

**Progressive Scan Type Black and White Camera
(Frame Shutter)**

KP-F1

Operation Guide

Hitachi Denshi , Ltd.

Table of Contents

1. General	2
2. External view	3
3. Specifications	4
4. Operating precautions	7
5. Name and function of each section	9
6. Connections	10
7. Arrangement of internal controls	12
8. Setting functions	13
9. Video out mode	15
10. External synchronization (2:1 interlaced)	16
11. Field-on-Demand function	18
12. Non-interlaced operation	22
13. Timing diagrams	23
14. Image sensor	29
15. Optical system	30
16. How to connect cables	31
17. Options	32

1. General

The Hitachi KP-F1 is a full-frame shutter black and white camera using a 1/2" CCD of all pixels read-out type.

The KP-F1 features high performance, high sensitivity, and high resolution. The KP-F1 is provided with a variety of functions including a multiple step electronic shutter, integration mode switching, external HD/VD sync input, Field-on-Demand, and non-interlaced scanning functions.

A picture suitable for image processing systems is obtained, because a CCD of square lattice unit pixels is used.

Major features

1) Frame shutter function

The frame shutter is provided to this camera.

High resolution in the vertical direction is obtained for moving objects, compared with the conventional cameras.

2) Simultaneous odd/even outputs

The signals of two horizontal lines are separately output at 1/60 sec (1/50 CCIR).

Two channel video signals can be simultaneously output from the multi-pin connector or the BNC connector on the rear. (The video signals cannot be simultaneously output from the multi-pin connectorsly out put from the multi-pin connector and BNC.)

3) Frame output

All electric charges are read out from all pixels at 1/30 sec (1/25 CCIR).(Non-interlaced mode)

4) High resolution

The latest high grade CCD of square lattice pixels. The number of pixels is 350,000 (490,000 CCIR), and the number of effective pixels is 659(H)×494(V) (782(H)×582(V) CCIR).

5) Multiple step electronic shutter

The multi-step electronic multi-step electronic shutter is provided.

Eight kinds of the shutter speeds are selectable between 1/100 (1/120 CCIR) and 1/10,000 sec.

6) Selectable internal/external synchronization (interlaced and non-interlaced)

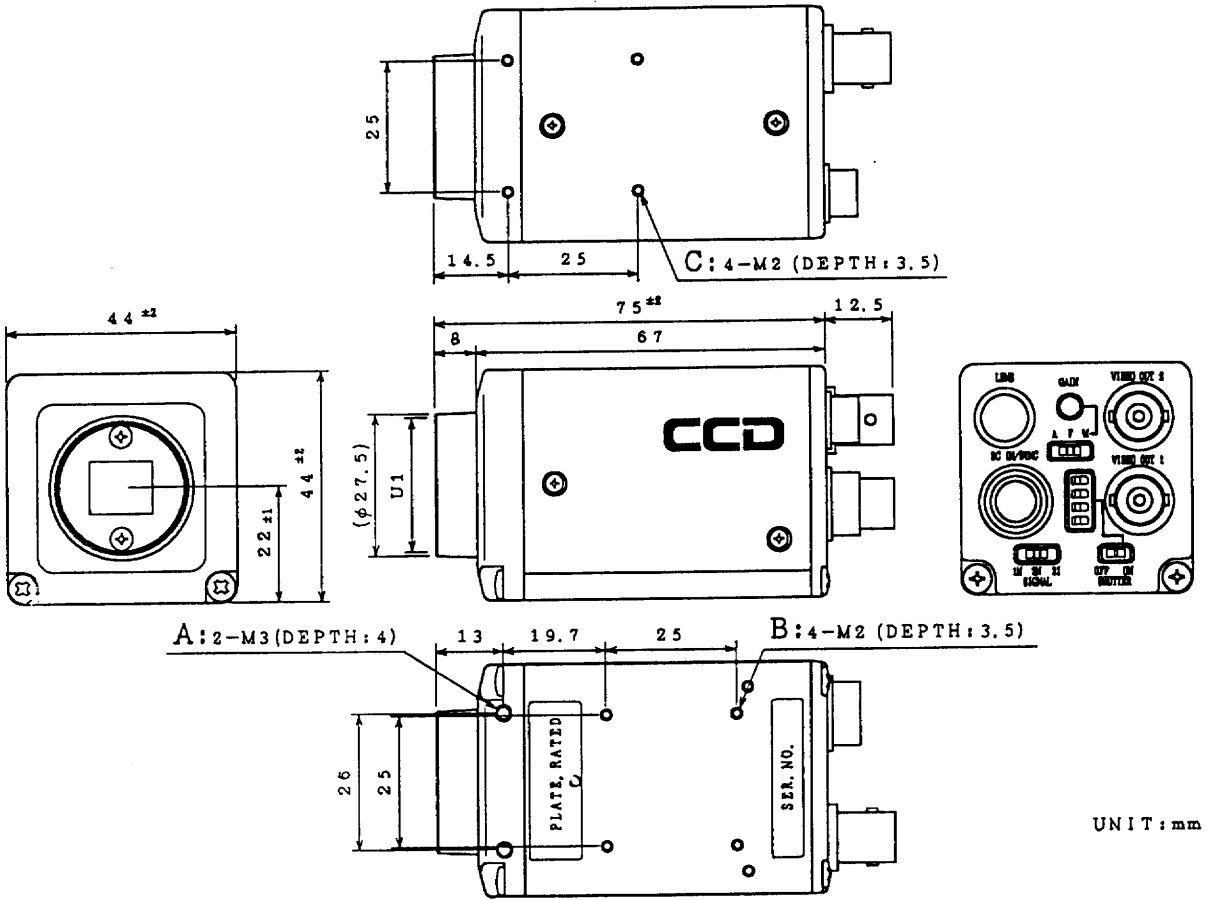
The sync mode and the scanning mode are automatically switched according to the kind of the sync signal applied.

7) Field-on-Demand function

The images captured at an optional timing by an external trigger signal input can be instantly obtained as images.

The timing can be adjusted by an external trigger signal and the shutter.

2. External view



Mass : approx. 150g Color : black

Caution

For installation of the camera use camera mounting holes A, B and C.

When a heavy lens is used, or when excessive shock or vibration is applied, fix the lens to the equipment, too.

3. Specifications

3.1 Specifications

1) Imaging device	Interline CCD
No. of total pixels	EIA: 692(H)×504(V) CCIR: 823(H)×592(V)
Pixel pitch	EIA: 9.9(H)×9.9(V) μm CCIR: 8.3(H)×8.3(V) μm
No. of effective pixels	EIA: 659(H)×494(V) CCIR: 782(H)×582(V)
2) Sensing area	EIA: 6.52(H)×4.89(V) mm CCIR: 6.49(H)×4.83(V) mm (1/2" size)
3) Signal format	Conforming to EIA/CCIR (Normal mode)
4) Lens mount	C-mount
5) Flange focal distance	17.526mm (Not adjustable)
6) Hor. scanning frequency	EIA: 15.734kHz CCIR: 15.625kHz
7) Vert. scanning frequency	EIA: 59.94Hz CCIR: 50Hz
8) Sync system	Internal/external (automatically switchable)
9) Int. sync operation	2:1 interlaced / non-interlaced
10) Ext. sync input	HD/VD: 2 to 6Vp-p, negative Input impedance: 1k Ω Frequency deviation: ±1%
11) Video output	1.0Vp-p, 75 Ω, unbalanced Video: 0.7Vp-p Sync: 0.3Vp-p, negative
12) Resolution	EIA: 500 TVL(H)/485 TVL(V) CCIR: 580 TVL(H)/575 TVL(V)
13) Sensitivity	400 lx, f4, 3200K
14) Minimum illumination	3 lx, f1.4, AGC:ON, gamma: ON, no IR cut filter
15) Signal-to-noise ratio	60dB
16) Electronic shutter	/10,000, 1/4000, 1/2000, 1/1000, 1/500, 1/250, 1/125, 1/100 (1/120 CCIR)s (External switch selectable) OFF mode: Normal exposure (Factory setting)

17) Gamma correction	1 (factory setting) or selectable by internal switch Separately settable to two video channels
18) AGC	Fixed or AGC: Available to only VIDEO OUT 1. The external switch is selectable. Fixed at factory setting.
19) Gain selection	VIDEO 1: Fixed or set by knob. VIDEO 2: Fixed The external switch is selectable. Finely adjustable to 2 channels by knob. (Fixed gain at factory setting)
20) Field-on-Demand function	ON/OFF: Internally switchable ONE trigger, TWO trigger, and Fixed shutter mode selectable by internal switch.(Factory setting: OFF) External trigger input is required. SYNC non-reset can be set.
21) Power supply	12VDC \pm 1V
22) Power consumption	250mA or less
23) Ambient conditions	Operating: -10 to 50°C, 90%RH or less Storage: -20 to 60°C, 70%RH or less

Caution: For continued stable operation, the camera should be used under 40°C or less when it is used continuously for extended period of time.

24) Anti-vibration	7G (10 to 60Hz, amplitude: 0.98 constant, 60 to 200Hz, amplitude: variable acceleration: constant) 10 to 200Hz, sweep: 1 min., XYZ, 30 min.
25) Resistance to shock	70G (Drop test, once each top, bottom, left and right)
26) Dimensions	44(W) \times 44(H) \times 67(D)mm
27) Mass	150g approx.

3.2 Composition

- 1) Camera body (w/IR cut filter)
- 2) Operation manual

3.3 Optional accessories

- 1) Tripod adaptor, TA-M1 (23855AX*)
- 2) 12-pin plug, HR10A-10P-12S(01) (23810AX*)
- 3) 6-pin plug, HR-10A-7R-6P(01) (JMH0092*)
- 4) AC adaptor, AP-130 (23805AX*)
- 5) Junction box, JU-F1A (23832AX*)
- 6) Dummy grass (AR coated) (XMD0009*)
- 7) Camera cables

	Assy type	Mould type
2m	C-201KS (23856AX*)	C-201KSM
5m	C-501KS (23857AX*)	C-501KSM
10m	C-102KS (23858AX*)	C-102KSM

Mould type: Produced upon request.

- 8) Trigger cables

	Assy type
2m	C-201RK (23864AX*)
5m	C-501RK (23865AX*)

*Product or part code

Caution

The specifications of this equipment are subject to change without notice for improvement. Prior to placing your order, be sure to confirm that these specifications are the latest ones.

Hitachi Denshi guarantee that the equipment shipped from our factory conforms to the Hitachi Denshi's standard warranty conditions and perform quality control within the range necessary to perform the warranty.

Warranty and After-sales Service

- 1) The guarantee period is one year after the date of purchase. However, the defects due to erroneous use or intentional act are excluded.
- 2) As the defect after expiration of the guarantee period, Hitachi Denshi will repair the equipment if the intended function is restored by the repair work, and the cost is charged to a customer.
- 3) Hitachi Denshi is not liable for the losses caused when the equipment is used in a system used for business trades, production process, medical fields, crime prevention applications, etc.
- 4) 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.

4. Operating precautions

4-1 Power supply

Connect $12V \pm 1V$ DC from an external power supply.

Use the stable power supply without ripple and noise.

4-2 To protect CCD(sensor)

1) Do not touch the glass surface of the sensor to avoid dirt and scratches.

2) If the glass surface of the sensor should become dusty or dirty, wipe off dust or dirt carefully with a cotton-tipped applicator. Never use dry cloth or paper.

The surface may be scratched and further the sensor may be damaged by static electricity.

3) Be sure to mount a lens or the supplied mount cap on the camera to protect the sensor from dust.

4-3 To protect camera

1) Do not use or store the camera under direct sunlight, in environments exposed to rain, or snow, or at a place exposed to flammable or corrosive gas.

2) The camera operates in the temperature range between -10 and 50°C .

If the camera is used or left at a high temperature(40°C or more)for hours, the life of the camera may be shortened.

When using the camera continuously for hours, avoid using the camera in such a high temperature or high humidity.

3) Do not drop the camera. Do not apply strong shock or vibration to the camera.

4) Before connecting or disconnecting a connector, turn off the camera.

Be sure to hold the connector body to connect or disconnect the connector.

4-4 Arrangement of camera

When several cameras are installed very close with each other, the cameras may interfere with each other to cause noise. Install the cameras as far as possible from each other or operate the cameras by an external sync signal.

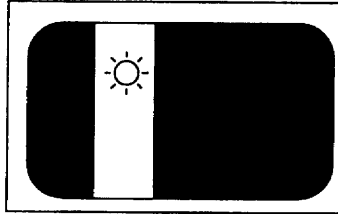
4-6 Phenomena inherent to CCD imaging device

Following are phenomena inherent to a CCD imaging device, and not defects.

