
SD Card Recording Module Manual

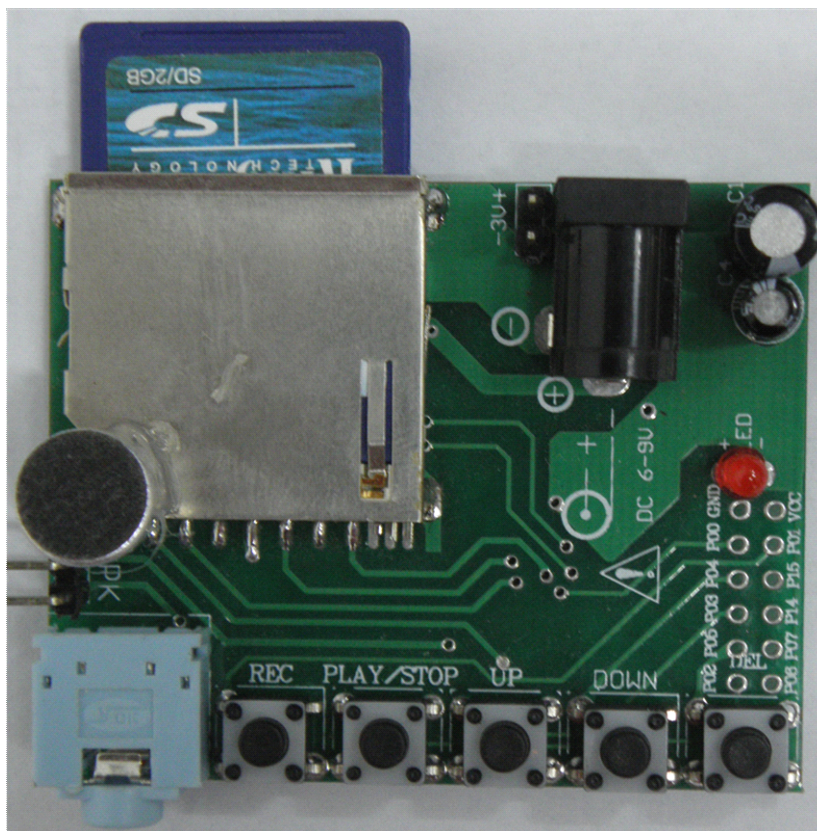
WTR010-SD module

Description:

1. Support SD card expansion.
2. SD card supports FAT16 (FAT) file system.
3. Support both mono and stereo playback.
4. Supports high-capacity recording and playback.
5. Support multi-button operation.
6. Support two-line communication, host-issue command control.

Features:

The product is cheap, simple-control, and widely used. It can stand longtime recording and playing. It uses standard WAV file. And audio format conversion software is available if you require.



Software: stereo music conversion software [DoubleChannel](#) (see Note). Other software is ok such as Goldwav, CoolEdit, use "Save As", save as the specified format wav (imaapdcm4bit).

