AK-UC4000
4K Studio Camera

A High End System Camera
Setting a New Standard in
4K/HD HDR Acquisition
A 4K studio camera with high video quality. Compatible with a 2/3 lens mount and contains a newly developed large 4.4K sensor.

This camera offers the high video quality that is only possible with a large sensor, along with a wide range of 4K acquisition with the latest functions such as HDR (HLG), BT.2020 and high-speed shooting*. The camera keeps up with diversifying systems with features such as 12G-SDI, TICO*, over SDI (4K over 3G-SDI) output and MoIP*, making it suitable not only for studio production but for a wide range of operations such as sports and events. With high video quality and a system that can be adapted to various situations, this camera provides the level of high-end production that is needed in the 4K age.

**Large 4.4K sensor**
With a newly developed 4.4K sensor, it realizes ultra-high-definition resolution, high sensitivity, low noise and a wide dynamic range.

**B4 mount**
The 2/3 lens can be used without an external adapter, and the internal lens is specially designed for large sensors, ensuring high video quality. This new acquisition method maximizes the effectiveness of incident light.

**2000-TV line resolution**
Beyond 4K sampling achieves a resolution of 2000 TV lines in the horizontal and vertical directions for a richly detailed picture of a wide range of subjects in a variety of settings.

**Supports 3 levels of high-speed output**
High-speed capture at 1080p, 1080i and 720p is available for sports and other active settings. This feature achieves a richly detailed picture even for fast-moving subjects. 2x, 3x or 4x output can be selected for compatibility with various slow-motion servers.

* Images are simulated.

**Future proof infrastructure in AK-UCU600 (CCU)**
This camera supports the uncompressed 12G-SDI output that is needed in the 4K age and enables 4K video to be transferred with one cable. Light compression technology called TICO*1 is also used, enabling 4K video to be sent by 3G-SDI without losing video quality, so that the current HD infrastructure can be used in 4K systems. It is also expected to support the next generation of MoIP (Media Over IP)*2.

* Images are simulated.

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*1: A codec developed by intoPIX. Stands for “Tiny Codec”.
*2: Optional feature, scheduled for release in the spring of 2019.
High-quality video and excellent operability
With the AK-UCU600 Camera Control Unit (CCU), uncompressed long-distance transmission of 4K/HD video signals via optical fiber is supported. The AK-HRP1000GJ/1005GJ Remote Operation Panels (ROP) are equipped with a color LCD display that provides excellent visibility and functions for quick response. This system achieves high-quality video and excellent operability. In cases where power is supplied by the CCU, it is possible to transmit at a long distance of up to approx. 2,000 m between the camera and the CCU. The distance can be extended up to 10,000 m by providing a local power supply at the camera head and using general-purpose single mode optical fiber. Between the CCU and the ROP, in addition to a dedicated serial line, IP connection via LAN cable is also supported.

High sensitivity and low noise
The AK-UC4000 is equipped with a newly developed large-format 4.4K MOS sensor. Two shooting modes can be selected. In High Sense Mode, it is possible to obtain an S/N ratio of 62 dB or higher while also achieving F10 high sensitivity. The result is low-noise and high-image-quality video.

Skew reduction realized through high-speed scans
This camera’s normal and low skew reading speeds are around 1/2 and 1/3 of those on a standard camera (1/60 of a second) respectively. The skewing characteristic of MOS sensors has been reduced by reading out the MOS sensor signal at high speed.

Chromatic Aberration Compensation (CAC)
This exclusive technology utilizes communication between the lens and camera to deploy for a sophisticated algorithm that will automatically compensate for the registration error caused by lens chromatic aberration, and minimize the circumjacent blur.

HDR (High Dynamic Range) support
This mode provides rich gradation to render contrast, color and shadow in dark image areas that could not previously be reproduced due to blackout, thus resulting in more realistic image quality. It supports a variable HDR by adjusting the high dynamic range. In addition, it is possible to configure a system supporting simultaneous HDR/SDR in order to handle production environments with both. SDR image can be adjusted over exposed by offset gain and knee function adjusts bright image as well as HDR.

