



B/W CCD Camera Model CS8560BD Operation Manual

Thank you for purchasing our B/W CCD camera. This operation manual contains many important information such as how to use this product correctly and safely. Please read through this manual carefully. After reading, keep this manual by the side of this product for your future reference.

TOSHIBA TELI CORPORATION

BEFORE USE - GENERAL SAFETY INSTRUCTIONS

Read the following safety precautions carefully before using this product. These instructions contain valuable information on safe and proper use that will prevent harm and damage to the operator and other persons. Make sure that you fully understand the following details (indications, graphic symbols) before proceeding to the remaining sections in this manual.

OWNER'S RECORD

Please fill in the blank below the model name and product serial number, which is found on bottom chassis of your device. Keep this number for your record.

Model Name _____

Serial No. _____

Indication definitions

Indication	Meaning
WARNING	This indicates the existence of a hazard that death or catastrophic bodily injury(*1) may result from improper use.
CAUTION	This indicates the existence of a hazard that bodily injury(*2) or property damage(*3) may result from improper use.

Notes

- *1 Catastrophic bodily injury means loss of eyesight, burns (high and low temperature), shock, fracture, poisoning, etc. which leaves a sequela and require hospitalization or prolonged treatment.
- *2 Bodily injury means injuries, burns and electric shock which does not require hospitalization or prolonged treatment.
- *3 Property damage means extended harm to home, household effects, domesticated animals, and pets.

Graphic symbol definitions

Indication	Meaning
	This mark indicates a prohibited action that must not be carried out. The actual prohibited action is indicated in the symbol or nearby graphically or described in text.
	This mark indicates a mandatory action that must not be carried out. The actual instruction is indicated in the symbol or nearby graphically or described in text.

Handling Precautions

	WARNING Stop operation immediately when any abnormality or defect occurs. Use during an abnormal condition; such as emitting smoke, burning odors, damage from dropping invasion of foreign objects, etc. may cause fire and/or electric shock. Be always sure to disconnect the power plug from the electrical outlet (socket) at once and contact your dealer.
	Do not operate in places with possibility of becoming wet. This may cause fire and/or electric shock.
	Do not repair, disassemble and/or modify by yourself. This may cause fire and/or electric shock. Be always sure to contact your dealer for internal repair, check and cleaning of the product.
	Don't place things or materials on the unit. Ingress of foreign materials such as metallic things and liquid into the unit may cause a fire or an electric shock.
	Do not put the product in an unstable, slanting and/or vibrated place. Drop and/or fail of the product may cause injury.
	Do not touch the power cord or other connection cables during a thunderstorm. This might cause electric shock.
	Use the specified power supply. Use of an unspecified power supply may result in fire or electric shock.
	Do not be handled roughly, damaged, fabricated, bent forcefully, pulled, twisted, bundled, placed under heavy objects or heated the power cord, connection cable. Otherwise, fire or electric shock may result.

	CAUTION Note the following instructions when installing. -Do not wrap the product in an inflammable material, such as cloth. -Do not put the product in a narrow space, since the heat generated from the product may be difficult to emanate. If you do not follow the above, the heat generated by the product may cause fire.
	Avoid setting in humid, smoky, vaporized or dusty places. A fire or an electric shock may occur in such places. This may cause fire and/or electric shock.
	Do not put the product in direct sunshine and/or high temperature. The temperature inside the product may cause fire.
	Use the specified DC power cable or connection cable. Otherwise, a fire or an electric shock may occur.
	Turn OFF the power in the case of connection. Turn OFF the power in the case of connection of power cable or connection cable. Otherwise, an electric shock or a malfunction may occur.
	Do not expose its camera head to any intensive light (such as direct sunlight). Otherwise, its inner image pickup device might get damaged.
	Avoid short-circuiting signal output. Otherwise, a malfunction may occur.
	Avoid giving a strong shock against the camera body. It might cause a breakdown or damage. If your camera is used in a system where its camera connector is subjected to strong repetitive shocks, its camera connector is possible to break down. If you intend to use your camera in such a situation, if possible, bundle and fix a camera cable in the place near the camera, and do not transmit a shock to the camera connector.

