

## FEATURES

- 4K UHD 1/3" Progressive Scan CMOS sensor capable of 4K (4096 x 2160) captures sharp and vivid images even under very low light conditions.
- Powered by a back-illuminated pixel technology.
- Advanced digital imaging processor provides vivid and detailed images by utilizing Dynamic Range, Auto White Balance, and Noise Reduction.
- Superb motion-compensated temporal noise reduction filter for motion video without blurring.
- OSD control breakout cable with two audio inputs and RS-485 for remote communication.
- Flawlessly relays multi-channel embedded audio via HDMI 1.3a.
- Perfectly suited for broadcast, pro audio/video, and security.
- Versatile, compact, and rugged design.

## OSD MENU

### MAIN MENU

*WB CONTROL	>
AE CONTROL	>
DAY /NIGHT	>
AUDIO	>
IMAGE CONTROL	>
SPECIAL	>
SETUP	>
RESET	>
EXIT	

L- Left | R- Right | U- Up | D- Down | ■- Select



1. Move the Cursor Up/Down to Choose Menu  
To move from item to item in the menu, move the joystick to the Up/Down.
2. Change the Value  
To change the value of the selected item, move the joystick to the Left/Right.
3. Shift to the Sub Menu of the Chosen Menu  
To go into sub menu, press SEL key. The menu items with > always have its sub menu.

## WHITE BALANCE

\*MODE      ATW  
 PUSH  
 BLUE  
 RED  
 RETURN

AWB - Auto white balance mode will adjust white balance within 3,000°K ~ 8,000°K temperature.

ATW - Auto trace white mode will adjust white balance within 1,900°K ~ 11,000°K temperature.

ONE PUSH - One push mode is used if AWB or ATW cannot produce the proper white balance. Place a white paper in front of the camera when using the one push mode to self adapt.

INDOOR - Indoor mode will adjust white balance to indoor lighting conditions.



OUTDOOR - Outdoor mode will adjust white balance to outdoor lighting conditions.

MANUAL - Manual mode will adjust white balance manually.

BLUE - 0 ~ 100 ( Select blue gain within the range of 0 to 100 )

RED - 0 ~ 100 ( Select Red gain within the range of 0 to 100 )

## AE CONTROL

\*AE MODE      AUTO  
 SHUTTER  
 IRIS  
 AGC  
 AGC MAX      13   
 SENS UP      OFF  
 AE BRIGHT    6   
 FLK CONTROL   OFF  
 LENS MODE     MANUAL  
 RETURN



## AUTO

Auto mode will adjust the exposure level automatically.

Detailed fine tuning options are available under this menu.

- AGC MAX : OFF, LOW, MIDDLE, HIGH, DMIN, DMID, DMAX  
 "AGC MAX" sets the maximum gain value to control the video noise caused by Auto Gain Control.
- SENS UP : OFF, x2 ~ x10  
 "SENS UP" mode controls the digital slow shutter to allow extra light into the camera and adjust the picture quality.
- AE BRIGHT : 0~20 - ( Auto Exposure brightness level can be adjusted )

## AE CONTROL

*AE MODE	SHUTTER
SHUTTER	1/30
IRIS	
AGC	
AGC MAX	13 
SENS UP	OFF
AE BRIGHT	6 
FLK CONTROL	OFF
LENS MODE	
RETURN	

## SHUT FIX

SHUT FIX mode provides more detailed shutter speed option.

All other controls are tuned for the selected shutter speed.

- SHUTTER : AUTO, 1/30 ~ 1/10,000 ( Shutter speed can be set )
- AGC MAX : OFF, LOW, MIDDLE, HIGH, DMIN, DMID, DMAX

"AGC MAX" sets the maximum gain value to control the video noise caused by Auto Gain Control.


- SENS UP : 0~20

"SENS UP" mode controls the digital slow shutter to allow extra light into the camera and adjust the picture quality.

- AE BRIGHT : 0~10

Auto Exposure brightness level can be adjusted.

## AE CONTROL

*AE MODE	AGC FIX
SHUTTER	
IRIS	
AGC	9dB
AGC MAX	
SENS UP	
AE BRIGHT	6 
FLK CONTROL	OFF
LENS MODE	MANUAL
RETURN	

## AGC FIX

AGC FIX mode provides more detailed gain option.

All other controls are tuned for the selected gain value.


- AGC : AUTO, 0dB ~ 27dB, d2X ~ d9X ( Gain level can be set )
- AGC MAX : OFF, LOW, MIDDLE, HIGH, DMIN, DMID, DMAX

"AGC MAX" sets the maximum gain value to control the video noise caused by Auto Gain Control.