ITU-R BT.2020
This camera is compatible with BT.2020, a color space that can recreate almost every color in the natural world, enabling a wider range of color expression.

Shockless gain
It is possible to smoothly transition the image changes that occur when gain is changed. In addition, with the 0.1 dB step master gain adjustment function, you can fine tune the adjustments to match the scene being shot.
Diverse color correction functions

In addition to EBU and NTSC preset color matrix, camera users can save two custom specified linear matrix tables, and additionally tune the saturation and hue individual colors with 12-pole color correction system. Specific skin tones can also be adjusted in addition to the primary secondary and tertiary colors in the 12-pole system.

Skin Tone Detail Correction

Tone down wrinkles and blemishes on air personalities to beautifully shoot natural skin tones. While designed to soften skin tones the skin tone detail feature can be applied to any hue phase so it could likewise be used to soften areas of other colors (such as green grass). The skin tone detail feature can define three independent skin tone ranges to manage different light levels or different people on camera. Skin-tone-get feature finds a specific color in frame to simplify the set up process.

Servo control ND / CC filters

The cameras are equipped with filters for a variety of shooting environments. [ND filters] CAP, Through, 1/4, 1/16, 1/64 [CC filters] Cross, 3200 K, 4300 K, 6300 K, Diffusion

Focus assist functions

Quick and accurate focusing is supported with focus assist functions such as Focus Bar (indicates focus level), Focus-in-Red (uses color to indicate areas in focus), MAG (magnifies central portion), and Square (shows focus status of screen as a whole). Lenses with auto focus and focus assist capabilities are also supported*. The Remote Operation Panel (ROP) can also be used to focus and zoom while using the digital lens.

Camera standalone output formats

For camera head output (HD-SDI 1/HD-SDI 2), it is possible to select 1080p, 1080i, and 720p.

Extensive video and data transmission (TRUNK) functions

Since video and data can be transmitted between the camera and a Camera Control Unit (CCU) using optical fiber cable alone, system expansion to match operation conditions is possible.
- HD-SDI (CCU→camera) two lines, VBS (CCU→camera) two lines: Can be used for monitoring with prompter, fixed return or camera (studio floor monitor), etc.
- HD-SDI (camera→CCU) one line: This line can be used to transmit an additional video signal of a handheld or remote camera to the studio. Since the camera video input is equipped with a frame synchronizer, asynchronous video signals can also be used.
- LAN (1000BaseT) one line*: To be used to control external devices and remote cameras by IP protocol. Transmission of streaming video is also supported.
- DATA (RS422A or RS232C) two lines: Can be used to transfer lens and pedestal position data in a virtual system.

Detailed settings and functions optimized for operability

- Color temperature display and adjustment function (2000 K to 15000 K variable).
- Transmission of up to 10,000 m possible using single fiber.*
- It is possible to save camera settings, such as video adjustments, on an SD memory card. Firmware version upgrades are also supported.
- A lens file function to save flare and shading values.
- Support for IP streaming and IP control.
- The NewTek Software "NewTek AutoLink for Panasonic PTZ"*, which is available on the Internet, allows Panasonic professional cameras equipped with IP streaming to be automatically detected from NewTek TriCaster® and IP series Video Mix Engine on the network, enabling direct use of IP streaming from the cameras with these NewTek products.
- DC12 V 2.5 A and 1.0 A output as a standard feature. This can be used as a power source for large lenses, prompters, and sub-monitors.
- There are four user buttons (enabling function selection) on the camera head and four on the viewfinder. They support rapid shooting by the camera operator.

Intercom connection

With two independent intercom lines, in addition to Intercom 1 and Intercom 2 switching, an Intercom 1 and 2 mix mode has been added and can be selected to observe the situation. With the Intercom front/rear switch and front volume, it is possible to adjust the intercom audio level even when the camera is being used from the shoulder.

Images showing Skin Tone Detail Correction effect

* Images are simulated.
AK-UCU600PJ/UCU600EJ
AK-UCU600PSJ/UCU600ESJ
Camera Control Unit (CCU)

The CCU supports not only UHD and HD simultaneous output, but also enables high-speed output*1 up to 240p in HD mode to be performed simultaneously with standard (1x) output, while still having a compact size.

