AtomS3R-CAM

SKU:C126-CAM



















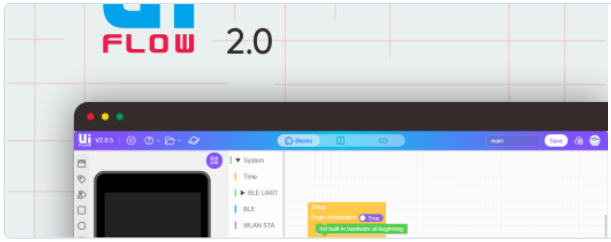


Description

AtomS3R-CAM is a mini IoT programmable controller with an integrated camera. It is powered by the **ESP32-S3-PICO-1-N8R8** SoC featuring Wi-Fi connectivity, 8MB on-chip **Flash**, and 8MB **PSRAM**. The unit carries a 5 V-to-3.3 V power-management circuit, a three-axis **BMM150** geomagnetic sensor, and a six-axis **BMI270** IMU. In addition, it is equipped with a 0.3 MP **GC0308** camera that supports image acquisition and infrared transmission control. Protective glass is fitted in front of the camera to keep dust out and enhance image quality. Compared with previous products, the **3D antenna** of **AtomS3R-CAM** has been enhanced to deliver higher performance and stability.

The factory firmware supports **UVC** (USB Video Class), allowing the device to work as a driver-free USB camera—simply connect via USB and use it directly. The product also features a **USB Type-C** port for power supply and firmware download, plus a **HY2.0-4P** expansion port. Six **GPIOs** and power pins are exposed on the bottom for further expansion. With compact dimensions of **24.0 x 24.0 x 13.5 mm**, it is well suited for IoT monitoring, educational development tools, and other embedded scenarios.

Tutorial



UiFlow2

This tutorial shows you how to control the AtomS3R-CAM using the UiFlow2 graphical programming platform.



Arduino IDE

This tutorial shows you how to program and control the AtomS3R-CAM with the Arduino IDE.

Features

- Integrated ESP32-S3-PICO-1-N8R8 SoC
- 0.3 MP GC0308 camera
- 9-axis sensor system (BMI270 6-axis IMU + BMM150 3-axis geomagnetic sensor)
- 8MB Flash and 8MB PSRAM
- Supports infrared transmission control
- Expandable pins and interfaces
- Development Platform
  - Arduino IDE
  - ESP-IDF

- PlatformIO

Includes

- 1 x AtomS3R-CAM

Applications

- Driver-free USB camera
- Motion detection & orientation sensing
- Wearable devices
- Smart device control
- IoT applications

Specifications

Specification	Parameter
SoC	ESP32-S3-PICO-1-N8R8 @ Xtensa® 32-bit LX7 dual-core processor, clock frequency 240MHz
USB	USB OTG, USB Serial/JTAG
Flash	8MB
PSRAM	8MB Octal
Wi-Fi	2.4 GHz Wi-Fi
6-axis IMU (BMI270)	Accuracy: 0.05 % (acceleration), 0.05 °/s (gyro) I2C address: 0x68
3-axis geomagnetic sensor (BMM150)	Accuracy: 0.3 µT. Mounted on BMI270, magnetometer data obtained via BMI270
Camera	GC0308. Max frame rate: 30 fps. Output formats: YCbCr4:2:2, RGB565, Raw Bayer. Aperture: F2.6. Resolution: 0.3 MP. Sensor size (diagonal): 1/6.5''. Field of view: FOV 57.6°
Camera panel material	Glass
Infrared IR	IR emission distance: 12.46 m @ ∠180° (unobstructed)
Sleep current	GPIO-5V supply: DC 5 V @ 11.63 µA; Grove-5V supply: DC 5 V @ 10.75 µA; USB-5V supply: DC 5 V @ 92.50 µA (including PD resistor loss)
Bottom GPIO	G5/G6/G7/G8/G38/G39
Operating temperature	0 ~ 40 °C
Product Size	24.0 x 24.0 x 13.5 mm
Product Weight	7.4 g
Package Size	85.0 x 65.0 x 14.3 mm
Gross Weight	13.6 g

Learn

BMM150 Magnetic Interference

Products containing magnets may interfere with the BMM150 magnetic sensor and cause abnormal readings. When used with M5

controllers that include magnets, please remove the magnets and avoid placing the BMM150 near strong magnetic fields.

