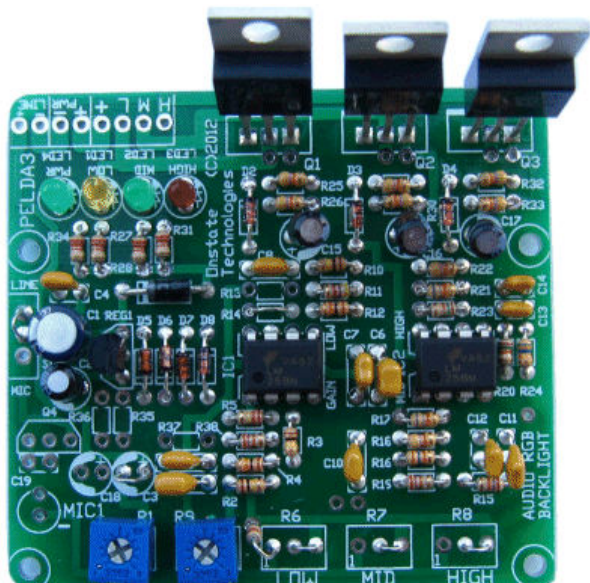




Audio RGB LED Colour Organ Band Spectrum Display



Description:

The Audio RGB Color Organ Band Spectrum Display is a DIY kit for displaying audio signal level brightness (AKA colour organ/light organ). It responds to music beat and intensity and displays it with different coloured LEDs. Three filters are used to separate the audio signal into low, mid and high bands. The outputs can be connected to an RGB LED strip to give a visual beat/intensity of the music. The audio source can be from a line level source or earphone output or with its built-in microphone circuit.

Circuit Operation:

The audio input is first amplified and level limited before going to each filter. Variable resistor R1 (MAIN) is used to adjust the signal level into the amplifier. The amplified audio is passed through the low-pass (LOW), band-pass (MID) and high-pass (HIGH) filters to separate the input audio. The individual bands are DC rectified to a smooth DC voltage to modulate the MOSFETs. The MOSFETs vary the brightness of the LEDs smoothly for consistent light display effect with minimum flicker or strobing. Variable resistor R9 (BIAS) is used to adjust the MOSFET output levels for the LEDs to be glowing or off with no music input. It is best to use 12VDC power with 12VDC RGB or individual LED strips. The MOSFETs can dissipate 0.5A for each band or higher with heatsinks mounted.

