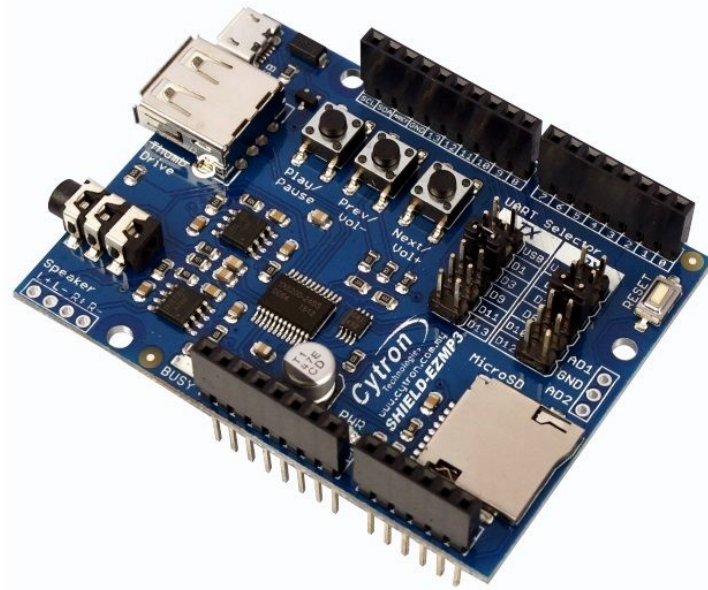




## EasyMP3 Shield SHIELD-EZMP3



## User's Manual

V1.0

Apr 2016

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## 1.0 INTRODUCTION

EasyMP3 Shield is an Arduino shield which integrates serial MP3 module and provides perfect integrated MP3 and WAV hardware decoding with any Arduino projects. It is compatible 3 with [Arduino Uno](#), [Arduino Duemilanove](#), [Arduino Mega2560](#), [Arduino Leonardo](#) and possibly other pin compatible main boards.

EasyMP3 shield offers high quality audio solution with the ability to decode and play MP3 audio files from storage drives. It has also on board 2 channel differential amplifier for direct drive of external loudspeakers and stereo audio jack socket for earphones.

EasyMP3 shield also provides easy and stable UART interface for users to communicate with MP3 module using Arduino boards. With provided library, users can give commands to the module through UART easily to carry out MP3 player functions such as play song, increase or decrease volume, playback, etc. There are 3 push buttons onboard for users to carry out basic MP3 functions directly without using UART.

EasyMP3 shield comes with microSD slot which serves as MP3 and WAV file storage for the users. For easier management of files in microSD, the shield also comes with USB-MicroB socket which allows user to connect the shield to PC and manage the files directly, just like SD card reader! Besides that, thumbdrive slot is also another alternative for users who prefer to use thumbdrive as file storage.

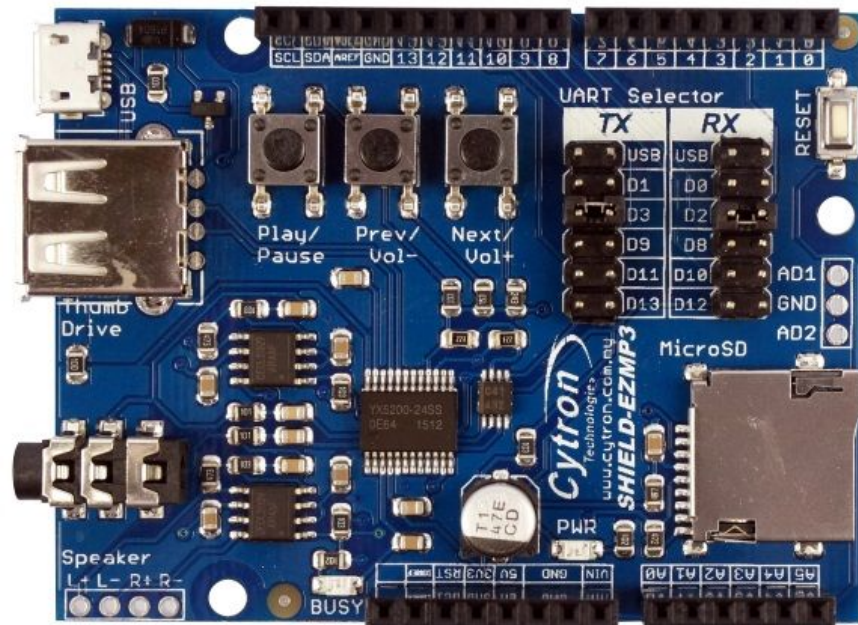
EasyMP3 shield has stackable side headers which allows more Arduino-compatible shields to be stacked on top of it. This shield provides digital pins options for software and hardware UART communication.

