User’s Manual

Louder-ESP32

(TD-ESP-AUDIO-LOUDER)

Louder-ESP32S3

(TD-ESP-AUDIO-LOUDER-S3)

Loud-ESP32

(TD-ESP-AUDIO-LOUD)

Loud-ESP32S3

(TD-ESP-AUDIO-LOUD-S3)

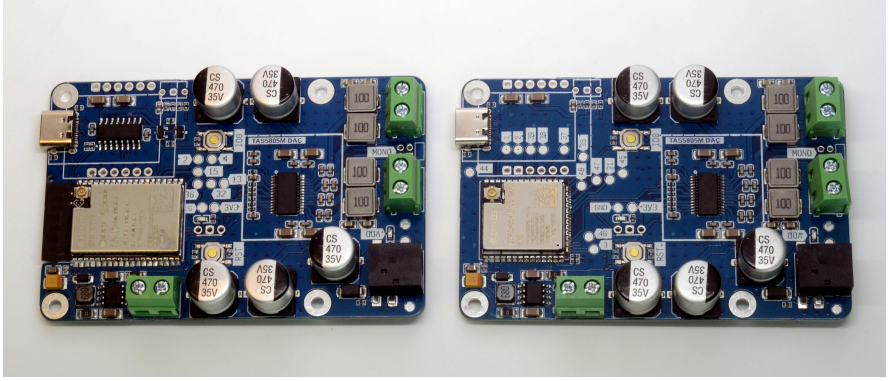
HiFi-ESP32

(TD-ESP-AUDIO-HIFI)

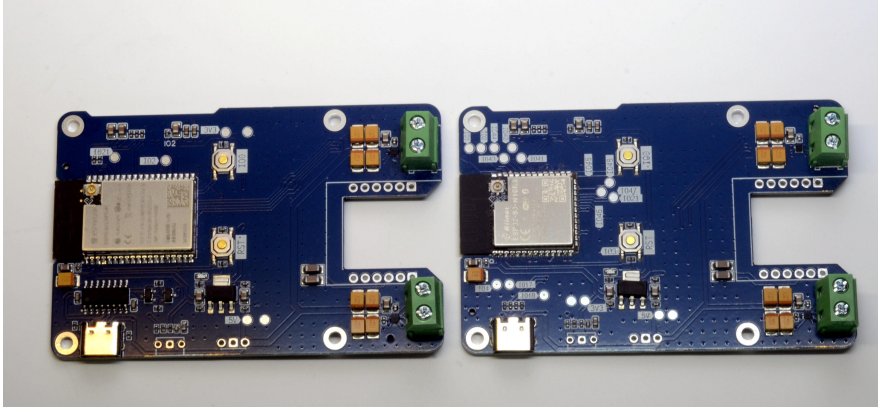
HiFi-ESP32S3

(TD-ESP-AUDIO-HIFI-S3)

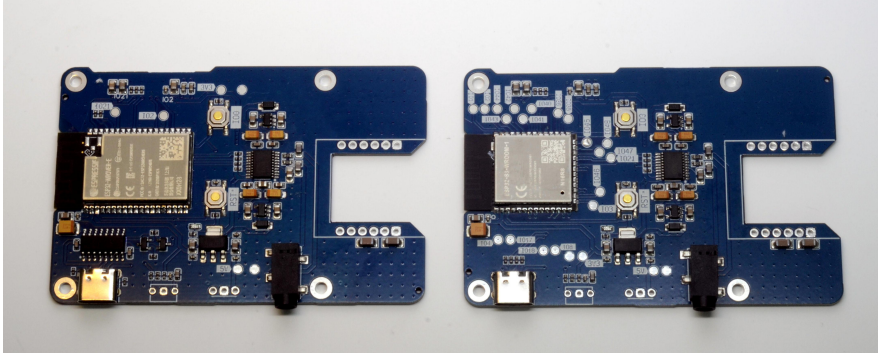
Louder-ESP32 and Louder-ESP32S3



Loud-ESP32 and Loud-ESP32S3



HiFi-ESP32 and HiFi-ESP32S3



https://sonocotta.com/

https://github.com/sonocotta/esp32-audio-dock

Core Features

MCU Core

- ESP32 Dual Core 32-bit LX6/LX7 microprocessor running at 240 MHz
- 16MB (Louder) of flash storage
- 8MB of PSRAM
- CH340 Serial communication/ Flashing chip (except S3)

