

SLPP200 RF Spannungslupe ft > 300MHz

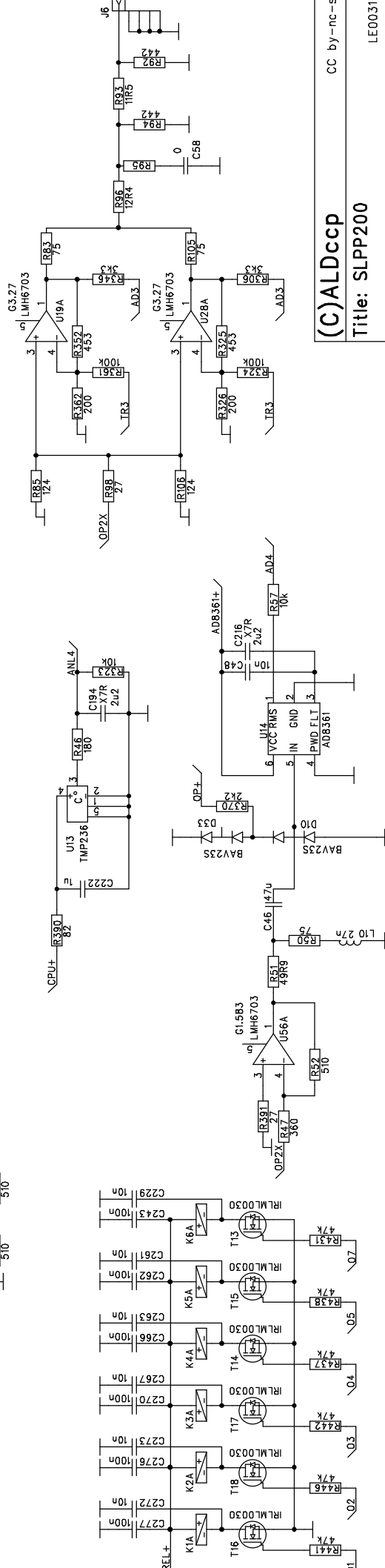
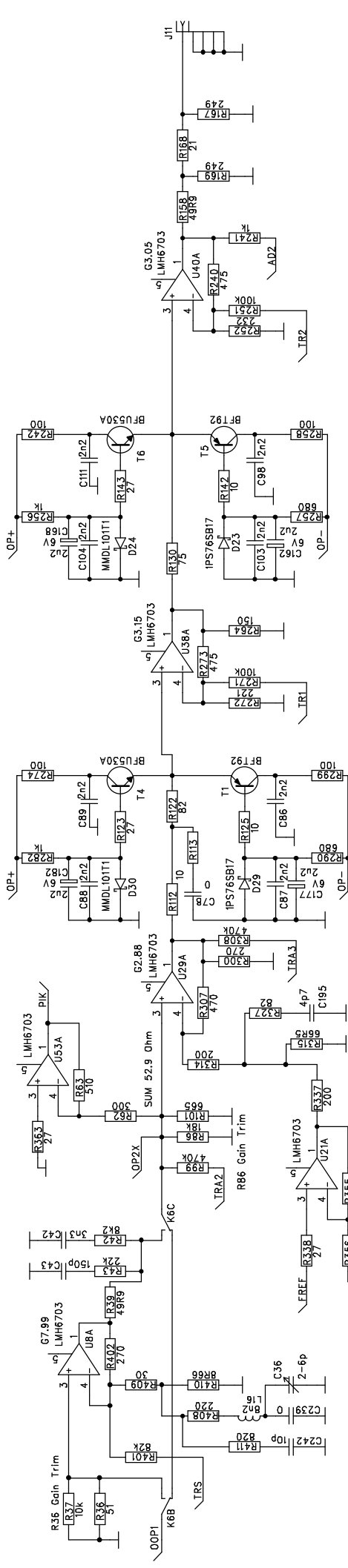
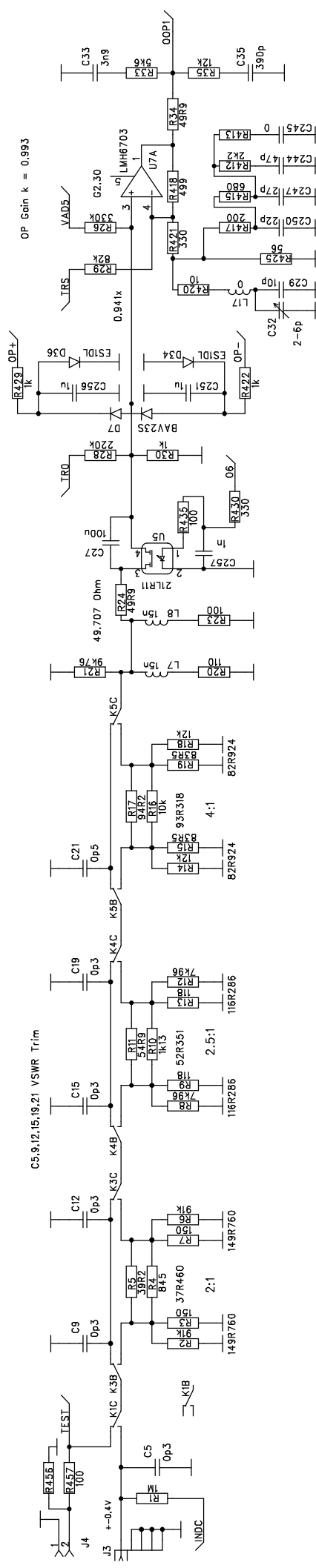
Rev 1.00: Schaltplan, Bestückung, Material Liste

