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# Dual KA 12 L Service Manual

Edition April 1974



## Contents

|                                   | Page    |
|-----------------------------------|---------|
| Technical Data                    | 2       |
| Functions                         | 3       |
| Alignment Procedure               | 4, 5    |
| Exchange of Sliders, Rope Diagram | 6       |
| Circuit Diagram                   | 7, 8    |
| Printed Circuit Boards            | 9 - 12  |
| Replacement parts                 | 13 - 18 |

Dual Gebrüder Steidinger · 7742 St. Georgen/Schwarzwald

## Technical data

### Turntable

Automatic turntable Dual 1211

### Pick-up

Ceramic pick-up Dual CDS 650

### FM Band

Frequency range 87 - 108 MHz

Intermediate frequency 10.7 MHz

Antenna input 240  $\Omega$  (symmetrical)

Retractable ferrite rod antenna

### Sensitivity

(with 22.5 kHz deviation and 26 dB signal-to-noise ratio)

Mono  $\geq 3.5$   $\mu$ V

Stereo  $\geq 18$   $\mu$ V

IF selectivity at  $\pm 300$  kHz  $\geq 45$  dB

Image frequency selectivity  $\geq 40$  dB

Close range selectivity  $\geq 70$  dB

Long range selectivity  $\geq 80$  dB

IF bandwidth 180 kHz

IF stability  $\geq 60$  dB

Limiting  $\geq 2$   $\mu$ V

### Signal-to-noise ratio

(at 1 mV, 1 kHz, and 40 kHz deviation)

$\geq 55$  dB

Harmonic distortion (DIN 45 500)

Mono  $\leq 1$  %

Stereo  $\leq 2$  %

Deemphasis 50  $\mu$ s

Mono/stereo switching 20  $\mu$ V

### Crosstalk attenuation

(at 1 kHz and 40 kHz deviation)  $\geq 26$  dB

AM suppression at 50  $\mu$ V  $\geq 40$  dB

Pilot frequency suppression  $\geq 40$  dB

Auxiliary carrier suppression  $\geq 40$  dB

AFC capture range  $\pm 300$  kHz

### AF output voltage

(99 MHz, modulated 50% with 1 kHz, input voltage 1 mV, measured at the input of the AGC amplifier)

$\geq 0.7$  V

### AM Bands

Frequency ranges LW 140 - 360 kHz

MW 500 - 1650 kHz

SW 5.85 - 10.3 MHz

Intermediate frequency 455 kHz

Antenna input High impedance (inductive)

### HF sensitivity

(measured with dummy antenna DIN 45 300, 6 dB signal-to-noise ratio)

MW = 30  $\mu$ V SW = 10  $\mu$ V LW = 40  $\mu$ V

IF selectivity  $\pm 9$  kHz  $\geq 35$  dB

Image frequency

selectivity MW  $\geq 26$  dB

SW  $\geq 10$  dB

LW  $\geq 26$  dB

IF bandwidth (-3 dB)  $\geq 3.5$  kHz

### AF output voltage (560 kHz, modulated

30% with 1 kHz, input voltage 1 mV

at antenna, measured at the input

to the AGC amplifier  $\geq 0.45$  V

### AF amplifier

### Output power

(measured across 4  $\Omega$ , distortion  $\leq 1$  %)

Music power 2 x 6 Watt

Continuous power (1 kHz) 2 x 4 Watt

### Input sensitivity

Tape 400 mV at 470  $\Omega$

### Frequency range

(With tone controls at mechanical

midposition) 20 Hz - 20 kHz  $\pm 3$  dB

### Outputs

4 loudspeaker sockets DIN 41 529, 4  $\Omega$

1 co-axial socket, 1/4 inch, for headphone connection

### Tone controls

Bass at 100 Hz  $\pm 12$  dB

Treble at 100 kHz  $\pm 12$  dB

### Volume control

with physiological control contour

### Balance control

Control range approx. 40 dB

### Quadro-effect control

With loudspeaker matrix for quadro-effect reproduction

### Stereo/Mono switch

### Signal-to-noise ratios

Phono rumble signal-to-noise ratio  $\geq 35$  dB

Rumble signal voltage ratio  $\geq 55$  dB

Tape, with reference to nominal power  $\geq 60$  dB

Tuner (at 1 mV, 1 kHz, and 40 kHz deviation)  $\geq 55$  dB

Cross-talk attenuation (at 1000 Hz)

Phono  $\geq 20$  dB

Tape, tuner  $\geq 35$  dB

### Power consumption

approx. 30 VA

Line voltages 110, 130, 150, 220, 240 V

Fuse at 110, 130, 150 V 315 mA, slow-blow  
at 220, 240 V 160 mA, slow-blow

### Components

3 integrated circuits (IC)

2 field-effect transistors (FET)

14 silicon transistors

4 germanium power transistors

12 silicon diodes

2 silicon stabilising diodes

2 fuses, 0.5 A, fast-blow, for the protection of output stages

### Dimensions

with cover H 14 355 x 180 x 325 mm

### Weight

approx. 9.6 kg

### Loudspeakers

2 loudspeaker boxes, each with a 6 Watt, special widerange loudspeaker

### Dimensions of the loudspeaker boxes

Walnut 195 x 300 x 105 mm (WxHxD)

White 195 x 300 x 130 mm



## Functions

### FM section

The FM circuits are equipped with two FETs (HF input stage T 101, Mixer T 102). T 103 produces the oscillator voltage.

The use of the two FETs, a separate oscillator stage, and tuned gate and drain circuits gives the best results with respect to sensitivity, noise, and large signal handling.

### FM-IF

It was decided to use two ICs (I 301, I 302), a ceramic filter, and an LC bandfilter, rather than discrete components.

The IF signal is extracted at the drain of the mixer by an LC-matched ceramic filter and passed to the input of IC 301 (TA 991, pins 2 and 4). The amplification is approximately 70 dB).

The IF signal is split at pin 8. One part is fed to the second IC (I 302) for further amplification, and the other part is fed to the AGC circuit. I 302 (TBA 120), as well as amplifying the signal a further 60 dB, also limits the signal correctly. The coincidence demodulator, which is integrated in the TBA 120, produces the AF signal.

### Control

The FM IF voltage at the output of I 301 (TA 991) drives the transistor T 301 (BF 254), whose collector circuit is tuned to the frequency of the ceramic filter.

The diode D 301, on the secondary side of this filter, rectifies HF, and produces the AGC voltage.

The following details are important for understanding this operation: The negative AGC voltage, produced by diode D 301, is fed to the transistor T 302 (BC 208 A). Which is biased on when no aerial input is present. When a signal of more than 1.5  $\mu$ V is received, a negative reference voltage is produced at the base of T 302, which is proportional to the field strength of the input signal. T 302 is an NPN transistor, and is biased off proportionally. A corresponding positive voltage appears at the collector, and is used to set up the stereo threshold and to prevent the stereo indicator lamp from lighting when the signal is noisy or too weak. The returning emitter current operates the field strength meter.

