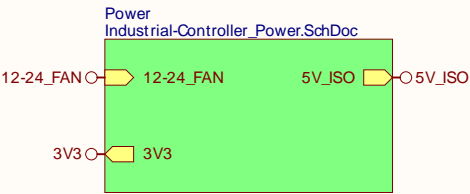
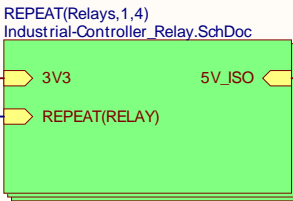
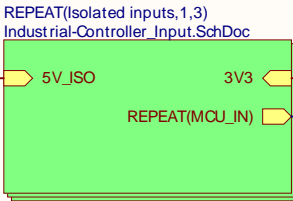
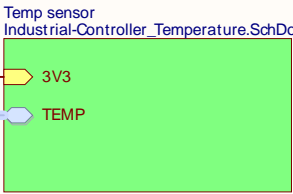
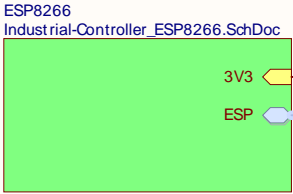
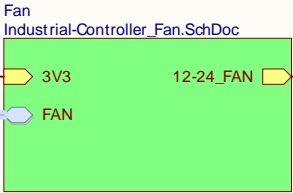
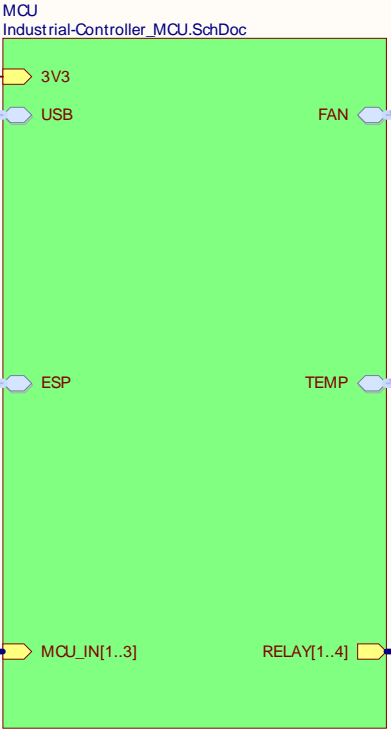
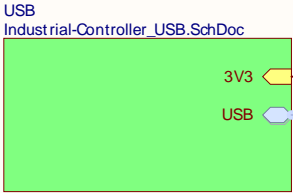



REVISION	DESCRIPTION	DATE	ECO	ENGINEER
0.1.0	Prototype	10/17/2022	0000	Podlesnyi V.S.

