



CV-M4⁺ CL

Digital Double Speed Monochrome Megapixel Progressive Scan Camera



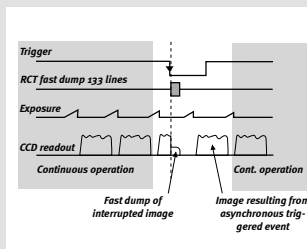
- **Digital 2/3" monochrome progressive scan CCD camera**
- **1392 (h) x 1040 (v) 6.45 μ m square pixels**
- **Extended IR sensitivity**
- **10 bit video output as Camera Link**
- **LVDS version with 8 bit video output**
- **Full 1380 (h) x 1030 (v) frame readout in 1/24 second**
- **Higher frame rates 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⁺ CL

Specifications	CV-M4 ⁺ 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)
Pixels in video output	
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 Vpp, 75 Ω
Gamma	1.0
Gain	Manual - Automatic
Gain range	-3 to +12 dB
Synchronization	Int. X-tal. Ext. random trigger
Sync. output	Composite 4 Vpp from 75 Ω
Trigger input TTL	4 V±2 V
EEN output	4 Vpp 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

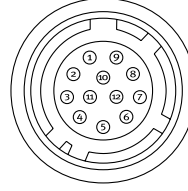


Internal Switch

	OFF	ON	
TRIGGER pol	1	↔	LVDS <-> Hirose
TRIGGER pol	2	↔	↔ <-> ↔
LEN/FEN/EEN pol	3	↔	↔ <-> ↔
MULTIPLE EXP.	4	↔	OFF <-> ON
	5	↔	
BINNING	6	↔	OFF <-> Vert.
	7	↔	
	8	↔	

Connection Description

DC-IN/TRIG.



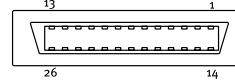
HIROSE HR10A-10R12P

Pin	Signal
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

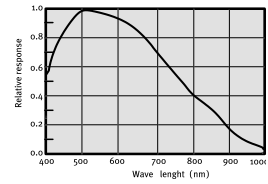
Pin	Signal	Function
1	14	GND
2	15	X0-/X0+
3	16	X1-/X1+
4	17	X2-/X2+
5	18	Xclk-/Xclk+
6	19	X3-/X3+
7	20	SerTC+/SerTC-
8	21	SerTFG-/SerTFG+
9	22	CC1-/CC1+
10	23	CC2-/CC2+
11	24	CC3-/CC3+
12	25	CC4-/CC4+
13	26	GND

Camera Link base configuration.

(for LVDS pinout, see operation manual)

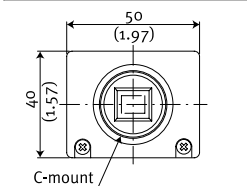
* In CL or Hirose 12-pin connector

Spectral Sensitivity

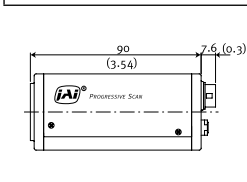


Dimensions

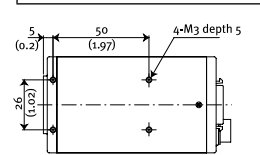
Front view



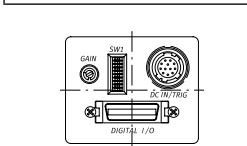
Side view



Bottom view



Rear view



Switch Setting

	OFF	ON	
SHUTTER	1	↔	1/24
	2	↔	1/50
	3	↔	1/100
	4	↔	1/200
EXT. TRIGGER	5	↔	Off
	6	↔	Edge pre sel.
	7	↔	Pulse width
	8	↔	Frame delay
SCANNING	9	↔	Full
	10	↔	1/2 part.
SMEAR-LESS	11	↔	1/4 part.
	12	↔	1/8 part.
CONTROL	13	↔	Normal
	14	↔	Smearless
	15	↔	Local
	16	↔	RS232C

Ordering Information

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

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