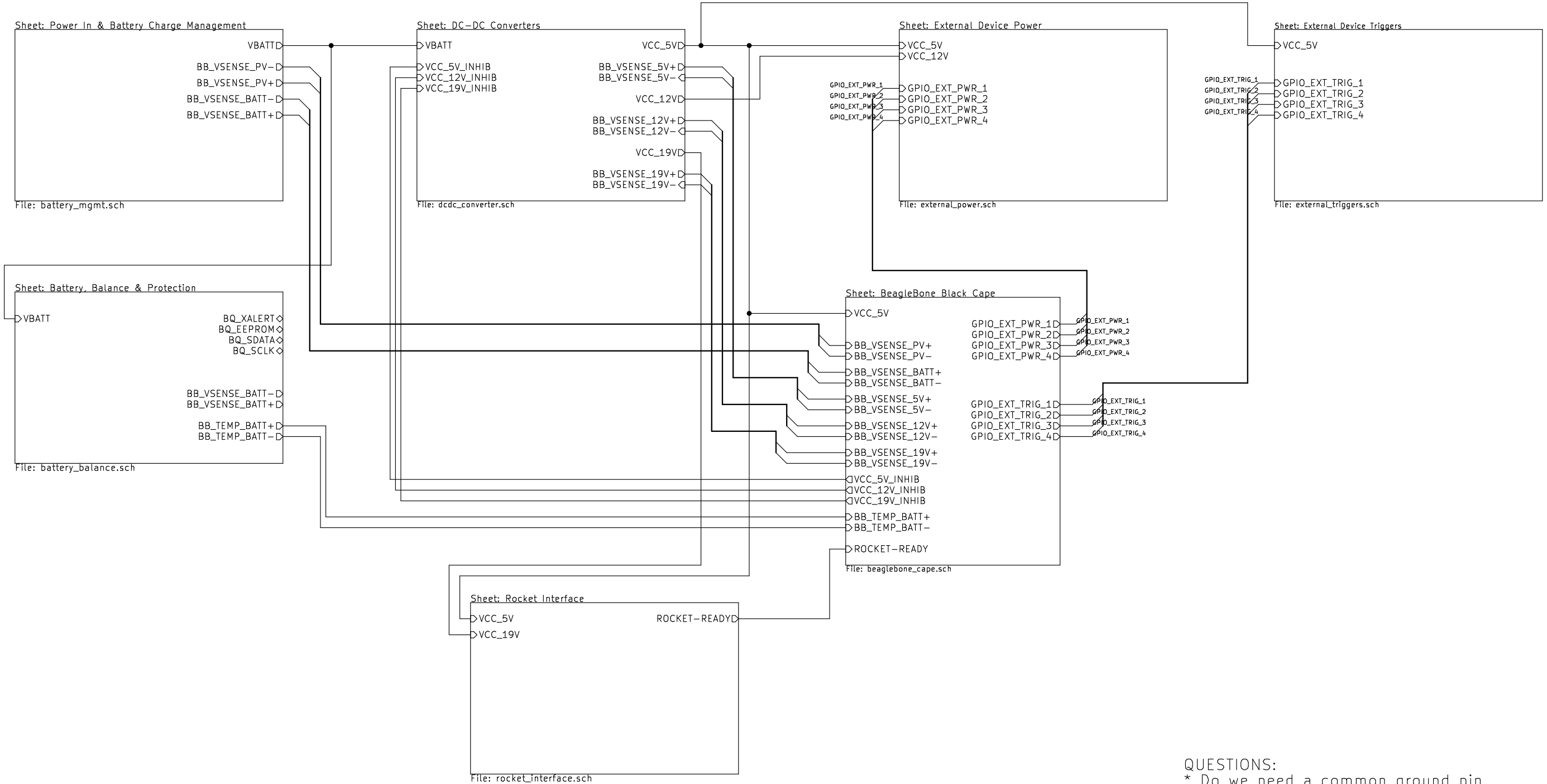

QUESTIONS:
* Do we need a common ground pin on each sub-sheet?

TODO:
* Fix "bus" wires (need labels).
* Prettify this page!

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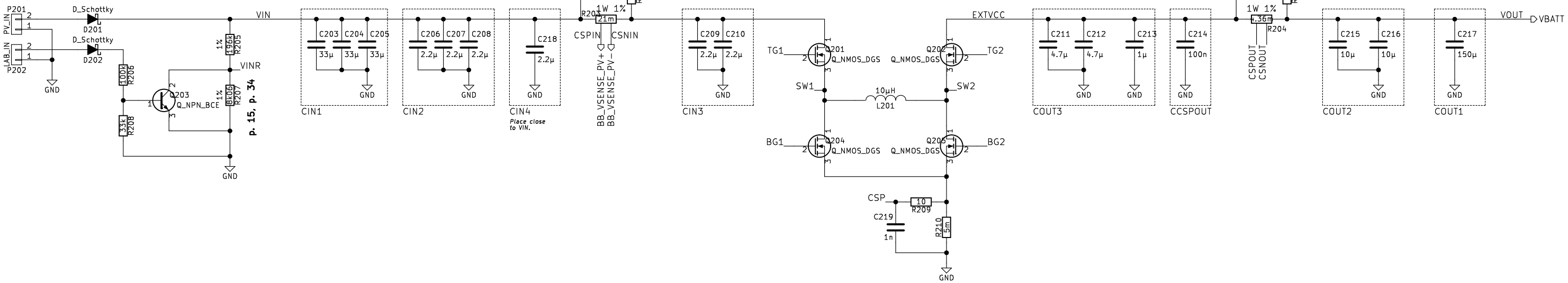
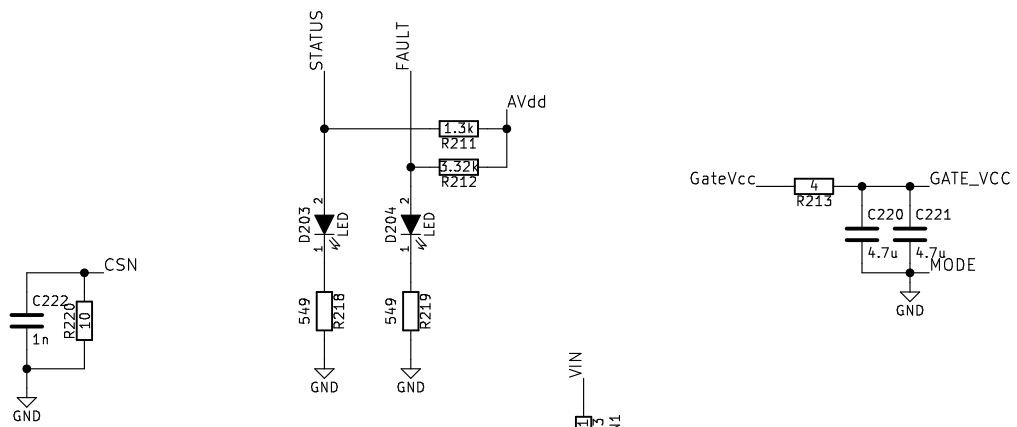
Sheet: /
File: Launch_Tower_Computer_III.sch

