

# InGaAs multichannel detector head C8061/C8062-01

Designed for InGaAs linear image sensor



C8061/C8062-01 series are high sensitivity multichannel detector heads for use with InGaAs linear image sensors. C8061-01 is designed for the one-stage TE-cooled InGaAs linear image sensors and C8062-01 for two-stage TE-cooled InGaAs linear image sensors.

C8061-01 and C8062-01 incorporate a low-noise driver/amplifier circuit that provide reliable operation from simple external signals. They also include a highly stable temperature controller that cools the sensor to a preset temperature level (C8061-01:  $T_s = -10\text{ }^\circ\text{C}$ , C8062-01:  $T_s = -20\text{ }^\circ\text{C}$ ) as soon as the power is turned on. If the cooler fails and overheat occurs, the built-in protection circuit automatically turns off the power to maintain safety. Despite its compact size, the housing configuration is designed for good heat dissipation, and threaded mounting holes on the front panel allow connections to other devices such as monochromators.

Controller for multichannel detector head C7557 is also available. The software supplied with the C7557 allows easy control of the multichannel detector head and data acquisition.

## Features

- Designed for InGaAs linear image sensor  
C8061-01: One-stage TE-cooled type  
C8062-01: Two-stage TE-cooled type
- Built-in driver/amplifier and temperature circuit
- Highly stable temperature controller  
Cooling temperature ( $T_a = 10$  to  $30\text{ }^\circ\text{C}$ )  
fixed at  $-10 \pm 0.1\text{ }^\circ\text{C}$  (C8061-01),  $-20 \pm 0.1\text{ }^\circ\text{C}$  (C8062-01)
- Simple signal input operation
- Compact configuration

## Applications

- Near infrared multichannel spectroscopy
- Radiation thermometry
- Non-destructive inspection
- Optical fiber transmittance measurement

## ■ Selection Guide

The table below shows InGaAs image sensors applicable for the C8061/C8062-01.

Since the C8061/C8062-01 do not include a InGaAs image sensor, so select the desired sensor and order it separately.

Type No.	InGaAs linear image sensor					
	Type No.	Cooling	Number of pixels	Number of active pixels <sup>*1</sup>	Pixel size [ $\mu\text{m(H)} \times \mu\text{m(V)}$ ]	Active area [mm (H) $\times$ mm (V)]
C8061-01	G9201-256S	One-stage TE-cooled	256	256	$50 \times 250$	$12.8 \times 0.25$
	G9202-512S		512	512	$25 \times 250$	$12.8 \times 0.25$
	G9203-256S		256	256	$50 \times 500$	$12.8 \times 0.50$
	G9204-512S		512	512	$25 \times 500$	$12.8 \times 0.50$
	G9211-256S		256	>251	$50 \times 250$	$12.8 \times 0.25$
	G9212-512S		512	>502	$25 \times 250$	$12.8 \times 0.25$
	G9213-256S		256	>251	$50 \times 500$	$12.8 \times 0.50$
	G9214-512S		512	>502	$25 \times 500$	$12.8 \times 0.50$
C8062-01	G9205-256W	Two-stage TE-cooled	256	>244	$50 \times 250$	$12.8 \times 0.25$
	G9206-256W					
	G9207-256W					
	G9208-256W					

\*1: Number of active pixels: The total number of pixels whose dark current and sensitivity uniformity do not exceed the maximum values.

■ Absolute maximum ratings

Parameter	Symbol	Min.	Typ.	Max.	Unit
Supply voltage (for digital circuitry)	VD1, VD2	-0.5	-	+7	V
Supply voltage (for analog circuitry)	VA+	-	-	+18	
	VA-	-	-	-18	
Supply voltage	Vp	-	-	+7	
	VF	-	-	+14	
Digital input voltage	-	-	-	VD1, VD2	
Operating temperature	Topr	+10 to +30			°C
Storage temperature	Tstg	0 to +50			

■ Electrical Characteristics

[unless otherwise noted, Ta=25 °C,

C8061-01: VD1,2=+5 V, VA+=+15 V, VA-=-15 V, VD2=+5 V, Vp=+5 V, VF=+12 V

C8062-01: VD1=+5 V, VA+=+15 V, VA-=-15 V, VD2=+6 V, Vp=+6 V, VF=+12 V]

