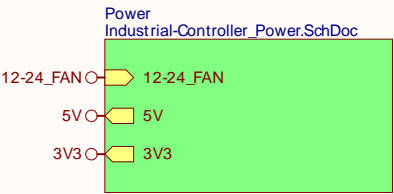
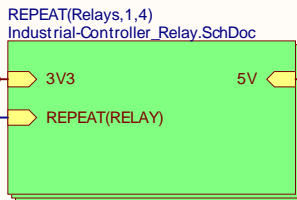
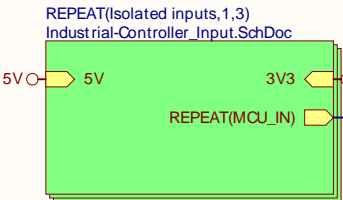
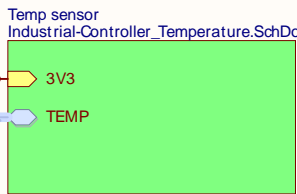
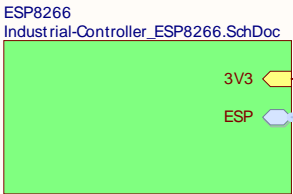
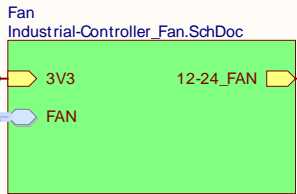
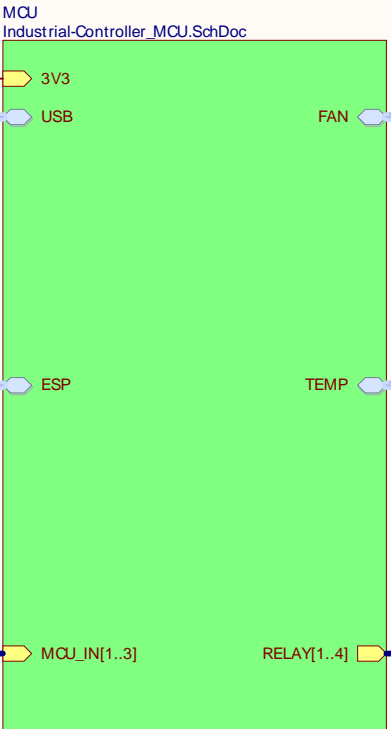
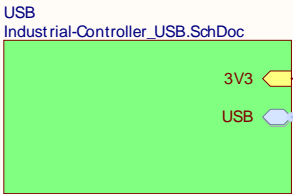



REVISION	DESCRIPTION	DATE	ECO	ENGINEER
0.1.0	Prototype	10/17/2022	0000	Podlesnyi V.S.

POWER



MCU



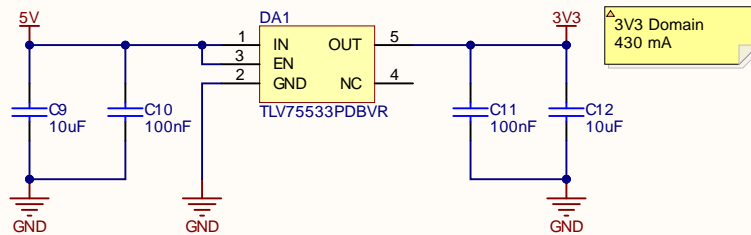
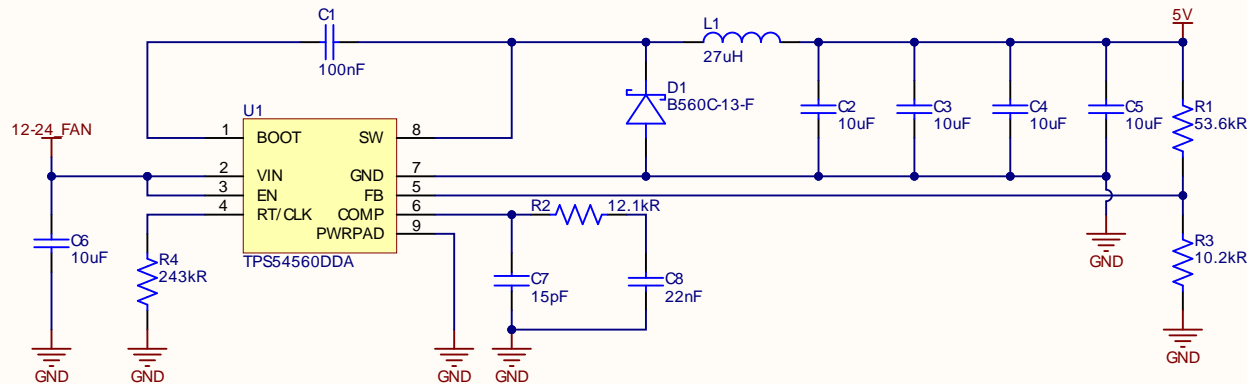
Title: Overview			MRobot, LCC nab. reki Karpovki, d. 5/3E Saint-Petersburg, 197022 Ph: +7 (911) 701-51-99	
Project: Industrial PLC				
Size A	Number: 0000-0000	Revision 0.1.0	Engineer: Podlesnyi Vasilii	www.mrobots.ru
Date: 23.10.2022	Time: 11:58:37	Sheet 2 of 21		
File: Industrial-Controller_Overview.SchDoc				

