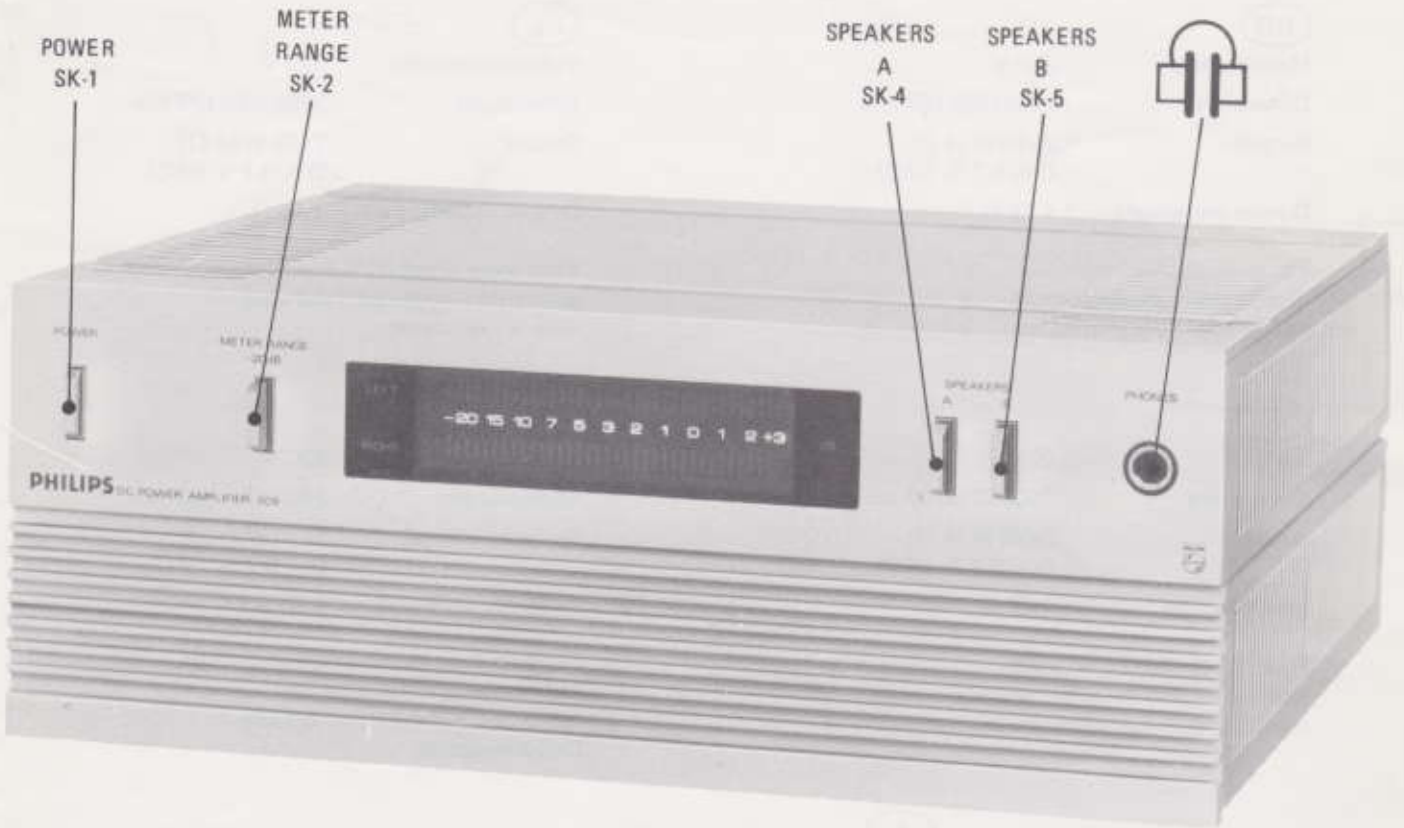


Service  
Service  
Service

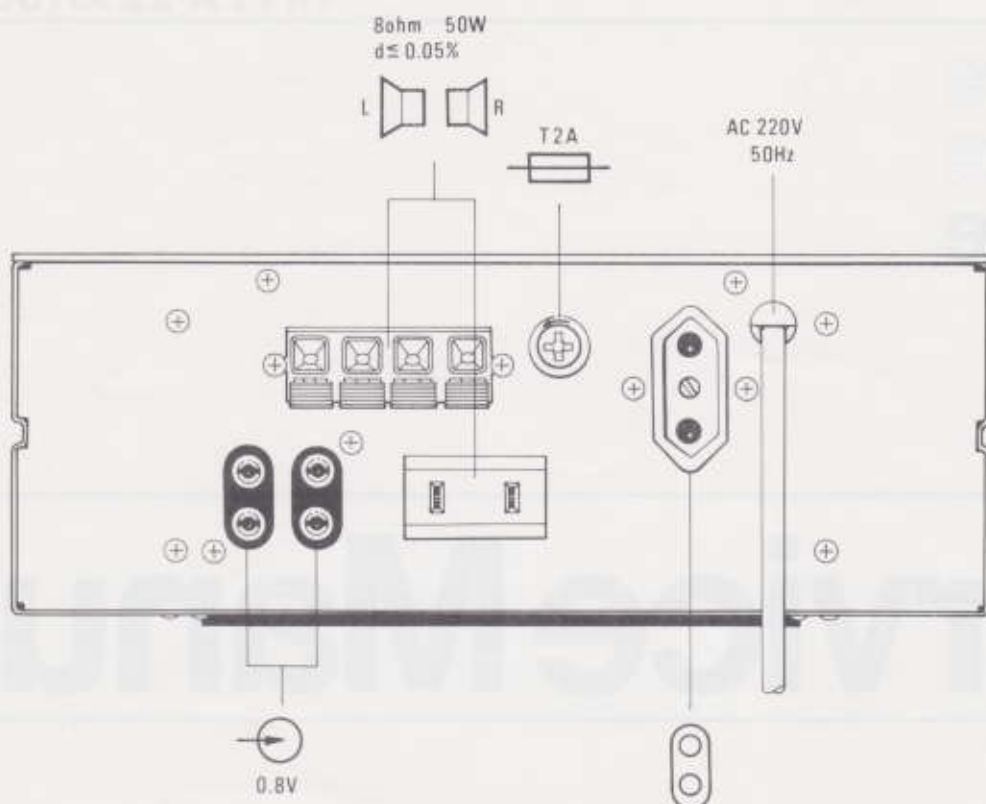
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# Service Manual



19687A12





MAX 2.5A  
SWITCHED  
19684B12

**(GB)**

Mains voltage : 220 V  
 Dimensions : 260x100x183 mm  
 Output : 2x70 W (4 Ω)  
 D ≤ 0.7 % (IEC)  
 Output impedance : 4-16 Ω

For more detailed technical specifications please consult commercial documentation

**(NL)**

Voedingsspanning : 220 V  
 Afmetingen : 260x100x183 mm  
 Output : 2x70 W (4 Ω)  
 D ≤ 0.7 % (IEC)  
 Output impedantie : 4-16 Ω

Voor meer uitgebreide specificaties gelieve de commerciële documentatie te raadplegen.

**(F)**

Tension : 220 V  
 Dimensions : 260x100x183 mm  
 Sortie : 2x70 W (4 Ω)  
 D ≤ 0.7 % (IEC)  
 Imp. de sortie : 4-16 Ω

Pour l'obtention de données techniques plus détaillées veuillez consulter la documentation.

