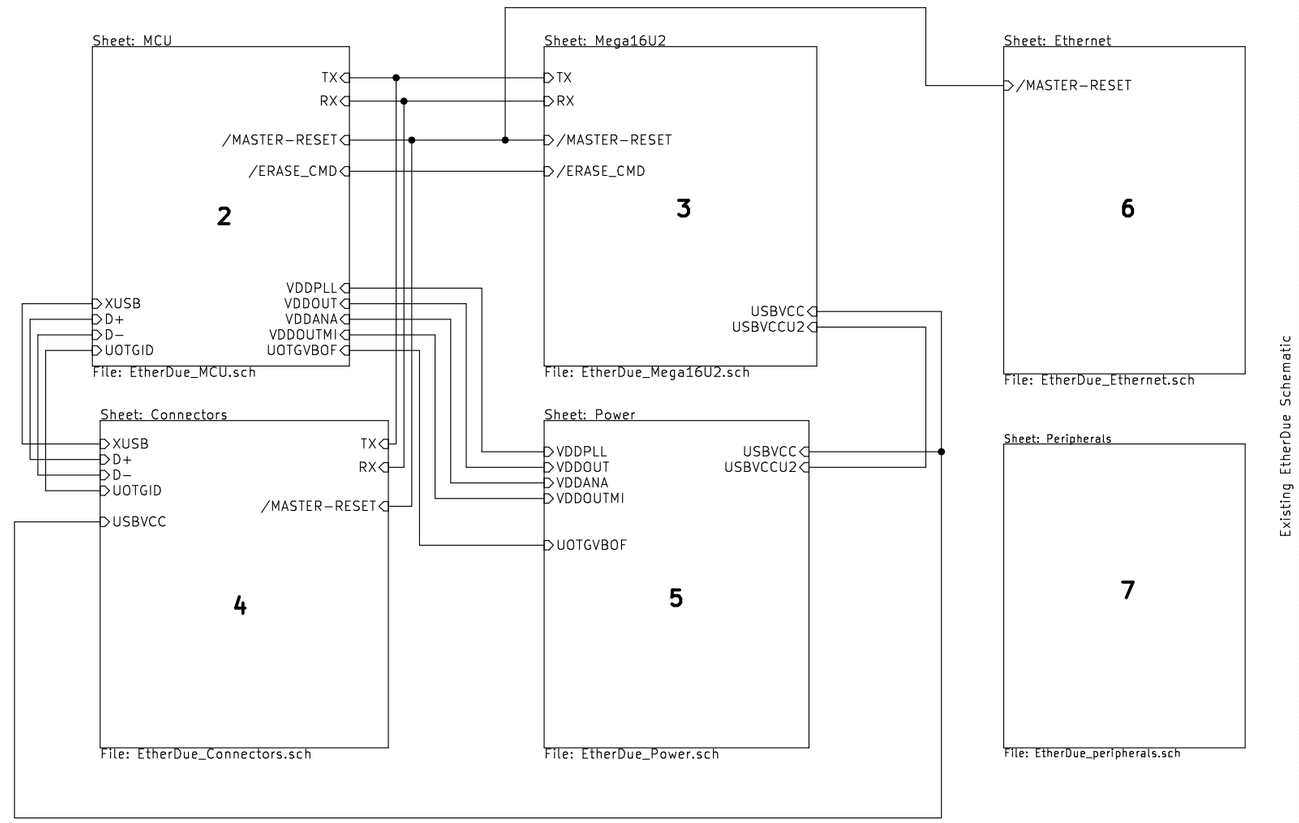
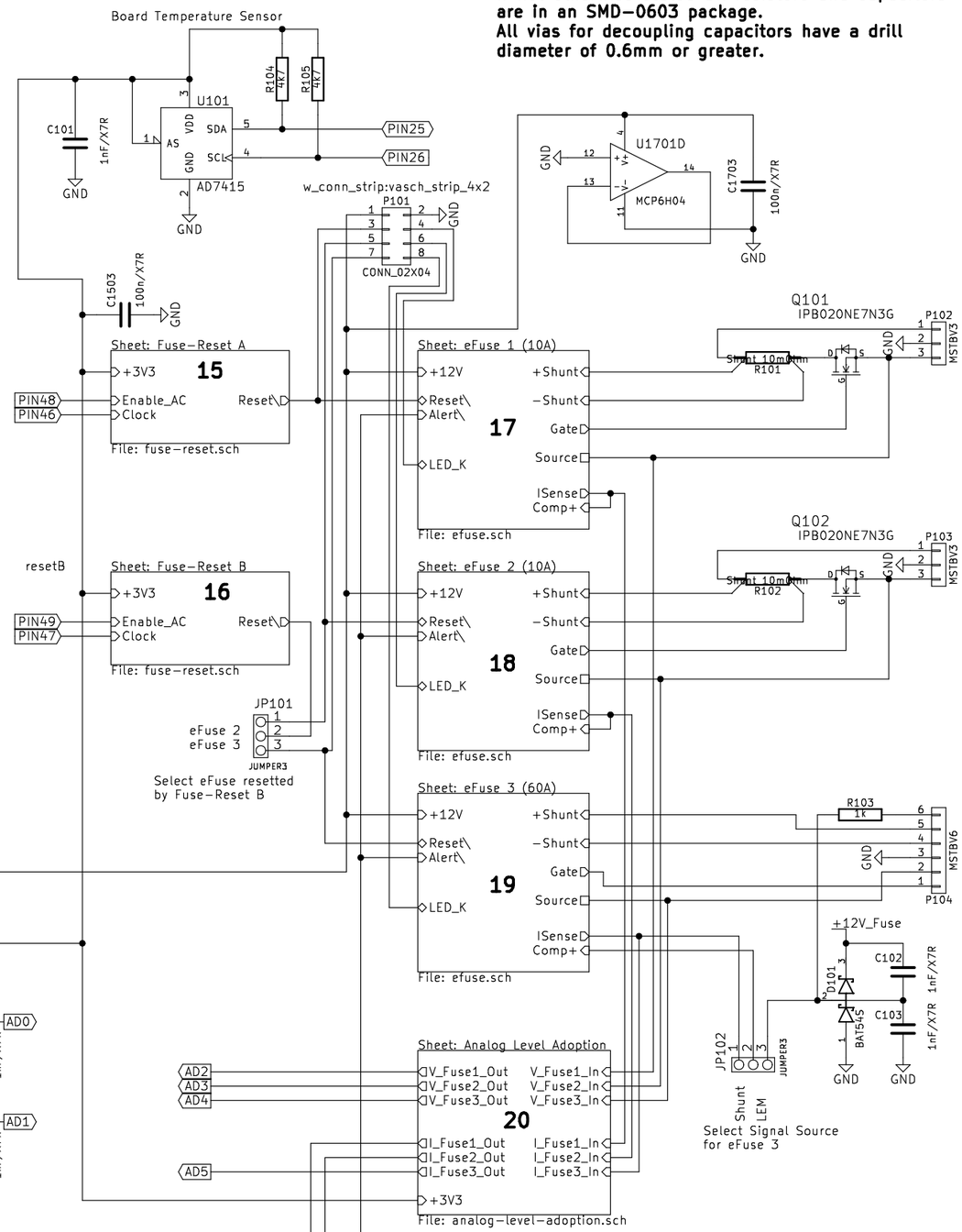


Labelling scheme: Use Global labels for simple 1:1 I/O pin<->MCU connectors, hierarchical labels for all other inter-sheet connections.

Existing EtherDue Schematic

Existing EtherDue Schematic

Notes for the PA-Monitor:
If not otherwise stated all resistors and capacitors are in an SMD-0603 package.
All vias for decoupling capacitors have a drill diameter of 0.6mm or greater.



Notes on the 1nF-1nF-BAT54 network of all ADC inputs.
The Cs and the dual-diode should be placed near the connector of the signal.
The add. low-side C should be placed near the ADC input pin.

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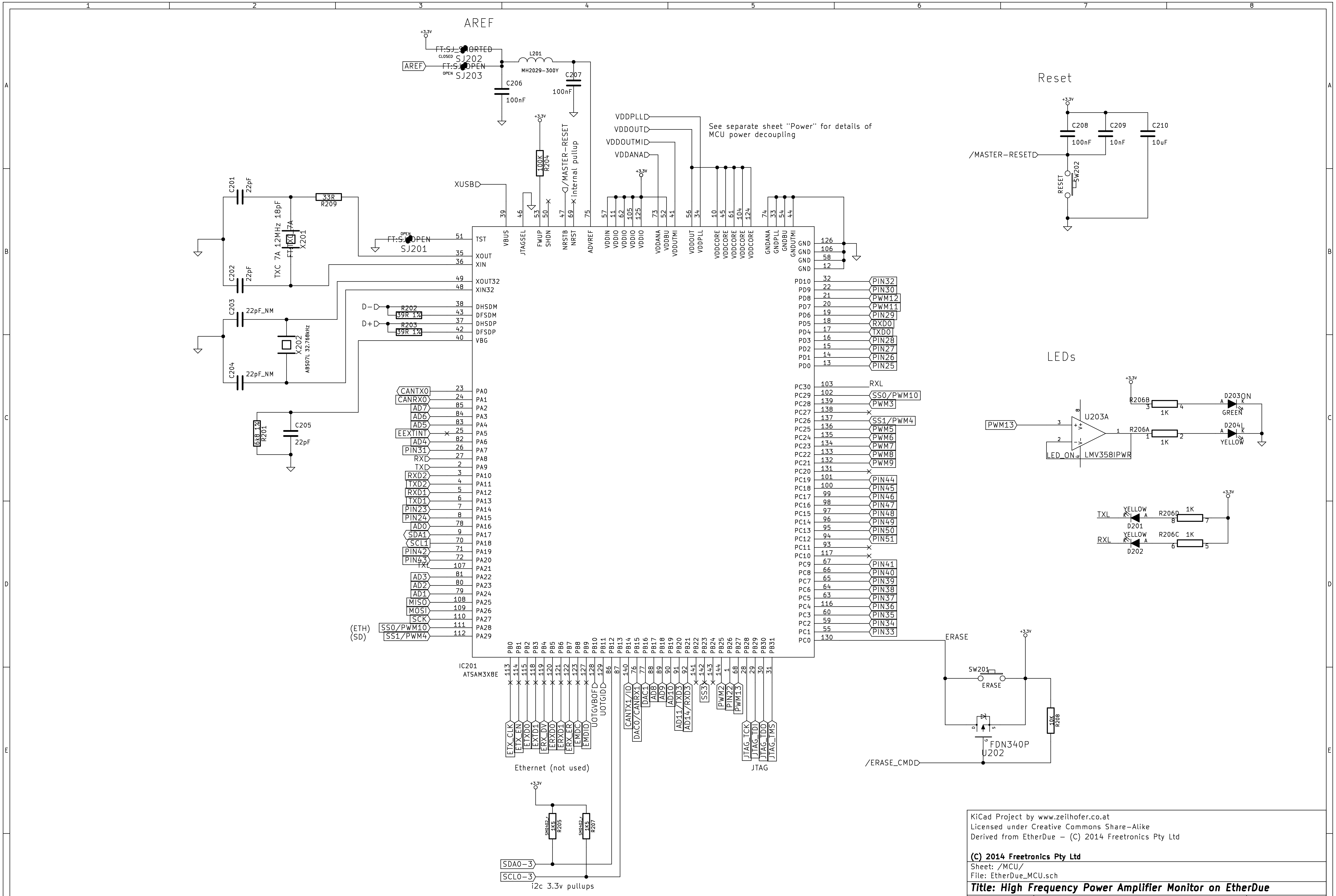
www.emvconsulting.at and Otelo eGen

