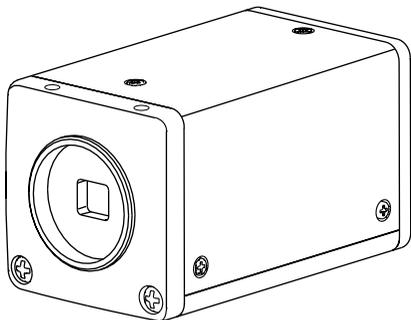# TOSHIBA

3 CCD CAMERA

IK-TF2

For Customer Use
Enter below the Serial No. which is located on the bottom of the cabinet. Retain this information for future reference.

Model No.:   IK-TF2

Serial No.:

WARNING
This is a Class A of EN55022 product. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.

INFORMATION
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, and 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 required to correct the interference at his own expense.

USER-INSTALLER CAUTION: Your authority to operate this FCC verified equipment could be voided if you make changes or modifications not expressly approved by the party responsible for compliance to Part 15 of the FCC Rules.

This Class A digital apparatus complies with Canadian ICES-003.

Cet appareil numérique de la classe A est comforme à la norme NMB-003 du Canada.

SAFETY PRECAUTIONS

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.

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.

Graphic symbol definitions

Symbol	Meaning
🚫	"🚫" 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.
⬤	"●" indicates a mandatory action that must be carried out. The actual instruction is indicated in the symbol or nearby graphically or described in text.

*1: Catastrophic bodily injury means loss of eyesight, burns (high and low temperatured), 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.

⚠️ 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.

- **Avoid installing in a shower room or a bathroom.**
  This may cause fire and/or electric shock.

- **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.

- **Use the specified power supply.**
  Otherwise, a fire or an electric shock may occur.

- **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.

⚠ Caution

- **Note the following instructions when installing.**
  - Do not put an inflammable material on the product.
  - Do not put the product on an Inflammable material such as carpet or blanket.
  - Do not block a vent hole.
  - 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.

- **Do not put the product in direct sunshine and/or high temperature.**
  The temperature inside 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 point the lens directly at the sun and/or intensive light such as direct sunlight, etc.**
  Focusing of the light may cause injury of eye and/or fire.

- **Do not put the product in your mouth or swallow any parts.**
  This may cause suffocation and/or injury.

- **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

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

1. 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.
2. 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.
3. Incorrect use not in compliance with instructions in this instruction manual.
4. Malfunctions resulting from misconnection to other equipment.
5. Repairs or modifications made by the user or caused to be made by the user and carried out by an unauthorized third party.
6. Notwithstanding the foregoing, Toshiba's liabilities shall not, in any circumstances, exceed the purchase price of the product.

Copyright and Right of Portrait

There may be a conflict with the Copyright Law and other laws when a customer uses, displays, distributes, or exhibits an image picked up by a television camera without permission from the copyright holder. Please also note that transfer of an image or file covered by copyright is restricted to use within the scope permitted by the Copyright Law.

TABLE OF CONTENTS

1. CAUTIONS ON USE AND INSTALLATION

●**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.

●**Do not shoot intense light.**

If there is an intense light at a location on the screen such as a spot light, a blooming and smearing may occur. When intense light enters, vertical stripes may appear on the screen. This is not a malfunction. Ghosts may occur when there is an intense light near the object. In this case, change the shooting angle.

●**Install the camera in a location free from noise.**

If the camera or the cables are located near power utility lines or a TV, etc. undesirable noise may appear on the screen. In such a case, try to change the location of the camera or the cable wiring.

●**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.

●**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.

●**Handling of the protection cap.**

Keep the protection cap away from children. Children may put them into mouth or swallow them accidentally. The protection cap protects the image sensing plane when the lens is removed from the camera, do not throw away.

●**When not using the camera for a longtime.**

Stop supplying power.

●**When cleaning the camera**

Always turn off the power and clean with a piece of soft dry cloth. Do not use benzine, alcohol, thinner, household detergents, chemically treated cloths, etc. If used, coating and printed letters may be discolored. When cleaning the lens, use a lens cleaning paper, etc.

●**Avoid using or storing the camera in the following places:**

Places filled with highly flammable gas.

Places near gasoline, benzene, or paint thinner.

Places subject to strong vibration.

Places contacting chemicals (such as pesticides), rubber or vinyl products for a long period of time.

2. COMPONENTS

（1）Camera Control Unit.. 1
（2）Accessories
　　　（a）Instruction manual.. 1

3. ITEMS CONTROLLED BY USING ON SCREEN DISPLAY

Item		Available selections	Preset value (Factory setting)
Electronic shutter	MODE	MANUAL, SS, EXT TRIG	MANUAL
	EXT TRIG	1PULSE SNR、1PULSE SR、2PULSE	1PULSE SNR
	MANUAL speed	OFF、1/100s、1/250s、1/500s、1/1000s、1/2000s、1/4000s、1/10000s、1/25000s、1/50000s	OFF
	Syncro. scan. — FLD	1/525H〜260/525H、OFF、1FRM〜255FRM	OFF
	Syncro. scan. — FRM	1/525H〜260/525H、OFF、2FRM〜256FRM	
	Storage mode	FLD、FRM	FLD
	Trigger (1PULSE SNR／SR)	⊓ 、⊔ 、⌐ ﹏ 、﹏ ⌐	⊓
	Trigger(2PULSE)	⊓⊓ 、⊔⊔ 、⌐⌐	⊓⊓
	1PULSE exposure time	0.02ms 〜 16ms	16ms
Gain	MODE	MANUAL、OFF	OFF
	MANUAL	-3dB 〜 18dB	0dB
White balance	MODE	AWB、MANUAL	AWB
	Color temperature	3200K、5600K	3200K
	MANUAL R GAIN	-100 〜 0 〜 100	0
	MANUAL B GAIN	-100 〜 0 〜 100	0
Process	Master pedestal	-64 〜 0 〜 64	0
	R pedestal	-64 〜 0 〜 64	0
	B pedestal	-64 〜 0 〜 64	0
	White clip	-50 〜 0 〜 50	0
	Shading correction mode	MANUAL、OFF	MANUAL
	Manual shading correction	-128 〜 0 〜 127	0
Sync	H phase adjustment	-100 〜 0 〜 100	0
	RGB SYNC	G、ALL ON、ALL OFF	G
Option	Baud rate	9600bps、19200bps	9600bps

4. NAMES AND FUNCTIONS

Prism faceplate

DC IN 12V terminal
DISP button
MENU UP button
DATA UP(AWB) button
DATA DOWN button
MENU DOWN button

(AWB)
DISP
DC IN 12V
MENU DATA
PAGE
RGB

PAGE button
RGB terminal

Front   **Rear**
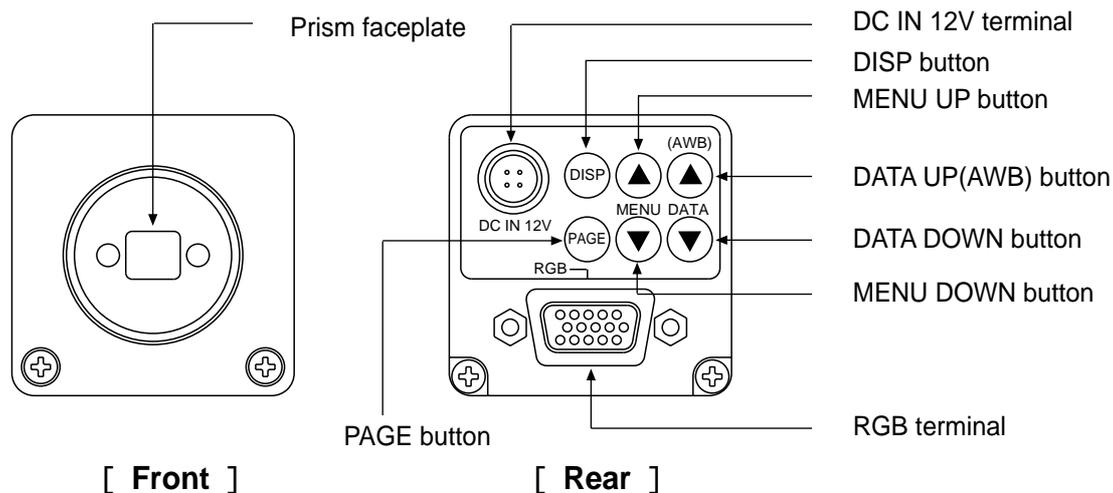
①	Prism faceplate	The protection cap is attached on the lens mount portion. After removing the cap, mount the lens. Be careful not to scratch or touch the optical area.
②	DISP button	Used when switching the display.
③	PAGE button	Used when switching to the menu and when selecting the menus.
④	MENU UP button	Select the function to be confirmed or changed on the menu.
⑤	MENU DOWN button	Select the function to be confirmed or changed on the menu.
⑥	DATA UP (AWB) button	Changes the value of the function selected by the MENU (UP/DOWN) button. (Also used when using AWB.)
⑦	DATA DOWN button	Changes the value of the function selected by the MENU (UP/DOWN) button.
⑧	DC IN 12V terminal	Accept a DC power input (12V).
⑨	RGB terminal	Used as the connector terminal for RGB output, and SYNC output. HD and VD signals are input/output. When the random trigger operation is used, the trigger signal is input and the index signal is output. This terminal also includes an RS232C format control.

5. CONNECTION

5．1　Standard Connection
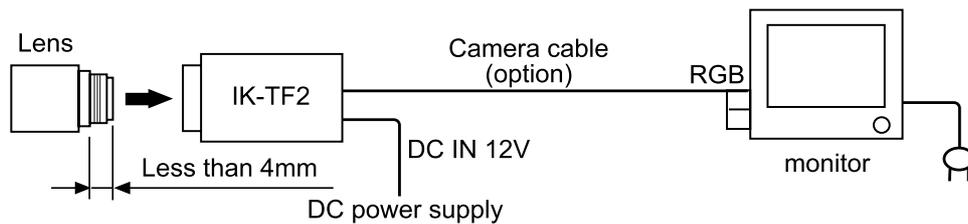
5．2　Cautions on Connection

・ When connecting the camera cables, be sure to turn off the camera and the other equipment connected.

・ We suggest using a C mount lens made for a 3CCD camera.

When using another lens, the best camera performance of this camera may not be obtained.

(For example, low resolution may occur, focus may be lost through the range of a zoom lens, and flare, ghost or shading may occur)

Furthermore, in order to avoid damaging the mounting portion of the camera head, use a lens which has projection dimension from the mounting base of less than 0.157"(4mm).

・ For DC power supply connecting to DC IN 12V terminal, use UL listed and/or CSA approved ungrounding type AC adaptor with the specifications described below.

