



## Service Manual

MI 120 Integrated Amplifier  
MA 120 Power Amplifier

**Myryad Systems Ltd.**

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Circuit Diagrams  
PCB Parts lists

## Service Manual Addendum

### All M-Series Products

Please add copies of this sheet into all M-Series Service Manuals, facing the page entitled "Disassembling the M\_\_\_\_\_ Fascia".

#### WARNING

When changing the fascia on any M-series product take very great care when re-tightening the (M3 x 16 Taptite) screws which attach the front panel PCB(s) to the fascia. If these screws are over-tightened they can locally deform the front surface of the fascia - making small "dimples". It is not possible to repair this defect, so the fascia would have to be scrapped.

Tighten the screws very carefully until the PCB is just held firmly and check that all the push buttons operate correctly - without any movement of the PCB.

#### Additional note: MT 100 only

If the MT 100 tuning knob is removed during service, take very great care not to over-tighten the set screw when re-fixing it. The tuning control used in the MT 100 has a plastic shaft. If the set screw is over-tightened the shaft can be deformed slightly, resulting in the control knob rotating eccentrically.

Tighten the set screw very carefully until the tuning knob is *just* gripped firmly.

This problem cannot occur when attaching the MI 120 or MP 100 volume control knobs as the control shafts are metal in these products.

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## DISASSEMBLING THE ML120

Remove cover - 2 X M3X6 black machine screws at rear.  
4 X M4X6 Buttonhead screws (2 at each side)

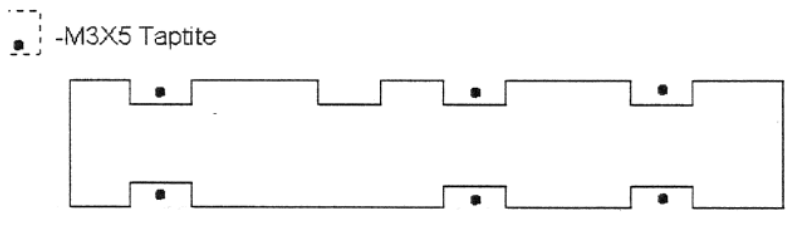
Unplug PL4

Remove sub-fascia screws - 2X M3X6 Machine screws (1 at each side)  
- 3X M3X6 Machine screws (Along underside)

Turn volume knob to approximately 2 O'clock. Undo grub screw with 1.5mm Allen key and remove Volume Knob (DO NOT DESOLDER WIRES)

Fold down fascia assembly out of chassis.

Remove subfascia from fascia 6XM3X5 taptite



Sit Sub-fascia back in chassis

Remove 2 P.C.B.'s 6X M3X15 Taptite being careful not to lose nylon washers that are underneath the P.C.B. standoffs.

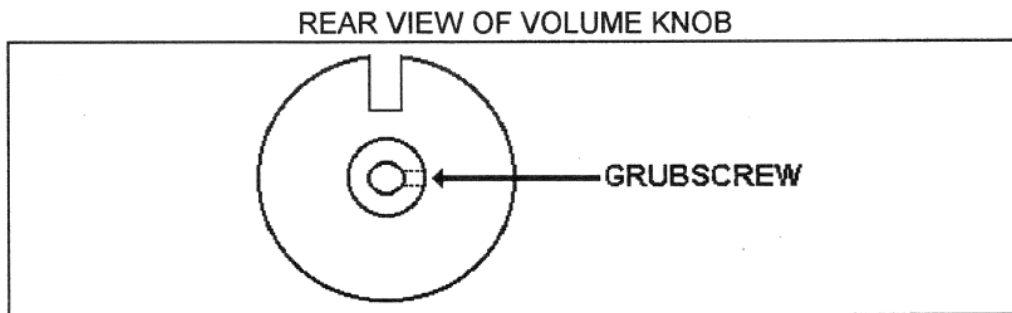
Remove headphone socket 2X M3X5 Taptite being careful not to lose rubber o-ring.

- Now remove fascia and replace with new one.
- Place nylon washers over correct holes and lower P.C.B.'s down onto them and screw-up, making sure at all time that the pushbuttons fall centrally in the fascia holes.
- Do not tighten screws too tight this will damage the plastic standoffs.
- Now attach Headphone socket.
- Lower sub-fascia down onto fascia - be careful not to trap ribbon cables when tightening up.
- Slide complete assembly back into chassis also being careful not to trap ribbon cables between chassis and sub-fascia.
- Screw sub-fascia back into chassis.
- Re-attach volume knob - make sure that grub screw sits centrally on the flat section of the volume pot.
- Plug PL4 back in and put top cover back on.
- Give unit a functional test.

Check that in standby none of the input select LED's are on - if so, the ribbon cable is trapped.  
Check that in operate mode all the correct LED's light when you push the button.

## REMOVING VOLUME P.C.B ASSEMBLY

1. REMOVE TOP COVER:- 4x M4x6 BUTTONHEAD (2 AT EACH SIDE)  
2x M3x6 BLACK M/S (2 AT REAR)
2. REMOVE VOLUME KNOB BY UNDOING M3x6 GRUBSCREW AT REAR OF KNOB.



3. UNDO VOLUME POT FROM FRONT OF MACHINE.
4. DESOLDER CBL601, UNPLUG PL4, DESOLDER COAX INPUTS (NOTE, DO NOT SWAP COAX'S WHEN RE-FITTING)
5. REPLACE WITH NEW ASSEMBLY.

TOOLS NEEDED: 1 POINT POZI DRIVER, 2.5mm HEX DRIVER, 1.5mm HEX DRIVER, SOLDERING IRON, SOLDER SUCKER, 11mm NUTSPINNER.

### Preliminary Service notes: MI 120 and MA 120

These notes are intended to provide trained electronics service personnel with some assistance in dismantling and repairing faults.

