1.Product Overview

HW-US003 Our company's latest offline voice intelligent recognition module has a beautiful appearance, simple and compact product circuit structure, stable performance, affordable cost, and high cost-effectiveness. Especially suitable for secondary development in other electronic fields such as intelligent appliances, voice wake-up products, lighting products, etc.

This product can be widely used in intelligent voice, intelligent control systems, voice lighting products, smart home control unit products, and so on.

2. Working principle of the product:

HW-US003 is an intelligent voice controlled offline speech recognition module that does not require networking. It adopts an internal 32bit RS IC architecture and core computing logic. It collects and compiles text pronunciation through a microphone, accurately responds to customized wake-up words, outputs speaker voice broadcasts, and IO port signals. After speech acquisition and recognition, the output IO port signal can drive various circuits to work.

3.Product features:

3.1. This module has rich IO output protocols and supports various application products developed twice. The PCB structure is simple, and it supports self compiling wake-up unit words and customizing wake-up unit words.

3.2. Support the compilation of Chinese and English unit word protocols, and download SDK files online. It has precise speech recognition function with wake-up words and anti false alarm function.

3.3. Support repeated compilation and burning of CH340 downloader. Support multiple tone voice broadcasts, and support up to 150 unit vocabulary voice recognition broadcasts.

3.4. Supports up to 10 GPIO ports for dynamic output, 1 12C master-slave controller, and multiple PWM ports for output. 1 SDR-ADC signal collector, etc
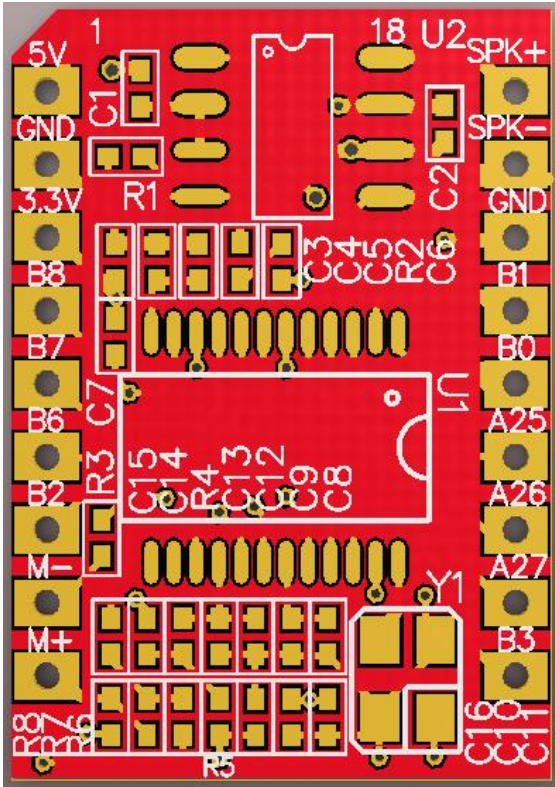
3.5. Support SDK voice compilation, burning, and downloading.

