

## **The detailed development datasheet download:**

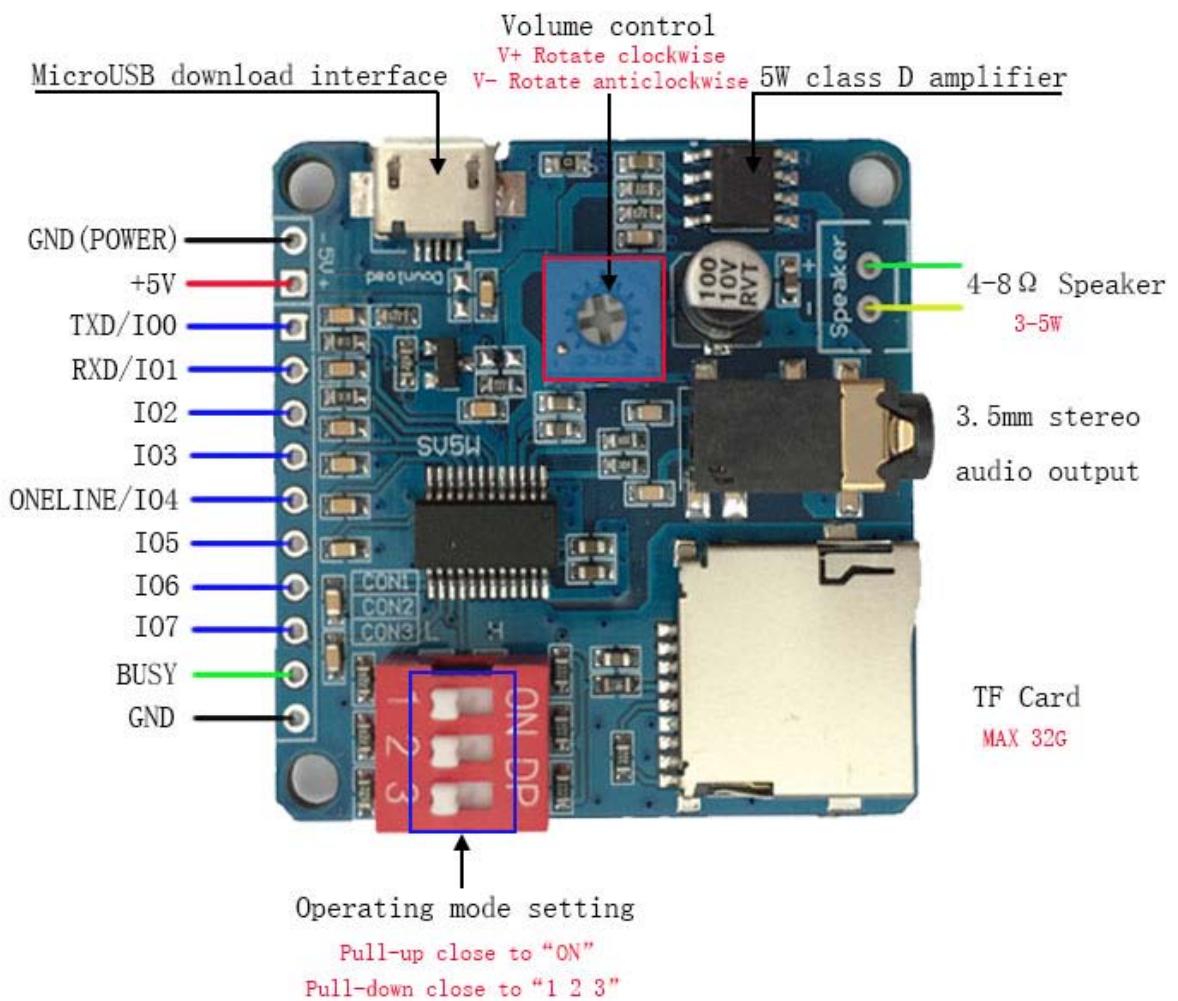
### **1. Product overview**

DY-SV5W is a smart voice module developed independently by our company, Integrated IO trigger, UART protocol control, One\_line single-bus protocol control, standard MP3 and other 7 operating modes setting by DIP switch; Drive 4~8Ω, 3~5W speaker by a 5W class D audio amplifier on board; Support MP3、WAV decoding; Support TF card for maximum 32G downloading music files directly by micro USB connector.

