

SENTECH

STC-MB43C/E STC-MB42C/E Product Specifications

Features

- 570 TV Lines
- 30 FPS
- EIA or CCIR
- Available with High Sensitivity

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1 Overview

1.1 The new cameras for the EIA, CCIR analog cameras information

The existing EIA, CCIR analog cameras have been discontinued due to the CDS and DAC ICs discontinuation. However Sentech is providing a new version of the existing camera models.

Please make sure to check the specification differences between the existing cameras and the new cameras before using the new cameras.

1.2 Camera Lineup

Existing product	New product (Same dimensions including the mounting position)	New product “-S” mode (Same mounting position as Sony or CIS camera)
STC-E43A	STC-MB43E (with trigger function)	STC-MB43E-S (with trigger function)
STC-E42A	STC-MB42E (with trigger function)	STC-MB42E-S (with trigger function)
STC-C43A	STC-MB43C (with trigger function)	STC-MB43C-S (with trigger function)
STC-C42A	STC-MB42C (with trigger function)	STC-MB42C-S (with trigger function)
STC-HE43A (High sensitivity)	STC-MBH43E (with trigger function)	STC-MBH43E-S (with trigger function)
STC-HE42A (High sensitivity)	STC-MBH42E (with trigger function)	STC-MBH42E-S (with trigger function)
STC-HE43A (High sensitivity)	STC-MBH43C (with trigger function)	STC-MBH43C-S (with trigger function)
STC-HE42A (High sensitivity)	STC-MBH42C (with trigger function)	STC-MBH42C-S (with trigger function)

1.3 Changes from the existing products

The functions below have been added to the new cameras.

- A. Pixel defect correction (up to 64 pixels)
- B. Reset mode (No. 5), clock speed (No.6) and trigger polarity (No.7) selection on DIP Switch
- C. AGC and auto shutter function (Default: Manual gain, manual shutter)
- D. Trigger function
 - a. Edge preset trigger
 - b. Pulse width trigger
 - c. Restart/Reset mode (long exposure)
 - d. Two pulses trigger
 - e. The trigger signal input through No. 11 (Trigger in) and No. 8 (GND) of 12pin connector
- E. Field update function

The specifications below have not changed.

- A. Software (CLCtrl2)
- B. IO signals
- C. Mechanical dimensions (including the mounting position)
- D. Tripod

1.4 New Models “-S”

“-S” models are 29x29mm dimension cameras. For further details, please refer to section [4.2](#).

2 General Specifications

2.1 STC-MB42E / STC-MB43E / STC-MB42E-S / STC-MB43E-S

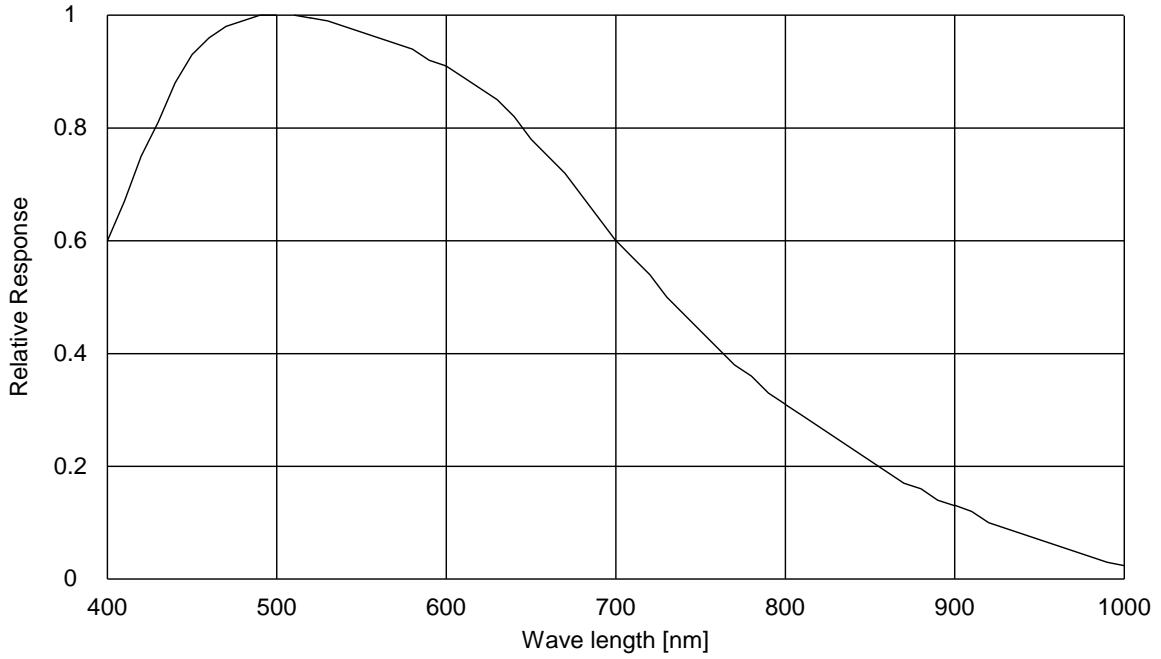
2.1.1 Electronic Specifications (STC-MB42E / STC-MB43E / STC-MB42E-S / STC-MB43E-S)

Model Number		STC-MB42E / STC-MB42E-S	STC-MB43E / STC-MB43E-S
Image Sensor		1/2" Interline Monochrome EIA CCD (Sony: ICX418AL)	1/3" Interline Monochrome EIA CCD (Sony: ICX408AL)
Active Picture Elements		756 (H) x 485 (V)	
Chip Size		7.40 (H) x 5.95 (V) mm	5.59 (H) x 4.68 (V) mm
Cell Size		8.4 (H) x 9.8 (V) μ m	6.35 (H) x 7.40 (V) μ m
Scanning System		2:1 Interlace	
Vertical Frequency		59.94 Hz (Normal Speed) / 119.88 Hz (Double Speed) (Default: 59.94 Hz)	
Horizontal Frequency		15.734 kHz (Normal Speed) / 31.468 kHz (Double Speed) (Default: 15.734 kHz)	
Pixel Frequency		14.318 MHz (Normal Speed) / 28.636 MHz (Double Speed) (Default: 14.318 MHz)	
Resolution		570 TV lines	
S/N ratio		56 dB (GAIN 0 dB)	
Minimum scene illumination		Less than 1 Lux at F1.2	
Sync. System		Internal / External (Auto Select)	
Video output		1.0 Vp-p / 75 Ω , DC coupling	
Shutter Speed	DIP Switch	Normal Speed: OFF, 1/60, 1/100, 1/120, 1/250, 1/500, 1/1000, 1/2000, 1/4000, 1/5000, 1/8000, 1/10000, 1/20000, 1/100000 seconds (Default: OFF) Double Speed: OFF, 1/120, 1/200, 1/240, 1/500, 1/1000, 1/2000, 1/4000, 1/8000, 1/10000, 1/16000, 1/20000, 1/40000, 1/200000 seconds	
	Communication	Normal Speed: OFF, 1/60 to 1/100000 seconds (Variable at every horizontal and clock) Double Speed: OFF, 1/120 to 1/200000 seconds (Variable at every horizontal and clock)	
Integration Mode		Field / Frame (Default: Frame)	
Gain		0 to 27 dB (Default: 0 dB)	
Gamma		1 / 0.45 (Default: 1)	
Operational Mode		Free-run / Edge preset trigger (V reset / Non-reset) / Pulse width trigger (V reset / Non-reset) / Re-start & Reset trigger (long exposure) / Start & stop trigger (Default: Pulse width trigger)	
Pixel Defect Correction		Up to 64 pixels (Default: ON)	
Field update Function		Supported	
Communication		RS232 through 12pin connector	
Power	Input Voltage	DC12V +/- 10%	
	Consumption	Less than 1.8 W	

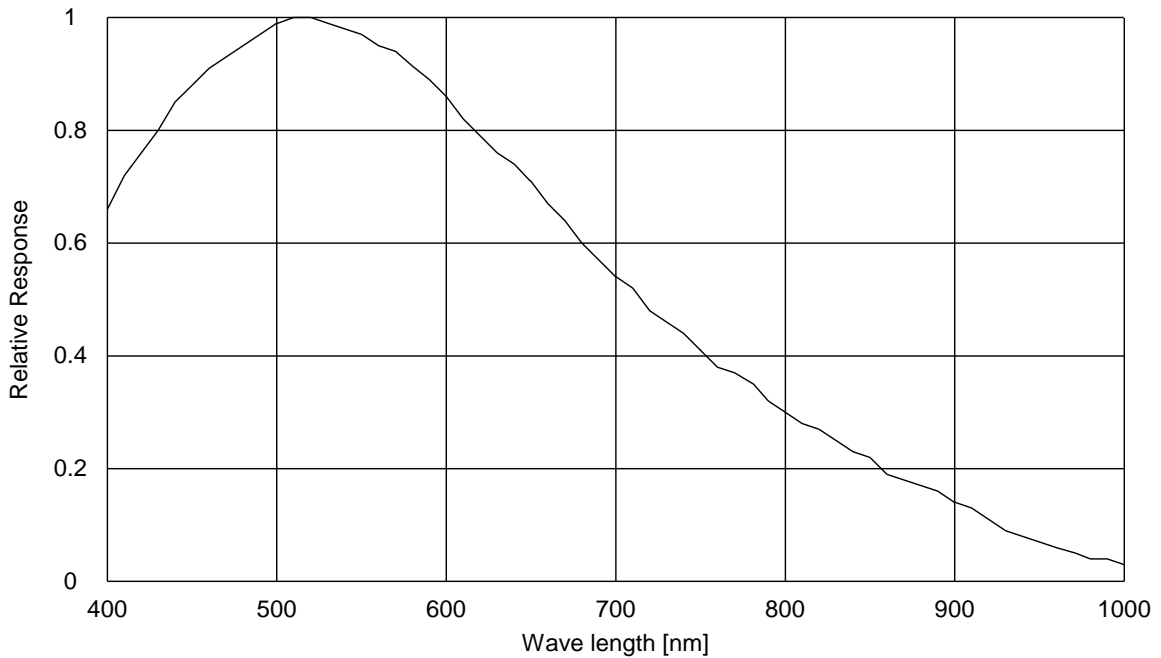
Table 1: Electronic Specifications (STC-MB42E / STC-MB43E / STC-MB42E-S / STC-MB43E-S)

2.1.2 Spectral Sensitivity Characteristics (STC-MB42E / STC-MB43E / STC-MB42E-S / STC-MB43E-S)

STC-MB42E / STC-MB42E-S



STC-MB43E / STC-MB43E-S



2.1.3 Mechanical Specifications (STC-MB42E / STC-MB43E / STC-MB42E-S / STC-MB43E-S)

Model Number		STC-MB42C / STC-MB43C	STC-MB42C-S / STC-MB43C-S
Dimensions		28 (W) x 28 (H) x 40 (D) mm *excluding the connectors	29 (W) x 29 (H) x 41 (D) mm *excluding the connectors
Lens Mount		C Mount	
Optical Filter		No IR Cut Filter	
Optical Center Accuracy		Positional accuracy in Horizontal and Vertical directions: +/- 0.31 mm Rotational accuracy of Horizontal and Vertical: +/- 2.1 deg.	
Material	Case	Aluminum alloys	
	Tripod	Polycarbonate ABS	
Interface connector		HR10A-10R-12PB (Hirose) or equivalent	
Tripod		Tripod can be attached to 4 plates (4 screws on the bottom plate, 3 screws on the top plate)	Not Supported
Weight		Approx. 46 g	Approx. TBD g

Table 2: Mechanical Specifications

2.1.4 Environmental Specifications (STC-MB42E/STC-MB43E/STC-MB42E-S/STC-MB43E-S)

Model Number	STC-MB42E / STC-MB43E / STC-MB42E-S / STC-MB43E-S
Operational Temperature	Environmental Temperature: -5 to +55 deg. C, Environmental Humidity: 0 to 85%
Storage Temperature	Environmental Temperature: -30 to +65 deg. C, Environmental Humidity: 0 to 90%
Vibration	20Hz to 200Hz to 20Hz (5min./cycle), acceleration 10G, XYZ 3 directions 30 min. each
Shock	Acceleration 70G, half amplitude 6ms, XYZ 3 directions 3 times each
Standard Compliancy	EMS: EN61000-6-2, EMI: EN55011 (Class B)
RoHS	RoHS Compliant

Table 3: Environmental Specifications

2.2 STC-MBH42E / STC-MBH43E / STC-MBH42E-S / STC-MBH43E-S

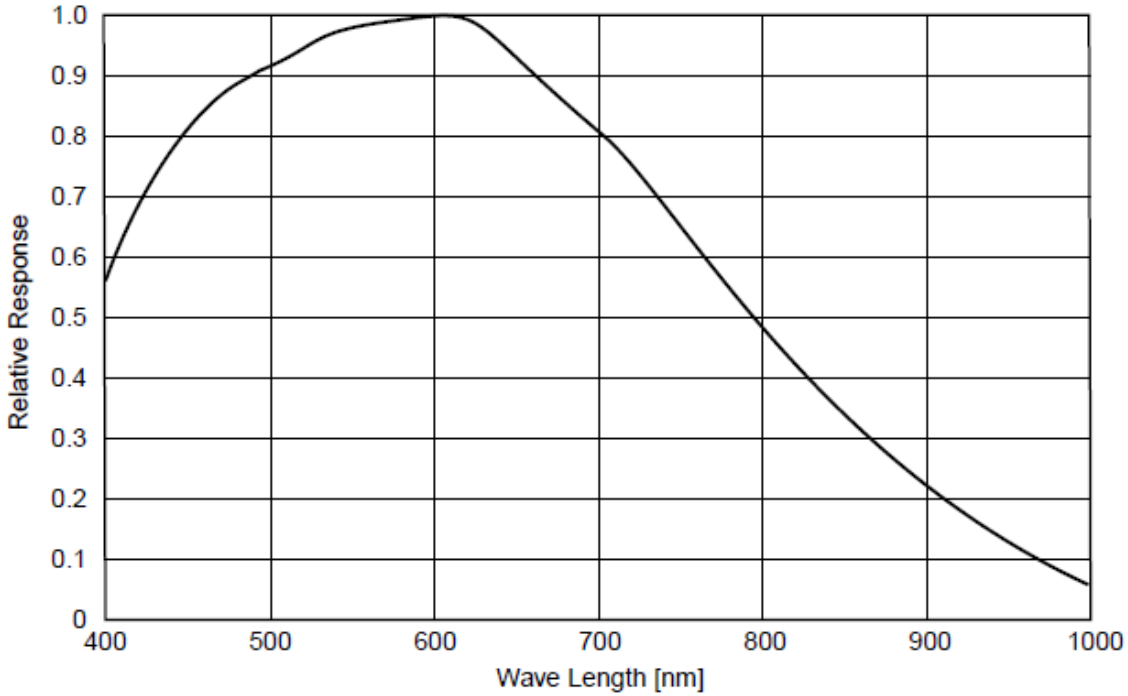
2.2.1 Electronic Specifications (STC-MBH42E / STC-MBH43E / STC-MBH42E-S / STC-MBH43E-S)

