Main Control Board

P5

Power Supply

P1

PWM_Solenoid1 — PWM_In

Shunt_Sig1 — Shunt_Out

Solenoid Driver

P2

PWM_Solenoid2 — PWM_In

Shunt_Sig2 — Shunt_Out

Solenoid Driver

P3

PWM_Solenoid3 — PWM_In

Shunt_Sig3 — Shunt_Out

Solenoid Driver

RPi_Input

In1 — RPi_In1

In2 — RPi_In2

Input signal from RPi

T_Sensor

Temp1 — Temp_Sense1

Temp2 — Temp_Sense2

Temperature Sensors

P6 Button L — B — PJ0

P7 Button R — B — PJ1

GND-Connection for buttons — PH1

PK0 — RPi_In1

PK1 — RPi_In2

Here, a Microcontroller, like the Arduino Mega should be

PWM_Solenoid3	PH3
PWM_Solenoid2	PH4
PWM_Solenoid1	PH5
LDR_COL1	PB7
LDR_COL2	PB6
LDR_COL3	PB5
LDR_COL4	PB4
Temp_Sense1	PK3
Temp_Sense2	PK4
Current_Sig3	PK5
Current_Sig2	PK6
Current_Sig1	PK7
LDR_ROW1	PF0
LDR_ROW2	PF1
LDR_ROW3	PF2

P4

Shunt_Sig1 — A_In1 — V_Out1 — Current_Sig1

Shunt_Sig2 — A_In2 — V_Out2 — Current_Sig2

Shunt_Sig3 — A_In3 — V_Out3 — Current_Sig3

A_In4 — V_Out4

R1 10k

Current_Sensing

0

Pull down resistor to set input to a defined level, as 4th channel is unused

LDR_COL1 LDR_COL2 LDR_COL3 LDR_COL4

J14

COL1 COL2 COL3 COL4

ROW1 — LDR_ROW1

ROW2 — LDR_ROW2

ROW3 — LDR_ROW3

LDR Matrix

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3603 Kongsberg
Norway

Title: Main Control Board		
Size: A4	Document Number: 1	Rev: JM
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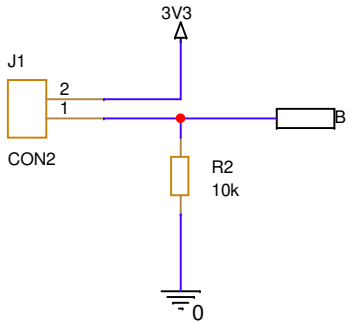

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Title
Main Control Board - Button Inputs

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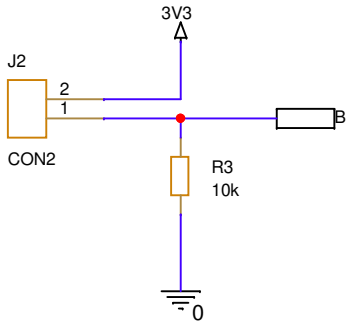

