



CV-M4⁺/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**
- **8 bit video output as LVDS (EIA 644) using 10 bit internal processing**
- **Camera Link version with 10 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 and horizontal binning**
- **Edge pre-select and pulse width external trigger modes**
- **Binning, frame-delay and smearless readout modes**
- **Multiple exposure with up to 6 exposures within a single frame**
- **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+/CV-M4+CL

Specifications	CV-M4+/CV-M4+CL
Scanning system	Progressive 1060 lines 24 frames/sec.
Pixel clock with H binning	40.49 MHz 20.25 MHz
Line frequency with H binning	25.43 kHz (1592 pixel clock/line) 23.11 kHz (1752 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.
H binning	690 (h) x 1030 (v) 24 frames/sec.
H+V binning	690 (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	>57 dB
Video A/D conversion	10 bit
Video output digital	8 bit LVDS (EIA 644) 10 bit in Camera Link
Video out (analogue for test)	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
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
Smearless readout	Edge pre-select, PWC and frame-delay
Multiple exposure Interval	≤6 fixed exposures in frame-delay readout. 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%. 3.3 W
Lens mount	C-mount
Dimensions	40 x 50 x 90 mm (HxWxD)
Weight	250g

Multiple Exposure

Internal Switch

Internal SW	OFF	ON
TRIGGER set	OFF	ON
TRIGGER pol.	↖	↗
LEN/FEN/een pol.	↖	↗
MULTIPLE EXP.	OFF	On
BINNING	<<<<>>>>	≡ ≡ ≡

LVDS <> HiRes
↖ <> ↗
↖ <> ↗
OFF <> On
<<<<>>>> ≡ ≡ ≡
OFF <>

Connection Description

DC-IN/TRIG.

HIROSE HR10A-10R12P

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

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

EIA 644 in/output

26 pin MDR connector
3M 10226-1A10JL

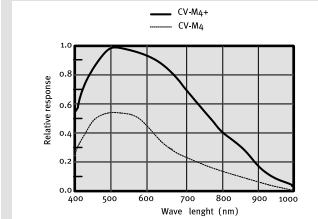
Digital I/O

Pin	Signal
1 14	+/- D0 Video output (LSB)
2 15	+/- D1 Video output
3 16	+/- D2 Video output
4 17	+/- D3 Video output
5 18	+/- D4 Video output
6 19	+/- D5 Video output
7 20	+/- D6 Video output
8 21	+/- D7 Video output (MSB)
9 22	+/- TRIG Trigger input
10 23	+/- Mult Multiple exposure
11 24	+/- LEN Line enable
12 25	+/- FEN Frame enable
13 26	+/- PCLK Pixel clock

EIA 644 in and output circuits
NS. D590C031/D590C032

For Camera Link pin configuration, see user manual.

Spectral Sensitivity



Dimensions

Front view

Side view

Bottom view

Rear view

Switch Setting

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

Ordering Information

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

JAI A-S, Denmark
Phone +45 4457 8888
Fax +45 4491 3252
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 +44 208 573 7737
Fax +44 208 573 7734
www.jai.com

JAI America Inc., USA
Phone (Toll-Free) +1 800 445-5444
www.jai.com



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