### **Features:**

- Support MP3 and WAV decoding
- 24-bit DAC output, dynamic range support 90dB, SNR supports 85dB
- Jumper selectors for software or hardware UART communication.
- POWER and BUSY LED indicators
- On board stereo 3.5mm audio jack socket
- On board dual channel/Stereo 3W differential audio amplifier for external speaker
- 1 USB Micro-B socket for MicroSD card reader function
- 1 ThumbDrive slot, maximum support 32GB thumbdrive
- 1 MicroSD card slot, supports FAT16, FAT32 file system, maximum support 32GB MicroSD card
- On board 3 push buttons for MP3 player basic functions.
- Supports AD key control mode.
- Arduino Stackable side headers.

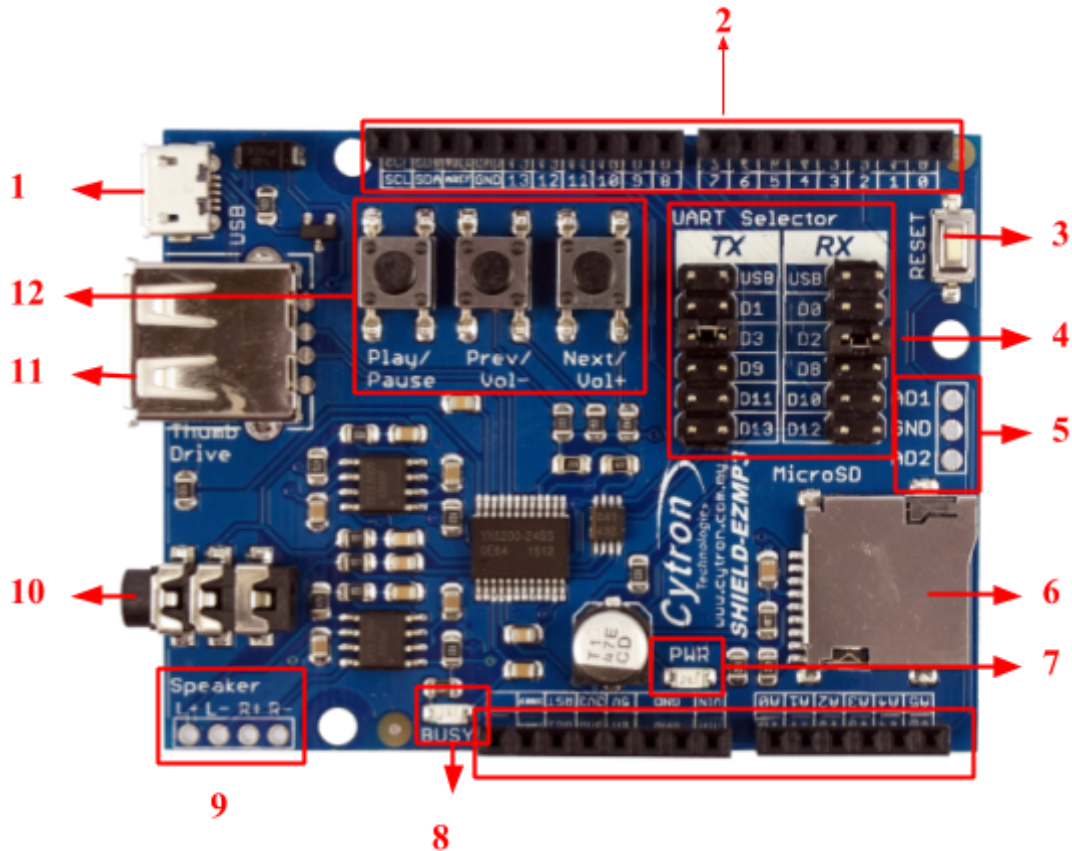
## 2.0 PACKING LIST

Please check the parts and components according to the packing lists. If there are any parts missing, please contact us at [sales@cytron.com.my](mailto:sales@cytron.com.my) immediately.



1. 1 x EasyMP3 Shield
2. 2 x mini jumper

### 3.0 BOARD OR PRODUCT LAYOUT



LABEL	DESCRIPTION
<b>1</b>	MicroUSB socket
<b>2</b>	Arduino R3 Standard Header
<b>3</b>	Arduino RESET button
<b>4</b>	UART Selector
<b>5</b>	ADKEY slot
<b>6</b>	MicroSD Card Slot
<b>7</b>	Power LED Indicator
<b>8</b>	Busy Indicator LED
<b>9</b>	Stereo Speaker Output
<b>10</b>	Audio Jack Socket
<b>11</b>	Thumb Drive Slot
<b>12</b>	Push Button

### **1. MicroUSB socket**

Allow connection between PC and shield and acts SD card reader.

