



Projecte EDD-Llums

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Jordi Godàs Mancha

Eines de Disseny
2024/2025

Diagrama de blocs



De què tracta el projecte?

Disseny del sistema de control d'il·luminació d'un cotxe mitjançant un microcontrolador.

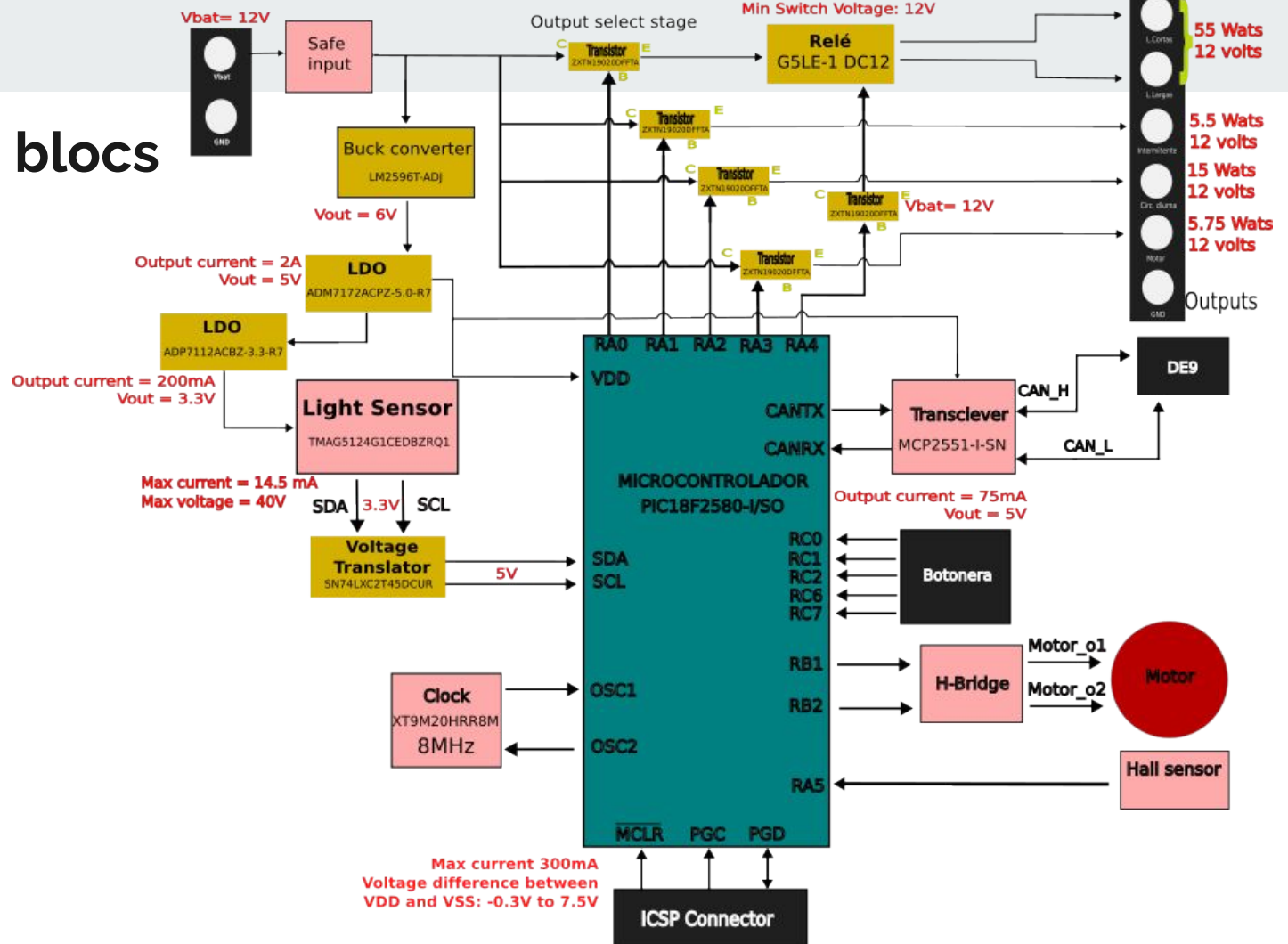


Requisits del projecte

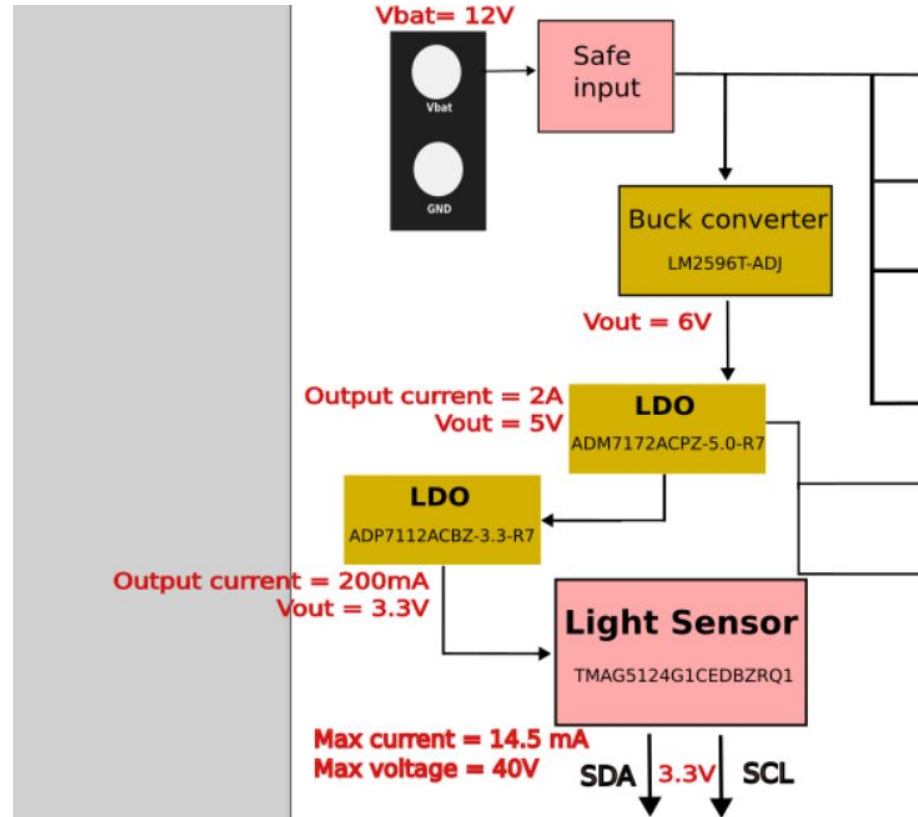
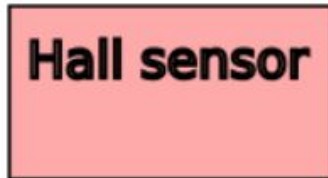
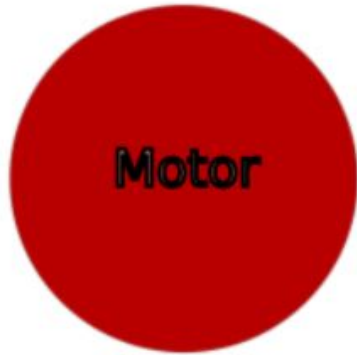
Parts clau del diagrama:

- Llums de carretera.
- Llums d'encreuament.
- Llums de circulació diürna.
- Intermitents
- Motor escombreta neteja-fars.
- Sensor digital de llum, per activar les llums.