1) Smear and blooming

When strong light (lamp, fluorescent lamp, reflected light, etc.) is shot, pale bands are displayed vertically above and below the light.

In this case, change the angle of the camera so that such strong light does not enter the camera through the lens.



2) Fixed pattern noise

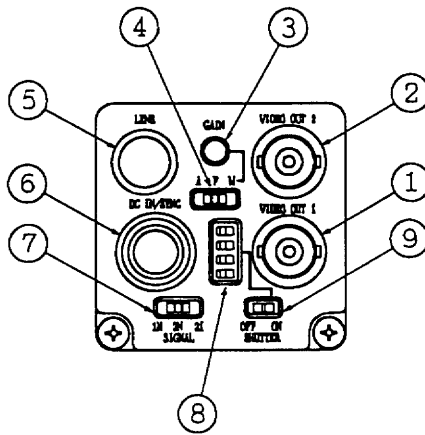
When the camera is operated in a high temperature, fixed pattern noise may appear on the entire screen.

The higher the sensitivity of camera, the more this fixed pattern noise appears.

3) Moire

When fine patterns are shot, moire may be displayed.

5. Name and function of each section



① Video Out 1 (BNC)

Composite video signal (VS) output (VIDEO OUT 1).

② Video Out 2 (BNC)

Composite video signal (VS) output (VIDEO OUT 2).

③ Manual gain control

Adjustable when switch 4 is set to M (effective only for Video Out 1).

④ Gain select switch

Selects gain adjustment (effective only for Video Out 1).

A: Automatic (AGC)

F: Fixed

M: Manual

⑤ LENS (Trigger) connector

Use for iris lens, FLD signal output and trigger signal input C.

⑥ DC In/Sync connector

Connector for DC 12 V supply, composite video signal (VS) output and external sync input.

⑦ Video output mode select switch

The following modes can be selected.

2I: Continuous interlaced odd and even field signals are respectively output from Video Out 1 and Video Out 2 at 1/60 s (CCIR: 1/50 s).

2N: Continuous odd and even field signals are respectively output from Video Out 1 and Video Out 2 at 1/60 s (CCIR: 1/50 s).

1N: Non-interlaced output at 1/30 s (CCIR: 1/25 s) is obtained only from Video Out 1.

⑧ Shutter speed select switches

Set the shutter speed.

⑨ Shutter on/off switch

Shutter mode is produced in the on position.

6. Signal connection to connector

1) Signal connection to DC IN/SYNC connector (12 pins)

PIN NO.	Internal sync mode	External sync mode				
		HD/VD	Field-on-demand			
			One trigger	Two trigger	Fixed shutter	Sync N.R.
1	GND	GND	GND	GND	GND	GND
2	+12V	+12V	+12V	+12V	+12V	+12V
3	Video 1 output (GND)	Video 1 output (GND)	Video 1 output (GND)	Video 1 output (GND)	Video 1 output (GND)	Video 1 output (GND)
4	Video 1 output (Signal)	Video 1 output (Signal)	Video 1 output (Signal)	Video 1 output (Signal)	Video 1 output (Signal)	Video 1 output (Signal)
5	————	HD input (GND)	————	Trigger B input (GND)	————	————
6	————	HD input (信号)	————	Trigger B input (信号)	————	————
7	————	VD input (Signal)	Trigger A input (Signal)	Trigger A input (Signal)	Trigger A input (Signal)	————
8	Video 2 output (GND)	Video 2 output (GND)	Video 2 output (GND)	Video 2 output (GND)	Video 2 output (GND)	Video 2 output (GND)
9	Video 2 output (Signal)	Video 2 output (Signal)	Video 2 output (Signal)	Video 2 output (Signal)	Video 2 output (Signal)	Video 2 output (Signal)
10	GND	GND	GND	GND	GND	GND
11	+12V	+12V	+12V	+12V	+12V	+12V
12	————	VD input (GND)	Trigger A input (GND)	Trigger A input (GND)	Trigger A input (GND)	————

Note

- The video signal cannot be fed simultaneously from both the VIDEO OUT connector and the DC IN/SYNC connector. If both the outputs are connected simultaneously, a proper picture cannot be obtained.
- Supply 12V DC in the range between 11 and 13V.

2) Signal connection to LENS(trigger) connector (6 pins)

PIN NO.	Signal
1	FLD pulse output
2	WEN pulse output
3	GND
4	Trigger C input (SYNC N.R. only)
5	Auto iris video output
6	+12V

Note:

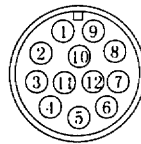
- The FLD pulse is not output in the field-on-demand function.
- The auto iris video output function cannot be used when the field-on-demand function is used.
- FLD and WEN pulse output is CMOS level.
- Strobe is inhibited in the L period of WEN pulse.

● Plug

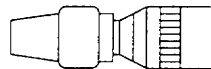
DC IN/SYNC

HR10A-10P-12S(01)

Product code : 23810AX



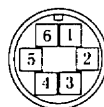
Viewed from this side →



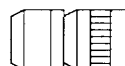
LENS(Trigger)

HR10A-7R-6P(01)

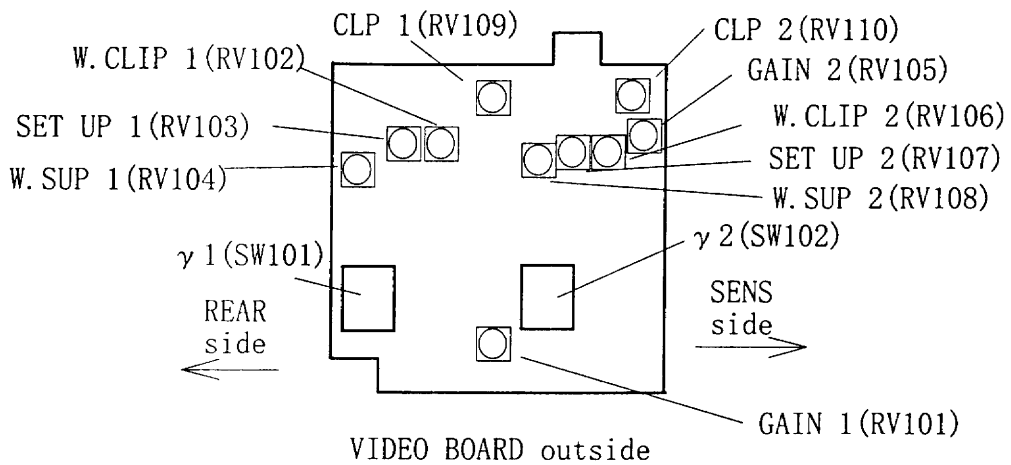
Part code : JMH0092



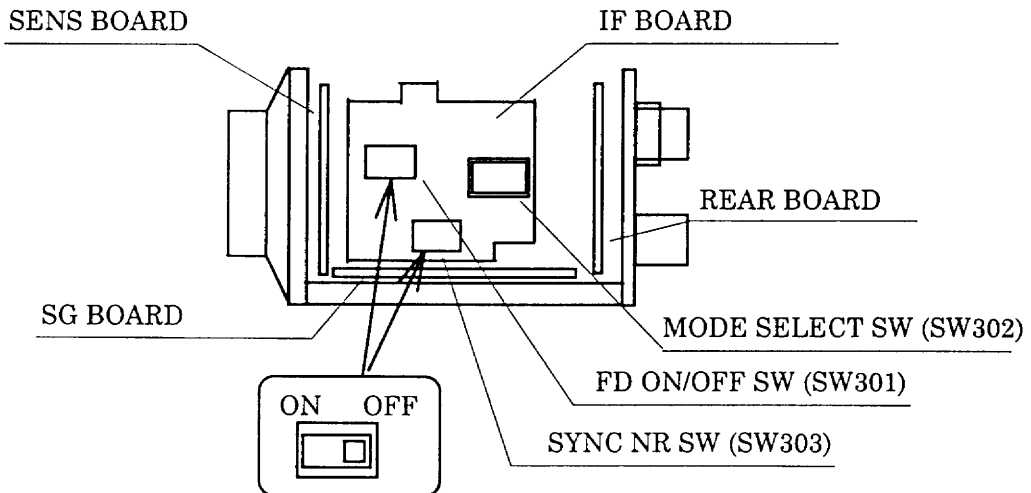
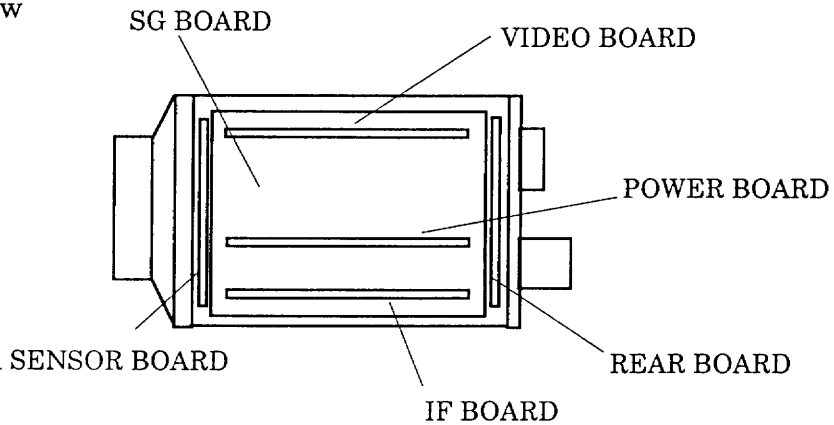
Viewed from this side →



7. Arrangement of Internal controls



Top view

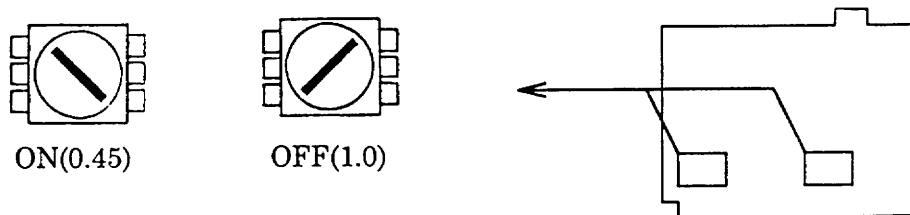


8. Setting function

◆Gamma (γ) correction

Factory setting is OFF (1.0), but it is changeable if necessary.

VIDEO OUT 1 (SW101) and VIDEO OUT 2 (SW102) can be set separately.



◆GAIN adjustment

Video output GAIN is adjusted. Adjusted to 0.70 V p-p (γ :OFF) at F4, 4001x at factory setting. VIDEO OUT 1 (RV101) and VIDEO OUT 2 (RV105) can be set separately.

◆Set-up adjustment

Set-up level is adjusted. Adjusted to 50 mV p-p (γ :OFF) at factory setting. VIDEO OUT 1 (RV103) and VIDEO OUT 2 (RV107) can be set separately.

◆White clip adjustment

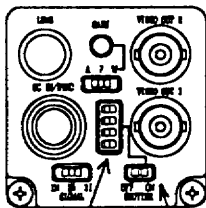
White clip is adjusted. Adjusted to 1.0 V_{p-p} at factory setting. VIDEO OUT 1 (RV102) and VIDEO OUT 2(RV106) are used for adjusting white clip

◆White suppress (knee) adjustment available upon request

Video signal level is prevented from white saturation and dynamic range is extended. It is adjusted so that the video level exceeding 120% can be suppressed. VIDEO OUT 1 (RV104) and VIDEO OUT 2 (RV108) can be set separately.

◆Electric shutter setting

The electric shutter speed is set by turning the ON/OFF switch to the ON position and using the shutter speed selection switch. The shutter always operates in the field storage mode.



Shutter speed selection switch

Shutter ON/OFF switch

Setting of shutter speed

Speed(second)	※ 1	※ 2	1/125	1/250	1/500	1/1000	1/2000	1/4000	1/10000
Setting position									

※ 1 1/60(EIA), 1/50(CCIR)

※ 2 1/100(EIA), 1/120(CCIR)

The higher the shutter speed, the greater the effect. However, since sensitivity lowers, adjust the lens iris or increase illumination. When the shutter is used, the flicker of an object may be emphasized. In such a case, use a light such as a DC lighting lamp which causes no flicker.

Long-time exposure (low speed shutter) available on order

Long-time exposure can be provided by switching the chip resistors of REAR board to 2FLD, 4FLD, 6FLD, 8FLD, 10FLD, 12FLD, 14 FLD or 16FLD.

◆Field-on-demand

The field-on-demand function is set as follows.

Mode	SW301	SW302								SW303
		1	2	3	4	5	6	7	8	
Initial setting							ON			
One trigger	ON	ON	ON	ON	ON					
Two trigger	ON	ON	ON		ON	ON				
Fixed shutter *	ON									
SYNC N.R.			ON					ON		ON

Note: Blanks mean OFF.

