A New Vision and Revolution in Filmmaking — Cinema VariCam 35

The Cinema VariCam line of cameras has been used on a wide variety of movies, commercials, and TV programs, and is renowned for its color reproduction, look, and for bringing progressive workflows to the production industry. This technology and know-how are now invigorating a new lineup. VariCam 35 boasts the highest-quality images of the new VariCam Series. It features a dynamic range with 14+ stops of latitude and a wide color gamut, acquisition functions that support 4K/120fps uncompressed RAW recording with Codex V-RAW Recorder* to bring form to the vision of today’s image creators. It’s part of a revolution, a highly innovative workflow led by dual codec recording, in-camera color grading, and a modular design with superlative durability, system expandability, and operating ease. Experience what it can do to achieve your vision, and join in the ultimate revolution — with the VariCam 35.

*Codex V-RAW Recorder is a product of Codex.
Cinematic Images at 4K Resolution

Super 35 mm 4K MOS Sensor
The VariCam 35 is equipped with the super 35 mm format full-size single-chip MOS sensor developed especially for this model. It offers 4K (4096 x 2160) and UHD (3840 x 2160) resolution, and boasts high sensitivity, low noise, wide dynamic range and cinematic depth of field.

14+ Stops of Latitude
The dynamic range is 14+ stops. The wide dynamic range assures accurate image rendering over the entire image area, from dark parts to highlights. Even in dimly lit scenes, which are particularly important in movie production, the VariCam 35 provides low-noise images without any compromise in picture quality.

The "VariCam Look" with Evolved Color Gamut and Dynamic Range
The VariCam 35 is equipped with the newly developed “V-Gamut” giving it a wider color gamut than that of film. The gamma curve has evolved to “V-Log”, further extending the dynamic range. It is capable of recording the 14+ stops of dynamic range offered by the VariCam 35, and enhances grading flexibility. The V-709 gamma provides a tone suitable for previewing on a monitor. It is also suitable for use in producing broadcast content such as TV commercials and TV series.

HDR (High Dynamic Range) Compatible
By providing a dynamic range with 14+ stops of latitude to the footage acquired using the VariCam 35’s V-Log gamma, HDR (High Dynamic Range) grading output in compliance with the SMPTE EOTF standard “ST 2084” is available for post production.
Shooting with ISO 5000

Upper: Shot on Native ISO 800 / Lower: Shot on Native ISO 5000

Dual Native ISO of 800/5000

The VariCam 35 has two native ISO settings: 800 and 5000. This means the VariCam 35 achieves very high sensitivity while maintaining a low noise level at 5000 ISO. The noise level at 5000 ISO is nearly identical to that seen at 800 ISO. In order to achieve this function two dedicated analog circuits are implemented on each pixel of the imager of the VariCam 35 for two native ISO before gain processing. This allows the camera to achieve much higher sensitivity without increased noise. Normally noise is introduced in the gain process of rating ISO in digital cameras. This functionality is revolutionary for low light scene shooting. Especially this ISO 5000 enables the camera to capture with very low available light maintaining a realistic mood.
4K-Optimized Internal Optical Filter
The VariCam 35 has a high-precision internal optical filter made by bonding an optical low-pass filter and IR glass and providing it with a UV/IR-cut coating (membrane). The low-pass filter is tuned for 4K, so it eliminates aliasing and provides optimum resolution. The UV/IR-cut filter prevents ghosts and reddening in dark areas inside the camera unit. For frequently used ND filters, the compact body houses a rotary filter system with four filters (0.6ND, 1.2ND, 1.8ND, CLEAR) for easy switching.

4K AVC-ULTRA Codec Recording
AVC-Intra4K is a 4K-compatible version of the AVC-Intra intraframe compression codec suitable for video production. Using this, the VariCam 35 can record with 4K (4096 x 2160) or UHD (3840 x 2160) resolution by AVC-Intra444/422/LT codecs. The VariCam 35 supports AVC-Intra2K444/422 for 2K recording and AVC-Intra444/422/200/100 for HD recording. In addition to this, Apple ProRes is also supported for HD acquisition, to enable recording of ProRes 4444/422 HQ. Using the new large-capacity expressP2 card, it can record approximately 180 minutes of 4K422/24p video, 24 bit/48 kHz/4-channel high-quality audio, and metadata.

