

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. The C11513 comes with application software (DCam-USB) that runs on Microsoft® Windows® 7 (32-bit, 64-bit)/10 (32-bit, 64-bit). It can be used to easily operate the C11513 from the PC. The application software includes a C11513 function library (DCamUSB.DLL) that users can use to develop their own software.

### 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 [ $\mu\text{m}$ (H) $\times$ $\mu\text{m}$ (V)]	Pixel pitch ( $\mu\text{m}$ )	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			3.35	
		G11620-256DA			1.80	
		G11620-512DA				
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	-	-	350	mA
		G11620-256DF			380	
		G11620-256DA				
		G11620-512DA			410	

\*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		4.5	5	5.5	V

\*5: Integration capacitance 1 pF

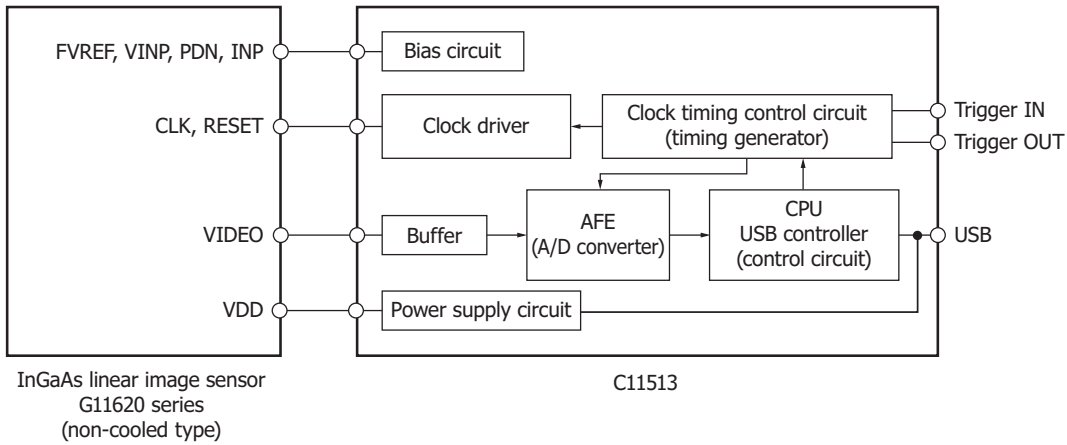
\*6: USB bus powered

### Function

Parameter	Specification
Data acquisition mode	Internal synchronization mode
	External synchronization mode
Gain adjustment	
Offset adjustment	
Pulse output setting	
Integration capacitance switch function	
Storage of settings	

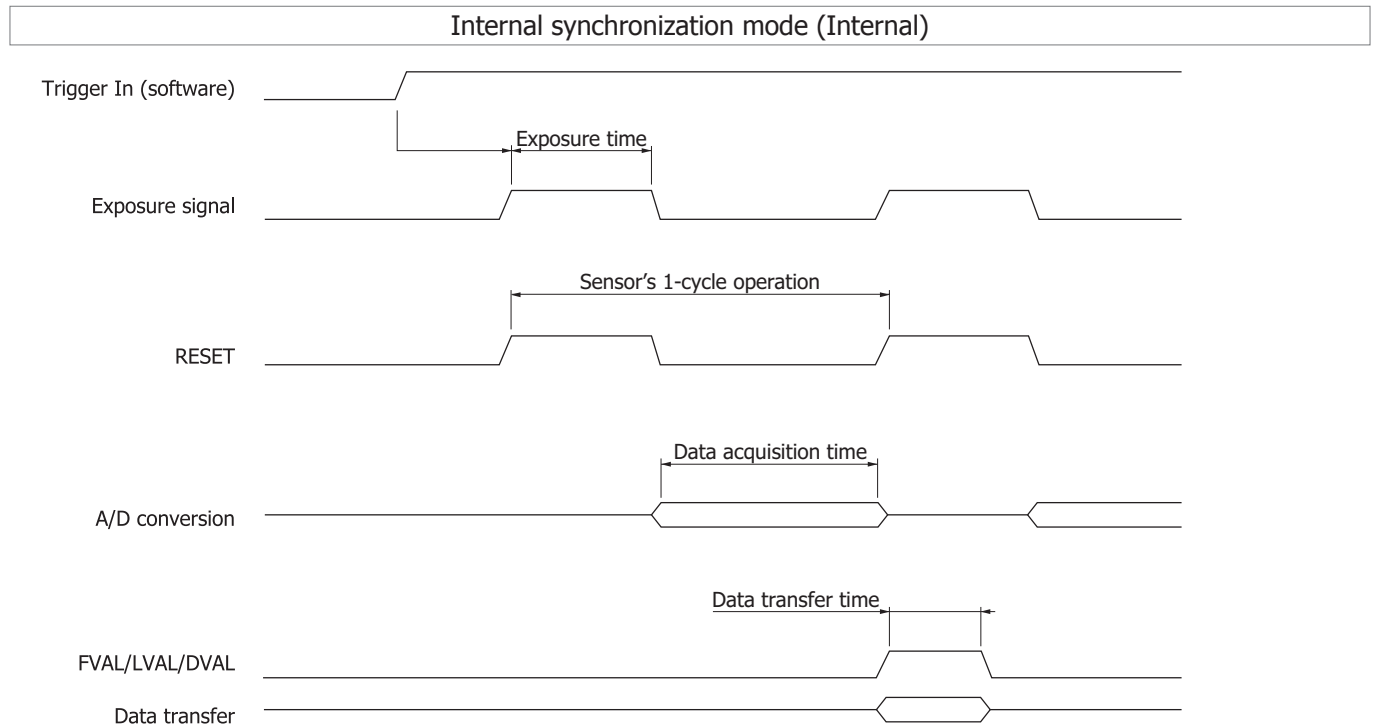
Note: For details on each function, see the instruction manual that comes with the product.

