MP3 Light Chaser V2
SKU: EK0050

Description

The MP3 Light Chaser uses 6 LEDs and the audio input from an MP3 player to create a sequencing light effect. The direction and speed of sequencing is controlled by the frequencies contained in the audio input to the circuit.

Construction

Solder in all the resistors, the DIL socket, capacitor and the transistor. The six LEDs need to be mounted using insulated wire of a length suitable for for use, it is important to ensure they are connected correctly - the Anode connection is the long leg of the LED and the **K**athode is the short leg of the LED. Solder in the diode D1 this ensures the PIC gets less than 6V when using a 6V battery pack, if you are using a 4.5V battery pack you can omit D1 and connect a switch in its place if required.

A 3.5mm audio lead needs to be prepared by cutting it in half (the spare piece can be used for another project or student). The outer sheath is cut back to reveal the 3 wires inside. Use a multimeter to identify the tip connection, usually a black wire - 0V, the is then stripped and tinned. The remaining two wires are stripped and tinned, if your device is mono then both can be solder together. If your device is stereo then cut off one of the wires, since the Light Chaser has only 1 input. These two wires are solder into the audio input with the black/0V wire at the bottom and the L/R signal wire in the middle connection.

Solder on the PP3 battery connector, you **must** use 4.5V or a 6V battery pack.

Parts List

Part ID	Part name
R1, R2, R3	330R/390R resistor
R4	10K resistor
R5	1K resistor
R6	5K6 resistor
R7	820R resistor
C1	0.1uF Ceramic capacitor
IC1	PIC 12F683 with MP3 Firmware
Q1	BC548B
D1	1N4148
D2 - D7	LED's 5mm Red
SW	Optional switch (not supplied)
CN1	PP3 Battery connector
PCB	PCB for MP3 Chaser
H1	8 pin DIL socket
CN2	3.5mm audio cable (not supplied)

PCB Layout
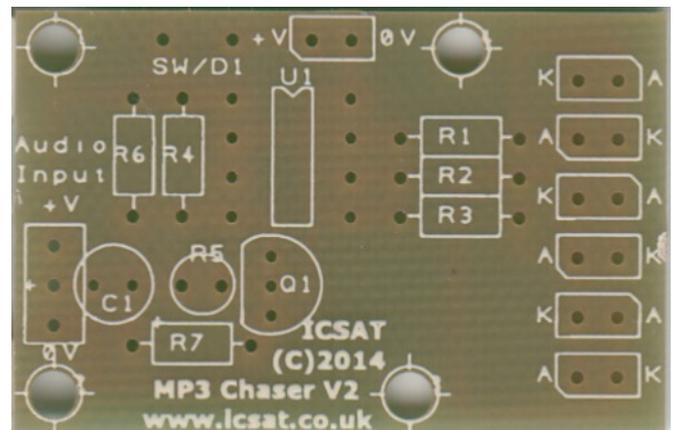
Connection info:
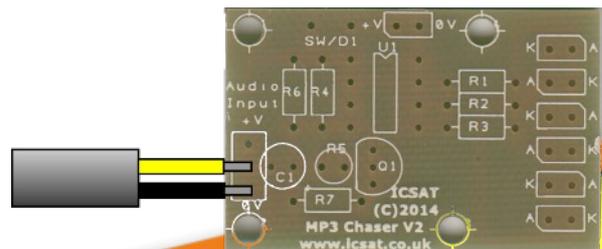
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In use

To operate the MP3 Light Chaser it is plugged into your MP3 player or it can be wire to the input section of an MP3, for example our MP3 Stereo amplifier kit.

Once switched on the LEDs will start to sequence back and forth in response to the audio content. If that doesn't happen you will need to increase the volume setting on your Phone / MP3 player until the LEDs start to respond. **Note** some Mobile Phones / MP3 Players have a volume limiter enabled, this can affect the Light Chaser operation, you may need to disable that setting.
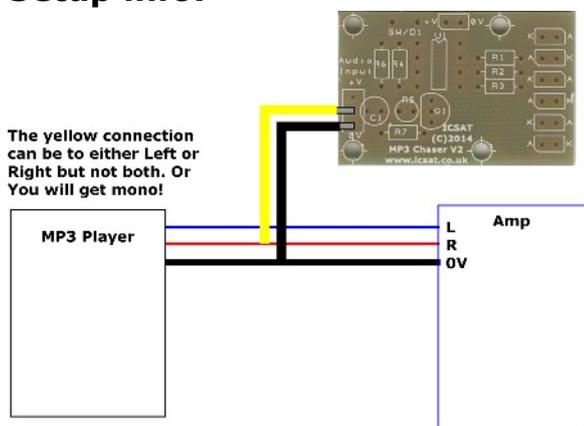
How does it work?

The PIC monitors the audio input via a simple transistor amplifier, once that inputs goes above 3V it times how long it takes for it to go below 1V. The time taken depends on the frequency (number of pulses per second), high frequencies give a short time and low frequencies a long time. These timings are then used to control how far and which way the lit LED sequence moves.

The LEDs are connected in an unsual manner, which allows 6 LEDs to be operated by **just** 3 pins. This method of driving LEDs is called **'Charlieplexing',** invented by Charlie Allen of Maxim a chip manufacturer in 1995. It makes use of the fact that the PICs pin are **'tristate',** they can be set to 1 (+V), 0 (0V) or an input which is effectively off (they have a very high resistance as an input).
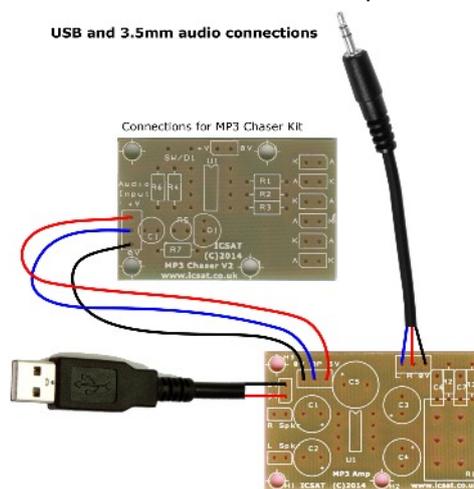
Using these factors, each LED can be lit by setting one pin to +V, one to 0V and the other to an input in the correct sequence. It is then quite easy to create a program to do this switching and select which LED you want to be lit up. How the LED is selected depends upon the program stored in the PIC, this operating code is known as **Firmware** - in embedded electronics terms.

This method has a limitation in that **only one LED** can be lit at any one time, but that be overcome using some advanced coding, but that's for another day and other product.

Setup info:

Connections for use with MP3 Amp Kit EK0090

The yellow connection can be to either Left or Right but not both. Or You will get mono!

USB and 3.5mm audio connections

Connections for MP3 Chaser Kit

Related Kits

1. MP3 Stereo Audio Amp Kit - for use in MP3 Docking Stations or similar projects
2. Sound to Light display - use in lighting, mood lighting, MP3 Docking Stations or similar projects

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