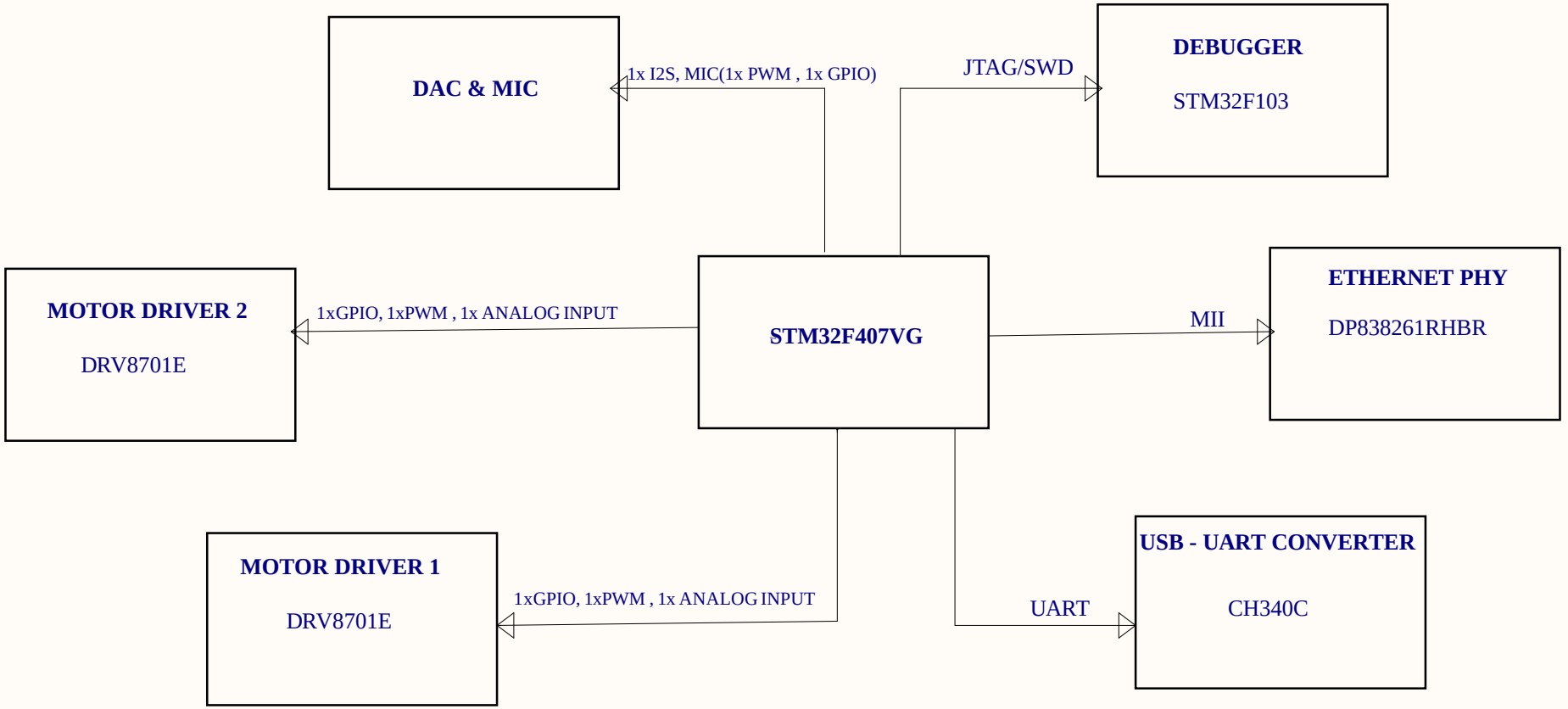
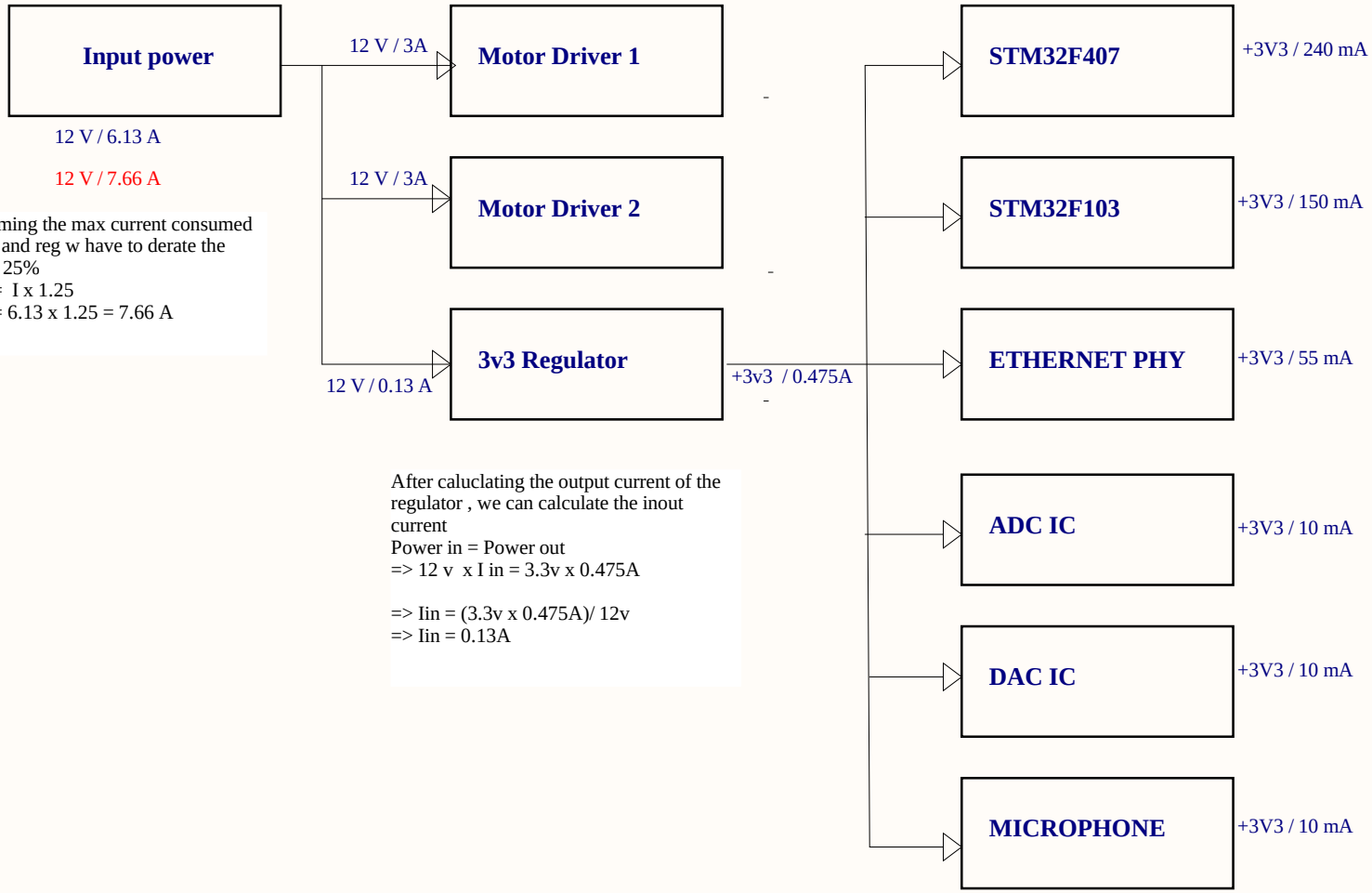
Block diagram