Parameter	Symbol	Min.	Typ.	Max.	Unit		
Digital input	High level	V <sub>IH</sub>	+2.0	-	VD1, 2	V	
	Low level	V <sub>IL</sub>	-0.5	-	+0.8	V	
Master clock (CLK) pulse frequency	f <sub>CLK</sub>	-	-	4	MHz		
Data video readout frequency	f <sub>v</sub>	-	-	f <sub>CLK</sub> /8	Hz		
Master start (start) pulse width	t <sub>st</sub>	1/f <sub>CLK</sub>	-	-	s		
Digital output	High level (I <sub>o</sub> = -6 mA)	V <sub>OH</sub>	+2.0	-	-	V	
	Low level (I <sub>o</sub> =+6 mA)	V <sub>OL</sub>	-	-	+0.8	V	
Power supply conditions							
Voltage	Digital circuitry	VD1	+4.75	+5.0	+5.25	V	
	Analog circuitry	VA1+	+14.5	+15.0	+15.5	V	
		VA1-	-14.5	-15.0	-15.5	V	
	Other	C8061-01	VD2	+4.75	+5.0	+5.25	V
			C8062-01	+5.75	+6.0	+6.25	V
		C8061-01	Vp	+4.75	+5.0	+5.25	V
				+5.75	+6.0	+6.25	V
C8062-01	VF	+11.75	+12.0	+12.25	V		
Current	VD1 (+5 VDC)	-	-	-	+100	mA	
	VA+ (+15 VDC)	-	-	-	+200	mA	
	VA- (-15 VDC)	-	-	-	-50	mA	
	VD2	-	-	-	+50	mA	
	C8061-01: +5 VDC		-	-	-	-	-
	C8062-01: +6 VDC		-	-	-	-	-
	Vp	C8061-01: +5 VDC	-	-	+1.2	+1.7	A
		C8062-01: +6 VDC	-	-	+2.0	+3.0	A
VF (+12 VDC)	-	-	-	+200	mA		

### ■ Electrical and optical characteristics

[Unless otherwise noted, Ta=25 °C,

C8061-01: Ts=-10 °C, G9211-256S (Cf=10 pF), VD1=+5 V, VA+=+15 V, VA=-15 V, VD2=+5 V, Vp=+5 V, VF=+12 V

C8062-01: Ts=-20 °C, G9208-256W (Cf=10 pF), VD1=+5 V, VA+=+15 V, VA=-15 V, VD2=+6 V, Vp=+6 V, VF=+12 V]

Parameter	Symbol	Min.	Typ.	Max.	Unit
Spectral response range	C8061-01	-	0.9 to 1.7	-	μm
	C8062-01	-	1.2 to 2.6	-	μm
Peak sensitivity wavelength	C8061-01	-	1.55	-	μm
	C8062-01	-	2.3	-	μm
Saturation output charge	Qsat	-	30	-	pC
Conversion gain <sup>*2</sup>	G	-	0.3	-	V/pC
Dark current	C8061-01	-	0.1	3	pA/pixel
	C8062-01	-	1000	4000	pA/pixel
Photo response non-uniformity <sup>*3</sup>	C8061-01	-	-	±5	%
	C8062-01	-	-	±10	%

\*2: Including the circuit gain.

\*3: Measured at 50 % of the saturated output charge. Except for the start pixel and the last pixel.

### ■ Specifications for temperature controller

[Unless otherwise noted, Ta=25 °C,

C8061-01: Ts=-10 °C, VD=+5 V, VA+=+15 V, VA=-15 V, VD2=+5 V, Vp=+5 V, VF=+12 V

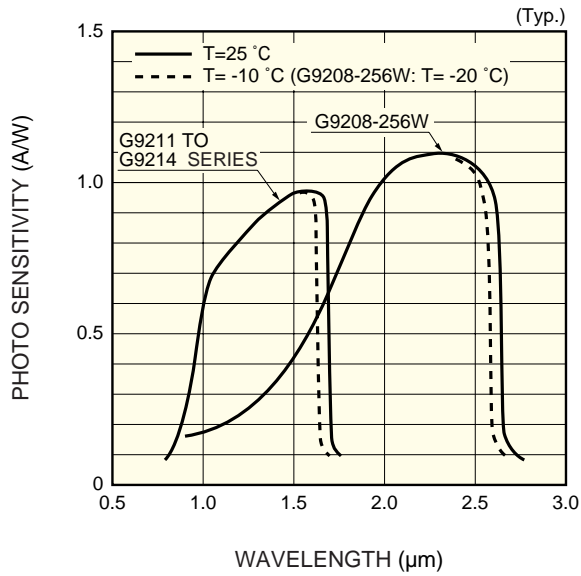
C8062-01: Ts=-20 °C, VD=+5 V, VA+=+15 V, VA=-15 V, VD2=+6 V, Vp=+6 V, VF=+12 V]

