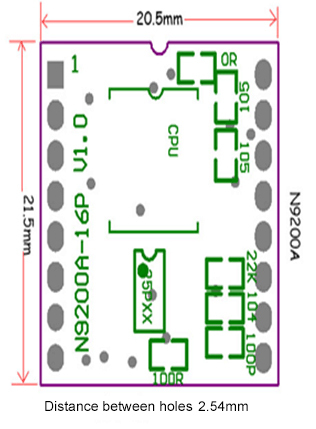
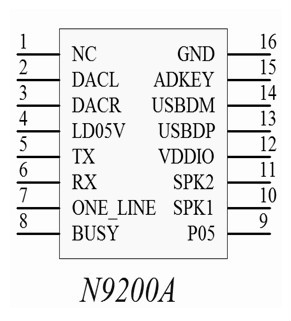
**1 Introduction**   
N9200 is a provider of serial chip MP3, perfectly integrated hardware decode MP3, WMV's. While the software supports TF card driver to support direct computer updates SPI flash support FAT16, FAT32 file system. Can be accomplished by a simple serial UART serial command line instructions or play the specified music, as well as how to play music and other functions, without the cumbersome underlying operating, beautiful sound, easy to use, stable and reliable is the most important feature of this product. In addition, this chip is the depth of customized products, designed for fixed voice playing field to develop low-cost solutions.   
  
**2 features**   
◆ supports sampling rates (KHz): 8/11.025/12/16/22.05/24/32/44.1/48 sound, stereo.   
◆ 24-bit DAC output, internal DSP hardware decoding, non PWM output, dynamic range support 90dB, 85dB SNR support   
◆ fully supports FAT16, FAT32 file system, maximum support 32G TFcard, support U disk to 32G   
◆ variety of control modes, UART serial mode, line serial mode, AD key control mode   
◆ Broadcast language spots feature, you can pause the background music is playing, song playback support under the specified path, the letter of support across the spots, spots ahead of the end support   
◆ Specify the time to play   
◆ Specify the drive to play, specify playback tracks   
◆ 30 level volume adjustable, five kinds of EQ adjustable (NORMAL-POP-ROCK-JAZZ-CLASSIC)   
◆ Specify the path players (support in English)   
◆ Folder Switching   
◆ specified period of time to repeat   
◆ support computer sound card control, support USB mass storage   
◆ Support trigger not interrupt play 

**3 application**   
1, car navigation voice broadcast   
2, road transport inspectors, toll voice prompts;   
3, train station, bus station security check voice prompts;   
4, electric power, telecommunications, financial operating room voice prompts;   
5, vehicle entrance, the tunnel authentication voice prompts;   
6, public security frontier passage voice prompts;   
7, multi-channel voice alarm or voice guidance equipment operation;   
8, electric sightseeing bus safety with voice notices;   
9, electrical and mechanical equipment failure automatic alarm;   
10, fire alarm voice;   
11, automatic broadcasting equipment, regular broadcast 

**4 circuit parameters**

|  |  |
| --- | --- |
| Name | Parameters |
| MP3 file format | 1, supports all bit rates 11172-3 and ISO13813-3 layer3 audio decoding |
| 2, the sampling rate support (KHZ): 8/11.025/12/16/22.05/24/32/44.1/ 48 |
| 3, support Normal, Jazz, Classic, Pop, Rock, etc. Sound |
| UART interface | Standard serial port, TTL level, the baud rate can be set |
| Input voltage | 3.5V-5V power supply in the best of 4.2V |
| Rated current | 20ma |
| Size | Standard DIP16 / DIP28 package |
| Speaker power | 8 ohms / 3 watts |
| Operating temperature | -40 Degrees to 80 degrees |
| Humidity | 5% to 95% |

