MiiS MCMF Product Specifications

400x400 Micro-Camera Module Technical Specifications

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Revision History

Date	Revision description	Version	Page	Created by
2022.11.08	First Edition	V0.1	18	Richer

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Introductions

Micro-Camera Module (MCM) is an All-In-One micro-camera solution for endoscope application and especially for the medical endoscopy. It has low voltage, high-performance, high sensitivity global shutter pixel and special design for medical endoscopic applications. MiiS applies the advanced package technology to integrate the micro-lens and CMOS image sensor (CIS) to make this micro-camera module with ultra-small form factor. The micro-camera module delivers the signal through micro coaxial cables to a matched ISP and shows the high quality images, that is, makes a minimal size of endoscopes come true. The MCMF product delivers most compact size of 400x400 pixels camera module in worldwide and especial suitable for the ultra-small size endoscopic applications.

Features

- Illumination integrated solution with small form factor (min. 0.65mm x 0.65mm)
- Advanced technology to make a robust and reliable structure
- Micro-coaxial cable (up to 3.0M) to deliver high S/N image
- 400x400 resolutions for endoscope applications
- Wide FOV (120 degree) for dedicated endoscopic application

Applications

- Medical endoscope
- Industrial endoscope
- All special endoscopes which need compact size camera module

Absolute Maximum Ratings

Table 1 MCMF Absolute Maximum Rating

Parameters	Value	Unit	Remark
V_{DD} (with respect to GND)	4.5	Volt	
Voltage to any IO	-0.3 to V_{DD-IO} +1	Volt	
Current to any IO	+/- 200	mA	
Ambient Storage Temp.	-40 ~ +85	℃	

General Specifications

Table 2 MCMF General Specifications

Parameters	Unit	Value	Remark
MCM Dimension	mm	Max. 0.65 x0.65 x 4.0	Max. length 4mm (including molding)
Resolutions	Pixels	400 x 400	
Sensing Area	um	411.26 x 411.26	
Field of View (Horizontal)	Degree	100	+/- 6
Field of View (Diagonal)	Degree	120	+/- 6
Depth of Field	mm	2 ~ 60	
LED Color and CCT	/	NA	w/o LED
Frame Rate	fps	30	
Typ. Power Consumption	mW	21.5	
Cable Diameter	mm	0.35/0.40/0.55	+/- 0.05mm
Cable Length	mm	Max. 3000	+/- 50mm

Block Diagram

The functional block diagram of this camera module are shown in Fig. 1 as follows.

