

# Embedded MP3 Module

Datasheet V2.1

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Note : The functions descriptive in grey words in the datasheet are not valid now .

## 1. Product Features

- \* Support mp3 files playing with stereo audio output
- \* Support normal mp3 player functions ( play, next, prev.,vol-,vol+,.... )
- \* With Parallel and Serial interface for MCU controlling
- \* Loop play function available
- \* Support one pushbutton play one mp3 file ,eight pushbuttons max.
- \* Easy to update the mp3 files by SD card reader connect to PC
- \* Wide power supply from 5V to 30V
- \* Select and play more than 3000 files by MCU via parallel or serial interface
- \* Support SD card from 32MB to 2GB
- \* Size with 51mm\*33mm\*8mm
- \* TF Card version also available with the same function but smaller size
- \* TF Card version size 51mm\*21mm\*8mm

## 2. Product Applications

Entertainment (MP3 music player , Sound box ,Background music system ,Game Machine music system ,Kid Rider Music player, Talking Robot, High-Class Talking Toys, .... )

Announcing system (Elevator announcer , Queue calling system ,Bus station announcer ,advertising system ,Warning system , Spots Voice Introducer ,Voice Tour Guider, Machine Voice manual ,.... )

Home & Office Appliance (MP3 Door Bell ,Home anti-theft alarm system, Phone Switch Board Music Player,Voice guide manual for home appliance,..... )

And so on .

## 3. Electrical Parameters

Parameter	Conditions	Min.	Typical	Max.	Unit
Operating voltage		6	12	24	V
Limited voltage		5		30	V
Standby current	VDD=12V			50	mA
Operating current	VDD=12V			100	mA
Audio power	Max. volume		200		mVpp

## 4. Pins and Operating Modes

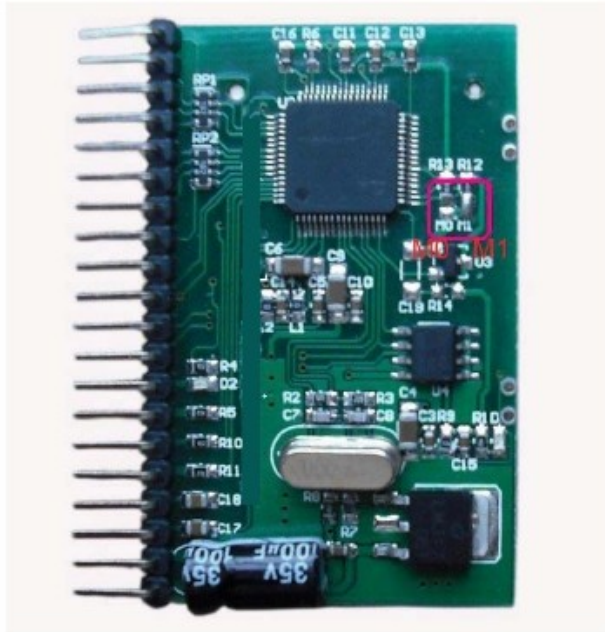
### 4.1.Pins Description

1	P0
2	P1
3	P2
4	P3
5	P4
6	P5
7	P6
8	P7
9	VOL-
10	VOL+
11	SCL
12	SDA
13	BUSY
14	PL
15	RXD
16	TXD
17	HPR
18	HPL
19	GND
20	VDD



Pin Name	Pin No.	Description	Remark
P0 - P7	8 - 1	Date Ports / Trigger Input	
PL	14	Trigger input	
VOL+	9	Button ,Vol+	
VOL-	10	Button, Vol-	
SCL	11	EEPROM CLK (I <sup>2</sup> C)	
SDA	12	EEPROM DATA (I <sup>2</sup> C)	
BUSY	13	Busy Low active	LED : D2 on PCB
RXD	15	Serial Port ,Data Receive	
TXD	16	Serial Port ,Data Transmit	
HPR	17	Audio output R	
HPL	18	Audio output L	
GND	19	Power GND	
VDD	20	Power Positive	LED : D1 on PCB

## 4.2 Operating Mode and settings



**MP3 Mode :** The module will work as a normal mp3 player with Play/Pause , Stop,Prev,Next, FF 10 (Fast forward 10 songs),REW 10 (Rewind 10 songs), Vol+,Vol- functions .

