

Electronic System Design Project Lab

PCB Design

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Project Breakdown

Our project consists of the following components:

- A custom acoustic sensor, which is a condenser microphone inserted into the tube connected to the stethoscope membrane.
- An amplifier circuit to boost the microphone signals.
- A microcontroller IC unit (ATmega328P) for processing the incoming data.
- An LCD TFT touchscreen display for visualization and interaction.
- A flash memory IC for storing waveforms and retrieving them later.

Working

The custom acoustic sensor is positioned on a pulse point of the body. The sound is transmitted to an amplifier circuit via a condenser microphone. The amplified signal is then sent to the A0 ADC pin of the ATmega328P microcontroller, where it is processed and displayed on the LCD screen.

The LCD screen provides several functionalities, including:

- Saving the waveform.
- Starting and stopping the recording.
- Erasing stored memory.

A flash memory IC is used to store the waveforms for later retrieval and display.

The screenshot displays the Xilinx ISE schematic editor interface. The main workspace shows a detailed circuit diagram for a digital stethoscope. Key components include:

- Microcontroller:** U1, ATmega328P, connected to various pins for power, ground, and I/O.
- Motor Driver:** U3, L2981, configured to drive a motor (represented by a motor symbol).
- Passive Components:** Numerous resistors (R1-R17) and capacitors (C1-C6) are placed throughout the circuit for timing, signal conditioning, and power regulation.
- Connectors:** J1 and J2 are used for external connections, likely for the stethoscope sensor and a display or data interface.
- Power Management:** The circuit includes a USB-to-UIC interface and a PWR_FLAG signal, suggesting it's powered by a USB source.

The bottom status bar indicates the project name is "Exdp.kicad_sch" and the title is "Digital Stethoscope". The sheet number is 1 of 1.

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ERC (Electrical Rule Check)