V-RAW Recording
Using the Codex V-RAW Recorder*
The Codex V-RAW Recorder* for VariCam can be docked to the rear section of the VariCam 35, thus eliminating the need for cable connection. This allows simultaneous recording of V-RAW data using this optional system on top of the recorder of the VariCam 35. The Codex V-RAW Recorder* supports uncompressed RAW recording with a frame rate up to 120 fps.

Variable Frame Rate
Variable frame rate recording in the range of 1 fps to 120 fps. Overcranking (slow-motion) and undercranking (quick-motion) effects are also possible. Frame rate can be adjusted while shooting.

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*1: ProRes is licensed from Apple Inc. Apple ProRes codec is under license from Atomos. Atomos is a trademark and copyright of Atomos Global Pty. Ltd.
*2: Schedule to be released in May 2016.
*3: Codex V-RAW Recorder is a product of Codex.
In-Camera Color Grading

The VariCam 35 also features an in-camera color grading function (3D LUT/CDL). This enables color tuning in the field, using the control panel of the VariCam or 3rd party software. Dailies that had been created after shooting can now be produced on-set and with only the camera. Grading information, such as a 3D LUT file and CDL file, can be recorded together with the image data of the Main Recorder, Sub Recorder and Codex V-RAW Recorder, thus allowing you to reflect what you imaged on-site to the post production process. LUT and CDL files can also be applied to playback and output images from Ver. 5.0 onward.

Double-Recorder and Double-Codec Recording

The VariCam 35 is provided with two independent recorders. This feature lets you record in two different formats and codecs, and select from V-Log/V-709/Grading, which means both an ungraded V-Log/4K master and graded HD dailies can be recorded simultaneously. It gives you main data for cinema production, as well as HD video for previewing or broadcasting. The sub-recorder records 2K/HD (AVC-Intra422/AVC-Intra100) together with a lower-rate AVC-Proxy file. All files contain common metadata. By using metadata from the proxy/preview file, speedy operation is possible when conducting offline editing.

From Ver. 5.0, the camera index, reel number, and clip number can be added to the filename to support cinema-style file names. Also, the exact same filename and recording time can be created for both MAIN and SUB recorders.
4K-Compatible Input/Output Terminals

VariCam 35 has flexible connection to external recorder and monitor.
- HD/3G SDI 4K QUAD Output (BNC x 4)
- HD/3G SDI Monitor Output (BNC x 2)
- HD/3G SDI VF SDI Output (BNC x 1)
- AUDIO Input (XLR x 2, 3-pin)
- MIC Input (XLR x 1, 5-pin)

Modular Structure

The VariCam 35 is comprised of the AU-V35C1G 4K camera module with PL lens mount and the AU-VREC1G recording module. This recording module is the same as that of the VariCam HS featuring the AU-V23HS1G HD camera module with 2/3-type lens mount. The two camera heads are interchangeable to suit a variety of applications. The camera head docks to the recorder without any cable connection. And the rugged docking mechanism allows easy docking and undocking in the field, without having to use a screwdriver.

Separate Location Operation

Using the AU-VEXT1G Extension Module, the camera module and recording module can be positioned at separate locations and connected with the AU-VCBL05G (5-meter length) or the AU-VCBL20G (20-meter length) Extension Cable. This lets you mount only the camera head to a crane, thus adding flexibility to your camera work.
Detachable Control Panel with Monitor

Control panel on the recording module has a built-in 3.5-type LCD display panel. It can be used as the display for menu operation and also can be used as a live/preview monitor. The keys and dials are laid out around the display for quick and accurate operation so frequently used settings can be accessed directly.

GUI is developed to suit those in filmmaking but the menu suitable for video system users are also available. The detachable structure allows the camera to be operated from a distant location (with 90cm extension cable). The VariCam 35 supports a variety of shooting styles and adds flexibility.