**Direct-Play Mode:** The module will play 8 files by 8 pushbuttons,Press one pushbutton play the corresponding MP3 file, Keep pressing the pushbutton for loop playing. PL button for playing files except file 1 to file 8 in root directory

**Parallel Mode:** The module working under Parallel interface control via PL and P7-P0 pins.

**Serial Mode:** The module working under Serial interface control via TXD and RXD

All the functions of this module can be realized in Parallel and serial mode .

There are 4 operating Modes ( MP3 Mode,Direct-Play Mode, Parallel Mode, Serial Mode)  
The Operating Mode settings

M1,M0	Operating Mode	Priority	Remark
0, 0	Parallel Mode	High	M0 and M1 points shown on above PCB picture "0": Connect to GND "1": NC (Not connected)
0, 1	Direct- Play Mode	Low	
1, 0	MP3 Mode	Low	
1, 1	Serial Mode	Highest	

Note:When the module powered , it will detect the state of M0 and M1 to enter into the selected Mode,The priority of serial interface Mode is Highest ,It is valid in any Mode.

#### 4.2.1. MP3 Mode

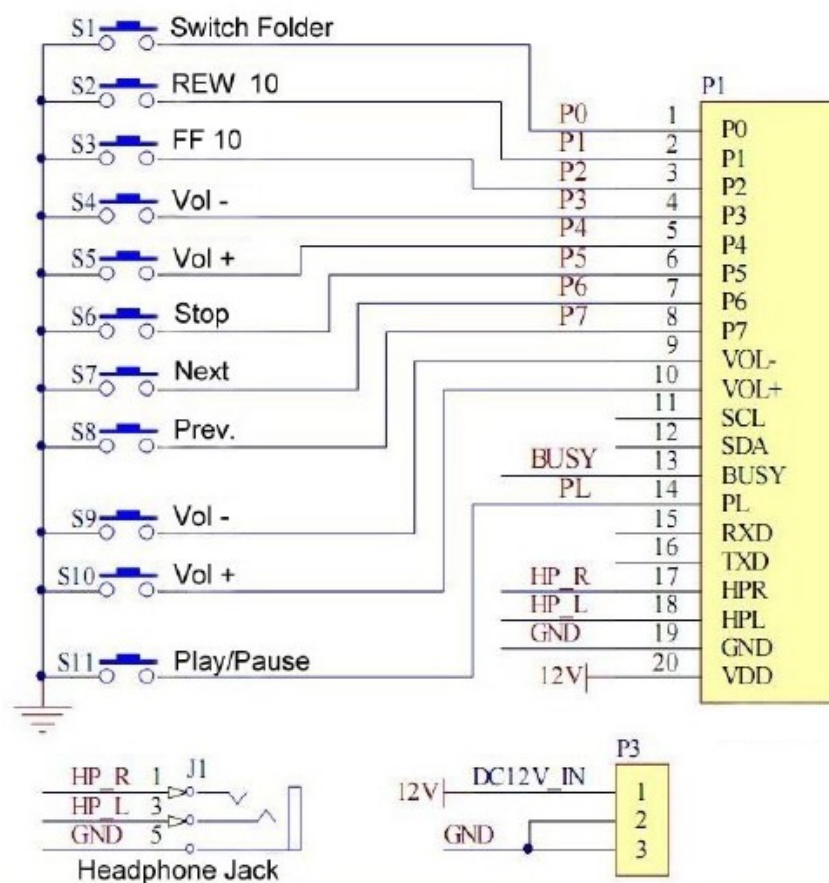
##### ① MP3 Mode settings

Set M1=1, M0=0 before powered the module.

##### ②MP3 Mode introduction

The module work as a normal mp3 player with Play/Pause , Stop,Prev.,Next, FF 10 (Fast forward 10 songs),REW 10 (Rewind 10 songs), Vol+,Vol- ,FC (Folder Change) functions .

##### ③ MP3 Mode Application Schematic.



④ Pins function in MP3 Mode.