Parameter <sup>*4</sup>	Symbol	Min.	Typ.	Max.	Unit
Cooling temperature	C8061-01	-11	-10	-9	°C
	C8062-01	-21	-20	-19	°C
Temperature control range	ΔTs	-0.1	-	+0.1	°C
Power dissipation of peltier element	C8061-01	-	-	7	W
	C8062-01	-	-	11	W
Cool down time to preset temperature	to	-	-	5	min.
Setting temperature for overheat protection <sup>*5</sup>	To	-	+45	-	°C

\*4: Other functions include error display, automatic power off, and detection of electrical opens and shorts by the thermosensor.

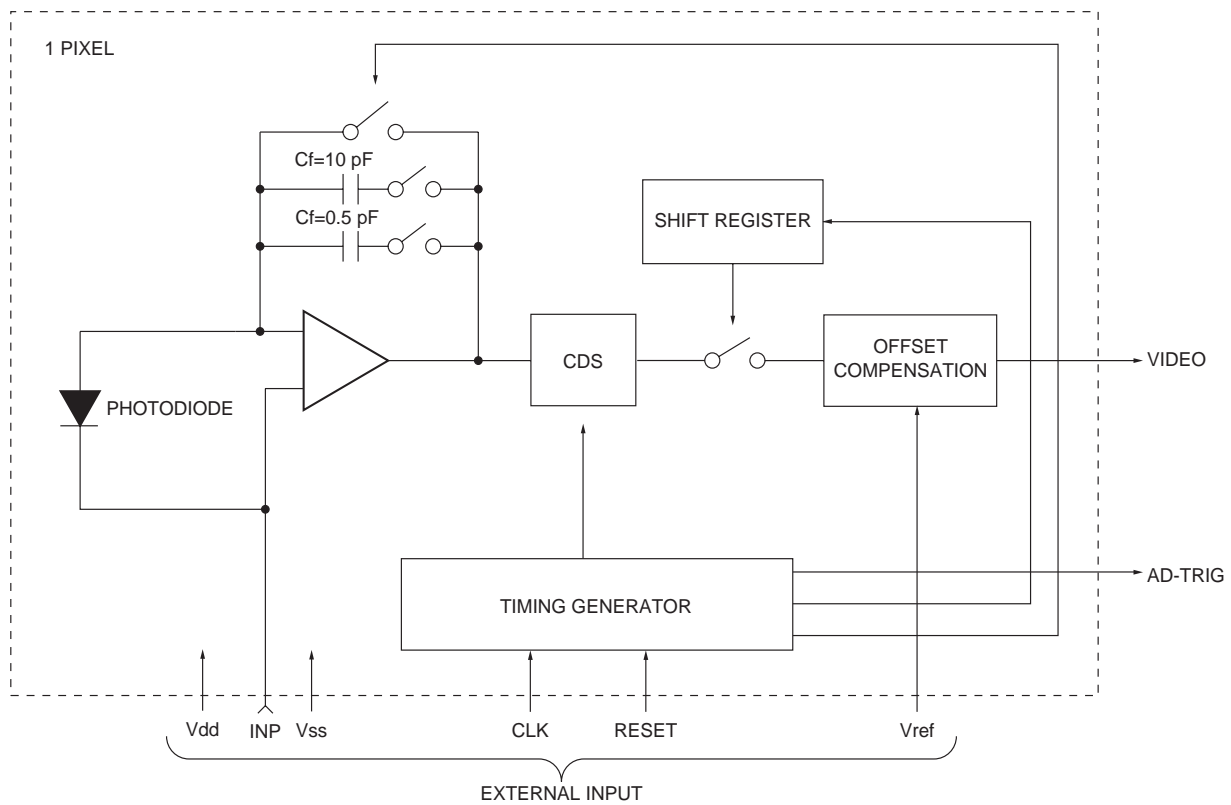
\*5: Temperature at back side of housing. (between housing and fin)