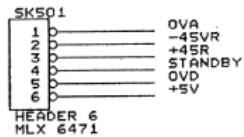
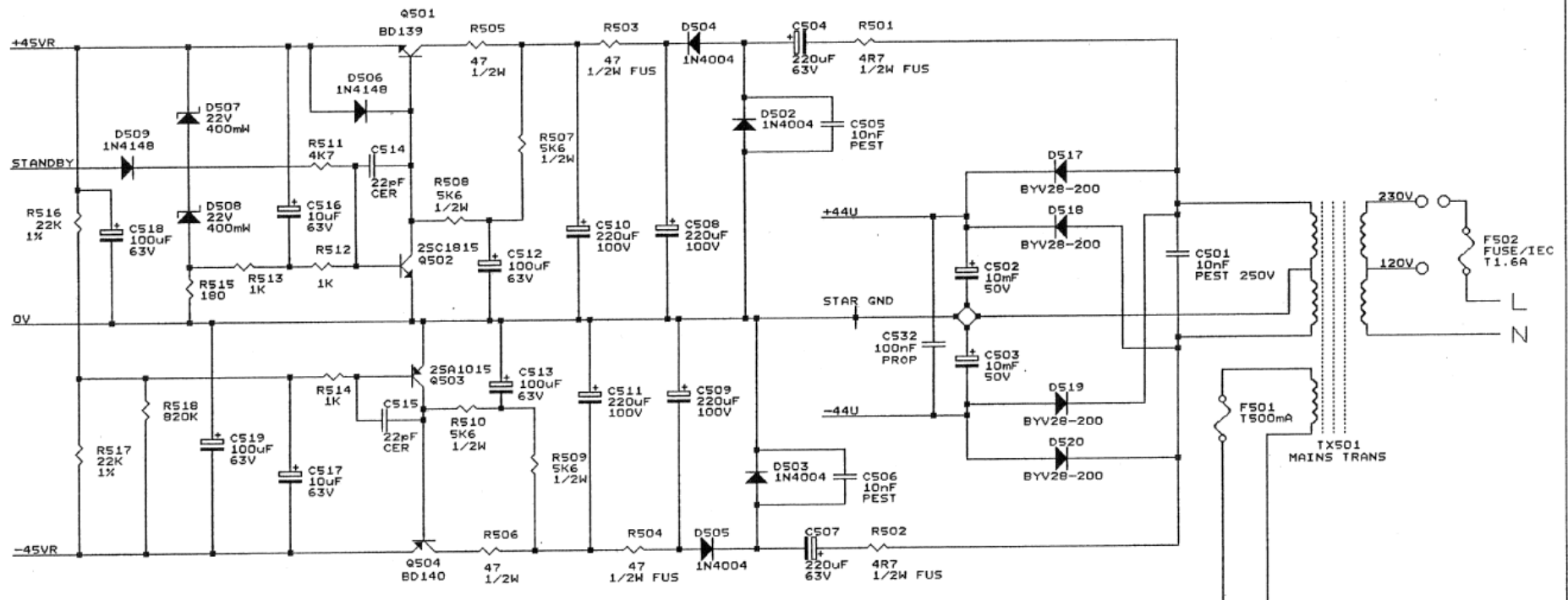
The integrated amplifier (MI 120) and its power amplifier counterpart (MA 120) are very closely related. The MA 120 has the same transformer and main amplifier PCB (with component changes) as the MI 120. They have different control electronics and the MA 120 has no input selector PCB's.

Removing the cover gains access to the main PCB containing the power amplifier and power supplies, the input selector relay boards, MY-Link and loudspeaker boards.

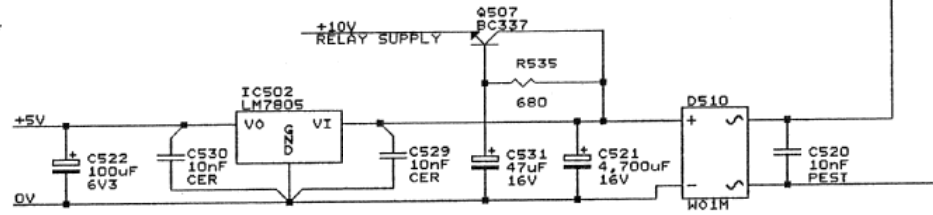
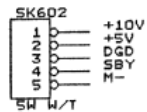
To get access to the microprocessor PCB, switch button PCB and headphone jack PCB, the fascia assembly must be removed. Since this can take some time, it is recommended that faults be located positively to this area if possible, before dismantling it.

### General Points for Guidance.

1. Should the transformer overheat as a result of prolonged over driving, the internal cut-out within the transformer will operate. The cut out is of the self- resetting type but the transformer may take a considerable time to cool down sufficiently.
2. The power amplifier outputs are relay protected. Short circuits applied to the speaker terminals will cause the relay to drop out as will a variety of electrical faults within either amplifier. The relay will reset about four seconds after the fault is cleared.



POWER TAKE OFF  
FOR PHONO  
MODULES

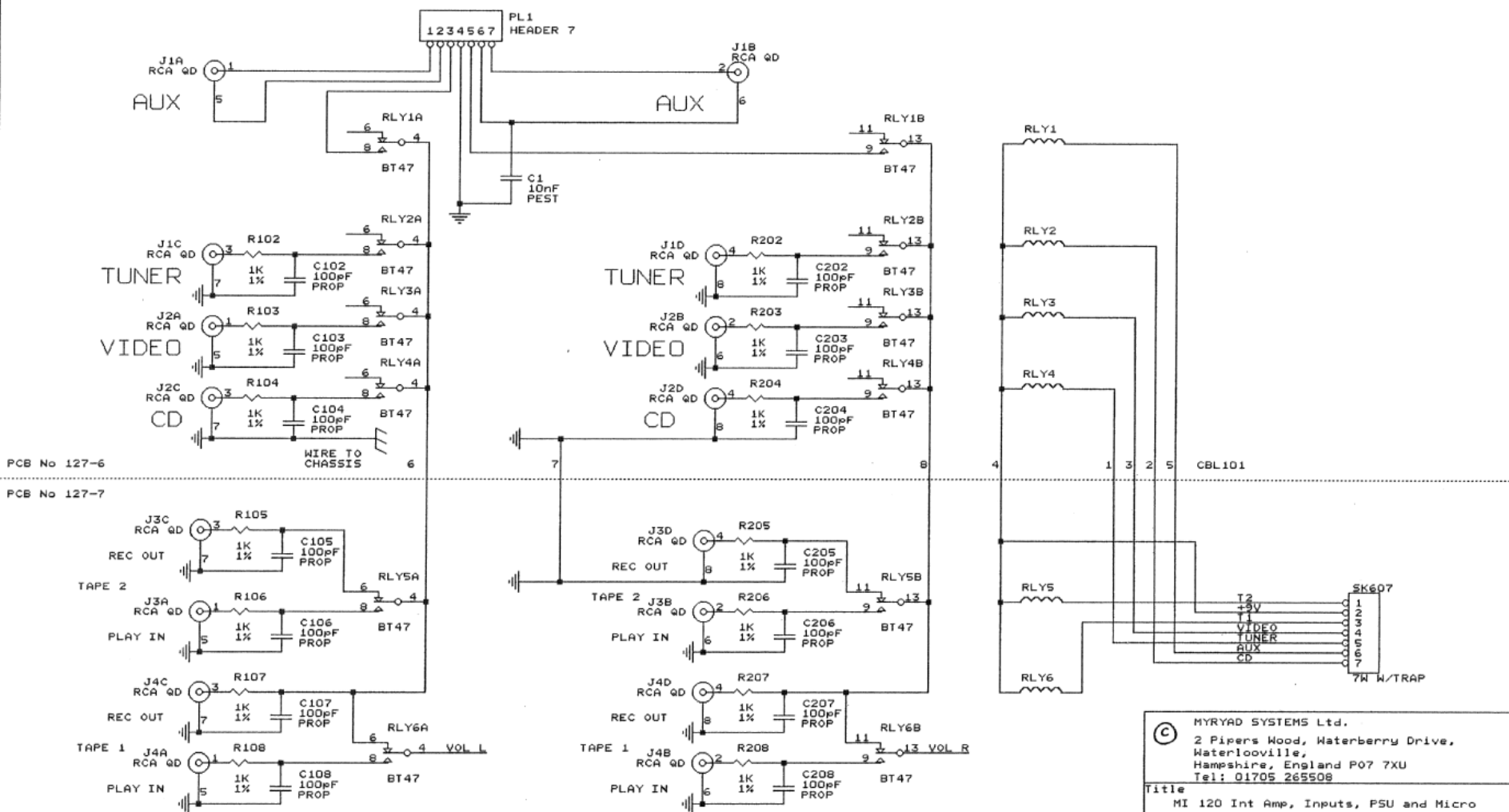
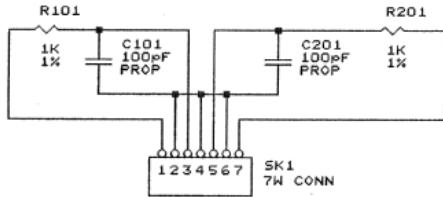


