with the correct number of links (single link in 10-bit, dual-link in 12-bit under 30p. The Odyssey7Q+ auto detects and accepts both Level A & Level B SDI signals.

Output Lane:

Refers to the number of SDI links required between the VariCam LT and the Odyssey7Q+.

Varicam System Setting			RAW Output Format					
MAIN Codec	Pixel	Frequency	Pixel	Frame rate	VFR range	Bit depth	Signal format	Output lane
AVC-I4K422	4096x2160	24.00p	4096x2160	over30.00p	1-30	10bit	3G level-B	1
		23.98p		over29.97p				
		29.97p		over25.00p	1-25			
		25.00p						
	3840x2160	23.98p	3840x2160	over29.97p	1-30			
		29.97p		over25.00p	1-25			
		25.00p						
	4096x2160	24.00p	4096x2160	over60.00p	1-30		3G level-A	1,2
		23.98p		over59.94p				
		29.97p		over50.00p	1-25			
		25.00p						
	3840x2160	23.98p	3840x2160	over59.94p	1-30			
29.97p		over50.00p		1-25				
25.00p								
AVC-I4K-LT	4096x2160	24.00p	4096x2160	over60.00p	30-60	10bit	3G level-A	1,2
		23.98p		over59.94p				
		29.97p		1-60				
		59.94p		25-50				
		25.00p		over50.00p	1-50			
		50.00p						
	3840x2160	23.98p	3840x2160	over59.94p	30-60			
		29.97p		1-60				
		59.94p		25-50				
		25.00p		over50.00p	1-50			
		50.00p						
AVC-I2K444	2048x1080	24.00p	4096x2160	24.00p	none	12bit	3G level-B	1,2
		23.98p		23.98p				
		29.97p		29.97p				
		25.00p		25.00p				
AVC-I444	1920x1080	23.98p	3840x2160	23.98p				
		29.97p		29.97p				
		25.00p		25.00p				
ProRes444	1920x1080	23.98p	3840x2160	over29.97p	1-30	10bit	3G level-B	1
		29.97p		over25.00p	1-25		3G level-A	1,2
		25.00p						
		23.98p		over59.94p	1-30			
		29.97p		over50.00p	1-25			

Varicam System Setting			RAW Output Format					
MAIN Codec	Pixel	Frequency	Pixel	Frame rate	VFR range	Bit depth	Signal format	Output lane
AVC-I2K422	2048x1080	24.00p	4096x2160	over60.00p	1-60	10bit	3G level-A	1,2
		23.98p		over59.94p				
		29.97p						
		59.94p		over50.00p				
		25.00p						
		50.00p						
AVC-I100 ProResHQ	1920x1080	23.98p	3840x2160	over59.94p	1-60			
		29.97p						
		59.94p		over50.00p				
		25.00p						
		50.00p						