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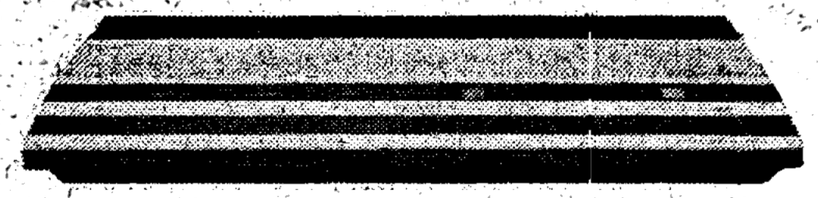

BEOMASTER 1900

TYPE 2903

SERVICE MANUAL

INTRODUCTION

In the diagrams each component is provided with an individual position number and a co-ordinate designation, e.g. B3. This designation refers to the position on the PC board which is provided with a printed division into spaces and with letters and figures along the edge of the PC board.
For the two amplifier channels the two last digits of the position numbers are identical. Left channel begins with 200, right channel with 300.

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TECHNICAL DATA AMPLIFIER

Power output 1000 Hz RMS	2 x 30 W/4 Ohms
	2 x 20 W/8 Ohms
Music power	2 x 50 W/4 Ohms
	2 x 30 W/8 Ohms
Speaker impedance	4 Ohms
Harmonic distortion	
1000 Hz, 50 mW	< 0,07%
DIN 45 500, 40 - 12.500 Hz	< 0,13%
Intermodulation DIN 45 500	< 0,15%
Frequency range ± 1,5 dB DIN 45 500	20 - 40.000 Hz
Power bandwidth, 1% distortion	10 - 40.000 Hz
Damping factor 1000 Hz	> 70
Input pick-up	3 mV/47 KOhms
Input tape	220 mV/470 KOhms
Signal-to-noise ratio DIN 45 500	
50 mW, pick-up	> 60 dB
50 mW, tape recorder	> 65 dB
Channel separation 1000 Hz, DIN 45 500	> 56 dB
250 - 10.000 Hz	> 38 dB
Output, tape recorder 1000 Hz, DIN 45 500	100 mV/100 KOhms
Headphones	Max. 6 V/200 Ohms
Bass control at 40 Hz	± 18 dB
Treble control at 12.500 Hz	± 15 dB

FM

FM range	87,5 - 108 MHz
Sensitivity, stereo 46 dB	< 30 µV/75 Ohms
Signal-to-noise ratio, stereo, weighted	> 60 dB
Frequency range DIN 45 500, ± 1,5 dB	20 - 15.000 Hz
Harmonic distortion DIN 45 500	< 0,4%
Stereo channel separation 1000 Hz	> 35 dB
Pilot suppression 19 KHz	> 45 dB
38 KHz	> 50 dB

OTHER DATA

Power supply	110 - 130 - 220 - 240 V
Power consumption	25 - 185 W
Dimensions W x H x D	62 x 6 x 25 cm
Weight	7,6 kg

Subject to change without notice

MÅLEBETINGELSER FOR DIAGRAM:

Alle DC spændinger er målt i forhold til stel med voltmeter (indre modstand 11 MOhm).
DC spændinger *uden* parantes er målt med modtageren i stilling FM 5 og antennesignal på 500 µV (1 mV EMK) med pilottone.
VOLUME i stilling MEDIUM og højttalere *ikke* tilsluttet.
DC spændinger *i* parentes på 2IC9 er målt, når et af betjeningsfelterne aktiveres.
DC spændinger *i* parentes på 2TR30, 2TR31 og 2TR32 er målt i stilling STAND BY.
FM signalniveauer er målt ved Δf 40 kHz, f mod. 1 kHz og antennesignal på 500 µV (1 mV EMK).
LF følsomheder er målt ved 30 W output. Balance, bas, diskant på 0, volume på max. Udgang belastet med 4 Ohm, input 1 kHz.

CONDITIONS OF MEASUREMENT FOR DIAGRAM:

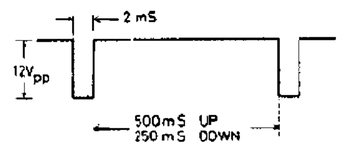
All DC voltages are measured in proportion to chassis with voltmeter (inner resistance 11 MOhm).
DC voltages *without* bracket are measured with the receiver in position FM 5 and aerial signal 500 µV (1 mV EMK) with pilot signal.
Volume in position MEDIUM and speakers *not* connected.
DC voltages *with* brackets on 2IC9 are measured when one of the operating fields is activated.
DC voltages *with* brackets on 2TR30, 2TR31 and 2TR32 are measured in position STAND BY.
FM signal levels are measured at Δf 40 kHz, f mod. 1 kHz and aerial signal 500 µV, (1 mV EMK).
LF sensitivities are measured at 30 W ouput. Balance, bass treble on 0, volume on max.
Output loaded with 4 Ohm, input 1 kHz.

MESSBEDINGUNGEN FÜR SCHALTBILD:

Alle DC Spannungen sind im Verhältnis zu Chassis mit Voltmeter (innerer Widerstand 11 MOhm) gemessen.
DC Spannungen *ohne* Klammern sind mit dem Empfänger in Stellung FM 5 und Antennensignal von 500 µV (1 mV EMK) mit Pilotten gemessen.
Volume in Position MEDIUM und Lautsprecher *nicht* angeschlossen.
DC Spannungen *in* Klammern auf 2IC9 sind gemessen, wenn eines der Bedienungsfelder aktiviert wird.
DC Spannungen *in* Klammern auf 2TR30, 2TR31 und 2TR32 sind in Position STAND BY gemessen.
FM Signalniveaus sind bei Δf 40 kHz, f mod. 1 kHz und Antennensignal von 500 µV (1 mV EMK) gemessen.
LF Empfindlichkeiten sind bei 30 W Output gemessen. Balance, Tiefton, Diskant auf 0, Volume auf max. Ausgang mit 4 Ohm belastet, Eingang 1 kHz.

TESTPUNKTER/TESTPOINTS/ TESTPUNKTE

2TP2	IF signal
2TP3	FM detector adjustment
2TP4	Osc. adjustment (2C24)
	3 V_{pp} square-wave 19 kHz
2TP13	27 V ± 1,5 V
2TP14	— 11,5 V ± 1,5 V
2TP15	15 V ± 0,1 V
2TP16	15,5 V ± 0,3 V
2TP17	15 V in STAND BY, 0 V on program

2TP202	12 mV
2TP302	12 mV
2TP203	0 V ± 200 mV
2TP303	0 V ± 200 mV
3TP1	
3TP2	3,2 V eff. (RMS), 9 V_{pp} approx. 100 kHz
3TP3	7,9 V, volume in MEDIUM
4TP1	Tuning voltage

FM SIGNALNIVEAUER/ FM SIGNAL LEVELS/ UKW SIGNALNIVEAUS

2TP1	9 mV
2TP2	100 mV
2TP3	180 mV, 1 kHz

FØLSOMHEDER/ SENSITIVITIES/ EMPFINDLICHKEITEN

2TP200	150 mV
2TP300	150 mV
2TP201	160 mV
2TP301	160 mV
PHONO	3 mV
TAPE	220 mV

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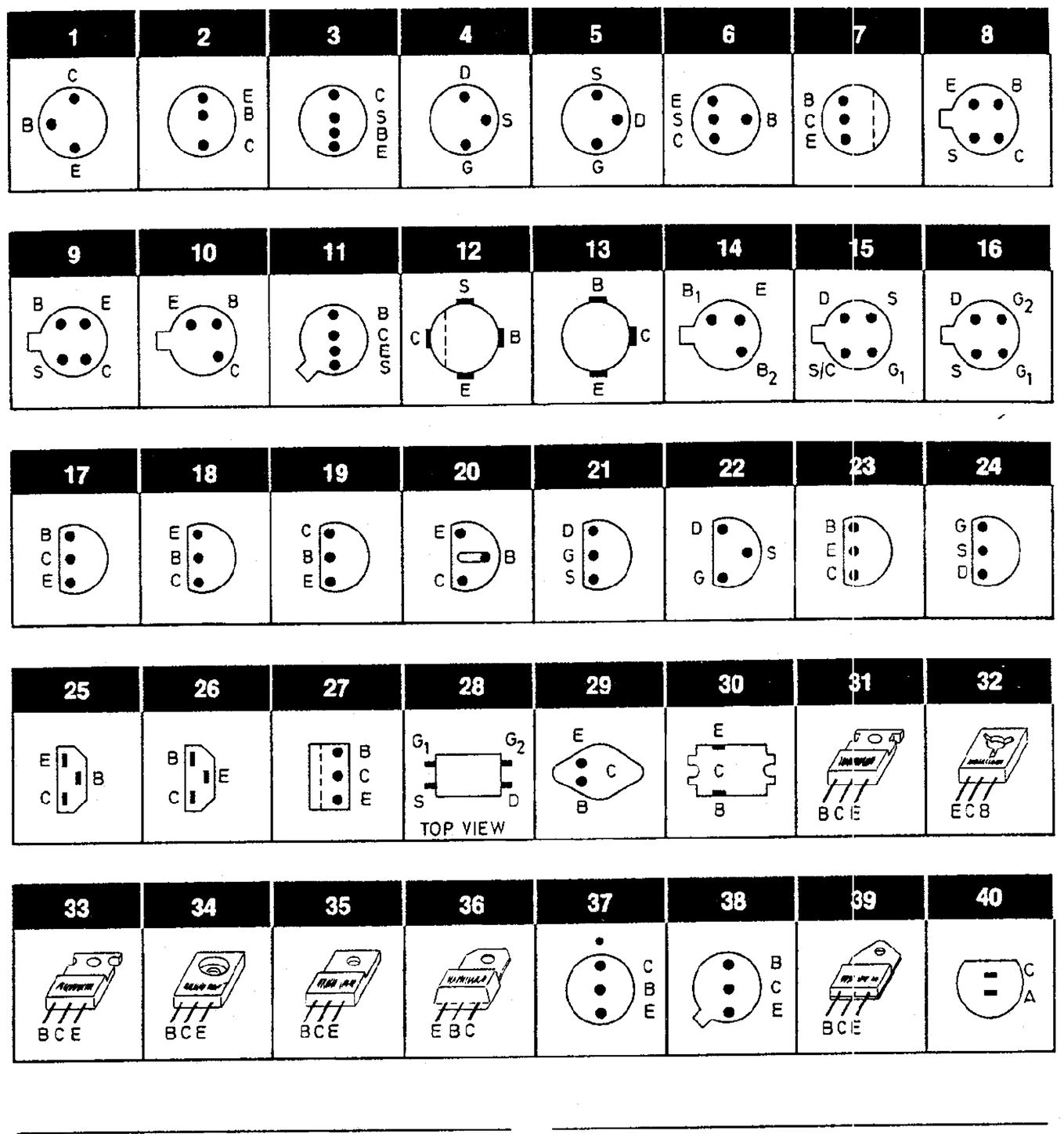
TRANSISTOR AND IC LIST



1TR1	8320119	4	U 1981 E
1TR2		21	2N 5245
		21	TIS 88 A
1TR3	8320136	4	U 1981 E
		21	3C2
		21	TIS 88 A
1TR4	8320112	26	BF 195
2TR1	8320311	23	BF 240
2TR2			
2TR14	8320316	20	BC 327
2TR15	8320132	20	BC 548 B
2TR22		20	BC 172 B
		20	BC 183 B
		17	BC 183 BL
		20	BC 183 BK
2TR23	8320104	20	BC 558 B
		20	BC 212 B
		17	BC 212 BL
		20	BC 212 BK
		20	BC 252 B
		18	BC 308 B
2TR24	8320316	20	BC 327
2TR25	8320132	20	BC 548 B
		20	BC 172 B
		20	BC 183 B
		17	BC 183 BL
		20	BC 183 BK
2TR26	8320161	20	BC 212 B
		20	BC 212 BK
		17	BC 212 BL
		20	BC 251 B
2TR27	8320257	33	TIP 32 A
		34	2N 4919
		34	MJE 2371
2TR28	8320316	20	BC 327
2TR29	8320132	20	BC 548 B
		20	BC 172 B
		20	BC 183 B
		17	BC 183 BL
		20	BC 183 BK
2TR30	8320104	20	BC 558 B
		20	BC 212 B
		17	BC 212 BL
		20	BC 212 BK
		20	BC 252 B
		18	BC 308 B
2TR31	8320240	32	BD 136
		32	BD 136/W

DIODE LIST

0D1	8310023	B80 C5000/3000
1D1	8300050	BB 103 blue
1D2-1D3	8300041	BB 103 green
1D4	8300032	BA 138
1D5	8300050	BB 103 blue
2D1-2D2	8300131	1N 4148
2D3-2D4	8300142	AA 143
		OA 47
2D5-2D9	8300131	1N 4148
2D14-2D15	8300023	EM 502
		1N 4002
		1N 4003
2D16	8300128	ZPD 5,6V 5%
		BZX 79 5,6V
2D17-2D18	8300023	EM 502
		1N 4002
		1N 4003
2D19	8340081	ZTK 27 ass.
2D20	8300222	ZPD 2,7V 5%
		BZX 83 2,7V
2D21	8300131	1N 4148
2D37	8300131	1N 4148
2D47	8300131	1N 4148
2D48	8300029	ZPD 12V
		BZX 79 12 V
2D49	8300131	1N 4148
2D50	8300247	KB10 B40 C 1500

2D51	8300028	ZPD 9,1V 5%
		BZX 79 9,1V
2D52	8300128	ZPD 5,6V 5%
		BZX 79 5,6V
2D53-2D54	8300131	1N 4148
2D55	8300023	EM 502
		1N 4002
		1N 4003
2D200-2D304	8300131	1N 4148
3D1-3D11	8300131	1N 4148
3D12	8300222	ZPD 2,7V 5%
		BZX 83 2,7V
3D13	8300131	1N 4148
4D1-4D5	8300131	1N 4148
5D1	8300195	TIL 209 A
		LED 5074
8D1-8D2	8300023	EM 502
		1N 4003
		1N 4002