## POWER



## MCU



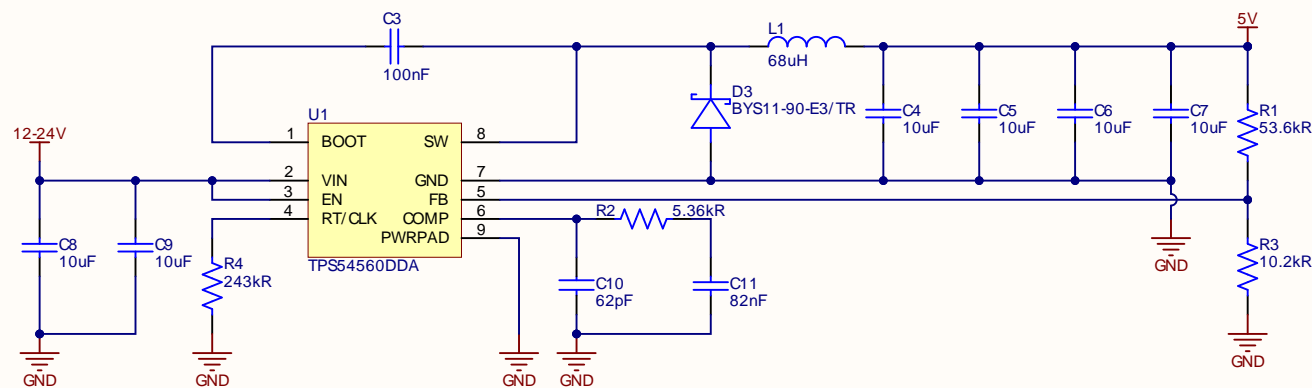
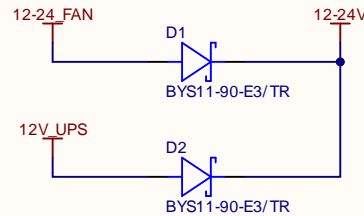
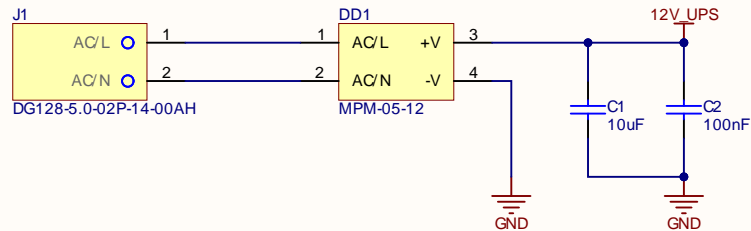
Title: Overview			MRobot, LCC nab. reki Karpovki, d. 5/3E Saint-Petersburg, 197022 Ph: +7 (911) 701-51-99	
Project: Industrial PLC				
Size A	Number: 0000-0000	Revision 0.1.0	Engineer: Podlesnyi Vasilii	<a href="http://www.mrobots.ru">www.mrobots.ru</a>
Date: 17.10.2022	Time: 20:17:24	Sheet 2 of 21		
File: Industrial-Controller_Overview.SchDoc				

12-24\_FAN

3V3

5V\_ISO

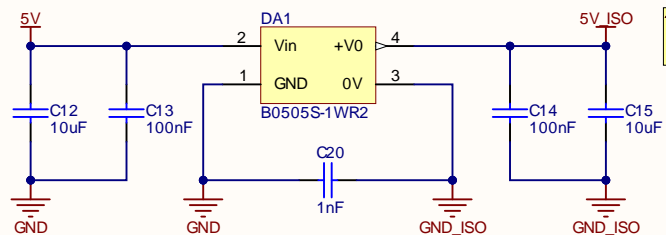
5V\_ISO



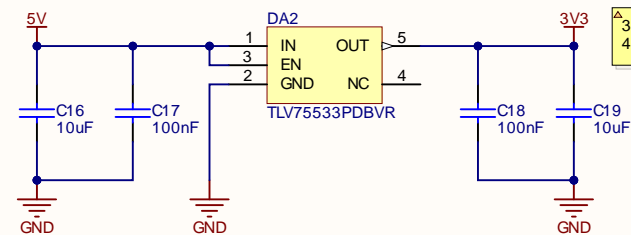
5V domain  
440 mA 2.2W

Inductor:  
Iout max = 500mA  
dL = 30%Iout = 150 mA  
Vin max = 24B  
V out = 5B  
f = 400 kHz  
L = 66uH


Cout:  
dVout = 1%Vout = 0.05 V  
dL = 30%Iout = 150 mA  
f = 400 kHz  
Cout = 1uF



5V\_ISO domain  
60 mA 0.5W



3V3 Domain  
472 mA 1.65W

Title: Power			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	<a href="http://www.mrobots.ru">www.mrobots.ru</a>
Date: 17.10.2022	Time: 20:17:24	Sheet 3 of 21		
File: Industrial-Controller Power.SchDoc				

