The world's first 4-sensor 4K camera directly employing 2/3-inch optics to achieve high-resolution, faithful images for television production applications.

These Specifications are subject to change without notice.
Hitachi's SK-UHD4000 system 4K color camera can be used with existing 2/3-inch format ENG and Studio/Field lenses without the use of an optical-mechanical adaptor between camera and lens. 2/3-inch lenses are the industry standard for studio and outside broadcast (OB) live event production applications. The extended depth of field required in sports television production is therefore preserved.

A unique, high-precision 4-sensor optical system and latest CMOS sensor technology, provide 4K (3840 X 2160) and 2K (1920 x 1080) video simultaneously. Camera controls and footprint are the same as current broadcast HDTV cameras making it simple to replace existing 2K infrastructure with minimal difficulty.

**Advanced Color Separation & Sharpness**

The use of a 4-port RGB color separating prism is instrumental in achieving the performance of a 4K 35mm single CFA sensor in a standard portable camera chassis. It is also the best method for preserving lens MTF (Modulation Transfer Function) to provide the utmost contrast in 4K images produced by the Hitachi's SK-UHD4000 camera. The camera's optical block employs "dual-green" and "pixel offset" technologies to dramatically increase resolution in the Y (luminance) channel. Using highly accurate sensor placement and Hitachi's advanced digital signal processing (DSP), the SK-UHD4000 creates high resolution images from a total 8.8 million effective pixels.

**Unique Digital Signal Processing**

Each essential part of the Hitachi's SK-UHD4000 camera system has its own DSP processor. Different DSP ICs are used independently for 4K camera head processing, the transmission system and Camera Control Unit (CCU) processing. New, power efficient Hitachi Digital Signal Processors are designed to work with any 4K imaging technology now or in the future, offering a high ROI (return on investment).

**Digital Signal Transmission Via Hybrid Fiber**

The SK-UHD4000 camera system utilizes industry standard Hybrid Fiber-Optic Cable (HFOC) connectors made of high-strength materials to ensure durability and reliable performance under the most demanding TV production conditions. Maximum HFOC length with applied camera power and fully operational facilities is 4,000m (13,200 feet) with no utility power*. The Optical power meters on the CCU front panel indicate the optical condition of both transmitting and receiving signals independently to accurately depict proximity to the "digital cliff" (maximum cable distance).

*HFOC distance with applied CCU power differs depending on system configuration and HFOC and connectors. It is dependent on type of lens used, viewfinder, studio adaptor, teleprompter, HFOC, connectors and other accessories that may be connected thereby consuming power otherwise available for the camera head.
Real-time Lens Aberration Correction (RLAC)

Modern HDTV lenses can still produce optical distortions. One of these called "lateral chromatic aberration" can be reduced in certain lens models when used with the SK-UHD4000 camera system. The SK-UHD4000 camera’s function is called RLAC (Real-time Lens Aberration Correction) and it dynamically corrects images using correction data provided by the lens, through a digital interface with the camera.

Luminance Response Tools

Black Gamma

The SK-UHD4000's Black Gamma function can control Initial Gamma gain more finely than conventional black stretch. Independent Initial Gamma controls are provided for the Red, Green and Blue channels providing a fine granularity control over dark colors.

Black Stretch

The SK-UHD4000’s Black Stretch function allows for better reproduction of dark or underexposed areas by evenly raising the luminance response without changing the pedestal or white clip/knee settings. It is especially useful in high contrast shooting conditions.

Ultra Gamma

A useful function implemented in the SK-UHD4000 is Ultra Gamma, which provides seven different responses to dramatically increase exposure latitude of the camera in shooting conditions where lighting and scenery vary widely in intensity.

Color Reproduction Excellence

Triple-Masking Excellence

The Triple-Masking function includes 12-vector, linear matrix and skin tone masking providing users wide latitude in subject image color control. The 12-vector color corrector provides independent control of hue and saturation for six primary and six secondary combinations of colors. A 6-axis linear matrix provides overall color control for excellent, precise color rendition control. The skin tone masking function provides "fine painting" (hue and saturation) of skin tones without affecting other colors in the scene.

