

High resolution monochrome CCD camera

KP-F200CL

Specifications

## 1. Outline

The Hitachi KP-F200CL is a high resolution black and white camera utilizing a 1/1.8-inch size

CCD with progressive scan, full frame readout, remote control, full frame shutter.

Output is non-interlace at 24 frames per second.

High resolution is provided by the 2.01 million pixels in a square lattice configuration that is conducive to image processing applications.

The host of versatile functions includes digital output, multi-step electronic shutter, HD/VD external sync, frame on demand and partial scan. The remote control permits setting from a personal computer.

## 2. Outstanding features

### 1) High resolution

Effective picture elements are 1628 (H) X 1236 (V) in a square lattice arrangement that provides a high resolution image.

### 2) Frame shutter

The frame shutter function improves vertical resolution of moving images.

### 3) Multi-step electronic shutter

The shutter speed can be set in 8 steps from 1/24 to 1/50000 second.

### 4) Frame on demand

An image can be captured at a desired timing with an external trigger signal input, then obtained instantly. The capture time can be adjusted by the external trigger and shutter.

### 5) Built-in CPU enables control settings by the remote control . Rear panel buttons can also be used for settings.

### 6) Digital output

Camera-Link digital output is provided.

### 7) Partial scan

High speed readout is capable up to 200 frames per second.

### 3. Specifications

(1) Pickup element	1/1.8-inch interline CCD
Total pixels	1688 (H) X 1248 (V)
Effective pixels	1628 (H) X 1236 (V)
Pixel pitch	4.4 (H) X 4.4 (V) $\mu$ m (square lattice)
(2) Scanning system	Non-interlaced
(3) Aspect ratio	4 : 3
(4) Frame rate	24 frames per second (full pixel readout)
(5) Horizontal scanning frequency	30.0 kHz
(6) Vertical scanning frequency	24 Hz
(7) Synchronization	Internal/external (automatic switching)
(8) Lens mount	C mount
(9) Flange focal distance	17.526 mm
(10) Video output	Digital output or analog output for image checking
Digital output	Camera-Link
Note:	Maximum digital out cable length is 10 meters.
(11) External sync input	HD/VD TTL negative deviation : $\pm 0.0005\%$ Input impedance: 10k ohm
(12) Electronic shutter speed	Selectable by external switches: 1/24, 1/60, 1/125, 1/250, 1/1000, 1/2000, 1/10000, 1/50000 second. Factory setting is 1/24.
(13) a correction	$r = 1$



(23) The remote control

(a) Signal system

Control system	Start-stop synchronization system
Transmission rate	9600 bps
Data length	8 bits
Start bit	1
Stop bits	2
Parity	None
Bit transfer	LSB first

(b) Communications control system

Full control by remote control software, data send/receive by text data transfer to camera microprocessor (BSC system handshake)

(C) Control items

1. Shutter speed 1/24, 1/60, 1/125, 1/250, 1/1000, 1/2000, 1/10000, 1/50000 second
2. Mode Normal, Fixed shutter, one trigger, two trigger, Partial Scan
3. Gain 0 to 15 dB (approx. 1 dB steps)
4. Black level
5. Partial scan 16H, 32H, 64H, 128H, 256H, 512H

4. Composition

- (1) Camera (with infrared blocking filter)
- (2) Operating instructions

## 5. Optional accessories

- |                                |                   |
|--------------------------------|-------------------|
| (1) Tripod adaptor             | TA-F120           |
| (2) 12 pin plug                | HR10A-10P-12S(01) |
| (3) D. OUT connector (26 pins) | 10226-5202JL(3M)  |
| (4) Junction box               | JU-M1A/ JU-F1     |
| (5) Dummy glass (AR coated)    | ARC1214           |
| (6) Camera cable               |                   |

	Molded type	Shield type
2 m	C-201-KSM	C-201KSS
5 m	C-501KSM	C-501KSS
10 m	C-102KSM	C-102KSS

Note : In the CE marking Legion , use the Shield type

## 6. DC input and sync connections

### (1) Connections to DC IN and SYNC

Pin No.	Int. Sync			
1	GND			
2	+12V			
3	_____			
4	_____			
5	_____			
6	_____			
7	_____			
8	_____			
9	_____			
10	GND			
11	+12V			
12	_____			

Connector (camera side) : Hirose HR10A-10R-12PB(01) or an equivalent

Plug (matching cable plug) : Hirose HR10A-10P-12S (01) or an equivalent

<Note> While the power supply is input to a camera it shines the omission of each cable and please do not do.

(2) Digital out connector

Pin No.	Signal	Pin No.	Signal
1	GND	14	GND
2	TXOUT 0 (-)	15	TXOUT 0 (+)
3	TXOUT 1 (-)	16	TXOUT 1 (+)
4	TXOUT 2 (-)	17	TXOUT 2 (+)
5	TXCLKOUT (-)	18	TXCLKOUT (+)
6	TXOUT 3 (-)	19	TXOUT 3 (+)
7	RX (+)	20	RX (-)
8	TX (-)	21	TX (+)
9	TRIG-A/VD (-) [ CC1 (-) ]	22	TRIG-A/VD (+) [ CC1 (+) ]
10	TRIG-B (+) [ CC2 (+) ]	23	TRIG-B (-) [ CC2 (-) ]
11	EXT-HD (-) [ CC3 (-) ]	24	EXT-HD (+) [ CC3 (+) ]
12	NC [ CC4 (+) ]	25	NC [ CC4 (-) ]
13	GND	26	GND

Signal connections to D. OUT (26 pin) or an equivalent

Connector: 10226-5202JL(3M) or an equivalent

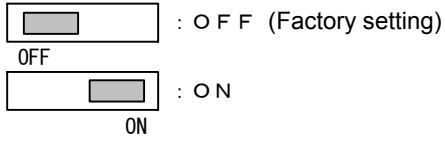
The digital out cable should be comprised of a twisted pair of wires having 100 ohm characteristic impedance and an outer sheath shield type conductor. Connect the shield (ground) of the digital out cable to the ground terminal of the video equipment, frame grabber, etc. In the CE marking Legion , install clamp filter(ZCAT3035-1330:TDK) at both ends(camera and video processor).

<Note> While the power supply is input to a camera it shines the omission of each cable and please do not do.

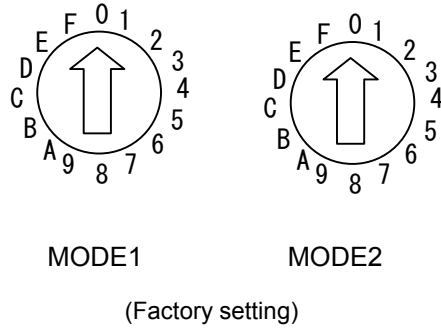
## 7. Rear panel switches

The rear panel includes switches for electronic shutter data, readout rate, and field on demand on/off and mode switches.

### (1) Remote on/off switch



### (2) Mode switch





(2) MODE1,MODE2 position select

MODE1

SW POS.	MODE 1
0	Normal mode
1	Normal shutter mode
2	One trigger mode
3	Two trigger mode
4	Fixed shutter mode
5	Partial scan (Normal mode) (READ POS.:CENTER)
6	Partial scan (Normal mode) (READ POS.:UPPER)
7	Partial scan (One trigger mode) (READ POS.:CENTER)
8	Partial scan (One trigger mode) (READ POS.:UPPER)
9	Normal mode
A	Normal mode
B	Normal mode
C	Normal mode
D	Normal mode
E	Normal mode
F	Normal mode