Model Number		STC-MBH42E / STC-MBH42E-S	STC-MBH43E / STC-MBH43E-S
Image Sensor		1/2" Interline Monochrome EIA CCD (Sony: ICX428ALL)	1/3" Interline Monochrome EIA CCD (Sony: ICX258AL)
Active Picture Elements		756 (H) x 485 (V)	
Chip Size		7.40 (H) x 5.95 (V) mm	5.59 (H) x 4.68 (V) mm
Cell Size		8.4 (H) x 9.8 (V) μm	6.35 (H) x 7.40 (V) μm
Scanning System		2:1 Interlace	
Vertical Frequency		59.94 Hz (Normal Speed) / 119.88 Hz (Double Speed) (Default: 59.94 Hz)	
Horizontal Frequency		15.734 kHz (Normal Speed) / 31.468 kHz (Double Speed) (Default: 15.734 kHz)	
Pixel Frequency		14.318 MHz (Normal Speed) / 28.636 MHz (Double Speed) (Default: 14.318 MHz)	
Resolution		570 TV lines	
S/N ratio		56 dB (GAIN 0 dB)	
Minimum scene illumination		Less than 1 Lux at F1.2	
Sync. System		Internal / External (Auto Select)	
Video output		1.0 Vp-p / 75 Ω , DC coupling	
Shutter Speed	DIP Switch	Normal Speed: OFF, 1/60, 1/100, 1/120, 1/250, 1/500, 1/1000, 1/2000, 1/4000, 1/5000, 1/8000, 1/10000, 1/20000, 1/100000 seconds (Default: OFF) Double Speed: OFF, 1/120, 1/200, 1/240, 1/500, 1/1000, 1/2000, 1/4000, 1/8000, 1/10000, 1/16000, 1/20000, 1/40000, 1/200000 seconds	
	Communication	Normal Speed: OFF, 1/60 to 1/100000 seconds (Variable at every horizontal and clock) Double Speed: OFF, 1/120 to 1/200000 seconds (Variable at every horizontal and clock)	
Integration Mode		Field / Frame (Default: Frame)	
Gain		0 to 27 dB (Default: 0 dB)	
Gamma		1 / 0.45 (Default: 1)	
Operational Mode		Free-run / Edge preset trigger (V reset / Non-reset) / Pulse width trigger (V reset / Non-reset) / Re-start & Reset trigger (long exposure) / Start & stop trigger (Default: Pulse width trigger)	
Pixel Defect Correction		Up to 64 pixels (Default: ON)	
Field update Function		Support	
Communication		RS232 through 12pin connector	
Power	Input Voltage	DC12V +/- 10%	
	Consumption	Less than 1.8 W	

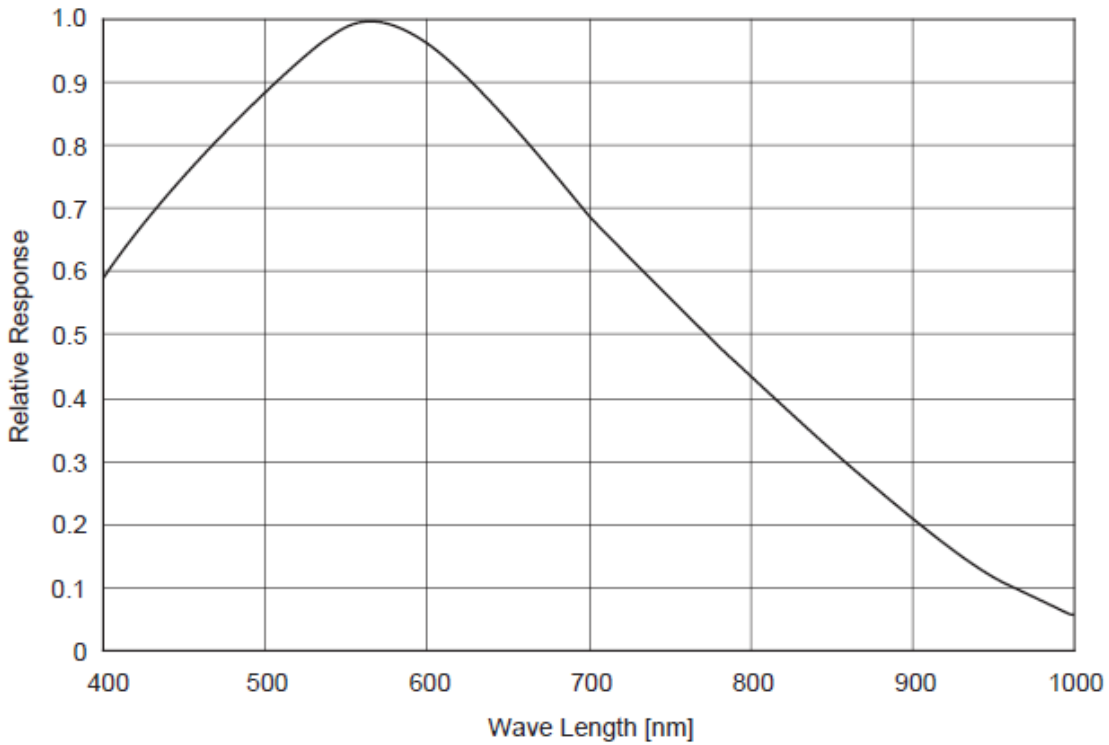
Table 2: Electronic Specifications (STC-MBH42E / STC-MBH43E / STC-MBH42E-S / STC-MBH43E-S)

2.2.2 Spectral Sensitivity Characteristics(STC-MBH42E / STC-MBH43E / STC-MBH42E-S / STC-MBH43E-S)

STC-MBH42E / STC-MBH42E-S



STC-MBH43E / STC-MBH43E-S



2.2.3 Mechanical Specifications (STC-MBH42E / STC-MBH43E / STC-MBH42E-S / STC-MBH43E-S)

Model Number	STC-MBH42C / STC-MBH43C	STC-MBH42C-S / STC-MBH43C-S
Dimensions	28 (W) x 28 (H) x 40 (D) mm *excluding the connectors	29 (W) x 29 (H) x 41 (D) mm *excluding the connectors
Lens Mount	C Mount	
Optical Filter	No IR Cut Filter	
Optical Center Accuracy	Positional accuracy in Horizontal and Vertical directions: +/- 0.31 mm Rotational accuracy of Horizontal and Vertical: +/- 2.1 deg.	
Material	Case	Aluminum alloys
	Tripod	Polycarbonate ABS
Interface connector	HR10A-10R-12PB (Hirose) or equivalent	
Tripod	Tripod can be attached to 4 plates (4 screws on the bottom plate, 3 screws on the top plate)	Not Supported
Weight	Approx. 46 g	Approx. TBD g

Table 2: Mechanical Specifications

2.2.4 Environmental Specifications (STC-MBH42E / STC-MBH43E / STC-MBH42E-S / STC-MBH43E-S)

Model Number	STC-MBH42E / STC-MBH43E / STC-MBH42E-S / STC-MBH43E-S
Operational Temperature	Environmental Temperature: -5 to +55 deg. C, Environmental Humidity: 0 to 85%
Storage Temperature	Environmental Temperature: -30 to +65 deg. C, Environmental Humidity: 0 to 90%
Vibration	20Hz to 200Hz to 20Hz (5min./cycle), acceleration 10G, XYZ 3 directions 30 min. each
Shock	Acceleration 70G, half amplitude 6ms, XYZ 3 directions 3 times each
Standard Compliancy	EMS: EN61000-6-2, EMI: EN55011 (Class B)
RoHS	RoHS Compliant

Table 3: Environmental Specifications

2.3 STC-MB42C / STC-MB43C / STC-MB42C-S / STC-MB43C-S

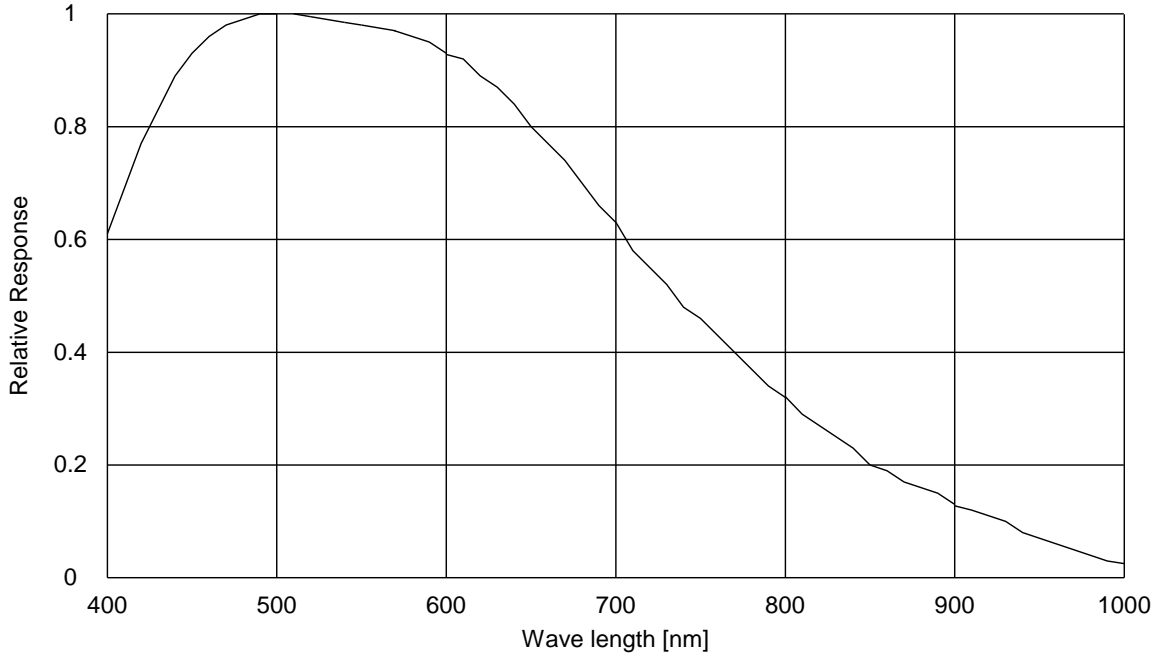
2.3.1 Electronic Specifications (STC-MB42C / STC-MB43C / STC-MB42C-S / STC-MB43C-S)

Model Number		STC-MB42C / STC-MB42C-S	STC-MB43C / STC-MB43C-S
Image Sensor		1/2" Interline Monochrome CCIR CCD (Sony: ICX419AL)	1/3" Interline Monochrome CCIR CCD (Sony: ICX419AL)
Active Picture Elements		741 (H) x 575 (V)	
Chip Size		7.40 (H) x 5.95 (V) mm	5.59 (H) x 4.68 (V) mm
Cell Size		8.6 (H) x 8.3 (V) μm	6.50 (H) x 6.25 (V) μm
Scanning System		2:1 Interlace	
Vertical Frequency (Frame rate)		50.00 Hz (Normal Speed) / 100 Hz (Double Speed) (Default: 50.00 Hz)	
Horizontal Frequency		15.625 kHz (Normal Speed) / 31.25 kHz (Double Speed) (Default: 15.625 kHz)	
Pixel Frequency		14.1875 MHz (Normal Speed) / 28.375 MHz (Double Speed) (Default: 14.1875 MHz)	
Resolution		560 TV lines	
S/N ratio		56 dB (GAIN 0 dB)	
Minimum scene illumination		Less than 1 Lux at F1.2	
Sync. System		Internal / External (Auto Select)	
Video output		1.0 Vp-p / 75 Ω , DC coupling	
Shutter Speed	DIP Switch	Normal Speed: OFF, 1/50, 1/100, 1/120, 1/250, 1/500, 1/1000, 1/2000, 1/4000, 1/5000, 1/8000, 1/10000, 1/20000, 1/100000 seconds (Default: OFF) Double Speed: OFF, 1/100, 1/200, 1/240, 1/500, 1/1000, 1/2000, 1/4000, 1/8000, 1/10000, 1/16000, 1/20000, 1/40000, 1/200000 seconds	
	Communication	Normal Speed: OFF, 1/50 to 1/100000 seconds (Variable at every horizontal and clock) Double Speed: OFF, 1/100 to 1/200000 seconds (Variable at every horizontal and clock)	
Integration Mode		Field / Frame (Default: Frame)	
Gain		0 to 27 dB (Default: 0 dB)	
Gamma		1 / 0.45 (Default: 1)	
Operational Mode		Free-run / Edge preset trigger (V reset / Non-reset) / Pulse width trigger (V reset / Non-reset) / Re-start & Reset trigger (long exposure) / Start & stop trigger (Default: Pulse width trigger)	
Pixel Defect Correction		Up to 64 pixels (Default: ON)	
Field update Function		Support	
Communication		RS232 through 12pin connector	
Power	Input Voltage	DC12V +/- 10%	
	Consumption	Less than 1.8 W	

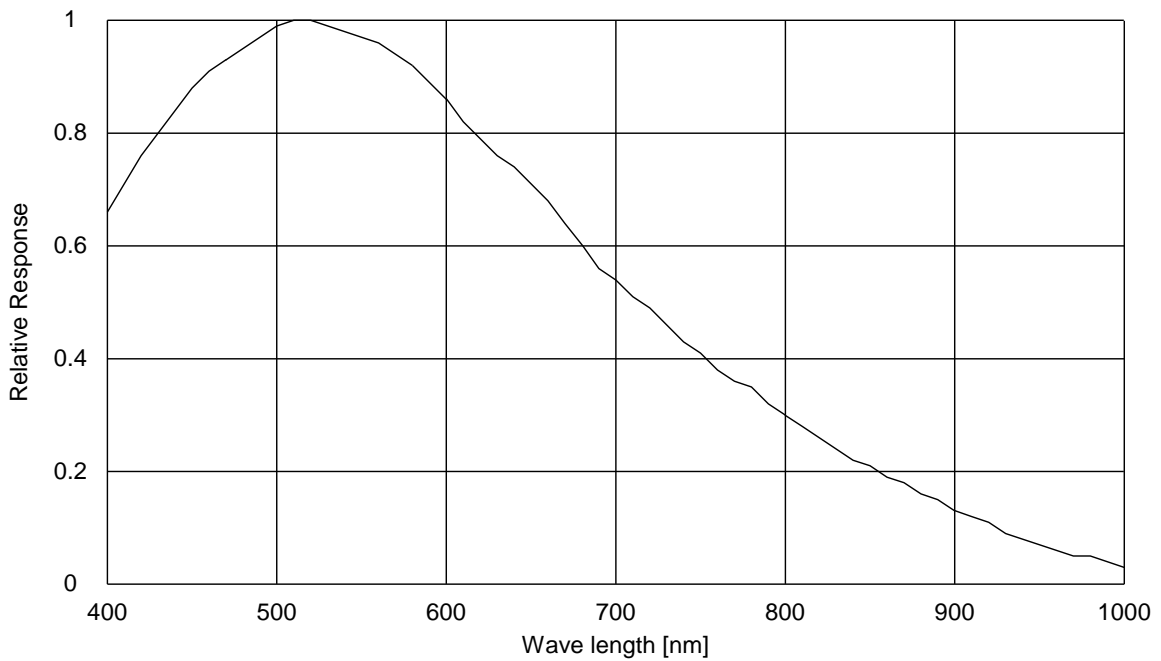
Table 3: Electronic Specifications (STC-MB42C / STC-MB43C / STC-MB42C-S / STC-MB43C-S)

2.3.2 Spectral Sensitivity Characteristics (STC-MB42C / STC-MB43C / STC-MB42C-S / STC-MB43C-S)

STC-MB42C / STC-MB42C-S



STC-MB43C / STC-MB43C-S



2.3.3 Mechanical Specifications (STC-MB42C / STC-MB42C-S)

Model Number		STC-MB42C / STC-MB43C	STC-MB42C-S / STC-MB43C-S
Dimensions		28 (W) x 28 (H) x 40 (D) mm *excluding the connectors	29 (W) x 29 (H) x 41 (D) mm *excluding the connectors
Lens Mount		C Mount	
Optical Filter		No IR Cut Filter	
Optical Center Accuracy		Positional accuracy in Horizontal and Vertical directions: +/- 0.31 mm Rotational accuracy of Horizontal and Vertical: +/- 2.1 deg.	
Material	Case	Aluminum alloys	
	Tripod	Polycarbonate ABS	
Interface connector		HR10A-10R-12PB (Hirose) or equivalent	
Tripod		Tripod can be attached to 4 plates (4 screws on the bottom plate, 3 screws on the top plate)	Not Supported
Weight		Approx. 46 g	Approx. TBD g

