QHY183M 'CMOS Slug' Calibration Sheet

Revised: Instead of 12-bit ADUs, binned pixels are averaged

Measurements by TG Tan http://pestobservatory.com/

Model	QHY183M	Firmware	18-3-30	
Sensor	IMX183	Binning	1 x 1	2 x 2
Date	5/04/2021			
CCD Temp.	-5	deg C		
ADU type	'12-bit' = 'ADU as output'/16		12-bit	16-bit
Gain setting	0	Offset:	8	
USB Traffic:	30			

1. System Noise (a)		**-5 deg C**	1 x 1	2 x 2
	GAIN:	e-/ADU	3.78	0.95
	SDEV:	ADU	0.71	5.83
	RD NOISE(e-):	e-	2.67	5.54

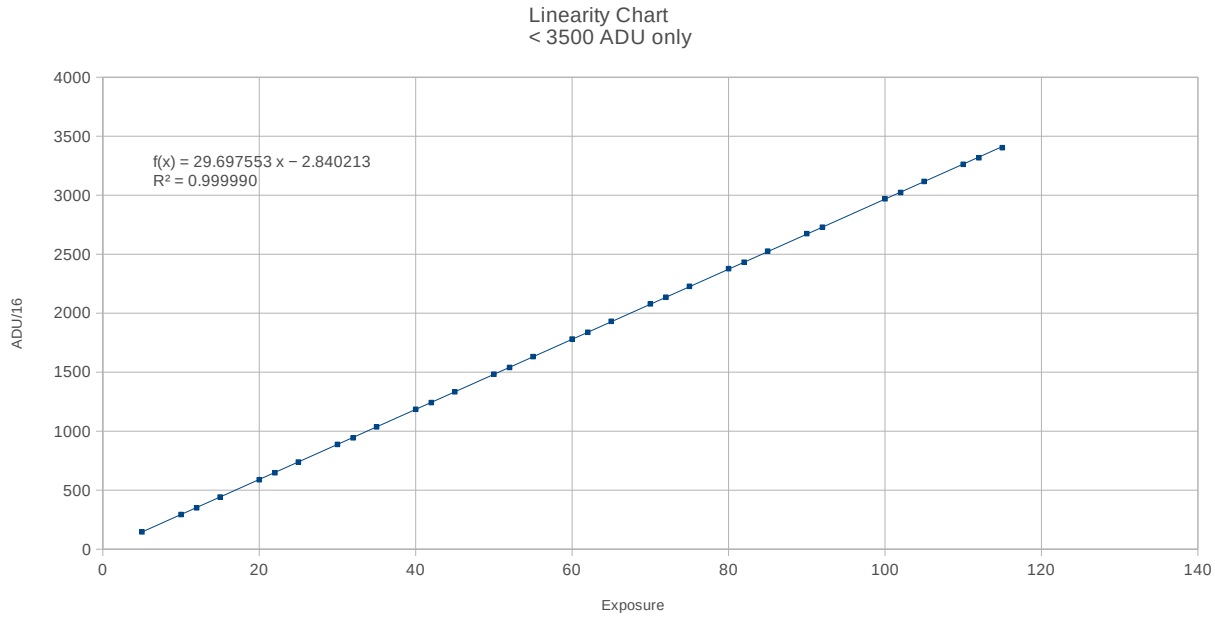
2. Bias Level:	ADU	32	32

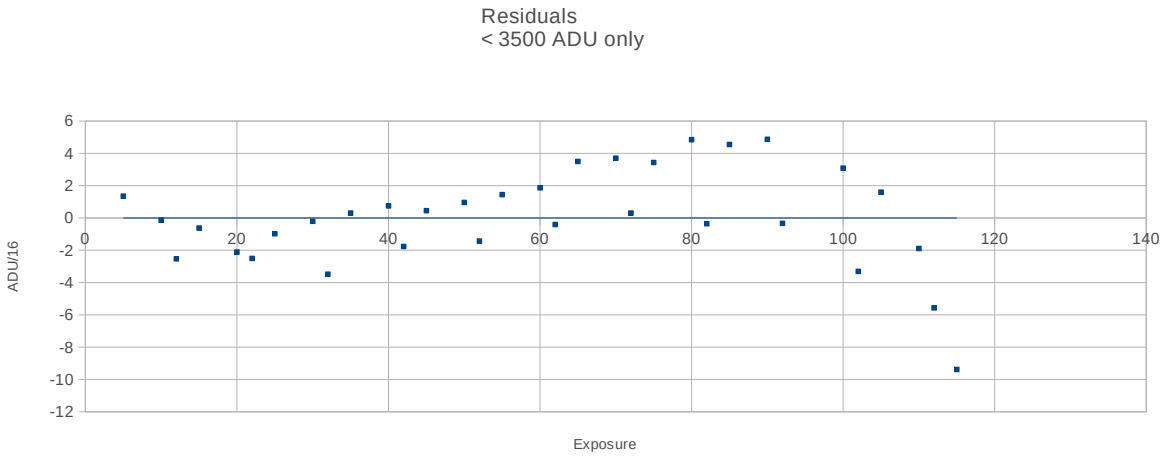
3. Dark Count:	e/pix/s	0.0068	not measured, but from QHYCCD

