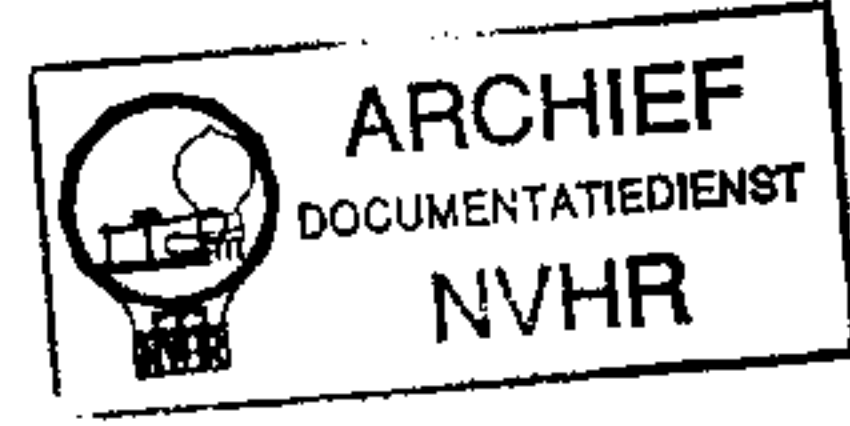


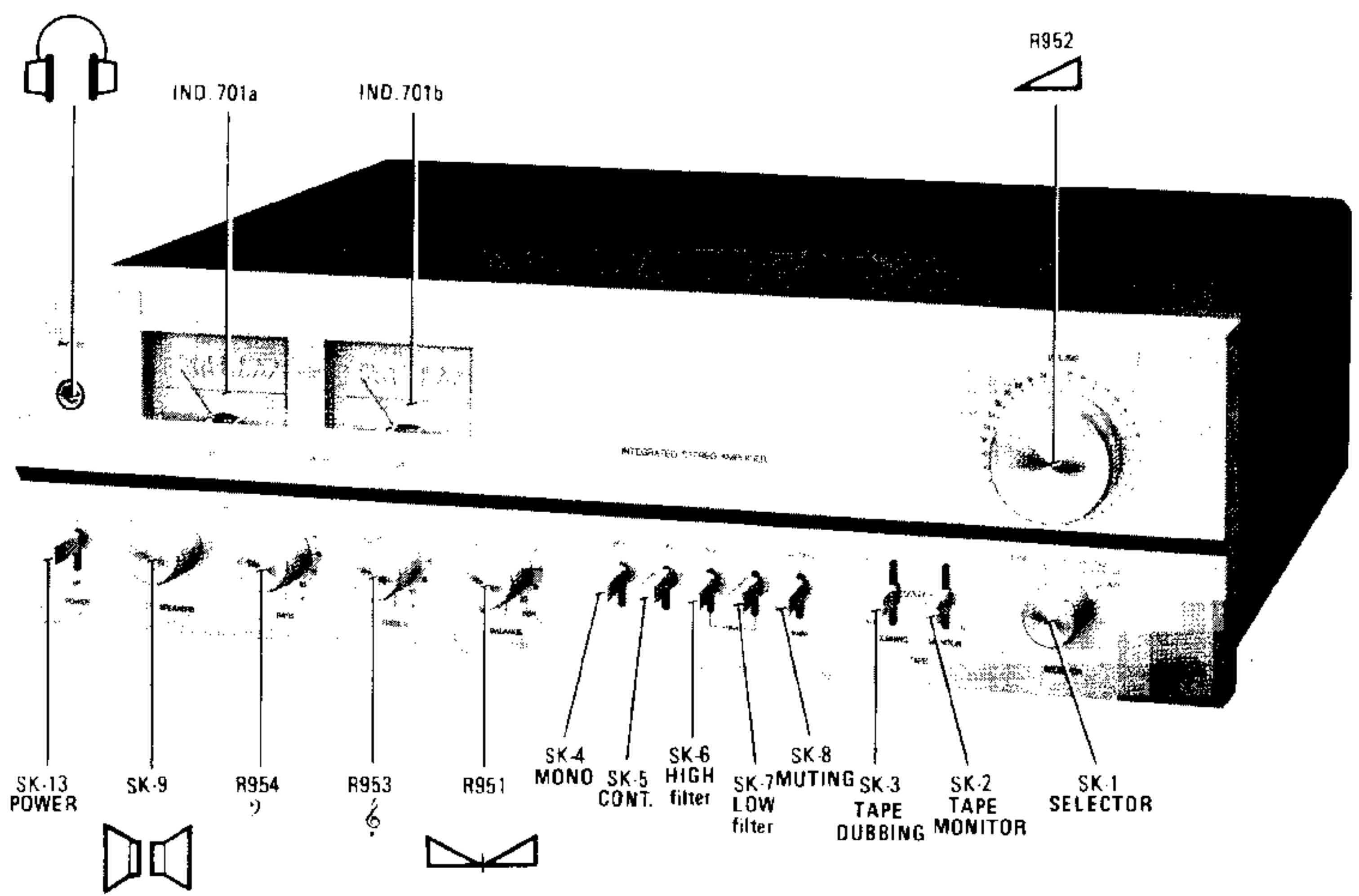
Service
Service
Service

Met dank aan www.radiomuseum-hengelo.nl

Ned. Ver. v. Historie v/d Radio

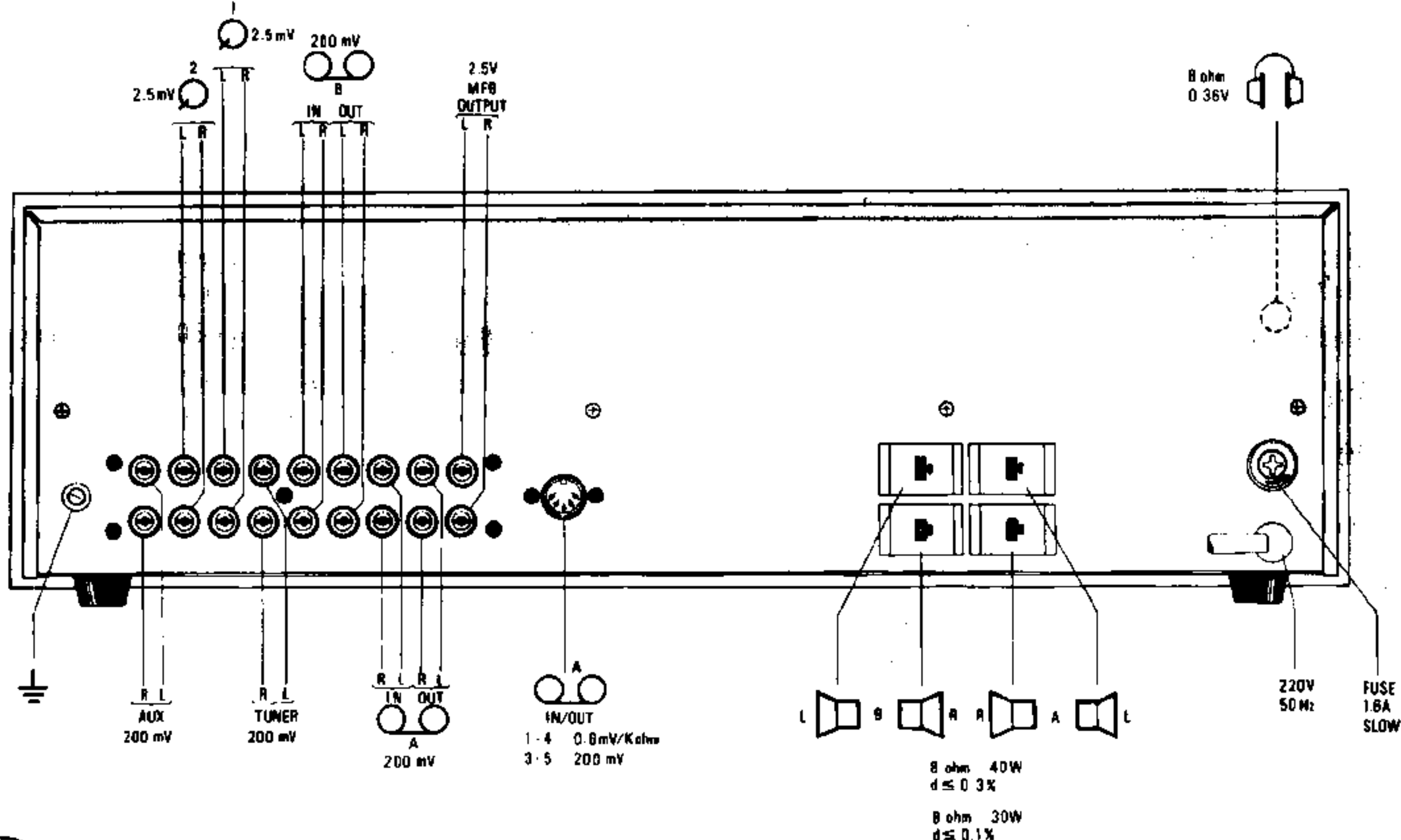


Service Manual



15017A12





GB SPECIFICATIONS

Power output	: 2x45 W (4 Ω) d ≤ 0.3 %	Stereo separation 100 Hz	: 45 dB
Power band width	d ≤ 0.3 %	1 kHz	: 50 dB
Harmonic distortion	: 10 - 40.000 Hz	10 kHz	: 40 dB
at 30 W (8 Ω)	: 0.1 %	Signal-to-noise ratio	
Intermodulation distortion		Phono 1,2	: 60 dB
(acc. to IHF 60-7000 Hz 4:1)		Aux./Tuner	: 80 dB
at 20 W (8 Ω)	: 0.1 %	Output impedance	
Frequency response	: 20 - 20.000 Hz	Loudspeaker	: 4-16 Ω
		Headphone	: 8 Ω
		Dimensions	: 480x150x380 mm.

NL SPECIFICATIES

Uitgangsvermogen	: 2x45 W (4 Ω) v ≤ 0,3 %	Kanaalscheiding 100 Hz	: 45 dB
Vermogensbandbreedte		1 kHz	: 50 dB
v ≤ 0,3 %	: 10 - 40.000 Hz	10 kHz	: 40 dB
Harmonische vervorming bij		Signaal/ruisverhouding	
30 W (8 Ω)	: 0,1 %	Phono 1, 2	: 60 dB
Intermodulatie		Aux, Tuner	: 80 dB
(acc. IHF 60-7000 Hz 4:1)		Uitgangsimpedantie	
bij 20 W (8 Ω)	: 0,1 %	Luidspreker	: 4-16 Ω
Frequentiebereik	: 20 - 20.000 Hz	Hoofdtelefoon	: 8 Ω
		Afmetingen	: 480x150x380 mm

F CARACTERISTIQUES TECHNIQUES

Puissance de sortie	: 2x45 W (4Ω) d ≤ 0,3 %	Séparation en stéréo 100 Hz	: 45 dB
Bande passante en puissance		1 kHz	: 50 dB
d ≤ 0,3 %	: 10 - 40.000 Hz	10 kHz	: 40 dB
Distorsion harmonique		Rapport signal/bruit	
à 30 W (8 Ω)	: 0,1 %	Phono 1, 2	: 60 dB
Distorsion intermodulatoire		Aux, Tuner	: 80 dB
(IHF 60-7000 Hz 4:1)		Impédance de sortie	
à 20 W (8 Ω)	: 0,1 %	Haut-parleur	: 4-16 Ω
Courbe amplitude/fréquence	: 20 - 20.000 Hz	Casque d'écoute	: 8 Ω
		Dimensions	: 480x150x380 mm

D TECHNISCHE DATEN

Ausgangsleistung	: 2x45 W (4 Ω) k $\leq$ 0,3 %
Leistungsbandbreite k $\leq$ 0,3 %	: 10 - 40.000 Hz
Klirrgrad bei 30 W (8 Ω)	: 0,1 %
Intermodulationsgrad (IHF 60-7000 Hz 4:1) bei 20 W (8 Ω)	: 0,1 %
Übertragungsbereich	: 20 - 20.000 Hz

Überspechdämpfung	100 Hz : 45 dB 1 kHz : 50 dB 10 kHz : 40 dB
S/R-Verhältnis	
Phono 1, 2	: 60 dB
Aux, Tuner	: 80 dB
Ausgangsimpedanz	
Lautsprecher	: 4-16 Ω
Kopfhörer	: 8 Ω
Abmessungen	: 480x150x380 mm

I DATA TECNICI

Potenza d'uscita	: 2x45 W (4 Ω) d $\leq$ 0,3 %
Banda di potenza d $\leq$ 0,3 %	: 10 - 40.000 Hz
Distorsione armonica a 30 W (8 Ω)	: 0,1 %
Intermodulazione (IHF 60-7000 Hz 4:1) a 20 W (8 Ω)	: 0,1 %
Risposta in frequenza	: 20 - 20.000 Hz

Separazione stereo	100 Hz : 45 dB 1 kHz : 50 dB 10 kHz : 40 dB
Rapporto segnale/disturbo	
Phono 1, 2	: 60 dB
Aux, Tuner	: 80 dB
Impedenza d'uscita	
Altoparlante	: 4-16 Ω
Cuffia	: 8 Ω
Dimensioni	: 480x150x380 mm

S TEKNISKA DATA

Uteffekt	: 2x45 W (4 Ω) d $\leq$ 0,3 %
Effekt bandbredd d $\leq$ 0,3 %	: 10 - 40.000 Hz
Harmonisk distorsion vid 30 W (8 Ω)	: 0,1 %
Intermodulation (IHF 60-7000 Hz 4:1) vid 20 W (8 Ω)	: 0,1 %
Frekvensomfång	: 20 - 20.000 Hz

