

Service *Manual*

MODEL: ALTO-Q

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1. Introduction

ALTO-Q has 5 band Parametric Equalizer delivers outstanding equalization both in live applications and in the studio.

For room equalization and extreme corrective surgery e.g. nothing out unwanted frequencies (feedback etc.)

For gentle contouring and audio sweetening in audio post-production and recording studios.

Parallel filter architecture ensures minimal phase shift and extremely transparent audio performance.

Precision state variable filters with constant "Q" principle ensure absolutely stable filter characteristics.

High and low cut filters remove unwanted frequencies e.g. floor rumble and tape hiss etc.

Each band can through "in/out" switch and is fully adjustable from extremely narrow notch filter (0.03 octaves) to broadband equalization (1.6 octaves).

A wide overlap between frequency bands allows for extreme cut or boost.

Balanced input and balanced output with 1/4" TRS and Gold plated XLR.

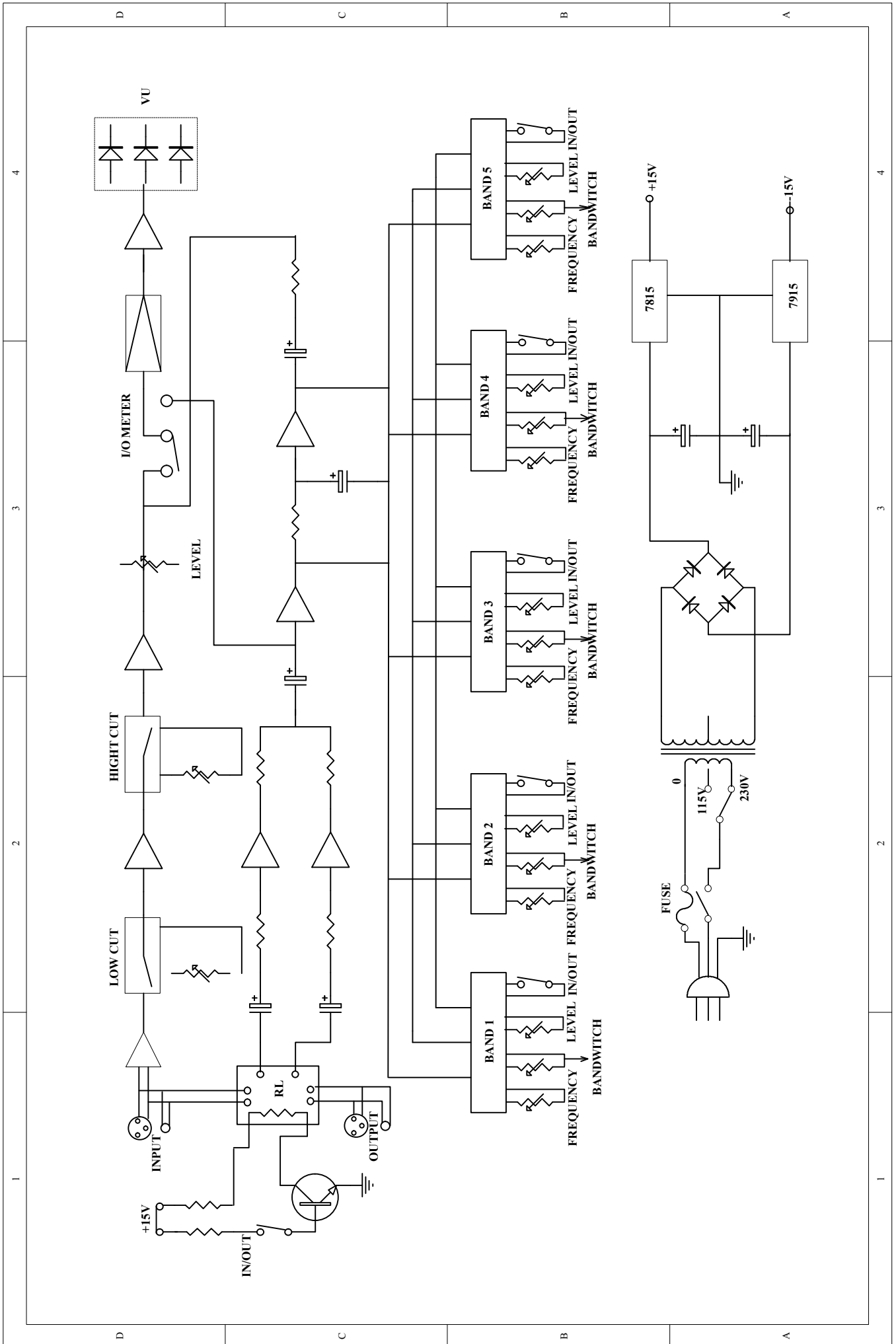
With an auto-bypass function during power failure.