	Ask your dealer to perform a periodical check and internal cleaning (approx. once every five years). Dust inside the product may cause fire and/or trouble. For check and cleaning cost, please consult your dealer.
--	--

DISCLAIMER (LIMITED WARRANTY)

We disclaim any responsibility and shall be held harmless for any damages or losses incurred by the user in any of the following cases;

- Fire, earthquake or any other act of God; acts by third parties; misuse by the user, whether intentional or accidental; use under extreme operating conditions.
- Malfunction or non-function resulting in indirect, additional or consequential damages, including but not limited to loss of expected income and suspension of business activities.
- Inconrent use not in compliance with instructions in this instruction specifications and manual.
- Malfunctions resulting from misconnection to other equipment.
- Repairs or modifications made by the user or caused to be made by the user and carried out by an unauthorized third party.
- Notwithstanding the foregoing, Teli's liabilities shall not, in any circumstances, exceed the purchase price of the product.
- About the item which does not have a publication in the specifications and manual of this product, it considers as the outside for a guarantee.

RESTRICTION FOR USE

- Should the equipment be used in the following conditions or environments, give consideration to safety measures and inform us of such usage:
 1. Use of the equipment in the conditions or environment contrary to those specified, or use outdoors.
 2. Use of the equipment in applications expected to cause potential hazard to people or property, which require special safety measures to be adopted.
- This product can be used under diverse operating conditions. Determination of applicability of equipment or devices concerned shall be determined after analysis or testing as necessary by the designer of such equipment or devices, or personnel related to the specifications. Such designer or personnel shall assure the performance and safety of the equipment or devices.
- This product is not designed or manufactured to be used for control of equipment directly concerned with human life (*1) or equipment relating to maintenance of public services/functions involving factors of safety (*2). Therefore, the product shall not be used for such applications.
 - (*1): Equipment directly concerned with human life refers to.
 - Medical equipment such as life-support systems, equipment for prearing theaters.
 - Exhaust control equipment for exhaust gases such as toxic fumes or smoke.
 - Equipment mandatory to be installed by various laws and regulations such as the Fire Act or Building Standard Law
 - Equipment related to the above.
 - (*2): Equipment relating to maintenance of public services/functions involving factors of safety refers to.
 - Traffic control systems for air transportations, railways, roads, or marine transportation
 - Equipment for nuclear power generation
 - Equipment related to the above

CAUTIONS ON USE

- Carefully handle the units.
Do not drop, or give a strong shock or vibration to the camera. This may cause problems. Treat the camera cables carefully to prevent cable problems, such as cable breakdown and loosened connections.
- Operating ambient temperature and humidity.
Do not use the camera in places where temperature and humidity exceed the specifications. Picture quality will lower and internal parts may be damaged.
Be particularly careful when using in places exposed to direct sunlight. When shooting in hot places, depending on the conditions of the object and the camera (for example when the gain is increased), noise in the form of vertical strips or white dots may occur. This is not a malfunction.
- Restriction for the lens combination
This camera might form a ghost to image area depending on the combination of a lens and an illumination with this camera. But this is not a failure of this camera. Therefore, please check the combination of the lens and the illumination with this camera when use.
When mounting a lens, take extra caution so that the lens is not tilted, nor does flaw exist at the lens-mount-screw part. Also check to confirm that no dirt nor other foreign object is put inside
Improper mounting might cause the parts to become locked.
- Do not shoot under intense light.
Avoid intense light such as spot light on part of the screen because it may cause blooming or smears. If intense light falls on the screen, vertical stripes may appear on the screen, but this is not a malfunction.
- Do not expose the camera's image-pickup-plane to sunlight or other intense light directly.
Its inner CCD (charge-coupled device) might be damaged.
- Moire
When thin stripe patterns are shot, stripe patterns that are not actually there (moire) may appears as interference stripes. This is not a malfunction.
- Undesirable noise
If the camera or the cables are located near something which emit strong magnetism or near something which emit strong electric wave, undesirable noise may appear on the screen. In such a case, try to change the location of the camera or the cable wiring.
- Handling of the protection cap
When the camera is not in use, put a lens-cap onto the camera head for protection of the image-pickup-plane.
- When not using the camera for a longtime.
Stop supplying power for safety.
- When cleaning the camera
Always turn off the power and clean with a piece of soft dry cloth.
To remove stubborn stains, use a soft cloth soaked in diluted acid-free detergent. Do not use alcohol, benzine, thinner, etc. If used, coating and printed letters may be discolored.
In case the image-pickup-plane should be settled with fine dust, dirt, or scratched, ask your dealer for technical advice.
- Wastes of this product should be separated and discarded in compliance with the various national and local ordinances.

