

C9118 series

Compact, easy-to-use driver circuit

The C9118 series CMOS driver circuit is designed for photodiode arrays with amplifier. The C9118 series operates a linear image sensor by just inputting two signals (M-CLK and M-RESET) and a signal +5 V supply. The C9118 series is assembled on a compact board measuring 48 × 56 mm and allows downsizing of the measurement equipment. The C9118 is intended for single use or parallel connections, while the C9118-01 is suitable for cascade connections.

Features

- ➔ Single power supply (+5 V) operation
- ➔ Operation with two input signals (M-CLK and M-RESET)
- ➔ Compact: 48 × 56 × 5.2^t mm

Applications

- ➔ Various types of image acquisition
- ➔ Optical detection equipment

Compatible photodiode arrays with amplifier

Driver circuit for photodiode array with amplifier	Photodiode array with amplifier (sold separately)		
	Type no.	Number of elements	Element size (pitch × height)
C9118	S11865-64, S11865-64G	64	0.8 mm × 0.8 mm
	S11865-128, S11865-128G	128	0.4 mm × 0.6 mm
C9118-01	S11866-128-02, S11866-128G-02	128	0.8 mm × 0.8 mm
	S11866-64-02, S11866-64G-02	64	1.6 mm × 1.6 mm

Note: These circuits do not support the S8865-256, S8866-64-02, S11865-256 and S11865-256G.

Absolute maximum ratings

Parameter	Symbol	Condition	Value	Unit
Supply voltage	V _{cc}	T _a =25 °C	+7	V
Digital input voltage	-	T _a =25 °C	V	V
Operating temperature	T _{opr}		0 to 50 ^{*1}	°C
Storage temperature	T _{stg}		0 to 70 ^{*1}	°C

*1: No condensation

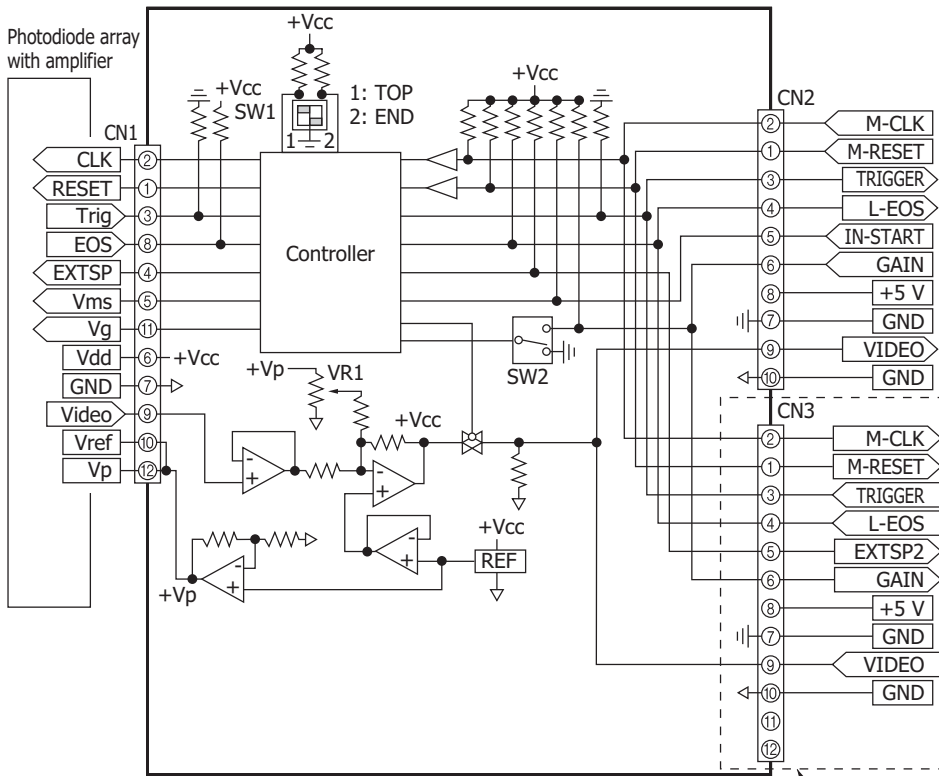
Note: Exceeding the absolute maximum ratings even momentarily may cause a drop in product quality. Always be sure to use the product within the absolute maximum ratings.

