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May 20, 2021
5193-6096

Report – PCB Design

Introduction

The goal of this module is to introduce the Altium software and basic concepts of PCB design. A complete schematic is provided, which is then reproduced inside of Altium, and a full PCB is then created based on the design schematic. In the case of this report, the schematic represented a guitar amplifier.

The PCB design must adhere to the following requirements: the board outline must be defined by the keep out layer, and there must be polygon pours implemented on both sides of the board.

Design

As mentioned above, the schematic utilized of this module is a simple guitar amplifier with two inputs. The amplifier is centered around the LM386 low-voltage audio power amplifier. Other components include resistors and capacitors of various values, $\frac{1}{4}$ " jacks, an LED, a switch, and a battery. The full schematic is shown below.

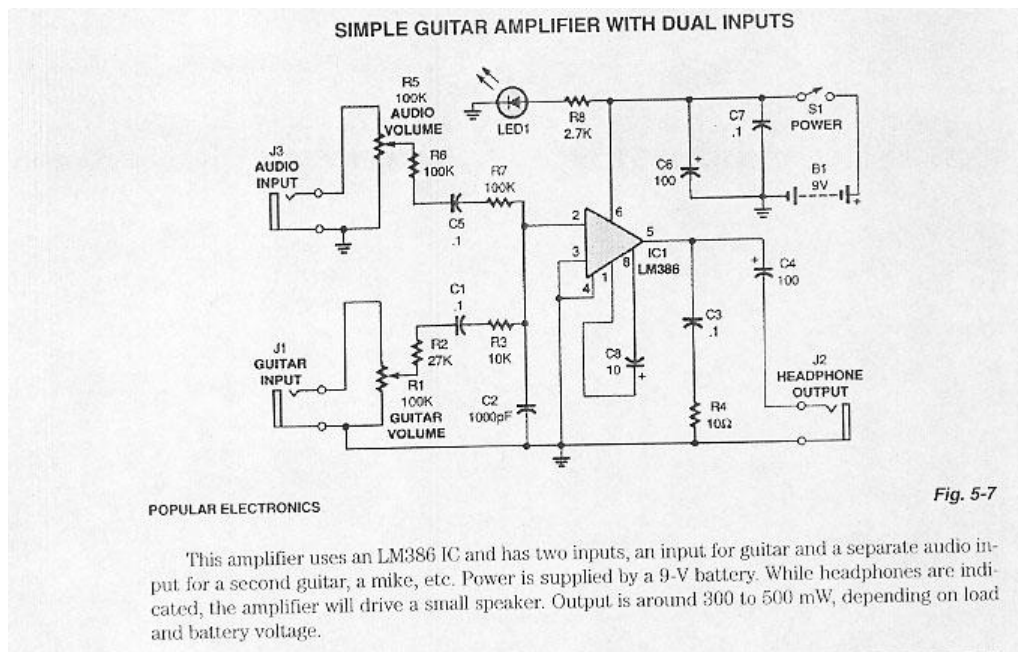


Figure 1. Simple Guitar Amplifier Schematic - Original

The schematic above was accurately recreated inside of Altium. Most components that were available in surface mount packages were used instead of their through hole counterparts. This design decision was made in order to reduce board size; however the point was made that our lab kit for this course only includes through hole components.

