

# Canon

## WHITE PAPER

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**EOS C500 Mark II**  
Digital Cinema Camera

# EOS C500 MARK II

## FULL FRAME DIGITAL CINEMA CAMERA



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## **Abstract**

*It has been a seven-year march for Canon in their progressive roll out of a broad Cinema EOS portfolio, including families of Cinema EOS lenses, cameras, and reference displays. At IBC 2019 Canon introduced the EOS C500 Mark II camera – positioning it squarely between the EOS C700 FF and the EOS C300 Mark II. This new Full Frame camera capitalizes on the globally accumulated experiences of the EOS C300, EOS C300 Mark II, EOS C200, and the EOS C700 – offering an important step forward in the ongoing evolution of the Cinema EOS system.*

*Expandability is central premise of the EOS C500 Mark II camera. The countless configurations that innovative production teams built around the four listed Cinema EOS cameras over the past seven years spoke to the enormous diversity of shooting needs for theatrical motion picture production, documentary, and episodic television production. Multiple recommendations and suggestions were made to Canon based on these experiences, and the EOS C500 Mark II reflects the incorporation of many of them. EOS C500 Mark II features a novel modular design intended to support multi-faceted shooting configurations.*

*A singular design feature of the EOS C500 Mark II camera is the incorporation of on-board 5.9K RAW recording – a response to widespread international requests. With a compact base model weighing only 3.8 lbs. this powerful integrated Cinema RAW Light recording capability significantly extends high-end production options – offering interesting possibilities in moviemaking. That basic lightweight camera offers imaging empowerment to single operator shooting, while also facilitating dexterous operation within gimbals, and support of shooting flexibility from drones.*

*Separately, a range of compact modular Extension Units are available that expand configuration options and system interfaces required for multiple movie and television production styles, including multi-camera operation – that are outlined in the paper.*

*Responding to widespread requests, the EOS C500 Mark II facilitates user interchangeable mounts – between PL, Standard EF, and EF Cinema Lock. This paper will furnish details on this.*

*NAB 2018 saw the formal introduction of the Full Frame EOS C700 FF digital cinema camcorder. This image sensor has an image circle of 43.1mm – but it is the standardized DCI aspect ratio of 1.896: 1 (also identified as 17:9) as contrasted with the traditional 3:2 FF in photography – in recognition that the intent is for digital motion imaging. The EOS C500 MkII camera deploys this same image sensor.*

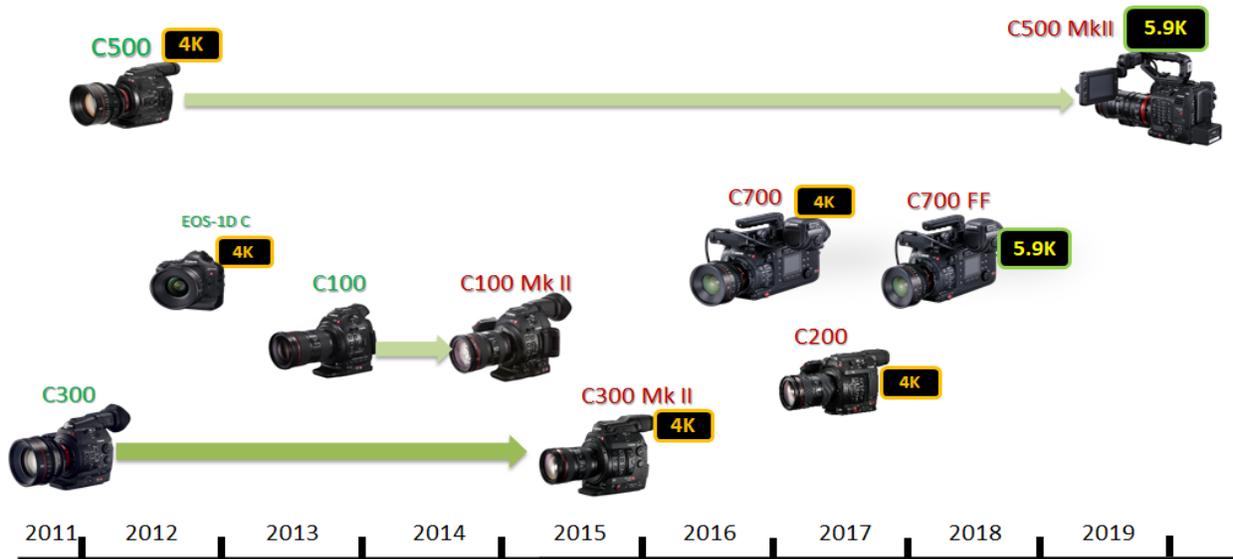
*Two new imaging innovations are incorporated within this digital cinematography camera – one, being 5-axis electronic image stabilization (EIS), and the second is electronic diffraction compensation. Both are described in the paper.*

*A new generation digital video processing system is central to the extended operational capabilities and the enhanced image performance of the EOS C500 Mark II. Both Canon Log2 and Canon Log3 are selectable, as is both PQ or HLG functionality for HDR productions.*

*Enhanced network functionality – in the form of IP streaming, FTP file transfer, and Browser Remote – are incorporated.*

## 1.0 INTRODUCTION

The Cinema EOS product family was first announced in September 2011 and was followed in September 2012 with the 4K EOS C500 camera. The second-generation EOS C300 Mark II made its debut in 2015. The EOS C200 and 200B made their formal debut at Cinegear 2017 – being the first Cinema EOS cameras to incorporate on-board RAW recording.



The Cinema EOS family transitioned into the full frame era with the debut of the EOS C700 FF at NAB 2018. Now, an important step forward in the evolving Cinema EOS family is the introduction of the EOS C500 Mark II camera at IBC 2019. This camera reflects a significant accumulation of global inputs and suggestions from the countless users of the EOS C300 Mark II, C200, and C700/700 FF. Prominent within all of these marketplace urgings were: (a) more flexible configurability and (b) higher-performance on-board image capture. EOS C500 Mark II is intended for program origination in both moviemaking and high-end television production. It recognizes the multiplicity of shooting configurations associated with such program capture in an innovative modularity accompanied by extensive connectivity.

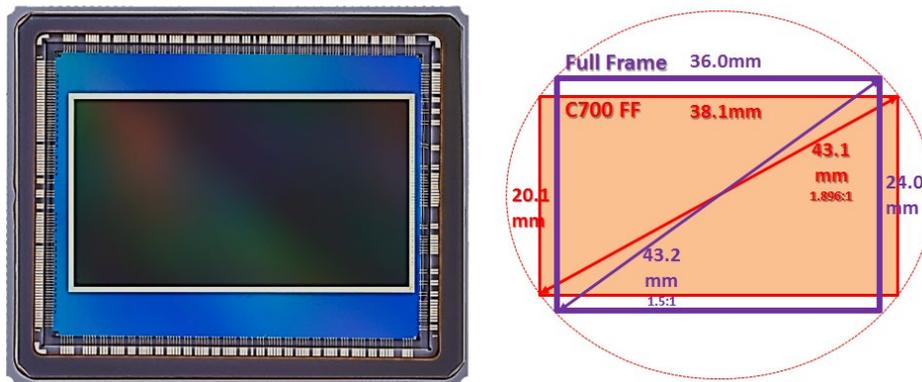
Specific attributes that distinguish the EOS C500 Mark II are:

- Compact lightweight and rugged Base Model
  - Weight 3.8 lbs.
  - Full frame 5.9K / 4K / 2K on-board RAW recording
  - User exchangeable lens mounts between PL, EF, and EF-C
  - In-Body electronic Image Stabilization
  - Electronic Diffraction correction
  - Alternative on-board XF-AVC recording of production formats of 4K / UHD or 2K / HD.
- Three plug-in Extension Units -- that support configurations extending from single person shooting to fully configured high-end cinematography systems.

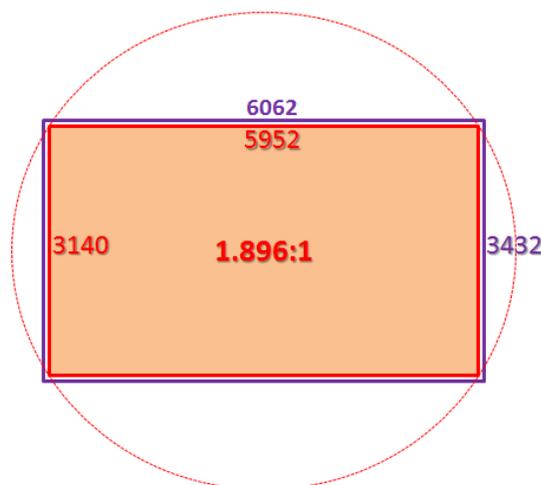
## 2.0 EOS C500 Mark II – WITH FULL FRAME IMAGE SENSOR

For many years, in the digital DSLR camera domain, the Full Frame 35mm image format signifies a 1.5:1 aspect ratio determined by the 36mm x 24mm active image dimensions – shown in Figure 1. This image format has formed the basis of the newly emerging full frame digital cinema cameras that have entered the marketplace during the past few years. The image sensor used in the EOS C500 MkII is a novel variant on the Full Frame sensor:

- Large format CMOS image sensor having the DCI aspect ratio of 1.896:1 (or 17:9) but having 2.11 times more photosites than the EOS C500 Super 35mm image sensor
- Image circle diameter equal to that of the 1.5:1 Full Frame DSLR
- Active image is wider than that of the traditional 1.5:1 full frame
- ALL of the active photosites contribute to the 17:9 frame (compared to reduced number if cropped from a 1.5:1 frame)



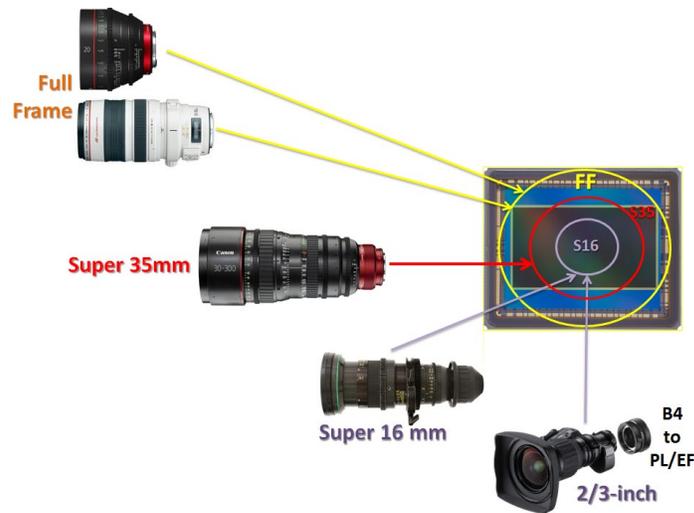
**Figure 1** Full Frame image sensor used in the new EOS C500 Mark II has an aspect ratio of 17:9 compared to the traditional Full Frame image format has an aspect ratio of 1.5 : 1



**Figure 2** The red outline defines the active image area – with active and total photosite counts shown

### 3.0 WORKS WITH A RANGE OF CINEMA LENS FORMATS

The EOS C500 Mark II can be used with a range of cinematography lenses – that include full frame lenses, Super 35mm lenses, Super 16mm lenses, and even 2/3-inch broadcast zoom lenses (using Canon B4 mount to PL / EF optical adaptors) – as shown in Figure 3.

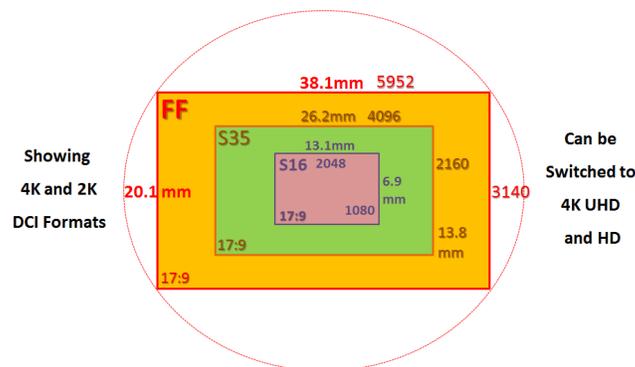


**Figure 3** The Full Frame EOS C500 Mark II can be used with all image formats of cine and broadcast lenses

When used with a full frame cine lens the EOS C500 Mark II has a menu selection that switches Image Sensor Readout modes between the following:

1. Full Frame 5.9K with 17:9 aspect ratio
2. 4K (either DCI or UHD) – downsampled from the 5.9K original
3. 2K (either DCI or HD) – downsampled from the 5.9K original
4. Anamorphic modes – including **2 x** and **1.3 x**

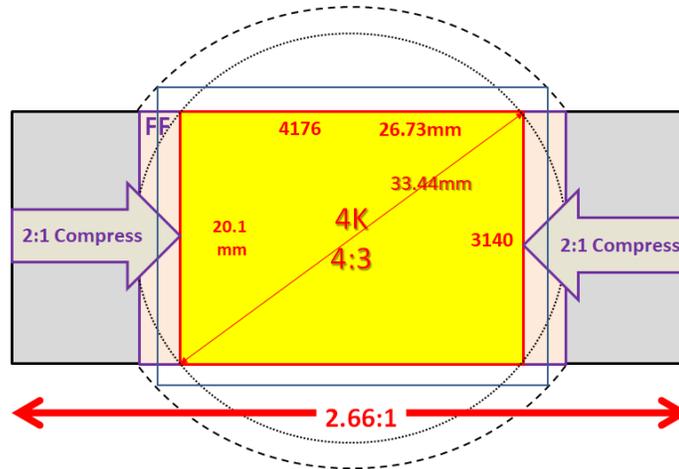
Depending upon the lens image format size that is selected the Image Sensor Readout menu selection delivers the appropriate cropped digital production format – selected as either 4K DCI or 4K UHD or 2K DCI or full HD – as outlined in Figure 4. The Super 35mm lens can deliver a choice of 4K / UHD / 2K / HD.



