

# Voice Pyramid

SKU:A167





## Description

Voice Pyramid is a functional base designed for smart voice interaction applications. Built specifically for the M5Stack Atom series controllers (excluding Atom Voice), it offers plug-and-play convenience for rapidly building high-performance audio interaction voice devices. By pairing with an Atom series controller, it handles audio data processing, wireless communication, business logic control, and IoT connectivity, making it well-suited for far-field voice recognition, voice assistants, voice control, and a wide range of other smart interaction scenarios.

The device features a dedicated **STM32G030F6P6** microcontroller responsible for managing the dual capacitive touch-slider zones and RGB indicator LEDs, enabling low-latency touch response and rich, programmable lighting effects. The intuitive touch controls combined with vivid visual feedback allow users to easily perceive device status, voice interaction results, and system prompts, enhancing both the overall user experience and product expressiveness. The audio system employs a high-performance **ES8311** audio codec paired with an **ES7210** microphone input acquisition chip featuring AEC echo cancellation, delivering efficient acoustic echo cancellation, noise suppression, and clear far-field voice capture to ensure reliable voice recognition and full-duplex interaction. An AW87559 high-efficiency Class-D speaker driver powers the built-in speaker, providing audio output with excellent dynamic range and clear sound quality. A **Si5351** programmable clock generator serves as the main clock source (MCLK), supplying low-jitter, flexibly configurable clock signals to both the audio ADC and DAC, effectively improving voice recognition accuracy and overall audio performance.

Voice Pyramid is ideal for development scenarios including smart speakers, desktop voice assistants, voice control hubs, local/cloud voice interaction prototypes, and IoT voice gateways.

## Tutorial



### Arduino IDE

This tutorial introduces how to control the Voice Pyramid via Arduino IDE programming.



### Home Assistant

This tutorial covers how to integrate Voice Pyramid with Home Assistant.



## Voice Pyramid Xiaozhi Voice Assistant

This tutorial explains how to use an AtomS3R paired with the Voice Pyramid base to build a personal voice assistant by flashing the Xiaozhi firmware via M5Burner.



## Voice Pyramid Bluetooth Speaker

This tutorial explains how to use an Atom-Matrix paired with the Voice Pyramid base to flash the Voice Pyramid Bluetooth speaker firmware via M5Burner.

## Features

- Compatible with Atom / AtomS3 / AtomS3R series controller modules
- Dedicated STM32G030F6P6 auxiliary MCU for touch and RGB lighting management
- ES8311 high-performance audio codec (supports high-fidelity playback and capture)
- ES7210 microphone input acquisition with AEC echo cancellation
- AW87559 high-efficiency speaker amplifier with built-in speaker
- Si5351 programmable low-jitter main clock generator
- Programmable RGB indicator LEDs
- Dual-side capacitive touch-slider zones
- 1x HY2.0-4P Grove expansion port (I2C)

## Includes

- 1x Voice Pyramid

## Applications

- Smart speakers and desktop voice assistants
- Voice control hubs
- Local / cloud voice interaction prototypes
- IoT voice gateways

## Specifications

Specification	Parameter
MCU	STM32G030F6P6
Audio Codec	ES8311
Audio ADC	ES7210
Microphone	LMA3729T381-0Y3S
Amplifier	AW87559
Indicator LED	28 x WS2812 RGB LED (7 LEDs per RGB Bar strip)
Touch Function	Dual-side touch-slider zones with 4 touch detection points, 2 per side
Input Power	DC 5V
Expansion Port	1x HY2.0-4P
Standby Current	14.92mA (standby without controller power)
Operating Current	578.47mA (maximum volume output with controller connected)
Operating Temp	-10°C ~ 60°C
Product Size	83.6 x 83.6 x 56.7mm
Product Weight	100.7g
Package Size	93.0 x 86.0 x 56.0mm
Gross Weight	145.1g

