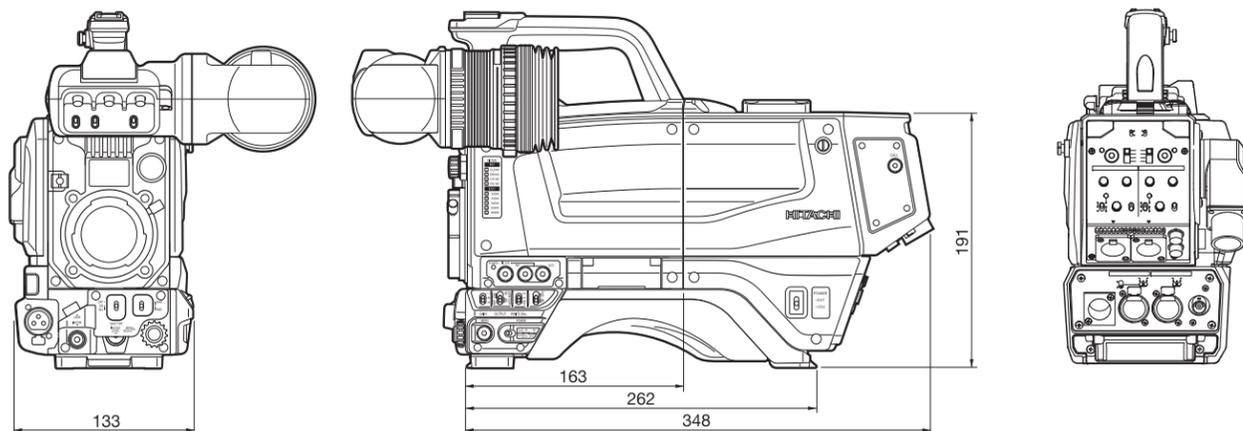
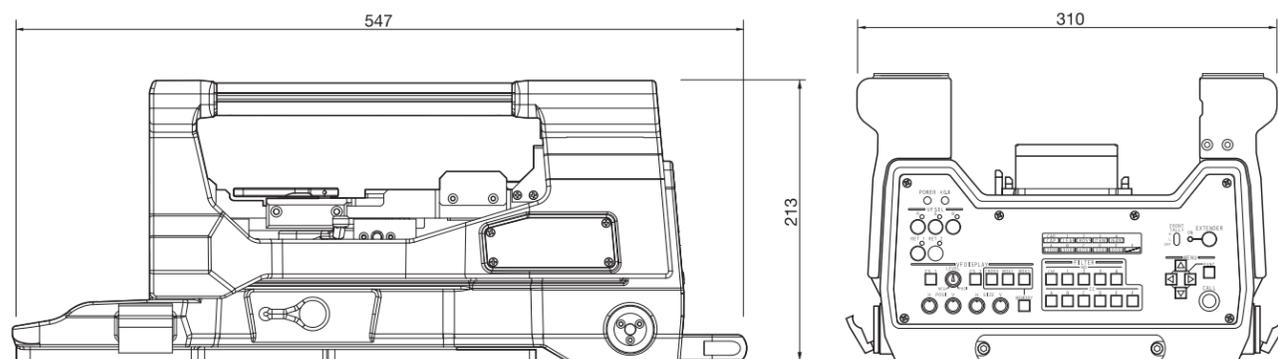


**DIMENSIONS (SK-HD1000)**



**DIMENSIONS (SA-1000)**



**CAUTION** : To ensure safe operation, please read the instruction manual before using this product.

These Specifications are subject to change without notice.

**Hitachi Kokusai Electric Inc.**

32, Miyuki-cho, kodaira-shi, Tokyo 187-8511, Japan  
 Phone : +81-50-3383-3432, Fax : +81-42-322-3270  
 URL : <http://www.hitachi-kokusai.co.jp/global/en/index.html>

**Hitachi Kokusai Linear Equipamentos Eletrônicos S/A**

URL : <http://www.hitachi-linear.com.br/>

**Head Office** : Rodovia BR 459, No121-A, Km 121 - Bairro Corrego Raso, Santa Rita do Sapucaí, 37540-000, MG - Brazil  
 Phone : +55 (35) 3473-3473, Fax : +55 (35) 3473-3474

**Sales Office** : Alameda Santos, 745 - 9 Andar - Conj. 91B, Cerqueira Cesar, São Paulo, 01419-001, SP - Brazil  
 Phone : +55 (11) 3541-3244, Fax : +55 (11) 3541-2425

**Hitachi Kokusai Electric Turkey Elektronik Ürünleri Sanayi ve Ticaret A.Ş.**

**Hitachi Kokusai Electric Turkey Yayıncılık Sistemleri A.Ş.**

URL : <http://www.hitachi-kokusai.com.tr/>

Istanbul Endüstri ve Ticaret Serbest Bölgesi Akif Kopuz Cad. No.3,  
 34957 Tuzla Istanbul, Turkey  
 Phone : +90-216-394-8484, Fax : +90-216-394-8482

**Hitachi Kokusai Electric Europe GmbH**

URL : <http://www.hitachi-keu.com/>

**Frankfurt Head Office** : Siemensstr. 9, D-63263 Neu-Isenburg, Germany  
 Phone : +49(0) 6102-8332-0, Fax : +49(0) 6102-202616  
**London Office** : Windsor House, Queensgate, Britannia Road, Waltham Cross, Hertfordshire, EN8 7NX, United Kingdom  
 Phone : +44(0) 845-121-2177, Fax : +44(0) 845-121-2180

**Hitachi Kokusai Electric**

**HITACHI**  
 Inspire the Next

**Multi-Format HDTV Camera System**  
**SK-HD1000**



# The ultra-efficient SK-HD1000 are members of Hitachi's "Green Products" Global initiative.



SK-HD1000



CA-HF1000 Rear Panel

Advanced Ergonomics Design

New low center of gravity chassis

Optimized for on-shoulder production

Lightweight, ideal for portable use

## Hitachi SK-HD1000 Multi-application HDTV Studio and Field Production Cameras

The SK-HD1000 is the companion portable version designed for hand-held lenses. 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. Optionally available is the ability to perform as a switchable cross-converting HD camera that outputs 1080i (50/59.94) or 720p (50/59.94) HDTV signal formats and SD at the same time.

