

# Ball Camera

DWC-BL2553DIR



 **STAR-LIGHT**™ **960H**

## ABOUT MANUAL

Before installing and using the camera, please read this manual carefully.  
Be sure to keep it handy for future reference.

## PRECAUTIONS

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- Do not open or modify.
- Do not open the case except during maintenance and installation, for it may be dangerous and can cause damages.
- Do not put objects into the unit.
- Keep metal objects and flammable substances from entering the camera.  
It can cause fire, short-circuits, or other damages.
- Be careful when handling the unit.
- To prevent damages, do not drop the camera or subject it to shock or vibration.
- Do not install near electric or magnetic fields.
- Protect from humidity and dust.
- Protect from high temperature.
- Be careful when installing near the ceiling of a kitchen or a boiler room, as the temperature may rise to high levels.
- Cleaning:  
To remove dirt from the case, moisten a soft cloth with a soft detergent solution and wipe.
- Mounting Surface:  
The material of the mounting surface must be strong enough to support the camera.

## FCC COMPLIANCE

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This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference, when the equipment is operated in a residential environment. This equipment generates, uses, and radiates radio frequency energy; and if it is not installed and used in accordance with the instruction manual, it may cause harmful interference to radio communications.

**WARNING:** Changes or modifications are not expressly approved by the manufacturer.

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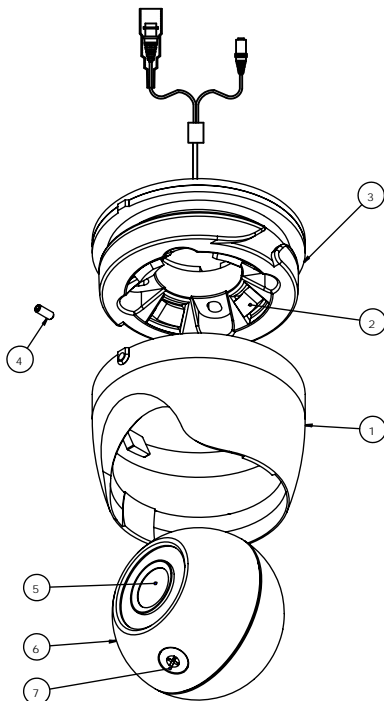
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## FEATURES\*

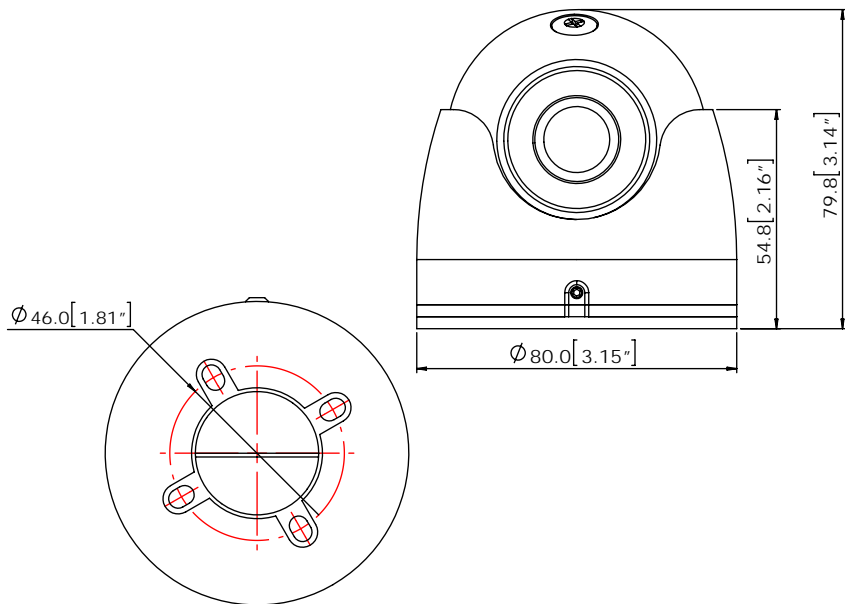
- 960H CCD Image Sensor (960 Horizontal Pixels)
- 720 TV Lines [B/W], 700 TV Lines [Color]
- 3.6mm Fixed Lens
- 50ft Range IR with Intelligent Camera Sync, Smart IR
- Electronic Day & Night
- 3D DNR (3D Digital Noise Reduction)
- Star-Light (Super Low Light Technology)
- HME (Highlight Masking Exposure)
- SLC (Side Light Compensation)
- Programmable Privacy Zones (8) & Motion Detection
- AGC / BLC / AWB
- Easy Icon Driven OSD Menu
- IP66 Certified (Weatherproof)
- Secondary Video-BNC Output