### **2. Product characteristics**

- 1、Support MP3、WAV decoding.
- 2、Support sampling rate (KHz):8/11.025/12/16/22.05/24/32/44.1/48.
- 3、24bit DAC output, support dynamic range 90dB, SNR 85dB.
- 4、Support FAT16/FAT32 file system, support TF card for maximum 32G.
- 5、Drive 4~8Ω speaker by 5W class D amplifier chip on board.
- 6、Play 65535 pieces of music by UART control protocol; Play, Pause, Selecting music, VOL+/- and so on can be controlled, the communication baud rate is 9600bps.
- 7、Play 255 pieces of music by IO triggering;
- 8、Play music by One\_line control protocol, Play, Pause, Selecting music, VOL+/- and so on can be controlled.
- 9、Switch 7 operating modes using DIP switch easily.

### **3. Definition of interfaces and functions**



## Definition of pins

PINS	Description
GND(POWER)	POWER GND
+5V	VCC (+5V)
TXD/IO0	IO1 in IO triggering mode; TX in UART control mode, connect to RX of MCU
RXD/IO1	IO1 in IO triggering mode; RX in UART control mode, connect to TX of MCU

IO2	IO2 in IO triggering mode
IO3	IO3 in IO triggering mode
IO4/ONE_LINE	IO4 in IO triggering mode; RX in One_line mode
IO5	IO5 in IO triggering mode
IO6	IO6 in IO triggering mode
IO7	IO7 in IO triggering mode
BUSY	Output low level while playing music (0V) , output high level when end playing (3.3V)
GND	Reference GND

## IO electric characteristics

IO input characteristics				
Symbol	Parameters	MIN	MAX	UNIT
V <sub>IL</sub>	LOW LEVEL INPUT	0	0.8	V
V <sub>IH</sub>	HIGH LEVEL INPUT	2.7	3.3	V
IO output characteristics				
V <sub>O L</sub>	LOW LEVEL OUTPUT	0	0.33	V
V <sub>O H</sub>	HIGH LEVEL OUTPUT	2.7	3.3	V

## Configuration of DIP Switch

Corresponds to the number on DIP switch	1	CON1	"Pull-down" close to the "1"	"Pull-up" close to the "ON"
	2	CON2	"Pull-down" close to the "2"	"Pull-up" close to the "ON"
	3	CON3	"Pull-down" close to the "3"	"Pull-up" close to the "ON"

Control modes	Configure PINS			I/O Function							
	CON3	CON2	CON1	IO7	IO6	IO5	IO4	IO3	IO2	IO1	IO0
I/O Combination mode 0	0	0	0	I/O Combination trigger at falling edge and restoring to high level , play $2^8-1$ (255) pieces music.							
I/O Combination mode 1	0	0	1	I/O Combination trigger while IOs keeping low level, play $2^8-1$ (255) pieces music .							
I/O stand-alone mode 0	0	1	0	8th music	7th music	6th music	5th music	4th music	3rd music	2nd music	1st music
I/O stand-alone mode 1	0	1	1	8th music	7th music	6th music	5th music	4th music	3rd music	2nd music	1st music
UART control mode	1	0	0							RXD	TXD
One_Line mode							RXD				
Standard MP3 mode	1	0	1				RPT	EQ	P/P/MOD E	PREV/V-	NEXT/V+

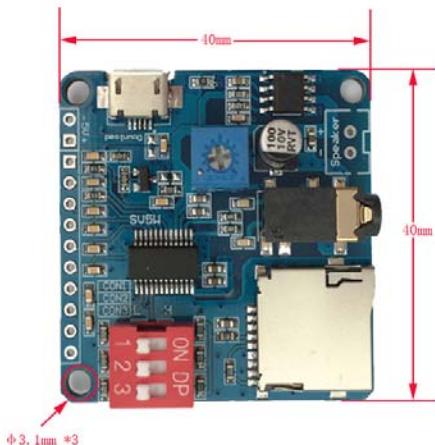
**NOTES:** “ I/O Combination mode 0” IO0~IO7 restore to high level after outputting corresponding level, It’s like triggering a button once.