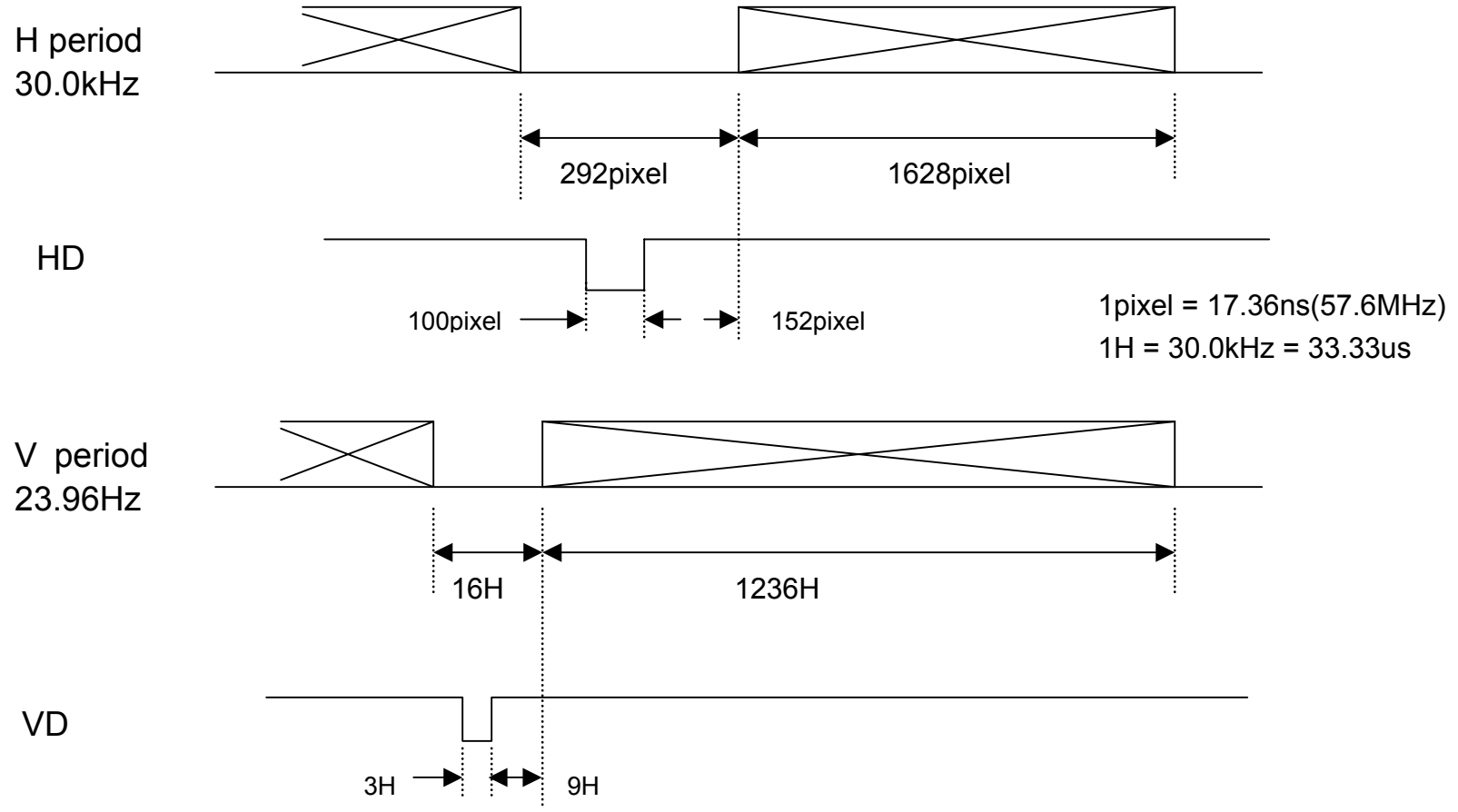
MODE2

SW POS.	MODE 2		
	(1)	(2)	(3)
0	0dB	1/24	16H
1	1dB	1/60	32H
2	2 dB	1/125	64H
3	3 dB	1/250	128H
4	4 dB	1/1000	256H
5	5 dB	1/2000	512H
6	6 dB	1/10000	512H
7	7 dB	1/50000	512H
8	8 dB	1/50000	512H
9	9 dB	1/50000	512H
A	10 dB	1/50000	512H
B	11 dB	1/50000	512H
C	12 dB	1/50000	512H
D	13 dB	1/50000	512H
E	14 dB	1/50000	512H
F	15 dB	1/50000	512H

(1),(2),(3)of MODE2 can be selected

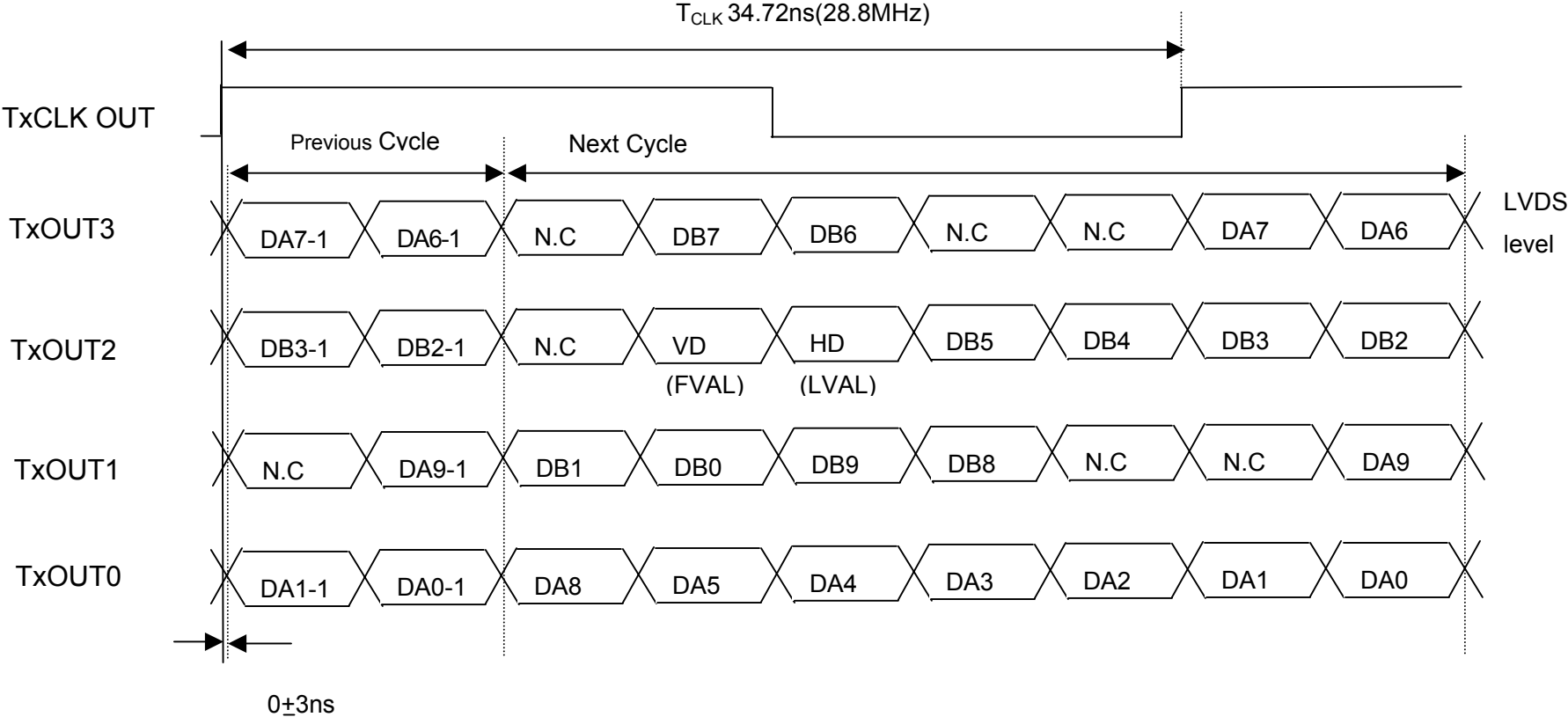
- (1):SW POS. of MODE1 : 0,2,3,9~F (Gain)
- (2):SW POS. of MODE1 : 1,4 (Shutter speed)
- (3):SW POS. of MODE1 : 5~8 (Partial scan)

