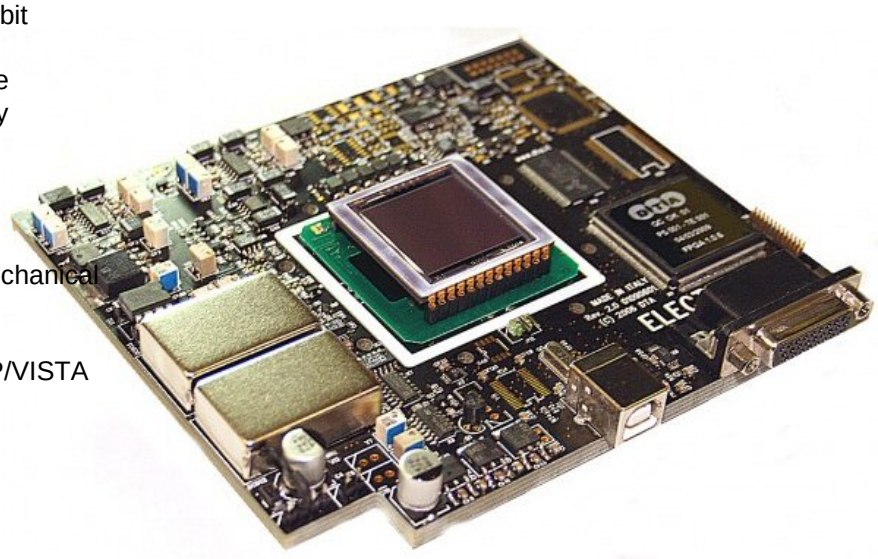
USB Camera module for Scientific Imaging

ELE-OEM

FEATURES

- Readout speed: up to 1Mpix/s
- A/D Converter: selectable 12/14/16bit
- Max total noise (typ.): 15e-
- Partial CCD reading: programmable
- Binning: from 1x1 to 8x8 or arbitrary
- Interface: USB 1.1/2.0
- Exposure time: from 0.1 to 9999s
- Settable gains: 64
- BIAS control: 9bit
- Floating CCD socket for perfect mechanical fit
- Dimensions: 146x125 mm
- Drivers for WINDOWS Me/2000/XP/VISTA
- SDK free downolad
- MaxIm Plug-In



APPLICATIONS

- Astronomy
- Plasma Physics
- X-Ray Physics

DESCRIPTION

ELECTRA Plus OEM is a very versatile and compact USB camera module thought to manage Full-Frame Scientific CCD sensors. It can mount the following CCD sensors, belonging to Kodak KAF series and E2V:

CCD30-11	CCD47-10	
KAF-0261	KAF-0402	KAF-1001
KAF-1603	KAF-3200	KAF-6303

On request different kind of CCD can be used.

displaying a wide range of resolutions and pixel dimensions. It is recommended for applications in low light illuminations or in situation with a low intrascenic range.
The module also offer a full management of the CCD temperature with an external (optional) peltier module. The temperature can be setted with an accuracy of +/- 0.1 Celsius.
Syncronization input and shutter output (as LVTTL and buffered with a MJD122) are also available.
This module requires a 13.8V power supply and we can offer you the following optionals:

Power supply (only 230V)
Peltier module
Kit for cooling system
ViSTA 3 Image Grab and Processing

