

**Panasonic**  
ideas for life

11/2011

# AK-HC3500

Multi-format Camera

(AK-HC3500P, HC3500E, HC3500ES)

*Powerful multi-format digital camera  
with 2/3 type 2.2 mega pixels IT-3CCD*



# High image quality, easy operation and high reliability from a new generation HD multi-format camera



The AK-HC3500 embodies many innovative camera technologies developed by Panasonic. In addition to a 2/3 type IT-3CCD and spatial offset processing technologies, it features a 14 bits A/D converter and 38 bits Digital Signal Processing LSI for precise and creative image expression. To satisfy the needs of camera operators, it also features an ergonomic design for easier, more comfortable use. The AK-HC3500 is a high performance and reliable multi-format camera for digital broadcasting in studio and field.

## Two types of HD formats, 1080/59.94i and 1080/50i, can be switched.

The AK-HC3500's multi-format capability makes it possible to be used world wide for broadcasting and image production.

Compatible  
formats

**HD**

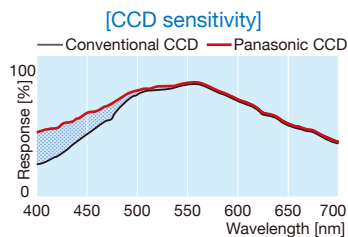
1080/59.94i, 1080/50i

## Panasonic's high sensitivity, low smear 2/3 type 2.2 mega pixels IT-3CCD.

Panasonic CCD sensor technology and the improved on-chip lens performance offers a high sensitivity of F10 (1080/59.94i) /F11 (1080/50i) at 2,000 lx, a low smear level and an excellent signal to noise ratio of 60 dB.

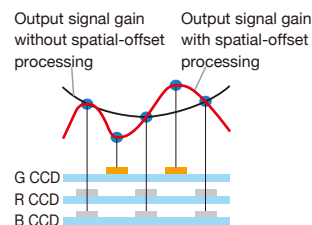


CCD/prism assembly

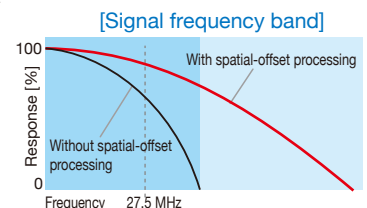


Blue channel sensitivity has been improved approximately 3 dB to achieve a better response ratio. Even deep-blue colors can be reproduced with vivid chrominance and significantly reduced noise.

Panasonic's single-channel transfer system and spatial-offset processing technologies improve signal modulation depth and reduce moire.



With spatial-offset processing, green samples are offset, allowing change in the object to be more faithfully reproduced.



With spatial-offset processing, the depth of modulation of high-frequency signals is greatly improved.



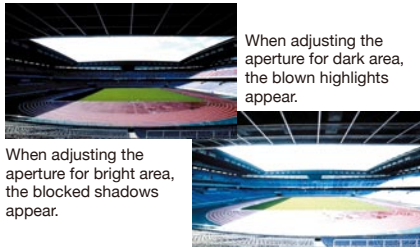
# 14 bits A/D converter and latest 38 bits Digital Signal Processing (DSP) provide clear, sharp images from dark to bright areas.

A/D conversion is improved to 14 bits compared to conventional 12 bits. A 38 bits Digital Signal Processing (DSP) and Panasonic's original real-time gamma correction enable high quality images with Dynamic Range Stretch (DRS) and other high-performance functions.

## Dynamic Range Stretch (DRS) Function

In scenes with mixed contrast, the DRS function can automatically suppresses blocked shadows and blown highlights. A gamma curve and knee slope are estimated to match the contrast of each pixel, and are applied in real time.

### Before correction



### After correction



Clear, sharp reproduction of both bright and dark areas.

## Cine Gamma Curve

Thanks to its cine gamma curve, the AK-HC3500 can produce images with the same kind of tone, gradation and color as a film.



## Color Correction

The 12-axis color correction function allows precise and independent hue and saturation adjustment of individual colors.



