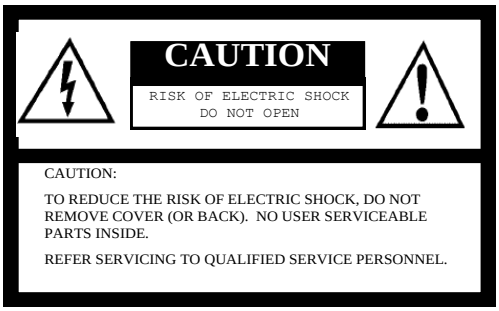
SENTECH

USB 2.0 Mini Board Series

Product Specification

Small Hardware
Board USB 2.0
Color / Monochrome Cameras

Safety Precautions



For U.S.A.

Warning:

This equipment generates and uses radio frequency energy and if not installed and used properly, I.e., in strict accordance with the instruction manual, may cause harmful interference to radio communications. It has been tested and found to comply with the limits for a Class A computing device pursuant to Subpart J of Part 15 of FCC Rules, which are designed to provide reasonable protection against such interference when operated in a commercial environment.

The lightning flash with arrowhead symbol, within an equilateral triangle, is intended to alert the user to the presence of uninsulated "dangerous voltage" within the product's enclosure that may be of sufficient magnitude to constitute a risk of electric shock to persons.

For Canada

Warning:

This digital apparatus does not exceed the Class A limits for radio noise emissions from digital apparatus set out in the Radio Interference Regulations of the Canadian Department of Communications.

The exclamation point within an equilateral triangle is intended to alert the user to the presence of important operating and maintenance (servicing) instructions in the literature accompanying the appliance.

WARNING:

TO PREVENT FIRE OR SHOCK HAZARD, DO NOT EXPOSE THIS APPLIANCE TO RAIN OR MOISTURE.

Product Precautions

- Handle the camera with care. Do not abuse the camera. Avoid striking or shaking it. Improper handling or storage could damage the camera.
- Do not pull or damage the camera cable.
- During camera use, do not wrap he unit in any material. This will cause the internal temperature of the unit to increase.
- Do not expose the camera to moisture, or do not try to operate it in wet areas.
- Do not operate the camera beyond its temperature, humidity and power source ratings.
- While the camera is not being used, keep the lens or lens cap on the camera to prevent dust or contamination from getting in the CCD or filter area and scratching or damaging this area.
- Do not keep the camera under the following conditions:
    - In wet, moist, and high humidity areas
    - Under hot direct sunlight
    - In high temperature areas
    - Near an object that releases a strong magnetic or electric field
    - Areas with strong vibrations
- Use a soft cloth to clean the camera. Use pressured air spray to clean the surface of the glass. Do not scratch the surface of the glass.

Copyright & Disclaimer

Contents

Caution for PCs with Intel Core i3, i5 or i7

- If the USB camera is used with a PC that has the Intel Core I series (i3, i5 and i7) chipset, the following problems may occur:
  - An image cannot be obtained with the USB camera
  - Frequent frame drop

  This issue may occur with other USB camera manufacturers as well.

- Cause of the issue:

  The image data cannot transfer to the PC because the Intel Core i3, i5 or i7 CPU frequently switches to the power save mode while the image is transferring.

- Solutions for the issue:

1. Disable the power save mode by changing the BIOS settings.

   Users will be responsible for any changes made to the BIOS setting.

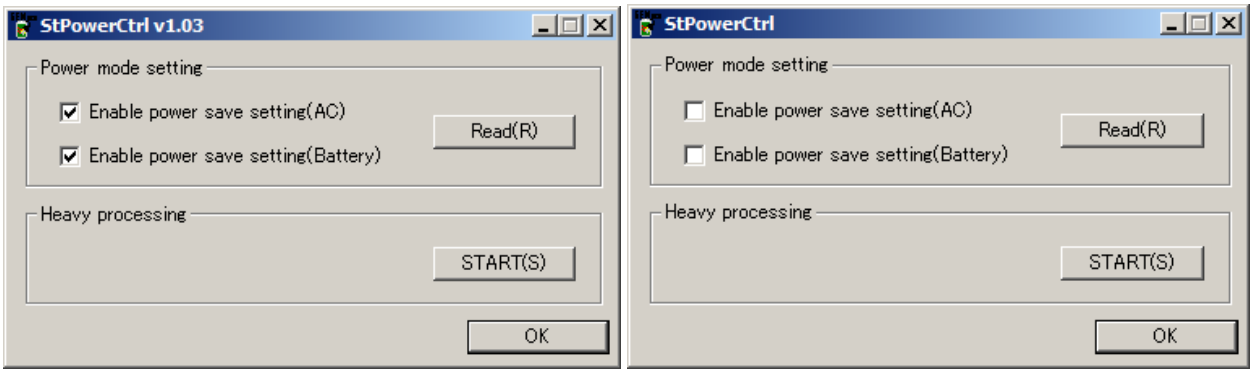
   The power consumption and the heat of the PC will increase whenever the power save mode is disabled. Please understand and accept this before disabling the power save mode.

2. Disable the power save mode with the Sentech PC power management software (StPowerCtrl)

   The power save mode can be disabled with the Sentech PC power management software "StPowerCtrl".

   A. Install "StCamSWare(v1.10)" or later revision.
   B. Launch "StPowerCtrl" from Windows start => Sentech => StCamSWare.
   C. Disable the two check boxes.

Before: After:



The power consumption and heat of the PC will increase when the power save mode is disabled. Please understand and accept this before disabling the power save mode.

3. Change the camera clock from "Normal" to "½" or "¼". (This will reduce the frame rate)

I. Overview

This document describes the specifications of the following cameras:

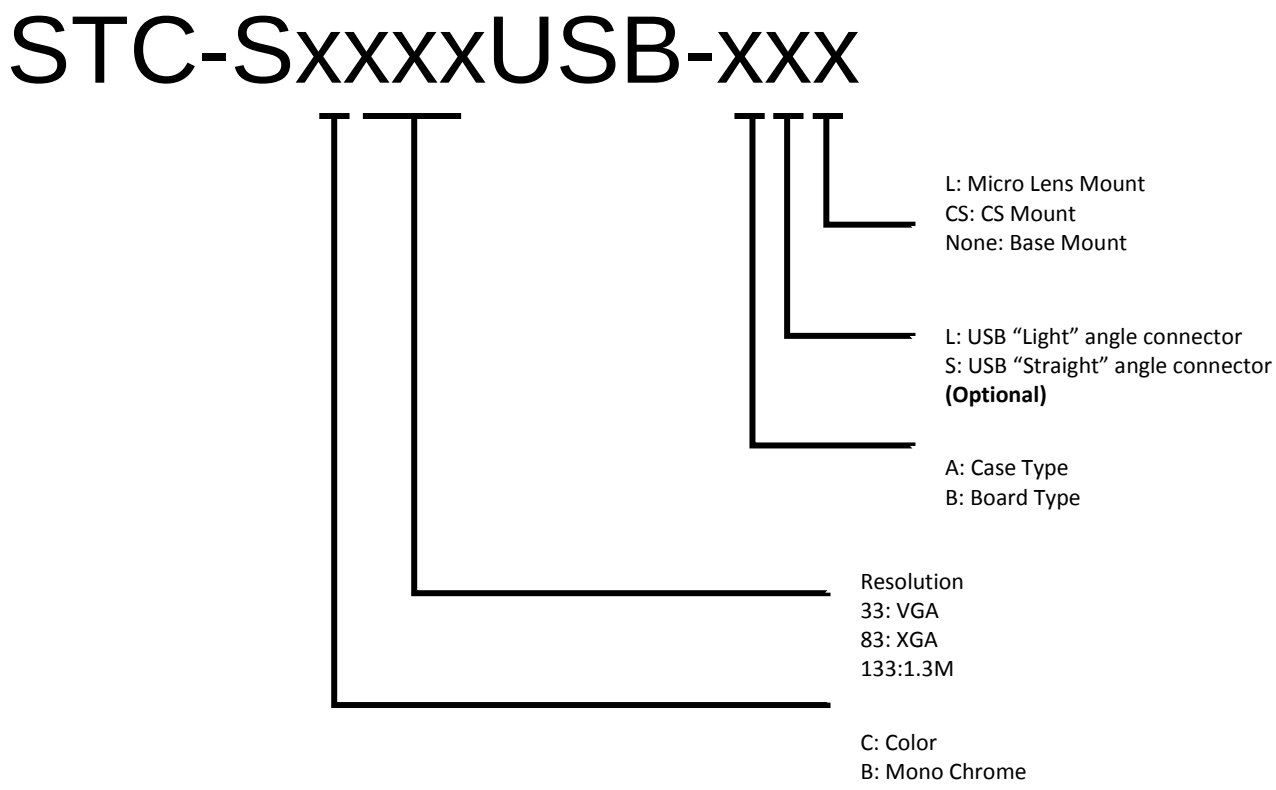
STC-SC33USB / SB33USB	(VGA)
STC-SC83USB / SB83USB	(XGA)
STC-SC133USB / SB133USB	(1.3MP)

A. Features

- Small Size
- New camera reset function
- Up to 64 pixel blemish static collection
- 8,10,12 bit output (10,12 bit only work on Trigger or ½ clock free run modes)

The new Board Mini USB Series are the smallest and lowest cost of Sentech's USB series. The port can now reset the camera without needing to reseed the USB cable. These cameras are available in Color or Monochrome models and various Lens Mounts. Up to 64 pixel blemish static collection is supported along with 8, 10, and 12 bit data output.

B. Naming Method



C. Application Support

These models work with Sentech's Viewing Software, (StCamSware), Sentech Trigger and Standard SDK, and sample code. Some of the functionality is different than other USB series, so the user must pay attention to the differences.

e.g.

One LED works on these models, even though sample code (StTrgDisplayVC2005.exe) shows two LED.
Two I/Os works on these models, even though Sentech's Viewing Software shows four I/Os.
Camera model can be known through Sentech Viewing Software, but not through SDK.
And so on.

D. Option Model

Sentech could provide the option model that is not mentioned in this document. As for the details, please speak with your sales representative for more information.

E. Power Supply

Sentech recommends to use the USB port power cable when using 90 fps with partial (or binning) mode on STC-SC33USB / STC-SB33USB.

F. Pixel Blemish Static Collection and Saving Camera Settings

These models have pixel blemish static collection and the ability to save camera settings on the camera(Default:ON). The user can recover the factory setting and save the camera setting on the PC also. As for the details, please see the user's guide for "StCamSware".

II. Specifications

A. STC-SC33USB / STC-SB33USB

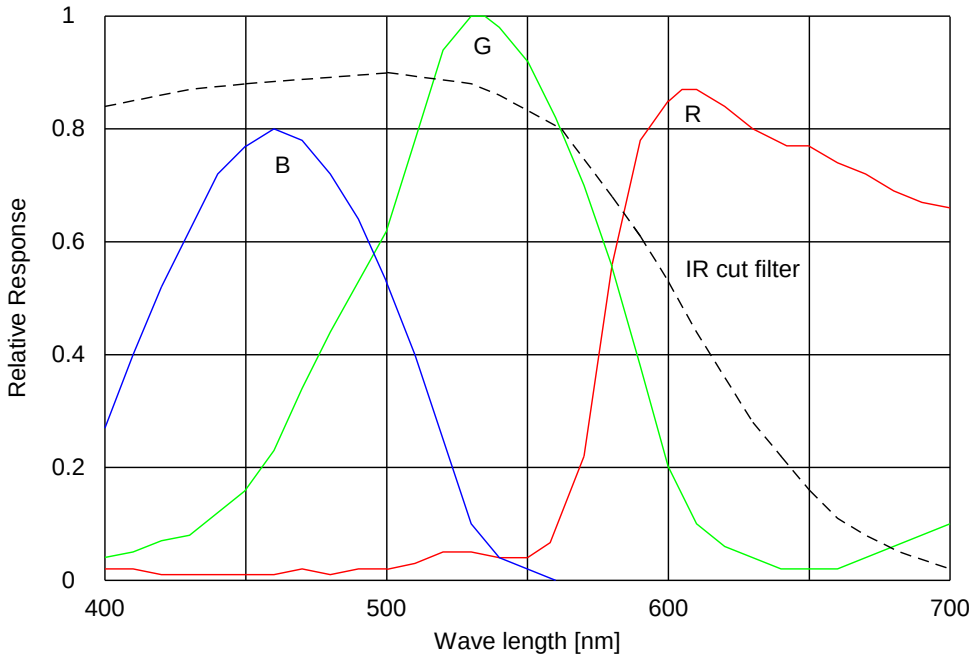
1. Electronic / Mechanical / Environmental Specifications