Power supply voltage	：	DC12V±10%
Current rating	：	More than 830mA, Less than2.5A
Ripple voltage	：	Less than 50mV（p－p）
Connector	：	HR10A－7P－4S by HIROSE electronics Co. Ltd
		Pins 1, 2 ： 12V
		Pins 3, 4 ： GND

5．3　Connector Pin Assignments

DC IN 12V

1	+12V
2	+12V
3	GND
4	GND
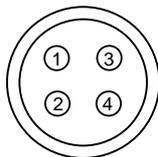
RGB

1	R
2	G
3	B
4	TXD
5	GND
6	GND
7	GND
8	SYNC
9	12V
10	GND
11	RXD
12	TRIG
13	HD IN/OUT
14	VD IN/OUT
15	INDEX
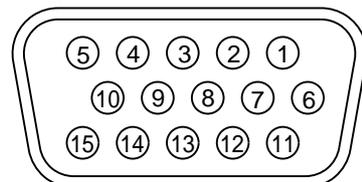
6. OPERATION

① Referring to the item " 5. CONNECTION", connect each equipment correctly.
② Turn on the connected equipment and the camera.
③ Pointing the lens at the object, operate the lens iris adjustment, focus adjustment, etc..
④ Referring to the item "6.1 White Balance", operate the adjustment.
⑤ Referring to the items "6.2 Gain, 7. MODE SETTING BY ON SCREEN DISPLAY", select the necessary items.

6. 1　White Balance

For the white balance adjustment for this unit, AWB (Automatic White Balance) and MANUAL (Manual white balance) adjustments are provided. Referring to the items "7.2 (3) WHT BAL (White balance), 7. MODE SETTING BY ON SCREEN DISPLAY", select the desired mode.

	AWB （Automatic White Balance）	MANUAL （Manual White Balance）
Outline	Adjust white balance by displaying the white object inside the area set by AWB menu and pressing the [DATA UP] button.	Adjust the white balance manually using the WHT BAL menu while shooting the white object.
Notes	When the shutter mode is EXT TRIG, AWB is not available.	Adjustment is performed by confirming with a waveform monitor.

① AWB(Automatic white balance)
・ Set the MODE to AWB on the WHT BAL menu.
　　Perform the C.TEMP (color temperature conversion) setting, if necessary.
　　(Refer to the item "7.2 (3) WHT BAL (White balance)".)
　　3200K：Appropriate for indoor shooting.
　　5600K：Appropriate for outdoor shooting.
・ If the index menu/menu is displayed, press the [DISP] button to disable the color bar pattern or the character display on the menu.
・ Shoot a known white object that fills the screen and push [DATA UP] button for approx. 1 second.
・ The character AWB blinks on the screen when the AWB starts.
・ The character AWB stops blinking when the AWB finishes, and the result is displayed for approx. 1 second.

Display	Meaning
AWB OK	Automatic white balance adjustment finished correctly.
AWB NG LEVEL LOW	Automatic white balance adjustment cannot be performed because the video level is too low. Set the video level properly.
AWB NG LEVEL HIGH	Automatic white balance adjustment cannot be performed because the video level is too high. Set the video level properly.
AWB NG C. TEMP LOW	Automatic white balance adjustment cannot be performed because the color temperature is too low. If the C.TEMP is set to 5600K, set to 3200K. If the message appears with the C.TEMP set to 3200K, change the illumination or use a color temperature conversion filter.
AWB NG C. TEMP HIGH	Automatic white balance adjustment cannot be performed because the color temperature is too high. If the C.TEMP is set to 3200K, set to 5600K. If the message appears with the C.TEMP set to 5600K, change the illumination or use the color temperature conversion filter.
AWB NG NOT AVAILABLE	Automatic white balance adjustment cannot be performed because the shutter speed mode is EXT TRIG mode.
AWB NG	Automatic white balance adjustment cannot be performed for other reasons. Such as no white area is included in an object, etc.

② MANUAL(Manual white balance)
  ・Set the MODE to MANUAL on the WHT BAL menu.
   (Refer to the item "7.2 (3) WHT BAL (white balance)".)
  ・Shoot a known white object, adjust the white balance adjusting the levels of R GAIN and B GAIN on the menu, confirming with a monitor or a waveform monitor.
   (Refer to the item "7.2 (3) (3.2) Changing each setting in MANUAL mode".)

6. 2 Gain

When the image is dark even if the lens iris is open, change the gain (video gain) to get the proper video level.

For the gain adjustment of the unit, MANUAL (Manual) and OFF (0 dB) modes are provided. Select the mode on the GAIN menu. (Refer to the item "7.2 (2) GAIN (Video gain)".)

① MANUAL(Manual gain)

Gain adjustment is performed on the GAIN menu. The adjustment range is from –3dB to 18dB in 1dB steps. (Refer to the item "7.2 (2) (2.1) (a) Changing the gain in MANUAL mode".)

② OFF

Gain is fixed at 0 dB.

6. 3 Shading Correction

Due to the lens used or the environmental condition, vertical color shading may occur at the top and bottom of the screen. In this case, the shading correction can decrease the color shading. For the shading correction of the unit, MANUAL (Manual shading correction) and OFF (no shading correction) modes are provided. Select the mode on the PROCESS menu. (Refer to the item "7.2 (4) (4.5) Changing shading correction mode".)

① MANUAL(Manual Shading)

Perform the correction amount setting on the PROCESS menu, confirming with a monitor or a waveform monitor. (Refer to the "7.2 (4) (4.6) Changing the manual shading correction setting".)

② OFF

The status is no shading correction.

* **The shading correction is effective when the lens iris or zoom ratio is fixed. Use the unit with SHADING OFF for variable lens conditions**.

7. MODE SETTING BY ON SCREEN DISPLAY

Various settings can be controlled on the unit by using the on screen menu displayed on the monitor. The contents once set are memorized when the power is turned off, so it is unnecessary to set again when using the unit next time. When the setting is performed, select the menu of the item to be set.

7. 1 Using the Menues

When the power turns on, the normal screen showing only the video signal appears. Change the output to each screen (video signal output, Index menu, and menus) by using the [DISP], [PAGE], [MENU UP], and [MENU DOWN] buttons.

* A menu is selected when pushing the [PAGE] button after moving the "→" on the screen by the [MENU UP], [MENU DOWN] button while the Index menu is displayed.
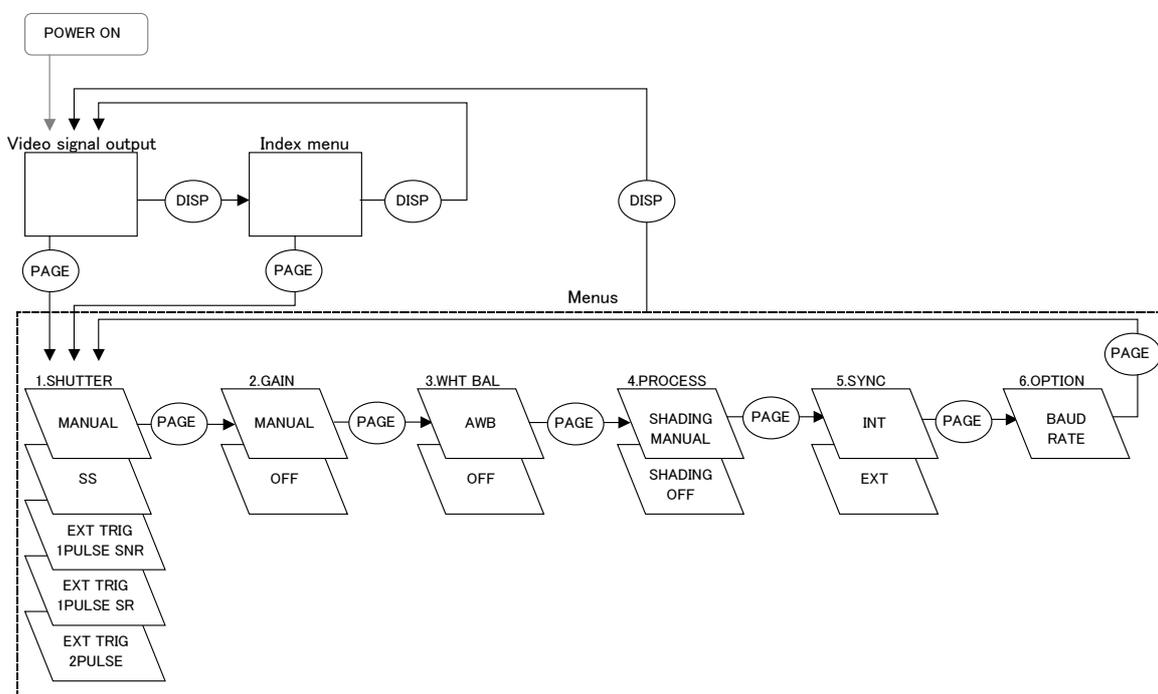
7. 2　Menus

・Select the menu to change the setting by referring the item "7.1 Using the Menus".)

・When the [MENU UP], [MENU DOWN] buttons are pushed, the "→" on the screen moves up and down. Move the "→" to the item to change.

(1) SHUTTER（Electronic shutter）

The electronic shutter has three modes; MANUAL, SS(Synchro. Scan), EXT TRIG(External trigger).

Press the "Page" button to enter the Shutter Page. Use the "Data Up/Down" buttons to select the Shutter Mode.

（1. 1）Changing each setting in MANU mode

Move up and down By pushing MENU UP,DOWN	Set by pushing DATA UP,DOWN

```
    -- 1  SHUTTER --

 →MODE          MANUAL
  MANUAL        1／50000s
  FLD／FRM       FLD
```

・Sutter mode　MANUAL, SS, EXT TRIG

・Sutter speed setting
OFF, 1/100s, 1/250s, 1/500s, 1/1000s, 1/2000s, 1/4000s, 1/10000s, 1/25000s, 1/50000s

・FLD/FRM SW　FLD, FRM

< MODE = MANUAL>
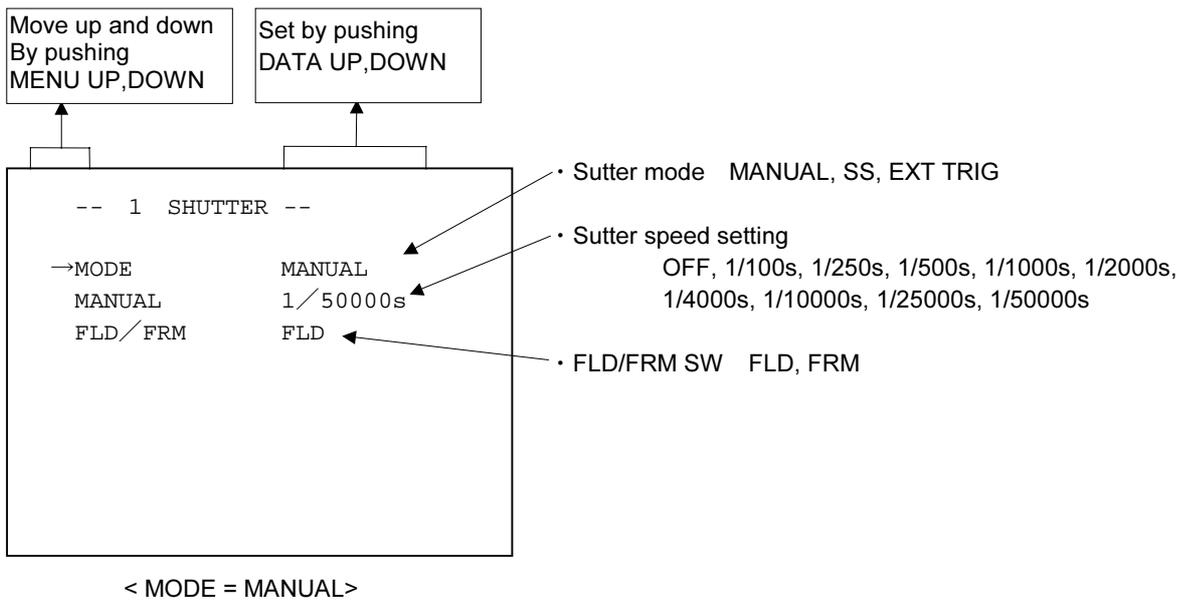
(a) Changing the shutter speed

① Set the "→" to MANU by pushing [MENU UP], [MENU DOWN] buttons.

