



C11513

**Driver circuit for InGaAs linear image sensor
[G11620 series (non-cooled type)]**

The C11513 is a driver circuit developed for InGaAs linear image sensors [G11620 series (non-cooled type)]. The driver circuit consists of an analog video signal processing circuit (16-bit A/D converter), timing generator, control circuit, and power supply. The circuit converts analog video signals received from an image sensor into digital signals and outputs them. A PC is connected to the circuit through the USB port (USB 2.0) and used to control the C11513 and retrieve data. Further, The C11513 has a BNC connector for external trigger input and a BNC connector for pulse output that can be used to synchronize with external devices. This product comes with application software (DCam-USB) that runs on Microsoft® Windows® 10 (64-bit). It can be used to easily operate the C11513 from the PC. This product also includes DLLs that the user can use to create original control programs.

Features

- Built-in 16-bit A/D converter
- Interface: USB2.0
- USB bus powered
- External synchronization function
- Gain and offset adjustment function

Applications

- Spectrometer
- Non-destructive inspection
- G11620 series (non-cooled type) control and data acquisition

Note: Microsoft and Windows are either registered trademarks or trademarks of Microsoft Corporation in the United States and/or other countries.

The C11513 is compatible with the following InGaAs linear image sensors (sensor sold separately).

Type no.	Total number of pixels	Number of effective pixels	Pixel size [μm (H) \times μm (V)]	Pixel pitch (μm)	Image size (mm)
G11620-128DA	128	128	50 \times 500	50	6.4 \times 0.5
G11620-256DF	256	256	25 \times 500	25	6.4 \times 0.5
G11620-256DA	256	256	50 \times 500	50	12.8 \times 0.5
G11620-512DA	512	512	25 \times 500	25	12.8 \times 0.5

Structure

Parameter	Specification	Unit
Output type	Digital	-
A/D resolution	16	bit
Interface	USB 2.0	-

Absolute maximum ratings

Parameter	Symbol	Condition	Value	Unit
Supply voltage	Vdd	Ta=25 °C	0 to +6.0	V
Input signal voltage*1	Vi	Ta=25 °C	0 to Vdd	V
Operating temperature*2	Topr		0 to +50	°C
Storage temperature*2	Tstg		-20 to +70	°C

*1: Trigger input

*2: No dew condensation

When there is a temperature difference between a product and the surrounding area in high humidity environment, dew condensation may occur on the product surface. Dew condensation on the product may cause deterioration in characteristics and reliability.

Note: Exceeding the absolute maximum ratings even momentarily may cause a drop in product quality. Always be sure to use the product within the absolute maximum ratings.

Electrical characteristics (Ta=25 °C)

Parameter	Symbol	Condition	Min.	Typ.	Max.	Unit
Scan rate*3	fop		-	1	-	MHz
Line rate*4	LR	G11620-128DA	-	-	5.88	klines/s
		G11620-256DF G11620-256DA			3.35	
		G11620-512DA			1.80	
Conversion gain	Gc	Gain 1	-	42.7	-	μV/ADU
		Gain 5	-	213.5	-	
Trigger output voltage	High level	-	Vdd=+5 V	-	Vdd	V
	Low level				0.6	
Trigger input voltage	High level	-	Vdd=+5 V	-	Vdd	V
	Low level				1.5	
Current consumption	Ic	G11620-128DA	-	-	330	mA
		G11620-256DF G11620-256DA			360	
		G11620-512DA			380	

*3: Fixed

*4: Theoretical line rate value determined by the internal operation timing of the driver circuit. This is different from the line rate defined in the sensor specifications. This is also different from the overall processing line rate of acquiring data from the circuit into the PC via the USB 2.0 port.

