



# **CV-M4<sup>+</sup> CL**

## **Digital Double Speed Monochrome Megapixel Progressive Scan Camera**



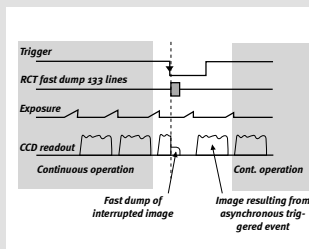
- **Digital 2/3" monochrome progressive scan CCD camera**
- **1392 (h) x 1040 (v) 6.45  $\mu$ m square pixels**
- **Extended IR sensitivity**
- **10 bit video output as Camera Link**
- **LVDS version with 8 bit video output**
- **Full 1380 (h) x 1030 (v) frame readout in 1/24 second**
- **Higher frame rates with partial scanning or binning**
- **Partial scan to 1/8 and vertical binning**
- **Edge pre-select (EPS) and pulse width control (PWC) trigger modes**
- **Restart continuous trigger (RCT) mode**
- **Analog video output for controlling auto-iris lenses**
- **Shutter speeds from 1/24 to 1/10,000 second in 10 steps**
- **Trigger and timing signals as LVDS or via Camera Link**
- **Setup by switches or serial control (short ASCII commands)**
- **Windows 98/NT/2000 setup software**

**The leading manufacturer of high performance camera solutions**

# Specifications for CV-M4<sup>+</sup> CL

Specifications	CV-M4 <sup>+</sup> CL
Scanning system	Progressive 1060 lines 24 frames/sec.
Pixel clock	40.49 MHz
Line frequency	25.43 kHz (1592 pixel clock/line)
Frame rate for full frame with V binning	24 frames/sec. (1060 lines/frame) 44 frames/sec. (565 lines/frame)
CCD sensor	2/3" progressive scan monochrome IT CCD
Sensing area	8.9 (h) x 6.6 (v) mm
Cell size	6.45 (h) x 6.45 (v) μm
Effective pixels	1392 (h) x 1040 (v)
<b>Pixels in video output</b>	
Full	1380 (h) x 1030 (v) 24 frames/sec.
V binning	1380 (h) x 515 (v) 44 frames/sec.
1/2 partial	1380 (h) x 512 (v) 44 frames/sec.
1/4 partial	1380 (h) x 256 (v) 70 frames/sec.
1/8 partial	1380 (h) x 128 (v) 102 frames/sec.
Spectral sensitivity	380 - 1000 nm
Sensitivity on sensor	0.1 Lux (Max. gain, 50% video)
S/N ratio	>55 dB
Video A/D conversion	10 bit
Video output digital	8 bit LVDS (EIA 644) 10 bit in Camera Link
Iris video	0.7 V <sub>pp</sub> , 75 Ω
Gamma	1.0
Gain	Manual
Gain range	-3 to +12 dB
Synchronization	Int. X-tal. Ext. random trigger
Sync. output	Composite 4 V <sub>pp</sub> from 75 Ω
Trigger input TTL	4 V±2 V
EEN output	4 V <sub>pp</sub> from 75 Ω
Pixel clock output	LVDS or Camera Link
LEN/FEN output	LVDS or Camera Link
Trigger input LVDS	LVDS or Camera Link
Multiple exposure	LVDS or Camera Link
Trigger modes	Continuous, Edge pre-select, Pulse width control, Restart continuous trigger
Trigger in (Edge pre-select)	>2 H
Shutter speed (fixed)	1/24 through 1/10,000 second
Pulse width control	2 H to 3 frames. (80 μsec. to 72 msec.)
Frame-delay readout	Fixed shutter speeds. Delay ≤3 frames
Restart continuous trigger	Capture begins 133 lines after trigger input
Smearless readout	Edge pre-select, PWC and frame-delay
Multiple exposure	≤6 fixed exposures in frame-delay readout.
Interval	Fixed shutter time + 1H (80 μsec.)
Camera setup by switches on rear	Shutter, Trigger, Scanning, Smearless, RS 232C control
Functions controlled by RS 232C	Shutter, Trigger, Scanning, Readout, Trigger input, Select/polarity, LEN/FEN/EEN polarity, Video level, Set-up level and Gain
Operating temperature	-5°C to +45°C
Humidity	20 - 80% non-condensing
Storage temp./humidity	-25°C to 60°C/ 20% - 90%
Power	12V DC ± 10%. 4.5 W
Lens mount	C-mount
Dimensions	40 x 50 x 90 mm (HxWxD)
Weight	250g

## Restart Continuous Trigger

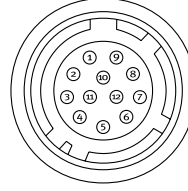


## Internal Switch

	OFF	ON	
TRIGGER pol	OFF	ON	LVDS <-> Hirose
LEN/FEN/EEN pol	↑	<->	
MULTIPLE EXP.	OFF	<->	ON
BINNING	OFF	<->	Vert.