② Set the shutter speed by pushing [DATA UP], [DATA DOWN] buttons.

(b) Changing the CCD storage mode

① Set the "→" to FLD/FRM by pushing [MENU UP], [MENU DOWN] buttons.

② Select either FLD (field) or FRM (frame) by pushing [DATA UP], [DATA DOWN] buttons.

（1．2）Changing each setting in SS（synchro. scan）mode

Move up and down By pushing MENU UP,DOWN	Set by pushing DATA UP,DOWN

```
  --  1  SHUTTER --

→MODE          SS
  SYNCHRO SCAN  OFF
  FLD／FRM      FLD
```

・Shutter mode　MANUAL, SS, EXT TRIG

・Synchro. scan setting
　1／525H←→260／525H←→OFF←→　FLD：1FRM←→255FRM
　　　　　　　　　　　　　　　　　　FRM：2FRM←→256FRM

・FLD/FRM SW　FLD, FRM

< MODE = SS >
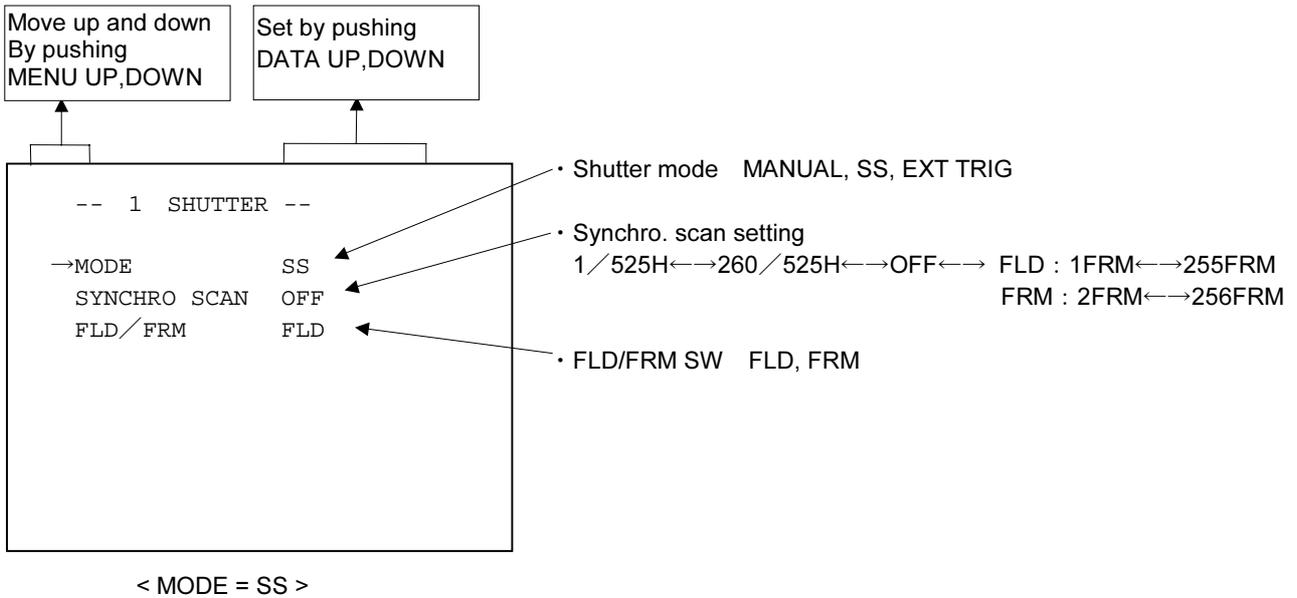
(a) Changing the shutter speed setting
　① Set the "→" to SYNCHRO SCAN by pushing [MENU UP], [MENU DOWN] buttons.
　② Select the shutter speed by pushing [DATA UP], [DATA DOWN] buttons.

(b) Changing the CCD storage mode
　① Set the "→" to FLD/FRM by pushing [MENU UP], [MENU DOWN] buttons.
　② Select either FLD (field) or FRM (frame) by pushing [DATA UP], [DATA DOWN] buttons.

Note:

The longer the storage time with extended exposures, the more visible certain characteristics of CCD cameras become: fixed pattern noise, white pixels, etc.

（1．3）**Changing each setting in EXT TRIG mode**

The EXT TRIG has three modes; 1PULSE SNR, 1PULSE SR, 2PULSE.

First set the "→" to MODE and select EXT TRIG, then set the "→" to EXT TRIG and select the desired EXT

TRIG mode.

（1．3．1）**Changing each setting in 1PULSE SNR mode**
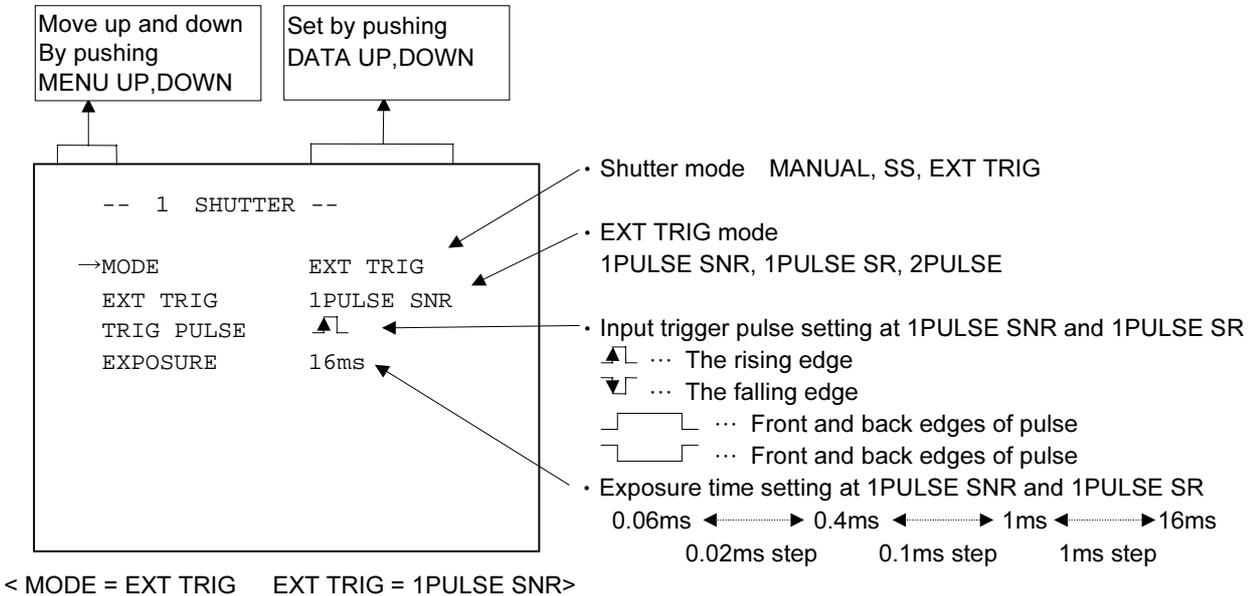
< MODE = EXT TRIG   EXT TRIG = 1PULSE SNR>

(a) Changing inputting trigger pulse setting

① Set the "→" to TRIG PULSE by pushing [MENU UP], [MENU DOWN] buttons.

② Select either ▲⌐ , ▼⌐ , ⌐‾‾⌐ , ⌐__⌐ by pushing [DATA UP], [DATA DOWN] buttons.

* **This setting is only valid in the 1PULSE mode (1PULSE SNR and 1PULSE SR). To make the trigger**
pulse setting when using the 2PULSE mode, first set the EXT TRIG mode to 2PULSE, then make the
settings with the TRIG PULSE items.

(b) Changing 1PULSE exposure time setting

① Set the "→" to EXPOSURE by pushing [MENU UP], [MENU DOWN] buttons.

② Set the exposure time by pushing [DATA UP], [DATA DOWN] buttons.

* **When ⌐‾‾⌐ or ⌐__⌐ is selected, EXPOSURE cannot be set. (EXPOSURE setting turns OFF.)**
Exposure time is automatically controlled by the trigger pulse width.

（1．3．2）Changing each setting in 1PULSE SR mode

Move up and down By pushing MENU UP,DOWN	Set by pushing DATA UP,DOWN

```
    -- 1  SHUTTER --

 →MODE         EXT TRIG
   EXT TRIG    1PULSE SR
   TRIG PULSE  ▲L
   EXPOSURE    16ms
```

· Shutter mode   MANUAL, SS, EXT TRIG

· EXT TRIG mode
  1PULSE SNR, 1PULSE SR, 2PULSE

· Input trigger pulse setting at 1PULSE SNR and 1PULSE SR
  ▲L ··· The rising edge
  ▼Γ ··· The falling edge
  ⌐‾‾L ··· Front and back edges of pulse
  ‾L___Γ ··· Front and back edges of pulse

· Exposure time setting at 1PULSE SNR and 1PULSE SR
  0.06ms ◄──► 0.4ms ◄──► 1ms ◄──► 16ms
      0.02ms step   0.1ms step   1ms step

< MODE = EXT TRIG   EXT TRIG = 1PULSE SR>

(a) Changing inputting trigger pulse setting

① Set the "→" to TRIG PULSE by pushing [MENU UP], [MENU DOWN] buttons.

② Select either ▲L , ▼Γ , ⌐‾‾L , ‾L___Γ by pushing [DATA UP], [DATA DOWN] buttons.

