

BE-IR10  
Black and White Board Camera  
Application Guide

Hitachi Denshi, Ltd.

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## 1. General

Thank you very much for your purchase of Hitachi BE-IR10 Black and White Board Camera.

Prior to using this camera, read this manual carefully.

## 2. Composition

- 1) Black and white board camera, BE-IR10 ..... 1
- 2) Interface cable ..... 1

Note : The interface cable is not included in the standard composition except for the sample camera.

Order the interface cable separately after determining the cable length.

## 3. Notes to users

### 3-1 Power supply

- Connect a 12V DC voltage (11 to 13V) from an external regulated DC power supply.
- The current capacity should be more than 300mA.
- Prior to turning on the power switch, check that the polarities of the power cable are correct, referring to the connection diagram (Fig.4).

### 3-2 To protect CCD sensor

- Do not touch the glass surface of the CCD sensor to avoid deterioration in picture quality due to dirt and scratches.
- If the glass surface of the sensor should become dusty or dirty, remove dust or dirt carefully with a cotton-tipped applicator. Do not wipe the surface with dry cloth or paper tissue to avoid possible damage to the glass surface by static electricity.

### 3-3 Protection of camera

- Do not use or store the camera under direct sunlight, at a place exposed to rain or snow, or at a place where flammable or corrosive gas is present.
- When housing the camera in a camera case, use the utmost care for the rise of internal temperature. When casing the camera, the temperature normally rises by 10 to 20°C, compared with the outside air temperature. The camera operates in the temperature ranging from -10 to 50°C. If the camera is used or left in high temperature environment for hours, the life of the camera may be shortened. When using the camera continuously for hours, avoid installing the camera in a high temperature environment or high humidity environment to prevent a failure.
- Do not drop the camera. Do not apply strong shock or vibration to the camera.
- Before connecting or disconnecting a connector, turn off the camera and be sure to hold connector body to connect or disconnect the connector.

### 3-4 Installation of plural cameras

When several cameras are installed very close with each other, they may interfere with each other to cause noise. When it is needed to install plural cameras, install them apart from each other or operate them on an external sync signal.

(For external sync operation, an optional unit is needed : This unit is now under development.)