**(D)**

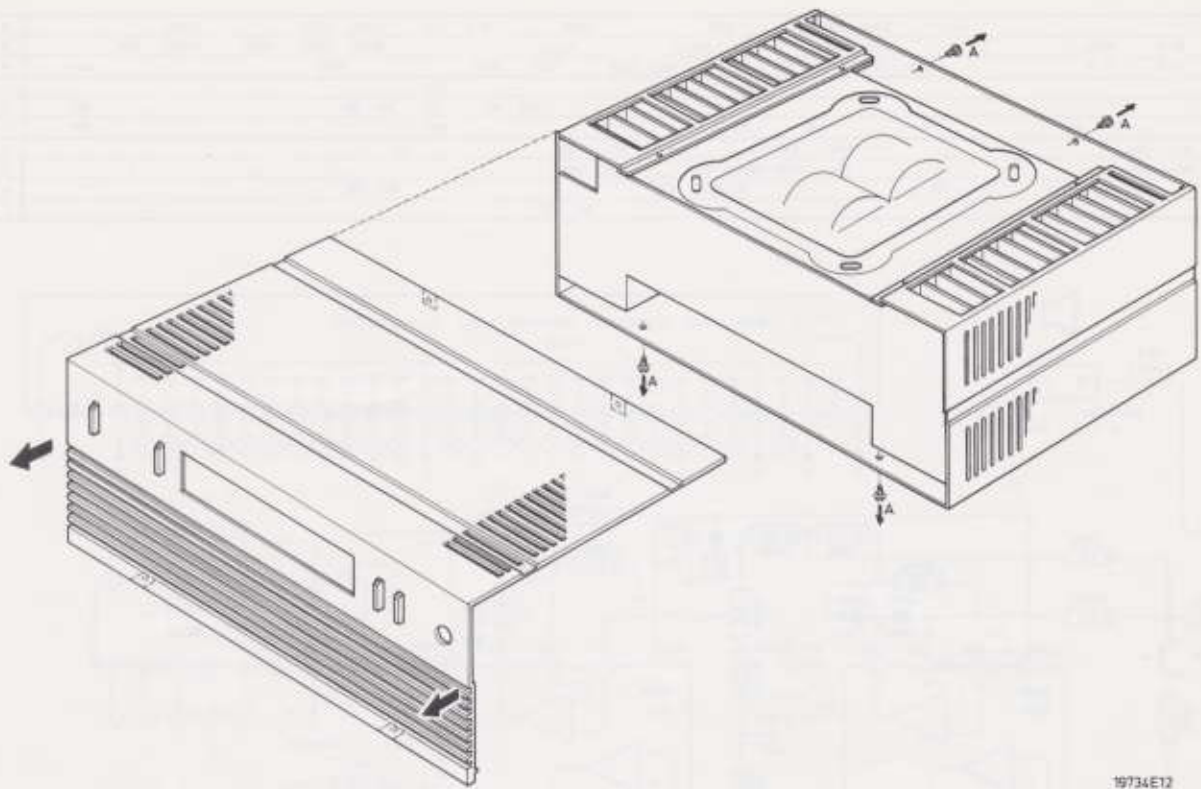
Spannung : 220 V  
 Abmessungen : 260x100x183 mm  
 Ausgangsleistung : 2x70 W (4 Ω)  
 D ≤ 0.7 % (IEC)  
 Ausgangs impedanz : 4-16 Ω

Für eine mehr detaillierte technische Spezifikation verweisen wir auf die kommerzielle Dokumentation

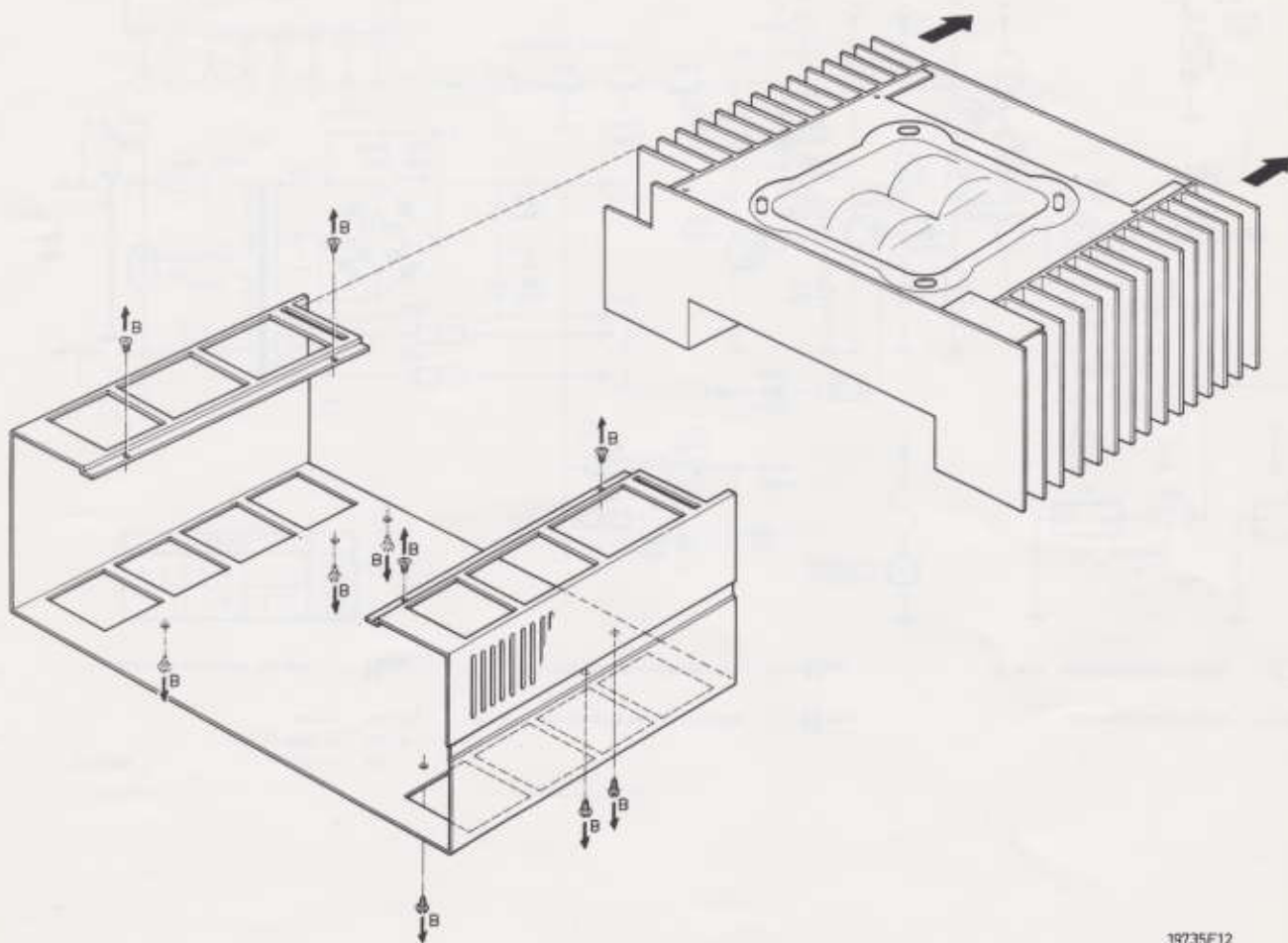
**(S)**

Nätspänningar : 220 V  
 Dimensioner : 260x100x183 mm  
 Uteffect : 2x70 W (4 Ω)  
 D ≤ 0.7 % (IEC)  
 Utgångsimpedans : 4-16 Ω

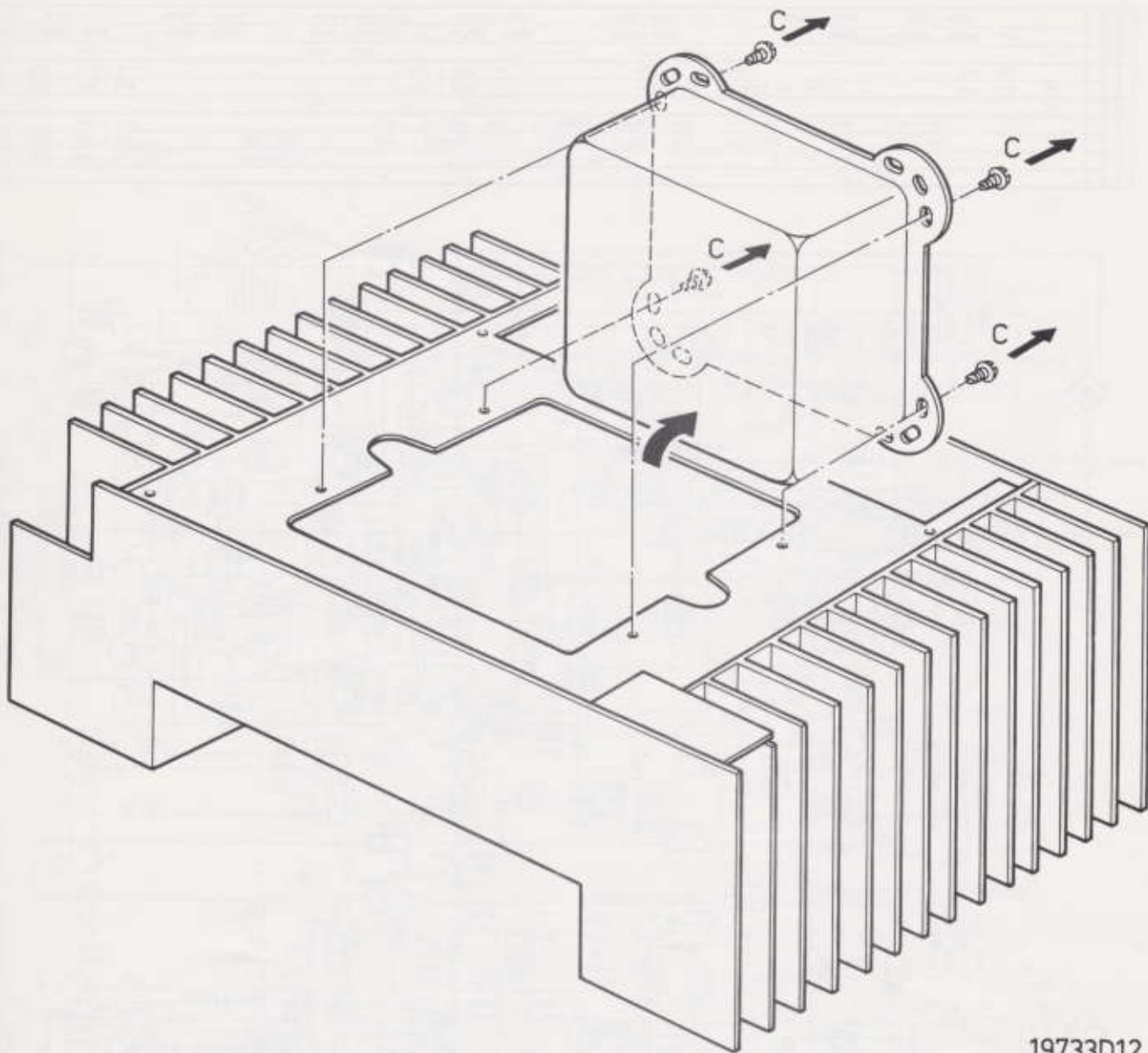
För mera detaljerade data se kommersiell dokumentation.



