

# Operating Manual

High-Resolution Digital Color Video Camera  
with ON-SCREEN DISPLAY setting

## ***EHD<sup>®</sup> kamPro04***



(Lens optional)

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## **1 General**

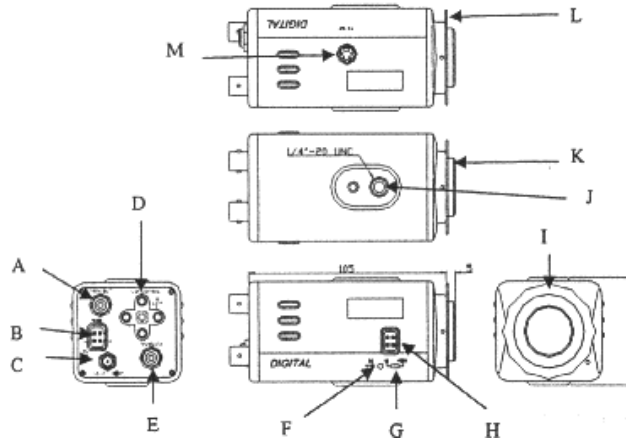
The *EHD<sup>®</sup> kamPro04<sup>+</sup>* is a SVHS color CCD video camera including a 1/2" (opt. 1/3") Hyper HAD sensor with 470.000/410.000 picture elements. This unit is equipped with a newly developed DSP (Digital Signal Processor) for processing the video signal. A micro-controller is also included to provide high color reproduction, sharp, stable picture and most of the functions control.

## **2 Features**

1. Extensive use of digital signal processing
2. 480 lines of horizontal resolution and high quality picture by utilizing processing LSI's
3. Minimum illumination of 0.5lx and signal-to-noise ratio of 48dB is realized by using a high sensitive image sensor with micro lenses and low-noise circuit design.
4. High quality picture - A digital signal processor performs digital horizontal and vertical aperture enhancement to produce a high resolution picture.
5. A newly developed intelligent wide range Auto Tracing White Balance (ATW), that automatically adjusts the tone according to the color temperature of the light source illuminating the subject.
6. Smart digital control auto Back Light Compensation (BLC), the combination of histogram equalizer and central windows weighting BLC functions ensure for use against any unusual lighting conditions.
7. Advanced Auto Exposure (AE) system for both fix iris and auto iris lenses control the amount of light to ensure it is always optimized.
8. Internal or Gen-lock external sync.

### 3 Name of parts and functions

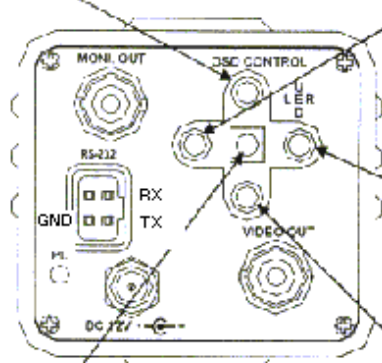
- A. Genlock Input Connector
- B. RS-232 Connector
- C. DC 12V Input Connector
- D. ON-SCREEN DISPLAY keypad
- E. Comp.Video output terminal BNC
- F. DC Level Adjuster
- G. Video DC Lens Switch
- H. Auto Iris Lens Connector
- I. Back Focal Adjusting Ring
- J. Camera Mounting Screw Hole
- K. C-Mount Adapter
- L. Flange Back Adjuster
- M. Y/C Output Connector



## 4 User OSD Setting

### 4.1 Setting switches and functions

**Up** button - to move the cursor upwards.  
Use this button to select item.



**Left** button - to move the cursor left. Use to select or adjust the parameter of the selected item.

**Right** button - to move the cursor right. Use to select or adjust the parameters of the selected item.

**Down** button - to move the cursor downwards. Use to select item.

**Enter** button - to display the setting menu. If the selected item has its own menu, press this button to enter sub menu.

### 4.2 PC control for Windows 95/98 (optional)

1. Copy all files from Disk A to your Harddisk drive.
2. Run main files.
3. A virtual keypad icon will be displayed on screen.
4. Use the mouse to point the icons for display settings.

