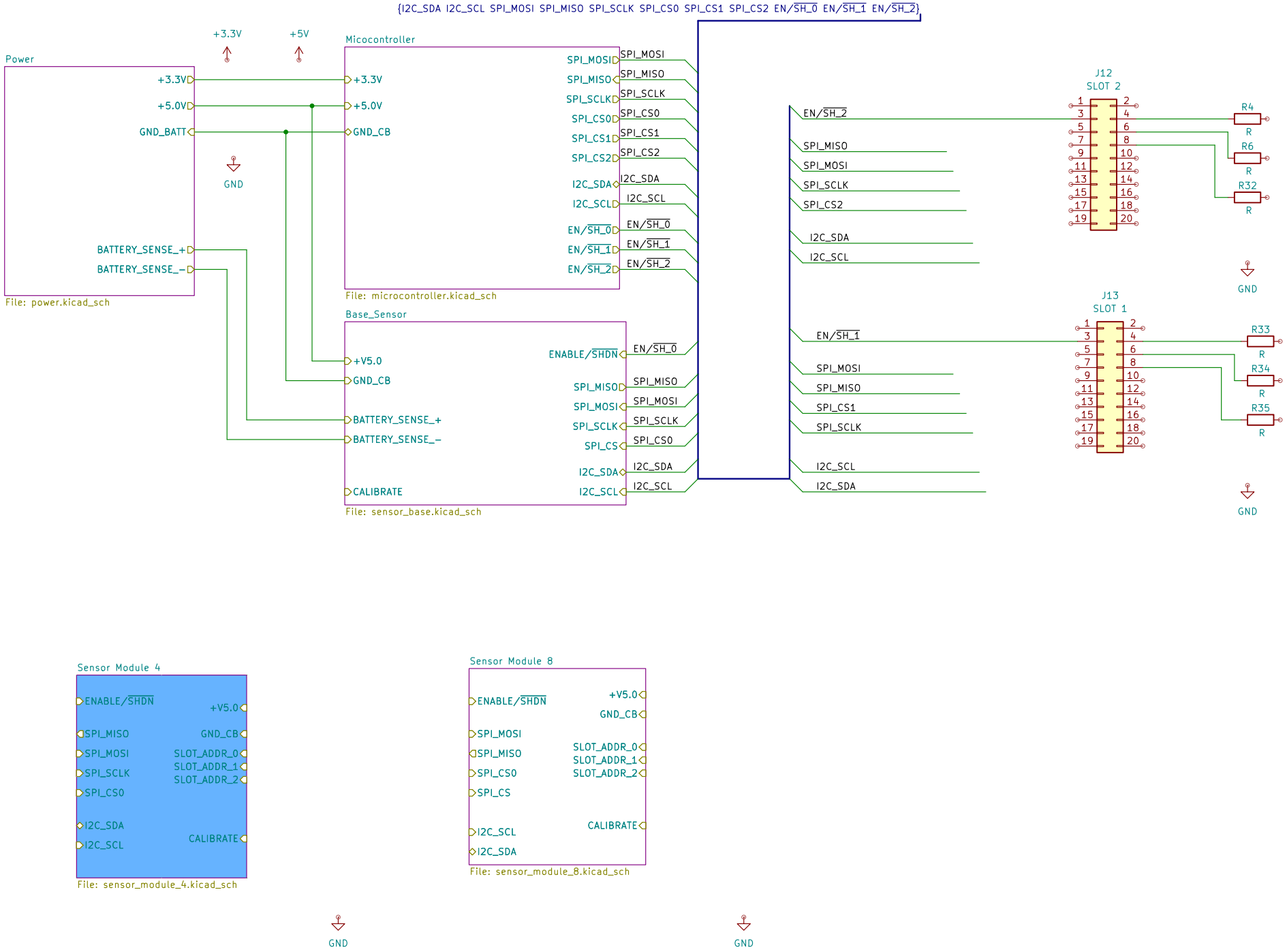