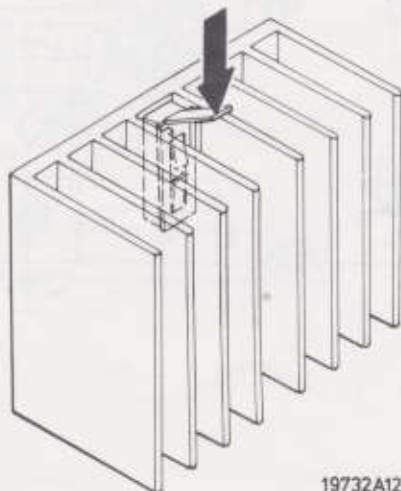
19734E12



19735E12

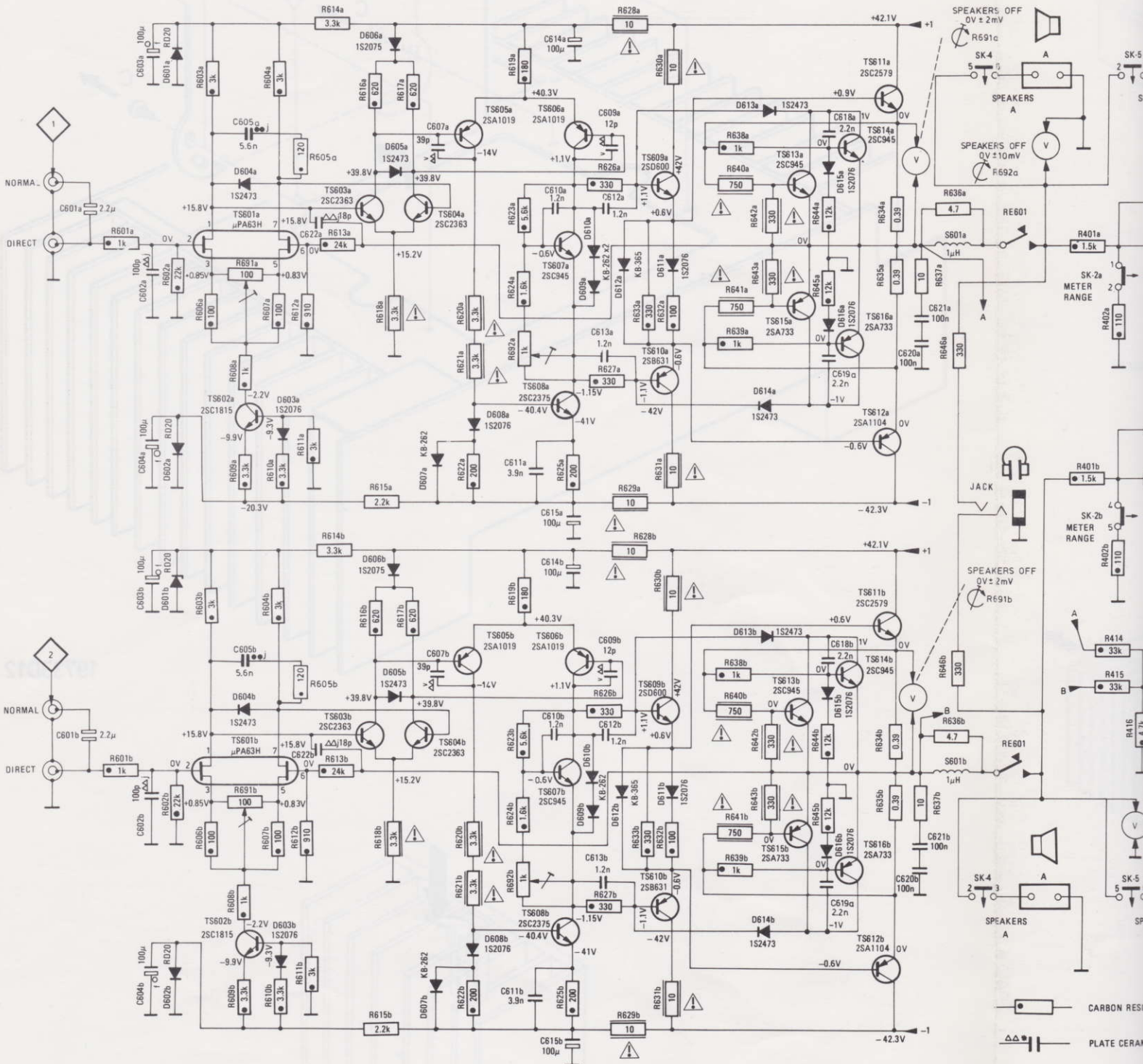


19733D12

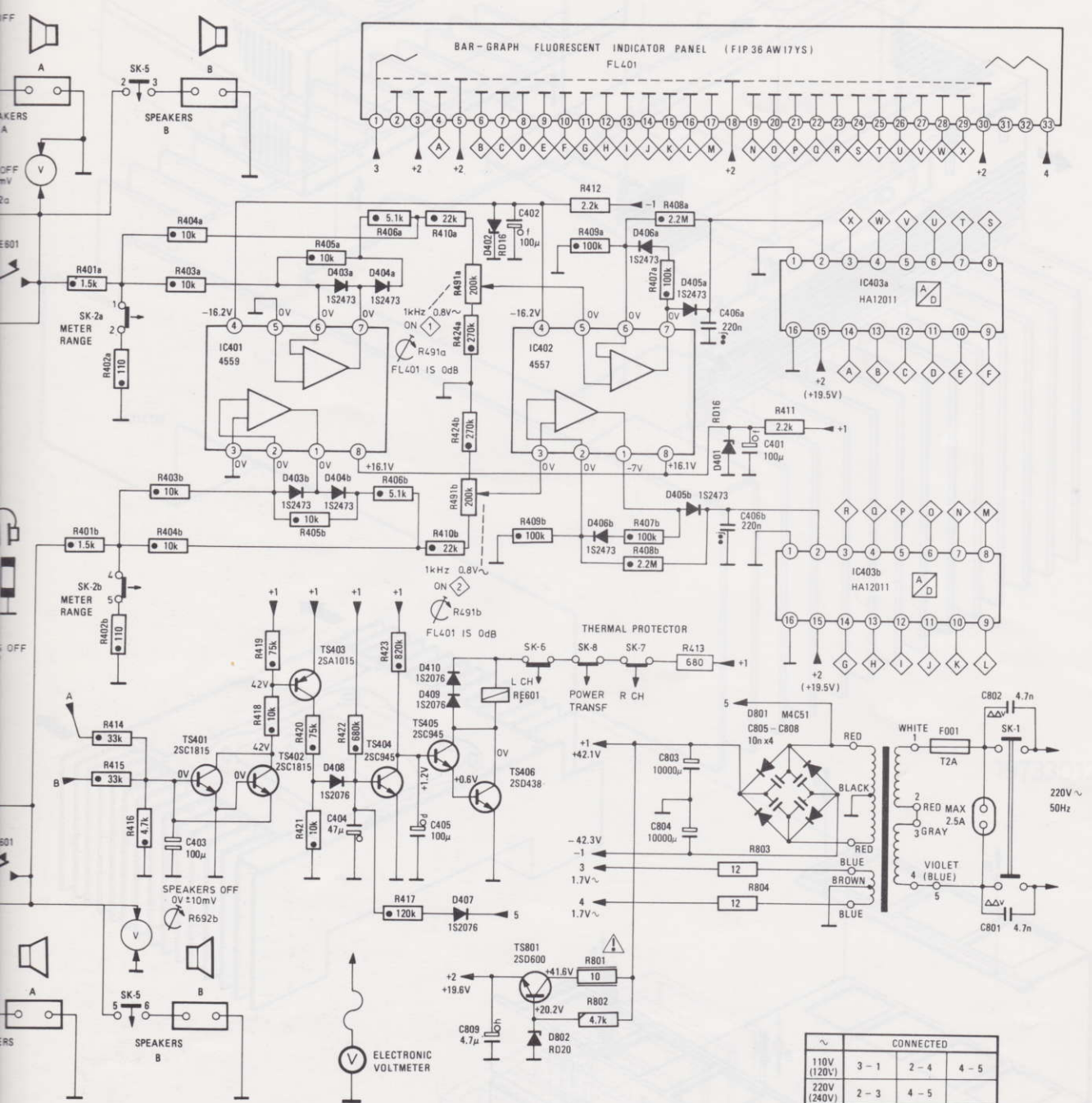


19732A12

M	D601a - D604a	TS601a - TS604a	D605a - D608a	TS605a - TS610a	D609a - D612a	TS611a - TS616a	D613a - D616a	S601a			
M	D601b - D604b	TS601a - TS604b	D605b - D608b	TS605b - TS610b	D609b - D612b	TS611b - TS616b	D613b - D616b	S601b	SK-4a	RE601	SK-2a
M									SK-4b		SK-2b
C	601a - 604a		605a	607a	609a - 615a		618a 619a 621a 620a				
C	601b - 604b		622a 605b	607b	609b - 615b		618b 619b 621b 620b				
C			622b								
R	601a - 607a	691a	612a - 614a	615a - 618a	692a	626a - 633a		646a			401a - 404a
R	601b - 607b	691b	612b - 614b	615b - 618b	619a - 625a	626b - 633b	638a - 645a	634a - 637a	646b		401b - 404a