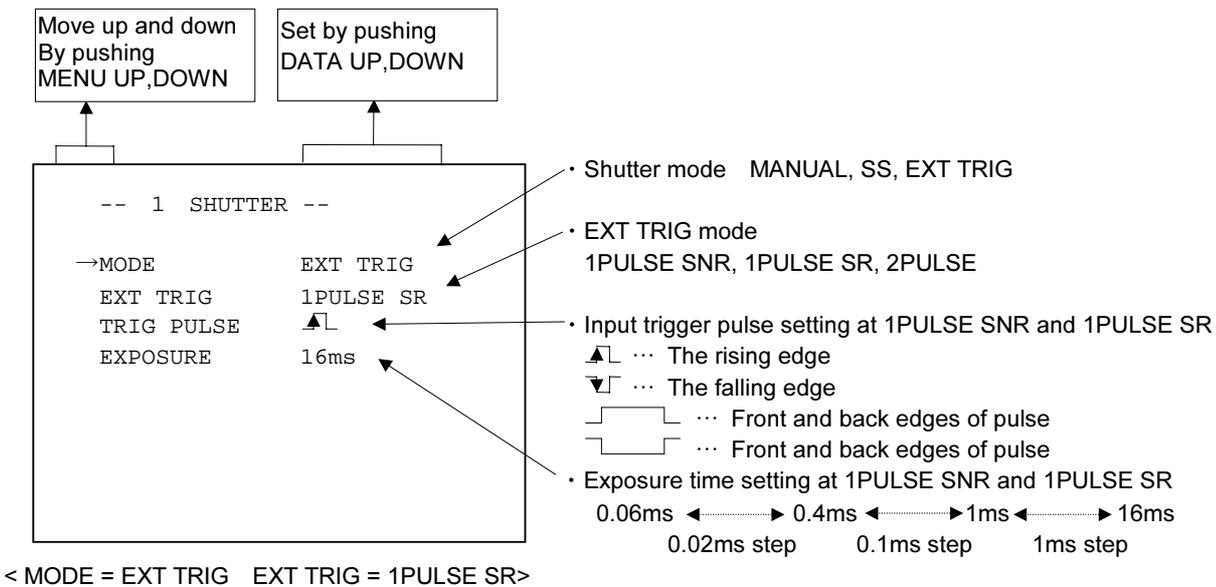   * **This setting is only valid in the 1PULSE mode (1PULSE SNR and 1PULSE SR). To make the trigger pulse setting when using the 2PULSE mode, first set the EXT TRIG mode to 2PULSE, then make the settings with the TRIG PULSE items.**

(b) Changing 1PULSE exposure time setting

① Set the "→" to EXPOSURE by pushing [MENU UP], [MENU DOWN] buttons.

② Set the exposure time by pushing [DATA UP], [DATA DOWN] buttons.

   * **When ⌐‾‾L or ‾L___Γ is selected, EXPOSURE cannot be set. (EXPOSURE setting turns OFF.) Exposure time is automatically controlled by the trigger pulse width.**

（1. 3. 3）**Changing each setting in 2PULSE mode**

Move up and down By pushing MENU UP,DOWN	Set by pushing DATA UP,DOWN

```
   -- 1  SHUTTER --

 →MODE           EXT TRIG
   EXT TRIG      2PULSE
     TRIG PULSE  ⎍_⎍
   FLD／FRM       FLD
```

・Shutter mode   MANUAL, SS, EXT TRIG

・EXT TRIG mode
1PULSE SNR, 1PULSE SR, 2PULSE

・Input trigger pulse setting at 2PULSE
⎍__⎍ ··· The rising edge
⎍‾‾⎍ ··· The falling edge
⎍‾‾‾⎍ ··· Front and back edges of pulse

・FLD/FRM SW   FLD, FRM

< MODE = EXT TRIG   EXT TRIG = 2PULSE>

(a) Changing inputting trigger pulse setting

① Set the "→" to TRIG PULSE by pushing [MENU UP], [MENU DOWN] buttons.

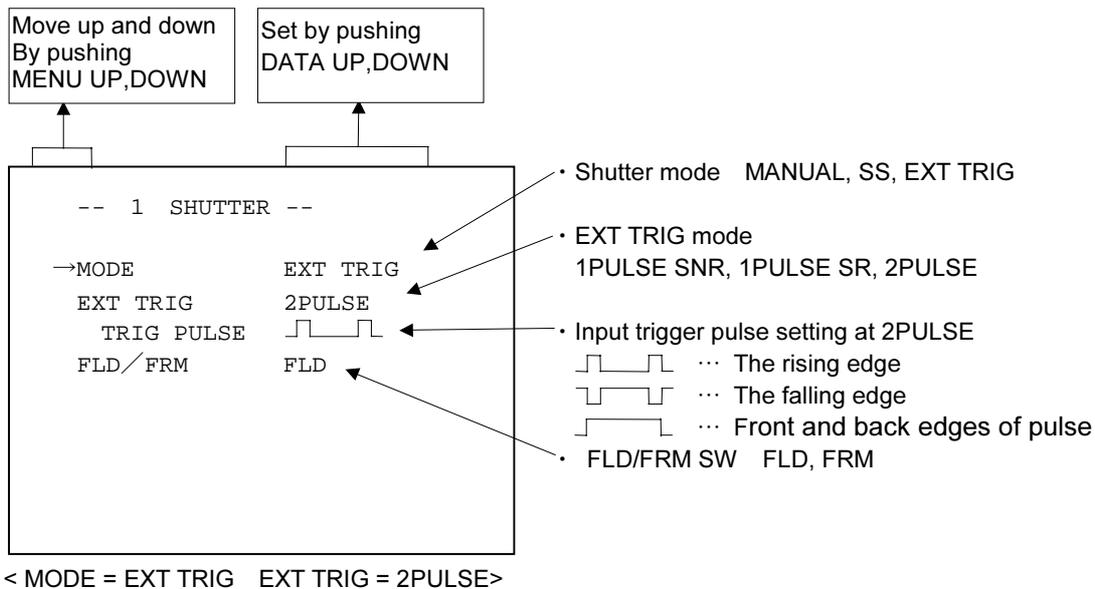② Select either ⎍__⎍ , ⎍‾‾⎍ or ⎍‾‾‾⎍ by pushing [DATA UP], [DATA DOWN] buttons.

  * **This setting is only valid in the 2PULSE mode. To make the trigger pulse setting when using the 1PULSE mode, first set the EXT TRIG mode to 1PULSE SNR or 1PULSE SR, then make the settings with the TRIG PULSE items.**

(b) Changing the CCD storage mode

① Set the "→" to FLD/FRM by pushing [MENU UP], [MENU DOWN] buttons.

② Select either FLD (field) or FRM (frame) by pushing [DATA UP], [DATA DOWN] buttons.

（2） GAIN (Video gain)

GAIN has two modes; MANUAL, OFF.

Set the "→" to MODE, push the [DATA UP], [DATA DOWN], and select mode among MANUAL, OFF. In the OFF mode, gain is fixed to 0dB.

（2．1） Changing each setting in GAIN

Move up and down By pushing MENU UP,DOWN	Set by pushing DATA UP,DOWN

```
    --  2  GAIN  --              ・Gain mode    MANUAL, OFF

  →MODE          MANUAL
    MANUAL           0dB          ・Manual gain setting    -3dB to 18dB(1dB step）
```
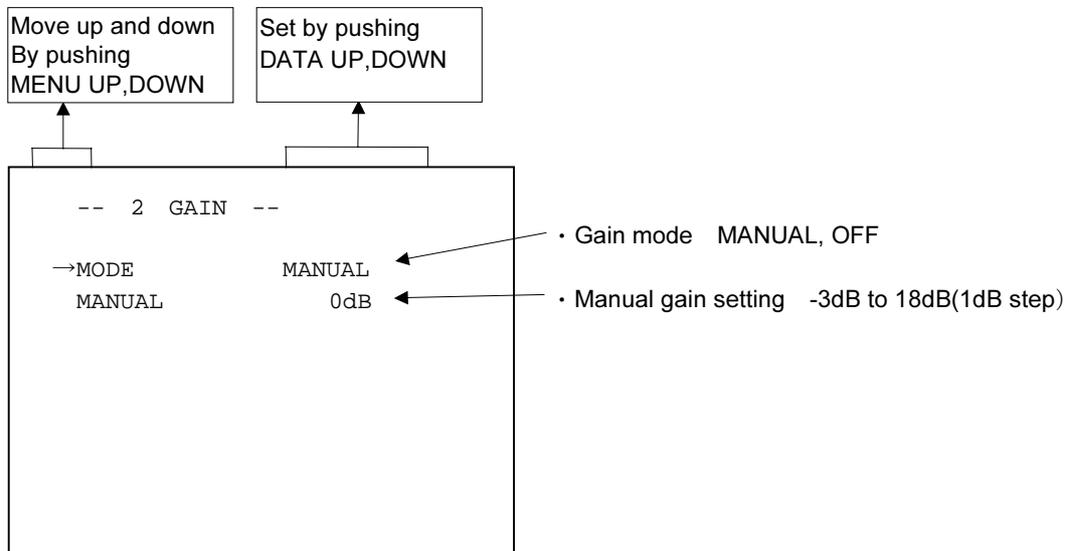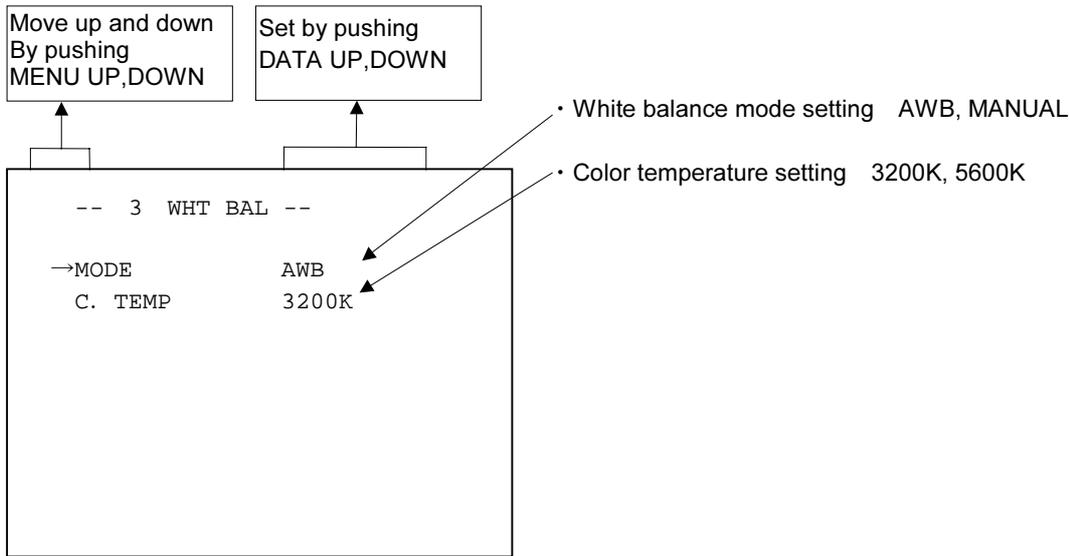
(a) Changing the gain in MANUAL mode

① Set the "→" to MANUAL by pushing [MENU UP], [MENU DOWN] buttons.

② Set the manual gain by pushing [DATA UP], [DATA DOWN] buttons.

（3） WHT BAL(White balance)

WHT BAL has two modes; AWB, MANUAL.