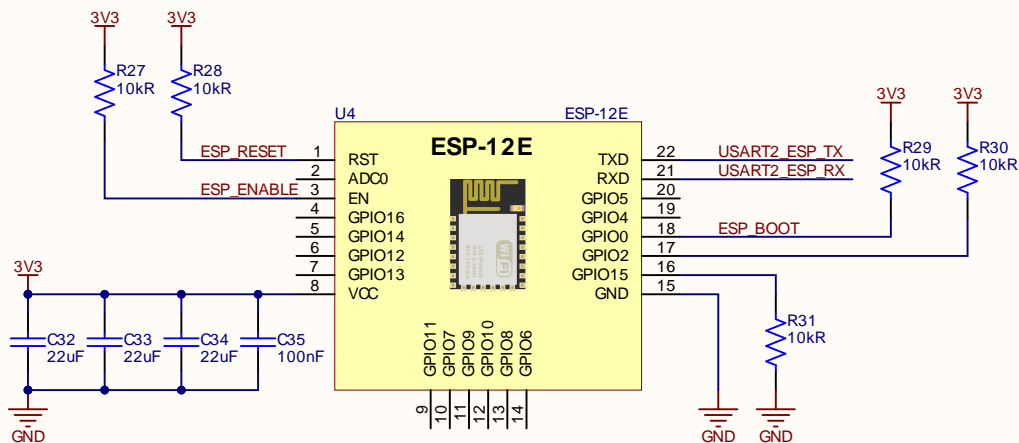
3V3

3V3

ESP

USART2\_ESP\_TX  
USART2\_ESP\_RX  
ESP\_RESET  
ESP\_ENABLE  
ESP\_BOOT

ESP



△ BOOT MODES:  
1) UART BOOTLOADER  
GPIO15 - "0" GPIO0 - "0" GPIO2 - "1"  
2) FLASH BOOT SKETCH  
GPIO15 - "0" GPIO0 - "1" GPIO2 - "1"

Title: ESP8266

Project: Industrial PLC

Size A Number: 0000-0000

Date: 17.10.2022 Time: 20:17:24

File: Industrial-Controller\_ESP8266.SchDoc

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

Engineer:  
Podlesnyi Vasilii



[www.mrobots.ru](http://www.mrobots.ru)