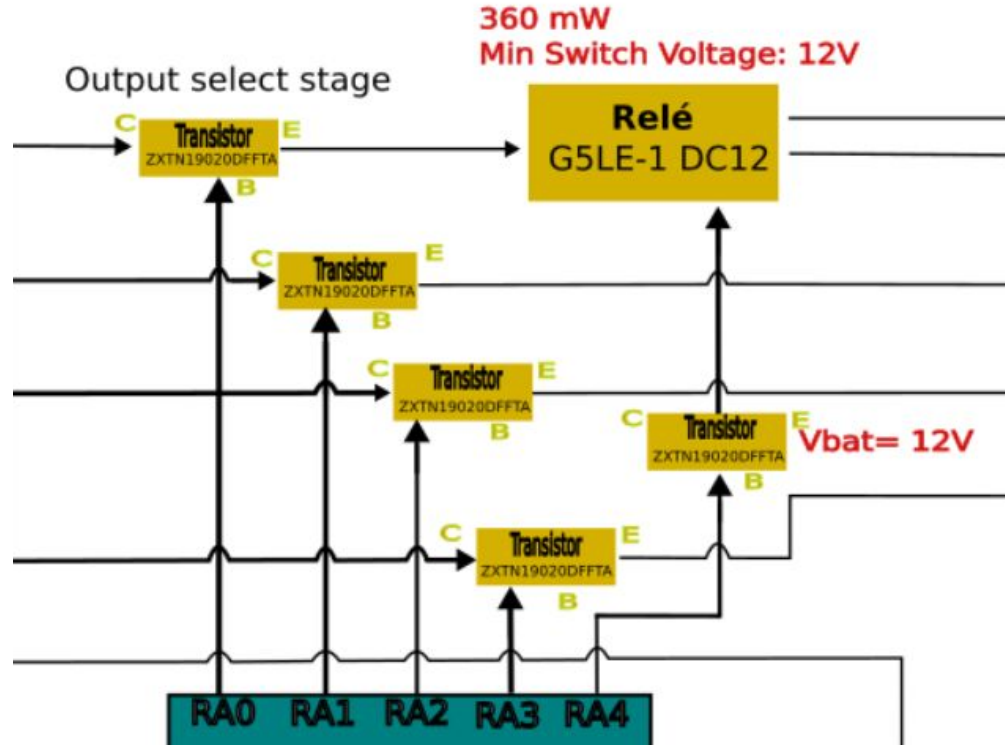
Diagrama de blocs



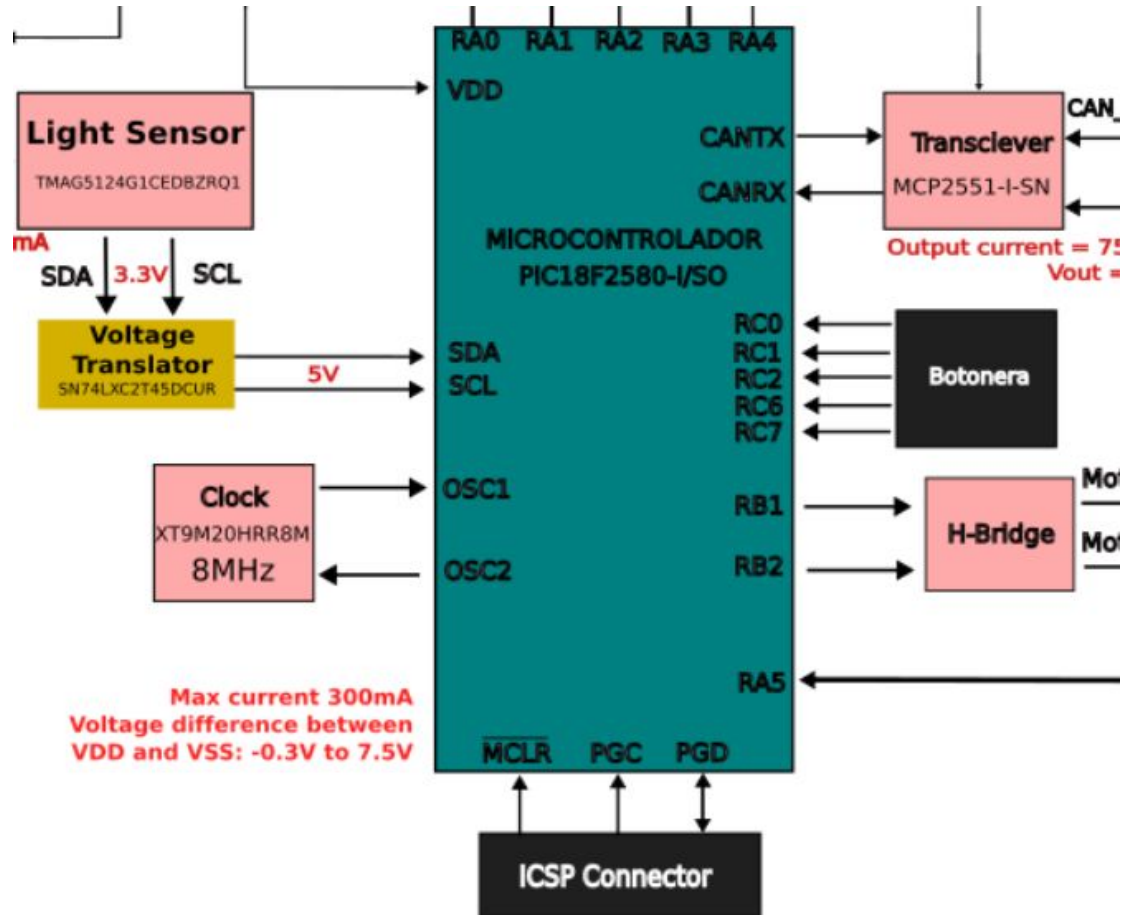
Inputs



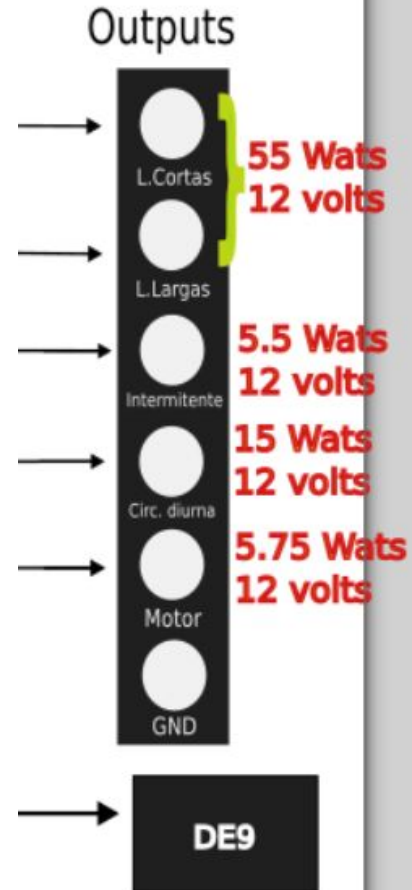
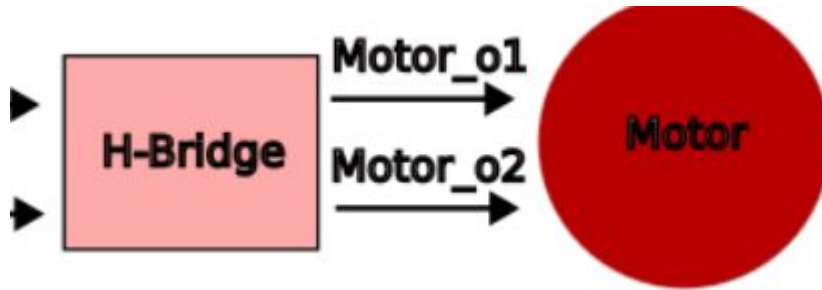
Output selection stage



