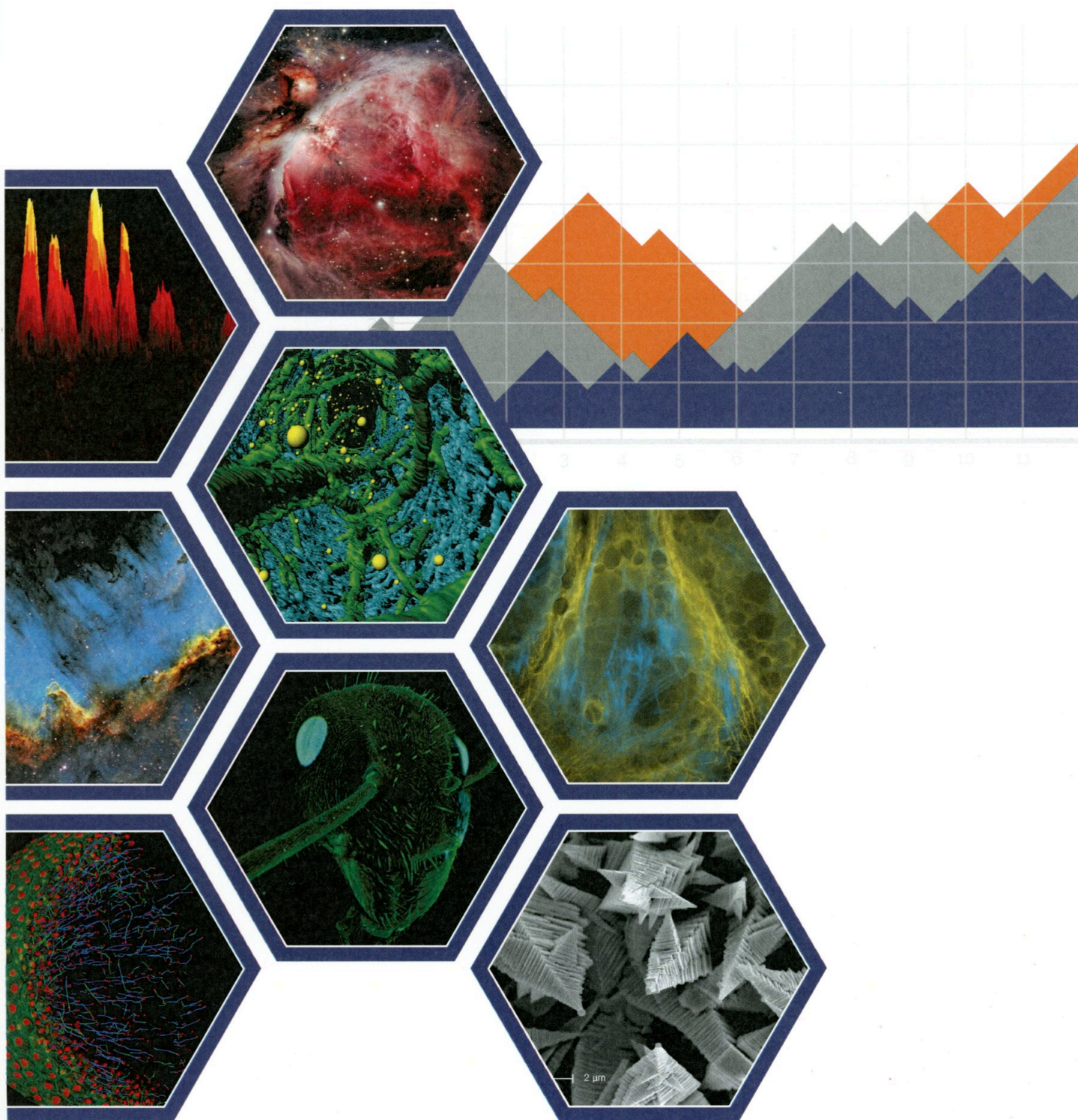


RMA#
R62047
Feb-2019

CCD-20477
BS05

ANDOR
an Oxford Instruments company

System Performance Booklet



Rcvd in HI
Mon, 04 Feb 2019
MF



discover new ways of seeing

Shipping Invoice

Shipment No. R62047
Andor Order No R62047
Customer Order No: F019025

Despatch Date: 01-Feb-2019
AWB No. 1Z8VW40070460624580

Shipped To:

SJSU RES. FOUND. MOSS LANDING
UNIV. MARINE CTR
965 N. NIMITZ HIGHWAY
HONOLULU, HI 96817
UNITED STATES

Customs Information:

Goods are part of an Optical Checking/Measuring Device
Harmonized No 90275000
Identification Code GBAND10BEL
Goods are made in the UK
Values are for Customs Purposes

UG-STD :

These goods are uncontrolled
to destination.
Goods re-exported may require an
export licence

Description of Goods		USD		
NWR (S)	NON WARRANTY REPAIR	1,750.00	1	off
	DU934P-BR-DD CCD-20477 ✓	0.00	0	off
	VALUE FOR CUSTOMS USD 15000	0.00	0	off
	CPC 3151000 - IPR IP/0920/500/21	0.00	0	off
	HS CODE 9802004040 - 8525804000	0.00	0	off
	TERMS: NET 30	0.00	0	off
	CONFIRM TO: HUE NGO	0.00	0	off
	END USER: MARK YARBROUGH	0.00	0	off
	EMAIL: yarbrough@mlml.calstate.edu	0.00	0	off
	PH #808-753-0664	0.00	0	off
	ANDOR CONTACT: SCOTT DEXTER	0.00	0	off
	SHIP VIA UPS	0.00	0	off
Values are for customs purposes only		Total Value	1,750.00	USD

Returns Report

Customer ANDUSA Yarbrough/MLML **Returns No** R62047

Classification NON WARRANTY **Customer RMA No** None

Equipment Details **Model** **Serial Number**

Head DU934P-BR-DD-9XT CCD-20477

Card

PSU

Multi IO

Other

Reported Fault

Returning iKon-M camera for widow changes.