Power budget

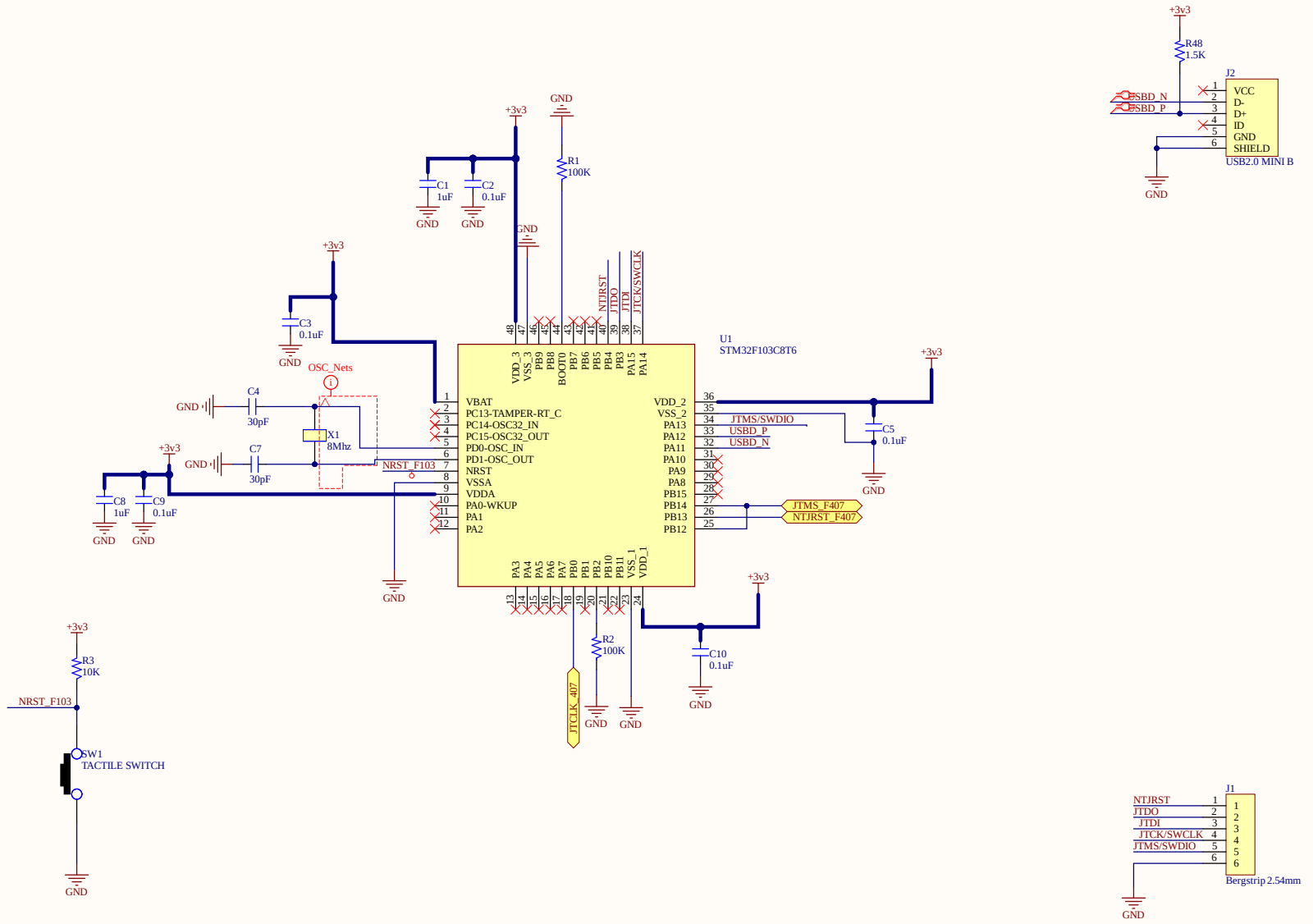


After summing the max current consumed by drivers and reg w have to derate the current by 25%
I derated = I x 1.25
I derated = 6.13 x 1.25 = 7.66 A

