



Sailor

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**INSTRUKTIONSBOG FOR
SAILOR N1401**

**INSTRUCTION BOOK FOR
SAILOR N1401**



A/S S. P. RADIO · AALBORG · DENMARK

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GENERAL DESCRIPTION

SAILOR N1401 is an AC power supply intended to supply a SAILOR SSB short-wave set, when the set has to be supplied from AC mains.

SAILOR N1401 has a MAIN SWITCH which controls all power supply to the short-wave set. All fuses for the short-wave set are located behind the AIR FILTER.

SAILOR N1401 has a built-in delay unit which ensures the proper sequence for applying voltages to the transmitter, regardless of how the MAIN SWITCH is operated.

SAILOR N1401 with MAIN SWITCH in position RECEIVER ONLY. Only the receiver is supplied and low power consumption is achieved.

SAILOR N1401 with MAIN SWITCH in position STAND BY, filament and negative bias are supplied to the transmitter.

SAILOR N1401 has a meter which controls the input voltage. A switch behind the AIR FILTER makes it possible, with the same meter, to check the voltages inside the set.

SAILOR N1401 is provided with thermal breakers, which switch off the set if the temperature inside the power supply gets too high.

SAILOR N1401 has a built-in loudspeaker for the connected receiver.

SAILOR N1401 fits into SAILOR 19" rack system.

SAILOR N1401

TECHNICAL DATA

The power supply N1401 delivers all necessary voltages to a SAILOR SSB short wave set with an output power of 800 W PEP in the frequency range 4 - 27.5 MHz. In the frequency range 1.6 - 4 MHz the plate voltage is reduced in order to limit the output power to 400 W PEP. When N1401 is used for 405 - 535 kHz transmitters the plate voltage is the same as when the frequency is 4 - 27.5 MHz.

Input voltage: 110/127/220/237V AC $\pm 10\%$, frequency 50 - 60 Hz.

Input current:

Input current (220V AC)	1.6 - 4 MHz	4 - 27.5 MHz
Receiver only	0.25A	0.25A
Stand by	1.2A	1.2A
On	1.4A	1.4A
Tune (full PEP 2-tone)	5.0A	6.5A
SSB Normal Speech	4.2A	5.2A
A3H Normal Speech	4.5A	5.8A
A2H telegraphy key up/down	2.5/5.0	2.5/6.5
A1 telegraphy key up/down	2.5/5.8	2.5/7.3

Output voltages:

DC unstabilized

Va 1.4/2 KV
Vfilament 27 V
-45 -45 V

DC stabilized

Vdriver 28V $\pm 5\%$
Vg1 -60V $\pm 5\%$
22V 22V $\pm 2\%$
8V 8V $\pm 5\%$
2xVg2 400V $\pm 2\%$

The currents from Vg2's are limited to protect the screen in the P.A. tubes.

AC unstabilized

Blower supply 220V (input via auto-transformer).

Operation temperature range: -15°C to $+55^{\circ}\text{C}$

Cooling:

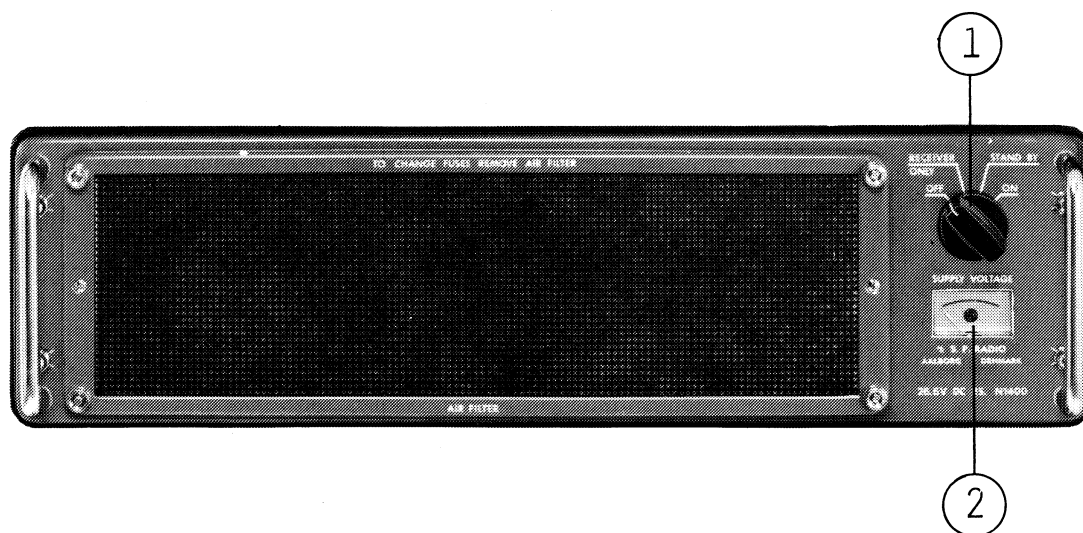
With MAIN SWITCH in positions STAND BY and ON the internal blower is running. If the inside temperature gets too high thermal breakers disconnect the 22V and stop the set until it has cooled down.

When MAIN SWITCH is in position RECEIVER ONLY and the temperature on the cooling fin for T102 exceeds $+70^{\circ}\text{C}$ the internal blower starts automatically, when the temperature falls below $+55^{\circ}\text{C}$ the blower stops. (Valid for power supplies N1401 with serial number higher than 192672).

Power supplies N1401 with a serial number below 217450 do not have the 8V supply, except those modified at the factory.

SAILOR N1401

CONTROLS



1 MAIN SWITCH

Switching between the functions.

OFF

The set is switched off.

RECEIVER ONLY

The receiver is supplied with power and ready for use.

STAND BY

Internal blower starts and voltages are supplied to the transmitter in order to make it ready for use.

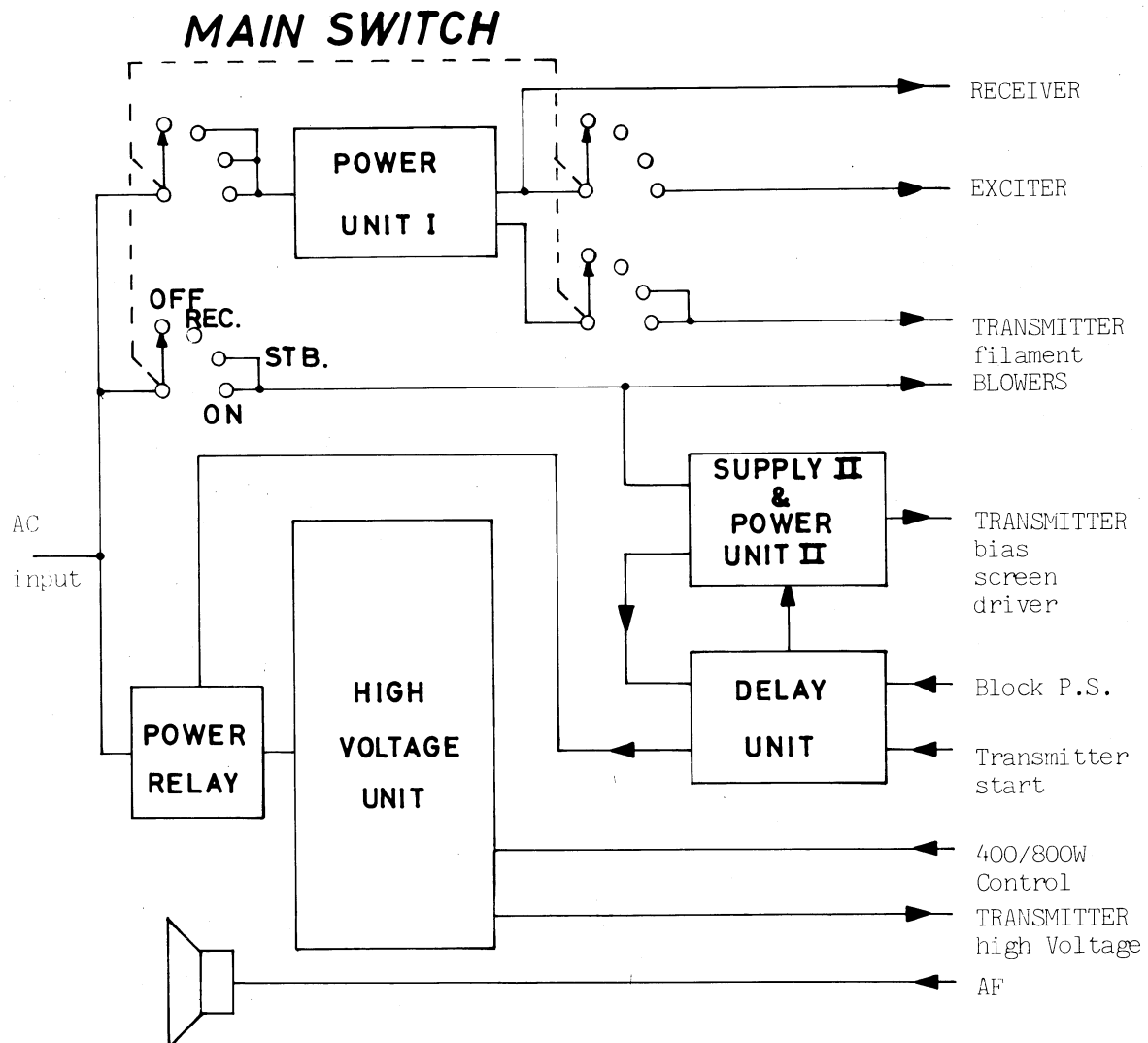
ON

The transmitter is ready for use if it has been in position STAND BY or ON for a period equal to or longer than the delay time.

2 SUPPLY VOLTAGE METER

Meter checking the input voltage to the set. Internal voltage check, by using the switch located behind the AIR FILTER it is possible to check different voltages in the set.

PRINCIPLE OF OPERATION N1401



POWER SUPPLY N1401

The function of the power supply is controlled from MAIN SWITCH, DELAY UNIT and the control inputs Transmitter start and Block P.S.

