

Bang & Olufsen



POWER SUPPLY SN17
Type 8802071

POWER SUPPLY SN18
Type 8802073



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TECHNICAL DATA

Range:	0...30V, 0...2A (SN17) 0...60V, 0...1A (SN18)
Remote:	Approx. 0.7k Ω /V (SN17) Approx. 1.7k Ω /V (SN18)
Regulation at $\pm 10\%$ change of mains voltage,	
Constant voltage:	< $\pm 0.01\%$
Constant current:	< $\pm 0.1\text{mA}$
Regulation at loads 0...100%,	
Constant voltage:	< 0.015%
Constant current:	< $\pm 0.1\text{mA}$
Temp. coefficient, const. voltage:	< 0.002%/ $^{\circ}\text{C}$
Output impedance:	< 0.002 Ω for DC < 0.2 Ω at 200kHz
Ripple and noise, 20Hz...200kHz:	< 100 μV_{rms} (SN17) < 200 μV_{rms} (SN18)
Transient response, loads 30%-100%-30%, nom. voltage $\pm 10\text{mV}$:	< 50 $\mu\text{sec.}$
Meter,	
Scales:	0...30V, 0...2A and 0...0.6A (SN17) 0...60V, 0...1A and 0...0.3A (SN18)
Accuracy:	$\pm 2\%$ of f.s.d.
Power Supply:	110/220V AC $\pm 10\%$, 50/60Hz
Consumption:	5...90W
Temperature range:	5...40 $^{\circ}\text{C}$
Dimensions, W x D x H:	163 x 210 x 80mm
Weight:	3.3kg. (7.3 lbs.)
Finish:	Silvery grey and blue enamel
Accessories:	1 manual

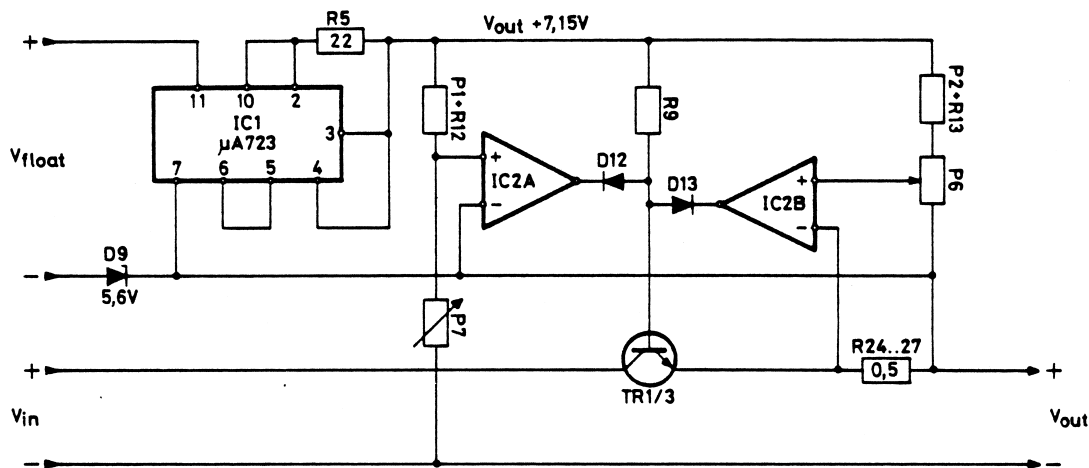
Subject to change without notice

APPLICATION

With few exceptions the Power Supplies SN17 and SN18 are identical, circuitry-wise. For this reason, the following description will primarily apply to SN17, and SN18 will be mentioned only in cases when it deviates.

The mains transformer is the same for both types. The two primary windings in SN17 are connected in parallel (30V/3.4A), and in SN18 they are connected in series (60V/1.7A). The non-regulated potential is rectified by the bridge circuit, consisting of the diodes D5...D8 and is smoothed by the charging capacitor C11, after which the two series transistors together with the regulating amplifier IC2 provide the remaining smoothing and regulation.