3V3

USB

MCU\_USB\_D\_N

MCU\_USB\_D\_N

MCU\_USB\_D\_P

MCU\_USB\_D\_P

USB

3V3

R12  
1.5kR

MCU\_USB\_D\_N

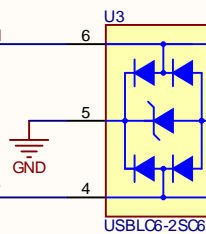
R13  
24R

MCU\_USB\_D\_P

R14  
24R

D\_N

D\_P



J2

VBUS  
D-  
D+  
GND  
SHELL

USB Type B

DS1099-WN0

Title: USB

Project: Industrial PLC

Size A Number: 0000-0000

Revision 0.1.0

Date: 17.10.2022 Time: 20:17:24

Sheet 14 of 21

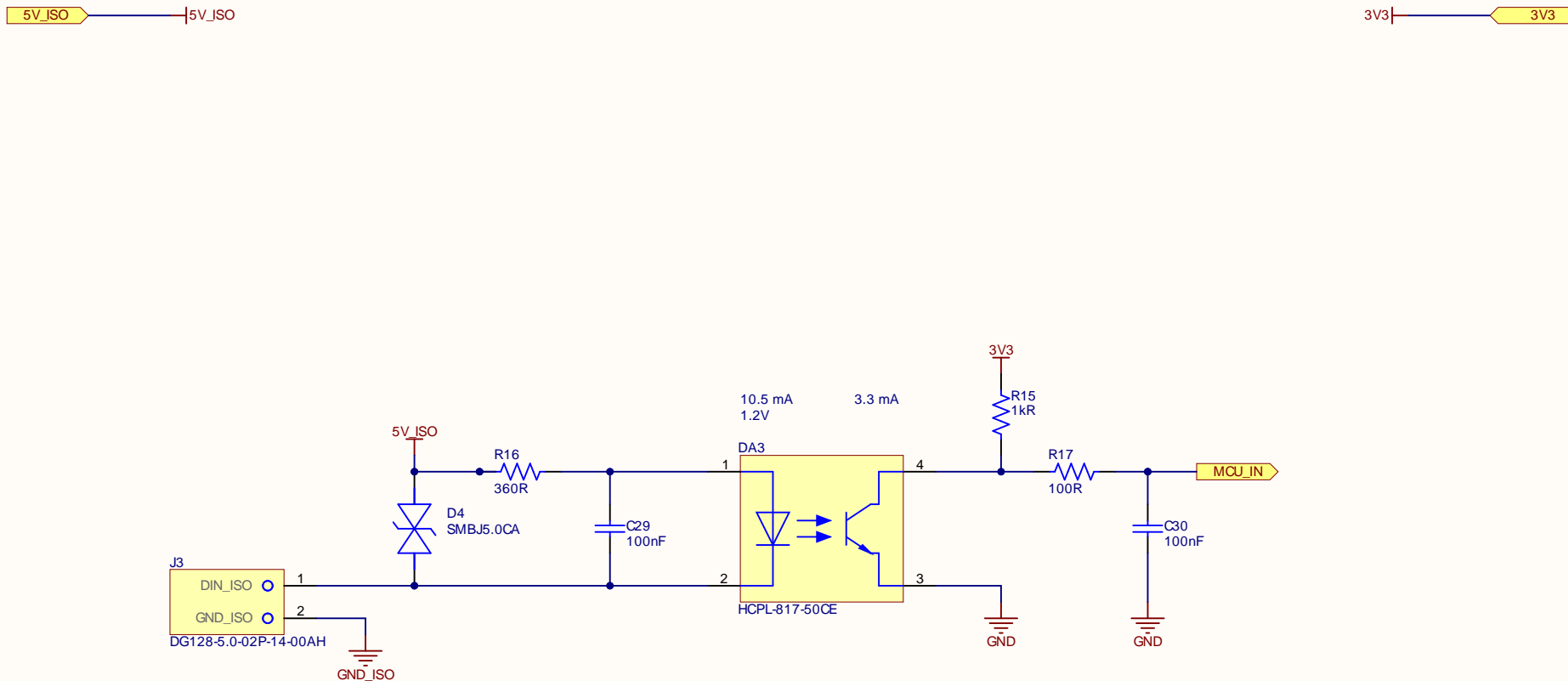
File: Industrial-Controller\_USB.SchDoc

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

Engineer:  
Podlesnyi Vasilii




[www.mrobots.ru](http://www.mrobots.ru)



Current consumption:  $(5V-1.2V) / 360 \text{ Ohm} = 10.5 \text{ mA}$

Power dissipation:  $0.0105 \text{ A} * 0.0105 \text{ A} * 360 \text{ Ohm} = 0.04 \text{ W} (0.1 \text{ max})$

Title: Isolated inputs			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
Date: 17.10.2022	Time: 20:17:24	Sheet 17 of 21	
File: Industrial-Controller Input.SchDoc			 <a href="http://www.mrobots.ru">www.mrobots.ru</a>