R		608a - 611a			619b - 625b		638b - 645b	634b - 637b			414
R		608b - 611b			692b						



RE601	SK-2a	SK-5a	IC401	D403a	D404a	D402	IC402	SK-6 - SK-8	D406a	D405a	IC403a	M
	SK-2b	SK-5b	D403b	D404b	RE601	FL401	SK-6 - SK-8	D406b	D405b	D403	IC403b	F001
			TS401 - TS406			D407 - D410	TS801	D802		D801		SK-1
						402			406a			
								803	804	401	805 - 808	801
			403	404	405	809				406b		802
			401a - 404a		405a	406a 410a	412	407a - 409a			411	
			401b - 404b		405b	406b 410b 491a 424a		407b - 409b				
			414 - 416	418 - 423		491b 424b	413			803	804	
					417			801	802			



— CARBON RESISTOR E24 SERIES 0.25W 5%

— MINIATURE ELECTROLYTIC CAPACITOR

— FLAT-FOIL POLYESTER CAPACITOR

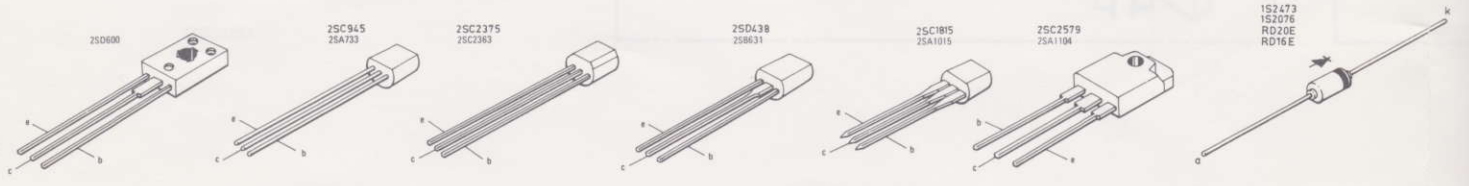
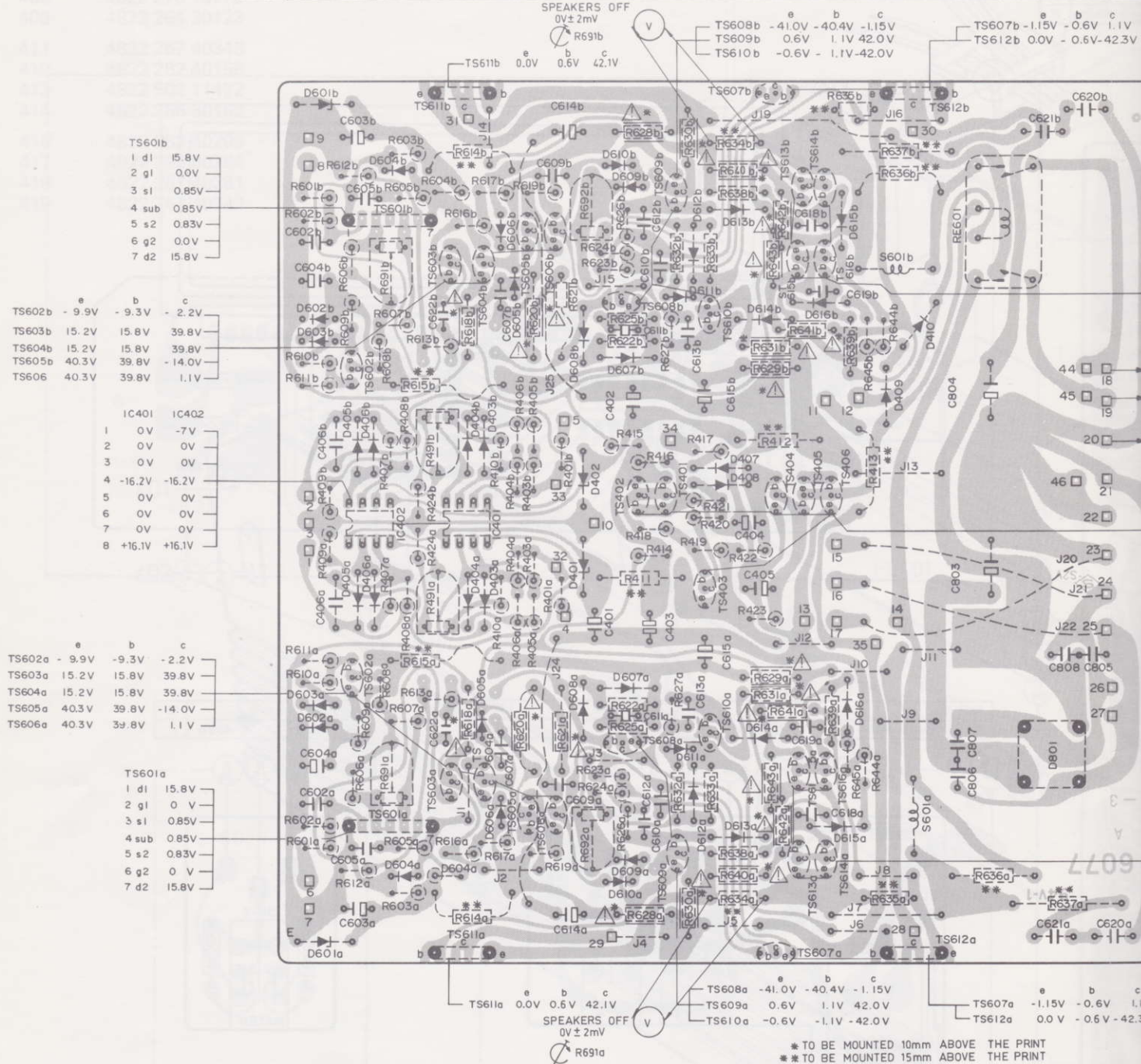
— PLATE CERAMIC CAPACITOR