The resistors R19 and R20 have the function to share equally the load current between the two series transistors.



Principle diagram.

Due to the rather high output voltage, and the wish to be able to regulate all the way down to 0V, the regulating circuit has been designed as "floating" with the positive output terminal as reference.

IC1 is coupled as voltage regulator with a voltage limitation of approx. 25mA determined by the resistor R5. The resultant voltage of 7.15V is determined by the temperature stabilized reference voltage in IC1. Consequently, this voltage is very stable and is used as reference voltage for both the voltage comparator IC2A and the current comparator IC2B.

In voltage regulating mode the potential on the non-inverted input will always be the same as on the inverted input. Therefore, the current through P1 and R12 will be determined exclusively by the ratio $7.15/(P1+R12)$. Since the same current is passing through the "VOLTAGE" potentiometer P7, the output voltage will be determined by the expression:

$$V_{out} = \frac{7.15}{P1+R12} \times P7$$

When the potential across R24...27 due to increasing load current becomes identical to the potential across the "CURRENT" potentiometer P6 (from the arm to +Vout) the comparator will assume control of the series transistors TR1 and TR3 (current limitation).

The OR gate, consisting of D12, D13 and R9, will assure, that the regulation will be either for constant voltage or constant current.

The diode D14 and the voltage divider R6/R1, in which R1 is in thermic contact with the heat sink, will assure that the temperature of the latter will never exceed approx. 80°C. At this temperature the voltage across the NTC resistor R1 will have dropped so much that the diode D14 will be conducting. The output of the comparator will go "low", whereby D13 will be conducting and the output voltage will drop. When the temperature in the heat sink for this reason has been reduced, the resistor value in the NTC (R1) will increase, the diode D14 will block, and the function will become normal again.

The LED D15 is powered by the driver transistor TR2, which is "on" in current regulating mode.

With the meter switch in its left-hand position the output voltage is metered with the moving coil instrument (sensitivity 1mA) in series with P5 and R23. The load current is metered with the switch in its centre position, and in the right-hand position the voltage across R24...27 (SN17: 0.5Ω, SN18: 1Ω) is metered. The series resistors in these current ranges are P3/R21 and P4/R22 respectively.

ADJUSTMENTS

The Power Supplies SN17/SN18 have been designed for long-time operation without adjustments or maintenance. One example, amongst others, of the inherent reliability is that 1% metal film resistors have been used in all critical places in the electric circuit. In normal circumstances, it will only become necessary in case of component failure to check and re-adjust the instrument. In such cases the below procedure should be followed.

To carry out the adjustments described, the following instruments will be needed:

Digital voltmeter, 4½ digit, e.g. Fluke 8050A

Current shunt 0.01Ω, e.g. Bang & Olufsen PC5 (SN17)

Current shunt 1Ω, e.g. Bang & Olufsen PC6 (SN18)

- 1) Check, and adjust, if required, the mechanical zero of the panel meter. (The mains switch (8) in position "OFF").
- 2) Connect the digital voltmeter and turn the "CURRENT" and "VOLTAGE" potentiometers (P6 and P7) fully clockwise, and then adjust P1 to 32.00V ±0.10V (SN18: 65.00V ±0.20V).
- 3) Turn the "VOLTAGE" potentiometer down to 25.00V (SN18: 50.00V) as read on the digital voltmeter, and then adjust P5 to 25V deflection (SN18: 50V) as read on the panel meter ("METER" switch in its left-hand position).
- 4) Set the "METER" switch in its centre position. Load the output with 0.01Ω current shunt, PC5 (SN18: 1Ω, PC6) and connect the digital voltmeter to the latter. Adjust with P2 until 21.00mV ±0.20mV is obtained (SN18: 1.050V ±10mV), corresponding to a load current of 2.1A (SN18: 1.05A).
- 5) Turn the "CURRENT" potentiometer P6 down to 17.00mV ±0.20mV (SN18: 0.800V ±10mV), and then adjust P3 to 1.7A deflection (SN18: 0.8A) on the panel meter.
- 6) Turn the "CURRENT" potentiometer down to 1A deflection (SN18: 0.5A) on the meter, and then tighten the button with the line pointing towards the centre of the LED.
- 7) Turn the "CURRENT" potentiometer down to 5.00mV ±0.05mV (SN18: 0.250V ±3mV). Set the meter switch in its right-hand position, and then adjust P4 to 0.5A deflection (SN18: 0.25A) on the panel meter.