REV. A1 2009/03/05

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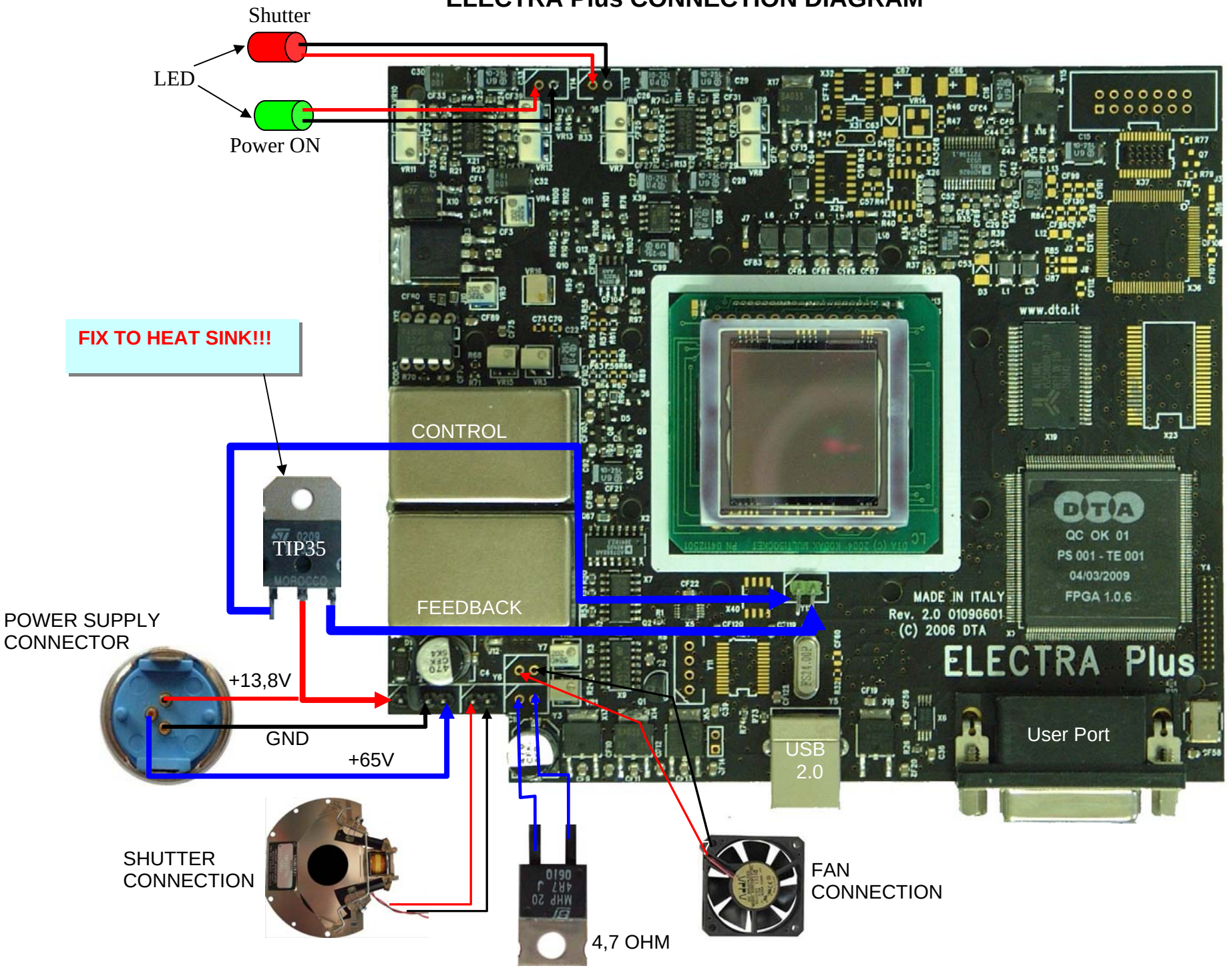