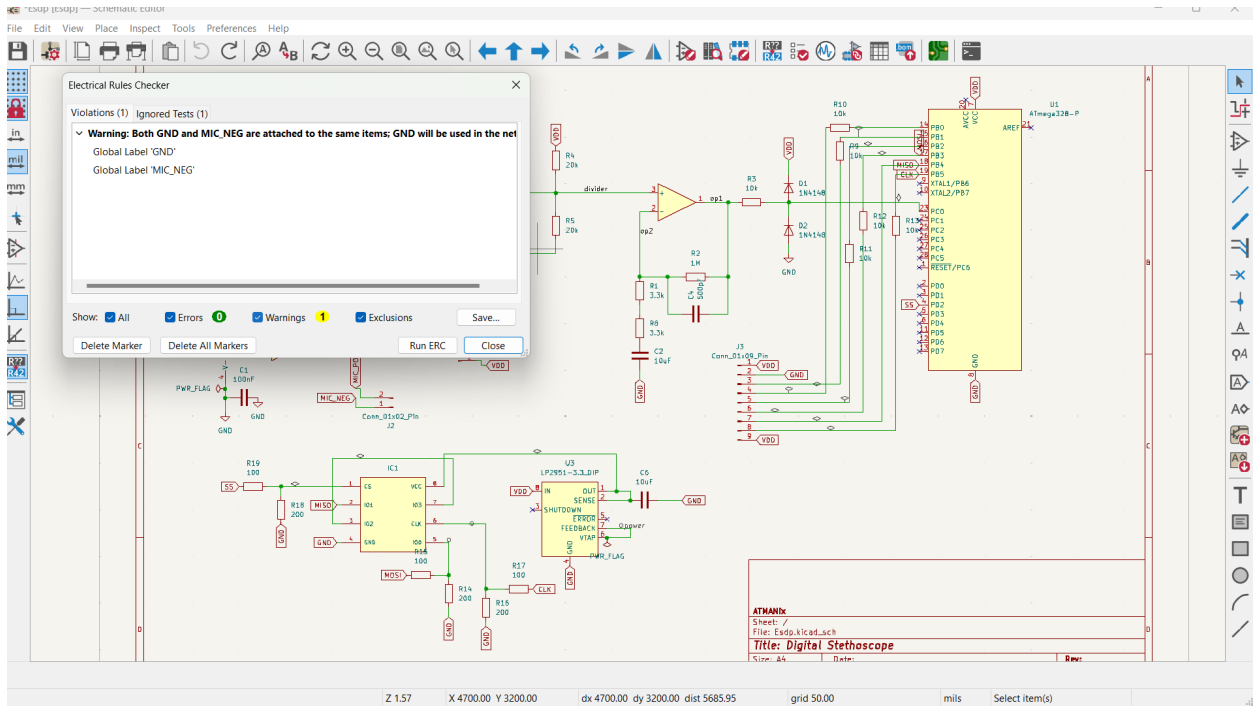


Figure 2: ERC

PCB Layout

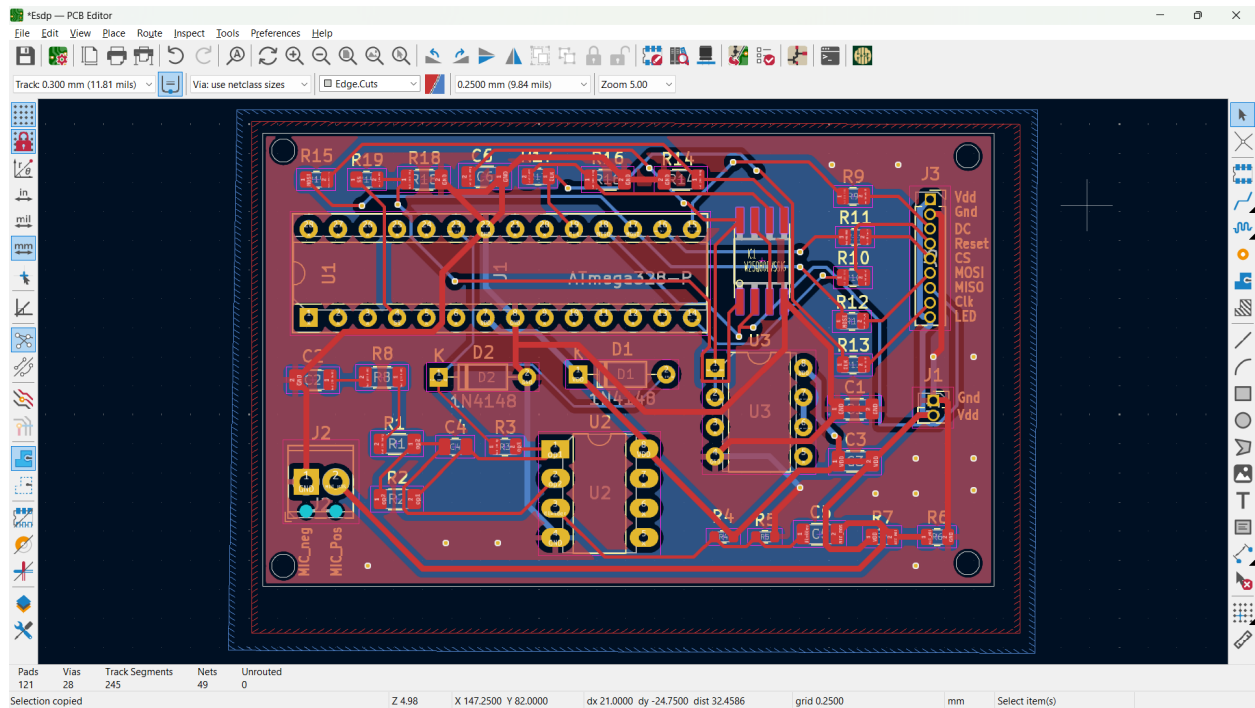


Figure 3: 3D view

DRC (Design Rule Check)