**Figure 4** Showing the three native image formats that are selectable depending upon the image circle size of the chosen cinema lens – the Sensor Readout mode can select between 4K DCI or UHD and 2K DCI or HD

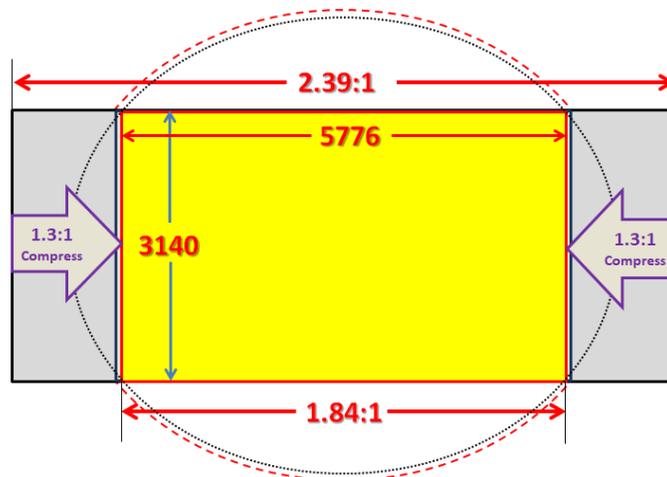
## 4.0 ANAMORPHIC SHOOTING

The EOS C500 Mark II camera supports anamorphic shooting – offering a choice of 2x or 1.3x horizontal squeeze. For the 2x anamorphic many directors and cinematographers prefer to capture a slightly wider compressed image – favoring the use of a 4:3 (or 1.33:1) image capture rather than the 6:5 (1.195 : 1) aspect ratio that defines a precise 2 x squeeze on a 2.39 : 1 ( $2.39 / 2 = 1.195$ ) image format. This practice allows some image margin on either side that will accommodate small repositioning within the postproduction work. This anamorphic choice entails an effective input image to the lens having an aspect ratio of  $1.33 \times 2 = 2.66 : 1$  as shown in Figure 5.



**Figure 5** Showing the photosite sampling of the active image (in yellow) for 2x anamorphic squeeze

The 1.3x compression anamorphic lens was developed to accommodate the wider 1.896 : 1 (17:9) aspect ratio specified by DCI for digital cinema cameras. The squeezed image that is sampled and recorded is very close to that DCI aspect ratio ( $2.39 / 1.3 = 1.84 : 1$ ). This works especially well with the full frame sensor as it has more height than the legacy Super 35mm film (20.1 mm versus 18.67 mm).



**Figure 6** Showing the photosite sampling of the active image (in yellow) for 1.3x anamorphic squeeze

## 5.0 EOC C500 Mark II – THE BASE MODEL

The compact nature of the Base Model of EOS C500 Mark II is shown in Figure 7.



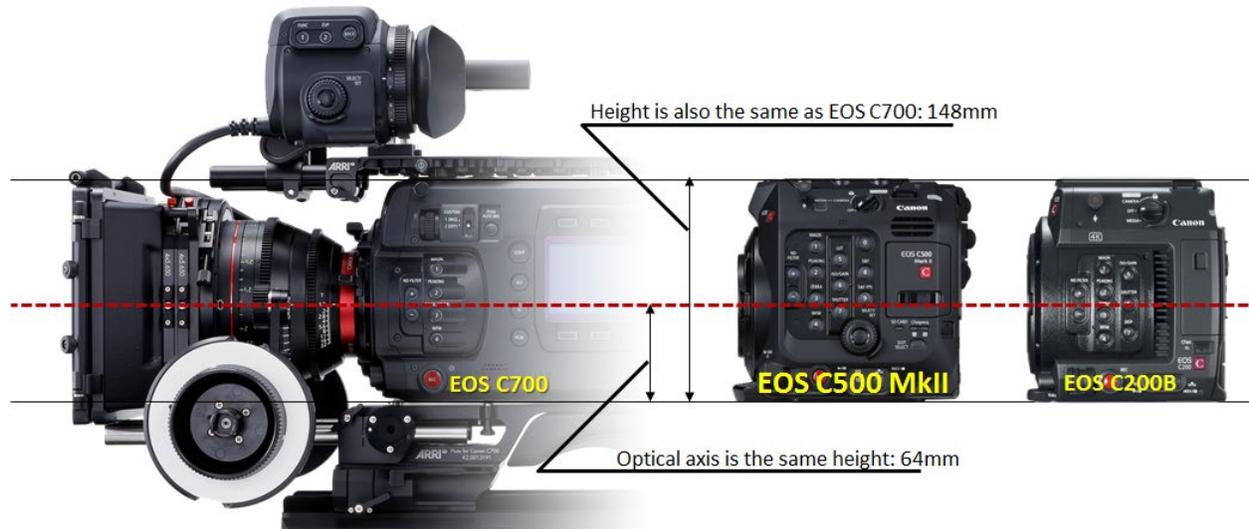
**Figure 7** Showing the front and rear of the Base Model EOS C500 Mark II

The Base Model is slightly lower and shorter in length than the original EOS C500 camera. A radical difference between the two is underscored by the on-board RAW recording capability of the new EOS C500 Mark II. In addition, as will be detailed in this paper, the operational functionality of the EOS C500 Mark II extends significantly beyond the original EOS C500.



**Figure 8** Showing the dimensions of the Base Model of EOS C500 Mark II

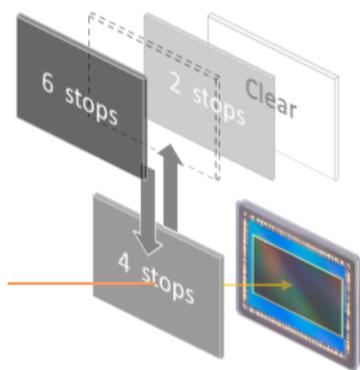
The EOS C500 Mark II maintains precisely the same optical axis as both the EOS C700 and the EOS C200.



**Figure 9** The aligned optical axis of the three Cinema EOS cameras facilitates accessory sharing

## 5.1 Motorized Internal 10-Stop ND System

The EOS C500 Mark II features an internal motorized ND unit whose simple construction makes for easy maintenance and which is durable. Two modes support selection of Clear / 2 / 4 / 6 / 8 / 10 stops. This range enables imaging using more shallow depth of field and bokeh effects even in bright sunlight.



ND Filter Combinations

	ND 1	ND 2	ND 3	Clear	Total
Normal mode	-	-	-	Clear	0 Stops
	-	-	2 Stops	-	2 Stops
	-	4 Stops	-	-	4 Stops
	6 Stops	-	-	-	6 Stops
Extension mode	6 Stops	-	2 Stops	-	8 Stops
	6 Stops	4 Stops	-	-	10 Stops

### Extension mode: 8 / 10-Stops

Normal Mode enables the following filters: 0 / 2 / 4 / 6-Stop.

The Extension Mode offers: 8 / 10-Stops by using a “glass + glass” combination.

NOTE: Focus may have to be re-adjusted in this Extension mode

**Figure 10** Showing the simple methodology for selection of a wide range of ND filtering

## 6.0 CONNECTIVITY OF BASE MODEL EOS C500 Mark II

The Base Model of the EOS C500 Mark II is well-endowed with critical connectivity that supports a range of single operator style shooting. Prominent among these is the ability to connect the uncompressed 4K video to an external recorder or to an on-set 4K reference display using a single cable – via the 12G SDI interface or the HDMI interface.

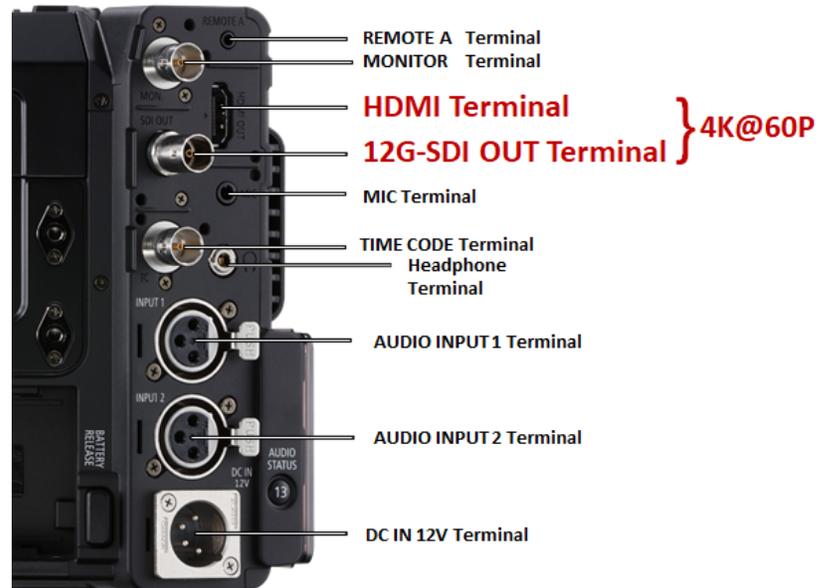


Figure 11 Showing the Connectivity options in the Base Model

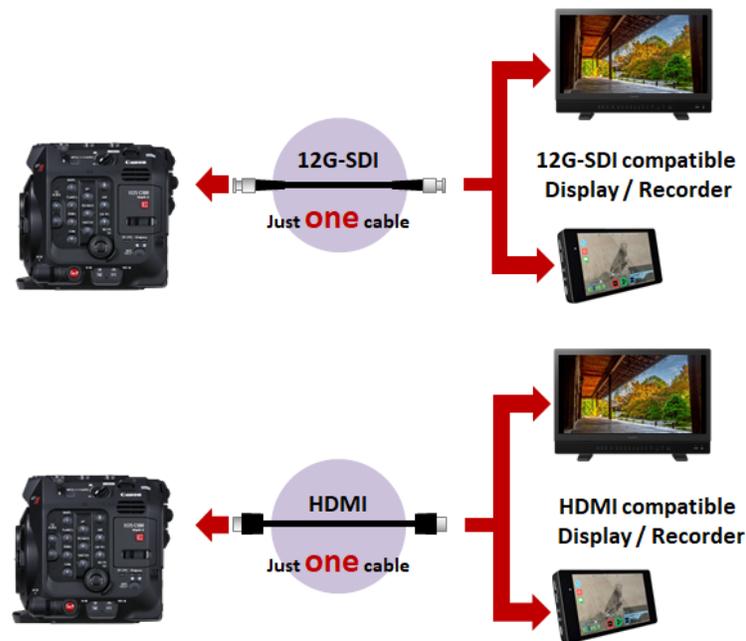


Figure 12 EOS C500 Mark II features 12G-SDI and HDMI terminals supporting transfer of uncompressed 4K

## 7.0 FUNCTIONALITY OF THE BASE MODEL EOS C500 Mark II

Base Model EOS C500 Mark II camera delivers impressive functionality supporting specialized shooting situations – such as gimbal mount or remote drone shooting – that include internal RAW recording.



**Figure 13** *Illustrating two of many specialized shooting applications that can capitalize on the lightweight compact Base Model*

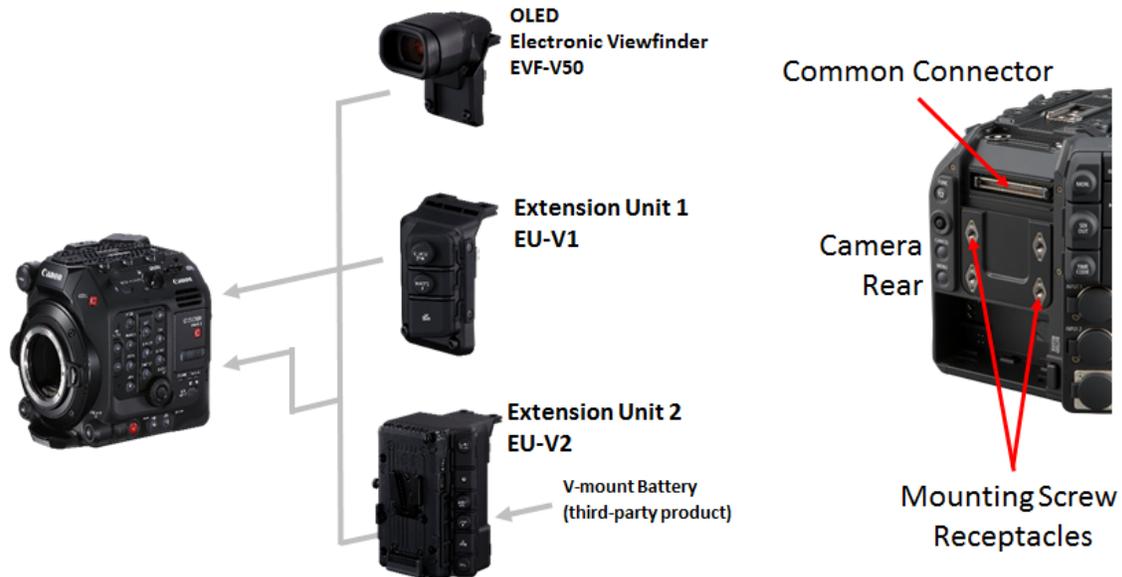
The EOS C500 Mark II camera has a broad array of accessories supplied with the basic camera – a small selection of which are shown in Figure 14. Those accessories support configuration of a handheld camera that is tailored for single operator shooting – seen on the right.



