

Dual

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Dual HS 140 Service Manual



Technical data

Turntable

HiFi-Automatic turntable Dual 1226 with Shure M 75 type D pick-up-cartridge

Input

Tuner linear 300 mV at 470 kOhm
Tape linear 300 mV at 470 kOhm

Frequency response

Measured with tone controls in midposition
25 Hz at 30 kHz \pm 1,5 dB
30 Hz – 30 kHz

Bandwidth (DIN 45 500)

Tone controls

Bass at 50 Hz + 14 dB at – 16 dB
Treble at 15 kHz + 16 dB at – 16 dB

Volume control

with switchable loudness characteristic

Balance control

control range approx. 12 dB

Mode switch

with loudspeaker-matrix for quadraphonic effect reproduction

Stereo-Mono-Switch

Signal-to-noise ratio

Phono
Rumble weighted signal-to-noise ratio > 38 dB
Rumble unweighted signal-to-noise ratio > 57 dB
Tuner and tape
related to NA = 2 x 50 mW > 50 dB
related to rated output > 70 dB

Cross-Talk Attenuation (at 1000 Hz)

Phono > 20 dB
Tuner and tape > 45 dB

Output power (measured at 4 Ohm, distortion) < 1 %

Music power 2 x 15 W
Continuous power (1 kHz) 2 x 10 W

Outputs

4 Loudspeaker jacks DIN 41 529
1 Coaxial jack 1/4 inch, for headphone
1 Connection jack for CD 4-decoder
1 Connection jack for matrix-decoder,
for tape connection in the input jack

Power consumption

approx. 75 VA

Current consumption

approx. 320 mA

Line voltage (resolderable)

110, 130, 150, 220, 240 V

Fuses

220, 240 V 315 mA slow-blow
110, 130, 150 630 mA slow-blow

Components

20 Silicon-transistors
4 Silicon-power transistors
6 Silicon-stabilizin-diodes
1 Silicon bridge rectifiers
2 Fuses 1 A slow-blow
to protect power stages

Dimensions

control unit with cover 420 x 213 x 385 mm

Weight

control unit with cover 10,7 kg.

Loudspeakerbox CL 116

Transmission range 60 Hz – 18 kHz

Resonance frequency 90 Hz

Nominal impedance 4 Ω

Power handling capacity 20 Watt

Music rating power 30 Watt

Minimum power required

(measured under room listening conditions) 1 Watt

Harmonic Distortion (DIN 45 500)

(at rated power 300 Hz – 18 kHz) < 1 %

Complement

1 special 130 mm broad band speaker system

Dimensions 230 x 363 x 105 mm (W x H x D)

Gross volume 8.8 l

Weight (each) approx 3.2 kg.

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Adjustment and test data

Current consumption

for 220 V no-load
and turntable operating approx. 140 mA

at 220 V and full load
6 V at 4 Ohm/channel, front
and turntable operating approx. 320 mA

at 220 V full load in
position 2 x stereo
front- and rear outputs fed
with 4 Ohm/channel terminated max. 370 mA

Operating voltages

AFC-Amplifier in off load approx. 22 V
Power amplifier in off load approx. 31 V
Power amplifier in full load
(6 V at 4 Ohm/channel, front) approx. 26 V

Closed-circuit current in power stage

after approx. 5 minutes operating
time (adjustable with R 68) approx. 20 mA

Abbreviations for control, and adjustment positions

Vc = Volume control (Volume)
Ba = Balance control (Balance)
Tc = Tone control (Treble, Bass)
Tu = Input selector switch
in Tuner position
Ph = Input selector switch
in Phono position
2 x CH = Mode-switch
in Stereo position
2 x 2 CH = Mode-switch
in 2 x Stereo position
Qu 1 = Mode switch
in Quadro 1 position
Qu 2 = Mode switch
in Quadro 2 position
Lin = Loudness-Linear-switch
in Linear position
1 = Control full on
2 = Control in midposition
3 = Control right back
40 = Control 40 dB below full
modulation

Output voltage and volume control

Tu, Ba 2, Lin, 2 CH
At 1000 Hz, feed in approx. 300 mV at Tuner
input activate both channels, with the vo-
lume control 6 V at 4 Ohm/channel, front

Harmonic distortion $\leq 1\%$

Headphone output terminated with 400 Ohm
have to 4,5 - 5,7 V and at the Tape jacks
(contact springs 1/2 and 4/2) 2 - 3 mV is
present, terminal resistance 10 kOhm.

Front and rear outputs with 4 Ohm termina-
ted.

Qu 1
Output voltage front 4,7 - 5,1 V
Output voltage rear 1,1 - 1,4 V

Qu 2
Output voltage front 4,7 - 5,1 V
Output voltage rear 2,7 - 3,1 V

2 x CH
Output voltage front 4,7 - 5,1 V
Output voltage rear 2,4 - 2,8 V

Check that the control tracks of the gain
controls are parallel over the entire range.

Channel deviation K 1/K 2
between Vc 1 and Vc 2 approx. 4 dB
between Vc 2 and Vc 40 approx. 6 dB

Quadro-switch-socket

Tu, Vc 1, Ba 2, 2 CH
Feed in 1000 Hz approx. 300 mV at Tuner in-
put voltage at the quadro-switch socket
contact spring 1/2 and 4/2 270 - 350 mV

Connect quadro switch socket (contact
springs 3/2 and 5/2) to 1000 Hz.