## Skin Tone Detail Correction

Separately reducing sharpness of two skin tones helps tone down wrinkles and dull areas to produce beautiful, naturally textured results when shooting people. And since it is possible to apply this function throughout the entire hue phase (360°), reducing sharpness can also be applied for colors other than skin tones.



## Enhanced DTL Signal Processing

Enhanced DTL signal processing ensures superb picture quality with minimal noise in horizontal and vertical directions, as well as in the image's dark and brightly lit areas.



## Color Correction Matrix

EBU or NTSC preset color correction matrix can be selected.

# Easy-to-use and high-performance camera head

## Designed for easy operation and expandability

The AK-HC3500 incorporates Panasonic's extensive broadcast camera design know-how to provide even easier operation. Convenient features include a backlight on the rear operation panel for improved operation in dark settings and an SD Memory Card slot for easy storage of user settings. A movable optical connector is also provided to reduce stress on the optical cable.

### Variable internal diameter lens mount for easy use with a build-up unit

When mounting onto an optional build-up unit, a mechanism enlarges the internal diameter of the lens mount. Because the lens and camera can be separately mounted onto or removed from the build-up unit, its operation is easier and faster than a conventional model.



JOG Dial Button

### Servocontrol ND/CC Filters

The following ND/CC motor driven double optical filters are available for shooting in variable lighting conditions.

[CC filters]  
3,200 K, 4,300 K,  
6,300 K, Cross, Diffusion

[ND filters]  
Cap, 100 %, 25 %, 6.3 %, 1.6 %

Menu Switch



### SD Memory Card slot

Using an SD Memory Card enables storage and retrieval of various camera settings such as user viewfinder indications.

\*SD Memory Cards are sold separately. (Panasonic cards with a capacity of 2GB or lower are recommended. SDXC and SDHC Memory Cards are not compatible.)

### Movable optical cable connector

AK-HC3500 can be connected to a camera control unit (CCU) via a fiber cable\*. High quality images and signals can be transmitted even when the cable length between camera and CCU is up to about 2.0 km. Operation convenience is further assured by the movable connector. \*AK-HC3500 is equipped with a LEMO type or a TAJIMI type connector interface. Connector type needs to be selected when purchasing.



Connector for TAJIMI type fiber cable.



Connector for LEMO type fiber cable.



Back Light for Rear Operation

HD SDI Output

RS422/RS232C Selectable Data Trunk Line

RET/VF HD SDI Output

### AUX connector

Either standard RET-Y input or PROMPT2 output can be selected.

PROMPT/GL

## Ergonomic design for easy handling

In response to customer requests, we have made numerous improvements such as optimal weight balance and boosted efficiency when used with a build-up unit, and a low center of gravity for more comfortable handling.

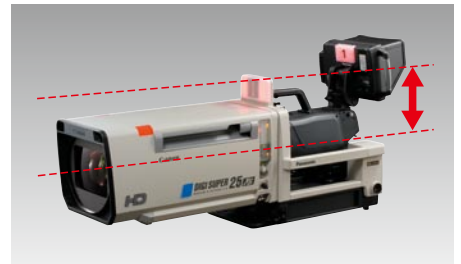
Thanks to this advanced design, the AK-HC3500 helps to reduce user fatigue while assuring high efficiency both in the studio and in the field.



In addition to the low center of gravity of the camera itself, the AK-HC3500 features slip-resistant shoulder pads adjustable up to 24 mm front and back. These design innovations help reducing fatigue during shoulder-mount use while assuring stable shooting.



The handle's end is shaped to enable easy carrying.



Lowering the height of the camera has moved the viewfinder closer to the camera's optical axis, thereby reducing the azimuth difference for improved operating convenience.



# for studio and field applications

## Fast, easy mounting onto a build-up unit

With cable-free mounting onto an optional build-up unit and minimal difference between the viewfinder's and the camera's optical axes, the AK-HC3500 provides the high maneuverability required for shooting.



Just slide AK-HC3500 in the build-up unit to complete mounting.

## Mounting an LCD viewfinder is also easy.



Even with an LCD viewfinder mounted on the camera, just slide the camera in the build-up unit.

## Build-up Unit AK-HBU3500P



\*This model is not available in some areas.