POWER UNIT I is connected in positions RECEIVER ONLY, STAND BY and ON. It supplies the RECEIVER and the EXCITER. The EXCITER in position ON only. POWER UNIT I delivers filament to the TRANSMITTER in positions STAND BY and ON.

POWER UNIT II & SUPPLY II is connected in positions STAND BY and ON. The output bias is present, whereas the outputs screen and driver follows the Transmitter start control input if the power supply N1401 is not blocked via the control input Block P.S.

HIGH VOLTAGE UNIT is functional in position ON controlled by the control input Block P.S. via the POWER RELAY. The size of the HIGH VOLTAGE is controlled via the control input 400/800W Control.

DELAY UNIT is started in position STAND BY and runs in STAND BY and ON while filament is supplied to the transmitter tubes. After the delay time the control inputs Transmitter start and Block P.S. are allowed to pass through the DELAY UNIT.

SERVICE

1. MAINTENANCE
2. NECESSARY TEST EQUIPMENT
3. TROUBLE-SHOOTING
4. PERFORMANCE CHECK
5. ADJUSTMENT PROCEDURE
6. NECESSARY ADJUSTMENTS AFTER REPAIR
7. FUNCTION CHECK

1. MAINTENANCE

1.1.

When the SAILOR SHORT-WAVE SET type 1000 has been correctly installed, the maintenance can, dependent on the environment and working hours, be reduced to a performance check at the service workshop at intervals not exceeding 5 years. A complete performance check list is enclosed in the PERFORMANCE CHECK section.

Also inspect the antennas, cables and plugs for mechanical defects, salt deposits, corrosion and any foreign bodies.

Along with each set a TEST SHEET is delivered, in which some of the measurements made at the factory are listed. If the performance check does not show the same values as those on the TEST SHEET, the set must be adjusted as described under ADJUSTMENT PROCEDURE.

Any repair of the set should be followed by a FUNCTION CHECK of the unit in question.

2. NECESSARY TEST EQUIPMENT

T1127	N140X	S1300	R1117	
X	X	X	X	<u>OSCILLOSCOPE:</u>
				Bandwidth 0-25 MHz
				Sensitivity 2mV/cm
				Input impedance 1 Mohm//30 pF
				Triggering EXT-INT-ENVELOPE
				E.g. PHILIPS PM3212
X		X	X	<u>PASSIVE PROBE:</u>
				Attenuation 10x
				Input resistance DC 10 Mohm
				Input capacitance 15 pF
				Compensation range 10 pF - 30 pF
				E.g. PHILIPS PM 9396
		X	X	<u>MULTIMETER:</u>
				Sensitivity (f.s.d.) 1V
				Input impedance 10 Mohm
				Accuracy (f.s.d.) $\pm 2\%$
				E.g. PHILIPS PM2503
X	X			<u>MULTIMETER:</u>
				Sensitivity 0.3V and 3A
				Input impedance 30 Kohm/V
				Accuracy (F.S.d.) $\pm 1\%$
				Current range 100A
				Voltage range 500V, and 2.5 kV
				E.g. Unigor A43, with probe and shunt

NECESSARY TEST EQUIPMENT cont.:

T1127	N140X	S1300	R1117
		X	
			X
		X	X
			X

TONEGENERATOR:

Frequency range 200 - 3000 Hz
 Output 1V RMS
 Output impedance $\leq 600 \text{ ohm}$
 E.g. PHILIPS PM5107

AF VOLTMETER:

Sensitivity (f.s.d.) 300 mV
 Input impedance $\geq 4 \text{ ohm}$
 Accuracy (f.s.d.) $\pm 5 \%$
 Frequency range 100 Hz - 5 kHz
 E.g. PHILIPS PM2503

FREQUENCY COUNTER:

Frequency range 100 Hz - 40 MHz
 Resolution 0,1 Hz at $f \geq 10 \text{ MHz}$
 Accuracy $1 \cdot 10^{-7}$
 Sensitivity 100 mV RMS
 Input impedance 1 Mohm
 Single period measurement range 1 sec.
 resolution 1 mS
 E.g. PHILIPS PM6611 + PM9679

SIGNAL GENERATOR

Frequency range 550 kHz - 30 MHz
 R1118: 100 kHz - 30 MHz
 Output impedance 50/75 ohm
 Output voltage 1 uV - 100 mV EMF
 Modulation AM, 30%, 1000 Hz
 E.g. PHILIPS PM5326

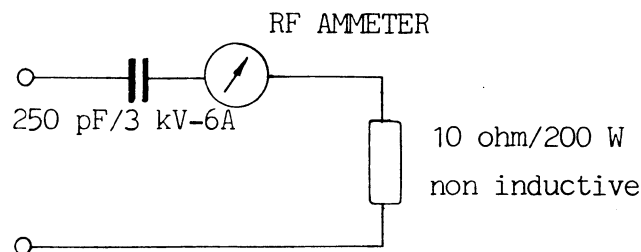
NECESSARY TEST EQUIPMENT cont.:

T1127	N140X	S1300	R1117
X			
<u>POWER SUPPLIES</u>			
T1127:			
V _{out} 26,5V DC			
I _{out} 60A DC			
E.g. 2 pcs. LAMBDA type LMG24			
	X	X	
R1117/S1300:			
V _{out} 1 22V			
I _{out} 1 1,5A			
V _{out} 2 -45V			
I _{out} 2 0,2A			
E.g. SAILOR POWER SUPPLY type N1402			
	X		
<u>TEST BOX S1300:</u>			
SP type S1300/01 TEST BOX			
X			
<u>POWER METER:</u>			
Power range 500W			
E.g. Bird Thruline Wattmeter Model 43			
plug-in element 500W 2-30 MHz			
impedance 50 ohm			
X			
<u>RF-AMMETER (Thermocross)</u>			
Current range 5A			
E.g. HELWEG MIKKELSEN & CO. Copenhagen, Denmark			
type TR-68x71 5A			
X	X		
<u>DUMMY LOAD for HF bands, 4 MHz to 25 MHz</u>			
Impedance 50 ohm			
Frequency range 0-25 MHz			
Power range 500W			
E.g. BIRD Termaline Coaxial resistor Model 8401			

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T1127	X
N140X	
S1300	
R1117	X

DUMMY LOAD for C.T. band 1.6 MHz to 4 MHz



250 pF

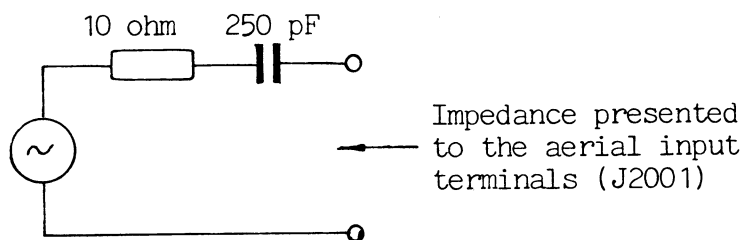
E.g. DRALORIC 06 1291 TD 20x50 L

8 KV_S 250 pF +20% R85

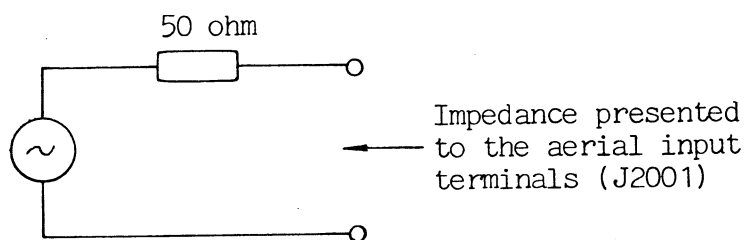
10 ohm

E.g. 10 pcs. DALE PH-25A-17, 100 ohm 5% 25W

X	DUMMY LOAD for the C.T. band 1.6 to 4 MHz
---	---



X	DUMMY LOAD for the HF bands 4 MHz to 25 MHz
---	---



E.g. SAILOR Rx DUMMY LOAD type H219.

3. TROUBLE-SHOOTING

Trouble-shooting should only be performed by persons with sufficient technical knowledge, who have the necessary test equipment at their disposal, and who have carefully studied the operation principles and structure of the unit in question.

Start to find out whether the fault is somewhere in the antenna circuit, the power source, or in the short-wave set.

For help with trouble-shooting in the short-wave set there is a built-in test meter and test meter switch, located behind the air filter on the power supply.

When the fault has been located to a certain unit look up the PERFORMANCE CHECK list in the instruction book and make relevant performance check to incircle the fault. Then look up the CIRCUIT DESCRIPTION. This section contains schematic diagrams, description of the modules and pictures showing the location of the components. (ADJUSTMENT LOCATIONS).

Typical AC and DC voltages are indicated on the schematic diagrams.

No adjustment must take place unless the service workshop has the necessary test equipment to perform the ADJUSTMENT PROCEDURE in question.

After repair or replacement of the module look up the section NECESSARY ADJUSTMENTS AFTER REPAIR to see, whether the unit has to be adjusted or not.

Anyway the unit has to have a complete FUNCTION CHECK after repair.

4. PERFORMANCE CHECK FOR N1401

In order to make the performance check easier, the function of the power supply for the different modes, in which the power supply can operate, are listed in the tables below.

4.1.

TABLE I, POWER SUPPLY FUNCTION.

This table indicates the outputs from the power supply and in which conditions the different outputs are present.
To achieve all these outputs, the power supply shall be connected to a short-wave set or controlled externally as indicated in 4.3. (table III) and 4.4. (table IV).

