



Interfacing an Analog Camera
with a DOMINO Board

JAI CV-M40

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Main characteristics

Sensor	Area-scan, monochrome
Image size	644 (H) x 492 (V) Pixels
Line rate	1000 Line per second
Frame rate	60 frames per second
Last update	16 Nov 2011

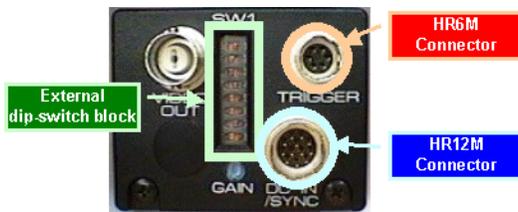
Configurations

Configuration	CAM file	Description
P60RA	CV-M40_P60RA.cam	Asynchronous reset, Camera controls exposure, Analog synchronization + WEN.
P60RM	CV-M40_P60RM.cam	Asynchronous reset, Grabber controls exposure, Master synchronization + WEN.
P60SA	CV-M40_P60SA.cam	Progressive Free-Run Scanning, Analog synchronization.
P60SD	CV-M40_P60SD.cam	Progressive Free-Run Scanning, Digital synchronization.
P60SM	CV-M40_P60SM.cam	Progressive Free-Run Scanning, Master synchronization.

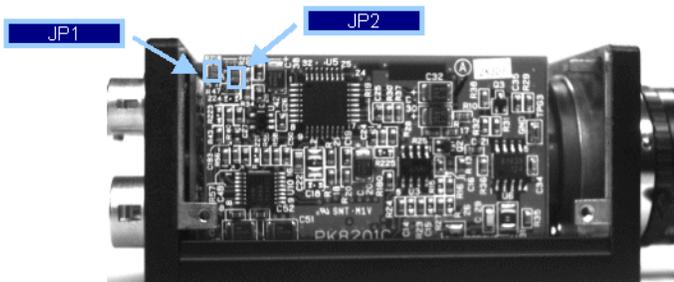
Compatible Cables

Configuration	Cable name	Designator	Usage
P60SM P60SA	Single Channel R	A15-C01-xx	Synchronous mode Single HR12M connector
P60RM	Single Channel RG	A15-C19-xx	Asynchronous reset Single HR12M connector
P60SD P60RA	Single Channel RGC/2	A15-C06-xx	Asynchronous reset Pixel clock HR12M and HR6M connectors

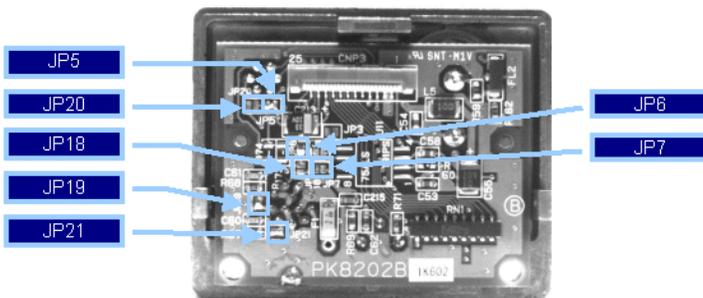
Locating Items



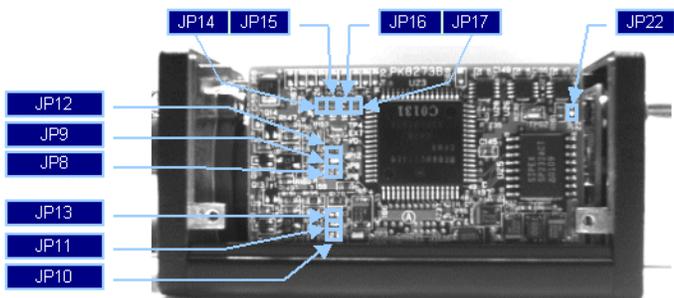
Camera rear view



Camera internal view. JP1 and JP2 jumpers are located on the PK8201 card.



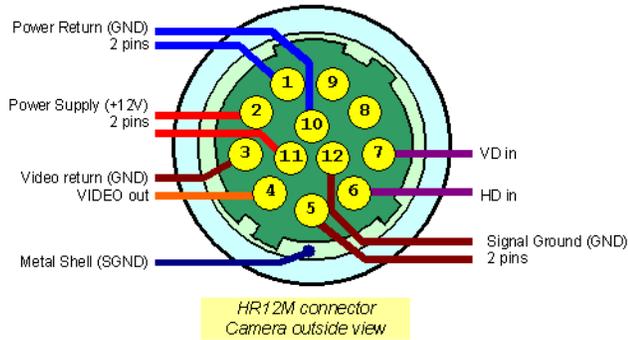
Camera internal view. JP5, JP6, JP7, JP18 jumpers are located inside rear card PK8202B.