4. Name of each section

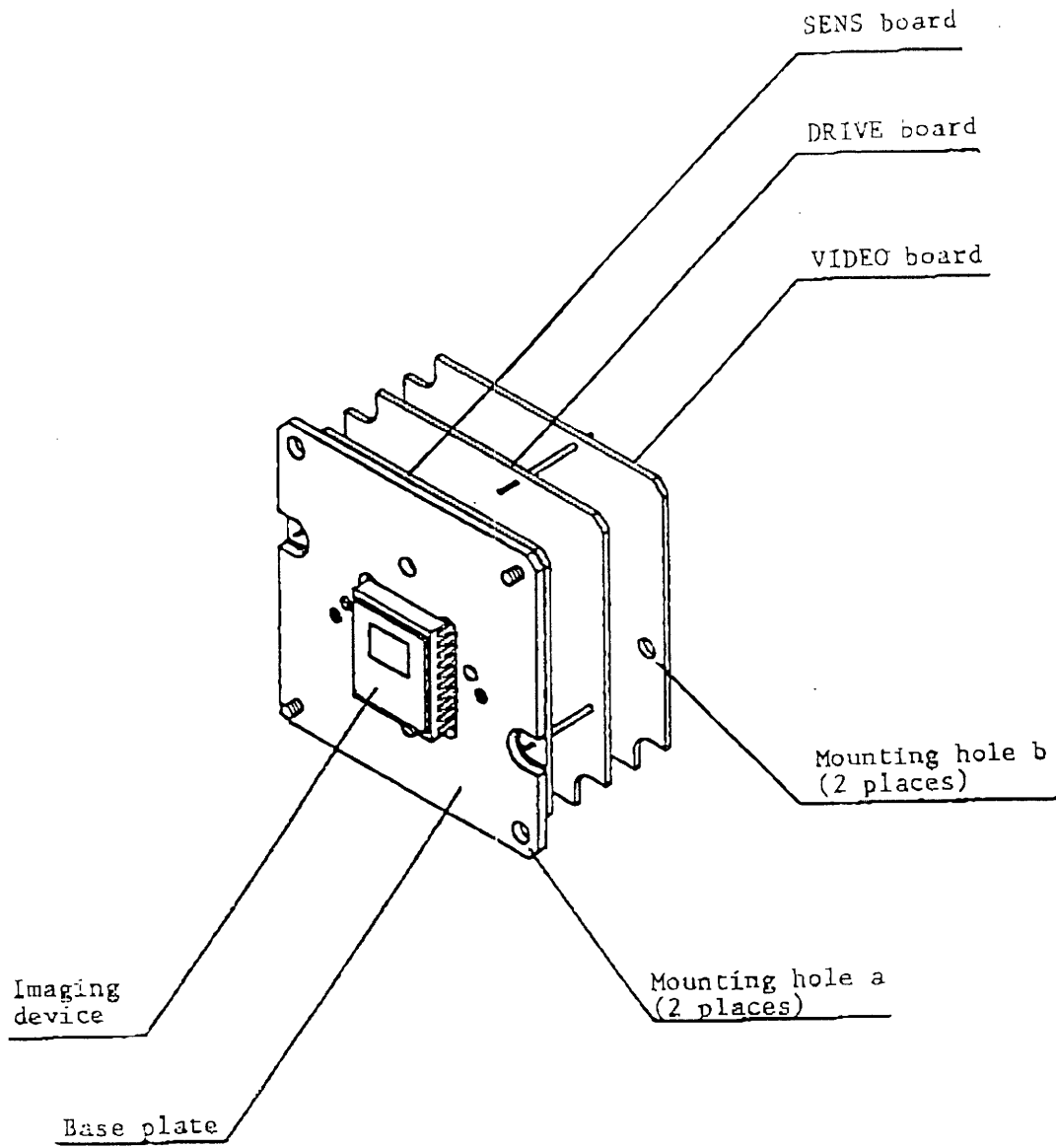


Fig. 1

## 5. Installation

When connecting or disconnecting a connector, use care not to apply excessive force to the printed circuit board. When the board is warped, soldering may be peeled off or chip components may be broken.

5-1 To install the camera to a housing or equipment, use the holes in the base plate (SENS board) or the VIDEO board.

- 1) When the camera is fixed, using two holes a in the base plate (SENS board), use M2.6 screws.
- 2) When the camera is fixed, using two holes b in the VIDEO board, use M2.6 screws.