Audio capabilities (HiFi-ESP32)

- [PCM5100A] 32-bit Stereo DAC (with -100 dB typical noise level)
- 2.1 VRMS Line-level stereo output 3.5 mm jack
- Powered by 2x [LP5907] 3.3 V Ultra-Low-Noise LDO

Audio capabilities (Loud-ESP32)

- Dual I²S DAC [MAX98357] with built-in D-Class amp
- 2x 3W (8Ω)
- 2x 5W (4Ω)
- Powered by 5V sources from USB port (Consuming up to 2A)

Audio capabilities (Louder-ESP32)

- Stereo I2S DAC TAS5805M with built in D-Class amp
- 2x 22W (8Ω, 1% THD+N)
- 2x 32W (4Ω, 1% THD+N)
- 1x 45W (4Ω, 1% THD+N) in bridged mode

Peripheral

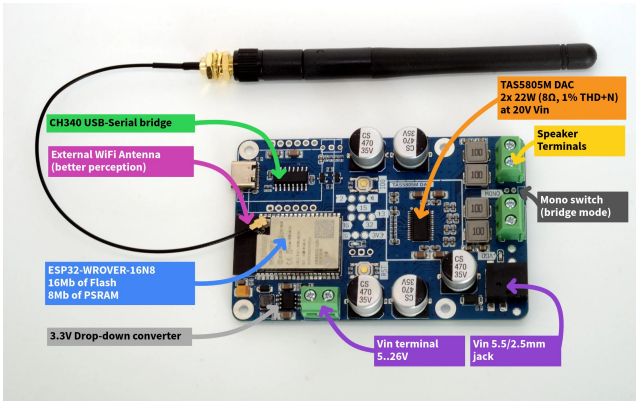
- Wi-Fi: 802.11 b/g/n
- Bluetooth: v4.2 (ESP32) and Bluetooth 5 (LE) (ESP32-S3)
- External 2.4G Antenna for better perception
- IR reader header (optional via header)
- RGB led header (optional via header)
- Wiznet W5500 SPI Ethernet (optional via header)
- SSD1306 128x64 OLED screen connector (soldering required, screen is not included)

Other

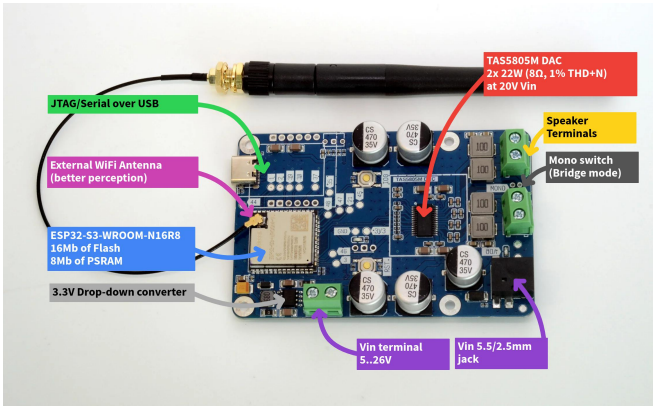
- RESET and GPIO0 (FLASH) buttons
- 80 x 50 x 20mm Alu case (HiFi and Loud)
- 85.6 mm x 56.5 mm compatible with Raspberry Pi 3/4 case

