

Starting from left and moving to the right we have in order :

- Power feed and ground from battery and/or block
- Reverse polarity hook up protection diode
- Current limiting resistor
- Zener over voltage clamping diode
- Charge storage electrolytic polarised 25V 1000uF capacitor (value may change, but 220 – 2200 is around what we want)
- High frequency tantalum 25V 10uF capacitor (35V units are expensive, as are 22uF)
- Ultra high frequency ceramic 0.1uF capacitor (larger units with similar frequency response would also be acceptable)
- 5V LDO (low drop out) voltage regulator
- Reverse voltage protection diode for the regulator in case of external capacitors discharging more quickly and/or to a lower level than internal ones (snubbing not required as this will not happen when things are actually running)
- High frequency tantalum 25V 10uF capacitor (35V units are expensive, as are 22uF)
- Ultra high frequency ceramic 0.1uF capacitor (larger units with similar frequency response would also be acceptable)
- Power feed and ground for CPU core

power_reg.sch

FreeEMS.org

File: power_reg2.sch

Sheet: /power regulator switched/

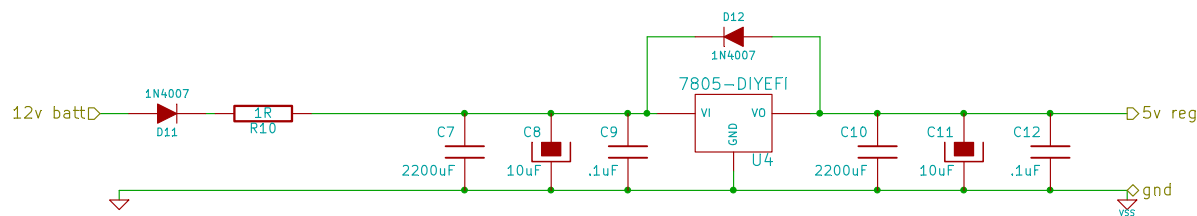
Title: DFH for freeEMS

Size: A Date: 11 sep 2011

Rev: A.21 P.02

KiCad E.D.A. eeschema (2011-07-08 BZR 3044)-stable

Id: 2/41



Starting from left and moving to the right we have in order :

- Power feed and ground from battery and/or block
- Reverse polarity hook up protection diode
- Current limiting resistor
- Zener over voltage clamping diode
- Charge storage electrolytic polarised 25V 1000uF capacitor (value may change, but 220 – 2200 is around what we want)
- High frequency tantalum 25V 10uF capacitor (35V units are expensive, as are 22uF)
- Ultra high frequency ceramic 0.1uF capacitor (larger units with similar frequency response would also be acceptable)
- 5V LDO (low drop out) voltage regulator
- Reverse voltage protection diode for the regulator in case of external capacitors discharging more quickly and/or to a lower level than internal ones (snubbing not required as this will not happen when things are actually running)
- High frequency tantalum 25V 10uF capacitor (35V units are expensive, as are 22uF)
- Ultra high frequency ceramic 0.1uF capacitor (larger units with similar frequency response would also be acceptable)
- Power feed and ground for CPU core

power_reg.sch

FreeEMS.org

File: power_reg1.sch

Sheet: /power regulator constant/

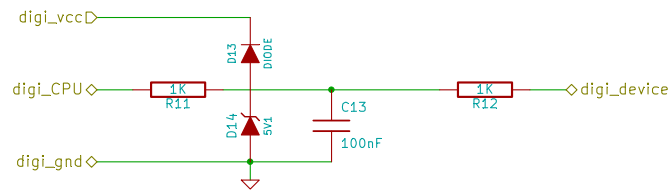
Title: DFH for freeEMS

Size: A Date: 11 sep 2011

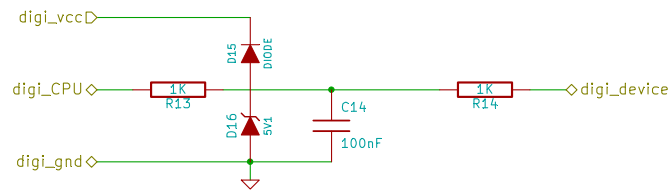
Rev: A.21 P.02

KiCad E.D.A. eeschema (2011-07-08 BZR 3044)-stable

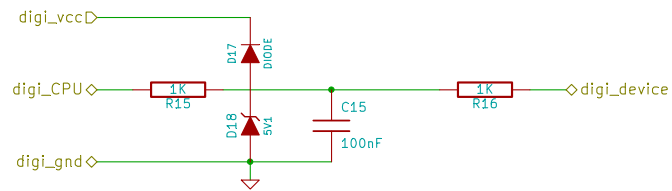
Id: 3/41



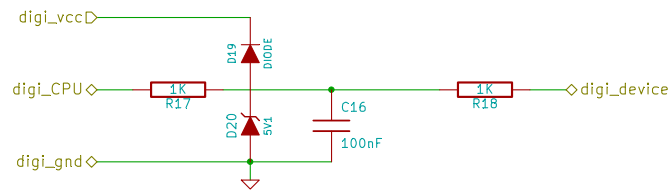
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Size: A4	Date: 11 sep 2011	Rev: A.21 P.02
KiCad E.D.A. eeschema (2011-07-08 BZR 3044)-stable		Id: 4/41



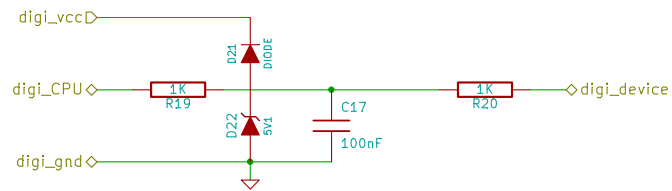
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Size: A4	Date: 11 sep 2011	Rev: A.21 P.02
KiCad E.D.A. eeschema (2011-07-08 BZR 3044)-stable		Id: 5/41



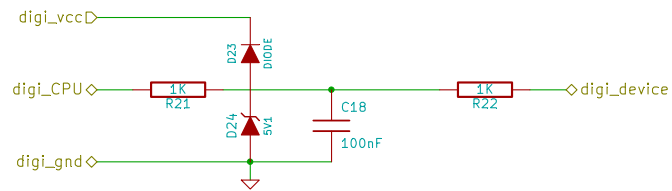
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KiCad E.D.A. eeschema (2011-07-08 BZR 3044)-stable		Id: 6/41



