

LAB 1600

SERVICEMANUAL

1996 EMC

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12.1-15.1.2	POWER SUPPLY <small>FROM SERIAL NO: 980-901</small>	PSU-G PSU-H	PSU-G-P PSU-H-P

OLD VERSIONS

<u>PAGE</u>	<u>CONTENTS</u>	<u>DRAWING SCHEMATIC</u>	<u>LAYOUT</u>
12-15	POWER SUPPLY <small>FROM SERIAL NO. 950-401 TO 980-825</small>	2KPSUC 2KPSUD	2KPSUC-P 2KPSUD-P

SERVICEINFORMATION FOR LAB 1200,1300,1600,2000,4000

New power supply board. PSUG, PSUH

Serial number from:

LAB 1200:	980-901
LAB 1300:	980-801
LAB 1600:	980-901
LAB 2000:	980-801
LAB 4000:	990-101

To be able to produce all the power supply on the same print board there have been some small changes done.

The out put power, and the electrical specification is not effected.

The new boards are called PSUG, and PSUH.

SERVICEINFORMATION FOR LAB 1200,1300,1600,2000,4000

New power supply board. PSUG, PSUH

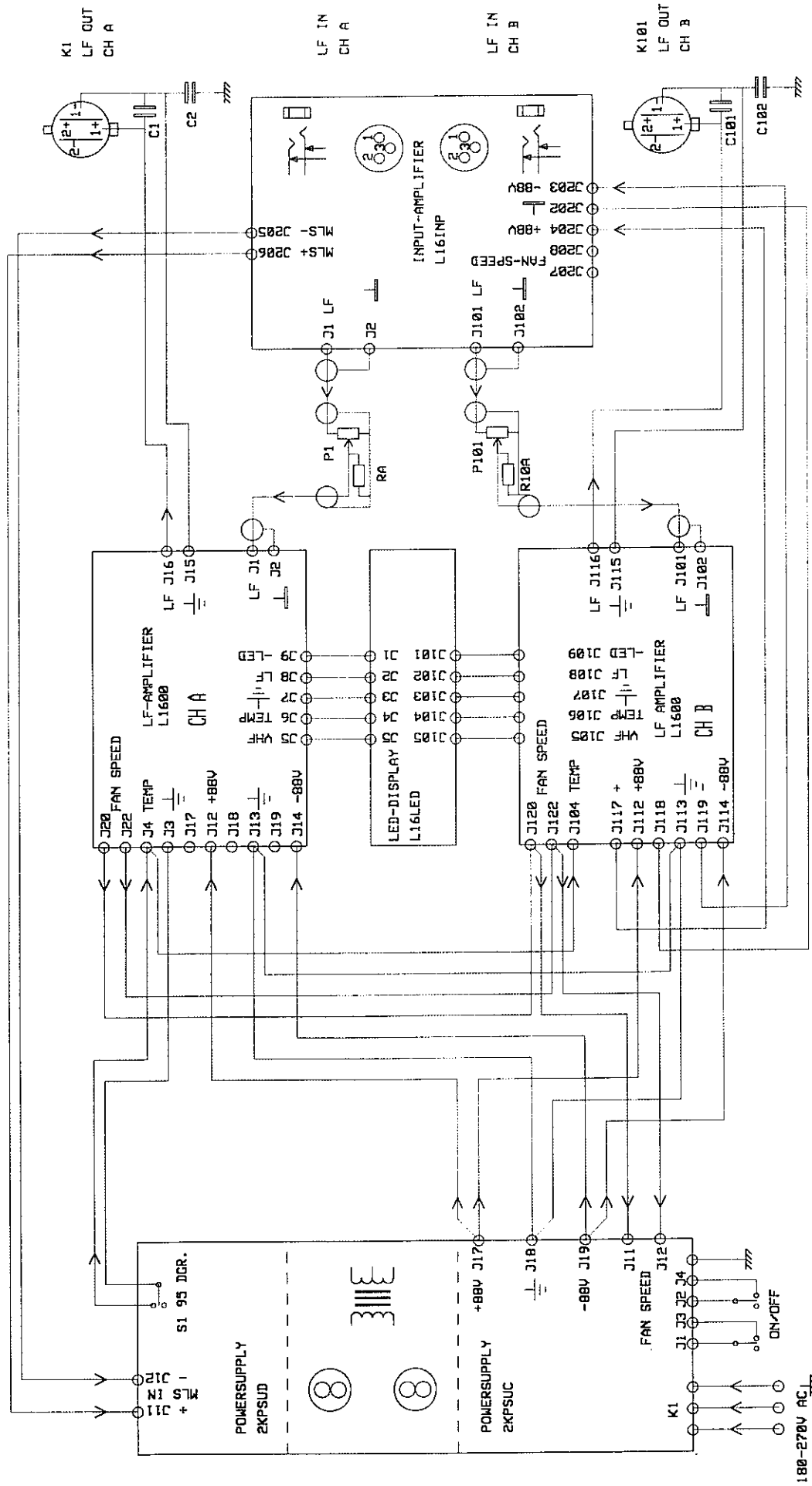
Serial number from:

LAB 1200:	980-901
LAB 1300:	980-801
LAB 1600:	980-901
LAB 2000:	980-801
LAB 4000:	990-101

To be able to produce all the power supply on the same print board there have been some small changes done.

The out put power, and the electrical specification is not effected.

