HIGH VOLTAGE POWER

This power supply is responsible for delivering non-isolated 5V power to the high voltage electronics. All AMS bus connected devices are powered from this regulator. Maximum current draw is 250mA. This Switcher was selected for its high efficiency even at light load.

Maximum Current Draw on 5V output: 1.2A

The flyback regulator responsible for delivering 5V isolated power to low voltage systems has been replaced with an isolated DC/DC converter. This is due to the insufficient output current (300mA) available when assembled. Cost is comparable.

DEVELOPMENT ONLY
Engineer: Geoff Nudge
Supervisor: Christopher Nadovich
Fall Semester 2015

Lafayette College
Sheet: Isolated Power Supply
File: power.sch

Title: Battery Pack Management Computer

Size: USLetter  Date: 2016-04-01  Rev: 0.5
KiCad E.D.A. kicad 4.0.2-4+622538ubuntu14.04.1-stable  Id: 2/6
SAFETY LOOP RELAY

This relay is responsible for switching the PACMAN safety loop connection ON/OFF. The lights show the user at a glance if the safety loop is open or closed.

This relay is capable of switching 8A. The SLOOP_CTRL signal is active low.

OPTO-ISOLATOR ON SL CLOSED SIGNAL

This device provides a galvanically isolated signal to the microcontroller to let it know the safety loop is closed in all components. This device provides a galvanically isolated signal to the microcontroller to let it know the safety loop is closed in all components. This results in the A1Rs should be closed if functional.

GROUND LOW VOLTAGE

+5V  +3.3V

SLOOP A1  SLOOP A4

SLOOP B1  SLOOP B4

SLOOP A3  SLOOP A6

A1 and B1 pins are shorted together only when the safety loop is not opened by this board.

Voltage between A3 and A4 greater than 0 means the safety loop is not opened by any other component in the system.

FAN CONTROL P-FET

This MOSFET is responsible for switching the charge fan ON/OFF. The fan will not come on automatically when charging begins, it is controlled by the software.

Fan Output Voltage: 5V

CHARGE CONTROL P-FET

This MOSFET is responsible for connecting the CHARGE relays when the pack charger has been connected. Power is supplied from either the pack terminals, or USB connector. Coil Output Voltage: 5V

DEVELOPMENT ONLY

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Lafayette College
Sheet: /Safety Loop Wiring/
File: safety_loop.sch

Title: Battery Pack Management Computer

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KiCad E.D.A.  kicad 4.0.2-4+622538ubuntu14.04.1-stable  Id: 3/6
NOTE: DO NOT populate R26. R26 provides the ability to use this board as a terminating CAN node in development only.
USB Bootstrap Power

This diode is used to power the PACMAN computer board when the battery pack has been fully discharged. If voltage is not present between PACK+ and PACK-, then this diode will allow the USB port to supply up to 500mA of sustained current. For periods less than 0.1 seconds, 1A can be drawn.

USB UART

This is an FTDI USB Serial Converter IC, it can be used to upload code, configure the device, or transfer debugging information if the software is configured properly.

Drivers available for Windows, Mac OS & Linux

FTDI Reset Connection

GROUNDED LOW VOLTAGE

+3.3V  +5V  +12V

GROUND

VUSB  USB0+  USB0-

RESET  TXD  RXD

TXD  RXD  DTR

VUSB  USBD+  USBD-

+5V  +3.3V  +12V

+5V  +3.3V  +12V

GROUNDED LOW VOLTAGE

+3.3V  +5V  +12V

GROUND

VUSB  USB0+  USB0-

RESET  TXD  RXD

TXD  RXD  DTR

VUSB  USBD+  USBD-

AGND  3.3VOUT

OSCI  OSCO

GND  GND

U12  FT232RL

D15  SK310A-LTP

+5V  +3.3V  +12V

+5V  +3.3V  +12V