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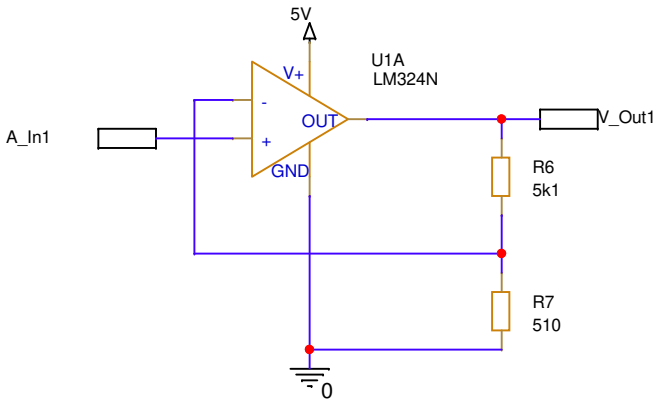
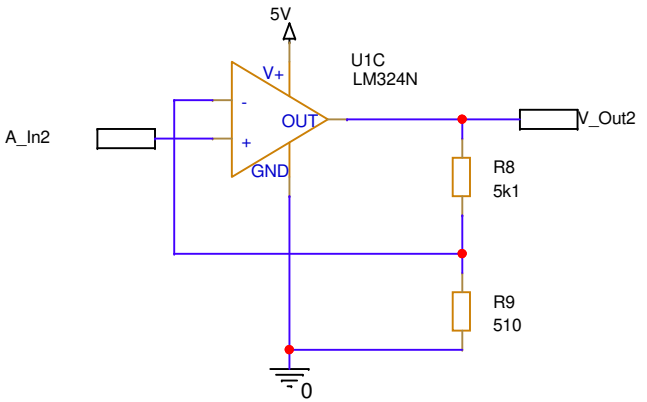
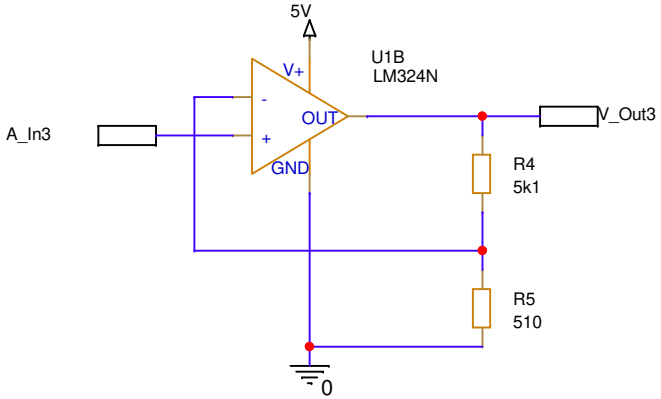
Title
Main Control Board - Button Inputs

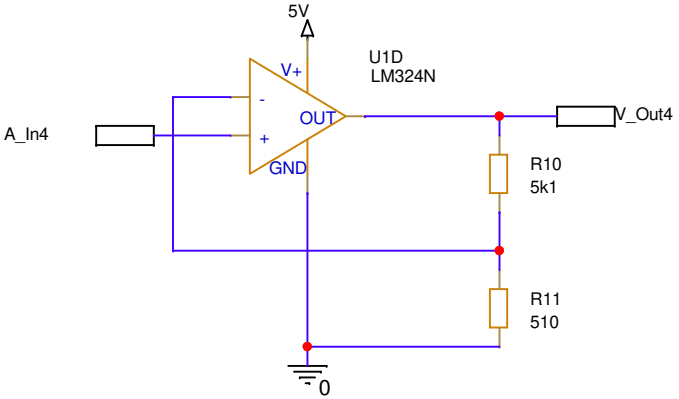
Size	Document Number	Rev
A4	1	JM

Date:	Sheet	of
Monday, November 29, 2021	3	15









gain calculation:

at 2.5A, 0.1Ohm Resisotr == 0.25 V @ 2.5A

gain of 11 is desirable:
a = 1 + R2/R1
picking R2 = 10k
R1 = R2 / (a - 1) = 1k

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Title
Main Control Board - Current Sensing

