

Load Driver

Separate board to actually do the load operations, with MOSFETs or whatever else

- Hardware Errata
- Adjustments

Hardware Errata

This page lists some issues with the hardware.

Rev 2

- Holes for current sense resistors should be slightly larger
 - Datasheet specifies $1.5\text{mm} \pm 0.12\text{mm}$
- Increase spacing between heatsink and MOSFET/resistor slightly
 - Right now, the legs need to be bent at a bit of an angle, which makes fitting everything a huge pain in the ass
- Zero offset resistor (R307, ???) is too large
 - 4M7 is too large and doesn't let us trim out the entire DC offset ($\sim 4.5\text{mV}$)
 - 1M was also too large ($\sim 3.5\text{mV}$)
 - 200k works (able to trim to $\sim 1\mu\text{V}$ remaining offset)
 - This is probably too low, maybe something like 330k or 500k is better
 - The trimming range is quite small

Rev 1

- MOSFET gate drive voltage too low
 - V_{GS} , with the current configuration can only drive to max +3V3. This is not sufficient to turn on the MOSFETs selected (IXTH80N075L2) with a $V_{GS(th)}$ of 4.5V max
 - May be salvageable by rework (op-amp powered from 5V instead) and selecting a different MOSFET
 - Future work
 - Select a MOSFET driver opamp that can be powered from $\pm 12\text{V}$
 - Update power section to generate isolated 12V (replace PS201 with PDSE1-S12-S12-S)
 - Generate 5V locally (switching supply off 12V)
- I²C isolator (U203, ADuM1250) has the output SCL/SDA swapped
 - The I²C bus is swapped for all devices downstream of the EEPROM

Adjustments

The driver boards need to have done to work.

Rev 1

Current driver zero offset

Trimmers: RV301, RV302

This adjustment controls the zero offset of the current sense amps. Connect the load to a (current limited) power supply, with a current meter in line. Ensure the current DACs are outputting an all zeros code, then adjust each of the trimmers so that the load is not drawing any current.

External trigger pulse shaper

Trimmers: RV501

Changes the length of external trigger pulses. Connect a signal generator to the external trigger input, and an oscilloscope to TP501. Adjust until the pulse is approximately 50ms in length.

Voltage sense offset

Trimmers: RV601

Controls directly the input voltage offset differential amp, and is used to trim any residual offset in the voltage. Select external voltage sense input with the relay, then short the input sense terminals to each other. Adjust until the voltage ADC reads an all zeros code.