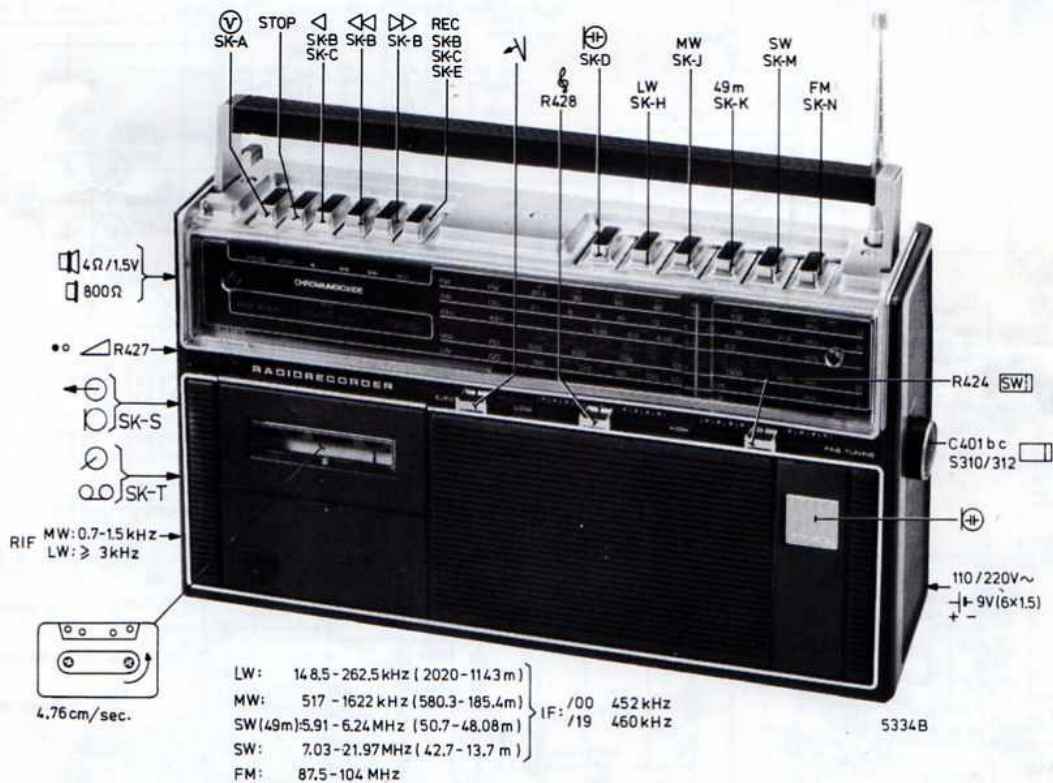


Service  
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# Service Manual



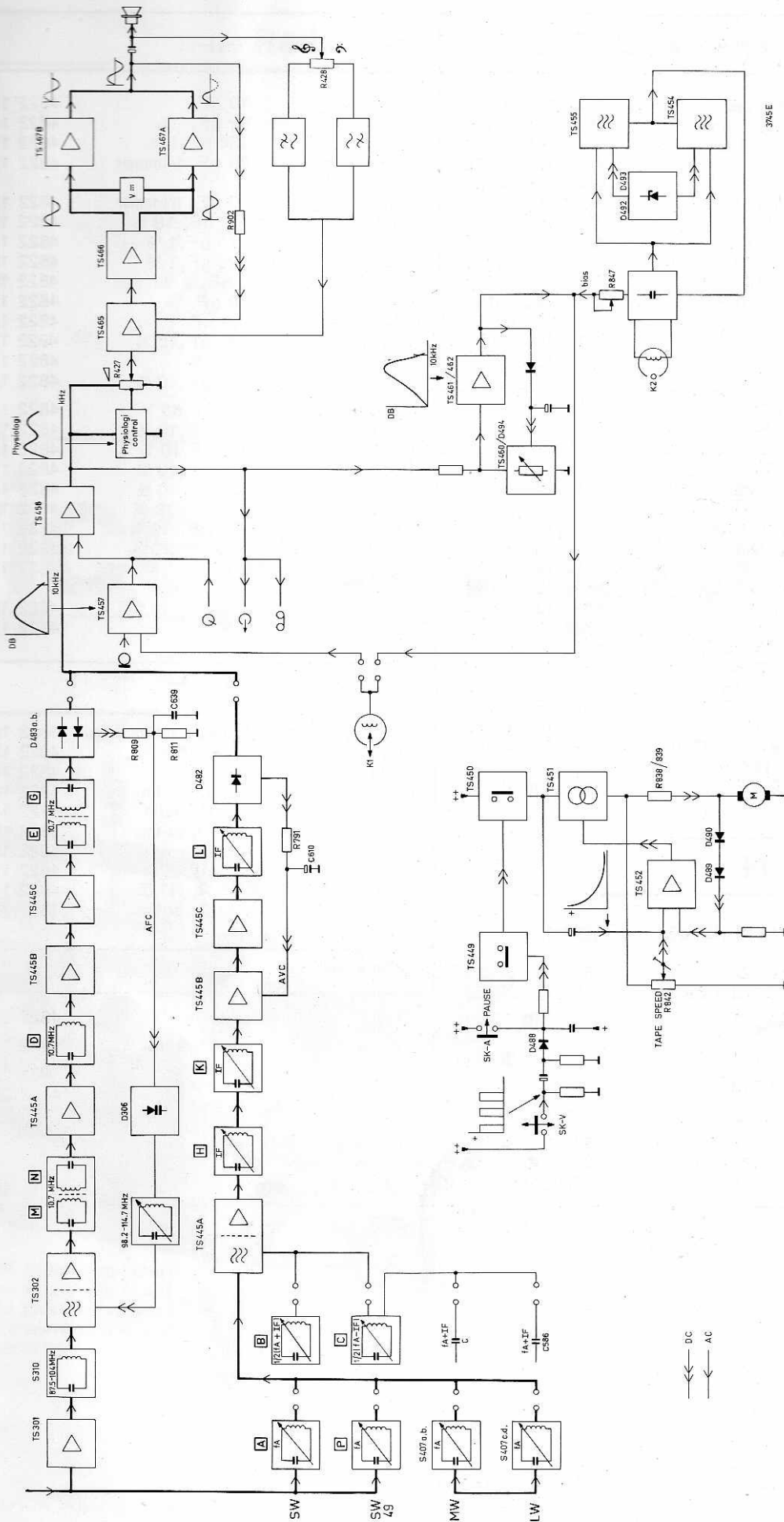
Safety regulations require that the set be restored to its original condition and that parts which are identical with those specified, be used.

Documentation Technique Service Dokumentation Documentazione di Servizio Huolte-Ohje Manual de Servicio Manual de Servicio



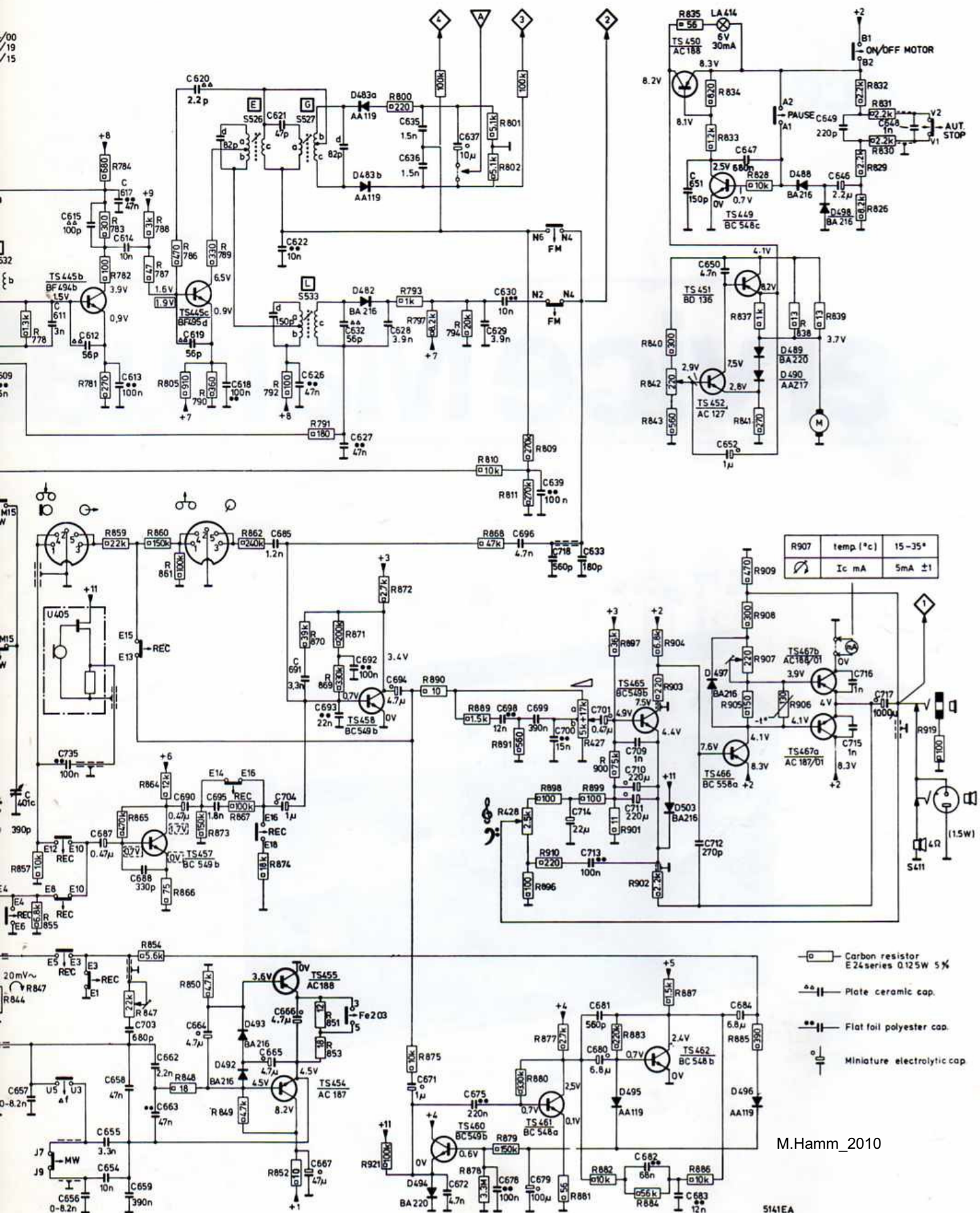
Subject to modification  
4822 725 11378  
Printed in The Netherlands

M.Hamm\_2010  
**PHILIPS**



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K	TS445b U405	TS445c; 457 D493; 492 E G Z	TS454; 455 D483a-b D482	TS458 D494	TS460	TS461	TS465 D495	TS462; 449-452 D497; 496	TS466; 467a-b D488-490; 498 S411	MISC
609	611 615 612 617 614 613 619 620 618	621 622 626 632 627 628 636 635 637 629 630 639	698 699 696 700 714 701 713 709+711	840 842 843 834 833 828 841 837-839	826 829-832			646 649 648		C
01c	735	687 688 690 695 685 704 691-693 694	698 699 696 700 714 701 713 709+711	715 +716 717						C
657	656 655 654 658 659 703 662-664	665 667 666	671 672 675 678 679 718 680 681 633 682	683 684						C
778	781-784	786-788 805 790 789	792 791	800 793 797 794 801 802 809-811	840 842 843 834 833 828 841 837-839	826 829-832				R
	857 855	859 864-866 860 861 873 867 862	874 870 869 871 872 890	889 891 868 428 896 910 898+900 427 897 901-904 835	905+909	919				R
844	847 854 848 850 849	852 851	921 875 876 879 880 877 881 882 883 884 887 886 885							R