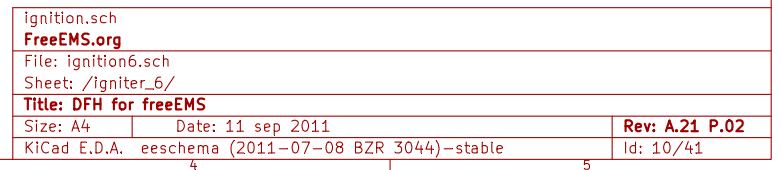
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KiCad E.D.A. eeschema (2011-07-08 BZR 3044)-stable		Id: 7/41

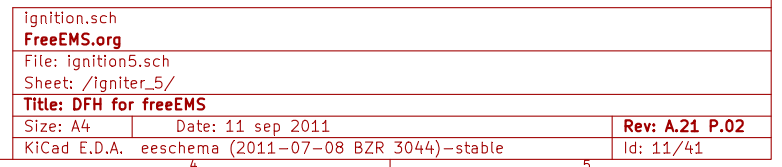


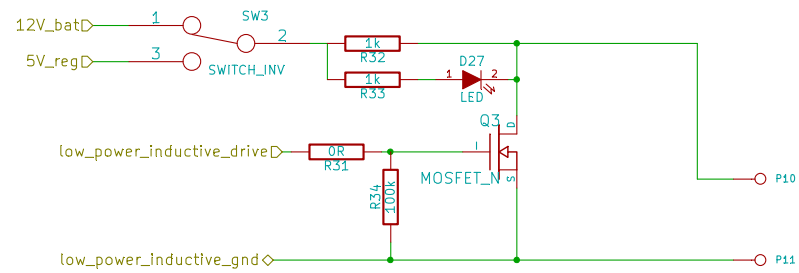
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Size: A4	Date: 11 sep 2011	Rev: A.21 P.02
KiCad E.D.A. eeschema (2011-07-08 BZR 3044)-stable		Id: 8/41



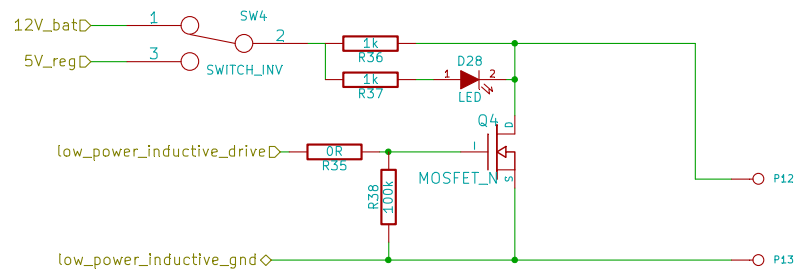
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Size: A4	Date: 11 sep 2011	Rev: A.21 P.02
KiCad E.D.A. eeschema (2011-07-08 BZR 3044)-stable		Id: 9/41



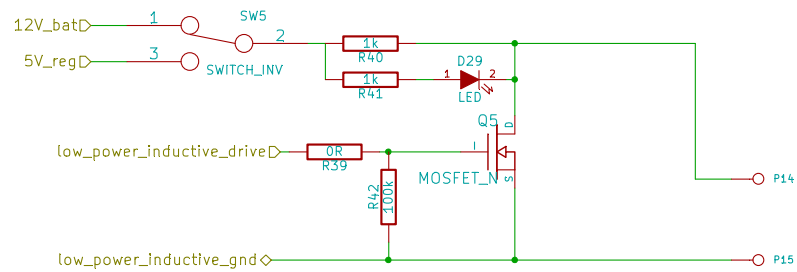




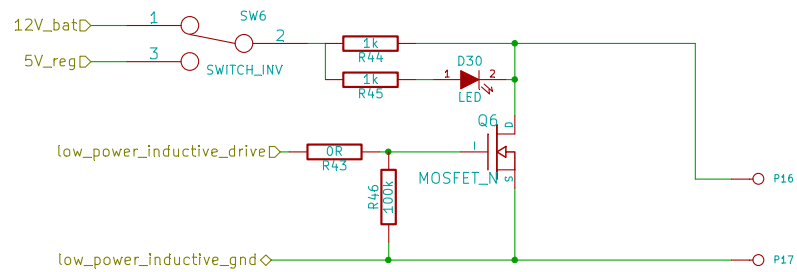
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Size: A4	Date: 11 sep 2011	Rev: A.21 P.02
KiCad E.D.A. eeschema (2011-07-08 BZR 3044)-stable		Id: 12/41



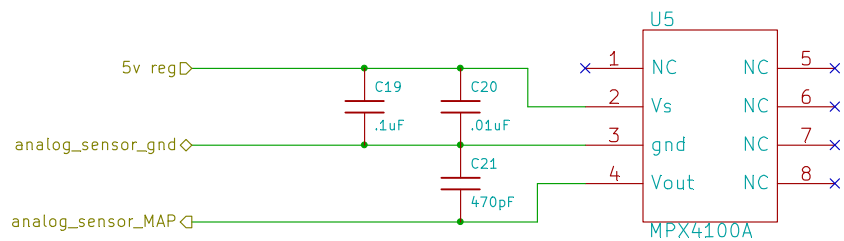
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FreeEMS.org		
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Title: DFH for freeEMS		
Size: A4	Date: 11 sep 2011	Rev: A.21 P.02
KiCad E.D.A.	eeschema (2011-07-08 BZR 3044)-stable	Id: 13/41



ignition.sch		
FreeEMS.org		
File: ignition2.sch		
Sheet: /Igniter_2/		
Title: DFH for freeEMS		
Size: A4	Date: 11 sep 2011	Rev: A.21 P.02
KiCad E.D.A. eeschema (2011-07-08 BZR 3044)-stable		Id: 14/41



ignition.sch		
FreeEMS.org		
File: ignition1.sch		
Sheet: /Igniter_1/		
Title: DFH for freeEMS		
Size: A4	Date: 11 sep 2011	Rev: A.21 P.02
KiCad E.D.A. eeschema (2011-07-08 BZR 3044)-stable		Id: 15/41