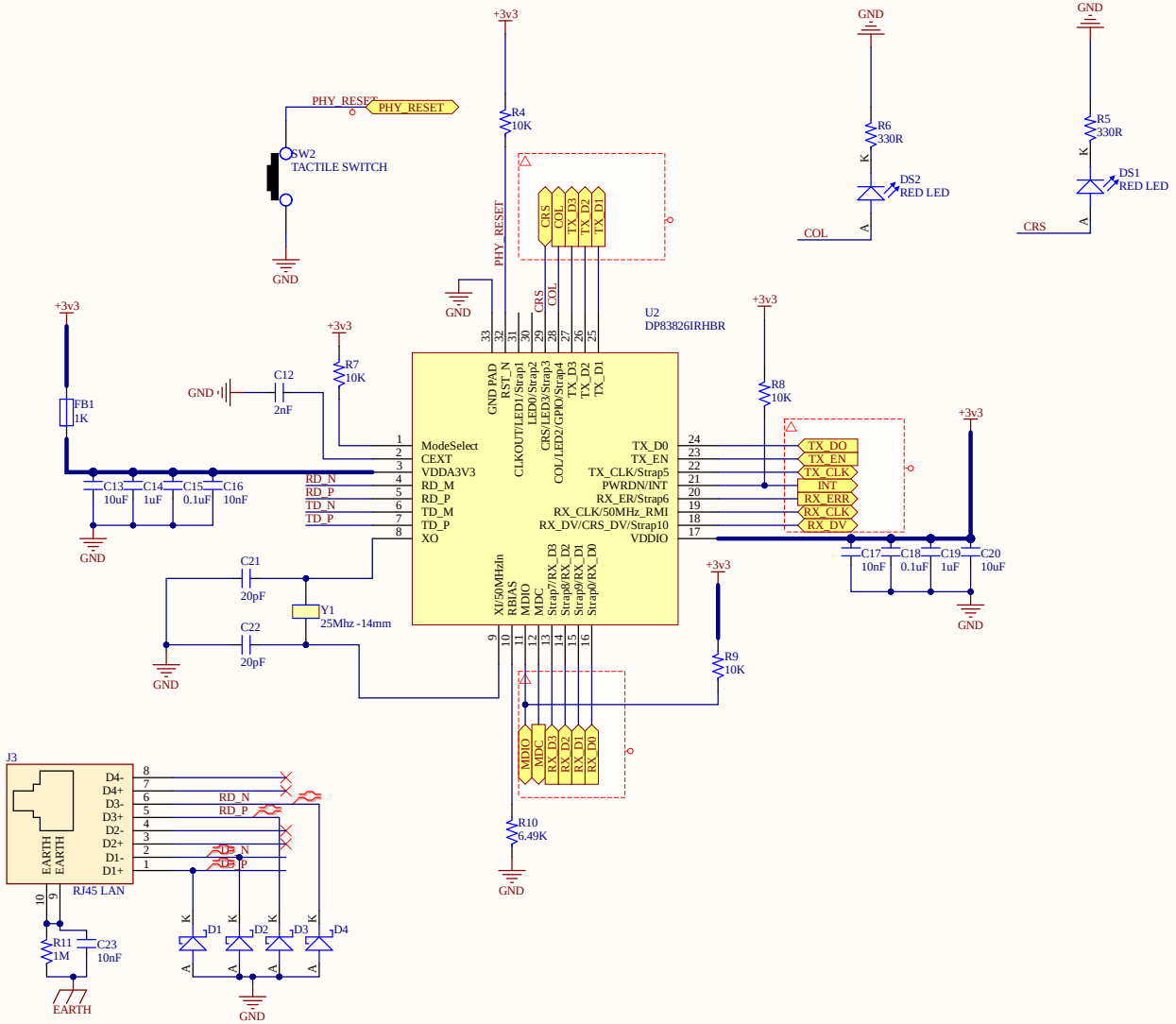
After caluclating the output current of the regulator , we can calculate the inout current
Power in = Power out
=> 12 v x I in = 3.3v x 0.475A