Kanalseparation	100 Hz : 45 dB 1 kHz : 50 dB 10 kHz : 40 dB
Signal/brusför hållande	
Phono 1, 2	: 60 dB
Aux, Tuner	: 80 dB
Impedans	
Högtalare	: 4-16 Ω
Hörtelefon	: 8 Ω
Dimensioner	: 480x150x380 mm

DK TEKNISKE DATA

Udgangseffekt	: 2x45 W (4 Ω) f $\leq$ 0,3 %
Effektbåndbredde f $\leq$ 0,3 %	: 10 - 40.000 Hz
Harmonisk forvrængning ved 30 W (8 Ω)	: 0,1 %
Intermodulation (IHF 60-7000 Hz 4:1) ved 20 W (8 Ω)	: 0,1 %
Frekvens område	: 20 - 20.000 Hz

Stereo separation	100 Hz : 45 dB 1 kHz : 50 dB 10 kHz : 40 dB
Signal/støjforhold	
Phono 1, 2	: 60 dB
Aux, Tuner	: 80 dB
Udgangsimpedans	
Højttaler	: 4-16 Ω
Hovedtelefoner	: 8 Ω
Dimensioner	: 480x150x380 mm

N TEKNISKE DATA

Utgangseffekt	: 2x45 W (4 Ω) f $\leq$ 0,3 %
Effektbåndbredde f $\leq$ 0,3 %	: 10 - 40.000 Hz
Harmonisk forvrengning ved 30 W (8 Ω)	: 0,1 %
Intermodulasjon (IHF 60-7000 Hz 4:1) ved 20 W (8 Ω)	: 0,1 %
Frekvensområde	: 20 - 20.000 Hz

Stereoseparasjon	100 Hz : 45 dB 1 kHz : 50 dB 10 kHz : 40 dB
Signal/støy-forhold	
Phono 1, 2	: 60 dB
Aux, Tuner	: 80 dB
Utgangsimpedans	
Høyttaler	: 4-16 Ω
Hodetelefoner	: 8 Ω
Dimensjoner	: 480x150x380 mm

SF **TEKNISET TIEDOT**

Lähtöteho : 2x45 W (4 Ω)
 $s \leq 0,3 \%$

Tehokaista : 10 - 40.000 Hz
 $s \leq 0,3 \%$

Harmoninen särö : 0,1 %
 30 W (8 Ω)

Keskeismodulaatio : 0,1 %
 (IHF 60-7000 Hz 4:1)
 20 W (8 Ω)

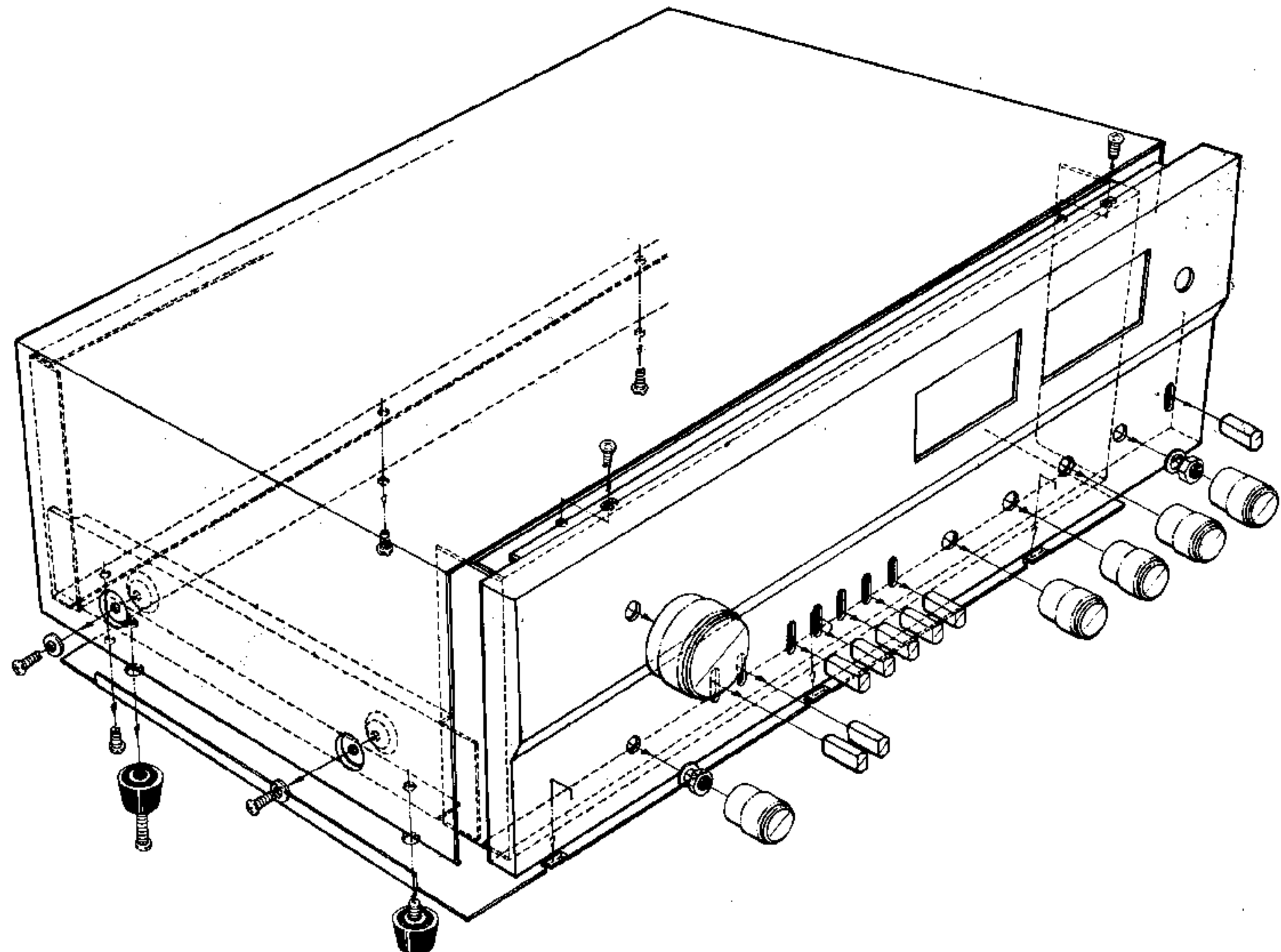
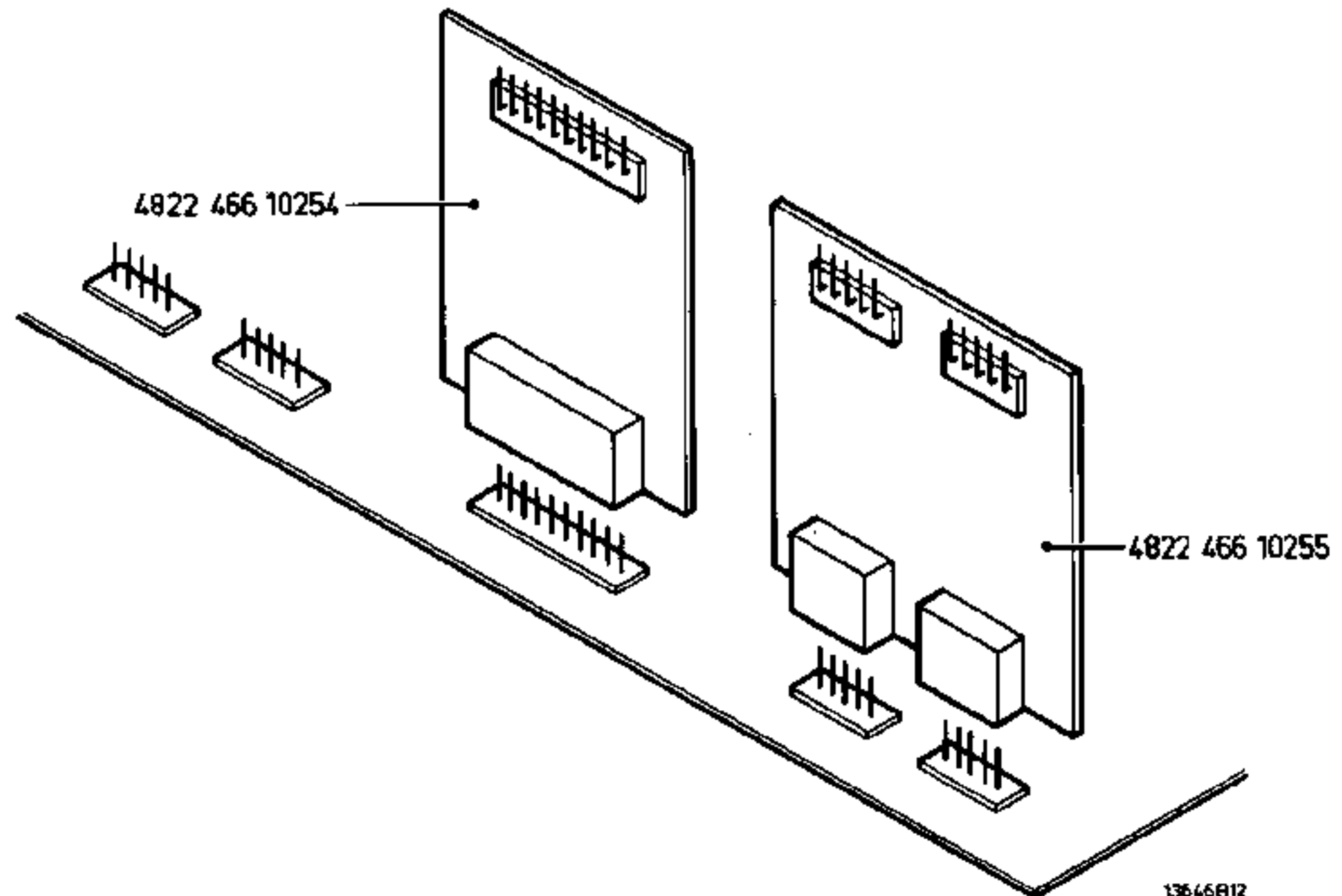
Toistoalue : 20 - 20.000 Hz

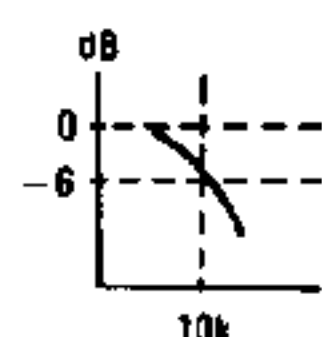
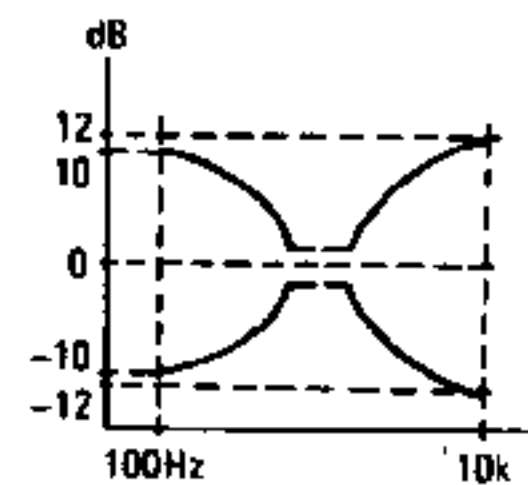
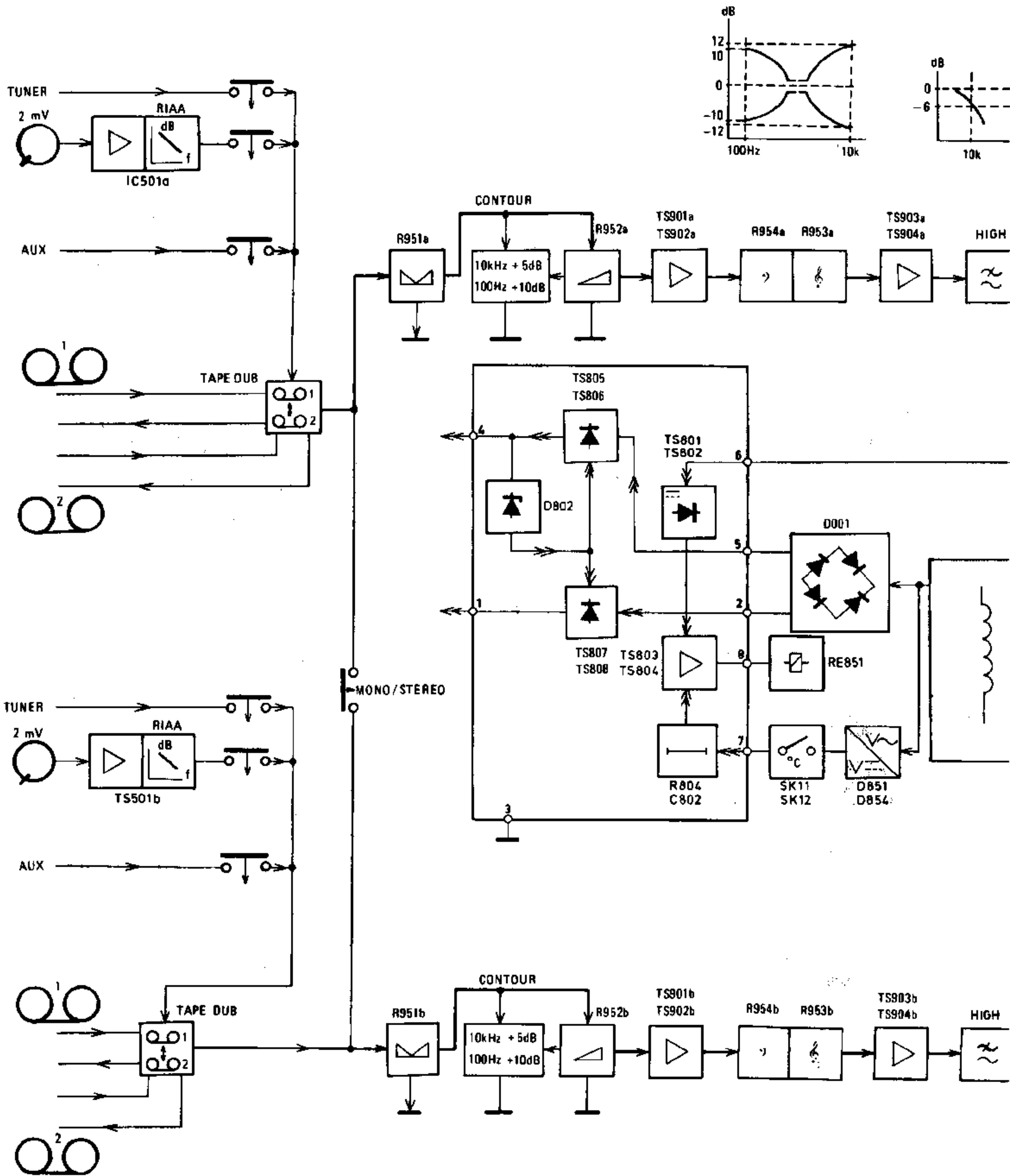
Kanavaerotus 100 Hz : 45 dB
 1 kHz : 50 dB
 10 kHz : 40 dB

