JQ8400-FL voice chip manual V1.5

First, the chip features

- ◆ Support MP3 WAV hardware decoding
- ◆ Support FAT file system
- ◆ Support sampling rate (KHz): 8/11.025/12/16/22.05/24/32/44.1/48
- ◆ 24-bit DAC output internal DSP hardware decoding, non-PWM output, dynamic range support 90dB, letter 85dB
- ◆ Multiple control modes, two-wire serial port mode, one-line serial port control
- ◆ Support SPIFLASH simulation into U disk, directly update SPIFLASH as U disk
- ◆ Supports previous song, next song, play, pause, stop, selection, etc.
- ◆ Support for track number acquisition, total track and total track listing, etc.
- ◆ Support various information queries and easily obtain the current state of the voice chip
- ◆ Supports the insertion of specified tracks, that is, you can pause the currently playing music, play the inserted tracks, and return after playback. Play back at the original track breakpoint
- support for Chinese and English path insertion, in addition to the specified track insertion, but also supports the specified path insert, only need to sen

 The path to insert broadcasts can be easily implemented
- ◆ Support the specified Chinese and English path to play, do not need to know the serial number of the content to be played, directly send the path You can.
- Support intelligent combination play, the combination of songs in a specific folder, send the track name can be combined.
- ◆ Support 30 levels of volume adjustment
- ◆ Support 5 kinds of EQ adjustment
- ◆ Support 7 kinds of playback mode control, can adapt to different applications
- ◆ Support cycle setting, more applications, more humane
- ◆ Support system deep sleep, the current after sleep is as low as 600 microamperes, can wake up through the serial string and instruction IO
- ◆ Support fast forward and rewind at specified time
- ◆ Support repeat reading for a specified period of time
- ◆ Supports specifying playback from the specified point in time
- ◆ Dedicated BUSY signal output indication
- ◆ Mature instructions and instruction parsing make applications more stable
- ◆ Special matching upper computer, quick start, convenient debugging, automatic generation of instructions

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Second, examples of applications

1, car navigation voice broadcast;

2, road transport inspection, toll station voice prompts;

3, voice prompts for security check at the train station and bus station;

4. Voice prompts for power, communications, and financial offices;

5. Verification of voice prompts for vehicles entering and exiting the channel;

6, public security border inspection voice prompts;

7. Multi-channel voice alert or device operation guide voice;

8. Electric sightseeing car safety driving voice announcement;

9, automatic mechanical and electrical equipment failure alarm;

10, fire alarm voice alarm;

11, automatic broadcast equipment, time broadcast;

12, treadmill voice navigation;

Three. Chip instructions

The JQ8400 voice chip selects the SOC solution, integrates a 16-bit MCU, and a dedicated pin

The audio decoding ADSP uses a hard decoding method to ensure the stability and sound quality of the system. Small size

More meet the needs of embedding other products.

SPI-flash change voice content

The biggest advantage of this chip is that it can flexibly replace voice content in SPI-flash, eliminating the need for traditional voice. The chip needs to install the host computer to change the voice troubles. SPI FLASH simulates the U disk directly, just like copying the U disk. Very convenient. Makes product development and production easy and simple. One-line serial port control mode, RX232 serial port control Optional, provide more selectivity for research and development.

Connect the USB data cable to the chip and plug in the computer. The computer will automatically recognize it as shown in the following figure:

Then double-click on the new disk and copy the sound you want to place.

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Fourth, hardware parameters

name parameter

MP3 file format	Sample Rate Support	(KHZ): 8/11.025/12/16/22.05/24/32/44.1/48
-----------------	---------------------------------------	---

3, support Normal, Jazz, Classic, Pop, Rock and other audio effects

USB interface 2.0 standard

UART interface One-line serial port, standard serial port, TTL level

Input voltage DC 3.3-5.5V is best 4.2V, IO level is 3.3V

Rated current: 500uA; Operating current: 10MA

IC package Standard SOP16

Operating temperature -40 degrees to 85 degrees

humidity $5\% \sim 95\%$

Five, chip pin description

Pins	Marked	Instructions
1	P01	SPIFLASH data pin
2	P00	SPIFLASH clock pin
3	P35	SPIFLASH Chip Select
4	P02	Busy signal pin, high for playback, low for others
5	USBDM	USB DM feet
6	USBDP	USB DP pin