=> Iin = (3.3v x 0.475A)/ 12v
=> Iin = 0.13A

First we have to get the maximum current rating of the electronics components such as stm32 and debugger ethernet phy ... then calculate the sum of currents to know how much current the regulator will supply

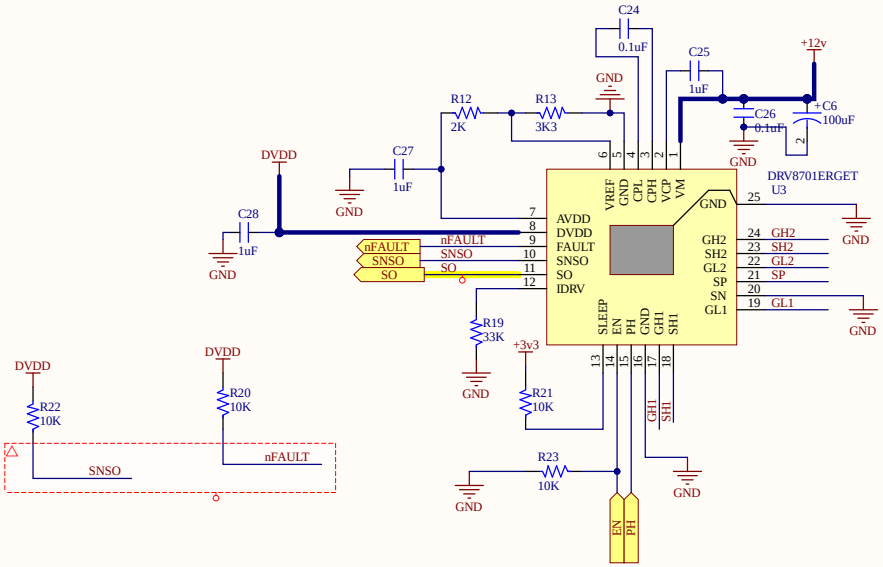


Title *			
Size: A3	Number:3	Revision:*	
Date: 15/12/2022	Time: 15:54:10	Sheet 3 of 11	
File: C:\Users\moham\Desktop\Electronic designs\mixed_audio_board\[3]STM32F103_Debugger.SchDoc			

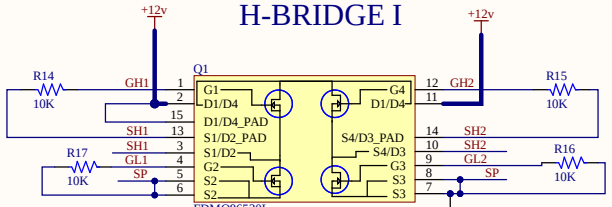


Title *			
Size: A3	Number:4	Revision:*	
Date: 15/12/2022	Time: 15:54:10	Sheet 4 of 11	
File: C:\Users\moham\Desktop\Electronic designs\mixed_audio_board\[4]Ethernet_PHY.SchDoc			

