

AtomS3R-CAM AI Chatbot

SKU:K147-CAM





Description

AtomS3R-CAM AI Chatbot is an AI vision and voice development kit. The kit consists of two core parts: the controller and the voice base. The controller uses AtomS3R-CAM, which is built around the ESP32-S3 chip. It provides a large memory combination of 8MB Flash + 8MB PSRAM. It also integrates a 0.3MP GC0308 camera, a 9-axis IMU (BMI270 + BMM150), IR emitter tube, and other rich peripherals. The voice base uses the Atomic Echo Base, based on the ES8311 audio codec chip, capable of high-fidelity audio decoding and microphone and speaker driving. The kit supports integration with XiaoZhi Voice Assistant, OpenAI Voice Assistant, and Volcengine Voice Assistant, making it suitable for voice assistant, smart home, and other embedded scenarios.

Tutorial



Quick Start

This tutorial introduces how to build a personal voice assistant application using the AtomS3 series devices + Atomic Echo Base hardware combo by flashing the XiaoZhi Voice Assistant firmware with M5Burner.

Features

- Integrated ESP32-S3-PICO-1-N8R8 main controller

- 0.3MP GC0308 camera
- 9-axis sensor system
- 8MB Flash and 8MB PSRAM
- Integrated IR emitter tube
- Expandable pins and interfaces
- Full-duplex I2S voice
- 24-bit audio codec
- MEMS digital microphone
- Class D amplifier (8Ω @ 1W speaker)
- Development platforms:
 - ESP-IDF
 - PlatformIO
 - Arduino
 - UiFlow2

| Includes

- 1 x AtomS3R-CAM
- 1 x Atomic Echo Base

| Applications

- Voice Assistant
- Smart home

| Specifications

Specification	Parameter
SoC	ESP32-S3-PICO-1-N8R8 @ Dual-core Xtensa LX7 processor, up to 240MHz @ USB-OTG
Storage	8 MB Flash + 8 MB PSRAM
Wireless	Wi-Fi 2.4 GHz
Camera	GC0308, 0.3 MP, F2.6, 57.6° FOV
Infrared IR	180° emission angle, up to 12.46 m in unobstructed conditions
6-axis IMU (BMI270)	Accuracy: 0.05% (acceleration), 0.05°/s (angular rate) I2C address: 0x68
3-axis magnetometer (BMM150)	Accuracy: 0.3 μ T Mounted on BMI270, data accessed via BMI270
Expansion Interfaces	Bottom GPIO: G5/G6/G7/G8/G38/G39 and HY2.0-4P expansion port
Audio Codec	ES8311: 24-bit resolution, using I2S protocol
MEMS Microphone	MSM381A3729H9BPC, SNR: ≥ 65 dB
Power Amplifier	NS4150B: Class D amplifier
Speaker	2014 cavity speaker: 1W @ 8 Ω
Operating Temperature	0 ~ 40°C
Product Size	AtomS3R-CAM: 24.0 x 24.0 x 13.5 mm Atomic Echo Base: 24.0 x 24.0 x 14.14 mm
Product Weight	AtomS3R-CAM: 7.4g Atomic Echo Base: 6.3g
Package Size	120.0 x 65.0 x 16.0 mm
Package Weight	22.1 g

Learn

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.