Table 2: Mechanical Specifications

2.3.4 Environmental Specifications

Model Number	STC-MB42C / STC-MB43C / STC-MB42C-S / STC-MB43C-S
Operational Temperature	Environmental Temperature: -5 to +55 deg. C, Environmental Humidity: 0 to 85%
Storage Temperature	Environmental Temperature: -30 to +65 deg. C, Environmental Humidity: 0 to 90%
Vibration	20Hz to 200Hz to 20Hz (5min./cycle), acceleration 10G, XYZ 3 directions 30 min. each
Shock	Acceleration 70G, half amplitude 6ms, XYZ 3 directions 3 times each
Standard Compliancy	EMS: EN61000-6-2, EMI: EN55011 (Class B)
RoHS	RoHS Compliant

Table 3: Environmental Specifications

2.4 STC-MBH42C / STC-MBH43C / STC-MBH42C-S / STC-MBH43C-S

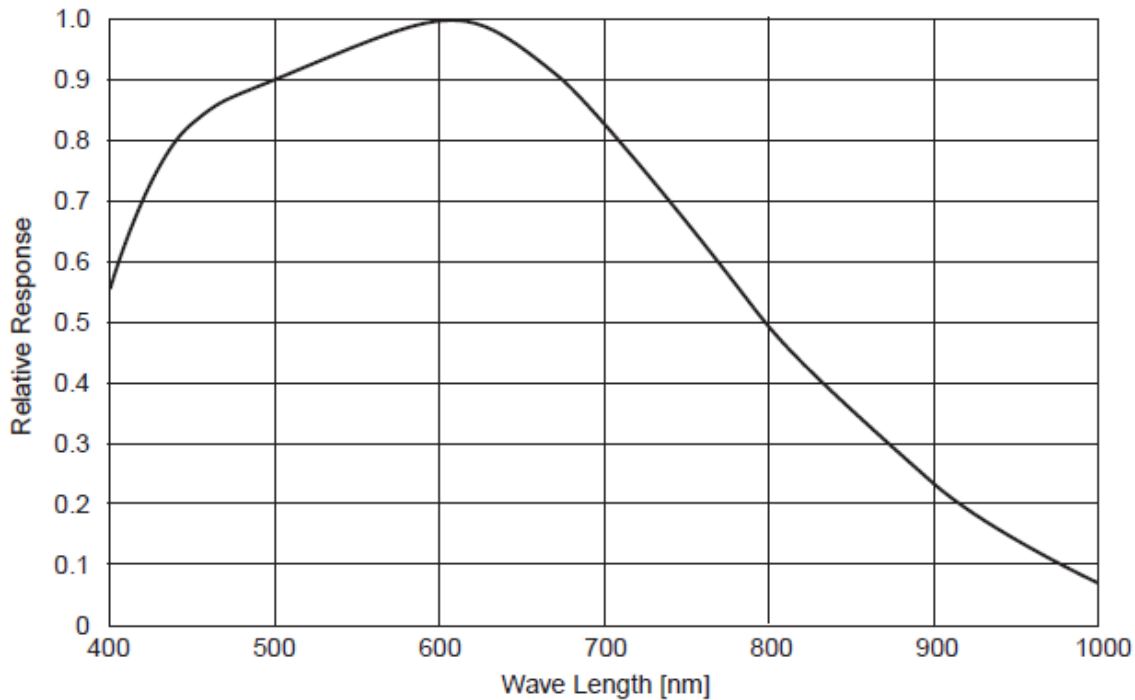
2.4.1 Electronic Specifications (STC-MBH42C / STC-MBH43C / STC-MBH42C-S / STC-MBH43C-S)

Model Number		STC-MBH42C/STC-MBH42C-S	STC-MBH43C/STC-MBH43C-S
Image Sensor		1/2" Interline Monochrome CCIR CCD (Sony: ICX429ALL)	1/3" Interline Monochrome CCIR CCD (Sony: ICX259AL)
Active Picture Elements		741 (H) x 575 (V)	
Chip Size		7.40 (H) x 5.95 (V) mm	5.59 (H) x 4.68 (V) mm
Cell Size		8.6 (H) x 8.3 (V) μm	6.50 (H) x 6.25 (V) μm
Scanning System		2:1 Interlace	
Vertical Frequency (Frame rate)		50.00 Hz (Normal Speed) / 100 Hz (Double Speed) (Default: 50.00 Hz)	
Horizontal Frequency		15.625 kHz (Normal Speed) / 31.25 kHz (Double Speed) (Default: 15.625 kHz)	
Pixel Frequency		14.1875 MHz (Normal Speed) / 28.375 MHz (Double Speed) (Default: 14.1875 MHz)	
Resolution		560 TV lines	
S/N ratio		56 dB (GAIN 0 dB)	
Minimum scene illumination		Less than 1 Lux at F1.2	
Sync. System		Internal / External (Auto Select)	
Video output		1.0 Vp-p / 75 Ω , DC coupling	
Shutter Speed	DIP Switch	Normal Speed: OFF, 1/50, 1/100, 1/120, 1/250, 1/500, 1/1000, 1/2000, 1/4000, 1/5000, 1/8000, 1/10000, 1/20000, 1/100000 seconds (Default: OFF) Double Speed: OFF, 1/100, 1/200, 1/240, 1/500, 1/1000, 1/2000, 1/4000, 1/8000, 1/10000, 1/16000, 1/20000, 1/40000, 1/200000 seconds	
	Communication	Normal Speed: OFF, 1/50 to 1/100000 seconds (Variable at every horizontal and clock) Double Speed: OFF, 1/100 to 1/200000 seconds (Variable at every horizontal and clock)	
Integration Mode		Field / Frame (Default: Frame)	
Gain		0 to 27 dB (Default: 0 dB)	
Gamma		1 / 0.45 (Default: 1)	
Operational Mode		Free-run / Edge preset trigger (V reset / Non-reset) / Pulse width trigger (V reset / Non-reset) / Re-start & Reset trigger (long exposure) / Start & stop trigger (Default: Pulse width trigger)	
Pixel Defect Correction		Up to 64 pixels (Default: ON)	
Field update Function		Support	
Communication		RS232 through 12pin connector	
Power	Input Voltage	DC12V +/- 10%	
	Consumption	Less than 1.8 W	

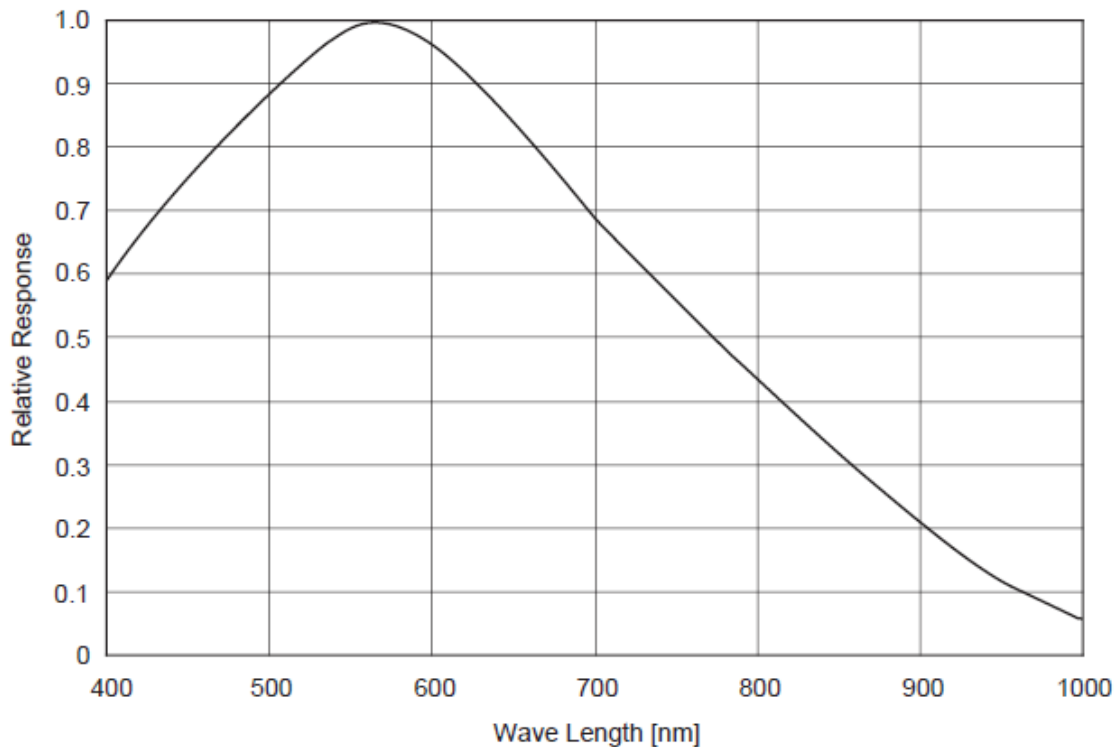
Table 4: Electronic Specifications (STC-MBH42C / STC-MBH43C / STC-MBH42C-S / STC-MBH43C-S)

2.4.2 Spectral Sensitivity Characteristics (STC-MBH42C/STC-MBH43C/STC-MBH42C-S/STC-MBH43C-S)

STC-MBH42C / STC-MBH42C-S



STC-MB43C / STC-MB43C-S



2.4.3 Mechanical Specifications (STC-MBH42C / STC-MBH42C-S)

Model Number		STC-MBH42C / STC-MBH43C	STC-MBH42C-S / STC-MBH43C-S
Dimensions		28 (W) x 28 (H) x 40 (D) mm *excluding the connectors	29 (W) x 29 (H) x 41 (D) mm *excluding the connectors
Lens Mount		C Mount	
Optical Filter		No IR Cut Filter	
Optical Center Accuracy		Positional accuracy in Horizontal and Vertical directions: +/- 0.31 mm Rotational accuracy of Horizontal and Vertical: +/- 2.1 deg.	
Material	Case	Aluminum alloys	
	Tripod	Polycarbonate ABS	
Interface connector		HR10A-10R-12PB (Hirose) or equivalent	
Tripod		Tripod can be attached to 4 plates (4 screws on the bottom plate, 3 screws on the top plate)	Not Supported
Weight		Approx. 46 g	Approx. TBD g

Table 2: Mechanical Specifications

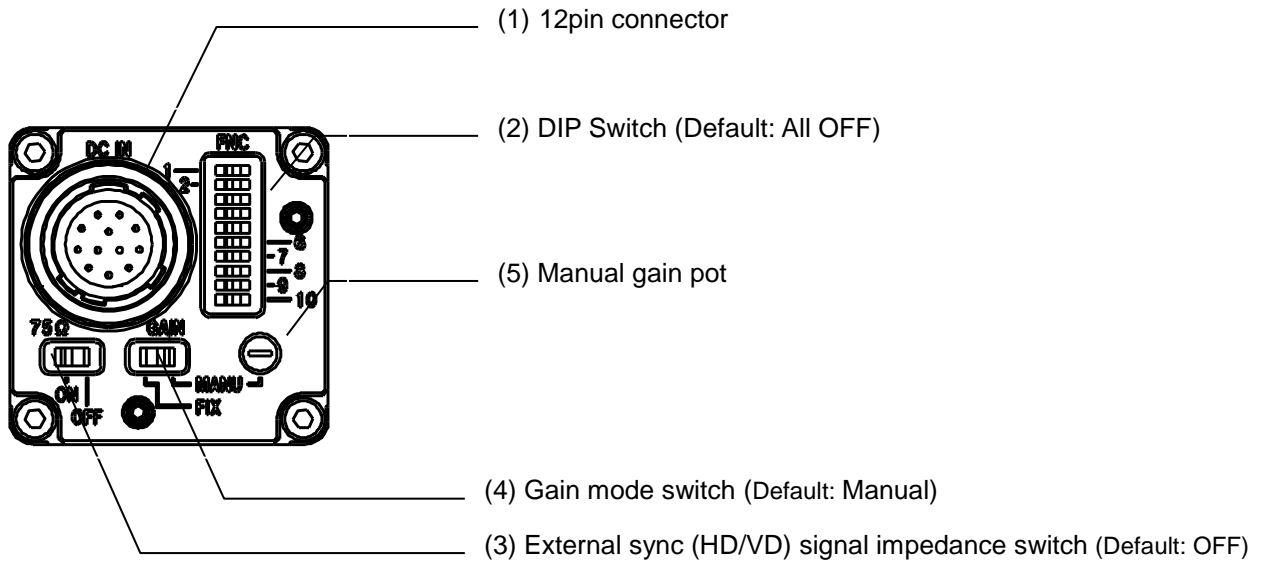
2.4.4 Environmental Specifications

Model Number	STC-MBH42C / STC-MBH43C / STC-MBH42C-S / STC-MBH43C-S
Operational Temperature	Environmental Temperature: -5 to +55 deg. C, Environmental Humidity: 0 to 85%
Storage Temperature	Environmental Temperature: -30 to +65 deg. C, Environmental Humidity: 0 to 90%
Vibration	20Hz to 200Hz to 20Hz (5min./cycle), acceleration 10G, XYZ 3 directions 30 min. each
Shock	Acceleration 70G, half amplitude 6ms, XYZ 3 directions 3 times each
Standard Compliancy	EMS: EN61000-6-2, EMI: EN55011 (Class B)
RoHS	RoHS Compliant

Table 3: Environmental Specifications

3 Connector Specifications

3.1 Rear Panel Specifications

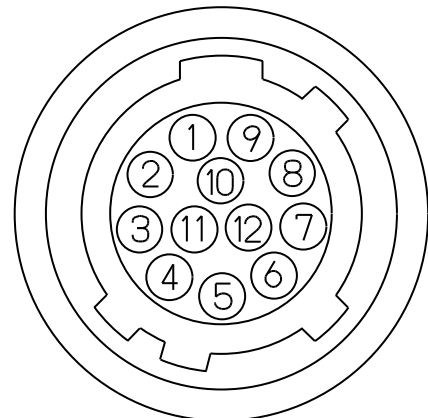


3.1.1 12pin Connector

The connector type: HR10A-10R-12PB (Hirose) or equivalent

Table 4. Pin Assignment

Pin No.	Signal type	
	Internal Sync.	External Sync.
1	GND	GND
2	+12V DC In	+12V DC In
3	Video GND	Video GND
4	Video Out	Video Out
5	HD GND	HD GND
6	HD Out	HD In
7	VD Out	HD In
8	GND	GND
9	Txd	Txd
10	WEN Out	WEN Out
11	Trigger In	Trigger In
12	Rxd	Rxd



*Note: Pin No.12 can be connected to GND.

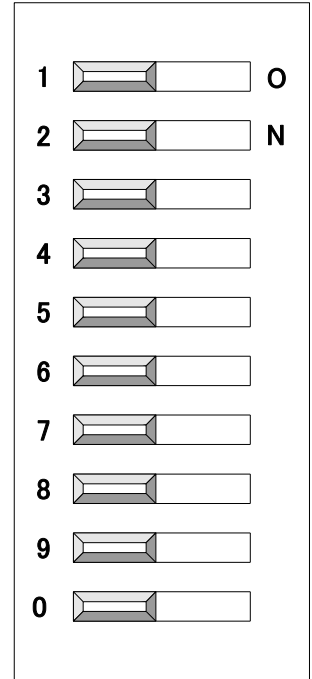
The camera settings are changeable via the RS232C communication with Pin No. 9 and 12.

3.1.2 DIP Switch Settings

The all DIP switch is enabled as the default setting. The DIP switch can be disable with the communication. (Address: 60H) The default setting for all DIP Switch is OFF.

