

SQ 20 AMPLIFIER - RANGE



SERVICE MANUAL

4822 733 24416

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1 INTRODUCTION

1.1. GENERAL

The SQ20 range of high performance audio mixing, pre-mixing, booster and system amplifiers have been designed for use in a wide variety of Public Address environments. Ease of operation, combined with good service-accessibility have been optimised in their design.

1.2. THE SQ 20 RANGE

The SQ20 range consists of the following products:

LBB 1227/00	Universal Pre-Amplifier	: SI 4822 861 05025
LBB 1228/00	Cassette Unit	: SI 4822 861 05012
LBB 1229/00	Tuner-unit	: SM 4822 733 24416
LBB 1230/00	Pre-Mixing Amplifier	:: " "
LBB 1231/00	30 Watt Mixing Amplifier	:: " "
LBB 1232/00	60 Watt Mixing Amplifier	:: " "
LBB 1233/00	120 Watt Mixing Amplifier	:: " "
LBB 1234/00	60 Watt Booster Amplifier	:: " "
LBB 1235/00	120 Watt Booster Amplifier	:: " "
LBB 1236/00	System Pre-Amplifier	: SI 4822 861 05019
LBB 1237/00	60 Watt System Amplifier	: SM 4822 733 24416
LBB 1238/00	120 Watt System Amplifier	:: " "
LBB 1239/00	Mounting-brackets	: " "
LBB 1240/00	240 Watt Booster Amplifier	: SI 4822 861 05039

Note: SM -> Service manual
SI -> Service information

All relevant service information for the products can be found in the bulletins listed above. Not included in this manual are the callstation(s) LBB 9427/10, LBB 9527/10 and LBB 9527/60. The LBB 9427/10, and the new colour-item LBB 9527/10, are described within service manual: 4822 733 24437. The LBB 9527/60 is described within a service information: 4822 861 05002.

This Service Manual is intended to provide all necessary information to carry out corrective maintenance according to agreed policies. Spare parts are defined accordingly. In general this means repair on sub assembly level. Component level repair can only be allowed where it can be carried out on a cost-effective way.

2 TECHNICAL DATA

Figure 2.1 upto and including 2.4 give all relevant data for SQ20 products.
For products for which service information is released through SI's this information can be found in chapter 8.

3 INSTALLATION INSTRUCTIONS

- Opening the amplifier

Access can be gained to the inner side of the amplifier by removing the top cover.
Care should be taken not to lose the toothed washers which are fitted underneath the screws. For safety reasons these washers are required to electrically bond the top cover to the earthed chassis of the amplifier. And must therefore always be fitted.

Warning !: Before removing the cover, disconnect the amplifier from the mains supply by removing the mains plug!

- 19" Rack Mounting

The range of SQ20 system amplifiers have been designed for both tabletop and 19" rack mounting. Two mounting brackets (LBB 1239/00) can be ordered when rack mounting is required.

To attach the mounting brackets, first remove the top cover as described.
Locate the two screw holes provided for at both sides of the amplifier. Using the also added screws, firmly mount the brackets to the amplifier.

CAUTION !: SQ20 amplifiers are not suitable for any surveillance application with e.g. 20kHz.

It is essential that the SQ 20 products are used within the specified temperature range.
The maximum permissible temperature is + 45°C. Care has to be taken that when they are mounted within a 19" cabinet the air inside the 19" cabinet never exceeds the above mentioned maximum temperature.

- Mains connections and earthing

The system amplifiers are supplied ready for use on 220 V a.c. mains. They are adjustable for use on 110 V, 127 V, 220 V –230 V and 240 V by resoldering the brown wire onto the appropriate tag on the mains transformer (T). The protective shield on the mains transformer should never be removed. Care should be taken to ensure that the wire is hooked in, and firmly soldered onto the tag. A non restoring thermal fuse, located in the mains transformer, will disconnect the mains supply, should the mains transformer overheat.

CAUTION: The amplifier must be tapped for the correct mains voltage, as described, before connecting it to the mains supply. On delivery the amplifier is supplied with a 2m long 3-core mains lead, terminated at one end with a 2 pole mains plug with earth contacts, and at the other end with a C.E.E connector. In some countries it may be necessary to replace the mains plug with one of a local standard type. A replacement plug must be wired as follows:

Earth - green/yellow
Neutral - blue
Live - brown

WARNING !: This amplifier must be powered via an earthed mains outlet

WARNING !: This fusible link operates on the primary winding of the mains transformer, and although the mains indicator LED may be off the full mains supply voltage is still present inside the amplifier.

4 CHECKING AND ADJUSTING

See Instructions for use which are always included in the same package as the product.

5 CIRCUIT-DESCRIPTION

Detailed circuit descriptions are not included in this manual. The used technique for this amplifiers in combination with the selected spare parts makes this not necessary. The knowledge of the workshop-engineer should be at the required level.

5.1 DIFFERENCE BETWEEN THE SEVERAL OUTPUT-STAGE'S:

<u>AMPLIFIER-MODEL</u>	<u>30W</u>	<u>60W</u>	<u>120W</u>
MIXING-	LBB 1231/00	1232/00	1233/00
BOOSTER-	LBB	1234/00	1235/00
SYSTEM-	LBB	1237/00	1238/00
<u>ITEM</u>	<u>30W</u>	<u>60W</u>	<u>120W</u>
R150, R156	-	-	4,7 Ω
R155, R158	-	-	1,5k Ω
R149, R166	470 Ω	1k Ω	1,5k Ω
R144	4,7 k Ω	5,6k Ω	5,6k Ω
C201	4700uF	6800uF	4700uF
C207			4700uF
F201	F 5A	F 8A	F 10A
F202			F 10A
F001	T 1A	T 1,6A	T 2,5A
R501	330 Ω	180 Ω	100 Ω ALL 5W

6 SPARE-PARTS

General:

The spare-parts, as indicated in the following lists, are selected components / sub assemblies.
The spare-parts are available from Philips Consumer Service.

The mentioned spare-parts, used within the several products of the SQ20 range, are NOT listed with the so-called 'pos.' numbers. Instead of, we have used the commercial code number of the component. E.g. Transistor Q302 which has a commercial indicator C458 is listed as "transistor C458 NPN with a 5322.. number-, and NOT as "pos. Q302", with a 5322.. number.

6.1 RECOMMENDED SPARE-PARTS TOTAL SQ 20 SERIES:

Tuner PCB assy. (LBB 1229-1236-1237-1238)	5322 214 11157
Tuner-Meter	5322 344 50118
Battery connector	5322 265 30875
Mains switch	5322 277 11136
Mains inlet	5322 265 30876
Thermistor SDT 09	5322 116 30414
Mains transformer (LBB 1227-1229-1230)	5322 146 10331
Mains transformer PT-SQ20-30W	5322 140 60291
Output transformer 30 W	5322 146 10327
Mains transformer PT-SQ20-60W	5322 146 10332
Output transformer 60 W	5322 146 10333
Mains transformer PT-SQ20-120W	5322 146 10334
Output transformer 120 W	5322 140 60332
Mains transformer (LBB 1236)	5322 148 20024
Output transformer 240 W (OT-SQ20-240W)	5322 140 10481
Transistor C485 NPN	5322 130 62667
Transistor A673 PNP	4822 130 41412
Operational amplifier LF 353	5322 209 81395
Operational amplifier LM 324	4822 209 80587
Integrated circuit BA 6144	4822 209 73037
Integrated circuit NJM 386 D	5322 209 72458
Diode 1 N 60 Germanium	4822 130 80562
Diode 1 N4148 (BAW 62)	4822 130 30613
Power-transistor C3281	5322 130 62673
Pre-amplifier integrated circuit OQ 0703	5322 209 63972
Fan-motor	5322 361 10598
Fuses: F 0,5 A	4822 070 35001
T 0,5 A	4822 070 15001
T 1,0 A	4822 070 31002
T 1,6A	4822 070 31602
T 2,0 A	4822 070 32002
T 2,5 A	4822 070 32502
T 3,15 A	4822 070 33152
F 5,0 A	5322 253 40055
T 5,0 A	4822 070 35002
F 8,0 A	5322 253 40034
F 10 A	4822 070 61003
Handgrip (2 pcs. incl. screws)	5322 498 50319

6.2 SPARE-PARTS listed per type-number:

6.2.1 SPARE-PARTS LBB 1227/00 SQ-20 UNIVERSAL PRE-AMPLIFIER

P.C.B assy. (27-1)	5322 214 91079
P.C.B assy. (27-2)	5322 214 91081
P.C.B assy. (27-3)	5322 214 91082
Mains transformer	5322 146 10331
Mains switch	5322 277 11136
Mains inlet	5322 265 30876
Rotary switch	5322 273 80347
Knob (volume)	5322 414 30152
Knob (tone control)	5322 414 30183
Handgrip (2 pcs. incl. screws)	5322 498 50319

6.2.2 SPARE-PARTS LBB 1228/00 SQ-20 CASSETTE UNIT

P.C.B assy. (SQ20 28-1)	5322 214 11226
Integrated circuit (U2) TA 7668 BP	4822 209 71873
Front panel	5322 447 50154
Complete cassette player (commercial item)	LBB 1228/50
19" mounting brackets (commercial item)	LBB 1239/00

6.2.3 SPARE-PARTS LBB 1229/00 SQ-20 TUNER-UNIT

Tuner PCB assy.	5322 214 11157
Tuner-Meter	5322 344 50118
Tuner channel-selector switch	5322 210 10424
Loudspeaker	5322 240 40196
Mains transformer (PT-SQ20-PM)	5322 146 10331
Mains switch	5322 277 11136
Mains inlet	5322 265 30876
Fuse (5A)	5322 253 40055
Battery connector	5322 265 30875
Potentiometer (50K)	5322 101 11138
Transistor C485 NPN	5322 130 62667
Transistor A673 PNP	4822 130 41412
Operational amplifier LF 353	5322 209 81395
Integrated circuit BA 6144	4822 209 73037
Integrated circuit NJM 386 D	5322 209 72458
Diode 1 N 60 Germanium	4822 130 80562
Diode BAW 62	4822 130 30613
Diode 1N4148	4822 130 30621
Front panel	5322 447 50146
Handgrip (2pcs. incl. screws)	5322 498 50319
Knob (Ø14)	5322 414 30183
Jack-plug (PJ-202 NP)	5322 265 20515
Phone jack (HT J064-03)	5322 267 10273
Phone jack	5322 267 10276

6.2.4 SPARE-PARTS LBB 1230/00 SQ-20 PRE-MIXING AMPLIFIER

PCB assy. (SQ20-3)	5322 214 11211
PCB assy. (SQ20-7)	5322 214 11212
Mains transformer PT SQ.20-PM	5322 146 10331
Main switch	5322 277 11136
Mains inlet 4300-1002	5322 265 30876
Battery connector (incl. fuse) DT55A02W-02	5322 265 30875
Fuses: F 0,5 A	4822 070 35001
T 1 A	4822 070 31002
T 0,5 A	4822 070 15001
Potentiometer RK163111A152	5322 101 11139
Potentiometer RK163111R376	5322 101 11138
Transistor C485 NPN	5322 130 62667
Transistor A673 PNP	4822 130 41412
Operational amplifier LF 353	5322 209 81395
Integrated circuit BA 6144	4822 209 73037
Integrated circuit NJM 386 D	5322 209 72458
Diode 1 N 60 Germanium	4822 130 80562
Diode BAW 62	4822 130 30613
Diode 1N4148	4822 130 30621
Front panel	5322 447 50153
Handgrip (2 pcs. incl. screws)	5322 498 50319
Knob (Ø 18)	5322 414 30152
Knob (Ø 14)	5322 414 30183
Jack plug PJ-202NP	5322 265 20515
Phone Jack HTJ064-03	5322 267 10273
DIN 5 pol DJ-005	5322 267 10272

6.2.5 SPARE-PARTS LBB 1231/00 SQ-20 30 W MIXING AMPLIFIER

PCB assy. Main 30W	(SQ20-1)	5322 214 11213
PCB assy. Pre-input	(SQ20-7)	5322 214 11212
PCB assy. Power supply	(SQ20-2)	5322 214 11218
Mains transformer 30W		5322 140 60291
Main switch		5322 277 11136
Mains inlet		5322 265 30876
Thermistor SDT 09		5322 116 30414
Battery conn. incl. fuse		5322 265 30875
Fuses: F 5,0 A		5322 253 40055
T 2,0 A		4822 070 32002
T 1,0 A		4822 070 31002
Output transformer 30 W		5322 146 10327
Potentiometer A152		5322 101 11139
Potentiometer R376		5322 101 11138
Transistor C485 NPN		5322 130 62667
Transistor D673 PNP		4822 130 41412
Transistor D613E NPN		5322 130 62961
Transistor D667 NPN		5322 130 43371
Power-transistor C3281		5322 130 62673
Power-transistor 2SD718(0)		5322 130 62836
Pre-amplifier integrated circuit OQ 0703		5322 209 63972
Operational amplifier LF 353		5322 209 81395
Integrated circuit BA 6144		4822 209 73037
Integrated circuit NJM 386 D		5322 209 72458
Diode 1 N 60 Germanium		4822 130 80562
Diode D 1502		5322 130 82533
Diode BAW 62		4822 130 30613
Diode 1N4148		4822 130 30621
Diode P600D		5322 130 82746
Front panel		5322 447 50144
Handgrip (2pcs. incl. screws)		5322 498 50319
Knob (Ø 18)		5322 414 30152
Knob (Ø 14)		5322 414 30183
Jack plug		5322 265 20515
5P DIN		5322 267 10272
Phone Jack		5322 267 10273
Made-and-lock 6 pol.		5322 267 40995

6.2.6 SPARE-PARTS LBB 1232/00 SQ-20 60 W MIXING AMPLIFIER

PCB assy. Main 60W	(SQ20-1)	5322 214 11214
PCB assy. Pre-input	(SQ20-7)	5322 214 11212
PCB assy. Power supply	(SQ20-2)	5322 214 11219
Mains transformer 60 W		5322 146 10332
Mains switch		5322 277 11136
Mains inlet		5322 265 30876
Battery conn. incl. fuse		5322 265 30875
Thermistor SDT 09		5322 116 30414
Fuses: F 8,0 A		5322 253 40034
T 3,15 A		4822 070 33152
T 1,6 A		4822 070 31602
Output transformer 60 W		5322 146 10333
Potentiometer A152		5322 101 11139
Potentiometer R376		5322 101 11138
Transistor C485 NPN		5322 130 62667
Transistor A673 PNP		4822 130 41412
Transistor D613E NPN		5322 130 62691
Transistor D667 NPN		4822 130 43371
Power-transistor C3281		5322 130 62673
Pre-amplifier integrated circuit OQ 0703		5322 209 63972
Operational amplifier LF 353		5322 209 81395
Integrated circuit BA 6144		4822 209 73037
Integrated circuit NJM 386 D		5322 209 72458
Diode 1 N 60 Germanium		4822 130 80562
Diode D 1502		5322 130 82533
Diode BAW 62		4822 130 30613
Diode 1 N4148		4822 130 30621
Diode P600D		5322 130 82746
Front panel		5322 447 50144
Handgrip (2 pcs. incl. screws)		5322 498 50319
Knob (Ø 18)		5322 414 30152
Knob (Ø 14)		5322 414 30183
Jack plug		5322 265 20515
Phone JACK		5322 267 10273
SP DIN		5322 267 10272
Made-and-lock 6 pol.		5322 267 40995

6.2.7 SPARE-PARTS LBB 1233/00 SQ-20 120 W MIXING AMPLIFIER

PCB assy. Main 120W	(SQ20-1)	5322 214 11215
PCB assy. Pre-input	(SQ20-7)	5322 214 11212
PCB assy. Power supply	(SQ20-2)	5322 214 11221
Mains transformer 120 W		5322 146 10334
Mains switch		5322 277 11136
Mains inlet		5322 265 30876
Thermistor SDT 09		5322 116 30414
Battery conn. incl. fuse		5322 265 30875
Fuses: F 10 A		4822 070 61003
T 5,0 A		4822 070 35002
T 2,5 A		4822 070 32502
Output transformer 120 W		5322 140 60332
Fan-motor		5322 361 10598
Potentiometer A152		5322 101 11139
Potentiometer R376		5322 101 11138
Transistor C485 NPN		5322 130 62667
Transistor A673 PNP		4822 130 41412
Transistor D613E NPN		5322 130 62961
Transistor D667 NPN		4822 130 43371
Power-transistor C3281		5322 130 62673
Pre-amplifier integrated circuit OQ 0703		5322 209 63972
Operational amplifier LF 353		5322 209 81395
Integrated circuit BA 6144		4822 209 73037
Integrated circuit NJM 386 D		5322 209 72458
Diode 1 N 60 Germanium		4822 130 80562
Diode D 1502		5322 130 82533
Diode BAW 62		4822 130 30613
Diode 1 N4148		4822 130 30621
Front panel		5322 447 50144
Handgrip (2 pcs. incl. screws)		5322 498 50319
Knob (Ø 18)		5322 414 30152
Knob (Ø 14)		5322 414 30183
Jack plug		5322 265 20515
Phone jack		5322 267 10273
5P DIN		5322 267 10272
Made-and-lock 6 pol.		5322 267 40995

6.2.8 SPARE-PARTS LBB 1234/00 SQ-20 60 W BOOSTER AMPLIFIER

PCB assy. Main 60W (SQ20-1)	5322 214 11223
PCB assy. Power supply (SQ20-2)	5322 214 11219
Mains transformer 60 W	5322 146 10332
Mains switch	5322 277 11136
Mains inlet	5322 265 30876
Thermistor SDT 09	5322 116 30414
Battery connector. incl. fuse	5322 265 30875
Fuses: F 8,0 A	5322 253 40034
T 3,15 A	4822 070 33152
T 1,6 A	4822 070 31602
Output transformer 60 W	5322 146 10333
Potentiometer	5322 101 11138
Transistor C485 NPN	5322 130 62667
Transistor A673 PNP	4822 130 41412
Transistor D613E NPN	5322 130 62961
Transistor D667 NPN	5322 130 43371
Power-transistor C3281	5322 130 62673
Operational amplifier LF 353	5322 209 81395
Integrated circuit BA 6144	4822 209 73037
Integrated circuit NJM 386 D	5322 209 72458
Diode 1 N 60 Germanium	4822 130 80562
Diode D 1502	5322 130 82533
Diode BAW 62	4822 130 30613
Diode 1 N4148	4822 130 30621
Diode P600D	5322 130 82746
Front panel	5322 447 50143
Handgrip (2 pcs. incl. screws)	5322 498 50319
Knob (Ø 18)	5322 414 30152
Jack-plug	5322 265 20515
Phone Jack	5322 267 10273
5P DIN	5322 267 10272
Made-and-lock 6 pol.	5322 267 40995

6.2.9 SPARE-PARTS LBB 1235/00 SQ-20 120 W BOOSTER AMPLIFIER

PCB assy. Main 120W (SQ20-1)	5322 214 11222
PCB assy. Power supply (SQ20-2)	5322 214 11221
Mains transformer 120 W	5322 146 10334
Main switch	5322 277 11136
Mains inlet	5322 265 30876
Thermistor SDT 09	5322 116 30414
Battery conn. incl. fuse	5322 265 30875
Fuses: F 10 A	4822 070 61003
T 5,0 A	4822 070 35002
T 2,5 A	4822 070 32502
Fan-motor	5322 361 10598
Output transformer 120 W	5322 140 60332
Potentiometer	5322 101 11138
Transistor C485 NPN	5322 130 62667
Transistor A673 PNP	4822 130 41412
Transistor D613E NPN	5322 130 62691
Transistor D667 NPN	5322 130 43371
Power-transistor C3281	5322 130 62673
Operational amplifier LF 353	5322 209 81395
Integrated circuit BA 6144	4822 209 73037
Integrated circuit NJM 386 D	5322 209 72458
Diode 1 N 60 Germanium	4822 130 80562
Diode D 1502	5322 130 82533
Diode BAW 62	4822 130 30613
Diode 1 N4148	4822 130 30621
Front panel	5322 447 50143
Handgrip (2 pcs. incl. screws)	5322 498 50319
Knob (Ø 18)	5322 414 30152
Jack-plug	5322 265 20515
Phone Jack	5322 267 10273
5P DIN	5322 267 10272
Made-and-lock 6 pol.	5322 267 40995

6.2.10 SPARE-PARTS LBB 1236/00 SQ-20 SYSTEM PRE-AMPLIFIER

PCB assy. (36-1)	5322 214 11169
PCB assy. (36-2 or 36-6)	5322 214 11171
PCB assy. (36-3)	5322 214 11172
PCB assy. (36-4)	5322 214 11173
PCB assy. (36-5)	5322 214 11174
PCB assy. (36-7)	5322 214 11175
PCB assy. (36-8)	5322 214 11176
PCB assy. (36-9)	5322 214 11177
PCB assy. (36-10)	5322 214 11178
PCB assy. (36-11)	5322 214 11179
PCB assy. (36-12)	5322 214 11181
Mains transformer (PT-SQ20-PS)	5322 148 20024
Mains switch	5322 277 11136
Mains inlet	5322 265 30876
Switch (zone)	5322 276 20512
Tuner channel-selector switch	5322 210 10424
Knob (volume)	5322 414 30152
Knob (tone control)	5322 414 30183
Knob (Z1....Z6)	5322 414 20393
Handgrip (2 pcs. incl. screws)	5322 498 50319

6.2.11 SPARE-PARTS LBB 1237/00 SQ-20 60 W SYSTEM AMPLIFIER

PCB assy. Main 60W (SQ20-1)	5322 214 11217
PCB assy. Power supply (SQ20-2)	5322 214 11219
PCB assy. System 60W (SQ20-8 & 9)	5322 214 11224
Tuner PCB assy (module), (incl. conn.)	5322 214 11157
Aerial plug assy (incl. filling pcs.)	5322 264 30317
Mains transformer 60 W	5322 146 10332
Mains switch	5322 277 11136
Mains inlet	5322 265 30876
Thermistor SDT 09	5322 116 30414
Battery conn. (incl. fuse)	5322 265 30875
Fuses: F 8,0 A	5322 253 40034
T 3,15 A	4822 070 33152
T 1,6 A	4822 070 31602
Output transformer 60 W	5322 146 10333
Tuner channel-selector switch	5322 210 10424
Tuner-meter	5322 344 50118
Zone switch 2 channel	5322 276 20512
Switch tuner/tape	5322 277 21507
Relais 2 pol.	5322 280 20483
Relais 4 pol.	5322 280 20484
Potentiometer A152	5322 101 11139
Potentiometer A376	5322 101 11144
Transistor C485 NPN	5322 130 62667
Transistor A673 PNP	4822 130 41412
Transistor D613E NPN	5322 130 62961
Transistor D667 NPN	5322 130 43371
Power-transistor C3281	5322 130 62673
Pre-amplifier integrated circuit OQ 0703	5322 209 63972
Operational amplifier LF 353	5322 209 81395
Operational amplifier LM 324	4822 209 80587
Integrated circuit BA 6144	4822 209 73037
Integrated circuit NJM 386 D	5322 209 72458
Diode 1 N 60 Germanium	4822 130 80562
Diode D 810	5322 130 82564
Diode D 1502	5322 130 82533
Diode BAW 62	4822 130 30613
Diode 1 N4148	4822 130 30621
Diode P600D	5322 130 82746
Front panel	5322 447 50145
Handgrip (2 pcs. incl. screws)	5322 498 50319
Knob (Ø 18)	5322 414 30152
Knob (Ø 14)	5322 414 30183
Knob 10 x 7	5322 414 20393
Phone Jack	5322 267 10273

SPARE-PARTS LBB 1237/00 SQ-20 60 W SYSTEM AMPLIFIER (Cont'd)

Jack-plug 2 pol.	5322 265 20515
Jack 4 pol.	5322 265 20517
DIN 5 pol.	5322 267 10272
DIN 6 pol.	5322 267 10275
Made-and-lock 9 pol.	5322 267 40999
Made-and-lock 12 pol.	5322 267 41001

6.2.12 SPARE-PARTS LBB 1238/00 SQ-20 120 W SYSTEM AMPLIFIER

PCB assy. Main 120W (SQ20-1)	5322 214 11216
PCB assy. Power supply (SQ20-2)	5322 214 11221
PCB assy. System 120W (SQ20-8 & 9)	5322 214 11225
Tuner PCB assy., (incl. conn.)	5322 214 11157
Aerial plug assy (incl. filling pcs.)	5322 264 30317
Mains transformer 120 W	5322 146 10334
Mains switch	5322 277 11136
Mains inlet	5322 265 30876
Thermistor SDT 09	5322 116 30414
Battery conn. (incl. fuse)	5322 265 30875
Fuses: F 10 A	4822 070 61003
T 5,0 A	4822 070 35002
T 2,5 A	4822 070 32502
Fan-motor	5322 361 10598
Output transformer 120 W	5322 140 60332
Tuner-meter	5322 344 50118
Tuner channel-selector switch	5322 210 10424
Zone switch	5322 276 20512
2 channel Switch tuner/tape	5322 277 21507
Relais 2 pol.	5322 280 20483
Relais 4 pol.	5322 280 20484
Potentiometer A152	5322 101 11139
Potentiometer A376	5322 101 11144
Transistor C485 NPN	5322 130 62667
Transistor A673 PNP	4822 130 41412
Transistor D613E NPN	5322 130 62961
Transistor D667 NPN	4822 130 43371
Power-transistor C3281	5322 130 62673
Pre-amplifier integrated circuit OQ 0703	5322 209 63972
Operational amplifier LF 353	5322 209 81395
Operational amplifier LM 324	4822 209 80587
Integrated circuit BA 6144	4822 209 73037
Integrated circuit NJM 386 D	5322 209 72458

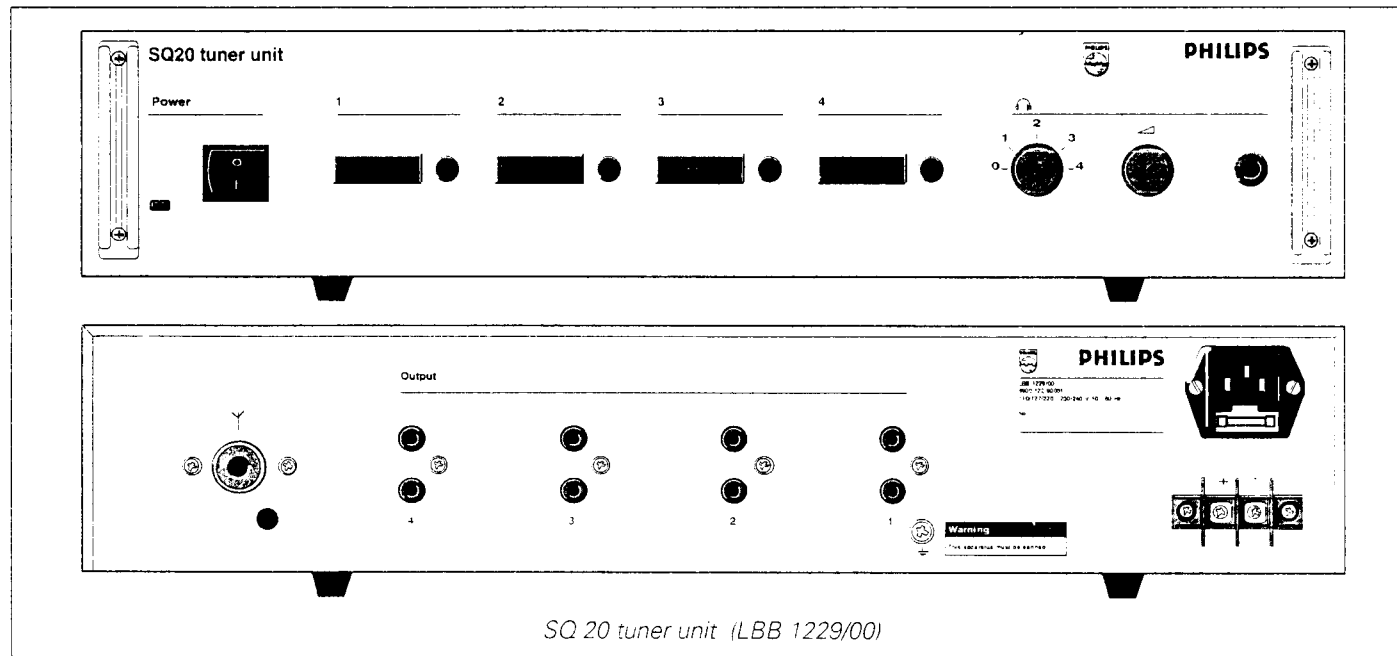
SPARE-PARTS LBB 1238/00 SQ-20 120 W SYSTEM AMPLIFIER
(Cont'd)