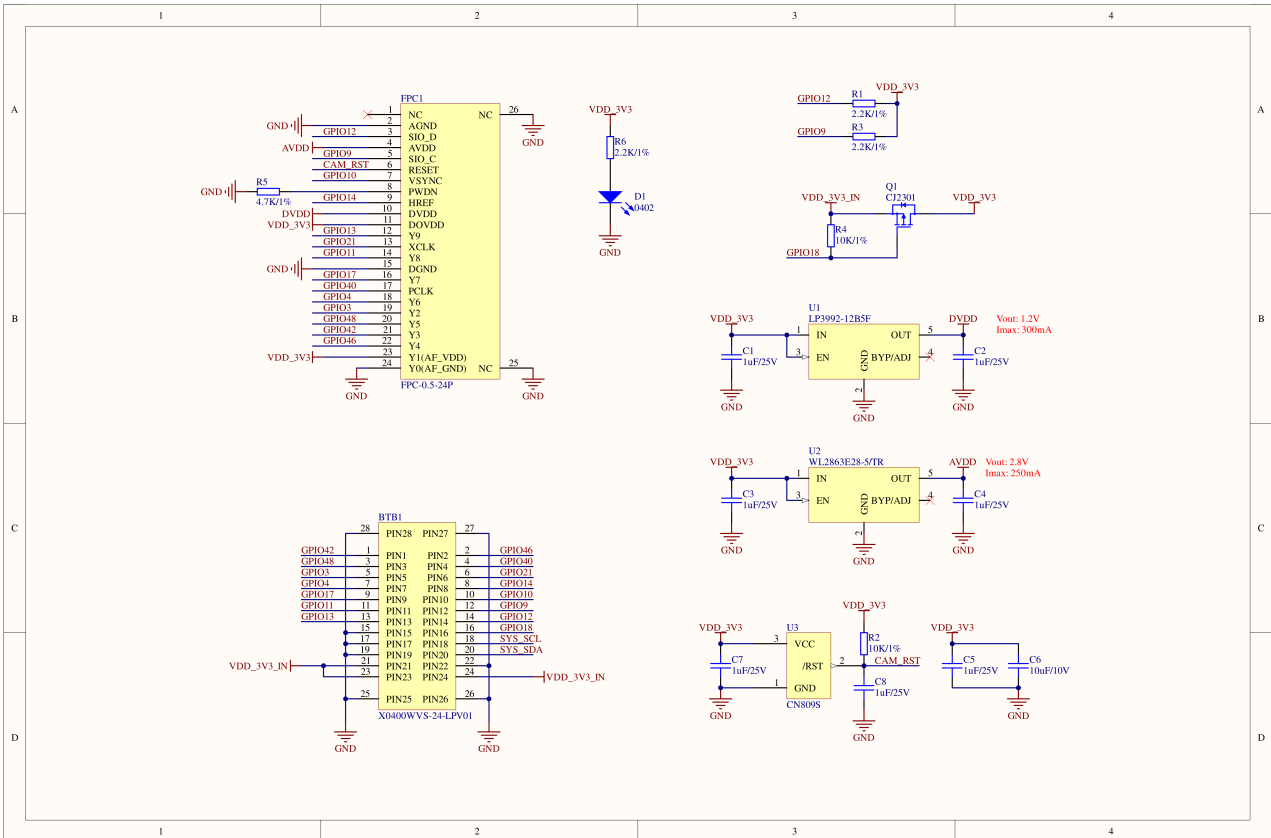
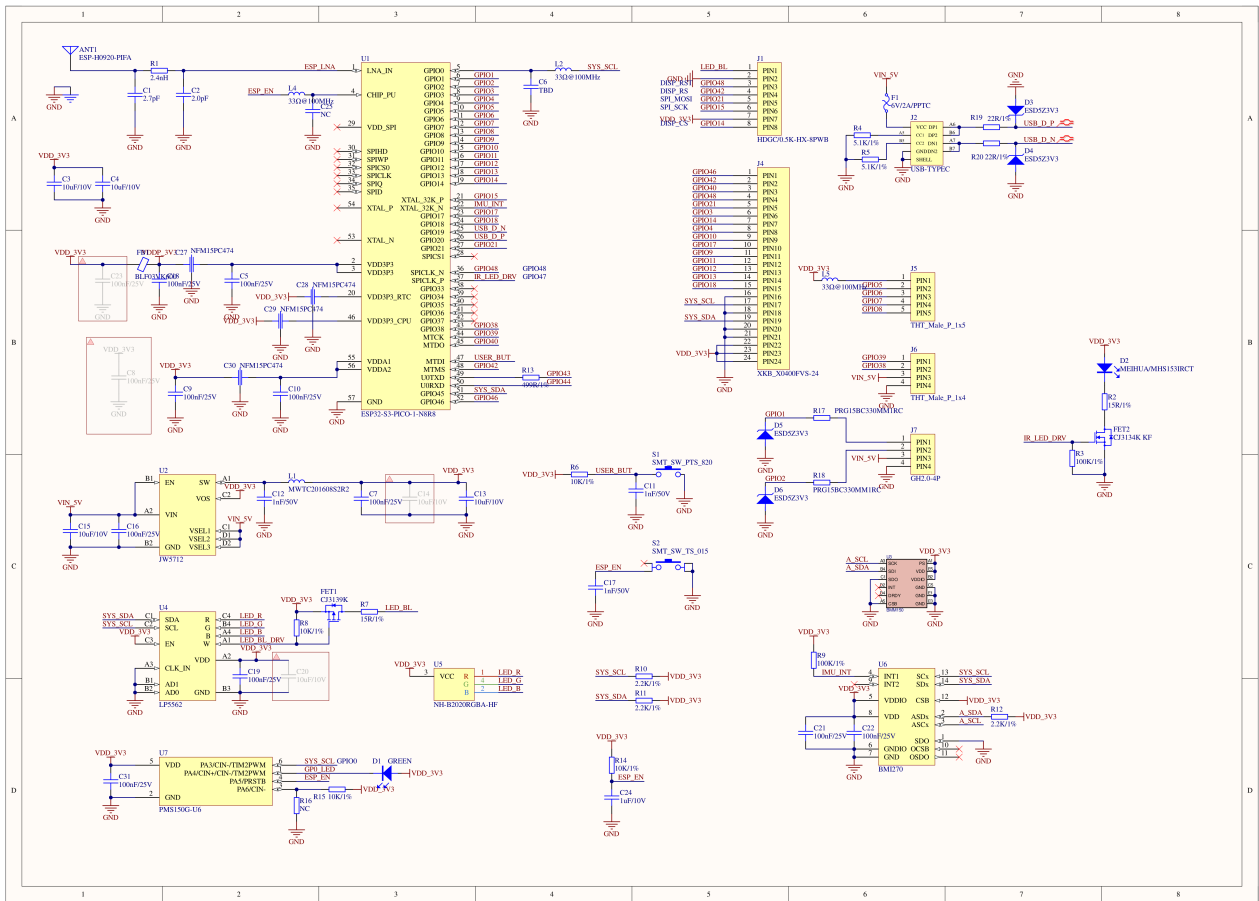
Download Mode

