Multi-Format Digital HDTV Production Camera

SK-HD1000

To ensure safe operation, please read the instruction manual before using this product.
The ultra-efficient SK-HD1000 is a member of Hitachi’s “Green Products” Global initiative.

Hitachi SK-HD1000 Multi-application HDTV Studio and Field Production Camera

The SK-HD1000 is Hitachi’s third generation HDTV camera that embodies the latest advanced digital signal processing patents and world-renowned Hitachi technology. It is a high performance, Multi-Standard HDTV studio and field production camera system that satisfies various TV Systems worldwide. One camera system that is now used with 50Hz or 60Hz AC line power regions of the world having both analog and digital signals that comply to the respective countries’ TV Systems. As a standard feature, the SK-HD1000 is a multi-format output camera system since it is able to output dual formats (SD and HD) at the same time. Optional available is the ability to perform as a switchable cross-converting HD camera that outputs 1080i or 720p HDTV at the same time. Optionally available is the ability to perform as a switchable cross-converting HD camera that outputs 1080i or 720p HDTV at the same time.

High-performance starts with advanced sensors

Hitachi has achieved incredibly high HDTV image quality which is the foundation for its high performance and excellent picture quality. With the use of NEW 2.3 million pixels, microlens array, 1080i CCDs, the SK-HD1000 surpasses for its high performance and excellent picture quality. With the use of NEW Hitachi has achieved an incredibly quiet HDTV image which is the foundation for its high performance and excellent picture quality. With the use of NEW Hitachi has achieved an incredibly quiet HDTV image which is the foundation for its high performance and excellent picture quality.

Optimized for on-shoulder production

Advanced Ergonomics Design

New low center of gravity chassis

Lightweight, ideal for portable use

Premier user of 16-bit analog-to-digital conversion

Hitachi cameras were the first on the market to recognize and implement 16-bit analog-to-digital conversion. The SK-HD1000 takes full advantage of the increased dynamic range output of the NEW imagers by using 3 Red, Green, Blue channel 16-bit analog-to-digital converters. These high speed ADCs are the bridge between the serial output of the CCDs and the advanced Hitachi processor. They assure that every nuance of the image captured and, converted to electrical signals by the sensors is interpreted in the digital domain resulting in faithful image reproduction.

Hitachi’s advanced digital signal processing

Each essential part of the Hitachi SK-HD1000 camera system has its own DSP processor. Different DSP ICs are used independently for the HDTV camera head processing, the transmission system and the Camera Control Unit (CCU) processing. The new, power-efficient Digital Signal Processor LSI’s are designed under the 65nm rule with dynamic processing capability in excess of 30-bits per pixel, per RGB channel. Hitachi’s DSP processors are designed for and, adept to progressive readout HDTV sensors. The processing dynamic headroom of the SK-HD1000 in theory (14-bit), allow for signals in excess of 85dB to be faithfully reproduced. Additional digital encoding at camera head and CCU provides low interference and high signal integrity for both digital and analog outputs.

Setup memory and adjustment transfer card

A small plug in setup card ISD card stores the user setup and Scene file information. The adjustment data can then be recalled and used for futures scenes and productions thereby assuring the exact video “look” and characteristics as the original Scene File and adjustment settings. A single camera’s setup data can also be transferred to quickly adjust a group of cameras to be used in a production. Access to setup card data and transfer is also available from the SU-1000 master setup panel.

Superb High Definition picture reproduction & enhancement tools

Luminance response tools

Selective trimming and gamma control

In addition to normal gamma point and balance adjustments, the SK-HD1000 offers a multi-point gamma table that provides the user with exposure control over just the darkest points in the image. It enables adjustment of the initial gamma gain to optimize the reproduction of dark scene components. Hitachi’s DSPs assure that no additional noise components are introduced in the image even with the most aggressive Gamma Table settings. Additionally, this function does not change any of the other parameters of the video signal thus maintaining overall exposure, detail, color reproduction and composition.

Black stretch

The SK-HD1000’s Black stretch function allows for better reproduction of dark or underexposed areas by ever raising the luminance response without changing the pedestal or white clip/ knee settings. It is especially useful in high contrast image venues, outdoors or sports production.