Input voltage for 6 V output voltage
at 4 Ohm/channel, front 270 - 350 mV

Phono output

Ph
Depress Pu knob, start record playing. Con-
nect test cable with phono-out socket and
check switch for proper operation.

Bass- and Treble Emphasis or Attenuation

see Fig. 1

Loudness control

see Fig. 2

Harmonic Distortion

see Fig. 3

Balance control

Control range approx. 12 dB

Input sensitivity

Tu, Vc 1, Ba 2, 2 CH
Insert 1000 Hz at Tuner input.
Input voltages required for full
modulation (6 V at 4 Ohm/channel front)

Tuner, Tape 270 - 330 mV

Noise voltage

Vc 3, Ba 2, Tc 2, Lin
Noise voltage max. 1 mV/channel

Tu, Vc 1, Ba 2, Tc
Input Tuner with 100 kOhm terminated
Noise voltage max. 1,5 mV/channel

Ph, Vc 1, Ba 2, Tc 2
Drive switched on, pick up arm next
to rest
Noise voltage max. 30 mV/channel

Fig. 1 Frequency response of the preamplifier, magnet input

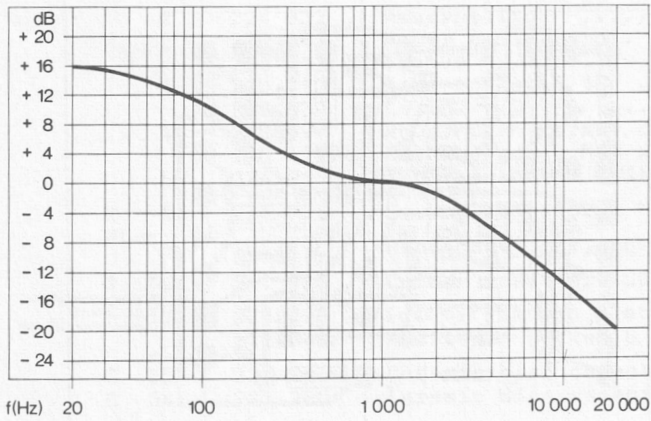


Fig. 3 Tone control
0 dB = bass and treble controls in midposition

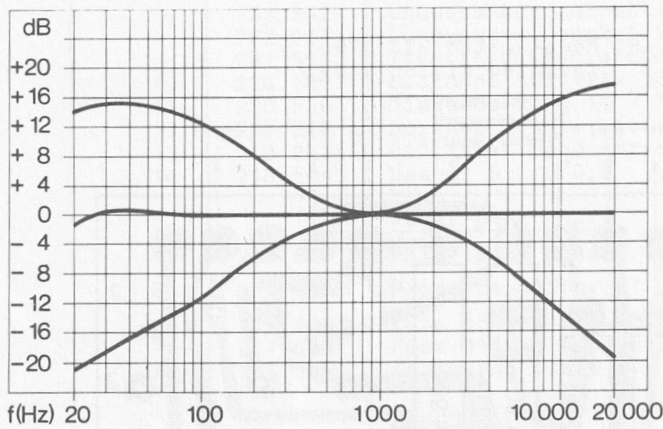


Fig. 2 Harmonic Distortion at 40 Hz, 1 kHz, 12,5 kHz depending from output power

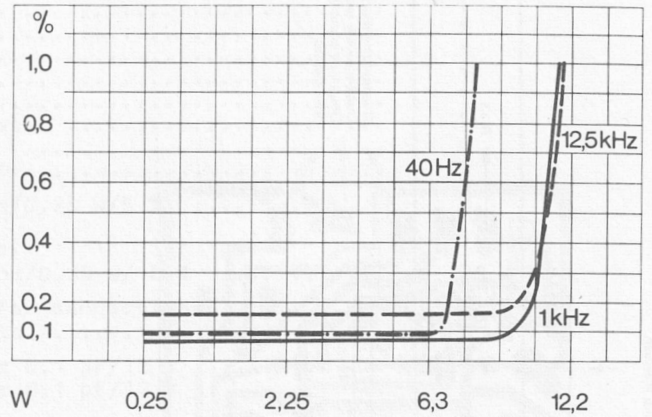


Fig. 4 Physiological loudness
0 dB = Volume control at max.

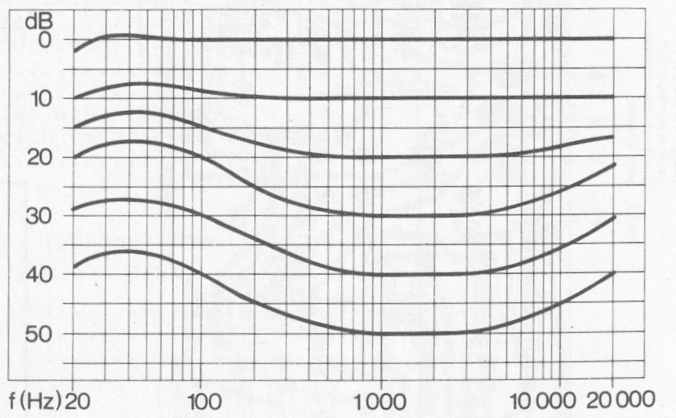


Fig. 5 Power amplifier 227 587 (printed wiring side)