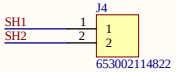
MOTOR DRIVER I



H-BRIDGE I



CONNECTOR I



sleep pin is active low so we have to pull it high in order to make our driver works .
WE MUST connect this pin to an external 3v3 voltage and nor a voltage generated by this chip otherwise it will be always off

SO is an analog signal decribe the exact value of the current sensed by Rsense , we can send this signal to MCU to make a closed loop

I = (SO - Voff) / (AV x Rsense)

[datasheet]
Voff = 0.05V
Av = 20 (gain)

[calculated based on Vref and the formula on datasheet]
Rsense = (50mOhm)

SNSO connected to open drain this signal will be low when the current sensed exceeded the maximum current set by VRef (voltage divider) we can send this signal to our MCU to take actions based on this signal

IDRV pulled down to ground through a resistor that will assign the rise time of mosfets switching 33k is recommanded by datasheet (for more details go to datasheet)

EN pin is resonsible for turning the motor on and controlling its speed using pwm . wehave to put pull down resistor so we prevent turning the motor on by noise

Title *			
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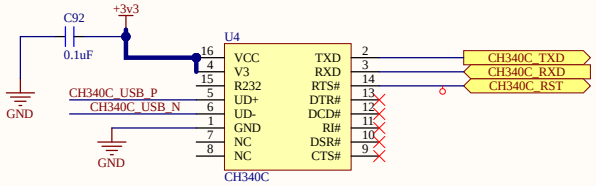
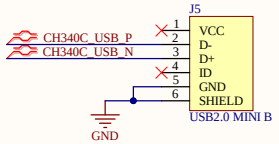
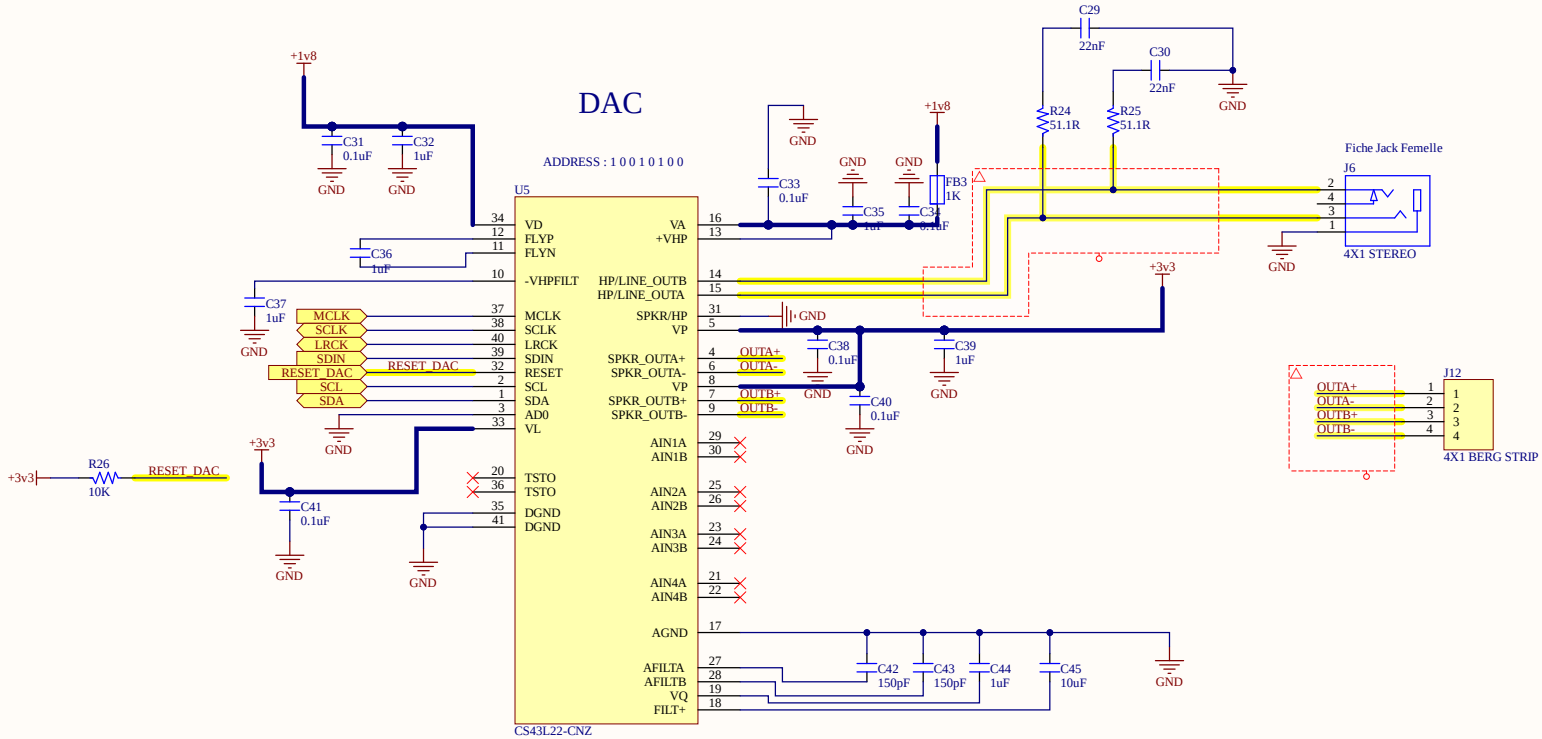
File: C:\Users\moham\Desktop\Electronic designs\mixed_audio_board\[5]Motor_Driver.SchDoc			