■ Spectral response



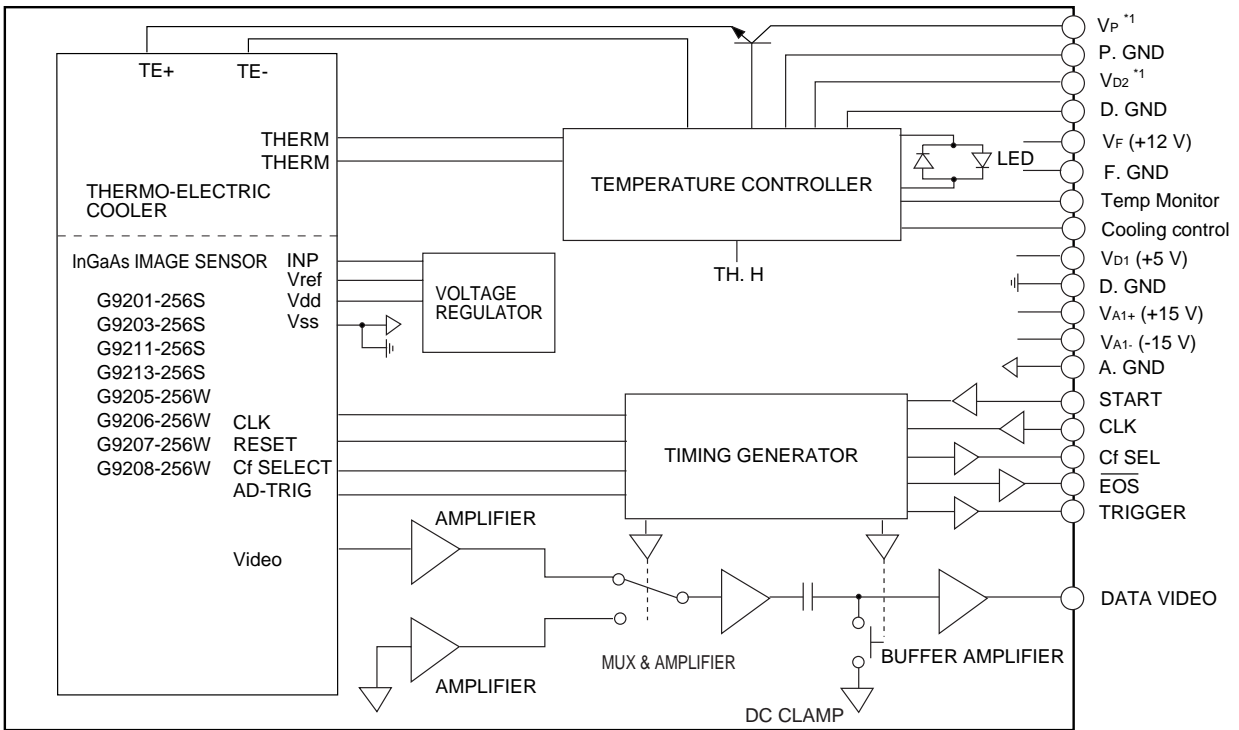
KMIRB0022EA

■ Equivalent Circuit



KMIRC0010EB

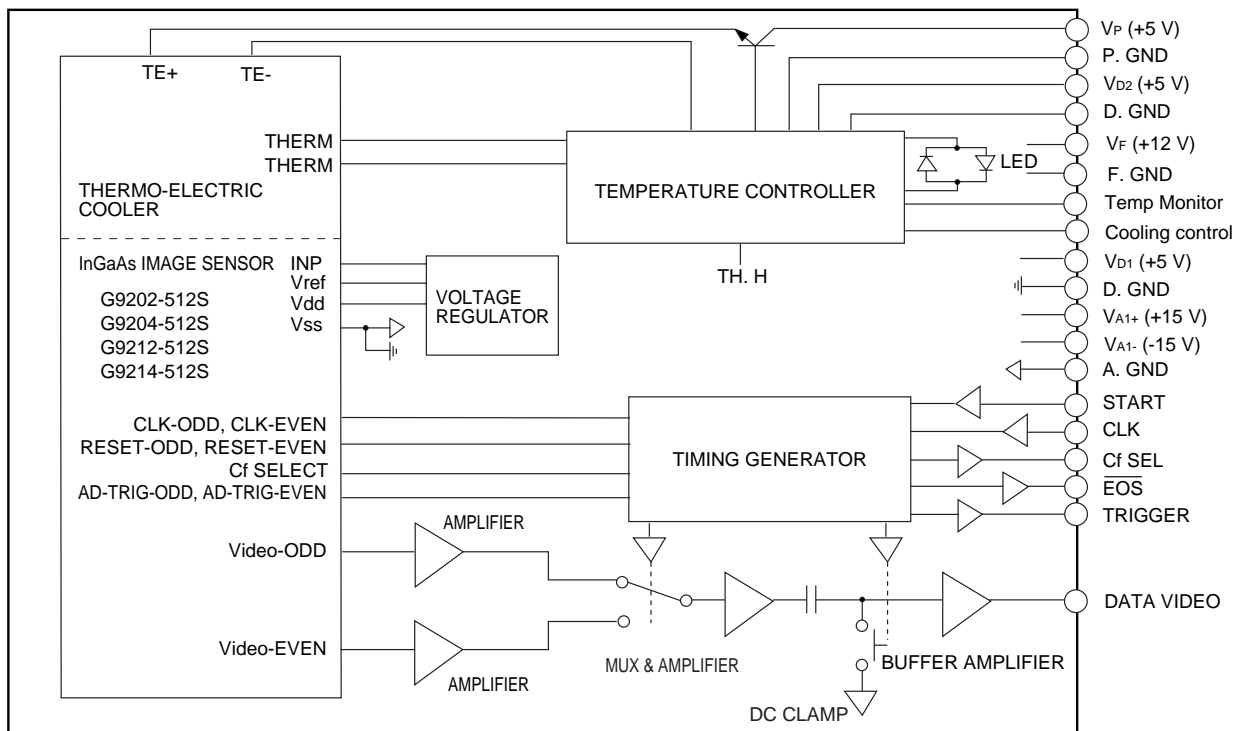
■ Block diagram 1 (C8061/C8062-01)



