HAMAMATSU

CCD signal processing module

C9266-03/-04

Signal processing module for CCD area image sensor (S10810, S10811)

The C9266-03/-04 are signal processing circuit designed for HAMAMATSU CCD area image sensors S10810, S10811. The C9266-03/-04 can be used in X-ray applications such as X-ray imaging and non-destructive inspection when combined with these CCD area image sensors.

The C9266-03/-04 hold a CCD driver circuit, analog video signal processing circuit (12-bit A/D converter), timing generator, control circuit and power supply. The C9266-03/-04 convert analog video signals from a CCD into digital signals and outputs them. The USB connector (USB 2.0) provided as a standard feature easily connects to a PC for the C9266-03/-04 control and data acquisition. No additional power supply for C9266-03/-04 are needed since power is supplied from the PC through the USB connector. The C9266-03/-04 also have a 36-pin MDR connector for connection to a CCD. The C9266-03/-04 case is compact, lightweight and very easy to handle.

Application software (C9266DCamAPL) that comes with The C9266-03/-04 allow easy operation from a PC running on Windows 2000/Xp. A function library (DCamLIB.DLL) included with the application software helps you to develop your own software. This software is available with DLL to help you develop your own software programs under various developmental environments.

Features

➡ **Built-in 12-bit AD converter**
➡ **Signal frequency: 1 MHz**
➡ **Adjustable offset**
➡ **Adjustable gain**
➡ **Interface of computer: USB 2.0**
➡ **Power supply: USB bus power or DC +5 V (C9266-03)**
    USB bus power (C9266-04)

Applications

➡ **Control of X-ray CCD area image sensor (S10810, S10811) and data aquisition**

Applicable CCD area image sensors

The table below shows CCD area image sensors applicable for C9266-03/-04.
Since the C9266-03/-04 do not include a CCD area image sensor, so select the desired sensor and order it separately.

CCD area image sensor				
Type no.	Number of pixels	Number of active pixels	Pixel size (µm)	Active area [mm (H) × mm (V)]
S10810	1508 × 1002	1500 × 1000	20 × 20	30 × 20
S10811	1708 × 1202	1700 × 1200	20 × 20	34 × 24

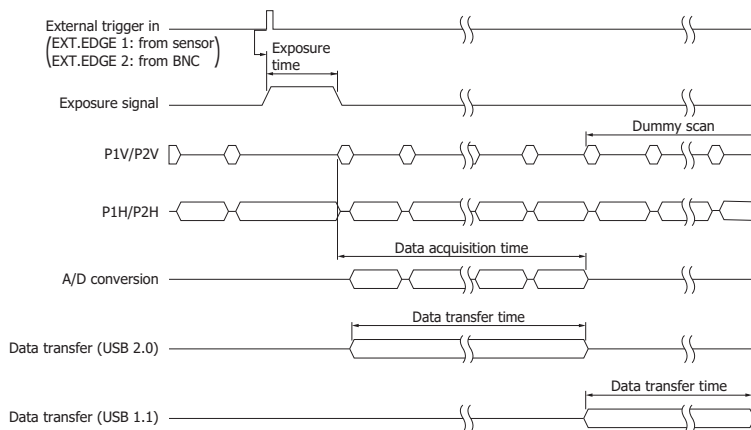## Specifications (Typ. Ta=25 °C, unless otherwise noted)

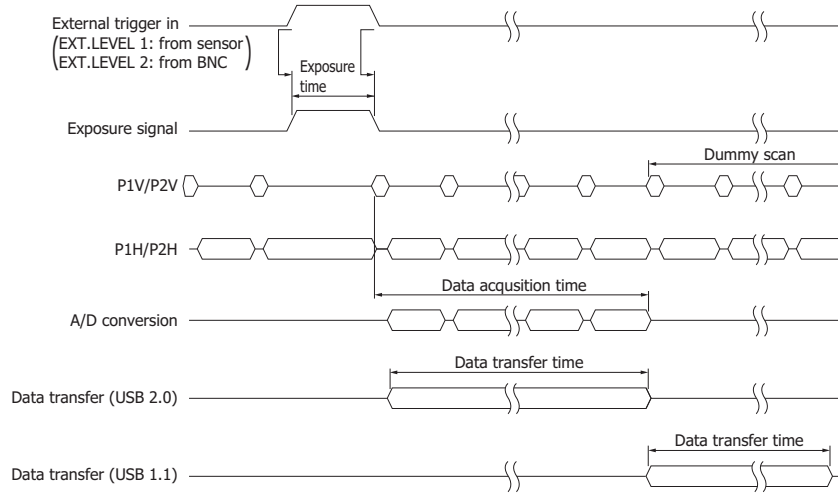| Parameter		Condition	CCD area image sensor		Unit
			S10810	S10811	
Scanning			1		MHz
Frame readout time			1.62	2.18	s
Data transfer time			1.62	2.17	s
Total transfer time			1.62	2.18	s
A/D conversion resolution		4095ADU	12		bit
Conversion gain			48.8		e^-/ADU
Readout noise			7		ADU
Dynamic range			585		-
Current consumption			350 max.		mA
Storage temperature			-20 to + 70		°C
Operating temperature			0 to + 50		°C
Operating humidity		No condensation	70 max.		%
Dimension			32 (H) × 115 (W) × 125 (D)		mm
Weight	C9266-03		Approx. 200		g
	C9266-04		Approx. 170		