## PARTS & DESCRIPTION\*

- ❶ Ball Cover
- ❷ Gap Sponge
- ❸ Ball Base
- ❹ Set Screw
- ❺ Camera's Lens
- ❻ Ball Camera Module
- ❼ OSD Plug



## DIMENSIONS IN MILLIMETERS (IN)\*



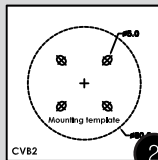
## INSIDE THE BOX\*

### Included with Ball Camera:

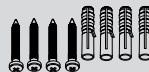
- ① User Manual
- ② Mounting Template
- ③ 4 Machine Screws and 4 Dry Wall Anchors
- ④ Secondary Video-BNC Cable
- ⑤ External OSD Controller



1



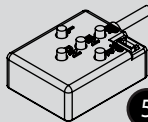
2



3



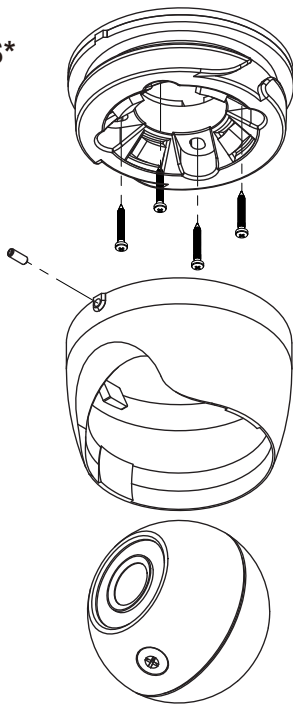
4



5

## INSTALLATION INSTRUCTIONS\*

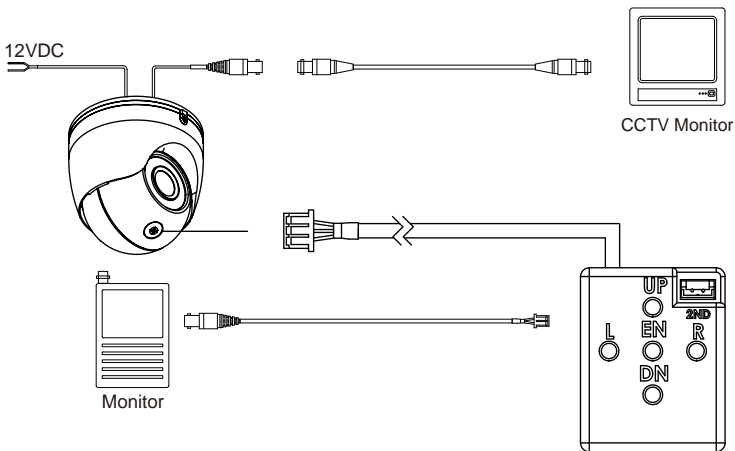
1. To disassemble the camera, uncrew the small screw at the base of the camera's housing. The ball with the camera module will get loose and separate from the ball housing.
2. Use the camera or mounting template to mark and drill the necessary holes in the wall or ceiling.
3. Pull wires through and make connections.
4. Using the four (4) included screws, mount and secure the camera to the wall or ceiling.
5. Use the joystick to adjust the OSD menu. See pages 11-22 for more information.
6. Secure the camera's ball module into the housing using the small screw at the base of the camera's housing.