- 8) After any repair job the instrument shall be insulation tested, when the instrument has been completely assembled and is ready for use.

Short-circuit the two pins on the mains plug and connect to one of the terminals of the insulation tester. Connect the other terminal to the chassis and the black screw terminal respectively.

It is important, in order to avoid instrument damage, that both insulation tester terminals are in really close mechanical contact.

Now increase the output voltage until a voltage of 1.5-2kV AC is achieved. Hold this for about 1 second, then slowly turn the voltage down again.

Flash-overs are not permissible at any point in time during the testing.

STYKLISTE/PARTS LIST SN171. Modstande/Resistors

R1	330K Ω	10%	0,5W NTC	5220036
R2	1K Ω	5%	0,25W	5010040
R3	4,7K Ω	5%	0,25W	5010048
R4	10K Ω	5%	0,25W	5010059
R5	22 Ω	5%	0,25W	5010448
R6	47K Ω	5%	0,25W	5010045
R7	4,7K Ω	5%	0,25W	5010048
R8	220 Ω	5%	0,25W	5010092
R9	4,7K Ω	5%	0,25W	5010048
R10	10K Ω	5%	0,25W	5010059
R11	10K Ω	5%	0,25W	5010059
R12	3,83K Ω	1%	0,25W	5020211
R13	4,02K Ω	1%	0,25W	5020212
R14	47K Ω	5%	0,25W	5010045
R15	10K Ω	5%	0,25W	5010059
R16	2,2K Ω	5%	0,25W	5010064
R17	10K Ω	5%	0,25W	5010059
R18	4,7K Ω	5%	1W	5020635
R19	0,47 Ω	10%	1W	5100130
R20	0,47 Ω	10%	1W	5100130
R21	383 Ω	1%	0,25W	5020361
R22	46,4 Ω	1%	0,25W	5020172
R23	27,4K Ω	1%	0,25W	5020688
R24	1 Ω	1%	0,25W	5020512
R25	1 Ω	1%	0,25W	5020512
R26	1 Ω	1%	0,25W	5020512
R27	1 Ω	1%	0,25W	5020512
R28	4,7K Ω	5%	0,25W	5010048

2. Kondensatorer/Capacitors

C2	22nF	20%	250V	4130079
C3	22nF	20%	250V	4130079
C4	22nF	20%	250V	4130079
C5	470 μ F	-10+100%	40V	4200141
C6	47 μ F	-10+50%	10V	4200466
C7	220nF	20%	100V	4130104
C8	100pF	5%	63V	4000176
C9	4,7nF	10%	63V	4010063
C10	100pF	5%	63V	4000176
C11	2200 μ F	-10+50%	63V	4200582
C12	100nF	20%	100V	4130150
C13	100 μ F	-10+100%	40V	4201082
C14	100nF	20%	275V	4130279

3. Potentiometre/Potentiometers

P1	2,2K Ω	20%	0,1W	5370006
P2	4,7K Ω	20%	0,1W	5370058
P3	100 Ω	20%	0,1W	5370236
P4	100 Ω	20%	0,1W	5370236
P5	4,7K Ω	20%	0,1W	5370076
P6	470 Ω	20%	0,15W	5300107
P7	22K Ω	20%	0,1W	5300108