— MINIATURE BIPOLAR ELECTROLYTIC CAPACITOR

\* d = 10V h = 63V  
 e = 16V r = 250V  
 f = 25V v = 500V

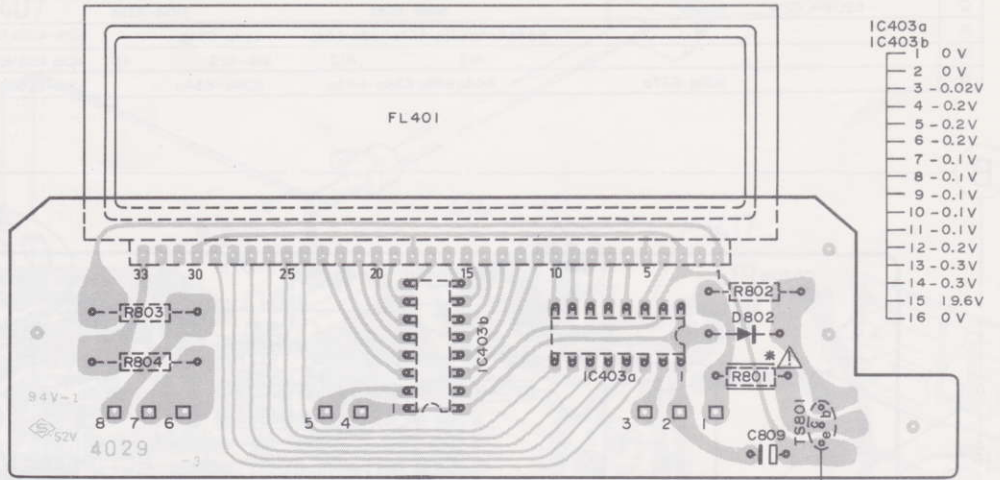
	CONNECTED		
110V (120V)	3 - 1	2 - 4	4 - 5
220V (240V)	2 - 3	4 - 5	

M	D601b-D604b	TS601b-TS604b	TS611b	TS605b	TS606b	D605b-D610b	TS608b	TS610b	D611b	D612b	D614b	TS607b	TS613b	TS616b	D616b	D615b	TS612b	S601b	
M	D403a-D406a	IC402	IC401	D403b-D406b	D401	D402	TS401-TS403	D408	D407	TS404-TS406	D409	D410	REG01	D801					
M	D601a-D606a	TS601a	TS604a	TS611a	TS605a	TS606a	D607a-D610a	TS608a	TS610a	D611a	D612a	D614a	TS607a	TS613a	TS616a	D616a	D615a	TS612a	S601a
C	602b-605b	622b	607b	609b			610b-615b			618b	619b						621b	620b	
C	406a	406b					401-403			404	405							803-808	
C	602a-605a	622a	607a	609a			610a-615a			619a	618a							621a	620a
R	602b	601b	606b	613b	691b	603b-605b	614b-620b	410b	692b	621b-628b			629b-634b		638b-643b	635b-637b	645b	644b	
R	407a-409a	407b-409b	424a-424b	491a	491b	403a-406a	403b-406b	401a	401b	411			414-423		412			413	
R	602a	601a	606a	613a	691a	603a-605a	614a-620a	410a	692a	621a-628a			629a-634a		638a-643a	645a	644a		635a-637a



M
M
M
C
C
620a
C
R
R
R

M	FL40I	IC403b	IC403a	D802	TS801	M
C				809		C
R	803 804			801 802		R



- IC403a  
IC403b
- 1 0 V
  - 2 0 V
  - 3 -0.02V
  - 4 -0.2V
  - 5 -0.2V
  - 6 -0.2V
  - 7 -0.1V
  - 8 -0.1V
  - 9 -0.1V
  - 10 -0.1V
  - 11 -0.1V
  - 12 -0.2V
  - 13 -0.3V
  - 14 -0.3V
  - 15 19.6V
  - 16 0 V

- TS801
- e 19.6 V
  - b 20.2 V
  - c 4L6 V

19682B12

\*TO BE MOUNTED 10mm ABOVE THE PRINT

	a	b	c
TS613b	0.0V	0.0V	1.0V
TS614b	0.0V	0.0V	1.0V
TS615b	0.0V	0.0V	-1.0V
TS616b	0.0V	0.0V	-1.0V



0V±10mV  
SPEAKERS OFF

R692a

	a	b	c
TS401	0.0V	0.0V	42.0V
TS402	0.0V	0.0V	42.0V
TS403	42.1V	42.0V	-0.6V
TS404	0.0V	0.8V	1.2V
TS405	0.6V	1.2V	0V
TS406	0.0V	0.6V	0V

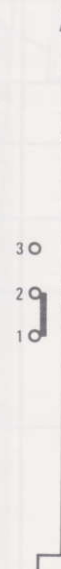
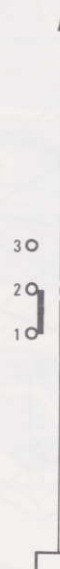
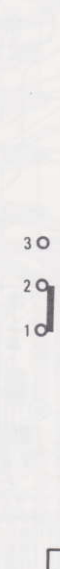
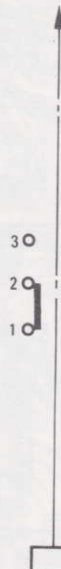
	a	b	c
TS613a	0.0V	0.0V	1.0V
TS614a	0.0V	0.0V	1.0V
TS615a	0.0V	0.0V	-1.0V
TS616a	0.0V	0.0V	-1.0V

POWER

METER RANGE

SPEAKERS A

SPEAKERS B



SK-1

SK-2

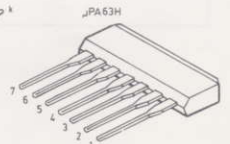
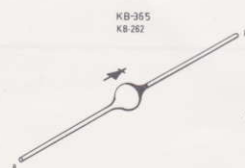
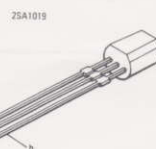
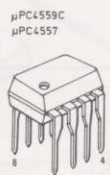
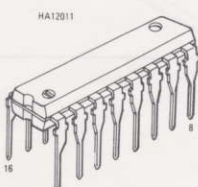
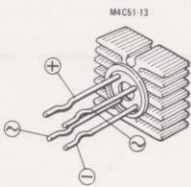
SK-4

