

Service
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For repair information of the cassette mechanism see
Service Manual of "Recorders tape deck MSM-1".

32 305A12

Service Manual

SPECIFICATION	Min. value	Typical value	
Mains voltage	: 220 V (110-127-240 V by changing the trans- former connections)	220 V (110-127-240 V by changing the trans- former connections)	
Mains frequency	: 50 - 60 Hz	50 - 60 Hz	
Power consumption	: 13 W	13 W	
Tape system	compact cassette	compact cassette	
Number of tracks	: 2 x 2 (stereo)	2 x 2 (stereo)	
Tape speed	: 4.76 cm/s	4.76 cm/s	
Speed deviation	: ± 1.5%	± 1.5%	
Wow and flutter weighted	: ≤ 0.2% (DIN)	0.16% (DIN)	≤ 0.06% (NAB)
Fast wind time C60 cassette	: ≤ 95 sec	≤ 95 sec	
Input sensitivity:			
- microphone	: 0.4 mV/2 kΩ	0.4 mV/2 kΩ	
- line in	: 30 mV/150 kΩ	30 mV/150 kΩ	
Output level			
- line out	: ≥ 0.5 V/< 5 kΩ	≥ 0.5 V/< 5 kΩ	
- headphones	: 0.2 W/8 - 600 Ω	0.2 W/8 - 600 Ω	
Distorsion K3	: ≤ 3%	≤ 2%	
Frequency range	: acc DIN 45500:	acc IEC:	acc NAB:
- Metal tape	: 30-15.000 Hz	30-17.000 Hz	30-18.000 Hz
- Cr tape	: 30-15.000 Hz	30-17.000 Hz	30-18.000 Hz
- Normal tape	: 30-13.000 Hz	30-15.000 Hz	30-16.000 Hz
Signal-to-noise without Dolby NR	acc DIN 45500:	acc IEC:	acc NAB:
- Metal tape	: ≥ 56 dB	58 dB	60 dB
- Cr tape	: ≥ 56 dB	58 dB	60 dB
- Normal tape	: ≥ 54 dB	56 dB	58 dB
Improvement with Dolby NR	: ≥ 8.5 dB (CCIR)	10 dB (at > 5 kHz)	
Bias and Erase frequency	: 85 kHz ± 10%	85 kHz ± 5%	
Dimensions	: 420 x 114 x 234 mm	420 x 114 x 234 mm	
Weight	: 3.9 kg approx.	3.9 kg approx.	



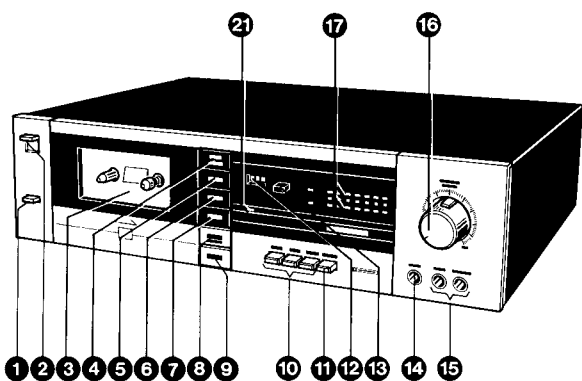


Fig. 1 32 306A12

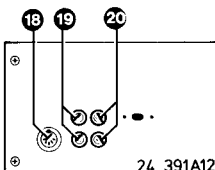


Fig. 2

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GB SERVICING HINTS

Dismantling of tape transport mechanism (Fig. 3)

1. Remove ornamental plate 406 and 407 of cassette compartment lid.
2. Remove belt 419 from counter pulley.
3. Turn screw M4x6 out of coupling piece 565 and take out coupling rod 563.
4. Lift fixing rod 554 out of locking device at lower side of apparatus.
5. Take out fixing rod 554.
6. Remove fixing screw of tape transport mechanism.
7. The tape transport mechanism may now be swung out of its position. After unplugging of various connectors the tape transport mechanism may be lifted out of the casing.

Adjustment of REC switch SK1 (Fig. 4)

Select REC mode of tape transport mechanism. Lever 306 moves to the right and displaces rod 563. Set the switching part of SK1 in the right-most position and fix coupling piece 565 with screw M4x6 on rod 563. Check whether SK1 also functions properly in the PLAY mode.

Tape speed

When servicing the tape transport, it is recommendable to check the tape speed. After replacement of component parts susceptible to wearing-in, like belts and motor, it is advisable to adjust the motor speed to a -1% deviation after servicing. After a very short period the recorder will meet the desired 0% tape speed deviation. When servicing electronic components, like ICs, resistors and capacitors, the tape speed should preferably be set to 0% .

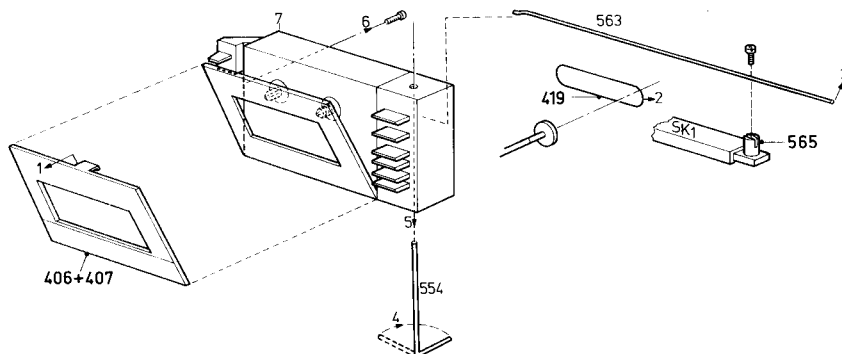


Fig. 3

Control and sockets

Fig. 1 and 2

1	SK0	12	Counter
2	eject	13	Reset counter
3	cassette holder	14	Headphone, BU8
4	REC, SK1	15	Mic L, R, BU2, 3
5	Pause	16	U404
6	Rewind, SK61	17	R469a, b
7	Wind	18	BU1
8	Play, SK62	19	IN L,R, BU4, 5
9	Stop, SK63	20	OUT L,R, BU6, 7
10	Tape select, SK4, 5, 6	21	D451
11	Dolby/MPX, SK3		

NL REPARATIEWENKEN

Uitkasten van het loopwerk (Fig. 3)

1. Sierplaat 406 en 407 van kassetteklep verwijderen.
2. Snaar 419 afnemen van tellerpoelie.
3. Schroef M4x6 uit koppelstuk 565 draaien en koppelstang 563 losnemen.
4. Bevestigingsstang 554 uit blokkering aan de onderzijde van het apparaat tillen.
5. Bevestigingsstang 554 uitnemen.
6. Bevestigingsschroef van het loopwerk verwijderen.
7. Loopwerk kan nu uit zijn positie gedraaid worden. Na het losnemen van diverse stekerverbindingen kan het loopwerk uit de kast worden genomen.

Instellen van REC schakelaar SK1 (Fig. 4)

Zet het loopwerk in de stand REC. Hefboom 306 beweegt naar rechts en verschuift stang 563. Het schakeldeel van SK1 in de meest rechtse stand plaatsen en nu koppelstuk 565 met de schroef M4x6 op stang 563 bevestigen. Controleer daarna of ook in de stand Play SK1 goed funktioneert.

Bandsnelheid

Bij reparaties aan het loopwerk verdient het aanbeveling de bandsnelheid te kontroleren. Na het vervangen van inloopgevoelige onderdelen, zoals snaren en motor, verdient het aanbeveling de motorsnelheid na deze reparatie op -1% afwijking in te stellen. In zeer korte tijd zal het apparaat daarna de gewenste 0% bandsnelheidsafwijking hebben bereikt. Bij reparaties aan elektrische componenten, zoals IC, weerstanden en condensatoren wordt de bandsnelheid bij voorkeur op 0% ingesteld.

F CONS

Démontage de

1. Enlever la
2. Oter la cou
3. Dévisser la
4. Soulever la
5. Extraire la
6. Enlever la
7. La mécani

Réglage du co

Positionner la
Le levier 306 s
563.
Positionner la
position d'extr
vis M4x6 à la t
Vérifier ensuit
position "Play"

Vitesse de défil

Lors de répara
vérifier la vites
Après que des
moteur out fait
de régler la vite
 -1% .
En très peu de
vitesse souhait
En cas de répa
tels les IC, les
vitesse de défil

I CONSI

Smontaggio de

1. Togliere la
2. Togliere la
3. Svitare la vi
4. Sollevare l'a
5. Estrarre l'as
6. Levare la vi
7. Il meccanis

Regolazione de

Posizionare il m
La leva 306 si s

F CONSEILS REPARATION

Démontage de la mécanique (Fig. 3)

1. Enlever la plaquette décorative 406 et 407 du couvercle de cassette.
2. Oter la courroie 419 de la poulie du compte-tours.
3. Dévisser la vis M4x6 du couple 565 et enlever la tige d'accouplement 563.
4. Soulever la tige de fixation 554 à la partie inférieure de l'appareil.
5. Extraire la tige de fixation 554.
6. Enlever la vis de fixation de la mécanique.
7. La mécanique pourra ainsi être extraite de sa position. Il faudra cependant encore détacher quelques connexions afin de pouvoir enlever la mécanique complète du boîtier.

Réglage du commutateur REC SK1 (Fig. 4)

Positionner la mécanique sur "REC".
Le levier 306 se meut sur la droite et pousse la tige 563.
Positionner la section commutation de SK1 dans la position d'extrême droite et fixer le couple 565 par la vis M4x6 à la tige 563.
Vérifier ensuite si SK1 fonctionne aussi bien en position "Play".

Vitesse de défilement

Lors de réparations à la mécanique il est conseillé de vérifier la vitesse de défilement.
Après que des pièces comme les courroies ou le moteur ont fait l'objet de remplacement il est conseillé de régler la vitesse du moteur avec une marge de $\pm 1\%$.
En très peu de temps l'appareil présentera l'écart de vitesse souhaité de 0%.
En cas de réparations à des composants électriques tels les IC, les résistances et les condensateurs, la vitesse de défilement est de préférence réglée à 0%.

I CONSIGLI PER LA RIPARAZIONE

Smontaggio del meccanismo (Fig. 3)

1. Togliere la piastrina decorativa 406 e 407 dal coperchio del vano cassetta.
2. Togliere la cinghia 419 dalla puleggia del contagiri.
3. Svitare la vite M4x6 della coppia 565 e togliere l'asta di accoppiamento 563.
4. Sollevare l'astina di fissaggio 554 della parte inferiore dell'apparecchio.
5. Estrarre l'astina di fissaggio 554.
6. Levare la vite di fissaggio del meccanismo.
7. Il meccanismo potrà quindi essere spostato dalla sua posizione ma bisognerà ancora staccare alcuni collegamenti prima di poter togliere il meccanismo dal mobile.

