

Service *Manual*

MODEL: EQU131VU-MKII



www.altoproaudio.com

Version 1.0

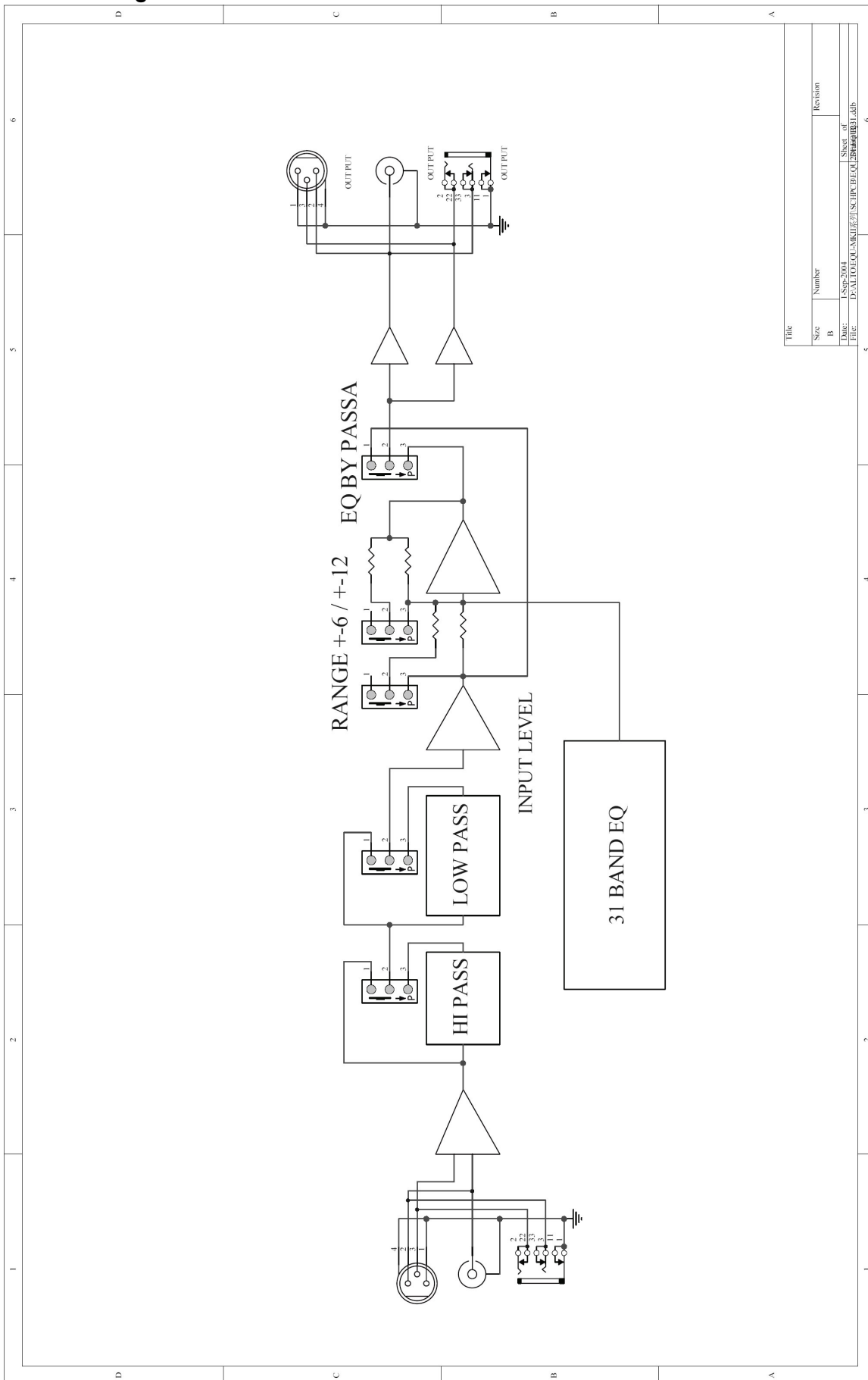
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1. Introduction

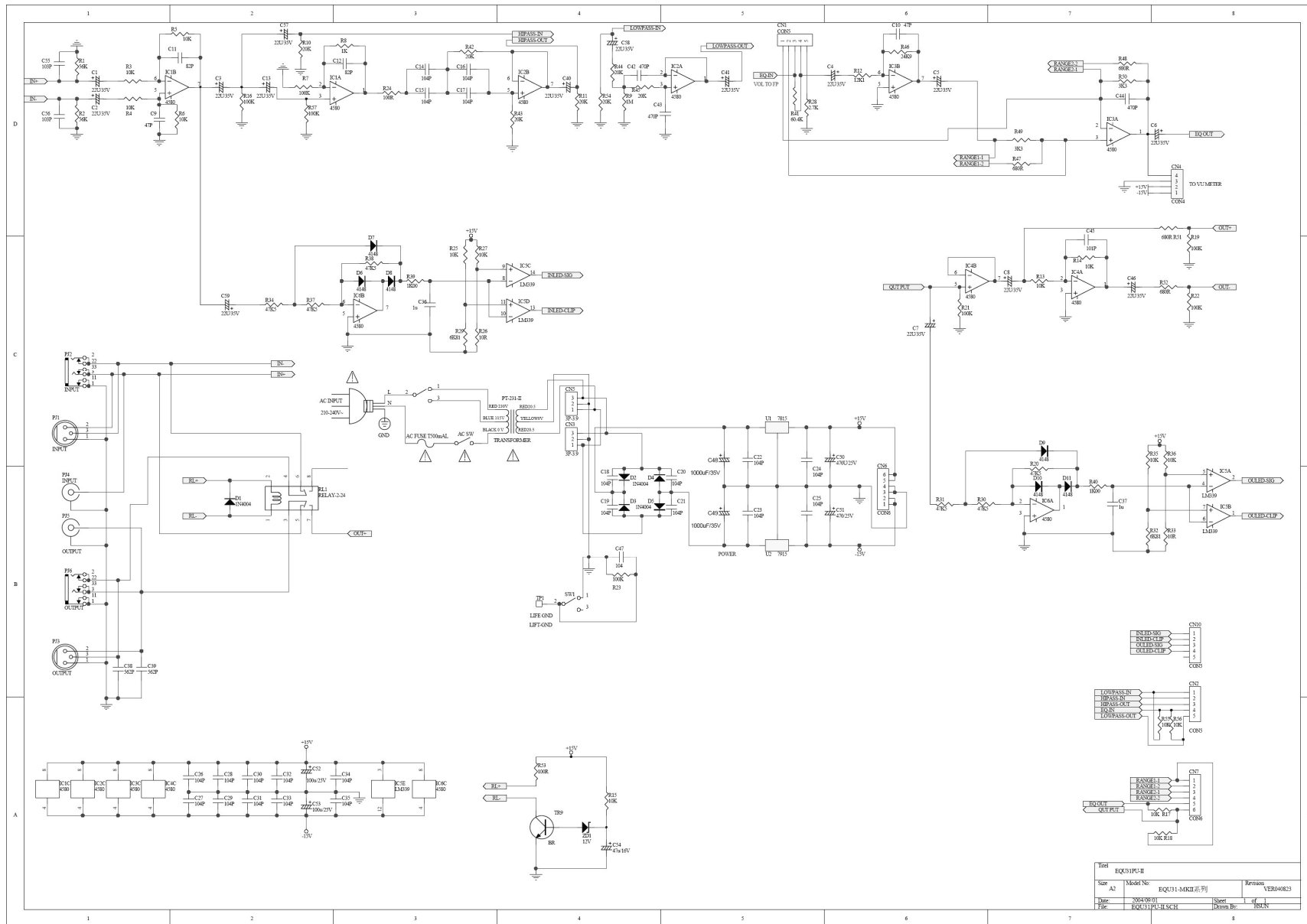
- 31 band, dual channels pure pre-amplifiers.
- Selectable hi-pass filter with 40Hz cut-off frequency.
- Selectable Low-pass filter with 16KHz cut-off frequency.
- Automatic switch to bypass function.
- Controllable input level for different input level and signal.
- Low-noise and precise linear potentiometer for frequency adjustment.
- Selectable +/-6 and +/-12dbu of EQ.
- Selectable EQ bypass function.
- Signal and distortion LED for input and output level.
- VU meter for output level.

