

ENGR 3430: Miniproject 3

layout due March 7, 2019

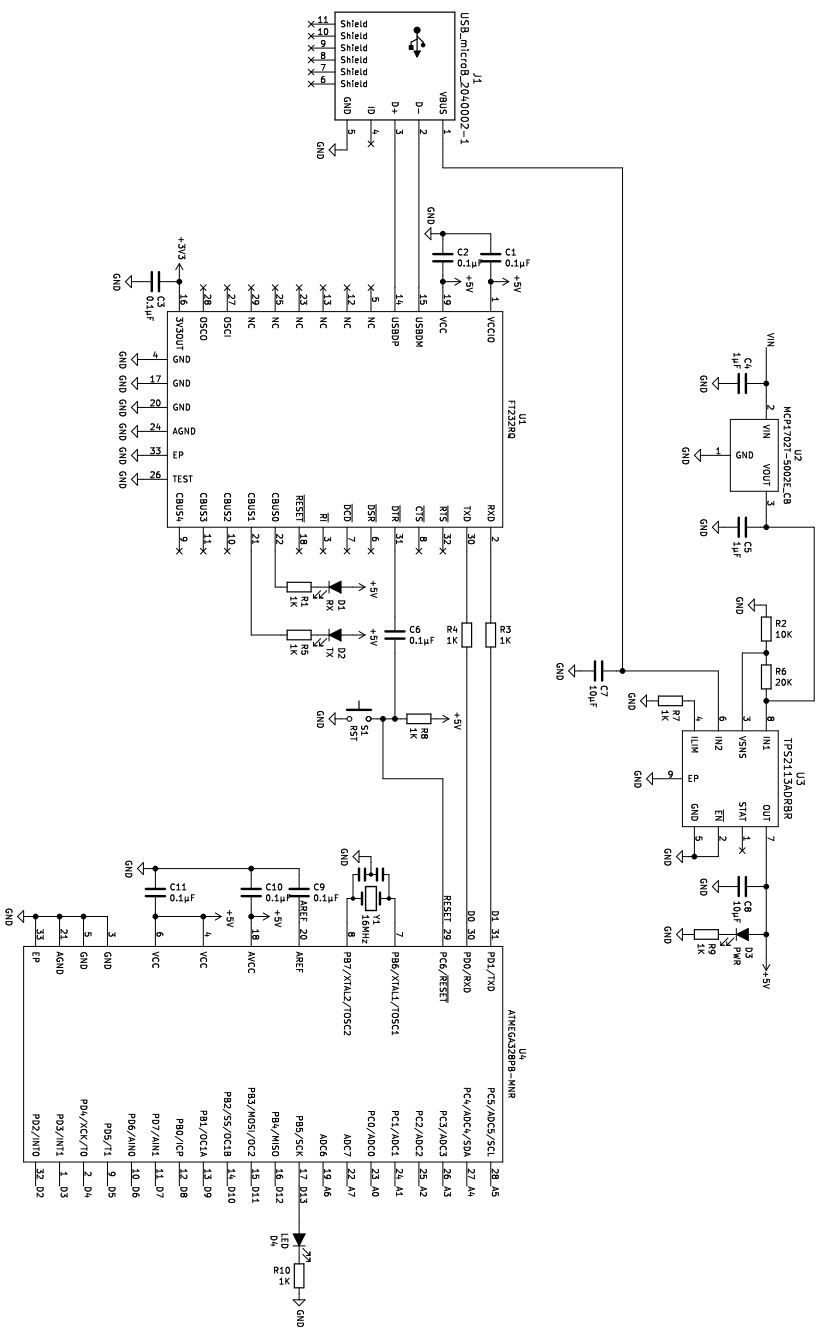
demo due April 1, 2019

In this miniproject, you will gain more experience doing surface-mount printed circuit board (PCB) layout and assembly with a more complex circuit. You will be designing your own Arduino Nano clone based on one of two KiCad projects that you can download from the course website. The two versions differ only in the packages used for the two main integrated circuits on the board: the ATmega328P microcontroller and the FT232R USB-to-UART chip. Version A of the schematic makes use of the smaller leadless QFN package options for both of these chips, whereas version B uses the (slightly) larger package options with leads (i.e., a 32-pin TQFP for the ATmega328P and a 28-pin SSOP for the FT232R). We will submit your boards for fabrication through PCBWay. When they come back, you will assemble your board, program the microcontroller with the Arduino bootloader, and demonstrate the standard blink sketch running on your board.