Used in	Use	Voltage (V)	Pin in J701	OFF	RECEIVER ONLY	STAND BY	ON	
			Common					keyed
Receiver		22	Chassis 10, 16 22, 23	11	X	X	X	X
		-45		12	X	X	X	X
Exciter		22		25			X	X
		-45		24	X	X	X	X
Trans- mitter	Va	1.4/2K					XD	XD
	Vg2	400		1				XD
	Vg2	400		4				XD
	Vg1	-60		18		X	X	X
	Vdriver	28		7				XD
	Blower	220 AC	Between	33 36		X	X	X
	Filament	26.5	26, 27 Chassis	6		X	X	X
		26.5		9	X	X	X	X
		26.5		15		X	X	X
Receiver		8	Chassis	13	X	X	X	X

X voltage present

XD voltage present after delay

PERFORMANCE CHECK FOR N1401 cont.:

4.1.1.

The accuracy of voltages.

Following voltages are stabilized:

22V, V_{g2} , V_{g1} , V_{driver} and 8V

22V and V_{g2} = 400V within $\pm 2\%$

V_{g1} = -60V, V_{driver} = 28V and 8V within $\pm 5\%$

Other voltages are not stabilized and will vary with input voltage and load.

4.2.

TABLE II, VOLTAGE CHECK WITH SUPPLY VOLTAGE METER.

This table indicates in which way the meter marked SUPPLY VOLTAGE can be used for checking different voltages inside the power supply.
Correct reading is when the pointer is in the middle of the green area.

NOTE: V_a only reaches the green area when V_a = 2kV (frequency above 4 MHz, or 405 - 535 kHz, pin 17 in J701 grounded).

This meter is only for checking, not for measuring voltages.

meter switch \ MAIN SWITCH	OFF	RECEIVER ONLY	STAND BY	ON	
					keyed
input		X	X	X	X
V_a				XD	XD
V_{g2}					XD
22V		X	X	X	X
V_{driver}					XD
V_{g1}			X	X	X

After use leave the meter switch in pos. input.

PERFORMANCE CHECK FOR N1401 cont.:

4.3.

TABLE III, CONTROL OF POWER SUPPLY.

This table indicates the state for the power supply, versus the control conditions. The MAIN SWITCH in position ON.

Control Conditions			State for P.S.	
Block P.S.	Transmitter start	Delay time past	Keyed	High Voltage present
pin 14 J701	pin 31 J701	30 secs		
grounded	22V	No		
grounded	0V	Yes		X
grounded	22V	Yes	X	X
open	22V	Yes		
open	0V	Yes		

4.4.

TABLE IV, CONTROL OF V_a VERSUS FREQUENCY.

This table indicates how the high voltage V_a is changed when the frequency is above or below 4 MHz.

Frequency	400/800W Control	High Voltage V_a
MHz	pin 17 J701	kV
below 4	open	1.4
above 4	grounded	2
0.405-0.535	grounded	2

5. ADJUSTMENT PROCEDURE FOR N1401

5.1.

ADJUSTMENT OF 22V.

5.1.1.

With the voltmeter in 30V range connect the + terminal to TP1 and the - terminal to chassis. The MAIN SWITCH in pos. ON (if the power supply is separate, load the 22V with 3 - 3.5A).

5.1.2.

Adjust with potentiometer R106 to the voltmeter reads 22.0V.

5.1.3.

Connect an oscilloscope to TP1 and check that the ripple is less than 200 mVpp.

5.1.4.

If possible variate the supply voltage and check that the 22V remains stable.

5.2.

ADJUSTMENT OF Vg2.

5.2.1.

With the voltmeter in 500 or 1000V range, connect the + terminal to TP2 and the - terminal to chassis. Key the short-wave set, but no drive to the PA stage (ex. A3J, no modulation). If the power supply is separate, key the power supply using the informations in TABLE III 4.3.

5.2.2.

Adjust with potentiometer R226 to the voltmeter reads 400V.

5.2.3.

Move the voltmeter to TP3, the reading shall remain 400V, even though TP4 is short-circuited to chassis. With the voltmeter on TP4 check that the voltage remain 400V when TP3 is short-circuited.

5.2.4.

Check that the voltage of TP5 is -60V.

5.2.5.

Check that the voltage of TP6 is 28V.

6. NECESSARY ADJUSTMENTS AFTER REPAIR

6.1.

AFTER REPAIR IN POWER UNIT I, PERFORM ADJUSTMENT IN ACCORDANCE WITH SECTION 5.1. ADJUSTMENT OF 22V.

6.2.

AFTER REPAIR IN POWER UNIT II, PERFORM ADJUSTMENT IN ACCORDANCE WITH SECTION 5.2. ADJUSTMENT OF Vg2.

7. FUNCTION CHECK FOR N1401

7.1.

FUNCTION CHECK WHEN THE POWER SUPPLY IS INSTALLED IN A SHORT-WAVE SET.

7.1.1.

Using TABLE II section 4.2. check that the reading on the meter marked SUPPLY VOLTAGE is correct.

7.2.

FUNCTION CHECK WHEN THE POWER SUPPLY IS SEPARATE.

7.2.1.

The power supply supplied with the correct input and controlled in accordance with TABLE III section 4.3. and TABLE IV section 4.4. Use TABLE II section 4.2. to check the function via the SUPPLY VOLTAGE meter.

7.2.2.

When the power supply is separate and unloaded the power consumption can give information about the condition of the circuit.

Input Voltage	OFF	RECEIVER ONLY	STAND BY	ON		
					Keyed 1.4KV	Keyed 2KV
	Iin	Iin	Iin	Iin	Iin	Iin
220V AC	0	0.1	0.4	0.5	0.75	0.75

7.3.

NOTES FOR SUPPLY VOLTAGE METER.

7.3.1.

In position Vg2 only Vg2 on pin 4 in J701 is checked.

7.3.2.

In N1401 the voltage -45V is used for the meter, when the meter switch is in position input.

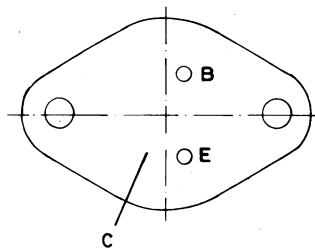
7.3.3.

Working frequency of converter. The frequency is between 300 - 500 Hz.

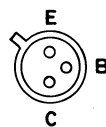
7.3.4.

In N1401 it is not possible to check the voltage 8V with the meter.

BOTTOM VIEW



MJ 802
MJ 3000
2N5686



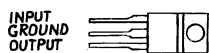
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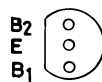
BRY 39



2N5064



MC 7808



2N4871

SAILOR N1401

CIRCUIT DESCRIPTION N1401

HIGH VOLTAGE UNIT

The HIGH VOLTAGE UNIT is made by two transformers TR301 and TR302, the belonging rectifiers and filter components.

The high voltage can be either 1.4 kV or 2 kV dependent on whether relay RE301 is open or closed (400/800 W Control).

Switching on and off the high voltage unit takes place via relay RE701.

Resistors R301, R302 and R303 ensure that the voltage across the capacitors C314 - C319 are equal even if the leakage currents are different.

POWER UNIT I

This unit supplies receiver and the exciter with the voltages +8V, +22V and -45V. The filament to the transmitter is also supplied from POWER UNIT I.

The transformer TR101 outputs are rectified and filtered, one is the voltage -45V and unstabilized. The other voltage is positive and via the regulator, consisting of the transistors T101 and T102 and the 7.5V zener diode D103 stabilized to +22V, adjustment of +22V is made by R106.

The output +22V is secured against overload by the fuse F704 6.3A.

POWER UNIT II

This unit supplies the transmitter and the driver unit with stabilized voltages. The input to the DC-DC converter is stabilized in the regulator, consisting of the transistors T201 and T202 and the 7.5V zener diode D201.

The output from the regulator is fed to the DC-DC converter with the transistors T203 and T204 and the matching transformers TR201 and TR202. The four outputs of the transformer TR202 are thereby stabilized and adjustment of the voltages is made by R226. The ratio of the voltages is determined by the transformer TR202.

The output Vg1 -60V is present as soon as the unit is in function, whereas the outputs Vdriver +28V and the two Vg2 +400V are controlled by the +22V to the relays RE201, RE202 and RE203 (Transmitter start).

The circuit for the Vg2 supply is made so that the currents to the screens in the PA tubes are limited due to R219 and R220. If a screen tends to emit, the increase of screen voltage is prevented due to a low impedance in the circuit consisting of R218 and the diodes D208 and D209.

The POWER UNIT II has built-in resistors for the TEST METER.

SUPPLY II

Transformer TR501 is on the primary coupled as an autotransformer in order to supply the blowers with 220V AC independent on the supply voltage. The output from TR501 is rectified and filtered in the D501, L501, C502, C503, C504, C505 and C506.

DELAY UNIT

The DELAY UNIT starts when it is connected. Across the zener diode D401 there is a voltage of 7.5V and the capacitor C404 starts charging up via resistor R407, when the anode gate is 0.7V below the anode, the D404 is triggered and the capacitor C404 is discharged.

In order to ensure enough current in the gate, a negative going pulse 200 - 500 mS of 0.7V is fed to the gate via C403.

The discharge of C404 causes a positive pulse across R406. The SCR D405 is triggered and relay RE402 is closed.

