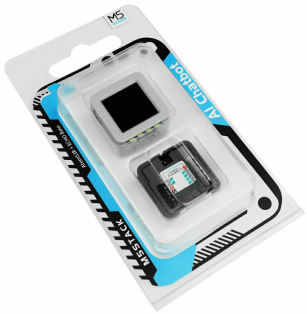
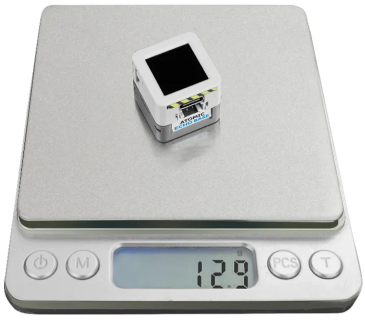
AtomS3R-AI Chatbot

SKU:K147





Description

AtomS3R-AI Chatbot is an AI voice development kit consisting of two core parts: a controller and a voice base.
The controller adopts AtomS3R, which is powered by the ESP32-S3 chip and provides a generous 8 MB Flash + 8 MB PSRAM memory combo. It also integrates a 9-axis IMU (BMI270 + BMM150), an IR transmitter, and other rich peripherals.
The voice base is the Atomic Echo Base, built on the ES8311 audio codec, delivering high-fidelity audio decoding together with microphone and speaker driving capability.

The kit supports multiple voice assistants such as XiaoZhi Voice Assistant, OpenAI Voice Assistant, and Volcano Engine Voice Assistant, enabling real-time voice interaction, custom wake-words, and low-latency recognition.

Tutorial

Atomic Echo Base OpenAI Voice Assistant

This tutorial introduces how to build a personal voice assistant application with the AtomS3R + Atomic Echo Base hardware combo by flashing the OpenAI Voice Assistant firmware using M5Burner.

AtomS3 / AtomS3R Series Smart Voice Assistant

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

Features

- Supports XiaoZhi Voice, OpenAI Voice Assistant, etc.
- AI speech recognition
- Cloud-edge collaboration & model management
- Integrated ESP32-S3 main controller
- 9-axis sensor system
- Edge AI inference
- 8 MB Flash and 8 MB PSRAM
- IR transmitter control capability
- Expandable pins and interfaces
- Full-duplex I2S audio
- 24-bit audio codec
- MEMS digital microphone
- Class-D amplifier (8 Ω @ 1 W speaker)
- Development Platform
  - ESP-IDF
  - PlatformIO
  - Arduino
  - UiFlow2

Includes

- 1 x AtomS3R
- 1 x Atomic Echo Base

Applications

- Voice assistant
- Smart home

Specifications

Specification	Parameter
SoC	ESP32-S3-PICO-1-N8R8, dual-core Xtensa LX7 @ 240 MHz, USB-OTG
PSRAM	8 MB
Flash	8 MB
TFT Driver	GC9107
Color IPS Resolution	128 x 128
6-Axis IMU (BMI270)	Accuracy: 0.05 % (accel), 0.05 °/s (gyro) I2C Addr: 0x68
3-Axis Magnetometer (BMM150)	Accuracy: 0.3 μT, mounted on BMI270, magnetometer data acquired via BMI270
IR	12.46 m transmitting distance @ 180° (unobstructed)
Expansion Interface	Bottom GPIO: G5/G6/G7/G8/G38/G39 and HY2.0-4P port
Audio Codec	ES8311: 24-bit resolution, I2S protocol
MEMS Microphone	MSM381A3729H9BPC, SNR ≥ 65 dB
Power Amplifier	NS4150B, Class-D
Speaker	2014 cavity speaker: 1 W @ 8 Ω
Operating Temperature	0 ~ 40 °C
Product Size	AtomS3R: 24.0 x 24.0 x 12.9mm Atomic Echo Base: 24.0 x 24.0 x 14.14mm
Product Weight	AtomS3R: 6.6g Atomic Echo Base: 6.3g
Package Size	120.0 x 65.0 x 16.0mm
Gross Weight	21.6g

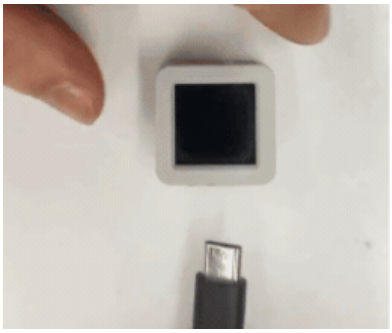
Learn

BMM150 Magnetic Interference

Products with magnets may interfere with the BMM150 magnetic sensor, causing abnormal readings. When used with M5 controllers that contain magnets, remove the magnets and avoid placing the BMM150 near strong magnetic fields.

Download Mode

To flash firmware, press and hold the reset button for about 2 s until the internal green LED lights up, then release. The device is now in download mode and ready for flashing.