This device complies with Part 15 of the FCC rules. Operation is subject to the following two conditions:

- (1) This device may not cause harmful interference, and
- (2) This device accept any interference received, including interference that may cause undesired operation.

This equipment has been tested and found to comply with the limits for a class A 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 commercial environment. This equipment generates, uses, can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be require to correct the interference at his own expense.

1. PRODUCT DESCRIPTION

Model CS8560BD is a one-body type B/W CCD camera with a VGA format all-pixel-data readout CCD. This model has twice greater driving frequency of conventional cameras to achieve fast-speed data-processing. The model is suited for high-speed, high-resolution image processing use. Its compact, light-weight body is ideal for system integration.

2. FEATURES

- (1) Double-speed scan
This model reads out image-data twice as fast as conventional cameras do.
 - (2) All pixel's data readout
With its built-in all-pixel-data-readout CCD, this model can read out image-data just in approximately 1/60 sec. A frame-shutter reads out all data even under RTS (Random Trigger Shutter) mode.
 - (3) High vertical resolution
As all pixel's data are read out even under RTS mode (in 1/60 sec.), images with no deterioration in vertical resolution are obtained.
 - (4) Square grid pattern CCD
Pixel's in CCD are aligned in square grid pattern. This makes it easier to perform computation correctly for image processing use.
 - (5) External Sync
The camera is switched over to external synchronization operation automatically when external HD signal is input.
 - (6) Random trigger shutter function
With a built-in RTS, the camera's CCD starts light-exposure in synchronization with external trigger signals. This function enables the camera to capture fast-moving subjects at constant position for precise image processing.
 - (7) Restart / Reset
Under the restart / reset mode, this model can capture images at an arbitrary timing cued by external VD signal.
 - (8) Multiple shutter
With this shutter, this model capture images at an arbitrary timing cued by external trigger signal, and then outputs video at an arbitrary timing cued by external VD signal.
 - (9) Partial-scan
Under the partial scan mode, only 1/2 or 1/4 screen center portion of image information is read out, resulting in a faster operation.
 - (10) Ultra-compact & light-weight camera head
The model features its ultra-compact and light-weight camera head, freeing you from your integration-space-problem. In addition, it has an excellent shock and vibration resistance.
- (1) RoHS compliant

3. CONFIGURATION

- (1)Camera body 1
- (2)Accessory
Manual 1

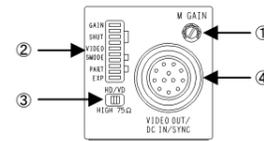
4. OPTION UNIT

- (1)DC SYNC IN cable Model name : CPRC3700 [2m,3m,5m,10m]
- (2)Camera adapter Model name : CA170
- (3)Camera-mounting kit Model name : CPT8560

- *Contact your dealer / distributor for details of option units.
- *Conformity of an option part and EMC conditions

About the conformity of EMC standard of this machine, it has guaranteed in the conditions combined with the above-mentioned option part.
When used combined parts other than specification of our company, I ask you to have final EMC conformity checked of a visitor with a machine and the whole equipment.