Linear and auto-knee

Like the peak video level control function of the white clip, the linear knee function is made up of the actual knee level compression) point and its slope which improve overexposed portions of the picture by compressing the video past a certain point. These points are user adjustable.

Knee

The SK-HD1000’s knee function provides the perception of a wider dynamic range by dynamically compressing (varying knee and slope) the video level in accordance to the strength of its over-exposure.

Digital signal transmission via Hybrid Fiber Optical Cable

The SK-HD1000 camera system utilizes industry standard Hybrid Fiber- optic cable connectors made of high-strength stainless steel to ensure durability and reliable performance under the most demanding TV Studio and Field production circumstances. All command audio and video signals, and from the camera are digitally transmitted herein, totally immune to EMI/ RFI interference. Camera power and cable condition supervision are also performed using the Hybrid Fiber Optic Cable (HFOC). Full Auxiliary (up to 4 analog or digital, HD or SD) video return and individual Teleprompter facilities are also available with the SK-HD1000 transmission system. The maximum HFOC length with applied camera power and fully operational facilities is 1,000 meters* (3,280 feet).

*HFOC distance with applied CUD camera power differs depending on the system configuration. It is dependent on the type of lens used, weather, audio Adaptor, Teleprompter and other accessories that may be connected and thereby consuming power otherwise available for the camera head.
Lens optimization

- Gray-Scale automatic setup
- Automatic vertical modulation shading adjustment

Color reproduction excellence

- Skin-tone masking
- Triple-masking
- Chroma Saturation
- Picture sharpness enhancement
- Vertical and horizontal detail
- Skin-tone masking
- Skin-tone masking for the "Painting" hue and saturation of Skin-tones without affecting other colors in the scene.
- High-contrast sunny outdoor scenes, fireworks, concerts, theatre stage lighting, and colored night scenes.

Optical and image capture functions

- Knee Saturation
- Versatile CCD drive functions
- Skew correction
- Transparency
- Master Detail functions
- Knee Saturation
- Lens files
- Absolute detail control
- Quick focus + Precision Focus (Auto Focus)
- Versatile output options
- Four optical ND filters are provided as standard on a motorized, remotely controlled optical filter. The setting can be stored in the Scene files and its status can be displayed on the viewfinder.

Ease of use characteristics & functions

- Motorized Auto Iris System
- Programmable soft-switches (CS-1, CA-CS)
- Quick Focus function automatically changes the iris so that set the video level with the electronic shutter.

Viewfinder status displays

- Focus Assist
- Full auto mode
- Tripod lock
- Comprehensive camcorder operation panel
- Camera head inputs & outputs

- Quick focus + Precision Focus (Auto Focus)
- Multi-Format Digital HDTV Production Camera
- SK-HD1000

The SK-HD1000 offers the Grey-Scale Automatic Setup function to optimize the optical parameters that could negatively affect the image you are trying to capture and faithfully reproduce. The Gamma, Gamma, and Phase are the video signal functions that vary from lens to lens.

The SK-HD1000 assures that with any lens used, an even, chroma response will be attained by the automatic vertical modulation shading correction function. At the simple push of a button, this function provides separate memory of lens' modulation shading characteristics to optimize the X1 and XG lens extender positions.

The SK-HD1000 can store 8 lens files which include various lens correction data such as vertical modulation shading. This lens correction data can also be stored in a card (SD card), where it can be recalled when necessary.

Hitachi provides 3 major detail controls designed to precisely place, control and shape the picture sharpness characteristics of the SK-HD1000.

The SK-HD1000 provides an excellent gamut of thoughtful viewfinder controls for intercom audio, program audio, audio with video switching controls, script lamp connector, dedicated XLR input connector located at the front of the camera.

The Skew correction function dynamically restores color saturation to scene highlights above the knee point. Color-saturated highlights lost in overexposed scenes are now visible. This function provides excellent results in, for example, when imaging: high-contrast, sunny outdoor scenes, fireworks, concerts, theatre stage lighting, and colored night scenes.