Sheet: /
File: EtherDue.sch

Title: High Frequency Power Amplifier Monitor on EtherDue

Size: A3	Date: 2015-03-07	**Rev: 20150308.4**
KiCad E.D.A. kicad 4.0.7+dfsg1-1ubuntu2		Id: 1/20



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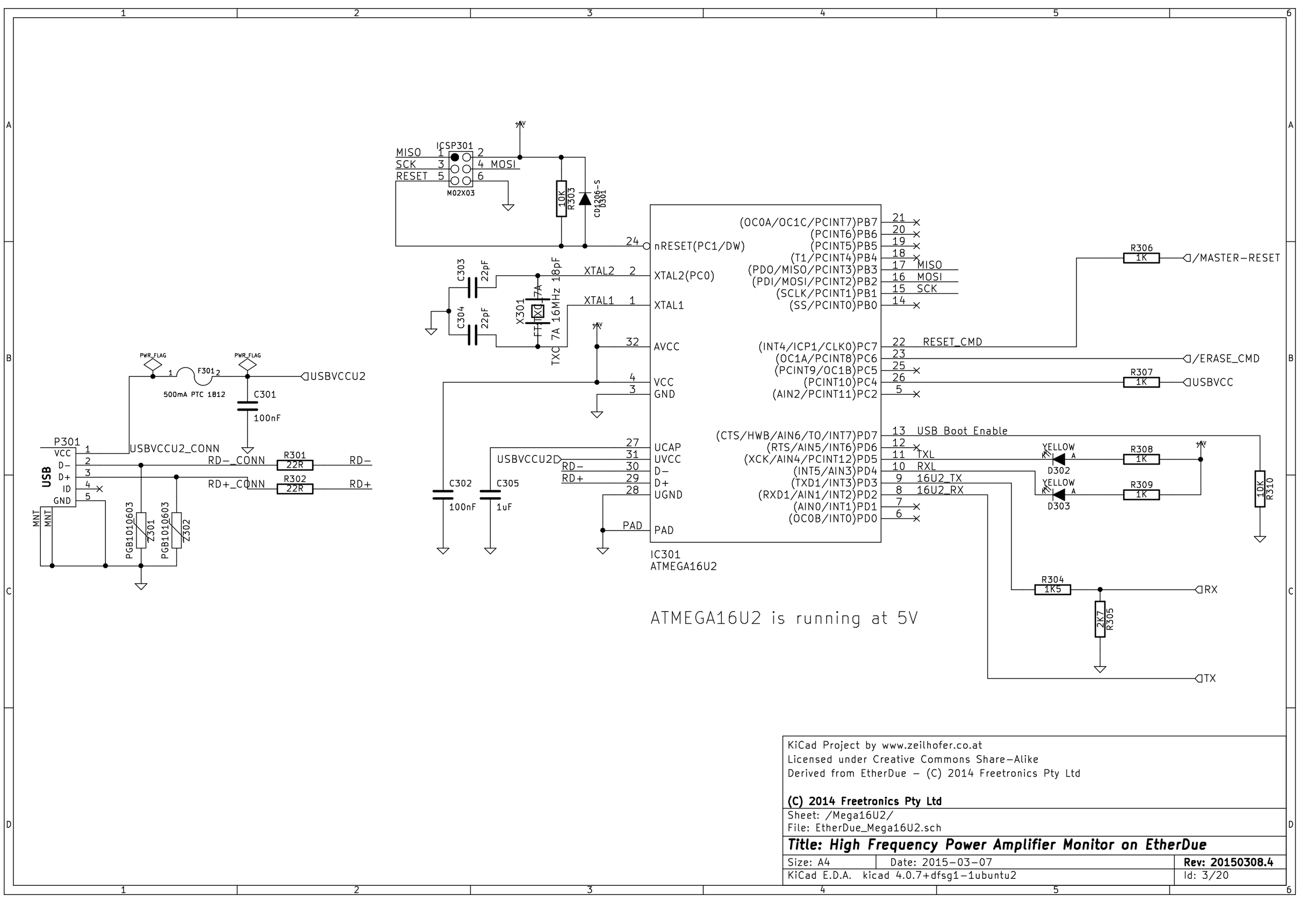
Sheet: /MCU/
File: EtherDue_MCU.sch

Title: High Frequency Power Amplifier Monitor on EtherDue

Size: A3	Date: 2015-03-07	**Rev: 20150308.4**
KiCad E.D.A. kicad 4.0.7+dfsg1-1ubuntu2		Id: 2/20



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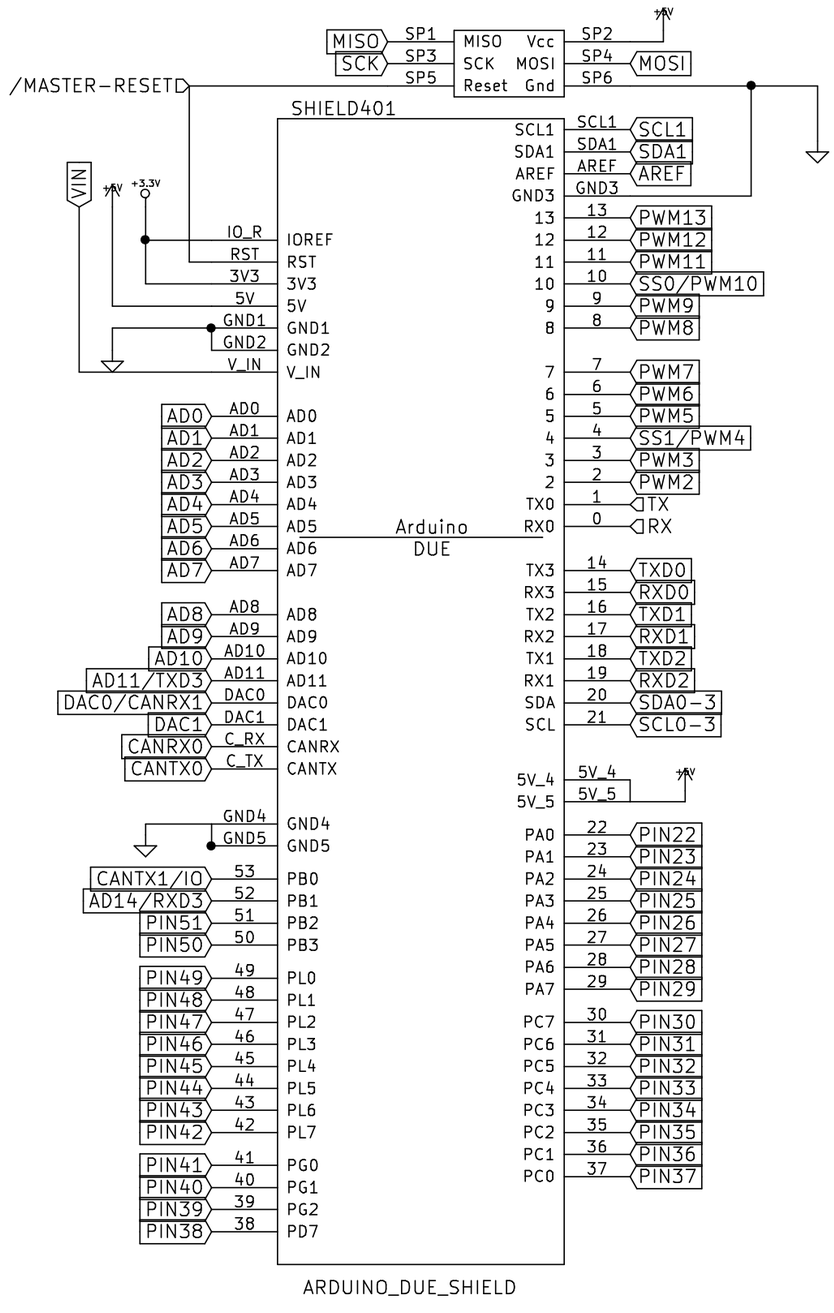
Sheet: /Mega16U2/
File: EtherDue_Mega16U2.sch