12 LED to indicate input or output level.

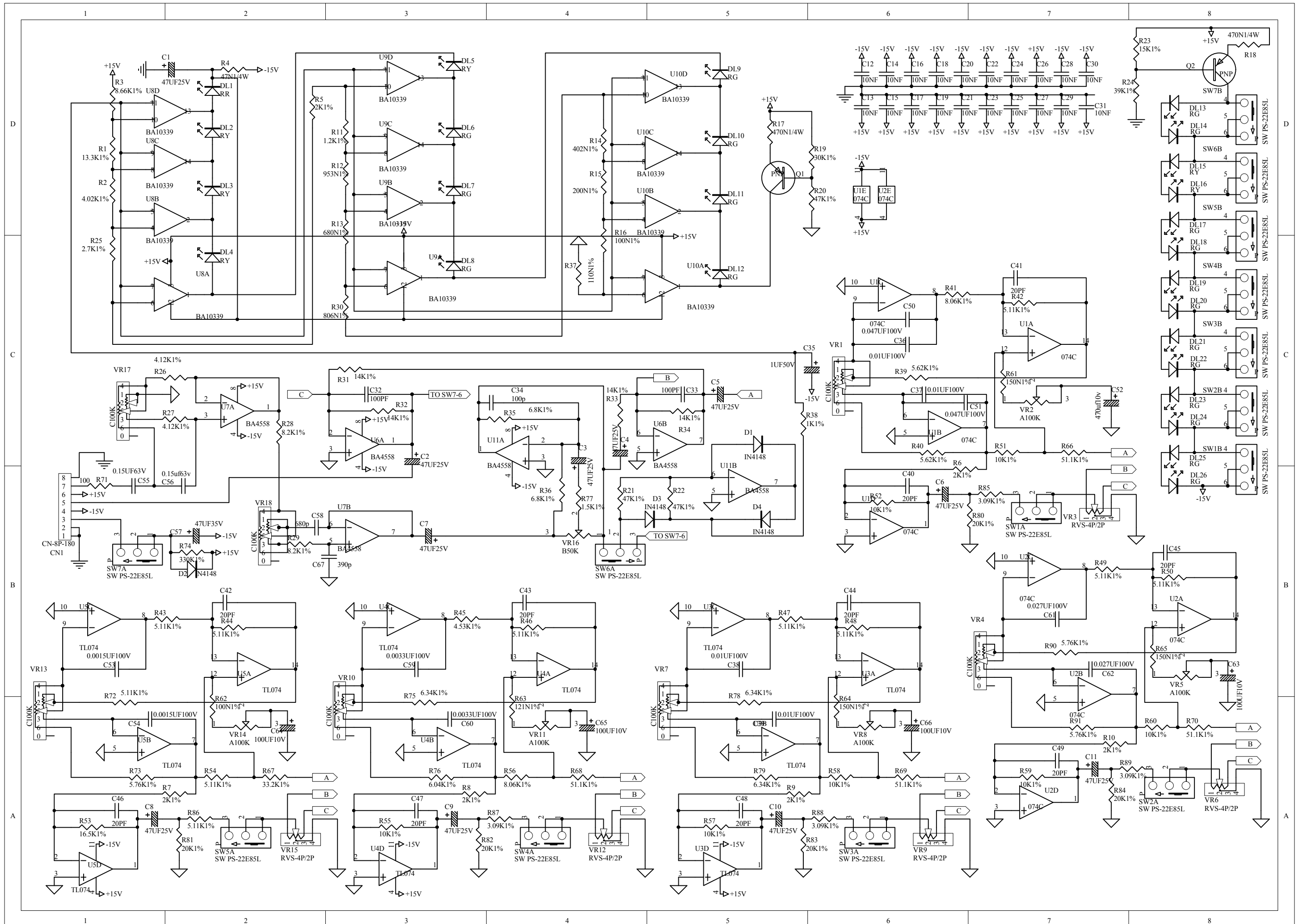
2. Specification

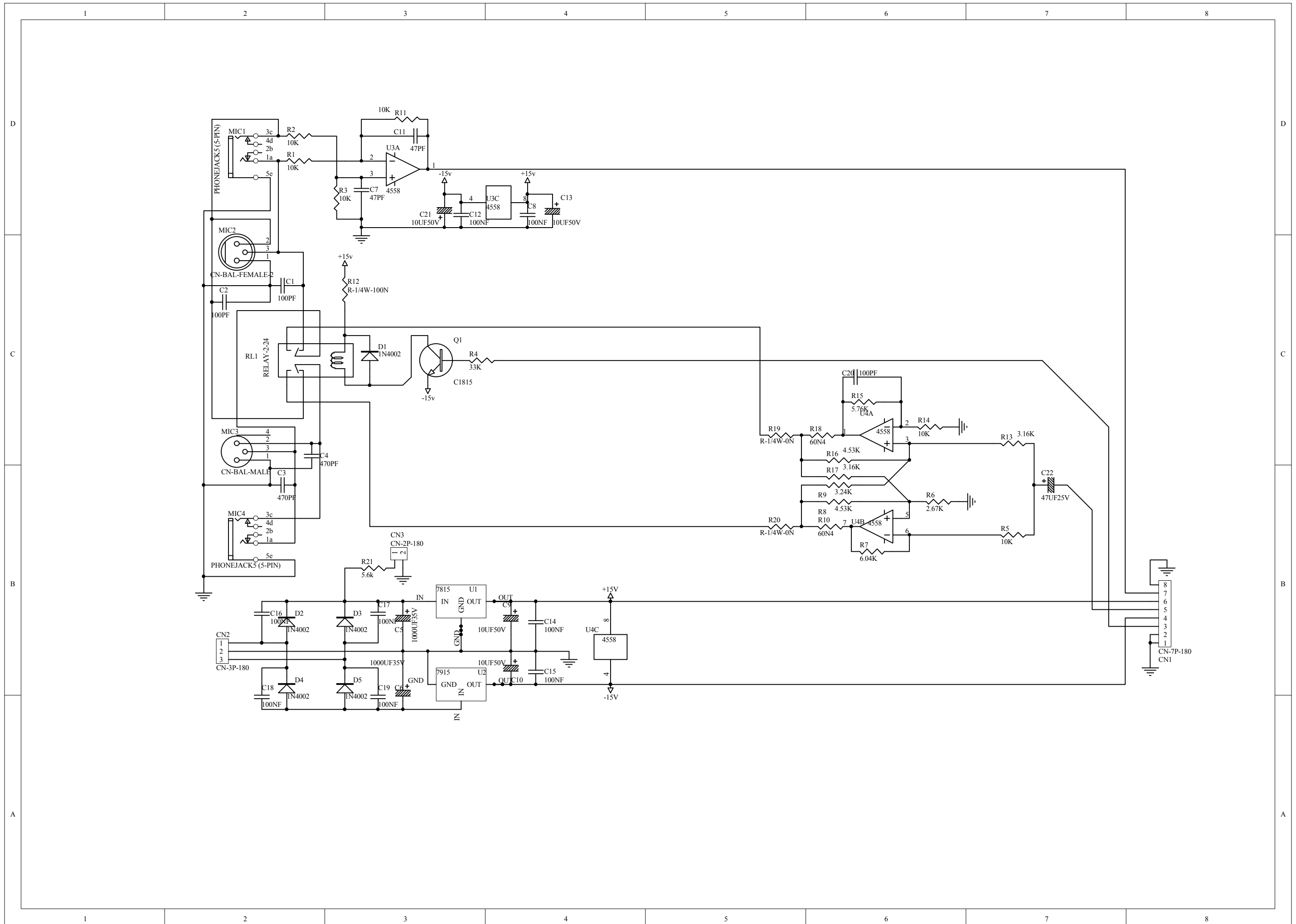
AUDIO INPUT		
	Type	Active balanced XLR and 1/4" JACK
	Impedance	Balanced: 50kOhm Unbalanced: 25kOhm
	Operating level	+4dBu/ - 10dBV
	Maximum input level	Balanced and Unbalanced: +18dBV
	CMRR	>55dB @1kHz
AUDIO OUTPUT		
	Type	XLR and 1/4" JACK
	Impedance	Balanced: 60Ohm Unbalanced: 30Ohm
	Maximum output level	+18dBV
SYSTEM SPECIFICATIONS		
	Bandwidth	18Hz to 30kHz at ± 3 dBV
	THD+N%	0.02% typ. 1kHz, @+4dBu
		0.04% typ. 1kHz, @ - 10dBu
	IMD	0.01% typ
	Noise	>-92dB unweighted 22Hz to 22kHz
	Frequency response	18Hz to 28kHz, ± 3 dB
	Low cut	Variable (10Hz to 400Hz)
	High cut	Variable (2.5kHz to 30kHz)
PARAMETRIC FILTER		
	Level	Variable (± 15 dB)
	Frequency	Band1: 20Hz to 400Hz
		Band2: 60Hz to 1kHz
		Band3: 150Hz to 2.5kHz
		Band4: 500Hz to 8kHz
		Band5: 1kHz to 20kHz
	Bandwidth	Variable (0.03 to 1.6 octaves)
FUNCTION SWITCHES		
	Audio IN/OUT	Relay controlled hard - bypass
	I/O meter IN/OUT	Switches the meter display from input to output
	IN/OUT	Activates each filter band
INDICATORS		
	Input/output level	12-segment LED display: -30/-24/-18/-12/-6/-3/0/+3/+6/+9/+12/+18dB
	Function switch	LED indicator of every switch
POWER SUPPLY		
	Main voltages	AC: 210 - 240VAC~50Hz
		AC: 95 - 120VAC~60Hz
	Power consumption	9watts
	Fuse	210 - 240V: T200mA 250VAC
		95 - 120V: T315mA 250VAC
PHYSICAL		
	Dimension	483(W) \times 194.1(D) \times 44(H)mm
	Weight	3.23kg