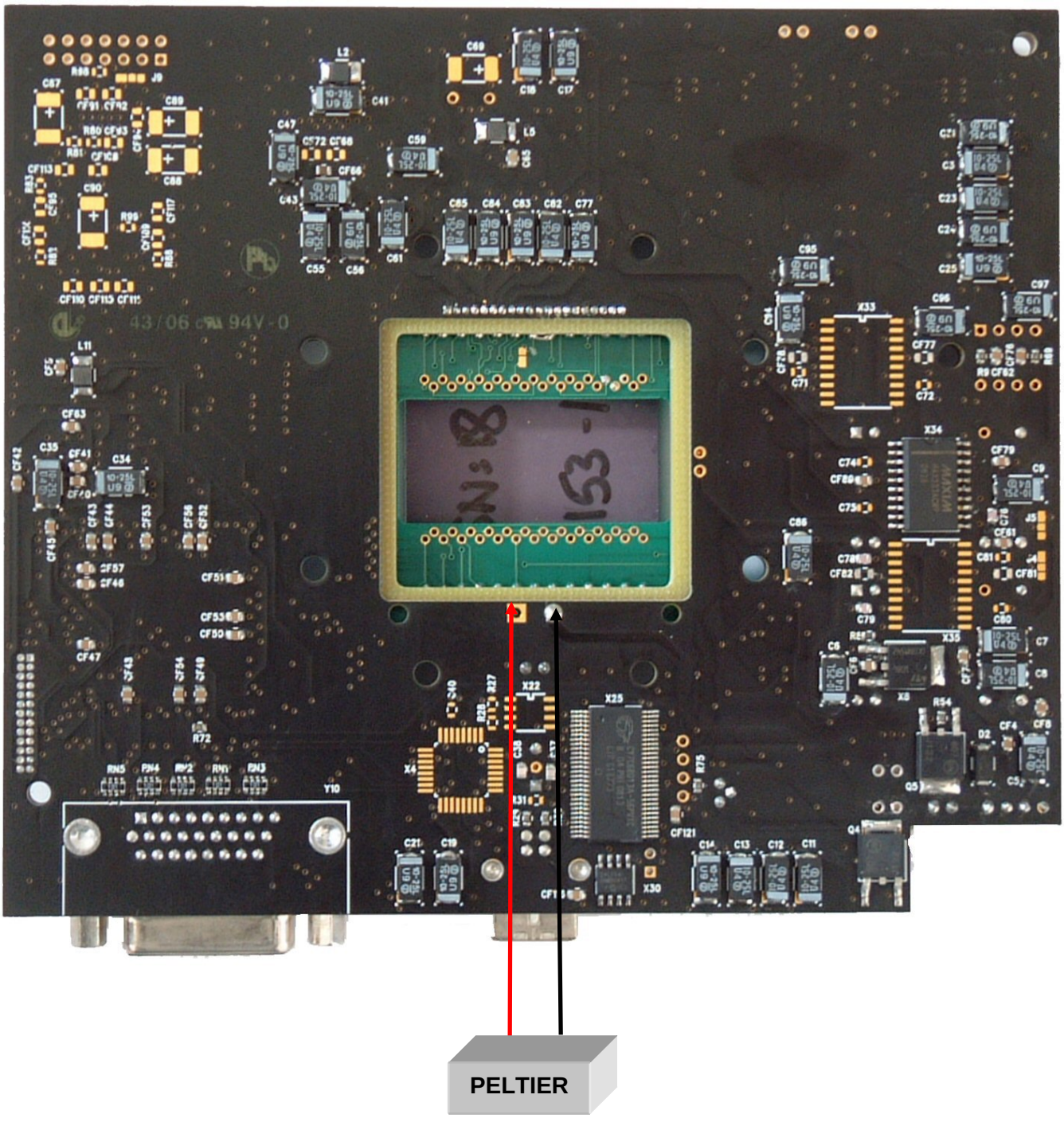
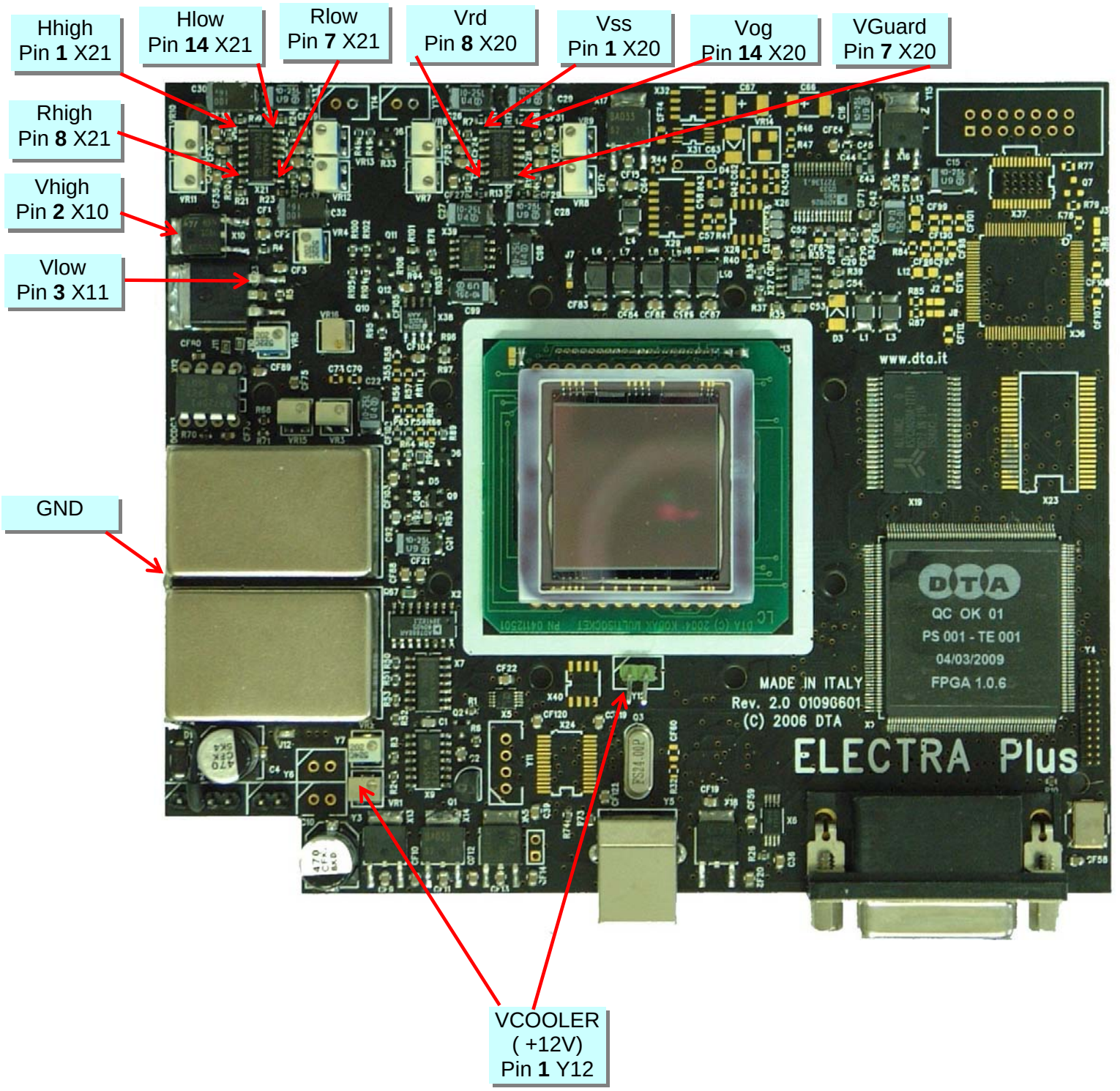
ELECTRA Plus CONNECTION DIAGRAM