MAP_input.sch

FreeEMS.org

File: MAP_input2.sch

Sheet: /MAP_input_2/

Title: DFH for freeEMS

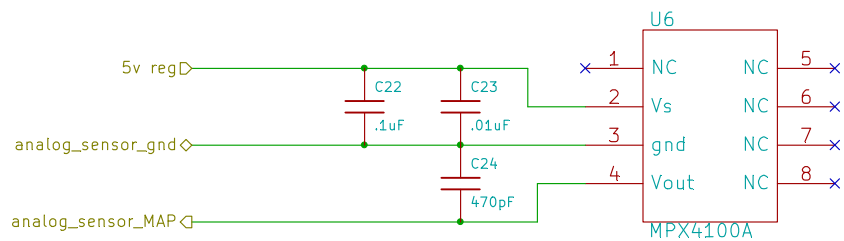
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Date: 11 sep 2011

Rev: A.21 P.02

KiCad E.D.A. eeschema (2011-07-08 BZR 3044)-stable

Id: 16/41



MAP_input.sch

FreeEMS.org

File: MAP_input1.sch

Sheet: /MAP_input_1/

Title: DFH for freeEMS

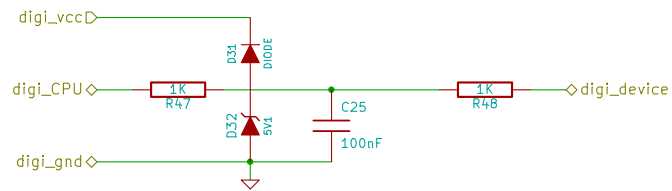
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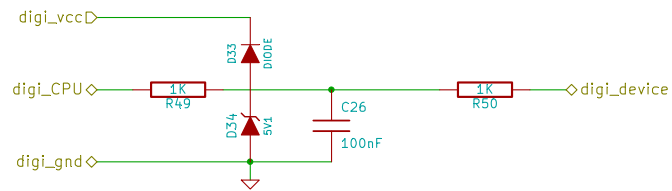
Rev: A.21 P.02

KiCad E.D.A. eeschema (2011-07-08 BZR 3044)-stable

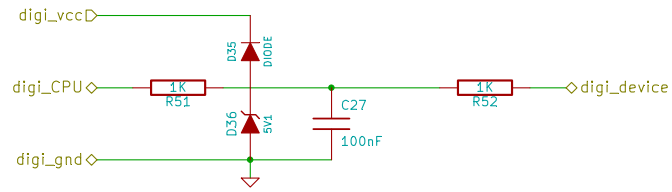
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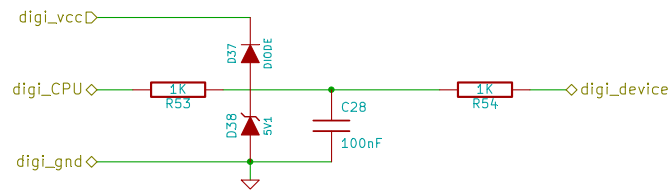
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KiCad E.D.A. eeschema (2011-07-08 BZR 3044)-stable		Id: 18/41



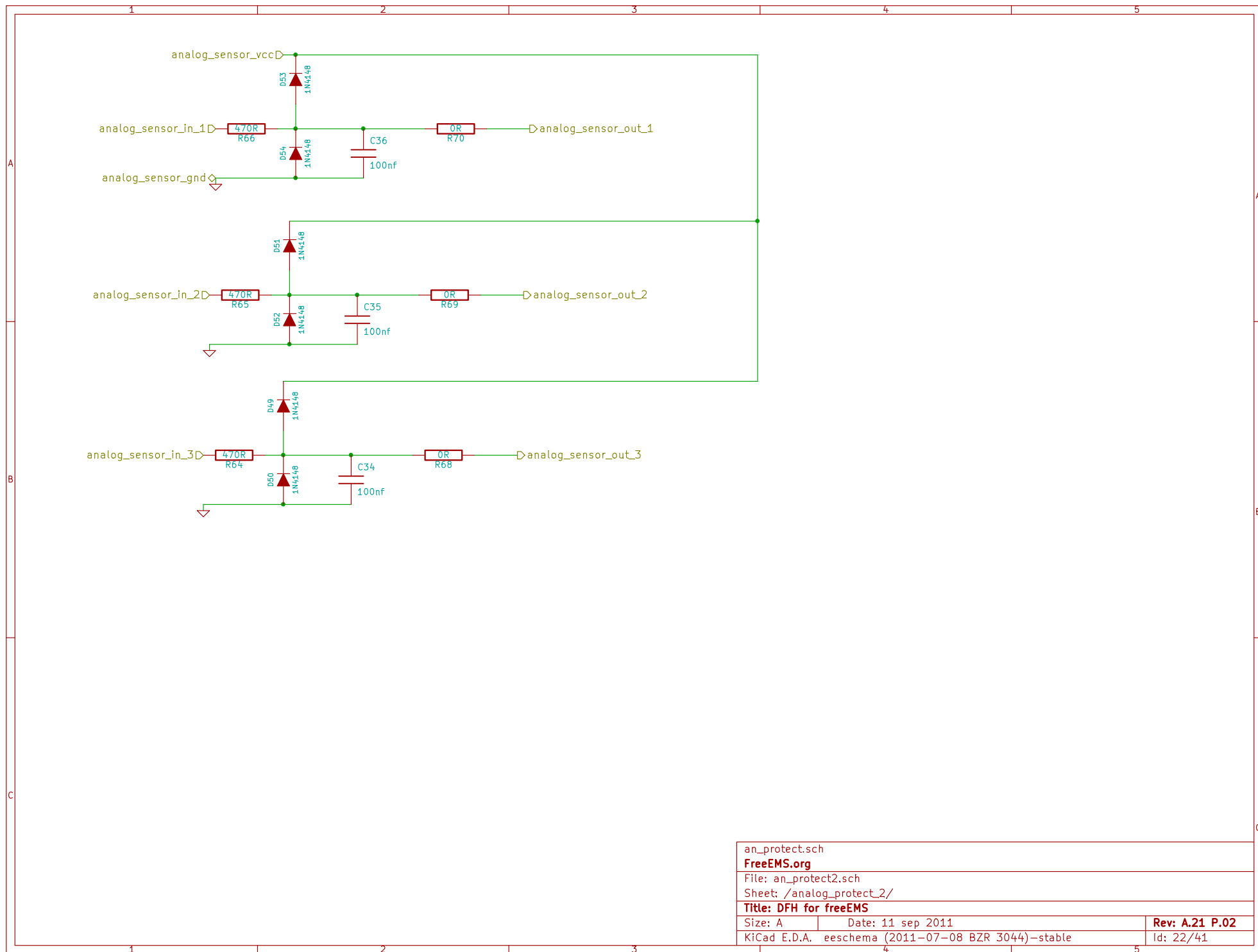
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KiCad E.D.A. eeschema (2011-07-08 BZR 3044)-stable		Id: 19/41