* The switch on the rear is set in the fixed shutter mode.

Shutter ON/OFF switch: ON

shutter speed selection switch: shutter speed is set.

(Refer to setting of electronic shutter.)

9. Video output modes

The frame shutter function operates in either of the following modes.

Simultaneous odd/even field output mode

The CCD odd and even line pixels are read simultaneously and are separately output simultaneously (video 2-channel output). The two output methods are interlaced and non-interlaced.

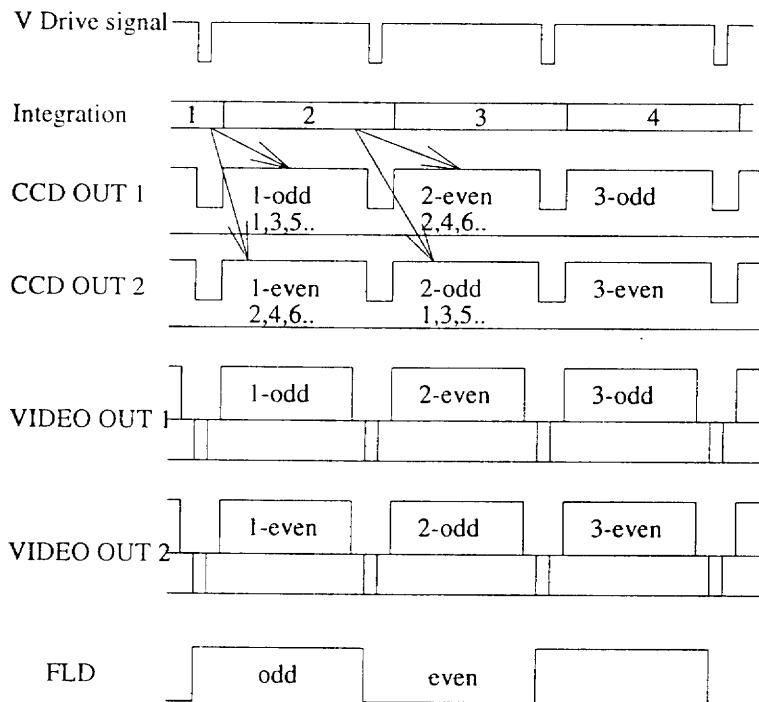
There are two kinds of output methods: interlaced (2 I) and non-interlaced (2 N).

Non-interlaced (2 N) : EIA: 518 lines/frame
 CCIR: 620 lines/frame

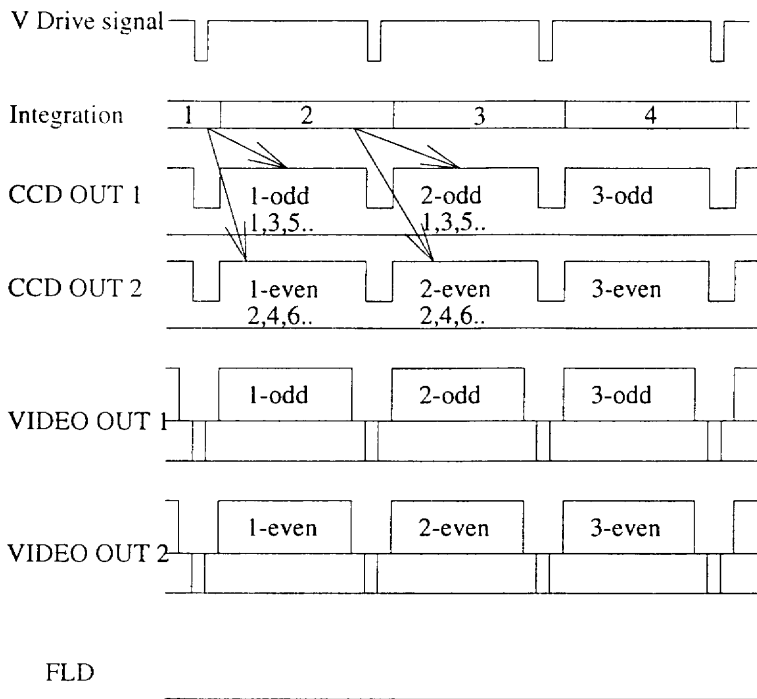
Frame output mode

The non-interlaced video data of all exposed pixels are output (Video 1 only) at one frame intervals.

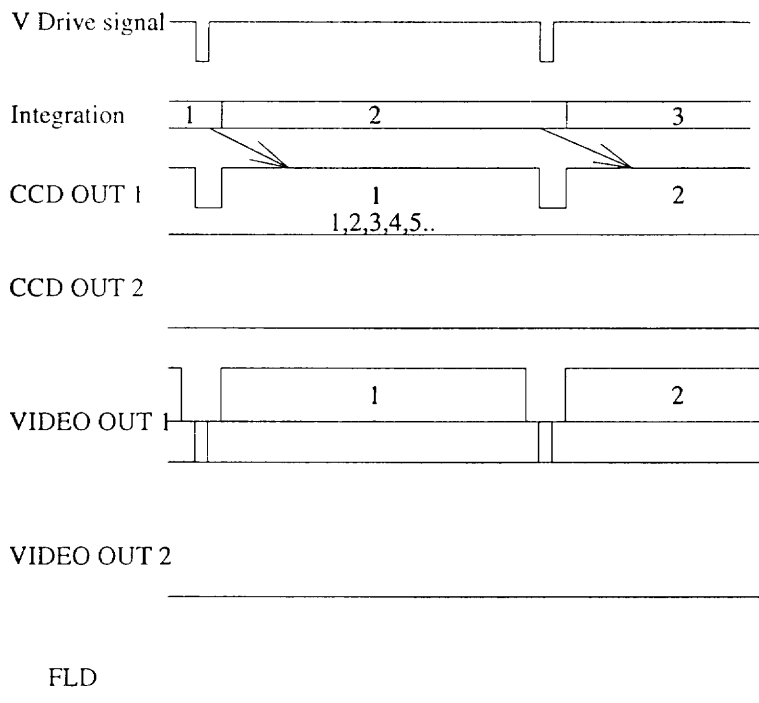
Interlaced (EIA: 1/60 s, CCIR: 1/50 s)



Non-interlaced (EIA: 1/60 s, CCIR: 1/50 s)



1/30 s (CCIR: 1/25 s) non-interlaced



10. External synchronization (2:1 interlaced)

When operating the camera by external drive signals, connect sync drive signals (HD,VD) to the DC IN/SYNC connector. When sync signals are supplied, the mode is automatically switched from the internal sync mode to the external sync mode.

• Input signals

HD and VD signals

HD EIA : $f(H)=15.734\text{kHz} \pm 1\%$

CCIR : $f(H)=15.625\text{kHz} \pm 1\%$

VD EIA : $f(V)=59.94\text{Hz}[f(V)=f(H) \div 262.5]$

CCIR : $f(V)=50\text{Hz}[f(V)=f(H) \div 312.5]$

• Input level

HD 2 to 6Vp-p, negative

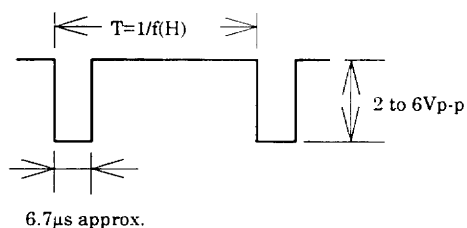
VD 2 to 6Vp-p, negative

• Input impedance

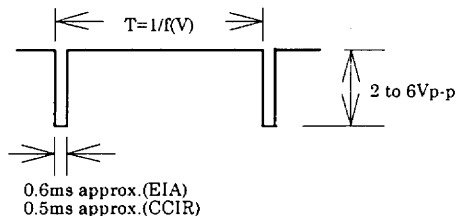
1k ohms

● Input waveforms

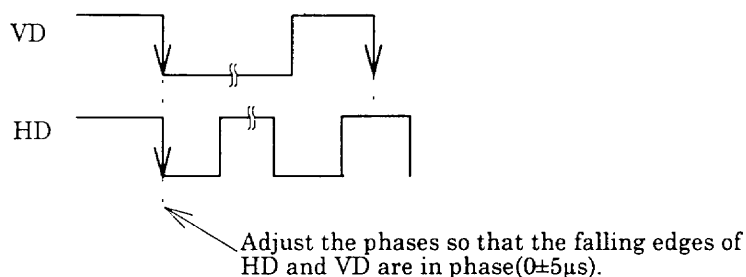
Horizontal drive signal(HD)



Vertical drive signal(VD)



Phase relationship between horizontal drive signal (HD) and vertical drive signal (VD)



11. Field on demand function

Field on demand refers to a function for picking up rapidly moving objects by applying a trigger pulse input at a desired timing to provide a desired or a fixed exposure time. The function is effective since the object is always taken at the same position in the picture.

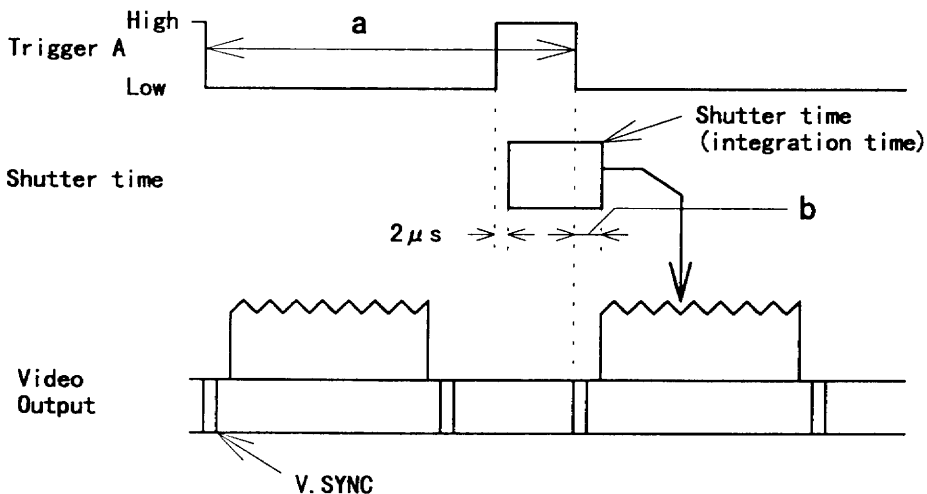
The camera is provided with four modes. Simultaneous odd and even field output and frame output can be produced for each of these modes. However, one image output is obtained per trigger.

This function is unavailable in the 2N mode.

One trigger mode

At a single trigger pulse input (Trig-A), exposure starts at the pulse rising edge and ends at the pulse falling edge. The vertical sync is reset and the video output is obtained immediately.

The pulse width equals the exposure time.



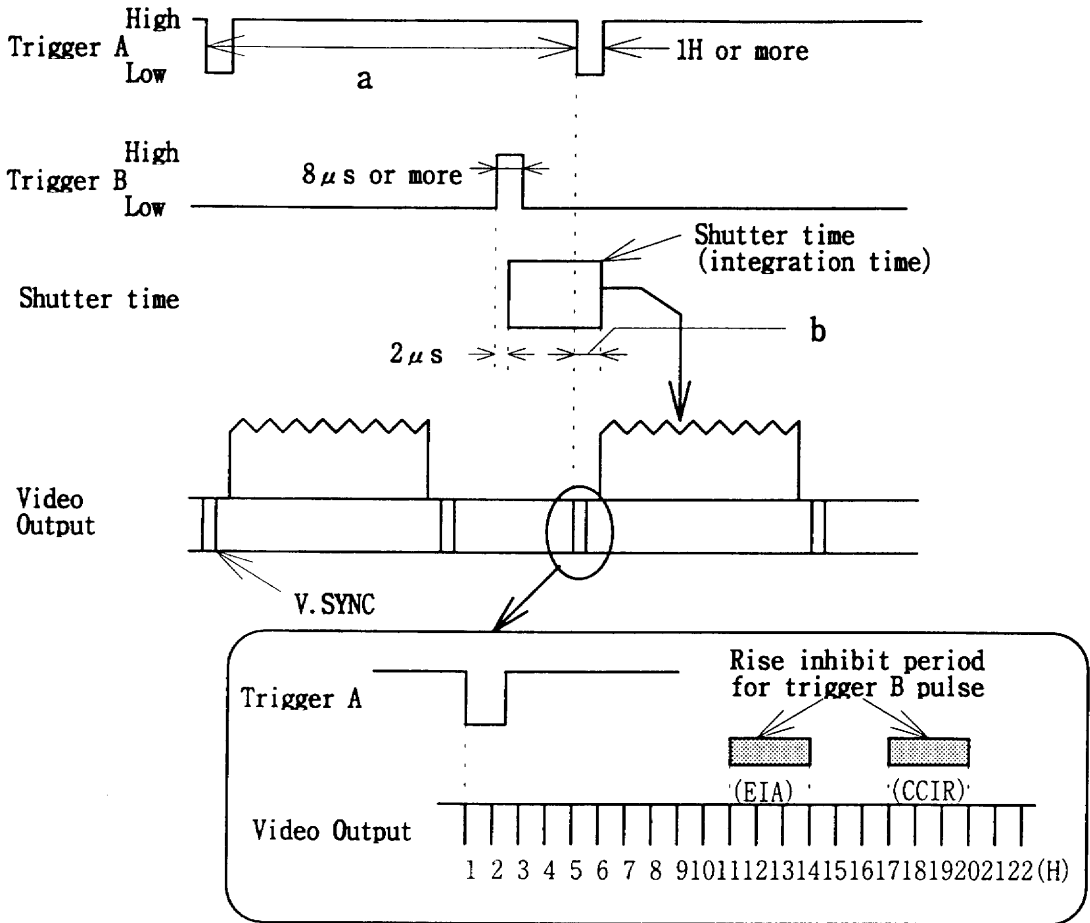
Trigger specifications

- 5V_{p-p} +0.5/-1.0V_{p-p}
- a: 2I: 1 field or more EIA : 16.7ms or more
 CCIR : 20ms or more
- 1N: 1 frame or more EIA : 33.4ms or more
 CCIR : 40ms or more
- b: 2I: 741.6 μs (EIA)
 1131.3 μs (CCIR)
- 1N: 1250.1 μs (EIA)
 2027.3 μs (CCIR)
- High period 8 μs or more

Note : Use a sync signal free of noise.

