



CMOS MT9N001 Camera Module

1/2.3-Inch 9MP Color Module Datasheet

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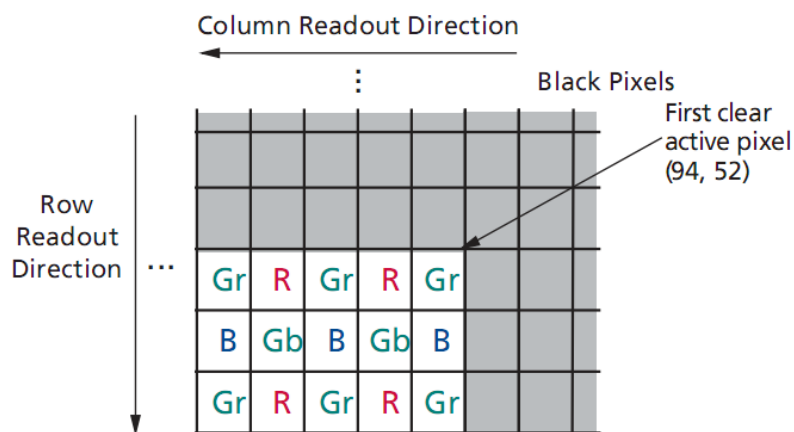
1 Introduction

The MT9N001 camera module features DigitalClarity—Micron’s breakthrough low-noise CMOS imaging technology that achieves near-CCD image quality (based on signal-to-noise ratio and low-light sensitivity) while maintaining the inherent size, cost, and integration advantages of CMOS.

When operated in its default mode, the sensor generates a full resolution image at 13.2 frames per second (fps). An on-chip analog-to-digital converter (ADC) generates a 12-bit value for each pixel.

The MT9N001 is a progressive-scan sensor that generates a stream of pixel data at a constant frame rate. It uses an on-chip, phase-locked loop (PLL) to generate all internal clocks from a single master input clock running between 6 and 48 MHz. The maximum output pixel rate is 96 Mp/s, corresponding to a pixel clock rate of 96 MHz.

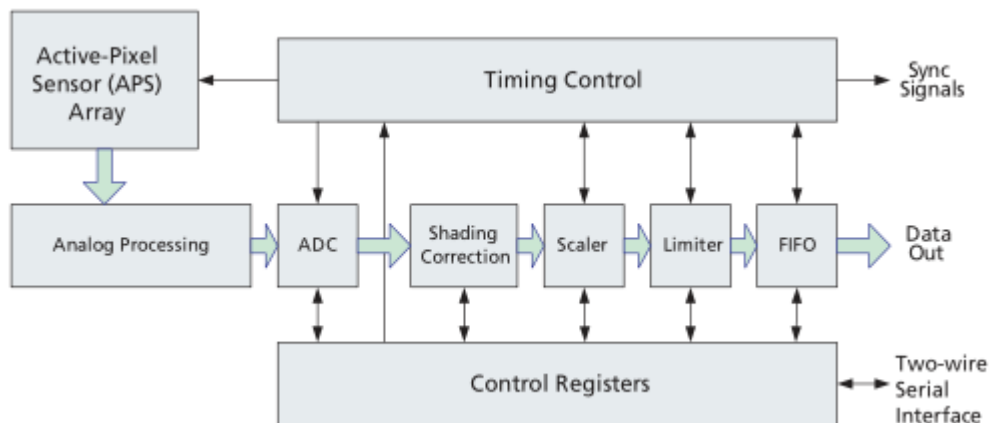
The camera uses a Bayer color pattern, as shown in the following figure. The even-numbered rows contain green and red pixels; odd-numbered rows contain blue and green pixels. Even-numbered columns contain green and blue pixels; odd-numbered columns contain red and green pixels.



2 Features

Parameter	Value	
Optical format	1/2.3-inch (4:3)	
Active imager size	6.104mm(H) x 4.578mm(V) 7.63mm diagonal	
Active pixels	3488H x 2616V	
Pixel size	1.75 x 1.75µm	
Chief ray angle	0°, 25°	
Color filter array	RGB Bayer pattern	
Shutter type	Electronic rolling shutter (ERS) with global reset release (GRR)	
Input clock frequency	6–48 MHz	
Maximum data rate	Parallel	96 Mp/s at 96 MHz PIXCLK
	CCP2	640 Mbps
	MIPI (two-lane)	1.536 Gbps
Frame rate	Full resolution	Programmable up to 9.7 fps parallel
	VGA	640H x 480V with 2X skip and 2X bin: 56.8 fps (full power), 50 fps (low power)
ADC resolution	12-bit, on-die	
Responsivity	0.44 V/lux-sec (550nm)	
Dynamic range	62.7dB	
SNR _{MAX}	37.4dB	
Power Consumption	Full resolution	485mW
	Preview	150mW low power VGA
	Standby	50µW (typical, EXTCLK disabled)
Operating temperature	–30°C to +70°C (at junction)	

3 Block Diagram



4 Application

- Digital still / video cameras
- Industrial camera
- Medical camera
- Microscopy camera
- UAV camera