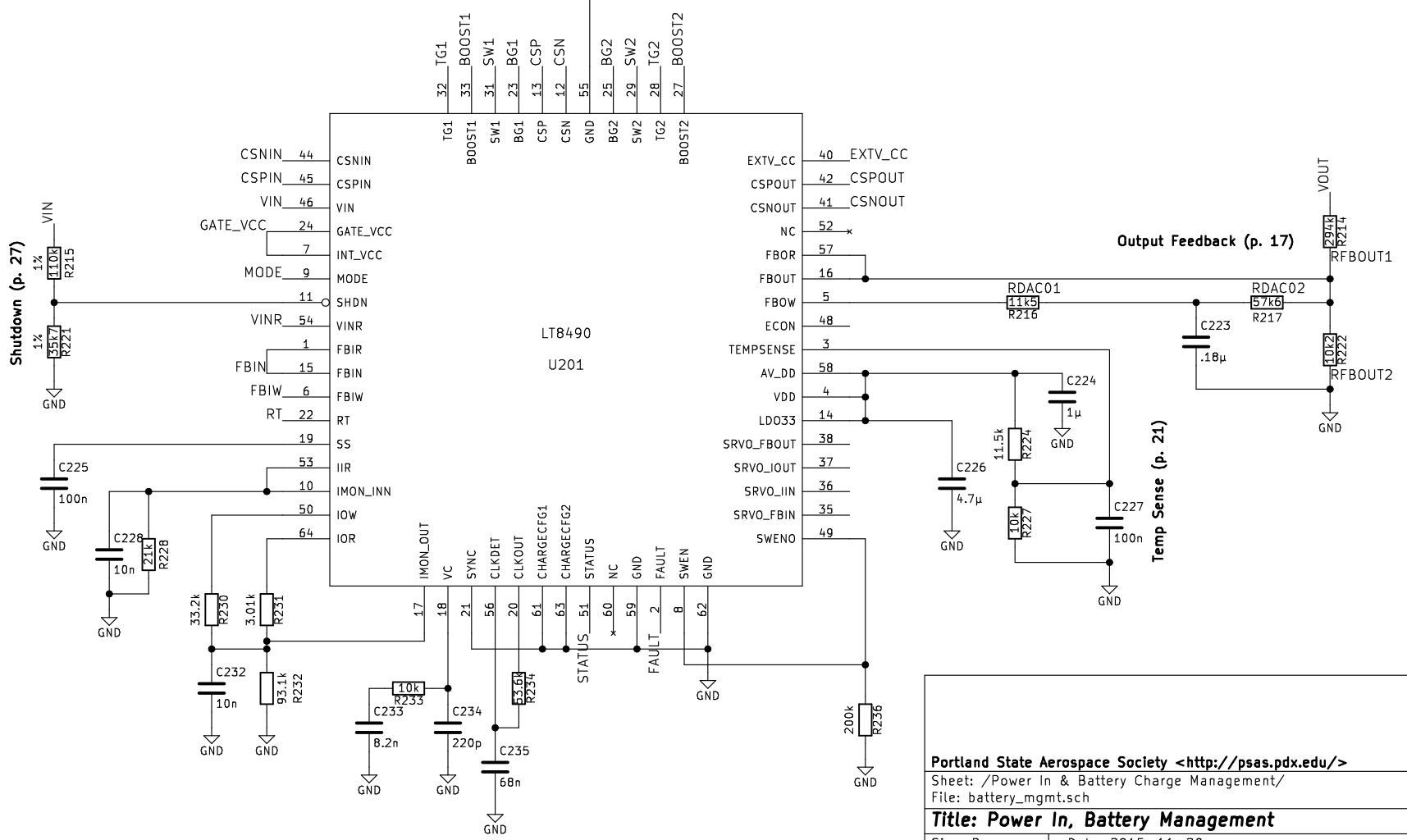
Title: Launch Tower Computer 3 (LTC3)

Size: B	Date: 2015-11-20	**Rev: A**
KiCad E.D.A. kicad 4.0.0rc1a-stable		Id: 1/8

FIXME: Safe to use one current-sense resistor for both the LT8490 and the LTC2991?







TODO:
* Add DC supply detection circuit (datasheet p. 35).
* Add feedback resistor disconnect circuit (datasheet fig. 27).