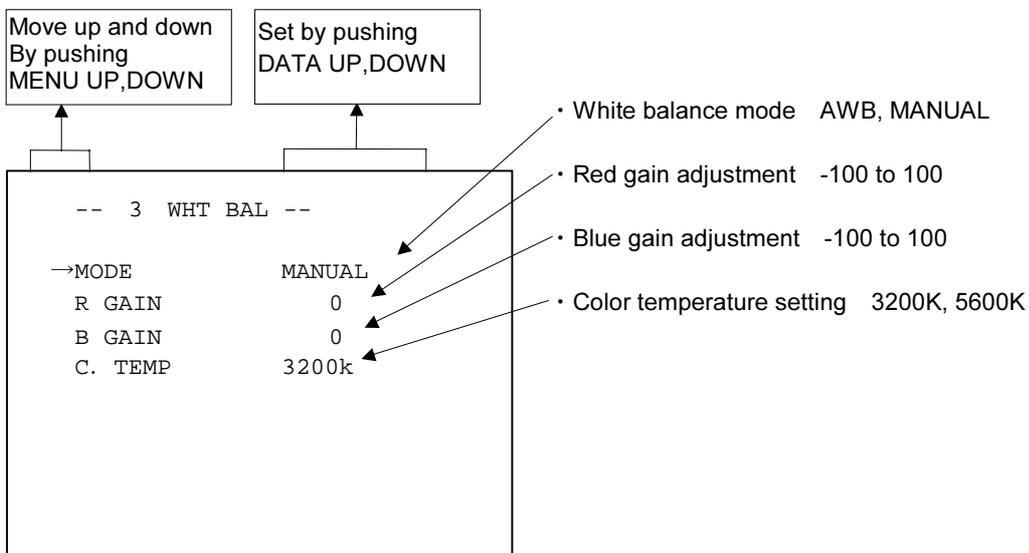Set the "→" to MODE, push the [DATA UP], [DATA DOWN], and select mode among AWB, MANUAL.

（3．1） Changing each setting in AWB(Automatic White Balance) mode

```
┌────────────────────┐  ┌────────────────────┐
│Move up and down    │  │Set by pushing      │
│By pushing          │  │DATA UP,DOWN        │
│MENU UP,DOWN         │  │                    │
└────────────────────┘  └────────────────────┘
         ▲                       ▲
         │                       │
┌────────┴───────────────────────┴──────────────┐
│                                                │
│       -- 3  WHT BAL --                         │
│                                                │
│    →MODE          AWB                          │
│     C. TEMP       3200K                        │
│                                                │
│                                                │
│                                                │
│                                                │
└────────────────────────────────────────────────┘
```

・ White balance mode setting   AWB, MANUAL

・ Color temperature setting   3200K, 5600K

(a) Changing color temperature setting

① Set the "→" to C.TEMP by pushing [MENU UP], [MENU DOWN] buttons.

② Select either 3200K or 5600K by pushing [DATA UP], [DATA DOWN] buttons.

（3．2） Changing each setting in MANUAL mode

```
┌────────────────────┐  ┌────────────────────┐
│Move up and down    │  │Set by pushing      │
│By pushing          │  │DATA UP,DOWN        │
│MENU UP,DOWN         │  │                    │
└────────────────────┘  └────────────────────┘
         ▲                       ▲
         │                       │
┌────────┴───────────────────────┴──────────────┐
│                                                │
│       -- 3  WHT BAL --                         │
│                                                │
│    →MODE          MANUAL                       │
│     R GAIN          0                          │
│     B GAIN          0                          │
│     C. TEMP       3200k                        │
│                                                │
│                                                │
└────────────────────────────────────────────────┘
```

・ White balance mode   AWB, MANUAL

・ Red gain adjustment   -100 to 100

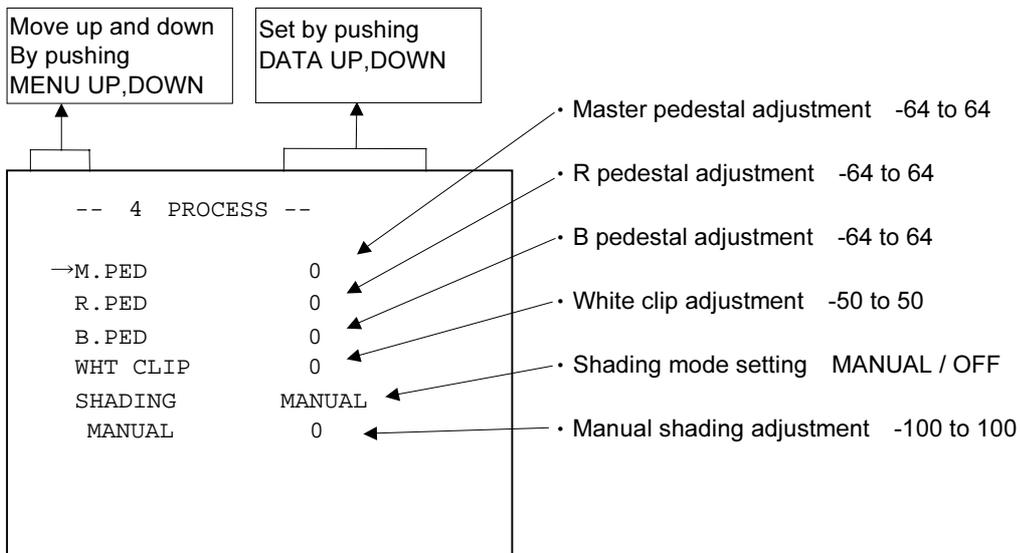・ Blue gain adjustment   -100 to 100

・ Color temperature setting   3200K, 5600K

(a) Changing the red gain

① Set the "→" to R GAIN by pushing [MENU UP], [MENU DOWN] buttons.

② Set the red gain by pushing [DATA UP], [DATA DOWN] buttons.

(b) Changing the blue gain

① Set the "→" to B GAIN by pushing [MENU UP], [MENU DOWN] buttons.

② Set the blue gain by pushing [DATA UP], [DATA DOWN] buttons.

（4）PROCESS

Move up and down By pushing MENU UP,DOWN	Set by pushing DATA UP,DOWN

```
   -- 4  PROCESS --

→M.PED          0          · Master pedestal adjustment   -64 to 64
 R.PED          0          · R pedestal adjustment   -64 to 64
 B.PED          0          · B pedestal adjustment   -64 to 64
 WHT CLIP       0          · White clip adjustment   -50 to 50
 SHADING     MANUAL        · Shading mode setting   MANUAL / OFF
  MANUAL        0          · Manual shading adjustment   -100 to 100
```

（4．1）Changing master pedestal

① Set the "→" to M. PED by pushing [MENU UP], [MENU DOWN] buttons.

② Set the master pedestal by pushing [DATA UP], [DATA DOWN] buttons.

（4．2）Changing R pedestal

① Set the "→" to R. PED by pushing [MENU UP], [MENU DOWN] buttons.

② Set the R pedestal by pushing [DATA UP], [DATA DOWN] buttons.

（4．3）Changing B pedestal

① Set the "→" to B. PED by pushing [MENU UP], [MENU DOWN] buttons.

② Set the B pedestal by pushing [DATA UP], [DATA DOWN] buttons.

（4．4）Changing White clip

① Set the "→" to WHT CLIP by pushing [MENU UP], [MENU DOWN] buttons.

② Set the WHT CLIP by pushing [DATA UP], [DATA DOWN] buttons.
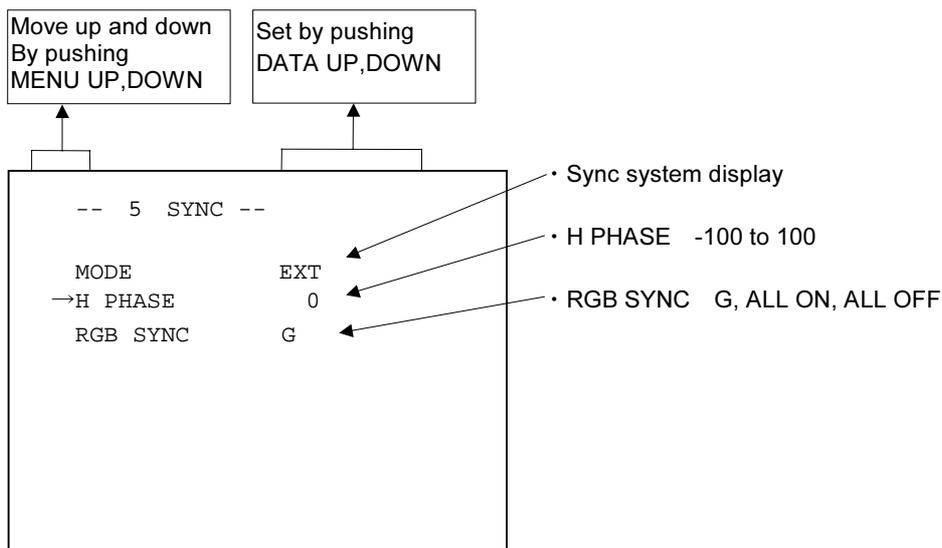
（4．5）Changing shading correction mode

① Set the "→" to SHADING by pushing [MENU UP], [MENU DOWN] buttons.

② Set the SHADING by pushing [DATA UP], [DATA DOWN] buttons.

（4．6）Changing manual shading correction

① Set the "→" to MANUAL SHADING by pushing [MENU UP], [MENU DOWN] buttons.

② Set the MANUAL SHADING by pushing [DATA UP], [DATA DOWN] buttons.

（5）SYNC

When an external sync signal is input, the display changes from INT (internal sync) to EXT (external sync) automatically.
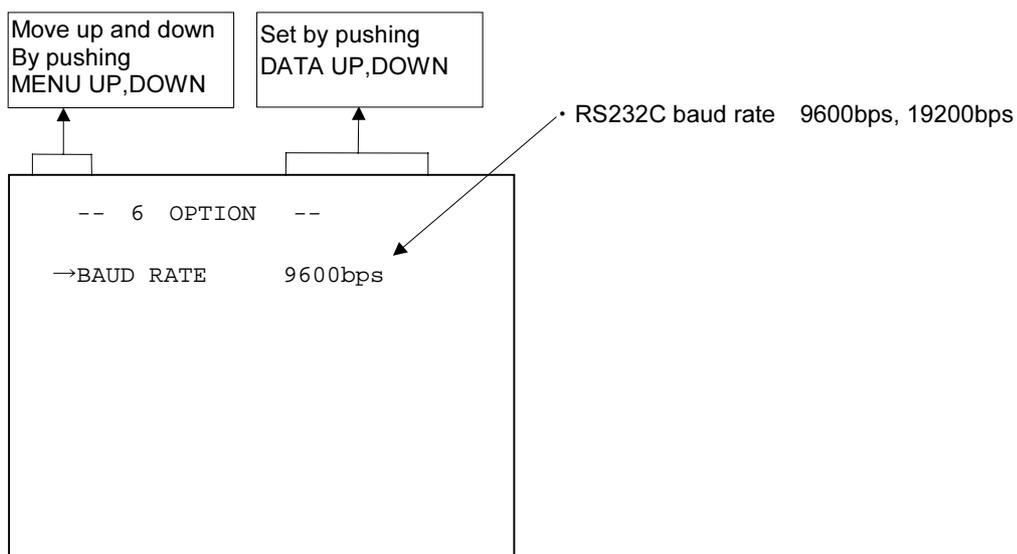
Move up and down By pushing MENU UP,DOWN	Set by pushing DATA UP,DOWN

```
    -- 5  SYNC --

    MODE          EXT
  →H PHASE          0
    RGB SYNC       G
```

· Sync system display

· H PHASE -100 to 100

· RGB SYNC   G, ALL ON, ALL OFF

（5.1）Adjusting horizontal phase
① Set the "→" to H PHASE by pushing [MENU UP], [MENU DOWN] buttons.
② Adjust the horizontal phase by pushing [DATA UP], [DATA DOWN] buttons.