Figure 1 The functional blocks of the micro-camera module

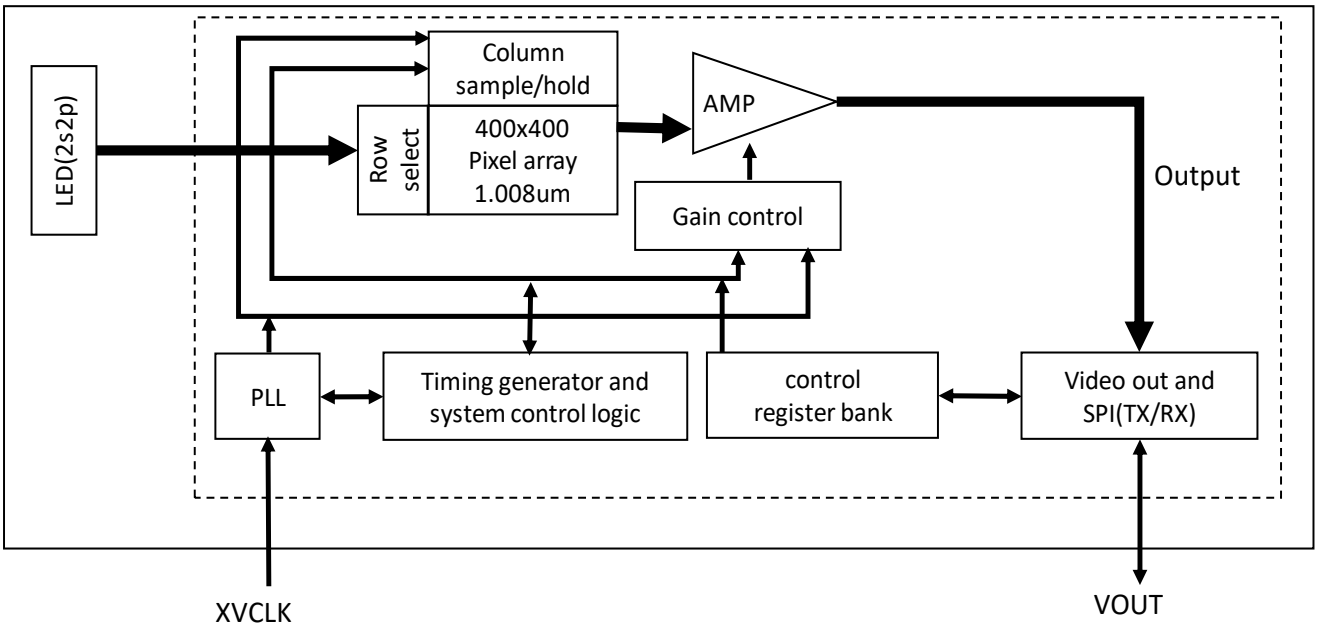


Figure 2 The functional blocks of the micro-camera module with ISP board

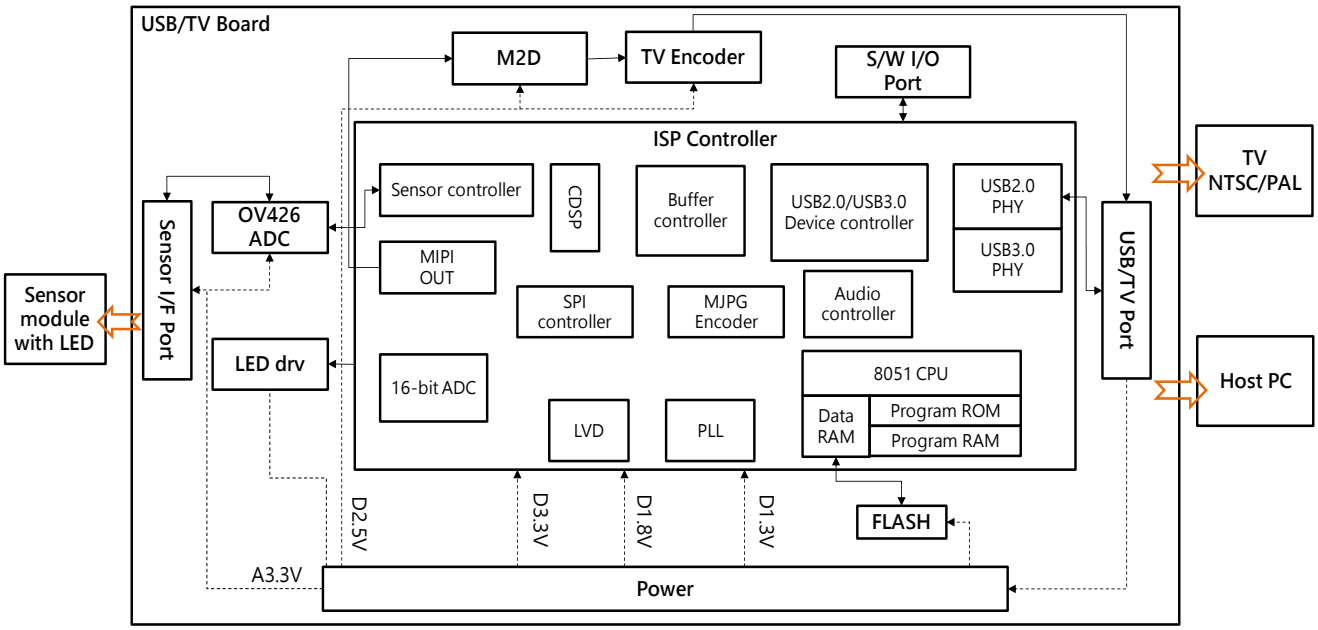
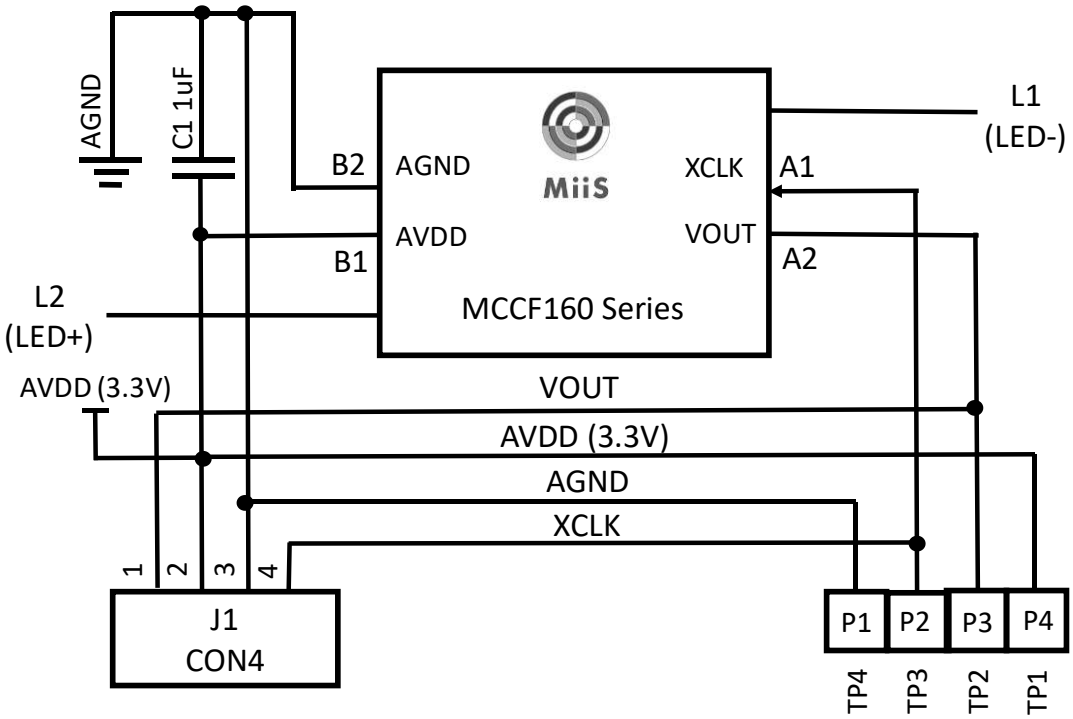


