



MR274xx

(CU and MU)

Camera Core

Specification

June 19, 2008

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2 Revision History

Revision	Date	Who	What
0.10	03.03.2008	ML	Initial draft created from MR274
0.20	19.06.2008	ML	MRR value changed

3 Disclaimers

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4 Privacy Information

This document contains information of a sensitive nature. This information should not be given to persons other than those who are involved in the MR274 project or who will become involved during the lifecycle.

5 Trademarks

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6 Glossary of Terms, Acronyms and Abbreviations

ADU	Analog to Digital Units
API	Application Program Interface
CCD	Charge Coupled Device
CTP	Compliance Test Procedure
DDRAM	Dual Data rate Random Access Memory
DLL	Dynamic Link Library
FPGA	Field Programmable Gate Array
FWC	Full Well Capacity
GUI	Graphical User Interface
OHCI	Open Host Controller Interface
PC	Personal Computer
PCB	Printed Circuit Board

7 Document Scope and Purpose

The purpose of this document is to specify MR274 camera core parameters and their dependencies.

8 Referenced Documents

- Sony: Datasheet E01X50C34
- Sony: Datasheet E01410C34
- SHT: MR274xx_BH Validation and Verification plan (MR274VVP)
- SHT: MR274xx_BH Compliance Test Procedure (MR274CTP)

9 Parameter tables

9.1 Mechanical

Description	Symbol	Value	Units
Height	H	32	mm
Width	W	60	mm
Depth	D	60	mm
Weight	M	100	g
Housing material and technology		Machined Aluminium alloy, no further surface treatments	
Lens adapter, material and technology		C-Mount, machined Aluminium alloy, anodized to black color	

9.2 Sensors

Description	MR274Cx_BH	MR274Mx_BH	Units
Brand	Sony ICX274AQ	Sony ICX274AL	
Sony Datasheet	E01410C34	E01X50C34	
Type	Interline CCD image sensor		
Pixel resolution	1620 (H) × 1220 (V)		pixels
Chip size	8.5(H) × 6.8(V)		mm
Unit cell size	4.40(H) × 4.40(V)		µm
Color filter	RGB Bayer mosaic	None	
FWC (*), typical	15000		ē
Dark current (**), typical	9		ē/p/s

All parameters in this table, except FWC and Dark current, are reprinted from respective Sony datasheet

(*) – FWC, no limits specified by CCD chip vendor, typical value provided here is for informational purposes only. It can not be used as a unit qualification parameter.

(**) – Dark current, limit specified by CCD chip vendor is ~200ē/p/s @ 60°C. A typical value provided here is for informational purposes only. It can not be used as a unit qualification parameter.

9.3 Optical path

Description	MR274Cx_BH	MR274Mx_BH	Units
IR Filter Brand	Hoya E-CM500S	Calflex-C	
Thickness	1.0±0.1	1.0±0.1	mm
Specification	HOYA 8405E	Linos Calflex 04_127-130_e05	
Coating	NA	NA	
CCD Spot blemishes and stain specification	Sony E01437B4Y	Sony E04508	
Filter cleanliness (spots, scratches)	±3 (*)	±3 (*)	%
Size of the cosmetics defects free aperture on filter	21.5	21.5	mm

(*) – Filter cleanliness is measured with the method and set of tools described in MR274CTP.

9.4 Camera core

Description	Symbol	Value	Units
Digitization		14	Bit
Supported bit resolutions		8, 10, 12 and 14	Bit/pix
Exposure time	EXP	20µs ... 500sec	
Variable Gain Range	VGA	36	dB

Refresh rate	MRR	11.4	Fps
Trigger/sync input (r)		Asynchronous CMOS 3.3V	
Trigger/sync output (rr)		CMOS 3.3V	
Dynamic range, Typical	DR	~70	dB
Linearity (*)	Lin	<1	%
Acquisition Gain (14bit)	G	1.5 ±0.3	ē/ADU
External interface		IEEE1394A	
Acquisition noise (**), typical	AN _{typ}	3.0	ē
Acquisition noise (**), max	AN _{max}	5.0	ē
Readout noise (***), typical	RN _{typ}	7.5	ē
Readout noise (***), max	RN _{max}	NA	ē