Electrical and optical characteristics (Ta=25 °C)

Parameter	Symbol	Condition	Min.	Typ.	Max.	Unit
Readout noise*5	Nr	Gain 1	-	6	-	ADU
		Gain 5	-	30	-	
Dynamic range	DR	Gain 1	-	11000	-	-
		Gain 5	-	2200	-	
Operating voltage*6	Vop		4.75	5	5.25	V

*5: Integration capacitance 1 pF

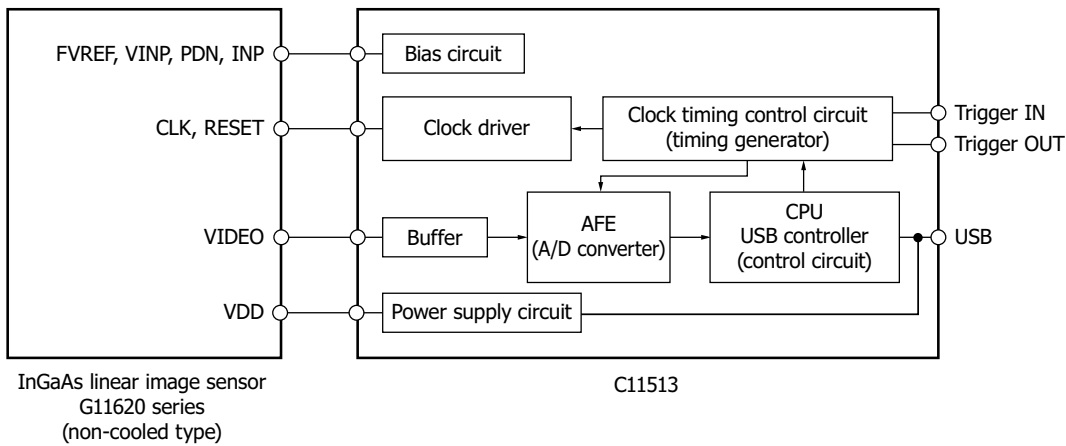
*6: USB bus powered

Function

Parameter	Specification
Data acquisition mode	Internal synchronization mode Data is acquired according to the trigger timing from the application software.
	External synchronization mode The start of integration, integration time, and the number of lines of the acquisition data are controlled by the input pulses to the TRIGGER_IN connector.
Gain adjustment	The output ADU can be varied in the range from 1 to 5 times.
Offset adjustment	This function adds any value to the output ADU by digital setting which can be varied within a specified range.
Pulse output setting	This is used to set the pulse signal to output from the PULSE_OUT connector (output on/off, signal polarity, delay time, pulse width). This signal is output in sync with the start of the integration time of the InGaAs image sensor. The signal output level is H-CMOS compatible.
Integration capacitance switch function	This function changes the integration amplifier's capacitance in the InGaAs image sensor. The integration capacitance can be switched between 1 pF and 10 pF. The default value is 1 pF. For more details, refer to the G11620 series (non-cooled operation type) datasheet.
Storage of settings	Settings for data acquisition and the like can be saved in the circuit's internal memory.