**Block diagram**



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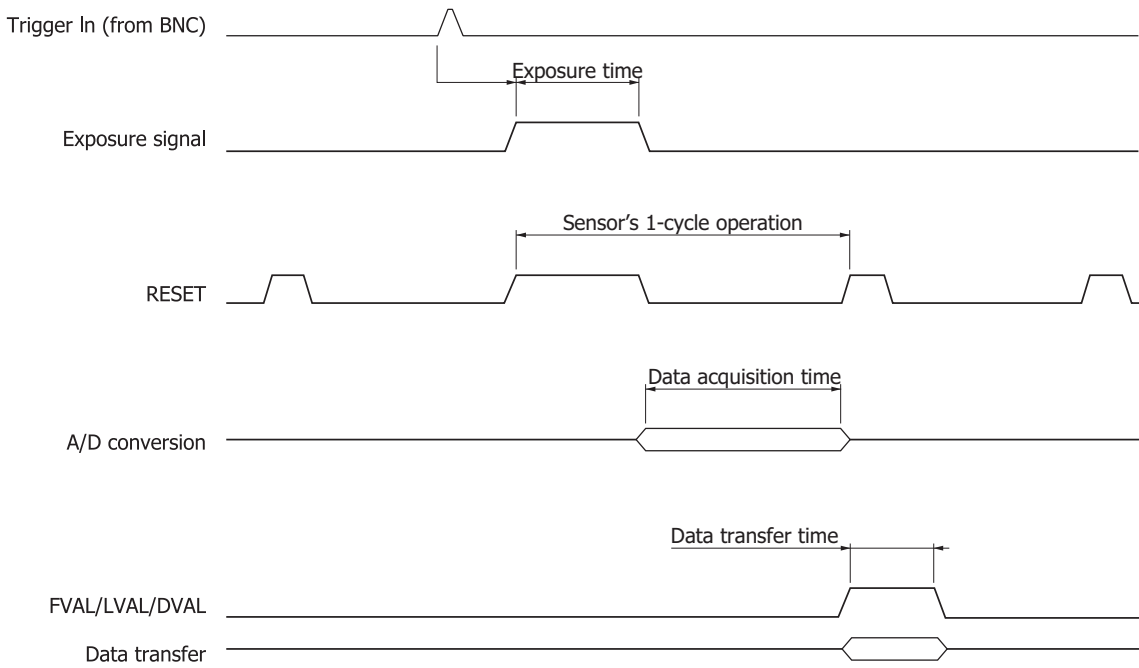
**Timing chart**