4. Dioder/Diodes

D1	1N4002	100V	1A	8300023
D2	1N4002	100V	1A	8300023
D3	1N4002	100V	1A	8300023
D4	1N4002	100V	1A	8300023
D5	1N5401	100V	3A	8300315
D6	1N5401	100V	3A	8300315
D7	1N5401	100V	3A	8300315
D8	1N5401	100V	3A	8300315
D9	ZPD5,6	5,6V	0,4W	8300128
D10	1N4148	75V	80mA	8300131
D11	1N4148	75V	80mA	8300131
D12	1N4148	75V	80mA	8300131
D13	1N4148	75V	80mA	8300131
D14	1N4148	75V	80mA	8300131
D15	CQV85NB	LED		8330026
D16	1N5401	100V	3A	8300315

5. Transistorer/Transistors

TR1	TIP141	NPN	80V	125W	8340042
TR2	BC557B	PNP	45V	0,5W	8320152
TR3	TIP141	NPN	80V	125W	8340042

6. Integrerede kredse/Integrated Circuits

IC1	µA723	Voltage Regulator	8340145
IC2	LF353N	Dual Fet Op. Amp.	8340195

7. Diverse/Miscellaneous

Drejespoleinstrument/Meter	8450025
Nettransformer/Power Transformer	8013152
Netledning/Power Cable	6271102
Omskifter/Switch "Meter"	7400122
Netafbryder/Line Switch	7400203
Sikring/Fuse 630mA-T (220V)	6600005
Sikring/Fuse 1,25A-T (110V)	6600013
Sikring/Fuse 2A-T	6600009
Klemskrue, rød/Binding Post, red	7210182
Klemskrue, sort/Binding Post, black	7210181
Knap/Knob "Meter"	2770200+3341022+3164357
Knap/Knob "Current"	2770201+3341022+3164357
Knap/Knob "Voltage"	2770201+3341021+3164357
Gummifod/Rubber Foot	0585027
Fatning/Socket "Remote"	7210159

STYKLISTE/PARTS LIST SN181. Modstande/Resistors

R1	330K Ω	10%	0,5W NTC	5220036
R2	1K Ω	5%	0,25W	5010040
R3	4,7K Ω	5%	0,25W	5010048
R4	10K Ω	5%	0,25W	5010059
R5	22 Ω	5%	0,25W	5010448
R6	47K Ω	5%	0,25W	5010045
R7	4,7K Ω	5%	0,25W	5010048
R8	220 Ω	5%	0,25W	5010092
R9	4,7K Ω	5%	0,25W	5010048
R10	10K Ω	5%	0,25W	5010059
R11	10K Ω	5%	0,25W	5010059
R12	9,09K Ω	1%	0,25W	5020152
R13	4,02K Ω	1%	0,25W	5020212
R14	47K Ω	5%	0,25W	5010045
R15	10K Ω	5%	0,25W	5010059
R16	2,2K Ω	5%	0,25W	5010064
R17	10K Ω	5%	0,25W	5010059
R18	22K Ω	5%	1W	5020697
R19	1 Ω	5%	1W	5020480
R20	1 Ω	5%	1W	5020480
R21	383 Ω	1%	0,25W	5020361
R22	46,4 Ω	1%	0,25W	5020172
R23	54,9K Ω	1%	0,25W	5020254
R24	2 Ω	2%	0,25W	5020694
R25	2 Ω	2%	0,25W	5020694
R26	2 Ω	2%	0,25W	5020694
R27	2 Ω	2%	0,25W	5020694
R28	22K Ω	5%	0,25W	5010079

2. Kondensatorer/Capacitors

C2	22nF	20%	250V	4130079
C3	22nF	20%	250V	4130079
C4	22nF	20%	250V	4130079
C5	470 μ F	-10+100%	40V	4200141
C6	47 μ F	-10+50%	10V	4200466
C7	220nF	20%	100V	4130104
C8	100pF	5%	63V	4000176
C9	4,7nF	10%	63V	4010063
C10	100pF	5%	63V	4000176
C11	1000 μ F	-10+50%	100V	4200583
C12	100nF	20%	100V	4130150
C13	47 μ F	-10+100%	100V	4200584
C14	100nF	20%	275V	4130279

