ULTIMATE CREATIVITY IN YOUR HANDS

AU-EVA1
5.7K COMPACT CINEMA CAMERA
NEW EVA 2.0
FIRMWARE UPGRADE

- RAW DATA OUTPUT
- ALL-INTRA FRAME CODECS
- ADDITIONAL INTERLACED CODECS
- REMOTE OPERATION SUPPORT
AND MORE...

ULTIMATE CREATIVITY IN YOUR HANDS

https://pro-av.panasonic.net/en/eva1/
When information technology (IT) became widespread since year 2000, digital technologies developed in a very fast pace and this reverberated even to digital video expression. Amid the advancements in the production environment, such as non-linear editing or computer graphics production, the screening system using video projectors has become widely used, and diverse ways of distributing video leveraging satellites or optical cables have been applied, showing signs that the industry has been digitized step by step.

Also, moves to digitize movie theaters have been gaining speed as Digital Light Processing (DLP) technology-based digital cinema was screened in the United States for the first time in the industry.

**Foray in Digital Cinema**

With this background, Panasonic Corporation was the first in the industry to develop a high-definition (HD) camera tailored to digital cinema when it introduced the VariCam HDC-27F variable frame rate camcorder in April 2002. The VariCam HDC-27F carried the functions and operability of a movie film camera as the first-generation VariCam camera. By varying the frame rate from 4 to 60fps, it can deal with 6x speed to 1/2.5x slow motion, reproducing picture quality at low cost. The shooting techniques called under cranking and over cranking, which were used for scenes that need video expressions such as slow motion or high speed, were supported for the first time.

In addition, when it comes to color reproducibility, which is typical of a film, the camcorder carried the cine gamma function that allows the reproduction of film's latitude using a video camera, making movie production employing a conventional film camera possible. Furthermore, thanks to the evolution of digital technology, the number of video expression opportunities has increased, changing the production and viewing environment significantly. Because of this, short films gained momentum, creating a new world of digital video (DV) film making.

**Era of Ultra High Definition**

In 2010, when YouTube started supporting 16:9 video with a horizontal resolution of 4096 pixels, with the U.S. market as the start, efforts to work on next-generation video production gained traction. In 2014, an environment to deliver 4K Internet content has started to make waves, prompting the likes of Amazon Prime Video and Netflix to deliver 4K contents since September 2015. Efforts to produce 4K videos have been intensified as well.

Panasonic went on to launch in October 2017 the AU-EVA1 EF-mount compact and lightweight cinema camera using a 4K 60p memory card, which targets the middle-range segment where demand from cinema production market is strong.

Panasonic launched the VariCam Series cinema camera compatible with 4K and high dynamic range (HDR) tailored to film production in 2014 (https://pro-av.panasonic.net/en/varicam/) and made a foray into the segment from a high-end market. This series has been rated highly by the industry for its video expression called VariCam Look that is created by its color reproduction and an advanced workflow that can be brought to video production.

Three types of camcorders, that is, the VariCam 35 4K camera that comes with a PL lens mount and a super 35mm image sensor, the VariCam LT compact and lightweight camcorder with lens that features “VariCam LOOK” cinema picture quality, and the VariCam Pure that can deal with uncompressed raw recording, make high-quality video expression possible.

Panasonic went on to launch in October 2017 the AU-EVA1 EF-mount compact and lightweight cinema camera using a 4K 60p memory card, which targets the middle-range segment where demand from cinema production market is strong.
The AU-EVA1 is a new cinema camera positioned between the Lumix GH5 4K mirrorless camera and the VariCam LT 4K cinema camera. Create cinematic imagery, thanks to both the newly-developed 5.7K Super 35mm sensor and color science inherited from VariCam cinema cameras.

A native EF mount with electronic connectivity has been utilised, and opens up the choice of lenses for EVA1 to a great extent – be it cine, fixed focal, macro or zoom lenses depending on the nature of the shoot.