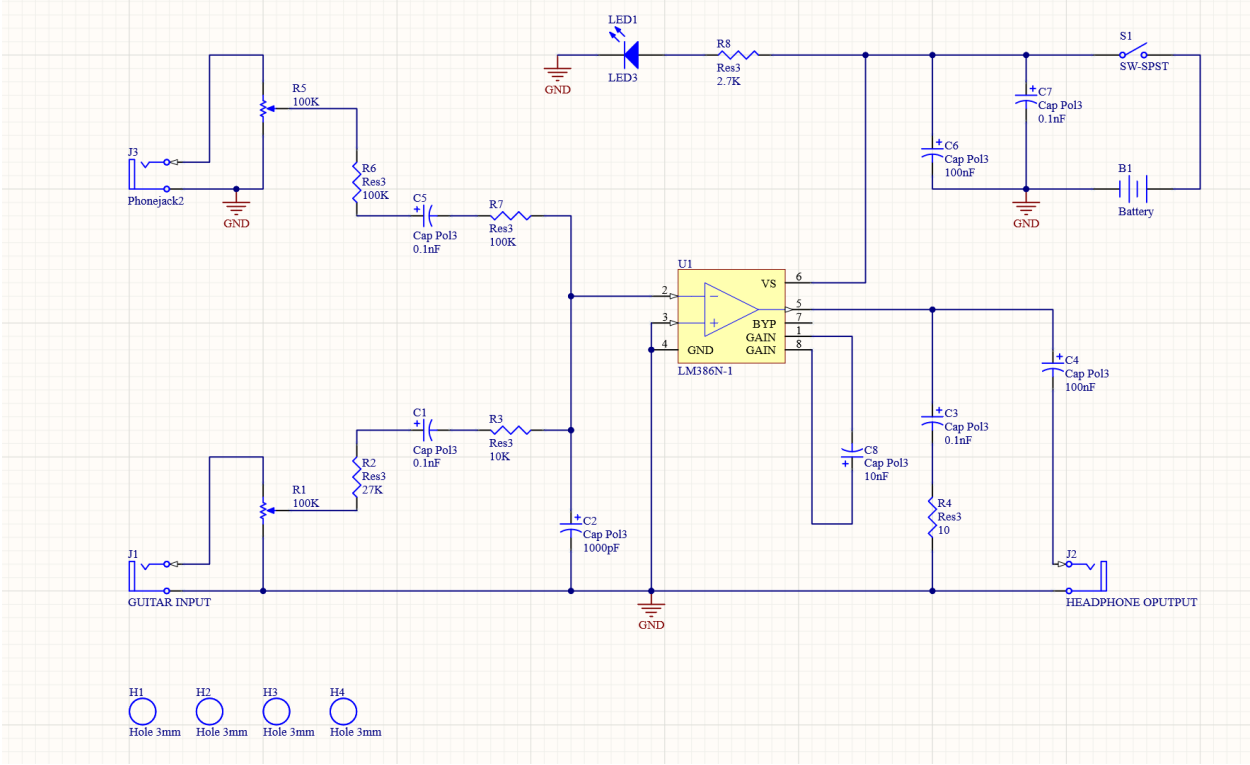


Figure 2. Simple Guitar Amplifier Schematic - Altium

With the schematic fully completed inside of Altium, the PCB was designed. The approach to PCB design was to minimize the area of the components, while keeping the layout close to the original schematic to protect functionality. The board includes four mounting holes, one in each corner. The final size of the board is about 3x4 inches. Polygon pours connected to the ground net were also implemented.

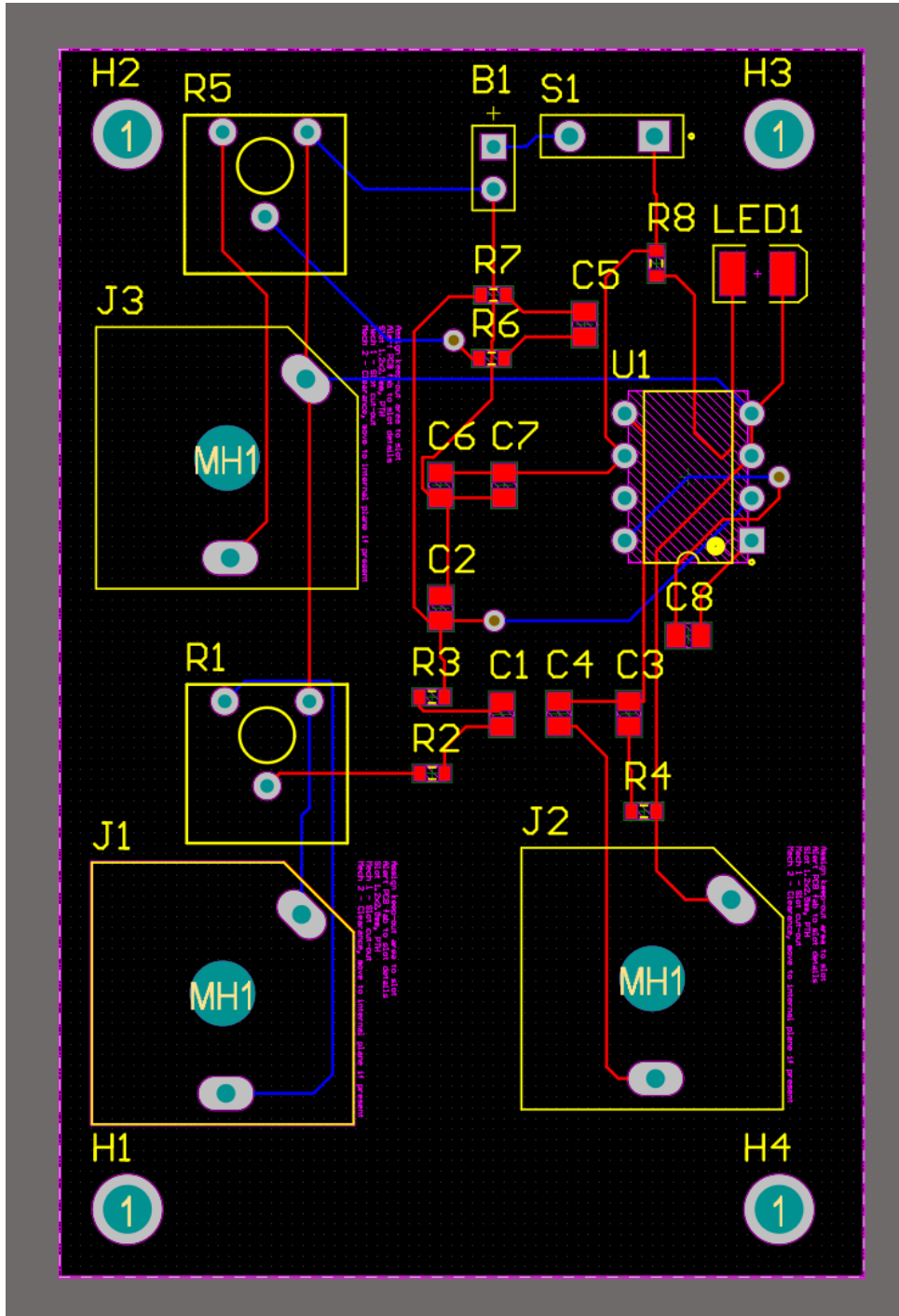


Figure 3. Simple Guitar Amplifier PCB

Conclusion

The PCB design of this guitar amplifier was overall a success. A few small changes were made along the way in order to improve design characteristics, including connecting both polygon pours to the ground net. If this board were being built in real life, surface mount components would also have been omitted in favor of through hole components. Ultimately, however, the board followed proper design principles and successfully implemented the provided circuit. With a board size of ~3x4 inches, this PCB would easily fit within the confines of a standard guitar pedal.