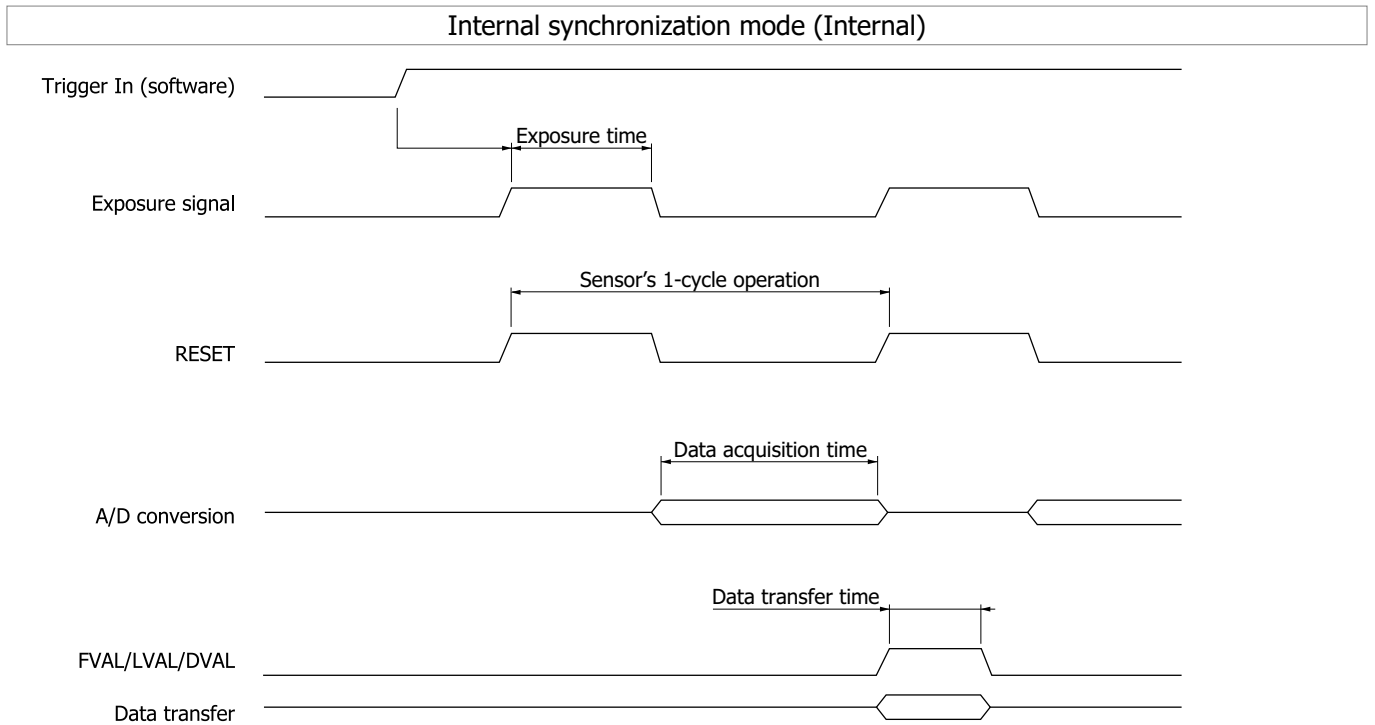
Note: For details on each function, see the instruction manual that comes with the product.

Block diagram



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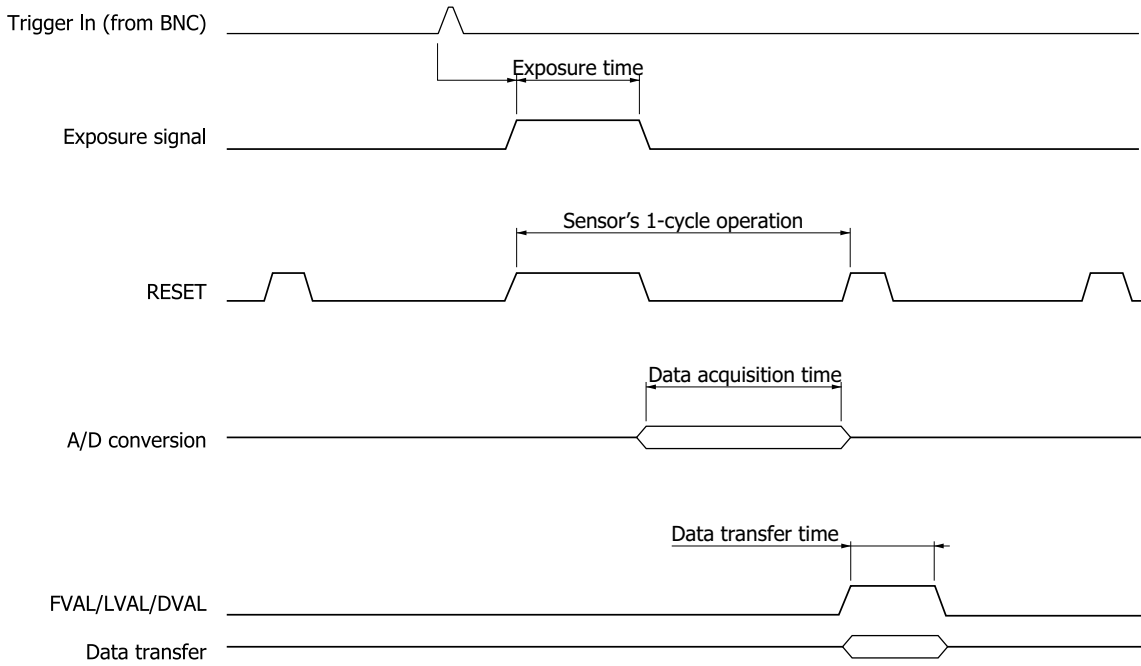
Timing chart