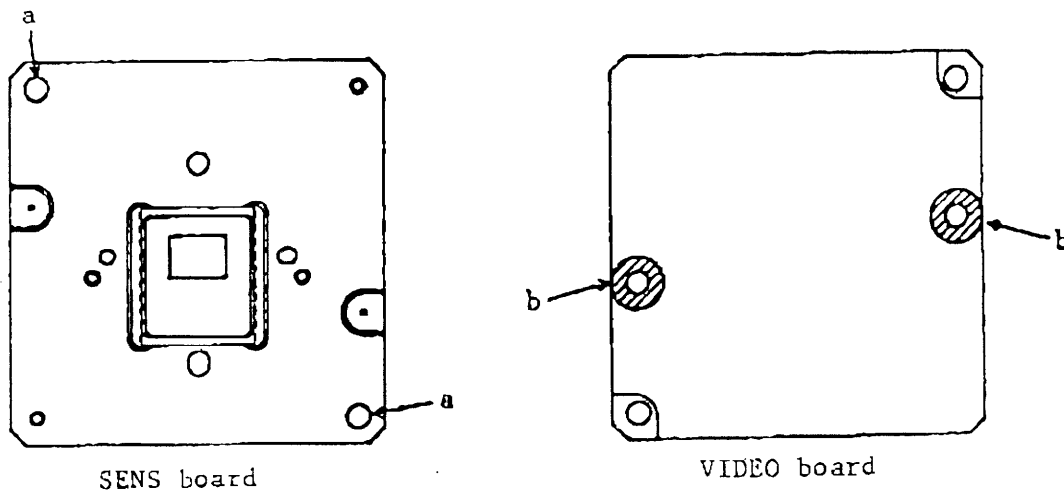


Fig. 2

5-2 The tip of the screw (fixing the base plate and the SENS board) is protruded by 1.2mm(max.) from the base plate.

Use care not to allow the protruded screw to touch a housing or equipment.