The lightweight (4.4Kg (9.6lbs) : Camera head) 2-piece, dock-able design gives it unique attributes which provide efficient and cost-effective adaptation to various TV program production demands. It's circuits' miniaturization yield not only the smallest most flexible Hitachi HDTV camera to date but, one the "greenest" and most power efficient (16W camera head power consumption) ones on the market.

### High-performance starts with advanced sensors

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 2.3 million pixels, micro-lens array, 1080i CCDs, the SK-HD1000 surpasses the performance of all prior models. These new sensors enable the SK-HD1000 to achieve outstanding low noise, resolution, dynamic range response, sensitivity and ultra-low vertical smear characteristics.

A high horizontal resolution performance of 1100TVL (Luminance channel) is the pinnacle of picture sharpness from any camera presently on the market and is an attribute to the claim of having the most transparent signal processing path of any Hitachi digital camera manufactured to date.



### 16-bit analog-to-digital conversion

The SK-HD1000 takes full advantage of the increased dynamic range output (600%) of the NEW imagers by using 3 (Red, Green, Blue channel) 16-bit Analog-to-digital converters. These high speed converters 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 energy 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 Hitachi's DSP processors are designed to work with any new 2K imaging technology that is in the near future thus, offering a high R.O.I. (return on investment)

An outstanding overall signal-to-noise ratio specification of 60dB is achieved by use of our own low-noise circuit technology. The standard sensitivity is rated at F10 @ 59.94 Hz (SK-HD1000) / F10 @ 50 Hz (F11 @ 50 Hz optionally) (SK-HD1000E) / F11 @ 50 Hz (SK-HD1000E-S14, SK-HD1000E-S16) with 2000 lx.

Even at high gain, clear images are obtained with little noise.

Also high horizontal resolution performance of 1100TVL (Luminance channel) is the pinnacle of picture sharpness and is an attribute to the claim of having the most transparent signal processing path of any Hitachi digital camera manufactured to date.

### 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 materials that insure durability and reliable performance under the most demanding TV production circumstances. All command audio and video signals to and from the camera are digitally transmitted hence, totally immune to EMI/RFI interference. Camera power and cable condition supervision are also performed when 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 3,000m (9,840 feet) with no utility power\*.

The Optical power meters at the camera head, control panel and CCU front of the camera control unit indicate the optical condition of both the receiving and transmitting signals independently to accurately depict proximity to the "digital cliff", (maximum cable distance) or provide basic HFOC diagnostics.

\*HFOC distance with applied CCU power differs depending on the system configuration. It is dependent on the type of lens used, viewfinder, studio adapter, teleprompter and other accessories that may be connected and thereby consuming power otherwise available for the camera head.

## Super High Definition picture reproduction & enhancement tools

### Lens optimization

#### Real-time Lens Aberration Correction (RLAC)

Modern HDTV lenses can still produce certain optical distortions. One of these called "Lateral chromatic aberration" can be reduced in certain model of lenses when used with the SK-HD1000 camera system. The Hitachi function is called RLAC meaning "Real-time-lens-aberration-correction" and it dynamically corrects the image using the correction data provided by the digital interface between the lens and camera.



Full Frame

RLAC OFF

RLAC ON

#### Gray-Scale automatic setup

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

#### Lens Files

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.

### Luminance response tools

#### Selectable gamma tables

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.

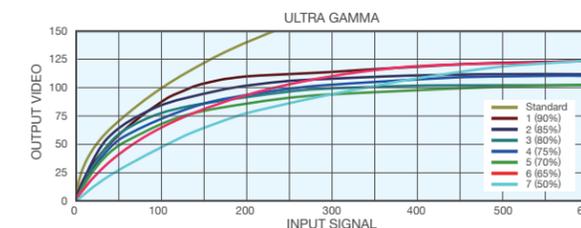


Standard Gamma

High Gamma Table ON (Simulated image)

#### Ultra-Gamma

A new and useful function implemented in the SK-HD1000 is the Ultra-Gamma function which provides seven different response. It dramatically increases the exposure latitude of the camera in shooting conditions where lighting and scenery vary widely in intensity.



#### Black stretch

The SK-HD1000'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 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. The auto knee 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.

## Color reproduction excellence

### ■ Triple-masking

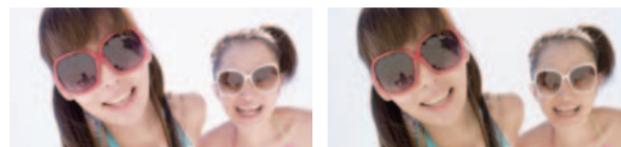
The triple-masking function includes the 12-vector, linear matrix and, Skin-tone masking provide the user wide latitude in subject image color control. The 12-vector color corrector provides independent control of the hue and saturation for six primary and six secondary combinations of colors. The 6-axis linear matrix provides overall color control thereby providing the user with excellent and precise color rendition control.