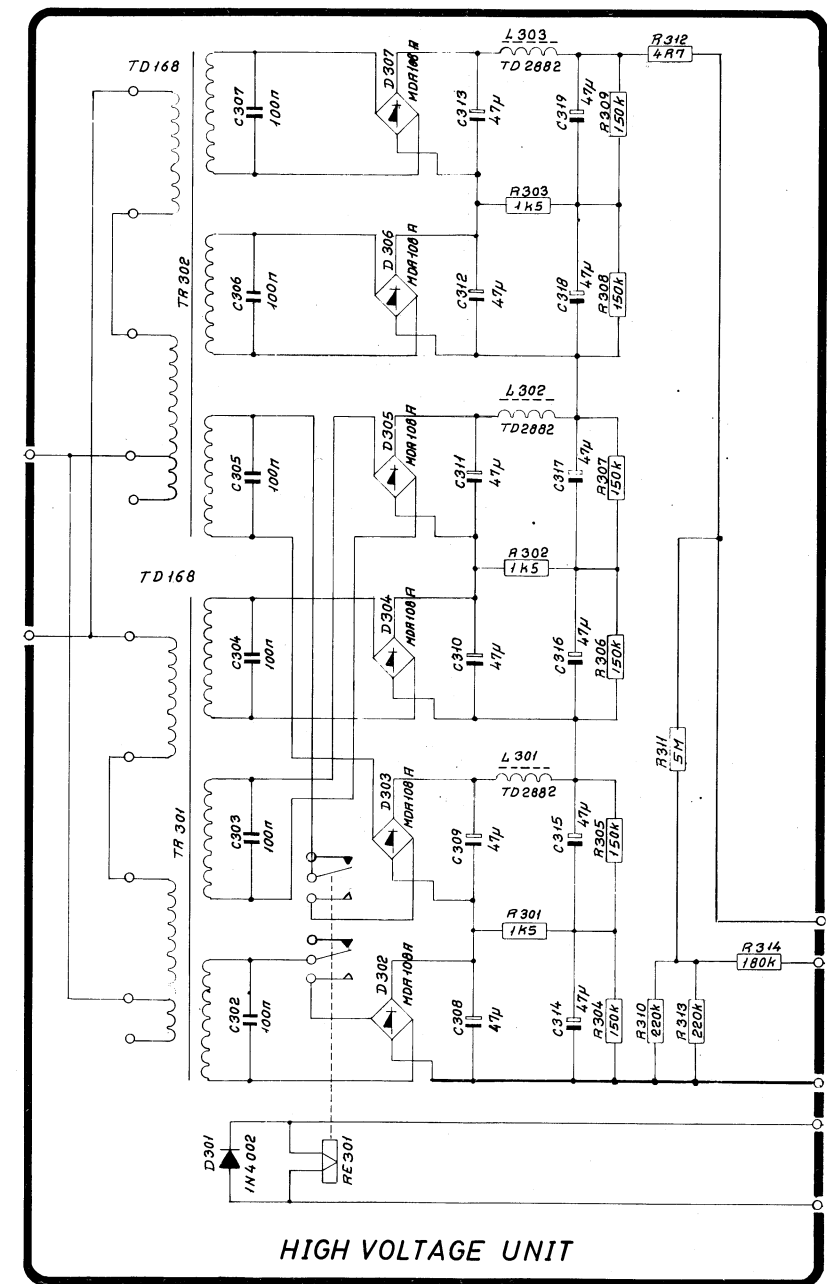
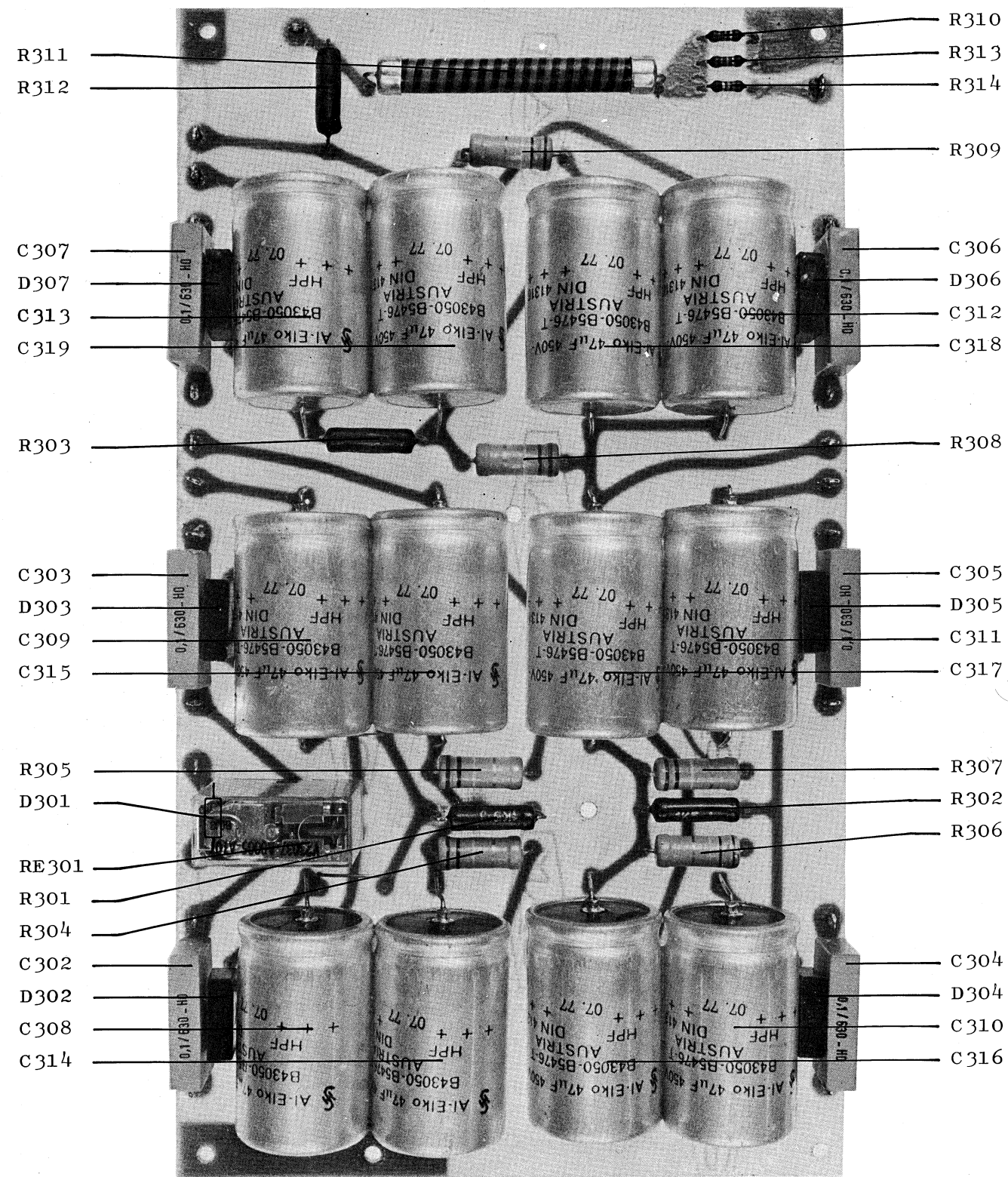
Relay RE401 is controlled via the control input Block P.S., when both relays are closed, control inputs are allowed to pass through the DELAY UNIT.

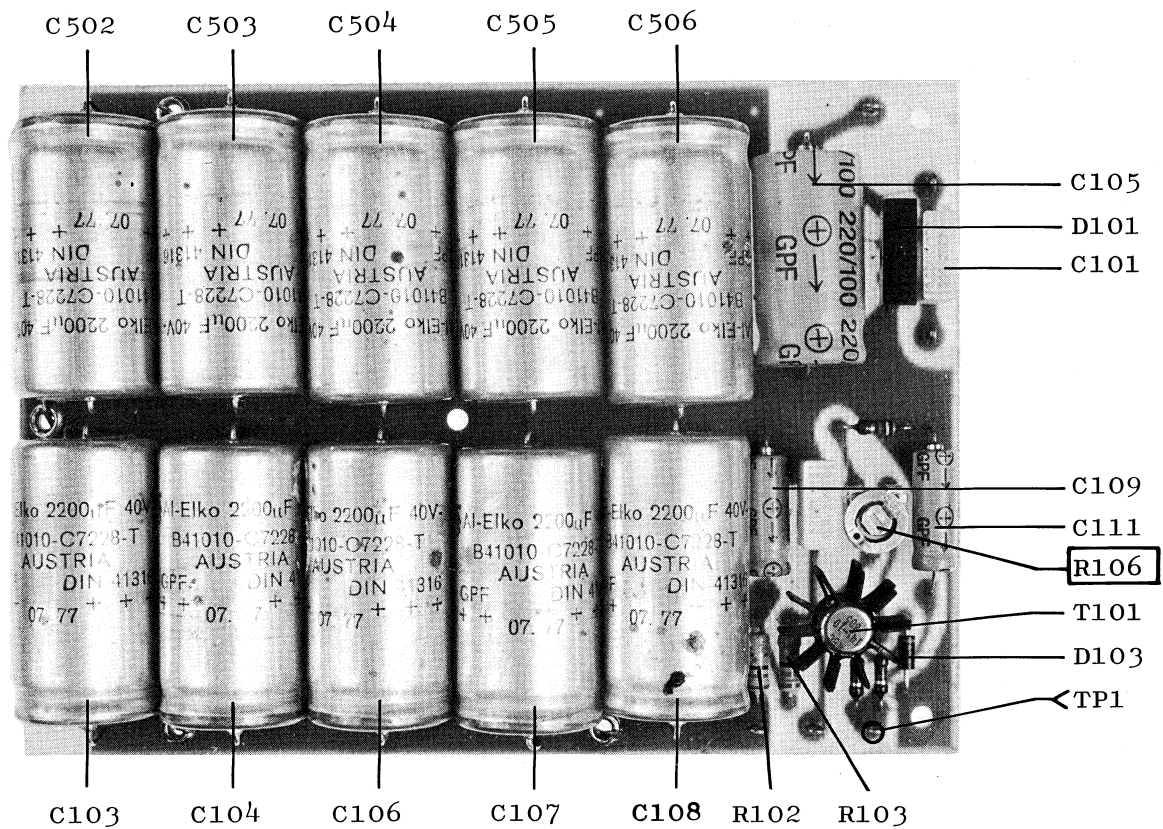
TEST METER

When using the SUPPLY VOLTAGE meter M601 and the switch S601 voltages are monitored. The resistors are placed either on the test meter print or in the different units.