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180-270V AC

SIGNAL DIRECTION

SIGNAL

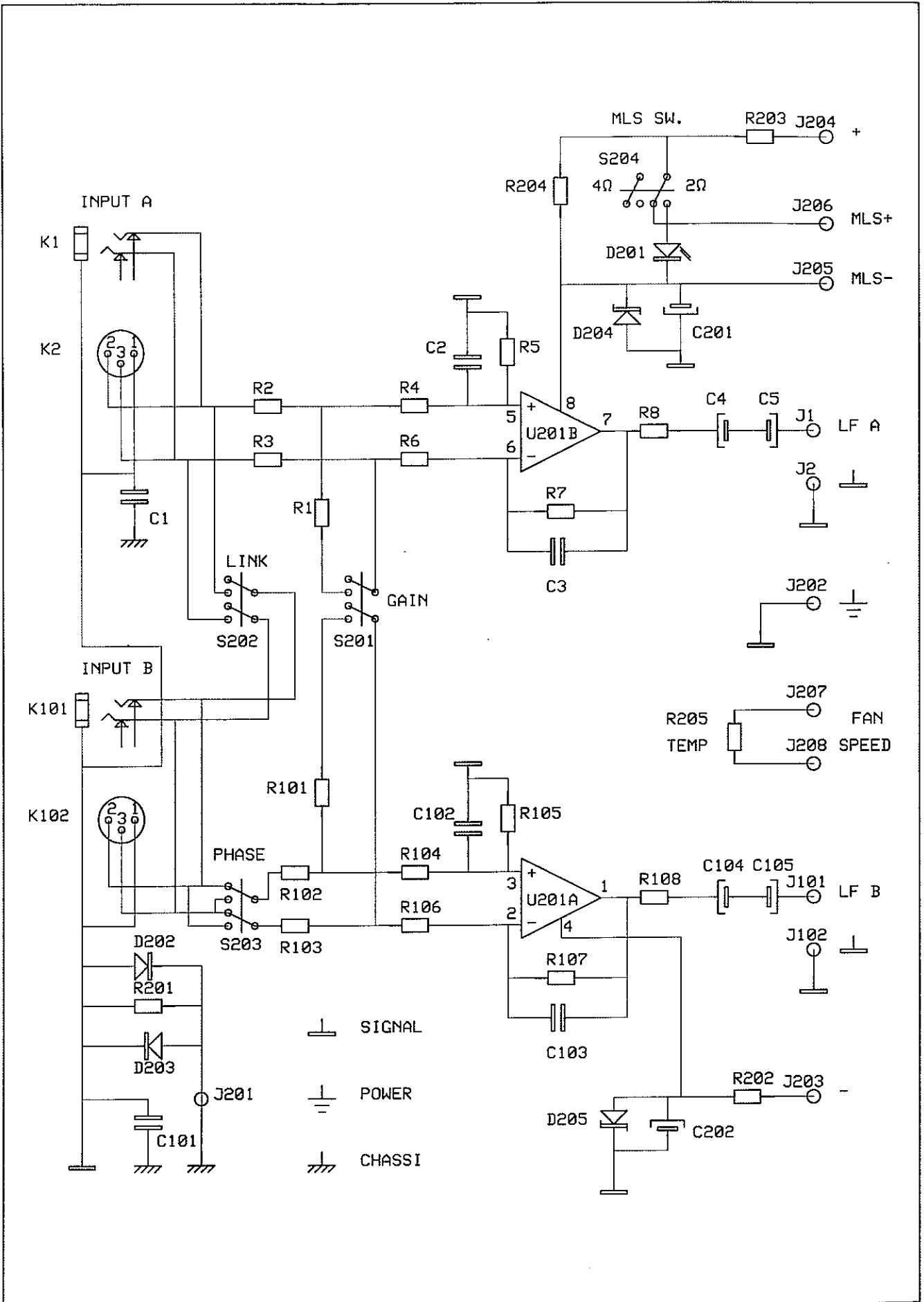
POWER LF

VOLTAGE WITH

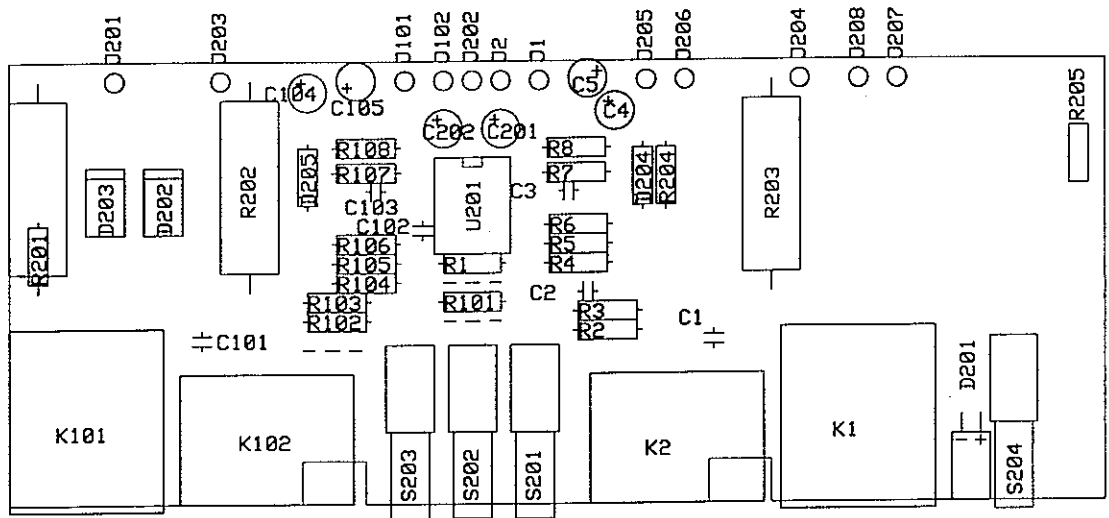
MLS IN 40

CHASSI

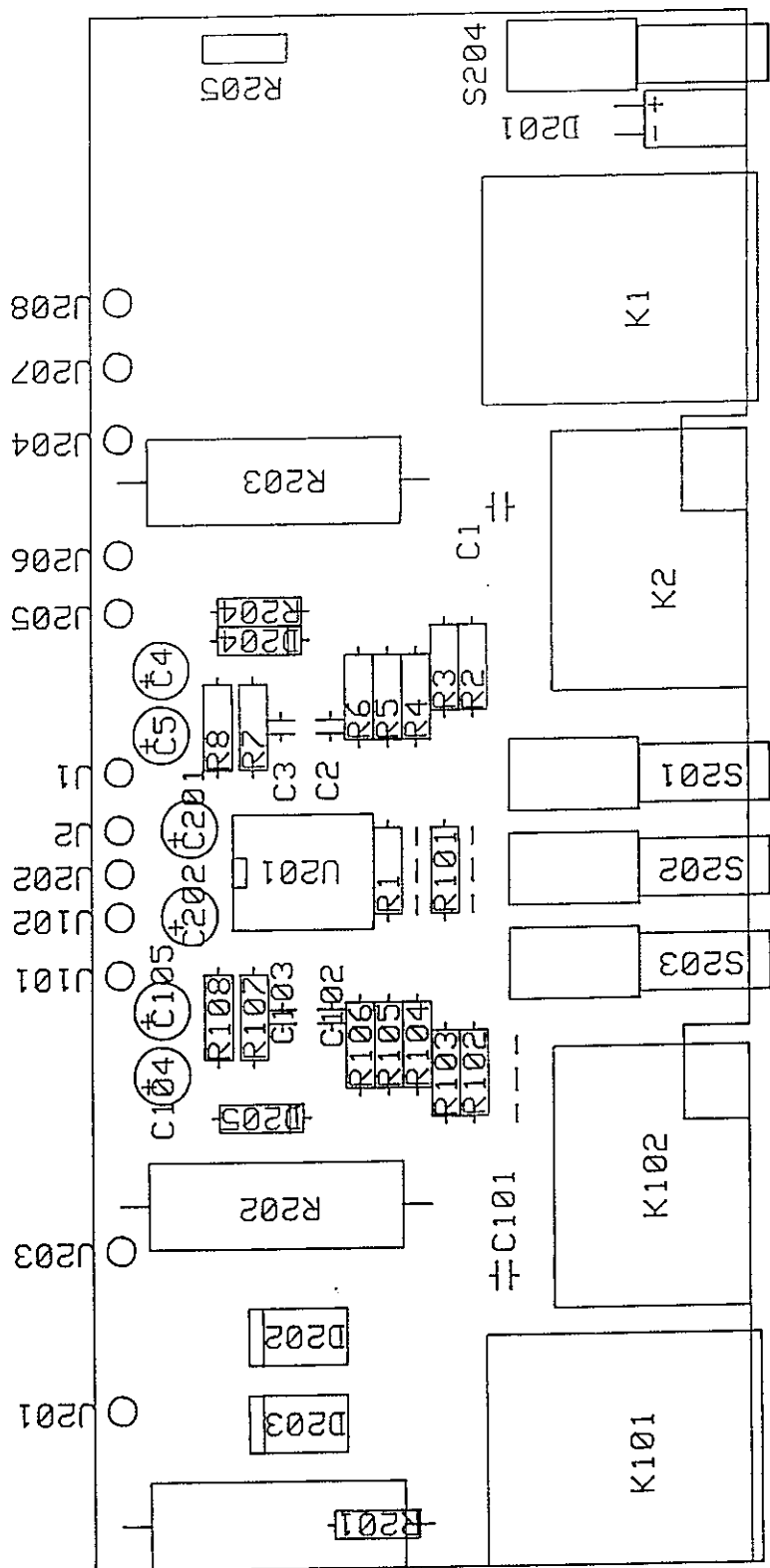
DESIGN	IRRAIN	CHECKED	INTERNAL CONNECTIONS	REPLACES	REPLACED BY
K.A.	K.A.		LAB 1600		
				DATE	PAGE
				95 01 05	
				DRAWING NO	L16CON



DESIGN K.A	DRAWN K.A	CHECKED	INPUT-AMPLIFIER	REPLACES	REPLACED BY
LABGRUPPEN KUNGSBACKA SWEDEN			LAB 1600	DATE 94-12-20	PAGE
				DRAWING NO	L16INP



DESIGN K.A	DRAWN K.A	CHECKED	INPUT AMPLIFIER		REPLACES	REPLACED BY
LABGRUPPEN KUNGSBACKA SWEDEN					LAB 1600	DATE 99 09 18
					DRAWING NO	L16INP-P



KONSTR.	RITAD K.A	KOP	KONTR.	STAND.	GODK.	SKALA	ERSÄTTER	ERSÄTT AV
LABGRUPPEN KUNGSBACKA SWEDEN							LAB 1600 INPUT-AMPLIFIER	
							RITN.-NR	DAT 94-12-20
							L16INP-P	

LAB 1600

INPUT AMPLIFIER AND INTERNAL CONECTIONS

Component-list

INPUT AMPLIFIER

Channel A (Channel B add 100)

Resistors

R1 6.04 k Ω 29 dB gain
 R1 2,32k Ω 23 dB gain
 R2 10 k Ω 1%
 R3 10 k Ω 1%
 R4 10 k Ω 1%
 R5 20 k Ω 1%
 R6 10 k Ω 1%
 R7 20 k Ω 1%
 R8 100 Ω

Capacitors

C1 0.1 μ F 63 V
 C2 -
 C3 -
 C4 22 μ F 50 V
 C5 22 μ F 50 V

Conectors

K1 3 pol XLR Neutrik
 NC3 FDH BAG
 K2 3 pol telejack Cliff
 S2/BBB/PC

Channel A and B

Resistors

R201 10 Ω
 R202 4.7 K Ω 3W
 R203 4.7 k Ω 3W
 R204 470 Ω

Capacitors

C201 22 μ F 50V
 C202 22 μ F 50V

Diodes

D201 Led Red
 D202 1N 5404
 D203 1N 5404
 D204 15V 0.4W Zener
 D205 15V 0.4W Zener

Integrated Circuits

U201 LF 353

Switches

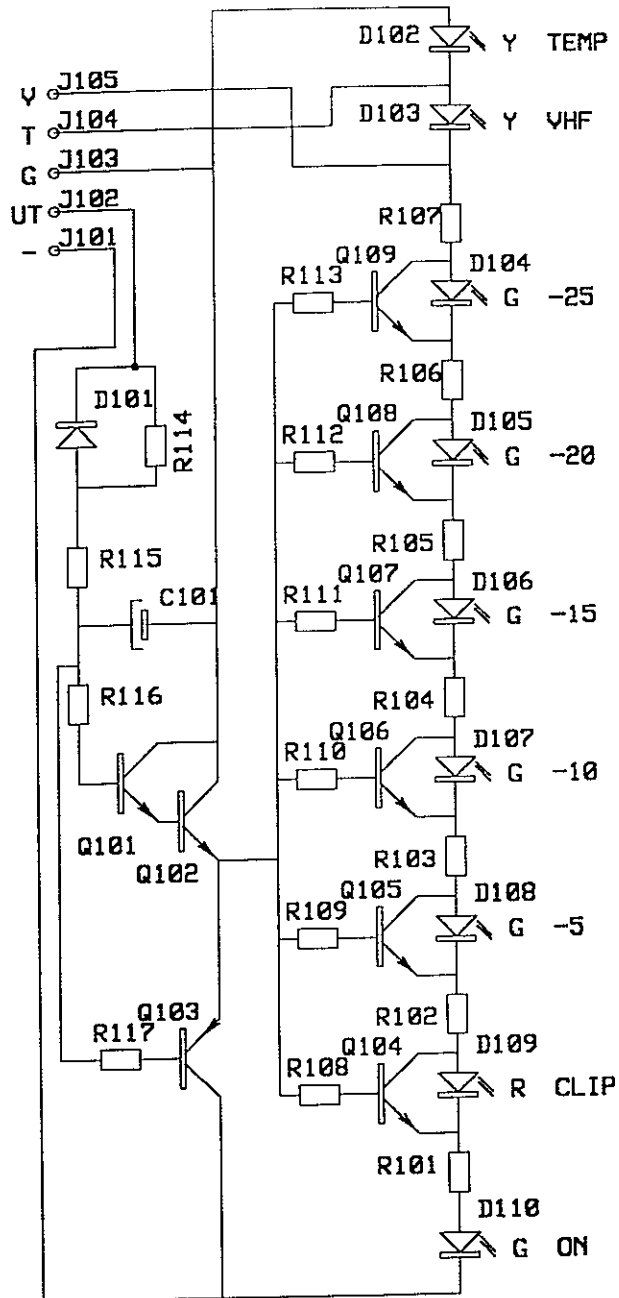
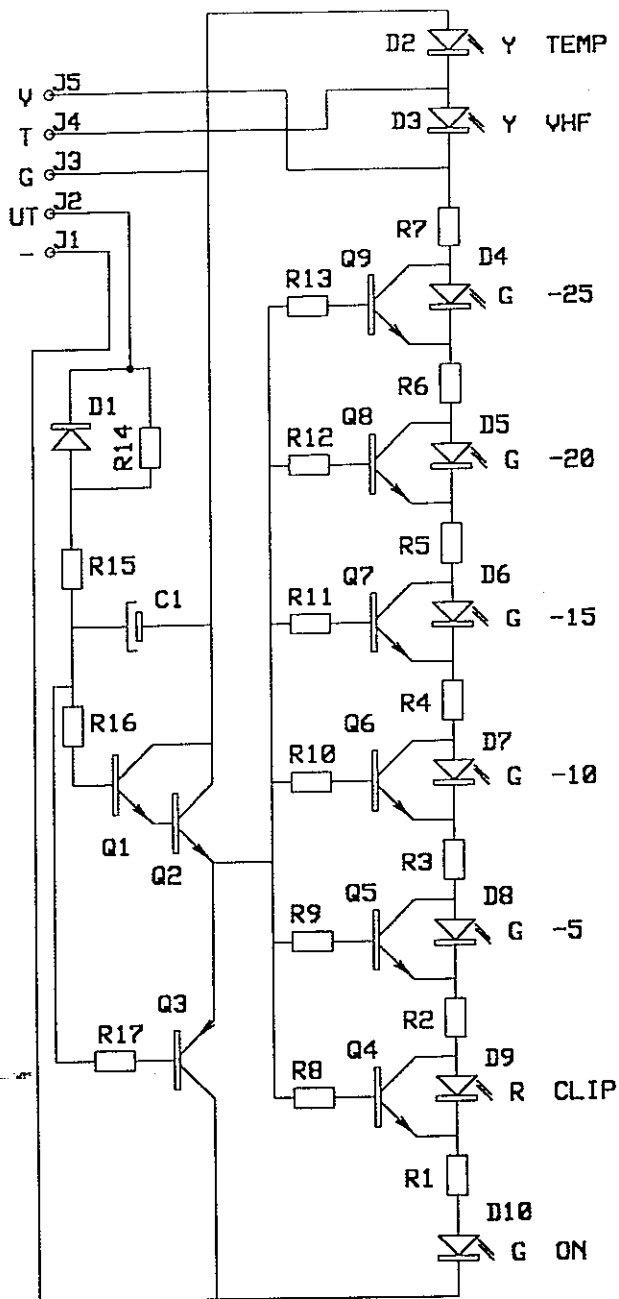
S201 ALPS SPP J3
 S202 ALPS SPP J3
 S203 ALPS SPP J3
 S204 ALPS SPP J3