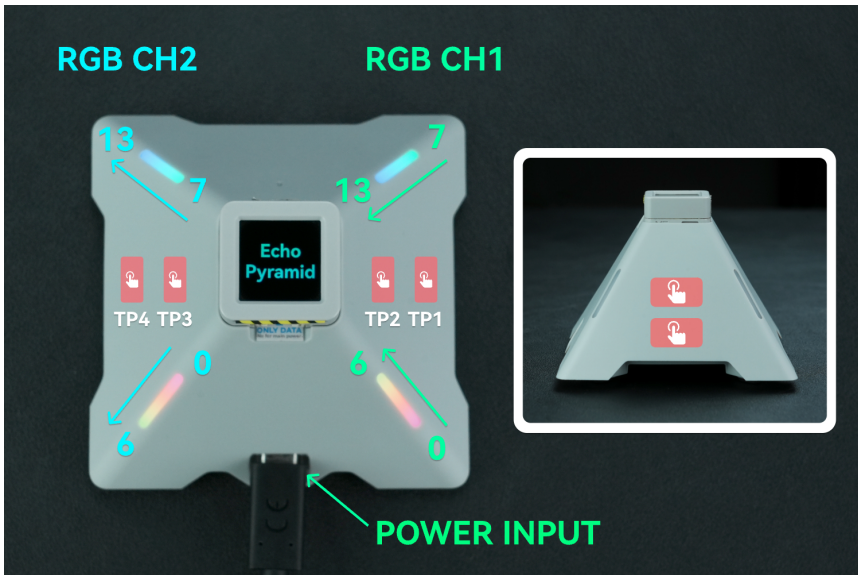
## Learn

### Installing the Atom Series Controller

Align the Atom series controller with the reserved pin header interface on the Voice Pyramid, then press it in vertically and steadily to ensure a reliable connection.



### RGB LED Strip and Touch Point Overview

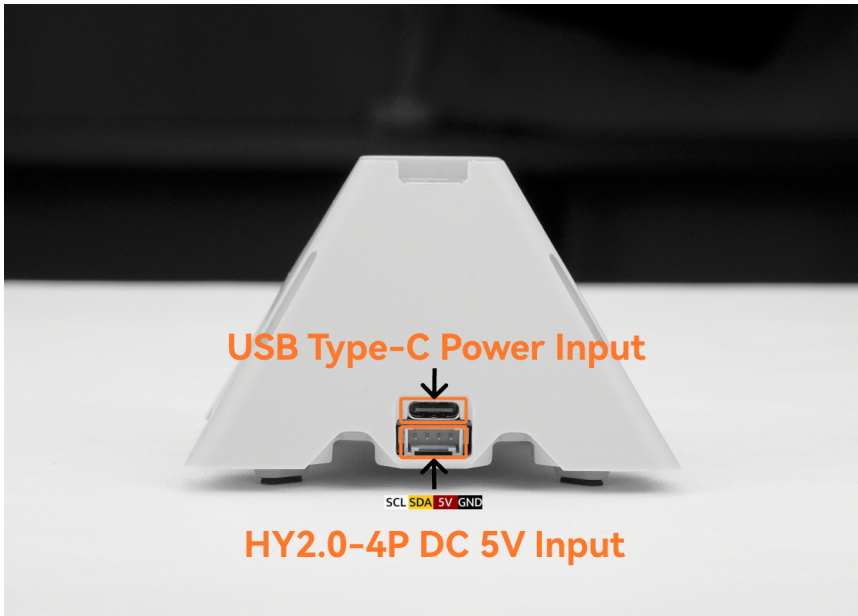


- The RGB LED strips inside the Voice Pyramid are divided into two groups (RGB CH1 / RGB CH2), controlled by the STM32 co-processor. The LEDs within each group are numbered sequentially from 0 to 13 (as shown in the diagram).
- The Voice Pyramid features a total of 4 touch detection points across both sides (TP1, TP2, TP3, and TP4 as shown above), which can be used for swipe or single-point touch interactions.

