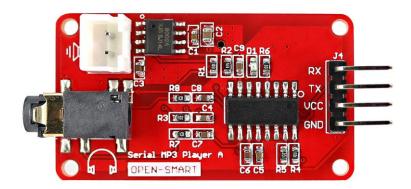# OPEN-SMART

Name: Serial MP3 Player A manual
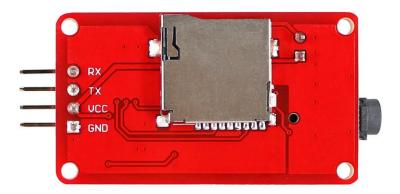
Version: v1.1

Date: 2018.01.13

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1 Description

The module is a kind of simple MP3 player device which is based on a high-quality MP3 audio chip. It can support 8k Hz ~ 48k Hz sampling frequency MP3 and WAV file formats. There is a TF card socket on board, so you can plug the micro SD card that stores audio files. MCU can control the MP3 playback state by sending commands to the module via UART port, such as switch songs, change the volume and play mode and so on. You can also debug the module via USB to UART module. It is compatible with Arduino / AVR / ARM / PIC.
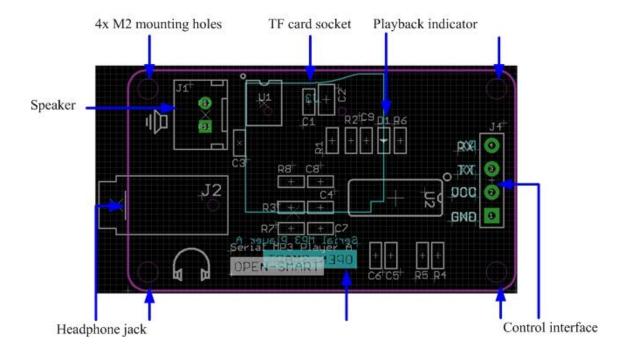
Features：

- Compatible with Arduino UNO / Leonardo / Mega2560 / DUE
- Support sampling frequency (kHz): 8 / 11.025 / 12 / 16 / 22.05 / 24 / 32 / 44.1 / 48
- Support file format: MP3 / WAV
- Support Micro SD card, Micro SDHC Card
- Onboard 3-watt mono amplifier
- On-board speaker interface XH2.54-2P, can connect to external speakers such as 8 ohm 3-watt, 8 ohm 2 watt, 8 ohm 1 watt
- 30 class adjustable volume
- UART TTL serial control playback mode, baud rate is **9600bps**
- Serial communication format: **8N1**
- Control logic interface can be 3.3V / 5V TTL
- Working voltage: 3.7 - 5.25VDC
- On-board headphone jack, it can connect headphones or external amplifier
- On-board TF card connector
- It is great for DIY

2 Specification

Item	Min	Typical	Max	Unit
Power Supply(VCC)	3.7	**5**	5.25	VDC
Current（@VCC=5V）	/	/	200	mA
Logic interface	3.3V / 5V TTL			/
Supported Card Type	Micro SD card(<=2G); Mirco SDHC card(<=32G)			/
File system format	Fat16 / Fat32			/
Uart baud rate	**9600**			bps
Dimensions	49X24X8.5			mm
Net Weight	5			g

3 Interface

Control interface: It is UART TTL interface. A total of four pins (GND, VCC, TX, RX), GND to ground, VCC is the power supply, TX is the TX pin of the MP3 chip, RX is the RX pin of the MP3 chip.

TF card socket: The micro sd card can be plugged in it.

Playbck indicator: Green light. If it is playing songs, it is on. Otherwise, it is off.

Headphone jack: It can be connected with the headphone or external amplifier.

Speaker: can connect to external speakers such as 8 ohm 3-watt, 8 ohm 2 watt, 8 ohm 1 watt.

Mounting holes: 4 screw mounting holes whose diameter is 2.2mm, so that the module is easy to install, easy to combine with other modules.

4 Usage

4.1 About the commands

4.1.1 Asynchronous serial port control play mode:

Command bytes: $S Len CMD data $O		
Mark	**Byte**	**Byte description**
$S	0x7E	Every command should start with $(0x7E)
Len	0xxx	The number of bytes of the command without starting byte and ending byte
CMD	0xxx	Such as PLAY and PAUSE and so on
data		The length of the data is not limit and usually it has one bytes
$O	0xEF	Ending byte of the command