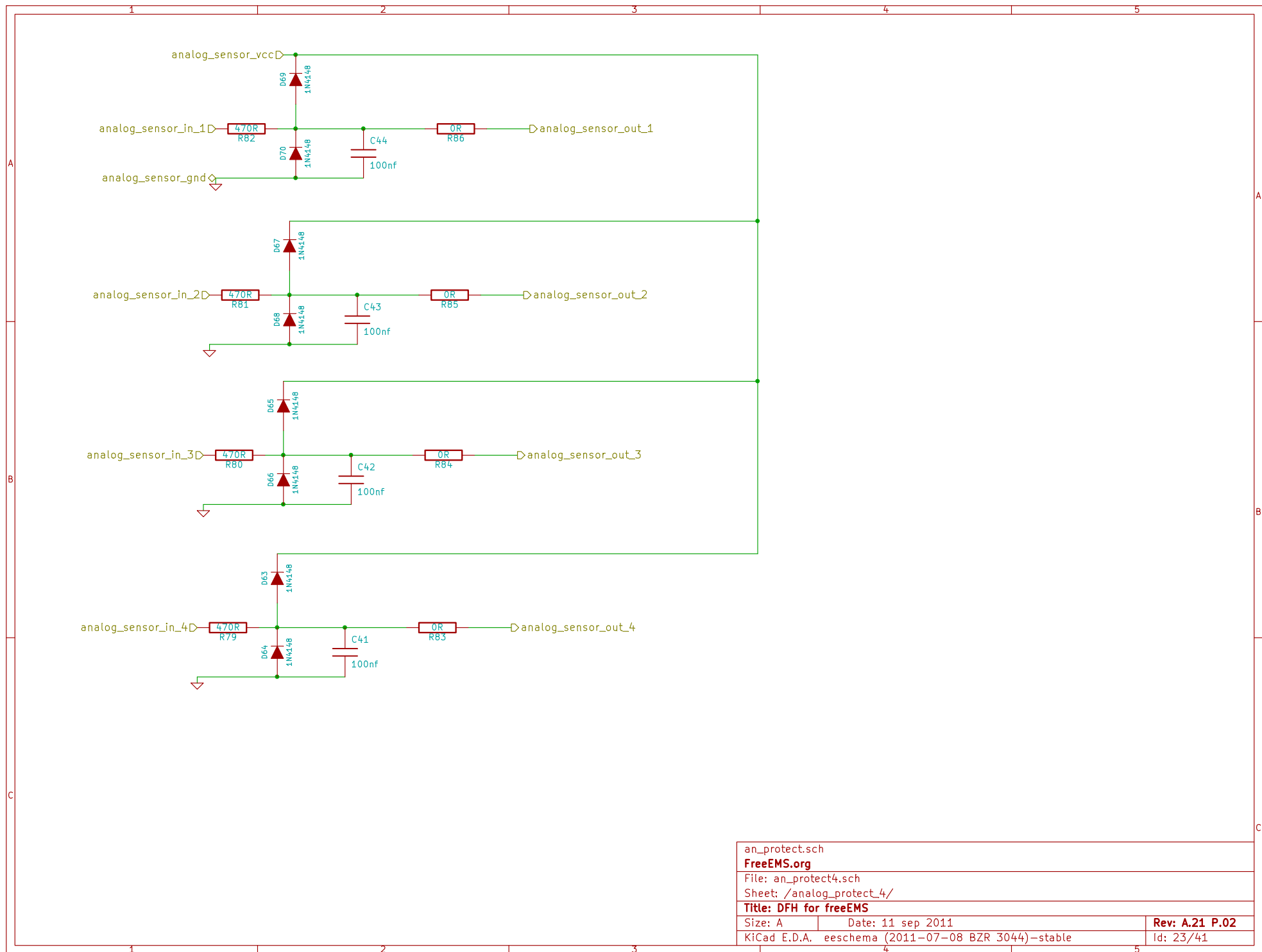


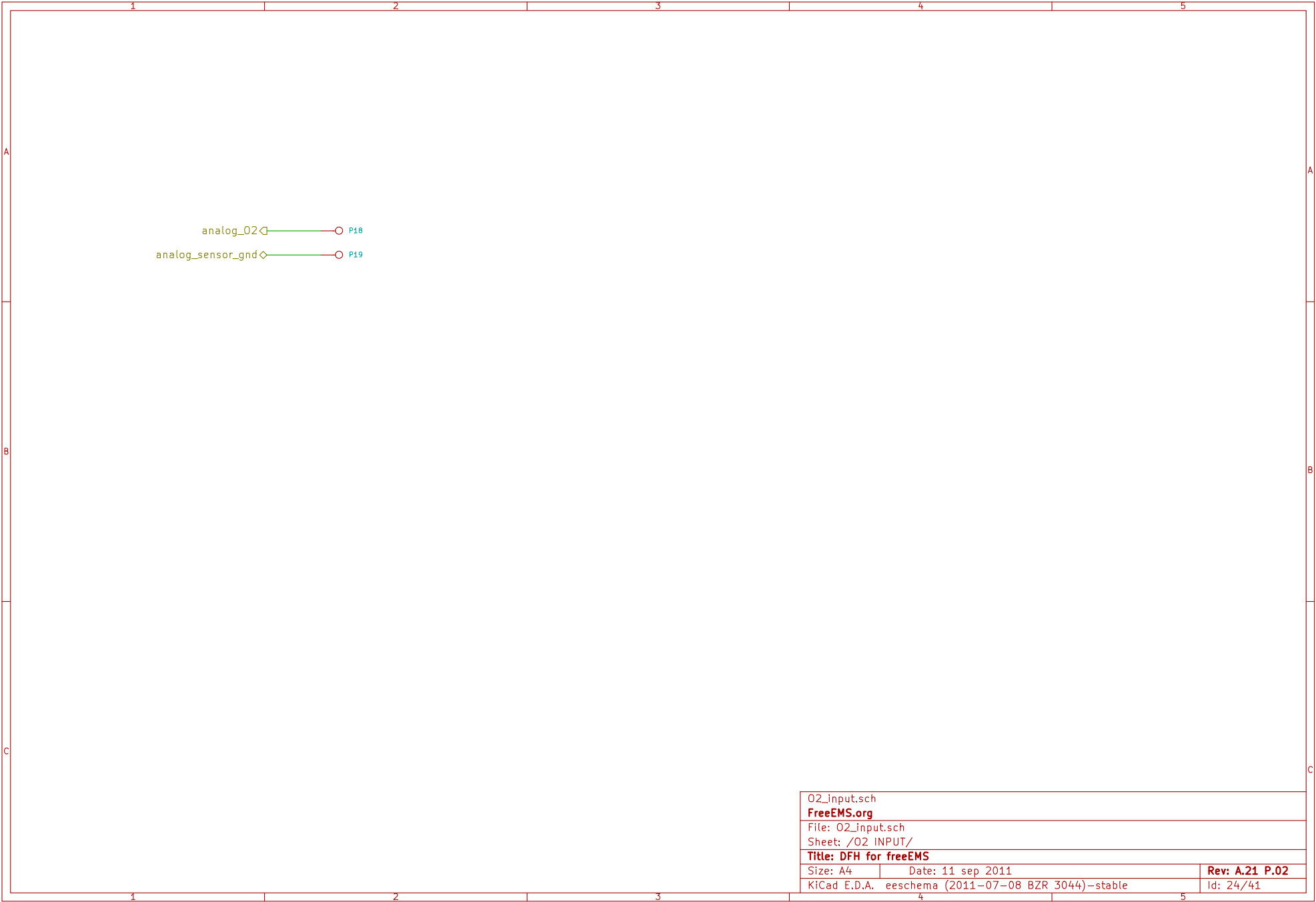
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Size: A4	Date: 11 sep 2011	Rev: A.21 P.02
KiCad E.D.A. eeschema (2011-07-08 BZR 3044)-stable		Id: 20/41

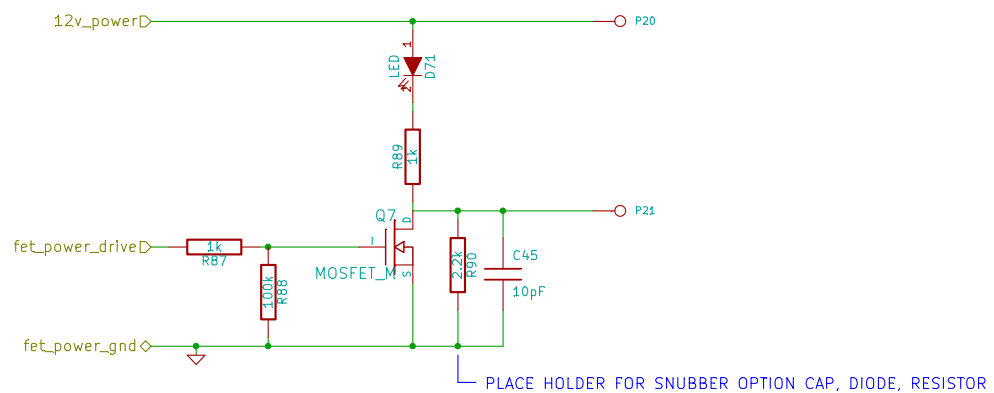


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Size: A4	Date: 11 sep 2011	Rev: A.21 P.02