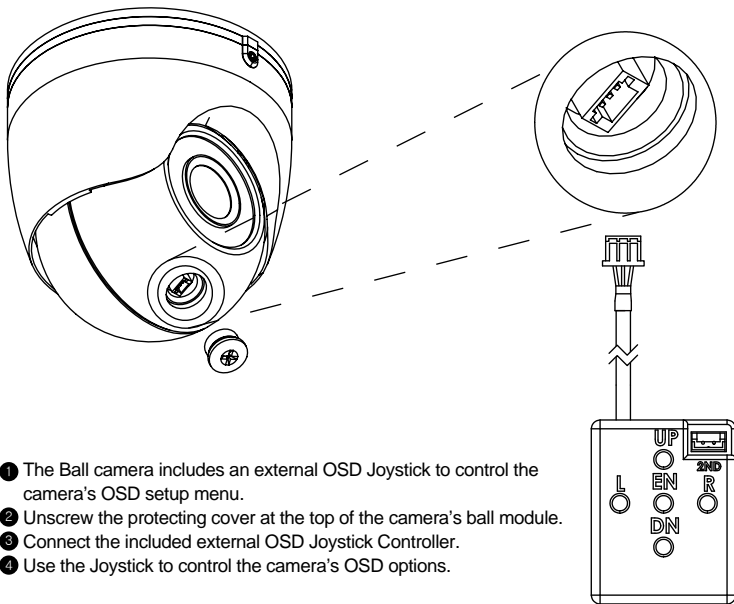
## CONNECTING TO MONITORS\*

Use the diagram below to connect to a Monitor or CRT Monitor properly.



- Power Connection - 12VDC
- All cameras are equipped with a second video output for on-site configuration.

## CONTROL BOARD\*



- 1 The Ball camera includes an external OSD Joystick to control the camera's OSD setup menu.
- 2 Unscrew the protecting cover at the top of the camera's ball module.
- 3 Connect the included external OSD Joystick Controller.
- 4 Use the Joystick to control the camera's OSD options.

# MODULE OSD MENU\*

EXPOSURE	COLOR	DAY & NIGHT	FUNCTION
<ul style="list-style-type: none"> <li>LENS <ul style="list-style-type: none"> <li>MANUAL / DC</li> </ul> </li> <li>BACKLIGHT <ul style="list-style-type: none"> <li>OFF / BLC / HME</li> </ul> </li> <li>DRC / DEFOG <ul style="list-style-type: none"> <li>OFF / DRC / DEFOG</li> </ul> </li> <li>AGC <ul style="list-style-type: none"> <li>0-20</li> </ul> </li> <li>STARLIGHT <ul style="list-style-type: none"> <li>OFF / x2 ~ x512</li> </ul> </li> <li>3D DNR <ul style="list-style-type: none"> <li>OFF / LOW / MID / HIGH</li> </ul> </li> <li>EXIT JUMP <ul style="list-style-type: none"> <li>SAVE &amp; EXIT / EXIT</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>WB BAL. <ul style="list-style-type: none"> <li>ATW / MANUAL / PUSHLOCK</li> </ul> </li> <li>COLOR GAIN <ul style="list-style-type: none"> <li>0-20</li> </ul> </li> <li>EXIT JUMP <ul style="list-style-type: none"> <li>SAVE &amp; EXIT / EXIT</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>D&amp;N MODE <ul style="list-style-type: none"> <li>AUTO / COLOR / B&amp;W</li> </ul> </li> <li>CONTROL <ul style="list-style-type: none"> <li>AUTO / EXTERN</li> </ul> </li> <li>DELAY <ul style="list-style-type: none"> <li>0-15</li> </ul> </li> <li>B/W BURST <ul style="list-style-type: none"> <li>OFF / ON</li> </ul> </li> <li>SMART IR <ul style="list-style-type: none"> <li>ANTI-SAT / SAT AREA</li> </ul> </li> <li>EXIT JUMP <ul style="list-style-type: none"> <li>SAVE &amp; EXIT / EXIT</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>MIRROR <ul style="list-style-type: none"> <li>OFF / ON</li> </ul> </li> <li>SHARPNESS <ul style="list-style-type: none"> <li>0-20</li> </ul> </li> <li>GAMMA <ul style="list-style-type: none"> <li>0.35 ~ 0.70</li> </ul> </li> <li>POS/NEGA <ul style="list-style-type: none"> <li>POS / NEGA</li> </ul> </li> <li>SLC <ul style="list-style-type: none"> <li>0-20</li> </ul> </li> <li>EXIT JUMP <ul style="list-style-type: none"> <li>SAVE &amp; EXIT / EXIT</li> </ul> </li> </ul>
MOTION	PRIVACY	SETUP	EXIT
<ul style="list-style-type: none"> <li>MOTION <ul style="list-style-type: none"> <li>OFF / ON</li> </ul> </li> <li>SENSITIV. <ul style="list-style-type: none"> <li>0-50</li> </ul> </li> <li>MOTION SET <ul style="list-style-type: none"> <li>AREA NO / AREA USE / TOP / BOTTOM / LEFT / RIGHT</li> </ul> </li> <li>EXIT JUMP <ul style="list-style-type: none"> <li>SAVE &amp; EXIT / EXIT</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>COLOR <ul style="list-style-type: none"> <li>BLACK / GRAY-1/ GRAY-2/ GRAY-3/ GRAY-4/ WHITE / YELLOW / GREEN / BLUE / RED / CYAN / MAGNETA</li> </ul> </li> <li>PRIVACY SET <ul style="list-style-type: none"> <li>AREA SET / DISPLAY / TOP / BOTTOM / LEFT / RIGHT / RET/IN/</li> </ul> </li> <li>EXIT JUMP <ul style="list-style-type: none"> <li>SAVE &amp; EXIT / EXIT</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>CAMERA TITLE <ul style="list-style-type: none"> <li>OFF / ON</li> </ul> </li> <li>SYNC</li> <li>COMMUNICA. <ul style="list-style-type: none"> <li>CAM ID / ID DISP. / BAUDRATE / PROTOCOL / UTC</li> </ul> </li> <li>LANGUAGE <ul style="list-style-type: none"> <li>ENGLISH</li> </ul> </li> <li>FONT COLOR <ul style="list-style-type: none"> <li>BLUE / GREEN / CYAN / RED / MAGENTA / YELLOW / BLACK / GRAY</li> </ul> </li> <li>SPECIAL <ul style="list-style-type: none"> <li>O.L.PF / DPC</li> </ul> </li> <li>EXIT JUMP <ul style="list-style-type: none"> <li>SAVE &amp; EXIT / EXIT</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>SAVE</li> <li>RESTORE</li> <li>EXIT</li> </ul>