**Figure 14** *Showing the selection from the supplied accessories with the EOS C500 Mark II camera that configure a compact single operator acquisition system*

## 8.0 EXTENSION UNITS – FOR EOS C500 Mark II

Three optional Extension Units can be separately purchased – that offer a range of flexible options in system configurability. All three attach to the rear of the Base Model camera – sharing a single common connector and mounting screws as shown on the right in Figure 15.



**Figure 15** Showing the three Extension Units that facilitate different configurations to address multiple shooting styles

The simplest of the three Extension Units is the OLED EVF and it helps configure a basic Run & Gun system.



**Figure 16** Attaching the tilting OLED EVF to the camera rear supports a flexible single operator system

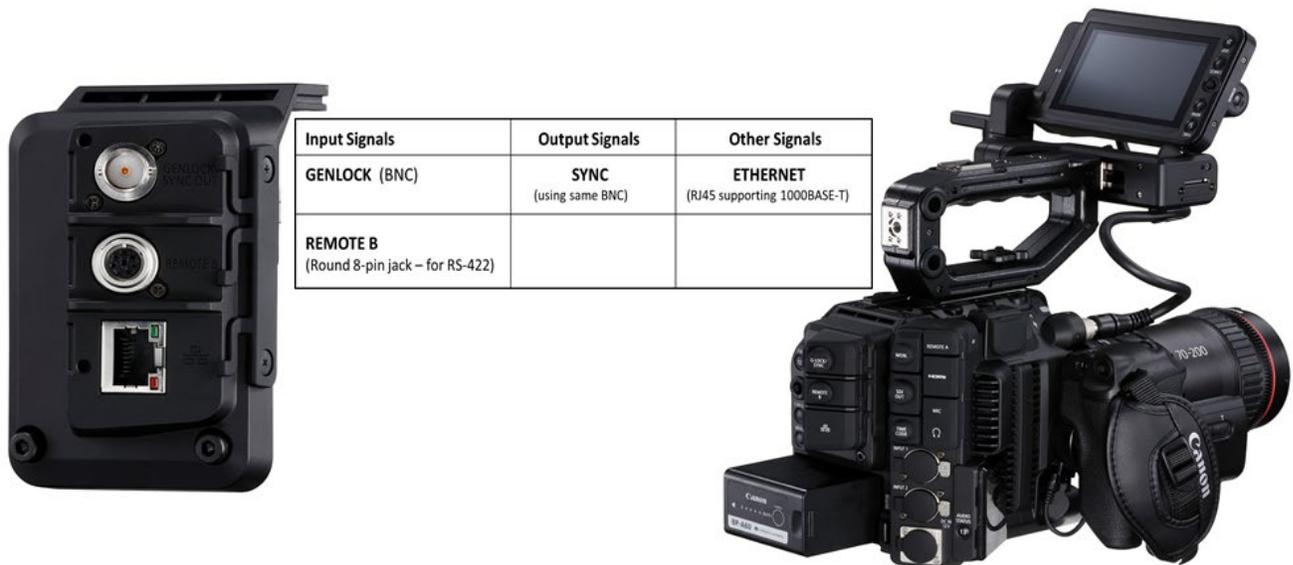
## 9.0 EXTENSION UNIT 1 – for EOS C500 Mark II BASE MODEL

The very compact Extension Unit 1 adds further connectivity that configures the camera for remote control and for multi-camera shooting.



**Figure 17** Extension Unit 1 attaches in the same manner as the optional OLED EVF – as shown in the image on the right (circled in red) mounted to the camera rear

Extension Unit 1 broadens the connectivity of the EOS C500 Mark II camera while still maintaining a compact physical system as shown in Figure 17. Genlock, Remote Video Control, and IP Streaming functionalities are added to the Base Model.



**Figure 18** Connectivity that Extension Unit 1 adds to the Base Model C500 Mark II – image on the right shows a fully configured camera with that Extension Unit mounted

## 10.0 EXTENSION UNIT 2 – for EOS C500 Mark II BASE MODEL

The alternative Extension Unit 2 adds important additional connectivity that configures the EOS C500 Mark II camera for fully-systemized cinematography. It uses the same camera body connector as Extension Unit 1 and the OLED EVF.



**Figure 19** The Extension Unit 2 attaches in the same manner as the Extension Unit 1 OLED EVF



Input Signals	Output Signals	Other Signals
<b>AUDIO INPUT 3/4</b> (XLR 3-pin jack) For MIC 600 ohm and -60 dBu For LINE 10K ohm and +4 dBu		<b>ETHERNET</b> (RJ45 supporting 1000BASE-T)
<b>GENLOCK (BNC)</b>	<b>SYNC</b> (using same BNC)	<b>LENS</b> (Round 12-pin jack)
	<b>DC 24V @ 2A</b> (Fischer 3-pin)	
<b>REMOTE B</b> (Round 8-pin jack – for RS-422)	<b>D-TAP</b>	

**Figure 20** Outlining the connectivity that Extension Unit 2 adds to the Base Model camera



**Figure 21**      *Showing the EOS C500 Mark II with the Extension Unit 2 mounted – and supporting a third party V-mount large capacity battery*



**Figure 22**      *The EOS C500 Mark II camera with Extension Unit 2 – configured for A-Camera Operation*

## 11.0 USER INTERCHANGEABLE LENS MOUNTS ON EOS C500 Mark II

Further flanking a design strategy to produce a camera system that is highly configurable, Canon responded to the urgings of many throughout the years in which the Cinema EOS system was steadily rolling out, by making user interchangeable mounts a centerpiece of the design of EOS C500 Mark II camera. Three distinct professional mount kits are available: The Canon EF mount, the Canon EF Cinema Lock mount (EF-C), and the long-established PL mount. Optional Canon adapter lens attachments MO-4E (EF-mount) /MO-4P (PL-mount) also supports mounting of a B4-mount 2/3-inch broadcast lens.



**Figure 23** A choice of three established mounts are available and can be changed by the end user

Only four M3 screws are required to implement the change out to the alternative mounts. Selections from the included shim sets can be added for precision adjustment of the flange back.



**Figure 24** Showing the simplicity of exchanging between the three mounts

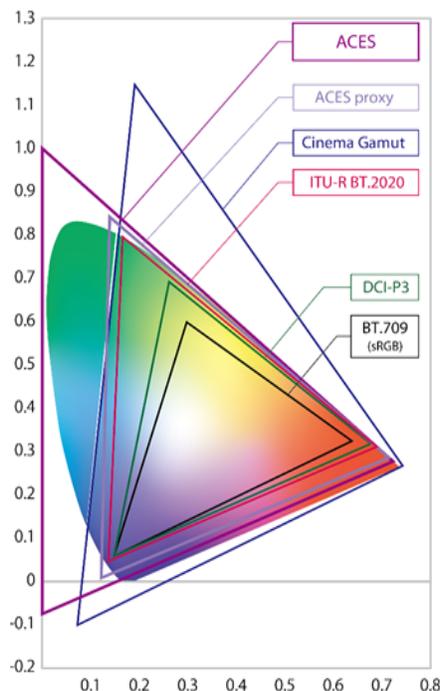
## 12.0 HIGH DYNAMIC RANGE (HDR) AND WIDE COLOR GAMUT (WCG)

For HDR imaging the EOS C500 Mark II offers an OETF selection of Canon Log2 or Canon Log3 [1]. Canon Log2 supports a 15-stop dynamic range and Canon Log3 supports a 14-Stop range. In terms of HDR recording the camera further supports the two standardized HDR systems – the Hybrid Log Gamma (HLG) and the Perceptual Quantization (PQ) system [2] – who’s respective primary attributes are summarized in Table 1. This choice is available in the menu system when XF-AVC recording mode is selected, and entails a transformation from the camera’s selected native OETF to the appropriate HDR transfer function. Both HLG and PQ are compliant with the latest HDR operational guideline ITU-R BT. 2408 [3] and ITU-R BT.2390 [4].

The camera also offers a selection of standardized color gamuts including BT.709, DCI-P3, and the Wide Color Gamut (WCG) BT. 2020 [5]. In addition, it supports the Canon-developed Cinema Gamut [6] – an ultra-wide color gamut specifically tailored for moviemaking.

When capturing its RAW data the EOS C500 Mark II uses a proprietary Color Gamut, and an OETF that ensures maximum digital coding regardless of the ISO setting. When Canon’s Cinema RAW Light is processed, the data can be conformed to a range of OETF curves (Canon Log 2, Canon Log3, and ITU-R BT.709), while color gamuts (ITU-R BT.2020, Canon Cinema Gamut, DCI P3, ITU-R BT.709) can be applied.

**TABLE 1 HDR systems and Color Gamuts in EOS C500 Mark II**



HLG	High Dynamic Range	PQ
System Optimized for Live Broadcast Television Production	Application	System Optimized for Pre-recorded Movie and Television Production
Scene Referred (OETF Specified in BT.2100)	System Design Premise	Display Referred (EOTF is Specified in BT.2100)
OETF is Compatible with SDR and HDR Displays	Feature	Underlying Perceptual Quantization is based upon Human Visual System
< 18 Stops for 2000 nit system	Theoretical Maximum Dynamic Range [7]	< 28 Stops for full 10,000 nit system

## 12.1 Management of Simultaneous HDR and SDR Capture

The EOS C500 Mark II can capture on-board an HDR reproduction of a given scene while simultaneously capturing the SDR version on an external recorder via the SDI interface.

When optimally exposing for an HDR video image, choices on the level of the related reference diffuse white vary depending upon the nature of the scene and aesthetic decisions made on-set. The EOS C500 Mark II internally derives an SDR version of that HDR video (which is recorded on-board to the CFexpress cards) and this is fed out via the SDI interface for connection to an external SDR recorder. Preparatory to that dual recording an SDR gain setting can be menu selected to adjust the SDR gain difference versus HDR – chosen from a range between -7.5dB and +7.5dB.

Two distinct situations are illustrated in Figures 22 and 23. The first situation is where a bright outdoor scene is accurately exposed for on-board HDR recording. The derived SDR will be reflective of that exposure and will appear overexposed. Decreasing the gain restores proper exposure of that SDR video and then the two parallel recordings can be initiated.



**Figure 25** Accurate HDR exposure of a bright outdoor scene will require a decrease in gain to properly set the effective exposure of the associated SDR video being simultaneously recorded

An alternative situation might be a low illumination within an indoor setting (Fig. 26) and when this is correctly exposed for on-board HDR recording the associated SDR derivative will appear underexposed. A gain increase is implemented to restore correct exposure, and the two are simultaneously recorded.



**Figure 26** Accurate HDR exposure of a lower illuminated indoor scene will require an increase in gain to properly set the effective exposure of the associated SDR video being simultaneously recorded

## 12.2 On-Board and External Recording Options for HDR/SDR/4K/2K

The EOS C500 Mark II camera offers a variety of options in terms of on-board recording while simultaneously supporting external uncompressed recording. In the case of external recording either the 12G-SDI or the HDMI interface may be used.

When recording 4K on-board using the XF-AVC Intra codec an uncompressed 4K or 2K version can be externally recorded. Conversely, if recording 2K on-board then only a 2K uncompressed version can be externally recorded.

When recording HDR on-board either that same HDR or the derived SDR may be externally recorded. If SDR is being recorded on board only that same SDR can be externally recorded.