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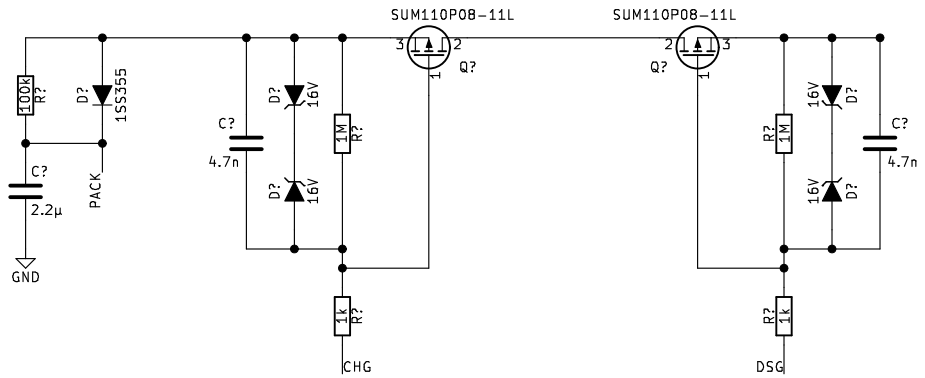
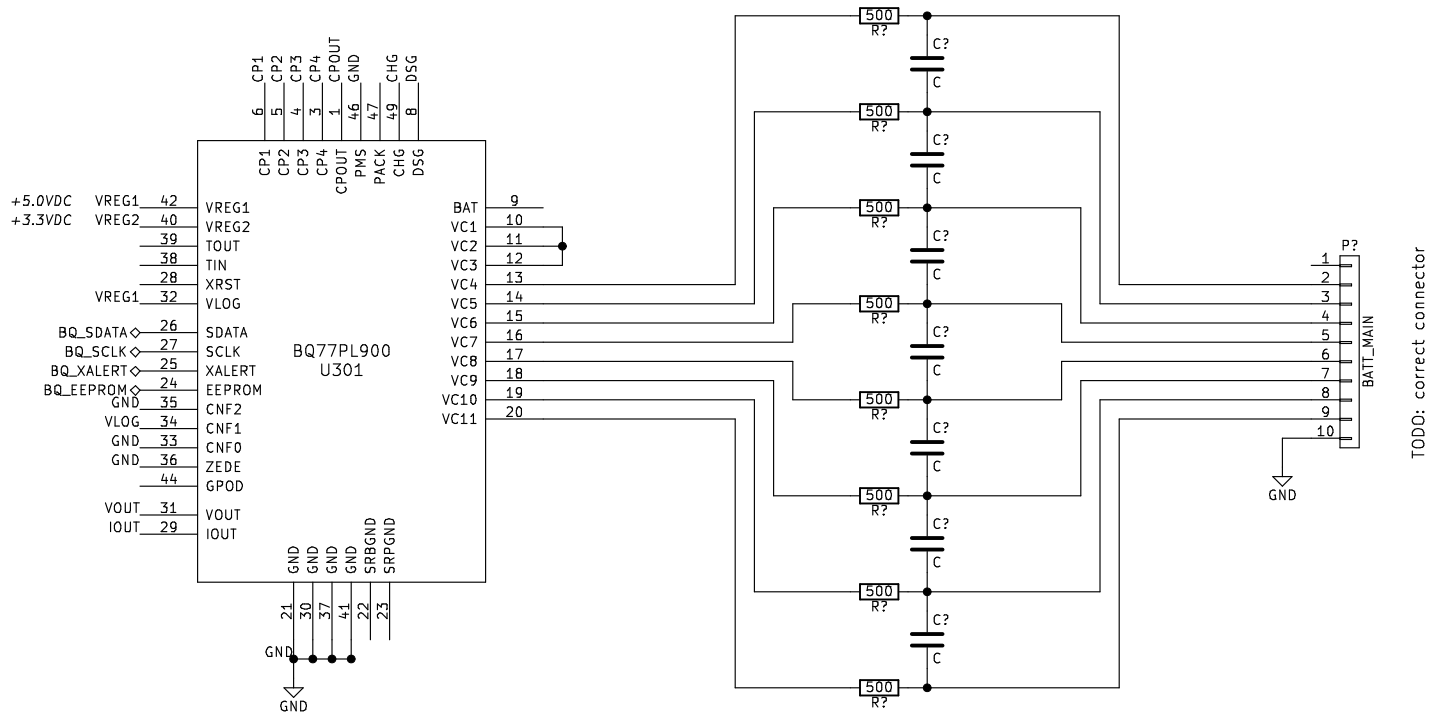
Sheet: /Power In & Battery Charge Management/	
File: battery_mgmt.sch	
Title: Power In, Battery Management	
Size: B	Date: 2015-11-20
KiCad E.D.A. kicad 4.0.0rc1a-stable	Id: 2/8
	Rev: A

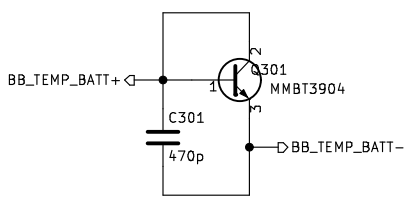
VBATT



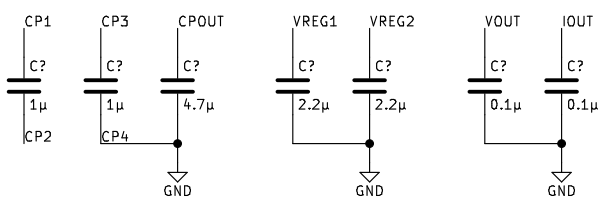


TODO: correct connector

BB_VSENSE_BATT+
BB_VSENSE_BATT−



Temperature Sensor, Main Battery



QUESTIONS:
* Can the bq and/or LT8490's batt temp sensing be accessed by the BeagleBone?
* Leave XRST unconnected (p.35)?
* Leave GPOD unconnected (p.34)?
* Are caps on VOUT and IOUT necessary if both outputs are disabled (pp.30,33)?
* Do we need multiple parallel switching FETs?

TODO:
* Finish circuit.

NB: Page references are to the bq datasheet.