3. Potentiometre/Potentiometers

P1	4,7K Ω	20%	0,1W	5370058
P2	4,7K Ω	20%	0,1W	5370058
P3	100 Ω	20%	0,1W	5370236
P4	100 Ω	20%	0,1W	5370236
P5	10K Ω	20%	0,1W	5370191
P6	470 Ω	20%	0,15W	5300107
P7	100K Ω	20%	0,1W	5300040

4. Dioder/Diodes

D1	1N4002	100V	1A	8300023
D2	1N4002	100V	1A	8300023
D3	1N4002	100V	1A	8300023
D4	1N4002	100V	1A	8300023
D5	1N5401	100V	3A	8300315
D6	1N5401	100V	3A	8300315
D7	1N5401	100V	3A	8300315
D8	1N5401	100V	3A	8300315
D9	ZPD5,6	5,6V	0,4W	8300128
D10	1N4148	75V	80mA	8300131
D11	1N4148	75V	80mA	8300131
D12	1N4148	75V	80mA	8300131
D13	1N4148	75V	80mA	8300131
D14	1N4148	75V	80mA	8300131
D15	CQV85NB	LED		8330026
D16	1N5401	100V	3A	8300315

5. Transistorer/Transistors

TR1	BDV65B	NPN	100V	125W	8340470
TR2	BC557B	PNP	45V	0,5W	8320152
TR3	BDV65B	NPN	100V	125W	8340470

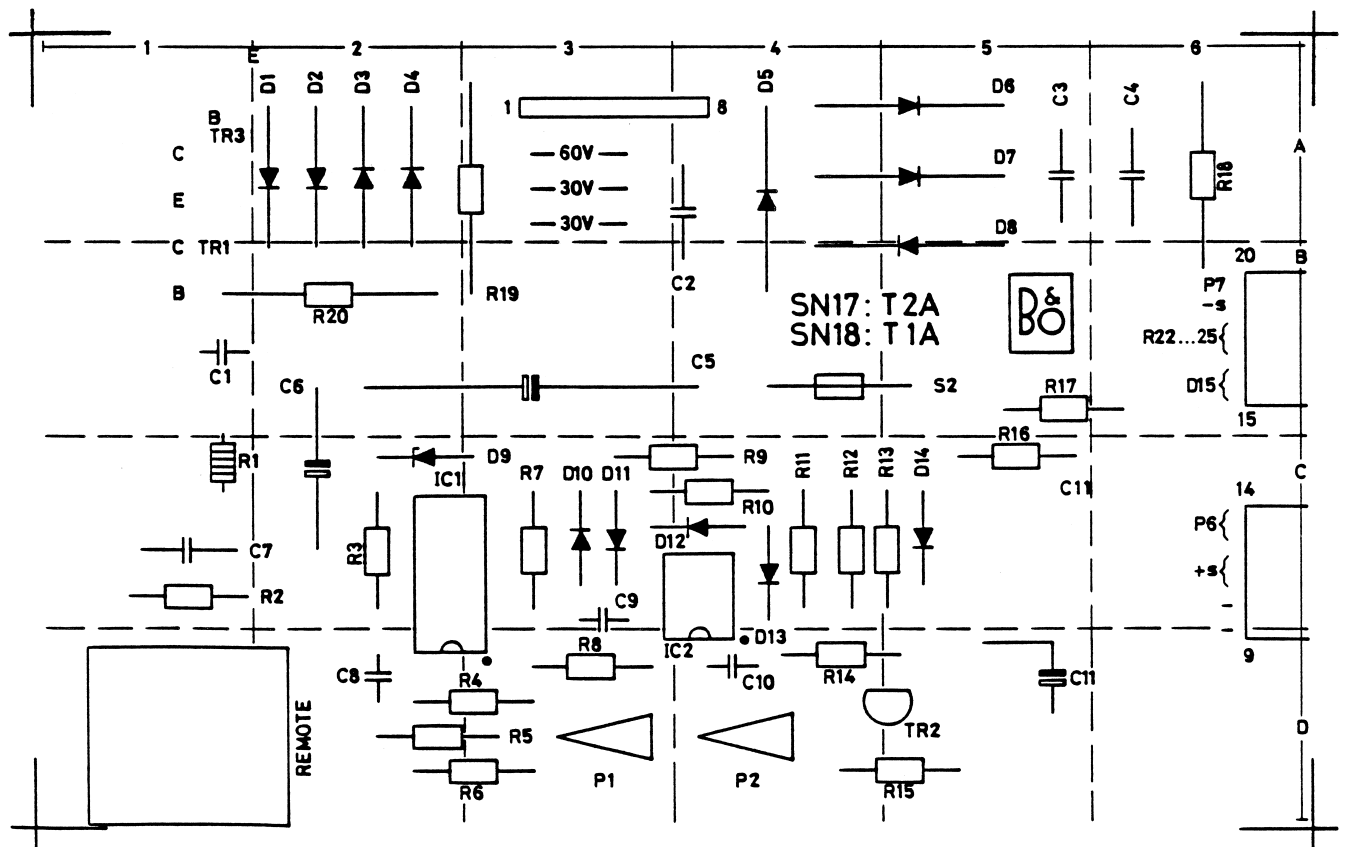
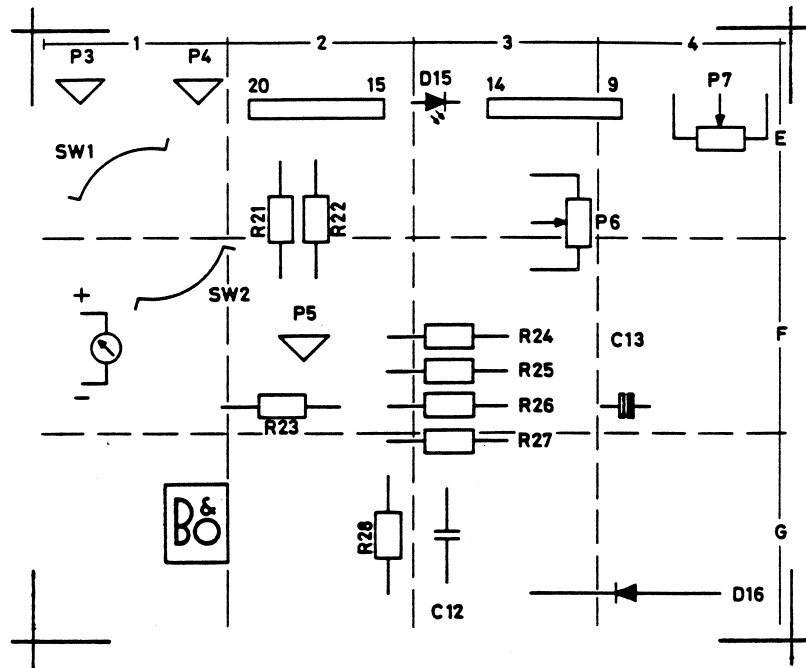
6. Integrerede kredse/Integrated Circuits

