

## Q Mode

The Q mode is disabled by default, and enabled by adding a letter Q as the fourth letter in the configuration file MODE.TXT. In the Q mode, the left channel output is inverted. For stereo files this creates a virtual surround. For mono files this creates a more powerful differential output, but the speaker (8 Ohm recommended for this mode) must be connected to the LEFT and the RIGHT terminals (instead of the LEFT and the COMMON terminals).

## Application Notes

### *I just want it to play a sound when the button is pressed.*

Do the wiring according to the Typical Wiring Diagram but skip the optional relay. Name the sound file "001.mp3" and copy it to the flash card. Insert the card into the system and it's ready to work! If you want to play different files sequentially (one per trigger), just name the rest of the files "002.mp3", "003.mp3" and so on.

### *Random Play*

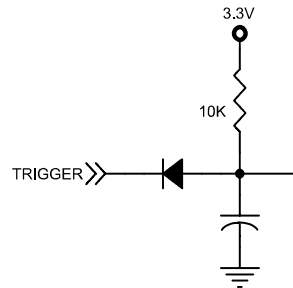
Random Play can be achieved by using either the DIC mode (for normally open contacts) or the DIO mode (for normally closed contacts.) The randomness is actually created by the variation in the duration of the momentary opening or closure of the contacts. For example, pressing a normally open push button in the DIC mode will apply a constant trigger to the unit, causing it to play a file. However, before the file can be played, the unit gets interrupted by the same constant trigger and tries to play the next file. This interrupting process goes on until the push button is released. At that moment, the unit is free to play whatever file it happens to land on.

Random Play is not available when the unit is in the Timer Mode.

### *DC Voltage Triggering*

The diagram to the right illustrates the internal circuitry of the trigger input. The input is considered OPEN when the trigger is either floating or higher than 2.7V. The input is considered CLOSED when the trigger is at or near zero volt (ground.) This design allows most devices with DC voltage output to be used for triggering, but there are some exceptions.

For example, the output from certain security alarms stays floating (no voltage) when not triggered, and rises to 12V or 24V when triggered. To our system it is always considered OPEN. In this case an external relay can be used to provide a contact closure for triggering.



# EM21A User's Manual

## Technical Specifications

### *Audio Quality*

CD quality (mono/stereo)

### *Max. Output Power*

6W (mono files in the Q mode) or 3W per channel

### *Supported File Types*

MP3 (ISO 11172-3 compliant)

### *Trigger Input*

One input for push button, motion sensor, or DC control voltage

### *Max. Number of Sound Files*

99

### *Flash Card Type*

Both SD (FAT16) and SDHC (FAT32) cards are supported

\* Mini and micro SD cards are also acceptable if an adaptor is used.

### *Max. Flash Card Capacity*

2GB for SD, 32GB for SDHC

### *Max. Recording Time*

About 34 hours of 128Kbps MP3 audio on a 2GB SD card

About 544 hours of 128Kbps MP3 audio on a 32GB SDHC card

### *Supply Voltage*

10 ~ 15 VDC regulated

### *Typical Standby Current*

120 mA

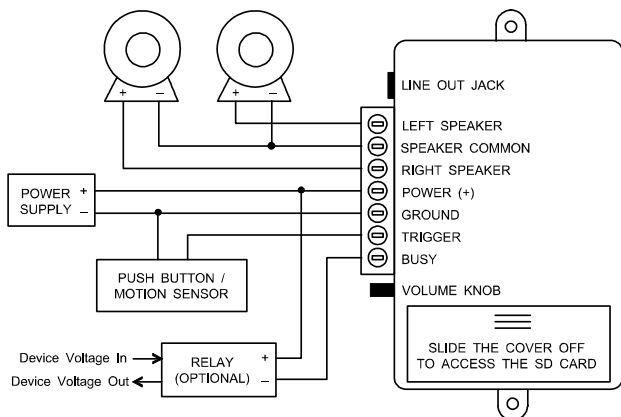
### *Physical Dimensions*

4.25" x 2.75" x 1.6" (excluding mounting ears)

### *Firmware Revision*

1.3 ~ 1.7

## Typical Wiring Diagram



### Line Out Jack

This 3.5mm phone jack provides single ended output for headphone or power amplifier.