Camera parallel window to be replaced with WN35FS Broadband VUV-NIR Wedged windows, code- (BB-VV-NR)W.

Diagnosis

Confirmed requested wedged window replacement required.

Work Carried Out

Wedged window installed.

Full system QC & new performance sheets completed: - Passed.

	Receipt Date	Work Complete	Passed For Shipping	Shipped
Date	22/08/2018	16/01/19	16/01/19	
Initials	PMC	PJ	MB	

* In the case of Products which are upgraded, the old Model No / Serial No are bracketed first, followed by the new Nos:

** Returns must be passed for shipping by the manufacturing manager and / or Sales Support

System Overview

Description	Model	Serial Number
CCD Head <input checked="" type="checkbox"/>	D U 9 34P - BEX2-DD-9XT	CCD-20477
TE Cooler performance (✓)	High	Ultra-high <input checked="" type="checkbox"/>
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	12262-17-08
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

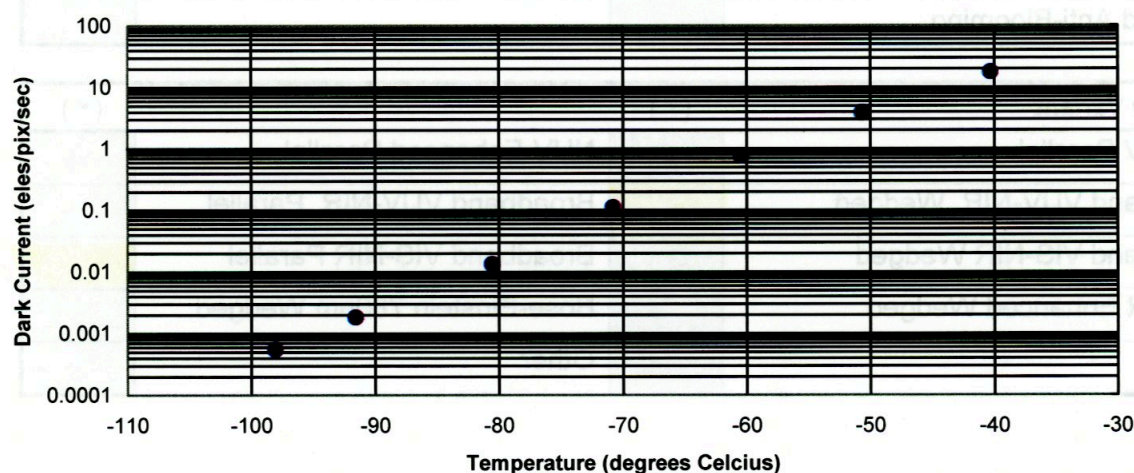
WAS
CHECKED

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	6.7	34.0	33.1	1077
5	x2	3.6	19.1	18.3	1528
5	x4	1.7	14.1	13.7	2786
3	x1	6.2	20.5	19.9	1185
3	x2	3.1	13.2	13.0	2200
3	x4	1.4	10.2	9.8	3879
1	x1	5.5	11.4	11.0	944
1	x2	2.9	8.3	8.1	1904
1	x4	1.3	6.8	6.5	3878
0.05	x1	5.4	5.2	5.2	548
0.05	x2	2.8	4.1	4.1	1493
0.05	x4	1.3	3.5	3.5	3437
Saturation Signal per pixel			140999	Electrons/pixel	

CCD Dark Current



Minimum Dark Current Achievable ♦4	0.000522	electrons/pixel/sec		
@ Sensor Temperature of ♦5	-98.068	°C	16	°C cooling Water
		With PS-25		
CCD Dark Current Uniformity better than ♦6	0.3788	electrons/pixel/sec		

Linearity and Uniformity

Linearity better than ♦7	1	% over 16 bits
Response Uniformity better than ♦8	1.70	%

Response Defects

White/Black Spots ♦9				(X, Y)
Centroid		Number of Pixels	Centroid	
<div> <div>(X , X)</div> <div>(,)</div> <div>(,)</div> <div>(,)</div> <div>(,)</div> <div>(,)</div> </div>		<div>X</div> <div></div> <div></div> <div></div> <div></div> <div></div>	<div>(,)</div> <div>(,)</div> <div>(,)</div> <div>(,)</div> <div>(,)</div> <div>(,)</div>	
White/Black Columns ♦10			Column numbers indicated	<div>X</div> <div>X</div> <div>X</div> <div>X</div>
Trap ♦11		(X, Y)	(X , X)	

Dark Current Defects

Hot Spots ♦12				(X, Y)
Centroid		Number of Pixels	Centroid	
<div> <div>(X , X)</div> <div>(X , X)</div> <div>(,)</div> <div>(,)</div> <div>(,)</div> <div>(,)</div> </div>		<div>X</div> <div>X</div> <div></div> <div></div> <div></div> <div></div>	<div>(,)</div> <div>(,)</div> <div>(,)</div> <div>(,)</div> <div>(,)</div> <div>(,)</div>	
Hot Columns ♦13			Column numbers indicated	<div>X</div> <div>X</div>

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

WN35FS Broadband VUV-NIR Wedged window fitted as per customer request.

System Passed for Shipping

Signed

Date

PATRICK MCGANN

18TH OCTOBER 2018

Hardware	HEADBOARD	FPGA
Version #	AF	20.24
Shipping Software	SOLIS	SDK
Version #	--	--
Testing Software	SOLIS	SDK
Version #	4.30.30008.0	2.102.30008.0

✓ **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.