DIP Switch settings (STC-MB42E / STC-MB43E / STC-MBH42E / STC-MBH43E)

Shutter Speed		No. 1	No. 2	No. 3	No. 4
Normal Speed	Double Speed				
Shutter OFF / Pulse width trigger		OFF	OFF	OFF	OFF
1/60 sec	1/120 sec	ON	OFF	OFF	OFF
1/100 sec	1/200 sec	OFF	ON	OFF	OFF
1/120 sec	1/240 sec	ON	ON	OFF	OFF
1/250 sec	1/500 sec	OFF	OFF	ON	OFF
1/500 sec	1/1,000 sec	ON	OFF	ON	OFF
1/1,000 sec	1/2,000 sec	OFF	ON	ON	OFF
1/2,000 sec	1/4,000 sec	ON	ON	ON	OFF
1/4,000 sec	1/8,000 sec	OFF	OFF	OFF	ON
1/5,000 sec	1/10,000 sec	ON	OFF	OFF	ON
1/8,000 sec	1/16,000 sec	OFF	ON	OFF	ON
1/10,000 sec	1/20,000 sec	ON	ON	OFF	ON
1/20,000 sec	1/40,000 sec	OFF	OFF	ON	ON
1/100,000 sec	1/200,000 sec	ON	OFF	ON	ON
Shutter OFF / Start & Stop trigger (External Trigger VD)		OFF	ON	ON	ON
OFF		ON	ON	ON	ON



DIP Switch settings (STC-MB42E / STC-MB43C / STC-MBH42C / STC-MBH43C)

Shutter speed		No. 1	No. 2	No. 3	No. 4
Normal Speed	Double Speed				
Shutter OFF / Pulse width trigger		OFF	OFF	OFF	OFF
1/50 sec	1/100 sec	ON	OFF	OFF	OFF
1/100 sec	1/200 sec	OFF	ON	OFF	OFF
1/120 sec	1/240 sec	ON	ON	OFF	OFF
1/250 sec	1/500 sec	OFF	OFF	ON	OFF
1/500 sec	1/1,000 sec	ON	OFF	ON	OFF
1/1,000 sec	1/2,000 sec	OFF	ON	ON	OFF
1/2,000 sec	1/4,000 sec	ON	ON	ON	OFF
1/4,000 sec	1/8,000 sec	OFF	OFF	OFF	ON
1/5,000 sec	1/10,000 sec	ON	OFF	OFF	ON
1/8,000 sec	1/16,000 sec	OFF	ON	OFF	ON
1/10,000 sec	1/20,000 sec	ON	ON	OFF	ON
1/20,000 sec	1/40,000 sec	OFF	OFF	ON	ON
1/100,000 sec	1/200,000 sec	ON	OFF	ON	ON
Shutter OFF / Start & Stop trigger (External Trigger VD)		OFF	ON	ON	ON
OFF		ON	ON	ON	ON

Shutter reset mode for the trigger mode	No. 5
Non-reset	OFF
V reset	ON

External VD reset mode for the continuous mode	No. 5
CCD Out Timing 1	OFF
CCD Out Timing 2	ON

Clock Speed	No. 6
Normal speed	OFF
Double speed	ON

Trigger Polarity	No. 7
Positive	OFF
Negative	ON

Gamma setting	No. 8
Gamma 1.0	OFF
Gamma 0.45	ON

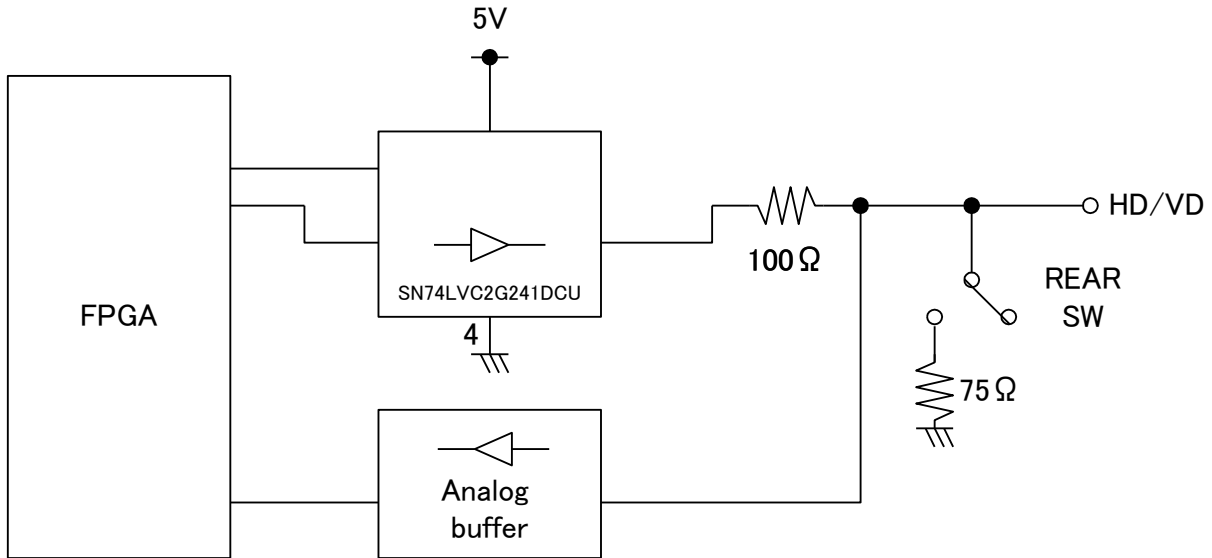
Sync System	No. 9
HD/VD signal in (External)	OFF
HD/VD signal out (Internal)	ON

Integration mode	No. 0
Frame	OFF
Field	ON

3.2 External Sync (HD/VD) Signal Impedance Switch

External sync (HD/VD) signal impedance	
75 Ohm termination	ON
High impedance	OFF

The equivalent circuits for HD/VD signal from the 12pin connector



3.3 Gain Mode Switch

Gain mode	
Fixed gain	FIX
Manual gain	MANU

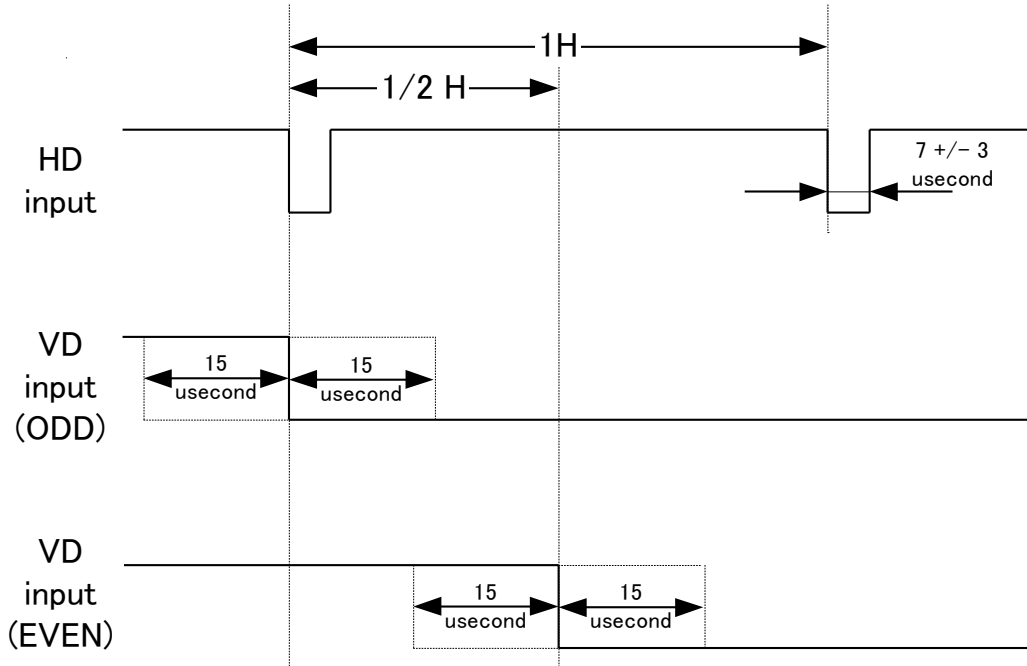
The fixed gain setting can be adjustable by the camera communication.

The manual gain can be adjustable by the manual gain pot (5).

3.4 Input Signal Specifications

3.4.1 HD / VD External Sync Signals

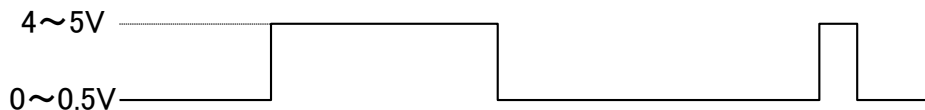
- Input signal level 2 to 5 Vp-p
- Input signal impedance 75 Ohm / 10 kOhm (DIP Switch No.9 setting)
- Input signal polarity Negative



- Input signal active duration
 - Normal speed HD: 7 +/- 3 useconds (Low level)
 - VD: 4 to 13 H (Low level)
 - Double speed HD: 3.5 +/- 5 useconds (Low level)
 - VD: 4 to 13 H (Low level)
- Allowance frequency for HD signal
 - Normal speed (30fps): 15.734 kHz +/- 1%
 - Double speed (60fps): 31.468 kHz +/- 1%

3.4.2 Trigger Signal

- Input signal level
 - Low level: 0 to 0.5 Vp-p
 - High level: 4 to 5 Vp-p
- Input signal impedance 10 kOhm



- Input signal polarity Rising edge / Falling edge (DIP Switch No.7 setting)
- Input signal active duration 2 useconds to 250 mseconds

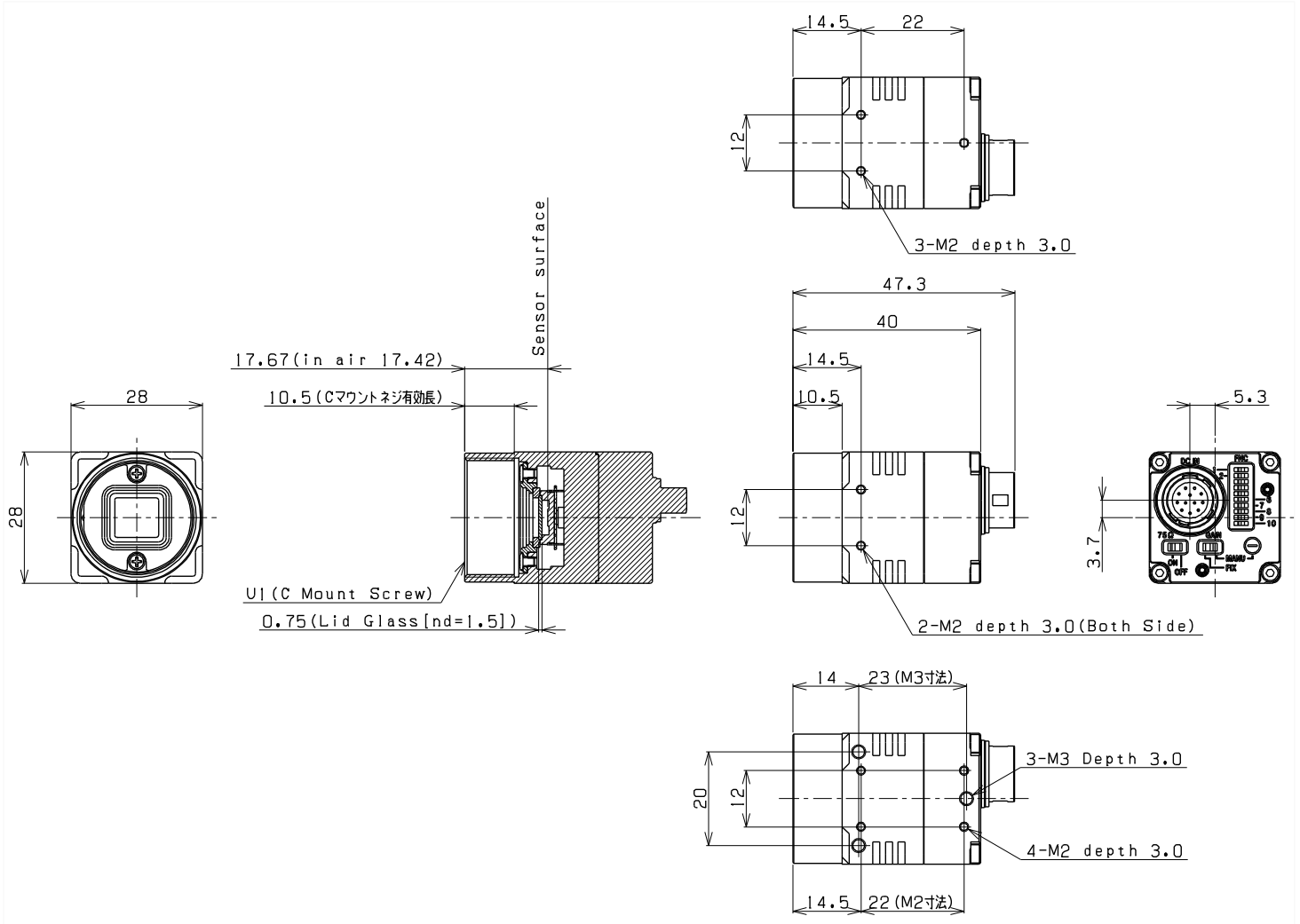
3.5 Output Signal Specifications

3.5.1 HD/VD external sync signal

- Output signal level 5 Vp-p
- Output signal impedance 100 Ohm
- Output signal polarity Negative
- Output signal active duration(EIA)
 - Normal speed HD: 6.3556 useconds (91 clocks)
 - VD: 0.5720 mseconds (9 H)
 - Double speed HD: 3.1778 useconds (91 clocks)
 - VD: 0.2860 mseconds (9 H)
- Output signal active duration(CCIR)
 - Normal speed HD: 6.414 useconds (91 clocks)
 - VD: 0.4800 mseconds (7.5 H)
 - Double speed HD: 3.207 useconds (91 clocks)
 - VD: 0.2400 mseconds (7.5 H)