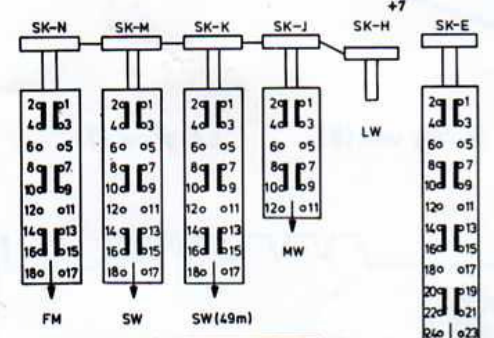
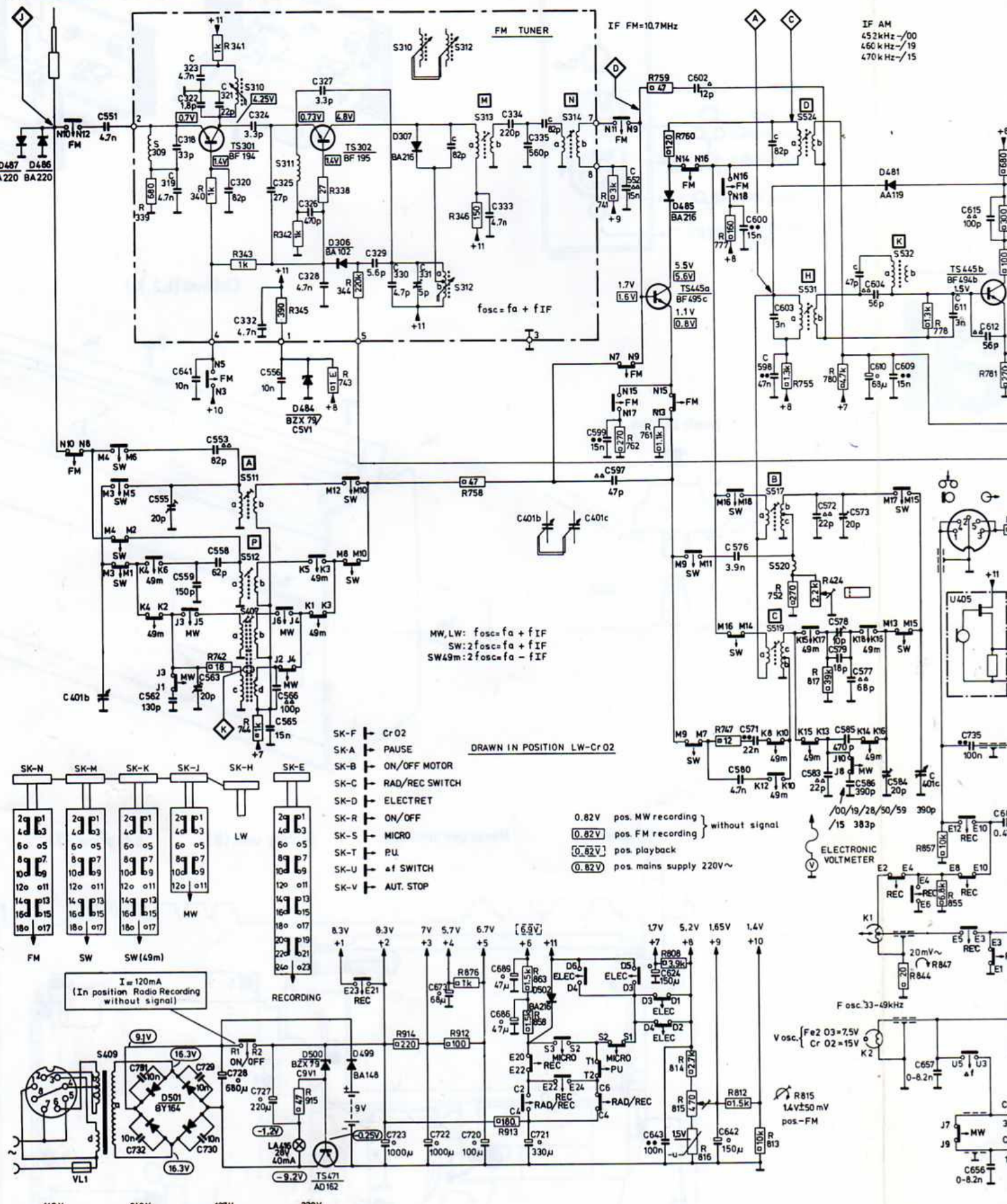


R907	temp (°C)	15-35°
Ic	mA	5mA ±1

- Carbon resistor E24 series 0.125W 5%
- Plate ceramic cap.
- Flat foil polyester cap.
- Miniature electrolytic cap.

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MSC D487 486	D480 VL1	S409,309,0501,502	TS301	S310,311	D484,501,599A,S407P,TS471	D306	TS302	D307	S312	M	D502	N	D485	TS445a	B	C	D	H	S320	D481	K	TS445b	U405
C		319 318	321+323 320	324 332 325	326 328	329 330 331	333	334	335				599	552 597 571	602	600 598 603	572 573	610	604 609	611	615	612	
C		551	401b	641 555 563	556	566	565							576			577+579		401c		735		
C		732 731	729 730 728 727	553 558		723	722 673 720	689 686 721					624	643	642 571 580		583+586			657	656	655 6	
R		339	340	341 343	342	338 344		346				741	759 760	777		755 780			778		781-		
R				345 742	744	743		758				876	762 761	747		817 748 753 752 424				857	855	8	
R				916 915				914 912 876				913 863 858			808 814 815	812 813							844

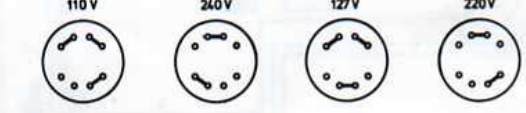
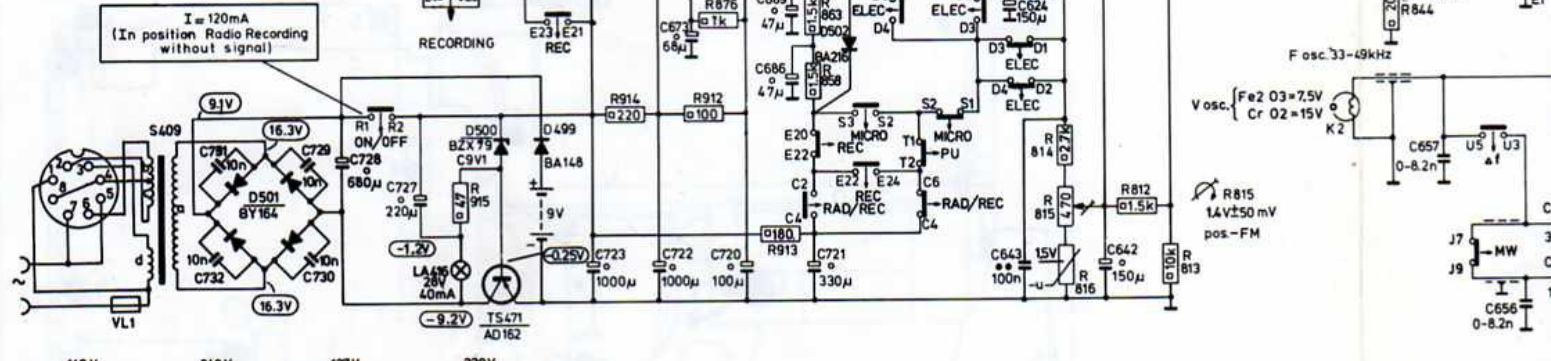


- SK-F Cr 02
- SK-A PAUSE
- SK-B ON/OFF MOTOR
- SK-C RAD/REC SWITCH
- SK-D ELECTRET
- SK-R ON/OFF
- SK-S MICRO
- SK-T PU
- SK-U af SWITCH
- SK-V AUT. STOP

DRAWN IN POSITION LW-Cr 02

MW,LW: fosc=fa + fIF  
 SW: 2fosc=fa + fIF  
 SW49m: 2fosc=fa - fIF

0.82V pos. MW recording } without signal  
 0.82V pos. FM recording }  
 0.82V pos. playback }  
 0.82V pos. mains supply 220V~

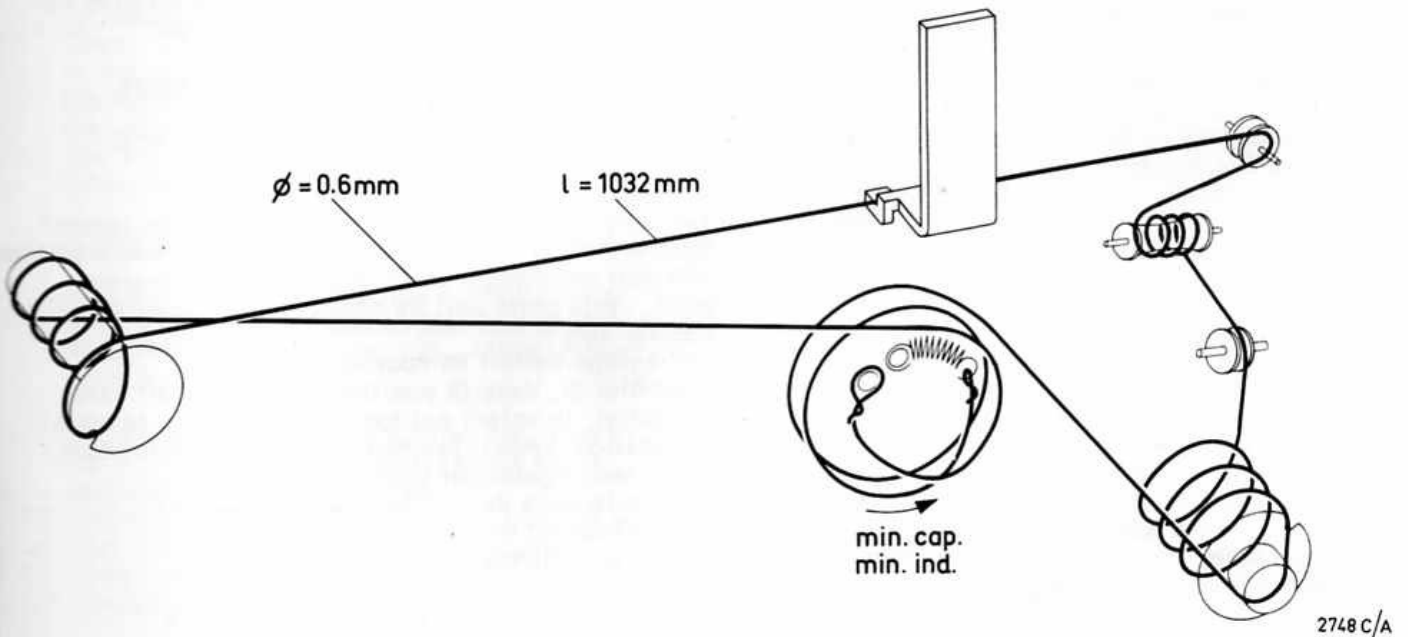
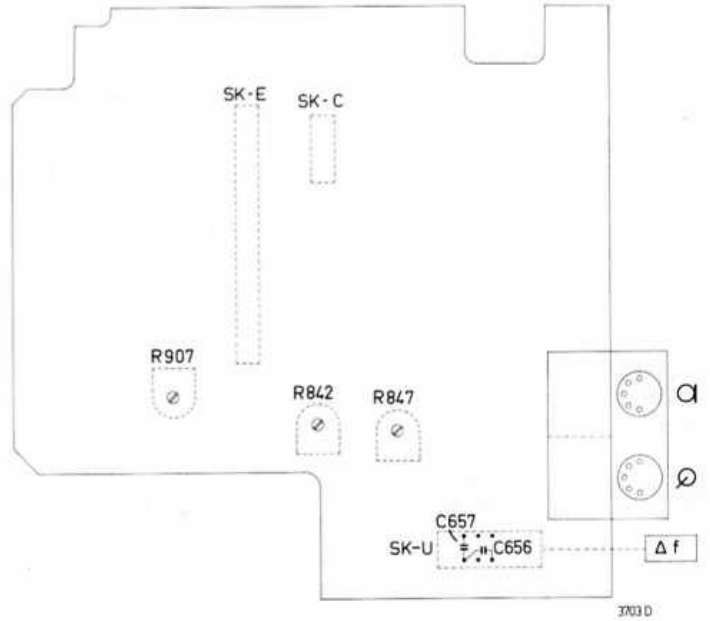
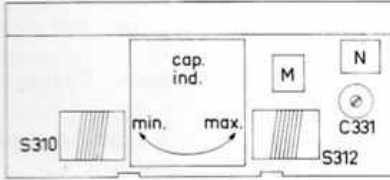
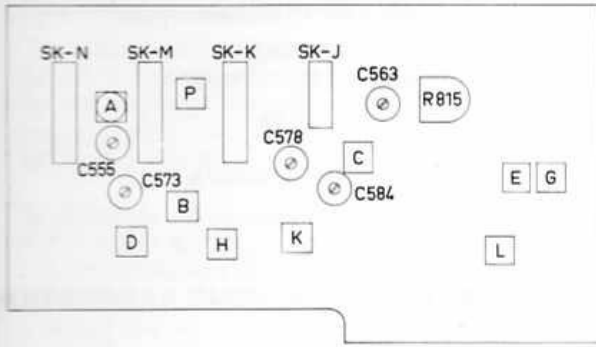


SK							
Wave range							
MW 517-1622 kHz	/00/28/50: 452 kHz /15 : 470 kHz /19/59 : 460 kHz $\Delta F$ 20 kHz (50 Hz) via 33 nF	 	C401 min. cap.				
LW 148.5-262.5 kHz	147 kHz		C401 max. cap.				
MW 517-1622 kHz	1635 kHz		C401 min. cap.				 V max.~
SW 7.03-21.97 MHz	6.95 MHz 22.2 MHz		C401 max. cap. C401 min. cap.				
LW 148.5-262.5 kHz	156 kHz						
MW 517-1622 kHz	550 kHz 1500 kHz						
SW 7.03-21.97 MHz	7.5 MHz 21 MHz			Tune in			 V max.~
SW (49 m) 5.91-6.24 MHz	6.1 MHz 5.89 MHz		C401 max. cap.				
FM 87.5-104 MHz	 10.7 MHz $\Delta F$ 200 kHz (50 Hz) via 5 nF	  	S310 min. ind.		     	    	
FM 87.5-104 MHz	108 MHz 96 MHz		S310 min. ind.		C331 S310,312	 	V max.~
				tune in			

\*Turn the mentioned coils fully outwards.

- Justiere auf maximale Höhe und Symmetrie.
- Öffne Brücke . Dämpfe S526c mit 1,5 k $\Omega$ .
- Schliesse Brücke .
- Justiere auf maximale Steilheit und Symmetrie der "S"-Kurve.

- Regolare per la massima ampiezza e simmetria.
- Aprire il ponte . Ammortizzare S526c con 1,5 k $\Omega$ .
- Chiudere il ponte .
- Regolare la curva ad "S" per la massima ampiezza e simmetria.



**(GB)**

- 1 Adjust for maximum height and symmetry.
- 2 Open bridge , damp S526c with 1,5 kΩ
- 3 Close bridge
- 4 Adjust for maximum slope and symmetry of the "S"-curve.

**(NL)**

- 1 Afregelen op maximum hoogte en symetrie.
- 2 Brug openen: S526c dempen met 1,5 kΩ.
- 3 Brug sluiten.
- 4 Afregelen op max. steilheid en symetrie van de "S"-kromme.