Product			STC-SC33USB	STC-SB33USB
Electronic Specifications	Image Sensor		1/3" interline VGA color progressive CCD: ICX424AQ(Sony)	1/3" interline VGA monochrome progressive CCD: ICX424AL(Sony)
		Total picture elements	692(H) x 504(V)	
		Effective picture elements	659(H) x 494(V)	
		Chip size	5.79(H) x 4.89(V) mm	
		Cell size	7.40(H) x 7.40(V) μm	
		Scanning system	Progressive	
	Resolution		640(H) x 480(V) (Full scanning) 640(H) x 224(V) (1/2 partial scanning) 640(H) x 80(V) (1/4 partial scanning)	
	Scanning methods		**Full scanning,** 1/1 partial scanning, 1/2 partial scanning, 1/4 partial scanning, Variable partial scanning	**Full scanning,** 1/1 partial scanning, 1/2 partial scanning, 1/4 partial scanning, Variable partial scanning, Binning scanning, Binning 1/1 partial scanning, Binning 1/2 partial scanning, Binning 1/4 partial scanning, Binning variable partial scanning
	Maximum framer rate	Full scanning	59.94 fps (Normal) / 29.97 fps (1/2clock) / 14.98 fps (1/4clock) / 89.91 fps (3/2clock) *Note1	
		1/2 partial scanning	120.11 fps (Normal) / 60.05 fsp (1/2clock) / 30.02 fps (1/4clock) / 180.165 fps (3/2clock)	
		1/4 partial scanning	240.22 fps (Normal) / 120.11 fps (1/2clock) / 60.055 fps (1/4clock) / 360.33 fps (3/2clock)	
	Pixel frequency		24.5454 MHz (Normal) / 12.2727 MHz (1/2clock) / 6.13635 MHz (1/4clock) / 36.818 MHz (3/2clock)	
	Video output		8bit / 10bit /12bit *Note2	
	Minimum scene illumination *Note2		TBD	TBD
	Sync. System		Internal	
	Electronic shutter		Auto / **Manual** (software selectable)	
		Normal	1/36,818,182 to 1/22.40 seconds(default 1/29.18 seconds)	
		1/2 clock	1/18,409,091 to 1/11.20 seconds	
		1/4 clock	1/9,204,545 to 1/5.60 seconds	
	Gain		Auto / **Manual** (software selectable,**default: x3.55**)	
	Gamma		Manual (software selectable,**default: 1**)	
	White balance		**Auto** / Manual / One shot (software selectable)	-
	Trigger mode		**Free-run** / Edge preset trigger / Pulse width trigger / Start & stop trigger (software selectable) (Hardware trigger and Software tigger are available)	
	Camera Reset		Support on Pin 5	
	LED Status		Green(Flicker):Power-On, Green:Camera works	
	Pixel Blemish Correction		64 Points (default:off)	
	Input/output		USB2.0 High speed	
	Power	Input voltage	+5 V through USB connector (+4.4 to +5.25V)	
		Consumption	less than 2.0 W *Note3	
Mechanical Specifications	Dimensions		Board Type::36(W) x 36(H) x 15.3(D) CS-Mount(without USB connector)	
	Lens mount		CS mount / MicroLens Mount / None Mount	
	Weight		approximately 15g	
	Interface connector	Angle	USB: mini-B USB connector IO Connector : SM05B-SRSS-TB (JST) 5pin	
Environmental Specifications	Operational temperature		0 to 40 deg. C	
	Storage temperature		-30 to 65 deg. C	
	Vibration *Note4		20Hz to 200Hz to 20Hz (5min./cycle), acccelaration 10G, 3 directions 30 min. each	
	Shock *Note4		Accelaration 70G, half amplitude 6ms, 3 directions 3 times each	
	Standard compliancy		TBD	
	RoHS		RoHS compliance	

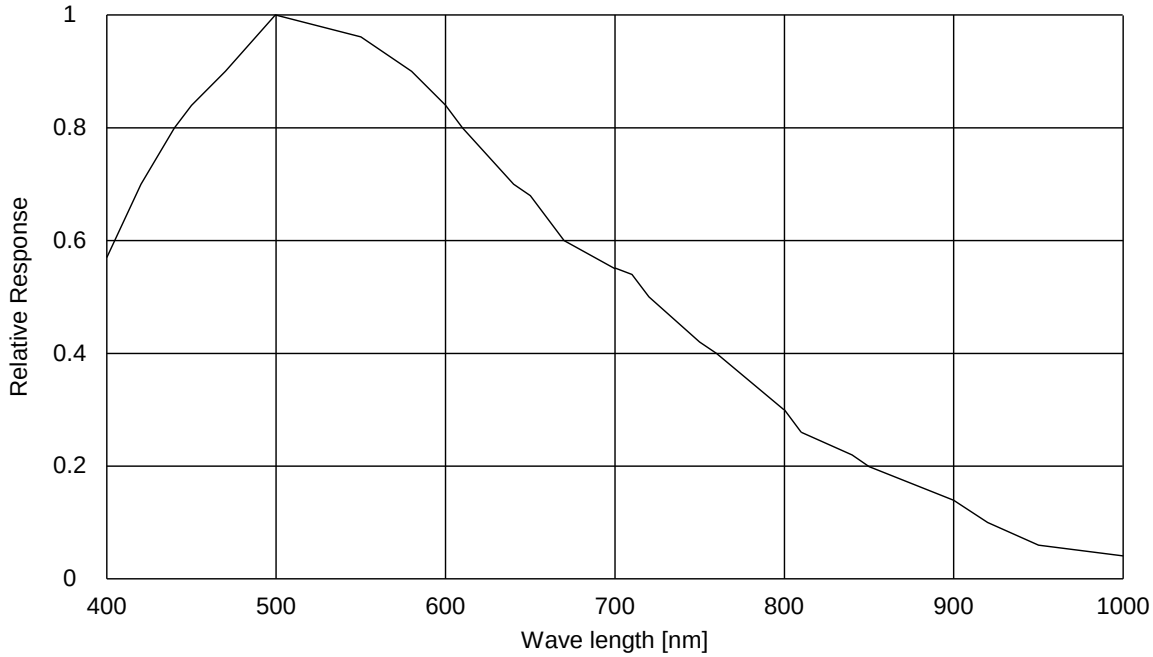
. Note 1: As for the 10 & 12 bit output, clock speed should be slowed to obtain the correct frame rate.
Note 2: Lens: CASMICAR/PENTAX, C1614-M with C-Adapter
Note 3: Power Consumption could be higher than this number when run at 90fps in partial scan mode.
Note 4: Lens: COSMICAR/PENTAX C1614-M with C-Adaptor

2. Spectral Sensitivity Characteristics

a. STC-SC33USB (with IR Cut Filter)