Two trigger modes

Two trigger pulses are input. Exposure starts at the Trig-B rising edge and ends at the Trig-A falling edge. The vertical sync is reset and the video output is obtained immediately. The interval between the two trigger pulses equals the exposure time.



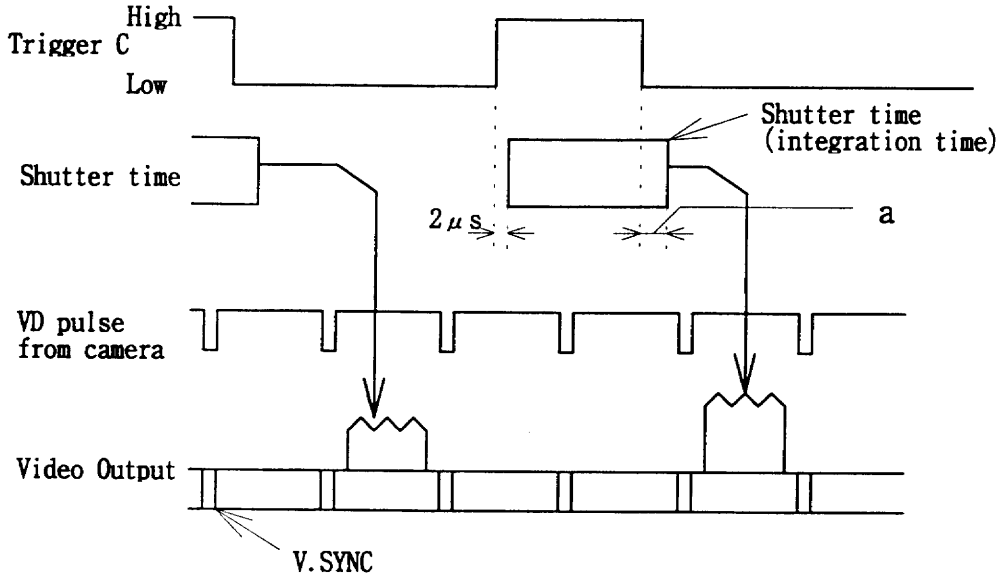
Trigger specifications

- 5Vp-p +0.5/-1.0Vp-p
- Trig-A Low Period : EIA 63.5 μs or more
- CCIR 64 μs or more
- a: 2I: EIA : 16.7ms or more b: 2I: 741.6μs(EIA)
- CCIR : 20ms or more 1131.3μs(CCIR)
- 1N: EIA : 33.4ms or more 1N: 1250.1μs(EIA)
- CCIR : 40ms or more 2027.3μs(CCIR)
- Trig-B Low period : Not specified
- High period : 8μs or more

Note : Use a sync signal free of noise.

Sync non-reset mode

At a single trigger pulse input (Trig-C), exposure starts at the pulse rising edge and ends at the pulse falling edge. The video output is obtained at the next field after the end of exposure. The pulse width equals the exposure time.



Note : Trigger input cannot be applied to fields of the video output where a picture is produced (a normal picture will not be obtained).

Use a sync signal free of noise.

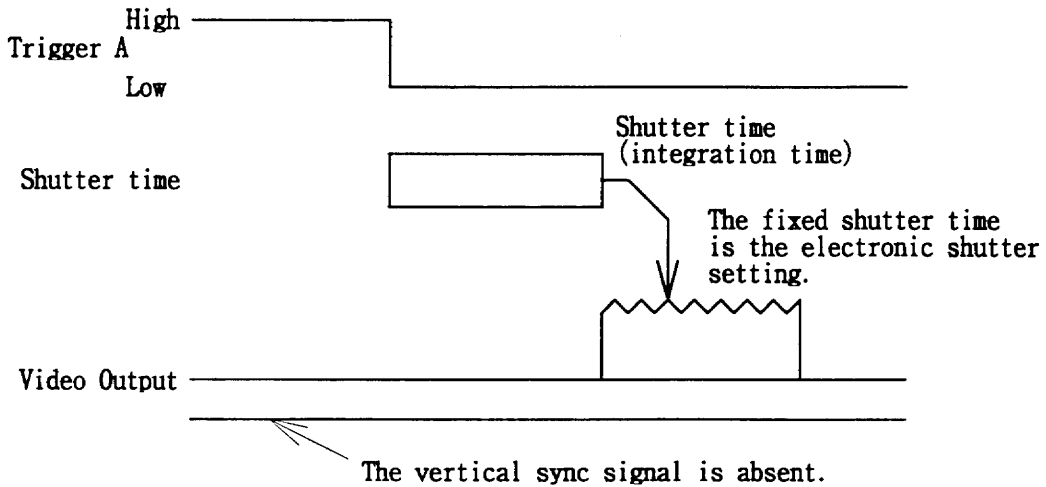
Trigger specifications

- 5Vp-p +0.5/-1.0Vp-p
- a: 2I: 741.6μs(EIA)
- 1131.3μs(CCIR)
- 1N: 1250.1μs(EIA)
- 2027.3μs(CCIR)
- High period 8μs or more

Fixed shutter mode

At a single trigger pulse input (Trig-A), exposure starts at the pulse rising edge. The exposure time is set by the camera electronic shutter switch. The video output is obtained immediately after the end of fixed exposure.

In this mode, the vertical sync signal is absent from the video output.



Note : Trigger input cannot be applied to fields of the video output where a picture is produced (a normal picture will not be obtained).

Use a sync signal free of noise.

Trigger specifications

- 5Vp-p +0.5/-1.0Vp-p
- High period 8 μ s or more

12. Non-interlaced operation

When non-interlaced external sync drive signals(HD/VD) are connected from an external unit, the mode is automatically switched to non-interlaced scanning mode.

When the following external sync drive signals are connected, the camera operates in the non-interlaced mode.

• Input signals

HD and VD signals

HD EIA : $f(H)=15.734\text{kHz} \pm 1\%$

CCIR : $f(H)=15.625\text{kHz} \pm 1\%$

VD EIA : $f(V)=f(H) \div (262 \pm 2)(\text{Hz})$

CCIR : $f(V)=f(H) \div (312 \pm 2)(\text{Hz})$

• Input level

2 to 6Vp-p, negative

• Input impedance

1k ohms

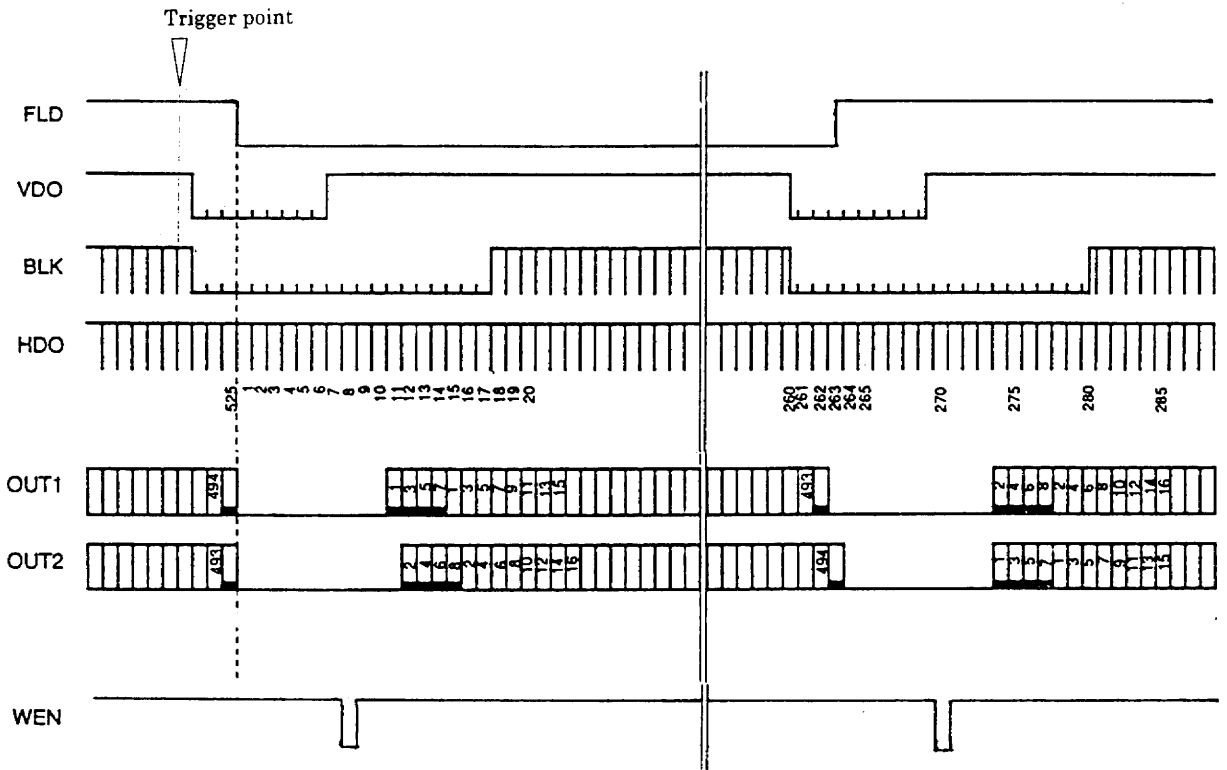
• Waveforms of external drive signal (non-interlaced scanning).

The waveforms are the same as those of 2:1 interlaced external sync drive signals.