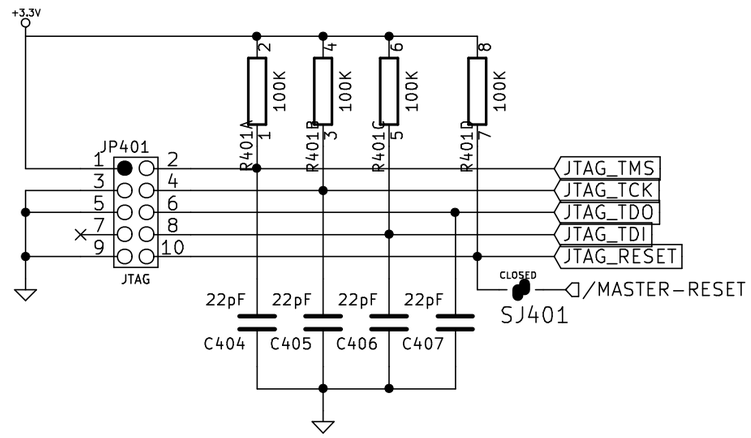
Title: High Frequency Power Amplifier Monitor on EtherDue

Size: A4	Date: 2015−03−07	**Rev: 20150308.4**
KiCad E.D.A. kicad 4.0.7+dfsg1−1ubuntu2		Id: 3/20

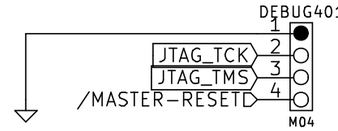
Arduino Headers



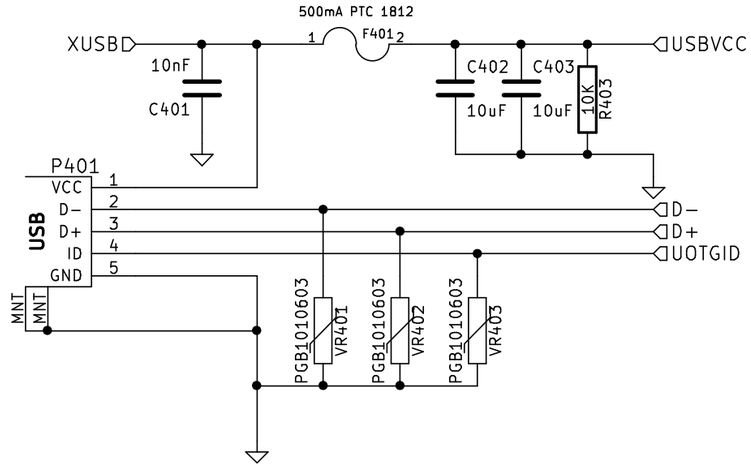
JTAG



Debug Port (SWD)



Native USB AB



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Sheet: /Connectors/
File: EtherDue_Connectors.sch

Title: High Frequency Power Amplifier Monitor on EtherDue

Size: A4	Date: 2015-03-07	**Rev: 20150308.4**
KiCad E.D.A. kicad 4.0.7+dfsg1-1ubuntu2		Id: 4/20

1.8v decoupling:
1 near pins 15/16,
1 near pin 33

W5100 Reset on Poweron

Reset IC – 140ms min, 280ms max
< 3.08 Vrst, push-pull output

APX811-31UG-7
U603

/MASTER-RESET
WIZRST

HY931147C
U602

/SCS & SS0 Behaviour:

MISO pin tri-state by SS & /SCS

SS0 low simultaneously drives SEN high -> SPI enabled & chip selected

W5100
IC601

PoE Module Header

Direct feed to Arduino VIN

JP601

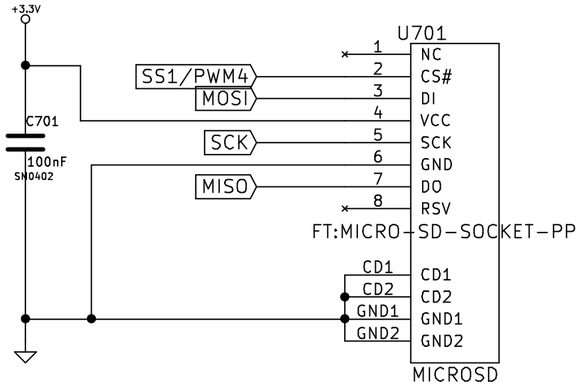
For DC PoE with low voltage, jumper 3(PoE_V+) to 4(VIN) & 2(PoE_V-) to 1(GND)

Analog Power Decoupling

L601 WE-CBF-742792093
L602 WE-CBF-742792093

Sheet: /Ethernet/		
File: EtherDue_Ethernet.sch		
Title: High Frequency Power Amplifier Monitor on EtherDue		
Size: A4	Date: 2015-03-07	**Rev: 20150308.4**
KiCad E.D.A. kicad 4.0.7+dfsg1-1ubuntu2		Id: 5/20

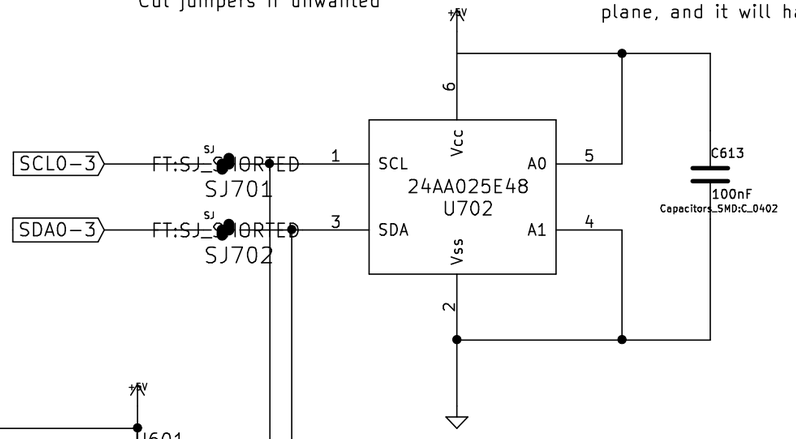
MicroSD Card Slot



24AA02E48 EEPROM w/ MAC

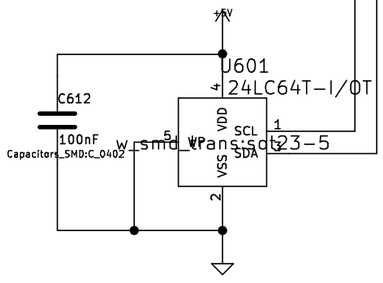
i2c address 0x51,
Cut jumpers if unwanted

NB: This device could be run on 3.3V but it happens to be located in a section of the board above a 5V power plane, and it will happily run on 5V.



24LC64 EEPROM for calibration data

i2c address 0x50



Sheet: /Peripherals/
File: EtherDue_peripherals.sch

Title: High Frequency Power Amplifier Monitor on EtherDue

Size: A4	Date: 2015-03-07	**Rev: 20150308.4**
KiCad E.D.A. kicad 4.0.7+dfsg1-1ubuntu2		Id: 6/20

Vin

VIN_JACK

U501 POWER_JACK

POWERJACK

PWR_FLAG

MH2029-300Y L501

C703 100nF

D501 1N4004

C501 47uF 25V

VIN

7–12V Recommended,
6–20V Possible.

5V Regulator

C502 10uF 25V

C702 2n2/50V/COG

10K R503

U502 LM2734Y

VIN EN BOOST GND SW FB

BUCK_OUT

CD1206-S01575 D502

C505 10nF

BUCK_SW

BUCK_FB

L502 10uH SRR0604-100ML

D503 STPS2L60A

52K3 R504

10K R505

C510 100uF 16V

3.3V Regulator

U505 NCP1117ST33T3G

VI VO GND

C528 10uF

MCU Power Decoupling

MH2029-300Y L503

C512 100nF

C517 10uF

VDDANA

MH2029-300Y L504

C513 100nF

C518 10uF

VDDOUTMI

MH2029-300Y L505

VDDOUT

VDDPLL

C509 100nF

C514 100nF

C519 10uF

C506 10uF

C515 100nF

C520 100nF

C522 100nF

C524 100nF

C526 100nF

C527 100nF

Place near MCU

6x 100nF decoupling, 1ea for MCU pins: VDDIN, VDDBU, 4xVDDIO

C511 100nF

C516 100nF

C521 100nF

C523 100nF

C507 10uF

4xVDDCORE 100nF decoupling caps + 1x bulk cap

USB Power

Forces off the power supply to USB port
when the USB port is in HOST mode
(and the board is powered from an external supply via VIN)

VBUSPO: VBus Polarity Off
0: The UOTGVBOF output signal is in its default mode (active high)
1: The UOTGVBOF output signal is inverted (active low)

