Hitachi Kokusai Electric

HITACHI

## Multi-format, Digital HDTV Production Camera.
## Progressive Capture, Processing & Transmission, 3Gbps.

# SK-HD1200



# Hitachi SK-HD1200 Advanced HDTV Studio and Field Production Camera



SK-HD1200 with VF-402

**Latest Advanced Progressive Scan Sensors**

**Advanced ADC and DSP**

**3 Gbps, 1080p transmission and outputs**

**Fully networked control system**



CA-HF1200 Rear Panel

The SK-HD1200 is Hitachi's fourth generation HDTV camera that employs most advanced progressive scan CCD image sensors, advanced digital signal processing patents and world-renowned Hitachi technology. It is a our highest performance, Multi-Standard HDTV studio and field production camera that satisfies TV Systems in various regions of the world having 50Hz or 60Hz AC line power and both analog and digital signals. As a standard feature, the SK-HD1200 is a multi-format output camera system since it is able to output dual formats (SD and HD) at the same time. Available as a standard feature is the ability to outputs 1080p, 1080i or 720p HDTV signal formats and SD at the same time.
The lightweight 4.4Kg camera is a 2-piece docable design that provides efficient and cost-effective adaptation to various configurations that facilitate HDTV. The circuits' miniaturization yield not only the smallest most flexible Hitachi HDTV camera to date but, one of the "greenest" and most power efficient (22W camera head power consumption) cameras on the market.

## High image quality-provided by NEW Progressive Sensors

Hitachi has achieved an incredibly low noise 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, native 1080p CCDs, the SK-HD1200 surpasses the performance of all prior models. These new sensors enable the SK-HD1200 to achieve outstanding horizontal and vertical resolution, dynamic range response, sensitivity and ultra-low vertical smear characteristics.

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

The SK-HD1200 takes full advantage of the increased dynamic range output of the NEW imagers by using the latest and most efficient, integrated16-bit analog-to-digital converters. These high speed ADCs are the bridge between the analog 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-HD1200 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 40nm rule with dynamic processing capability in excess of 38-bits per pixel, per RGB channel. Hitachi's DSP processors are designed to easily manage the higher bandwidth of progressive readout HDTV sensors. The increased dynamic headroom of the SK-HD1200, allows faithful reproduction of even the most contrasting images.
An outstanding overall signal-to-noise ratio is achieved by using our own low-noise circuit technology without resorting to noise filtering methods.
Even at high gain, clear images are obtained with little noise.

## Setup memory and adjustment transfer card

A small plug-in setup card (SD card up to 2GB) stores the camera person viewfinder indicators and video operator 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 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 SD Card access on various control panels.



## Digital signal transmission via Hybrid Fiber Optical Cable

Hitachi has brought to market the first 3Gbps, fully digital optical transmission system in an HDTV production camera. It is the most accurate transport available for the 10-bit, 1080p images from the camera head to the camera control unit. 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 standard SMPTE311-type Hybrid Fiber Cable. Full Auxiliary (up to 6 digital, HD or SD) video return and individual are with the SK-HD1200 transmission system. The maximum HFOC length with applied camera power and fully operational facilities is 4,000m (13,200 feet) with no utility power.

Unique to cameras in the SK-HD1200' s price range are optical power meters at the camera head (via engineering menu) and on the front of the CU-HD1200 camera control unit. These meters indicate the optical condition of both the receive and, transmit signals independently to accurately depict the proximity to the "digital cliff", maximum cable distance or provide basic fiber cable diagnostics in the field.

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



# Superb High Definition picture reproduction & enhancement tools

## Luminance response tools

### Selectable gamma tables

In addition to normal gamma point and balance adjustments, the SK-HD1200 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.



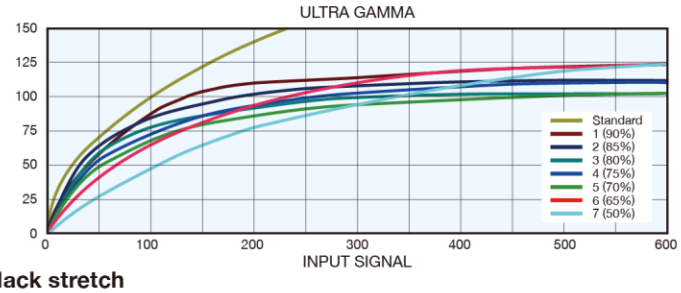
Standard Gamma



High Gamma Table ON (Simulated image)

### Ultra Gamma

This function dramatically increases the exposure latitude of the camera in shooting conditions where the intensity of lighting and scenery varies widely. Seven different ultra-gamma responses are pre-programmed to suit just about every possible adverse shooting condition.