**(F)**

- 1 Ajuster sur hauteur et symétrie maximales.
- 2 Ouvrir le pontet . Amortir S526c avec 1,5 kΩ
- 3 Fermer le pontet .
- 4 Ajuster sur Raideur et symétrie maximales de la courbe en "S".

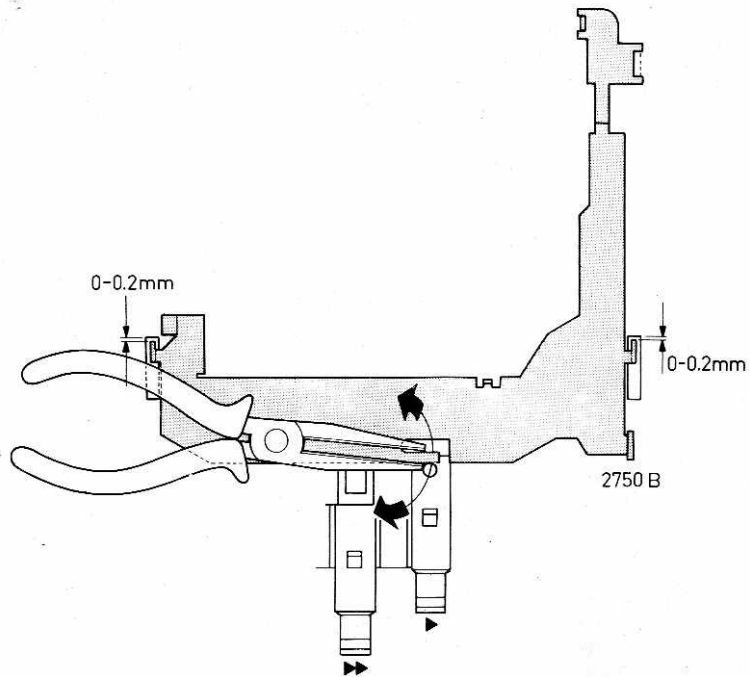


Fig. 2

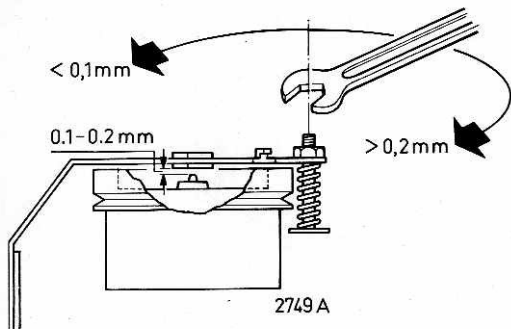


Fig. 3

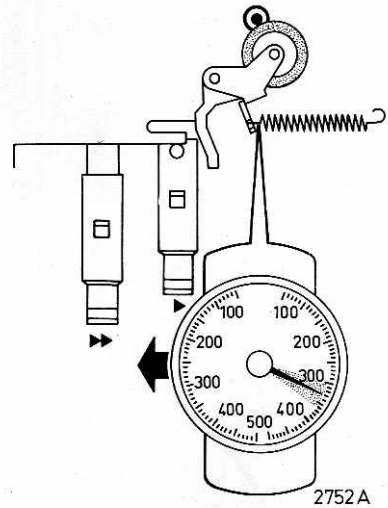


Fig. 4

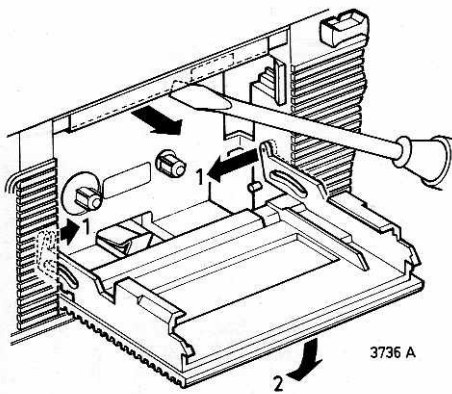


Fig. 5

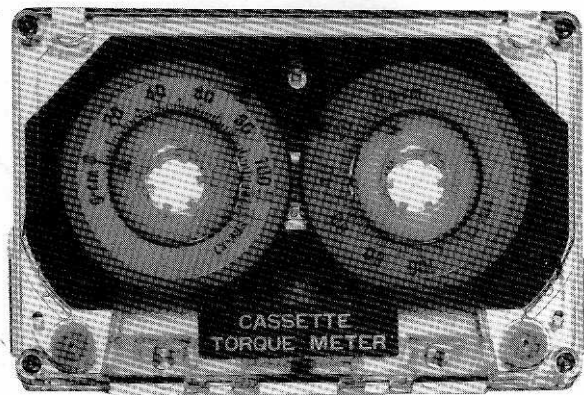


Fig. 6

**Replacing the collector 92, Fig. 1**

The collectors supplied by Concern Service must be glued to the mounting plates (in the set delivered by the factory, the collectors are riveted to the mounting plates). Glue to be used: for example 4822 390 30014.

**1. Azimuth alignment**

- Put some cellulose lacquer 4822 389 20005 on the azimuth screw before mounting the recorder in the cabinet.
- Mount the recorder in the cabinet.
- Insert a test cassette (6300 Hz) - 8945 600 13501 into the recorder.
- Connect an electronic voltmeter to 1 .
- Adjust for maximum output voltage by means of the screw which can be reached through a hole in the front, in the cassette compartment (Fig. 5).
- Do not use the recorder for the next hour.

**2. Adjusting the head bracket 96, Figs. 1 and 2****3. Adjusting the bracket 507, Fig. 1**

In position "fast forward winding" the tag of bracket 507 is pressed against bracket 105 so that idler wheel 109 must come clear of wheel 102. However in position "stop" this tag must be just clear of the bracket.

Adjust the clearance between this tag and the bracket by bending the tag.

Check: When in position "stop" (without a cassette in the machine), the flywheel is turned manually in the normal direction of rotation, the two catches 91 are taken along.

The catches 91 rotate in directions opposite to each other; thus, they provide the required braking action.

**4. Adjusting the flywheel bracket 503, Fig. 3****5. Adjusting the force of the pressure roller 76, Fig. 4**

When the pressure roller is just free of the capstan, the pulling force must be 400...460 g. Adjust this force by bending tag A.

**6. Checking the winding friction coupling 81, Fig. 1**

For this check the Cassette Torque Meter, 4822 395 30054 is used (Fig. 6)

- Insert the cassette torque meter into the recorder. Set the recorder to position Playback.
- The Cassette Torque Meter should give the following indications: Right-hand reel disc 30-60 g-cm  
Left-hand reel disc 3-8 g-cm
- The meter reading should be as constant as possible.
- If the aforementioned values are not measured, the chassis must be removed.
- Degrease the belts and running surfaces of the flywheel, the idler wheels, the friction wheel and the reel discs.
- If the aforementioned values are still not measured, the winding friction wheel must be replaced. (See "Repair hints").

**Note:**

The friction wheel may also be checked by a measurement of the current taken from the external power supply.

- Connect the recorder to an external power supply of 9 V via a current meter.
- Set the recorder to position "Playback" and read the amount of current taken from the power supply.
- Block the rotating reel disc and read the increase in current.

This should be 10-12 mA.

7. When operated from mains voltage, the recorder must be set (without cassette) to position "fast forward winding" or "fast rewinding".

Block the rotating reel disc; then a current increase of at least 120 mA must be measured. The manner of measuring is identical to that described in para 6. If the value of 120 mA is not reached, the running surfaces of idler wheels and pulleys must be greased with alcohol. If necessary, cord 54 must be replaced.

**8. Checking the speed**

The tape speed is measured with the Cassette Service Set 4822 395 30052.

- Play back the 50-Hz side of the test cassette. Compare the 50-Hz frequency of the test cassette with the mains frequency.
- If the tape speed is too low, first check that the pressure roller, the winding friction wheel, the flywheel, etc. run smoothly.
- If necessary, readjust the speed with R842. To this end, the lower cabinet should be removed.

**Note:**

The tape speed may also be checked with a test cassette on which a 800-Hz signal has been modulated at intervals of 4,76 m.

Code number of cassette: 8945 600 13501.

- Play back the test cassette. Measure the time between two signals to be 98-102 seconds.

**Lubricating instructions**

Shell Alvania 2 4822 389 10001

Ball tracks of balls 95 in chassis 506

Lubricant 10 (4822 390 10003)

Contact faces of brackets 110, 111 and 507

All purpose oil 4822 390 10048

Shaft of flywheel 66

Shafts 100 and 102 of turntables

Shaft of idler wheel 99

**Vervangen van de collector 92, fig. 1**

De door Service geleverde collector dient op de montageplaat te worden gelijmd in plaats van gefelst, welke methode door de fabriek wordt toegepast (te gebruiken lijm b.v. 4822 390 30014).

**1. Instelling van de azimuth**

- Doe celluloselak (4822 389 20004) op de schroef voor de azimuthinstelling, voordat de recorder wordt ingekast.
- Monteer de recorder in de kast.
- Leg een testkassette (6300 Hz) - 8945 600 13501 in het apparaat.
- Sluit een elektronische voltmeter aan op punt 1 .
- Regel af op maximum uitgangsspanning met behulp van de schroef, die bereikbaar is door een gat in het front, in de kassetteruimte (fig. 5).
- Gebruik het apparaat het eerste uur niet.

**2. Instelling van de koppenbeugel 96, fig. 1 en 2****3. Instelling van beugel 507, fig. 1**

De lip van beugel 507 drukt in de stand snel vooruitspoelen tegen beugel 105 waardoor tussenwiel 109 moet vrijkomen van spoelwiel 102.

In de stand stop moet deze lip echter iets vrijkomen van beugel 105.

Instelling geschiedt door de lip te verbuigen.



- Enlever toute la graisse des surfaces de glissement du volant, entre les rondelles, de la friction et des plateaux à bobine.
- Si l'on n'obtient pas encore les indications requises, il faudra remplacer la friction d'enroulement. A ce propos, voir "Instructions pour la réparation".

#### Remarque:

La friction pourra aussi être vérifiée en mesurant le courant absorbé.

- Brancher le magnétophone sur une source d'alimentation externe de 9 V à travers un ampèremètre.
- Positionner le magnétophone sur "reproduction" et lire le courant absorbé.
- Bloquer le plateau tournant et lire la hausse de courant. Celle-ci doit se situer entre 10 et 12 mA.

#### 7. Contrôle de l'avance rapide

Placer l'appareil (sans cassette) dans la position avance rapide, ou rebobinage rapide (alimentation secteur). Lorsque le plateau à bobine qui tourne est bloqué, l'augmentation de courant mesurée doit être de 120 mA au moins; la mesure se fait de la façon indiquée sous contrôle 6.

Si cette valeur n'est pas atteinte, dégraisser les surfaces de roulement des pignons intermédiaires et des poulies en enduisant un peu d'alcool. Si nécessaire, renouveler la corde 54.

#### 8. Contrôle de la vitesse de défilement de bande

La vitesse est contrôlable avec le "Cassette Service Set" no de code 4822 395 30052.

- Faire passer le côté 50 Hz de la cassette d'essai. Les 50 Hz de la cassette d'essai sont comparés à la fréquence secteur.
- Si la vitesse de défilement est trop basse, il faudra d'abord vérifier si la course du galet presseur, de la friction d'enroulement et du volant se font sans entrave.
- Par la suite, la vitesse pourra être ajustée avec R842. La partie inférieure du boîtier doit être enlevée à cet effet.

#### Remarque:

La vitesse de défilement peut aussi être contrôlée avec une cassette d'essai comportant un signal modulé de 800 Hz tous les 4,76 m (8945 600 13501)

- Faire passer la cassette. L'intervalle entre deux signaux, doit se situer entre 98 et 102 sec.

#### Instructions pour lubrification

Shell Alvania 2 4822 389 10001

Cages à billes avec billes 95 dans le châssis 506.

Lubrifiant 10 (4822 390 10003)

Surfaces de glissement d'étriers 110, 111, 507

All Purpose Oil 4822 390 10048

Axe de volant 66

Axes 100 et 102 des plateaux à bobine

Axe du pignon intermédiaire 99



#### REPARATURHINWEISE (RECORDER)

#### Auswechseln des Kollektors 92, Abb. 1

Der vom Service gelieferte Kollektor ist auf die Montageplatte zu leimen (mit z.B. Leim 4822 390 30014) und nicht zu fälzen; diese Methode wird in der Fabrik angewandt.

#### 1. Azimuteinstellung

- Tröpfel Zelluloselack (4822 389 20004) auf die Azimuteinstellschraube, bevor der Recorder eingebaut wird.
- Montiere den Recorder ins Gehäuse.
- Lege eine Testcassette (6300 Hz) - 8945 600 13501 in das Gerät.

- Schliesse ein elektronisches Voltmeter an 1 an.
- Justiere mit der Schraube, die an der Vorderseite im Cassettenraum zugänglich ist, auf maximale Ausgangsspannung (Abb. 5).
- Benutze das Gerät während der ersten Stunde nicht.

#### 2. Einstellen des Kopfbügels 96, Abb. 1 und 2

#### 3. Einstellen von Bügel 507, Abb. 1

Die Zunge von Bügel 507 drückt in Stellung "schneller Vorlauf" gegen Bügel 105, wodurch Zwischenrad 109 vom Antriebsrad 102 freikommen muss.

In Stellung "Stop" muss diese Zunge jedoch etwas von Bügel freikommen.

Einstellen erfolgt durch Verbiegen der Zunge. Kontrolle: Wenn das Schwungrad in Stellung "Stop" (keine Cassette im Gerät) von Hand in normaler Richtung gedreht wird, müssen sich die zwei Mitnehmer 91 ebenfalls drehen.