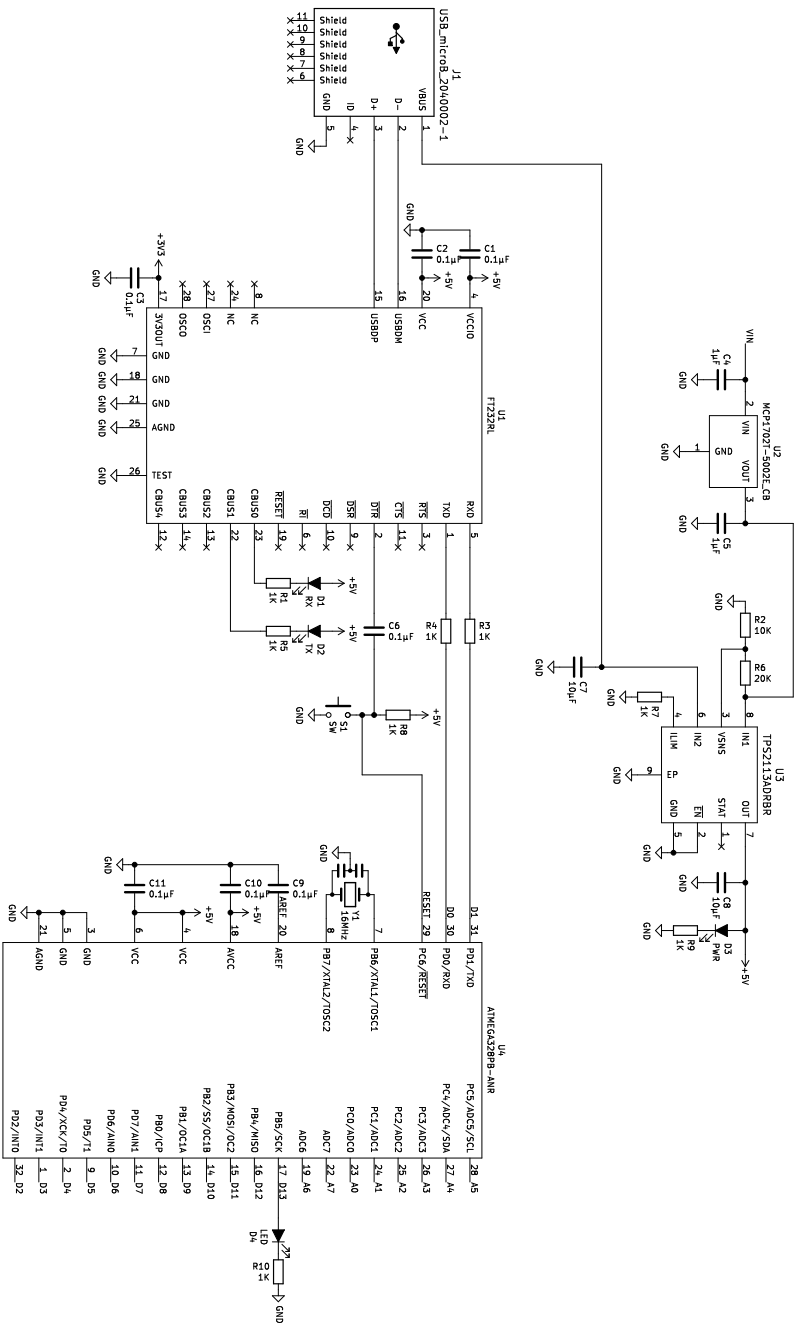
Requirements. Your design must meet the following requirements:

1. It must be a two-layer board, no larger than 3.94 in \times 3.94 in (i.e., 100 mm \times 100 mm) with all components on the top side.
2. The minimum allowable trace width and spacing is 6 mils.
3. The minimum allowable via size is 24 mils with a 12-mil drill hole.