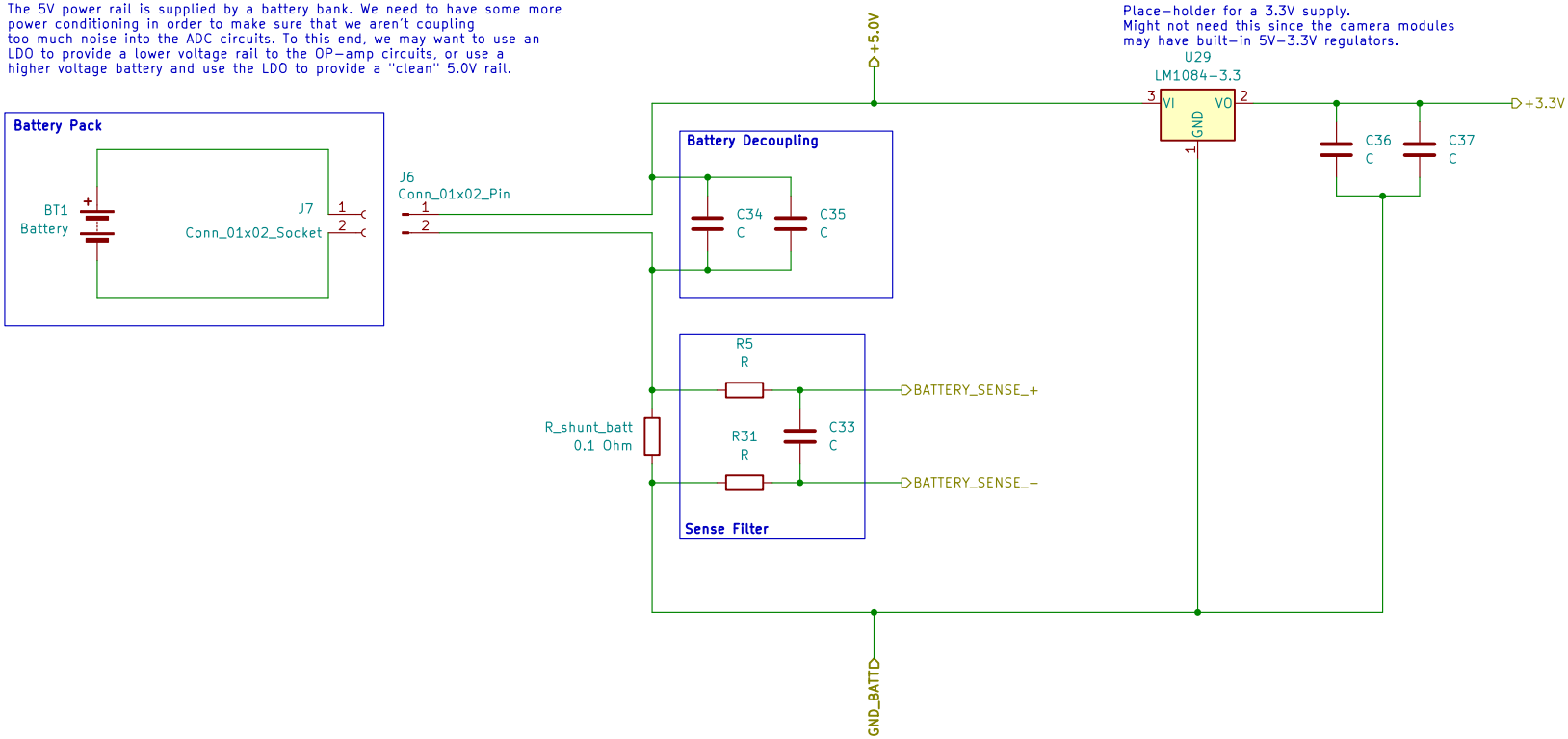