### Black stretch

The SK-HD1200' 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.

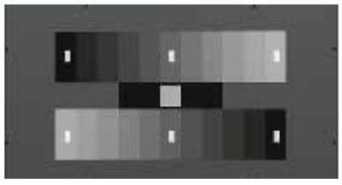
### Linear and auto-knee

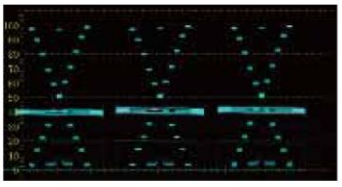
Like the peak video level control function of the white clip; the linear knee function is made up of the actual knee (level compression) point and its slope which improve overexposed portions of the picture by compressing the video past a certain point. These points are user adjustable.
The auto knee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

## Lens optimization

### Gray-Scale automatic setup

The SK-HD1200 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.





### Automatic vertical modulation shading adjustment

The SK-HD1200 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 X2 lens extender positions.







### 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 ; 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)

### Lens Files

The SK-HD1200 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.

## 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 reproduce various image color such as STANDARD(Hitachi stanard)/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)

### Chroma Saturation

In addition to the extensive colorimetry controls offered in the SK-HD1200, the overall color saturation can be varied to achieve "dramatic" or artistic "effects" .



Original Image



Color corrected (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-HD1200.

### Master Detail items

Master Detail items are available to adjust various 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.



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)

## Optical and image capture functions

**Versatile CCD drive functions**

Three modes of shutter operation are provided in the SK-HD1200 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.

**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.

**Focus Assist**

Advanced Focus Assist Function aids are available to support the camera operator in finding the right focus regardless of the viewfinder model used. 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.

**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 Correction)**

Due to the wide gain characteristics of the SK-HD1200, the ECC function corrects 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.

**2X Digital extender**

The Digital extender function enlarge an image two times to capture an more zooming image.

# Ease of use characteristics & functions

**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, 2X Digital Extender, marker-1 or marker-2 on/off.

**Viewfinder options**

Three viewfinder options are offered with the SK-HD1200 camera system. Black & White CRT-type viewfinders are manufactured for ENG (2-inch) and OB (5-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-HD1200 incorporates heavy duty mounts for both the ENG and Studio viewfinders.

**Viewfinder markers & functions**

The SK-HD1200 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.

**Viewfinder status displays**

Iris F-stop, Lens Externder 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, dual-tally and call functions the norm in high-end broadcast cameras. These functions along with available 100VA of teleprompter monitor power and dedicated prompter SD signal make the SK-HD1200 a logical choice for sophisticated productions.

**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-HF1200. All the microphone input provides phantom power supplies and accept mic or line levels. These IOs satisfy a wide variety of production requirements.

# 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-HD1200 in this configuration.







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



SA-1000 Rear Panel

## 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)



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

The CU-HD1200 and the CA-HF1200 constitute the camera control and transmission system for the new multi-standard camera SK-HD1200. The Camera Control Unit CU-HD1200 provides significantly reduced power consumption and improved functionality. SDI（1080p/1080i/720p/480i/ 576i ）inputs/outputs are offered as standard. This flexible system is capable of providing many modern HD/SD-SDI video signals required by today's HDTV program production demands.

- Constructed full complement of Serial Digital Interfaces is provided as standard.
  Digital inputs/outputs:
  - HD-SDI OUT x8 or Dual Link-HD-SDI x4 [Embedded audio available]
  - HD-SDI or SD-SDI OUT x4 [x2/x2 Embedded audio available] (SD-SDI 16:9/4:3 switchable)
  - HD-SDI or SD-SDI WFM OUT x1 [Embedded audio available]
  - HD-SDI or SD-SDI PIX OUT x1 [Embedded audio available]
  - HD-SDI or SD-SDI RET In x4 [for VF]
  - HD-SDI or SD-SDI RET In x2 [for Floor Monitor] (HD-SDI 3G/1.5G switchable)