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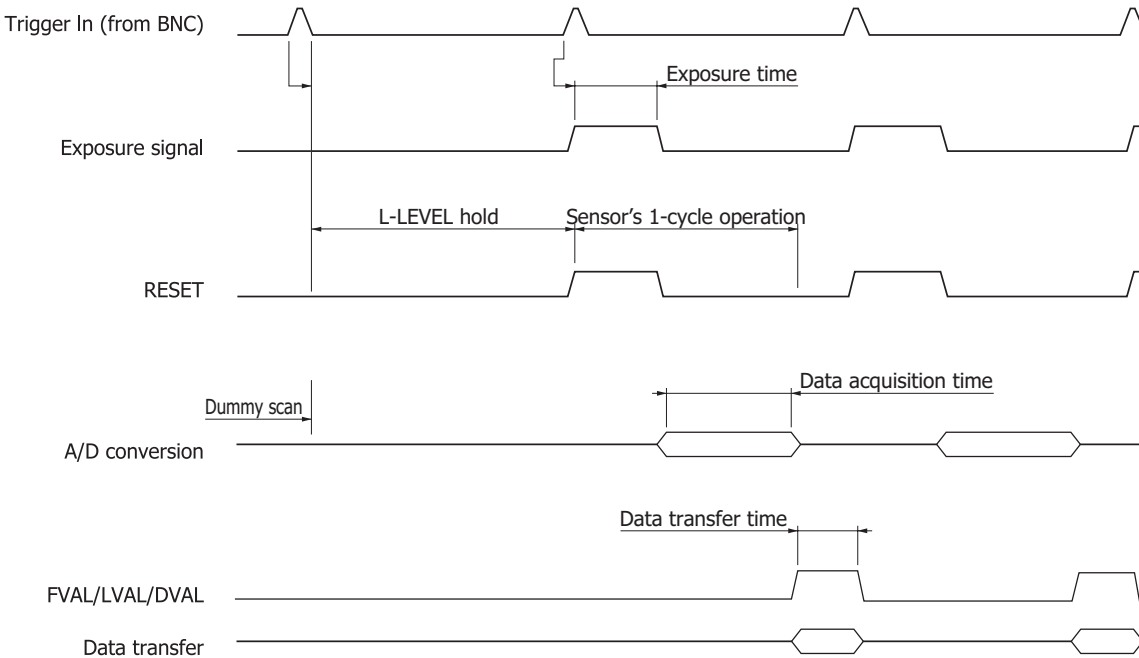
External synchronization mode

External Edge 1



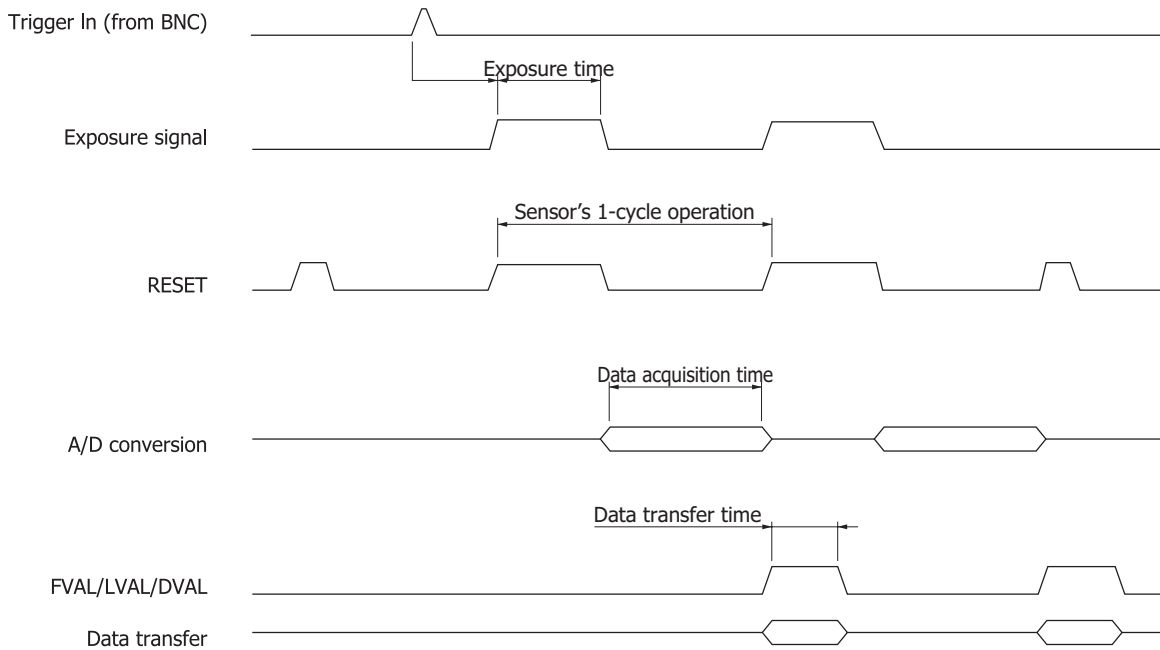
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External Edge 2