Specifications (T_a=25 °C)

Parameter	Symbol	Min.	Typ.	Max.	Unit	
Rated voltage	-	4.9	5.0	5.2	V	
Current consumption	+I _s	-	75	80	mA	
Digital input	High level	V _{IH}	2.0	-	5	V
	Low level	V _{IL}	0	-	0.8	V
M-RESET pulse width (Low level)	T _{pwst} RESET1	10	-	-	μs	
M-CLK frequency	f(CLK)	40	-	4000	kHz	
Digital rise/fall times	t _{TLH} /t _{THL}	-	20	30	ns	
Data rate	f _V	10	-	1000	kHz	
Offset output	V _{offset}	-	0.5	-	V	
VIDEO saturation output*2	V _{sat}	-	4.5	-	V	

*2: From offset value

Block diagram (C9118-01)

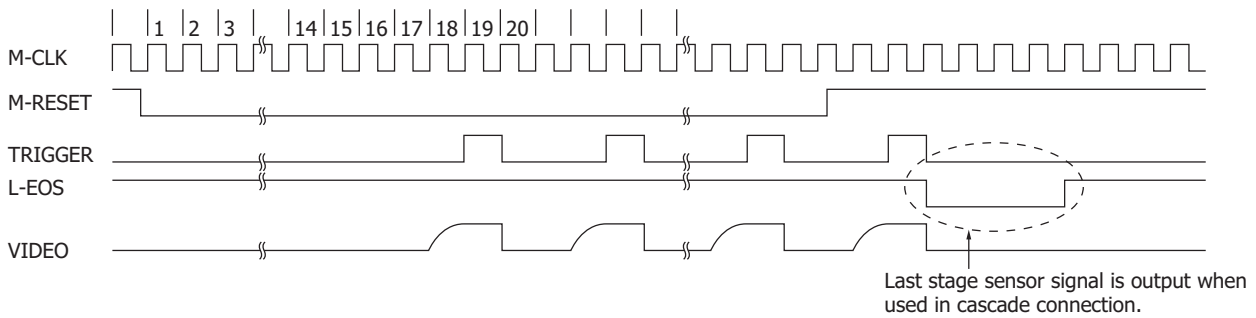


The C9118 does not have CN3.