  Analog inputs/outputs:
  - PROMPT IN x1
  - GL IN x1
- High-performance SDTV down-converter
  - Due to the use of an independent and separate processor located in the CU-HD1200, detail can be adjusted for the SD video outputs without affecting the HD video signal outputs.
  - SD aspect ratio is switchable between 16:9 and 4:3.
- HD up-converter
  The HDTV up-converter for displaying the SDTV return signals in the HD Viewfinder is provided as standard with the CU-HD1200. The up converter is of a line-correction type capable of displaying 1080 effective scanning lines. In addition, AUX and Return color signals can be displayed in the TFT-LCD color viewfinders offered.
- High-quality digital transmission using optical fiber cable.
  An HFOC (Hybrid Fiber Optic Cable) is used to connect the camera adaptor (CA) and the camera control unit (CCU). The signals are transmitted using an optical serial digital transmission system that can be switched between 1080i and 1080p transmission modes to ensure high-quality transmission.
- The effective HFOC length can be up to 4,000m (13,200 feet) with no utility power and up to 10km with normal single mode fiber (2 required per camera).
  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 (option))

CU-HD1200 Front Panel




CU-HD1200 Rear Panel



# ACCESSORIES

## 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-HD1200 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) or 128 cameras in ethernet operation.

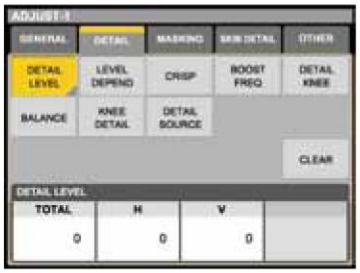
The compact and lightweight SU-1000 features Color LCD indicators in the display section to easily identify and access the provided control parameters. The unit is sufficiently small and lightweight enough to be used in space deprived locations such as encountered on a broadcast OB Van.

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.
Ethernet connectivity and cabling







## RU-1500JY Remote Control Unit

The RU-1500JY Remote Control Unit is a new remote operation panel for the Hitachi SK-HD1200. Painstaking attention has been paid to making the most commonly used controls and functions directly and instantaneously accessible to the video control engineer. A touch screen display provides access to multi-level menus that are intuitive and easy to read. Data storage and transfer of the camera adjustments can easily be performed with the use of the SD card slot provided.
It is an ideal production tool that enhances any HD studio or field production.



# Studio and Field Production Viewfinders

The SK-HD1200 camera system offers two choices for Studio or Field production viewfinders. Model VF-L90HD 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 fitted with alternate mounts thereby decreasing the overall system cost.