# EXPOSURE



## LENS

Manual

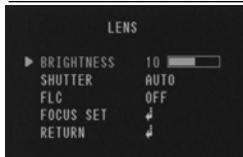
Manual mode supports the fixed board lens or the manual iris lens.

DC

DC mode supports the auto-iris varifocal lens.

**NOTE:** Both MANUAL and DC mode have FOCUS SET. You can adjust the focus by finding the highest number on the FOCUS SET. See page 15 for focus information.

## MANUAL Lens Submenu



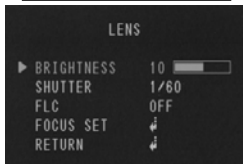
**Brightness:** Adjust the camera's brightness from 0~20. The higher the number, the brighter the image will appear.

**Shutter:** Sets the shutter speed levels from 1/60 to 1/120000.

\*For LENS-MANUAL Mode, the default SHUTTER is AUTO.

\*For LENS-DC Mode, the default SHUTTER is 1/60. Select DC-AUTO for outdoor use.

## DC Lens Submenu



**FLC:** Enable or disable to adjust the camera's view and prevent the image from flickering.



# EXPOSURE

## BACKLIGHT

### OFF

### BLC BACK LIGHT COMPENSATION

If BLC is selected, adjust the following options in the submenu:

- LEVEL: Set the BLC level from the available options: LOW/ MIDDLE/ HIGH)
- DISPLAY: Selet to show or hide the BLC mask.
- POSITION: Set the BLC masks' size and position.

TOP: Set level from 0~54. The higher the number, the higher the top border of the BLC mask will be in the camera's view.

BOTTOM: Set level from 1~55. The higher the number, the lower the bottom border of the BLC mask will be in the camera's view.

LEFT: Set level from 0~217. The lower the number, the closer the BLC mask will be to the camera's left border.

RIGHT: Set level from 1~218. The lower the number, the closer the BLC mask will be to the camera's right border.

- RET/ INI.: Select whether to return to the main menu, or reset the BLC settings to factory default.

## HME

### HIGHLIGHT MASKING EXPOSURE

HME masks highlights to allow objects to appear clearly on the screen. If ON is selected, HME levels are adjustable. The lower the setting, the darker the masking areas. Select from: LOW / MIDDLE / HIGH.





