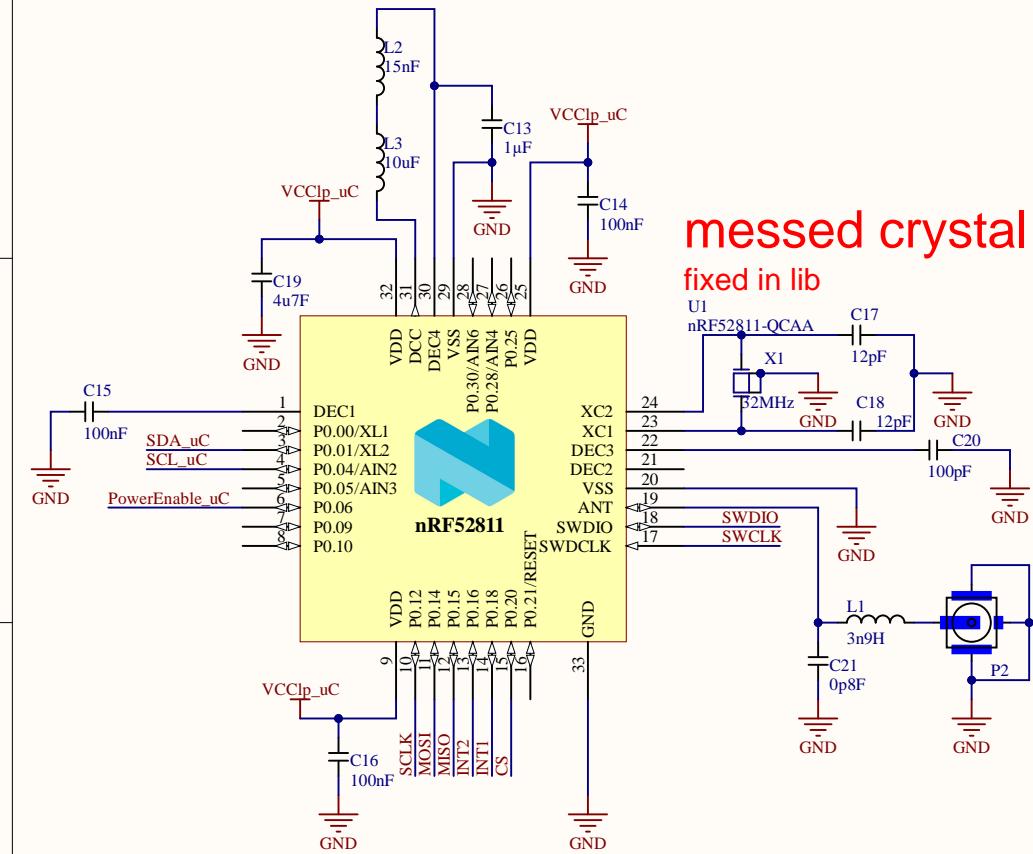
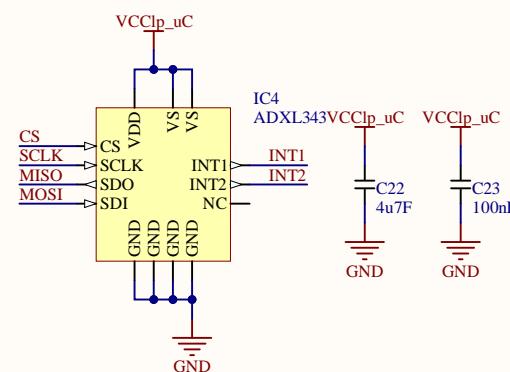


A

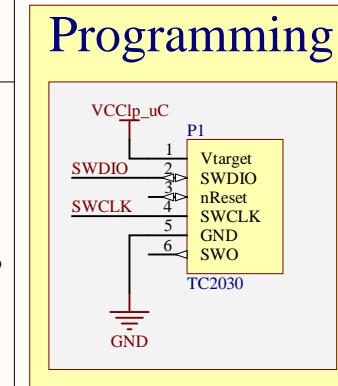
messed crystal pinout, rotate 90°  
fixed in lib



B



C

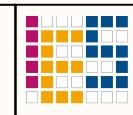


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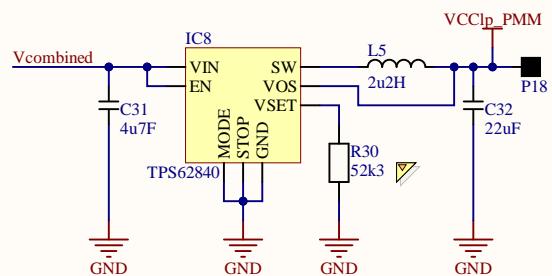
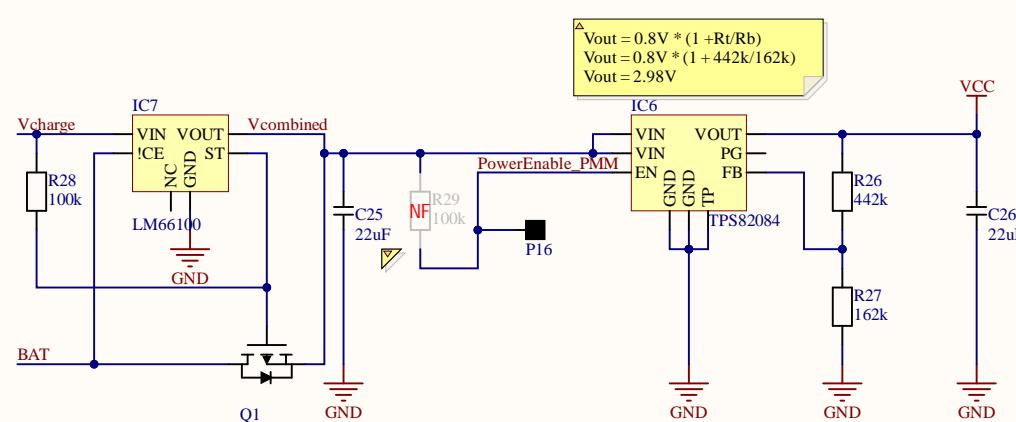
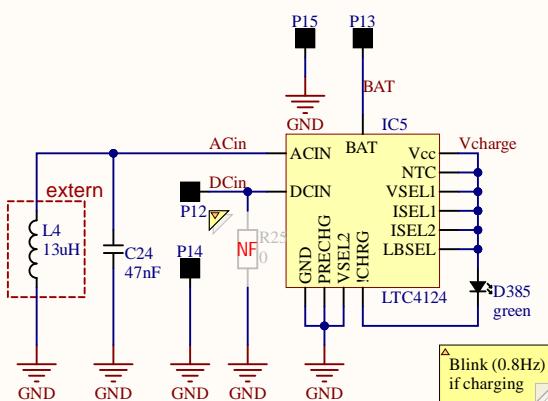
### Title: Fair Dice