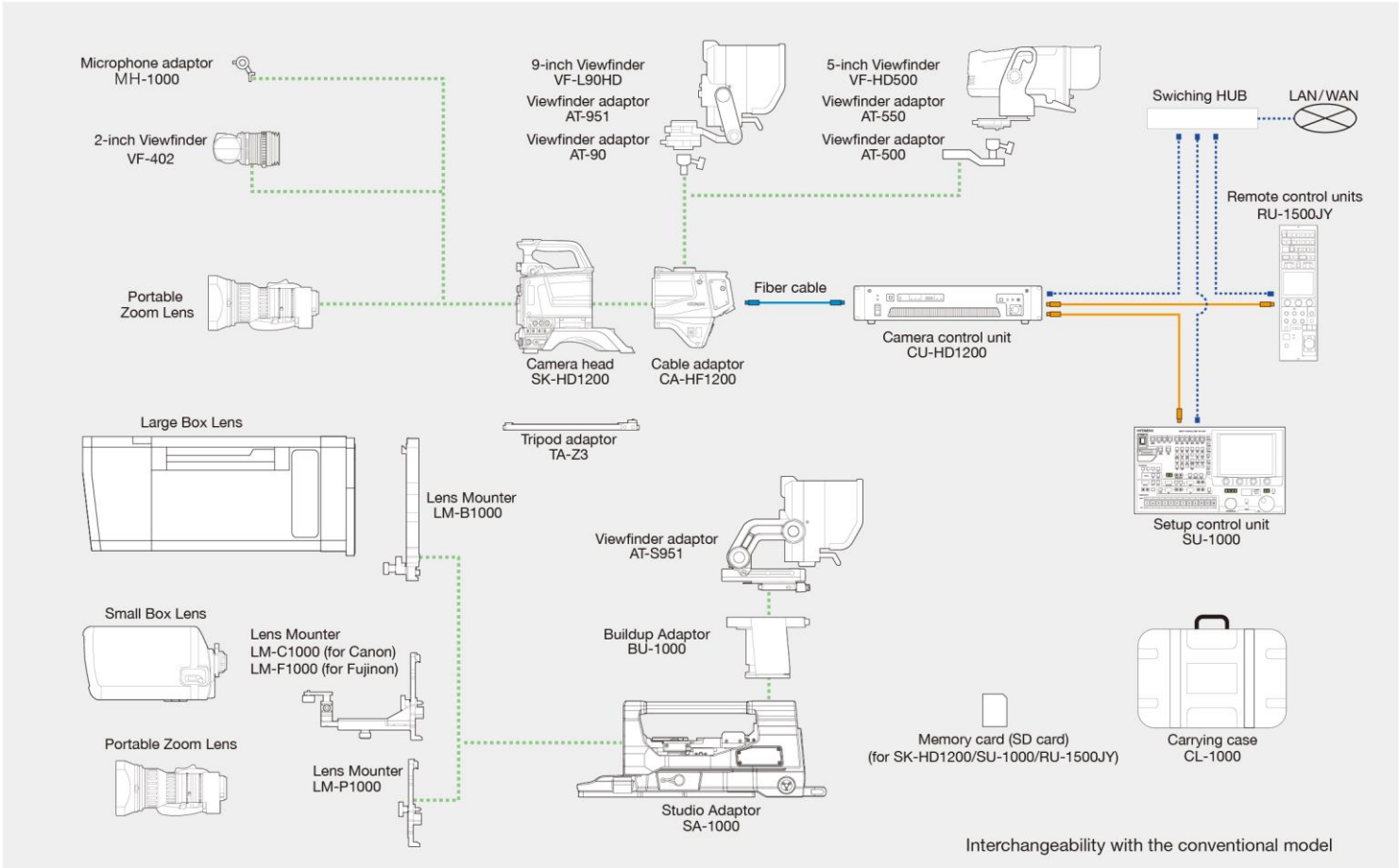
VF-L90HD Viewfinder/AT-951



VF-HD500 Viewfinder/AT-550




# System configuration chart



# SPECIFICATIONS

## SK-HD1200 Camera Head

| | SK-HD1200 | SK-HD1200-S2 |
|---|---|---|
| Imaging Device | ( 3x - RGB ) 2/3-inch, 16:9, 2.3 M Pixel. Ultra-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 with 4 filter positions<br>1: Clear, 2: Cross, 3:1/16ND, 4:1/64ND<br>ECC ( Electronic Color Correction ) with 5 settings<br>( 3200K, 4300K, 5600K, 6300K, 8000K ) | 2x motorized filter wheel with 5 filter positions<br>ND CAP, 1 : Clear, 2 : 1/4ND, 3 : 1/16ND, 4 : 1/64ND<br>CC A : CROSS, B : 3200K, C : 4300K, D : 6300K, E : 8000K<br>ECC (Electronic Color Correction) 5600K. |
| Sensitivity | F8 @2000lx, 3200K, 89.9% reflectance ( 1080p ) | |
| Signal to Noise Ratio | 60dB ( 1080i ) ( typical ) | |
| Horizontal resolution | Horizontal 1100TVL, Vertical 1000TVL ( at center ) | |
| Depth of modulation | 60% ( typical ) ( 800TV Lines at center, 27.5 MHz ) | |
| Registration | Overall 0.01% ( excluding lens limitations ) | |
| Lens mount | B4 bayonet-type | |
| Gain selection | L (low) -3, 0dB<br>M (medium) 0, +3, +6, +9, +12, +15, +18, +21dB<br>H (high) +3, +6, +9, +12, +15, +18, +21, +24dB | |
| Electronic Shutter | 1/100, 1/250, 1/500, 1/1000, 1/2000 ( 1080/59.94p ), AES, CC Frame<br>1/60, 1/250, 1/500, 1/1000, 1/2000 ( 1080/50p ) | |
| Power consumption | 22 W Head only ( without VF, lens ) | |
| Dimensions | 133 (W) x 191 (H) x 262 (D) mm | |
| Mass | 2.2kg, 4.8lbs | |
| Operating temperature | -10ºC to +45ºC, 14ºF to 113ºF | |
| Input & Output | 1x BNC HD-SDI VF out ( Character ON/OFF ) or HD-SDI RET out<br>4-pin Multi connector for remote control unit<br>20-pin Multi VF connector, 12-pin Multi LENS connector<br>XLR 3-pin MIC-1 connector, SD Memory Card Slot | |