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Title  
MI 120 Integrated Amp, Power Supplies

Size	Document Number	REV
B	127-2	G

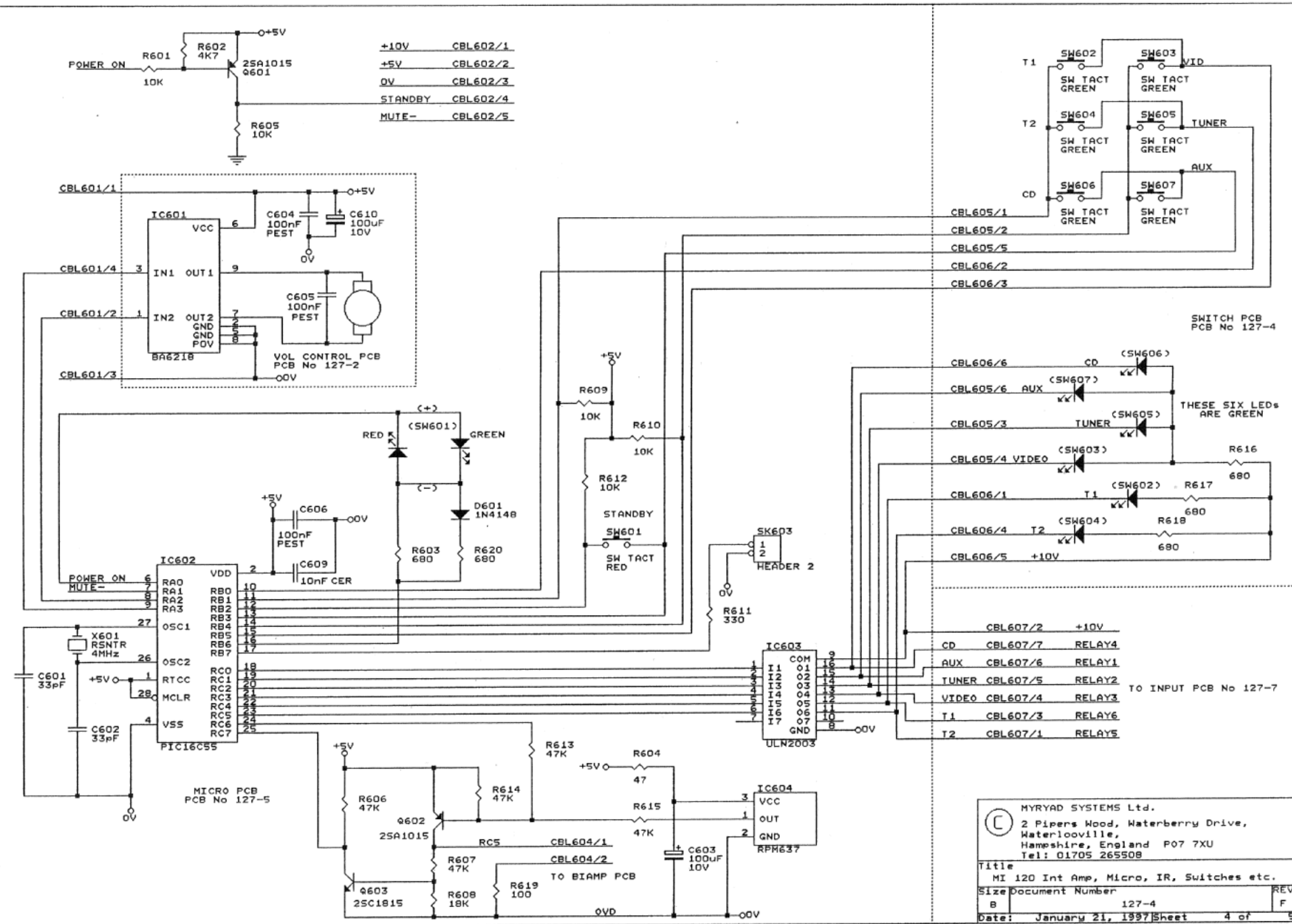
Date: February 10, 1997 Sheet 3 of 5



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Title		MI 120 Int Amp, Inputs, PSU and Micro	
Size		Document Number	
B	127-3		REV D
Date: November 24, 1995		Sheet	5 of 5