KiCad E.D.A. eeschema (2011-07-08 BZR 3044)-stable		Id: 21/41

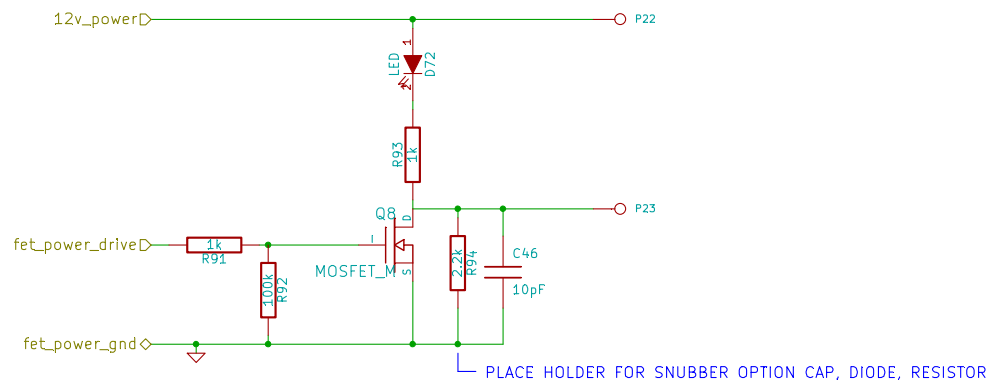




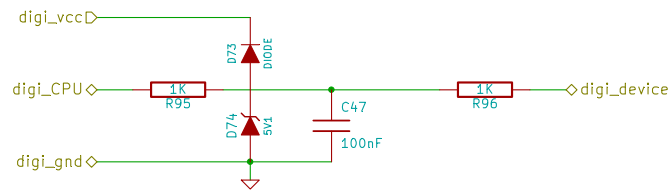




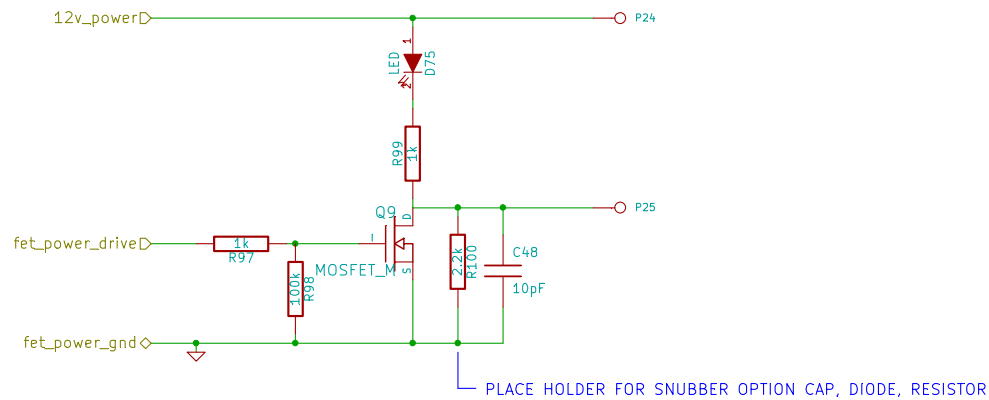
general_drive.sch		
FreeEMS.org		
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Size: A4	Date: 11 sep 2011	Rev: A.21 P.02
KiCad E.D.A. eeschema (2011-07-08 BZR 3044)-stable		Id: 25/41