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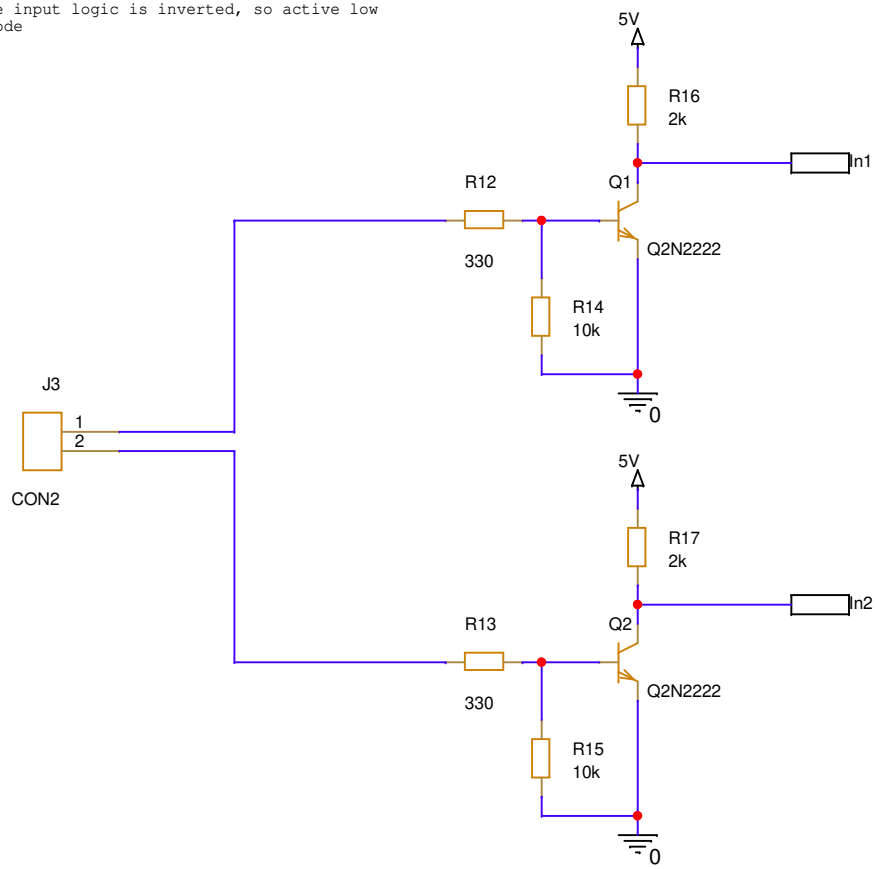
This Transistor circuit is required, as the 3.3V from the
RPi are not enough to set the input pin to a high level.

Threshold is 0.7 * VCC = 3.5V

With this circuit, the input logic is inverted, so active low
Is taken care of in code



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Title: SG Amplifier		
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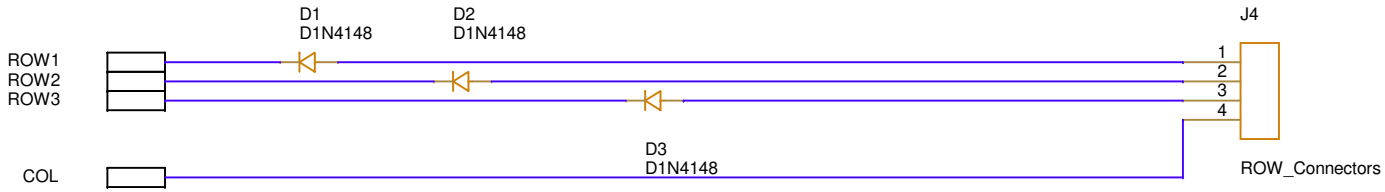

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Title: Main Control Board - LDR Matrix unit		
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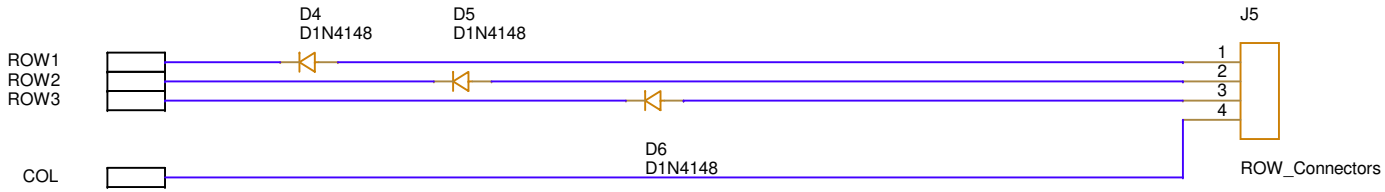