## CA-HF1200 Fiber Camera Adaptor

| | |
|---|---|
| CCU connector | 1x-type HFOC female connector ( LEMO )<br>SMPTE-304M-type |
| Intercom | 2x channel, each XLR 5-pin, channel selection,<br>MIC on/off, volume |
| Program audio | 2x, PGM audio level controls w/ Chnl1 & Chnl2 intercom mix |
| Teleprompter power output | 1x 5-pin, AC230V, 100VA, external prompter R/G Tally drive out<br>( depending on configuration accessories ) |
| Microphones | Channel 1 & 2 Line or MIC level select ( MENU ),<br>with phantom power on/off |
| Return/ Aux switcher | 2-channel, 4-input remote AUX/VF video select connector<br>( RET control ) |

| | |
|---|---|
| Video Inputs & Outputs | 1x 3G HD-SDI OUT, 1X SD analog teleprompter out shared with Genlock in |
| Other I/O | 1x 29-pin (for SA-1000 cable-less interface) (female) |
| | 1x 5-pin script lamp DC12V (1.0A max) (female) |
| | 1x 6-pin VF AUX return (female)<br>(for use in cranes or extended Head/VF configurations) |
| | 1x R05-R8F 8-pin TRUNK RS-422 or RS-232C (option) (female) |
| | 1x XLR 4-pin, DC12V power input (male) |
| Dimensions | 133 (W) x 189 (H) x 194 (D) mm |
| Mass | 2.2kg, 4.8lbs. |
| Operating temperature | -10ºC to +45ºC, 14ºF to 113ºF |

## CU-HD1200 Camera Control Unit

| | |
|---|---|
| Genlock | 1x BNC, B-BST 0.45Vp-p/75Ω (loop through) |
| | HDTV tri-level sync 0.60Vp-p/75Ω (loop through) |
| Digital Return A (1/2/3/4)<br>B (1/2) | 6x BNC, HD SDI : 3G/1.5G switchable or SD SDI |
| Prompt | 1x BNC, VS or VBS 1.0Vp-p/75Ω (loop through) |
| Intercom ( Headset ) | IN : 1x XLR, 5-pin, -60dBm (female) |
| | OUT : 1x XLR, 5-pin, 0dBu Max +15dB (female) |
| Communication | 1x D-sub 25-pin (female) |
| Intercom | 0dBm, 600Ω/ 4Wire |
| PGM | 0dBu or -15dBu, 200Ω at 2Wire 0dBm/ 600Ω |
| R/G TALLY | DC or contact supply |
| Digital Out | 8x BNC HD-SDI (3G/1.5G or Dual Link switchable)<br>(Embedded 2-Chnl audio available) |
| | 4x BNC HD-SDI or SD-SDI selectable (HD-SDI : 3G/1.5G switchable)<br>(Embedded 2-Chnl audio available) |
| | 1x BNC HD-SDI or SD-SDI selectable WFM<br>(HD-SDI : 3G/1.5G switchable) |
| | 1x BNC HD-SDI or SD-SDI selectable PIX<br>(HD-SDI : 3G/1.5G switchable) |

| | |
|---|---|
| MIC OUT 1 | 1x XLR, 3-pin, 0dBm/ 600Ω (male) |
| MIC OUT 2 | 1x XLR, 3-pin, 0dBm/ 600Ω (male) |
| Remote 1 | 1x 4-pin, 1.5Vp-p (female) |
| Remote 2 | 1x 4-pin, 1.5Vp-p (female) |
| Remote 3 | 1x RJ-45 |
| TALLY OUT | 1x D-sub 9-pin (female) |
| R/G Tally | Contact or Voltage selectable |
| WFM control | 1x D-sub 15-pin WFM 0-7, 0/5V (female) |
| MIC REMOTE | 1x D-sub 15-pin MIC 1.2GAIN (female) |
| TRUNK | 1x D-sub 9-pin TRUNK RS-422 or RS-232C (option) (male) |
| Power supply voltage | CU-HD1200J AC100V @ 50/60Hz |
| | CU-HD1200U AC117V @ 60Hz |
| | CU-HD1200E AC230V @ 50Hz |
| HFOC maximum cable distance | 4,000m (13,200 feet) with no utility power* |
| Operating temperature | 0°C to 40°C, 32°F to 104°F |
| Mass | 10kg, 22lbs. |
| Power consumption | 300W approx. (AC operation, including SK-HD1200, VF-402 and AUX POWER OUT 100VA) |

* 10km ( with normal single fiber )

## RU-1500JY Remote Control Unit

| | |
|---|---|
| Dimensions | 102 (W) x 370 (D) x 56.2 (H) mm |
| Mass | 1.3kg |
| Power input | DC12V |
| Operational temperature | 0°C to 40°C, 32°F to 104°F |
| Interface | 1x RJ-45, 1x 4-pin |

## 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 | AC 100 / 117 / 220 / 240V, 50/60Hz, auto-sensing |
| Mass | 4.1kg, 9lbs |
| Operational temperature | 0°C to 40°C, 32°F to 104°F |
| Power consumption | 33W (Approx.) |
| Interface | 1x RJ-45, 1x 4-pin |