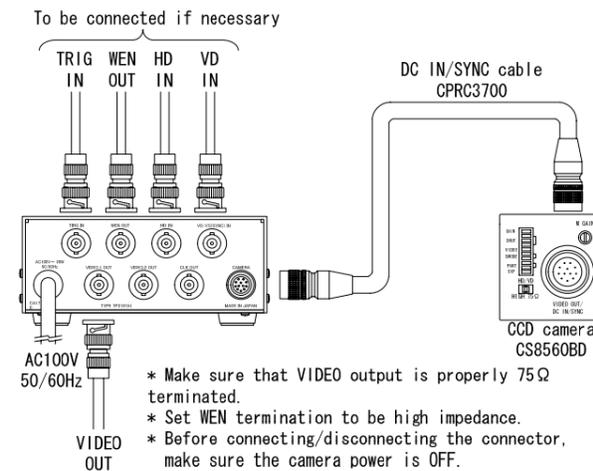
5. EXPLANATION OF REAR PANEL



- ① Manual gain adjustment potentiometer (M.GAIN)
This potentiometer is enabled when DIP SW No.1 (GAIN selection) is in ON.
When you turn clockwise to right, canera sensitivity level goes up.
- ② Mode selection rear DIP SW
This is the camera mode selection switch.
- ③ Ext-sync input impedance selection SW
This SW switches external-sync input impedance. When set in right side, the input impedance is 75-ohm termination. When set in left, it is 10k-ohm. (The initial factory setting is in OFF position.)
- ④ VIDEO OUT / DC IN / SYNC
This connector is for DC power input, external sync signal input, and video output.

6. CONNECTION

6-1 Connection examples

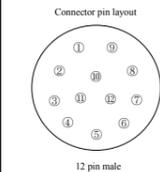


6-2 DC IN/SYNC connector

- (1) Compatible connector
- (2) Pin assignment

HR10A-10P-12S (Supplied by HIROSE ELEC.)

Pin No.	Signal
1	DC12V_GND
2	DC12V
3	VIDEO_GND
4	VIDEO_OUT
5	HD_GND
6	HD_IN
7	VD_IN
8	TRIG_GND
9	NC
10	WEN_OUT
11	TRIG_IN
12	VD_GND



Picture Rear-camera connector (Rear-view)

* Before connecting / disconnecting the connector, make sure the camera power is OFF.

** For board connection, check compatibility.

7. OPERATION MODE

CCU rear-panel DIP SW

No.	Function
1	GAIN selection (GAIN)
2	
3	E-shutter-speed (SHUT)
4	
5	Video output mode (VIDEO)
6	
7	Shutter mode (SMODE)
8	
9	Partial scan (PART)
0	RTS Exposure (EXP)



*Initial factory setting: All OFF

(1) GAIN selection

Switches sensitivity setting

- (1-1) FIX Factory-prefixed gain
- (1-2) MANU Gain is adjustable via the manual gain potentiometer (M.GAIN)

■ Rear-panel DIP SW setting

No.	GAIN selection (GAIN)	FIX	MANU
1	OFF	ON	ON

(2) Video output mode selection

Switches video format

- (2-1) 1/60 1/60s Non-interlace mode
As all pixels are read out in 1/60s, you will get images with the higher V resolution
- (2-2) 1/120 1/120s 2:1 interlace MIX mode
As vertical pixels are added in readout, the sensitivity is same as that of 1/60s non-interlace mode during electronic shutter OFF. Twice greater sensitivity is obtained under shutter-speed range of 1/200 - 1/20000.

■ Rear-panel DIP SW setting

No.	Video output mode selection (VIDEO)	
	1/60	1/120
5	OFF	ON

(3) Shutter mode selection

Switches shutter mode

- (3-1) NOR mode Normal electronic shutter
Exposure control via internal sync signal
High-speed shutter: From 1/20,000s through OFF (8 position)

■ Rear-panel DIP SW setting

No.	E-shutter speed setting (SHUT)			
	OFF	1/200s	1/500s	1/1,000s
2	OFF	ON	OFF	ON
3	OFF	OFF	ON	ON
4	OFF	OFF	OFF	OFF

No.	E-shutter speed setting			
	1/2,000s	1/4,000s	1/8,000s	1/20,000s
2	OFF	ON	OFF	ON
3	OFF	OFF	ON	ON
4	ON	ON	ON	ON

* Don't set Electronic shutter-speed in OFF under RTS mode.

(3-2) RDM mode Random trigger shutter

Exposure control via ext. trigger or ext. sync. Input

- Notes: * RDM selection is automatic with TRIG status
** Neither under FIX nor PULSE W mode, RTS doesn't work if E-shutter speed SW is set in OFF position.

■ There are the following in RDM mode.