Project: FlexVI.PjPcb	Date: 14.05.2021
File: Microcontroller.SchDoc	
Variant: Standard	Revision: 0.2
Author: Dominik G.	Sheet: 1 of 4

TU Darmstadt  
IES  
Merckstraße 25  
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Germany



A

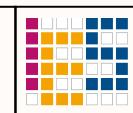

**Title: Fair Dice**

Project: FlexV1.PjtPcb

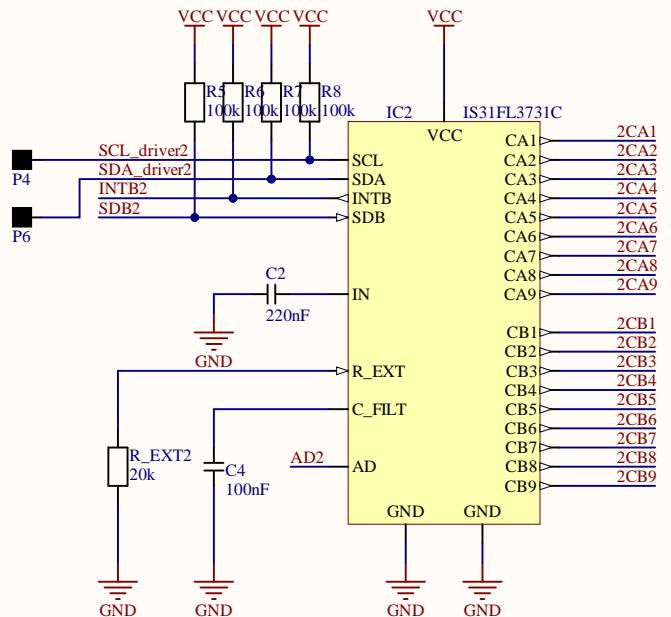
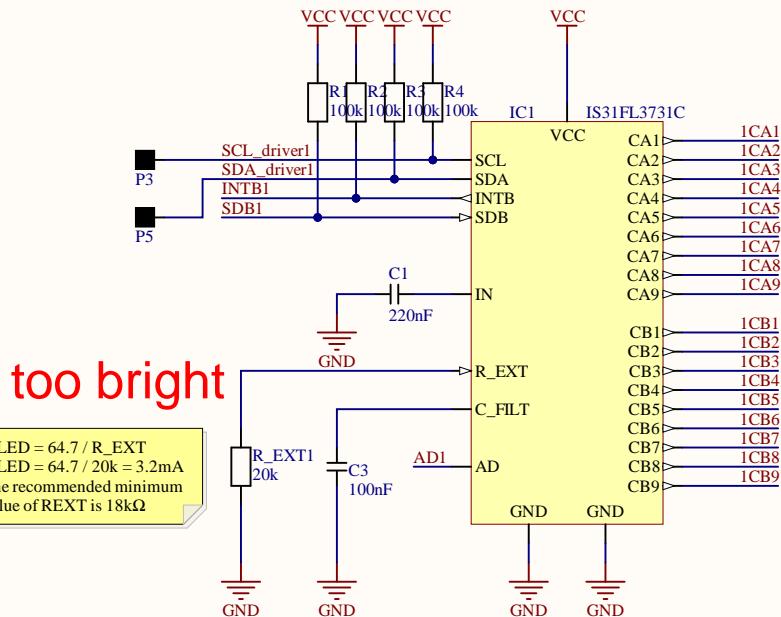
File: PowerMM.SchDoc

Variant: Standard

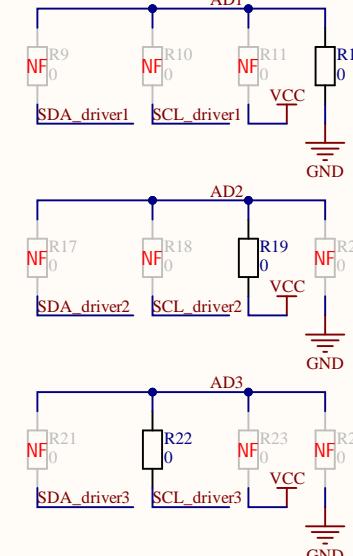
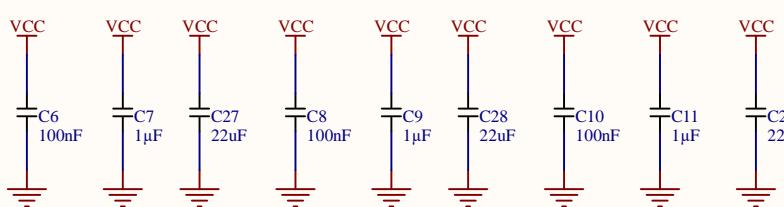
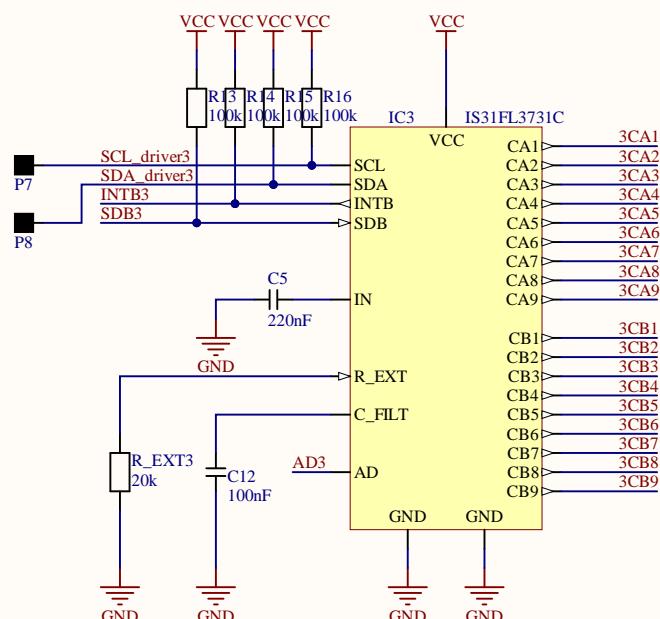
Author: Dominik G.