4.1.2 Commonly Command bytes Descriptions:

Command	Command bytes without checksum(HEX)	Remark
[Play]	7E 02 **01** EF	Resume playback
[Pause]	7E 02 **02** EF	Playback is paused
[Next Song]	7E 02 **03** EF	
[Previous Song]	7E 02 **04** EF	
[Volume up]	7E 02 **05** EF	Volume increased one
[Volume down]	7E 02 **06** EF	Volume decrease one
[Forward]	7E 02 **0A** EF	Fast forward
[Rewind]	7E 02 **0B** EF	Fast rewind
[Stop play]	7E 02 **0E** EF	
[Stop inject]	7E 02 **0F** EF	Stop injecting the song
[Select device]	7E 03 **35 01** EF	Select storage device to TF card
[Set IC mode]	7E 03 **35 02** EF	Wake up
	7E 03 **35 03** EF	Sleep
	7E 03 **35 05** EF	Reset
[Play with index]	7E 04 **41 00 01** EF	Play the first song
	7E 04 **41 00 0A** EF	Play the tenth song
[Play with folder and file name]	7E 04 **42 01 01** EF	Play the song with the directory: /01/001xxx.mp3
	7E 04 **42 01 02** EF	Play the song with the directory: /01/002xxx.mp3
[Inject with index]	7E 04 **43 00 01** EF	Inject the fist song in the TF card
[Set volume]	7E 03 **31 0F** EF	Set the volume to 15 (0x0F is 15)
[Play with volume]	7E 04 **31 1E 01** EF	Set the volume to 30 (0x1E is 30) and play the first song
	7E 04 **31 0F 02** EF	Set the volume to 15(0x0f is 15) and

		play the second song
[Set play mode]	7E 03 **33 00** EF	All songs cycle play
	7E 03 **33 01** EF	Start up single cycle play
	7E 04 **33 00 01** EF	Single cycle play the first song
[Play combine]	7E 08 **45** 01 05 02 01 01 03 EF	Play combination of the fifth song in the folder "01", the first song in the folder "02" and the third in the folder "01"

4.1.3 Check status

Command	Command bytes without checksum(HEX)	Return Parameter
[Get Status]	7E 02 **10** EF	0(STOP), 1(PLAY), 2(PAUSE), 3(FAST FORWARD), 4(FAST REWIND)
[Get Volume]	7E 02 **11** EF	0-0x1E
[Get Online Device]	7E 02 **18** EF	1=U disk, 2 = TF card, 3 = SPI flash

Return bytes: Answer Bytes + Command bytes(include Return Parameter)

And all Answer Bytes is **7E 02 00 EF**

For example:

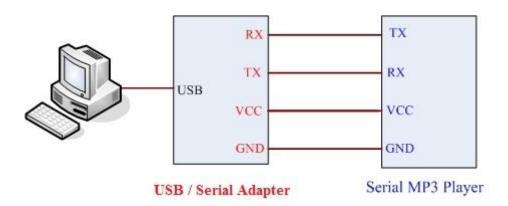If you want to know the playing status of the player,

You should send 7E 02 **10** EF, if it is playing, and it will return **7E 02 00 EF** 7E 03 **10 01** EF

if it is pause, it will return **7E 02 00 EF** 7E 03 **10 02** EF

If you want to know whether the TF card is insert or not,

You can send 7E 02 **18** EF, if the TF card is online, it will return **7E 02 00 EF** 7E 03 **18 02** EF

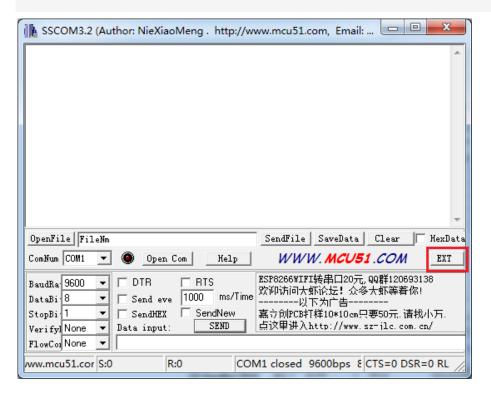And if you plug the TF card into the socket, it will return 7E 03 **3A** 02 EF

4.2 Use USB to Uart TTL module

(1) You need a **USB to Uart TTL module** (such as USB/Serial Adapter) to connect

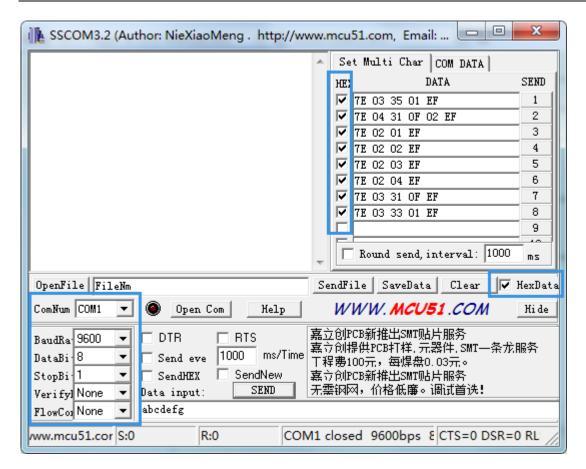**Serial MP3 Player** to PC. The hardware installation as show below:

(2) After the connection is completed, open the sscom32 serial tool that you can

down load from catalex net disk to send commands. About the specific commands,

please refer to 4.1.1 part.

(3) Click the EXT button and then you can manage the commands to be sent.