（5.2）Changing RGB SYNC
① Set the "→" to RGB SYNC by pushing [MENU UP], [MENU DOWN] buttons.
② Select G, ALL ON or ALL OFF by pushing [DATA UP], [DATA DOWN] buttons.

（6）OPTION

Move up and down By pushing MENU UP,DOWN	Set by pushing DATA UP,DOWN

· RS232C baud rate   9600bps, 19200bps

```
    -- 6  OPTION  --

  →BAUD RATE     9600bps
```

（6.1）Changing RS232C communication baud rate
① Set the "→" to BAUD RATE by pushing [MENU UP], [MENU DOWN] buttons.
② Select either 9600bps or 19200bps by pushing [DATA UP], [DATA DOWN] buttons.

（7） Setting to factory setting status

The contents set of each scene file can be returned to the factory default status (preset status).

(1) If characters are displayed on the screen, press the [DISP] button to disable the character display.

(2) Push [MENU DOWN] and [DATA DOWN] buttons simultaneously for approx. 1 second.

(3) The preset operation starts. When the preset operation finishes, the character PRESET OK is displayed for approx. 1 second.

7．3　External Sync

When using the unit with an external sync signal, input HD and VD to RGB terminal on the rear panel, or input SYNC to RGB terminal. When the external sync signal is input, the camera automatically switches its sync from the internal sync to the external sync.

The operation is as shown below, depending on the unit's status and how external sync signals are input.

Unit's status	HD / SYNC input	VD input	Operation
Shutter mode：EXT TRIG EXT TRIG：1PULSE SR or 2PULSE	Off	－	Internal sync
	HD	－	External sync with HD (Only for H sync with HD)
	SYNC	－	External sync with SYNC (H sync with HSYNC)
Others	Off	Off	Internal sync
	HD	On	External sync with HD, VD (H·V sync with HD, VD)
	SYNC	Off	External sync with SYNC (H·V sync with H SYNC, V SYNC)
	Off	On	External sync with VD (Only for VD reset)
	SYNC	On	Prohibited

－：Don't care.

（1） External sync signal input conditions

HD 　　　　　　： 2 to 5V（p-p）　　Negative

VD 　　　　　　： 2 to 5V（p-p）　　Negative

（2） External sync frequency range

(External sync with HD, VD)

For EIA standard frequency ：Within ±1% (at horizontal sync frequency)

（3） Using the unit with external sync signal

When adjusting H (horizontal) phase refer to the item "7.2 (5)(5.1) Adjusting horizontal phase".

## （3．1） H (horizontal) phase adjustment

Observe the external sync signal and the video signal output waveform of the unit with a dual trace oscilloscope, and adjust H phase so that the H phases match.

Match the phase.

External Sync. signal

Camera Video output
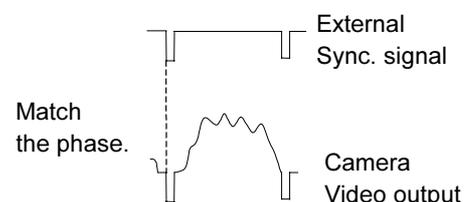
（4） Changing HD/VD input/output

(1) Put off 6 screws both on flank/top of camera chassis.

(2) Change internal switch SJ01(HD/VD).

- HD/VD OUTPUT
- HD/VD INPUT high-impedance
- HD/VD INPUT 75　(factory setting)
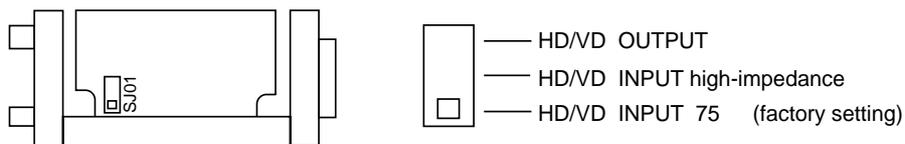
7．4　Synchro. Scan Operation

The shutter speed can be set by the horizontal scanning period (1H) or by the frame. Also, CCD integration mode can be set.

（1） Setting by 1H

260/525H to 1/525H stands for the setting by the 1H and the shutter speed can be set by the 1H (63.56ms).

（2） Setting by the frame

1FRM to 255FRM (at field storage) and 2FRM to 256FRM (at frame storage) stand for the setting (long period exposure) by the frame.
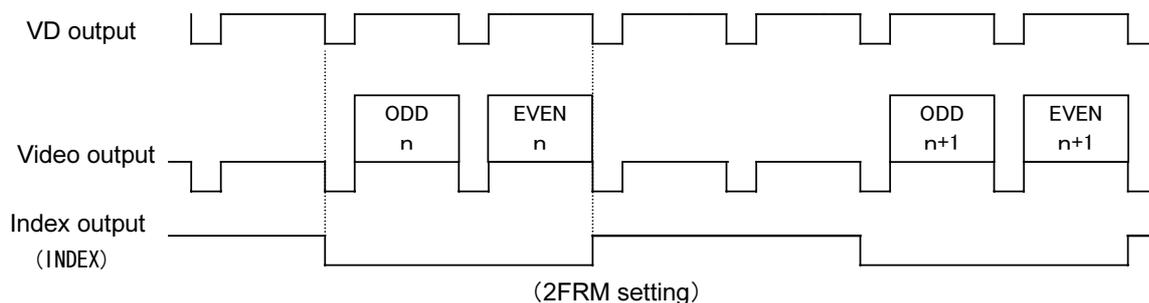
(a) Field storage period

The video signal stored during the frame period set is output as 1 field video image at a frame interval specified.


（2FRM setting）
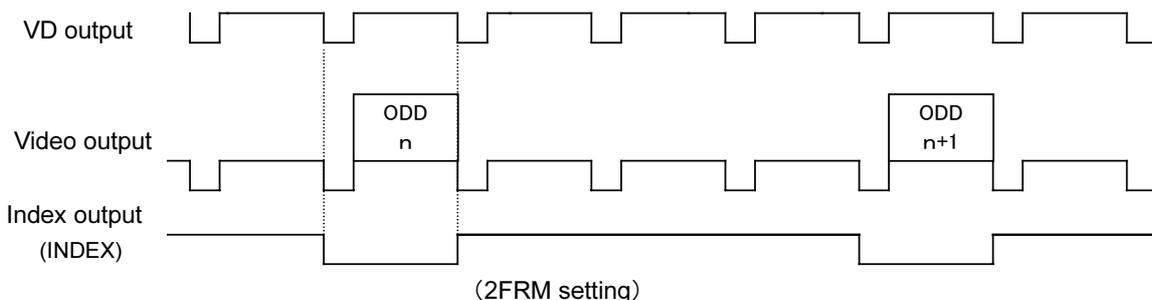
(b) Frame storage period

The video signal stored during the frame period set is output as 1 frame video image in a frame interval.

（2FRM setting）

7．5　EXT TRIG (External trigger)

Charge begins to accumulate after the trigger input, and 1 field or 1 frame images are output.　There are three modes:　1PULSE SNR, 1PULSE SR and 2PULSE.

The RGB terminal trigger input and index output interface are as shown below.
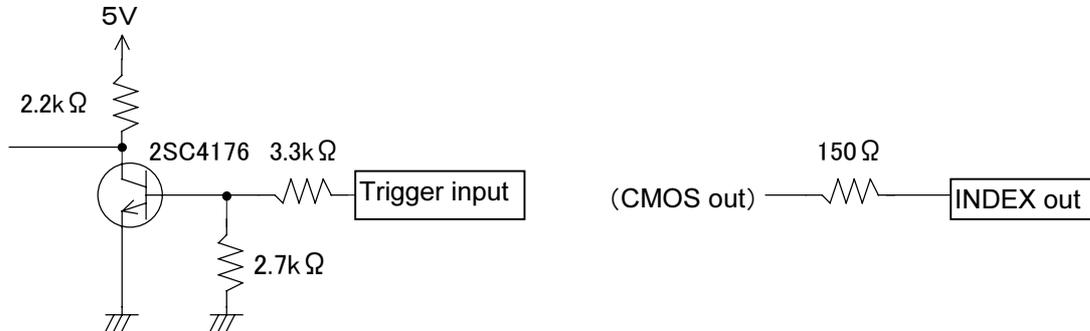
（1）1 PULSE SNR（1 Pulse Sync Non Reset）

Charge begins to accumulate after the trigger input to the RGB terminal, and 1 field images are output.

(a) Rising edge / Falling edge mode

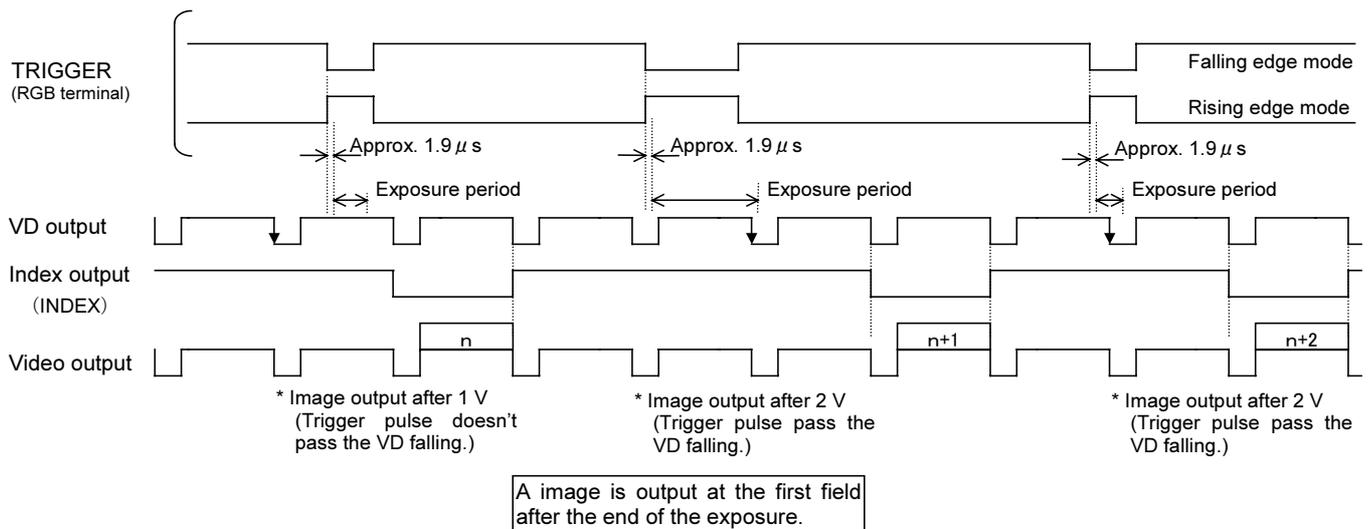The exposure time is set to 0.02 ms to 16 ms on the menu.