### **2. Arduino R3 Standard header**

Allow other Arduino shield to be stacked on top of this stackable header. Pin A2 acts as BUSY signal pin by default. When the file is playing, the pin is at low logic level and otherwise it is HIGH. User can choose to remove pin A2 as BUSY signal pin or change it to other Arduino pin by following instructions at [Section 7.8](#).

### **3. Arduino Reset button**

Reset button is for convenience of user to reset the Arduino main board.

### **4. UART Selector**

Allow UART communication with selectable pins using mini jumpers. User may select D0, D2, D8, D10 and D12 as the RX pin; D1, D3, D9, D11 and D13 as the TX pin from Arduino main board.

### **5. ADKEY slot**

Additional slot which allows user to carry out additional MP3 functions with proper hardware connection.

### **6. MicroSD card slot**

Slot for microSD card which acts as file storage, maximum support up to 32GB.

### **7. Power LED**

Power indicator LED for onboard MP3 module. The LED will turn on when 5V power is supplied to the module.

### **8. BUSY Indicator LED**

Busy LED indicator for MP3 module. LED will turn on when the module is playing files.

### **9. Stereo Speaker Output**

Allow connection to external speakers up to 3W rating.

### **10. Audio Jack Socket**

Allow connection to earphone.

### **11. Thumbdrive slot**

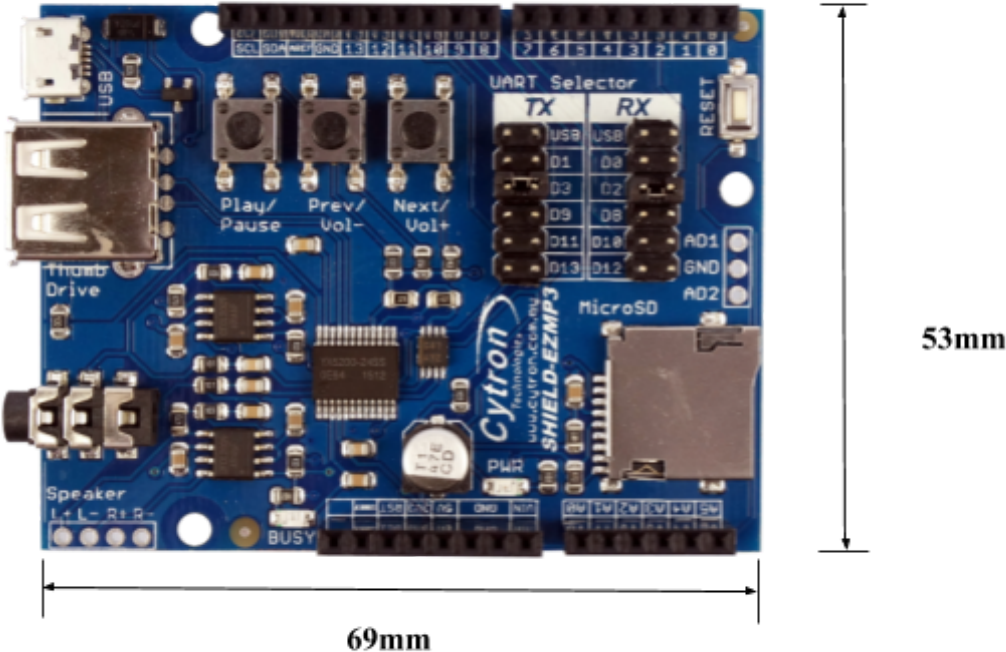
Slot for thumbdrive card which acts as file storage, maximum support up to 32GB.

### **12. Push Buttons**

Push buttons to play basic MP3 functions such as play, pause, next, previous, volume up and down.



4.0 DIMENSION



## 5.0 UART/SERIAL COMMUNICATION

MP3 module on EasyMP3 shield allows users to communicate with the it using UART communication.

Default settings are **9600 kbps baudrate, 8 bit data, 1 stop bit and no parity.**

### 5.1 Guideline for setting up TX and RX pin with Arduino Boards

The following table shows suitable RX and TX pins to be chosen for compatible Arduino boards.