Diode 1 N 60 Germanium	4822 130 80562
Diode D 810	5322 130 82564
Diode D 1502	5322 130 82533
Diode BAW 62	4822 130 30613
Diode 1 N4148	4822 130 30621
Front panel	5322 447 50145
Handgrip (2 pcs. incl. screws)	5322 498 50319
Knob (Ø 18)	5322 414 30152
Knob (Ø 14)	5322 414 30183
Knob 10 x 7	5322 414 20393
Jack-plug	5322 265 20515
Jack	5322 265 20517
Phone jack	5322 267 10273
DIN 5 pol.	5322 267 10272
DIN 6 pol.	5322 267 10275
Made-and-lock 9 pol.	5322 267 40999
Made-and-lock 12 pol.	5322 267 41001

6.2.13 SPARE-PARTS LBB 1240/00 SQ-20 240 W BOOSTER AMPLIFIER

PCB assy. (240-1)	5322 214 11197
PCB assy. (240-2)	5322 214 11198
PCB assy. (240-3)	5322 214 11199
Mains transformer 120W	5322 146 10334
Mains switch	5322 277 11136
Mains inlet	5322 265 30876
Output transformer 240W	5322 140 10481
Fan motor	5322 361 10598
Power transistor C3281	5322 130 62673
Handgrip	5322 498 10466
Knob (Ø 18)	5322 414 30152

SQ 20 Tuner Unit



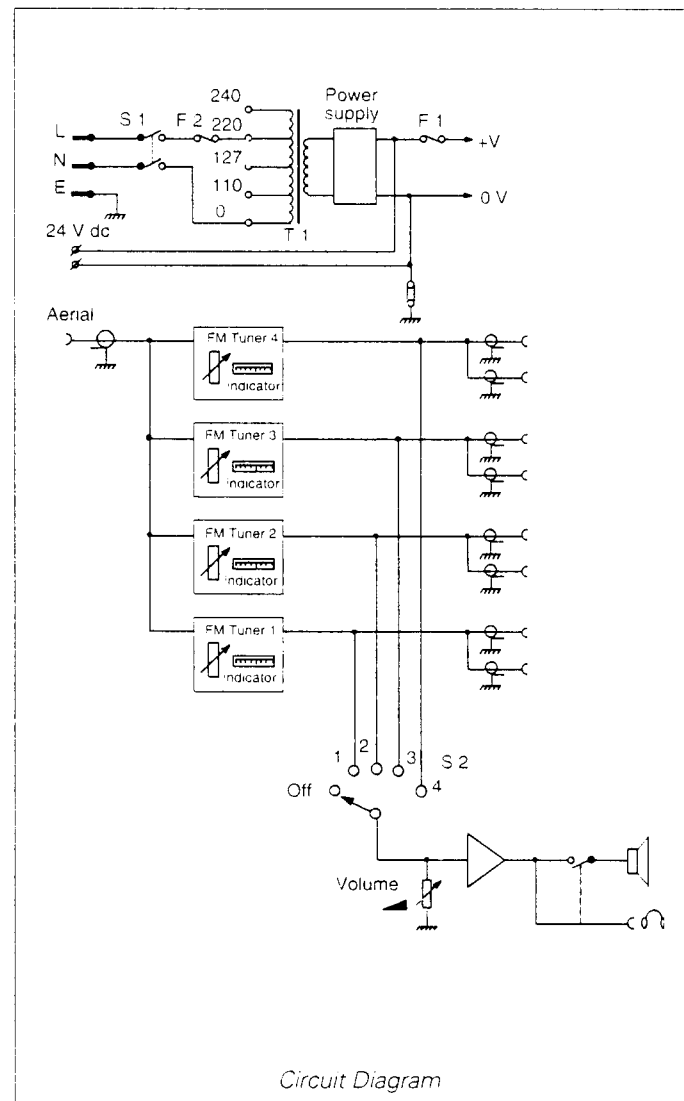
SQ 20 tuner unit (LBB 1229/00)



- Contains four individual FM tuners
- Tuning range from 87.5 to 108 MHz
- Suitable for table-top or 19" rack mounting
- Matches SQ 20 amplifier series cabinets
- Built-in monitor loudspeaker with volume control
- Complies with international installation and safety regulations

Technical data

Mains supply	110, 127, 220 V ±10% and 230, 240 V +6/-10%
At delivery	50 or 60 Hz
DC supply	220-230 V +24 V -10/+20% (0 V grounded)
Power consumption	20 VA
Outputs	
Headphone output	
- output signal	3 V
- output impedance	68 Ω
Tuner outputs (4)	
- output signal	1 V ±1 dB
- output impedance	< 200 Ω
FM tuner unit	
- frequency range	87.5 to 108 MHz
- frequency response	40 Hz to 12 kHz ±2 dB
- sensitivity	≤ 4 μV at 26 dB signal-to-noise ratio and 75 kHz deviation
- signal-to-noise ratio at 40 kHz	>= 55 dB
- aerial impedance	75 Ω
Environmental conditions	
- ambient temperature	rated range -10 to +45 °C
- storage temperature range	-40 to +70°C
- relative humidity	< 95%
Dimensions	
- height	88 mm (100 mm including feet)
- width	440 mm (483 mm including 19" mounting brackets)
- depth	308 mm (348 mm including handles)
Weight	6 kg
Safety	according to IEC 65 and BS415



Circuit Diagram

The Philips SQ 20 range of high-performance audio amplifiers and compatible system accessories has been designed to meet the most demanding professional public address requirements.

SQ 20 tuner unit

The LBB 1229/00 tuner unit contains four separate FM-tuners, and is an ideal music source for hospital and hotel public address systems offering a choice of channels to each individual listener. Each tuner can be independently tuned over the full FM range (87.5 to 108 MHz) and has a tuning indicator calibrated in MHz and preset potentiometer tuning knob mounted on the front panel.

The output sockets are mounted on the rear panel, (two cinch sockets per tuner, although the output signal is mono), and a coaxial aerial socket is also included. Four screened stereo cables, each 1.5 m long and terminated at both ends with one red and one black cinch connector, are supplied with the tuner unit for

connecting outputs to a suitable booster amplifier.

Monitor loudspeaker

A built-in monitor loudspeaker with volume control is provided on the front panel. A five-position switch is included to monitor each tuner in turn using the loudspeaker or via a headphone (a socket is provided which automatically disconnects the loudspeaker when the headphone is inserted). The monitor loudspeaker can also be used to provide music for the area where the system is installed, such as in a hotel reception.

Mains supply

The tuner unit can be connected to 110, 127, 220-230 or 240 V supplies (at 50 or 60 Hz) as the mains transformer has taps on the primary winding to allow for different line voltages. The transformer is thermally fused to prevent overheating. It is supplied wired for 220 V operation, and changes are made by resoldering the connections to the appropriate

transformer tags. The tuner unit can also be powered from a 24 V DC source. Both the mains and the DC supplies are fused. A 2 m long mains cable terminated at one end with an CEE plug and at the other with an earthed 2-pin mains plug is supplied.

Mounting

Suitable for either table-top or 19" rack mounting, the tuner unit is housed in a SQ 20 cabinet that matches all other elements in the range. The cabinet has non-corrosive anti-skid feet fitted. For rack mounting, the cover plate and feet must be removed and the unit is secured using two special mounting flanges (LBB 1239/00 - not supplied).

Safety

In common with all Philips products, care is taken to meet high safety standards. The SQ 20 tuner unit complies with the relevant safety and installation regulations of IEC 65 and BS 415.

Technical data

(Applicable to all types unless otherwise stated)

Mains supply 110, 127 and 220 V $\pm 10\%$, 50/60 Hz
230 and 240 V $\pm 6/-10\%$, 50/60 Hz

The amplifier is delivered connected for 220 - 230 V

Battery supply + 24 V d.c. $\pm 10/+20\%$ (0 V grounded)

Power Consumption

Rated mains supply voltage:

	LBB 1230/00	LBB 1231/00	LBB 1232/00	LBB 1233/00
at rated output	16 VA	99 VA	168 VA	368 VA
at rated output -8 dB	16 VA	53 VA	83 VA	180 VA
no audio signal	16 VA	25 VA	25 VA	74 VA

Current consumption

Battery supply:

at rated output -3 dB	0.16 A	1.70 A	3.10 A	5.68 A
at rated output -8 dB	0.16 A	1.05 A	1.83 A	3.38 A
no audio signal	0.11 A	0.20 A	0.20 A	0.70 A

PRE-AMPLIFIER STAGE INPUTS**Microphone (channels 1, 2, 3, 4 and 5)**

Balanced input with phantom supply	12 V
input sensitivity	1.5 mV
input impedance	1360 Ω
Max. overload within 2% distortion	25 dB

Channel 1 has priority over channels 2 to 5 if selected

AUX. (channels 1 and 2)

input sensitivity	120 mV
input impedance	17 k Ω
Max. overload within 2% distortion	20 dB

Phono RIAA (channel 3)

input sensitivity	2.5 mV
input impedance	17 k Ω
Max. overload within 2% distortion	10 dB

CD (channel 4)

input sensitivity	360 mV
input impedance	17 k Ω
Max. overload within 2% distortion	15 dB

Tape in (channel 5)

input sensitivity	120 mV
input impedance	17 k Ω
Max. overload within 2% distortion	20 dB

insertion/interconnection

input sensitivity	1 V
input impedance	>20 k Ω

PRE-AMPLIFIER STAGE OUTPUTS**Headphone**

Output signal	3 V
Output impedance	88 Ω

insertion/interconnection

Output signal	1 V
Output impedance	<200 Ω

Output is short circuit protected

Tape out

Output signal	500 mV
Output impedance	3.3 k Ω

PRE-AMPLIFIER STAGE SPECIFICATIONS

Frequency Response	60 Hz to 18 kHz (+1 to -3 dB)
Speech filter response	-3 dB at 315 Hz (slope 6 dB/octave)

Distortion

Total Harmonic Distortion (THD) at rated output voltage	<0.5% (1 kHz)
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Tone Controls

Bass control	± 10 dB at 100 Hz
Treble control	± 10 dB at 10 kHz

Signal-to-noise ratiomeasured with microphone input terminated with 200 Ω resistor, phono input with 2 k Ω , AUX, tape and CD input with 2 k Ω :

Master volume control max. and all volume controls min.	70 dB
Microphone control max.	63 dB
Phono	50 dB
Tape in	66 dB
CD	66 dB
Aux	66 dB

Measured between 20 Hz and 20 kHz flat

POWER AMPLIFIER STAGE INPUTS**insertion/interconnection**

input sensitivity	1 V
input impedance	20 k Ω

LOUDSPEAKER OUTPUTS

Output	LBB 1231/00	LBB 1232/00	LBB 1233/00
100 V output	100 V	100 V	100 V
70 V output	70 V	70 V	70 V
50 V output	50 V	50 V	50 V
8 Ω output	15.5 V	22 V	31 V

Minimum load	LBB 1231/00	LBB 1232/00	LBB 1233/00
100 V output	333 Ω	167 Ω	83 Ω
70 V output	163 Ω	82 Ω	41 Ω
50 V output	83 Ω	42 Ω	22 Ω
8 Ω output	8 Ω	8 Ω	8 Ω

POWER AMPLIFIER STAGE SPECIFICATIONS

Rated output power*	LBB 1231/00	LBB 1232/00	LBB 1233/00
Mains	30 W	60 W	120 W
Battery	15 W	30 W	60 W

*according to IEC 268

Frequency Response

Measured at 10 dB below rated output power	within +1 to -3 dB between 60 Hz and 18 kHz.
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Distortion

Total Harmonic Distortion (THD) at rated output power -20 dB at 1 kHz	<1%
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Signal-to-noise ratio

input connected with 2 k Ω	S/N >80 dB between 20 Hz and 20 kHz flat.
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LED VU meter

Green LED	-20 \pm 6 dB
Green LED	-6 \pm 3 dB
Red LED	0 \pm 2 dB

With respect to rated output voltage

Environmental conditions:

Operating temperature	-10 to +45 $^{\circ}$ C
Storage temperature	-40 to +70 $^{\circ}$ C
Relative humidity	15 to 90%

Dimensions

Height	88 mm (100 mm incl. feet)
Width	440 mm (483 mm incl. 19" mounting bracket)
Depth	308 mm (348 mm incl. handles)

Weight

LBB 1230/00	LBB 1231/00	LBB 1232/00	LBB 1233/00
5.5 kg	8.1 kg	9.1 kg	11.2 kg

Safety

According to IEC 65 and BS 415

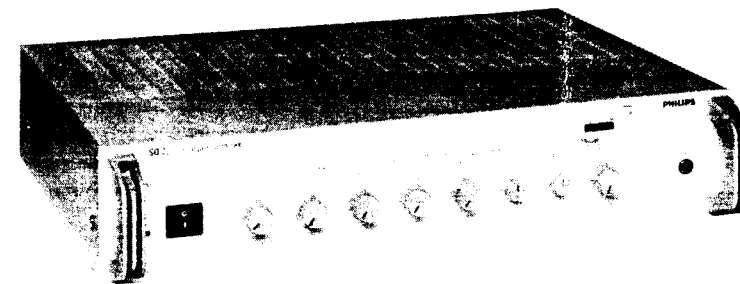
Colour

Cabinet	light grey (PH10709)
Brackets	dark grey (PH10711)

These products are manufactured to comply with the radio interference requirements of the Council Directive of 87/308/EEC.



SQ 20 Mixing and Pre-Mixing Amplifiers



The SQ 20 range of high-performance audio amplifiers and compatible system accessories has been designed to meet the most demanding public address requirements. The total range includes pre-mixers, mixers, system amplifiers, booster amplifiers, microphones, loudspeaker horns and loudspeaker enclosures.

These system components are ideal for building multi-zone public address installations where a number of input signals must be handled simultaneously. Straightforward installation, optimal reliability, service accessibility and ease-of-use are characteristics of the SQ 20 sound systems. Typical applications include restaurants, hotels, stores, shopping arcades, sports complexes and recreational facilities.

SQ 20 mixing and pre-mixing amplifiers

One pre-mixing amplifier and three mixing amplifiers are available, offering

a choice of rated output power. The type numbers are:

LBB 1230/00	pre-mixing amplifier
LBB 1231/00	30 W mixing amplifier
LBB 1232/00	60 W mixing amplifier
LBB 1233/00	120 W mixing amplifier

Table-top or 19" rack mounting

They are all housed in matching enclosures for table-top use or 19-inch rack mounting. The front panels include mains on/off switch with LED indicator, rotary controls for input sensitivity on all channels, rotary controls for bass and treble adjustment of the output, a master volume control and a VU meter for monitoring output level (comprising three LEDs) and a headphone socket.

Input channels

All models feature five input channels, each of which can be internally preset for use as either a microphone input or a line input. When used as microphone inputs, a phantom power supply is

- High-performance public address amplifiers.
- Five inputs: microphone or line.
- Priority microphone channel facility.
- Built-in loudspeaker matching transformer.
- Insertion/interconnection feature for versatile system configuration.
- Comply with international installation and safety regulations.

available, meaning either Philips dynamic or condenser microphones can be used. Microphone inputs are 5-pole 180 $^{\circ}$ DIN sockets on the rear panel.

When used as line inputs, a variety of sources such as cassette or tape player, compact disc player, tuner or record deck can be used. Line inputs are double DIN-type sockets mounted on the rear panel (adjacent to the respective microphone input sockets).

Priority channel

A priority microphone channel, optional on channel 1, which when used with certain Philips microphones equipped with a "priority" switch, gives the user priority over all other input sources. The other channels are automatically muted when this feature is active.

A built-in switchable speech filter on all input channels can be enabled to reduce the bass content of the input signal for improved speech clarity.

All models are fitted with an "insertion/interconnection" socket that allows the pre-mixer and mixer amplifiers to be easily connected to other SQ 20 system equipment (another mixing amplifier or a booster amplifier for example). Note that the LBB 1230/00 pre-mixing amplifier has no power amplifier for directly driving loudspeakers. It is ideal for use with another mixing amplifier, system amplifier or booster amplifier in systems where a relatively large number of inputs are required.

The "insertion" facility on this socket is for connecting auxiliary equipment, such as a graphic equaliser, between the pre-amplifier and the output power amplifier. Using this connector, a whole range of public address systems can be easily configured. The insertion/inter-connection connector is a 5-pole 180° DIN socket on the rear panel.

Outputs

A tape output socket is also provided to allow recording of the amplifier's output. These are double cinch-type sockets mounted on the rear panel. For monitoring, a headphone output socket is provided on the front panel.

Loudspeaker outputs

The output of the power amplifier (except pre-mixing amplifier type LBB 1230/00) is connected to a built-in loudspeaker matching transformer. This transformer provides a choice of three line output voltages: 50, 70 and 100 V. This feature allows large groups of loudspeakers spread over considerable distances, to be connected to the

output. A low impedance output (8 ohms) is also available for use with low impedance loudspeakers.

The outputs of the loudspeaker matching transformer are connected to a 12-pole "Mate-N-Lok" connector mounted on the rear panel. This connector greatly simplifies loudspeaker connections.

Power supply

The pre-mixing and mixing amplifiers can be connected to 110, 127, 220-230 or 240 V mains supplies at 50 or 60 Hz as the mains transformer has taps on the primary winding to allow for different line voltages. The transformer is thermally fused to prevent overheating. It is supplied wired for 220/230 V operation, and changes are made by resoldering the connections to the appropriate transformer solder tags.

A 2 m long mains cable is delivered with the unit, terminated at one end

with an earthed 2-pole mains plug, and at the other with an CEE standard mains connector. The rear panel is fitted with a matching CEE mains connector.

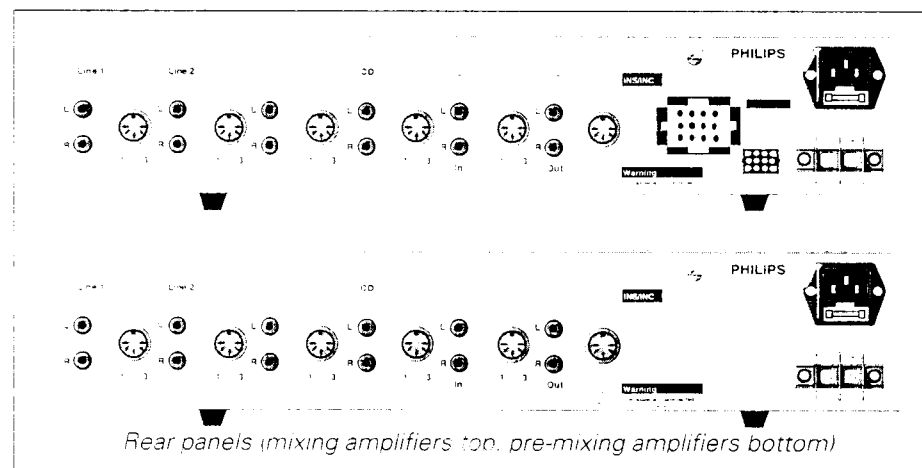
For powering the amplifier from a 24 V battery supply, two screw terminals are provided on the rear panel.

Mounting

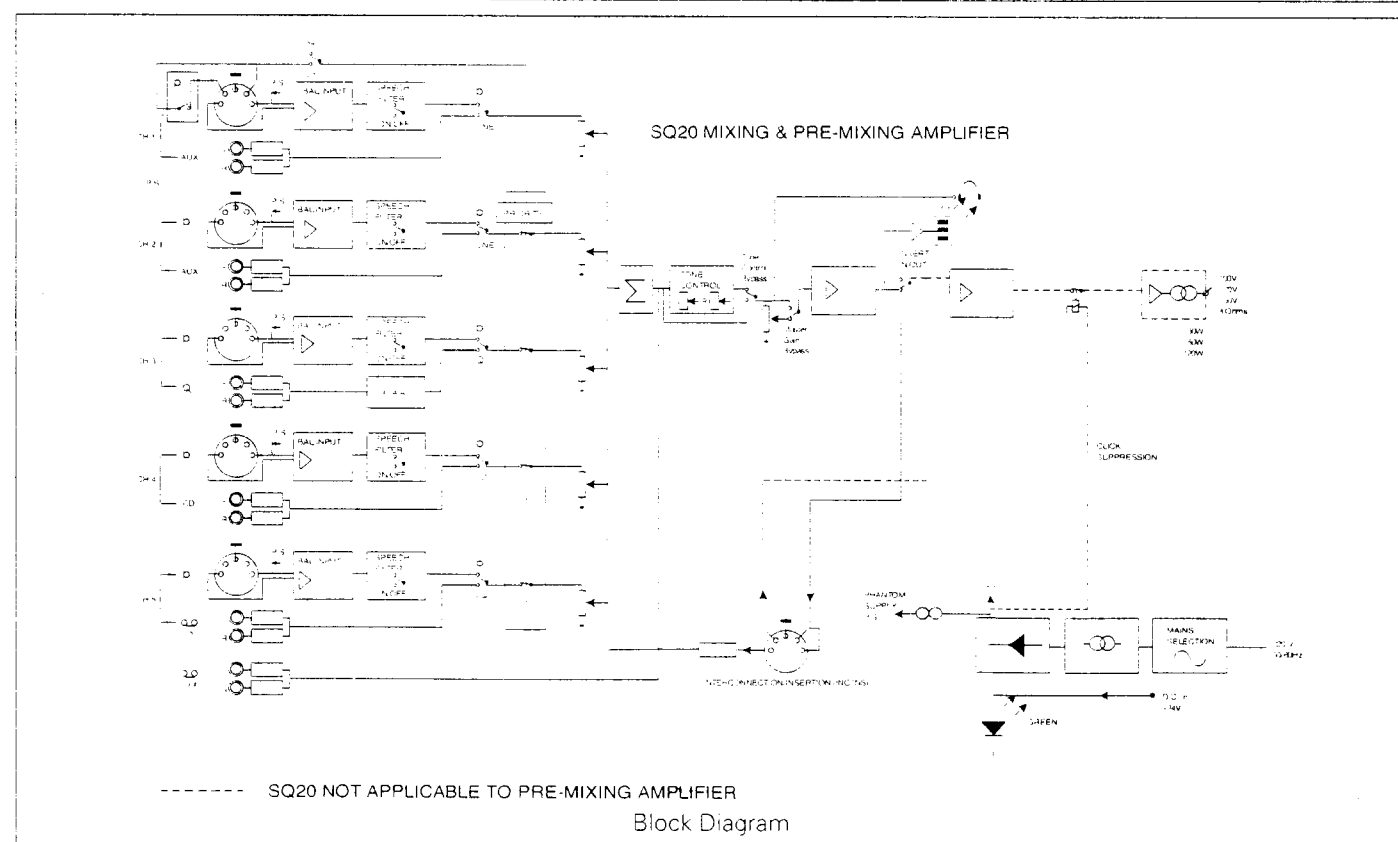
For table-top use, the cabinet is fitted with non-corrosive anti-skid feet. If the unit is to be rack mounted, the cover plate of the enclosure must be removed and two special mounting flanges (LBB 1239/00 - not supplied) used to secure it into a 19-inch rack.

Safety

In common with all Philips products, care is taken to meet high safety standards. The SQ 20 pre-mixing and mixing amplifiers comply with the relevant safety and installation regulations of IEC 65 and BS 415.



Rear panels (mixing amplifiers top, pre-mixing amplifiers bottom)



Block Diagram

SQ 20 Booster Amplifiers

Technical data

Mains supply 110, 127, 220 V ±10%, 50/60 Hz
230 V & 240 V +6/-10%, 50/60 Hz
(delivered connected for 220/230 V)

Battery supply: +24 V -10/+20% (0 V grounded)

	LBB 1234/00	LBB 1235/00	LBB 1240/00
Power consumption	176 VA	352 VA	682 VA

Rated output power*	LBB 1234/00	LBB 1235/00	LBB 1240/00
Mains	60 W	120 W	240 W
Battery	30 W	60 W	120 W

* acc. to IEC 268

Interconnection inputs
sensitivity: 1 V
impedance: >20 kΩ

Frequency response within +1 to -3 dB between 60 Hz and 18 kHz
(measured at 10 dB below rated output power)

Distortion
total harmonic distortion (THD) at rated output power -20 dB at 1 kHz: <1%

Signal-to-noise ratio
input connected
with 2 kΩ S/N >80 dB between 20 Hz and 20 kHz flat.

Loudspeaker outputs

Output voltages	LBB 1234/00	LBB 1235/00	LBB 1240/00
100 V output	100 V	100 V	100 V
70 V output	70 V	70 V	70 V
50 V output	50 V	50 V	50 V
8 Ω output	22 V	31 V	44 V

Minimum load impedance	LBB 1234/00	LBB 1235/00	LBB 1240/00
100 V output	167 Ω	83 Ω	41 Ω
70 V output	82 Ω	41 Ω	20 Ω
50 V output	42 Ω	22 Ω	11 Ω
8 Ω output	8 Ω	8 Ω	8 Ω

LED VU
Green LED -20 dB ±6 dB
Green LED -6 dB ±3 dB
Red LED 0 dB ±2 dB
(With respect to rated output voltage)

Environmental conditions
operational temperature -10 to +45 °C
storage temperature -40 to +70 °C
relative humidity 15 to 90%

Dimensions
LBB 1234/00 and LBB 1235/00
height 100 mm (incl. feet)
width 440 mm (483 mm incl. 19" mounting brackets)
depth 308 mm (348 mm incl. handles)

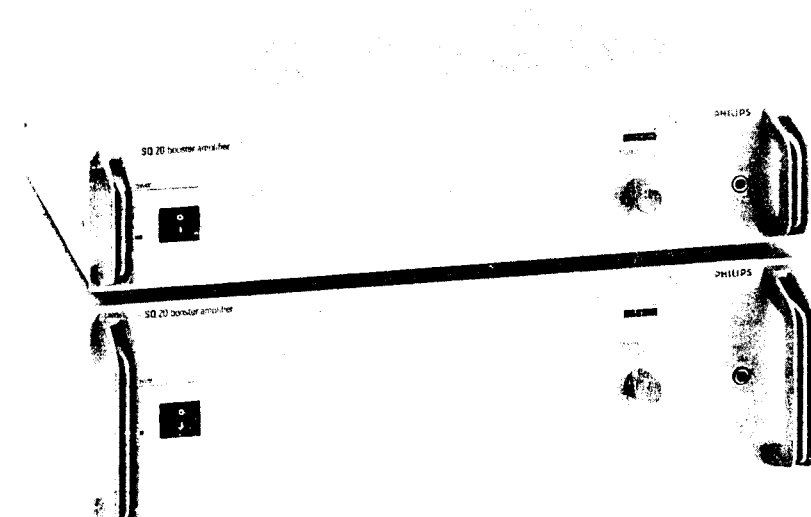
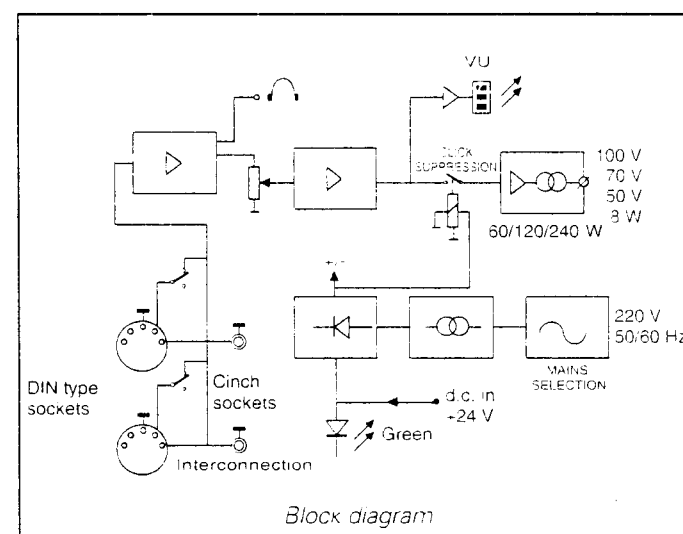
LBB 1240/00
height 140 mm (incl. feet)
width 440 mm (485 mm incl. 19" mounting brackets)
depth 311 mm (361 mm incl. handles)

Weight
LBB 1234/00 3.9 kg
LBB 1235/00 11 kg
LBB 1240/00 17 kg

Safety According to IEC 65 and BS 415

Colour
cabinet light grey (PH 10709)
brackets dark grey (PH 10711)

These products are manufactured to comply with the radio interference requirements of the Council Directive of 87/303/EEC.