## EXPOSURE

### DRC

#### DYNAMIC RANGE COMPRESSOR

DRC enables dark spots in images to become more visible without overexposing the bright spots to create one perfect image.

- DEFOG: AUTO / Manual: If AUTO is selected, the WDR and DRC levels will be set automatically based on the environment. If MANUAL is selected, set the WDR and DRC level from LOW / MIDDLE / HIGH.

- MODE: \* ONLY DAY: DRC and WDR will work in day time.

\* ALL DAY: DRC and WDR will work in day and night time.

### AGC

1~20

#### AUTO GAIN CONTROL

AGC enhances the picture brightness in low light conditions. A higher level AGC setting makes the images brighter; however, it could increase the amount of noise.

### STARLIGHT

OFF / x2 ~ x512

Automatically activates slow shutter function when the image is too dark. High values are not recommended as they may cause the image to lag. Starlight menu cannot be controlled if the SHUTTER setting is above 1/60.

### 3D DNR

OFF / LOW / MID / HIGH

**3D DIGITAL NOISE REDUCTION-** 3D-DNR reduces the noise on the screen in low light conditions and allows for clearer images, even at night.



## COLOR

### WB MODE

- ATW** Auto Tracking White Balance Control mode compensates for color temperature changes between 2500K and 9500K.
- PUSHLOCK** Pushlock is to fix the white balance based on the lighting.
- MANUAL** Users can control the white balance manually by changing RED GAIN and BLUE GAIN (see below).



### RED GAIN

0 ~ 40 Adjusts the amount of red in the image.

### BLUE GAIN

0 ~ 40 Adjust the amount of blue in the image.

### COLOR GAIN

Set the color gain from 0~20.



## DAY & NIGHT

### D&N MODE

**AUTO /** In AUTO mode, the camera switches between day and night automatically depending on light level. If COLOR is selected, the camera always stays in day/color mode.  
**B&W** If B&W is selected, camera always stays in night/B&W mode. If AUTO is selected, please define the following settings:

**CONTROL:** AUTO/EXT. If using IR LEDs built into the camera, select AUTO. If using external IR LEDs separately, select EXT.

Adjust the following submenu options:

\* **EXT SIGNAL:** Select from CDS or LOW/HIGH.

If CDS is selected: Day & Night will work by CDS signal level.

If LOW/ HIGH is set for EXT SIGNAL: Day & Night will work by CDS's Low/High signal.

- CDS D>N : Set D>N level from 0 ~ 40. Adjusts the light level at which the camera switches from day to night. Higher values, the lower the light level.
- CDS N>D : Set N>D level from 0 ~ 20. Adjusts the light level at which the camera switches from night to day. This should be lower than the value of D>N above.
- NIGHT S/W : Decide the Low/High signal of CDS.

\***EXT LED:** If you want to turn off the external LED by force, you can change the value from AUTO to OFF.



### DELAY

0 ~ 15 Sec. Time interval delay before switching from day mode to night mode.

### B/W BURST

**OFF / ON** If ON is selected, the camera provides a color burst signal in night mode.

**SMART IR - ANTI-SAT:** Select level value from 1 ~ 20.

- **SAT. AREA :** Set SMART IR area from 0 ~ 20.





## FUNCTION

### MIRROR

OFF

MIRROR Reflects the camera horizontally.



Mirror OFF



Mirror ON

### SHARPNESS

0 ~ 30 Sets the image sharpness. The higher the number, the sharper the image.

### GAMMA

0.35 ~ 0.7 Select the desired gamma level. 0.45 is default setting.

### POSI / NEGATIVE

OFF / ON If NEGATIVE is enabled, the camera's image will appear in negative colors.

### SLC (SIDE LIGHT COMPENSATION)

0~20 Increase the brightness on sides of the image.





## MOTION

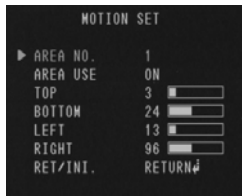
The camera can detect the movement and display an alarm on the screen when movement is detected.

### MOTION

OFF / ON Select to enable or disable the camera's motion detection. If ON is selected:

### SENSITIV.

0 ~ 30 Sensitivity level of the motion detection is adjustable. Motion Detection will be more sensitive at a higher number.



