

# ECU Module Tester

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## ABSTRACT

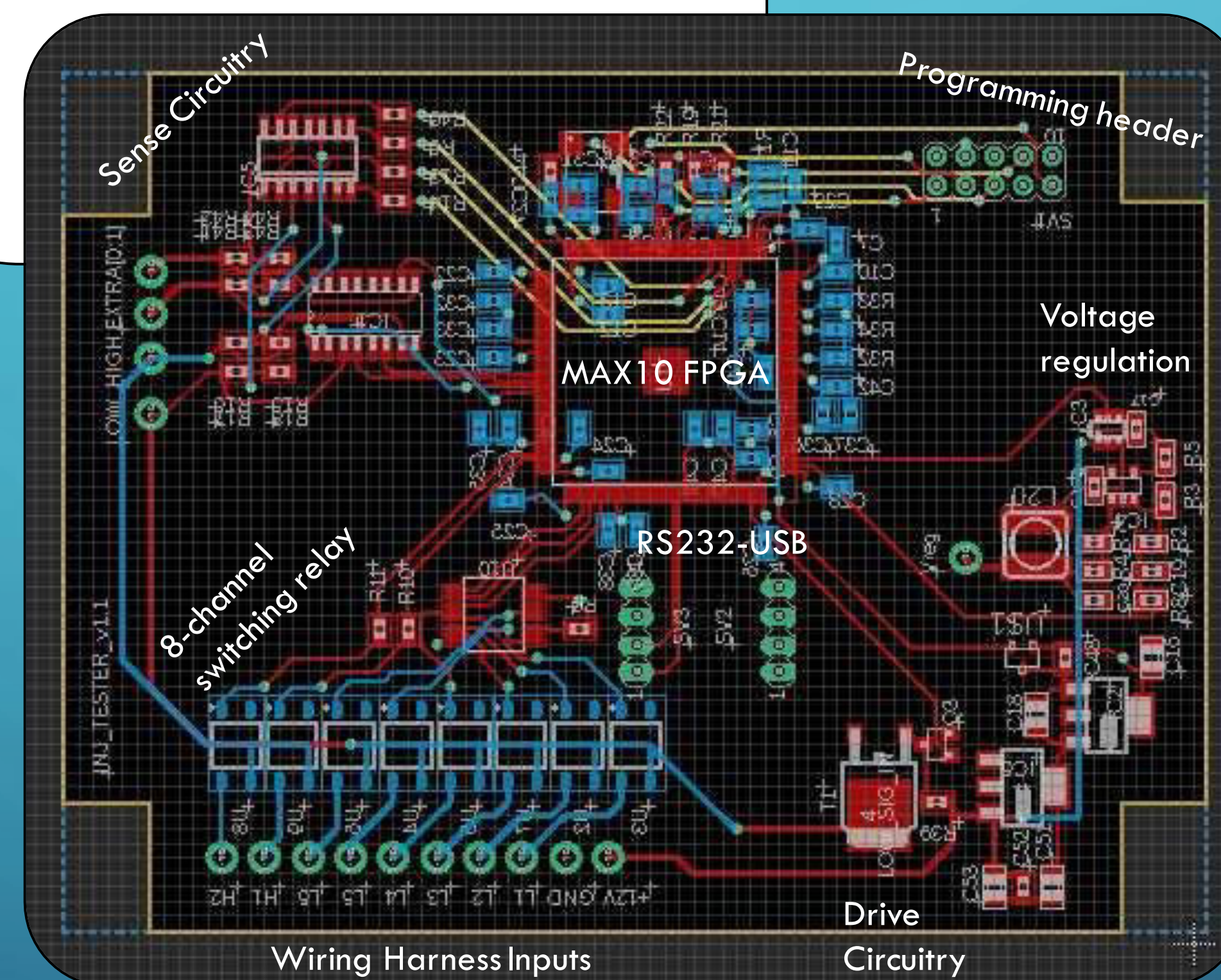
LabView is an all-in-one tester that PSI Power uses to test its injector modules, but it only displays a rough analog reconstruction of the output signal. LabView code must also be rewritten with every update. This project is a new, independent tester that displays a digital output signal with timings to the nearest microsecond and accurate voltage levels. Additionally, the module's hardware was stress tested to ensure no components used were defective all while remaining low cost and open to revision.

## GOAL

- Create an injection event that will trigger the module
- Read analog output signals and record edge timings as well as voltage amplitudes with a MAX10 FPGA
- Display a digital reconstruction of the output signal on a computer monitor with Microsoft Visual Studio GUI
- Load the module output with an automotive injector solenoid to stress module components with 1A to simulate application settings
- Create a wiring harness to interface the modules with the tester

## HARDWARE

- Intel MAX10M08SAE1 44 FPGA
  - NIOSII Implemented Microprocessor
  - MAX10 ADC
- Injector solenoid to draw 1A
- 8 signal solid state switching relay
- Variable trigger voltage



## Capability of Expansion

- Duplicate existing hardware to test multiple modules at once
- Trigger the inverse output signal of the module
- Add signal inputs for the capability of testing different classes of modules

## SOFTWARE

- Quartus II
  - Verilog
    - Edge detection
    - Injection event creation
    - Timer
    - PWM
  - NIOS II (C#)
    - ADC control
    - communications
- Microsoft Visual Studio 2017 (C#)
  - GUI display
  - communications

## Tester GUI



## ACKNOWLEDGEMENTS

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