12-24_FAN → 12-24_FAN

5V → 5V

3V3 → 3V3

12V Domain
600 mA



3V3 Domain
430 mA

5V domain
1.2A


Inductor ripple current:
 $I_{out\ max} = 1.2\ A$
 $L = 22\ \mu H$
 $V_{in\ max} = 24\ V$
 $V_{out} = 5\ V$
 $f = 400\ kHz$
 $dI_L = 0.37\ A = 30\%\ I_{outmax}$

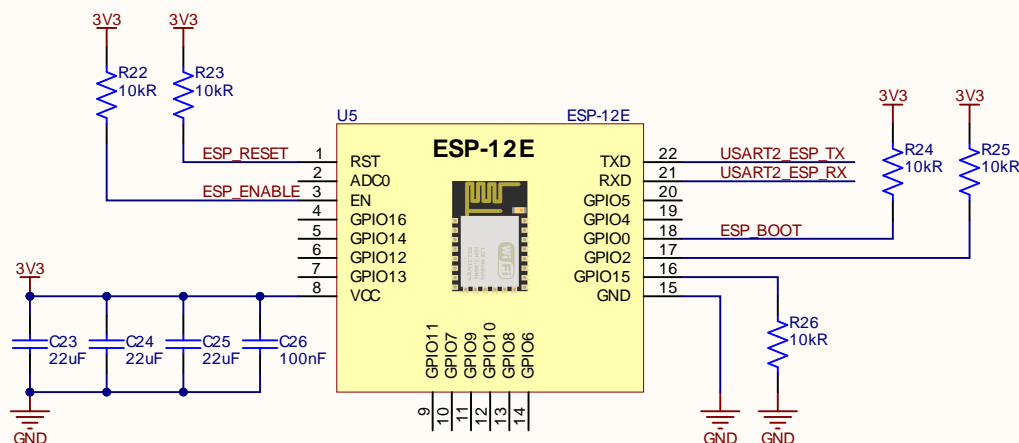
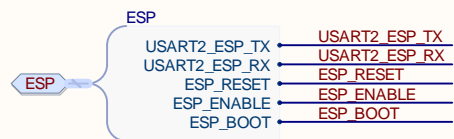
Inrush current:
 $C_{out} = 40\ \mu F$
 $V_{out} = 5\ V$
 $t_{ss} = 3\ ms$
 $I_{inrush} = 0.07\ A$

Inductor peak current:
 $I_{out\ max} = 1.2\ A$
 $dI_L = 0.37\ A$
 $I_{inrush} = 0.07\ A$
 $I_{L\ peak} = 1.2\ A + 0.37\ A/2 + 0.07\ A = 1.46\ A$

Inductor saturation current:
 $I_{L\ peak} = 1.5\ A$
 $I_{L\ sat} = 1.5 * I_{L\ peak} = 1.5 * 1.5\ A = 2.2\ A$


C_{out} :
 $dV_{out} = 1\% V_{out} = 0.05\ V$
 $dI_L = 30\% I_{out} = 0.45\ A$
 $f = 400\ kHz$
 $C_{out} = 2.8\ \mu F$

Title: Power			MRobot, LCC nab. reki Karpovki, d. 5/3E Saint-Petersburg, 197022 Ph: +7 (911) 701-51-99		 www.mrobots.ru
Project: Industrial PLC					
Size A	Number: 0000-0000	Revision 0.1.0	Engineer: Podlesnyi Vasilii		
Date: 23.10.2022	Time: 11:58:38	Sheet 3 of 21			
File: Industrial-Controller Power.SchDoc					