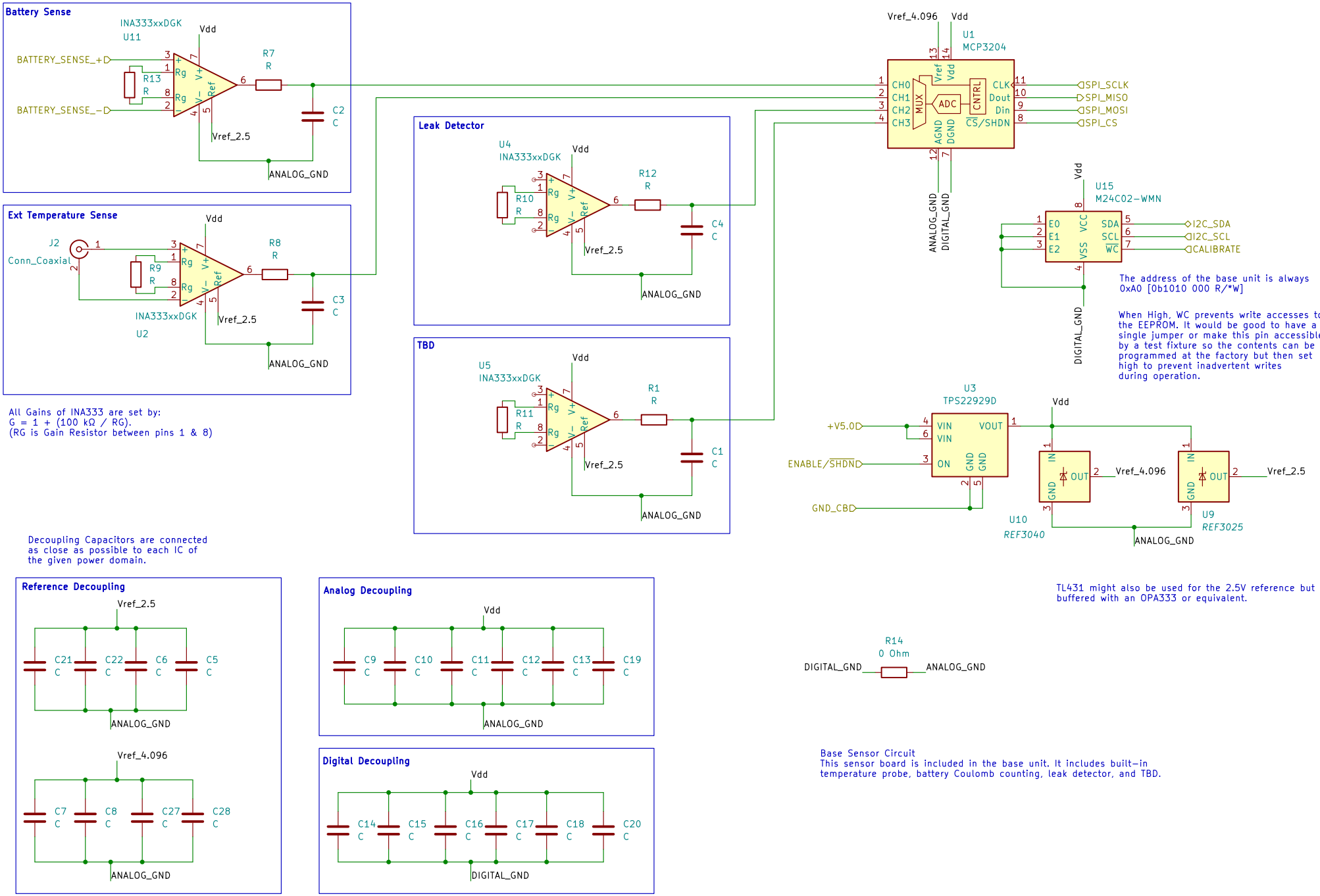
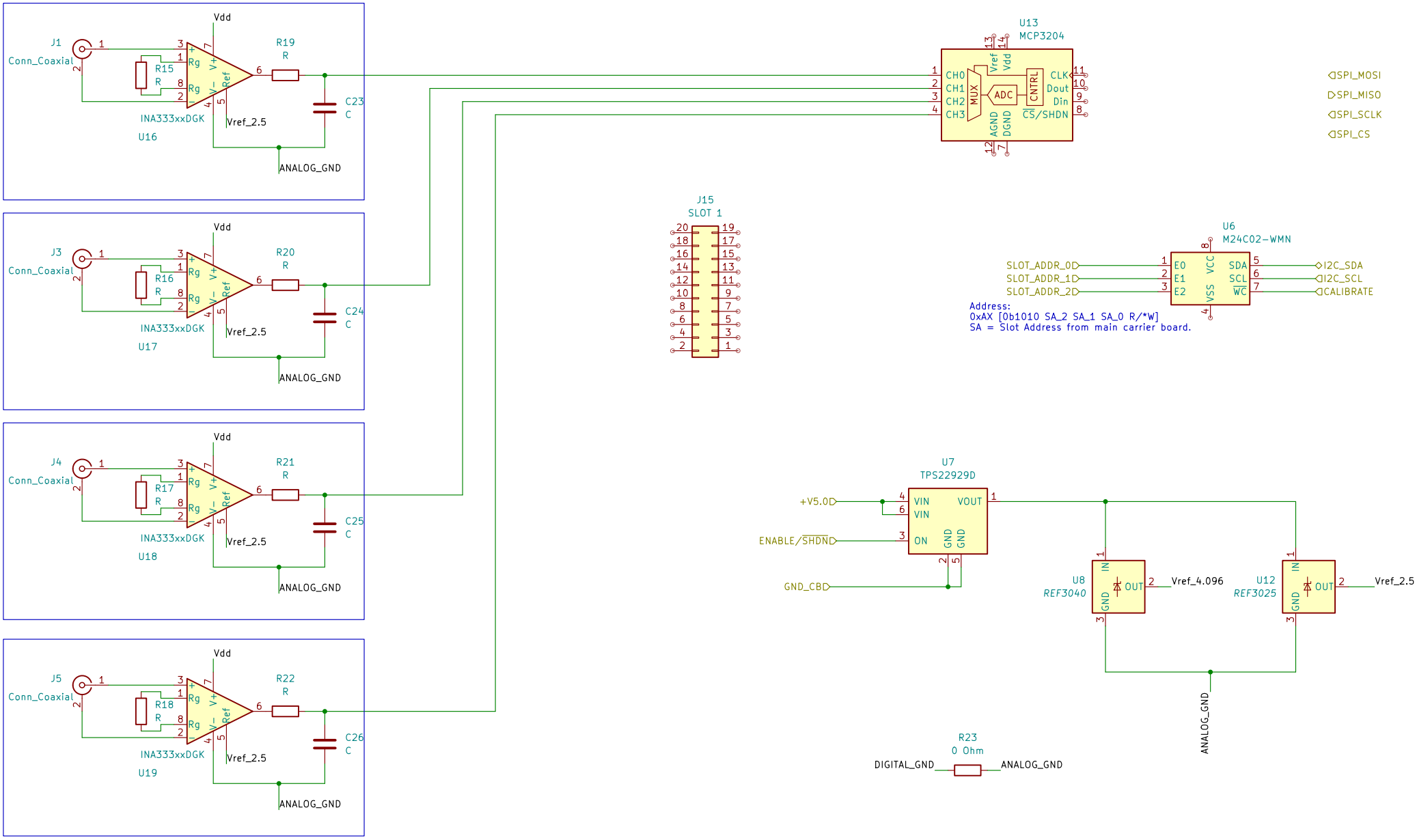