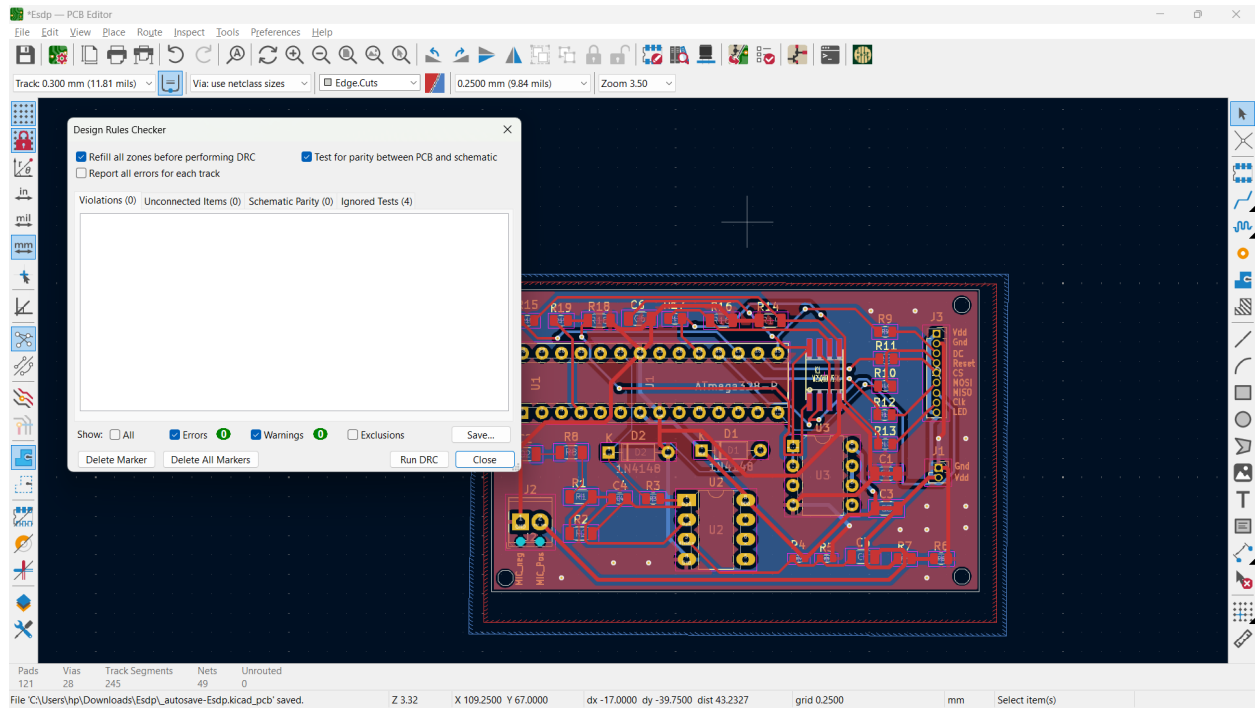


Figure 4: DRC

3D view

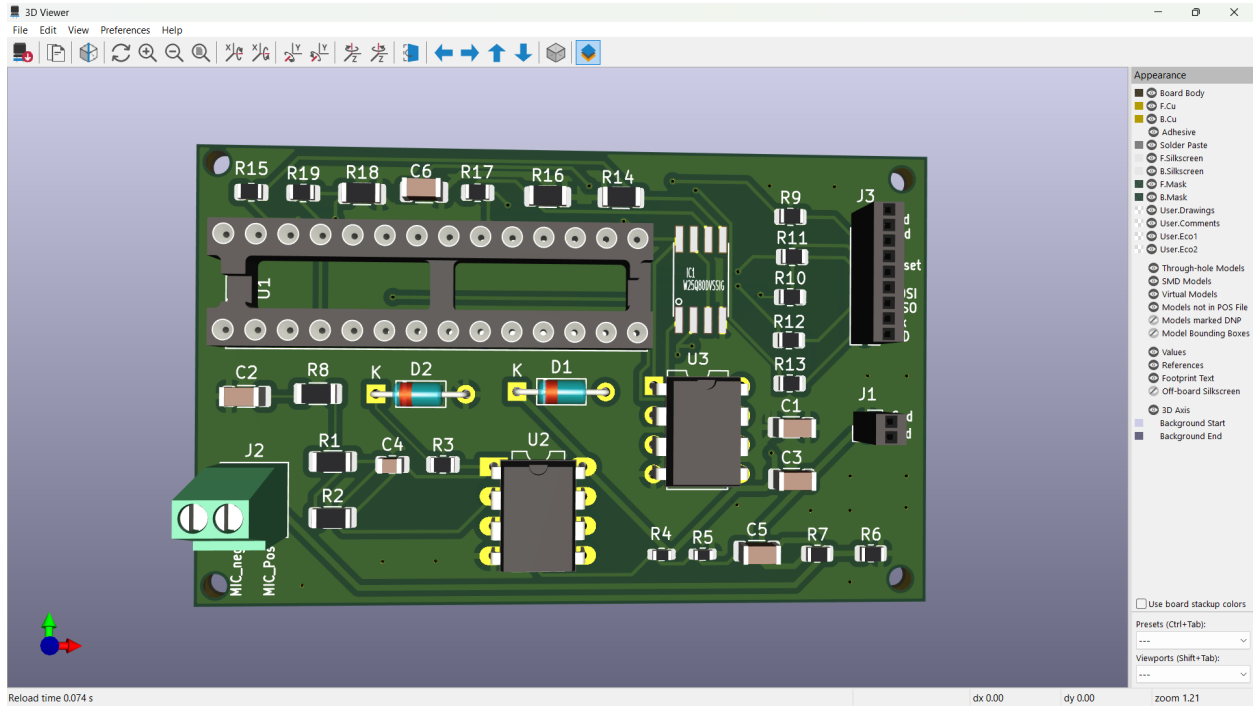