**5 module pin map**   


**6 module Pin Description**   
**6.1** **Table I, N9200A-16P MP3 module Pin Description**

|  |  |  |  |
| --- | --- | --- | --- |
| Pin Number | Pin Name | function descriptor | Remark |
| 1 | NC | No connection |  |
| 2 | DACL | Audio output left channel | Drive headphones, amplifier |
| 3 | DACR | Right channel audio output | Drive headphones, amplifier |
| 4 | LD05V | Module power input | Power caps |
| 5 | TX | UART serial port | Data output |
| 6 | RX | UART serial port | Data Entry |
| 7 | ONE\_LINE | Serial input line | MCU control |
| 8 | BUSY | Busy Signal | Audio output is low, no audio output high |
| 9 | P05 | AD mouth |  |
| 10 | SPK1 | Speaker + | Direct drive 2W / 8R less horn |
| 11 | SPK2 | Speaker - |  |
| 12 | VDDIO | Module power input | Not exceed 5.2V |
| 13 | USBDP | U disk data port |  |
| 14 | USBDM | U disk data port |  |
| 15 | ADKEY | AD button |  |
| 16 | GND | Ground | Power Ground |

**6.2** **Table II, N9200B-28P MP3 module pin map**

|  |  |  |  |
| --- | --- | --- | --- |
| Pin Number | Pin Name | function descriptor | Remark |
| 1 | NC | No connection |  |
| 2 | NC | No connection |  |
| 3 | NC | No connection |  |
| 4 | NC | No connection |  |
| 5 | NC | No connection |  |
| 6 | NC | No connection |  |
| 7 | NC | No connection |  |
| 8 | DACL | Audio output left channel | Drive headphones, amplifier |
| 9 | DACR | Right channel audio output | Drive headphones, amplifier |
| 10 | LDO5V | Module power input | Power caps |
| 11 | TX | UART serial port | Data output |
| 12 | RX | UART serial port | Data Entry |
| 13 | ONE\_LINE | Serial input line | MCU control |
| 14 | BUSY | Busy Signal | Audio output is low, no audio output high |
| 15 | GND | Ground | Power Ground |
| 16 | ADKEY | AD mouth |  |
| 17 | USBDM | U disk data port |  |
| 18 | USBDP | U disk data port |  |
| 19 | VDDIO | Module power input | Not exceed 5.2V |
| 20 | SPK2 | Speaker + | Direct drive 1W / 8R less horn |
| 21 | SPK1 | Speaker - | Direct drive 1W / 8R less horn |
| 22 | P05 | AD mouth |  |
| 23 | NC | No connection |  |
| 24 | NC | No connection |  |
| 25 | NC | No connection |  |
| 26 | NC | No connection |  |
| 27 | NC | No connection |  |
| 28 | NC | No connection |  |

**7 control instructions**  **7.1** **Key Control**   
Module we use the AD key way to replace the traditional matrix keyboard connection, this has the advantage of full use of the increasingly powerful MCU AD function. Design simple but not simple, module 2 AD port default configuration, the resistance assigned 10 buttons, if used in strong electromagnetic interference or strong inductive, capacitive load situations, please refer to our "Notes."   
(1), ADKEY reference schematics   
  