Enable Camera

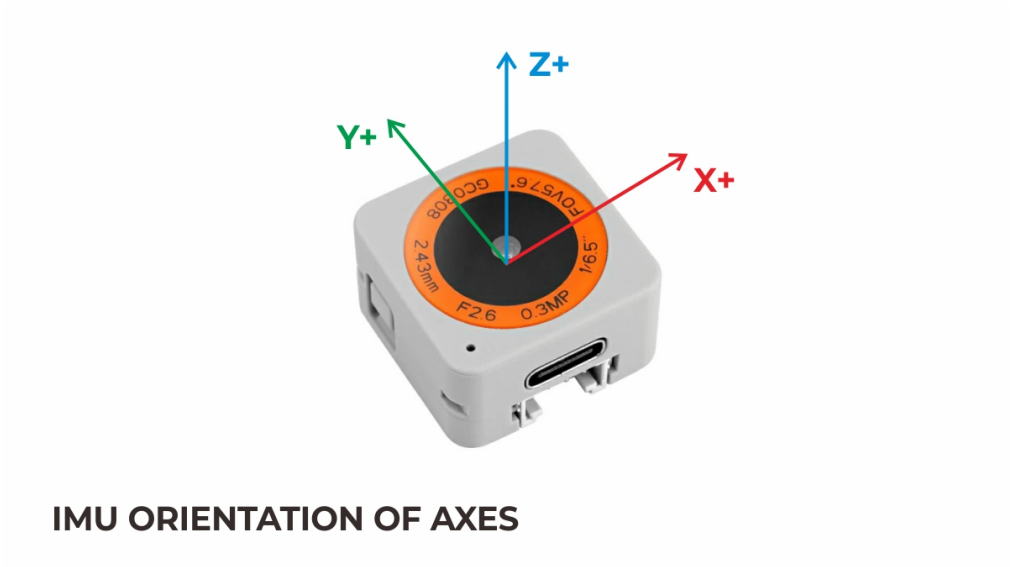
Before camera initialization, set **GPIO18** low to enable power; this action also turns on the power indicator LED.

Download Mode

To flash firmware, press and hold the reset button for about 2 seconds until the internal green LED lights up, then release the button. After release, the green LED turns off, indicating that the device has entered download mode and is ready for flashing.