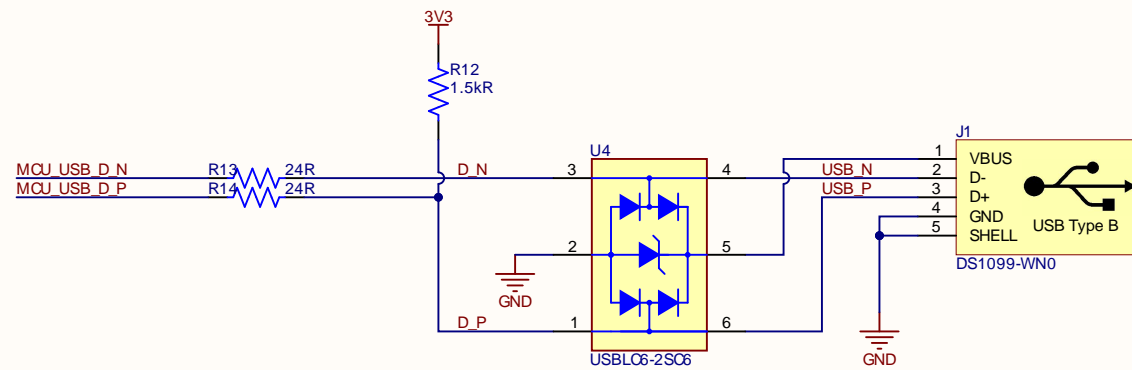



1) UART BOOTLOADER
GPIO15 - "0" GPIO0 - "0" GPIO2 - "1"

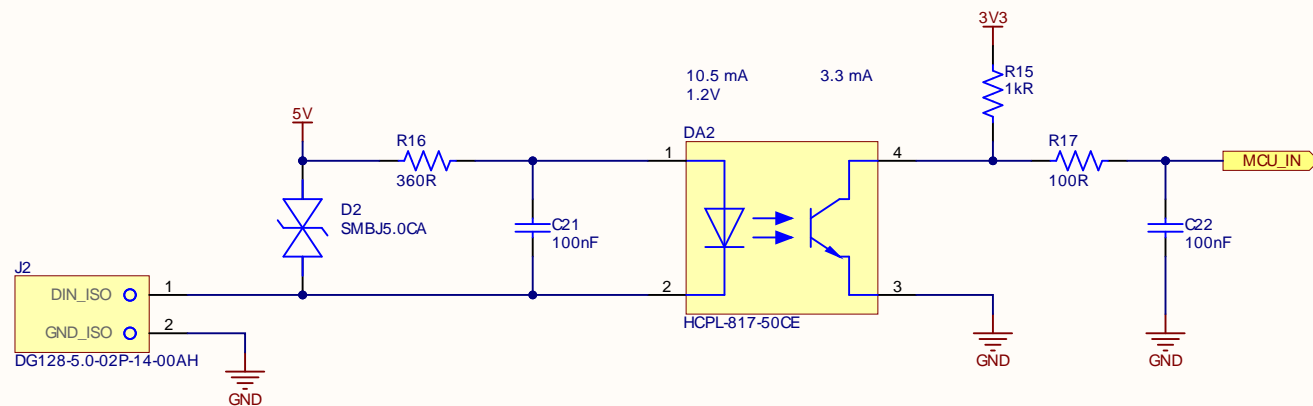
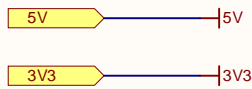
2) FLASH BOOT SKETCH
GPIO15 - "0" GPIO0 - "1" GPIO2 - "1"


Title: ESP8266			MRobot, LLC nab. reki Karpovki, d. 5/3E Saint-Petersburg, 197022 Ph: +7 (911) 701-51-99	 www.mrobots.ru
Project: Industrial PLC				
Size A	Number: 0000-0000	Revision 0.1.0	Engineer: Podlesnyi Vasiliy	
Date: 23.10.2022	Time: 11:58:38	Sheet 13 of 21		
File: Industrial-Controller_ESP8266.SchDoc				

3V3



Title: USB			MRobot, LCC nab. reki Karpovki, d. 5/3E Saint-Petersburg, 197022 Ph: +7 (911) 701-51-99	 www.mrobots.ru
Project: Industrial PLC				
Size A	Number: 0000-0000	Revision 0.1.0	Engineer: Podlesnyi Vasilii	
Date: 23.10.2022	Time: 11:58:38	Sheet 14 of 21		
File: Industrial-Controller_USB.SchDoc				