INTERNAL CONNECTIONS

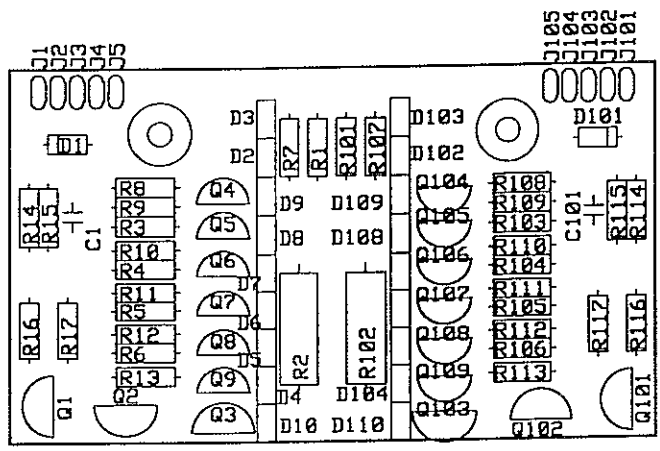
RA 10 k Ω 1%
 P1 10 k Ω lin Tokos
 C1 10 nF 400V
 C2 2.2 μ F 63V
 K1 4 pol speakon
 Neutrik

CHA

CHB



DESIGN K.A	DRAWN K.A	CHECKED	LED.DISPLAY	REPLACES	REPLACED BY
LABGRUPPEN			LAB500 1000 1300	DATE 90 12 01	PAGE
KUNGSBACKA SWEDEN			1600 2000 4000	DRAWING NO	2KLED



DESIGN K.A	DRAWN K.A	CHECKED	LED DISPLAY	REPLACES	REPLACED BY
LABGRUPPEN KUNGSBACKA SWEDEN				DATE 99 09 18	PAGE
			LAB500 1000 1300 1600 2000 4000		DRAWING NO

LAB 500 – 2000C

LED DISPLAY

Component-list

Channel A
(Ch. B add 100)

Resistors

R1	see below
R2	2.7 k Ω 3W
R3	1.2 k Ω 1W
R4	680 Ω
R5	330 Ω
R6	120 Ω
R7	220 Ω
R8	33 k Ω
R9	33 k Ω
R10	33 k Ω
R11	33 k Ω
R12	33 k Ω
R13	33 k Ω
R14	33 k Ω
R15	100 Ω 1%
R16	2.7 k Ω
R17	2.7 k Ω

Capacitors

C1	4.7 μ F 100V
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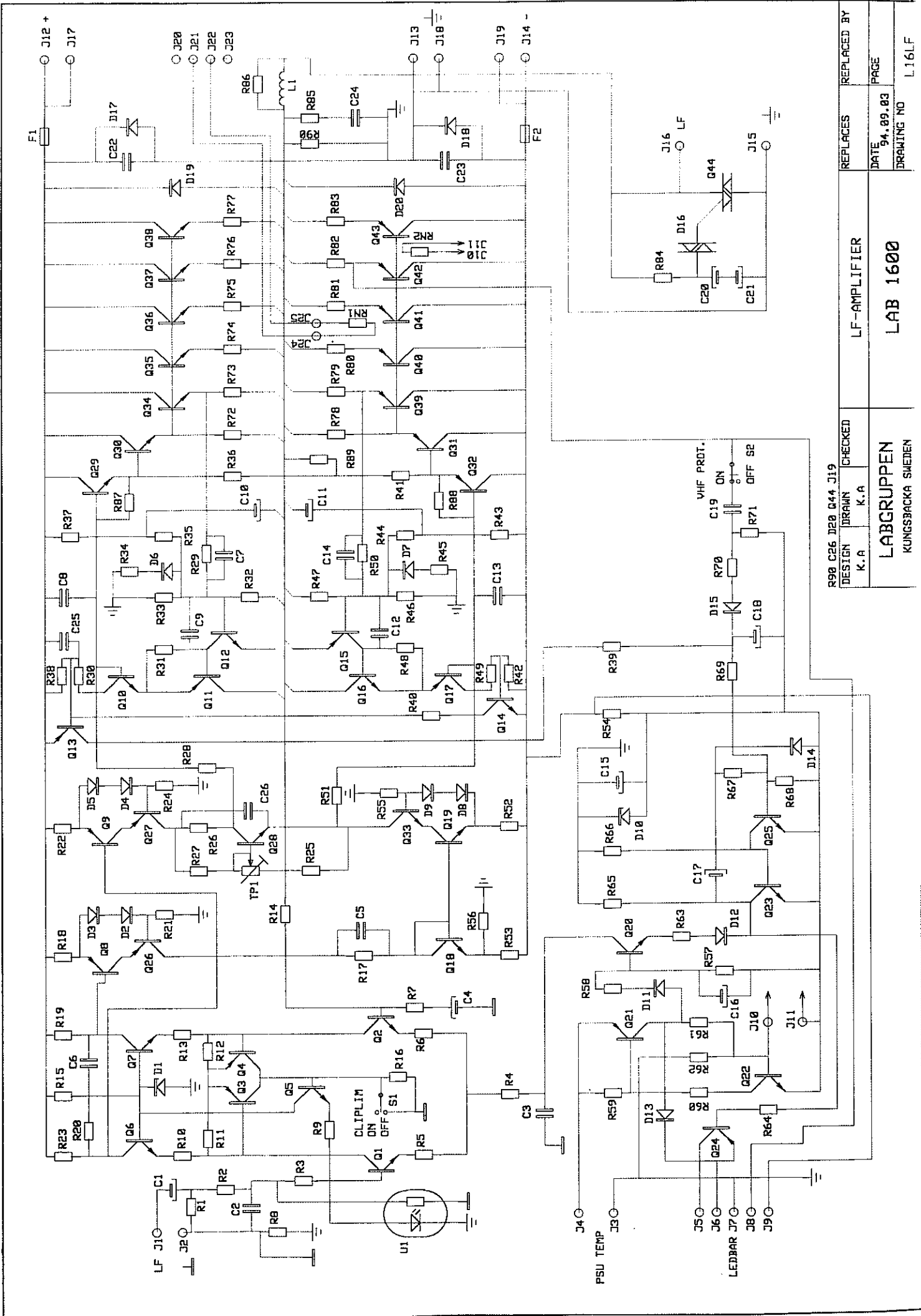
Diodes

D1	1N 4004
D2	Led Y
D3	Led Y
D4	Led G
D5	Led G
D6	Led G
D7	Led G
D8	Led G
D9	Led R
D10	Led G

Transistors

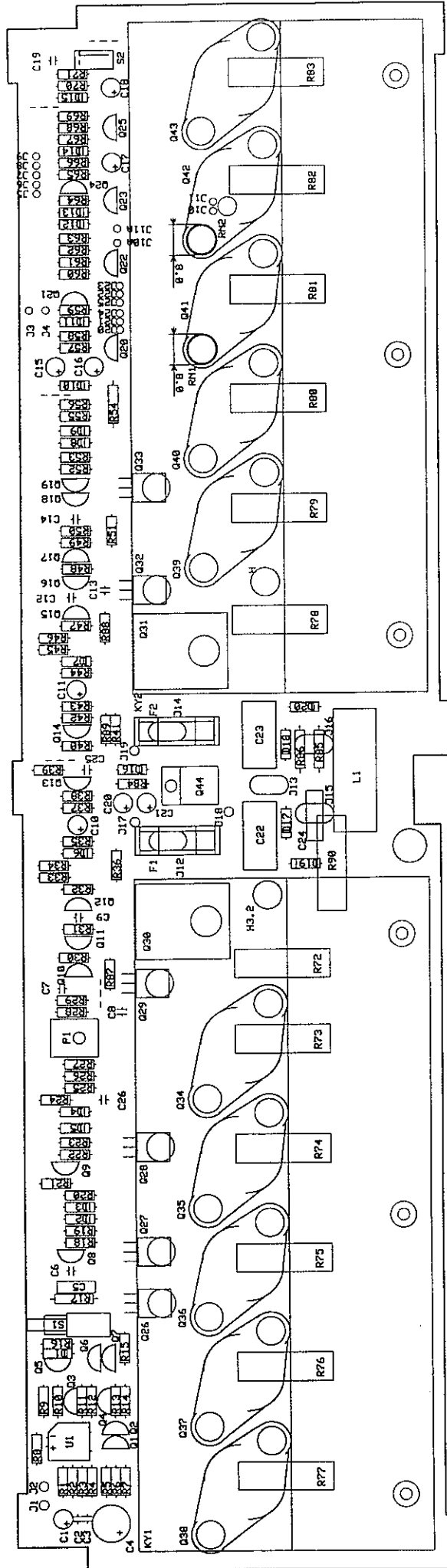
Q1	MPSA 42
Q2	MPSA 42
Q3	MPSA 92
Q4	BC 547
Q5	BC 547
Q6	BC 547
Q7	BC 547
Q8	BC 547
Q9	BC 547