b. STC-SB33USB



B. STC-SC83USB / STC-SB83USB

1. Electronic / Mechanical / Environmental Specifications

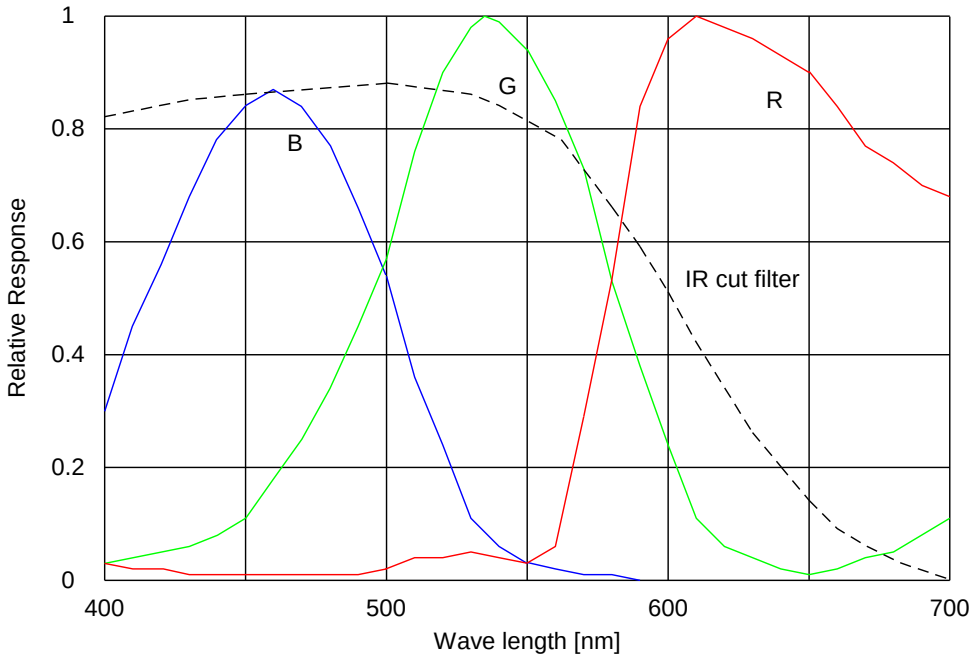
Product			STC-SC83USB	STC-SB83USB
Electronic Specifications	Image Sensor		1/3" interline XGA color progressive CCD: ICX204AK (Sony)	1/3" interline XGA monochrome progressive CCD: ICX204AL (Sony)
		Total picture elements	1077 (H) x 788 (V)	
		Effective picture elements	1034 (H) x 779 (V)	
		Chip size	5.80 (H) x 4.92 (V) mm	
		Cell size	4.65 (H) x 4.65 (V) µm	
		Scanning system	Progressive	
	Resolution		1024 (H) x 768 (V) (Full scanning) 1024 (H) x 344 (V) (1/2 partial scanning) 1024 (H) x 136 (V) (1/4 partial scanning)	
	Scanning methods		**Full scanning,** 1/1 partial scanning, 1/2 partial scanning, 1/4 partial scanning, Variable partial scanning	**Full scanning,** 1/1 partial scanning, 1/2 partial scanning, 1/4 partial scanning, Variable partial scanning, Binning scanning, Binning 1/1 partial scanning, Binning 1/2 partial scanning, Binning 1/4 partial scanning, Binning variable partial scanning
	Maximum framer rate	Full scanning	**29.18 fps** (Normal) / 14.59 fps (1/2 clock) / 7.295 fps (1/4 clock)	
		1/2 partial scanning	60.02 fps (Normal) / 30.01 fps (1/2 clock) / 15.00 fps (1/4 clock)	
		1/4 partial scanning	120.35 fps (Normal) / 60.175 fps (1/2 clock) / 30.087 fps (1/4 clock)	
	Pixel frequency		29.5 MHz (Normal) / 14.75 MHz (1/2 clock) / 7.375 MHz (1/4 clock)	
	Video output		**8bit** / 10bit / 12bit *Note1	
	Minimum scene illumination		TBD	TBD
	Sync. System		Internal	
	Electronic shutter		Auto / **Manual** (software selectable)	
		Normal	1/36,818,182 to 1/22.40 seconds(default 1/29.18 seconds)	
		1/2 clock	1/18,409,091 to 1/11.20 seconds	
		1/4 clock	1/9,204,545 to 1/5.60 seconds	
	Gain		Auto / **Manual** (software selectable,**default: x3.55**)	
	Gamma		Manual (software selectable,**default: 1**)	
	White balance		**Auto** / Manual / One shot (software selectable)	-
	Trigger mode		**Free-run** / Edge preset trigger / Pulse width trigger / Start & stop trigger (software selectable) (Hardware trigger and Software tigger are available)	
	Camera Reset		Support on Pin 5	
	LED Status		Green(Flicker):Power-On, Green:Camera works	
	Pixel Blemish Correction		64 Points	
	Input/output		USB2.0 High speed	
	Power	Input voltage	+5 V through USB connector (+4.4 to +5.25V)	
		Consumption	Less than 1.4W	
Mechanical Specifications	Dimensions		Board Type::36(W) x 36(H) x 15.3(D) CS-Mount(without USB connector)	
	Lens mount		CS mount / MicroLens Mount / None Mount	
	Weight		Approximately 15g	
	Interface connector	Angle	USB: mini-B USB connector IO Connector : SM05B-SRSS-TB (JST) 5pin	
Environmental Specifications	Operational temperature		0 to 40 deg. C	
	Storage temperature		-30 to 65 deg. C	
	Vibration *Note2		20Hz to 200Hz to 20Hz (5min./cycle), acccelaration 10G, 3 directions 30 min. each	
	Shock *Note2		Accelaration 70G, half amplitude 6ms, 3 directions 3 times each	
	Standard compliancy		TBD	
	RoHS		RoHS compliance	

Note 1: As for the 10 & 12 bit output, clock speed should be slowed to obtain the correct frame rate.

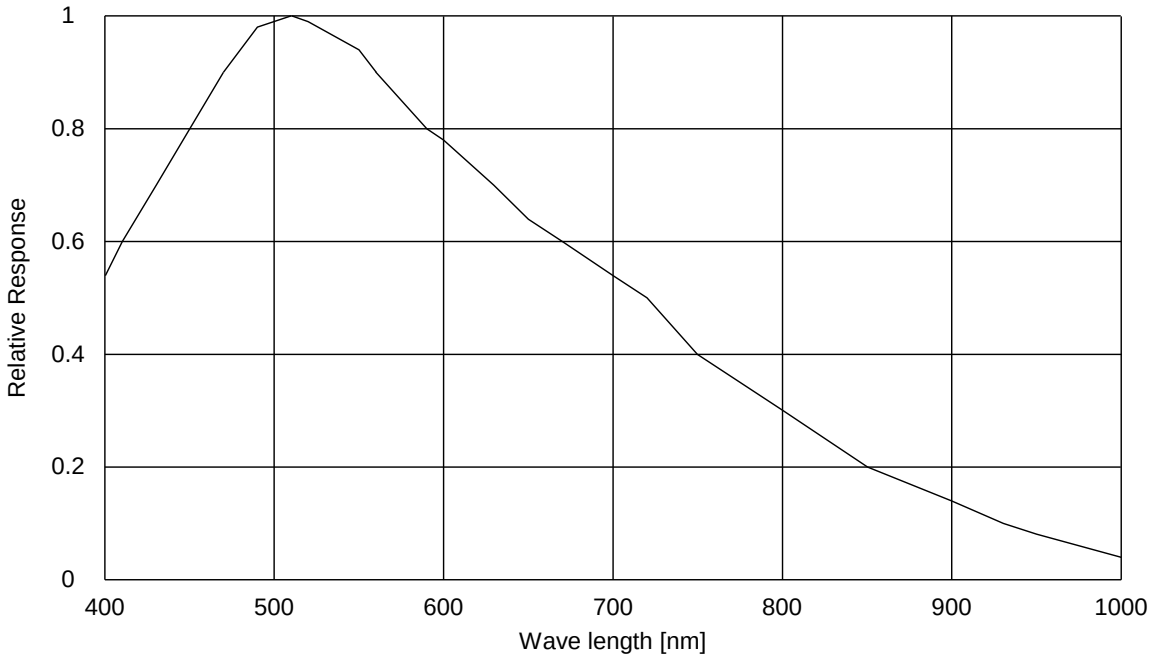
Note 2: Lens: CASMICAR/PENTAX, C1614-M with C-Adapter

