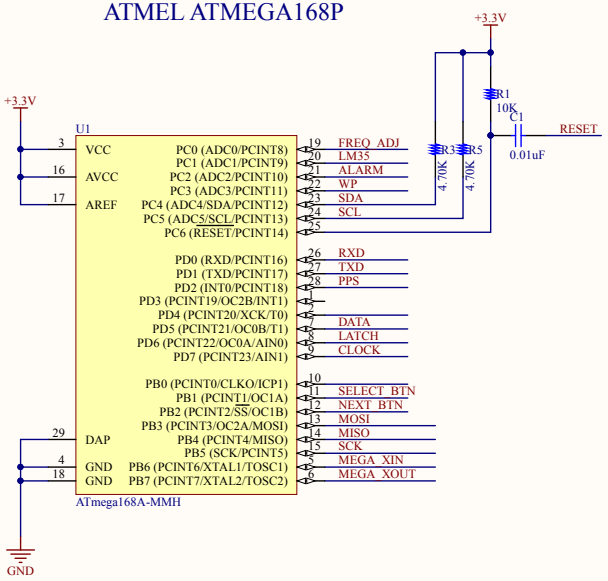
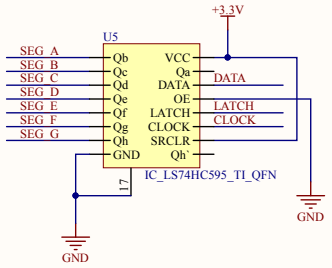
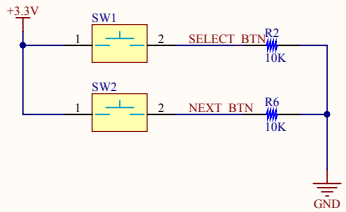
ATMEL ATMEGA168P

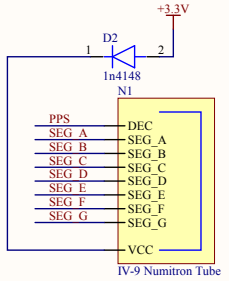




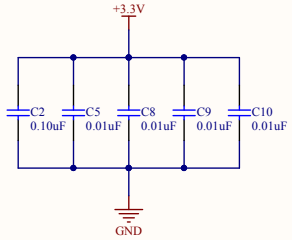
CONTROL BUTTONS



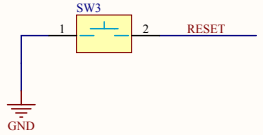
Numitron Tube



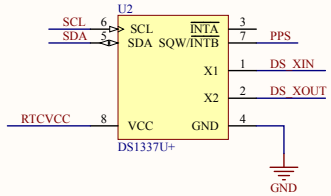
DECOUPLING CAPS



RESET BUTTON

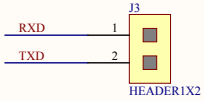


RTC DS1337



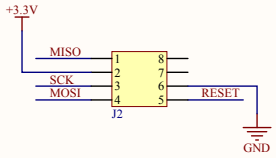
PPS is open drain, requires a pull up 10k should be fine

SERIAL TERMINAL PORT

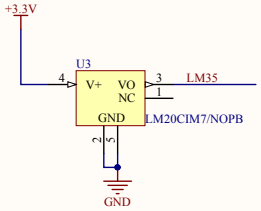


\RTS is not used
\CTS is \RESET
RXD,TXD switched at the connector

ISCP



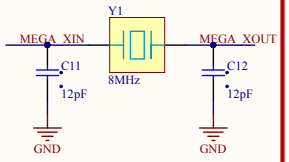
LM35 TEMP SENSOR



Alarm Buzzer

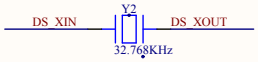
Load cap formula 2(C-cstray), 2(8-2) = 12