	500	1000	1300C	1600	2000
R1	1,5 k Ω	820 Ω	680 Ω	680 Ω	680 Ω 1% long legs



DESIGN	DRAWN	CHECKED	REPLACES	REPLACED BY
K.A	K.A		LF-AMPLIFIER	
LABGRUPPEN			DATE	PAGE
KUNGSBACKA SWEDEN			94.09.03	
			DRAWING NO	L16LF

R90 C26 D20 Q44 J19



DESIGN DRAWN CHECKED
K.A. K.A.

REPLACES LF AMPLIFIER

REPLACED BY

LABGRUPPEN

LAB 1600

DATE 99 09 18
DRAWING NO.

LAB 1600

LF-AMPLIFIER

Component-list

Resistors

R1	15 k Ω
R2	15 k Ω
R3	1 k Ω
R4	2.2 k Ω 1%
R5	47 Ω
R6	47 Ω
R7	422 Ω 1%
R8	10 Ω
R9	1.8 k Ω
R10	6.8 k Ω 1%
R11	47 k Ω
R12	47 k Ω
R13	6.8 k Ω 1%
R14	33 k Ω 1%
R15	10 k Ω 1% on legs
R16	470 k Ω
R17	6.8 k Ω 3W
R18	100 Ω 1%
R19	3.3 k Ω 1%
R20	5.6 k Ω
R21	82 k Ω
R22	100 Ω 1%
R23	3.3 k Ω 1%
R24	82 k Ω
R25	560 Ω
R26	47 Ω
R27	3.3 k Ω 1%
R28	180 Ω
R29	2.2 k Ω 1%
R30	47 k Ω
R31	5.6 k Ω
R32	499 Ω 1%
R33	294 k Ω 1%
R34	180 k Ω 1%
R35	68 k Ω 1%
R36	47 Ω
R37	68 k Ω 1%
R38	1.8 k Ω
R39	33 k Ω 1%
R40	100 k Ω 1%
R41	47 Ω
R42	1.8 k Ω
R43	68 k Ω 1%
R44	68 k Ω 1%
R45	180 k Ω 1%
R46	294 k Ω 1%
R47	499 Ω 1%
R48	5.6 k Ω
R49	47 k Ω
R50	2.2 k Ω 1%
R51	220 Ω
R52	100 Ω 1%
R53	100 Ω 1%
R54	12 k Ω 2W
R55	82 k Ω
R56	82 k Ω
R57	56 k Ω 1%

R58	100 k Ω 1%
R59	5.6 k Ω
R60	33 k Ω 1%
R61	2.2 M Ω
R62*	220 k Ω 1%
R63	4.32 k Ω 1%
R64	33 k Ω 1%
R65	56 k Ω 1%
R66	56 k Ω 1%
R67	180 k Ω 1%
R68	100 k Ω 1%
R69	100 k Ω 1%
R70	10 k Ω 1%
R71	5.6 k Ω
R72	4.7 Ω 5W
R73	0.33 Ω 5W
R74	0.33 Ω 5W
R75	0.33 Ω 5W
R76	0.33 Ω 5W
R77	0.33 Ω 5W
R78	4.7 Ω 5W
R79	0.33 Ω 5W
R80	0.33 Ω 5W
R81	0.33 Ω 5W
R82	0.33 Ω 5W
R83	0.33 Ω 5W
R84	180 k Ω 1%
R85	10 Ω 3W
R86	10 Ω 3W
R87	1.8 k Ω
R88	1.8 k Ω
R89	220 Ω
R90	4.7 k Ω 5W

Thermistors

RN1	150 k Ω 20 $^{\circ}$
RN2*	150 k Ω 20 $^{\circ}$

Potentiometers

TP1	250 Ω
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Capacitors

C1	47 μ F 25V
C2	68 pF
C3	1 nF
C4	470 μ F 16V
C5	22 nF 250V
C6	390 pF
C7	1 nF
C8	100 pF
C9	470 pF
C10	2.2 μ F 100V
C11	2.2 μ F 100V
C12	470 pF
C13	22 pF

C14	1 nF
C15	10 μ F 50V
C16	10 μ F 50V
C17	10 μ F 50V
C18	4.7 μ F 50V
C19	39 pF
C20	4.7 μ F 50V
C21	4.7 μ F 50V
C22	2.2 μ F 100V
C23	2.2 μ F 100V
C24	0.1 μ F 250V
C25	33 nF 100V
C26	10 nF 100V

Diodes

D1	15 V 0.4W Zener
D2	1N 4148
D3	1N 4148
D4	1N 4148
D5	1N 4148
D6	BAV 21
D7	BAV 21
D8	1N 4148
D9	1N 4148
D10	15 V 0.4W Zener
D11	1N 4148
D12	1N 4148
D13	1N 4148
D14	1N 4148
D15	1N 4148
D16	DB 3 *
D17	1N 4004
D18	1N 4004
D19	1N 4004
D20	1N 4004

Transistors

Q1	BC 549C
Q2	BC 549C
Q3	BC 557B
Q4	BC 557B
Q5	BC 547B
Q6	MPSA 42
Q7	MPSA 42
Q8	BC 557B
Q9	BC 557B
Q10	MPSA 42
Q11	BC 557B
Q12	BC 547B
Q13	MPSA 92
Q14	MPSA 42
Q15	BC 557B
Q16	BC 547B
Q17	MPSA 92
Q18	BC 547B
Q19	BC 547B
Q20	BC 547B
Q21	BC 557B

Q22	BC 547B
Q23	BC 547B
Q24	BC 557B
Q25	BC 547B
Q26	MJE 350
Q27	MJE 350
Q28#	BD329
Q29	MJE 340
Q30	2SC 3281
Q31	2SA 1302
Q32	MJE 350
Q33	MJE 340
Q34	MJ 21194
Q35	MJ 21194
Q36	MJ 21194
Q37	MJ 21194
Q38	MJ 21194
Q39	MJ 21193
Q40	MJ 21193
Q41	MJ 21193
Q42	MJ 21193
Q43	MJ 21193