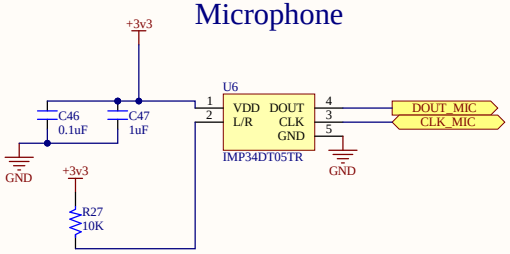
Title *			
Size: A3	Number:6	Revision:*	
Date: 15/12/2022	Time: 15:54:10	Sheet 6 of 11	
File: C:\Users\moham\Desktop\Electronic designs\mixed_audio_board\[6]CH340C.SchDoc			

DAC



setting ADDRESS :
1 0 0 1 0 1 'AD0' 0
in our case , ad0 is grounded so the address is 1 0 0 1 0 1 '0' 0

Microphone



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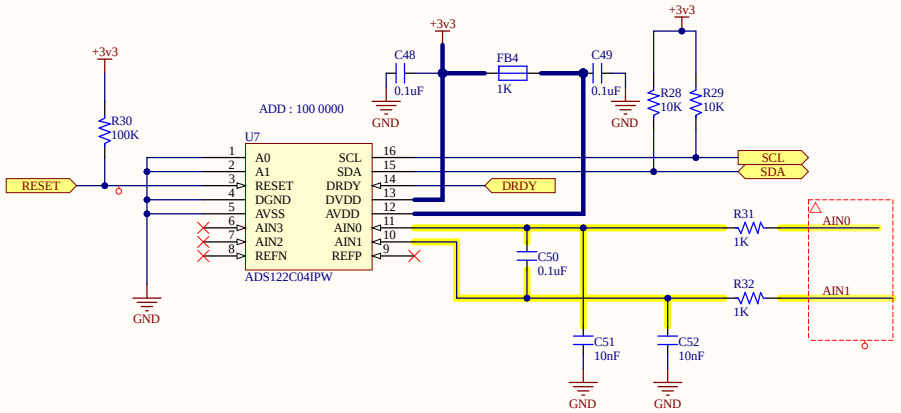
Size: A3	Number:7	Revision:*	
Date: 15/12/2022	Time: 15:54:10	Sheet 7 of 11	
File: C:\Users\moham\Desktop\Electronic designs\mixed_audio_board\[7]DAC_and_MIC.SchDoc			