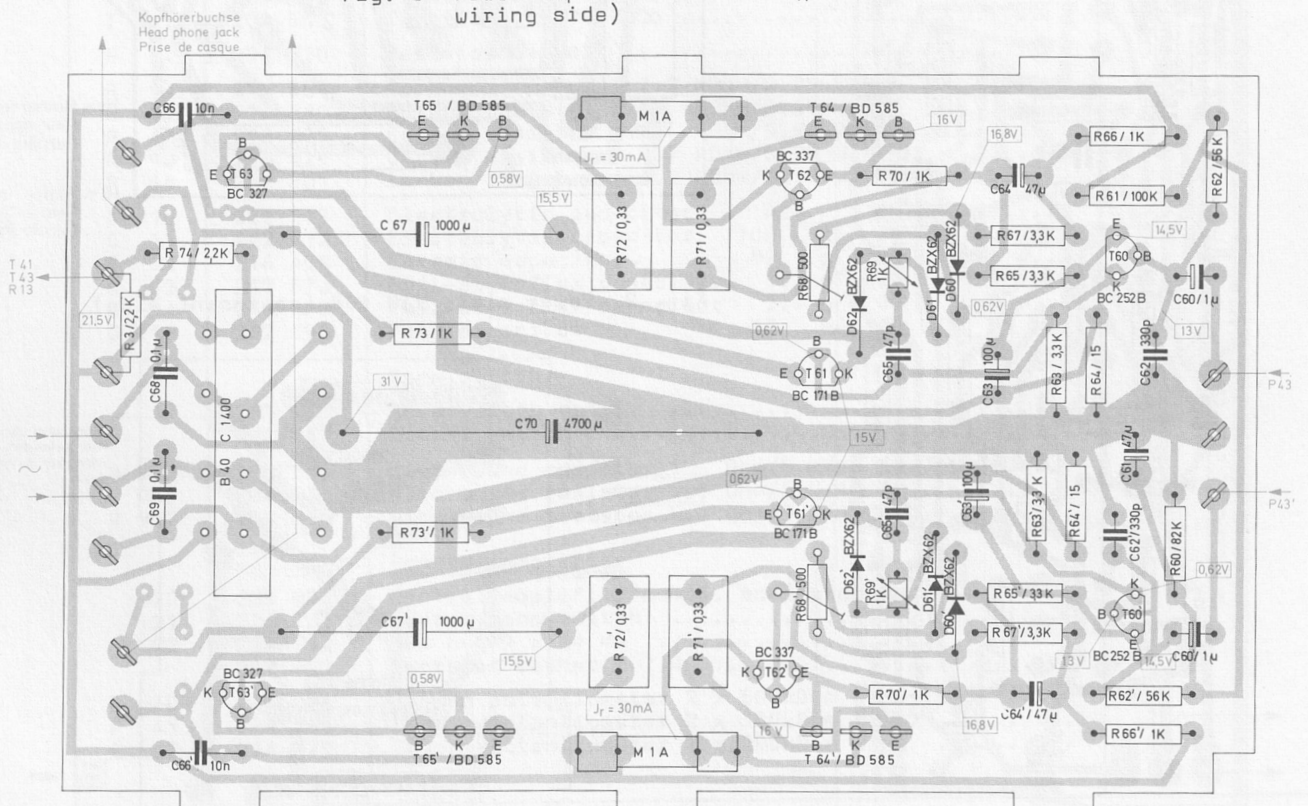


Fig. 6 Control amplifier 230 609
(printed wiring side)

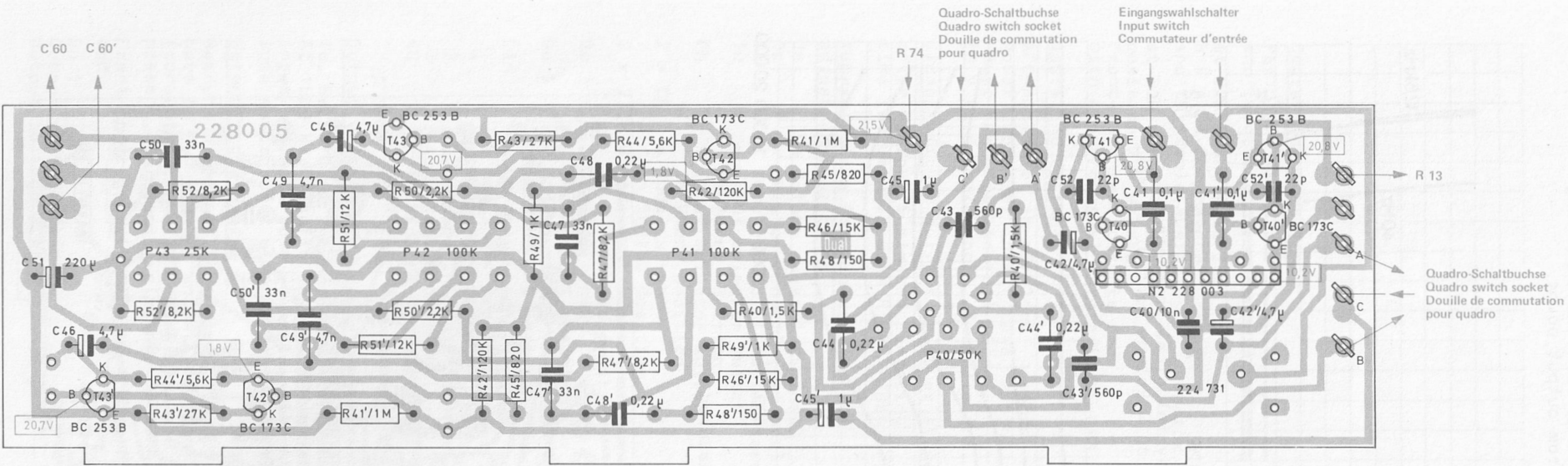


Fig. 7 Pre-amplifier 227 585
(printed wiring side)

