

# Operating Manual

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

## ***EHD***<sup>®</sup> kamPro02



(Lens optional)

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## **1 General**

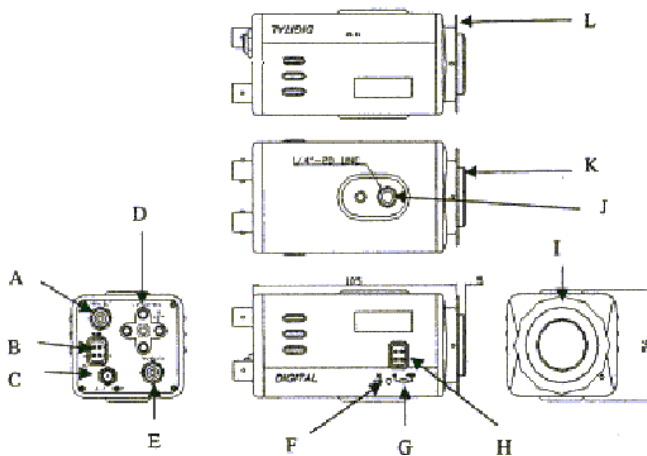
The *EHD® kamPro02* is a monochrom CCD video camera including a 1/2" (opt. 1/3") SuperHAD sensor with 470.000/410.000 picture elements. This unit is equipped with a newly developed DSP (Digital Signal Processor) for processing the video signal. A micro-controller is also included to provide high color reproduction, sharp, stable picture and most of the functions control. All camera parameters are controllable via the On-Screen-Display menu or RS-232 connection.

## **2 Features**

1. Extensive use of digital signal processing
2. 600 lines of horizontal resolution and high quality picture by utilizing processing LSI's
3. Minimum illumination of 0.0002lx and signal-to-noise ratio of 50dB 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. 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.
6. Advanced Auto Exposure (AE) system for both fix iris and auto iris lenses control the amount of light to ensure it is always optimized.
7. Internal or Gen-lock external sync.
8. RS-232 control
9. Long life and high reliability

### 3 Name of parts and functions

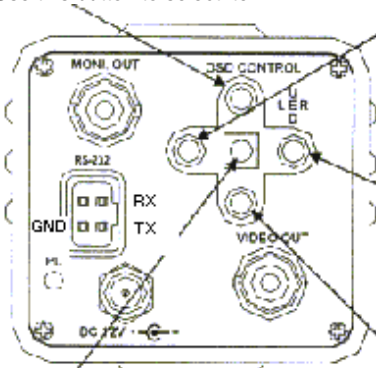
- |                                   |                               |
|-----------------------------------|-------------------------------|
| A. Genlock Input Connector        | H. Auto Iris Lens Connector   |
| B. RS-232 Connector               | I. Back Focal Adjusting Ring  |
| C. DC 12V Input Connector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



## 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

#### 4.2.1 Cable remote control (Optional)

A cable remote control keypad can be connected to RS-232.

### 4.3 Setting menu and functions

SETUP MENU	
CAMERA ID	ON
LIGHT CNTL	AES
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	
PICTURE	VIDEO	L M N O P Q R S T U V	
DISPLAY	MONOCH POS	W X Y Z a b c d e f g	
OPD WINDOW		h i j k l m n o p q r	
EXT SYNC	INIT	s t u v w x y z ' .	
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 character 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 (LIGHT CNTL)

AES→FLICKERLESS→ AES LOW →AUTO IRIS→  
AI SHUTTER→ME

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

##### 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.

## **BLC Setting**

LEFT/RIGHT key to turn **Back Light Compensation** function ON/OFF. Press ENTER key to display BLC sub menu.

BLC SETUP MENU	
>HIST BLC	ON
BLC LEVEL	12
WINDOWS BLC	OFF
WNDW 0 WEIGHT	01
WNDW 1 WEIGHT	01
WNDW 2 WEIGHT	03
WNDW 3 WEIGHT	03
RETURN	

The HIST BLC (Histogram) is good when the subject has only a slightly darker luminance and moving around the screen, back-light compensation is performed through exposure luminous intensity to the dark areas. The internal u-com will detect the overall picture contrast and turn on or off the back-light compensation function automatically.

- BLC-LEVEL for histogram BLC

The compensation level of histogram back-light compensation can be modified from 0-255, the default setting is 13, increase the number to increase the compensation effect.

- WINDOWS BLC ON/OFF

This method is suited for cases where the main subject is fixed within the screen. The important object in a scene is usually placed in the center of the monitor's screen. In this mode more photometric weight is given to the center of the screen than to the edge of the picture, this function will eliminate the interference by strong background light which makes the camera picture dark. The size and location of the center window can be adjusted freely by the user within 225 areas on screen with the OPD window menu.

- Windows Weighting Setting

The weighting for window 0 to 3 can be set independently in a range from 0 to 15. Window 4 in the center is fixed to the max. value of 15.

The combination of two types back-light compensation makes it easier to arrange back-light compensation operation to match the imaging conditions and installation location.

Note: Compensation may be insufficient when the background is extremely bright.

### **Av:Pk setting** (for all AE modes)

Adjust the Av:Pk value by press the LEFT or RIGHT key.

Greater Av value for average photometric method, the electronic convergence is automatically adjusted with the average video signal level of the object as the right photometric value.

Increase the Pk value for the peak photometric method, the electronic convergence is automatically adjusted with the peak video signal level of the object as the right photometric value.

It is recommend to adjust this setting on DC iris lens after level setting.

### **AGCMAX / AGCMIN setting** (for all AE modes)

Press the LEFT or RIGHT key for AGC maximum or minimum setting. The range of AGC MAX is 0dB to 36dB, the range of AGC MIN is 0dB to 20dB.