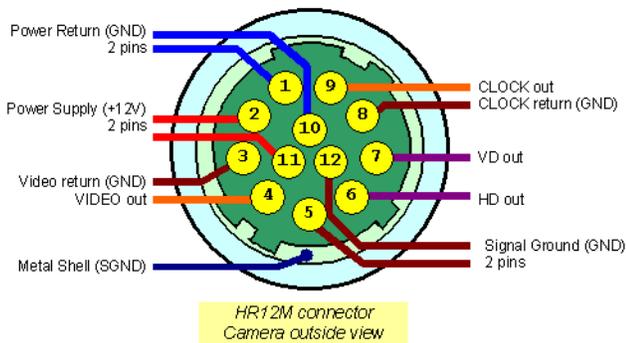
Camera internal view. JP8 up to JP17 and JP22 jumpers are located on the left card PK8273B. JP7 and JP18 must NOT be short at the same time!

Connection Information

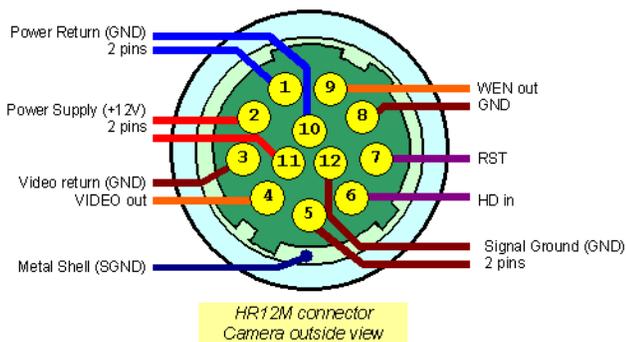
HR12M Pin-out



Valid for configurations P60SA, P60SM, P60RA

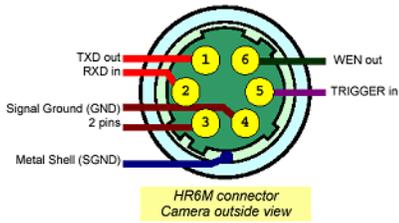


Valid for configuration P60SD



Valid for configurations P60RM

HR6M Pin-out



Valid for configuration P60RA

Signal Mapping

Cable "Single Channel R"

Signal @ Camera	Signal @ Board	Configuration		Usage
		P60SA	P60SM	
VIDEO out	V1+	✓	✓	Analog channel
VIDEO return GND	V1-	✓	✓	
+12 V	+12 V	✓	✓	Power supply
Power Return GND	PGND	✓	✓	
Signal Return GND	GND	✓	✓	Signal return
Metal Shell SGND	Metal Shell SGND	✓	✓	EMC shield
HD in	HIO	-	✓	Horizontal synchronization
VD in	VIO	-	✓	Vertical synchronization
TRIGGER in	RST	-	-	-

Refer to the camera cable A15-C01-xx for additional useful manufacturing information.

Cable "Single Channel RGC/2"

Signal @ Camera	Signal @ Board	Configuration		Usage
		P60SD	P60RA	
VIDEO out	V1+	✓	✓	Analog channel
VIDEO return GND	V1-	✓	✓	
+12 V	+12 V	✓	✓	Power supply
Power Return GND	PGND	✓	✓	
HD out	HIO	✓	✓	Horizontal synchronization
VD out	VIO	✓	✓	Vertical synchronization
CLOCK out	CK+	✓	✓	Pixel Clock
CLOCK return GND	CK-	✓	✓	
TRIGGER	RST	✓	✓	Asynchronous reset
WEN	GATE	✓	✓	Vertical synchronization
Signal Return GND	GND	-	✓	Signal return
Metal Shell SGND	Metal Shell SGND	-	✓	EMC shield
TXD	No connect	-	-	-
RXD	No connect	-	-	-

Refer to the camera cable A15-C06-xx for additional useful manufacturing information.

Cable "Single Channel RG"

Signal @ Camera	Signal @ Board	Configuration	Usage
		P60RM_D	
VIDEO out	V1+	✓	Analog channel
VIDEO return GND	V1-	✓	
+12 V	+12 V	✓	Power supply
Power Return GND	PGND	✓	
HD in	HIO	✓	Horizontal synchronization
WEN	GATE	✓	Vertical synchronization
TRIGGER	RST	✓	Asynchronous reset
Signal Return GND	GND	✓	Signal return
Metal Shell SGND	Metal Shell SGND	✓	EMC shield

Refer to the camera cable A15-C19-xx for additional useful manufacturing information.

