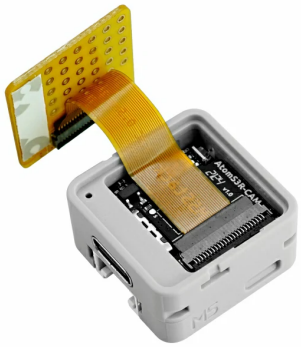
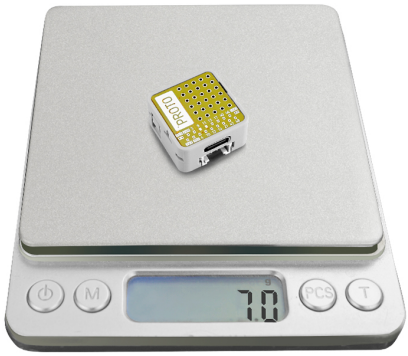
AtomS3R-Ext

SKU:C126-Ext





Description

AtomS3R-Ext is a programmable controller based on the ESP32-S3 main control, designed for prototype development and extension. It features a **universal expansion board** on top, allowing users to connect and debug multiple **IO** ports, suitable for expanding and verifying various peripheral modules. It integrates the **ESP32-S3-PICO-1-N8R8** main control, supports Wi-Fi functionality, and includes 8 MB of on-chip **Flash** and 8 MB of **PSRAM**, along with a power circuit converting 5V to **3.3V/2.8V/1.2V**. It has a built-in three-axis **BMM150** geomagnetic sensor and a six-axis **BMI270** attitude sensor. The controller is equipped with a **USB Type-C** interface for power supply and firmware download, and features a **HY2.0-4P** expansion port, six **GPIO** and power pins for easy function expansion. Compared to previous ATOM series host products, the **3D antenna** of **AtomS3R-Ext** has been enhanced, providing better signal performance and stability. With dimensions of only **24.0 x 24.0 x 12.0mm**, it is ideal for prototype development and verification applications in embedded smart devices.

Features

- Integrated ESP32-S3-PICO-1-N8R8 main control
- Nine-axis sensor system (BMI270 six-axis + BMM150 three-axis geomagnetic sensor)
- 8MB Flash and 8MB PSRAM
- Supports infrared transmission control function
- Expandable pins and interfaces
- Breadboard
- Development Platform
  - Arduino IDE
  - ESP-IDF
  - PlatformIO

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BMM150 Magnetic Field Interference

Products with magnets may interfere with the BMM150 magnetic field sensor, causing abnormal readings. When used with an M5 master control device containing a magnet, the magnet needs to be removed, and at the same time, the BMM150 sensor should be kept away from strong magnetic fields.

Includes

- 1 x AtomS3R-Ext

Applications

- Motion detection and orientation awareness
- Smart device control
- IoT applications

Specifications

Specification	Parameter
SoC	ESP32-S3-PICO-1-N8R8@Dual-core Xtensa LX7, up to 240MHz
USB	USB OTG, USB Serial/JTAG
Flash	8MB
PSRAM	8MB
Wi-Fi	2.4 GHz Wi-Fi
6-axis Attitude Sensor (BMI270)	Accuracy: 0.05% (acceleration), 0.05°/s (angular velocity) I2C @0x68
3-axis Geomagnetic Sensor (BMM150)	Accuracy: 0.3 μT Mounted on BMI270, magnetic data is obtained through BMI270
Infrared IR	Infrared emission distance: 12.46m at ∠180° (unobstructed)
Sleep Current	GPIO-5V power: DC 5V@11.63 uA Grove-5V power: DC 5V@10.75 uA USB-5V power: DC 5V@92.50 uA (including PD resistor loss)
Universal Expansion Board Spec	5 x 6@2.54mm
Bottom Reserved GPIO	G5/G6/G7/G8/G38/G39
Proto Board Reserved GPIO	G3/G4/G9/G10/G11/G12/G13/G14/G17/G21/G40/G42/G46/G48
Operating Temperature	0 ~ 40°C
Product Size	24.0 x 24.0 x 12.0mm
Product Weight	7.0g
Package Size	85.0 x 65.0 x 15.2mm
Gross Weight	13.6g

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Proto Board

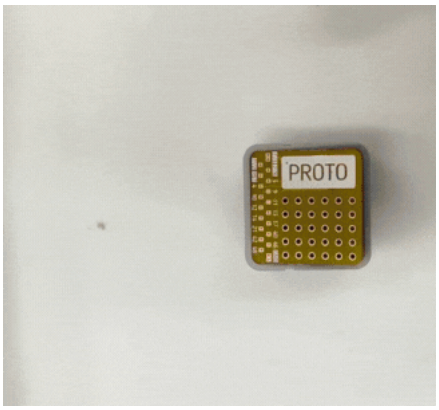
The top Proto Board is connected to the base main controller via an FPC ribbon cable. The sections marked by silkscreen are connected to the corresponding pins of the main controller, while the 5x6@2.54mm area is a user-defined soldering area with no circuit connections.