## Power Supply

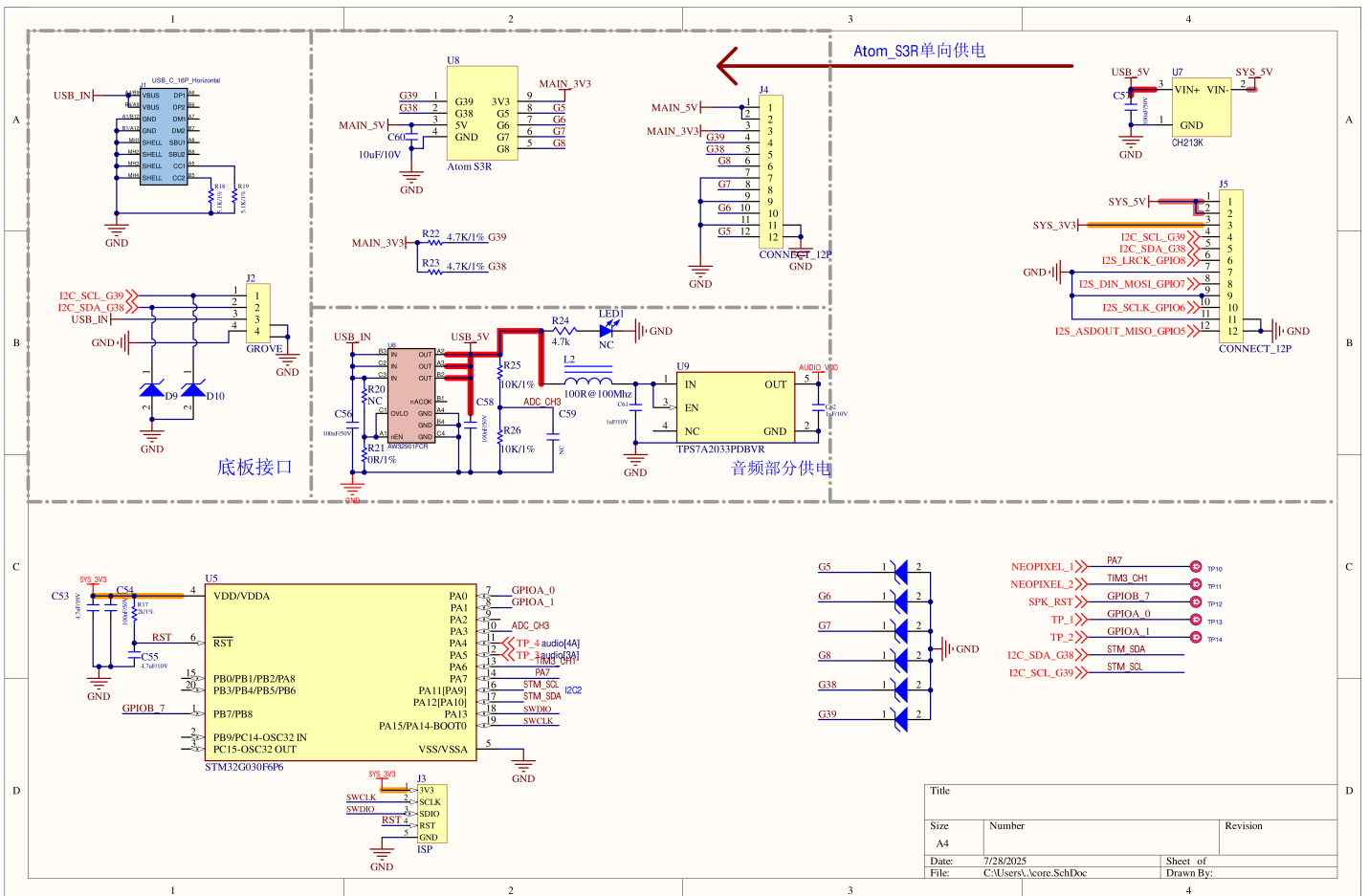