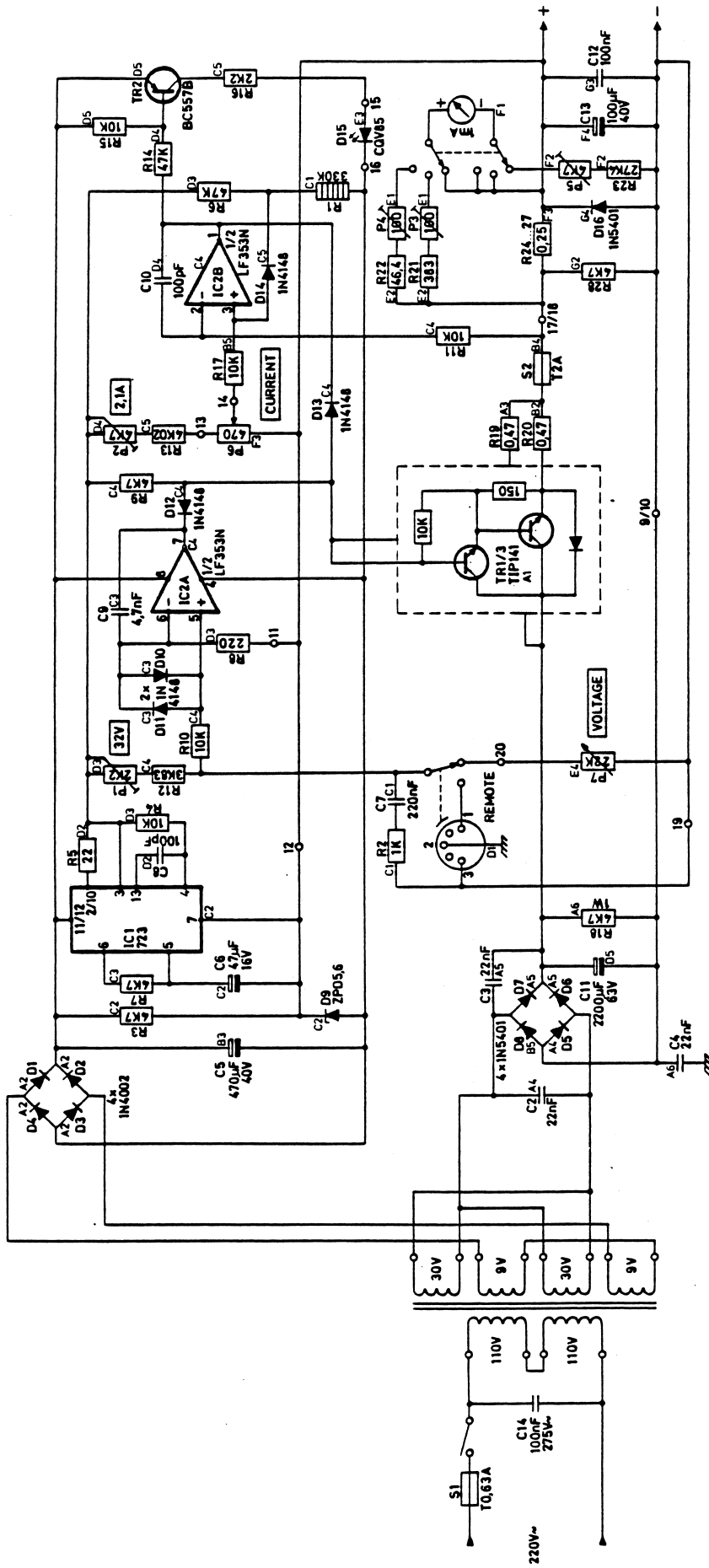
IC1	μ A723	Voltage Regulator	8340145
IC2	LF353N	Dual Fet Op. Amp.	8340195