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2TR32	8320132	**20**	BC 548 B
		20	BC 172 B
		20	BC 183 B
		17	BC 183 BL
		20	BC 183 BK
2TR200 / 300	8320095	**20**	BC 549 B
2TR201 / 301		**20**	BC 184 B
2TR202 / 302		**17**	BC 184 BL
		20	BC 184 BK
2TR203 / 303	8320132	**20**	BC 548 B
		20	BC 172 B
		20	BC 183 B
		17	BC 183 BL
		20	BC 183 BK
2TR204 / 304	8320221	**20**	BC 549 C
2TR205 / 305		**20**	BC 184 C
		17	BC 184 CL
		20	BC 184 CK
2TR206 / 306	8320345	**24**	MPF 111
		21	E 5565
2TR207 / 307	8320132	**20**	BC 548 B
		20	BC 172 B
		20	BC 183 B
		17	BC 183 BL
		20	BC 183 BK
2TR208 / 308	8320377	**20**	BC 547 C
2TR209 / 309		**20**	BC 182 C
		17	BC 182 CL
		20	BC 182 CK
2TR210 / 310	8320092	**20**	BC 182 B
		17	BC 182 BL
		20	BC 182 BK
		20	BC 547 B
		18	BC 237 B
		1	BC 207 B
2TR211 / 311	8320132	**20**	BC 548 B
		20	BC 172 B
		20	BC 183 B
		17	BC 183 BL
		20	BC 183 BK
2TR212 / 312	8320365	**19**	MPS H54
2TR213 / 313	8320321	**19**	MPS A06
2TR214 / 314			
2TR215 / 315	8320132	**20**	BC 548 B
2TR216 / 316		**20**	BC 172 B
		20	BC 183 B
		17	BC 183 BL
		20	BC 183 BK
2TR217 / 317	8320104	**20**	BC 558 B
		20	BC 212 B
		17	BC 212 BL
		20	BC 212 BK
		20	BC 252 B
		18	BC 308 B
2IC1	8340071		MC 1355 PQ
2IC2	8340032		MC 1310 PQ
			CA 1310 Q
			LM 1310 Q
2IC3	8340028	**19**	MPS A13
2IC4		**19**	SPS 5418
2IC5	8340055		SAS 570 S
2IC6			
2IC9	8340025	**20**	BC 516
		19	MPS A65
		19	SPS 5431
2IC200 / 300	8340042	**39**	TIP 141
2IC201 / 301	8340041	**39**	TIP 146
3TR1	8320132	**20**	BC 548 B
3TR2		**20**	BC 172 B
		20	BC 183 B
		17	BC 183 BL
		20	BC 183 BK
3TR3	8320104	**20**	BC 558 B
		20	BC 212 B
		17	BC 212 BL
		20	BC 212 BK
		20	BC 252 B
		18	BC 308 B
3TR4	8320132	**20**	BC 548 B
		20	BC 172 B
		20	BC 183 B
		17	BC 183 BL
		20	BC 183 BK
3TR5	8320377	**20**	BC 547 C
		20	BC 182 C
		17	BC 182 CL
		17	BC 182 CK
3TR6	8320104	**20**	BC 558 B
3TR7		**20**	BC 212 B
		17	BC 212 BL
		20	BC 212 BK
3TR8	8320161	**20**	BC 212 B
3TR9		**20**	BC 212 BK
		17	BC 212 BL
		20	BC 251 B
3TR10	8320132	**20**	BC 548 B
3TR11		**20**	BC 172 B
		20	BC 183 B
		17	BC 183 BL
		20	BC 183 BK
3TR12	8320221	**20**	BC 549 C
		20	BC 184 C
		17	BC 184 CL
		20	BC 184 CK
3TR13	8320104	**20**	BC 558 B
		20	BC 212 B
		17	BC 212 B
		20	BC 212 BK
3IC1	8340070		MP 14516 CP
4TR200 / 300	8320069	**1**	BC 154
		19	BC 322 B
		18	BC 309 B
		20	BC 214 B
		20	BC 559 B
		18	BC 253 B
4TR201 / 301	8320095	**20**	BC 549 B
		20	BC 184 B
		17	BC 184 BL
		20	BC 184 BK
5TR1-	8320201	**20**	BC 183 B
5TR7		**20**	BC 183 BK
		17	BC 183 BL
		19	MPS 6515
		1	BC 207 B

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8002294

+15 V

LEFT CHANNEL

RIGHT CHANNEL

PHONO LEFT CHANNEL

TAPE - LEFT CHANNEL

PHONO RIGHT CHANNEL

TAPE - RIGHT CHANNEL

VOLUME - LEFT CHANNEL

VOLUME - RIGHT CHANNEL

BAL.

LOUDN.

LEVEL

8002293

2 IL1 FAULT

VOL.

MUTING

-12 V

15V SUPPLY

EL. SWITCH

+15 V St. by

SWITCH OFF

SWITCH ON

8002294

8002283

TREBLE

BASS

8002293

8002287

8002291

OFF HIGH OFF ON

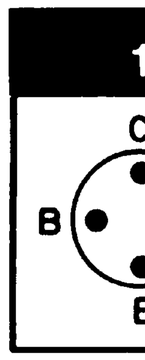
AFC I STEREO I PRESET LOUDNESS HT 2

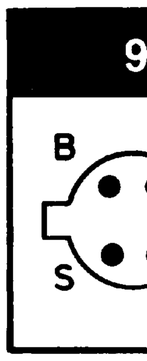
LEFT RIGHT PHONES FAULT SWITCH

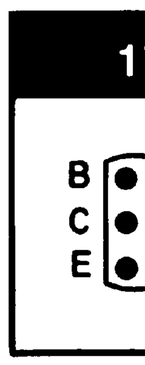
4 8

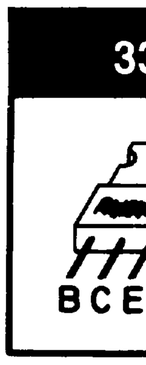
TRANSISTOR AND IC LIST

1TR1	8320119	4	U 1981 E
1TR2		21	2N 5245
		21	TIS 88 A
1TR3	8320136	4	U 1981 E
		21	3 C 2
		21	TIS 88 A
1TR4	8320112	26	BF 195
2TR1	8320311	23	BF 240
2TR2			
2TR14	8320316	20	BC 327
2TR15 –	8320132	20	BC 548 B
2TR22		20	BC 172 B
		20	BC 183 B
		17	BC 183 BL
		20	BC 183 BK
2TR23	8320104	20	BC 558 B
		20	BC 212 B
		17	BC 212 BL
		20	BC 212 BK
		20	BC 252 B
		18	BC 308 B
2TR24	8320316	20	BC 327
2TR25	8320132	20	BC 548 B
		20	BC 172 B
		20	BC 183 B
		17	BC 183 BL
		20	BC 183 BK
2TR26	8320161	20	BC 212 B
		20	BC 212 BK
		17	BC 212 BL
		20	BC 251 B
2TR27	8320257	33	TIP 32 A
		34	2N 4919
		34	MJE 2371
2TR28	8320316	20	BC 327
2TR29	8320132	20	BC 548 B
		20	BC 172 B
		20	BC 183 B
		17	BC 183 BL
		20	BC 183 BK
2TR30	8320104	20	BC 558 B
		20	BC 212 B
		17	BC 212 BL
		20	BC 212 BK
		20	BC 252 B
		18	BC 308 B
2TR31	8320240	32	BD 136
		32	BD 136/W
2TR32	8320132	20	BC 548 B
		20	BC 172 B
		20	BC 183 B
		17	BC 183 BL
		20	BC 183 BK
2TR200/300	8320095	20	BC 549 B
2TR201/301		20	BC 184 B
2TR202/302		17	BC 184 BL
		20	BC 184 BK
2TR203/303	8320132	20	BC 548 B
		20	BC 172 B
		20	BC 183 B
		17	BC 183 BL
		20	BC 183 BK
2TR204/304	8320221	20	BC 549 C
2TR205/305		25	BC 149 C
2TR206/306	8320345	24	MPF 111
		21	E 5565
2TR207/307	8320132	20	BC 548 B
		20	BC 172 B
		20	BC 183 B
		17	BC 183 BL
		20	BC 183 BK
2TR208/308	8320377	20	BC 547 C
2TR209/309		20	BC 182 C
		17	BC 182 CL
		20	BC 182 CK
2TR210/310	8320092	20	BC 182 B
		17	BC 182 BL
		20	BC 182 BK
		20	BC 547 B
		18	BC 237 B
		1	BC 207 B
2TR211/311	8320132	20	BC 548 B
		20	BC 172 B
		20	BC 183 B
		17	BC 183 BL
		20	BC 183 BK
2TR212/312	8320365	19	MPS H54
2TR213/313	8320321	19	MPS A06
2TR214/314			
2TR215/315	8320132	20	BC 548 B
2TR216/316		20	BC 172 B
		20	BC 183 B
		17	BC 183 BL
		20	BC 183 BK
2TR217/317	8320104	20	BC 558 B
		20	BC 212 B
		17	BC 212 BL
		20	BC 212 BK
		20	BC 252 B
		18	BC 308 B
2IC1	8340071		MC 1355 PQ
2IC2	8340032		MC 1310 PQ
			CA 1310 Q
			LM 1310 Q
2IC3	8340028	19	MPS A13
2IC4		19	SPS 5418
2IC5	8340055		SAS 570 S
2IC6			
2IC9	8340025	20	BC 516
		19	MPS A65
		19	SPS 5431
2IC200/300	8340042	39	TIP 141
2IC201/301	8340041	39	TIP 146
3TR1	8320132	20	BC 548 B
3TR2		20	BC 172 B
		20	BC 183 B
		17	BC 183 BL
		20	BC 183 BK
3TR3	8320104	20	BC 558 B
		20	BC 212 B
		17	BC 212 BL
		20	BC 212 BK
		20	BC 252 B
		18	BC 308 B
3TR4	8320132	20	BC 548 B
		20	BC 172 B
		20	BC 183 B
		17	BC 183 BL
		20	BC 183 BK
3TR5	8320377	20	BC 547 C
		20	BC 182 C
		17	BC 182 CL
		20	BC 182 CK
3TR6	8320104	20	BC 558 B
3TR7		20	BC 212 B
		17	BC 212 BL
		20	BC 212 BK
3TR8	8320161	20	BC 212 B
3TR9		20	BC 212 BK
		17	BC 212 BL
		20	BC 251 B









3TR10
3TR11
3TR12
3TR13
3IC1

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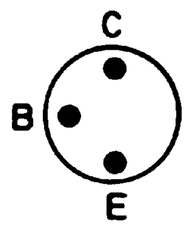
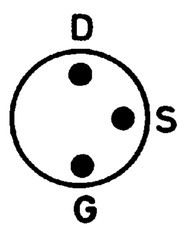
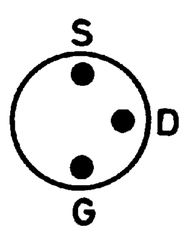
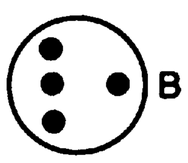
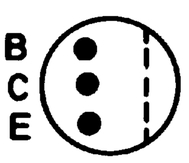
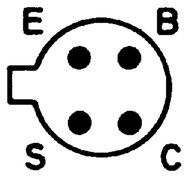
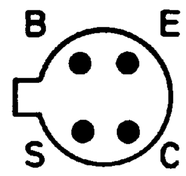
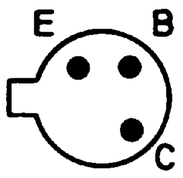
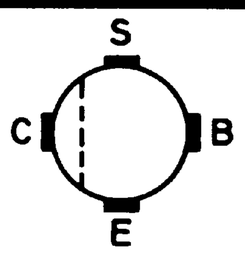
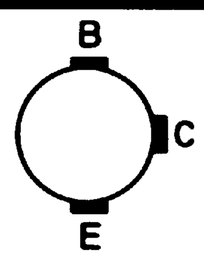
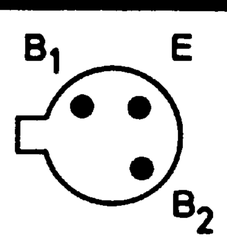
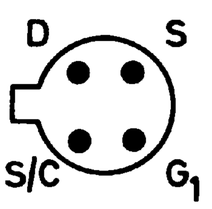
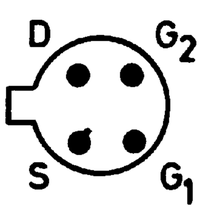
1	2	3	4	5	6	7	8
							

9	10	11	12	13	14	15	16
							

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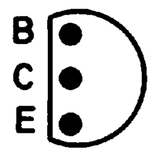	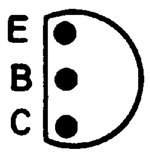	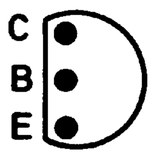	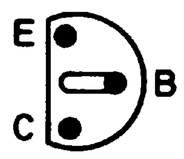		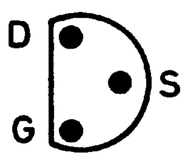		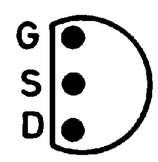

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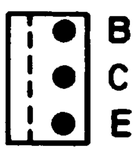
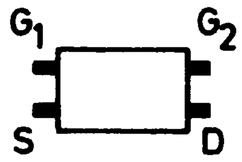
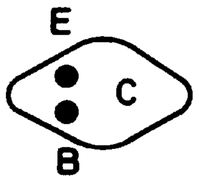
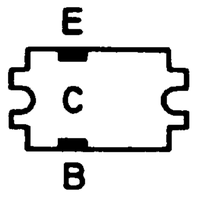
			 TOP VIEW				

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				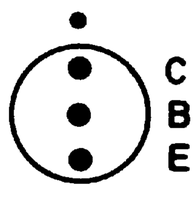	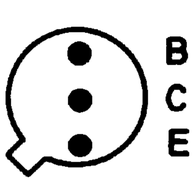		

3TR10	8320132	**20**	BC 548 B
3TR11		**20**	BC 172 B
		20	BC 183 B
		17	BC 183 BL
		20	BC 183 BK
3TR12	8320221	**20**	BC 549 C
		25	BC 149 C
3TR13	8320104	**20**	BC 558 B
		20	BC 212 B
		17	BC 212 B
		20	BC 212 BK
3IC1	8340070		MP 14516 CP

4TR200/300	8320069	**1**	BC 154
		19	BC 322 B
		18	BC 309 B
		20	BC 214 B
		20	BC 559 B
		18	BC 253 B
4TR201/301	8320095	**20**	BC 549 B
		20	BC 184 B
		17	BC 184 BL
		20	BC 184 BK
5TR1 -	8320201	**20**	BC 183 B
5TR7		**20**	BC 183 BK
		17	BC 183 BL
		19	MPS 6515
		1	BC 207 B

PRINTED IN DENMARK

8050054

TUNER

FM-AERIAL

1

IF / STE

8002283

FM - PROGRAM

4

SUPPLY

2

8002288

PROGRAM SELECTION SWITCH

5

PROGRAM - INDICATION

PROGRAM SELECTION

Bang & Olufsen

8002294

8002288
5 IL 1 STEREO
6,3V
P3 5
P3 6
+15V

R7 560 B2 12 V
R10 330 11 V
BP 2
TP2
R15 100 A2
R8 5K6 A2
C5 22n A2
R11 560 A2
R14 820 A2 13,5V
5,3 V
TR 2 10 V A2
0,8V
C7 10n A2
IC1 A2
C13 56p A3
A3 L2 A3 L3
C14 39p A3
C15 3p3 A3
D3 A3
R17 1K5 A3
C16 47p A3
C17 47p A3
D4 A3
R18 1K5 A3
C18 10µ A3
R19 12K A3
R20 5K6 A3
R16 270 A3
C6 1n A1
0,1V
R9 390 A1
R12 22 A1
R13 330 A2
C8 10n A2
C9 10n A2
C10 10n A2
C11 10n A2
C12 10n A2

R21 180 A2 14 V
A4 L4
C19 47p A4
C23 220µ A2
C20 2µ2 B3
1,3 V
12,5V
R23 68 B3
R25 220 B3
R 200 4K7 B3
R 300 4K7 B3
47µ C99 A3
11,5V
TP4
IC 2 B3
C21 47n B3
C22 680p B3
R22 47K B4
C27 0,47µ B4
C200 4n7 B3
LP200 B3
C 201 A3 2µ2
R201 820K B3
R203 10K B2
TR200 B2
1,3V
4 V
0,7 V
C203 C202 B3 2µ2 2µ2
C3
LEFT CHANNEL
R202 100K A3
R204 680 A2
2K7 R28 A2

