ANDOR | iKon-M

CCD PERFORMANCE

System Overview

Description	Model					Serial Number			
CCD Head ▽	D	U	9	34P	-	BR-DD	CCD-19348		
TE Cooler performance (✓)						High		Ultra-high	✓
Accessories	Power Supply Unit (PS -24)						PS -25		
			--					✓	
	SO-		LM-			MFL-			
Serial/Batch Number									
Other									

▽   Sensor types are defined in Table 1 using the last two letters in box Model Number.

CCD Details

Manufacturer / Model No.		Pixels	Serial Number
E2V	CCD47-10	1024x1024, 13µm x 13µm	12262-05-04
E2V	CCD57-10	512x512, (FT), 13µm x 13µm	
E2V	CCD77-00	512x512, 24µm x 24µm	

Special Feature	(✓)		(✓)
NIMO		Custom Mounting Flange	
Fringe Suppression		Custom Cables	
Shielded Anti-Blooming			

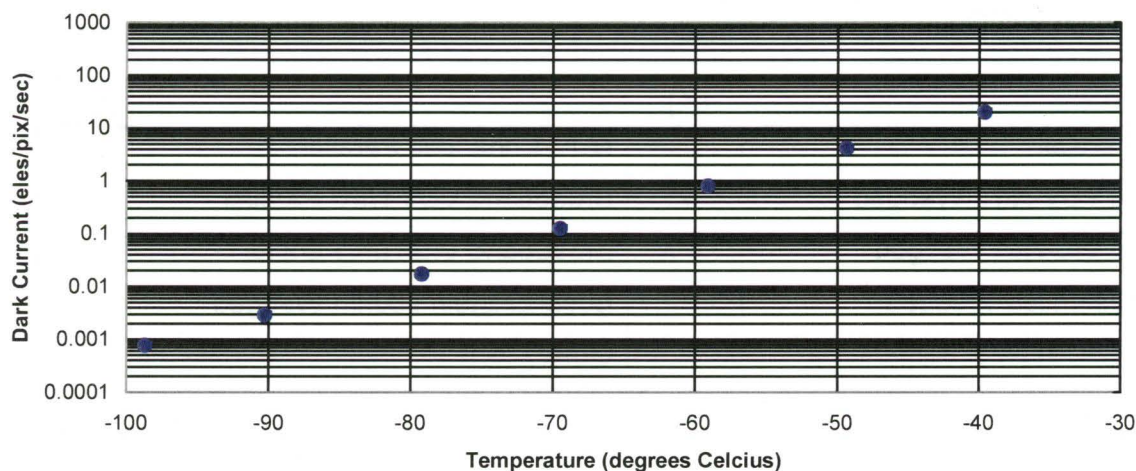| Window Variant	(✓)		(✓)
VUV-UV Parallel		NUV-Enhanced Parallel	
Broadband VUV-NIR Wedged	✓	Broadband VUV-NIR Parallel	
Broadband VIS-NIR Wedged		Broadband VIS-NIR Parallel	
VIS-NIR Enhanced Wedged		Bose-Einstein 780nm Wedged	
None		Other	

ANDOR | iKon-M

CCD PERFORMANCE

Summary of System Test Data

Readout Noise ♦1 and Base Mean Level

A/D Rate (MHz All 16 bit)	Preamp setting	CCD Sensitivity ♦3 eles per A/D count	Single Pixel Noise electrons	Full Vert Bin Noise electrons	Base Level ♦2 (Counts)
5	x1	6.4	32.4	30.9	983
5	x2	3.4	19.1	18.7	1428
5	x4	1.6	13.6	13.0	2653
3	x1	5.6	18.6	18.3	1139
3	x2	2.9	12.3	12.1	2081
3	x4	1.3	9.6	9.4	3731
1	x1	5.0	10.5	10.4	945
1	x2	2.6	7.8	7.6	1883
1	x4	1.2	6.5	6.3	3842
0.05	x1	5.1	5.1	5.0	535
0.05	x2	2.6	4.1	4.1	1453
0.05	x4	1.2	3.6	3.6	3371
Saturation Signal per pixel			126243	Electrons/pixel	

CCD Dark Current

Minimum Dark Current Achievable ♦4	0.00078	electrons/pixel/sec		
@ Sensor Temperature of ♦5	-98.72	°C	16	°C cooling Water
		With PS-25		
CCD Dark Current Uniformity better than ♦6	0.606	electrons/pixel/sec		

CCD PERFORMANCE

Linearity and Uniformity

Linearity better than ◆7	1	% over 16 bits
Response Uniformity better than ◆8	1.89	%

Response Defects

White/Black Spots ◆9 (X , Y)