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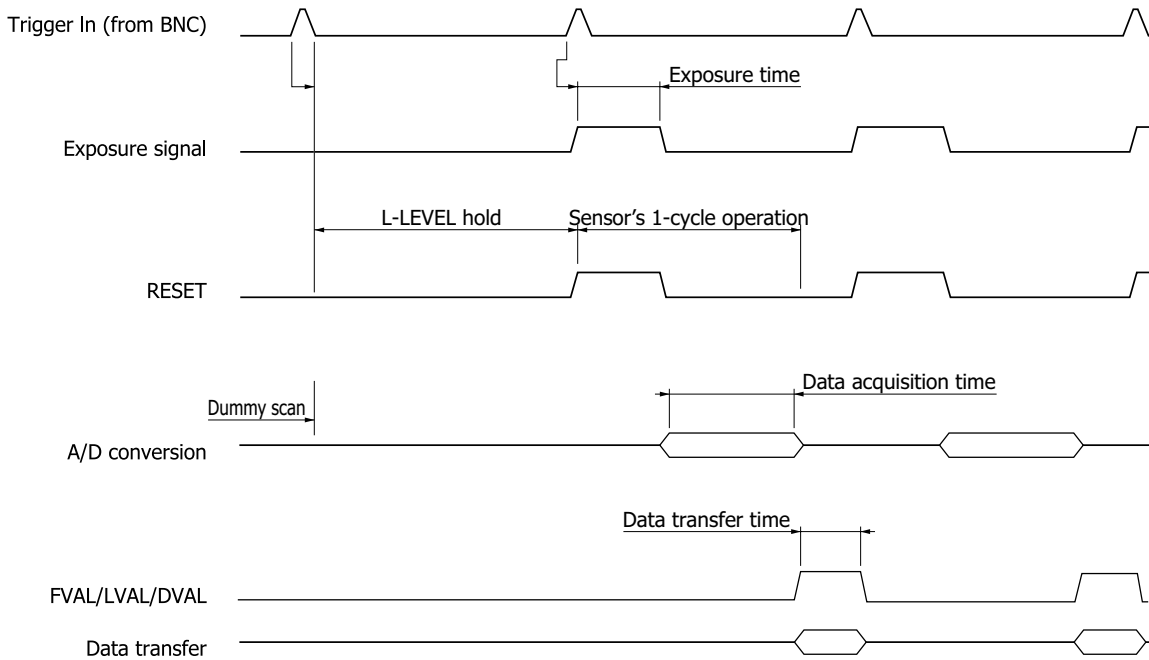
External synchronization mode