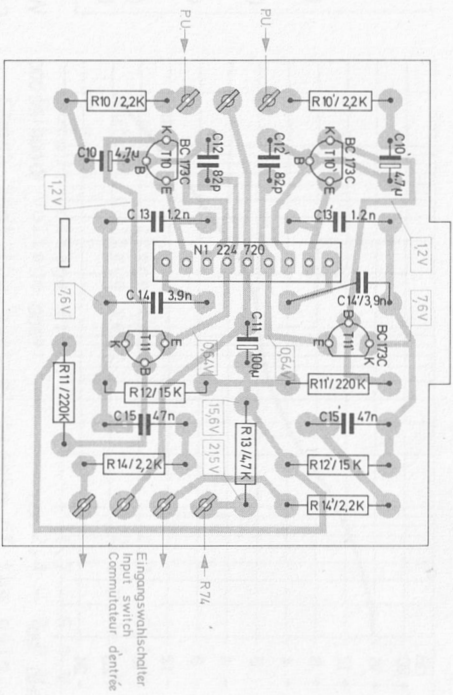


Fig. 8 Mode-switch 233 975
(printed wiring side)

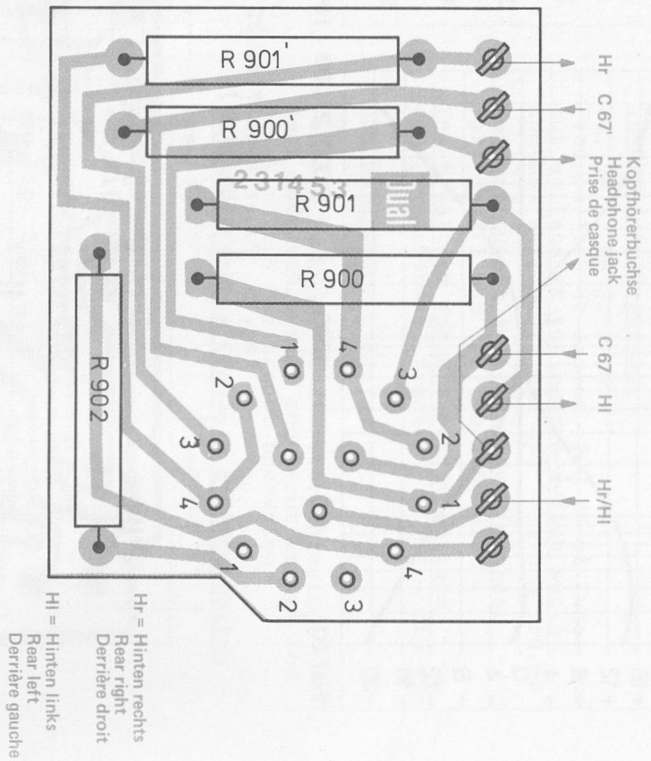


Fig. 9 Power plate 230 608 (equipment side)