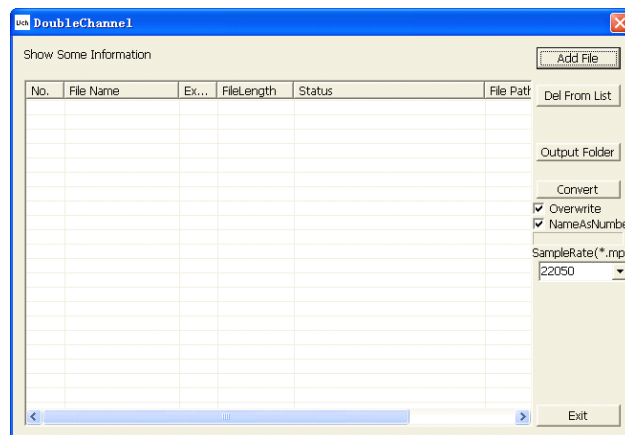
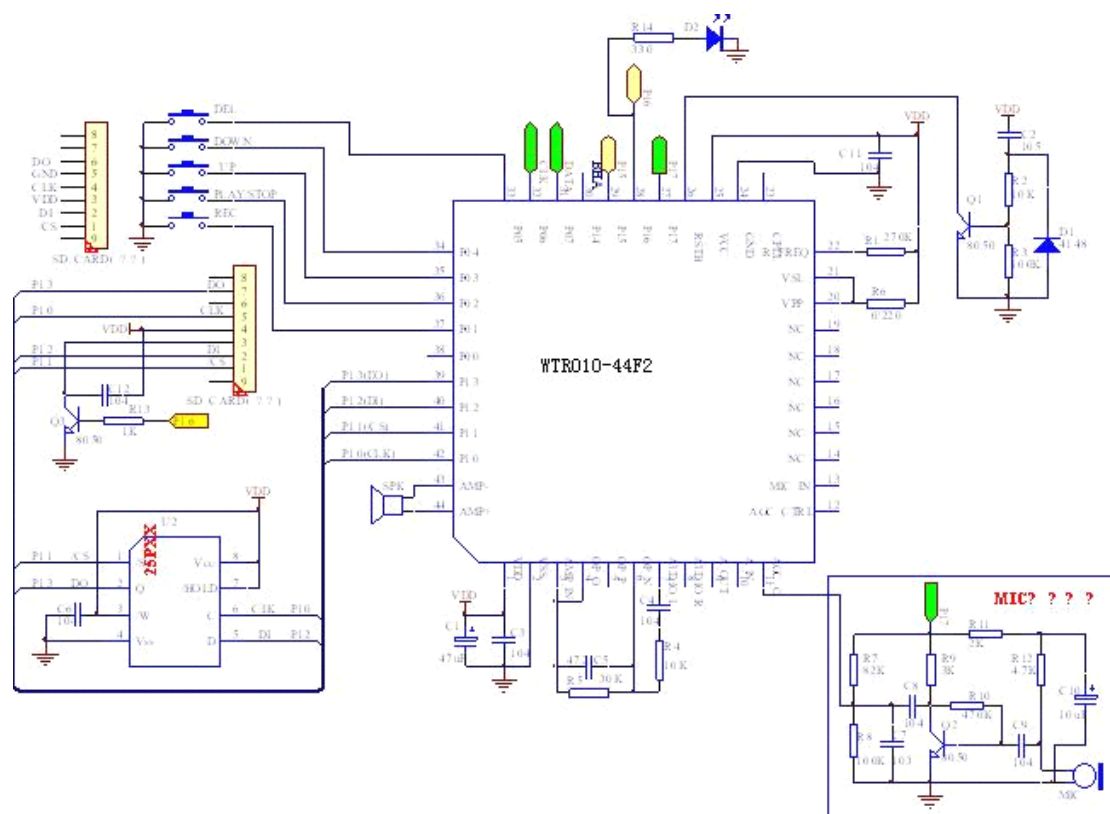


Diagram:



Function:

1. Support expansion SD card, with capacity from 128M ~ 2G Byte.

2. SD card supports FAT16 (FAT) file system. You can operate on the files in this card in PC via card reader or SD card interface. It can not identify folders. Files have to be put under the root directory. Up to 511 files can be stored in SD card.

3. It supports both mono playing mode and stereo playing mode, and AD4 (ADPCM), WAV (ADPCM) audio format. The maximum sampling rate of audio format is as follows:

- Maximum frequency of AD4 and WAV (ADPCM) mono playing is 32K
- Maximum frequency of AD4 and WAV (ADPCM) dual-channel playing is 22K

4. SD Card file name rule: All sound files are four-digit sequence numbered, and for recording files "REC" is automatically added before the number.

5. Key modes and port function:

Key: Long-Press: press and hold down for about 3 seconds; Short-Press, click the button and immediately release.

BEEP1: beep once; BEEP2: beep twice.

Module power: BEEP1 while SD initializing successful, otherwise BEEP3 if unsuccessful.

- P01: REC, Long-press, BEEP1, then start recording; Short-press, BEEP2, and end the recording. (Add: If this module download another program, pressing down the key starts recording, releasing the key stop recording)
- P02: PLAY / STOP, Short-Press stops or starts playing, or stop recording and starts current voice piece.
- P03: UP, Short-press, play previous track, for example, the current segment number is 0005, and play 0004 after Short-press; Long-press, BEEP1, forward loop all tracks.
- P04: DOWN, Short-press, play next track, for example, the current segment number is 0005, Short-press and then play 0006; Long-press, BEEP1, loop back all the tracks.
- P05: DEL, Long-press, BEEP1, delete the current voice segment. If the current voice segment is recorded, it will be deleted and BEEP2 after successful. Otherwise it will not be deleted.

6. Other interface line function:

- P14: BLA (Busy Low Active), low when playing or recording.

