1. Product Features

Ø Product Support external SD card maximum capacity 1G ;

Ø Support playback 4Bit ADPCM format files ;

Ø Automatic Speech Recognition files ;

Ø loadable 6KHz ~ 32KHz, 36KHz sampling rate AD4 audio ;

Ø loadable 6KHz ~ 16KHz sampling rate WAV audio ;

Ø 16bitDAC and PWM audio output ;

Ø can store up to 512 segments voice ;

Ø WTV020-SD-20S, WTV020-SD-16P two kinds of module types ;

Ø Support micro-processor and key control ;

Ø can call any paragraphs voice to play ;

Ø Power-down save operation data capabilities ;

Ø loaded voice without software assistance, direct voice to the SD card can be placed ;

Ø Support files combination play, including mute combination ;

Ø Working voltage : DC2.5 ~ 3.6V;

Ø Quiescent Current : 16uA ( SD card is not inserted )

B , Product Overview

WTV020-SD module is a rewritable audio content of high-capacity storage type voice module, can plug a maximum capacity of 1GB SD card memory . Can load WAV format voice and AD4 voice format .

WTV020-SD module WTV020SD-20S voice chip as the master core, with MP3 control mode , one button control mode ( 3 paragraph 5 above voice with voice two kinds ) , power- loop control mode, and second-line serial control mode. Control mode is set when the chip sample preparation , and can not be switched during operation of various control modes , such as the need to control which mode to use , can be made ​​to the Division I .

MP3 control mode : a play / stop , next track , previous track , volume + , volume - and other functions.

One- button control mode ( three -voice ) : a key corresponding to trigger a voice , with a 3-band voice and adjust the playback volume addition and subtraction functions , all the buttons are by default not repeat trigger pulse .

One- button control mode ( five of voice ) : With three control methods , ⑴, all keys are triggering pulse can be repeated ; ⑵, all keys are play / stop trigger ( single not cycle ); ⑶, all keys are play / Stop ( singles can be recycled ) .

Power- loop control mode : After power , without triggering any I / O ports , a direct memory SD card automatically play all the voice , and has a point of power and memory playback function when power off and then power up automatically from the last power-down to continue playing voice . Has two control modes , ⑴, P04 has a pulse play / pause function ; ⑵, P05 has a level of play / pause function.

Two-wire serial control mode : the microcontroller through the CLK clock and data lines to send data on the DI WTV020-SD module control. Free to play any one address voice . Under this condition , can be combined voice playback.

Voice content updates directly through an SD card reader on a PC replacement. The module supports the FAT file system. Support 6KHz ~ 32KHz, 36KHz sampling rate AD4 voice and 6KHz ~ 16KHz sampling rate WAV audio that can automatically recognize the voice sampling rate and voice file format.

C , the application areas

WTV020-SD module can be used in automotive electronics ( burglar alarm, reversing radar , GPS navigation systems , electronic dog , central locking ) , intelligent home systems, home burglar alarm, human voice prompt medical devices , music players , home appliances ( cooker , rice cookers, microwave ovens ) , entertainment ( games, amusement machines ) , learning model ( early machines , children's audiobooks ) , intelligent transportation equipment ( toll stations , car parks ) , communications equipment ( telephone switches, telephones ) , industrial control areas ( elevators, industrial equipment ) , toys and other fields.

5, Package Pin

5.1, WTV020-SD-20S

Pin description:

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| 管脚 | 描述 | 功能 | 管脚 | 描述 | 功能 |
| 1 | DC+3.3V | +3.3V正电源输入 | 9 | GND | 地 |
| 2 | SPK+ | 音频输出 | 10 | DC+3.3V | +3.3V正电源输入 |
| 3 | P07 | I/O口 | 11 | SPK+ | 音频输出 |
| 4 | P03 | I/O口 | 12 | SPK- | 音频输出 |
| 5 | NC | 空 | 13 | P06 | BUSY输出 |
| 6 | NC | 空 | 14 | RST | 复位脚 |
| 7 | P02 | I/O口 | 15 | P04 | I/O口 |
| 8 | NC | 空 | 16 | P05 | I/O口 |