4. Saturation, deviation from linearity line			1 x 1	2 x 2
Saturation at		12-bit ADU	3300	13200
		16-bit ADU	52800	52800

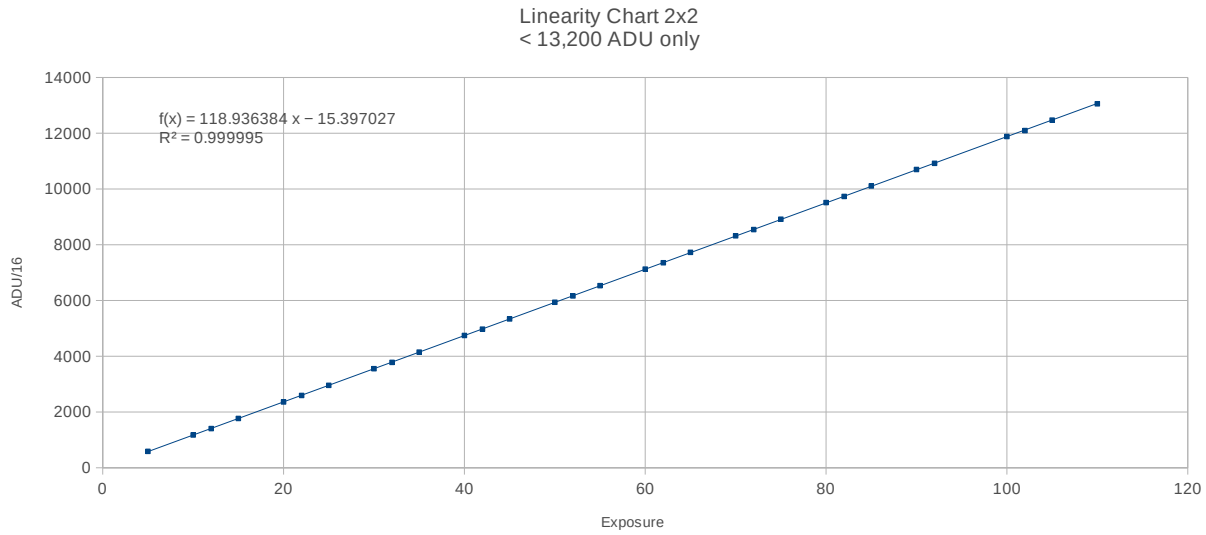
5. Calculated Quantities			1 x 1	2 x 2
	Well Depth:	electrons	12,467	50,160
	Dynamic Range:	levels	4,667	9,062
	No. of bits	bits	12	13
	Download time	s	3.5	