Regolazione del commutatore SK1 (Fig. 4)

Posizionare il meccanismo su di "REC".
La leva 306 si sposta sulla destra e preme l'astina 563.

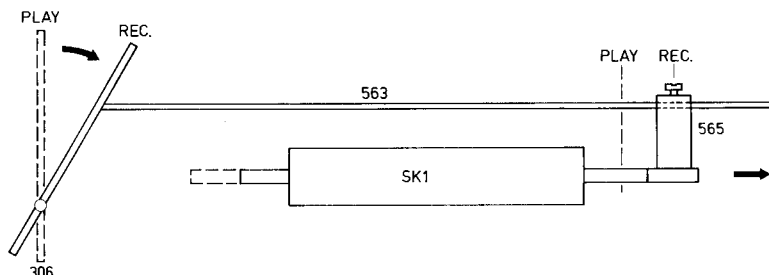


Fig. 4

D REPARATURHINWEISE

Ausbau des Laufwerks (Bild 3)

1. Zierplatte 406 und 407 der Cassettenfachklappe abnehmen.
2. Seil 419 von Zählwerk-Seilrolle abnehmen.
3. Schraube M4x6 aus Kupplungsstück 565 herausdrehen und Kupplungsstange 563 lösen.
4. Befestigungsstange 554 aus Blockierung auf der Unterseite des Gerätes heben.
5. Befestigungsstange 554 herausnehmen.
6. Befestigungsschraube des Laufwerks herausdrehen.
7. Laufwerk lässt sich nun aus seiner Position drehen. Nach Lösen mehrerer Steckverbindungen lässt sich das Laufwerk ausbauen.

Einstellen von "REC"-Schalter SK1 (Bild 4)

Laufwerk in "REC"-Stellung schalten.
Hebel 306 geht nach rechts und verschiebt Stange 563.
Schaltteil von SK1 in die äusserst rechte Stellung bringen und nun Kupplungsstück 565 mit der Schraube M4x6 auf Stange 563 befestigen.
Anschliessend prüfen, ob auch in "PLAY"-Stellung SK1 einwandfrei arbeitet.

Bandgeschwindigkeit

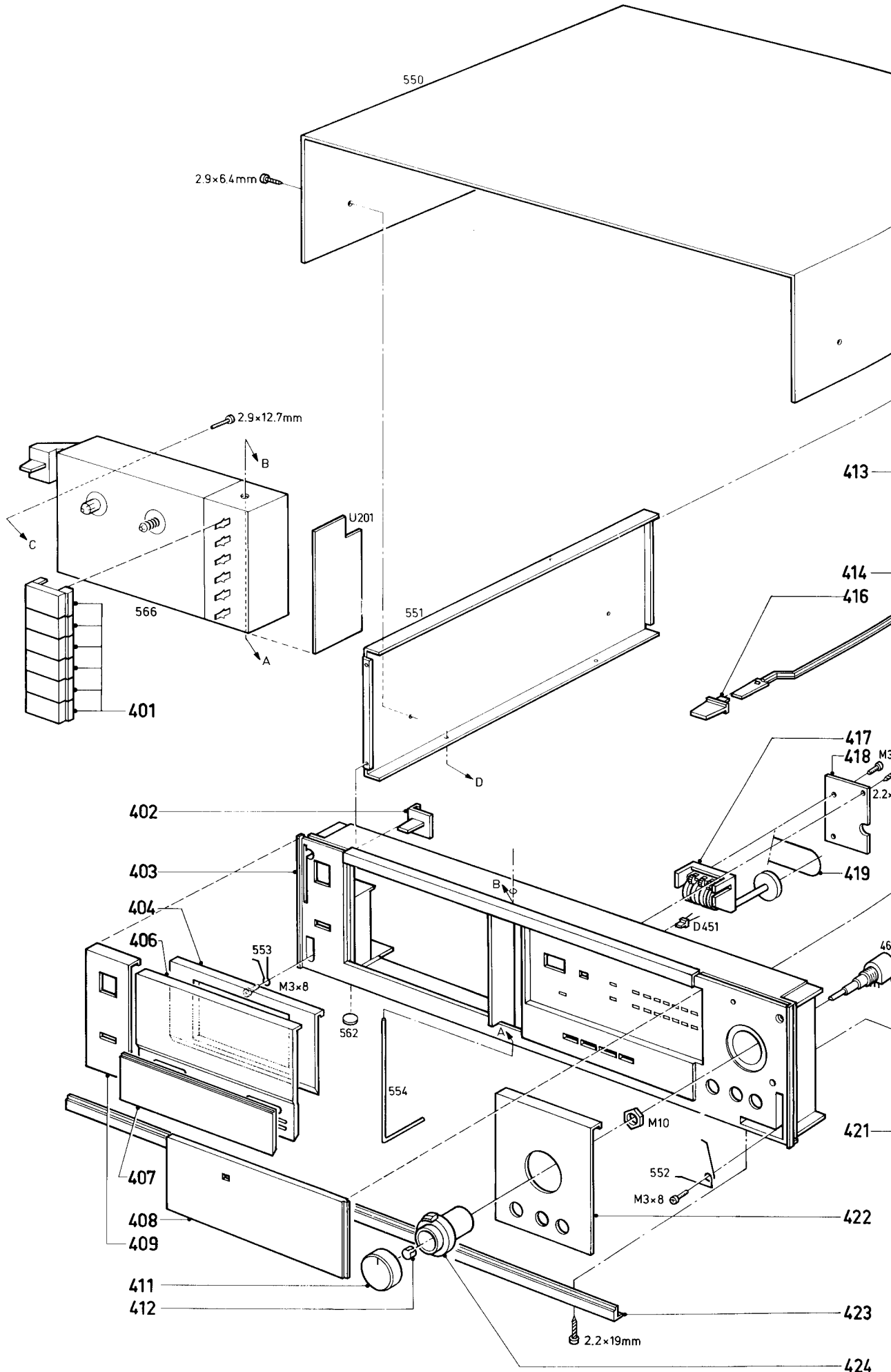
Bei Reparaturen am Laufwerk empfiehlt sich, die Bandgeschwindigkeit zu prüfen.
Nach Auswechseln einlaufempfindlicher Teile wie Seile und Motor empfiehlt sich, die Motorgeschwindigkeit nach dieser Reparatur auf eine Abweichung von $\pm 1\%$ einzustellen.
In kürzester Zeit wird das Gerät dann die verlangte Bandgeschwindigkeitsabweichung von 0% erreicht haben.
Bei Reparaturen an elektrischen Teilen wie integrierte Schaltungen, Widerstände und Kondensatoren wird die Bandgeschwindigkeit vorzugsweise auf 0% eingestellt.

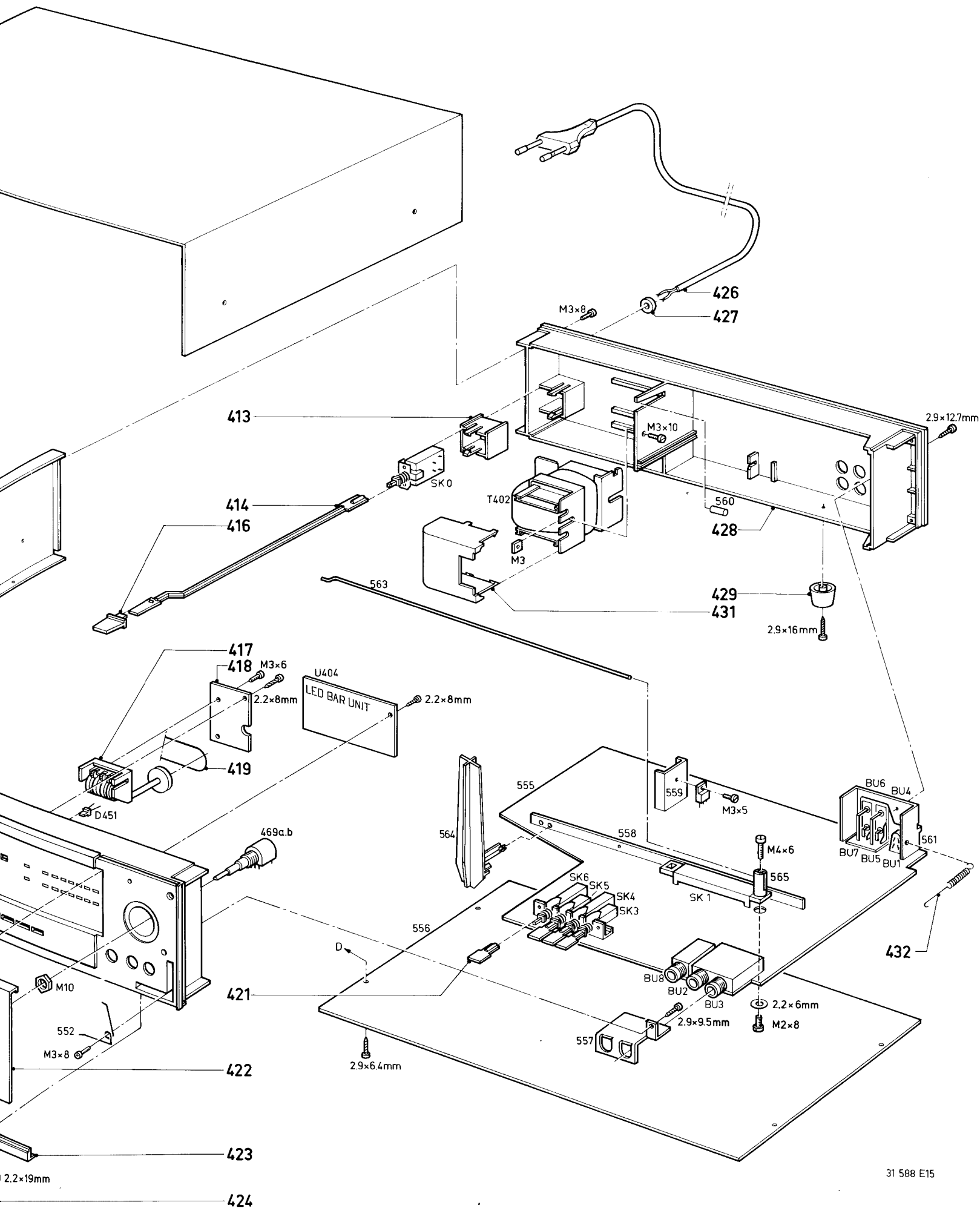
Posizionare la parte commutazione di SK1 all'estrema destra e fissare la coppia 565 per mezzo della vite M4x6 all'asta 563.
Quindi controllare se SK1 funziona anch'è bene in posizione "Play".