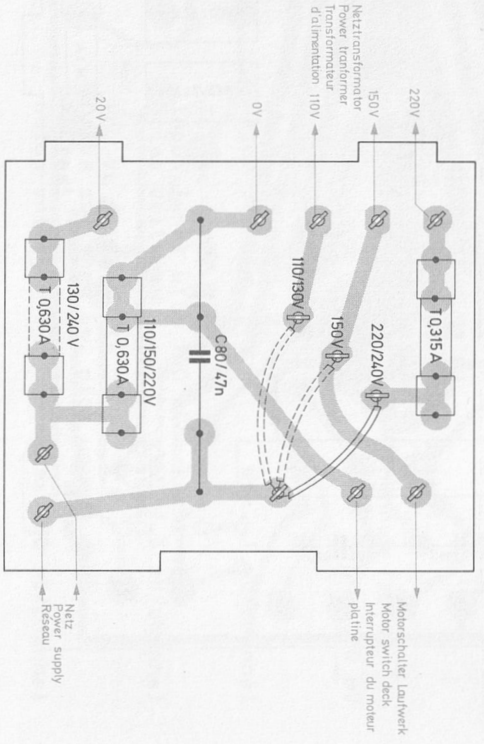
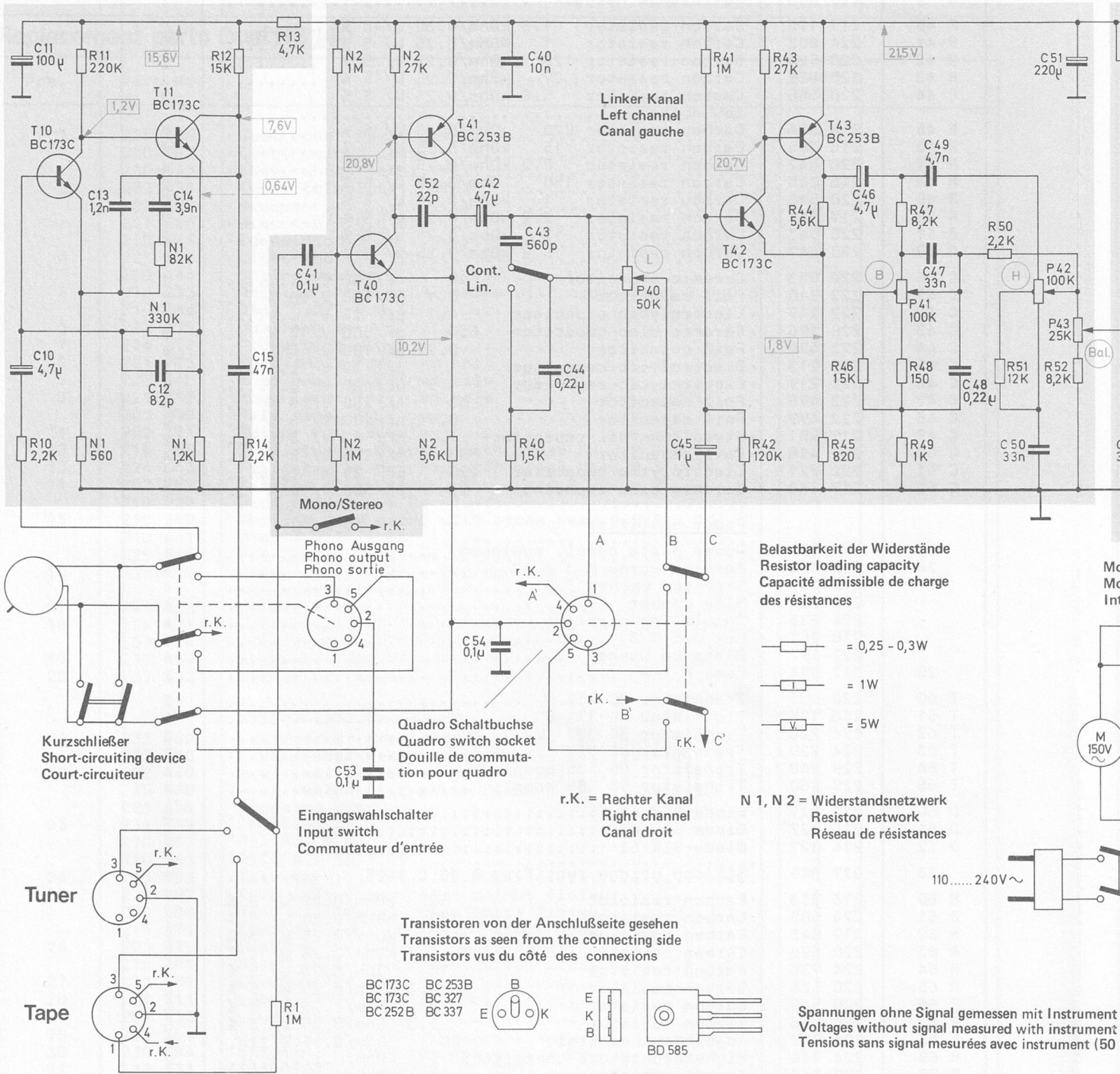