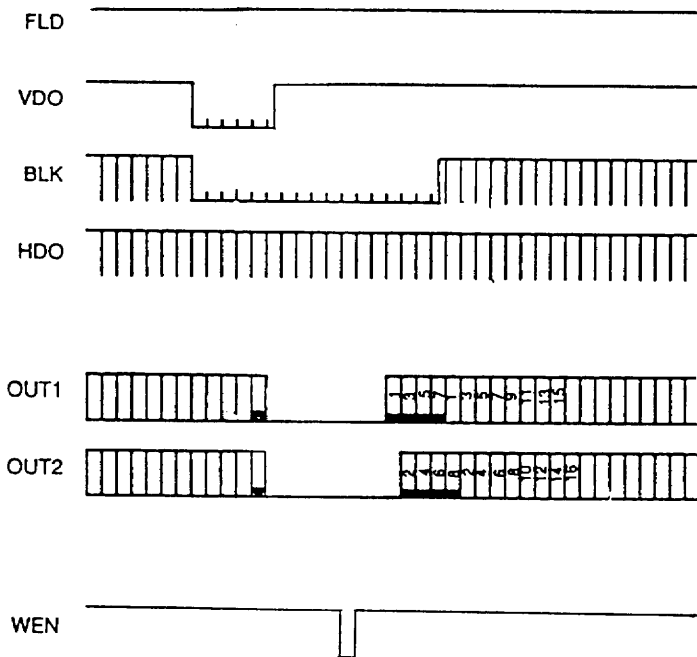
13. Timing diagrams

● EIA

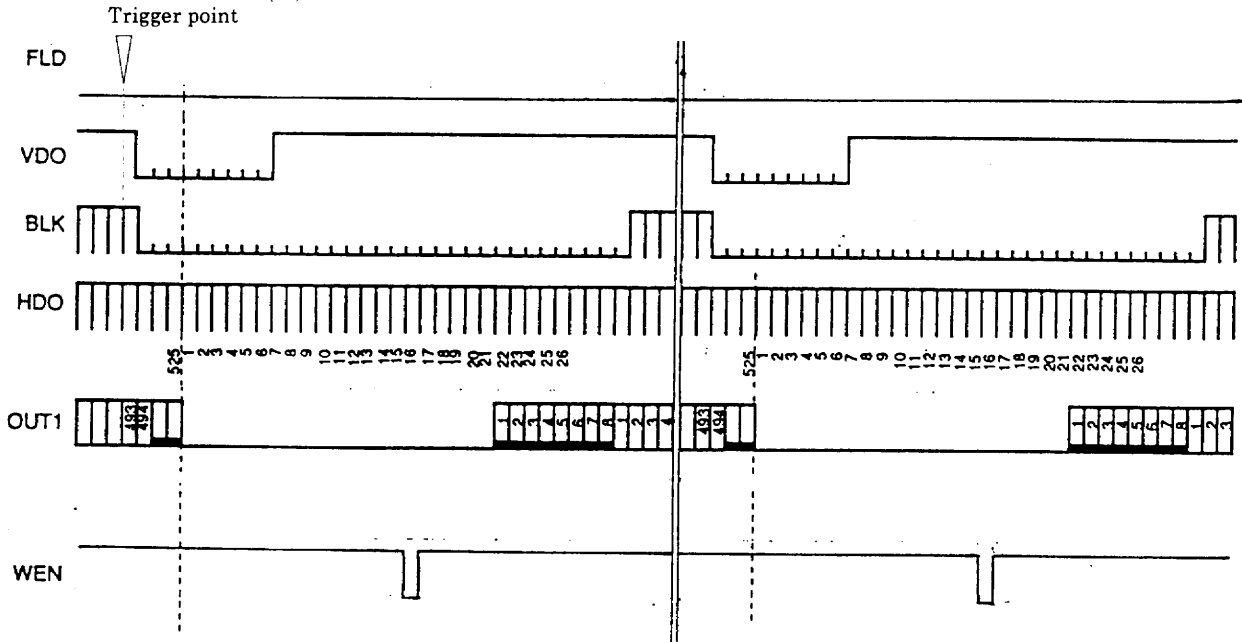
· 1/60sec interlace(V)



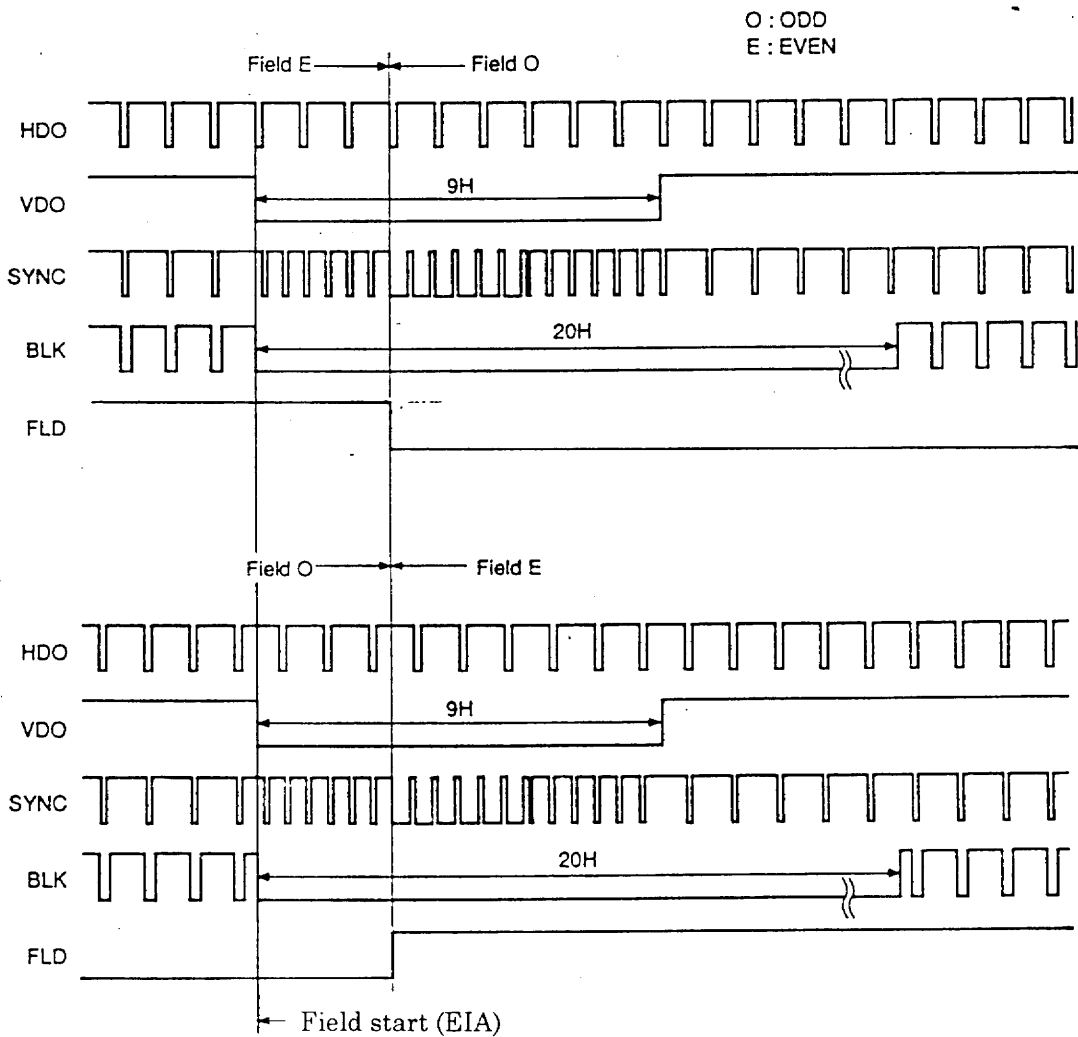
· 1/60sec non-interlace(V)



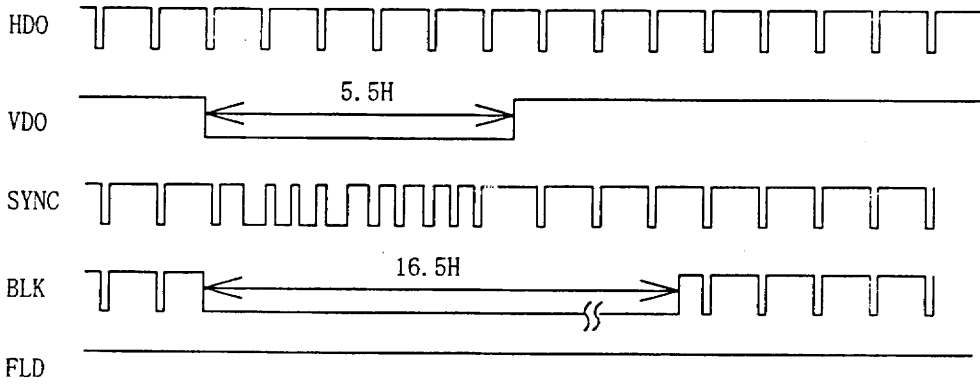
· 1/30sec non-interlace(V)



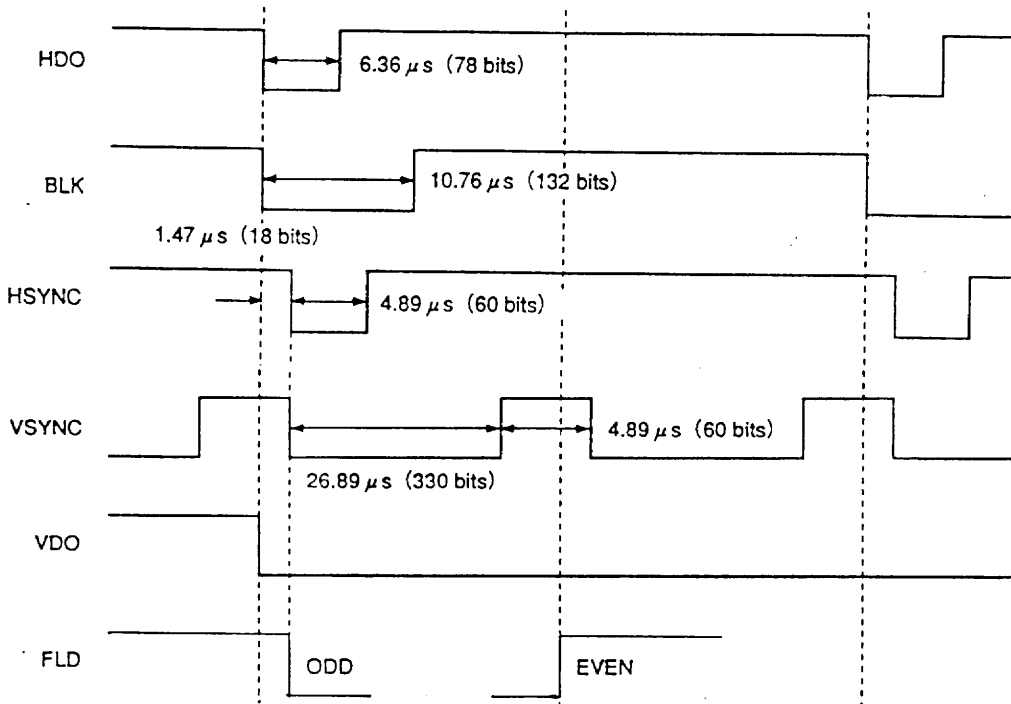
· SG vertical (1/60sec, 1/30sec)



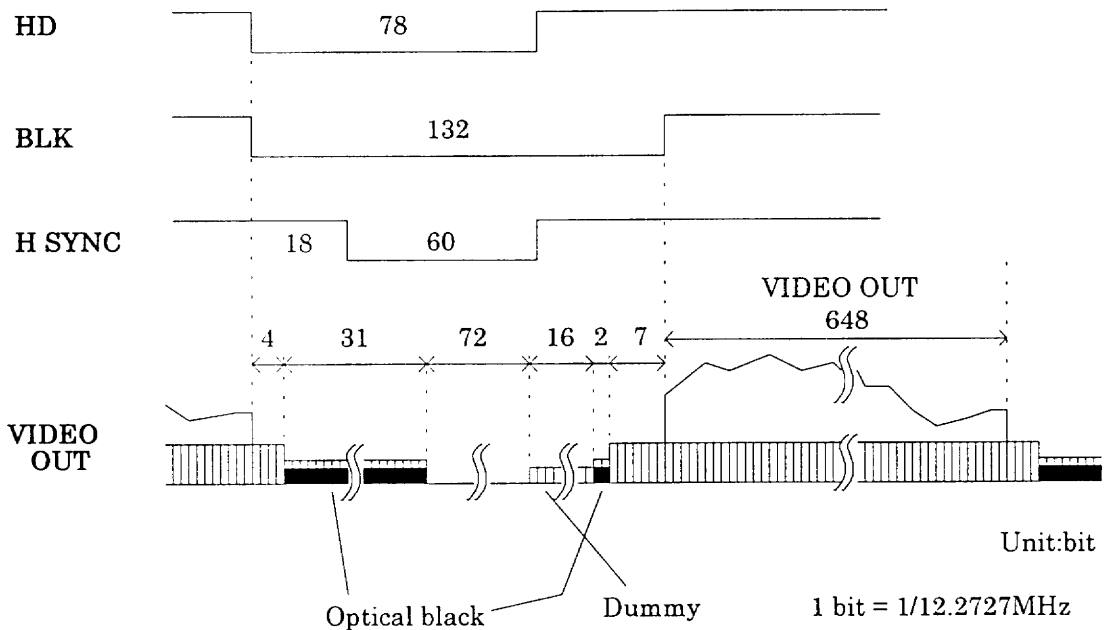
· SG vertical (1/60sec non-interlace)