### ■ Preset Masking

The Preset Masking function recalls known industry standard colorimetry values that are precisely calibrated at the factory. These color standards are: STANDARD (Hitachi standard) / ITU-709 / SMPTE240M / SMPTE-WIDE / NTSC / EBU.

### ■ Skin-tone masking

The Skin-tone masking function provides "fine Painting" (hue and saturation) of Skin tones without affecting other colors in the scene. This functions additional and independently from the linear and 12-vector-masking functions thereby adding an additional color-correction (Triple-masking) Channel to the overall image color control.



Skin-tone masking OFF

Skin-tone masking ON (Simulated image)

### ■ 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. Also has the effect of 'legalizing' the color gamut of a particular preset masking setting.

### ■ Chroma Saturation

In addition to the extensive colorimetry controls offered in the SK-HD1000, the overall color saturation can be varied to achieve "dramatic" or artistic "effects".



Original Image

Color corrected (Simulated image)

### ■ Knee Saturation

The Knee Saturation 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.



Knee Saturation OFF

Knee Saturation ON (Simulated image)

## Picture sharpness enhancement

### ■ Absolute detail control

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

### ■ Master Detail items

Master Detail items are available to adjust varied parameters of the detail signal to taste or to achieve a desired "look" in your productions. Some of these adjustments are ; H/V detail, crisp, level dependence, knee detail, limiter, source, frequency and balance.

### ■ Skin-tone Detail

The Skin-tone Detail functions allow a flesh color-based softening of the image to achieve the impression of more youthful TV personalities. 2 individual memories exist as well as a function to automatically detect the hue, saturation and luminance of the Skin-tone to be affected. This function is not limited to Skin-tones only ; it can increase or decrease the sharpness of any pair of colors in the image.

Furthermore, the Skin-tone Detail level can be adjusted to follow the lens' zoom so that one can avoid 'rubber faces' at wide angle shots of talent.



Skin-tone Detail OFF

Skin-tone Detail ON (Simulated image)

### ■ High-chroma detail

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



High-chroma detail OFF

High-chroma detail ON (Simulated image)

## Setup memory and adjustment transfer card

A small plug-in setup card (SD card) stores the user setup and Scene File information. The adjustment data can then be recalled and used for future 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.



## Optical and image capture functions

### ■ Versatile CCD drive functions

Four modes of shutter operation are provided in the SK-HD1000 camera system : Five PRESET electronic shutter speeds. For stopping action or fast

- moving objects in the image.
- LOCK SCAN to image non-synchronous displays without flicker.
- Automatic Electronic Shutter (AES) maintains the video level when the maximum F-stop shooting condition is reached.
- Charge Controlled Frame (CC FRM) offers improved vertical resolution.
- Very useful in capturing highly detailed static images.

### ■ Motorized and remotely controlled optical filters

In traditional photography, ND filters are used for depth of field control. Four optical ND filters are provided as standard on a motorized, Remotely controlled filter wheel. These are : Clear, 4-point Cross, 1/16ND, 1/64ND. A second remotely controlled optical wheel is available in the S2 camera head versions with color Temperature filters for 3200K, 4300K, 6300K & 8000K.

### ■ Focus assist

Three different visual aids are available to support The camera operator In finding the right focus in the viewfinder . The Area Marker detects edges inside area, while a focus indicator shows the actual detail level by a horizontal line. A Focus Indicator Gauge can further be set to lock the maximum achieved level for a few seconds.

### ■ Programmable soft-switches (CS-1, CA-CS)

The cameraperson can assign Zebra, marker, VF Detail, Quick Focus or FAW to the CS-1 switch via the operation menu. The CA-CS switch can take on the functions of VF Detail on/off, marker-1 or marker-2 on/off.

### ■ Viewfinder options

Three viewfinder options are offered with the SK-HD1000 camera system. Black & White CRT-type viewfinders are manufactured for ENG (2-inch). These are of high-brightness and contrast making them ideal for easy visibility in field production.

A 9-inch color TFT-LCD screen viewfinder is offered for critical viewing such as encountered in studio productions.



The SK-HD1000 incorporates heavy duty mounts for both the ENG and Studio viewfinders.

### ■ Viewfinder markers & functions

The SK-HD1000 provides an excellent gamut of thoughtful viewfinder markers and functions to aid the cameraman in providing outstanding results during a TV program production.

All VF parameters can be stored in 4 dedicated memories which can catalog preferences for different camerapersons, programs, shooting condition or event period.

Programmable functions include; color/mono, detail, crisp, safety zone, 2 movable markers, center cross-hair, 2 movable effects boxes, variable aspect ratio side panels, side panel contrast/ bright, 2-mode zebra and variable line display level polarity.

### ■ Quick focus + Precision Focus (Auto Focus)

The Quick Focus function automatically opens the iris then sets the video level with the electronic shutter. The resulting shallow depth of focus, allows the cameraman to set the exact focus with ease. Lenses with Precision Focus(Auto Focus) technology are supported equally.

### ■ ECC (Electronic Color Compensation)

Due to the wide gain characteristics of the SK-HD1000, the ECC function compensates for color temperature electronically by providing preset gains to equal color temperature gradations of 3200K, 4300K, 5600K, 6300K and 8000K. The ECC can be controlled by the remote control panel and the base station like an optical filter. The setting can be stored in the Scene files and its status can be displayed on the view finder and the monitor output.