Fig. 10

Dual

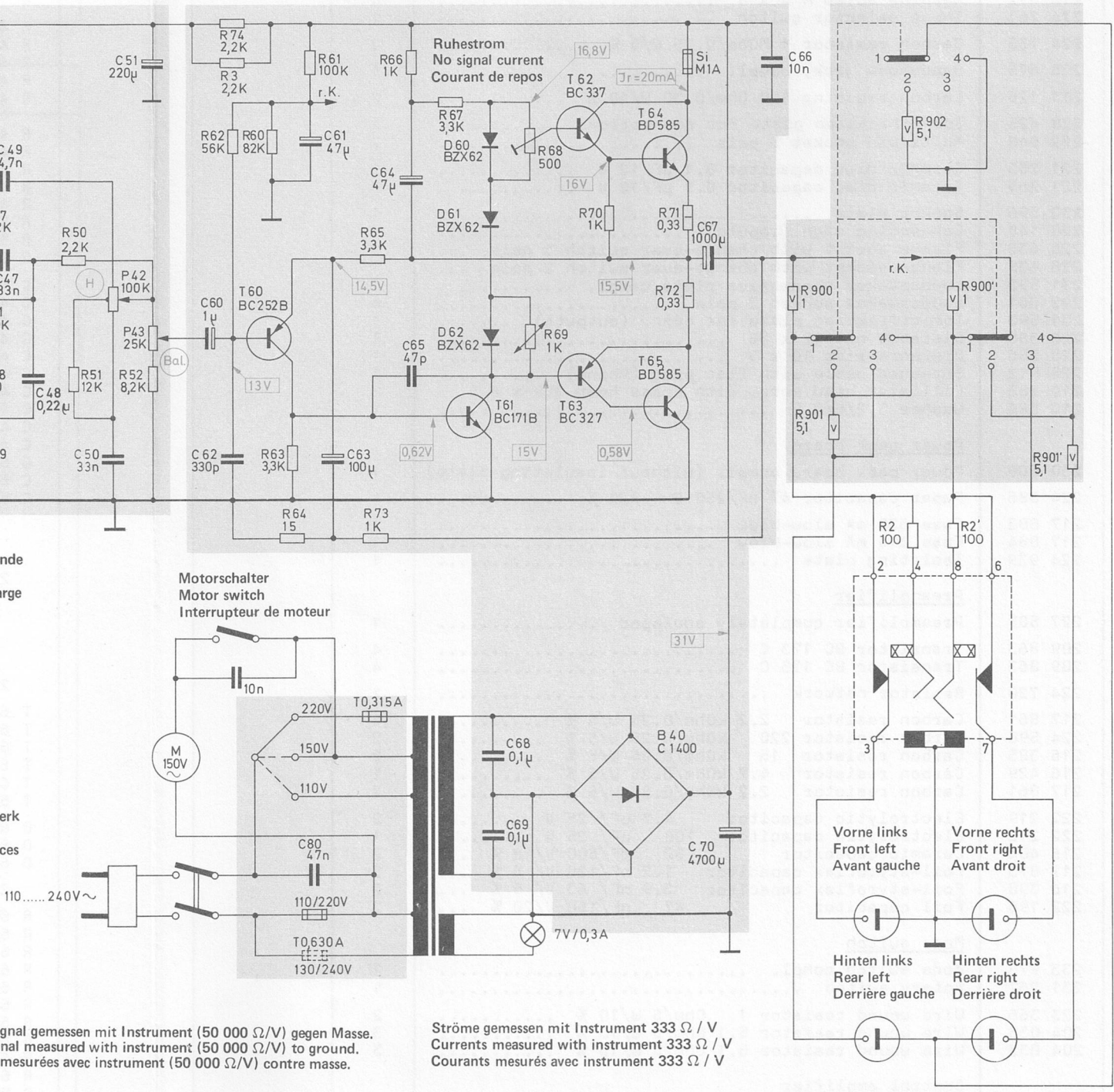
TV 324



R	11	N1	12	13	N2	N2			P40	41	43		44	46	47	P42	P43
	10	N1	14	1	N2		N2	40				42	45	46	P41,48		52
C	11		15			52	42	43					46	49	49	51	
	10		13	14				43		45			46	47	48		50
			12					53									

Änderungen v

V 324



Signal gemessen mit Instrument (50 000 Ω/V) gegen Masse.
 Signal measured with instrument (50 000 Ω/V) to ground.
 Mesurées avec instrument (50 000 Ω/V) contre masse.

Ströme gemessen mit Instrument 333 Ω / V
 Currents measured with instrument 333 Ω / V
 Courants mesurés avec instrument 333 Ω / V

P42	P43	3,74	61	66	67	68	71	900	902,2	900'
52	52	62 - 60	63	65	67	69	72	901		901'
51		61	64	73						
49	48	60	61	64	68	70	66			
47		62	63	65	69		67			
50		60	63	64	68	70				

Replacement parts Dual TV 324

Pos.	Part No.	Description	Quantity
1	224 832	Power switch	1
2	220 141	Power cable compl.	1
	223 811	Sleeve	1
3	210 113	Lamp socket E 10	1
	209 439	Lamp 7 V/0.3 A	1
4	230 597	Power transformer compl.	1
	210 512	Machine screw M 4 x 5	4
5	224 261	Input selector switch	1
R 1	224 733	Carbon resistor 1 MΩ/0.25 W/5 %	2
6	225 675	Headphone jack, compl.	1
R 2	211 126	Carbon resistor 100 Ω/0.30 W/10 %	2
7	228 425	Identification plate for connections	1
	222 048	Multi-pin socket 5 pole	2
C 53	221 265	Ceramic disc capacitor 0.1 μF/12 V	2
C 54	221 265	Ceramic disc capacitor 0.1 μF/12 V	2
8	230 596	Socket plate	1
	228 140	Connecting sign (inputs)	1
	228 438	Flange socket with change-over switch 3 pole ...	1
	228 439	Flange socket with change-over switch 2 pole ...	1
9	231 592	Loudspeaker connection plate compl.	1
	222 041	Loudspeaker socket 2 pole	4
	231 593	Identification plate for conn. (outputs)	1
10	228 388	Distance nut 12 x 36	1
11	220 556	Distance ring 10 x 5	1
12	228 012	Screened cable with flat plug (Phono)	1
13	210 283	Fillister head screw with cross head 2.9 x 6.5	3
14	210 584	Washer 3.2/6/0.5	1
		<u>Power pack board</u>	
15	230 608	Power pack board compl. (without insulating plate)	1
C 80	224 886	Paper capacitor 47 nF/250 V ~ /20 %	1
16	217 883	Fuse 630 mA slow-blow	1
	217 884	Fuse 315 mA slow-blow	1
17	224 939	Isolating plate	1
		<u>Preamplifier</u>	
18	227 585	Preamplifier completely equipped	1
T 10	209 863	Transistor BC 173 C	4
T 11	209 863	Transistor BC 173 C	4
N 1	224 720	Resistor network	1
R 10	217 861	Carbon resistor 2.2 kΩ/0.25 W/5 %	4
R 11	224 590	Carbon resistor 220 kΩ/0.25 W/5 %	2
R 12	216 385	Carbon resistor 15 kΩ/0.25 W/5 %	2
R 13	216 429	Carbon resistor 4.7 kΩ/0.25 W/5 %	1
R 14	217 861	Carbon resistor 2.2 kΩ/0.25 W/5 %	2
C 10	222 219	Electrolytic capacitor 4.7 μF/ 25 V	2
C 11	222 212	Electrolytic capacitor 100 μF/ 25 V	1
C 12	216 404	Ceramic capacitor 82 pF/500 V/10 %	2
C 13	217 873	Foil-styroflex capacitor 1.2 nF/120 V/ 5 %	2
C 14	216 398	Foil-styroflex capacitor 3.9 nF/ 63 V/ 5 %	2
C 15	222 196	Foil capacitor 47 nF/160 V/20 %	2
		<u>Mode switch</u>	
19	233 975	Mode switch compl.	1
	231 267	Rotary switch	1
R 900	223 366	Wire wound resistor 1 Ω/5 W/10 %	2
R 901	204 033	Wire wound resistor 5.1 Ω/5 W/10 %	3
R 902	204 033	Wire wound resistor 5.1 Ω/5 W/10 %	3
		<u>Control amplifier</u>	
20	230 609	Control amplifier compl. equipped	1
21	224 731	Stereo/mono switch	1
22	224 732	Hex nut 9 x 24 mm	1
	227 821	Serrated washer I 7.4	2
P 40	228 004	Tandem potentiometer 2 x 50 kΩ pos. log.	1
P 41	224 728	Tandem potentiometer 2 x 100kΩ lin.	1
P 42	224 728	Tandem potentiometer 2 x 100kΩ lin.	1