\*1: +5 V (C8061-01), +6 V (C8062-01)

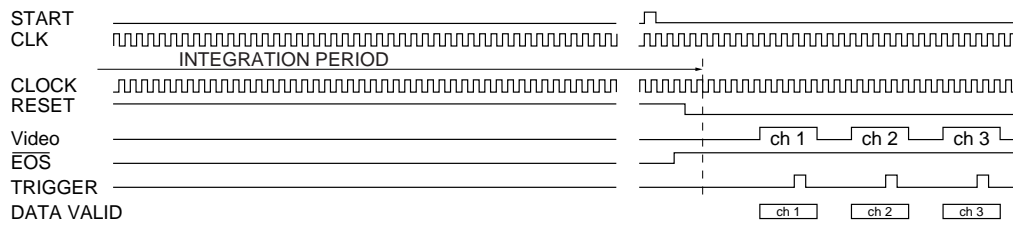
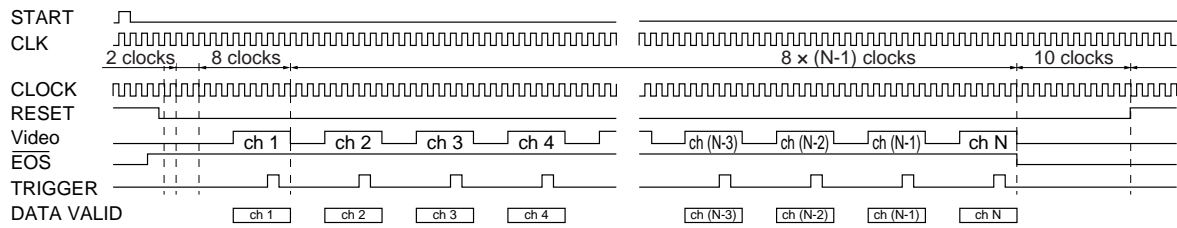
KACCC0193EB

■ Block diagram 2 (C8061-01)