### ■ Full auto mode

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-1500JY and SU-1000 remote control panels. Full-time Auto White balance (FAW) corrects in real-time for color temperature variations due to changing types of lighting conditions on the scene object.

### ■ Viewfinder status displays

Iris F-stop, Lens Extender position, Shutter speed, Optical and ECC filter in use, and Gain setting are all displayed or defeated via menu selection. Menu selection also includes the over-level or between range-type zebra are also provided.

### ■ Comprehensive cameraperson operation panel

In Studio and Field production, the panel provides the camera-person With a wide array of controls for intercom audio, program audio, aux video switching controls, script lamp connector, dually and call functions the norm in high-end broadcast cameras.

### ■ Camera head inputs & outputs

The camera head provides 2 buffered HD-SDI, 1 SD analog teleprompter out, and 1 HD-SDI switchable as Monitor or VF and RET video output via BNC connectors. The MIC-1 channel is switchable with balanced XLR input connector located at the front of the camera (shotgun mic) or at the rear of the CA-HF1000. All the microphone input provides phantom power supplies and accept mic or line levels.

These IOs satisfy a wide variety of production requirements.



### ■ Prompter and floor monitor powers

The SK-HD1000 camera system provides 100VA for teleprompter and floor monitor power from the camera head. This is a standard feature available with Fiber and Digital Triax configurations.

### ■ Floor Monitor Digital Video

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

### ■ Professional Audio connectors

Hitachi uses dependable XLR-professional type audio connectors for the 2 intercom Headset and 2 MIC/LINE audio connections.

# ACCESSORIES

## Flexible Choice of Camera Control Units

### Optical Fiber System

The SK-HD1000 camera system can employ 2 different model control units to suit your budget for Studio and Field production. The CU-HD1000-S8 and CU-HD500 optical fiber CCUs (camera control units) can be used worldwide due to their 50/59.94Hz switchable universal power supplies. They furthermore comply with RoHS/WEEE directives.

The CU-HD500 is 88mm high and, of 2-RU EIA 19-inch rack width, weighing 9kg. (approx.).

The CU-HD1000-S8 additionally has the ability to output 1080i or 720p and is a half-rack size 3RU' s high, weighing 8.5Kg (approx.).

All CCUs employ the same control panels, data cables, accessories and peripherals.

**CU-HD1000-S8** Optical Power Meter



CU-HD1000-S8 Rear Panel

**CU-HD500** Optical Power Meter



CU-HD500 Rear Panel

### CCU Features and Benefits

- Front panel Optical Power meter
- Simultaneous HD-SDI and SD-SDI outputs
- with 2 channel embedded digital audio
- Analog RGB or Y, B-Y, R-Y component outputs (CU-HD1000-S8)
- 4 auxiliary returns (CU-HD1000-S8)
- Dedicated teleprompter channel and AC power
- ARIB-type color bar output
- 2 channel balanced analog Mic audio outputs
- Genlock with composite or tri-level sync
- 2-tally (Red/Green) system.
- 2-channel, 2W/4W intercom system.
- RS-232C remote control
- TCP/IP Network connectivity via RJ45 (CU-HD1000-S8, TU-HD1000, SU-1000 and RU-1500JY)

### Single Mode Fiber

CU-HD500 now works with either Hybrid fiber cable or Single mode fiber cable. These cable types are selected on CCU menu. Single mode fiber Up to 6km.

### TU-HD1000/CX-HD1000 Digital Triax System

The SK-HD1000 camera system can employ Digital Triax System.

Hitachi's Digital Triaxial cable transmission system addresses 2 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
- Employs no RF modulation or modems
- Little to no signal degradation.
- Capitalizes on reduced costs and flexibility of triaxialcopper cable.
- Includes 1080i (50/59.94) / 720p (50/59.94) cross-converter for HD-SDI outputs
- Built in, high-performance SDTV up/ down converters
- Provides the same IO's as the CU-HD1000

A full-rack mount adaptor AM-1000 is required when mounting the CU-HD1000-S8 and the TU-HD1000 to the rack.



CX-HD1000 Triax adaptor



TU-HD1000 Triax base station

## 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 SK-HD1000 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 but it can be extended up to 128 camera systems utilizing LAN operation.

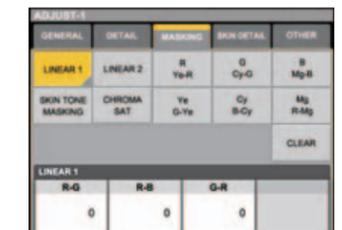
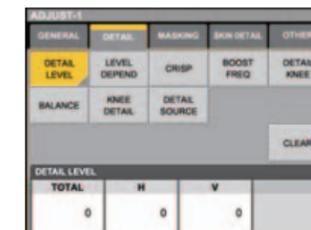
The compact and lightweight SU-1000 features Color LCD indicators in the display section to easily identify and access the provided control parameters. The unit is sufficiently small and lightweight enough to be used in space deprived locations such as encountered on a broadcast OB Van.

**SU-1000**



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.
- Adjustment and file data (write/ read) from SD memory card
- Video output selection including external video switcher control.
- LAN connectivity and cabling



## Remote Control Unit RU-1000VR & RU-1500JY

The RU-1000VR is a compact remote operation panel designed for easy operation of standard camera functions. Iris and master black adjustments employ "VR- type" rotary knob controls and commonly used controls and functions are directly and Instantaneously accessible to the video control engineer.