Pos.	Part No.	Description	Quantity
P 43	224 730	Tandem potentiometer 2 x 25 kOhm lin.	1
T 40	209 863	Transistor BC 173 C	4
T 41	216 042	Transistor BC 253 B	4
T 42	209 863	Transistor BC 173 C	4
T 43	216 042	Transistor BC 253 B	4
N 2	228 003	Resistance network	1
R 40	211 175	Carbon resistor 1.5 kOhm/0.30 W/10 %	2
R 41	224 603	Carbon resistor 1 MOhm/0.25 W/ 5 %	2
R 42	220 524	Carbon resistor 120 kOhm/0.25 W/ 5 %	2
R 43	220 602	Carbon resistor 27 kOhm/0.25 W/ 5 %	2
R 44	220 546	Carbon resistor 5.6 kOhm/0.25 W/ 5 %	2
		low noise	
R 45	216 326	Carbon resistor 820 Ohm/0.25 W/ 5 %	2
R 46	216 385	Carbon resistor 15 kOhm/0.25 W/ 5 %	2
R 47	220 547	Carbon resistor 8.2 kOhm/0.25 W/ 5 %	4
R 48	216 345	Carbon resistor 150 Ohm/0.25 W/ 5 %	2
R 49	220 548	Carbon resistor 1 kOhm/0.25 W/ 5 %	2
R 50	217 861	Carbon resistor 2.2 kOhm/0.25 W/ 5 %	2
R 51	220 543	Carbon resistor 12 kOhm/0.25 W/ 5 %	2
R 52	220 547	Carbon resistor 8.2 kOhm/0.25 W/ 5 %	4
C 40	220 533	Ceramic capacitor 10 nF/250 V	1
C 41	222 210	Foil capacitor 0.1 μF/160 V/20 % ..	2
C 42	222 219	Electrolytic capacitor 4.7 μF/ 25 V	4
C 43	228 496	Ceramic disc capacitor 560 pF/500 V/10 % ..	2
C 44	222 499	Foil capacitor 0.22 μF/100 V/ 5 % ..	4
C 45	222 213	Electrolytic capacitor 1 μF/ 50 V	2
C 46	222 219	Electrolytic capacitor 4.7 μF/ 25 V	4
C 47	222 498	Foil capacitor 33 nF/250 V/ 5 % ..	4
C 48	222 499	Foil capacitor 0.22 μF/100 V/ 5 % ..	4
C 49	217 981	Styroflex foil capacitor 4.7 nF/ 63 V/ 5 % ..	2
C 50	222 498	Foil capacitor 33 nF/250 V/ 5 % ..	4
C 51	222 221	Electrolytic capacitor 220 μF/ 25 V	1
C 52	217 862	Ceramic disc capacitor 22 pF/500 V/10 % ..	2
		<u>Power amplifier</u>	
23	227 587	Power plate compl. equipped	1
24	210 488	Machine screw M 3 x 12	4
	210 155	Serrated washer 3.2	4
	222 202	Mica washer	4
	224 536	Insulating nipple	4
	210 361	Hex nut M 3	4
	227 197	Distance washer	4
25	217 854	Fuse F 1 A	2
T 60	220 535	Transistor BC 252 B	2
T 61	213 186	Transistor BC 171 B	2
T 62	224 726	Transistor BC 337	2
T 63	224 729	Transistor BC 327	2
T 64	229 260	Transistor BD 585 compl.	4
T 65	229 260	Transistor BD 585 compl.	4
D 60	216 027	Diode BZX 62	6
D 61	216 027	Diode BZX 62	6
D 62	216 027	Diode BZX 62	6
26	217 849	Silicon bridge rectifier B 40 C 1400	1
R 60	216 383	Carbon resistor 82 kOhm/0.25 W/ 5 %	1
R 61	224 589	Carbon resistor 100 kOhm/0.25 W/ 5 %	1
R 62	217 843	Carbon resistor 56 kOhm/0.25 W/ 5 %	2
R 63	220 526	Carbon resistor 3.3 kOhm/0.25 W/ 5 %	6
R 64	224 736	Carbon resistor 15 Ohm/0.25 W/ 5 %	2
R 65	220 526	Carbon resistor 3.3 kOhm/0.25 W/ 5 %	6
R 66	220 548	Carbon resistor 1 kOhm/0.25 W/ 5 %	6
R 67	220 526	Carbon resistor 3.3 kOhm/0.25 W/ 5 %	6
R 68	224 737	Adjustment control 500 Ohm/0.15 W/lin.	2
R 69	224 738	High-temperature thermistor 1 kOhm	2
R 70	220 548	Carbon resistor 1 kOhm/0.25 W/ 5 %	6
R 71	224 595	Carbon resistor 0.33 Ohm/1 W/10 %	4
R 72	224 595	Carbon resistor 0.33 Ohm/1 W/10 %	4
R 73	220 548	Carbon resistor 1 kOhm/0.25 W/ 5 %	6
R 74	217 861	Carbon resistor 2.2 kOhm/0.25 W/ 5 %	1
C 60	222 213	Electrolytic capacitor 1 μF/ 50 V	2
C 61	220 265	Electrolytic capacitor 47 μF/ 16 V	3
C 62	223 278	Ceramic disc capacitor 330 pF/500 V/10 %	2
C 63	220 531	Electrolytic capacitor 100 μF/ 16 V	2