EVA1 records internally onto SD memory card at up to 4:2:2 10 bit, thus reducing the outlay on media costs. Compact and lightweight 1.2kg (2.65lb) body.

A single 4K sensor has limitations in achieving a 4K image. Because a single sensor utilizes a Bayer pattern color filter array, the camera must take the limited color and resolution information and extrapolate a full 4K RGB image. This results in a loss of resolving power as well as color data.

The solution is to utilise a greater native number of photosites on the sensor that will yield more resolution and color information in the finished image. To deliver a full 4K finished image, a 5.7K Bayer pattern sensor is required. This is the new sensor design in the EVA1.

Panasonic’s mission is to offer cinematographers innovative technology to capture cinematic images that will engage audiences on multiple viewing platforms. EVA1’s newly developed Super 35 sensor offers high resolution and wide dynamic range that is future-proofed for all types of productions.

EVA1 contains a Super 35 (24.60x12.97mm) sensor that captures 5.7K resolution. With an active resolution of 5720x3016, the EVA1 delivers more than 17.25 million photosites, nearly double the 8.8 million for 4K DCI (4096x2160). By starting at a higher native resolution, the 5.7K sensor yields a higher resolving image when down-sampled to 4K, UHD, 2K, or even 720p. Additionally, the increased color information results in a finer, more accurate finished image.

- The newly developed 5.7 K (5720x3016) Super 35mm (24.60x12.97mm) image sensor achieves high-quality 4K/10-bit 4:2:2 images.
- The wide 14-stop dynamic range, V-Log gamma and wide-color gamut V-Gamut colorimetry, which are inherited from the VariCam Series, ensure cinema-like pictures called VariCam Look.
- Dual native ISO of 800/2500 offers very high sensitivity with low noise.
- Supports High-Frame-Rate recording of 4K 60fps/2K 240fps maximum.
- The IR (infrared ray) cut filter ON/OFF mechanism provides the ability to shoot fantasy-like IR images with Cinematography mode.
- The main unit is lightweight and compact, weighing only 1.2kg (Main unit only). It is equipped with an EF lens mount. The LCD monitor features a touch-panel function and allows flexible mounting.
- The detachable handle and rotary grip add a new dimension of mobility by enabling the installation of the camera to a drone or gimbal.

EVA1's newly developed Super 35 sensor offers high resolution and wide dynamic range that is future-proofed for all types of productions.

TARGET USERS

Productions/Freelance (O&O)/Media Schools: Drama, Documentary, Promotion, Wedding, Short Films
Government Agencies: Police, Military (with IR Night Shooting)

LIST PRICE

US$7,499 €7,290 JP¥830,000 (w/o tax)

Find out more about EVA1: https://pro-av.panasonic.net/en/eva1/index.html
Panasonic Corporation has introduced the much anticipated AU-EVA1 (EVA1) 5.7K resolution Compact Cinema Camera that comes with an EF lens mount, targeting the cinema production industry. In developing the EVA1, the company listened to the feedbacks and requests of various cinema industry professionals in Japan, United States, and countries in Europe who identified specifications and design that users are demanding.

Despite tag price of roughly US$10,000, EVA1’s quality finish, which satisfies professionals in the video production arena, has earned good reviews from many great users. In this report, the Panasonic team members involved in the planning and development of the cinema camera describe the outstanding performance of EVA1.

Takes in Users’ Feedback
Technologies to develop camcorders for professional use that Panasonic has cultivated in the broadcasting industry over the years were lavishly injected in the EVA1. Positioned as a strategic model to be proposed to the movie production industry, the EVA1 comes with capabilities that surely meet an extensive range of video production requirements from the middle-range to high-end segments.

The EVA1 fills the gap between the company’s LUMIX GH5 4K mirrorless camera and the VariCam LT 4K cinema camera in the lineup and for Panasonic, it is its first product introduced in the mid-range zone. The company released this into the marketplace with confidence as a camera that demonstrates Panasonic’s steadfast in meeting the needs of the video production industry.