6a. Linearity	1x1 binning

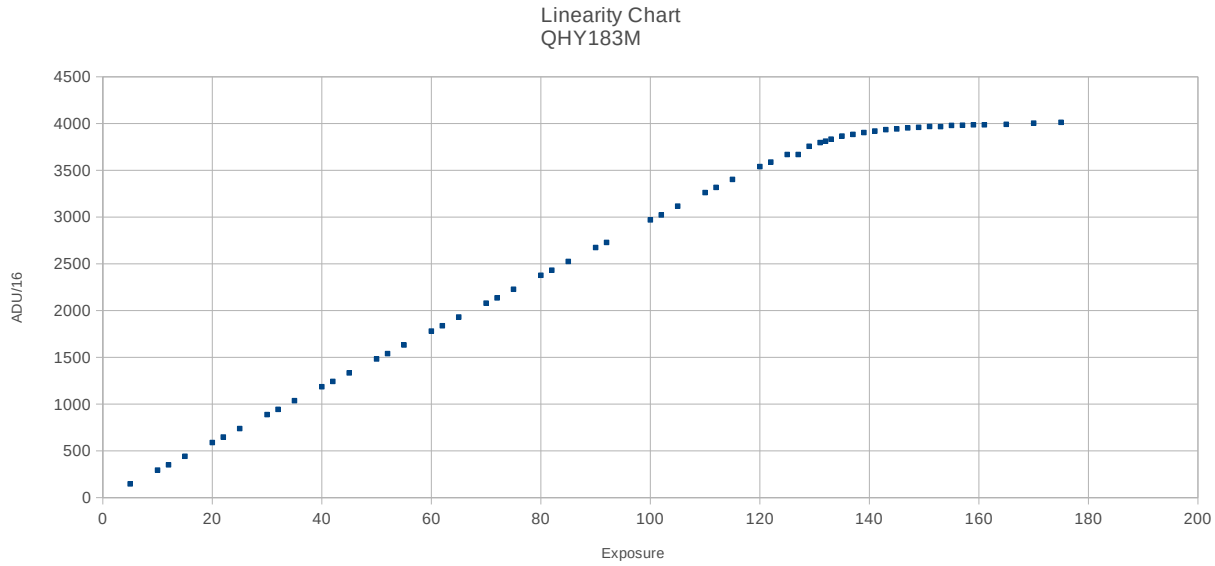




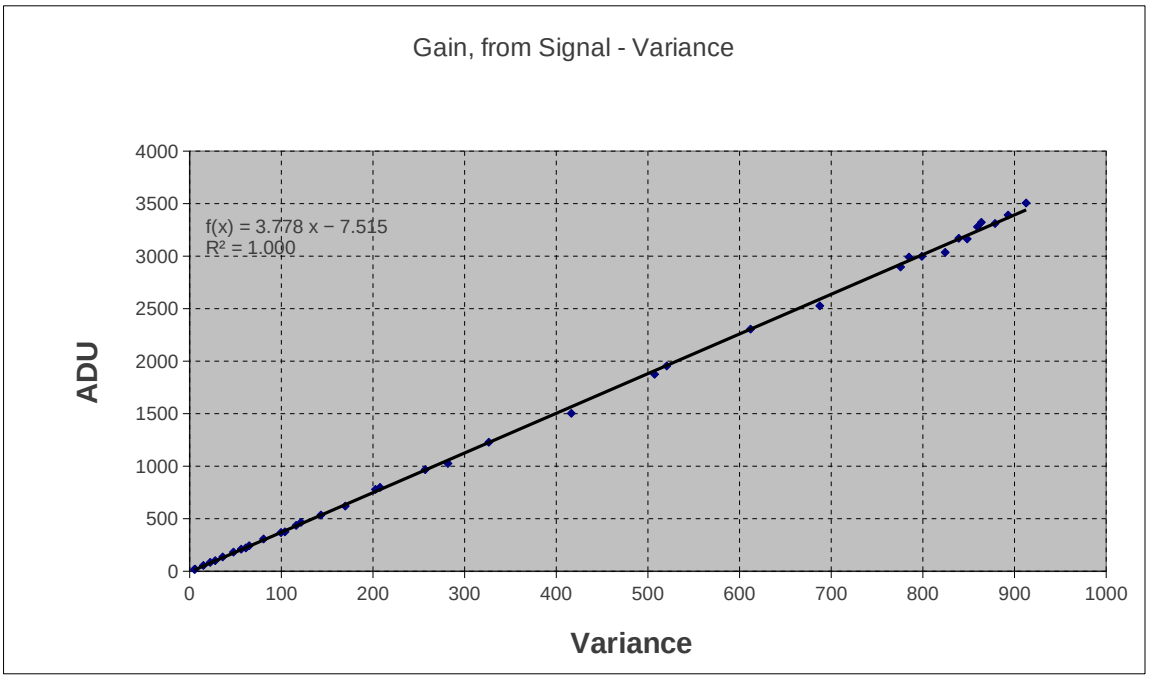
6b. Linearity	2x2 binning

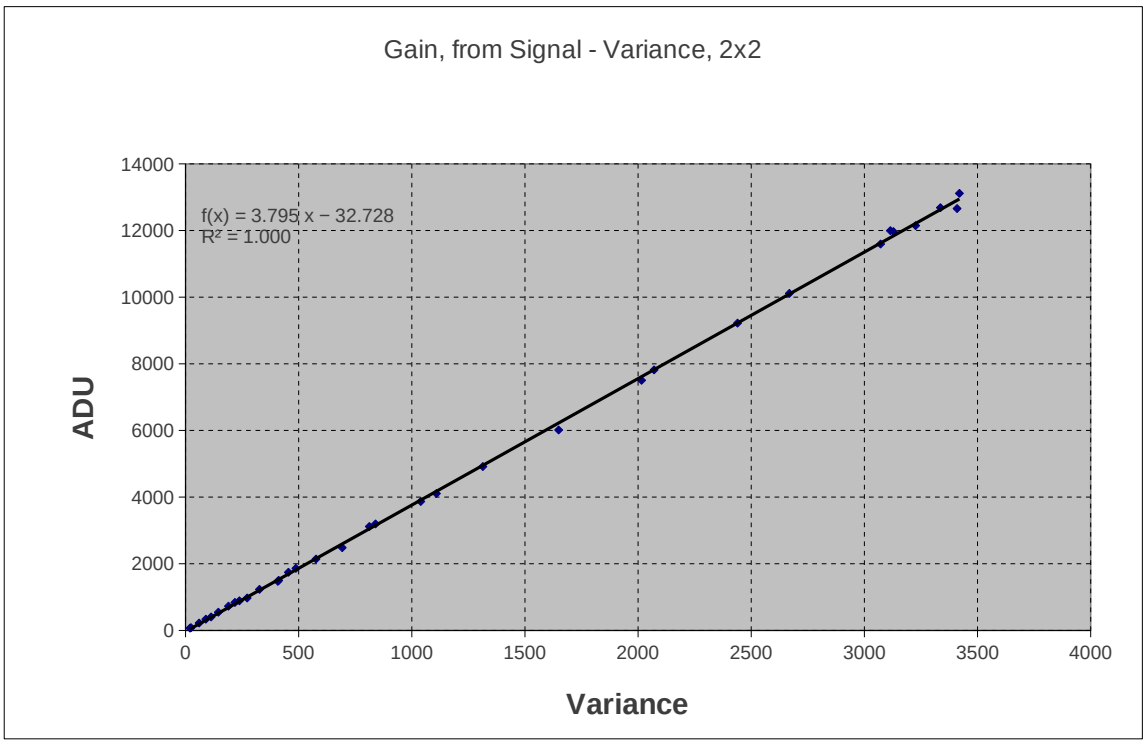


6c. Linearity	Full range

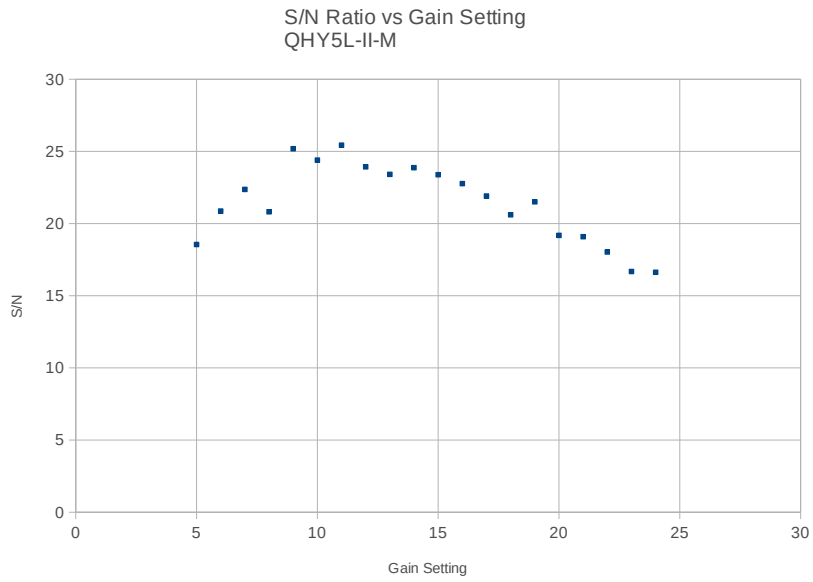


7. Signal Variance (Gain calculation)	Temp = -5 deg C





8. Guider Optimal S/N settings			Binning:	2x2	Revised
Guider	**QHY5L-II-M**		Gain:	11	9
	USB Traffic:	70	Offset:	90	10



On-sky testing 1s exp
Gain = 9; Offset = 10

mag	pk ADU	OK?
9.72	40000	yes
9.8	60000	yes