Da sich die Mitnehmer 91 in entgegengesetzter Richtung drehen, erhält man die erforderliche Bremskraft.

#### 4. Einstellen des Schwungradbügels 503, Abb. 3

#### 5. Einstellen der Andruckkraft von Andruckrolle 76, Abb. 4

Wenn sich die Andruckrolle etwas von der Tonachse hebt, muss die Zugkraft 400...460 g betragen. Einstellen erfolgt mit Zunge A.

#### 6. Überprüfen der Aufwickelfriction 81, Abb. 1

Für diese Überprüfung wird die Friktionsmesscassette ("Cassette Torque Meter"). Abb. 6 Kodenummer 4822 395 30054, verwendet.

- Die friktionsmesscassette in das Gerät einlegen und den Recorder in die Stellung "Wiedergabe" bringen.
- Die Cassette muss folgende Werte angeben:  
Rechter Spulenteller 30-60 gcm  
Linker Spulenteller 3-8 gcm  
Die Werte sollten so konstant wie möglich sein.
- Falls die genannten Werte nicht angezeigt werden, muss das Gerät demontiert werden.
- Die Riemen, die Laufflächen des Schwungrades, die Zwischenräder, die Friktion und Spulenteller fettfrei machen.
- Wenn die genannten Werte noch nicht angezeigt werden, muss die Aufwickelfriction ersetzt werden. Siehe hierzu "Reparaturanleitungen".

#### Anmerkung:

Die Friktion kann kontrolliert werden, indem man den aufgenommenen Strom misst.

- Das Gerät über einen Strommesser an eine externe Speiseeinheit von 9 V anschliessen.
- Den Recorder in die Stellung "Wiedergabe" bringen und den aufgenommenen Strom ablesen.
- Den drehenden Spulenteller blockieren und die Stromzunahme ablesen. Diese muss 10 bis 12 mA betragen.

#### 7. Kontrolle des Schnelllaufs

Schalte das Gerät (ohne Cassette, bei Netzspeisung) in Stellung "Schnellauf".

Wenn man den drehenden Spulenteller blockiert, muss man eine Stromzunahme von wenigstens 120 mA messen. (Miss auf die unter 6 beschriebene Weise). Wird dieser Wert nicht erreicht, müssen die Laufflächen der Zwischen- und der Seilräder mit Alkohol gereinigt werden. Erneuere nötigenfalls Seil 54.

#### 8. Kontrolle der Bandgeschwindigkeit

Die Bandgeschwindigkeit wird mit dem "Cassette Service Set", Kodenummer 4822 395 30052, überprüft.

- Die 50 Hz-Seite der Testcassette abspielen. Die 50 Hz der Testcassette wird mit der Netzfrequenz verglichen.

Controle: Als in de stand stop "zonder cassette in het apparaat" het vliegwiel met de hand in de normale draairichting wordt gedraaid moeten de beide meeners (91) meedraaien.

Doordat de meeners (91) in tegengestelde richting draaien wordt hiermee de benodigde remwerking verkregen.

#### 4. Instelling vliegwielbeugel 503, fig. 3

5. Instelling aandrukkracht van de drukrol 76, fig. 4  
Wanneer drukrol juist vrijkomt van de toonas, moet de trekkracht 400-460 gram bedragen. Instelling geschiedt d.m.v. lip A.

6. Controle van de opspoelfrictie koppeling 81, Fig. 1  
Voor deze controle wordt de friktiemeetcassette ("Cassette Torque Meter"), Fig. 6 codenummer 4822 395 30054, gebruikt.

- Leg de friktiemeetcassette in het apparaat en zet de recorder in stand weergave.
- De cassette moet de volgende aanwijzingen geven:  
Rechter spoelschotel 30-60 grcm.  
Linker spoelschotel 3-8 grcm.  
De aanwijzing van de meter moet zo konstant mogelijk zijn.
- Indien bovengenoemde aanwijzingen niet worden verkregen moet het apparaat uitgekast worden.
- Maak de snaren en loopvlakken van vliegwiel, tussenwielen, friktie en spoelschotels vetvrij.
- Wanneer de bovenstaande aanwijzingen nog niet worden verkregen, moet de opspoelfrictie vervangen worden. Zie hiervoor "Reparatie-aanwijzingen".

Opmerking:

- De friktie kan ook gecontroleerd worden door de opgenomen stroom te meten.
- Sluit het apparaat aan op een uitwendige voedingsbron van 9 V via een Ampèremeter.
- Zet de recorder in stand weergave en lees de opgenomen stroom af.
- Blokkeer de draaiende spoelschotel en lees de stroomtoename af. Deze moet 10 tot 12 mA zijn.

#### 7. Controle snelspoelen

Schakel het apparaat (zonder cassette, bij gebruik van netvoeding) in de stand snel vooruit ofwel snel terugspoelen.

Bij blokkeren van de draaiende spoelschotel moet men een stroomtoename meten van minstens 120 mA; gemeten op identieke wijze als bij controle nr. 6 beschreven. Indien deze waarde niet wordt bereikt, moeten de loopvlakken van tussenwielen en snaarwielen met alcohol vetvrij worden gemaakt. Eventueel moet de snaar 54 worden vernieuwd.

#### 8. Controle van de bandsnelheid

De snelheid wordt gecontroleerd met de "Cassette Service Set" codenummer 4822 395 30052.

- Speel de 50 Hz-zijde van de testcassette af. De 50 Hz van de testcassette wordt vergeleken met de netfrequentie.
- Indien de bandsnelheid te laag is moet eerst gecontroleerd worden of drukrol, opspoelfrictie, vliegwiel enz. niet te zwaar lopen.
- Daarna kan de snelheid bijgesteld worden met R842. Hiervoor moet de onderkast verwijderd worden.

Opmerking:

- De bandsnelheid kan ook gecontroleerd worden met een testcassette waarop om de 4,76 m een signaal van 800 Hz gemoduleerd is. Codenummer 8945 600 13501.
- Speel de testcassette af. De tijd tussen 2 signalen moet tussen 98 en 102 sec. liggen.

#### Smeervoorschrift

Shell Alvania 2 4822 389 10001  
Kogelbanen van kogels 95 in chassis 506

Smeermiddel 10 (4822 390 10003)  
Glijvlakken van beugels 110, 111, 507

All purpose oil 4822 390 10048

As van vliegwiel 66

Assen 100 en 102 van spoelschotels

As van tussenwiel 99



#### INSTRUCTIONS POUR REPARATION (RECORDER)

##### Remplacement du collecteur 92, fig. 1

Le collecteur fourni par le Département Service doit être collé sur la plaque de montage et non riveté; la méthode de rivetage s'applique à l'usine (colle à utiliser, 4822 390 30014, par exemple).

##### 1. Réglage de l'azimut

- Appliquer de la laque cellulosique (4822 389 20004) sur la vis de réglage de l'azimut avant de monter le magnétophone.
- Placer le magnétophone dans le boîtier.
- Poser une cassette d'essai (6300 Hz) - 8945 600 13501 dans l'appareil.
- Relier un voltmètre électronique sur 1.
- Régler à la tension de sortie maximum à l'aide de la vis à l'avant du boîtier, accessible du compartiment de cassette (fig. 5).
- Ne pas utiliser l'appareil pendant une heure.

##### 2. Réglage de l'étrier des têtes 96, fig. 1 et 2

##### 3. Réglage de l'étrier 507, fig. 1

La patte de l'étrier 507 en position "avance rapide" touche l'étrier 105 de sorte que le pignon intermédiaire 109 doit se dégager de la poulie 102. En position arrêt, cette patte doit se dégager légèrement de l'étrier 105.

Le réglage se fait en courbant la patte.

Contrôle: Si, dans la position arrêt (appareil sans cassette), le volant est tourné à main dans le sens de rotation normal, les deux pièces d'entraînement 91 doivent également tourner.

Comme le sens de rotation des deux pièces d'entraînement 91 est opposé l'un à l'autre l'effet de freinage nécessaire est obtenu.

##### 4. Réglage de l'étrier de volant 503, fig. 3

5. Réglage de la force de pression du galet presseur 76, fig. 4. Lorsque le galet presseur se dégage tout juste du cabestan, la force de traction doit être comprise entre 400 et 460 g. Le réglage se fait par la patte A.

##### 6. Contrôle de la friction d'emboîtement 81, fig. 1

- On procédera à cette vérification avec la cassette "Torque Meter", Fig. 6, no de code 4822 395 30054.
- Placer la cassette dans l'appareil et positionner l'appareil sur "reproduction".
- La cassette doit donner les indications suivantes:  
plateau à bobine de droite 30-60 grcm  
plateau à bobine de gauche 3-8 grcm  
L'affichage du mètre doit rester aussi constant que possible.
- Si l'on n'obtient pas les indications ci-dessus, extraire l'appareil du boîtier.

**Replacing the collector 92, Fig. 1**

The collectors supplied by Concern Service must be glued to the mounting plates (in the set delivered by the factory, the collectors are riveted to the mounting plates). Glue to be used: for example 4822 390 30014.

**1. Azimuth alignment**

- Put some cellulose lacquer 4822 389 20005 on the azimuth screw before mounting the recorder in the cabinet.
- Mount the recorder in the cabinet.
- Insert a test cassette (6300 Hz) - 8945 600 13501 into the recorder.
- Connect an electronic voltmeter to 1 .
- Adjust for maximum output voltage by means of the screw which can be reached through a hole in the front, in the cassette compartment (Fig. 5).
- Do not use the recorder for the next hour.

**2. Adjusting the head bracket 96, Figs. 1 and 2****3. Adjusting the bracket 507, Fig. 1**

In position "fast forward winding" the tag of bracket 507 is pressed against bracket 105 so that idler wheel 109 must come clear of wheel 102.

However in position "stop" this tag must be just clear of the bracket.

Adjust the clearance between this tag and the bracket by bending the tag.

Check: When in position "stop" (without a cassette in the machine), the flywheel is turned manually in the normal direction of rotation, the two catches 91 are taken along.

The catches 91 rotate in directions opposite to each other; thus, they provide the required braking action.

**4. Adjusting the flywheel bracket 503, Fig. 3**

**5. Adjusting the force of the pressure roller 76, Fig. 4**  
When the pressure roller is just free of the capstan, the pulling force must be 400...460 g. Adjust this force by bending tag A.

**6. Checking the winding friction coupling 81, Fig. 1**  
For this check the Cassette Torque Meter, 4822 395 30054 is used (Fig. 6)

- Insert the cassette torque meter into the recorder. Set the recorder to position Playback.
- The Cassette Torque Meter should give the following indications: Right-hand reel disc 30-60 g-cm  
Left-hand reel disc 3-8 g-cm
- The meter reading should be as constant as possible.
- If the aforementioned values are not measured, the chassis must be removed.
- Degrease the belts and running surfaces of the flywheel, the idler wheels, the friction wheel and the reel discs.
- If the aforementioned values are still not measured, the winding friction wheel must be replaced. (See "Repair hints").

**Note:**

The friction wheel may also be checked by a measurement of the current taken from the external power supply.

- Connect the recorder to an external power supply of 9 V via a current meter.
  - Set the recorder to position "Playback" and read the amount of current taken from the power supply.
  - Block the rotating reel disc and read the increase in current.
- This should be 10-12 mA.

7. When operated from mains voltage, the recorder must be set (without cassette) to position "fast forward winding" or "fast rewinding". Block the rotating reel disc; then a current increase of at least 120 mA must be measured. The manner of measuring is identical to that described in para 6. If the value of 120 mA is not reached, the running surfaces of idler wheels and pulleys must be greased with alcohol. If necessary, cord 54 must be replaced.

**8. Checking the speed**

The tape speed is measured with the Cassette Service Set 4822 395 30052.

- Play back the 50-Hz side of the test cassette. Compare the 50-Hz frequency of the test cassette with the mains frequency.
  - If the tape speed is too low, first check that the pressure roller, the winding friction wheel, the flywheel, etc. run smoothly.
  - If necessary, readjust the speed with R842.
- To this end, the lower cabinet should be removed.

**Note:**

The tape speed may also be checked with a test cassette on which a 800-Hz signal has been modulated at intervals of 4.76 m.

Code number of cassette: 8945 600 13501.

- Play back the test cassette. Measure the time between two signals to be 98-102 seconds.

**Lubricating instructions**

Shell Alvania 2 4822 389 10001

Ball tracks of balls 95 in chassis 506

Lubricant 10 (4822 390 10003)

Contact faces of brackets 110, 111 and 507

All purpose oil 4822 390 10048

Shaft of flywheel 66

Shafts 100 and 102 of turntables

Shaft of idler wheel 99

**Vervangen van de collector 92, fig. 1**

De door Service geleverde collector dient op de montageplaat te worden gelijkgesteld in plaats van gefelst, welke methode door de fabriek wordt toegepast (te gebruiken lijm b.v. 4822 390 30014).

**1. Instelling van de azimuth**

- Doe celluloselak (4822 389 20004) op de schroef voor de azimuthinstelling, voordat de recorder wordt ingekast.
- Monteer de recorder in de kast.
- Leg een testkassette (6300 Hz) - 8945 600 13501 in het apparaat.
- Sluit een elektronische voltmeter aan op punt 1 .
- Regel af op maximum uitgangsspanning met behulp van de schroef, die bereikbaar is door een gat in het front, in de kassetteruimte (fig. 5).
- Gebruik het apparaat het eerste uur niet.

**2. Instelling van de koppenbeugel 96, fig. 1 en 2****3. Instelling van beugel 507, fig. 1**

De lip van beugel 507 drukt in de stand snel vooruitspoelen tegen beugel 105 waardoor tussenwiel 109 moet vrijkomen van spiegelwiel 102.