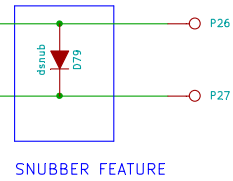
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Size: A4	Date: 11 sep 2011	Rev: A.21 P.02
KiCad E.D.A. eeschema (2011-07-08 BZR 3044)-stable		Id: 26/41



digi_protect.sch		
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Size: A4	Date: 11 sep 2011	Rev: A.21 P.02
KiCad E.D.A. eeschema (2011-07-08 BZR 3044)-stable		Id: 27/41



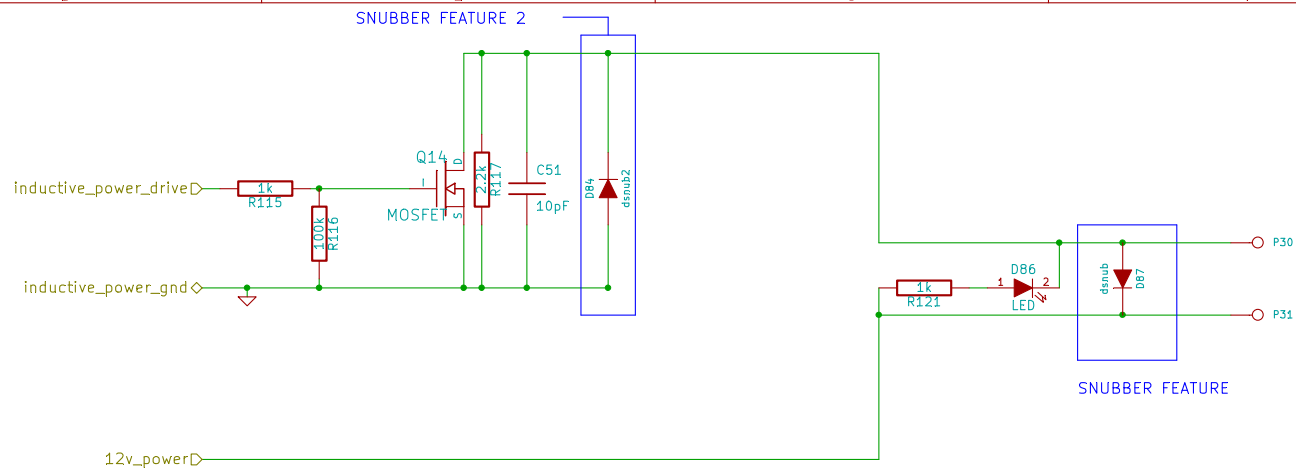
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Size: A4	Date: 11 sep 2011		Rev: A.21 P.02
KiCad E.D.A.	eeschema (2011-07-08 BZR 3044)-stable		Id: 28/41



YOU CAN POPULATE DIFFERENT FEATRUES WITH THIS CIRCUIT

injector_drive.sch		
FreeEMS.org		
File: injector_drive1.sch		
Sheet: /Injector_drive_1/		
Title: DFH for freeEMS		
Size: A4	Date: 11 sep 2011	Rev: A.21 P.02
KiCad E.D.A.	eeschema (2011-07-08 BZR 3044)-stable	Id: 29/41

injector_drive.sch		
FreeEMS.org		
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Size: A4	Date: 11 sep 2011	Rev: A.21 P.02
KiCad E.D.A.	eeschema (2011-07-08 BZR 3044)-stable	Id: 30/41

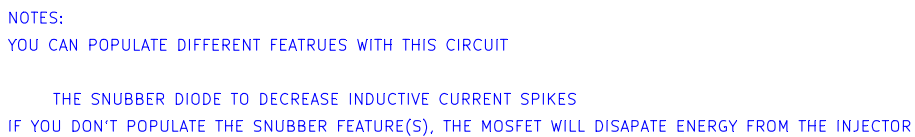


NOTES:

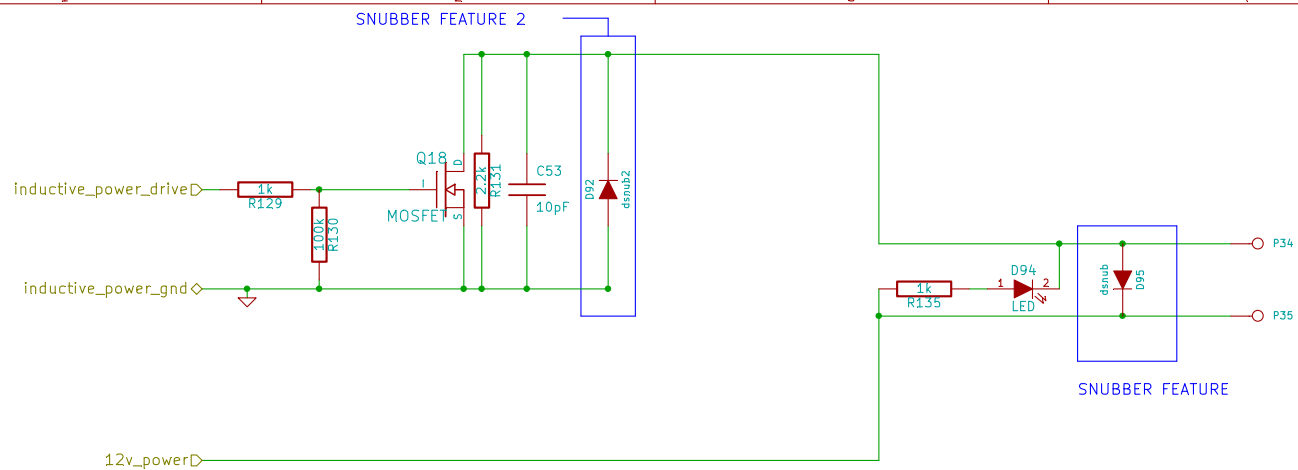
YOU CAN POPULATE DIFFERENT FEATRUES WITH THIS CIRCUIT

THE SNUBBER DIODE TO DECREASE INDUCTIVE CURRENT SPIKES
IF YOU DON'T POPULATE THE SNUBBER FEATURE(S), THE MOSFET WILL DISAPATE ENERGY FROM THE INJECTOR