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JQ840 00-FL voiceSound chip uManual V1.5

7	VCOM	AudidDrandupling capacitor	
8	AGND	Simulated ghoudinal frequency	
9	DACL	DAC audi Ownpondel Rhoundnel	
10	DACR	DAC audi Output righ Robdnnel	
11	3.3V	Internal DO output 3V, current 100mA	
12	VMCU	Cônip supply più.3-5. 0V	
13	GND	po @ensup ply	

14	P24	Chip Serial port Fandingofinatet RXM6df
15	P25	Chip String port receMicig/Seet TX foot
16	VPP	StringSerial port

six,One-line seri@bpuntunjuatioroAssociation

 $Sda\ Send\ data\ Send\ port,\ se \textbf{Se} dnd\ voice\ add \textbf{Sess} d\ low\ \textbf{finist}\ The\ follow \textbf{finist}\ The\ follow \textbf{Sessend}\ property and \textbf{Sessed}\ property and \textbf{Sess$

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00	Number 0	Numbers 0-9 can be used
01	Number 1	To the function of numbers, than Such as selection, setting tone
02	Number 2	Quantity, setting EQ, setting
03	Number 3	Cycle mode, settings pass Channel, setting up an episode
04	Number 4	Head, starting with digital
05	Number 5	Functional instructions
06	Number 6	
07	Number 7	
08	Number 8	
09	Number 9	
0A	Clear the number	Clear the sent number
0B	Selection confirma	ntion Match

0C	Set the volume	Together
0D	Set up EQ	number
0E	Set the cycle mode	word
0F	Set up the channel	real
10	Set up an episode	Now
11	Playing	
12	time out	
13	stop	
14	previous piece	

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15	next track	Control instructions:
16	Previous directory	$0x00\sim0x09$: Only indicated The number $0\sim9$.
17	Next directory	0x0a: for
18	Select SD card	Single-byte control instructions for clearing Empty the last received number.
19	Select U disk	0x0b~0x10: multiple words Section control instructions, need and
1A	Select FLASH	Use 0x00~0x09.
1B	System sleep	0x11~0x1c: is Single-byte control instructions, just
202		To send a control instruction

can.

One-line serial port MP3 file naming rules:

The file name must be 5 digits, which is the track number of the file. Selection Play Instruction (0xb) is identified by this number. As shown below.

```
To put it in the root directory, open the drive letter.
Example 1: Setting the Volume to 20
The procedure is as follows: Clear Digital -> Volume 20 -> "Set Volume" control command.
Send code
                0x0A - > 0x02 - > 0x00 - > 0x0C
Using the microcontroller to send the function is as follows:
SendData(0x0a);
SendData(0x02);
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                    JQ8400-FL voice chip manual V1.5
SendData(0x00);
SendData(0x0c);
Before using a multi-byte control instruction, it is best to send the "Clear Digit" instruction first and then send the new number.
Example 2: Select Track Number 2 Play
The procedure is as follows: Clear number -> "chore play" control instruction.
Send code
               0x0A - > 0x02 - > 0x0b
Using the microcontroller to send the function is as follows:
SendData(0x0a);
SendData(0x02);
SendData(0x0b);
  Selected track number 15 Play
SendData(0x0a);
SendData(0x01);
SendData(0x05);
SendData(0x0b);
Example 3: Start playing
The steps are as follows: "Start play" control instruction.
Send code
                        0x11
                                                . Just send a 0x11.
Using the microcontroller to send the function is as follows:
C51 Send Subfunction Description: For using different frequencies, different types of microcontrollers need to be modified
```