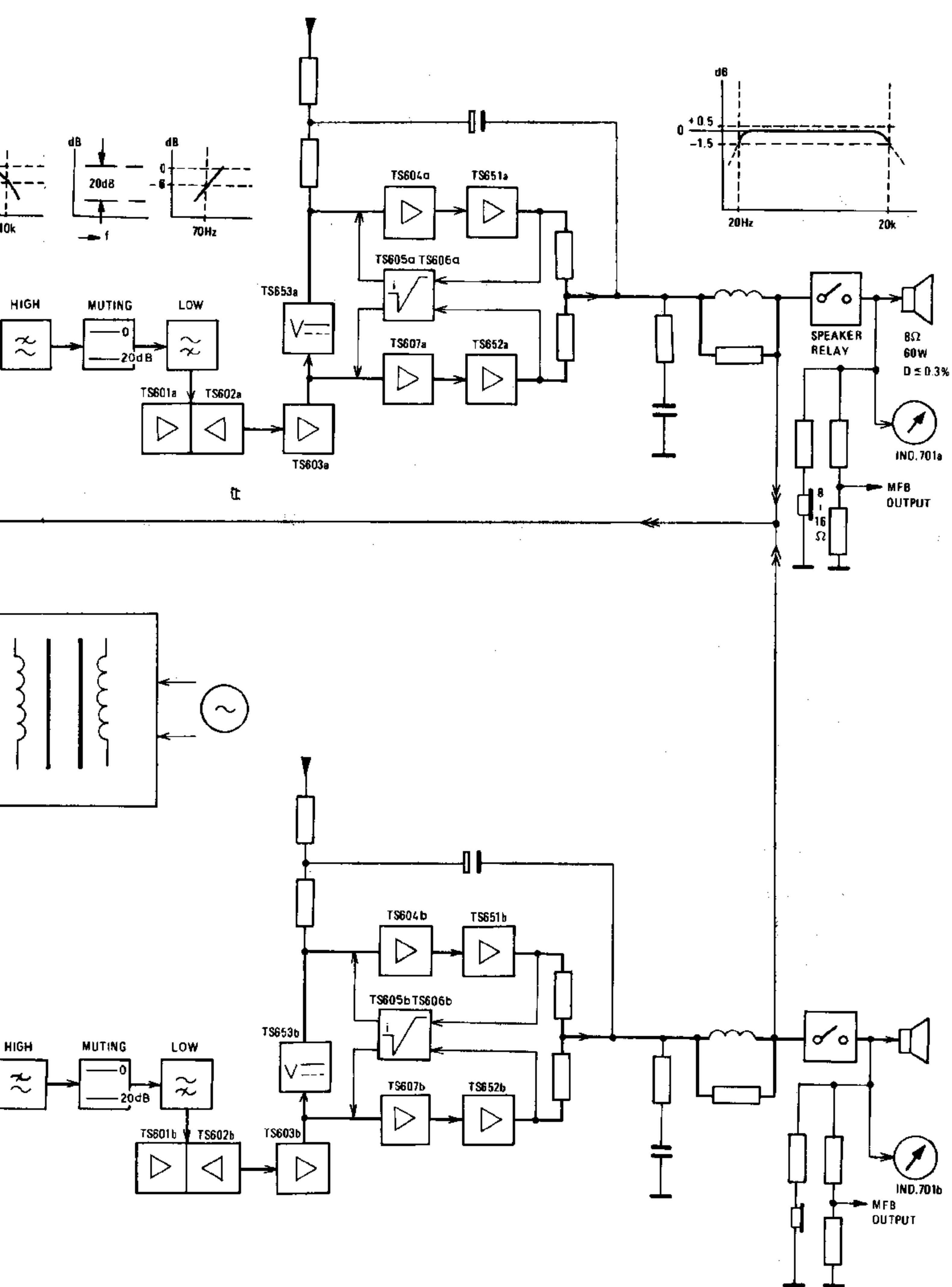
Signaalikohinasuhde
 Phono 1, 2 : 60 dB
 Aux, Tuner : 80 dB

Lähtöimpedanssi
 Kaiutin : 4-16 Ω
 Kuulokkeet : 8 Ω

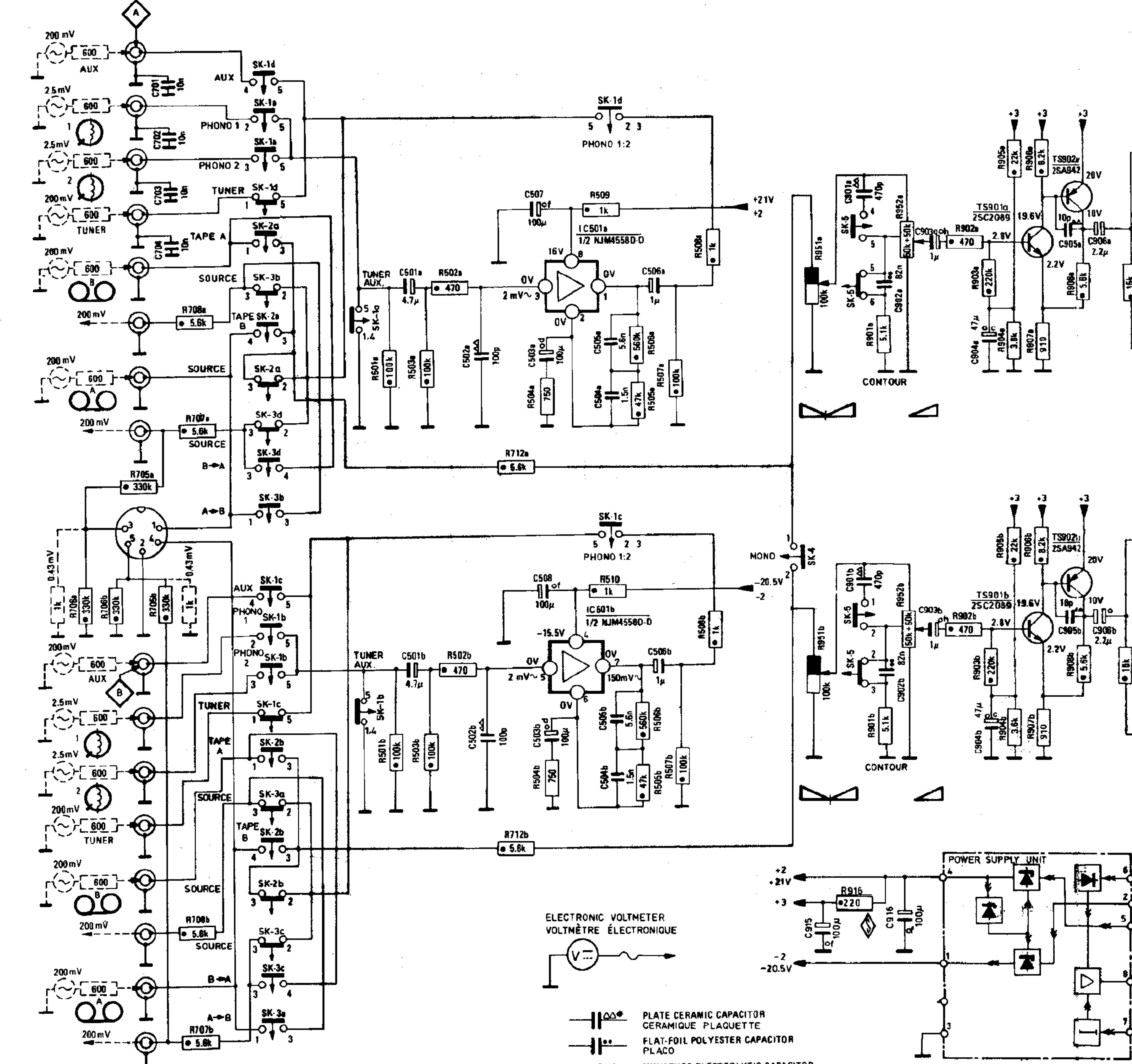
Mitat : 480x150x380 mm







M	SK-1 SK-2 SK-3			IC501a			SK-4	SK-5	TS901a TS902a	
M				IC501b					TS901b TS902b	
M										
C	701-704			501a	502a	507 503a	504a-506a	951a	901a-903a	904a-906a
C				501b	502b	508 503b	504b-506b	951b	901b-903b	904b-906b
C								915	916	
R	705a 707a			501a-503a	712a	504a	505a-507a 509		901a 952a	902a-908a
R	705a 706b 707b			501b-503b	712b	504b	505b-509b 510		901b 952b	902b-908b
R	706a 706b 705b								916	



THE CIRCUIT IS DRAWN IN POSITION TUNER
LE CIRCUIT EST DESSINEE EN POSITION TUNER

ELECTRONIC VOLTMEETER
VOLTMEÈTRE ÉLECTRONIQUE

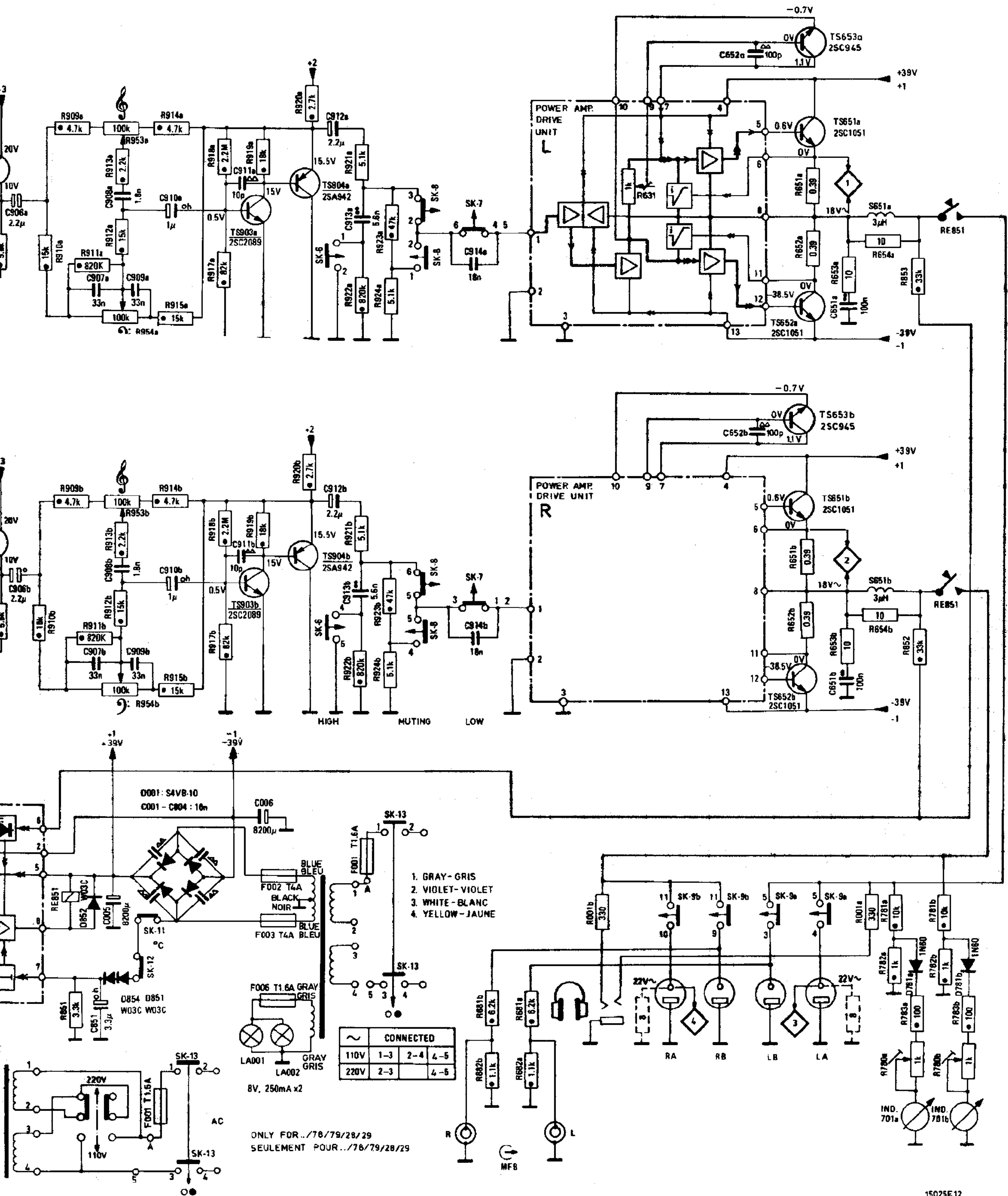
- PLATE CERAMIC CAPACITOR
CERAMIQUE PLAQUETTE
- FLAT-FOIL POLYESTER CAPACITOR
PLACO
- MINIATURE ELECTROLYTIC CAPACITOR
CHIMIQUE MINIATURE
- CARBON RESISTOR E24 SERIES 0.25W 5%
RÉSISTANCE CARBONNE SERIE E24 0.25W