Picture Sharpness Enhancement

High Chroma Detail

The High Chroma Detail adjustments allow precise control of the detail level in high color saturated portions of the picture such as the petals of a rose or a colorful fabric.

Skin Tone Detail

The Skin Tone Detail functions allow a flash color based softening of the image to achieve a more youthful look for on camera personalities. Two individual memories exist as well as a function to automatically detect the hue, saturation and luminance of the skin tone to be affected. Furthermore, the Skin Tone Detail level can be adjusted to follow the lens’ zoom to avoid "rubber faces" in wide angle shots while using the function.

Chroma Saturation

Total Chroma Saturation allows control over the amount of color in the image. A purely black & white image can also be achieved.

Auto Chroma

Auto Chroma automatically reduces over-saturated colors in the image caused by extremely bright and colorful objects such as emergency vehicle lights or stage lighting LEDs. Provides "legalizing" the color gamut of preset masking settings.

Focus Assist

Precise focus can be easily achieved with the aid of Hitachi’s viewfinder Focus Assist functions. There is a Linear Focus indicator at the bottom of the viewfinder display, a Pixel-to-Pixel function that displays an enlarged image without re-sizing and Edge color peaking which emphasizes the in-focus area in an easily visible color. Each focus assist function can be selected in the ‘VF menu according shooting conditions and can be activated when the camera operator begins to focus.

Dual Filter Wheel with 10 Optical Filters

SK-UHD4000 offers two remotely controlled filter wheels as a standard feature. A total of 10 optical filters are available: 4 ND filters and a cap on one wheel and 4 color correction filters and an effect on another wheel. Optical filters are the preferred method of color correction or attenuation to preserve the camera’s signal to noise ratio and color reproduction fidelity.

Other Useful Production Camera Features

Prompter and Floor Monitor Power

The SK-UHD4000 camera system provides plenty of power to drive two 24-inch LCD monitors. This makes for a cleaner, more reliable installation and avoids safety issues with multiple cables on your studio floor.

Foot Monitor Digital Video

The studio floor or talent monitor can be driven with SDI (digital) video for critical viewing by the talent. 

RET/INCOM Handle Switches

RET and INCOM talk switches are located on the handle for easy operation in hand held and low angle shooting.

Lighting Control

Integrated lighting control allows for control of the video’s color temperature, which reduces color casts for more accurate color reproduction throughout the production process.

Gray-Scale Automatic Setup

Hitachi’s Gray-scale auto-setup accurately adjusts the video parameters of the camera by using an external known reference, under actual lighting conditions, compensating for the lens in use. Color matching can easily be accomplished by employing this unique function.

High Dynamic Range

Selectable HLG and PQ HDR profiles provide deeper blacks, increased detail in mid-tones, brighter highlights and vivid colors. This dramatic improvement in picture quality is easily visible at all viewing distances. HDR is available on the 4K and 2K CCU SDI outputs. An optional simultaneous HDR and SDR output capability has separate and independent adjustments for each output.

Skin Tone Detail

The Skin Tone Detail set is designed to shape skin tones according to the skin tone detail function set. Skin tone masking provides users wide latitude in subject image color control. A 6-axis linear matrix provides overall color control for excellent, precise color rendition control. The skin tone masking function provides "fine painting" (hue and saturation) of skin tones without affecting other colors in the scene.

Pixel-to-Pixel display on the VF screen.

The display position is selected from the center area and four quadrant area. The display position is selected from the center area and four quadrant area. The display position is selected from the center area and four quadrant area. The display position is selected from the center area and four quadrant area.

Note: Available after March 2015.