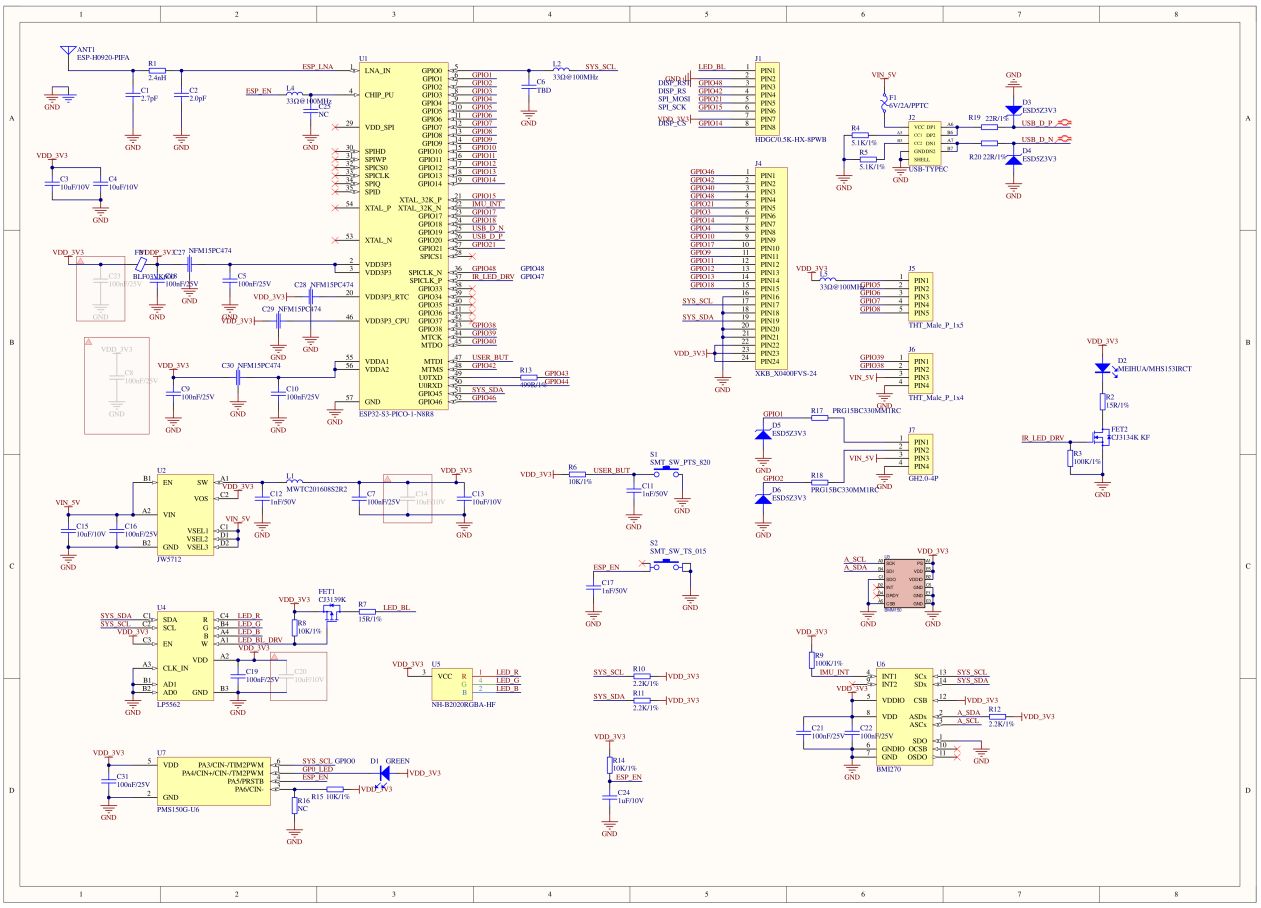


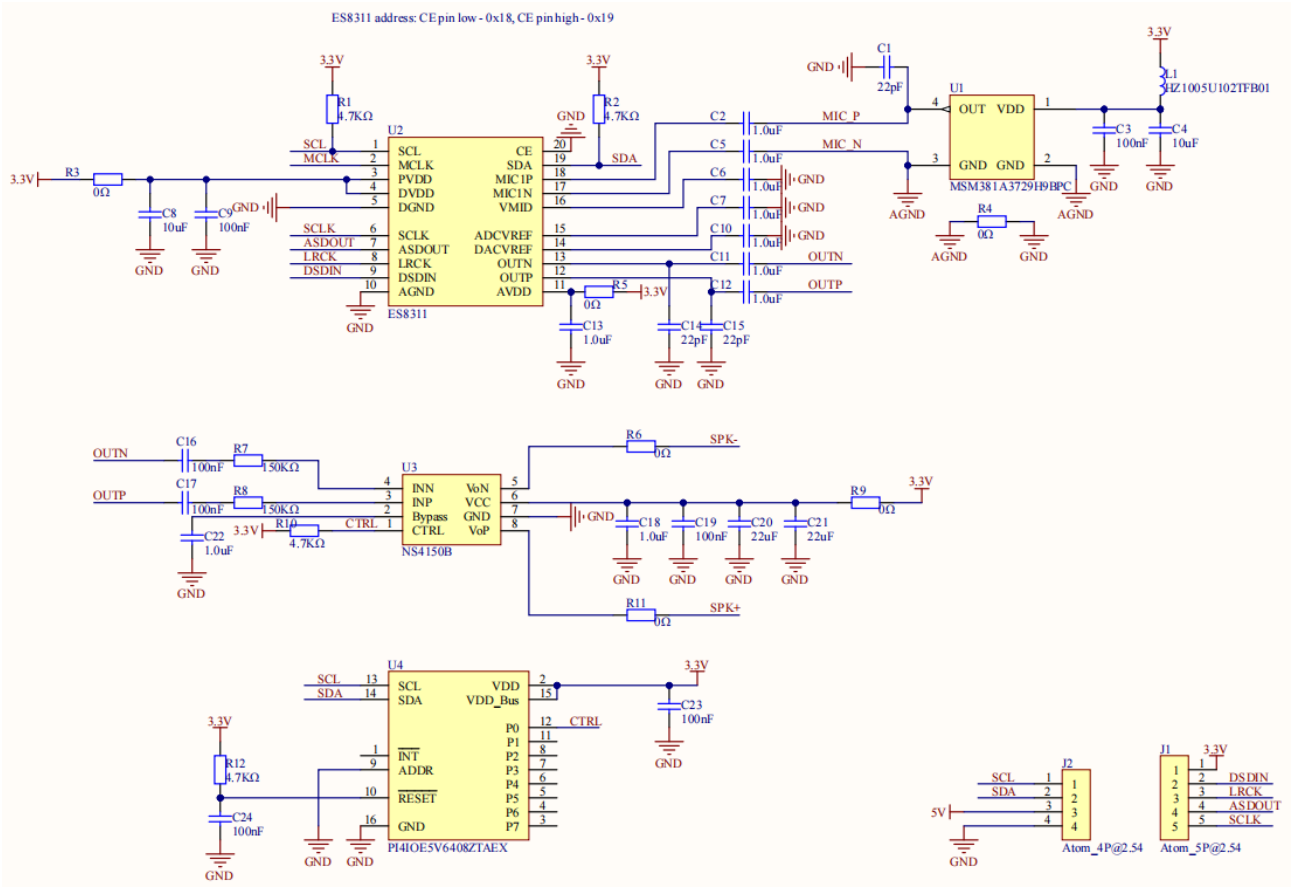
Note

When controlling the LCD back-light, a PWM frequency of 500 Hz is recommended.