* c = 6.3V h = 63V
d = 10V j = 100V
e = 16V r = 250V
f = 25V u = 400V
g = 40V

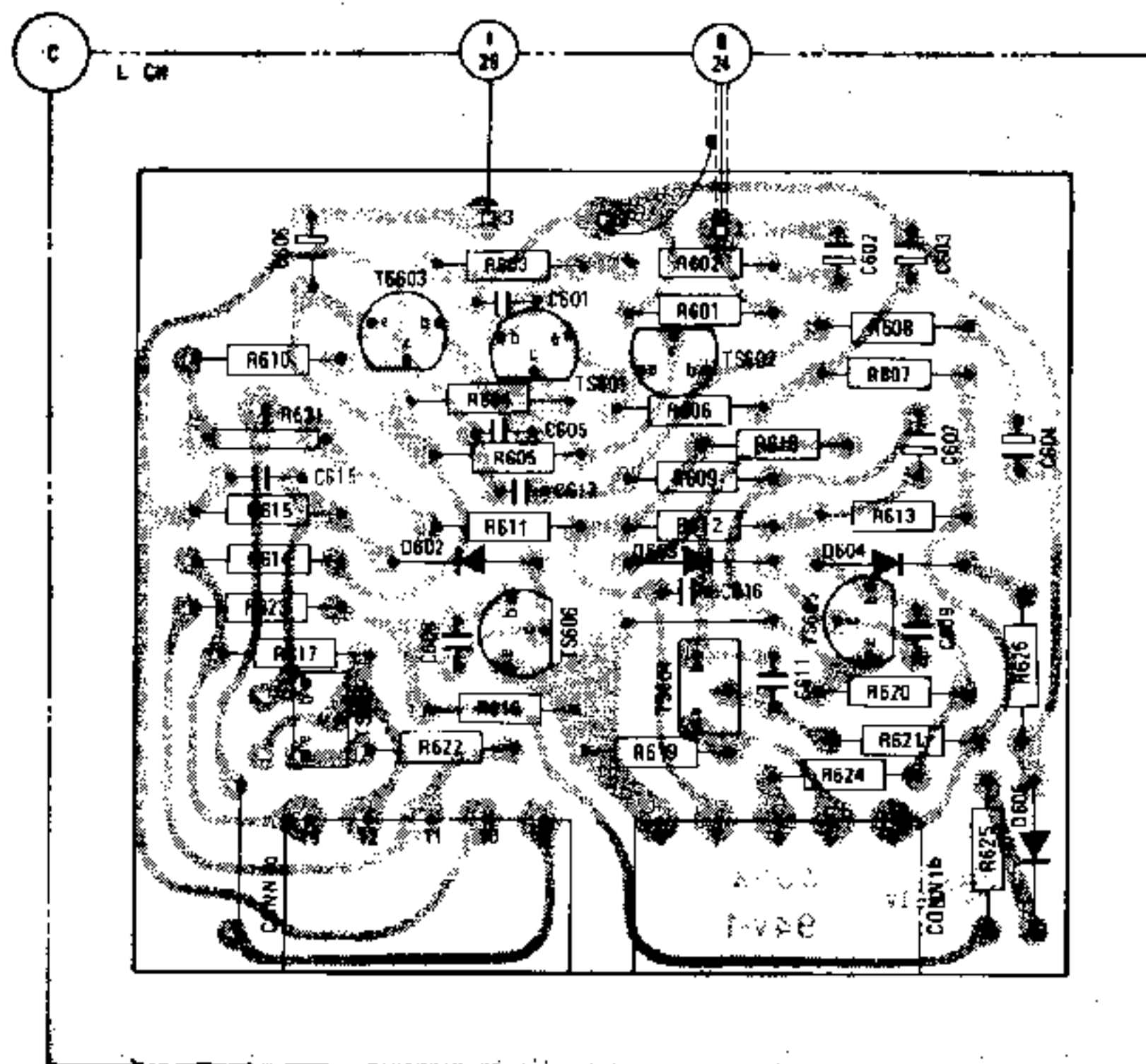
SK	Signal to	Trimming point	Adjust	Indication
Input selector Speaker selector				
Aux SPEAKERS off	No signal	Volume min.	R681 (R ch.) R681 (L ch.)	 14 mV ± 2 mV... 14 mV ± 2 mV...
Aux SPEAKERS A	1 kHz 200 mV	 Volume	R780a (L ch.) R780b (R ch.)	Adjust for 0 dB reading on Ind. 701a and 701b

1 : Set 3 and 4 to 10 V~

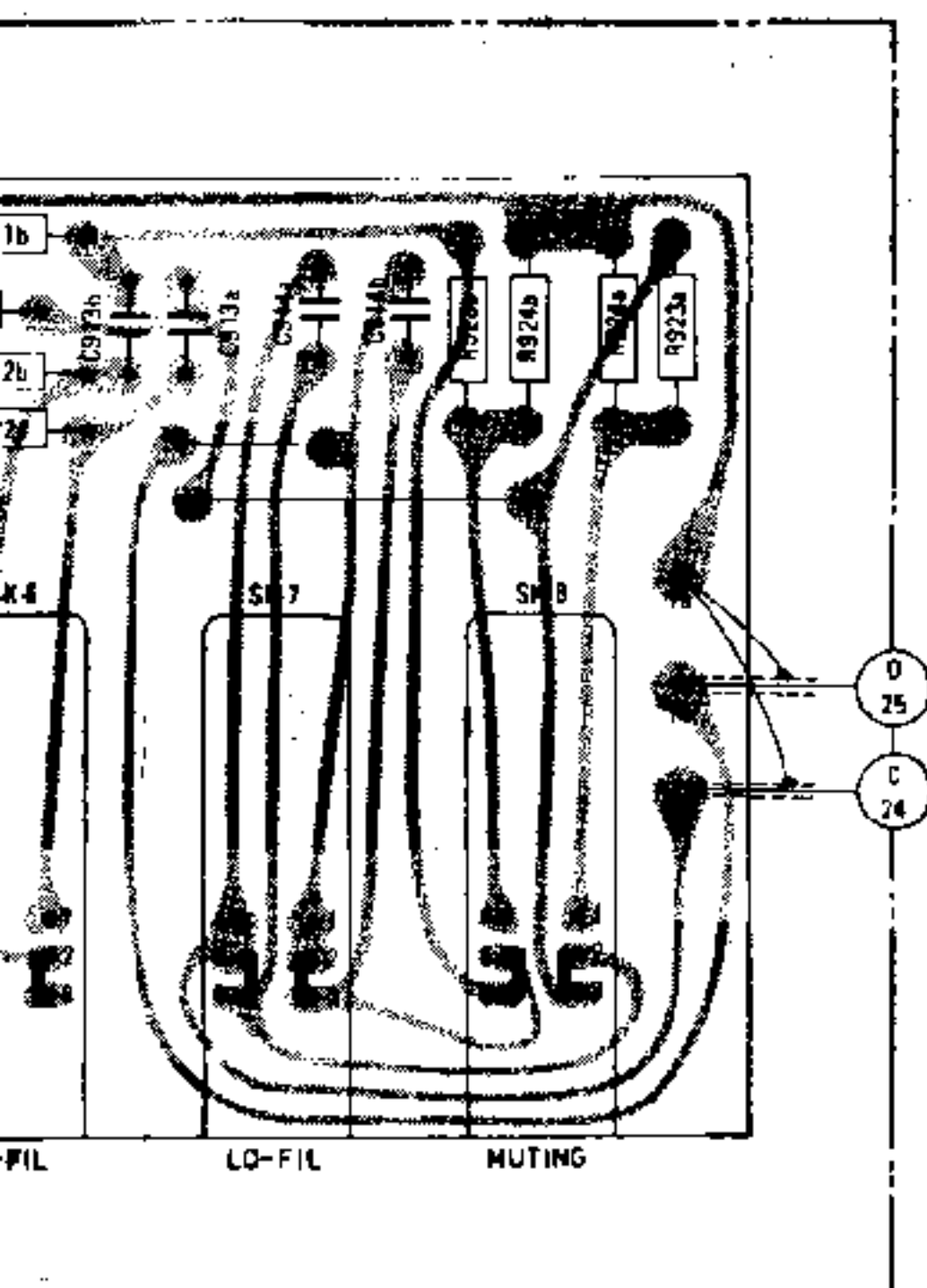
		TS903a	TS904a	SK-6	SK-8		SK-7			TS851a - TS853a	S851a	M	
		D854	SK-11	SK-12	TS903b	TS904b	F006			TS851b - TS853b	S851b D781b IND.701b	M	
RE851	D852	D851	D001	LA001	LA002	F001 - F003	SK-13			SK-9	D781a IND.701a	M	
		907a - 910a		911a		912a 913a				914a	651a	C	
		907b - 910b		911b		912b 913b				914b	651b	C	
851		D05	001 - 004		D06								C
909a - 913a		953a	954a	914a	915a	917a - 924a				651a - 654a		853	R
909b - 913b		953b	954b	914b	915b	917b - 924b				651b - 654b		852	R
851						681b 682b		681a 682a	681b			D01a 780a - 783a 780b - 783b	R



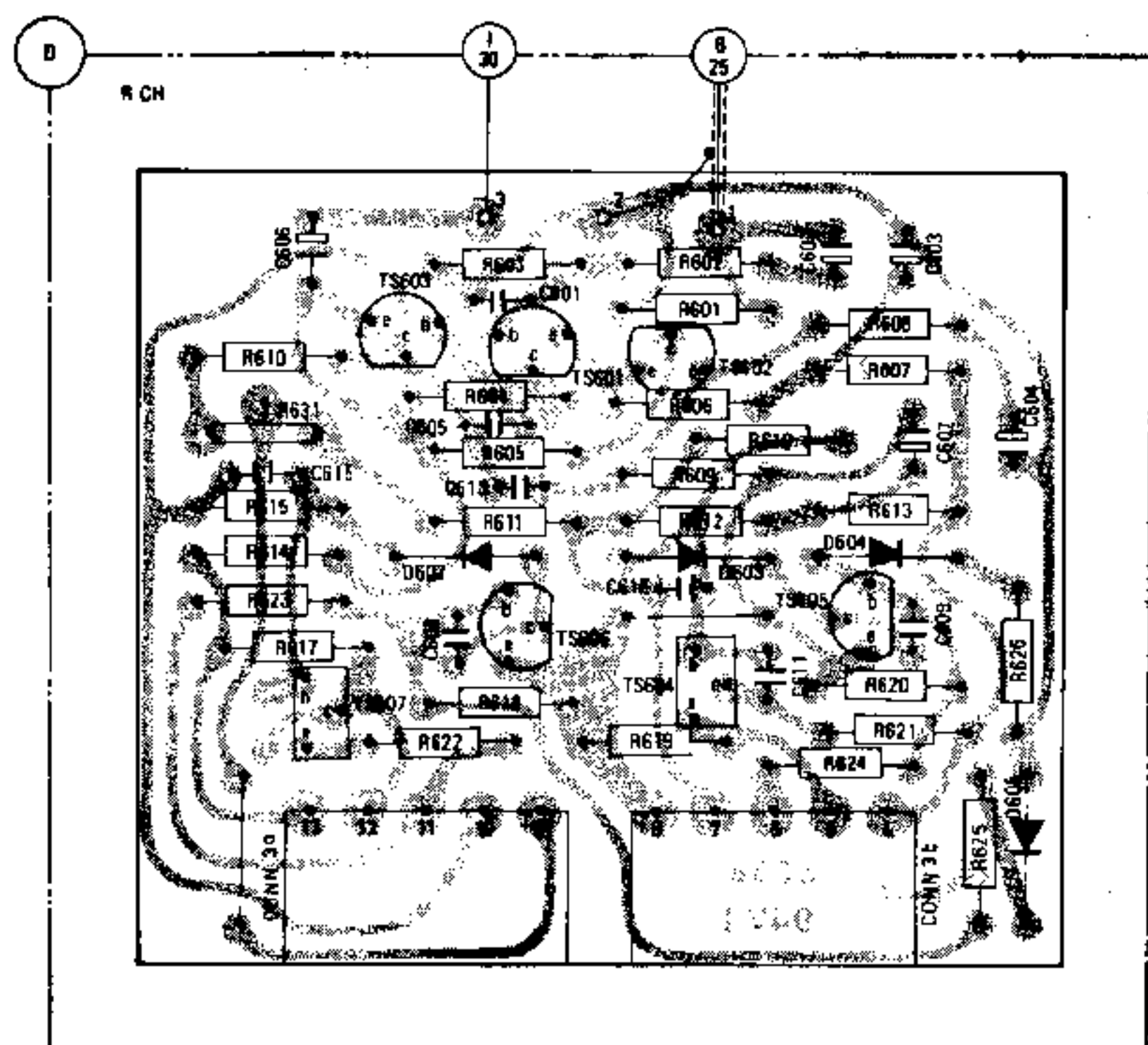
M	TS607	TS603	D602	TS601	TS608	TS602	D603	TS604	D604	TS605	D605	M
C	615 606		605 601					602 603 607	604			C
C	610		604 613		616	611		609				C
R	610 681 615		604 603 605		602 601 606 608 616	604 607 613						R
R	614 623 617		622 612 618		619 611	624 620 621	626 625					R