· SG horizontal

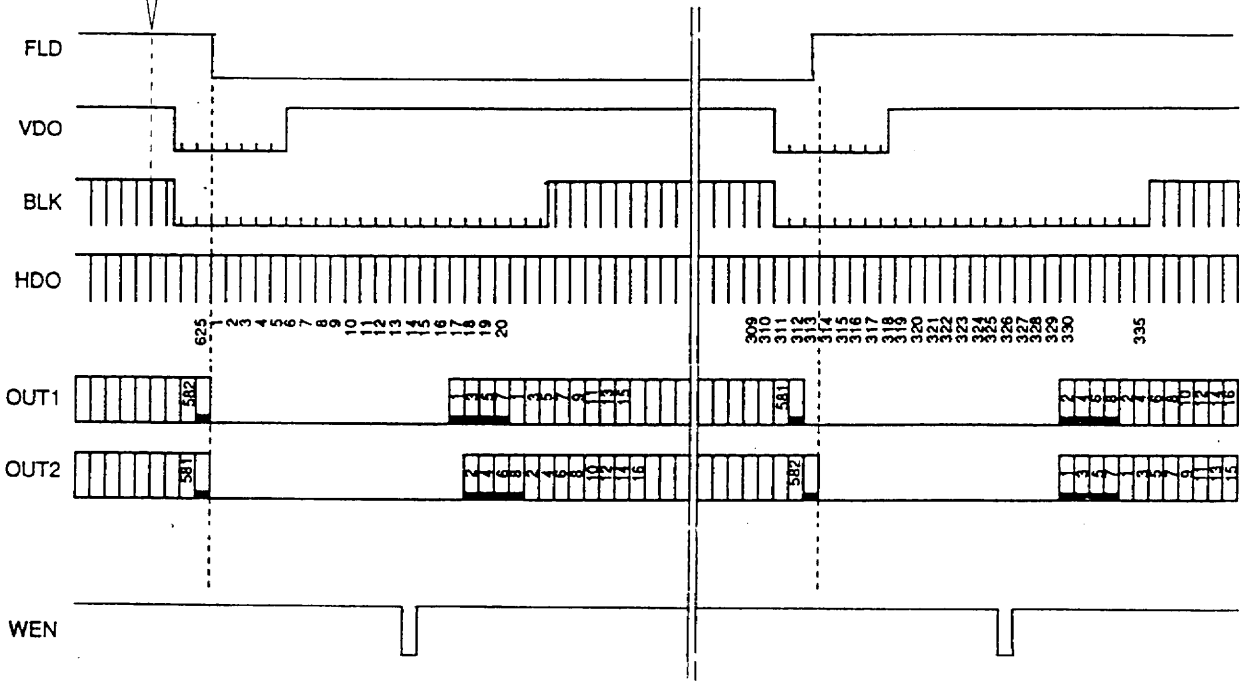


· Horizontal

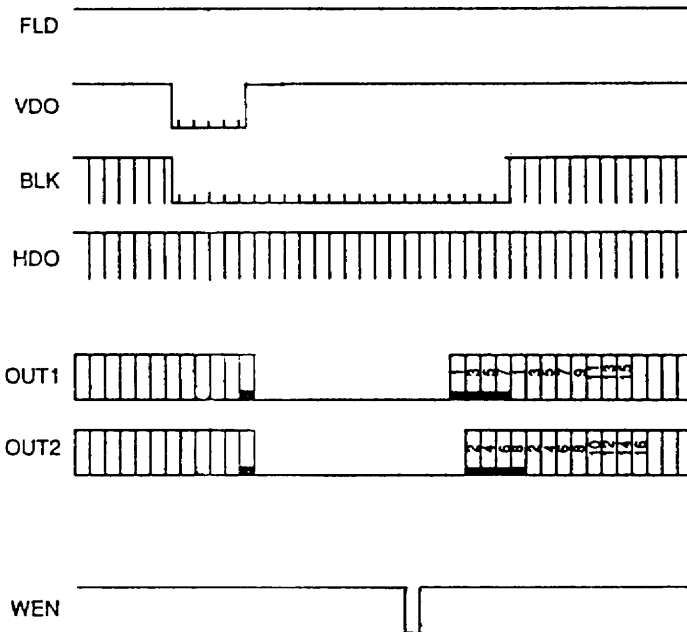


● CCIR

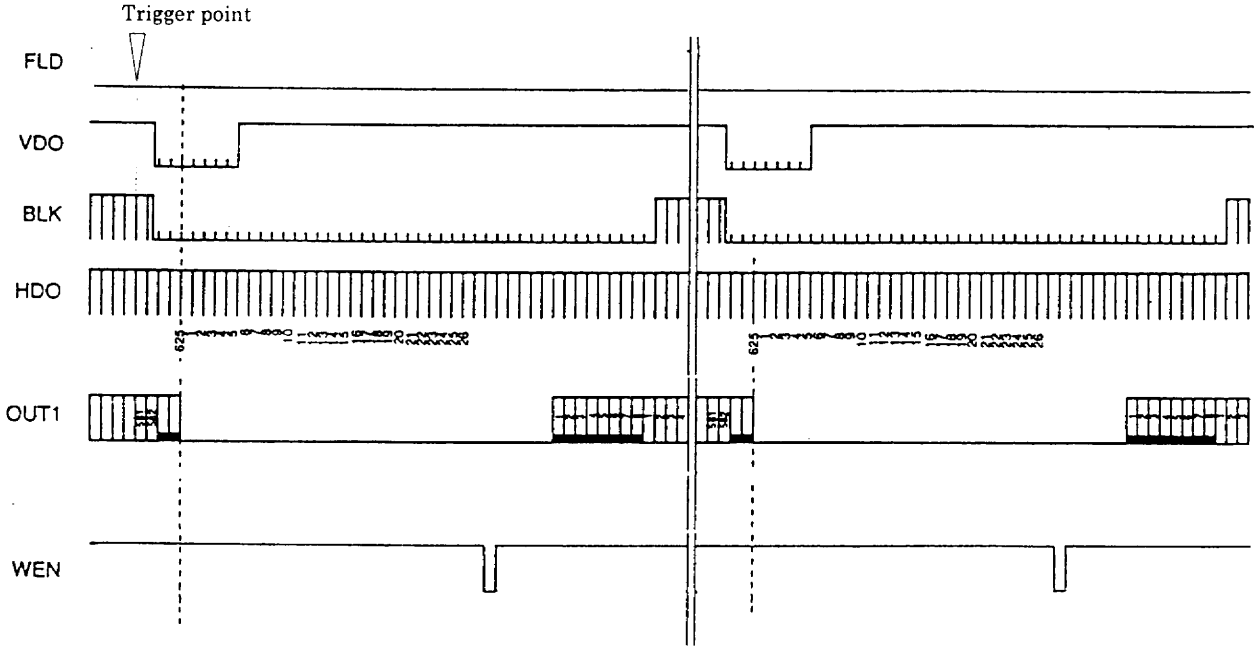
· 1/50sec interlace(V)
Trigger point



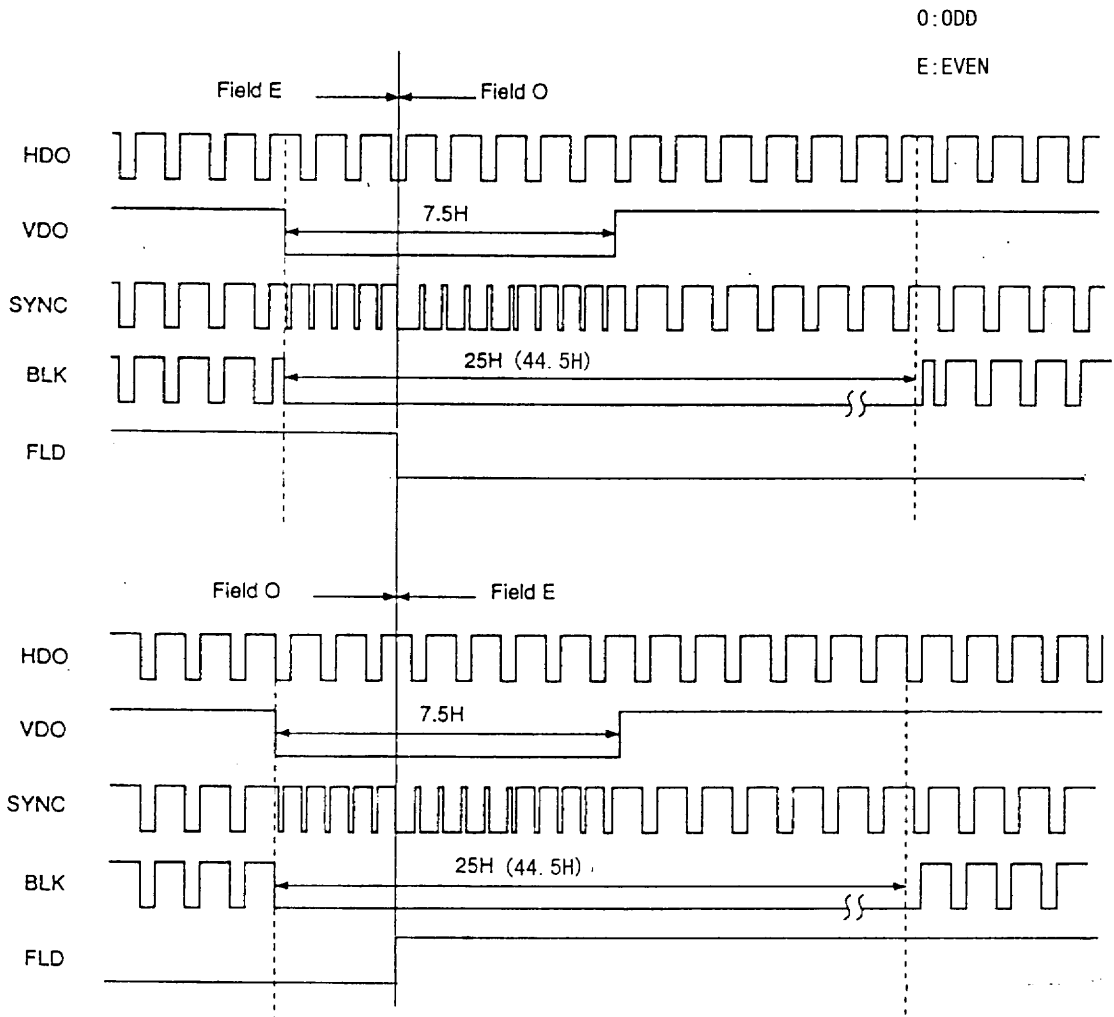
· 1/50sec non-interlace(V)



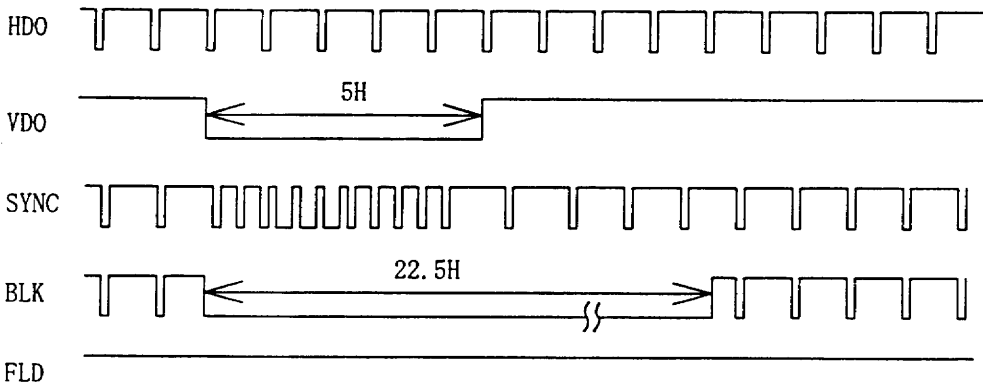
· 1/25sec non-interlace(V)



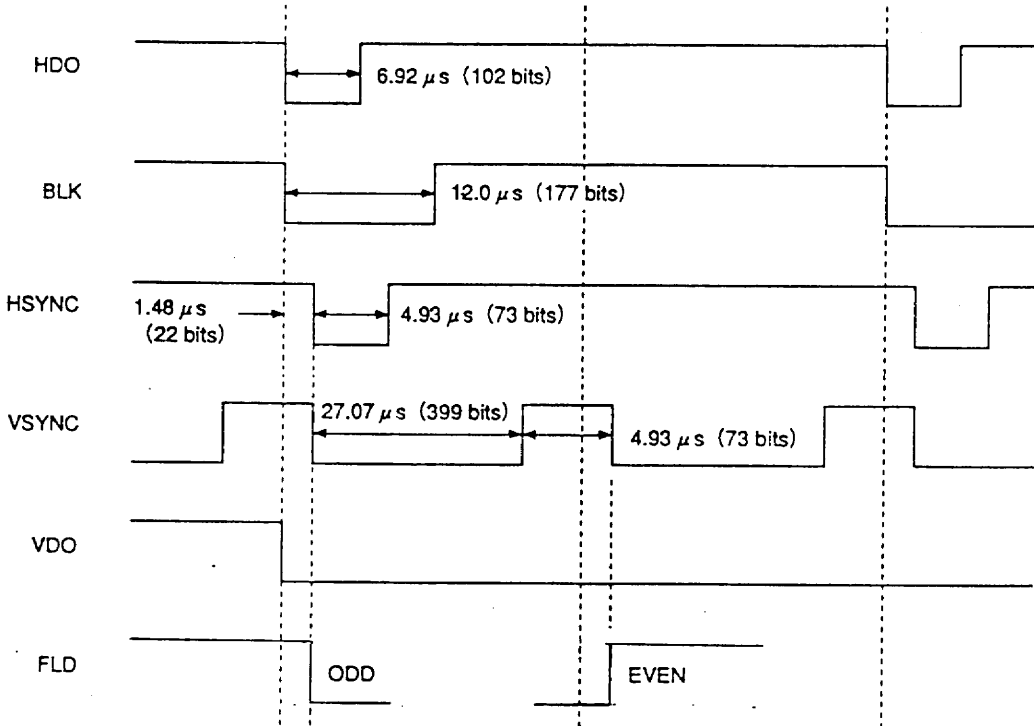
· SG vertical (1/50sec, 1/25sec)