Pin Name	Function	Priority	Remark
PL	Play/ Pause	High	
P7	Previous	Low	
P6	Next	Low	
P5	Stop	Higher	
P4	Vol +	Highest	
P3	Vol -	Highest	
P2	FF 10 files	Lowest	
P1	REW 10 files	Lowest	
P0	Folder Change	Highest	
BUSY	Busy ,Low active	— —	

Priority : Highest > Higher > Low > Lowest

Set the module to MP3 Mode and keep PL pin low level(Connect PL to GND),Once power up the module it will start to play all the MP3 files and Loop automatically.

Connect a pushbutton between PL and GND , Press the button,it will start to play all files,during playing the next press will Pause it. In Pause state ,press this button again will continue to play .

Playing order: From first file to last file in folder 1 , then first file to last file in folder 2 , loop in this way .

FF 10 / REW 10 :It will Fast Forward 10 files , or Rewind 10 files ,if the folder no have enough files , it will switch to next folder or previous folder.

P0 for folder change: The module playing file in folder 1 , press the button to change the folder, it will switch to folder 2 and start to play file 1 in this folder.

#### 4.2.2. Direct-Play Mode

① Direct-Play Mode settings

Set M1=0, M0=1 before powered the module

②Direct-Play Mode introduction

In the Direct-Play Mode , Press the PL button will random trigger one file, Long press PL button will loop play all the files in root directory(if total not more than 8 filesin root directory )

Long press PL button will loop play all the files except anterior files( from file 1 to file 8 ),



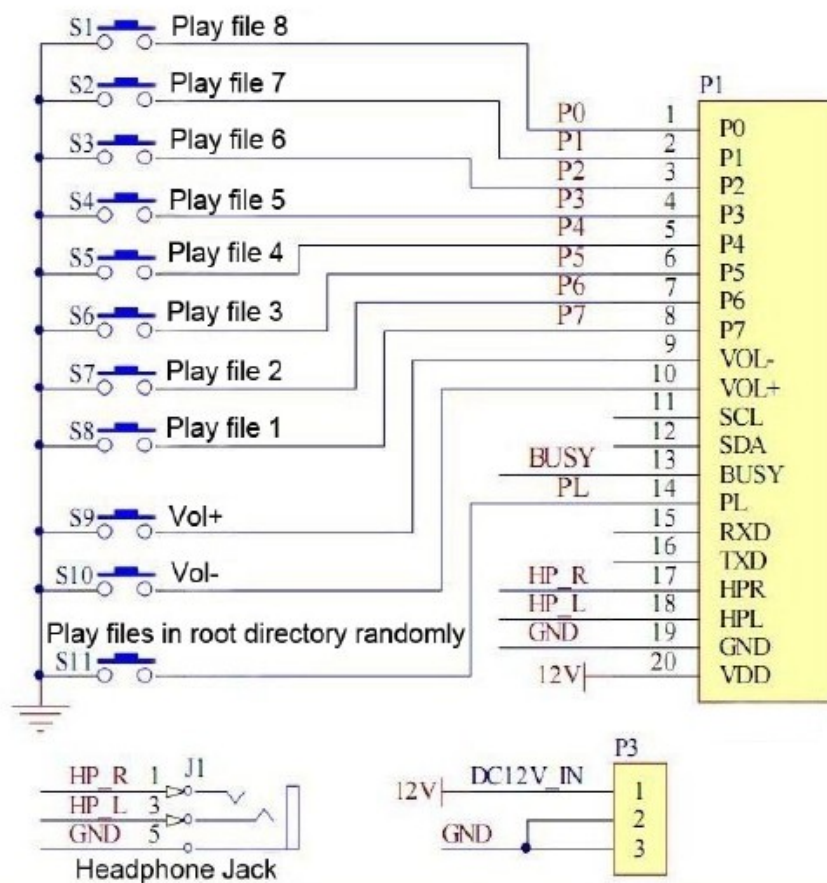
will play from file 9 . (if more than 8 files in root directly )

P7 to P0 work as direct play buttons, one button play corresponding one file , negative pulse trigger .Press the button one time ,will play file one time and stop. Long press the button will loop playing the corresponding file.