MEGA CRYSTAL



Load cap formula 2(C-cstray), 2(7pF-2) = 10pF

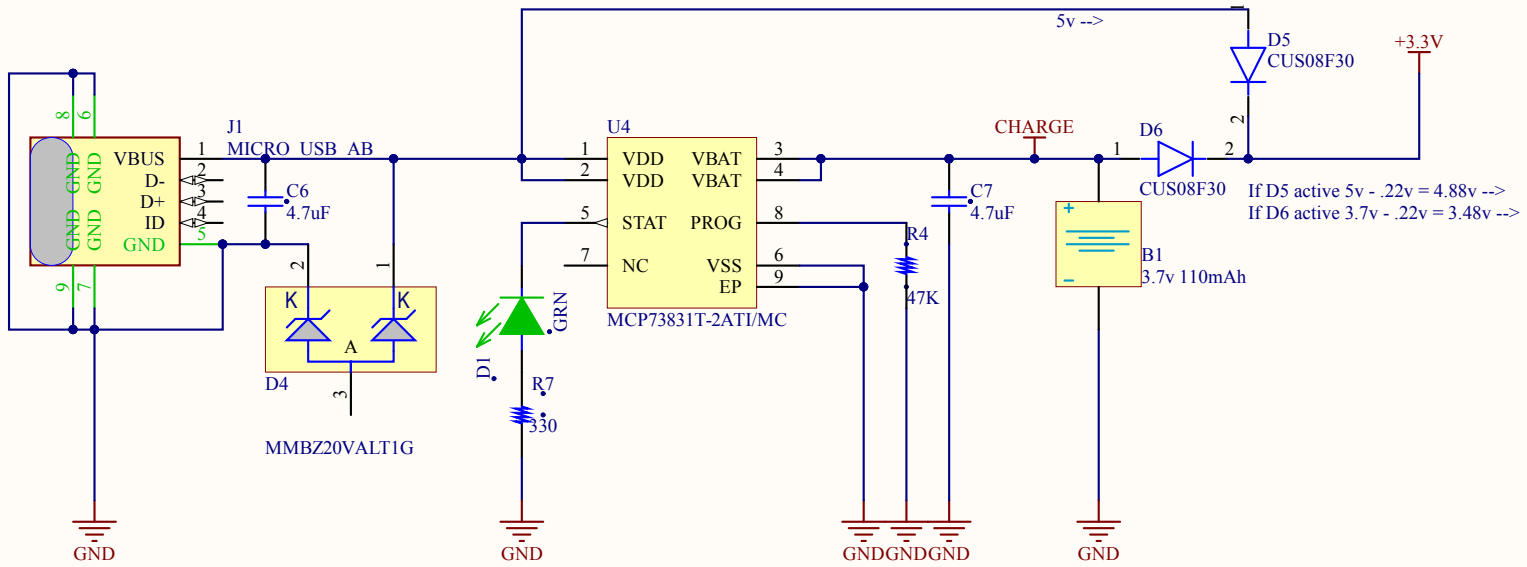
RTC CRYSTAL



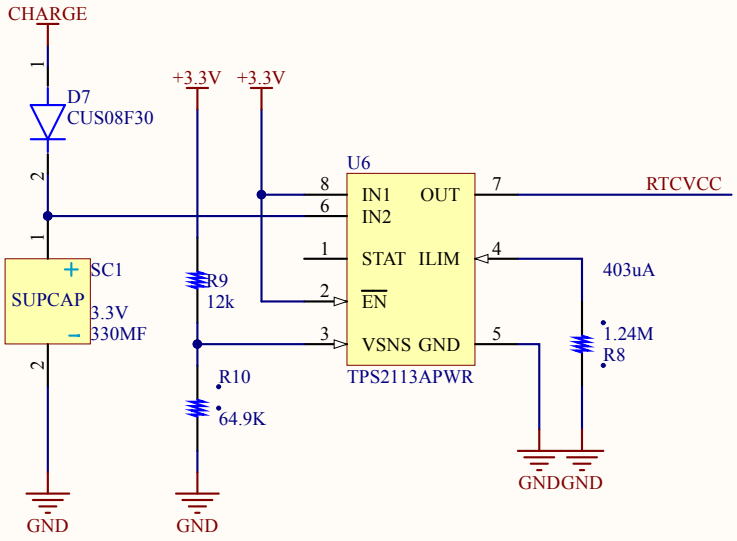

```
int INTERUPT_0 = 2;          //This is the PPS signal from the RTC.
int Freq_Adj = A0;           //this is our trimmer for boost converter or light sensor.
int FILL = A1;               //Filament of the VFD/Numitron, not used if sevenseg
int LM35 = A2;               //ADC used for the Temp sensor LM35
int ALARM = A3;                                          //Alarm buzzer pin.
int Select_BTN = 9;
int Next_BTN = 10;

int DATA_PIN = 5;        //Serial Data input
int LATCH = 6;           // Shift Register clock input
int CLOCK = 7;           // Storage register clock input

//328P Pin out/Ports.
//PORT B
//PB0 = 8, PB1 = OC1A/9/PWM, PB2 = OC1B/10/PWM, PB3 = MOSI/OC2A/11/PWM,
//PB4 = MISO/12, PB5 = SCK/13, PB6 = XTAL1, PB7 = XTAL2.
//PORT C
//PC0 = A0,PC1 = A1, PC2 = A2, PC3 = A3, PC4 = SDA(Data)/A4, PC5 = SCL(Clock)/A5,
//PC6 = Reset.
//PORT D
//PD0 = RXD/0, PD1 = TX/1, PD2 = 3, PD3 = OC2B/3/PWM, PD4 = 4, PD5 = OC0B/5/PWM,
//PD6 = OC0A/6/PWM, PD7 = 7, PD8 = 8.
```

Title		
Size: B	Number	Revision
Date: 10/1/2015		Sheet of
File: C:\Products\...\Micro.SchDoc		Drawn By:

USB power / Lipo charger



Super Cap Charger, Supply Switch



Title		
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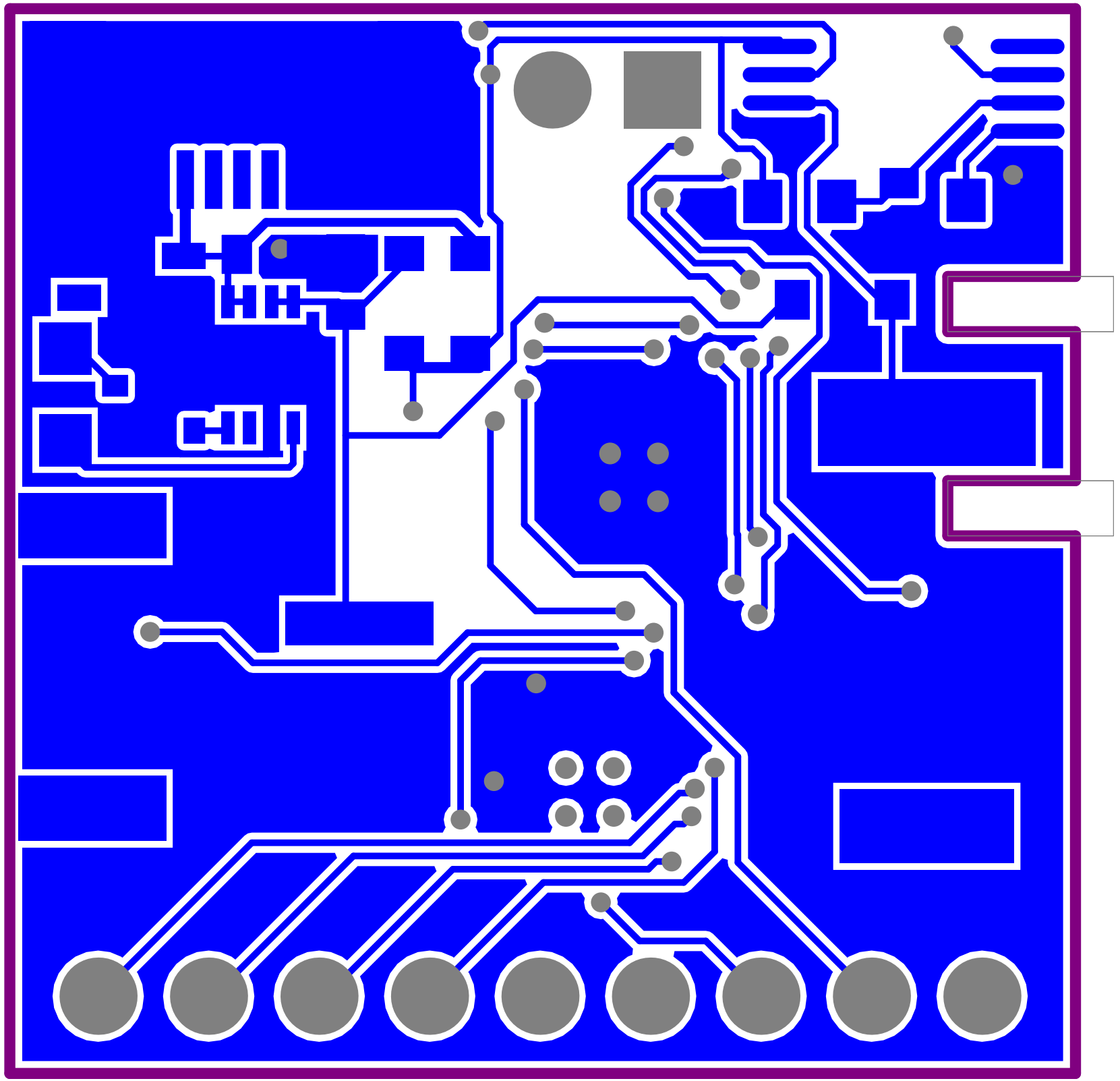
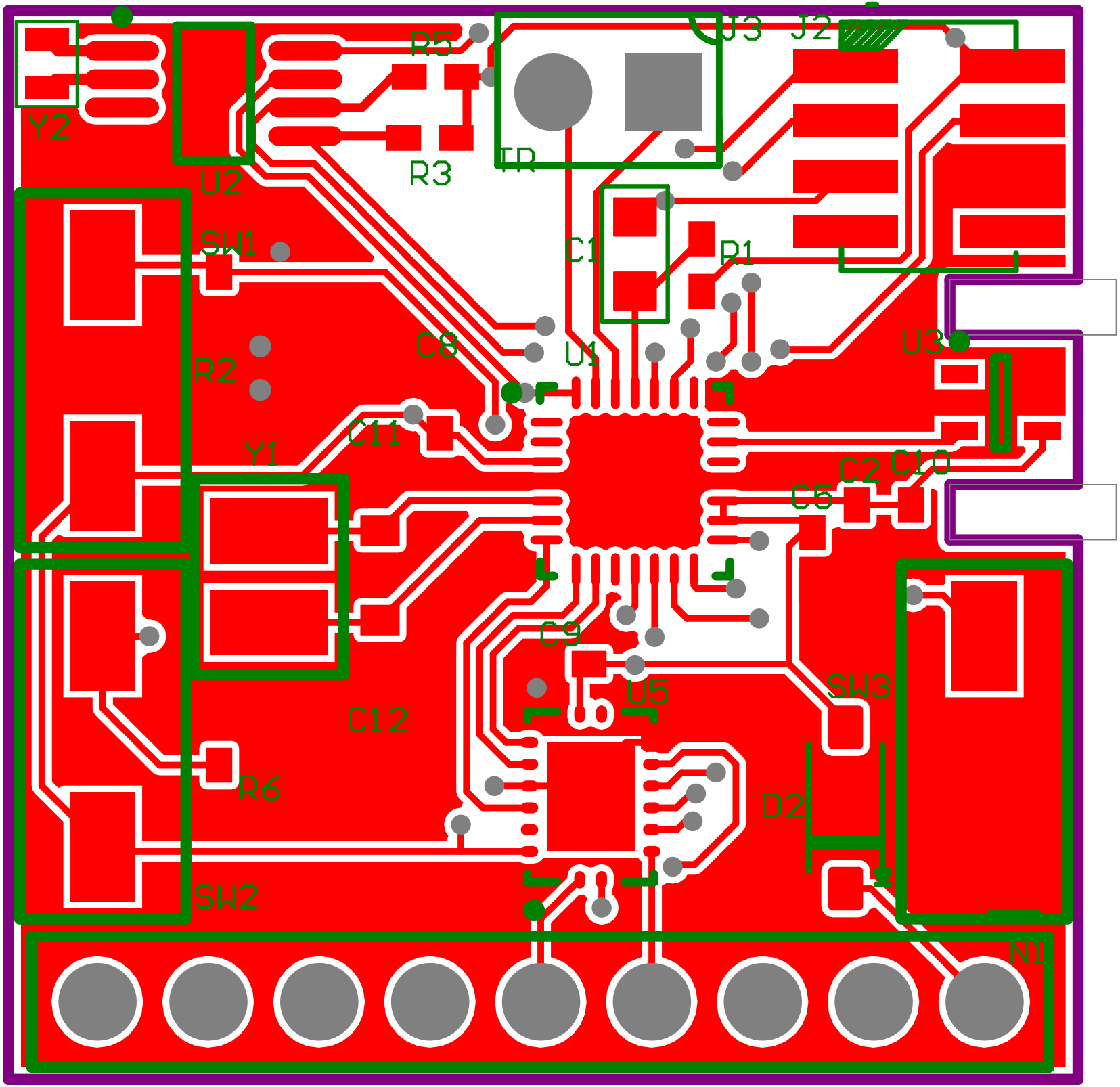
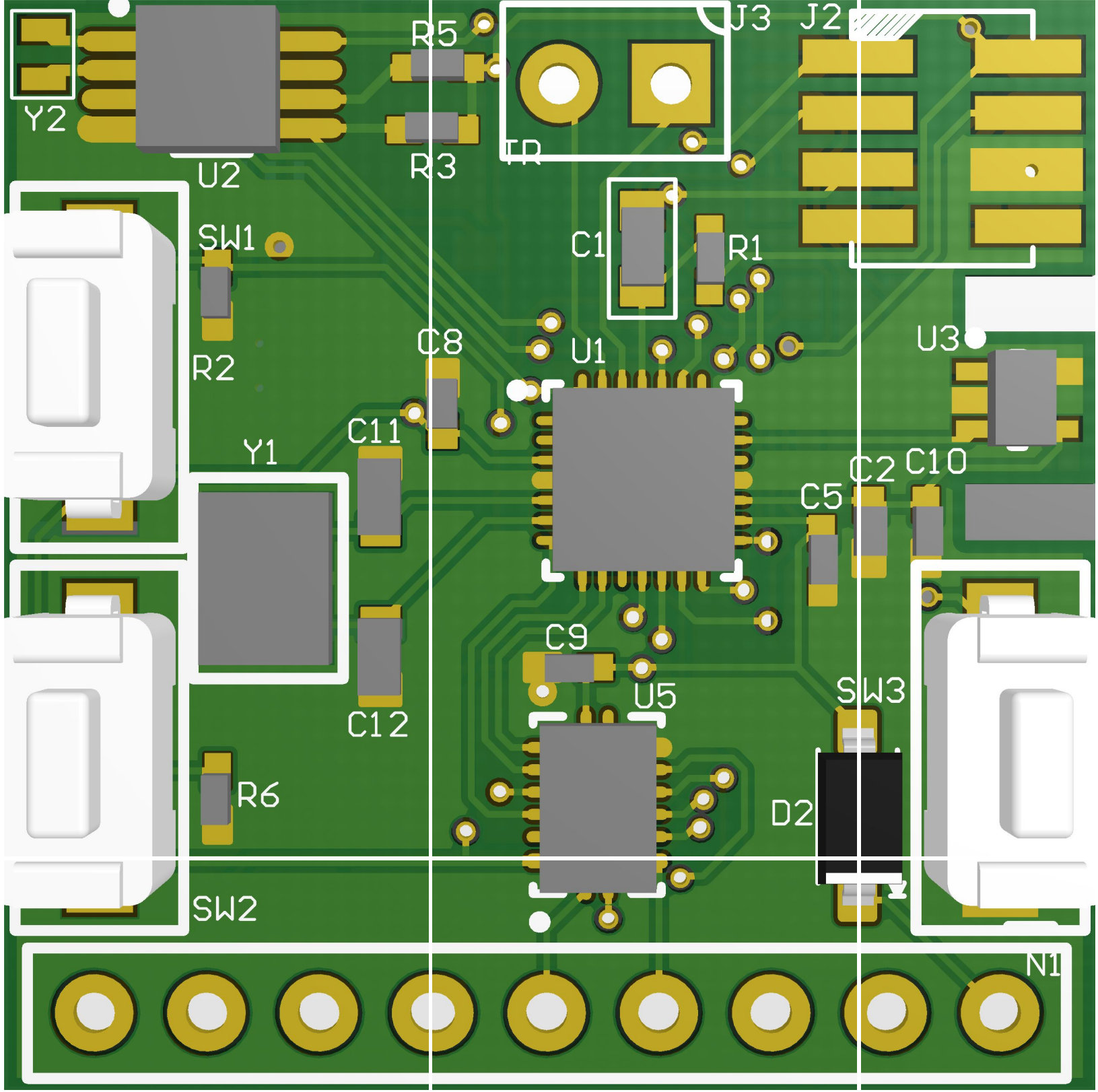