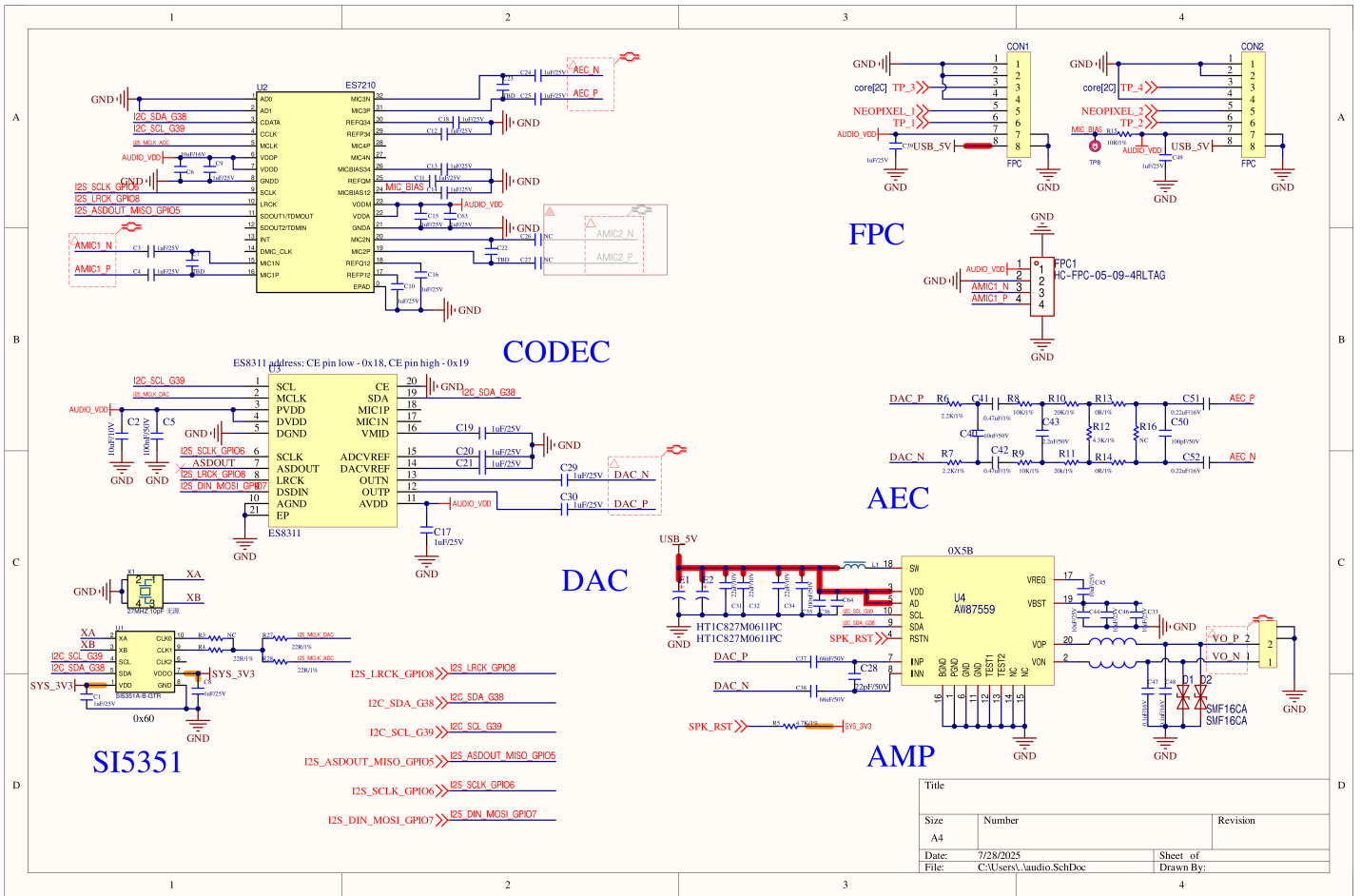
### Note