About Loop Play : Keep pressing the button after 0.5 secondds, It will get into loop play state , if release the button at that moment, it will stop playing .

When there are more than 8 files in the root directory , Long press PL for loop playing files from file 9 as background music , if there is a trigger on the direct play pins( P07 to P00), it will hook up PL button's playing (background music )and play the corresponding file , after finish this file playing it will keep continue the PL button's playing (background music).

### ③ Direct-Play Mode Application Schematic



### ④ Pins function in MP3 Mode

Pin No.	Pin Name	Function	Priority	Remark
1	PL	Loop playing files in root directory randomly	Low 1	
2	P7	Play file 1 in root directory	Low 2	
3	P6	Play file 2 in root directory	Low 3	
4	P5	Play file 3 in root directory	Low 4	

5	P4	Play file 4 in root directory	Low 5	
6	P3	Play file 5 in root directory	Low 6	
7	P2	Play file 6 in root directory	Low 7	
8	P1	Play file 7 in root directory	Low 8	
9	P0	Play file 8 in root directory	Low 9	
10	BUSY	Busy , Low active	--	

Note: Priority order

Low 9 > Low 8 > Low 7 > Low 6 > Low 5 > Low 4 > Low 3 > Low 2 > Low 1

For example ,when press button P1 and P0 ,it will play the file corresponding to P0 ,because it have higher priority .

### 4.2.3. Parallel Mode

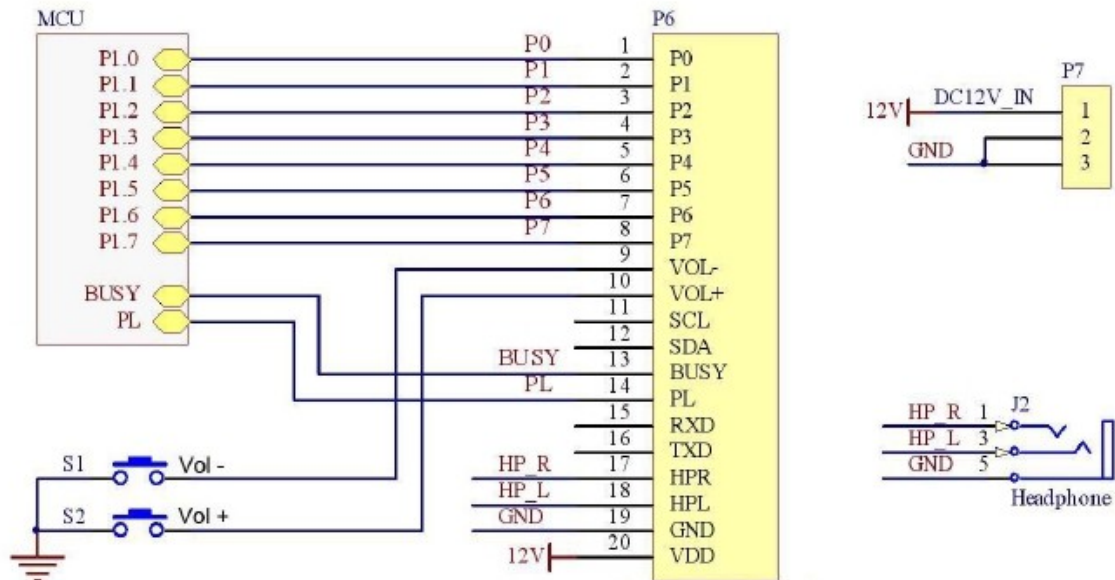
#### ①Parallel Mode settings

Set M1=0, M0=0 before powered the module

#### ②Parallel Mode introduction

All the functions of the module can be realized in Parallel Mode , by PL and address pins P7 - P0 .Such as play the exact file , volume setting , and so on .

#### ③ Parallel Mode Application Schematic



#### ④Pins function in Parallel Mode



Pin No.	Pin Name	Function	Priority	Remark
14	PL	Execute the Command	Low	
8 - 1	P7-P0	Set command for the specified MP3 file	High	
13	BUSY	Busy ,Low active	--	

#### ⑤Data Pin and Function

P7-P0	Function	Priority	Remark
000	Random play files in root directory	Low	
001-199	Selected the MP3 file	Low	
200-231	Set volume(0 to 31) , Value=command word-200	Highest	
...	Other command same in Serial Mode	...	