Camera Setup

Internal Jumpers

Valid for configurations P60SA, P60RA

Jumper	Required	Factory	Meaning
JP5	Short	Short	Enable TRIGGER as camera input
JP6	Short	Short	Enable WEN as camera output
JP7	Open	Open	No pixel clock
JP8	Open	Open	Enable VD as camera input
JP9	Short	Short	
JP12	Open	Open	
JP10	Open	Open	Enable HD as camera input
JP11	Short	Short	
JP13	Open	Open	
JP14	Open	Open	Partial scan mode of 120 lines
JP15	Open	Open	
JP16	Short	Short	
JP17	Open	Open	
JP18	Open	Open	Disable WEN on #9 of HR12F
JP19	Short	Short	Enable external VD
JP20	Open	Open	
JP21	Short	Short	
JP22	Open	Open	

Valid for configuration P60SM

Jumper	Required	Factory	Meaning
JP5	Open	Short	Disable TRIGGER as camera input
JP6	Open	Short	Disable WEN as camera output
JP7	Open	Open	No pixel clock
JP8	Open	Open	Enable VD as camera input
JP9	Short	Short	
JP12	Open	Open	
JP10	Open	Open	Enable HD as camera input
JP11	Short	Short	
JP13	Open	Open	
JP14	Open	Open	Partial scan mode of 120 lines
JP15	Open	Open	
JP16	Short	Short	
JP17	Open	Open	
JP18	Open	Open	Disable WEN on #9 of HR12F
JP19	Short	Short	Enable external VD
JP20	Open	Open	
JP21	Short	Short	
JP22	Open	Open	Enable positive WEN

Change JP5 and JP6 from the factory condition

Valid for configuration P60SD

Jumper	Required	Factory	Meaning
JP5	Open	Short	Disable TRIGGER as camera input
JP6	Open	Short	Disable WEN as camera output
JP7	Short	Open	Enable pixel clock
JP8	Open	Open	Enable VD as camera output
JP9	Open	Short	
JP12	Short	Open	
JP10	Open	Open	Enable HD as camera output
JP11	Open	Short	
JP13	Short	Open	
JP14	Open	Open	
JP15	Open	Open	Partial scan mode of 120 lines
JP16	Short	Short	
JP17	Open	Open	
JP18	Open	Open	Disable WEN on #9 of HR12F
JP19	Short	Short	Enable external VD
JP20	Open	Open	
JP21	Short	Short	
JP22	Open	Open	Enable positive WEN

Change JP5, JP6, JP7, JP9, JP11, JP12, JP13 from the factory condition.

Valid for configuration P60RM

Jumper	Required	Factory	Meaning
JP5	Open	Short	Disable TRIGGER as camera input
JP6	Open	Short	Disable WEN as camera output
JP7	Open	Open	No pixel clock
JP8	Open	Open	Enable VD as camera input
JP9	Short	Short	
JP12	Open	Open	
JP10	Open	Open	
JP11	Short	Short	Enable HD as camera input
JP13	Open	Open	
JP14	Open	Open	
JP15	Open	Open	Partial scan mode of 120 lines
JP16	Short	Short	
JP17	Open	Open	
JP18	Short	Open	Enable WEN on #9 of HR12F
JP19	Short	Short	Enable external VD
JP20	Open	Open	
JP21	Short	Short	
JP22	Open	Open	Enable positive WEN

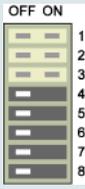
Change JP5, JP6, JP18 from the factory condition.

Valid for all configurations

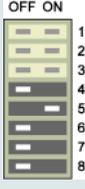
Adjust JP1 and JP2 as required for the application.