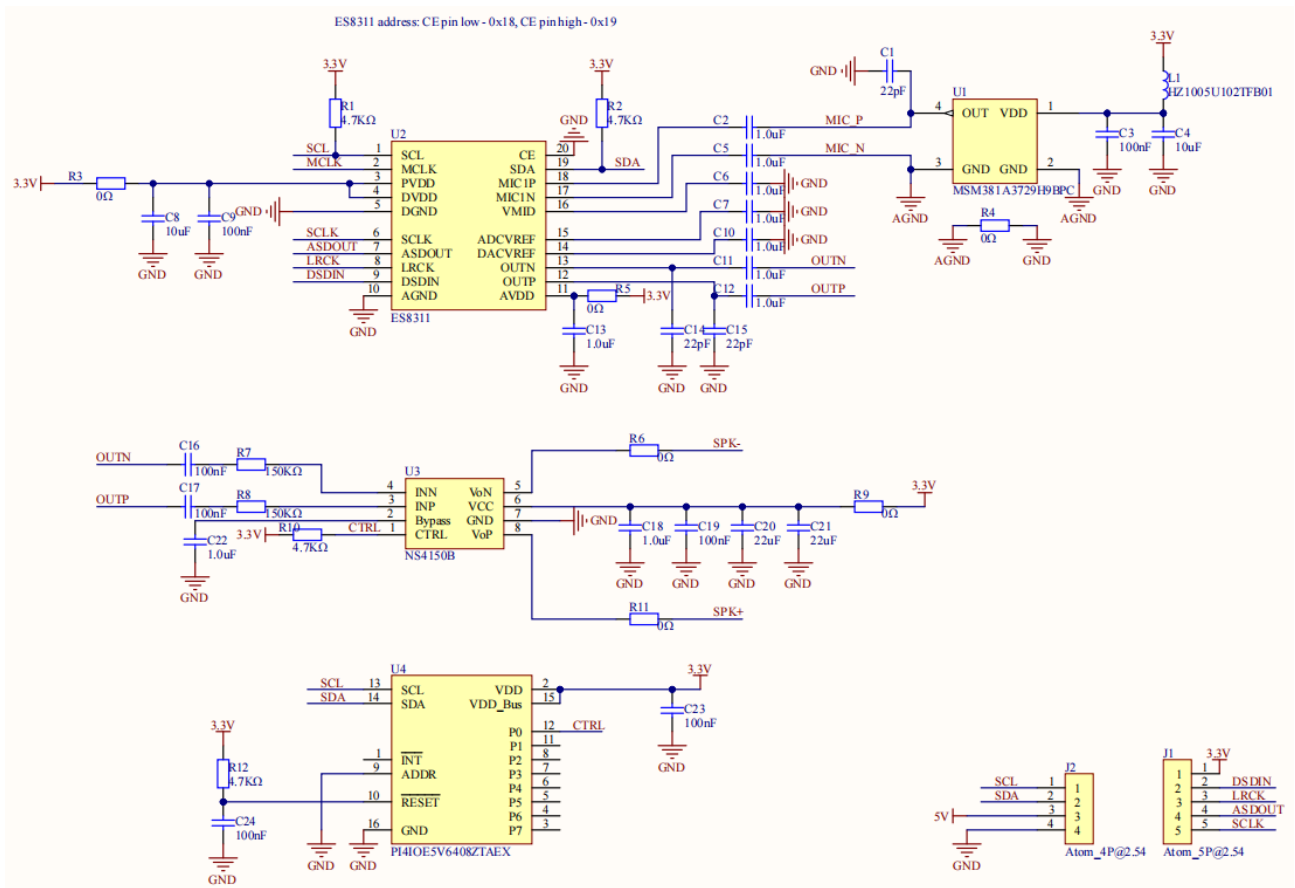
To flash firmware, press and hold the reset button for about 2 seconds until the internal green LED lights up, then release. The device will enter download mode and be ready for flashing.