Toughness, Durability and Reliability

- The lens mount section is made of stainless steel, and designed to prevent flange back deviation due to temperature changes.
- Body made of strong and rigid aluminum alloy.
- Cooling system designed for effective dissipation of heat from the circuitry section.

Compatible with a Wide Variety of Cine Style Accessories

- Flat top and bottom panels for easy installation of various plates.
- Mounting holes provided on both sides and handle for convenient mounting of accessories.
- Shoulder mount module (AU-VSHL1G/AU-VSHL2G) can be moved in a range of 110 mm (4-3/8 Inches) in the front and back direction to accommodate a diversity of lenses.

Large-Diameter OLED Viewfinder (AU-VCVF1G)

The 0.7-type (1280 pixels x 720 pixels) high-resolution OLED panel shows a wide field angle with a viewfinder magnification of 0.78x. The large-diameter 38 mm eyepiece lens with high eye point (minimum vignetting) and the eyepiece filter allow comfortable viewing. The optical zoom function responds to precise focusing needs.
**General (Combination of AU-V35C1G and AU-VREC1G)**

- **Power:** DC 12 V (11.0 V – 17.0 V)
- **Power Consumption:**
  - Body: 69 W (body only)
  - Body with all optional accessories connected and maximum power supplied from each output terminal: 99 W
- **Operating Temperature:** 0 °C to 40 °C (32°F to 104°F)
- **Humidity:** 10% to 85% (relative humidity)
- **Dimensions (W x H x D):** 179 mm x 230.5 mm x 347 mm
- **Weight:** Approx. 5 kg (including accessories), Approx. 4.7 kg (body only, excluding protrusions and accessories)

**Camera Module (AU-V35C1G)**

- **Pickup Device:** super35 mm, MOS, 8.9 megapixels
- **Number of Pixels:** Total pixels: Approx. 10.3 million pixels, Effective pixels: Approx. 8.9 million pixels
- **Lens Mount:** 35 mm, PL mount
- **Optical Filter:** ND filter: 1: CLEAR, 2: 0.6 ND, 3: 1.2 ND, 4: 1.8 ND
- **Effective pixels:** Approx. 8.9 million pixels
- **Shutter Speed:** (deg) mode: 1.0 deg to 358 deg (0.5 deg step), (sec) mode: 1/24 sec to 1/250 sec (for 24p mode)

**Recording Module (AU-VREC1G) When used with AU-V35C1G**

- **Memory Card Recorder**
  - **Recording Media:** expressP2 card, P2 card, microP2 card
  - **Recording Resolution:** 4096 x 2160, 3840 x 2160, 2048 x 1080, 1920 x 1080
  - **Recording Frame Rate:** 4K: Maximum 100p/120p, 2K: Maximum 100p/120p
  - **System Frequency:** 59.94p, 59.94i, 50i
  - **Recording Format:**
    - (Main Recorder) AVC-Intra4K444, AVC-Intra4K222, AVC-Intra4K-LT
    - (Sub Recorder) AVC-Intra4K444, AVC-Intra4K222

**Digital Audio**

- **Recording Audio Signal:** 48 kHz/24 bit, 4 ch
- **Headroom:** 18 dB/20 dB switchable menu
- **Proxy**
- **Video Compression Format:** AVC-Intra4K444, AVC-Intra4K222, AVC-Intra4K-LT
- **Audio Compression Format:** LPCM

**Recording Time**

- **(Main Code):** When using 256 GB expressP2 card
  - AVC-Intra4K444 (24p): Approx. 45 min.
  - AVC-Intra4K222 (VFR ON, 50p/60p): Approx. 36 min.
  - AVC-Intra4K-LT (VFR OFF, 24p): Approx. 90 min.

- **(Sub Code):** When using 64 GB microP2 card
  - AVC-Intra2K422 (25p/29.97p): Approx. 64 min.
  - AVC-Intra100 (25p/29.97p): Approx. 128 min.
  - AVC-Intra4K-LT (VFR ON, 50p/60p): Approx. 36 min.