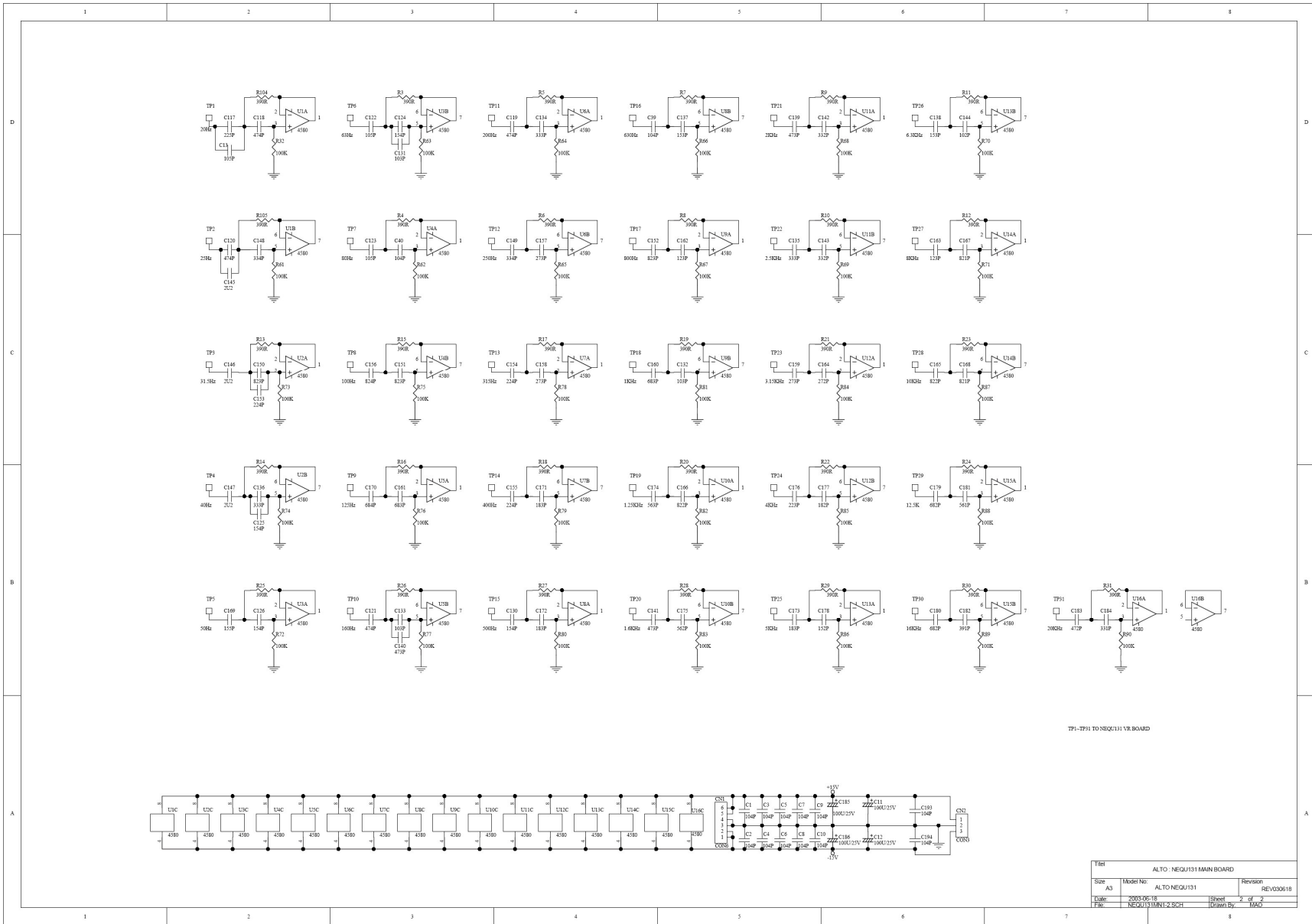
2. Block Diagram

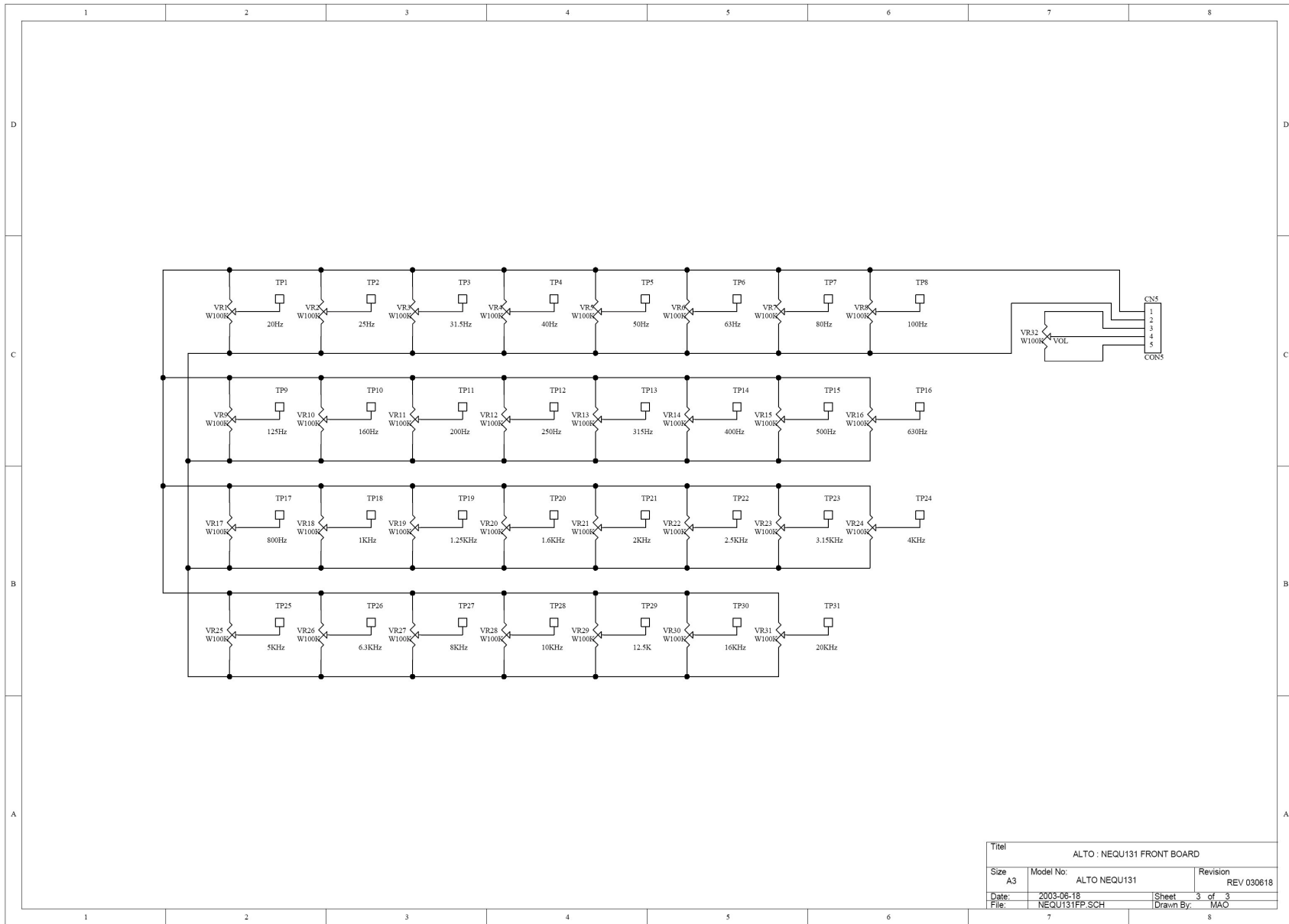


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Size:	Number
B:	Revision
Date:	Sheet of
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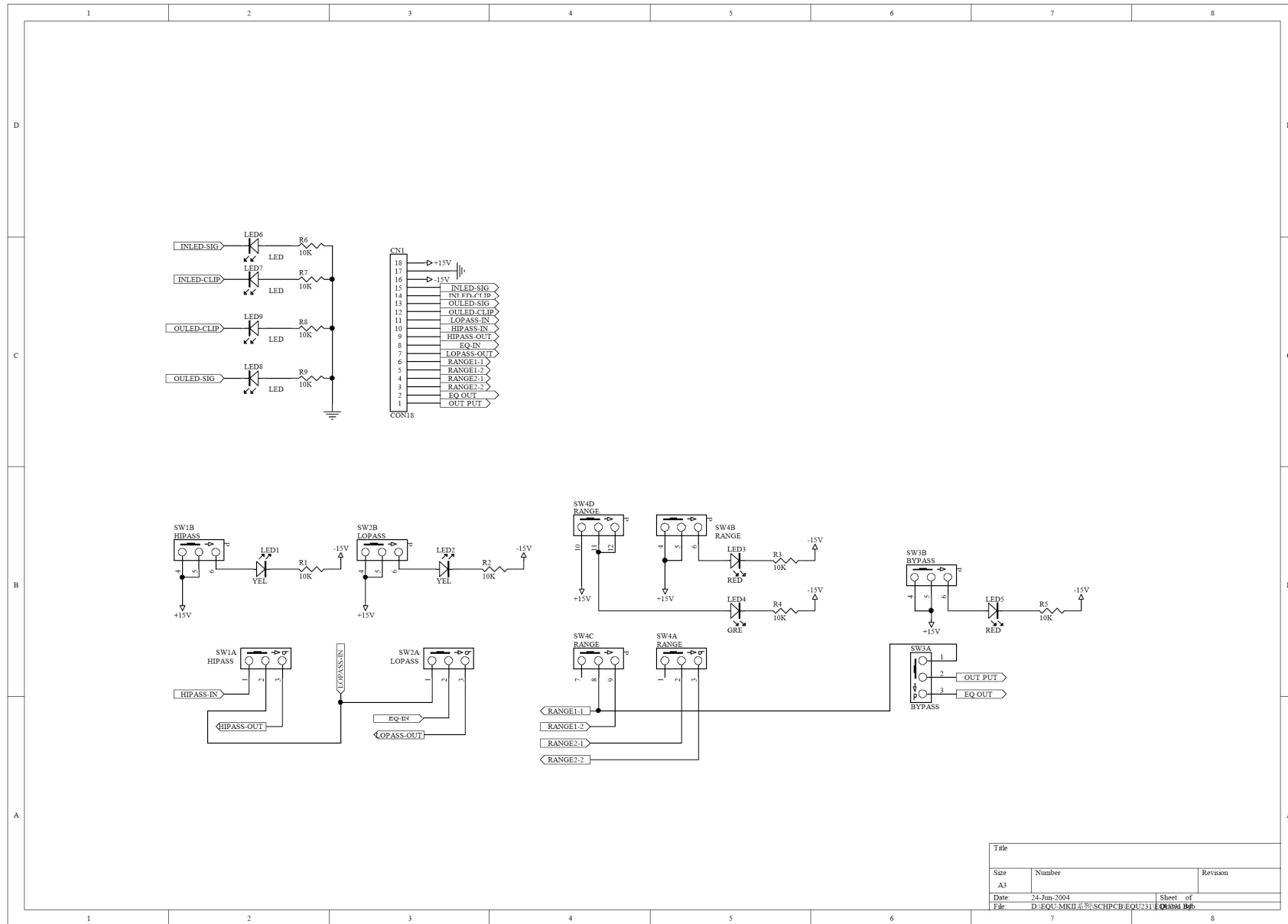
3. Schematic Diagram