Figure 27 Allowable combinations of on-board and external recording of HDR / SDR and 4K / 2K

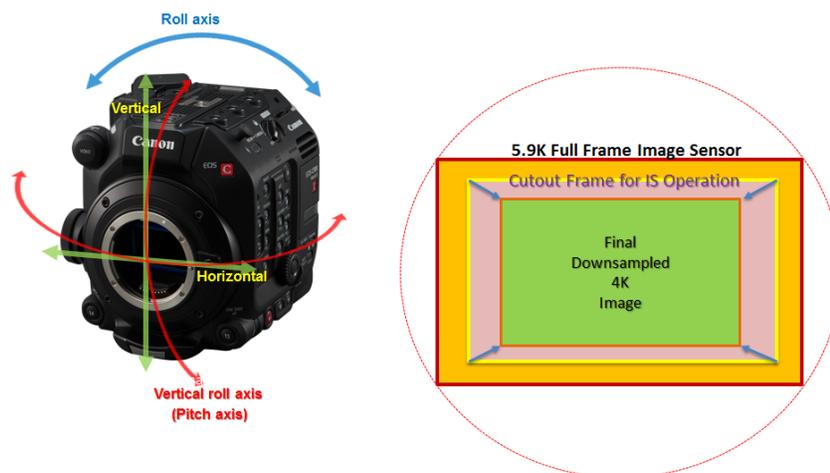
## 13.0 NEW SHOOTING ASSISTS THAT ENHANCE FINAL IMAGERY

The EOS C500 Mark II camera embodies novel built-in innovations that either extend image quality itself or add robust protection of the integrity of the high-resolution 5.9K or 4K images. These include:

- 13.1 Electronic Image Stabilization – that implements 5-axis stabilization when the camera is used with lenses that have no inherent IS – or three-axis control when used with lenses that do have built-in IS (in which case the lens does the other two axes of stabilization)
- 13.2 Diffraction Correction – borrowing from years of technical refinements in Canon professional DSLR, this innovative correction has now been optimized for motion imaging – specifically, the 5.9K downsampled to 4K video – and it compensates for the effects of diffraction when lens aperture is turned down
- 13.3 Enhanced Dual Pixel CMOS Auto Focus
- 13.4 Extended range of the alternative Focus Guide
- 13.5 Recreation of manual focus control as used by professional directors of photography

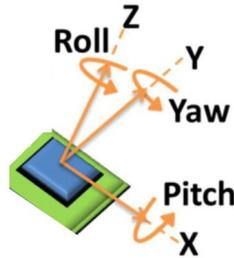
### 13.1 Electronic Image Stabilization (EIS)

A first for the Cinema EOS camera family – the EOS C500 MkII embodies Electronic Image Stabilization (EIS). The camera system offers five-axis correction when coupled to a lens that has no internal image stabilization – the axes are identified in Figure 28. When operating with a lens that does have internal IS the lens manages the Yaw and Pitch compensation while the camera deals with the Roll and Horizontal/Vertical (X/Y) movements. Central to the EIS system is creation of an active image frame (yellow outline in Figure 26) that is smaller than the Full Frame 5.9K sensor itself. The essence of the correction strategy is to move that frame under software control in a manner that counters the image shift created by the external vibrations and restores the image to its central position.



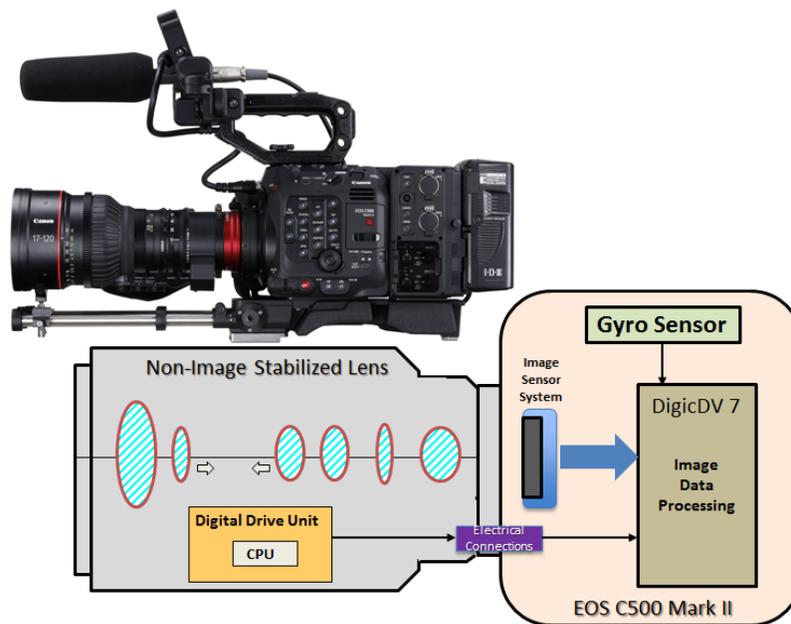
**Figure 28** The EOS C500 Mark II incorporates five-axis Electric Image Stabilization (EIS)

A gyroscopic sensor mounted within the body of the camera reports on angular rates along reference axes. This data is reported to the DigicDV7 processor that make high-speed calculations that in turn create the appropriate instruction to reposition the selected active image area.



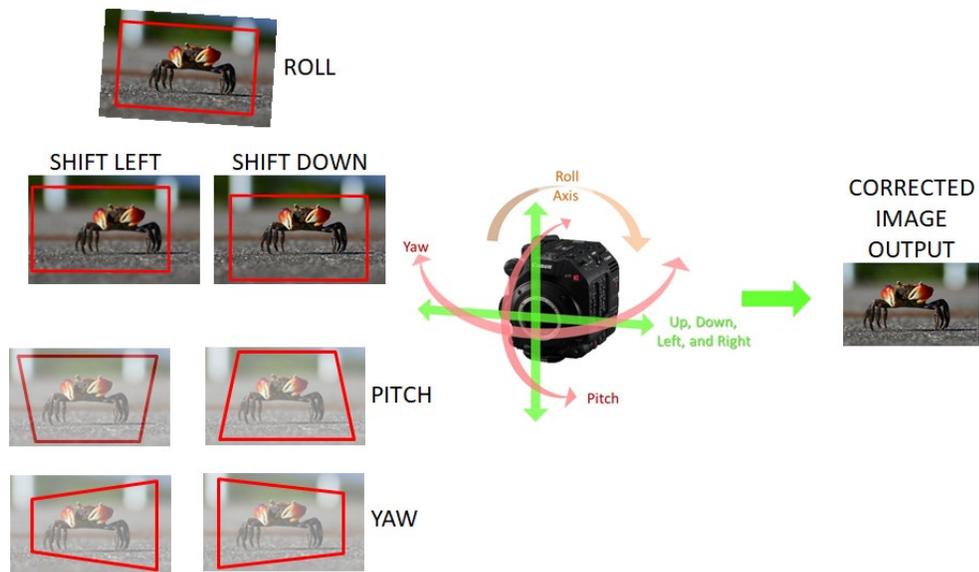
**Figure 29** Gyro sensor mounted in the camera sends information on movements in three axes

The EIS controlling system is based on motion vectors in the image that aid in the decisions for repositioning the active image area. The correcting action itself is an effective "pan and scan" within the full image sensor raster that repositions the image back to its correct central location.



**Figure 30** EOS C500 Mark II operating with a non-IS cine lens – where the camera corrects all five axes

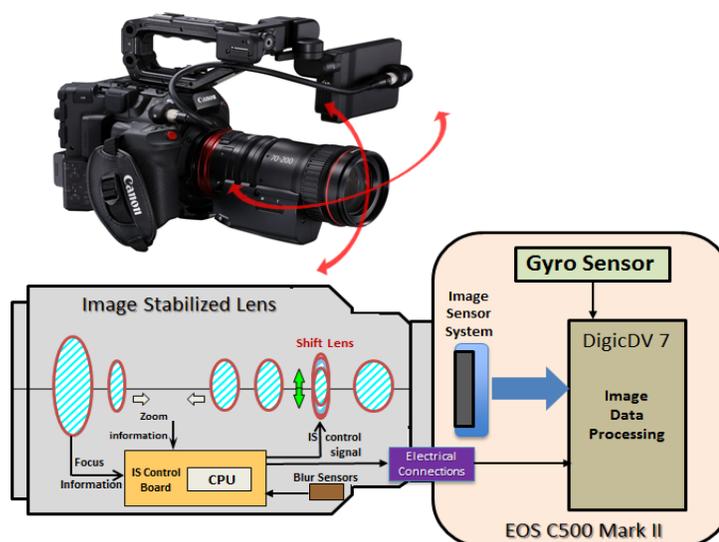
The EIS system only operates when recording in XF-AVC – it does not function when recording Cinema RAW Light. If recording 4K the 5.9K image sensor is engaged and the reduced sampling structure shown in Figure 28 is initiated. This is still larger than 4K so a degree of the Oversampling 4K Processing ensures a very high quality image stabilized 4K. If, however, a Super 35mm lens is used then the camera must be switched to 4K Crop and now this becomes the raster within which a reduced size active image is moved around in the IS operation. This does lower the image sharpness somewhat when it is resampled to 4K for recording. The same is true if the camera is operating in 2K Crop.



**Figure 31** Showing examples of the image shifts caused by a disturbance in each of the five axes

The detection of Pitch and Yaw is more complex than the three planar movements (Roll, Shift up/down, and Shift Left/Right) shown in Figure 31. They entail sensing the loss of sharpness and an alteration to image perspective – in the vertical direction associated with a Pitch movement, and in the horizontal direction for the Yaw movement.

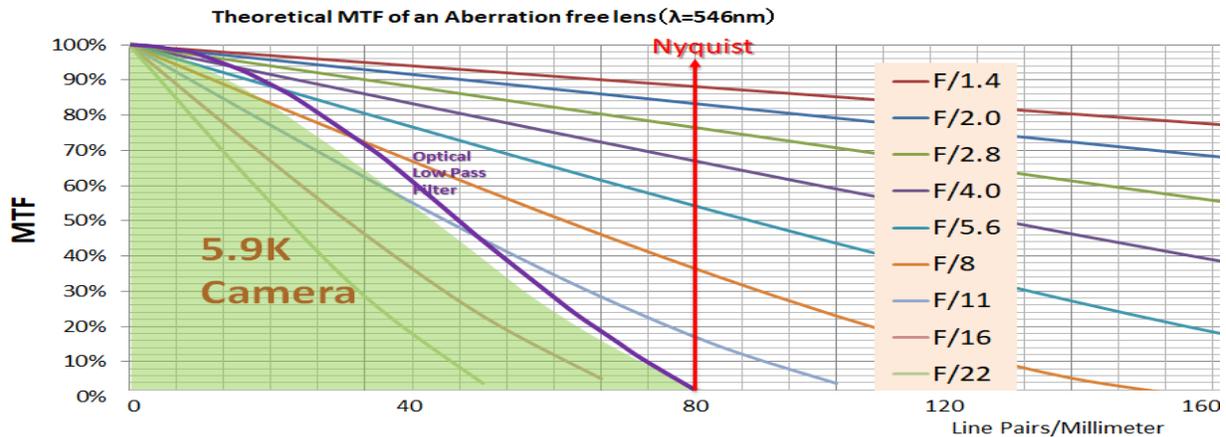
Figure 32 shows the camera operating with a lens that has built-in image stabilization. In this case the lens takes over total management of corrections for the Pitch and Yaw disturbances. The camera continues to correct for the Roll, Horizontal, and Vertical.



**Figure 32** Showing the EOS C500 Mark II with the image stabilized lens CN-E70-200mm

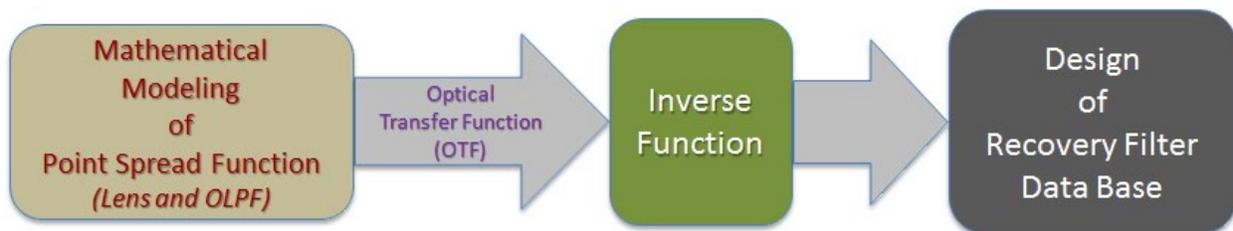
## 13.2 Diffraction Correction System

There are two inescapable optical limitations to the sharpness of the video image originated in any lens-camera system. One is in the lens itself – the optical phenomenon of diffraction – that sees a progressive lowering of optical MTF as the lens aperture is stopped down. In Figure 33 this is shown for an otherwise ideal lens (one having no aberrations) – and it applies to all lenses. The second is the roll-off in the optical pre-filtering that must be deployed to counter the aliasing associated with the image sensor sampling – shown as the hypothetical purple curve in Figure 33 – that defines the optical Nyquist frequency of 80 LP/mm (3140/2 vertical samples divided by the vertical image height of 20.1mm).



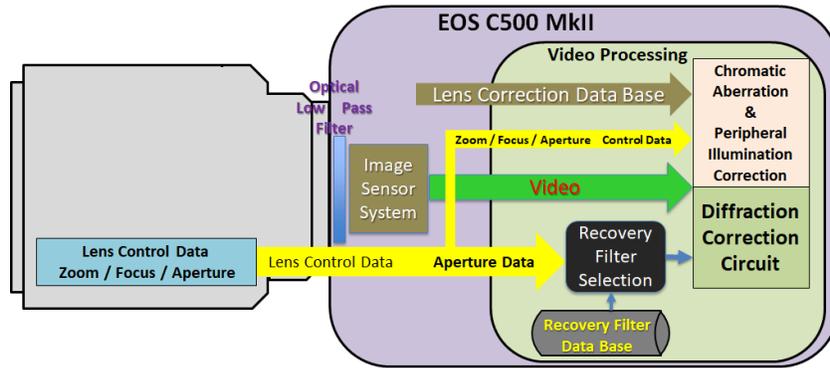
**Figure 33** Summarizing the diffraction action in an ideal lens when mounted on a 5.9K camera full frame camera (80 LP/mm Nyquist limit) having a hypothetical optical low pass filter

The Diffraction Correction system within the EOS C500 Mark II camera processor implements real-time compensation for diffraction and for the optical pre-filtering. A correction circuit under control of a recovery filter data base within the DIGIC DV7 implements this compensation. The design of that data base – outlined in Figure 34 – is based upon an assessment of the textural image deterioration as the light passes through the lens aperture followed by the camera pre-filtering. That entailed an analysis of the behaviour of the point spread function of light beams passing through that system which was converted into a mathematical function – termed the optical transfer functions (OTF). This modelling incorporates the alterations to the point spread function as the lens aperture ranges from fully open to fully closed. An inverse function was then created and this formed the basis of the recovery filter data base that would control the correction circuit (in realtime as the lens aperture is operated) to return the video image quality to close to the state associated with wide open aperture setting.