VIN

U203B LMV358IPWR

CMP

GATE_CMD

R502C 100K

R502D 100K

R502B 100K

R502A 100K

R501 1K

BC847BSMD Q501

C504 100nF

C503 100nF

UOTGVBOF

USBVCC

USBVCCU2

U503 FDN340P

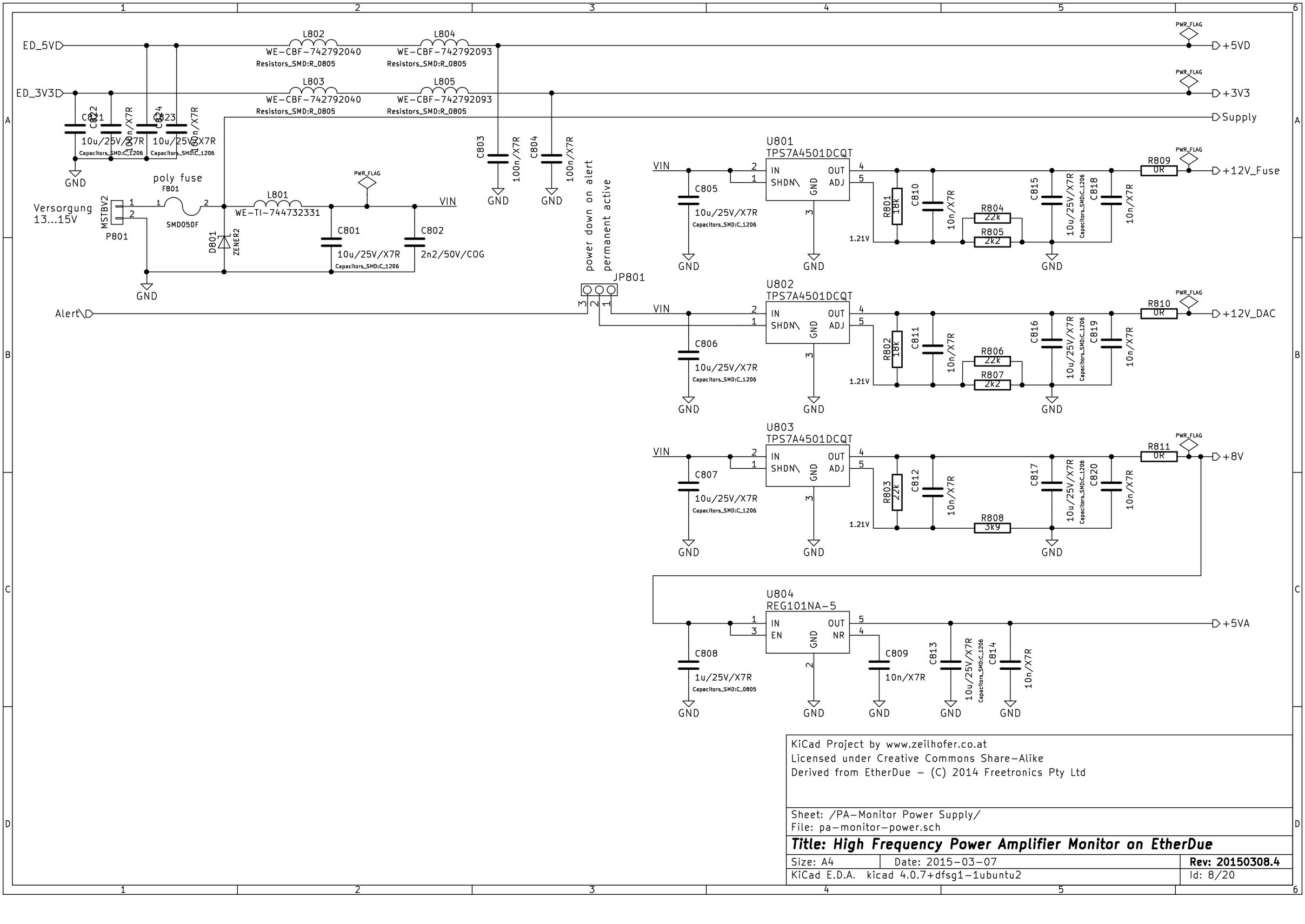
U504 FDN340P

+5V

Sheet: /Power/
File: EtherDue_Power.sch

Title: High Frequency Power Amplifier Monitor on EtherDue

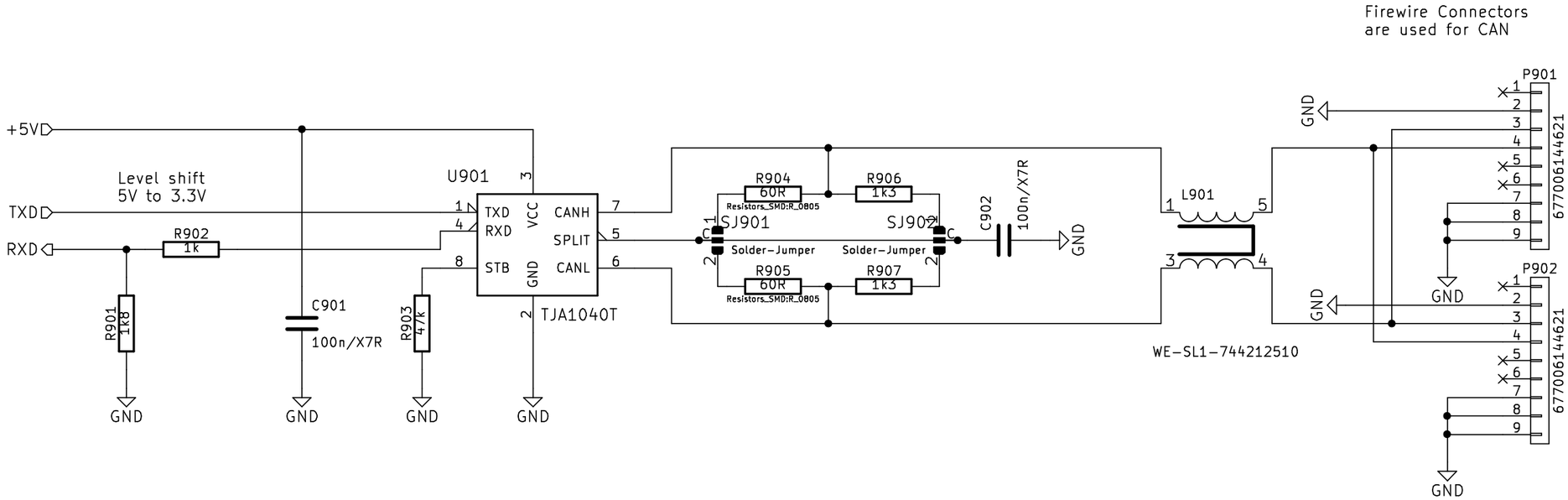
Size: A4	Date: 2015-03-07	**Rev: 20150308.4**
KiCad E.D.A. kicad 4.0.7+dfsg1-1ubuntu2		Id: 7/20



Sheet: /PA-Monitor Power Supply/
File: pa-monitor-power.sch

Title: High Frequency Power Amplifier Monitor on EtherDue

Size: A4	Date: 2015-03-07	**Rev: 20150308.4**
KiCad E.D.A. kicad 4.0.7+dfsg1-1ubuntu2		Id: 8/20



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Sheet: /CAN-Bus/
File: can-bus.sch

Title: High Frequency Power Amplifier Monitor on EtherDue

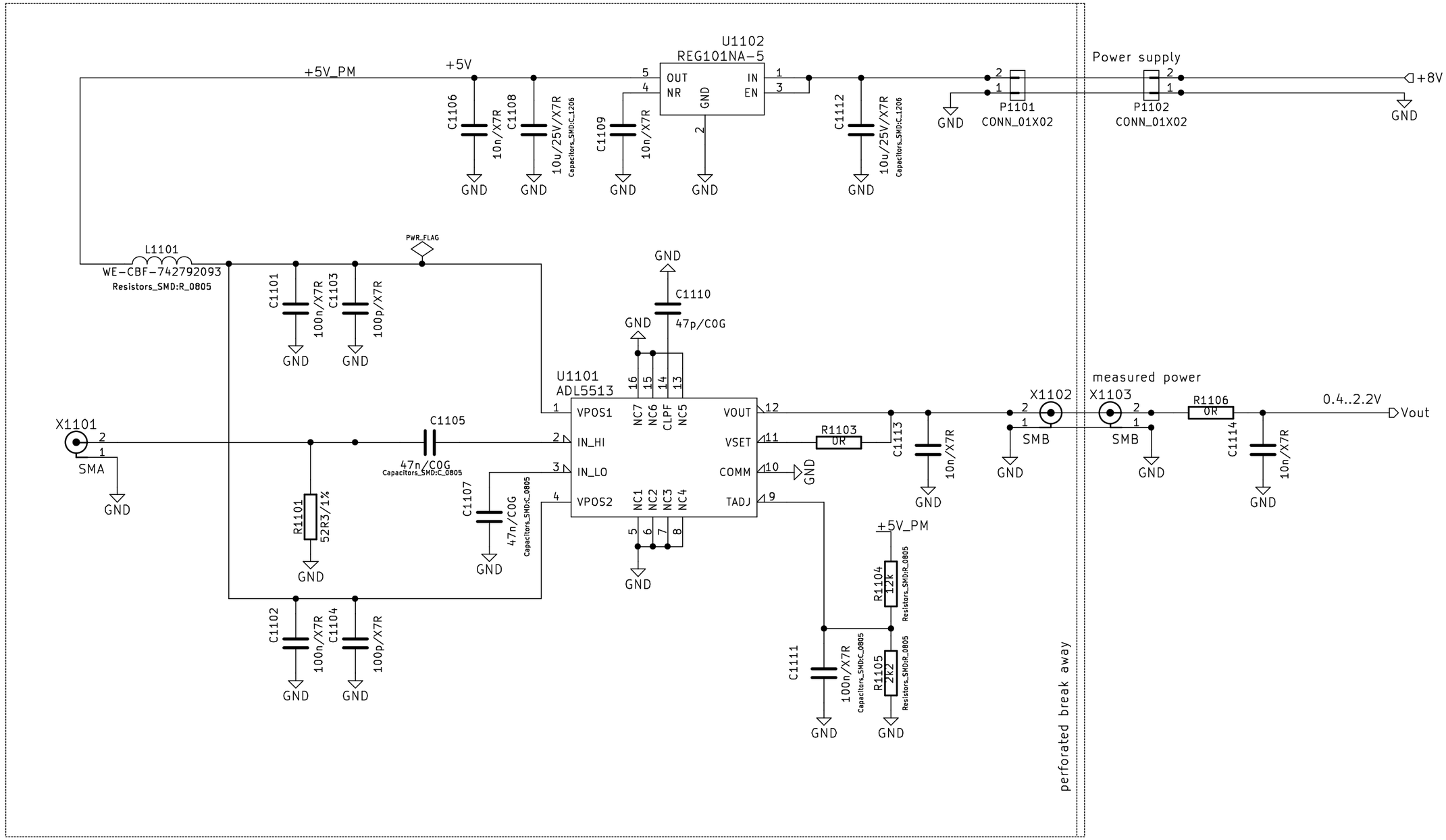
Size: A4	Date: 2015-03-07	**Rev: 20150308.4**
KiCad E.D.A. kicad 4.0.7+dfsg1-1ubuntu2		Id: 9/20