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 IES  
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 Germany


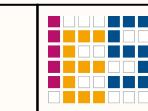
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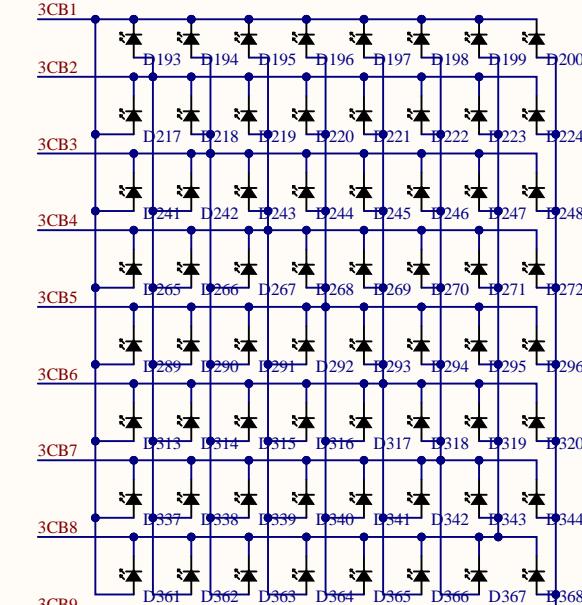
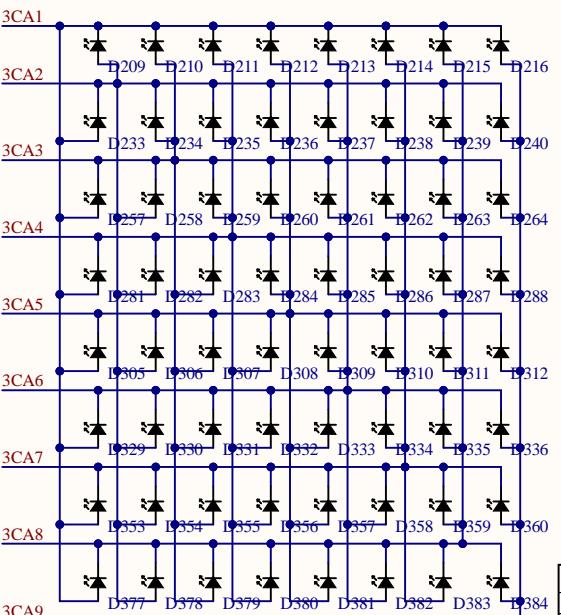
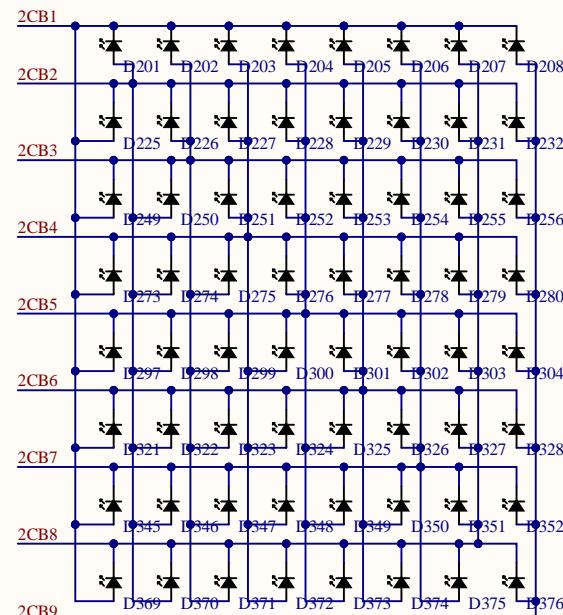
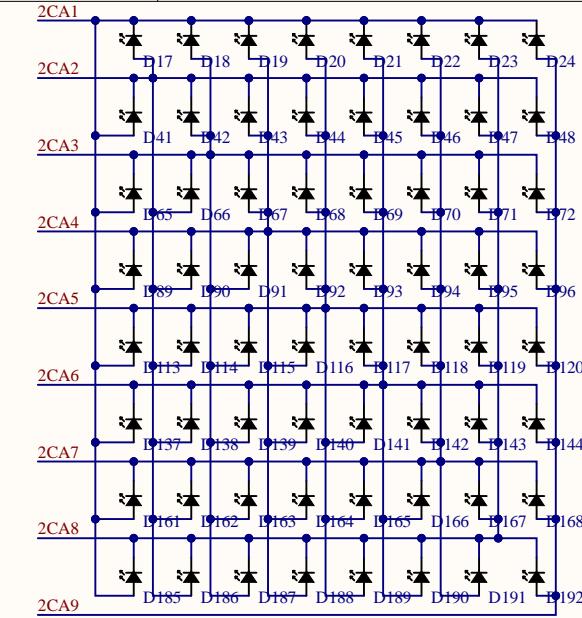
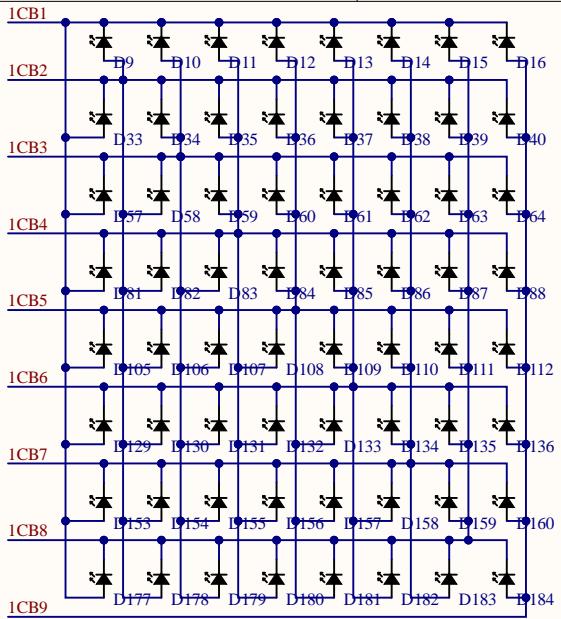
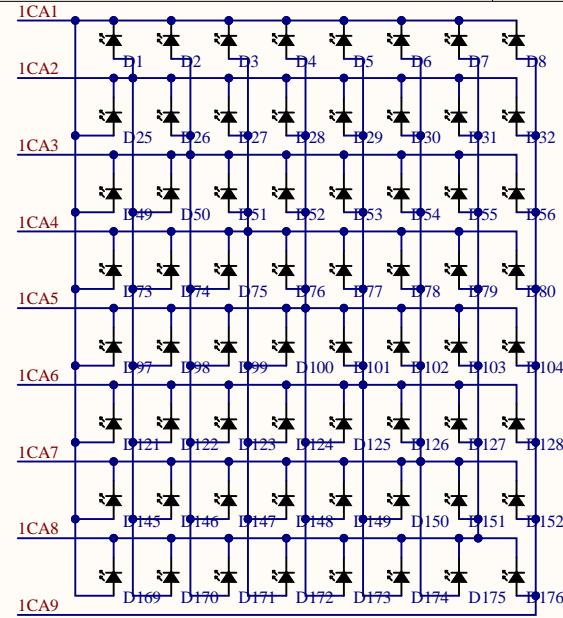