2. Spectral Sensitivity Characteristics

a. STC-SC83USB (with IR Cut Filter)



b. STC-SB83USB



C. STC-SC133USB / STC-SB133USB

1. Electronic / Mechanical / Environmental Specifications

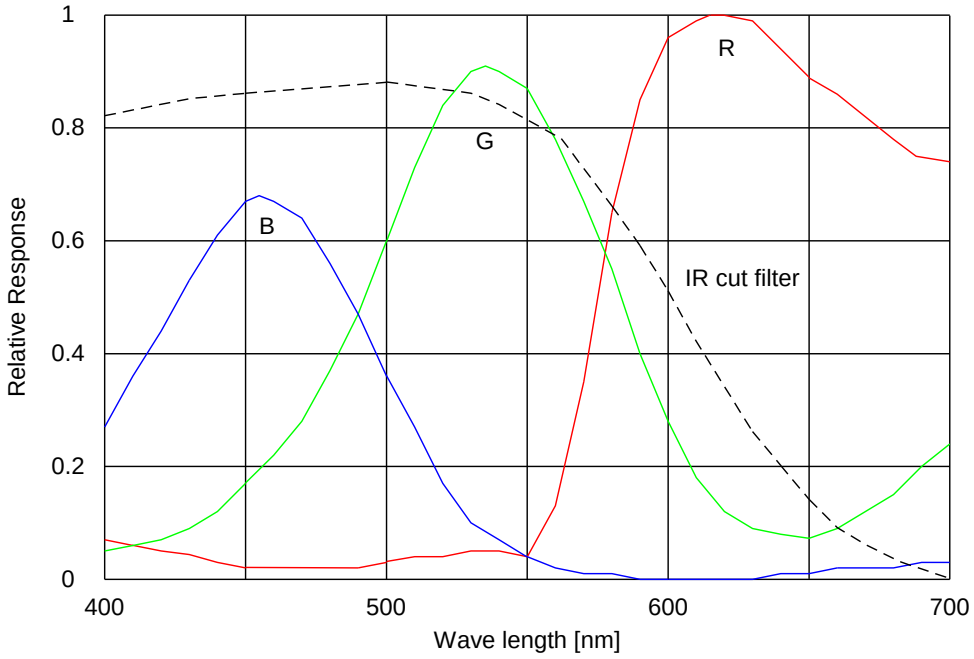
Product			STC-SC133USB	STC-SB133USB
Electronic Specifications	Image Sensor		1/3" interline 1.3M color progressive CCD: ICX445AQ (Sony)	1/3" interline 1.3M monochrome progressive CCD: ICX445AL (Sony)
		Total picture elements	1348 (H) x 976 (V)	
		Effective picture elements	1296 (H) x 966 (V)	
		Chip size	6.26 (H) x 5.01 (V) mm	
		Cell size	3.75 (H) x 3.75 (V) µm	
		Scanning system	Progressive	
	Resolution		1280 (H) x 960 (V) (Full scanning) 1280 (H) x 440 (V) (1/2 partial scanning) 1280 (H) x 168 (V) (1/4 partial scanning)	
	Scanning methods		**Full scanning,** 1/1 partial scanning, 1/2 partial scanning, 1/4 partial scanning, Variable partial scanning	**Full scanning,** 1/1 partial scanning, 1/2 partial scanning, 1/4 partial scanning, Variable partial scanning, Binning scanning, Binning 1/1 partial scanning, Binning 1/2 partial scanning, Binning 1/4 partial scanning, Binning variable partial scanning
	Maximum framer rate	Full scanning	**22.40 fps** (Normal) / 11.20 fps (1/2 clock) / 5.60 fps (1/4 clock)	
		1/2 partial scanning	44.81 fps (Normal) / 22.40 fps (1/2 clock) / 11.20 fps (1/4 clock)	
		1/4 partial scanning	89.80 fps (Normal) / 44.90 fps (1/2 clock) / 22.45 fps (1/4 clock)	
	Pixel frequency		36.818 MHz (Normal) / 18.409 MHz (1/2 clock) / 9.20453 MHz (1/4 clock)	
	Video output		**8bit** / 10bit / 12bit *Note1	
	Minimum scene illumination *Note2		TBD	TBD
	Sync. System		Internal	
	Electronic shutter		Auto / **Manual** (software selectable)	
		Normal	1/36,818,182 to 1/22.40 seconds **(default:1/22.40 seconds)**	
		1/2 clock	1/18,409,091 to 1/11.20 seconds	
		1/4 clock	1/9,204,545 to 1/5.60 seconds	
	Gain		Auto / **Manual** (software selectable,**default: x3.55**)	
	Gamma		**Manual** (software selectable,**default: 1**)	
	White balance		**Auto** / Manual / One shot (software selectable)	-
	Trigger mode		Free-run / Edge preset trigger / Pulse width trigger / Start & stop trigger (software selectable) (Hardware trigger and Software tigger are available)	
	Camera Reset		Support on Pin 5	
	LED Status		Green(Flicker):Power-On, Green:Camera works	
	Pixel Blemish Correction		64 Points	
	Input/output		USB2.0 High speed	
	Power	Input voltage	+5 V through USB connector (+4.4 to +5.25V)	
		Consumption	Less then 1.5W	
Mechanical Specifications	Dimensions		Board Type::36(W) x 36(H) x 15.3(D) CS-Mount(without USB connector)	
	Lens mount		CS mount / MicroLens Mount / None Mount	
	Weight		Approximatlly 16g	
	Interface connector	Angle	USB: mini-B USB connector IO Connector : SM05B-SRSS-TB (JST) 5pin	
Environmental Specifications	Operational temperature		0 to 40 deg. C	
	Storage temperature		-30 to 65 deg. C	
	Vibration *Note2		20Hz to 200Hz to 20Hz (5min./cycle), acccelaration 10G, 3 directions 30 min. each	
	Shock *Note2		Accelaration 70G, half amplitude 6ms, 3 directions 3 times each	
	Standard compliancy		TBD	
	RoHS		RoHS compliance	

Note 1: As for the 10 & 12 bit output, clock speed should be slowed to obtain the correct frame rate.