5 Pin Definition

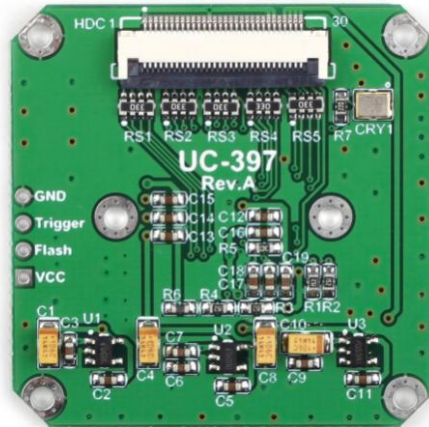
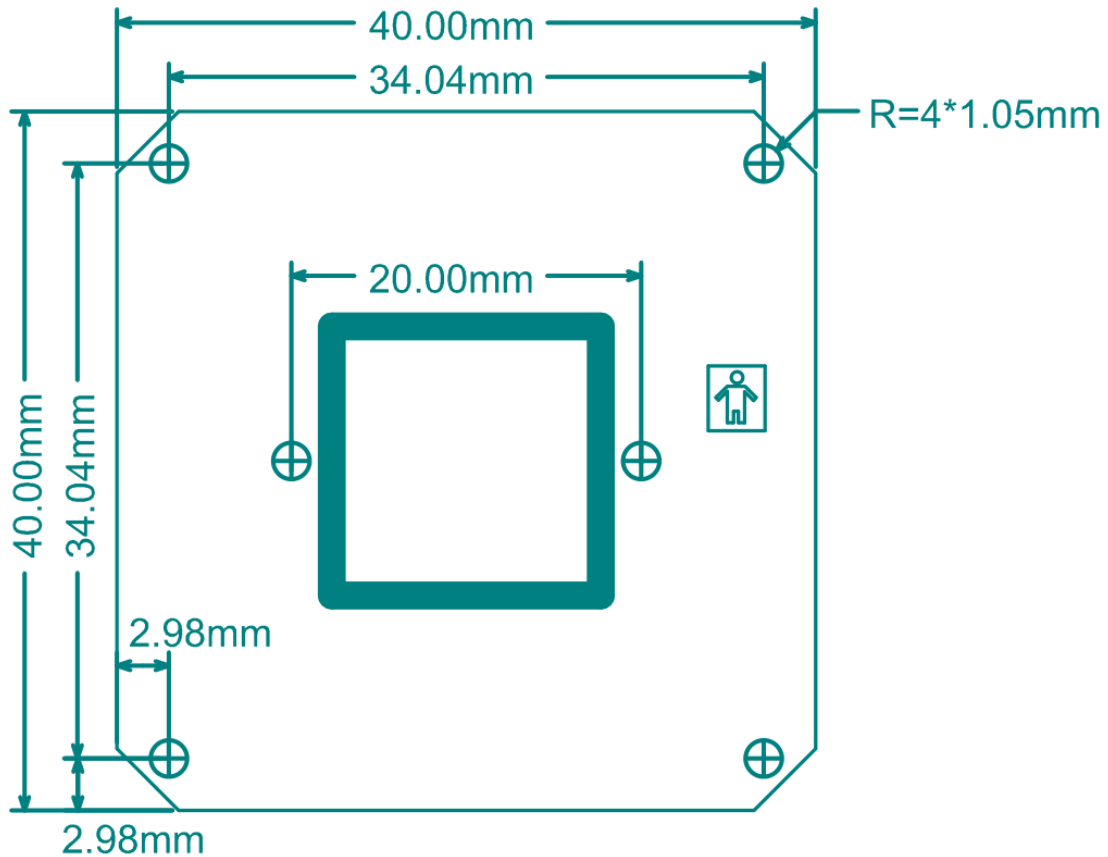


Table 1 HDC1 Connector Pin Definition

Pin No.	PIN NAME	TYPE	DESCRIPTION
1	GND	Ground	Power ground
2	FLASH	Output	Flash output control
3	Trigger	Input	Exposure synchronization input
4	VSYNC	Output	Active High: Frame Valid; indicates active frame
5	HREF	Output	Active High: Line/Data Valid; indicates active pixels
6	DOUT11	Output	Pixel Data Output 11 (MSB)
7	DOUT10	Output	Pixel Data Output 10
8	DOUT9	Output	Pixel Data Output 9
9	DOUT8	Output	Pixel Data Output 8
10	DOUT7	Output	Pixel Data Output 7
11	DOUT6	Output	Pixel Data Output 6
12	DOUT5	Output	Pixel Data Output 5
13	GND	Ground	Power ground
14	DOUT4	Output	Pixel Data Output 4
15	DOUT3	Output	Pixel Data Output 3
16	DOUT2	Output	Pixel Data Output 2
17	DOUT1	Output	Pixel Data Output 1
18	DOUT0	Output	Pixel Data Output 0(LSB)
19	XCLK	Input	Master Clock into Sensor
20	PCLK	Output	Pixel Clock output from sensor
21	SCL	Input	Two-Wire Serial Interface Clock
22	SDATA	Bi-directional	Two-Wire Serial Interface Data I/O
23	RST	Input	Sensor reset signal, active low
24	GND	Ground	Power ground
25	GND	Ground	Power ground
26	STANDBY	Input	Standby-mode enable pin (active HIGH)
27~30	VCC	POWER	3.3v Power supply

6 Mechanical Dimension



7 Lens Options

The camera board shipped with default LS-18023M12, optional CS mount lens LS-18023CS is also available. Lens specification list as follows. Please contact us admin@arducam.com for more lens options or visit www.arducam.com/downloads/Lenses/.

PRODUCT NAME : LS-18023

1. SPECIFICATION :

- 1.SENSOR SIZE
- 2.WAVELENGTH
- 3.FOCAL LENGTH (EFL)
- 4.F/NO (INFINITE)
- 5.BACK FOCAL LENGTH
- 6.FLANGE BACK LENGTH
- 7.FIELD OF VIEW (DIAGONAL)
- 8.OPTICAL DISTORTION (DIAGONAL)
- 9.Thread Size
- 10.Element

1/1.8" CMOS CCD
$\lambda = 400 - \infty$
f = 4.2 mm
F/NO = 2.0
BFL = 6.20 mm
FB = 5.8 mm
= 140°
< - 40%
M12X0.5
ALL GLASS

2. OPTICAL LAYOUT : scale 4 : 1