P3 6
TP3
R38 150K A4
R39 470K A4
3,4V
C24 60p A3
C25 440p A3
18K7 R24 A3
C26 B4 220n
B4 1K R26
C28 B4 470n
100 K R 27 B4
P1 1 B4
8002283
AFC STEREO
F2 F1
R9 1K G2
C2 100n F1
4
P1 17
R37 680K A4
R35 680K A4
IC4 A4
7,2V
4V
2,9 V
R40 470K A3
C30 220n A2
C31 220n A3
C100 100n A4
R34 39 A4
R36 47 A4
R32 270K A4
C29 100n A4
R30 39 K A4
R31 25 K A4
IC3 A4
7,2V
4V
TUNING - INDIC.
8002288
5 IL 2
5 IL 3
P3 9
P3 7
IF / STEREO - DECODER

LP300 B3
C301 B3 2µ2
TR300 B2
1,3V
11,5 V
4V
0,7V
R301 820K B3
R303 10K B2
25 K R29 B2
C303 C302 B3 2µ2 2µ2
C3
RIGHT CHANNEL
C300 4n7 B3
R302 100K B2
R304 680 B2

R33 1M A4
A4
D56
27V
R41 47 K C3
R42 47K C3
C32 22n C3
D7 C3
D8 C3
D9 C3
P1 14
P1 15
P1 16
FM3 FM4 FM5
100K R5 I1
100K R6 I1
100K R7 J1
25 K R8 J2
D4 I1
D5 I2
3,5V
SWITCH OFF
+15 V St.by
QL
QR
QBL
QBR

D3
R43 22K D3
R44 22K D3
R45 22K D3
R46 22K D3
C33 22n
C34 22n
3,3V
0V 0V 28V
FM3 FM4 FM5
IC6 C4
15K R47 C3
12V
2

8002292
÷12V
C1 TR1 D1 ÷11,3V
C2 D2 ÷11,3
R6 1M C1
TR2 C1
R13 22K C1
R14 56K C1
C3 2µ2 B1
100K R11 A1
C4 B1
R16 100K B1
R18 100K B1
R20 100K B1
R22 100K B1
÷11,8 V
R1 12K C2
C1 C2 220n
D3 C2
D4 C2
R5 1M C2
C2 C2 3n3
R7 56K C1
R8 12K C1
TP1
12 V
D9 C1
D10 C1
TR4 B1
÷12V
0V
D5 C1
D6 C1
TR3 C1
D7 B1
D8 B1
R15 100K B1
R17 120K C1
R19 240K B1
R21 470K B1
R23 910K B1
R24 470K B1
R25 7K5 A1
÷6 V
7,7 V
C5 2µ2 C1
R2 100K C2
R3 5M6 C2
R4 10M B2
R9 330K C1
R10 1M C1
R12 100K A1
R28a 470K
MUTING
2,9V
D11 A1
2,4 V
TR6 A2
R28 470K B2
2,5V
3
C6 100n A1
5M6 R26 A2
3V
2 IL1 FAULT
R27 8K2 A2
R29 2K7 A2
R30 560 A1
R31 4K7 11V
C8 2µ2 A1
C9 22n A1
R33 15K A1
TR7 A2
10,5V
1V
R32 1K2 A2
R34 39K A2
L1 A2
C7 4n7 A2
TP2
9V
C10 0,47µ B2
100K R35 B2
TR8 B2
TR 9 B2
R39 100K B2
C13 0,47µ B2
12,5V
100K R36 B2
12,3V TR 10 C2
DOWN UP
TR 11 B2 12,3V
R40 100K B2
R37 100K C2
C11 3p3 C2
C12 3p3 B2
100K R38 A2
D12 A2
15V
+15V
R41 6K8 A2
8,4V
TR12 A1
VOL. - INDIC.
6
IL1
DOWN
D13 A1
TP3
7,9V
TR13 A1
R1 680
UP
IL2
7,7V
R42 33K A1
8002289
18 V
EL. VOLUME - CONTROL
VOL.
SWITCH ON

P3 10
P3 12
P3 11
8002288
TR4
TR5
TR6
TR7
33 R3
11 V
IL7
2,5V
IL8
IL9
IL10
P3 13
P3 14
DICATION

C80 22n
C82 22n
C84 22n
100K R116 R118 10M D4 D4
100K R120 R122 10 M C4 C4
100K R124 R126 10M B4 C4 B4
D37 B4
C86 1µ B4
R128 100K R130 10M B4 B4
15,5V
TR19 C4
TR20 C4
TR21 B4
St.by A4
TR22 B4
FM4
FM5
C83 3p3 C4
C85 3p3 B4
C87 3p3 A4
100K R117 C4
100K R121 C4
100K R125 B4
100K R129 A4
SELECTION
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Bang & Olufsen

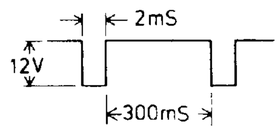
FEINEINSTELLUNG DES LEERLAUFSTROMS:

Der Leerlaufstrom wird feineingestellt, während der Empfänger kalt ist, und bei herabgedrehtem Lautstärkeregler. *Lautsprecher dürfen nicht angeschlossen sein.*

Mit 2R249 (2R349) auf 25 mA im Kollektor von 2IC200 (2IC300) oder 12 mV über 2R256 (2R356) justieren.

Wenn der Empfänger 10 Minuten mit herabgedrehtem Lautstärkeregler angeschlossen gewesen ist, wird der Leerlaufstrom kontrolliert und wieder auf 25 mA oder 12 mV über dem Emitterwiderstand justiert.

TESTPUNKTER/TESTPOINTS/ TESTPUNKTE

2TP2	IF signal
2TP3	FM detector adjustment
2TP4	Osc. adjustment (2C24) 3 V_{pp} square-wave 19 kHz
2TP13	27 V ± 1,5 V
2TP14	–11,5 V ± 1,5 V
2TP15	15 V ± 0,1 V
2TP16	15,5 V ± 0,3 V
2TP17	15 V in STAND BY. 0 V on program.
2TP202	12 mV
2TP302	12 mV
2TP203	0 V ± 200 mV
2TP303	0 V ± 200 mV
3TP1	12 V_{pp} 
3TP2	3,2 V eff. (RMS), 9 V_{pp} approx. 100 kHz
3TP3	7,9 V, volume in MEDIUM
4TP1	Tuning voltage

FM SIGNALNIVEAUER/FM SIGNAL LEVELS/UKW SIGNALNIVEAUS

2TP1	9 mV
2TP2	100 mV
2TP3	180 mV, 1 kHz

FØLSOMHEDER/ SENSITIVITIES/ EMPFINDLICHKEITEN

2TP200	150 mV
2TP300	150 mV
2TP201	160 mV
2TP301	160 mV
Phono	3 mV
Tape	220 mV

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DIODE LIST		
0D1	8310023	B80 C5000/3000
1D1	8300050	BB 103 blue
1D2-1D3	8300041	BB 103 green
1D4	8300032	BA 138
1D5	8300050	BB 103 blue
2D1-2D2	8300131	1N 4148
2D3-2D4	8300142	AA 143
		OA 47
2D5-2D9	8300131	1N 4148
2D14-2D15	8300023	EM 502
		1N 4002
		1N 4003
2D16	8320128	ZPD 5,6 V 5 %
		BZX 79 5,6 V
2D17-2D18	8300023	EM 502
		1N 4002
		1N 4003
2D19	8340081	ZTK 27 ass.
2D20	8300222	ZPD 2,7 V 5 %
		BZX 83 2,7 V
2D21	8300131	1N 4148
2D37	8300131	1N 4148
2D47	8300131	1N 4148
2D48	8300029	ZPD 12 V
		BZX 79 12 V
2D49	8300131	1N 4148
2D50	8300247	KB10 B40 C1500
2D51	8300028	ZPD 9,1 V 5 %
		BZX 79 9,1 V
2D52	8300128	ZPD 5,6 V 5 %
		BZX 79 5,6 V
2D53-2D54	8300131	1N 4148
2D55	8300023	EM 502
		1N 4002
		1N 4003
2D200-2D304	8300131	1N 4148
3D1-3D11	8300131	1N 4148
3D12	8300222	ZPD 2,7 V 5 %
		BZX 83 2,7 V
3D13	8300131	1N 4148
4D1-4D5	8300131	1N 4148
5D1	8300195	TIL 209 A
		LED 5074
8D1-8D2	8300023	EM 502
		1N 4003
		1N 4002

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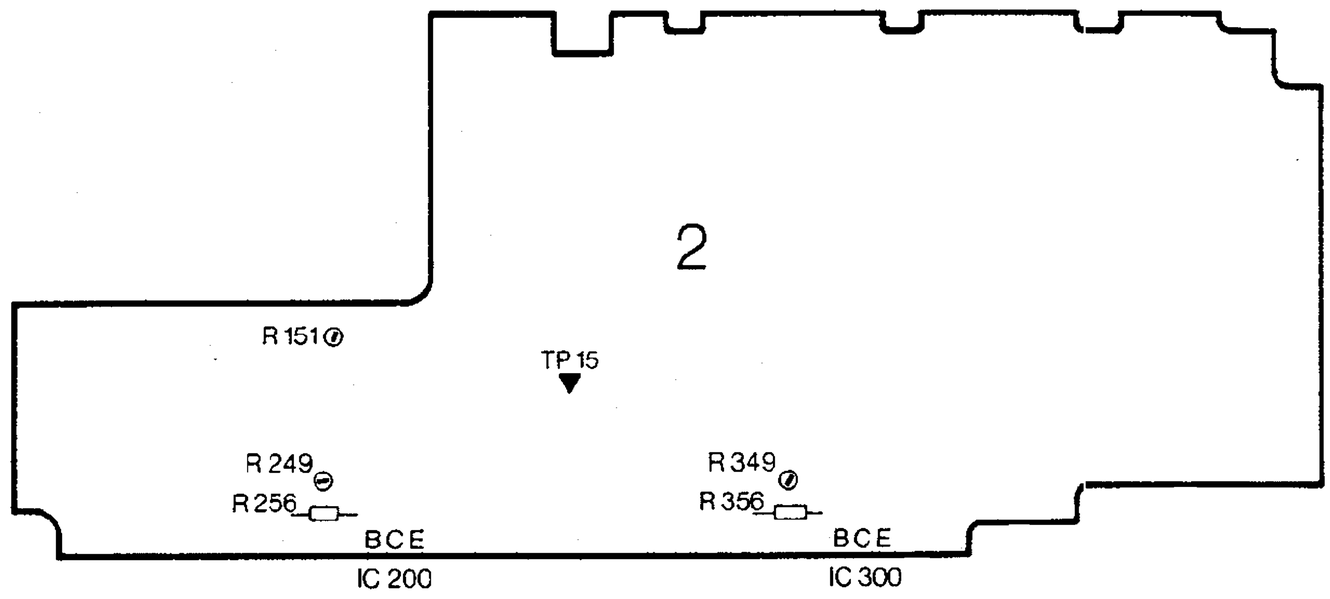
ADJUSTMENTS

15-VOLT SUPPLY

With the receiver switched to FM, adjust 2R151 so that 15 volts is present at 2TP15.



NO-SIGNAL CURRENT

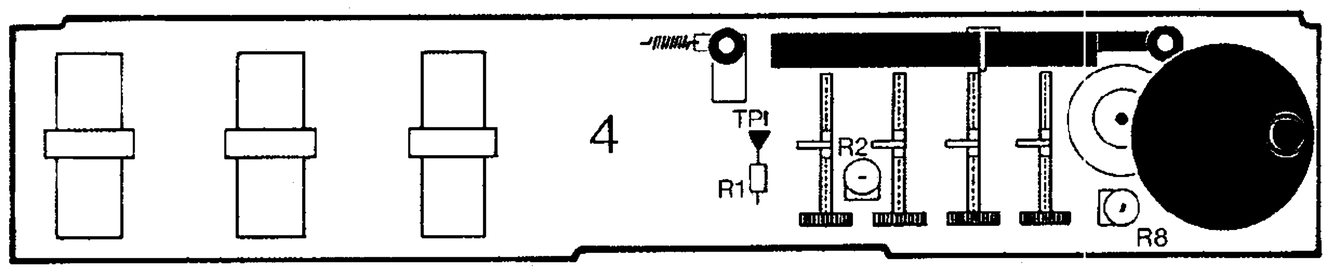
No-signal current is adjusted while the receiver is cold and with the volume control turned down.

Speakers must not be connected.

With 2R249 (2R349) adjust for 25 mA collector current in 2IC200 (2IC300) or - 12 mV across 2R256 (2R356).
When the receiver has been on for ten minutes, with the volume control turned down, check the no-signal current and again adjust for 25 mA or 12 mV across the emitter resistor.

TUNING VOLTAGE

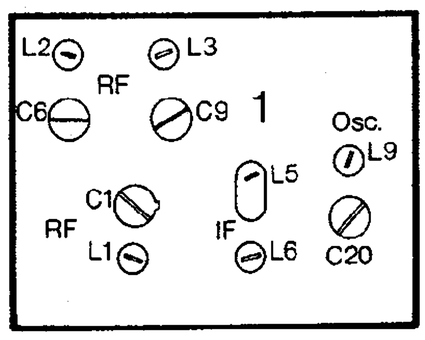
With receiver switched to FM 1 and potentiometer 4R3 turned against the stop at 88 MHz, adjust 4R2 so that 4.5 volts is present at 4TP1.



With receiver switched to FM 5 and potentiometer 4R7 turned against stop at 88 MHz, adjust 4R8 so that 4.6 volts is present at 4TP1.

VHF TUNER

Set tuning control to 89 MHz and sweep generator to 89 MHz.
With 1L1, 1L2, 1L3 and 1L9 adjust for max. IF curve at 2TP2.
Set tuning control to 106 MHz and sweep generator to 106 MHz.
With 1C1, 1C6, 1C9 and 1C20 adjust for max. IF curve at 2TP2.
Check dial accuracy and repeat adjustment if necessary.



Set tuning control to 97 MHz and sweep generator to 97 MHz. With 1L5 and 1L6 adjust for max. IF curve at 2TP2.