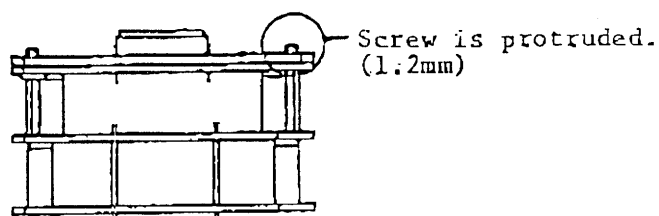


Fig. 3

6. Typical connection

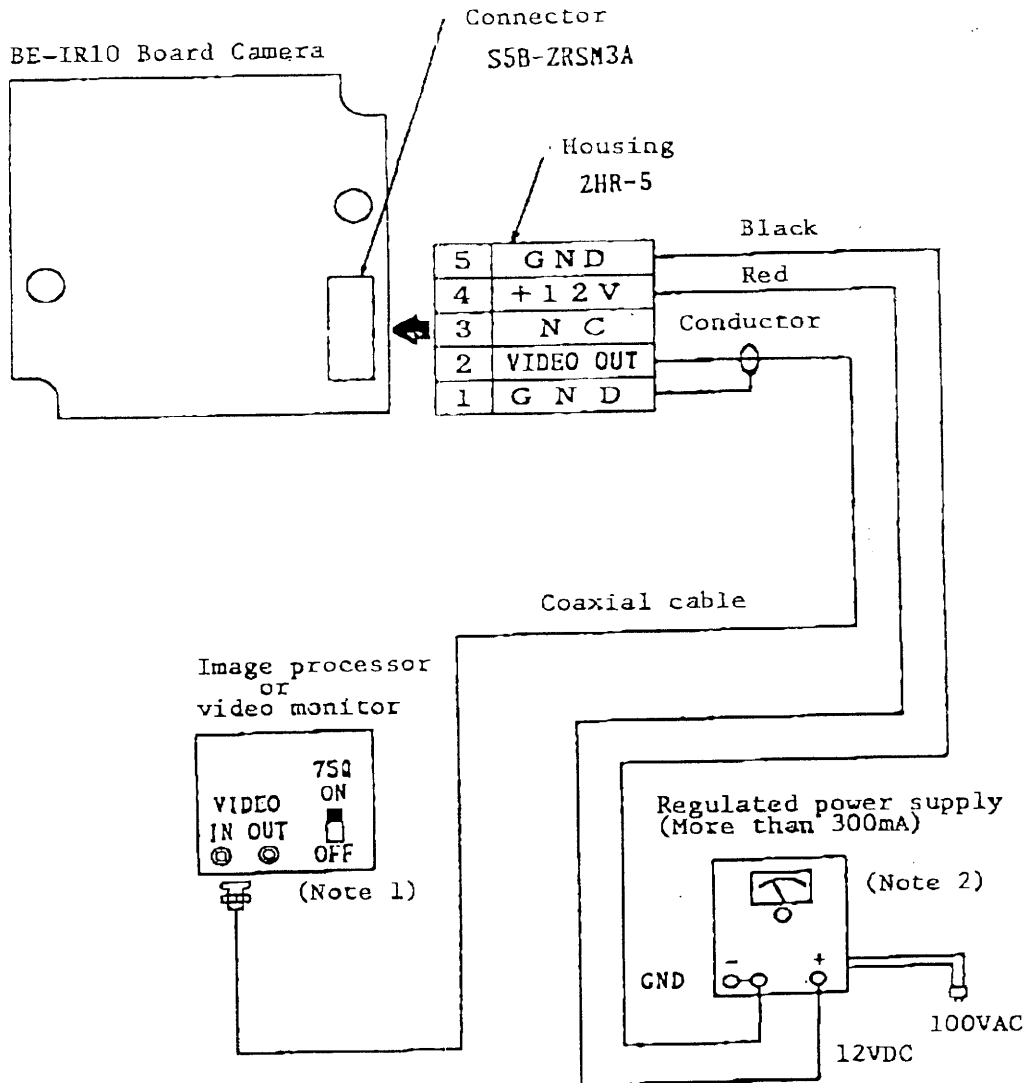


Fig. 4

Note1 : When more than one video monitor is connected in series, set the 75Ω termination switch on the last unit to ON.

Note2 : · Supply voltage range : 11 to 13V  
 · Be sure to check the polarities of the power source before turning on the external DC power supply.

## 7-2 Video gain

The gain mode of this camera can be switched to the AGC mode.

The camera is placed in the normal gain mode at the factory.

(1) Normal gain mode (0dB)

Video gain is constant.

(2) High gain mode (6dB)

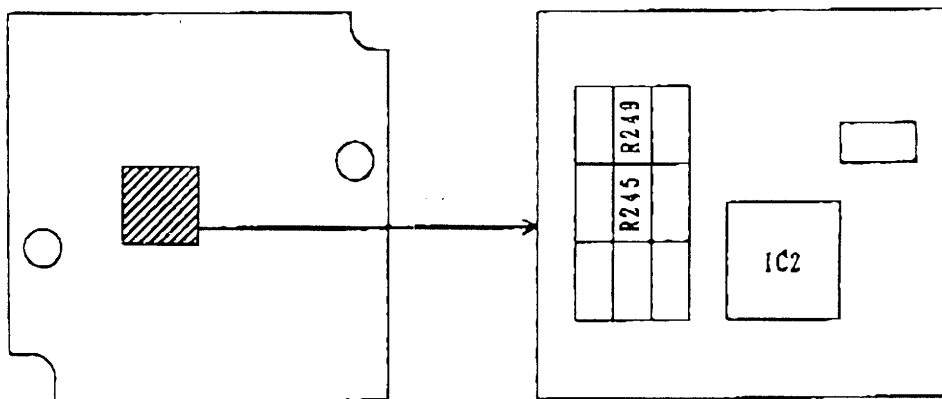
Video gain is increased by 6dB at all times.

The gain modes can be switched by installing and removing chip resistors as listed below.

Table 2

Video gain	R245	R249
* Normal gain (0dB)	Not used	0Ω
High gain (6dB)	0Ω	Remove
AGC	Not used	Remove

\* Set at the factory



VIDEO board (sideA)

Fig. 6 Location of related chip resistors

(3) AGC mode

When the illumination on the CCD imaging face becomes lower than the specified level, gain automatically increases.



7-3 White suppress function and dynamic white suppress function.

The white suppress function and the dynamic suppress function can be switched to obtain an optimum picture.

(1) White suppress function

Use this function when bright portion exists in a scene.

(2) Dynamic white suppress function

Use this function to shoot a highly contrasted scene.

Switching is made by installing and removing chip resistors as listed below.