Note : Undefined command word will be carried out . When the Falling Edge is detected from PL, the system will read the data ports and judge to carry out the command and operation.

#### ⑥Data ports

P7	P6	P5	P4	P3	P2	P1	P0	No.	Remark
0	0	0	0	0	0	0	0	0	
0	0	0	0	0	0	0	1	1	
0	0	0	0	0	1	1	0	2	
...	...	...	...	...	...	...	...	...	
1	1	1	1	1	1	0	1	233	
1	1	1	1	1	1	1	0	254	
1	1	1	1	1	1	1	1	255	

0: Data port connect to GND , 1: Data port N/C (Not connected )or connect to positive

### 4.2.4. Serial Mode

#### ① Serial Mode settings

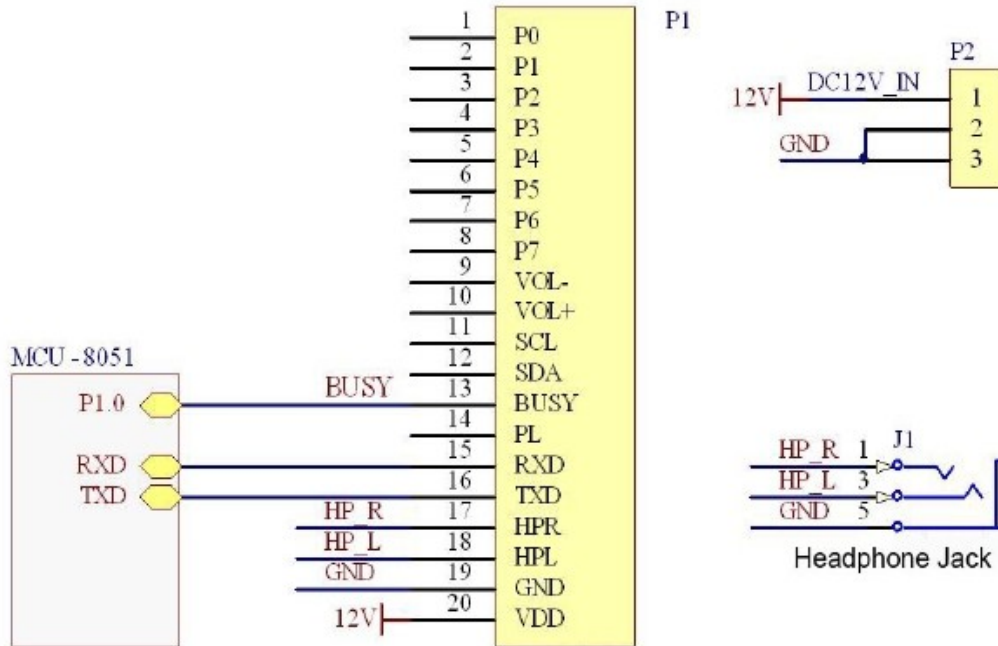
The Serial Mode always valid in any settings or Operating Mode.

## ② Serial Mode introduction

The Serial Mode is full-function with the highest priority .

Serial Port Baud rate : 4800bps , Verify Bit :None ,Data bit : 8 , Stop Bit :1

## ③Parallel Mode Application Schematic



## ④ Serial port command

The Serial port command are Single-byte ,No need Preamble Code and Check Code .

Command and function list as follows

Command Word	Function	Priority	Remark
000	0x00	Random play files in folder 01(Root directory)	Low
001-199		Play the selected MP3 file	Low
200-231	C8- E7	Set volume , Value=command word - 200	Highest
232	0xE8	Vol +	Highest
233	0xE9	Vol -	Highest
234	0xEA	Responds Illegal Command signal	High
235	0xEB	Suspend current playing	Low
236	0xEC	Resume playing	Low
237	0xED	Pause 0.5 second	Low
238	0xEE	Responds files amount in current folder ,255 Maximum	Low

239	0xEF	Stop to play	High	
240	0xF0	Responds the folders amount in the SD card	High	Not Valid Now
241	0xF1	Change to folder 01 ( Root directory)	High	
...	...	...	...	
255	0xFF	Change to folder 15	High	

Note: The Command word can send by series ,but not over 30 Command words .The system will process the pause automatically . Undefined command word will be carried out.