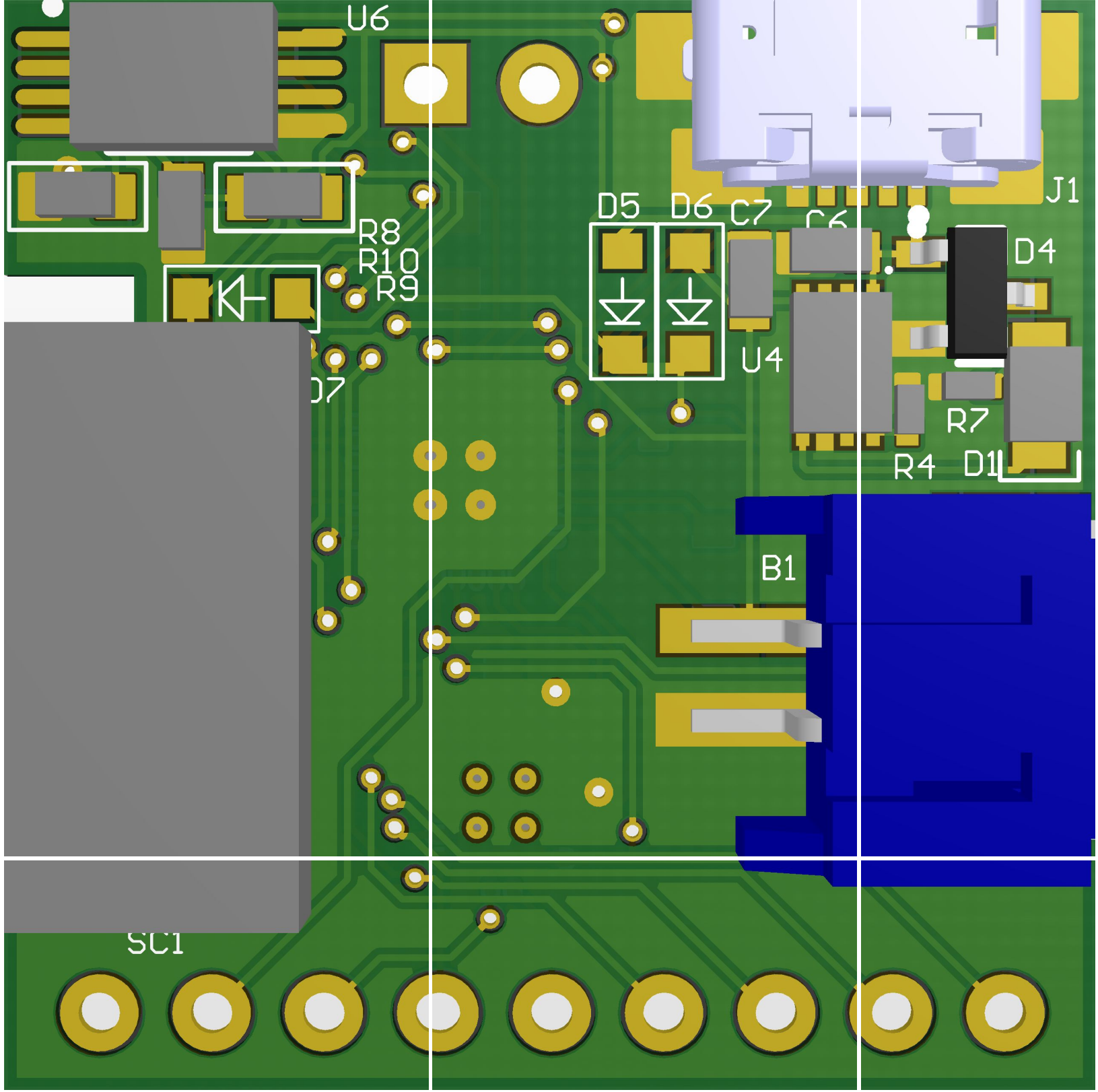
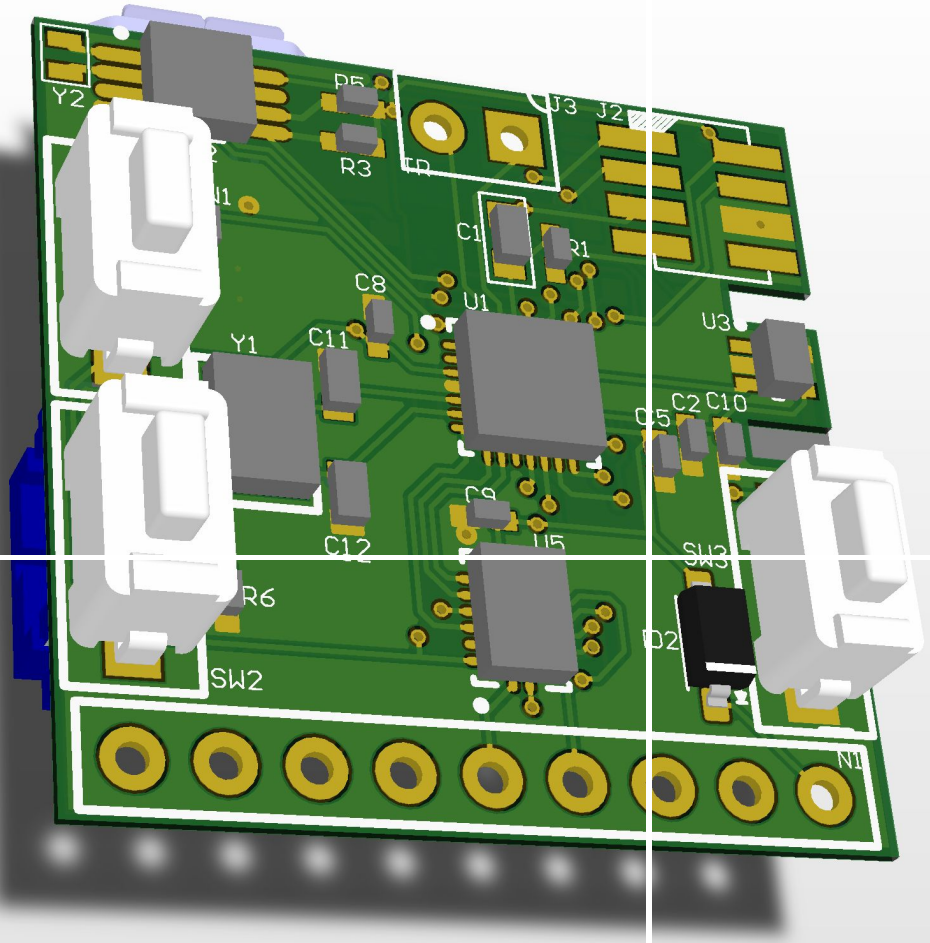
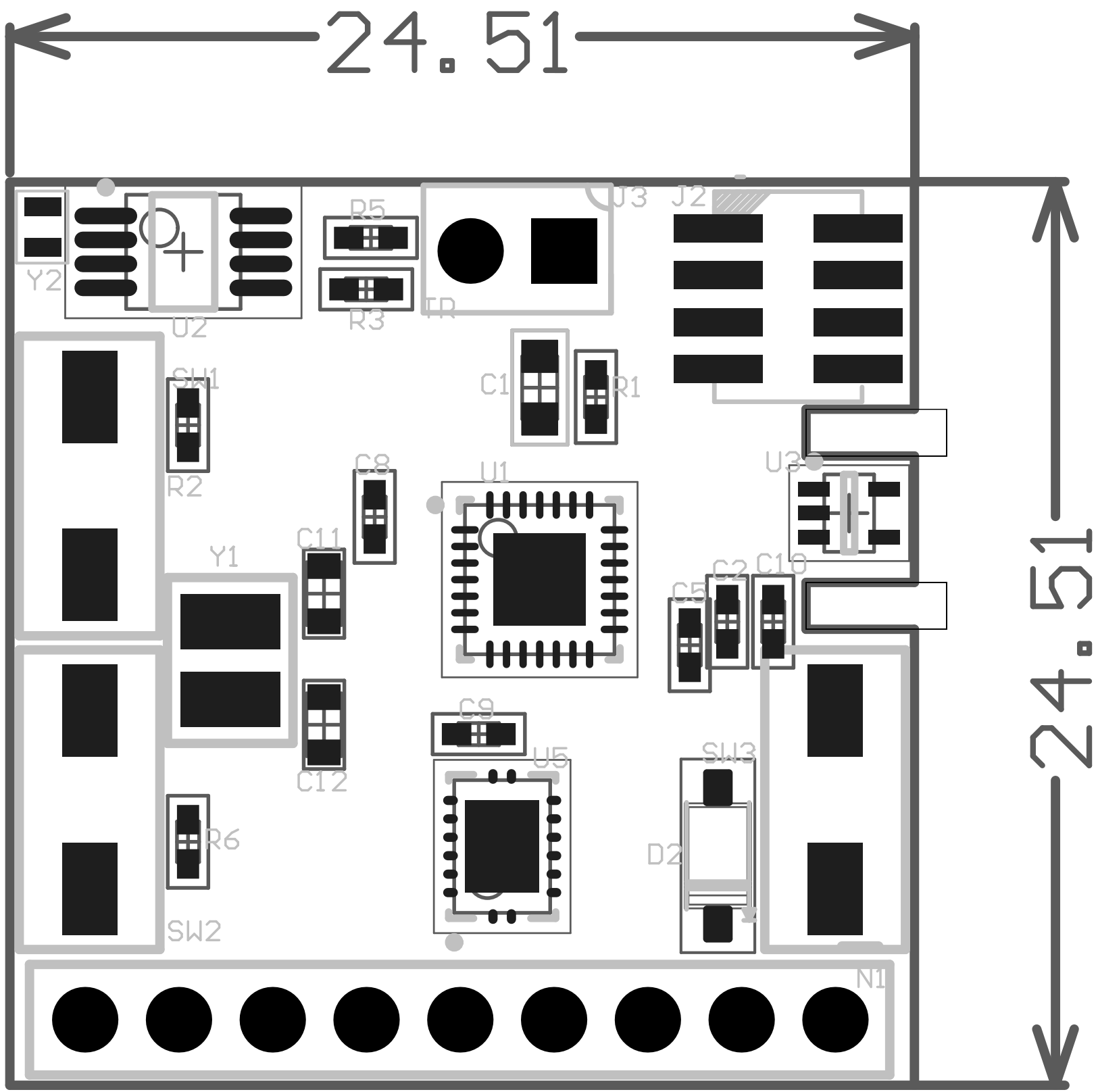



