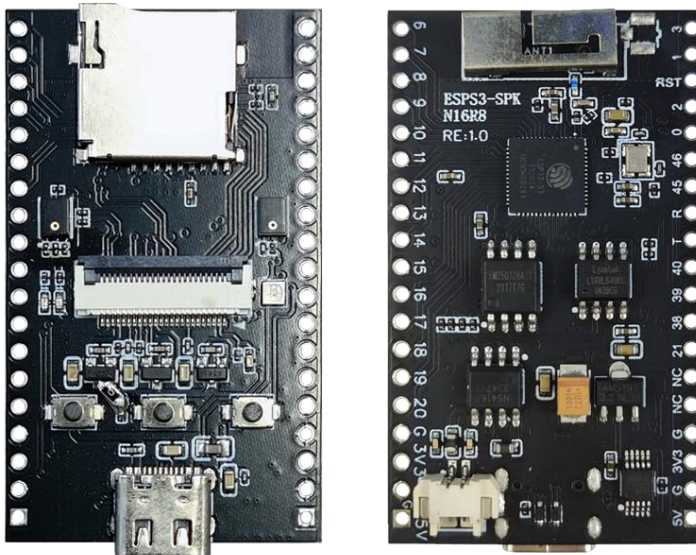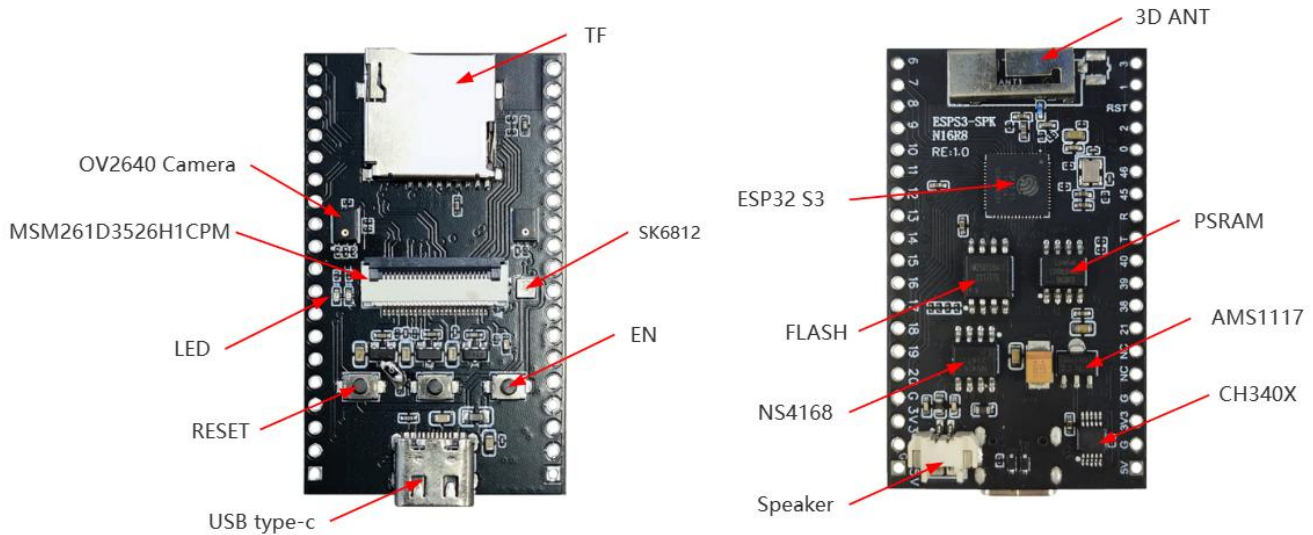# ESP32-S3 SPK

product specification

Features：

　　The ESP32-S3 SPK is a feature-rich, compact and portable iot development board.The development version is powered by a 240 MHz Tensilica Xtensa LX7 COMF processor, MSM261D3526H1CPM microphone and NS4168 power amplifier for recording and playback, and 16M flash for storing program code and data, as well as external flash memory and external 8M PSRAM extensions, to meet greater capacity storage requirements. Support Wi-Fi and Bluetooth communication, provides rich peripheral interfaces, including multiple general serial buses (SPI, I2C, UART), GPIO pins, ADC, DAC. These interfaces can be used to connect various sensors, actuators, and external devices. This development version supports programming using the Arduino development environment, and also provides an ESP-IDF development framework for lower-level programming and system debugging. Suitable for use in prototyping and rapid development of a variety of IoT applications.