- (a)Non-reset mode (Under internal sync / external sync --- Consecutive VD IN)
Exposure starts at the timing of TRIG signal IN. After each exposure is completed, the camera outputs video at each next VD IN timing.
 - (b)Non-reset mode (Under external sync --- Single VD IN)
After TRIG IN and exposure, the camera goes into standby until next ext. VD IN.
 - (c)V-reset mode (Under internal sync / external sync --- No VD IN)
Exposure starts at the timing of TRIG signal IN. After each exposure is completed, the camera outputs video immediately by resetting VD. (HD is not reset)
 - (d)SYNC reset mode (Under internal sync)
Exposure starts at TRIG signal input timing, resets HD, and outputs video immediately after exposure by resetting VD.
* Available under FIX mode only.
- RTS (Random Trigger Shutter) exposure selection
Switches light exposure mode under RTS mode
•FIX mode Exposure-time control via rear-panel DIP switch
•PULSE W mode Exposure-time control via TRIG signal pulse width

(3-3) MULTIPLE mode
Multiple shutter operation is available by providing TRIG IN more than one time before ext. VD IN. (Non-reset mode, single VD, consecutive VD IN)

(3-4) Restart / Reset
The restart / reset function is available with the ext. VD signal. You can get an arbitrary slower shutter speed than normal shutter and random trigger shutter.
Here are some notes;
* The shutter speed (exposure time) is determined by ext. VD signal interval.
** This function is enabled when the rear-panel shutter speed DIP SW is OFF.
*** Supply consecutive VD.

■ Rear-panel DIP SW setting

No.	Shutter mode selection (SMODE)						Non acceptable
	Random trigger						
	V-reset [(3-2)(c)]		SYNC-reset [(3-2)(d)]		Non-reset[(3-2)(a)]		
	Fix	Pulse	Fix	Pulse	Fix	Pulse	
1	Arbitrary	Arbitrary	Arbitrary	Arbitrary	Arbitrary	Arbitrary	Arbitrary
2-4	#1	#2	#1	#2	#1	#2	all OFF
5	Arbitrary	Arbitrary	Arbitrary	Arbitrary	Arbitrary	Arbitrary	Arbitrary
6	OFF	ON	OFF	ON	OFF	ON	ON
7	OFF	ON	OFF	ON	OFF	ON	ON
8,9	Arbitrary	Arbitrary	Arbitrary	Arbitrary	Arbitrary	Arbitrary	Arbitrary
0	OFF	ON	OFF	ON	OFF	ON	Invalid
HD INPUT	No HD (Internal sync)						
VD INPUT	No VD						
TRIG INPUT	TRIG IN						

No.	Shutter mode selection (SMODE)						Restart/ Reset [(3-4)]
	Random trigger						
	Non-reset [(3-2)(b)] (Multiple shutter [(3-3)])		Non-reset [(3-2)(a)]		V-reset[(3-2)(c)]		
	Fix	Pulse	Fix	Pulse	Fix	Pulse	
1	Arbitrary	Arbitrary	Arbitrary	Arbitrary	Arbitrary	Arbitrary	Arbitrary
2-4	#1	#2	#1	#2	#1	#2	all OFF
5	Arbitrary	Arbitrary	Arbitrary	Arbitrary	Arbitrary	Arbitrary	Arbitrary
6	OFF	ON	OFF	ON	OFF	ON	ON
7	OFF	ON	OFF	ON	OFF	ON	ON
8,9	Arbitrary	Arbitrary	Arbitrary	Arbitrary	Arbitrary	Arbitrary	Arbitrary
0	OFF	ON	OFF	ON	OFF	ON	Invalid
HD INPUT	HD IN (Ext. sync)						
VD INPUT	Single VD	Consecutive VD	No VD	No VD	Single VD	Single VD	
TRIG INPUT	TRIG IN						Invalid

#1 Set Electronic shutter-speed in arbitrary exposure time (except OFF) under FIX mode
#2 Don't set Electronic shutter-speed in OFF under PULSE W mode.
* Under PULSE W mode, SYNC reset is disabled.

(4) Partial-scan mode selection

Switches partial-scan mode

(4-1) 1/2 Partial-scan --- Screen center 1/2 readout

Under 1/60s non-interlace mode, only the center portion of 227H out of the total effective lines 494H (excluding BLK time) is read out.
Under 1/120s interlace mode, only the center portion of 207H out of the total effective lines 485H (excluding BLK time) is read out.