### MOTION SET

- Area Number: The camera supports up to 4 different motion detection masks. Select which ones to display.
- Area Use: Select which one of the motion areas to enable.
- TOP: The higher the number, the higher the top border of the mask will be in the camera's view.
- BOTTOM: The higher the number, the lower the bottom border of the mask will be in the camera's view.
- LEFT: The lower the number, the closer the mask will be to the camera's left border.
- RIGHT: The lower the number, the closer the mask will be to the camera's right border.
- RET/ INI.: Select whether to return to the main menu, or reset the motion settings to factory default.



# PRIVACY

You can hide some parts of the screen for privacy masking.  
A total of 8 different privacy masking zones are available.

## MASK COLOR

Privacy zones can be set with eight different colors-Gray-1, Gray-2, Gray-3, Gray-4, White, Yellow, Green, Blue, Red, Cyan, and Magenta.

## PRIVACY SET

- Area Number: The camera supports up to 8 different privacy masks. select 1~8 which masks to display.
- Area Use: Select which one of the motion areas to enable.
- TOP: The higher the number, the higher the top border of the mask will be in the camera's view.
- BOTTOM: The higher the number, the lower the bottom border of the mask will be in the camera's view.
- LEFT: The lower the number, the closer the mask will be to the camera's left border.
- RIGHT: The lower the number, the closer the mask will be to the camera's right border.
- RET/INI.: Select whether to return to the main menu, or reset the motion settings to factory default.

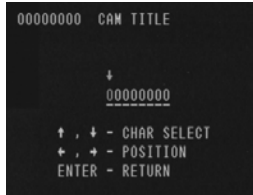




# SETUP

## TITLE

OFF / ON If ON is selected, you can display the camera title on the screen. If enabled, manually enter the camera's display name using the joystick controller.



## INTERNAL SYNC.

INT/ Select whether the camera synchronizes internally or using Line Lock.

## COMMUNICATION

The Communications settings allow you to setup the camera's ID, Baudrate, Protocol, and UTC.

- CAM ID: Provide an ID number for the camera ( 0 ~ 255 ).
- ID DISP.: Decide to show the ID on screen or not. Select ON & OFF.
- BAUDRATE: 9600bps is default. Select the baudrate from the following options:  
2400/4800/9600/57600 and 115200bps.
- PROTOCOL: Set as PELCO-D/ PELCO-P.
- UTC: Automatically set UTC as 15/ 32 BIT.





# **SETUP**

## **LANGUAGE**

The camera supports the following languages: ENGLISH.

## **FONT COLOR**

The following colors are available for the OSD menu: BLUE, GREEN, CYAN, RED, MAGENTA, YELLOW, BLACK, and GRAY.

## **SPECIAL**

OLPF: Select the filter that you use from BLUE/RED and PASS, then reboot the camera to use.

DPC: Set as START and compensate the white dot by changing the THRESHOLD value.





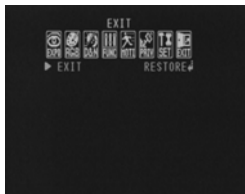
## EXIT

### EXIT

**SAVE** Exit the OSD menu after saving the recent changes.

**RESTORE** Exit the OSD menu without saving recent changes.

**INITIAL** Exit the OSD menu after resetting the camera to factory default.



## **TROUBLESHOOTING**

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Before sending your camera for repair, check the following or contact our technical specialist.

### **FOR NO VIDEO**

Check the coaxial cable and make sure it is connected securely.

Check the lens' iris adjustment at the camera's OSD menu.

Check the power supply and make sure the camera has the proper voltage and current.

### **FOR OUT-OF-FOCUS VIDEO**

Check the clear dome cover and the lens for dirt or fingerprints. Use a soft cloth and gently clean. Check the lens' manual focal and zoom adjustment. The use of a field test monitor is recommended.

## WARRANTY INFORMATION\*

Digital Watchdog (referred to as “the Warrantor”) warrants the Digital Watchdog Camera against defects in materials or workmanship as follows:

**LABOR:** For the initial five (5) years and one (1) year on IR LED from the original purchase date, if the camera is determined to be defective, the Warrantor will repair or replace the unit with a new or refurbished product at its option at no charge.