Velocità del nastro

Quando si ripara la parte trasporto nastro, si raccomanda di controllare la velocità.
Dopo la sostituzione di componenti suscettibili a logorio come cinghie e motore, si raccomanda di regolare la velocità del motore per una deviazione pari a $\pm 1\%$.
Dopo un periodo molto breve il registratore avrà una variazione di velocità pari a 0%.
Quando si interviene su componenti elettronici, come IC, resistenze e condensatori, la velocità del nastro dovrebbe essere regolata a 0%.

401	4822 410 22968
402	4822 443 61085
403	4822 443 50387
404	4822 464 50257
406	4822 450 60291
407	4822 460 20447
408	4822 450 60289
409	4822 460 20451
411	4822 410 22967
412	4822 532 10284
413	4822 444 60377
414	4822 535 91586
416	4822 410 22934
417	4822 349 50169
418	4822 460 20448
419	4822 358 30365
421	4822 410 22965
422	4822 460 20452
423	4822 460 20449
424	4822 410 22966
426	4822 321 10084
427	4822 401 10652
428	4822 460 20301
429	4822 153 40011
431	4822 443 60809
432	4822 492 62439





ELECTRICAL MEASUREMENTS AND ADJUSTMENTS

General conditions

The following general conditions apply to the electrical measurements and adjustments, unless explicitly stated otherwise.

- Mains voltage 220 V $\pm$ 5%, 50 Hz
- Ambient temperature 20 to 25°C
- Dolby/MPX switch SK3 off
- Tape selector: Cr SK5
- Volume control recording level R469: max.
- The voltages have been measured relative to earth.

— The measurements and adjustments are related to the left-hand channel.

The corresponding test points and adjusting elements for the right-hand channel are given in brackets.

Required test equipment and test cassettes

- LF generator
- AC millivoltmeter (mV-meter)
- Wow-and-flutter-meter
- Universal test cassette SBC419Cr - 4822 397 30069
- Multimeter
- Frequency counter

Adjustment	Cassette	Recorder in position	Apply signal to	Measure on	Read on	Adjust with	Adjust to
Playback speed	SBC419Cr 3150 Hz	PLAY	—	BU6 (BU7)	Wow-and-flutter meter (Filter on)	R478	*b
Azimuth R/P head K1-K101	SBC419Cr 10 kHz	PLAY	—	BU6 (BU7)	mV-meter	*c Left hand screw of K1-K101	Max. output
Playback sensitivity + Indicators	SBC419Cr 315 Hz-0 dB	PLAY	—	BU6 (BU7)	mV-meter	R470 (R471)	650 mV
				—	U404	R472 (R473)	+ 1 dB
Playback frequency response	SBC419Cr 40Hz ;250Hz; 6.3 kHz; 12.5 kHz	PLAY	—	BU6 (BU7)	mV-meter	—	See graph Fig. 6 frequency response
Target value BIAS	Arbitrary cassette	REC	—	MP1 (MP101)	mV-meter	R476 (R477)	8.5 mV (9.25 mV)
Recording sensitivity	SBC419Cr side 2 *d	REC + PLAY	315 Hz, to BU4 (BU5)	BU6 (BU7)	mV-meter	LF-Generator	290 mV
				Disable the bias by removing R610			
				MP1 (MP101)	mV-meter	R474 (R475)	0.9 mV
				Connect R610 make a recording and play it back			
		PLAY	—	BU6 (BU7)	mV-meter	—	290 mV *e
BIAS	SBC419Cr side 2 *d	REC + PLAY	—	MP1 (MP101)	mV-meter	R476 (R477)	8.5 mV } target (9.25 mV) } value
			315 Hz, to BU4 (BU5)	BU6 (BU7)	mV-meter	LF-generator	29 mV
		PLAY	40 Hz-6.3 kHz 10 kHz-12 kHz 13 kHz-14 kHz 15 kHz, to BU4 (BU5)	Record a number of frequencies with the (same input voltage) and play them back			
			—	BU6 (BU7)	mV-meter	—	See graph Fig. 7 if necessary repeat BIAS adjustment *f
f.osc.	Arbitrary cassette	REC	—	MP2	Frequency counter	L468	85 kHz
19/85 kHz suppression	Arbitrary cassette	REC DOLBY/MPX	315 Hz, to BU4 (BU5)	BU6 (BU7)	mV-meter	LF generator	775 mV
			19 kHz, to BU4 (BU5) (same input voltage)	BU6 (BU7)	mV-meter	L462 (L463) 19 kHz part	$\leq$ 25 mV
			f.osc. to BU4 (BU5) (same input voltage).	BU6 (BU7)	mV-meter	L462 (L463) 85 kHz part	Min output $\leq$ 4.35 mV

2.9x12.7mm

561

2

GB Notes:

- *a. Prior to any measurement or adjustment with the tape running, heads and tape guides should be degaussed and cleaned.
- *b. The max. permissible speed deviation is $\pm 1.5\%$. See also Service Hints: Tape speed. Moreover, the wow-and-flutter can be read. This value should not exceed 0.13% .
- *c. See also Service Manual: Recorders tape deck MSM; Head adjustments.
- *d. If the accuracy requirements are less stringent a high quality chromium cassette may be used as an alternative.
- *e. The output voltage on BU6 (BU7) should read $290\text{ mV} \pm 0.25\text{ dB}$. If this is not the case reduce the LF-signal (bias disabled) by as many dB's as the reading was too low or too high by means of R474 (R475).
- *f. When one channel is adjusted this may slightly affect the adjustment of the other channel. If the adjustment is correct the frequency response curve will be similar to curve b in Fig. 8, distortion $\leq 3\%$.

F Remarques:

- *a. Le chaque mesure ou réglage à la chaîne, les têtes et guide-bande doivent être démagnétisées et nettoyées.
- *b. Ecart maximum admissible $\pm 1,5\%$. Voir aussi conseils réparation: Vitesse de défilement. On pourra aussi lire le niveau de pleurage que ne doit pas dépasser $0,13\%$.
- *c. Voir aussi Service Manual: Recorders tape deck MSM: Réglages des têtes.
- *d. Si les exigences point de vue précision ne soit pas tellement élevées, une cassette au chrome de bonne qualité pourra aussi convenir.
- *e. La tension de sortie doivent afficher $290\text{ mV} \pm 0,25\text{ dB}$. Si ce n'était pas le cas, régler avec R474 (R475) le signal AF (prémagnétisation exclue) d'autant de dB en-dessous ou au-dessus du résultat de l'affichage qui serait trop haut ou trop bas.
- *f. Lors du réglage d'un des canaux on pourrait constater qu'il y a incidence sur l'autre. Si le réglage est comme il faut, la courbe de fréquence aura la forme de celle de la Fig. 8 courbe b, distortion $\leq 3\%$.

I Note:

- *a. Prima di effettuare della misure o regolazioni con la cassetta inserita, le testine e le guide nastro devono essere smagnetizzate e pulite.
- *b. Massima deviazione tollerata $\pm 1,5\%$. Vedere istruzioni per la riparazione: Velocità del nastro. Può essere letto anche il wow. Questo può essere come massimo $0,13\%$.
- *c. Vedere istruzioni per la Documentazione Servizio „Recorder tape deck MSM: Regolazioni testina”.
- *d. Si il controllo non deve essere molto accurato, si può utilizzare una cassetta al cromo di alta qualità.

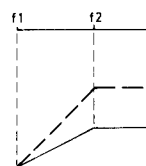
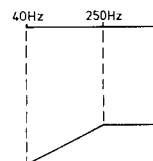
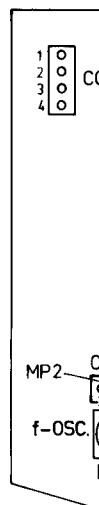
NL Opmerkingen:

- *a. Voor alle meting of instelling met lopende band dienen de koppen en bandgeleiders gedemagnetiseerd en gereinigd te worden.
- *b. Max. toelaatbare snelheidsafwijking $\pm 1,5\%$. Zie ook Servicewenken: Bandsnelheid. Tevens kan bij deze meting de jengelwaarde worden afgelezen. Deze mag max. $0,13\%$ bedragen.
- *c. Zie ook Service Manual: Recorders tape deck MSM: Instellingen van de koppen.
- *d. Bij minder hoge nauwkeurigheid kan ook een chromiumcassette van goede kwaliteit worden gebruikt.
- *e. Indien de uitgangsspanning op BU6 (BU7) geen $290\text{ mV} \pm 0,25\text{ dB}$ is, regel dan met R474 (R475) het LF signaal (voormagnetisatie uitgeschakeld) zoveel dB lager of hoger als de meteruitslag te hoog of te laag is.
- *f. Bij het instellen van het ene kanaal kan het andere iets worden beïnvloed. Bij een goede instelling zal de frequentie karakteristiek als in Fig. 8 curve b verlopen, vervorming $\leq 3\%$.

D Anmerkungen:

- *a. Vor jeder Messung oder Einstellung mit laufendem Band empfiehlt es sich, die Köpfe und Bandführungen zu entmagnetisieren und zu reinigen.
- *b. Maximal zulässige Geschwindigkeitsabweichung $\pm 1,5\%$. Siehe auch Reparaturhinweise: Bandgeschwindigkeit. Auch kann der Jaulwert abgelesen werden, der höchstens $0,13\%$ betragen darf.
- *c. Siehe auch Service Manual: Recorders tape deck MSM: Einstellungen der Köpfe.
- *d. Bei weniger höher Genauigkeit lässt sich auch eine Chromium-Cassette guter Qualität verwenden.
- *e. Die Ausgangsspannung an BU6 (BU7) muss $290\text{ mV} \pm 0,25\text{ dB}$ anzeigen. Ist dass nicht der Fall, dann mit R474(R475) das NF-Signal (Vormagnetisierung ausgeschlossen) um soviel dB niedriger oder höher einstellen als die Messeranzeige zu hoch oder zu niedrig war.
- *f. Beim Einstellen des einen Kanals kann der andere etwas beeinflusst werden. Bei einer entsprechenden Einstellung verläuft der Frequenzgang wie in Abb. 8, Kurve b, Verzerrung $\leq 3\%$.