UART		Arduino Boards
RX	TX	
USB*	USB*	Arduino Uno/Arduino Mega/Arduino Leonardo
D0	D1	Arduino Uno/Arduino Mega/Arduino Leonardo
D2	D3	Arduino Uno only
D8	D9	Arduino Uno/Arduino Leonardo
D10	D11	Arduino Uno/Arduino Mega/Arduino Leonardo
D12	D13	Arduino Uno/Arduino Mega

**\* This option enables communication between EasyMP3 and PC using suitable UART software such as Arduino Serial Monitor, Hyperterminal, RealTerm etc.**

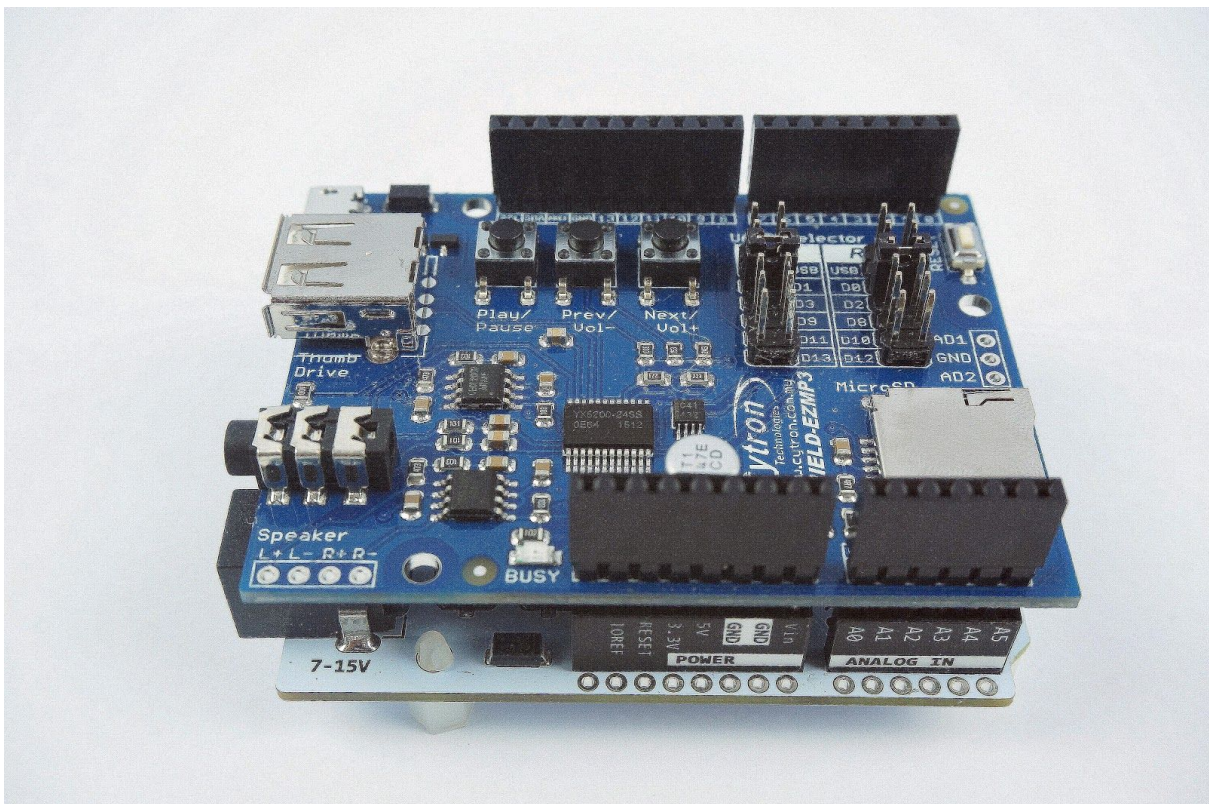


## 6.0 HARDWARE INSTALLATION

This section will show example installation of EasyMP3 Shield with [Arduino Uno](#) as a main controller. Besides Arduino Uno, other Arduino main boards such as [Arduino Duemilanove](#), [CT-UNO](#), [Arduino Mega2560](#) and [CIKU](#) are also compatible with this shield.

### 6.1 Arduino Uno

Arduino is an open-source physical computing platform based on a simple I/O board and a development environment that implements the Processing/Wiring language. EasyMP3 Shield can be used together with Arduino Uno. Figure below shows example hardware connection between Arduino Uno and EasyMP3 Shield; it is simply stacking up the shield onto the Arduino main board.