**PARTS:** In addition, the Warrantor will supply replacement parts for the initial five (5) years and one (1) year on IR LED.

To obtain warranty or out of warranty service, please contact a Technical Support Representative at **1-866-446-3595** Monday through Friday from 9:00AM to 8:00PM Eastern Standard Time.

A purchase receipt or other proof of the original purchase date is required before warranty service is rendered. This warranty only covers failures due to defects in materials and workmanship which arise during normal use. This warranty does not cover damage which occurs in shipment or failures which are caused by products not supplied by the Warrantor or failures which result from accident, misuse, abuse, neglect, mishandling, misapplication, alteration, modification, faulty installation, set-up adjustments, improper antenna, inadequate signal pickup, maladjustment of consumer controls, improper operation, power line surge, improper voltage supply, lightning damage, rental use of the product or service by anyone other than an authorized repair facility or damage that is attributable to acts of God.



## LIMITS & EXCLUSIONS\*

There are no express warranties except as listed. The warrantor will not be liable for incidental or consequential damages (including damage to recording media without limitation) resulting from the use of these products or arising out of any breach of the warranty. All express and implied warranties, including the warranties of merchantability and fitness for particular purpose, are limited to the applicable warranty period set forth above.

Some states do not allow the exclusion or limitation of incidental or consequential damages, or limitations on how long an implied warranty lasts, so the exclusions or limitations listed above may not apply to you. This warranty gives you specific legal rights, and you may also have other rights that vary from state-to-state.

If the problem is not handled to your satisfaction, then write to the following address:

Digital Watchdog, Inc.  
ATTN: RMA Department  
5436 W. Crenshaw Street  
Tampa, FL 33634

Service calls which do not involve defective materials or workmanship as determined by the Warrantor, in its sole discretion, are not covered. Costs of such service calls are the responsibility of the purchaser.

# SPECIFICATIONS\*

## VIDEO

Image Sensor	960H CCD
Total Pixels	960 (H) x 478 (V)
Scanning System	2 : 1 Interlace
Frequency	15.734KHz (H), 59.95Hz (V)
Synchronization	Internal or Line Lock
Horizontal Resolution	720 TV Lines [B/W], 700 TV Lines [Color]
Minimum Illumination	F1.2 (30IRE): 0.0 Lux
S/N Ratio	52dB (AGC off)
Video Output	CVBS: 1.0Vp-p / 75 $\Omega$

## LENS

Focal Length	3.6mm
Lens Type	Fixed Lens Auto Iris
IR Distance	50ft Range IR

## OPERATIONAL

Shutter Speed	1/60s~1/120000s
Backlight	OFF / ON
Star-Light	X2 ~ X512
3D-DNR	OFF / Low / Middle / High
White Balance	ATW/ PUSH/ MANUAL
Day and Night	Auto / Day / Night

## OPERATIONAL

Mirror	OFF / V. Flip / Rotate
Auto Gain Control	1 ~ 20
Gamma	0.35 ~ 0.7
Motion Detection	4 Motion Regions
Privacy Zones	8 Programmable Privacy Masks
Dynamic Range Compressor	OFF / Low / Middle / High
Sharpness	0 ~ 20
Highlight Masking Exposure	OFF / Low / Middle / High
DPC (Dead Pixel Cancellation)	OFF / ON

## ENVIRONMENTAL

Operating Temperature	-10°C ~ 50°C (14°F ~ 122°F)
Operating Humidity	Less than 90% (Non-Condensing)
IP Rating	IP66 (Protects against dust and high pressure water.)

## ELECTRICAL

Power Requirement	DC12V
Power Consumption	1.1W, 91mA, LED On: 2.3W, 191mA

## MECHANICAL

Housing Material	Aluminum
Dimensions	Ø80 X 79.8 mm (3.15 X 3.14 in)
Weight	0.83 lbs

\*Specification is subject to change without prior notice.



5436 W Crenshaw St. Tampa, FL 33634

Tel : 866-446-3595 / 813-888-9555

Fax : 813-888-9262

[www.Digital-Watchdog.com](http://www.Digital-Watchdog.com)

[technicalsupport@dwcc.tv](mailto:technicalsupport@dwcc.tv)

Technical Support Hours : Monday-Friday

9:00am to 8:00pm EST