Title: Isolated inputs			MRobot, LCC nab. reki Karpovki, d. 5/3E Saint-Petersburg, 197022 Ph: +7 (911) 701-51-99	 www.mrobots.ru
Project: Industrial PLC				
Size A	Number: 0000-0000	Revision 0.1.0	Engineer: Podlesnyi Vasilii	
Date: 23.10.2022	Time: 11:58:38	Sheet 17 of 21		
File: Industrial-Controller_Input.SchDoc				

3V3

3V3

TEMP

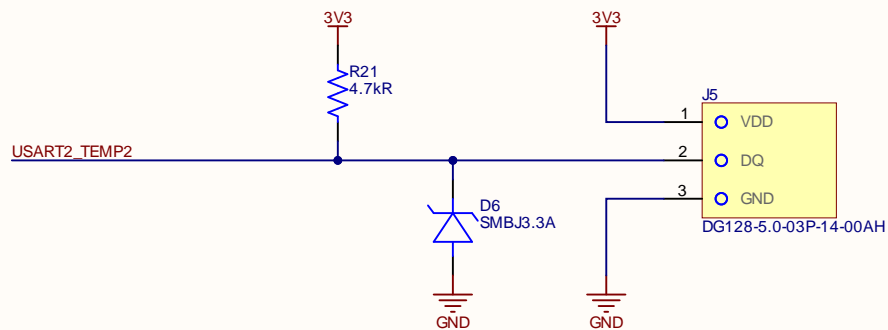
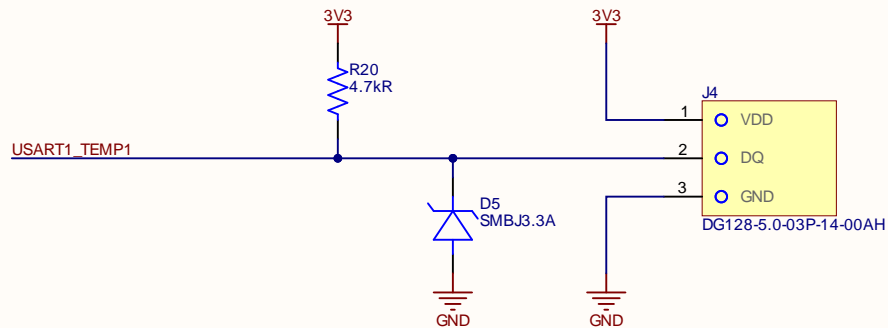
USART1_TEMP1

USART1_TEMP1

USART2_TEMP2

USART2_TEMP2

TEMP



Title: Temp sensor

Project: Industrial PLC

Size A Number: 0000-0000

Date: 23.10.2022 Time: 11:58:38

File: Industrial-Controller_Temperature.SchDoc

Revision 0.1.0

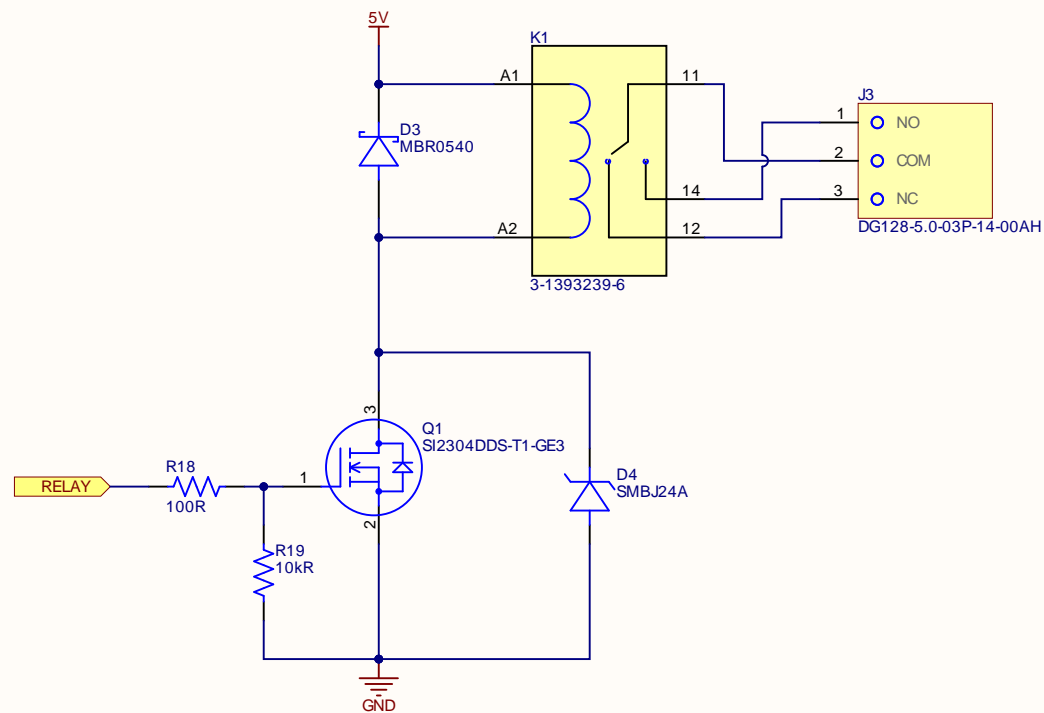
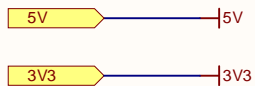
Sheet 18 of 21