In de stand stop moet deze lip echter iets vrijkomen van beugel 105.

Instelling geschiedt door de lip te verbuigen.

- Wenn die Bandgeschwindigkeit zu niedrig ist, muss erst überprüft werden, ob die Anpressrolle, die Aufwickelfriction, das Schwungrad usw., nicht schleifen.
- Die Bandgeschwindigkeit kann dann mit R842 nachgestellt werden. Hierzu muss der untere Gehäuseteil entfernt werden.

**Anmerkung:**

Die Bandgeschwindigkeit kann auch mit einer Testcassette kontrolliert werden, auf die jede 4,76 m ein Signal von 800 Hz moduliert ist. Kodenummer 8945 600 13501.

Die Testcassette abspielen. Die Zeitdauer zwischen zwei Signalen muss 98 bis 102 Sek. betragen.

**Schmiervorschrift**

Shell Alvania 2 4822 389 10001  
Bahnen der Kugeln (95) im Chassis (506)

Schmiermittel 10 (4822 390 10003)  
Gleitflächen der Bügel 110, 111, und 507

Allzwecköl 4822 390 10048  
Achse des Schwungrads 66  
Die Achsen 100 und 102 der Spulenteller  
Achse des Zwischenrads 99

I

**SUGGERIMENTI PER LA RIPARAZIONE (REGISTRATORE)**

**Sostituzione dell'anello 92, fig. 1**

Gli anelli forniti dal Concern Service devono essere incollati alle piastre di montaggio (negli apparecchi che escono dalla fabbrica gli anelli sono rivettati sulla piastra di montaggio).  
La colla da usare per esempio 4822 390 30014.

**1. Regolazione dell'azimut**

- Applicare la lacca cellulosa (4822 389 20004) sulla vite di regolazione dell'azimut prima di montare il registratore.
- Ponere il registratore nella cassa.
- Introdurre una cassetta campione (6300 Hz) - 8945 600 13501 nel registratore.
- Collegare un voltmetro elettronico al punto 1.
- Regolare la tensione di uscita massima per mezzo della vite sul davanti del mobile, la quale è accessibile dal fondo del vano cassetta (fig. 5).
- Non utilizzare l'apparecchio durante un ora.

**2. Regolazione della staffa della testina 96, fig. 1 e 2**

**3. Regolazione della staffa 507, fig. 1**

In pos. "avvolgimento veloce" la linguetta della staffa è premuta contro la staffa 105 così che la ruota oziosa 109 che deve essere libera dalla ruota 102. Comunque in pos. "stop" questa linguetta deve essere opportunamente liberata dalla staffa.  
Regolare il gioco tra questa linguetta e la staffa curvando la linguetta.

Verifica: Quando in pos. "stop" (senza una cassetta nell'apparecchio) il volano è ruotato manualmente nella direzione normale di rotazione, i due fermi vengono portati in avanti.

I fermi girano in direzione opposta l'uno con l'altro; in questo modo essi forniscono l'azione di frenaggio richiesta.

**4. Regolazione della staffa del volano 503, fig. 3.**

**5. Regolazione della forza del rullo preminastro 76, fig. 4**

Quando il rullo preminastro è opportunamente libero dal capstan, la forza di trazione deve essere 400...460 grammi.

Regolare questa forza curvando la linguetta A.

**6. Controllo della trazione della frizione di avvolgimento 81, fig. 1**

Si procederà a questo controllo usando la cassetta campione numero di codice 4822 395 30054.

- Inserire la cassetta campione nell'apparecchio e metterlo in posizione "riproduzione".
- La cassetta deve dare le seguenti indicazioni:  
piatto portabobina di destra 30-60 grcm  
piatto portabobina di sinistra 3-8 grcm  
L'indicazione deve rimanere il più possibile costante.
- Se non si ottengono le indicazioni sopra riportate, togliere l'apparecchio dal mobile.
- Pulire tutte le superfici di slittamento del volano, tra cui le rondelle frizione e dei piatti portabobine.
- Se non si ottengono ancora le indicazioni richieste, bisognerà sostituire la frizione d'avvolgimento. A questo proposito vedere "Istruzioni per la riparazione".

**Osservazione:**

La frizione può anche essere controllata misurando la corrente assorbita.

- Collegare il registratore ad un alimentatore esterno di 9 V ponendo un amperometro in serie.
- Mettere il registratore in posizione "riproduzione" e leggere sull'amperometro la corrente assorbita.
- Bloccare il piatto che gira e leggere l'aumento di corrente ottenuta.  
Questo deve essere compreso tra 10 e 12 mA.

7. Quando funziona a tensione di rete, il registratore deve essere posto in pos. "avvolgimento veloce" o "riavvolgimento veloce" (senza cassetta).  
Bloccando la rotazione del disco portabobina si deve misurare un incremento minimo di corrente pari a 120 mA. Il metodo di misura è uguale a quello descritto al paragrafo 6. Se ciò non avviene le superfici di contatto delle pulegge devono essere pulite con alcool. Se necessario sostituire l'anello 54.

**8. Controllo della velocità**

- La velocità può essere controllata con il "Cassette Service Set" numero di codice 4822 395 30052.
- Inserire la cassetta campione 50 Hz e mettere il registratore in posizione riproduzione. I 50 Hz della cassetta campione sono comparati alla frequenza d'alimentazione.
- Se la velocità di avanzamento è troppo bassa, bisognerà prima controllare se il movimento del rullo preminastro, della frizione d'avvolgimento, del volano è privo di attriti.
- Fatto ciò, la velocità potrà essere regolata con R842. Si può accedere a questo potenziometro togliendo la parte posteriore del mobile.

**Osservazione:**

La velocità di avanzamento può essere controllata anche con la cassetta campione avente un segnale modulato di 800 Hz ad intervalli di 4,76 m numero di codice 8945 600 13501

- Inserire la cassetta campione e mettere il registratore in posizione "riproduzione". L'intervallo tra due segnali deve essere compreso tra 98 e 102 sec.

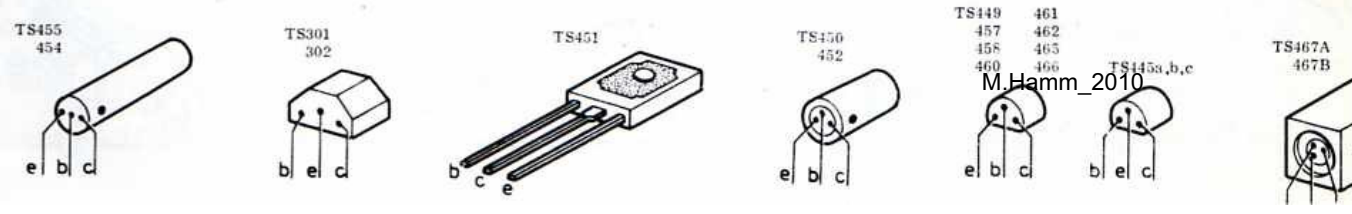
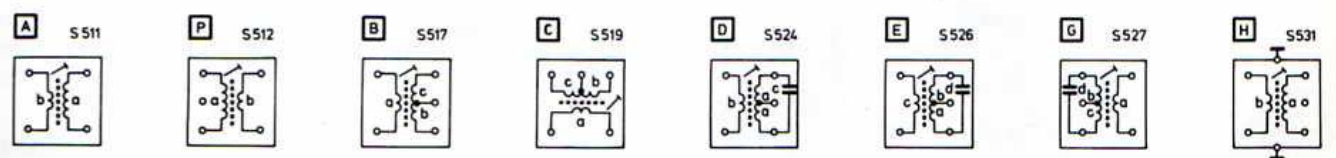
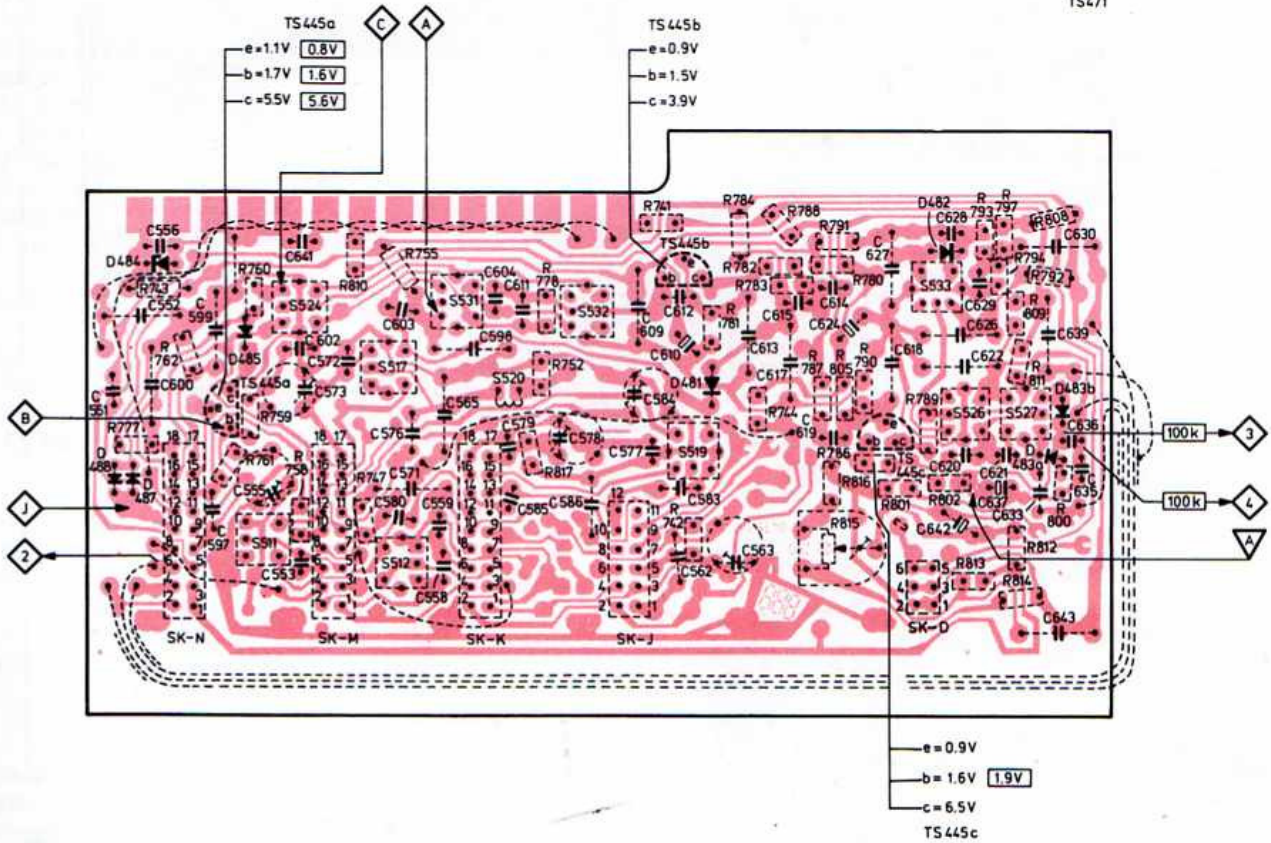
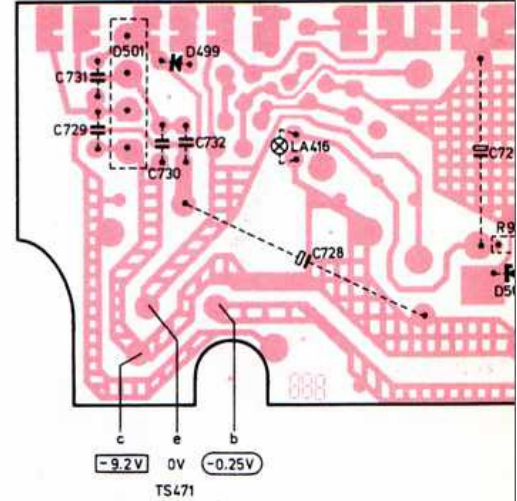
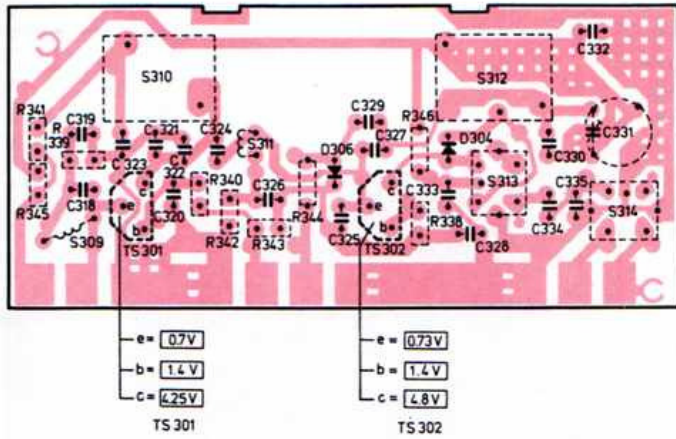
**Istruzioni per la lubrificazione**

Shell Alvania 2 4822 389 10001  
Sfera, sedi della sfere 95 sulla piastra 506

Lubrificante 10 (4822 390 10003)  
Superfici di contatto delle staffe 110, 111 e 507