- +10V CBL602/1
- +5V CBL602/2
- 0V CBL602/3
- STANDBY CBL602/4
- MUTE- CBL602/5

- CBL605/1
- CBL605/2
- CBL605/5
- CBL606/2
- CBL606/3

- CBL606/6 CD
- CBL605/6 AUX
- CBL605/3 TUNER
- CBL605/4 VIDEO
- CBL606/1 T1
- CBL606/4 T2
- CBL606/5 +10V

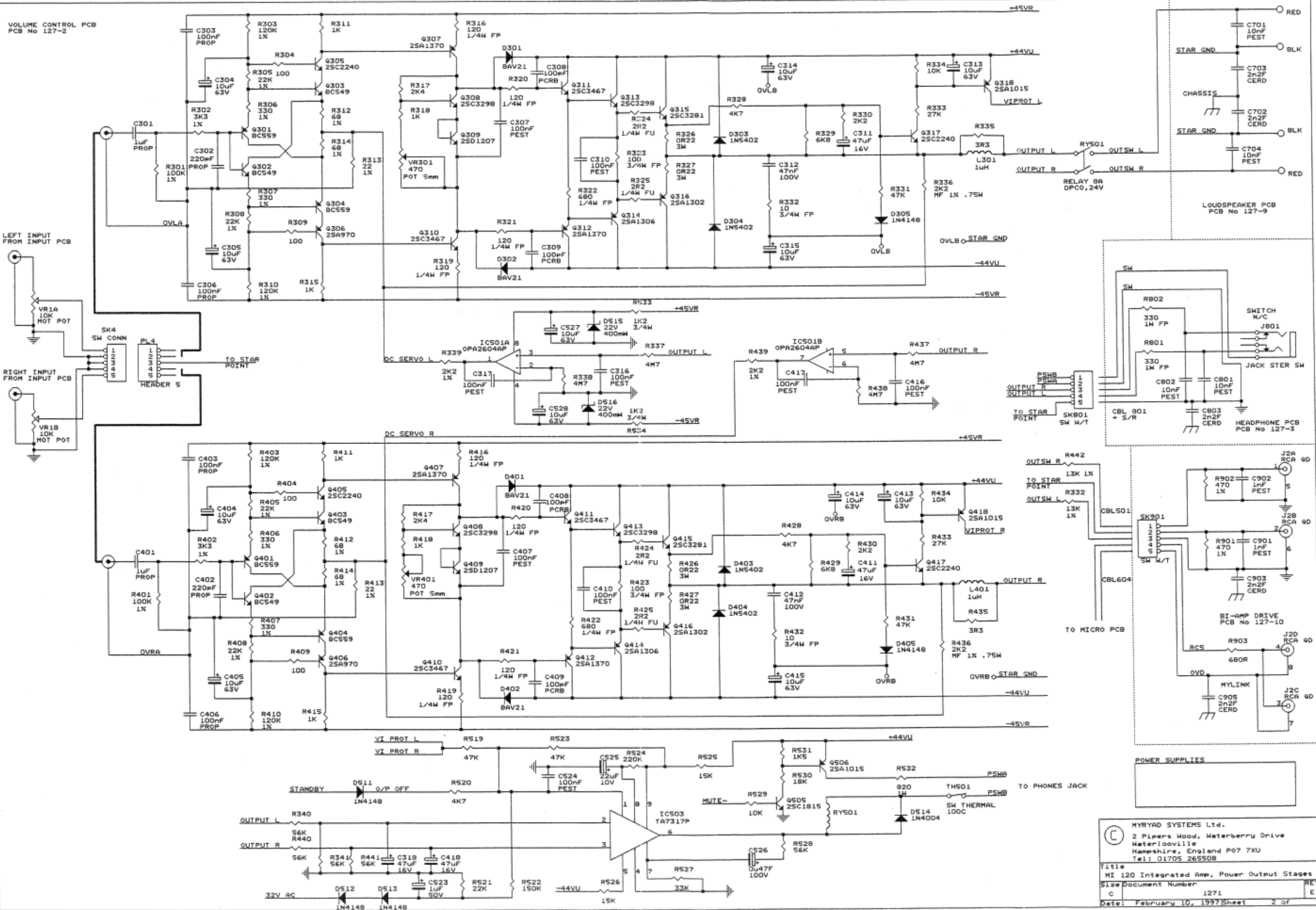
- CBL607/2 +10V
- CD CBL607/7 RELAY4
- AUX CBL607/6 RELAY1
- TUNER CBL607/5 RELAY2
- VIDEO CBL607/4 RELAY3
- T1 CBL607/3 RELAY6
- T2 CBL607/1 RELAYS

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Title  
 MI 120 Int Amp, Micro, IR, Switches etc.

Size Document Number  
 B 127-4

Date: January 21, 1997 Sheet 4 of 5



**POWER SUPPLIES**

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File  
 MI 120 Integrated Amp, Power Output Stages  
 Size Document Number  
 C 1271 REV  
 Date: February 10, 1997 Sheet 2 of 5

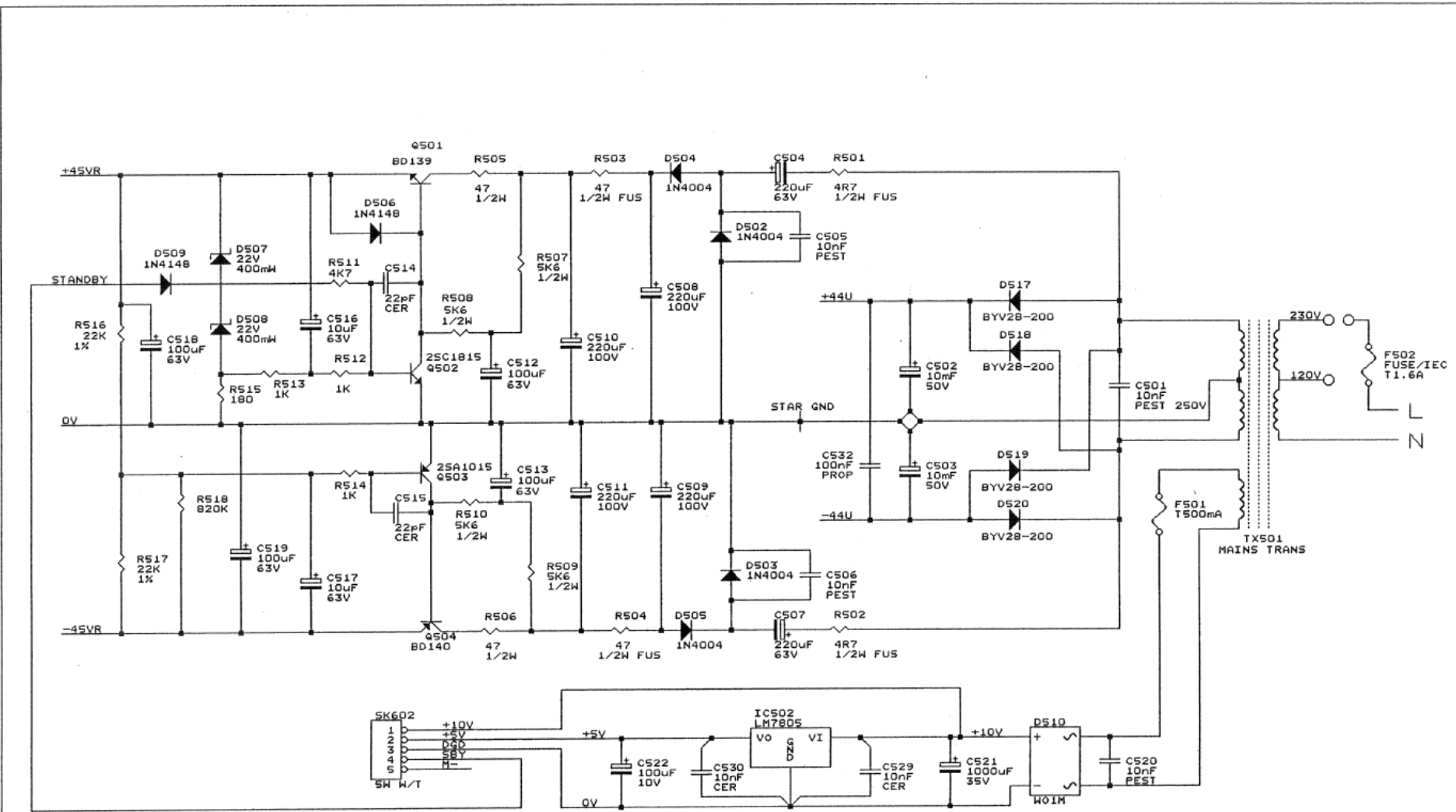
MI 120 Integrated Amp, Power Output Stages and Power Supplies						
				1271	Revision: E	
		Bill of Materials		1272	Revision: G	
				Revised: February 10, 1997		
Item	Qty	Reference	Part	Name	Material	Rating
1	2	C301,C401	1uF	Capacitor	Polypropylene	160V
2	2	C302,C402	220pF	Capacitor	Polypropylene	63V
3	5	C303,C306,C403,C406,C532	100nF	Capacitor	Polypropylene	160V
4	14	C304,C305,C313,C314,C315, C404,C405,C413,C414,C415, C516,C517,C527,C528	10uF	Capacitor	Al Electrolytic	63V
5	9	C307,C310,C316,C317,C407, C410,C416,C417,C524	100nF	Capacitor	Polyester	63V
6	4	C308,C309,C408,C409	100pF	Capacitor	Polycarbonate	100V
7	5	C311,C318,C411,C418,C531	47uF	Capacitor	Al Electrolytic	16V
8	2	C312,C412	47nF	Capacitor	Polyester	100V
9	1	C501	10nF	Capacitor	Polyester	250V
10	2	C502,C503	10,000uF	Capacitor	Al Electrolytic	50V
11	2	C504,C507	220uF	Capacitor	Al Electrolytic	63V
12	7	C505,C506,C520,C701,C704, C801,C802	10nF	Capacitor	Polyester	100V
13	4	C508,C509,C510,C511	220uF	Capacitor	Al Electrolytic	100V
14	4	C512,C513,C518,C519	100uF	Capacitor	Al Electrolytic	63V
15	2	C514,C515	22pF	Capacitor	Ceramic disc	50V
16	1	C521	4,700uF	Capacitor	Al Electrolytic	16V
17	1	C522	100uF	Capacitor	Al Electrolytic	10V
18	1	C523	1uF	Capacitor	Al Electrolytic	50V
19	1	C525	22uF	Capacitor	Al Electrolytic	10V
20	1	C526	0u47F	Capacitor	Al Electrolytic	100V
21	2	C529,C530	10nF	Capacitor	Ceramic disc	50V
22	5	C702,C703,C803,C903,C905	2n2F	Capacitor	Ceramic disc	50V
23	2	C901,C902	1nF	Capacitor	Polyester	100V
24	4	D301,D302,D401,D402	BAV21	Diode	Small signal	
25	4	D303,D304,D403,D404	1N5402	Diode	Silicon	
26	7	D305,D405,D506,D509,D511, D512,D513	1N4148	Diode	Small signal	
27	5	D502,D503,D504,D505,D514	1N4004	Diode	Silicon	
28	4	D507,D508,D515,D516	22V,400mW,	Diode	Low power zener	
29	1	D510	WO1M	Diode bridge		
30	4	D517,D518,D519,D520	BYV28-200	Diode	High speed rectifier	
31	1	F501	T500mA	Fuse	Anti-surge	250V
32	1	F502	T1.6A	Fuse	Anti-surge	250V
33	1	IC501	OPA2604AP	Integrated circuit		
34	1	IC502	LM7805	Integrated circuit		
35	1	IC503	TA7317P	Integrated circuit		
36	1	J2	RCA QUAD			
37	1	J801	Jack Stereo Sw	Headphones jack		
38	2	L301,L401	1uH	Coil		
39	1	PL4	HEADER 5	Connector		
40	4	Q301,Q304,Q401,Q404	BC559	Transistor	Silicon small signal	
41	4	Q302,Q303,Q402,Q403	BC549	Transistor	Silicon small signal	
42	4	Q305,Q317,Q405,Q417	2SC2240	Transistor	Silicon small signal	
43	2	Q306,Q406	2SA970	Transistor	Silicon small signal	
44	4	Q307,Q312,Q407,Q412	2SA1370	Transistor	Low power	