- Contains a dual UHD 12G-SDI system, and supports 3G-SDI quad link with quadrant or two-sample interleave.
- Optical fiber transmission of uncompressed video signals over a distance of approx. 2,000 m between camera and CCU*2.
- The compact, lightweight unit measures 2U in height and is rack-mountable.

**Supported formats**

<table>
<thead>
<tr>
<th>Format</th>
<th>Resolution</th>
<th>Frame Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>HD</strong></td>
<td>1080/59.94p, 50p, 25p, 23.98p</td>
<td>59.94p, 50p, 25p, 23.98p</td>
</tr>
<tr>
<td><strong>HD High Speed</strong></td>
<td>1080/59.94p-240fps, 180fps, 120fps, 1080/50p-200fps, 150fps, 100fps, 1080/59.94-240fps, 180fps, 120fps, 1080/50p-200fps, 150fps, 100fps, 720/59.94-240fps, 180fps, 120fps, 720/50p-200fps, 150fps, 100fps</td>
<td></td>
</tr>
</tbody>
</table>

*1: When in HD Hi-Speed mode. Requires a firmware upgrade scheduled for release in the fall of 2018.
*2: When power is supplied from CCU.
*3: A codec developed by intoPIX. Stands for “Tiny Codec.”
*4: Requires a firmware upgrade scheduled for release in the fall of 2018.

AK-HRP1000GJ
AK-HRP1005GJ
Remote Operation Panel (ROP)

- Two models: 1/4 rack size (AK-HRP1000GJ) and 1/5 rack size (AK-HRP1005GJ).
- LCD panels with enhanced visibility.
- AK-HRP1000GJ: 8.9 cm (3.5 inches) (VGA)
- AK-HRP1005GJ: 8.1 cm (3.2 inches) (VGA)
- Camera serial control and IP control (RJ45 LAN cable) are possible.
- Supports PoE*2, which can supply power via LAN cable (CAT5e or faster).
- Functions for studio camera scene file registration and retrieval.
- Equipped with SD memory card slot for saving user files, scene file and updating firmware versions.

*1: Requires firmware version 4.50 or later. For more details, please see “Service and Support” on the following website [https://pro-av.panasonic.net/en/].
*2: Abbreviation of Power over Ethernet.
**AK-HVF100GJ**
22.9 cm (9 inches) LCD Color Viewfinder

Equipped with newly designed tilt mechanism and extensive functions such as focus assist and external video input.

- High-resolution 22.9 cm (9 inches) color LCD panel displays full HD 1920 x 1080 pixel
- Focus assist functions (Focus-in-Red, Focus Bar*)
- Detail depends on zoom ratio*1
- External HD-SDI (3G-SDI) input
- External DC input (+12 V DC)
- Four assignable function buttons
- Contrast, brightness, and peaking are adjustable
- Pan, tilt, and lift structure used

*1: When connected to AK-UC4000.

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**AK-MSU1000GJ**
Master Setup Unit (MSU)

Controls up to 99 CCU units via IP

- IP and serial connections supported. IP connection: Up to 99 units Serial connection: Up to six unit
- 17.8 cm (7 inches) Touch Panel LCD Video monitoring function
- HD-SDI Input (Monitoring) (1080i)
- Power DC12 V (DC10 V - DC17 V) or PoE+ (via PoE+ Hub)

*1: Requires firmware version 4.50 or later. For more details, please see "Service and Support" on the following website(https://pro-av.panasonic.net/en/).
*2: Abbreviation of Power over Ethernet.

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**AK-HBU500GJ**
Build-up Unit

Enables use of large studio-use lens.

- Smooth camera mounting/removal possible
- Precise optical axis (horizontal/vertical) adjustment structure
- Rear control panel equivalent to that of a large camera
- DC OUT 12V 7.5 A (XLR4-pin)/DC OUT 1.5 A (4-pin)
Other accessories

AJ-CVF50G
38.1 mm (1.5 inches) HD EVF

AJ-HVF21KG
50.8 mm (2 inches) HD EVF
59.94 Hz/50 Hz Switchable
Not available in some areas.