+3V3
+5VD
+5VA
+12V
VIN0
VIN1
VIN2
VIN3
GND
C1028 100n/X7R
C1032 100n/X7R
R1013 4K7
R1016 4K7
R1017 4K7
Alert
Q1001
R1014 100R
BSS308
33R R1018 SDA
33R R1019 SCL
R1015 100R
TODO: R berechnen
LED1001 RED
U1001
AD7294BSUZ
TQFP-64
DVDD
AVDD1
AVDD2
AVDD3
AVDD4
AVDD5
AVDD6
Analog 5V
C1013 10u/25V/X7R
C1016 C1019 C1021 C1025 C1029 100n/X7R
unused highside current amp
VPP1
VPP2
ISense 5V
VDRIVE
ALERT
I2C
SDA
SCL
Address
AS0
AS1
AS2
I2C Address: 0x61
Digital
ISENSE_1_OVERRANGE
ISENSE_2_OVERRANGE
NC1
NC2
NC3
NC4
NC5
NC6
NC7
NC8
DAC_OUTV+_AB
DAC_OUTV+_CD
DAC_OUT_GND_AB
DAC_OUT_GND_CD
OPGND
DAC
C1020 C1024 100n/X7R
GND GND
I2C
DGND1
DGND2
DGND3
AGND1
AGND2
AGND3
AGND4
AGND5
AGND6
AGND7
Power Supply
D1001 D1002 D1003 D1004 BAT54S
C1003 C1009 C1017 C1022 1n/X7R
C1004 C1010 C1018 C1023 10n/X7R
C1033 C1038 C1039 C1040 C1041 1n/X7R
VIN0
VIN1
VIN2
VIN3
ADC
REF_ADC
C1026 10u/25V/X7R
RS1-
RS1+
RS2-
RS2+
ISense
D1-
D1+
D2-
D2+
DCAP
Temperature
Analog Inputs
OFFSET_IN_A
OFFSET_IN_B
OFFSET_IN_C
OFFSET_IN_D
DAC Offset
VOUT_A
VOUT_B
VOUT_C
VOUT_D
REF_DAC
Analog Outputs
C1034 C1035 C1036 C1037 1n/X7R
C1033 10u/25V/X7R
C1042 10n/X7R
X1009
X1010
X1011
X1012
SMB
Shielded Outputs for Gate-Biasing
X1001 X1002 X1003 X1004
R1001 R1002 R1003 R1004 100R
C1001 C1002 1n/X7R
C1005 C1007 C1011 C1014 100p/X7R
Shielded Inputs Temperature Sensors
X1005 X1006 X1007 X1008
R1005 R1006 R1007 R1008 100R
C1006 C1008 C1012 C1015 100n/X7R
Shielded Inputs for Offset
C1030 100n/X7R
+12V
R1009 R1010 R1011 R1012 5K6
10-turn potentiometers
VR1001 VR1002 VR1003 VR1004 10k
C1031 100n/X7R
JP1001 JP1002 JP1003 JP1004 JUMPER3

Sheet: /Analog I/O/
File: analog-io.sch

Title: High Frequency Power Amplifier Monitor on EtherDue

Size: A3	Date: 2015-03-07	Rev: 20150308.4
KiCad E.D.A. kicad 4.0.7+dfsg1-1ubuntu2		Id: 10/20



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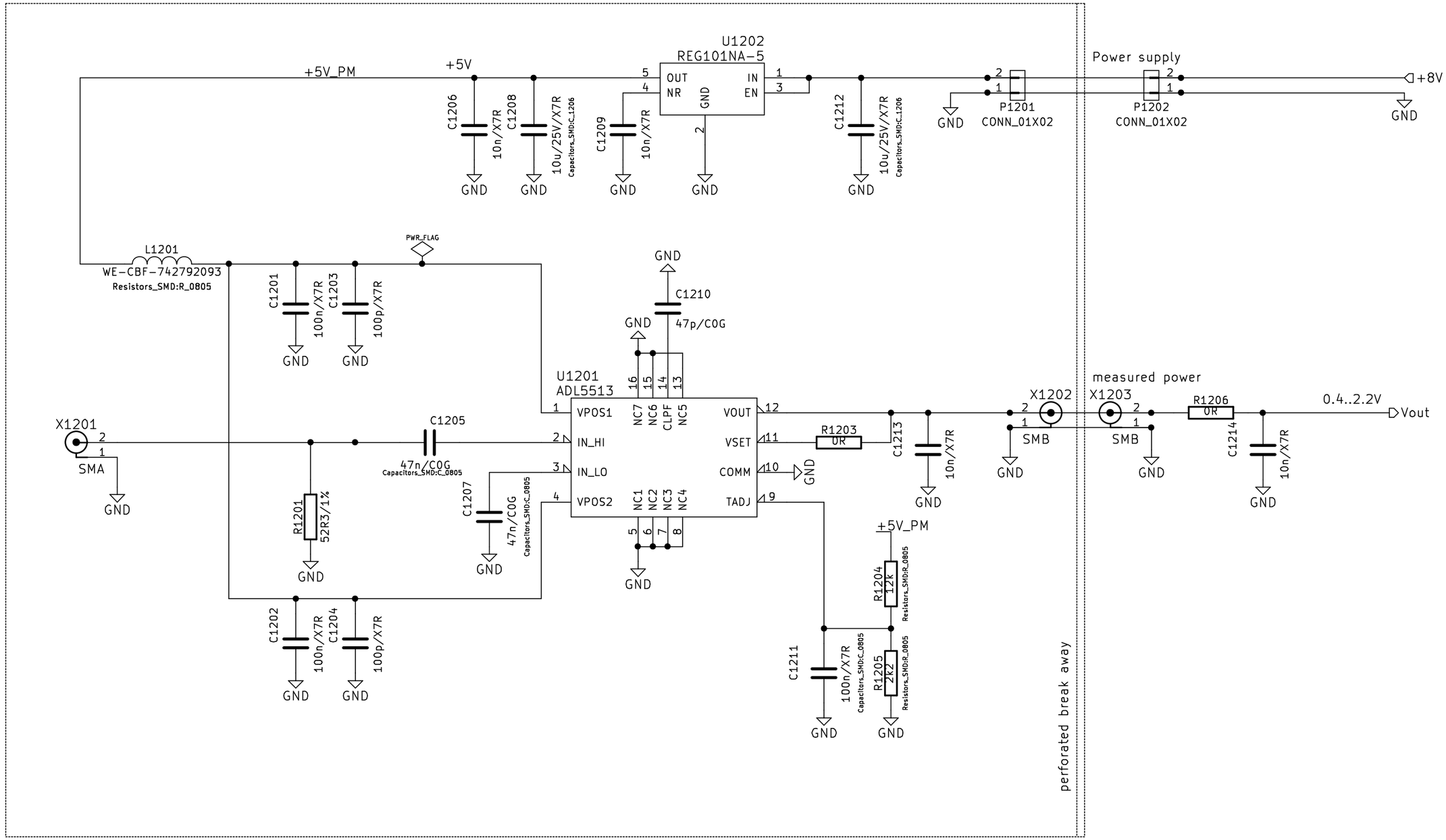
Sheet: /Power-Meter Forward 1/
File: power-meter.sch

Title: High Frequency Power Amplifier Monitor on EtherDue

Size: A4	Date: 2015-03-07	**Rev: 20150308.4**
KiCad E.D.A. kicad 4.0.7+dfsg1-1ubuntu2		Id: 11/20



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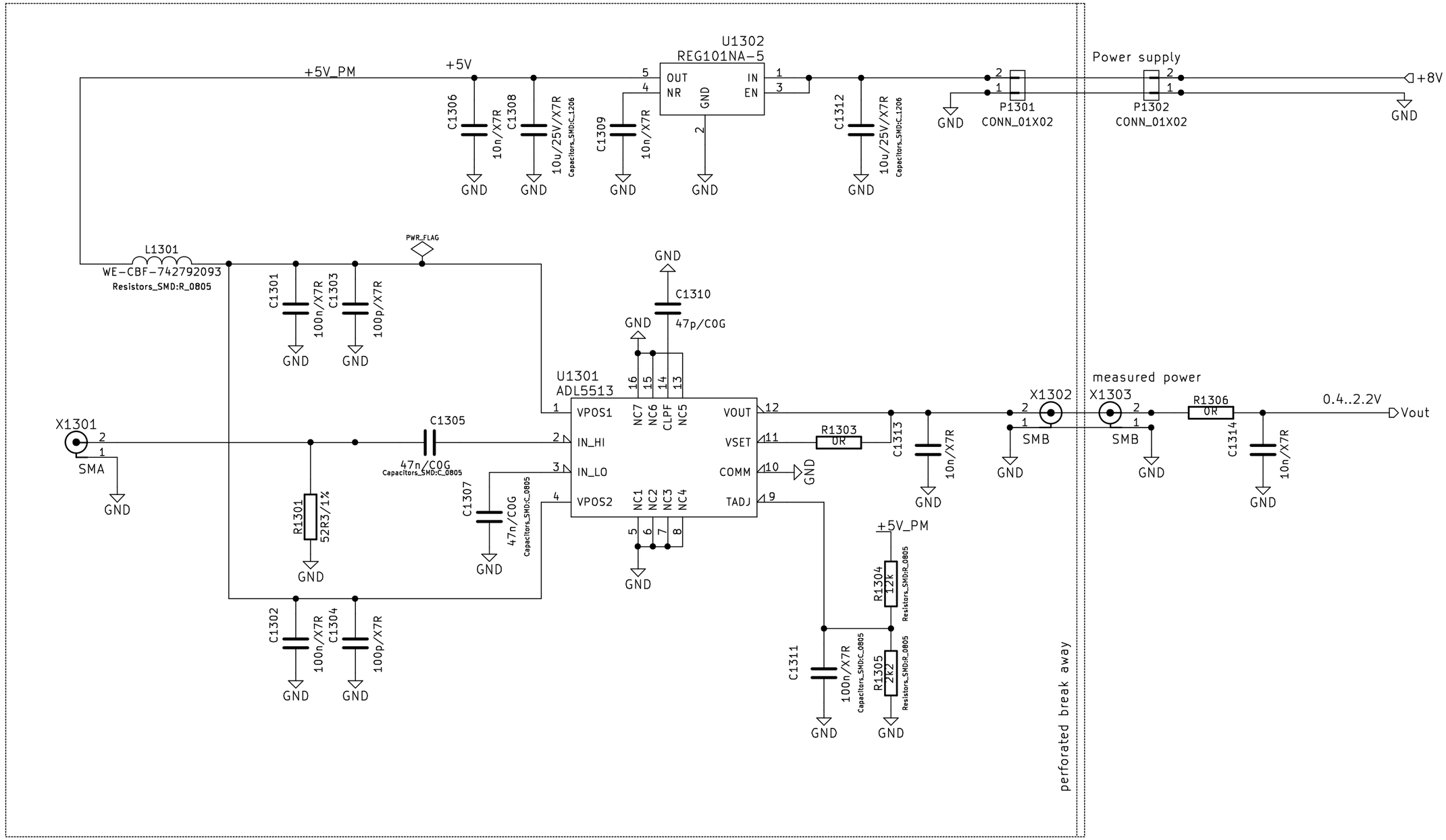
Sheet: /Power-Meter Forward 2/
File: power-meter.sch