5.2, WTV020-SD-16P

Pin description

|  |  |  |  |
| --- | --- | --- | --- |
| 封装引脚 | 引脚标号 | 简述 | 功能描述 |
| 1 | /RESET | /RESET | 复位脚 |
| 2 | AUDIO-L | AUDIO-L | 悬空 |
| 3 | NC | NC | 空 |
| 4 | SP+ | PWM+ | PWM+音频输出脚/DAC音频输出正极 |
| 5 | SP- | PWM- | PWM-音频输出脚 |
| 6 | NC | NC | 空 |
| 7 | P04 | K3/A2/CLK | 按键/二线串口时钟脚 |
| 8 | GND | GND | 地线脚 |
| 9 | P07 | K5/A4/SBT | 按键触发脚 |
| 10 | P05 | K4/A3/DI | 按键/二线串口数据输入脚 |
| 11 | NC | NC | 空 |
| 12 | P03 | K2/A1 | 按键 |
| 13 | P02 | K1/A0 | 按键 |
| 14 | NC | NC | 空 |
| 15 | P06 | BUSY | 语音播放忙信号输出脚 |
| 16 | VDD | VDD | 电源输入脚 |

7, the control mode

7.1, MP3 mode

MP3 mode, WTV020-SD module automatically default to six I / O port function, the corresponding list is as follows:

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| I/O口 | P02 | P03 | P04 | P05 | P06 | P07 |
| 功能 | K1 | K2 | K3 | K4 | BUSY | K5 |
| 触发方式 | 下一曲 | 上一曲 | 音量+ | 音量- | ------ | 播放/停止 |
| 语音 | 下一段 | 上一段 | ------ | ------ | ------ | 当前段 |

BUSY is the signal detect output, when the voice playback, BUSY output is high, the voice can be connected to an LED status indicators, such as zero or receiving relay device, do the voice playback control output. The trigger status as shown below

7.1.1, play / stop trigger

Note: Negative pulse trigger. A negative pulse to start playing the next negative pulse ends. Whether the sound is being played or stopped, are in compliance with this rule.

7.1.2, the next one

Note: Negative pulse trigger. With a key trigger Play voice. A negative pulse trigger playback of a voice, the next pulse trigger to play the next segment of voice, repeat the operation finishes playing the last paragraph of the speech, it will demand to the first segment of voice, so the cycle triggers Play voice.

7.1.3, on a

Note: Negative pulse trigger. With a key trigger Play voice. A negative pulse trigger to play a voice, the next player on the pulse trigger a voice, repeat the operation, the most finished playing before a voice, a voice will demand to the last, and so trigger the playback voice.

7.2, one-button mode (three-voice)

One-button mode (three-voice), low I / O ports P02, P03, P07, respectively trigger three paragraphs voice, P04, P05 for the volume control, the specific features are as follows:

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| I/O口 | P02 | P03 | P04 | P05 | P06 | P07 |
| 功能 | K1 | K2 | K3 | K4 | BUSY | K5 |
| 触发方式 | 脉冲不可重复 | 脉冲不可重复 | 音量- | 音量+ | ----- | 脉冲不可重复 |
| 语音 | 第1段 | 第2段 | ----- | ----- | ----- | 第3段 |

Keys K1, K2, K5 are unrepeatable trigger pulse , BUSY signal detection for the output, when the voice playback , BUSY output is high , the voice can be connected to an LED status indication , or connect to the relay and other components in the voice playback a control output. Pulse unrepeatable trigger status as shown below.

7.2.1 , unrepeatable trigger pulse timing diagram

Note : Negative pulse trigger . When the I / O port detects a falling edge ( eg , the I / O port is shorted to ground it ) , triggering Play voice. During the voice playback , I / O port again falling edge is detected , the action is invalid. Voice stopped , I / O port detects a negative pulse will again play voice .