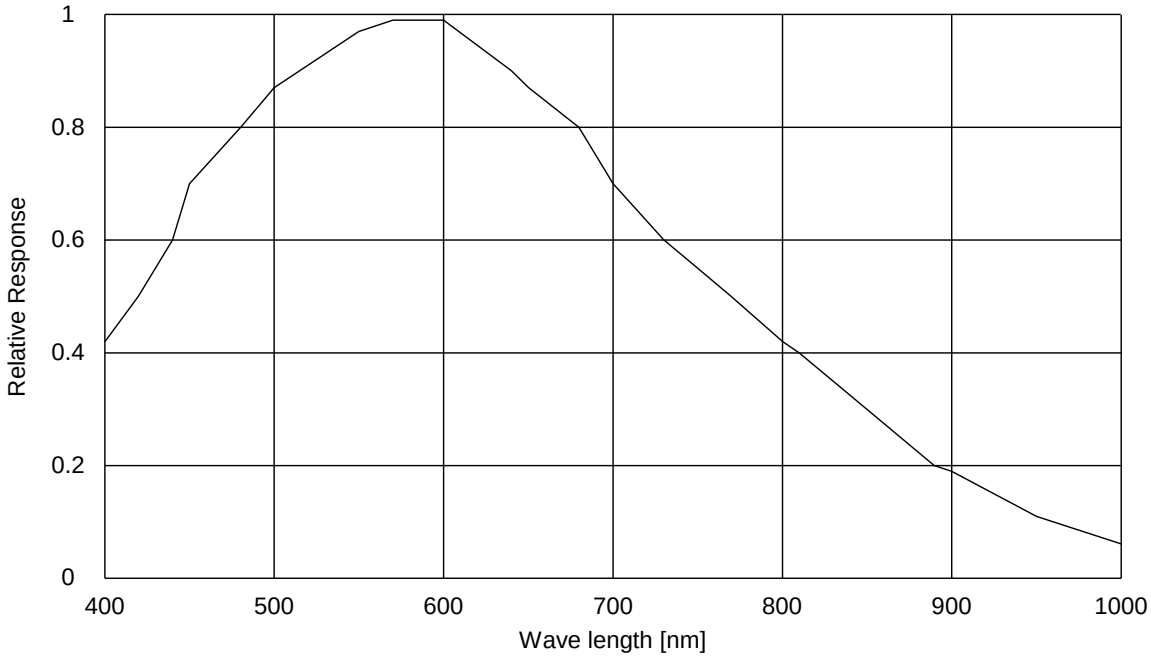
Note 2: Lens: CASMICAR/PENTAX, C1614-M with C-Adapter

2. Spectral Sensitivity Characteristics

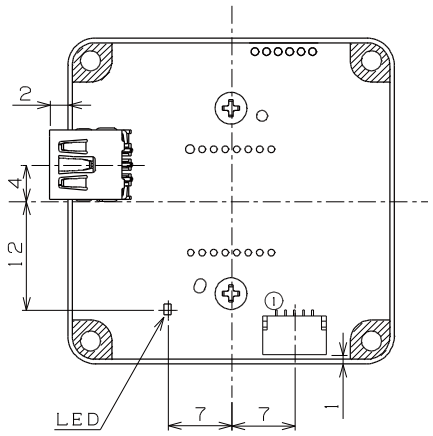
a. STC-SC133USB (with IR Cut Filter)



b. STC-SB133USB



III. Interface Connector Specifications (Board Type)



A) USB Connector Mini-B USB Type
B) I/O Connector Angle: SM05B-SRSS-TB (JST) 5pin or equivalent
Straight (Option): BM05B-SRSS-TB(JST) 5pin or equivalent
This connector is for input and output signals.
Trigger Input and the output signals can be assigned through the camera setting communication.
The power in this connector is for the input / output signals, NOT for the camera power.

A. Pin Assignment

Pin	Singal	Function	IO	Electric Specification	Default
1	IO_GND	IO GND	-	IO GND	-
2	IO_VCC	IO Power	IN	+2.0 to 5.0Vdc	-
3	IO2_OUT	Camera Output	OUT		No-Function
4	IO1_IN	Camera Input	IN		No-Function
5	RST	Camera Reset	IN		TBD

Input and Output Signals are isolated.
Reset Port: Pin N is assigned as the Reset. This is used when the camera does not recognize the PC. Once the reset signal is input, the camera will begin rebooting without needing to reseed to USB cable.

B. LED
Green (Flicker): Power ON
Green (No-Flicker): Camera Working

IV. Input / Output Signal Specifications

A. Input Signal Specifications

2. Functions of the Input Signals

The following functions can be configured for the input signals (In1) through the software.

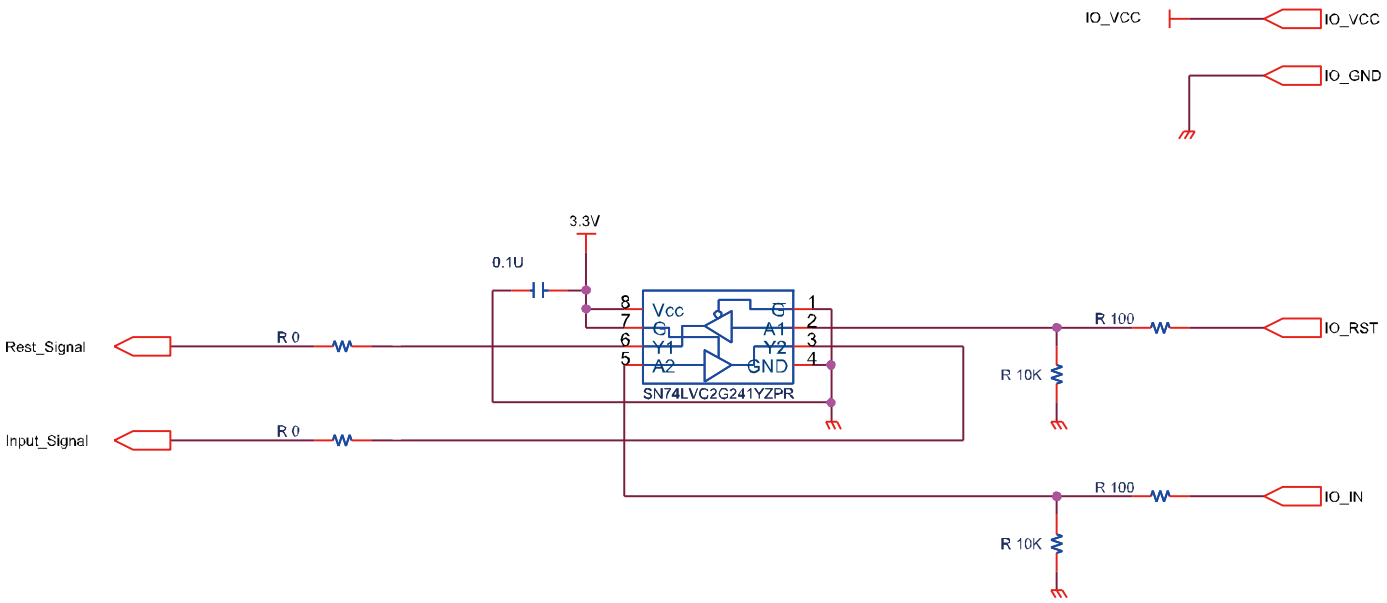
No.	Functions	Polarity
1	No signal (Default)	-
2	General input	-
3	Trigger signal input	Positive / Negative

The polarity for the trigger signal input can be selectable.