- AE BRIGHT : 0~10

Auto Exposure brightness level can be adjusted.

### AE CONTROL

*AE MODE	AUTO
SHUTTER	
IRIS	
AGC	
AGC MAX	
SENS UP	OFF
AE BRIGHT	6 
FLK CONTROL	OFF
LENS MODE	MANUAL
RETURN	

- IRIS SPEED : 0 ~ 5  
Electronic Iris speed can be controlled. ( DC Iris lens only )
- LENS MODE : INDOOR, OUTDOOR, MANUAL  
Lens setting will be optimized for the selected environment. ( DC Iris lens only )
- FLK CONTROL : AUTO, ON, OFF  
"FLK CONTROL" mode provides a proper image sensor frequency to match the power frequency in order to minimize video flicker.

### DAY & NIGHT

*MODE	DAY (COLOR)
NIGHT COLOR	OFF
COLOR BURST	OFF
RETURN	

Adjust color or B&W setting from this menu.

- MODE : DAY(COLOR), NIGHT(B&W) Set camera to either color mode or B&W mode.
- NIGHT COLOR : ON, OFF  
When "NIGHT COLOR" is turned ON, camera stays on color mode even "NIGHT(B&W)" is selected from the MODE.
- COLOR BURST : ON, OFF  
Color burst signal ON or OFF can be set for CVBS signal. ( Not applicable )

## AUDIO

*MODE	LINE
AUDIO LEVEL	0 dB
MIC ATTENUATOR	OFF
AGC LIMIT	
SAMPLE BITS	24BITS
RETURN	

MODE : OFF, LINE, MIC

Select the proper audio mode from this menu.

AUDIO LEVEL : -12dB ~ 48dB

Audio level can be manually adjusted from this menu.

MIC ATTENUATOR : ON, OFF

Audio input attenuation can be controlled from this menu to minimize the audio noise level.

AGC LIMIT: -0dB ~ 58dB

Audio gain level can be adjusted from this menu when MIC attenuation is enabled.

SAMPLE BITS : 16, 20, 24, 32 ( Audio sample bit rate can be adjusted from this menu )

IMAGE CONTROL	
*LENS SHADING	SHUTTER
CONTRAST	11
BRIGHTNESS	11
SATURATION	10
HUE	0
EDGE ENHANCE	5
AUTO SATURATE	MIDDLE
AUTO EDGE	ON
BLACK WHITE LV	>
GAMMA CORRECT	DEFAULT
DNR	>
RETURN	

Camera image control can be adjusted from EFFECT menu.

- LENS SHADING : ON, OFF  
Optical vignetting issue can be corrected from this menu.
- BLACK LEVEL : -64 ~ 64 ( Gamma level can be adjusted )
- GAMMA CORRECT : DEFAULT, 0.4 ~ 1.0 ( Gamma level can be adjusted )
- DNR : Camera noise level can be adjusted from this menu.
  - DNR MODE : OFF, 2D, 3D, 2D+3D  
Digital noise reduction can be applied from this menu.
  - DNR LEVEL : AUTO, LOW, MIDDLE, HIGH  
Noise reduction level can be adjusted from this menu.
  - DNR APERTURE : 0 ~ 4 ( Motion artifacts tightness can be adjusted )

\*0= Most Ghost Artifact | 4= Most Ghost Artifact

IMAGE CONTROL	
LENS SHADING	OFF
*CONTRAST	11
BRIGHTNESS	11
SATURATION	10
HUE	0
EDGE ENHANCE	5
AUTO SATURATE	MIDDLE
AUTO EDGE	ON
BLACK WHITE LV	>
GAMMA CORRECT	DEFAULT
DNR	>
RETURN	

- CONTRAST : 0 ~ 20 ( Contrast level can be adjusted )
- BRIGHTNESS : 0 ~ 20 ( Brightness level can be adjusted )
- SATURATION : 0 ~ 20 ( Saturation level can be adjusted )
- HUE : 0 ~ 20 ( Hue level can be adjusted )
- EDGE ENHANCE : 0 ~ 20 ( Image sharpness level can be adjusted )
- AUTO SATURATE : OFF, LOW, MIDDLE, HIGH  
Decrease saturation automatically when noisy scene is detected.
- AUTO EDGE : ON, OFF  
Decrease edge enhancement (sharpness) automatically when noisy scene is detected.
- DEFAULT : See Effects menu to default value.