The RU-1500JY is a high performance touchscreen remote operation panel designed for ease of use. Easily adjustable using the 3.5" LCD touchscreen panel and rotary encoders, plus custom switches to further support the professional user in designing a personal workflow. The RU-1500JY provides an integrated SD card slot for transferring user setup and Scene File information, and LAN connectivity for control over an IP network.

**RU-1500JY**



**RU-1000VR**



# ACCESSORIES

## 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.



SA-1000 Rear Panel



**LM-B1000/SA-1000**  
(for Large Box Lens)



### Additional lens mounting options for the SA-1000

**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)



### Dockable : One camera body to suit multiple configurations.

- Hybrid Fiber-optic cable Adaptor
- Triax cable Adaptor
- P2 Solid-State HDTV recorder
- (3rd party) Wireless Adaptor



Wireless Adaptor    HDTV dockable recorder    Fiber cable Adaptor    Triax cable Adaptor

## Studio and Field Production View Finder

The SK-HD1000 camera system offers three choices for Studio or Field production viewfinders. Model VF-L90HD is a color 9-inch TFT-LCD screen and Model HDF-700H is a color 7-inch TFT-LCD screen which are designed for critical color viewing of the image.

TFT-LCD screens are suitable where precise composition and color evaluation of the image are required. The VF-HD500 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.