3. Block Diagram

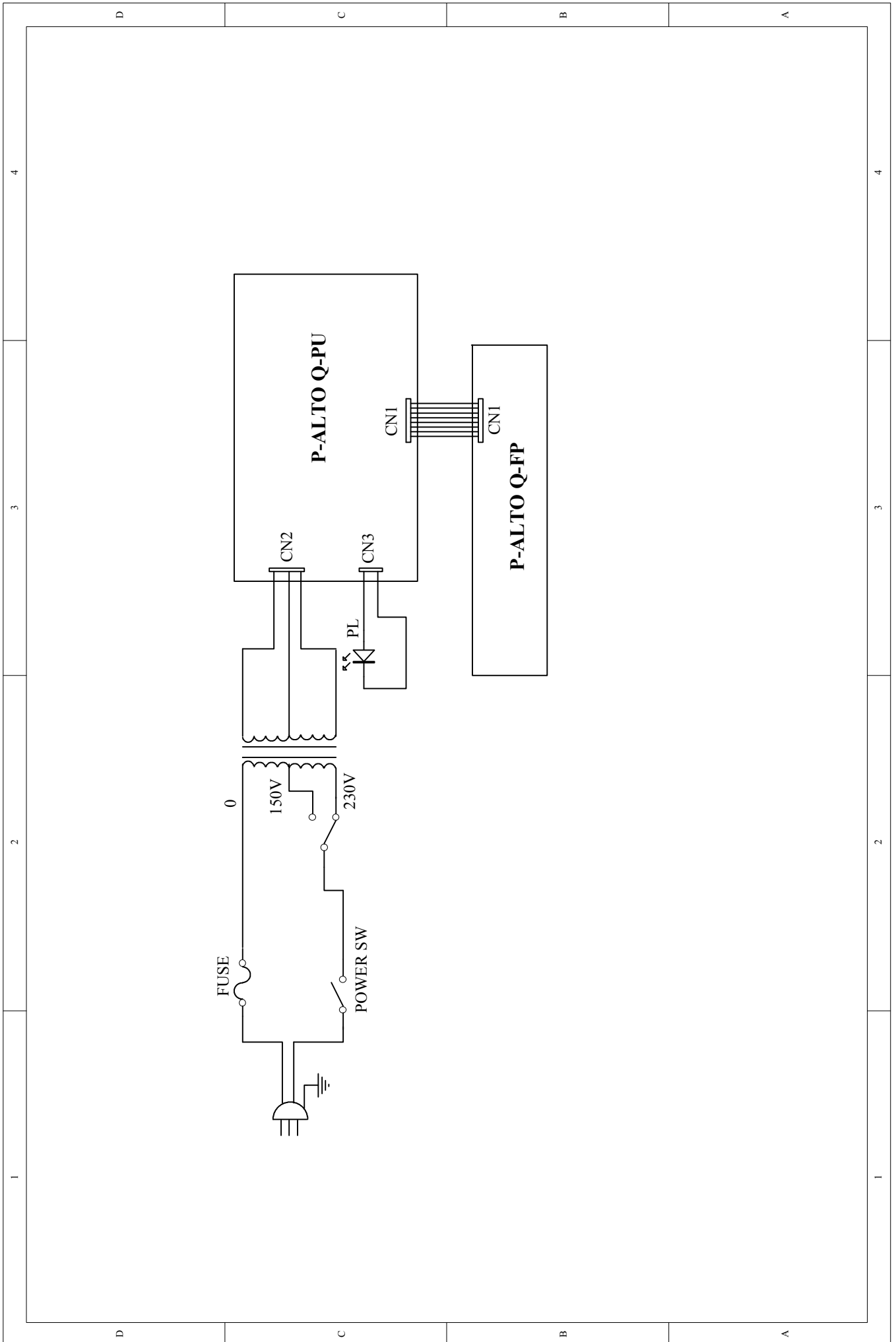


4. Schematic Diagram

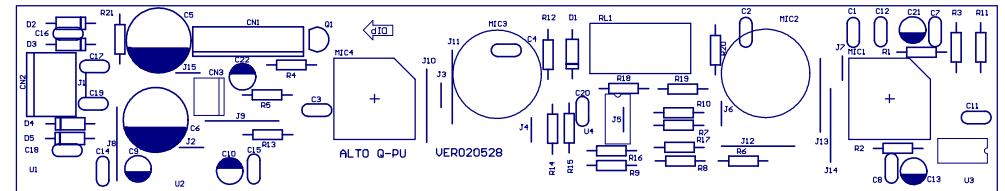
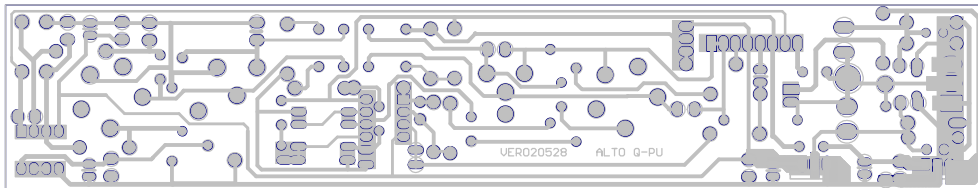
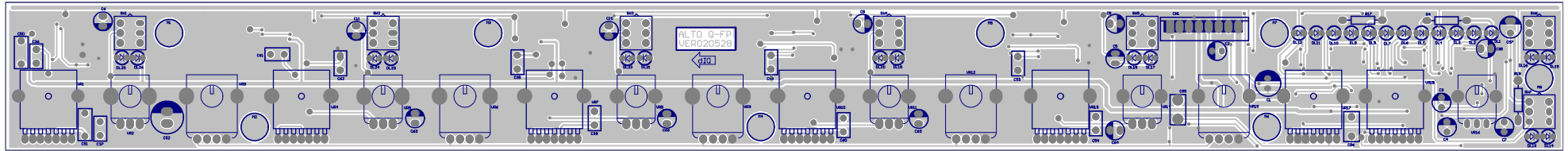
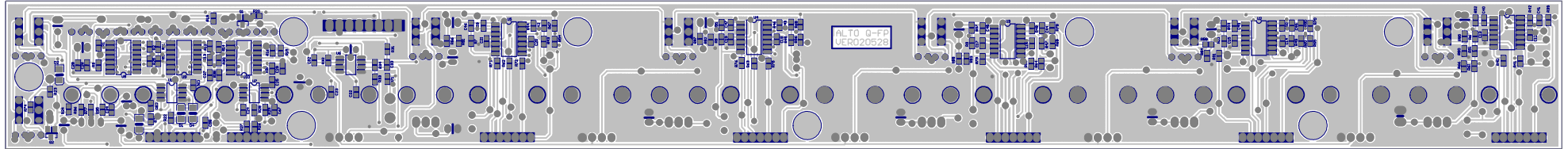