External DIP Switch Block

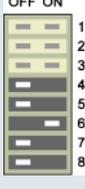
Valid for configurations P60SA, P60SD, P60SM

Look	Switch	Setting	Effect
	1	ON/OFF	Select exposure time as indicated below
	2	ON/OFF	
	3	ON/OFF	
	4	OFF	Binning is disabled
	5	OFF	Asynchronous reset Edge pre-select mode
	6	OFF	
	7	OFF	Partial scan is disabled
	8	OFF	RS-232 control disabled

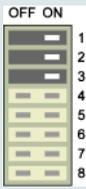
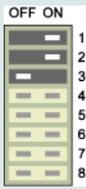
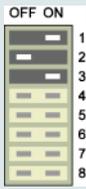
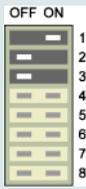
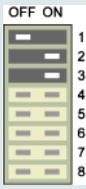
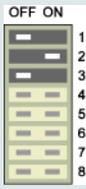
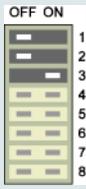
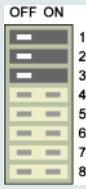
Valid for configuration P60RA

Look	Switch	Setting	Effect
	1	ON/OFF	Select exposure time as indicated below
	2	ON/OFF	
	3	ON/OFF	
	4	OFF	Binning is disabled
	5	ON	Asynchronous reset Edge pre-select mode
	6	OFF	
	7	OFF	Partial scan is disabled
	8	OFF	RS-232 control disabled

Valid for configuration P60RM

Look	Switch	Setting	Effect
	1	ON/OFF	Irrelevant
	2	ON/OFF	
	3	ON/OFF	
	4	OFF	Binning is disabled
	5	ON	Asynchronous reset Edge pre-select mode
	6	OFF	
	7	OFF	Partial scan is disabled
	8	OFF	RS-232 control disabled

Establishing exposure time

			
1/12000 s 83 μ s	1/8000 s 125 μ s	1/4000 s 250 μ s	1/2000 s 500 μ s
			
1/1000 s 1 ms	1/500 s 2 ms	1/250 s 4 ms	1/125 s 8 ms

This drawing applies to the jumper block facing the connector the camera is linked to.

Configuration of Partial Scan Mode P106RM_D

The CV-M40_P106RM_D CAM file is suitable for 1/2 partial scan mode. If another partial scan mode is required, it is necessary to edit the CV-M40_P106RM_D CAM file and alter the values of 3 parameters according to the following table:

Partial scan mode	Number of lines	Vtotal_Ln	Vactive_Ln	VdriveDly_Ln
1/2	240	298	240	45
1/4	120	202	120	66
1/8	60	158	60	80
1/16	30	136	30	87

Configuration of Partial Scan Mode P106SM

The CV-M40_P106SM CAM file is suitable for 1/2 partial scan mode. If another partial scan mode is required, it is necessary to edit the CV-M40_P106SM CAM file and alter the values of 3 parameters according to the following table:

Partial scan mode	Number of lines	Vtotal_Ln	Vactive_Ln	VdriveDly_Ln
1/2	240	296	240	14
1/4	120	201	120	35
1/8	60	157	60	49
1/16	30	135	30	56

Board Jumpers Setup

The Domino Iota and Domino Alpha 2 jumper blocks should be configured as follows.

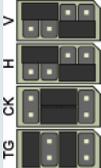
Valid for configurations P60SA, P60SM, P106SM, P120SM, P60RA, P60RM_D, P106RM_D, P120RM_D

Settings for the jumper block facing the connector the camera is linked to

Jumper block	MultiCam parameter	Value	Meaning
	JumperV	TTL	The pin 4 (VIO) and pin 5 (EXP) of the connector feeding the channel can be used as input or output in TTL format.
	JumperH	TTL	The pin 14 (HIO) and pin 15 (GATE) of the connector feeding the channel can be used as input or output in TTL format.
	JumperCK	EMPTY	Camera clock: None. Pin 9 and pin 10 of the channel connector are unused.
	JumperL1	DT	The video lane 1 is sensed as a differential 75 W terminated analog signal applied at pin 1 (V1+) and pin 2 (V1-).
	JumperL2	DT	The video lane 2 is sensed as a differential 75 W terminated analog signal applied at pin 11 (V2+) and pin 12 (V2-).

Valid for configuration P60SD

Settings for the jumper block facing the connector the camera is linked to

Jumper block	MultiCam parameter	Value	Meaning
	JumperV	TTL	The pin 4 (VIO) and pin 5 (EXP) of the connector feeding the channel can be used as input or output in TTL format.
	JumperH	TTL	The pin 14 (HIO) and pin 15 (GATE) of the connector feeding the channel can be used as input or output in TTL format.
	JumperCK	CKDPOS	The channel receives a non-inverted differential pixel clock from the camera through pin 9 (CK+) and pin 10 (CK-).
	JumperL1	DT	The video lane 1 is sensed as a differential 75 W terminated analog signal applied at pin 1 (V1+) and pin 2 (V1-).
	JumperL2	DT	The video lane 2 is sensed as a differential 75 W terminated analog signal applied at pin 11 (V2+) and pin 12 (V2-).