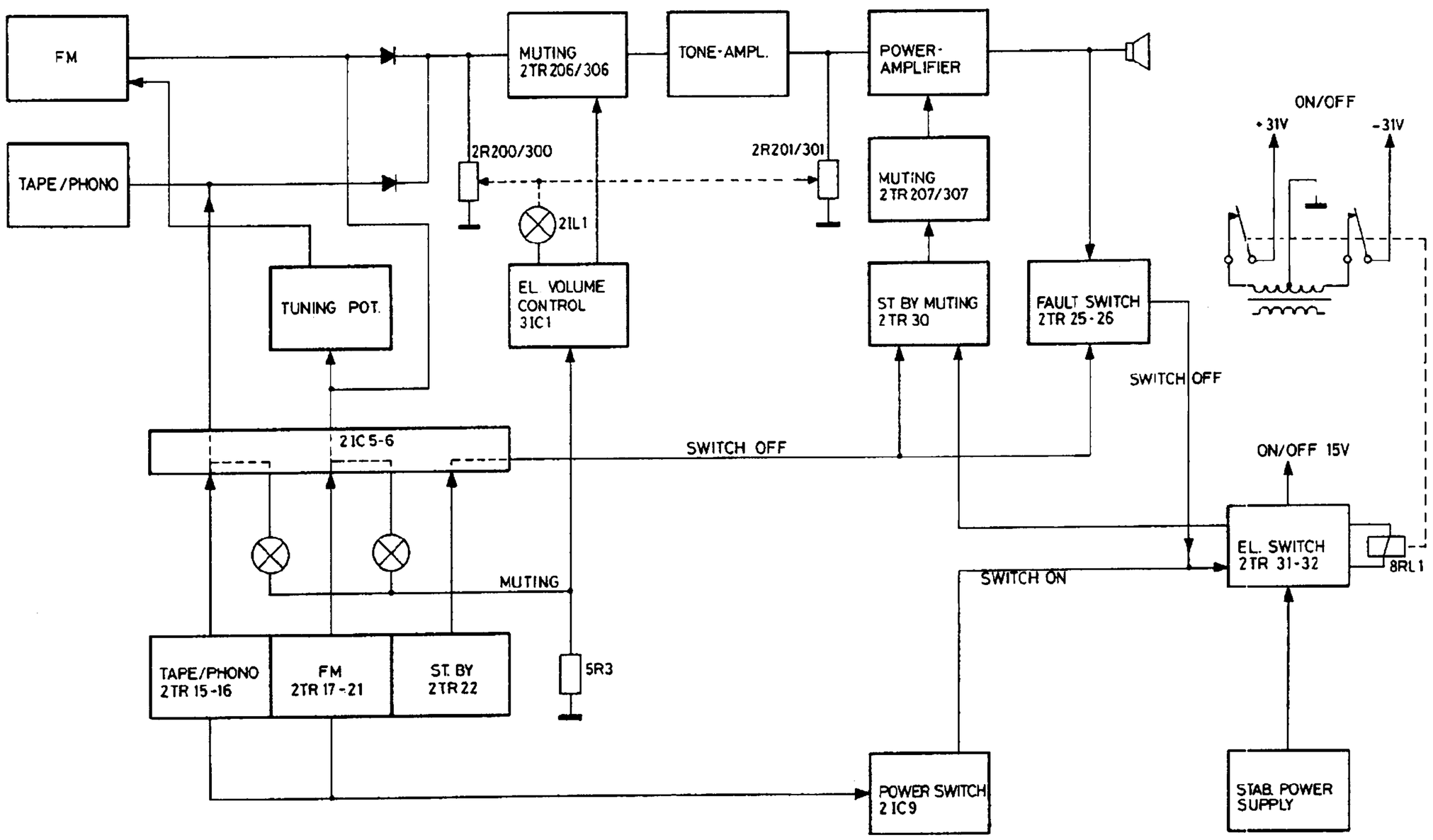
DETECTOR

Adjust 2L2 for max. S-curve, measured at 2TP3.
Set tuning control so that so signal is being received and adjust 2L3 so that 0 volts is present at 2TP3.

Bang & Olufsen

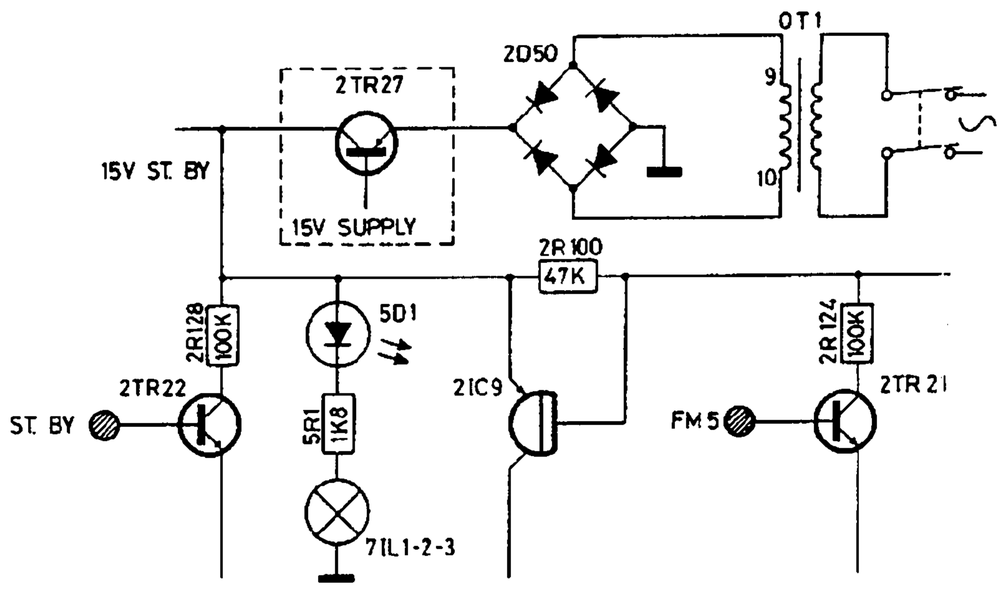
DESCRIPTION
BEOMASTER 1900

This description covers the switch functions, muting circuits and counter circuits for volume regulation. The other circuits are considered known and therefore will not be described.



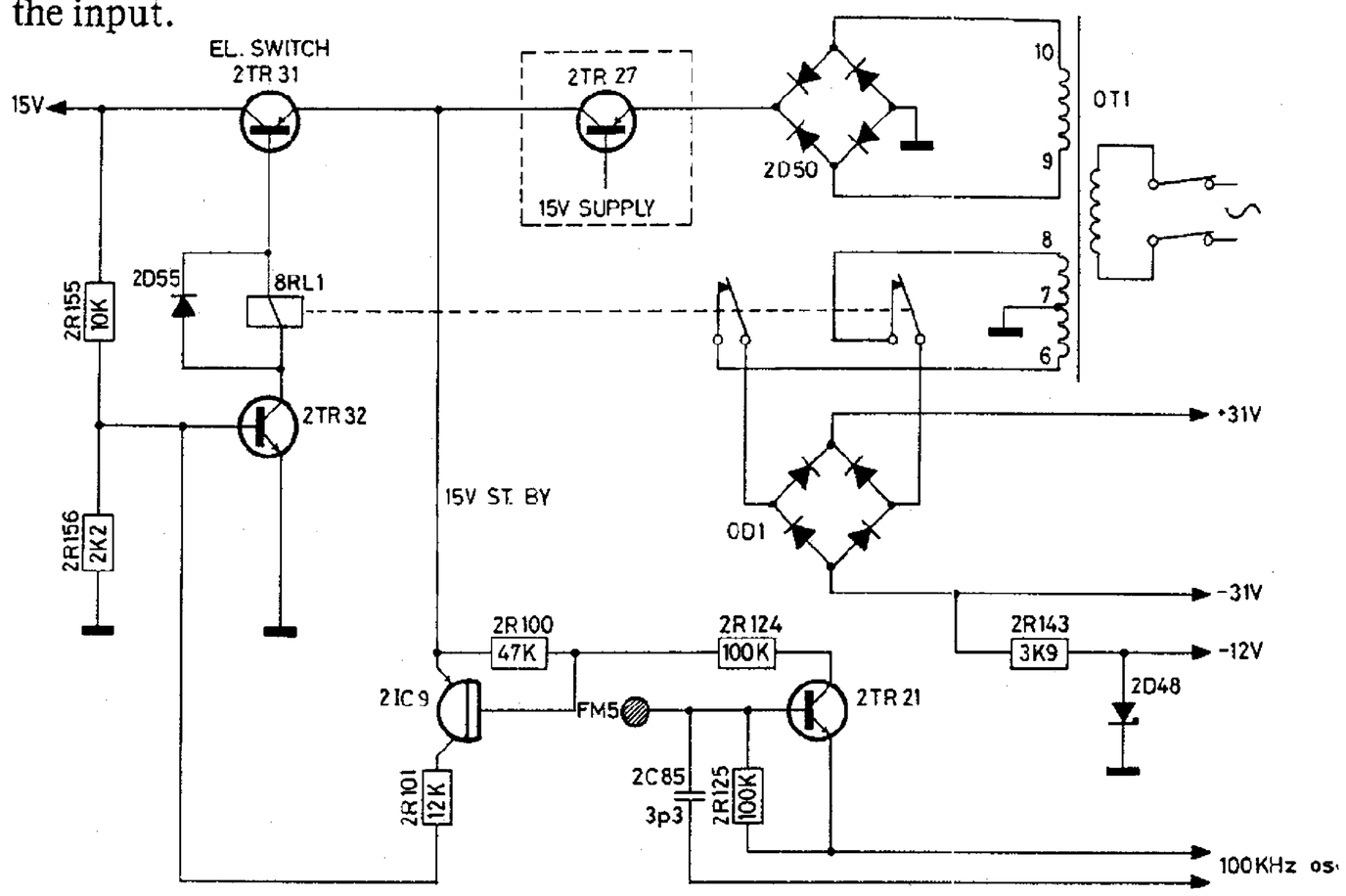
STAND BY

When the on/off switch is operated, 15V stabilised appears at the collector of 2TR27. 15V stand by is brought out to the PROGRAM SELECTION circuit and the anode of 5D1 (stand by indicator), which lights. Return current is fed through 5R1 and dial lights 7IL1-2-3. The set is now ready to receive orders. Orders can be given by touching the control fields.



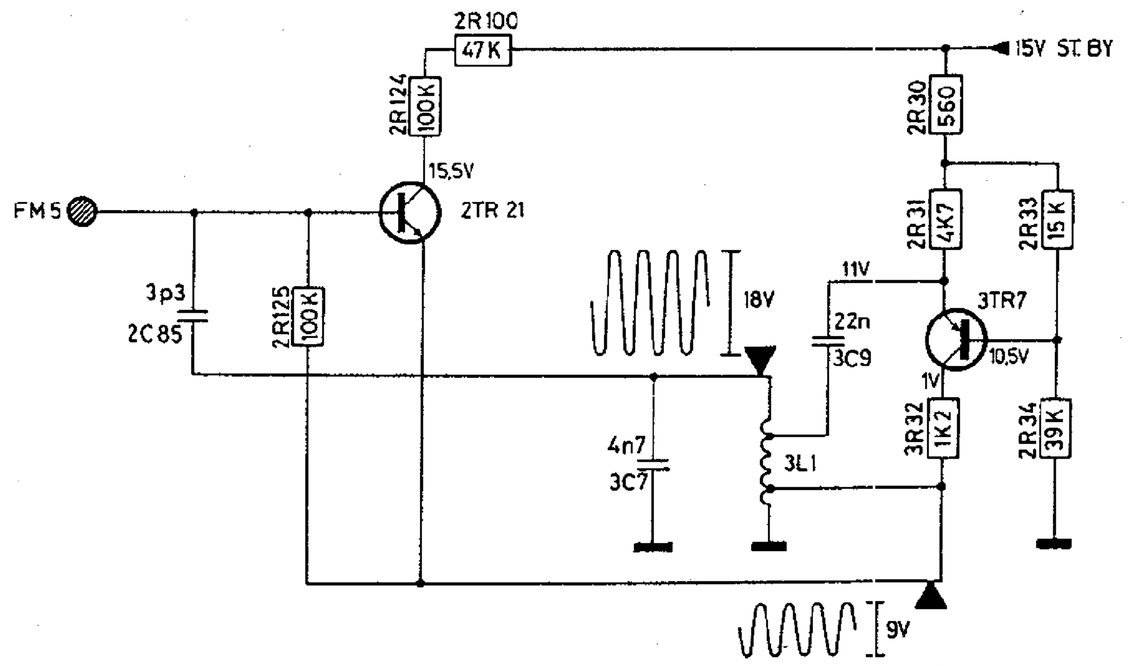
ON

When one of the control fields is touched, the EL. SWITCH, 2TR31 and 2TR32, is activated via 2IC9; also, the relay is energised, applying supply voltage to the rest of the receiver; ± 31V unstabilised is applied to the output amplifier, —12V to EL. VOLUME CONTROL, 27V to FM tuning, and 15V to tuner, IF, decoder, pre-amplifier, tone amplifier, and PROGRAM INDICATION. The stand by indicator turns off when 15V appears at the cathode.
In addition to the application of supply voltage, a pair of switch diodes, 2D200, 2D300, are activated, enabling the signal to pass on to the amplifier.
Furthermore the 15V are applied as supply voltage to 2IC5 and 2IC6 through 2D20. Apart from reducing the voltage, 2D20 prevents noise impulses on the supply rail from cansing the IC to change program. This will happen if the supply voltage briefly becomes higher than the voltage on the input.

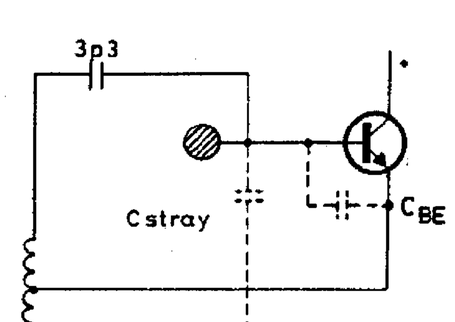


PROGRAM SELECTION

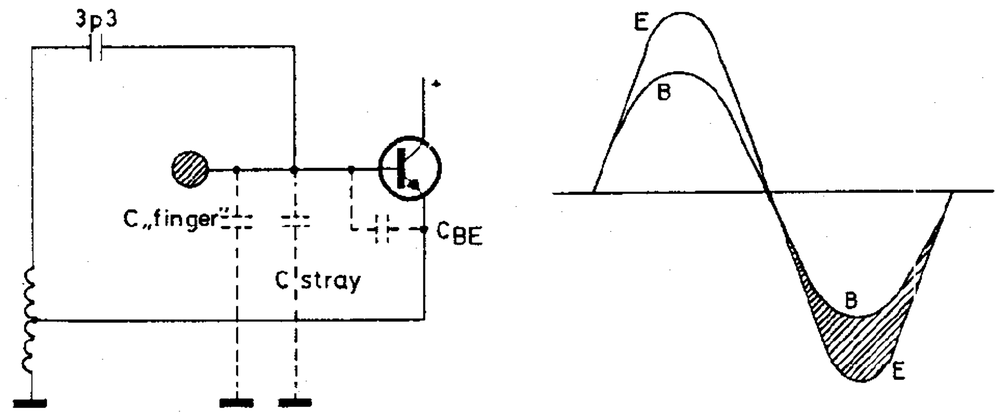
The heart of the circuit is a 100 kHz oscillator, 3TR7, 3L1 and 3C7. The oscillator coil supplies 100 kHz power to the transistors of the PROGRAM SELECTION circuit, 2TR15 - 2TR22.



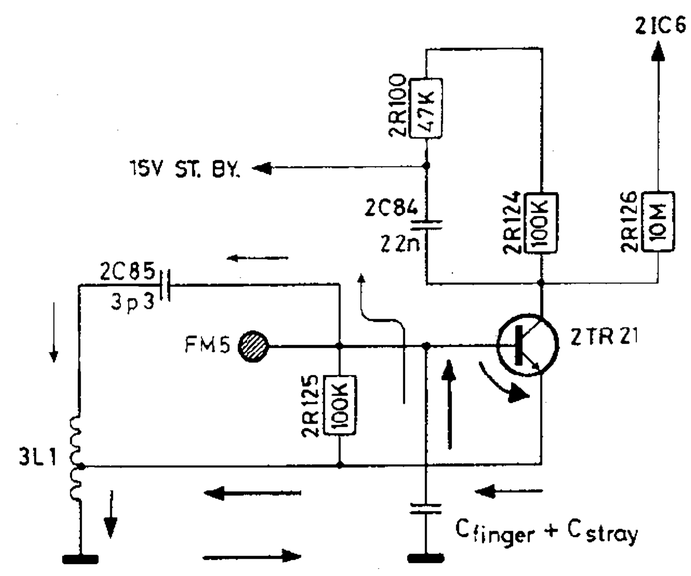
The amplitude of the 100 kHz voltage at the emitter of 2TR21 is approx. 3V rms whilst approx. 6V rms is present at the top of 3L1.
This voltage is fed to the base of 2TR21 through 2C85. The base is connected to the FM 5 control field through a solder terminal and a bronce spring.
The capacitance of 2C85 is 3.3 pF because C spread is 3.3 pF. This provides a division of the 6V voltage so that 3 V will be present at the base just like at the emitter. Hence balance exists between the emitter and base, and the transistor is OFF.