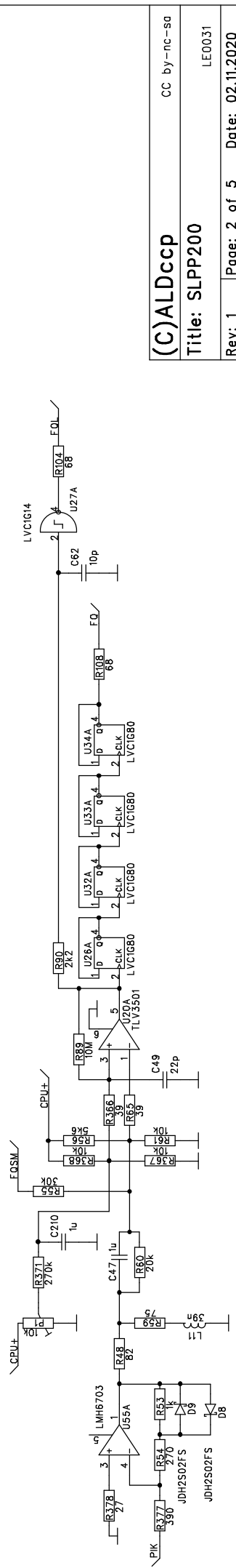
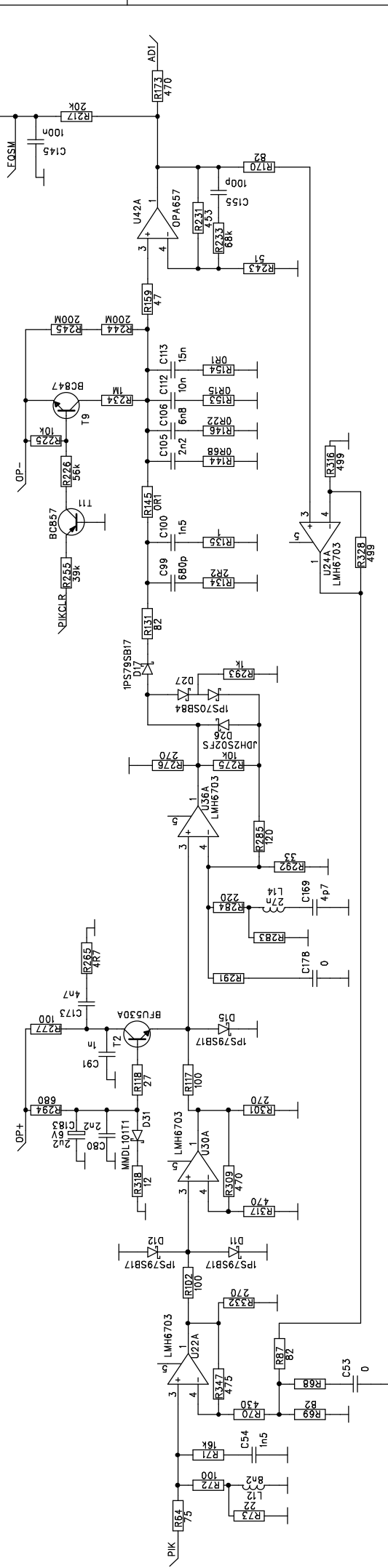
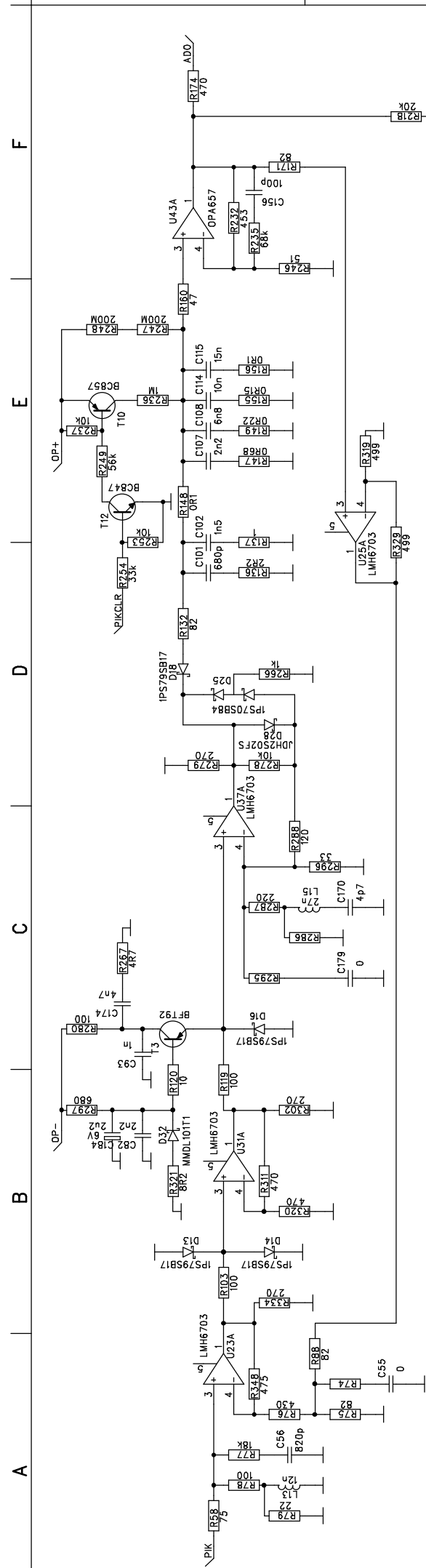


Dieses Werk ist lizenziert unter einer [Creative Commons Namensnennung - Nicht-kommerziell - Weitergabe unter gleichen Bedingungen 4.0 International Lizenz](https://creativecommons.org/licenses/by-nc-sa/4.0/)

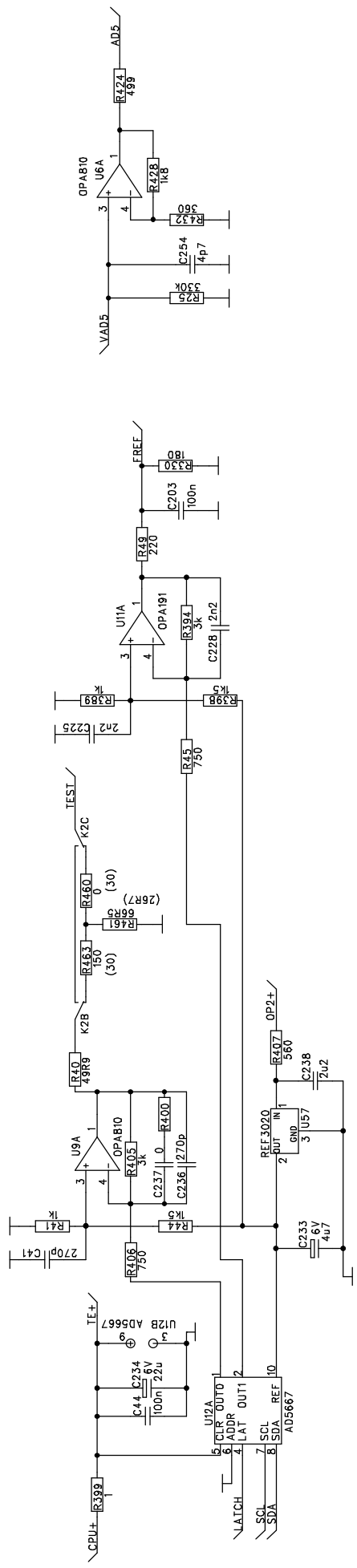
<http://www.aldccb.at/>

Hoefer Alfred
(hw16@aldccb.at)