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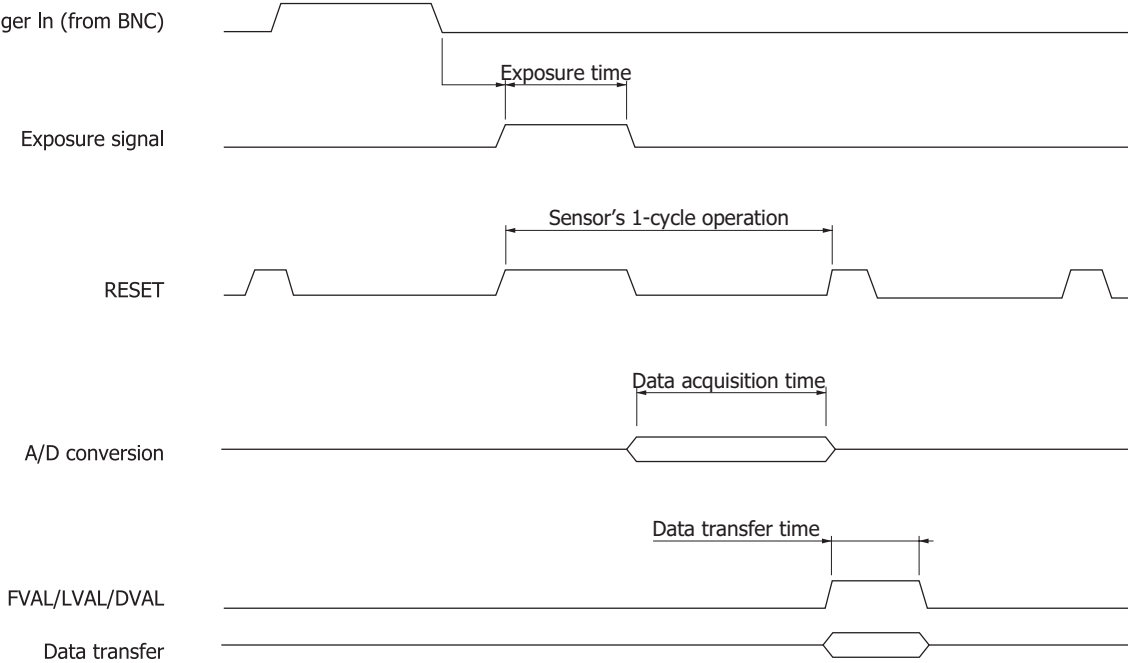
External Edge 3\*6



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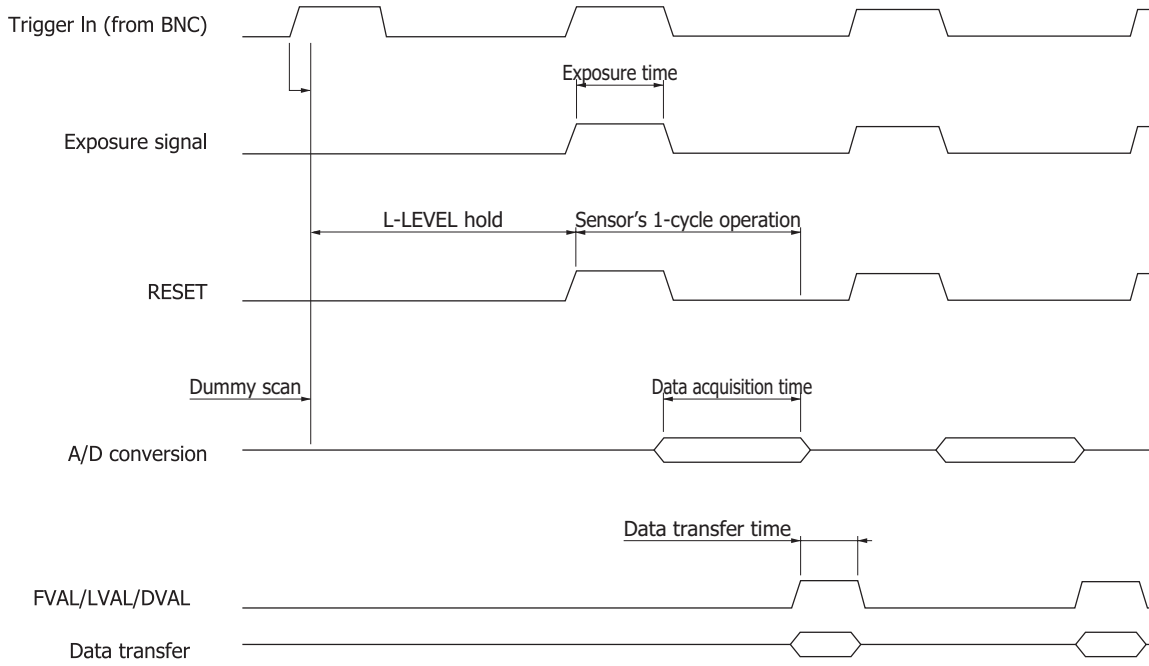
\*6: Data of multiple lines can be acquired with a single external trigger signal as well as similar operation to External Edge 1.