R5
U3
J2
Y2
U2
R3
TR
SW1
C1
R1
C8
U1
U3
R2
C11
Y1
C2
C10
C5
C9
U5
SW3
C12
R6
D2
SW2
N1


Y2
U2
R5
R3
U3
J2
SW1
C1
R1
R2
C8
U1
U3
C11
Y1
C2
C10
C5
C9
U5
SW3
C12
R6
D2
SW2
N1


U6
R8
R10
R9
D7
D5
D6
C7
C6
J1
D4
U4
R7
R4
D1
B1
SC1


Y2
R3
U3
J2
C1
C8
U1
Y1
C11
C2
C10
C5
C12
R6
SW3
D2
SW2
N1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24.51
Y2
U2
R5
R3
TR
J3
J2
SW1
R2
C1
R1
C8
U1
U3
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Y1
C2
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C5
C9
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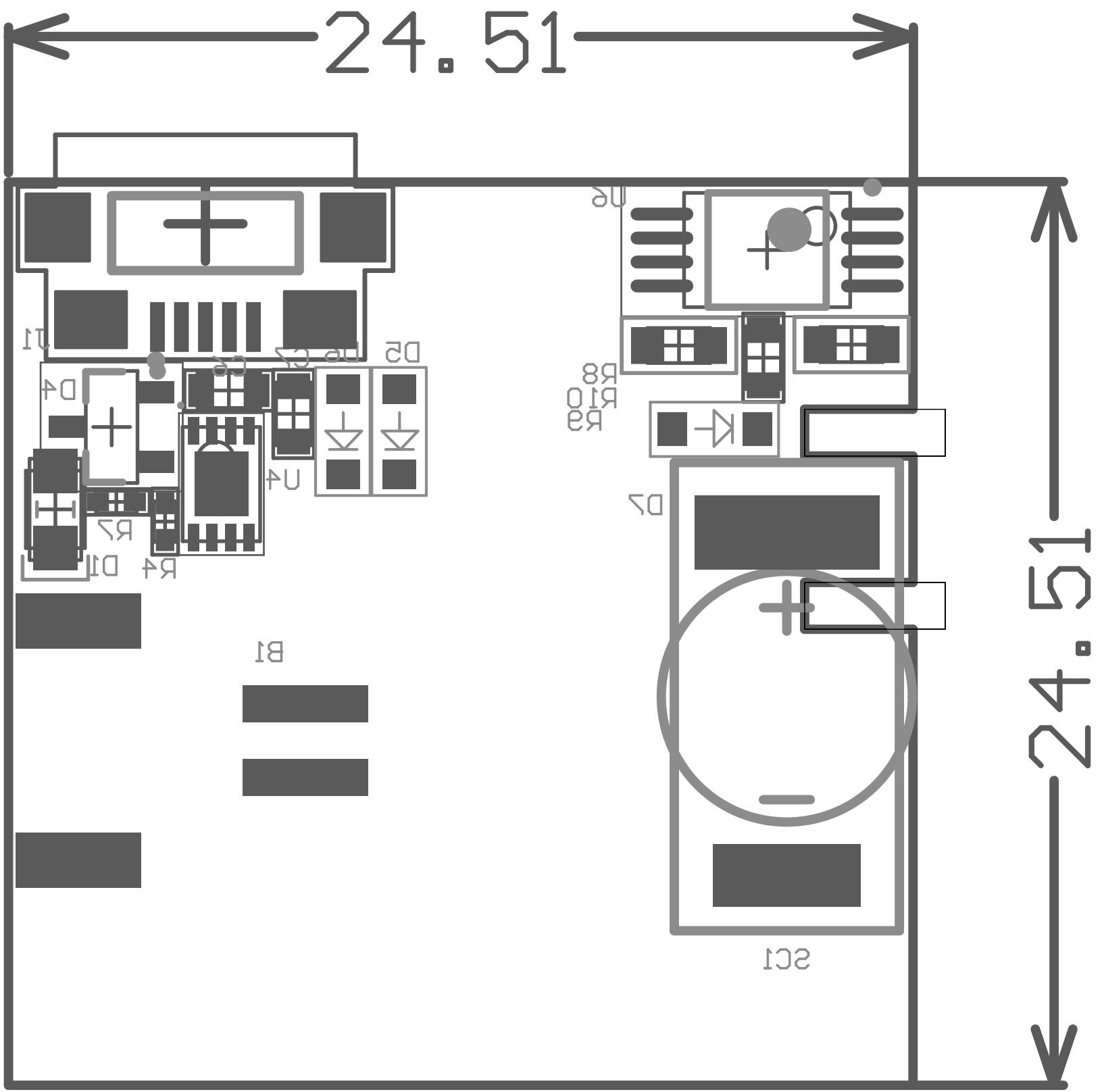
SW3
C12
R6
D2
SW2
N1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24.51
U6
R8
R10
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C7
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D4
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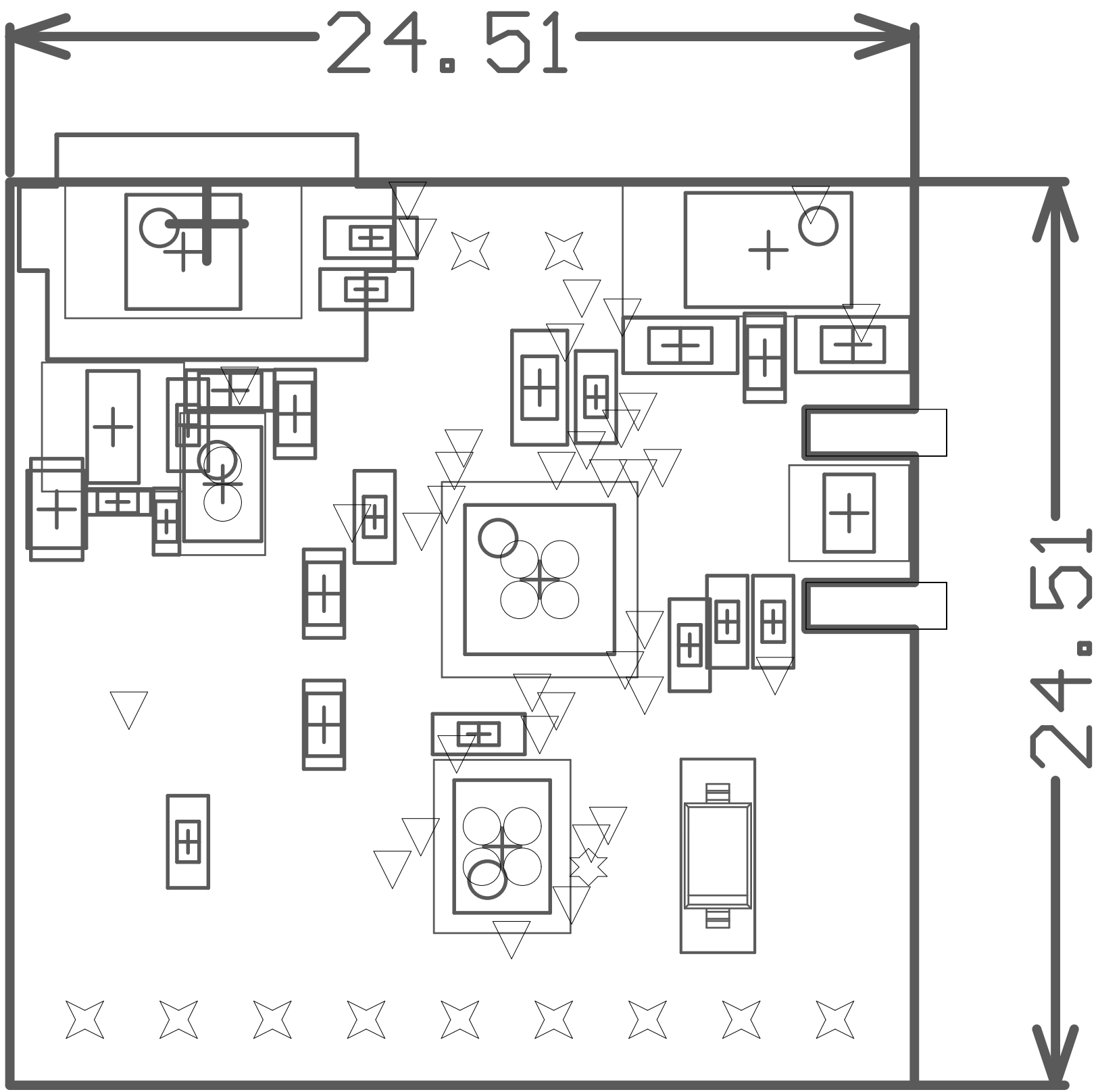
J1
B1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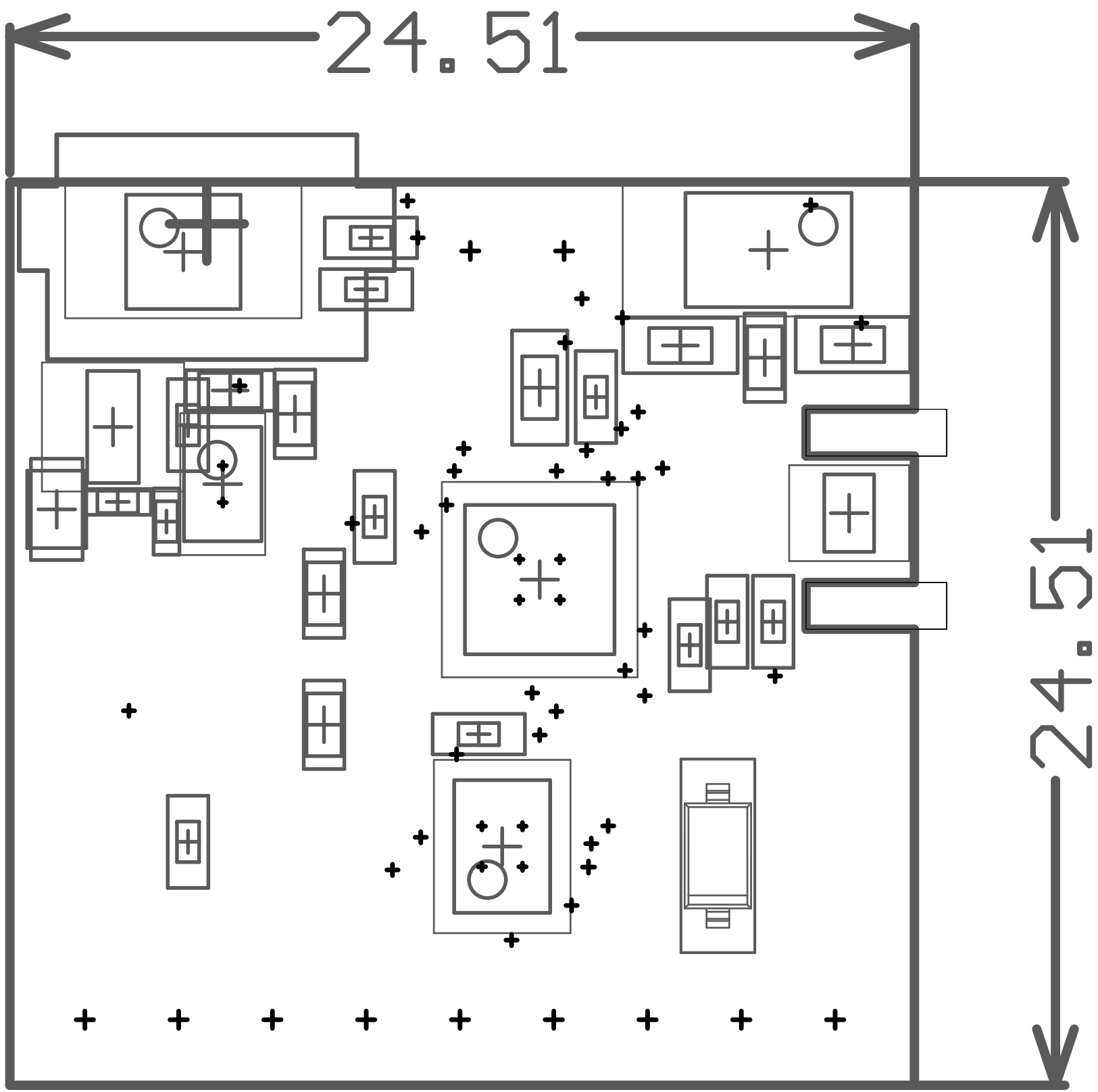
24.51
24.51