## VF-402 B&W CRT ENG Viewfinder

| | |
|---|---|
| TV System | 50 or 60Hz 1080i or 720p |
| Construction | Metal die-cast chassis and mount |
| CRT | 2-inch B&W 16:9 CRT with removable Diopter (CRT Focus ring) |
| User-comfort | VF angle rotation, X-Y mechanical movement, anti-fog lens, rubber eyecup |
| Resolution | 650TVL |
| Functions | Bright, Contrast, Peaking, knobs VR front-facing |
| Internal Tally | Red/ Green, Front-facing high brightness LEDs |
| Tally controls | Tally OFF, NORMAL, HIGH |
| Mass | 0.76kg, 1.7lbs |
| Power Consumption | 5W (approx.) |

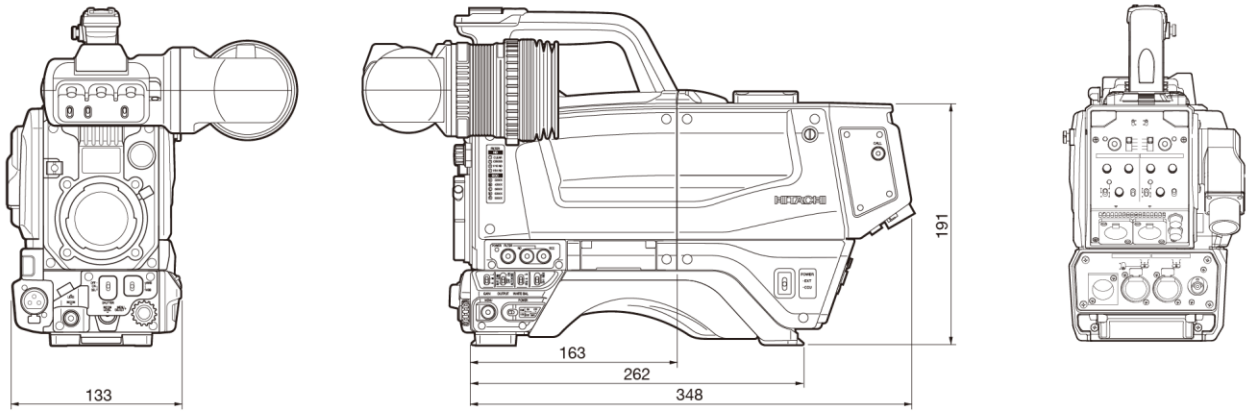
## VF-L90HD LCD Color Studio Viewfinder

| | |
|---|---|
| TV System | 50/60Hz, 1080i/ 720p auto-switching |
| Construction | Metal chassis and mount<br>9-inch, color TFT-LCD, 1280 (H) x 768 (V) |
| Display | 6500°K with removable hood |
| Camera mounts | 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.) |

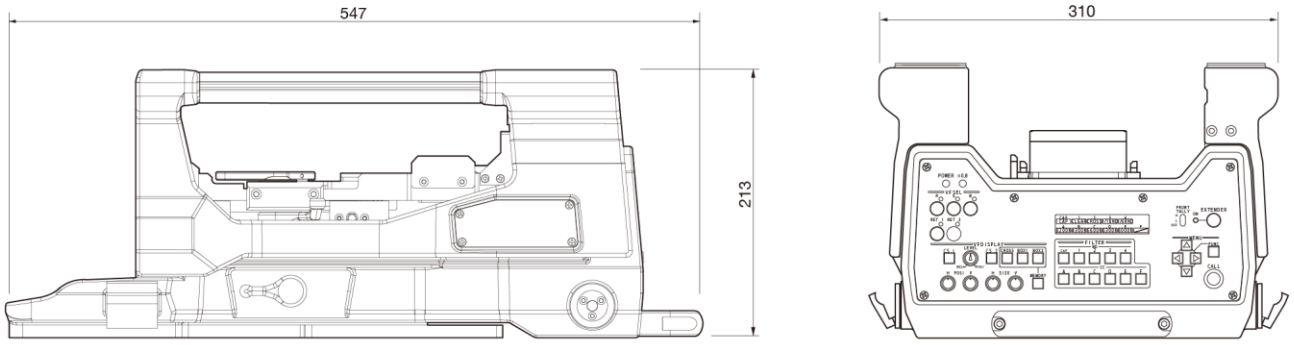
## VF-HD500 B&W CRT Studio Viewfinder

| | |
|---|---|
| TV System | 50 or 60Hz, 1080i or 720p |
| Construction | High-impact plastic |
| CRT | 5-inch B&W 4 : 3 CRT with removable hood |
| Camera mounts | 2x, AT-500/ AT-550 |
| Resolution | 750TVL |
| 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.) |