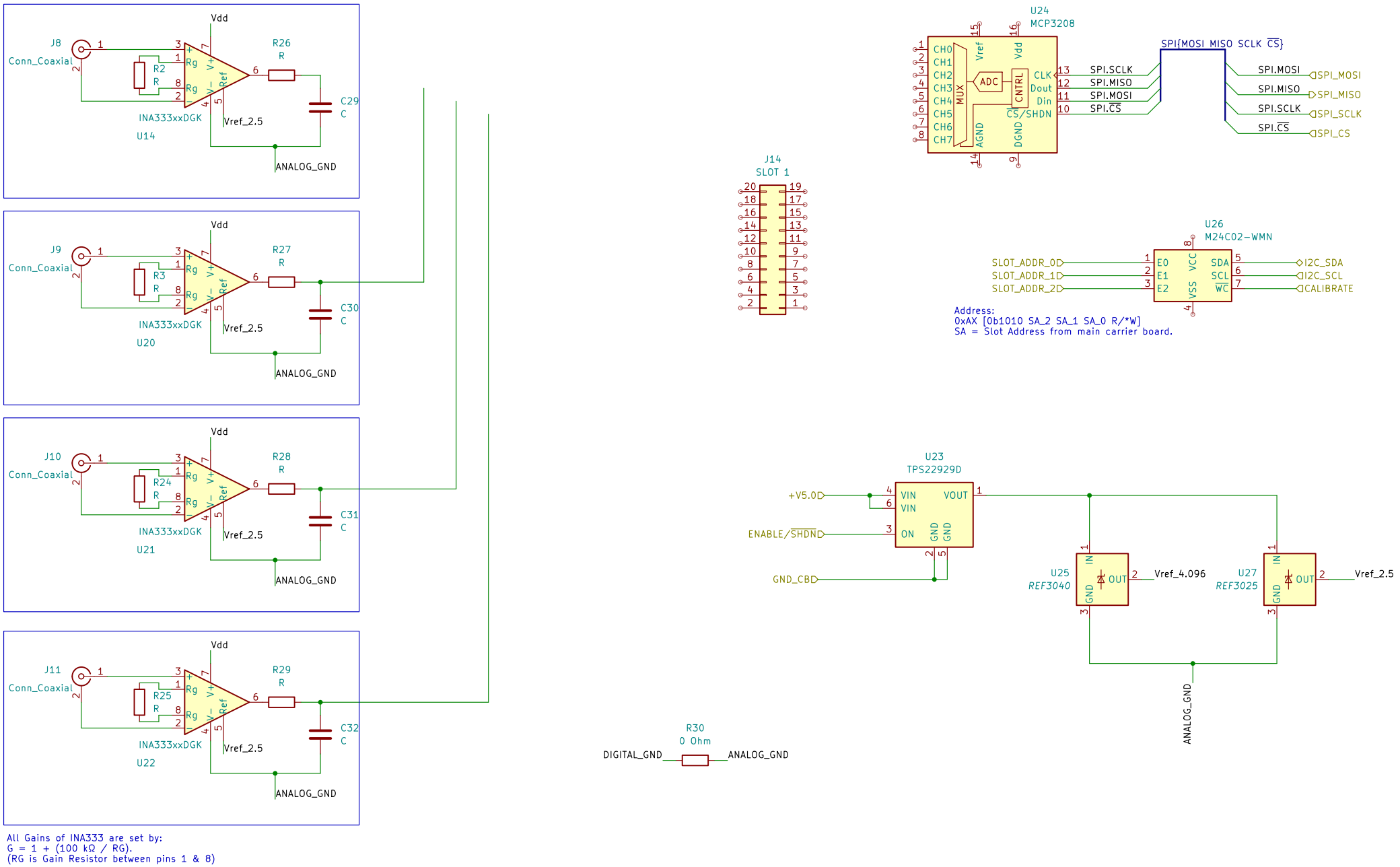
to be switched off or must have a shutdown pin.