Product Images: Louder-ESP32

ESP32

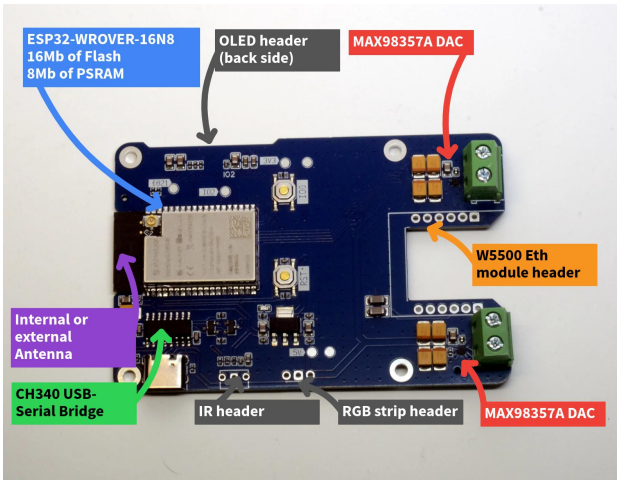


ESP32-S3

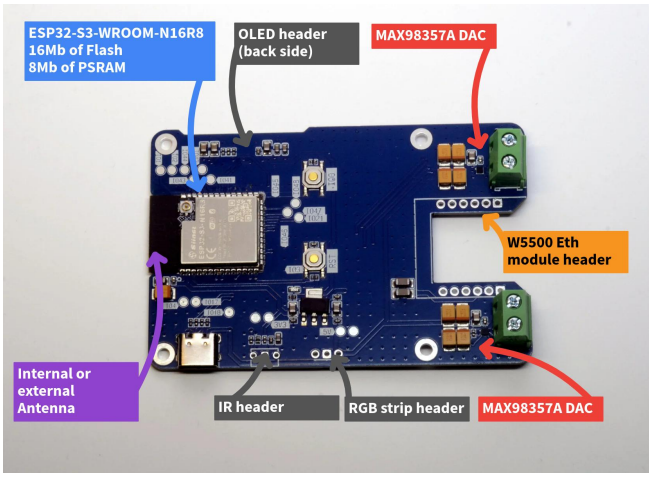


Product Images: Loud-ESP32

ESP32

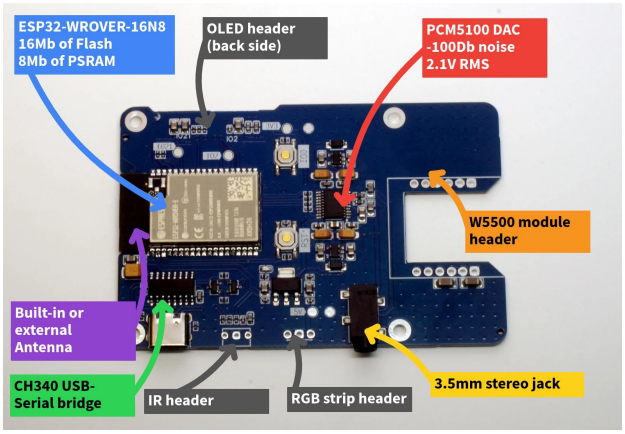


ESP32-S3

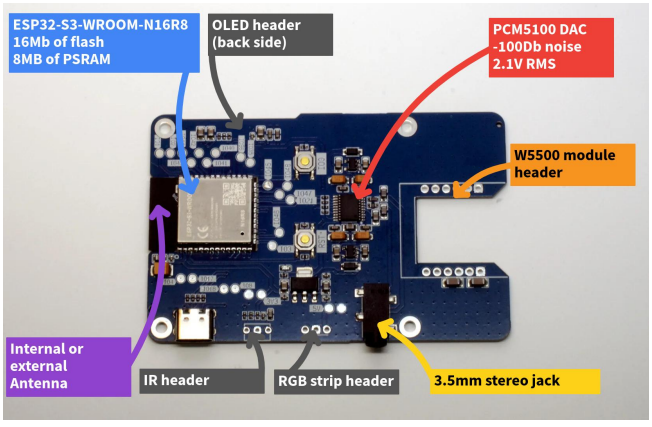


Product Images: HiFi-ESP32

ESP32



ESP32-S3



Pin Definitions

HiFi-ESP32

	I2S CLK	I2S DATA	I2S WS	PSRAM RESERVED
ESP32	26	22	25	16, 17
ESP32-S3	14	16	15	35, 36, 37

Loud-ESP32

	I2S CLK	I2S DATA	I2S WS	DAC EN	PSRAM RESERVED
ESP32	26	22	25	13	16, 17
ESP32-S3	14	16	15	8	35, 36, 37

Louder-ESP32

	I2S CLK	I2S DATA	I2S WS	PSRAM RESERVED	TAS5805 SDA	TAS5805 SCL	TAS5805 PWDN	TAS5805 FAULT
ESP32	26	22	25	16, 1	21	27	33	34
ESP32-S3	14	16	15	35, 36, 37	8	9	17	18

Ethernet (all boards)

	SPI CLK	SPI MOSI	SPI MISO	SPI CS	SPI HOST/SPEED	ETH INT	ETH RST
ESP32	18	23	19	05	2/20MHz	35	14
ESP32-S3	12	11	13	10	SPI2/20MHz	6	5

Optional peripheral (all boards)

	IR IN	RGB OUT	OLED SPI HOST/SPEED	OLED SPI CLK	OLED SPI MOSI	OLED SPI MISO	OLED SPI CS	OLED SPI DC	OLED RST
ESP32	39	12	2/20MHz	18	23	19	15	4	32
ESP32-S3	7	9	SPI2/20MHz	12	11	13	39	(37)	38

Software

Squeezelite-ESP32

Squeezelite-ESP32 is a multimedia software suite, that started as a renderer (or player) of LMS (Logitech Media Server). Now it is extended with

- **Spotify** over-the-air player using SpotifyConnect (thanks to cspot)
- **AirPlay** controller (iPhone, iTunes ...) and enjoy synchronization multiroom as well (although it's AirPlay 1 only)
- Traditional **Bluetooth** device (iPhone, Android)

And LMS itself

- Streams your local music and connects to all major online music providers (Spotify, Deezer, Tidal, Qobuz) using Logitech Media Server - a.k.a LMS with **multi-room** audio synchronization.