## Connection Description

### DC-IN/TRIG.



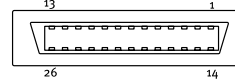
HIROSE HR10A-10R12P

Pin	1	Ground
	2	+12V DC
	3	Ground
	4	Iris video
	5	Ground
	6	RXD RS 232C
	7	TXD RS 232C
	8	Ground
	9	Sync. output/EEN output*
	10	Trigger input (TTL)*
	11	+12V DC/Multiple exposure*
	12	Ground

\* Signals can be changed by internal switches and jumpers or via RS 232C.

### Camera Link interface

26 pin MDR connector  
3M 10226-1A10JL



### Digital I/O

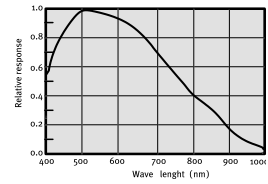
Pin	Signal	Function	
1	14	GND	
2	15	X0-/X0+	CL Data
3	16	X1-/X1+	CL Data
4	17	X2-/X2+	CL Data
5	18	Xclk-/Xclk+	CL Clk
6	19	X3-/X3+	CL Data
7	20	SerTC+/SerTC-	Serial in*
8	21	SerTFG+/SerTFG-	Serial out*
9	22	CC1-/CC1+	Trigger*
10	23	CC2-/CC2+	Not used
11	24	CC3-/CC3+	Not used
12	25	CC4-/CC4+	Not used
13	26	GND	

### Camera Link base configuration.

(for LVDS pinout, see operation manual)

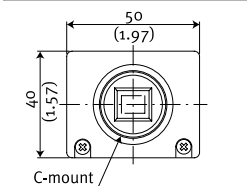
\* In CL or Hirose 12-pin connector

## Spectral Sensitivity

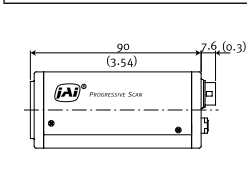


## Dimensions

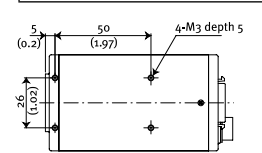
### Front view



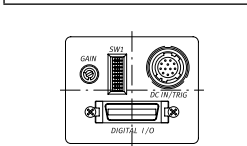
### Side view



### Bottom view



### Rear view



## Switch Setting

	OFF	ON	
SHUTTER	1	1/24	seconds
	2	1/50	
	3	1/100	
	4	1/200	
EXT. TRIGGER	5	Off	Edge pre sel. Pulse width Frame delay
	6	Edge pre sel.	
	7	1/1500	
	8	1/3000	
SCANNING	9	Full	Smearless
	10	1/2 part.	
SMEAR-LESS		Normal	1/4 part. 1/8 part.
		Smearless	
CONTROL	Local	RS232C	

## Ordering Information

CV-M4<sup>+</sup> CL 2/3" Digital Double Speed Megapixel Progressive Scan Camera. Camera Link  
CV-M4<sup>+</sup> 2/3" Digital Double Speed Megapixel Progressive Scan Camera. LVDS

JAI A-S, Denmark  
Phone +45 4457 8888  
Fax +45 4491 8880  
www.jai.com

JAI Corporation, Japan  
Phone +81 45 933 5400  
Fax +81 45 931 6142  
www.jai-corp.co.jp

JAI UK Ltd., England  
Phone +44 1895 821481  
Fax +44 1895 824433  
www.jai.com

JAI PULNIX Inc., USA  
Phone (Toll-Free) +1 877 472 5909  
Phone +1 408 747 0300  
www.jaipulnix.com

Visit our web site on [www.jai.com](http://www.jai.com)



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