PELTIER

ELECTRA Plus VOLTAGE SETTING



CCD SIGNAL

261 E

Min.	Nom.	Max.						Min.	Nom.	Max.
4	4,5	5	VOG	1		24	VLG	VSS-1	VSS	VSS+1
			VOUT2	2		23	GUARD	9	10	15
15	17	17,5	VDD	3		22	ϕV1	0/-10,2	0/-10	2/-9
11,5	12	12,5	VRD	4		21	ϕV1	0/-10,2	0/-10	2/-9
2	+3/+10	3,5	ϕR	5		20	ϕV2	0/-10,2	0/-10	2/-9
1,4	2	2,1	VSS	6		19	ϕV2	0/-10,2	0/-10	2/-9
7,8/-2,2	-2/+8	8,2/-1,8	ϕH1	7		18	ϕV2	0/-10,2	0/-10	2/-9
7,8/-2,2	-2/+8	8,2/-1,8	ϕH2	8		17	ϕV2	0/-10,2	0/-10	2/-9
			VOUT1	9		16	ϕV1	0/-10,2	0/-10	2/-9
-4	ϕH2 low(-2)	ϕH2 low(-2)	ϕH21	10		15	ϕV1	0/-10,2	0/-10	2/-9
	ϕH2		ϕH22	11		14	SUB	0	0	0
			N/C	12		13	SUB	0	0	0