Tyristors

Q44	Q4015L5
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Optoresistors

U1	VTL5C4
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Inductors

L1

Fuses

F1	T10A
F2	T10A

Switches

S1	SPPJ3 Alps
S2	A1347 Siemens

* Until 9611

R62	237k Ω 1%
RN2	220 k Ω 20 $^{\circ}$

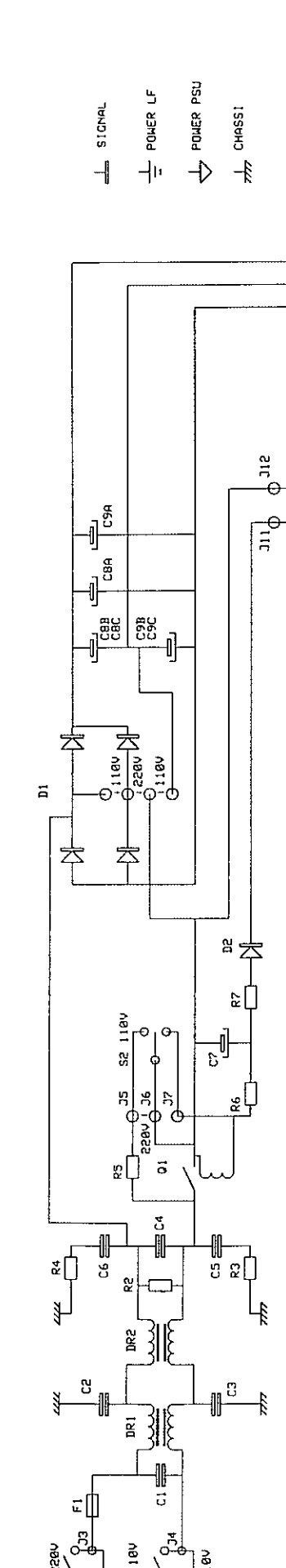
* Until 9801

Q28	MJE 340
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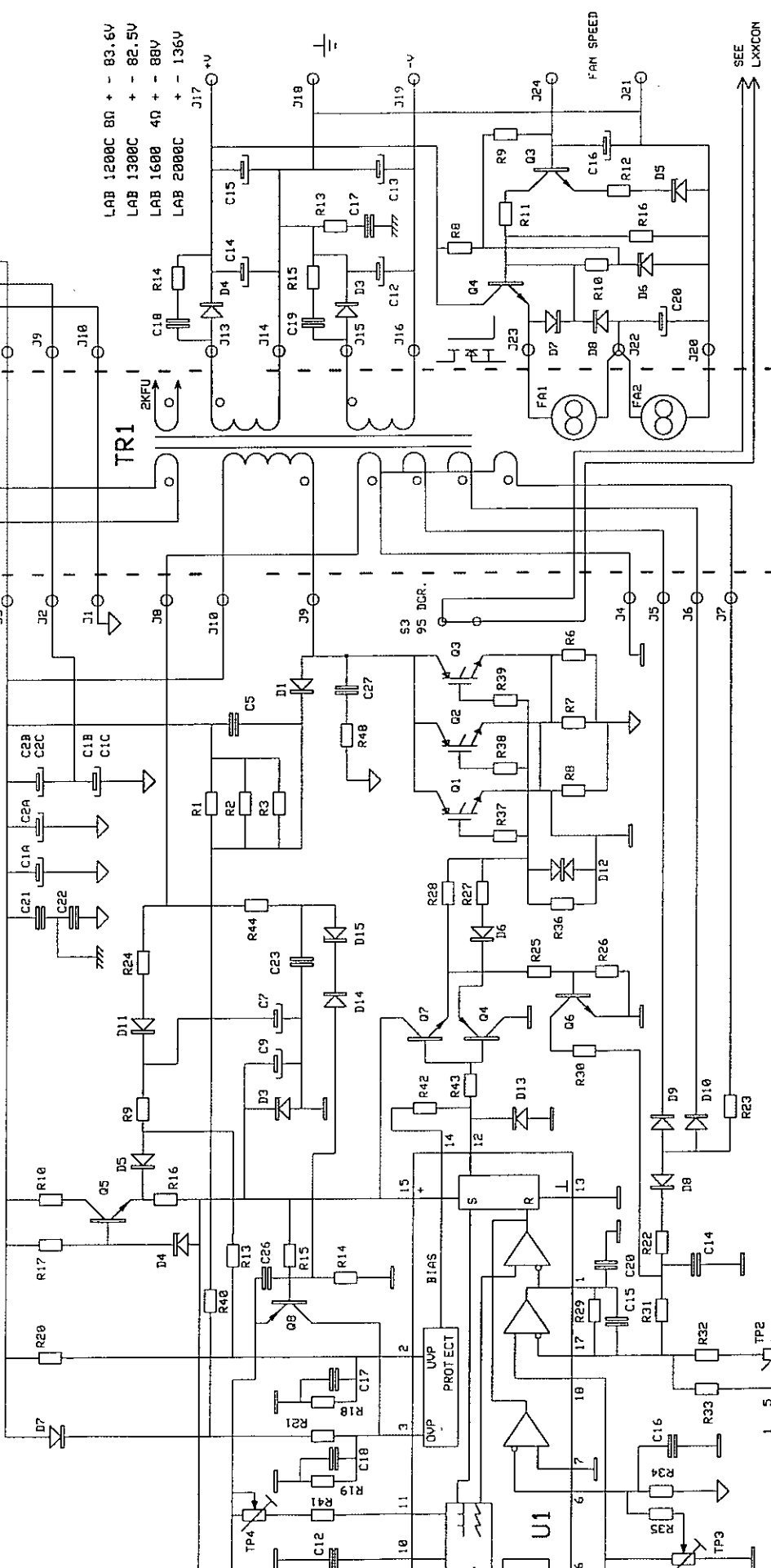
* Until 2001-06

D16	HS 10
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PSU-G



PSU-H

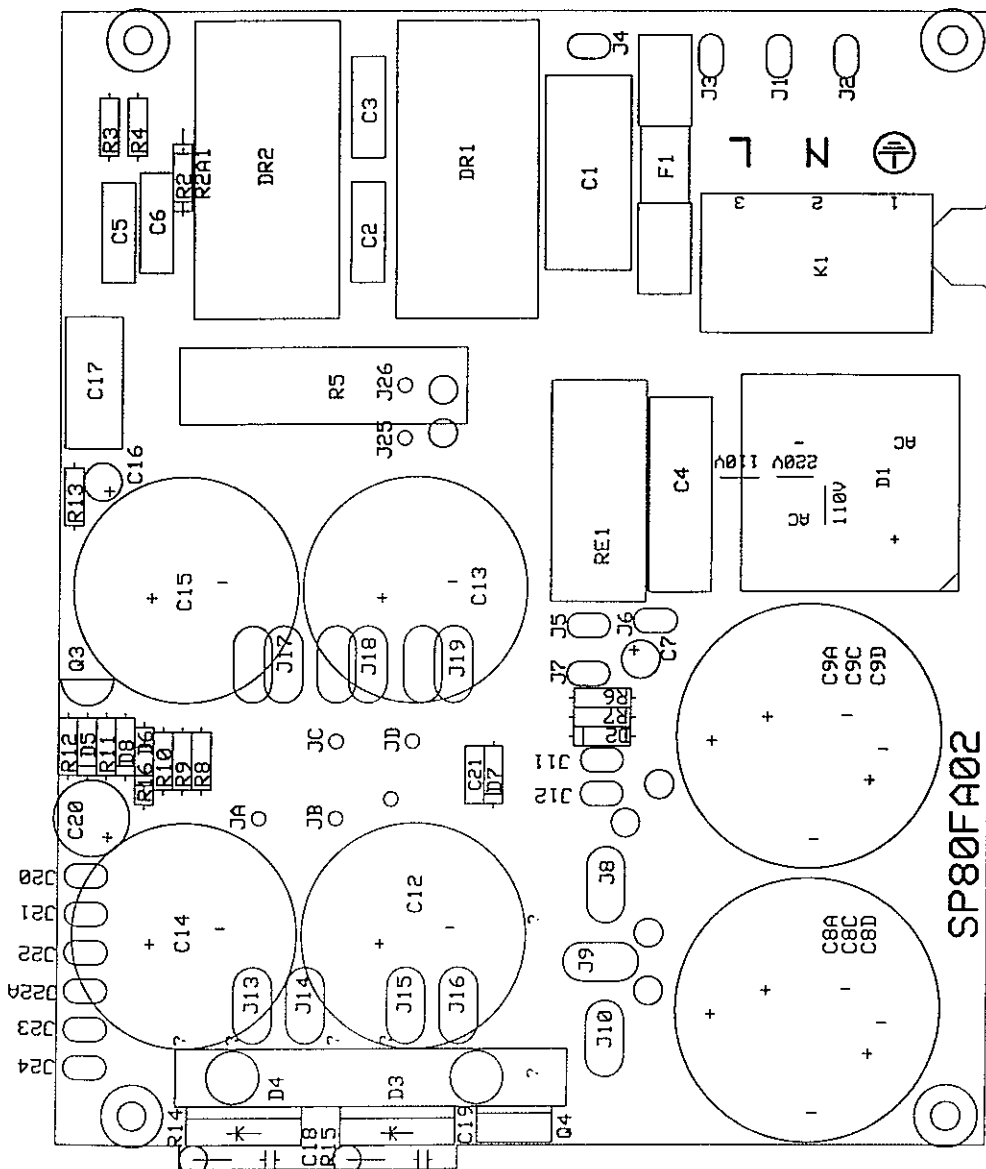


LAB 1200C 80 + - 83.6V
 LAB 1300C + - 82.5V
 LAB 1600 40 + - 88V
 LAB 2000C + - 136V

- SIGNAL
- POWER LF
- POWER PSU
- CHASSI

DESIGN	DRAWN	CHECKED	REPLACES	REPLACED BY
K.A	K.A		98-06-24	
LABGRUPPEN			LAB 1200 1300 1600	
			DATE	PAGE
			01-03-01	1

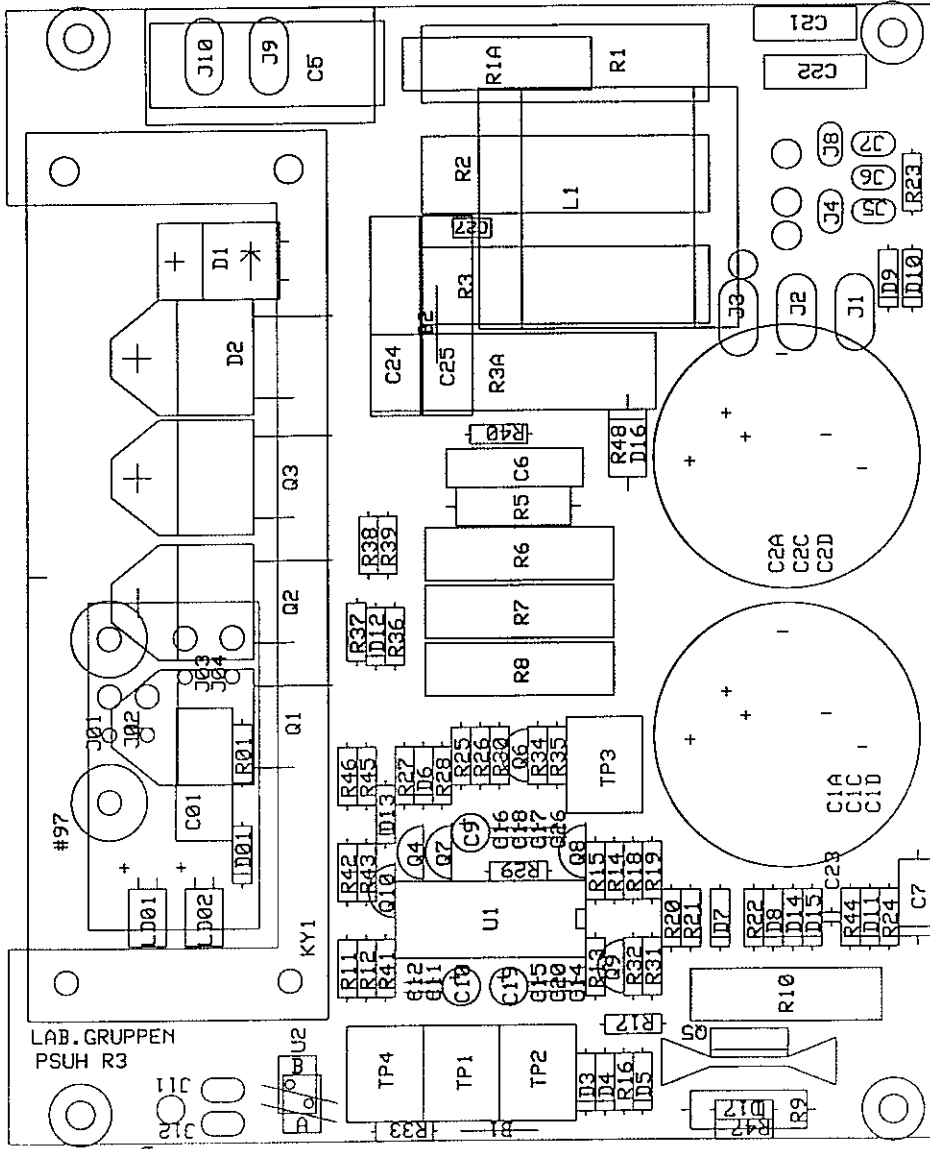




4 rectangles in milling type 1 = hole plated

SP80FA02

DESIGN K.A	DRAWN K.A	CHECKED	POWER SUPPLY SP80FA	REPLACES 01 04 13	REPLACED BY
LABGRUPPEN			LAB 1200 1300 1600	DATE 01 05 04	PAGE
KUNGSBACKA SWEDEN			2000 2002 4000 PSU48	DRAWING NO	SP80FA02-P