BMM150 Magnetic Interference

Products containing magnets may interfere with the BMM150 magnetic field sensor, resulting in abnormal readings. When used together with M5 main controller devices that contain magnets, the magnet must be removed, and the BMM150 sensor should be kept away from strong magnetic fields.

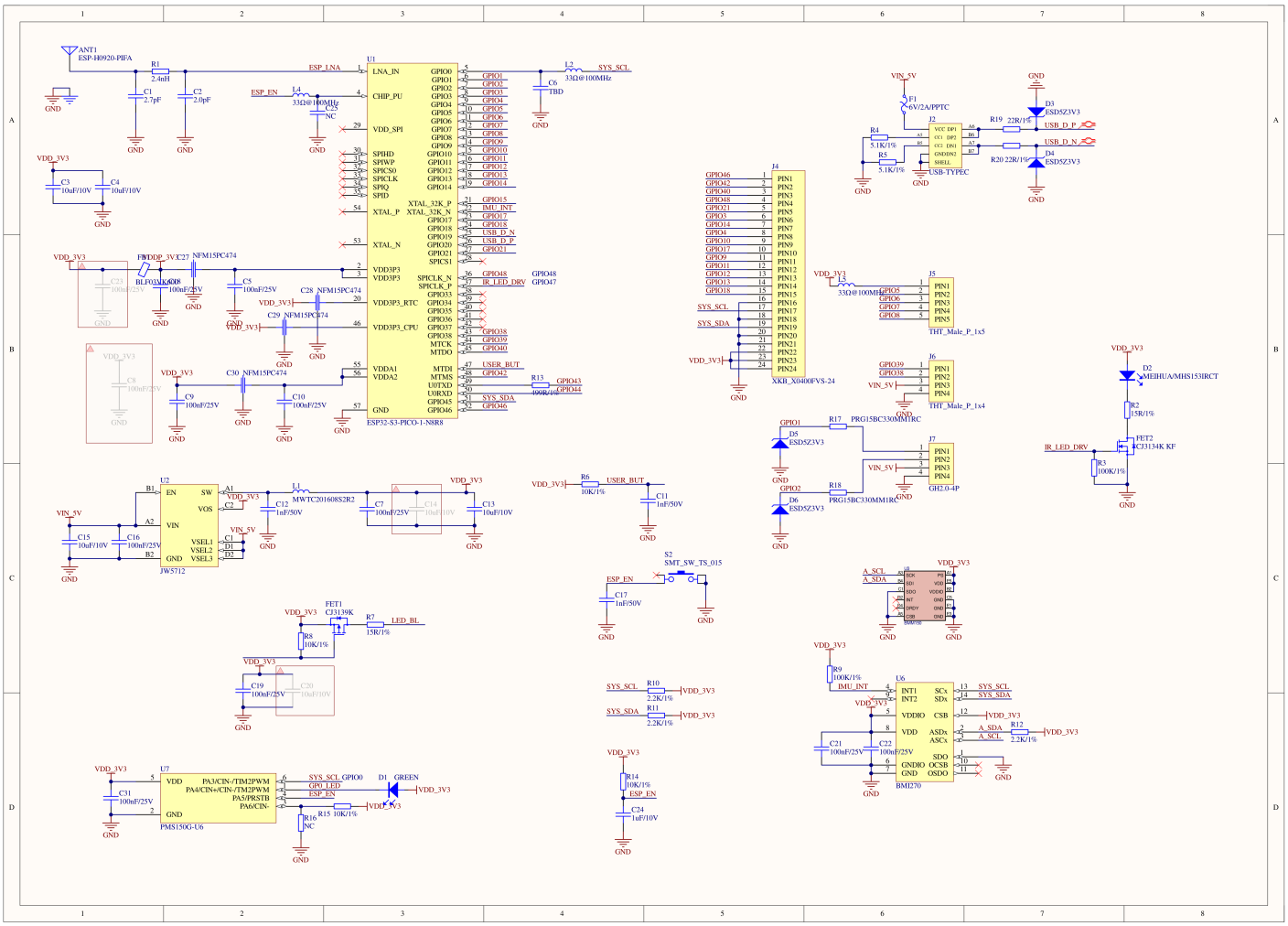
Enter Download Mode

To flash firmware, press and hold the reset button (about 2 seconds) until the internal green LED lights up, then release the button. The device will enter download mode and wait for flashing.