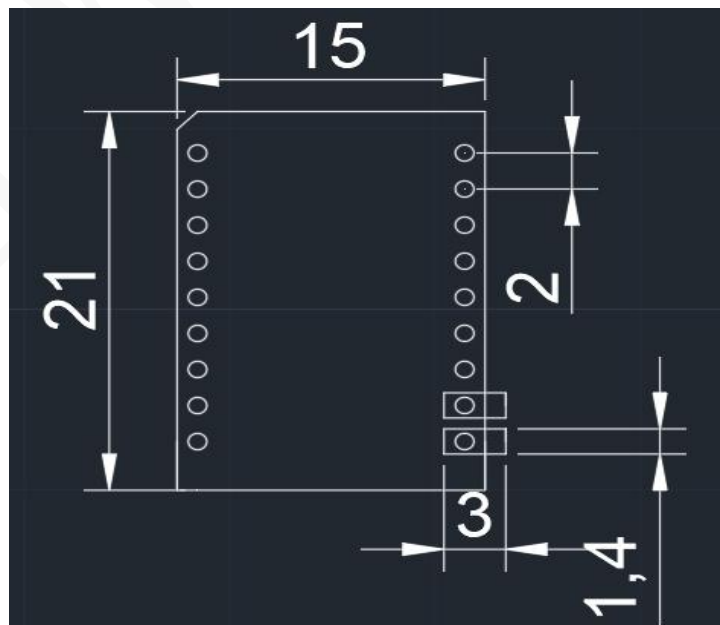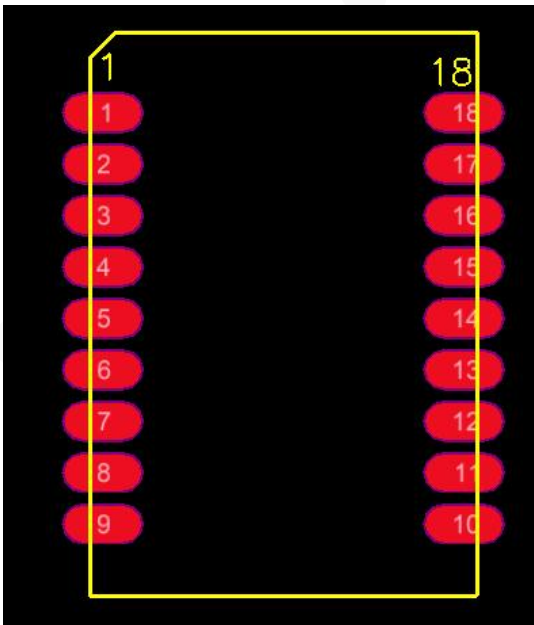3.6. Support time timing settings.

4. Parameters

Model	US003	Intelligent speech recognition module	18pin
VCC	5V/200mA	3.3V customizable	
Output IO driver	GPIO 3V/50-100mA	Compilation required	
Output	Voice command control output	Wake up output broadcast	GPIOhigh level
Microphone	4x1.5 microphone	single microphone	
Language	Chinese　-　English		
Wake up distance	1-2m　40-60dB	3-5m 60-90dB	Default 80dB
Wake up reaction time	50ms		Default
Wake up waiting time	10s	customizable	
Timing	----	customizable	
Number of voice entries	150pcs	------------------	Default
Voice selector	Men's Voice	Ladies' Voice	Default Ladies' Voice
IO Port	Please refer to Article 5		