Though the model is priced at around US$10,000 that an individual can afford to buy, there exist wide-ranging and diverse requirements in this zone from individual semi-professional users to high-end users who want to use this as a sub-camera, and demand varies from user to user.

Panasonic, in developing this cinema camera, has taken into consideration the feedbacks from broad range of users, from professionals engaged in video production in Japan, the United States, and countries in Europe, to professionals involved in image production and to students who attend technical schools, in a bid to involve them in product development.

One of those who were involved in the EVA1 development project from the initial planning phase is Hiroshi Shirahama, Supervisor, Product Engineering Department, Media & Entertainment Business Division, Panasonic.

According to Shirahama, when he brought a mockup of the EVA1 to one of its dealers (owner of a rental company) in the United States that used the GH5 or VariCam LT, he gave a good review, saying, “This is great. I want this right now!”
In response to this, Shirahama thought of making a camera that this guy wanted. "His review gave me confidence. I felt that, with such a camera, we should be able to win in the middle zone, which is crowded with rivals," he said.

"We equipped the EVA1 with a new sensor and engine so that it may be used as a compact or sub camera for high-end users and as an upgraded version camera for entry users," said Minoru Namikawa, Assistant Chief, Product Strategy Planning Department, who was in charge of the product planning along with Shirahama.

They attached importance to the naming of the EVA1 as well. "We named it EVA1 so that it may be called with familiarity. EVA stands for Entrant class of VariCam because in the cinema camera market many cameras are called by their nickname. Users have come to call it 'i-v a wan'," Namikawa said. Being called by a nickname is a proof that it is accepted by the market already.

**High Quality 5.7K Sensor**

Carrying the 5.7K image sensor that Panasonic developed on its own is one of EVA1's biggest features. Hiroki Takahashi, Staff Engineer, Product Engineering Department, who was in charge of tuning picture quality, said, "In the case of a 5.7K sensor that can generate 4K resolution fully, it suffers a disadvantage in terms of a dynamic range as its number of pixels roughly doubles. However, by optimizing the performance of the image sensor, it achieved a wide 14-stop dynamic range."

In terms of a color palette, the EVA1 delivers the reproduction of cinema-quality colors inherited from the VariCam. A color space in the V-Log mode is V-Gamut, the same as that of the VariCam, and fully covers BT. 2020.

"The VariCam has been rated highly for its realistic color reproduction and warmth of skin color. The EVA1 also combines the same V-Log and V-Gamut and is the optimal option as a sub-camera for the VariCam," he noted.

**Dual Native ISO**

The EVA1 comes with the Dual Native ISO technology that was deployed in the VariCam 35 for the first time. The Dual Native ISO is based on two ISOs: ISO800 and ISO2500.

"Generally speaking, when shooting in a dark environment, if you raise an ISO number, sensitivity rises but the amount of noise in the image increases. By leveraging EVA1's Dual Native ISO, "the amount of noise of ISO800 and ISO2500 will be equal. If you use ISO2500, you can shoot with less lighting even in a dark environment, which results in curbing costs," Takahashi said.

In recent years, natural lighting has tended to be favored at movie production
sites. This is exactly the reason the VariCam has garnered the industry’s support, which is fitted with the Dual Native ISO technology that enables the shooting of high sensitivity and low noise video even in a dark environment.

“You can choose sensitivity depending on shooting circumstances, such as a preference for natural light, and create an extensive range of images,” Namikawa said.

10-bit 4:2:2 SD Card Recording

The EVA1 uses a new engine that allows high-definition recording with 4K resolution. Hitoshi Suzuki, Supervisor, Software Engineering Department, was responsible for its development. In order for the EVA1 to feature not only high image quality but compact size and economic efficiency, the team worked on two objectives in developing the camera, that is, supporting the 10-bit codec and using SD memory card recording, in a bid to make it as a camcorder for professional use.