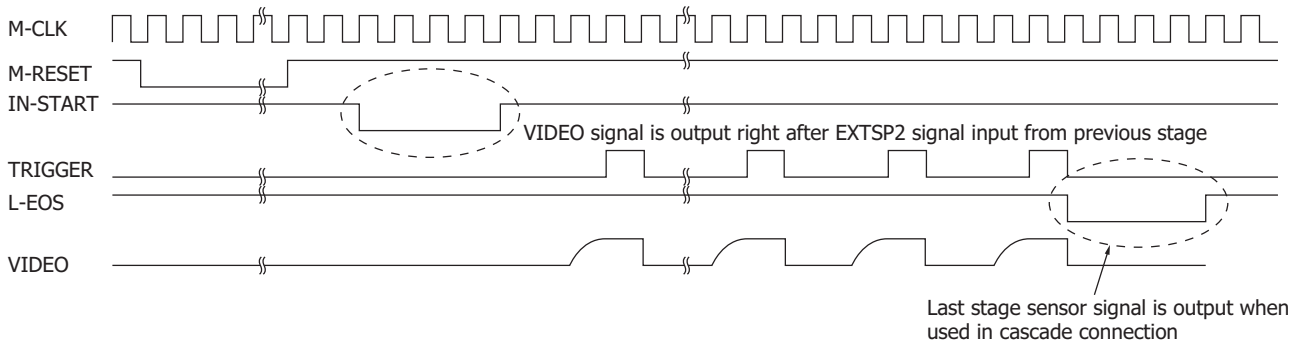
KACCC0187EH

Timing chart

Timing chart of first stage sensor when used singly or in cascade connection



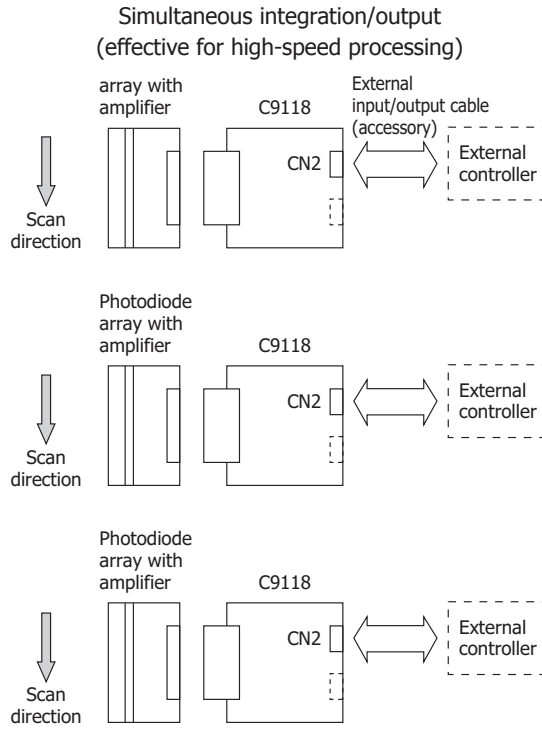
Timing chart of second and subsequent stage sensors when used in cascade connection



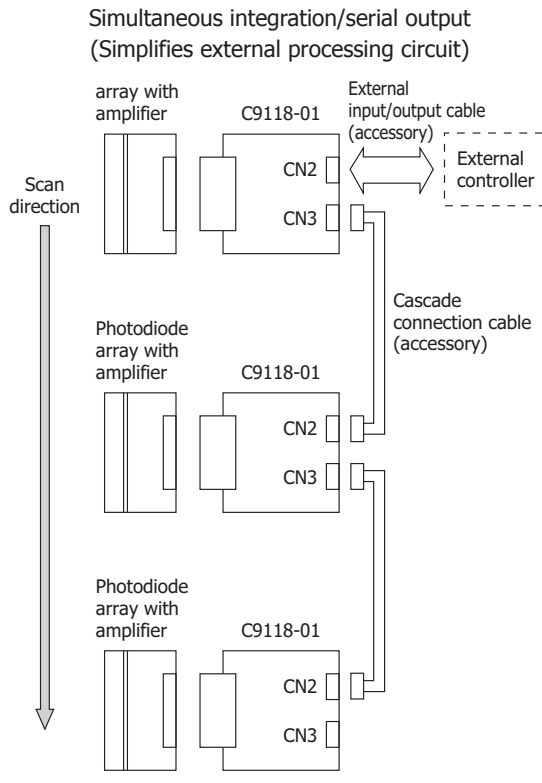
KACCC0188EA

Connection examples

Single or parallel readout example (C9118)