7.3 , one- button mode ( five paragraphs voice )

One- button mode ( five paragraphs voice ) can play a key control a voice , provides up to five segments voice control . When the voice playback , BUSY output is high , the voice can be connected to an LED status indication , or connect to the relay and other components , do the voice playback control output .

There are three operating modes:

⑴, all keys trigger pulse can be repeated ;

⑵, all the buttons to play / stop ( singles not cycle ) ;

⑶, all the buttons to play / stop ( singles can be recycled ) .

7.3.1 , all the keys for the trigger pulse can be repeated

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| I/O口 | P02 | P03 | P04 | P05 | P06 | P07 |
| 功能 | K1 | K2 | K3 | K4 | BUSY | K5 |
| 触发方式 | 脉冲可重复 | 脉冲可重复 | 脉冲可重复 | 脉冲可重复 | ----- | 脉冲可重复 |
| 语音 | 第1段 | 第2段 | 第3段 | 第4段 | ----- | 第5段 |

7.3.2, repeatable trigger pulse timing diagram

Note: Negative pulse trigger, when the I / O port detects a falling edge (eg, the I / O port is shorted to ground it), triggering Play voice. During the voice playback, I / O ports to a falling edge is detected again, re-triggered playback of the current segment voice.

7.3.3, all the buttons to play / stop (singles not cycle)

Trigger I / O port, you can make the corresponding voice playback, triggered again to stop playback voice. Table in the "Play / Stop" for the non-loop mode, ie voice playback again, automatically stop working.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| I/O口 | P02 | P03 | P04 | P05 | P06 | P07 |
| 功能 | K1 | K2 | K3 | K4 | BUSY | K5 |
| 触发方式 | 播放/停止 | 播放/停止 | 播放/停止 | 播放/停止 | ----- | 播放/停止 |
| 语音 | 第1段 | 第2段 | 第3段 | 第4段 | ----- | 第5段 |

7.3.4, Play / Stop (singles not cycle) Trigger Timing Diagram

Note: Negative pulse trigger, when the I / O port detects a falling edge (eg, the I / O port is shorted to ground it), the trigger playback of voice, voice playback End again, the automatic stop action. In the voice playback, if a falling edge is detected again, stop playback voice. Again the I / O port trigger, then played from the beginning of the paragraph voice. Control mode so the cycle progressive.

7.3.5, all the buttons to play / stop (singles can be recycled)

Trigger I / O port, you can make the corresponding voice playback, triggered again to stop playback voice. Table in the "Play / Stop" for the playback mode can be recycled, that voice played once, if not triggered again to stop it, the voice will always loop.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| I/O口 | P02 | P03 | P04 | P05 | P06 | P07 |
| 功能 | K1 | K2 | K3 | K4 | BUSY | K5 |
| 触发方式 | 播放/停止 | 播放/停止 | 播放/停止 | 播放/停止 | ----- | 播放/停止 |
| 语音 | 第1段 | 第2段 | 第3段 | 第4段 | ----- | 第5段 |

7.4, the power loop playback mode

Power-loop mode, the power can directly play the voice, and will automatically loop player, SD card memory all playable voice. The first trigger associated I / O port, perform suspend action triggered again, it will continue to loop playback from the paused voice. With power and memory playback, power after power-on, power-off from the last time to continue playing. At power-loop mode, the need to create a ". TXT" text document, text document content can be empty, and rename it to "1111.AD4", and together with other AD4 audio, placed together to the SD card root directory in order to make the power loop playback mode is in effect.