In traditional photography, ND filters are used for depth of field control. The AES and automatic iris maintain the video level even with rapidly changing light intensity. These functions are accessed via the menu system or the shutter buttons provided on the RU-1200/JY and SU-1000 remote control panels.

Three viewfinder options are offered with the SK-HD1000 camera system. Black & White CRT-type viewfinders are manufactured for ENG and EFP and the monitor output.

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The Skin-tone masking function provides "fine Painting" (hue and saturation) control and shape the picture sharpness characteristics of the SK-HD1000.

The Skin-tone masking function provides the user with excellent and precise color rendition control. The 6-axis linear matrix provides overall color control thereby providing the user with excellent and precise color rendition control.

The SK-HD1000 offers the Black & White CRT-type viewfinders with a wide array of controls for intercom audio, program audio, audio with video switching controls, script lamp connector, dedicated XLR input connector located at the front of the camera.

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SA-1000 Studio Adaptor

With consideration to our customers and advancements in production workflows that require hand-held cameras to be used with large lenses in studio or field HD productions, Hitachi offers the SA-1000 studio Adaptor. The SA-1000 serves primarily as a mechanical lens supporter and it also offers these important features:

- The ability to use “Hanger-type” box lenses and “Bayonet-type” hand-held portable lenses without removing the camera from the SA-1000.

Functions routinely required by the cameraperson in Studio and Field production are brought out from the camera menu system and grouped in the SA-1000’s rear operation panel for easy access. Hitachi’s efforts at providing an advanced level of studio-camera features with this Studio Adaptor include a “Cable-less” and “tool-less” camera interface which increases the systems’ reliability and Hitachi retains the flexibility of having 2 choices for viewfinders when using the SK-HD1000 in this configuration.

Flexible Choice of Camera Control Units

Three models of Camera Control Units are offered for the SK-HD1000 camera system. The CU-HD1000, TU-HD1000 and the CU-HD500 CCUs serve applications for Studio and Field production. The CU-HD1000/TU-HD1000 offer the ability of 50/60Hz line power switching. They are compliant with RoHS directives* and as a standard function, the ability to output 1080i or 720p. Its reduced size (half-rack width / 9RU’s high), weight (7kg approx.) and improved power consumption make it ideal for OB applications**. CU-HD1000 also includes a unique optical power meter that indicates the status of the HFOC.

The CU-HD500 is (88mm) high and, of 2-RU EIA 19-inch rack width. And have HD/SD-SDI

Both CCUs are of easy-to-maintain modular design; employ the same control panels, data cables and peripherals. Other common CCU features include:

- Simultaneous HDTV/ SDTV, digital and analog video outputs
- 3 clean HD-SDI and SD-SDI outputs
- Analog RGB or Y, B-Y, R-Y component outputs
- 4 auxiliary returns
- Dedicated teleprompter channel
- ARIB-type color bar output
- 2-channel balanced analog Mic audio outputs or embedded HD-SDI digital audio,
- Genlock with composite or tri-level sync
- 2-tally (Red/Green) system.
- 2-channel, 2W/4W intercom system.
- RS-232C remote control
- TRUNK (RS-422) option

Dockable : One camera body to suit multiple configurations.

- Hybrid Fiber-optic cable Adaptor
- Triax cable Adaptor
- P2 Solid-State HDTV recorder
- Wireless Adaptor

Dockable : One camera body to suit multiple configurations.

- P2 Solid-State HDTV recorder
- Fiber cable Adaptor
- Triax cable Adaptor

Additional lens mounting options for the SA-1000

- LM-B1000/SA-1000 (for Large Box Lens)
- LM-C1000/SA-1000 (for Canon Small Box Lens)
- LM-F1000/SA-1000 (for Fujinon Small Box Lens)
- LM-P1000/SA-1000 (for Portable Lens)
- Wireless Adaptor

Dockable : One camera body to suit multiple configurations.

CU-HD1000 Unique Optical Power Meter

TU-HD1000/CX-HD1000 Digital Triax System

Hitachi’s Digital Triaxial cable transmission system addresses two application requirements posed by our customers worldwide. It is the next best, completely digital, signal transport compared to that using fiber-optic cable. No other HDTV triaxial cable transmission system comes close.