RS-232 connection (Com1 default) male plug:

1. TXD
2. RXD
3. GND
4. NC

### 4.3 Setting menu and functions

SETUP MENU	
CAMERA ID	ON
LIGHT CNTL	AES
WHITE BAL	ATW
PICTURE	VIDEO
DISPLAY	COLOR POS
OPD WINDOW	
EXT SYNC	INT
END INIT DEMO ↑ UNLOCK	

1. Press the ENTER key to enter main menu.
2. Press UP/DOWN key to select item for adjusting.
3. Press the ENTER key to enter sub menu of a selected item.
4. Move the cursor to **END** at the bottom line and press the ENTER key to close the setup menu and return to normal camera operation mode.
5. Move the cursor to **INIT** and press the ENTER key to return all parameters to the factory default settings.
6. Move the cursor to **DEMO** and press ENTER key to enter the function demo mode, turn off the power to stop the demo.
7. Move the cursor to ↑ and press the ENTER key for menu position setting.
8. Move the cursor to **UNLOCK** and press the ENTER key to lock the setup menu.  
Press **UP, DOWN, DOWN, RIGHT then ENTER** to unlock the menu.

**Note:** If no button is pressed for 2 minutes while any setting menu displayed, all modified datas will be stored, and the camera returns to normal camera picture mode.

## 4.4 Setting procedure

### 4.4.1. Camera identification setting (CAMERA ID)

SETUP MENU	CAMERA ID
>CAMERA ID ON	0 1 2 3 4 5 6 7 8 9 :
LIGHT CNTL AES	A B C D E F G H I J K
WHITE BAL ATW	L M N O P Q R S T U V
PICTURE VIDEO	W X Y Z a b c d e f g
DISPLAY COLOR POS	h i j k l m n o p q r
OPD WINDOW	s t u v w x y z ' .
EXT SYNC INIT	□ □ □ □ □ □ □ □ □ □ □ □ □ □ □ □
END INIT DEMO ↑ UNLOCK	□
	RET POSI ← → BRI BLK

1. Move the cursor to the character you want to enter or modify by pressing UP, DOWN, RIGHT, LEFT key. After selecting the character by pressing the ENTER key, the selected character will be displayed on the editing data area.
2. Repeat the step above until all characters are displayed on the editing data area.
3. Move the cursor to ← → to edit a specific character in the editing data area.
4. Move the cursor to BLANK character position and then press ENTER to erase the character.
5. Move the cursor to **POSI** and then press ENTER, the camera id is displayed on screen. Move the camera id to the desired position by pressing UP, DOWN, RIGHT, LEFT key. Press the ENTER key to fix the ID position and return to the previous menu.
6. Move the cursor to **BRI** position to adjust the ID brightness by pressing the ENTER key, move to **BLK** to adjust the fringe of the character.

#### 4.4.2. Light Control

SETUP MENU		AES MENU	
CAMERA ID	ON	>BLC	ON
>LIGHT CNTL	AES	Av:Pk	AES
WHITE BAL	ATW	AGCMAX	36dB
PICTURE	VIDEO	RESPONSE	03
DISPLAY	COLOR POS	AGCMIN	01 dB
OPD WINDOW		SHUTLIM	1/100000
EXT SYNC	INIT		
END INIT DEMO	↑ UNLOCK	RETURN	

Press the ENTER key to enter the sub menu.

Item sequence:

AES→AESLOW→FLICKERLESS→AUTOIRIS+SHUTTER  
→ME→AES

##### *AES Mode*

AES mode is performed by the electronic iris and AGC control. AES operation basically sets the AGC to the minimum necessary gain to control the exposure with the electronic iris, however when even the maximum exposure time (1/50, 1/60sec) result in insufficient exposure, AGC control is performed with the shutter speed set to the maximum exposure time. If exposure is excessive, the AGC gain will be lowered first, if exposure is still over even at the minimum gain, the electronic iris starts.

##### *Flickerless Mode*

In this mode, the shutter is fixed to 1/100s, 1/120s to reduce the flicker of fluorescent light. Auto exposure is performed by AGC only.

##### *Auto-Iris Mode*

In this mode, the shutter speed is fixed to 1/50s, 1/60s. Auto exposure operation is performed by AGC through the microcontroller and mechanical iris of an external lens. The Back Light Compensation amount is calculated by the internal microcontroller, which drives the Auto-Iris lens.

### Auto Iris with Shutter Speed Mode

This mode is the same as mechanical Auto-Iris mode with the additional function to select the shutter speed by the user. This function is very useful for applications that allow shooting a fast moving object with a higher shutter speed in order to catch a more clear picture.

### ME (Manual Exposure)

ME MENU	
>SHUTTER	1/50 SEC
GAIN	0 dB
RETURN	

Press ENTER key at LIGHT CNTRL menu, the MANUAL EXPOSURE menu will be displayed on the screen. Move the cursor by UP/DOWN key to select adjustment item.

Shutter speed: 1/50(1/60), 1/120(1/100), 1/250, 1/500, 1/1.000, 1/2.000, 1/5.000, 1/10.000 sec.