Figure 5: PCB Layout

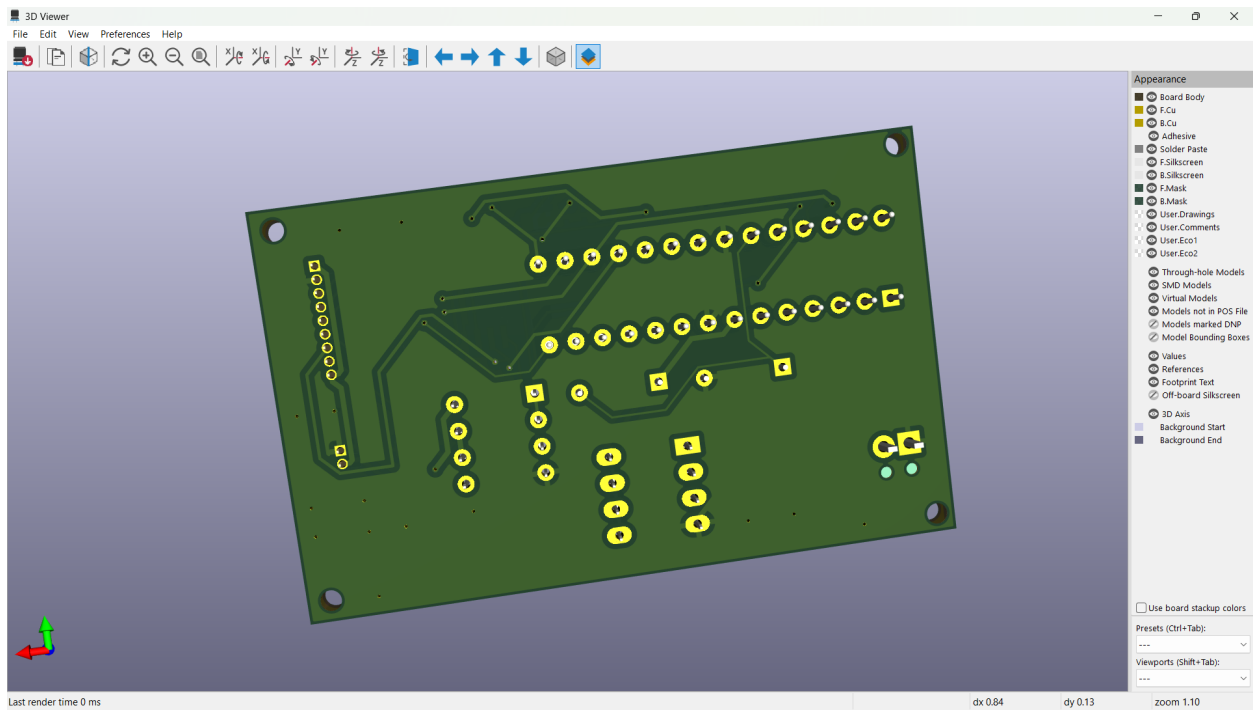


Figure 6: PCB Layout