## 7.0 GETTING STARTED

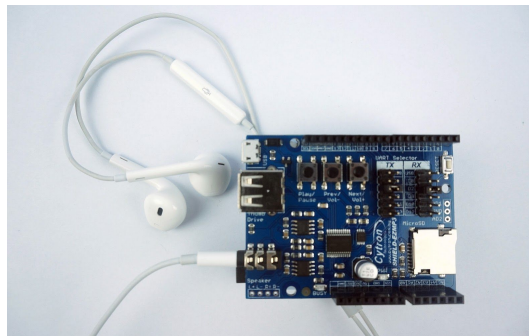
This section will show examples of getting started with EasyMP3 Shield with Arduino

- 1) Audio devices connection
- 2) Storage drives selection
- 3) Manage storage files
- 4) Test board basic functionality
- 5) Upload example sketches to play tracks
- 6) ADKEY function
- 7) SD card reader
- 8) Selectable BUSY signal pin

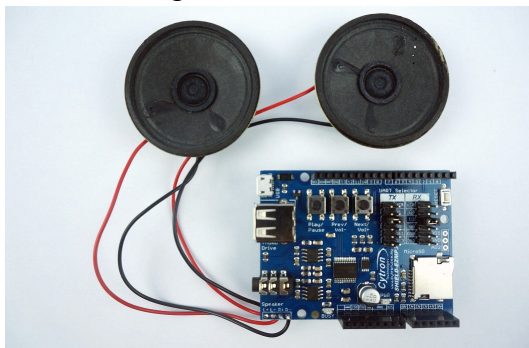
### 7.1 Audio devices connection

User can attach a few types of audio devices to EasyMP3 Shield with Arduino such as earphones, speakers, etc. The following figures show the connection of different types of audio devices to EasyMP3 Shield with Arduino. Highly recommended only one audio device is connected at one time for the best performance.

- a) Earphones



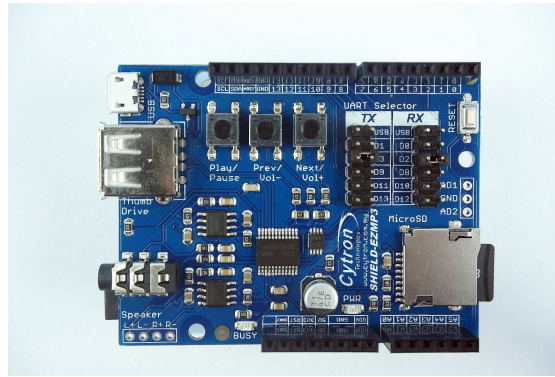
- b) External speakers with soldering



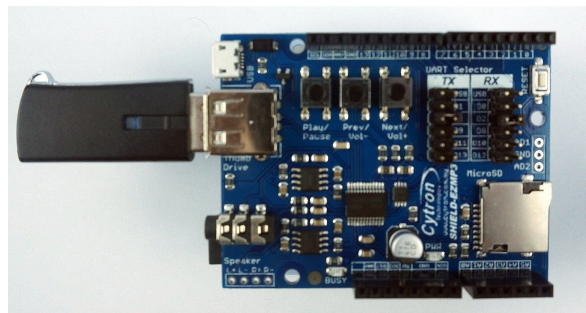
### 7.2 Storage drives selection

User can attach a few types of storage devices to EasyMP3 Shield with Arduino such as MicroSD card and thumbdrive. The following figures show the connection of different types of storage devices to EasyMP3 Shield with Arduino. User can attach MicroSD card and thumbdrive at the same time.