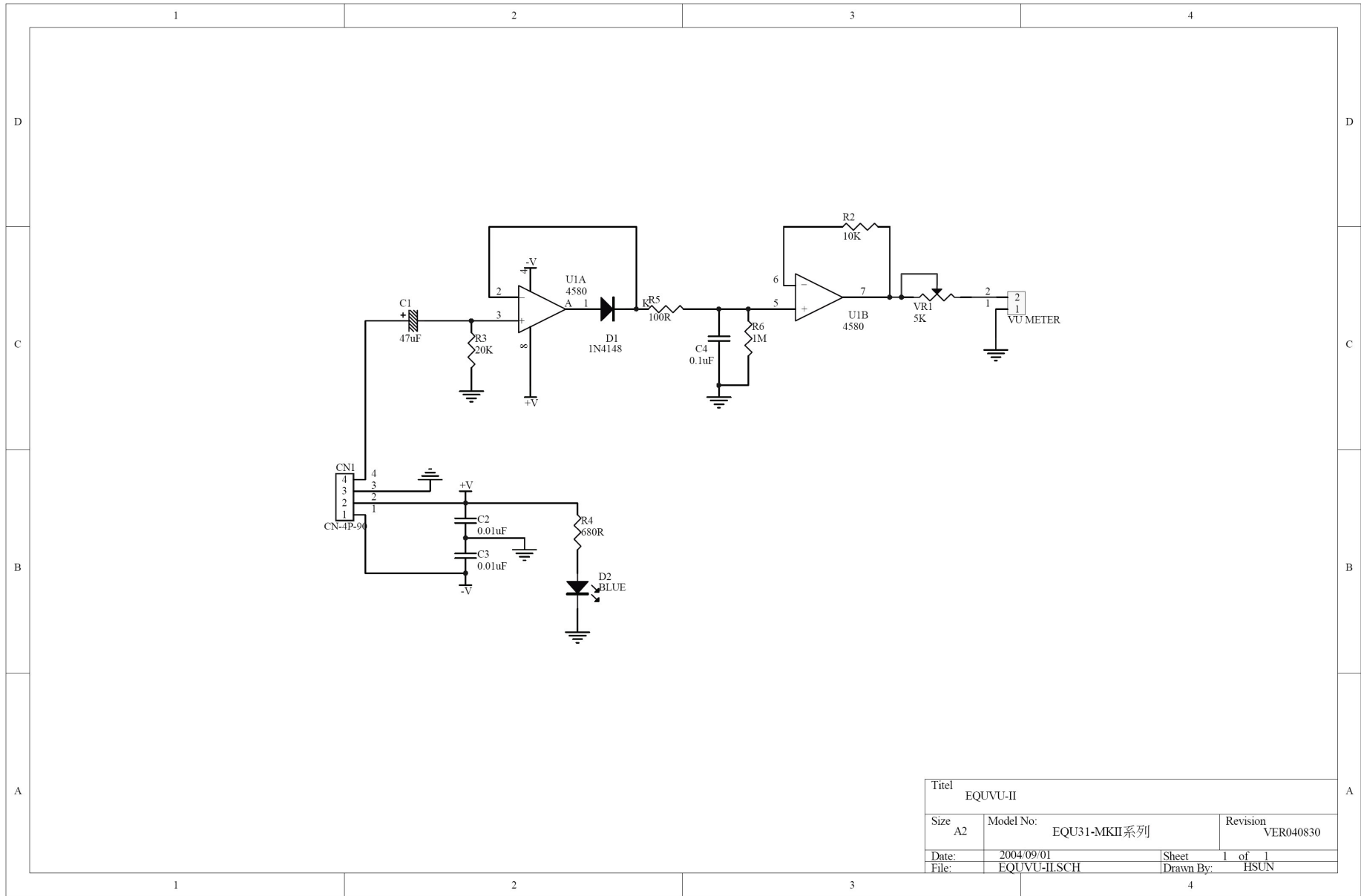






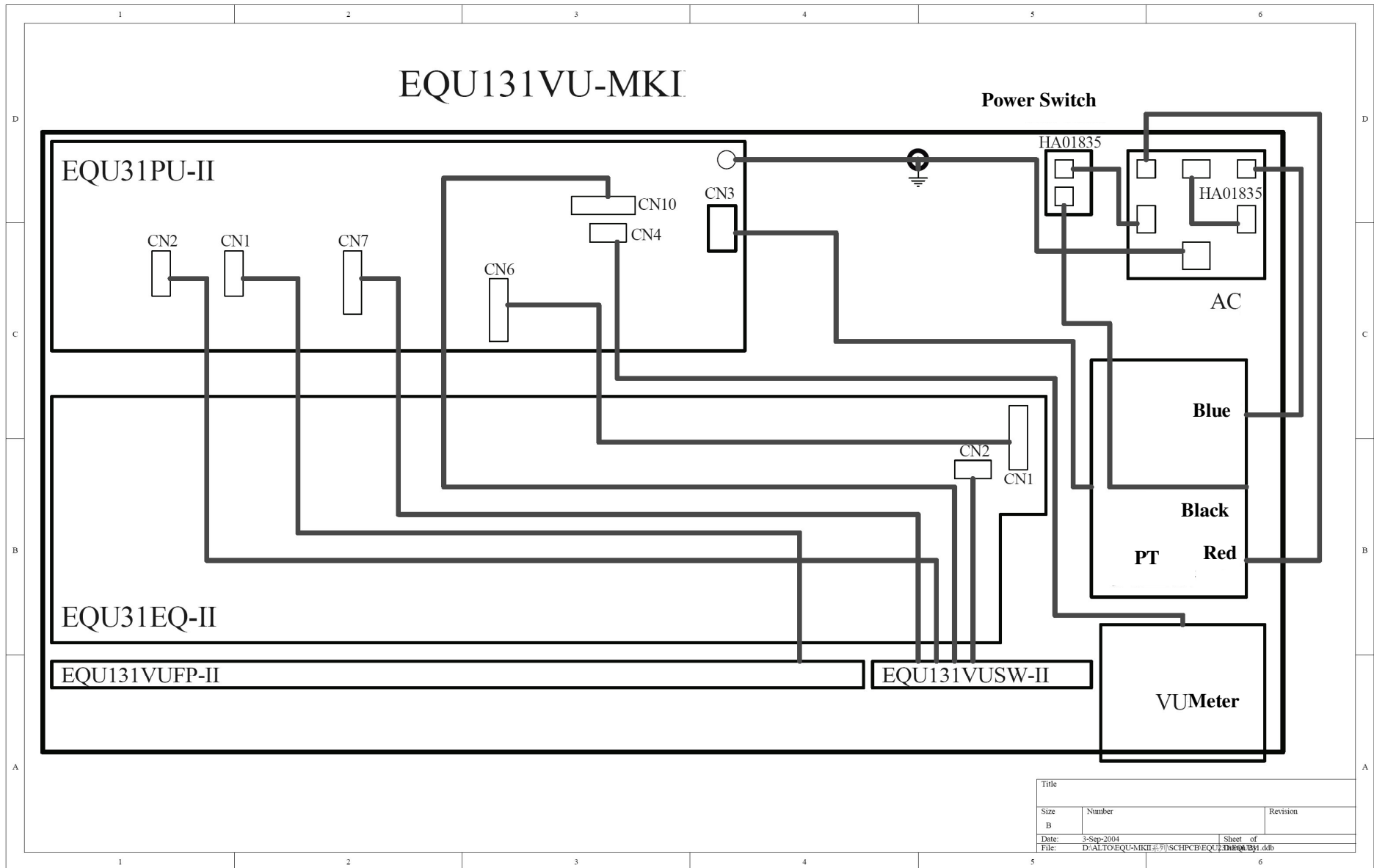
Titel		
ALTO : NEQU131 FRONT BOARD		
Size	Model No:	Revision
A3	ALTO NEQU131	REV 030618
Date:	2003-06-18	Sheet 3 of 3
File:	NEQU131FP.SCH	Drawn By: MAO



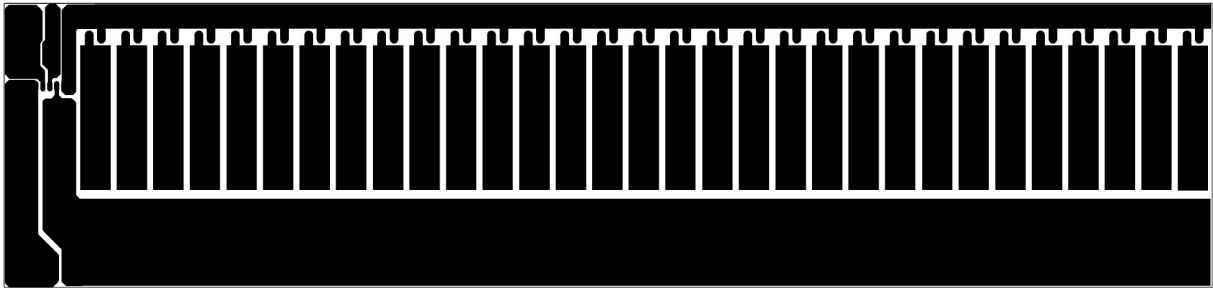


Titel		
EQUVU-II		
Size	Model No:	Revision
A2	EQU31-MKII系列	VER040830
Date:	2004/09/01	Sheet 1 of 1
File:	EQUVU-ILSCH	Drawn By: HSUN