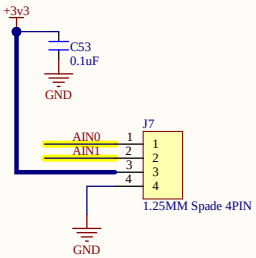


I2C address

if A1 and A2 is connected to DGND I2C address is 100 0000

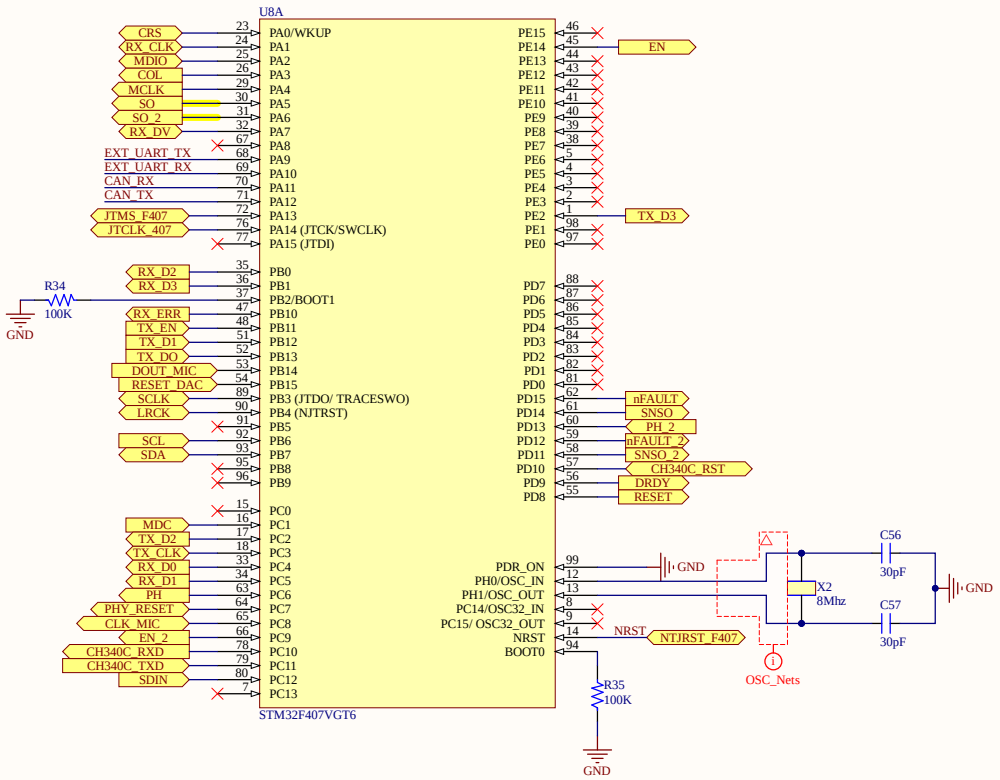
PULL UP resistor

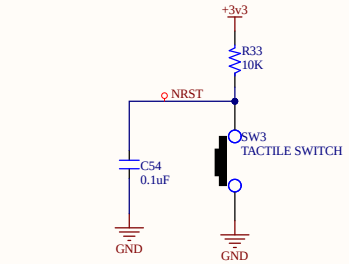
to define the value of a pull up resistor you have to see in the data sheet how much is the sink current of the pin

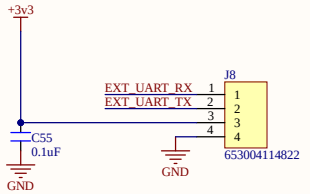


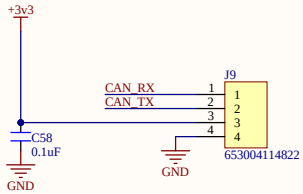
Title *			
Size: A3	Number:8	Revision:*	
Date: 15/12/2022	Time: 15:54:10	Sheet 8 of 11	
File: C:\Users\moham\Desktop\Electronic designs\mixed_audio_board\[8]ADC_chip.SchDoc			