3V3

3V3

TEMP

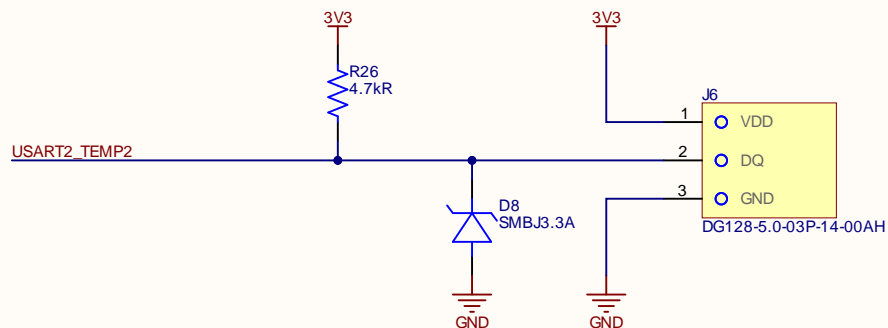
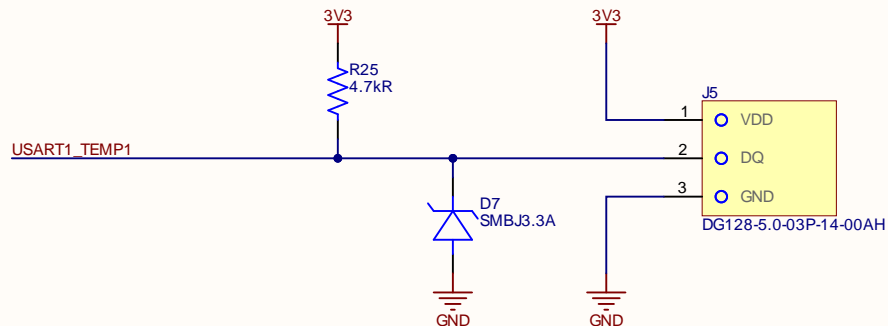
USART1\_TEMP1