Table 3

	R227	R228
Dynamic white suppress function "ON"	Not used	0Ω
White suppress function "ON"	Not used	Remove
Bath functions "OFF"	0Ω	Remove

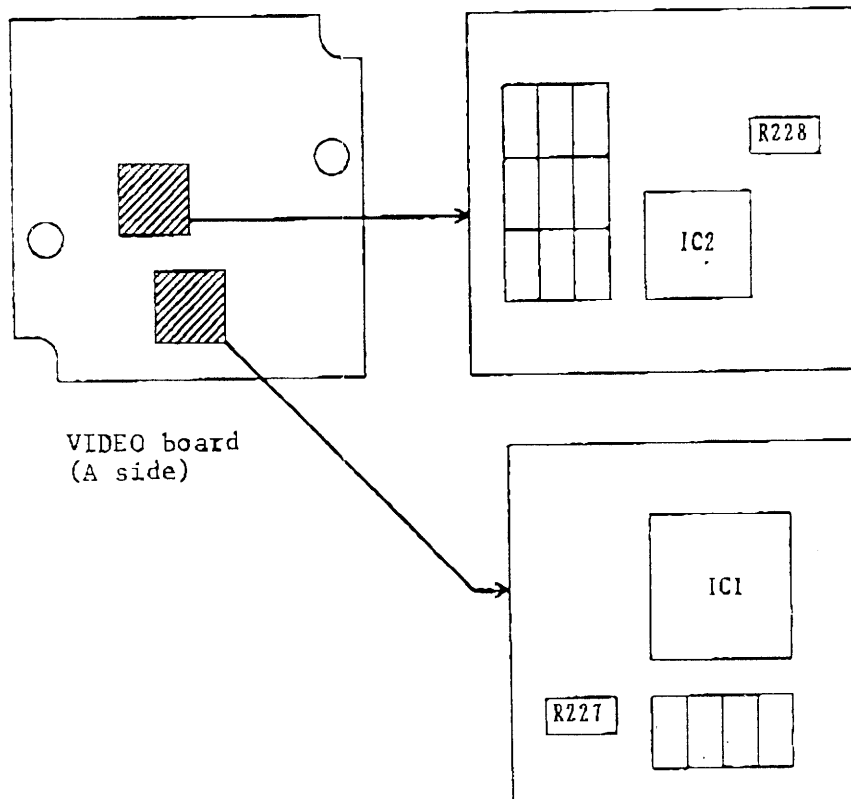


Fig.7 Location of related chip resistors