401 E

1602 E

Min.	Nom.	Max.						Min.	Nom.	Max.
3,75	4	5	VOG	1	[redacted]	[redacted]	24	N/C			
			VOUT	2	[redacted]	[redacted]	23	VGUARD	8	9	12
14,5	15	15,5	VDD	3	[redacted]	[redacted]	22	ϕV1	+0/-10,5	+0,5/-10	+1/-9,5
10,5	11	11,5	VRD	4	[redacted]	[redacted]	21	ϕV1	+0/-10,5	+0,5/-10	+1/-9,5
+3,5/-3	+4/-2	+5/-1,75	ϕR	5	[redacted]	[redacted]	20	ϕV2	+0/-10,5	+0,5/-10	+1/-9,5
1,5	2	2,5	VSS	6	[redacted]	[redacted]	19	ϕV2	+0/-10,5	+0,5/-10	+1/-9,5
+5/-5	+6/-4	+6,5/-3,5	ϕH1	7	[redacted]	[redacted]	18	ϕV2	+0/-10,5	+0,5/-10	+1/-9,5
+5/-5	+6/-4	+6,5/-3,5	ϕH2	8	[redacted]	[redacted]	17	ϕV2	+0/-10,5	+0,5/-10	+1/-9,5
			N/C	9	[redacted]	[redacted]	16	ϕV1	+0/-10,5	+0,5/-10	+1/-9,5
			N/C	10	[redacted]	[redacted]	15	ϕV1	+0/-10,5	+0,5/-10	+1/-9,5
			N/C	11	[redacted]	[redacted]	14	VSUB	0	0	0
			N/C	12	[redacted]	[redacted]	13	N/C			

1001

Min	Nom	Max					Min	Nom	Max
	0		GND	1	26	GND		0	
	+0.5/-10		ϕV2	2	25	ϕV2		+0.5/-10	
	+0.5/-10		ϕV1	3	24	ϕV1		+0.5/-10	
	0		GND	4	23	VGUARD		+10	
			OUT2	5	22	ϕV1		+0.5/-10	
	+17		VDD	6	21	ϕV2		+0.5/-10	
	+2		VLG	7	20	NC			
	+2		VSS	8	19	NC			
	+3/+10		ϕR	9	18	NC			
	+12		VRD	10	17	ϕH2		-2/+8	
	+17		VDD	11	16	ϕH1		-2/+8	
			OUT1	12	15	H22		ϕH2	
	+4		VOG	13	14	H21		ϕH2 low(-2)	

3200

Min.	Nom.	Max.						Min.	Nom.	Max.
4	5	6	VOG	1		24	N/C			
			VOUT2	2		23	VGUARD	9	10	15
15	15	17,5	VDD	3		22	ϕV1	+0/-10	+2/-8,5	+1/-9
11,5	12	12,5	VRD	4		21	ϕV1	+0/-10	+2/-8,5	+1/-9
+3/+10	+4/+11	4,2/11,2	ϕR	5		20	ϕV2	+0/-10	+2/-8,5	+1/-9
1,7	3	3,5	VSS	6		19	ϕV2	+0/-10	+2/-8,5	+1/-9
-3,5/+10	-3/+7	-2/+10	ϕH1	7		18	ϕV2	+0/-10	+2/-8,5	+1/-9
-3,5/+10	-3/+7	-2/+10	ϕH2	8		17	ϕV2	+0/-10	+2/-8,5	+1/-9
			VOUT1	9		16	ϕV1	+0/-10	+2/-8,5	+1/-9
			N/C	10		15	ϕV1	+0/-10	+2/-8,5	+1/-9
			N/C	11		14	SUB	0	0	0
			N/C	12		13	SUB	0	0	0

6303

Min.	Nom.	Max.						Min.	Nom.	Max.
0	0	0	VSUB	1		26	VSUB	0	0	0
			VOUT	2		25	VOG	3,75	4	5
14,5	15	15,5	VDD	3		24	VGUARD	8	10	12
10,5	11	11,5	VRD	4		23	ϕV1	0,5/-10,5	+1/-10	1,5/-9,5
+3,5/-4	+4/-3	+5/-2	ϕR	5		22	ϕV1	0,5/-10,5	+1/-10	1,5/-9,5
1,5	2	2,5	VSS	6		21	ϕV2	0,5/-10,5	+1/-10	1,5/-9,5
			NC	7		20	ϕV2	0,5/-10,5	+1/-10	1,5/-9,5
			NC	8		19	ϕV2	0,5/-10,5	+1/-10	1,5/-9,5
			NC	9		18	ϕV2	0,5/-10,5	+1/-10	1,5/-9,5
4/-6	-4/+6	6,5/-3,5	ϕH1	10		17	ϕV1	0,5/-10,5	+1/-10	1,5/-9,5
4/-6	-4/+6	6,5/-3,5	ϕH2	11		16	ϕV1	0,5/-10,5	+1/-10	1,5/-9,5
			N/C	12		15	VSUB	0	0	0
0	0	0	VSUB	13		14	VSUB	0	0	0