Timing chart

Internal synchronous mode ("INT" mode)
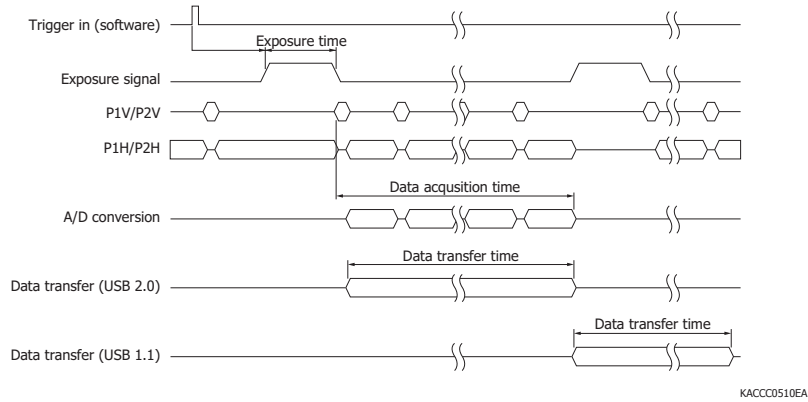
KACCC0510EA

External trigger mode 1, 2 ("EXT.EDGE 1, 2" mode)

Note: "EXT.EDGE 2" mode is not usable in the C9266-04 because there is not a BNC connector.

KACCC0511EA

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External trigger mode 3, 4 (EXT.LEVEL 1, 2" mode)

External trigger in
(EXT.LEVEL 1: from sensor)
(EXT.LEVEL 2: from BNC)

Exposure time

Exposure signal

Dummy scan

P1V/P2V

P1H/P2H

Data acqusition time

A/D conversion

Data transfer time

Data transfer (USB 2.0)
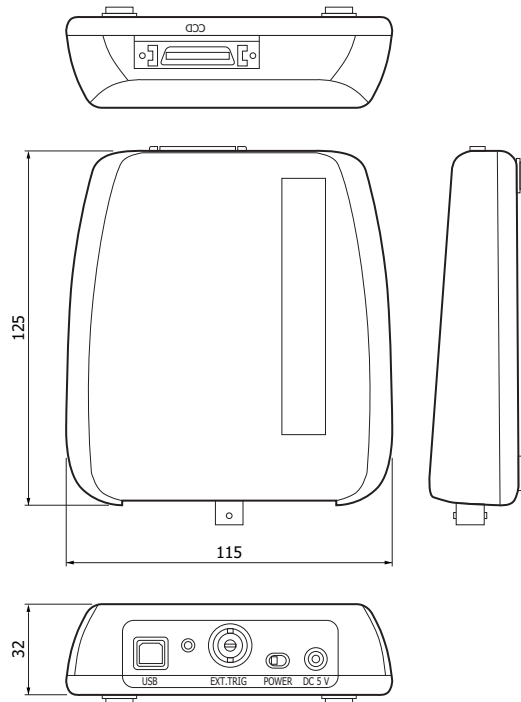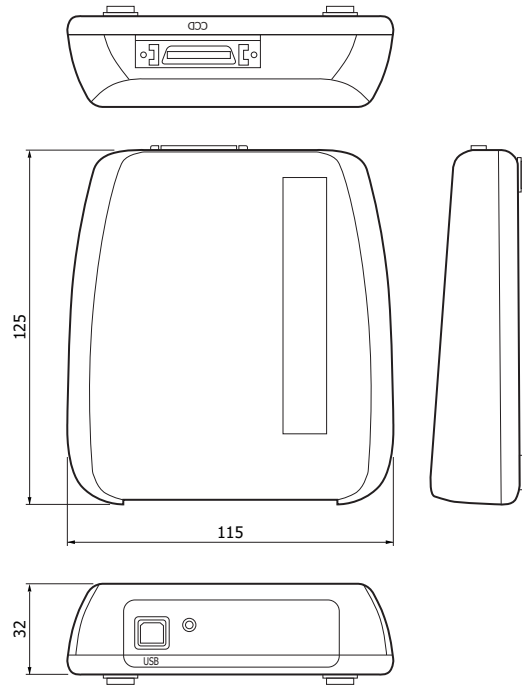
Data transfer time

Data transfer (USB 1.1)

Note: "EXT.LEVEL 2" mode is not usable in the C9266-04 because there is not a BNC connector.