- Large studio lenses can be mounted.
- Camera can be mounted fast and smoothly.
- Innovative design minimizes camera and viewfinder azimuth difference and lowers the center of gravity.

### Specifications

Switch functions:	AC outlet reset, Viewfinder power, Up tally ON/OFF, Center maker, Cursor, Cursor memory 1, Cursor memory 2, 4:3 marker, ND filter selection, Local, CC filter selection, Menu ON/OFF, Menu JOG, Return A switch, Return B switch, User, Viewfinder detail, Monitor output selection, P in P function ON/OFF, P in P position selection (functions not available with the AK-HC3500)
Power supply:	AC 220 V, 50/60 Hz
Power consumption:	Approx. 20 W (main unit only) 200W (with large lens, viewfinder and maximum load condition of AC outlet)
Operating temperature:	-10 °C to 45 °C (14 °F to 113 °F)
Storage temperature:	-20 °C to 60 °C (-4 °F to 140 °F)
Dimensions (WxHxD):	300 mm x 417 mm x 510 mm (11-13/16 inches x 16-7/16 inches x 20-1/16 inches)
Weight:	Approx. 14.5 kg (Approx. 32.0 lb)

## Viewfinder



5 cm (2 inches) HD EVF  
**AJ-HVF21KG**

### Specifications

Adjustment functions:	Brightness, Contrast, Peaking
Power supply:	DC12 V (supplied from camera (10.3V - 17V))
Power consumption:	Approx. 3.8 W
Operating temperature:	0 °C to 40 °C (32 °F to 104 °F)
Dimensions (WxHxD):	240 mm x 80 mm x 206 mm (9-1/2 inches x 3-3/16 inches x 8-1/8 inches)
Weight:	Approx. 0.75 kg (1.65 lb)



20 cm (8 inches) LCD Color Viewfinder  
**AK-HVF931A**

- Controllers are easily accessible with one hand.
- Pan angle: 90 °
- 1080i, 720p switchable
- Aspect ratio 16:9/4:3 switchable

### Specifications

Adjustment functions:	Brightness, Contrast, Peaking
Power supply:	DC12 V (supplied from camera)
Power consumption:	Approx. 18 W
Operating temperature:	0 °C to 40 °C (32 °F to 104 °F)
Dimensions (WxHxD):	275 mm x 209 mm x 230 mm (10-13/16 inches x 8-1/4 inches x 9-1/16 inches)
Weight:	Approx. 2.8 kg (6.1 lb) (including hood)

# Versatile system components

To meet system requirements, a wide range of convenient peripheral equipment is available, including a camera control unit (CCU), a master setup unit (MSU) and remote operation panels (ROP).

## Camera Control Unit AK-HCU3550P/E/ES

The half-rack size Camera Control Unit AK-HCU3550 uses the optical fiber transmission system for maintaining superb picture quality between the camera and CCU even from long distances.



### HD and SD format simultaneous operation

As a standard feature, the AK-HCU3550 incorporates not only HD video signal outputs but SD video signal outputs (SDI and analog composite).

### Width equivalent to a half-rack unit

With a tub, 2 units of AK-HCU3550 can be mounted together in a 3U rack size, and the rack space can be utilized effectively. AK-HCU3550 is also removable.

### Bar ID display

Characters can be displayed on the color bar signals to identify the output source of the images.

### Utility power supply

The power supply capability is large to enable 200 VA to be taken out from the utility power supply of the buildup unit. (The power supplied varies depending on the length of the optical fiber cable.)

### DC power drive

AK-HCU3550 can also be driven using a DC power supply (DC 12V). (When the camera is driven by a DC power supply.)

### Prompter

Two prompter inputs are provided as a standard feature. (One input when dual sync is used.)

### Data trunk function

Two RS-422 or two RS-232C circuits are provided as a standard feature. They obviate the need for the cables used with virtual control, pan-tilt head and lens control, etc.