Figure 3 Reference Schematic



Electrical Characteristics

The module will comply with the specifications listed in this section within the operating ranges listed in the respective section. The parameters with Min and Max values are guaranteed with production tests or SQC (Statistical Quality Control) methods.

Table 3 Electrical Characteristics

Symbol	Parameters	min	typ	max	unit
Supply					
VDD	Supply voltage(analog), ±5%	3.14	3.3	3.47	V
IDD	Active(operating) current, +20%		6.5	8	mA
Vout Digital Input (Typ conditions : AVDD = 3.3V)					
VIL	Input voltage LOW			1.1	V
VIH	Input voltage HIGH	1.5			V
Vout Digital Output					
VOL(IO=3mA)	Output voltage LOW		0.8		V
VOH(IO=3mA)	Output voltage HIGH		1.8		V
Clock Input (Typ conditions : AVDD = 3.3V)					
VIL	Input Voltage LOW			0.99	V
VIH	Input Voltage HIGH	2.31			V
CIN	Input Capacitor			10	pF

Optical Specifications

The pixel array consists of 408 x 408 square rolling shutter pixels with a pitch of 1.008μm (1.008μm x 1.008μm). This results in an optical area of 411.264μm x 411.264μm. Figure 4 shows a cross-section of the image sensor array.