DESIGN K.A	DRAWN K.A	CHECKED	POWER SUPPLY H	REPLACES 99 09 18	REPLACED BY
LABGRUPPEN KUNGSBACKA SWEDEN			LAB 1200 1300 1600 2000C 2002 4000 PSU48	DATE 00 03 02	PAGE
				DRAWING NO	PSUHR3-P

POWER SUPPLY, BOARD PSUG

component-list

Resistors

R1-
 R2 1 M Ω 1%
 R3 33 Ω
 R4 33 Ω
 R5# 47 Ω 9W
 R6 33 Ω
 R7 2.2 Ω 1W
 R8 See below
 R9 See below
 R10 See below
 R11 See below
 R12 See below
 R13 4.7 Ω
 R14 See below
 R15 See below
 R16 See below

Capacitors

C1 0.47 μ F
 C2# 1.5 nF Y
 C3# 1.5 nF Y
 C4 0.22 μ F
 C5# 1.5 nF Y
 C6# 1.5 nF Y
 C7 100 μ F 50V
 C8a# See below
 C9a# See below

C12 See below
 C13 See below
 C14 See below
 C15 See below
 C16 22 μ F 16V
 C17 2.2 μ F 63V
 C18 See below
 C19 See below
 C20 See below
 C21 See below

Diodes

D1 600V 35A
 D2 BYW26C
 D3 STTB3006PI
 D4 STTB3006PI
 D5 5.6V Zener
 D6 See below
 D7 See below
 D8 See below

Transistors

Q3 BC 546
 Q4 See below

Relays

RE1 FEME MZF 0014816

Fuses

FU1 See below

Coils

DR1# See below
 DR2# See below

Switches

S1# See below
 S2# See below
 S3 Comepa 4JT95 ARIUI 95°C

Relays

RE1 FEME MZF 0014816

Socket

K1 MKDSP10/3-10,16

110V AC

R5 22 Ω 9W
 C2 2,2 nF Y
 C3 2,2 nF Y
 C5 2,2 nF Y
 C6 2,2 nF Y

* Until 9708

Q4 BDX53F
 D7 -
 D8 -

POWER SUPPLY, BOARD PSUG

	LAB 1200C	LAB 1300C	LAB 1600	LAB 2000C	LAB 4000	PSU48-8
R8	4.7 k Ω 1%	Jumper	8.2 k Ω 1%	Jumper	27 k Ω 1% long leg	4,7 k Ω 1%
R9	1 M Ω	470 k Ω	150 k Ω	390 k Ω	180 k Ω 1%	470 k Ω
R10	39 k Ω 1%	4.7 k Ω 1% long leg	39 k Ω 1%	47 k Ω 1%	39 k Ω 1%	10 k Ω 1%
R11	18 k Ω 1%	1.8 k Ω	18 k Ω 1%	6.8 k Ω	18 k Ω 1%	4,7 k Ω 1%
R12	4.7 k Ω 1%	Jumper	4.7 k Ω	1.8 k Ω	4.7 k Ω 1%	Jumper
R14	2.2 Ω 2W	-	2.2 Ω 2W	-	-	-
R15	2.2 Ω 2W	-	2.2 Ω 2W	-	-	-
R16	-	18 k Ω 1%	-	39 k Ω 1%	-	-
C8a	220uF 385V	220uF 385V	220uF 385V	220uF 385V		220uF 385V
C9a	220uF 385V	220uF 385V	220uF 385V	220uF 385V		220uF 385V
C8b	-	-	-	-	1500 uF 200V	-
C9b	-	-	-	-	1500 uF 200V	-
C12	3900 uF 100V	3900 uF 100V	3900 uF 100V	1800 uF 160V	1800 uF 160V	3900 uF 100V
C13	3900 uF 100V	3900 uF 100V	3900 uF 100V	1800 uF 160V	1800 uF 160V	3900 uF 100V
C14	3900 uF 100V	3900 uF 100V	3900 uF 100V	1800 uF 160V	1800 uF 160V	3900 uF 100V
C15	3900 uF 100V	3900 uF 100V	3900 uF 100V	1800 uF 160V	1800 uF 160V	3900 uF 100V
C18	4.7 nF 400V	-	4.7 nF 400V	-	-	-
C19	4.7 nF 400V	-	4.7 nF 400V	-	-	-
C20	100 uF 50V	100 uF 50V	100 uF 50V	100 uF 50V	100 uF 50V	-
C21	-	-	-	680 pF/400V	680 pF/400V	-
D6	62 V \pm 2% Zener	-	62 V \pm 2% Zener	-	62 V \pm 2% Zener	27V Zener
D7	-	-	-	15V Zener	15V Zener	-
D8	-	-	-	39V \pm 2% Zener	39V \pm 2% Zener	-
Q4	TIP132	TIP41	TIP132	*IRF730	*IRF730	BDX53F
F1	T10AH250V	T8AH250V	T10AH250V	T10AH250V	T15AH250V	T10AH250V
DR1	2.7mH 8A 220V	2.7mH 8A 220V	2.7mH 8A 220V	2.7mH 8A 220V	1.4mH 16A 110V	2.7mH 8A 220V
DR2	2.7mH 8A 220V	2.7mH 8A 220V	2.7mH 8A 220V	2.7mH 8A 220V	1.4mH 16A 110V	2.7mH 8A 220V
S1	8550VB	8550VB	8550VB	8550VB	Jumper	8550VB
S2	-	-	-	-	H8610VBBB	-
B1	JB-JC, D1,2	-	-	-	-	-
B2	-	-	-	-	-	JA-JB, D1,2
B3	-	-	-	-	-	JC-JD, D1,2
B4	J5-J6	J5-J6	J5-J6	J5-J6	-	J5-J6
B5#	Rectifier 220V	Rectifier 220V	Rectifier 220V	Rectifier 220V	Rectifier 220V	Rectifier 220V

110V

C8b#	1500 uF 200V	1500 uF 200V	1500 uF 200V	1500 uF 200V	-	1500 uF 200V
C9b#	1500 uF 200V	1500 uF 200V	1500 uF 200V	1500 uF 200V	-	1500 uF 200V
C8d#	-	-	-	-	2200 uF 200V	-
C9d#	-	-	-	-	2200 uF 200V	-
F1#	T20A	T20A	T20A	T20A	T30A	T20A
DR1#	1.4mH16A110V	1.4mH16A110V	1.4mH16A110V	1.4mH16A110V	1.4mH25A110V	1.4mH16A110V
DR2#	1.4mH25A110V	1.4mH16A110V	1.4mH16A110V	1.4mH16A110V	1.4mH25A110V	1.4mH16A110V
S1	Jumper	Jumper	Jumper	Jumper	Jumper	Jumper
S2#	H8610VBBB	H8610VBBB	H8610VBBB	H8610VBBB	H8610VBBB	H8610VBBB
B5	Rectifier 110V	Rectifier 110V	Rectifier 110V	Rectifier 110V	Rectifier 110V	Rectifier 110V
B6	Rectifier 110V	Rectifier 110V	Rectifier 110V	Rectifier 110V	Rectifier 110V	Rectifier 110V

POWER SUPPLY, BOARD PSUH

component-list

Resistors

R1	See below
R2	See below
R3	See below
R4	-
R5	See below
R6	0.1 Ω 4W
R7	0.1 Ω 4W
R8	0.1 Ω 4W
R9	See below
R10	4.7 k Ω 5W
R11	680 k Ω 5%
R12	33 k Ω 1%
R13	100 k Ω 1%
R14	10 k Ω 1%
R15	18 k Ω 1%
R16	180 Ω 1%
R17	120 k Ω 2W
R18#	8.2 k Ω 1% (110V see below)
R19	See below
R20	432 k Ω 1% highvolt
R21	750 k Ω 1%
R22	4.7 Ω
R23	See below
R24	4.7 Ω
R25	15 k Ω 1%
R26	1 k Ω 1%
R27	See below
R28	82 Ω
R29	4.7 M Ω
R30	See below
R31	220 k Ω 1%
R32	See below
R33	See below
R34	See below
R35	See below
R36	15 k Ω 1%
R37	See below
R38	See below
R39	See below
R40	See below
R41	18 k Ω 1%
R42*	-
R43*	Jumper
R44	See below
R45	See below
R46	See below
R47	See below
R48	See Below

Capacitors

C1a#	See below
C2a#	See below
C5	0.68 μ F 250V
C6	-
C7	10 μ F 63V
C8	-
C9	10 μ F 50V
C10	22 μ F 50V
C11*	470 pF NPO
C12	1 nF
C13	-
C14	10 nF
C15	See below
C16	330 pF
C17	-
C18	1 nF
C19	10 μ F 50V
C20	-
C21#	1.5 nF Y
C22#	1.5 nF Y
C23	1 nF
C24	See below
C25	See below
C26	1 nF
C27	See Below

Diodes

D1	BYT 12PI 1000
D2	See below
D3	15V 1.3W Zener
D4	5.6V 0.4W Zener
D5	1N 4148
D6	BYW 26C
D7	1N 4004
D8	1N 4148
D9	1N 4148
D10	1N 4148
D11	BYW 26C
D12	BZW 06P15B
D13	BAT 85
D14	1N 4148
D15	See below
D16	See below
D17	See below

Trim potentiometers

TP1	10 k Ω
TP2	25 k Ω
TP3	10 k Ω
TP4*	15 k Ω Resistor

Integrated circuits

U1	UC 3851 alt. UC 3841
U2	See below

Transistors

Q1	See below
Q2	See below
Q3	See below
Q4	BC 327
Q5	TIP 50
Q6	BC 547
Q7*	Jumper b-e
Q8	BC 557
Q9	See below
Q10	See below