Originally, the 10-bit codec was the company’s differentiating technology that was applied to the VariCam cinema camera and the P2 camcorder and it has been advertised under the name of the AVC-Intra or its successor AVC-ULTRA.

“With the group that developed the H.264/10-bit codec technology, which serves as the base of the AVC-ULTRA, we developed a compression codec of the same quality for this compact-size SD card but there are some users who opt for other companies’.

For this reason, “We spent a plenty of time increasing the quality of recording in SD card so that as many SD cards by rivals can be used as possible as long as they meet speed standards. It took us more than a month to evaluate and tune to over 100 different types of SD cards in order to verify if they can be recorded more than 100 thousand times, thereby achieving high-level recording quality to SD cards as well,” Suzuki said.

At present, it has a specification that gives sufficient speed even at high rate of 150Mbps, 200Mbps. Furthermore, software capable of supporting even higher rate 400Mbps was also developed and released in April (2017).

Featuring dual card slots, the EVA1 enhances the reliability of recording, enabling users to continuously record from card to card, or record to both cards simultaneously for a backup.

“We also did our best to ensure high-speed compression and recording of
sensor images. With the EVA1, you can deal with 240p VFR (variable frame rate) recording, which is yet another feature,” Suzuki added. Based on 24 hertz clip recording, it can achieve 10 times faster 240p VFR recording; it is thus possible to slow them down 10 times for replay.

“As it compresses and records images at 10 times faster speed, high-speed processing is required to catch up with this. The 240p recording requires recording an image in 4.2msec. To catch up with this speed, we spent months tuning software to achieve 4.2msec recording,” he explained.

Suzuki added, “We also attached importance to indications other than recording. For instance, we ensured that you can get information needed for shooting on the home screen at a single glance. A touch screen feature is also supported, so that the user can choose with one touch of a button while viewing an image, which has also garnered very good reviews,” he said.

On the normal view screen, the image display zone and the OSD (On Screen Display) (ISO, white balance, etc.) zone are explicitly divided for ease of viewing. “We came up with a design in which OSD does not overlap an image so that the user may be able to focus on an image,” he added.

**Importance is Attached to Design**

Design is one of the key elements for cameras for production, not to mention picture quality and performance. Yoshihito Morishita, Senior Designer, Design Center, said, “In the initial phase of planning, we came out with a mockup based on the DVX200 memory card camcorder with integrated lens, but based on the results of hearings, we switched the direction to a design that is similar to the silhouette of the VariCam.”

> **Dual native ISO of 800/2500 offers very high sensitivity with low noise.**

Ease of holding is another requirement for a lightweight, compact, and mobile camera. “We made a wide variety of demands for compactness, including asking optical design staff to reduce the width of an ND filter,” Morishita noted.

“We adopted a design with balanced gravity center to be mounted on a triaxial gimbal or drone. It is a size that fits into the Ronin M triaxial gimbal used by many people in the middle zone,” he said.

“It has an LCD only as we dared to eliminate a view finder. In addition, we rounded off the corners of the rear part of the camera. This allows a wider operational range for panning and tilting when using a gimbal,” Namikawa noted.

Furthermore, “In terms of appearance design, we applied a red line so that the camera may make a certain statement. Unlike the DVX200, quiet colors and thinner lines were applied,” Morishita said. They perceived “the fun of holding” among O&O users to be another key element and paid attention to its appearance design.

Engineers exercised ingenuity in many aspects of its exterior as well. To reduce weight, die-cast aluminum was applied to make the walls as thin as possible. In addition, the EVA1 grip features a one-touch rotating design for quick repositioning while shooting.

“Albeit it is one-touch rotating design, we ensured that it can be repositioned easily with no backlash. The screw-type handle features the easy-to-remove structure for ease of maintenance,” said Junya Yamada, Staff Engineer, Mechanical Design Engineering Department, who was in charge of the exterior.