2. Characteristics of the Input Signals

Input Signal Level: High: IO VCC IN (+2.0 to +5.0V)
Low: Less than 0.8V

3. Input Signal Circuit (Includes Reset Signal)



4. Reset Signal

The camera will be reset 5 seconds after a high signal is input through Pin 5.

B. Output Signal Specifications

1. Functions of the Output Signals

The following functions can be configured for the output signals (OUT) through the software on Pin 3.

No.	Functions	Polarity
1	No signal (Default)	-
2	General output	-
3	Trigger signal output	Positive / Negative
4	Exposure end signal output	Positive / Negative
5	CCD read out end signal output	Positive / Negative
6	Strobe signal output (Time setting)	Positive / Negative
7	Strobe signal output (Exposure time)	Positive / Negative

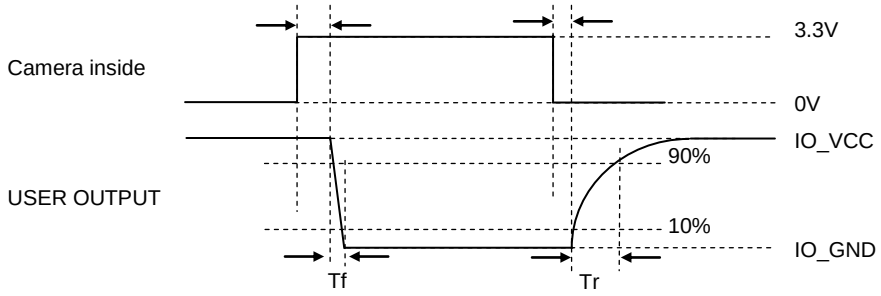
The polarity for the trigger signal, the exposure end signal, the CCD read out signal, the strobe signal (time setting) and the strobe signal (exposure time) can be selected.

2. Characteristics of the Output Signals

Output Signal Level: High: IO VCC IN (+3.0 to +26.4V)
Low: Less than 0.8V

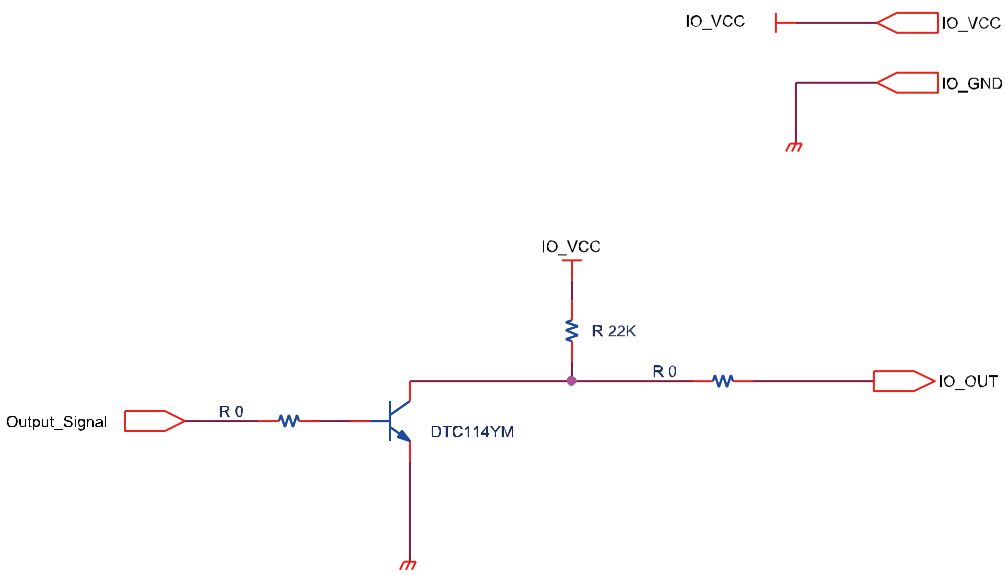
Output Signal Duration: The signal duration should be than “Tf + Tr”
Please check “Output Signal Response Timing” for Tf and Tr.
The signal duration can adjust by the software.

Output Signal Response Timing



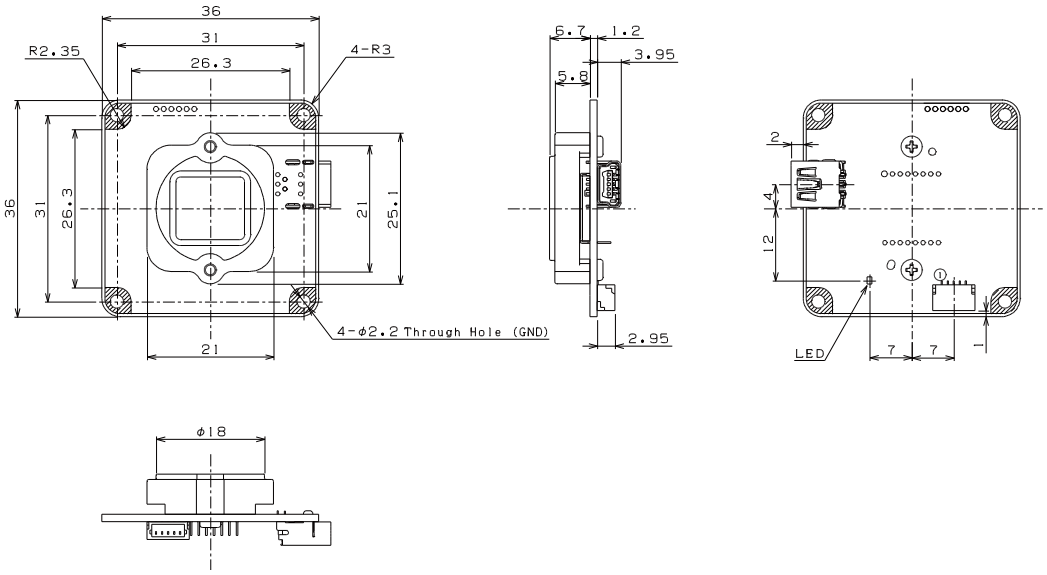
	IO_VCC			
	3.3[V]	5.0[V]	12[V]	24[V]
Td	2.80 [us]	2.76 [us]	2.72 [us]	2.54 [us]
Tr	1.86 [us]	1.95 [us]	1.74 [us]	1.95 [us]
Ts	0.07 [us]	0.07 [us]	0.08 [us]	0.08[us]
Tf	0.06[us]	0.07 [us]	0.12 [us]	0.18 [us]