S	SK 7	SK 8	M
	913a 913b	914a 914b	C
			C
	923a 923b	924a 924b	R
			R

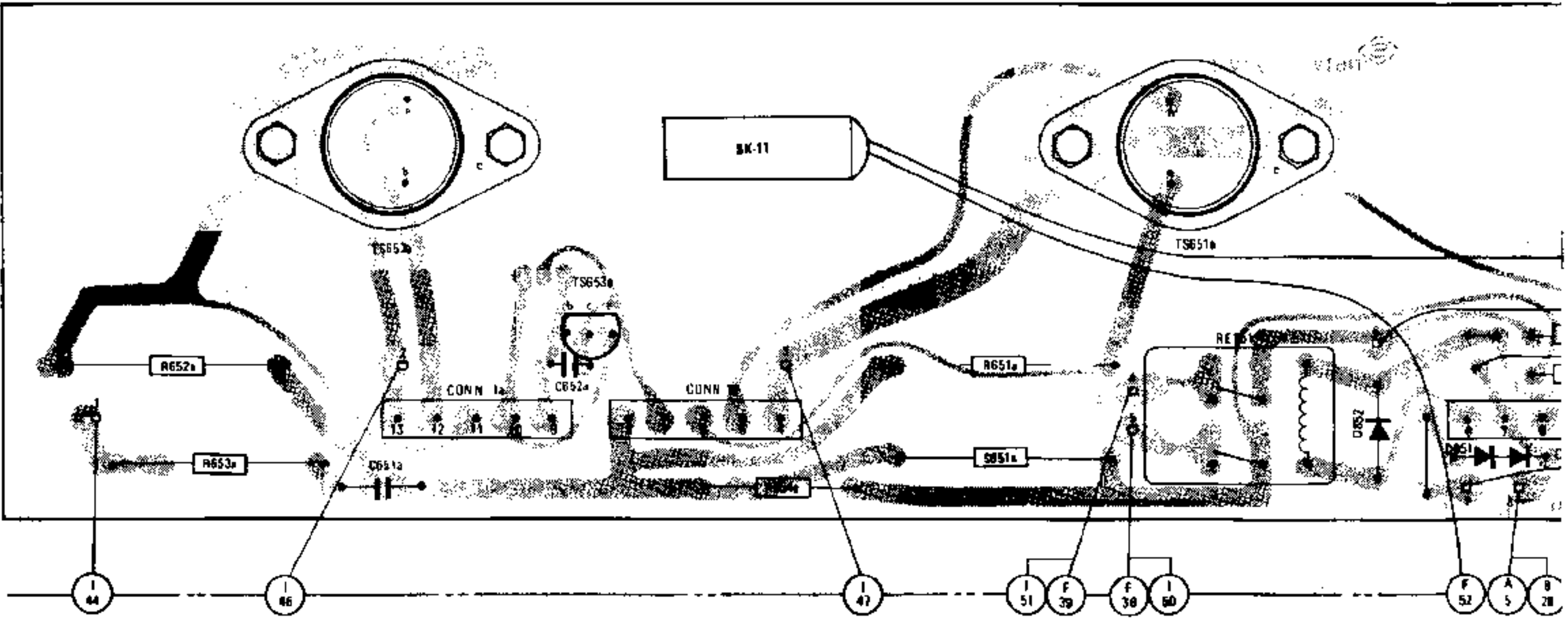


M	TS607	TS603	D602	TS601	TS608	TS602	D603	TS604	D604	TS605	D605	M
C	615 606		605 601					602 603 607	604			C
C	610		608 613		616	611		609				C
R	610 681 615		604 603 605		602 601 606 608 616	604 607 613						R
R	614 623 617		622 612 618		619 611	624 620 621	626 625					R

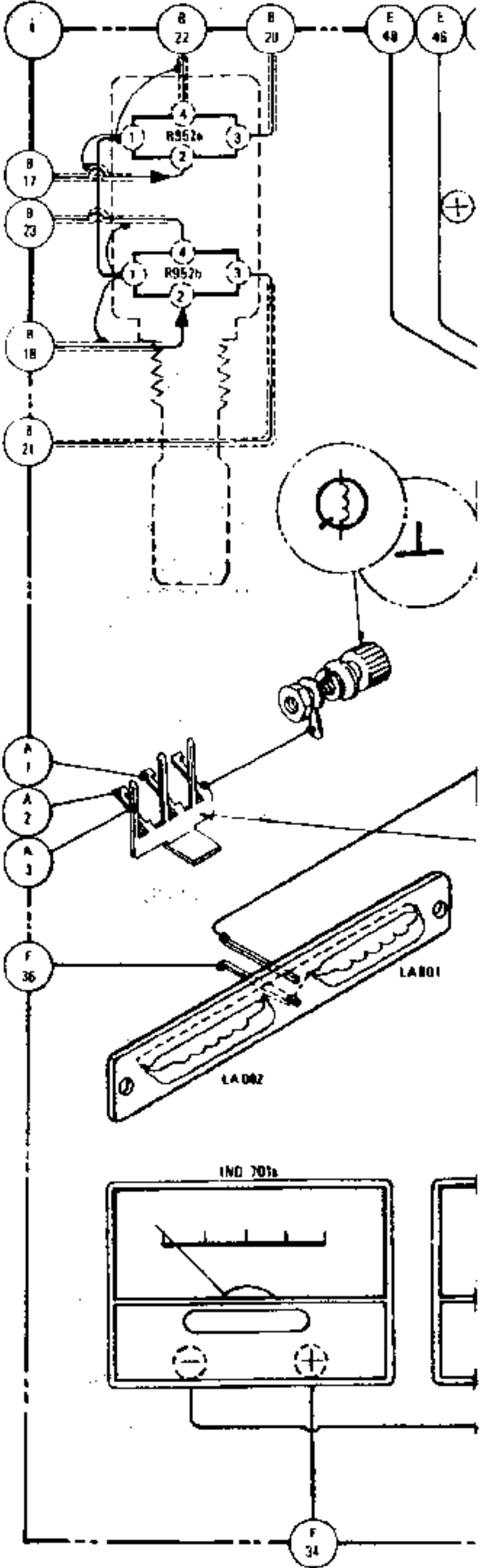
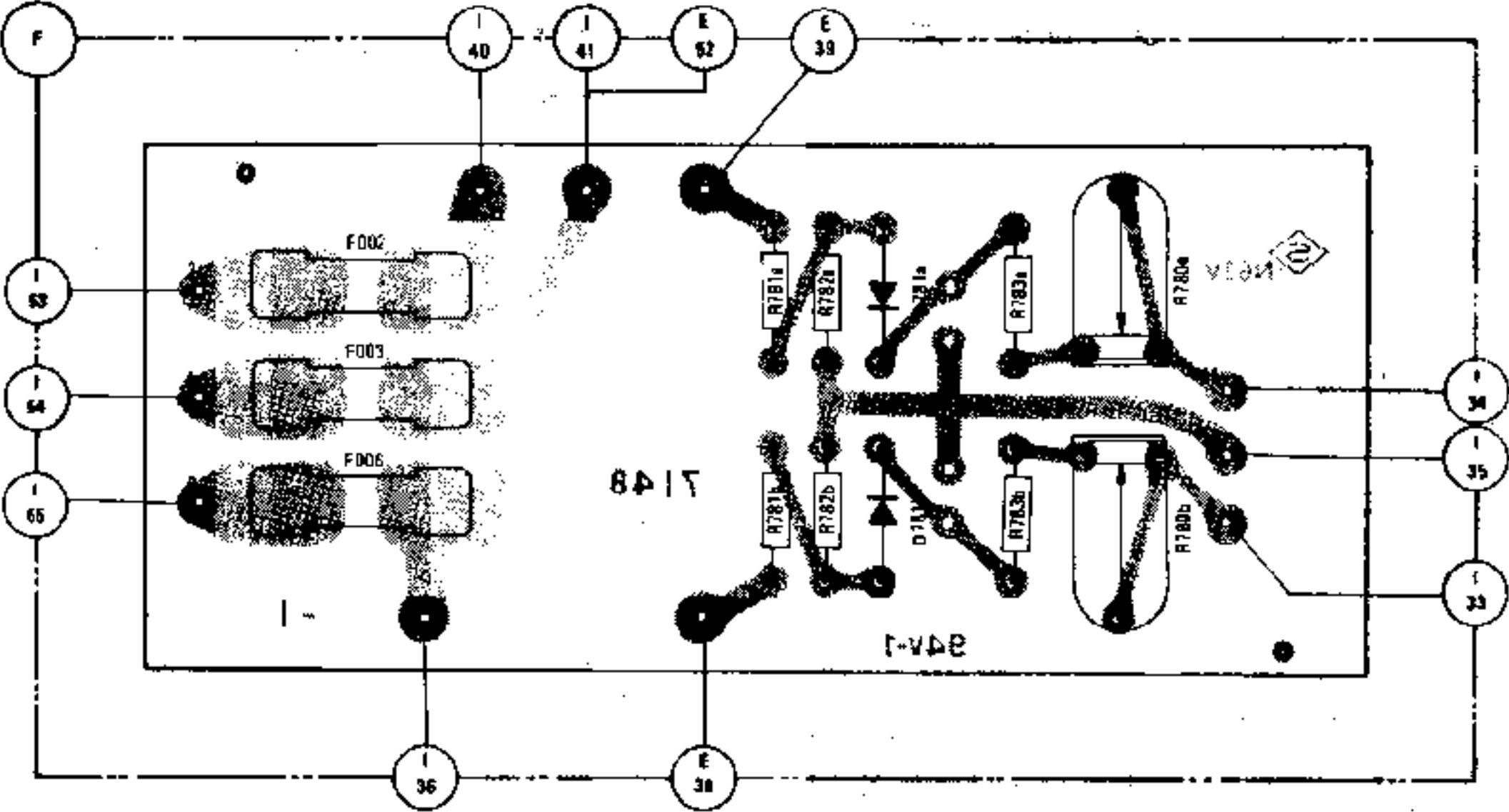


M	TS652a		TS653a	SK-11	SB51a	TS651a	RE851	D852	D851	D854
C	651a		652a							
R	652a	653a		654a	651a					852 R

E

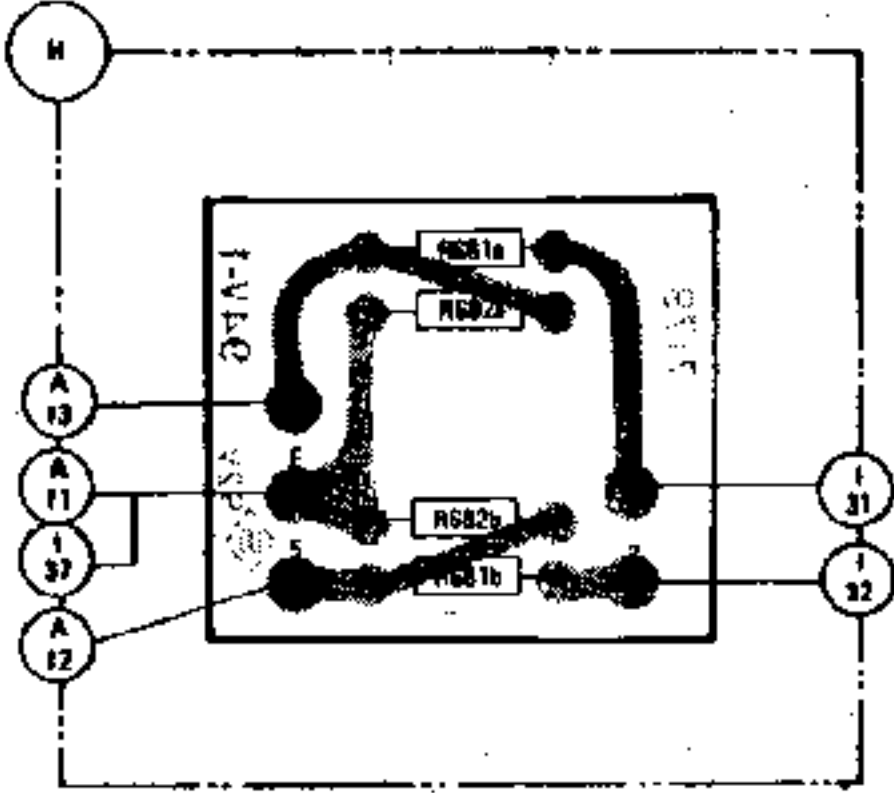
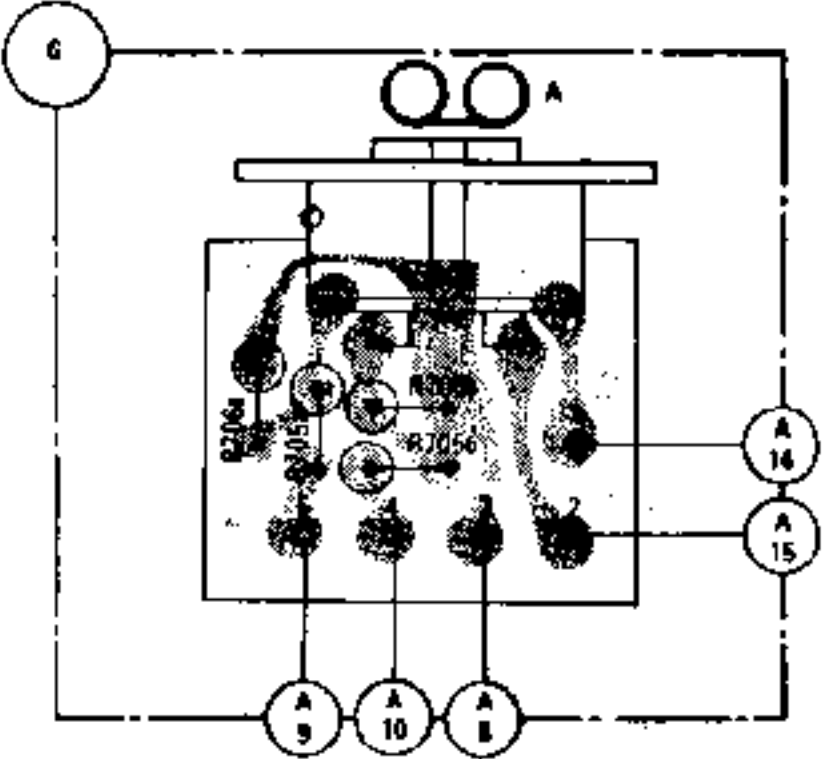