- P15: BHA (Busy High Active), high when playing or recording.
- P16: LED (BHA), high while working.
- P10: Connect to CLK of SD Card.
- P11: Connect to CS of SD Card.
- P12: Connect to DI(Data Input) of SD card.
- P13: Connect to DO(Data Output) of SD card.
- P17: MIC power control, high effective.
- P06: CLK receiving port of two-line communication.
- P07: DATA receiving port of two-line communication.

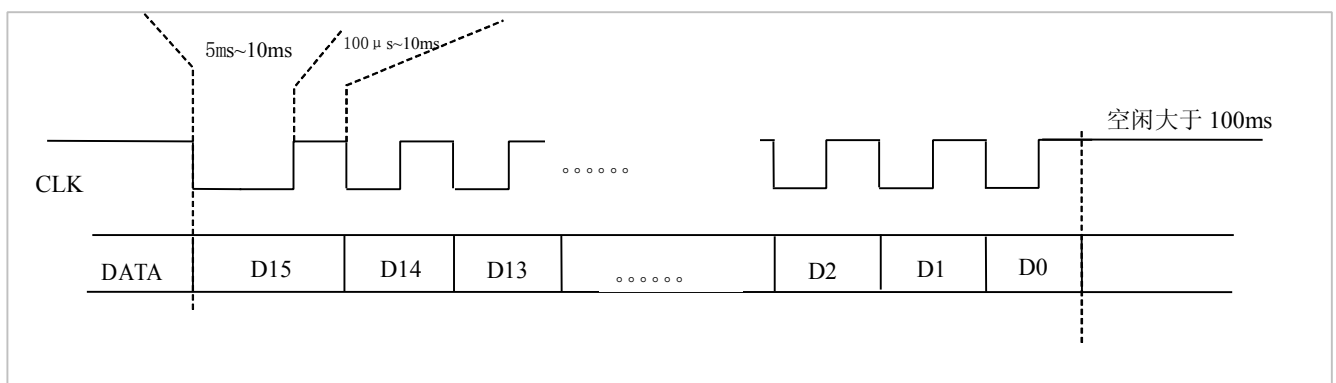
7. Support two-line communication (similar to the SLAVE mode of I2C communication) which has clock line (CLK) and data line (DATA).

8. Support 512 voice segments, which are named by decimal number, for example 0000.AD4, 0009.AD4, 0010.WAV.

9. Two-line communication protocol

- Two lines: CLK (P06), DATA (P07). Voltage level: 1--high (3.0V); 0-- LOW (0V)
- Idle: CLK is high, DATA is any state.
- Code: 16BIT, send from high bit. Data on DATA line refresh at CLK falling edge. It is recommended to receive data at CLK rising edge.

Timing diagram:



Note:

- The first CLK pulse is not less than 5 milliseconds, to wake up the system from hibernation.
- High state should not last over 100ms while sending or receiving data, or code is considered as failure.

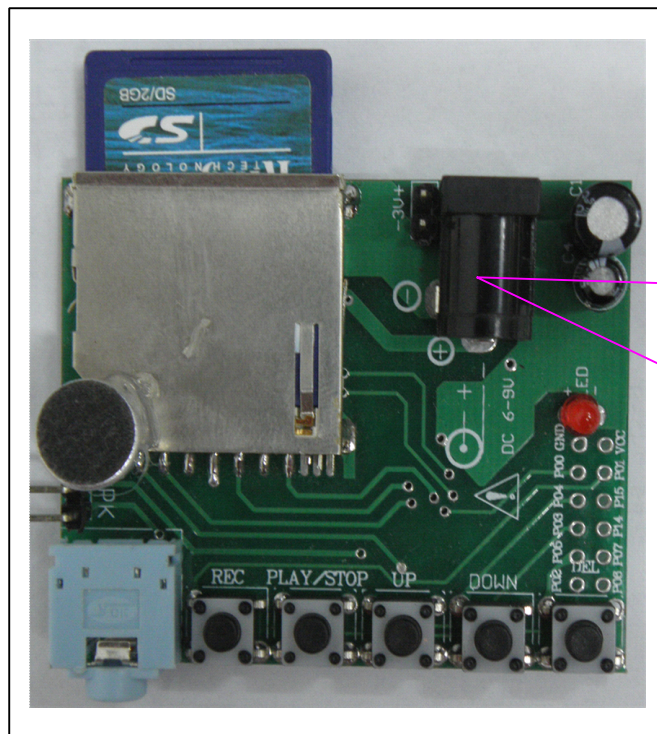
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- Semi-cycle of CLK should not be less than half 0.1ms. If too short the system can not detect. Recommended value is 1ms. Please do not select the limit value if not must.
 - Code definition as follows:

0x000-0xFE00	Play 0000.wav (/ ad4) ~ 9999.wav (/ ad4) file
0xFFFF	Stop current state (If current is playback, it will stop playback; If recording, it will stop recording)
0xFFFE	Pause / continue
0xFFFD	Start recording

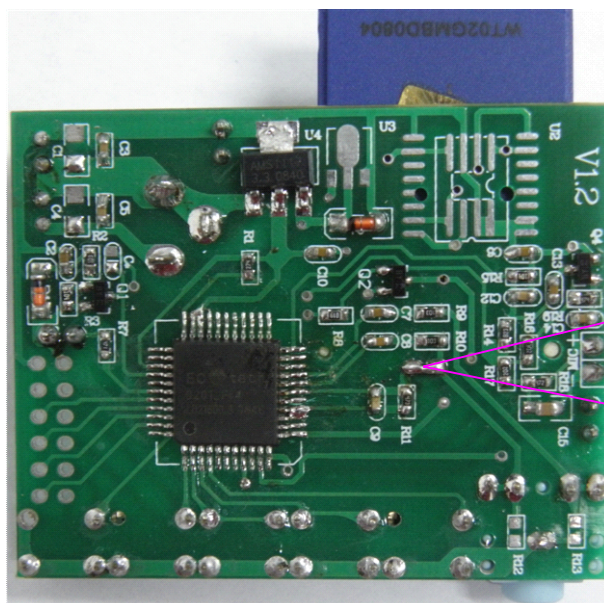
Use:

1. Connect SD card with the computer through card reader, or laptop SD card interface.
2. Find the logical drive letter of SD card. Make sure that its file system is FAT format. If not, back up the file in the SD card, reformat it in FAT format.
3. Name the files by the rules bellow and put them into the SD card's root directory.
 - a. File naming rules:
 - For songs, four numbers (10 decimal), from 0000.wav/0000.ad4, in the right order.
 - For recording, automatically name as: "REC" + 4 figures, following the song's number.
 - Recorded file can be deleted, but songs can not be deleted. If songs and recorded files have the same number, songs have priority.
 - b. Supported file formats.
 - *. Ad4, ADPCM format, non-standard file format.
 - *. Wav, IMA-ADPCM, 4Bit, standard wav formats, including mono, stereo. WAV files have many kinds, please do select the type above.
 - c. Sampling rate:
 - Playback sample rate: Mono 8K ~ 32K; Stereo 8 ~ 22K
 - Recording sample rate: defaults 16K as shown in SET.TXT. Recording sampling rate can be set as 8K ~ 22K

4. Remove the SD card from the computer into the player.
5. Power up the SD card player, connect it to the speaker.



Power (3V or 5~12V)
Speaker: If mono, connect to SPK. If stereo, connect to the output interface beside "REC".



For V1.2 version, select mono mode or stereo mode manually. If mono, short the two points while playing. If stereo, disconnect the points.

6. Triggered by the button (different versions may vary): Long-press, hold the key for about 2.5 seconds; Short-press, press and hold the key time for less than 1 second, then release.
- REC: Short-press to end the recording, effective while recording. Long-press to start recording.

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- PLAY / STOP: short-press, play current audio file (The default file to be played while powered on is 0000.WAV or 0000.AD4). Long-press to keep circulating current song.
 - DOWN: Short-press to start playing next song. Stop playing after finishing it. Long-press to finish looping all the rest songs.
 - UP: Short-press to play previous song. Stop playing after finishing it. Begin to play the last sound file, play stops after. Press and all the songs have been forward loop.

Notes:

File supported

1. File Format:

- 4 bit MA-ADPCM WAV, with suffix "WAV"
- AD4 file, with suffix "AD4"

2. File Name:

File name must be 4 digits, and sound file name should start from 0000, in serial numbers order. Missing or duplicate numbers are not permitted. All files' suffix should be "WAV" or "AD4".

3. File Storage:

File must be stored in the root directory, and totally less than 511 files. Other data files' storage is not restricted..

SD Card Player:

- Please note that power connection must not be reversed.
- Turn off the power or remove the battery for long use.