C. Output Signal Circuit

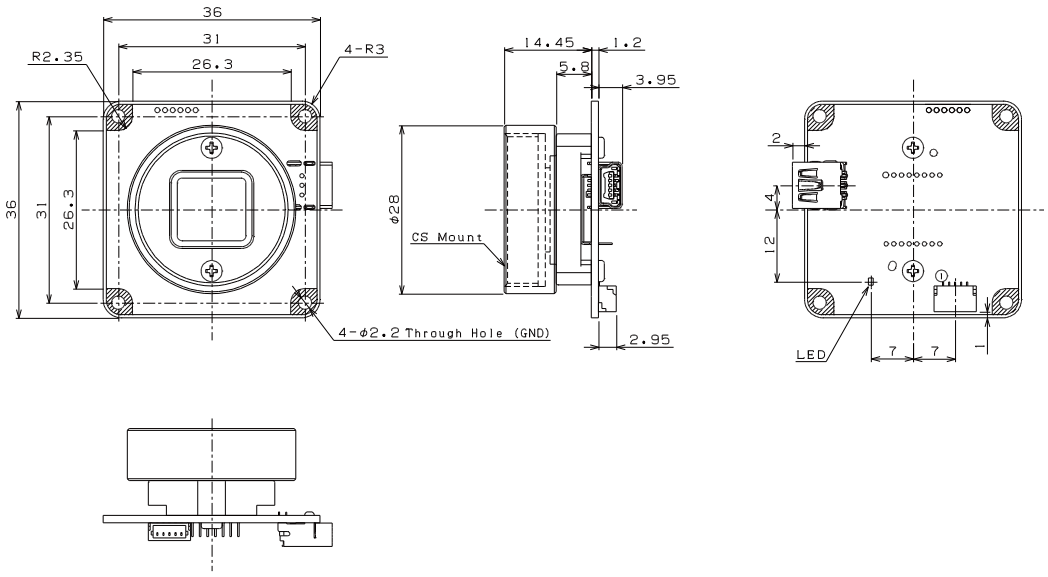


V. Dimensions

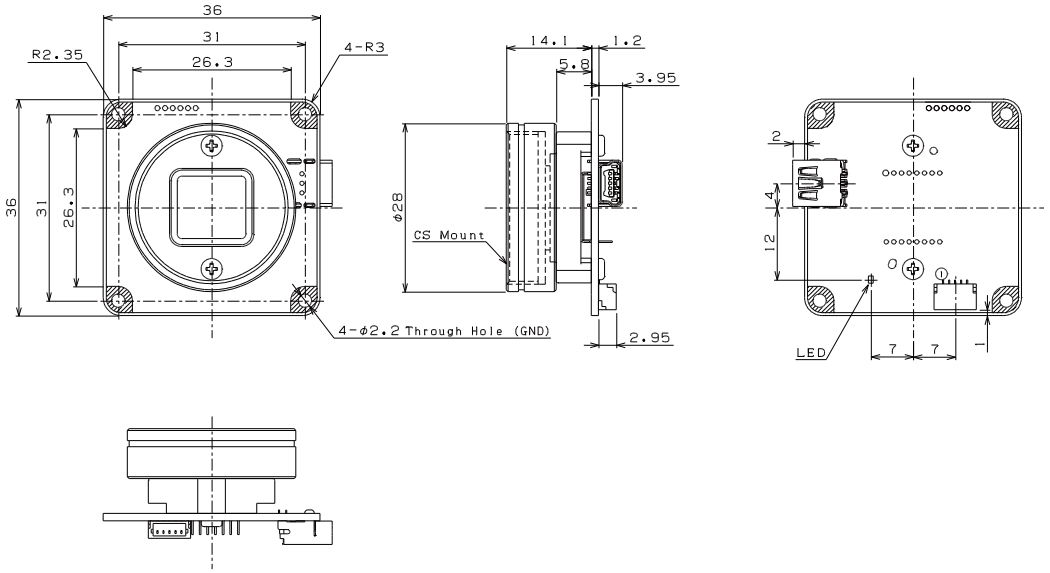
A. STC-SCxxxUSB-B / STC-SBxxxUSB-B (Color / Monochrome, Board Type, No Mount)



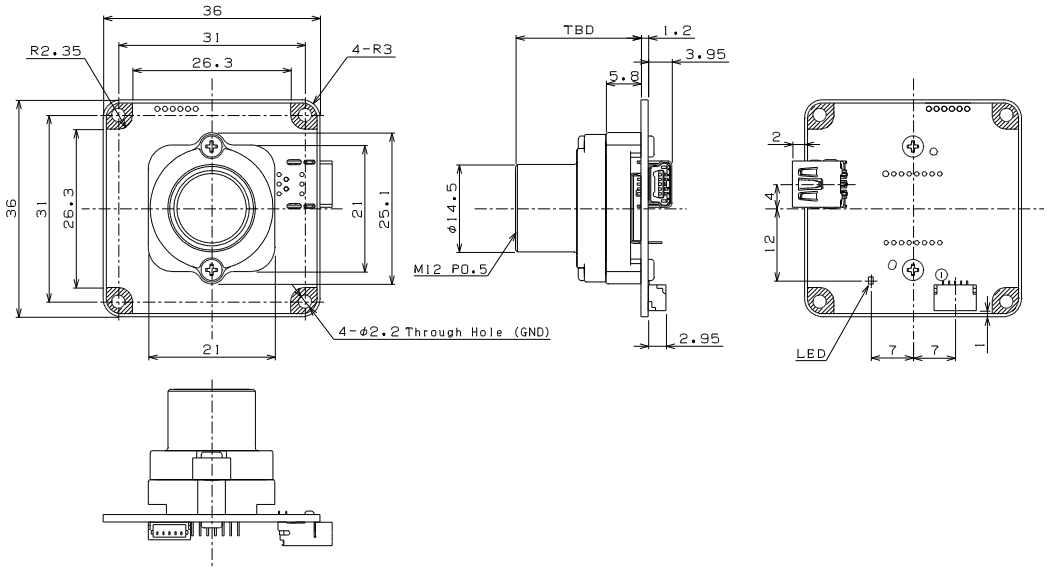
B. STC-SCxxxUSB-BCS (Color, Board Type, CS-Mount)



C. STC-SBxxUSB-BCS (Monochrome, Board Type, CS Mount)



D. STC-SCxxxUSB-BL / STC-SBxxxUSB-BL (Color / Monochrome, Board Type, Fixed Focus)



Revisions

Date	Rev.	Change	Notes
September 3, 2013	1.0	New Document	

Senor Technologies America, Inc.
1345 Valwood Parkway, Suite 320
Carrollton, Texas 75006-6891
TEL (972)481-9223 FAX(972) 481-9209
URL http://www.sentechamerica.com/

Sensor Technology Co., Ltd.
7F, Harada Center Building
9-17, Naka cho 4 chome
Atsugi-city, Kanagawa
243-0018 Japan
TEL +81-46-295-7061 FAX +81-46-295-7066
URL http://www.sentech.co.jp/

Taiwan Sensor Technology, Inc.
3F-6, No. 9, Aiguo W, Rd., Jhong Jheng District
Taipei City 100, Taiwan, R.O.C.
TEL 886-2-2383-2331
FAX 886-2-2370-8775
EMAIL sentech0501@yahoo.com.tw