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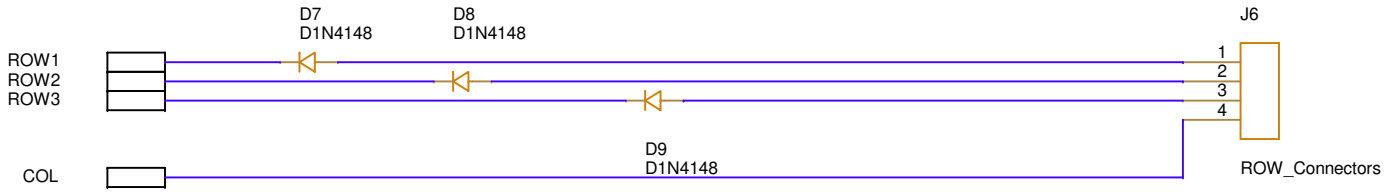

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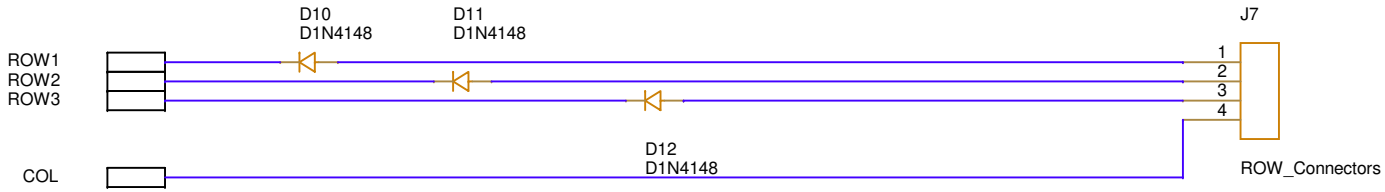

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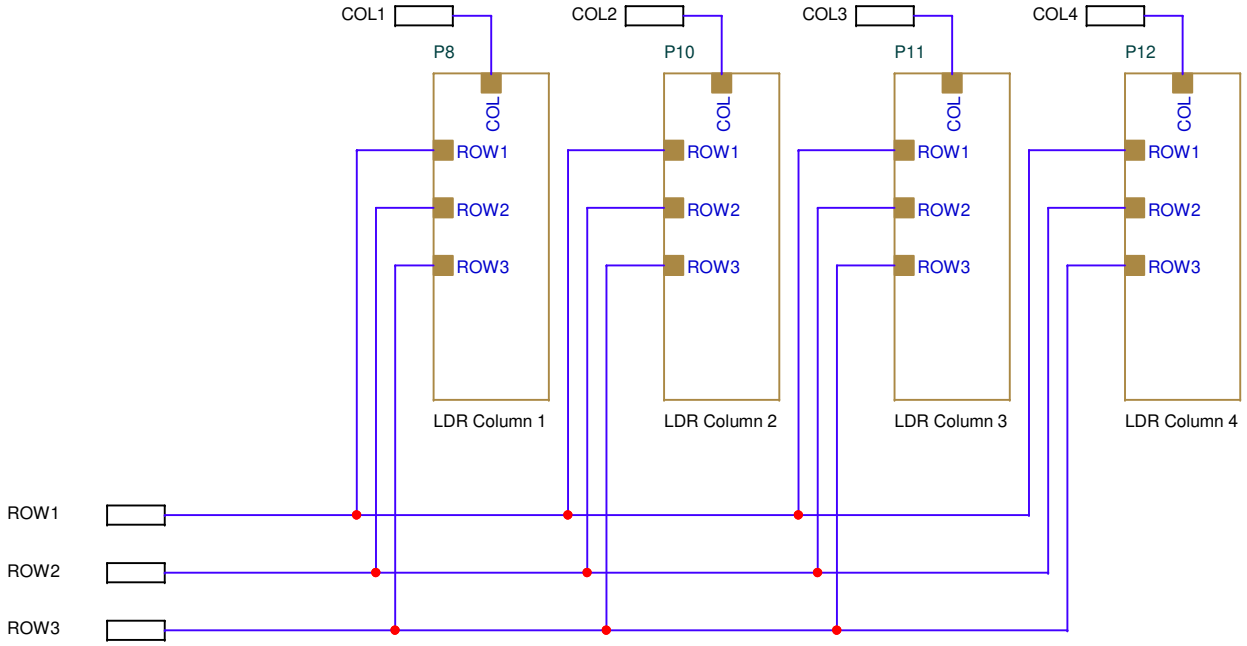

