Coreco Imaging P2-42-02K40-50E

Line Scan CCD Camera

Limited Availability
Used and in Excellent Condition

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User Supplement

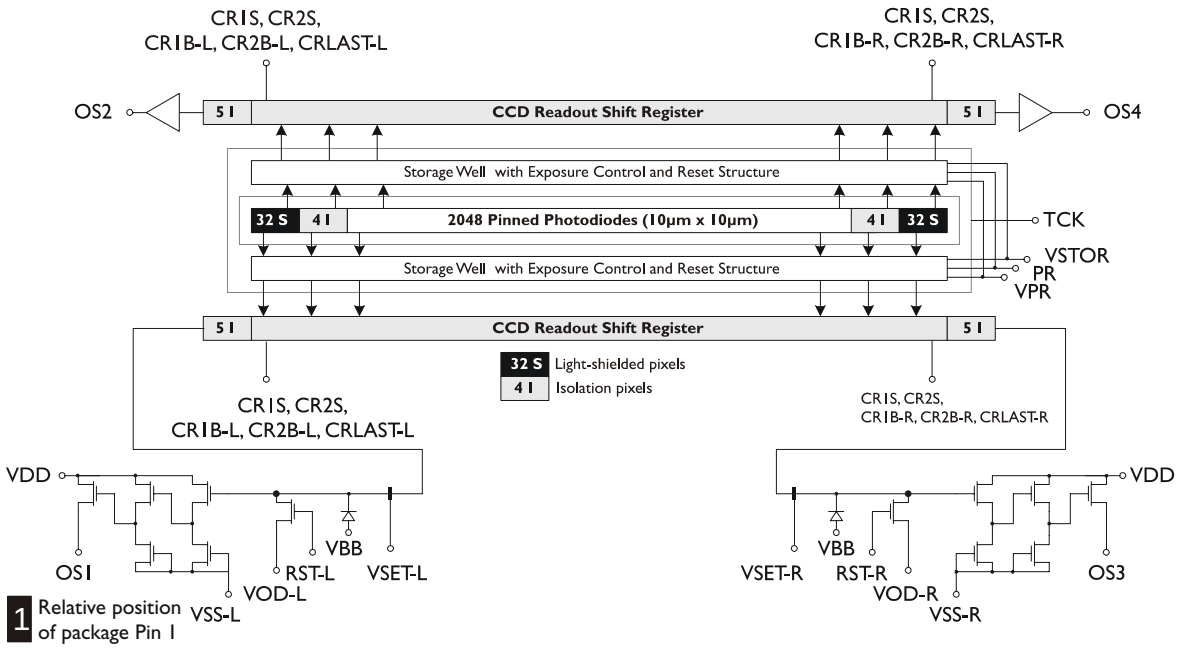
P2-42-02K40-50E

This document supplements the Piranha2 User Manual (03-32-00493) and details how the P2-42-02K40-50E differs from the models explained in the user manual.

Sensor

The P2-42-02K40-50E uses the IT-P1-2048D output image sensor with 10µm square pixels and 100% fill factor.

Figure 1: IT-P1-2048D Sensor Drawing



Performance Specifications

The following two tables list the P2-42-02K40-50E's performance specifications. The first table lists the operating ranges of the camera, and the second table lists the performance specifications at minimum, nominal and maximum gain levels at 1kHz data rate. Note that as gain levels increase, performance decreases, because your signal to noise decreases.

Also note that the cameras performance specifications were obtained using a line rate of only 1kHz. At low line rates, dark current can become a significant source of noise and appears in specifications such as FPN, PRNU, and noise. If you operate the camera at faster line rates, such as 10kHz or greater, the amount of dark current will be reduced by 10x or greater.

Table 1. P2-42-02K40-50E Operating Requirements and Ranges

Operating Requirements	Units	Typical	Notes
Power	W	8.5	
Power Supply Current (Vin = +12V)	mA	700	
Time to power up, typ	sec.	15	
Time to calibrate (FPN/PRNU)	sec.	19	

Operating Ranges	Units	Min	Max	Notes
Data Rate, per tap	MHz	40	40	
Line Rate	kHz	1	68	
Temperature				
Front plate Temperature	°C	10	50	2
Temperature drift before recalibration, (recommendation)	°C		10	

Note that the environment conditions represent the state of the environment when the camera was being tested. Typical results are the average values obtained with at a 1kHz line rate and 30°C. Maximum results represent the worst case results from any camera operating at 50°C with a 1kHz line rate.

Table 2. P2-42-02K40-50E Performance Specifications, 1kHz line rate

		Min. Gain			Nom. Gain			Max. Gain			
Environment Conditions	**Units**	**Min**	**Typ**	**Max**	**Min**	**Typ**	**Max**	**Min**	**Typ**	**Max**	**Notes**
Data Rate	MHz	40	40	40	40	40	40	40	40	40	
Line Rate	kHz		1	1		1	1		1	1	
Gain Setting	dB	-10	-10	-10	0	0	0	+10	+10	+10	
Front Plate Temperature	°C		30	50		30	50		30	50	2
Electro-Optic Specifications	**Units**	**Min**	**Typ**	**Max**	**Min**	**Typ**	**Max**	**Min**	**Typ**	**Max**	**Notes**
Broadband Responsivity	DN/(nJ/cm²)	6	6.8	7.6	18.8	21.4	24	60	68	76	
Dynamic Range	Ratio	496:1			207:1	390:1		62:1	135:1		
Pk-Pk Noise, max	DN		2	3		4	8		15	32	3
RMS Noise, max	DN		0.5	0.5		0.75	1.2		2.2	4	3
FPN uncorrected	DN		1.1	4		3.5	8		8	27	
FPN corrected, max	DN		0.3	2		1	2		2	8	1
PRNU uncorrected ECD/ECE	DN		5	18		5	23		8/10	39	
PRNU corrected ECD/ECE	DN		1.5/2	3/3		1.2/1.5	3/8		2/3.5	5/27	1
DC Offset	DN		2	3		5	5		7	17	

Notes:

DN = Digital Numbers (0-255); also known as gray levels.
ECE = Exposure Control Enabled
ECD = Exposure Control Disabled

- All measurements taken in 8-bit output mode.
- All measurements are valid for front plate temperatures in still air.
- All measurements used a Tungsten halogen light source, 3200K bulb temp., and 750nm cutoff filter

1. Due to FPN/PRNU correction calculations, certain digital numbers will be unavailable when outputting 10 bits with FPN/PRNU correction.
2. Measured at front plate. The corresponding ambient temperature range with still air is 0°C - 37°C.
3. Measurements taken at maximum line rates.

Software Commands

Note: This section is only applicable if you are using the Piranha2 User Manual Revision 4 (03-32-00493-04) or greater.

Some commands described in the Piranha2 User Manual (revision 4 or greater) are unavailable or have slightly different functionality in the P2-42-02K40-50E. See the table below for details.

Table 3: P2-42-02K40-50E Command Differences

Feature	P2-42-02K40-50E	Notes
roi command	Sets a region of interest for end of line statistics only.	Refer to section 3.10 Setting a Region of Interest for details.
css command	You can sample up to 128 lines (factory setting).	Refer to section 3.11 Returning Video Information for details.
cag command	Allowable range is 128 to 251DN (8 bit) or 512 to 1007DN (10 bit).	Refer to section 3.13 Calibrating Gains for details.
ccp command	Allowable range is 128 to 251DN (8 bit) or 512 to 1007DN (10 bit).	Refer to section 3.14 How to Calibrate the Camera for details.

Mechanical Interface

Figure 2: P2-42-02K40-50E Mechanical Interface