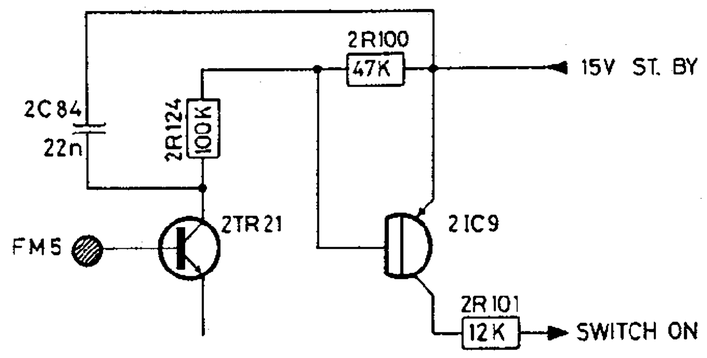
When the control field is touched, a different capacitance to chassis potential will exist (approx. 7 pF). This affects the voltage division ratio so that a lower amplitude is now present at the base than at the emitter, causing the transistor to go ON during the half-cycles in which the base is positive relative to the emitter.



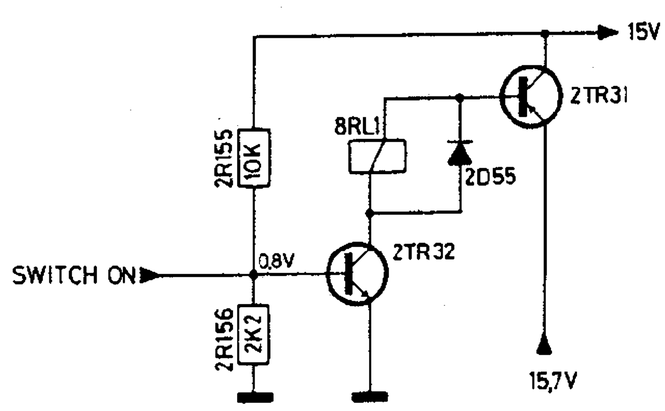
This will result in a flow of pulsating current in the direction of the arrows, and the same amount of collector current will flow in the transistor. This pulsating current is integrated across 2C84, and a voltage drop occurs at the collector of 2TR21.



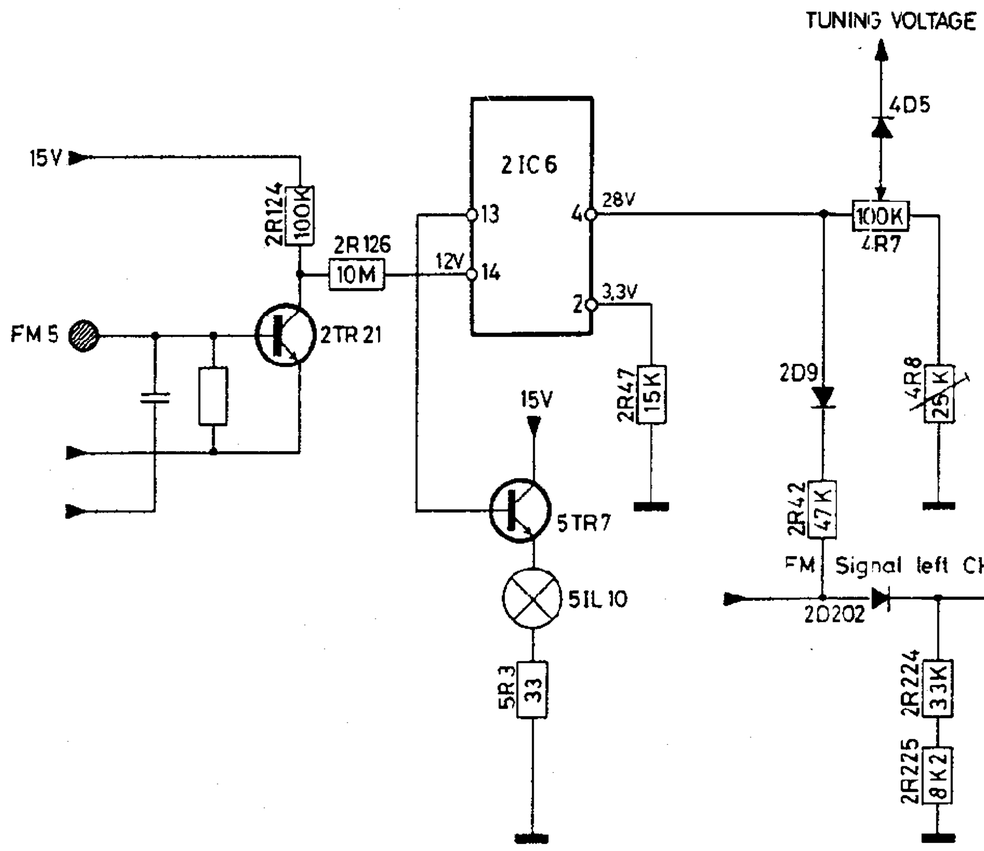
Supply voltage for 2TR21 is obtained through 2R100 and 2R124. When the collector of 2TR21 goes towards chassis potential, the base of 2IC9 will likewise go towards chassis. This will cause the base/emitter voltage to increase, and 2IC9 goes ON.



As long as the control field is touched, a current flows from the collector of 2IC9 to the base of 2TR32. 2TR32 will go ON, drawing its current from the base of 2TR31 through relay coil 8RL1. The relay operates, applying supply voltage, + and -31 V, to the output and -12 V to the volume-control counter circuit. Simultaneously, 2TR31 goes ON and receives 15 V at its collector. This causes 2TR32 to receive constant base bias through voltage divider 2R155 - 2R156; the transistor is ON; and the FM 5 setting is locked. Supply voltage is now applied to the entire receiver. The stand by indicator, 5D1, turns off, 15 V now being present on both sides.



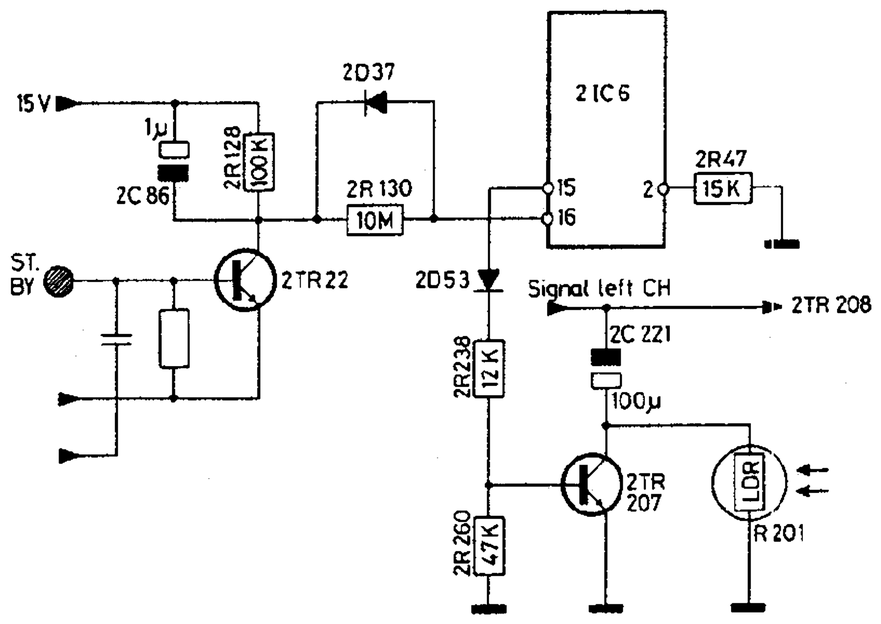
In addition to activating the power supply to the rest of the receiver, the negative voltage jump at 2TR21 is also applied to pin 14 of 2IC6 through 2R126.



When pin 14 of 2IC6 goes towards chassis potential, a positive-going pulse appears at pin 2 across 2R47. This causes the preceding program to be turned off. Simultaneously therewith, a positive voltage appears at pins 13 and 4.
From pin 13, the voltage is fed to 5TR7, which goes ON, and lamp 5IL10 (FM 5) lights.
From pin 4, tuning voltage is fed up to the tuning potentiometer, 4R7. In addition, the voltage at pin 4 is fed through 2D9 and 2R42 to 2D202. The diodes receive forward bias, allowing the FM signal to pass. Simultaneously with this, 2D200 (phono) and 2D201 (tape receive reverse voltage, thereby preventing the passage of any signal on these programs. The same voltage is employed as base bias for 2TR1 and 2IC3.

OFF

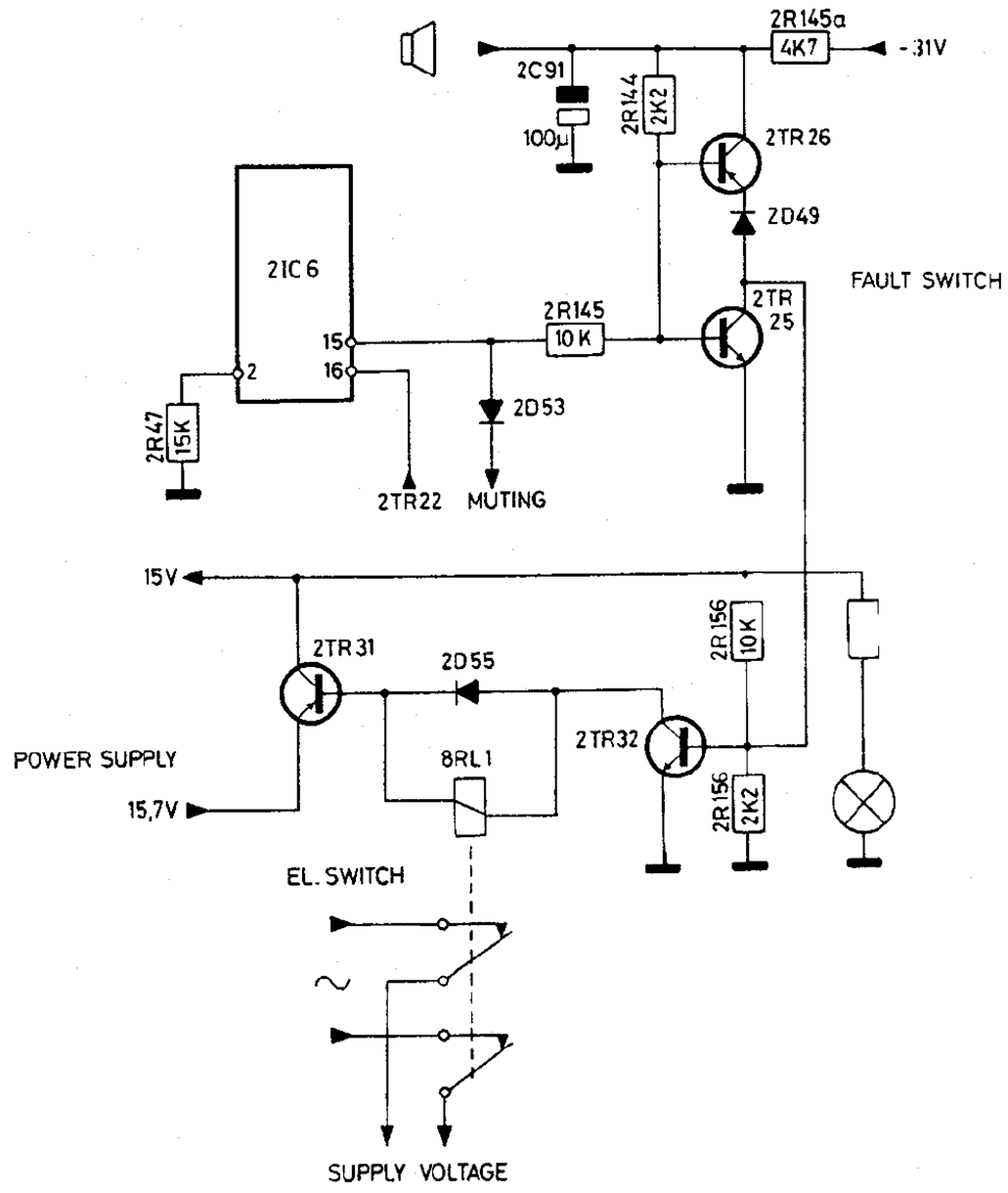
The receiver is turned off by touching the stand by field. The resulting voltage drop at the collector of 2TR22 passed via 2D37 and 2R130 to pin 16 of 2IC6.



At pin 15 there now appears a positive voltage, which is fed to muting transistor 2TR207 through 2D53. The muting transistor goes ON, and the signal is shorted to chassis potential.

2D37 insures during "Switch OFF" that the 2IC6 input pin 16 is held below the supply voltage, as otherwise the positive voltage on output pin 15 would disappear and thus preventing the apparatus from going in "Stand by".

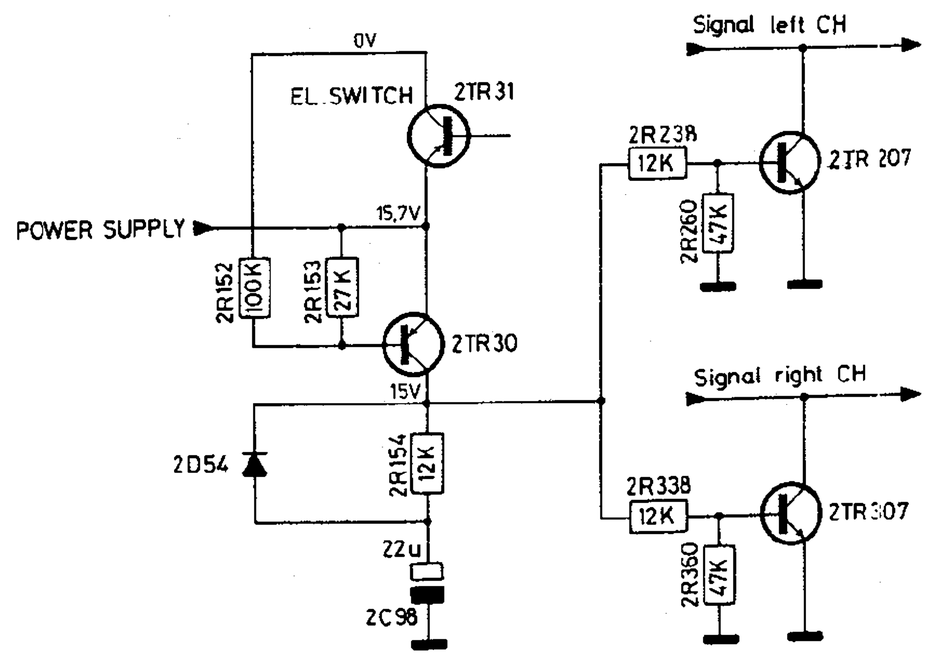
Furthermore, the voltage is fed to the output stage FAULT SWITCH 2TR25 and 2TR26. 2TR25 goes ON, the collector is placed at chassis potential, which potential is transmitted to 2TR32 in EL SWITCH.