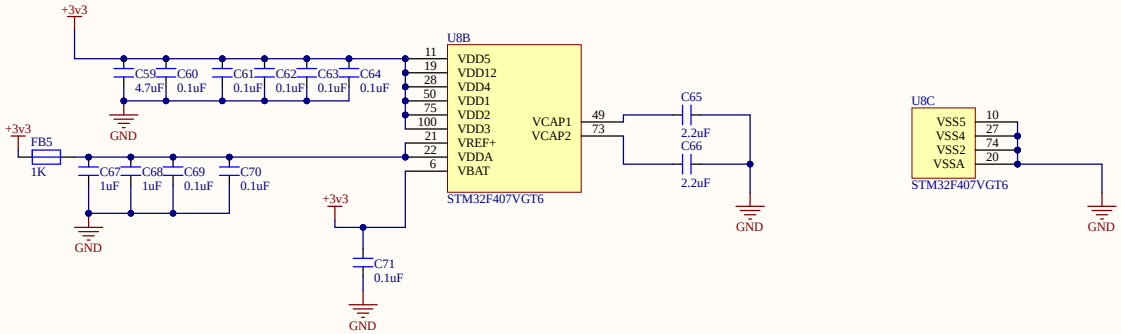
MCU





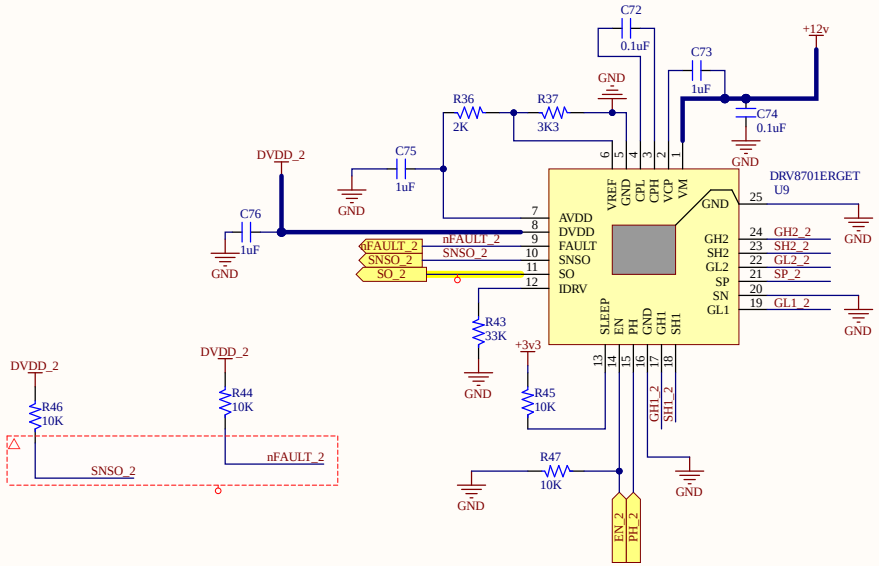




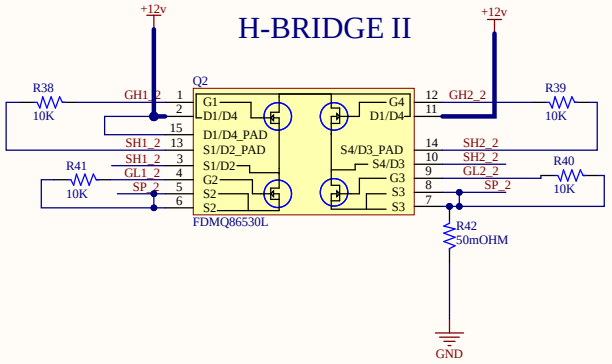


Title *			
Size: A3	Number:9	Revision:*	
Date: 15/12/2022	Time: 15:54:10	Sheet 9 of 11	
File: C:\Users\moham\Desktop\Electronic designs\mixed_audio_board\[9]STM32F407_Controller.SchDoc			

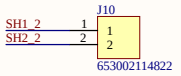
MOTOR DRIVER II



H-BRIDGE II



CONNECTOR II



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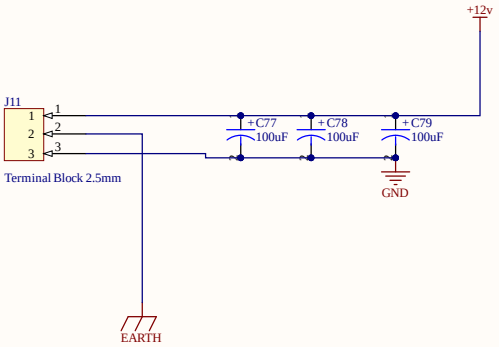
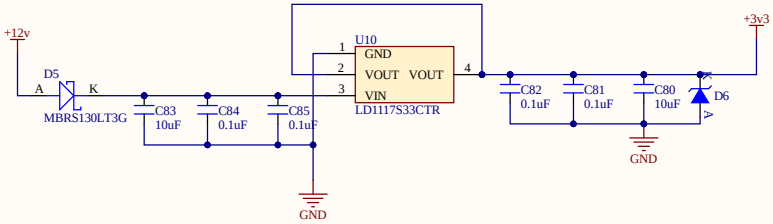
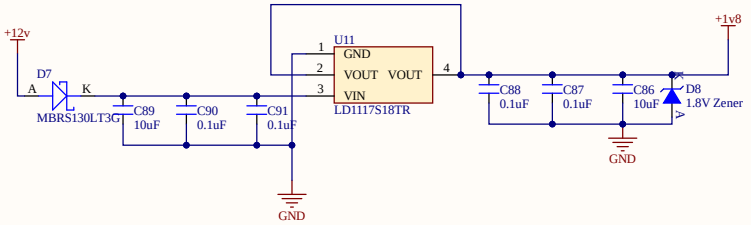
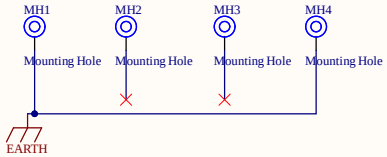
Title *			
Size: A3	Number:10	Revision:*	
Date: 15/12/2022	Time: 15:54:10	Sheet 10 of 11	
File: C:\Users\moham\Desktop\Electronic designs\mixed_audio_board\[10]Motor_Driver_2.SchDoc			









Title *			
Size: A3	Number:11	Revision:*	
Date: 15/12/2022	Time: 15:54:11	Sheet 11 of 11	
File: C:\Users\moham\Desktop\Electronic designs\mixed_audio_board\[11]power_input_and_regualtors.SchDoc