

Service Manual

Model: Mistral 400



www.altoproaudio.com

Version: .1.0

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1. INTRODUCTION

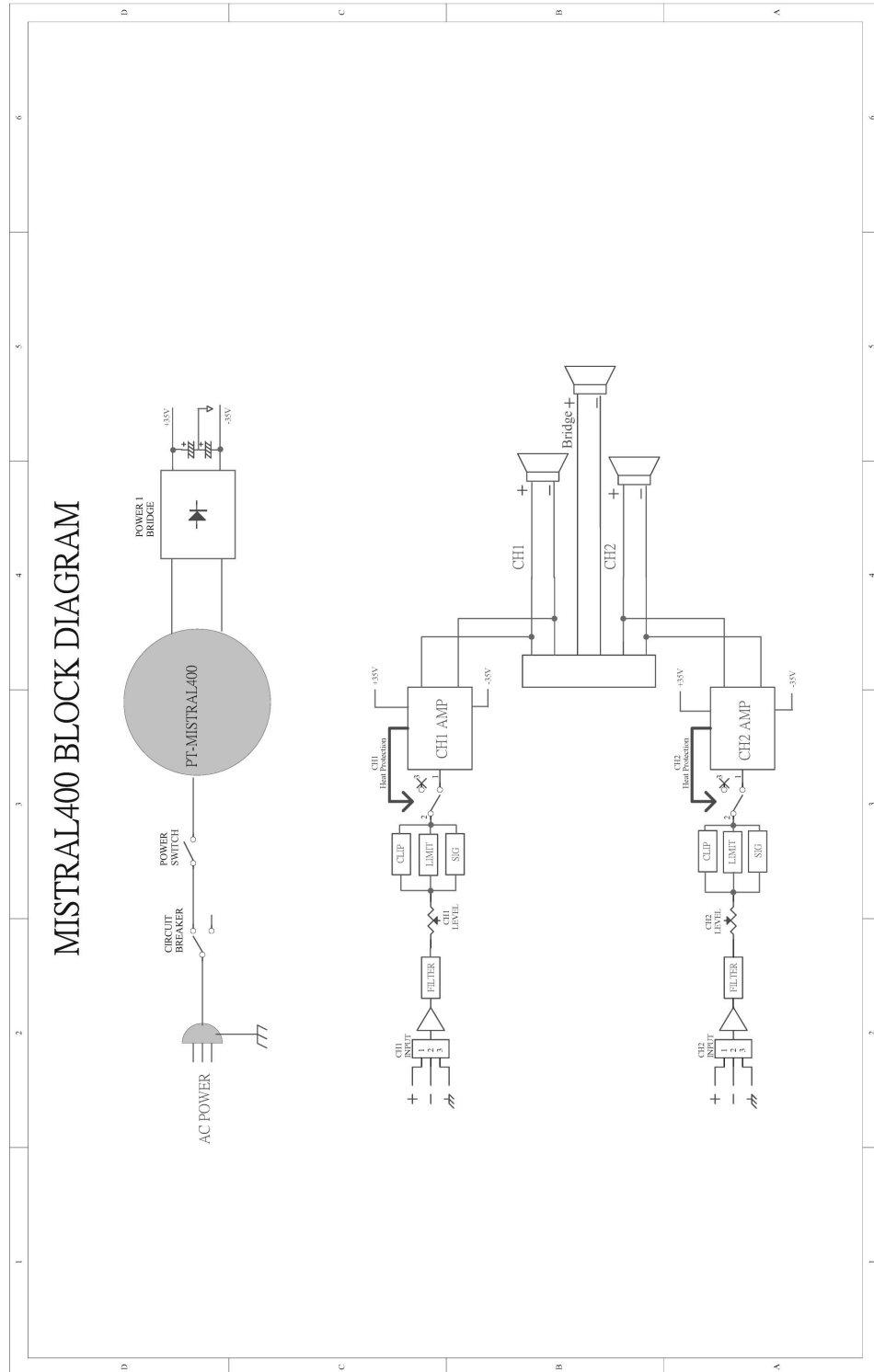
ALTO MISTRAL 400 amplifier is innovative design power amplifiers. It work under high stability with great power supply in just 1-rack spaces.

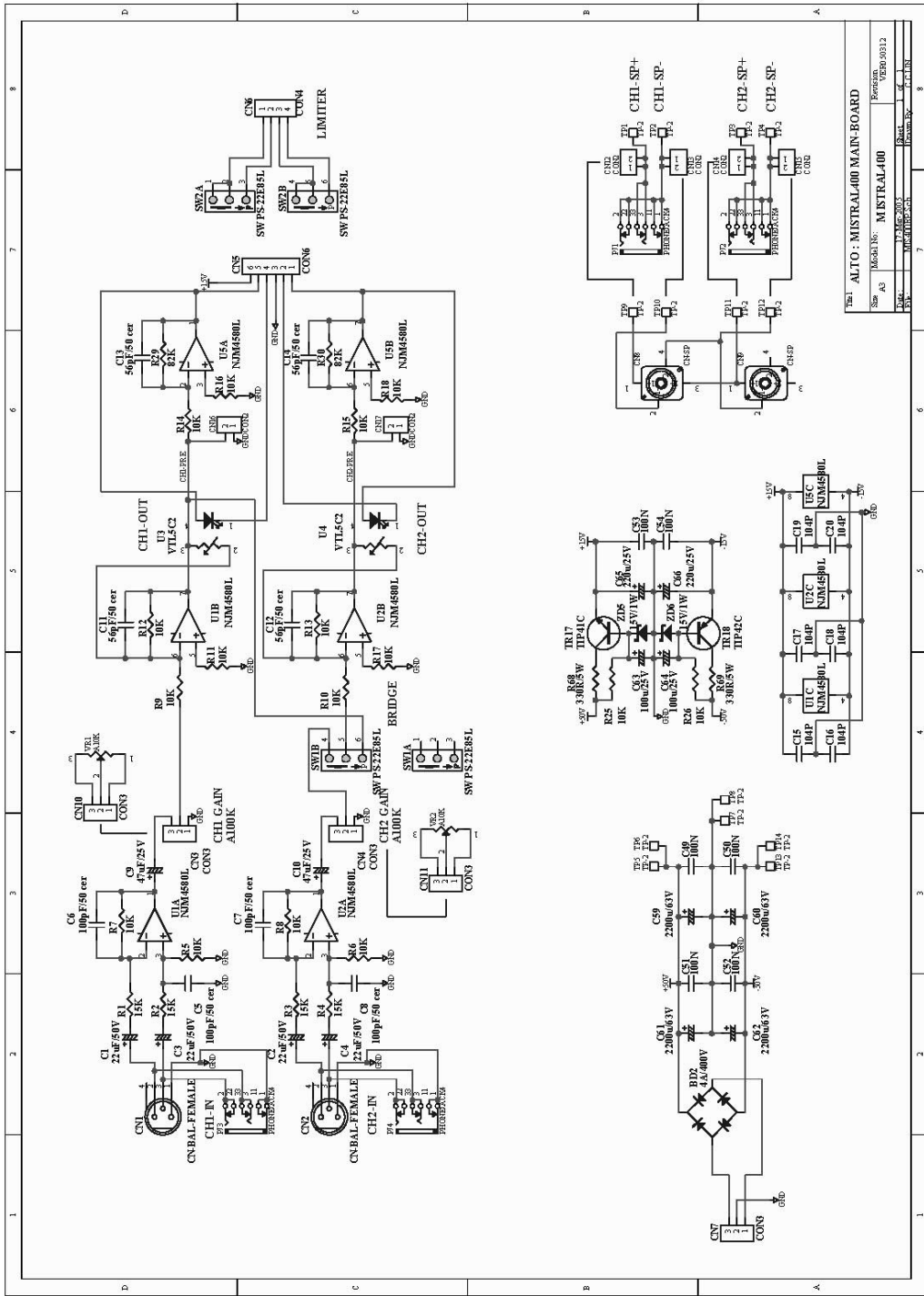
MISTRAL 400 amplifiers includes 2 independent channels with separate protection system. The independent protection system avoids opening circuit, short, wrong loading or over-heating. The special-designed protective system applies automatically restarting functions upon the default status and then goes back to normal.