B

**Title: Fair Dice**

Project: FlexV1.PjPcb	TU Darmstadt
File: LEDController.SchDoc	IES
Variant: Standard	Merckstraße 25
Author: Dominik G.	64283 Darmstadt
	Germany

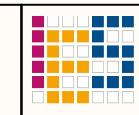




**Title: Fair Dice**

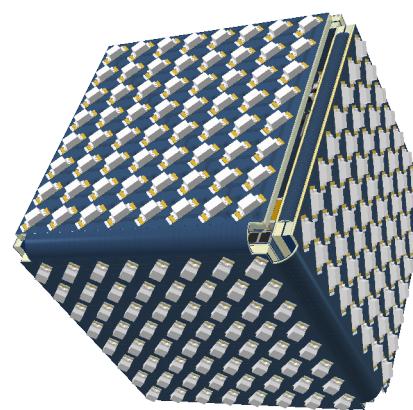
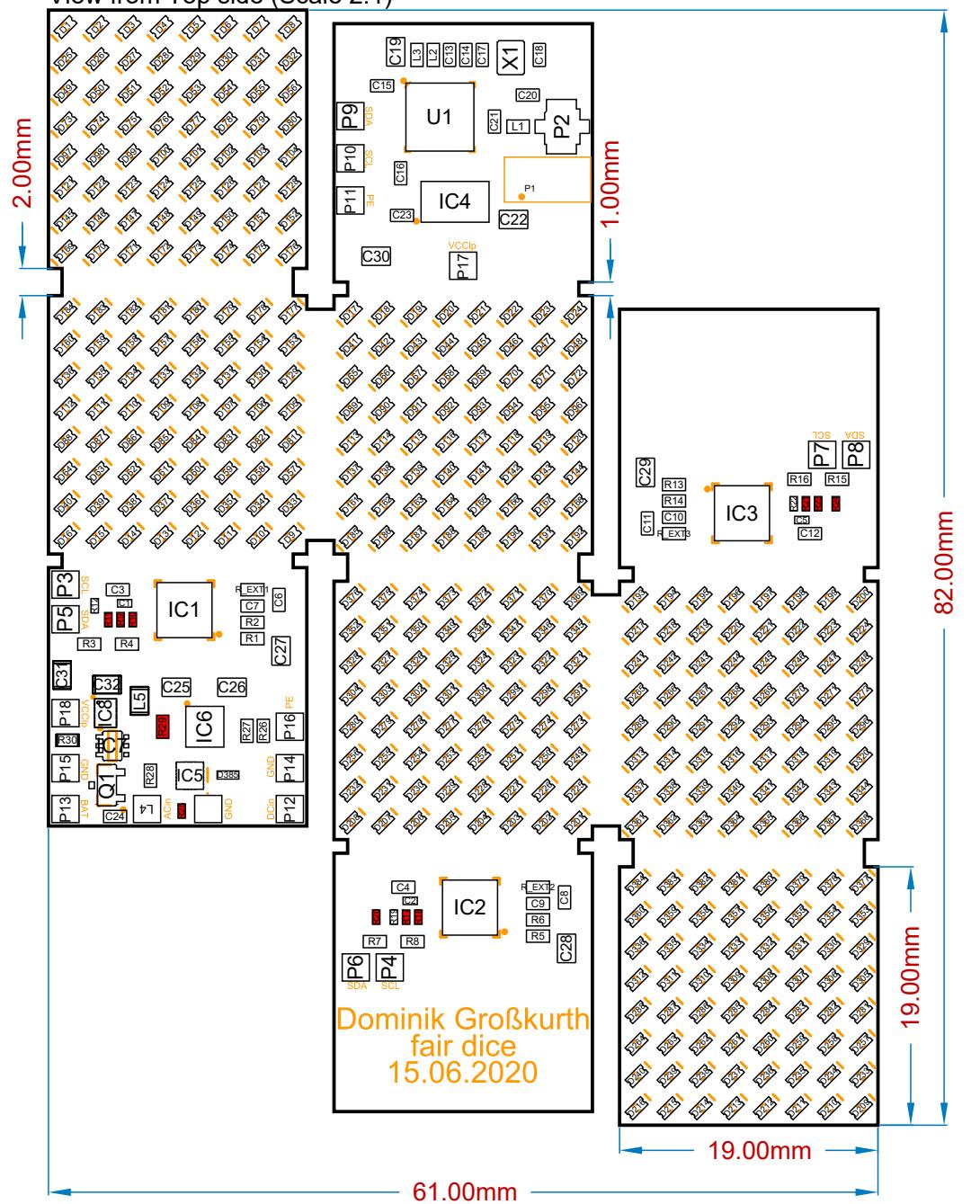
Project: FlexV1.PrtPcb  
File: LEDs.SchDoc  
Variant: Standard  
Author: Dominik G.