“I/O Combination mode 1” IO0~IO7 always keep the corresponding level after Outputting corresponding level.

The difference between “I/O Combination mode 0” and “I/O Combination mode 1” is that it still plays music when IOs restore to original high level in “I/O Combination mode 0”, and it stops playing music when IOs restore to original high level in “I/O Combination mode 1”

The difference between “I/O stand-alone mode 0” and “I/O stand-alone mode 1” is the same as above

## 4. Module size



## 5. Modes operation instructions

### 5.1 I/O Combination mode 0

MCU I/O output corresponding level to trigger specified music and release the IO level to high, it stops playing music after completing playing current music; It will play the new music, if retrigger the music while playing. If keep the triggering state, it will keep playing circularly. The busy pin is always effective while playing.

**NOTE: The music files must be named by five numbers such as  
00001.mp3~00255.mp3**

#### Music Control

IO7	IO6	IO5	IO4	IO3	IO2	IO1	IO0	Music playing
1	1	1	1	1	1	1	0	00001.mp3
1	1	1	1	1	1	0	1	00002.mp3
1	1	1	1	1	1	0	0	00003.mp3
1	1	1	1	1	0	1	1	00004.mp3
1	1	1	1	1	0	1	0	00005.mp3
1	1	1	1	1	0	0	1	00006.mp3
1	1	1	1	1	0	0	0	00007.mp3

.....	.....	.....	.....	.....	.....	.....	.....	.....
0	0	0	0	0	0	0	0	00255.mp3

## 5.2 I/O Combination mode 1

MCU I/O output corresponding level to trigger specified music and keep the triggering state, it will keep playing circularly. It will stop playing immediately when release to original high level anytime. The busy pin is always effective while playing.

**NOTE: The music files must be named by five numbers such as  
00001.mp3~00255.mp3**

### Music Control

IO7	IO6	IO5	IO4	IO3	IO2	IO1	IO0	Music playing
1	1	1	1	1	1	1	0	00001.mp3
1	1	1	1	1	1	0	1	00002.mp3
1	1	1	1	1	1	0	0	00003.mp3
1	1	1	1	1	0	1	1	00004.mp3
1	1	1	1	1	0	1	0	00005.mp3
1	1	1	1	1	0	0	1	00006.mp3
1	1	1	1	1	0	0	0	00007.mp3
.....	.....	.....	.....	.....	.....	.....	.....	.....
0	0	0	0	0	0	0	0	00255.mp3

## 5.3 I/O stand-alone mode 0

IO0~IO7 control 8 pieces of music, one IO only control one piece of music; IO trigger specified music by falling edge level and restore to original high level, it stops playing after completing playing the triggered music. It will play new music, if retrigger the music while

playing; If keep the triggering state, it will keep playing circularly. The busy pin is always effective while playing.

**NOTE: The music files must be named by five numbers such as**

**00001.mp3~00008.mp3**

#### Music Control

IO7	IO6	IO5	IO4	IO3	IO2	IO1	IO0	Music playing
1	1	1	1	1	1	1	0	00001.mp3
1	1	1	1	1	1	0	1	00002.mp3
1	1	1	1	1	0	1	1	00003.mp3
1	1	1	1	0	1	1	1	00004.mp3
1	1	1	0	1	1	1	1	00005.mp3
1	1	0	1	1	1	1	1	00006.mp3
1	0	1	1	1	1	1	1	00007.mp3
0	1	1	1	1	1	1	1	00008.mp3

## 5.4 I/O stand-alone mode 1

IO0~IO7 control 8 pieces of music, one IO only control one piece of music; IO trigger specified music by low level, and it will keep playing circularly if keep the triggering state. It will stop playing immediately when release to original high level anytime. The busy pin is always effective while playing.