Download Tools	CH340		
Size	21mm x 15mm		
Port	SMD -2.0mm x 24pin		
Operation temperature	-20~+80℃		ambient temperature

5. IO Port Definition:

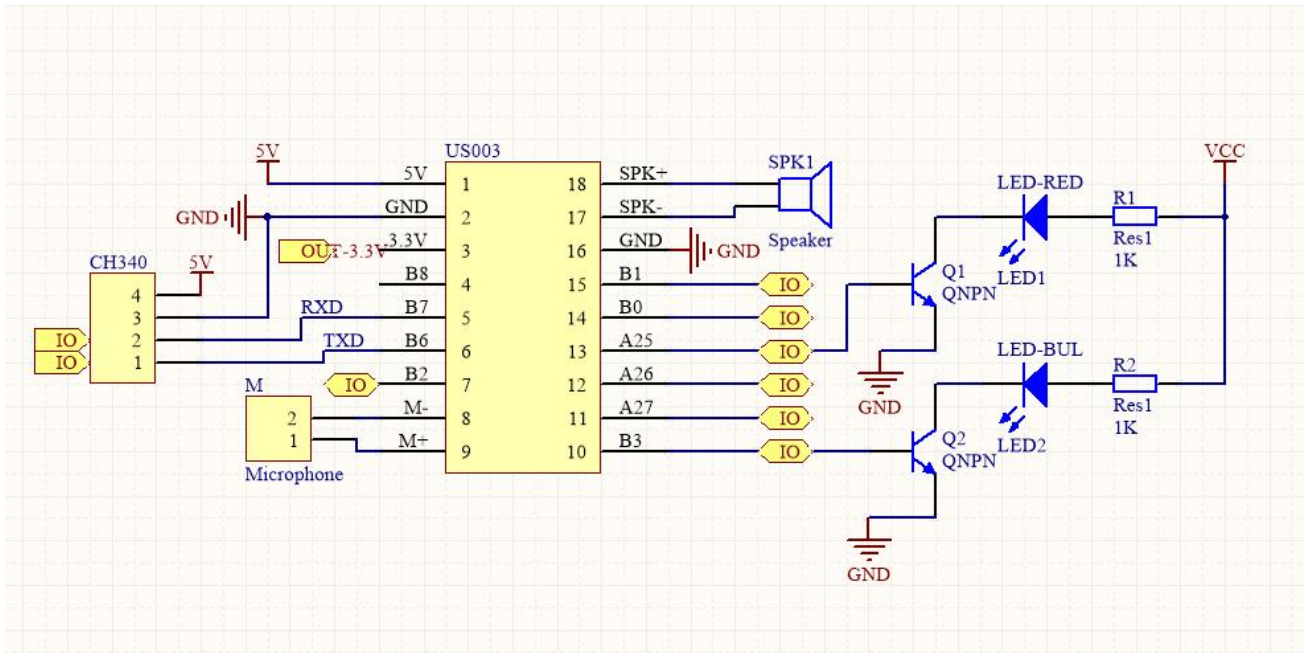| 1	5V	5V-200mA	Input Voltage
2	GND	Power grounding	
3	3.3V	3.3V Output terminal	
4	B8	EFUSE VDD	
5	B7	RXD	CH340-RXD
6	B6	TXD	CH340-TXD
7	B2	UART1-TXD/12C-SCL/TIM3-PWM	
8	M-	Microphone input -	
9	M+	Microphone input +	
10	B3	UART1-RXD/12C-SCL/TIM4-PWM	
11	A27	ADC6 -GPIO-pulse output-PMW	
12	A26	ADC6 -GPIO-pulse output-PMW	
13	A25	ADC6 -GPIO-pulse output-PMW	
14	B0	UART1-TXD12C-SCL-PMW	
15	B1	UART1-RXD12C-SCL-PMW	
16	GND	Power grounding	
17	SPK -	Language broadcasting speaker -	
18	SPK+	Language broadcasting speaker +	