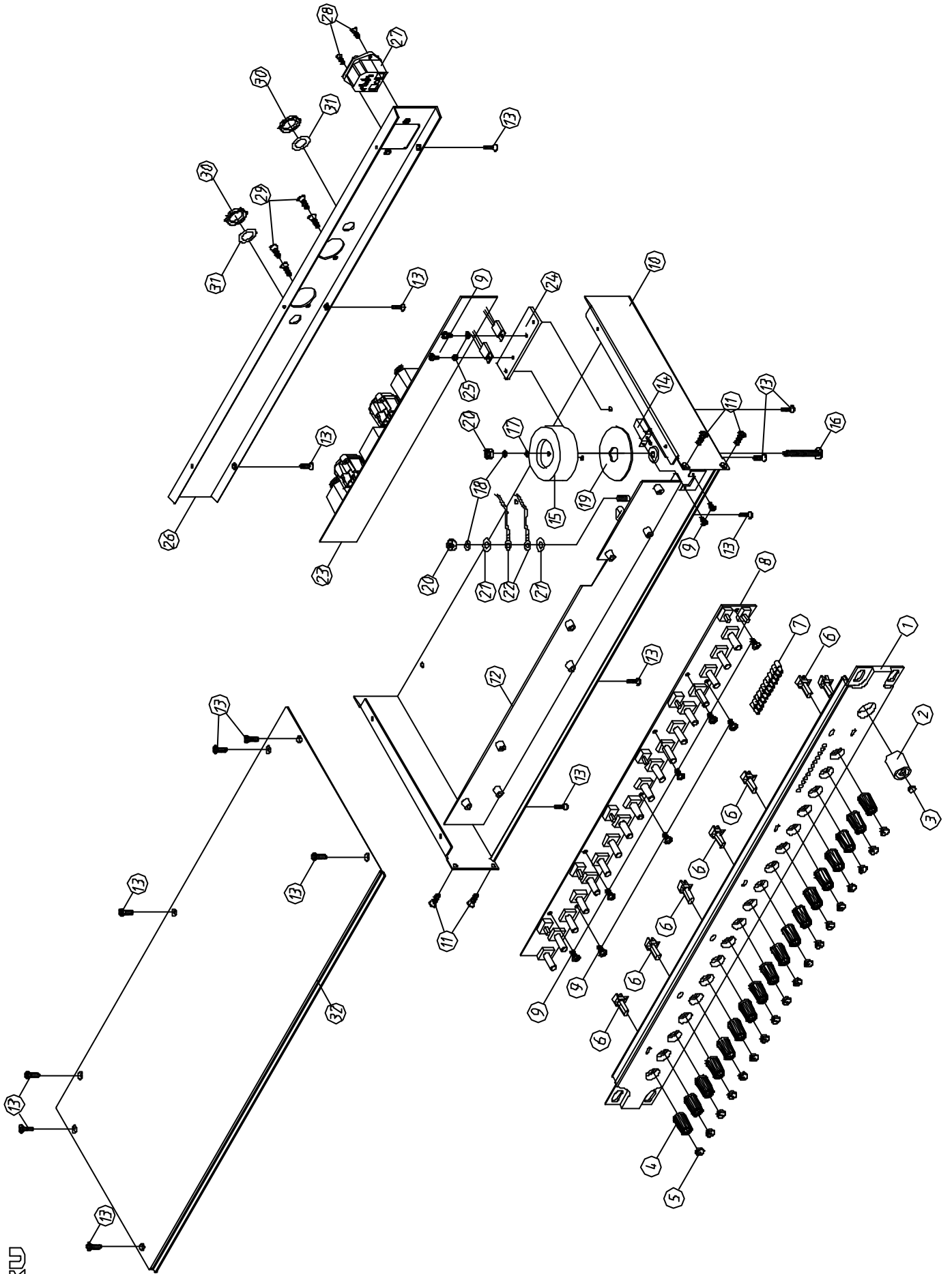
5. Wiring Diagram



6. Printed Circuit Board



7. Exploded View & Mechanical Parts List



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Part List

Mechanical Parts List				
No.	Item NO.	Item Description	Specification	pcs
1	MA03352	panel	ALTO-Q	1
2	NMBA02	Power switch	15*17	1
3	NPL285	Power switch cover	6*2.5 yellow C	1
4	NMBP64	Plastic knob(double color)	11*117.5	18
5	NPL272	Knob cover	8.5*4 blue 072C	18
6	NPL275	Lens key	3*W6*18.3 transparency	7
7	NPL325	Lens pillar	3.1*85	12
8		PCB semi-finished product		1
9	MSCB32	Black-plated screw	3*6 pill	10
10		Chassis base assemble		1
11	MSCB38	Black plated screw	3*7 pan head iron-plate	4
12	MI01394	Front panel	ALTO-Q	1
13	MSCB13	Black-plated screw	3*6 pan-head	15
14	HSWA13	Power supply SW	SDDL B 1007U	1
15	TP4042	transformer	PT-CLE40	1
16	MSCC40	screw	4*30 pill	1
17	MFSC02	washer	4* 12*1t	1
18	MFSS04	Spring washer	4* 7*1t	2
19	NLXC07	Rubber coil	20* 60*2tB	1
20	MSTC04	nut	4m/m	2
21	MFST01	Shake proof washer	4* 8*0.5t	2
22	HLSC76	Ground wire		1
23		PCB semi-finished product		1
24	MHLB12ZZ	Heat sink	CLE2.0	1
25	NPL029	Plastic washer	T0220B	2
26	MB02298	Rear panel	ALTO-Q	1
27	HCSA16	AC socket	(s)315-B (enclosed AC adaptor)	1
28	MSCB35	Black-plated screw	3*10 pan head	2
29	MSCB58	Black-plated screw	3*10 pill iron-plate	4
30	ME00060	MIC socket nut	Hexagon JY-6531G-02-250	2
31	MF00061	MIC socket washer	JY-6531G-02-250	2
32	MTP229ZZ	Top cover	CLE2.0	1

8. Electrical Parts List

No.	Part No.	Description	Specification	Remark
1	MA03352	panel	ALTO-Q	
2	MA03253	panel	ALTO-Q	
3	MA03349	panel	ALTO-Q	
4	MA03353	panel	ALTO-Q	
5	MI01279	panel	44.2*17.5*483	
6	MB00522	rear board	CLE2.0_V1.6	
7	MB00520	rear board	CLE2.0	
8	MB00521	rear board	CLE2.0_V1.7	
9	MJ00059	single light board	1.2*2135*1220 24.54kg	
10	ME00001	screw pillar	M4*10*0.7PH	
11	MI01357	fixed bracket	CLE2.0	
12	MJ00063	iron board	1.2*2135*1220 24.54kg	
13	MI01394	front board	ALTO-Q	
14	MI01393	front board	ALTO-Q	
15	MJ00061	iron board	1*2135*1220 20.45kg	
16	ME00035	iron pillar	hexagon6.35*M3*6	
17	MB02298	rear board	ALTO-Q_V1.0	
18	MB02296	rear board	ALTO-Q	
19	MB02295	rear board	ALTO-Q	
20	MJ00058	single light board	1*2135*1220 20.45kg	
21	MC00209	top cover	CLE2.0	
22	MC00207	top cover	CLE2.0	
23	MC00208	top cover	CLE2.0_V1.2	
24	MJ00059	single light board	1.2*2135*1220 24.54kg	
25	NI01156	button	φ3*W6*18.3	
26	NI01876	LED spacer support	7.6*4.5*184	
27	NI01178	LED lens	φ3.1*85	
28	NI00362	knob	(COOL GRAY 8C/white)	
29	NI00896	knob cover	φ8.5*4 072C	
30	HC00015	AC socket	(S)315-B (AC select)	
31	HD00023	glass tube fuse	200mA 250V φ5.2*20mm CSA/S/UL/VDE	
32	NI00308	power switch button	φ15*17	
33	NI01159	power switch button cap	φ6*2.5 YELLOW C	
34	HI00023	power switch	SDDL B 1007U	
35	SA00065	L.E.D	LG2043 green	
36	MG00041	screw	M3*6	
37	MG00025	screw	M3*6	
38	MG00042	screw	M3*10	
39	MG00045	screw	M3*7	
40	MG00061	screw	M3*10	
41	MG00111	color screw	pill 4*30	
42	ME00016	color nut	4m/m	

