

Animated Prop Systems

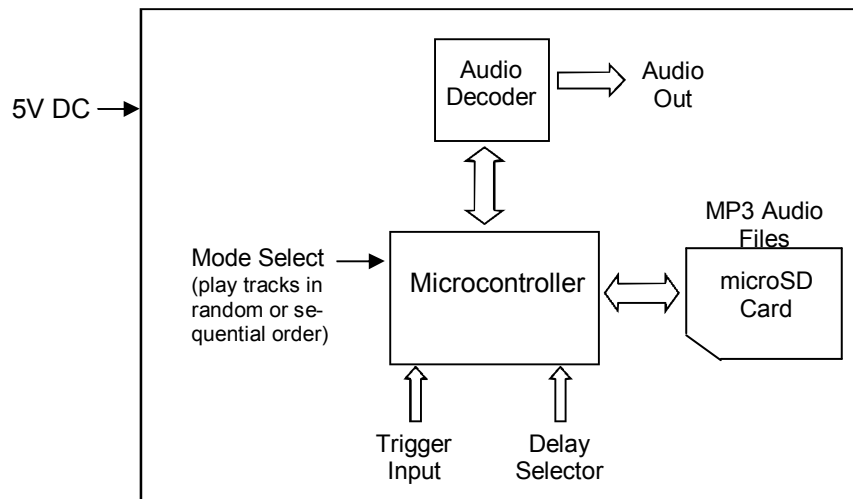
User's Guide for the AP2 Audio Player

Thank for your purchase of the AP2 Audio Player. This player was designed specifically to provide high quality audio for home and professional prop systems.

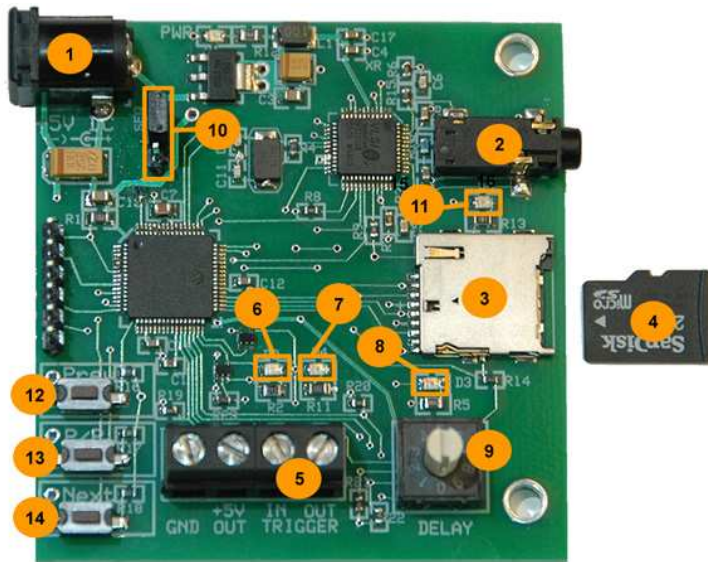
System Features

- Plays CD-quality MP3 audio files up to 320kbps
- Audio files stored in microSD card (not included)
- 1/8" audio jack out for connection to headphones, powered speakers or amplifier
- Audio tracks can be triggered from 3.3V - 12V input signal
- 5V output trigger while audio track is playing for controlling other devices
- Programmable "post trigger" delay after audio track finishes from 5s to 5 min
- Indicator LEDs to show trigger in, trigger out and delay

AP2 Audio Player Block Diagram



AP2 Board Layout and Basic Functions



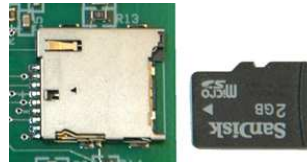
- 1 - Power connector (5V DC)
- 2 - Audio connector (1/8" Stereo jack)
- 3 - microSD card socket
- 4 - microSD card (not included)
- 5 - Trigger in/out connector
- 6 - LED indicator for Trigger In (green)
- 7 - LED indicator for Trigger Out (red)
- 8 - LED indicator for Post cycle delay (yellow)
- 9 - Post cycle delay selector switch
- 10 - Mode select jumper
- 11 - LED indicator for microSD card access (green)
- 12 - Previous track button
- 13 - Play/Pause button
- 14 - Next track button

Powering the Board

The AP2 requires a 5V regulated DC supply and consumes about 60mA when it idles and about 100mA when playing a track. The power jack requires a center positive 5.5 x 2.1mm connector.

microSD Card and Audio Files

The AP2 uses audio tracks stored on a standard microSD card formatted as either FAT16 or FAT32. Only audio tracks that are formatted as MP3 are supported by the board. All files must be in the root directory of the microSD card i.e., audio files in subdirectories will not be recognized by the player. Please read the section on choosing Random Mode or Sequential Mode for the player as this affects the naming convention for your audio files. Insert the card as shown in the photo to the right.