External Level 1



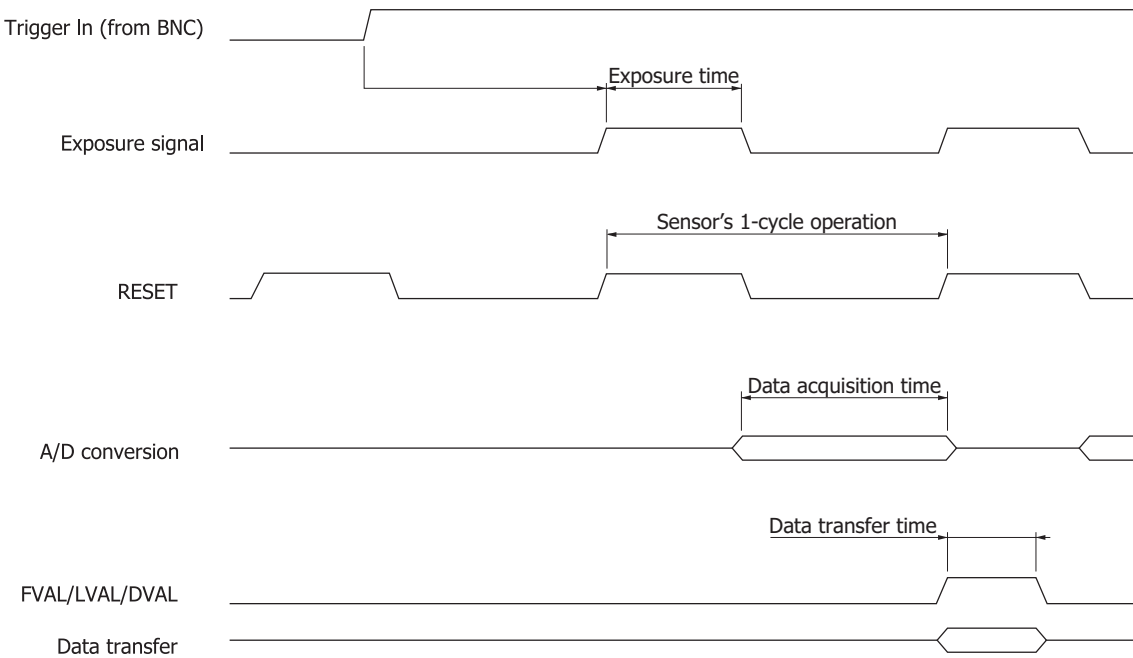
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External Level 2