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**High-speed, Progressive, Optical Digital Transmission and Camera Control System**

The CU-UHD4000 Camera Control Unit and CA-UHF4000 Fiber Camera Adaptor constitute the control and transmission system for the new SK-UHD4000 portable 4K color camera. The Camera Control Unit (CU-UHD4000) provides significantly reduced power consumption and improved functionality. SDI outputs (1080p/1080i/720p/480i/576i) and SDI inputs (1080p/1080i/720p) are offered as standard. Down-converted 2K images are very high quality and completely compatible with standard HD cameras. This flexible system is capable of providing most modern HD/SD-SDI video signals required by today's HDTV program production demands.

A full complement of Serial Digital Interfaces are provided as standard equipment:

**Digital Inputs/Outputs:**
- 4K Digital OUT [4x 3G-SDI OUT /1 set]
- 4K 3G-SDI OUT x 2 sets (Option board)
- 3G-SDI HD-SDI or SD-SDI OUT x4 [x2/x2 Embedded Audio available]
- 3G-SDI 16/9/4:3 switchable
- HD-SDI or SD-SDI PIX OUT x1 [Embedded Audio available]
- HD-SDI or HD-SDI RET In x4 [for Viewfinder]
- HD-SDI or HD-SDI RET In x2 [for Floor Monitor] (HD-SDI 3G/1.5G switchable)

**Analog Input**
- PROMPT IN x1
- GL IN x1

**4K Output Format**
4K outputs are available via BNC connectors. They can be switched between SQUARE DIVISION and 2 SAMPLE INTERLEAVE DIVISION formats.

**12G Output Format**
4K outputs are available via a 12G Single Link BNC output option. They can be switched between SQUARE DIVISION and 2 SAMPLE INTERLEAVE DIVISION formats.

**2K Cutout Output**
A 2K 1080p/1080i image can be cut out of and output from the original 4K image. The 2K raster can be selected via menu anywhere within the 4K image.

**Compact CCU:**
The CU-UHD4000 Camera Control Unit is a very compact 2U size.

**High Quality Down-converted HD:**
A high performance down-conversion process is used to change the 4K signal to 2K HD. It maintains a high depth of modulation and outputs superb HD picture quality.

**SMTE 311M Hybrid Fiber Cable:**
The effective HFOC length can be up to 4,000m (13,200 feet) with no utility power. HFOC distance with applied CCU power differs depending on system configuration and HFOC and connectors.

**SDI Embedded Audio:**
Two channels of MIC audio can be embedded in HD-SDI/SD-SDI output (SMPTE 425M/299M/272M).

**TRUNK DATA (RS-422 or RS-232C (optional))**

**4K Ultra HD Television Production Camera**

**Studio and Field Production Viewfinders**
The SK-UHD4000 camera system offers three choices for Studio or Field production viewfinders. VF-L90HD is a color 9-inch TFT-LCD screen designed for critical color image viewing. TFT-LCD screens are most suitable where precise composition and color evaluation of the image are required. The HD-EL800H is a color 7.4-inch OLED screen. OLED viewfinders are more suited to Sports and OB applications where quick response and contrast are required. Studio and Field production viewfinders can be equipped with alternate mounts to decrease overall system cost. The VF-402-S3 is a black & white CRT-type ENG viewfinder with high-brightness and contrast making it ideal for easy visibility in field production.
ACCESSORIES

➤ Setup Control Unit & Remote Control Unit

The SU-1000 Setup Control Unit is used for the adjustment of camera parameters in a multi-camera production environment. This unit provides full control of SK-UHD4000 camera systems, utilizing a new touch screen LCD panel to expand control functions. It is connected directly to each CCU in parallel via serial data cable with a distance of up to 100 meters. Up to 12 cameras can be directly connected to the SU-1000.

The RU-1500JY Remote Control Unit is a new touchscreen remote operation panel. Painstaking attention has been paid to making the most commonly used controls and functions directly and instantaneously accessible to the video control engineer. A touchscreen display provides access to multi-level menus that are intuitive and easy to read. Data storage and transfer of camera adjustments can easily be performed with the use of the card slot provided. It is an ideal production tool that enhances any HD studio or field production.