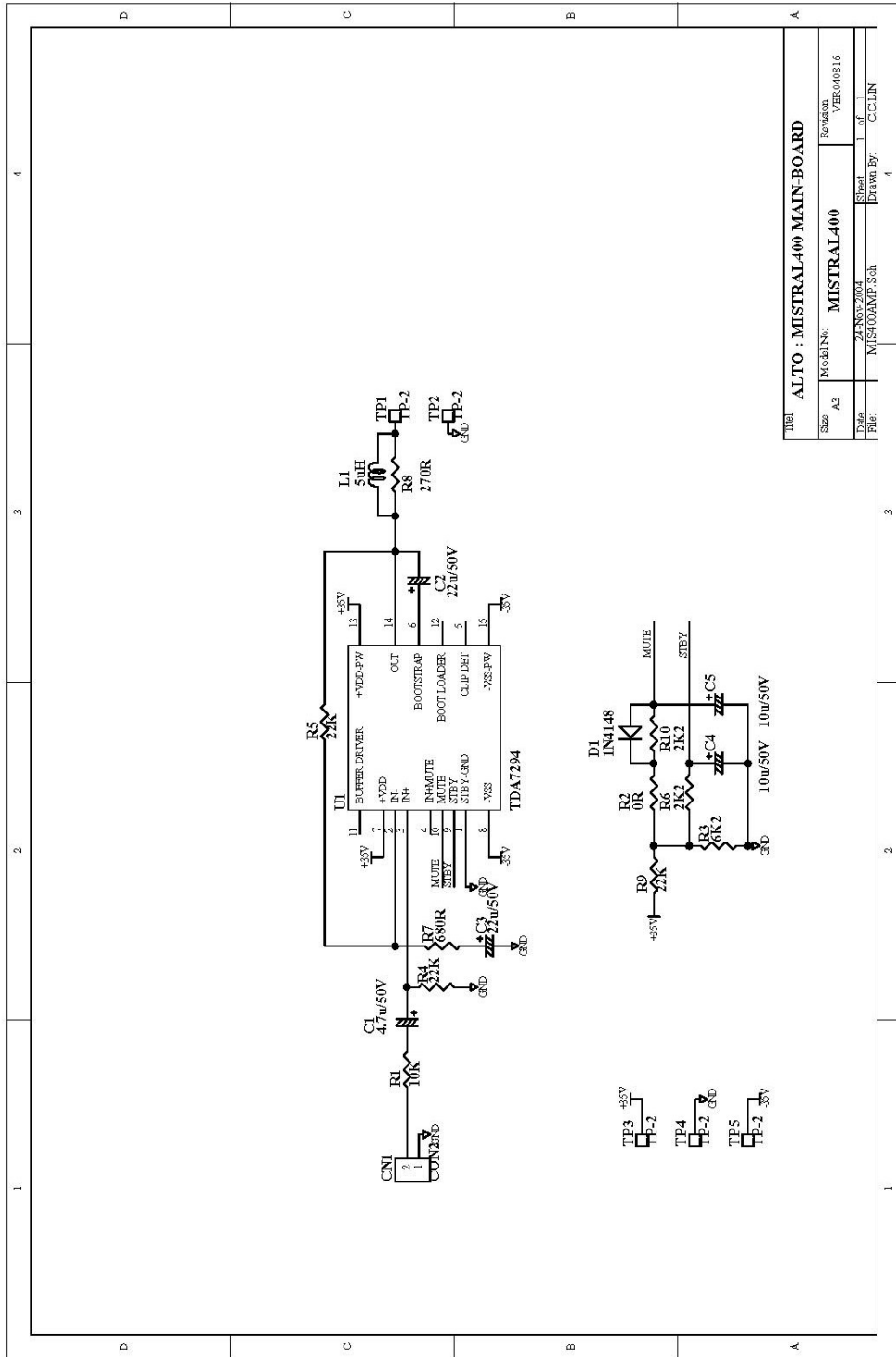
All electronic inputs equip standard power connectors. And all inputs are electronic balanced, with hi-quality transformer, MISTRAL400 amplifier provide an outstanding performance in any conditions

- innovative design and high stability power amplifier
- AB class high power amplifier in 19" rack, 1U size
- rugged amplifiers in a strong, compact chassis
- 2 independent channels with separate protection system and power supply
- smart-designed protection system for auto re-operation after fault
- 3LEDs for limitation power on and clip
- high current TORIDAL transformer designed for high power at 4Ohms with low noise.