No.	Part No.	Description	Specification	Remark
43	ME00060	MIC jack	JY-6351G-02-250	
44	MF00061	MIC jack	φ9.6*φ13*0.5t	
45	MG00162	screw	M3*8	
46	MF00019	washer	φ4*φ12*1t_V1.0	
47	MF00106	washer	φ4*φ12*1t_V1.0	
48	MJ00058	single light board	1*2135*1220 20.45kg	
49	MF00038	washer	φ4*φ7*1t	
50	MF00048	washer	φ4*φ8*0.5t	
51	NI00443	rubber coil	φ20*φ60*2tB	
52	HA01537	header wiring AF:W301	8P-8P 240	
53	HA01638	row-wire connector wiring	2P 280	
54	HA01798	wire	250 black	
55	HA01835	P.V.C single wave wired UL1617	80 brown	
56	HA01789	P.V.C wire UL1007 AWG24	150 black	
57	HA00086	wire	2200mm black L3R3	
58	HA01333	single terminal wiring CF:W76	150mm UL1015 18AWG green/yellow	
59	MJ00344	solder plate	AMP	
60	HA00861	power cord Europe 3P	LT-312+LT-501	
61	NI00240	sleeve	φ2.5*10mm	
62	NI00239	sleeve	φ2.5*1000mm	
63	NI00252	sleeve	φ4*20mm	
64	NI00248	sleeve	φ4*1000mm	
65	NC00005	mica	SB-9500DSP 18*13*0.1t_V1.0	
66	NI02249	plastic washer	TW-1(TO-220)	
67	NI00218	cable tie	ALT-102SB	
68	NI00501	self-adhere foot cushion	12.7*9*3t(SF-004)	
69	NA00137	clip-chain bag	5*7	
70	NA00123	PE bag	0.04t*580*300mm	
71	HJ00006	dessicant	30g	
72	NE05267	label	red	
73	NH00025	bond paper	0.065*1M	
74	NI00018	membrane	0.06*1M	
75	NE06156	label	ALTO-Q	
39	MG00045	screw	M3*7	
76	NH00012	bond paper	0.04*1M	
77	NI00014	membrane	0.035*1M	
78	NE05004	label	ALTO	
79	NH00334	cone paper	0.040*1m	
80	NB02072	gift carton	ALTO Q ALTO_V1.0	
81	NB02163	barrier	X23,34,40	
82	NB02164	barrier	X23,34,40	
83	NB02088	carton	(1H) ALTO 19"used to series	

No.	Part No.	Description	Specification	Remark
84	NF00961	instruction	ALTO-Q ALTO_V2.4	
85	NH00149	paper	889*640mm	
86	NF00061	assurance card	ALTO	
87	TD00118	transformer	PT-CLE4.0	
88	SD00077	integrated circuit-RS	L7815CV(TO-220)(ST)(MOROCCO)	
89	SD00079	integrated circuit	L7915CV(TO-220)(ST)	
90	MF00037	washer	φ3.2*φ5.5*1t	
91	MJ00115	heat-sink	CLE2.0 4*80.5*18_V1.1	
92	MJ00070	AL plate	4*2440*1220 32.40kg	
93	ME00015	color nut	3m/m	
94	NI02085	power switch sleeve	φ22*9.69	
95	HK01250	PC board	P-ALTO Q-FP-DIP	
96	RA00174	fixed resistor 1/4W	47Ω M type	R4
97	RA00204	fixed resistor 1/4W	470Ω M type	R17,R18
98	CB00009	electrolytic capacitor	1uF/50V φ4*7mm	C35
99	CB00039	electrolytic capacitor	47uF/25V φ5*11mm	C1,C10,C11,C2,C3,C4,C5,C6,C7,C8,C9
100	CB00041	electrolytic capacitor	47uF/50V φ6*11mm	C57
101	CB00045	electrolytic capacitor	100uF/10V φ5*11mm	C63,C64,C65,C66
102	CB00068	electrolytic capacitor	470uF/10V φ8*11mm	C52
103	CC00045	mylar capacitor	0.0015uF/100V 3%	C53,C54
104	CC00010	mylar capacitor	0.0033uF/100V 3%	C59,C60
105	CC00021	mylar capacitor	0.01uF/100V 3%	C36,C37,C38,C39
106	CC00029	mylar capacitor	0.027uF/100V 3%	C61,C62
107	CC00035	mylar capacitor	0.047uF/100V 3%	C50,C51
108	CF00036	metal-film capacitor MSC	0.15uF/63V	C55,C56
109	SA00071	L.E.D	φ3 green LVG2340/A	DL10,DL11,DL12,DL13,DL14,DL17,DL18,DL19,DL20,DL21,DL22,DL23,DL24,DL25,DL26,DL6,DL7,DL8,DL9
110	SA00072	L.E.D	φ3 red LI2340/A	DL1
111	SA00073	L.E.D	φ3 yellow LUY2340/A	DL15,DL16,DL2,DL3,DL4,DL5
112	HI00162	push-button switch	2 paragraphs 6p PS-22E8552L	SW1,SW2,SW3,SW4,SW5,SW6,SW7
113	HC00082	connector(male)	8P 2.5mm 180°	CN1
114	NI01781	LED spacer support	LEDS-8 8mm	DL1,DL10,DL11,DL12,DL13,DL14,DL15,DL16,DL17,DL18,DL19,DL2,DL20,DL21,DL22,DL23,DL24,DL25,DL26,DL3,DL4,DL5,DL6,DL7,DL8,DL9
115	RC00229	potentiometer	C100KΩ R1411G0A-V1C104FN00-00	VR1,V10,VR13,VR17,VR18,VR4,VR7
116	RC00230	potentiometer	A100KΩ R0911NOB-V1-A104FN00-00	VR11,VR14,VR2,VR5,VR8
117	RC00231	potentiometer	B50KΩ R1111NTA-V1B503FM00-00	VR12,VR15,VR3,VR6,VR9
118	RC00217	potentiometer	B50KΩ R0911NOB-V1B503FN00-00	VR16
119	HK01249	PC board	P-ALTO Q-FP-SMD	
120	HB00703	PCB	ALTO-Q-FP 38*400_VER020405	
121	RD00218	SMD precise resistor 1/10W	15.0KΩ ±1% 0603	R23
122	RD00282	SMD precise resistor 1/10W	1.00KΩ ±1% 0603	R38