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Title: Main Control Board - LDR Matrix		
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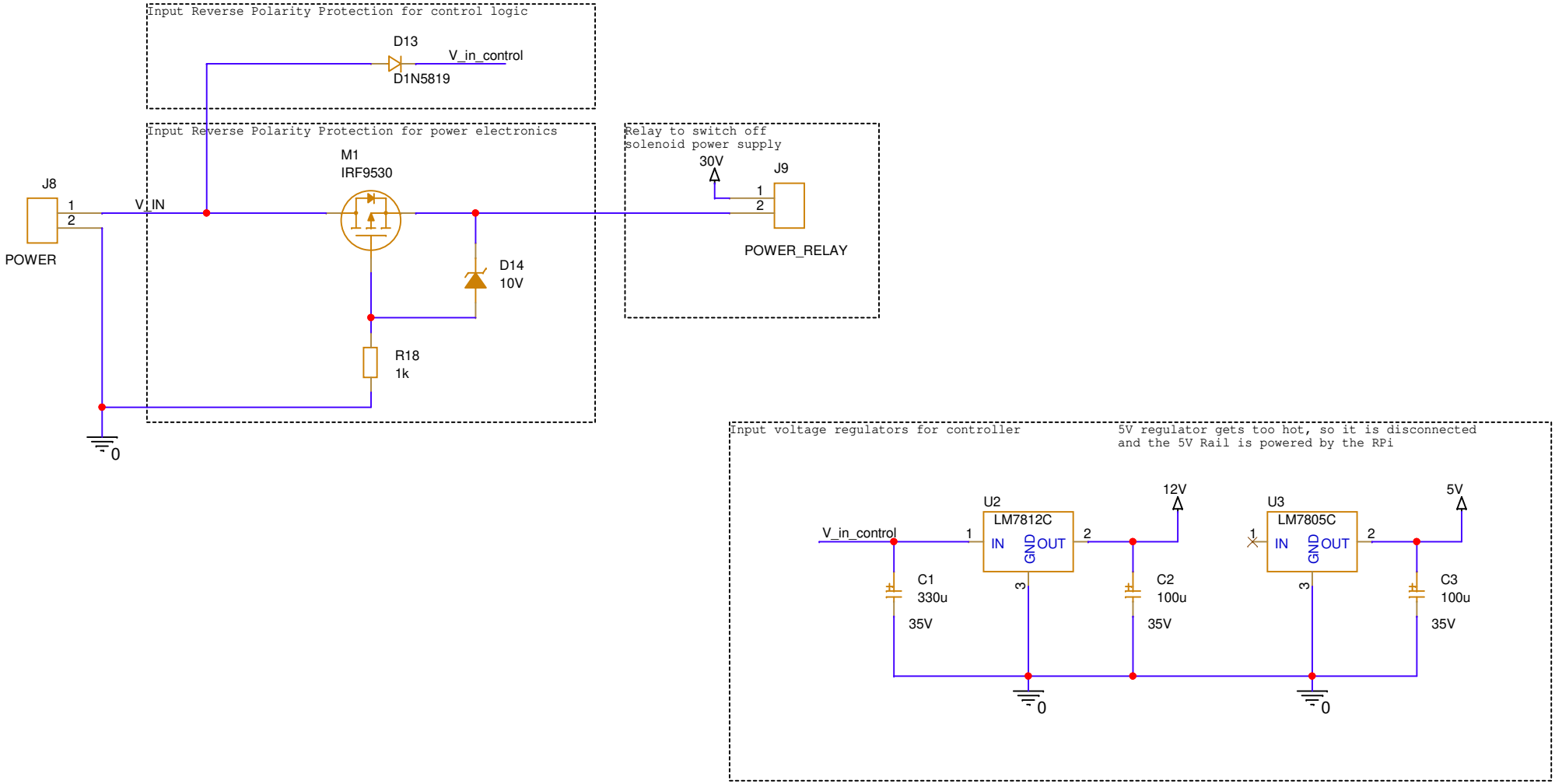