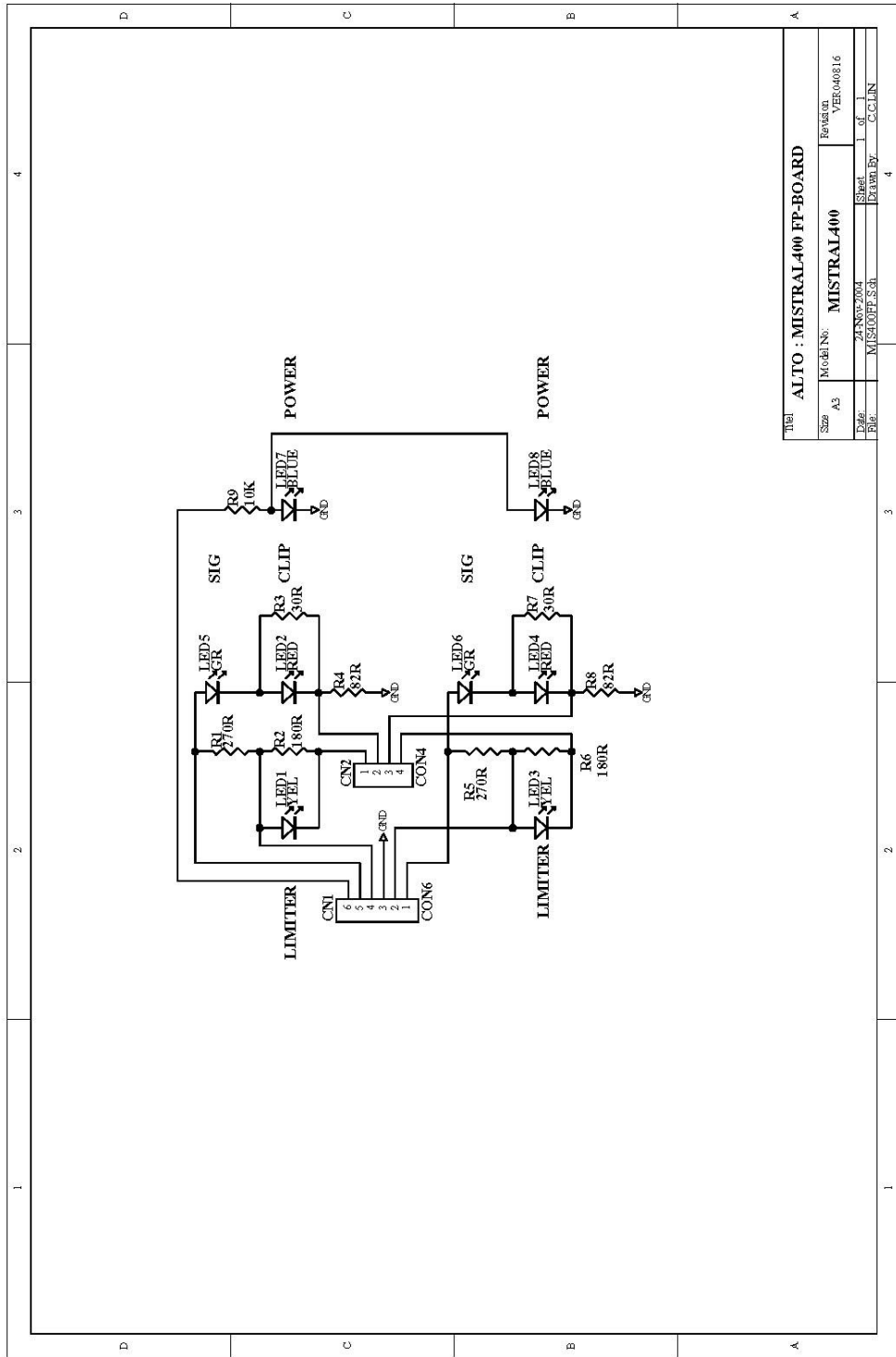
BLOCK DIAGRAM





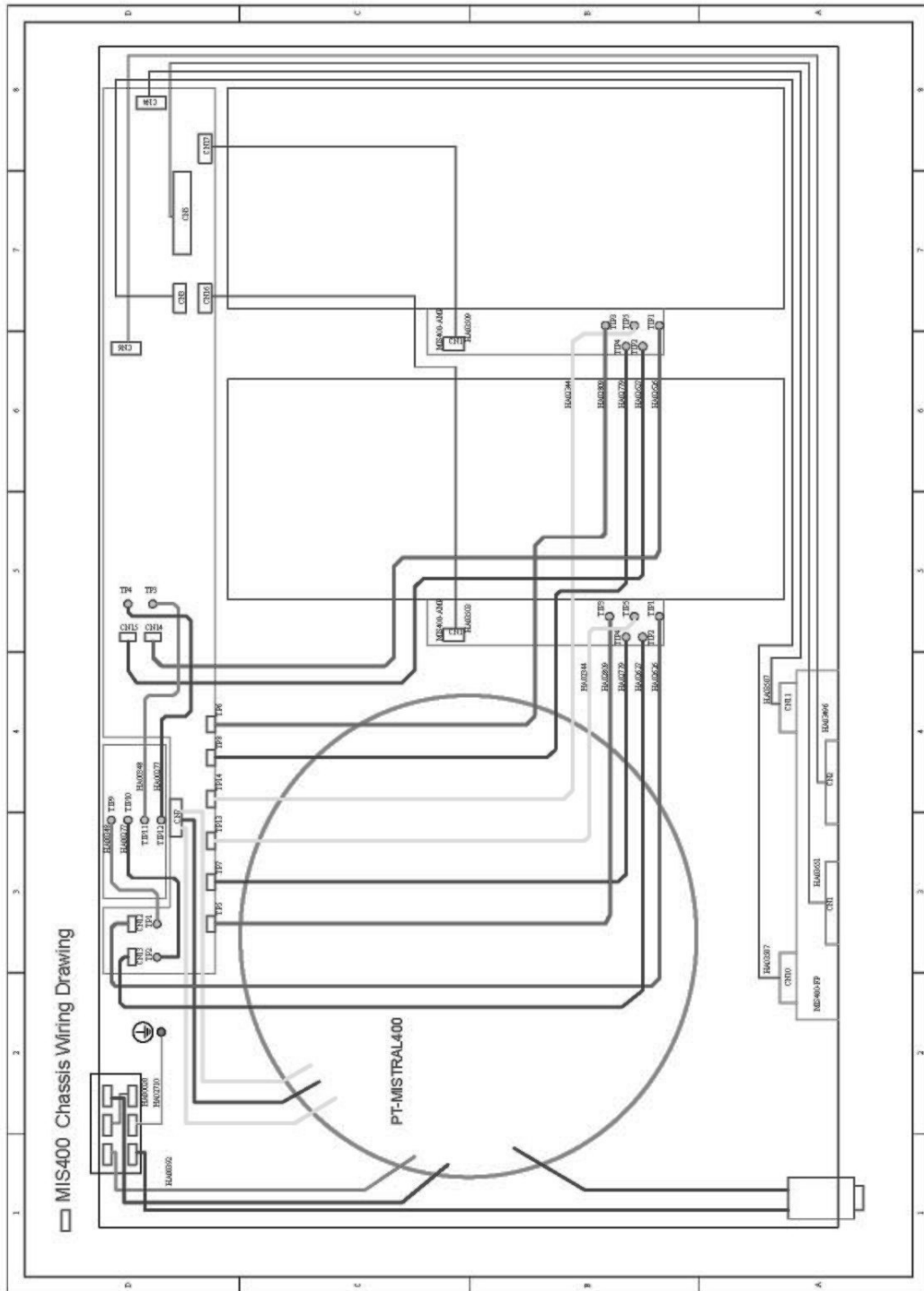


Title		ALTO : MISTRAL400 MAIN-BOARD	
Size	A3	Model No.	MISTRAL400
Date	24-Nov-2004	Revision	VER.040816
File	N:\5100AMP.Sch	Sheet	1 of 1
		Drawn By	C.C.LIN

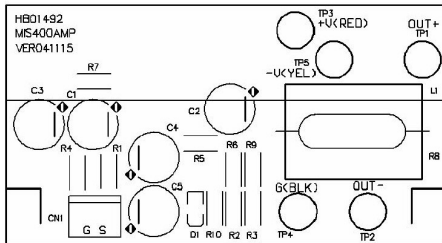
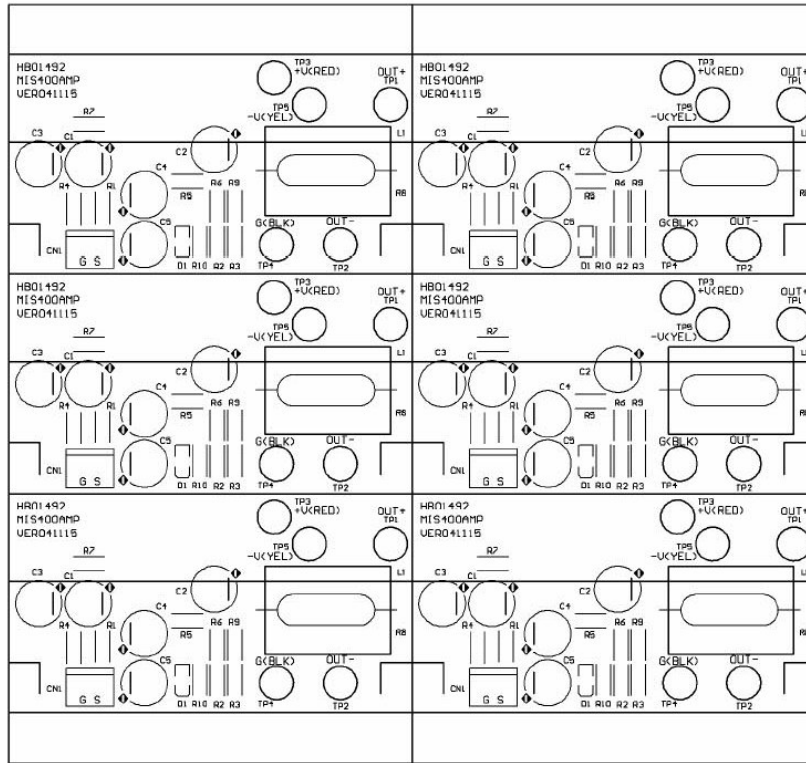