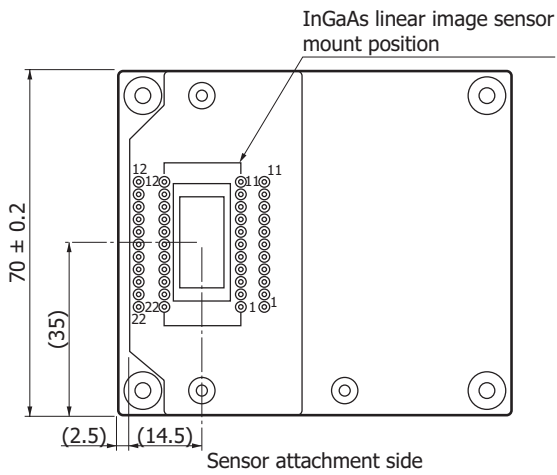
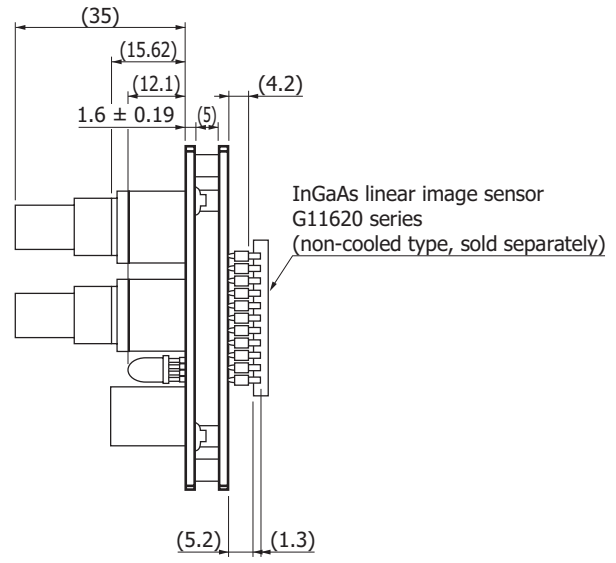
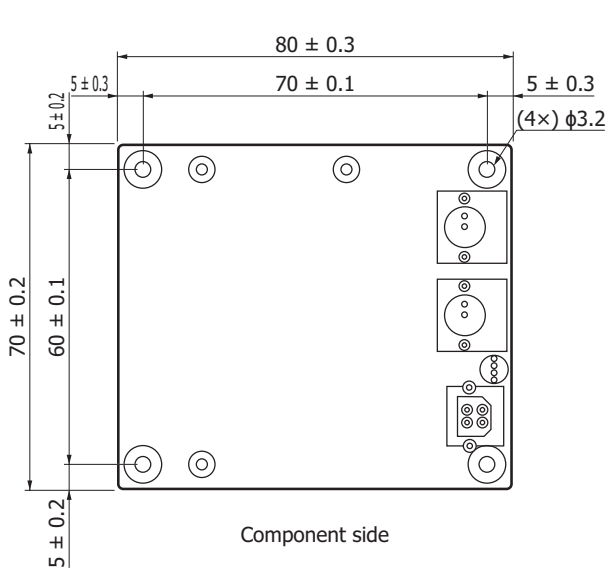
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External Gated



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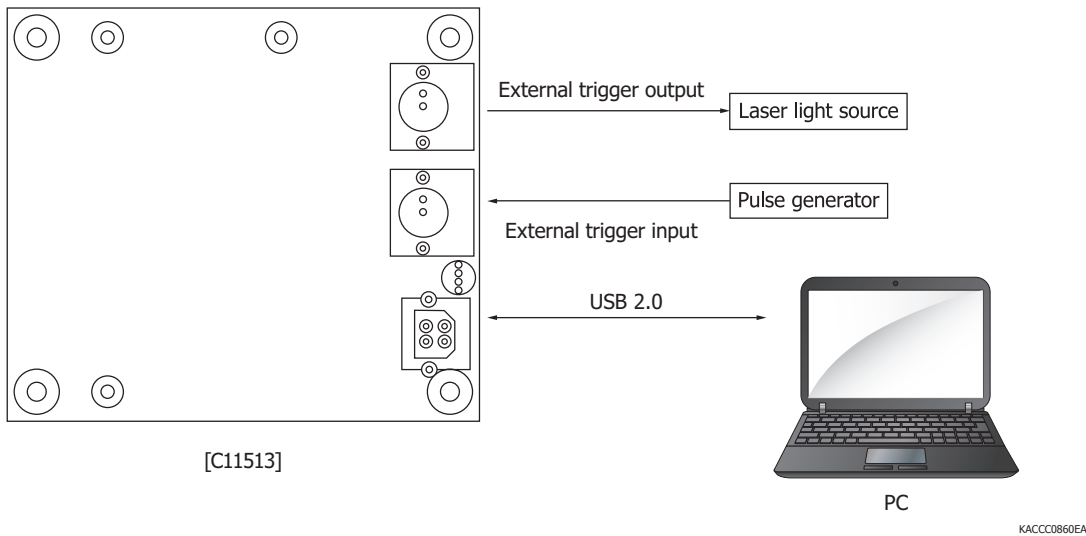
**Dimensional outline (unit: mm)**



Values in parentheses indicate reference values.  
Weight: Approx. 70 g (excluding the sensor)

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### Connection example



### Accessories

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

### Related information

[www.hamamatsu.com/sp/ssd/doc\\_en.html](http://www.hamamatsu.com/sp/ssd/doc_en.html)

- Precautions
- Disclaimer

### Applicable product datasheet

Available at our website ([www.hamamatsu.com](http://www.hamamatsu.com))

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

Information described in this material is current as of February 2017.

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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