➤ System Configuration Chart

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➤ Studio Adaptor

Hitachi offers the SA-1000 Studio Adaptor for maximum lens compatibility. The studio adaptor serves as a mechanical lens supporter with other important features:

Digital Inputs/Outputs:
- The ability to use "Hanger-type" box lenses and "Bayonette-type" hand-held portable lenses without removing the camera from the SA-1000.
- Unlike other lens adaptor systems, the SA-1000 maintains perfect back-focus and optical centering due to Hitachi’s Positive Lock camera-to-lens bayonet mount method.
- Functions routinely required by the camera operator in Studio and Field productions are brought out from the camera menu system and grouped on the SA-1000’s rear operation panel for easy access.

Hitachi’s efforts at providing an advanced level of studio camera features with the Studio Adaptor include a "cable-less" and "toolless" camera connection which increases the systems reliability while retaining the flexibility of 2 viewfinder choices for the SK-UHD4000 in this configuration.

➤ Single Mode Fiber System

Hitachi offers the SA-1000 Studio Adaptor for maximum lens compatibility. The studio adaptor serves as a mechanical lens supporter with other important features:

Digital Inputs/Outputs:
- The ability to use "Hanger-type" box lenses and "Bayonette-type" hand-held portable lenses without removing the camera from the SA-1000.
- Unlike other lens adaptor systems, the SA-1000 maintains perfect back-focus and optical centering due to Hitachi’s Positive Lock camera-to-lens bayonet mount method.
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Hitachi’s efforts at providing an advanced level of studio camera features with the Studio Adaptor include a "cable-less" and "toolless" camera connection which increases the systems reliability while retaining the flexibility of 2 viewfinder choices for the SK-UHD4000 in this configuration.
**SPECIFICATIONS**

**Camera Head SK-UHD4000 / SK-UHD4000E**

- **Lens mount**: EF/PL (S310)
- **Imaging device**: 3.44M pixels (S310), 4.5M pixels (S348)
- **Total pixels**: 2,720 x 1,144 / 2,304 x 1,760 pixels
- **TV system**: 1080i 50/60Hz, 720p 50/60Hz
- **Optical system**: 1/2.3-inch 4K CMOS sensor
- **Number of pixels**: 9.18M pixels (S310), 12.7M pixels (S348)
- **Full HD**: 1,920 x 1,080 pixels
- **4K Ultra HD**: 3,840 x 2,160 pixels
- **59.94Hz / 50Hz**: RGB 3G-SDI, HD-SDI
- **Gain selection**: 0.01 % (excluding lens characteristics)
- **Registration**: 0.01 \%
- **Min 1800TVL (4K output from CU-UHD4000)
- **50p :F9 @ 2000 lx, 3200 K, 89.9% reflectance
- **CC(CROSS, 3200K, 4300K, 6300K, 8000K)**
- **Total pixels**: 2,270 (H) × 1,144 (V) 2.6 million pixels
- **CMOS**: 9-inch Viewfinder VF-L90HD
- **LENS**: 1x 12-pin Multi for LENS
- **TF-X**: 3.5" X-Y mechanical movement
- **VF angle rotation**: 35° (top), 45° (left), 45° (right), 25° (bottom)
- **VTR**: 3x 9-pin D-sub (Female)
- **Menu**: 1x 15-pin D-sub (Female), 4x BNC, 2x HDMI
- **USB**: 1x Micro-USB, 1x USB (Type-C)
- **LAN**: 1x RJ-45, 1x HDMI, 1x 15-pin D-sub (Female)
- **Remote control**: RM-L90AM, RM-L190AM
- **Power consumption**: Approx. 300W (in AC power operation) Combined with CU-UHD4000E (J) AC100V 50Hz/60Hz (CU-UHD4000J)
- **power consumption**: Combined with SK-CCU4000, SK-VE4000, SK-AUHD4000
- **Temperature range**: -20 °C to +60 °C, -4 °F to +140 °F
- **Dimensions**: 215 x 158 x 51.5mm (main body)
- **Weight**: 1.25kg, 2.8lb