**7.2 serial control line**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| MP3 nine-cell line serial command table | | | | | |
| Tracks command | | Volume instruction | | Playback Functions | |
| Instruction | Features | Instruction | Features | Instruction | Features |
| 0X01 | Select track 1 | 0XD2 | Volume is 0 | OXF1 | Switch to the U disk |
| 0X02 | Select track 2 | 0XD3 | Volume 1 | OXF2 | Switch to SD |
| 0X03 | Select track 3 | 0XD4 | Volume 2 | OXF3 | Switch to MP3 mode |
| 0X04 | Select track 4 | 0XD5 | Volume 3 | OXF4 | Switch to flash mode |
| 0X05 | Select track 5 | 0XD6 | Volume 4 | OXF5 | Next EQ |
| 0X06 | Select track 6 | 0XD7 | Volume 5 | OXF6 | Full cycle |
| 0X07 | Select track 7 | 0XD8 | Volume 6 | OXF7 | Single cycle |
| 0X08 | Select track 8 | 0XD9 | Volume 7 | OXF8 | On a |
| 0X09 | Select track 9 | 0XDA | Volume 8 | OXF9 | Under a |
| 0X0A | Select track 10 | 0XDB | Volume 9 | OXFA | Broadcast |
| 0X0B | Select track 11 | 0XDC | Volume 10 | OXFB | time out |
| 0X0C | Select track 12 | 0XDD | Volume 11 | OXFC | Stop |
| 0X0D | Select track 13 | 0XDE | Volume 12 | OXFD | On a folder |
| 0X0E | Select track 14 | 0XDF | Volume 13 | OXFE | Next folder |
| 0X0F | Select track 15 | 0XE0 | Volume 14 |  |  |
| 0X10 | Select track 16 | 0XE1 | Volume 15 |  |  |
| 0X11 | Select track 17 | 0XE2 | Volume 16 |  |  |
| 0X12 | Select track 18 | 0XE3 | Volume 17 |  |  |
| 0X13 | Select track 19 | 0XE4 | Volume 18 |  |  |
| 0X14 | Select track 20 | 0XE5 | Volume 19 |  |  |
| 0X15 | Select track 21 | 0XE6 | Volume 20 |  |  |
| 0X16 | Select track 22 | 0XE7 | Volume 21 |  |  |
| 0X17 | Select track 23 | 0XE8 | Volume 22 |  |  |
| 0X18 | Select track 24 | 0XE9 | Volume 23 |  |  |
| 0X19 | Select track 25 | 0XEA | Volume 24 |  |  |
| 0X1A | Select track 26 | 0XEB | Volume 25 |  |  |
| 0X1B | Select track 27 | 0XEC | Volume 26 |  |  |
| 0X1C | Select track 28 | 0XED | Volume 27 |  |  |
| 0X1D | Select track 29 | 0XEE | Volume 28 |  |  |
| 0X1E | Select track 30 | 0XEF | Volume 29 |  |  |
| 0X1F | Select track 31 | 0XF0 | Volume 30 |  |  |
| 0X20 | Select track 32 |  |  |  |  |

**7.2.1 Timing serial line**   
MCU serial line requires only one line can be controlled from beginning yards and duty group code, starting low, head down 3ms yards or more, usually maintain a high. A total of eight. Timing duty cycle of approximately 1: 3 Timing range from 300us: 900us to   
1000us: between 3000us. Error tolerance of 10%.   
  
  
**7.2.2 Program Example (MCU: PIC16F57 Crystal: 4MHz)**   
sda = 0;   
wait (300); /\*> 3ms \*/   
for (i = 0; i <8; i ++)

{  
sda = 1;   
if (addr & 1)   
{  
wait (15); / \*> 1200us \* /   
sda = 0;   
wait (5); / \*> 400us \* /   
}   
else   
{   
wait (5);   
sda = 0;   
wait (15);   
}   
addr >> = 1;   
}   
sda = 1;   
  
**3 Control**   
N9200 series of built-in standard UART asynchronous serial interface. Belongs to TTL level interface, can be converted into RS232 level through MAX232 chip. Full-duplex serial communications module serial communication, 9600, data bits: 8, 1 stop bit, no check bits   
  
**1**. Communication data format:   
Instruction code + Verification code + data length + ​​Data 1, Date 2 … data n + (SM)   
instruction code: used to distinguish the type of instruction   
Verification code: FF - instruction code, used to verify the instruction code   
Data length: the number of bytes of data in the instruction   
Data: instruction related data   
(SM): the sum of all previous byte low 8   
Data: data or commands transmitted data high 8bit first, low 8bit next 

**2**. Require fault tolerance:   
Online real-time recipient must verify command code and its inverse, and verify the correctness. Number of data bytes per instruction may be different, and therefore must receive real-time to determine the number of bytes to be received after the subsequent data bytes. If an error should discard accept instruction. If an instruction is received for more than 500ms, then forced to discard more acceptable instruction bytes, resynchronization instruction reception.   
  
**3**. Agreement:   
new track will send track number during playback. Here's serial number for the overall unity of the serial number, if you want to distinguish between the parent directory and subdirectories can query path and the path depth and other information   
letter sent only pull out when removing the drive instruction, not-for letter processing, wait for the operation instruction   
agreement All data represents HEX   
SM represent the sum of all the bytes before the low 8   
Agreement middle finger index files are files that can be played not include non-broadcast files.   
Mode switch over all processing stops playing status, to send PLAY command will play, power-on default for the entire cycle.   
The default is the maximum volume that can be queried or set the size by the relevant directive.   
  