Gain: 0, 6, 12, 18 dB.

### 4.4.3. White balance

SETUP MENU		ATW MENU	
CAMERA ID	ON	>FRAME	STD
LIGHT CNTL	AES		2500K-9500K
>WHITE BAL	ATW	SPEED	13
PICTURE	VIDEO	WNDW SEL	FULL
DISPLAY	COLOR POS		
OPD WINDOW			
EXT SYNC	INIT		
END INIT DEMO	↑ UNLOCK	RETURN	

Item sequence:

ATW→AWB→PUSH TO LOCK→MANUAL→PRESET→ATW

#### *AWB Mode*

Auto color temperature tracing white balance is a feedback system, that aligns the white balance by detecting the R-Y and B-Y signal after performing white detection the convergence shift processing is judged and accurate operated by internal microcontroller. The operating color temp. range is from 2500°K to 9500°K approximately. (Default setting).

#### *Push To Lock Mode*

If the camera is used in conditions below.

The subject is illuminated by several different light sources. A sodium lamp, mercury vapor lamp or special effect lamp is used. The subject has a single color, like blue, red, etc.

A picture with proper tone may not be obtained, in such case please adjust the tone while observing the picture on a color monitor.

- After setting into Push To Lock mode, point the camera at a white object and bring it into focus.
- Press to ENTER button, the picture color becomes optimum automatically.

#### *Manual Mode White Balance*

When set to MWB, use the UP/DOWN button to change the direction in which you want to adjust.

- You can switch the direction in which you are going to adjust the manual white balance direction to the Red or Blue gain by LEFT/RIGHT button.

#### *Fixed Mode White Balance*

Indoor mode	3200°K
Fluorescent mode	4200°K
Outdoor mode	6300°K
USR select	

#### 4.4.4. Picture control

Menu item:

VIDEO→PATTERN→APERTURE→GAMMA→VIDEO

VIDEO MENU	
>CHROMA	... ...
HUE	... ...
BRIGHT	90
PEDESTAL	7.5 IRE
SPRS EFCT	120
SPRS GAIN	48
RETURN	

##### 1. Chroma gain setting:

Move the cursor to CHROMA position, while observing the monitor, move the ']' bar to adjust the color level.

##### 2. HUE gain setting:

Move the cursor to HUE position, while observing the monitor, move the ']' bar to adjust the TINT phase.

##### 3. Brightness level setting:

Move the cursor to BRIGHT position, while observing the monitor, press LEFT/RIGHT key to adjust the brightness level. Press ENTER key to default brightness setting value.

##### 4. Pedestal level setting:

Move the cursor to PEDESTAL position, while observing the monitor, press LEFT/RIGHT key to adjust the pedestal level.

##### 5. Chroma suppress effect level setting:

This parameter controls the timing of minimal lighting level when the camera swap from color picture into monochrome. Increase the parameter value to lower the lighting level, the default setting is around 2 lux.

##### 6. Chroma suppress gain:

This parameter controls the color gain when the picture swap from color into monochrome under low light. Set the value to '0' for completely black and white picture effect, set the value to maximum for no color suppress.

PATTERN MENU	
>PATTERN	OFF
TYPE	HSR
COLOR	BLUE
RETURN	

This function is good for a quick color monitor calibration and cable canal checking.

Move the cursor to PATTERN to turn on or off the pattern.

Move the cursor to TYPE to select the pattern type.

Move the cursor to COLOR for pattern color selection.

APERTURE MENU	
>AP GAIN L	02
AP GAIN H	02
V AP GAIN	10
RETURN	

Move the cursor to AP GAIN L for horizontal low frequency aperture correction.

Move the cursor to AP GAIN H for horizontal high frequency aperture correction.

Move the cursor to A AP GAIN for vertical aperture correction.

GAMMA MENU	
>Y GAMMA ADJUST ON	
Y GAMMA	04
Y KNEE	00
C GAMMA ADJ ON	
C GAMMA	04
C KNEE	07
RETURN	

1. Move the cursor to Y GAMMA ADJ to turn on or off the gamma correction. Turn off the Y GAMMA ADJ for gamma = 1.
2. Move the cursor to Y GAMMA for different gamma corrections, set the value to 04 equal to gamma 0.45, the value of around 01 gamma 0.9, value 07 equal to 0.1.
3. The default setting for Y KNEE is 00. There are 7 knee curve selectable.

#### 4.4.5 Display control

Display order:

COLOR POS→COLOR NEG→MONO POS→MONO NEG

#### 4.4.6 Optical detect windows setting (OPD WINDOW)

Enter this menu for detecting window size and position setting.