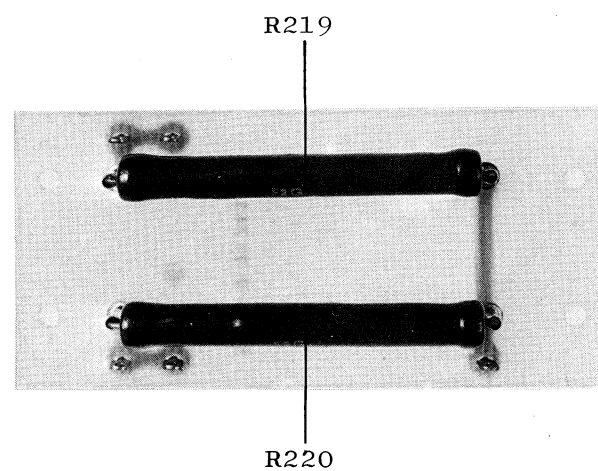
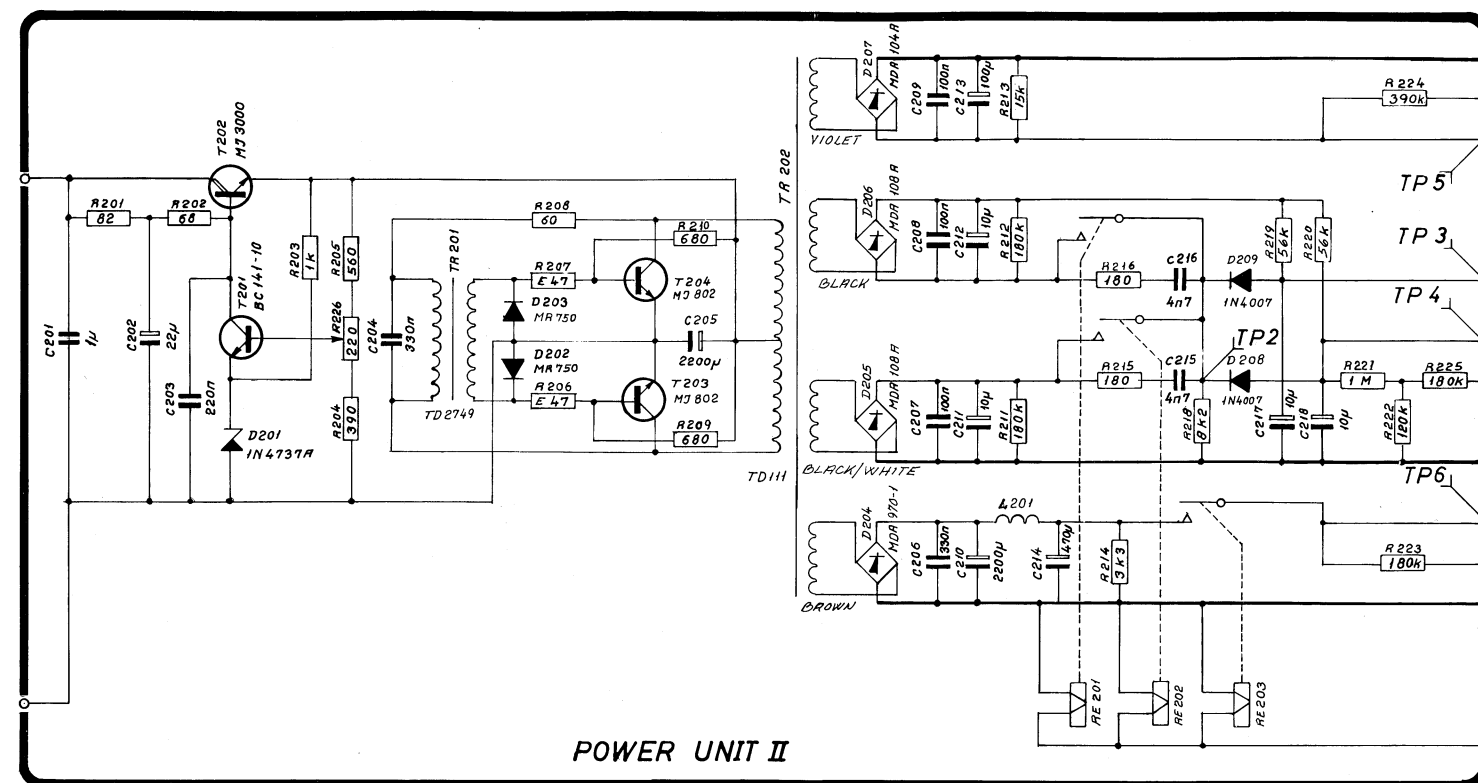
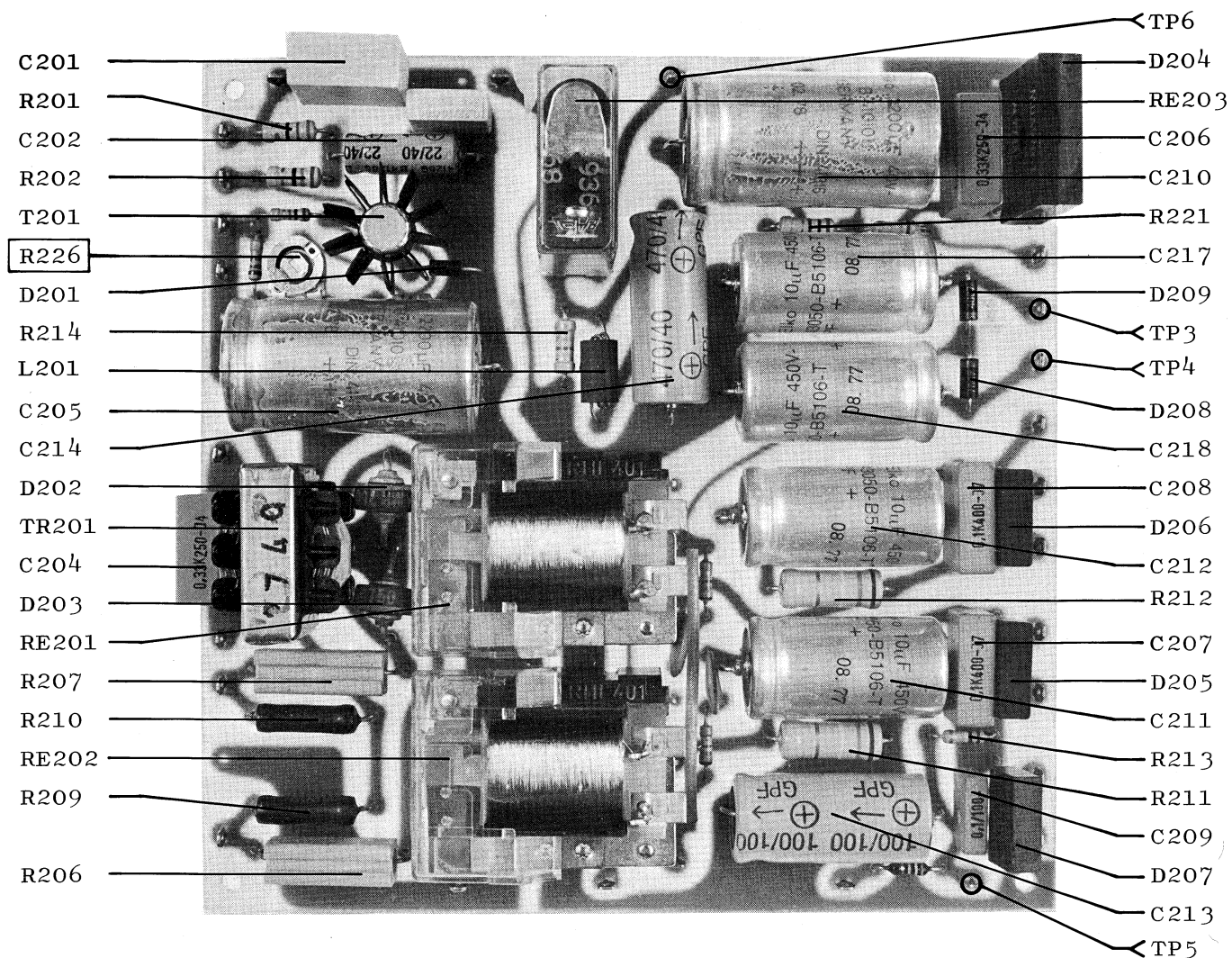
MAIN SWITCH