- LMS can be extended by numerous plugins and can be controlled using a Web browser or dedicated applications (iPhone, Android).
- It can also send audio to UPnP, Sonos, Chromecast, and AirPlay speakers/devices.

All ESP32-based boards are tested with Squeezelite-ESP32 software, which can be flashed using nothing but a web browser. You can use Squeezelite-ESP32 installer for that purpose.

Note that ESP32-S3 support is very much experimental in the current version of the Squeezelite-ESP32 and most likely will have some issues.

How to flash and configure

Use dedicated Squeezelite-ESP32 installer to flash the firmware. It has been preconfigured to work with ESP32 boards and will configure all the hardware automatically. You would only need to configure WiFi once using the built in hotspot. Default password is **squeezelite**

Home Assistant

There is a number of ways ESP32 audio devices can be integrated into the Home Assistant setup. Each of them gives a unique feature, losing some other in return. As usual, there is no perfect solution for everyone, but perhaps there is one for you. Below is the summary table of the tested methods

Integration type	Tested	Description	Pros	Cons
LMS/ Airplay	Yes	Connect to Music Assistant as external protocol device. Can play your media library and internet radio	Still can use squeezelite, i.e. use Spotify Connect and Apple Airplay when HA is not using the device	No native integration into HA, only works with Music Assistant
ESPHome way	Yes	Connect as HA media device. Can be used with any HA integration, including Music Assistant, Text-to-Speach announcements, alarms, etc	More integrations with HA, more flexibility in use case	No longer works as Spotify, Airplay, etc.