D 301 also supplied the AGC voltage for the integrated circuit I 301. This voltage is fed to pin 5 of the IC via filter circuits.

### Stereo Decoder

The integrated circuit I 401 (TBA 450) used in the stereo decoder operates on the matrix principle. The 38 kHz switching frequency is obtained by doubling the pilot frequency. I 401 contains the lamp driver and the two triggers for mono/stereo changeover. One trigger operates at 0.9 V, while the second is actuated by the 19 kHz pilot frequency. At pin 7 (left channel) and pin 8 (right channel), the stereo signal is available, which is then amplified to about 800 mV by the following transistors T 401 and T 402.

## AFC

The AF output voltage, from which the AFC voltage is obtained, contains a DC component, which is also true for the AFC reference voltage. This is equalised on the one side by the voltage divider R 321, R 341, R 323 and on the other side by the stabilised voltage available at MP 9. The AFC voltage, which controls the variable capacity diode D 101, is adjusted by means of R 341 (variable).

### AM section

The AM HF circuits are built in a conventional manner, with a separate oscillator and a gain-controlled HF transistor.

### AM-IF

The coupling of the HF circuits to the IF amplifier is carried out by means of an LC-matched ceramic filter. The IF amplification is carried out by I 301 (TAA 991), whose input is switched across. At the output there are two LC filters in series. The signal is extracted selectively. The reference voltage is available at the anode of the diode D 302, while the AF voltage passes through the decoder and is amplified in the following AF amplifier stages T 401 and T 402 to about 800 mV.

### Indicating meter

The two rectifiers (455 kHz and 10.7 MHz) are connected in series. Current is supplied via R 315 from a negative potential. Thus a voltage is developed across R 315, which is connected in a bridge circuit with R 316, the meter, R 314, and T 302 (BC 238 A). With no input signal, the meter is not deflected. When a signal is received, the bridge becomes unbalanced, and the meter shows an indication proportional to the field strength of the signal.

### Power supply

The HF circuits have a separate power supply. The AC voltage from the mains transformer is rectified by D 501 and D 502 (full-wave rectification) and stabilised by T 501 and the Zener diode D 503.

### LF section

#### AGC amplifier

The volume can be adjusted by a tandem potentiometer (logarithmic). This potentiometer also has connections for a physiological control contour. T 10 is used to match the signal to the high impedance volume control. The signal is extracted via C 13 and is passed to the following bass control P 11, treble control P 12, and the balance control P 13.

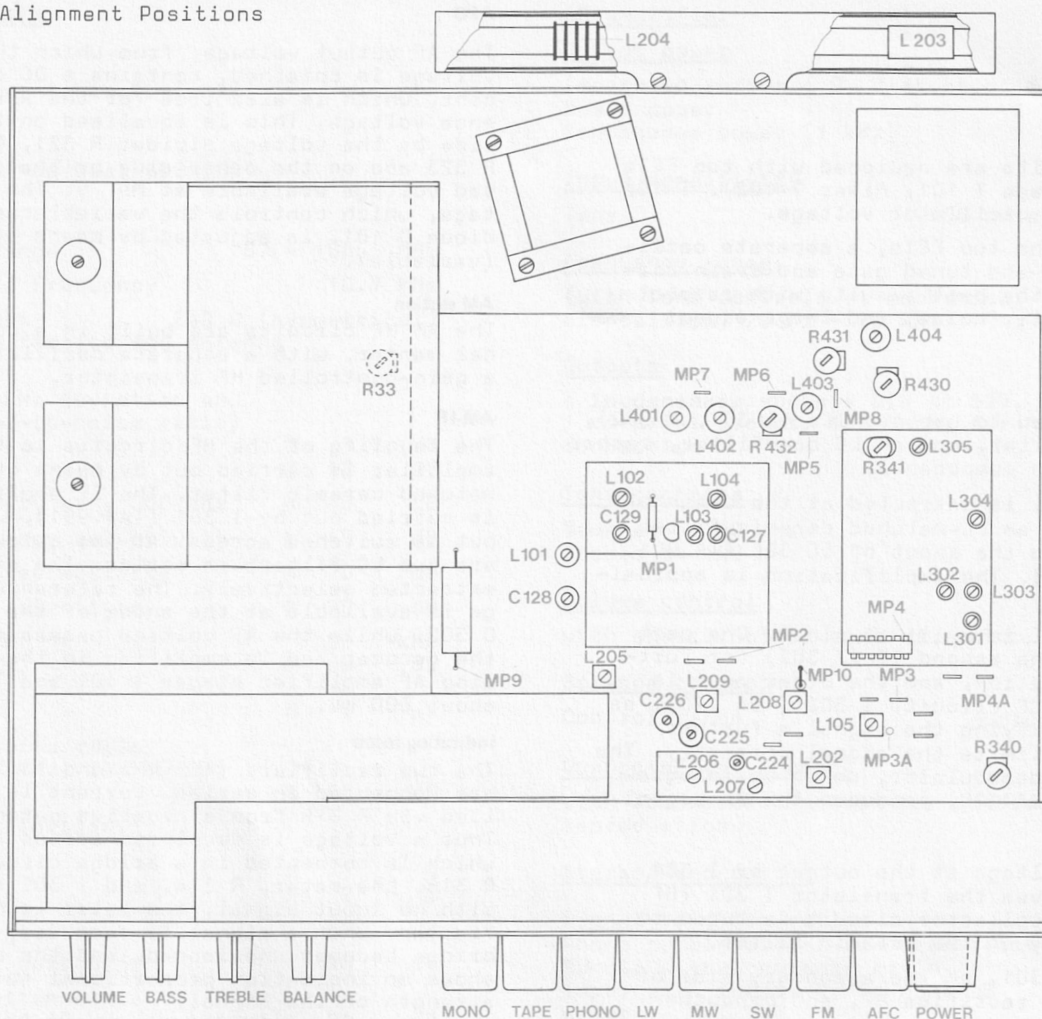
#### Power amplifier

The signal is passed to the base of T 30 via C 30. T 31 amplifies large signals. The negative feedback via R 35, R 34, R 33, and R 43 determines the gain of the amplifier. R 33 is variable and is used to symmetrize the two channels. The idle current of the complementary final stage T 32, T 33 is stabilised by R 38, R 41, and D 30. The AF signal is fed via C 35 to the headphone socket and the loudspeaker outputs.

#### Power supply

The four diodes D 31 - D 35, which are connected as a bridge rectifier, and the smoothing capacitor C 36 supply the amplifier with voltage.

Fig. 1 Alignment Positions



#### Alignment instructions

##### AM IF 455 kHz

Select MW, disconnect the ferrite antenna (yellow wire), connect an oscilloscope to MP 4 A, with a sensitivity of 100 mV, connect a sweep generator (terminated with 60  $\Omega$ ) via a 10 nF capacitor to MP 2, and set it to approximately 60 mV.

