

Fix for the FrankenBoard Voltage Monitor Circuit

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Description

The *FrankenBoard* features an on-board ADC to monitor a set of *MCOR* voltages:

- *MCOR* control voltages (also used to supply the *CANDI* boards).
- *VME* and *Xilinx* control voltages which are relevant to the *FrankenBoard* itself.
- Bulk supply voltage.
- Ground Sense Resistor voltage.

The *MCOR* system is designed to let all voltages float with respect to chassis ground. The only current path to chassis ground during normal operation is through a ground sense resistor (nominal value: 15Ω) from the negative terminal of the bulk supply.

The *FrankenBoard*, on the other hand, is grounded at the chassis. The digital communication paths, i.e. the only connections to the *CANDI* channels are optically isolated from the *FrankenBoard*. Since the ADCs monitoring the *MCOR* control and Bulk voltages are part of the *FrankenBoard* circuit, they are *not* directly sensing the Bulk- and *MCOR*- control voltages but adding the voltage drop across the ground sense resistor. For a simplified schematic, consult fig. 1. The relevant drawings can be found in the *FrankenBoard* documentation (schematics, pp. 7) and *MCOR12* backplane drawing (SD-236-251-00-C0), respectively.

Important Note

As of the time of this writing, the ground sense front-end circuit of the *FrankenBoard* exhibits a design flaw, preventing it from sensing any ground fault voltage (input terminals must be interchanged, e.g., by

unsoldering R29 and R30 and making the necessary crossover connections). A blue wire modification of the FrankenBoard is required as indicated on fig. 2.

Furthermore, the SBC/FrankenBoard's VME Ground is lacking a tight connection to chassis ground requiring yet another wire from P1(c25) to e.g., P1(a20).

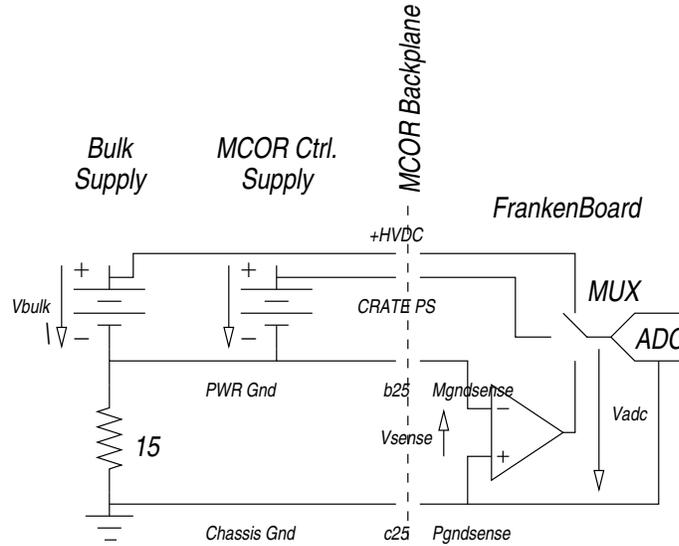


Figure 1: Simplified schematic of the ground sensing and voltage monitoring circuit present on the FrankenBoard. The ADC reading e.g., for the bulk voltage, obeys the equation $V_{ADC} = V_{bulk} - V_{sense}$.

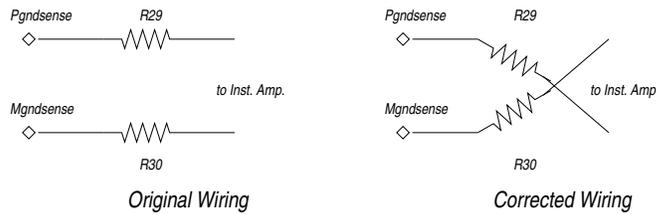


Figure 2: “Blue wire” correction to the FrankenBoard needed for correctly sensing the ground fault voltage. Without the fix, the diode protection network present on the FrankenBoard clamps the ground sense voltage to $\approx \pm 0.7V$.