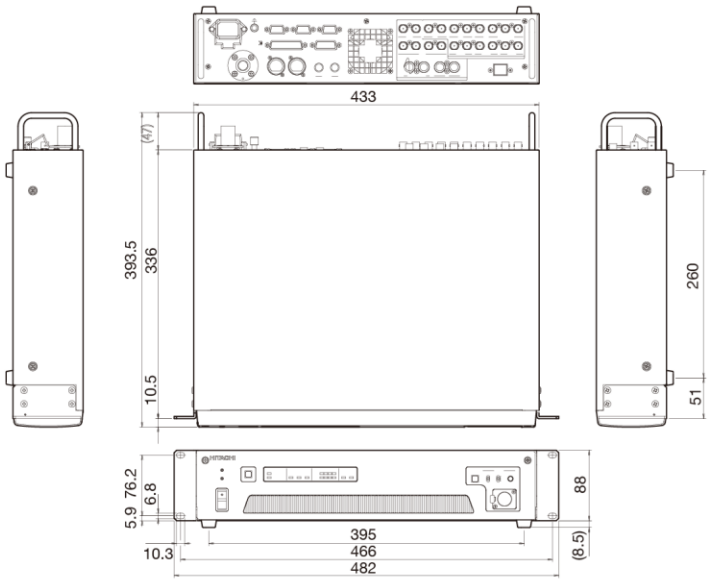
## DIMENSIONS (SK-HD1200)



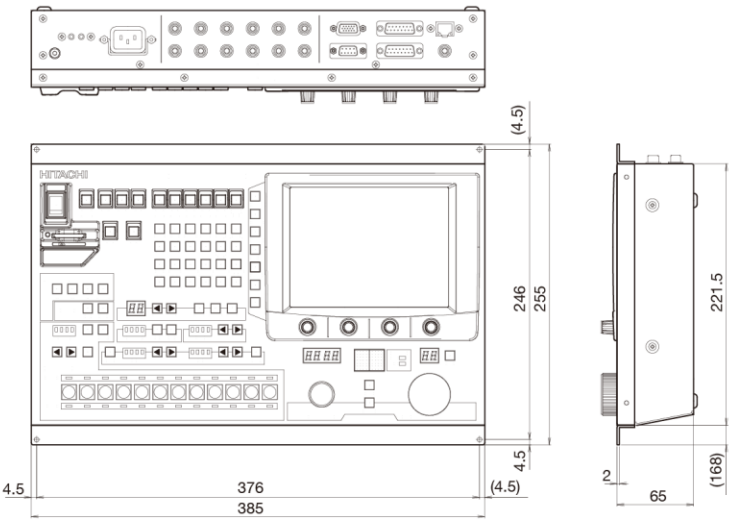

## DIMENSIONS (SA-1000)



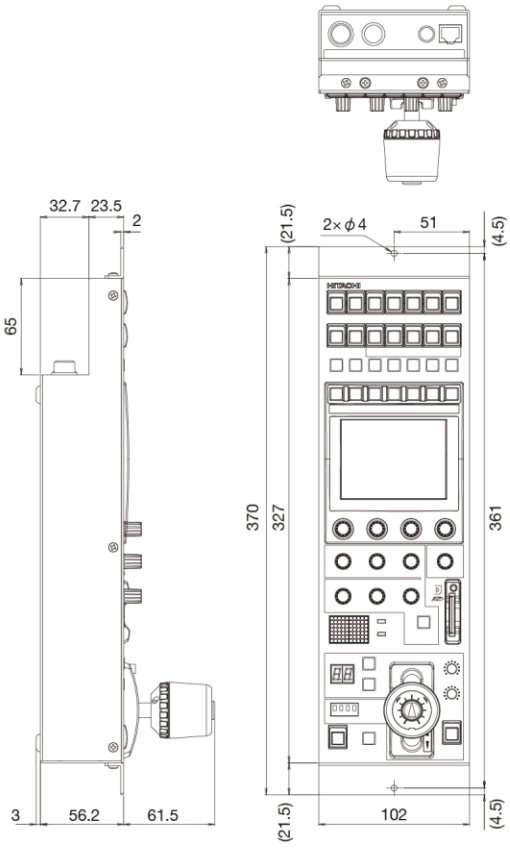
## DIMENSIONS (CU-HD1200)