Microcontrolador



Outputs



Esquemàtic

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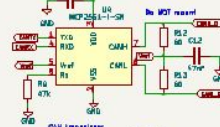
Pin diagram of PIC18F2550-1/SO showing pin numbers 1-40 and their functions. The diagram is divided into two columns of pins. Pin 1 is GND, Pin 2 is RA0/AN0, Pin 3 is RA1/AN1, Pin 4 is RA2/AN2/INT-, Pin 5 is RA3/AN3/INT+, Pin 6 is RA4/AN4, Pin 7 is RA5/AN5/VSS, Pin 8 is VSS, Pin 9 is CS0/CU0/INT2, Pin 10 is CS1/CU1/INT3, Pin 11 is CS2/CU2/INT4, Pin 12 is CS3/CU3/INT5, Pin 13 is CS4/CU4/INT6, Pin 14 is CS5/CU5/INT7, Pin 15 is CS6/CU6/INT8, Pin 16 is CS7/CU7/INT9, Pin 17 is CS8/CU8/INT10, Pin 18 is CS9/CU9/INT11, Pin 19 is CS10/CU10/INT12, Pin 20 is CS11/CU11/INT13, Pin 21 is CS12/CU12/INT14, Pin 22 is CS13/CU13/INT15, Pin 23 is CS14/CU14/INT16, Pin 24 is CS15/CU15/INT17, Pin 25 is CS16/CU16/INT18, Pin 26 is CS17/CU17/INT19, Pin 27 is CS18/CU18/INT20, Pin 28 is CS19/CU19/INT21, Pin 29 is CS20/CU20/INT22, Pin 30 is CS21/CU21/INT23, Pin 31 is CS22/CU22/INT24, Pin 32 is CS23/CU23/INT25, Pin 33 is CS24/CU24/INT26, Pin 34 is CS25/CU25/INT27, Pin 35 is CS26/CU26/INT28, Pin 36 is CS27/CU27/INT29, Pin 37 is CS28/CU28/INT30, Pin 38 is CS29/CU29/INT31, Pin 39 is CS30/CU30/INT32, Pin 40 is CS31/CU31/INT33.

Maximum current is 100 mA @ 5V = 25 mA
 Maximum current is 100 mA @ 200 mA
 Maximum current due to PIC = 300 mA
 Maximum current PIC 100 = 350 mA
 Voltage difference between VDD and VSS = 4.3V to 7.5V

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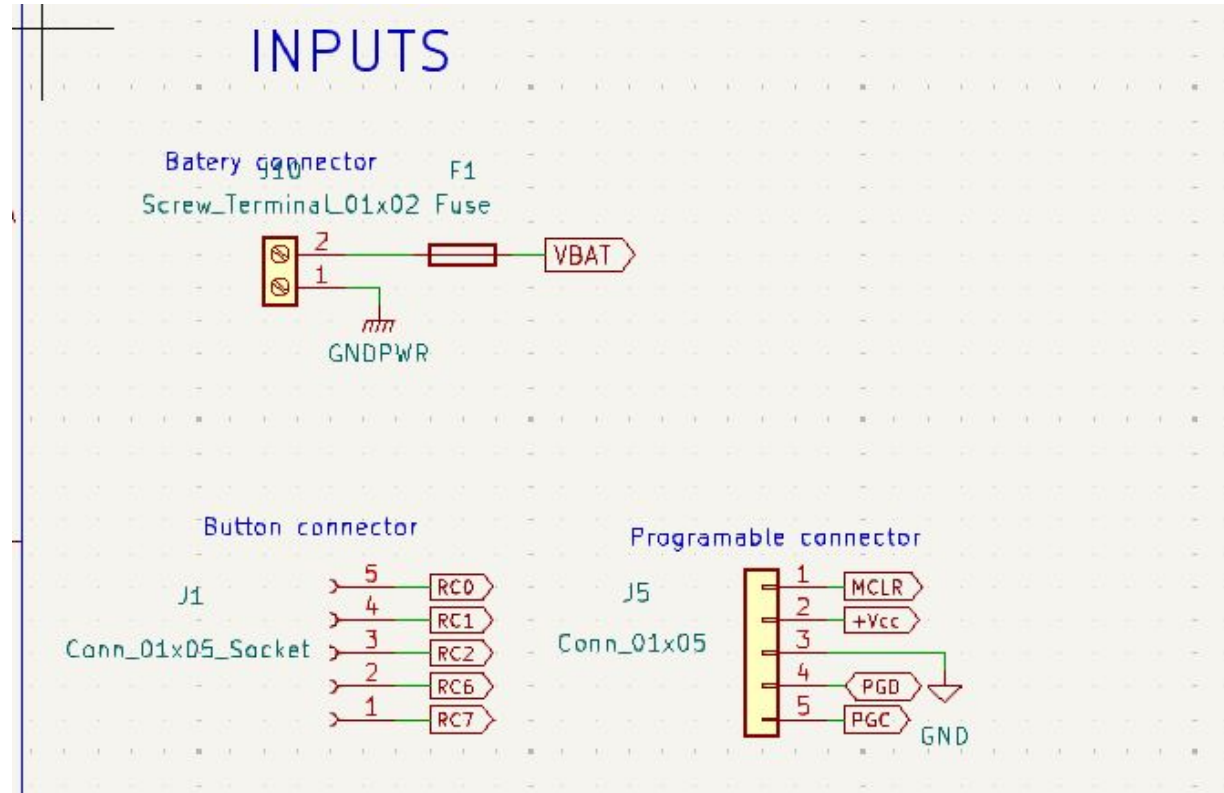
For "A" turn reader, turn on Motor_{1nd}, turn off Motor_{2d}
 For "B" turn reader, turn on Motor_{2d}, turn off Motor_{1st}
 For turn off the motor, turn off Motor_{1st} and Motor_{1nd}