Detune L 208, L 209, and L 302, and set the sweep generator to the frequency of the ceramic filter (455 kHz). If necessary, increase the input voltage.

Adjust L 302, L 209, and L 208 for maximum and symmetry.

##### AM oscillator and input stage

Reconnect the yellow wire of the ferrite aerial. Fully close the variable capacitor and set the scale pointer to the alignment mark by sliding it along the cord. Connect an AF valve voltmeter to MP 5, or to the AF output, and a frequency generator via a dummy aerial (200  $\Omega$ , 200 pF in series) to the aerial input socket. Adjust the oscillator and the input stages as shown in the table for maximum at the lowest possible input voltage. Carry out the adjustments in the following sequence: LW, MW, SW.

##### FM IF 10.7 MHz

Damp L 301 with a 330  $\Omega$  resistor, select the FM band, connect an oscilloscope to MP 4 A, with a sensitivity of 100 mV, connect the sweep generator, terminated with 60  $\Omega$ , to R 113 (R 113 is reserved in the circuit on sets up to serial number 21 500) or MP 10. Detune L 303 and set the sweep generator to the frequency of the ceramic filter. Remove the damping resistor (330  $\Omega$ ) and couple the

signal loosely (via a 5 cm long piece of insulated wire) into the FM circuits. Adjust L 103, L 105, L 301, L 303, and L 304 for maximum and symmetry. Repeat this adjustment sequence.

##### FM oscillator and input stage

Switch off the AFC, connect the AF valve voltmeter to MP 5, or the AF output, the signal generator to the aerial input (240  $\Omega$  symmetrical), set the receiver and the signal generator 88 MHz. Adjust L 104 (oscillator), L 101 (input stage), and L 102 (coupling transformer) for maximum. Set the receiver and the signal generator to 106 MHz, and adjust C 127 (oscillator), C 128 (input stage), and C 129 (coupling capacitor) for maximum. Repeat this adjustment sequence 2 or 3 times. Switch on the AFC, set the signal generator to 89 MHz, 1 mV, 50 % modulated with 1 kHz. Adjust L 305 (phase circuit) for maximum. Switch off the AFC and adjust R 341 for the same output voltage.

##### Stereo decoder

Switch on the AFC, connect a high impedance oscilloscope (measuring probe 10 : 1, 10 M $\Omega$ , 7 pF) to MP 6. Connect a stereo signal generator to the aerial input 240  $\Omega$  symmetrical). Set the signal generator and receiver to 99 MHz, and the signal generator to approximately 200  $\mu$ V, modulated with 19 kHz (pilot frequency). Adjust L 402 and L 404 for maximum. Move the oscilloscope probe to MP 7, and adjust L 401 (38 kHz) for maximum. Adjust the variable resistor R 340 so that the stereo indicator lamp lights. Move the oscilloscope probe to MP 8, and modulate



the stereo signal generator with 300 Hz, 80 % L-R. Adjust L 403 for maximum amplitude and sharp zero transistions. The zero transistions must be at the same level. Connect the AF valve voltmeter to the left AF output, and modulate the stereo signal generator with 1 kHz, 50 % left. Adjust for a maximum AF on the left channel with L 401. Move the AF valve voltmeter to the right AF

output. Adjust for minimum AF output on the right channel (crosstalk) with R 430 and R 431. Leave the valve voltmeter connected to the right AF output, modulate the stereo signal generator with 19 kHz (pilot frequency), and switch off the AF modulation. Adjust for minimum 38 kHz carrier with R 432. Reduce the input voltage to 20  $\mu$ V, and adjust the decoder threshold with R 340.

| Range | Frequency                                  | Circuit                                                   | Alignment Position               |
|-------|--------------------------------------------|-----------------------------------------------------------|----------------------------------|
| LW    | 160 kHz<br>160 kHz<br>300 kHz              | Oscillator<br>Ferrite aerial<br>Input stage               | L 205<br>L 204<br>C 226          |
| MW    | 560 kHz<br>560 kHz<br>1450 kHz<br>1450 kHz | Oscillator<br>Ferrite aerial<br>Oscillator<br>Input stage | L 206<br>L 203<br>C 225<br>C 224 |
| SW    | 6.5 MHz<br>6.5 MHz                         | Oscillator<br>Input stage                                 | L 207<br>L 202                   |

Center position to extreme maximum.

## Adjustment-and test data

### Current consumption

at 220 V, without signal max. 50 mA

at 220 V, full power (4 V into 4  $\Omega$ , front) and the record player switched on max. 180 mA

### Voltages

Without signal 17 - 18 V

At full power (4 V into 4  $\Omega$ /channel, front) 13 - 14 V

### Idle current of the final stage

After about 5 minutes operation approx. 4 mA

### Abbreviations for controls, switches, and settings

Tp = Button TAPE depressed

Vol = Volume control

Bal = Balance control

Ton = Tone controls (bass and treble)

Qu = Quadro-effect control

- 1 = control fully clockwise
- 2 = control in mechanical center position
- 3 = control fully anticlockwise
- 30 = control 30 dB below maximum
- 40 = control 40 dB below maximum

### Output voltage

Tp, Bal 2, Vol 1

Input signal 1000 Hz, 200 mV, on both channels at the TAPE input.

Equalise the amplification of the two channels with R 33. Increase the input voltage until the front outputs each have 4 V into 4  $\Omega$ . The distortion at this output voltage should not exceed 10 %.

The output voltage at the headphone output, terminated with 400  $\Omega$ , should be 2.6 - 3.6 V, and at the tape recorder socket (contacts 1/2 and 4/2), terminated with 100 k $\Omega$ , 30 - 40 mV. Check the volume control throughout its range for parallelity of the tracking.

Channel deviation Ch 1/Ch 2 in the range between Vol 1 and Vol 2 max. 4 dB

Channel deviation Ch 1/Ch 2 in the range between Vol 2 and Vol 40 max. 6 dB

### Quadro output

Tp, Bal 2

Input signal 1000 Hz, 400 mV, on both channels at the TAPE input. Adjust the volume control for 3 V into 4  $\Omega$ /channel on the front output.

Terminate the rear outputs with 4  $\Omega$  per channel, and measure the voltages.

at Qu 2 0.40 - 0.55 V/channel

with Qu in the position + 0.85 - 1.10 V/channel

with Qu in position - 0.25 - 0.40 V/channel

Voltage on the front outputs, terminated with 4  $\Omega$  2.10 - 2.60 V/channel

Remove the termination from each of the outputs in turn. The output of the corresponding front output should rise to the value (3 V) set up above.

### Bass and treble lift and attenuation

Tp, Bal 2, Vol 1

Input signal 1000 Hz at the TAPE input. Output signal into 4  $\Omega$ /channel, front, 100 mV.