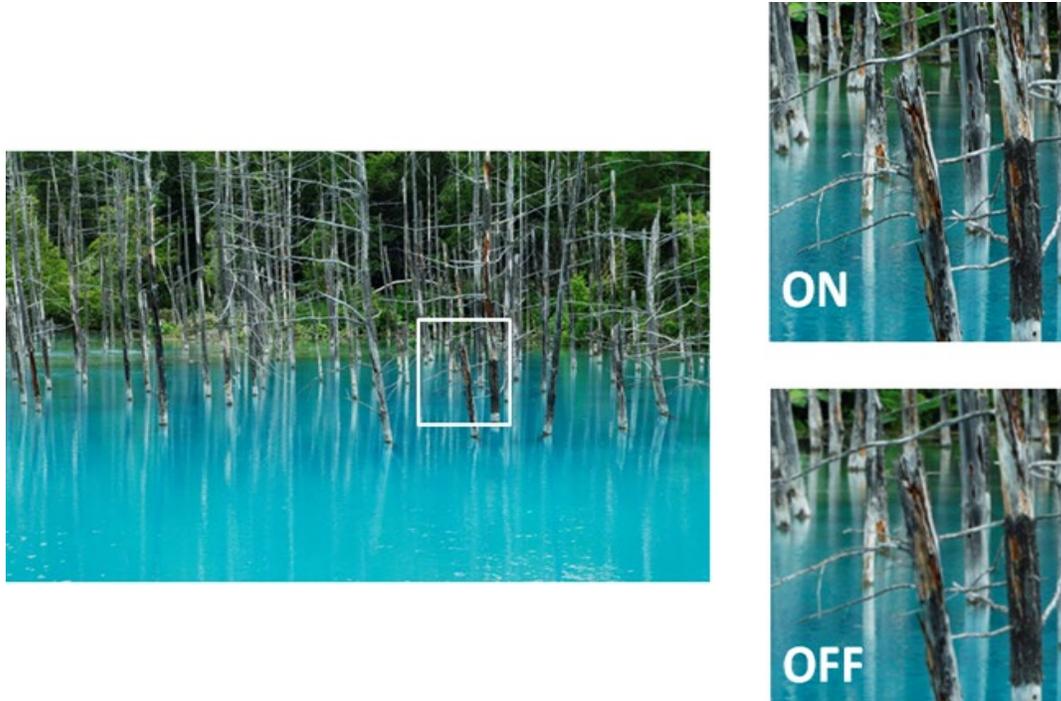
**Figure 34** Principle of the technology underlying the creation of the recovery filter data base used to control the Diffraction Correction system

For the compensation of diffraction only the lens aperture settings are required – see Figure 35. **Note:** Diffraction correction does not operate on RAW video – only on the downsampled 4K / UHD / 2K / HD video. The lens data base is also separately processed to implement correction for lateral chromatic aberration and for peripheral illumination. Because both of these impairments vary with the zoom/focus/iris settings of the lens, their control data are also reported to the processor which makes appropriate dynamic corrections in synchronism with the operational adjustments of the lens.



**Figure 35** Showing the stored data files on lens aberrations and the real-time lens operational controls communication across to the video processor within the EOS C500 Mark II camera

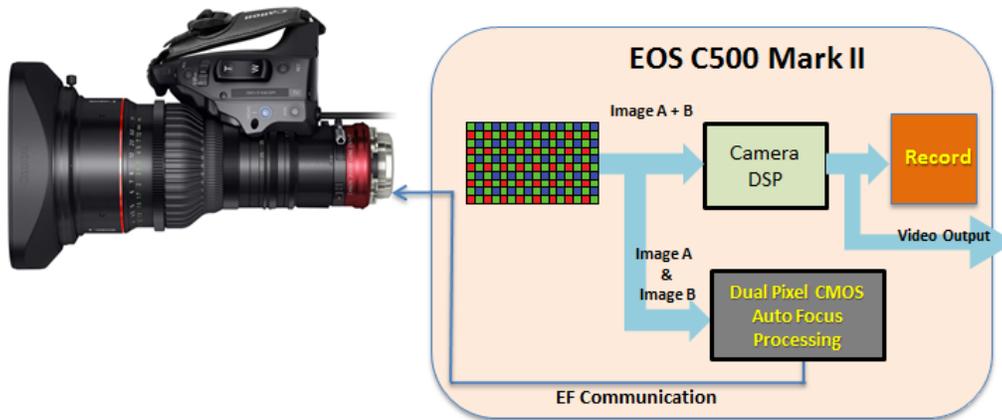
It should be noted that the diffraction correction is not a traditional video sharpening process – but rather it is a restoration based upon reported predictability. It manifests itself by restoring a good deal of the subtle image textural information that is lost by diffraction and pre-filtering – as suggested in Figure 36.



**Figure 36** Showing how the correction of diffraction restores textural detail to the image

### 13.3 Dual Pixel CMOS Auto Focus System

The EOS C500 Mark II embodies a powerful auto focus system where the sensing of sharp focus takes place within the image sensor photosite itself. Dual photodiodes within each individual photosite create two separate images A and B that facilitate a phase detection system indicating the degree of defocusing. Both A and B data streams are fed to a processing system that makes all of the decision-making and data manipulation associated with the Auto Focus system.



**Figure 37** Showing the separate processing of the dual pixel data from the image sensor for Auto Focus

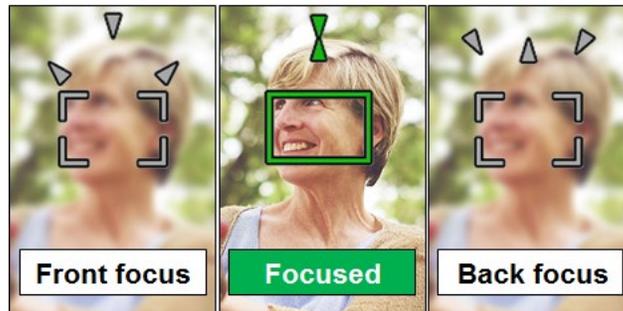
EOS C500 Mark II offers high-speed One-Push AF and Continuous AF within a horizontal and vertical range encompassing 80% of total image area. It provides very accurate Face Detection AF. Sensitivity has been improved and new operational modes added based on extensive user recommendations.



**Figure 38** Using the LCD Monitor LM-V2, with touch panel support, focusing becomes even more intuitive, with the capability to choose the subject for focusing with a touch

### 13.4 Focus Guide System

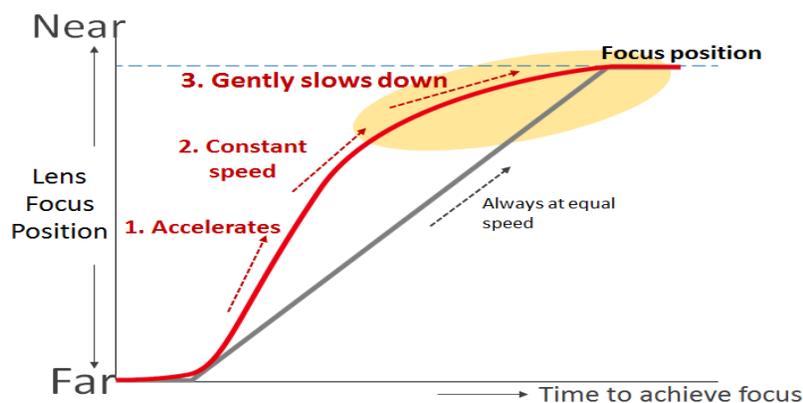
For the cinematographer who prefers the creative option of manual focus operation, the dual pixel system can alternatively be switched from the Auto Focus control loop (encompassing the lens focus control) to an open loop system that utilizes the Dual Pixel CMOS AF data processing to instead transfer precision signaling in the camera viewfinder. This signaling indicates the required rotation direction – with arrows as shown in Figure – when starting from a distinctly defocused image to achieve sharp focus, and confirmation when precise focus is achieved (arrows switch to green). In the EOS C500 Mark II the useable display f-number with Dual Pixel Focus Guide has been extended from ~F/11 to ~F/13.



**Figure 39** Principle of the Focus Guide system – where manual actuation of the lens focus control is detected within the image sensor and the data processing signals focusing directions in the viewfinder

### 13.5 Augmented Manual Focus Control

Canon conducted studies with a number of high profile DoPs with respect to their creative manipulation of manual control of focus. While diverse in their manipulation, there were common attributes in terms of their respective control of the speed of focus control. This was carefully studied by Canon and has been simulated and incorporated into the electronic control of lens focus. This empowers the camera operator to recreate more natural and smoother control of focus. It ensures professional-quality focus work, even when using the autofocus system.



**Figure 40** Showing the basic principle of the augmented manual focus control

## 14.0 EOS C500 Mark II – ON-BOARD RECORDING OPTIONS

The EOS C500 Mark II supports three distinct on-board recording file formats – shown below in Figure 41.



**Figure 41** EOS C500 Mark II offers a choice of three high-performance on-board recording codecs

The two codecs facilitate the following recording options:

1. **On-Board Recording** – 5.9K Cinema RAW Light, 4K Cinema RAW Light, and 2K Cinema RAW Light
2. **On board Recording** – 4K DCI or 4K UHD digital production formats with XF-AVC Intra codec
3. **On-board Recording** – 2K DCI or 1080-line HD digital production formats with XF-AVC Intra codec
4. **On-board Recording** – Proxy video recording using XF-AVC LongGOP

## 15.0 RECORDING MEDIA FOR EOS C500 Mark II



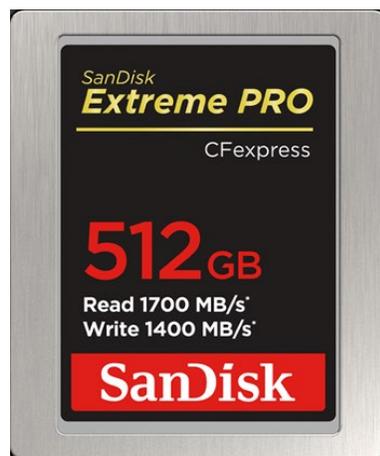
**Figure 42** Two CFexpress 2.0 cards record the 5.9K Cinema RAW Light or the 4K XF-AVC file formats and an SD card records the Proxy video

Anticipating the unceasing demands for high-density data storage, the CompactFlash Association has developed the new CFexpress memory card – this was announced in early 2019 [8]. Final standardization of these cards by CFA is anticipated before year’s end. Just as SD cards are available in miniSD, microSD, and SD, the CFexpress 2.0 will feature three distinct physical card sizes – Type A, Type B, and Type C. The EOS C500 Mark II uses the Type B memory card.

	Type A	Type B	Type C
Dimension	20mm x 28mm x 2.8mm 	38.5mm x 29.8mm x 3.8mm 	54mm x 74mm x 4.8mm 
PCIe® Interface	Gen3, 1 lane	Gen3, 2 lanes	Gen3, 4 lanes
Stack	NVMe™ 1.3	NVMe™ 1.3	NVMe™ 1.3
Maximum Theoretical Performance	1000MB/s	2000MB/s	4000MB/s

**Figure 43** The newly standardized CFexpress 2.0 memory cards come in three sizes and associated specs

Five companies have already announced CFexpress cards: Apacer, Delkin, Lexar, ProGrade Digital, and SanDisk. Three Type B cards have so far appeared in the marketplace – and one is shown in Figure 44.