2TR32 goes OFF, relay 8RL1 releases, and the supply voltage for the output stages disappears. 2TR31 also goes OFF, and the 15 V supply voltage at the collector disappears. From now on, supply voltage is pressent only at the PROGRAM SELECTION circuit.

MUTING WHILE SWITCHING ON

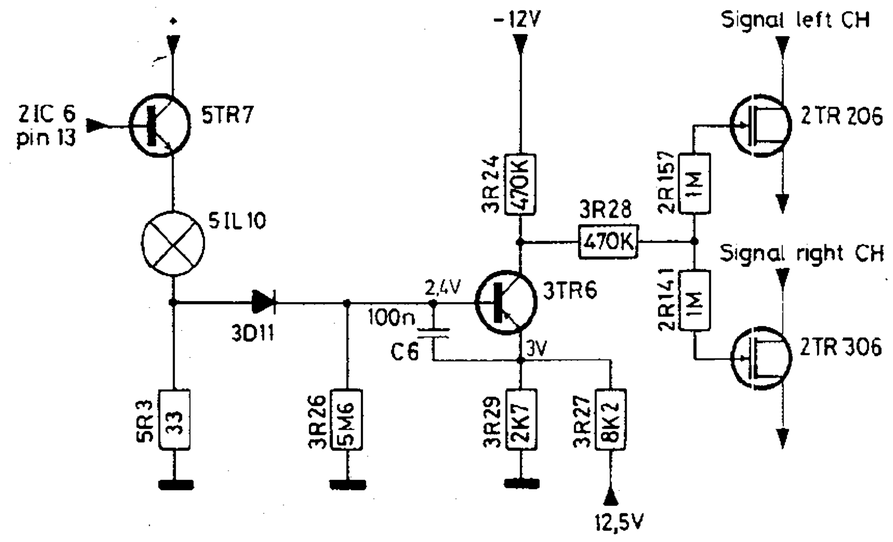
When the set is in stand by, 15 V is present at the collector of 2TR30 and 2C98 carries a charge. The 15 V at the collector keeps the muting transistors, 2TR207 and 2TR307, ON so that any signal is shorted to chassis potential as long as the set is in stand by.



When a program is selected, 2TR30 goes OFF and the 15 V potential disappears from the muting transistors. However, the muting transistors are kept ON until 2C98 is discharged. Discharge occurs through 2D54 and resistors 2R238 and 2R338; the discharge time is determined by these components and is approx. 200 msec.
When stand by is activated, 2TR30 goes ON and 2C98 charges again through 2R154.

MUTING WHILE SWITCHING PROGRAMS

When switching programs there appears across 5R3 a positive voltage jump which is applied to the base of 3TR6. 3TR6 goes OFF, causing -12 V to be present at its collector. The -12 V potential is applied via 2R141 and 2R157 to the muting transistors, 2TR206 and 2TR306, which go OFF, thus blocking the signal path.



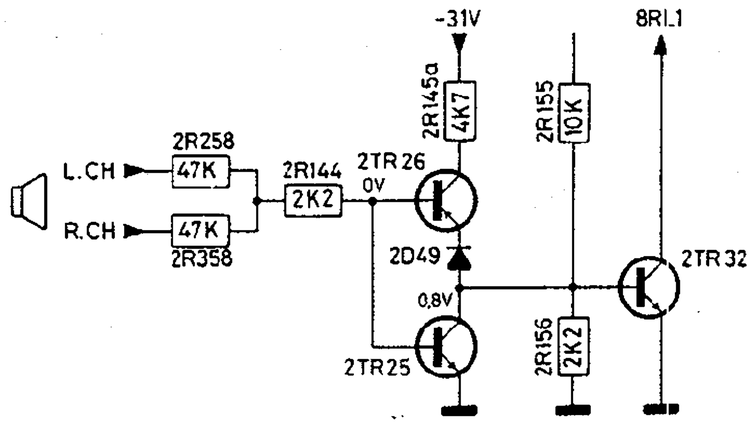
This remains blocked until 3C6 is discharged, which lasts approx. 500 msec. 3D11 secures that 3C6 will not discharge through 5R3 but only through 3R26.

MUTING WHILE SWITCHING OFF

When the set is switched off, the positive pulse appearing at pin 15 of 2IC6 is fed to muting transistors 2TR207 and 2TR307, causing them to go ON. Simultaneously therewith the 15 V supply voltage disappears, and 2TR30 goes ON. The 15 V potential at the collector of 2TR30 thereafter provides base bias for 2TR207 and 2TR307 and keeps them ON as long as the set is in stand by.

FAULT SWITCH

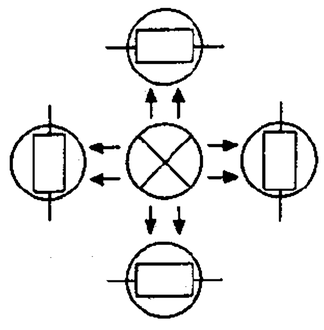
In the event of faults in the output, the circuit, 2TR25 and 2TR26, will cut off the supply voltage, and the set will go into stand by. If a positive DC voltage appears at the output, in either the left or right channel, 2TR25 will go ON, and the collector will be at chassis potential. This will cause 2TR32 to go OFF; the relay releases and the supply voltages disappear.



If the DC voltage appearing at the output is a negative one, 2TR26 will go ON. The emitter receives a negative voltage as a result of which 2TR32 goes OFF, the relay releases and the supply voltages disappear.
2D49 ensures that 2 TR26 will not go ON without reason.

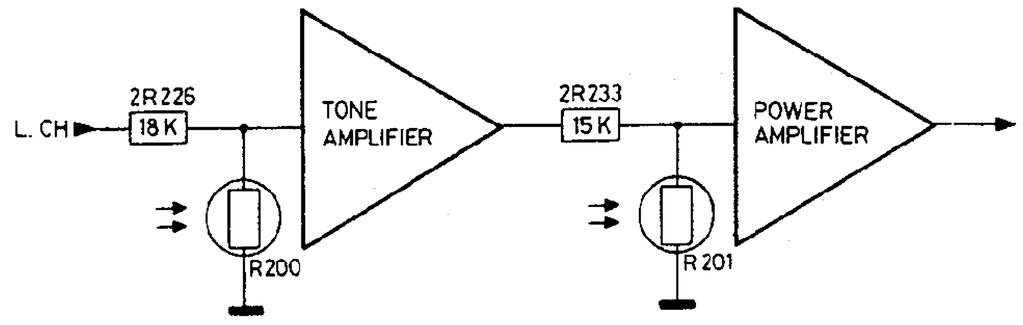
VOLUME CONTROL WITH PHOTORESISTORS

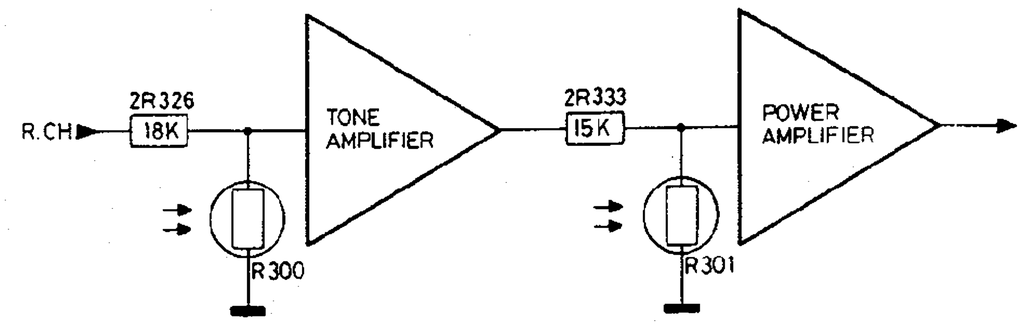
Volume control by means of sensitouch requires either a motor-driven potentiometer or some form of electronic control.
The system selected for the Beomaster 1900 is electronic control by means of photoresistors, so-called LDR's (light-dependent resistors). The photoresistors, four in all, are physically grouped around the same lamp, which thus controls in both left and right channels.



When under strong light the resistors have a value of a few hundred ohms. Decreasing light intensity causes an increase in resistance, reaching several megohms in darkness.

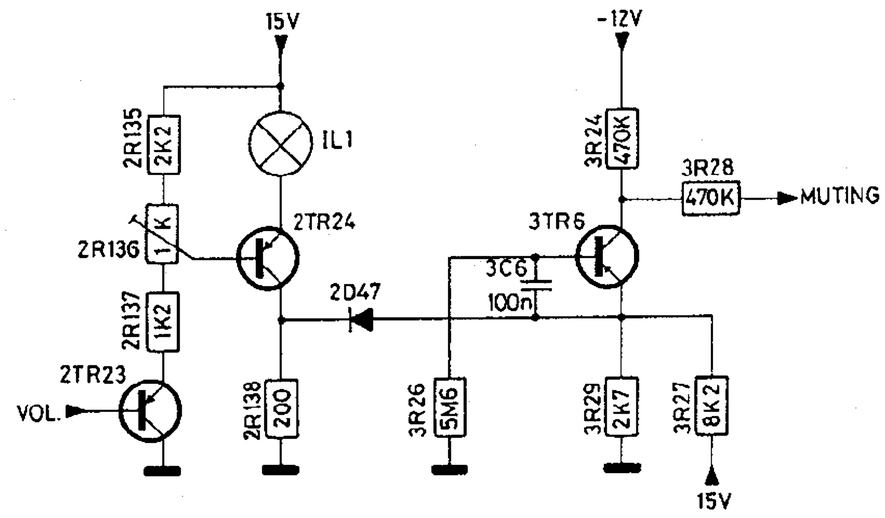
Circuitwise, the resistors are connected as shown:





The mode of operation is as follows:
Looking at the left channel:

If the photoresistors receive no light, their resistance is very high, and the signal passing through 2R226 continues unobstructed to the tone amplifier and from there through 2R233 to the output amplifier.
This situation corresponds to full-on volume.
If the photoresistors are thereafter illuminated their resistance will be lower, and only part of the signal from 2R226 will go into the tone amplifier because of the voltage division taking place between the photoresistor 2R200 and 2R226. The same condition exists in the output amplifier.
The lamp is powered from an adjustable lamp driver circuit.

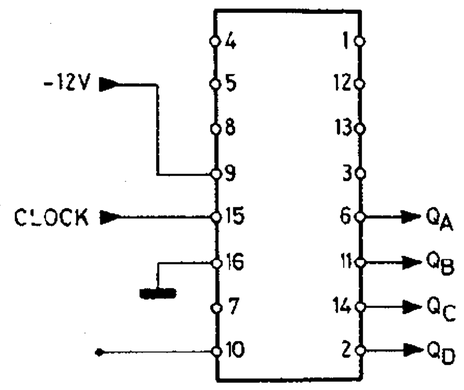


At max. volume, approx. 1 V is present across the lamp; at min. volume, approx. 5 V.
The resulting control range is 70-75 dB.

A defective lamp will correspond to max. volume. To prevent this, the collector of 2TR24 is connected to 3TR6 via 2D47.
If the lamp filament breaks, the collector voltage of 2TR24 will disappear.
The emitter of 3TR6 goes towards zero via 2D47, causing 3TR6 to go OFF.
At the collector there now appears -12 V, which is fed to the muting transistors, 2TR206 and 2TR306, which go OFF, and the receiver is muted.

Volume regulation is carried out by altering the base bias of 2TR23. This means that we need a circuit that is capable of altering this voltage upwards or downwards as long as we touch the volume control and thereafter locking the voltage until we again want a volume change.

For this purpose we employ a binary counter circuit, MC 14516, which can count in both directions.
It is an integrated circuit. We are not going to discuss what it contains. We just want to study its properties.

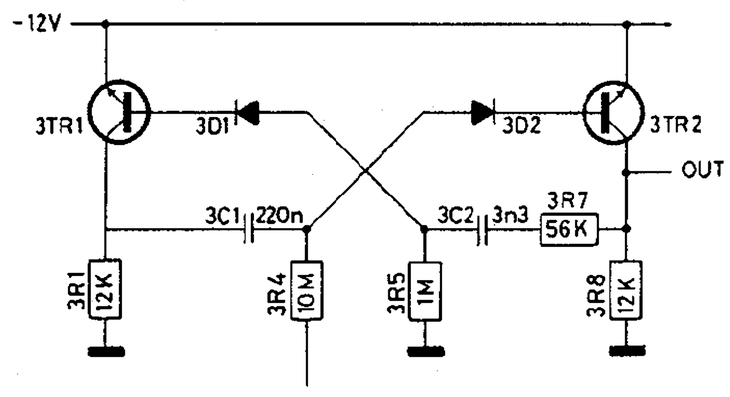


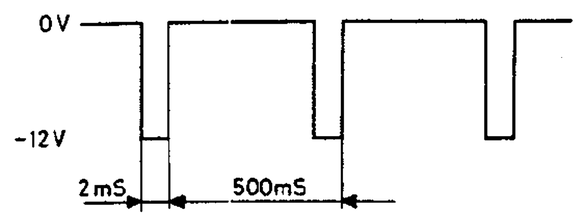
The sketch shows the counter IC. It is connected between chassis potential and —12V. There are four outputs, Q_A - Q_B - Q_C - Q_D. These outputs can assume only two voltage values, either -12 V or 0 V. In digital parlance an output is said to be low when it has assumed its most negative value, and high when it has assumed its most positive value. Alternatively, these two states are called 0 and 1, respectively, which is what we will do below. Therefore: a zero represents -12 V and a figure one represents 0V.
Since it is therefore possible for each for output to have two positions we shall have a total of
2 x 2 x 2 x 2 = 16 combinations.
In system form it looks like this:

	Q_D	Q_C	Q_B	Q_A
0	0	0	0	0
1	0	0	0	1
2	0	0	1	0
3	0	0	1	1
4	0	1	0	0
5	0	1	0	1
6	0	1	1	0
7	0	1	1	1
8	1	0	0	0
9	1	0	0	1
10	1	0	1	0
11	1	0	1	1
12	1	1	0	0
13	1	1	0	1
14	1	1	1	0
15	1	1	1	1

This set-up is called the binary code. Q_A is called the least significant digit, and Q_D is called the most significant digit.
The counter is designed so that it will itself run through these combinations when ordered to do so. It does this by feeding a series of pulses from a clock generator to pin 15.
The clock generator is a multivibrator whose pulses have the appearance shown in the sketch below.

When +12 V is applied to 3R3 or 3R4, the multivibrator starts.
If -12 V is fed to 3R3 or 3R4, the multivibrator blocks.