Ton 1, Bass lift at 100 Hz 12 dB  $\pm$  2 dB

Ton 3, Bass attenuation at 100 Hz 12 dB  $\pm$  2 dB

Channel deviation Ch 1/Ch 2 max. 3 dB

Ton 1, Treble lift at 10 kHz 12 dB  $\pm$  2 dB

Ton 3, Treble attenuation at 10 kHz 12 dB  $\pm$  2 dB

Channel deviation Ch 1/Ch 2 max. 3 dB

### Physiological volume control

Tp, Bal 2, Vol 2

Input voltage 1000 Hz, 200 mV, at the TAPE input. Output voltage 2 V into 4  $\Omega$ /channel, front.

Vol 30

Ton 1, Bass lift at 100 Hz 24 dB  $\pm$  2.5 dB  
Treble lift at 10 kHz 24 dB  $\pm$  2.5 dB

with reference to 1000 Hz.

### Balance control

Control range approximately 40 dB

### Input sensitivity

Bal 2, Ton 1

Measuring frequency 1000 Hz. Necessary input voltage for 1 V output into 4  $\Omega$ /channel, front

Tape approx. 100 mV

### Noise voltage

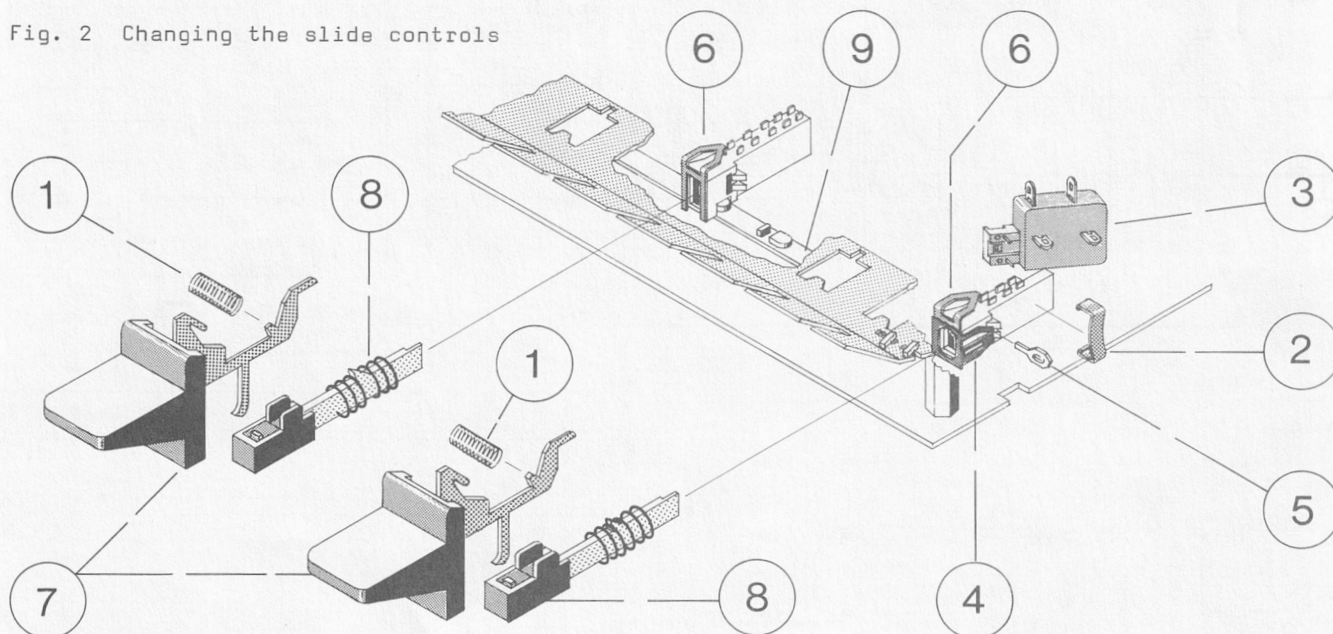
Tp, Bal 2, Ton 1, Vol 1

Terminate the tuner input with 100 k $\Omega$ , and the front outputs with 4  $\Omega$ /channel.

Permissible noise voltage

max. 10 mV/channel

Fig. 2 Changing the slide controls



### Exchange of key sliders

Remove the chassis and take off the light box. Remove pressure spring 1, and the clip 2, and swing the mains switch 3 to one side (if necessary, unsolder one end of the diode D 303, which is beside the mains switch). Lift spring 4 slightly and remove the switching pin 5. Lift spring 6 and pull out the

slider 7, complete with the pushrod 8. Reassembly is carried out in the reverse order. The mutually releasing switch buttons are removed as follows: Remove pressure spring 1, lift spring 6, push the release plate 9 to the right until push rod 8 is released, and pull the slider 7 and the push rod 8 out forwards.