■ External Edge 1



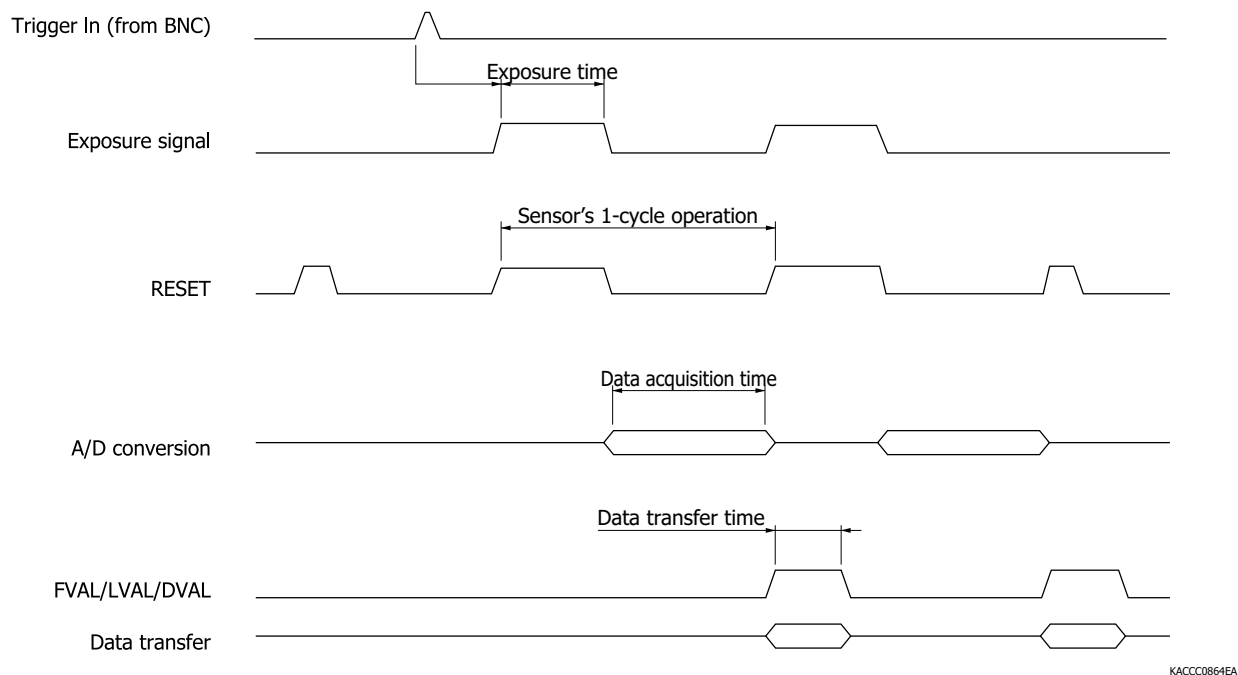
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■ External Edge 2



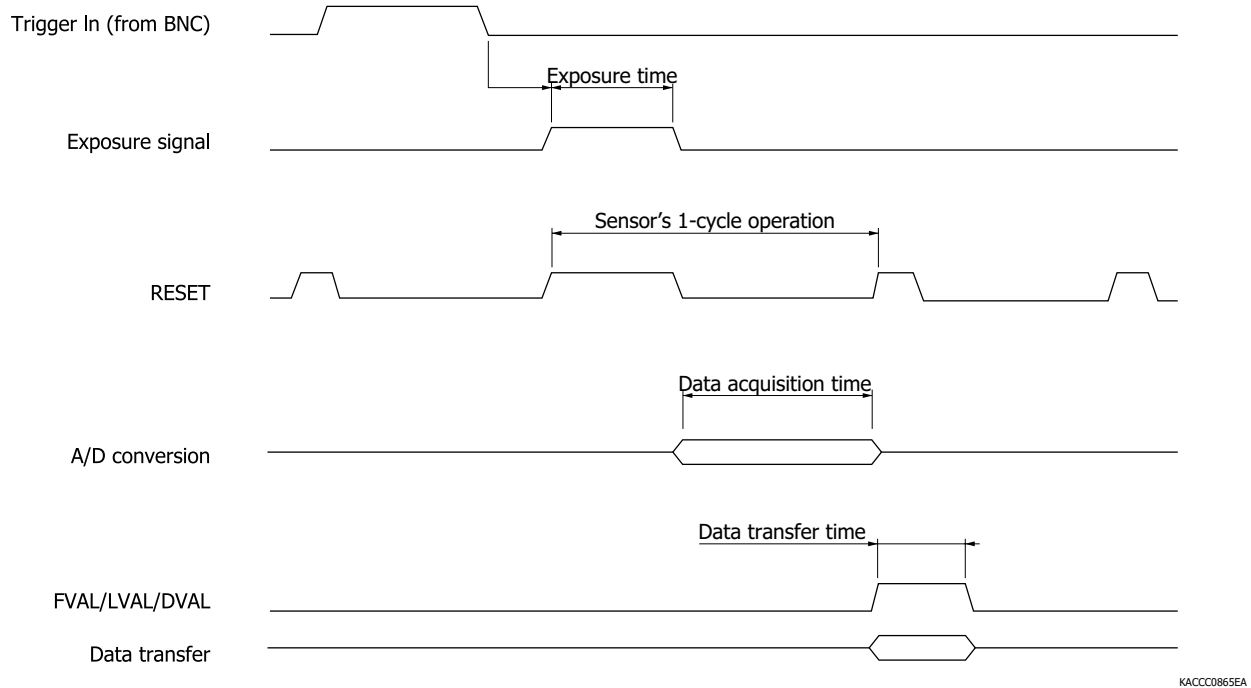
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External Edge 3*6