SK-5

19686A12

19681D12

c  
1.1V  
-42.3V

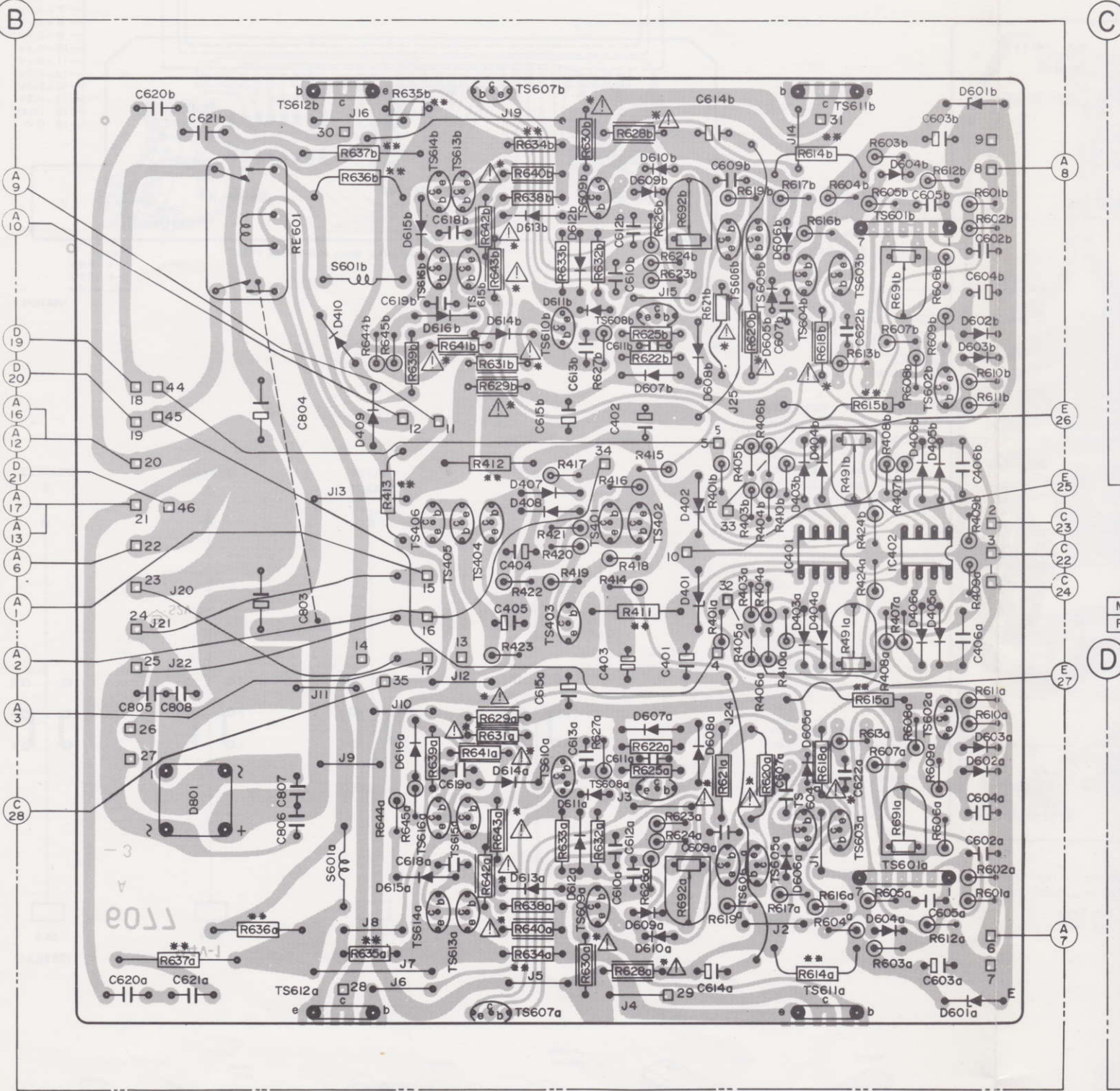


19685C12



M	S601b TS612b D615b D616b TS613b TS616b TS607b D612b D614b D611b TS608b TS610b D605b D610b TS606b TS605b TS611b TS601b TS604b D601b D604b										M	
M	D801	RE601	D410 D409	TS404-TS406	D407 D408	TS401-TS403	D402 D401	D403b-D406b	IC401 IC402	D403a-D406a	M	
M	S601a TS612a D615a D616a TS613a TS616a TS607a D612a D614a D611a TS608a TS610a D607a D610a TS606a TS605a TS611a TS601a TS604a D601a D604a										M	
C	620b	621b	619b 618b		610b-615b			607b 609b		622b	602b-605b	C
C	803-808		405 404			401-403		406b 406a				C
C	620a	621a	618a 619a		610a-615a			607a 609a		622a	602a-605a	C
R	644b 645b 635b-637b 638b-643b			629b-634b			621b-628b 692b 410b		614b-620b	603b-605b 691b	606b-613b 601b 602b	R
R	413			412		414-423	411	401b 401a 403b-406b	403a-406a 491b 491a 424b 424a	407b-409b 407a-409a	R	
R	635a-637a			644a 645a 638a-643a			629a-634a		621a-628a 692a 410a 614a-620a	603a-605a 691a	606a-613a 601a 602a	R

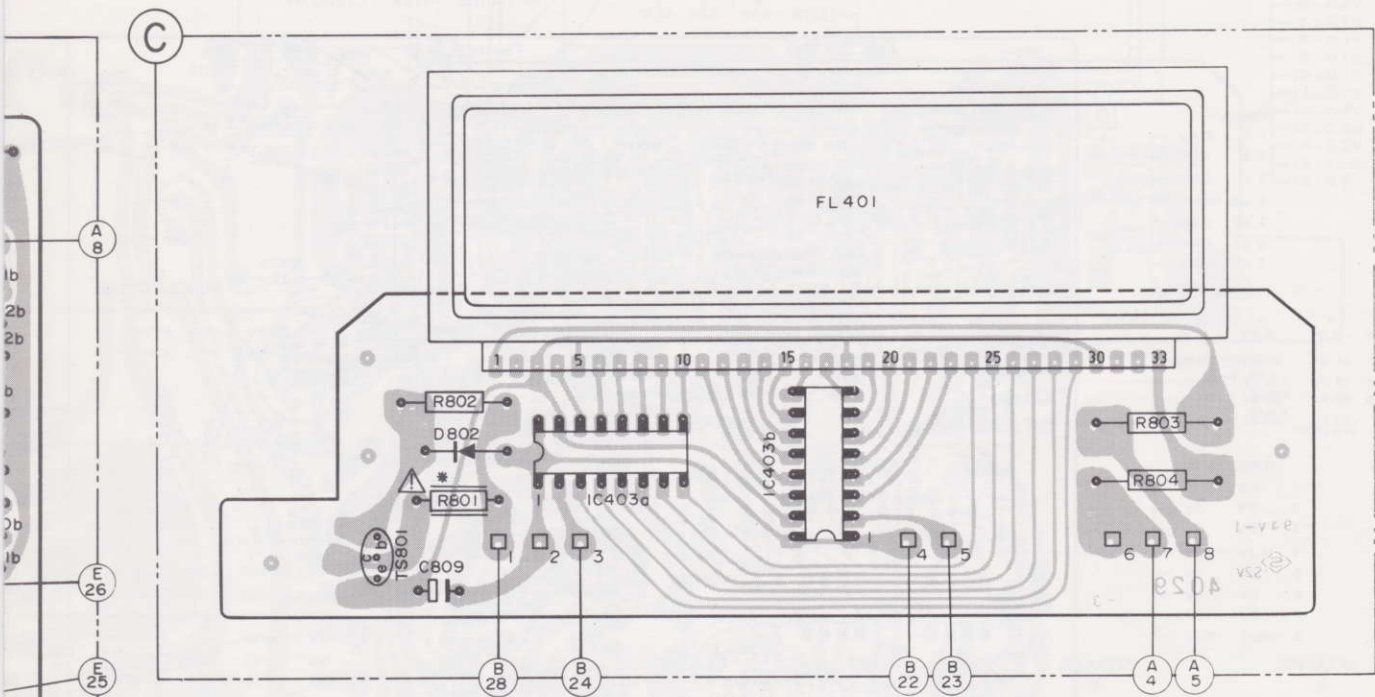
M
C
R



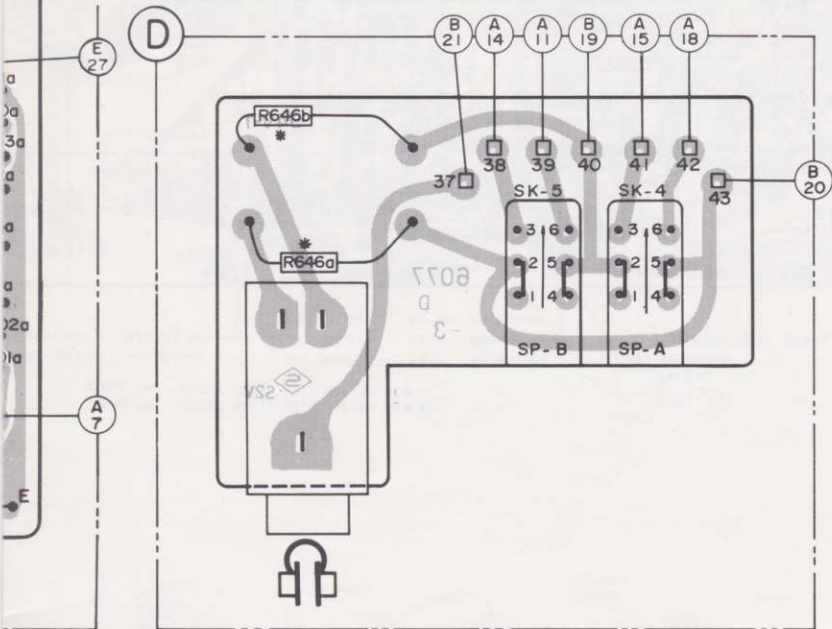
M
R

D604b	M
5a	M
D606a	M
	C
a	C
	C
b 602b	R
7a-409a	R
6a 602a	R

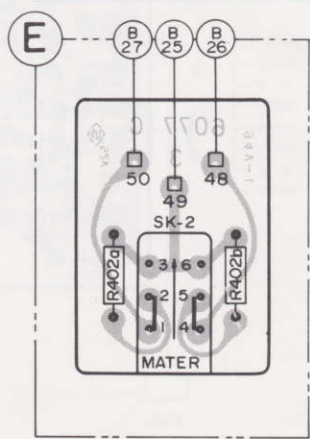
M	TS801	D802	IC403a	IC403b	FL401	M
C		809				C
R		802 801				R
					803 804	