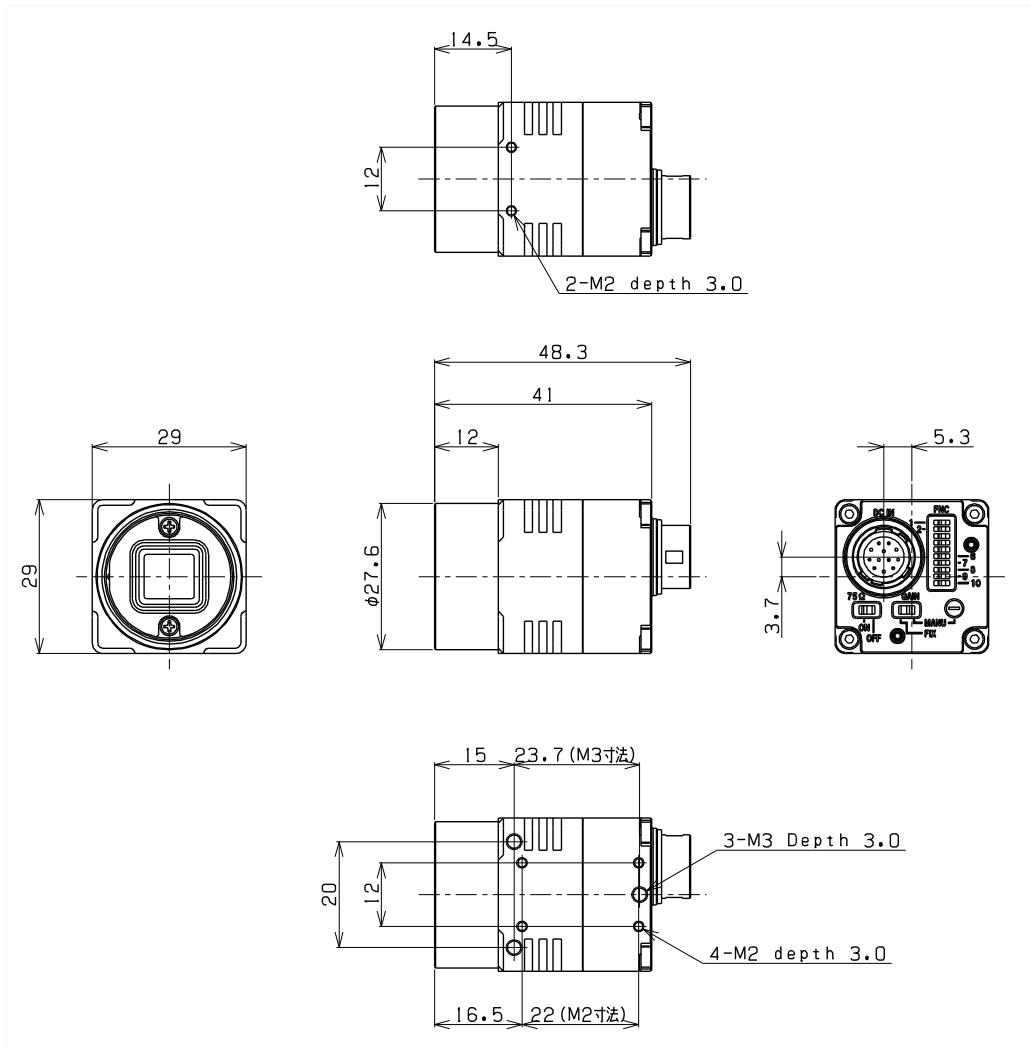
4 Dimensions

4.1 Dimensions for STC-MB42E / STC-MB53E / STC-MB42C / STC-MB53C



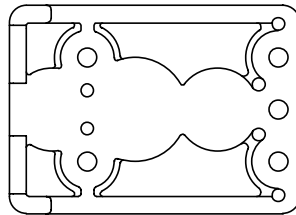
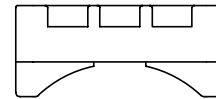
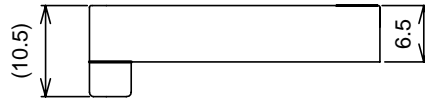
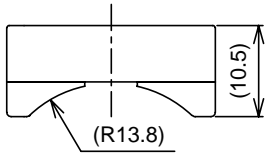
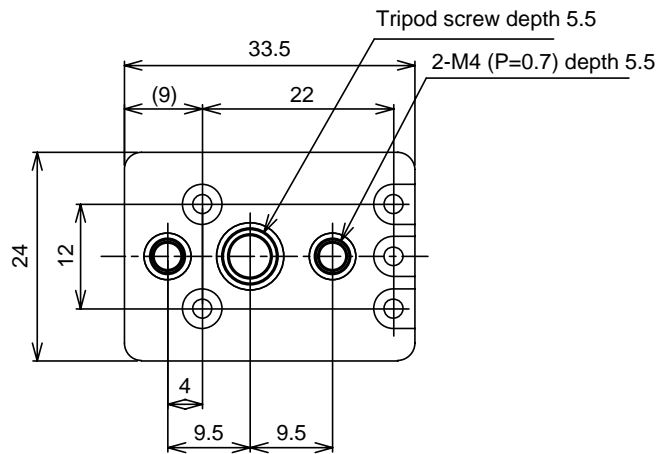
Unit: mm

4.2 Dimensions for STC-MB42E-S / STC-MB43E-S / STC-MB42C-S / STC-MB43C-S



Unit: mm

4.3 Tripod Dimensions



Unit: mm

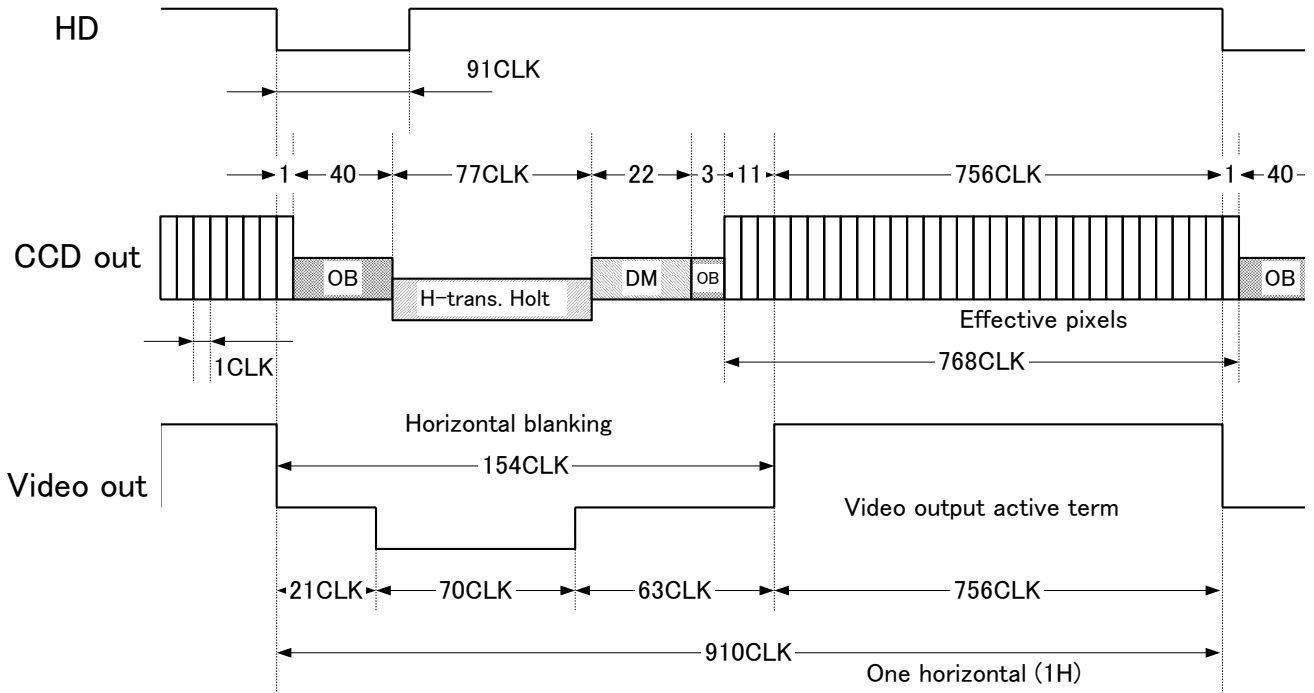
5 Camera Output Timing Charts

5.1 Camera Output Timing Charts (STC-MB42E / STC-MB43E / STC-MBH42E / STC-MBH43E)

5.1.1 Horizontal Timing

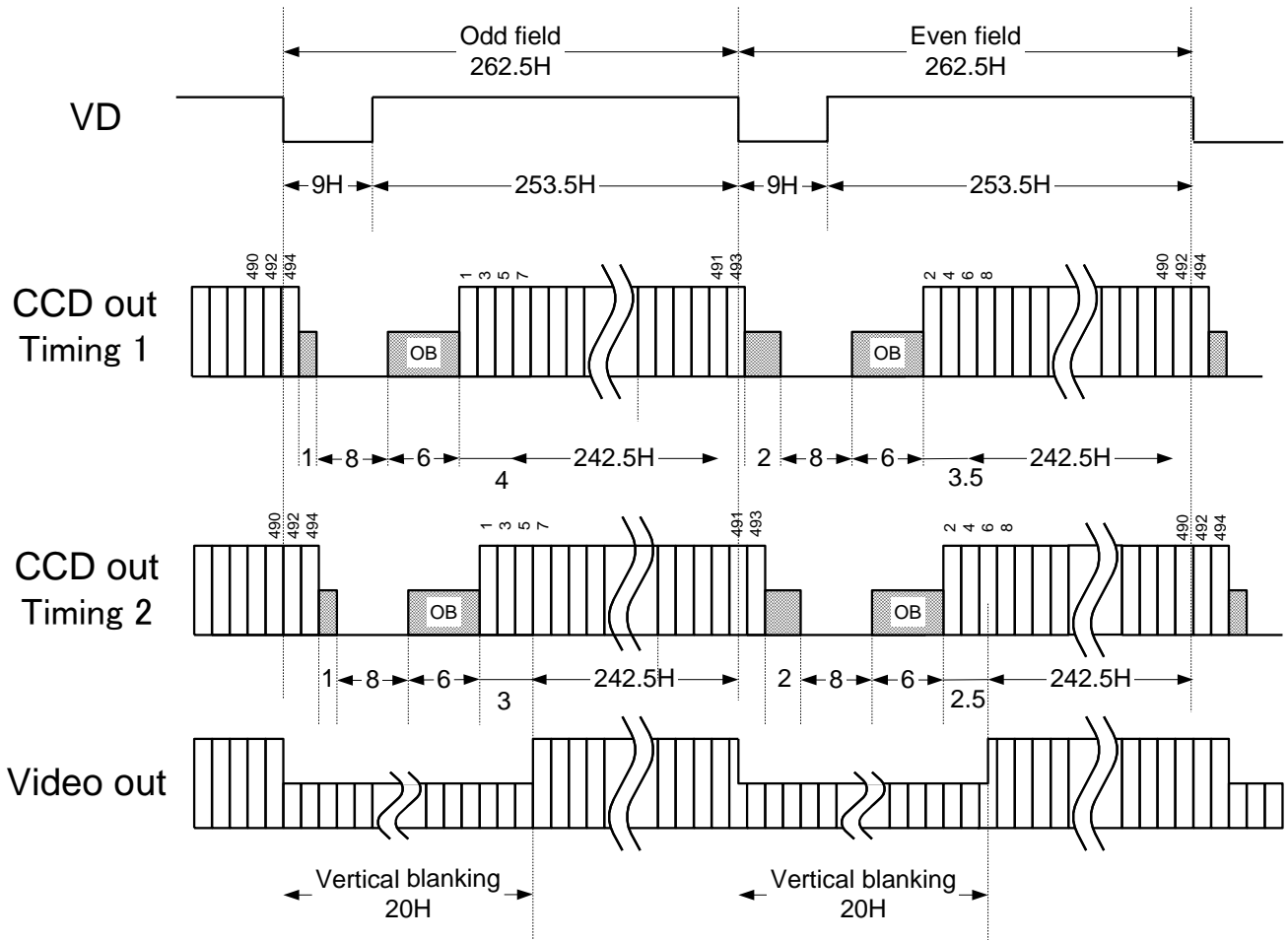
1CLK = 69.8 nseconds (Normal speed: 30 fps)

1CLK = 34.9 nseconds (Double speed: 60 fps)



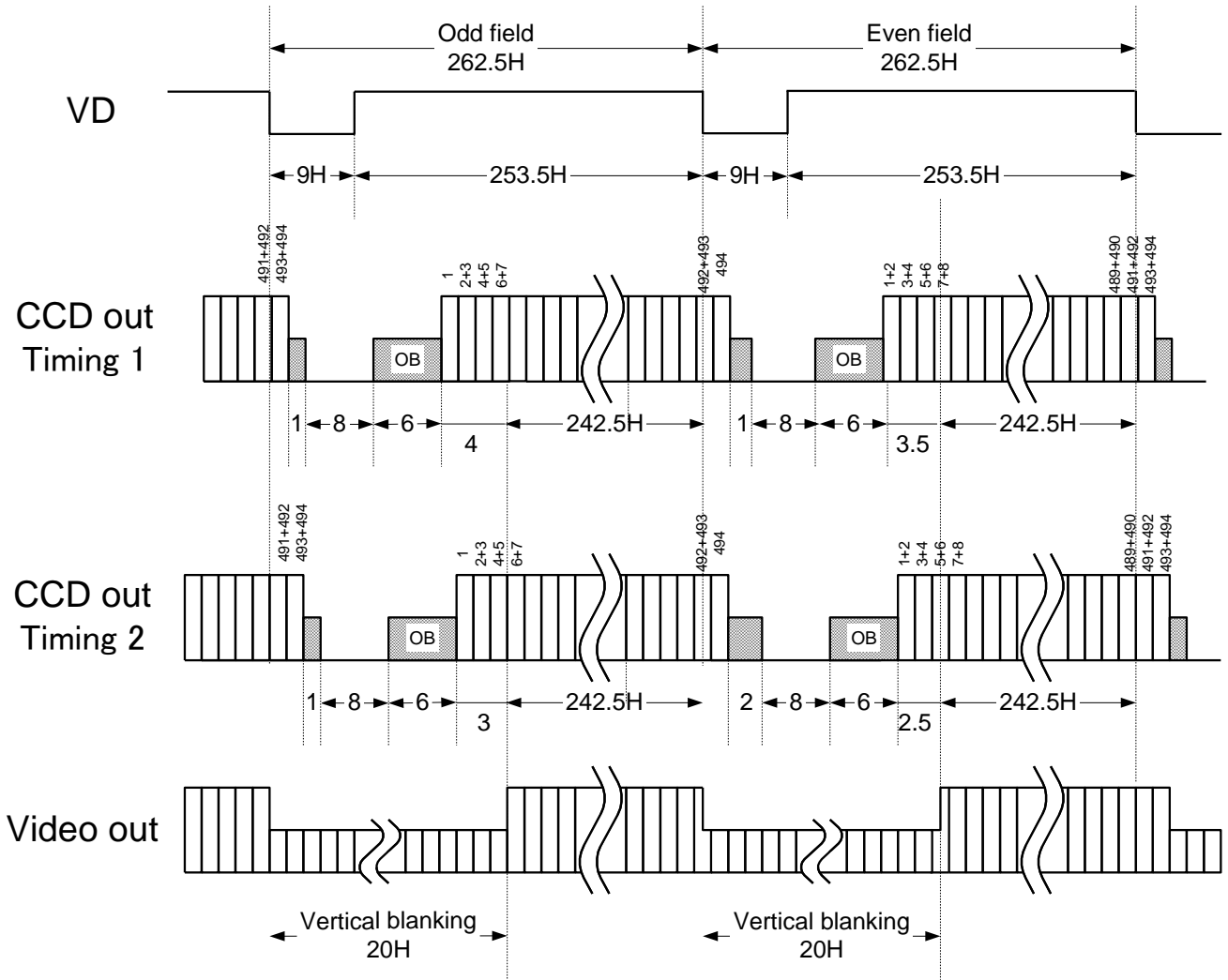
5.1.2 Vertical Timing

2:1 interlace (Frame integration)



* CCD out timing 1 DIP-SW5 = OFF state, CCD out timing 2 of DIP-SW5 = ON state

2:1 interface (Field integration)



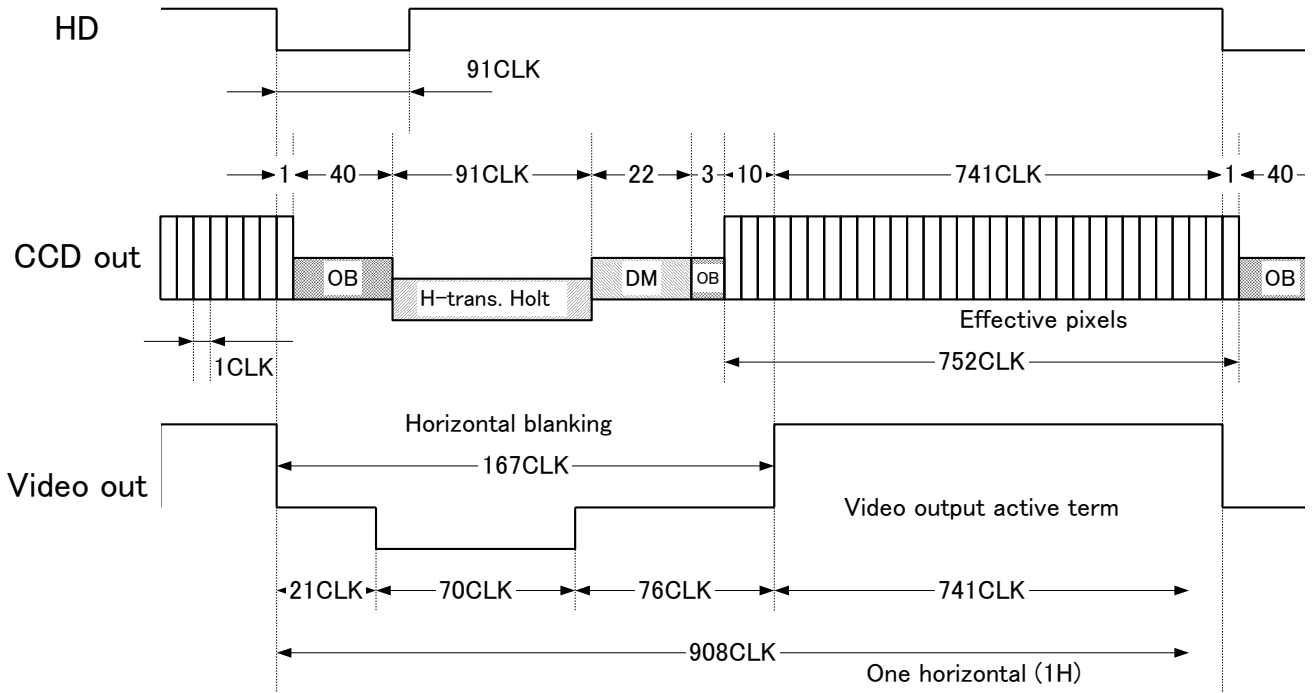
* CCD out timing 1 DIP-SW5 = OFF state, CCD out timing 2 of DIP-SW5 = ON state