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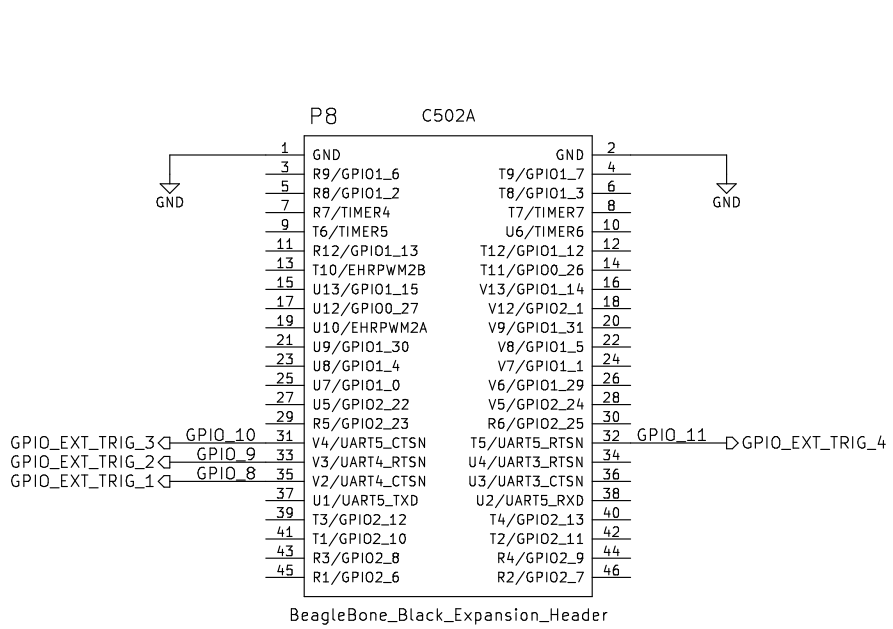
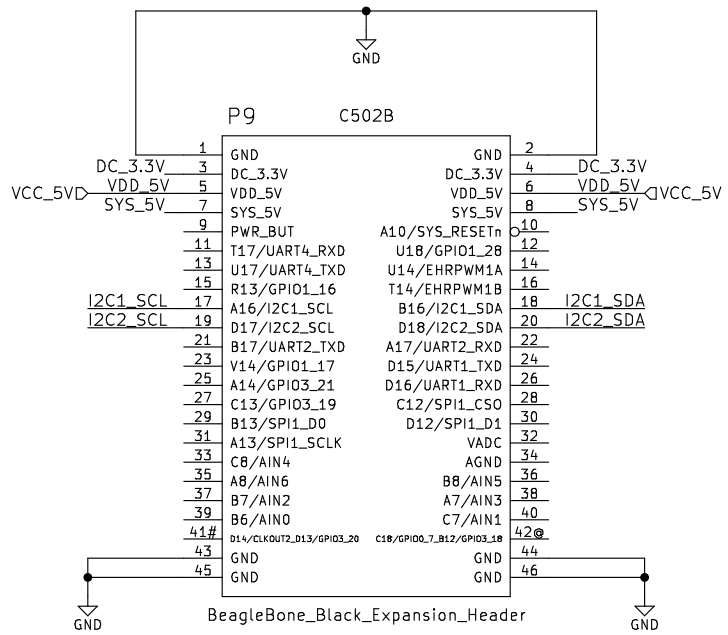
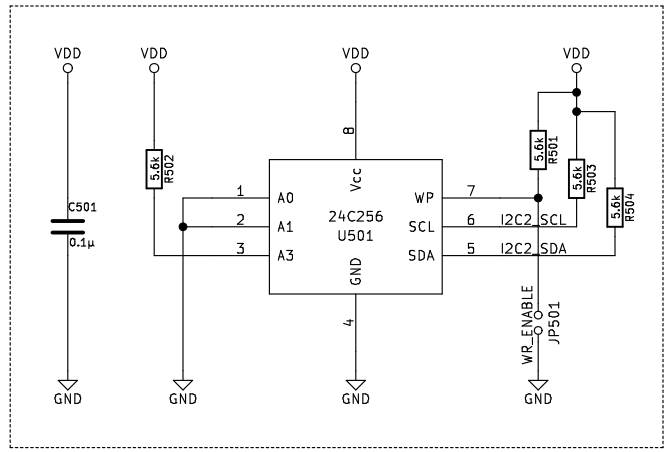
Sheet: /Battery, Balance & Protection/
File: battery_balance.sch

Title: Battery Balance

Size: B	Date: 2015-11-20	**Rev: A**
KiCad E.D.A. kicad 4.0.0rc1a-stable		Id: 3/8







Cape EEPROM
I2C addr 0x54

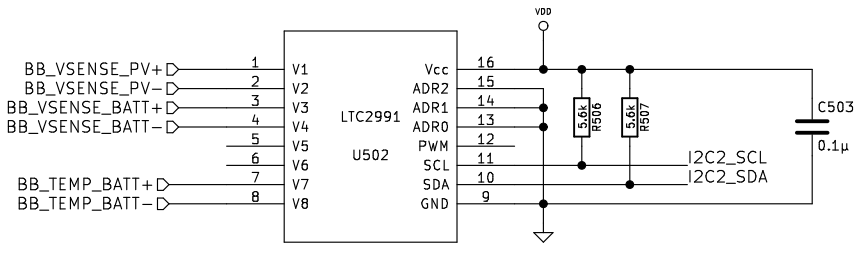
TODO: connect these labels to BBB GPIO pins.

ROCKET-READY▷

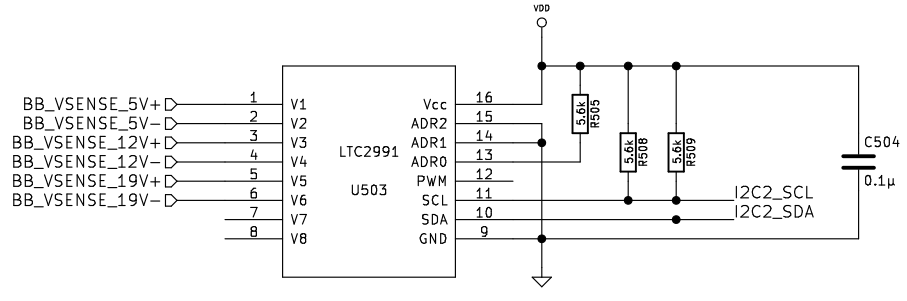
▷GPIO_EXT_PWR_1
▷GPIO_EXT_PWR_2
▷GPIO_EXT_PWR_3
▷GPIO_EXT_PWR_4

▷VCC_5V_INHIB
▷VCC_12V_INHIB
▷VCC_19V_INHIB

Voltage, Current & Temp Sensors



Power Sources
I²C addr 0x90



DC Rails
I2C addr 0x91

Signals ending in + indicate the high side of the respective shunt resistor; signals ending in − indicate the low side.

NB: Consider placing ICs at opposite ends of the board so that their internal temp sensors provide a thermal gradient of the LTC3 internals.