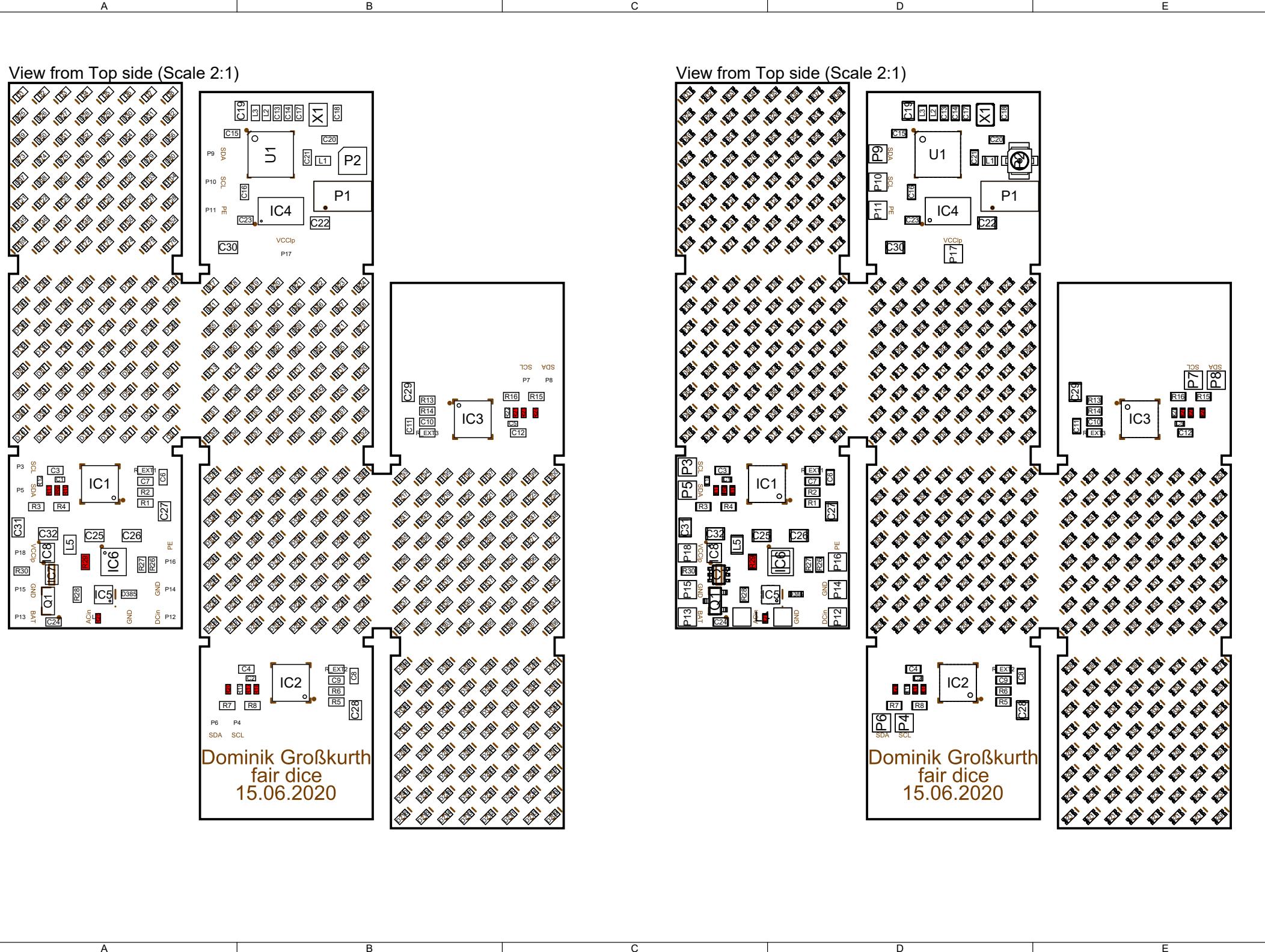
TU Darmstadt  
IES  
Merckstraße 25  
64283 Darmstadt  
Germany



# Realistic View

View from Top side (Scale 2:1)