30-11

Min.	Nom.	Max.						Min.	Nom.	Max.
			N/C	1	[redacted]	[redacted]	20	N/C			
	+6,0/-6,0		ϕV3	2	[redacted]	[redacted]	19	VSG		-6,0	
	+6,0/-6,0		ϕV2	3	[redacted]	[redacted]	18	VDD		+18,0	
	+6,0/-6,0		ϕV1	4	[redacted]	[redacted]	17	N/C			
	0		GND	5	[redacted]	[redacted]	16	GND		0	
	+6,0/-6,0		ϕR	6	[redacted]	[redacted]	15	VRD		+12,0	
	+6,0/-5,0		ϕH3	7	[redacted]	[redacted]	14	VOD		+22,5	
	+6,0/-5,0		ϕH2	8	[redacted]	[redacted]	13	OUT			
	+6,0/-5,0		ϕH1	9	[redacted]	[redacted]	12	VOG		-3,0	
			N/C	10	[redacted]	[redacted]	11	N/C			

Min.	Nom.	Max.						Min.	Nom.	Max.
	+21.5		ABD	1		24	ABG		-9.5	
	+5.5/-9.5		ϕV3	2		23	ϕV3		+5.5/-9.5	
	+5.5/-9.5		ϕV2	3		22	ϕV2		+5.5/-9.5	
	+5.5/-9.5		ϕV1	4		21	ϕV1		+5.5/-9.5	
	-8.5		VOG	5		20	DG		-9.5	
			NC	6		19	NC			
	0		VSS	7		18	ϕH3		+1.5/-8.5	
	+2.5/-8.5		ϕR	8		17	ϕH2		+1.5/-8.5	
	+1.5/-8.5		ϕH2	9		16	ϕH1		+1.5/-8.5	
	+1.5/-8.5		ϕH1	10		15				
	+19.5		VOD	11		14	VRD		+8.5	
			OUTL	12		13	OUTR			

USER PORT

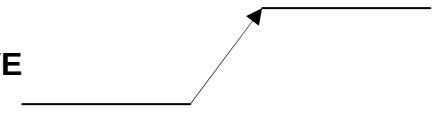
WARNING: All the signals present on this port are compliant to 3.3V TTL standard and NOT to 5V TTL standard. To violate this standard would involve serious damages to the camera. If you have the necessity to use a 5V signal, we suggest you to connect in series a 100 Ω resistance.

1	**+3.3V**	**2**	**PA0**	**3**	**PA1**
4	**PA2**	**5**	**PA3**	**6**	**PA4**
7	**PA5**	**8**	**PA6**	**9**	**PA7**
10	**PB0**	**11**	**PB1**	**12**	**PB2**
13	**PB3**	**14**	**PB4**	**15**	**PB5**
16	**PB6**	**17**	**PB7**	**18**	**AD0**
19	**AD1**	**20**	**AD2**	**21**	**AD3**
22	**SHUT INPUT**	**23**	**TRIG INPUT**	**24**	**TRIG OUT**
25	**SHUTTER**	**26**	**GND**	**-**	**-**

- **3.3 V**: digital supply
- **PA[0:7]**: bidirectional parallel port reserved for user.
- **PB[0:7]** : bidirectional parallel port reserved for user
- **AD[1:3]**: 12 bit a/d Converter input
- **SHUT INPUT**: shutter input
- **TRIG INPUT**: Trigger input.

  When we enable the TRIGGER mode, it is necessary to provide the signal for starting the camera acquisition. In fact, when we run the function: “DC_GetCCD”, the camera, after the Clear CCD operation, wait for the hardware signal to start the acquisition, that is the TRIG INPUT signal.

  This signal is **RISING EDGE SENSITIVE**

  Once the signal is provided, after just 1-2 ns, it opens the shutter, start the acquisition of the image (the acquisition time is prefixed by the user), then, after the hysteresis time for the shutter closure, there is the image downloading.

- **SHUTTER**: TTL signal output, it is high active for all the time of shutter opening. It can be used for manage an external shutter.
- **GND**: ground.