a) MicroSD card

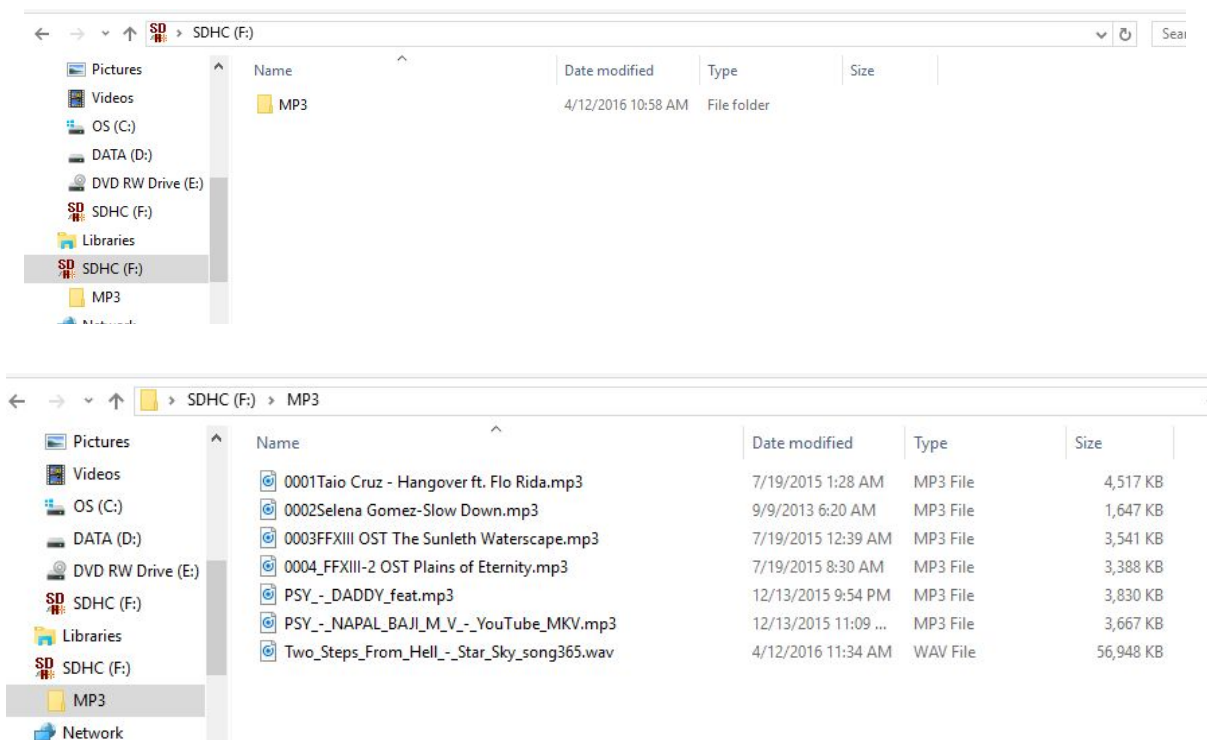


b) Thumbdrive



### 7.3 Manage storage files

Create a folder named “MP3” in **root directory** of storage drive and store all files into it. EasyMP3 shield supports **MP3 and WAV** file decoding.



To play the file accordingly using the arduino sketches, user can rename the file using one of the following options:



Example: To play “ABC.mp3” in MP3 folder as 1st track, user can rename the file to

- I. 0001.mp3 or
- II. 0001ABC.mp3 or
- III. 0001\_ABC.mp3

Note: As long as setting 0001 as prefix of the name of the file and provided that the file is stored in MP3 folder, EasyMP3 shield will treat it as 1st file. This applies the same to making 2nd, 3rd track and so forth.

#### **7.4 Test board basic functionality**

There are 3 onboard push buttons for basic MP3 player functionality.

1. Make sure all steps from 7.1 to 7.3 are completed.
2. Stack EasyMP3 Shield onto compatible Arduino Board. It is advisable to upload an empty sketch to Arduino before stacking the shield onto it. Ensure that the pins alignment is correct.
3. Power up the whole setup with 12-5V adapter or connecting it to PC via USB cable.
4. Press any of 3 buttons to start playing the files.
5. Button 1: Play/Pause
  - Press the button to pause while the file is playing. Press again to resume after the file stops playing.
6. Button 2: Prev/Vol-
  - Press the button to play previous file. Long press the button to decrease the volume.
7. Button 2: Next/Vol+
  - Press the button to play next file. Long press the button to increase the volume.

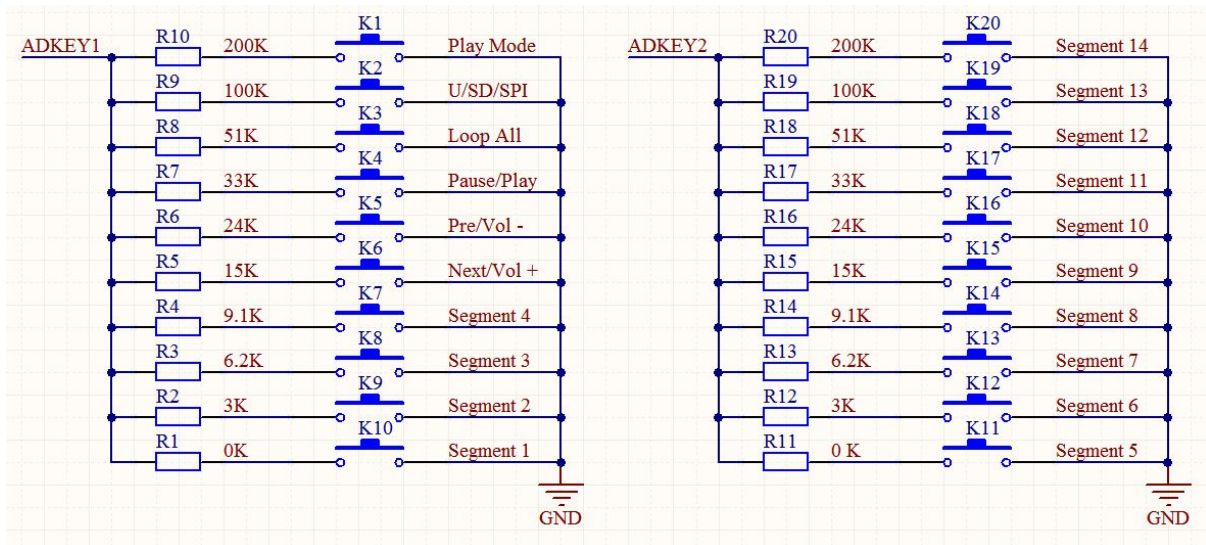
#### **7.5 Upload example sketches to play tracks**