- High-performance booster amplifiers for table-top use or 19" rack mounting
- 60 W, 120 W and 240 W versions available
- Built-in loudspeaker matching transformer
- Emergency external battery supply
- Monitoring facility with VU meter and headphone
- Interconnection facility for versatile system configuration
- Comply with international installation and safety regulations

The Philips SQ 20 range of stand-alone high-performance audio amplifiers and compatible system accessories satisfy the most demanding professional public address requirements. Applications include restaurants, hotels, stores, shopping arcades, sports complexes and recreational facilities. The total range comprises pre-mixers, mixers, system amplifiers, booster amplifiers, microphones, loudspeaker horns and loudspeaker enclosures.

Ease of installation and use, together with excellent reliability and service accessibility are key characteristics of the versatile SQ 20 equipment.

SQ 20 booster amplifiers
The booster amplifier range features models with 60 W, 120 W and 240 W rated output power. The type numbers are:
LBB 1234/00 60 W booster amplifier
LBB 1235/00 120 W booster amplifier
LBB 1240/00 240 W booster amplifier

Two interconnection sockets on the rear panel allow other amplifiers in the SQ 20 range to be connected, meaning multi-zone public address installations with several different input signals can be easily configured and installed.

The booster amplifier outputs for driving loudspeakers or groups of loudspeakers feature a built-in loudspeaker matching transformer with a choice of three line voltages (50 V, 70 V and 100 V) plus an 8 Ω low-ohmic output. This means that a wide range of loudspeaker types may be connected. A further advantage of this built-in facility is that the volume level of each loudspeaker or group of loudspeakers may be set accordingly.

To provide quick and effective loudspeaker connections, the output connectors are versatile 'Mate-N-Lok' types located on the rear of the amplifier enclosure. The front panel includes a master volume control to set the overall gain level of the amplifier, and an LED

mains indicator located next to the on/off switch. To monitor the amplifier output power, a front panel LED VU meter and headphone socket is provided.

Power supply
The mains transformer is fitted with taps for a.c. mains voltages of 110 V, 127 V, 220-230 V and 240 V at 50 or 60 Hz. On delivery, all amplifiers are wired for 220-230 V, but different voltages can be set by resoldering the connections to the appropriate tags. A 2 m long mains lead terminated at one end with a 2-pole mains plug with earth contacts, and at the other end with a CEE mains connector is supplied. The rear panel has a matching CEE mains connector.

For powering the amplifiers from a 24 V battery supply, two screw terminals are provided on the rear panel.

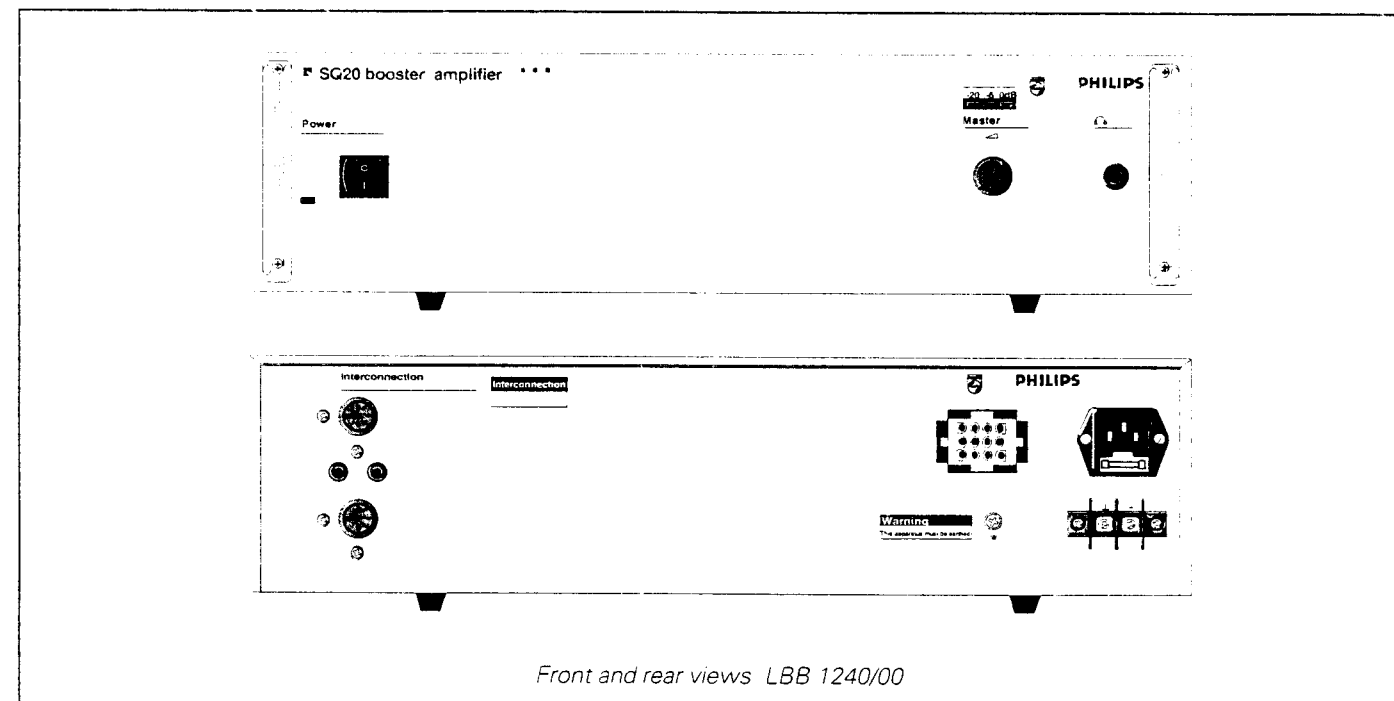
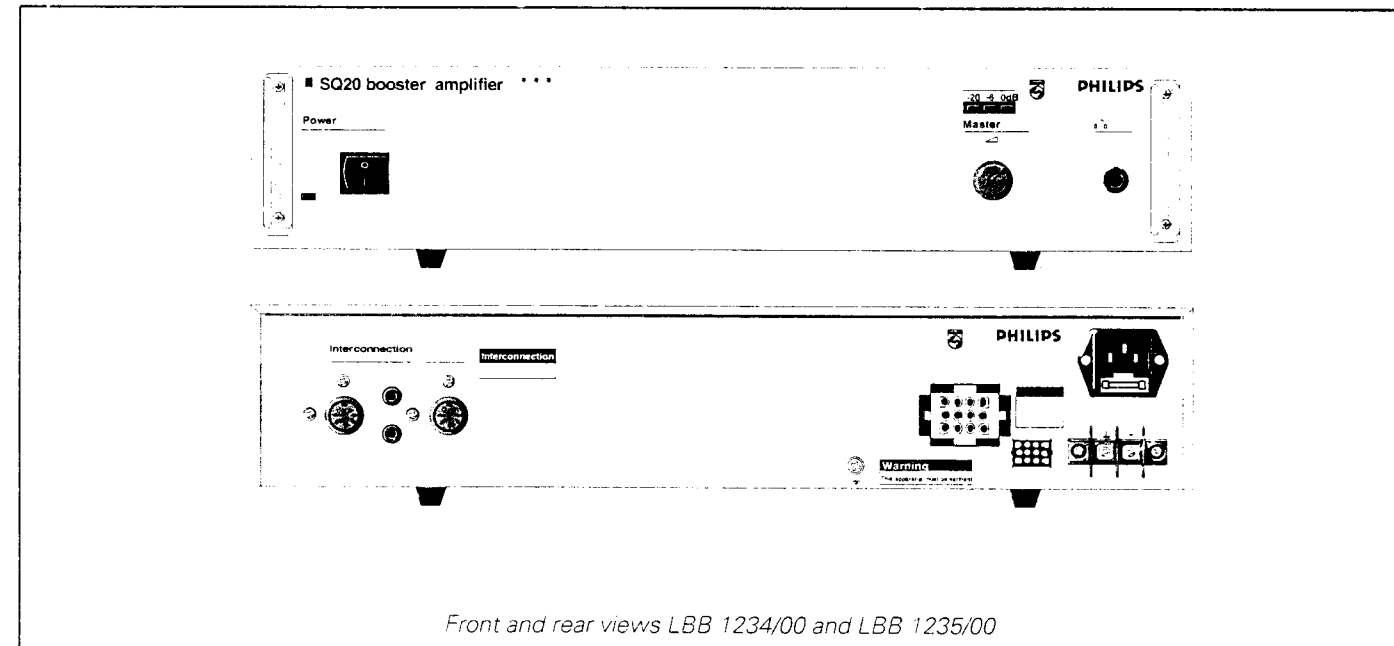
Mounting

For table-top use, the cabinet is fitted with anti-skid feet. If the unit is to be rack mounted, the cover plate is simply removed and two mounting flanges

(LBB 1239/00 for the 60 W and 120 W booster amplifiers, and LBB 1239/10 for the 240 W version) are used to secure it into the 19" rack.

Safety

In common with all Philips products, care is taken to meet high safety standards. The SQ 20 booster amplifiers comply with the relevant safety and installation regulations of IEC 65 and BS 415.



Technical data

(Applicable to both types unless otherwise stated)

Mains supply 110, 127 and 220 V $\pm 10\%$,
50/60 Hz
230 and 240 V $+6/-10\%$,
50/60 Hz

The amplifier is delivered connected for 220 - 230 V

Battery supply +24 V DC $\pm 10/+20\%$
(0 V grounded)

Power consumption

Rated mains supply voltage:

	LBB 1237/00	LBB 1238/00
at rated output	182 VA	368 VA
at rated output -3 dB	90 VA	173 VA
no audio signal	32 VA	58 VA

Current consumption

Battery supply:

at rated output -3 dB	3.10 A	5.68 A
at rated output -8 dB	1.84 A	3.34 A
no audio signal	0.30 A	0.30 A

PRE-AMPLIFIER STAGE INPUTS**Microphone (channels 1, 2 and 3)**

balanced input with

phantom supply	12 V
input sensitivity	1.5 mV
input impedance	1360 Ω

max. overload with

2% distortion	25 dB
---------------	-------

Channels 1 and 2 have priority over channels 3 and 4.

AUX. (channel 3)

input sensitivity	120 mV
input impedance	47 k Ω
max. overload within 2% distortion	20 dB

Tape In. (channel 4)

input sensitivity	120 mV
input impedance	47 k Ω
max. overload within 2% distortion	20 dB

Insertion/interconnection

input sensitivity	1 V
input impedance	>20 k Ω

Chime, alarm and time signal tones

chime (2-tone)	(1) 440 Hz (1 s) (2) 555 Hz (0.5 s)
time-signal	555 Hz (4 s constant)
alarm	440 Hz & 555 Hz (0.25 s constant)

PRE-AMPLIFIER STAGE OUTPUTS**Headphone**

output signal	0 V
output impedance	63 Ω

Insertion/interconnection

output signal	1 V
output impedance	<200 Ω

Output is short circuit protected

Tape out

output signal	500 mV
output impedance	3.3 k Ω

Tuner out

output signal	1 V
output impedance	<200 Ω

BUILT-IN FM TUNER

frequency range	87.5 - 108 MHz
aerial impedance	75 Ω
sensitivity at 26 dB S/N at 75 kHz dev.	1 μ V
signal-to-noise ratio at 40 kHz dev	55 dB

PRE-AMPLIFIER STAGE SPECIFICATIONS**Frequency Response**

at rated output power	60 Hz to 18 kHz (+1 to -3 dB)
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speech filter

response	-3 dB at 315 Hz (slope 6 dB/octave)
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Distortion

total harmonic distortion at rated output voltage	<0.5% (1kHz)
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Tone Controls

bass control	± 10 dB at 100 Hz
treble control	± 10 dB at 10 kHz

Signal-to-noise ratio

Measured with microphone input terminated with 200 Ω resistor, phono input with 2 k Ω , AUX, tape and CD input with 2 k Ω

master volume control

max. and all volume controls min.	70 dB
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1 microphone

control max.	63 dB
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AUX	66 dB
-----	-------

Tape	66 dB
------	-------

Measured between 20 Hz and 20 kHz flat.

POWER AMPLIFIER STAGE INPUTS**Insertion/interconnection**

input sensitivity	1 V
input impedance	20 k Ω

LOUDSPEAKER OUTPUTS

Output voltages	LBB 1237/00	LBB 1238/00
100 V output	100 V	100 V
70 V output	70 V	70 V
50 V output	50 V	50 V

Minimum load

100 V output	167 Ω	83 Ω
70 V output	32 Ω	41 Ω
50 V output	42 Ω	22 Ω

POWER AMPLIFIER STAGE SPECIFICATIONS**Rated output power***

	LBB 1237/00	LBB 1238/00
Mains	60 W	120 W
Battery	30 W	60 W

*acc. to IEC 268

Frequency Response

measured at 10 dB below rated output power	within +1 to -3 dB between 60 Hz and 18 kHz.
--	--

Distortion

Total Harmonic Distortion (THD) at rated output power -20 dB at 1 kHz	<1%
---	-----

Signal-to-noise ratio

input connected with 2 k Ω	S/N >80 dB between 20 Hz and 20 kHz flat.
-----------------------------------	---

LED VU meter

Green LED	-20 dB ± 6 dB
Green LED	-6 dB ± 3 dB
Red LED	0 dB ± 2 dB

(With respect to rated output voltage)

Environmental Conditions

Operating temperature	-10 to +45 °C
Storage temperature	-40 to +70 °C
Relative humidity	15 to 90%

Dimensions

height	88 mm (100 mm incl. feet)
width	440 mm (483 mm incl. 19" mounting bracket)
depth	308 mm (348 mm incl. handles)

Weight

LBB 1237/00	9.8 kg	LBB 1238/00	11.9 kg
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Safety

According to IEC 65 and BS 415

FZZ approval numbers

LBB 1237/00	G 602953 AS
LBB 1238/00	G 602954 AS

Colour

Cabinet	Light grey (PH10709)
Brackets	Dark grey (PH10711)

LBB 9527/10 CALL STATION MICROPHONE

Description	table-stand microphone
Switches	3-position switch (off, all-call and call)

Indicators	LED (on and busy)
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Transducer	condenser
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Polar pattern	cardioid
---------------	----------

Frequency range:

(acc. to IEC 268-4)	100 to 16 000 Hz
after filter setting	160 to 16 000 Hz

Sensitivity

(acc. to IEC 268-4)	2 mV/Pa ± 3 dB
	(-54 dB rel. to 1 V/Pa)

Max. SPL for THD <3%

Rated output impedance	<200 Ω
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Load impedance	>600 Ω
----------------	---------------

Equivalent input noise level	24 dB(A)
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Phantom power supply	
----------------------	--

(acc. to DIN 45596 and IEC 268 - 15A)	11 - 52 V
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Current consumption	<5 mA
---------------------	-------

Environmental conditions:

ambient temperature range	-20 °C to +55 °C
ambient rel. humidity	80% max. at 20 °C

Cables	2-core + 2-core screened (3 m) and 5-core (3 m)
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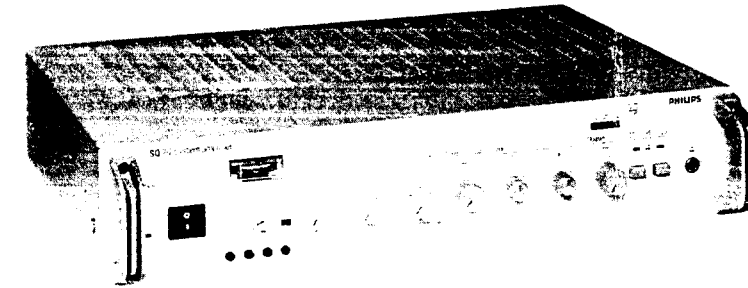
Connectors	5-pole 180° DIN plug 6-pole 240° DIN plug
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Weight	0.87 kg (incl. cable)
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These products are manufactured to comply with the radio interference requirements of the Council Directive of 87/308/EEC.



SQ 20 System Amplifiers



- High-performance public address amplifiers.
- Three loudspeaker output zones with routing facilities.
- Two call station microphone inputs with three priority modes.
- Built-in attention, alarm and time-signal tones.
- Insertion/interconnection feature for versatile system configuration.
- Comply with international installation and safety regulations.

Input channels

Both models have three microphone input channels, each with a phantom power supply available. Two of these channels are configured for use with the Philips stand-alone "call station" microphone type LBB 9527/10. This call station provides additional push-button message routing facilities, either individually or collectively assigned, to the three zones. This feature is ideal for applications where an announcement is intended for listeners in one zone only, a staff message in a supermarket, for example.

The third input channel is for use with either Philips dynamic or condenser microphones, and can be internally preset for use as either a microphone input or as an auxiliary line input (for connecting tape/cassette recorder or similar background music source). A built-in speech filter on all microphone input channels can be enabled to reduce the bass content of the input signal and so improve speech clarity.

The SQ 20 range of high-performance audio amplifiers and compatible system accessories has been designed to meet the most demanding public address requirements. The total range includes pre-mixers, mixers, system amplifiers, booster amplifiers, microphones, loudspeaker horns and loudspeaker enclosures.

These system components are ideal for building multi-zone public address installations where a number of input signals must be handled simultaneously. Straightforward installation, optimal reliability, service accessibility and ease-of-use are characteristics of the SQ 20 sound systems. Typical applications include restaurants, hotels, stores, shopping arcades, sports complexes and recreational facilities.

SQ 20 system amplifiers

Two system amplifiers are available, offering a choice of rated output power. The type numbers are:

LBB 1237/00 60 W system amplifier
LBB 1238/00 120 W system amplifier

These system amplifiers feature zone routing facilities for driving loudspeakers in three separate zones. Three operational modes are available to assign microphone priority according to user requirements. Audible 'attention', alarm and time signal tone generators are built-in. An FM radio with four channel pre-sets is also built-in to provide a convenient music source for one or more of the zones.

Table-top or 19" rack mounting

The amplifiers are both housed in matching enclosures for table-top or 19-inch rack mounting use. The front panels include mains on/off switch with LED indicator, rotary controls for input sensitivity on all channels, an FM channel selector, rotary controls for bass and treble adjustment of the output, a master volume control and a headphone socket. Two push-buttons are provided for routing the chosen music source to zone 2 and/or 3. Indicators or LED's indicate the chosen zone or zone selected.

A fourth auxiliary input channel is provided for connecting a tape or cassette recorder. Microphone inputs are 5-pole 180° DIN sockets and the line inputs are double cinch-type sockets, all mounted on the rear panel.

Microphone priority modes

Three modes of operation for assigning microphone priority are provided. They are:

1. *First-in, first-served.*
The first call station gains access to the system and therefore priority over the other call station.
2. *Serial priority.*
Call stations are given priority in numeric order (call station 1 has priority over call station 2).
3. *Single call station.*
Call station 1 has priority over all connected inputs, whilst call station 2 is mixed with other inputs. Call station 2 can be replaced with a normal condenser or dynamic microphone.

Attention, alarm and time-signal tones

A built-in tone generator provides a number of audible signals for attention, alarm and time-signal applications. The message tone is a two-tone "chime" that precedes an announcement and is activated by a call station.

Inputs for activating the alarm and time signal tones are connected to a 6-pole 240° DIN socket mounted on the rear panel. The alarm tone is for use in emergency situations, and is a continuous two-tone signal that will take priority over all other inputs whilst activated. For time-signal applications, a single tone lasting four seconds is generated. This is useful for signalling the end of the working day, for example, and can be externally activated by a clock or push-button.

Insertion/interconnection

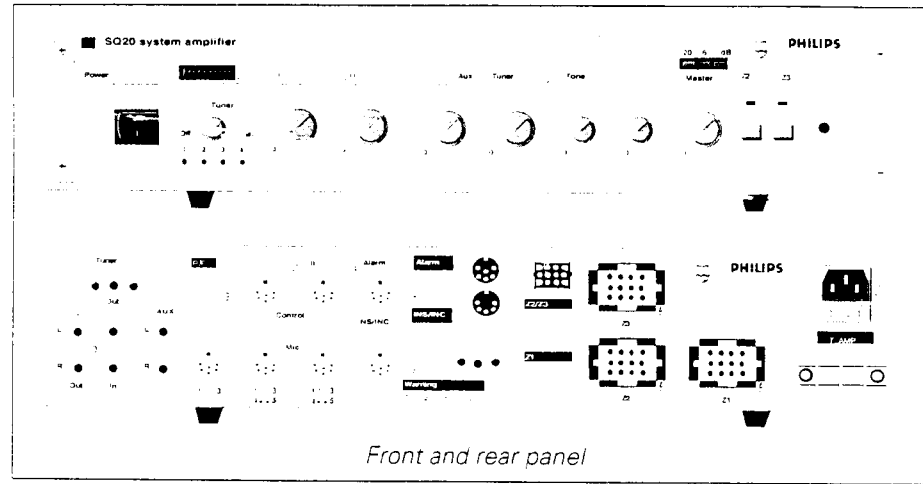
The system amplifiers are fitted with an "insertion/interconnection" socket that allows them to be easily connected to other SQ 20 system equipment (a booster amplifier for driving an extra group of loudspeakers, for example).

The "insertion" facility on this socket is for connecting auxiliary equipment, such as a graphic equaliser. Using this connector, a whole range of public address systems can be easily configured. The insertion/interconnection connector is a 5-pole 180° DIN socket, mounted on the rear panel.

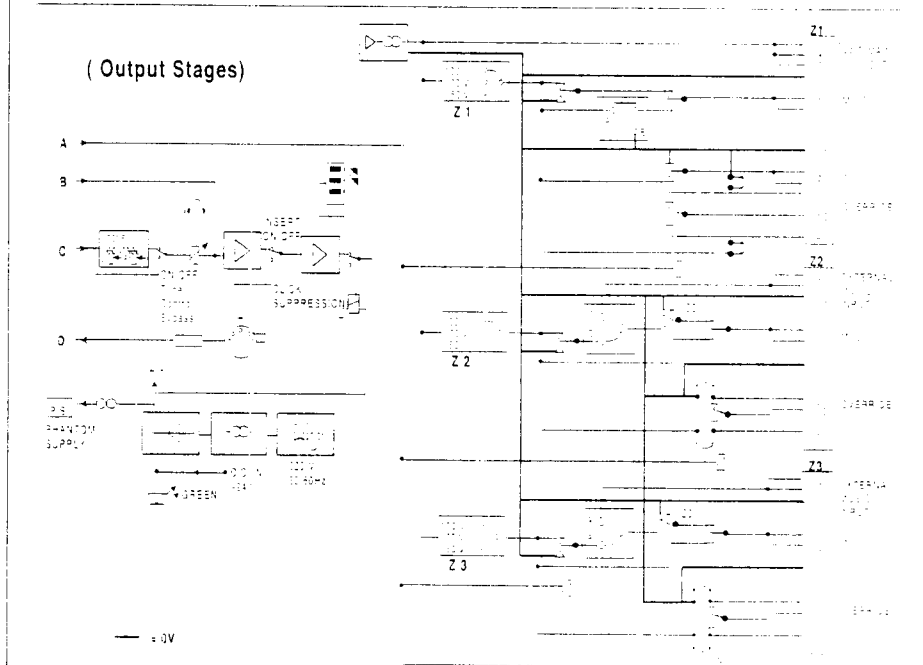
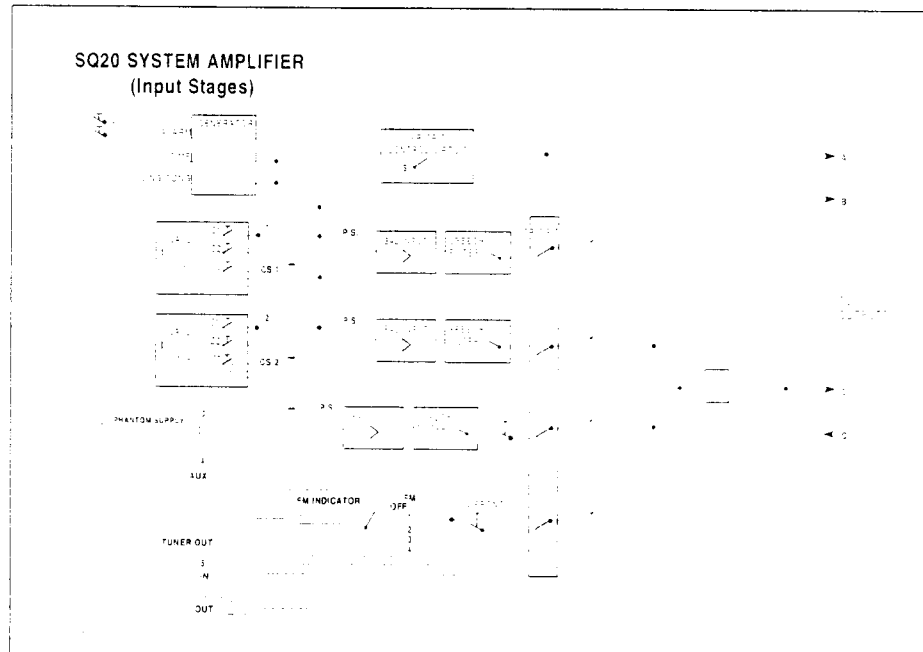
Outputs

A tape output is also provided to allow recording of the amplifier's output. These are double cinch-type sockets mounted on the rear panel. For monitoring purposes, a headphone output socket is provided on the front panel.

LBB 1237/00 and LBB 1238/00



Front and rear panel



Block Diagram

Loudspeaker outputs

The output of the power amplifier is connected to a built-in loudspeaker matching transformer. This transformer provides a choice of three line output voltages: 50, 70 and 100 V. This allows large groups of loudspeakers spread over considerable distances to be connected to the outputs. Note that the line output voltage for each of the three zones can be independently selected.

The outputs of the loudspeaker matching transformer are connected to three 12-pole "Mate-N-Lok" connectors, one for each zone, mounted on the rear panel. These connectors greatly simplify loudspeaker connections.

Override facility

The Mate-N-Lok connectors also include input connections for the built-in override facility for three or four-wire loudspeaker systems. This allows all loudspeakers in an appropriately wired system, including those with individual volume controls or on/off switches, to be activated for relaying emergency announcements.

An additional application of the override facility is to use it for triggering external functions, illuminating warning lamps in designated areas by pressing the call button, for example.

External music source

Zones 2 and 3 are also provided with external music inputs (on the Mate-N-Lok connectors). These are 100 V line

inputs for connecting additional background music sources, and are selected by pressing the respective push-buttons on the front panel. When this feature is in use, the zone to which the external music is routed will not be muted when a message is sent to one of the other zones.

Internal FM tuner

A high-quality FM tuner is built into the amplifier for providing music to one or more zones. Four miniature preset tuning controls, a rotary channel selector and an FM tuning indicator are included on the front panel of the amplifier. A single cinch-type socket on the rear panel provides an extra output connection from the FM tuner. A standard aerial socket is also fitted to the rear panel.