A

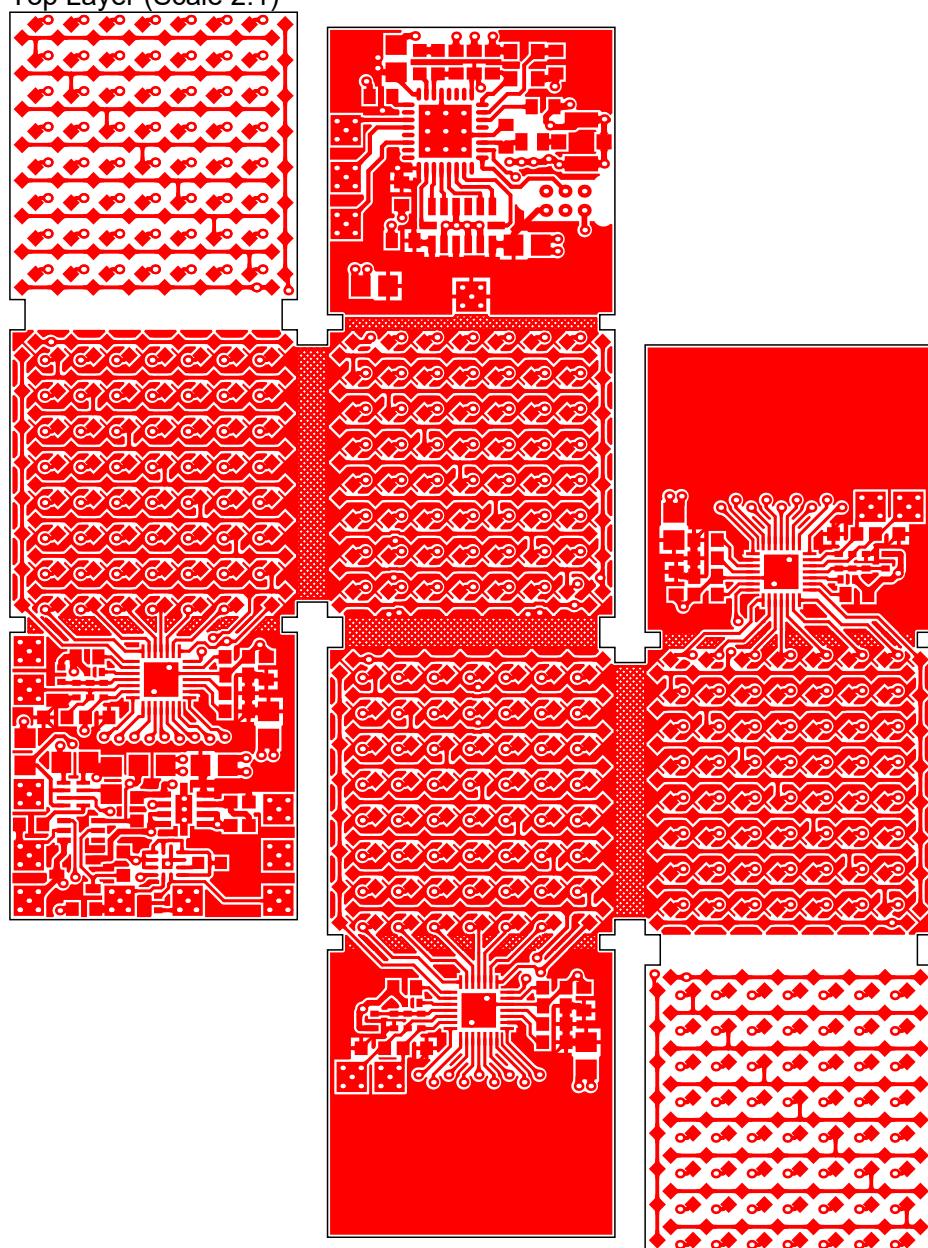
B

C

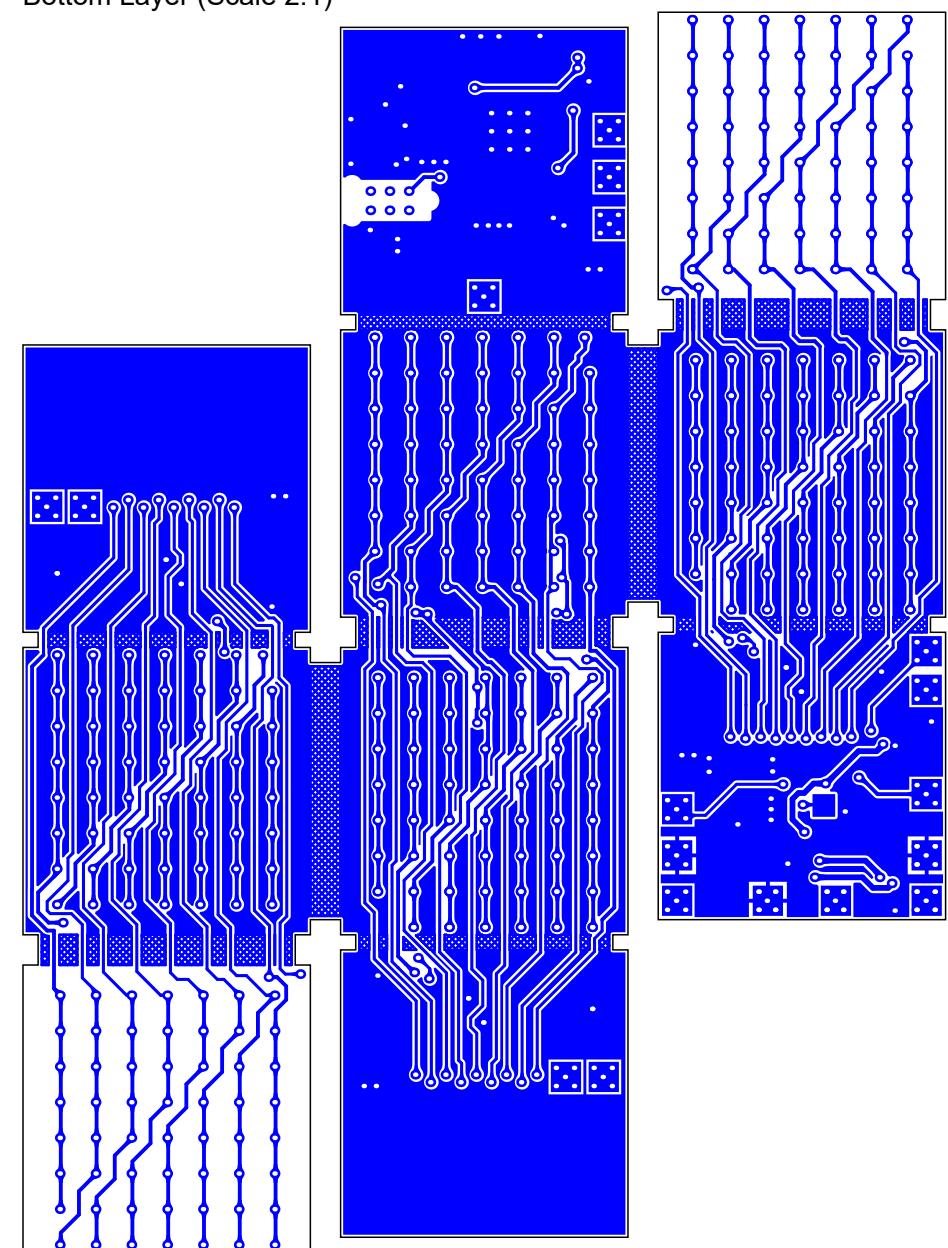
D

E

Top Layer (Scale 2:1)



Bottom Layer (Scale 2:1)