Figure 4 Pixel Array

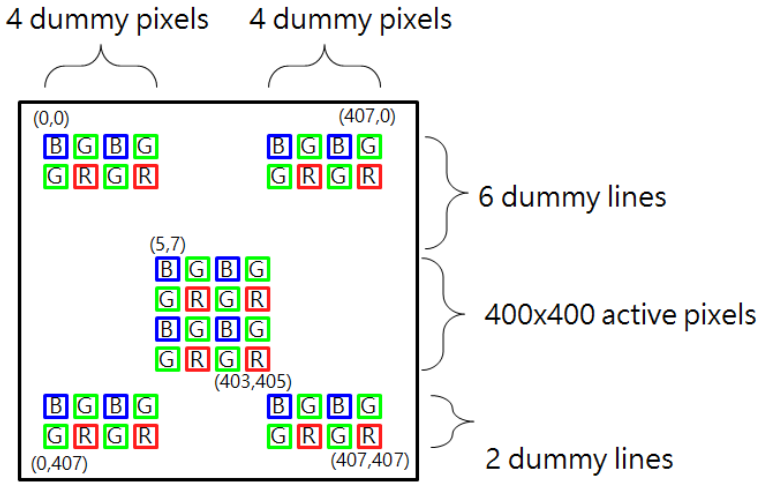


Figure 5 Default LED Illumination Spectrum

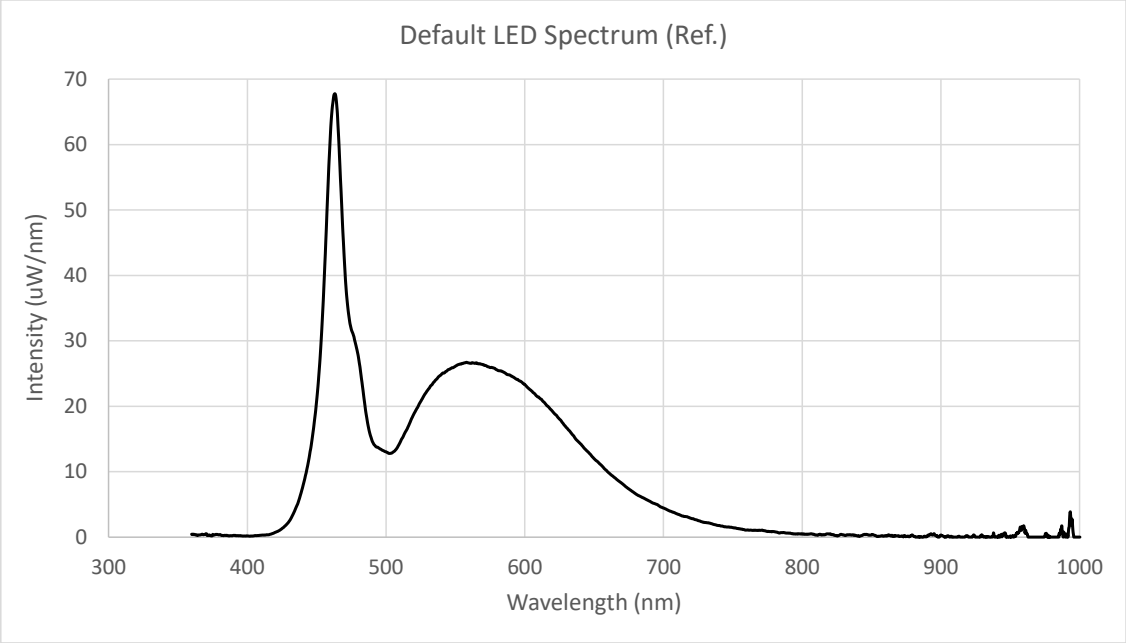


Table 4 Optical Characteristics

MCMF160120 Series

Parameters	Value	Unit	Remark
Field of View (H & V)	100	Degree	Horizontal
Field of View (D)	120	Degree	Diagonal
F Number	2.8	/	
Focal Length	0.175	mm	
TV Distortion	< 11%	/	
Depth of Field	2 ~ 60	mm	
IR Band Pass Filter	660 +/- 10	nm	50% cut-off