for sensing if we're on TX or RX mode



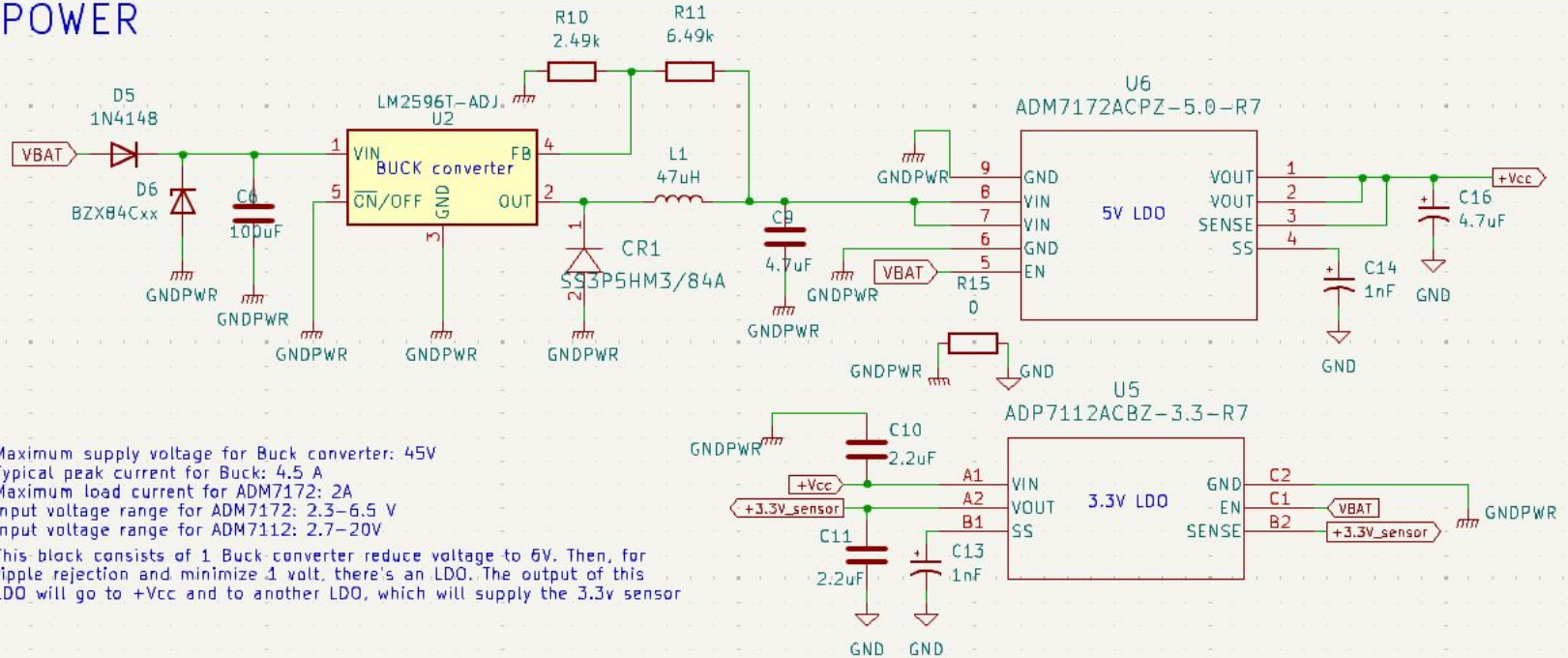
Jordi Godàs i Max Pérez		
Sheet: /		
File: 01J05_Llums_GodàsJordiPérezMax.Vicad_sch		
Title: Projecte Eines de Disseny: Llums		
Size: A3	Date: 2025-03-21	Rev: L6
HTC& C.B.A. B.D.B		Id: 3/3