No.	Part No.	Description	Specification	Remark
123	RD00322	SMD precise resistor 1/10W	2.70K Ω \pm 1% 0603	R25
124	RD00277	SMD precise resistor 1/10W	200 Ω \pm 1% 0603	R15
125	RD00219	SMD precise resistor 1/10W	20.0K Ω \pm 1% 0603	R80,R81,R82,R83,R84
126	RD00203	SMD precise resistor 1/10W	2.00K Ω \pm 1% 0603	R10,R5,R6,R7,R8,R9
127	RD00289	SMD precise resistor 1/10W	8.06K Ω \pm 1% 0603	R41,R56
128	RD00286	SMD precise resistor 1/10W	4.53K Ω \pm 1% 0603	R45
129	RD00339	SMD precise resistor 1/10W	47.0K Ω \pm 1% 0603	R2,R21,R22
130	RD00371	SMD precise resistor 1/10W	51.1K Ω \pm 1% 0603	R66,R68,R69,R70
131	RD00365	SMD precise resistor 1/10W	5.62K Ω \pm 1% 0603	R39,R40
132	RD00360	SMD precise resistor 1/10W	121 Ω \pm 1% 0603	R63
133	RD00368	SMD precise resistor 1/10W	16.5K Ω \pm 1% 0603	R53
134	RD00329	SMD precise resistor 1/10W	30.0K Ω \pm 1% 0603	R19
135	RD00331	SMD precise resistor 1/10W	330K Ω \pm 1% 0603	R74
136	RD00330	SMD precise resistor 1/10W	39.0K Ω \pm 1% 0603	R24
137	RD00364	SMD precise resistor 1/10W	4.02K Ω \pm 1% 0603	R2,R86
138	RD00324	SMD precise resistor 1/10W	4.12K Ω \pm 1% 0603	R26,R27
139	RD00279	SMD precise resistor 1/10W	402 Ω \pm 1% 0603	R14
140	RD00210	SMD precise resistor 1/10W	5.11K Ω \pm 1% 0603	R42,R43,R44,R46,R47,R48,R49,R50,R54,R72
141	RD00299	SMD precise resistor 1/10W	5.76K Ω \pm 1% 0603	R73,R90,R91
142	RD00300	SMD precise resistor 1/10W	6.04K Ω \pm 1% 0603	R76
143	RD00287	SMD precise resistor 1/10W	6.34K Ω \pm 1% 0603	R75,R78,R79
144	RD00326	SMD precise resistor 1/10W	6.80K Ω \pm 1% 0603	R35,R36
145	RD00332	SMD precise resistor 1/10W	680 Ω \pm 1% 0603	R13
146	RD00327	SMD precise resistor 1/10W	8.20K Ω \pm 1% 0603	R28,R29
147	RD00328	SMD precise resistor 1/10W	8.66K Ω \pm 1% 0603	R3
148	RD00281	SMD precise resistor 1/10W	806 Ω \pm 1% 0603	R30
149	RD00362	SMD precise resistor 1/10W	953 Ω \pm 1% 0603	R12
150	RD00321	SMD precise resistor 1/10W	1.20K Ω \pm 1% 0603	R11
151	RD00201	SMD precise resistor 1/10W	1.50K Ω \pm 1% 0603	R77
152	RD00274	SMD precise resistor 1/10W	100 Ω \pm 1% 0603	R16,R62,R71
153	RD00214	SMD precise resistor 1/10W	10.0K Ω \pm 1% 0603	R51,R52,R57,R58,R59,R60
154	RD00275	SMD precise resistor 1/10W	110 Ω \pm 1% 0603	R37
155	RD00301	SMD precise resistor 1/10W	12.1K Ω \pm 1% 0603	R55
156	RD00216	SMD precise resistor 1/10W	13.3K Ω \pm 1% 0603	R1
157	RD00217	SMD precise resistor 1/10W	14.0K Ω \pm 1% 0603	R31,R32,R33,R34
158	RD00200	SMD precise resistor 1/10W	150 Ω \pm 1% 0603	R61,R64,R65
159	RD00370	SMD precise resistor 1/10W	33.2K Ω \pm 1% 0603	R67
160	RD00323	SMD precise resistor 1/10W	3.09K Ω \pm 1% 0603	R85,R87,R88,R89
161	CI00115	SMD ceramic capacitor 0603	390PF/50V NPO \pm 5%	C67
162	CI00064	SMD ceramic capacitor	680PF/50V NPO \pm 5	C58
163	CI00059	SMD ceramic capacitor	100PF/50V NPO \pm 5%	C32,C33,C34
164	SG00001	SMD integrated circuit	TL074CDT	U1,U2,U3,U4,U5