8. External view

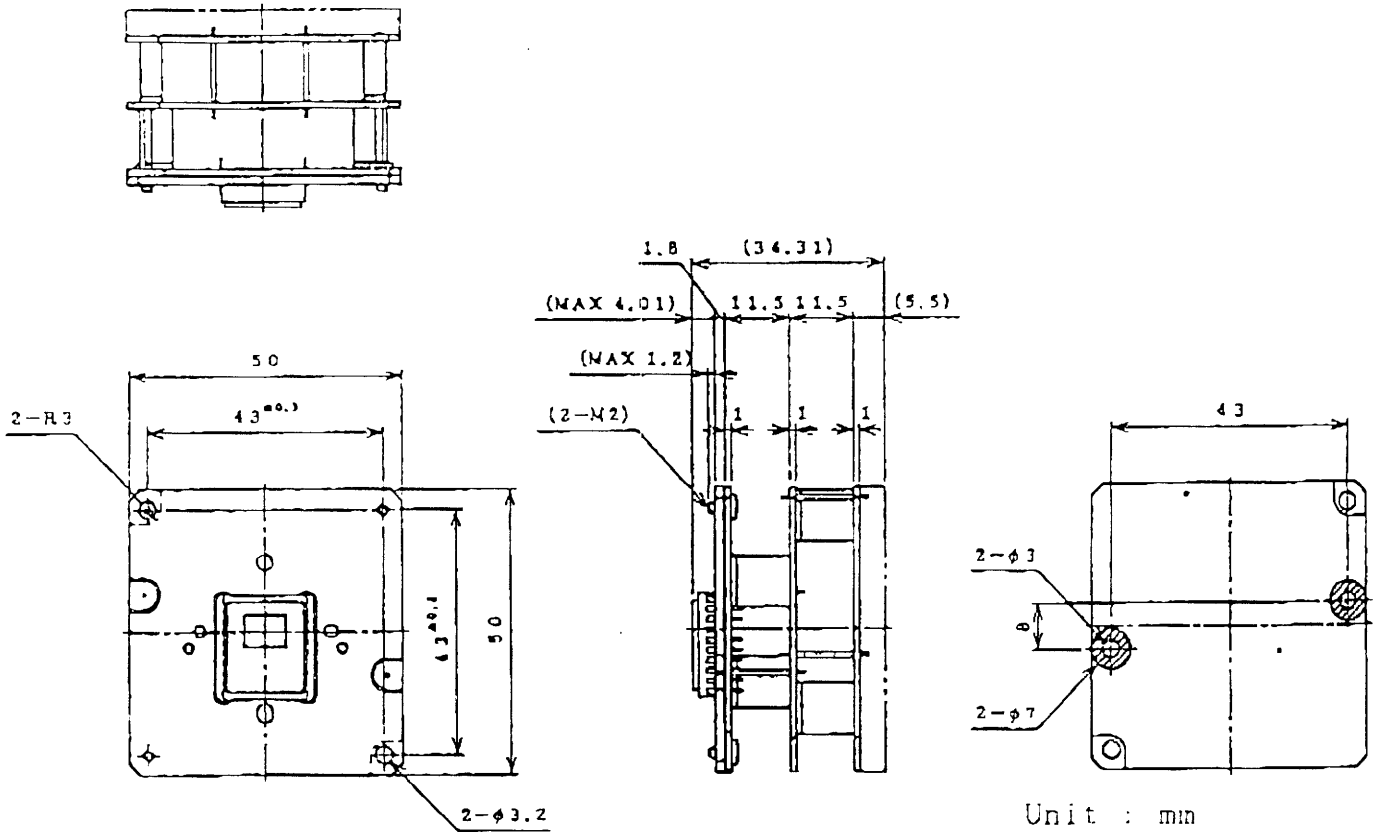
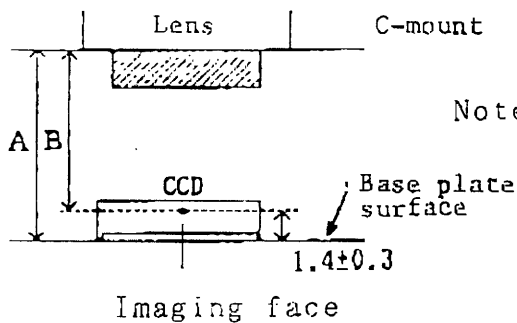


Fig. 8 Dimensions

Extension of optical path due to the thickness of CCD glass is considered.