AG-CVF15G
87.6 mm (3.45 inches) Color HD EVF
Open two ways for LCD monitor viewing

AK-HVF70G
17.8 cm (7 inches) LCD Color Viewfinder

AJ-MC700P
Microphone Kit (monaural)

AW-PS551
AC Adaptor

SHAN-TM700
Tripod Adaptor

System Configuration

2/3-type 4K or HD Lens

4K Studio Camera
AK-UC4000GJ
AK-UC4000GJ

Optical Fiber Multi Cable
Max 2,000 m

LD Color Viewfinder

2/3-type 4K or HD Lens

Remote Control Cable
Remote Control Cable

Remote Operation Panel
Remote Operation Panel

Power Cable

SD Memory Card

SD Memory Card

SD Memory Card

SD Memory Card

*1: For software supporting Chromatic Aberration Compensation (CAC), please download from "Software download" on Panasonic website: https://pro-av.panasonic.net/en/

*2: A power cable is included with the AC Adaptor.

*3: With the use of a serial remote control cable AJ-C10050G, power for ROP is supplied from a CCU.

*4: If using a J-MSU1000GJ, a J-UCU600PJ/UCU600EJ/UCU600PSJ/J-UCU600ESJ, or if using an optical fiber cable, an AC-PS350 or PoE+ HUB is required.

*5: Requires firmware version 4.00 or later. For more details, please see "Service and Support" on the following website: https://pro-av.panasonic.net/en/
**Specifications**

**AK–UC4000GJ/UC4000GSJ**

<table>
<thead>
<tr>
<th>Specification</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Power Supply</strong></td>
<td>DC 12 V (when using an external power supply) AC 240 V, 50 Hz/60 Hz (when connecting to an AK-UC600PJ/AK-UC600EJ/AK-UC600PSJ/AK-UC600ESJ)</td>
</tr>
<tr>
<td><strong>Power Consumption</strong></td>
<td>119 W (for the camera only, when connecting to an external 12 V) 360 W (when connecting to an AK-UC600PJ/AK-UC600EJ/AK-UC600PSJ/AK-UC600ESJ)</td>
</tr>
<tr>
<td><strong>Operating Temperature</strong></td>
<td>–10 °C to 45 °C (14 °F to 113 °F) (Preheating required under a temperature 0 °C (32 °F) or below)</td>
</tr>
<tr>
<td><strong>Storage Temperature</strong></td>
<td>–20 °C to 60 °C (–4 °F to 140 °F)</td>
</tr>
<tr>
<td><strong>Operating Humidity</strong></td>
<td>85% or less (relative humidity)</td>
</tr>
<tr>
<td><strong>Weight</strong></td>
<td>Approx. 4.5 kg (9.90 lb) (body only)</td>
</tr>
<tr>
<td><strong>Dimensions (W x H x D)</strong></td>
<td>151 mm x 267 mm x 371.5 mm (5-31/32 inches x 10-17/32 inches x 14-21/32 inches) (excluding protrusions)</td>
</tr>
<tr>
<td><strong>Pickup Device</strong></td>
<td>11.14 million pixels, MOS x 1</td>
</tr>
<tr>
<td><strong>Optical Filter</strong></td>
<td>CC: 3200 K, 4300 K, 6300 K, Cross, Diffusion ND: CAP, Clear, 1/4, 1/16, 1/64</td>
</tr>
<tr>
<td><strong>Lens mount</strong></td>
<td>2/3-type bayonet</td>
</tr>
<tr>
<td><strong>Gain switching</strong></td>
<td>Two shooting modes [HIGH SENS]: F10 (59.94 Hz)/F11 (50 Hz) [NORMAL]: F6 (59.94 Hz)/F7 (50 Hz) 2000 Kx 3200 K, when white reflectivity is 89.9%</td>
</tr>
<tr>
<td><strong>Horizontal Resolution</strong></td>
<td>4K: 2000 TV lines or above (center) AK-UC600PJ/AK-UC600EJ/AK-UC600PSJ/AK-UC600ESJ output  HD: 1000 TV lines or above (center)</td>
</tr>
<tr>
<td><strong>S/N</strong></td>
<td>62 dB or above</td>
</tr>
<tr>
<td><strong>Horizontal Modulation</strong></td>
<td>50% or above (27.5 MHz)</td>
</tr>
</tbody>
</table>