Taking into consideration a case where the camera is mounted on a gimbal or drone, Yamada said, “We designed internal configuration so that its overall size may fit into the Ronin M. We held numerous discussions on ways of locating boards and terminals with hardware designers almost every week to come out with this size and design.”

There are a number of points to which meticulous attention was paid, including its entirely flat surface with the handle and grip removed so that peripheral equipment or accessories may be easily installed. “We shared information with third parties at early stages in an effort to get the accessories ready in time for the launch of the camera,” Namikawa noted.

“Depending on user preferences or uses, it is designed to be easily customized. One unexpected happy miscalculation was that Wooden Camera made a PL mount modification kit for users who wish to use a PL lens,” Shirahama said.

“Customers and third party makers thought of various ways to use creatively,” said Namikawa. “We think this is because the camera in itself is rated highly,” Shirahama added.

**Listening to Voices of Users**

The EVA1 is what Panasonic developed with its fighting spirit, targeting the cinema production market. “We are proud of the fact that we have contributed to the development of the cinema production market through the first-generation VariCam and the DVX100. Today, with the VariCam 35, the LT, the Pure and the EVA1, we are feeling that we are regaining confidence from the market again. We will continue to listen to the voices of users to meet the requirements of the marketplace,” Namikawa said with enthusiasm. Panasonic intends to keep accelerating product development in a bid to take the lead in the movie production market.
Brisbane-based director/cinematographer Dane Hansen recently completed a short film, Hotel Mysteria, for BlackMilk Clothing, an Australian high-end fashion label producing stylized fashion short films to be viewed on social media. The film consists of beautiful models posing in colorful outfits against the backdrop of soft lighting, rich tapestries and staircases.

The main reason Hansen went with the AU-EVA1 was because he needed a small and lightweight camera package that was maneuverable. According to Hansen, the Hotel Mysteria shoot was straightforward. Hansen shot most of the short at 4K, 8-bit 4:2:0 in LongGop 100Mbps. “The reason for this was that I could switch between varying frame rates quickly, from 25fps, through 33, and up to 50fps,” says Hansen. “At times, I switched over to 2K mode to shoot at 100fps.”

Hansen also shot at native 2,500 ISO for most of the shoot. “The place we shot at is a club, and it was a very large space and had very little available lighting.” “I did not have a dedicated gaffer or a huge lighting kit, so I relied on increasing my ISO to get the ambient lighting I needed. I didn’t need to change it off (ISO) 2500, as the dynamic range and saturation was the same as it was at 800,” he adds.

Hansen used his Zeiss ZE prime lens kit for sharpness. For lighting, Hansen employs bi-color lighting kits. For moving shots, he used an Aladdin 2x1 LED panel on a boom pole powered by a V-lock battery to create a beauty light just above his models and out of frame as a soft source. To light a difficult shot of a model walking down a staircase, Hansen used a RAYZR 7 Fresnel light with a couple of LEDs as backlight.

For post, Hansen did a minimal amount of grading, occasionally using power windows. “That’s one of the great things I’ve found with Panasonic colors – you can tweak a bit, but what you are getting straight out of camera is phenomenal,” reveals Hansen.

To view Hotel Mysteria, visit https://vimeo.com/252464445.

Creating a unique western-inspired film on a small budget in 2017 is no easy feat. Shot with the AU-EVA1, Near to Superstition is a supernatural western that tells the story of two treasure hunters, Saylor (Darren Bailey) and Hunter (Christopher Stein), who have discovered gold in a remote mountain cave. On their hike back to civilization, Saylor collapses from the heat and is denied water from Hunter, who abandons him in the desert. Continuing the journey, Hunter encounters four mysterious women near the town of Superstition where he meets his fate.

The short film was written, directed, and shot by filmmaker Elle Schneider. According to Schneider, creating a look for a western is difficult because there’s already an established look. “I tried to create visuals that were in-between a modern and classic western look,” explains Schneider.