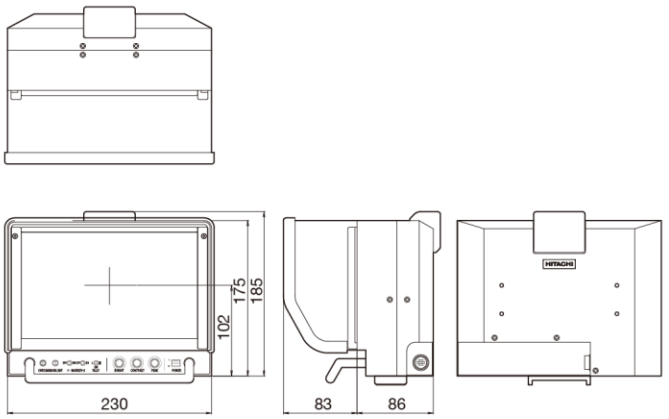

## DIMENSIONS (SU-1000)



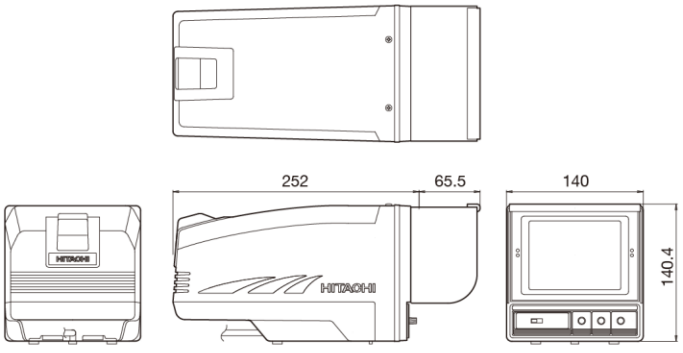

## DIMENSIONS (RU-1500JY)




## DIMENSIONS (VF-L90HD LCD Color Studio Viewfinder)




## DIMENSIONS (VF-HD500 B&W CRT Studio Viewfinder)




**⚠ 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.

**Head Office** : 14-1, Sotokanda 4-choume, Chiyoda-ku, Tokyo 101-8980, Japan
Phone : +81(0)3-6734-9432, Fax : +81(0)3-5209-5942
**URL : http://www.hitachi-kokusai.co.jp/**

**Hitachi Kokusai Electric (Shanghai) Co., Ltd.**
**Beijing Branch** : Room 1415, Beijing Fortune Building, 5 Dong San Huan Bei-Lu, Chao Yang District, Beijing
Phone : +86(0) 10-6590-8755/8756, Fax : +86(0) 10-6590-8757

**Hitachi Kokusai Electric America, Ltd.** **URL : http://hitachikokusai.us**
**Headquarters and Northeast Office** : 150 Crossways Park Drive, Woodbury, New York 11797, U.S.A.
Phone : (+1)516-921-7200, Fax : (+1)516-496-3718
**West Office** : 11258 Monarch, Unite Garden Grove, CA 92841, U.S.A.
Phone : (+1)310-328-6116, Fax : (+1)310-328-6252
**Midwest Sales** : Phone : (+1)330-334-4115, Fax : (+1)516-496-3718
Service : (+1)989-345-5379
**South Sales** : Phone : (+1)850-934-1234
Service : (+1)256-774-3777
**Parts Center** : Phone : (+1)516-682-4435, Fax : (+1)516-921-0993
**Latin Sales** : Phone : (+1)516-682-4420, Fax : (+1)516-496-3718

**Hitachi Kokusai Electric Canada, Ltd.** **URL : http://hitachikokusai.ca**
**Head Office** : 1 Select Avenue Unit#11 Scarborough, Ontario M1V5J3, Canada
Phone : (+1)416-299-5900, Fax : (+1)416-299-0450
**Eastern Office** : 5795 Chemin St. Francois St. Laurent, Quebec H4S 1B6, Canada
Phone : (+1)514-332-6687, Fax : (+1)514-335-1664

**Hitachi Kokusai Electric Europe GmbH** **URL : http://www.hitachi-keu.com**
**Sales and Engineering Frankfurt office** : Siemensstr. 9, D-63263 Neu-Isenburg, Germany
+49(0) 6102-8332-0, Fax : +49(0) 6102-202616

**London office** : Windsor House, Britannia Road, Waltham Cross, Hertfordshire EN8 7NX,United Kingdom
Phone : +44(0) 845-121-2177, Fax : +44(0) 845-121-2180
General email address : webmaster@hitachi-keu.com



DB-E228Q Printed in Japan (D) '12-03