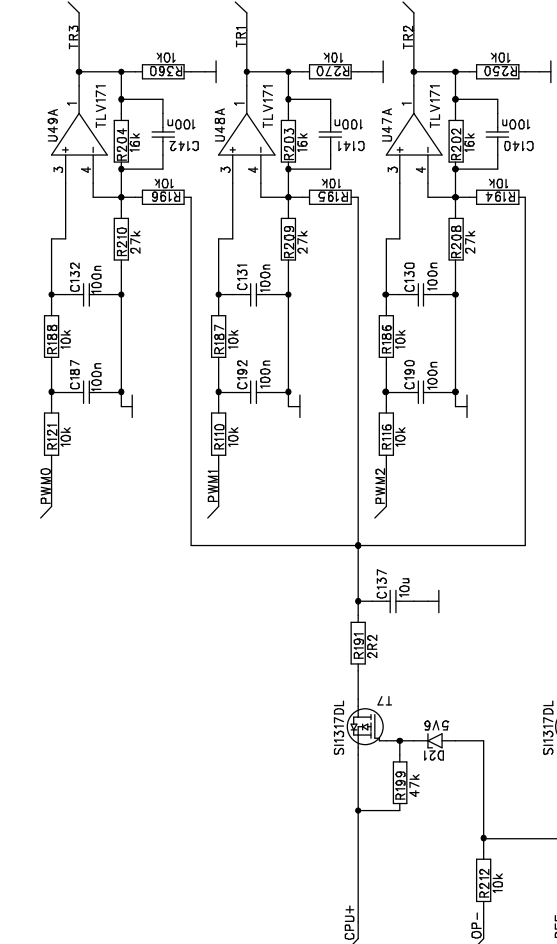




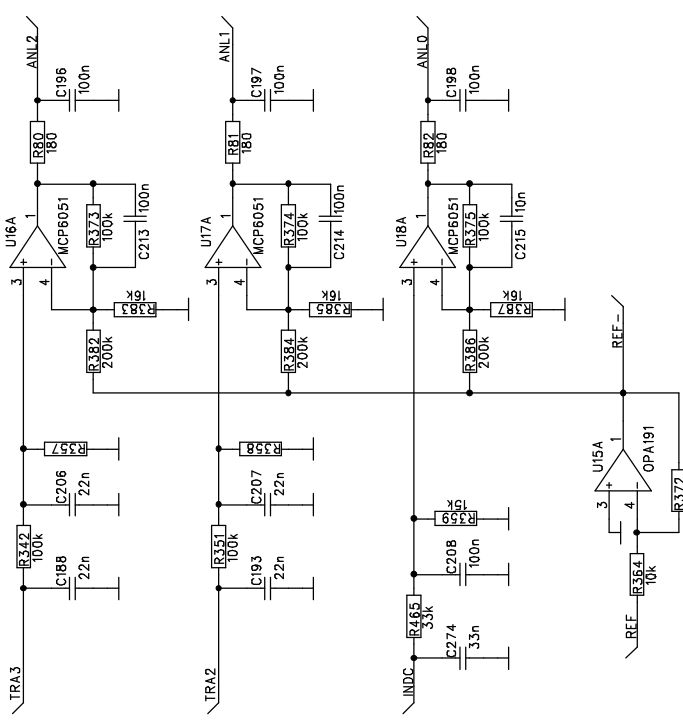
4



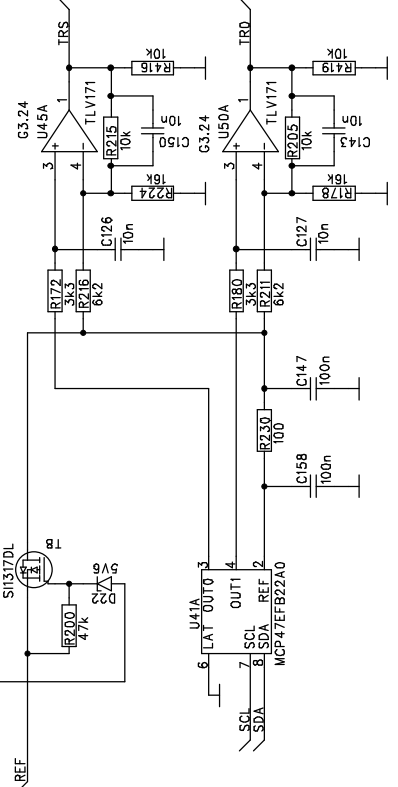
3

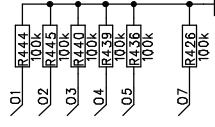
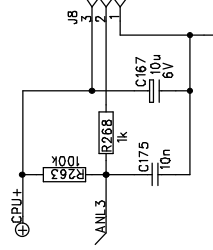
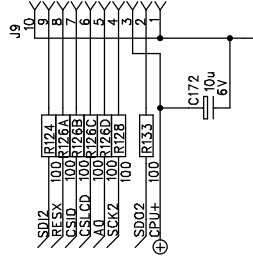