**Rear View**

- **<MIC 2> terminal**: XLR x 1, 3-pin (female) <LINE>, <MIC> [<–48 V] switchable <MIC> <0 dBu, +4 dBu menu selection available <MIC> <–60 dBu, –40 dBu, or –20 dBu menu can be selected
- **<MIC> terminal (front)**: XLR x 1, 3-pin (female) Switchable with <MIC 1> terminal
- **<INTERCOM1> terminal**: XLR x 1, 5-pin (female)
- **<INTERCOM2> terminal**: XLR x 1, 5-pin (female)
- **<EARPHONE> terminal**: Stereo mini jack x 1
- **<OPT FIBER> terminal**: Optical composite connector x 1, Tajimi/LEMO
- **<LENS> terminal**: 12-pin x 1
- **<VF> terminal**: 20-pin x 1
- **<VF> terminal (rear)**: 29-pin x 1
- **<DC IN> terminal**: XLR x 1, 4-pin, DC 12 V
- **<DC OUT 12 V 1 A> terminal**: 4-pin x 1
- **<RET CTRL> terminal**: 6-pin x 1
- **<EXT I/O> terminal**: 20-pin x 1, DC 12 V 0.5 A
- **<REMOTE> terminal**: 10-pin x 1
- **<TRUNK> terminal**: 12-pin x 1
- **<DC OUT> terminal**: 2-pin x 1, DC 12 V 2.5 A
- **<LAN> terminal**: RJ-45 x 1
- **<USB2.0> terminal (host)**: Type A connector, DC 5 V 0.5 A
- **Build-up terminal**: 20-pin x 1

As of March, 2018
### Specifications

**AK-UCU600PJ/UCU600EJ/UCU600PSJ/UCU600ESJ**

**Power Supply**
- AK-UCU600PJ: 100 V ~ 120 V AC, 50 Hz/60 Hz
- AK-UCU600EJ/UCU600PSJ/UCU600ESJ: 100 ~ 240 V AC, 50 Hz/60 Hz.

**Power Consumption**
- 500 W (Without camera connected: 90 W)

**Capacity for Supplying Power to a Camera**
- 240 V AC (tolerance: 5%) , 1.46 A

**Operating Temperature**
- 0 °C to 40 °C (32 °F to 104 °F)

**Humidity**
- 90% or less

**Dimensions (W x H x D)**
- 300 mm x 417 mm x 510 mm

**XLR x 1, 4-pin, 12 V DC**
- When connected: 20 m (65.7 ft)

**HD TRUNK/TICO Output**
- HD-SDI: 1 line (HD TRUNK output)
- HD/SD-SDI: 1 line (TICO output)

**Return Input**
- 3G-SDI/HD/SD-SDI: 4 lines (REI input has active-through output)
- Analog composite: 1 line

**Prompter Input**
- HD-SDI: 1 line (with active-through output)
- Analog composite: 2 lines (through output of 1 input and 2 share the connector*)
- 1 line (if terminated when the unit is turned OFF. No through output.

**Reference Input**
- BB: [black burst] / [tri-level]*: 1 line (automatic termination, connect to upper connector; BB signal and tri-level signal automatically recognized, with loop-through output)

**Microphone Output**
- 0 dBm: 600 Ω, 2 lines (XLR, 3-pin, male)

**Communication**
- Intercom input/output (ENG): PRO, 0 dBm, 600 Ω (4 W), 1 line
- Intercom input/output (RTS): 200 Ω (RTS), 4 W / RTS / CLRCOM: 2 lines*
- Tally input (red, green, yellow): 1 line each

**AUX**
- 6-bit (open collector output, terminal shared with camera microphone gain setting*)
- Camera microphone gain setting input
- 5-bit (photo-coupler input, terminal shared with WFM control*)
- Down-convert system setting input 2-bit (photo-coupler input)