(4-2) 1/4 Partial-scan --- Screen center 1/4 readout

Under 1/60s non-interlace mode, only the center portion of 81H out of the total effective lines 494H (excluding BLK time) is read out.
Under 1/120s interlace mode, only the center portion of 61H out of the total effective lines 485H (excluding BLK time) is read out.

■ Rear-panel DIP SW setting

No.	Partial-scan mode selection (PART)			
	OFF	non	1/2 Partial	1/4 Partial
8	OFF	ON	OFF	ON
9	OFF	OFF	ON	ON

* Under normal shutter mode partial-scan, set No.6, 7 in OFF.

(5) Ex-sync IN impedance selection

Switches external-sync signal input impedance.

(5-1) High --- High impedance termination

(5-2) 75Ω --- 75Ω termination

■ SW setting

SW selection	Ex-sync IN impedance selection
HIGH	High impedance termination
75Ω	75Ω termination



8. SPECIFICATIONS

[Basic spec]

- | | |
|------------------------|--|
| (1) Image sensor | All Pixel's Data Read |
| Total pixels | 692(H) x 504(V) |
| Active pixel | 659(H) x 494(V) |
| Video output pixels | 648(H) x 494(V) (Under non-interlace) |
| Scanning area | 4.88(H) x 3.66(V) mm (= Equivalent to 1/3" type CCD size) |
| Unit cell size | 7.4(H) x 7.4(V) μm (Square-grid array) |
| (2) Scanning lines | 525 lines |
| (3) TV system | Special format (Non-conforming to EIA/CCIR) |
| (4) Interface | 1/60s Non-interlace mode
1/120s 2:1 Interlace mode
Switching via rear-panel DIP SW |
| (5) Sync system | Internal/External automatic switch-over |
| (6) Aspect ratio | 4:3 |
| (7) Video output | VS 1.0V(p-p) / 75 Ω, DC coupled, 1 line |
| (8) Resolution | 485 TV lines(H)
485 lines (350 TV lines)(V) |
| (9) S/N | Standard: 52dB(p-p)/rms (Initial factory setting) |
| (10) Illumination | Standard 400 lx (F5.6) |
| (11) Gain | Minimum 4 lx (F1.4) (GAIN MAX, Approx. 50 % video output)
FIX (Fixed) gain: Factory-shipped preset level
MANU (Manual) gain: Setting through GAIN VR
FIX / MANU switching via rear-panel DIP SW |
| (12) Gamma correction | Gamma = 1 (Fixed) |
| (13) White-clip level | Approx. 840mV(p-p) (Excluding SYNC) |
| (14) Power source | DC12V ±10 %
Ripple voltage: 50mV(p-p) or less |
| (15) Power consumption | Approx. 1.5W |

[Internal sync spec]

- Base clock frequency 24.545MHz (1CLK) ± 200ppm
- HD sync frequency 31.468kHz (1H = 780CLK)
- V sync frequency 59.94Hz (Under non-interlace)
119.88Hz (Under 2:1 interlace)

[External sync spec]

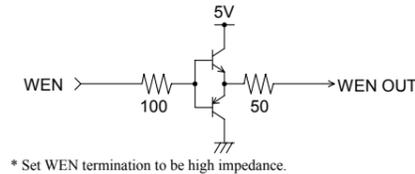
- Ext. sync input signal HD/VD
75Ω / High impedance (switching via rear-panel SW)
(Initial factory setting: High)
- Input impedance 2~5V (p-p)/10kΩ
2~4V (p-p)/75Ω
- Input level 1/60s non-interlace or 1/120s 2:1 interlace
Negative
- Interface HD: 3.2 ± 1 μs (LOW)
VD: From 125 through 400 μs (LOW)
- Polarity
- Pulse width
- Repeating frequency
- Phase difference

[Shutter trigger spec]

- Input level LOW level: 0~0.5V(p-p)
HIGH level: 4~5V(p-p)
High impedance (10kΩ)
Rising edge detection (Positive)
Minimum 2 μs
Maximum 1/8s
- Input impedance
- Capture timing
- Pulse width

[Sync signal spec]

- Polarity



* Set WEN termination to be high impedance.