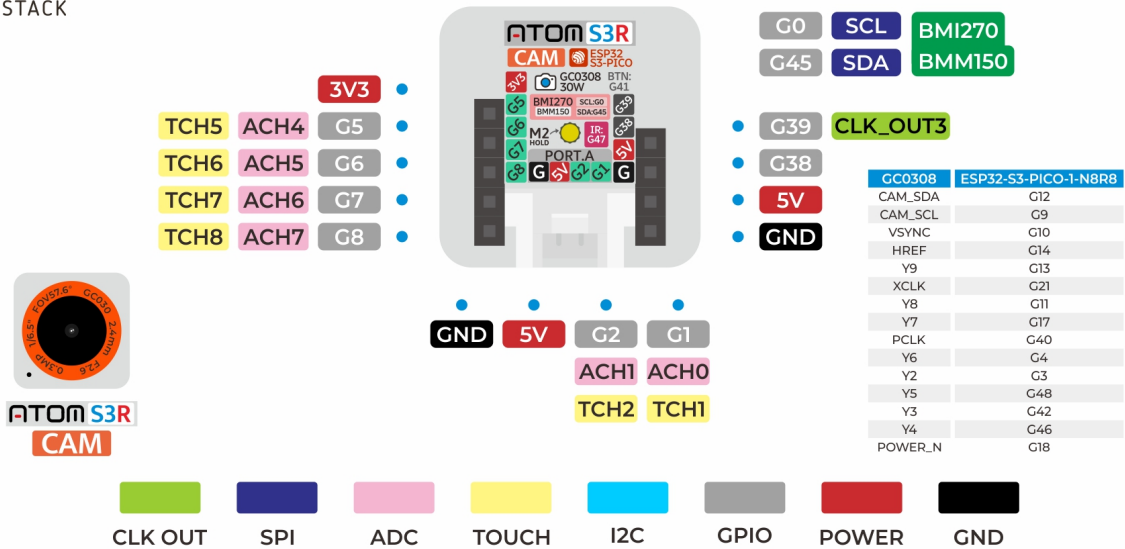
Schematics

- [AtomS3R-CAM main board schematic](#)
- [AtomS3R-CAM ext board schematic](#)
- [Atomic Echo Base schematic PDF](#)





PinMap



BMI270 & IR

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

| BMM150

BMI270	BMI270_ASDx	BMI270_ASCx
BMM150	A_SDA	A_SCL

BMM150 is mounted on the BMI270 and interfaced via the BMI270's Sensor Hub auxiliary I2C port for unified 9-axis sensor data acquisition.