- *e. Gli la tensione d'uscita devono essere su $290\text{ mV} \pm 0,25\text{ dB}$. Se ciò non è aumentare o ridurre il segnale AF (bias disinserito), in funzione della indicazione, in dB, troppo bassa o troppo alta, per mezzo di R474 (R475).
- *f. Quando viene regolato un canale, questo può influire sulla regolazione dell'altro. Se la regolazione è corretta la curva della risposta in frequenza sarà simile alla curva b della Fig. 8. Distorsione aumenterà $\leq 3\%$.



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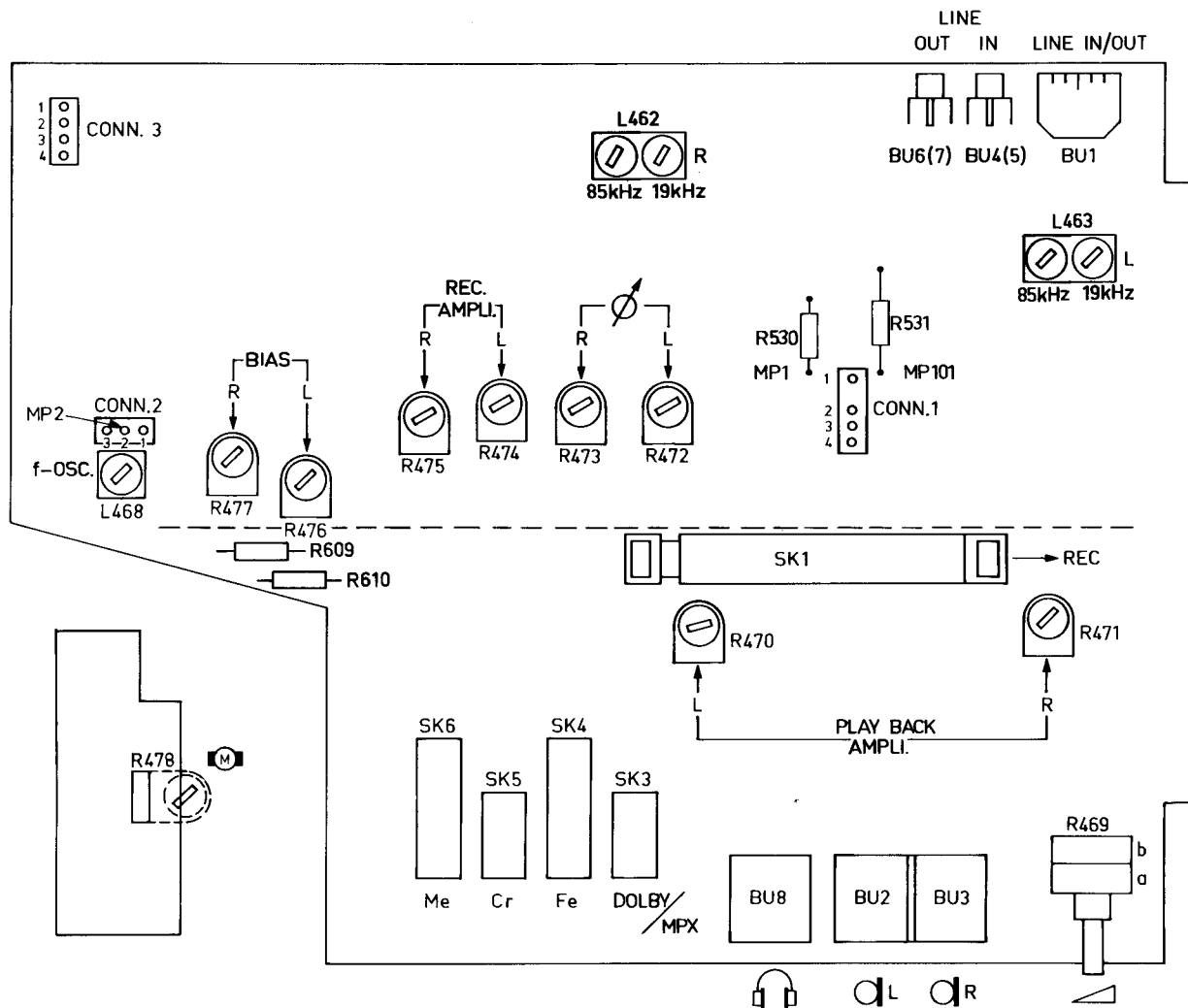


Fig. 5

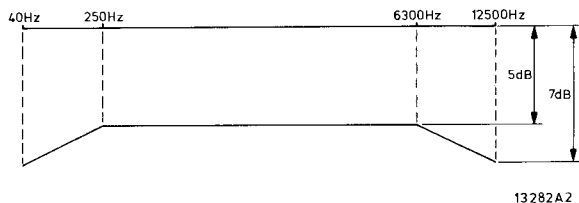


Fig. 6

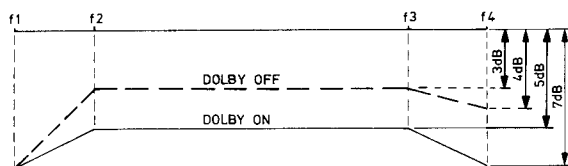


Fig. 7

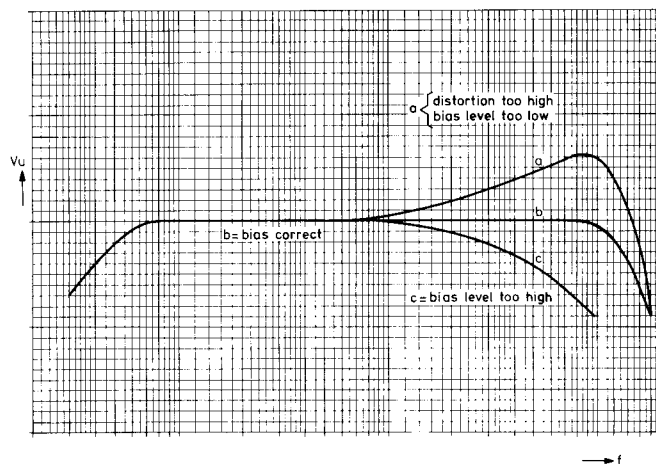
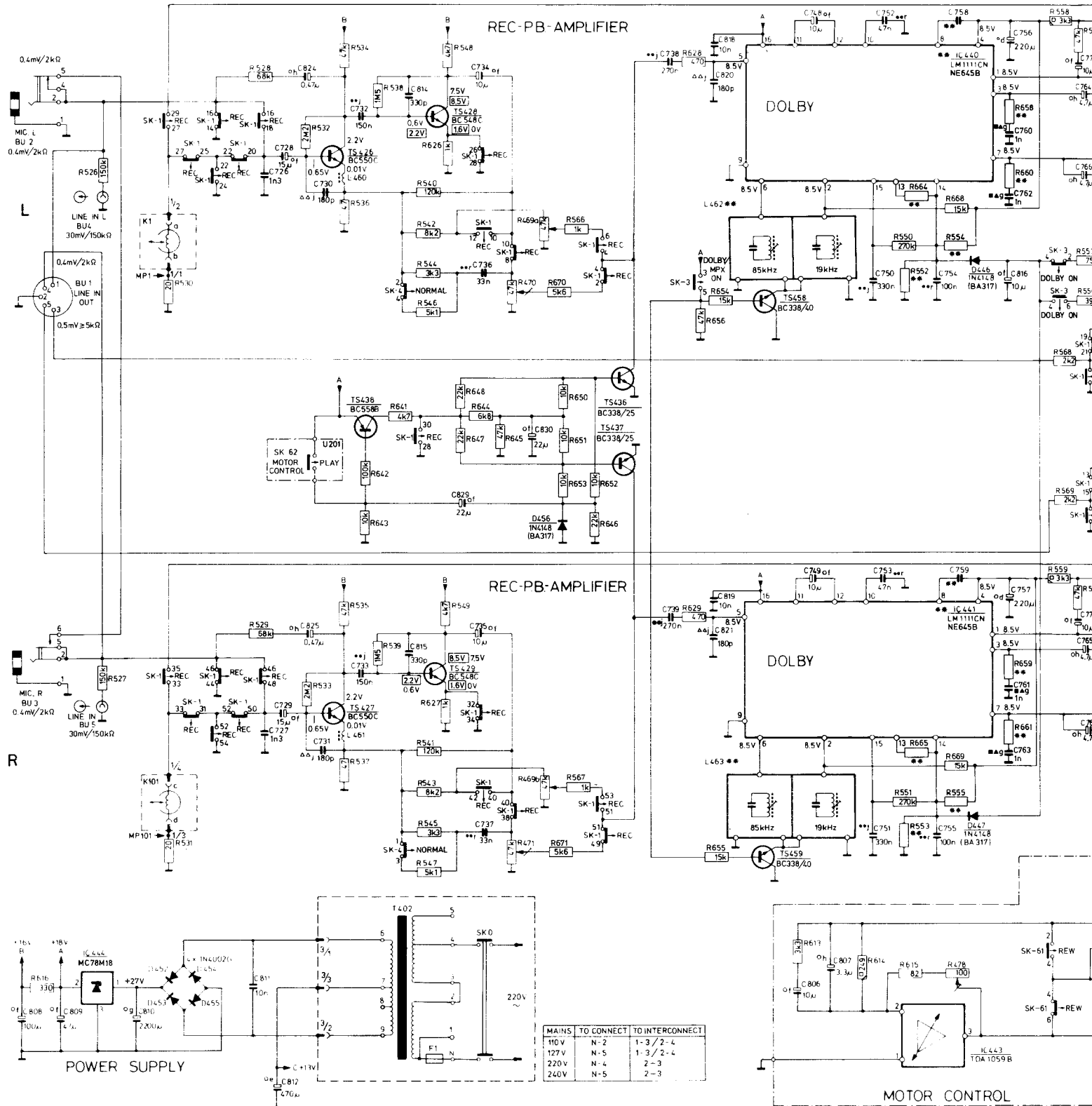