Pos.	Part.-No.	Description	Quantity
C 64	220 265	Electrolytic capacitor 47 μ F/ 16 V	3
C 65	213 498	Ceramic disc capacitor 47 pF/500 V/10 %	2
C 66	220 533	Ceramic disc capacitor 10 nF/250 V	2
C 67	217 847	Electrolytic capacitor 1000 μ F/ 25 V	2
C 68	222 210	Foil capacitor 0.1 μ F/160 V/20 %	2
C 69	222 210	Foil capacitor 0.1 μ F/160 V/20 %	2
C 70	224 739	Electrolytic capacitor 4700 μ F/ 35 V	1

Replacement parts Dual HS 140

Pos.	Part No.	Description	Quantity
1	225 486	Dust cover CH 21 compl.	1
2	230 592	Case, walnut compl.	1
	230 593	Case, white compl.	1
3	233 981	Front trimplate, compl.	1
	228 209	Sleeve	4
	211 556	Disc 4.3/9/0.8 St	4
	210 146	Ideal disc 3.2	4
4	223 532	Light rod	1
	200 444	Spring washer	1
5	210 283	Philips sheet metal screw with cross head 2.9x6.5	4
	210 586	Disc 3.2/7/0.5 St	4
	222 335	Dual emblem	1
6	224 377	Protecting ring	1
7	221 913	Knob small for 6 mm hole	1
8	223 148	Knob small for 4 mm hole	6
9	221 912	Knob large for 6 mm hole	1
10	203 239	Felt ring	1
11	202 371	Holder for spindle	1
12	210 286	Fillister head screw with cross head 2.9 x 9.5	2
13	224 643	Fillister head screw with cross head M 3 x 10	4
14	202 257	Machine sheet screw with cross B 3.9 x 25	1
	210 638	Disc 4.2/10/0.5 Ps	1
15	210 289	Philips head screw with cross head B 3.5 x 16	3
	210 641	Disc 4.2/10/1 St	3
	225 948	Pot washer	3
16	216 488	Power cable compl. (to connect amplifier to pho- no-chassis)	1
17	223 855	Voltage plate	1
18	232 477	Loudspeaker CL 116 walnut compl.	1
	232 478	Loudspeaker CL 116 white compl.	1
19	230 595	Shipping carton compl.	1
20	232 352	Operating manual	1
		<u>Loudspeaker CL 116</u>	
21	233 889	Loudspeaker case walnut compl.	1
	233 890	Loudspeaker case white compl.	1
22	222 449	Dual emblem (for walnut finish)	1
	215 888	Dual emblem (for white finish)	1
	221 455	Blocking disc	1
23	231 759	Loudspeaker	1
	210 367	Hex nut M 4	4
	210 641	Disc 4.2/10/1 St	4
24	203 953	Foam mat	1
25	230 807	Rear wall compl. (for walnut finish)	1
	230 808	Rear wall compl. (for white finish)	1
	215 671	Special sink screw with cross head 3 x 25	6
26	203 925	Bushing for speaker jack, compl.	1
	216 481	Sheet metal sink screw with cross head 2.9 x 9.5	4
27	213 589	Loudspeaker jack	1
28	208 811	Loudspeaker cable, compl.	1
	209 433	Loudspeaker plug	2
29	215 954	Protecting felt	1
30	230 594	Shipping carton compl.	1
31	232 431	Technical data sheet CL 116	
		For replacement parts, function description and troubleshooting chart of the HiFi-automatic turn- table Dual 1226 refer to Service Instructions Dual 1226.	



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