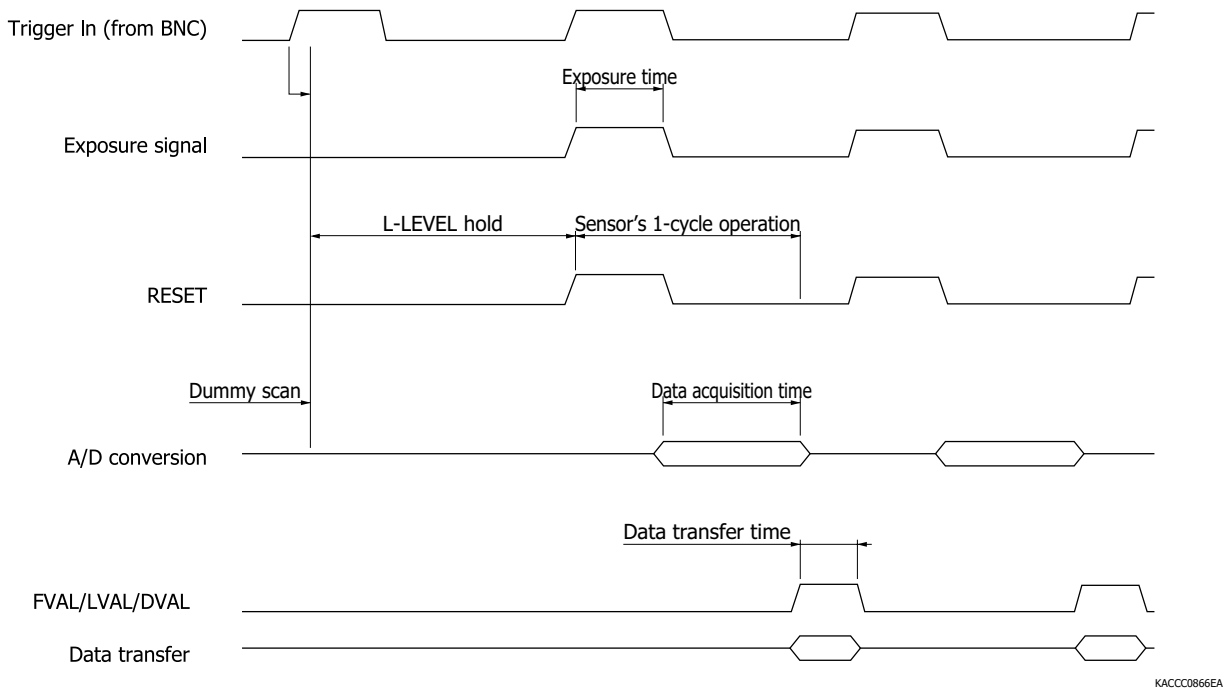


*6: Data of multiple lines can be acquired with a single external trigger signal as well as similar operation to External Edge 1.