Tables of Model Names

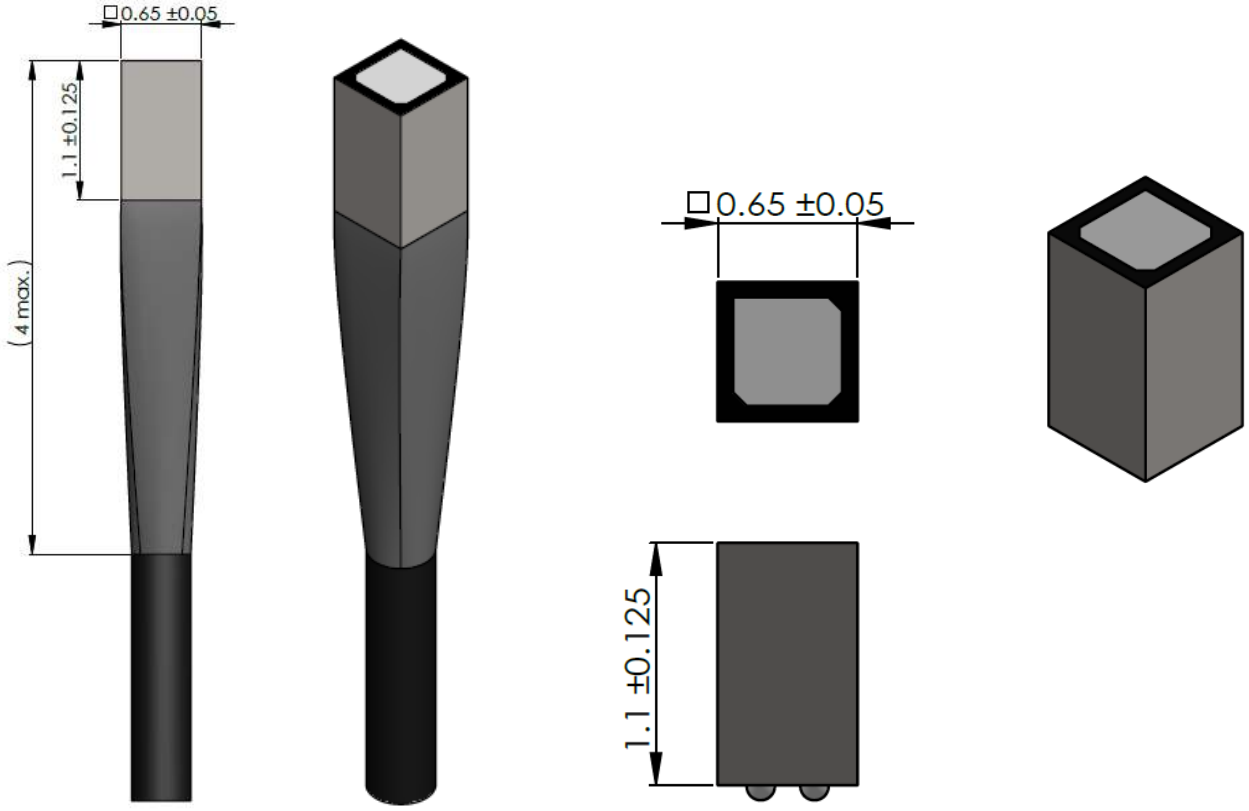
Table 5 Model Name for MCMF Micro-Camera Module

Group	Resolution	FOV (Diagonal)	Cable Dia.	Cable Length	Model Name
Micro-Camera Module (MCM)	400 x 400	120	Typ. 0.40mm	Max. 200cm	MCMF-B160120
			Typ. 0.55mm	Max. 300cm	MCMF-C160120
			Typ. 0.35mm	Max. 200cm	MCMF-D160120

Mechanical Drawings

Figure 6 Micro-Camera Module Outline Drawing

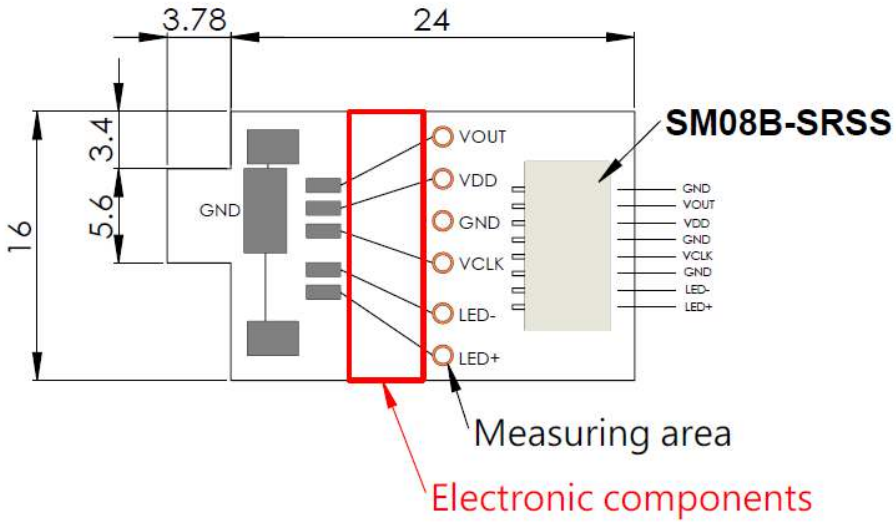
Model Name: MCMF-B/C/D Series



Notes:

1. Dimensions are in millimeters.
2. Tolerances unless mentioned are ± 0.1mm.

Figure 7 Connector Board Outline Drawing



Notes:

1. Dimensions are in millimeters.
2. Tolerances unless mentioned are ± 0.1mm.

Shipping and Packing

Figure 8 Drawings of Micro-Camera Module Packing Tray