KACCC0512EA

Dimensional outlines (unit: mm)

C9266-03

125

115

32

USB   EXT.TRIG   POWER   DC 5 V

KACCA0270EA

C9266-04

KACCA0191EB

Pin connections

CCD connector (3M 10236-5202JL, 36-pin female)

Pin no.	Signal name	Voltage (amplitude)	Pin no.	Signal name	Voltage (amplitude)
1	GND	+8 V	19	NC	
2	VCC	+13 V	20	P2H	0 V/+12 V
3	SG	0 V/+12 V	21	NC	
4	TRIGGER	+8 V/+13 V	22	P1H	0 V/+12 V
5	RG	0 V/+12 V	23	NC	
6	NC		24	GND	+8 V
7	OG	+11 V	25	NC	
8	NC		26	RD	+20 V
9	RD	+20 V	27	NC	
10	NC		28	OD	+23 V
11	OD	+23 V	29	NC	
12	NC		30	GND	+8 V
13	OUT		31	NC	
14	NC		32	OUT	
15	GND	+8 V	33	NC	
16	NC		34	P2V	0 V/+12 V
17	P1V	0 V/+12 V	35	NC	
18	NC		36	TG	0 V/+12 V

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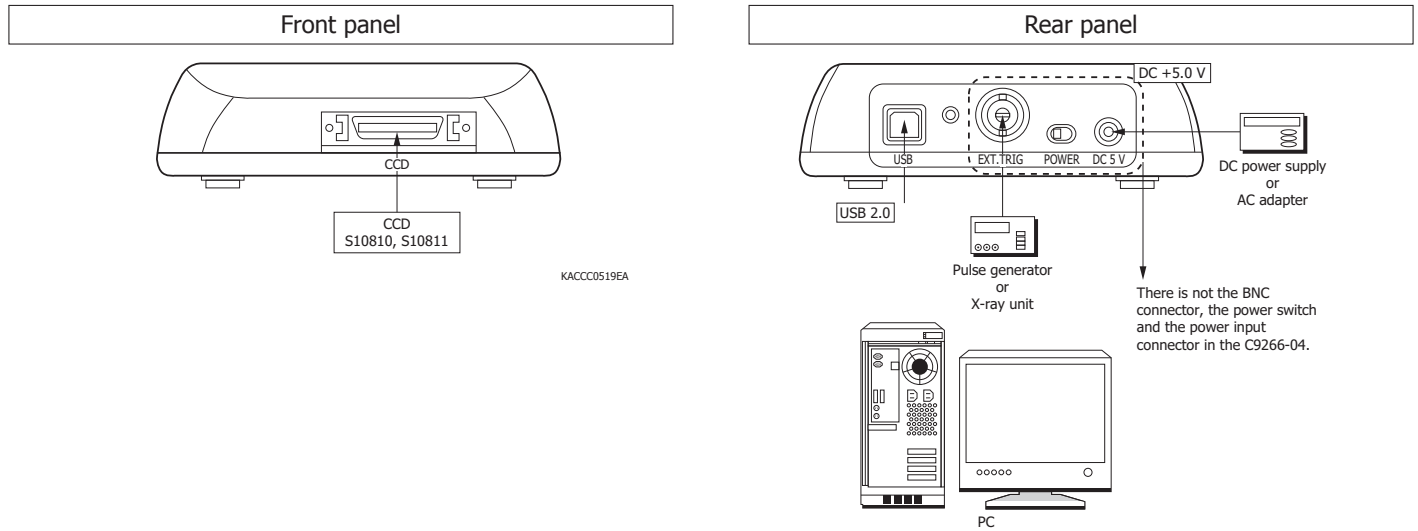## ▶ "POWER" connector (DC power jack: compatible with EIAJ RC5320A, voltage class "2")

There is not an connector in the C9266-04.

KACCC0513EA

▶ Connection

Refer to the following diagram to connect hardware peripherals.

Front panel	Rear panel

CCD
CCD
S10810, S10811

KACCC0519EA

DC +5.0 V

USB   EXT.TRIG   POWER   DC 5 V

USB 2.0

Pulse generator
or
X-ray unit

DC power supply
or
AC adapter

There is not the BNC connector, the power switch and the power input connector in the C9266-04.

PC

KACCC0514EA

▶ Example of sample software (C9266DCamAPL) on PC screen

OS: Windows2000/XP
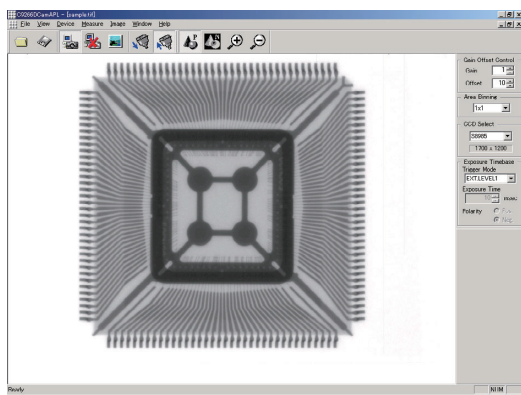
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Cat. No. KACC1174E01 Jan. 2010 DN