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Delay1us delay function.

```
Void Delay lus ( int T )//Delay function {
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```

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```
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   While ( T-- );
Void SendData (u8 addr )//send function.
   U8 i;
   EA = 0; /* Turn off interrupts when sending to prevent interrupts affecting timing. */
   Sda = 1;/* starts to pull up */
   Delaylus (1000);
   Sda = 0;/* start boot code */
   Delay1us (2200); /* where the delay is at least 2ms, the delay of this parameter is 310ms */
   For (i = 0; i < 8; i++) /*8 data total*/
      Sda = 1;
      If (addr & 0x01) /*3:1 represents data bit 1, each bit is represented by two pulses */
          Delay1us ( 500 );
          Sda = 0;
          Delay1us (210);
      Else
                       /*1:3 indicates data bit 0, each bit is represented by two pulses */
          Delay1us (210);
          Sda = 0;
          Delay1us (500);
      Addr>>=1;
```

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```
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```

```
Sda = 1;
EA = 1; // Resume interrupt
```

A serial line instructions and precautions:

- 1, because it is the test pulse width ratio, it is recommended to use the oscilloscope debug for the first time.
- 2. The delay requirement of the pilot code is greater than 2MS. 4MS delay is recommended.
- 3, pulse ratio base number can be identified in 2-5, for example, 4:1 will be recognized as 1
- 4, the function sending process is recommended to close the relevant interrupt, so as not to affect the waveform accuracy
- 5. The delay between two bytes is recommended to be above 10MS.
- 6, Delay1us (); function is written according to the customer's own MCU, subject to the actual test
- 7, the instructions are single-byte operations, such as the previous song as long as sending 0x14
- 8. Song selection operation: firstly send the corresponding track number, and then send the selection song confirmation (0x0B), other required numbers With the method can be operated in this way

Seven, two-wire serial communication

Two-wire serial port to specify the path to play

- 1. The two-wire serial port supports Chinese and English numbers and other groups. It is recommended that the folder name and file name should not be The client uses two characters plus a combination of *.
- 2, if the folder or file name with the letter, the letter requires all uppercase
- 3, pay attention to the format in front of no point, pay attention to the back of the three question marks and letter input method to switch to English
- 4, the corresponding instruction can be generated by the host computer

For example: /Advertisement / Xiaomi mobile phone.mp3, can be formatted as follows

/Advertisement*/MiMi*???, "Advertisement*" represents the folder where the first two words are "Advertisement", * is a wildcard,

"Millet *???" represents the first two words of the document "millet" file, the latter three? The number indicates that the format is not limited, The chip supports both MP3 and WAV formats.

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/ABCD*/ASSD*???

/test*/ADSS*???

Two-wire serial combo player

Combine play is combined by file name. The file request is stored under the "ZH" folder and the files to be combined can be combined.

The name is changed to a two-byte name and it is generally recommended to use numbers. Such as: 01.mp3,02.mp3, you can also use two

One letter or one character is named.

Chip communication uses full duplex serial communication;

Baud rate is 9600, data bits: 8, stop bit 1, check bit N

7.1 Communication Format

Start Code - Instruction Type - Data Length (n) - Data 1 - Data n- and Check (SM)

Script: Fixed to AA

Instruction Type: Used to distinguish instruction types

Data Length: The number of bytes of data in the instruction

Data: The relevant data in the instruction, when the data length is 1, it means only CMD, there is no data bit

And check: the lower 8 bits of the sum of all the previous bytes, ie, the lower 8 bits after the start code is added to the data

Data format: data or command sent, high 8 bits in front, low 8 bits in

7.2 Communication Mechanism

1, we as a slave processing, power-on default wait state, all playback operations are controlled by the host.

2. The slave will not initiate communication, all communication is initiated by the host.

3, the serial port is a 3.3V TTL level, if the host system is 5V level, in the middle of the string 1K resistance.

4. Unless otherwise specified, all data in the protocol represents hexadecimal data

7.3 Agreement

The following is the data definition returned and recognized by this chip.