M	F002	F003	F006	D781a D781b								Me
R				781a	781b	782a	782b	783a	783b	789a	789b	R

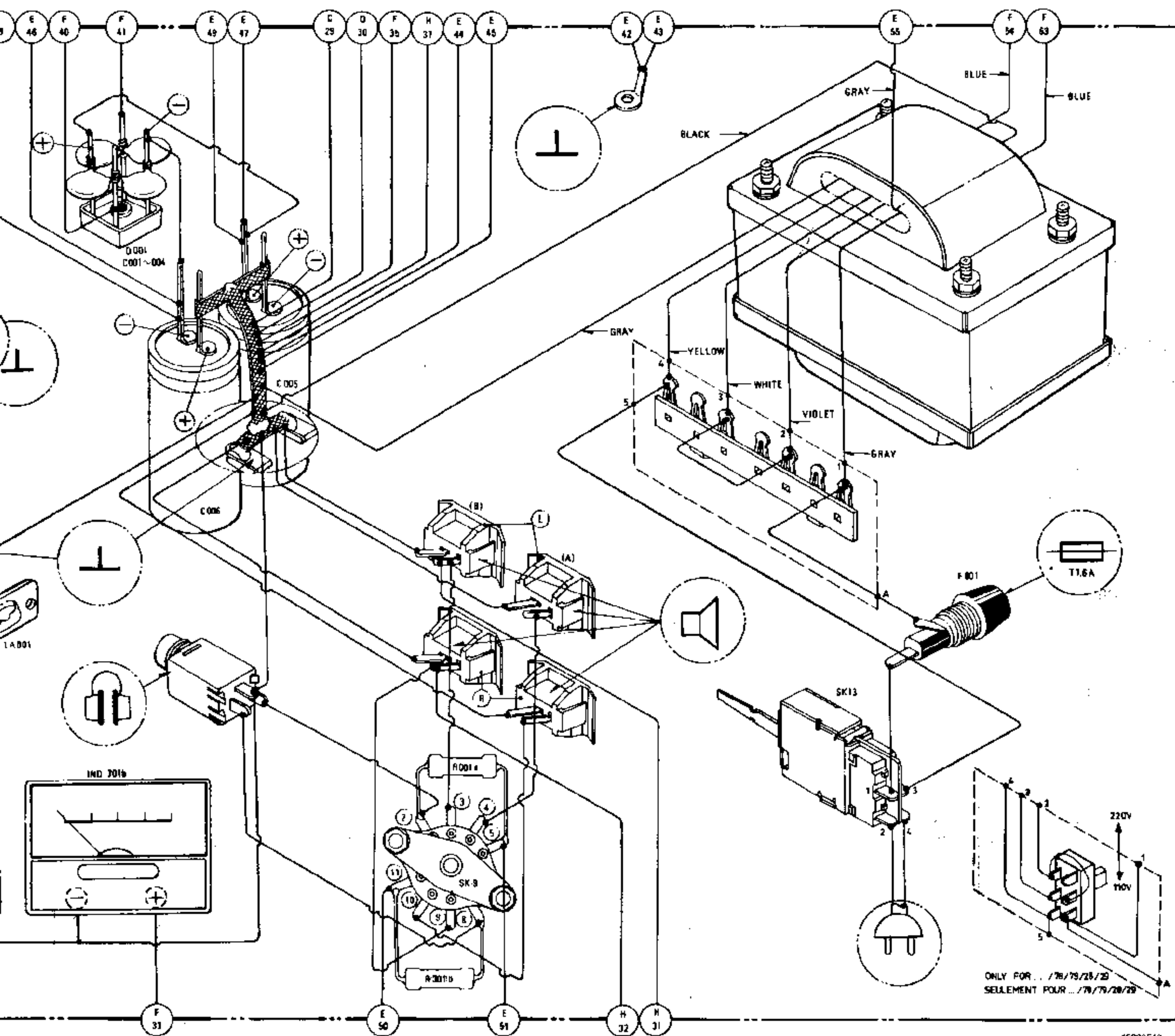
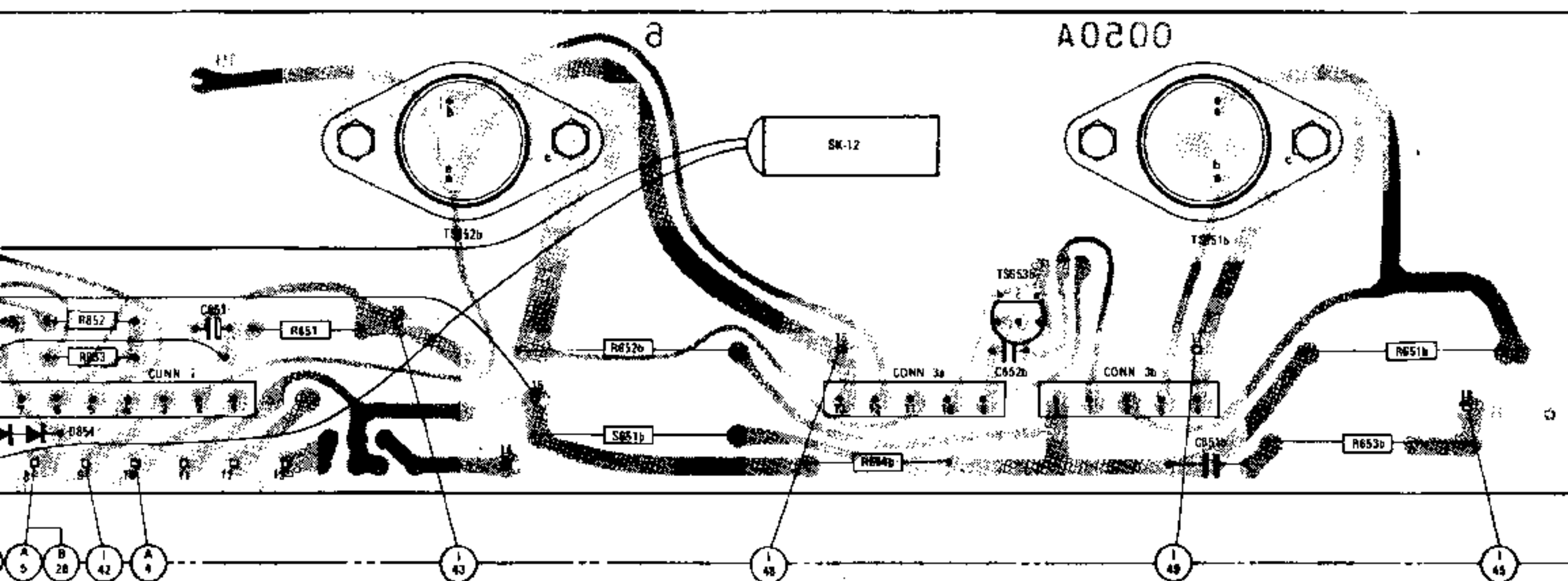