**NOTE: The music files must be named by five numbers such as**

**00001.mp3~00008.mp3**

#### Music Control

IO7	IO6	IO5	IO4	IO3	IO2	IO1	IO0	Music playing
1	1	1	1	1	1	1	0	00001.mp3
1	1	1	1	1	1	0	1	00002.mp3
1	1	1	1	1	0	1	1	00003.mp3

1	1	1	1	0	1	1	1	00004.mp3
1	1	1	0	1	1	1	1	00005.mp3
1	1	0	1	1	1	1	1	00006.mp3
1	0	1	1	1	1	1	1	00007.mp3
0	1	1	1	1	1	1	1	00008.mp3

## 5.5 UART Control Mode

### 5.5.1 Communication format

Full duplex serial communication;

Baud: 9600bps, Data: 8 bits , stop:1bit, Check: N.

**Start-CMD Type-data length (n) -data1 - data n - CRC(SM)**

- ※ CMD CODE : fixed AA.
- ※ CMD TYPE : Used to distinguish CMD types.
- ※ DATA LENGTH: The number of bytes of data in CMD
- ※ DATA : Data in CMD, there is no data when the length of data is one, only CMD.
- ※ CRC : The sum of all data from the start code to the end data before the CRC, and select the low 8 bits.

※ DATA FORMAT: Send the high 8 bits first, and the low 8 bits follow.

### 5.5.2 Communication Protocol

The definition of data as follows.

1. Definition of playing state : It is in stop state when power on.

※ 00(Stop) 01(Play) 02(Pause)

2. The definition of devices: It is in stop state when switch device.

※ USB:00 SD:01 FLASH:02 NO\_DEVICE: FF

3. Volume: The volume all is 31 steps which is 0-30, it is 20 steps when power on.

4. The definition of playing modes: It is in single stop mode when power on.

- ※ Full cycle(00): Play all music in sequence.
- ※ Single cycle(01): Play the current music always.
- ※ Single stop(02): Stop playing after playing the current music once.
- ※ Random broadcast(03): Play music randomly in device.
- ※ Repeat folder(04): Play all music in current folder in sequence.
- ※ Random broadcast in folder(05): Play music randomly in current folder.
- ※ Order play in folder (06): Play music in current folder in sequence, and stop when complete playing the last music.
- ※ Order play (07): Play music in device in sequence, and stop when complete playing the last music.

5. Definition of EQ: It is NORMAL (00) when power on.

- ※ NORMAL(00) POP(01) ROCK(02) JAZZ(03) CLASSIC(04)

6. Definition of combination play: It is combined by file name, the file is stored in DY folder, the file is named as two bytes , the number name is recommended such as 01.mp3, 02.mp3, and it is also named by two letters.

### 5.5.3 Definition of CMD

#### Control CMD

CMD	CODE	RESPONSE
Play	AA 02 00 AC	No return
Pause	AA 03 00 AD	No return
Stop	AA 04 00 AE	No return
Previous music	AA 05 00 AF	No return
Next music	AA 06 00 B0	No return

Volume+	AA 14 00 BE	No return
Volume-	AA 15 00 BF	No return
Previous folder directory	AA 0E 00 B8	No return
Next folder directory	AA 0F 00 B9	No return
End playing	AA 10 00 BA	No return