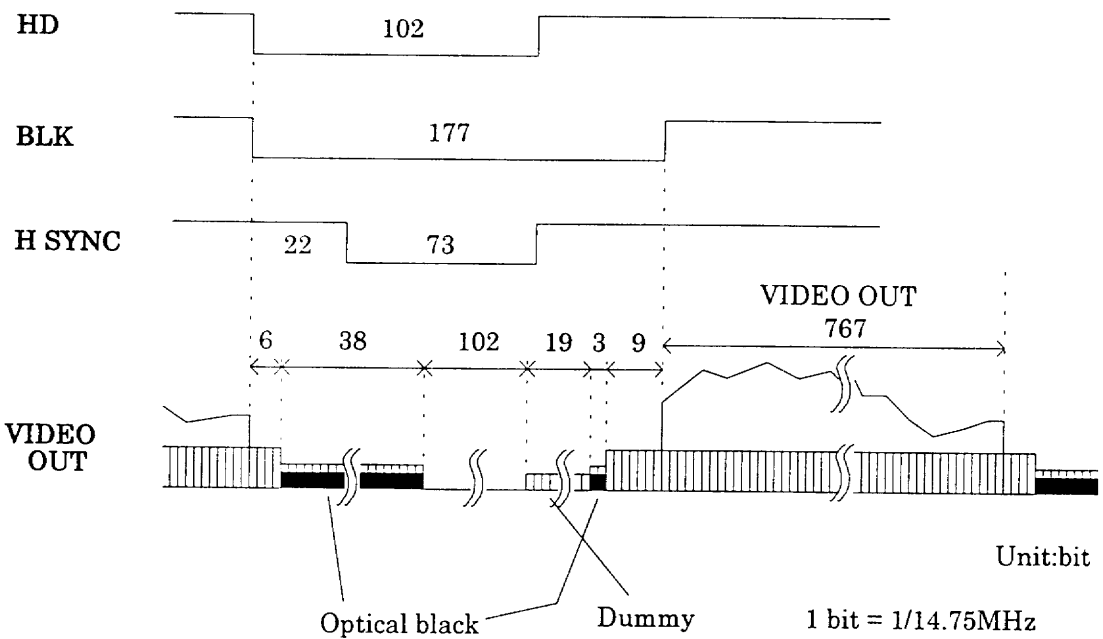
· SG vertical (1/50sec non-interlace)



· SG horizontal

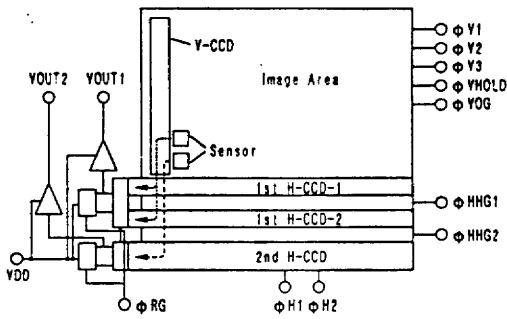
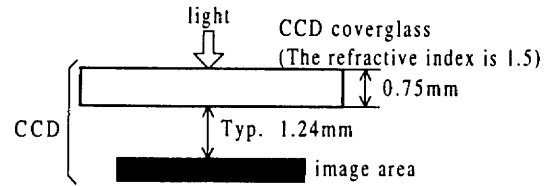


· Horizontal

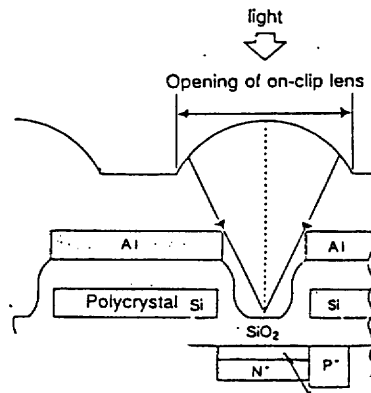


14. Image sensor

- 1/2 inch interline, all-pixel read out type CCD
- Total pixel number : EIA 692(H)×504(V) CCIR 823(H)×592(V)
- Effective pixel number : EIA 659(H)×494(V) CCIR 782(H)×582(V)
- Imaging area : EIA 6.52(H)×4.89(V)mm CCIR 6.49(H)×4.83(V)mm
- Pixel size : EIA 9.9(H)×9.9(V) μm CCIR 8.3(H)×8.3(V) μm
- Equivalent aperture size per pixel : EIA about 6(H)×6(V) μm CCIR about 5(H)×5(V) μm

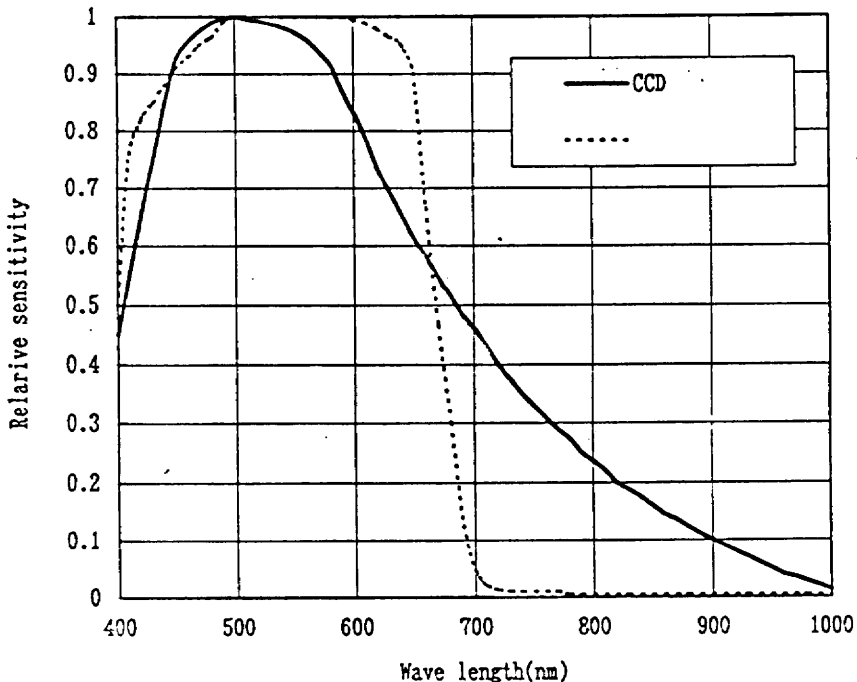


CCD block diagram



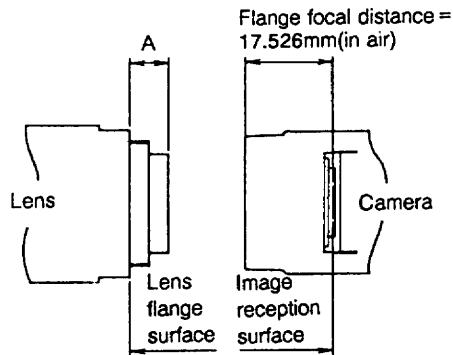
Face plate cross section

- Spectral response (lens response included, optical source response excluded)



15. Optical system

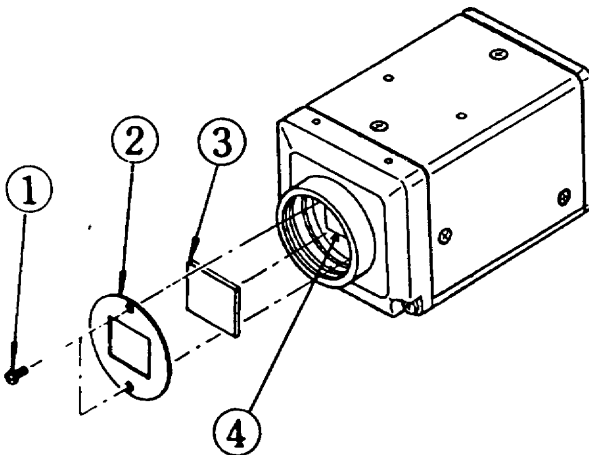
● Flange focal distance



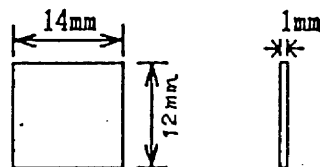
Note : Flange focal distance cannot be adjusted.

● How to remove the IR cut filter

- 1) Remove two screws, and filter holder ② will come off.
- 2) Remove the IR filter ③ from filter frame ④.
- 3) Then reinstall and secure filter holder ② with two screws ①.



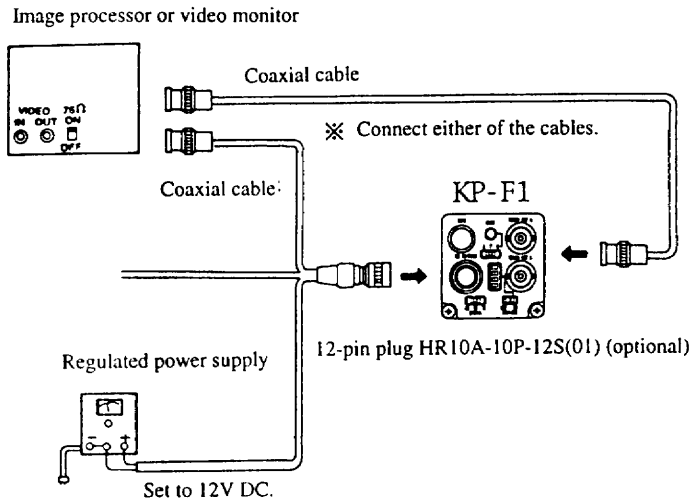
IR cut filter IRC650
Dimensions : 14×12×1.0t
Part code : XMD0006



External view

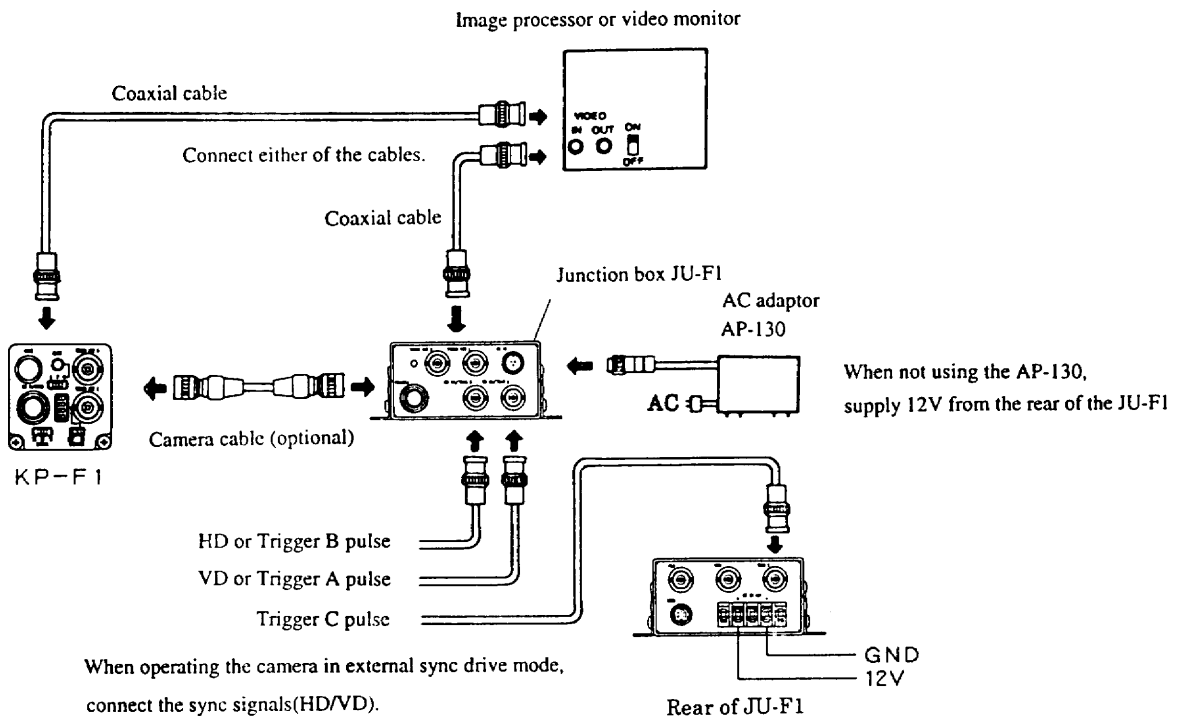
16. How to connect cables

16.1 Basic connection



- Set on 75 Ω termination switch only of the end monitor when plural monitors are connected in loop-through.
- Supply HD and VD pulses to the KP-F1 for external sync drive.
- Use stable external power supply within 11 ~ 13V DC free from ripples or noises.
- Make sure voltage polarity before connecting external power supply.