WeisTek Engineering

Bill of Materials

Bill of Materials For Project [NumiClockMicro.PrjPcb] (No PCB Document Selected)

Source Data From: NumiClockMicro.PrjPcb
Project: NumiClockMicro.PrjPcb
Variant: None

Creation Date: 10/1/2015 11:46:31 PM
Print Date: 01-Oct-15 11:46:38 PM

Production Quantity: 3
Currency: USD

Item Number	Quantity	Designator	Value	Footprint	Description	LibRef	Comment	Supplier 1	Supplier Part Number 1	Supplier Unit Price 1	Supplier Order Qty 1	Supplier Subtotal 1	Manufacturer 1	Manufacturer Part Number 1	#Column Name Error:Supplier 2	#Column Name Error:Supplier Part Number 2	#Column Name Error:Supplier Unit Price 2	#Column Name Error:Supplier Order Qty 2	#Column Name Error:Supplier Subtotal 2	#Column Name Error:Manufacturer 2	#Column Name Error:Manufacturer Part Number 2	#Column Name Error:Library Name	#Column Name Error:Library Reference
	1	B1	3.7v 110mAh	LIPO_110mAh	400mAh_Lipo_battery	LIPO_400mAh_Sparkfun	LIPO_400mAh_Sparkfun	SparkFun	10718				Supplier disabled	Supplier disabled									
	1	C1	0.01uF	C1608N	CAP CER 10000PF 50V 5% X7R 0603	C103_0603_X7R_50V0_5%_Kemet	C103_0603_X7R_50V0_5%_Kemet						Kemet	C0603C103J5RACTU\									
	1	C2	0.10uF	C1005N	CAP CER 0.1UF 16V 10% X7R 0402	C104_0402_X7R_16V0_10%_Kemet	C104_0402_X7R_16V0_10%_Kemet	Digi-Key	399-3521-1-ND	$ 0.1100	3	$ 0.3300	Kemet	C0402C104K4RACTU									
	4	C5, C8, C9, C10	0.01uF	C1005N	CAP CER 10000PF 25V 5% X7R 0402	C103_0402_X7R_25.0V_5%_Kemet	C103_0402_X7R_25.0V_5%_Kemet	Digi-Key	399-1279-1-ND	$ 0.0360	12	$ 0.4320	Kemet	C0402C103J3RACTU									
	2	C6, C7	4.7uF	C1608L	CAP CER 4.7UF 6.3V 20% X5R 0603	C475-0603-X5R-20%	C475-0603-X5R-20%	Digi-Key	445-1417-1-ND	$ 0.1700	6	$ 1.0200	TDK Corporation	C1608X5R0J475M080AB									
	2	C11, C12	12pF	C1608L	CAP CER 12PF 50V 5% C0G 0603	C120-0603-C0G-NPO-5%_TDK	C120-0603-C0G-NPO-5%	Digi-Key	445-1270-1-ND	$ 0.0300	10	$ 0.3000	TDK Corporation	C1608C0G1H120J080AA									
	1	D1	GRN	LEDCP2015X08L	LED THIN 560NM GRN DIFF 0805 SMD	LED-GRN-0805-LUMEX-SML-LXT0805SGW	LED-GRN-0805-LUMEX-SML-LXT0805SGW	Digi-Key	67-1553-1-ND	$ 0.4700	3	$ 1.4100	Lumex Opto/Components Inc.	SML-LXT0805GW-TR									
	1	D2		SOD123	DIODE GEN PURP 100V 150MA SOD123	DIODE-1N4148-100v-150MA-SOD123-MICRO	1n4148	Digi-Key	1N4148WTPMSCT-ND	$ 0.1100	3	$ 0.3300	Micro Commercial Co	1N4148W-TP									
	1	D4		SOT23_95P237x111-3N	TVS DIODE 17VWM 28VC SOT23	TVS_MMBZ20VALT1G_OnSemi	TVS_MMBZ20VALT1G_OnSemi	Digi-Key	MMBZ20VALT1GOSCT-ND	$ 0.2200	3	$ 0.6600	ON Semiconductor	MMBZ20VALT1G									
	3	D5, D6, D7		DIODE-USC	DIODE SCHOTTKY 30V 800MA USC	DIODE-CUS08F30-30v-800MA-USC-Toshiba	CUS08F30	Digi-Key	CUS08F30H3FCT-ND	$ 0.3400	9	$ 3.0600	Toshiba Semiconductor and Storage	CUS08F30,H3F									
	1	J1	MICRO_USB_AB	CONN USB_Micro		CONN_MICRO_USB_AB	MICRO_USB_AB	Digi-Key	H11635CT-ND	$ 1.0200	3	$ 3.0600	Hirose Electric Co Ltd	ZX62-AB-5PA(11)									
	1	J2		4x2 50mil header_FCI	CONN HEADER 8POS DL UNSHRD SMD	HEADER 4x2 50mil FCI	HEADER 4x2 50mil FCI	Digi-key	609-3694-1-ND	$ 0.7000	3	$ 2.1000	FCI	20021121-00008C4LF									
	1	J3		CONN_2P_SINGLE_100MIL		CONN_2P_Header	HEADER1X2	Digi-Key	SAM1035-50-ND	$ 2.1800	3	$ 6.5400	Samtec Inc.	TSW-150-07-T-S									
	3	R1, R2, R6	10K	C1005N	RES 10K OHM 1/10W 5% 0402 SMD	R103_0402_5%_Panasonic	10K	Digi-Key	P10KJCT-ND	$ 0.0106	50	$ 0.5300	Panasonic Electronic Components	ERJ-2GEJ103X									
	2	R3, R5	4.70K	C1005N	RES 4.7K OHM 1/10W 1% 0402 SMD	R472-0402-1%	R472-0402-1%	Digi-Key	P4.70KLCT-ND	$ 0.1000	6	$ 0.6000	Panasonic Electronic Components	ERJ-2RKF4701X									
	1	R4	47K	C1005L	DEPRECATED - RES 47K OHM 1/10W 5% 0402 SMD	R473-0402-5%	R473-0402-5%	Digi-Key	P47KJCT-ND	$ 0.1000	3	$ 0.3000	Panasonic Electronic Components	ERJ-2GEJ473X									
	1	R7	330	C1005L		R331-0402-5%	R331-0402-5%	Digi-Key	P3.30KLCT-ND	$ 0.1000	3	$ 0.3000	Panasonic Electronic Components	ERJ-2RKF3301X									
	1	R8	1.24M	C1608N	RES SMD 4.7M OHM 5% 1/10W 0603	R4.7M-0603-5%-Yageo	1.24M	Digi-Key	311-4.7MGRCT-ND	$ 0.0110	10	$ 0.1100	Yageo	RC0603JR-074M7L									
	1	R9	12k	C1608N	RES SMD 12K OHM 5% 1/10W 0603	R123_0603_5%_Panasonic	R123_0603_5%_Panasonic						Panasonic Electronic Components	ERJ-3GEYJ123V									
	1	R10	64.9K	C1608L	RES SMD 64.9 OHM 1% 1/10W 0603	R643R9-0603-1%_Yageo	R643R9-0603-1%_Yageo	Digi-key	311-64.9HRCT-ND	$ 0.0140	10	$ 0.1400	Yageo	RC0603FR-0764R9L									
	1	SC1	330MF	SUPCAP_330MF	CAP 330MF -20% +80% 3.3V SMD	SUPCAP_330MF_SMD	SUPCAP_330MF_SMD	Digi-Key	604-1160-1-ND	$ 2.5200	3	$ 7.5600	Elna America	DSK-3R3H334T-HL									
	3	SW1, SW2, SW3		SPST_NO_6x3.5	SWITCH TACTILE SPST-NO 0.05A 24V	SPST-NO_6mm_x_3.5mm	SPST-NO_6mm_x_3.5mm	Digi-key	450-2146-1-ND	$ 0.3300	9	$ 2.9700	TE Connectivity Alcoswitch Switches	FSM2JMTR									
	1	U1		28M1_N	8-bit AVR Microcontroller, 16KB Flash, 512 Bytes EEPROM, 1KB SRAM, 28-pin VQFN, Industrial Grade (-40°C to 85°C).	ATmega168A-MMH	ATmega168A-MMH																
	1	U2		U8+1_N	I2C Serial Real-Time Clock, 8-Pin uSOP, -40 to 85 degC, Pb-Free	DS1337U+	DS1337U+																
	1	U3		MAA05A_N	2.4V, 10µA Temperature Sensor, 5-pin SC-70 Micro SMD, Pb-Free	LM20CIM7/NOPB	LM20CIM7/NOPB																
	1	U4		DFN-MC8	Miniature Single-Cell, Fully Integrated Li-Ion, Li-Polymer Charge Management Controller, 4.2V, 8-Pin DFN, Industrial Temperature, Tape and Reel	MCP73831T-2ATIMC	MCP73831T-2ATIMC	Digi-Key	MCP73831T-2ATIMC-ND	$ 0.4500	3300	$ 1,485.0000	Microchip Technology	MCP73831T-2ATIMC									
	1	U5		QFN50P350X250X100-HS-17N	IC 8-BIT SHIFT REGISTER 16-DIP	IC_LS74HC595_TI_QFN	IC_LS74HC595_TI_QFN	Digi-Key	568-2719-1-ND	$ 0.4700	3	$ 1.4100	Texas Instruments	SN74HC595N									
	1	U6		PW8_N	Dual In / Single Out Autoswitching Power Mux 2.8 to 5.5 V, -40 to 85 degC, 8-pin TSSOP (PW), Green (RoHS & no Sb/Br)	TPS2113APWR	TPS2113APWR	Digi-Key	296-16938-1-ND	$ 2.1500	3	$ 6.4500	Texas Instruments	TPS2113APWR									
	1	Y1	8MHz	NDK_8MHZ_CRYSTAL	Crystal 8.0000MHz 50ppm 8pF 500 Ohm -40°C - 150°C AEC-Q200 Surface Mount 2-SMD	CRYSTAL_8Mhz_8pF_Micro_NDK	CRYSTAL_8Mhz_8pF_Micro_NDK	Digi-Key	644-1178-1-ND	$ 0.9000	3	$ 2.7000	NDK	NX3225GD-8MHZ-STD-CRA-3									
	1	Y2	32.768KHz	ABS05	Crystal 32.7680kHz 20ppm 12.5pF 90 kOhm -40°C - 85°C Surface Mount 2-SMD	CRYSTAL-32.768KHZ_ABS-Micro	32.768KHz	Digi-Key	535-11899-1-ND	$ 1.4600	3	$ 4.3800	Abracon LLC	ABS05-32.768KHZ-T									
	42									$ 14.0016		$ 1,531.6920					$ -		$ -				

Approved

Notes