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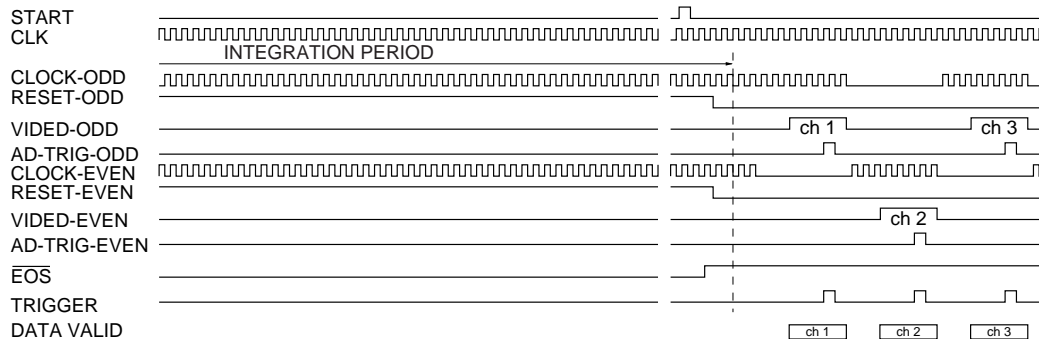
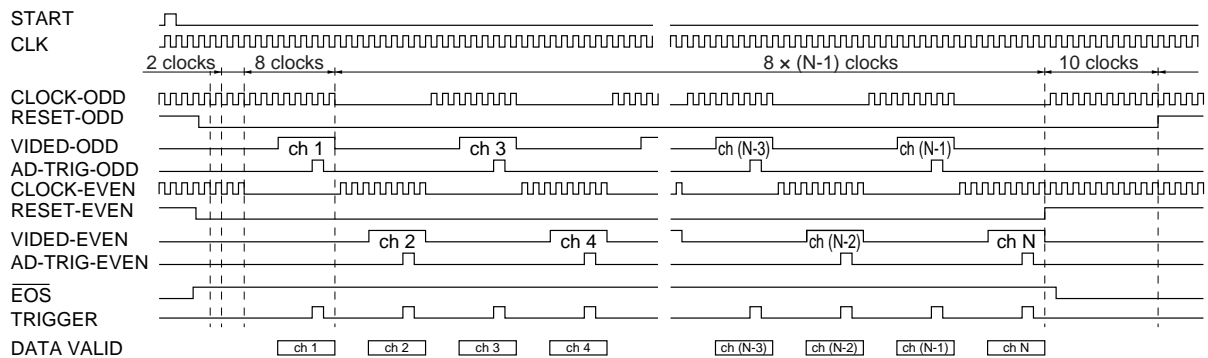
■ Timing chart 1 (256 pixels)



Note: N is the number of pixels (N=256)

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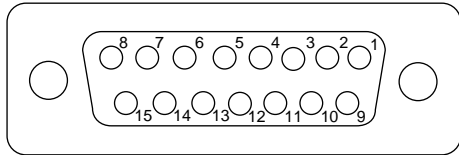
■ Timing chart 2 (512 pixels)



Note: N is the number of pixels (N=512)

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■ Pin assignment of “signal I/O” connector  
15-pin D-sub connector



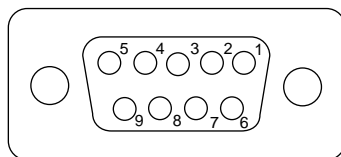
KACCC0069EA

Pin No.	Terminal name	Description
1	Cf SEL	Digital Input signal used to select conversion gain of charge amplifier in InGaAs image sensor. HCMOS compatible High level or left open: Low gain (0.3 V/pc) Low level: High gain (6 V/pc)
2	Data video *	Analog video output Positive polarity (Typ. 10 V)
3	VA1+ (+15 V)	Analog power supply
4	VA1- (-15 V)	Analog power supply
5	VD1 (+5 V)	Digital power supply
6	Start	Digital input signal for initializing the circuit HCMOS compatible. Positive logic
7	CLK	Digital input signal for operating the circuit HCMOS compatible Rising edge operation
8	$\overline{\text{EOS}}$	Digital input signal for indicating end-of-scan of the image sensor HCMOS compatible Negative logic
9	A. GND	Analog ground
10	A. GND	Analog ground
11	NC	No Connection
12	D. GND	Digital ground
13	D. GND	Digital ground
14	D. GND	Digital ground
15	Trigger	Digital output signal for A/D conversion HCMOS compatible Positive logic

\* Depending on the individual sensor to install, some channels might have a dark output lower than ground potential so use a bipolar A/D converter.

■ Pin assignment of “TE control I/O” connector

9-pin D-sub connector



KACCC0075EA

Pin No.	Terminal name	Description
1	V <sub>D2</sub> (+6V)	Power supply.
2	Temp Monitor	Analog output signal of the temperature of the InGaAs image sensor.
3	Cooling control	Digital input signal for starting to cool down. HCMOS compatible. H-level or left open : cooling L-level : stand-by
4	V <sub>p</sub> (+6V)	Power supply for the thermoelectric cooler in the InGaAs image sensor.
5	V <sub>F</sub> (+12 V)	Power supply for cooling fan.
6	D. GND	Ground.
7	D. GND	Ground.
8	P. GND	Power supply return of the thermoelectric cooler mounted in the InGaAs image sensor.
9	F. GND	Ground return for cooling fan.

Note: Available for using same power supply (+6 V) for “V<sub>D2</sub>” and “V<sub>P</sub>”.