R	786a	786b	786c	786d	R
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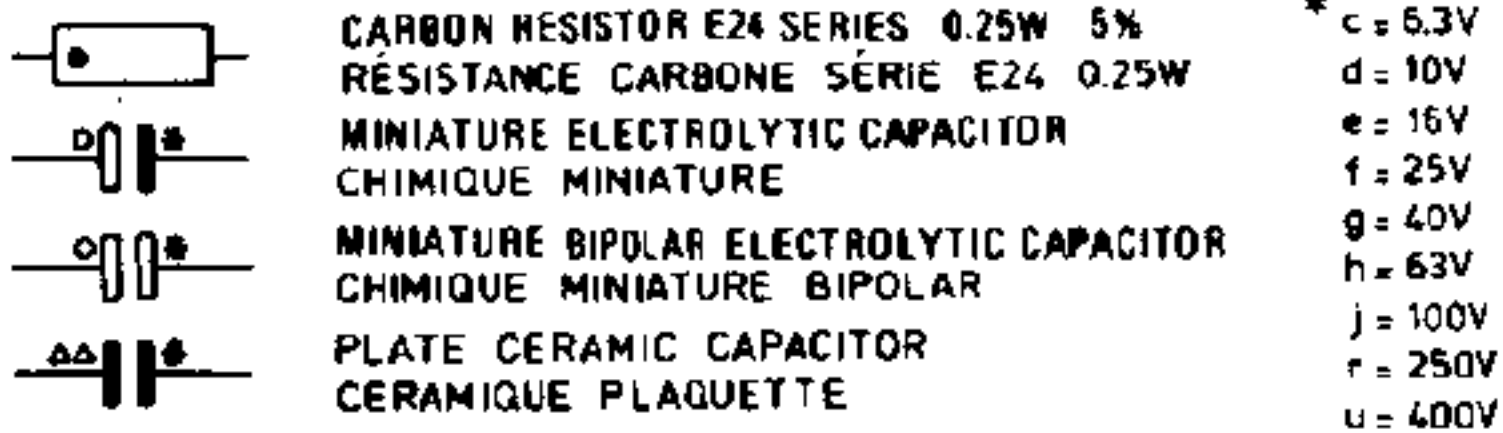
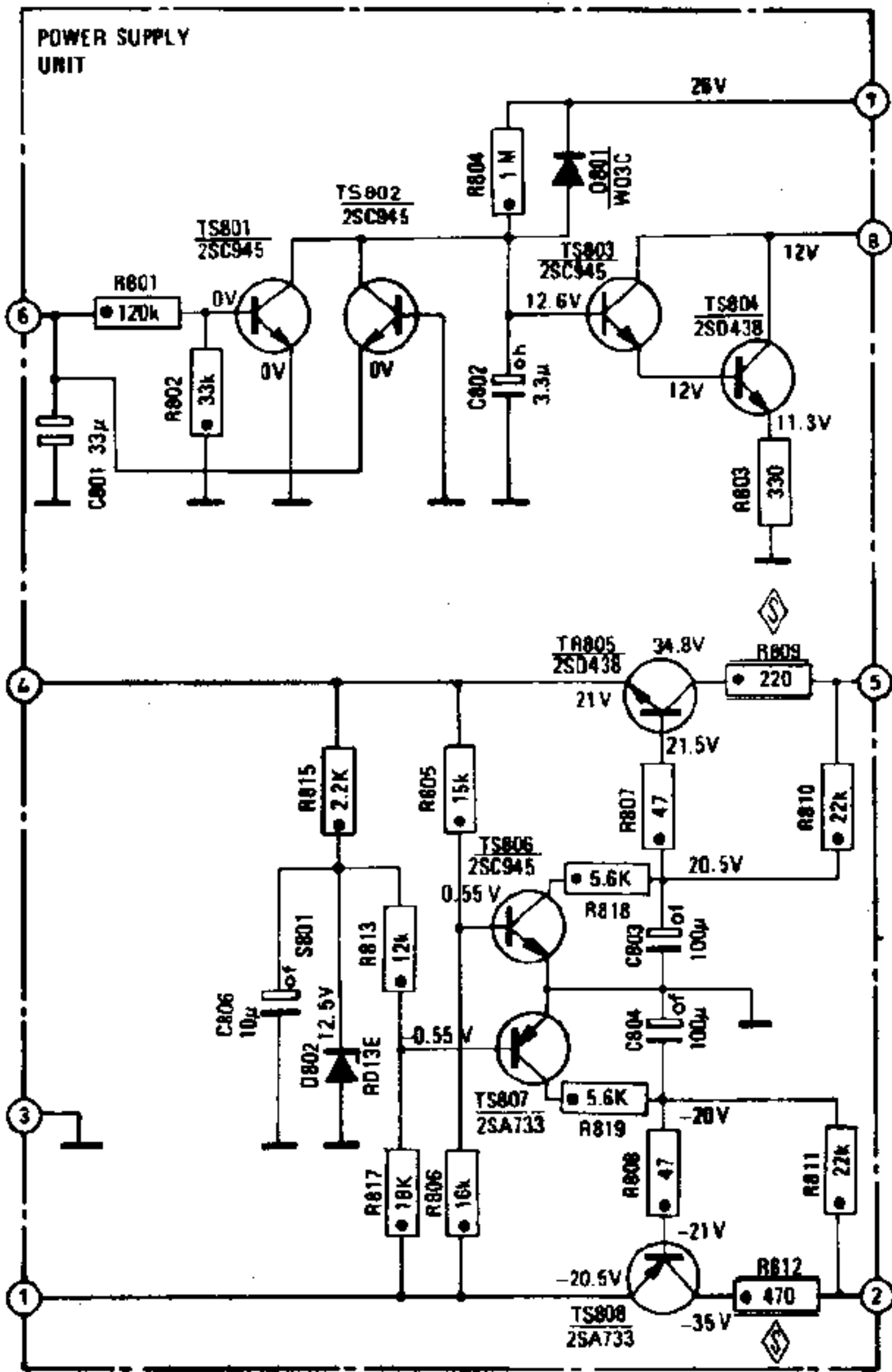
R	681a	682a	682b	681b	R
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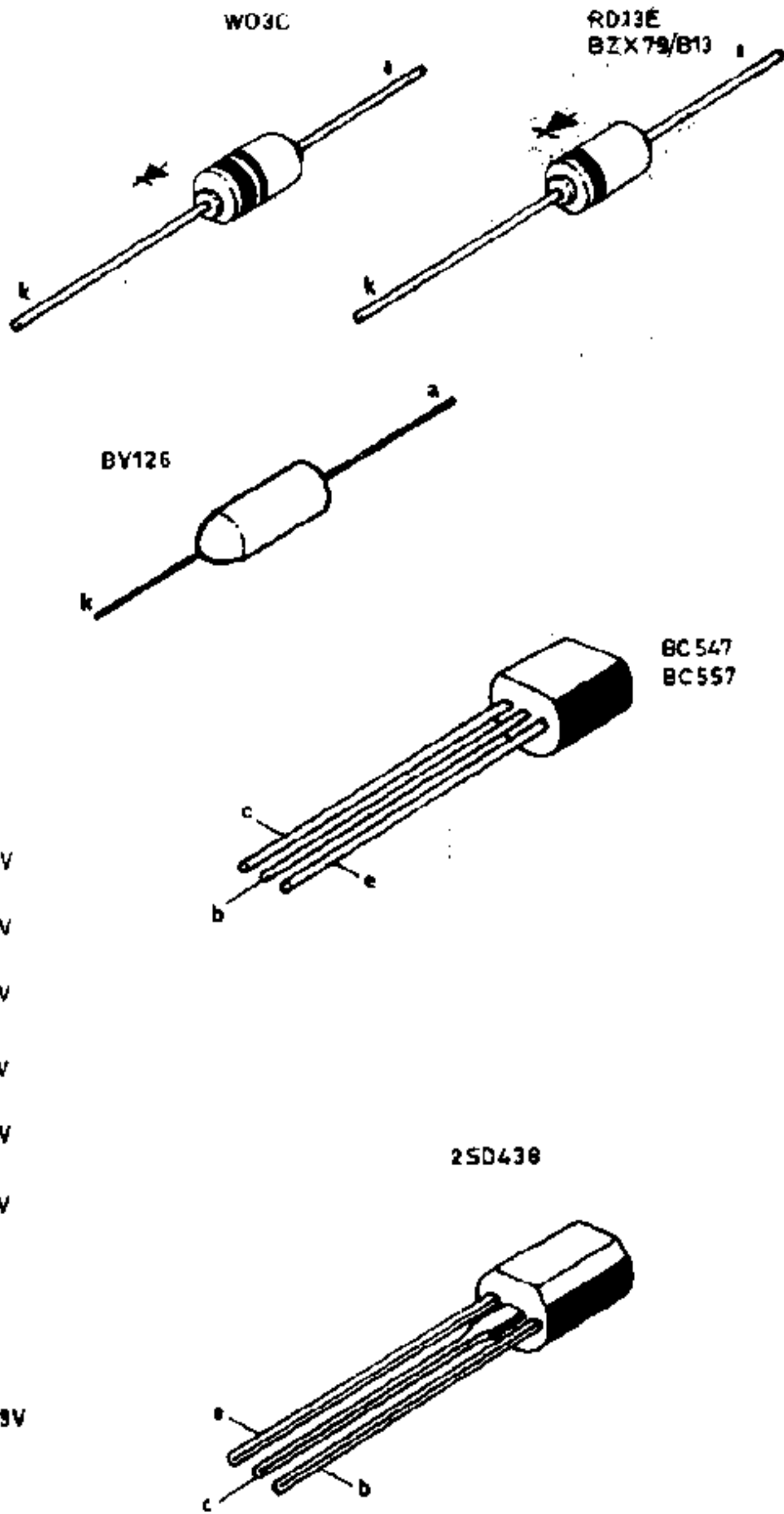
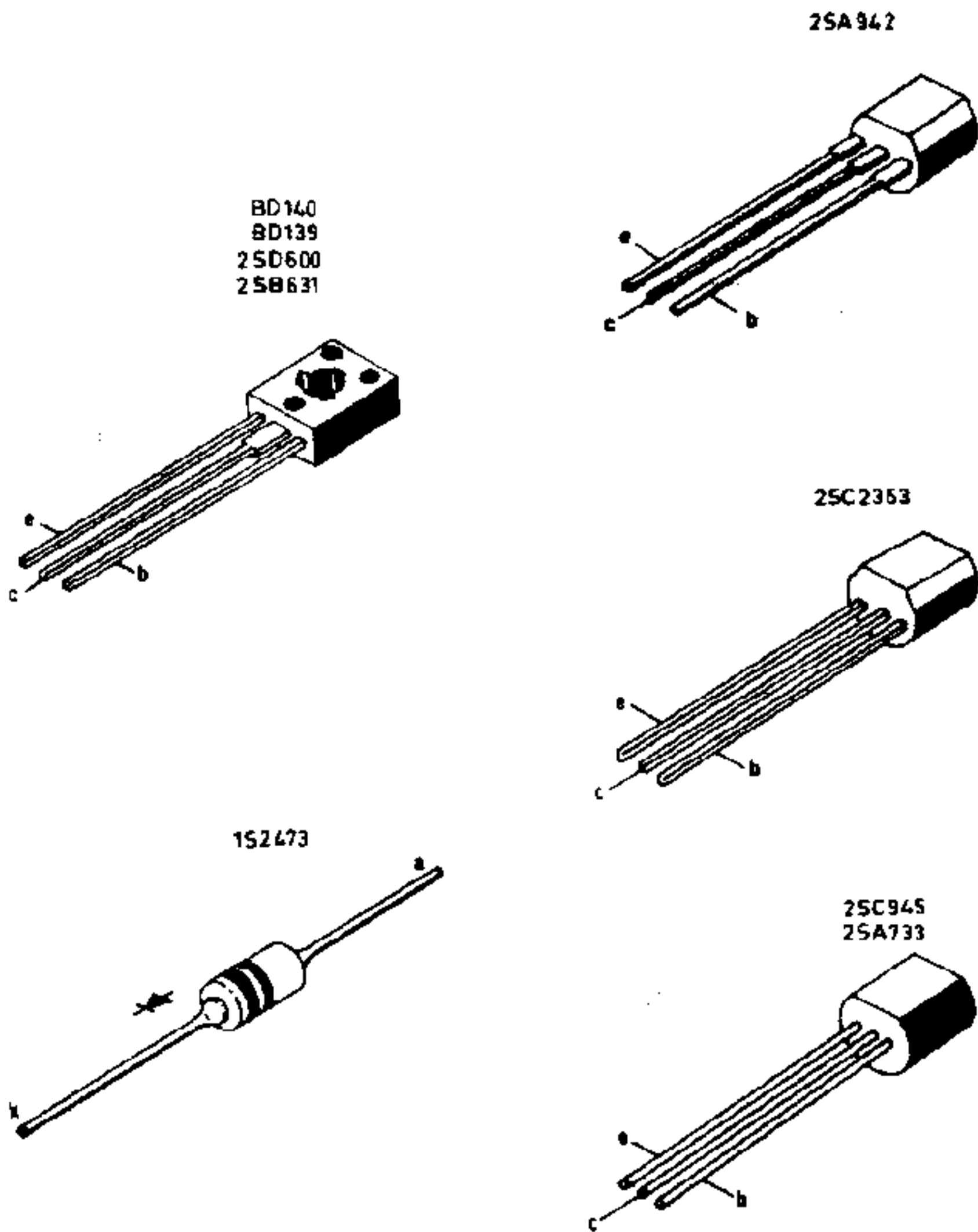
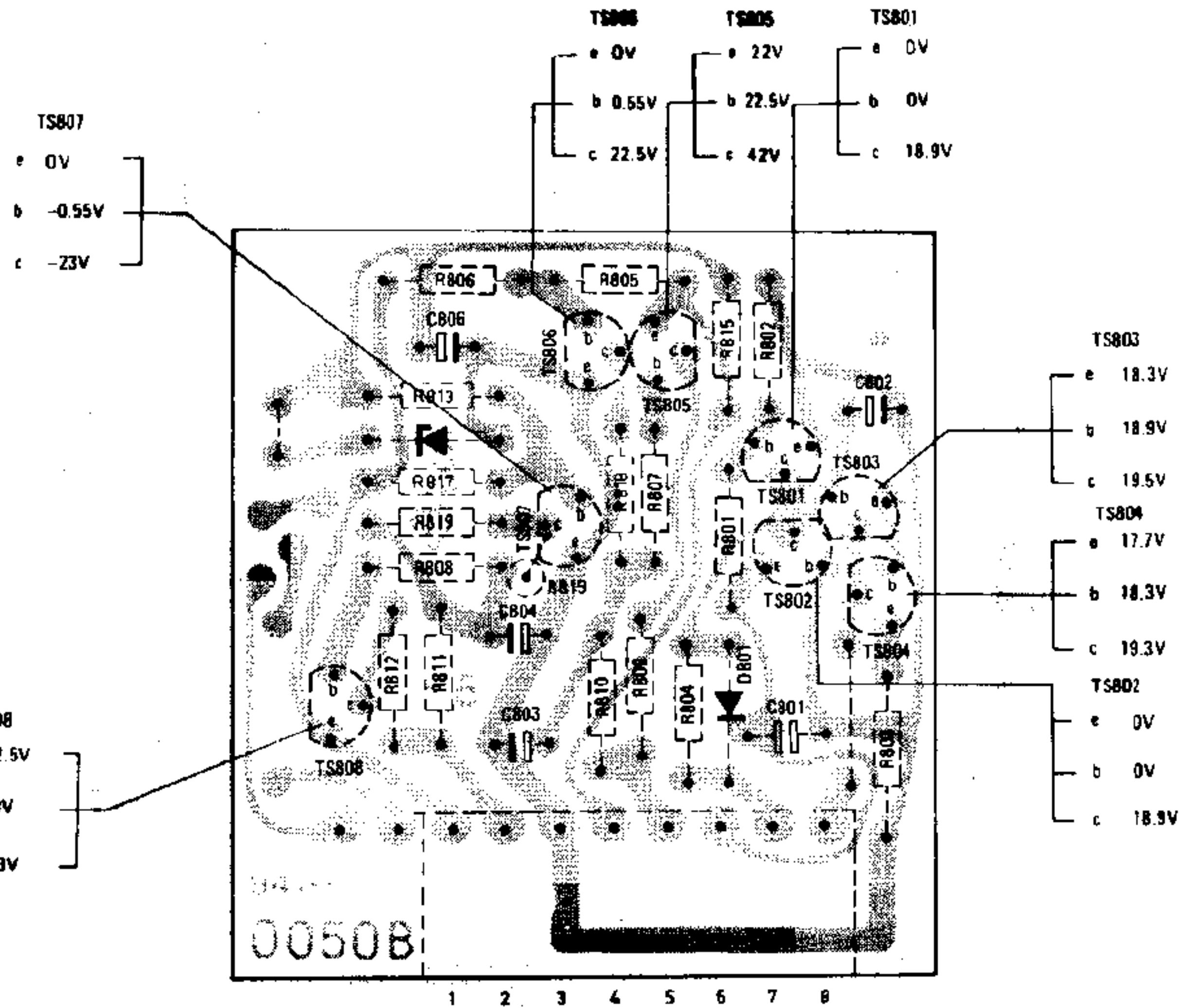
0854	TS652b		SK-12	TS653b	TS651b	M C R
851	853	854	852	652b	651b	
852	853	851	652b	654b	653b	