#### **AE response speed setting (RESPONSE) (for all AE modes)**

If you want to adjust the response speed of exposure, move the cursor to RESPONSE position, adjust the value by press LEFT or RIGHT key. The response time of exposure system can be set from 0.5 sec. (01) to 15 sec. (255). The default setting is 0.5 sec. for normal applications. If you want the monitor screen picture been influenced by auto exposure respond speed when suddenly a spot light displayed on screen which makes the camera picture become dark.

This function is very usefull when the camera is installed at car parking area or on the street at night. You can see objects more clearly inside the car and the number of license plate or like that.

#### **Shutter limit setting (SHUTLIM) (for AES/CCD iris mode)**

Move the cursor to SHUTLIM position, press LEFT or RIGHT key for shutter limit setting.

The shutter speed range of AES (CCD IRIS) is from 1/50(1/60) sec. to 1/100,000 sec. For some applications need higher quality pictures or minimize the sensor smear, the max. shutter can be limited to 1/500 to 1/100,000 sec.

#### **Shutter speed (SHUTSPEED) (for Auto Iris + shutter mode)**

Move the cursor to SHUTSPEED position on AUTOIRIS – SHUTTER mode sub menu, press LEFT or RIGHT key for shutter speed setting.

Under appropriate shutter speed setting, the blurring of motion objects will be greatly reduced when the camera with auto iris lens been installed to view fast moving objects.

### **4.4.3 PICTURE**

VIDEO→GAMMA→APERTURE

### Video Menu

VIDEO MENU	
>BRIGHT	STD
PEDESTAL	3.0 IRE
RETURN	

#### Brightness level setting

Move the cursor to BRIGHT position while observing the video monitor, press LEFT/RIGHT key to adjust the brightness level.

#### Pedestal level setting

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

### GAMMA Menu

GAMMA MENU	
>Y GAMMA ADJ	ON
Y GAMMA	04
Y KNEE	00
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.

Off1 for gamma = 1 with NO knee effect.

Off2 for gamma = 2 with knee ON effect.

2. Move the cursor to Y GAMMA for different gamma correction and set the value to 04 equal to gamma 0.45, the value of 01 is around gamma 0.9, value 07 equal to 0.1.

3. The default setting of Y KNEE is 00. There are 6 knee curves selectable.

## APERTURE Menu

```
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 (00-03).

Move the cursor to AP GAIN H for horizontal high frequency aperture correction (00-03).

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

### 4.4.4 DISPLAY

MONOCH POS→MONOCH NEG

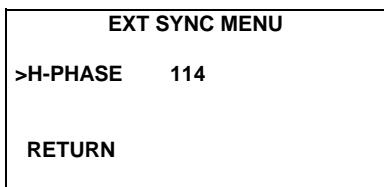
Use this key to switch the video signal from positive to negative.

### 4.4.5 OPD WINDOW

```
OPD WINDOW MENU  
  
>OPD WINDOW POSITION  
OPD WINDOW SIZE  
  
RETURN
```

Enter this menu for detecting window size and position setting.

## 4.4.6 EXTERNAL SYNC

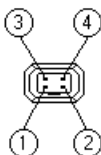


Sync mode selecting and phase adjusting. Move the cursor to EXT SYNC and press LEFT/RIGHT key for sync mode selection. Press ENTER key to enter external sync sub menu and align the sync phase by press LEFT/RIGHT key.

## CONNECTORS

### 5.0 Auto-Iris lens connector

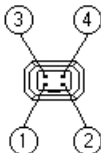
Use the accompanying Auto-Iris lens control connector plug.



- |                  |                     |
|------------------|---------------------|
| 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.

### **5.1 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.

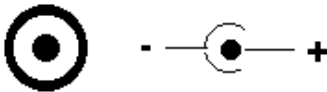
Note:

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.

### **5.2 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 <b>SuperHAD</b> CCD
Signal System	CCIR or EIA
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	600 TV lines
Minimum Illumination	0.001lx at F0.75
Aperture Correction	H aperture and V aperture-gain adjustable
Gain	Super AGC 0-36dB, Min gain 0-20dB, Man. Gain 0,6,12,18dB
S/N Ratio	Better than 50dB
Auto exposure system	<ol style="list-style-type: none"> <li>1. CCD iris mode 1/50s(1/60) - 1/100.000s</li> <li>2. Flickerless mode PAL 1/120s, NTSC 1/100s</li> <li>3. Slow shutter mode 1/100(1/125) - 1/100.000s</li> <li>4. Auto iris mode 1/50s(1/60s)</li> <li>5. Auto iris with shutter mode</li> </ol> Auto Exposure Av/Pk level 1:10 to 10:1 AE response speed 0.5 to 15s
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
Back light compensation	<ol style="list-style-type: none"> <li>1. Histogram detect: level can be adjusted from 0 to 15 times.</li> <li>2. Windows weighting: 225 divisions on screen, each window compensation weighting can be adjusted.</li> <li>3. Histogram and windows weighting can be set on/off individually.                BLC function activated for auto iris lens also.</li> </ol>
Video output signal	Composite: 1Vpp at 75Ω load
Gamma correction	0.1-1.0 gamma curve selectable
Knee effect	Knee selectable
OSD functions	<ol style="list-style-type: none"> <li>1. Camera ID upto 20 char., pos. bright. contr.</li> <li>2. Light control: Exposure mode, BLC, AGC max or min, AE response speed, AE average/peak, shutter limit</li> <li>3. Sync system selection, phase adjustment</li> <li>4. Picture brightness, pedestal, gamma, aperture.</li> <li>5. Negative/Positive</li> <li>6. OSD menu lock</li> </ol>
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	3.5W
Dimensions	57 x 52 x 110 mm