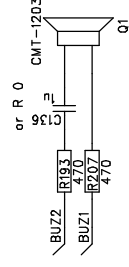
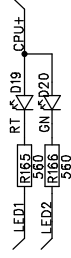
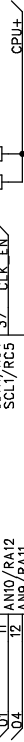
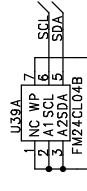
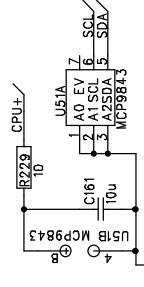
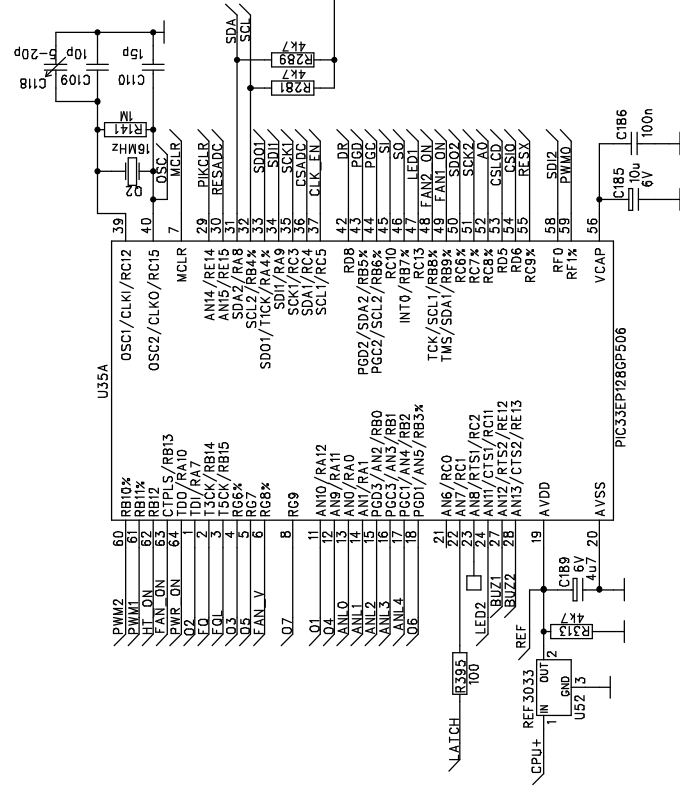
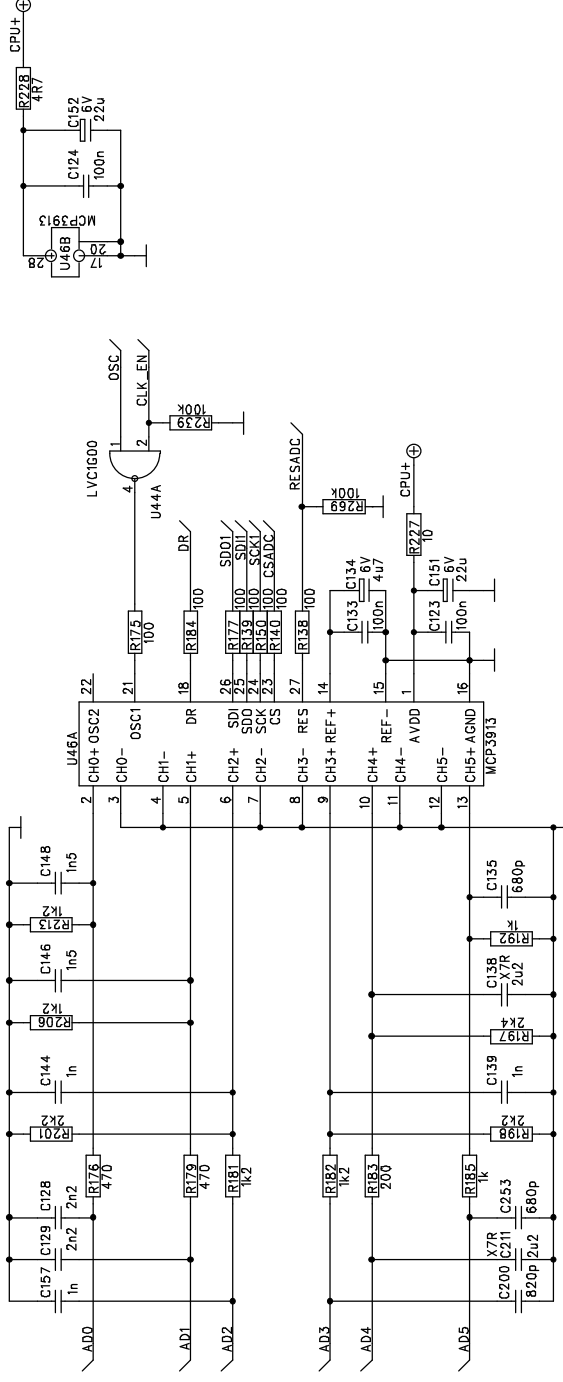