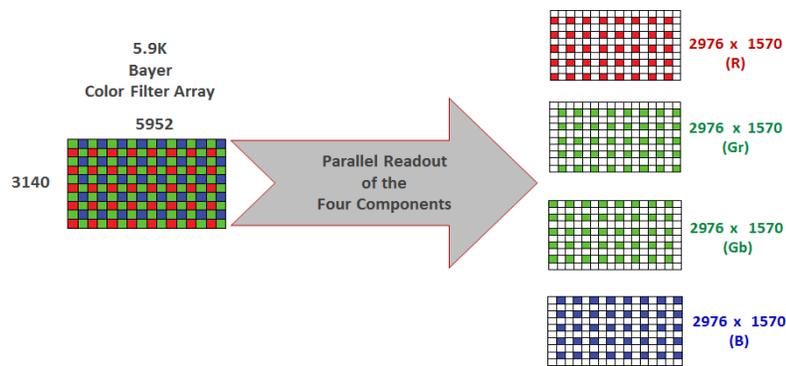


**Figure 44** Showing the first of the CFexpress cards formally tested and approved for the EOS C500 Mark II

## 16.0 ON-BOARD RECORDING

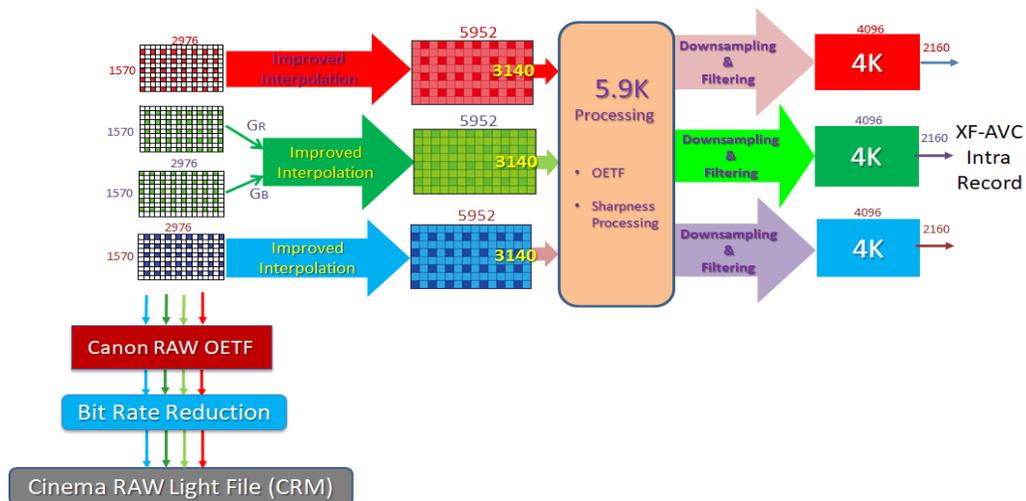
### *Preparation of the 4K Video for On-board Recording:*

To accomplish on-board image capture, the Canon EOS C500 Mark II implements a unique **“Over Sampling 5.9K Processing”** – a processing algorithm that effectively mobilizes the significant resolution of the 5.9K sensor to produce outstanding image quality for 4K DCI / UHD and 2K / HD recording. What is very important in the EOS C500 Mark II is that the construction of the red, green, and blue components entails no algorithmic debayering processes. A unique parallel readout process within the 5.9K image sensor separately extracts the four individual components – including the two spatially offset green components (green having twice as many spatial samples as the red and blue components). This innovative approach totally avoids any of the reconstruction errors inevitably associated with algorithmic debayering and this forms the basis for a clean artifact-free final recorded image.



**Figure 45** C500 Mark II image sensor directly reads out four parallel components from the 5.9K Bayer image sensor

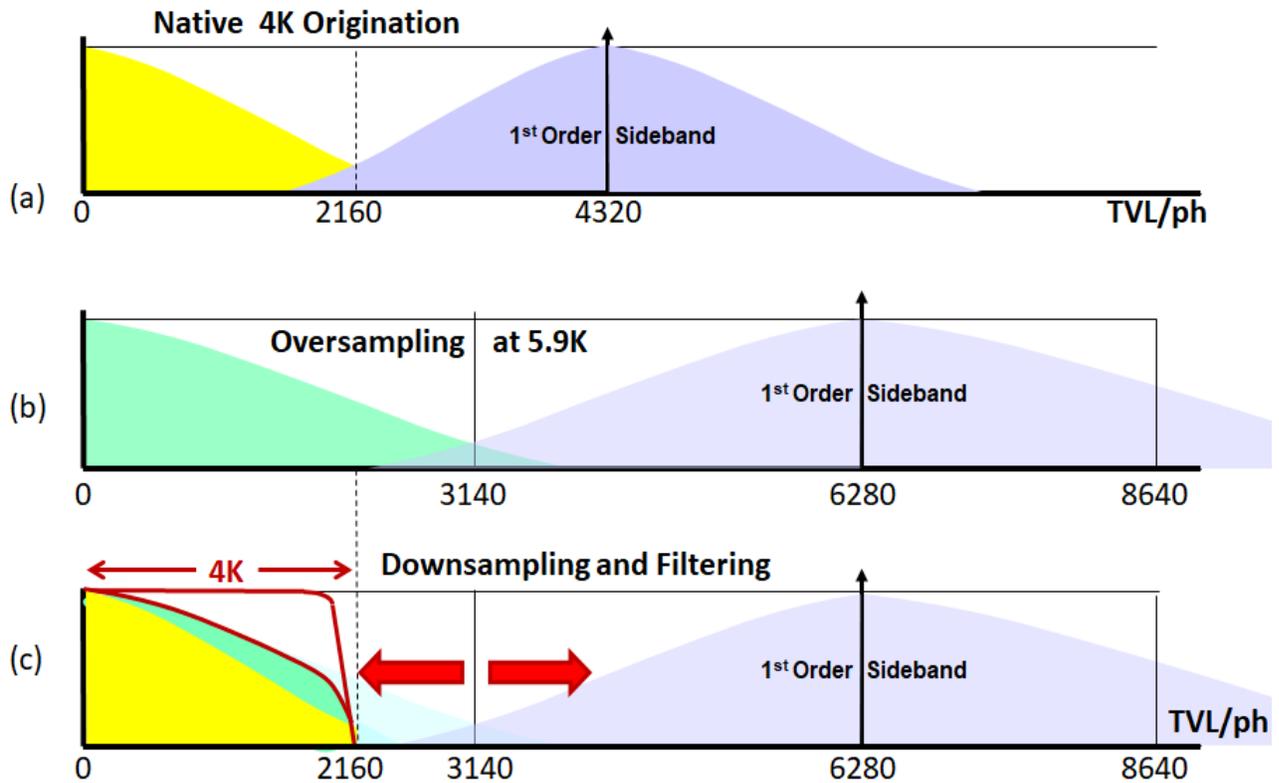
The extracted four RGrGbB components are separately interpolated – using a new and improved interpolation algorithm – to form three 5.9 K frames as shown in Figure 46. The three RGB frames are then processed – entailing a new refined sharpening system that enhances edge detail.



**Figure 46** Three RGB frames each having a digital sampling structure of 5952 (H) x 3140 (V) are created

A sophisticated bit rate reduction process is applied to these 5.9K RGB components and then the Cinema RAW Light file is constructed – see Figure 46.

The second critically important step in the overall process is the downsampling of these three processed 5.9K components to the standardized 4K (selectable as DCI or UHD) components. The downsampling process produces a set of 4K RGB baseband components that have been spatially separated from their respective 1<sup>st</sup> order sideband signals (which remain centered at 6280 TVL/ph).



**Figure 47** Comparing the management of the 1<sup>st</sup> order sideband of the 5.9K system versus a native 4K system

This all-important opening of spectral space allows implementation of sophisticated filtering that protects that elevated baseband 4K MTF profile while eliminating aliasing.

## 17.0 ON-BOARD RAW RECORDING

The integrity of the RAW signal is protected by eliminating video processes like the Linear Matrix that selects the color gamut, and employing a special RAW OETF that optimizes the digital coding over the entire transfer curve for all ISO settings [1].

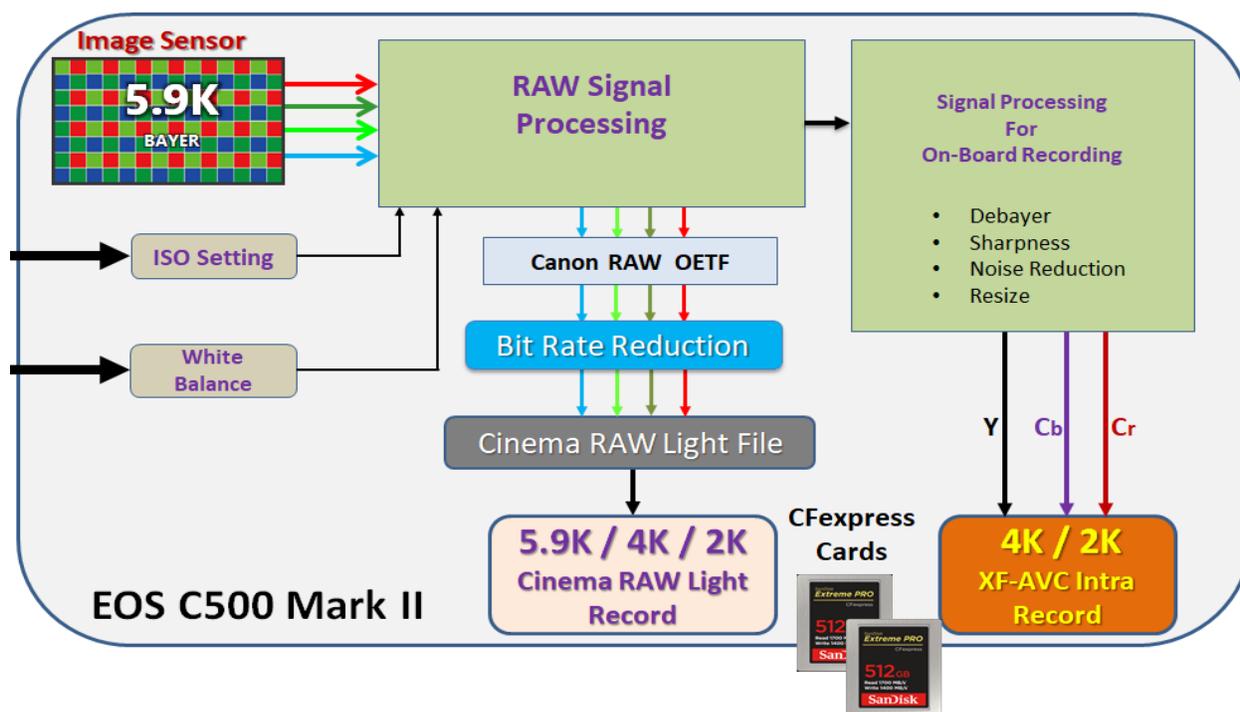


Figure 48 Showing the preparation of the Cinema RAW Light data file and the separately processed XF-AVC

TABLE 2 RAW Recording Options in EOS C500 Mark II

Cinema RAW Light		On-Board Recording				Recording Media	Slow & Fast
Format	Resolution	Color Sampling	Data Rate	Bit Depth	Max Frame Rate (fps)	CFexpress	
						Recording Durations	
						512 GB	
5.9K RAW	5952 x 3140	RGB Bayer RAW	2.1 Gbps 2.1 Gbps	10-bit 12-bit	59.94P / 50P 23.98P/24P/25P/29.97P	30 min	12 – 60 fps
4K RAW (Crop)	4096 x 2160	RGB Bayer RAW	1 Gbps 1 Gbps	10-bit 12-bit	59.94P / 50P 23.98P/24P/25P/29.97P	64 min	(No Audio Track)
2K RAW (Crop)	2048 x 1080	RGB Bayer RAW	250 Mbps 250 Mbps	10-bit 12-bit	59.94P / 50P 23.98P/24P/25P/29.97P	256 min	12 – 120 fps (No Audio)

## 18.0 ON-BOARD RECORDING IN XF-AVC Intra

Canon XF-AVC Intra codec records the following production format options:

1. 4K DCI or UHD production formats downsampled from Full Frame – up to 60 fps
2. 2K DCI or full HD production formats downsampled from Full Frame – up to 60 fps
3. 4K DCI or UHD production formats cropped from Full Frame – up to 60 fps
4. 2K DCI or full HD cropped from Full Frame – up to 120 fps (23.98 base)

These RGB components are matrixed to a 4K set of YCrCb 4:2:2 component set with the Luma signal having enhanced MTF – that results in images that are visibly sharper than natively originated 4K that has been optically pre-filtered.

### 18.1 Full Frame Sensor Capture Mode for 4K / UHD / 2K / HD Recording

Using a full frame lens and with the EOS C500 MkII camera capture mode set for full frame 5.9K the specific video format for recording is selected from a choice of 4K or UHD, 2K or HD. The chosen format is internally formulated via the 4K Oversampling Process and is recorded to the CFexpress card using the XF-AVC Intra codec. Table 3 summarizes the digital video format choices and their associated recording data rates (which vary with the chosen frame rate) and recording durations. This table also shows the recording of the associated proxy video to the separate SD card using the XF-AVC LongGOP codec.

**TABLE 3 Intra-frame recording of YCbCr 4:2:2 4K / UHD or 1080-line 2K/HD**

Codec XF-AVC (VBR)	Resolution	Color Sampling & Bit Depth		Max Bit Rate (Mbps)	Frame Rates (fps)	File Format	Media CFexpress		
							Recording Duration		
							512 GB	Slow & Fast	
XF-AVC Intra	4K (4096x2160) or UHD (3840x2160)	4:2:2	10	810 410	59.94P / 50P 29.97P / 25P / 24.0P / 23.98P	MXF	79 min 156 min	12 – 60 fps Audio Muted	
	Full Frame Sensor Mode	2K (2048x1080) or HD (1920x1080)	4:2:2	10	310 160		59.94P / 50P 29.97P / 25P / 24.0P / 23.98P	MXF	207 min 401 min
		HD (1920x1080)	4:2:2	10	160	59.94i / 50i	401 min		
XF-AVC Long GOP Proxy Video	2048 x 1080	4:2:0	8	35 24	59.94P / 50P 29.97P / 25P / 24.0P / 23.98P	MXF	Media SD Card		
							64 GB	128 GB	
							240 min 350 min	485 min 705 min	

## 18.2 Super 35mm Crop Mode

When a Super 35mm lens is used the camera should be switched to the Super 35mm Crop Mode and the desired video format – from the choice of 4K / UHD or the 2K / HD formats—should then be selected for recording in the XF-AVC codec according to the options shown in TABLE 4.