5.2 Camera Output Timing Charts (STC-MB42C / STC-MB43C / STC-MBH42C / STC-MBH43C)

5.2.1 Horizontal Timing

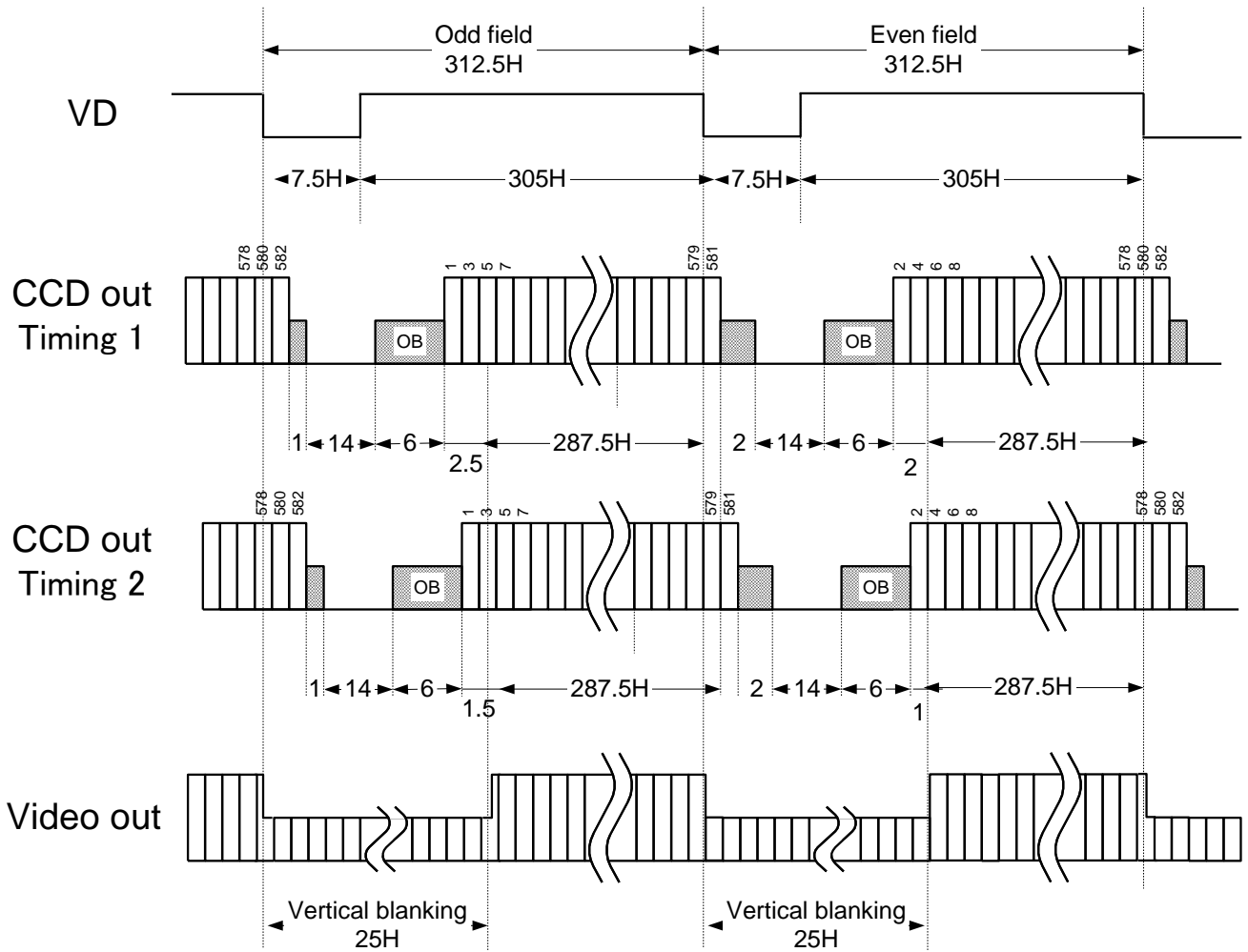
1CLK = 70.5 nseconds (Normal speed 25 fps)

1CLK = 35.2 nseconds (Double speed 50 fps)

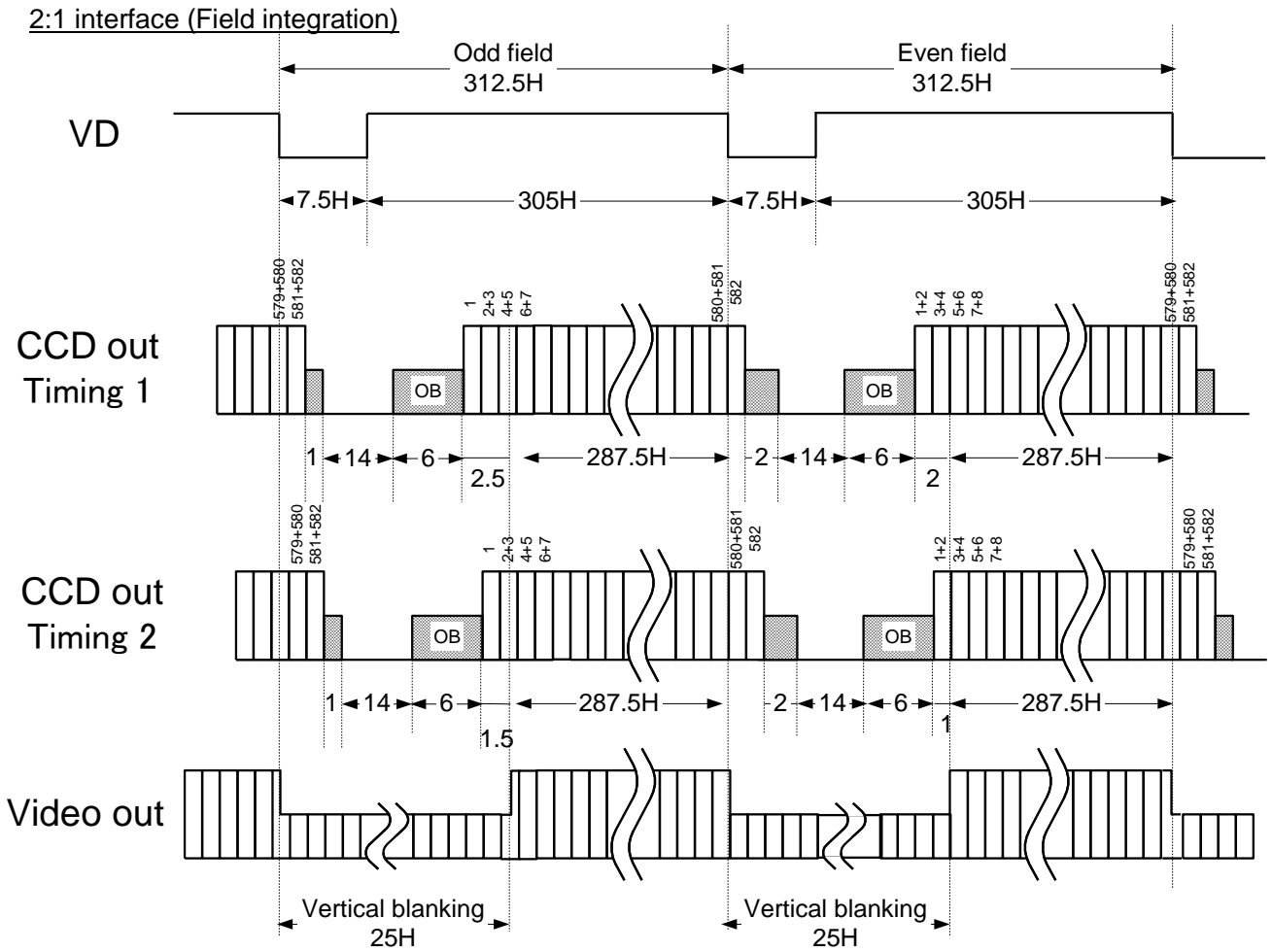


5.2.2 Vertical Timing

2:1 interlace (Frame integration)



* CCD out timing 1 DIP-SW5 = OFF state, CCD out timing 2 of DIP-SW5 = ON state



* CCD out timing 1 DIP-SW5 = OFF state, CCD out timing 2 of DIP-SW5 = ON state

6 Communication Protocol Specifications

This camera has a communication function, which allows an external device such as a PC to change the camera settings.

Please use the “CLCtrl2” communication software or use the following communication protocol to communicate to the camera.

6.1 Communication Method

UART (RS232C), binary communication

6.2 Communication Settings

Baud rate	9,600bps / 38,400bps
Data bit	8bit
Parity	None
Stop bit	1bit
Flow control	None

6.3 Communication Format

- The format for sending data from the PC to the Camera is as follows:

- The read command is sent:

SOF	Device Code	Read / Write	Page Selection	Command Code	Data Length	Data	EOF
8 bit (always 02H)	6 bit	1 bit (always 00H)	1 bit	8 bit	8 bit	8 bit	8bit (always 03H)

- The write command is sent:

SOF	Device Code	Read / Write	Page Selection	Command Code	Data Length	Data	EOF
8 bit (always 02H)	6 bit	1 bit (always 01H)	1 bit	8 bit	8 bit	Data Length Byte	8 bit (always 03H)

- The format for receiving data from the camera is as follows:

- After the read command has been sent:

SOF	Data Length	Data	EOF
8 bit (always 02H)	8 bit	Data Length Byte	8bit (always 03H)

- After the write command is sent:

SOF	Data Length	Data	EOF
8 bit (always 02H)	8 bit (always 00H)	8 bit	8bit (always 03H)

● Descriptions of the Format:

Name	Descriptions
SOF	Start of the frame. The set (or receive) value is always "02H".
Device Code	This indicates the destination of the communication. The device code for the camera is "000000". Other device codes are the peripheral devices.
Read / Write	This specifies "Read" or "Write" to command numbers. Set 0 for "Read" and 1 for "Write".
Page Selection	This specifies page selection (access selection) to registers and EEPROM of command. Set 0 to access the command register of the camera. Read command: To read the current data from the command register. Write command: To set the data into the command register. The data in the EEPROM is not replaced. Set 1 to access the EEPROM of the camera. Read command: To read the data from the EEPROM. Write command: To save the data into the EEPROM as default data. Notes: 1. The camera operates with the data in the EEPROM when the camera is powered on. 2. The camera returns the receiving code "01H" to the PC after save the data into the EEPROM. The camera rejects any commands during the data saved. (approximately 5 mseconds / byte)
Command Code	This indicates the command. Refer to the following page for the details.
Data Length	This indicates the data length (Unit is byte). Sending data: Set to 0 when sending the read command. The data length is dependent on each write command when sending the write command. Receiving data: The data length is dependent on each write command after sending the read command. Receive "00H" after sending the write command. Receive "00H" when an error has occurred.
Data	This indicates write data or read data according to the command type.
EOF	End of the frame. The set (or receive) value is always "03H".
Receiving Code	This indicates result of the sending command: 01H: Receiving OK (ACK) 10H: Receiving problem (NAC) 11H: Communication problem

6.4 Camera Control Commands

6.4.1 Camera Command List

Notes:

1. The data unit of each command is 1 byte (8bit).
2. Data can be saved to the EEPROM if there is an "X" in the "Save to EEPROM" column in the list below.
3. The camera initializes based on the stored data in the EEPROM when the camera is powered on.

Command No.	Read/Write	EEPROM	Function	Default Data	Data Range
00 - 0FH			Reserved	-	-
10H	Read/Write	X	The camera function mode1 (8bit: D[7...0])	20H	
11H	Read/Write	X	The camera function mode2 (8bit: D[7...0])	0	
12H	Read/Write	X	The camera function mode3 (8bit: D[7...0])	0	
13H	Read/Write	X	The camera function mode4 (8bit: D[7...0])	0	
14H	Read/Write	X	The communication mode (8bit: D[7...0])	1	
15H	Read/Write	X	The trigger filtering (8bit: D[7...0])	0	
16 - 1CH			Reserved	-	-
1DH	Read/Write	X	ALC target (8bit: D[7...0])	80H	
1EH	Read/Write	X	ALC mode (8bit: D[7...0])	0	
1FH			Reserved	-	-
20H	Read/Write	X	The exposure time of the electronic shutter H-unit (16bit: D[7...0])	0	0 to 261
21H	Read/Write	X	The exposure time of the electronic shutter H-unit (16bit: D[15...8])		
22H	Read/Write	X	The exposure time of the electronic shutter CLK-unit (16bit: D[7...0])	0	0 to 909
23H	Read/Write	X	The exposure time of the electronic shutter CLK-unit (16bit: D[15...8])		
24 - 27			Reserved	-	-
28H	Read/Write	X	The delay time of the trigger (8bit: D[7...0])	0	0 to 255
29 - 2FH			Reserved	-	-
30H	Read/Write	X	CDS gain (8bit: D[7...0])	0	0 to 255
31H	Read/Write	X	The digital gain (8bit: D[7...0])	The value of 0EH address	-
32H	Read/Write	X	The gain offset (8bit: D[7...0])	The value of 0FH address	-
33 - 37H			Reserved	-	-
38H	Read/Write	X	The clamp level (8bit: D[7...0])	92	0 to 255
39 - 5FH			Reserved	-	-
60H	Read/Write	X	Control selection (Rear panel / communication) (8bit: D[7...0])	0	-
61H			Reserved	-	-
62H	Read/Write	X	Fixed gain value for the rear panel (8bit: D[7...0])	16	0 to 255
63 - 64H	Read/Write	X	Maximum setting of the pot on the rear panel (16bit: D[15...0])	440	0 to 440
65 - 6FH			Reserved	-	-
70 - 71H	Read	-	The current selection on the rear panel (1bit: D[15])	-	-
			The current gain value of the point on the rear panel (15bit: D[14...0])	-	-

Command No.	Read/Write	EEPROM	Function	Default Data	Data Range
72H	Read	-	The current gain value (8bit: D[7...0])	-	-
73 - 75H			Reserved	-	-
76 - 77H	Read	-	Status of the DIP switch on the rear panel (10bit: D[9...0])	-	-
78 - 7FH			Reserved	-	-
80H	Read/Write	-	EEPROM control (8bit: D[7...0])	0	0 to 3
81 - 9FH			Reserved	-	-
A0H	Read/Write	X	Pixel defect correction control (8bit: [D7...0])	1	-
A1H	Read/Write	X	Position designate number for the pixel defect correction (8bit: D[7...0])	0	-
A2H	Read/Write	X	Horizontal position for the pixel defect correction (write) (8bit: D[7...0])	0	-
A3H	Read/Write	X	Horizontal position for the pixel defect correction (write) (8bit: D[7...0])	0	-
A4H	Read/Write	X	Vertical position for the pixel defect correction (write) (8bit: D[7...0])	0	-
A5H	Read/Write	X	Vertical position for the pixel defect correction (write) (8bit: D[7...0])	0	-
A6H	Read/Write	X	Horizontal position for the pixel defect correction (Read) (8bit: D[7...0])	0	-
A7H	Read/Write	X	Horizontal position for the pixel defect correction (Read) (8bit: D[7...0])	0	-
A8H	Read/Write	X	Vertical position for the pixel defect correction (Read) (8bit: D[7...0])	0	-
A9H	Read/Write	X	Vertical position for the pixel defect correction (Read) (8bit: D[7...0])	0	-
AA - FFH			Reserved		

6.4.2 Descriptions of the Camera Control Commands

Please note that the underlined settings are the default settings.