TODO:
* Pick GPIO for rocket-ready signal.
* Buffer btw rocket-ready signal and BB, ign. board, etc?
* Umbilical connection state
* Ignition fuse state

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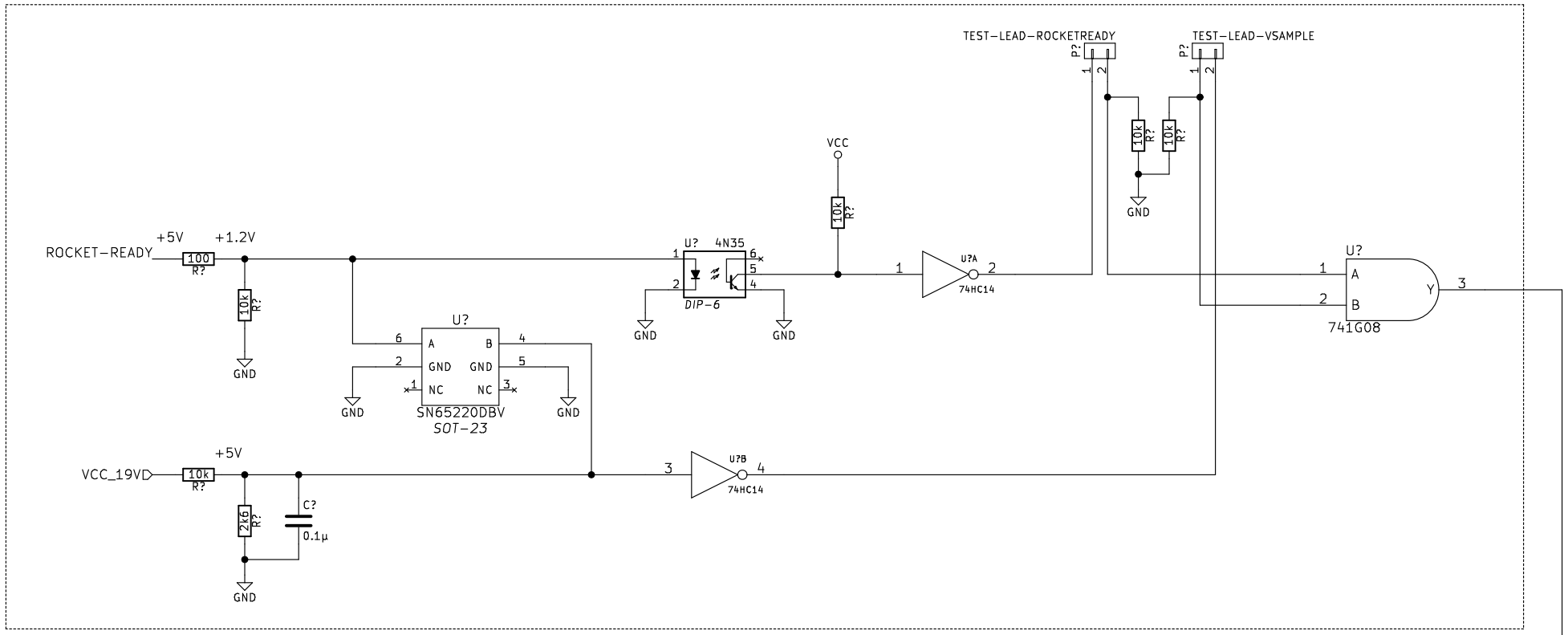
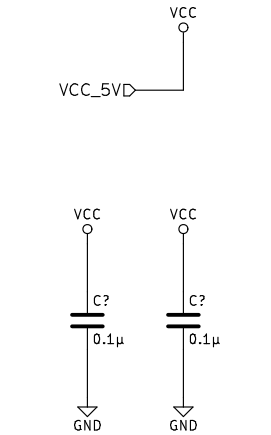
Sheet: /BeagleBone Black Cape/
File: beaglebone_cape.sch

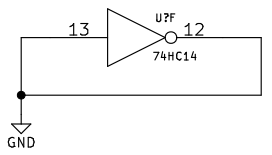
Title: LTC3 BeagleBone Black Cape Interface

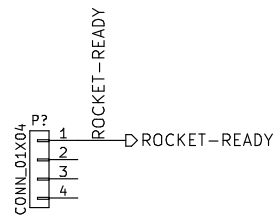
Size: B	Date: 2015-11-20	**Rev: A**
KiCad E.D.A. kicad 4.0.0rc1a-stable		Id: 4/8

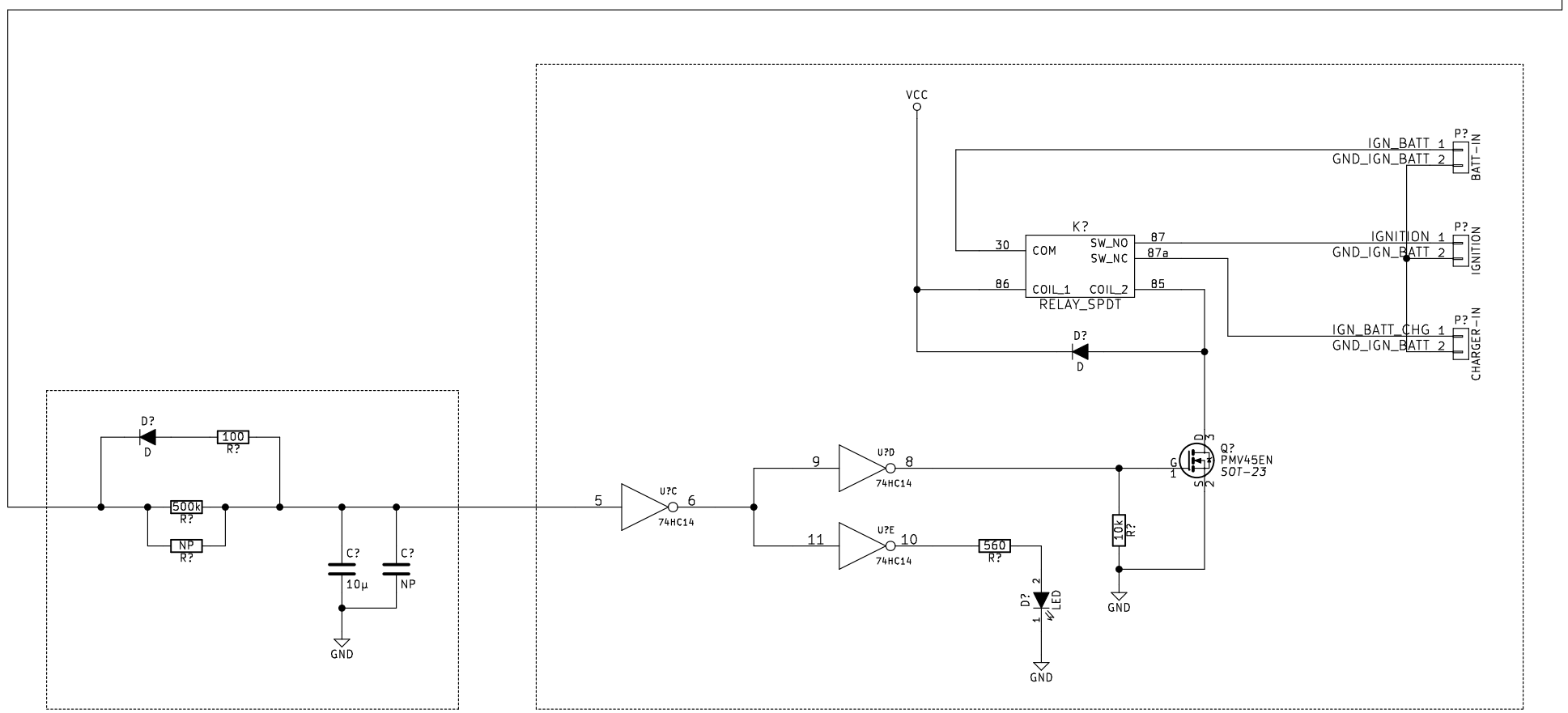


Input Logic









Delay (5s)

Ignition/Battery Control

TODO:
* Select appropriate component values.