4. mode control :(**instruction: 03**)   
MODE Description: MUSIC: 00 SPIFLASH: 01   
query the current mode (00): 03 FC 01 00 00 Returns: 03 FC 02 00 MODE SM   
switch mode (01): 03 FC 02 01 MODE SM Returns: None   
(If you want to switch the mode and current mode is not the same process, switch over all at a standstill, play command to send only playback)   
E.g.:   
03 FC 02 01 00 02 to switch to the MUSIC   
03 FC 02 01 01 03 switched to SPIFLASH   
  
5. Play control :(**instruction: 04**)   
Player Status: 00 01 Play 02 Pause Stop   
Device Definition: 00 USB 01 SD 02 FLASH   
query playback status (00): 04 FB 01 00 00 Returns: 04 FB 02 00 Playing status SM   
play (01): 04 FB 01 01 01 Returns: 04 FB 02 00 Playing status SM   
Pause (02): 04 FB 01 02 02 Returns: 04 FB 02 00 Playing status SM   
stop (03): 04 FB 01 03 03 return; 04 FB 02 00 Playing status SM   
on a (04): 04 FB 01 04 04 Returns: None   
under one (05): 04 FB 01 05 05 Returns: None   
Specify the track (06): 04 FB 03 06 Tracks Tracks High Low SM Returns: None   
  
E.g.:   
04 FB 03 06 00 08 10 designated to play the current letter of the first eight, track number from 1-65535   
the current drive to specify the path to play (07): 04 FB SM path length 07 Returns: None   
E.g.:   
/ Emil / cupboard MP3   
Modulo data 2FD6DCBBAABDA120202FC4D1C4EEB5C4BEAD4D503304FB16072FD6DCBBAABDA120202FC4D1C4EEB5C4BEAD4D50332A   
/ Emil / Is there a song that makes you think of me .MP3   
File name more than four characters instead of using \*   
/ Emil / There is no \* MP3   
Modulo data: 2FD6DCBBAABDA120202FD3D0C3BBD3D02A4D5033   
04FB15072FD6DCBBAABDA120202FD3D0C3BBD3D02A4D5033EC   
(See Path Format Description)   
query the current line number (08) equipment: 04 FB 01 08 08 Returns: 04 FB 02 08 Number SM   
query the current playback device (09): 04 FB 01 09 09 Returns: 04 FB 02 09 letter SM   
switch to U disk (0A): 04 FB 01 0A 0A Returns: None   
switch to SD (0B): 04 FB 01 0B 0B Returns: None   
query total tracks (0D): 04 FB 01 0D 0D Returns: 04 FB 03 0D tracks high total low total tracks SM   
the current track query (0E): 04 FB 01 0E 0E return: 04 FB 03 0E track high track low SM   
the current track specified time playback (0F): 04 FB 03 0F Minutes SM Returns: None   
E.g.:   
04 FB 03 0F 02 14 27 Specifies the current track starts playing from 2:20 minutes: 0-60, 0-60 seconds specified time should not exceed the total playing time   
Specify the track to play a specified time t (10): 04 FB 05 10 Tracks low high Minutes SM Returns: None   
E.g.:   
04 FB 05 10 00 03 02 14 2D specify the first three songs from the 2:20 start playing   
specify the drive letter specified time specified track playback (11): 04 FB 06 11 letter Track High Low Minutes SM track Returns: None   
E.g.:   
04 FB 06 11 00 00 06 02 14 32 U disk first 6 from 2:20 to start playing   
04 FB 06 11 01 00 04 02 14 31 SD section 4 from 2:20 to start playing   
on a folder (12): 04 FB 01 12 12 Returns: Returns the track number during playback   
the next folder (13): 04 FB 01 13 13 Returns: return while playing track number   
query the current total number of files (18) in the directory: 04 FB 01 18 18 Returns: 04 FB 03 18 Tracks High Low SM   
  
6. Play time control **:(** **instruction: 05)**   
Total playing time t query (00): 05 FA 01 00 00 Returns: 05 FA 04 00 minutes and seconds SM   
send the current playback time (01): 05 FA 04 01 minutes and seconds SM   
send playback time opening (02): 05 FA 01 02 02 Returns: the current time   
sent off playing time (03): 05 FA 01 03 03 Returns: None   
  