**VF-L90HD Viewfinder/ AT-951**



**HDF-700H Viewfinder /AT-750**

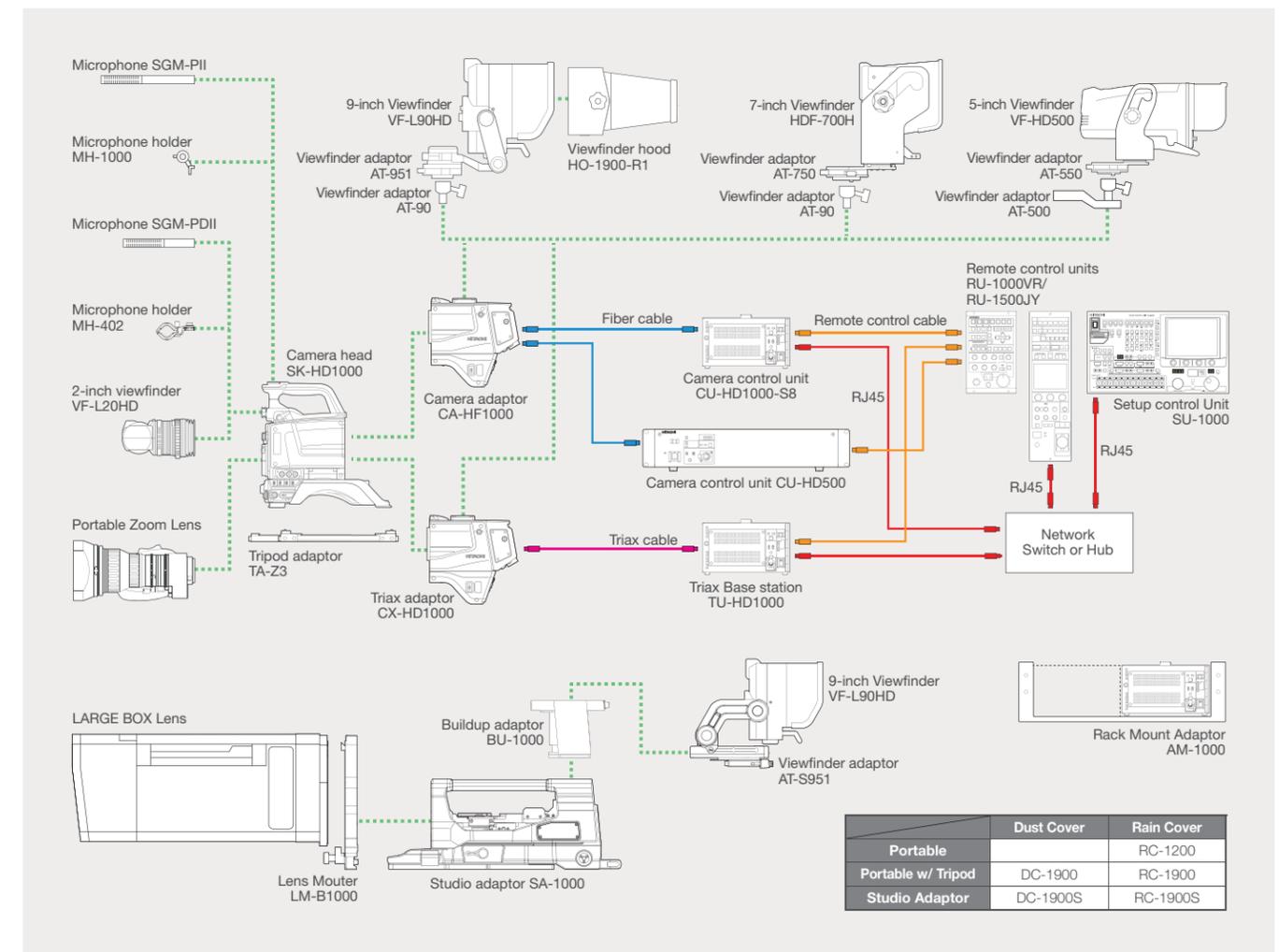


**VF-HD500 Viewfinder/ AT-550**



**VF-L20HD Viewfinder**

## System configuration chart



# SPECIFICATIONS

## SK-HD1000 Camera Head

	SK-HD1000	SK-HD1000-S2	SK-HD1000E-S14	SK-HD1000E-S16
Imaging Device	(3x - RGB) 2/3-inch, 16.9, 2.3 M Pixel Super-Advanced, micro-lens IT-CCD			
Effective pixels	1,920 (H) x 1,080 (V)			
Optical system	F1.4 prism.			
Optical Filters	1x motorized filter wheel w/4 filter positions 1: Clear, 2: Cross, 3:1/16ND, 4:1/64ND	2x motorized filter wheel w/5 filter positions ND CAP, 1: CLEAR, 2:1/4ND, 3:1/16ND, 4:1/64ND CC A: CROSS, B: 3200K, C: 4300K, D: 6300K, E: 8000K	1x motorized filter wheel w/4 filter positions 1: Clear, 2: Cross, 3:1/16ND, 4:1/64ND	2x motorized filter wheel w/5 filter positions ND CAP, 1: CLEAR, 2:1/4ND, 3:1/16ND, 4:1/64ND CC A: CROSS, B: 3200K, C: 4300K, D: 6300K, E: 8000K
ECC Filters	3200K, 4300K, 5600K, 6300K, 8000K	5600K	3200K, 4300K, 5600K, 6300K, 8000K	5600K
Sensitivity	59.94Hz:F10, 50Hz:F10(50Hz:F11 optionally) @2000lx, 3200K, 89.9% reflectance			
Signal to Noise Ratio	60dB (typical)			
Horizontal resolution	1100 TV Lines (at center)			
Depth of modulation	60% (typical) (800TV Lines at center, 27.5 MHz, 1080i)			
Registration	Overall 0.01% (excluding lens limitations)			
Lens mount	B4 bayonet-type			
Gain selection	L (low) -3, 0dB M (medium) 0, +3, +6, +9, +12, +15, +18, +21dB H (high) +3, +6, +9, +12, +15, +18, +21, +24dB			
Electronic Shutter	1/100, 1/250, 1/500, 1/1000, 1/2000(1080/59.94i), 1/60, 1/250, 1/500, 1/1000, 1/2000(1080/50i) AES, CC Frame			
Power consumption	16 W Head only (without VF, lens)			
Dimensions	133 (W) x 191 (H) x 262 (D) mm			
Mass	2.2kg, 4.8lbs. Camera head			
Operating temperature	-10°C to +45°C, 14°F to 113°F			
Camera head	1x BNC HD-SDI VF out (Character ON/OFF) or HD-SDI RET out 1x BNC HD-SDI VF out (Character ON/OFF) or HD-SDI RET out			
Input & Output	4-pin Multi connector for remote control unit 20-pin Multi VF connector, 12-pin Multi LENS connector XLR 3-pin MIC-1 connector, SD Memory Card Slot			

## CA-HF1000 Fiber Camera Adaptor (CA-HF1000(59.94Hz)/CA-HF1000E(50Hz))

CCU connector	1x-type HFOC female connector (LEMO Type) SMPTE-304M-type
Video transmission system	Fully digital, bi-directional, 10-bit, 4:2:2 sampling, SMPTE-274M
Intercom	2x channel, 5-pin each XLR, channel selection, MIC on/off, volume
Program audio	2x, PGM audio level controls w/ Chnl1 & Chnl2 intercom mix
Teletypewriter power output	1x 5-pin, 230VAC, 60W to 100W, external prompter Tally drive out (depending on configuration accessories)
Microphones	Chnl1 & 2 Line or MIC level select (MENU), with phantom power on/off
Return/ Aux switcher	2-channel, 4-input remote AUX/VF video select connector (RET control)
Video Inputs & Outputs	2x HD-SDI out, 1X SD analog teletypewriter out shared with Genlock in
Other I/O	1x 29-pin (for SA-1000 cable-less interface) 1x 5-pin script lamp +12VDC (1.0 A max) 1x 5-pin VF AUX return (for use in cranes or extended Head/VF configurations) 1x 4-pin XLR, 12VDC, power input
Mass	2.2kg, 4.8lbs.

## 2-inch Color Viewfinder VF-L20HD

Display device	2-inch color TFT LCD (16:9)
Number of pixels	960 (H) x 540 (V)
Functions	BRIGHT, CONTRAST, Diopter PEAKING knob VR (front facing)
Internal tally	Red / Green
Tally switch	Tally switch OFF, NORMAL, HIGH
Power Consumption	Approx. 5.0 W (at Heater -OFF) 6.5 W (at Heater -ON)

## B&W CRT Viewfinder VF-HD500 (VF-HD500-R2 (59.94Hz) / VF-HD500E-R2 (50Hz))

TV System	1080i
Construction	High-impact plastic
CRT	5-inch B&W 4 : 3 CRT with removable hood
Camera mounts	2x, AT-500/ AT-550
Resolution	750TVL

## CX-HD1000 Triax Camera Adaptor (CX-HD1000(59.94Hz)/CX-HD1000E(50Hz))

CCU connector	1x-Triax connector
Video transmission system	Fully digital, bi-directional, 10-bit, 4:2:2 sampling, SMPTE-274M
Intercom	2x channel, 5-pin each XLR, channel selection, MIC on/off, volume
Program audio	2x, PGM audio level controls w/ Chnl1 & Chnl2 intercom mix
Teletypewriter power output	1x 5-pin, 230VAC, 60W to 100W, external prompter Tally drive out (depending on configuration accessories)
Microphones	Chnl1 & 2, Line or MIC level select (MENU), with phantom power on/off
Return/ Aux switcher	Remote AUX/VF video select connector (RET control)
Video Inputs & Outputs	2x HD-SDI out (1x HD/SD-SDI Cam/Ret, SD-SDI PPT switchable) 1x SD analog out (VBS/PPT), Genlock (Tri-level sync) switchable
Other I/O	1x 29-pin (for SA-1000 cable-less interface) 1x 5-pin script lamp +12VDC (1.0A max) 1x 5-pin VF AUX return (for use in cranes or extended Head/VF configurations) 1x 4-pin XLR, 12VDC, power input
Mass	2.6kg, 5.7lbs.