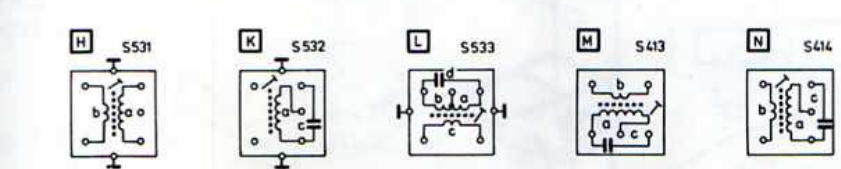
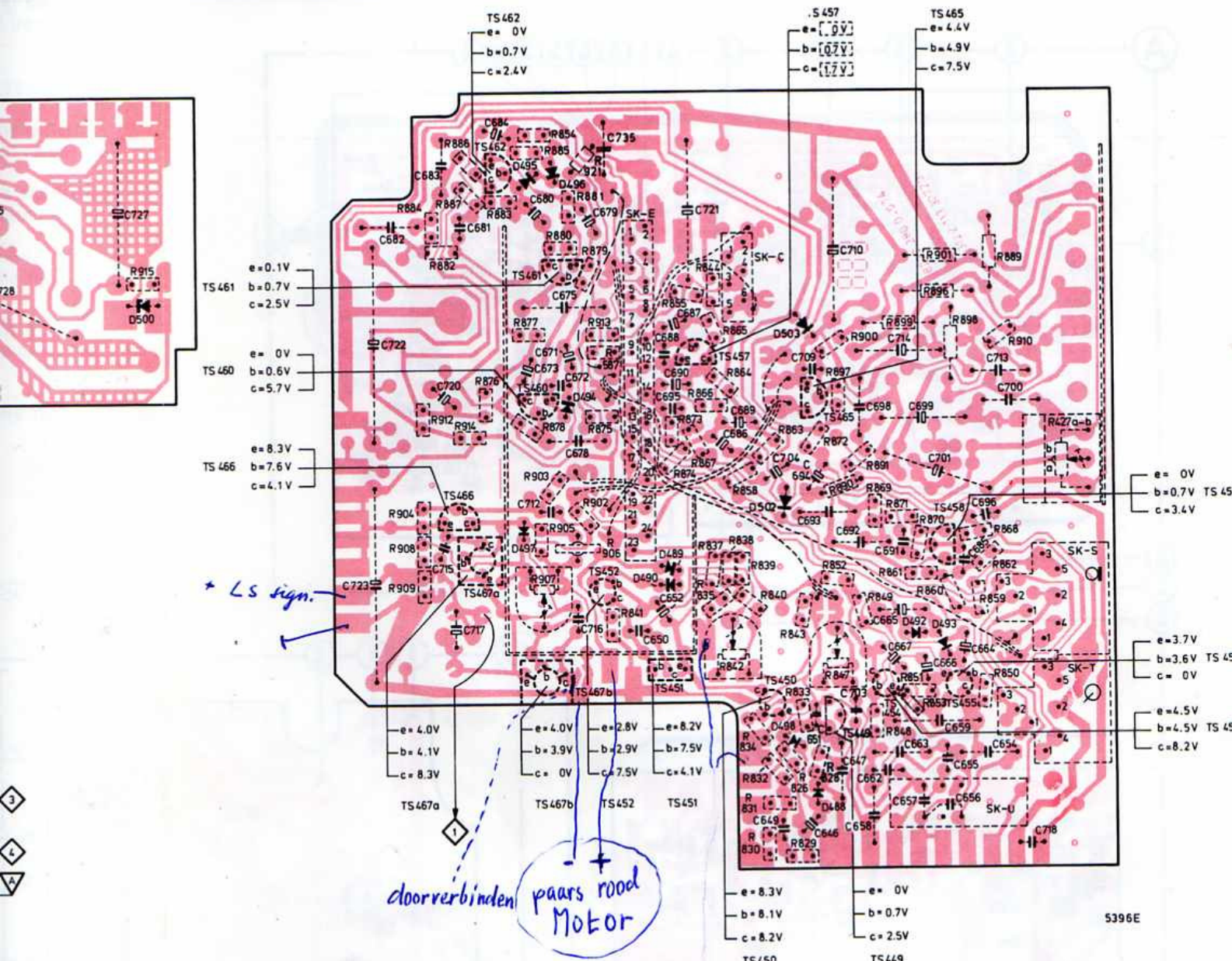
Lubrificante universale 4822 390 10048  
Albero del volano 66  
Alberi 100 e 102 del portabobine  
Albero della ruota folle 99

MISC	D488, D487, TS445a, TS301, S310, S524, S311, D306, TS302, D304, S312, S313, TS445b, S314, TS 445c, D482, D483a, D501, D499, LA416, SK-D 5533, S526, S527, D483b.
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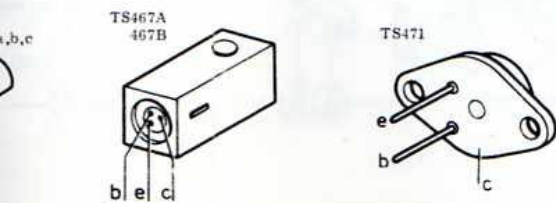
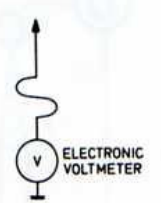


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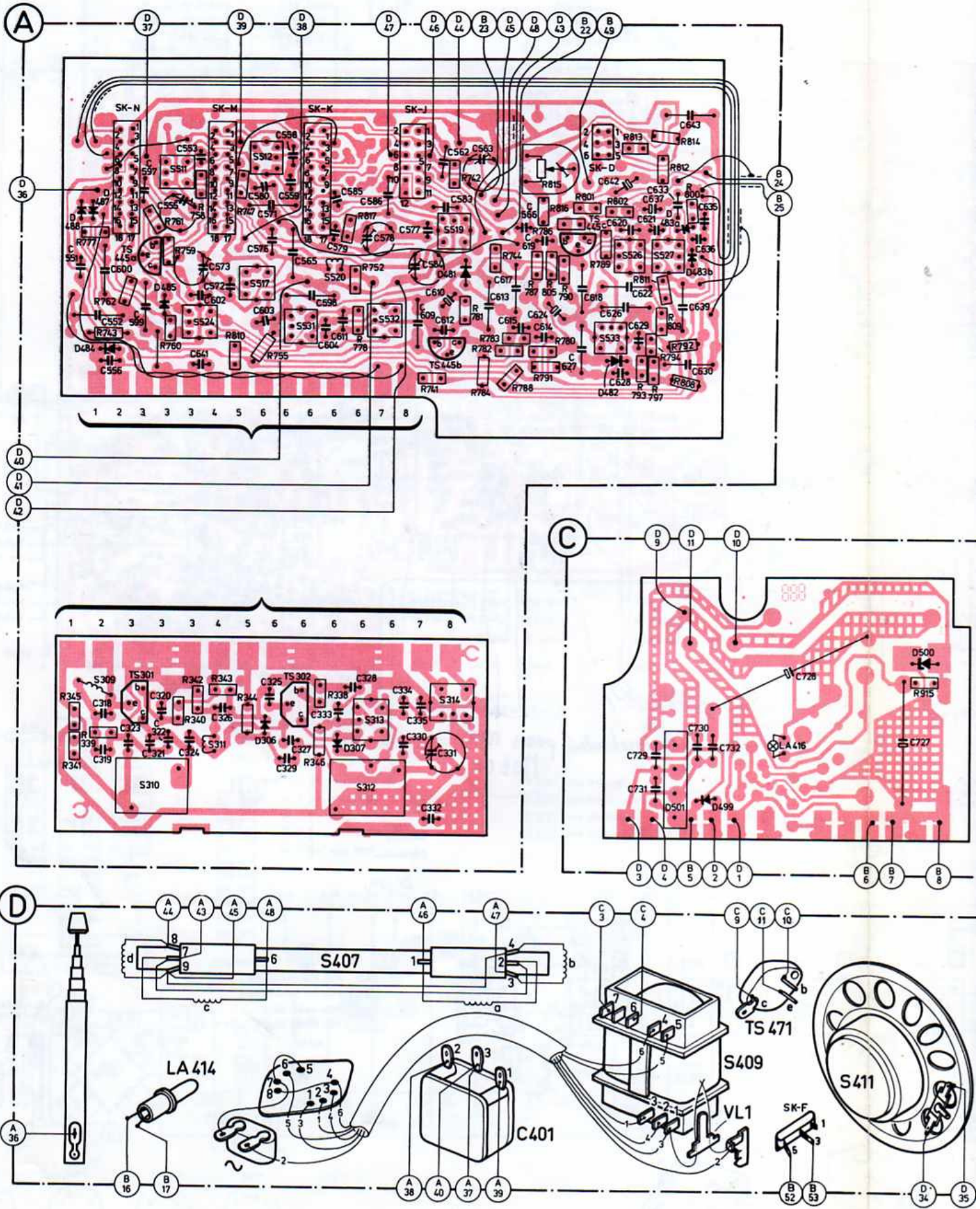
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		723.	717. 715. 720.	675. 716. 650. 652. 693. 658. 649. 646. 647. 703. 648. 663. 657. 655. 656. 654. 718.
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			904. 908. 909. 912. 883. 876.	877. 878. 906. 902. 875. 874. 873. 867. 835. 837. 838. 840. 832. 833. 829. 847. 910.
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0.82V POS. M.W. RECORDING } WITHOUT SIGNAL  
 0.82V POS. F.M. RECORDING }  
 0.82V POS. PLAY-BACK }  
 0.82V POS. MAINS SUPPLY 220V~

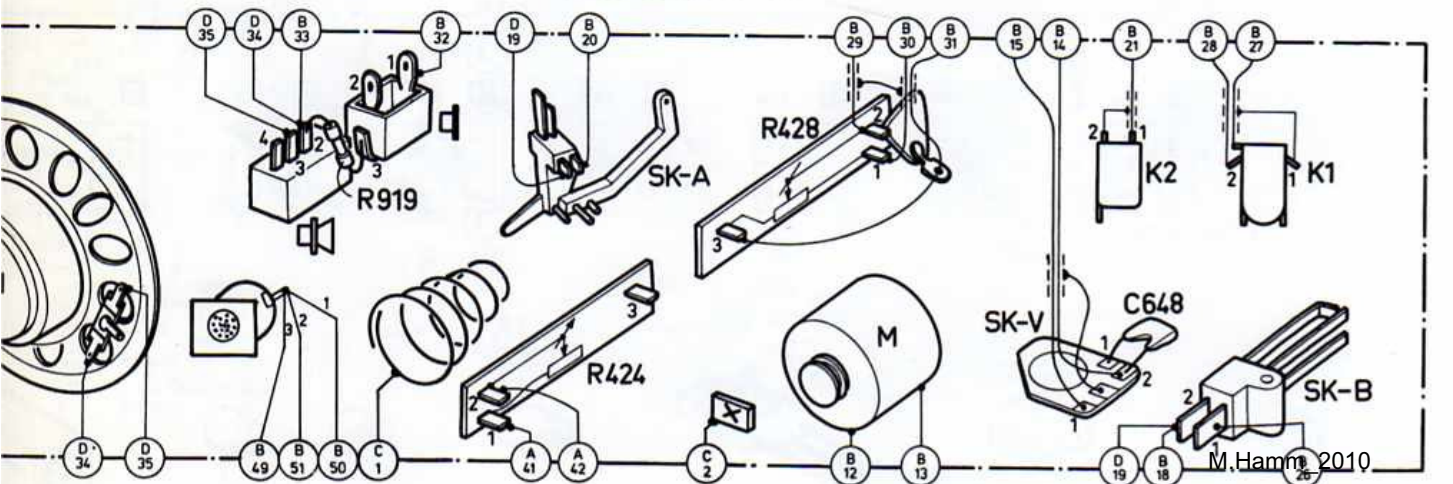
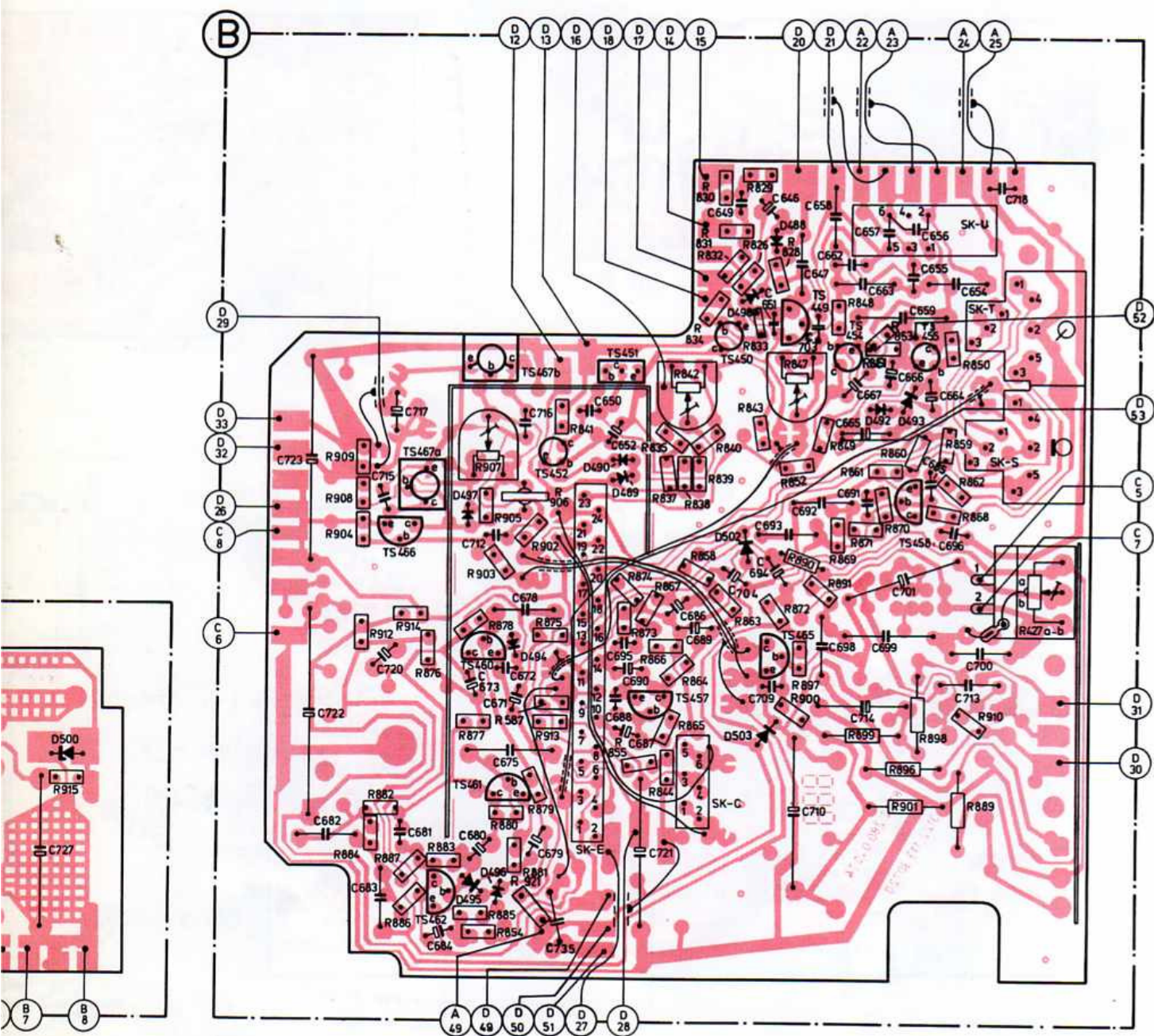