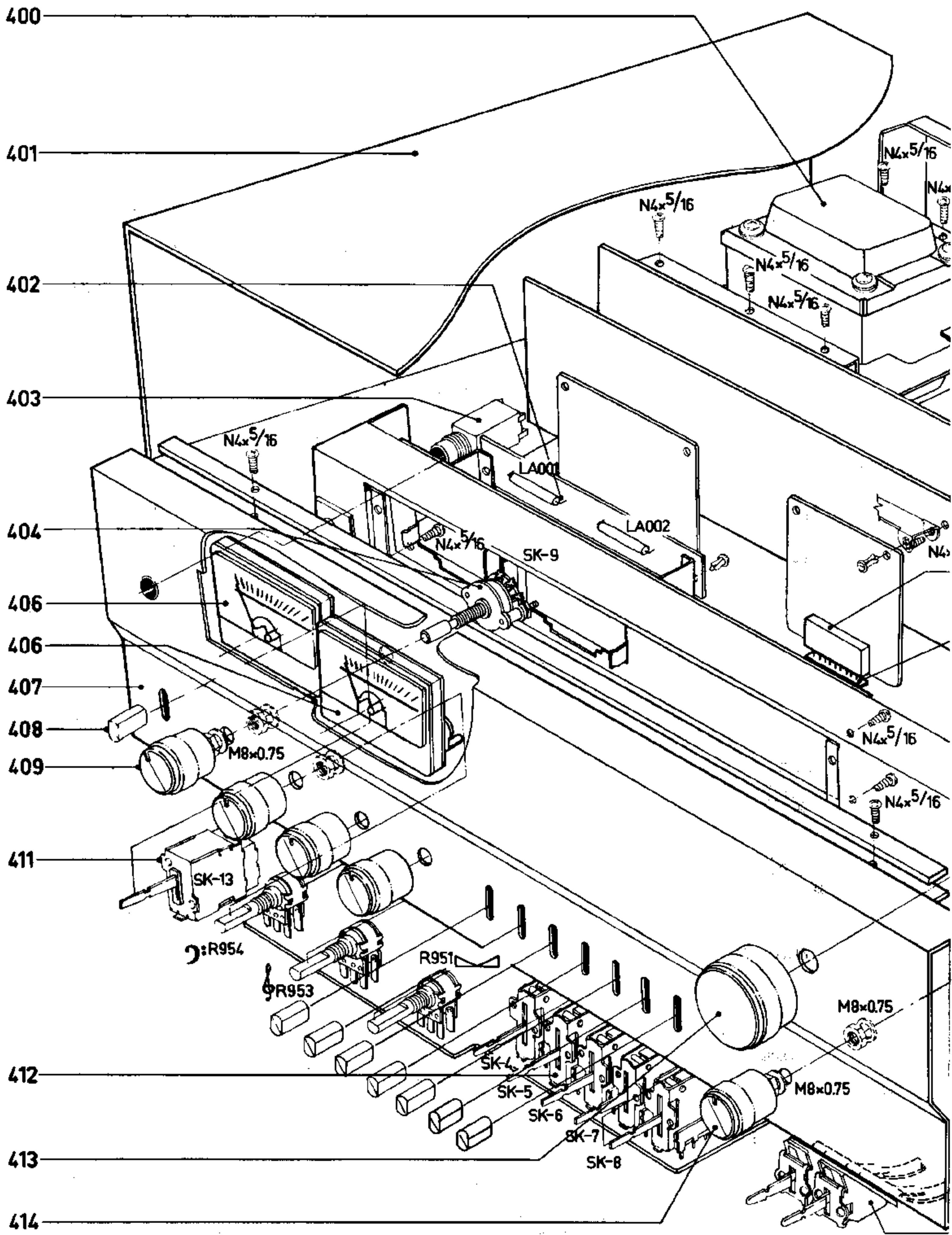


M	TS801		TS802	D801		TS803	TS804	M
M	D802			TS805 - TS808				M
C	801	806		802	803	804		C
R	801	802	805 804			803		R
R	815 813 817 806			818 819 807 - 812				R

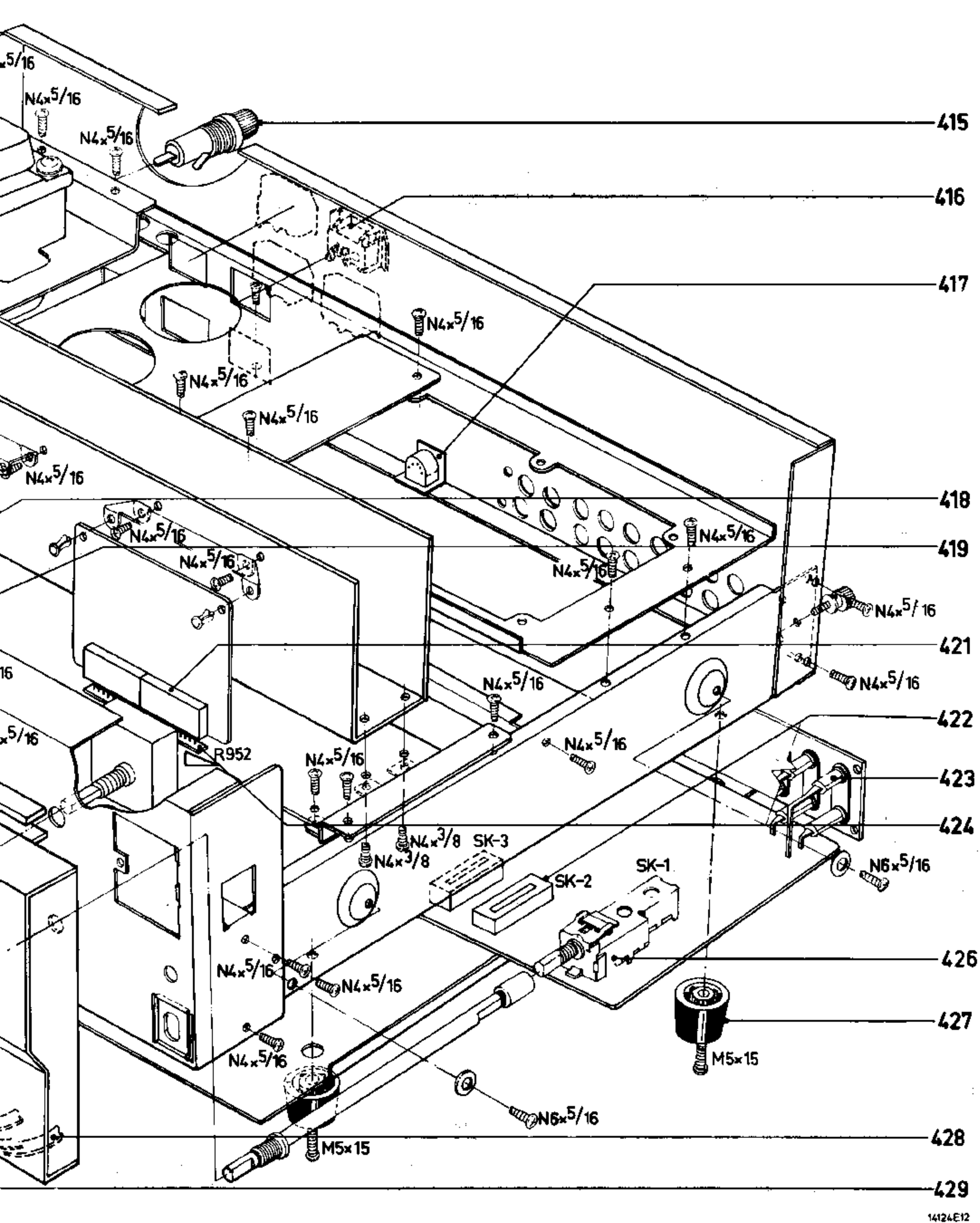


M	TS808	D802	TS807	TS806	TS805	D801	TS801 - TS804	M			
C	806	804	803			801	802	C			
R	806	813		805	818	807	815	801	802	R	
R	814	817	808	812	811	819	810	808	804	803	R





400	4822 146 30317	406	4822 347 20086	412	4822 277 10431
401	4822 425 50108	407	4822 426 50306	413	4822 413 50974
402	4822 134 90007	408	4822 410 22008	414	4822 413 40783
403	4822 267 30283	409	4822 413 40783	415	4822 256 30162
404	4822 273 60107	411	4822 276 10665	416	4822 267 30284



14124E12

417 4822 267 40209
 418 4822 265 40134
 419 4822 265 40131
 421 4822 267 40262
 422 4822 277 10433

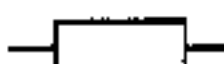
423 4822 267 50257
 424 4822 267 40259
 426 4822 273 80172
 427 4822 462 71088
 428 4822 277 10432

429 4822 277 10449

INPUT + RIAA PRINT



501a-b	Elco Lo-Leak 4.7 μ - 25 V	5322 124 10014
504a-b	Mylar cap. 1500 pF	4822 121 40452
505a-b	Mylar cap. 5600 pF	4822 121 40462
506a-b	Elco Lo-Leak 1 μ - 50 V	4822 124 20658
701÷704	Ceramic cap. 10 nF	4822 121 50582



504a-b	Carbon res. 750 Ω - ¼ W	5322 116 50685
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I.C.

501	NJM 4558 D-D	4822 209 80381
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TONE CONTROL PRINT



906a-b	Elco bi-polar 2.2 μ F-50 V	4822 124 20657
907a-b	Mylar cap. 33 nF	5322 121 54111
908a-b	Mylar cap. 1800 pF	4822 121 40454
909a-b	Mylar cap. 33 nF	5322 121 54111
912a-b	Elco 2.2 μ F - 50 V	4822 124 20584
914a-b	Mylar cap. 18 nF	4822 121 40314



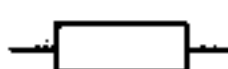
901a-b	Carbon res. 5.1 k Ω -¼ W	5322 116 54595
904a-b	Carbon res. 3.6 k Ω -¼ W	4822 110 60122
907a-b	Carbon res. 910 Ω -¼ W	4822 110 60106
921a-b	Carbon res. 5.1 k Ω -¼ W	5322 116 54595
924a-b		
951a-b	Balance 100 K	4822 102 30278
952a-b	Volume 50±50 K	4822 102 30277
953a-b	Treble 100 K	4822 102 30276
954a-b	Bass 100 K	4822 102 30276

901a-b	2SC2089	4822 130 41177
902a-b	2SA942	4822 130 41176
903a-b	2SC2089	4822 130 41177
904a-b	2SA942	4822 130 41176

POWER AMP DRIVE UNIT



602-603	Elco 2.2 μ - 25 V	4822 124 20845
606	Elco 100 μ - 50 V	5322 124 24123
613	Ceramic cap. 5 pF	5322 122 34033



610	Carbon res. 2 K - ¼ W	5322 116 54572
625-626	Carbon res. 20 K - ¼ W	5322 116 54642
631	Trimpot. 1 K	4822 100 10208



601-602	2SA942	4822 130 41176
603	2SC2363	4822 130 41208
604	* 2SD600 = BD139	4822 130 40823
605	* 2SC945 = BC547	4822 130 44257

606	* 2SA733 = BC557	4822 130 44256
607	* 2SB631 = BD140	4822 130 40824



602÷605	IS2473 = BA221	4822 130 30831
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LF OUTPUT + POWER PRINT

651a-b	Metal res. 0.39 Ω - 3 W	4822 116 51171
652a-b		
653a-b	Metal res. 10 Ω - 2 W	5322 116 54348
654a-b	Metal res. 10 Ω - 1 W	5322 116 54214
851	Metal ox. res. 3.3 K - 1 W	4822 116 51149



651a-b	Choke coil 3 μ H	4822 157 40148
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651a-b	2SC1051	4822 130 41138
652a-b		
653a-b	2SC945	4822 130 44257



851-852	W03C = BY126	4822 130 41119
854	W03C = BY126	4822 130 41119

POWER SUPPLY UNIT



801	Elco bi-polar 33 μ F-16 V	4822 124 20665
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801÷803	* 2SC945 = BC547	4822 130 44257
804-805	2SD438	4822 130 41139
806	* 2SC945 = BC547	4822 130 44257
807-808	* 2SA733 = BC557	4822 130 44256



801	W03C = BY126	4822 130 41119
802	RD13E = BZX79/B13	4822 130 34195

MISCELLANEOUS

C001÷004	Ceramic cap. 10 nF	5322 122 50046
C005-006	Elco 8200 μ F - 45 V	4822 124 20662
R001a-b	Metal ox. res. 330 Ω -2 W	5322 116 54395
R681a-b	Carbon res. 6.2 k Ω - ¼ W	4822 110 63129
R682a-b	Carbon res. 1.1 k Ω - ¼ W	4822 110 60108
R780a-b	Trimpot. 1K	4822 100 10225
D001	S4VB-10	4822 130 30977
D781a-b	IN60 = AA119	4822 130 31012
F001	Fuse 1.6 A slow	4822 253 30024
F002-003	Fuse 4 A slow	4822 253 30038
F006	Fuse 1.6 A slow	4822 253 30024
SK11-12	Thermal switch	4822 282 40158
	Fuse holder for PCB	4822 256 30154
RE851	Relay	4822 280 20072

* Watch the connections of E-B-C
Voir les connexions de E-B-C

GB

Safety regulations require that the set be restored to its original condition and that parts which are identical with those specified, be used.

NL

Veiligheidsbepalingen vereisen, dat het apparaat bij reparatie in zijn oorspronkelijke toestand wordt teruggebracht en dat onderdelen, identiek aan de gespecificeerde, worden toegepast.

F

Les normes de sécurité exigent que l'appareil soit remis à l'état d'origine et que soient utilisées les pièces de rechange identiques à celles spécifiées.

D

Die Sicherheitsvorschriften erfordern, dass das Gerät sich nach der Reparatur in seinem originalen Zustand befindet und dass die benutzten Einzelteile den aufgeführten Teilen identisch sind.

SF

Korjattaessa laitetta on turvallisuussyistä ehdottomasti eneteltävä oikein ja käytettävä tehtaan määräämiä alkuperäisvaraosia.

I

Le norme di sicurezza esigono che l'apparecchio venga rimesso nelle condizioni originali e che siano utilizzati i pezzi di ricambio identici a quelli specificati.

S

Säkerhetsbestämmelserna kräver att varje reparation skall utföras korrekt med hänsyn till ursprunglig placering av komponenter, ledningar etc. och med användning af föreskrivna reservdelar.

DK

Myndighedernes sikkerheds- og radiostøjbestemmelser kræver, at enhver reparation skal udføres korrekt m.h.t. overholdelse af originalplacering og montering af komponenter, ledningsbundter, etc., og ved anvendelse af de foreskrevne reservedele.

N

Sikkerhetsbestemmelser kreves at apparatet blir gjenopprettet til original utførelse og at deler som er identiske med de som er spesifisert, blir benyttet.