7. Volume Control **:(** **instruction: 06)**   
the volume up to 30, the default boot volume to maximum   
query volume (00): 06 F9 01 00 00 Returns: 06 F9 02 00 VOL SM   
volume setting (01): 06 F9 02 01 VOL SM Returns: None   
E.g.:   
06 F9 02 01 14 16 set the volume to 20   
volume increase (02): 06 F9 01 02 02 Returns: None   
volume reduction (03): 06 F9 01 03 03 Returns: None   
  
8. Repeat control :( **instruction: 08)**   
repeat a specified time (00): 08 F7 05 00 starting points starting second end points ending seconds SM   
Returns: None   
E.g.:   
08F70500020602202E starting from 2 minutes 06 seconds to 2 minutes 32 seconds repeat   
the end of the repeater (01): 08 F7 01 01 01 Returns: None   
After execution of this command is invalid repeat, or perform other operations can also end repeat   
  
9. Spots control :( **instruction: 09)**   
Specify the track t-stream (00): 09 F6 04 00 letter Track High track low SM Returns: None   
E.g.:   
09 F6 04 00 01 00 04 08 SD card spots first four   
the end of the spots (01): 09 F6 01 01 01 Returns: None   
  
10. The cycle mode control :( **instruction: 0B)**   
polling loop mode (00): 0B F4 01 00 00 Returns: 0B F4 02 00 cycle mode SM   
Setting cycle mode (01): 0B F4 02 01 cycle mode SM   
is set to a song cycle: 0B F4 02 01 01 03   
all cycle: 00 in order to play the overall track, play after the loop   
Repeat One: play the current track 01 has been circulating   
folder cycle: 02 in order to repeat the current folder tracks   
Shuffle: Shuffle letter within 03 Tracks   
Stop singles: 04 finished playing the current track again to stop   
the order of play: 05 according to the order of play overall track after playback stops   
folder order of play: 06 order of play in the current folder track finishes playing stops   
folder Shuffle: 07 Shuffle current folder tracks   
Explanation:   
02,03 in SPIFLASH mode is not supported, 06,07 these types of cycle mode, if set to these types will be processed by 04 mode   
  
11. Error message :( **instruction: AA)**   
AA 55 02 FF 00 00 Serial receive data error   
AA 55 02 FF 01 01 serial port is busy   
AA 55 02 FF 02 02 batches could not find the given letter   
AA 55 02 FF 03 03 no letter can be played.   
AA 55 02 FF 04 04 file playback errors, such as file not found, etc.   
  
12. The apparatus of pluggable status :(**instruction: BB)**   
BB 44 01 00 00 U disk inserted   
BB 44 01 01 01 U disk aside   
BB 44 01 02 02 SD card into   
BB 44 01 03 03 SD card aside   
BB 44 01 04 04 to enter the PC mode   
BB 44 01 05 05 to exit PC mode   
  
**Path Format Description**   
Path requirements:   
the folder name is 8 bytes, more than 8 bytes take the first 8 bytes, is less than 8 bytes with spaces complement, 8-byte characters is four or eight letters.   
Filename for 8 bytes, not enough can be used? Or \* indicate, for example, ABC ????? Represents the beginning of the three characters in the file abc, abc \* also said that three characters at the beginning of abc files.   
Regardless of the letter inside the folder or file names are in capital letters, in the preparation of the program, folder and file names must be uppercase letters or numbers.   
A character occupies two bytes, a space is occupied by a byte or character.   
e.g.:   
Specified folder of songs   
"/ Background / \*???", / \* All files folder background, back background four spaces \* /   
"/ MODE???? MP3", / \* mode beginning with the root directory of MP3 files \* /   
/ Emil / cupboard MP3   
  
Data acquisition path:   
Recommended tools: amo programming gadget collection V1.2.6   
E.g.:   
"/ Emil / cupboard MP3", the input format to select Ascii, enter the corresponding entry in the path.   
Choose  We can get the corresponding data   
2FD6DCBBAABDA120202FC4D1C4EEB5C4BEAD4D5033