Item	Qty	Reference	Part	Name	Material	Rating
45	4	Q308,Q313,Q408,Q413	2SC3298	Transistor	Driver	
46	2	Q309,Q409	2SD1207	Transistor	Low power	
47	4	Q310,Q311,Q410,Q411	2SC3467	Transistor	Low power	
48	2	Q314,Q414	2SA1306	Transistor	Driver	
49	2	Q315,Q415	2SC3281	Transistor	Power output	
50	2	Q316,Q416	2SA1302	Transistor	Power output	
51	4	Q318,Q418,Q503,Q506	2SA1015	Transistor	Silicon small signal	
52	1	Q501	BD139	Transistor	Low power	
53	2	Q502,Q505	2SC1815	Transistor	Silicon small signal	
54	1	Q504	BD140	Transistor	Low power	
55	1	Q507	BC337	Transistor	Silicon small signal	
56	2	R301,R401	100K, 1%	Resistor	Metal film	1/4W
57	2	R302,R402	3K3, 1%	Resistor	Metal film	1/4W
58	4	R303,R310,R403,R410	120K, 1%	Resistor	Metal film	1/4W
59	4	R304,R309,R404,R409	100, 5%	Resistor	Carbon film	1/4W
60	6	R305,R308,R405,R408,R516, R517	22K, 1%	Resistor	Metal film	1/4W
61	4	R306,R307,R406,R407	330, 1%	Resistor	Metal film	1/4W
62	9	R311,R315,R318,R411,R415, R418,R512,R513,R514	1K, 5%	Resistor	Carbon film	1/4W
63	4	R312,R314,R412,R414	68, 1%	Resistor	Metal film	1/4W
64	2	R313,R413	22, 1%	Resistor	Metal film	1/4W
65	8	R316,R319,R320,R321,R416, R419,R420,R421	120, 5%	Resistor	Flameproof	1/4W
66	2	R317,R417	2K4, 5%	Resistor	Carbon film	1/4W
67	2	R322,R422	680, 5%	Resistor	Flameproof	1/4W
68	2	R323,R423	100, 5%	Resistor	Flameproof	3/4W
69	4	R324,R325,R424,R425	2R2, 5%	Resistor	Fusible	1/4W
70	4	R326,R327,R426,R427	0R22, 10%	Resistor	Wirewound	3W
71	4	R328,R428,R511,R520	4K7, 5%	Resistor	Carbon film	1/4W
72	2	R329,R429	6K8, 5%	Resistor	Carbon film	1/4W
73	2	R330,R430	2K2, 5%	Resistor	Carbon film	1/4W
74	4	R331,R431,R519,R523	47K, 5%	Resistor	Carbon film	1/4W
75	2	R332,R432	10, 5%	Resistor	Flameproof	3/4W
76	2	R332,R442	13K, 1%	Resistor	Metal film	1/4W
77	2	R333,R433	27K, 5%	Resistor	Carbon film	1/4W
78	3	R334,R434,R529	10K, 5%	Resistor	Carbon film	1/4W
79	2	R335,R435	3R3, 5%	Resistor	Carbon film	1/4W
80	2	R336,R436	2K2, 1%	Resistor	Metal film	3/4W
81	4	R337,R338,R437,R438	4M7, 5%	Resistor	Carbon film	1/4W
82	2	R339,R439	2K2, 1%	Resistor	Metal film	1/4W
83	5	R340,R341,R440,R441,R528	56K, 5%	Resistor	Carbon film	1/4W
84	2	R501,R502	4R7, 5%	Resistor	Fusible	1/2W
85	2	R503,R504	47, 5%	Resistor	Fusible	1/2W
86	2	R505,R506	47, 5%	Resistor	Carbon film	1/2W
87	4	R507,R508,R509,R510	5K6, 5%	Resistor	Carbon film	1/2W
88	1	R515	180, 5%	Resistor	Carbon film	1/4W
89	1	R518	820K, 5%	Resistor	Carbon film	1/4W
90	1	R521	22K, 5%	Resistor	Carbon film	1/4W
91	1	R522	150K, 5%	Resistor	Carbon film	1/4W
92	1	R524	220K, 5%	Resistor	Carbon film	1/4W
93	2	R525,R526	15K, 5%	Resistor	Carbon film	1/4W
94	1	R527	33K, 5%	Resistor	Carbon film	1/4W