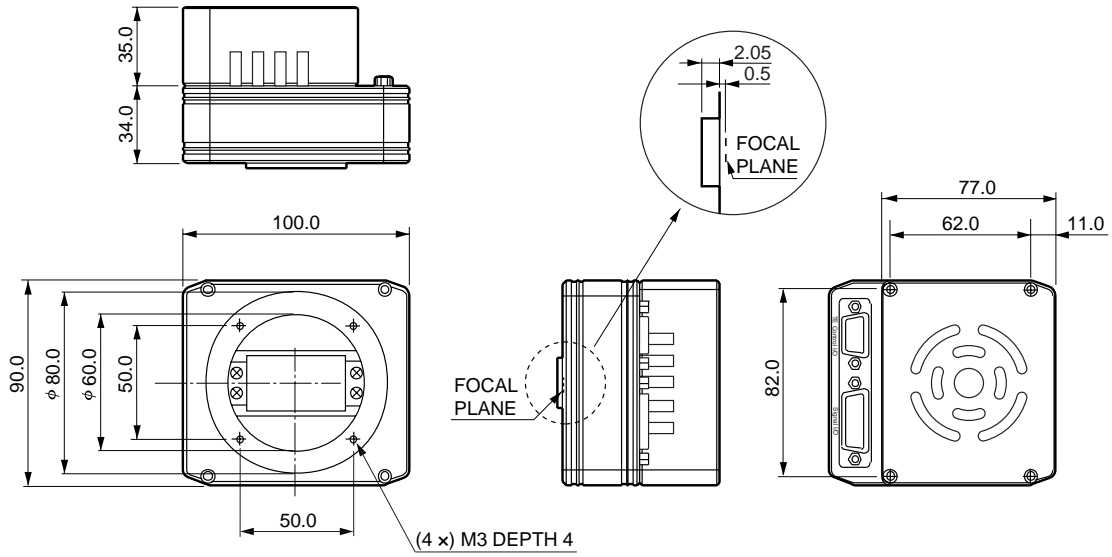
Caution: Do not connect “V<sub>D2</sub>” and “V<sub>P</sub>” together on the backside of the 9-sub D-sub connector.

These may be connected (shorted) at the power supply end, not 9-pin D-sub connector.



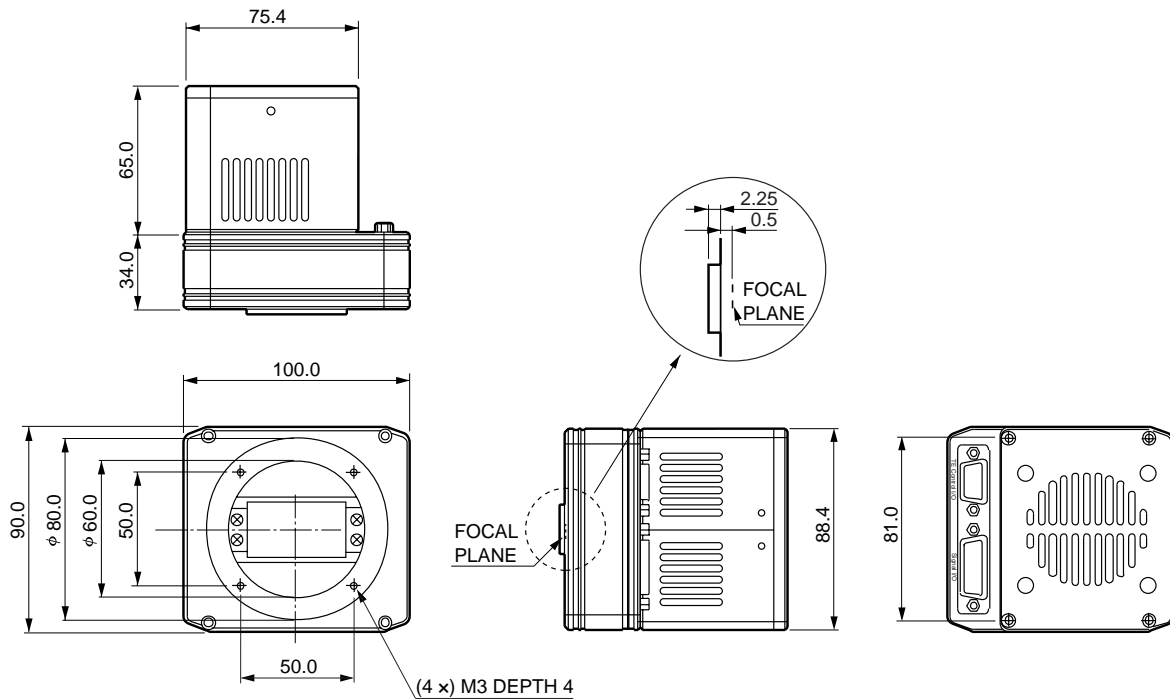
■ Dimensional outlines (unit: mm)