QUESTIONS:
* Keep the "test" jumpers?
* Do we need to integrate a charger for the ignition battery?
* Where's the launch/ignition signal?
* What's the purpose of the TVS on the input signals? It clamps at 7V, more than enough to look like a genuine high input.
* What's the purpose of the extra resistor and cap. in the delay stage? Post-assembly adjustment?

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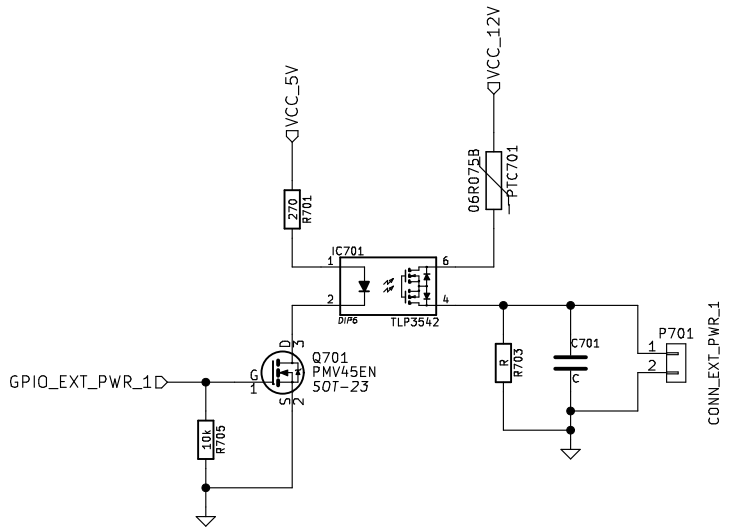
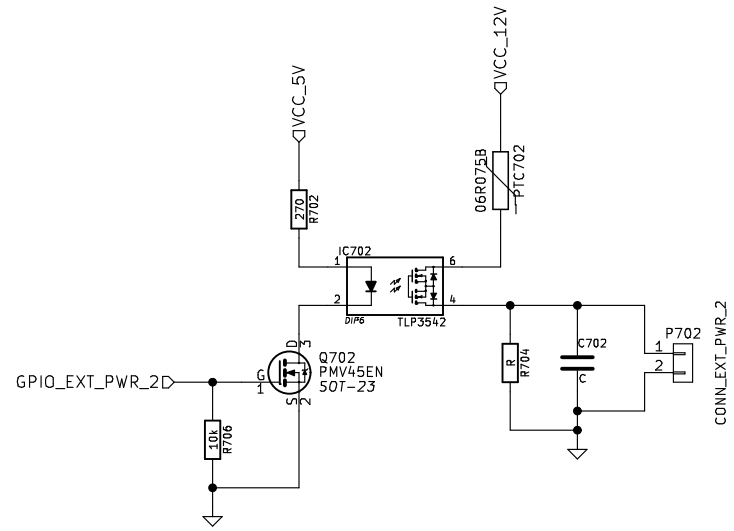
Sheet: /Rocket Interface/
File: rocket_interface.sch

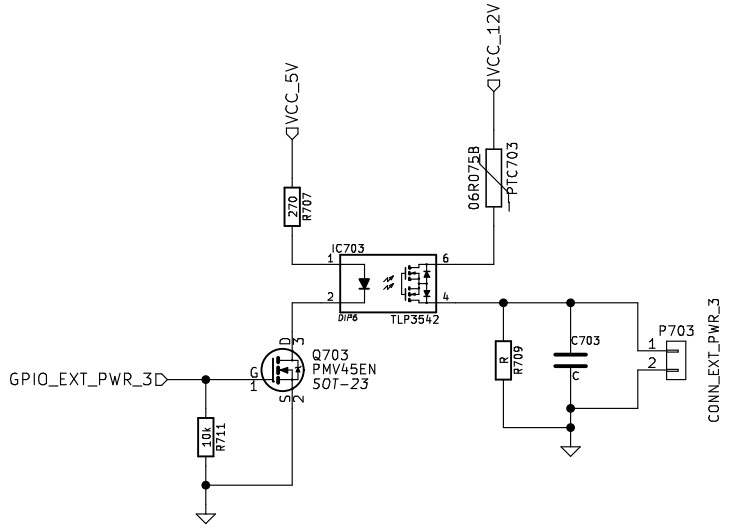
Title: LTC3 Rocket Interface

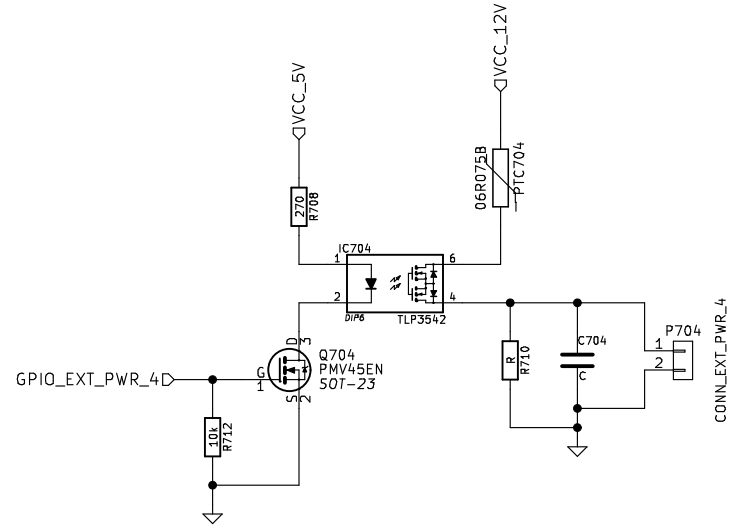
Size: B	Date: 2015-11-20	**Rev: A**
KiCad E.D.A. kicad 4.0.0rc1a-stable		Id: 5/8

TODO:
1. Determine values for bleeder resistor
and filter capacitor on each output connector.
2. Pick new PolyFuses, 0.5–1.0A max.