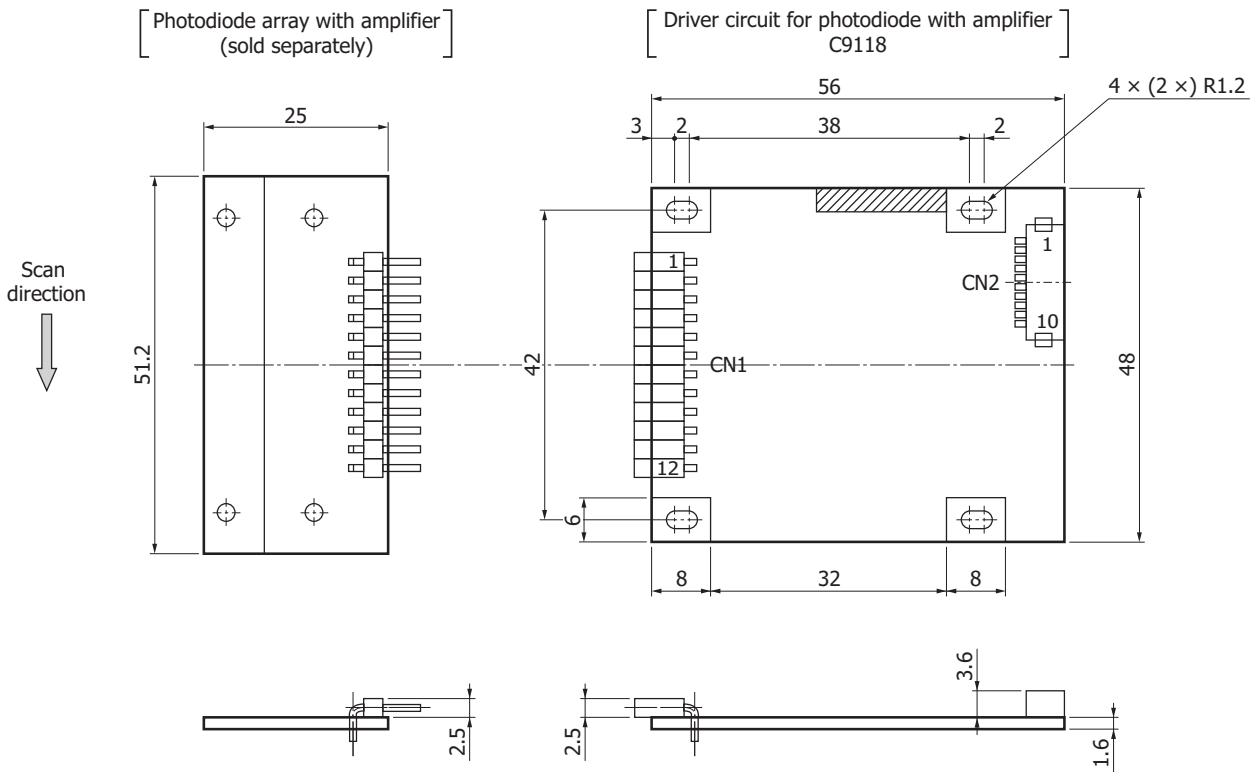


Cascade readout example (C9118-01)



Dimensional outlines (unit: mm)

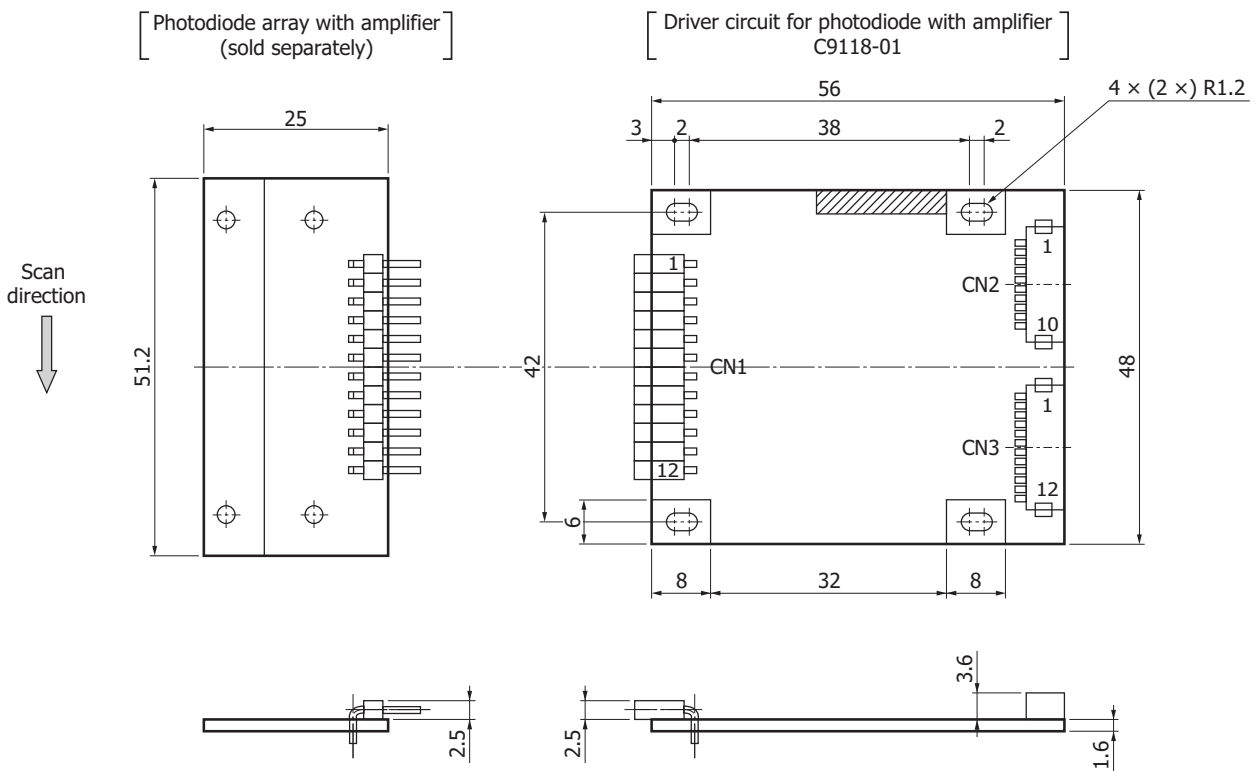
C9118



* S11865-64, S11865-64G, S11865-128, S11865-128G

KACCA0357EB

C9118-01



* S11865-64, S11865-64G, S11865-128, S11865-128G

KACCA0124EE

Pin assignment of I/O connector

- CN1 [Connector type: 801-87-012-20-002101 PRECI-DIP (made by DURTAL) or equivalent]