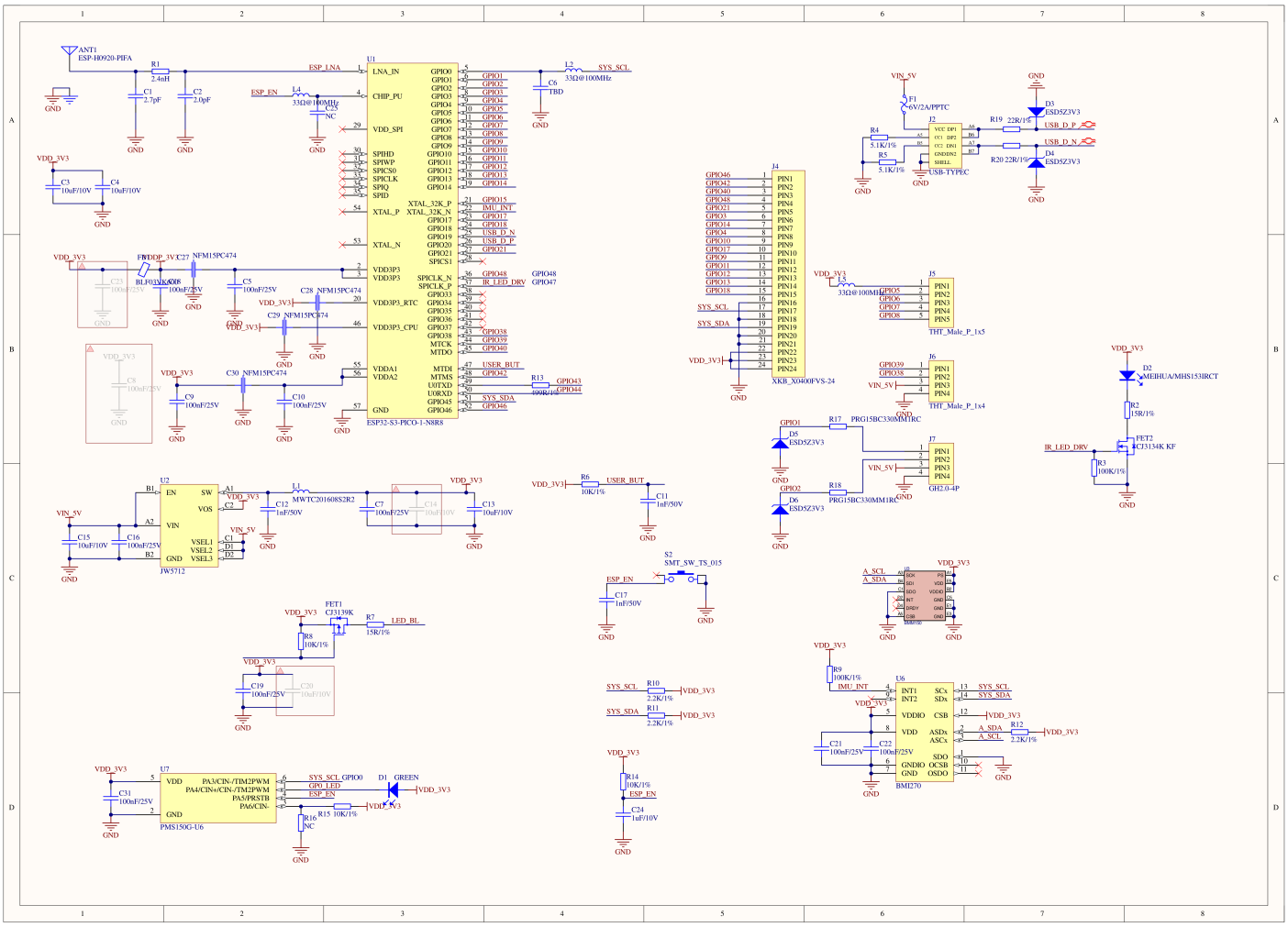


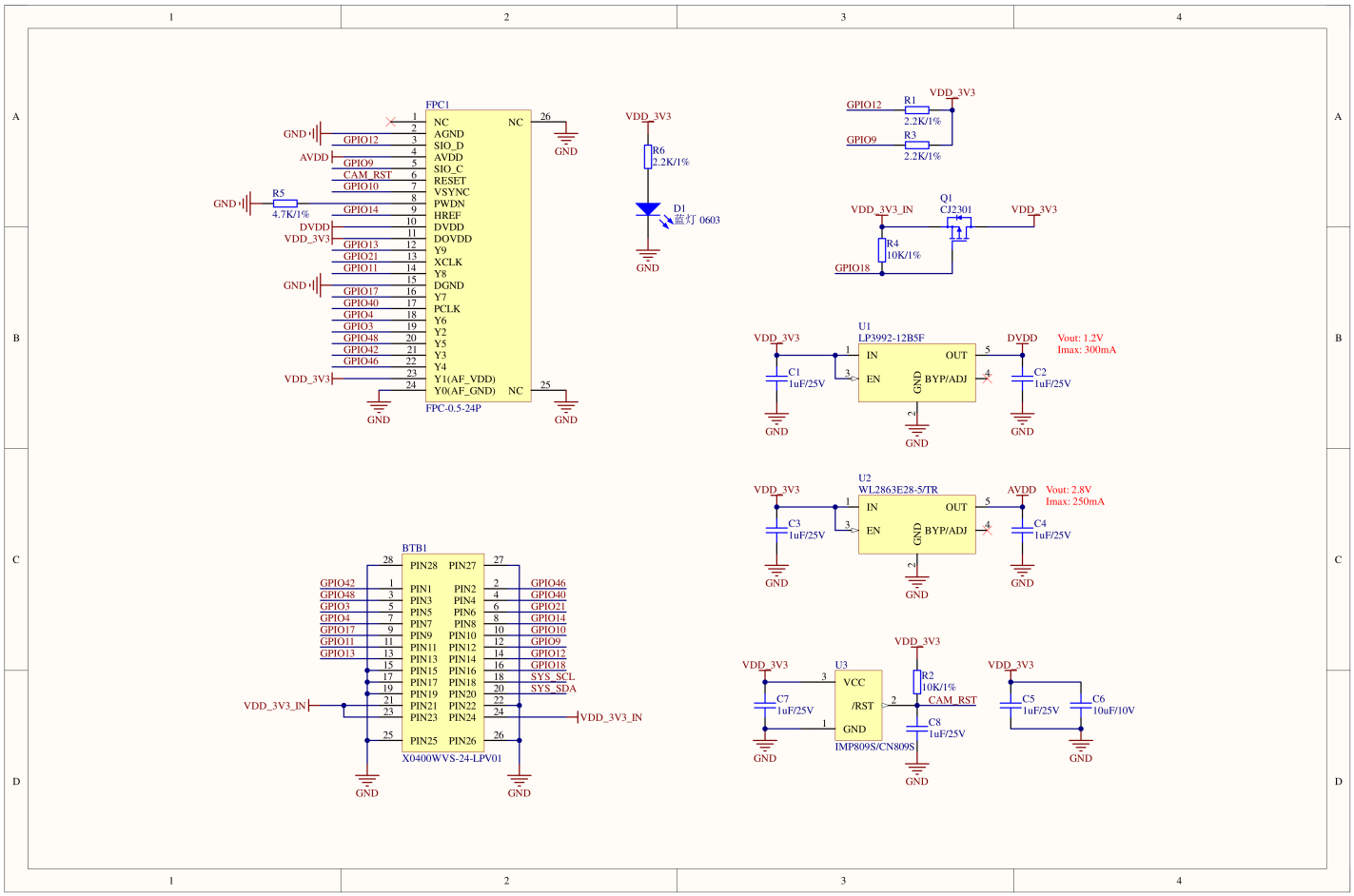
IMU Triaxial Direction Schematic Diagram