Title: High Frequency Power Amplifier Monitor on EtherDue

Size: A4	Date: 2015-03-07	**Rev: 20150308.4**
KiCad E.D.A. kicad 4.0.7+dfsg1-1ubuntu2		Id: 12/20



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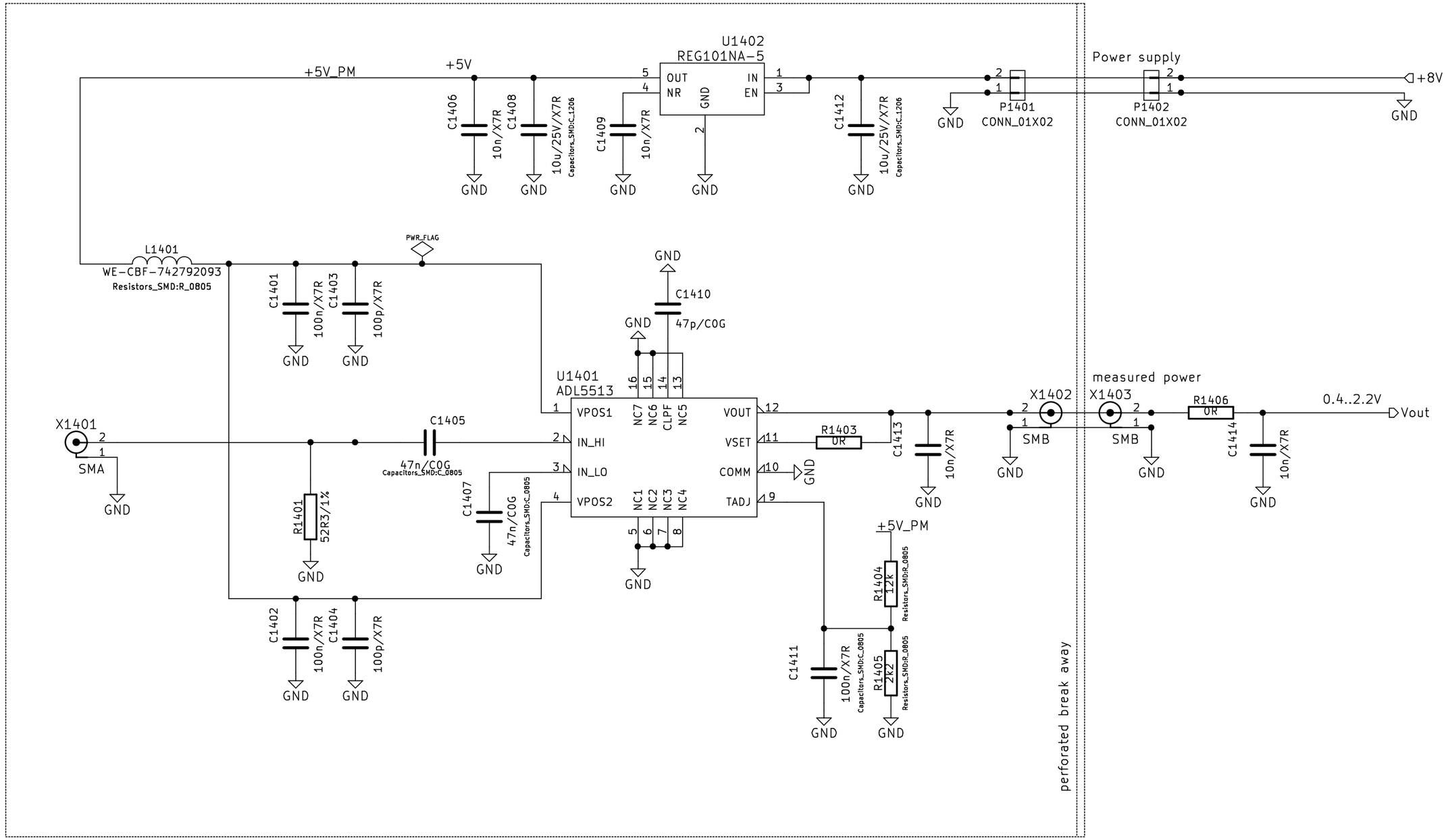
Sheet: /Power-Meter Return 1/ File: power-meter.sch		
Title: High Frequency Power Amplifier Monitor on EtherDue		
Size: A4	Date: 2015-03-07	**Rev: 20150308.4**
KiCad E.D.A. kicad 4.0.7+dfsg1-1ubuntu2		Id: 13/20



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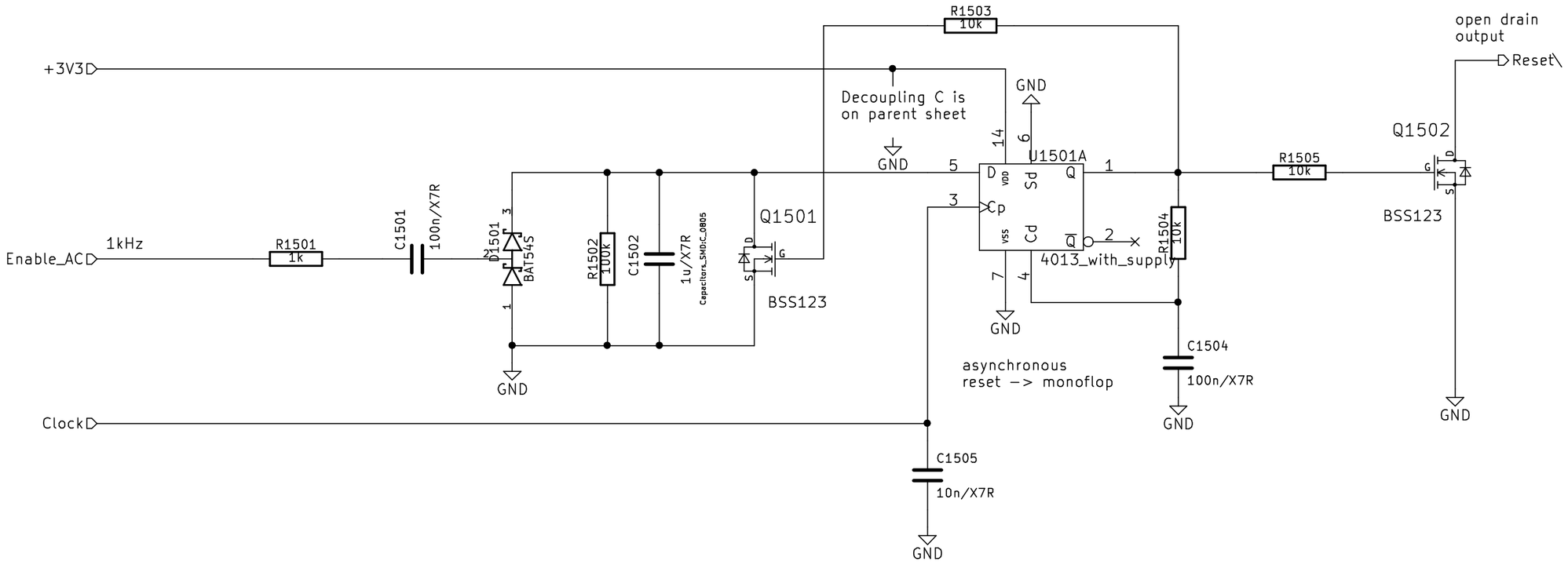
Sheet: /Power-Meter Return 2/
File: power-meter.sch

Title: High Frequency Power Amplifier Monitor on EtherDue

Size: A4	Date: 2015-03-07	**Rev: 20150308.4**
KiCad E.D.A. kicad 4.0.7+dfsg1-1ubuntu2		Id: 14/20

The reset output is pulsed low, when
a) a 1kHz (digital, 3.3V) signl is applied to the Enable_AC input and
b) a rising edge is applied to Clock input