MRobot, LCC
nab. reki Karpovki, d. 5/3E
Saint-Petersburg, 197022
Ph: +7 (911) 701-51-99

Engineer:
Podlesnyi Vasilii



www.mrobots.ru



Title: Relays			MRobot, LCC nab. reki Karpovki, d. 5/3E Saint-Petersburg, 197022 Ph: +7 (911) 701-51-99	 www.mrobots.ru
Project: Industrial PLC				
Size A	Number: 0000-0000	Revision 0.1.0	Engineer: Podlesnyi Vasilii	
Date: 23.10.2022	Time: 11:58:38	Sheet 19 of 21		
File: Industrial-Controller_Relay.SchDoc				

A

B

C

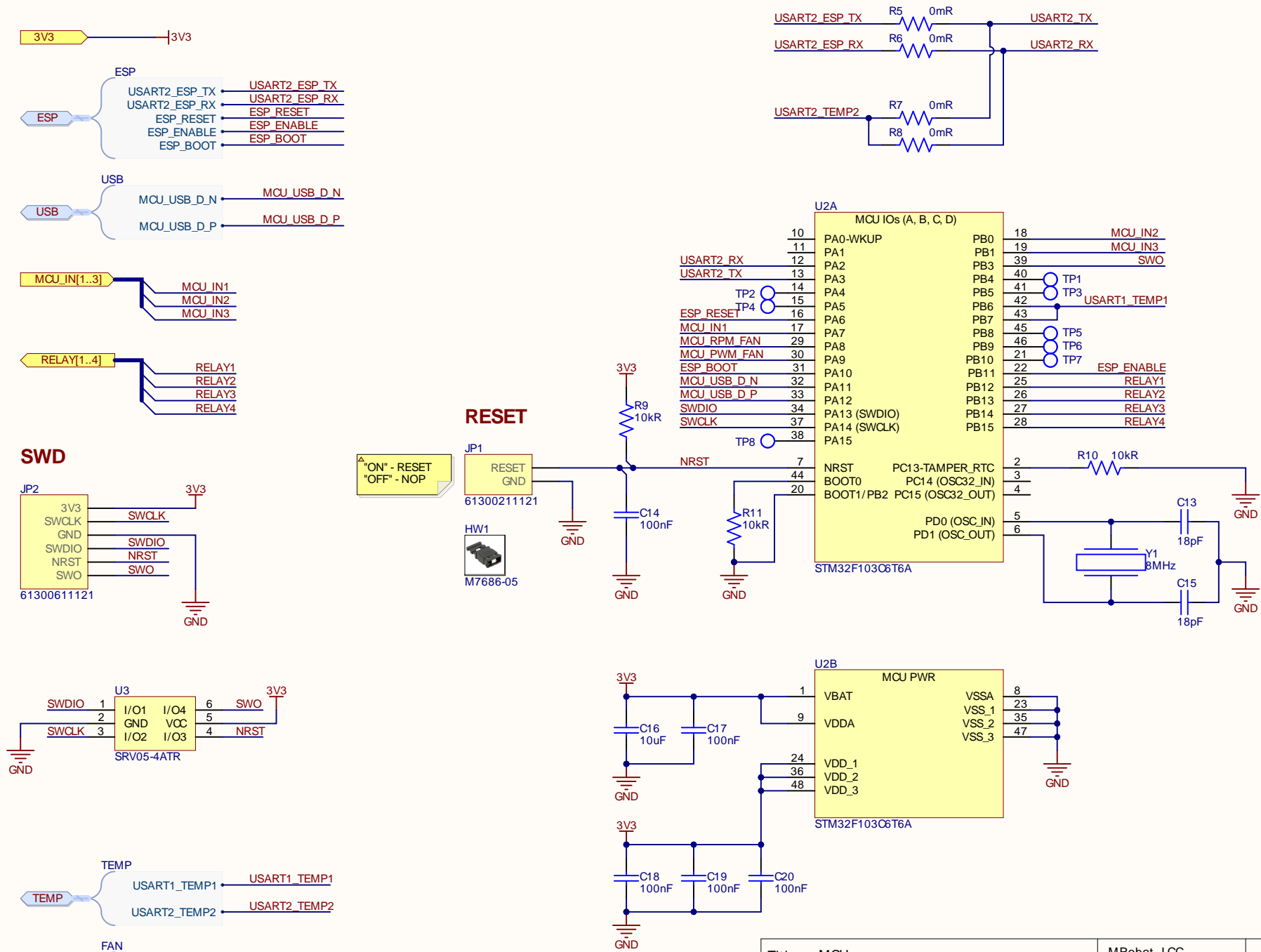
D


A

B

C

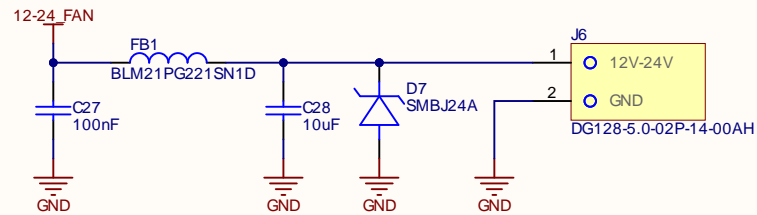
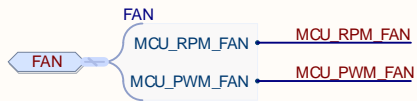
D



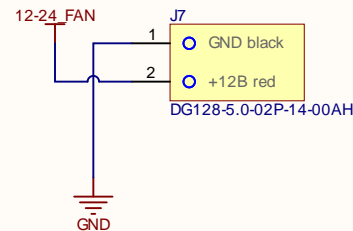