C8061-01



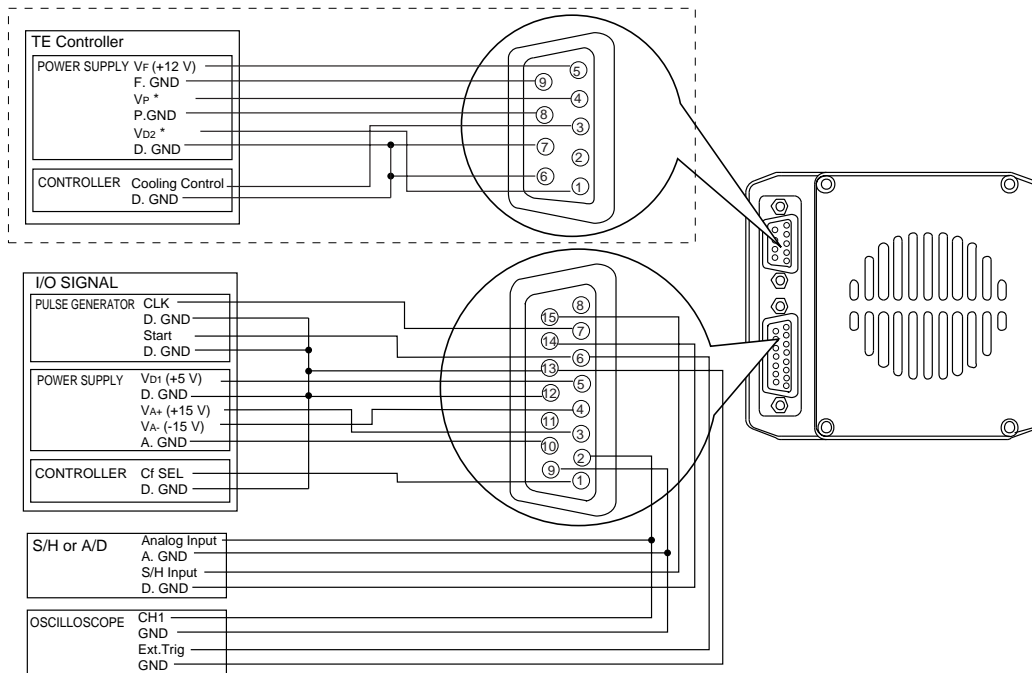
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C8062-01



KACCA0089EA

■ Connection Example



\* C8061-01: +5 V, C8062-01: +6 V

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Multichannel detector head controller C7557

When connected to a HAMAMATSU multichannel detector head and a personal computer, C7557 allows easy control of the detector head and data acquisition by using dedicated software that comes with the unit.

Suitable multichannel detector head

C7020/-02, C7021/-02, C7025/-02,  
C7040, C7041, C7043, C7044, C7180,  
C7181, C8061-01, C8062-01, C10150, C10151

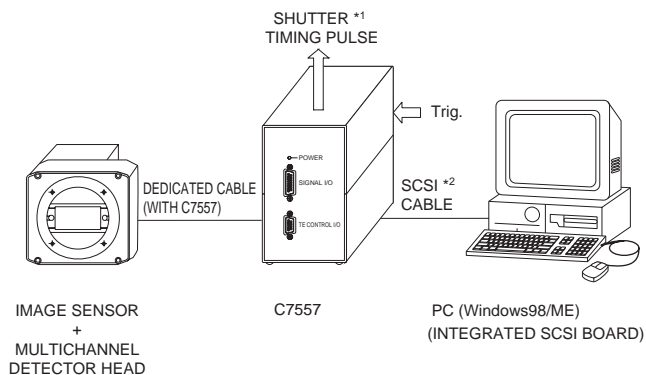
■ Accessories

- SCSI terminator
- Fuse (2.5 A)
- Detector head connection cables
- AC cable
- Software (Compatible OS: Windows 98/ME \*)
- Operation manual



\* This software may be run on Windows 2000/NT/XP with a simple task. For information on how to do this, please consult with our sales office.

## ■ Connection



\*1: Shutter, etc. are not available.

\*2: SCSI cable and SCSI board (card) are not supplied with C7557.

KACCC0077ED

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