Fig. 8

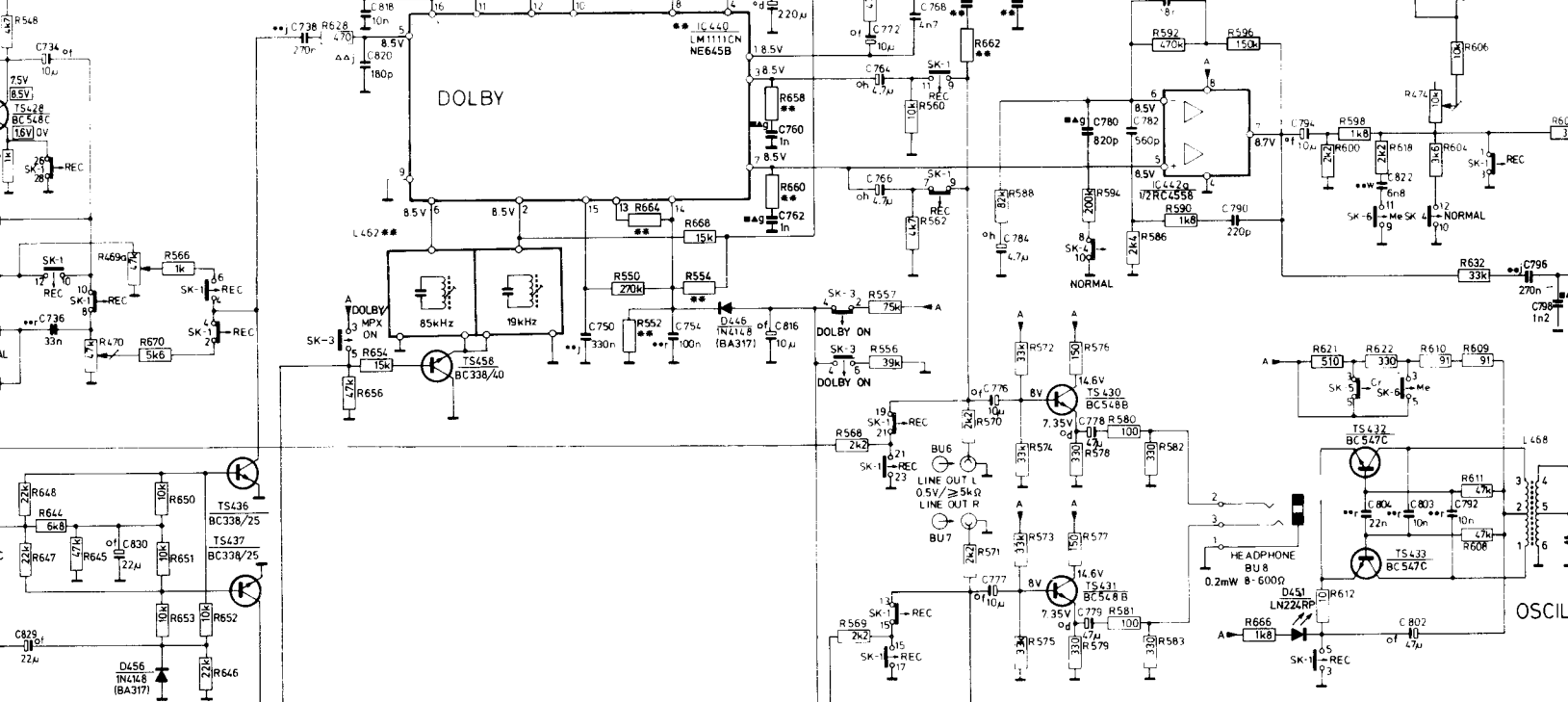
	f1	f2	f3	f4
Metal	30 Hz	125 Hz	8 kHz	15 kHz
Cr	30 Hz	125 Hz	8 kHz	15 kHz
Normal	30 Hz	125 Hz	8 kHz	13 kHz

R	616	526	530	528	532	642 534	536 641	538	540-547	548	644-648	469a	469b	650-653	566	628	656	654	613	614	550 552 615	664 478	664 658+661	558 568 557
		527	531	529	533	643 535	537	539	626 627	549	470 471	670 671	567			629	655			551 553	665	669	559 569 556	
C	808	809	810		811	726 812	728 824	730	732	814	734-737					738	818-821			806 748 807	750-753	754 758	756 760-763	764-767
						727 729 825	731	733		815	829					830				749	755 759	757 816	772 777	
MISC	BU2BU3BU1BU4BU5	IC444K1	K101		D452-455		TS426 427	SK62	TS438.T402	F1	TS428 429		D456	TS436.437		L462 L463	TS458.459		IC443	IC440 441	D446 447	SK61	SK63	

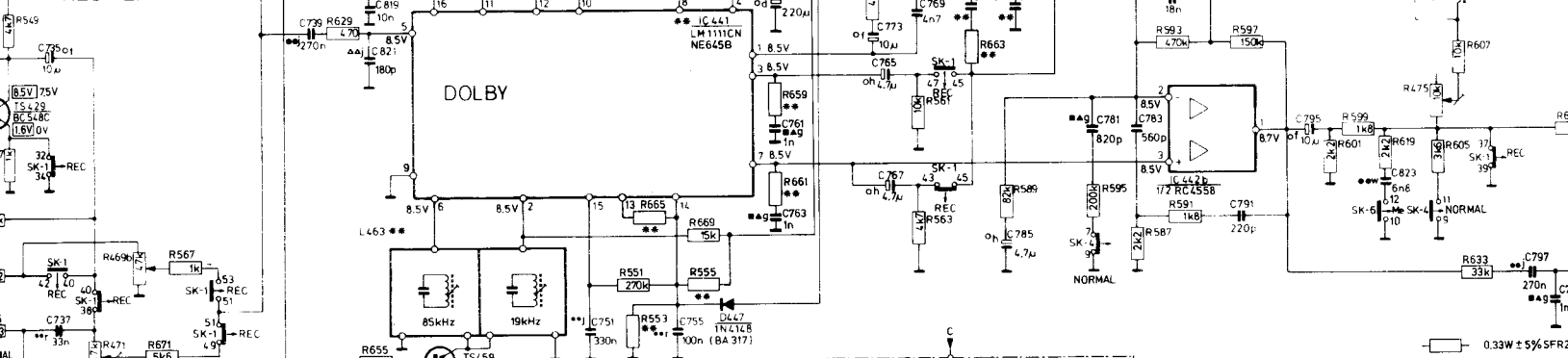


7 548 644-648 690 690 650-653 566	628 656 654	613	614	550 552 615	664 478	668 658-661	558 568	557 564 560-563	570 588	572-575 594	576-583 590-593	596 666	600 621 588 622 618 474	604-611	R632	60
7 549 470 471 670 671 567	629 655			551 553	665	669	559 569	556 565 662 663	571 589	595 586 587	597	601 612 599	619 475	R633	60	
734-737		738	818-821	806 748 807	750-753	754 758	756 760-763	764-767 768 774 845 776 784	780 770 778	782 786	790	794	804 822 803 826	792	800 796 798	60
829	830	739		749		755 759	757 816	772 773 769 778	777 785 781 771 779	783 787	791	795	823 802 827		801 797 799	60
TS428 429	D456	TS436 437	L462 L463	TS458 459	IC443	IC440 441 D446 447	SK61 SK63	M BU6 BU7	TS430 431	IC442a b	BU8	D451	TS432 433	L466 L467	L468	60