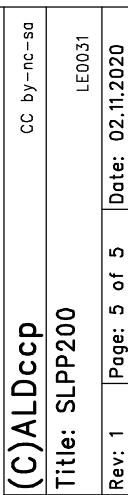
2

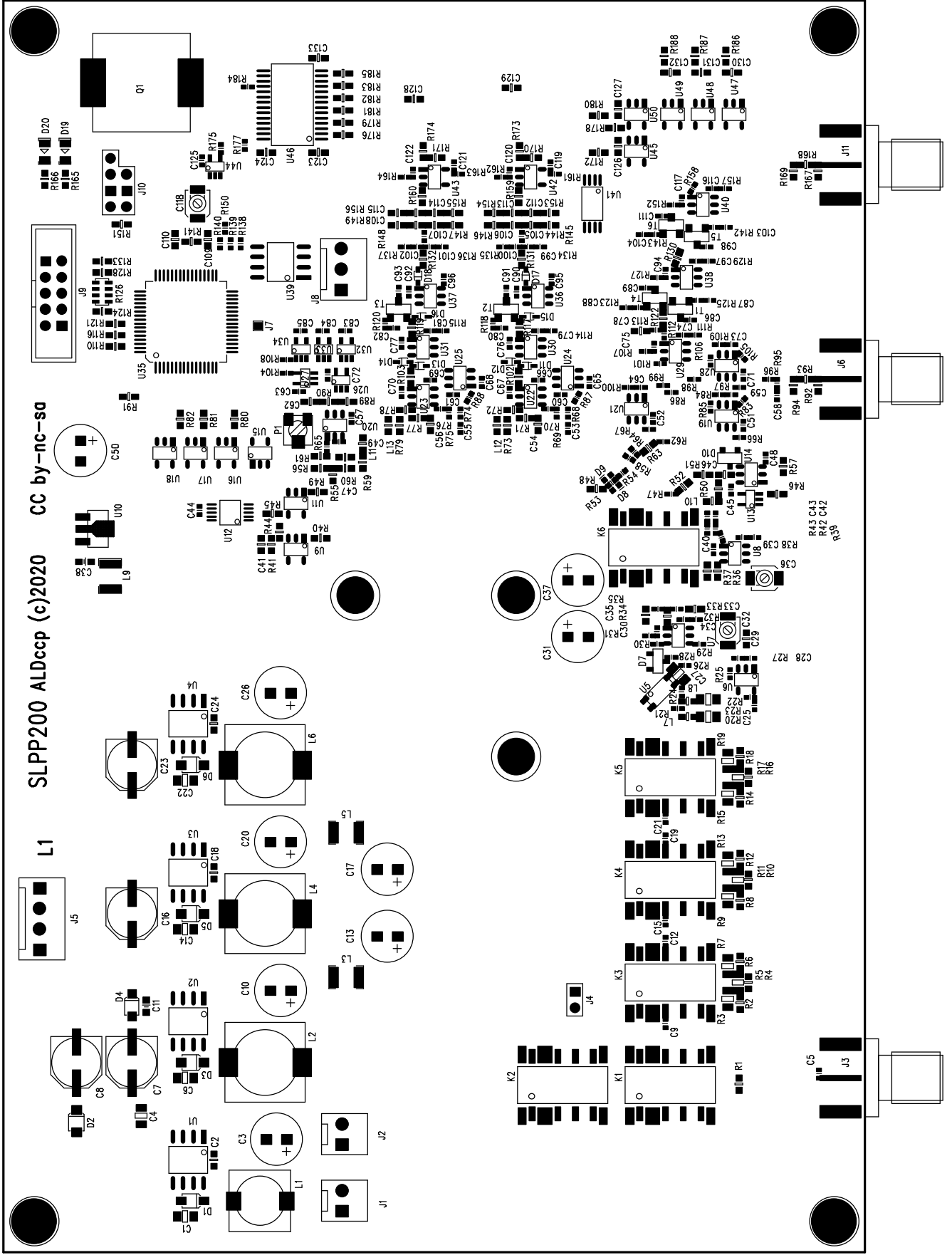


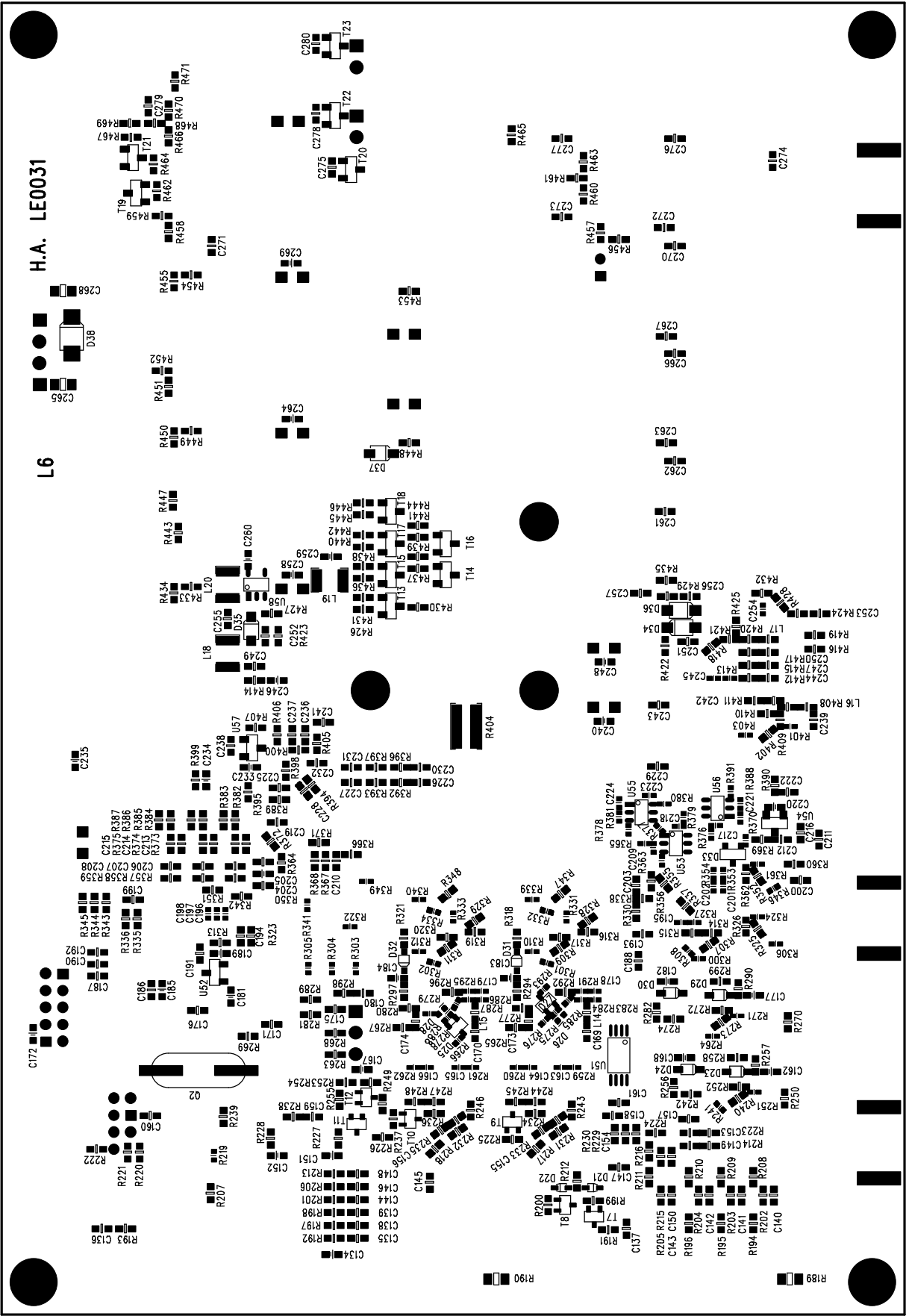
1











Bill Of Materials for SLPP200.sch on Wed Mar 31 17:46:45 2021

Item	Qty	Reference	Part Name	Wert	Wert2	PCB DECAL
1	1	U12	AD5667	AD5667		MSOP-10
2	1	U14	AD8361			SOT23-6
3	2	T9 T12	BC847			SOT323
4	1	T21	BC847			SOT23
5	2	T10-11	BC857			SOT323
6	1	T19	BC857			SOT23
7	3	T1 T3 T5	BFT92			SOT23
10	1	Q1	BUZ_1203	CMT-1203		BUZ_1203
11	7	C1 C4 C6 C14 C22 C265 C268	C	10u	35V	0805
12	5	C5 C15 C19 C9 C12	C	0p3		0402
13	19	C2 C24 C48 C112 C114 C126-127 C143 C150 C175 C215 C229 C261 C263 C18 C267 C271-273	C	10n		0603
14	56	C25 C51-52 C57 C59-61 C63-77 C79 C81 C83-85 C90 C92 C94-97 C28 C116-117 C119-122 C125 C30 C34 C196-198 C209 C39 C217-218 C221 C223-224 C40 C44-45	C	100n		0402
15	6	C105 C107 C128-129 C225 C228	C	2n2		0603
16	10	C111 C82 C86-89 C80 C98 C103-104	C	2n2		0402
17	2	C115 C113	C	15n		0603
18	40	C124 C130-133 C140-142 C145 C147 C154 C158 C160 C171 C176 C186-187 C190-192 C199 C203 C205 C208 C213-214 C219 C232 C241 C243 C262 C266 C123 C270 C275-280	C	100n		0603
19	4	C170 C195 C254 C169	C	4p7		0603
20	1	C35	C	390p		0603
21	4	C139 C144 C257 C157	C	1n		0603