USART1\_TEMP1

USART2\_TEMP2

USART2\_TEMP2

TEMP



Title: Temp sensor

Project: Industrial PLC

Size A Number: 0000-0000

Date: 17.10.2022 Time: 20:17:24

File: Industrial-Controller\_Temperature.SchDoc

Revision 0.1.0

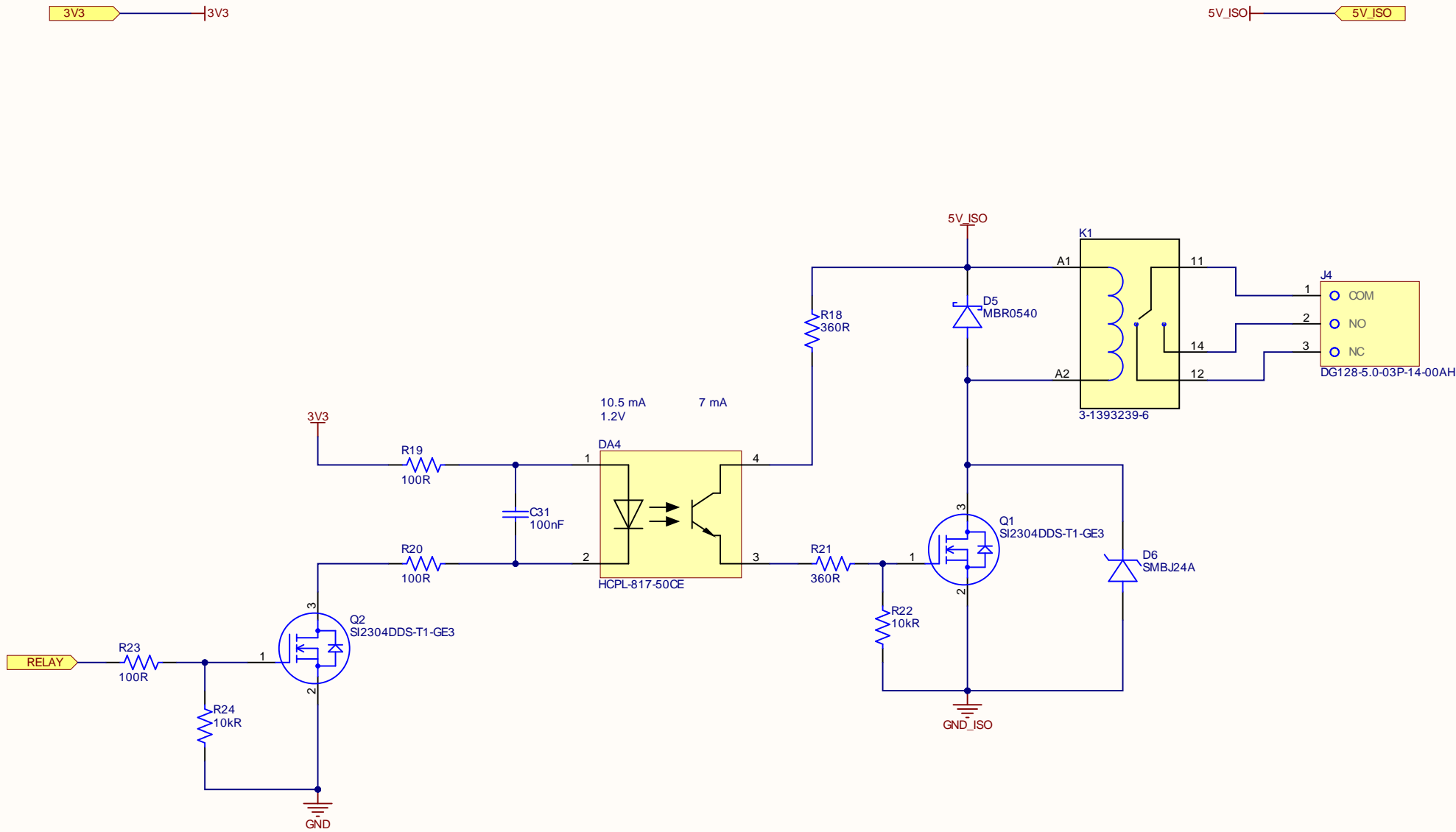
Sheet 18 of 21

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

Engineer:  
Podlesnyi Vasilii




[www.mrobots.ru](http://www.mrobots.ru)



Current consumption:  $(3.3V - 1.2V) / 200 \Omega = 10.5 \text{ mA}$

Power dissipation:  $0.0105 \text{ A} \cdot 0.0105 \text{ A} \cdot 200 \Omega = 0.02 \text{ W} (0.1 \text{ max})$

Title: Relays			MRobot , LCC nab. reki Karpovki, d. 5/3E Saint-Petersburg, 197022 Ph: +7 (911) 701-51-99	 <a href="http://www.mrobots.ru">www.mrobots.ru</a>
Project: Industrial PLC				
Size A	Number: 0000-0000	Revision 0.1.0	Engineer:	
Date: 17.10.2022	Time: 20:17:24	Sheet 19 of 21	Podlesnyi Vasilii	
File: Industrial-Controller_Relay.SchDoc				

A

B

C

D

A

B

C

D

3V3

ESP

USART2\_ESP\_TX  
USART2\_ESP\_RX  
ESP\_RESET  
ESP\_ENABLE  
ESP\_BOOT

ESP

USB

MCU\_USB\_D\_N  
MCU\_USB\_D\_P

USB

SWD

JP1  
3V3  
SWCLK  
GND  
SWDIO  
NRST  
SWO  
61300611121

3V3  
SWCLK  
SWDIO  
NRST  
SWO  
GND

RESET

"ON" - RESET  
"OFF" - NOP

JP2  
RESET  
GND  
61300211121  
HW1  
M7686-05

3V3  
R9 10kR  
C22 100nF  
GND

ESP\_RESET  
USART2\_RX  
USART2\_TX  
ESP\_ENABLE  
ESP\_BOOT  
MCU\_RPM\_FAN  
MCU\_PWM\_FAN  
USART1\_TEMP1  
MCU\_USB\_D\_N  
MCU\_USB\_D\_P  
SWDIO  
SWCLK

U2A

MCU IOs (A, B, C, D)

10	PA0-WKUP	18	PB0
11	PA1	19	PB1
12	PA2	39	PB3
13	PA3	40	PB4
14	PA4	41	PB5
15	PA5	42	PB6
16	PA6	43	PB7
17	PA7	45	PB8
29	PA8	46	PB9
30	PA9	21	PB10
31	PA10	22	PB11
32	PA11	25	PB12
33	PA12	26	PB13
34	PA13 (SWDIO)	27	PB14
37	PA14 (SWCLK)	28	PB15
38	PA15		