Title		ALTO : MISTRAL400 FP-BOARD	
Size	Model No.	Revision	VER040816
A3	MISTRAL400		
Date	24-Nov-2004	Sheet	1 of 1
File	MIS400FP.Sch	Drawn By	G.CLIN

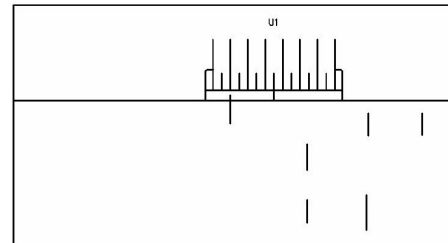
Wiring Diagram



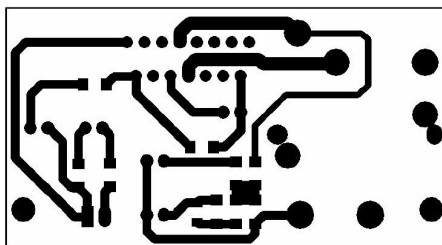
PCB layout



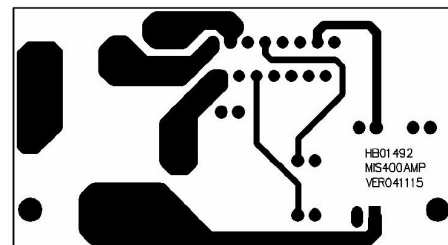
PCB : MIS400AMP Top Overlay



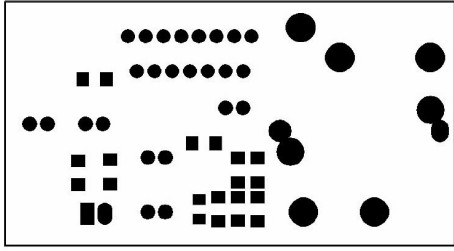
PCB : MIS400AMP Bottom Overlay



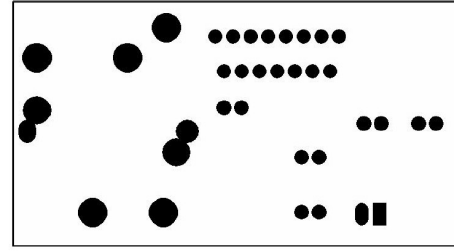
PCB : MIS400AMP Top Layer



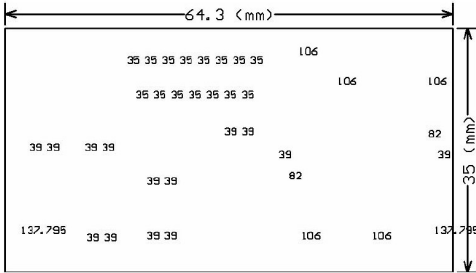
PCB : MIS400AMP Bottom Layer



PCB : MIS400AMP Top Solder Mask

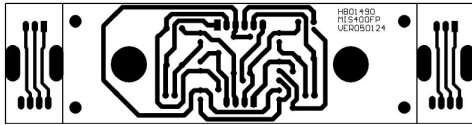


PCB : MIS400AMP Bottom Solder Mask

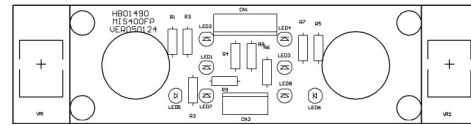


PCB : MIS400AMP Drill Drawing

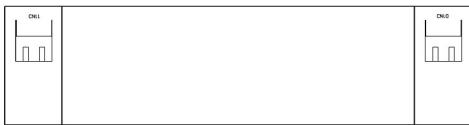
Tool	Hole Size	Hole Count Plated
T1	35mil (0.889mm)	15
T2	39mil (0.9906mm)	14
T3	82mil (2.0828mm)	2
T4	106mil (2.6924mm)	5
T5	138mil (3.5052mm)	2
Totals		38