Note : Distance from the imaging face of the CCD to the flange focal face

	A (mm)
C-mount	19.255±0.3
CS-mount	15.855±0.3

	B (mm)
C-mount	17.526
CS-mount	12.5

Fig. 9

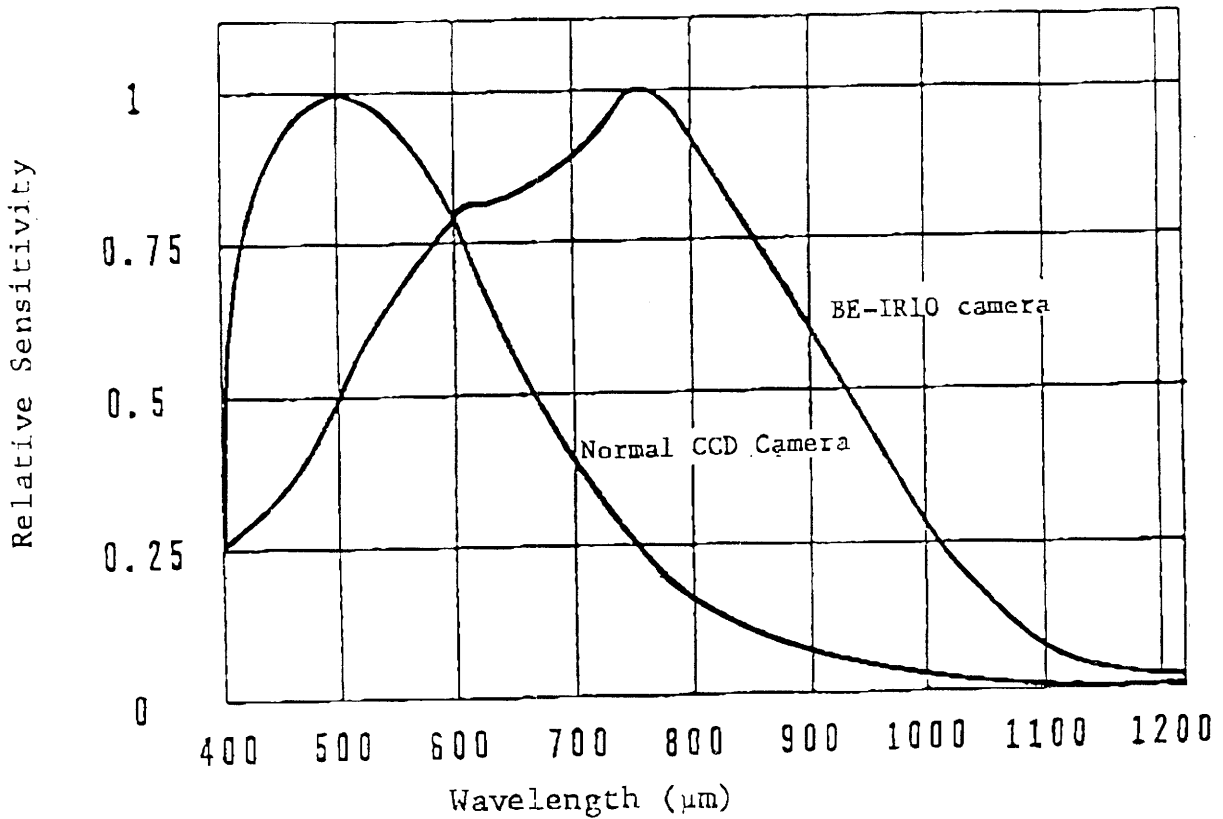
## 9. Specifications

- (1) Imaging device: 1/2" Frame Transfer CCD
- Total number of pixels
- EIA: 786(H) x 484(V)
  - CCIR: 732(H) x 580(V)
- Number of effective pixels
- EIA: 756(H) x 484(V)
  - CCIR: 699(H) x 576(V)
- (2) Sync system: Internal
- (Optional unit, which is now under development, is needed for external sync mode)
- (3) Scanning system: 2:1 interlaced
- (4) Scanning frequency
- EIA: Hor. : 15.734kHz
  - Vert. : 59.94Hz
  - CCIR: Hor. : 15.625kHz
  - Vert. : 50Hz
- (5) Video output: 1.0Vp-p/75Ω
- Video: 0.7Vp-p
  - Sync: 0.3Vp-p
- (6) S/N: 46dB (Gamma: 1.0, Normal gain)
- (7) Minimum illumination: 0.5 lx, f1.4
- (8) Gamma: Gamma=1.0 or 0.45 (selectable by replacing chip resistors)
- (9) Integration mode: Filed integration mode
- (10) Gain: Normal, 6dB or AGC (selectable by replacing chip resistors)
- (Set to the normal mode at the factory.)