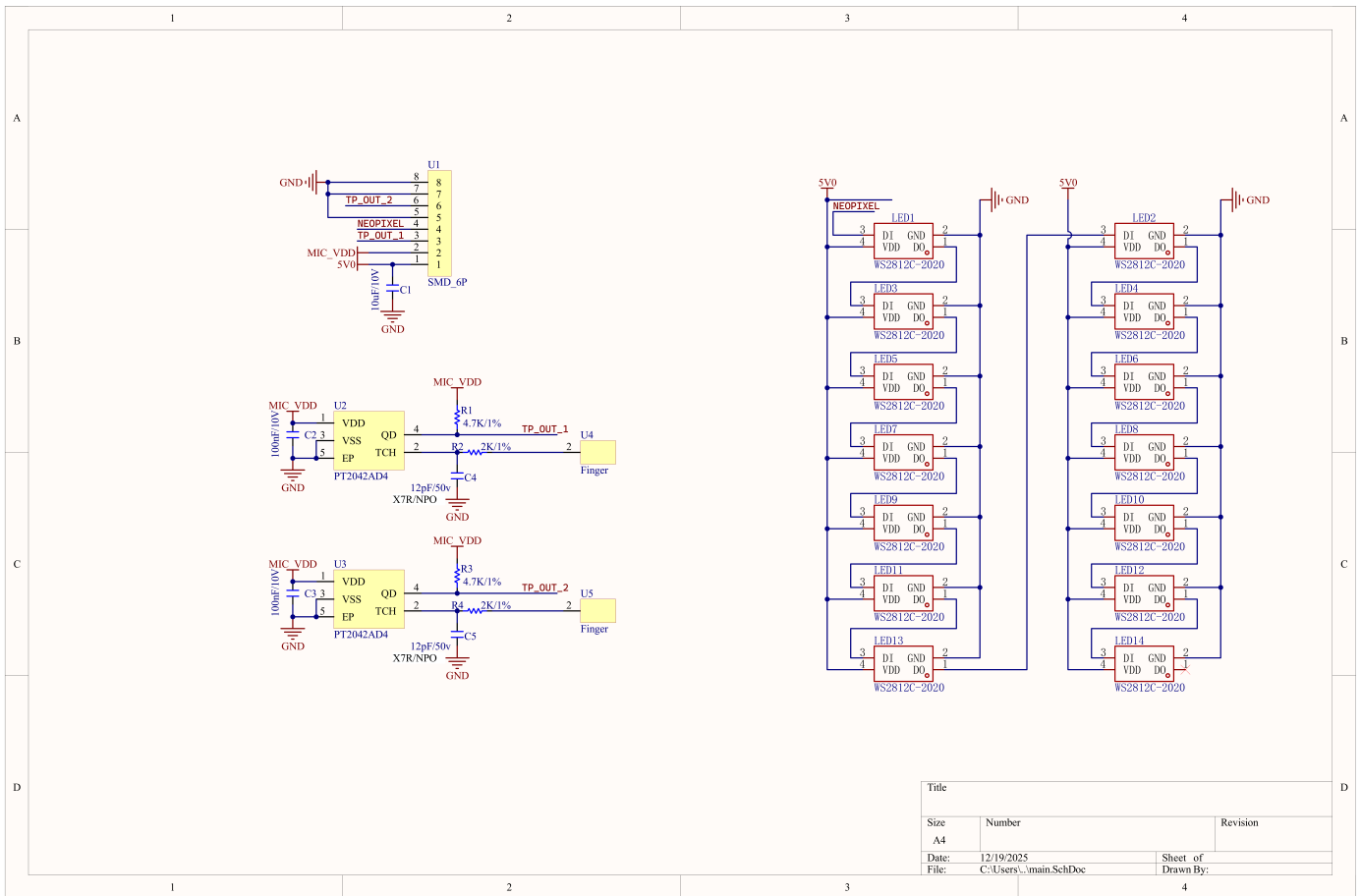
Please power the device through the USB Type-C or HY2.0-4P port at the bottom of the Voice Pyramid. Powering from any other source may prevent the device from starting normally.