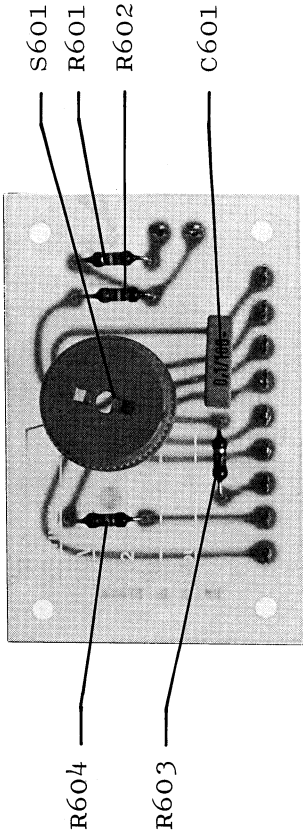
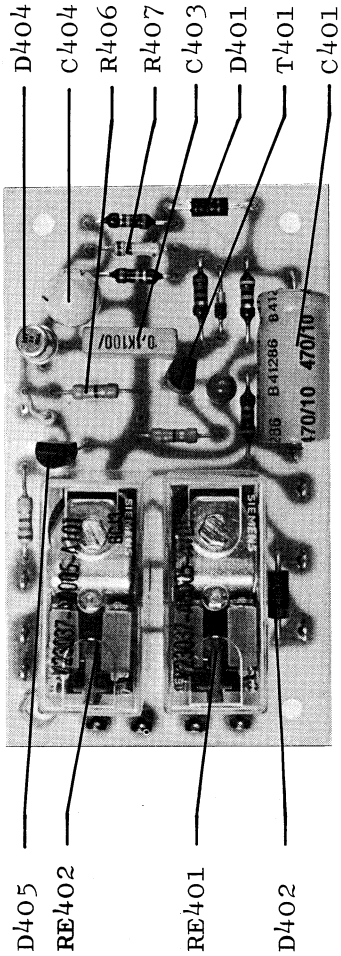
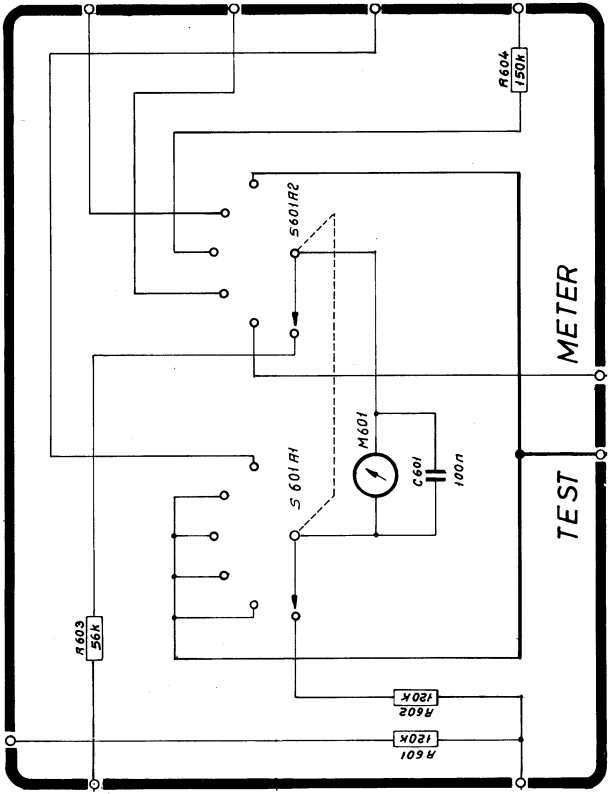
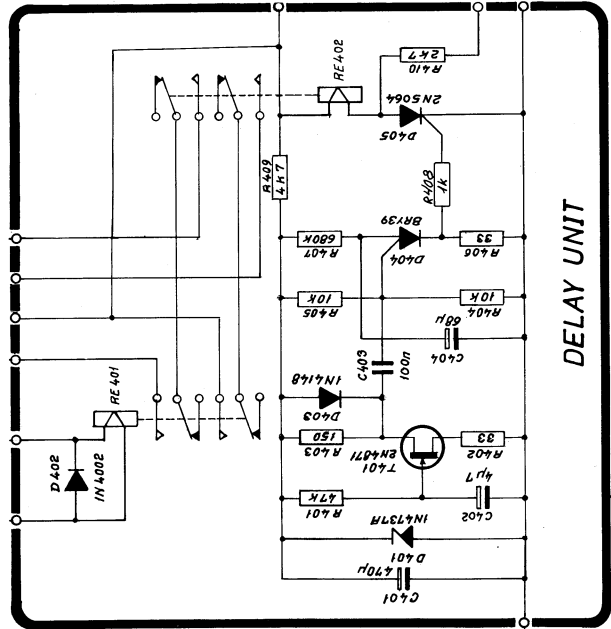
The switch S701 controls the function of the power supply and it is operated from the front.