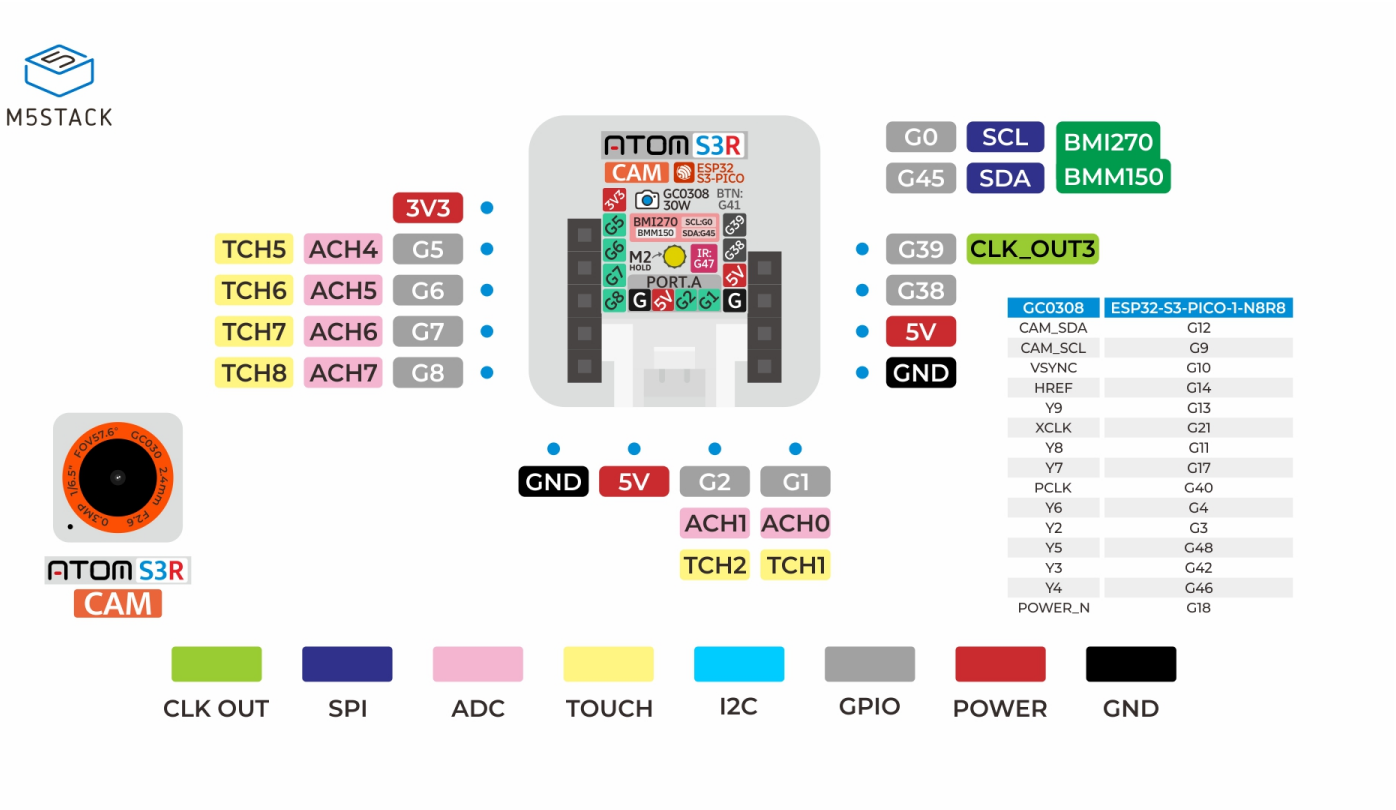
Schematics

- AtomS3R-CAM main board Schematics PDF
- AtomS3R-CAM ext board Schematics PDF


ANT1
ESP-H0920-PIFA
U1
ESP32-S3-PICO-1-N8R8
U2
JW5712
U7
PMS150G-U6
FET1
C31339K
U4
MEIHUA/MHS153IRCT
FET2
CJ3134K KF
J4
XKB_X0400FVS-24
J5
THT_Male_P_1x5
J6
THT_Male_P_1x4
J7
GH2.0-4P
USB-TYPEC
D3
ESD5Z3V3
D4
ESD5Z3V3
D5
ESD5Z3V3
D6
ESD5Z3V3
S2
SMT_SW_TS_015
U6
BMI270
VIN_5V
VDD_3V3
GND
ESP_LNA
ESP_EN
SYS_SCL
SYS_SDA
USER_BUT
LED_BL
IR_LED_DRV
USB_D_P
USB_D_N
A_SCL
A_SDA


FPC1
FPC-0.5-24P
D1
蓝灯 0603
Q1
CJ2301
U1
LP3992-12B5F
Vout: 1.2V
Imax: 300mA
U2
WL2863E28-5/TR
Vout: 2.8V
Imax: 250mA
U3
IMP809S/CN809S
BTB1
X0400WVS-24-LPV01
VDD_3V3
VDD_3V3_IN
DVDD
AVDD
GND

PinMap



BMI270 & IR

ESP32-S3-PICO-1-N8R8	G0	G45	G47
BMI270 (0x68)	SYS_SCL	SYS_SDA	
IR			IR_LED_DRV

BMM150

BMI270	BMI270_ASDx	BMI270_ASCx
BMM150	A_SDA	A_SCL

BMM150 Mounted on BMI270

The BMM150 is connected via the BMI270 Sensor Hub auxiliary I2C interface, providing unified 9-axis sensor data acquisition.