## SPECIAL

*DZOOM	OFF	
DEFOG	OFF	
DIS	OFF	
BACKLIGHT	OFF	
BINNING	OFF	
DEFECT PIXEL	ON	>
DISP. FUNCTION		>
WDR	OFF	
FLICKER DETECT	OFF	
PRIVACY		>
HDMI MODE	RGB444.709	
RETURN		

## D-ZOOM

*ZOOM CONTROL		>
PIP	OFF	
PIP SIZE	1/16	
PIP POSITION		>
DZOOM SAVE		
DEFAULT		
RETURN		

Camera special functions can be adjusted from SPECIAL menu.

D ZOOM : ON, OFF

Digital Zoom and PIP function can be enabled from this menu.

- ZOOM CONTROL : RATIO, POSITION, RETURN

Adjust the digital zoom ratio and position.

Use LEFT / RIGHT button to adjust the ratio, then press select.

USE LEFT / RIGHT/ UP / DOWN button to adjust the image position, then press select.

Press select to exit.

- PIP : ON, OFF

Turn ON or OFF the PIP window.

- PIP SIZE : 1/16, 1/25

Change the size of PIP window.

- PIP POSITION : POSITION, RETURN

Adjust the PIP window location.

USE LEFT / RIGHT/ UP / DOWN button to adjust the image position, then press select.

Press select to exit.

- DEFAULT : Set privacy zone to default value.

## DEFOG SETUP

\*STRENGTH 4 

THRESHOLD

AUTO LEVEL

RETURN

DEFOG : ON, OFF, AUTO

"DEFOG" menu improves foggy image.

- STRENGTH : 0 ~ 16  
Change defog strength.
- THRESHOLD : 0 ~ 3  
Threshold value sets minimum sensitivity value for automatic defog control.  
Higher value makes defog-on control reluctant.
- AUTO LEVEL : LOW, MID, HIGH  
Auto level value sets maximum strength value for automatic defog control.  
Higher value makes defog effect to be stronger.


DWDR : ON, OFF

Wide Dynamic range can be adjusted from the sub menu.


MOTION DETECT : ON, OFF

Camera can detect a motion within the selected areas.

## BACKLIGHT - BLC

\*BLC ON 

SIZE/POSITION

LEVEL 128 

DISPLAY ON

DEFAULT

RETURN

BACK-LIGHT : OFF, BLC, HLM ( Camera back-light compensation can be adjusted )

BLC : OFF, ON ( BLC enables back light compensation )

- SIZE/POSITION : SIZE, POSITION, RETURN  
Adjust BLC area window size.
- LEVEL : Back-light level compensation level can be adjusted from this menu.  
Higher level will compensate more from the selected area.
- DISPLAY : OFF, ON  
BLC area display can be turned ON or OFF.
- DEFAULT : Set BLC menu to default value.



## BACKLIGHT - HLM

AREA	ON	
*AREA DISPLAY	ON	
SIZE/POSITION		>
LEVEL	3	◀ [ ] ▶
BLACK MASK	ON	
DEFAULT		
RETURN		

HLM : OFF, ON

HLM can be adjusted.

- AREA DISPLAY : ON, OFF  
HLM AREA DISPLAY can be turned ON or OFF.
- SIZE/POSITION : SIZE, POSITION, RETURN  
Adjust BLC area window size.
- LEVEL : 0 ~ 20  
Amount of masking area can be adjusted.
- BLACK MASK : OFF, ON  
Masking area highlight can be turned ON or OFF.
- DEFAULT : Set HLM menu to default value.

## DEFECT PIXEL

*STATIC PROGRESS	PRESS OK
SDPC UPDATE	PRESS OK
SDPC CLEAR	PRESS OK
RETURN	

BINNING : OFF, ON

Binning can be turned ON or OFF

DEFECT PIXEL : OFF, ON, ON (FIXED), STATIC

Defective Pixel Correction feature can be operated. It is turned ON by default and will run both dynamic and static DPC function.

## DISPLAY FUNCITON

*FREEZE	OFF
MIRROR	OFF
IMAGE EFFECT	OFF
ROTATION	OFF
PICTURE STYLE	OFF
PIC CONTRAST	ON
PIC SATURATION	
PIC EDGE	
RETURN	

DISPLAY FUNCTION : OFF, ON

Adjust image display features from this menu.

- FREEZE : OFF, ON  
Image freeze can be turned ON or OFF.
- MIRROR : OFF, MIRROR, V-FLIP, BOTH(H/V)  
Image mirror or flip can be operated.
- IMAGE EFFECT : OFF, NEGATIVE, GREY MODE, REDDISH-1 ~ 4, BLUISH-1 ~ 4, GREENISH-1 ~ 4. ROTATION : OFF, ROT\_L 1:1  
Several color effects can be applied.
- ROTATION : OFF, ROT\_L FULL, ROT\_L 1:1, ROT\_R Full, ROT\_R 1:1  
Image can be rotated either left or right side.
- PICTURE STYLE : OFF, STANDARD, VIVID, CLEAR, VIVID CLEAR, NEUTRAL  
Different types of picture style can be applied.