16.2 Connection of options

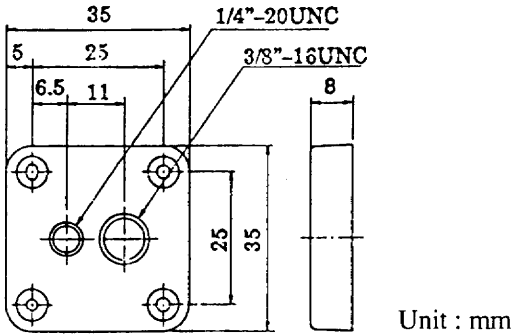


- Read operation manual of the AP-130 before use it

17. Options

● Tripod adaptor TA-M1

Product code : 23855AX



Mount on tripod hole B or C of the camera.

Use supplied M2×5 four screws.

Caution :

Excessive length screw may damage the camera.

Make sure screw long the before using.

Unit : mm

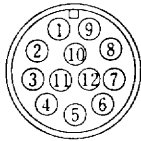
● Plug

HR10A-10P-12S(01)

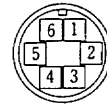
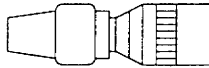
Product code : 23810AX

HR10A-7R-6P(01)

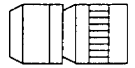
Part code : JMH0092



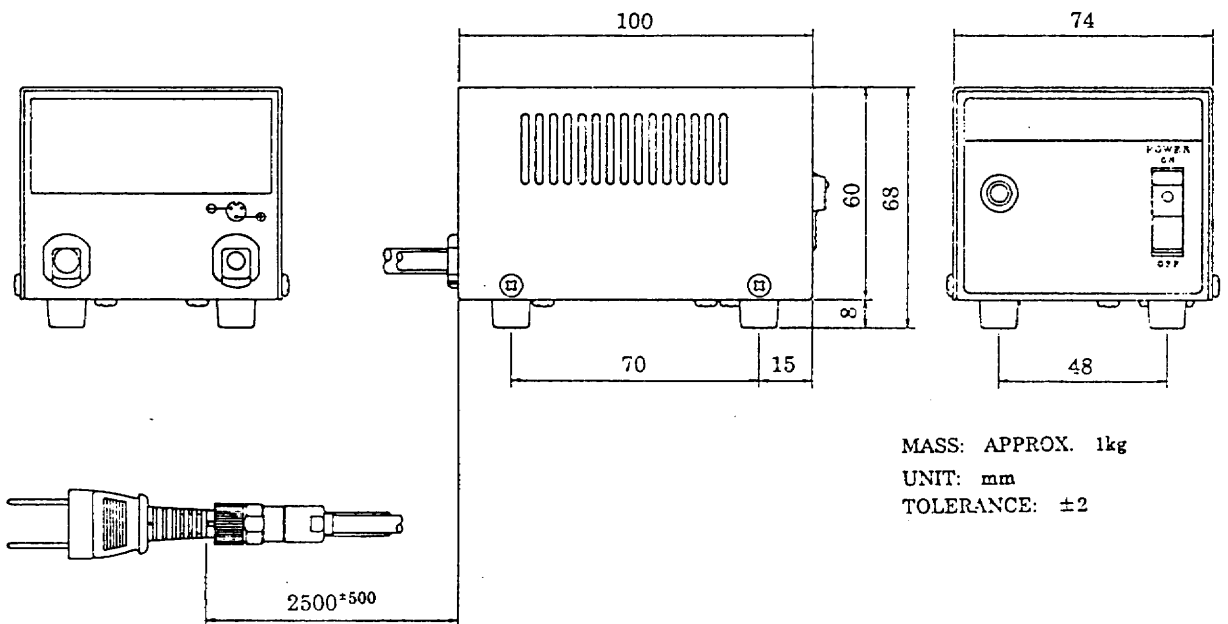
Viewed from this side



Viewed from this side



● AC adaptor AP-130 Product code : 23805JX



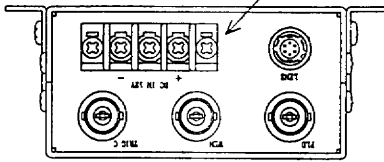
MASS: APPROX. 1kg

UNIT: mm

TOLERANCE: ±2

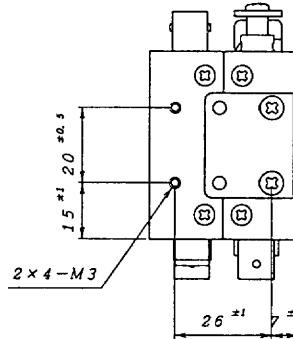
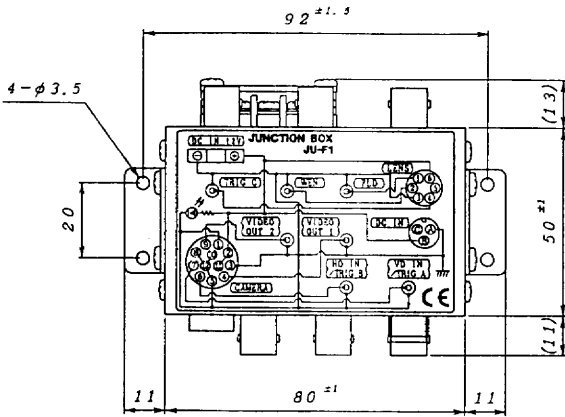
● Junction box JU-F1 Product code : 23832AX

Connect power supply to these terminal when the AP-130 is not used.

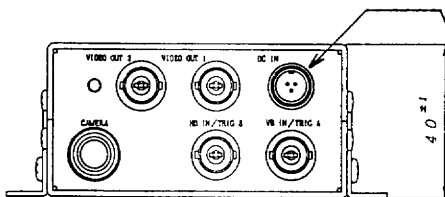


Notes :

- Supply voltage ranged 11 to 13 V.
- Make sure voltage polarity before connection of an external power supply.
- Use an external power supply other then the AP-130 at your own risk.

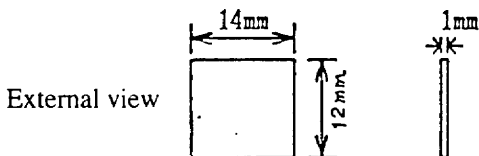


MASS : APPROX. 200g
UNIT : mm



Connects the AC adaptor AP-130

● Dummy glass (AR coated) (ARC1214) Part code: XMD0009

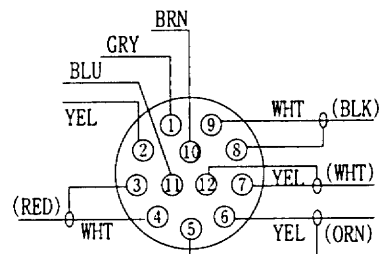


● Camera cable

	Assy type	Mould type
2m	C-201KS (23856AX*)	C-201KMS (23861AX*)
5m	C-501KS (23857AX*)	C-501KMS (23862AX*)
10m	C-102KS (23858AX*)	C-102KMS (23863AX*)

*Product or part code

Mould type: Produced upon request.



Pin arrangement

● Trigger cable

	Assy type
2m	C-201RK (23864AX*)
5m	C-501RK(23865AX*)

*Product or part code.

Standard type: Pin5 and pin6 are not used.

● Attenuation of video signal due to used cable

Attenuation due to optional cables C-501KS and C-102KS is shown below.

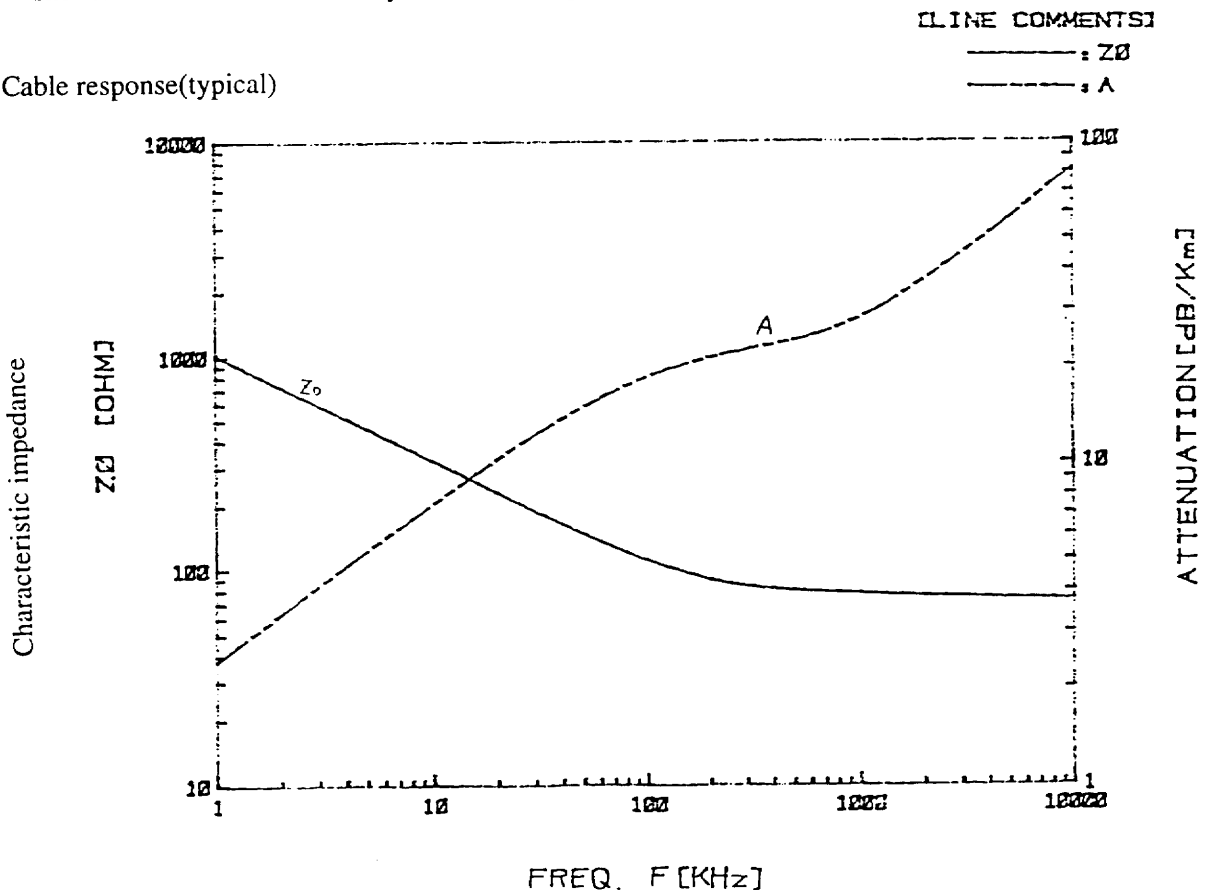
Attenuation is proportionate to the cable length.

Characteristic impedance is kept at constant even at cable length change.

	Cable length	Attenuation at 4MHz	Attenuation at 7MHz
		50dB/Km	70dB/Km
Attenuation due to cable length(dB)	1m	0.05	0.07
	2m	0.1	0.14
	5m	0.25	0.35
	10m	0.5	0.7

The video bandwidth obtained by the KP-F1 is up to approximately 7MHz.

Cable response(typical)



HITACHI DENSHI (Europa) GmbH

Weiskircher Str. 88

63110 Rodgau, Germany

T. 06106-6992-0

Fax 06106-16906

http://ourworld.compuserve.com/homepages/Hitachi_Denshi

E-Mail: 100443.2014@compuserve.com