Pin no.	Terminal Name	I/O	Description
1	RESET	O	Sensor scan start signal. Pulse width at High level nearly equals sensor integration time.
2	CLK	O	Sensor scan sync signal. Sensor starts scanning in synchronization with this signal.
3	Trig	I	For A/D conversion timing signals. Positive logic
4	EXTST	O	High level at first stage during parallel or serial readout. At second and subsequent stages during serial readout, this outputs the EOS pulse of preceding stage.
5	Vms	O	High level at first stage during parallel or serial readout. At second and subsequent stages, this sets to Low level.
6	Vdd	O	Sensor supply voltage
7	GND	-	Sensor GND
8	EOS	I	EOS (end of scan) signal of sensor. Negative logic
9	Video	I	Video output signal. Positive polarity
10	Vref	O	Reference voltage
11	Vgain	O	Sensor gain switching H: high gain, L: low gain
12	Vpd	O	Photodiode voltage

- CN2 [Connector type: DF13-10P-1.25H (50) (made by Hirose Electric)]

Used to connect the first stage to an external I/O during parallel readout or serial readout

For the second and subsequent stages during serial readout, CN2 is used to connect to CN3 at preceding stage.

Pin no.	Terminal Name	I/O	Description
1	M-RESET	I	Sensor scan start signal. Pulse width at High level nearly equals sensor integration time.
2	M-CLK	I	Sensor scan sync signal. Sensor and circuit start operating in synchronization with this signal.
3	TRIGGER	O	For A/D conversion timing signals. Positive logic
4	L-EOS	O	EOS (end of scan) signal of all sensors during parallel or serial readout. Negative logic
5	IN-START	I	NC (no connection) at first stage during parallel or serial readout. At second and subsequent stages during serial readout, this receives the EOS pulse of preceding stage.
6	GAIN	I	External setting for sensor gain H: high gain, L: low gain
7	GND	-	Circuit GND
8	+5 V	I	+5 V power supply
9	VIDEO	O	Video output signal. Positive polarity
10	A.GND	O	Video GND

- CN3 [CN3 is installed only for C9118-01. Connector type: DF13-12P-1.25H (50) (made by Hirose Electric)]

Used to connect to CN2 at next stage during serial readout.

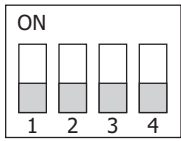
Pin no.	Terminal Name	I/O	Description
1	M-RESET	I	Sensor scan start signal. Pulse width at High level nearly equals sensor integration time.
2	M-CLK	I	Sensor scan sync signal. Sensor starts scanning in synchronization with this signal.
3	TRIGGER	O	For A/D conversion timing signals. Positive logic
4	L-EOS	O	EOS (end of scan) signal of all sensors during parallel or serial readout. Negative logic
5	EXTSP2	O	Video signal scan start signal at second stage during serial readout. Negative logic
6	GAIN	I	External setting for sensor gain H: high gain, L: low gain
7	GND	-	Circuit GND
8	+5 V	I	+5 V power supply
9	VIDEO	O	Video output signal. Positive polarity
10	A.GND	O	Video GND
11	NC	-	No connection
12	NC	-	No connection

Note: CN3 is installed only for serial readout.

Pin no. 1 to 4 and 6 to 10 connect to the same pin No. of CN2 as common lines.

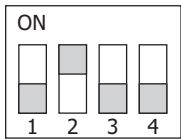
Parallel readout and serial readout settings (C9118-01)

<Parallel readout setting>



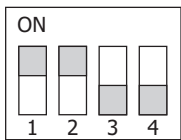
Set SW1 and SW2 to OFF as shown at left.
(SW3 and SW4 have no connection)

<First stage setting for serial readout>



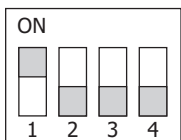
Set SW1 to OFF and SW2 to ON as shown at left.
(SW3 and SW4 have no connection)

<Second stage to second from last stage setting for serial readout>



Set SW1 and SW2 to ON as shown at left.
(SW3 and SW4 have no connection)

<Last stage setting for serial readout>



Set SW1 to ON and SW2 to OFF as shown at left.
(SW3 and SW4 have no connection)