Command No.	Command Descriptions																																																	
10H: MOD1[7...0]	<p>[The camera function mode1] Default data: MOD1[7...0] = 20H</p> <p>This command sets the camera function modes shown below.</p> <p>D[7...0]</p> <table border="1" style="width: 100%; text-align: center;"> <tr> <td>D7</td><td>D6</td><td>D5</td><td>D4</td><td>D3</td><td>D2</td><td>D1</td><td>D0</td> </tr> </table> <table border="1" style="width: 100%; margin-top: 10px;"> <tr> <td>D7:</td> <td>Continuous / Trigger Mode</td> <td><u>0: Auto</u></td> <td>1: Manual</td> </tr> <tr> <td>D6:</td> <td>Trigger Polarity</td> <td><u>0: Positive</u></td> <td>1: Negative</td> </tr> <tr> <td>D5:</td> <td>Trigger Mode</td> <td>0: Edge Preset</td> <td><u>1: Pulse Width</u></td> </tr> <tr> <td>D4:</td> <td>Binning Mode</td> <td><u>0: OFF (Normal)</u></td> <td>1: ON (Binning)</td> </tr> <tr> <td>D3:</td> <td>Scanning Mode</td> <td><u>0: Full Scanning</u></td> <td>1: No function (Prohibited setting)</td> </tr> <tr> <td rowspan="3">D2 to D0:</td> <td rowspan="3">Reset Mode</td> <td><u>000: Non-Reset</u></td> <td>001: V Reset</td> </tr> <tr> <td>010: No Function (Prohibited setting)</td> <td>011: Restart Reset</td> </tr> <tr> <td colspan="2">100 to 111: No Function (Prohibited setting)</td> </tr> </table>	D7	D6	D5	D4	D3	D2	D1	D0	D7:	Continuous / Trigger Mode	<u>0: Auto</u>	1: Manual	D6:	Trigger Polarity	<u>0: Positive</u>	1: Negative	D5:	Trigger Mode	0: Edge Preset	<u>1: Pulse Width</u>	D4:	Binning Mode	<u>0: OFF (Normal)</u>	1: ON (Binning)	D3:	Scanning Mode	<u>0: Full Scanning</u>	1: No function (Prohibited setting)	D2 to D0:	Reset Mode	<u>000: Non-Reset</u>	001: V Reset	010: No Function (Prohibited setting)	011: Restart Reset	100 to 111: No Function (Prohibited setting)														
D7	D6	D5	D4	D3	D2	D1	D0																																											
D7:	Continuous / Trigger Mode	<u>0: Auto</u>	1: Manual																																															
D6:	Trigger Polarity	<u>0: Positive</u>	1: Negative																																															
D5:	Trigger Mode	0: Edge Preset	<u>1: Pulse Width</u>																																															
D4:	Binning Mode	<u>0: OFF (Normal)</u>	1: ON (Binning)																																															
D3:	Scanning Mode	<u>0: Full Scanning</u>	1: No function (Prohibited setting)																																															
D2 to D0:	Reset Mode	<u>000: Non-Reset</u>	001: V Reset																																															
		010: No Function (Prohibited setting)	011: Restart Reset																																															
		100 to 111: No Function (Prohibited setting)																																																
11H: MOD2[7...0]	<p>[The camera function mode2] Default data: MOD2[7...0] = 0</p> <p>This command sets the camera function modes shown below.</p> <p>D[7...0]</p> <table border="1" style="width: 100%; text-align: center;"> <tr> <td>D7</td><td>D6</td><td>D5</td><td>D4</td><td>D3</td><td style="background-color: #cccccc;">D2</td><td style="background-color: #cccccc;">D1</td><td style="background-color: #cccccc;">D0</td> </tr> </table> <table border="1" style="width: 100%; margin-top: 10px;"> <tr> <td>D7:</td> <td>Sync System</td> <td><u>0: HD/VD signal in (External)</u></td> <td>1: HD/VD signal out (Internal)</td> </tr> <tr> <td rowspan="2">D6 to D5:</td> <td rowspan="2">Frame Rate</td> <td><u>00: 30 fps</u></td> <td>01: 60 fps</td> </tr> <tr> <td>(Normal Speed, CLK: 14.318 MHz)</td> <td>(Double Speed, CLK: 28.636 MHz)</td> </tr> <tr> <td colspan="2"></td> <td colspan="2">10 to 11: No Function (Prohibited setting)</td> </tr> <tr> <td>D4:</td> <td>Trigger Pulse Mode</td> <td><u>0: Single Pulse Trigger</u></td> <td>1: Two Pulses Trigger</td> </tr> <tr> <td>D3:</td> <td>Function Mode (Note)</td> <td><u>0: Trigger Mode</u></td> <td>1: Continuous Mode</td> </tr> <tr> <td>D2 to D0:</td> <td>No Function</td> <td colspan="2"><u>Always set "000"</u></td> </tr> </table> <p>Note: 10H.D7, continuous / trigger mode setting and this 11H.D3, function mode, interrelates to each other and the combinations of both settings determine final operation modes of the camera. The functions of the cameras determined by these two settings are summarized as below:</p> <table border="1" style="width: 100%; margin-top: 10px;"> <tr> <td>10H.D7 Continuous / Trigger Mode</td> <td>11H.D3 Function Mode</td> <td>Operational mode</td> </tr> <tr> <td>1: Manual</td> <td>0: Trigger Mode</td> <td>Trigger mode with the long exposure enable</td> </tr> <tr> <td>1: Manual</td> <td>1: Continuous Mode</td> <td>Continuous mode</td> </tr> <tr> <td>0: Auto</td> <td>0: Trigger Mode</td> <td>Trigger mode without long exposure enable (Note)</td> </tr> <tr> <td>0: Auto</td> <td>1: Continuous Mode</td> <td>Trigger mode without long exposure enable (Note)</td> </tr> </table> <p>Note: The camera goes into the continuous mode automatically when the trigger input lasts more than 500 mseconds.</p>	D7	D6	D5	D4	D3	D2	D1	D0	D7:	Sync System	<u>0: HD/VD signal in (External)</u>	1: HD/VD signal out (Internal)	D6 to D5:	Frame Rate	<u>00: 30 fps</u>	01: 60 fps	(Normal Speed, CLK: 14.318 MHz)	(Double Speed, CLK: 28.636 MHz)			10 to 11: No Function (Prohibited setting)		D4:	Trigger Pulse Mode	<u>0: Single Pulse Trigger</u>	1: Two Pulses Trigger	D3:	Function Mode (Note)	<u>0: Trigger Mode</u>	1: Continuous Mode	D2 to D0:	No Function	<u>Always set "000"</u>		10H.D7 Continuous / Trigger Mode	11H.D3 Function Mode	Operational mode	1: Manual	0: Trigger Mode	Trigger mode with the long exposure enable	1: Manual	1: Continuous Mode	Continuous mode	0: Auto	0: Trigger Mode	Trigger mode without long exposure enable (Note)	0: Auto	1: Continuous Mode	Trigger mode without long exposure enable (Note)
D7	D6	D5	D4	D3	D2	D1	D0																																											
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10H.D7 Continuous / Trigger Mode	11H.D3 Function Mode	Operational mode																																																
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1: Manual	1: Continuous Mode	Continuous mode																																																
0: Auto	0: Trigger Mode	Trigger mode without long exposure enable (Note)																																																
0: Auto	1: Continuous Mode	Trigger mode without long exposure enable (Note)																																																
12H: MOD3[7...0]	<p>[The camera function mode3] Default data: MOD3[7...0] = 0</p> <p>This command sets the camera function modes shown below.</p> <p>D[7...0]</p> <table border="1" style="width: 100%; text-align: center;"> <tr> <td style="background-color: #cccccc;">D7</td><td style="background-color: #cccccc;">D6</td><td style="background-color: #cccccc;">D5</td><td style="background-color: #cccccc;">D4</td><td style="background-color: #cccccc;">D3</td><td style="background-color: #cccccc;">D2</td><td style="background-color: #cccccc;">D1</td><td style="background-color: #cccccc;">D0</td> </tr> </table> <table border="1" style="width: 100%; margin-top: 10px;"> <tr> <td>D7 to D3:</td> <td>No Function</td> <td colspan="2"><u>Always set "00000"</u></td> </tr> <tr> <td>D2:</td> <td>Integration Mode</td> <td><u>0: Frame Integration</u></td> <td>1: Field Integration</td> </tr> <tr> <td rowspan="2">D1 to D0:</td> <td rowspan="2">Gamma Mode</td> <td><u>00: 1.0</u></td> <td>01: 0.45</td> </tr> <tr> <td colspan="2">10 to 11: No Function (Prohibited setting)</td> </tr> </table>	D7	D6	D5	D4	D3	D2	D1	D0	D7 to D3:	No Function	<u>Always set "00000"</u>		D2:	Integration Mode	<u>0: Frame Integration</u>	1: Field Integration	D1 to D0:	Gamma Mode	<u>00: 1.0</u>	01: 0.45	10 to 11: No Function (Prohibited setting)																												
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		10 to 11: No Function (Prohibited setting)																																																

Command No.	Command Descriptions																																
13H: MOD4[7...0]	<p>[The camera function mode4] Default data: MOD4[7...0] = 0 This command sets the camera function modes shown below. D[7...0]</p> <table border="1"> <tr> <td>D7</td><td>D6</td><td>D5</td><td>D4</td><td>D3</td><td>D2</td><td>D1</td><td>D0</td> </tr> </table> <table border="1"> <tr> <td>D7 to D4:</td> <td>No Function</td> <td colspan="4"><u>Always set "0000"</u></td> </tr> <tr> <td rowspan="4">D3 to D0:</td> <td rowspan="4">External Sync Phase Adjust</td> <td>0111: 7CLK</td> <td>0110: 6CLK</td> <td>0101: 5CLK</td> <td>0100: 4CLK</td> </tr> <tr> <td>0011: 3CLK</td> <td>0010: 2CLK</td> <td>0001: 1CLK</td> <td><u>0000: 0CLK</u></td> </tr> <tr> <td>1111: -1CLK</td> <td>1110: -2CLK</td> <td>1101: -3CLK</td> <td>1100: -4CLK</td> </tr> <tr> <td>1011: -5CLK</td> <td>1010: -6CLK</td> <td>1001: -7CLK</td> <td>1000: -8CLK</td> </tr> </table>	D7	D6	D5	D4	D3	D2	D1	D0	D7 to D4:	No Function	<u>Always set "0000"</u>				D3 to D0:	External Sync Phase Adjust	0111: 7CLK	0110: 6CLK	0101: 5CLK	0100: 4CLK	0011: 3CLK	0010: 2CLK	0001: 1CLK	<u>0000: 0CLK</u>	1111: -1CLK	1110: -2CLK	1101: -3CLK	1100: -4CLK	1011: -5CLK	1010: -6CLK	1001: -7CLK	1000: -8CLK
D7	D6	D5	D4	D3	D2	D1	D0																										
D7 to D4:	No Function	<u>Always set "0000"</u>																															
D3 to D0:	External Sync Phase Adjust	0111: 7CLK	0110: 6CLK	0101: 5CLK	0100: 4CLK																												
		0011: 3CLK	0010: 2CLK	0001: 1CLK	<u>0000: 0CLK</u>																												
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		1011: -5CLK	1010: -6CLK	1001: -7CLK	1000: -8CLK																												
14H: UART[7...0]	<p>[The communication mode] Default data: UART[7...0] = 1 This command sets the camera function modes shown below. D[7...0]</p> <table border="1"> <tr> <td>D7</td><td>D6</td><td>D5</td><td>D4</td><td>D3</td><td>D2</td><td>D1</td><td>D0</td> </tr> </table> <table border="1"> <tr> <td>D7 to D2:</td> <td>No Function</td> <td colspan="4"><u>Always set "000000"</u></td> </tr> <tr> <td rowspan="2">D1 to D0:</td> <td rowspan="2">Baud Rate</td> <td colspan="2">00: 38,400bps</td> <td colspan="2"><u>01: 9,600bps</u></td> </tr> <tr> <td colspan="4">10 to 11: No Function (Prohibited setting)</td> </tr> </table>	D7	D6	D5	D4	D3	D2	D1	D0	D7 to D2:	No Function	<u>Always set "000000"</u>				D1 to D0:	Baud Rate	00: 38,400bps		<u>01: 9,600bps</u>		10 to 11: No Function (Prohibited setting)											
D7	D6	D5	D4	D3	D2	D1	D0																										
D7 to D2:	No Function	<u>Always set "000000"</u>																															
D1 to D0:	Baud Rate	00: 38,400bps		<u>01: 9,600bps</u>																													
		10 to 11: No Function (Prohibited setting)																															
15H: TRGFIL[7...0]	<p>[The trigger filtering] Default data: TRGFIL [7...0] = 0 This command sets the following trigger filtering modes. D[7...0]</p> <table border="1"> <tr> <td>D7</td><td>D6</td><td>D5</td><td>D4</td><td>D3</td><td>D2</td><td>D1</td><td>D0</td> </tr> </table> <table border="1"> <tr> <td>D7:</td> <td>Trigger Filtering</td> <td>0: OFF</td> <td>1: ON</td> </tr> <tr> <td>D6 to D0:</td> <td>Trigger Filtering Coefficient</td> <td>0: 0CLK</td> <td>127: 127CLK</td> </tr> </table> <p>Note: When the trigger filtering is on, the trigger signal is invalid if the active duration of the trigger signal is less than trigger filtering coefficient.</p>	D7	D6	D5	D4	D3	D2	D1	D0	D7:	Trigger Filtering	0: OFF	1: ON	D6 to D0:	Trigger Filtering Coefficient	0: 0CLK	127: 127CLK																
D7	D6	D5	D4	D3	D2	D1	D0																										
D7:	Trigger Filtering	0: OFF	1: ON																														
D6 to D0:	Trigger Filtering Coefficient	0: 0CLK	127: 127CLK																														
1DH: ALCLV[7...0]	<p>[ALC target] Default data: ALCLV[7...0] = 80, data range: 0 to 255 This command sets the target brightness for the ALC function. This is only valid when the ALC mode is ON.</p>																																
1EH: ALST[7...0]	<p>[ALC mode] Default data: ALST[7...0] = 0 This command sets the following ALC modes. D[7...0]</p> <table border="1"> <tr> <td>D7</td><td>D6</td><td>D5</td><td>D4</td><td>D3</td><td>D2</td><td>D1</td><td>D0</td> </tr> </table> <table border="1"> <tr> <td>D7 to D2:</td> <td>No Function</td> <td colspan="4"><u>Always set "000000"</u></td> </tr> <tr> <td>D1:</td> <td>ALC Mode (AGC)</td> <td colspan="2"><u>0: OFF (Manual Gain)</u></td> <td colspan="2">1: ON (AGC)</td> </tr> <tr> <td>D0:</td> <td>ALC Mode (Auto Shutter)</td> <td colspan="2"><u>0: OFF (Manual Shutter)</u></td> <td colspan="2">1: ON (Auto Shutter)</td> </tr> </table>	D7	D6	D5	D4	D3	D2	D1	D0	D7 to D2:	No Function	<u>Always set "000000"</u>				D1:	ALC Mode (AGC)	<u>0: OFF (Manual Gain)</u>		1: ON (AGC)		D0:	ALC Mode (Auto Shutter)	<u>0: OFF (Manual Shutter)</u>		1: ON (Auto Shutter)							
D7	D6	D5	D4	D3	D2	D1	D0																										
D7 to D2:	No Function	<u>Always set "000000"</u>																															
D1:	ALC Mode (AGC)	<u>0: OFF (Manual Gain)</u>		1: ON (AGC)																													
D0:	ALC Mode (Auto Shutter)	<u>0: OFF (Manual Shutter)</u>		1: ON (Auto Shutter)																													