# 8-1. KP-F200CL Output Signals Timing



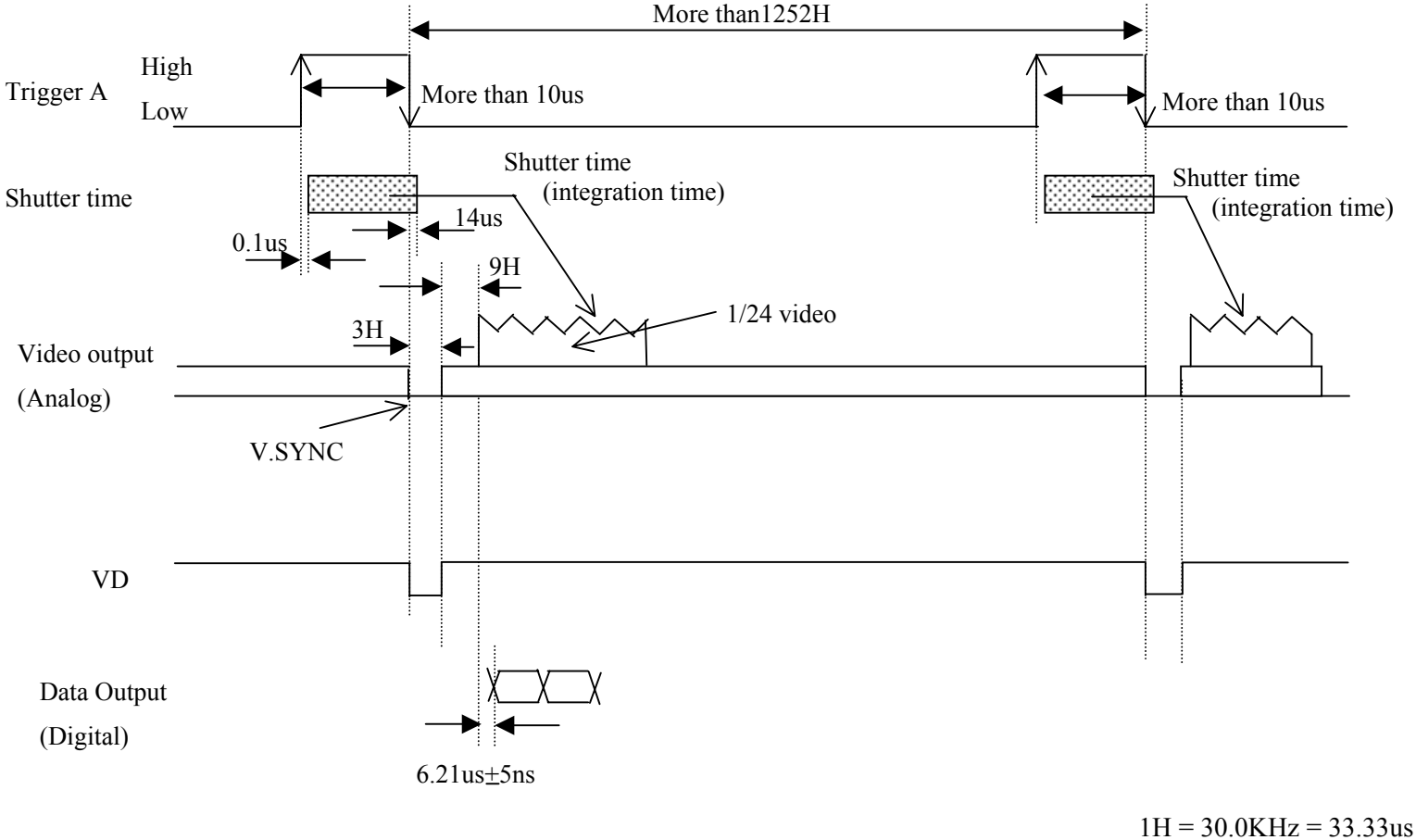
## 8-2. KP-F200CL Transmitter LVDS Output Pulse Position Measurement

Dual channel DA and DB outputs with respect to 1628 effective pixels of 1 horizontal line ( first DA)