1. Make sure all steps from 7.1 to 7.3 are completed. (Put at least 4 files in MP3 folder with prefix 0001 to 0004)
2. For UART selector, select D2 for RX and D3 for TX pin.
3. Stack EasyMP3 Shield onto compatible Arduino Board. Ensure that the pins alignment is correct.
4. Download [CytronEasyMP3Shield](#) library from link provided at product page and extract the files to Arduino Library folder (My Documents -> Arduino -> Libraries).
5. Connecting the whole setup to PC via USB cable.
6. Open Arduino IDE. Determine which COM port Arduino Uno is connected to and configure the port settings under menu Tools -> Port.
7. Go to File -> Examples -> CytronEasyMP3 and open example sketch PlayATrack. Compile and upload.
8. Open and set up Arduino Serial Monitor with 9600 Baud, and monitor the progress.

#### **7.6 ADKEY function**

ADKEY function provides user with more control on EasyMP3 shield via buttons. Other than Play/Pause, Prev/Vol- and Prev/Vol+ buttons onboard, user can choose to perform other actions via buttons such as select storage drive to play, repeat track, etc. The schematics is as

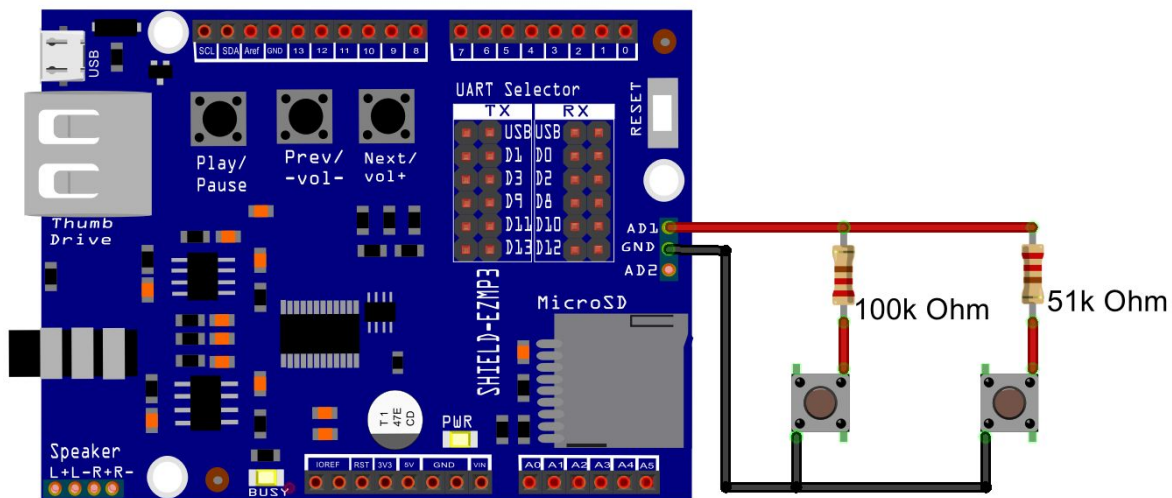
follow.



**Correction: \*\***

Value of R5 and R6 are swapped. R5 should be 24K for Next/Vol+ and R6 15K for Prev/Vol-.