No.	Part No.	Description	Specification	Remark
165	CI00071	SMD ceramic capacitor 0603	0.01uF/50V X7R ±10%	C12,C13,C14,C15,C16,C17,C18,C19,C20,C21,C22,C23,C24,C25,C26,C27,C28,C29,C30,C31
166	SG00032	SMD integrated circuit	LM339DR/(TI)	U10,U8,U9
167	SG00041	SMD integrated circuit	BA4558F	U11,U6,U7
168	SE00011	SMD rectifier diode	RLS4148 0.5A (LL-34)	D1,D2,D3,D4
169	SF00053	transistor	MMBT3906(SOT-23)/(PHI)	Q1,Q2
170	AE00449	solder material without lead	9308/Sn Ag Cu	
171	CI00265	SMD ceramic capacitor-RS 0603	20PF/50V NPO ±5	C40,C41,C42,C43,C44,C45,C46,C47,C48,C49
172	AC00179	tin without lead	M705E Sn 3Ag-0.5Cu	
173	HK01248	PC board	P-ALTO Q-PU	
174	HB00702	PCB	ALTO-Q-PU 38*200_VER020405	
175	RA00515	precise resistor 1/4W	10.0KΩ M type	R1,R11,R14,R2,R3,R5
176	RA00484	precise resistor 1/4W	2.67KΩ M type	R6
177	RA00712	precise resistor 1/4W	3.16KΩ M type	R13,R17
178	RA00489	precise resistor 1/4W	3.24KΩ M type	R9
179	RA00544	precise resistor 1/4W	33.0KΩ M type	R4
180	RA00715	precise resistor 1/4W	4.53KΩ M type	R16,R8
181	RA00628	precise resistor 1/4W	5.76Ω M type	R15
182	RA00629	precise resistor 1/4W	6.04KΩ M type	R7
183	RA00452	precise resistor 1/4W	100Ω M type	R12
184	RA00711	precise resistor 1/4W	60.4Ω M type	R10,R18
185	RA00157	fixed resistor 1/4W	0.0Ω	R19,R20
186	RA00234	fixed resistor 1/4W	5.6KΩ M type	R21
187	CB00073	electrolytic capacitor	1000uF/35V φ13*20mm	C5,C6
188	CB00025	electrolytic capacitor	10uF/50V φ6*7mm	C10,C13,C21,C9
189	CB00039	electrolytic capacitor	47uF/25V φ5*11mm	C22
190	HA01919	jump	5mm	J1,J15,J2,J3,J4,J5,J6,J7
191	HA02249	wire	φ0.6_Tin plated	
192	HA01930	jump	15mm	J10,J11,J12,J13,J14,J8,J9
193	HA02249	wire	φ0.6_Zn plated	
194	HC00082	connector(male)	8P 2.5mm 180°	CN1
195	HC00076	connector(male)	2P 2.5mm 180°	CN3
196	HC00172	connector(male)	3P 3.96mm 180°	CN2
197	CA00052	ceramic capacitor	0.1uF SL	C12,C14,C15,C16,C17,C18,C19,C8
198	CA00023	ceramic capacitor	100PF SL	C1,C2
199	CA00002	ceramic capacitor	10PF NPO	C20
200	CA00015	ceramic capacitor	47PF NPO	C11,C7
201	CA00033	ceramic capacitor	470PF Y5E	C3,C4
202	SA00094	rectifier diode	1N4002/100V	D1,D2,D3,D4,D5
203	SB00034	transistor	2SC1815GR	Q1
204	SD00043	integrated circuit	JRC 4558 DD(NJM4580D)	U3,U4
205	HI00013	relay	GS-SH-224T 24V	RL1

No.	Part No.	Description	Specification	Remark
206	HC00392	balance MIC jack-RS	JY-5030-030G 180°	MIC3
207	HC00126	balance MIC jack-RS	JY-5042-030G female plug 180°	MIC2
208	HC00125	MIC jack-RS	JY-6351G-02-250	MIC1,MIC4
209	AC0P0179	tin without lead	M705E Sn 3Ag-0.5Cu	
210	SA00175	Schottky barrier diode	1A/40V 1N5819	
211	NI02408	fixed board	φ15*2.7mm white CONTROL30	
212	MF00132	MIC jack	φ3*φ8*0.8t_v1.0	
213	MF00030	washer	φ3.5*φ8*0.8t_V1.0	
214	MJ00067	single light board	0.8t*2135*1220mm 18.69kg	
215	AD00012	twin adhesive	90*120mm_V1.0	
216	NA00279	clip-chain bag	0.04t*100*150mm_V1.0	
188	CB00025	electrolytic capacitor	10uF/50V φ6*7mm	C10,C13,C21,C9
189	CB00039	electrolytic capacitor	47uF/25V φ5*11mm	C22
190	HA01919	jump	5mm	J1,J15,J2,J3,J4,J5,J6,J7
191	HA02249	wire	φ0.6_Tin plated	
192	HA01930	jump	15mm	J10,J11,J12,J13,J14,J8,J9
193	HA02249	wire	φ0.6_Tin plated	
194	HC00082	connector(male)	8P 2.5mm 180°	CN1
195	HC00076	connector(male)	2P 2.5mm 180°	CN3
196	HC00172	connector(male)	3P 3.96mm 180°	CN2
197	CA00052	ceramic capacitor	0.1uF SL	C12,C14,C15,C16,C17,C18,C19,C8
198	CA00023	ceramic capacitor	100PF SL	C1,C2
199	CA00002	ceramic capacitor	10PF NPO	C20
200	CA00015	ceramic capacitor	47PF NPO	C11,C7
201	CA00033	ceramic capacitor	470PF Y5E	C3,C4
202	SA00094	rectifier diode	1N4002/100V	D1,D2,D3,D4,D5
203	SB00034	transistor	2SC1815GR	Q1
204	SD00043	integrated circuit	JRC 4558 DD(NJM4580D)	U3,U4
205	HI00013	relay	GS-SH-224T 24V	RL1
206	HC00392	balance MIC jack-RS	JY-5030-030G 180°	MIC3
207	HC00126	balance MIC jack-RS	JY-5042-030G female plug 180°	MIC2
208	HC00125	MIC jack-RS	JY-6351G-02-250	MIC1,MIC4
209	AC00179	tin without lead	M705E Sn 3Ag-0.5Cu	
210	SA00175	Schottky barrier diode	1A/40V 1N5819	
211	NI02408	fixed board	φ15*2.7mm white CONTROL30	
212	MF00132	MIC jack	φ3*φ8*0.8t_v1.0	
213	MF00030	washer	φ3.5*φ8*0.8t_V1.0	
214	MJ00067	single light board	0.8t*2135*1220mm 18.69kg	
215	AD00012	twin adhesive	90*120mm_V1.0	
216	NA00279	clip-chain bag	0.04t*100*150mm_V1.0	