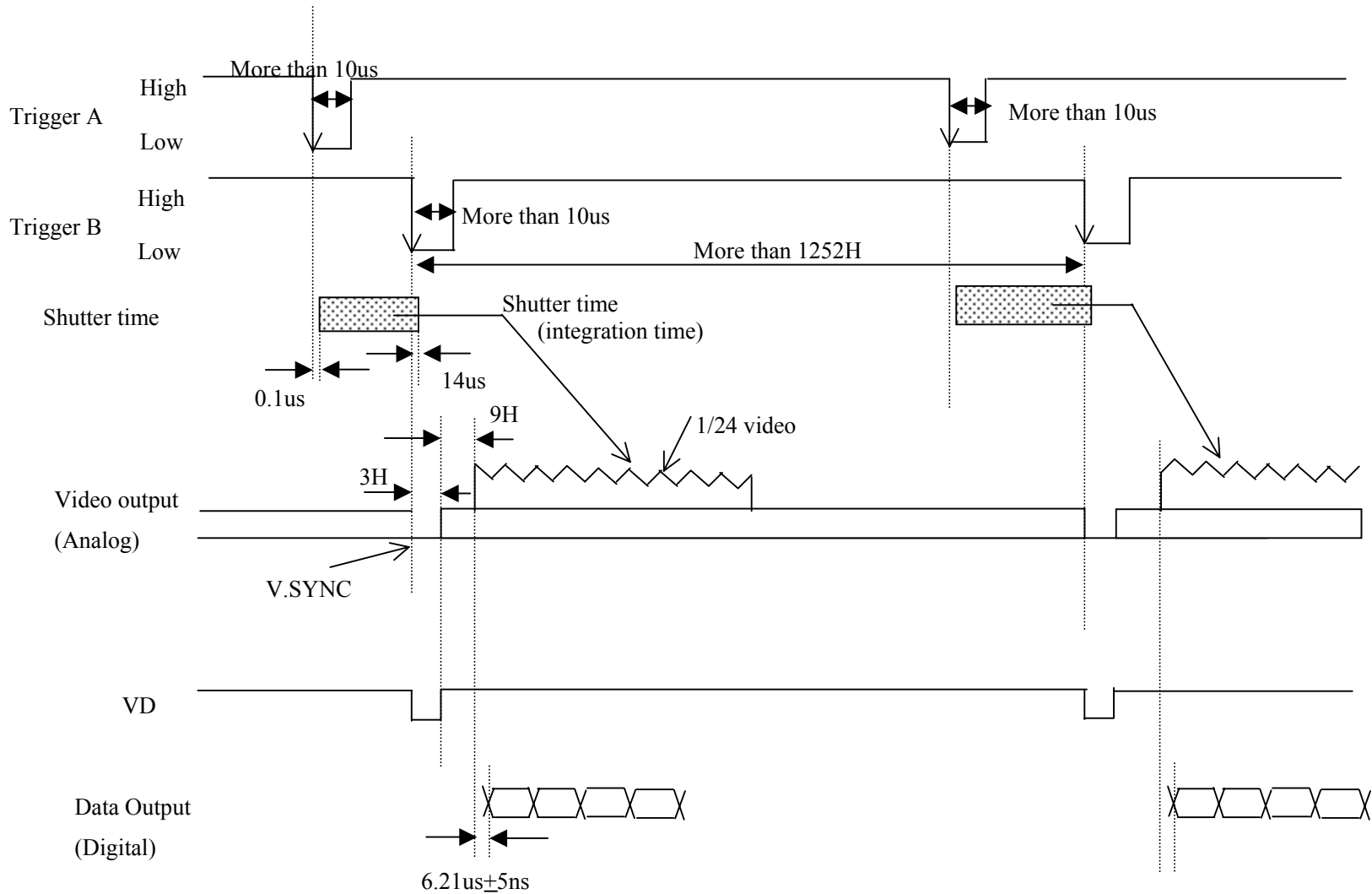


# 8-3. MODE TIMING CHART

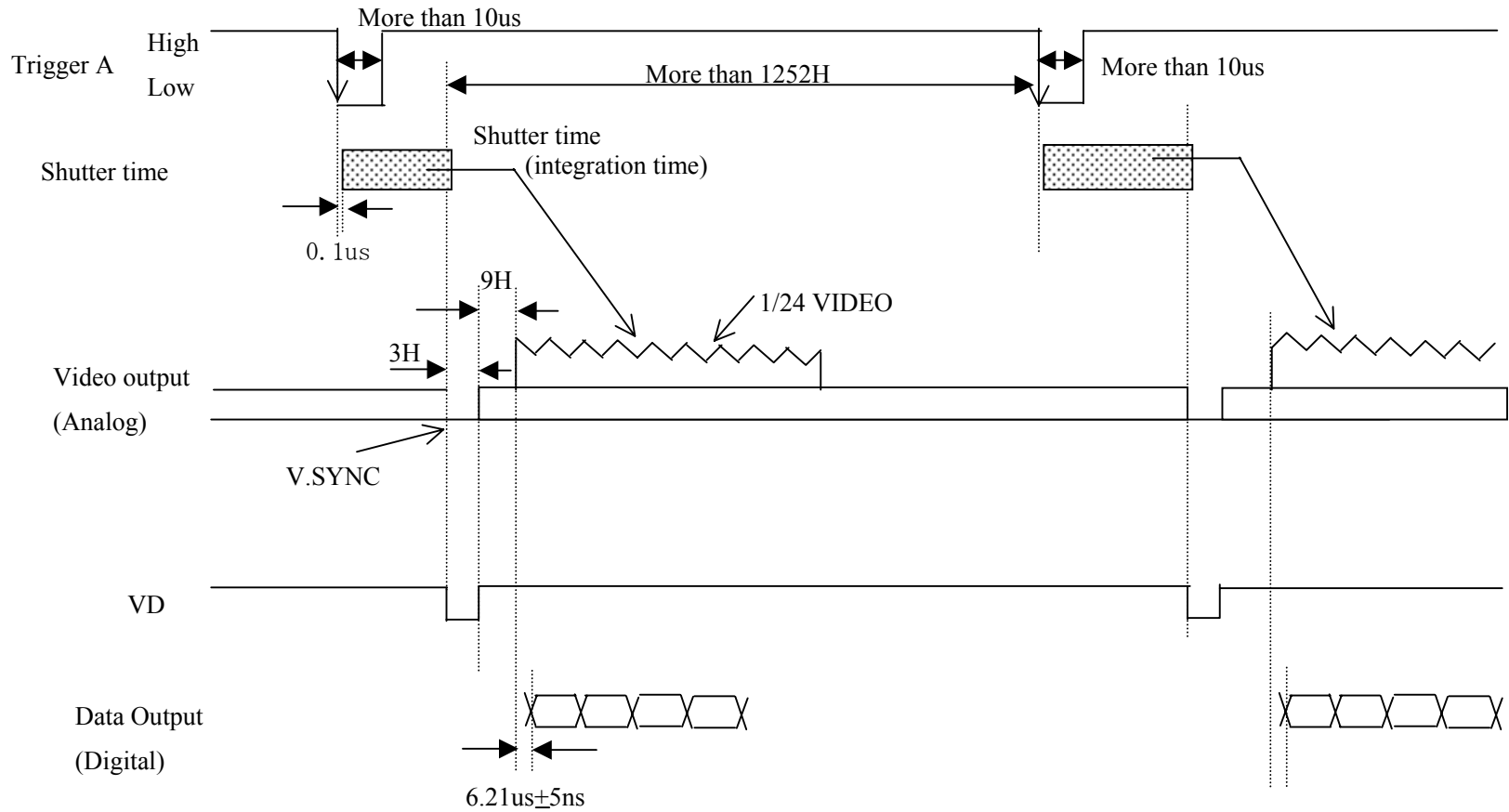
## 1. ONE trigger mode Timing Chart



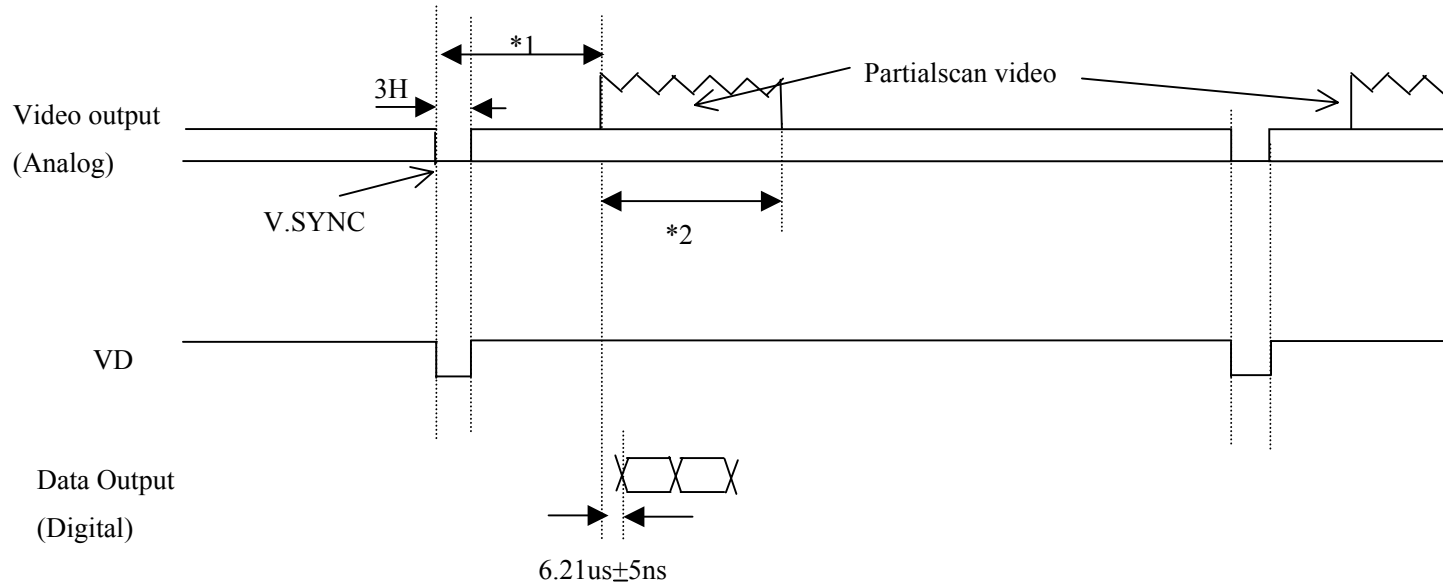
## 2.TWO trigger mode Timing Chart



### 3.Fixed shutter mode Timing Chart



#### 4. Partial Scan (NORMAL) (READ POS. : CENTER) mode Timing Chart

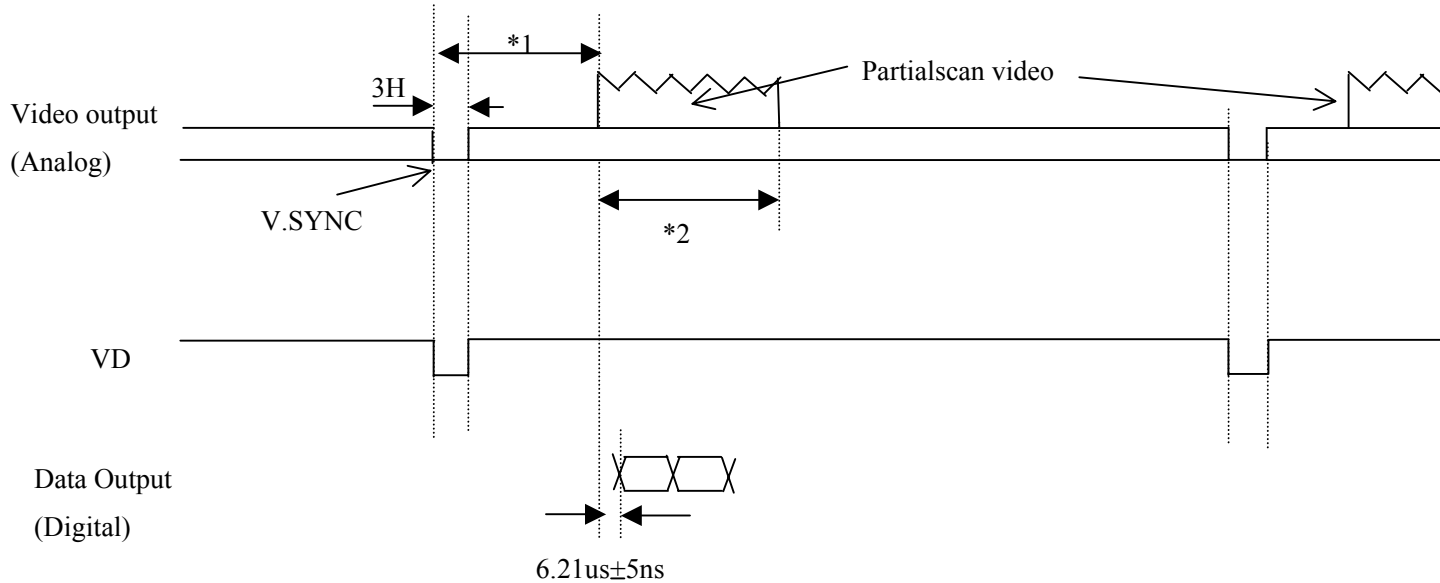


\*1: It changes with area setup. (Table 5 reference).