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Play status definition: System is powered off

00 (stop) 01 (play) 02 (pause)

Drive letter definition: Stopped after switching the drive letter

USB: 00 SD: 01 FLASH: 02 NO_DEVICE: FF

Volume: The volume is a total of 31 levels, 0-30 levels, and the default is 20 levels for power-on

Play mode definition: Power on default is single stop

Full-cycle (00): Plays whole tracks in sequence, looping after playing

Single cycle (01): Plays the current track continuously

Single stop (02): Stops the current track once

Full random (03): Randomly play tracks within the drive letter

Directory loop (04): Plays the tracks in the current folder in order, loops after playing, and the directory does not contain subdirectories

Random directory (05): Random play within the current directory, directory does not contain subdirectories

Directory sequential play (06): play the tracks in the current folder in order, stop after playing, the directory does not contain subdirectories

Sequential playback (07): Play the entire track in order, stop after playing

EQ Definition: NORMAL(00) POP(01) ROCK(02) JAZZ(03) CLASSIC(04)

Power on default EQ is NORMAL(00)

DAC output channel definition: Power on defaults to MP3 playback channel (00)

MP3 Play Channel (00): Play MP3 channel, the sound output by DAC is music play sound

AUX channel (01): The sound output from the DAC is the input sound of P26 and P27

MP3+AUX(02): AUX channel MP3 is turned on at the same time, the sound output from the DAC is the music playback sound and P26, P27 input sound mixing output

Combined Play Definition: Combine playback is combined by file name. The file request is stored under the "ZH" folder.

Change the name of the file to be combined to a two-byte name, which is generally recommended to be represented by a number. Such as:

01.mp3,02.mp3 can also be named with two letters or a Chinese character.

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7.4 Communication Instructions

Query play status (01)

Directive: AA 01 00 AB

Returns: AA 01 01 Play Status SM

Note: The current playback status can be queried at any time

Play (02)

Instruction: AA 02 00 AC

Return: None

Description: Send this command at any time will start the current track from the beginning

Suspension (03)

Instruction: AA 03 00 AD

Return: None

Stop (04)

Directive: AA 04 00 AE

Return: None

Previous (05)

Directive: AA 05 00 AF

Return: None

Next song (06)

Instruction: AA 06 00 B0

Return: None

Designated tracks (07)

Command: AA 07 02 Tracks High Track Low SM

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Return: None

For example: AA 07 02 00 08 BB specifies the 8th letter of the current drive, the number of tracks from 1-65535

Specify the drive letter to specify the path to play (08)

Command: AA 08 length letter path SM

Return: None

Description: length = drive length + path length = 1 + path length

For example: /Advertisement / Xiaomi mobile phone.mp3, can be formatted as follows

/Advertisement*/MiMi*???, "Advertisement*" means that the first two words are "Advertisement Folders", and * is a wildcard.

"Millet *???" represents the first two words of the document "millet" file, the latter three? The number indicates that the format is not limited, The chip supports both MP3 and WAV formats. Use the upper computer to take the module data as follows:

The instructions generated by the upper computer are: 0xAA, 0x08, 0x10, 0x01, 0x2F, 0xB9, 0xE3, 0xB8, 0xE6, 0x2A, 0x2F 0xD0 0xA1 0xC3 0xD7 0x2A 0x3F 0x3F 0x3F 0x77

The specific format and method refer to the attached "JQ8400 Path Format Description.PDF"

Query current online drive letter (09)

Directive: AA 09 00 B3

Returns: AA 09 01 Drive letter SM

Note: The online drive letter is distinguished by bits: USB:BIT(0) SD:BIT(1) FLASH:BIT(2)

This function can know the current online drive letter. It is recommended to check the online drive letter before switching the drive letter.

Query the current drive letter (0A)

Instructions: AA 0A 00 B4

Returns: AA 0A 01 drive letter SM

Switch to the specified drive letter (0B)

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Command: AA 0B 01 drive letter SM

Return: None

Description: Drive letter switching instruction. If the current drive letter is online, you can switch to the corresponding drive letter to wait for playing. After the first track, it is recommended to check whether the drive letter is online before switching.