Switches

S2	Temp switch 95°
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Inductors

L1	See below
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Jumpers

B1	See below
B2	See below

110V

C1b	See below
C2b	See below
C21	2,2nF Y
C22	2,2nF Y
R18	10k Ω 1%

* UC3841

R42	4.7 k Ω
R43	82 Ω
TP4	10 k Ω
C11	1 nF
Q7	BC 337

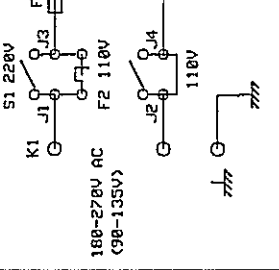
POWER SUPPLY, BOARD PSUH

	LAB 1200C	LAB 1300C	LAB 1600	LAB 2000C	LAB 4000	PSU 48-8
R1	18 kΩ 9W	18 kΩ 9W	18 kΩ 9W	18 kΩ 9W	33 kΩ 9W	18 kΩ 9W
R2	18 kΩ 9W	18 kΩ 9W	18 kΩ 9W	18 kΩ 9W	-	18 kΩ 9W
R3	18 kΩ 9W	18 kΩ 9W	18 kΩ 9W	18 kΩ 9W	-	18 kΩ 9W
R5	-	-	-	-	330 Ω 2W	-
R9	1.5 kΩ 2W	1.5 kΩ 2W	1.5 kΩ 2W	1.5 kΩ 2W	1 kΩ 3W	1.5 kΩ 2W
R19	5.62 kΩ 1%	5.62 kΩ 1%	5.62 kΩ 1%	5.62 kΩ 1%	5.9 kΩ 1%	5.62 kΩ 1%
R23	8,2 kΩ 1%	6.8 kΩ 1%	6.8 kΩ 1%	6.8 kΩ 1%	6.8 kΩ 1%	10 kΩ 1%
R27	4.7 Ω	4.7 Ω	4.7 Ω	4.7 Ω	jumper	4.7 Ω
R30	56 kΩ 1%	56 kΩ 1%	56 kΩ 1%	56 kΩ 1%	180 kΩ 1%	56 kΩ 1%
R32	133 kΩ 1%	88.7 kΩ 1%	169 kΩ 1%	88.7 kΩ 1%	88.7 kΩ 1%	-
R33	270 kΩ 1%	-	330 kΩ 1%	-	1 kΩ 1%	-
R34	2,2 kΩ 1%	2,0 kΩ 1%	2,2 kΩ 1%	2,2 kΩ 1%	2,4 kΩ 1%	-
R35	4.7 kΩ 1%	4.7 kΩ 1%	4.7 kΩ 1%	4.7 kΩ 1%	3,3 kΩ 1%	4.7 kΩ 1%
R37	4.7 Ω	4.7 Ω	4.7 Ω	4.7 Ω	2.2 Ω	-
R38	4.7 Ω	4.7 Ω	4.7 Ω	4.7 Ω	2.2 Ω	4.7 Ω
R39	4.7 Ω	4.7 Ω	4.7 Ω	4.7 Ω	2.2 Ω	4.7 Ω
R40	1 MΩ 1%	1 MΩ 1%	1 MΩ 1%	1 MΩ 1%	1,2 MΩ 1%	1 MΩ 1%
R44	470 Ω	470 Ω	470 Ω	470 Ω	560 Ω	470 Ω
R45	-	-	-	-	698 Ω 1%	-
R46	-	-	-	-	196 Ω 1%	-
R47	-	-	-	-	820 Ω	-
R48	2,2Ω 2W	2,2Ω 2W	2,2Ω 2W	2,2Ω 2W	-	2,2Ω 2W
C1a#	220 uF 385V	220 uF 385V	220 uF 385V	220 uF 385V	-	220 uF 385V
C2a#	220 uF 385V	220 uF 385V	220 uF 385V	220 uF 385V	-	220 uF 385V
C1b#	-	-	-	-	1500 uF 200V	-
C2b#	-	-	-	-	1500 uF 200V	-
C6	-	-	-	-	1 nF 1.5 kV	-
C15	330 pF	330 pF	330 pF	330 pF	330 pF	1 nF
C24	-	-	-	-	22 nF 1kV	-
C25	-	-	-	-	22 nF 1kV	-
C27	100pF/1600V	100pF/1600V	100pF/1600V	100pF/1600V	-	100pF/1600V
D2	-	-	-	-	STTA 1512PI	-
D15	43V 2% Zener	43V 2% Zener	39V 2% Zener	43V 2% Zener	43V 2% Zener	30V 2% Zener
D16	-	-	-	-	BYM 26E	-
D17	-	-	-	-	1N4148	-
Q1	BUP 307	BUP 307	BUP 307	BUP 307	BUP 314S	BUP 307
Q2	BUP 307	BUP 307	BUP 307	BUP 307	BUP 314S	-
Q3	BUP 307	BUP 307	BUP 307	BUP 307	BUP 314S	-
Q9	Jumper b-c	-	Jumper b-c	-	BC557	-
Q10	-	-	-	-	BC547	-
U2	PC 113	-	PC 113	-	Jumper 1-5	PC 113
U2	-	-	-	-	Jumper 2-4	-
L1	-	-	-	-	400 uH LAB	-
B1	-	-	-	-	-	jumper
B2	-	-	-	-	-	jumper
# 110V						
C1b#	1500 uF 200V	1500 uF 200V	1500 uF 200V	1500 uF 200V	-	1500 uF 200V
C2b#	1500 uF 200V	1500 uF 200V	1500 uF 200V	1500 uF 200V	-	1500 uF 200V
C1d#	-	-	-	-	2200 uF 200V	-
C2d#	-	-	-	-	2200 uF 200V	-
R18	10 kΩ 1%	10 kΩ 1%	10 kΩ 1%	10 kΩ 1%	-	-
AFS IND.						
R01	-	-	-	-	4,7 kΩ 1%	-
C01	-	-	-	-	0,1uF 400V	-
D01	-	-	-	-	1N4148	-
LD01	-	-	-	-	green 2,5x5mm	red 2,5x5mm
LD02	-	-	-	-	red 2,5x5mm	green 2,5x5mm

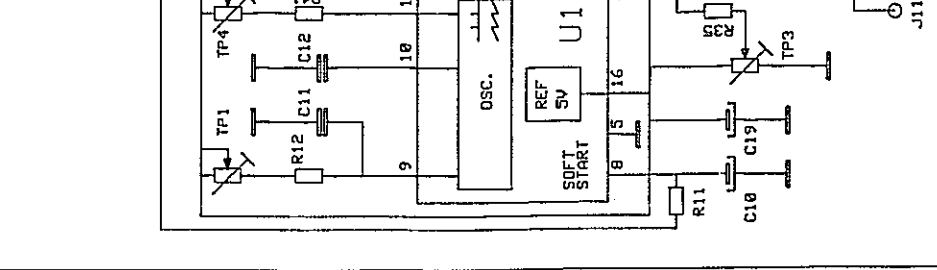
Old versions Lab 1600

<u>PAGE</u>	<u>CONTENTS</u>	<u>DRAWING SCHEMATIC</u>	<u>LAYOUT</u>
11-14	POWER SUPPLY <small>FROM SERIAL NO. 950-401 TO 980-825</small>	2KPSUC 2KPSUD	2KPSUC-P 2KPSUD-P

PSU-C



PSU-D

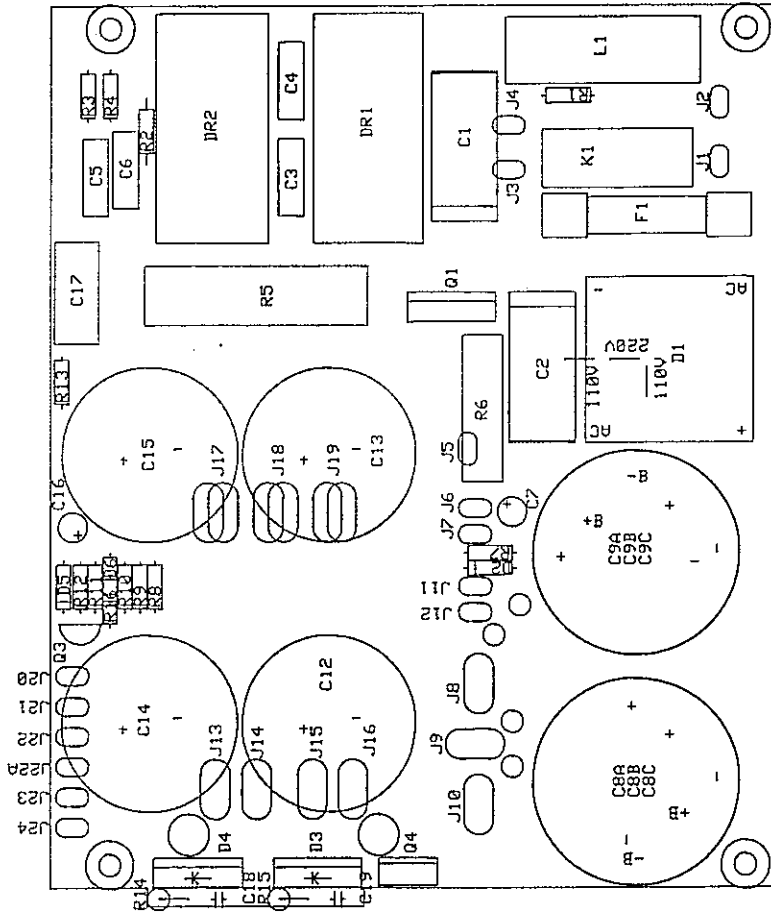
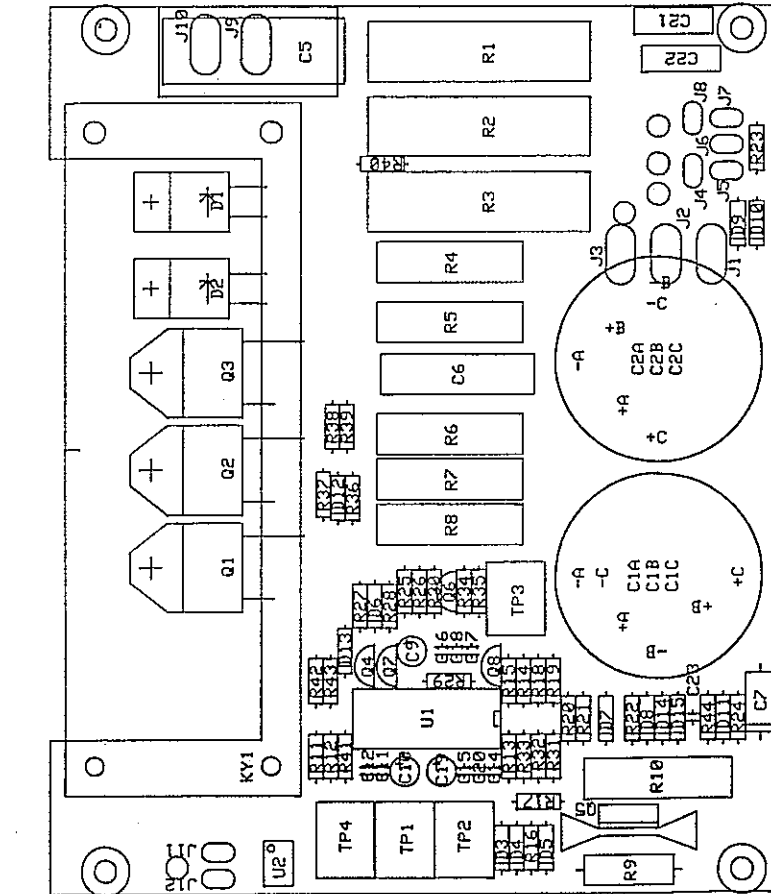