6.CAD drawings and patch drawings:

Note: The overall size of the module is 15x21mm, with a foot pitch of 2.0mm.

The SMD chip packaging is shown in the figure, and the standard size of the solder pad is specified as 3mm x 1.4mm, with a foot pitch of 2.0mm

7.Test Application

Introduction: This product defaults to the original program.

After connecting the wires as shown in the figure, if the power is turned on for 5V, there will be a welcome speech broadcast, and then enter standby mode. In standby mode, if the keywords are not burned, there will be no triggering conditions. (Customers need to customize voice keywords and IO protocols before they can work).

This product supports the CH340 downloader to burn SDK voice files. After the burning is completed, it can execute voice recognition keywords and corresponding IO output protocols.

Usually, IO protocols support the output of high-level to low-level GPIO output drivers or pulse output signals, while PWM output protocols require the development of IO ports and SDK protocol burning.

The voice output can drive various circuits to work by executing IO signals. (As shown in the legend: If Xiaowang and Xiaowang turn on the red light, A25 will output a high level to drive LED-RED to work. Xiaowang and Xiaowang turn off the red light and LED-RED to turn off.)

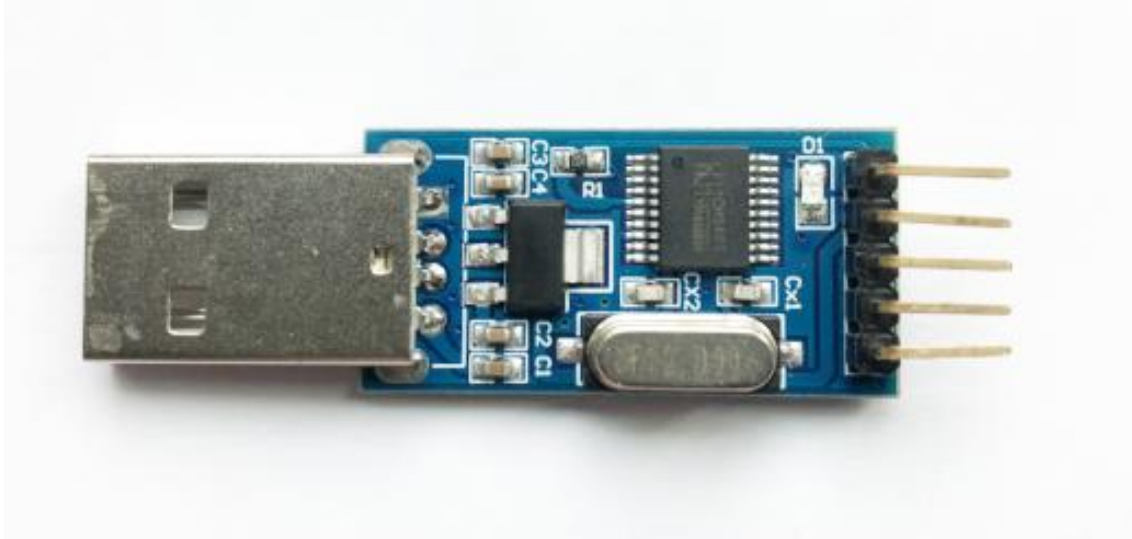A25 works with the same IO port properties as other IO ports.
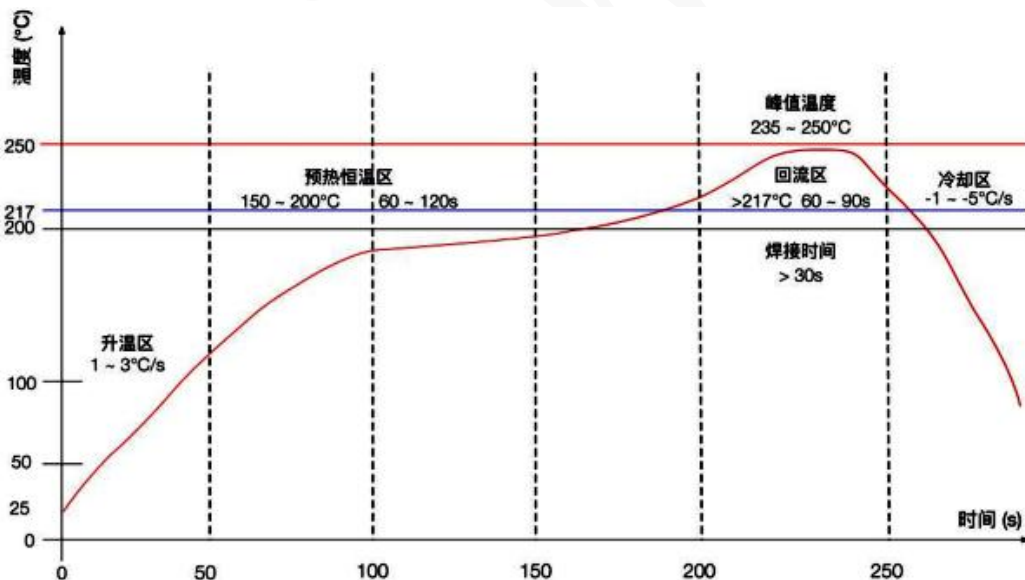
8.Burning Application

Introduction: Using the CH340 downloader as shown in the diagram, connect it to the computer USB port, compile the SDK voice file, upload the image file, and click burn. Then disconnect the 5V and US003 power supplies and power them on again. Then the voice keyword writing module can be executed. After the language keywords are written into the voice module, the system will execute voice broadcasting and IO driver output signals when turned on again. Language burning supports English compilation and keyword writing without wake-up for homophones. (If the SDK file cannot be compiled, our company can customize voice keywords and IO protocol.)

【CH340 downloader】

9. Precautions:

9.1. SDM chip reflow soldering temperature curve:

升温区 — 温度: 25 ~ 150℃ 时间: 60 ~ 90s 升温斜率: 1 ~ 3℃/s
预热恒温区 — 温度: 150 ~ 200℃ 时间: 60 ~ 120s
回流焊接区 — 温度: >217℃ 时间: 60 ~ 90s; 峰值温度: 235 ~ 250℃ 时间: 30 ~ 70s
冷却区 — 温度: 峰值温度 ~ 180℃ 降温斜率 -1 ~ -5℃/s
焊料 — 锡银铜合金无铅焊料 (SAC305)

9.2. The actual module microphone installation should not be obstructed by obstacles and needs to be installed exposed.

9.3. This product is not suitable for high-power power input (such as 5v1A or 5V2A) to avoid burning the module.

9.4. The special compilation IO protocol needs to be written within the specified program scope.

10. Product Application:

10.1. As a speech recognition module, this product can output driving signals and voice broadcasts as long as someone wakes up. Suitable for various types of electrical equipment.