M		SK-5	SK-4	M
R	646b 646a			R

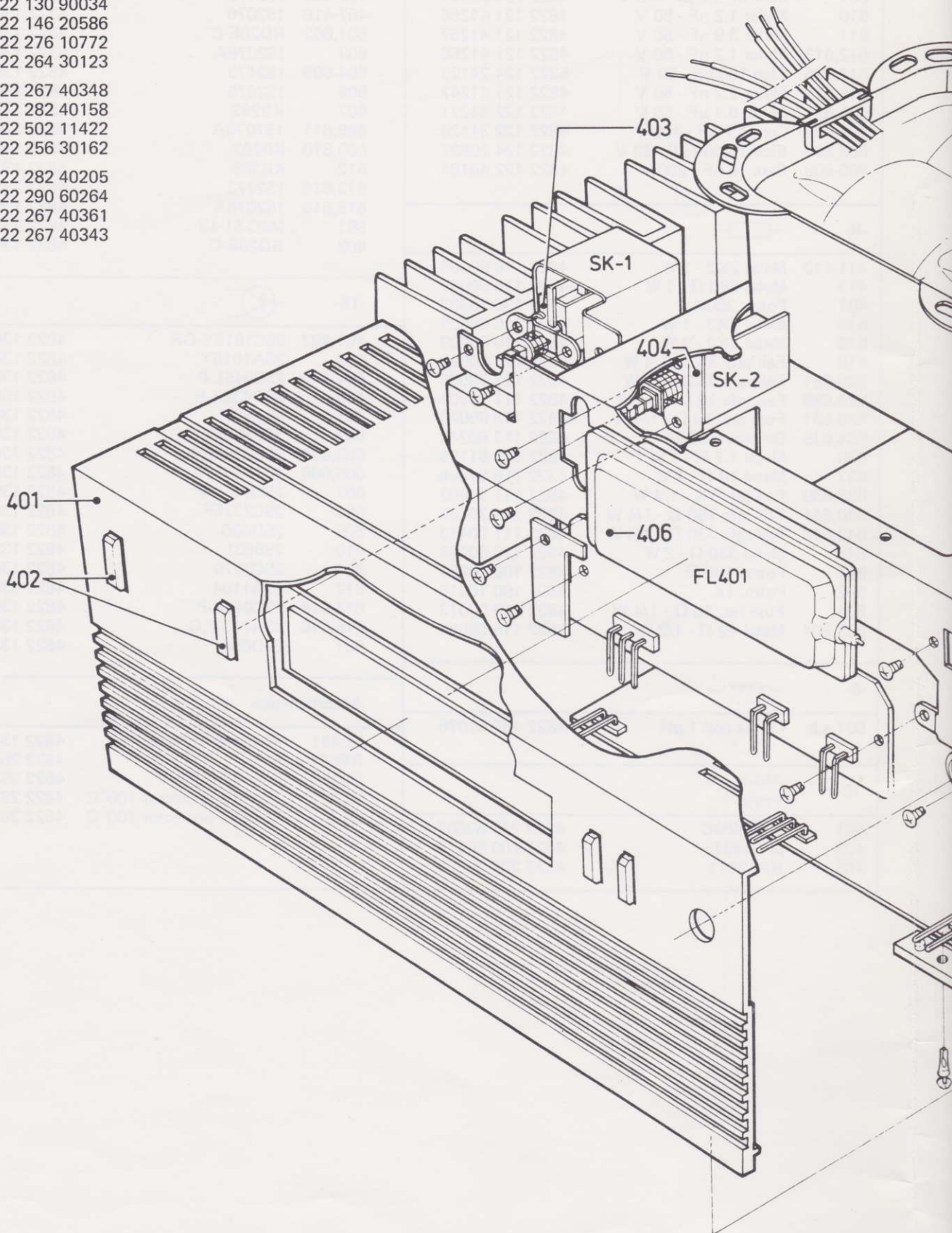


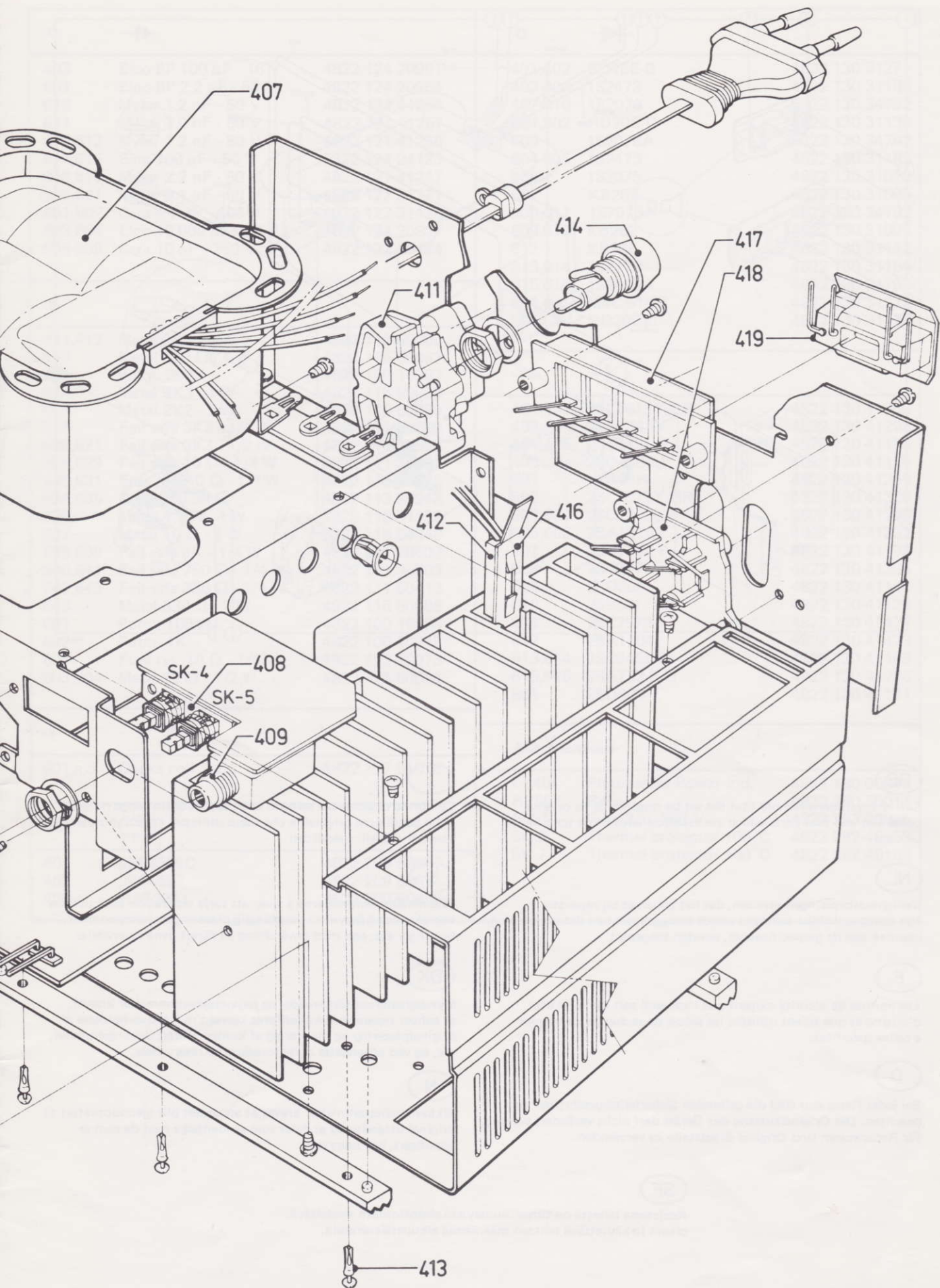
M		SK-2	M
R	402a 402b		R



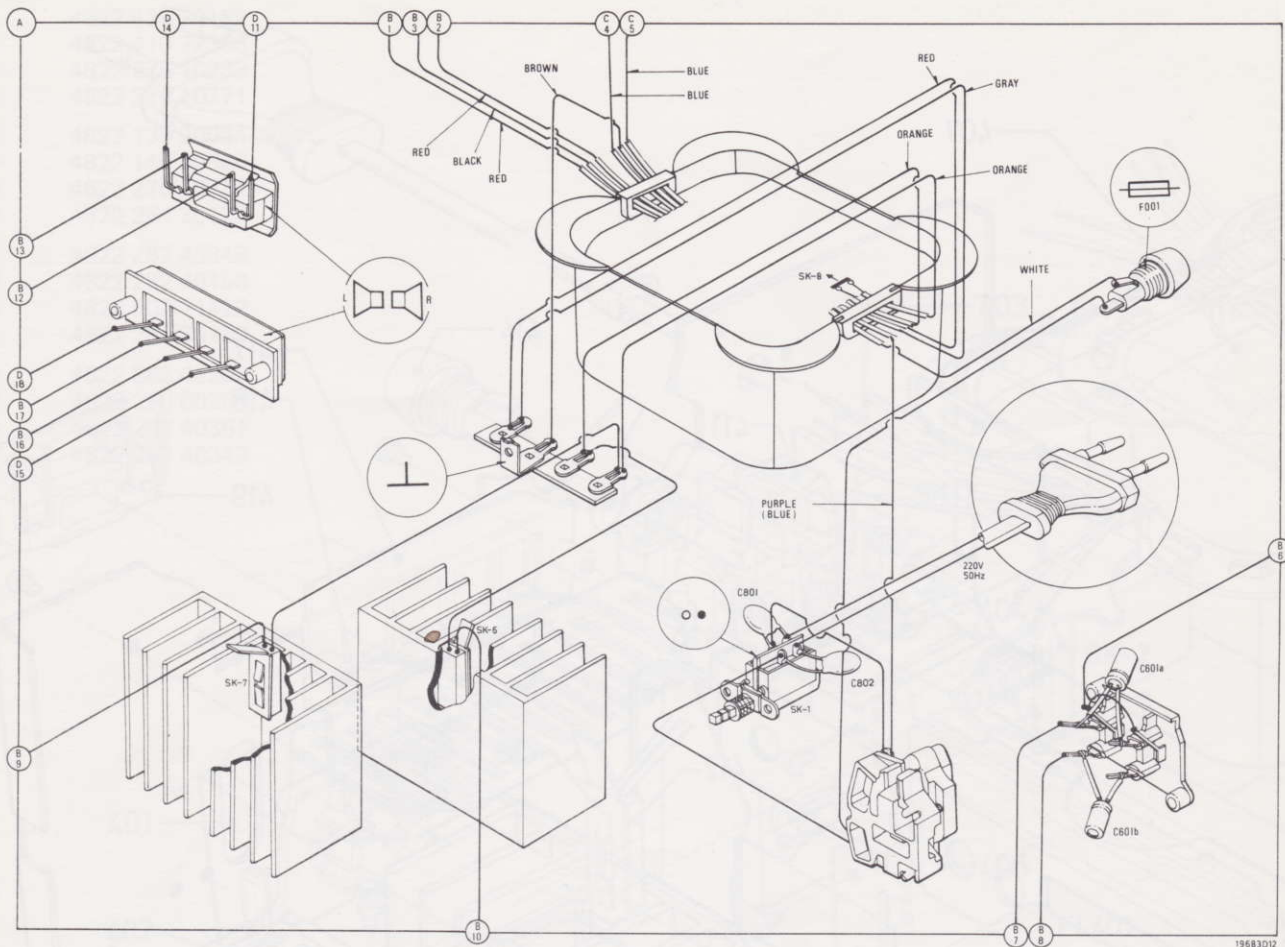
\*TO BE MOUNTED 10mm ABOVE THE PRINT  
 \*\*TO BE MOUNTED 15mm ABOVE THE PRINT

401	4822 425 30152
402	4822 410 22308
403	4822 276 10733
404	4822 276 10771
406	4822 130 90034
407	4822 146 20586
408	4822 276 10772
409	4822 264 30123
411	4822 267 40348
412	4822 282 40158
413	4822 502 11422
414	4822 256 30162
416	4822 282 40205
417	4822 290 60264
418	4822 267 40361
419	4822 267 40343





18433D14



**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**

Bei jeder Reparatur sind die geltenden Sicherheitsvorschriften zu beachten. Der Originalzustand des Geräts darf nicht verändert werden; für Reparaturen sind Original-Ersatzteile zu verwenden.

**SF**

Korjattessa 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 av 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.

<b>-C-</b>			<b>-D-</b>		
403	Elco BP 100 $\mu$ F - 16 V	4822 124 20961	401,402	RD16E-B	4822 130 31271
601	Elco BP 2.2 $\mu$ F - 50 V	4822 124 20954	403-406	1S2473	4822 130 31185
610	Mylar 1.2 nF - 50 V	4822 121 41256	407-410	1S2076	5322 130 34792
611	Mylar 3.9 nF - 50 V	4822 121 41257	601,602	RD20E-C	4822 130 31136
612,613	Mylar 1.2 nF - 50 V	4822 121 41256	603	1S2076A	5322 130 34792
614,615	Elco 100 $\mu$ F - 50 V	5322 124 24123	604-605	1S2473	4822 130 31185
618,619	Mylar 2.2 nF - 50 V	4822 121 41247	606	1S2075	4822 130 31026
620,621	Mylar 0.1 $\mu$ F - 50 V	4822 122 31271	607	KB262	4822 130 31095
801,802	Cera 4.7 nF - 400 V	4822 122 31428	608,611	1S7076A	4822 130 34792
803,804	Elco 10.000 $\mu$ F - 50 V	4822 124 20897	609,610	KB262	4822 130 31095
805-808	Cera 10 nF - 250 V	4822 122 40184	612	KB365	4822 130 31142
			613,614	1S2473	4822 130 31185
			615,616	1S2076A	4822 130 34792
			801	M4C-51-13	4822 130 31272
			802	RD20E-C	4822 130 31136
<b>-R-</b>			<b>-TS-</b>		
411,412	Metal 2K2 - 1 W	4822 116 60065	401,402	2SC1815Y-GR	4822 130 41306
413	Metal 680 $\Omega$ - 1 W	4822 116 60087	403	2SA1015Y	4822 130 41298
491	Potm. 200K	4822 100 10303	404,405	2SC945L-P	4822 130 41198
614	Metal 3K3 - 1 W	4822 116 60059	406	2SD438E,F	4822 130 41139
615	Metal 2K2 - 2 W	4822 116 60089	601	$\mu$ PA63H	4822 130 41295
618	Fail safe 3K3 - 1/4 W	4822 111 30599	602	2SC1815Y-GR	4822 130 41306