Module hardware layout

Functions Overview

MCU : ESP32-S3	The Xtensa® 32LX7 dual-core processor has its frequency adjustable between 20 and 40 MHz. It integrates 2.4GHz Wi-Fi and Bluetooth dual-mode. With a 40-nanometer manufacturing process, it internally integrates 512KB of RAM and 384KB of ROM storage space (used for program startup and core function calls). The FLASH supports peripherals such as SPI, Dual SPI, Quad SPI, and Octal SPI as well as RAM.
USB : CH340X	1.Automatic download circuit, with E8051 kernel compatible with MCS51 instruction set, the average instruction speed is 8~15 times faster than the standard MCS 51. 2.ESP32-CAM module uses CH340X to achieve automatic download circuit, with USB can easily write and debug ESP 32.
MSM261D3526H1CPM	It is equipped with a 24-bit I2S interface, featuring PDM digital output mode and a flexible signal processing architecture. It supports independent use (only analog output) or deep integration with digital systems (via I2S/PDM), adapting to diverse application scenarios such as smart speakers and IoT devices.

	digital signal by codec ADC and coding for audio processing by the main control chip.
TF card slot.	1.The module onboard TF card slot can be compatible with most standard TF cards on the market, up to 16GB, with the camera can achieve photography, storage and other functions.
SK6812-EC20	1. The SK6812-EC20 is a digital programmable color LED that integrates LED and control circuits. It uses the surface mount technology (SMD) packaging, with a small size and reliable performance. The SK6812-EC20 LED is a digitally programmable RGB LED.
OV2640 Camera	1.Provide the full functionality of the single-chip JXGA (1632x1232) camera and image processor, and the YUV (422 / 420) / YCbCr422 via the serial camera control bus(SCCB) interface. The best image distance is 20 – 250CM.
TYPE-C 16PIN 2MD	1.Electric connector for Type-C interface devices with high-speed transmission, reversible plugging and multi-function expansion. Among them, USB2 and CH340 connection automatic download. The USB1 is connected to the ESP32-S3 chip.
NS4168	NS4168 Is a support for I2S digital audio signal input, output with anti-distortion function, 2.5W mono class D audio power amplifier.

Operating Principle

Output Model Category: Digital sensor	How it works: Biosensors
Sensor Category: Optical sensor	Working current: 0.15A Working voltage: 5V

Support Software Development

C++ / Esp-IDF / Ardiuno-IDE / Vscode

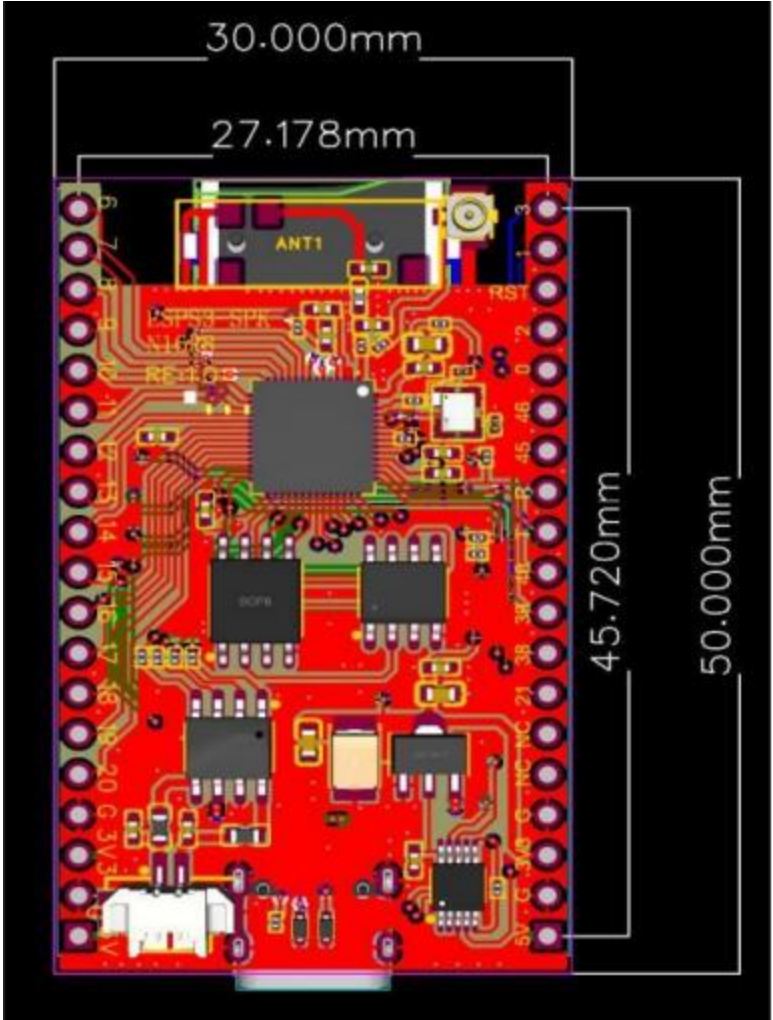| Module application scenarios |
|---|
| Second development of monitoring, video, photography and other Aolt applications |
| Low cost camera solution |
| Iot node devices |

Size	
Length	50.00mm
width	30.00mm

Module size diagram

Unit: mm

Document Update Record

Version	Time	Mark
V1.0	2024-02-26	first release