A

B

C

D

E

A

B

C

D

E

## Bill Of Materials

	Designator	Name	Quantity	Manufacturer Part Number
1	C1, C2, C5	220nF	3	CC0402KRX5R6BB224
	C3, C4, C6, C8, C10, C12, C14, C15, C16, C23	100nF	10	CL10B104KB8NNNC
	C7, C9, C11, C13	1µF	4	CL10A105KA8NNNC
	C17, C18	12pF	2	CL10C120JB8NNNC
	C19, C22, C31	4u7F	3	CL21A475KAQNNNE
	C20	100pF	1	CL10B101KB8NNNC
	C21	0p8F	1	CBR06C808BAGAC
	C24	47nF	1	CL10B473KB8NNNC
	C25, C26, C27, C28, C29, C30, C32	22uF	7	C2012X7S1A226M125AC
2	D1, D2, D3, D4, D5, D6, D7, D8, D9, D10, D11, D12, D13, D14, D15, D16, D17, D18, D19, D20, D21, D22, D23, D24, D25, D26, D27, D28, D29, D30, D31, D32, D33, D34, D35, D36, D37, D38, D39, D40, D41, D42, D43, D44, D45, D46, D47, D48, D49, D50, D51, D52, D53, D54, D55, D56, D57, D58, D59, D60, D61, D62, D63, D64, D65, D66, D67, D68, D69, D70, D71, D72, D73, D74, D75, D76, D77, D78, D79, D80, D81, D82, D83, D84, D85, D86, D87, D88, D89, D90, D91, D92, D93, D94, D95, D96, D97, D98, D99, D100, D101, D102, D103, D104, D105, D106, D107, D108, D109, D110, D111, D112, D113, D114, D115, D116, D117, D118, D119, D120, D121, D122, D123, D124, D125, D126, D127, D128, D129, D130, D131, D132, D133, D134, D135, D136, D137, D138, D139, D140, D141, D142, D143, D144, D145, D146, D147, D148, D149, D150, D151, D152, D153, D154, D155, D156, D157, D158, D159, D160, D161, D162, D163, D164, D165, D166, D167, D168, D169, D170, D171, D172, D173, D174, D175, D176, D177, D178, D179, D180, D181, D182, D183, D184, D185, D186, D187, D188, D189, D190, D191, D192, D193, D194, D195, D196, D197, D198, D199, D200, D201, D202, D203, D204, D205, D206, D207, D208, D209, D210, D211, D212, D213, D214, D215, D216, D217, D218, D219, D220, D221, D222, D223, D224, D225, D226, D227, D228, D229, D230, D231, D232, D233, D234, D235, D236, D237, D238, D239, D240, D241, D242, D243, D244, D245, D246, D247, D248, D249, D250, D251, D252, D253, D254, D255, D256, D257, D258, D259, D260, D261, D262, D263, D264, D265, D266, D267, D268, D269, D270, D271, D272, D273, D274, D275, D276, D277, D278, D279, D280, D281, D282, D283, D284, D285, D286, D287, D288, D289, D290, D291, D292, D293, D294, D295, D296, D297, D298, D299, D300, D301, D302, D303, D304, D305, D306, D307, D308, D309, D310, D311, D312, D313, D314, D315, D316, D317, D318, D319, D320, D321, D322, D323, D324, D325, D326, D327, D328, D329, D330, D331, D332, D333, D334, D335, D336, D337, D338, D339, D340, D341, D342, D343, D344, D345, D346, D347, D348, D349, D350, D351, D352, D353, D354, D355, D356, D357, D358, D359, D360, D361, D362, D363, D364, D365, D366, D367, D368, D369, D370, D371, D372, D373, D374, D375, D376, D377, D378, D379, D380, D381, D382, D383, D384	SMD LED	384	SML-D12U1WT86
3	D385	green	1	LTST-C190GKT
	IC1, IC2, IC3	IS31FL3731C	3	IS31FL3731C-QFLS2-TR
	IC4	ADXL343	1	ADXL343BCZ-RL
	IC5	LTC4124	1	LTC4124EV#TRMPBF
	IC6	TPS82084	1	TPS82084SILR
	IC7	LM66100	1	LM66100DCKR
	IC8	TPS62840	1	TPS62840DLCR
	L1	3n9H	1	LQW18AN3N9B80D
	L2	15nF	1	LQW18AN15NJ10D
	L3	10uF	1	MLZ1608N100LT000
	L4	13uH	1	760308101208
	L5	2u2H	1	MLZ2012N2R2LT000
	P2	73412-0110	1	73412-0110
	Q1	NTR4101PT1G	1	NTR4101PT1G
4	R1, R2, R3, R4, R5, R6, R7, R8, R13, R14, R15, R16, R28	100k	13	RC0603JR-07100KL
	R12, R19, R22	0	3	RC0402JR-070RL
	R26	442k	1	RT0603DRE07442KL
	R27	162k	1	RT0603BRD07162KL
	R30	52k3	1	RC0603FR-0752K3L
	R_EXT1, R_EXT2, R_EXT3	20k	3	RC0603FR-0720KL
	U1	nRF52811-QCAA	1	nRF52811-QCAA0
	X1	32MHz	1	R2520-32.000-8-F-1030-EXT-TR