**TABLE 4 Intra-frame Recording for the Super 35mm Crop Mode**

Codec XF-AVC (VBR)	Resolution	Color Sampling & Bit Depth		Max Bit Rate (Mbps)	Frame Rates (fps)	File Format	Media CFexpress		
							Recording Duration		
							512 GB	Slow & Fast	
XF-AVC Intra <b>Super 35mm Crop Mode</b>	4K (4096x2160) or UHD (3840x2160)	4:2:2	10	810 410	59.94P / 50P 29.97P / 25P / 24.0P / 23.98P	MXF	79 min 156 min	12 – 60 fps Audio Muted	
	2K (2048x1080) or HD (1920x1080)	4:2:2	10	310 160	59.94P / 50P 29.97P / 25P / 24.0P / 23.98P		MXF	207 min 401 min	12 – 60 fps Audio Muted
	HD (1920x1080)	4:2:2	10	160	59.94i / 50i			401 min	
XF-AVC Long GOP <i>Proxy Video</i>	2048 x 1080	4:2:0	8	35 24	59.94P / 50P 29.97P / 25P / 24.0P / 23.98P	MXF	Media SD Card		
							128 GB		
							485 min 705 min		

## 18.3 Super 16mm Crop Mode

When a Super 16mm lens, or a 2/3-inch broadcast lens (with the B4 mount adapters – MO-4E for EF-mount /MO-4P for PL-mount) are used on EOS C500 Mark II the camera is set to formulate a choice between 2K or HD video formats which in turn are recorded according to the specifications shown in TABLE 5.

**Table 5 Intra Frame XF-AVC for the Super 16mm Sensor Crop**

Codec XF-AVC (VBR)	Resolution	Color Sampling & Bit Depth		Max Bit Rate (Mbps)	Frame Rates (fps)	File Format	Media CFexpress	
							Recording Duration	
							512 GB	Slow & Fast
XF-AVC Intra <b>Super 16mm Crop</b>	2K(2048x1080) or HD(1920x1080)	4:2:2	10	310 160	59.94P / 50P 29.97P / 25P / 24.0P / 23.98P	MXF	207 min 401 min	12 – 60 fps Audio Muted
	HD(1920x1080)	4:2:2	10	160	59.94i / 50i		401 min	
XF-AVC Long GOP <i>Proxy</i>		4:2:2	10	35 24	59.94 / 50P 29.97P / 25P / 24.0P / 23.98P	MXF	Media SD Card	
							64 GB	128 GB
							240 min 350 min	485 min 705 min

## 19.0 SLOW AND FAST MOTION

TABLE 6

Sensor mode	Playback Frame Rates	FAST																SLOW																		
		Shooting Frame Rates																																		
Full Frame or Super35	59.94p	1	2	3	6	15	30	44	48	52	56	60	Max. is 60 fps (for both 50Hz and 60Hz system frequencies)																							
	29.97p	1	2	3	6	15	22	24	26	28	30	32	36	40	44	48	52	56	60																	
	23.98p	1	2	3	6	12	16	18	20	22	24	26	28	30	32	36	40	44	48	52	56	60														
	24.00p	1	2	3	6	12	16	18	20	22	24	26	28	30	32	36	40	44	48	52	56	60														
	50.00p	1	5	15	25	34	38	42	46	50	54	58	60																							
	25.00p	1	5	15	17	19	21	23	25	26	28	30	34	38	42	46	50	54	58	60																
Super16	59.94p	1	2	3	6	15	30	44	48	52	56	60	90	120	Max. is 120 fps (for both 50Hz and 60Hz system frequencies)																					
	29.97p	1	2	3	6	12	15	22	24	26	28	30	32	36	40	44	48	52	56	60	90	120														
	23.98p	1	2	3	6	12	16	18	20	22	24	26	28	30	32	36	40	44	48	52	56	60	72	96	120											
	24.00p	1	2	3	6	12	16	18	20	22	24	26	28	30	32	36	40	44	48	52	56	60	72	96	120											
	50.00p	1	5	15	25	34	38	42	46	50	54	58	60	75	100	120																				
	25.00p	1	5	15	17	19	21	23	25	26	28	30	34	38	42	46	50	54	58	60	75	100	120													



Digital Format	Frame Rate	Slow / Fast Motion Rates
3840 x 2160 (150 Mbps)	59.94P 29.97P 23.98P	x2, x4, x10, x20, x60, x120, x600, x1200 x 0.5 x 0.8
1920 x 1080 (35 Mbps) 1920 x 1080 (17 Mbps)	59.94P 29.97P 23.98P	x0.5, x2, x4, x10, x20, x60, x120, x600, x1200 x0.25, x0.5 x0.2, x0.4, x0.8
1280 x 720 (8 Mbps) 1280 x 720 (4 Mbps)	59.94P 29.97P	x2, x4, x10, x20, x60, x120, x600, x1200 x0.5

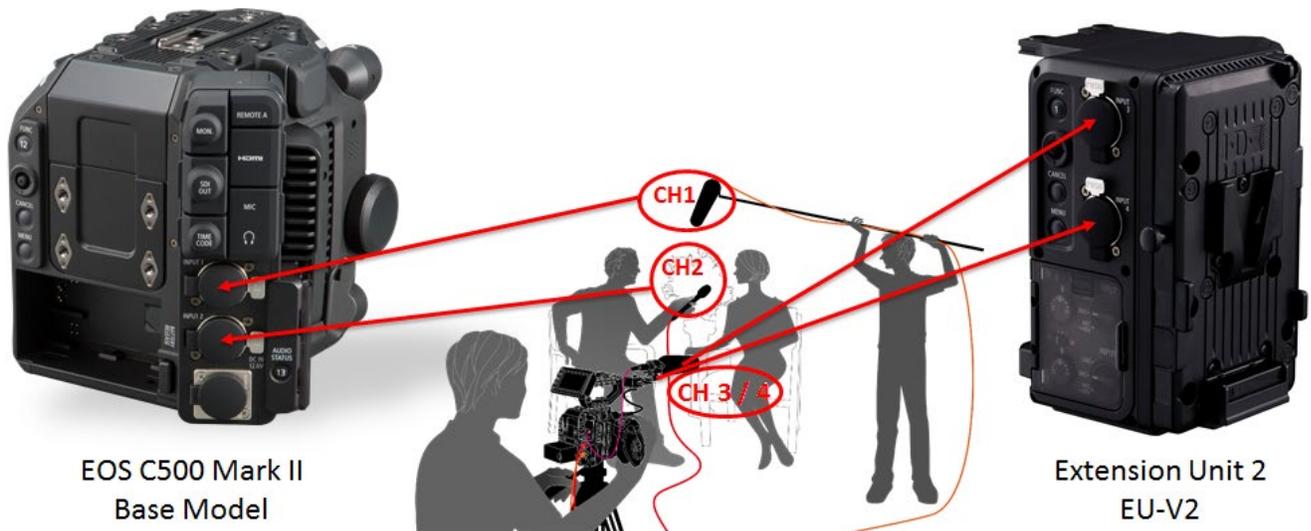
Figure 49 A new direct access to the Slow / Fast Motion mode offered by a dedicated button

## 20.0 AUDIO RECORDING

The EOS C500 Mark II supports four channels of LPCM 24-bit / 48 kHz audio inputs. Two channels from the mic jack (1 input) in the body, and the internal monaural mic (1 input). Two channels of LINE audio input is supported from the main camera XLR input terminals – termed Inputs 1 and 2. These two inputs will support standardized AES / EBU digital inputs.

Using the EU-V2 Extension Unit extends recording of analog audio sources via the four separate INPUT terminals – see Figure 49. Inputs can be selected from these options – and their respective specifications are shown in Table 7.

One example of the potential of this audio system flexibility is suggested in Figure 50. Two channels of audio signal are recorded from the boom pole microphone and the reporter’s hand microphone. Two channels of ambient sound can also be recorded from the stereo microphone attached to the camera when using the Extension Unit 2



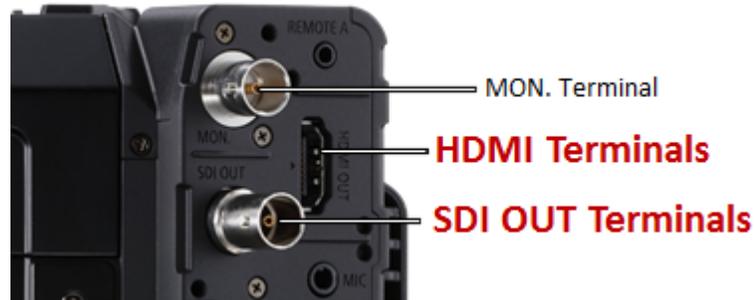
**Figure 50** *Extension Unit 2 extends the camera’s capability to four channels of independently controlled analog audio*

**TABLE 7 SPECIFICATIONS RELATING TO ALL OF THE AUDIO INTERFACES OF C500 MK II AND EU-V2**

<b>EOS C500 Mark II</b>	Terminal	Input Impedance	Sensitivity	ATT	Standard	Supply Voltage
<b>Camera Body</b> <b>INPUT 1 and 2</b>	<b>XLR</b> 3-pin jack (Balanced)					
<i>MICROPHONE</i>	1 Shield 2 Hot 3 Cold	600 Ohm	-60 dBu	20 dB		48V DC
<i>LINE</i>		10K Ohm	+4 dBu			
<i>AES/EBU</i>		110 Ohm			AES3 48 kHz 24-bit 2-Channel	
<b>MIC Jack</b>	Ø 3.5mm Stereo mini-jack Unbalanced	1.5K Ohm	-65 dBV	20 dB		2.4 V DC
<b>Extension Unit 2</b> <b>INPUT 3 and 4</b>	<b>XLR</b> 3-pin jack (Balanced)					
<i>MICROPHONE</i>	1 Shield 2 Hot 3 Cold	600 Ohm	-60 dBu	20 dB		
<i>LINE</i>		10K Ohm	+4 dBu			

## 21.0 VIDEO CONNECTIVITY – OUTPUT SIGNAL FORMATS

Three key video output terminals on the EOS C500 Mark II are central to supporting the many possible system configurations – the 12G-SDI, the HDMI, and the MONITOR out. TABLE 8 lists these in relation to the specific sensor readout mode that has been selected.



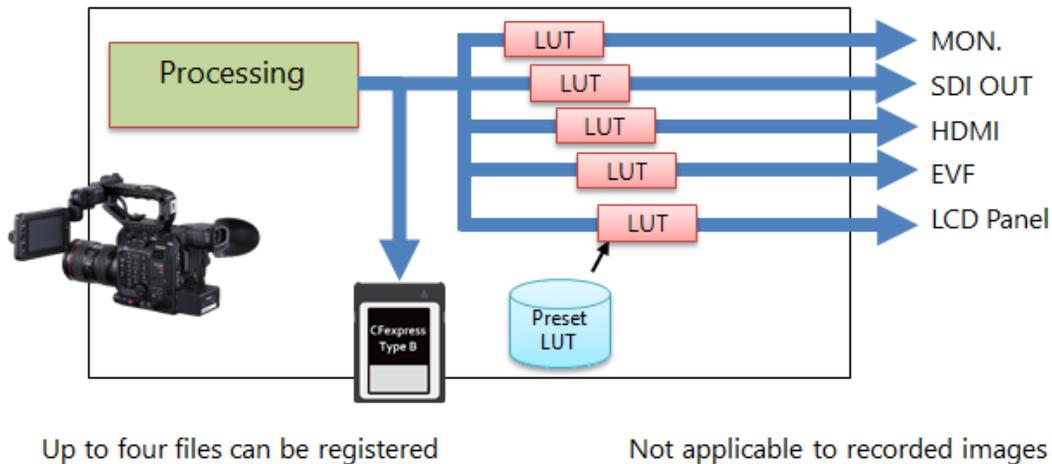
**TABLE 8 UNCOMPRESSED OUTPUT VIDEO FORMATS DURING EACH CAPTURE MODE**

Sensor mode	CFexpress Recording (x2)			12G-SDI output YCC422 10 bit	HDMI output* YCC422 10 bit	MON. output* YCC422 10 bit	
	Format	Signal	Resolution	Resolution	Resolution	Resolution	
FF 5.9K	Cinema RAW Light	RAW 12 bit / 10 bit	5.9K DCI	4096x2160p	4096x2160p / 1920x1080p 1920x1080i / 1280x720p	2048x1080p / 1920x1080p 1920x1080i / 1280x720p	
			4K DCI				
	XF-AVC	All-I	YCC422 10 bit	4K UHD	3840x2160p	3840x2160p / 1920x1080p 1920x1080i / 1280x720p	1920x1080p / 1920x1080i 1280x720p
				2K DCI	2048x1080p	1920x1080p / 1920x1080i 1280x720p	2048x1080p / 1920x1080p 1920x1080i / 1280x720p
				FHD	1920x1080p		1920x1080p / 1920x1080i 1280x720p
				FHD interlace	1920x1080i	1920x1080i	1920x1080p / 1920x1080i 1280x720p
Super35	Cinema RAW Light	RAW 12 bit / 10 bit	4K DCI	4096x2160p	4096x2160p / 1920x1080p 1920x1080i / 1280x720p	2048x1080p / 1920x1080p 1920x1080i / 1280x720p	
			4K DCI				
	XF-AVC	All-I	YCC422 10 bit	4K UHD	3840x2160p	3840x2160p / 1920x1080p 1920x1080i / 1280x720p	1920x1080p / 1920x1080i 1280x720p
				2K DCI	2048x1080p	1920x1080p / 1920x1080i 1280x720p	2048x1080p / 1920x1080p 1920x1080i / 1280x720p
				FHD	1920x1080p		1920x1080p / 1920x1080i 1280x720p
				FHD interlace	1920x1080i	1920x1080i	1920x1080p / 1920x1080i 1280x720p
Super16	Cinema RAW Light	RAW 12 bit / 10 bit	2K DCI	2048x1080p	1920x1080p / 1920x1080i 1280x720p	2048x1080p / 1920x1080p 1920x1080i / 1280x720p	
			2K DCI				
	XF-AVC	All-I	YCC422 10 bit	FHD	1920x1080p	1920x1080p / 1920x1080i 1280x720p	1920x1080p / 1920x1080i 1280x720p
				FHD interlaced	1920x1080i	1920x1080i	1920x1080p / 1920x1080i 1280x720p