When the folder number over 15 , it will return to folder 01( root directory),When the files number over 199 in the folder,it will return to file 1 .

The Maximum folder is 15(including root directory) in the SD card , the extra will not be identified. There are 199 files maximum in each folder,the extra files will not be identified. When the Module Operating in MP3 Mode ,the maximum files is 65535 in each folder.

#### ⑤Pins function in Serial Mode

Pin No.	Pin Name	Function	Priority	Remark
13	BUSY	Busy, Low active	--	
15	RXD	Data Receive	--	
16	TXD	Data Transmit	--	

## 5. On-Board EEPROM

The On-Board EEPROM with 256 Byte for storing the operating information. Now only use Byte address 0x00 - 0x0F , others Byte address 0x10 - 0xFF are available for users.

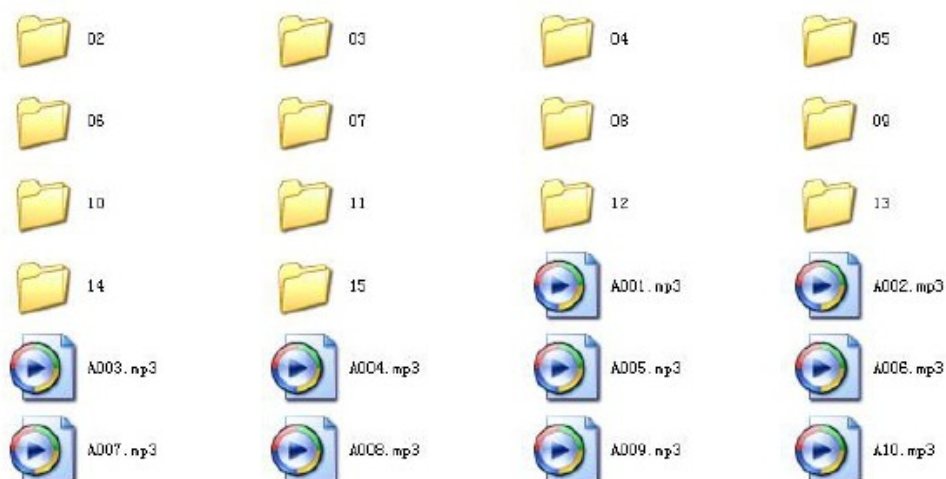
Parameter	Value	Store Address	Read-Write Nature	Remark
Volume	00 - 31	0x01	Read and Write	
Note : Byte addresses 0x00 - 0x0F only for system using,Prohibit to access .				

## 6. Transfer files to SD Memory Card

The Root directory will default act as folder No.01 ,and other folders should be named to 02 ,03,... .... 14,15 . The folders will not be identified over folder 15 .

In PC ,Name the MP3 files to A001.mp3 ,A002.mp3 ,.....A199.mp3 ,select all the files and right click the mouse and send the files to SD card root directory (act as folder 01).Then New folders(folder 02,03,... 15) in PC , and copy the MP3 files to each folder and name them A001.mp3 ,A002.mp3,A003.mp3 ,...A199.mp3. The maximum files in each folder is 199 .Also select all the folders right click the mouse and send them to SD card . The files and folders transfer order to SD card is the real order in the MP3 Module playing system , rename the MP3 files and foders just for the order transfer .Because the file transfer in PC will follow the rule :Transfer the selected folders to SD card ,it will transfer folder 02 first ,then 03,.....15 ,inside the folder it will transfer from A001.mp3,A002.mp3,...A199.mp3 in folder 02,then A001.mp3 ,A002.mp3 ..... A199.mp3 in folder 03,.....By order.

Example



## 7. Versions

Date	Description	Remark
2007-06	Initial version	V1.0
2008-08	Add product pictures	V2.0
2010-01	Add some functions to Direct-play Mode	V2.1

Note : The functions descriptive in grey words in the datasheet are not valid now .