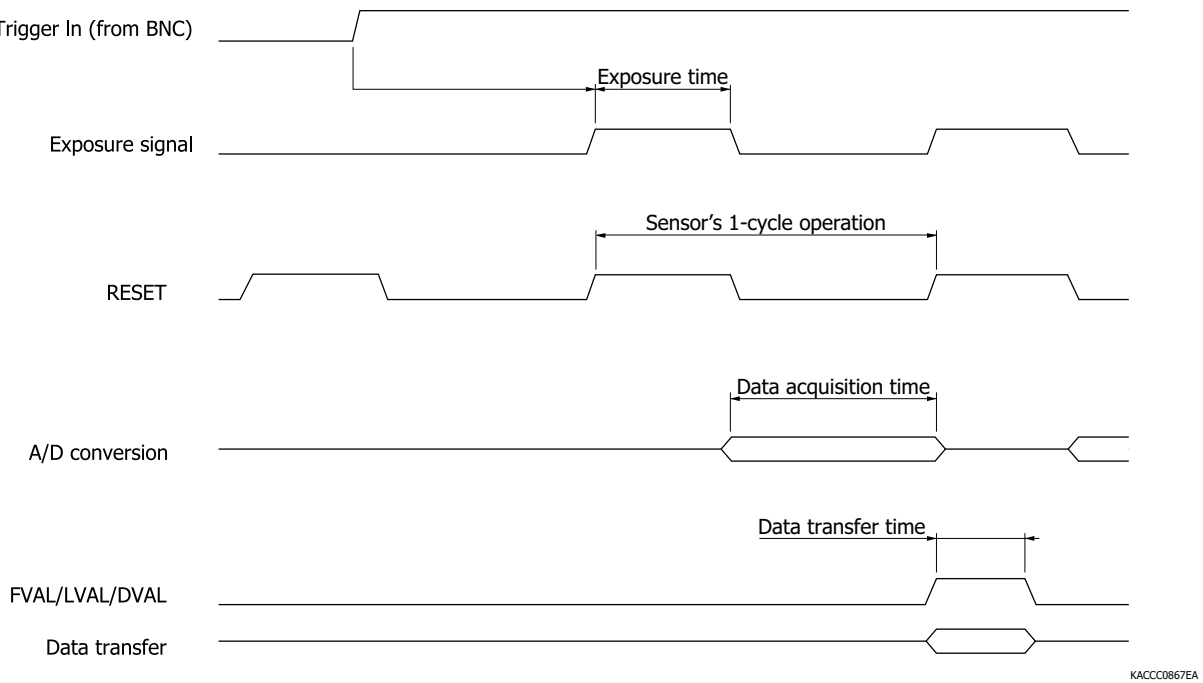
External Level 1



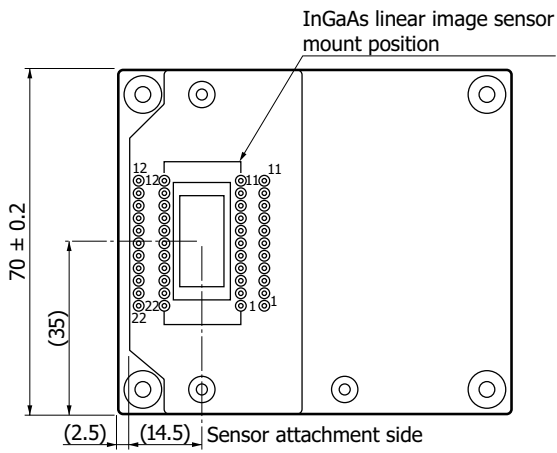
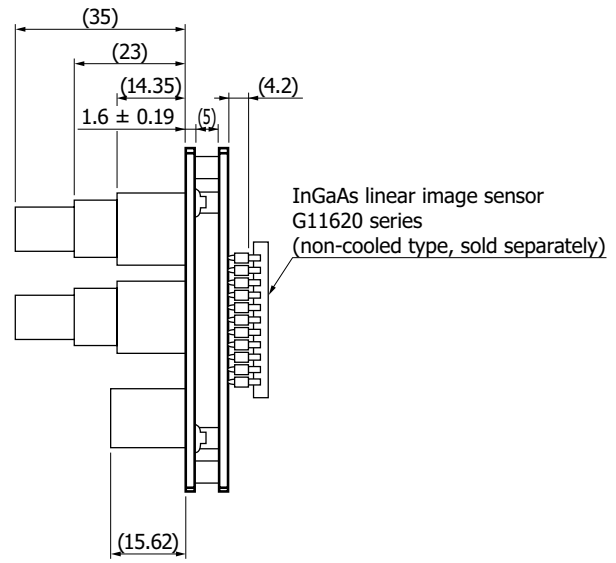
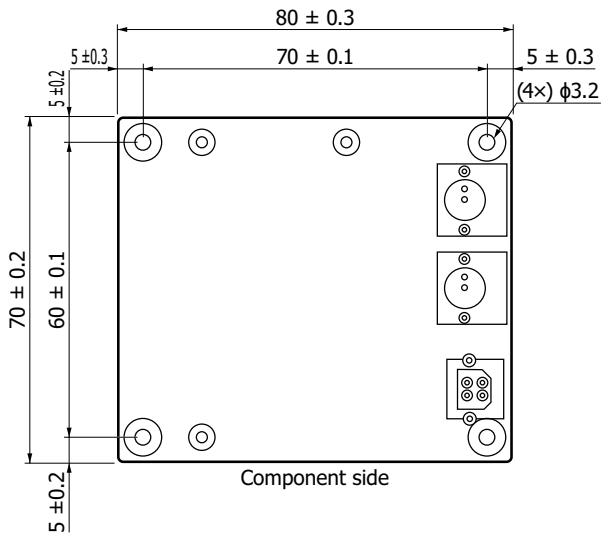
External Level 2