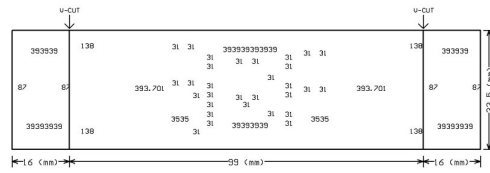
PCB : MIS400FP Bottom Layer



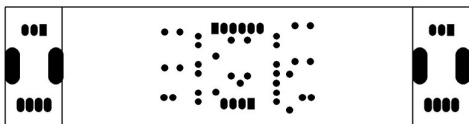
PCB : MIS400FP Top Overlay



PCB : MIS400FP Bottom Overlay

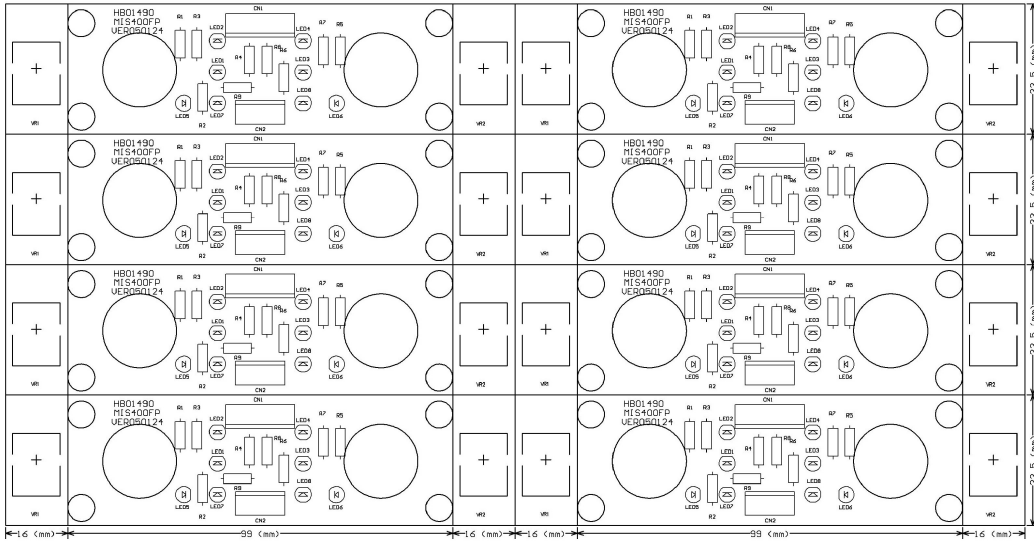


PCB : MIS400FP Drill Drawing

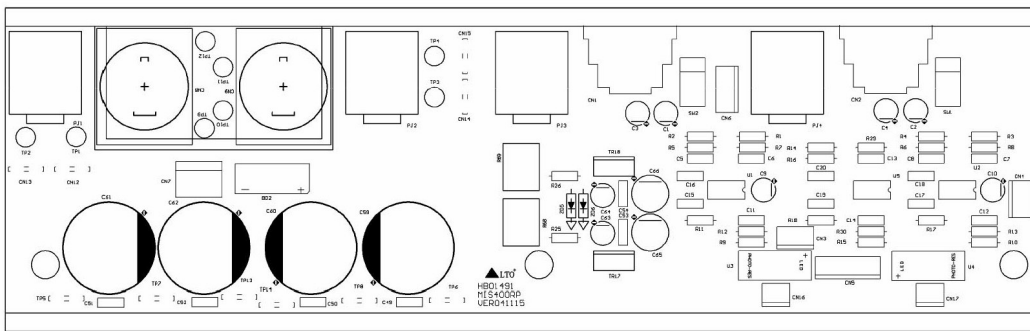


PCB : MIS400FP Bottom Solder Mask

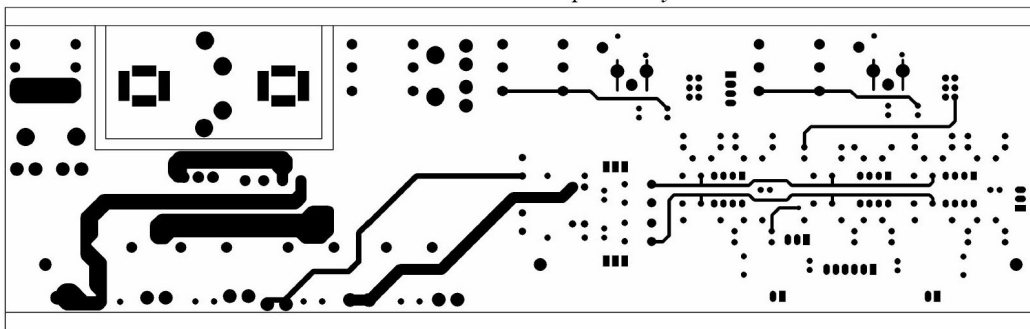
Tool	Hole Size	Hole Count Plated	Tool Travel
T1	31mil (0.7874mm)	30	17.32 Inch (439.86 mm)
T2	35mil (0.889mm)	4	12.06 Inch (306.25 mm)
T3	39mil (0.9906mm)	24	18.74 Inch (475.91 mm)
T4	87mil (2.2098mm)	4	14.47 Inch (367.59 mm)
T5	138mil (3.5052mm)	4	NPTH 15.11 Inch (383.72 mm)
T6	394mil (10.0076mm)	2	NPTH 12.79 Inch (324.86 mm)
Totals		68	90.48 Inch (2298.18 mm)