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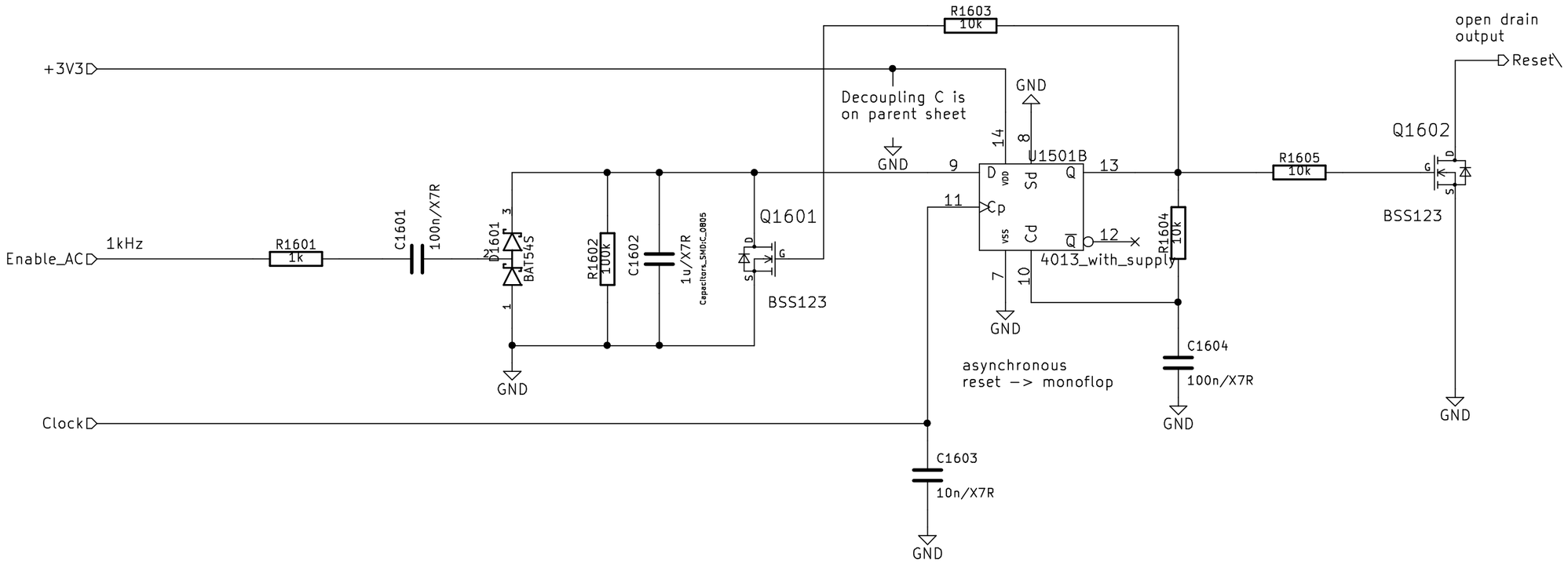
Sheet: /Fuse-Reset A/
File: fuse-reset.sch

Title: High Frequency Power Amplifier Monitor on EtherDue

Size: A4	Date: 2015-03-07	**Rev: 20150308.4**
KiCad E.D.A. kicad 4.0.7+dfsg1-1ubuntu2		Id: 15/20

The reset output is pulsed low, when
a) a 1kHz (digital, 3.3V) signl is applied to the Enable_AC input and
b) a rising edge is applied to Clock input



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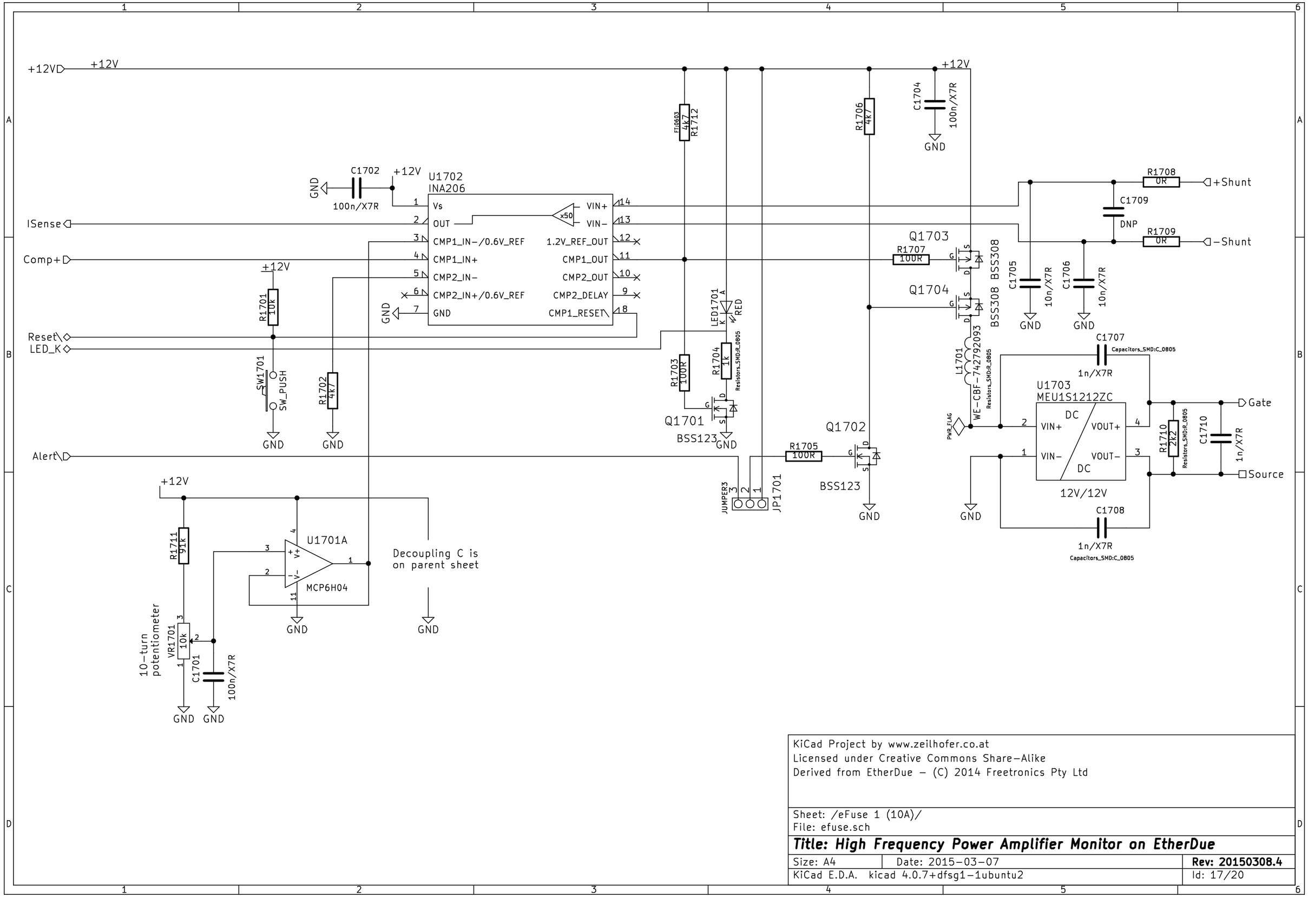
Sheet: /Fuse-Reset B/
File: fuse-reset.sch

Title: High Frequency Power Amplifier Monitor on EtherDue

Size: A4	Date: 2015-03-07	**Rev: 20150308.4**
KiCad E.D.A. kicad 4.0.7+dfsg1-1ubuntu2		Id: 16/20



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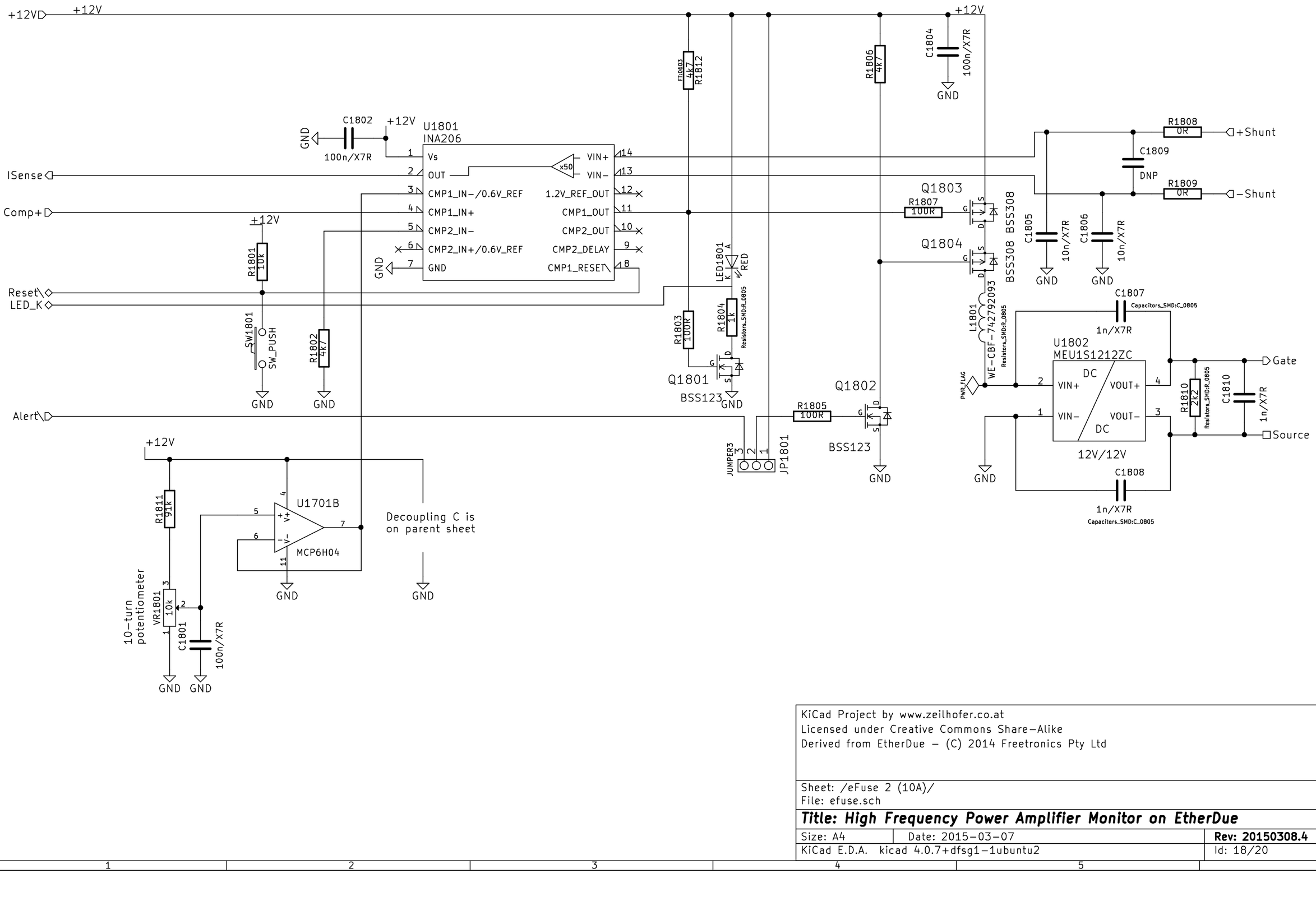
Sheet: /eFuse 1 (10A)/
File: efuse.sch