#### 4.4.7 External control

Sync mode settings and phase adjust.

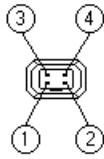
### 5 Connectors

#### 5.1 Y/C (SVHS) output terminal

For Y/C output connection, Y: 1.0Vpp and C: 0.3Vpp at 75 Ohm load.

## 5.2 Auto-Iris lens connector

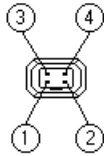
Use the accompanying Auto-Iris lens control connector plug.



- |                  |                     |
|------------------|---------------------|
| 1. Red for power | 3. White for video  |
| 2. Not connected | 4. Black for shield |

For Auto-Iris lens without EE amp. set the lens selector switch to 'DC' position. Use DC level adjust (VR) for DC drive Auto-Iris lens level adjustment, in order to obtain correct exposure light.

For Auto-Iris lens with build-in EE amp. set the lens selector switch to 'Video' position.



- |                     |                     |
|---------------------|---------------------|
| 1. Damping coil (-) | 3. Driving coil (+) |
| 2. Damping coil (+) | 4. Driving coil (-) |

Connect the leads as shown above. refer to the instructions of the lens.

### 5.3 External sync. signal input terminal (Gen-Lock in)

This input terminal (BNC) is used for the video signal, which serve as reference for the external sync.

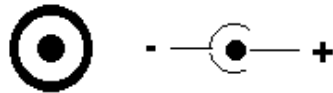
Note:

The external sync. signal is a composite video signal 1.0Vpp. Signals from a VCR or other equipment that causes jitter (irregular vertical and horizontal shaking on the screen) may disturb synchronization.

For Gen-Lock, image condition adjustment of the horizontal phase is required. When the external sync. input signal is looped with use of a T-Connector, set the switch of terminal to off position, otherwise keep the switch at 75 Ohm position.

### 5.4 Power cord

Connect the power supply to the power-input terminal as shown in the figure below.



Power for the camera is 12V DC  $\pm 10\%$ , connector center as positive and the outside being common ground.

## 6 Specifications

Image Device	1/2" Interline Transfer Hyper HAD CCD
Signal System	PAL or NTSC
Picture Elements	PAL: 752 x 582, NTSC: 768 x 494
Scanning System	PAL: 625 lines, NTSC: 525 lines, 2:1 interlace
Sync. System	internal / external
Horizontal Resolution	480 TV lines
Minimum Illumination	0.5lx at F1.2
Aperture Correction	H aperture and V aperture-gain adjustable
Gain	Super AGC 0-36dB, Min gain 0-20dB, Man. Gain
S/N Ratio	Better than 48dB
Auto exposure system	1. CCD iris mode 1/50s(1/60) - 1/100.000s 2. Flickerless mode PAL 1/120s, NTSC 1/100s 3. Slow shutter mode 1/100(1/125) - 1/100.000s 4. Auto iris mode 1/50s(1/60s) 5. Auto iris with shutter mode Auto Exposure Av/Pk level 1:10 to 10:1 AE response speed 0.5 to 20s
Manual exposure system	Shutter speed: 1/50, 1/120, 1/250, 1/500, 1/1000, 1/2000, 1/5000, 1/10.000s Gain: 0, 6, 12, 18dB
White balance	ATW: 2000°K-18000°K speed, detect wnd. adj. AWB: conventional Push to Lock: gain memory User memory mode: MWB R gain, B gain adjustable
Back light compensation	1. Histogram detect: level can be adjusted from 0 to 15 times. 2. Windows weighting: 225 divisions on screen, each window compensation weighting can be adjusted. 3. Histogram and windows weighting can be set on/off individually. BLC function activated for auto iris lens also.
Video output signal	Composite: 1Vpp at 75Ω load Y/C: Y=1Vpp at 75Ω load, C=0.286Vpp 75Ω load
Gamma correction	0.1-1.0 Y/C curve selectable
Knee effect	Y/C knee selectable
OSD functions	1. Camera ID upto 20 char., pos. bright. contr. 2. Light control: Exposure mode, BLC, AGC max or min, AE response speed, AE average/peak, shutter limit 3. White balance: ATW, AWB, PTL, MWB preset, ATW speed, detect area. 4. Sync system selection, phase adjustment 5. Picture chroma, hue, brightness, gamma, aperture, color suppress. 6. Negative/Positive 7. Color pattern generator 8. OSD menu lock
Auto Iris function	Accepts video or DC drive iris lens
Lens Mount	C & CS-Mount
Operating Temp.	-10° to 50°C
Power Source	DC 12V
Power Consumption	3W
Dimensions	57 x 52 x 110 mm

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