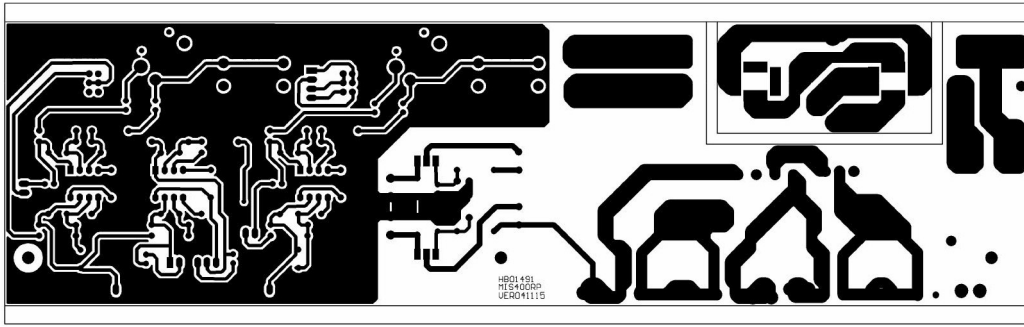
PCB : MIS400FP 連片示意圖



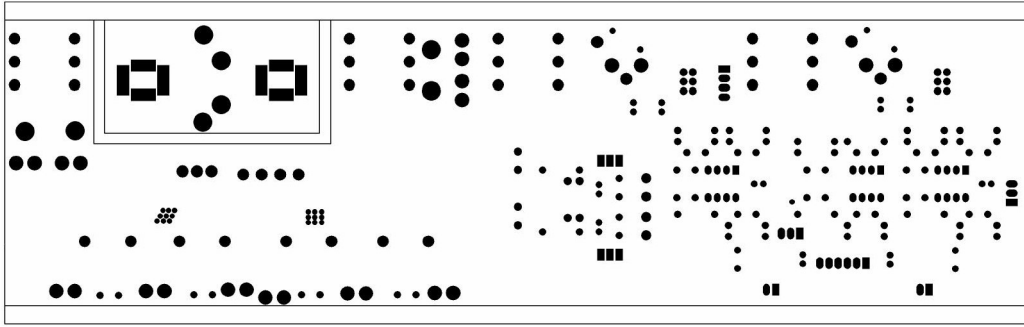
PCB : MIS400RP Top Overlay



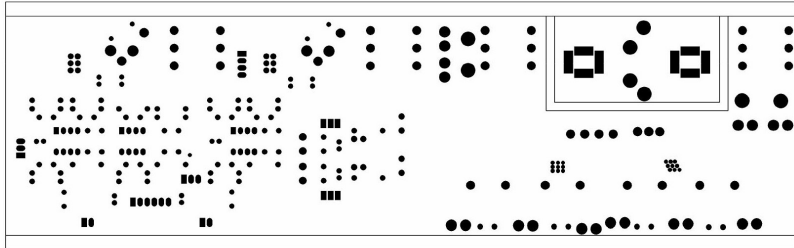
PCB : MIS400RP Top Layer



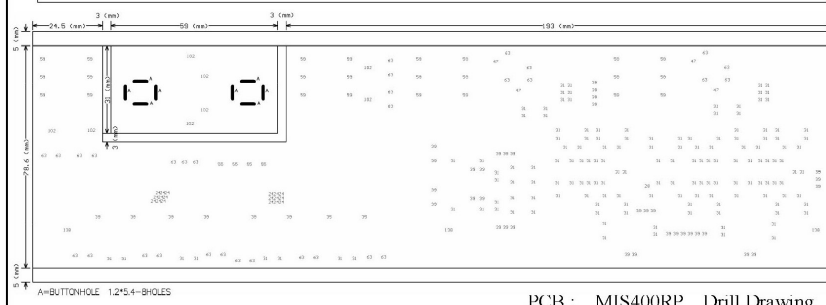
PCB : MIS400RP Bottom Layer



PCB : MIS400RP Top Solder Mask



PCB : MIS400RP
Bottom Solder Mask



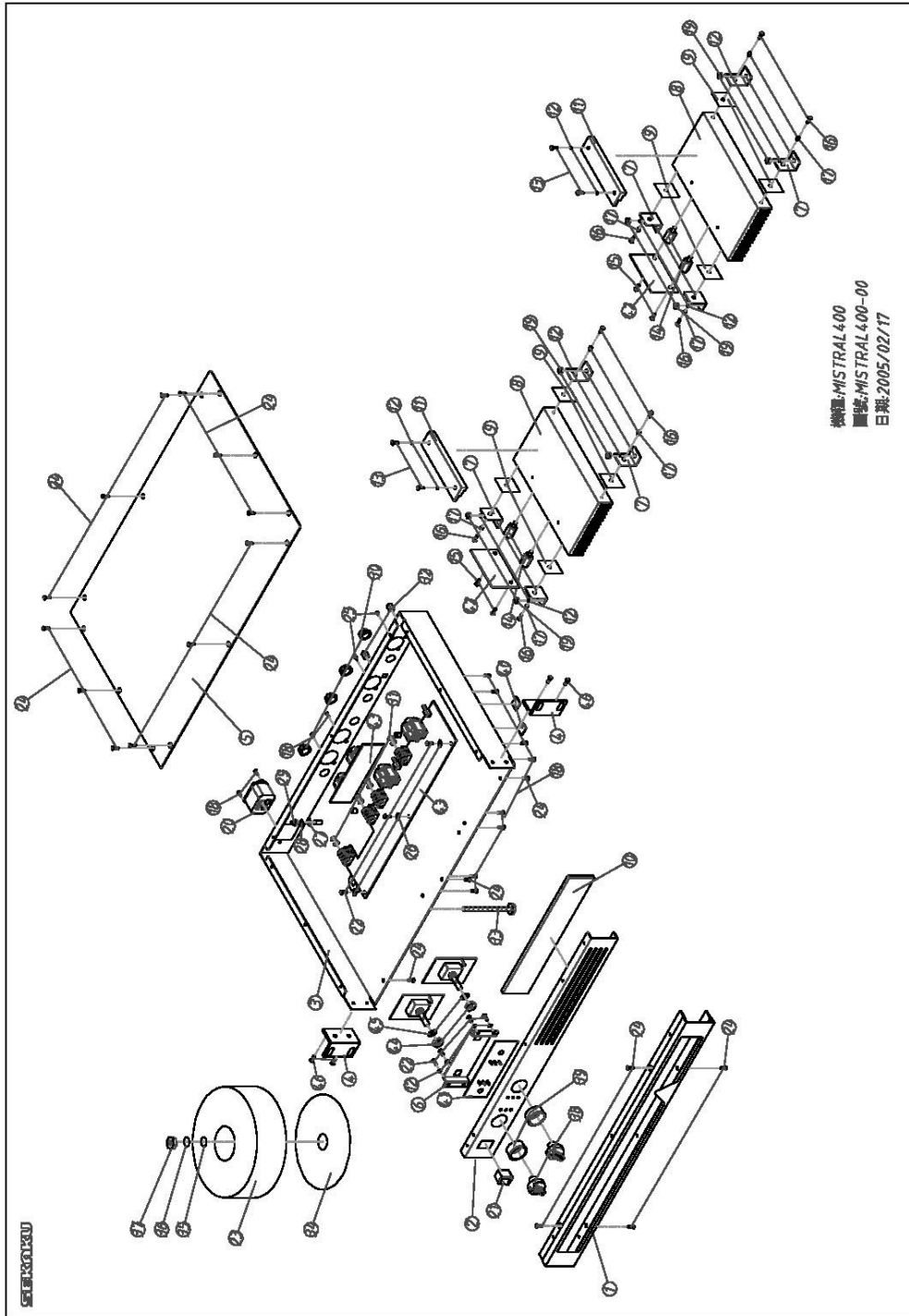
PCB : MIS400RP Drill Drawing

Tool	Hole Size	Hole Count Plated
T1	24mil (0.6096mm)	18
T2	28mil (0.7112mm)	1
T3	31mil (0.7874mm)	148
T4	35mil (0.889mm)	2
T5	39mil (0.9906mm)	40
T6	47mil (1.1938mm)	4
T7	55mil (1.397mm)	4
T8	59mil (1.4986mm)	24
T9	63mil (1.6002mm)	31
T10	102mil (2.5908mm)	8
T11	138mil (3.5052mm)	3
Totals		283

MISTRAL400 TEST PROCEDURE

1. Set the LIMITER switch to the position OFF, the MODE switch to the position STEREO and VR of CH1 and CH2 to the position MIN. Turn on the power switch on the front panel and the blue LED lights up. Then adjust VR, LIMITER LED lights up gradually. When wave starts to distort, CLIP LED lights up. Input 1 KHz / 2.3 ± 0.2 dBV signal and connect 4Ω load on the output terminal. When the output power is 80W, CLIP LED lights up and distortion is more than 0.1%
1. Set the LIMITER switch to the position ON. When input is more than 1 KHz / +2 dBV, the output signal changes slowly along with the boost of input signal and the CLIP LED does not lights up. When the LIMITER switch is in the position ON, CLIP LED does not lights up even if the output is distorted.
3. Press the BRIDGE switch. Input 1KHz / -1.6dBV signal to CH1 and connect 4Ω load on the output terminal. At this time, the output is no less than 140W and the distortion is no more than 1%.
4. Press the BRIDGE switch. Input 1KHz / 1.9dBV signal to CH1 and connect 8Ω load on the BRIDGE output terminal. At this time, the output is no less than 140W and the distortion is no more than 1%.
5. Input 1KHz / 1.9dBV signal and connect 8Ω load on the BRIDGE output terminal. At this time, the output is no less than 60 W and the distortion is no more than 1%.
6. When there is no signal input, set the VR of CH1 and CH2 to the position MAX. The output noise is less than 2mv.
7. Input 1KHz/ 2.3 ± 0.2 dBV signal and connect 4Ω load to the output terminal. When the output power is about 90W, adjust the input signal and make THD=1%. At this time, check S/N and it should be more than 100dB (+A).
8. Input 1KHz/2.0dBV signal and connect 4Ω load on the output terminal. Then adjust the potentiometer. The distortion should be less than 0.1% and there is no thorn on the wave when check the oscillograph.
9. The unit can not be short circuited for a long time. Otherwise the IC will get damaged.

The exploded view and part list



mechanical part list

NO	item NO	item description	specification	pcs
1	MA00066	front panel	MISTRAL400 ALTO_V1.0	1
2	MA04013	front panel	MISTRAL400_V1.0	1
3	MB03776	bottom rear panel	MISTRAL400_V1.0	1
4	MC00666	upper lid	MISTRAL400_V1.0	1
5	MI02693	fixing rack for the front panel	MISTRAL400 L 型_V1.0	2
6	MI02532	fixing rack	MISTRAL400 99*36*9.5_V1.0	1
7	MI02531	fixing rack	MISTRAL400 1.2*15*20*25 L 型_V1.0	8
8	MI02533	heat sink	MISTRAL400 5*22*93*170 0.5kg_V1.0	2
9	MJ00466	washer	MISTRAL400 1.5*24*27_V1.0	8
10	NI03333	filtering net	205*38.585t_V1.0	1
11	MI02003	heat sink	8*24*70mm aPOWER200_V1.3	2
12	MF00037	spring washer	$\varphi 3^* \varphi 5^*1t$	
13	MG00170	nickel screw	M3*14	4
14	MG00243	copper pole	M3*5*0.5PH single flat length 11	4
15	MG00197	nickel screw	M3*4	4
16	MG00167	nickel screw	M3*10	8
17	NI02249	plastic bush	TW-1(TO-220)	8
18	MG00042	black plated screw	M3*10	14
19	ME0001	color nut	3mm	8
20	HC00015	AC socket	(S)315-B (AC selection attached)	1
21	HI00030	power switch	4P R9D2KKFT0F	1
22	MG00041	black plated screw	M3*6	7
23	TD00354	loop transformer	PT-MISTRAL400-115/230V	1
24	MG00025	black plated screw	M3*6	19
25	MG00061	black plated screw	M3*10	4
26	MF00014	shake proof	$\varphi 3^* \varphi 6.5^*0.5t$	3
27	MF00048	shake proof	$\varphi 4^* \varphi 8^*0.5t$	1
28	MF00038	spring washer	$\varphi 4^* \varphi 7^*1t$	1
29	ME00016	colorful nut	4mm	1
30	NI00002	plastic nut	hex $\varphi 7/16^*G20/15^*4.8$	4
31	NC00131	T-wooden washer	1* $\varphi 11.3^* \varphi 15.3$ RED	8
32	NI00312	power switch button	square5*5*9 孔 2.8*2.8 black	2
33	MG00458	black plated screw -T	M6*40*1.0PH	1
34	NI00437	rubber loop	$\varphi 20^* \varphi 120^*2tB$	1
35	MF00028	colorful washer	$\varphi 6.7^* \varphi 12.1^*1.2t$	1
36	MF00040	spring washer	$\varphi 6^* \varphi 10^*1.5t$	1
37	ME00014	colorful nut	M6*1.0PH	1
38	NI02650	plastic knob	$\varphi 18^*18mm$	2
39	NI02651	knob fixing bush	10* $\varphi 22.5$ black A600.2	2