– Low noise interfaces on sensor inputs.
– High frequency lines should be adequately blocked




The 5V power rail is supplied by a battery bank. We need to have some more power conditioning in order to make sure that we aren't coupling too much noise into the ADC circuits. To this end, we may want to use an LDO to provide a lower voltage rail to the OP-amp circuits, or use a higher voltage battery and use the LDO to provide a "clean" 5.0V rail.
Battery Pack
BT1
Battery
J7
Conn_01x02_Socket
J6
Conn_01x02_Pin
Battery Decoupling
C34
C
C35
C
+5.0V
Place-holder for a 3.3V supply.
Might not need this since the camera modules may have built-in 5V-3.3V regulators.
U29
LM1084-3.3
VI
VO
GND
+3.3V
C36
C
C37
C
R5
R
R_shunt_batt
0.1 Ohm
R31
R
C33
C
BATTERY_SENSE_+
BATTERY_SENSE_-
Sense Filter
GND_BATT


Battery Sense
INA333xxDGK
U11
Vdd
BATTERY_SENSE_+
BATTERY_SENSE_−
R13
R
R7
R
C2
C
Vref_2.5
ANALOG_GND
Ext Temperature Sense
J2
Conn_Coaxial
R9
R
R8
R
C3
C
INA333xxDGK
U2
Vref_2.5
ANALOG_GND
Leak Detector
U4
INA333xxDGK
Vdd
R10
R
R12
R
C4
C
Vref_2.5
ANALOG_GND
TBD
U5
INA333xxDGK
Vdd
R11
R
R1
R
C1
C
Vref_2.5
ANALOG_GND
All Gains of INA333 are set by:
G = 1 + (100 kΩ / RG).
(RG is Gain Resistor between pins 1 & 8)
Vref_4.096
Vdd
U1
MCP3204
CH0
CH1
CH2
CH3
MUX
ADC
CNTRL
CLK
Dout
Din
CS/SHDN
AGND
DGND
SPI_SCLK
SPI_MISO
SPI_MOSI
SPI_CS
ANALOG_GND
DIGITAL_GND
U15
M24C02−WMN
E0
E1
E2
VCC
VSS
SDA
SCL
WC
I2C_SDA
I2C_SCL
CALIBRATE
The address of the base unit is always
0xA0 [0b1010 000 R/*W]
When High, WC prevents write accesses to
the EEPROM. It would be good to have a
single jumper or make this pin accessible
by a test fixture so the contents can be
programmed at the factory but then set
high to prevent inadvertent writes
during operation.
U3
TPS22929D
+V5.0
ENABLE/SHDN
GND_CB
VIN
VOUT
ON
GND
U10
REF3040
U9
REF3025
Vref_4.096
Vref_2.5
ANALOG_GND
TL431 might also be used for the 2.5V reference but
buffered with an OPA333 or equivalent.
Decoupling Capacitors are connected
as close as possible to each IC of
the given power domain.
Reference Decoupling
Vref_2.5
C21
C22
C6
C5
C
ANALOG_GND
Vref_4.096
C7
C8
C27
C28
ANALOG_GND
Analog Decoupling
Vdd
C9
C10
C11
C12
C13
C19
ANALOG_GND
Digital Decoupling
Vdd
C14
C15
C16
C17
C18
C20
DIGITAL_GND
R14
0 Ohm
DIGITAL_GND
ANALOG_GND
Base Sensor Circuit
This sensor board is included in the base unit. It includes built−in
temperature probe, battery Coulomb counting, leak detector, and TBD.