Command No.	Command Descriptions
20H: SVR[7...0] 21H: SVR[15...8]	<p>[The exposure time (H) of the electronic shutter] Default data: SVR[15...0] = 0, data range: 0 to 261</p> <p>This command and SHR[15...0] set the preset shutter speed (or CCD exposure time) for the electronic shutter.</p> <p>The preset shutter speed is defined by the following formula: $\text{Preset Shutter Speed} = \text{SVR}[15...0] \times (1\text{H cycle time}) + \text{SHR}[15...0] \times (1\text{CLK cycle time})$</p> <p>Notes:</p> <ol style="list-style-type: none"> 1. The data in 20H through 23H reflects to the present shutter speed. 2. The camera works with the shutter off (maximum shutter speed) when both SVR[] and SHR[] are set to 0. 3. The camera works with the minimum shutter speed when this value is set to 0 and SHR[] is set between 1 and 143. 4. EIA: The value replaces by 261 automatically when this value is set to greater than 261. CCIR: The value replaces by 311 automatically when this value is set to greater than 311.
22H: SHR[7...0] 23H: SHR[15...8]	<p>[The exposure time (CLK) of the electronic shutter] Default data: SHR [15...0] = 0, data range: 0 to 909</p> <p>This command and SVR[15...0] set the preset shutter speed (or CCD exposure time) for the electronic shutter.</p> <p>The preset shutter speed is defined by the following formula: $\text{Preset Shutter Speed} = \text{SVR}[15...0] \times (1\text{H cycle time}) + \text{SHR}[15...0] \times (1\text{CLK cycle time})$</p> <p>Notes:</p> <ol style="list-style-type: none"> 1. The data in 20H through 23H reflects to the preset shutter speed. 2. The camera works with the shutter off (maximum shutter speed) when both SVR[] and SHR[] are set at 0. 3. The camera works with the minimum shutter speed when this value is set between 1 and 143 and SHR[] is set to 0. 4. EIA: The value replaces by 909 automatically when this value is set to greater than 909. CCIR: The value replaces by 907 automatically when this value is set to greater than 907.
28H: DLY [7...0]	<p>[The delay time for the trigger] Default data: DLY[7...0] = 0, data range: 0 to 255</p> <p>This command sets the delay time for the input trigger signal to the start of the exposure.</p> <p>Delay time is defined by the following formula: EIA: Delay Time = 148 CLK x DLY[7...0] (Unit is useconds) CCIR: Delay Time = 142 CLK x DLY[7...0] (Unit is useconds)</p>
30H: PGA[7...0]	<p>[The CDS gain] Default data: PGA[7...0] = 0, data range: 0 to 255</p> <p>This command sets the CDS gain, which is the programmable gain.</p> <p>CDS gain is defined by the following formula: $\text{CDS Gain} = \text{PGA}[7...0] \times 3 \times 0.0351 \text{ (Unit is dB)}$</p>
31H: DGB[7...0]	<p>[The digital gain] Default data: DGB[7...0] = The value in the address 0EH</p> <p>This command sets the digital gain.</p> <p>Digital gain is defined by the following formula: $\text{Digital Gain} = \text{DGB}[7...0] / 128 + 1 \text{ (Unit is times)}$</p>
32H: GOFs[7...0]	<p>[The gain offset] Default data: GOFs[7...0] = The value in the address 0FH, data range: 0 to 255</p> <p>This command sets the gain offset.</p> <p>Gain offset is defined by the following formula: $\text{Gain Offset} = \text{GOFs}[7...0] \times 0.0351 \text{ (Unit is dB)}$</p>
38H: CLAMP[7...0]	<p>[The clamp level] Default data: CLAMP[7...0] = 4, data range: 0 to 255</p> <p>This command sets the clamp level for the black signal.</p>

Command No.	Command Descriptions																								
60H: SWCOM[7...0]	<p>[The control selection (Rear panel / communication)] Default data: SWCOM[7...0] = 0</p> <p>This command sets the following control selections.</p> <p>D[7...0]</p> <table border="1" style="width: 100%; text-align: center;"> <tr> <td>D7</td><td>D6</td><td>D5</td><td>D4</td><td>D3</td><td>D2</td><td>D1</td><td>D0</td> </tr> </table> <table border="1" style="width: 100%; margin-top: 10px;"> <tr> <td style="width: 15%;">D7 to D2:</td> <td style="width: 35%;">No Function</td> <td colspan="2" style="text-align: center;"><u>Always set "000000"</u></td> </tr> <tr> <td>D1:</td> <td>Control Selection</td> <td style="text-align: center;"><u>0: DIP switch on the camera</u></td> <td style="text-align: center;"><u>1: Communication</u></td> </tr> <tr> <td>D0:</td> <td>Gain Switch</td> <td style="text-align: center;"><u>0: Gain mode is selectable by the switch on the rear panel</u></td> <td style="text-align: center;"><u>1: Gain mode is selectable and the fixed gain is adjustable by the communication.</u></td> </tr> </table>	D7	D6	D5	D4	D3	D2	D1	D0	D7 to D2:	No Function	<u>Always set "000000"</u>		D1:	Control Selection	<u>0: DIP switch on the camera</u>	<u>1: Communication</u>	D0:	Gain Switch	<u>0: Gain mode is selectable by the switch on the rear panel</u>	<u>1: Gain mode is selectable and the fixed gain is adjustable by the communication.</u>				
D7	D6	D5	D4	D3	D2	D1	D0																		
D7 to D2:	No Function	<u>Always set "000000"</u>																							
D1:	Control Selection	<u>0: DIP switch on the camera</u>	<u>1: Communication</u>																						
D0:	Gain Switch	<u>0: Gain mode is selectable by the switch on the rear panel</u>	<u>1: Gain mode is selectable and the fixed gain is adjustable by the communication.</u>																						
62H: FIX_GAIN[7...0]	<p>[The fixed gain for the rear panel] Default data: FIX_GAIN[7...0] = 16, data range: 0 to 255</p> <p>This command sets the gain for the fixed gain on the rear panel.</p> <p>Fixed gain is defined by the following formula: Fixed Gain = FIX_GAIN[7...0] x 3 x 0.0351 (Unit is dB)</p>																								
63H: VR_MAX[15...8] 64H: VR_MAX[7...0]	<p>[The maximum setting of the pot on the rear panel] Default data: VR_MAX[15...0] = 440, data range: 0 to 440</p> <p>This command sets the maximum gain for the pot on the rear panel for the manual gain.</p>																								
70H: GAIN[15...8] 71H: GAIN[7...0]	<p>[The current gain selection on the rear panel / the current pot position on the rear panel]</p> <p>This command obtains the status of the gain selection and manual gain on the rear panel.</p> <p>D[15...0]</p> <table border="1" style="width: 100%; text-align: center;"> <tr> <td>D15</td><td>D14</td><td>D13</td><td>D12</td><td>D11</td><td>D10</td><td>D9</td><td>D8</td><td>D7</td><td>D6</td><td>D5</td><td>D4</td><td>D3</td><td>D2</td><td>D1</td><td>D0</td> </tr> </table> <table border="1" style="width: 100%; margin-top: 10px;"> <tr> <td style="width: 15%;">D15:</td> <td style="width: 35%;">Gain Mode</td> <td style="text-align: center;">0: Manual Gain</td> <td style="text-align: center;">1: Fixed Gain</td> </tr> <tr> <td>D14 to D0:</td> <td>Manual Gain</td> <td colspan="2"></td> </tr> </table>	D15	D14	D13	D12	D11	D10	D9	D8	D7	D6	D5	D4	D3	D2	D1	D0	D15:	Gain Mode	0: Manual Gain	1: Fixed Gain	D14 to D0:	Manual Gain		
D15	D14	D13	D12	D11	D10	D9	D8	D7	D6	D5	D4	D3	D2	D1	D0										
D15:	Gain Mode	0: Manual Gain	1: Fixed Gain																						
D14 to D0:	Manual Gain																								

Command No.	Command Descriptions																																																																								
76H: DSW_ST[9...8] 77H: DSW_ST[7...0]	<p>[Status of the DIP switch on the rear panel]</p> <p>This command obtains the status of the DIP switch on the rear panel.</p> <p>D[9...0]</p> <table border="1" style="margin-left: 20px;"> <tr> <td>D9</td><td>D8</td><td>D7</td><td>D6</td><td>D5</td><td>D4</td><td>D3</td><td>D2</td><td>D1</td><td>D0</td> </tr> </table> <table border="1" style="margin-left: 20px; width: 100%;"> <tr> <td>D9:</td> <td>Integration Mode</td> <td>0: Field Integration</td> <td>1: Frame Integration</td> </tr> <tr> <td>D8:</td> <td>Sync System</td> <td>0: HD/VD signal out (Internal)</td> <td>1: HD/VD signal in (External)</td> </tr> <tr> <td>D7:</td> <td>Gama Mode</td> <td>0: 0.45</td> <td>1: 1.0</td> </tr> <tr> <td>D6:</td> <td>Trigger Polarity</td> <td>0: Negative</td> <td>1: Positive</td> </tr> <tr> <td>D5:</td> <td>Frame Rate</td> <td>0: 60 fps (Double Speed, CLK: 28.636 MHz)</td> <td>1: 30 fps (Normal Speed, CLK: 14.318 MHz)</td> </tr> <tr> <td rowspan="2">D4:</td> <td>Reset Mode (Trigger Mode)</td> <td>0: V Reset</td> <td>1: Non-Reset</td> </tr> <tr> <td>Reset Mode (Continuous Mode)</td> <td>0: CCD Out Timing 2</td> <td>1: CCD Out Timing 1</td> </tr> <tr> <td rowspan="14">D3 to D0:</td> <td rowspan="8">Shutter speed (Normal speed)</td> <td>0000: OFF</td> <td>0001: OFF</td> </tr> <tr> <td>0010: 1/100,000 sec</td> <td>0011: 1/20,000 sec</td> </tr> <tr> <td>0100: 1/10,000 sec</td> <td>0101: 1/8,000 sec</td> </tr> <tr> <td>0110: 1/5,000 sec</td> <td>0111: 1/4,000 sec</td> </tr> <tr> <td>1000: 1/2,000 sec</td> <td>1001: 1/1,000 sec</td> </tr> <tr> <td>1010: 1/500 sec</td> <td>1011: 1/250 sec</td> </tr> <tr> <td>1100: 1/120 sec</td> <td>1101: 1/100 sec</td> </tr> <tr> <td>1110: 1/60 sec</td> <td>1111: OFF / Pulse width trigger</td> </tr> <tr> <td rowspan="6">Shutter speed (Double speed)</td> <td>0000: OFF</td> <td>0001: OFF</td> </tr> <tr> <td>0010: 1/200,000 sec</td> <td>0011: 1/40,000 sec</td> </tr> <tr> <td>0100: 1/20,000 sec</td> <td>0101: 1/16,000 sec</td> </tr> <tr> <td>0110: 1/10,000 sec</td> <td>0111: 1/8,000 sec</td> </tr> <tr> <td>1000: 1/4,000 sec</td> <td>1001: 1/2,000 sec</td> </tr> <tr> <td>1010: 1/1,000 sec</td> <td>1011: 1/500 sec</td> </tr> <tr> <td>1100: 1/240 sec</td> <td>1101: 1/200 sec</td> </tr> <tr> <td>1110: 1/120 sec</td> <td>1111: OFF / Pulse width trigger</td> </tr> </table>	D9	D8	D7	D6	D5	D4	D3	D2	D1	D0	D9:	Integration Mode	0: Field Integration	1: Frame Integration	D8:	Sync System	0: HD/VD signal out (Internal)	1: HD/VD signal in (External)	D7:	Gama Mode	0: 0.45	1: 1.0	D6:	Trigger Polarity	0: Negative	1: Positive	D5:	Frame Rate	0: 60 fps (Double Speed, CLK: 28.636 MHz)	1: 30 fps (Normal Speed, CLK: 14.318 MHz)	D4:	Reset Mode (Trigger Mode)	0: V Reset	1: Non-Reset	Reset Mode (Continuous Mode)	0: CCD Out Timing 2	1: CCD Out Timing 1	D3 to D0:	Shutter speed (Normal speed)	0000: OFF	0001: OFF	0010: 1/100,000 sec	0011: 1/20,000 sec	0100: 1/10,000 sec	0101: 1/8,000 sec	0110: 1/5,000 sec	0111: 1/4,000 sec	1000: 1/2,000 sec	1001: 1/1,000 sec	1010: 1/500 sec	1011: 1/250 sec	1100: 1/120 sec	1101: 1/100 sec	1110: 1/60 sec	1111: OFF / Pulse width trigger	Shutter speed (Double speed)	0000: OFF	0001: OFF	0010: 1/200,000 sec	0011: 1/40,000 sec	0100: 1/20,000 sec	0101: 1/16,000 sec	0110: 1/10,000 sec	0111: 1/8,000 sec	1000: 1/4,000 sec	1001: 1/2,000 sec	1010: 1/1,000 sec	1011: 1/500 sec	1100: 1/240 sec	1101: 1/200 sec	1110: 1/120 sec	1111: OFF / Pulse width trigger
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7EH: FWVR[15...8] 7FH: FWVR[7...0]	<p>[The firmware version verification] Default data: FWVR[15...0] = Firmware version</p> <p>This command is used to find the firmware version verification when the camera is powered on.</p> <p>The data of the address 10H to 7FH on the EEPROM are initialized with the factory default if this and the value on the register are not equal.</p>																																																																								
80H: E2P[7...0]	<p>[The EEPROM control] Default data: E2P[7...0] = 0</p> <p>This command sets the EEPROM control mode.</p> <p>D[7...0]</p> <table border="1" style="margin-left: 20px;"> <tr> <td>D7</td><td>D6</td><td>D5</td><td>D4</td><td>D3</td><td>D2</td><td>D1</td><td>D0</td> </tr> </table> <table border="1" style="margin-left: 20px; width: 100%;"> <tr> <td>D7 to D2:</td> <td>No Function</td> <td colspan="2"><u>Always set "000000"</u></td> </tr> <tr> <td>D1:</td> <td>Register simultaneously updates with the EEPROM</td> <td>0: <u>Prohibited</u></td> <td>1: Permitted</td> </tr> <tr> <td>D0:</td> <td>Writing control into EEPROM</td> <td>0: <u>Prohibited</u></td> <td>1: Permitted</td> </tr> </table> <p>Notes:</p> <ol style="list-style-type: none"> This bit is cleared to 0 automatically by the internal process after the execution of the command. By synchronizing to the EEPROM read/write access, the subject control register is also updated. 	D7	D6	D5	D4	D3	D2	D1	D0	D7 to D2:	No Function	<u>Always set "000000"</u>		D1:	Register simultaneously updates with the EEPROM	0: <u>Prohibited</u>	1: Permitted	D0:	Writing control into EEPROM	0: <u>Prohibited</u>	1: Permitted																																																				
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Revisions

Rev	Date	Changes	Note
00	2015/04/23	New Document	
01	2015/05/19	Update Added "-S" model Update the specifications table Update the rear paned drawing Update the DIP Switch descriptions Update the vertical output timing chart Change the dimensions drawing Update the default setting for the DIP Switch on the rear panel	
02	2015/06/30	Update Added CCIR and High Sensitivity model;	
03	2015/07/06	Update Added Information of High sensitivity model	