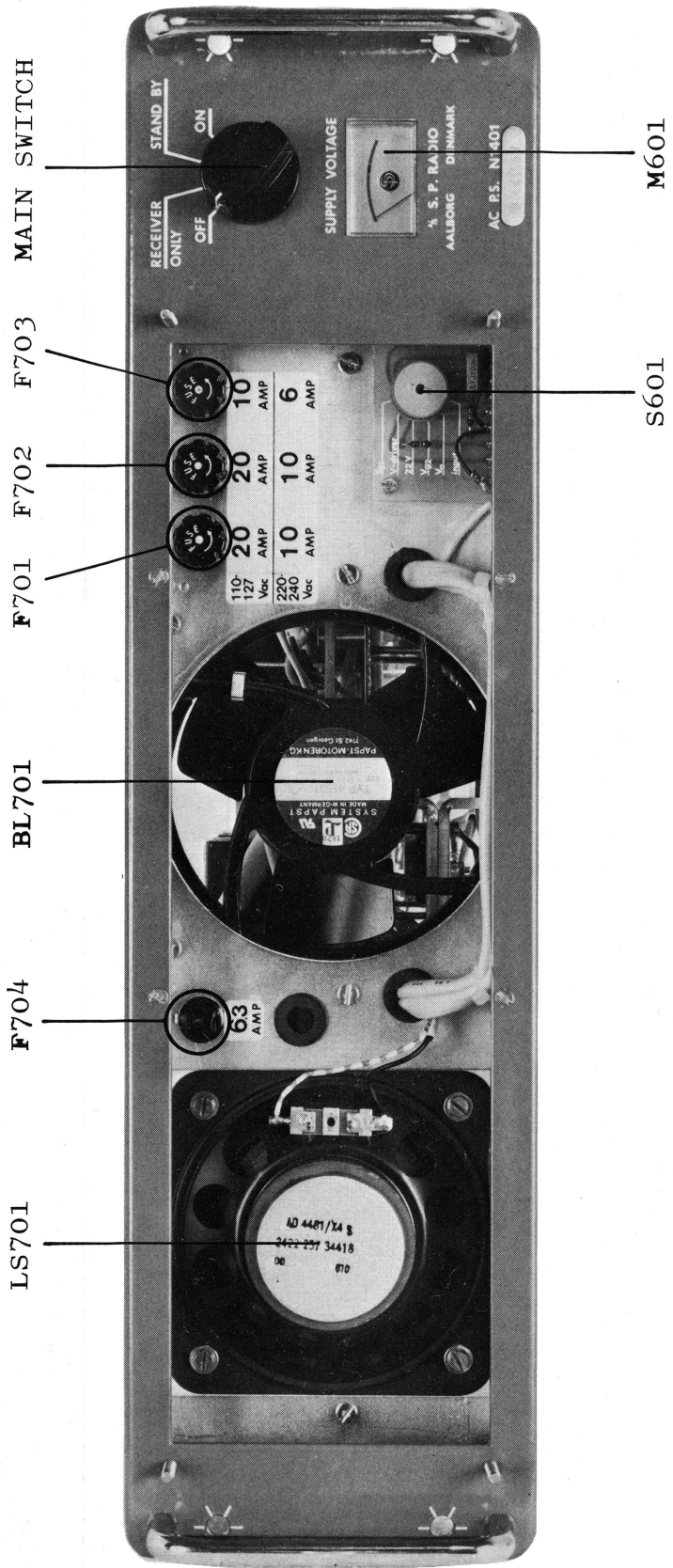
POWER UNIT I & SUPPLY II N1401



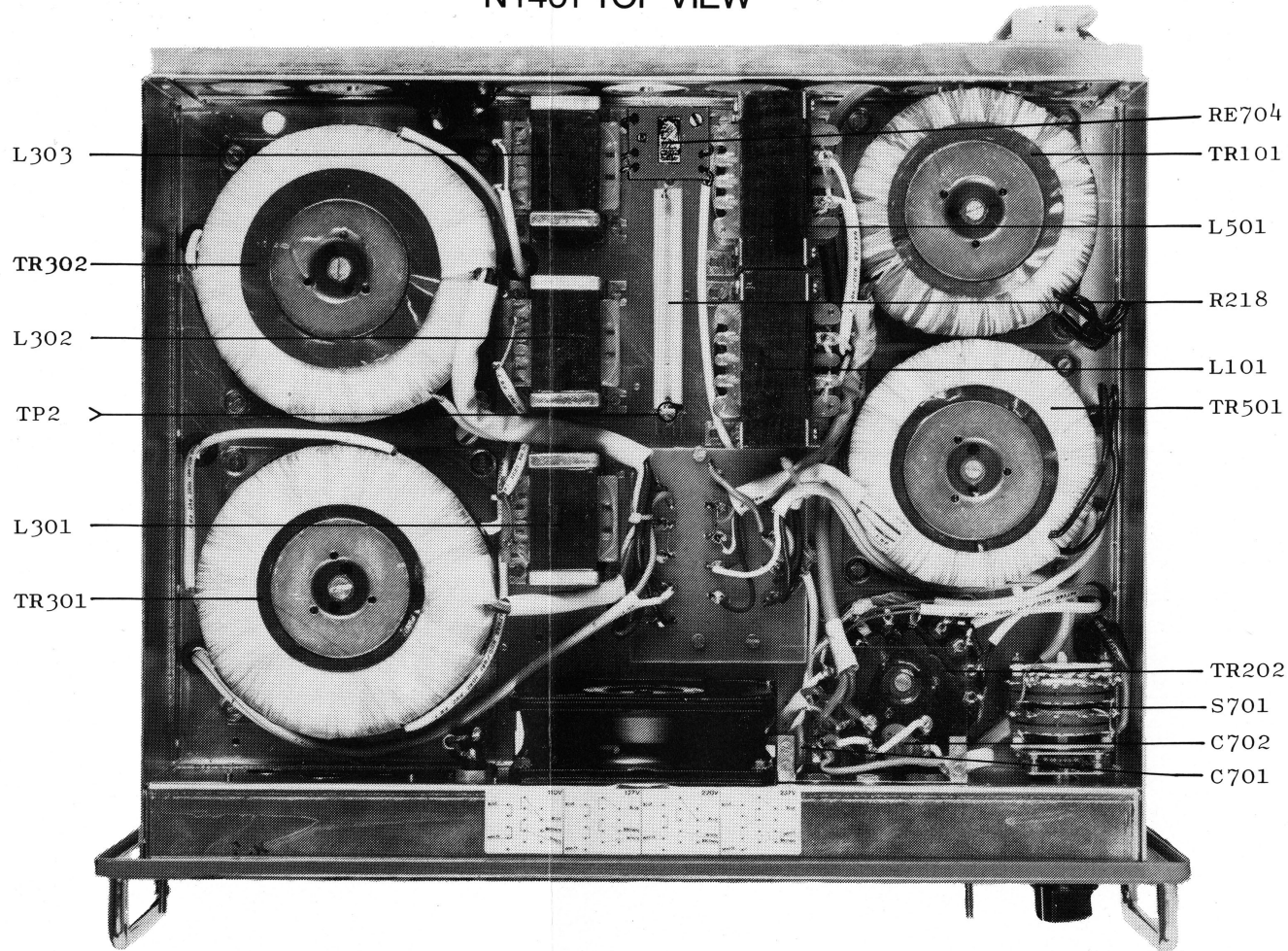


DELAY UNIT & TEST METER N1400/N1401

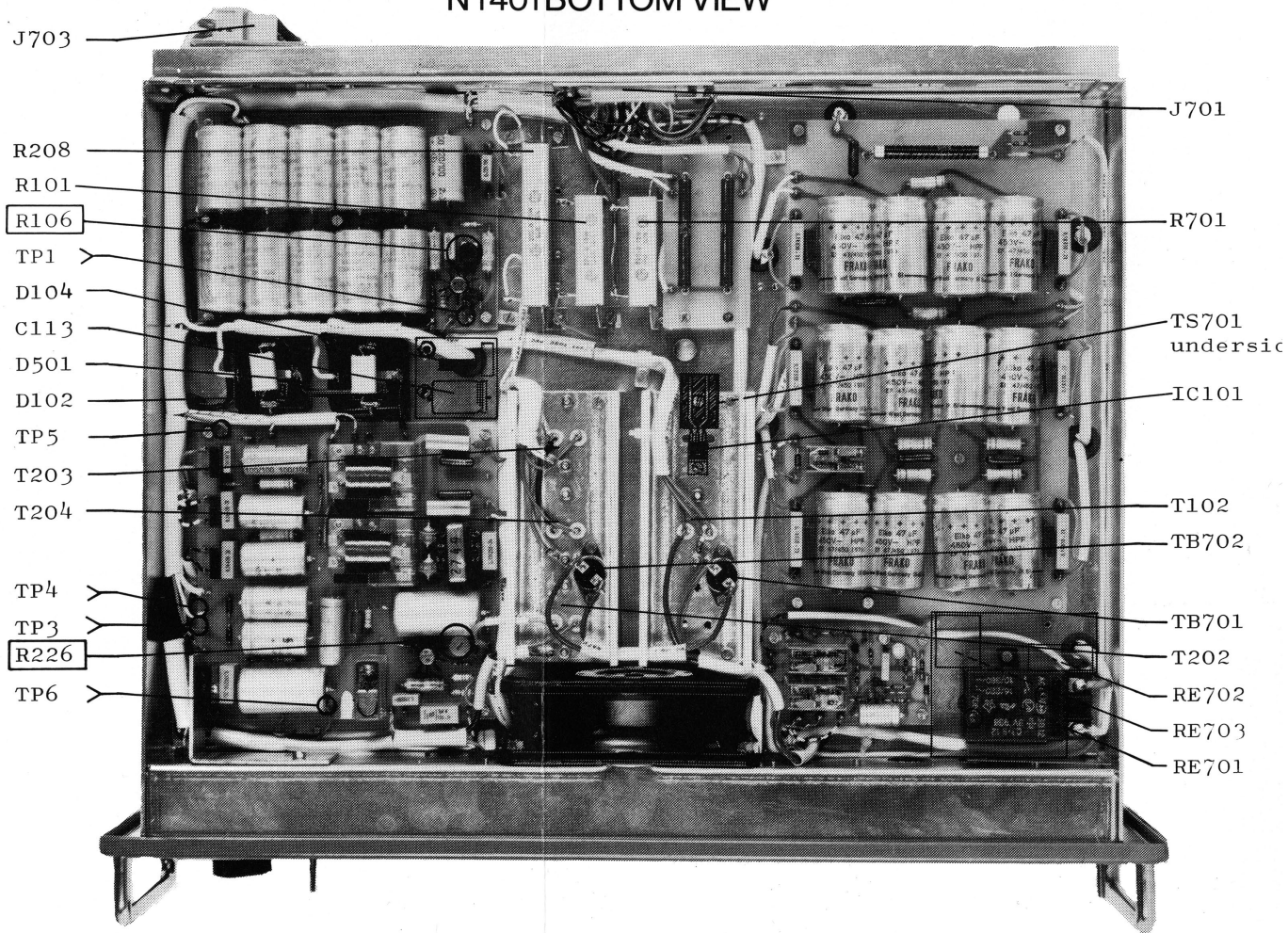
N1401 FRONT VIEW



N1401 TOP VIEW



N1401 BOTTOM VIEW



C

POWER UNIT I N1401

Symbol	Description			Manufact.	
R101	Resistor	100 ohm 10%	15W	Vitrohm	222-0
R102	Resistor	82 ohm	0.5W	Philips	2322 212 13829
R103	Resistor	68 ohm	0.5W	Philips	2322 212 13689
R104	Resistor	1kohm	0.33W	Philips	2322 211 13102
R105	Resistor	390 ohm	0.33W	Philips	2322 211 13391
R106	Potentiometer	220 ohm 20%		Noble	TM8KV2-1S-220
R107	Resistor	560 ohm	0.33W	Philips	2322 211 13561
C101	Capacitor polyester	0.22uF	100V	ERO	MKT1822-422/0
C102	Capacitor polyester	0.47uF	100V	Philips	2222 341 29474
C103	Capacitor electrolytic	2200uF	40V	Siemens	B41010-C7228-T
C104	Capacitor electrolytic	2200uF	40V	Siemens	B41010-C7228-T
C105	Capacitor electrolytic	220uF	100V	Siemens	B41010-D9227-T
C106	Capacitor electrolytic	2200uF	40V	Siemens	B41010-C7228-T
C107	Capacitor electrolytic	2200uF	40V	Siemens	B41010-C7228-T
C108	Capacitor electrolytic	2200uF	40V	Siemens	B41010-C7228-T
C109	Capacitor electrolytic	22uF	40V	Siemens	B41283-B7226-T
C110	Capacitor polyester	0.22uF	100V	ERO	MKT1822-422/0
C111	Capacitor electrolytic	22uF	40V	Siemens	B41283-B7226-T
C112	Capacitor polyester	0.22uF	100V	ERO	MKT1822-422/0
C113	Capacitor electrolytic	3300uF	25V	Philips	2222 021 46332
C114	Capacitor polyester	0.33uF	100V	ERO	MKT1822-433/0
C115	Capacitor polyester	100nF	100V	ERO	MKT1822-410/0
C116	Capacitor electrolytic	3300uF	25V	Philips	2222 021 46332
L101	Coil			Tradania	TD3827
TR101	Transformer			Tradania	TD207A
D101	Diode bridge			Motorola	MDA 104A/MDA 204
D102	Diode bridge			Motorola	BYW21
D103	Diode zener	7.5V	1W	Motorola	1N4737A
D104	Diode bridge			G.I.	2KBP 005
TR101	Transistor			Siemens	BC141-10
TR102	Transistor			Motorola	MJ3000
IC101	Integrated circuit			Motorola	MC7808 CT

a

Power unit II N1400/N1401

Symbol	Description			Manufact.	
R201	Resistor	82 ohm	0,5W	Philips	2322 212 13829
R202	Resistor	68 ohm	0,5W	Philips	2322 212 13689
R203	Resistor	1Kohm	0,33W	Philips	2322 211 13102
R204	Resistor	390 ohm	0,33W	Philips	2322 211 13391
R205	Resistor	560 ohm	0,33W	Philips	2322 211 13561
R206	Resistor	0,47 ohm 10%	4W	Vitrohm	206-0
R207	Resistor	0,47 ohm 10%	4W	Vitrohm	206-0
R208	Resistor	60 ohm 5%	23W	Vitrohm	222-0
R209	Resistor	680 ohm	4,2W	Philips	2322 330 22681
R210	Resistor	680 ohm	4,2W	Philips	2322 330 22681
R211	Resistor	180Kohm	1,15W	Philips	2322 214 13184
R212	Resistor	180Kohm	1,15W	Philips	2322 214 13184
R213	Resistor	15Kohm	0,33W	Philips	2322 211 13153
R214	Resistor	3,3Kohm	0,5W	Philips	2322 211 13332
R215	Resistor	180 ohm	0,33W	Philips	2322 211 13181
R216	Resistor	180 ohm	0,33W	Philips	2322 211 13181
R218	Resistor	8,2Kohm 5%	30W	Vitrohm	224-0
R219	Resistor	56Kohm 5%	12W	Danotherm	GAN 12
R220	Resistor	56Kohm 5%	12W	Danotherm	GAN 12
R221	Resistor	1Mohm	0,5W	Philips	2322 212 13105
R222	Resistor	120Kohm	0,33W	Philips	2322 211 13124
R223	Resistor	180Kohm	0,33W	Philips	2322 211 13184
R224	Resistor	390Kohm	0,33W	Philips	2322 211 13394
R225	Resistor	180Kohm	0,33W	Philips	2322 211 13184
R226	Potentiometer	220 ohm		Draloric	70 WTD-K-C
C201	Capacitor polyester	1uF	100V	ERO	MKT1822-510/0
C202	Capacitor electrolytic	22uF	40V	Siemens	B41283-B7226-T
C203	Capacitor polyester	0,22uF	100V	ERO	MKT1822-422/0
C204	Capacitor polyester	0,33uF	250V	ERO	MKT1822-433/2
C205	Capacitor electrolytic	2200uF	40V	Siemens	B41010-C7228-T
C206	Capacitor polyester	0,33uF	250V	ERO	MKT1822-433/2
C207	Capacitor polyester	0,1uF	400V	ERO	MKT1822-410/4
C208	Capacitor polyester	0,1uF	400V	ERO	MKT1822-410/4