### Speaker Outputs

The speaker outputs are single ended. Load impedance is 4 to 8 Ohms.

### Power & Ground

Be sure the supply voltage is within the specifications or the unit may be damaged.

### Trigger Input

Depending on the operation mode, the playback is activated by making or breaking the contact between this input and the ground.

### Busy Output

This open collector output is activated during audio playback. Maximum load is 100 mA. This output can be used to turn on an external relay that further controls a device such as a motor or a light.

### Volume Knob

Turn the knob clockwise to increase the output level. It affects both the speaker output and the line out.

### SD Card

Both SD (FAT16) and SDHC (FAT32) cards are supported. Files on the flash card should be properly numbered (see Numbering Files section). Be sure to turn the unit off before inserting the card (face up). To remove the card, push it again.

## Numbering Files

Sound files must be numbered consecutively starting from 001, even if only one file is used. The 3-digit file number must be added at the beginning of the filename, e.g. "001 Anyname.mp3".

Sound files are played according to the numbering sequence. The first trigger plays file 001, the second trigger plays file 002 and etc. When the next file number is missing, the sequence restarts from 001.

## System Configuration

The system can be easily configured with a simple text file called MODE.TXT on the flash card. If there is no MODE.TXT on the flash card, the system will operate in the default mode "DNC". Put one of the following modes (three letters) in the MODE.TXT file.

In this document, "the contact" means the connection between the trigger input and the ground.

### *If you want the playback to be non-interruptible:*

**DNC** (default mode) - Play the file once when the contact is closed. If the contact is still closed when the playback finishes, the next file will start to play immediately.

**DNO** - Play the file once when the contact is open. If the contact is still open when the playback finishes, the next file will start to play immediately.

**DNM** - Play the file once when the contact makes (open then close). After the playback finishes, the contact must open then close to play the next file.

**DNB** - Play the file once when the contact breaks (close then open). After the playback finishes, the contact must close then open to play the next file.

### *If you want the playback to be interruptible:*

**DIC** - Similar to DNC, but the playback can be interrupted by opening then closing the contact.

**DIO** - Similar to DNO, but the playback can be interrupted by closing then opening the contact.

**DIM** - Similar to DNM, but the playback can be interrupted by opening then closing the contact.

**DIB** - Similar to DNB, but the playback can be interrupted by closing then opening the contact.

### *If you want the playback to stop as soon as the trigger is removed:*

**DHC** - Similar to DNC but the playback stops as soon as the contact is open. If the contact is still closed when the playback finishes, the next file will start to play immediately.

**DHO** - Similar to DNO but the playback stops as soon as the contact is closed. If the contact is still open when the playback finishes, the next file will start to play immediately.

**DHM** - Similar to DNM but the playback stops as soon as the contact is open. If the contact is still closed when the playback finishes, the next file will not start to play - the contact must open then close to play the next file.

**DHB** - Similar to DNB but the playback stops as soon as the contact is closed. If the contact is still open when the playback finishes, the next file will not start to play - the contact must close then open to play the next file.

## Timer Mode

The system can be made to automatically play at preset, fixed intervals. This is called the Timer Mode which is configured by using "Txx" for the configuration letters, where "xx" is a two digit number specifying the interval in minutes. For example, "T60" sets the interval to 60 minutes, so the system will automatically play a file every 60 minutes, starting from file 001.

Although the Timer Mode does not require manual triggering, you can still manually trigger the system when it's idle. In the idle period, the system works as if it's in the DNC mode. After the system fulfills the manual triggering, the idle period resets (restarts from the beginning).