E.g:

AA 0B 01 00 B6 Switch to U disk and stop after switching

AA 0B 01 01 B7 Switch to TF card, stop after switching

AA 0B 01 02 B8 Switch to FLASH card, stop after switching

Query the total track (0C)

Instruction: AA 0C 00 B6

Returns: AA 0C 02 total track high total track low SM

Query the current track (0D)

Instruction: AA 0D 00 B7

Returns: AA 0D 02 Tracks High Track Low SM

Previous folder directory (0E)

Directive: AA 0E 00 B8

return:

Description: The first song in the folder will be played after switching

Next Folder Directory (0F)

Command: AA 0F 00 B9

return:

Description: The first song in the folder will be played after switching

End play (10)

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Directive: AA 10 00 BA

Explanation: This instruction can end the current operation in advance and end the current playback. If it is in the insert, it will lead to early

Beam insertion returns to its original state

Query the folder track (11)

Directive: AA 11 00 BB

Returns: AA 11 02 Tracks High Track Low SM

Description: The serial number of the first song in the current directory

Query folder directory total track (12)

Directive: AA 12 00 BB

Returns: AA 12 02 Tracks High Track Low SM

Description: This track does not include the number of files in the subdirectory

Volume setting (13):

Command: AA 13 01 VOL SM

Return: None

For example: AA 13 01 14 D2 sets the volume to 20 levels

Volume plus (14):

Directive: AA 14 00 BE

Return: None

Volume reduction (15):

Directive: AA 15 00 BF

Return: None

Specify track insertion (16):

Command: AA 16 03 Drive Track High Track Low SM

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Return: None

For example: 9th in AA 16 03 00 00 09 CC Insert U disk

Description: Return to the insertion point to continue playing after the end of the insertion

Specify path insertion (17):

Command: AA 17 length letter path SM

Return: None

Description: length = drive length + path length = 1 + path length

The instructions sent are: 0xAA, 0x17, 0x10, 0x02, 0x2F, 0xB9, 0xE3, 0xB8, 0xE6, 0x2A, 0x2F, 0xD0, 0xA1, 0xC3, 0xD7, 0x2A, 0x3F, 0x3F, 0x3F, 0x87,

End of insertion:

Instruction: end playing instruction

Return: None

Note: In the process of inserting, you can end the in advance

Set the loop mode (18):

Instruction: AA 18 01 Loop Mode SM

Return: None

Example: Set to single stop: AA 18 01 03 C6

Set the number of loops (19):

Directive: AA 19 02 times high times low SM

Return: None

Note: This command is valid only when the playback mode is full-circle, single-loop, or directory-loop.

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For example: AA 19 02 00 06 CB cycle 6 times

EQ settings (1A)

Directive: AA 1A 01 EQ SM

Return: None

For example: AA 1A 01 02 C7 Set EQ to ROCK

Combined play (1B)

Instruction: AA 1B Length Track 1 Name High byte, Track name 1 Low byte..... Track n Name High byte, Song

Item n Name Low byte SM

Return: None

For example: AA1B04303130328C, the file name is "01", "02" song combination play

Note: The file name combination is much more convenient, more accurate than the file serial number group, and is not limited by the copy order.

End Combined Play (1C)

Directive: AA 1C 00 C6

Return: None

Description: The knot speed combined play, return to the play status before combination

Set the channel (1D)

Command: AA 1D 01 Channel SM

Return: None

Query song short file name (1E)

Directive: AA 1E 00 C8

Returns: AA 1E Short Filename Length Short Filename SM

Songs are not played (1F)

Command: AA 1F 02 Tracks High Track Low SM

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Return: None

Repeat Control (20)

Command: AA 20 04 Start minute Start second End minute End second SM

Return: None

End Repeat (21)

Directive: AA 21 00 CB

Return: None

Specified time rewind (22)

Command: AA 22 02 Time High 8 Bit Time Low 8 Bit SM

Return: None

Description: The unit is second

Specify time to fast forward (23)

Command: AA 23 02 Time High 8 Bit Time Low 8 Bit SM

Return: None

Description: The unit is second

Get the total current track time (24)

Instruction: AA 24 00 CE

Returns: AA 24 03 hours, minutes and seconds SM

Open play time send (25)

Instruction: AA 25 00 CF

Returns: AA 25 03 hours, minutes and seconds SM

Description: Opens the broadcast time and automatically returns when the time is updated.

Turn off play time send (26)

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Instruction: AA 26 00 D0

Return: None

Description: Turn off the broadcast time to send

Special supporting upper computer, quick start, convenient debugging, automatic generation of instructions, as shown below:

Eight, schematic example
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Need a big picture to ask the staff

Nine, chip package size chart

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