40	NI00498	adhesive pad	12.7*7*6mm(SF-005)	4
41	HK04846	K-PCB	P-MIS400FP-DIP	1
42	HK04845	K-PCB	P-MIS400AMP-DIP	2
43	HK04844	K-PCB	P-MIS400RP-DIP	1
44	ME00006	NUT	$\varphi 9$	2
45	MF00004	colorful washer	$\varphi 9^* \varphi 14^*0.5t$	2
46	MG00021	black plated screw	M4*6	4

BOM

Remarks

NO	PART NO	DESCRIPTIONS	SPECIFICATION	Remarks
1	MA00066	ZC-panel	MISTRAL400 ALTO_V1.0	
2	MA04013	ZC-panel	MISTRAL400_V1.0	
3	MI02532	ZD-fixing rack	MISTRAL400 99*36*9.5_V1.0	
4	MB03776	ZC-bottom rear panel	MISTRAL400_V1.1	
5	MC00666	ZC-upper	MISTRAL400_V1.1	
6	MI02693	ZB-front panel fixing rack	MISTRAL400 Ltype_V1.0	
7	TD00354	loop transformer	PT-MISTRAL400_115/230V	
8	HC00015	AC socket	(S)315-B	
9	HD00009	glass tube fuse-slow	1.6A 250V ϕ 5.2*20mm CSA/S/UL/VDE	
10	HI00030	power switch	4P R9D2KKFT0F	
11	MG00021	black plated screw	M4*6	
12	MG00041	black plated screw	M3*6	
13	MG00042	black plated screw	M3*10	
14	MF00014	shake proof	ϕ 3* ϕ 6.5*0.5t	
15	MF00037	spring washer	ϕ 3* ϕ 5*1t	
16	ME00015	colorful screw	3mm	
17	MG00061	black plated screw	M3*10	
18	MG00025	black plated screw	M3*6	
19	MF00038	spring washer	ϕ 4* ϕ 7*1t	
20	MF00048	shake proof	ϕ 4* ϕ 8*0.5t	
21	ME00016	colorful nut	4mm	
22	ME00006	screw-for R.S use	ϕ 9	
23	MF00004	nut	ϕ 9* ϕ 14*0.5t	
24	NI00437	rubber	ϕ 20* ϕ 120*2tB	
25	MG00458	black plated screw	M6*40*1.0PH	
26	ME00014	colorful nut	M6*1.0PH	
27	MF00028	colorful washer	ϕ 6.7* ϕ 12.1*1.2t	
28	MF00040	spring washer	ϕ 6* ϕ 10*1.5t	
29	NI02650	plastic knob	ϕ 18*18mm	
30	NI02651	knob fixing knob -ABS	10* ϕ 22.5 black A600.2	
31	NI03333	filtering net	205*38.585t_V1.0	
32	NI00002	plastic nut	hex ϕ 7/16"*G20/15*4.8	
33	NC00131	T-wooden washer	1* ϕ 11.3* ϕ 15.3 red	
34	NI00312	power switch knob	square 5*5*9 hole 2.8*2.8 black	
35	HA02710	mono-terminal wire	100mm UL1015 14AWG	
36	HA03507	header wire 2.5	3P-3P 700mm UL2547 28AWG	
37	HA03509	header wire 2.5	2P-2P 250mm UL1185 26AWG	
38	HA03503	header wire 2.5	2P-2P 300mm UL1185 26AWG	
39	HA03496	header wire 2.5	4P-4P 700mm UL1007 28AWG	
40	HA03651	header wire 2.5	6P-6P 550mm UL1007 28AWG	

No	Part No	Description	Specification	Remarks
41	HA00392	single wave wire UL1015 18AWG	270mm black L5R5	
42	HA00370	single wave wire UL1015 18AWG	80mm black L5R5	
43	NI00261	N-pyrocondensation tube	φ 5*20mm	
44	NI00258	R-pyrocondensation tube	φ 5*1000mm	
45	NI00218	nylon wire tie	ALT-102SB	
46	HA00861	power wire	LT-312+0.75*3C(H05VV-F) 6FT+LT-501	
47	NB03284	colorful box	MISTRSL400 ALTO_V1.0	
48	NB03283	carton	MISTRSL400 ALTO_V1.0	
49	NE11347	serial bar code 30*11mm	ALTO PI for special use	
50	NE06164	ZC-bar code sticker 30*11mm	MISTRSL400 unit type bar code _V1.0	
51	NA00137	plastic bag	5*7	
52	NI00498	adhesive pad	12.7*7*6mm(SF-005)	
53	NA00125	PE bag	0.04t*580*400mm	
54	HJ00006	drying agent	30g	
55	NF00061	warranty card	can be used for all the products of ALTO	
56	NA00279	plastic bag	0.04t*100*150mm_V1.0	
57	AD00012	two side sticker	90*120mm_V1.0	
58	NF02036	user's manual English	MISTRAL400 ALTO_V1.0	
59	NF02036	solder	GND -3 for AMP	
60	CA00050	ceramic capacitor	0.068uF/100V	
61	NI00234	N-pyrocondensation tube	φ 2*23mm	
62	NI00229	R-pyrocondensation tube	φ 2*1000mm	
63	HK04846	K-PCB	P-MIS400FP-DIP	
64	HB01490	PCB-CEM-1 131*37.5*1.6	MIS400FP(2*4)_VER050124	
65	RC00209	potentiometer	A10K Ω RV1 10-40E1-225A-A14	
66	HC00066	header	3P 2.5mm 90°	Cn10, CN11
67	RA00168	fixed resistor	30 Ω	R3,R7
68	RA00181	fixed resistor 1/4W	82 Ω	R4,R8
69	RA00191	fixed resistor 1/4W	180 Ω	R2,R6
70	RA00196	fixed resistor 1/4W	270 Ω	R1,R5
71	RA00242	fixed resistor 1/4W	10K Ω	R9
72	HC00078	header	4P 2.5mm 180°	CN12
73	HC00080	header	6P 2.5mm 180°	Cn1
74	SA00052	LED	φ 3 round green hi-brightness long pin 26mm	LED5, LED6
75	SA00053	LED	φ 3 round red hi -brightness long pin 26mm	LED2, LED4
76	SA00054	LED	φ 3 round yellow hi-brightness long pin 26mm	LED1, LED3
77	SA00194	LED	φ 3 round blue LDBK2040	LED7, LED8
78	NI01782	LED spacer	LEDS-11 11mm	LED2, LED4 , LED1, LED3 LED7, LED8
79	NI01783	LED spacer	LEDS-3.5 3.5mm	LED5, LED6
80	NI00261	N-pyrocondensation tube	φ 5*20mm	LED5, LED6
81	NI00258	R-pyrocondensation tube	φ 5*1000mm	
82	HK04844	K-PCB	P-MIS400RP-DIP	