Trigger pulse level　　　　　　　:　(Low Level)：Less than 0.5V , (High Level)：3.4V to 5V

（RGB terminal）

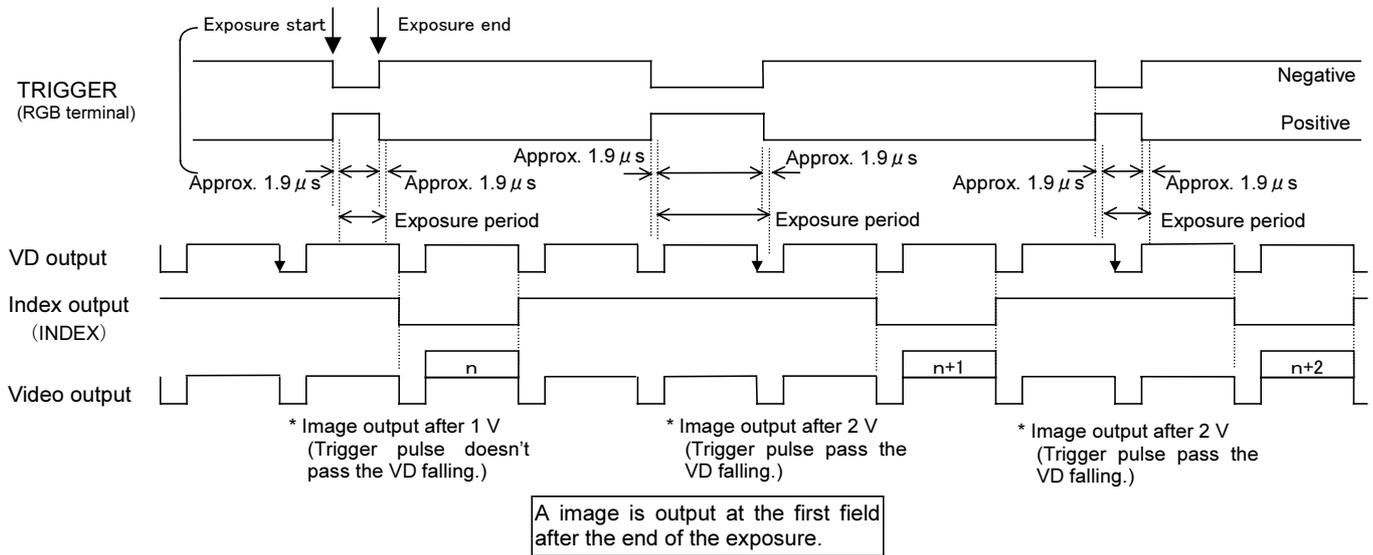Trigger pulse fetch timing　　　:　Rising edge / Falling edge selectable

Trigger pulse width　　　　　　　:　More than 2 μ s

Trigger pulse interval　　　　　　:　More than 50ms

(b) Width mode

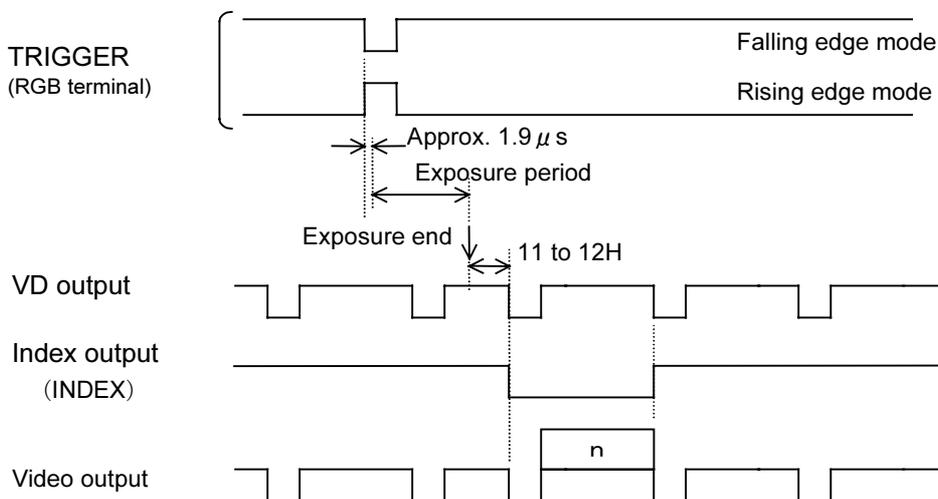|		
Trigger pulse level	:	(Low Level)：Less than 0.4V , (High Level)：3.4V to 5V
Trigger pulse width	:	More than 4 μ s　Less than 255FRM
Trigger pulse interval	:	More than 33.4ms
Trigger pulse polarity	:	Positive or Negative

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（2） 1 PULSE SR（1 Pulse Sync Reset）

Charge begins to accumulate after the trigger input to the RGB terminal, the vertical sync signal is reset and field images are output.
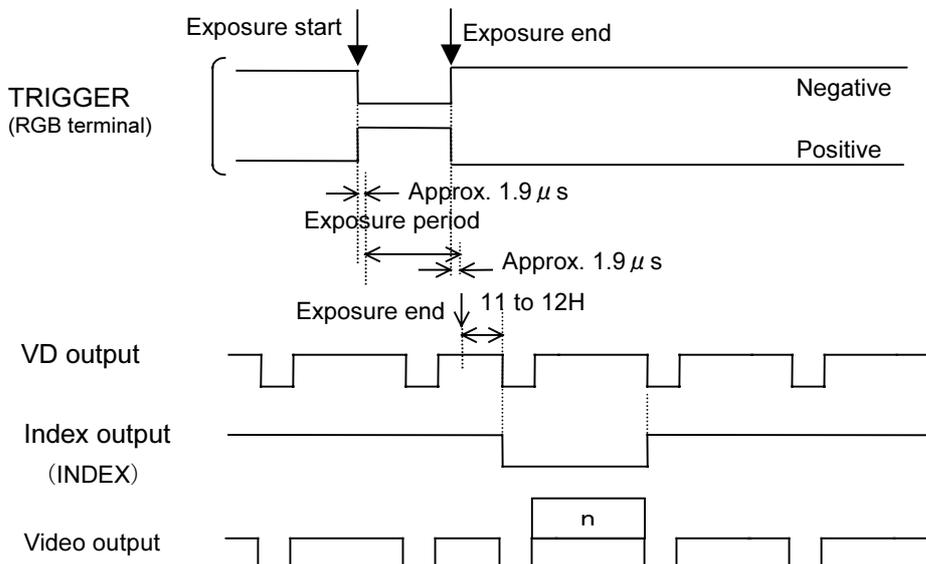
(a) Rising edge / Falling edge mode

The exposure time is set to 0.02 ms to 16 ms on the menu.

Trigger pulse level	:	(Low Level)：Less than 0.5V , (High Level)：3.4V to 5V
（RGB terminal）		
Trigger pulse fetch timing	:	Rising edge / Falling edge　selectable
Trigger pulse width	:	More than 2μs
Trigger pulse interval	:	More than 33.5 ms

(b) Width mode

Trigger pulse width	:	More than 4μs　Less than 255FRM
Trigger pulse interval	:	17.5ms (From exposure end to next exposure start.)

（3）2PULSE

Accumulation of charges is started and ended through the trigger pulse input to the RGB terminal, the vertical sync signal is reset and field images are output.

Trigger pulse level   : (Low Level)：Less than 0.5V , (High Level)：3.4V to 5V
（RGB terminal）

Trigger pulse fetch timing   : Rising edge / Falling edge / Pulse width   selectable

・When the trigger pulse fetch timing is set to pulse width

    Trigger pulse width   : More than 16.7ms(FLD/FRM setting：FLD)

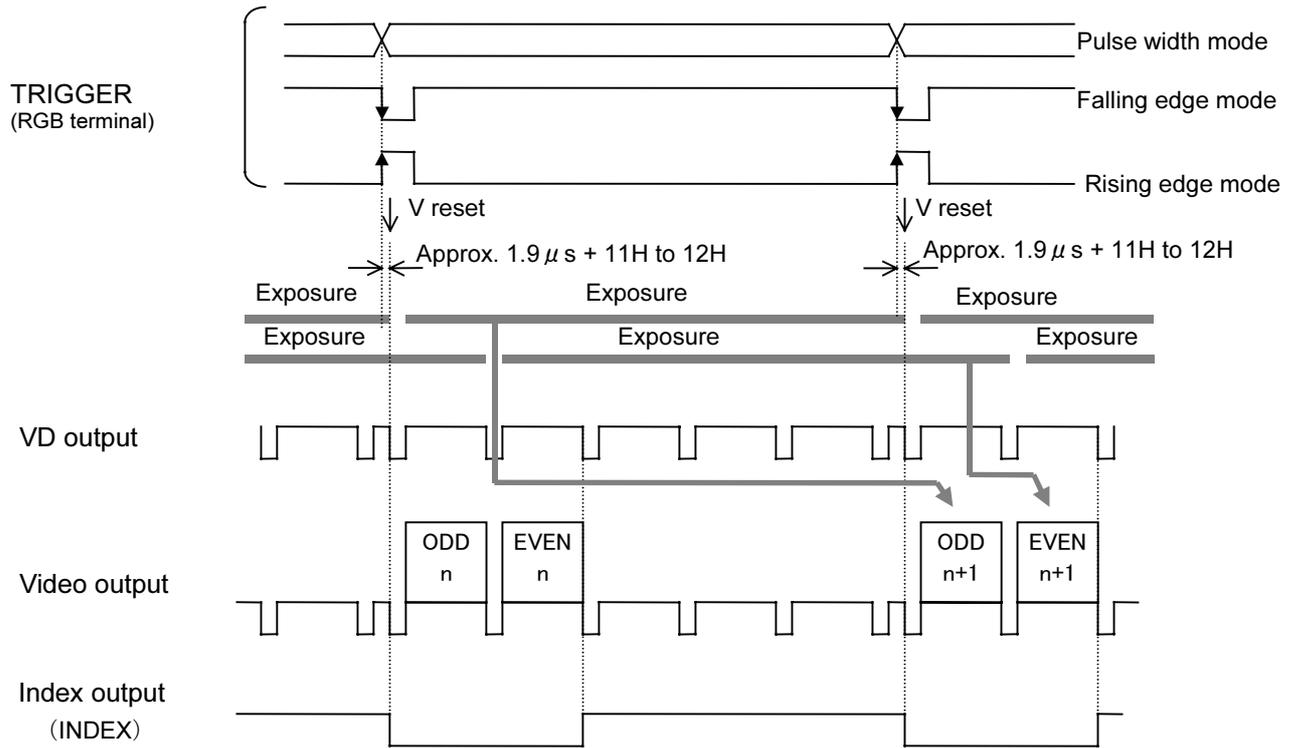   More than 33.4ms(FLD/FRM setting：FRM)