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Title: Main Control Board - Power Supply		
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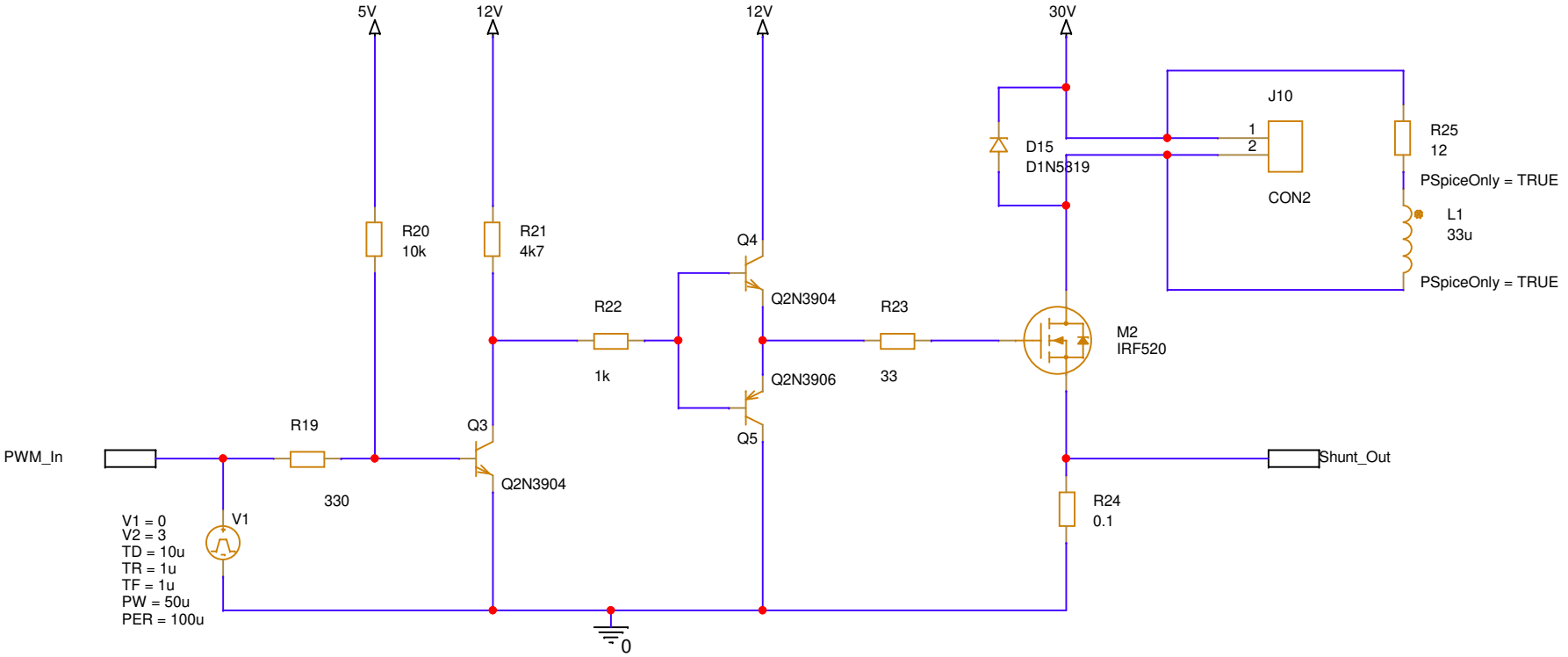
2N3904
hFE = 100 --> I_B = 2 mA