(3) Baud rate should be 9600. Tick HEX and HexData so that the command can be received by the Serial MP3 Player and you can see the feedback information in the blank of the window. Before sending commands, you should select the [ComNum] and click [Open Com].

(4) Make sure your micro sd card is formatted as FAT16 or FAT32 and there is some songs in it. May be you should creat folder "01" and "02", and put some songs with the name 001xxx.mp3 / 002xxx.mp3 / 003xxx.mp3 in the two folder. Some commands need them.

(5) After power up, you should send the command [**Select device**] first. Serial MP3 Player only supports micro sd card, so you should send "7E 03 **35 01** EF".

Then you can send the command [**Play with index**] to play some song.

You can send the command [**Set volume**] to set the volume(0 ~ 30 class).

More operations ? Please refer to 4.1.1 part.

4.3 Use Arduino UNO R3

4.3.1 Project1: Simple test for the player.

Step1: Material preparation

1x Arduino UNO R3

1x USB Cable

1x Serial MP3 Player A

1x IO Expansion Shield

4x Female to Female Dupont cables

1x Speaker 8ohm 1watt

Step2: Hardware install

(1)Plug the IO Expansion Shield which is just the I/O expansion board to Arduino UNO R3.

(2)Connect the modules and IO Expansion Shield with the cables, and plug the speaker:

Serial MP3 Player	Wire	IO Expansion Shield
GND	<--->	GND
VCC	<--->	5V
TX	<--->	D8
RX	<--->	D7

(3)Make sure your micro sd card is formatted as FAT16 or FAT32 and there is some songs in it. May be you should creat folder "01" and "02", and put some songs with the name 001xxx.mp3 / 002xxx.mp3 / 003xxx.mp3 in the two folder. Some commands need them. Plug the micro sd card into the TF card socket on the Serial MP3 Player, and then plug the headphone.

Step3: Power on

Use the USB cable to connect the Arduino UNO R3 and PC.

Step4: Upload the demo code

Download the demo code (SerialMP3PlayerDemoforArduino-1.0.zip), and unzip it to your code project folder such as ../Arduino-1.0/MyProject. And then upload the code **SimpleTest.ino** to your arduino UNO R3.

Step5: Enjoy yourself

Push the reset button on the IO Expansion Shield to play the first song in the micro sd card.

Step6: Power off

Unplug USB cable.

4.3.2 Project2: Use some modules to control the player. Enjoy!

Step1: Material preparation

1x Arduino UNO R3

1x USB Cable

1x Serial MP3 Player A

1x Base Shield

1x Touch Sensor

1x Rotary Angle Sensor

10x Female to Female Dupont cables

1x Speaker 8ohm 1watt

Step2: Hardware install

(1) Plug the Base Shield which is just the I/O expansion board to Arduino UNO R3.

(2)Connect the modules and Base Shield with the cables, and plug the speaker:

Serial MP3 Player A	Wire	IO Expansion Shield
GND	<--->	GND
VCC	<--->	5V
TX	<--->	D8
RX	<--->	D7

Touch Sensor	Wire	IO Expansion Shield
GND	<--->	GND
VCC	<--->	5V
SIG	<--->	D2

Rotary Angle Sensor	Wire	IO Expansion Shield
GND	<--->	GND
VCC	<--->	5V
SIG	<--->	A0

(3)Make sure your micro sd card is formatted as FAT16 or FAT32 and there is some songs in it. May be you should creat folder "01" and "02", and put some songs with the name 001xxx.mp3 / 002xxx.mp3 / 003xxx.mp3 in the two folder. Some commands need them.

Plug the micro sd card into the TF card socket on the Serial MP3 Player, and then plug the headphone.

Step3: Power on

Use the USB cable to connect the Arduino UNO R3 and PC.

Step4: Upload the demo code. If you have download in Project1, skip this step.

Download the demo code (SerialMP3PlayerDemoforArduino-1.0.zip), and unzip it to your code

project folder such as ../Arduino-1.0/MyProject. And then upload the code **ControlMP3PLayer.ino** to your arduino UNO R3.

Step5: Enjoy yourself

   Push the reset button on the IO Expansion Shield. In the process that the Rotation Angle Sensor is rotated from the 'Min' side to the 'Max' side, the volume is gradually greater. If you touch the Touch Sensor,it will play or pause.

   About more specific commands, please refer to **4.1.1** part.

Step6: Power off

   Unplug USB cable.

5 Part List

1x Serial MP3 Player A Module

Documents download link:

https://drive.google.com/folderview?id=0B6uNNXJ2z4CxaFVzZEZZVTR5Snc&usp=sharing

Buy from:

https://www.aliexpress.com/store/product/UART-Serial-MP3-Music-Player-Module-with-1W-Speaker-for-Arduino-Onboard-Monaural-Amplifier-Speaker-Socket/1199788_32782488336.html?spm=2114.12010615.0.0.6d855cf3MW4P7H

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