10.2. Example: (Automotive products: Xiaowang, Xiaowang, turn on the navigation or Xiaowang, Xiaowang, turn off the headlights.)

10.3. Example: (Robot product: Xiao Wang, Xiao Wang, let the sweeping machine robot work or Xiao Wang, Xiao Wang, stop sweeping the floor.)
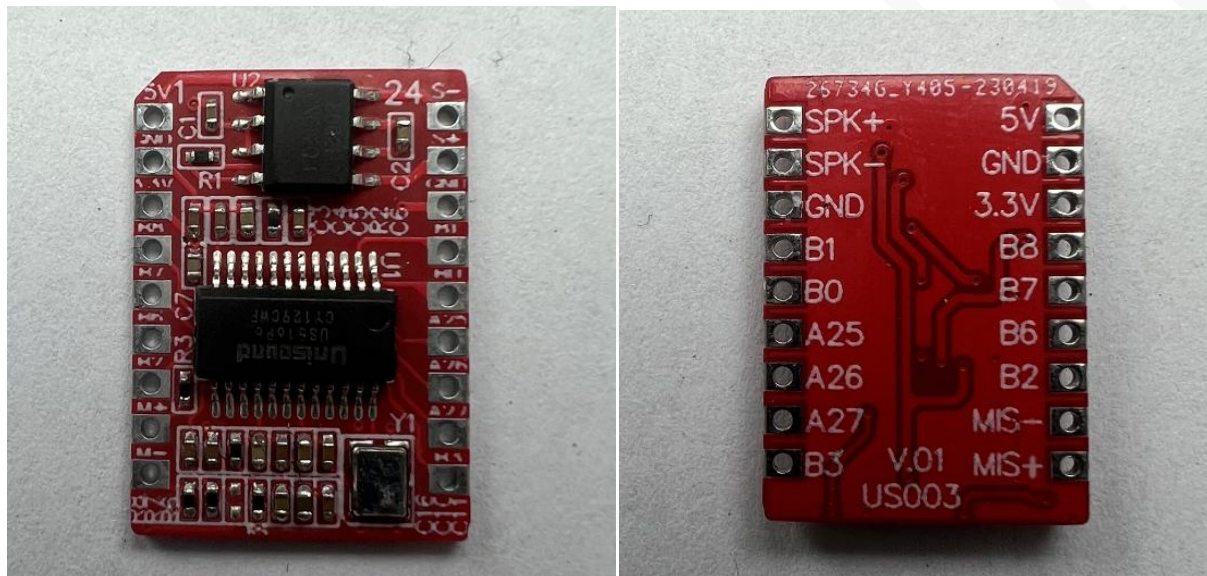
10.4. Example: (Lamp products: Xiao Wang, Xiao Wang, turn on the bedroom light or Xiao Wang, Xiao Wang, turn off the bedroom light.)

10.5. Example: (Electrical products: Xiao Wang, Xiao Wang, turn on the water heater or Xiao Wang, Xiao Wang, turn off the water heater.)

10.6. Example: (Automotive products: Xiao Wang, Xiao Wang, turn on the navigation or Xiao Wang, Xiao Wang, turn off the headlights.)

10.7. Example: (Smart home products: Xiao Wang, Xiao Wang, I'm back or Xiao Wang, Xiao Wang, I'm out.)

Physical product:

11.Regarding the manufacturer - Shenzhen Haiwang Sensor Co., Ltd

ShenZhen HaiWang Sensor Co., Ltd. is a high-tech enterprise that integrates research and development, production, sales, and after-sales service. We have been focusing on infrared and microwave induction technology for more than ten years. We specialize in providing a variety of sensor components, sensitive electronic devices, intelligent electronic devices, and other series of products, such as pyroelectric infrared probes and their supporting ICs and Fresnel lenses; Infrared sensing module; Microwave induction module; Audio players, and can provide technical development and design, customized processing, and technical support for products. Our products are widely used in lighting fixtures, public security, advertising media, traffic safety, and more.

Please identify our brand [HW].

ShenZhen HaiWang Sensor Co., Ltd.