injector_drive.sch		
FreeEMS.org		
File: injector_drive3.sch		
Sheet: /Injector_drive_3/		
Title: DFH for freeEMS		
Size: A4	Date: 11 sep 2011	Rev: A.21 P.02
KiCad E.D.A. eeschema (2011-07-08 BZR 3044)-stable		Id: 31/41



injector_drive.sch		
FreeEMS.org		
File: injector_drive4.sch		
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Title: DFH for freeEMS		
Size: A4	Date: 11 sep 2011	Rev: A.21 P.02
KiCad E.D.A.	eesschema (2011-07-08 BZR 3044)-stable	Id: 32/41



NOTES:

YOU CAN POPULATE DIFFERENT FEATRUES WITH THIS CIRCUIT

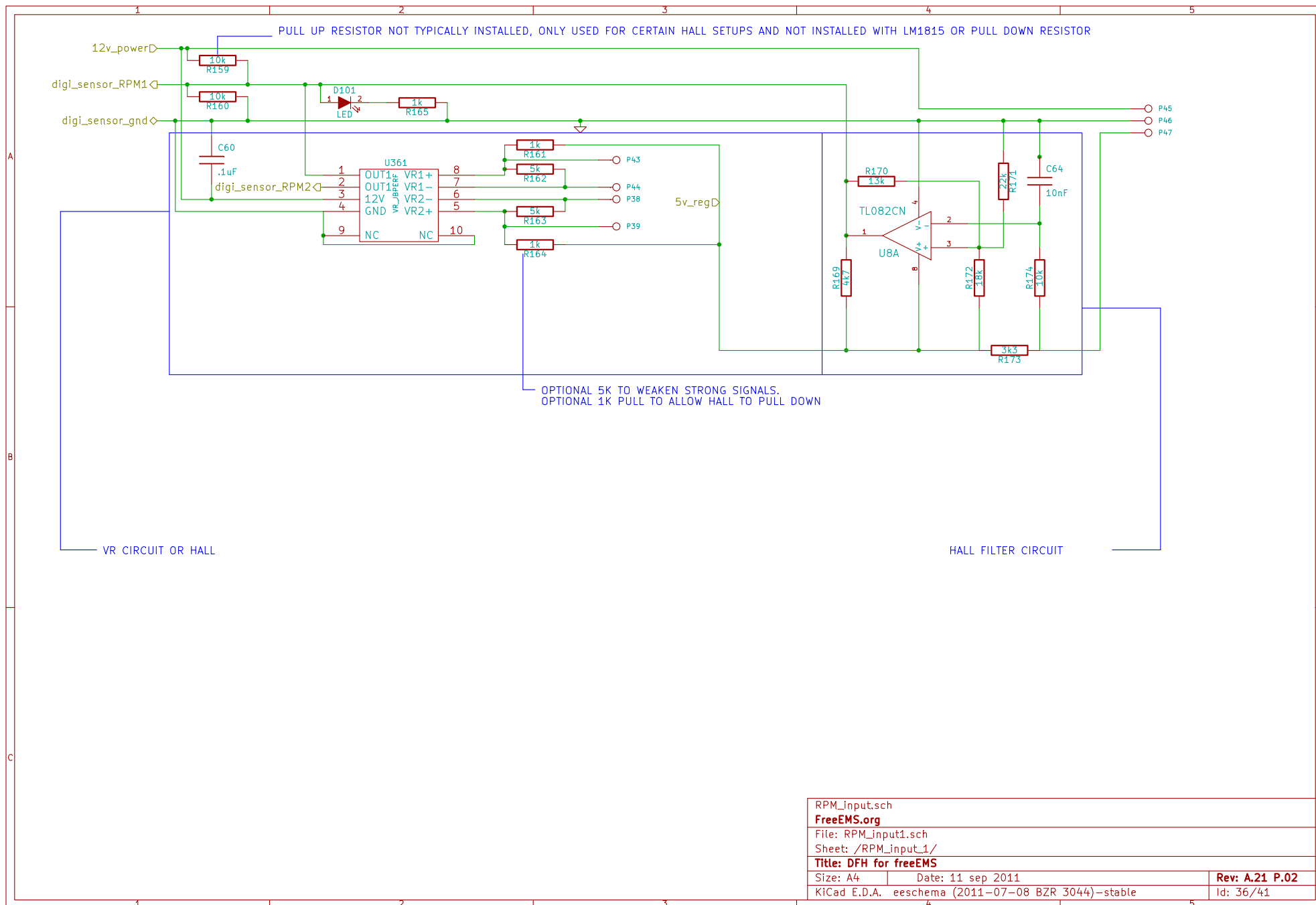
THE SNUBBER DIODE TO DECREASE INDUCTIVE CURRENT SPIKES
IF YOU DON'T POPULATE THE SNUBBER FEATURE(S), THE MOSFET WILL DISAPATE ENERGY FROM THE INJECTOR

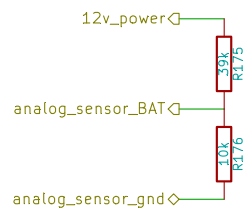
injector_drive.sch			
FreeEMS.org			
File: injector_drive5.sch			
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Title: DFH for freeEMS			
Size: A4	Date: 11 sep 2011	Rev: A.21 P.02	
KiCad E.D.A. eeschema (2011-07-08 BZR 3044)-stable			Id: 33/41