620,621	Fail safe 3K3 - 1/2 W	4822 111 30598	603,604	2SC2363E,F	4822 130 41208
628,629	Fail safe 10 $\Omega$ - 1/4 W	4822 111 30601	605,606	2SA1019F	4822 130 41333
630,631	Fuse res. 10 $\Omega$ - 1/4 W	4822 113 90073	607	2SC945L-P	4822 130 41198
634,635	Cement 0.39 $\Omega$	4822 113 80248	608	2SC2375F	4822 130 41335
636	Metal 4.7 $\Omega$ - 1 W	4822 116 51195	609	2SD600	4822 130 41141
637	Metal 10 $\Omega$ - 2 W	5322 116 54348	610	2SB631	4822 130 41136
638,639	Fail safe 1K - 1/4 W	4822 111 30602	611	2SC2579	4822 130 41474
640,641	Fail safe 750 $\Omega$ - 1/4 W	4822 111 30603	612	2SA1104	4822 130 41473
642,643	Fail safe 330 $\Omega$ - 1/4 W	4822 111 50413	613,614	2SC945L-P	4822 130 41198
646	Metal 330 $\Omega$ - 2 W	4822 116 60088	615,616	2SA733-P,Q	4822 130 44256
691	Potm. 100 $\Omega$	4822 100 10253	801	2SD600	4822 130 41141
692	Potm. 1K	4822 100 10215			
801	Fuse res. 10 $\Omega$ - 1/4 W	4822 113 90073			
803,804	Metal 12 $\Omega$ - 1/2 W	4822 116 60086			
<b>-S-</b>			<b>-Miscellaneous-</b>		
601,a,b	Choke coil 1 $\mu$ H	4822 157 51076	FL401	Flourescent Power Ind.	4822 130 90034
			RE601	Relay	4822 280 50017
			F001	Fuse 2A - 250 V	4822 253 30025
<b>-IC-</b>			SK-6	Thermal protector 100 $^{\circ}$ C	4822 282 40158
401	$\mu$ PC4559C	4822 209 80607	SK-7	Thermal protector 100 $^{\circ}$ C	4822 282 40158
402	$\mu$ PC4557	4822 209 80671			
403	HA12011	4822 209 80669			

Please apply the following modifications in your Service Manual

- Pos. 412 - thermal switch 90°C codenumber 4822 282 40158 is changed into thermal switch 100°C codenumber 4822 273 10079.
- Diode - D606a, b - IS2075 code number 4822 130 31026 is changed into IS2076A codenumber 5322 130 34792.
- Resistor R638a, b and R639a, b - 1 k $\Omega$  (circuit diagram) are safety resistors, code number 4822 111 30602.
- Resistor R405a, b - 10 k $\Omega$  is changed into 20 k $\Omega$ .
- Between base and collector of TS801 a capacitor of 1 nF  $\Delta\Delta j$  is added.

#### Alignment procedure

##### *quiescent current*

For adjusting the quiescent current, the voltage across R634a, b is measured, and adjusted by R692a, b at a value of 12 mV  $\pm$  2 mV.

The zero volts adjustment is to be done with R691a, b instead of R692a, b.

For the alignment of the power indicators, the input-signal level must be adjusted for 20 V rms output at 1 kHz with no load.

How adjust R491a, b for 0 dB reading on the power indicator.