Power supply

The system amplifiers can be connected to 110, 127, 220-230 or 240 V mains supplies at 50 or 60 Hz as the mains transformer has taps on the primary winding to allow for different line voltages. The transformer is thermally fused to prevent overheating. It is supplied wired for 220/230 V operation, and changes are made by resoldering the connections to the appropriate transformer solder tags.

A 2 m long mains cable is delivered with the unit, terminated at one end with an earthed 2-pole mains plug, and at the other with an CEE standard mains connector. The rear panel is fitted

with a matching CEE mains connector. For powering the amplifier from a 24 V battery supply, two screw terminals are provided on the rear panel.

Mounting

For table-top use, the cabinet is fitted with non-corrosive anti-skid feet. If the unit is to be rack mounted, the cover plate of the enclosure must be removed and two special mounting flanges (LBB 1239/00 - not supplied) used to secure it into the 19-inch rack.

Call station microphone

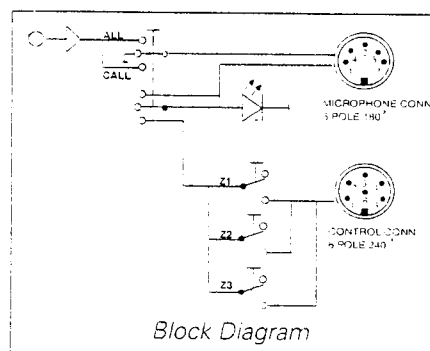
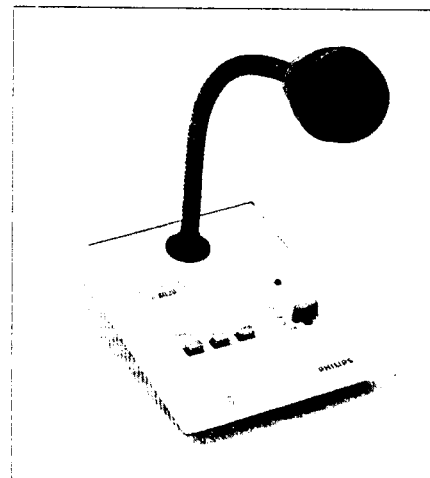
The LBB 9527/10 is a table-stand call station microphone. It is a cardioid condenser type, and is ideally suited for use with the SQ 20 system amplifiers. It has a three-position switch for "Centre-off", "All-call" and "Call", and three push-buttons for individually or collectively selecting loudspeaker zones.

It is connected to the system amplifier (microphone input channels 1 or 2 only) via two 3 m long cables terminated with a 5-pole 180° DIN plug and a 6-pole 240° DIN plug. If required the cable can be extended to maximum of 250 m. An easy to use junction box (LBB 1268/00) is available.

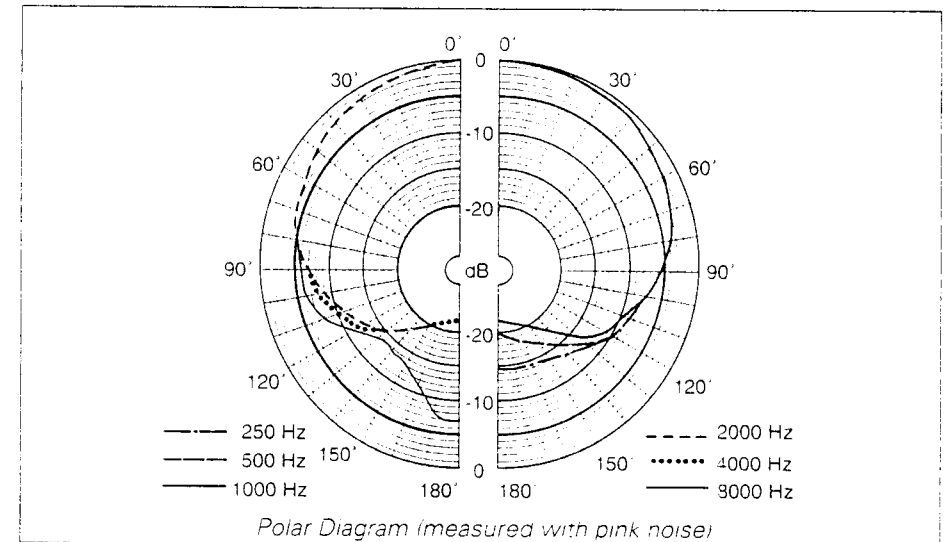
Safety

In common with all Philips products, care is taken to meet high safety standards. The SQ 20 system amplifiers comply with the relevant safety and installation regulations of IEC 65 and BS 415.

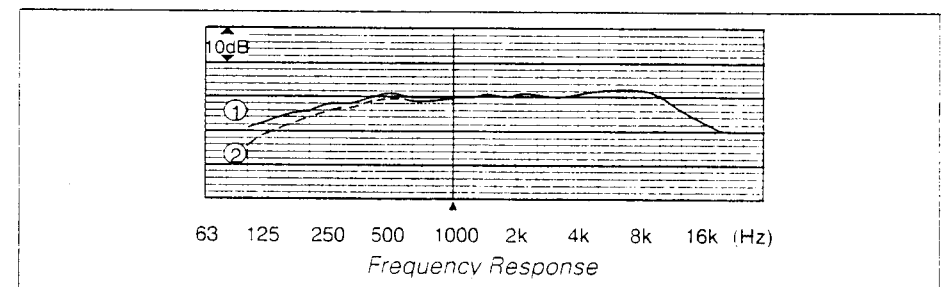
LBB 9527/10



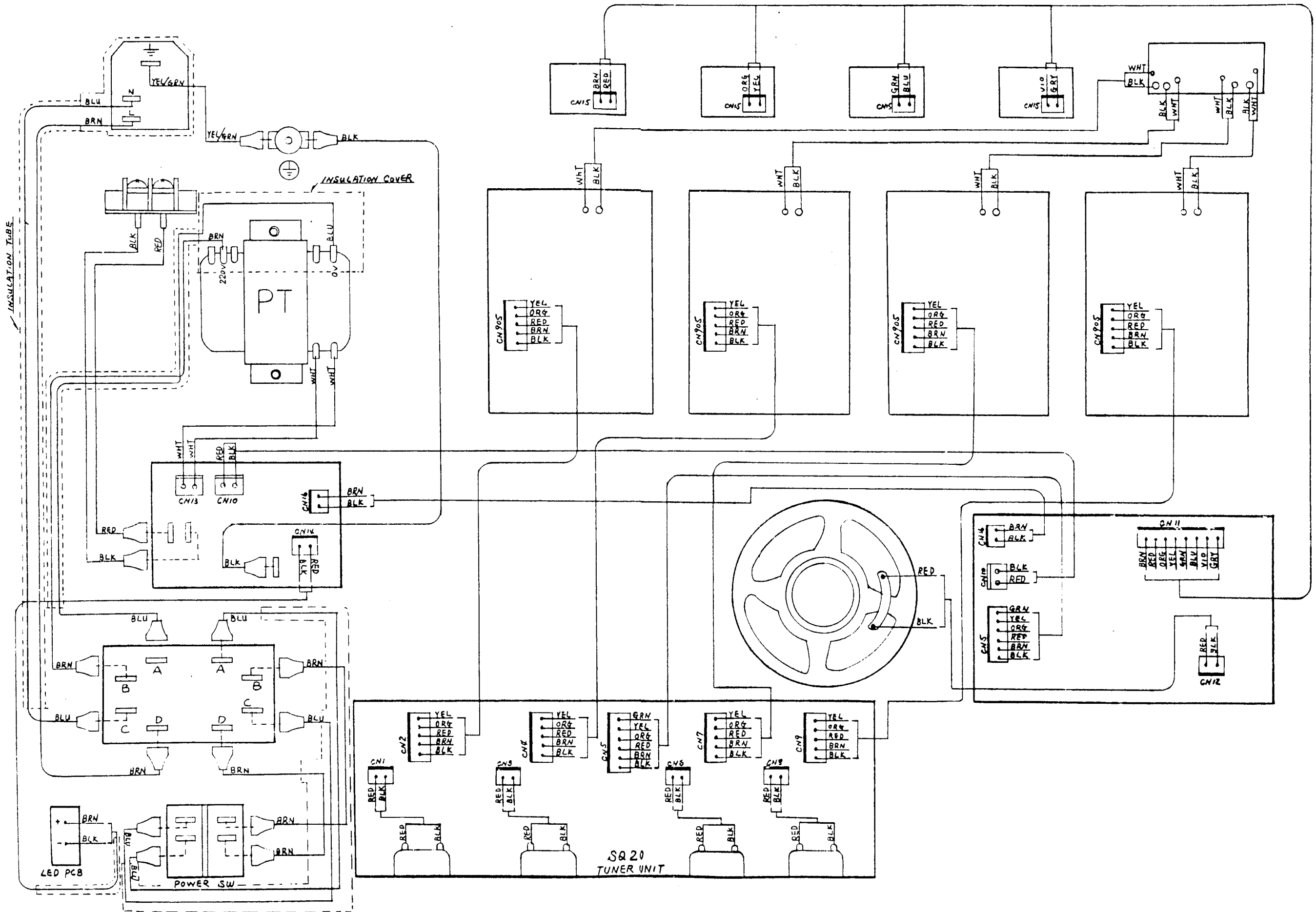
Block Diagram



Polar Diagram (measured with pink noise)



Frequency Response



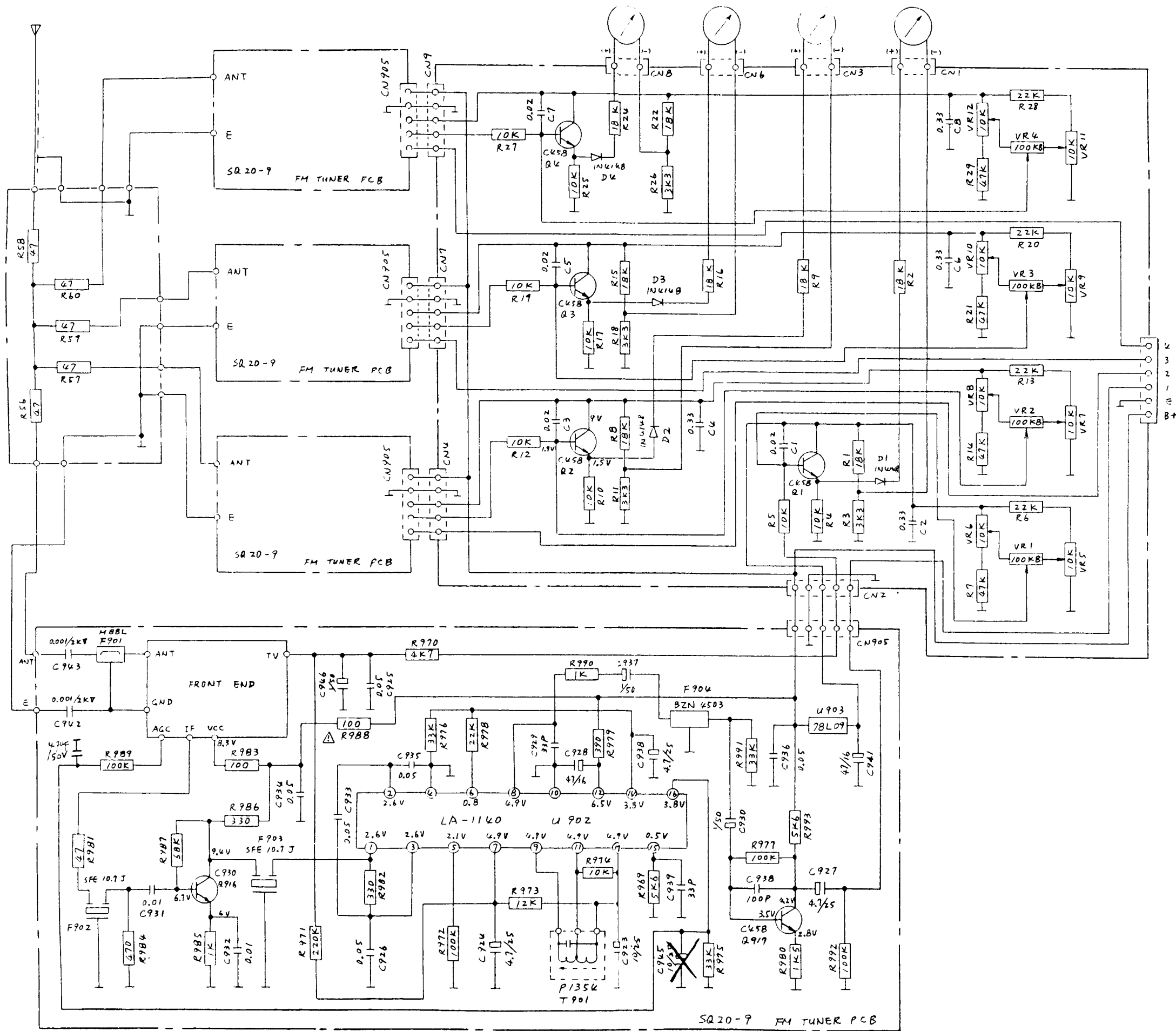
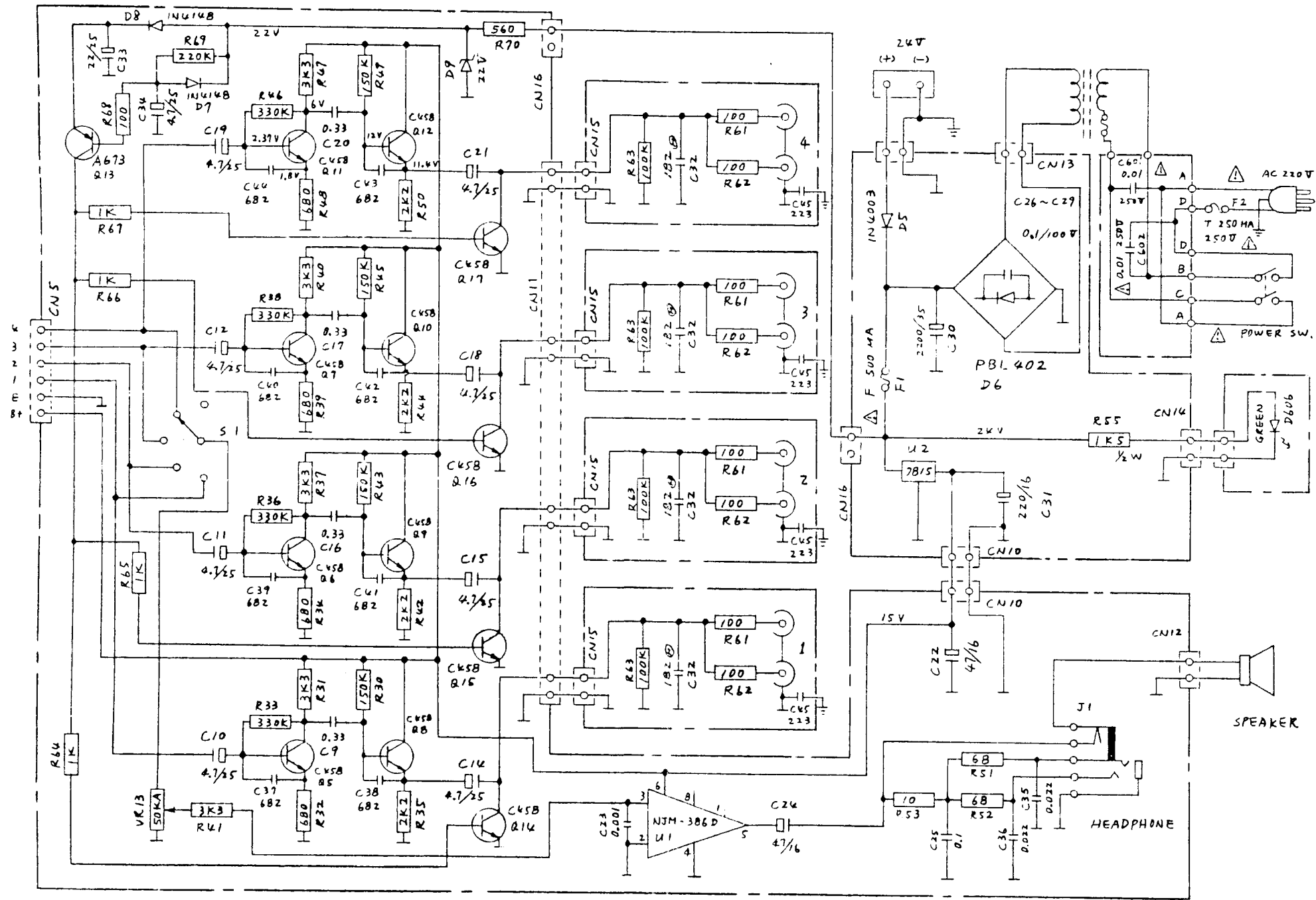


FIGURE 7.2
LBB 1229/00
CIRCUIT DIAGRAM PART 1



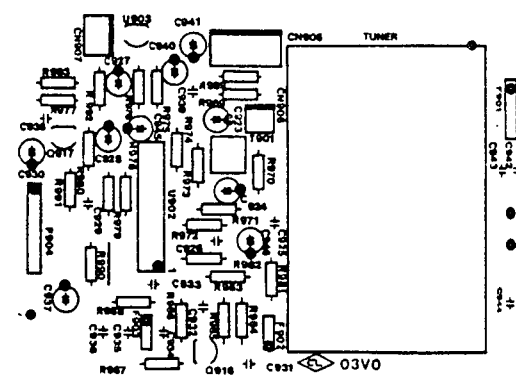
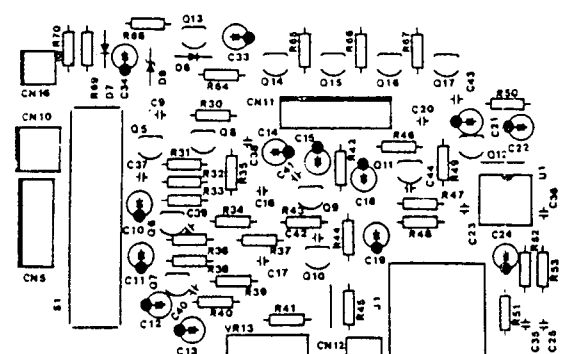
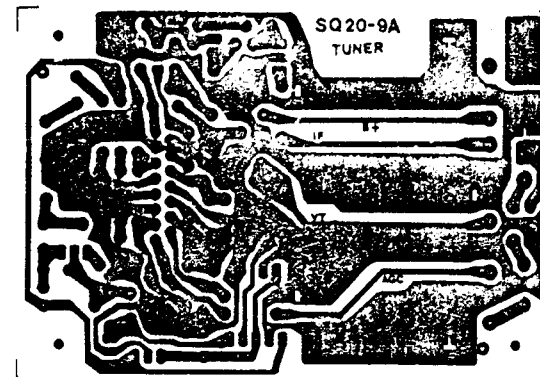
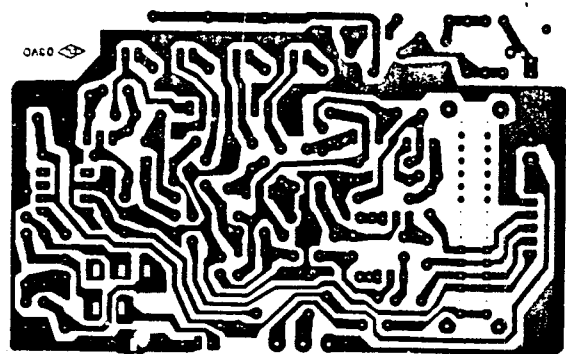
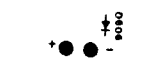
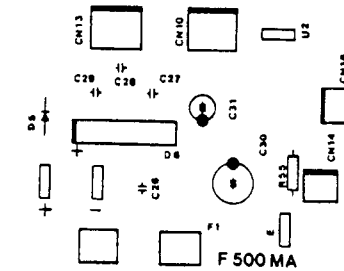
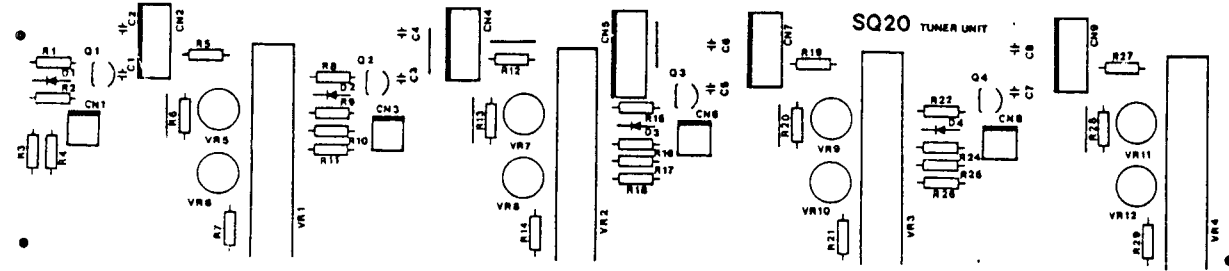
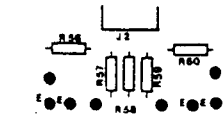
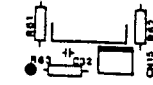
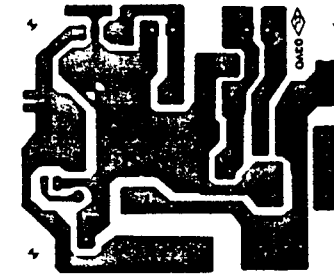
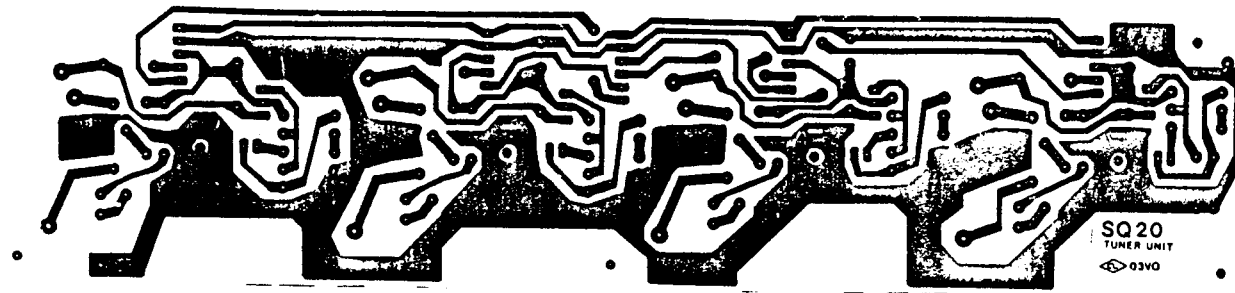
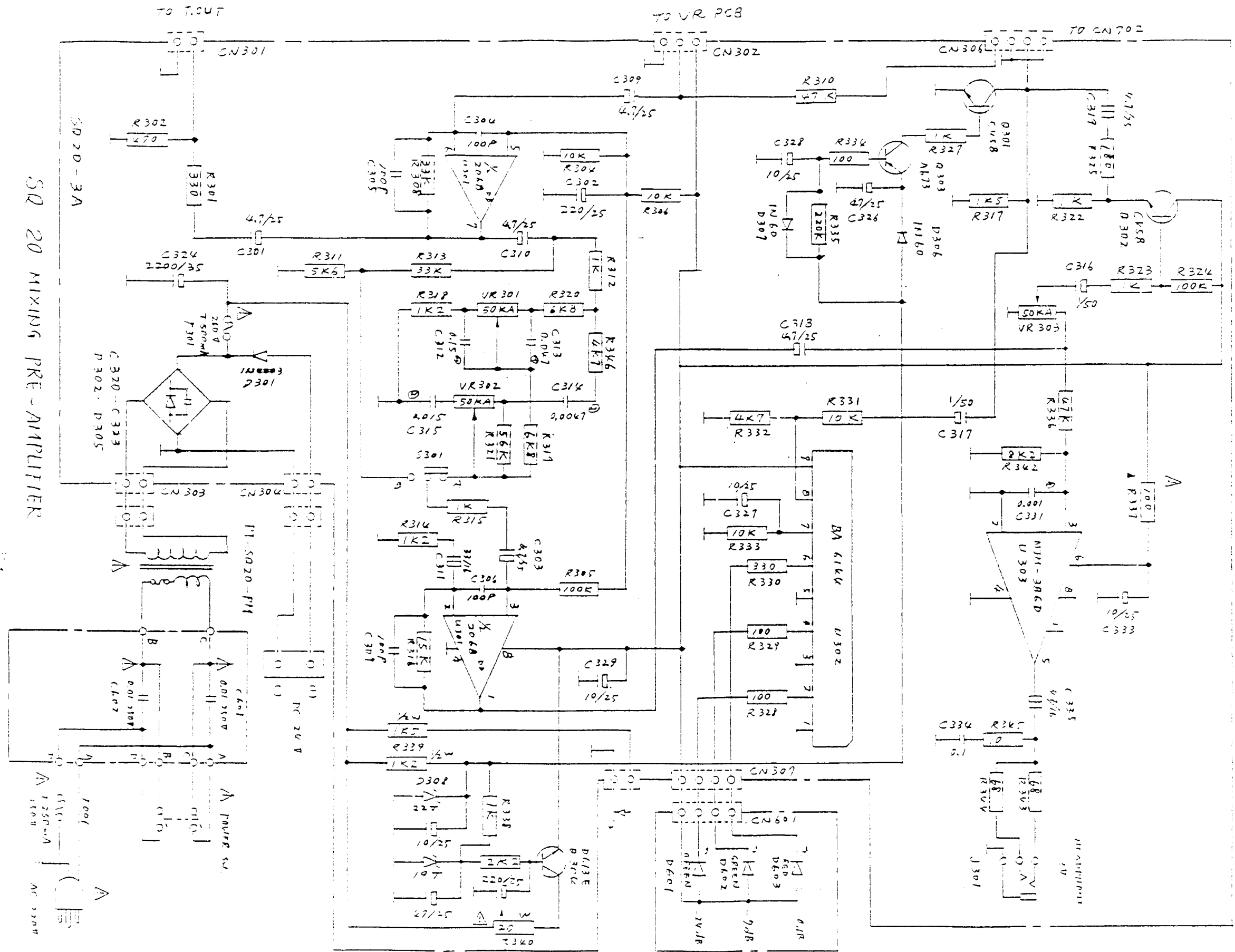