R_Bmax = 12 V / 2 mA = 6k



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Title: Main Control Board - Solenoid Stage		
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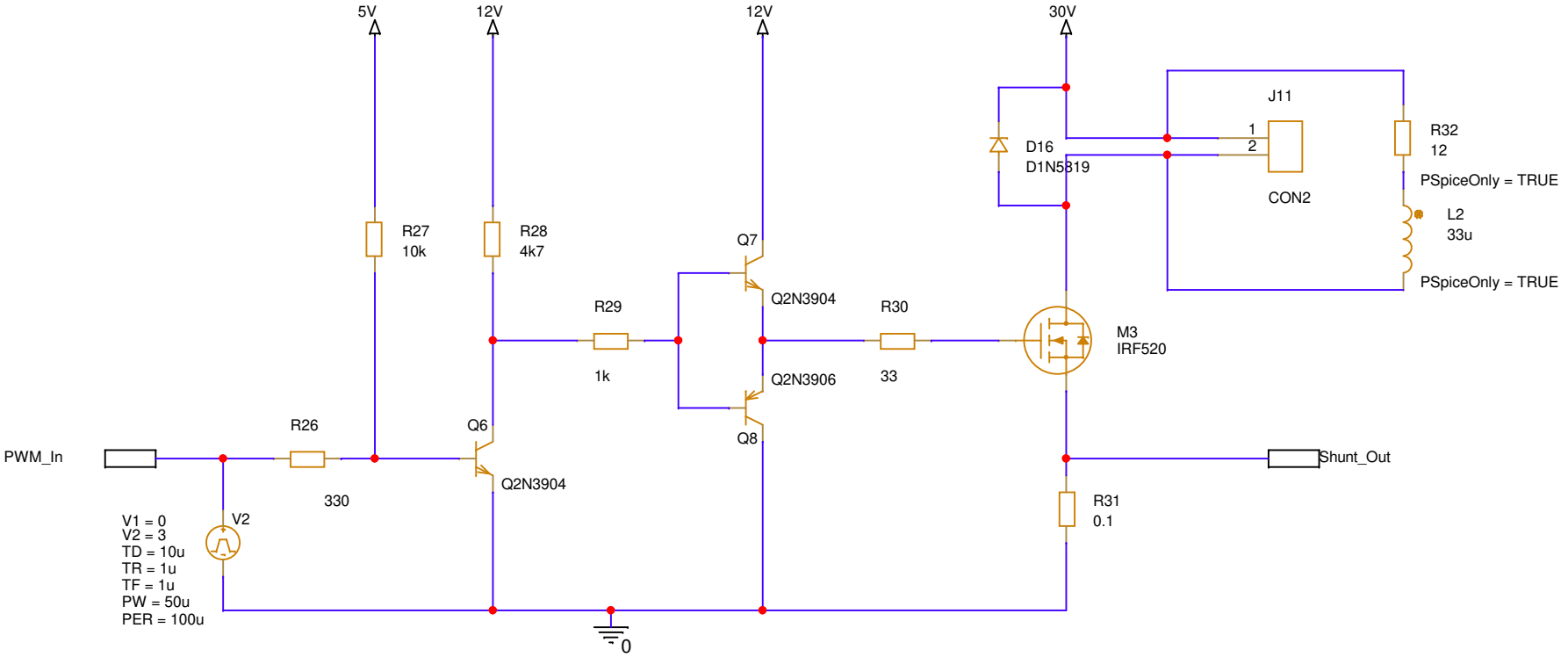
2N3904
hFE = 100 --> I_B = 2 mA