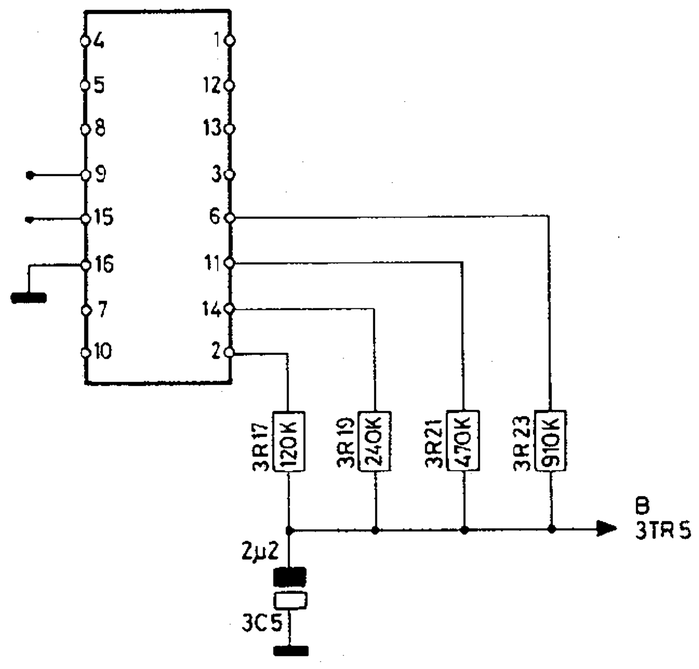




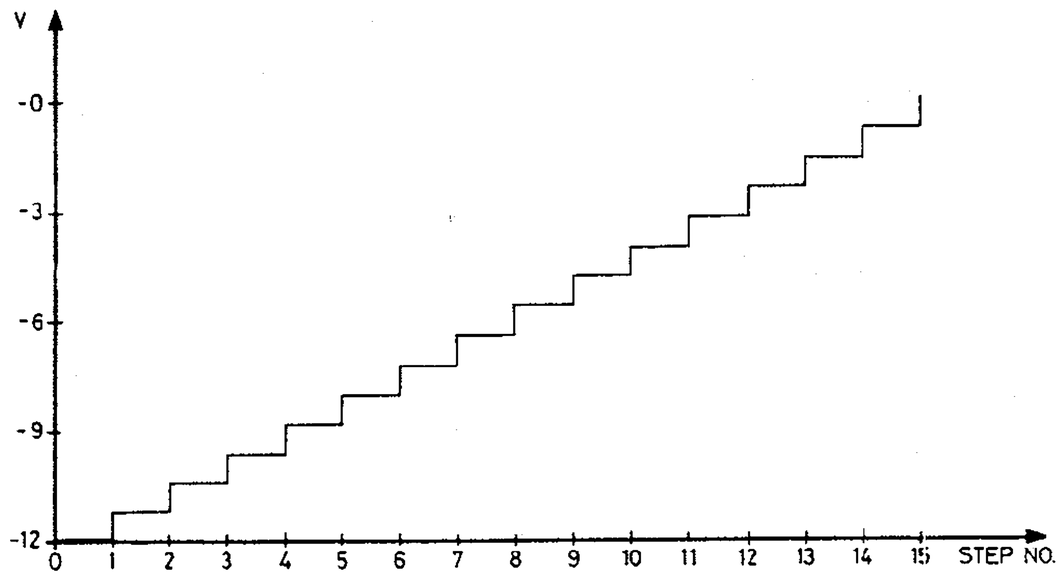
The counter switches from one combination to the next every time the clock voltage jumps from -12 V to 0 V.
If pin 10 of the IC is connected to chassis potential the IC will count in the direction from 0 to 15. If, on the other hand, pin 10 is connected to -12 V the counter will count in the direction 15, 14, 13, ... 0.
On reaching one of its extreme positions, the counter turns round; that is, it starts all over again. For example, 12 - 13 - 14 - 15 - 0 - 1 - 2 etc.
Of course this won't do when it is to operate the volume control. For this reason a stop circuit is provided which blocks the multivibrator when one of the extreme positions is reached.

DIGITAL/ANALOG CONVERTER

By means of four resistors we alter the voltages at Q_A, Q_B, Q_C, and Q_D to a voltage analogous with the number at which the counter happens to be at the particular moment.



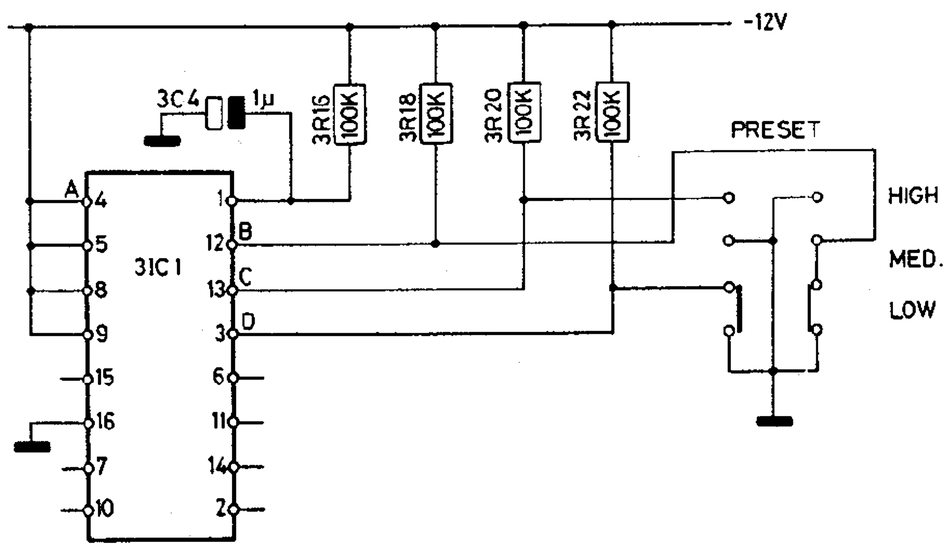
Each output connects through a resistor to a common junction. The resistance values have been chosen so that the most significant digit Q_D has the lowest resistance connected to it. the most important but one has a resistance that is twice as high, etc.
It is easily seen that the voltage at the junction will be 0V in one extreme position and —12V in the other extreme position. For all other positions the voltage will assume some value between —12V and 0V.
The change will take place in jumps so a graphical representation would have the appearance of a staircase.
However, we smooth down the staircase with 3C5 so that the volume variation will not take place in audible jumps.



VOLUME CONTROL PRESET

In addition to having four outputs, the IC also has four inputs, A, B, C, and D, which may be used for programming the IC. We are going to make use of this because we want the receiver to set itself to a preset volume when started up.
The A input we fixed at —12V. That is, 0 in digital parlance.
B, C, and D have also been fixed at —12V, but through a 100 kohm resistor each of them. Furthermore, B, C, and D are connected to a preset switch.
The switch allows us to set the input in the following combinations:

H 0110
M 1000
L 1010



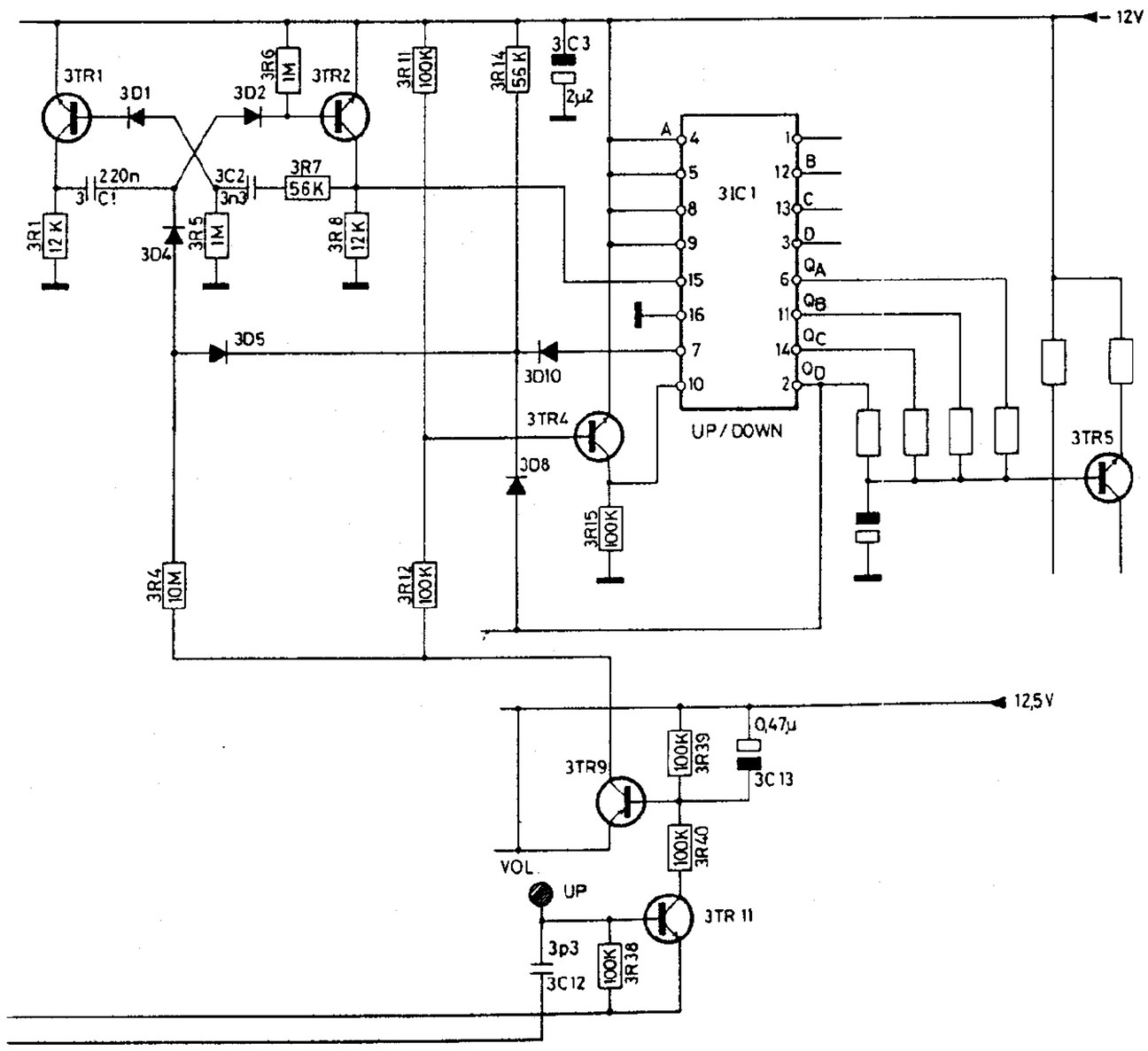
The combination selected will automatically be transmitted to the outputs when we start the receiver. The fact is that the outputs will set themselves to be equal to the inputs if the voltage at pin 1 has the digital value of 1, which it has during start, as pin 1 is connected to chassis potential through a 1µF capacitor, 3C4.
A fraction of a second after start, pin 1 has dropped to 0 on account of 3R16, and the IC is ready to count.

UPWARD REGULATION OF VOLUME END STOP:

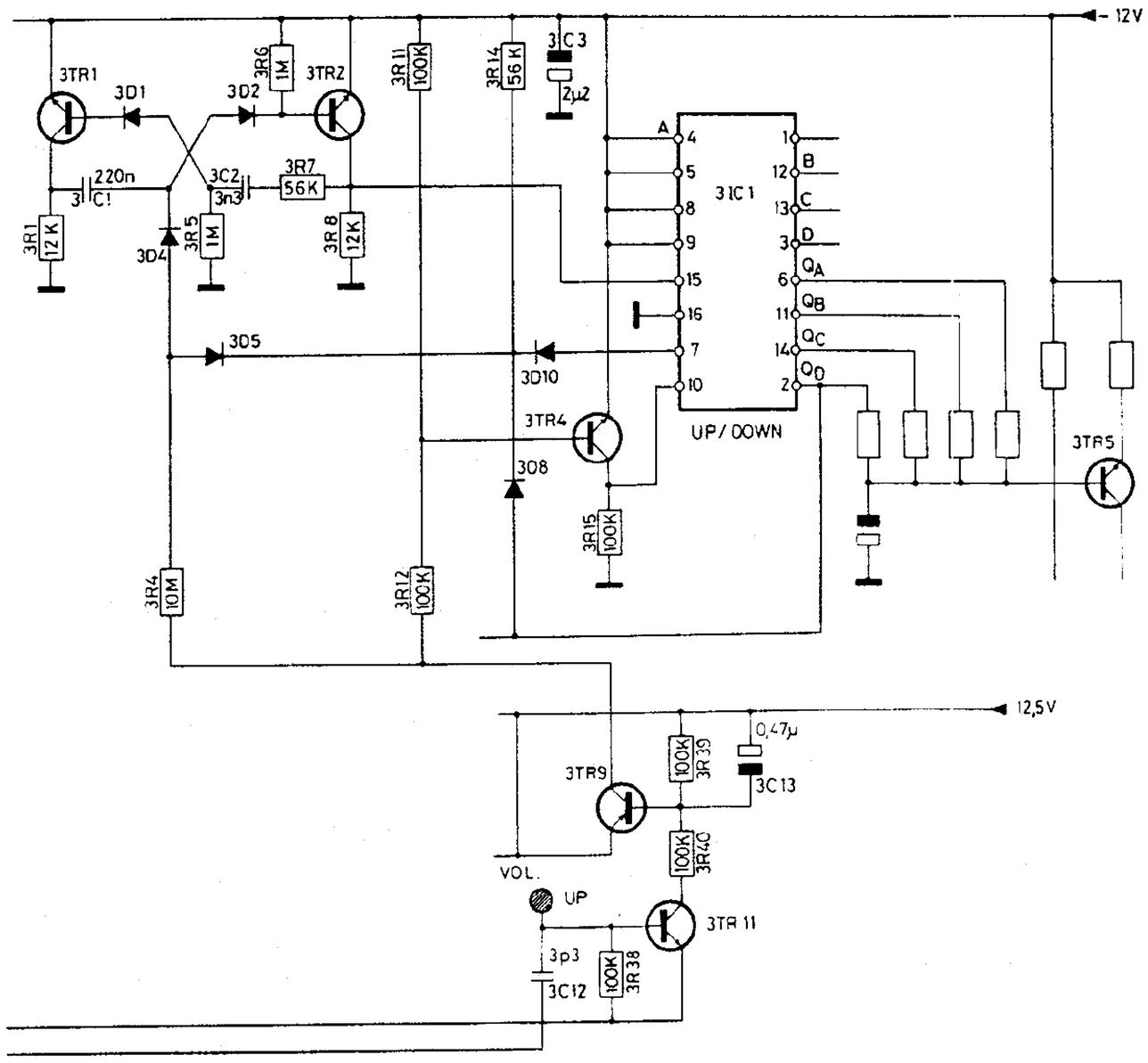
The IC carries a marking as to whether it is in one of the extreme positions. This marking is the voltage at pin 7.
Normally, pin 7 is 1, but when we reach one extreme position (max. volume), where the outputs are 0000, pin 7 is also 0.
In the other extreme position (min. volume), where the outputs are 1111, pin 7 is also 0.
In all other positions, pin 7 is 1.
The pin 7 output may now be added to the combination table as shown:

Counter position	Pin 7	Q_D	Q_C	Q_B	Q_A
0	0	0	0	0	0
1	1	0	0	0	1
2	1	0	0	1	0
3	1	0	0	1	1
.	.	.	.	.	.
.	.	.	.	.	.
12	1	1	1	0	0
13	1	1	1	0	1
14	1	1	1	1	0
15	0	1	1	1	1

It will be seen that in the 0 position, pin 7 and Q_D have the combination 00. In the 15 position, the combination is 01.
In other words: the combination of pin 7 and Q_D tells us whether we are in an extreme position, and also which one.
We make use of this fact for stopping the multivibrator when we reach one of the extreme positions.



When we touch the "Up" field, 3TR11 and 3TR9 draw current.
Some of the current flows through 3R12 to the base of 3TR4, causing 3TR4 to go ON and so connect pin 10 to —12V. This means that the counter has been told to count downwards, giving louder volume, when and if the multivibrator starts up.
From 3TR9, a current flows through 3R4 to the junction of 3D4 and 3D5.