J1
Conn_Coaxial
R15
R
R19
R
C23
C
INA333xxDGK
U16
Vdd
Vref_2.5
ANALOG_GND
J3
Conn_Coaxial
R16
R
R20
R
C24
C
INA333xxDGK
U17
Vdd
Vref_2.5
ANALOG_GND
J4
Conn_Coaxial
R17
R
R21
R
C25
C
INA333xxDGK
U18
Vdd
Vref_2.5
ANALOG_GND
J5
Conn_Coaxial
R18
R
R22
R
C26
C
INA333xxDGK
U19
Vdd
Vref_2.5
ANALOG_GND
All Gains of INA333 are set by:
G = 1 + (100 kΩ / RG).
(RG is Gain Resistor between pins 1 & 8)
U13
MCP3204
CH0
CH1
CH2
CH3
MUX
ADC
CNTRL
CLK
Dout
Din
CS/SHDN
Vref
Vdd
AGND
DGND
SPI_MOSI
SPI_MISO
SPI_SCLK
SPI_CS
J15
SLOT 1
U6
M24C02-WMN
SLOT_ADDR_0
SLOT_ADDR_1
SLOT_ADDR_2
E0
E1
E2
VSS
VCC
SDA
SCL
WC
I2C_SDA
I2C_SCL
CALIBRATE
Address:
0xAX [0b1010 SA_2 SA_1 SA_0 R/*W]
SA = Slot Address from main carrier board.
U7
TPS22929D
+V5.0
ENABLE/SHDN
GND_CBD
VIN
VIN
ON
GND
GND
VOUT
U8
REF3040
IN
GND
OUT
Vref_4.096
U12
REF3025
IN
GND
OUT
Vref_2.5
ANALOG_GND
R23
0 Ohm
DIGITAL_GND
ANALOG_GND


J8
Conn_Coaxial
R2
R
INA333xxDGK
U14
Vdd
R26
R
C29
C
Vref_2.5
ANALOG_GND
J9
Conn_Coaxial
R3
R
INA333xxDGK
U20
Vdd
R27
R
C30
C
Vref_2.5
ANALOG_GND
J10
Conn_Coaxial
R24
R
INA333xxDGK
U21
Vdd
R28
R
C31
C
Vref_2.5
ANALOG_GND
J11
Conn_Coaxial
R25
R
INA333xxDGK
U22
Vdd
R29
R
C32
C
Vref_2.5
ANALOG_GND
All Gains of INA333 are set by:
G = 1 + (100 kΩ / RG).
(RG is Gain Resistor between pins 1 & 8)
J14
SLOT 1
U24
MCP3208
CH0
CH1
CH2
CH3
CH4
CH5
CH6
CH7
MUX
ADC
CNTRL
Vref
Vdd
AGND
DGND
CLK
Dout
Din
CS/SHDN
SPI.SCLK
SPI.MISO
SPI.MOSI
SPI.CS
SPI{MOSI MISO SCLK CS}
SPI.MOSI
SPI.MISO
SPI.SCLK
SPI.CS
SPI_MOSI
SPI_MISO
SPI_SCLK
SPI_CS
U26
M24C02-WMN
SLOT_ADDR_0
SLOT_ADDR_1
SLOT_ADDR_2
E0
E1
E2
VSS
VCC
SDA
SCL
WC
I2C_SDA
I2C_SCL
CALIBRATE
Address:
0xAX [0b1010 SA_2 SA_1 SA_0 R/*W]
SA = Slot Address from main carrier board.
U23
TPS22929D
+V5.0
ENABLE/SHDN
GND_CB
VIN
VIN
ON
GND
GND
VOUT
U25
REF3040
IN
GND
OUT
Vref_4.096
U27
REF3025
IN
GND
OUT
Vref_2.5
ANALOG_GND
R30
0 Ohm
DIGITAL_GND
ANALOG_GND


I2C_SDA
I2C_SCL
SPI_MISO
SPI_MOSI
SPI_SCLK
SPI_CS0
SPI_CS1
SPI_CS2
+5.0V
+3.3V
GND_CB
EN/SH_0
EN/SH_1
EN/SH_2