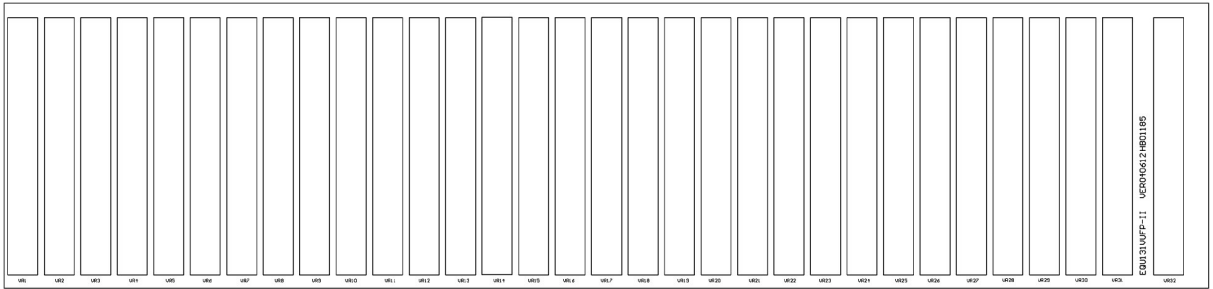
4. Wiring Diagram



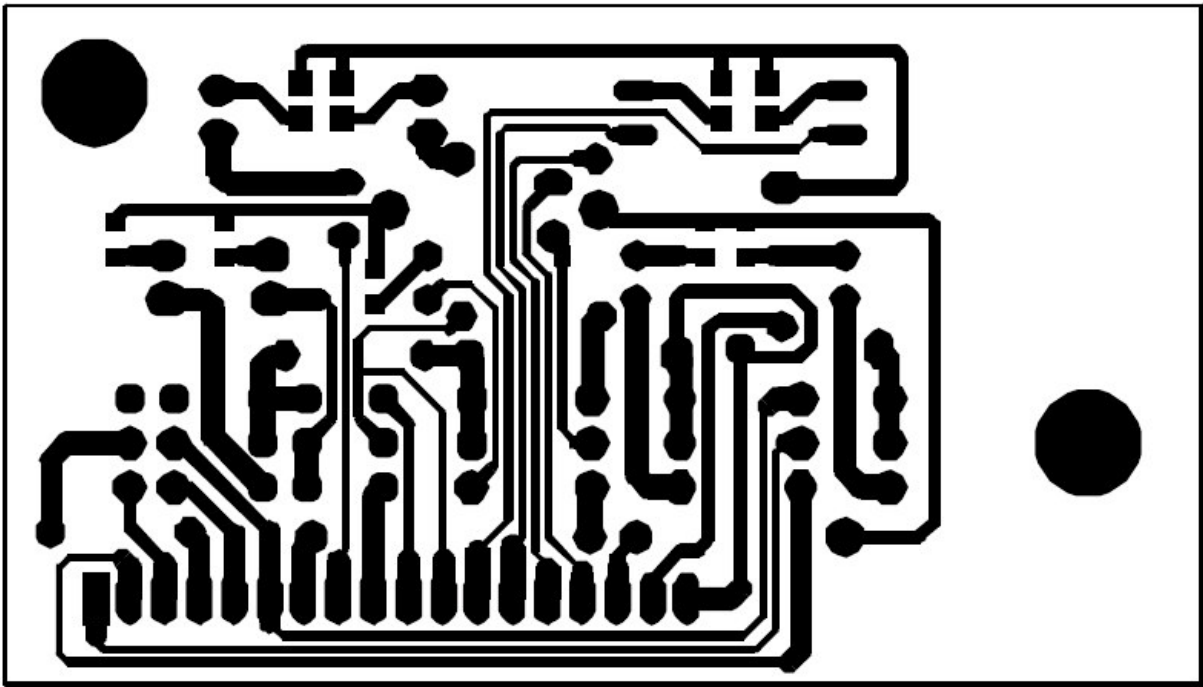
5. PCB Layout



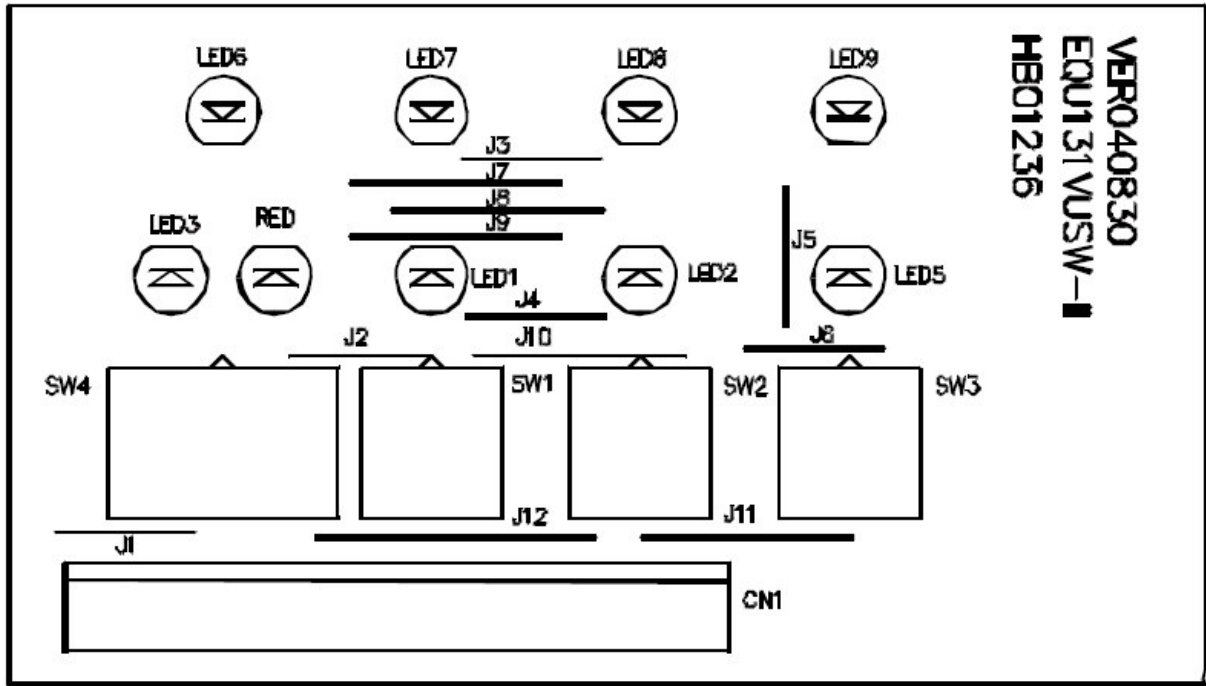
PCB: EQU131VUFP-II Bottom Layer



PCB: EQU231VUFP-II Top Overlay



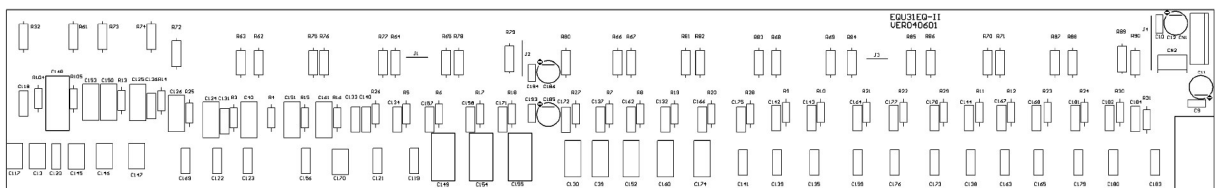
PCB: EQU231VUSW-II Bottom Layer



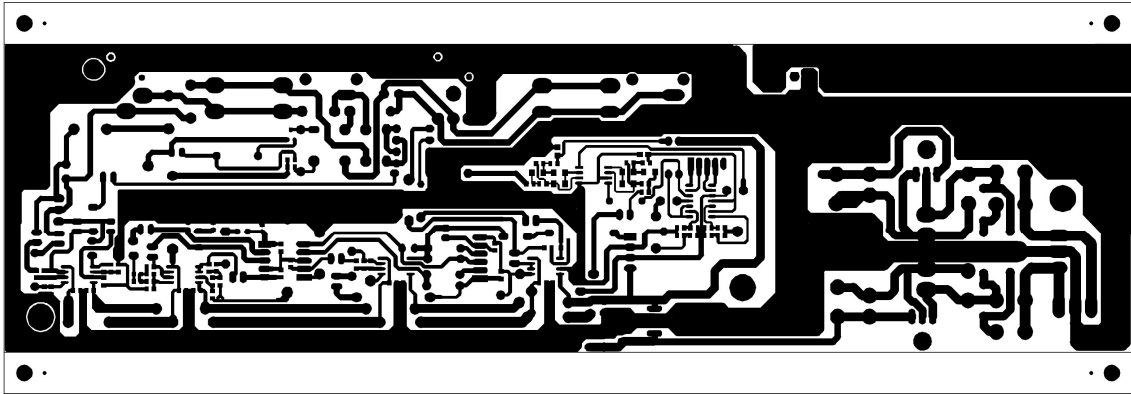
PCB: EQU231VUSW-II Top Overlay



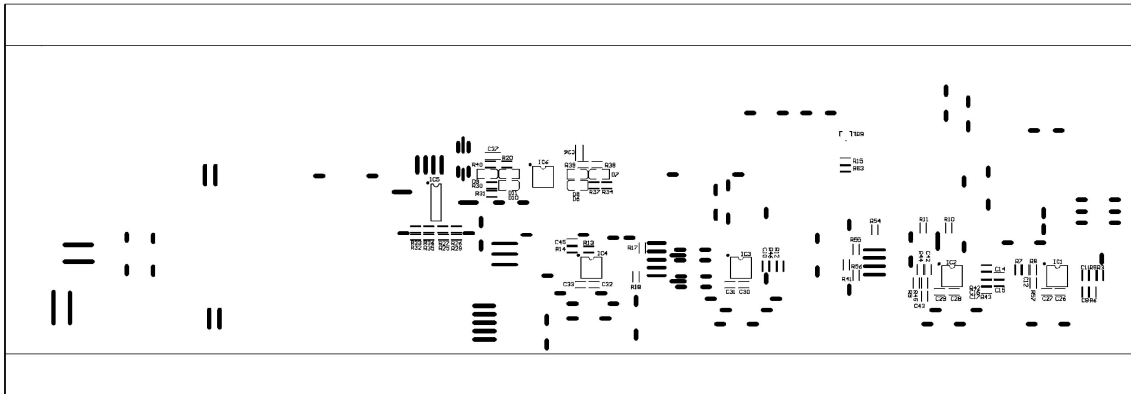
PCB: EQU31EQ-II Bottom Layer



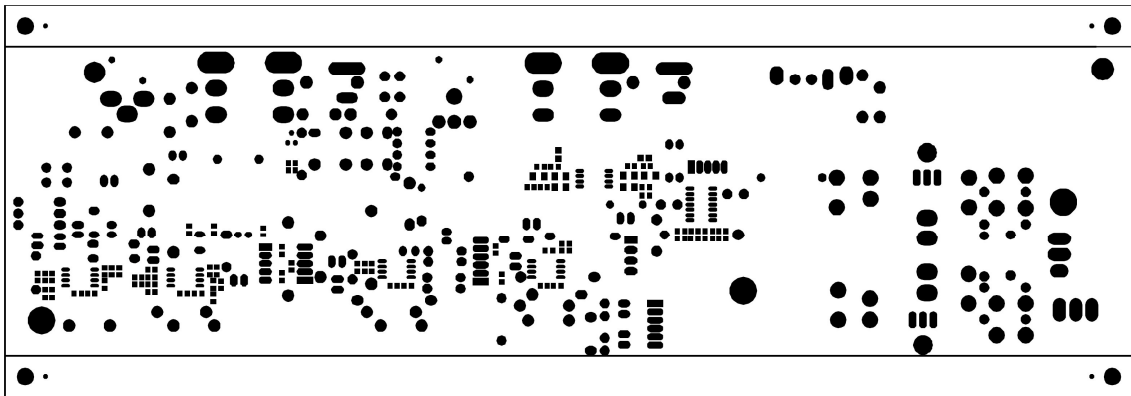
PCB: EQU31EQ-II Top overlay



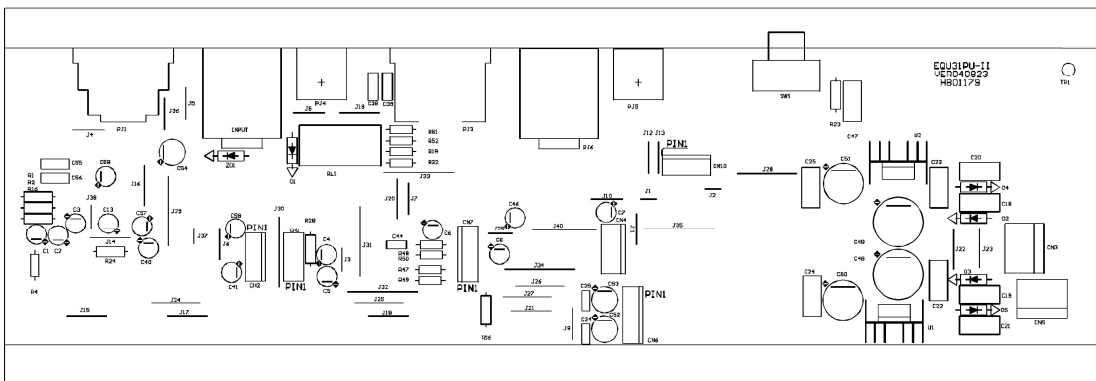
PCB: EQU31PU-II Bottom Layer



PCB: EQU31PU-II Bottom Overlay



PCB: EQU31PU-II Top Layer



PCB: EQU31PU-II Top Overlay

6. Test Procedure

1) Test Equipment:

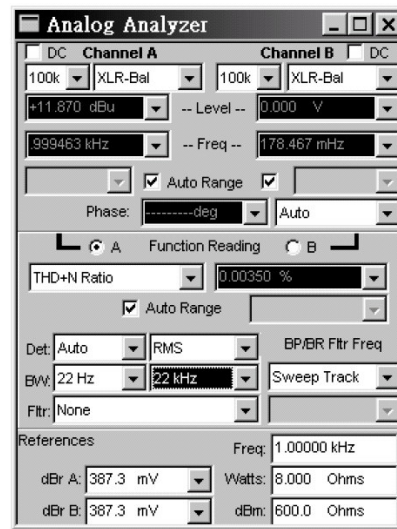
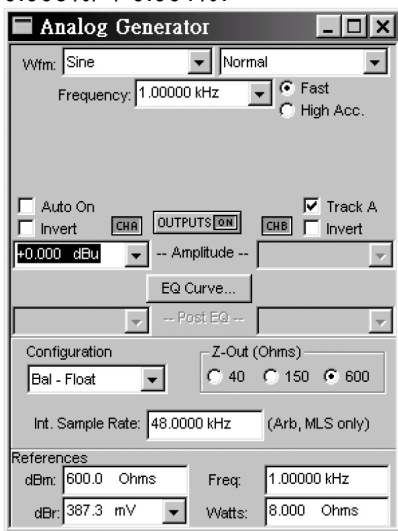
1. AP (Audio precision)
2. Dual-track oscilloscope

2) Equipment setting

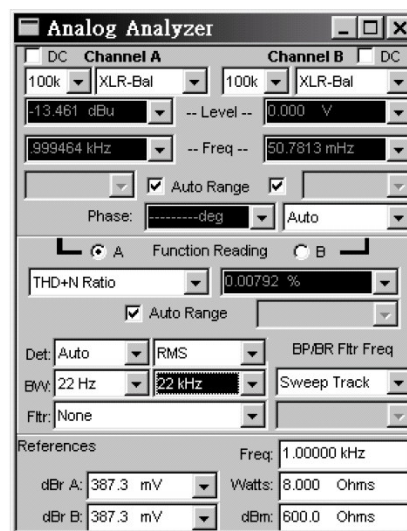
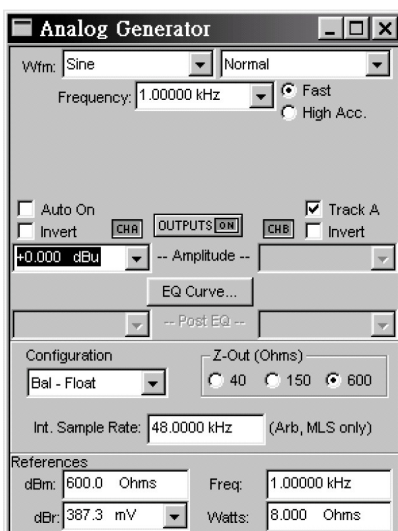
1. Set proper AC input voltage.
2. Connect the output signal of AP to the input of EQU131VU-MKII.
3. Connect the output of EQU131-MKII to the input of AP.
4. Set Lift GND to GND.