## Setting CMD

CMD	CODE	RESPONSE
Volume setting	AA 13 01 <u>VOL</u> SM	No return
Cycle mode setting	AA 18 01 <u>Mode</u> SM	No return
Cycle times setting	AA 19 02 <u>High Byte Low Byte</u> SM <i>Times</i>	No return
EQ setting	AA 1A 01 <u>EQ</u> SM	No return
Select specified music	AA 07 02 <u>High Byte Low Byte</u> SM <i>Music NO.</i>	No return
Select device and path	AA 08 <u>Length Device Path</u> SM	No return
Switch to selected device	AA 0B 01 <u>Device</u> SM	No return
Select specified file to interlude	AA 16 03 <u>Device High Byte Low Byte</u> SM <i>Music NO.</i>	No return
Select specified path to interlude	AA 17 <u>Length Device Path</u> SM	No return

Select file but do not play	AA 1F 02 <u>High Byte Low Byte</u> SM <i>Music NO.</i>	No return
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## Check CMD

CMD	CODE	RESPONSE
Check Play State	AA 01 00 AB	AA 01 01 <u>State</u> SM
Check Device Online	AA 09 00 B3	AA 09 01 <u>Device</u> SM
Check Current Playing Device	AA 0A 00 B4	AA 0A 01 <u>Device</u> SM
Check Number Of all Music	AA 0C 00 B6	AA 0C 02 <u>High Byte Low Byte</u> SM <i>Music NO.</i>
Check Current Music	AA 0D 00 B7	AA 0D 02 <u>High Byte Low Byte</u> SM <i>Music NO.</i>
Check the first Music in Folder	AA 11 00 BB	AA 11 02 <u>High Byte Low Byte</u> SM <i>Music NO.</i>
Check Number of Music In Folder	AA 12 00 BC	AA 12 02 <u>High Byte Low Byte</u> SM <i>Music NO.</i>

## UART Tuning Tool

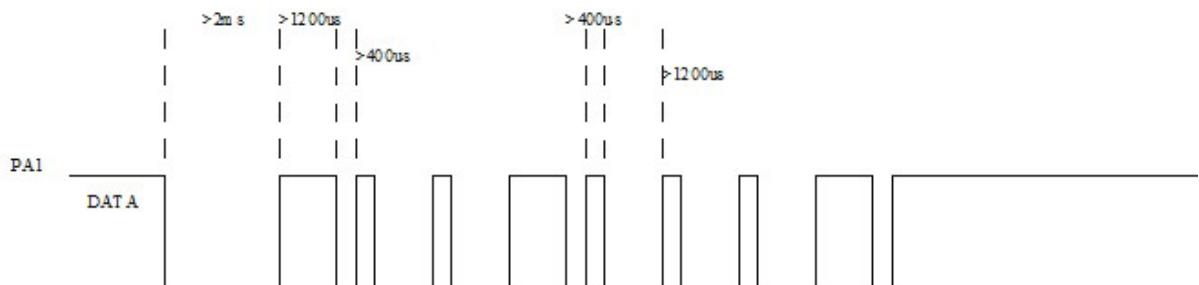


The detailed development data of UART mode, please check the "UART mode user's guide"

## 5.6 One\_line Mode

### One\_line control to play

Send the CMD as follow, send the low bit first. Send 89H as follow. The start flag is min 2ms.





## CMD format

CMD(HEX)	Function	Instruction
00	NO.0	
01	NO.1	
02	NO.2	
03	NO.3	
04	NO.4	
05	NO.5	
06	NO.6	
07	NO.7	
08	NO.8	
09	NO.9	
0A	Clear digital	Clear digital sent
0B	Select and enter	
0C	Volume Setting	
0D	EQ Setting	Setting function with digital
0E	Set cycle mode	
0F	Set channel	
10	Select music to	

	inter-cut	
11	Play	
12	Pause	
13	Stop	
14	Previous music	
15	Next music	
16	Previous directory	
17	Next directory	
18	SD card selected	
19	U Disk selected	
1A	FLASH selected	
1B	System sleep	
1C	End playing	

**NOTE: “Select music” and “Inter-cut” are based the name of music;  
For example, the music name is “00123.mp3”, send the data  
“0x01”“0x02”“0x03”“0x0B” in sequence to complete selecting  
music.**

**The detailed development data of One\_Line mode, please check the  
“One\_Line mode user’s guide”**