Example circuit connection:



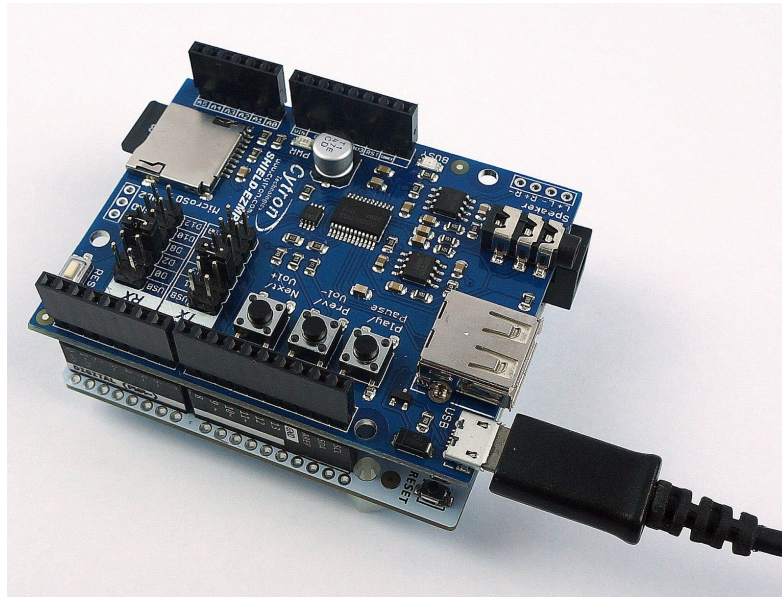
fritzing

This allows function switch U/SD/SPI for button 1 and function loop all for button 2.

**7.7 SD card reader**

EasyMP3 shield also provides user easy access to microSD card content via onboard microUSB slot. With microSD card inserted and USB cable connected to PC via microUSB slot, user can access microSD card directly from PC. User can create, move, rename and manipulate folders and files in microSD card.

MicroSD card can be accessed by connecting USB microB cable to EasyMP3 shield only, stacking shield onto Arduino board while accessing microSD card is not necessary.



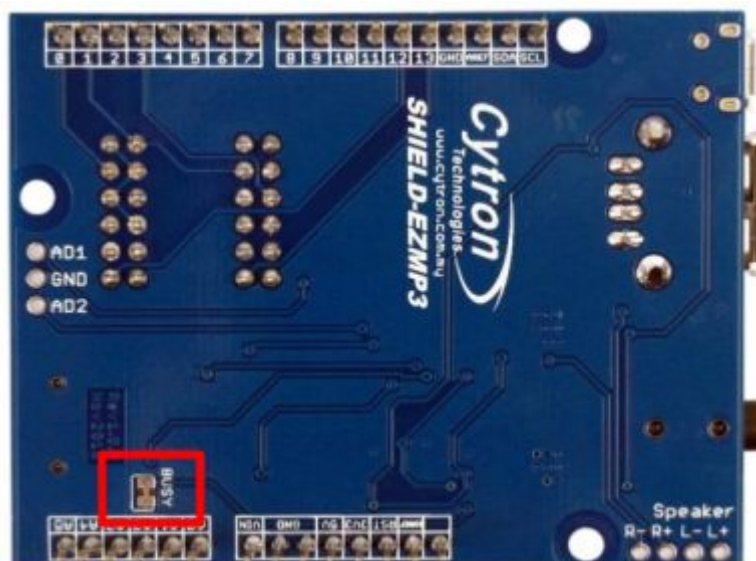
There are a few limitation for this feature:

- During SD card reader function is being performed, EasyMP3 shield cannot play files. However user still can access and play files from PC.
- The speed accessing and manipulating files in microSD card is highly limited and is not suitable for transferring large amount of files at one time.
- Safely remove device from PC is highly advisable for changes in microSD card to take effect properly.

**\*\*This feature does not apply to thumbdrive.**

## 7.8 Selectable BUSY signal pin

By default, BUSY signal pin is connected to Arduino pin A2. To remove it, just simply cut the trace between 2 jumper pads at the back of EasyMP3 shield.





If user wishes to change BUSY signal pin to other Arduino pin, cut the trace, then simply solder the jumper pad (left hand side) to any desired pin.



In CytronEasyMP3 library, look for CytronEZMP3.h header file, change the line below

```
#define PIN_BUSY A2  
To  
#define PIN_BUSY (any desired pin)
```

For example, Arduino digital pin 6 is selected as new BUSY signal pin.

```
#define PIN_BUSY 6
```



## 8.0 WARRANTY

- Product warranty is valid for 6 months.
- Warranty only applies to manufacturing defect.
- Damaged caused by misuse is not covered under warranty
- Warranty does not cover freight cost for both ways.

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