Inputs



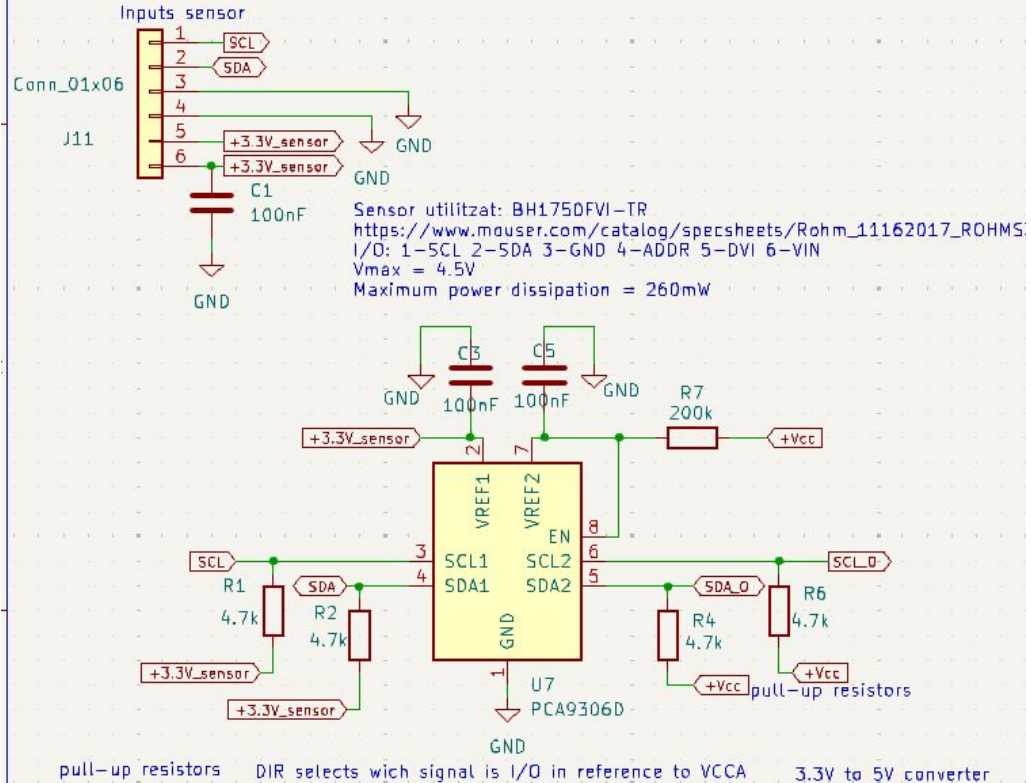
Power

POWER

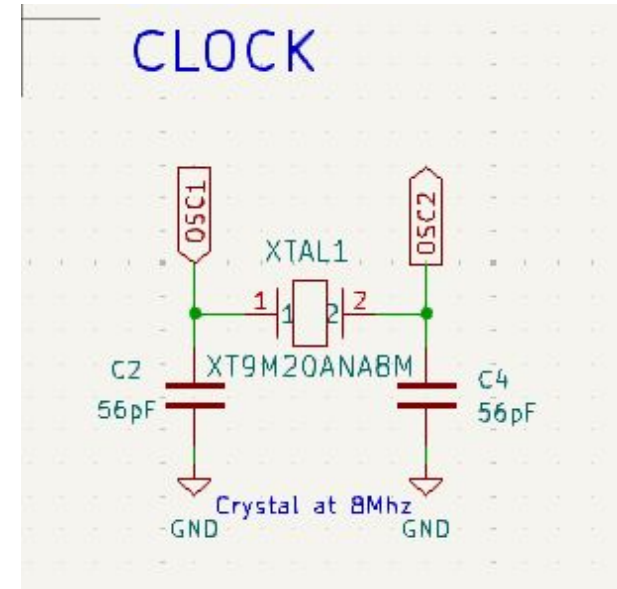
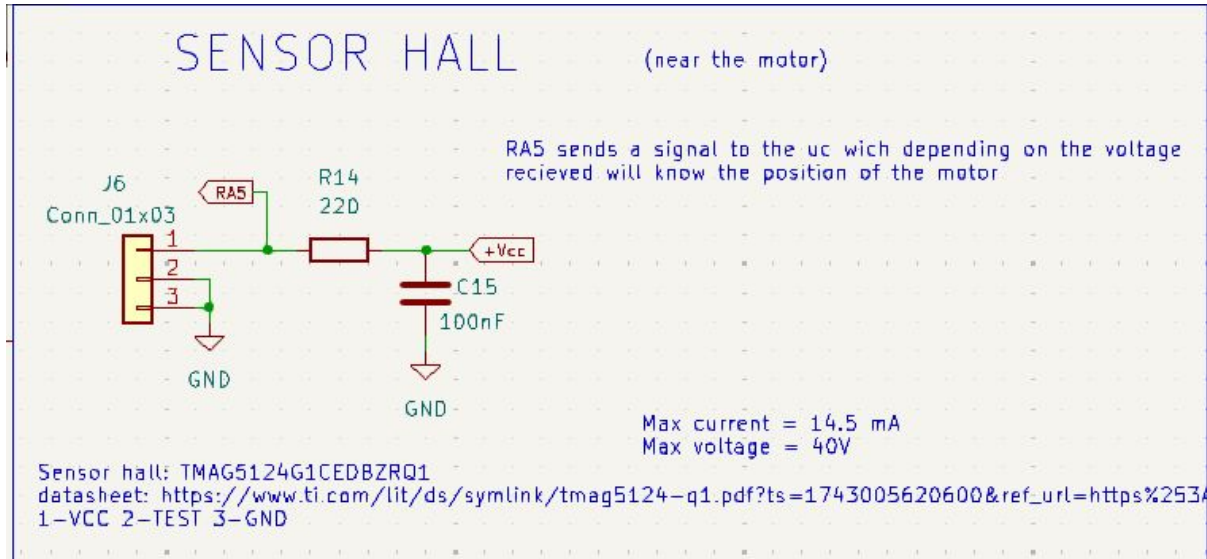


Light Sensor

Light Sensor (out of the pcb)