## Schematics

- [Voice Pyramid Schematics PDF](#)





## PinMap

PIN	LEFT	RIGHT	PIN
		1	3V3
SCL	2	3	I2S_DOUT
SDA	4	5	I2S_SCLK
5V	6	7	I2S_DIN
GND	8	9	I2S_LRCK

## Voice Pyramid

Voice Pyramid	SCL	SDA	I2S_SCLK	I2S_LRCK	I2S_DOUT	I2S_DIN
SI5351 (0x60)	SCL	SDA				
ES8311 (0x18)	SCL	SDA	SCLK	LRCK		DSDIN
ES7210 (0x40)	SCL	SDA	SCLK	LRCK	ASDOUT	
STM32G030F6P6 (0x1A)	SCL	SDA				
AW87559 (0x5B)	SCL	SDA				

## SI5351

SI5351 (0x60)	CLK1
ES7210 (0x40)	I2S_MCLK_ADC
ES8311 (0x18)	I2S_MCLK_DAC

## AW87559

AW87559 (0x5B)	SPK_RST
STM32G030F6P6 (0x1A)	GPIOB 7

## WS2812C

STM32G030F6P6 (0x1A)	PA6	PA7
NEOPIXEL1		DIN
NEOPIXEL2	DIN	

## PT2042AD4

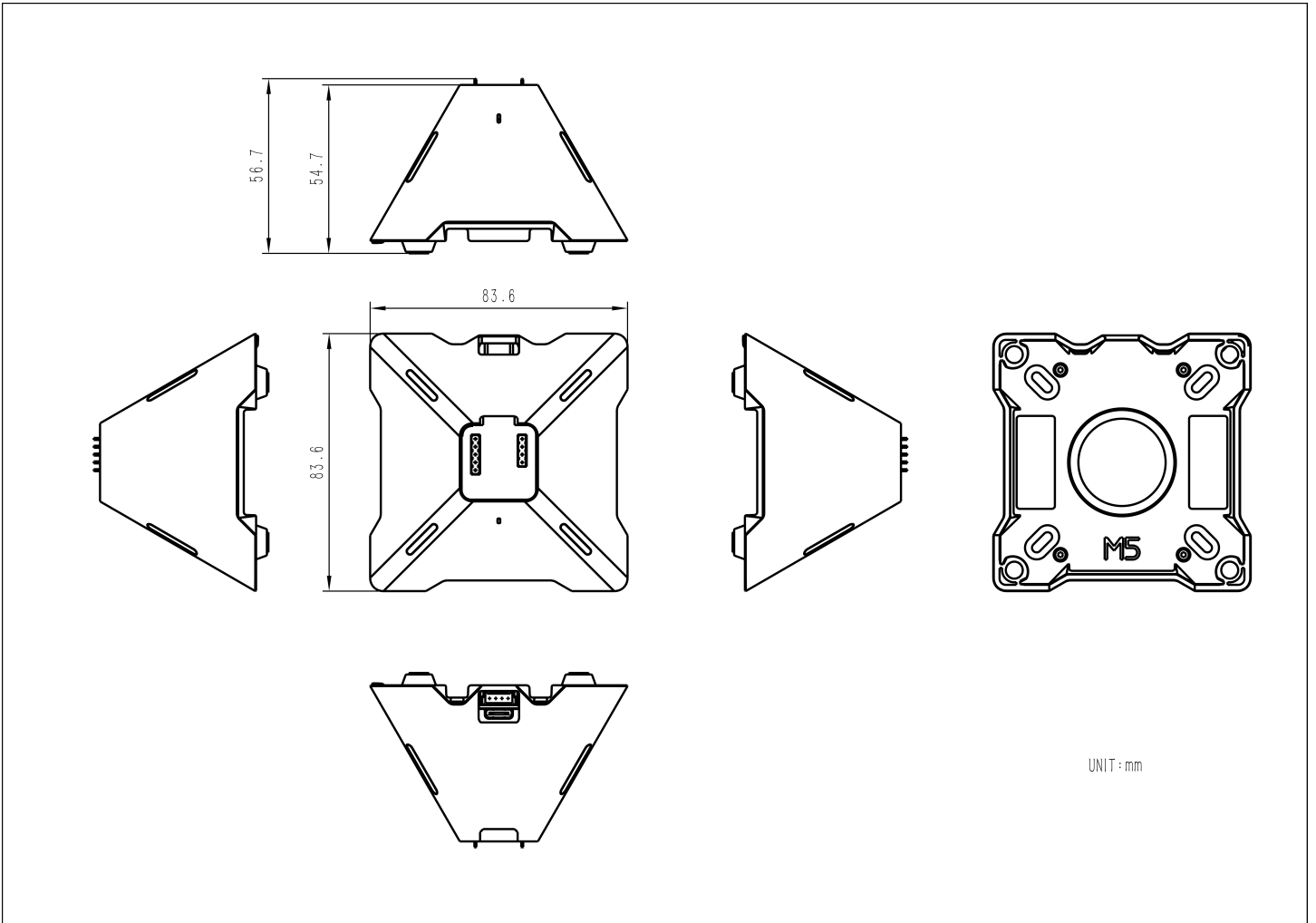
STM32G030F6P6 (0x1A)	PA0	PA1	PA4	PA5
TP_1	TP_1_OUT			
TP_2		TP_2_OUT		
TP_3				TP_3_OUT
TP_4			TP_4_OUT	

## HY2.0-4P

HY2.0-4P	Black	Red	Yellow	White
PORT.A	GND	5V	SCL	SDA

## Model Size

- [Voice Pyramid Model Size PDF](#)



## Datasheets

- [ES7210](#)
- [ES8311](#)
- [AW87559](#)
- [SI5351](#)
- [STM32G030F6P6](#)

## Softwares

## Quick Start

- [Voice Pyramid Home Assistant Guide](#)
- [Voice Pyramid Xiaozhi Voice Assistant](#)
- [Voice Pyramid Bluetooth Speaker](#)

## | Arduino

- [Voice Pyramid Arduino Quick Start](#)
- [Voice Pyramid Arduino Library](#)

## | ESP-IDF

- [BT Audio Player Source Code](#)

## | Video

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- [Voice Pyramid Product Introduction and Feature Demonstration](#)

[A167\\_Echo\\_Pyramid\\_video\\_EN.mp4](#)