NRST  
BOOT0  
BOOT1/PB2  
PC13-TAMPER\_RTC  
PC14 (OSC32\_IN)  
PC15 (OSC32\_OUT)  
PD0 (OSC\_IN)  
PD1 (OSC\_OUT)

STM32F103C6T6A

SWO

RELAY1  
RELAY2  
RELAY3  
RELAY4  
MCU\_IN1  
MCU\_IN2  
MCU\_IN3

RELAY[1..4]

MCU\_IN[1..3]

R10 10kR  
C21 18pF  
Y1 8MHz  
C23 18pF  
GND

TEMP

USART1\_TEMP1  
USART2\_TEMP2

TEMP

FAN

MCU\_RPM\_FAN  
MCU\_PWM\_FAN

FAN


3V3  
C24 10uF  
C25 100nF  
GND  
C26 100nF  
C27 100nF  
C28 100nF  
GND

U2B

MCU PWR

1	VBAT	8	VSSA
9	VDDA	23	VSS_1
		35	VSS_2
		47	VSS_3
24	VDD_1		
36	VDD_2		
48	VDD_3		

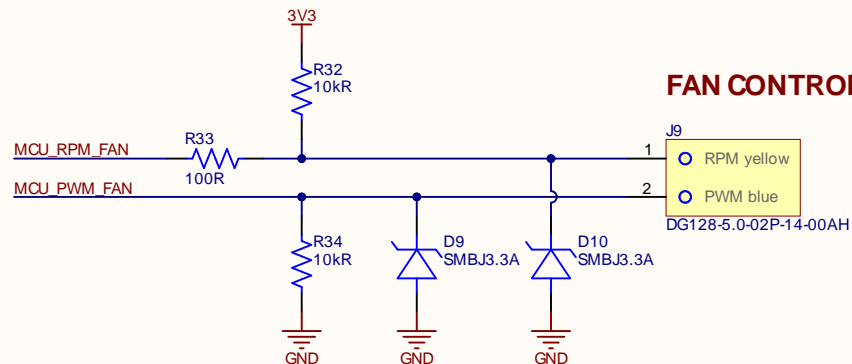
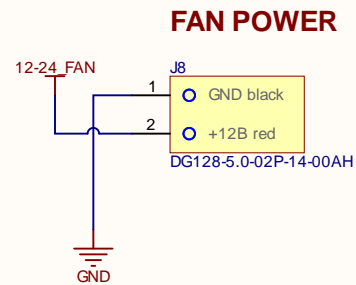
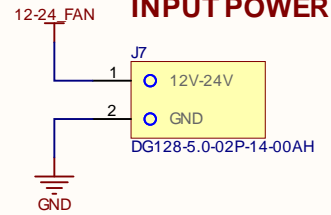
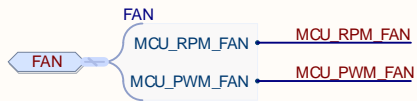
STM32F103C6T6A


Title: MCU			MRobot, LCC nab. reki Karpovki, d. 5/3E Saint-Petersburg, 197022 Ph: +7 (911) 701-51-99	 <a href="http://www.mrobots.ru">www.mrobots.ru</a>
Project: Industrial PLC				
Size A	Number: 0000-0000	Revision 0.1.0	Engineer: Podlesnyi Vasilii	
Date: 17.10.2022	Time: 20:17:24	Sheet 19 of 21		
File: Industrial-Controller MCU.SchDoc				



12-24\_FAN

3V3



Title: Fan			MRobot, LCC nab. reki Karpovki, d. 5/3E Saint-Petersburg, 197022 Ph: +7 (911) 701-51-99	  <a href="http://www.mrobots.ru">www.mrobots.ru</a>
Project: Industrial PLC				
Size A	Number: 0000-0000	Revision 0.1.0	Engineer: Podlesnyi Vasilii	
Date: 17.10.2022	Time: 20:17:24	Sheet 20 of 21		
File: Industrial-Controller_Fan.SchDoc				