- SIGNAL
- POWER LF
- POWER PSU
- CHASSI

- LAB 1200C 80 + - 83.6V
- LAB 1300C + - 82.5V
- LAB 1600 40 + - 88V
- LAB 2000C + - 136V

KONSTR. K.A	RITAD K.A	KOP	KONTR.	STAND.	GODK.	SKALA	ERSATTS	ERSATT AV
LABGRUPPEN KUNGSBACKA SVELEN			LAB	1200	1300	1600	2000	2KPSU-D
								94-86-16
								2KPSU-C
								2KPSU-D

POWERSUPPLY



KONSTR. K.A.	RITAD. K.A.	KOP. K.A.	KONTR. K.A.	STAND. K.A.	GODK. K.A.	SKALA	ERSÄTT. AV
LABGRUPPEN			LAB		1200	1300	
KUNGSBACKA SVEDEN					1600	2000	
						POWERSUPPLY	
							ERSÄTT. AV
							DAT 94 07 09
							2KPSU-C-P
							2KPSU-D-F

LAB 1200C, LAB 1300C, LAB 1600, LAB 2000C

POWER SUPPLY, BOARD PSUC

component-list

Resistors

R1-
 R2 1 M Ω 1%
 R3 33 Ω
 R4 33 Ω
 R5# 47 Ω 9W
 R6# 150 Ω 5W
 R7 2.2 Ω 1W
 R8 See below
 R9 "
 R10 "
 R11 "
 R12 "
 R13 4.7 Ω
 R14 See below
 R15 "
 R16 "

Capacitors

C1 0.47 μ F
 C2# 1.5 nF Y
 C3# 1.5 nF Y
 C4 0.22 μ F
 C5# 1.5 nF Y
 C6# 1.5 nF Y
 C7 100 μ F 50V
 C8a# 220 μ F 385V
 C9a# 220 μ F 385V
 C12 See below
 C13 "
 C14 "
 C15 "

C16 22 μ F 16V
 C17 2.2 μ F 63V
 C18 See below
 C19 "

Diodes

D1 600V 35A
 D2 BYW26C
 D3 BYT30PI400
 D4 BYT30PI400
 D5 5.6V Zener
 D6 See below

Fuses

F1# See below

Transistors

Q1# Q6025J6
 Q2 -
 Q3 BC 546
 Q4 See below

Coils

DR1# 2.7mH 8A 220V
 DR2# 2.7mH 8A 220V

Switches

S1 Arcoelectric 8550VB
 S3 Comepa 4JT95 ARIUI 95°C

110V AC

R5 22 Ω 9W
 R6 180 Ω 0.7W
 C2 2,2 nF Y
 C3 2,2 nF Y
 C5 2,2 nF Y
 C6 2,2 nF Y
 C8b 1500 μ F 200V
 C9b 1500 μ F 200V
 Q1 Relay SDS JrlaF-TM-24
 S2 Marquart 1803.0102
 DR1 1.4mH 16A 110V
 DR2 1.4mH 16A 110V

	LAB 1200C	LAB 1300C	LAB 1600	LAB 2000C
R8	4.7 k Ω 1%	0 Ω	8.2 k Ω 1%	0 Ω
R9	1 M Ω	470 k Ω	150 k Ω	390 k Ω
R10	39 k Ω 1%	4.7 k Ω 1% 0.7W long leg	39 k Ω 1%	47 k Ω 1%
R11	18 k Ω 1%	1.8 k Ω	18 k Ω 1%	6.8 k Ω
R12	4.7 k Ω 1%	0 Ω	4.7 k Ω	1.8 k Ω
R14	2.2 Ω 2W	-	2.2 Ω 2W	-
R15	2.2 Ω 2W	-	2.2 Ω 2W	-
R16	-	18 k Ω 1%	-	39 k Ω 1%
C12	3900 μ F 100V	3900 μ F 100V	3900 μ F 100V	1800 μ F 160V
C13	3900 μ F 100V	3900 μ F 100V	3900 μ F 100V	1800 μ F 160V
C14	3900 μ F 100V	3900 μ F 100V	3900 μ F 100V	1800 μ F 160V
C15	3900 μ F 100V	3900 μ F 100V	3900 μ F 100V	1800 μ F 160V
C18	4.7 nF 400V	-	4.7 nF 400V	-
C19	4.7 nF 400V	-	4.7 nF 400V	-
D6	62 V \pm 2% Zener	-	62 V \pm 2% Zener	-
F1 220V	T10AH250V	T8AH250V	T10AH250V	T10AH250V
F1# 110V	T20A	T20A	T20A	T30A
Q4	BDX53F	TIP41	BDX53F	BDX53F

LAB1200C, LAB 1300C, LAB 1600, LAB 2000C POWER SUPPLY, BOARD PSUD component-list

UC 3851

Resistors

R1 18 k Ω 9W
 R2 18 k Ω 9W
 R3 18 k Ω 9W
 R4 100 Ω 5W
 R5 100 Ω 5W
 R6 0.1 Ω 4W
 R7 0.1 Ω 4W
 R8 0.1 Ω 4W
 R9 1.5 k Ω 2W
 R10 4.7 k Ω 5W
 R11 680 k Ω 5%
 R12 33 k Ω 1%
 R13 100 k Ω 1%
 R14 10 k Ω 1%
 R15 18 k Ω 1%
 R16 180 Ω 1%
 R17 120 k Ω 2W
 R18 8.2 k Ω 1%
 R19 5.62 k Ω 1%
 R20 432 k Ω 1% highvolt
 R21 750 k Ω 1%
 R22 4.7 Ω
 R23 6.8 k Ω 1%
 R24 4.7 Ω
 R25 15 k Ω 1%
 R26 1 k Ω 1%
 R27 4.7 Ω
 R28 82 Ω 1%
 R29 4.7 M Ω
 R30 56 k Ω 1%
 R31 220 k Ω 1%
 R32 See below
 R33 "
 R34 "
 R35 4.7 k Ω 1%
 R36 15 k Ω 1%
 R37 4.7 Ω
 R38 4.7 Ω
 R39 4.7 Ω
 R40 1 M Ω 1%
 R41 18 k Ω 1%
 R42* -
 R43* Jumper
 R44 470 Ω

Capacitors

C1a# 220 μ F 385V
 C2a# 220 μ F 385V
 C5 0.6 μ F 500V
 C6 2.2 nF 1.5 kV
 C7 10 μ F 63V
 C8 -
 C9 10 μ F 50V
 C10 22 μ F 50V
 C11* 470 pF NPO
 C12 1 nF
 C13 -
 C14 10 nF
 C15 330 pF
 C16 330 pF
 C17 -
 C18 1 nF
 C19 10 μ F 50V
 C20 -
 C21# 1.5 nF Y
 C22# 1.5 nF Y
 C23 1 nF

Diodes

D1 BYT 12PI 1000
 D2 BYT 12PI 1000
 D3 15V 1.3W Zener
 D4 5.6V 0.4W Zener
 D5 1N 4148
 D6 BYW 26C
 D7 1N 4004
 D8 1N 4148
 D9 1N 4148
 D10 1N 4148
 D11 BYW 26C
 D12 BZW 06P15B
 D13 BAT 85
 D14 1N 4148
 D15 See below

Trim potentiometers

TP1 10 k Ω
 TP2 25 k Ω
 TP3 10 k Ω
 TP4* 15 k Ω Resistor

Integrated circuits

U1 UC 3851 alt. UC 3841
 U2 See below

Transistors

Q1 BUP 307
 Q2 BUP 307
 Q3 BUP 307
 Q4 BC 327
 Q5 TIP 50
 Q6 BC 547
 Q7* Jumper b-e
 Q8 BC 557

Switches

S2 Temp switch 95°

110V

C1b 1500 μ F 200V
 C2b 1500 μ F 200V
 C21 2,2nF Y
 C22 2,2nF Y

*** UC3841**

R42 4.7 k Ω
 R43 82 Ω
 TP4 10 k Ω
 C11 1 nF
 Q7 BC 337

	LAB 1200C	LAB 1300C	LAB 1600	LAB 2000C
R32	133 k Ω 1%	88.7 k Ω 1%	169 k Ω 1%	88.7 k Ω 1%
R33	270 k Ω 1%	-	330 k Ω 1%	-
R34	2,2 k Ω 1%	2,0 k Ω 1%	2,2 k Ω 1%	2,2 k Ω 1%
D15	43V 2% Zener	43V 2% Zener	39V 2% Zener	43V 2% Zener
U2	PC 113	-	PC113	-