FIGURE 7.4
LBB 1229/00
PCB LAY-OUT



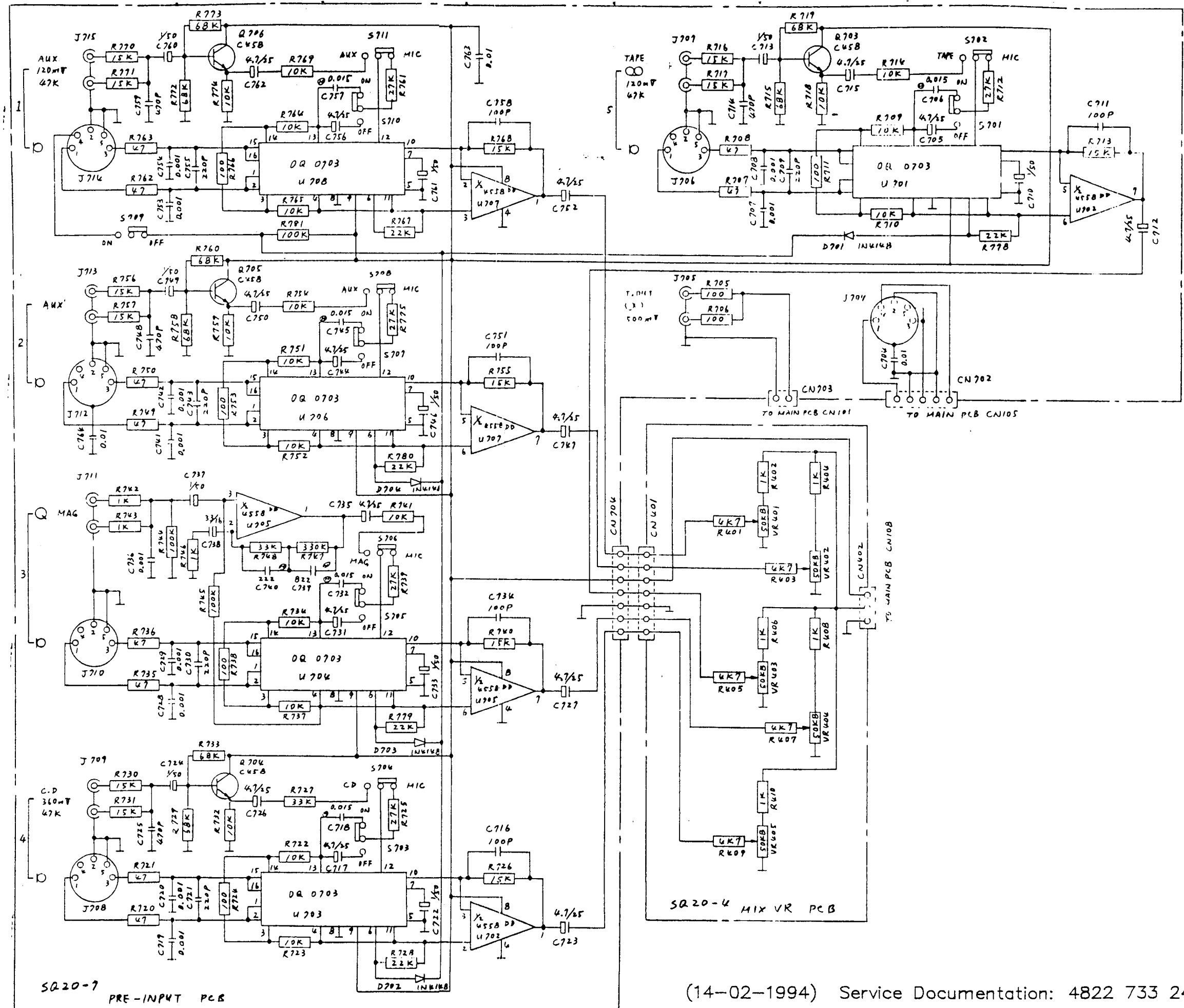
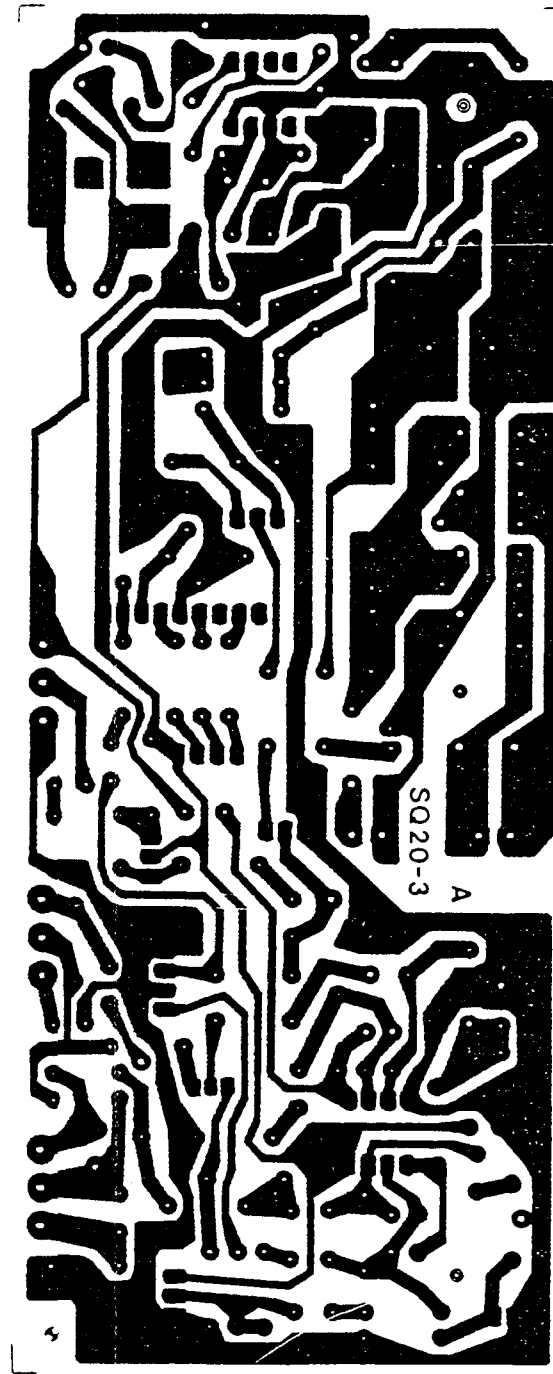
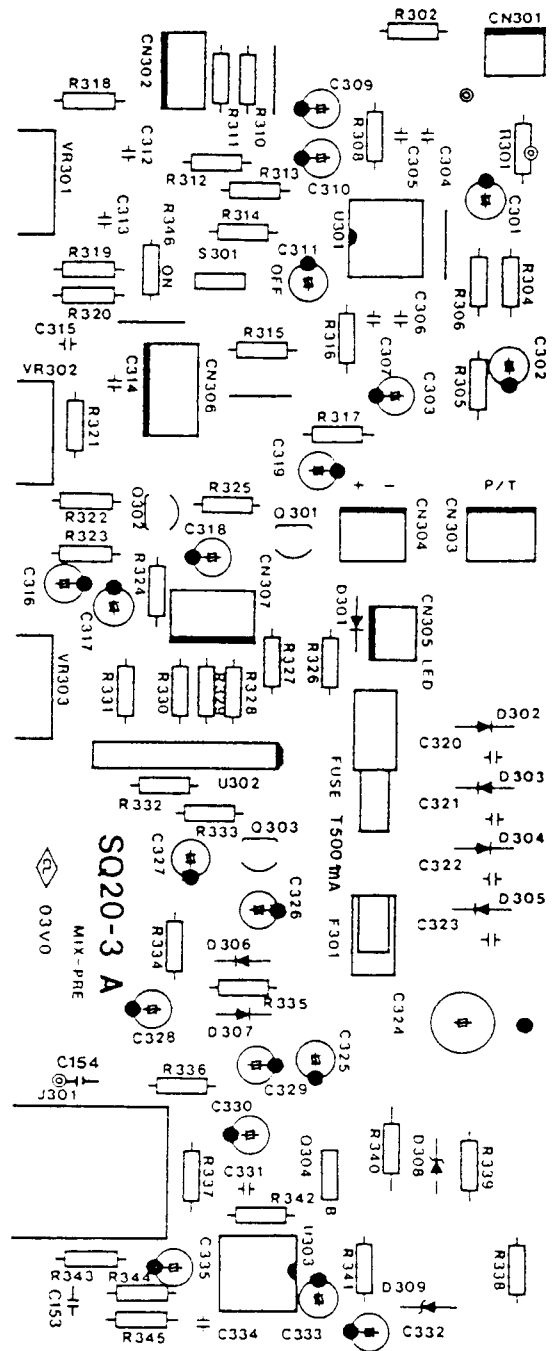


FIGURE 7.5
LBB 1230/00
CIRCUIT DIAGRAM PART 2



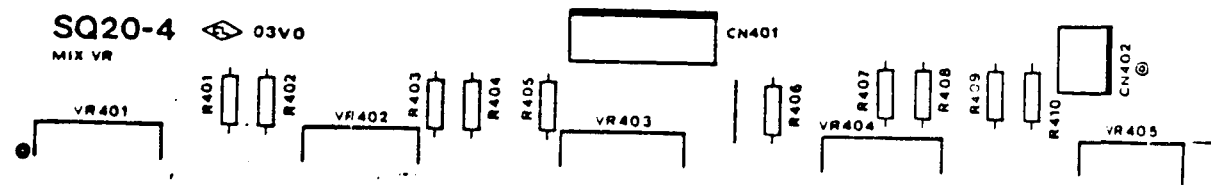
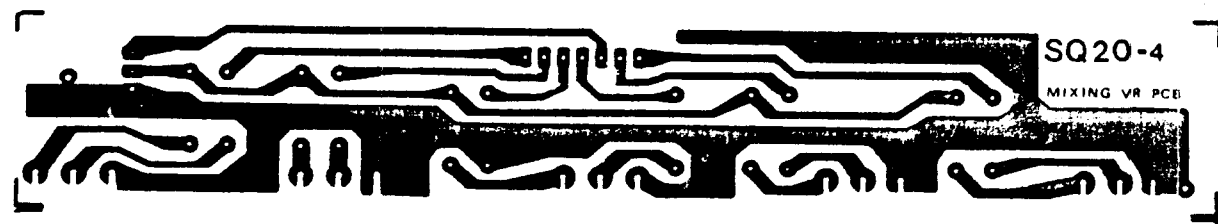
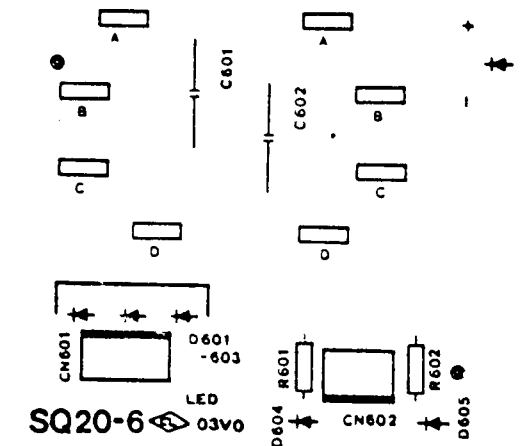
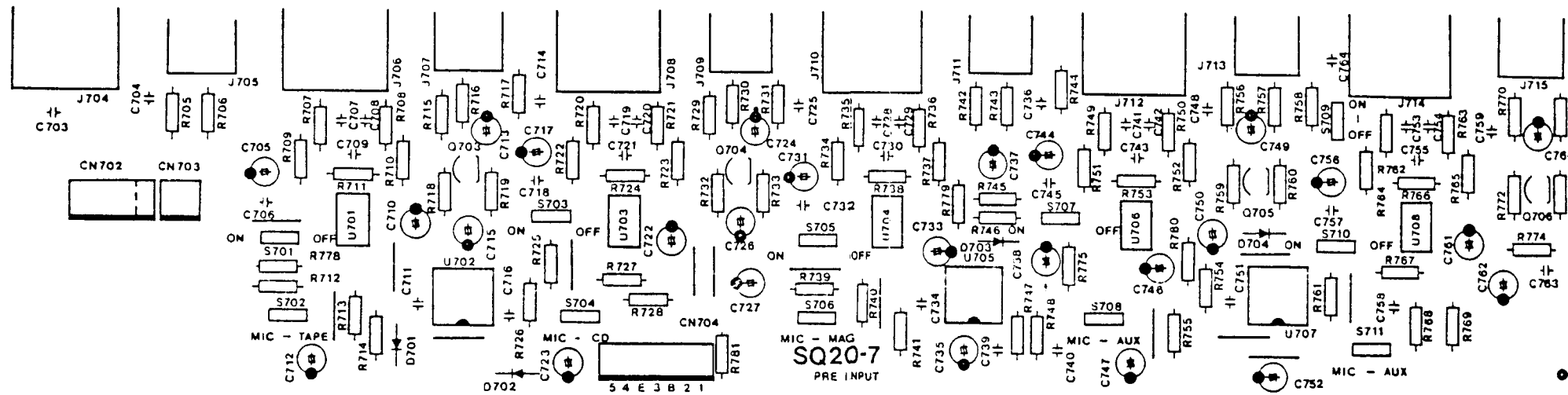
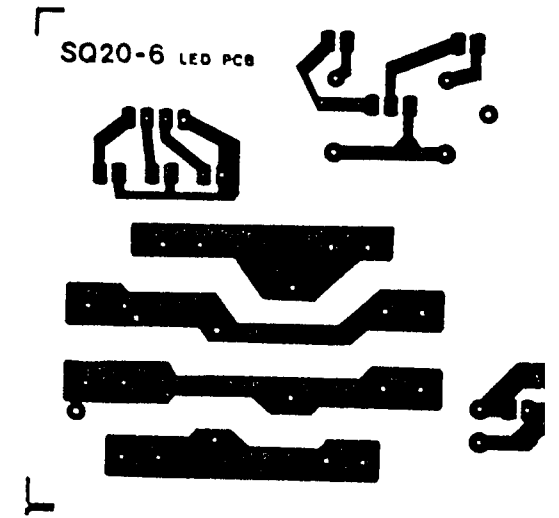
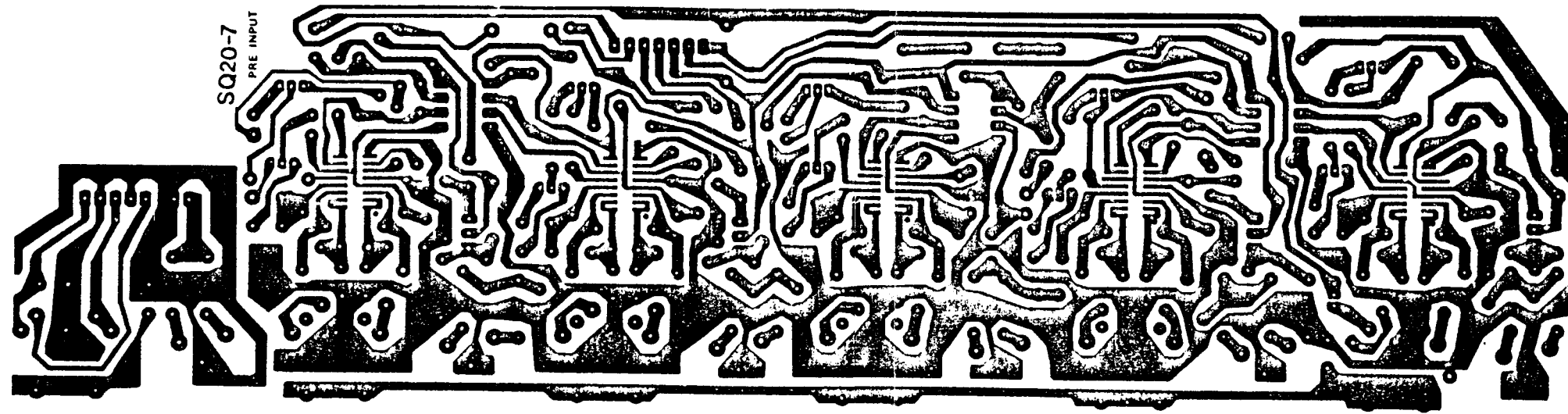
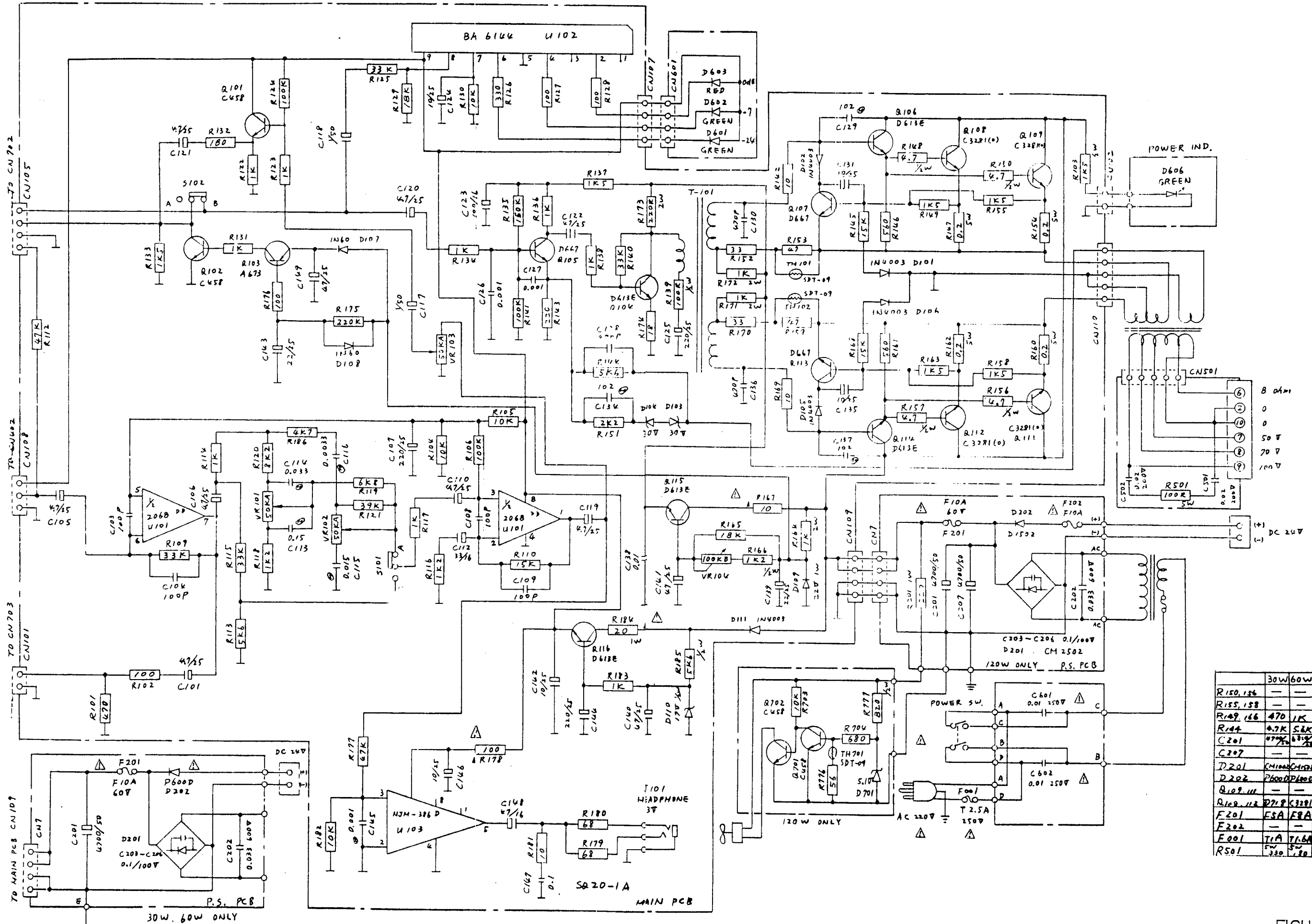


FIGURE 7.7
LBB 1230/00
PCB LAY-OUT PART 2



	30W/60W/120W
R150, 156	— — 4.7K
R155, 158	— — 1.5K
R149, 156	470 1K 1.5K
R144	4.7K 5.6K 5.6K
C201	470 5.6K 5.6K
C207	— — 470 5.6K
D201	CM1000 CM1000 CM1500
D202	P6000 P6000 P1500
Q109, 111	— — C3001
Q109, 112	D779 C3201 C3201
F201	ESA F8A F10A
F202	— — F10A
F201	T1A T1.6A T2.5A
R501	330 1.5K 100

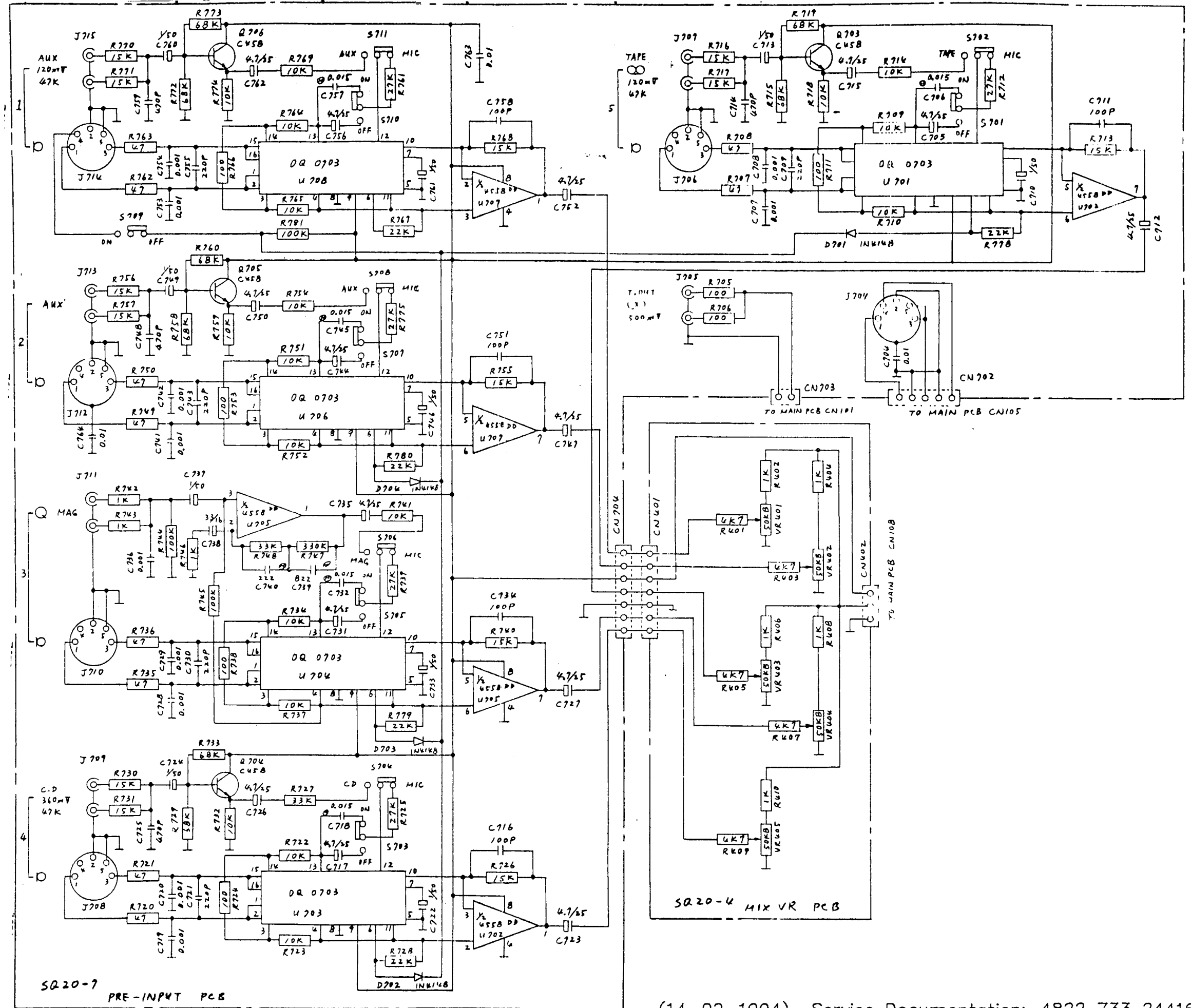
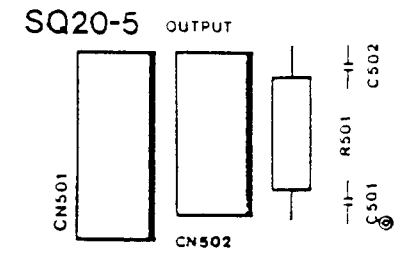
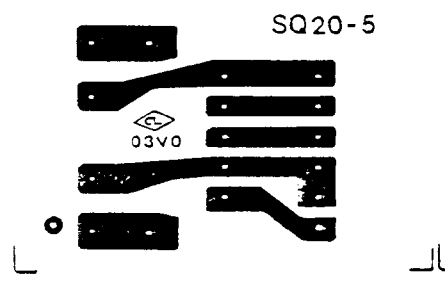
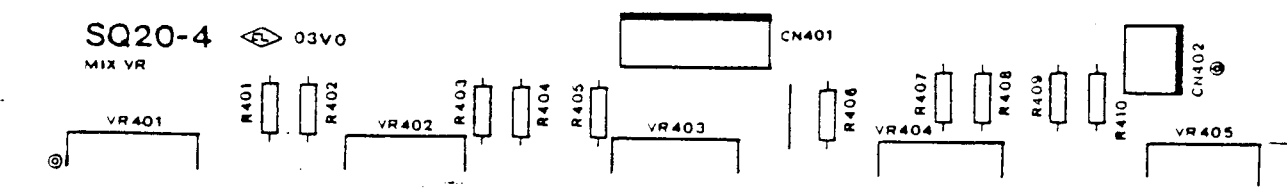
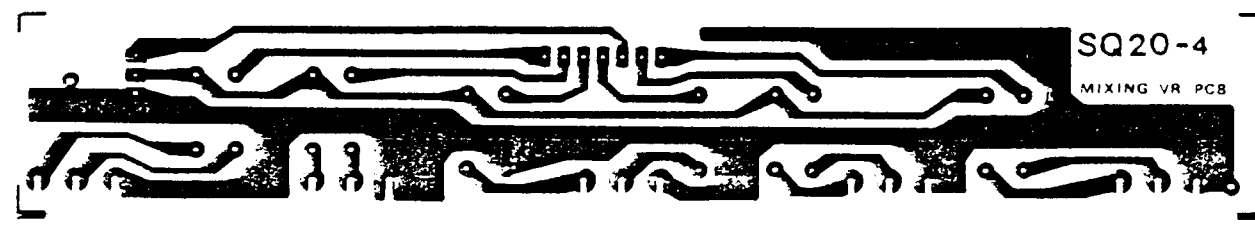
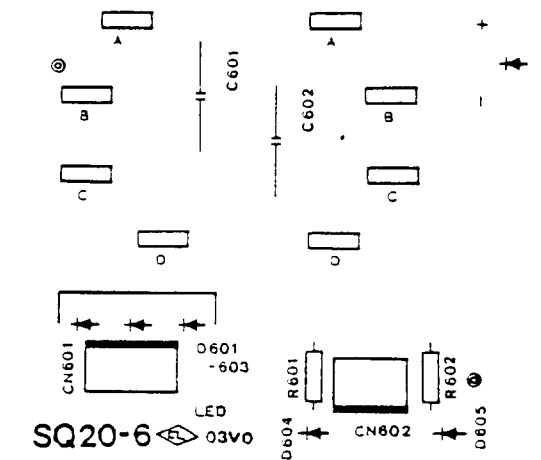
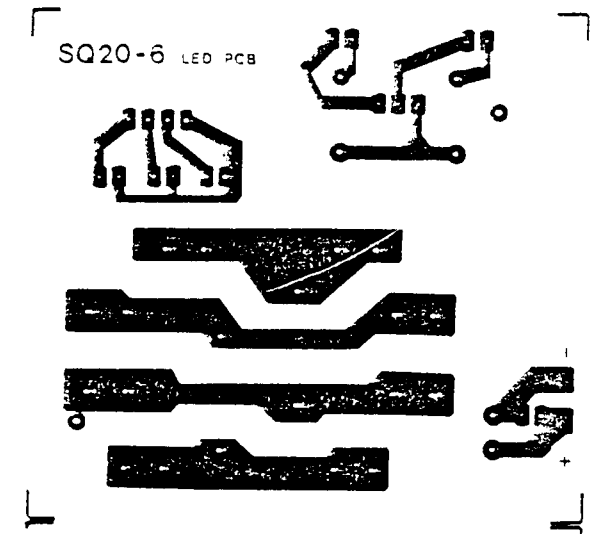
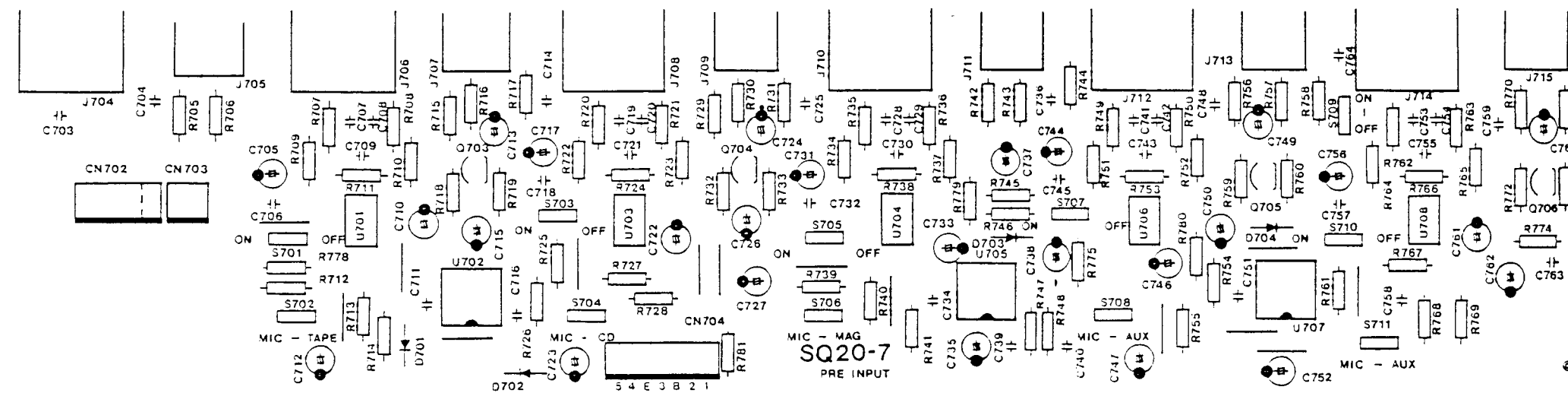
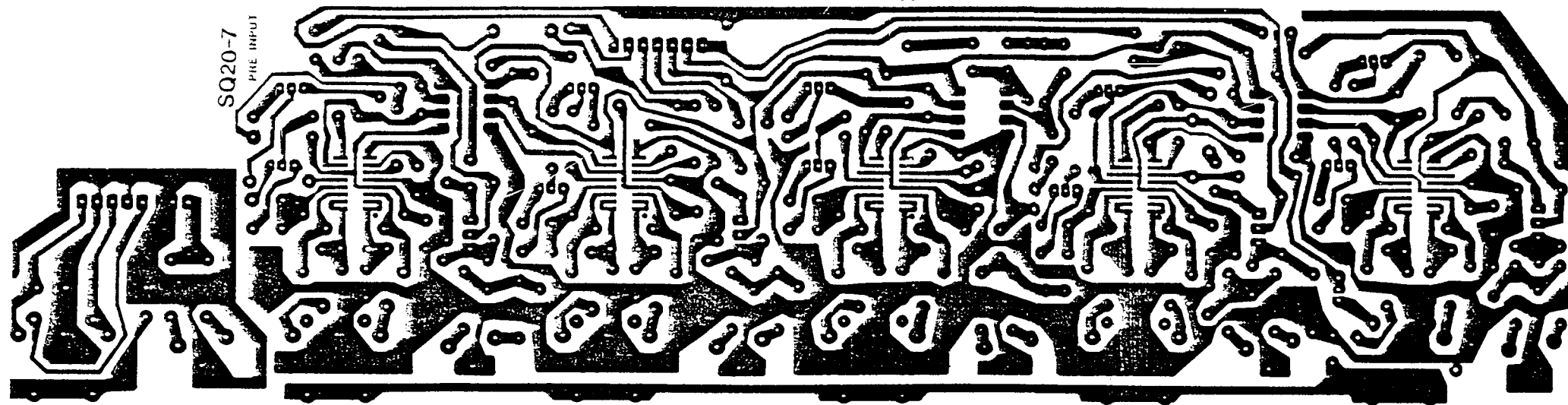