Title: MCU			MRobot , LCC nab. reki Karpovki, d. 5/3E Saint-Petersburg, 197022 Ph: +7 (911) 701-51-99		 www.mrobots.ru
Project: Industrial PLC					
Size A	Number: 0000-0000	Revision 0.1.0	Engineer:		
Date: 23.10.2022	Time: 11:58:38	Sheet 19 of 21	Podlesnyi Vasilii		
File: Industrial-Controller MCU.SchDoc					

12-24_FAN

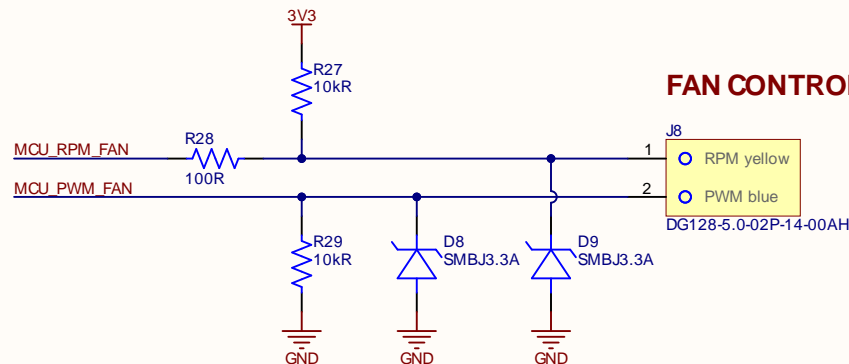
3V3




INPUT POWER



FAN POWER



FAN CONTROL

Title: Fan			MRobot, LCC nab. reki Karpovki, d. 5/3E Saint-Petersburg, 197022 Ph: +7 (911) 701-51-99	
Project: Industrial PLC				
Size A	Number: 0000-0000	Revision 0.1.0	Engineer: Podlesnyi Vasilii	www.mrobots.ru
Date: 23.10.2022	Time: 11:58:38	Sheet 20 of 21		
File: Industrial-Controller_Fan.SchDoc				