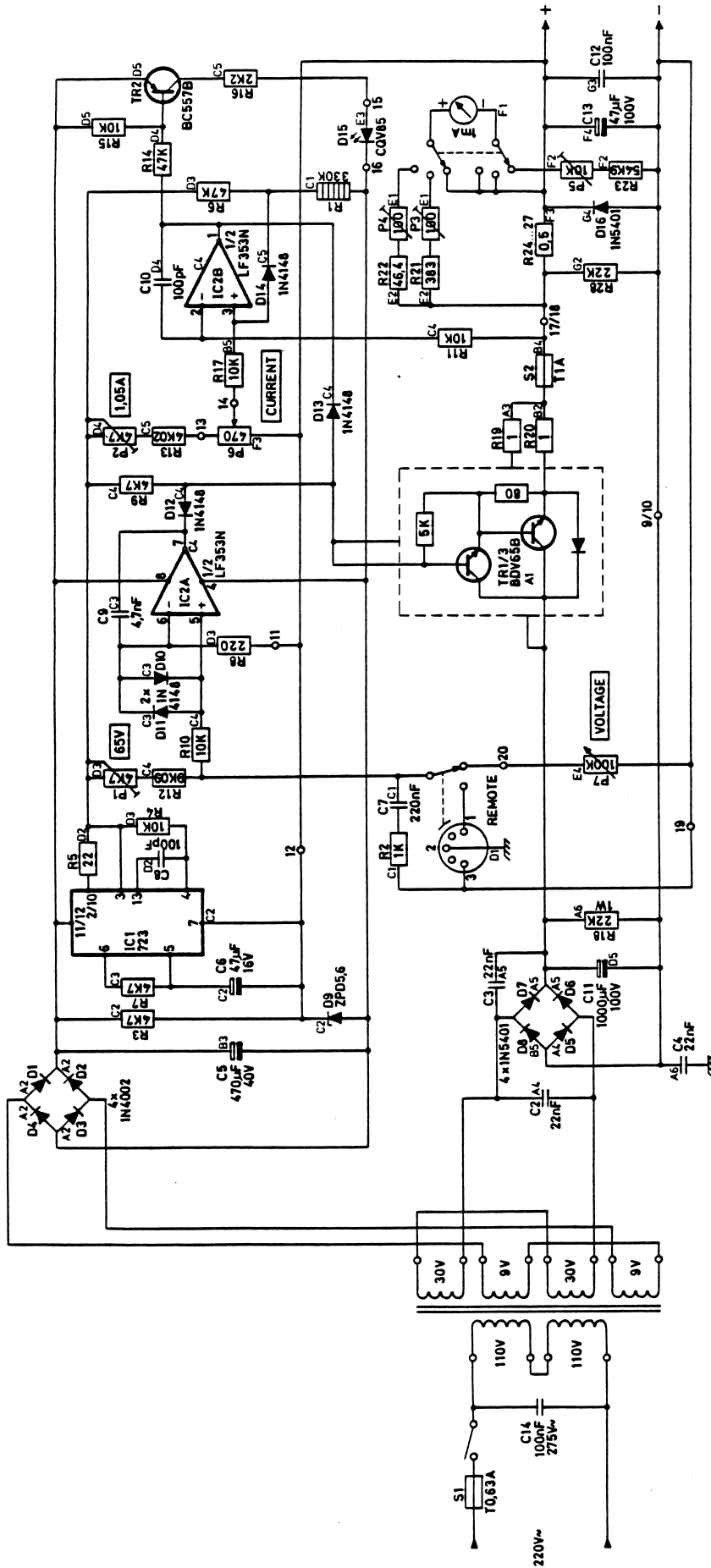
7. Diverse/Miscellaneous

Drejespoleinstrument/Meter	8450042
Nettransformer/Power Transformer	8013152
Netledning/Power Cable	6271102
Omskifter/Switch "Meter"	7400122
Netafbryder/Line Switch	7400203
Sikring/Fuse 630mA-T (220V)	6600005
Sikring/Fuse 1,25A-T (110V)	6600013
Sikring/Fuse 1A-T	6600006
Klemskrue, rød/Binding Post, red	7210182
Klemskrue, sort/Binding Post, black	7210181
Knap/Knob "Meter"	2770200+3341022+3164357
Knap/Knob "Current"	2770201+3341022+3164357
Knap/Knob "Voltage"	2770201+3341021+3164357
Gummifod/Rubber Foot	0585027
Fatning/Socket "Remote"	7210159

KOMPONENTPLACERING/COMPONENT LOCATION







**BANG & OLUFSEN
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DENMARK**

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CABLE ADDRESS BANGOLUF**