### Specifications

Video output:	HD SDI/SD SDI x 4 lines <sup>1*</sup> (shared by picture monitor output 1 line <sup>4*</sup> ) Analogue composite x 2 lines (shared by picture monitor output 1 line <sup>4*</sup> )
WFM output:	Analogue composite x 1 line
Return input:	HD SDI/SD SDI x 4 lines
Prompter input:	Analogue composite x 2 lines <sup>2*</sup>
Reference input:	Black burst/tri-level x 2 lines (loop-through x 1 line) <sup>2*3*</sup>
Sync output:	Analogue sync, HD ( $\pm 0.3$ V [p-p]) / SD (1 V [p-p]) (with 75 $\Omega$ termination) x 1 line <sup>4*</sup>
Mic output:	0 dBm/600 $\Omega$ x 2 lines
Communication:	Intercom input/output (0 dBm, 600 $\Omega$ , 2W/RTS/4W <sup>4*</sup> ) x 2 lines (ENG/PROD) PGM input (0 dBm/600 $\Omega$ ) x 2 lines Tally input (Red, Green) x 1 line each
WFM CONT:	For WFM control (open collector output)
AUX:	For setting down-conversion system (photo-coupler input) For tally, alarm (open collector output)
TRUNK:	RS-422/RS-232C x 2 lines <sup>4*</sup>
ROP I/F:	RS-422 x 1 line, 12 V output
MSU I/F:	RS-422 x 1 line, GPI for control
LAN:	For use with PC connections x 1 line (10Base-T, 100Base-TX)
AC input voltage:	100 V to 120 V, 50/60 Hz (AK-HCU3550P) 220 V to 240 V, 50/60 Hz (AK-HCU3550EA)
DC input voltage:	12 V
Power consumption:	37 W (excluding power supply), 340 W (include power supply)
Power supply capacity:	AC220 V $\pm 5$ %, 1.2 A, 50/60 Hz
Operating temperature:	0 °C to 40 °C (32 °F to 104 °F)
Humidity:	10 % to 90 % (no condensation)
Dimensions (WxHxD):	200 x 120 x 455 mm (7-7/8 inches x 4-3/4 inches x 17-15/16 inches) excluding protrusions
Weight:	Approx. 9 kg (Approx. 19.8 lb)

<sup>1\*</sup> Embedded audio is supported only for HD signal output.

<sup>2\*</sup> Prompter input 2 and reference input 2 share the same connector so only one of these inputs can be selected at one time.

<sup>3\*</sup> The black burst signal and tri-level sync signal of reference input 1 are recognized automatically.

<sup>4\*</sup> Depending on the setting, only one of these outputs can be selected at one time.



(Rear view)

## Master Setup Unit AK-MSU935P/EA

The MSU (with a large LCD control panel) can adjust the camera's entire parameters; serves up to 12 camera systems.



- Image and wave form monitor are selectable
- Master control of precise camera settings for the entire camera system (up to 12 camera systems)
- Large scale (16 cm/6.3 inches) LCD display
- SD memory card slot for storing/recalling three user references, eight scene files, and sixteen lens files

### Specifications

Switch functions:	Camera selection, MODE ON/OFF (5600 K, flare OFF, black gamma ON, gamma OFF, knee OFF, white clip OFF, HD matrix ON, PM character display, HDTV detail OFF, SDTV detail off, HDTV skin tone detail ON, SDTV skin tone detail ON), Control item selection (UNDO, black shading selection, white shading selection, R/G/B shading, matrix control, FUNC, system, pedestal control, gain control, gamma curve control, flare control, knee/white clip control, HD detail control, SDTV detail), ALL, Reference, Camera video output selection, Automatic adjustment (auto white balance, auto black balance, auto setup), Monitor selection, Scene files, SHUTTER, Gain selection, Filter selection (HEAD, ND filter, CC filter), CALL, Auto iris, Lens file storage, Lens file call, Iris active, Master pedestal storage, Master pedestal file call
Power supply:	DC12 V
Power consumption:	Approx. 15 W
Operating temperature:	0 °C to 40 °C (32 °F to 104 °F)
Storage temperature:	-20 °C to 60 °C (-4 °F to 140 °F)
Dimensions (WxHxD):	340 mm x 75 mm x 264 mm (13-3/8 inches x 2-15/16 inches x 10-3/8 inches)
Weight:	Approx. 3.25 Kg (Approx. 7.2 lb)

## Remote Operation Panel AK-HRP935P/E

The 1/4 rack size remote operation panel can easily adjust camera parameters.