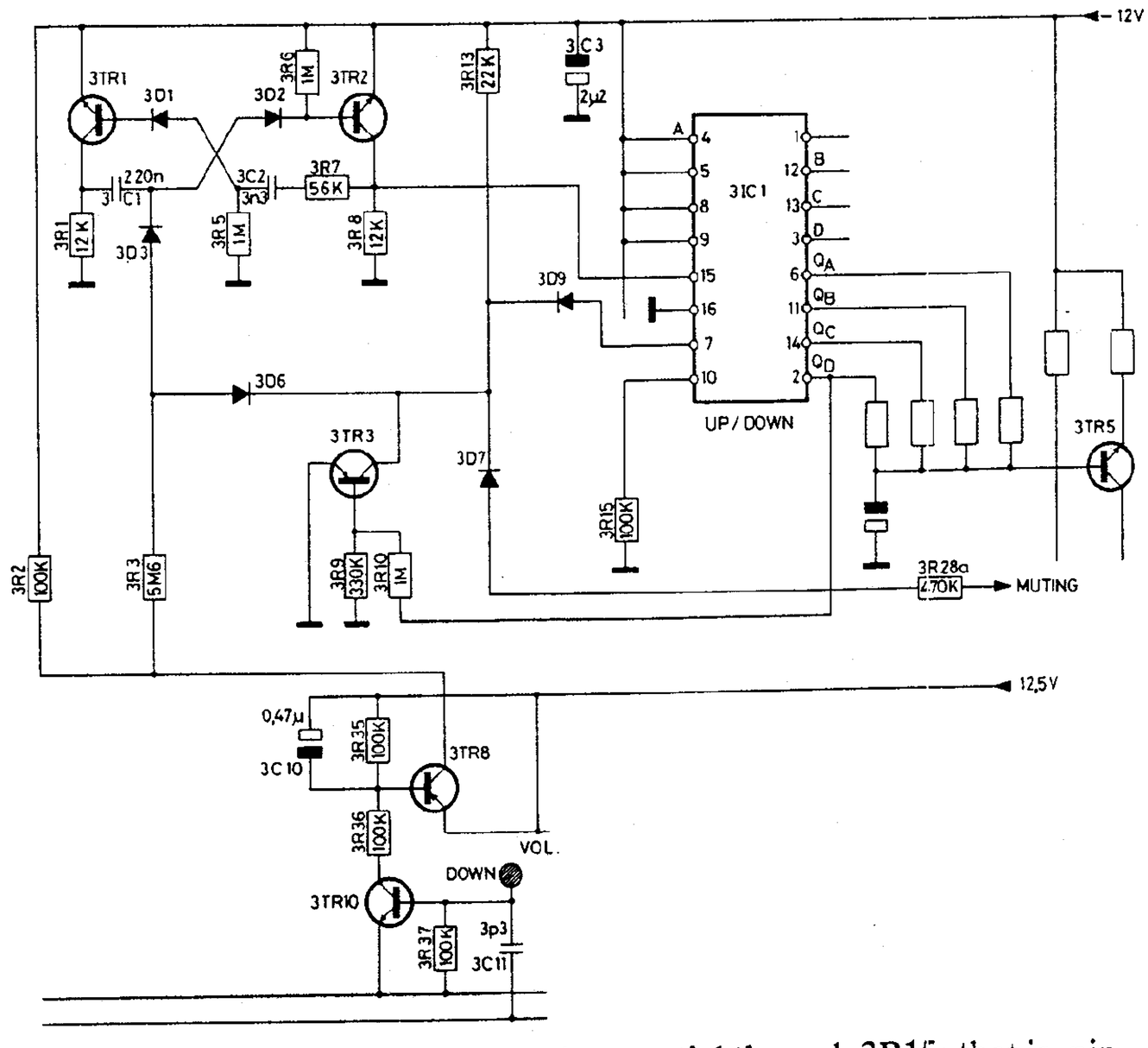


Which way will the current flow now? Well, that depends on whether the voltage on the other side of 3D5 is high or low.
If the voltage is low, the current will flow through 3D5 and 3R14 to —12V, and the multivibrator will not start up.
If, on the other hand, the voltage is high, 3D5 is cut off, and the current will flow into the multivribrator and start it up.
In order for the multivibrator to run, therefore, the voltage at the junction of 3D5, 3D8 and 3D10 must be high. When is it high? it is high if: Q_D is 1, pin 7 is 1 or both Q_D and pin 7 are 1. The voltage is low if both Q_D and pin 7 are 0, and it is low only in the 0 position. Accordingly, the multivibrator can run until the 0 position is reached; then it stops.

DOWNWARD REGULATION OF VOLUME

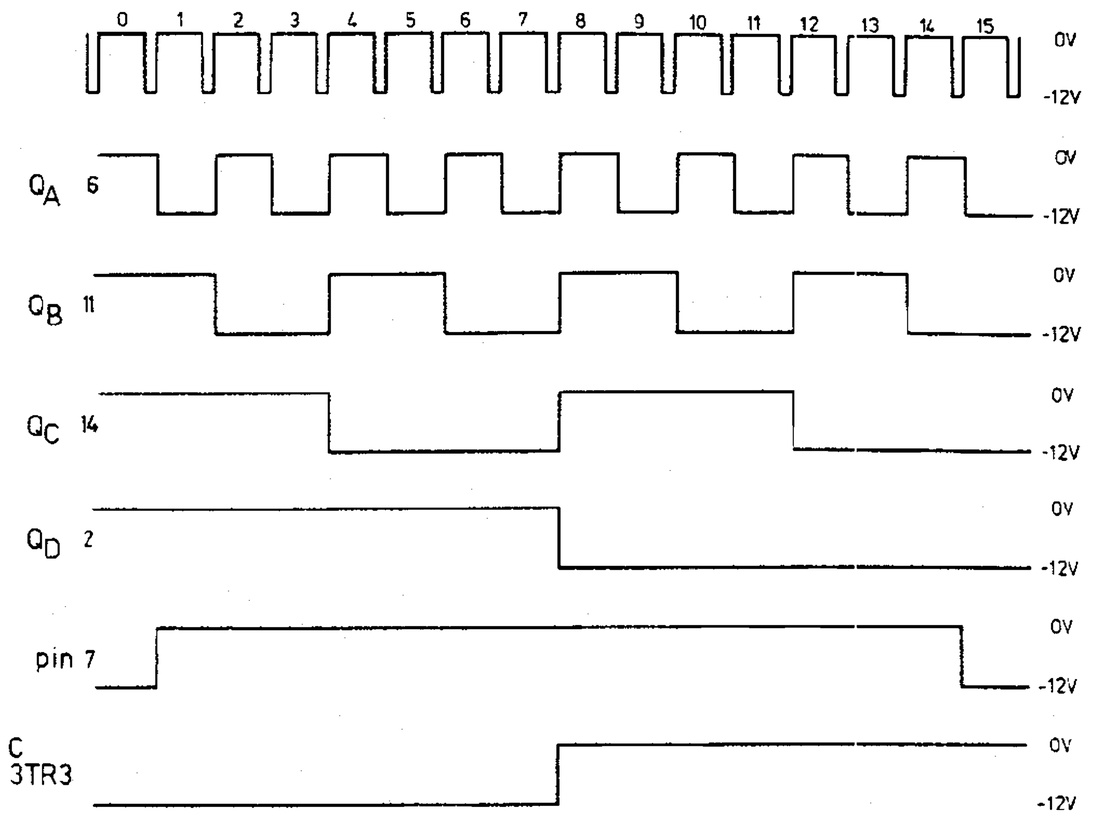
END STOP

This function is somewhat similar to the one just described.



Pin 10 of the IC is connected to chassis potential through 3R15; that is, pin 10 is 1: this means that the counter is now ready to count upwards, giving lower volume

If we touch the "Down" field, 3TR10 and 3TR8 will draw current, which will start the multivibrator if the voltage at the junction of 3D6, 3D9 and the collector of 3TR3 is high, and it will be high if:
the collector of 3TR3 is 1, or pin 7 is 1, or both are 1.



TIMING DIAGRAM

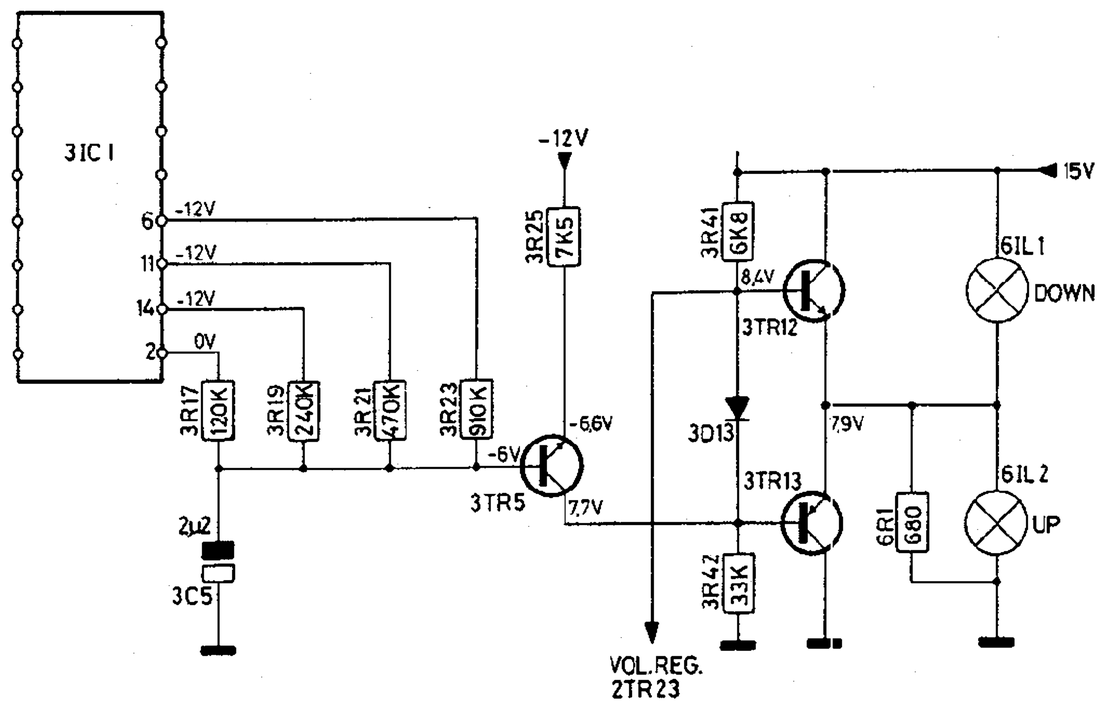
For 3TR3 it applies that the collector is 1 when Q_D is 0 and vice versa.
To stop the multivibrator, pin 7 must be 0 and Q_D1; that is, the combination 01. This is obtained in the 15 position, so the multivibrator stops here.

MUTING

In the 15 position, or min. volume, the voltage at the junction of 3D6, 3D9 and 3D7 is low, which fact is utilised for muting the receiver.
The —12V potential is fed via 3D7 to the muting transistors, 2TR206 and 2TR306, which go OFF and in so doing block the signal.

VOLUME INDICATION

When volume is regulated upwards the voltage at the base of 3TR5 goes towards —12V. The collector voltage goes in the positive direction. This voltage change is transmitted to the base of 3TR13 and via 3D13 to the lamp driver circuit, Which makes the voltage across 2IL1 drop and in so doing makes the volume increase.
The voltage change at the base of 3TR13 is also employed for lamps 6IL1 and 6IL2.

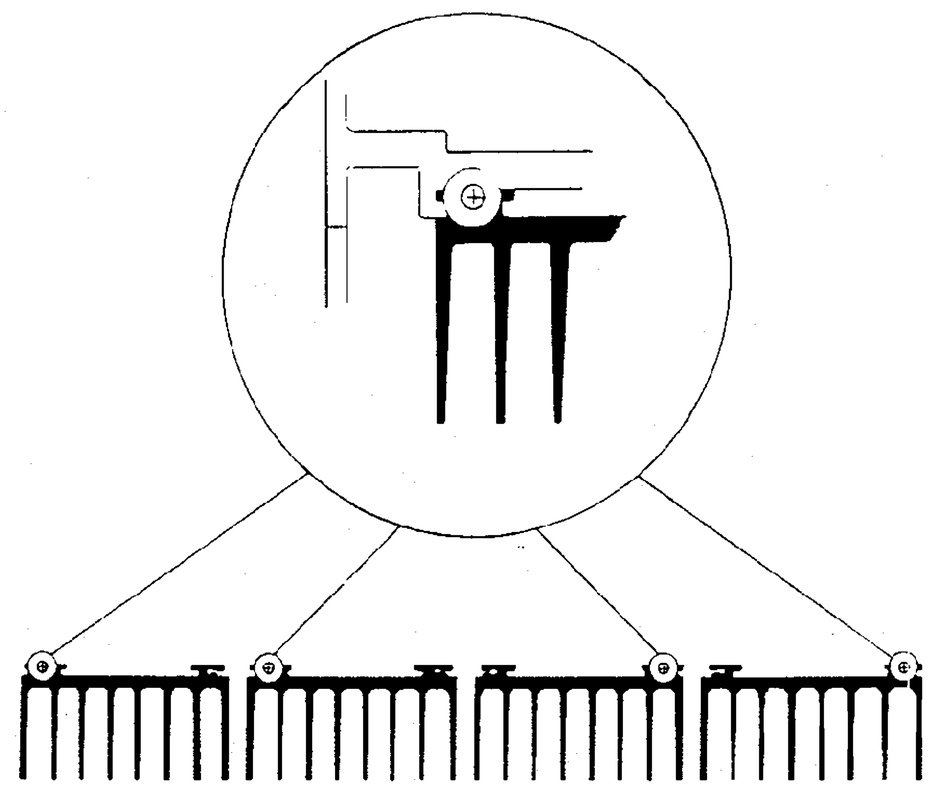


The voltages are measured in the MEDIUM position, and volume is regulated from the MEDIUM position upwards.
When the voltage at the base of 3TR13 becomes more positive, the base/emitter voltage drops, and 3TR13 is OFF.
The voltage at the base of 3TR12 becomes more positive too as a result of which 3TR12 will draw more current and 6IL2 become brighter.
If volume is regulated from the MEDIUM position downwards, the voltage at the base of 3TR13 will move in the negative direction. This will make 3TR13 go ON and 6IL1 become brighter.

Bang & Olufsen

MODIFICATIONS

FASTENING OF HEAT SINKS



The heat sinks are fastened to the chassis by means of screws and washers.
Screw No. 2013024
Washer No. 2622261
The change has been introduced from No. 189001.

CHANGE OF TUNING VOLTAGE

From apparatus No. 248001 2D19 has been changed to No. 8340105 which is the same type of diode, but with a larger voltage, 27.5V - 29.5V. This means that the tuning voltage must be adjusted to a larger voltage:

FM1, 4R2 to be adjusted to 4.7V
FM5, 4R8 to be adjusted to 4.8V.

SERVICE TIPS

SENSITIVITY ON THE OPERATING FIELDS

The oscillator coil, 3L1, has in production been adjusted to 3.2 Volts measured in 3TP2 with voltmeter (Ri ≧ 1 Mohm).
If the sensitivity on the operating fields is too low, the voltage in 3TP2 may be increased to max. 3.5 Volts.