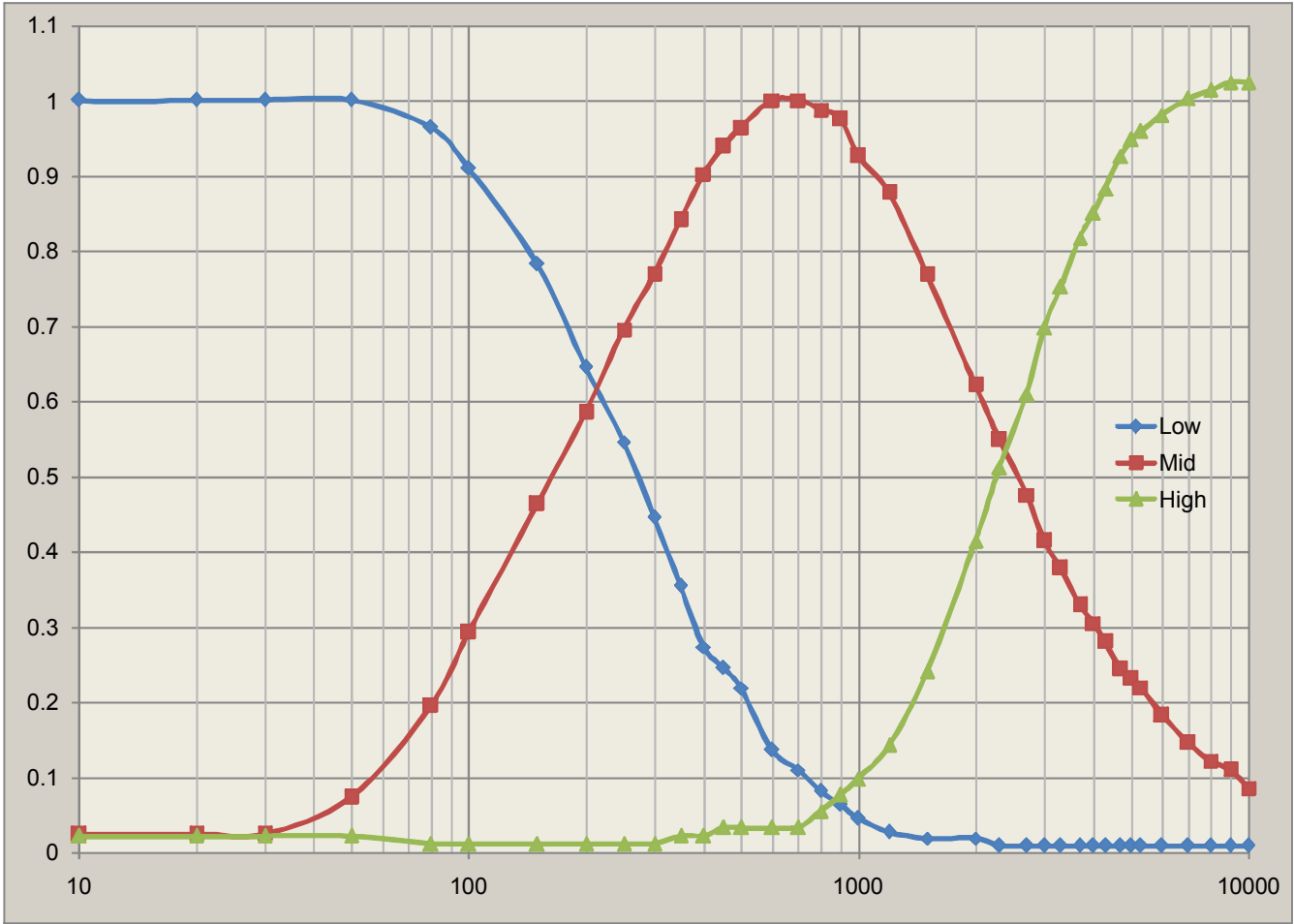
Optional: The unit has an optional microphone circuit for sound input. A SPDT switch (SW1) can be used to select LINE or MIC input. Variable resistors R6 (LOW), R7 (MID) and R8 (HIGH) can be used to individually adjust each band intensity level.

Technical Specifications:

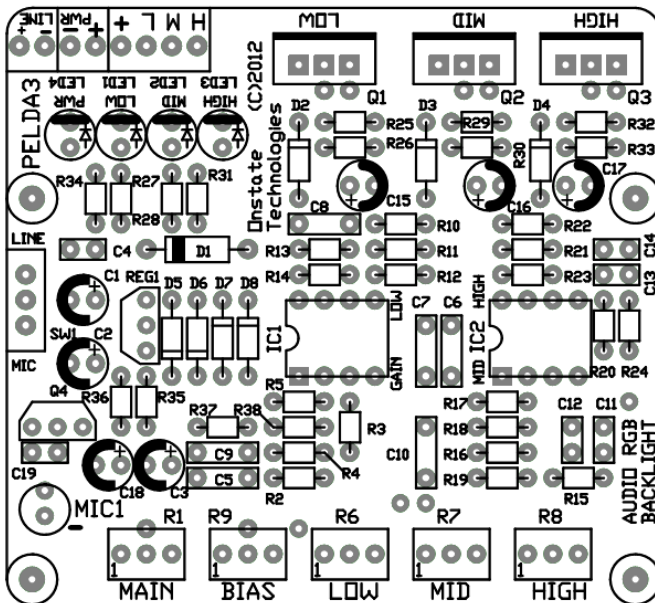
Dimension:	66mm x 60mm (2.6"x2.36")
Operating voltage:	10V - 28V. Match LED strips with operating voltage.
Output current:	0.5A (per band), N-Ch modulation. Common +.
Standby current:	< 15mA.
Audio input level (min):	50mV. AGC controlled.
Audio input level (max):	2V.
Microphone input:	Normal/talk music/audio.