\*2: Time of AREA setting.

$$1H = 30.0\text{KHz} = 33.33\mu\text{s}$$

### 5. Partial Scan (NORMAL) (READ POS. : UPPER) mode Timing Chart



\*1: It changes with area setup. (Table 6 reference).

\*2: Time of AREA setting.

$$1H=30.0KHz=33.33us$$



Table 5

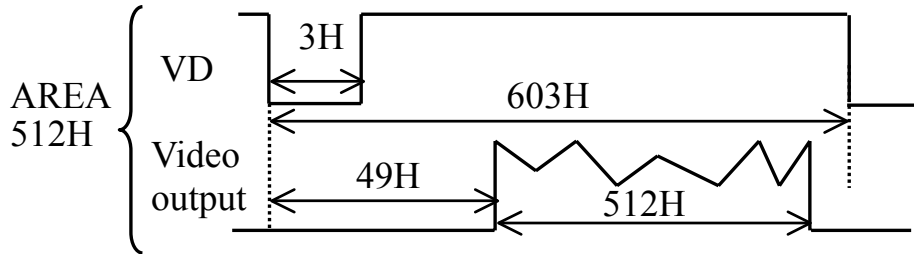
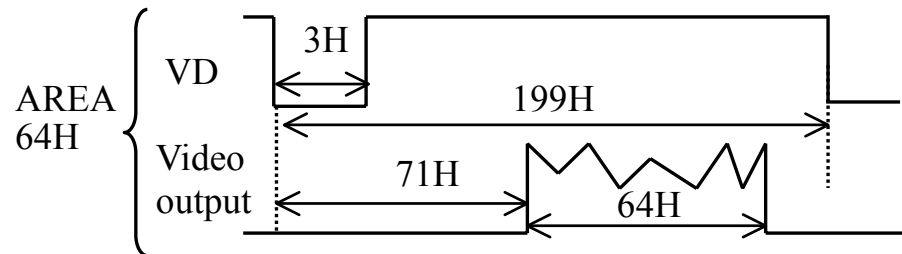
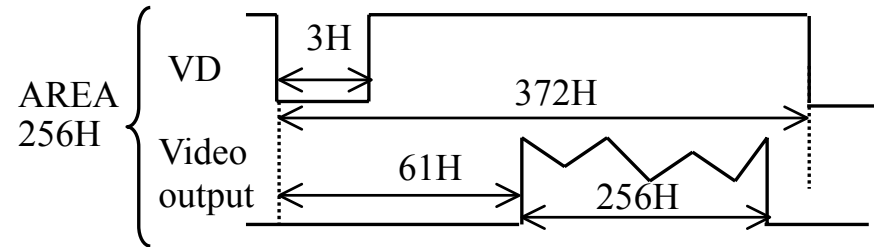
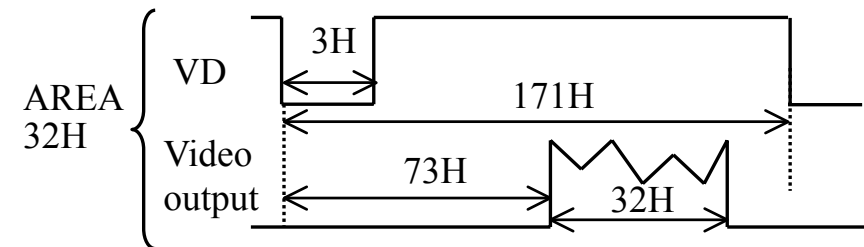
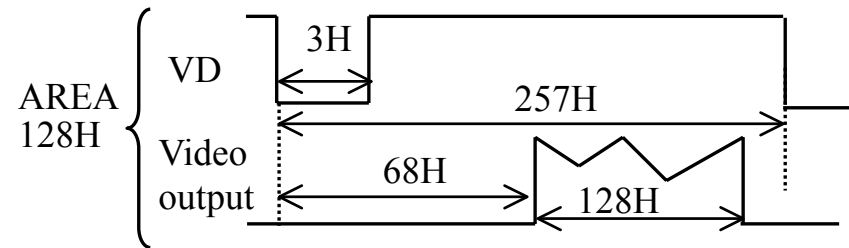
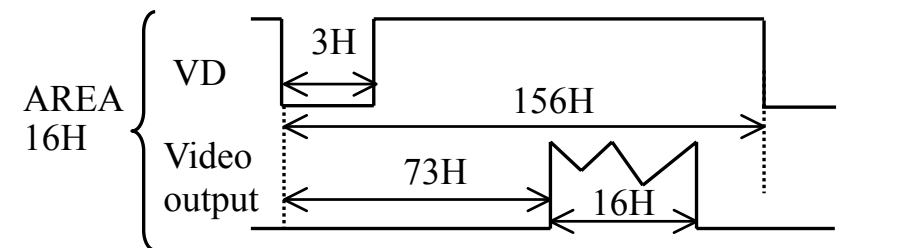
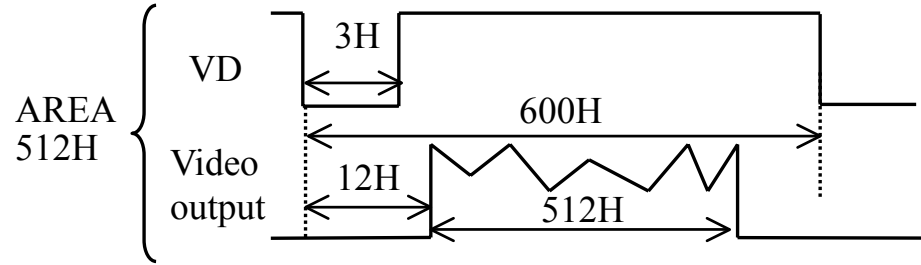
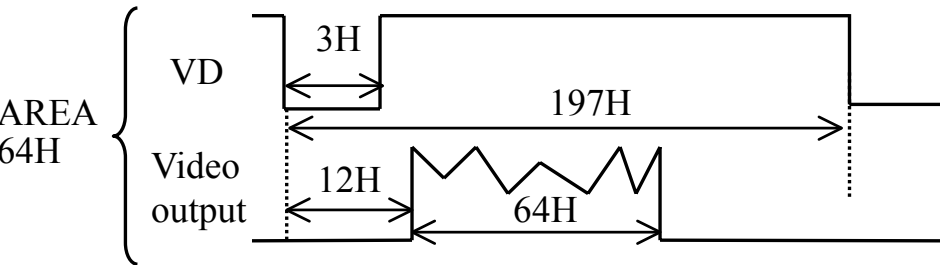
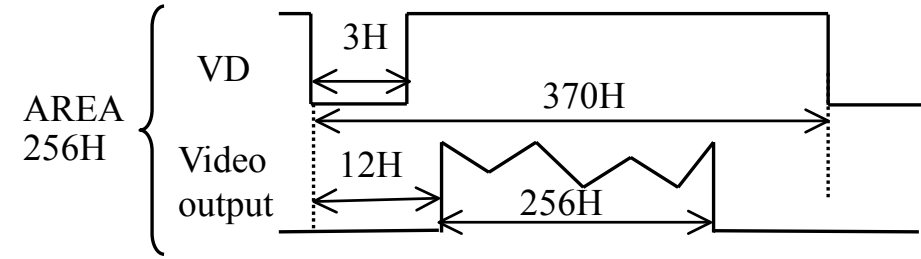
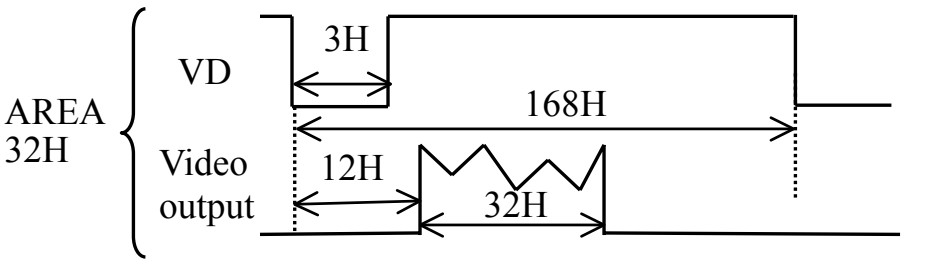
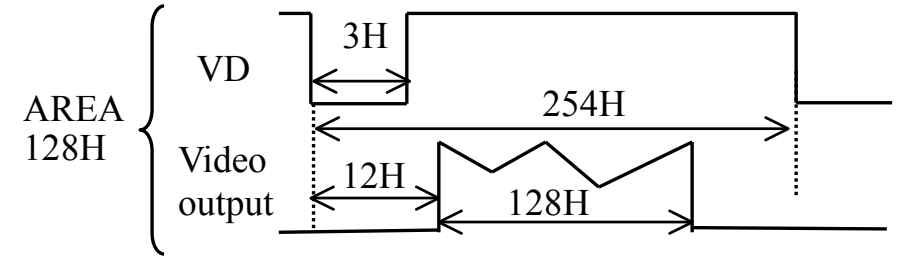
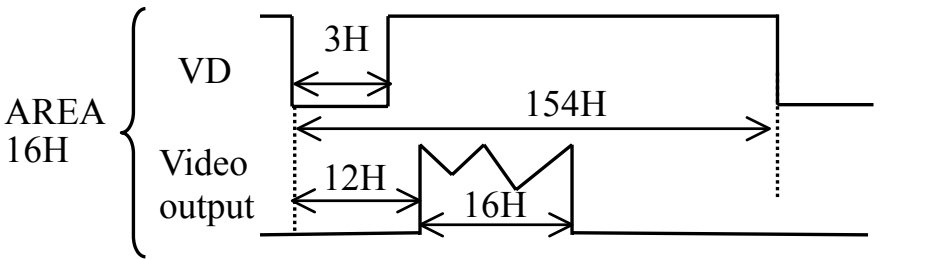
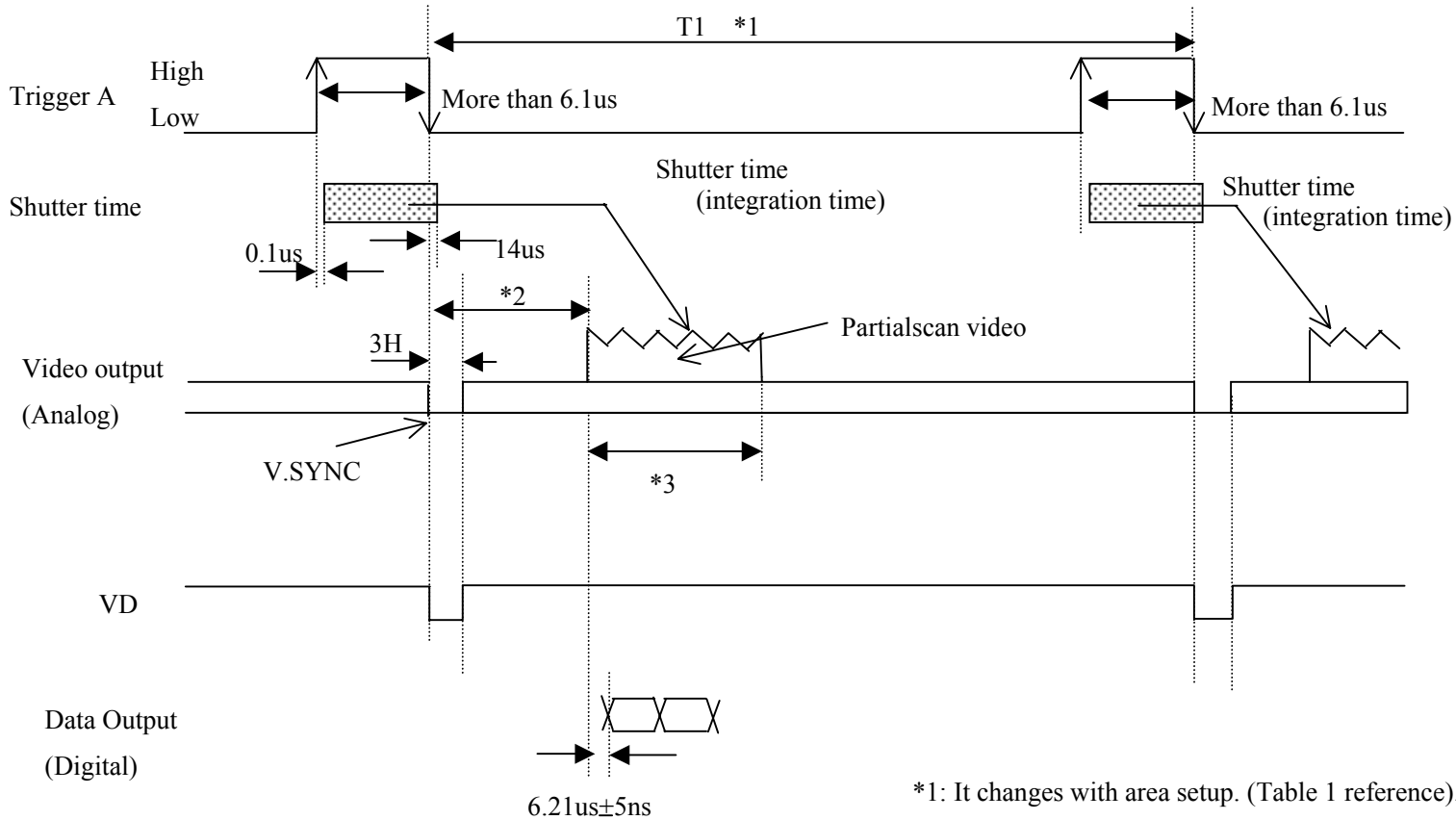