## VF-L90HD LCD Color Studio Viewfinder

TV System	50/60Hz, 1080i / 720p auto-switching
Construction	Metal chassis and mount
Display	9-inch, color TFT-LCD, 1280 (H) x 768 (V)
Camera mounts	6500°K with removable hood AT-951 / AT-90
Functions	Chroma, WF on/off, Marker-1/2 On/Off, Bright, Contrast, Peaking, knobs VR front-facing, Power ON/OFF
Internal Tally	Red/ Green, Front-facing high brightness LEDs
Tally controls	Tally OFF, NORMAL, HIGH
Mass	1.6kg, 3.5lbs.
Power consumption	16W (approx.)

## Functions

Functions	Bright, Contrast, Peaking, knobs VR front-facing
Internal Tally	Red/ Green, Front-facing high brightness lamp
Tally controls	Tally ON/OFF
Mass	1.8kg, 4lbs
Power consumption	15W (approx.)

## CU-HD1000-S8 Camera Control Unit (CU-HD1000-S8 (59.94Hz)/CU-HD1000E-S8 (50Hz))

Optical Connector	1x-type HFOC female connector(LEMO Type) SMPTE-304M-type
Genlock	1x BNC, B-BST 0.45Vp-p/75Ω (loop through) HDTV tri-level sync 0.60Vp-p/75Ω (loop through)
Digital Return 1/2/3/4	4x BNC, HD SDI or SD SDI
Analog Return 1/2	2x BNC, VS or VBS 1.0Vp-p/75Ω (loop through)
Prompt	1x BNC, VS or VBS 1.0Vp-p/75Ω (loop through)
Intercom (Headset)	5-pin XLR, -60dBm
Communication	1x D-sub 25-pin, Incom, Tally
Intercom PGM R/G TALLY	0dBm / 600Ω at 4Wire, 0dbu or -15dbu/200Ω at 2Wire 0dBm / 600Ω Contact or Voltage selectable
Output signals	
ENCR	3x BNC, VBS 1.0Vp-p/75Ω
R-Y or R	1x BNC, NTSC : 0.7Vp-p, PAL : 0.525Vp-p/75Ω VS 1.0Vp-p/75Ω (Selectable)
Y or G	1x BNC, VS 1.0Vp-p/75Ω 1x BNC, VS 1.0Vp-p/75Ω (Selectable)
B-Y or B	1x BNC, NTSC : 0.7Vp-p, PAL : 0.525Vp-p/75Ω VS 1.0Vp-p/75Ω (Selectable)
Digital Out	3x BNC, HD-SDI (Embedded audio available) 3x BNC, HD-SDI or SD-SDI selectable (Embedded audio available) HD-SDI or SD-SDI selectable PIX (Embedded audio available)
PIX (R,G,B,ENCR)	1x BNC, VS or VBS 1.0Vp-p/75Ω
WFM OUT (R,G,B,ENCR)	1x BNC, VS or VBS 1.0Vp-p/75Ω
MIC OUT 1	1x XLR, 3-pin, 0dBm/600Ω
MIC OUT 2	1x XLR, 3-pin, 0dBm/600Ω
Intercom (headset)	1x XLR, 5-pin, 0dBu Max +15dB
Remote 1	1x 4-pin, 1.5Vp-p or 1x D-sub, 9-pin RS-232C (Switchable)
Remote 2	1x 4-pin, 1.5Vp-p
TALLY OUT (R/G Tally)	1x D-sub 9-pin Contact 24V DC, 10mA
WFM control	1x D-sub 15-pin WFM 0-7, 0/5V
Power supply voltage	CU-HD1000J-S8 AC100V @ 50/60Hz CU-HD1000U-S8 AC117V @ 60Hz CU-HD1000E-S8 AC230V @ 50Hz
HFOC maximum cable distance	3,000 meters* (9,840 feet*) with CCU power*
Operating temperature	0°C to 40°C, 32°F to 104°F
Mass	8.7kg, 19.1lbs.
Power consumption	210W approx. (AC operation, including SK-HD1000, VF-L20HD and AUX POWER OUT 100VA)