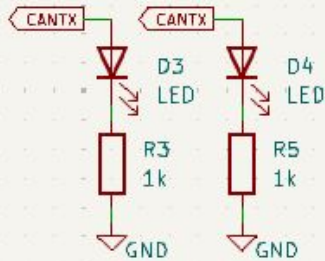


Sensor Hall i Clock

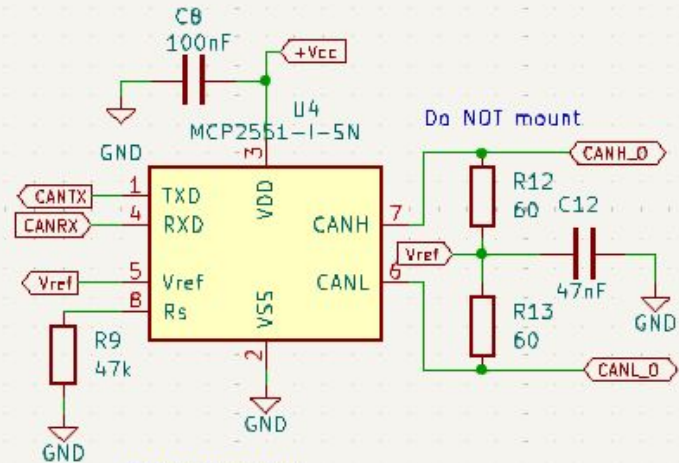


Transceiver i leds

Communication



LEDS for proving if we're on TX or RX mode



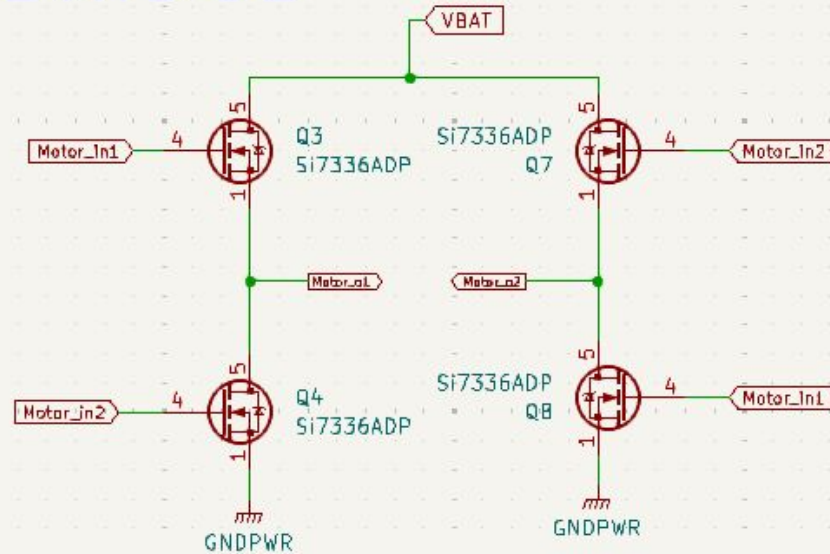
CAN transceiver

Maximum supply current = 75 mA

Maximum supply voltage = 7 V

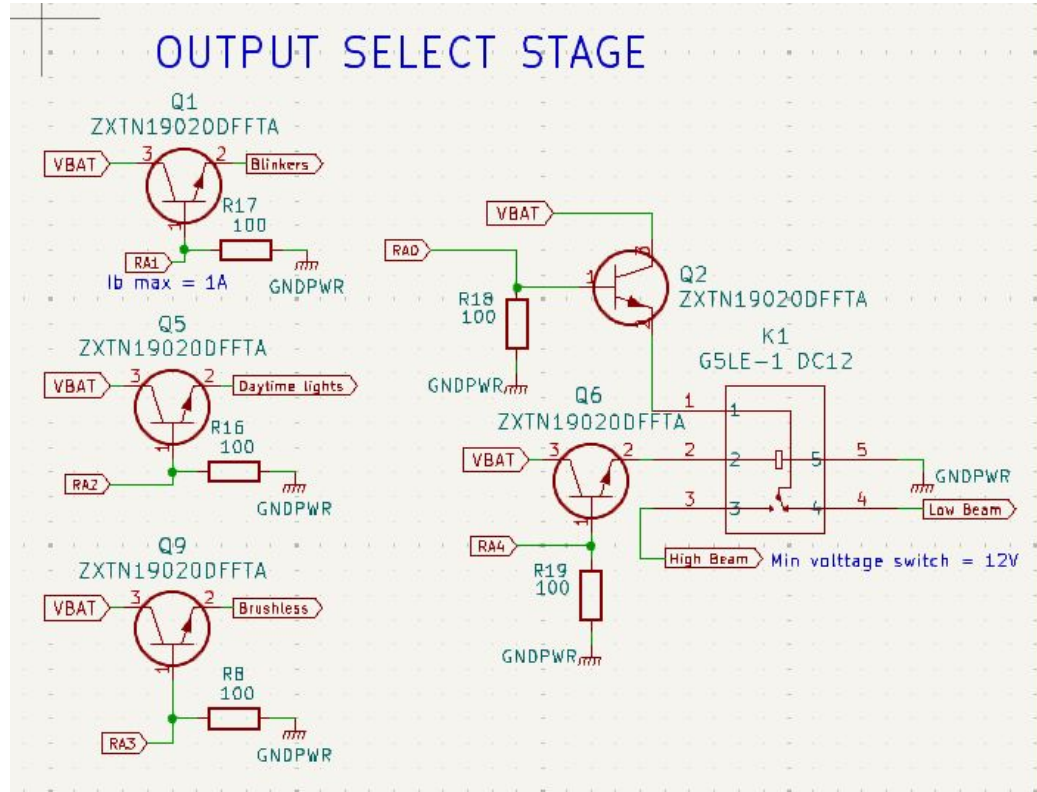
H-bridge

H-BRIDGE



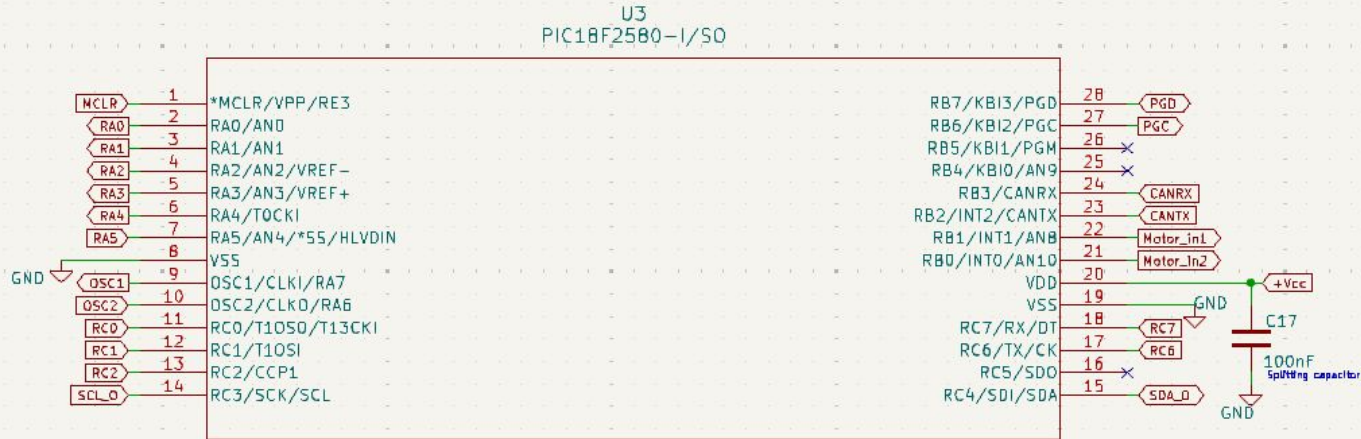
For "A" turn mode, turn on Motor_in1, turn off Motor_in2.
For "B" turn mode, turn on Motor_in2, turn off Motor_in1.
For turn off the motor, turn off Motor_in1 and Motor_in2

Output select stage



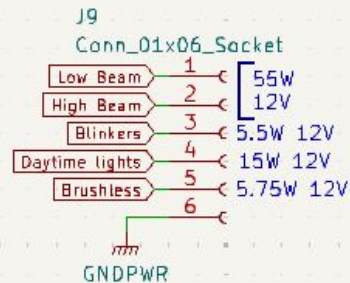
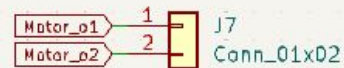
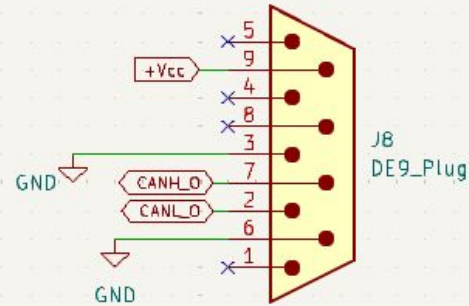
Microcontrolador