Title: High Frequency Power Amplifier Monitor on EtherDue

Size: A4	Date: 2015−03−07	**Rev: 20150308.4**
KiCad E.D.A. kicad 4.0.7+dfsg1−1ubuntu2		Id: 17/20



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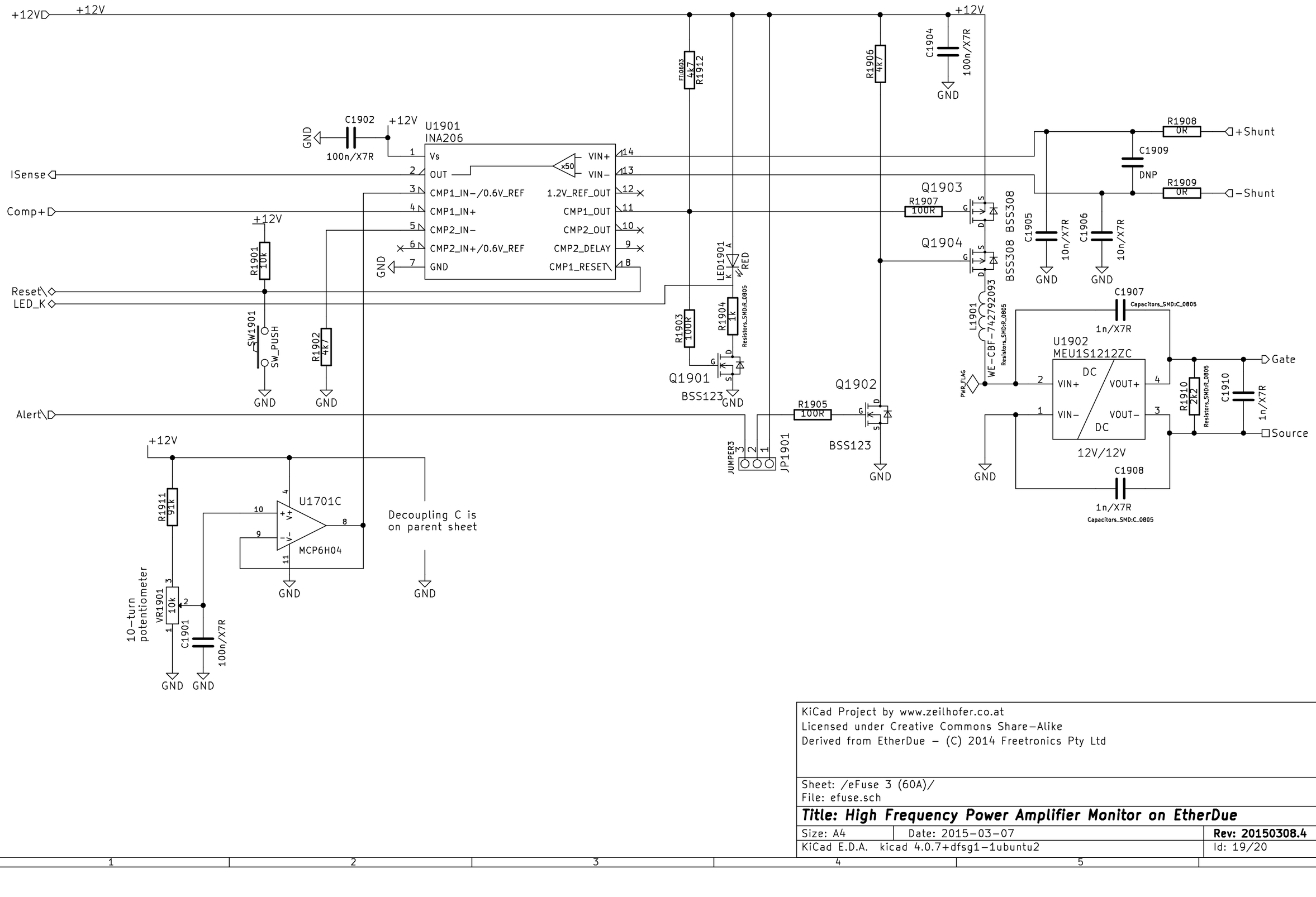
Sheet: /eFuse 2 (10A)/
File: efuse.sch

Title: High Frequency Power Amplifier Monitor on EtherDue

Size: A4	Date: 2015−03−07	**Rev: 20150308.4**
KiCad E.D.A. kicad 4.0.7+dfsg1−1ubuntu2		Id: 18/20



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Sheet: /eFuse 3 (60A)/
File: efuse.sch

Title: High Frequency Power Amplifier Monitor on EtherDue

Size: A4	Date: 2015−03−07	**Rev: 20150308.4**
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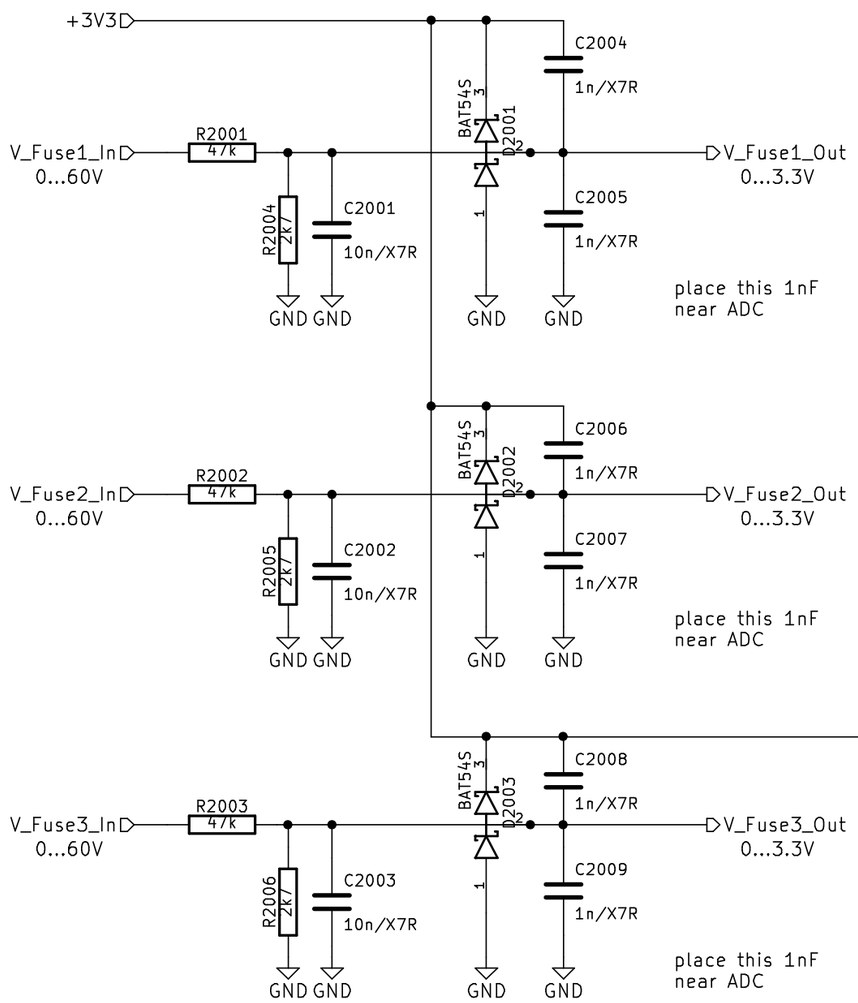
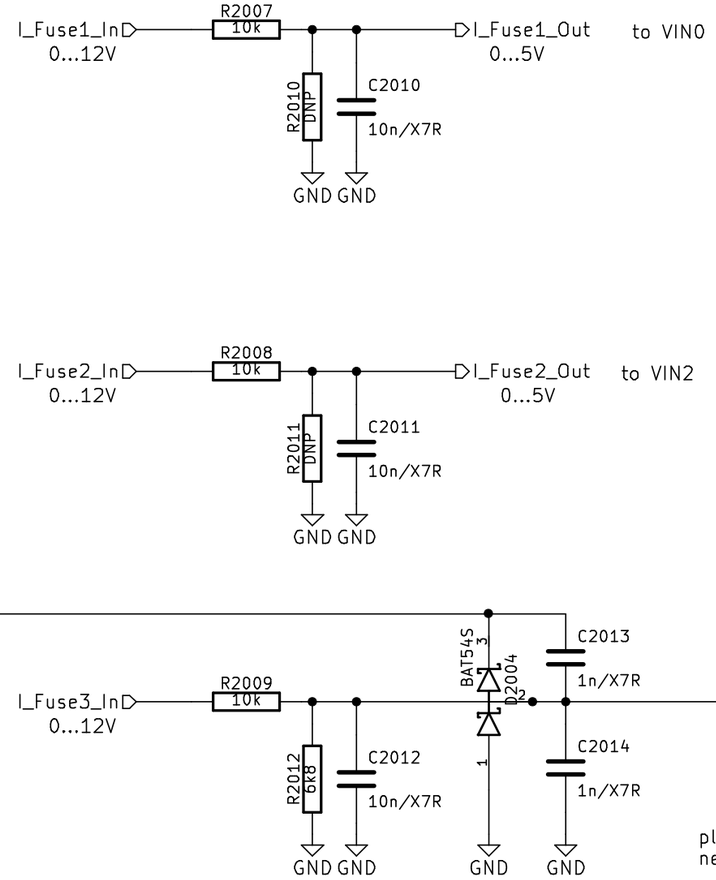
Voltages from 60V to 3.3V



Currents of F1 and F2 from 12V to 5V and of F3 from 12V to 3.3V



Sheet: /Analog Level Adoption/
File: analog-level-adoption.sch

Title: *High Frequency Power Amplifier Monitor on EtherDue*

Size: A4	Date: 2015-03-07	**Rev: 20150308.4**
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