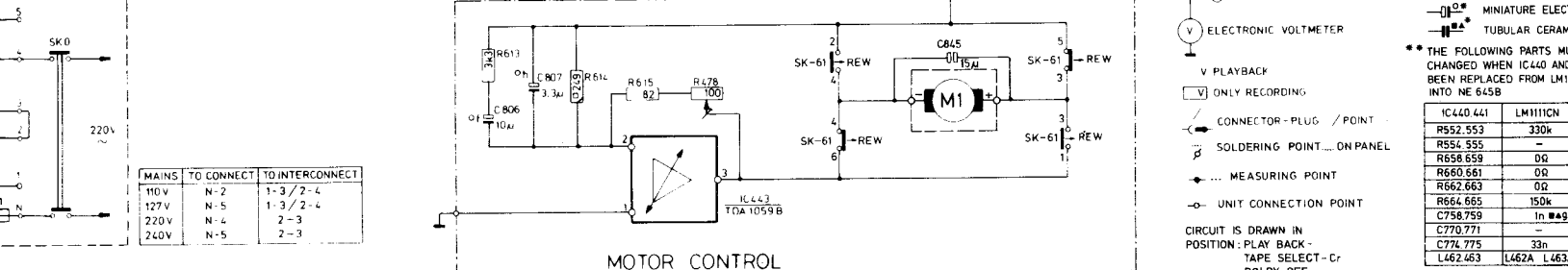
REC-PB-AMPLIFIER



REC-PB-AMPLIFIER

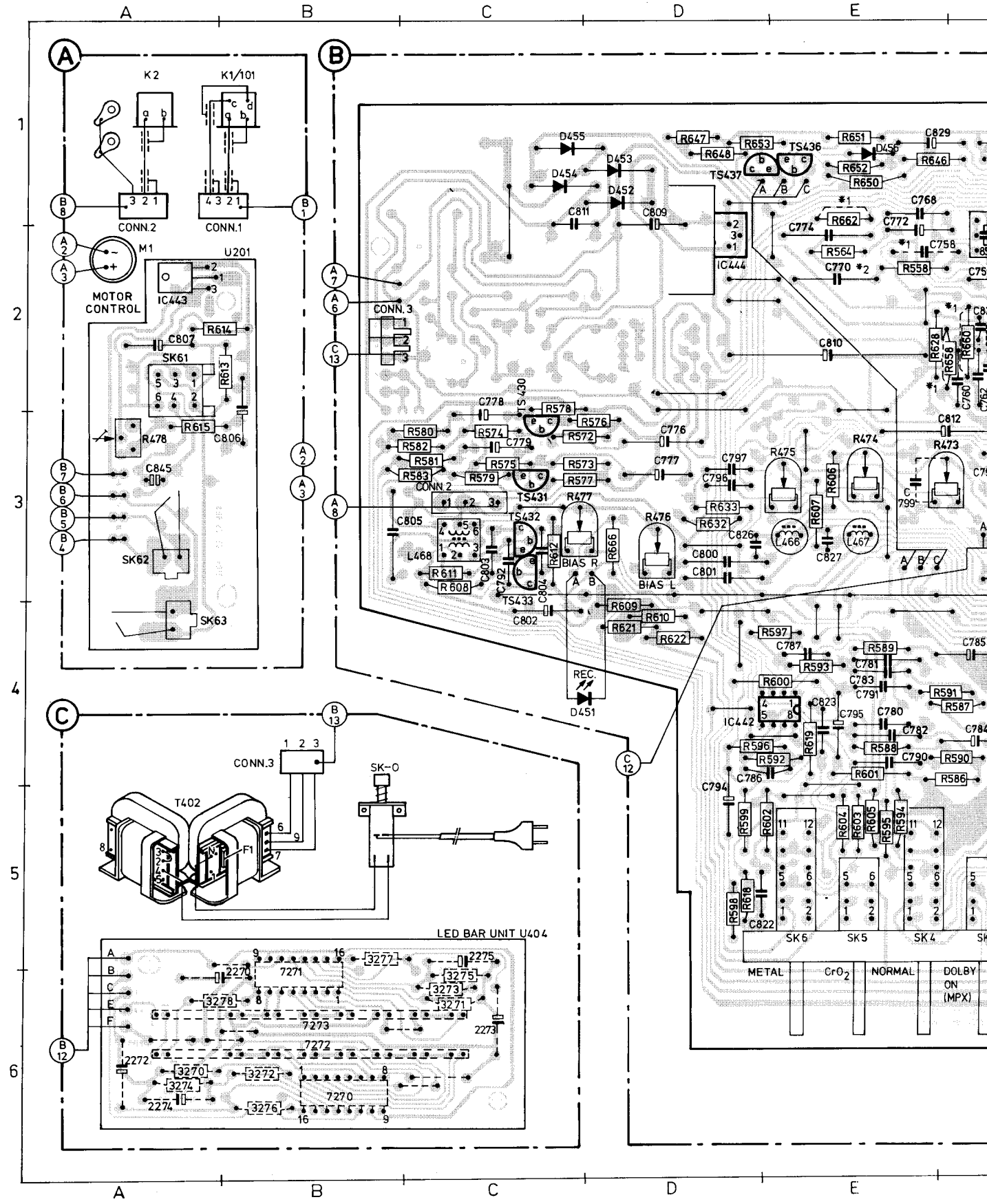


REC-PB-AMPLIFIER



[illegible]

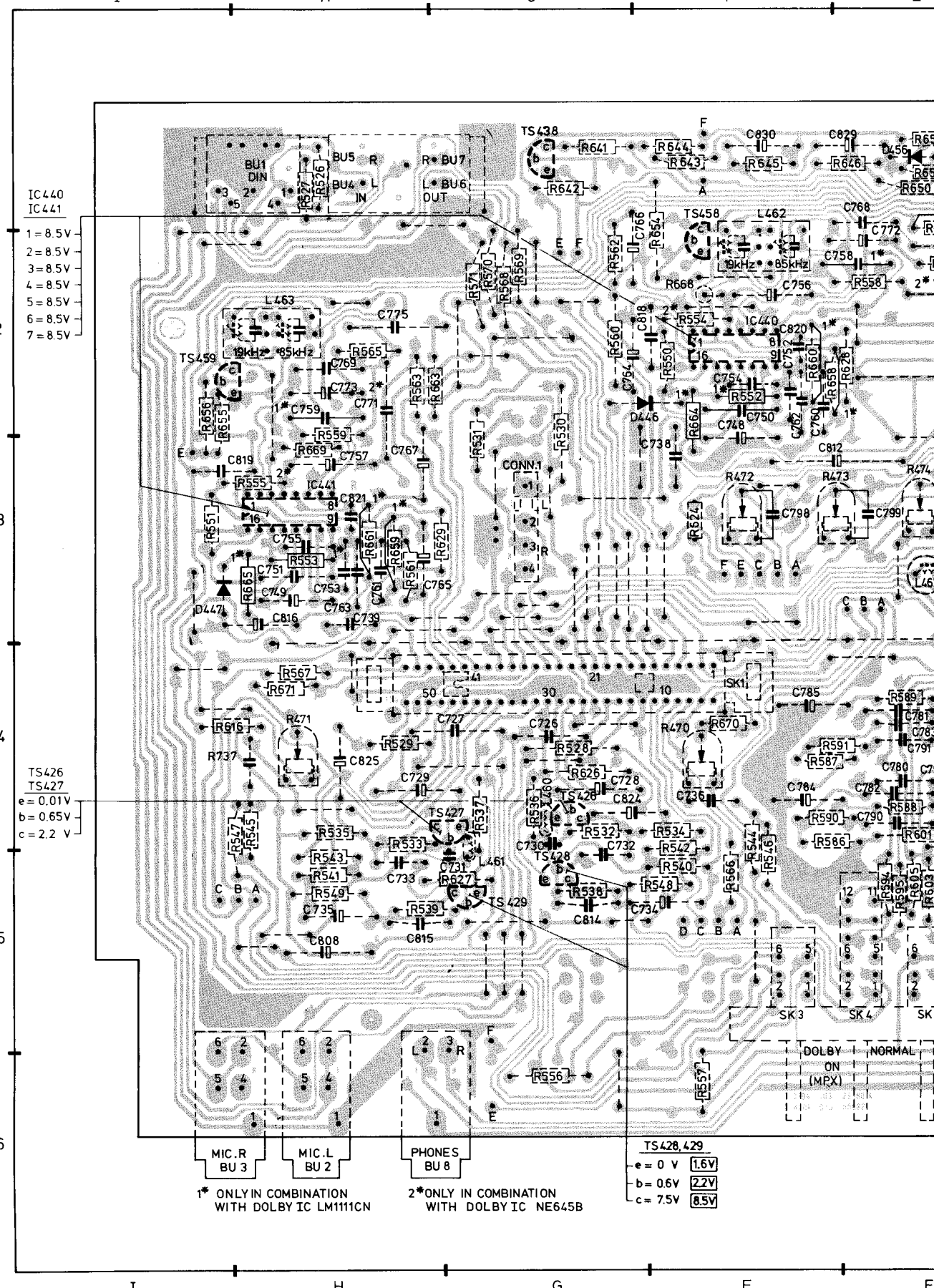
F1	B05	B02	H06	B07	G01	SK4	E05	2273	C06	3272	B06	3277	B05	7273	B06	C730	G04	C735	H05	C748	F02	C753	H03	C758	E02	C763	H03	C768	E01	C773
K1	B01	B03	H06	B08	H06	SK5	E05	2274	A06	3273	C06	3278	B06	C726	G04	C731	G05	C736	F04	C749	H03	C754	F02	C759	H02	C764	G02	C769	H02	C774
K2	A01	B04	H01	B04	B05	SK6	E05	2275	C05	3274	C06	7270	B06	C727	G04	C732	G04	C737	H04	C750	F02	C755	H03	C760	F02	C765	H03	C770	E02	C775
M1	A02	B05	H01	SK1	F04	2270	B06	3270	A06	3275	C06	7271	B05	C728	G04	C733	H05	C738	F03	C751	H03	C756	F02	C761	H03	C766	G02	C771	H02	C776
B01	H01	B06	G01	SK3	F05	2272	A06	3271	C06	3276	B06	7272	B06	C729	H04	C734	F05	C739	H03	C752	F02	C757	H03	C762	F02	C767	H03	C772	E01	C777
D447	I03	D455	C01	L462	F01	R469	F06	R474	E03	R526	H01	R531	G02	R536	G04	R541	H05	R546	F05	R551	I03	R556	G06	R561	H03	R566	F05	R571	G02	R576
D451	C04	D456	E01	L463	H02	R470	F04	R475	E03	R527	H01	R532	G04	R537	G04	R542	F04	R547	H04	R552	F02	R557	F06	R562	G02	R567	H04	R572	C03	R577
D452	D01	K101	B01	L466	E03	R471	H04	R476	D03	R528	G04	R533	H04	R538	G05	R543	H05	R548	F05	R553	H03	R558	E02	R563	H02	R568	G02	R573	C03	R578
D453	D01	L460	G04	L467	E03	R472	F03	R477	D03	R529	G04	R534	H05	R539	H05	R544	F04	R549	H05	R554	F02	R559	H02	R564	E02	R569	G02	R574	C03	R579
D454	C01	L461	G05	L468	C03	R473	F03	R478	A03	R530	G02	R535	H04	R540	F05	R545	H04	R550	F02	R555	H03	R560	G02	R565	H02	R570	G02	R575	C03	R580
R646	E01	R652	E01	R659	H02	R664	F02	R669	H03	SK63	A04	IC442	D04	TS428	G05	TS433	C03	TS459	I02											
R647	D01	R653	D01	R660	F02	R665	H03	R670	F04	T402	A05	IC443	A02	TS429	G05	TS436	E01													
R648	D01	R654	F01	R661	H03	R665	I02	R671	H04	U201	A02	IC444	D02	TS430	C02	TS437	D01													
R650	E01	R656	I02	R662	E01	R666	D03	SK61	A02	IC440	F02	TS426	G04	TS431	C03	TS438	G01													
R651	E01	R658	F02	R663	H02	R668	F02	SK62	A03	IC441	H03	TS427	G04	TS432	C03	TS458	F01													



This is a detailed electronic circuit board layout for a stereo amplifier. The board is populated with numerous components, including resistors (R), capacitors (C), integrated circuits (IC), and transformers (L). The layout is organized into functional blocks, such as the input stage, pre-amplifier, and power amplifier stages. Key components include:

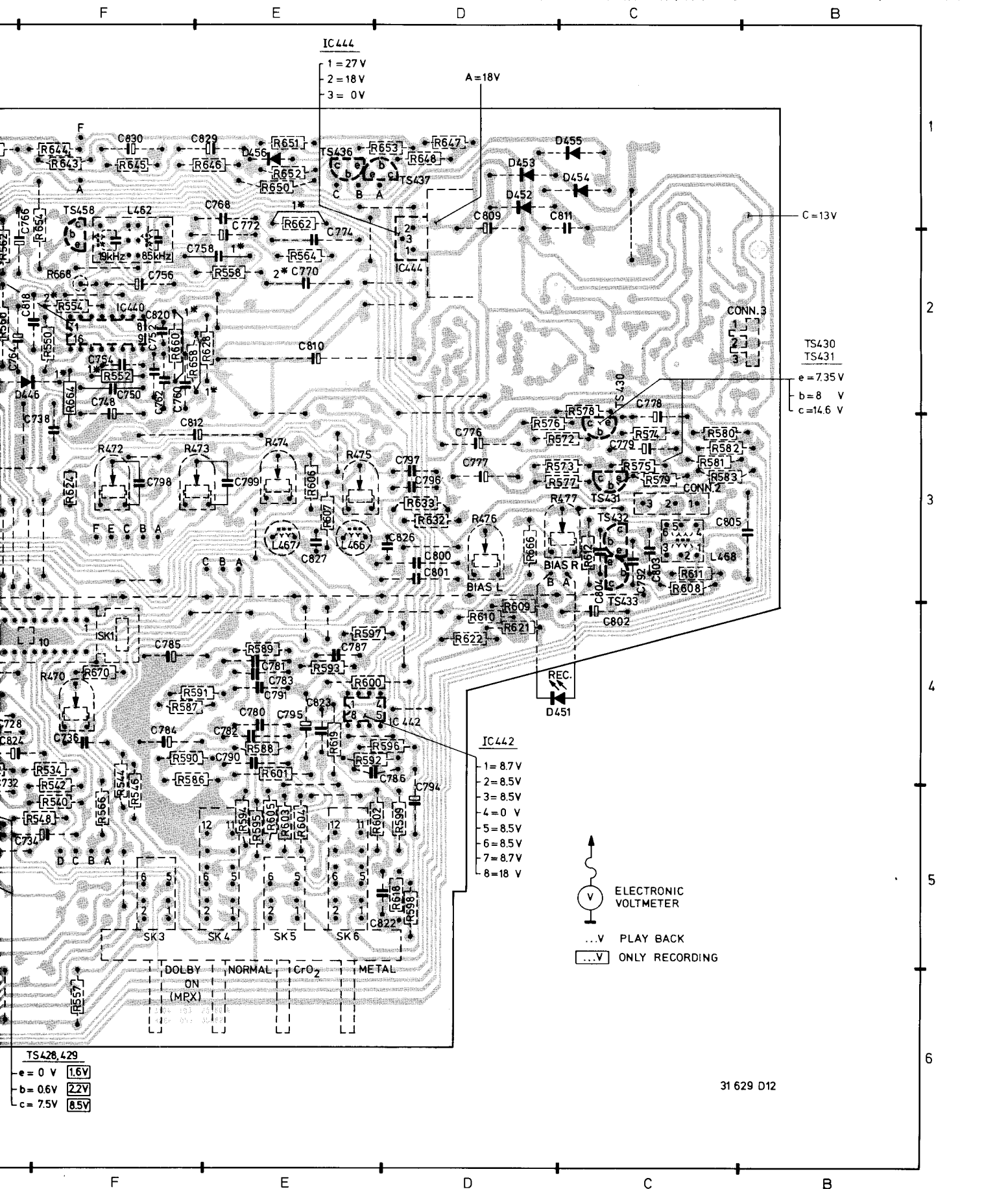
- Resistors:** Labeled with values like R653, R651, R652, R650, R644, R641, R642, R643, R645, R646, R647, R648, R649, R654, R655, R656, R657, R658, R659, R660, R661, R662, R663, R664, R665, R666, R667, R668, R669, R670, R671, R672, R673, R674, R675, R676, R677, R678, R679, R680, R681, R682, R683, R684, R685, R686, R687, R688, R689, R690, R691, R692, R693, R694, R695, R696, R697, R698, R699, R700, R701, R702, R703, R704, R705, R706, R707, R708, R709, R710, R711, R712, R713, R714, R715, R716, R717, R718, R719, R720, R721, R722, R723, R724, R725, R726, R727, R728, R729, R730, R731, R732, R733, R734, R735, R736, R737, R738, R739, R740, R741, R742, R743, R744, R745, R746, R747, R748, R749, R750, R751, R752, R753, R754, R755, R756, R757, R758, R759, R760, R761, R762, R763, R764, R765, R766, R767, R768, R769, R770, R771, R772, R773, R774, R775, R776, R777, R778, R779, R780, R781, R782, R783, R784, R785, R786, R787, R788, R789, R790, R791, R792, R793, R794, R795, R796, R797, R798, R799, R800, R801, R802, R803, R804, R805, R806, R807, R808, R809, R810, R811, R812, R813, R814, R815, R816, R817, R818, R819, R820, R821, R822, R823, R824, R825, R826, R827, R828, R829, R830, R831, R832, R833, R834, R835, R836, R837, R838, R839, R840, R841, R842, R843, R844, R845, R846, R847, R848, R849, R850, R851, R852, R853, R854, R855, R856, R857, R858, R859, R860, R861, R862, R863, R864, R865, R866, R867, R868, R869, R870, R871, R872, R873, R874, R875, R876, R877, R878, R879, R880, R881, R882, R883, R884, R885, R886, R887, R888, R889, R890, R891, R892, R893, R894, R895, R896, R897, R898, R899, R900, R901, R902, R903, R904, R905, R906, R907, R908, R909, R910, R911, R912, R913, R914, R915, R916, R917, R918, R919, R920, R921, R922, R923, R924, R925, R926, R927, R928, R929, R930, R931, R932, R933, R934, R935, R936, R937, R938, R939, R940, R941, R942, R943, R944, R945, R946, R947, R948, R949, R950, R951, R952, R953, R954, R955, R956, R957, R958, R959, R960, R961, R962, R963, R964, R965, R966, R967, R968, R969, R970, R971, R972, R973, R974, R975, R976, R977, R978, R979, R980, R981, R982, R983, R984, R985, R986, R987, R988, R989, R990, R991, R992, R993, R994, R995, R996, R997, R998, R999, R1000.
- Capacitors:** Labeled with values like C768, C772, C758, C756, C760, C762, C764, C766, C768, C770, C772, C774, C776, C778, C780, C782, C784, C786, C788, C790, C792, C794, C796, C798, C800, C802, C804, C806, C808, C810, C812, C814, C816, C818, C820, C822, C824, C826, C828, C830, C832, C834, C836, C838, C840, C842, C844, C846, C848, C850, C852, C854, C856, C858, C860, C862, C864, C866, C868, C870, C872, C874, C876, C878, C880, C882, C884, C886, C888, C890, C892, C894, C896, C898, C900, C902, C904, C906, C908, C910, C912, C914, C916, C918, C920, C922, C924, C926, C928, C930, C932, C934, C936, C938, C940, C942, C944, C946, C948, C950, C952, C954, C956, C958, C960, C962, C964, C966, C968, C970, C972, C974, C976, C978, C980, C982, C984, C986, C988, C990, C992, C994, C996, C998, C1000.
- Integrated Circuits:** Labeled with values like IC444, IC440, IC442, IC446, IC448, IC450, IC452, IC454, IC456, IC458, IC460, IC462, IC464, IC466, IC468, IC470, IC472, IC474, IC476, IC478, IC480, IC482, IC484, IC486, IC488, IC490, IC492, IC494, IC496, IC498, IC500, IC502, IC504, IC506, IC508, IC510, IC512, IC514, IC516, IC518, IC520, IC522, IC524, IC526, IC528, IC530, IC532, IC534, IC536, IC538, IC540, IC542, IC544, IC546, IC548, IC550, IC552, IC554, IC556, IC558, IC560, IC562, IC564, IC566, IC568, IC570, IC572, IC574, IC576, IC578, IC580, IC582, IC584, IC586, IC588, IC590, IC592, IC594, IC596, IC598, IC600, IC602, IC604, IC606, IC608, IC610, IC612, IC614, IC616, IC618, IC620, IC622, IC624, IC626, IC628, IC630, IC632, IC634, IC636, IC638, IC640, IC642, IC644, IC646, IC648, IC650, IC652, IC654, IC656, IC658, IC660, IC662, IC664, IC666, IC668, IC670, IC672, IC674, IC676, IC678, IC680, IC682, IC684, IC686, IC688, IC690, IC692, IC694, IC696, IC698, IC700, IC702, IC704, IC706, IC708, IC710, IC712, IC714, IC716, IC718, IC720, IC722, IC724, IC726, IC728, IC730, IC732, IC734, IC736, IC738, IC740, IC742, IC744, IC746, IC748, IC750, IC752, IC754, IC756, IC758, IC760, IC762, IC764, IC766, IC768, IC770, IC772, IC774, IC776, IC778, IC780, IC782, IC784, IC786, IC788, IC790, IC792, IC794, IC796, IC798, IC800, IC802, IC804, IC806, IC808, IC810, IC812, IC814, IC816, IC818, IC820, IC822, IC824, IC826, IC828, IC830, IC832, IC834, IC836, IC838, IC840, IC842, IC844, IC846, IC848, IC850, IC852, IC854, IC856, IC858, IC860, IC862, IC864, IC866, IC868, IC870, IC872, IC874, IC876, IC878, IC880, IC882, IC884, IC886, IC888, IC890, IC892, IC894, IC896, IC898, IC900, IC902, IC904, IC906, IC908, IC910, IC912, IC914, IC916, IC918, IC920, IC922, IC924, IC926, IC928, IC930, IC932, IC934, IC936, IC938, IC940, IC942, IC944, IC946, IC948, IC950, IC952, IC954, IC956, IC958, IC960, IC962, IC964, IC966, IC968, IC970, IC972, IC974, IC976, IC978, IC980, IC982, IC984, IC986, IC988, IC990, IC992, IC994, IC996, IC998, IC1000.
- Connectors:** Labeled with values like SK1, SK2, SK3, SK4, SK5, SK6, SK7, SK8, SK9, SK10, SK11, SK12, SK13, SK14, SK15, SK16, SK17, SK18, SK19, SK20

BU1	H01	BU6	G01	SK4	E05	C728	G04	C733	H05	C738	F03	C751	H03	C756	F02	C761	H03	C766	G02	C771	H02	C776	D03	C781	E04	C786	D04	C794	D04	C79
BU2	H06	BU7	G01	SK5	E05	C729	H04	C734	F05	C739	H03	C752	F02	C757	H03	C762	F02	C767	H03	C772	E01	C777	D03	C782	E04	C787	E04	C795	E04	C80
BU3	H06	BU8	H06	SK6	E05	C730	G04	C735	H05	C748	F02	C753	H02	C758	E02	C763	H03	C768	E01	C773	H02	C778	C02	C783	E04	C790	E04	C796	D03	C80
BU4	H01	SK1	F04	C726	G04	C731	G05	C736	F04	C749	H03	C754	F02	C759	H02	C764	G02	C769	H02	C774	E02	C779	C03	C784	F04	C791	E04	C797	D03	C80
BU5	H01	SK3	F05	C727	G04	C732	G04	C737	H04	C750	F02	C755	H03	C760	F02	C765	H03	C770	E02	C775	H02	C780	E04	C785	F04	C792	C03	C798	F03	C80
R530	G02	R535	H04	R540	F05	R545	H04	R550	F02	R555	H03	R560	G02	R565	H02	R570	G02	R575	C03	R580	C03	R587	F04	R592	E04	R597	E04	R602	D05	R60
R531	G02	R536	G04	R541	H05	R546	F05	R551	I03	R556	G06	R561	H03	R566	F05	R571	G02	R576	C03	R581	C03	R588	E04	R593	E04	R598	D05	R603	E05	R60
R532	G04	R537	G04	R542	F04	R547	H04	R552	F02	R557	F06	R562	G02	R567	H04	R572	C03	R577	C02	R582	C03	R589	E04	R594	E05	R599	D05	R604	E05	R60
R533	H04	R538	G05	R543	H05	R548	F05	R553	H03	R558	E02	R563	H02	R568	G02	R573	C03	R578	C02	R583	C03	R590	F04	R595	E05	R600	E04	R605	E05	R61
R534	F04	R539	H05	R544	F04	R549	H05	R554	F02	R559	H02	R564	E02	R569	G02	R574	C03	R579	C03	R586	F04	R591	F04	R596	D04	R601	E04	R606	E03	R61
TS431	C03	TS438	G01																											
TS432	C03	TS438	F01																											
TS433	C03	TS439	I02																											
TS436	E01																													
TS437	D01																													