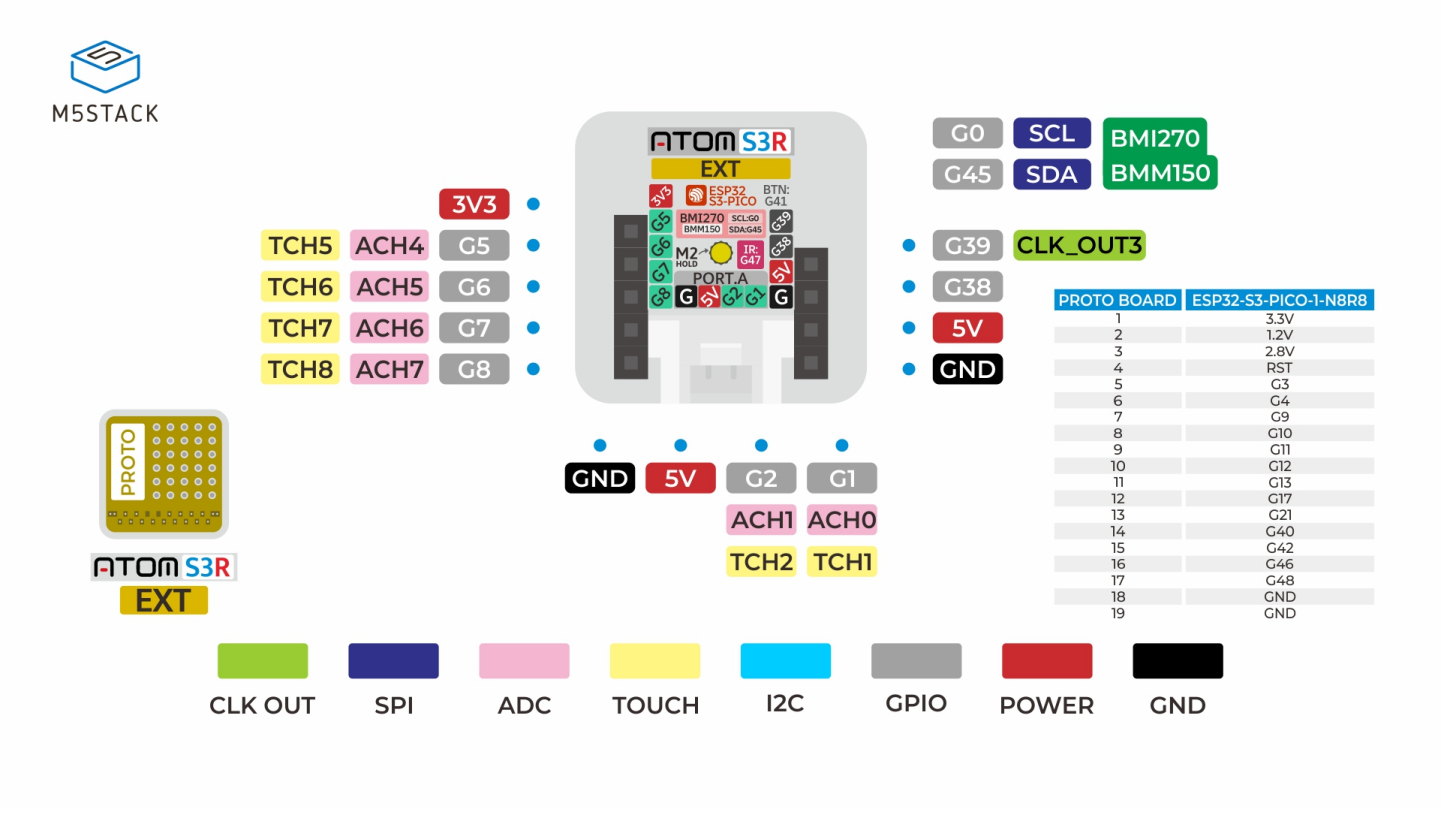


Schematics

- AtomS3R-Ext main board Schematics PDF
- AtomS3R-Ext ext board Schematics PDF


ANT1
ESP-H0920-PIFA
U1
ESP32-S3-PICO-1-N8R8
U2
JW5712
U7
PMS150G-U6
FPC1
FPC-0.5-24P
BTB1
X04000WVS-24-LPV01
U1
LP3992-12B5F
U2
WL2863E28-5/TR
U3
IMP809S/CN809S
Vout: 1.2V
Imax: 300mA
Vout: 2.8V
Imax: 250mA