Parameters in this table are subject to qualification measurements specified in MR274VVP and/or Sony data sheets E01410C34 and E01X50C34 and/or MR274CTP

(r) – Pull up resistor of 100kΩ

(rr) – Serial resistor of 1kΩ

(*) – Linearity of 1% guaranteed in the range of exposures 1ms to 16s.

(**) – Acquisition noise means noise generated by the camera with ADC input connected to ground via resistor equivalent to CCD output impedance of 200Ω.

(***) – Readout noise means noise generated by the camera with ADC input connected to CCD chip. Typical value provided here is for informational purposes only. It can not be used as a unit qualification parameter.

9.5 Power

Description	Symbol	Value	Units
Power supply, via IEEE1394 system connector	V _{nom}	12 ±10%	V
Consumption, typical no cooling	P _{nom}	1.8	W
Consumption, maximum no cooling	P _{max}	2.5	W

All parameters in this table are subject to qualification measurements specified in MR274CTP

9.6 Environment

Description	Symbol	Value	Units
Optimal ambient temperature operation	T _{opt}	+10 ... +25	°C
Ambient temperature operation (*)	T _{max}	+5 ... +60	°C
Ambient temperature for storage and transportation	T _{storage}	-25 ... +70	°C
Relative Humidity, non condensing	RH	80	%

All parameters in this table are subject to qualification measurements specified in MR274VVP

(*) – Housing temperature shall not exceed +65°C, also beyond of the optimal range the following parameters are not guaranteed:

Dark current, Dynamical Range, Linearity, Acquisition and readout noise, S/N ratio, durability.

9.7 Firmware/Host driver/API features

Description	Symbol	Value	Units
Interpolation methods		9331, SHT_advanced	
White balance coefficients ranges		0.0 ... 3.9	x
Sharpness filter		0 ... 100	%
Gamma		0.3 ... 1.0	
Full color correction matrix (3+1)x3 coefficients ranges		-3.9 ... 3.9	x

Partial readout granularity @ (1x binning)		2 (H) x 2 (V)	pixels
Max refresh rate x1 binning		11.4	Frames/s

All parameters in this table are subject to qualification measurements specified in MR274VVP

9.8 Supported readout modes

Mode	Binning	Mode MR274C	Mode MR274B	Pixels	Frm/s	Fld/s	Bits /pix
0	2x2 HS	Color	B/W	814 × 618	40.1	-	14
1	1x1	Color	B/W	1628×1236	11.4	-	14
2	2x2	Color	B/W	814 × 618	21.7	-	14
3	3x3	Color	B/W	542 × 412	31.1	-	14
4	3x3 HS	Color	B/W	542 × 412	56.1	-	14
5	1x1 Interlace	Color	B/W	1628×1236	10.3	20.6	14
6	1x1 Interlace HS	Color	B/W	1628×1236	18.4	36.7	14
7	1x1 HS	Color	B/W	1628×1236	20.0	-	8
8	2x2 HS	B/W	B/W	814 × 618	40.1	-	14
9	1x1	Color	B/W	1628×1236	11.4	-	14
10	2x2	B/W	B/W	814 × 618	21.7	-	14
11	3x3	B/W	B/W	542 × 412	31.1	-	14
12	3x3 HS	B/W	B/W	542 × 412	56.1	-	14
13	4x4	B/W	B/W	406 × 308	40.1	-	14
14	4x4 HS	B/W	B/W	406 × 308	69.5	-	14
15	1x1 HS	Color	B/W	1628×1236	20.0	-	8

All parameters in this table are subject to qualification measurements specified in MR274VVP

(*) – In development