22	2	C108 C106	C	6n8		0603
23	4	C188 C193 C206-207	C	22n		0603
24	4	C29 C62 C109 C242	C	10p		0603
25	2	C93 C91	C	1n		0402
26	4	C194 C211 C216 C138	C	2u2	X7R	0603
27	3	C146 C148 C54	C	1n5		0603
28	6	C178 C53 C58 C55 C245 C179	C	0		0402
29	6	C149 C153 C227 C231 C137 C161	C	10u		0603
30	3	C78 C237 C239	C	0		0603
31	2	C100 C102	C	1n5		0402
32	16	C202 C226 C230 C201 C222 C251 C255-256 C212 C180 C136 C159 C47 C210 C165-166	C	1u		0603
33	2	C200 C56	C	820p		0603
34	1	C249	C	22u		0603
35	1	C250	C	22p		0603
36	1	C33	C	3n9		0603
37	1	C252	C	330p		0603
38	2	C253 C135	C	680p		0603
39	1	C110	C	15p		0603
40	2	C173-174	C	4n7		0603
41	2	C41 C236	C	270p		0603
42	1	C42	C	3n3		0603
43	1	C43	C	150p		0603
44	1	C238	C	2u2		0603
45	2	C101 C99	C	680p		0402
46	1	C49	C	22p		0402
47	1	C27	C	100u		0805
48	1	C46	C	47u		0603
49	2	C155-156	C	100p		0603
50	1	C247	C	27p		0603
51	2	C163-164	C	1u		0402
52	1	C274	C	33n		0603
53	1	C244	C	47p		0603
54	1	C21	C	0p5		0402
55	3	D7 D10 D33	D2_ACC	BAV23S	NXP	SOT23
56	2	D27 D25	D2_ACC	1PS70SB84		SOT323
57	2	D21-22	DZ	5V6		SOD-523_LP
58	4	D8-9 D26 D28	D_S	JDH2S02FS		SOD923
59	8	D13-18 D11-12	D_S	1PS79SB17		SOD-523_LP
60	2	D23 D29	D_S	1PS76SB17		SOD-323F
61	4	D24 D30-32	D_S	MMDL101T1		SOD-323F
62	9	C3 C10 C13 C17 C20 C26 C31 C37 C50	EC	220u	16V	EC100D60
63	3	C16 C7 C23	EC	100u	35V	EC-SMD-D63
64	1	C8	EC	150u	35V	EC-SMD-D63
65	9	C11 C38 C240 C248 C258-260 C264 C269	EC_SMD	10u	10V	0603P
66	8	C177 C182-184 C204 C246 C162 C168	EC_SMD	2u2	6V	0603P
67	4	C220 C233	EC_SMD	4u7	6V	0603P

		C134 C189				
68	3	C234	EC_SMD	22u	6V	0603P
		C151-152				
69	5	C185 C235	EC_SMD	10u	6V	0603P
		C167 C181				
		C172				
70	2	D34 D36	ES1DL			SSMA
71	6	K1-6	G6K-2F-RF-S			G6K-2F-RF-S
72	1	U39	I2C-6-MEM	FM24CL04B		S08
73	9	T13-18 T20	IRLML0030			SOT23
		T22-23				
74	1	L1	L	150uH		PIS2816
75	3	L2 L4 L6	L	100uH		PIS3920
76	1	D19	LED_SMD	RT		0805D
77	1	D20	LED_SMD	GN		0805D
78	1	U58	LM2611	LM2611A		SOT23-5
79	1	U1	LM2674	ADJ		S08
80	3	U2-4	LM2675	ADJ		S08
81	19	U7-8 U19	LMH6703			SOT23-6
		U21-25				
		U28-31				
		U36-38 U40				
		U53 U55-56				
82	1	J7	LP			LP_D16
83	1	U44	LVC1G00	LVC1G00		SC70-5
84	1	U27	LVC1G14	LVC1G14		SC70-5
85	4	U26 U32-34	LVC1G80	LVC1G80		SC70-5
86	4	L3 L5 L9 L19	L_SMD	2uH2	LQH32PB	1210
87	2	L7-8	L_SMD	15n	LQG18HN	0603
88	1	L11	L_SMD	39n	LQG18HN	0603
89	2	L12 L16	L_SMD	8n2	LQG18HN	0603
90	3	L14-15 L10	L_SMD	27n	LQG18HN	0603
91	1	L17	L_SMD	0	LQG18HN	0603
92	1	L18	L_SMD	47uH	LQH32PB	1210
93	1	L13	L_SMD	12n	LQG18HN	0603
94	1	L20	L_SMD	15uH	LQH32PB	1210
95	1	U10	MCP1700	3V5		SOT89
96	1	U46	MCP3913			SSOP28
97	1	U51	MCP9843			TSSOP8
98	1	U54	MCP1700S	5V		SOT23
99	1	U41	MCP47FEBX2	MCP47EFB22A		TSSOP8
				0		
100	2	T7-8	MFETS_P	SI1317DL		SOT323
101	3	T2 T4 T6	NPN	BFU530A		SOT23
102	2	U6 U9	OP-SOT23-5	OPA810		SOT23-5
103	2	U11 U15	OP-SOT23-5	OPA191		SOT23-5
104	3	U16-18	OP-SOT23-5	MCP6051		SOT23-5
105	2	U42-43	OP-SOT23-5	OPA657		SOT23-5
106	5	U45 U47-50	OP-SOT23-5	TLV171		SOT23-5
107	1	U5	OPT0	21LR11	G3VM-21LR11	SSOP4
108	1	U35	PIC33EP128GP506			TQFP64
109	1	J10	PICPG7			PICPG7_79
110	4	D1 D4 D35	PMEG4010	PMEG4010EH		SOD-123F
		D37				
111	4	D5-6 D3 D2	PMEG4010	PMEG4010ETR		SOD-123W
112	1	P1	POTI	10k		P4L_SMD
113	1	Q2	Q	16MHz		QSMD
114	4	R1 R141 R234	R	1M		0603
		R236				
115	1	R5	R	39R2	0.1% 0.25W	0805
116	2	R6 R2	R	91k		0603
117	2	R8 R12	R	7k96		0603
118	1	R10	R	1k13	0.1%	0603
119	1	R11	R	54R9	0.1% 0.25W	0805
120	2	R9 R13	R	118	0.1% 0.25W	0805
121	3	R14 R18 R35	R	12k		0603
122	1	R17	R	94R2	0.1% 0.25W	0805
123	2	R15 R19	R	83R5	0.1% 0.25W	0805
124	1	R20	R	110	0.1% 0.25W	0805
125	1	R21	R	9k76		0402
126	2	R22 R27	R	0.22		0402