Fig. 4 Scale drive cord

Fig. 3 Connection Diagram of Ferrite Antenna

rt = red  
gr = grey  
ge = yellow  
gn = green  
ws = white

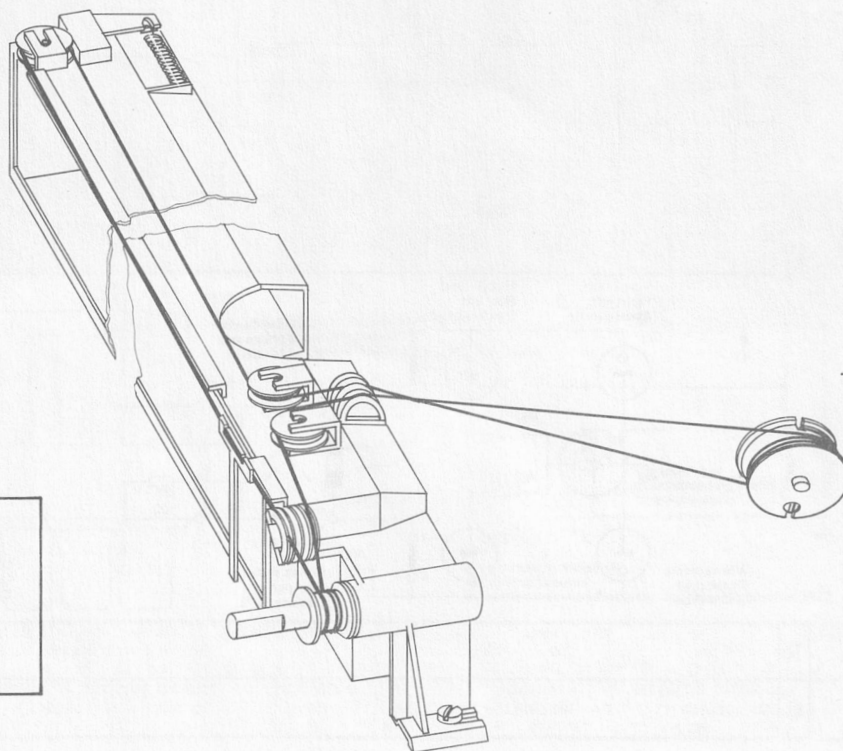
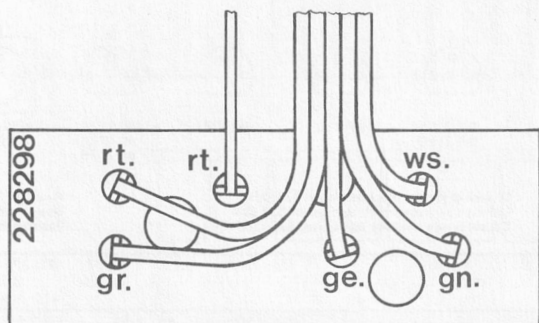
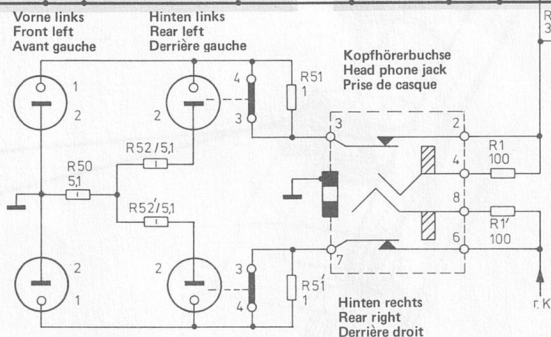
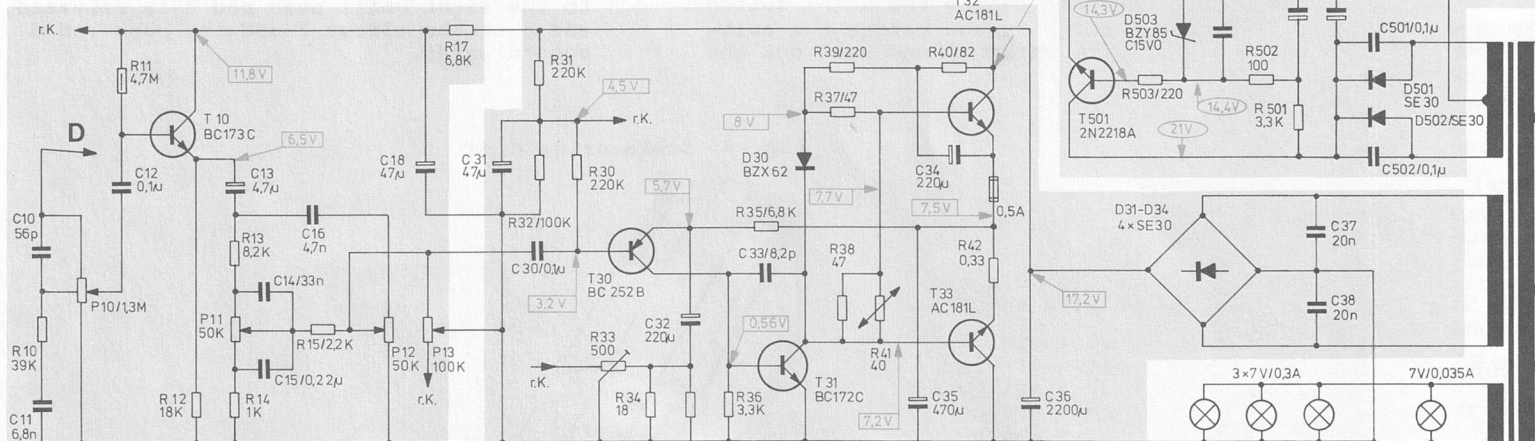
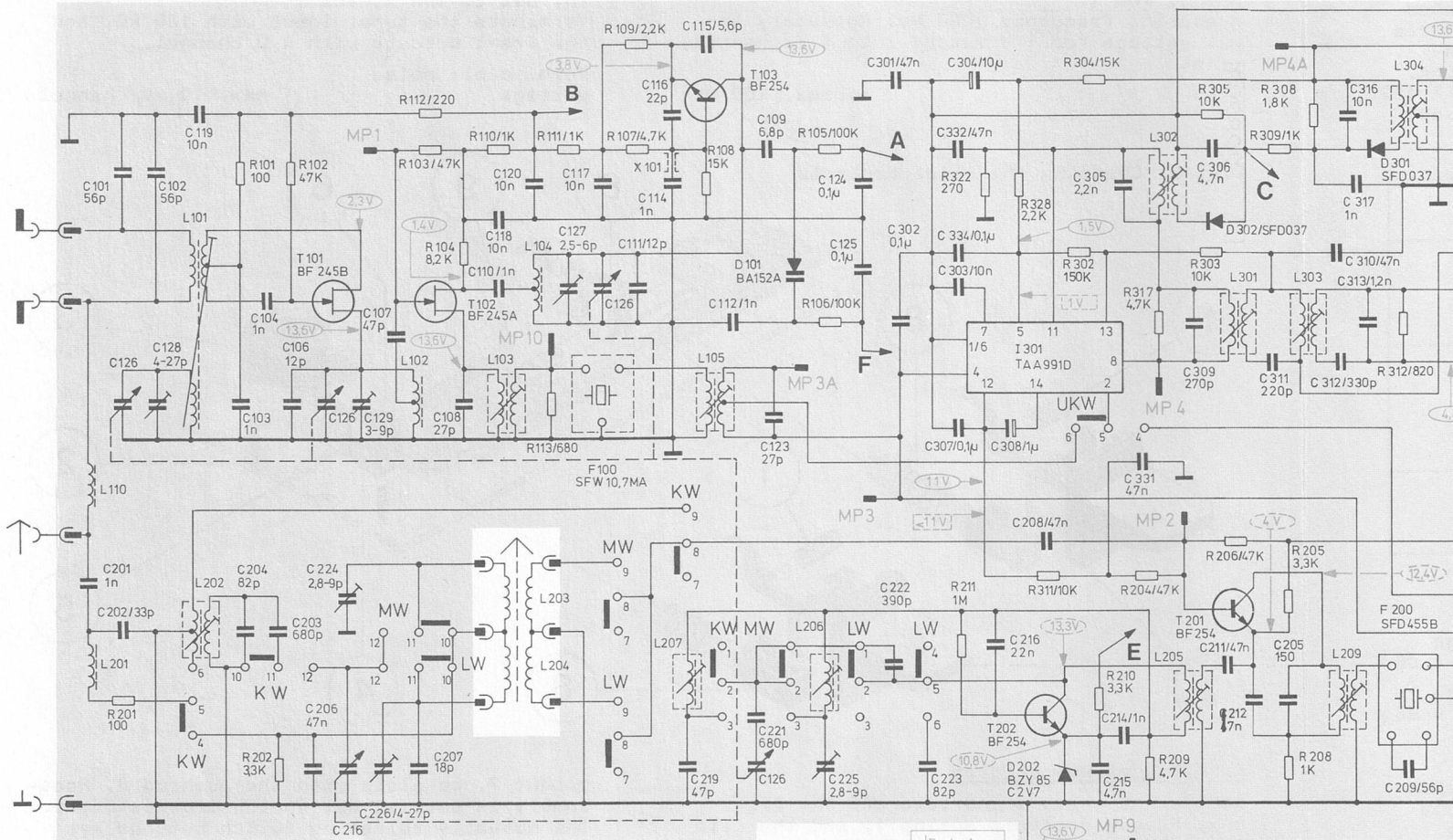
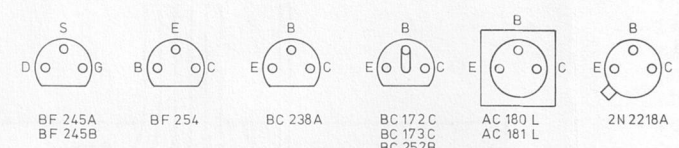