**TRUNK**
- RS-222 / RS-232C: 2 lines*

**FRONT ROP**
- RS-222: 1 line, 16 V DC output (only one of this and REAR ROP can be selected at one time via the menu or the [ROP FRONT] / [REAR] selection switch on the front panel)

**REAR ROP**
- RS-222: 1 line, 16 V DC output (only one of this and FRONT ROP can be selected at one time via the menu or the [ROP FRONT] / [REAR] selection switch on the front panel)

**MSU**
- RS-222: 1 line, GPI for control

**LAN TRUNK**
- LAN connection with camera side via an optical cable**

**LAN**
- Personal computer connection for distribution via the Web**
- 1 line, 10BASE-T, 100BASE-TX (use a crossover cable when connecting directly with a personal computer)

**AK-MSU1000GJ**

**Power Supply**
- 12 V DC (DC input range: 10 V ~ 16 V DC)

**Power Consumption**
- 1.6 A (Power supply: 12 V DC)
- 0.6 A (PoE+ power supply)

**Operating Temperature**
- 0 °C to 40 °C (32 °F to 104 °F)

**Humidity**
- 90% or less

**Storage Temperature**
- -20 °C to 60 °C (-4 °F to 140 °F)

**Weight**
- Approx. 8.8 kg (19.4 lb)

**Dimensions (W x H x D)**
- 482 mm x 222 mm x 41 mm (excluding mounting brackets and dial heights)

**Adjustment Functions**
- Scene file, ND filter, CC filter, Color temperature (COLOR TEMP), Master gain (MASTER GAIN), Shutter (SHUTTER), Master pedestal (MPED), Iris (IRIS), Camera selection

**CCU Control**
- RS422 or IR

**Maximum Cable Length**
- When CCU is connected: 50 m (164 ft)

**AK-HVF100GJ**

**Power Supply**
- DC 12 V (supplied from camera or XLR)

**Power Consumption**
- 18 W

**Operating Temperature**
- 0 °C to 45 °C (32 °F to 113 °F)

**Operating Humidity**
- 10% ~ 85% (no condensation)

**Weight**
- Approx. 2.6 kg (5.73 lbs.) (not including hood)

**Dimensions (W x H x D)**
- 200 mm x 234 mm x 44 mm (excluding protrusions)

**Power Supply**
- 240 V AC (tolerance: 5%), 1.46 A , 50 Hz/60 Hz

**Dimensions (W x H x D)**
- 300 mm x 417 mm x 510 mm

**Adjustment Functions**
- Scene file, ND filter, CC filter, Color temperature (COLOR TEMP), Master gain (MASTER GAIN), Shutter (SHUTTER), Master pedestal (MPED), Iris (IRIS), Camera selection

**CCU Control**
- RS422 or IR

**Maximum Cable Length**
- When CCU is connected: 50 m (164 ft)

**AK-HBU500GJ**

**Power Supply**
- 12 V DC (when external power is supplied)

**Power Consumption**
- 70 W (when external power is supplied)

**Operating Temperature**
- -20 °C to 60 °C (-4 °F to 140 °F)

**Humidity**
- 85% or less (relative humidity)

**Storage Temperature**
- -20 °C to 60 °C (-4 °F to 140 °F)

**Weight**
- Approx. 4.0 kg (8.82 lb)

**Dimensions (W x H x D)**
- 102 mm x 385 mm x 113 mm

**Power Supply**
- 240 V AC, 50 Hz/60 Hz (when CCU is connected)

**Dimensions (W x H x D)**
- 482 mm x 222 mm x 41 mm (excluding mounting brackets and dial heights)

**Adjustment Functions**
- Scene file, ND filter, CC filter, Color temperature (COLOR TEMP), Master gain (MASTER GAIN), Shutter (SHUTTER), Master pedestal (MPED), Iris (IRIS), Camera selection

**CCU Control**
- RS422 or IR

**Maximum Cable Length**
- When CCU is connected: 50 m (164 ft)
Dimensions

As of March, 2018

Unit: mm (inches)

* Dimensions are for LEMO connector model.
Please refer to the latest Non-linear Compatibility Information, P2 Support, Download and Service Information, etc. at the following Panasonic web site.

https://pro-av.panasonic.net/