3) Adjust according to following procedures.

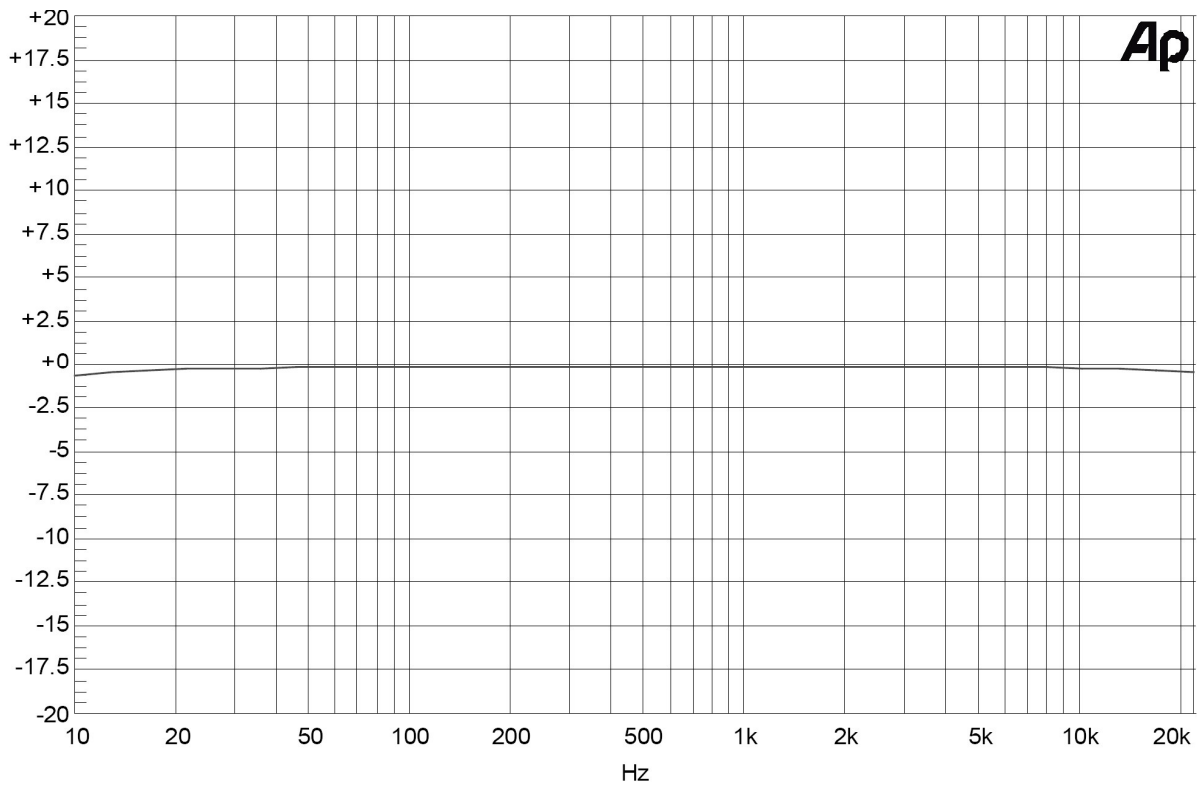
1. Set the potentiometer of 31BAND EQ in center, set the input level at 0dB, all buttons out.
2. Turn input level to maximum, the output level shall be +12dB/+/-1dB, and the distortion shall be 0.003%/+/-0.001%.



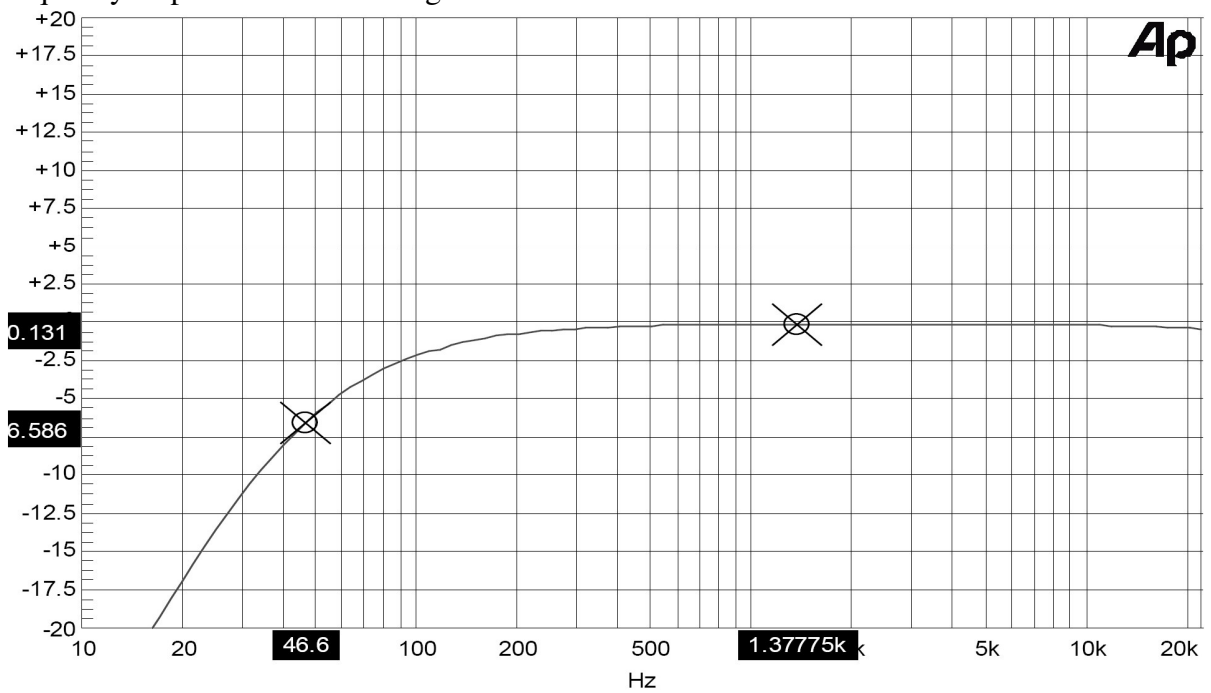
3. Set INPUT LEVEL at minimum, the output level shall be -12db/+/-1dB, and distortion shall be 0.007%/+/-0.002% •



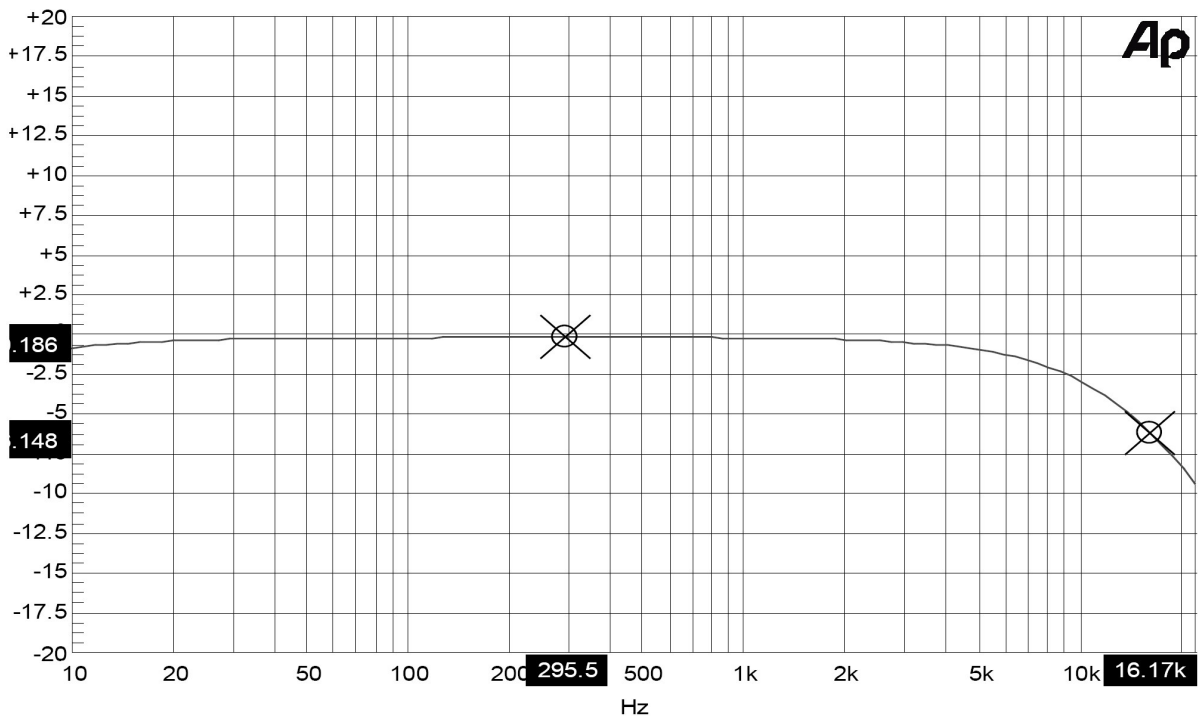
4. Adjust the input level so that the AP output is 0dB, the frequency response is as following.