External Gated



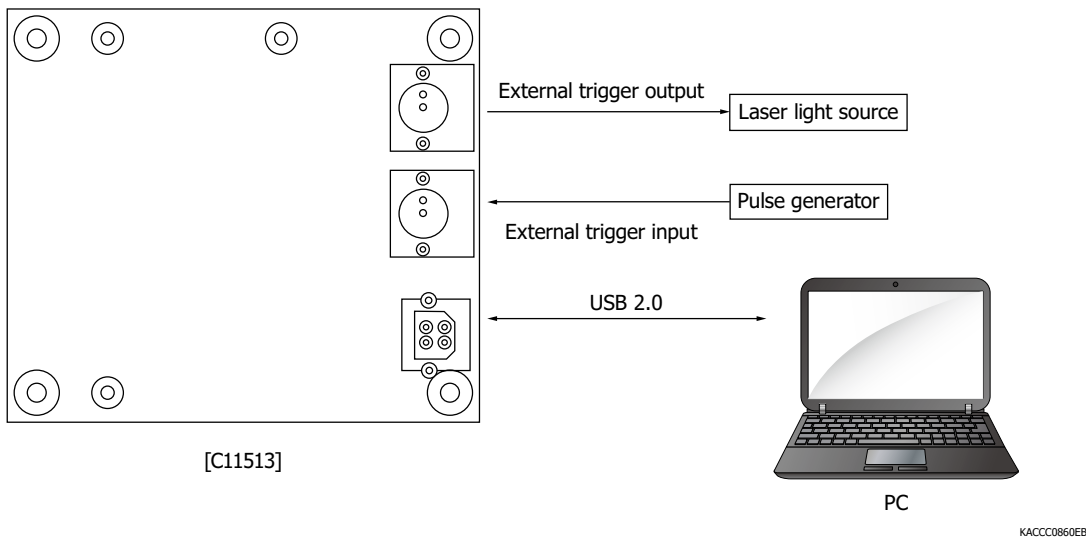
Dimensional outline (unit: mm)



Values in parentheses indicate reference values.
Weight: Approx. 85 g (excluding the sensor)

KACCA0395EB

Connection example



Accessories

- CD-ROM (includes the C11513 instruction manual, application software, and SDK)
- USB cable

Related information

www.hamamatsu.com/sp/ssd/doc_en.html

- Precautions
- Disclaimer

Applicable product datasheet

Available at our website (www.hamamatsu.com)

- InGaAs linear image sensors G11620 series (non-cooled type)

Information described in this material is current as of March 2022.

Product specifications are subject to change without prior notice due to improvements or other reasons. This document has been carefully prepared and the information contained is believed to be accurate. In rare cases, however, there may be inaccuracies such as text errors. Before using these products, always contact us for the delivery specification sheet to check the latest specifications.

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