Buttons

Buttons on the player exist for the following functions:

Previous Track (PREV)

If an audio track is currently playing when this button is pressed then it will jump to the previous track and begin playing. If the track currently playing is the first audio track, then it will jump to the beginning of the track. If an audio track is not playing when this button is pressed then it will jump to the previous track and wait for either the Pause/Play button to be pressed or a valid trigger.

Pause/Play (P/P)

If the player is not currently playing an audio track, pushing the P/P button will cause the player to begin playing the current audio track. Once this track finishes playing then the next track will be loaded but will not start playing unless the P/P button is pressed again or it is triggered by the trigger signal. If the player is currently playing a track when the P/P button is pressed then it will pause the audio track at the current position until the P/P is pressed again or a trigger is received.

Previous Track (NEXT)

If an audio track is currently playing when this button is pressed then it will jump to the next track and begin playing. If the track currently playing is the last audio track, then it will "roll around" to the first audio track and begin playing. If an audio track is not playing when this button is pressed then it will jump to the next track and wait for either the Pause/Play button to be pressed or a valid trigger.

Trigger Section

The trigger section of the AP2 is shown in the photo to the right. This section allows you to connect a sensor or other type of switch to the board which will indicate to the AP2 board that it should begin to play an audio track.

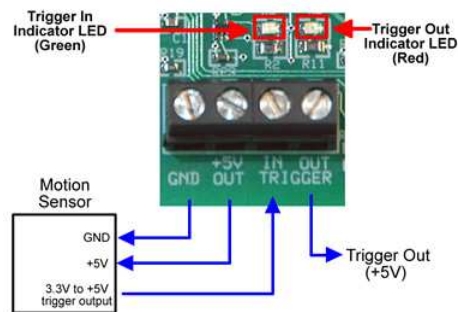
The 4-position connector in the bottom of the photo is where you will connect your switch or sensor. The position on the far left is connected to ground and the second position from the left is a 5V output. These two connections can be used to power your sensor if needed.

The third position from the left on the connector is for the trigger input signal from your switch or sensor. Any DC signal from 3.3V up to 12 can be used as a trigger signal.

The green **Trigger In Indicator LED** will light up anytime the trigger signal is above this threshold. However, if an audio track is already playing, additional triggers will be ignored until the audio track has completed AND the delay period has expired (please read next section on setting the post cycle delay period).

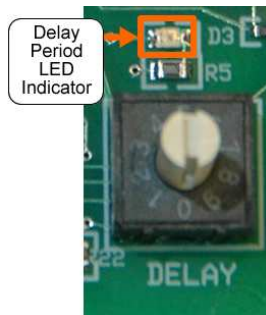
The **Trigger Out connection** provides the means of controlling other devices or acting as the trigger signal for other controllers when the AP2 plays an audio track. The Trigger Out connection provides a +5V output signal whenever the player has been triggered by the trigger input and the audio track is playing. This connection will remain high as long as the audio track plays and will go low as soon as the track completes. This output will be low during the post cycle delay period. Whenever the Trigger Out connection is high, the red **Trigger Out Indicator LED** will turn on as well.

The Trigger Out signal will only drive about 25mA so it is NOT suitable for directly driving relays or motor - you will need to use a suitable drive circuit for an application such as this. Please see the section in this manual "[How to drive a relay with the Trigger Out pin](#)" for details on a suitable driver circuit.



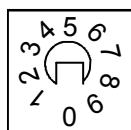
Setting the Post Cycle Delay

The post cycle delay feature allows you to set the delay period after an audio track plays before another trigger is accepted. The post cycle delay cannot be turned off - the feature is always enabled and the delay time can be changed from 5 sec to 5 min. The longer delay times are typically used in situations where multiple triggers are occurring in a short period of time (such as people continuously walking past the sensor) and you want the audio player to wait a certain amount of time before it plays the next audio track. Once some people realize that a sensor has caused something to happen they may be compelled to attempt to make the trigger go off multiple times - which you/and or your neighbors may find annoying. Using a post cycle delay of 30 sec or more usually takes care of this issue.

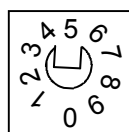


The post cycle delay is set using the rotary dip switch on the player board as shown in photo on the right. The switch can be turned to one of 10 positions to set the delay as shown below.