Centroid	Number of Pixels	Centroid	Number of Pixels
(X , X)	X	(,)	
(,)		(,)	
(,)		(,)	
(,)		(,)	
(,)		(,)	
(,)		(,)	

White/Black Columns ◆10	Column numbers indicated	X X X X

Trap ◆11	(X , Y)	(X , X)

Dark Current Defects

Hot Spots ◆12 (X , Y)

Centroid	Number of Pixels	Centroid	Number of Pixels
(X , X)	X	(,)	
(X , X)	X	(,)	
(,)		(,)	
(,)		(,)	
(,)		(,)	
(,)		(,)	

Hot Columns ◆13	Column numbers indicated	X X

Test Conditions

Readout Noise tested at	-80	°C with	16	°C water
Base Mean Level measured at	-80	°C with	16	°C water
Dark Current Uniformity tested at	-65	°C with	16	°C water
Blemishes tested at	-65	°C with	16	°C water

Custom Testing

System Passed for Shipping

Signed	Date
P. SCOTT	**11TH APRIL 2016**

Hardware Version #	HEADBOARD	FPGA
	AC	20.24

Shipping Software Version #	SOLIS	SDK
	--	--

Testing Software Version #	SOLIS	SDK
	4.28.30041.0	2.100.30041.0

▽ Table 1; Key code to define the meanings of the last two letters in the Model Number

Sensor Options			
OE	Open electrode	BU2	Back Illuminated (BI) + 250nm UV optimised
FI	Front illuminated (FI)	BU	BI + UV (350nm) optimised
UV	FI+UV coating	BV	BI + VIS (550nm) optimised)
FO	FI + Fibre optic	BR-DD	BI + NIR +deepdepletion
FI-DD	FI + deep depletion	BN	BI with no AR coating

Performance Notes

◆1 Readout Noise is measured for both single pixel (SP) and fully vertically binned (FVB) with the CCD in darkness at temperature indicated and minimum exposure time. Noise values will change with pre-amplifier gain selection [PAG].

◆2 Average electronic DC offset for CCD in darkness at temperature indicated and minimum exposure time under dark conditions measured by single pixel (SP) for imaging systems and by (FVB) for spectroscopic systems.

◆3 Sensitivity is calculated in photoelectrons per A/D count from measurements of the Photon Transfer Curve.

◆4 Dark current falls exponentially with temperature. However, for a given temperature the actual dark current can vary by more than an order of magnitude from device to device. The devices are specified in terms of minimum dark current achievable rather than minimum temperature.

◆5 Minimum temperature achieved for thermoelectric (TE) cooler set to maximum value with water cooling

◆6 RMS (root mean square) deviation of dark current for fully binned operation for spectroscopic cameras, or full resolution image for imaging cameras, under dark conditions at temperature indicated (pixel/column defects not included). This variation is mainly cosmetic since it is fully subtractable without significant loss of performance.

◆7 Linearity is measured from a plot of Counts vs. Signal over the 16 bit dynamic range. Linearity is expressed as a %age deviation from a straight line fit. This quantity is not measured on individual systems.

◆8 RMS (root mean square) deviation from the average response of the CCD in full resolution image for imaging cameras, illuminated with uniform white light (defects not included).

◆9 White/black pixels have signals >25% above/below the average (25% contrast) with uniform illumination across the sensor.

◆10 A black column is defined as having ≥ 10 black pixels for imaging cameras.

◆11 Pixels which absorb charge as it is clocked through the defective area. When the light source is switched off, the signal from the trap appears to drop off more slowly than the signal from the surrounding pixels.

◆12 Hot spots are counted if they exhibit >50 times the maximum specified dark current at the test temperature indicated.

◆13 A column is considered defective if >10 pixels are affected, or if the column exhibits >2 times the maximum specified dark current at the test temperature indicated.

PACKING LIST

Andor Technology
425 Sullivan Avenue
Suite #3
South Windsor, CT 06074, USA
Tel (860) 290-9211

MARK YARBROUGH
MOSS LANDING MARINE LABS
1 SAND ISLAND ACCESS ROAD
HANOLULU HI 96819
UNITED STATES

Shipping Ref	Customer	Date	Customer Ref.	Carrier	Control Code	LOC
521972	SANJOSEU	13/04/16	25-1509-4919E		UG-STD	n

Model Number	Description	Serial No.	Qty.	Packed
11 DU934P-BR-DD	1024x1024,13um,BR-DD,5MHz,-100C	CCD-19348	1	
SHIPPING	SHIPPING		1	
	TERMS: NET 30			
	CONFIRM TO: MARK YARBROUGH			
	ANDOR CONTACT: ANIKA HALL			
	TO BE INVOICED WITH X522065			

Software Version _____

Detector Cables ____

Accessory Cables ____

Power Supply ____   Manuals ____   Packed By _____