Filter Response (50% output)

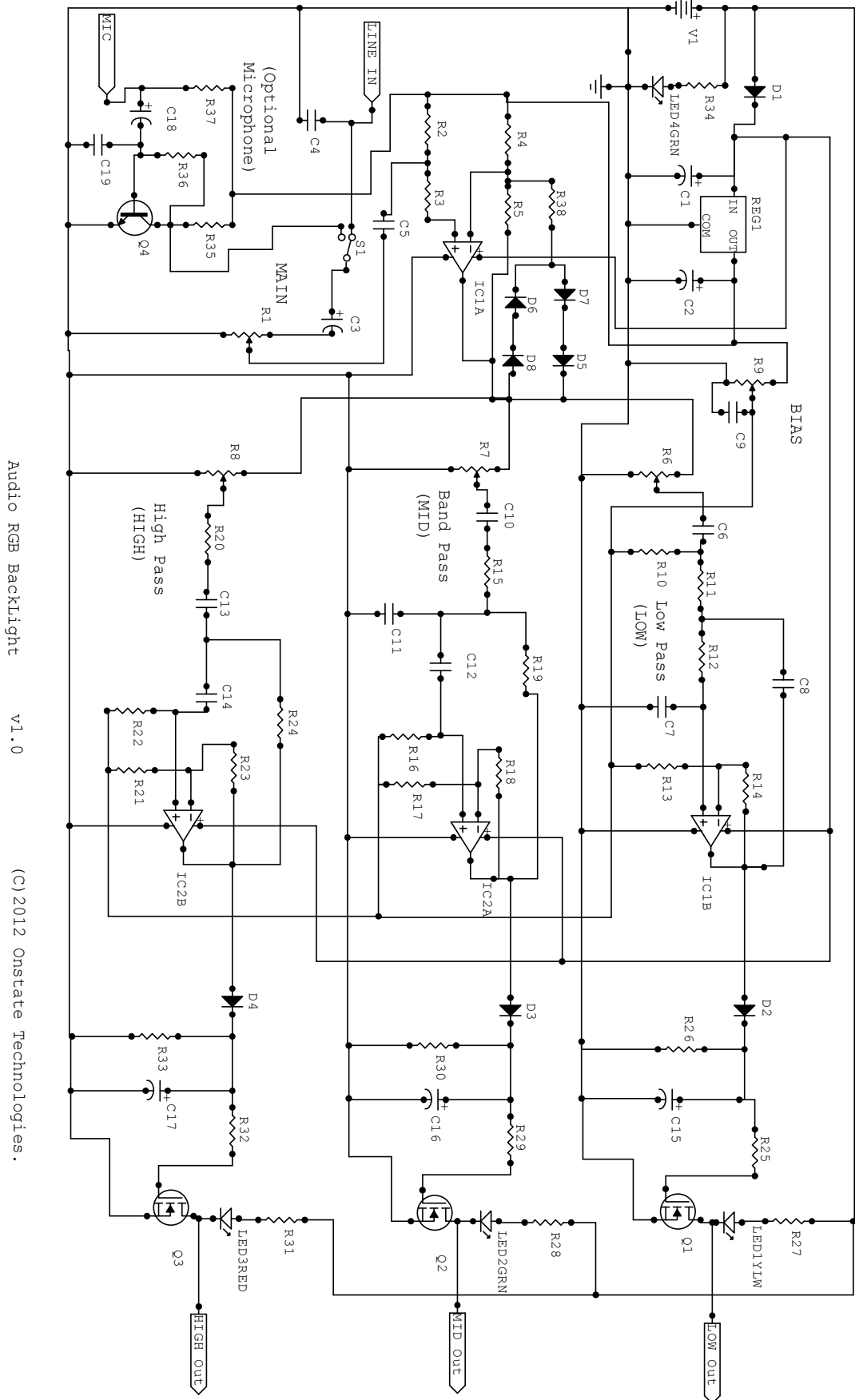
Low pass:	270Hz
Band pass:	700Hz (180Hz - 2500Hz)
High pass:	2170Hz