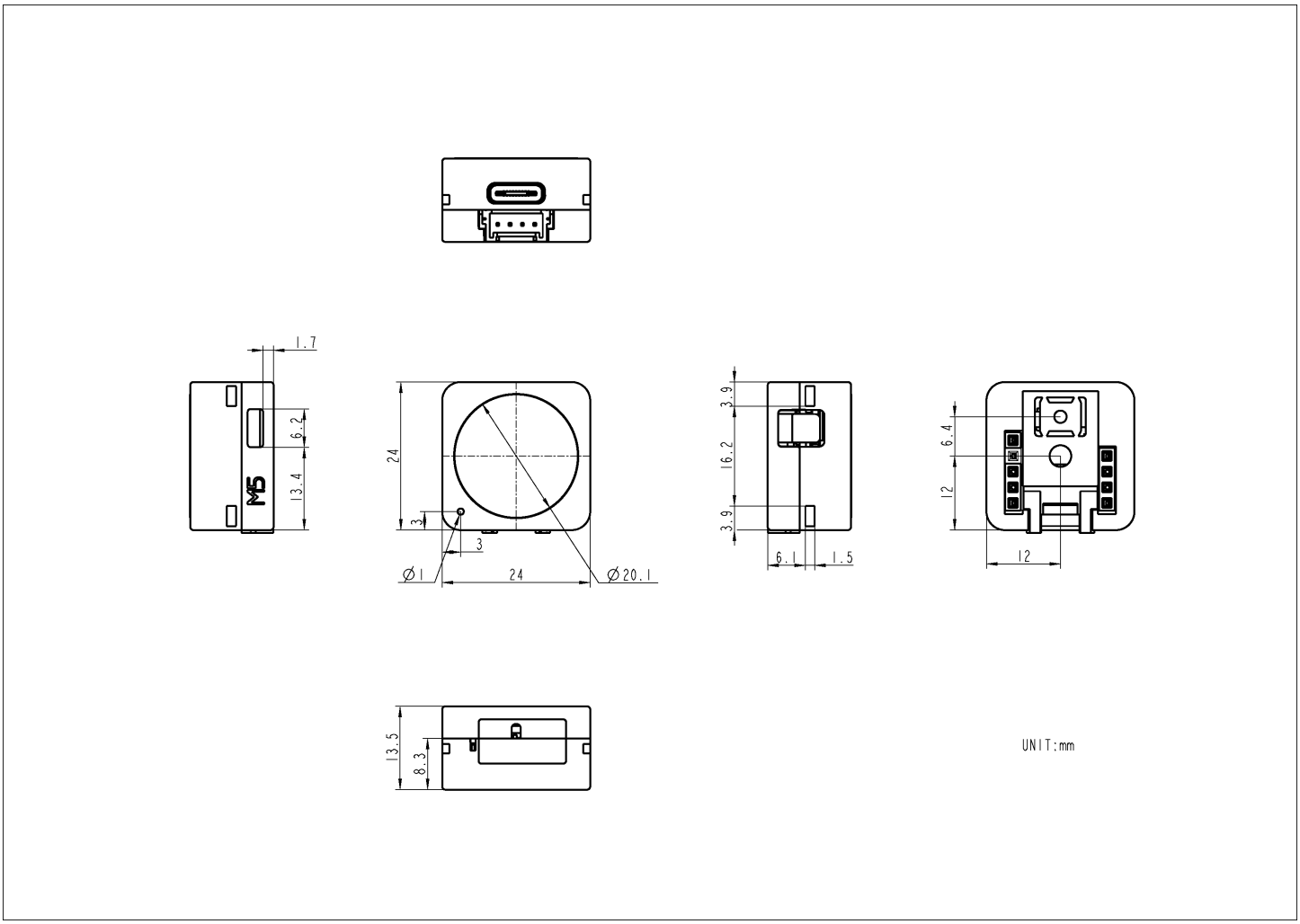
GC0308

GC0308	ESP32-S3-PICO-1-N8R8
CAM_SDA	G12
CAM_SCL	G9
VSYNC	G10
HREF	G14
Y9	G13
XCLK	G21
Y8	G11
Y7	G17
PCLK	G40
Y6	G4
Y2	G3
Y5	G48
Y3	G42
Y4	G46
POWER_N	G18

HY2.0-4P

HY2.0-4P	Black	Red	Yellow	White
PORT.CUSTOM	GND	5V	G2	G1

Model Size



Structure

- AtomS3R-CAM Structure Files

Datasheets

- ESP32-S3-PICO-1-N8R8
- GC0308
- BMI270
- BMM150

Softwares

Arduino

- AtomS3R-CAM Arduino Quick Start
- AtomS3R-CAM Arduino Network Camera Example

UiFlow2

- AtomS3R-CAM UiFlow2 Quick Start

PlatformIO

```
[env:m5stack-atoms3r]
platform = espressif32@6.7.0
board = esp32-s3-devkitc-1
framework = arduino
board_build.arduino.memory_type = qio_opi
build_flags =
    -DESP32S3
    -DBOARD_HAS_PSRAM
    -mfix-esp32-psram-cache-issue
    -DCORE_DEBUG_LEVEL=5
    -DARDUINO_USB_CDC_ON_BOOT=1
    -DARDUINO_USB_MODE=1
lib_deps =
    M5Unified=https://github.com/m5stack/M5Unified
```

ESP-IDF

- AtomS3R-CAM Factory Firmware

> **Factory Firmware Function**
>
> The factory firmware provides both `UVC` and `Wi-Fi video streaming` functions. The UVC mode allows direct PC connection and image preview via any camera application. For Wi-Fi streaming, connect to the AP "AtomS3R-CAM-WiFi" and open 192.168.4.1 in a browser to view the stream.