No	Part No	Description	Specification	Remarks
83	HB01491	PCB-FR4/2L 282.5*78.6*1.6	MIS400RP_VER041115	
84	RA00242	fixed resistor 1/4W	10K Ω	R5, R6, R7, R8, R9, R10, R11, R12, R13, R14, R15, R16, R17, R18, R25, R26
85	RA00277	fixed resistor 1/4W	82K Ω	R29, R30
86	RA00084	cement resistor 5W	330 Ω SQM Type	R68, R69
87	CA00018	ceramic capacitor	56PF NPO	C11, C12, C13, C14
88	CA00024	ceramic capacitor	100PF SL pin distance 5mm	C5, C6, C7, C8
89	CA00053	ceramic capacitor	0.1uF SL pin distance 5mm	C15, C16, C17, C18, C19, C20, C49, C50, C51, C52, C53, C54
90	CB00030	electrolyte capacitor	22uF/50V ϕ 6*5mm	C1, C2, C3, C4
91	CB00039	electrolyte capacitor	47uF/25V ϕ 5*11mm	C9, C10
92	CB00047	electrolyte capacitor	100uF/25V ϕ 6*11mm	C63, C64
93	CB00056	electrolyte capacitor	220uF/25V ϕ 8*11mm	C65, C66
94	CB00078	electrolyte capacitor	2200uF/63V ϕ 25*28mm	C59, C60, C61, C62
95	SA00107	voltage constant diode	1W 15V 1N4744	ZD5, ZD6
96	SA00005	bridge rectifier	4A/400V RS405	BD2
97	SD00130	IC	NJM4580D	U1, U2, U5
98	HK02231	K-light coupler	P-light sensitive resistor + ϕ 5LLED	U3, U4
99	RH00020	light sensitive resistor	VT90N1	
100	SA00201	LED	ϕ 5 round red (LI3330/A)	
101	NI02738	plastic tube -ABS	ϕ 8.2*15 black	
102	NI02779	N-pyrocondensation tube	ϕ 9*30mm	
103	NI00274	R-pyrocondensation tube	ϕ 9*1000mm	
104	SB00064	transistor	TIP41C(ST)	Tr17
105	SB00067	transistor	TIP42C(ST)	Tr18
106	HI00039	pressing SW	SP70300-0202-11F1-N	SW1, SW2
107	HC00108	stereo MIC jack	ϕ 6.3 LJB0661-6	PJ1, PJ2, PJ3, PJ4
108	HC00112	balanced MIC jack	99M-107SP-1-2 female jack 90° with PUSH	CN1, CN2
109	HC00442	speaker jack	NLAMP female jack (NEUTRIK)	CN8, CN9
110	MJ00942	ZD-fixing rack -CS12-29	CS12/600	CN8, CN9
111	MJ00061	R-zinc plated	1.0t*2135*1220mm 20.447kg	
112	HC00324	connecting terminal	6.5mm (PC250)	CN12, CN13, CN14, CN15, TP5, TP6, TP7, TP8, TP13, TP14
113	HC00076	header	2P 2.5mm 180°	CN16, CN17
114	HC00077	header	3P 2.5mm 180°	CN3, CN4
115	HC00078	header	4P 2.5mm 180°	Cn6
116	HC00080	header	6P 2.5mm 180°	Cn5
117	HC00172	header	3P 3.96mm 180°	Cn7
118	HA00348	single wave wire UL1015 16AWG	120mm white L5R5	TP1, TP9, TP3, TP11
119	HA00277	single wave wire UL1015 16AWG	120mm black L5R5	TP2, TP10, TP4, TP12
120	RA00246	fixed resistor 1/4W	15K Ω M type	R1, R2, R3, R4
121	HK04845	K-PCB	P-MIS400AMP-DIP	
122	RA00038	metal oxide foil resistor 2W	270 Ω P type	R8
123	CB00015	electrolyte capacitor	4.7uF/50V SLL ϕ 5*11mm	C1
124	CB00025	electrolyte capacitor	10uF/50V ϕ 6*7mm	C4, C5

NO	PART NO	DESCRIPTION	SPECIFICATION	REMARKS
125	CB00030	electrolyte capacitor	22uF/50V ϕ 6*5mm	C2,C3
126	CN00060	fixed inductor	2uH 10A(CSAF-302824)(ϕ 1.5mm*12 1/2T)	L1
127	SD00084	IC	TDA7294(S&T)	U1
128	HC00076	header	2P 2.5mm 180°	Cn1
129	HA02343	mono terminal wire PC250	300mm UL1015 18AWG black	TP2,TP4
130	HA02809	mono terminal wire PC250	220mm UL1015 18AWG red	TP1,TP3
131	HA02344	mono terminal wire PC250	250mm UL1015 18AWG yellow	TP5
132	MI02533	ZD-heatsink-aluminum-MISTRAL400-06	MISTRAL400 5*22*93*170 0.5kg_V1.0	
133	MI02003	Heat sink-aluminum	8*24*70mm aPOWER200_V1.3	
134	MG00168	nickel screw	M3*12	
135	MG00197	nickel screw	M3*4	
136	MF00037	spring washer	ϕ 3* ϕ 5*1t	
137	MG00243	copper pole	M3*5*0.5PH single flat 11	
138	MG00167	nickel screw	M3*10	
139	NI02249	plastic bush	TW-1(TO-220)	
140	MI02531	ZD-fixing rack-MISTRAL400-07	MISTRAL400 1.2*15*20*25 L- type_V1.0	
141	MJ00466	ZD-washer-MISTRAL400-10(NC00406)	MISTRAL400 1.5*24*27_V1.0	
142	MJ00344	solder	GND -3 for AMP	
143	HK04843	K-PCB	P-MIS400AMP-SMD	
144	HB01492	PCB-FR4/2L 2oz 64.3*35*1.6	MIS400AMP(2*3)_VER041115	
145	RD00129	SMD fixed resistor 1/4W	0.0 Ω \pm 5% 1206	R2
146	RD00428	SMD fixed resistor 1/4W	680 Ω \pm 5% 1206	R7
147	RD00247	SMD precise resistor 1/4W	2.20K Ω \pm 1% 1206	R6,R10
148	RD00335	SMD precise resistor 1/4W	6.20K Ω \pm 1% 1206	R3
149	RD00399	SMD precise resistor 1/4W	10.0K Ω \pm 1% 1206	R3
150	RD00252	SMD precise 1/4W	22.0K Ω \pm 1% 1206	R4,R5,R9
151	SE00011	SMD rectifying LED	0.5A RLS4148 LL-34	D1
152	Nb03354	PAPER BOARD	MISTRAL400_V1.0	