Table 6



## 6. Partial Scan (READ POS. : CENTER) ONE Trigger mode Timing Chart



\*1: It changes with area setup. (Table 1 reference).

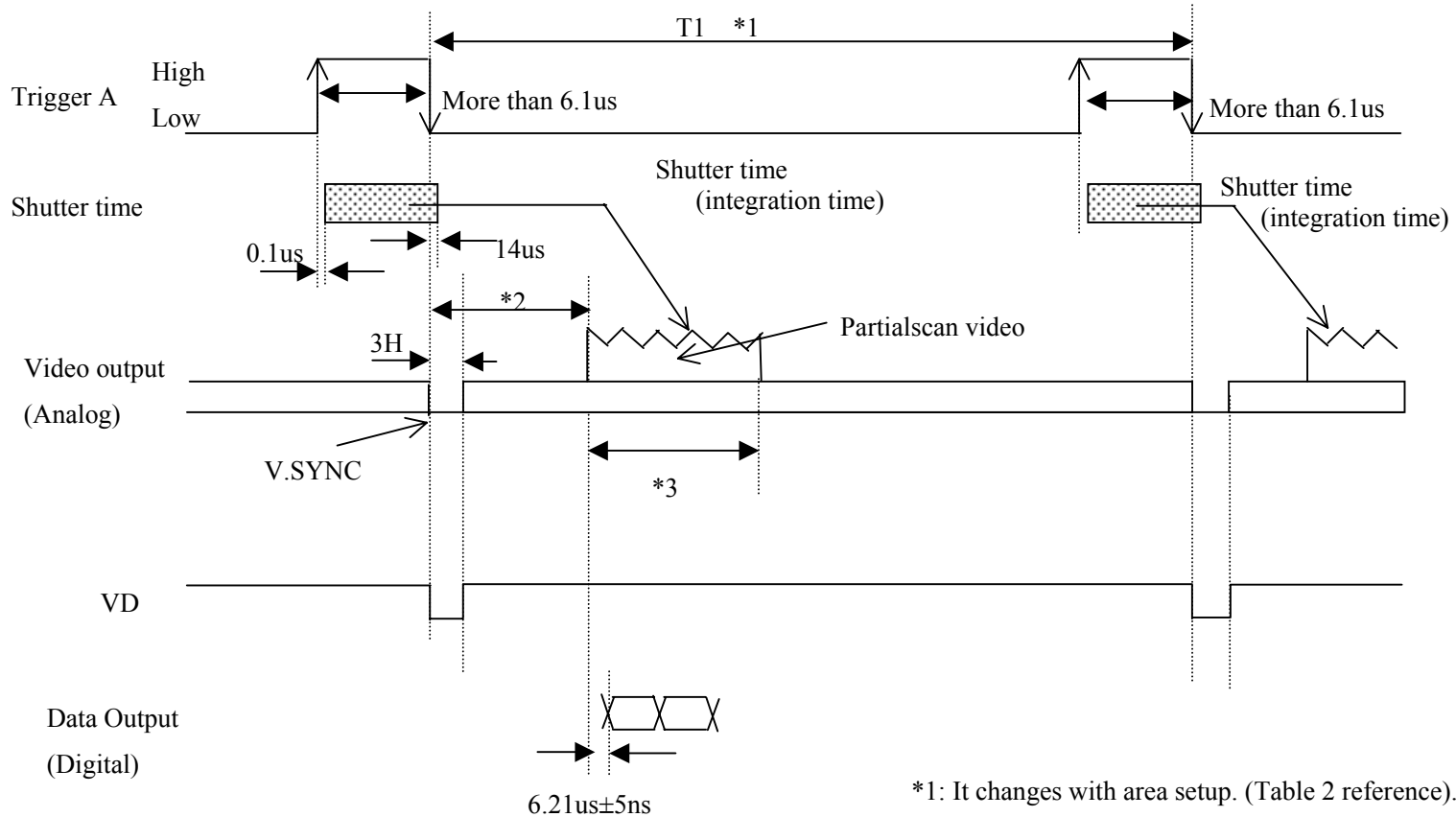
\*2: It changes with area setup. (Table 3 reference).