    Trigger pulse interval   : More than 16.7ms(FLD/FRM setting：FLD)

                                    More than 33.4ms(FLD/FRM setting：FRM)

・When the trigger pulse fetch timing is set to rising edge or falling edge
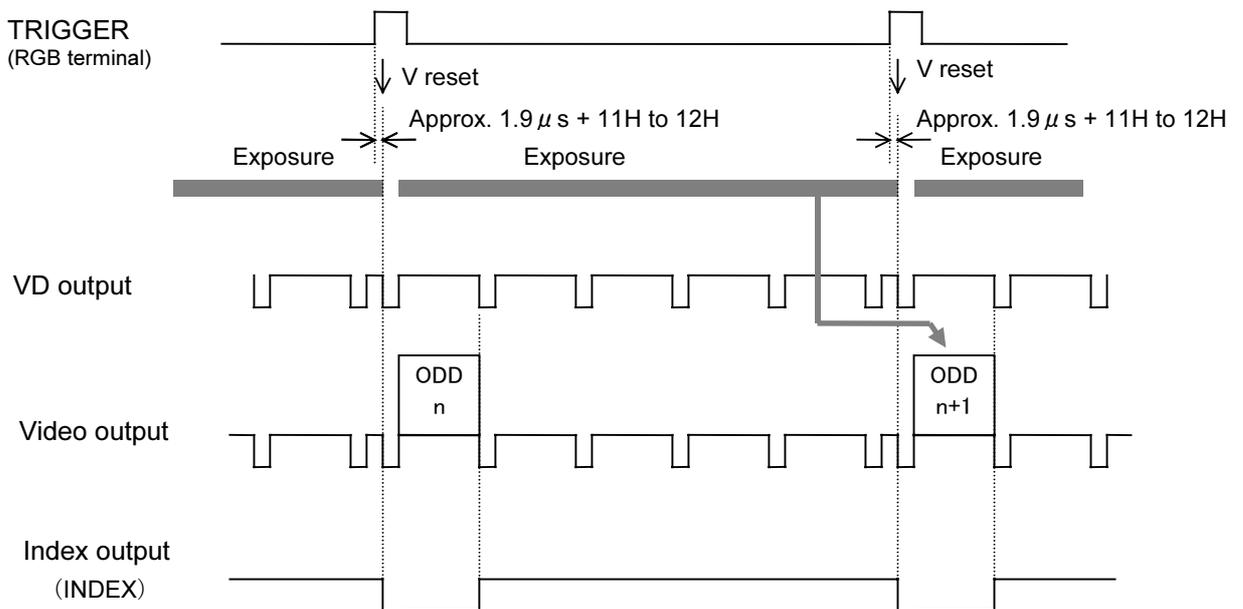
    Trigger pulse width   : More than 2μs

    Trigger pulse interval   : More than 16.7ms(FLD/FRM setting：FLD)

                                    More than 33.4ms(FLD/FRM setting：FRM)

（Frame storage period）

TRIGGER
(RGB terminal)

Pulse width mode

Falling edge mode

Rising edge mode

↓ V reset

↓ V reset

Approx. 1.9 μs + 11H to 12H

Approx. 1.9 μs + 11H to 12H

Exposure | Exposure | Exposure

Exposure | Exposure | Exposure

VD output

Video output

ODD n | EVEN n | ODD n+1 | EVEN n+1

Index output
（INDEX）

（Field storage period）

TRIGGER
(RGB terminal)

↓ V reset

↓ V reset

Approx. 1.9 μs + 11H to 12H

Approx. 1.9 μs + 11H to 12H

Exposure | Exposure | Exposure

VD output

Video output

ODD n | ODD n+1

Index output
（INDEX）

8. BEFORE MAKING A SERVICE CALL

| Symptom	Items to be checked
No image	・ Is the power supplied correctly? ・ Is the lens iris adjusted correctly? ・ Are the cables connected correctly? ・ Is the shutter mode set correctly?
Poor color	・ Is the monitor (TV) adjusted correctly? ・ Is the white balance of the camera adjusted correctly? ・ Is the illumination dark?

9. SPECIFICATIONS

Power supply	DC12V±10%
Power consumption	Approx. 3.6W
Pick-up system	RGB, 3CCD, Micro prism system
Image sensor (Effective pixels)	1/3inch　IT－CCD （Horizontal：768pixels, Vertical：494pixels）
Scanning system	2：1 interlace
Scan frequency	Horizontal：15.734kHz, Vertical：59.94Hz
Sync system	Internal/External(Automatic switching)
Horizontal resolution	570TV lines
Sensitivity	F8 standard（2000 lx, 3000K）
Minimum illumination	10 lx（F2.2, Sensitivity＋18dB, 3000K）
SN ratio	64dB standard (G)
Lens mount	C mount(flange back：17.526mm in-air)
Ambient temperature	32 to 104°F (0 to 40℃)
Ambient humidity	Less than 90%
Weight	Approx. 5.47oz (155g)
External dimension	1.73"(W)×1.73"(H)×3.07"(D) (44(W)×44(H)×78(D)mm)　　　　　　　　(except for protruded portion)
White balance	AWB（Automatic white balance）, MANUAL（Manual）
Gain	MANUAL（Manual）, OFF（0dB）
Output signal	RGB：75Ω unbalanced, D sub 15 pin connector
External sync input	HD or VD：　2－5V(p－p) Negative
Sync signal output	SYNC：　　　　　　2.0V±1V(p－p)　75Ω unbalanced HD, VD, INDEX：　5V$^{+0.5}_{-1.0}$ V(p－p) , Negative, 　　　　　　　　　Load impedance：More than 10kΩ
External trigger input	TRIGGER：　Low level：Less than 0.4V, High level：3.4－5V 　　　　　　1 Pulse：Positive/Negative/Width selectable 　　　　　　2 Pulse：Positive/Negative/Width selectable
Interface	Serial data interface（RS-232C）
Optional parts	EXC－TF05B(RGB cable), etc

●Design and specifications are subject to change without notice.

Unit : mm [inch]
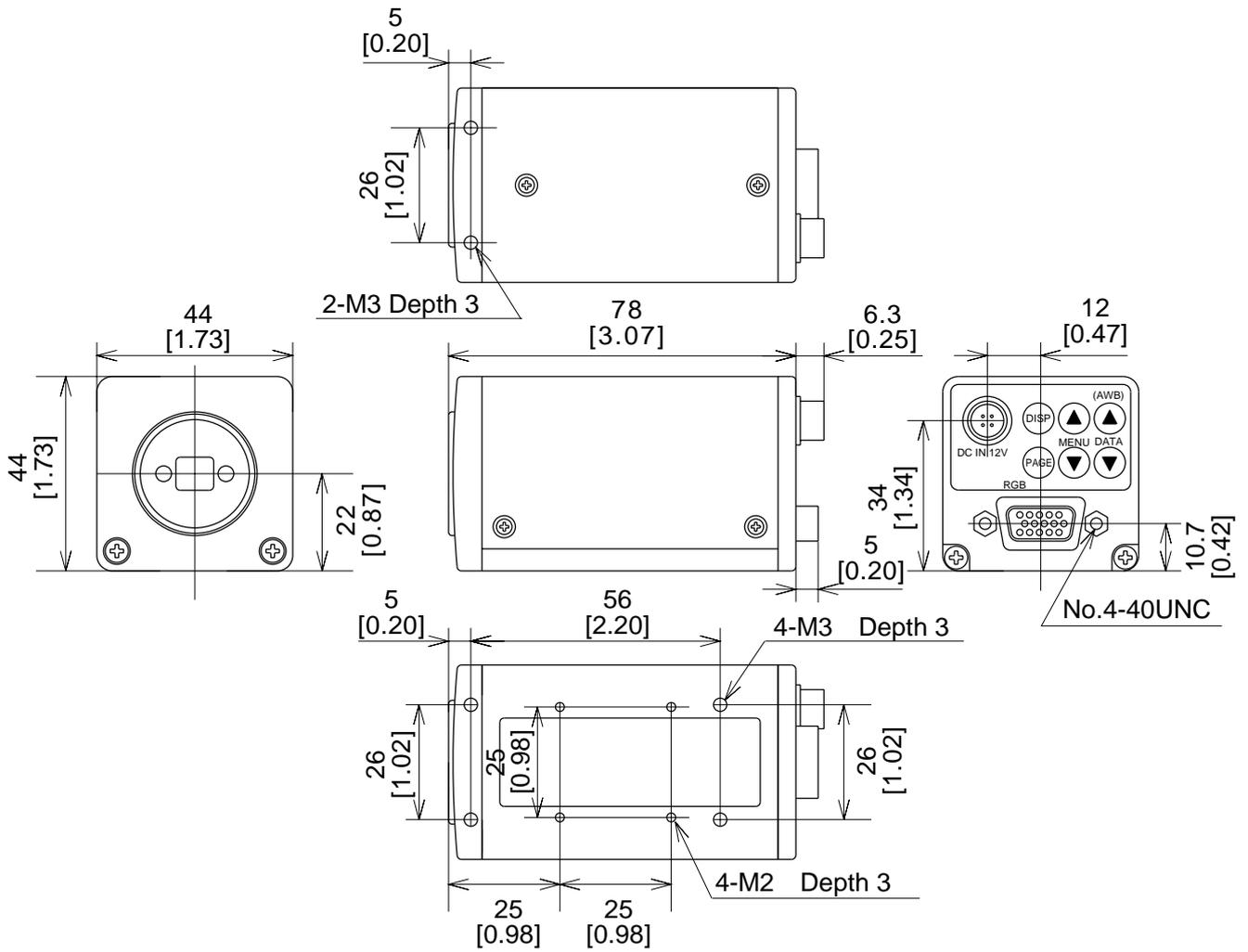
LIMITED WARRANTY
TOSHIBA CCD CAMERA

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ISD warrants this product and parts against defects in material or workmanship for a period of one year from the date of original retail purchase by the end-user. During this period, ISD will repair or replace a defective product or part with a new or refurbished item. The user must deliver the entire product to an ISD authorized service center. The user is responsible for all transportation and insurance charges for the product to the Service Center. ISD reserves the right to substitute Factory Refurbished Parts and / or Factory Refurbished Product in place of those in need of repair.

Step-by-step Procedures - How to Obtain Warranty Service
[1] Verify operation of the unit by checking the instruction manual
[2] If there is a defect in material or workmanship, contact an Authorized Service Provider within 30 days after the product fails to comply with specifications.
[3] Arrange for delivery of the product to the ISD authorized service center. Products must be insured and securely packed, preferably in the original shipping carton. A letter explaining the defect and a copy of the bill of sale or other proof of purchase must be enclosed with a complete return street address and daytime telephone number. Charges for transportation and insurance must be prepaid by the end-user.

Questions? If you have any questions, please check the Toshiba Imaging Systems Division Web site as follows:

Website: **http://www.toshiba.com/taisisd/indmed**

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