11.82	13000	yes
12.03	16000	yes
12.42	12000	yes
12.45	13000	yes
12.88	12000	yes
13.09	8000	no
13.31	8000	no

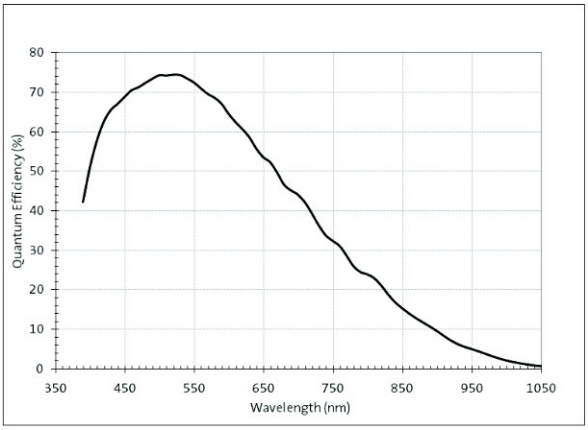


Figure 25. Estimated Quantum Efficiency – Monochrome Sensor

9. Notes
(a) Gain calc per Method 1: http://www.mirametrics.com/tech_note_ccdgain.htm
(b) SDEV: Difference of 2 bias frames / 1.4142
(c) NOISE = SDEV * GAIN
(d) Linearity: Median ADU of central 100x100pix with pulsed LED, 1ms on 10ms off
(e) Guider S/N: Avg median of 3 dark subtr light frames, diff of 2 darks