\*3: Time of AREA setting.

$$1H=30.0KHz=33.33\mu s$$

\*Exposure time becomes trigger width+13.9us.

## 7. Partial Scan (READ POS. : UPPER) ONE Trigger mode Timing Chart



\*1: It changes with area setup. (Table 2 reference).

\*2: It changes with area setup. (Table 4 reference).

\*3: Time of AREA setting.

$$1H = 30.0KHz = 33.33\mu s$$

\*Exposure time becomes trigger width + 13.9us.

Table 1

<b>Operating range (V direction)</b>	<b>Trigger period T1 (msec)</b>
<b>16H</b>	<b>Exposure time + 5.2 ≤ T1 ≤ 41.6</b>
<b>32H</b>	<b>Exposure time + 5.7 ≤ T1 ≤ 41.6</b>
<b>64H</b>	<b>Exposure time + 6.6 ≤ T1 ≤ 41.6</b>
<b>128H</b>	<b>Exposure time + 8.6 ≤ T1 ≤ 41.6</b>
<b>256H</b>	<b>Exposure time + 12.3 ≤ T1 ≤ 41.6</b>
<b>512H</b>	<b>Exposure time + 20.1 ≤ T1 ≤ 41.6</b>

Table 2

<b>Operating range (V direction)</b>	<b>Trigger period T1 (msec)</b>
<b>16H</b>	<b>Exposure time + 5.1 ≤ T1 ≤ 41.6</b>
<b>32H</b>	<b>Exposure time + 5.6 ≤ T1 ≤ 41.6</b>
<b>64H</b>	<b>Exposure time + 6.6 ≤ T1 ≤ 41.6</b>
<b>128H</b>	<b>Exposure time + 8.5 ≤ T1 ≤ 41.6</b>
<b>256H</b>	<b>Exposure time + 12.3 ≤ T1 ≤ 41.6</b>
<b>512H</b>	<b>Exposure time + 20.0 ≤ T1 ≤ 41.6</b>