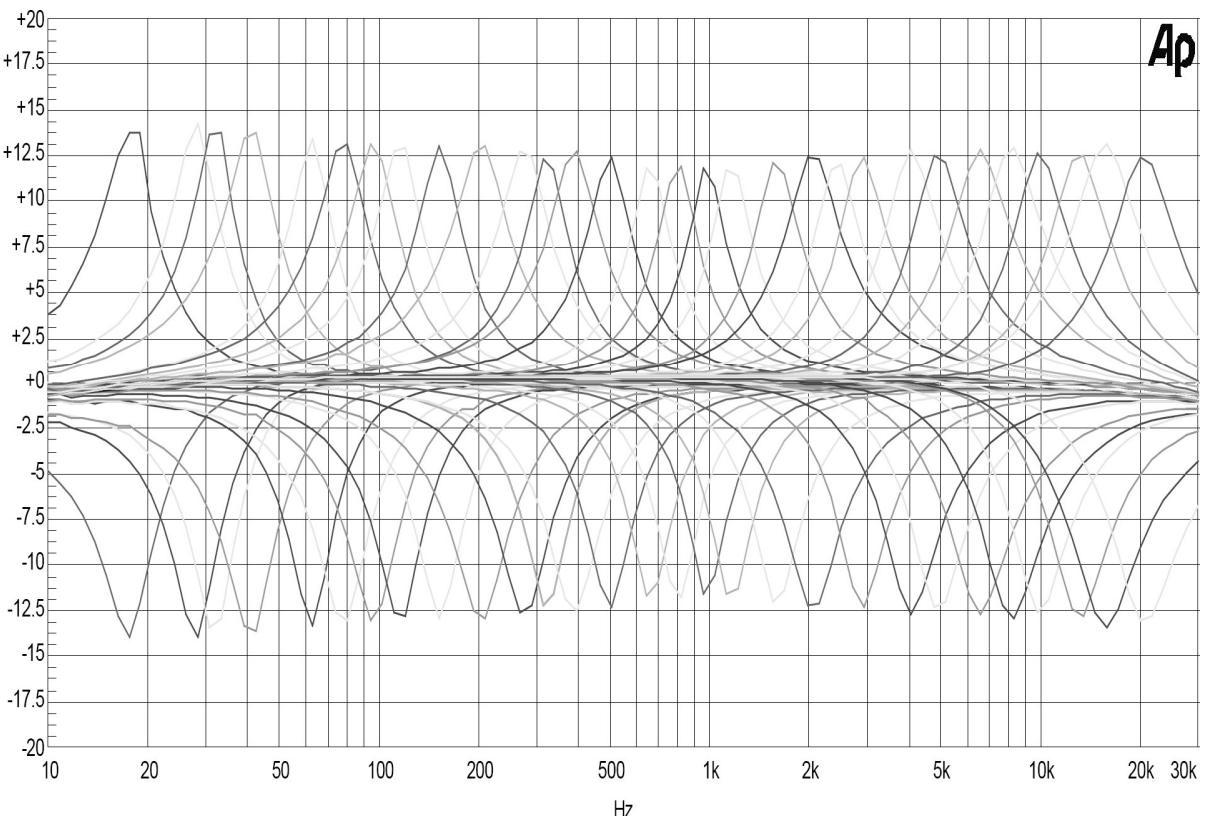
5. Adjust the input level so that the AP output is 0dB, press the Hi-pass button and the frequency response is as following.



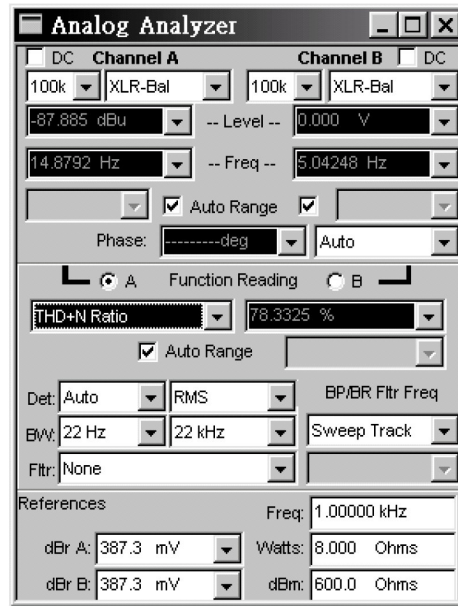
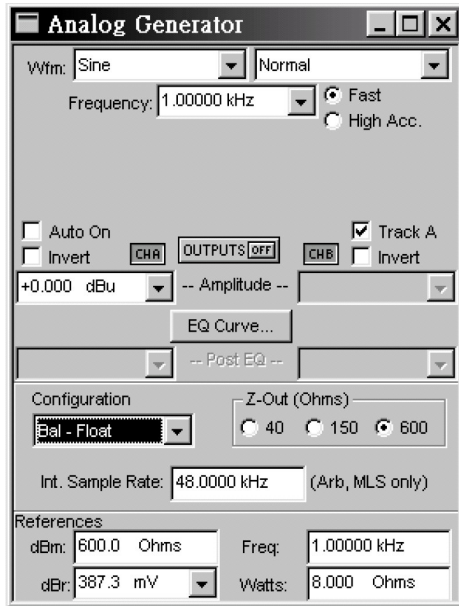
6. Adjust the input level so that the AP output is 0dB, press the Low Pass button and the frequency response is as following.



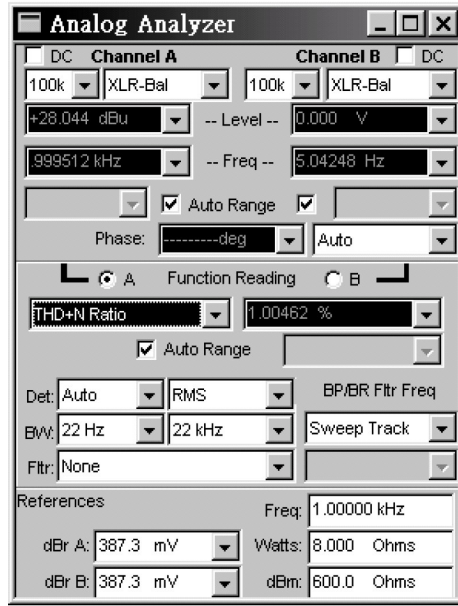
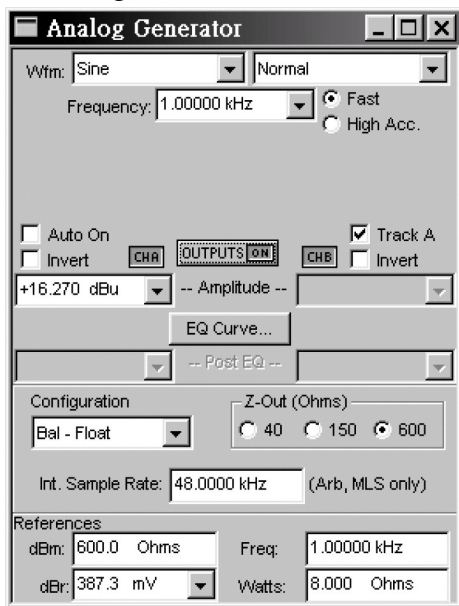
7. Press EQ button down, keep RANGE out and the LED indicates +12, adjust all slide buttons to maximum and minimum, measure the frequency response independently and the curve shall be as following.



8. Turn off the AP input signal and set input level at maximum, the AP setting is as following, now, it shall be no more than -82dB .



9. Turn on the AP input signal, and set the input level at maximum, the AP setting is as following, the maximum non-distortion level is $+28\text{dBu}/\pm 1\text{dB}$ and distortion is 1%.

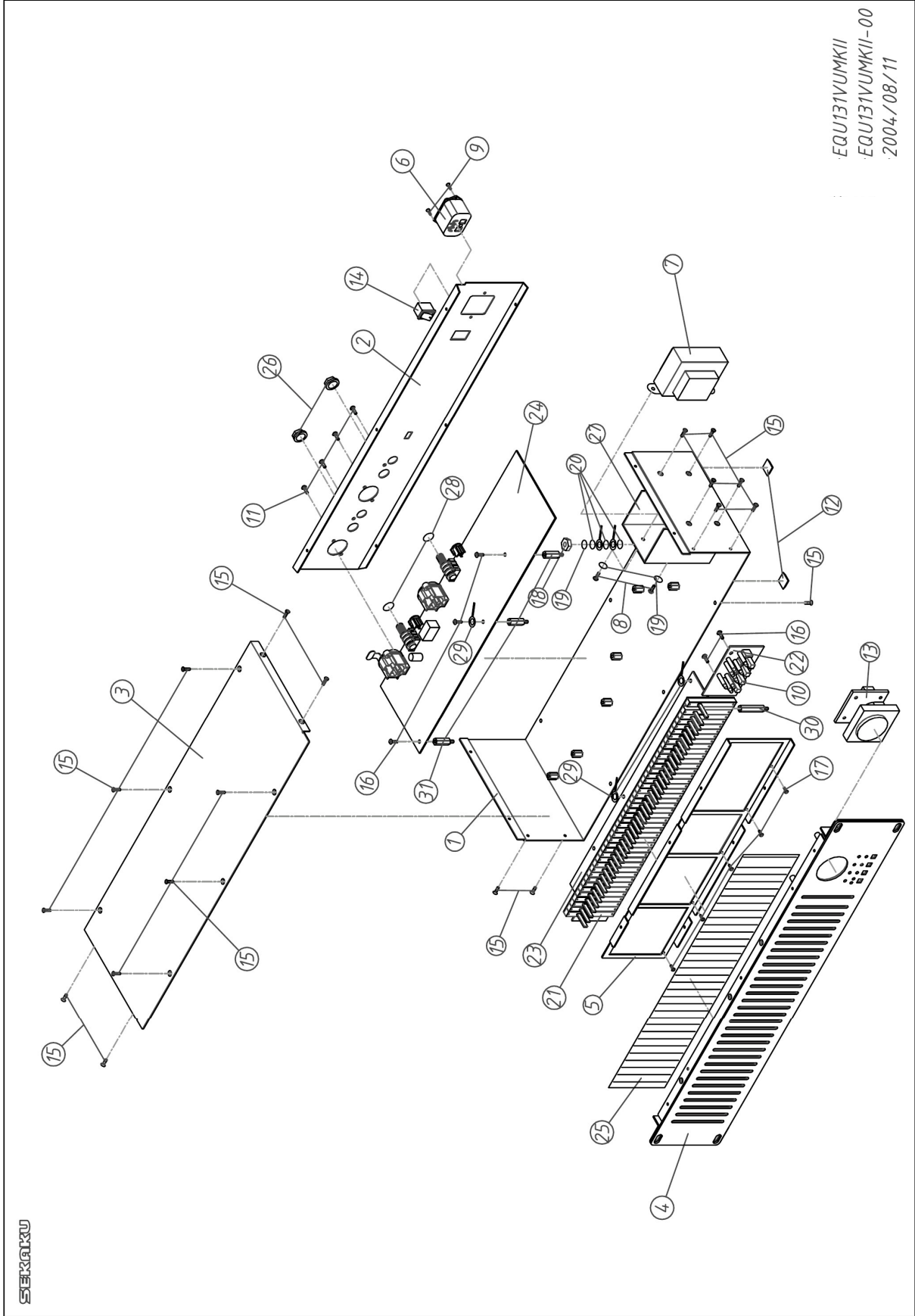


10. Now, the S/N shall be not less than 110dB.

11. Input a 0dBu signal, adjust the INPUT LEVEL to 0dBu, and AP output shall be 0dBu, now it shall indicate 0dBu on the VU meter.