A

B

C

D

E



Designator	Name	Description	Footprint	Quantity	Supplier 1	Supplier Part Number 1	Manufacturer 1	Manufacturer Part Number 1
C1, C2, C5	220nF	CAP CER 0.22UF 10V X5R 0402	RC0402	3	Digi-Key	311-1421-1-ND	Yageo	CC0402KRX5R6BB224
C3, C4, C6, C8, C10, C12, C14, C15, C16, C23	100nF	Capacitor: ceramic; MLCC; 100nF; 50V; X7R; ±10%; SMD; 0603; -55+125°C	CL10B104KB8NNNC	10	Digi-Key	1276-1000-1-ND	Sams	CL10B104KB8NNNC
C7, C9, C11, C13	1µF	Cap Ceramic 1uf 25V X5R 10% Pad SMD 0603 85°C T/R	CL10B104KB8NNNC	4	Digi-Key	1276-1102-1-ND	Sams	CL10A105KA8NNNC
C17, C18	12pF	Cap Ceramic 12pF 50VDC COG 5% SMD 0603 Paper T/R	CL10B104KB8NNNC	2	Digi-Key	1276-1254-1-ND	Sams	CL10C120JB8NNNC
C19, C22, C31	4u7F	SAMSUNG ELECTRO-MECHANICS - CL21A475KAQNNNE - SMD Multilayer Ceramic Capacitor, 4.7 µF, 25 V, 0805 [2012 Metric], ± 10%, X5R, CL Series	C0805	3	Digi-Key	1276-1244-1-ND	Samsung	CL21A475KAQNNNE
C20	100pF	CAP CER 100PF 50V X7R 0603	CL10B104KB8NNNC	1	Digi-Key	1276-1909-1-ND	Samsung	CL10B101KB8NNNC
C21	0p8F	CAP CER 0.8PF 250V COG/NPO 0603	CL10B104KB8NNNC	1	Digi-Key	399-8836-1-ND	KEMET	CBR06C808BAGAC
C24	47nF	CAP CER 0.047UF 50V X7R 0603	RC0603	1	Digi-Key	1276-1063-1-ND	Samsung	CL10B473KB8NNNC
C25, C26, C27, C28, C29, C30, C32	22uF	TDK - C2012X7S1A226M125 AC - SMD Multilayer Ceramic Capacitor, 22 µF, 10 V, 0805 [2012 Metric], ± 20%, X7S, C Series TDK	C0805	7	Digi-Key	445-14560-1-ND	TDK	C2012X7S1A226M125AC
D1, D2, D3, D4, D5, D6, D7, D8, D9, D10, D11, D12, D13, D14, D15, D16, D17, D18, D19, D20, D21, D22, D23, D24, D25, D26, D27, D28, D29, D30, D31, D32, D33, D34, D35, D36, D37, D38, D39, D40, D41, D42, D43, D44, D45, D46, D47, D48, D49, D50, D51, D52, D53, D54, D55, D56, D57, D58, D59, D60, D61, D62, D63, D64, D65, D66, D67, D68, D69, D70, D71, D72, D73, D74, D75, D76, D77, D78, D79, D80, D81, D82, D83, D84, D85, D86, D87, D88, D89, D90, D91, D92, D93, D94, D95, D96, D97, D98, D99, D100, D101, D102, D103, D104, D105, D106, D107, D108, D109, D110, D111	SMD LED	LED RED DIFFUSED 1608 SMD	SML-D12x1	384	Digi-Key	SML-D12U1WT86CT-ND	Rohm	SML-D12U1WT86
D385	green	LED, LTST-C190GKT	LTST-C190EKT	1	Digi-Key	160-1183-1-ND	Vishay Lite-On	LTST-C190GKT
IC1, IC2, IC3	IS31FL3731C	LED Lighting Drivers Audio Modulated 144 Dot LED Driver	IS31FL3731	3	Digi-Key	706-1219-1-ND		
IC4	ADXL343	ACCEL 2-16G I2C/SPI 14LGA	ADXL343	1	Digi-Key	ADXL343BCCZ-RLCT-ND	Analog Devices	ADXL343BCCZ-RL
IC5	LTC4124	Linear Battery Charger Li-Ion 100mA 4V/4.1V/4.2V/4.35V 12-Pin LOFN EP Reel	LTC4124	1	Digi-Key	LTC4124EV#TRMPBFCT-ND	Analog Devices	LTC4124EV#TRMPBF
IC6	TPS82084	TEXAS INSTRUMENTS - TPS82084SILR - Convert. DC/DC POL, Ajust. Buck, Micro SIP, Entrée 2,5V à 6V, Sortie 0,8V à 6V/2A, 2,4MHz, µSIP-8	TPS82084	1	Digi-Key	296-46279-1-ND	Texas Instruments	TPS82084SILR
IC7	LM66100	1.5-V to 5.5-V, 1.5-A, 0.5-uA IQ ideal diode with Integrated FET 6-SC70 -40 to 105	LM66100	1	Digi-Key	296-53541-1-ND	Texas Instruments	LM66100DCKR
IC8	TPS62840	60-nA IQ, 1.8-V to 6.5-VIN, high-efficiency 750-mA step-down converter 8-VSON-HR -40 to 125	TPS62840DLC	1	Digi-Key	296-TPS62840DLCRCT-ND		
L1	3n9H	Ind RF Chip Unshielded Wirewound 3.9nH 0.1nH 100MHz 30Q-Factor Ferrite 2.2A 0603 Paper T/R	LQW18AN3N9B80D	1	Digi-Key	490-16894-1-ND	Murata	LOW18AN3N9B80D

Designator	Name	Description	Footprint	Quantity	Supplier 1	Supplier Part Number 1	Manufacturer 1	Manufacturer Part Number 1
L2	15nF	Inductor RF Chip Wirewound 15nH 5% 100MHz 42Q-Factor 700mA 85mOhm DCR 0603 Paper T/R	RC0603		1 Digi-Key	490-6867-1-ND	Murata	LOW18AN15NJ10D
L3	10uF	Inductor Power Shielded Multi-Layer 10uH 20% 2MHz Ferrite 0.06A 0.780hm DCR 0603 T/R	RC0603		1 Digi-Key	445-6755-1-ND	TDK	MLZ1608N100LT000
L4	13uH	WURTH ELEKTRONIK - 760308101208 - WIRELESS POWER CHARGING COIL, 13uH, 10%	ChargeInductorPads		1 Digi-Key	732-6205-ND	Wurth Electronics	760308101208
L5	2u2H	Inductor Power Shielded Multi-Layer 2.2uH 20% 2MHz Ferrite 0.8A 0.1560hm DCR 0805 T/R	C0805		1 Digi-Key	445-6758-1-ND		
P2	73412-0110	MOLEX 73412-0110 RF COAXIAL, MICROCOAXIAL, JACK, 500HM	UFL		1 Digi-Key	WM5587CT-ND	Molex	0734120110
Q1	NTR4101PT1G	ON SEMICONDUCTOR NTR4101PT1G - MOSFET Transistor, P Channel, 3.2 A, -20 V, 0.07 ohm, -4.5 V, -720 mV	NTR4101P		1 Digi-Key	NTR4101PT1GOSC T-ND	ON Semiconductor	NTR4101PT1G
R1, R2, R3, R4, R5, R6, R7, R8, R13, R14, R15, R16, R28	100k	RES SMD 100K OHM 5% 1/10W 0603	RC0603	13	Digi-Key	311-100KGRCT-ND	Yageo	RC0603JR-07100KL
R12, R19, R22	0	RES SMD 0 OHM JUMPER 1/16W 0402	RC0402		3 Digi-Key	311-0.0JRCT-ND	Yageo	RC0402JR-070RL
R26	442k	RES SMD 442K OHM 0.5% 1/10W 0603	RC0603		1 Digi-Key	311-2099-1-ND	Yageo	RT0603DRE07442KL
R27	162k	RES SMD 162K OHM 0.1% 1/10W 0603	RC0603		1 Digi-Key	YAG1541CT-ND	Yageo	RT0603BRD07162KL
R30	52k3	Res Thick Film 0603 52.3K Ohm 1% 0.1W(1/10W) ±100ppm/C Epoxy SMD T/R	RC0603		1 Digi-Key	311-52.3KHRCT- ND		
R_EXT1, R_EXT2, R_EXT3	20k	RES SMD 20K OHM 1% 1/10W 0603	RC0603	3	Digi-Key	311-20.0KHRCT- ND	Yageo	RC0603FR-0720KL
U1	nRF52811-QCAA	Multi-protocol Bluetooth Low Energy, IEEE 802.15.4, ANT and 2.4GHz proprietary system- on-chip	Nordic_QFN50P500X5 00X90-33N	1				
X1	32MHz	Xtal 32MHz 8PF SMD	R2520-32.000-8-F- 1030-EXT-TR		1 Digi-Key	2151-R2520- 32.000-8-F-1030- EXT-TRCT-ND	Raltron Electronics	R2520-32.000-8-F- 1030-EXT-TR