Table 3

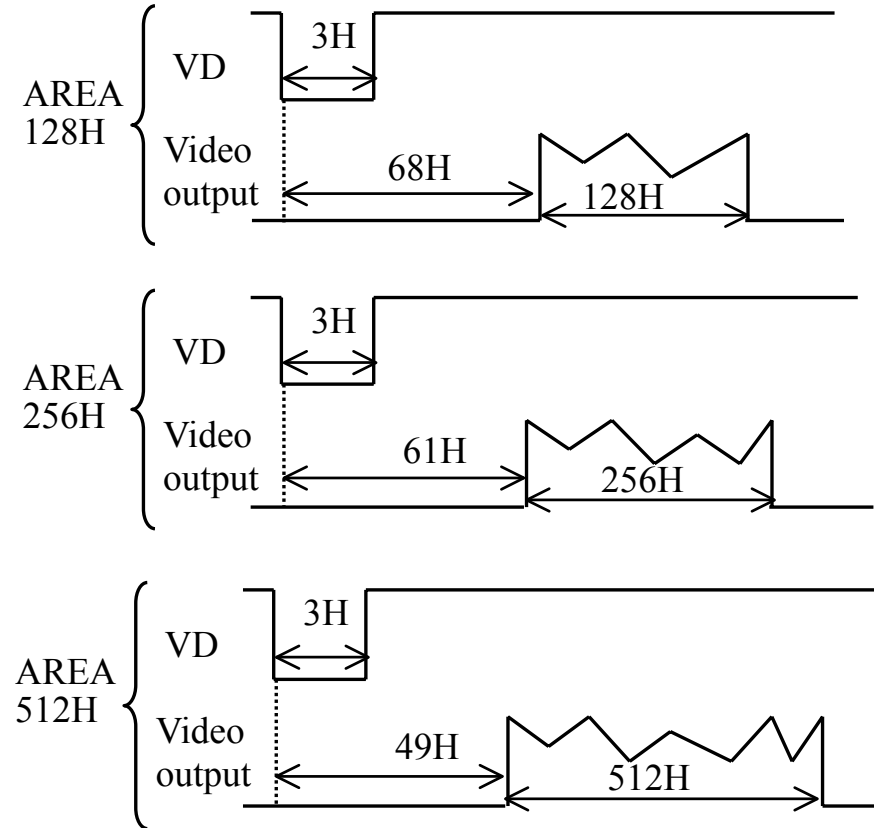
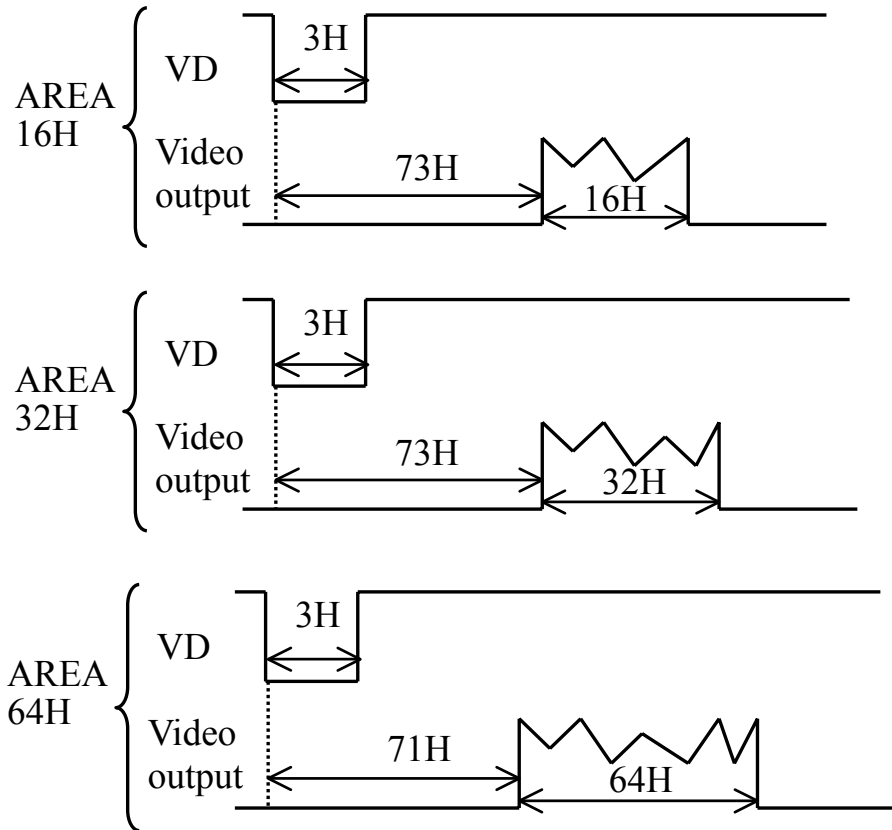
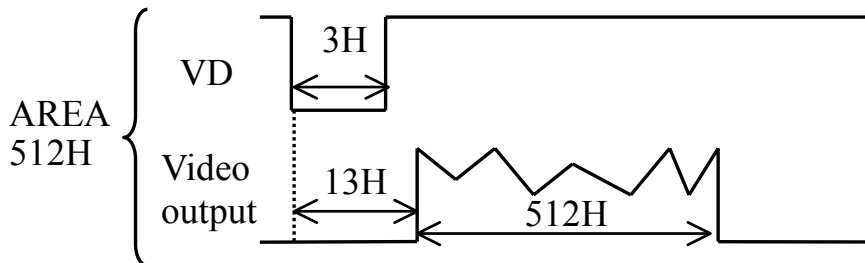
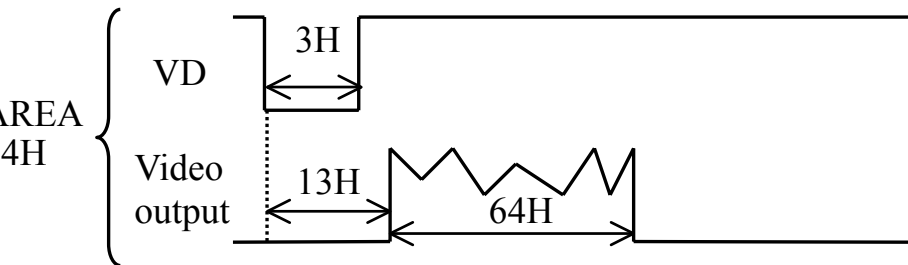
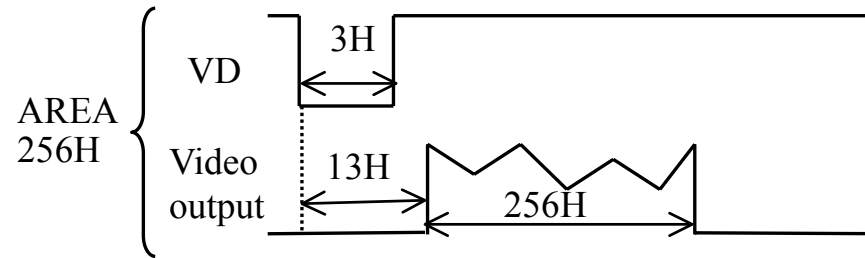
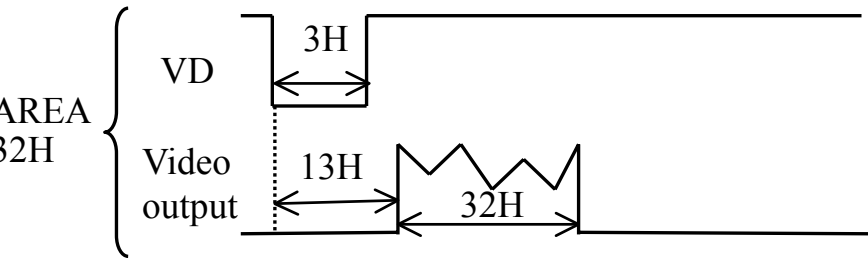
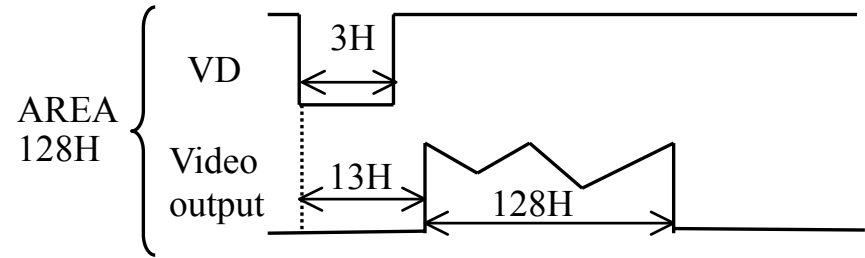
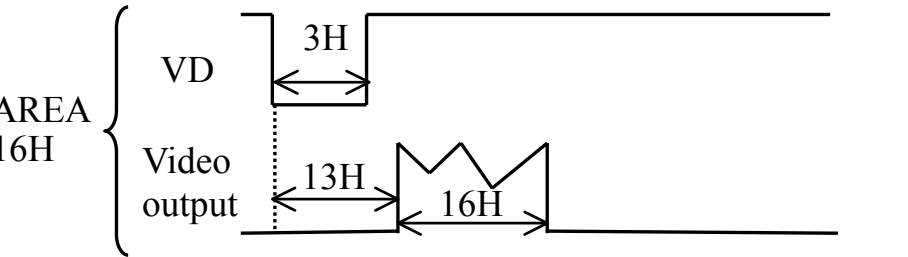
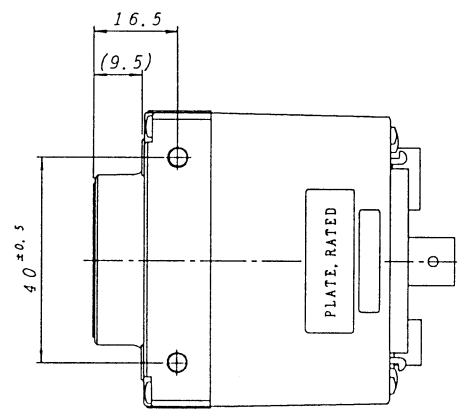
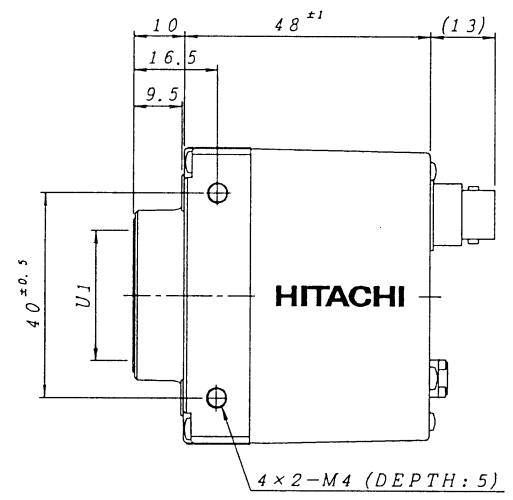
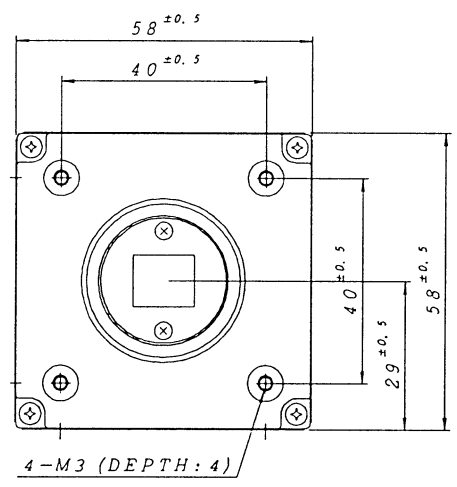


Table 4



# 9.EXTERNAL VIEW





**Notice:**

These specifications are subject to change without prior notice due to product improvement.

Confirm the most recent specifications at time of order.

Hitachi Kokusai Electric certifies this product complies with the standard warranty conditions of Hitachi Kokusai Electric , and that quality control is implemented to the extent required to comply with these conditions.

**Warranty and service:**

- (1) The guarantee period is one year after the data purchase. However, the defects due to erroneous use or intentional act are excluded.
- (2) As the defect after expiration of the guarantee period, where product repair is possible, repair will be performed at charge. .
- (3) The present Warranty pertains only to the camera unit. Secondary malfunctions attributable to camera failure as well as expenses incurred by disassembly and reassembly of the related system, are beyond the scope of this Warranty.
- (4) Compensation for loss of business, loss or damage to software, database and other contingent losses are beyond the scope of this Warranty.
- (5) Hitachi Kokusai Electric Inc. is not liable for the losses caused when the equipment is used in a system, use for business trades, production process, medical fields, crime prevention applications, etc.
- (6) The parts used in the equipment have their respective lives. The lives of such parts will be shortened under the environments of high temperature or high humidity.  
When the stable operation is required for a long time, it is recommended to perform periodical maintenance and inspection every year or every two years.
- (7) In the case of camera trouble by miss wiring of cable, it will be considered as out of warranty.