Item	Qty	Reference	Part	Name	Material	Rating
95	1	R530	18K, 5%	Resistor	Carbon film	1/4W
96	1	R531	1K5, 5%	Resistor	Carbon film	1/4W
97	1	R532	820, 5%	Resistor	Carbon film	1W
98	2	R533,R534	1K2, 5%	Resistor	Carbon film	3/4W
99	1	R535	680, 5%	Resistor	Carbon film	1/4W
100	2	R801,R802	330, 5%	Resistor	Flameproof	1W
101	2	R901,R902	470,1%	Resistor	Metal film	1/4W
102	1	R903	680R, 5%	Resistor	Carbon film	1/4W
103	1	RY501	RELAY 8A,DPCO	Relay		24V
104	1	SK4	5W CONN	Connector		
105	1	SK501	HEADER 6	Connector		
106	3	SK602,SK801,SK901	5W W/T	Connector		
107	1	TH501	SW THERMAL,100C	Temperature sensor		
108	1	TX501	Mains Transformer			
109	1	VR1	10K,MOT POT,	Volume control		
110	2	VR301,VR401	470,POT 5mm,	Idle current preset		

MI 120 Integrated Amp, Micro, IR, Switches etc.				1274	Revision: F	
		Bill of Materials		Revised:	January 21, 1997	
Item	Qty	Reference	Part	Name	Material	Rating
1	2	C601,C602	33pF	Capacitor	Ceramic disc	50V
2	2	C603,C610	100uF,10V,	Capacitor	Al Electrolytic	10V
3	3	C604,C605,C606	100nF,PEST,	Capacitor	Polyester	100V
4	1	C609	10nF,CER,	Capacitor	Ceramic disc	50V
5	1	D601	1N4148	Diode	Small signal	
6	1	IC601	BA6218	Integrated circuit		
7	1	IC602	PIC16C55	Integrated circuit		
8	1	IC603	ULN2003	Integrated circuit		
9	1	IC604	RPM637	Integrated circuit		
10	2	Q601,Q602	2SA1015	Transistor	Silicon small signal	
11	1	Q603	2SC1815	Transistor	Silicon small signal	
12	5	R601,R605,R609,R610,R612	10K, 5%	Resistor	Carbon film	1/4W
13	1	R602	4K7, 5%	Resistor	Carbon film	1/4W
14	5	R603,R616,R617,R618,R620	680, 5%	Resistor	Carbon film	1/4W
15	1	R604	47, 5%	Resistor	Carbon film	1/4W
16	5	R606,R607,R613,R614,R615	47K, 5%	Resistor	Carbon film	1/4W
17	1	R608	18K, 5%	Resistor	Carbon film	1/4W
18	1	R611	330, 5%	Resistor	Carbon film	1/4W
19	1	R619	100, 5%	Resistor	Carbon film	1/4W
21	1	SW601	Switch, tact, with Red/Green LED			
22	6	SW602,SW603,SW604,SW605, SW606,SW607	Switch, tact, with Green LED			
23	1	X601	Ceramic resonator, 4MHz			

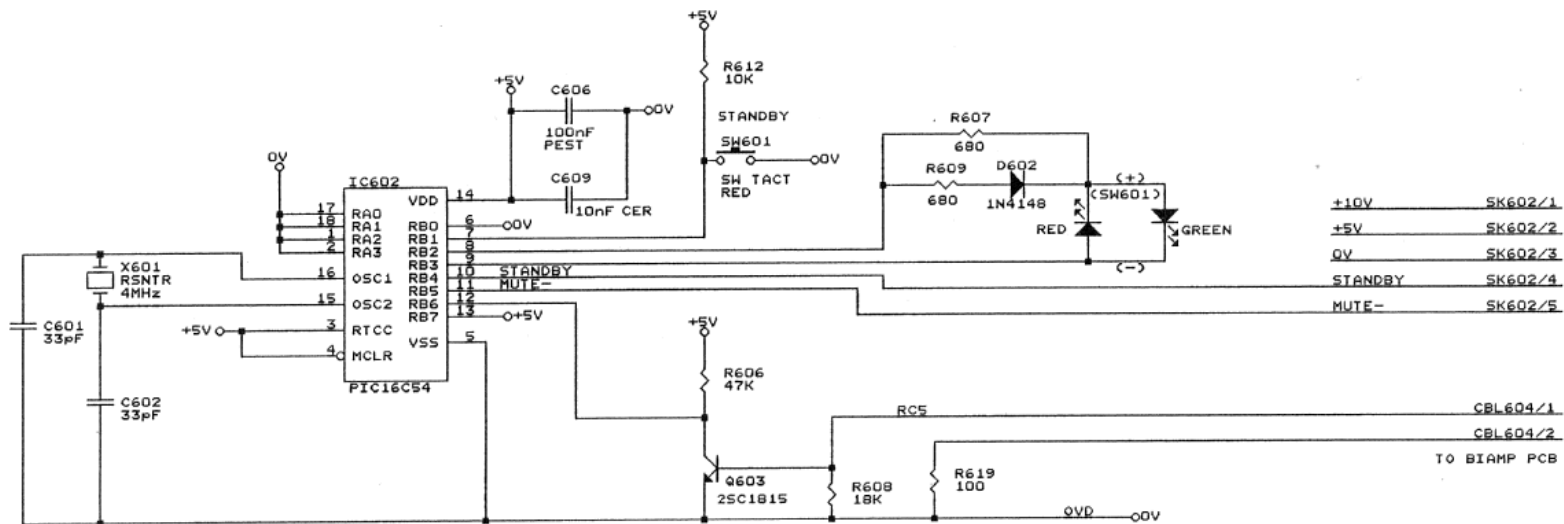
Item	Quantity	Reference	Part
1	16	C101,C102,C103,C104,C105, C106,C107,C108,C201,C202, C203,C204,C205,C206,C207, C208	100pF,PROP
2	1	C1	10nF,PEST
3	4	J1,J2,J3,J4	RCA QD Input Jacks
4	1	PL1	HEADER 7
5	16	R101,R102,R103,R104,R105, R106,R107,R108,R201,R202, R203,R204,R205,R206,R207, R208	1K,1%
6	6	RLY1,RLY2,RLY3,RLY4,RLY5, RLY6	BT47 Input Relays
7	1	SK1	7W CONN
8	1	SK607	7W W/TRAP