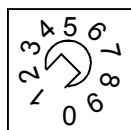
The yellow LED indicator above the switch will go on after an audio track has finished and will stay on as long as the delay period is in effect. During this delay period no other triggers will be accepted.



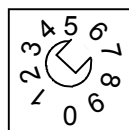
Delay indicator = 0
Delay time = 5 sec



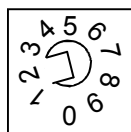
Delay indicator = 5
Delay time = 60 sec



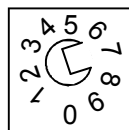
Delay indicator = 1
Delay time = 10 sec



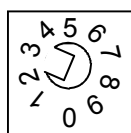
Delay indicator = 6
Delay time = 90 sec



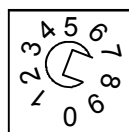
Delay indicator = 2
Delay time = 15 sec



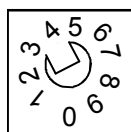
Delay indicator = 7
Delay time = 2 min



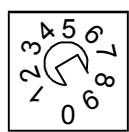
Delay indicator = 3
Delay time = 30 sec



Delay indicator = 8
Delay time = 4 min



Delay indicator = 4
Delay time = 45 sec



Delay indicator = 9
Delay time = 5 min

Choosing Between Random Mode and Sequential Mode

The AP2 selects audio tracks in one of two operational modes—Random Mode or Sequential Mode. The mode is selected using the Mode Select Jumper on the board. If the jumper is removed all together, Random Mode will always be selected.

Selecting Random Mode

Place jumper
on left 2 posts



RND SEQ

Selecting Sequential Mode

Place jumper
on right 2 posts



RND SEQ

Random Mode

When random mode is chosen, the AP2 does not care what the filenames are for any audio track as long as the tracks are mp3 format and the filename has the .mp3 extension. Each time the player is triggered a random track is played. After the track finishes, another random track is chosen and it will wait for the next trigger. There is a filter to prevent the same track from being played twice in a row. There is technically no limit on the number of audio tracks you can have when operating in this mode. If you are having problems getting the player to work for some reason we suggest you start with the random mode being selected.

Sequential Mode

When sequential mode is selected, each audio track will be played in order based on a 2 digit number at the beginning of the filename. The filename of each audio track must be formatted correctly for it to play in this mode. WHEN IN SEQUENTIAL MODE ONLY AUDIO FILES THAT BEGIN WITH A 2-DIGIT NUMBER BETWEEN 1 AND 99 WILL PLAY. TRACKS LESS THAN 10 MUST HAVE A LEADING ZERO. If you do not have any audio files that begin with a 2-digit number then no tracks will play when the board is triggered. In addition, sequential mode limits you to 99 files. The files must begin with a number between 1 and 99 although there can be spaces between the numbers, i.e., you can have a filename that starts with 01 and then the next filename starts with 07. Once the last numeric audio track has been played, the player will 'roll over' and begin playing the first numeric track.

Examples of valid filenames:

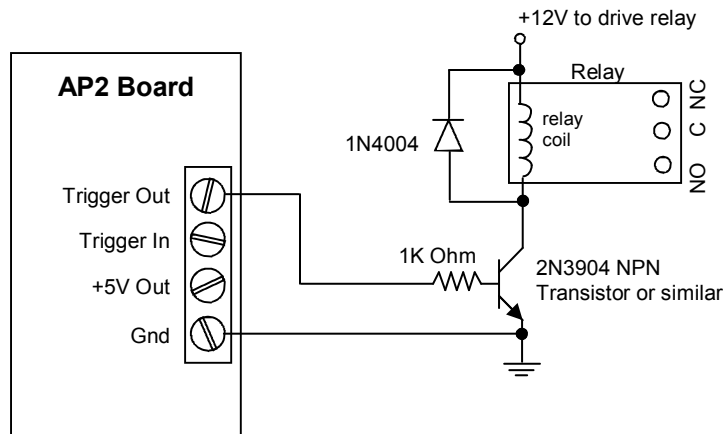
01myintro.mp3
07_part7.mp3
99_screams.mp3

Examples of filenames that are NOT valid in Sequential Mode:

Myintro.mp3 *(file does not begin with 2 digit number)*
7_screams2.mp3 *(filename begins with only one digit– must have 2 digits)*
127seance.mp3 *(filename must begin with number between 1 and 99)*

How to drive a relay with the Trigger Out pin

The Trigger Out pin can be used to activate other controllers or devices, however if you want to use this pin to drive a relay, you must use a suitable driver circuit. A relay typically requires 100mA to drive the coil in the relay and the Trigger Out pin does not have the ability to drive this much current by itself. The circuit below shows a simple circuit that will allow the Trigger Out pin to drive a relay.



Notes

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