12. All slides shall be set in center and all buttons out before shipping.

7. Exploded Views & Mechanical Parts List



EQU131VUMK11
 EQU131VUMK11-00
 2004/08/11

SEKAKU

Mechanical Parts List

No.	Item Number	Description	Specification	Quantify
1	MB03477	Chassis	EQU231VUMK II	1
2	MB03220	Rear panel	EQU231MK II	1
3	MC00578	Cover	EQU231MK II	1
4	MA04798	Front panel	EQU231VUMK II ALTO	1
5	HC00015	AC socket	(S)315-B (with AC selector)	1
6	TC00212	Fixed voltage transformer	PT-231-II -230V	1
7	MG00127	Color screw	M4*8	2
8	MG00042	Black plated screw	M3*10	2
9	NI00315	Power switch	5*5*9(inner 3.3*3.3)	8
10	MG00061	Black plated screw	M3*10	12
11	NI00501	Adhesive cushion	12.7*9*3t(SF-004)	4
12	HK00327	K-PCB	P-131VU	2
13	HI00026	Power SW	RA12KKATO F 2P	1
14	MG00025	Black plated screw-plate	M3*6	24
15	MG00041	Black plated screw-ball	M3*6	20
16	ME00016	Color nut	4mm	1
17	MF00038	Spring washer	φ 4* φ 7*1t	2
18	MF00048	Outer-tooth washer	φ 4* φ 8*0.5t	3
19	HK02058	K-PCB	P-EQU231VUFP-II- SMD	2
20	HK02063	K-PCB	P-EQU31EQ-II- DIP	2
21	HK02065	K-PCB	P-EQU31PU- II-DIP	1
22	HK02066	K-PCB	P-EQU31PU-II-1- DIP	1
23	ND00340	Dust cover	344*37	2
24	HK04116	K-PCB	P-EQU231SW-II-DIP	2
25	NI00002	Plastical nut	hexagon φ 7/16"*G20/15*4.8	4
26	MI01998	Fixing bracket	EQU231MK II	1
27	NC00131	T-wood washer	1* φ 11.3* φ 15.3 red	4
28	MJ00808	Power fixing plate	WL3-32T	6
29	MG00247	Copper post	M3*0.5PH*10 total length 16	3
30	MG00408	Copper post	M3*33*0.5PH total length 39	3
31	MG00241	Copper post	M3*30*0.5PH total length 36	3
32	MG00512	Copper post	M3*12.5*0.5PH total length 17mm	3

8. BOM

EQU131VU-MKII Parts List

No.	Part No.	Description	Specification	Remark
1	MA04863	panel	EQU131VU-MK II ALTO_V1.5	
2	MA04864	panel	EQU131VU-MK II	
3	MA04865	panel	EQU215-MK II_V1.2	
4	MJ01154	iron board	2.0t*1850*950mm 27.6kg	
5	MI02053	fixed bracket	EQU131VU-MK II_V1.2	
6	MJ00059	iron board	1.2*2135*1220 24.54kg	
7	ME00186	iron pillar	M3*18*0.5PH* ϕ 5.8_V1.1	
8	MI02113	fixed bracket	EQU131VU-MK II_V1.1	
9	MJ00059	iron board	1.2*2135*1220 24.54kg	
10	MI01997	fixed bracket	EQU231MK II L type_V1.1	
11	MJ00088	iron board	1.5*2135*1220 30.67kg	
12	MB03285	rear board	EQU131VU-MK II	
13	MB03286	bottom board	EQU131VU-MK II_V1.0	
14	MJ00059	iron board	1.2*2135*1220 24.54kg	
15	ME00001	screw pillar	M4*10*0.7PH	
16	ME00051	iron pillar	M3*12	
17	ME00078	pillar iron	6.35*3*7.7	
18	MB03282	rear board	EQU131VU-MK II_V1.1	
19	MB03283	rear board	EQU131VU-MK II	
20	MB03284	rear board	EQU131VU-MK II_V1.1	
21	MJ00058	iron board	1*2135*1220 20.45kg	
22	MC00578	top cover	EQU231MK II	
23	MC00575	top cover	EQU231MK II	
24	MC00577	top cover	EQU231MK II_V1.0	
25	MJ00059	iron board	1.2*2135*1220 24.54kg	
26	HC00015	AC socket	(S)315-B (AC select)	
27	HD00021	glass tube fuse	100mA 250V ϕ 5.2*20mm CSA/S/UL/VDE	
28	TC00212	transformer	PT-231- II _230V	
29	MG00127	screw	M4*8	
30	MG00042	screw	M3*10	
31	NI00315	power switch button-cambered s	5*5*9(inner 3.3*3.3)	
32	MG00061	screw	M3*10	
33	HA01835	P.V.C single wave wired UL1617	80 brown	
34	HA01333	single terminal wiring CF-W76	150mm UL1015 18AWG green/yellow	
35	HA00861	power cord Europe 3P	LT-312+LT-501	

EQU131VU-MKII Parts List

No.	Part No.	Description	Specification	Remark
36	NI00240	sleeve	φ 2.5*10mm	
37	NI00239	sleeve	φ 2.5*1000mm	
38	NI00252	sleeve	φ 4*20mm	
39	NI00248	sleeve	φ 4*1000mm	
40	NI00218	cable tie-black	ALT-102SB	
41	NI00501	foot cushion	12.7*9*3t(SF-004)	
42	NA00137	clip-chain bag	5*7	
43	NA00123	PE bag	0.04t*580*300mm	
44	HJ00006	desiccant	30g	
45	HA03309	wire	4P-4P 400mm	
46	HI00026	power switch	RA12KKATOF 2P	
47	MG00025	screw	M3*6	
48	MG00041	screw	M3*6	
49	MG00150	screw	M2*4	
50	ME00016	nut	4m/m	
51	MF00038	washer	φ 4* φ 7*1t	
52	MF00048	washer	φ 4* φ 8*0.5t	
53	ND00341	non woven	0.35t*348.5*72.5mm black_V1.0	
54	HK02131	PC board	P-EQU131VUFP- II	
55	RC00016	sliding potentiometer	RA6043-20,handle20,100KW,white	VR1,VR2,VR3,VR4,VR5,VR6,VR7,VR8,VR9,VR10,VR11,VR12,VR13,VR14,VR15,VR16,VR17,VR18,VR19,VR20,VR21,VR22,VR23,VR24,VR25,VR26,VR27,VR28,VR29,VR30,VR31,VR32
56	HC00250	row-wire header(male)	5P 2.0mm 180°	CN5
57	HB01185	PCB	EQU131VUFP- II (1*2)_VER040612	
58	AC00002	soldering	63/37%	
59	HK02063	PC board	P-EQU31EQ- II -DIP	
60	RA00282	fixed resistor 1/4W	100K Ω M type	R32,R61,R62,R63,R64,R65,R66,R67,R68,R69,R70,R71,R72,R73,R74,R75,R76,R77,R78,R79,R80,R81,R82,R83,R84,R85,R86,R87,R88,R89,R90
61	RA00340	fixed resistor 1/8W	390 Ω M type	R3,R4,R5,R6,R7,R8,R9,R10,R11,R12,R13,R14,R15,R16,R17,R18,R19,R20,R21,R22,R23,R24,R25,R26,R27,R28,R29,R30,R31,R104,R105
62	CB00047	electrolytic capacitor	100uF/25V φ 6*11mm	C11,C12,C185,C186
63	CH00017	Multi-layer ceramic capacitor	0.1uF/50V Y5V PH5	C9,C10,C194,C193
64	HC00254	row-wire header(male)	3P 2.0mm 180°	CN2
65	CC00002	mylar capacitor	0.001uF/100V 3%	C144
66	CC00021	mylar capacitor	0.01uF/100V 3%	C131,C132,C133
67	CC00039	mylar capacitor	0.1uF/100V 3%	C39,C40
68	CC00023	mylar capacitor	0.012uF/100V 3%	C162,C163
69	CC00004	mylar capacitor	0.0015uF/100V 10%	C178
70	CC00025	mylar capacitor	0.015uF/100V 3%	C137,C138

EQU131VU-MKII Parts List

No.	Part No.	Description	Specification	Remark
71	CC00042	mylar capacitor	0.15uF/100V	C130,C124,C125,C126
72	CC00005	mylar capacitor	0.0018uF/100V 10%	C177
73	CC00026	mylar capacitor	0.018uF/100V 10%	C171,C172,C173
74	CC00027	mylar capacitor	0.022uF/100V 5%	C176
75	CC00043	mylar capacitor	0.22uF/100V	C153,C154,C155
76	CC00008	mylar capacitor	0.0027uF/100V 10%	C164
77	CC00028	mylar capacitor	0.027uF/100V 10%	C157,C158,C159
78	CC00057	mylar capacitor	0.00033uF/100V ±5%	C184
79	CC00010	mylar capacitor	0.0033uF/100V 3%	C142,C143
80	CC00031	mylar capacitor	0.033uF/100V 3%	C134,C135,C136
81	CC00044	mylar capacitor	0.33uF/100V	C149,C148
82	CC00054	mylar capacitor	0.00039uF/100V ±5%	C182
83	CC00013	mylar capacitor	0.0047uF/100V 3%	C183
84	CC00035	mylar capacitor	0.047uF/100V 3%	C139,C140,C141
85	CF00042	metal-film capacitor MSC	0.47uF/63V 5% CASE02	C121,C118,C119,C120
86	CC00055	mylar capacitor	0.00056uF/100V ±5%	C181
87	CC00014	mylar capacitor	0.0056uF/100V 10%	C175
88	CC00036	mylar capacitor	0.056uF/100V 10%	C174
89	CC00017	mylar capacitor	0.0068uF/100V 3%	C179,C180
90	CC00037	mylar capacitor	0.068uF/100V 10%	C160,C161
91	CF00044	metal-film capacitor MSC	0.68uF/63V 5% CASE06	C170
92	CC00056	mylar capacitor	0.00082uF/100V ±5%	C167,C168
93	CC00018	mylar capacitor	0.0082uF/100V 10%	C165,C166
94	CC00047	mylar capacitor	0.082uF/100V 10%	C150,C151,C152
95	CF00057	metal-film capacitor MPF	0.82uF/63V	C156
96	HK02062	PC board	P-EQU31EQ- II -SMD	
97	HB01178	PCB	EQU31EQ- II (1*2)_VER040601	
98	SG00122	SMD integrated circuit	NJM4580M-TE3	U7,U8,U9,U10,U11,U12,U13,U14,U15,U16, U1,U2,U3,U4,U5,U6
99	CI00095	SMD ceramic capacitor 1206	0.1uF/50V X7R	C1,C2,C3,C4,C5,C6,C7,C8
100	AE00221	Soldering paste	SJ-617	
101	HA03134	wire	6P(male)-6P(female) 350mm UL1007 28AW	CN1
102	CF00045	metal-film capacitor MSC	1.0uF/63V 5% CASE07	C122,C123,C117
103	CF00086	metal-film capacitor MSC	1.5uF/63V 5% CASE07	C169
104	CF00123	metal-film capacitor MSC	2.2uF/63V 5% CASE05	C13,C145,C146,C147
105	HA01920	jumper wire	6mm	J1,J3