127	5	R24 R34 R39-40 R51	R	49R9	0.1%	0603
128	2	R29 R401	R	82k		0402
129	2	R31-32	R	0R22		0402
130	2	R33 R56	R	5k6		0603
131	32	R16 R37 R61 R110 R116 R121 R186-188 R194-196 R205 R212 R215 R220-221 R225 R237 R250 R253 R270 R323 R335 R360 R367-368 R416 R419 R427 R466 R471	R	10k		0603
132	42	R67 R84 R97 R100 R107 R109 R38 R111 R114-115 R127 R129 R152 R157 R161-164 R219 R259-260 R303-305 R310 R312 R322 R331 R333 R339-341 R349 R365 R369 R376 R379-381 R388 R403 R66	R	0R1		0402
133	3	R72 R78 R457	R	100	0.1%	0603
134	4	R112 R227 R229 R420	R	10		0603
135	1	R26	R	330k	0.1%	0402
136	17	R117 R119 R124 R128 R133 R151 R230 R242 R258 R274 R277 R280 R299 R102-103 R395 R435	R	100		0603
137	2	R135 R137	R	1		0402
138	2	R136 R134	R	2R2		0402
139	7	R139-140 R150 R175 R177 R184 R138	R	100		0402
140	2	R146 R149	R	0R22		0603
141	12	R148 R154 R156 R238 R261-262 R298 R353-354 R392 R396 R145	R	0R1		0603
142	2	R160 R159	R	47		0402
143	4	R82 R46 R80-81	R	180		0603

144	3	R166 R407 R165	R	560		0603
145	2	R169 R167	R	249	0.1%	0603
146	8	R171 R48 R122 R327 R131-132 R390 R170	R	82		0603
147	5	R179 R173 R307 R174 R176	R	470	0.1%	0603
148	2	R144 R147	R	0R68		0603
149	3	R41 R192 R185	R	1k	0.1%	0603
150	2	R189-190	R	270	0.5W	0805
151	1	R191	R	2R2		0603
152	1	R42	R	8k2		0603
153	7	R193 R207 R309 R311 R317 R320 R433	R	470		0603
154	9	R200 R431 R199 R437-438 R441-442 R446-447	R	47k		0603
155	3	R209-210 R208	R	27k		0603
156	3	R172 R180 R462	R	3k3		0603
157	1	R49	R	220	0.1%	0603
158	2	R216 R211	R	6k2		0603
159	3	R218 R60 R217	R	20k		0603
160	1	R28	R	220k		0402
161	8	R222 R241 R256 R268 R282 R389 R422 R429	R	1k		0603
162	6	R123 R118 R363 R378 R143 R391	R	27		0402
163	1	R4	R	845		0603
164	3	R53 R266 R293	R	1k		0402
165	4	R240 R273 R347-348	R	475	0.1%	0603
166	4	R244-245 R247-248	R	200M		0603
167	3	R246 R243 R36	R	51	0.1%	0603
168	4	R251 R271 R324 R361	R	100k		0402
169	3	R255 R452 R459	R	39k		0603
170	3	R125 R120 R142	R	10		0402
171	2	R79 R73	R	22		0603
172	14	R263 R269 R239 R342 R351 R373-375 R426 R436 R439-440 R444-445	R	100k		0603
173	1	R86	R	18k		0402
174	2	R278 R275	R	10k		0402
175	2	R153 R155	R	0R15		0603
176	2	R226 R249	R	56k		0603
177	2	R284 R287	R	220		0402
178	8	R286 R291 R295 R95	R			0402

		R283 R68				
		R413 R74				
179	5	R294 R297	R	680		0603
		R290 R415				
		R257				
180	2	R130 R59	R	75		0603
181	8	R301-302	R	270		0402
		R332 R334				
		R300 R54				
		R279 R276				
182	2	R45 R406	R	750	0.1%	0603
183	2	R83 R105	R	75	0.1%	0402
184	10	R313 R289	R	4k7		0603
		R336 R281				
		R443 R448				
		R451 R453				
		R458 R467				
185	3	R57 R364	R	10k	0.1%	0603
		R372				
186	5	R326 R314	R	200	0.1%	0603
		R337 R362				
		R183				
187	2	R94 R92	R	442	0.1%	0603
188	4	R182 R213	R	1k2	0.1%	0603
		R206 R181				
189	6	R328 R316	R	499	0.1%	0603
		R329 R418				
		R424 R319				
190	4	R343-345 R43	R	22k		0603
191	4	R231 R352	R	453	0.1%	0603
		R232 R325				
192	3	R267 R228	R	4R7		0603
		R265				
193	2	R7 R3	R	150	0.1% 0.25W	0805
194	4	R356 R52	R	510	0.1%	0603
		R355 R63				
195	3	R90 R370	R	2k2		0603
		R412				
196	2	R99 R308	R	470k		0603
197	2	R70 R76	R	430	0.1%	0402
198	2	R85 R106	R	124	0.1%	0402
199	1	R101	R	665	0.1%	0402
200	3	R254	R	33k		0603
		R464-465				
201	5	R357 R113	R			0603
		R358 R400				
		R456				
202	2	R233 R235	R	68k		0603
203	2	R104 R108	R	68		0603
204	3	R382 R384	R	200k		0603
		R386				
205	9	R385 R383	R	16k		0603
		R387 R71				
		R178				
		R202-204				
		R224				
206	2	R394 R405	R	3k	0.1%	0603
207	1	R158	R	49R9	0.1%	0402
208	7	R397 R399	R	1		0603
		R414 R223				
		R393 R214				
		R350				
209	1	R404	R	120	1W	1020
210	1	R23	R	100	0.1% 0.25W	0805
211	4	R91 R450	R	1k8		0603
		R454 R468				
212	1	R410	R	8R66	0.1%	0603
213	1	R411	R	820		0603
214	1	R96	R	12R4	0.1%	0402
215	2	R292 R296	R	33		0603
216	2	R288 R285	R	120		0603