Integration type	Tested	Description	Pros	Cons
Snapcast way	Yes	Connect to Music Assistant as snapcast protocol device. Can play your media library and internet radio.	Perfect for multiroom sync (Sonos-like, perhaps even better). Can be used with other Snapcast servers around the house	No longer works as Spotify, Airplay, etc. No native integration into HA only works with Music Assistant

Detailed instruction on each method can be found in the project repository at https://github.com/sonocotta/esparagus-media-center

Using ESP32 Audio Boards with the snapcast server

Snapcast is a multi-room audio player that synchronizes playback across multiple devices, ensuring that audio streams play simultaneously in perfect sync. It consists of a server, which distributes audio streams, and clients, which receive and play the audio. There is a snapcast fork that was created to implement ESP32 Audio Boards specific configuration on top of the ESP32 Snapcast client. This allows us to build flexible and extendable setups connected to various sources, like Mopidy, MPD or Home Assistant.

You can use below link to flash your Esparagus Media Center device with snapcast client and connect to existing snapcast server: https://sonocotta.github.io/esparagus-snapclient/

Alternative: Programming using Platformio

Project repository includes software samples that are provided as Plarformio IDE projects (https://platformio.org/platformio-ide). This can be a foundation for your own custom code that utilize board peripheral, specifically DAC. After installing the IDE, open the sample project. Select the proper environment based on your board version. Run the **Build and Upload** commands to install necessary tools and libraries, and build and upload the project to the board. Communication and proper upload method selection will be handled by IDE automatically.

Alternative: Programming using Arduino IDE

Follow the ESP8266Audio library guide at github.com/earlephilhower/ESP8266Audio. Default settings will work out of the box with HiFi and Loud Esparagus boards. To setup the Louder-ESP32 boards, you'd need a TAS5805M DAC drives, that can be found at https://github.com/sonocotta/esp32-tas5805m-dac

Safety Instruction

Esparagus Media Center Regulatory Compliance and Safety Information

Product Name: Esparagus HiFi MediaLink (CS-HIFI-ESPARAGUS), Loud Esparagus Media Center (CS-LOUD-ESPARAGUS), Louder Esparagus Media Center (CS-LOUDER-ESPARAGUS)

Warnings

Product shall only be connected to an external power supply via built in USB port. Power supply should be rated at 5V DC, and a maximum current no more than 3000mA. USB PD enabled power adapters should be certified with USB PD 3.0 version and thus deliver no more than 19V / 3250 mA of power.

Any USB 2.0 compliant device can be used with the Product.

Please be aware that while the device may become warm during operation, it is designed to never reach a temperature that would be unsafe to handle with bare hands.

If the device becomes excessively hot, disconnect it immediately and consider it malfunctioning.

Instruction For Safe Use

To avoid malfunction or damage to Esparagus Media Center please observe the following rules

- Do not expose it to water or moisture. If the equipment is exposed to water, ensure it is thoroughly dried out before using it again.

- Do not expose the device to high voltage and sources of static electricity to prevent damage and ensure safe operation.

- Take care while handling to avoid mechanical damaging. Take special care not to damage glass surface of the screen, as minute glass fragments pose danger to health.

- Avoid bending PCB, since microscopic fractures can cause intermittent failure conditions as well as catastrophic failures of certain components.

- Avoid applying excessive force to on-board buttons and connectors, as all of them designed to be operated with a reasonable effort.

- The device is equipped with built-in short-circuit protection for its speakers to enhance safety. However, users should avoid deliberately causing a short circuit, as it can lead to damage or compromise the device's functionality in rare cases.

Compliance Information

The Product specified in this safety instruction conform with the following CE directives: European

RoHS Directive (2011/65/EU + Amendment 2015/863).

WEEE directive statement for EU

In common with all Electronic and Electrical products the Esparagus Media Center should not be disposed of in household waste. Please check local rules and regulations for electronic waste disposal in other jurisdictions.