**Fiber Camera Adaptor CA-UHF4000**

- **Video output**: 1x BNC SDI (SMPTE 292M), 2x BNC 3G/HD/SD-SDI
- **HDMI**: 1x HDMI 1.4a (4K)
- **Return / AUX switcher**: 2-channels, PGM audio level controls w/Chnl1 & Chnl2
- **Input signals**: Analog Y/Pb/Pr/SYNC
- **Output signals**: Analog Y/Pb/Pr/SYNC
- **Black-burst or tri-level sync**: 1x BNC HD-SDI2 OUT
- **Prompter output**: VS or VBS
- **Intercom**: 1x BNC 1080i 59.94/50Hz, 1080p/1080i/720p auto-switching
- **Intercom**: 1x BNC 720p 59.94/50Hz
- **Power consumption**: 1.3W
- **Power input**: 12VDC (CCU-UHD4000)

**Camera Control Unit CU-UHD4000S/59.94Hz / CU-UHD4000E/50Hz**

- **Output signals**: 4x BNC 3G-SDI or HD-SDI / 4x BNC 3G-SDI or HD-SDI
- **Gain selection**: 0.01 % (excluding lens characteristics)
- **Registration**: 0.01 \%
- **Min 1800TVL (4K output from CU-UHD4000)
- **50p :F9 @ 2000 lx, 3200 K, 89.9% reflectance
- **CC(CROSS, 3200K, 4300K, 6300K, 8000K)**
- **Total pixels**: 2,270 (H) × 1,144 (V) 2.6 million pixels
- **CMOS**: 9-inch Viewfinder VF-L90HD
- **LENS**: 1x 12-pin Multi for LENS
- **TF-X**: 3.5" X-Y mechanical movement
- **VF angle rotation**: 35° (top), 45° (left), 45° (right), 25° (bottom)
- **VTR**: 3x 9-pin D-sub (Female)
- **Menu**: 1x 15-pin D-sub (Female), 4x BNC, 2x HDMI
- **USB**: 1x Micro-USB, 1x USB (Type-C)
- **LAN**: 1x RJ-45, 1x HDMI, 1x 15-pin D-sub (Female)
- **Remote control**: RM-L90AM, RM-L190AM
- **Power consumption**: Approx. 300W (in AC power operation) Combined with CU-UHD4000E (J) AC100V 50Hz/60Hz (CU-UHD4000J)
- **power consumption**: Combined with SK-CCU4000, SK-VE4000, SK-AUHD4000
- **Temperature range**: -20 °C to +60 °C, -4 °F to +140 °F
- **Dimensions**: 215 x 158 x 51.5mm (main body)
- **Weight**: 1.25kg, 2.8lb

**DIMENSIONS (SK-UHD4000 / CA-UHF4000)**

- **Remote Control Unit RU-1500JY**
  - **Remote control**: RM-L90AM, RM-L190AM
  - **Power consumption**: Approx. 300W (in AC power operation)
  - **Temperature range**: -20 °C to +60 °C, -4 °F to +140 °F
  - **Dimensions**: 215 x 158 x 51.5mm (main body)
  - **Weight**: 1.25kg, 2.8lb

**Setup Unit SU-1000**

- **Input signal**: 1x Video Engineer Switch / Input: Contact closure
- **Power input**: 12VDC (10.5 - 14V DC) / 10W
- **SNR**: 54.5dB
- **Temperature range**: -20 °C to +60 °C, -4 °F to +140 °F

**2-viewfinder VF-402-S3**

- **Input signal**: 1x Video Engineer Switch / Input: Contact closure
- **Power input**: 12VDC (10.5 - 14V DC) / 10W
- **SNR**: 54.5dB
- **Temperature range**: -20 °C to +60 °C, -4 °F to +140 °F

**Dimensions (SA-1000)**

- **Remote control**: RM-L90AM, RM-L190AM
- **Power consumption**: Approx. 300W (in AC power operation)
- **Temperature range**: -20 °C to +60 °C, -4 °F to +140 °F
- **Dimensions**: 215 x 158 x 51.5mm (main body)
- **Weight**: 1.25kg, 2.8lb