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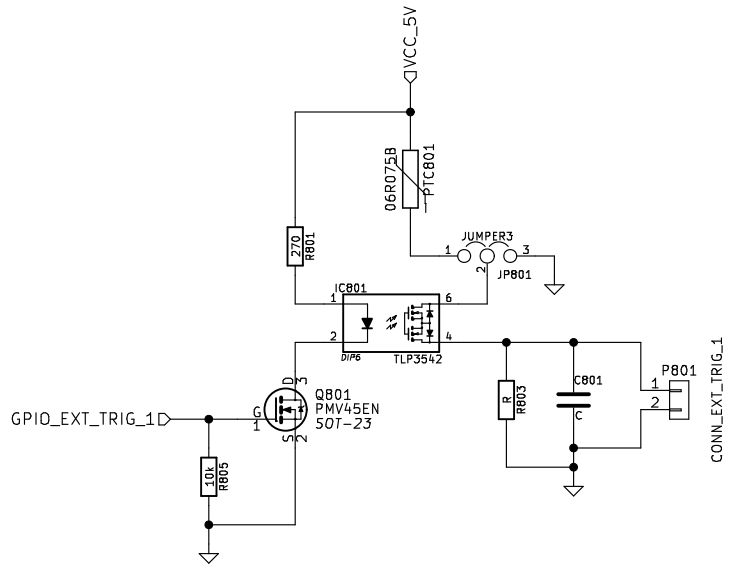
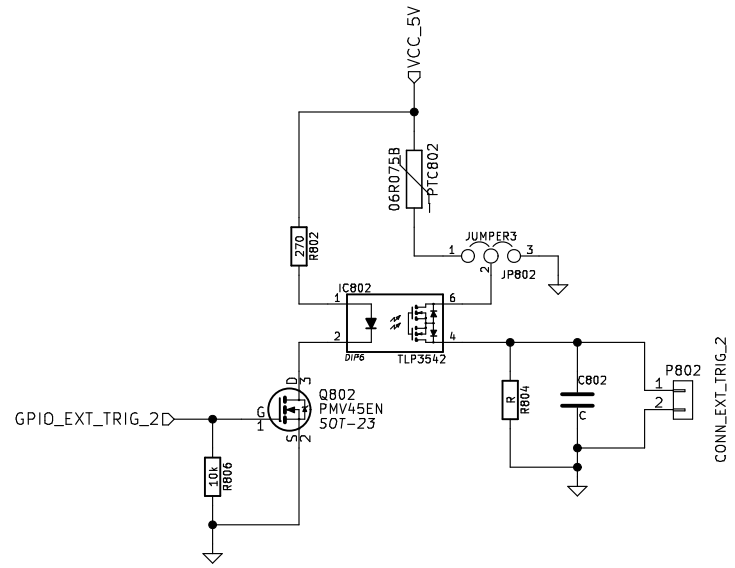
Sheet: /External Device Power/
File: external_power.sch

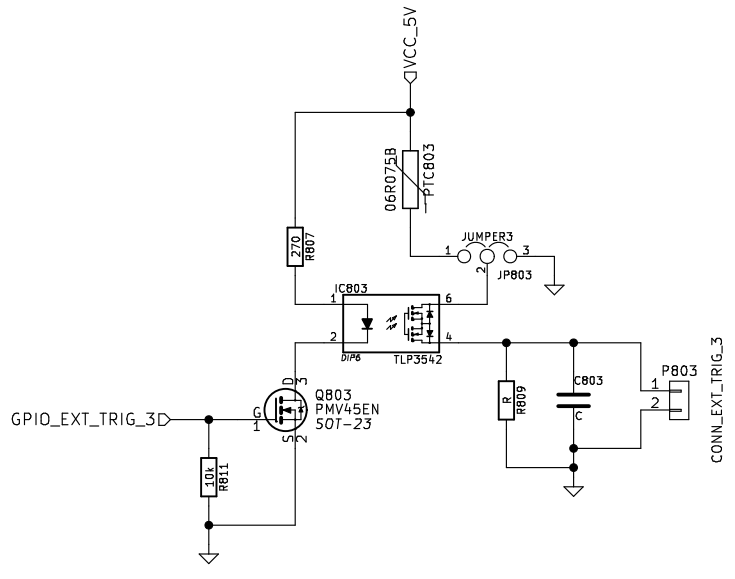
Title: LTC3 External Device Power

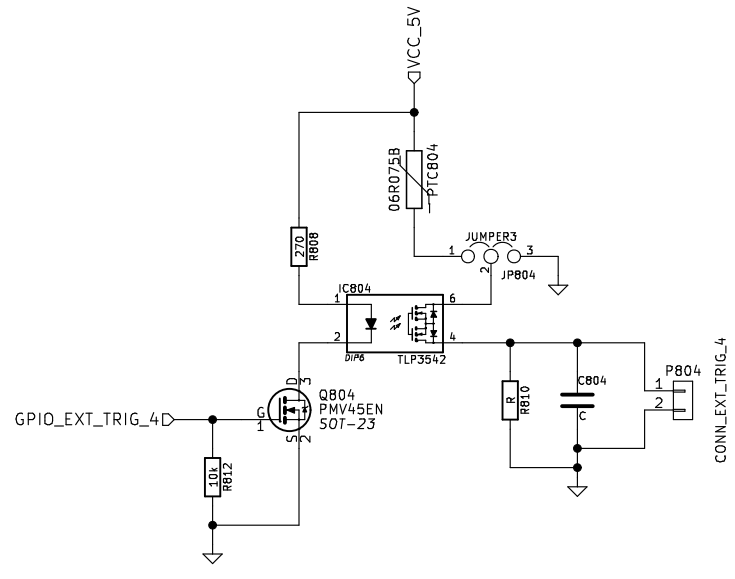
Size: B	Date: 2015-11-20	**Rev: A**
KiCad E.D.A. kicad 4.0.0rc1a-stable		Id: 6/8

TODO:
1. Determine values for bleeder resistor
and filter capacitor on each output connector.
2. Pick new PolyFuses, 100-200mA max.