| GC0308

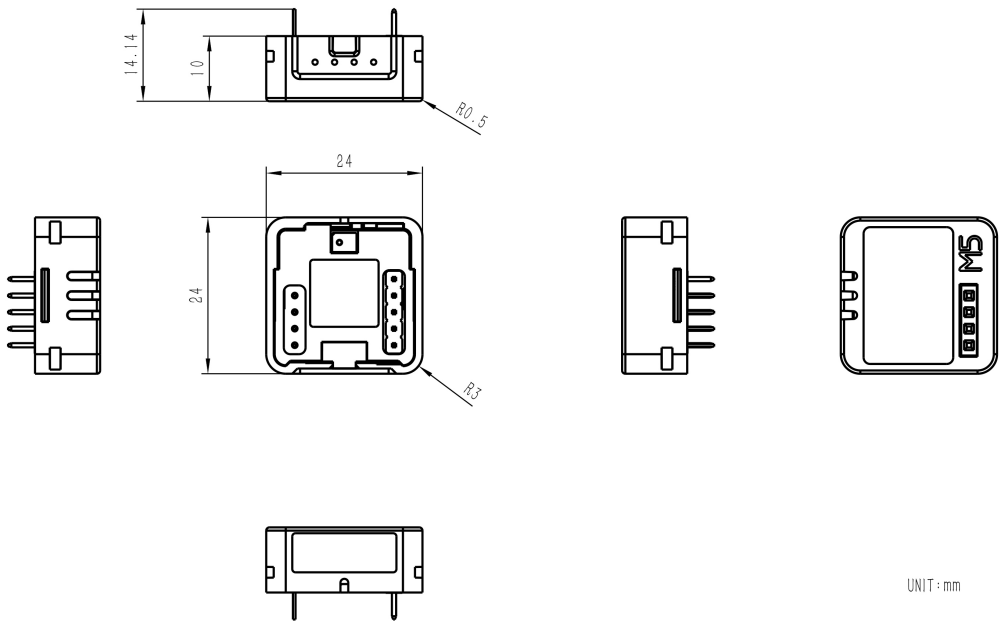
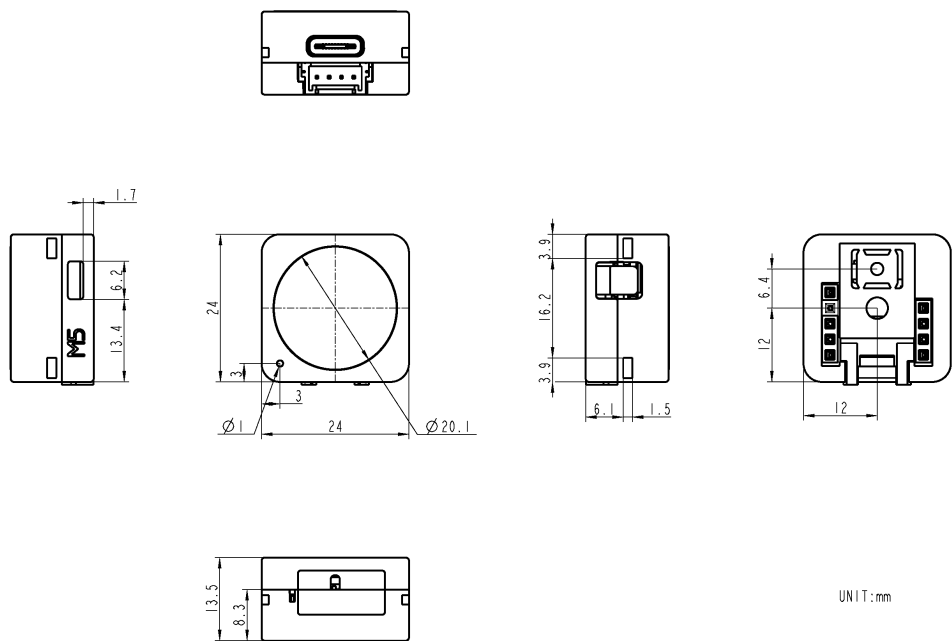
GC0308	ESP32-S3-PICO-1-N8R8
CAM_SDA	G12
CAM_SCL	G9
VSYNC	G10
HREF	G14
Y9	G13
XCLK	G21
Y8	G11
Y7	G17
PCLK	G40
Y6	G4
Y2	G3
Y5	G48
Y3	G42
Y4	G46
POWER_N	G18

HY2.0-4P

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

Atomic Echo Base

Atomic Echo Base	SCL	SDA	SD/DSDIN	WS/LRCK	ASDOUT	SCK/SCLK
AtomS3R CAM	G39	G38	G5	G6	G7	G8



| Datasheets

- [ESP32-S3-PICO-1-N8R8](#)
- [GC0308](#)
- [BMI270](#)
- [BMM150](#)
- [ES8311](#)
- [MEMS MIC](#)
- [NS4150B](#)

| Softwares

| Quick Start

- [Atomic Echo Base XiaoZhi Voice Assistant Guide](#)

| Arduino

- [Atomic Echo Base Arduino Library](#)
- [AtomS3R-CAM Network Camera Example](#)

| UiFlow2

- [Atomic Echo Base UiFlow2 Docs](#)

| ESP-IDF

- [Open RealtimeAPI Embedded SDK](#)

| 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
```


| Videos

- AtomS3R-CAM AI Chatbot Product Introduction and Demo Showcase

[K147-CAM-AtomS3R-CAM-AI-Chatbot_2.mp4](#)

- Atomic Echo Base Product Introduction

[Atomic Echo Base.mp4](#)