Filter frequency response (log frequency scale).



PCB Parts Layout



Audio RGB Backlight

V1.0

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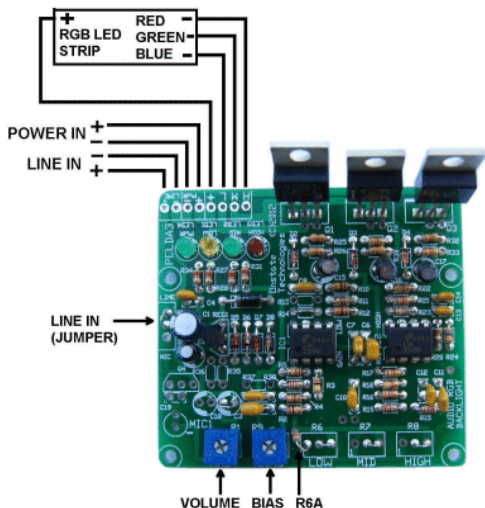
BOM notes:

- R1 (MAIN) 100k variable resistor for brightness intensity control.
- R9 (BIAS) 10k variable resistor for adjusting output LED bias (offset) voltage levels.
- R6, R7, R8 10k variable resistors for LOW, MID and HIGH audio sensitivity control. Optional VR's. Use jumper wires as replacements when not used. See assembly picture for location of R6, R7, R8 and R6A (3.3k load resistor). R6/R7/R8 are wire jumpers pin 2/3.
- SW1 SW1, bypass with wire jumper for LINE input selection.

Basic version: Line level audio signal, full-range audio signal, general music.

1. Microphone circuit not required. Do not solder parts R35/R36/R37, C18/C19, Q4.

Assembly:



The user should have basic soldering and troubleshooting skills. Basic equipment such as a soldering iron and a digital multimeter are also required. All parts are through-hole assembly.

Other parts required for project:

1. Output LEDs (RGB LED strip).
2. +12V power supply (for 12V RGB LED). Note: If operating at different voltages, ensure the LEDs can handle the power when the output is at full on.
3. Line level audio source.

1. Check components to match parts listing. Use a multimeter to check resistor values if required.
2. Check the PCB layout and know where the parts are placed.
3. Insert and solder the components. Ensure capacitors and diodes are inserted with correct polarity. Trim off any excess leads.
4. Solder wires to circuit board layout "H M L + PWR LINE" connections. The band outputs are common positive to the LEDs. Recommended LED colors: blue for low, green for mid, and red for high. If preferred, other LED colors can be used for the outputs.
5. Apply +12V power to circuit board POWER IN. Check power LED4 (PWR) is on.
6. Turn R9 (BIAS) variable resistor all the way clockwise. Output LEDs (LOW, MID, HIGH) should be on. Turn R9 counter-clockwise until all LEDs are just off. Note: R9 adjusts the bias level of the MOSFETs to set the minimum output level. Adjust R9 to set the LED ambient level if required.
7. Adjust R1 (MAIN) for volume brightness control.
8. Apply line level audio input to LINE IN. R1 sets sensitivity and averally response and brightness.
9. The LEDs should be pulsing to the beat/loudness of the music.