R_Bmax = 12 V / 2 mA = 6k



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Title: Main Control Board - Solenoid Stage		
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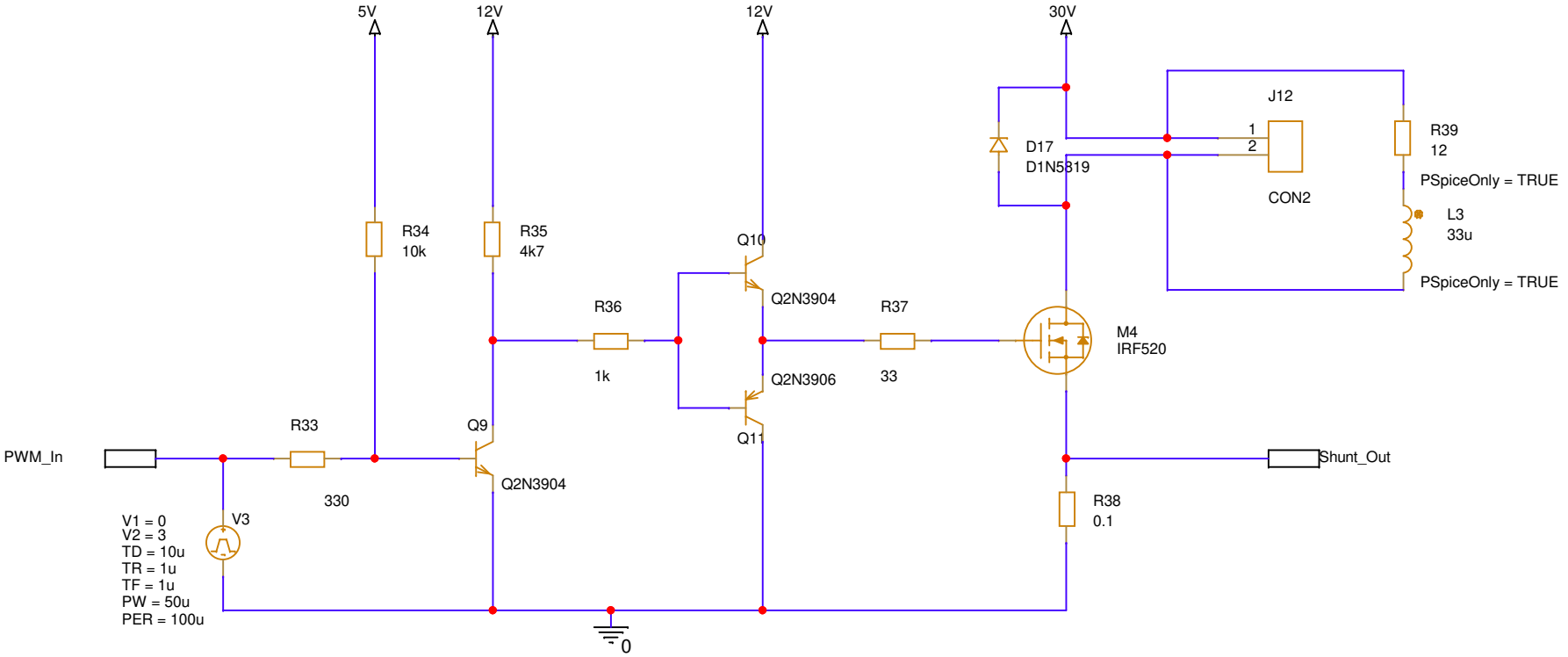
2N3904
hFE = 100 --> I_B = 2 mA

R_Bmax = 12 V / 2 mA = 6k



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Title: Main Control Board - Solenoid Stage		
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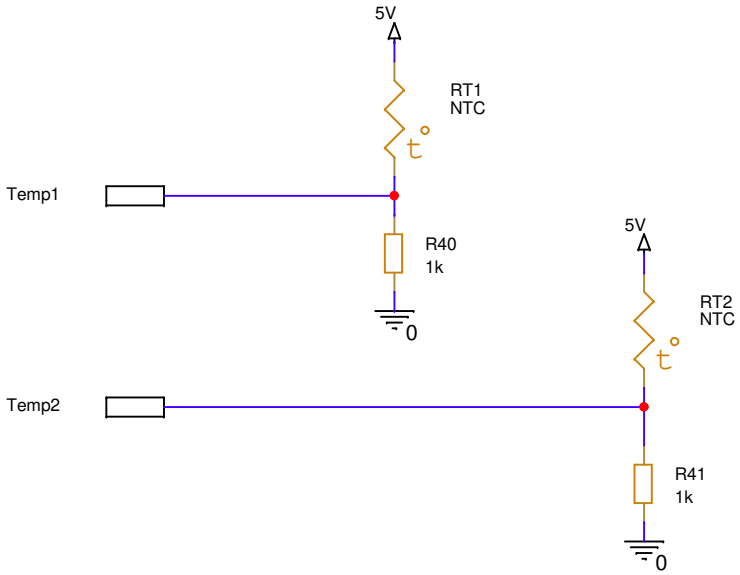

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Title: Main Control Board - Temperature Sensors		
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