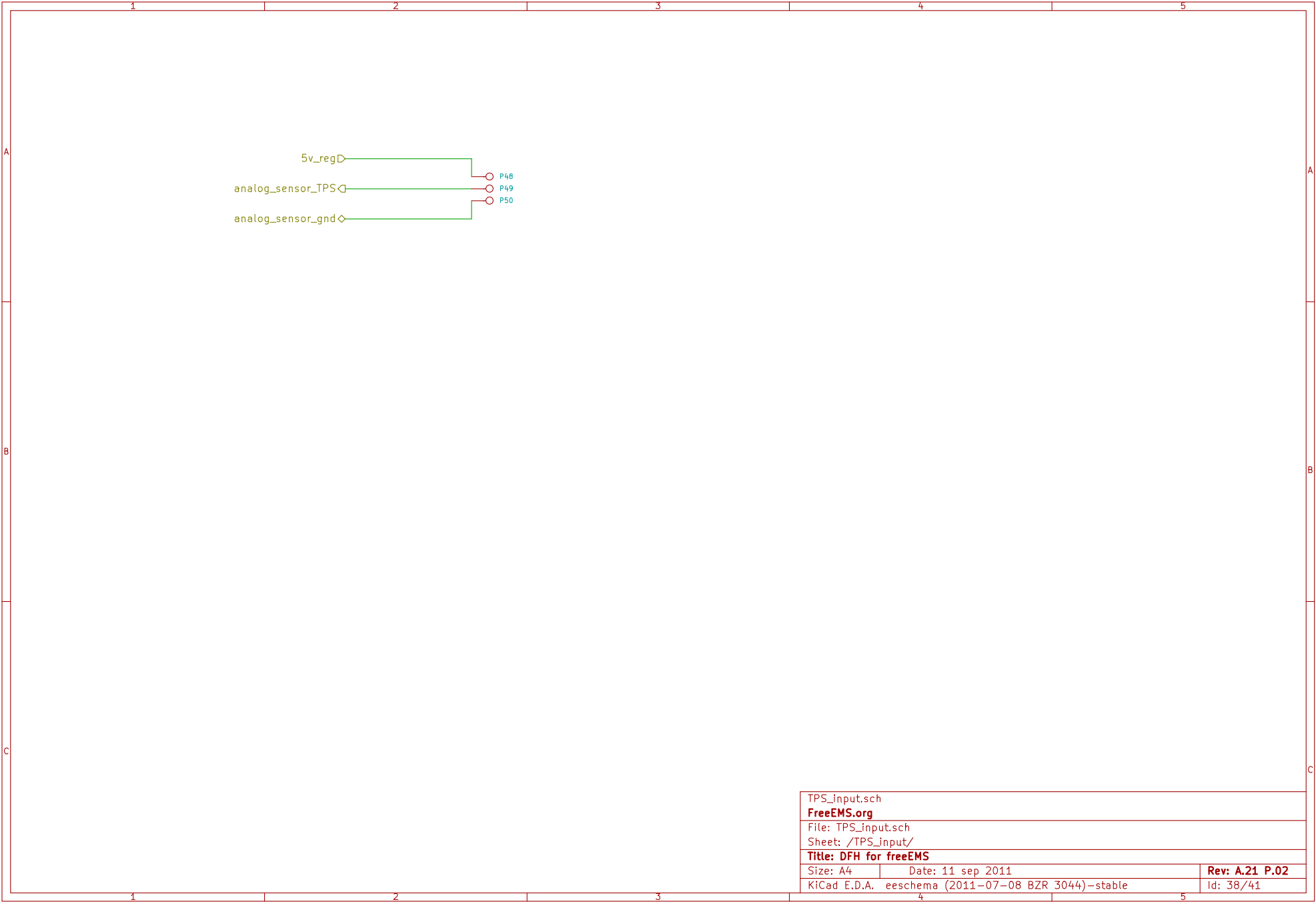
THE SNUBBER DIODE TO DECREASE INDUCTIVE CURRENT SPIKES
IF YOU DON'T POPULATE THE SNUBBER FEATURE(S), THE MOSFET WILL DISAPATE ENERGY FROM THE INJECTOR

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FreeEMS.org		
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Title: DFH for freeEMS		
Size: A4	Date: 11 sep 2011	Rev: A.21 P.02
KiCad E.D.A.	eesschema (2011-07-08 BZR 3044)-stable	Id: 34/41

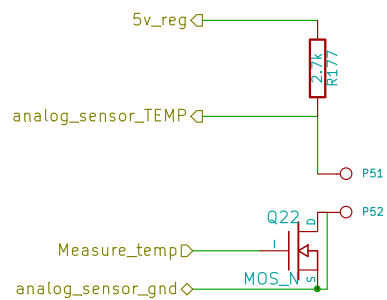




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FreeEMS.org		
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Title: DFH for freeEMS		
Size: A4	Date: 11 sep 2011	Rev: A.21 P.02
KiCad E.D.A. eeschema (2011-07-08 BZR 3044)-stable		Id: 37/41



TPS_input.sch		
FreeEMS.org		
File: TPS_input.sch		
Sheet: /TPS_input/		
Title: DFH for freeEMS		
Size: A4	Date: 11 sep 2011	Rev: A.21 P.02
KiCad E.D.A. eeschema (2011-07-08 BZR 3044)-stable		Id: 38/41



thermistor_resistor_input.sch

FreeEMS.org

File: thermistor_resistor_input2.sch

Sheet: /thermistor_input_2/

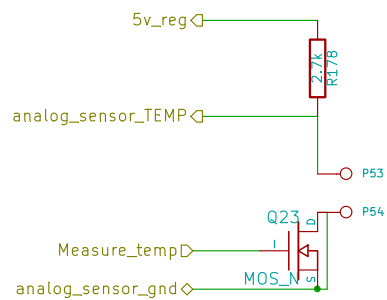
Title: DFH for freeEMS

Size: A Date: 11 sep 2011

KiCad E.D.A. eeschema (2011-07-08 BZR 3044)-stable

Rev: A.21 P.02

Id: 39/41



thermistor_resistor_input.sch

FreeEMS.org

File: thermistor_resistor_input1.sch

Sheet: /thermistor_input1/

Title: DFH for freeEMS

Size: A Date: 11 sep 2011

KiCad E.D.A. eeschema (2011-07-08 BZR 3044)-stable

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Id: 40/41