217	1	R417	R	200		0603
218	4	R69 R75	R	82	0.1%	0402
		R87-88				
219	1	R398	R	1k5	0.1%	0603
220	2	R423 R55	R	30k		0603
221	1	R425	R	56	0.1%	0603
222	1	R252	R	232	0.1%	0603
223	3	R64 R58 R50	R	75	0.1%	0603
224	2	R430 R469	R	330		0603
225	1	R432	R	360	0.1%	0603
226	1	R25	R	330k	0.1%	0603
227	3	R434 R44	R	1k5		0603
		R470				
228	1	R330	R	180	0.1%	0603
229	1	R62	R	300	0.1%	0402
230	2	R366 R65	R	39		0603
231	1	R47	R	360	0.1%	0402
232	1	R428	R	1k8	0.1%	0603
233	1	R197	R	2k4	0.1%	0603
234	2	R315 R461	R	66R5	0.1%	0603
235	1	R168	R	21	0.1%	0603
236	1	R359	R	15k		0603
237	1	R318	R	12		0603
238	2	R449 R455	R	499		0603
239	1	R89	R	10M		0603
240	1	R30	R	1k	0.1%	0402
241	2	R198 R201	R	2k2	0.1%	0603
242	1	R264	R	150		0402
243	1	R377	R	390		0603
244	1	R338	R	27		0603
245	1	R321	R	8R2		0603
246	2	R346 R306	R	3k3		0402
247	1	R98	R	27	0.1%	0402
248	1	R402	R	270	0.1%	0603
249	1	R463	R	150	0.1%	0603
250	1	R371	R	270k		0603
251	1	R460	R	0	0.1%	0603
252	1	R77	R	18k		0603
253	1	R93	R	11R5	0.1%	0603
254	1	R409	R	30	0.1%	0603
255	1	R408	R	220		0603
256	1	R272	R	221	0.1%	0603
257	1	R421	R	330	0.1%	0603
258	1	R126	RA4	100		0603X4
259	1	U52	REF30XX	REF3033		SOT23
260	1	U57	REF30XX	REF3020		SOT23
261	1	D38	SK36A			SMAD
262	2	J1-2	SL2			PSS254_2G
263	1	J4	SL2			SL79_1X2G
264	1	J8	SL3			PSS254_3G
265	1	J5	SL4			PSS254_4G
266	1	J9	SL10			SL79U_2X10
267	3	J3 J6 J11	SMA_B			SMA-180
268	2	C32 C36	TC	2-6p	JR060	TC3SMD
269	1	C118	TC	5-20p	JR200	TC5SMD
270	1	U13	TEMP5	TMP236		SC70-5
271	1	U20	TLV3501			SOT23-6

Zusätzliche Komponenten:

Lüfter: SUNON MF25101V2-1000U-A99 DC12V

Schirmung: Laird BMIS-202-F + BMIS-202-C

ACHTUNG: !!!

Alle Tantal Kondensatoren sind Polymer Kondensatoren
mit kleinen ESR ca. 300 ... 500 mOhm.

Polymer Kondensatoren niemals durch Keramik Kondensatoren ersetzen !!!
zu kleiner ESR (sie werden zum Schwingkreis oder bilden Schwingkreise)

zB.: EC_SMD 2u2 ROHM "TCTO M 1A 225" 500 mOhm
EC_SMD 4u7 ROHM "TCTO M 1A 475" 500 mOhm
EC_SMD 10u ROHM "TCSO M 1A 106" 300 mOhm
EC_SMD 22u ROHM "TCSO M 0J 226" 300 mOhm

Bei den Aluminium Elektrolyt Kondensatoren auf kleinen ESR achten

Bei den Keramik Kond. C138,C194,C211,C216 2u2 auf Dielectric X7R achten !!!

Bei den Peak-Decoder Keramik Kond. C114,C115,usw. auf Dielectric C0G (NP0) achten !!!
Die Dielektrische Absorption von C0G (ca.0.5%) macht schon genug Probleme.

Bei den Widerständen (0.1%) in den Spannungsteilern ist auch auf
thermische Stabilität zu achten min. 25ppm

Nicht zu vergessen, auf ein gutes Netzteil achten (Schirmung, Störungen)
Ein Transformator mit Gleichrichter + Filter ist eine Überlegung wert

Vor den ein löten der Eingangs Spannungsteiler Widerstände (0805) sind diese
zu messen (0.1% ist zu ungenau) und den dazugehörigen parallel
Widerstand (0603) gegebenenfalls zu ändern.

zB.: Soll: R2||R3 = 149,760 Ohm +-0.01% (+-0.015 Ohm)
Schaltplan: 91000||150 = 149.753
R3 gemessen: 149.925 -0.05%
R2||R3 --> 91000||149.925 = 149.678 Error -0.082 Ohm
R2 137k: R2||R3 --> 137000||149.925 = 149.761 Ok.

Widerstand Auswahl Reihenfolge (0805)

1. Thermische Stabilität: min. 25ppm besser 10ppm
2. Leistung: 0.25W alternativ 2x 0.125W (den 2. invers verlöten)
zB: R5=2x 75 || R4=36k --> 37.460 Ohm
3. Genauigkeit: ideal 0.01% jedoch sind nur 0.1% Widerstände in kleiner
Stückzahl erhältlich.

----- Im Prototyp verwendete Widerstände -----

Teiler 2:1

R3 || R2 = 149.760 -> 149.98 || 100k --> 149.755
R5 || R4 = 37.460 -> (75.00 || 75.00) || 36k --> 37.461
R7 || R6 = 149.760 -> 149.90 || 160k --> 149.760

Teiler 2.5:1

R9 || R8 = 116.286 -> 118.03 || 7k87 --> 116.286
R11||R10 = 52.351 -> (100.01 || 109.99) || 91k --> 52.351
R13||R12 = 116.286 -> 118.03 || 7k87 --> 116.286

Teiler 4:1

R15||R14 = 82.924 -> 90.93 || 941.8 --> 82.924
R17||R16 = 93.318 -> (149.98 || 255.02) || 7k87 --> 93.319
R19||R18 = 82.924 -> 90.94 || 941.7 --> 82.931