DIGITAL



Outputs

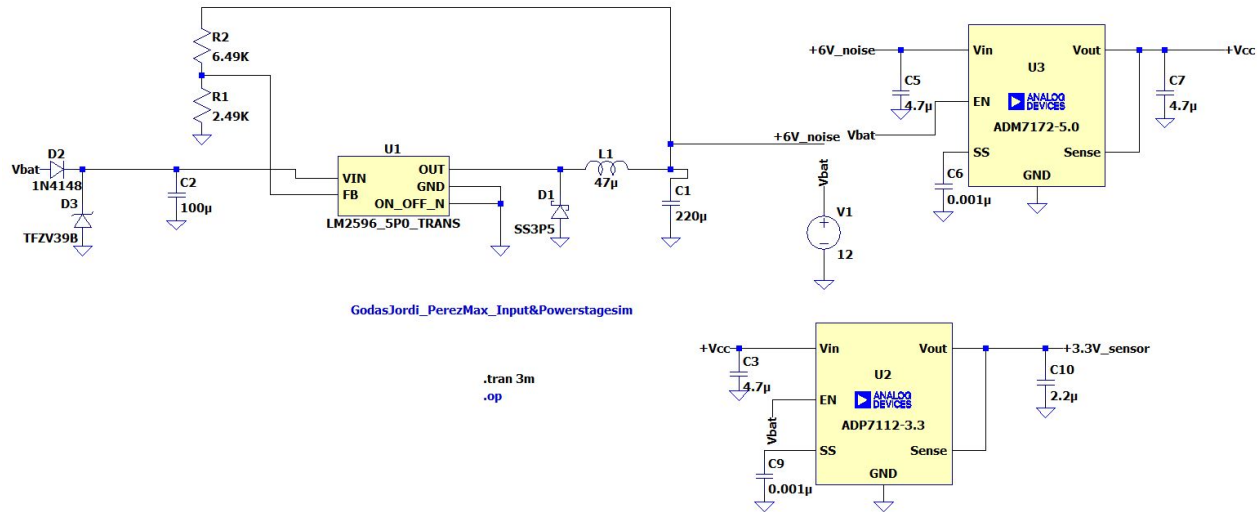
OUTPUT



Simulacions

Power stage

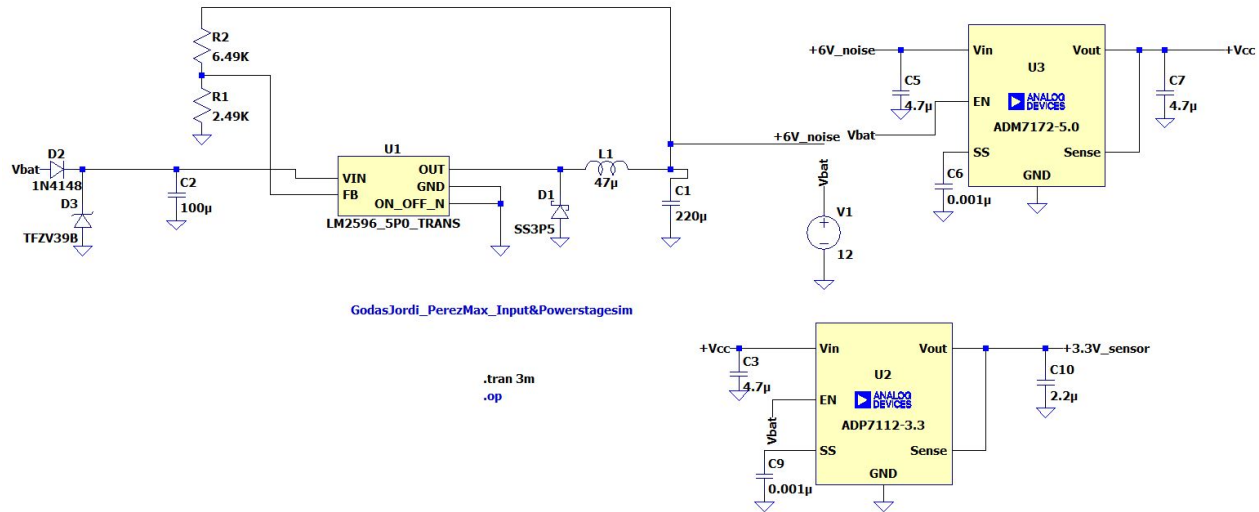
Ripple LM2596:



Etapa de potència

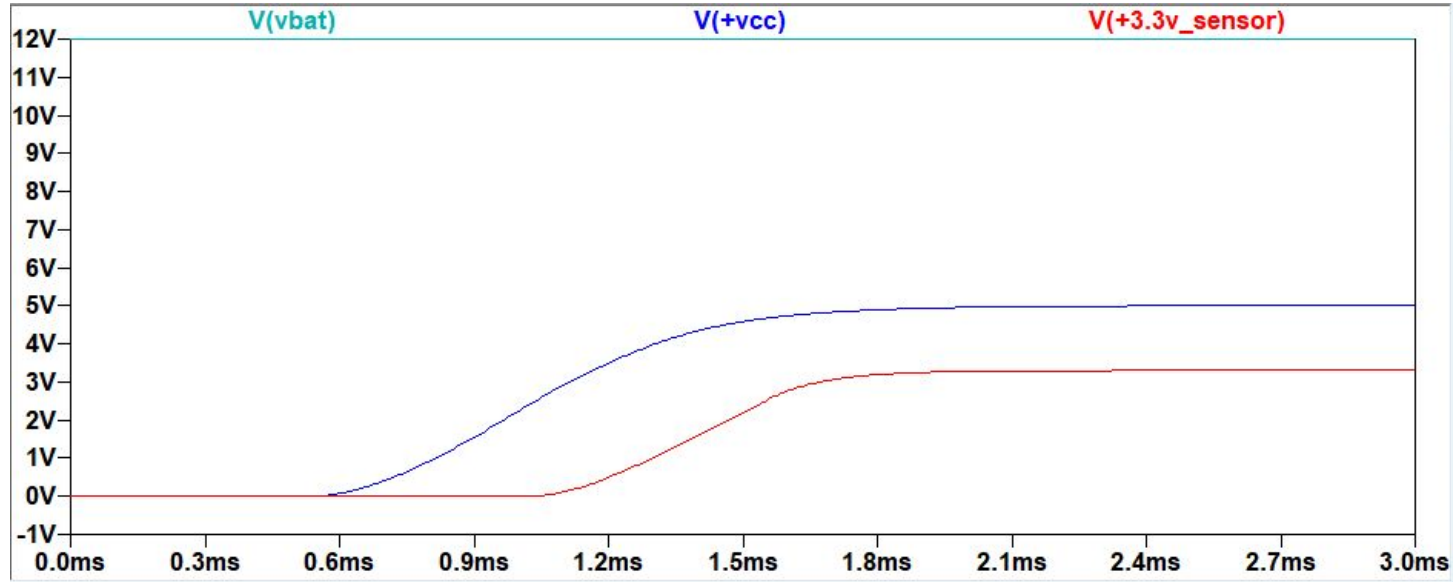
Power stage

Ripple LM2596:



Etapa de potència

Power stage



Representació gràfica dels diferents voltatges de l'etapa de potència en funció del temps

H-Bridge

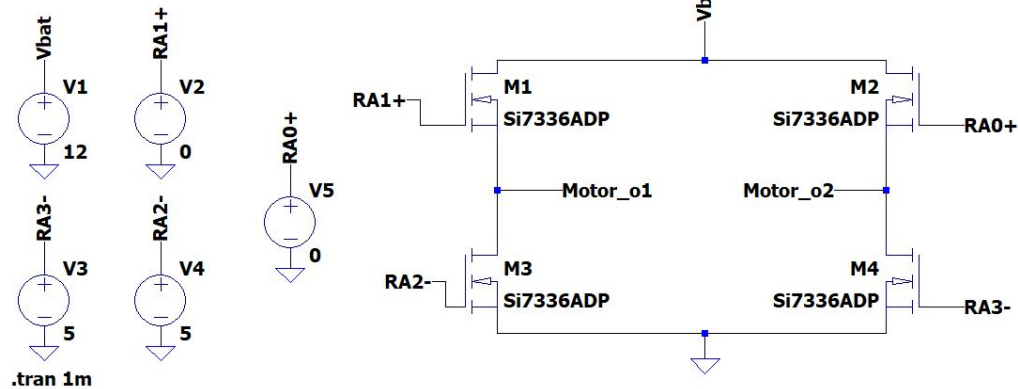
GodasJordi_PerezMax_hbridge

Todo esto se controlará con el micro, inclusive el fin de carrera

Para que el motor gire en el sentido A, hay que dar corriente de base RA1+ y RA3-

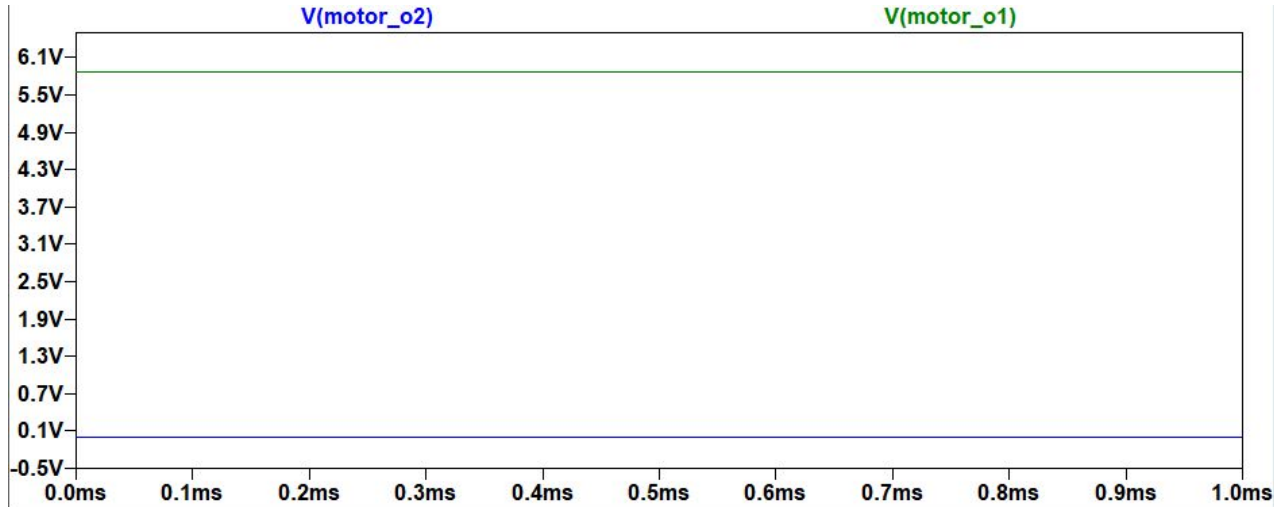
Para que el motor gire en el sentido B, hay que dar corriente de base RA0+ y RA2-