\*HDMI terminal and MON. terminal cannot output simultaneously

## 22.0 OUTPUT VIEWING LUTS

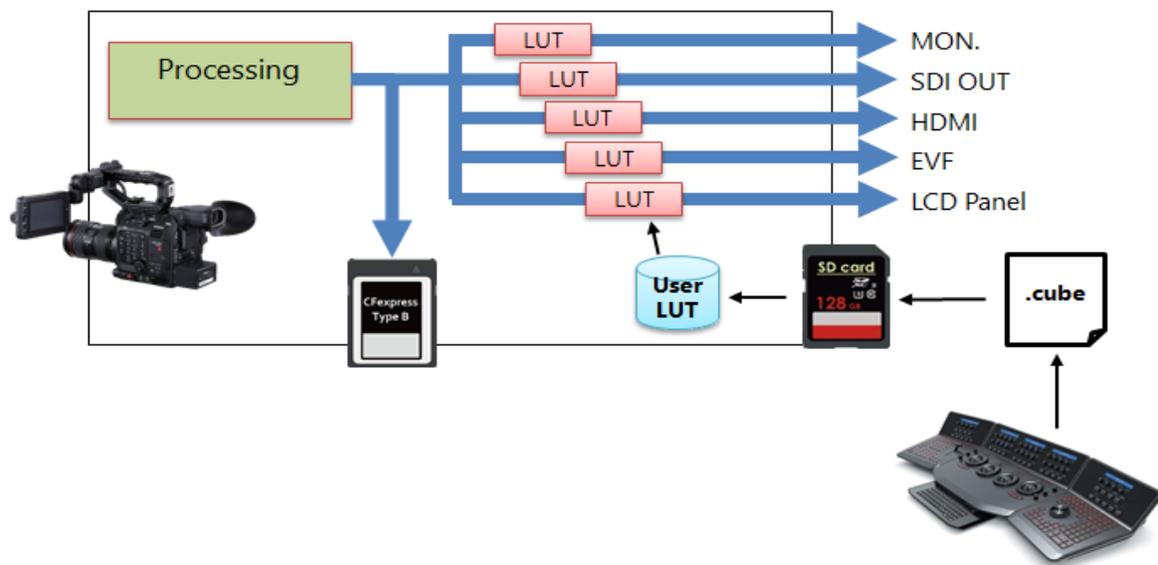
For video verification and simple editing – gradation and color gamut can be corrected using a Preset Viewing LUT for each output. Relevant outputs are MON., HDMI, SDI OUT, and VIDEO terminal/EVF-V50 – see Figure 51. LUTs affect not only images but also assistive display such as zebra, as well as UI elements



**Figure 51** *Showing the preset LUTs*

User LUTs can also be created – via the chosen system (DaVinci Resolve, and .cube) – as shown in Figure 52 – and then be loaded via an SD card and separately stored as shown.

- 3D-LUT (.cube file) created by DaVinci Resolve can be applied to the output



**Figure 52** *Individual LUTs can be assigned to each of the camera output interfaces*

For video verification and simple editing, gradation and color gamut can be corrected using a LUT for each Output – per the Table 9 below. XF-AVC / RAW recording is not affected by application of these LUTs.

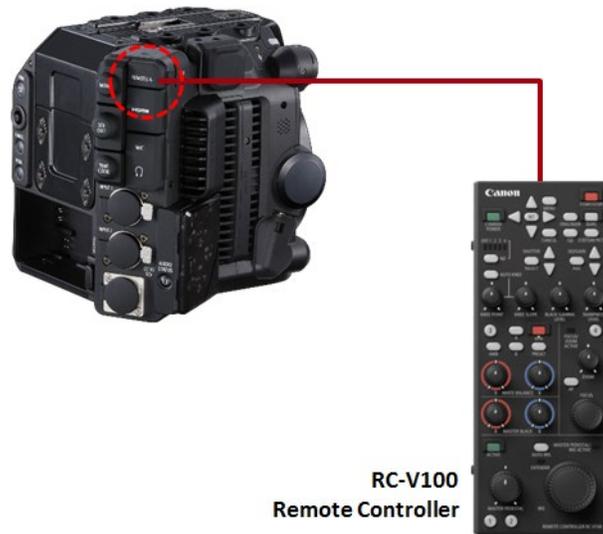
**TABLE 9 OUTLINING THE INDIVIDUAL LUTs THAT CAN BE APPLIED TO THE OUTPUT SIGNALS**

Output Destination \ Viewing LUT	BT.709	BT.2020	DCI	ACES proxy	PQ	HLG	HDR 1600%/400%	User LUT
<b>SDI OUT</b> (without OSD)	○	○	○	○	○	○	-	○
<b>MONITOR</b> (with OSD)	○	○	○	○	○	○	-	○
<b>HDMI</b> (with OSD)	○	○	○	○	○	○	-	○
<b>VIDEO Terminal</b> (with OSD)	○	-	-	-	-	-	○	○
<b>EVF-V50</b> (with OSD)	○	-	-	-	-	-	○	○

## 23.0 REMOTE CONTROL OF EOS C500 Mark II

### 23.1 Remote video Control Panel

When the EOS C500 Mark II is mounted on a crane or jib-arm all of the basic video functions can be controlled from the RC-V100 remote video panel.



**Figure 53** The RC-V100 video control panel supports remote control of video and also lens zoom, iris, and focus (including the Canon CINE SERVO lenses)

## 23.2 Browser Remote Operation

Browser Remote allows the camera to be remotely operated from a tablet or other terminal – including remote focusing operations. A new accessory unit WFT-E9 connected to the camera supports connection to the wireless network.



**Figure 54** New Wireless File Transmitter (WFT) model WFT-E9a

The new WFT-E9a has added a new high speed port connection, dual antenna, and faster speeds (up to 270 Mbps) compared to its predecessor.

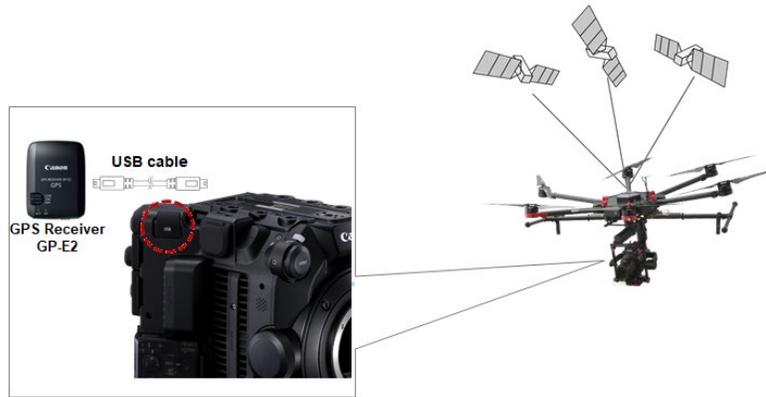
The selected focusing area can be moved by touch on the tablet. In situations such as shooting from a crane or drone aerial shooting this empowers accurate AF shooting.



**Figure 55** Browser Remote supports the control of the EOS C500 Mark II from a tablet

### 23.3 GPS

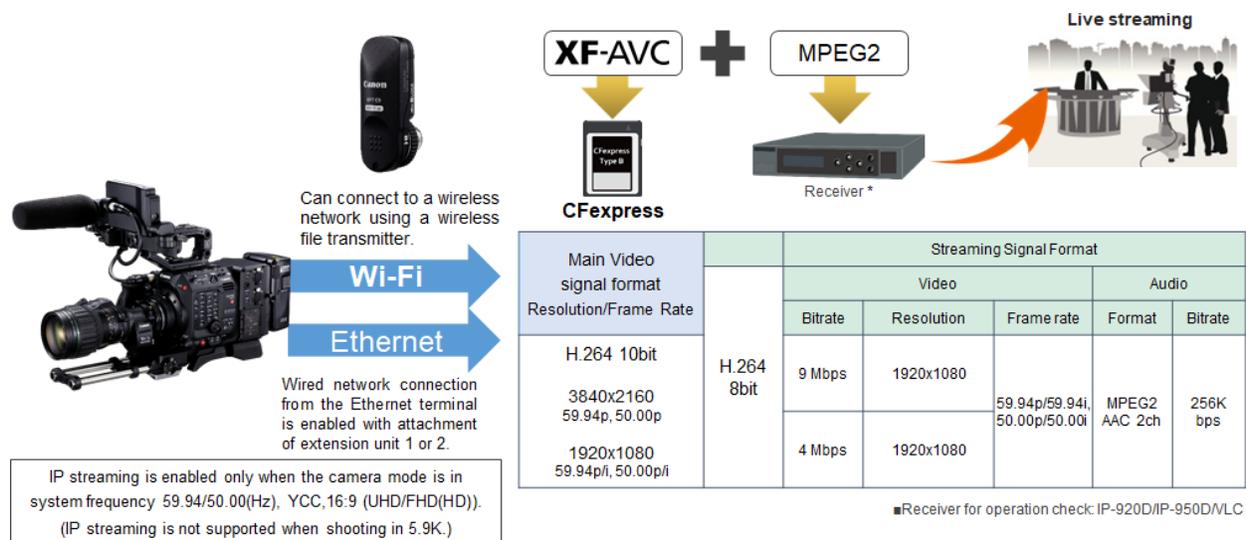
Separately, the EOS GPS Receiver GP-E2 can also be connected to EOS C500 Mark II (using a USB cable) and provides location and time information that is recorded during shooting.



**Figure 56** A GPS receiver can simply connect to the USB port on the EOS C500 Mark II and provide location and time information

### 24.0 IP STREAMING

The EOS C500 Mark II supports IP streaming via the Ethernet terminal that is on both Extension Units 1 and 2. This provides live video streaming in real time during the shooting. When the Main Video is progressive scan both progressive and interlace streaming is possible. If the Main is interlace scan only then only interlace streaming is possible.



**Figure 57** The Ethernet connectivity supports streaming of video while the EOS C500 Mark II is recording

## 25.0 POWER CONSUMPTION

Two battery sizes are available for the EOS C500 Mark II camera – the BPA-60 and the BPA-30. Using the CG-A10 / CGA-20 battery chargers the times taken for charging are approximately 5 hours for the BPA-60, and approximately 2 hour and 50 minutes for the BPA 30.



Figure 58 The two battery sizes available for the EOS C500 Mark II

The power consumption and continuous recording durations for the two primary modes of recording are shown in the following table:

Video Format	Sensor Mode Resolution	Frame Rate (fps)	Power Consumption (Watts)	Continuous Record Duration	
				BP-A30 (3100 mAh)	BP-A60 (6200 mAh)
RAW	Full Frame (5952 x 3140)	59.94 / 50	34	50 min	115 min
	Super 16mm (2048 x 1080)	59.94 / 50	28	60 min	150 min
XF-AVC	Full Frame (4096 x 2160)	59.94 / 50	33.4	50 min	125 min
	Super 16mm (2048 x 1080)	59.94 / 50	28	60 min	150 min

DC OUT: 24V 2.0A nominal value (max. output current) via jack Fischer Connectors 3-pin connector

Battery terminal: 14.4 V DC (battery pack),

DC 12–20V (using V-mount battery with EU-V2)

D-TAP terminal D-TAP connector, output: max. 50 W nominal value



On the video signal side, separate processing innovations in the EOS C200 and EOS C700 cameras became springboards for development of further performance improvements in the EOS C500 Mark II:

1. The processing of the 5.9K RGB components were enhanced prior to the Oversampling 5.9K Processing that is used to create very clean 4K RGB components
2. The recording performance of the on-board Cinema RAW Light (initially introduced in the EOS C200) was extended in the new EOS C500 Mark II by a doubling of the recording data rate to 2Gbps allied with improved processing of the RAW signal itself
3. The ability to capture 5.9K RAW at 10/12-bit on-board the compact 3.8lb. EOS C500 MkII Base Model offers a powerful B and C camera for high-end productions (single camera operator, or when mounted in a drone, on a crane, or on a motorcycle etc.)
4. Diffraction correction is a new innovation in a digital motion imaging camera that broadens freedoms in lens aperture settings
5. The Electronic Image Stabilization (EIS) system will be a boon to single operator shooting – being especially effective in handheld shooting when the camera operator is also in motion
6. The extensions to the Dual Pixel CMOS Auto Focus is a powerful assistance in shooting situations entailing high mobility
7. Equally important, the same Dual Pixel technology empowers the alternative Focus Guide to support manual focus operation – by signaling in the viewfinder when precision focus is achieved. That signaling indicates *the direction of manual focus rotation required to seek precise focus on a chosen subject* within a scene (a moveable viewfinder cursor is positioned on that subject). The Focus Guide mode has been improved to operate up to an aperture setting of F/13.0.

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