b

Power unit II N1400/N1401

Symbol	Description	Manufact.	
C209	Capacitor polyester 0,1uF 100V	ERO	MKT1822-410/0
C210	Capacitor electrolytic 2200uF 40V	Siemens	B41010-C7228-T
C211	Capacitor electrolytic 10uF 450V	Siemens	B43050-B5106-T
C212	Capacitor electrolytic 10uF 450V	Siemens	B43050-B5106-T
C213	Capacitor electrolytic 100uF 100V	Siemens	B41010-A9107-T
C214	Capacitor electrolytic 470uF 40V	Siemens	B41010-A7477-T
C215	Capacitor ceramic 4,7nF 400V	Ferroperm	9/0138,9
C216	Capacitor ceramic 4,7nF 400V	Ferroperm	9/0138,9
C217	Capacitor electrolytic 10uF 450V	Siemens	B43050-B5106-T
C218	Capacitor electrolytic 10uF 450V	Siemens	B43050-B5106-T
T201	Transistor	Siemens	BC141-10
T202	Transistor	Motorola	MJ3000
T203	Transistor matched pair	Motorola	MJ802
T204	Transistor	Motorola	MJ802
D201	Diode zener 7,5V	Motorola	1N4737A
D202	Diode	Motorola	MR750
D203	Diode	Motorola	MR750
D204	Diode bridge	Motorola	MDA970-1
D205	Diode bridge	Motorola	MDA108A/MDA208
D206	Diode bridge	Motorola	MDA108A/MDA208
D207	Diode bridge	Motorola	MDA104A/MDA204
D208	Diode	Motorola	1N4007
D209	Diode	Motorola	1N4007
L201	Coil	S.P.	Drg.No. TL067
TR201	Transformer	Tradania	TD2749
TR202	Transformer	Tradania	TD111
RE201	Relay	AEG	RHL401 24V/02
RE202	Relay	AEG	RHL401 24V/02
RE203	Relay	PASI	KH/A BV 936

High voltage unit N1401

Symbol	Description			Manufact.	
R301	Resistor	1,5 Kohm	4,2W	Philips	2322 330 22152
R302	Resistor	1,5 Kohm	4,2W	Philips	2322 330 22152
R303	Resistor	1,5 Kohm	4,2W	Philips	2322 330 22152
R304	Resistor	150 Kohm	1,15W	Philips	2322 214 13154
R305	Resistor	150 Kohm	1,15W	Philips	2322 214 13154
R306	Resistor	150 Kohm	1,15W	Philips	2322 214 13154
R307	Resistor	150 Kohm	1,15W	Philips	2322 214 13154
R308	Resistor	150 Kohm	1,15W	Philips	2322 214 13154
R309	Resistor	150 Kohm	1,15W	Philips	2322 214 13154
R310	Resistor	220 Kohm	0,33W	Philips	2322 211 13224
R311	Resistor	5 Mohm 20%	2W	Vitrohm	177-0
R312	Resistor	4,7 ohm	4,2W	Philips	2322 330 22478
R313	Resistor	220 Kohm	0,33W	Philips	2322 211 13224
R314	Resistor	180 Kohm	0,33W	Philips	2322 211 13184
C302	Capacitor polyester	0,1uF	630V	ERO	MKT1822-410/6
C303	Capacitor polyester	0,1uF	630V	ERO	MKT1822-410/6
C304	Capacitor polyester	0,1uF	630V	ERO	MKT1822-410/6
C305	Capacitor polyester	0,1uF	630V	ERO	MKT1822-410/6
C306	Capacitor polyester	0,1uF	630V	ERO	MKT1822-410/6
C307	Capacitor polyester	0,1uF	630V	ERO	MKT1822-410/6
C308	Capacitor electrolytic	47uF	450V	Siemens	B43050-B5476-T
C309	Capacitor electrolytic	47uF	450V	Siemens	B43050-B5476-T
C310	Capacitor electrolytic	47uF	450V	Siemens	B43050-B5476-T
C311	Capacitor electrolytic	47uF	450V	Siemens	B43050-B5476-T
C312	Capacitor electrolytic	47uF	450V	Siemens	B43050-B5476-T
C313	Capacitor electrolytic	47uF	450V	Siemens	B43050-B5476-T
C314	Capacitor electrolytic	47uF	450V	Siemens	B43050-B5476-T
C315	Capacitor electrolytic	47uF	450V	Siemens	B43050-B5476-T
C316	Capacitor electrolytic	47uF	450V	Siemens	B43050-B5476-T
C317	Capacitor electrolytic	47uF	450V	Siemens	B43050-B5476-T
C318	Capacitor electrolytic	47uF	450V	Siemens	B43050-B5476-T
C319	Capacitor electrolytic	47uF	450V	Siemens	B43050-B5476-T

a

High Voltage unit N1401

Symbol	Description	Manufact.	
TR301	Transformer	Tradania	TD168
TR302	Transformer	Tradania	TD168
D301	Diode	Motorola	1N4002
D302	Diode bridge	Motorola	MDA 108A /MDA208
D303	Diode bridge	Motorola	MDA 108A /MDA208
D304	Diode bridge	Motorola	MDA 108A /MDA208
D305	Diode bridge	Motorola	MDA 108A /MDA208
D306	Diode bridge	Motorola	MDA 108A /MDA208
D307	Diode bridge	Motorola	MDA 108A /MDA208
RE301	Relay	Siemens	V23037-A00005-A101

a

Delay unit N1400/N1401

Symbol	Description			Manufact.	
R401	Resistor	47Kohm	0,33W	Philips	2322 211 13473
R402	Resistor	33 ohm	0,33W	Philips	2322 211 13339
R403	Resistor	150 ohm	0,33W	Philips	2322 211 13151
R404	Resistor	10Kohm	0,33W	Philips	2322 211 13103
R405	Resistor	10Kohm	0,33W	Philips	2322 211 13103
R406	Resistor	33 ohm	0,33W	Philips	2322 211 13339
R407	Resistor	680Kohm	0,33W	Philips	2322 211 13684
R408	Resistor	1Kohm	0,33W	Philips	2322 106 13102
R409	Resistor	4,7Kohm	0,33W	Philips	2322 211 13472
R410	Resistor	2,7Kohm	0,33W	Philips	2322 211 13272
C401	Capacitor electrolytic	470uF	10V	Siemens	B41283-A3477-T
C402	Capacitor tantal	4,7uF	35V	ERO	ETP2E 4.7/35
C403	Capacitor polyester	0,1uF	100V	ERO	MKT 1822-410/0
C404	Capacitor tantal	68uF $\pm 10\%$	16V	ERO	ETQ5 68/16 $\pm 10\%$
T401	Transistor UJT			Motorola	2N4871
D401	Diode zener		7,5V	Motorola	1N4737A
D402	Diode			Motorola	1N4002
D403	Diode			Texas	1N4148
D404	Diode SCR			Philips	BRY39
D405	Diode SCR			Motorola	2N5064
RE401	Relay			Siemens	V23037-A0005-A101
RE402	Relay			Siemens	V23037-A0005-A101

Supply II N1401

<i>Symbol</i>	<i>Description</i>		<i>Manufact.</i>	
C501	Capacitor polyester 0,47uF	100V	Philips	2222 341 29474
C502	Capacitor electrolytic 2200uF	40V	Siemens	B41010-C7228-T
C503	Capacitor electrolytic 2200uF	40V	Siemens	B41010-C7228-T
C504	Capacitor electrolytic 2200uF	40V	Siemens	B41010-C7228-T
C505	Capacitor electrolytic 2200uF	40V	Siemens	B41010-C7228-T
C506	Capacitor electrolytic 2200uF	40V	Siemens	B41010-C7228-T
L501	Coil		Tradania	TD1054
TR501	Transformer		Tradania	TD135
D501	Diode bridge		Motorola	BYW21

Testmeter N1400 /N1401

Symbol	Description			Manufact.	
R601	Resistor	120Kohm	0,33W	Philips	2322 211 13124
R602	Resistor	120Kohm	0,33W	Philips	2322 211 13124
R603	Resistor	56Kohm	0,33W	Philips	2322 211 13563
R604	Resistor	150Kohm	0,33W	Philips	2322 211 13154
C601	Capacitor polyester	0,1uF	100V	ERO	MKT1822-410/0
M601	Meter			Aug.Eklöw	MG20 Drg. No. 9-3-21496
S601	Switch			ITT	RBP 12F 2x6NCC

C

Chassis N1401

Symbol	Description	Manufact.	
R701	Resistor 1 ohm 10% 15W	Vitrohm	220-0
R702	Resistor 6,8 ohm 25W	Danotherm	GRF25L-6,8 ohm
R703	Resistor 2,2 ohm 4W	Philips	2322 329 34228
R704	Resistor 180 ohm 4W	Philips	2322 329 04181
C701	Capacitor ceramic 4,7 nF 5KV	Ferroperm	9/0138,9
C702	Capacitor ceramic 4,7 nF 5KV	Ferroperm	9/0138,9
C703	Capacitor electrolytic 470 uF 16V	Siemens	B41283-A4477-T
C701	Diode	Motorola	1N4002
	<u>At 220V AC</u>		
F701	Fuse 10A	Wickmann	314010
F702	Fuse 10A	Wickmann	314010
F703	Fuse 6A	Wickmann	314006
F704	Fuse 6,3A	ELU	5x20mm 6,3A
	<u>At 110V AC</u>		
F701	Fuse 20A	Wickmann	314020
F702	Fuse 20A	Wickmann	314020
F703	Fuse 10A	Wickmann	314010
F704	Fuse 6,3A	ELU	5x20mm 6,3A
S701	Switch	NSF	HD 120231S MSD 2
RE701	Relay Ag/CdO Contacts	PASI	CR/B-BV-938
RE702	Relay	PASI	KH/A-BV-1074
RE703	Relay	PASI	MS/K-13-C
RE704	Relay	PASI	KS/U-BV-998
BL701	Blower 220V AC	PAPST	Typ 4550N
LS701	Loudspeaker	Philips	2422 257 34438
TB701	Thermal Breaker	Elmwood	2455 R-21-910
TB702	Thermal Breaker	Elmwood	2455 R-21-910
TS701	Thermostat	Elmwood	2455 R-88-915
J701	Receptacle	Molex	1772-2
J702	Socket	Hirschmann	Meb 160
J703	Plug	Weidmüller	STV 2/10-3338,6