Shooting with the EVA1, Schneider captured 4K DCI (4096×2160) files at 23.98fps, using the EVA1’s 10-bit 4:2:2 Long GOP (150-Mbps) codec. She also captured and monitored her footage in V-Log because they were working in high contrast lighting situations for most of the shoot.

Another visual feature that separates the look of Near to Superstition from traditional westerns is the use of high angle shots and moving shots on rough terrain captured by drones provided by drone specialist DJI.

Working in extreme brightness and darkness, Schneider employed both native 800 and 2,500 ISOs. “This would have normally been a challenge but being able to shoot native 2,500 ISO really helped us out, particularly with the fire scenes. We were also able to control depth of field by using a higher ISO to create really beautiful shots that would have been difficult to accomplish without it.”

To view Near to Superstition, please visit https://vimeo.com/234912785.
Cinematographer Johnny Derango came out to Los Angeles in 2002 after graduating from Columbia College Chicago. Before turning 25, he already had a number of feature films, TV shows, and commercials under his belt.

Derango was the first U.S. cinematographer to test out the new 5.7K AU-EVA1 cinema camera. Short film Radio 88, which Derango both shot and produced, tells the story of a young DJ, Angie DeFozzio (Cyrina Fiallo), who communicates with her dead father, Danger Dickie DeFozzio (Jeremy Ratchford), that she plans to blow up the radio station at the conclusion its final broadcast at midnight. On the same night, a young musician, Fontaine (Paul Holowaty), is kidnapped and held hostage in a laundromat by a bank robber (Efren Ramirez) and finds a way to escape to get his record to DeFozzio before midnight. Derango shot the project using two EVA1s. “With this script, I thought it would be a cool exercise for the EVA1 because the environments are so different,” explains Derango.

With the EVA1, Derango captured AVC Intra 10-bit 422 Long GOP (150-Mbps) files in 4K DCI at 23.98-fps. He also captured in V-Log and viewed in Rec 709. Even though the film takes place entirely at night, Derango reveals that he did not shoot at 2500 ISO, but instead dialed down from 2500 to 1600 ISO. Even shooting his character running down a street lit with practical street lamps, Derango felt he had enough light, even at 1600.

Radio 88 was color graded at Technicolor by colorist Alexander Schwab. Radio 88 editor Neil Evans, who also co-produced the project, edited on Adobe Premiere Pro and he delivered a 4K DCI ProRes 422 HQ project to Technicolor.

According to Derango, the EVA1 is like a mini VariCam, especially in terms of color. “There is something that just feels more cinematic,” he explains.


Having won multiple local and national awards for its corporate videos, Wise Guys specializes in creative and original promotional work. Wise Guys, run by Charlie Ray and Sam Gott, offer advertisement, short film production, corporate videos and much more.

Working with both big and small brands, Wise Guys were looking for a camera which was applicable for both filming applications. Previously relying on mirrorless cameras for its smaller jobs, Wise Guys resorted to renting in cinema cameras for the bigger and more technically demanding projects.

Filling the gap for a variety of filmmaking applications, sitting between Panasonic’s GH5 and the VariCam LT, the AU-EVA1 highlights the light weight of a mirrorless camera, yet contains a 5.7K Super 35mm-sized sensor, ideal for capturing true cinematic images.

Charlie Ray, Company Director at Wise Guys said, “We wanted something that felt like it has the quality of a cinematic camera, but also has the portability and light weight of a mirrorless camera. Now we have the EVA1, we have one camera for everything, which is great!”

The ability to capture accurate colors and rich skin tones, is a must for any filmmaker. Much like the VariCam line-up of cinema camera, the EVA1 contains V-Log/V-Gamut color science, and is able to capture and deliver both high dynamic range and a broad color palette.

One of the key features of the VariCam line-up, which has been implemented into the EVA1, is the dual native ISO. Utilizing a process that allows the sensor to be read in a fundamentally different way, the dual native ISO extracts more information from the sensor without degrading the image.
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