Fig. 5



Transistoren von der Anschlußseite gesehen.  
Transistors as seen from the connecting side.  
Transistors vus du côté des connexions

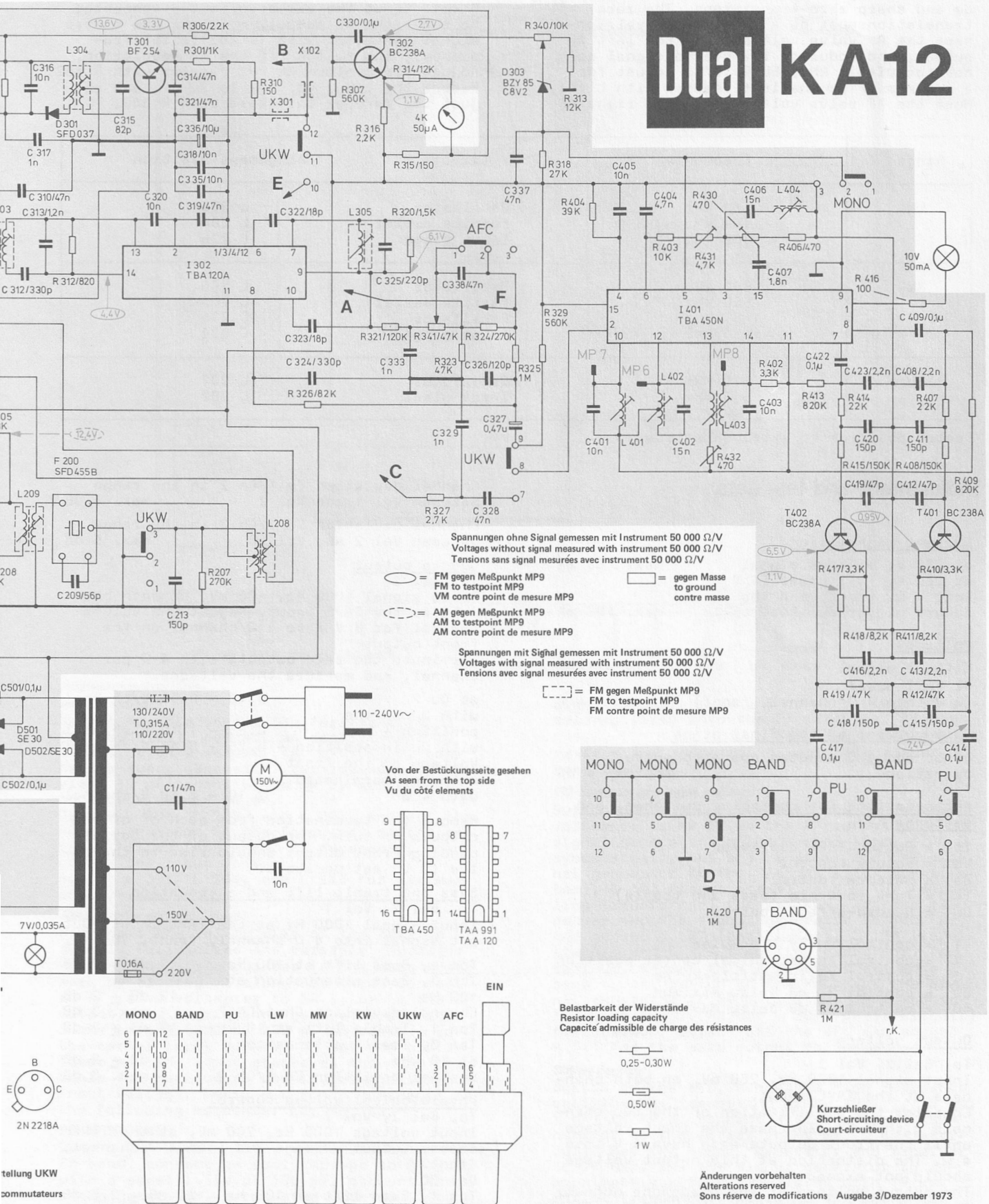


Ströme gemessen mit Instrument 333 Ω/V  
Currents measured with instrument 333 Ω/V  
Courants mesurés avec instrument 333 Ω/V

Gezeichnete Schalterstellung UKW  
Show switch position  
Position dessinée des commutateurs

| R | 201   | 101 | 102 | 103,112 | 104 | 110 | 113,111 | 107,109 | 108 | 105,106 | 322         | 328 | 302,304     | 317     | 303,305 | 309 | 308     | 312 |
|---|-------|-----|-----|---------|-----|-----|---------|---------|-----|---------|-------------|-----|-------------|---------|---------|-----|---------|-----|
| C | 201   | 101 | 102 | 103     | 104 | 106 | 126     | 129     | 107 | 108     | 110,118,120 | 127 | 117,126,111 | 114,116 | 115     | 112 | 109,123 | 209 |
|   | 10,11 | 12  | 13  | 14,15   | 16  | 18  | 31      | 30      | 32  | 33      | 34          | 35  | 36          | 37      | 38      | 39  | 40      | 41  |