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

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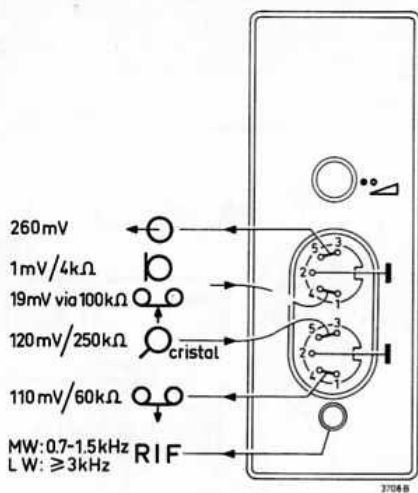


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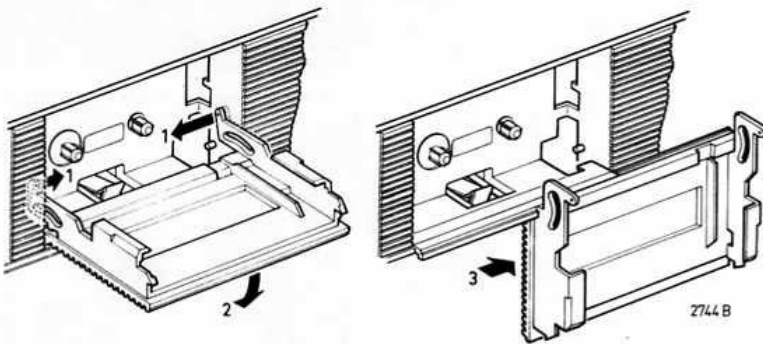


-S- 	-C- 
<p>abcd</p> <p>S407a-d ferroceptor 4822 158 60344  S409a-d transformer 4822 145 30135  S411 LS - 8 Ω 4822 240 40054  S511a-c 4822 156 30472  S512 26-741 4822 156 40592  S517a-c 28-612 4822 156 30473  S519a-c 4822 156 30424  S520 4822 157 50629  S524a-c 20-220 4822 153 50102  S526a-d 20-210 4822 153 50108  S527a-d 20-220 4822 153 50102  S531a,b 319- 4822 156 40597  S532a-c 24-- 4822 153 10081  S533a-d 07-- 4822 153 10101</p>	<p>C556,641 10 nF 4822 122 30043  C558 62 pF, 1 % 4822 121 50558  C562 130 pF, 1 % 4822 121 50533  C563,573,584, 20 pF, trimmer 4822 125 50029  555  C578 10 pF, trimmer 4822 125 50026  C580,672,696 4.7 nF, 10 % 4822 122 30129  C585 470 pF, 1 % 4822 121 50553  C586 390 pF, 1 % 4822 121 50418  C603,611 3 nF, 2 % 4822 121 50414  C614 10 nF 4822 122 30043  C628,629,576 3.9 nF 4822 122 30098  C633 180 pF, 10 % 4822 122 31172  C635,636 1.5 nF 4822 122 31169  C649 220 pF, 10 % 4822 122 30094  C680,684 6.8 uF, 63 V 4822 124 20606  C681,718 560 pF, 10 % 4822 122 31166  C685,655 1.2 nF, 10 % 4822 122 31171  C688 330 pF, 10 % 4822 122 31165  C691 3.3 nF, 10 % 4822 122 30099  C695 1.8 nF, 10 % 4822 122 31164  C699,659 390 nF, 10 % 4822 121 40207  C703 680 pF, 10 % 4822 122 31178  C709,715,716, 1 nF 4822 122 30027  615,616  C712 270 pF, 10 % 4822 122 31168  C729-732 1 nF 4822 122 30027</p>
<p>-TS- </p> <p>TS445A BF495C } 40835  TS445B BF494B }  TS445C BF495D } 4822 130 40949  TS449 BC548C 5322 130 44196  TS450 AC188 5322 130 40456  TS451 BD136 5322 130 40712  TS452 AC127 5322 130 40096  TS454 AC187 5322 130 40314  TS455 AC188 5322 130 40456  TS457,458,460 BC549B 4822 130 40936  TS461 BC548A 4822 130 40948  TS462 BC548B 4822 130 40937  TS465 BC549B 4822 130 40936  TS466 BC558A 4822 130 40962  TS467a,b pair AC187/01, 188/01 5322 130 40319  TS471 AD162 5322 130 40213</p>	<p>-R- </p> <p>R424 2.5 kΩ, potm. log. 4822 105 10119  R427a,b-SKR 17 kΩ/5 kΩ 4822 101 50167  R428 2.5 kΩ lin. 4822 105 10118  R815 470 Ω, potm. 4822 100 10038  R816 1.5 V, VDR 4822 116 20094  R842 220 Ω, potm. 4822 100 10019  R847 22 kΩ 4822 100 10051  R878 3.3 MΩ 4822 110 63201  R906 130 Ω, NTC 4822 116 30016  R907 220 Ω, potm. 4822 100 10019</p>
<p>-D- </p> <p>D497,502,503  D482,485,488, 408 BA216 (BAW62) 5322 130 30702  D483a,b pair 2xAA119 4822 130 30312  D484 BZX79/C5V1 5322 130 30767  D486,487,489, 494 BA220 5322 130 34221  D492,493 BA315 4822 130 30843  D490 AAZ17 5322 130 30283  D495,496,481 AA119 5322 130 40229  D499 BA148 4822 130 30839  D500 BZX79/C9V1 5322 130 30667  D501 BY164 5322 130 30414</p>	<p>-Miscellaneous-</p> <p>VL-1 in trafo 4822 252 20007  LA414 6 V - 30 mA 4822 134 40302  LA416 28 V - 40 mA 4822 134 40127  Mains flex /00/19 4822 321 10117</p>

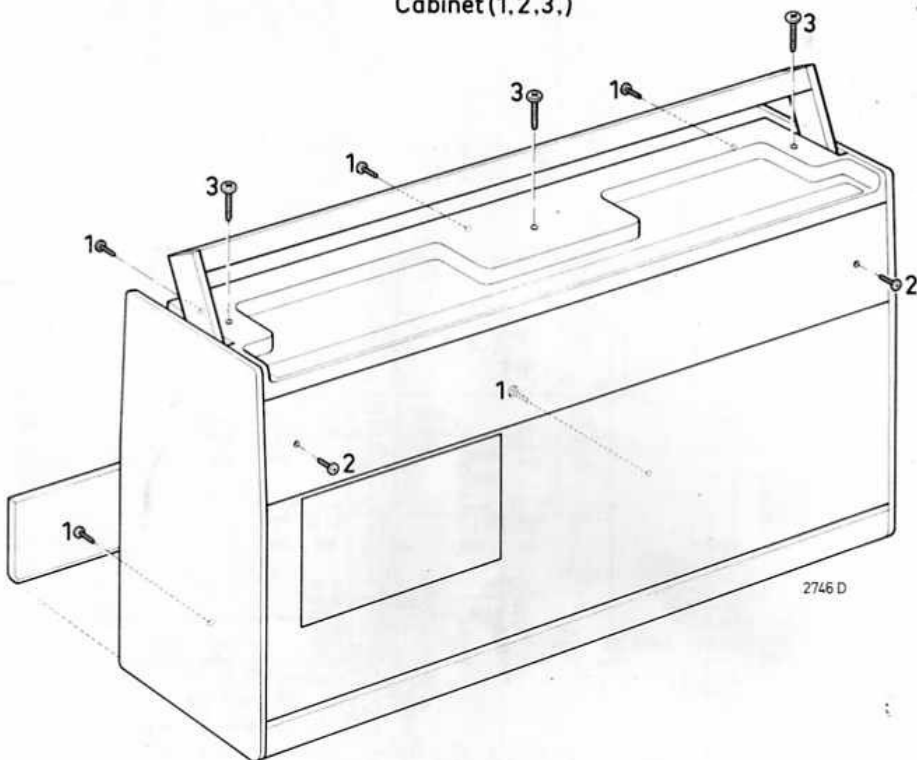
Connecting possibilities



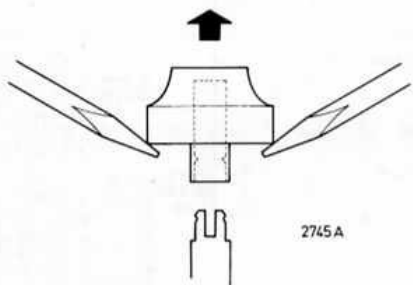
cassette envelope



Cabinet (1,2,3.)



push button

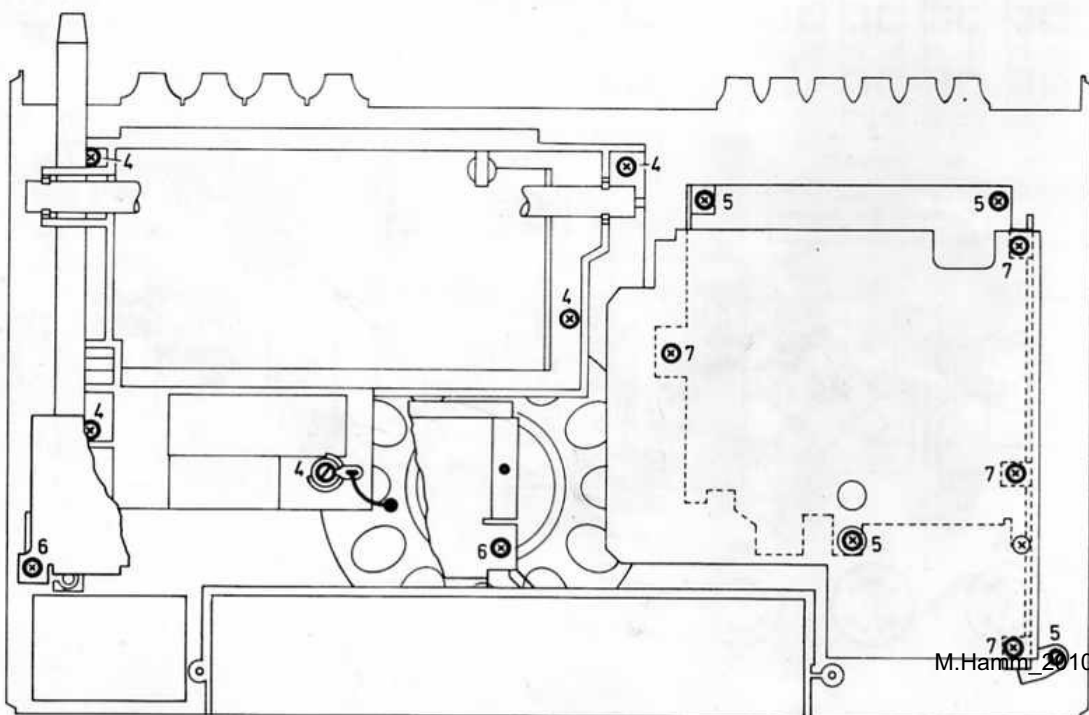


H.F. unit (4)