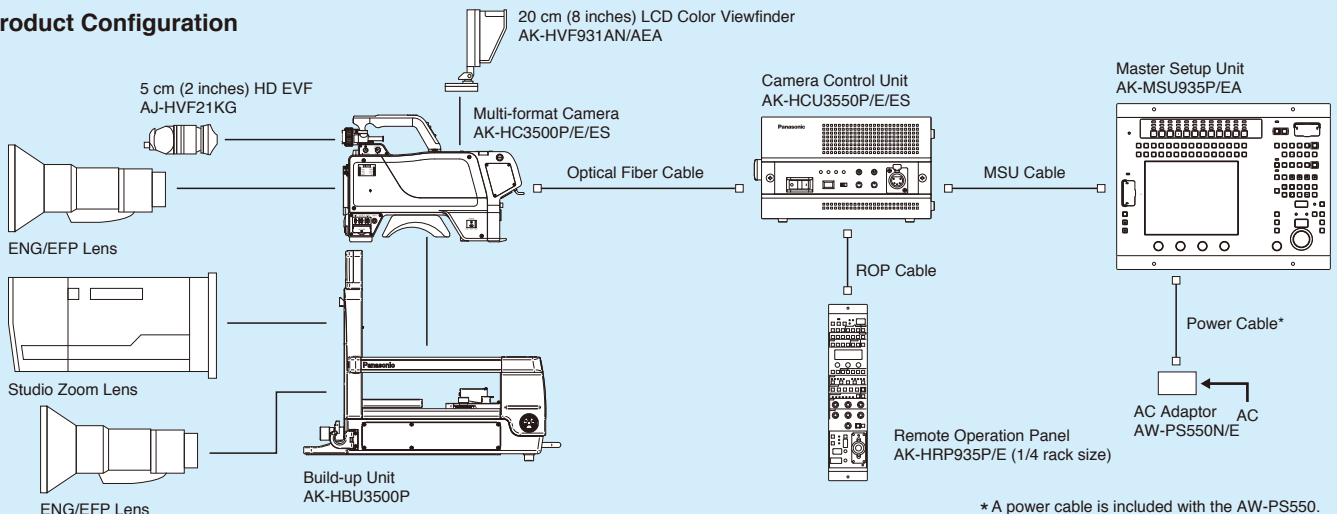


- Full control of camera settings
- Joystick-type iris control
- 1/4 rack size remote operation panel

### Specifications

CCU control:	Control signals (camera, CCU control) Power supply (DC12 V) Tally control signals
RCP control:	Control signals (fader control), Power supply (DC12 V)
Power supply:	DC12 V (DC 10V to 17V) (supplied from CCU)
Power consumption:	Approx. 6 W
Operating temperature:	0 °C to 40 °C (32 °F to 104 °F)
Storage temperature:	-20 °C to 60 °C (-4 °F to 140 °F)
Dimensions (WxHxD):	92 mm x 55 mm x 419 mm (3-5/8 inches x 2-3/16 inches x 16-1/2 inches)
Weight:	Approx. 1.85 kg (Approx. 4.1 lb)