**Video Input/Output**

- **SDI OUT:** HD (1.5G)/3G-SDI, 0.8 V[p-p], 75 Ω
- **MON OUT1:** HD (1.5G)/3G-SDI, 0.8 V[p-p], 75 Ω
- **MON OUT2:** HD (1.5G)/3G-SDI, 0.8 V[p-p], 75 Ω
- **VF SDI:** HD (1.5G)/3G-SDI, 0.8 V[p-p], 75 Ω

**Audio Input/Output**

- **AUDIo IN (CH1/CH2):** XLR x 2, 3-pin, LINE/MIC/MIC+48 V AES
- **MIC IN:** XLR x 1, 5-pin
- **PHONES:** Stereo mini jack
- **Speaker:** 20 mm diameter, round x 1

**Other Input/Output**

- **GENLOCK IN:** HD (1.5G)/3G-SDI, 0.8 V[p-p], 75 Ω
- **TC IN/OUT:** BNC x 1, Input/Output switching: 0.5 V[p-p] to 8 V[p-p], 10 kΩ

**Display Panel**

- **LCD:** 3.5-type QHD color monitor, approx. 1.56 million dots

**Extension Module (AU-VEXT1G)**

- **Power:** DC 12 V (11.0 V to 17.0 V)
- **Power Consumption:** 33 W (body only)
- **Dimensions (W x H x D):** 121 mm x 143 mm x 61 mm
- **Weight:** Camera Extension Module: Approx. 0.95 kg (2.1 lb)
  - Recording Extension Module: Approx. 0.65 kg (1.43 lb)
- **Storage Temperature:** -20 °C to 60 °C (–4°F to 140°F)

**Electronic HD Color View Finder (AU-VCF1G)**

- **Display Panel:** OLED, 0.7-type, approx. 2.76 million dots

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1: Specification is as of April 2016. Specification subject to change upon firmware upgrade. For the latest specification, please visit Panasonic website. (http://pro-av.panasonic.net/)

2: Figures are for continuous recording as one clip. Depending on the number of clips, the overall recording time may be shorter than the above.

3: ProRes is licensed from Apple Inc. Apple ProRes codec is under license from Atomos. Atomos is a trademark and copyright of Atomos Global Pty. Ltd.
VariCam Series

4K Camera Recorder
AU-V35LT1G

The 4K camera recorder enables highly flexible camera work. Installed the same super 35 mm image sensor with VariCam 35. A dynamic range with 14+ stops of latitude and dual native ISO (800/5000) are integrated into this compact and lightweight (approx. 2.7 kg / 6.0 lb) camera recorder. This invites flexibility in the form of shoulder mounting, gimbal, and drone applications. An EF lens* mount comes as standard equipment, and can be exchanged with a PL mount (optional).

* Panasonic does not guarantee the compatibility or performance of all EF lenses. Details will be updated on the Panasonic website.

4K Camera Recorder
AG-DVX200

This 4K camera recorder with integrated lens offers excellent mobility. Its large 4/3-type image sensor produces superb bokeh effects, and a dynamic range with 12 stops of latitude, and the 4K/24p, UHD/60p, FHD/60p multi-codec renders high-quality images. A built-in 13x zoom lens combines with a high-speed, high-precision full-auto function and professional manual function to provide levels of operating ease and maneuverability that only a camera with an integrated lens can do.

Digital Camera/Interface Unit
AG-GH4U

This digital single lens mirrorless camera excels in 4K video recording (Professional Interface Unit Model). V-Log L* adds a dynamic range with 12 stops of latitude. The interface unit features a Quad Link SDI output* that connects to professional 4K recorders and 4K monitors, as well as 2 channels of XLR audio input, and TC input.

*1: You may need to update the firmware. Please refer to "service and support" on the Panasonic Website.
*2: Motion pictures cannot be recorded onto the memory card in the camera when 4:2:2/10 bit output is selected.

787.4 mm (31 inches) 4K LCD Monitor
BT-4LH310

This reference monitor is actively used in 4K, 2K, and HD image production. BT-4LH310 offers 4K (4096 x 2160), QFHD (3840 x 2160) resolution and a DCI (P3) color gamut. An LUT (Look-up Table) upload function also supports digital cinema color management.