FIGURE 7.9
LBB 1231/00, 1232/00, 1233/00
CIRCUIT DIAGRAM PART 2



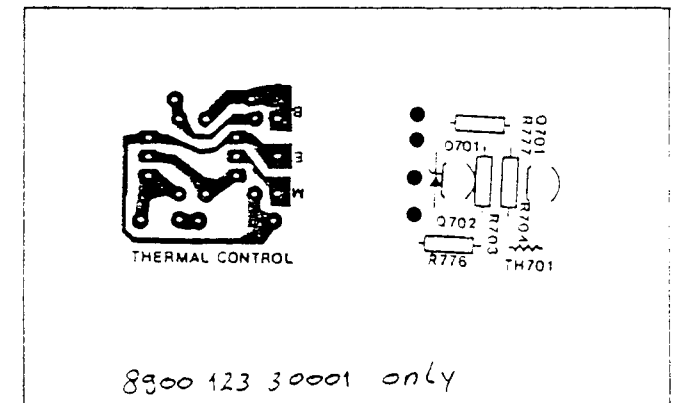
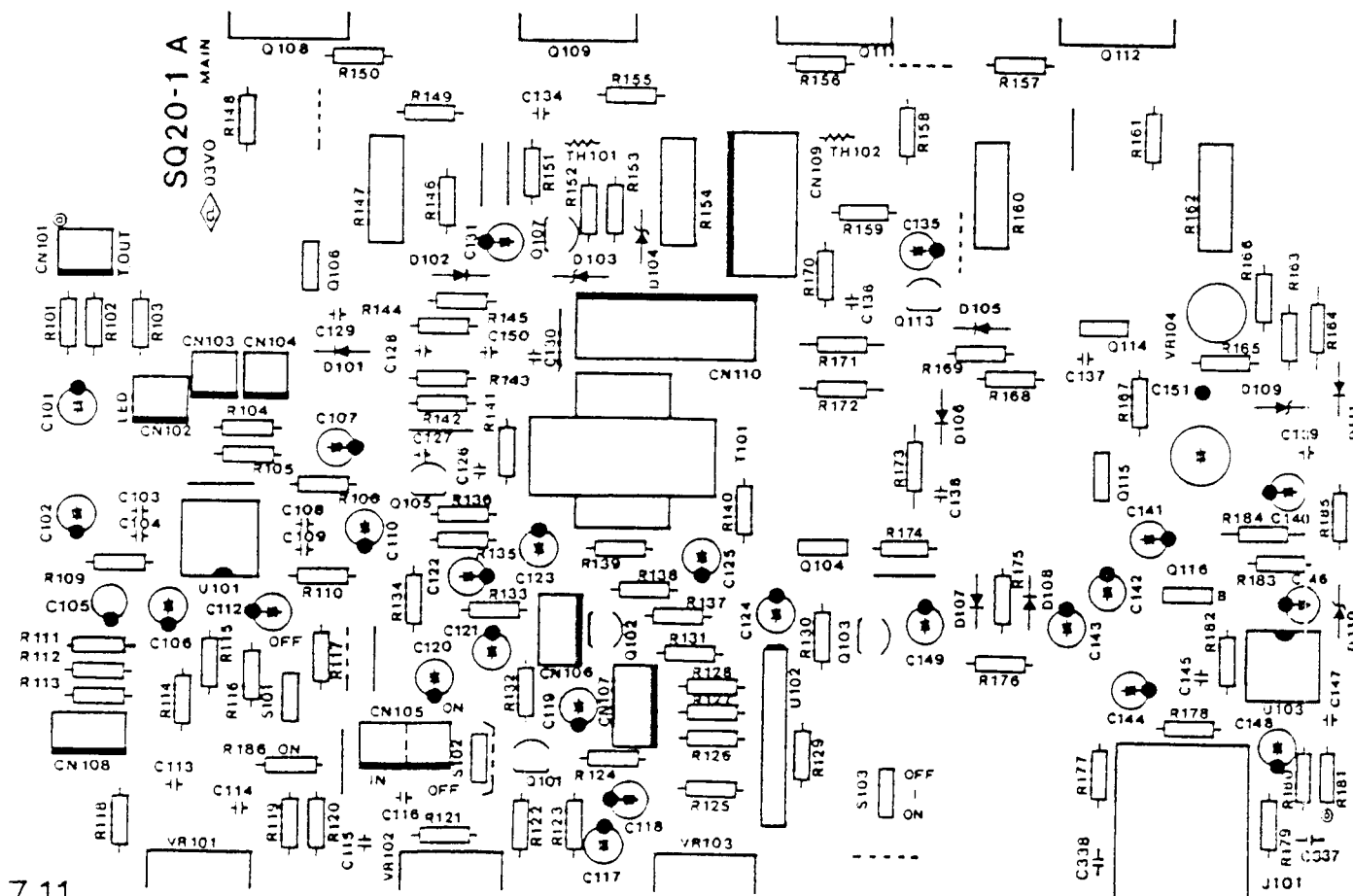
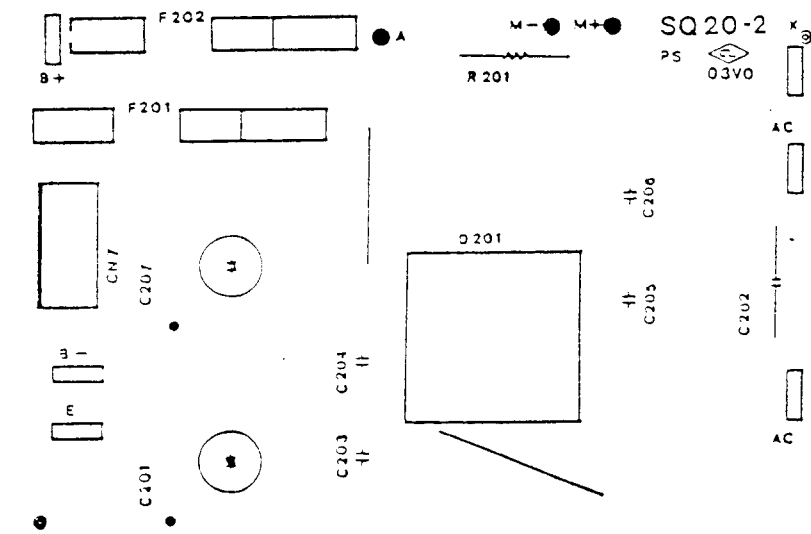
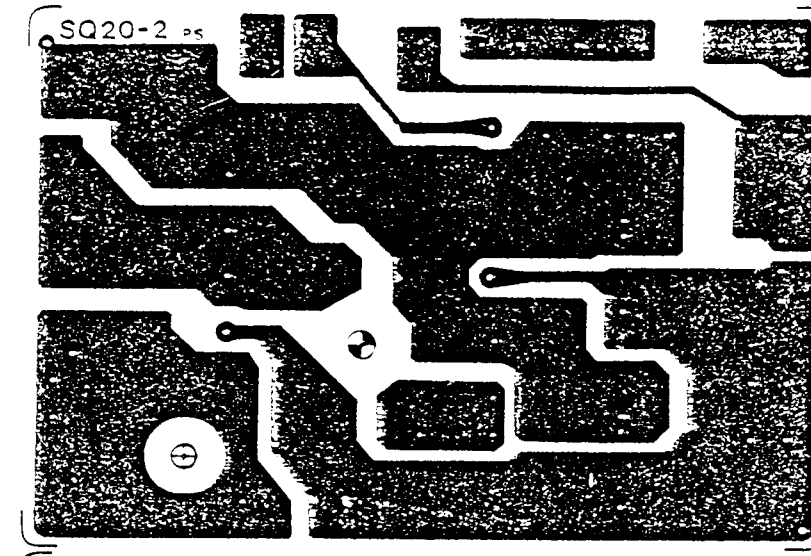
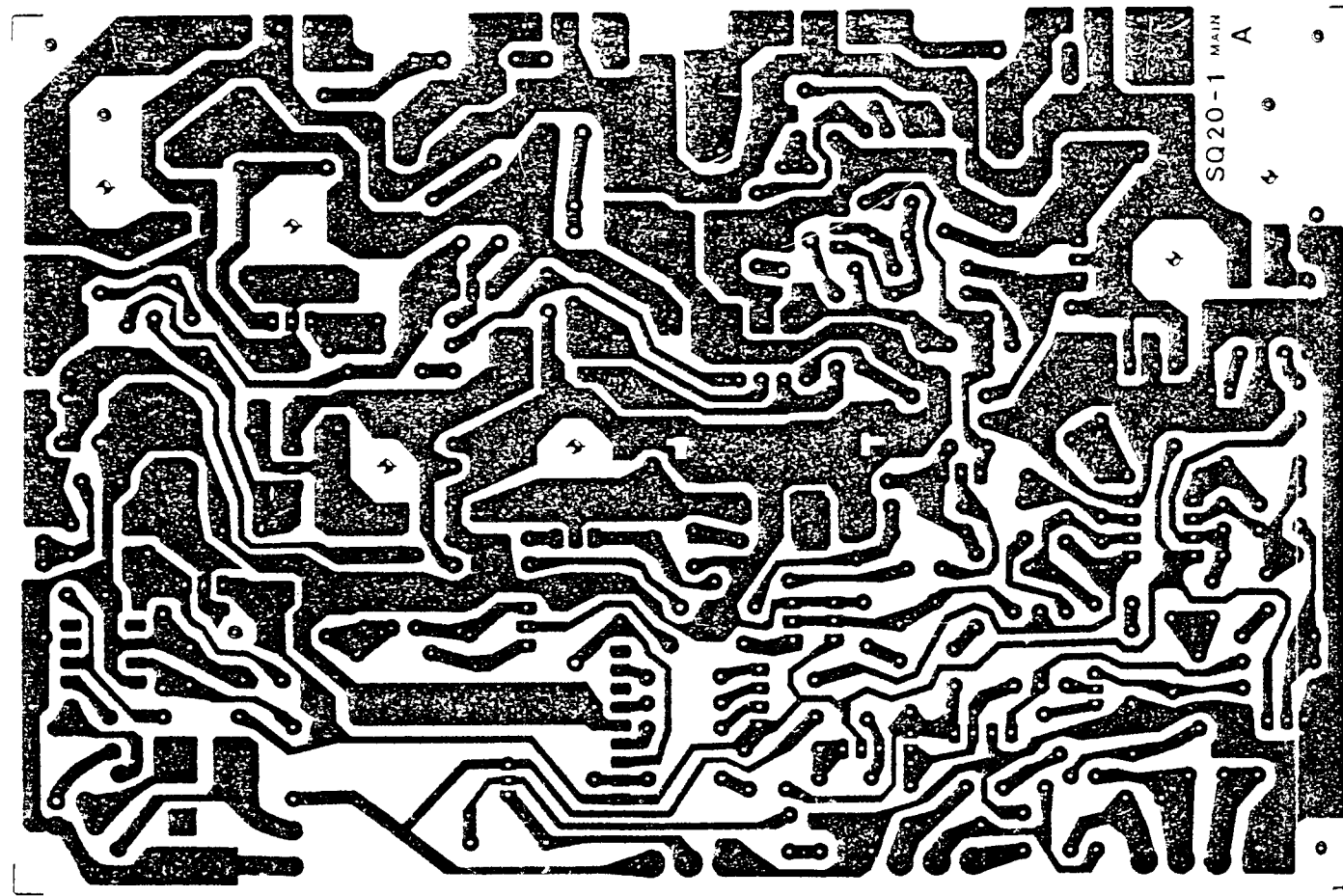
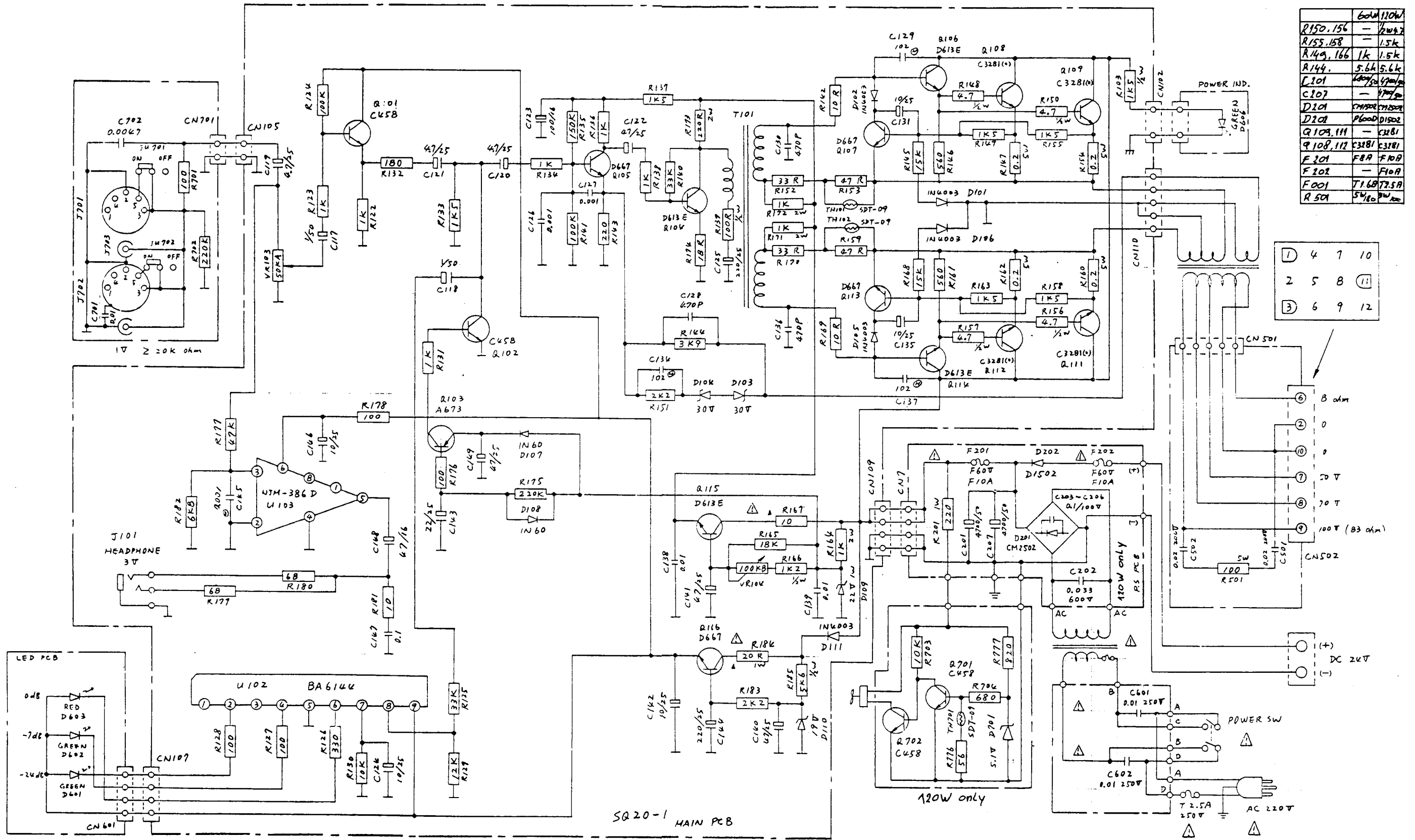
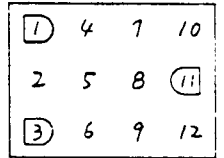


FIGURE 7.11
LBB 1231/00, 1232/00, 1233/00
PCB LAY-OUT PART 2



R150,156	60W/110W
R155,158	— 2W/2
R149,166	1k 1.5k
R144	5.6k 5.6k
C101	60V/0.1µF
C107	— 1µF/20
D101	TH102 SPT-09
D102	P600D/D1502
Q109,111	— 2N3055
Q107,112	2N3055
F201	F8A F10A
F202	— F10A
F001	T1.60/7.5A
R501	5W/60Ω