EQU131VU-MKII Parts List

No.	Part No.	Description	Specification	Remark
106	HA02249	wire	φ 0.6	
107	HA01925	jumper wire	10mm	J2
108	HA02249	wire	φ 0.6	
109	HA01930	jumper wire	15mm	J4
110	HA02249	wire	φ 0.6	
111	AC00002	soldering	63/37%	
112	HK02065	PC board	P-EQU31PU- II -DIP	
113	RA00347	fixed resistor 1/8W	680 Ω M type	R51,R52,R47,R48
114	RA00371	fixed resistor 1/8W	3.3K Ω M type	R49,R50
115	RA00386	fixed resistor 1/8W	10K Ω M type	R4
116	RA00418	fixed resistor 1/8W	100K Ω M type	R19,R22
117	RA00184	fixed resistor 1/4W	100 Ω M type	R24
118	RA00224	fixed resistor 1/4W	2.7K Ω M type	R28
119	RA00270	fixed resistor 1/4W	56K Ω M type	R1,R2
120	RA00282	fixed resistor 1/4W	100K Ω M type	R23,R16,R21
121	CA00034	ceramic capacitor	470PF Y5E	C44
122	CC00039	mylar capacitor	0.1uF/100V 3%	C18,C19,C20,C21,C47,C22,C23,C24,C25
123	CH00017	Multi-layer ceramic capacitor	0.1uF/50V Y5V PH5	C34,C35
124	SA00098	rectifier diode	1A/400V IN4004	D1,D2,D3,D4,D5
125	CC00014	mylar capacitor	0.0056uF/100V 10%	C38,C39
126	CB00029	electrolytic capacitor	22uF/35V φ 5*11mm	C1,C2,C3,C4,C5,C6,C7,C8,C13,C46,C40,C41,C57,C58,C59
127	CB00047	electrolytic capacitor	100uF/25V φ 6*11mm	C52,C53
128	CB00036	electrolytic capacitor	47uF/16V φ 6*7mm	C54
129	CB00065	electrolytic capacitor	470uF/25V φ 10*16mm	C50,C51
130	CB00073	electrolytic capacitor	1000uF/35V φ 13*20mm	C48,C49
131	HC00112	XLR MIC jack	99M-107SP-1-2 90° PUSH	PJ1
132	HC00111	XLR MIC jack	99M-108SP1	PJ3
133	HC00108	stereo MIC jack	φ 6.3 stereo LJB0661-6	PJ2,PJ6
134	HC00241	RCA jack	RJ-1081-01-0500A	PJ4,PJ5
135	HI00121	slide switch	SCH-12-07	SW1
136	SD00077	integrated circuit	L7815CV(TO-220)(ST)	U1
137	SD00079	integrated circuit	L7915CV(TO-220)(ST)	U2
138	MI00256	heat-sink	25*15*10.6-1PIN SCL-2020	
139	MG00162	screw	M3*8	
140	MF00037	washer	φ 3* φ 5*1t	

EQU131VU-MKII Parts List

No.	Part No.	Description	Specification	Remark
141	NC00005	silicone insulator	TO-220 square type	
142	HC00089	row-wire header(male)	3P 3.9mm 180°	CN3,CN5
143	HC00256	row-wire header(male)	5P 2.0mm 180°	CN2,CN10,CN1
144	HC00257	row-wire header(male)	6P 2.0mm 180°	CN6,CN7
145	HC00078	row-wire header(male)	4P 2.5mm 180°	CN4
146	HK04108	PC board	P-EQU31PU- II -AI	
147	HA01920	jumper wire	6mm	J3,J39
148	HA02249	wire	φ 0.6	
149	HA01922	jumper wire	8mm	J9,J10,J11,J12,J4,J5,J6,J7,J8,J13,J36
150	HA02249	wire	φ 0.6	
151	HA01925	jumper wire	10mm	J14,J15,J16,J17,J18,J19,J20,J21,J22,J23
152	HA02249	wire	φ 0.6	
153	HA01928	jumper wire	12mm	J24,J25,J26,J27
154	HA02249	wire	φ 0.6	
155	HA01930	jumper wire	15mm	J28
156	HA02249	wire	φ 0.6	
157	HA01937	jumper wire	18mm	J29,J30,J31,J32,J33,J34,J35
158	HA02249	wire	φ 0.6	
159	HK02064	PC board	P-EQU31PU- II -SMD	
160	HB01179	PCB	EQU31PU-II_VER040823	
161	RD00282	SMD precise resistor 1/10W	1.00K Ω \pm 1% 0603	R39,R40,R8
162	RD00272	SMD precise resistor 1/10W	10.0 Ω \pm 1% 0603	R26,R33
163	RD00288	SMD precise resistor 1/10W	6.81K Ω \pm 1% 0603	R32,R29
164	RD00214	SMD precise resistor 1/10W	10.0K Ω \pm 1% 0603	R3,R5,R6,R17,R18,R55,R15,R25,R27,R35,R36,R56,R13,R14
165	RD00219	SMD precise resistor 1/10W	20.0K Ω \pm 1% 0603	R42,R43,R44,R45,R10,R11,R54
166	RD00294	SMD precise resistor 1/10W	24.9K Ω \pm 1% 0603	R46
167	RD00290	SMD precise resistor 1/10W	47.5K Ω \pm 1% 0603	R20,R30,R31,R34,R38,R37
168	CI00055	SMD ceramic capacitor 0603	47PF/50V NPO \pm 5%	C9,C10
169	CI00058	SMD ceramic capacitor 0603	82PF/50V NPO \pm 5%	C11,C12
170	CI00063	SMD ceramic capacitor 0603	470PF/50V NPO \pm 5%	C42,C43
171	CI00030	SMD ceramic capacitor 0805	1uF/16V Y5V-0805(2012)	C36,C37
172	SG00032	SMD integrated circuit	LM339DR/(TI)	IC5
173	SE00011	SMD rectifier diode	RLS4148 0.5A (LL-34)	D11,D6,D7,D8,D9,D10
174	CI00075	SMD ceramic capacitor 0603	0.1uF/50V Y5V +80,-20%	C14,C15,C16,C17,C26,C27,C28,C29,C30,C31,C32,C33
175	SG00122	SMD integrated circuit	NJM4580M-TE3	IC6,IC1,IC2,IC3,IC4

EQU131VU-MKII Parts List

No.	Part No.	Description	Specification	Remark
176	SF00010	SMD transistor	2SC2412K(SOT-23)/(R)	TR9
177	RD00274	SMD precise resistor 1/10W	100Ω ±1% 0603	R53
178	RD00301	SMD precise resistor 1/10W	12.1KΩ ±1% 0603	R12
179	RD00264	SMD precise resistor 1/10W	60.4KΩ ±1% 0603	R41
180	RD00224	SMD precise resistor 1/10W	100KΩ ±1% 0603	R7,R57
181	CI00059	SMD ceramic capacitor 0603	100PF/50V NPO ±5%	C45
182	RD00292	SMD precise resistor 1/10W	1.00MΩ ±1% 0603	R9
183	AE00221	soldering paste	SJ-617	
184	HA01931	jumper wire	16mm	J40
185	HA02249	wire	φ 0.6	
186	HI00008	relay	RY-12W-K 12V	RL1
187	HA02190	wire	150mm	TP1
188	HA01918	jumper wire	4mm	JP1,JP2
189	SA00124	zener diode	1/2W 12V 12A2	ZD1
190	AC00002	soldering	63/37%	
191	NF00061	assurance card	ALTO	
192	NE05004	label	ALTO	
193	NH00334	cone paper	0.040*1m	
194	NE12786	label	EQU131VU-MK II_V1.0	
195	NH00012	bond paper	0.04*1M	
196	NI00014	membrane	0.035*1M	
197	NI00002	nut of plastic	φ 7/16"*G20/15*4.8(hexagon)	
198	NB02910	box	EQU131VU-MK II ALTO_V1.1	
199	NB03679	cushion	EQU231MKII serirs_V1.0	
200	HK04112	PC board	P-EQU131VUSW- II -DIP	
201	HI00162	push-button switch	2 paragraphs 6p PS-22E8552L	SW1,SW2,SW3
202	HI00163	push-button switch	2 stage 12P PS-42E85	SW4
203	SA00053	L.E.D high intensity	3m/m round(red)long foot 26mm	LED4,LED7,LED9
204	SA00052	L.E.D high intensity	3m/m round(green)long foot 26	LED3,LED6,LED8
205	SA00054	L.E.D high intensity	3m/m round(yellow)long foot 26	LED1,LED2,LED5
206	NI02049	LED separating pillar	LEDS-14 14mm	
207	HK04111	PC board	P-EQU131VUSW- II -SMD	
208	HB01236	PCB	EQU131VUSW- II (4*2)_VER040830	
209	RD00380	SMD precise resistor 1/8W	10.0KΩ ±1% 0805	R1,R2,R3,R4,R5,R6,R7,R8,R9
210	AE00221	soldering paste	SJ-617	

EQU131VU-MKII Parts List

No.	Part No.	Description	Specification	Remark
211	HA03155	wire	140/350/400/350mm UL1007 28AWG	CN1
212	HA01922	jumper wire	8mm	J1,J2,J3,J4,J5,J6
213	HA02249	wire	φ 0.6	
214	HA01928	jumper wire	12mm	J7,J8,J9,J10,J11
215	HA02249	wire	φ 0.6	
216	HA01931	jumper wire	16mm	J12
217	HA02249	wire	φ 0.6	
218	AC00002	soldering	63/37%	
219	MJ00808	power clip	WL3-32T	
220	NC00131	washer	1* φ 11.3* φ 15.3 red	
221	MG00251	copper pillar	M3*17.5*0.5PHsingle,length23.5	
222	MG00408	copper pillar	M3*33*0.5PH	
223	MI01998	fixed bracket	EQU231MK II	
224	MI01999	fixed bracket	EQU231MK II 1.5t*85*57*84mm_V1.3	
225	MJ00088	iron board	1.5*2135*1220 30.67kg	
226	HK04532	PC board	P-EQUVU-II-DIP	
227	HK04531	PC board	P-EQUVU-II-AI	
228	HB01357	PCB	EQUVU- II (3*3)_VER040921	
229	CA00081	ceramic capacitor	0.01uF Z5V	C2,C3
230	CB00193	electrolytic capacitor	47uF/16V φ 6*7mm	C1
231	RA00209	fixed resistor 1/4W	680 Ω M type	R4
232	RA01112	fixed resistor 1/4W	100 Ω	R5
233	RA01115	fixed resistor 1/4W	20K Ω	R3
234	RA01276	fixed resistor 1/4W	33K Ω	R6
235	SA00093	rectifier diode	1N4148 0.5A	D1
236	HA01925	jumper wire	10mm	JP4,JP1,JP2,JP3
237	HA02249	wire	φ 0.6	
238	CB00190	electrolytic capacitor	4.7uF/25V φ 4*7mm	C4
239	SA00194	L.E.D	φ 3	D2
240	SD00130	integrated circuit	NJM4580D	U1
241	HC00067	row-wire header(male)	4P 2.5mm 90°	CN1
242	HH00046	voltage meter	700 Ω /150UA P-210SI-xxx ALTO	
243	RC00180	resistor	10K Ω φ 6 EVND2A	VR1
244	AC00002	soldering	63/37%	
245	NB03645	box	EQU231-MK II ALTO_V1.0	

EQU131VU-MKII Parts List

No.	Part No.	Description	Specification	Remark
246	NF01783	instruction English	EQU MK II SERIESALTO_V1.1	
247	NH00149	paper	889*640mm	
248	NA00279	clip-chain bag	0.04t*100*150mm_V1.0	
249	AD00012	twin adhesive	90*120mm_V1.0	
250	MI02054	front board	EQU131VU-MK II_V1.0	
251	MJ00063	Zn-plated board	1.2*2135*1220 24.54kg	
252	HA03856	wire	5P-5P 350mm UL1007 28AWG	