[Electronic shutter spec]

- Normal shutter Shutter-speed setting via rear-panel SW (Initial: OFF)
Selection among 8 scales (= OFF, 1/200s, 1/500s, 1/1000s, 1/2000s, 1/4000s, 1/8000s, 1/20000s)
- RTS

- Operation mode

- Multiple shutter

- Restart / Reset

No.	Reset	Exposure	Sync
1	Non-reset	Rear SW (FIX mode)	Internal
2		Consecutive HD / Consecutive VD IN	Consecutive HD / Single VD IN
3		TRIG pulse width (PULSE mode)	Internal
4	V-reset	Rear SW (FIX mode)	Consecutive HD IN
5		SYNC reset	Internal
6		TRIG pulse width (PULSE mode)	Consecutive HD IN

* RTS shutter mode automatically switches over through TRIG IN
RTS disabled under electronic shutter OFF

Multiple shutter via ext. trigger signal and ext. VD signal
* Operation like No.3, 6 above

Restart / reset available via ext. VD signal
(Switching via rear panel DIP SW, Initial OFF)

- Notes:
- * The exposure-time (shutter-speed) is determined by ext. VD interval.
 - ** Enabled when rear-panel DIP SW OFF.
 - *** Provide Consecutive HD.

[Mechanical spec]

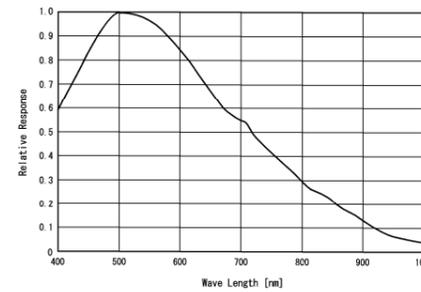
- External dimension 29 x 29 x 26.5(D)mm (Not including protrusion)
Refer to the attached external view drawing
- Weight Approximately 41g
- Lens mount C mount
- GND / insulation Circuit GND ~ Chassis electrically conducted

[Ambient condition]

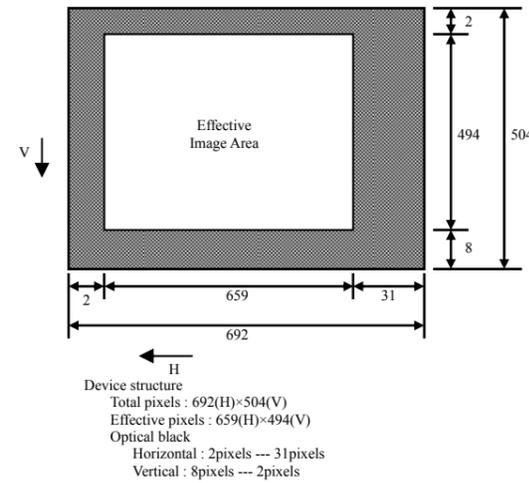
- Environment condition
 - Performance guaranteed Temperature: From 0 through 40 °C
Humidity: From 30 through 90 % (No condensing)
 - Operation guaranteed Temperature: From -5 through 45 °C
Humidity: From 10 through 90 % (No condensing)
 - Storage Temperature: From -20 through 60 °C
Humidity: From 10 through 90 % (No condensing)
 - EMC conditions (Electro-Magnetic Compatibility)
 - EMI (Electro-Magnetic Interference) EN61000-6-4 Conformity
 - EMS (Electro-Magnetic Susceptibility) EN61000-6-2 Conformity
- *Conformity of EMC conditions
About the conformity of the EMC standard of this machines, it has guaranteed in the conditions combined with the option part of 4th clause.
When used combining parts other than specification of our company, I ask you to have final EMC conformity checked of a visitor with a machine and the whole equipment.

[Relative Spectrum Response]

(Including lens characteristics, not including light source characteristics)

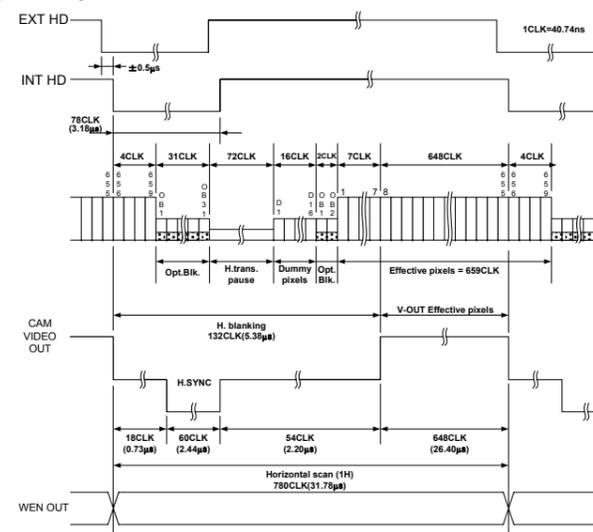


[Optical black layout]