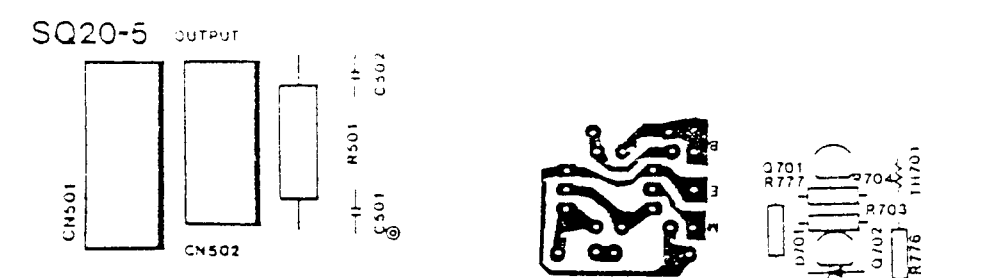
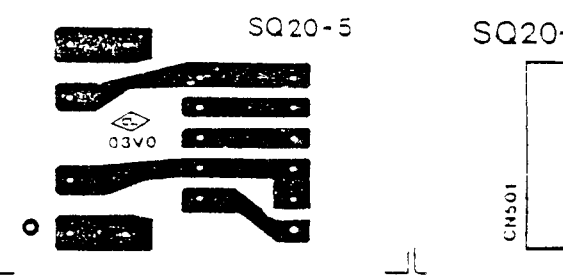
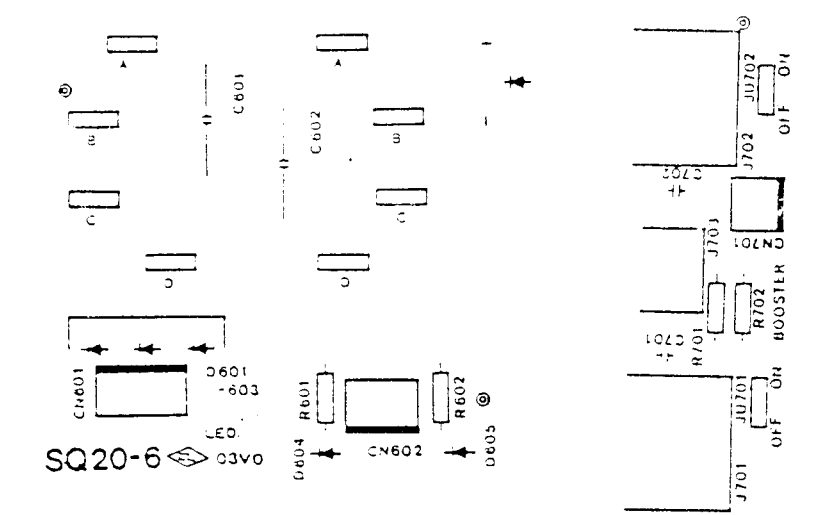
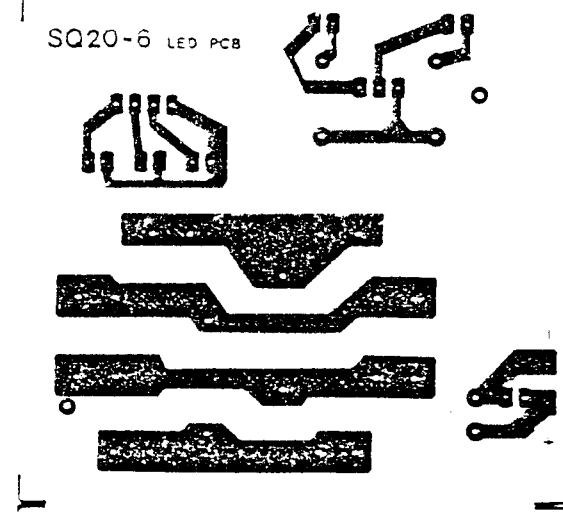
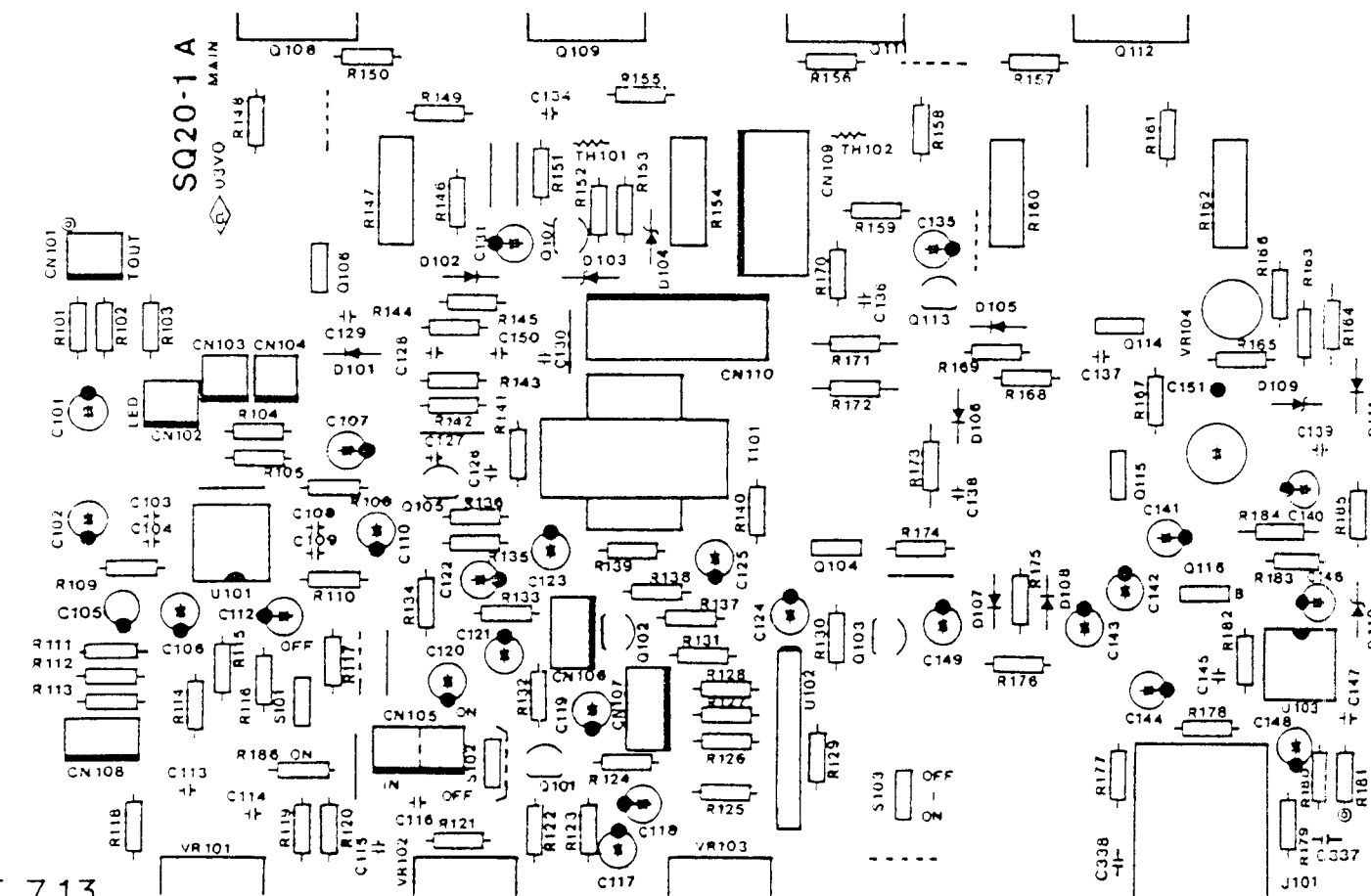
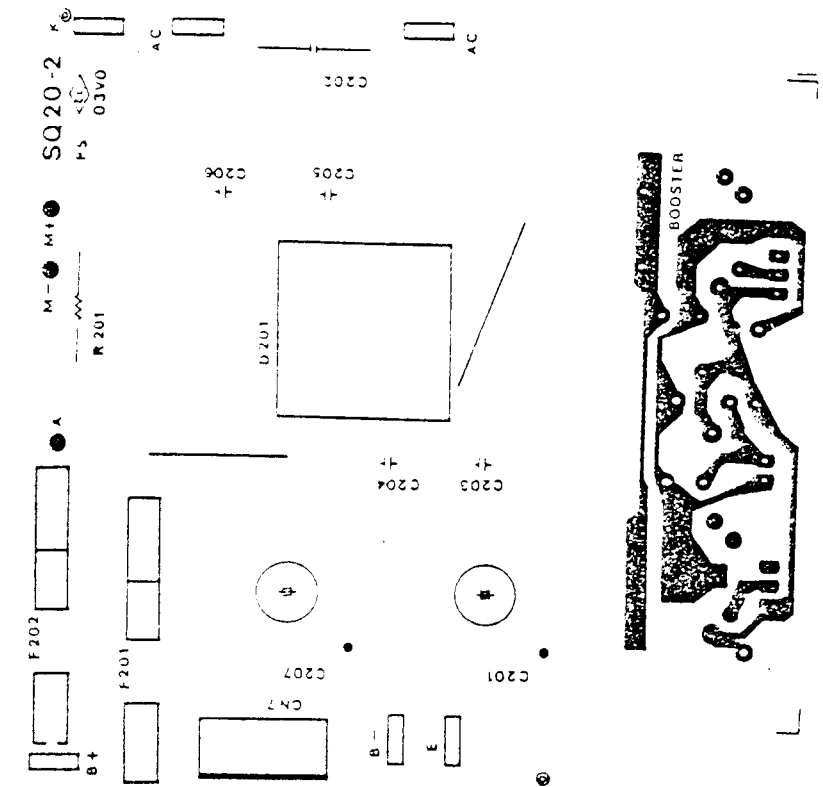
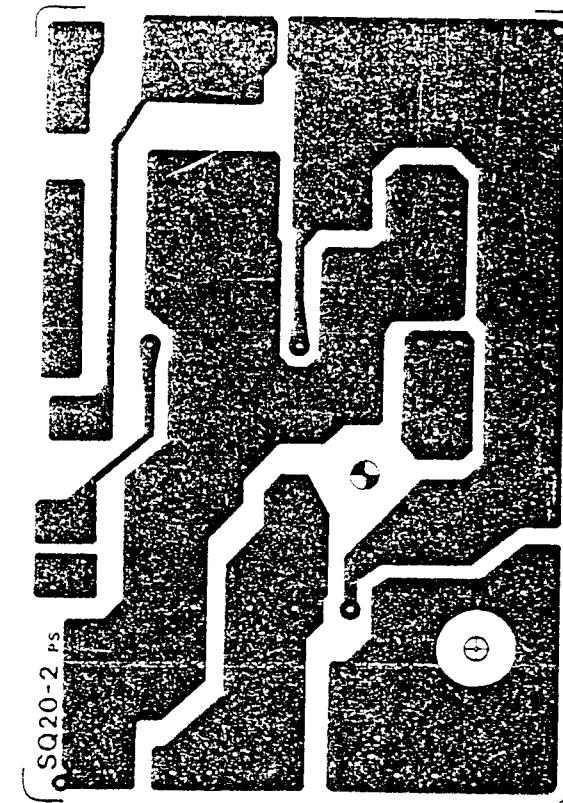
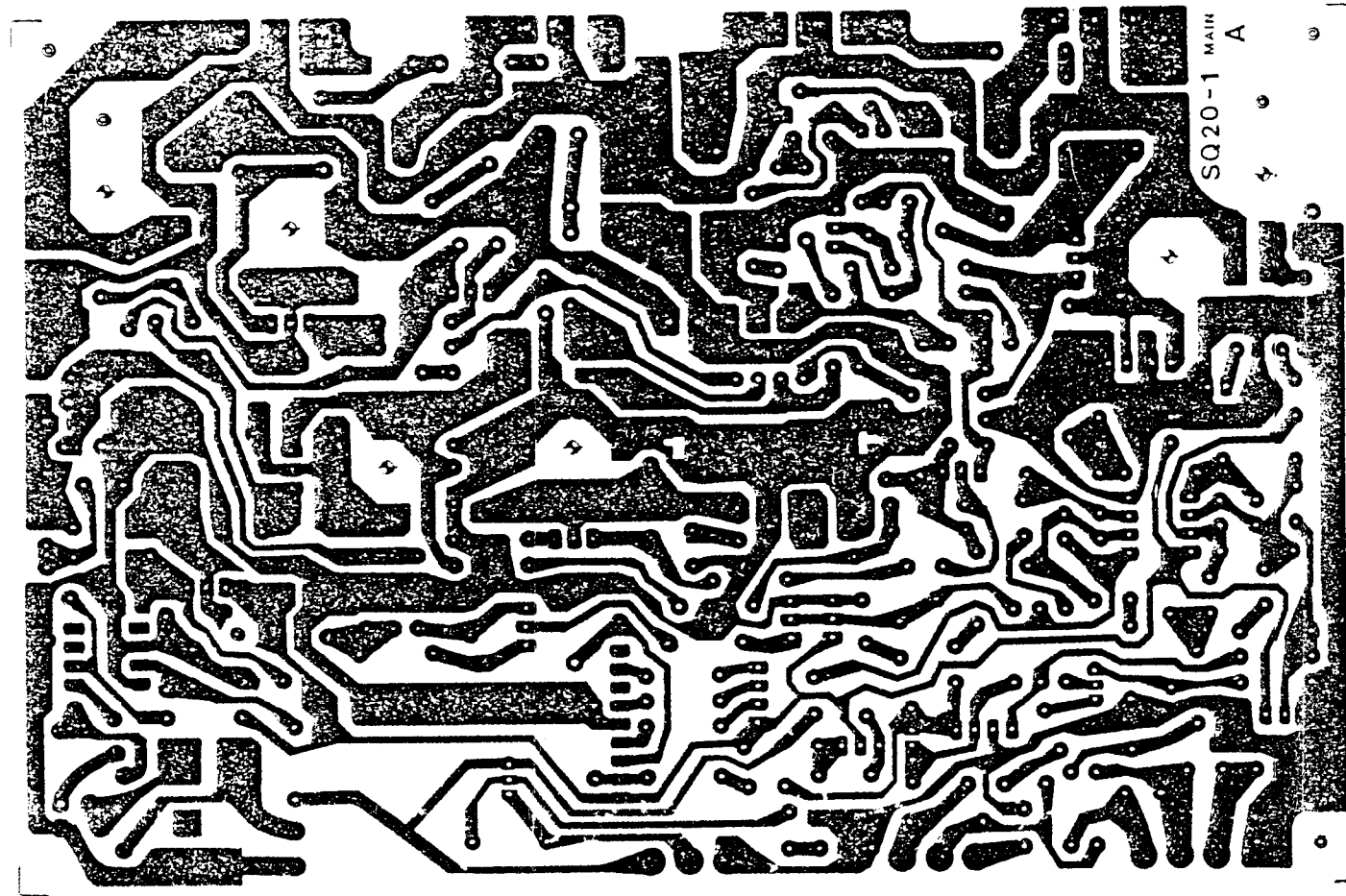
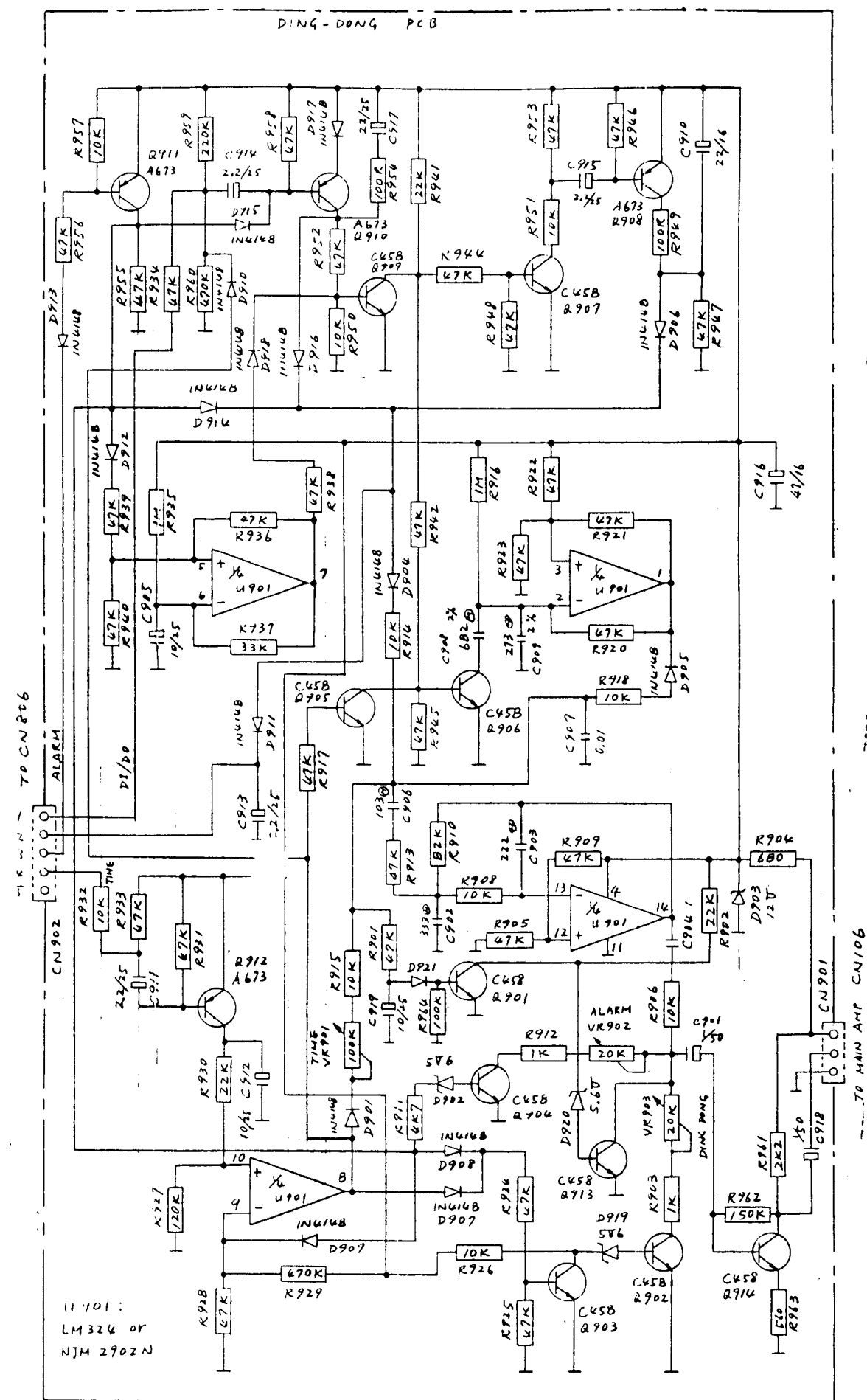
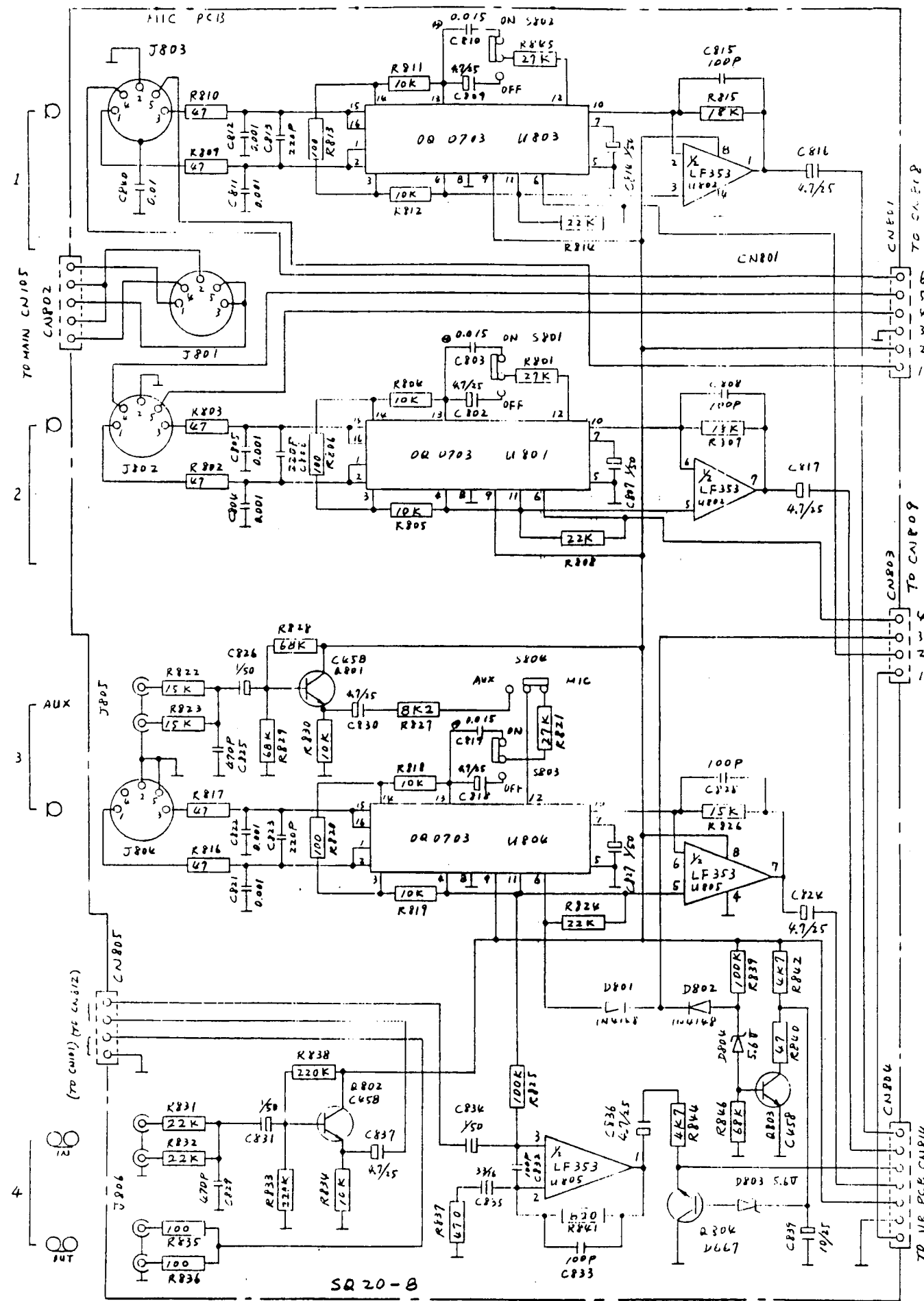
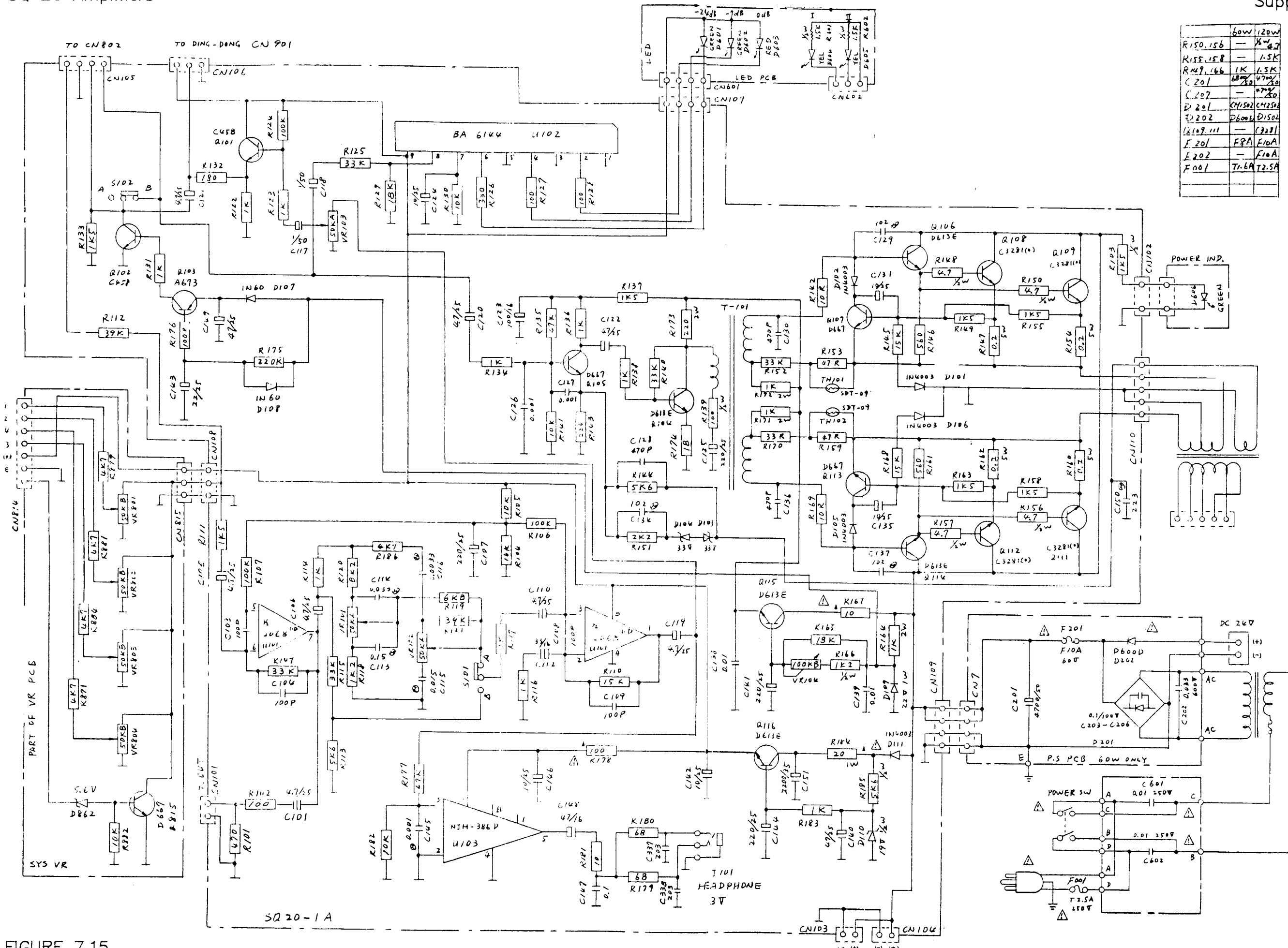


FIGURE 7.13
LBB 1234/00, LBB 1235/00
PCB LAY-OUT

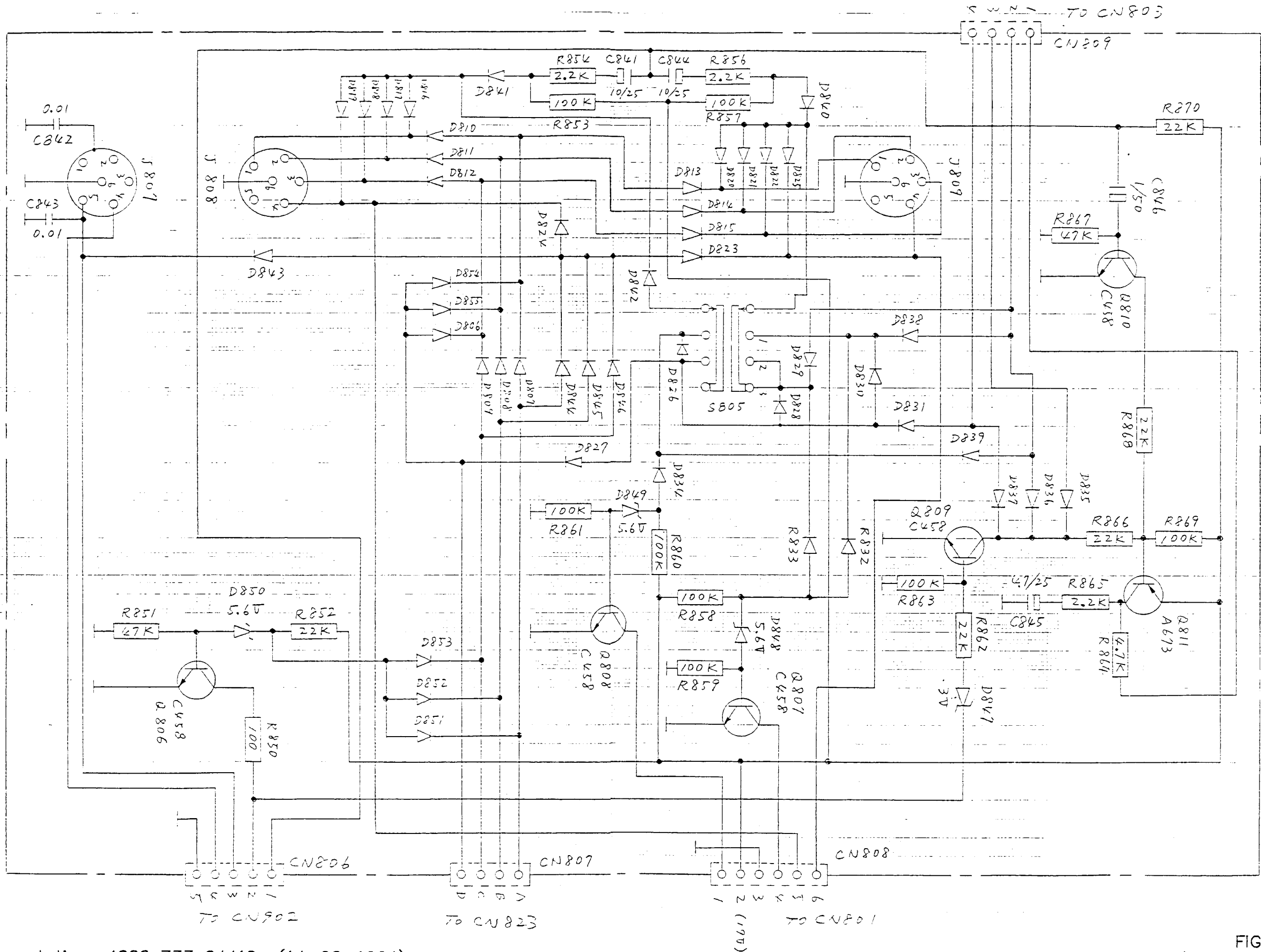




	60w	120w
R150, 156	—	Xw
R155, 158	—	1.5K
R149, 166	1K	1.5K
C201	6800	4700
C207	—	4700
D201	CM1502	CM2502
D202	D6004	D1502
I209, 111	—	(321)
F201	F8A	F10A
F202	—	F10A
F001	T1.6A	T2.5A