Para que el motor no gire, aplicamos voltage en RA2- y RA3-



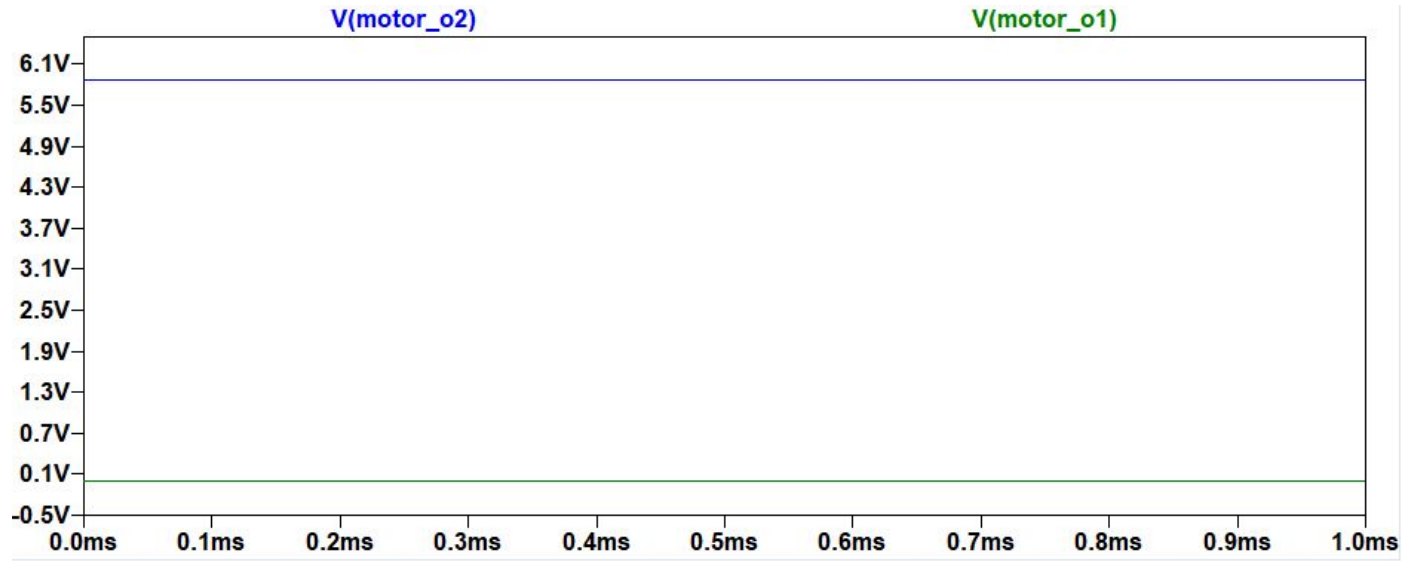
Pont H per controlar el sentit de gir del motor i final de carrera

H-Bridge (sentit de gir A)



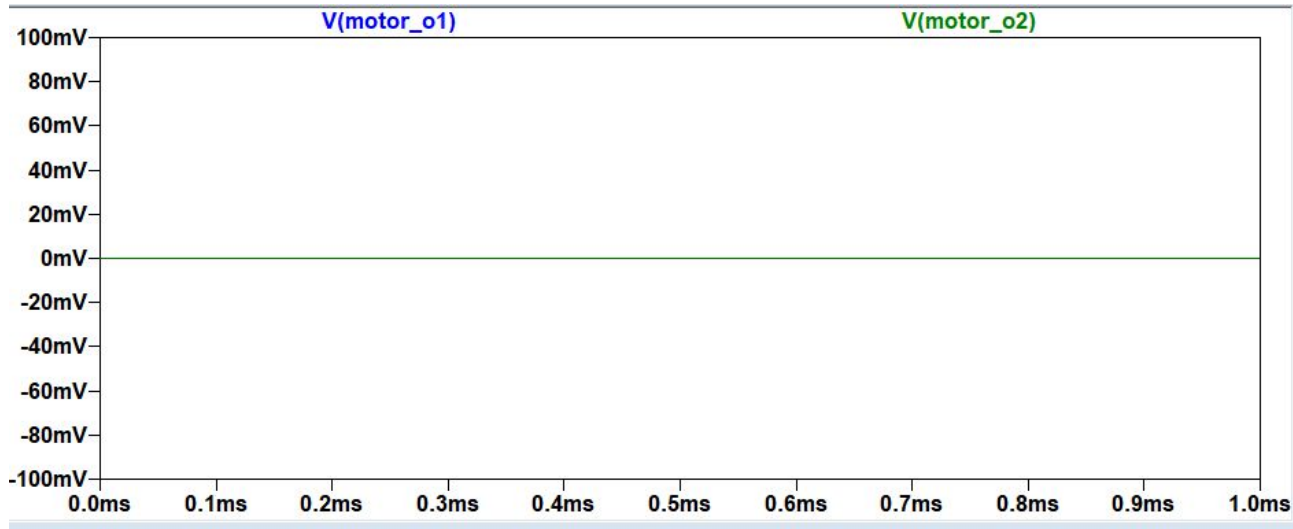
Representació gràfica dels voltatges en el Pont H per a un sentit de gir "A"

H-Bridge (sentit de gir B)



Representació gràfica dels voltatges en el Pont H per a un sentit de gir "B"

H-Bridge (motor apagat)



Representació gràfica dels voltatges en el Pont H per al motor apagat

Components



Nom del component	Funció	Datasheet
ADM7172ACPZ-5.0-R7	LDO 5V	ADM7172ACPZ-5.0-R7
ADP7112ACBZ-3.3-R7	LDO 3.3V	ADP7112ACBZ-3.3-R7
BH1750FVI-TR	Sensor de llum	BH1750FVI-TR
G5LE-1 DC12	Relé	G5LE-1 DC12
LM2596T-ADJ	BUCK converter	LM2596T-ADJ
MCP2551-I-SN	Transceiver	MCP2551-I-SN
PIC18F2580-I/SO	Microprocesador	PIC18F2580-I/SO
Si7336ADP	Transistor BJT	Si7336ADP
SN74LXC2T45DCUR	Traductor de 5V a 3.3V	SN74LXC2T45DCUR
TMAG5124G1CEDBZRQ1	Sensor hall	TMAG5124G1CEDBZRQ1
ZXTN19020DFFTA	Transistor mosfet	ZXTN19020DFFTA
PCA9036	Tracuctor de nivells	PCA9036
XT9M20HRR8M	Cristall	XT9M20HRR8M