Second, in applications where traditional triax is already in use, substantial savings in the cabling infrastructure can be realized by employing Hitachi HDTV Digital Triax cameras.

Hitachi’s patented Digital Triax System consists of the camera head triax adaptor and the corresponding TU-HD1000 camera control unit. The main advantages and characteristics are:

- Hitachi’s patented, fully digital, bi-directional signal transmission system
- Employed no RF modulation or modems
- Little to no signal degradation.
- Capitalizes on reduced costs and flexibility of triaxial copper cable.
- Includes 1080i/ 720p cross-converter for HD-SDI outputs
- Built-in, high-performance SDTV up/ down converters
- Similar IO’s as the CU-HD1000

*RoHS stands for the “restriction on the use of certain hazardous substances in electrical and electronic equipment”. It is a European Directive aiming to control the use of certain hazardous substances in the production of new electrical and Electronic equipment (EEE).

** (See detailed specifications on the last page of this brochure)
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### SU-1000 Setup 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 the SK-HD1000 camera systems. Utilizing a new wide touch screen LCD panel that expands control functions. It is connected directly to each CCU in parallel fashion via serial data cable with a distance of up to 100 meters. 12 cameras can be directly controlled from the SU-1000. Camera control can be extended from 12 cameras up to 48 cameras (option).

The SU-1000 has these primary functions:
- Selection of a single camera or groups of cameras to be controlled.
- On/Off control of all functions.
- Control of all variable data adjustments including Iris & Master black.
- Selection of storage and operation data files.
- Transfer of files and data between cameras or groups of cameras.
- Adjustments and file data (write/ read) from SD memory card.
- Video output selection including external video switcher control (source or sink).
- Ethernet connectivity and cabling.

### Studio and Field Production Viewfinders

The SK-HD1000 camera system offers two choices for Studio or Field production viewfinders. Model VF-L9HD is a color 9-inch TFT-LCD screen designed for critical color viewing of the image. The LCD screen offers a wide viewing angle and fast transient response time for a lag-less, crisp image similar to a CRT-type screen. It is most suitable where precise composition and color evaluation of the image are required. The VF-HD 500 model is a monochrome 5-inch CRT-type unit that is more suited for Sports and OB applications where high-brightness and contrast are required. Both our Studio and Field production viewfinders can be outfitted with alternate mounts thereby decreasing the overall system cost.

VF-L9HD Viewfinder/AT-951
VF-HD500 Viewfinder/AT-550

### VR Remote Control Unit

RU-1200JY/VR&RU-1500JY

- The RU-1200JY/VR Remote Control Unit is a new design of remote operation panels for the Hitachi SK-HD1000. Painstaking attention has been paid to making the most commonly used controls and functions directly and instantaneously accessible to the video control engineer.
- It is an ideal production tool that enhances any HD studio or field production.
- The RU-1200JY and RU-1200VR are completely identical in their functions except the Iris and Master black adjustments, for which the “JY-type” uses a joystick type control while the “VR-type” uses rotary knobs.
- The RU-1500JY has all the functionality of the RU-1200JY, but with touchscreen panel operation and Ethernet connectivity and cabling.

### System configuration chart

[Diagram showing system configuration]
**SPECIFICATIONS**

**SK-HD1000 Camera Head**

- **VF-402 B&W CRT ENG Viewfinder**
- **VF-HD500 B&W CRT Studio Viewfinder**
- **VF-L9HD LCD Color Studio Viewfinder**
- **VF-HD500 B&W CRT Studio Viewfinder**

**CU-HD1000 Camera Control Unit**

- **SET/SWITCH**
- **REMOTE 1**
- **REMOTE 2**
- **R/G TALLY**
- **TALLY OUT**

**TU-HD1000 Triax base station**

- **SET/SWITCH**
- **REMOTE 1**
- **REMOTE 2**

**RU-1500YJ Operation Control Panel**

- **SET/SWITCH**
- **REMOTE 1**
- **REMOTE 2**

**SU-1000 Setup Control Unit**

- **SET/SWITCH**