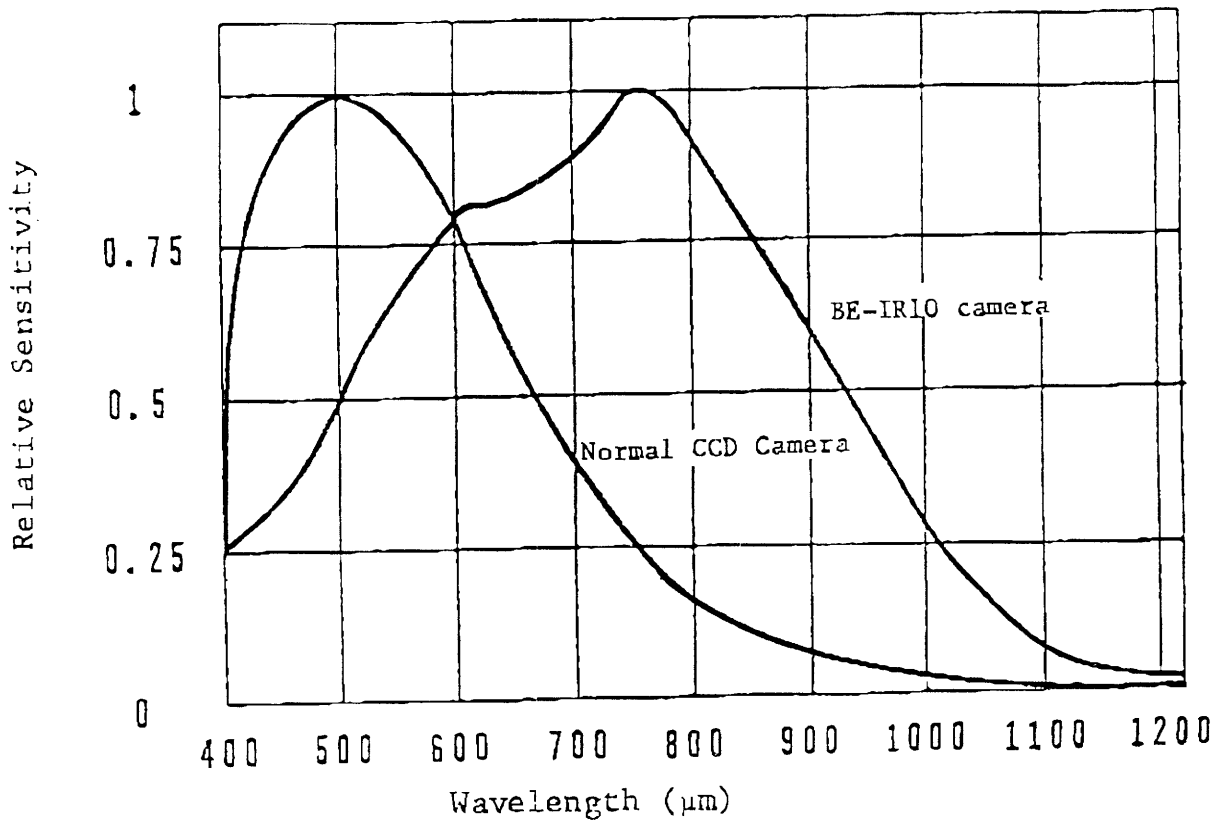
- (11) Supply voltage: 12V DC  $\pm$ 1V
- (12) Power consumption: 260mA approx.
- (13) Ambient temperature and humidity: -10 to 50°C, 90% RH or less
- (14) Storage temperature and humidity: -20 to 60°C, 70% RH or less
- (15) Dimensions: 50(W) x 50(D) x 26(H)mm
- (16) Mass: 60g approx.

Attachment: Spectral sensitivity characteristics

Human eyes are sensitive to the magnetic wave having the wavelength ranging from 380nm to 780nm, and the magnetic wave within this range is called "light". Though normal CCD cameras are sensitive up to 700nm, the BE-IRIO is sensitive to the near infrared ray region (780nm to 950nm) to which human eyes are not sensitive.



# HITACHI BE-IR10



### QUESTION 10