FLICKER DETECT : OFF, ON

"FLICKER DETECT" mode provides a proper image sensor frequency to match the power frequency in order to minimize video flicker.

PRIVACY MASK	
*MODE	ON
TYPE	SQUARE
MASK NO.	MASK 1
DISPLAY	ON
COLOR	BLACK
POLY PIXEL	
POSITION-X	2
POSITION-Y	5
SIZE-X	20
SIZE-Y	11
DEFAULT	
RETURN	

Privacy zone can be setup from this menu.

MODE : ON, OFF

Enable "PRIVACY ZONE" ON or OFF.

TYPE : SQUARE, POLYGON

Select privacy zone shape.

MASK NO : MASK1 ~ MASK8

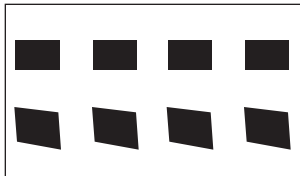
Select privacy zone mask number.

DISPLAY : ON, OFF

Turn ON or OFF the selected privacy mask zone.

COLOR : WHITE, GREEN, BLUE, RED, CYAN, MAGENTA, YELLOW,  
GRAY-1 ~ 6, MOSAIC, BLACK.

Select privacy zone mask color.



POLY SELECT : L- TOPP, L- BOTTOM, R- TOP, R-BOTTOM

Change the shape of the polygon by selecting the corner of the polygon.

POSITION-X & POSITION-Y

Change the size of the selected corner from "POLY SELECT" menu.

SIZE-X & SIZE-Y

Change the size of the privacy square.

DEFAULT

Set privacy zone to default value.

## SETUP

```
*CAM TITLE      OFF
COMMUNICATION   >
SYSTEM INFO     >
OUTPUT FORMAT   1080P30 >
RETURN
```

Camera setup can be adjusted from this menu.

CAM TITLE : OFF, ON

Camera title can be turned ON or OFF.

COMMUNICATION : ON, OFF, AUTO ( VISCA communication control can be adjusted )

- CAM ID : 0 ~ 7 ( Camera ID can be setup )
- ID DISPLAY : OFF, ON ( Camera ID can be setup )
- BAUDRATE : 2400, 4800, 9600, 19200, 38400 ( Camera baudrate can be set )

SYSTEM INFO : ON, OFF, AUTO ( Camera information can be found under this menu )

OUTPUT FORMAT : ON, OFF, AUTO ( Camera resolution and frame rate can be set )

Supported formats are:

\* 1080p by default

1080P - 60 / 59.94 / 50 / 30

29.97 / 25 / 24

1080I - 60 / 59.94 / 50

720P - 60 / 59.94 / 50

## RESET

```
*MODE          FACTORY
RESET          >
SYSTEM INFO
SAVE AS USER
RETURN
```

MODE : FACTORY, USER

Camera will reset to factory default or user saved value.

RESET :

Reset the camera to the selected mode.

SAVE AS USER :

Save the user desired setting from the menu. Mode must be set to User.

**VIDEO**

Image Sensor	1/3 inch Progressive CMOS
Sensor Size	Diagonal 7.2mm
Effective Pixels	Horizontal: 1920, Vertical: 1080
Pixel Size	2.75 $\mu\text{m}$ x 2.75 $\mu\text{m}$
Resolution	1080p & 1080i: 1920 x 1080, 720p & 720i: 1280 x 720
Resolution/Rate	1080 60p/59.94p/50p/30p/29.97p/25p/24p 1080 60i/59.94i/50i 720 60p/59.94p/50p
Output	HDMI 1.3a
Color Space	4:2:2 (YCbCr) 10bit
Min. Illumination	0.2Lux (Day), 0.1Lux (Night), 0.005Lux (Slow Shutter ON)
White Balance	Auto & Manual (9,000 K - 11,000 K)

**LENS**

Lens	C/CS Mount (Default 4mm HD Lens)
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**AUDIO INPUT**

Input	3.5mm TRS Stereo Mic-in & Line in over I/O Cable
Sample Rate	16/24/32 Bits

**PHYSICAL**

Camera Control	RS-485 VISCA, OSD Button
Operation Temp	32° F - 104° F
Dimension	39mm x 39mm x 50.50mm / 1.53" x 1.53" x 1.99" (With default 4mm Lens)
Weight	180g / 0.39lbs (With default 4mm Lens)
Power	6W at 12VDC (+9 - +15VDC)

\*Specification are subject to change without notice.