## CU-HD500 Camera Control Unit (CU-HD500 (59.94Hz)/CU-HD500E (50Hz))

Optical Connector	1x-type HFOC female connector(LEMO Type) SMPTE-304M-type
Genlock	1x BNC, B-BST 0.45Vp-p/75Ω (loop through) HDTV tri-level sync 0.60Vp-p/75Ω (loop through)
Digital Return 1/2	1x BNC, HD SDI or SD SDI
Prompt	1x BNC, VS or VBS 1.0Vp-p/75Ω (loop through)
Intercom (Headset)	5-pin XLR, -60dBm
Communication	1xD-sub 25-pin, Incom, Tally
Intercom PGM R/G TALLY	0dBm / 600Ω at 4Wire, 0dbu or -15dbu / 200Ω at 2Wire 0dBm / 600Ω Contact or Voltage selectable
Digital Out	2x BNC, HD-SDI (Embedded audio available) 4x BNC, HD-SDI or SD-SDI selectable (Embedded audio available) HD-SDI or SD-SDI selectable PIX (Embedded audio available)
MIC OUT 1	1x XLR, 3-pin, 0dBm/600Ω
MIC OUT 2	1x XLR, 3-pin, 0dBm/600Ω
Intercom (headset)	1x XLR, 5-pin, 0dBu Max +15dB
Remote 1	1x 4-pin, 1.5Vp-p
Remote 2	1x 4-pin, 1.5Vp-p
MIC REMOTE	1x D-sub 15-pin MIC1.2 GAIN
TALLY OUT (R/G Tally)	1x D-sub 9-pin Contact 24V DC, 10mA
WFM control	1x D-sub 15-pin WFM 0-7, 0/5V
Power supply voltage	CU-HD500J AC100V @ 50/60Hz CU-HD500U AC117V @ 60Hz CU-HD500E AC230V @ 50Hz
HFOC maximum cable distance	3,000 meters* (9,840 feet*) with CCU power*
Operating temperature	0°C to 40°C, 32°F to 104°F
Mass	9kg, 15.4lbs.
Power consumption	300W approx. (AC operation, including SK-HD1000, VF-L20HD and AUX POWER OUT 100VA)

## TU-HD1000 Triax Base Station (TU-HD1000 (59.94Hz)/TU-HD1000E (50Hz))

Triax Connector	1x-Triax Connector
Genlock	1x BNC, B-BST 0.45Vp-p/75Ω (loop through) HDTV tri-level sync 0.60Vp-p/75Ω (loop through)
Digital Return 1/2/3/4	4x BNC, HD SDI or SD SDI
Analog Return 1/2	2x BNC, VS or VBS 1.0Vp-p/75Ω (loop through)
Prompt	1x BNC, VS or VBS 1.0Vp-p/75Ω (loop through)
Intercom (Headset)	5-pin XLR, -60dBm
Communication	1x D-sub 25-pin, Incom, Tally
Intercom PGM R/G TALLY	0dBm / 600Ω at 4Wire, 0dbu or -15dbu/200Ω at 2Wire 0dBm / 600Ω Contact or Voltage selectable
Output signals	
ENCR	3x BNC, VBS 1.0Vp-p/75Ω
R-Y or R	1x BNC, NTSC : 0.7Vp-p, PAL : 0.525Vp-p/75Ω VS 1.0Vp-p/75Ω (Selectable)
Y or G	1x BNC, VS 1.0Vp-p/75Ω 1x BNC, VS 1.0Vp-p/75Ω (Selectable)
B-Y or B	1x BNC, NTSC : 0.7Vp-p, PAL : 0.525Vp-p/75Ω VS 1.0Vp-p/75Ω (Selectable)
Digital Out	3x BNC, HD-SDI (Embedded audio available) 3x BNC, HD-SDI or SD-SDI selectable (Embedded audio available) HD-SDI or SD-SDI selectable PIX (Embedded audio available)
PIX (R,G,B,ENCR)	1x BNC, VS or VBS 1.0Vp-p/75Ω
WFM OUT (R,G,B,ENCR)	1x BNC, VS or VBS 1.0Vp-p/75Ω
MIC OUT 1	1x XLR, 3-pin, 0dBm/600Ω
MIC OUT 2	1x XLR, 3-pin, 0dBm/600Ω
Intercom (headset)	1x XLR, 5-pin, 0dBu Max +15dB
Remote 1	1x 4-pin, 1.5Vp-p or 1x D-sub, 9-pin RS-232C (Switchable)
Remote 2	1x 4-pin, 1.5Vp-p
TALLY OUT (R/G Tally)	1x D-sub 9-pin Contact 24V DC, 10mA
WFM control	1x D-sub 15-pin WFM 0-7, 0/5V
Power supply voltage	TU-HD1000J AC100V @ 50/60Hz TU-HD1000U AC117V @ 60Hz TU-HD1000E AC230V @ 50Hz
Operating temperature	0°C to 40°C, 32°F to 104°F
Mass	7.9kg, 17.4lbs.
Power consumption	210W approx. (AC operation, including SK-HD1000, VF-L20HD and AUX POWER OUT 100VA)

## RU-1000VR Remote Control Unit

Dimensions	116 (W) x 182 (D) x 60 (H) mm
Mass	0.6kg, 1.2lbs.
Power input	+12V DC
Operation temperture	0°C to 40°C, 32°F to 104°F
Interface	4 pin connector

## RU-1500JY Remote Control Unit

Dimensions	102 (W) x 370 (D) x 56.2 (H) mm
Mass	1.3kg, 2.9lbs.
Power input	+12VDC
Operational temperature	0°C to 40°C, 32°F to 104°F
Interface	RJ-45 connector, 4-pin connector

## SU-1000 Setup Control Unit

Input signal	VE (Video Engineer) Switch input : Contact closure
Dimensions	385 (W) x 255 (D) x 65 (H) mm
Power input	100/117/220/240VAC, 50/60Hz, auto-sensing
Mass	4.1kg, 9lbs.
Operational temperature	0°C to 40°C, 32°F to 104°F
Power consumption	Approx. 33VA
Interface	RJ-45 connector, 4-pin connector

\* The maximum length of the cable supplying power to the camera varies with the camera system configuration and with the type of optical fiber cable.