In accordance with the play / pause control, can be divided into

1. , pulse trigger play / pause mode

⑵, level triggered play / pause mode

7.4.1, pulse trigger play / pause mode

Automatic power-play voice, with a negative trigger pulse P04, pause the voice, triggered again, to resume it from voice. As long as the voice on the playback status, it will execute the loop command.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| I/O口 | P02 | P03 | P04 | P05 | P06 | P07 |
| 功能 | ------ | ------ | K1 | ------ | BUSY | ------ |
| 触发方式 | ------ | ------ | 播放/暂停 | ------ | ----- | ------ |
| 语音 | ------ | ------ | 所有语音 | ------ | ----- | ------ |

7.4.2, pulse trigger play / pause mode timing diagram

Note: Negative pulse trigger. Automatic power-play voice, play all the contents of the SD card is executed when loop playback mode, the first with a negative trigger pulse P04, voice paused, again with a negative pulse trigger P04, continue the fight paused playback voice control mode so the cycle progressive. When all voice playback is finished, automatically start playing from the first paragraph.

7.4.3, level triggered play / pause mode

Automatic power-play voice, with a low trigger P05, pause the voice, P05 recovery is high, it continues to play a voice from the point of suspension. As long as the voice on the playback status, it will execute the loop command.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| I/O口 | P02 | P03 | P04 | P05 | P06 | P07 |
| 功能 | ------ | ------ | ------ | K1 | BUSY | ------ |
| 触发方式 | ------ | ------ | ------ | 播放/暂停 | ------ | ------ |
| 语音 | ------ | ------ | ------ | 所有语音 | ------ | ------ |

7.4.4, level triggered play / pause mode timing diagram

Note: level triggered. Automatic power-play voice, play all the contents of the SD card when the execution loop mode, the P05 is placed low voice paused, P05 is high and continue from where you paused playback voice control mode so the cycle progressive. When all voice playback is finished, automatically start playing from the first paragraph.

7.5, second-line serial control

Including 2-wire serial communication lines triggered, ie the clock CLK and data DI. In addition, there is a reset line. If the chip is reset within 1S no trigger to enter dormancy. Keys section, on one and the next one has the power and memory function, if the power to the front on an on-demand voice in paragraph 7, then power off and then power on, press on one, you can directly demand first 6 of voice.

7.5.1, I / O port correspondence table

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| I/O口 | P02 | P03 | P04 | P05 | P06 | P07 |
| 功能 | K1 | K2 | CLK | DI | BUSY | K3 |
| 触发方式 | 下一曲 | 上一曲 | 串口通讯 | 串口通讯 | ------ | 播放/停止 |
| 语音 | 下一段 | 上一段 | ------ | ------ | ------ | 当前段 |

7.5.2, voice address correspondence table

SD card can be placed 512-voice, a voice file named decimal place, such as 0000.AD4, 0001.AD4 so on. Microcontroller send data trigger, you need to send a voice file name with the corresponding 16-bit binary data. MCU control end signal CLK signal is transmitted simultaneously with the DI, DI data must first low fat high recurrence. No hair code when CLK is high with DI should be placed.

|  |  |  |  |
| --- | --- | --- | --- |
| 语音地址 | 触发状态 | 文件名 | 触发数据（二进制） |
| 地址1 | 播放第1段语音 | 0 | 0 |
| 地址2 | 播放第2段语音 | 1 | 1 |
| 地址3 | 播放第3段语音 | 2 | 10 |
| 地址4 | 播放第4段语音 | 3 | 11 |
| …… | …… | …… | …… |
| 地址509 | 播放第509段语音 | 508 | 111111100 |
| 地址510 | 播放第510段语音 | 509 | 111111101 |
| 地址511 | 播放第511段语音 | 510 | 111111110 |
| 地址512 | 播放第512段语音 | 511 | 111111111 |
| 命令码 | 功能 | 描述 |
| FFF0H～FFF7H | 音量调节 | 在语音播放或者待机状态发此命令可以调节8级音量，FFF0H最小，FFF7H音量最大。 |
| FFFB | 所有循环 | 让SD卡里面的所有音频文件循环播放 |
| FFFC | 停止循环 | 可以停止正在循环播放的命令，包括单曲和所有循环。 |
| FFFD | 单曲循环 | 使当前正在播放的语音循环播放。 |
| FFFEH | 播放/暂停 | 播放、暂停当前的地址语音。 |
| FFFFH | 停止 | 停止播放语音命令。 |