KACCC0191EA

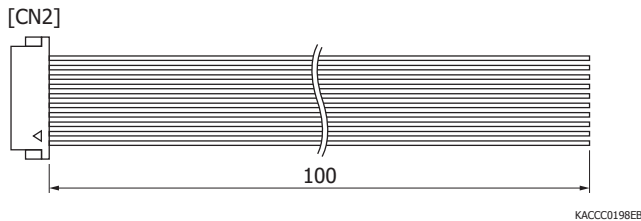
Accessory (unit: mm)

- C9118
 - External input/output cable
- C9118-01
 - External input/output cable
 - Cascade connection cable

External input/output cable

This cable connects CN2 to an external device (power supply, pulse generator, etc.).

Connector: DF-13-10S-1.25C (made by Hirose Electric)
 Terminal: DF13-2630SCFA (gold plating)
 Cable: Conforms to UL1061 AWG28

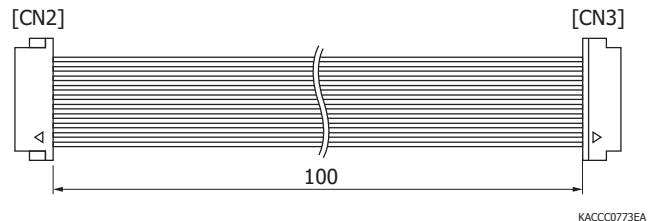


Pin no.	Color	Pin no.	Color
1	Brown	6	Blue
2	Red	7	Purple
3	Orange	8	Gray
4	Yellow	9	White
5	Green	10	Black

Cascade connection cable

This cable connects between CN2 and CN3 for serial readout.

Connector: [CN2] DF13-10S-1.25C (made by Hirose Electric)
 [CN3] DF13-12S-1.25C (made by Hirose Electric)
 Terminal: DF13-2630SCFA (gold plating)
 Cable: Conforms to UL1061 AWG28



Pin no.	Color	Pin no.	Color
1	Brown	7	Purple
2	Red	8	Gray
3	Orange	9	White
4	Yellow	10	Black
5	Green	11	No cable
6	Blue	12	No cable

Related information

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

- Precautions
 - Disclaimer

Information described in this material is current as of April 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.

The product warranty is valid for one year after delivery and is limited to product repair or replacement for defects discovered and reported to us within that one year period. However, even if within the warranty period we accept absolutely no liability for any loss caused by natural disasters or improper product use. Copying or reprinting the contents described in this material in whole or in part is prohibited without our prior permission.

HAMAMATSU

www.hamamatsu.com

HAMAMATSU PHOTONICS K.K., Solid State Division
 1126-1 Ichino-cho, Higashi-ku, Hamamatsu City, 435-8558 Japan, Telephone: (81) 53-434-3311, Fax: (81) 53-434-5184
 U.S.A.: Hamamatsu Corporation: 360 Foothill Road, Bridgewater, N.J. 08807, U.S.A., Telephone: (1) 908-231-0960, Fax: (1) 908-231-1218
 Germany: Hamamatsu Photonics Deutschland GmbH: Arzbergerstr. 10, D-82211 Herrsching am Ammersee, Germany, Telephone: (49) 8152-375-0, Fax: (49) 8152-265-8
 France: Hamamatsu Photonics France S.A.R.L.: 19, Rue du Saule Trapu, Parc du Moulin de Massy, 91882 Massy Cedex, France, Telephone: 33-(1) 69 53 71 00, Fax: 33-(1) 69 53 71 10
 United Kingdom: Hamamatsu Photonics UK Limited: 2 Howard Court, 10 Tewin Road, Welwyn Garden City, Hertfordshire AL7 1BW, United Kingdom, Telephone: (44) 1707-294888, Fax: (44) 1707-325777
 North Europe: Hamamatsu Photonics Norden AB: Torshamnsgatan 35 16440 Kista, Sweden, Telephone: (46) 8-509-031-00, Fax: (46) 8-509-031-01
 Italy: Hamamatsu Photonics Italia S.r.l.: Strada della Moia, 1 int. 6, 20020 Arese (Milano), Italy, Telephone: (39) 02-93581733, Fax: (39) 02-93581741
 China: Hamamatsu Photonics (China) Co., Ltd.: B1201, Jiaming Center, No.27 Dongsanhuan Beilu, Chaoyang District, Beijing 100020, China, Telephone: (86) 10-6586-6006, Fax: (86) 10-6586-2866