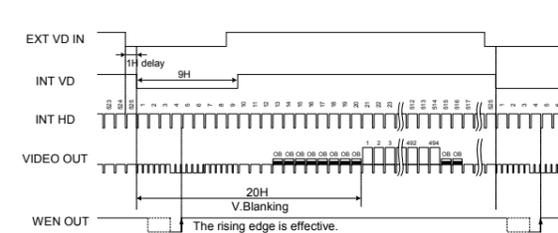


9. TIMING CHART

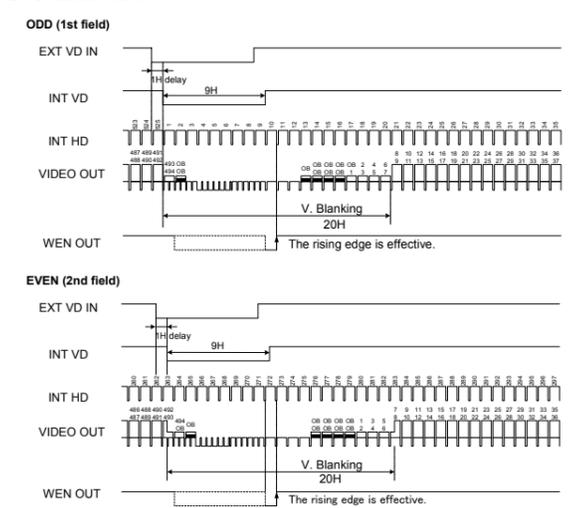
(1)H rate timing



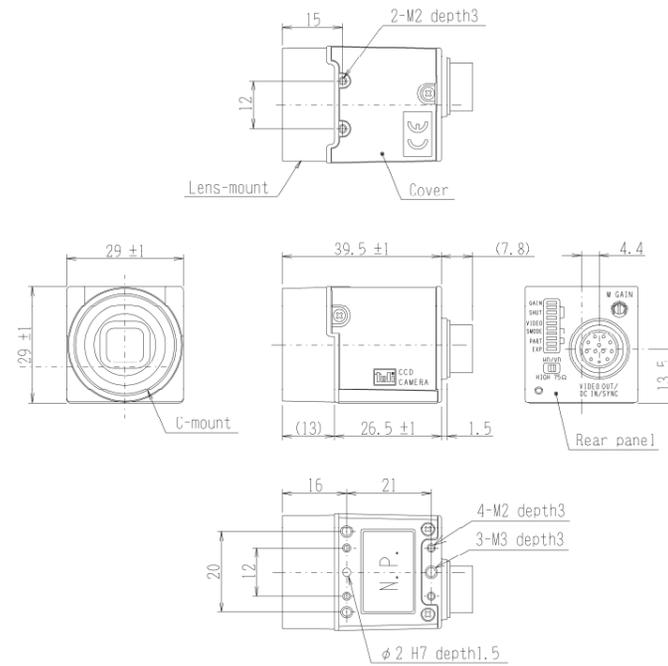
(2)1/60s Non-interlace mode



(3)1/120s 2:1 Interlace mode



10. EXTERNAL VIEW DRAWING



Specification

- Material
Lens-mount, Rear panel : Aluminum die-cast
Cover : Anticorrosion aluminum alloy
- Processing
Lens-mount, Rear panel : Cation coating
Cover : Leather satin coating (Black)

Following information is only for EU-member states:

The use of the symbol indicates that this product may not be treated as household waste. By ensuring this product is disposed of correctly, you will help prevent potential negative consequences for the environment and human health, which could otherwise be caused by inappropriate waste handling of this product. For more detailed information about the take-back and recycling of this product, please contact your supplier where you purchased the product.

"This symbol is applicable for EU member states only"