# Dual KA12







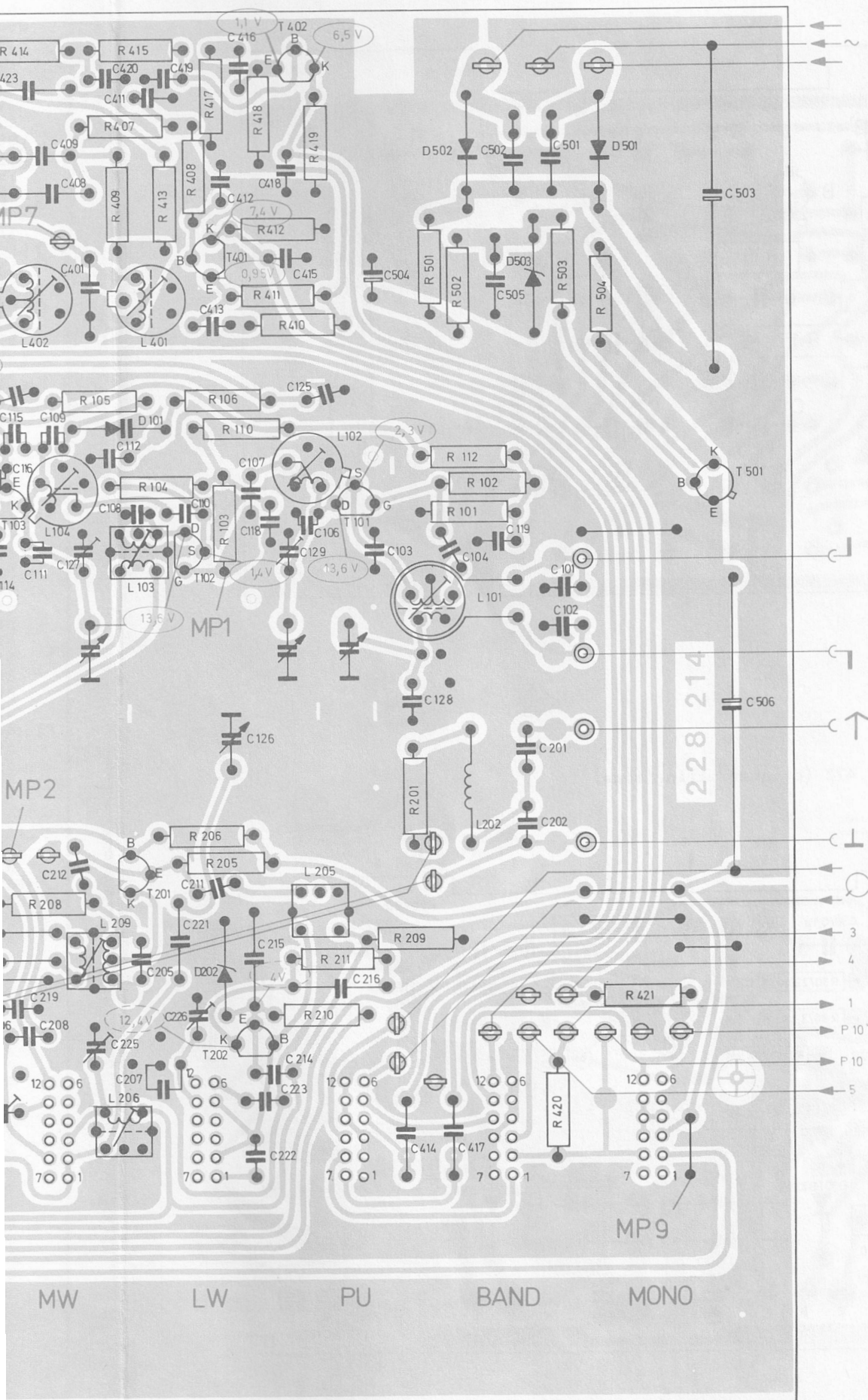






Fig. 9 Loudspeaker-Matrix 228 194 (equipment side)

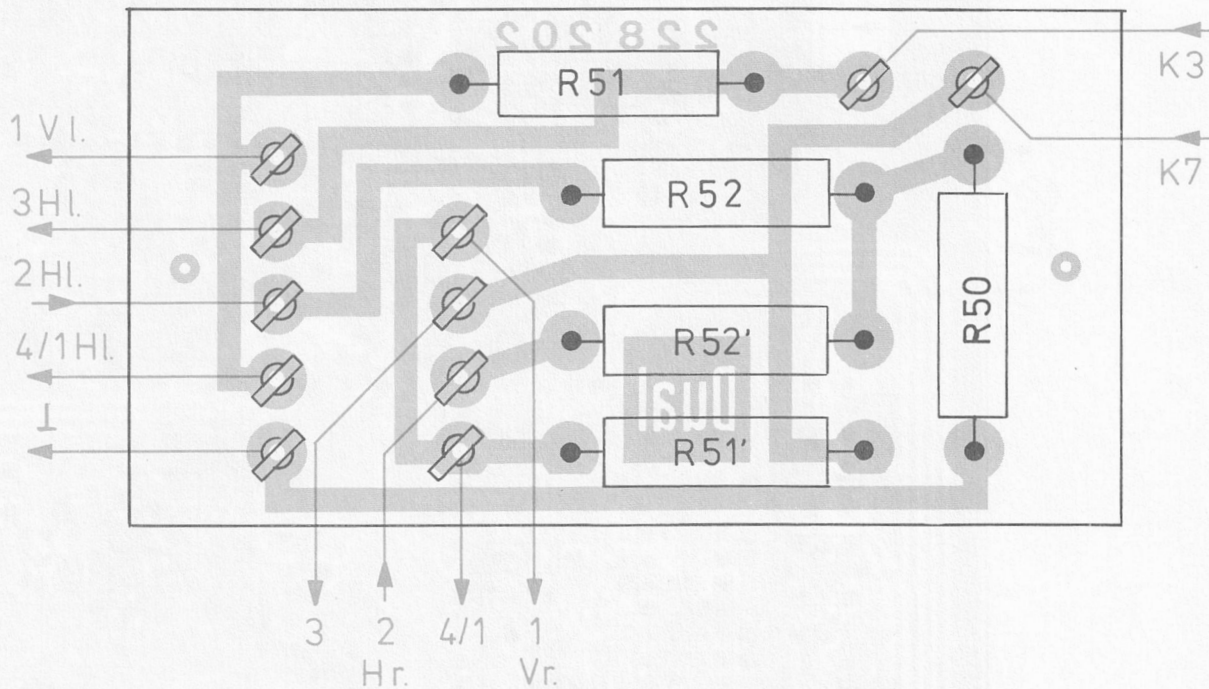
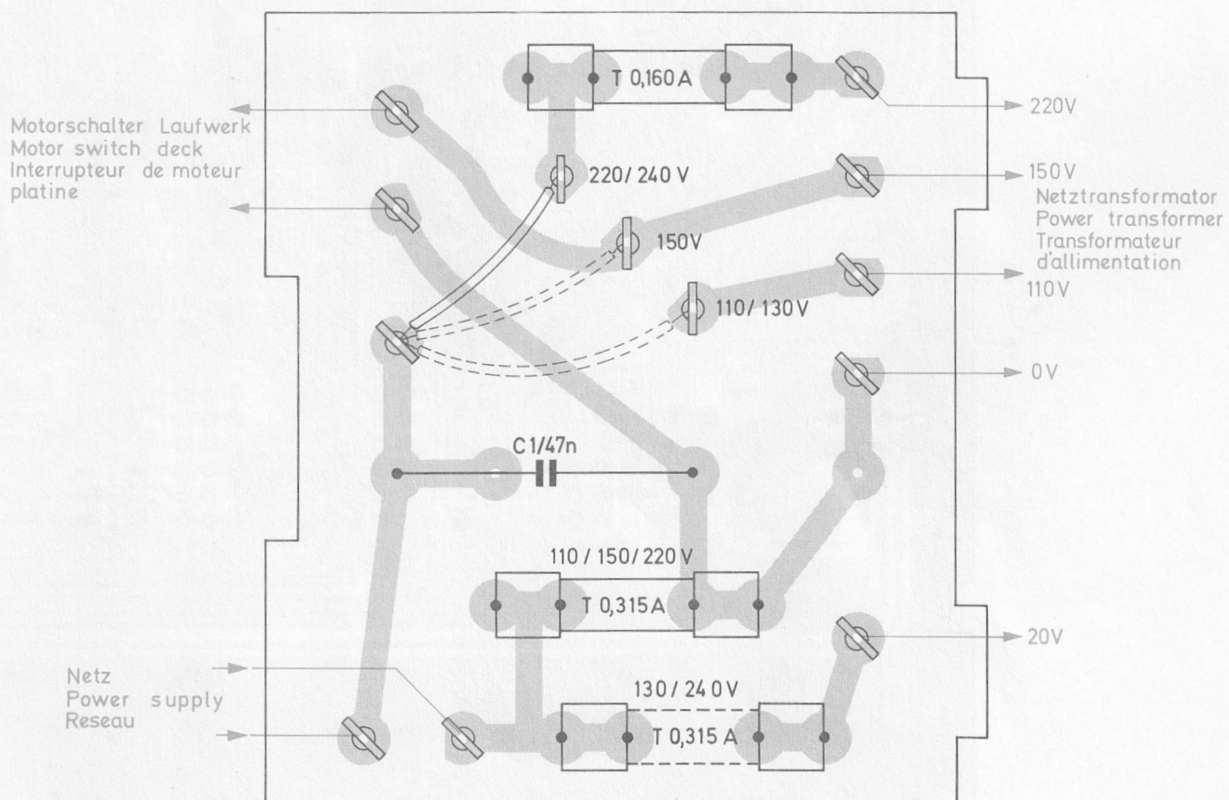