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Title MA 120 - Power Supplies  
 Size Document Number B 1732 REV C  
 Date: May 21, 1997 Sheet 2 of 3

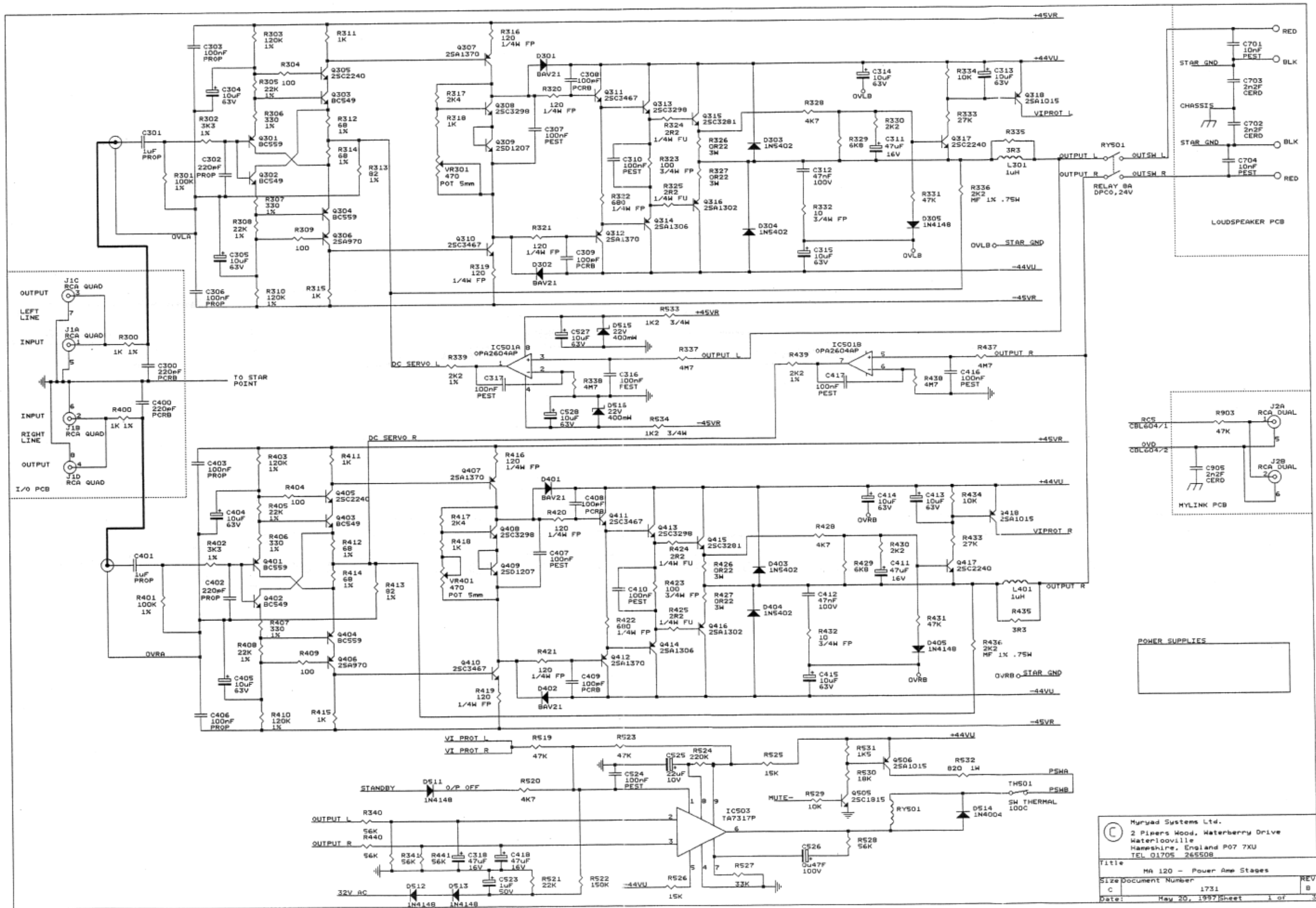




+10V SK602/1  
 +5V SK602/2  
 0V SK602/3  
 STANDBY SK602/4  
 MUTE- SK602/5

CBL604/1  
 CBL604/2  
 TO BIAMP PCB

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Title MA 120 - Microprocessor etc.		
Size B	Document Number 1733	REV B
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Title: MA 120 - Power Amp Stages  
 Size: Document Number 1731  
 Date: May 20, 1997 Sheet 1 of 3

MA 120, Power Amp Stages				1731	Revision: B	
Bill of Materials				1732	Revision: C	
				Revised:	May 20, 1997	
Item	Qty	Reference	Part	Name	Material	Rating
1	2	C300,C400	220pF	Capacitor	Polycarbonate	100V
2	2	C301,C401	1uF	Capacitor	Polypropylene	160V
3	2	C302,C402	220pF	Capacitor	Polypropylene	63V
4	5	C303,C306,C403,C406,C532	100nF	Capacitor	Polypropylene	160V
5	14	C304,C305,C313,C314,C315, C404,C405,C413,C414,C415, C516,C517,C527,C528	10uF	Capacitor	Al Electrolytic	63V
6	9	C307,C310,C316,C317,C407, C410,C416,C417,C524	100nF	Capacitor	Polyester	63V
7	4	C308,C309,C408,C409	100pF	Capacitor	Polycarbonate	100V
8	4	C311,C318,C411,C418	47uF	Capacitor	Al Electrolytic	16V
9	2	C312,C412	47nF	Capacitor	Polyester	100V
10	1	C501	10nF	Capacitor	Polyester	250V
11	2	C502,C503	10,000uF	Capacitor	Al Electrolytic	50V
12	2	C504,C507	220uF	Capacitor	Al Electrolytic	63V
13	5	C505,C506,C520,C701,C704	10nF	Capacitor	Polyester	100V
14	4	C508,C509,C510,C511	220uF	Capacitor	Al Electrolytic	100V
15	4	C512,C513,C518,C519	100uF	Capacitor	Al Electrolytic	63V
16	2	C514,C515	22pF	Capacitor	Ceramic disc	50V
17	1	C521	1000uF	Capacitor	Al Electrolytic	35V
18	1	C522	100uF	Capacitor	Al Electrolytic	10V
19	1	C523	1uF	Capacitor	Al Electrolytic	50V
20	1	C525	22uF	Capacitor	Al Electrolytic	10V
21	1	C526	0u47F	Capacitor	Al Electrolytic	100V
22	2	C529,C530	10nF	Capacitor	Ceramic disc	50V
23	3	C702,C703,C905	2n2F	Capacitor	Ceramic disc	50V
24	4	D301,D302,D401,D402	BAV21	Diode	Small signal	
25	4	D303,D304,D403,D404	1N5402	Diode	Silicon	
26	7	D305,D405,D506,D509,D511, D512,D513	1N4148	Diode	Small signal	
27	5	D502,D503,D504,D505,D514	1N4004	Diode	Silicon	
28	4	D507,D508,D515,D516	22V	Diode	Low power zener	400mW
29	1	D510	WO2M	Diode bridge		
30	4	D517,D518,D519,D520	BYV28-200	Diode	High speed rectifier	
31	1	F501	T500mA	Fuse	Anti-surge	250V
32	1	F502	T1.6A,	Fuse	Anti-surge	250V
33	1	IC501	OPA2604AP	Integrated circuit		
34	1	IC502	LM7805	Integrated circuit		
35	1	IC503	TA7317P	Integrated circuit		
36	1	J1	RCA QUAD			
37	1	J2	RCA DUAL			
38	2	L301,L401	1uH	Coil		
39	4	Q301,Q304,Q401,Q404	BC559	Transistor	Silicon small signal	
40	4	Q302,Q303,Q402,Q403	BC549	Transistor	Silicon small signal	
41	4	Q305,Q317,Q405,Q417	2SC2240	Transistor	Silicon small signal	
42	2	Q306,Q406	2SA970	Transistor	Silicon small signal	
43	4	Q307,Q312,Q407,Q412	2SA1370	Transistor	Low power	
44	4	Q308,Q313,Q408,Q413	2SC3298	Transistor	Driver	
45	2	Q309,Q409	2SD1207	Transistor	Low power	
46	4	Q310,Q311,Q410,Q411	2SC3467	Transistor	Low power	
47	2	Q314,Q414	2SA1306	Transistor	Driver	
48	2	Q315,Q415	2SC3281	Transistor	Power output	
49	2	Q316,Q416	2SA1302	Transistor	Power output	