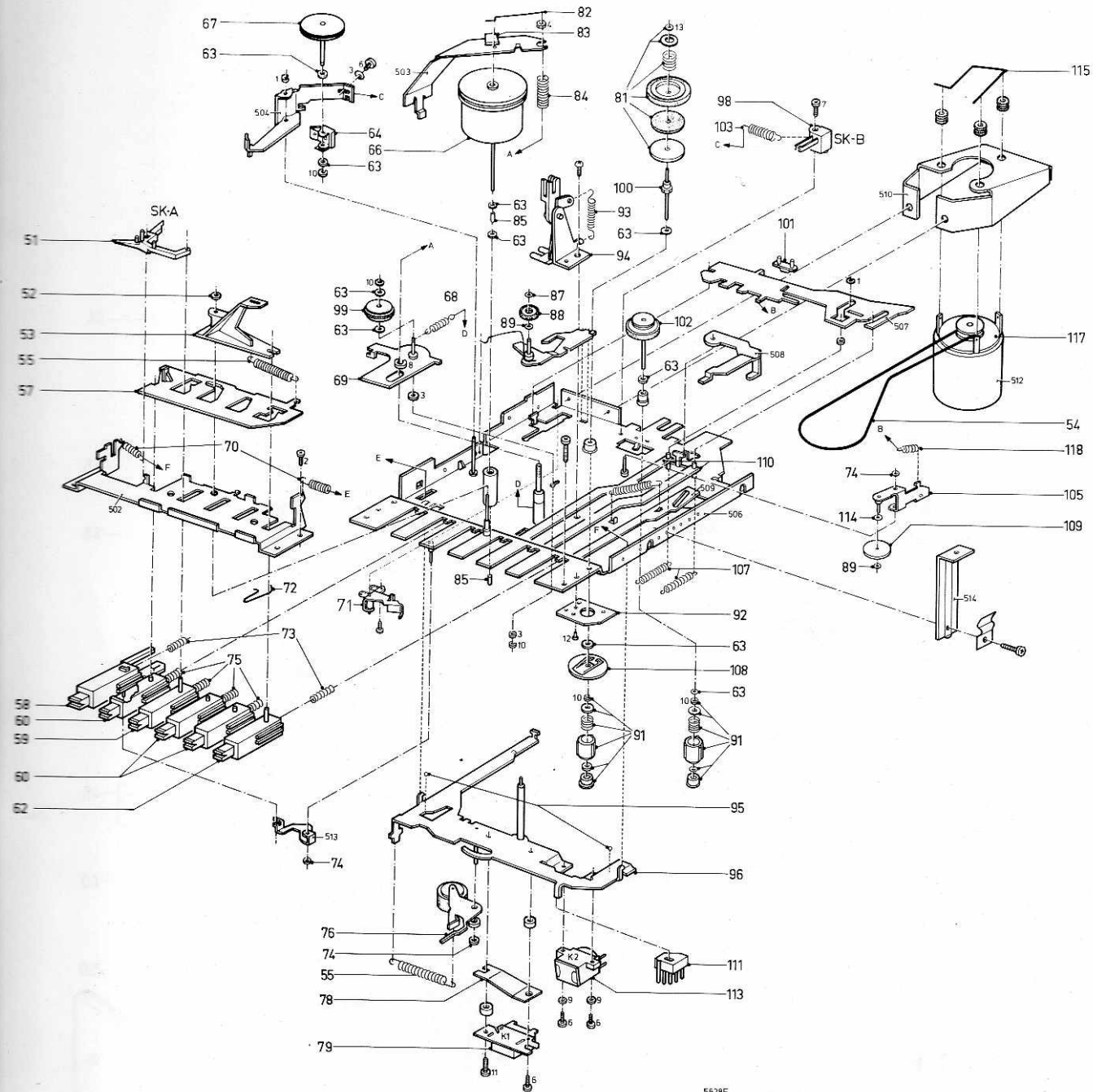
Recorder unit (5)

Supply unit (6)

L.F. panel (7)



M. Hammer 2010

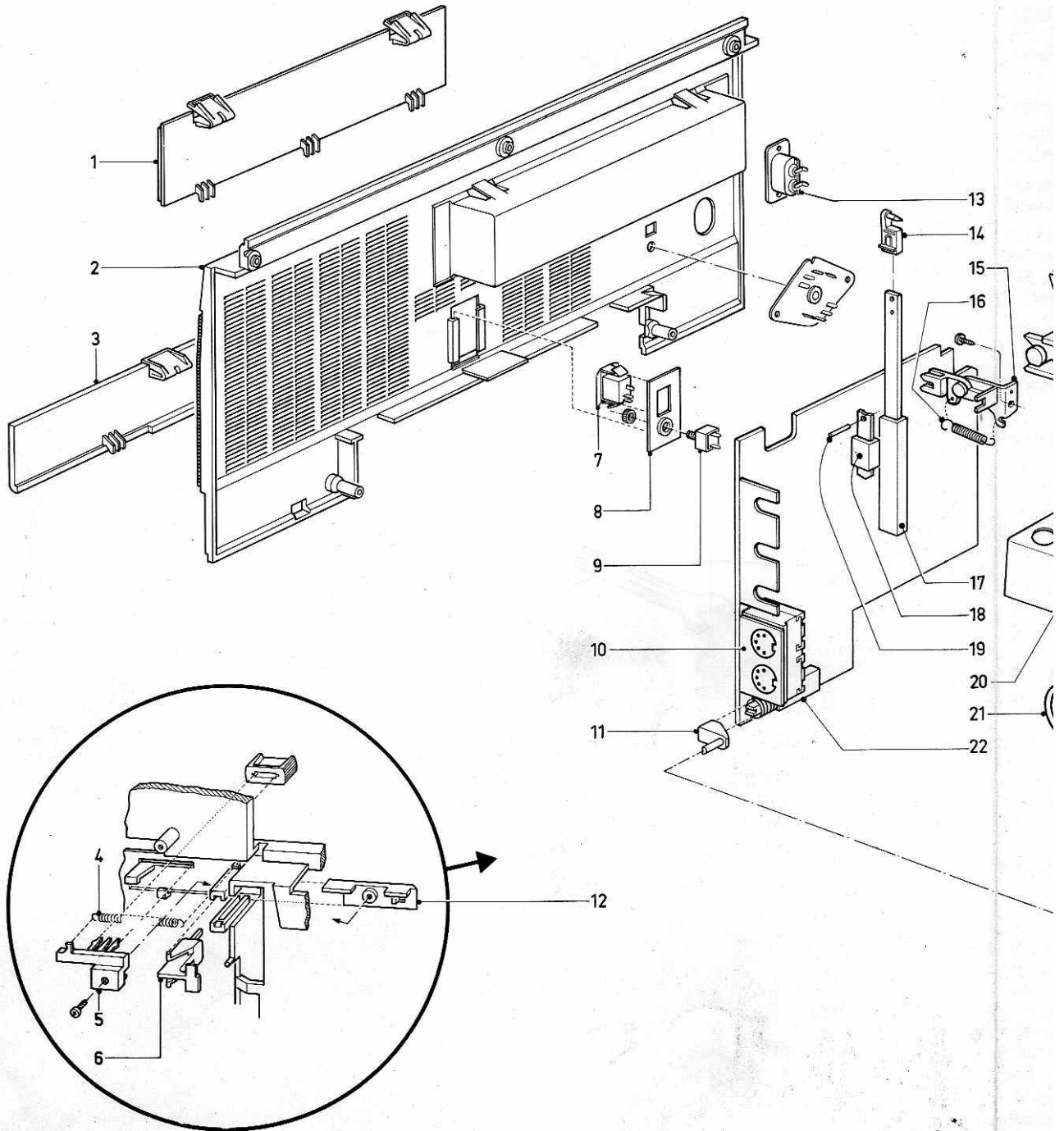


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Fig. 1

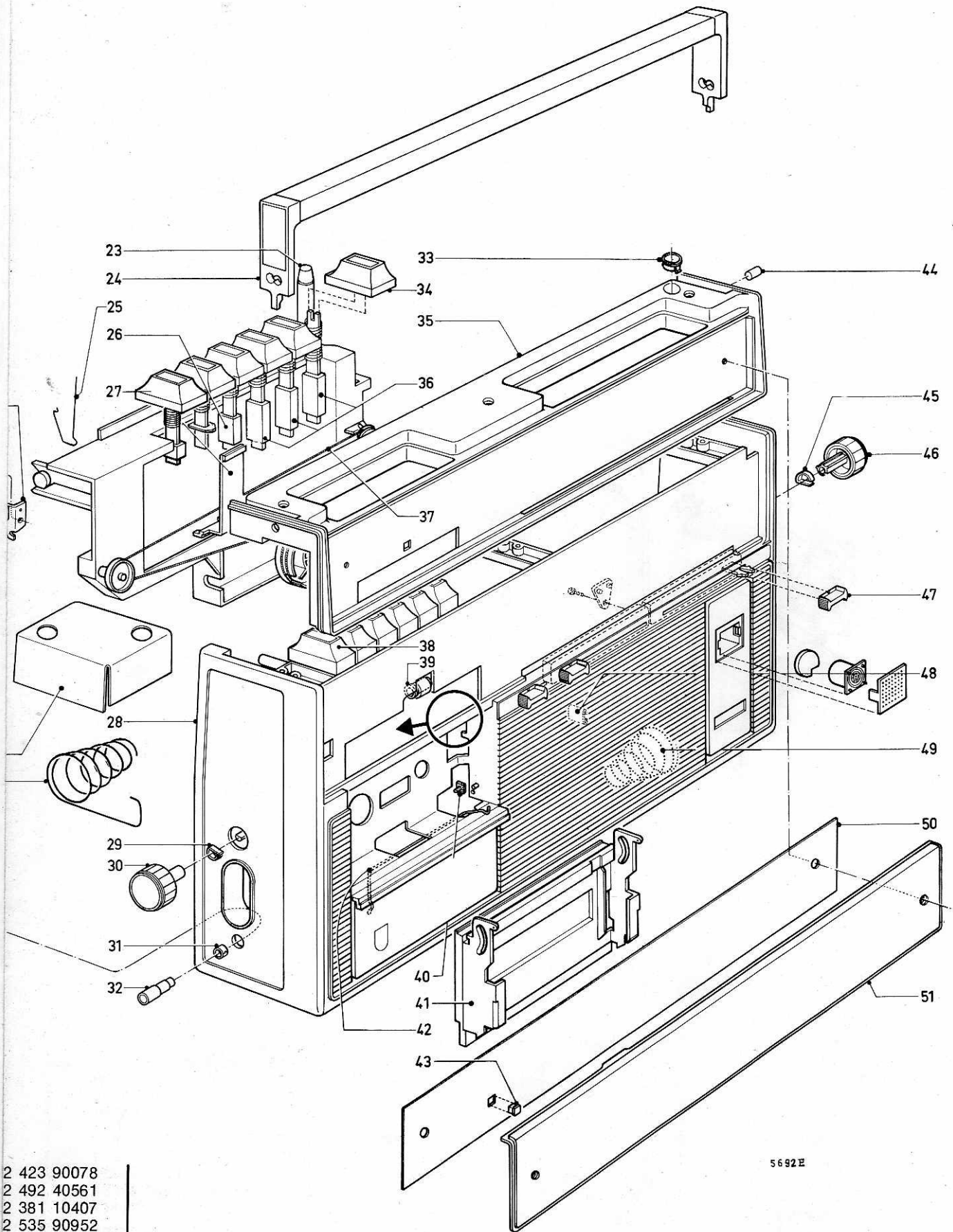
1	4822 530 70122	53	4822 404 10223	73	4822 492 51029	95	4822 520 40005
2	5322 502 84005	54	4822 358 30189	74	4822 532 50268	96	4822 403 50729
3	5322 532 10215	55	4822 492 31095	75	4822 492 51028	98	4822 403 30219
4	4822 505 10464	57	4822 403 50753	76	4822 403 40056	99	4822 528 70194
	4822 532 10215	58	4822 403 30225	78	4822 492 61866	100	4822 528 80558
6	4822 502 10089	59	4822 411 60259	79	4822 249 10032	101	4822 403 30221
7	4822 502 30048	60	4822 411 60258	81	4822 528 80567	102	4822 528 70254
8	4822 530 70047	62	4822 411 60261	82	4822 492 61867	103	4822 492 31051
9	4822 532 50816	63	4822 532 50692	83	4822 403 50731	105	4822 403 50732
10	4822 530 70121	64	4822 520 10357	84	4822 492 51032	107	4822 492 31117
11	4822 502 60908	66	4822 528 60082	85	4822 520 30276	108	4822 528 30167
12	4822 532 14521	67	4822 528 80588	87	4822 532 50262	109	4822 528 70253
13	4822 530 70119	68	4822 492 31157	88	4822 403 50646	110	4822 403 50838
	4822 502 10814	69	4822 403 20111	89	4822 532 50706	111	4822 401 10601
51	4822 403 30226	70	4822 492 31099	91	4822 528 10287	113	4822 249 40075
52	4822 532 50268	71	4822 278 90311	92	4822 214 30212	114	4822 532 50286
		72	4822 492 40525	93	4822 492 31113	115	4822 492 61989
				94	4822 404 10221	117	4822 361 70296
						118	4822 403 1048

M. Hamm



1	4822 423 40388	11	4822 404 10243	21	4822 492 50824	31	4822 532 10284	41	4822 423
2	4822 422 60014	12	4822 404 10293	22	4822 276 10535	32	4822 413 30677	42	4822 492
3	4822 423 40387	13	4822 265 20088	23	4822 303 30145	33	4822 325 60189	43	4822 381
4	4822 492 51056	14	4822 404 10288	24	4822 498 40357	34	4822 410 21344	44	4822 535
5	4822 404 10241	15	4822 404 10287	25	4822 492 61741	35	4822 459 60386	45	4822 492
6	4822 404 10242	16	4822 492 51057	26	4822 277 30536	36	4822 277 30537		
7	4822 267 30245	17	5322 277 30505	27	4822 450 80401	37	4822 321 30132	46	4822 413
8	4822 404 10286	18	4822 273 30186	28	4822 420 60041	38	4822 410 21345	47	4822 411
9	4822 267 30232	19	4822 535 90892	29	4822 492 60705	39	4822 255 20068	48	4822 492
10	4822 276 20173	20	4822 462 70924	30	4822 413 40643	40	4822 466 40112	49	4822 492

50-/00 4822 33:  
/19



2 423 90078  
 2 492 40561  
 2 381 10407  
 2 535 90952  
 2 492 60705

2 413 40642  
 2 411 60292  
 2 492 60949  
 2 492 50824  
 22 333 50518

51  
 Insulation bush }  
 Insulation plate } TS471  
 Electret micr.  
 FM-tuner C401  
 Earphone plug

4822 450 60109  
 4822 532 50695  
 5322 255 40069  
 4822 242 10017  
 4822 210 10171  
 4822 242 50015

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