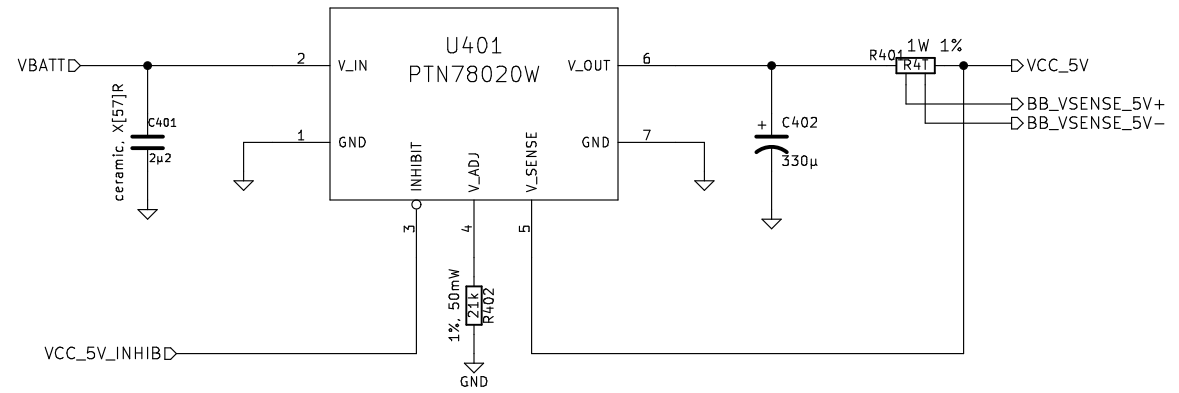


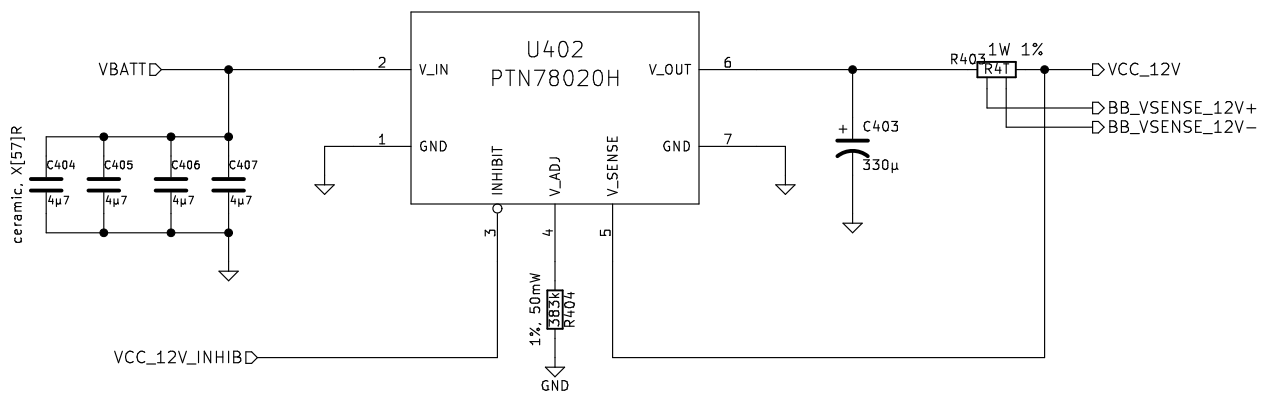
Portland State Aerospace Society <http://psas.pdx.edu/>

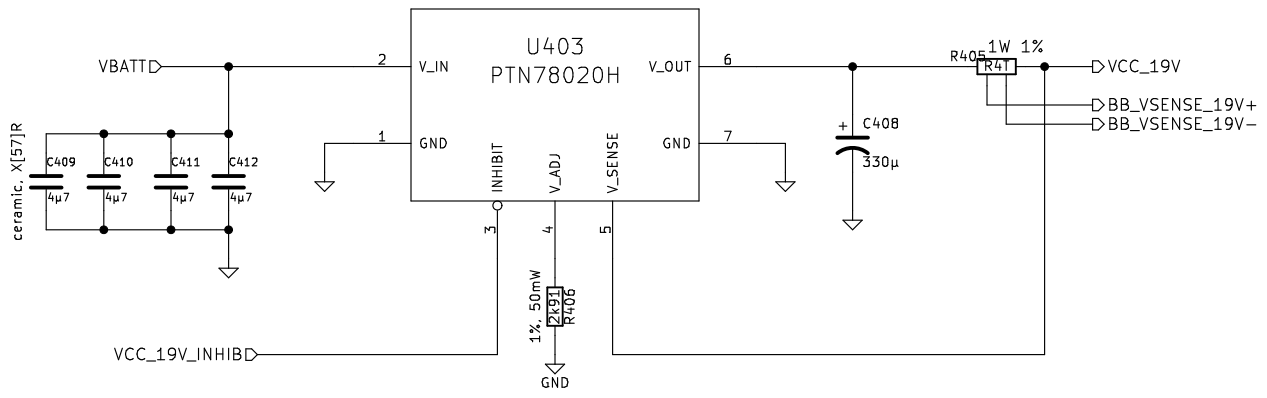
Sheet: /External Device Triggers/
File: external_triggers.sch

Title: LTC3 External Device Triggers

Size: B	Date: 2015-11-20	**Rev: A**
KiCad E.D.A. kicad 4.0.0rc1a-stable		Id: 7/8







NB:
1. V_sense should connect as close as possible
to the largest load on the given power rail.
2. Place Rset resistors as close to package pins as possible.
3. Ceramic (Cin) capacitors should be located within 0.5 in
of the input pins.
4. We may need heat sinks on the converters. The datasheet
indicates a range of 2W to 5W of power dissipation given our
specs.
5. Pay attention to the datasheet's recommendations regarding
capacitor selection.

TODO:
* Capacitor values are minimums. Consider increasing these.
Consult datasheet for more info.

R_sense = 1/Imax**2
1 A = 1 ohm
3 A = 0.1 ohm
5 A = 0.04 ohms
10 A = 0.01 ohms

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Sheet: /DC−DC Converters/
File: dcdc_converter.sch

Title: LTC3 DC−DC Converters

Size: B	Date: 2015−11−20	**Rev: A**
KiCad E.D.A. kicad 4.0.0rc1a−stable		Id: 8/8