Item	Qty	Reference	Part	Name	Material	Rating
50	4	Q318,Q418,Q503,Q506	2SA1015	Transistor	Silicon small signal	
51	1	Q501	BD139	Transistor	Low power	
52	2	Q502,Q505	2SC1815	Transistor	Silicon small signal	
53	1	Q504	BD140	Transistor	Low power	
54	2	R300,R400	1K,1%	Resistor	Metal film	1/4W
55	2	R301,R401	100K,1%	Resistor	Metal film	1/4W
56	2	R302,R402	3K3,1%	Resistor	Metal film	1/4W
57	4	R303,R310,R403,R410	120K,1%	Resistor	Metal film	1/4W
58	4	R304,R309,R404,R409	100, 5%	Resistor	Carbon film	1/4W
59	6	R305,R308,R405,R408,R516, R517	22K,1%	Resistor	Metal film	1/4W
60	4	R306,R307,R406,R407	330,1%	Resistor	Metal film	1/4W
61	9	R311,R315,R318,R411,R415, R418,R512,R513,R514	1K, 5%	Resistor	Carbon film	1/4W
62	4	R312,R314,R412,R414	68,1%	Resistor	Metal film	1/4W
63	2	R313,R413	82,1%	Resistor	Metal film	1/4W
64	8	R316,R319,R320,R321,R416, R419,R420,R421	120, 5%	Resistor	Flameproof	1/4W
65	2	R317,R417	2K4, 5%	Resistor	Carbon film	1/4W
66	2	R322,R422	680, 5%	Resistor	Flameproof	1/4W
67	2	R323,R423	100, 5%	Resistor	Flameproof	3/4W
68	4	R324,R325,R424,R425	2R2, 5%	Resistor	Fusible	1/4W
69	4	R326,R327,R426,R427	0R22, 10%	Resistor	Wirewound	3W
70	4	R328,R428,R511,R520	4K7, 5%	Resistor	Carbon film	1/4W
71	2	R329,R429	6K8, 5%	Resistor	Carbon film	1/4W
72	2	R330,R430	2K2, 5%	Resistor	Carbon film	1/4W
73	5	R331,R431,R519,R523,R903	47K, 5%	Resistor	Carbon film	1/4W
74	2	R332,R432	10, 5%	Resistor	Flameproof	3/4W
75	2	R333,R433	27K, 5%	Resistor	Carbon film	1/4W
76	3	R334,R434,R529	10K, 5%	Resistor	Carbon film	1/4W
77	2	R335,R435	3R3, 5%	Resistor	Carbon film	1/4W
78	2	R336,R436	2K2, 1%	Resistor	Metal film	3/4W
79	4	R337,R338,R437,R438	4M7, 5%	Resistor	Carbon film	1/4W
80	2	R339,R439	2K2,1%	Resistor	Metal film	1/4W
81	5	R340,R341,R440,R441,R528	56K, 5%	Resistor	Carbon film	1/4W
82	2	R501,R502	4R7, 5%	Resistor	Fusible	1/2W
83	2	R503,R504	47, 5%	Resistor	Fusible	1/2W
84	2	R505,R506	47, 5%	Resistor	Carbon film	1/2W
85	4	R507,R508,R509,R510	5K6, 5%	Resistor	Carbon film	1/2W
86	1	R515	180, 5%	Resistor	Carbon film	1/4W
87	1	R518	820K, 5%	Resistor	Carbon film	1/4W
88	1	R521	22K, 5%	Resistor	Carbon film	1/4W
89	1	R522	150K, 5%	Resistor	Carbon film	1/4W
90	1	R524	220K, 5%	Resistor	Carbon film	1/4W
91	2	R525,R526	15K, 5%	Resistor	Carbon film	1/4W
92	1	R527	33K, 5%	Resistor	Carbon film	1/4W
93	1	R530	18K, 5%	Resistor	Carbon film	1/4W
94	1	R531	1K5, 5%	Resistor	Carbon film	1/4W
95	1	R532	820, 5%	Resistor	Carbon film	1W
96	2	R533,R534	1K2, 5%	Resistor	Carbon film	3/4W
97	1	RY501	RELAY 8A,DPCO	Relay		24V
98	1	SK602	5W W/T	Connector		
99	1	TH501	SW THERMAL,100C	Temperature sensor		
100	1	TX501	Mains Transformer			
101	2	VR301,VR401	470,POT 5mm,	Idle current preset		

MA 120, Microprocessor etc.			1733	Revision: B		
Bill of Materials			Revised:	April 18, 1996		
<b>Item</b>	<b>Qty</b>	<b>Reference</b>	<b>Part</b>	<b>Name</b>	<b>Material</b>	<b>Rating</b>
2	2	C601,C602	33pF	Capacitor	Ceramic disc	50V
3	1	C606	100nF	Capacitor	Polyester	100V
4	1	C609	10nF	Capacitor	Ceramic disc	50V
5	1	D602	1N4148	Diode	Small signal	
6	1	IC602	PIC16C54	Integrated circuit		
7	1	Q603	2SC1815	Transistor	Silicon small signal	
8	1	R606	47K, 5%	Resistor	Carbon film	1/4W
9	2	R607,R609	680, 5%	Resistor	Carbon film	1/4W
10	1	R608	18K, 5%	Resistor	Carbon film	1/4W
11	1	R612	10K, 5%	Resistor	Carbon film	1/4W
12	1	R619	100, 5%	Resistor	Carbon film	1/4W
13	1	SW601	Switch, tact, with red/Green LED			
14	1	X601	Ceramic resonator, 4MHz			