### Product Configuration



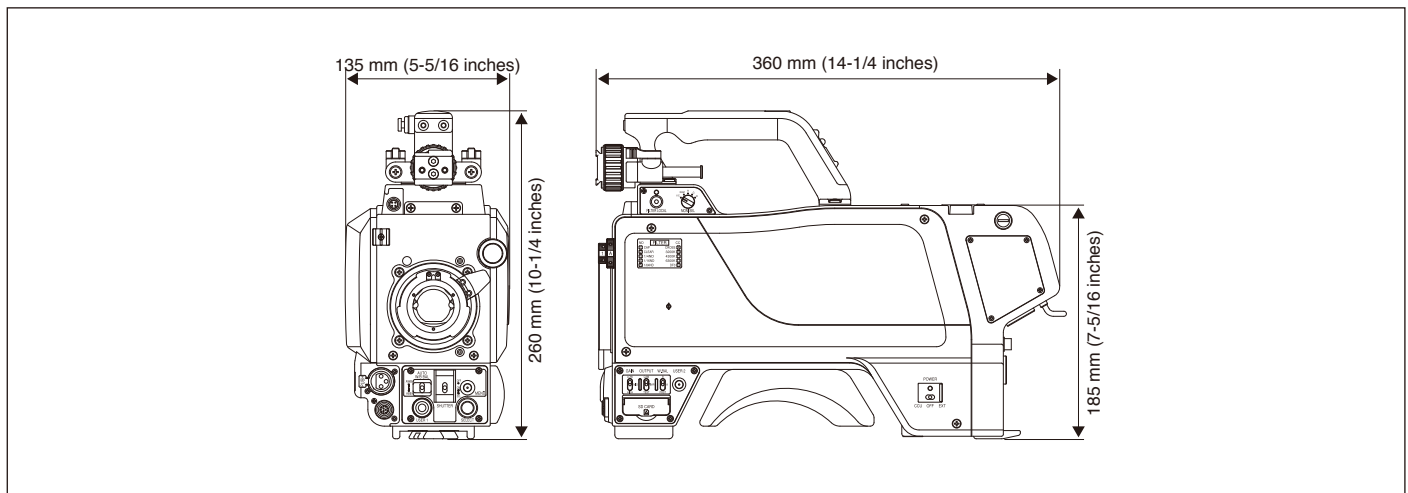
## Specifications

Pickup device:	2/3 type 2.2 million pixel IT-CCD x 3
System:	GBR pickup system
Total number of pixels:	2 010 (H) x 1 120 (V)
Effective pixels:	1 920 (H) x 1 080 (V)
Color separation optical system:	f/1.4 prism
Optical filter:	CC: 3 200 K, 4 300 K, 6 300 K, Cross, Diffusion: ND: Cap, Through, 1/4, 1/16, 1/64
Lens mount:	Bayonet mount
Sensitivity:	F10 (1080/59.94i) /F11 (1080/50i) at 2000 lx, 3200 K, white reflectance 89.9% (Vertical frequency: 59.94 Hz)
S/N ratio:	60 dB (typ) (1080/59.94i) (Y: 30 MHz) 60 dB (typ) (1080/50i) (Y: 30 MHz)
Horizontal modulation:	More than 50 % (27.5 MHz)
Storage temperature:	-20 °C to 60 °C (-4 °F to 140 °F)
Operating temperature:	-10 °C to 45 °C (14 °F to 113 °F) *Preheating required at temperatures below 0 °C (32 °F)

Power consumption:	Approx. 28 W (during external power supply operation, camera only), 34W (when CCU is connected)
Dimensions (WxHxD):	135 mm x 260 mm x 360 mm (5-5/16 inches x 10-1/4 inches x 14-1/4 inches (excluding protrusions))
Weight:	Approx. 4.7 kg (10.36 lb)
HD SDI 1 output <sup>1*</sup> :	HD signal: 0.8 V [p-p] 75 Ω (BNC)
HD SDI 2 output <sup>1*</sup> :	HD signal: 0.8 V [p-p] 75 Ω (BNC)
PROMPT output:	VBS signal: 1 V [p-p] 75 Ω (BNC)
GENLOCK input:	Tri-level SYNC or Black Burst (BNC) Selected using a switch.
AUX output:	RET-Y input or PROMPT2 output are selectable
Microphone input <sup>2*</sup> :	-60 dBu to 4 dBu (XLR 3 pin female x 2) Gain selected by camera menu
INCOM <sup>3*</sup> :	Input: -60 dBu to -10 dBu, Output: 100 mW max. (XLR, 5 pin female x 2)

<sup>1\*</sup> HD signal can be selected by the monitor output selection switch.  
<sup>2\*</sup> Gain is selected by the menu switch.  
<sup>3\*</sup> Mixing is controlled separately for PGM1 and PGM2.

## Dimensions



Please refer to the latest information, etc. at the following Panasonic web site.



<http://pro-av.panasonic.net/>

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JQA-0443



Factories of Business Solutions Business Group have received ISO14001:2004-the Environmental Management System certification. (Except for 3rd party's peripherals.)