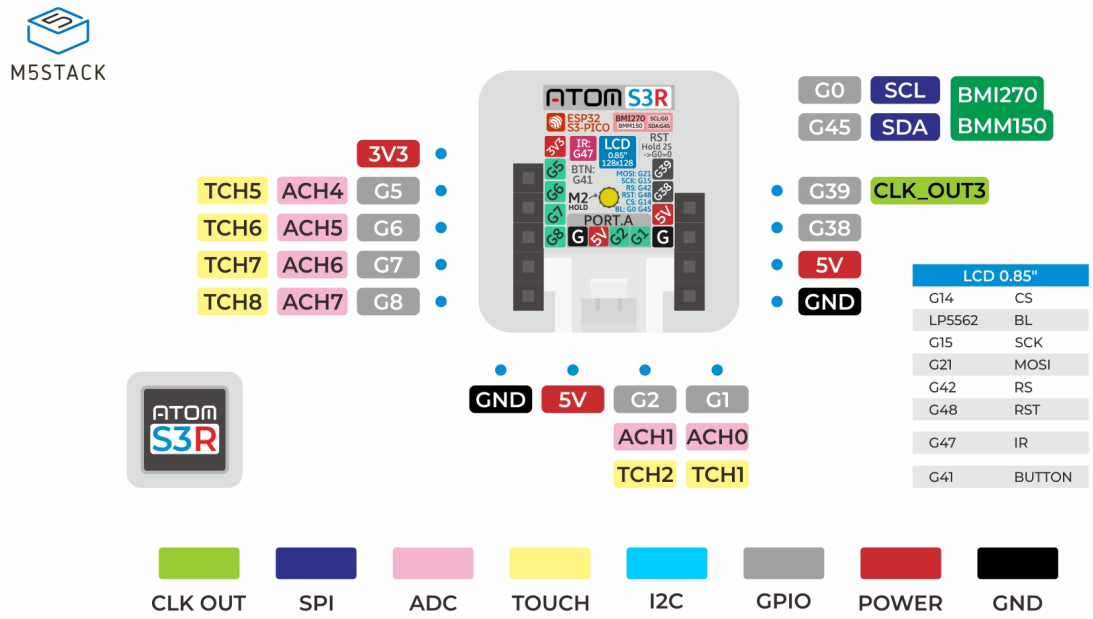
Schematics

- AtomS3R Schematics PDF
- Atomic Echo Base Schematics PDF




ES8311 address: CE pin low - 0x18, CE pin high - 0x19
ES8311
MSM381A3729H9BPC
NS4150B
PI4IOE5V6408ZTAEX
Atom_4P@2.54
Atom_5P@2.54

PinMap



RGB & BMI270 & IR & BUTTON

ESP32-S3-PICO-1-N8R8	G0	G45	G47	G41
LP5562 (RGB Controller)	SYS_SCL	SYS_SDA		
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

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

SCREEN

ESP32-S3-PICO-1-N8R8	LP5562_W	G48	G42	G21	G15	G14
0.85-Inch IPS	LCD_BL	DISP_RST	DISP_RS	SPI_MOSI	SPI_SCK	DISP_CS

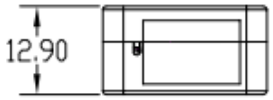
HY2.0-4P

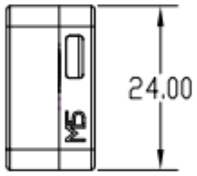
HY2.0-4P	Black	Red	Yellow	White
PORT.CUSTOM	GND	5V	G2	G1

Atomic Echo Base

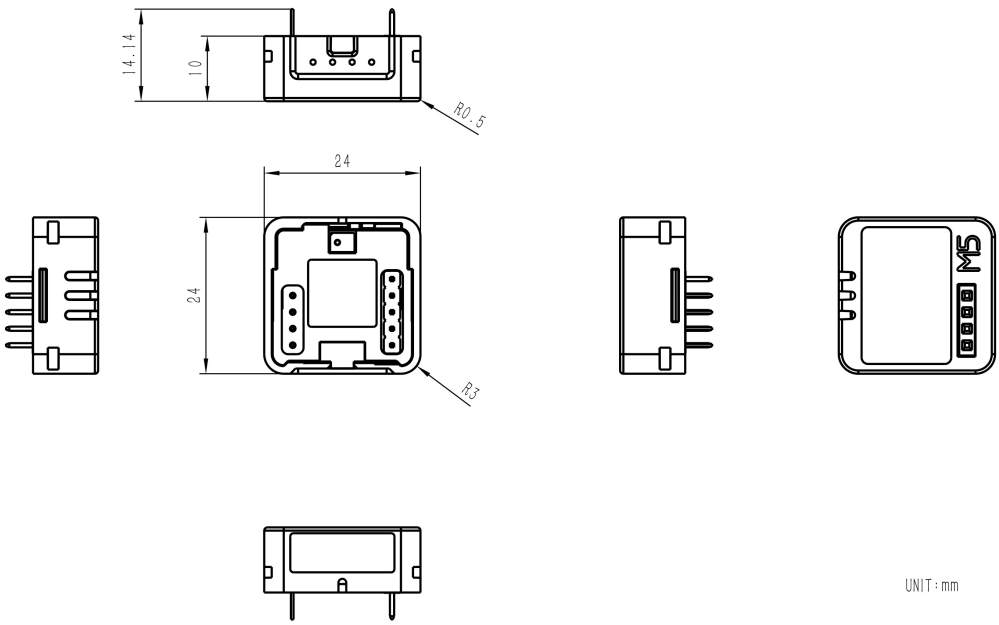
Atomic Echo Base	SCL	SDA	SD/DSDIN	WS/LRCK	ASDOUT	SCK/SCLK
AtomS3R	G39	G38	G5	G6	G7	G8

Model Size





UNIT:mm



Datasheets

- ESP32-S3-PICO-1-N8R8
- BMI270
- BMM150
- ES8311
- MEMS MIC
- NS4150B

Softwares

Quick Start

- OpenAI Voice Assistant For AtomS3R + Atomic Echo Base Guide
- XiaoZhi Voice Assistant For AtomS3R + Atomic Echo Base Guide

Arduino

- Atomic Echo Base Arduino Library

UiFlow2

- Atomic Echo Base UiFlow2 Docs

ESP-IDF

- Open RealtimeAPI Embedded SDK

Video

- AtomS3R-AI Chatbot Product Introduction and Demo

K147-AtomS3R-AI-Chatbot_video.mp4

- OpenAI Voice Assistant For AtomS3R + Atomic Echo Base

OpenAI Voice Assistant For AtomS3R.mp4