PinMap



PROTO BOARD	ESP32-S3-PICO-1-N8R8
1	3.3V
2	1.2V
3	2.8V
4	RST
5	G3
6	G4
7	G9
8	G10
9	G11
10	G12
11	G13
12	G17
13	G21
14	G40
15	G42
16	G46
17	G48
18	GND
19	GND

BMI270 & IR & BUTTON

ESP32-S3-PICO-1-N8R8	G0	G45	G47	G41
BMI270	SYS_SCL	SYS_SDA		
IR			IR_LED_DRV	
BUTTON				USER_BUT

BMM150

BMI270	BMI270_ASDx	BMI270_ASCx
BMM150	A_SDA	A_SCL

BMM150 Mounted on BMI270

Integrating BMM150 via BMI270’ s Sensor Hub auxiliary I2C interface for unified 9-axis sensor data collection

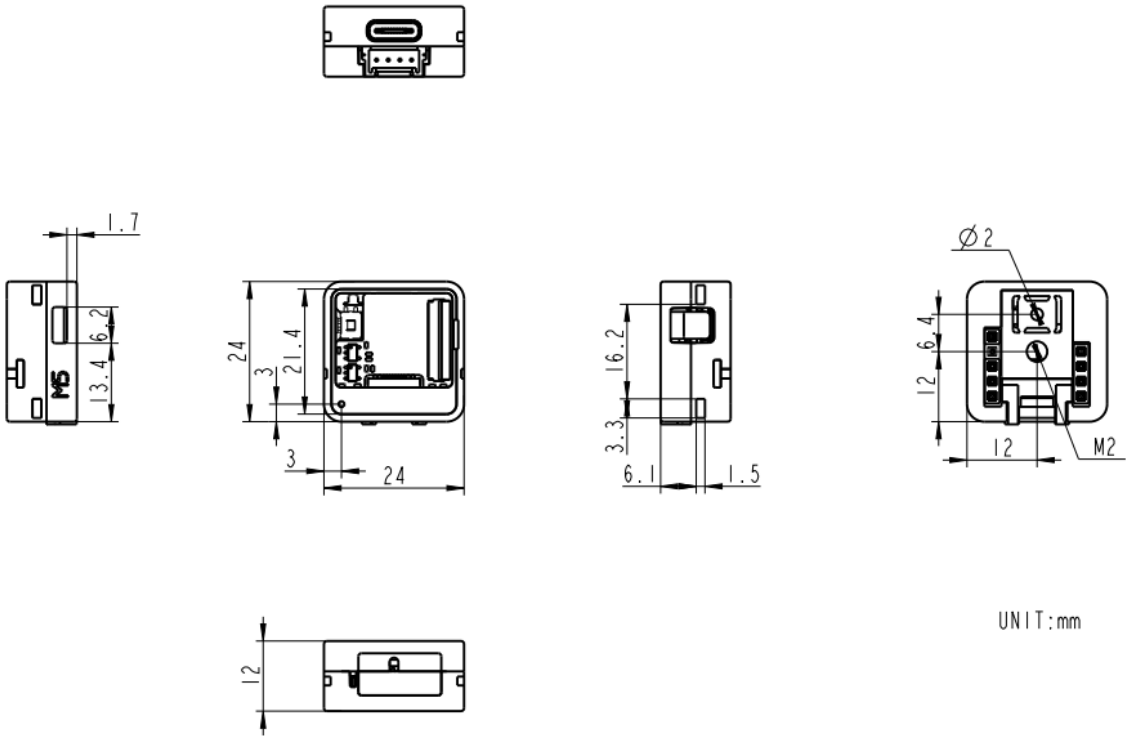
Proto Pin

Proto Board	ESP32-S3-PICO-1-N8R8
1	3.3V
2	1.2V
3	2.8V
4	RST
5	G3
6	G4
7	G9
8	G10
9	G11
10	G12
11	G13
12	G17
13	G21
14	G40
15	G42
16	G46
17	G48
18	GND
19	GND

HY2.0-4P

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

Model Size



PCB

- AtomS3R-Ext PcbDoc

Datasheets

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

Softwares

- AtomS3R-Ext Arduino Library

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
```

Video

- AtomS3R-Ext Product Introduction and Case Demonstration

AtomS3R-Ext-VIDEO.mp4

Product Comparison

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.