Easyloader

Easyloader	Download	Note
AtomS3R-CAM User Demo Easyloader	download	/

Video

Product Comparison

Product Compare		
	AtomS3R-M12	**AtomS3R-Cam**
Camera	**Image Sensor**: OV3660 **Max Frame Rate**: 30 fps **Output Formats**: RAW RGB, RGB565/555/444, CCIR656, YCbCr422, and compression **Aperture**: F2.4 **Resolution**: 3 MP (3 megapixels) **Focal Length**: 1.8 ± 5 % mm **Field of View (FOV)**: 120°	**Image Sensor**: GC0308 **Max Frame Rate**: 30 fps **Output Formats**: YCbCr4:2:2, RGB565, Raw Bayer **Aperture**: F2.6 **Resolution**: 0.3 MP (300 k pixels) **Sensor Size** (diagonal): 1/6.5'' **Focal Length**: 2.43 mm **Field of View (FOV)**: 57.6°
Resolution	3 MP	0.3 MP
Communication	Supports UVC and Wi-Fi	Supports UVC and Wi-Fi
SoC	ESP32-S3-PICO-1-N8R8	ESP32-S3-PICO-1-N8R8
Memory	8MB Flash + 8MB PSRAM	8MB Flash + 8MB PSRAM
Sensor	BMI270 + BMM150	BMI270 + BMM150
Antenna	Enhanced 3D antenna	Enhanced 3D antenna

To compare information on the Atom series products, you can visit the Product Selection Table, check the target products, and get the comparison results. The selection table covers key information such as core parameters and functional features, and supports comparison of multiple products simultaneously.