FIGURE 7.15
LBB 1237/00, LBB 1238/00
CIRCUIT DIAGRAM PART 2

SQ20 SYSTEM AMP. CONTROL PCB



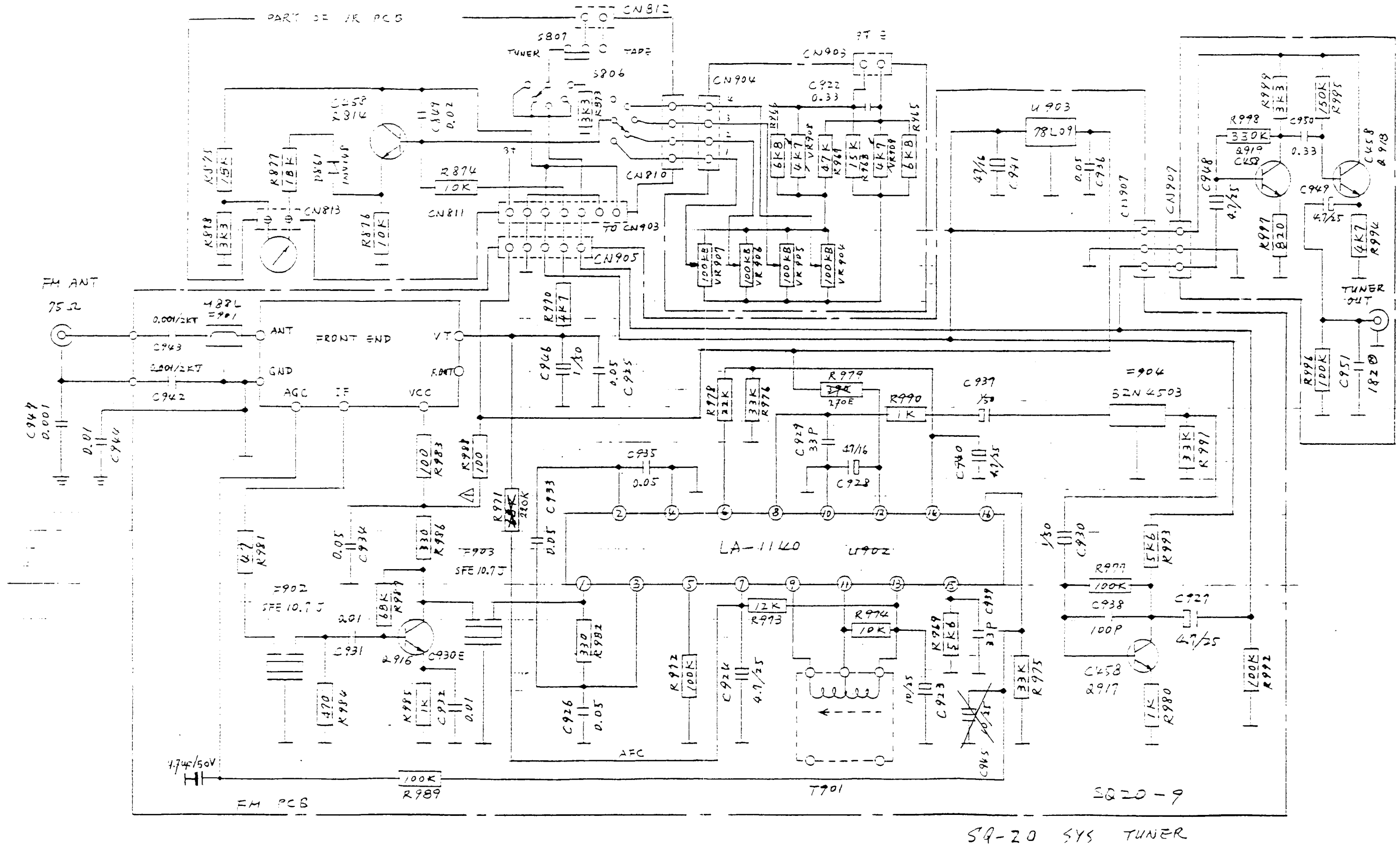


FIGURE 7.17
LBB 1237/00, LBB 1238/00
CIRCUIT DIAGRAM PART 4

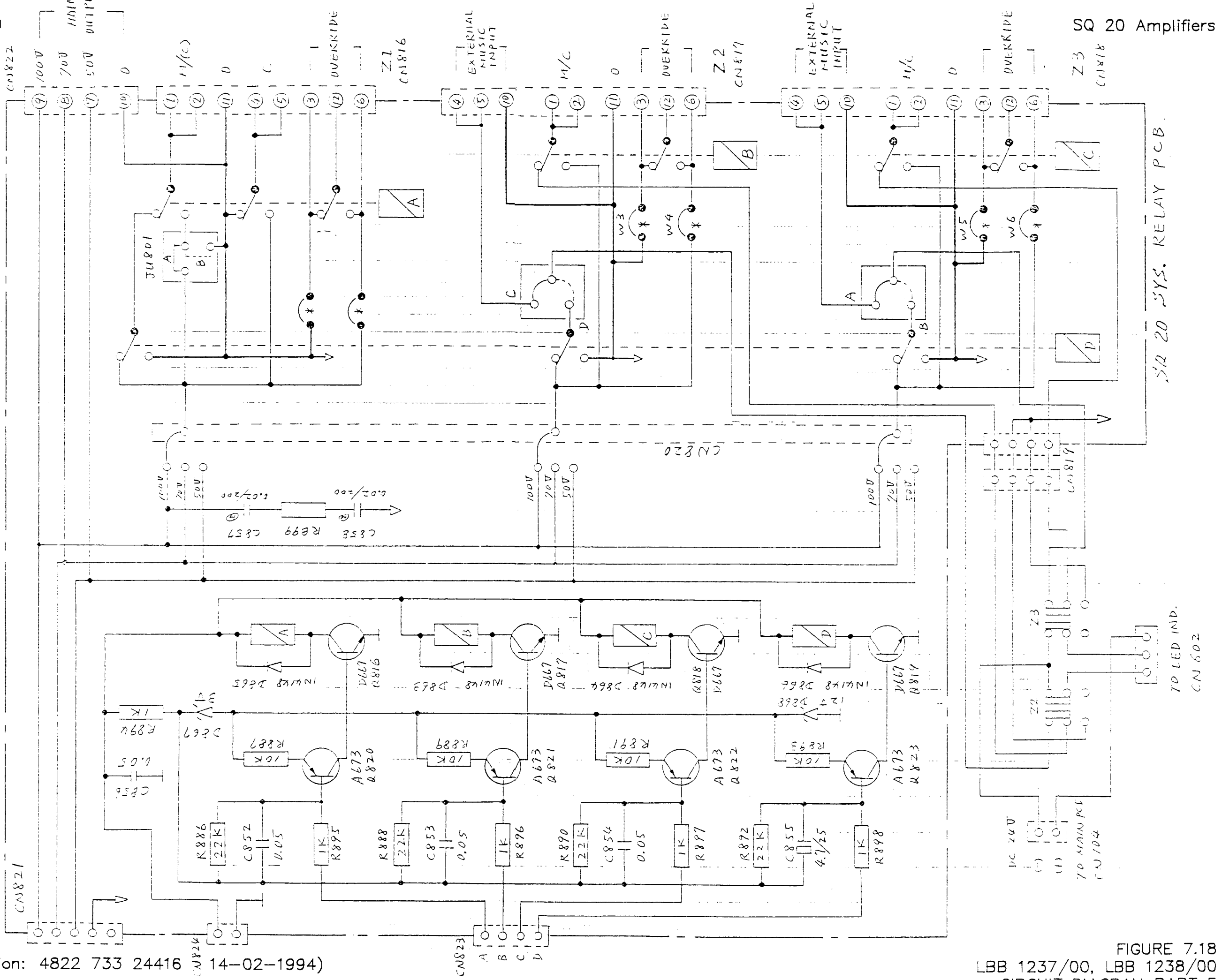


FIGURE 7.18
LBB 1237/00, LBB 1238/00
CIRCUIT DIAGRAM PART 5

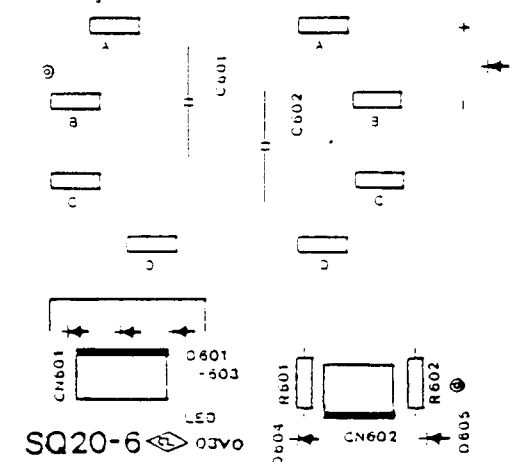
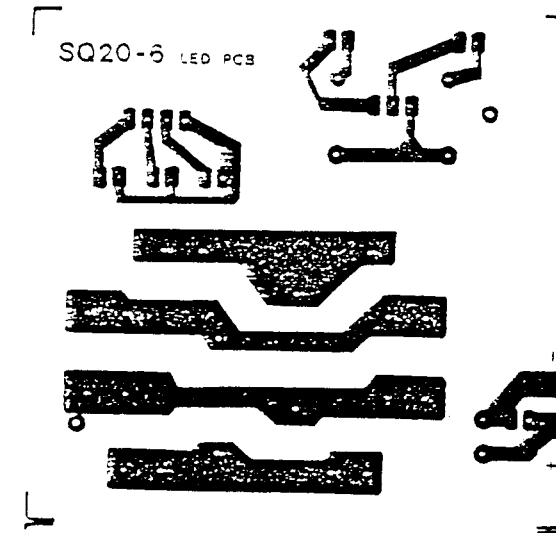
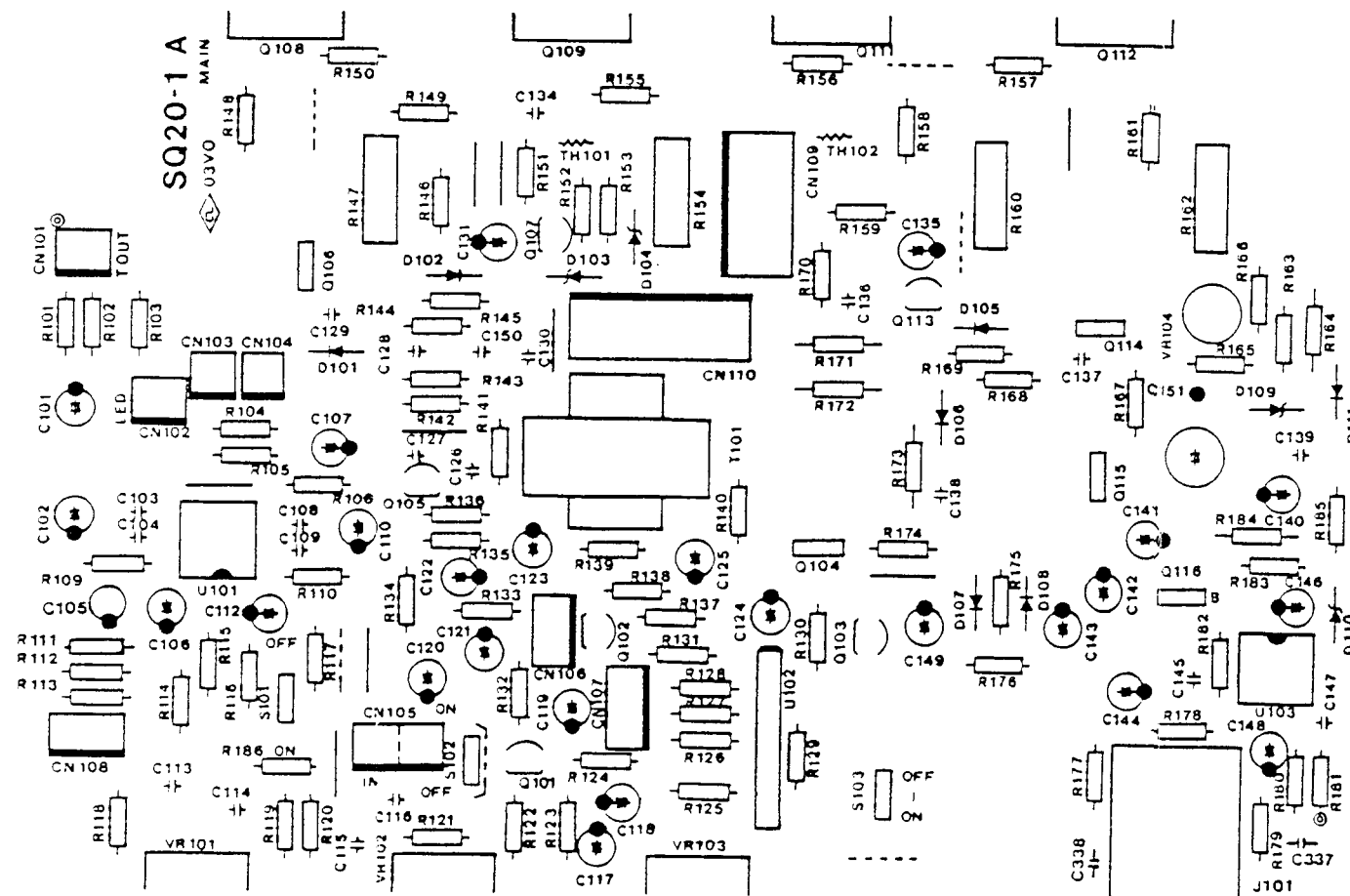
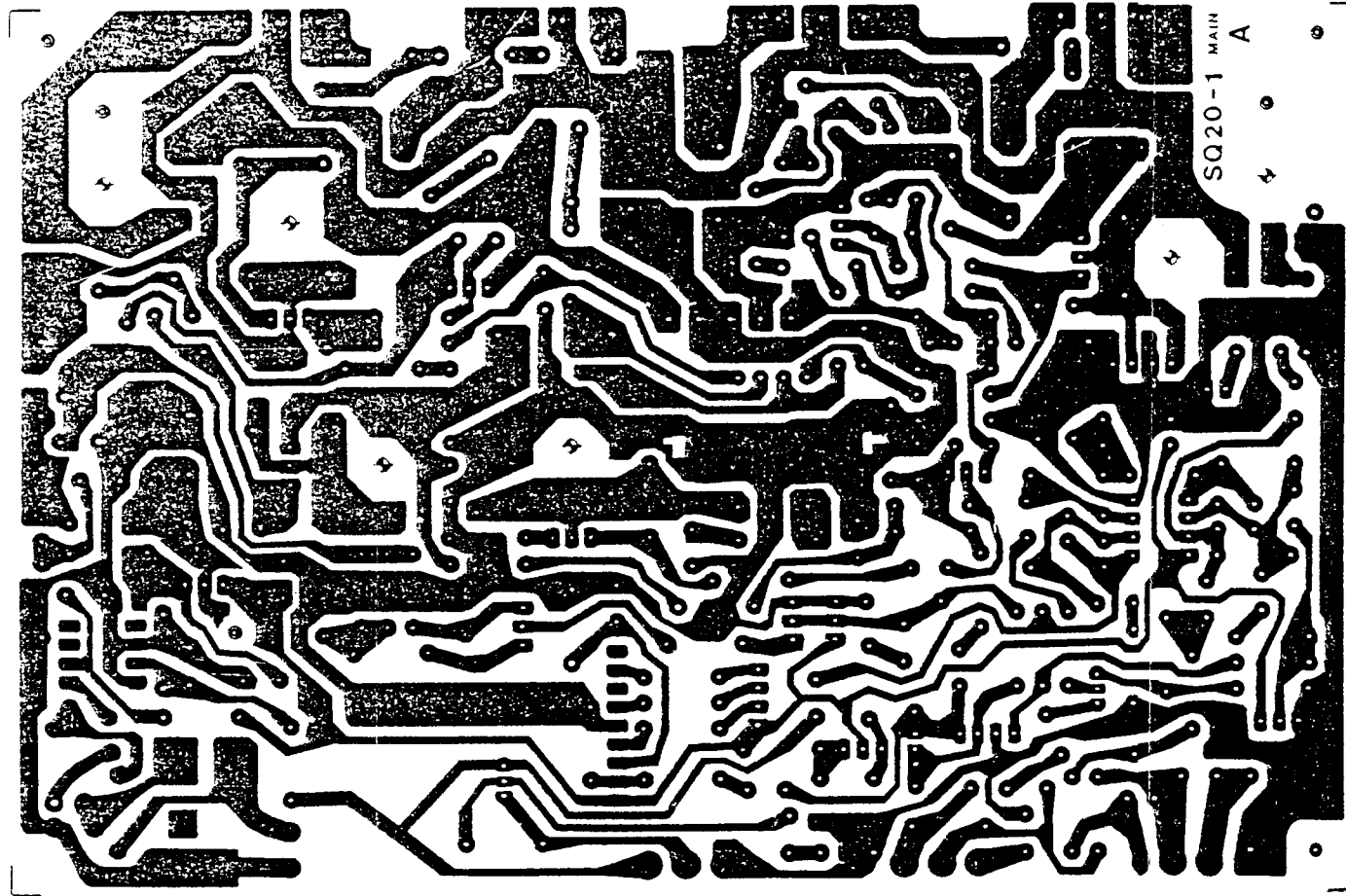


FIGURE 7.19
LBB 1237/00, LBB 1238/00
PCB LAY-OUT PART 1

VOLUME PCB

DING DONG PCB

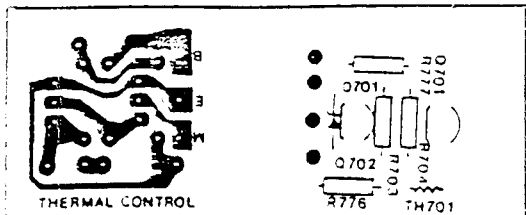
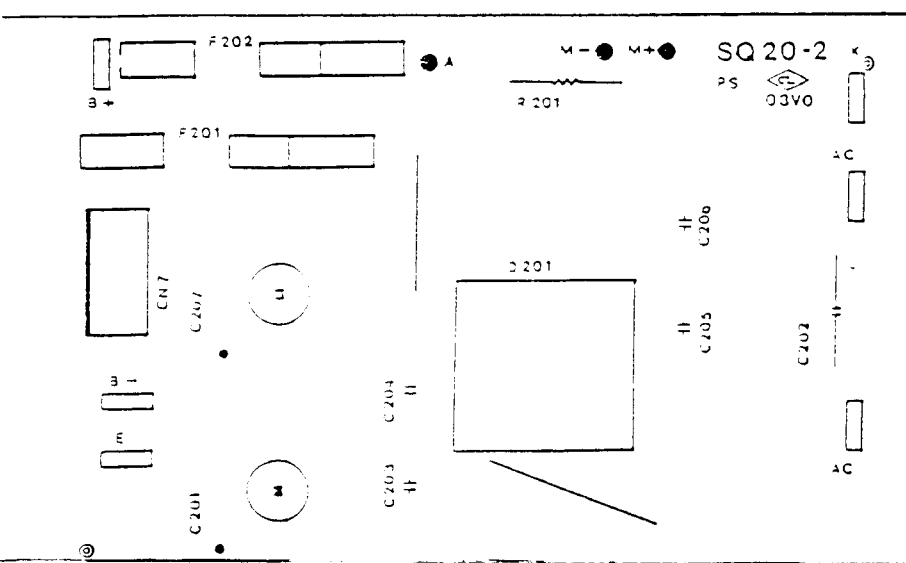
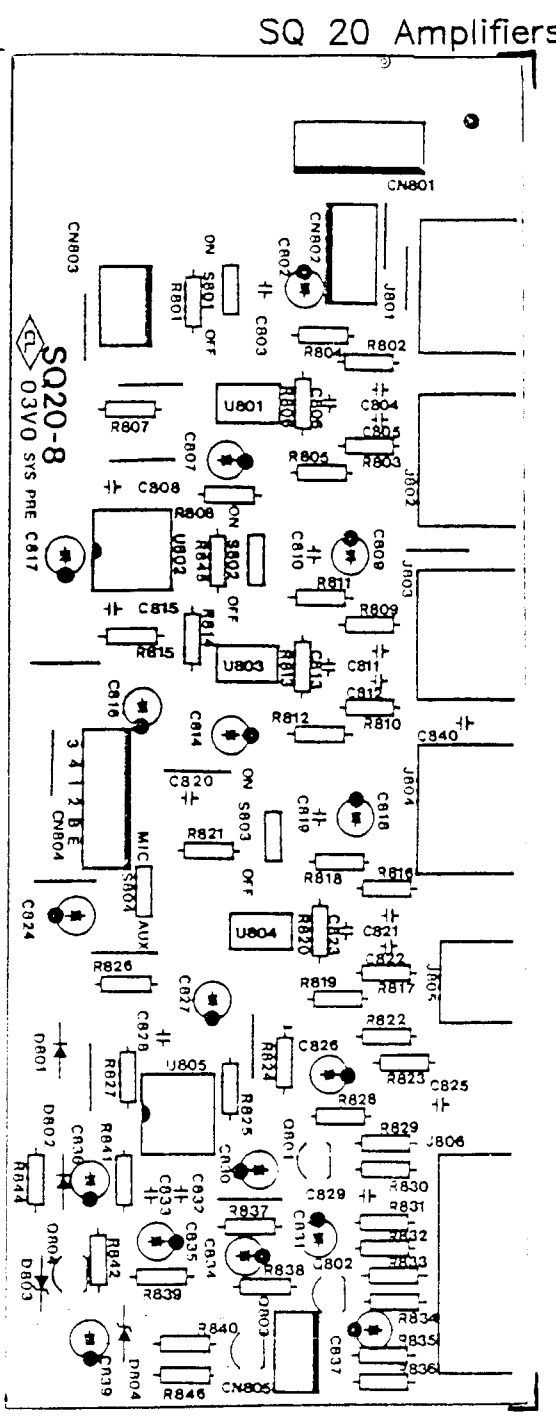
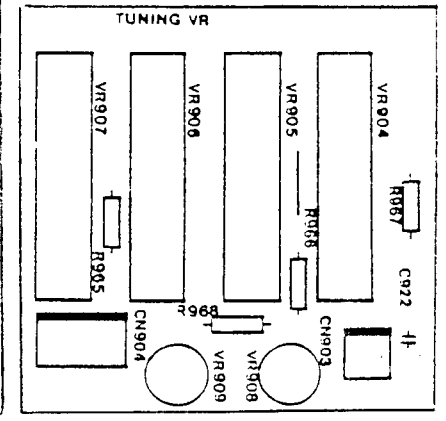
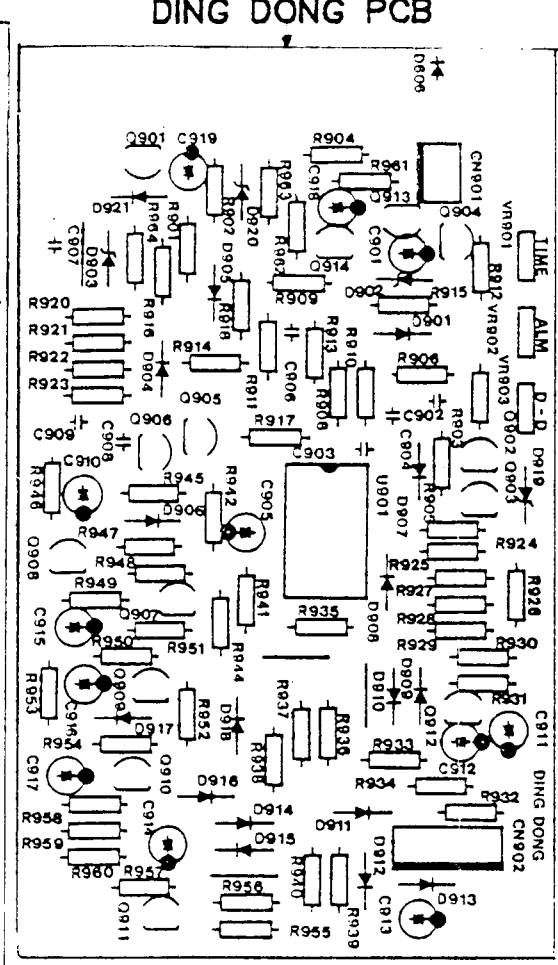
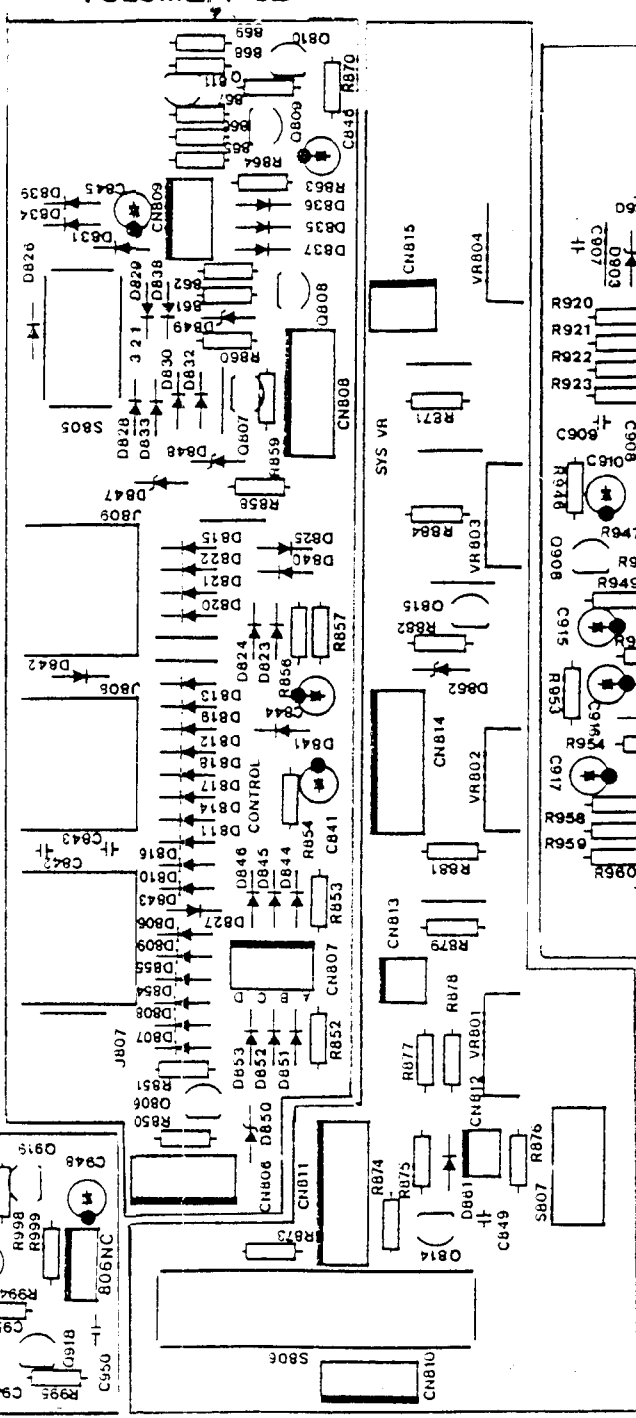
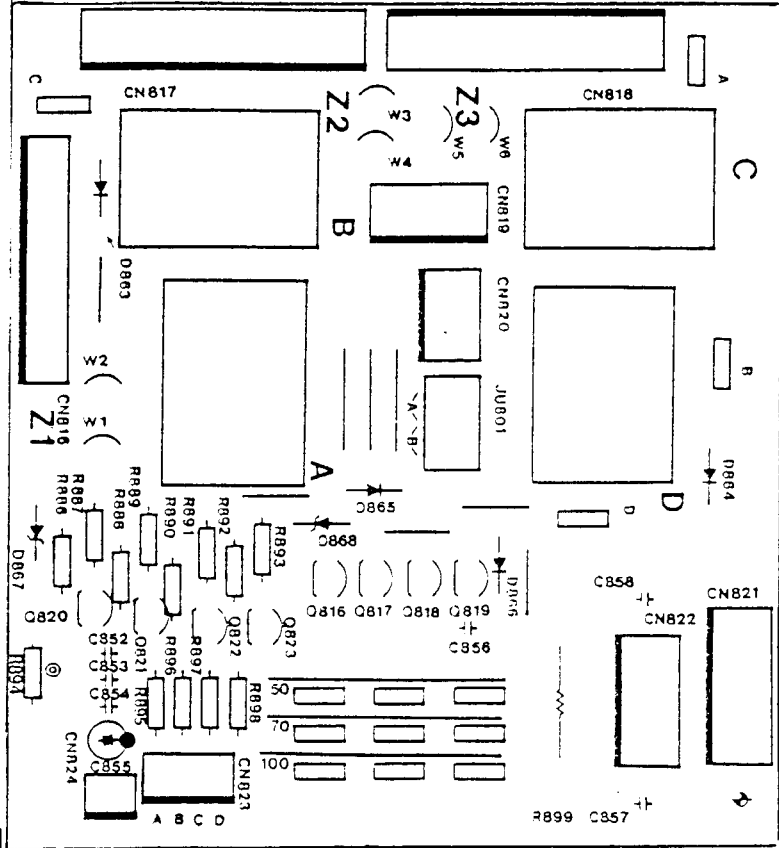
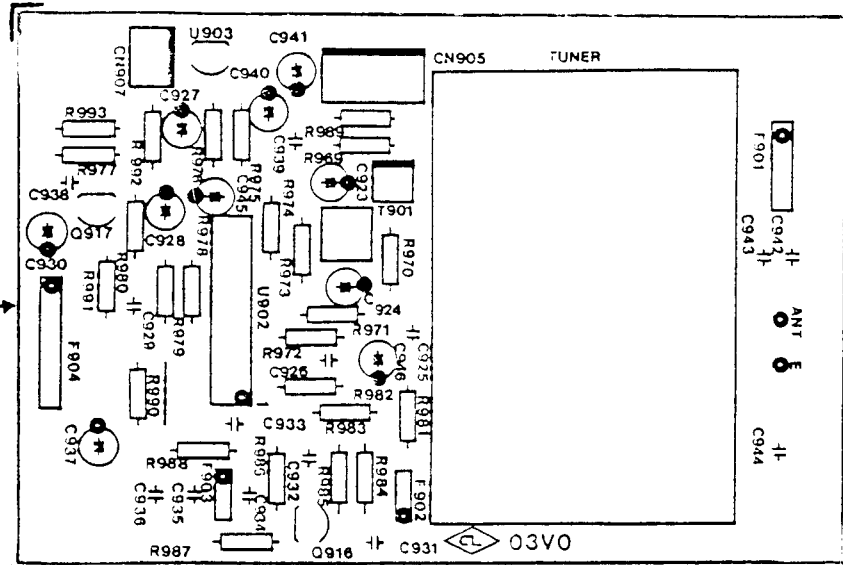
SQ 20 Amplifiers

TUNER PCB →

RELAIS PCB →

TUNER-OUT PCB VOLUME PCB

TUNER VR PCB



ONLY VALID FOR LBB 1238

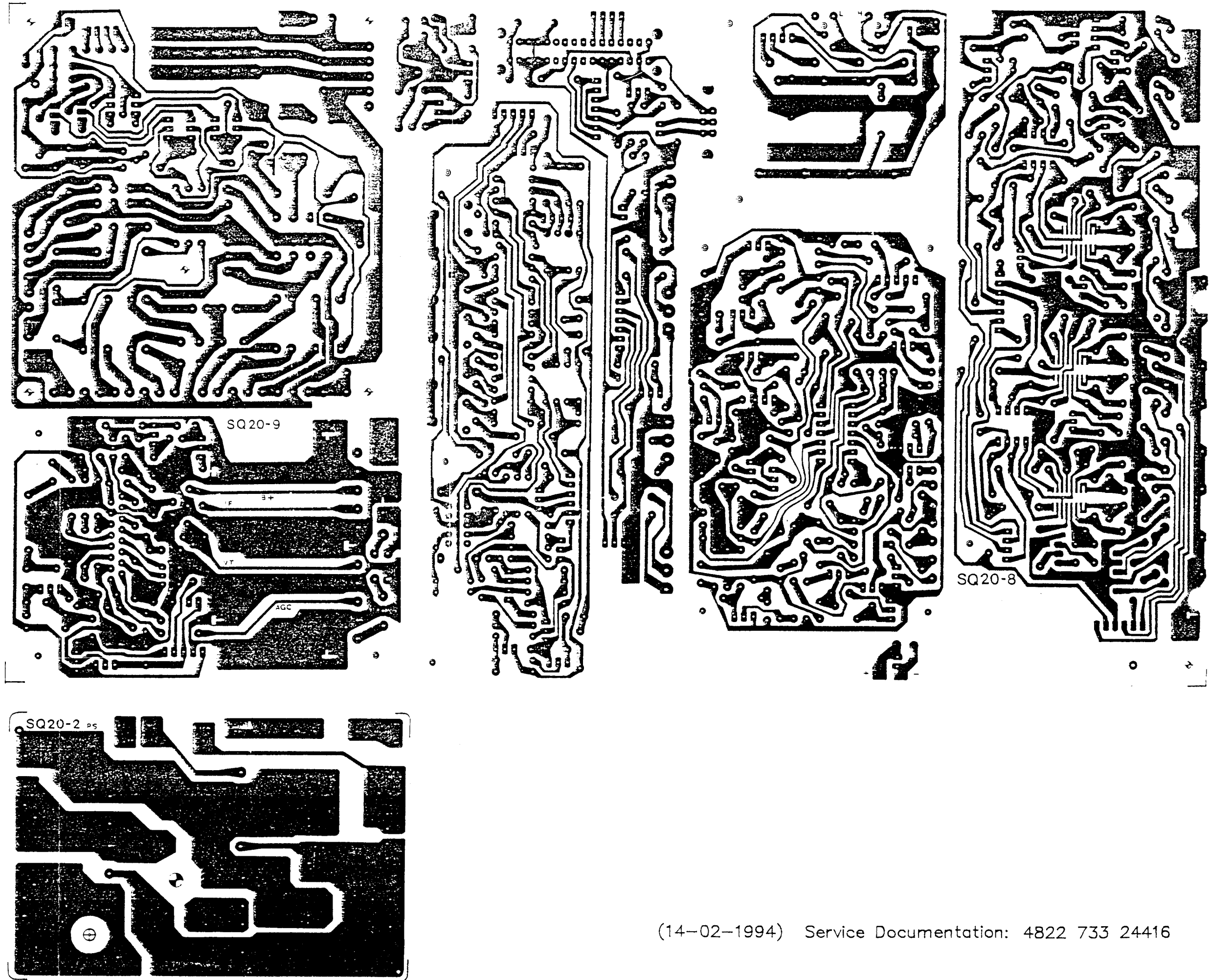


FIGURE 7.21
LBB 1237/00, LBB 1238/00
PCB LAY-OUT PART 3