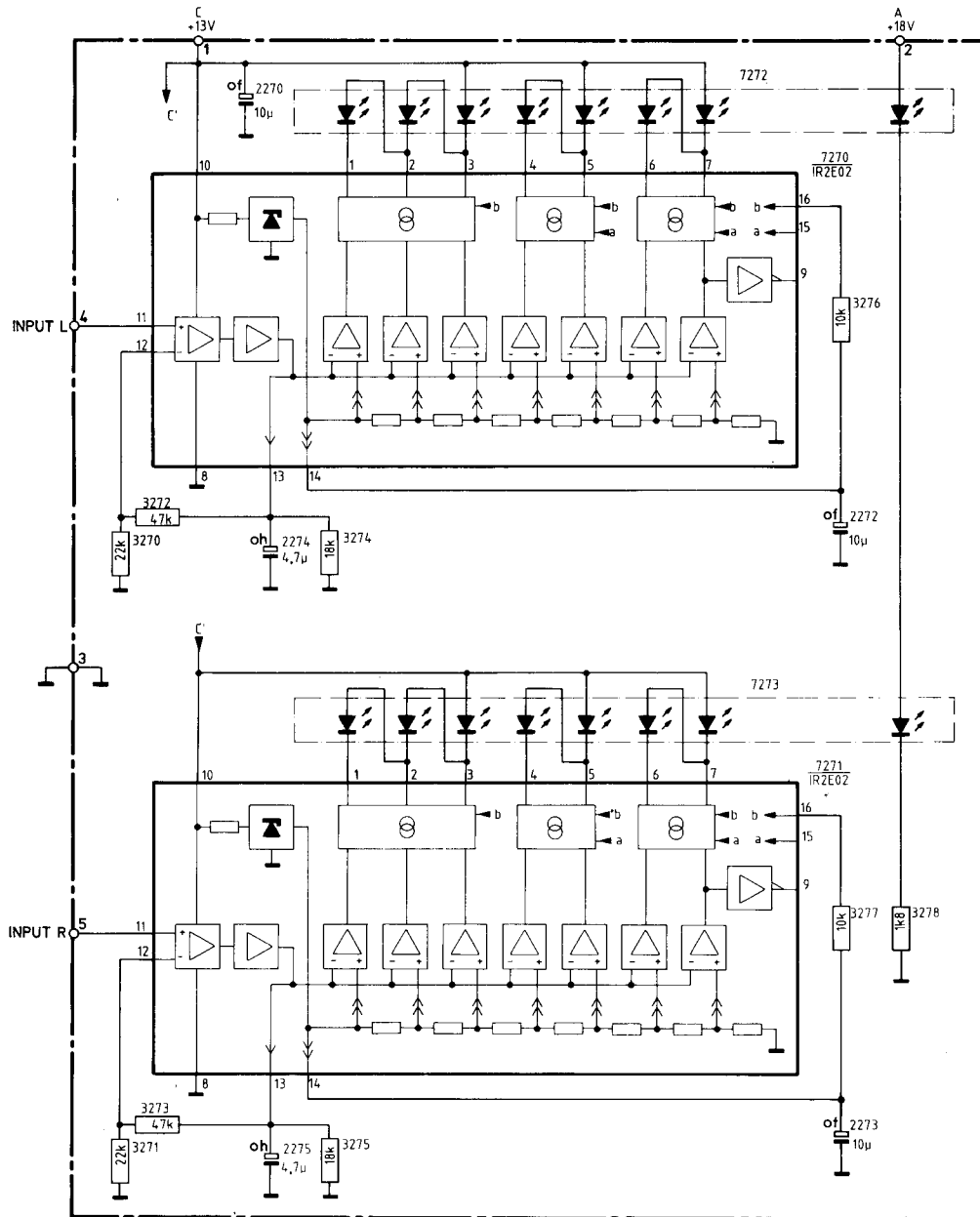
C776	D03	C781	E04	C786	D04	C794	D04	C799	E03	C803	C03	C810	E02	C816	H03	C822	D05	C827	E03	D451	C04	D456	E01	L466	E03	R472	F03	R477	C03
C777	D03	C782	E04	C787	E04	C795	E04	C800	D03	C804	C03	C811	C01	C818	F02	C823	E04	C829	F01	D452	D01	L460	G04	L467	E03	R473	F02	TS426	G04
C778	C02	C783	E04	C790	E04	C796	D03	C801	D03	C805	C03	C812	F03	C819	T03	C824	G04	C830	F01	D453	D01	L461	G05	L468	C03	R474	E03	TS427	H01
C779	C03	C784	F04	C791	E04	C797	D03	C802	C04	C808	H05	C814	G05	C820	F02	C825	H04	D446	F02	D454	C01	L462	F01	L470	F04	R475	E03	TS428	G05
C780	E04	C785	F04	C792	C03	C798	F03	C802	F02	C809	D01	C815	H05	C821	H03	C826	D03	D447	I03	D455	C01	L463	H02	R471	H04	R476	D03	TS429	H04

R587	F04	R592	E04	R597	E04	R602	D05	R607	E03	R612	C03	R622	D04	R629	G03	R643	F01	R648	D01	R654	F01	R661	H03	R665	H03	R671	H04	TS426	G04
R588	E04	R593	E04	R598	D05	R603	E05	R608	D03	R616	H04	R624	F03	R632	D03	R644	F01	R650	E01	R656	I02	R662	E01	R666	D03	IC440	F02	TS427	G04
R589	E04	R594	E05	R599	D05	R604	E05	R609	D04	R618	D05	R626	G04	R633	D03	R645	F01	R651	E01	R658	F02	R663	H02	R668	F02	IC441	H03	TS428	G05
R590	F04	R595	E05	R600	E04	R605	E05	R610	D04	R619	E04	R627	G05	R641	G01	R646	E01	R652	E01	R659	H03	R664	F02	R669	H03	IC442	D04	TS429	G05
R591	F04	R596	D04	R601	E04	R606	E03	R611	C03	R621	D04	R628	E02	R642	G01	R647	D01	R653	D01	R660	F02	R665	I02	R670	F04	IC444	D02	TS430	G02



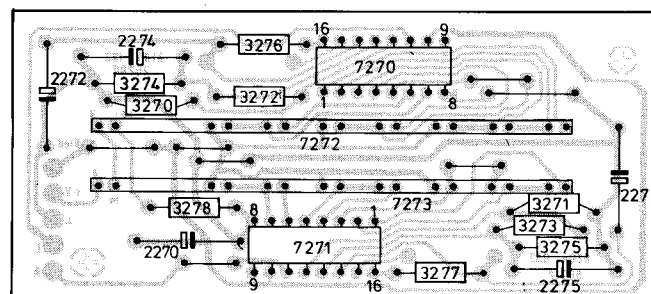
U404

LED BAR UNIT



30 899 C15

Fig. 9



31 628 B12

Fig. 10

-U404-		
7270, 7271	IR-2E02	4822 209 80943
7272, 7273	LN081130P	4822 256 90484

-IC- 			-C- -H-		
IC440,441**	LM1111CN	4822 209 80886	C726,727	1n3/160 V	4822 121 50565
IC440,441**	NE645B	4822 209 80454	C758,759**	1 nF/ 50 V	4822 122 10158
IC442	RC4558	4822 209 80401	C760,761	1 nF/ 50 V	4822 122 10158
IC443	TDA1059B	4822 209 80361	C762,763	1 nF/ 50 V	4822 122 10158
IC444	MC78M18	4822 209 81396	C768,769	4n7/ 63 V	4822 121 50539
-TS- 			C770,771**	27 nF/ 63 V	4822 121 50607
BC337/40		4822 130 41344	C774,775**	33 nF/ 63 V	5322 121 54111
BC338/25		4822 130 40958	C774,775**	5n6	4822 121 50543
BC338/40		5322 130 44779	C780,781	820 pF/ 50 V	4822 122 10173
BC548B		4822 130 40937	C782,783	560 pF/ 50 V	4822 122 31693
BC548C		4822 130 44196	C790,791, } C800,801 }	220 pF/ 50 V	4822 122 10172
BC550C		4822 130 41096	C805	2n7/630 V	5322 121 54093
BC558B		4822 130 44197	C811	10 nF	4822 121 41482
-D- 			C814,815	330 pF/ 50 V	4822 122 31466
BA317	(1N4148)	4822 130 30847	C818,819	10 nF	4822 122 10177
1N4002G	(DS130TD)	5322 130 30684	C845	15 µF/ 16 V	4822 124 21087
-LED- 			-BU-		
D451	LN224RP	4822 130 31431	BU1		4822 267 40325
-L- 			BU2,3		4822 267 30291
L460,461		4822 156 20993	BU4-7		4822 267 40341
L462A,463A**		4822 158 60484	BU8		4822 267 30324
L462B,463B**		4822 158 60485	-SK-		
L466,467		4822 156 21061	SK0		4822 276 10807
L468		4822 146 20565	SK1		4822 277 20684
-R- 			SK3-6		4822 276 40312
R469a,b	2x 47k log	4822 102 40042	SK61		4822 277 20778
R470, 471, } R476,477 }	47k	4822 100 10079	SK62,63		4822 278 30117
R472,473	4k7	4822 100 10036	-Miscellaneous-		
R474,475	10k	4822 100 10035	K1,K101		4822 249 10148
R478	100 Ω	4822 100 10073	K2		4822 249 40117
R558,559	3k3 1%	4822 116 51247	M1		4822 361 20232
R614	249 Ω 1%	5322 116 54499	T402		4822 146 20697
R624	25 Ω PTC	5322 116 44008	F1		4822 252 20007

**Refer to the table in the Circuit Diagram to see which component has been applied.

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.

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.

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.