Deliverables. Your final PCB layout is due by noon on Thursday, March 7. You will need to submit copies of all of your KiCad files. Assuming there are no problems with your design, we will generate the Gerber files and submit them to PCBWay for fabrication. The boards should be back from fab sometime late the following week. Once they return, you will assemble your board, program the microcontroller with the Arduino bootloader, and demonstrate the standard blink sketch running on your board by no later than the start of class on Monday, April 1.



U1	MCP1702T-5002L	3	VOU1	+3V3
U2	TPS2113ADRBR	3	VOUT	+5V
U3	74VHC125	1	Y	+5V
U4	AM3359	1	VDD1	+3V3
		2	VDD2	+5V
		3	VDD3	+5V
		4	VDD4	+5V
		5	VDD5	+5V
		6	VDD6	+5V
		7	VDD7	+5V
		8	VDD8	+5V
		9	VDD9	+5V
		10	VDD10	+5V
		11	VDD11	+5V
		12	VDD12	+5V
		13	VDD13	+5V
		14	VDD14	+5V
		15	VDD15	+5V
		16	VDD16	+5V
		17	VDD17	+5V
		18	VDD18	+5V
		19	VDD19	+5V
		20	VDD20	+5V
		21	VDD21	+5V
		22	VDD22	+5V
		23	VDD23	+5V
		24	VDD24	+5V
		25	VDD25	+5V
		26	VDD26	+5V
		27	VDD27	+5V
		28	VDD28	+5V
		29	VDD29	+5V
		30	VDD30	+5V
		31	VDD31	+5V
		32	VDD32	+5V
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		34	VDD34	+5V
		35	VDD35	+5V
		36	VDD36	+5V
		37	VDD37	+5V
		38	VDD38	+5V
		39	VDD39	+5V
		40	VDD40	+5V
		41	VDD41	+5V
		42	VDD42	+5V
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		92	VDD92	+5V
		93	VDD93	+5V
		94	VDD94	+5V
		95	VDD95	+5V
		96	VDD96	+5V
		97	VDD97	+5V
		98	VDD98	+5V
		99	VDD99	+5V
		100	VDD100	+5V



Pin	Function	Value
1	PC5/ADC5/SCI	28. A5
2	PC4/ADC4/SDA	27. A4
3	PC3/ADC3	26. A3
4	PC2/ADC2	25. A2
5	PC1/ADC1	24. A1
6	PC0/ADC0	23. A0
7	AD07	22. A7
8	AD06	19. A6
9	PB9/SCK	17. D13
10	PB8/MISO	16. D12
11	PB3/MOS/OC2	15. D11
12	PB2/SS/OC1B	14. D10
13	PB1/OC1A	13. D9
14	PB0/ICP	12. D8
15	PB7/ANI	11. D7
16	PB6/AN0	10. D6
17	PB5/1	9. D5
18	PA4/CKE/10	2. D4
19	PA3/M1	1. D3
20	PA2/N10	32. D2
21	AREF	20. AREF
22	RESET	29. RESET
23	PB7/TIM2/TOSC2	7. PB7/TIM2/TOSC2
24	PB6/TIM2/TOSC1	7. PB6/TIM2/TOSC1
25	PB0/2ND	30. 2ND
26	PB1/1XD	31. 1XD
27	AREF	20. AREF
28	AREF	20. AREF
29	AREF	20. AREF
30	AREF	20. AREF
31	AREF	20. AREF
32	AREF	20. AREF