Fig. 10 Power supply connecting plate 224 505 (equipment side)





# Replacement parts

| Pos. | Part. No. | Description                                                            | Quantity | Price group |
|------|-----------|------------------------------------------------------------------------|----------|-------------|
| 1    | 223 312   | Cover H 14 cpl. ....                                                   | 1        | Mdse.gp. C  |
| 2    | 231 248   | Wooden console cpl. ....                                               | 1        | 071         |
|      | 231 249   | White console cpl. ....                                                | 1        | 072         |
| 3    | 202 257   | Cheese-head screw B 3.9 x 25 ....                                      | 1        | 014         |
|      | 210 638   | Disk 4.2 x 10 x 0.5 Ps ....                                            | 1        | 012         |
| 4    | 228 529   | Hexagon tin screw BZ 3.5 x 9.5 ....                                    | 3        | 012         |
|      | 225 948   | Crown wheel ....                                                       | 3        | 013         |
|      | 210 641   | Disk 4.2 x 10 x 1 St ....                                              | 3        | 012         |
| 5    | 231 250   | Front cover cpl. ....                                                  | 1        | 069         |
| 6    | 228 209   | Lead socket ....                                                       | 4        | 012         |
|      | 211 556   | Disk 4.3 x 9 x 0.8 ....                                                | 4        | 012         |
|      | 210 146   | Securing disk 3.2 ....                                                 | 4        | 012         |
| 7    | 222 335   | Dual sign ....                                                         | 1        | 018         |
| 8    | 225 648   | Slider carrier ....                                                    | 1        | 018         |
|      | 222 354   | Set of slides ....                                                     | 1        | 023         |
| 9    | 225 693   | Dial window ....                                                       | 1        | 044         |
| 10   | 228 616   | Turning knob ....                                                      | 4        | 027         |
| 11   | 221 984   | Turning knob ....                                                      | 1        | 024         |
| 12   | 222 287   | Head phone socket cpl. ....                                            | 1        | 025         |
|      | 224 377   | Cover ....                                                             | 1        | 013         |
| R 1  | 211 126   | Film resistor 100 $\Omega$ /0.30 W/10 % ....                           | 1        | 016         |
| 13   | 227 765   | Tuning guage with illumination cpl. ....                               | 1        | 052         |
|      | 225 888   | Bulb green 7 V 30 mA ....                                              |          |             |
|      | 209 438   | Bulb E 10 10 V/0.05 A ....                                             | 1        | 021         |
| 14   | 210 113   | Bulb housing E 10 ....                                                 | 4        | 018         |
|      | 209 439   | Bulb E 10 7 V/0.3 A ....                                               | 3        | 021         |
| 15   | 225 636   | Dial ....                                                              | 1        | 037         |
| 16   | 225 620   | Bank of lights cpl. ....                                               | 1        | 024         |
|      | 225 628   | Turning knob axle cpl. ....                                            | 1        | 021         |
|      | 210 675   | Disk 6.2 x 12 x 0.3 Bronze ....                                        | 2        | 012         |
| 17   | 225 634   | Dial string cpl. ....                                                  | 1        | 016         |
|      | 225 623   | Tension spring ....                                                    | 1        | 013         |
| 18   | 225 624   | String roll ....                                                       | 3        | 014         |
|      | 228 211   | Tubular rivet ....                                                     | 3        | 012         |
| 19   | 225 660   | Tensioning section ....                                                | 1        | 015         |
| 20   | 225 635   | Dial ....                                                              | 1        | 015         |
|      | 225 630   | Lead string cpl. ....                                                  | 1        | 015         |
| 21   | 225 633   | Variable condenser roll ....                                           | 1        | 017         |
| 22   | 224 505   | Mains plate cpl. ....                                                  | 1        | 038         |
| 23   | 209 735   | G Fuse link 160 mA delay action ....                                   | 1        | 018         |
|      | 209 736   | G Fuse link 315 mA delay action ....                                   | 1        | 018         |
| C 1  | 224 886   | Paper condenser 47 nF/250 V $\sim$ /20 % ....                          | 1        | 022         |
| 24   | 220 141   | Power cable cpl. ....                                                  | 1        | 028         |
| 25   | 231 252   | Power transformer cpl. ....                                            | 1        | 052         |
|      | 210 515   | Cheese-head screw M 4 x 6 ....                                         | 4        | 012         |
| 26   | 222 041   | Loudspeaker socket 2-terminals ....                                    | 2        | 019         |
| 27   | 228 001   | Connection label (rear) ....                                           | 1        | 021         |
| 28   | 228 321   | Loudspeaker sleeve with switch, 1-terminal ....                        | 2        | 018         |
| 29   | 209 487   | Aerial sleeve FM ....                                                  | 1        | 023         |
| 30   | 209 488   | Aerial sleeve AM ....                                                  | 1        | 023         |
| 31   | 225 650   | Ferrite antenna cpl. ....                                              | 1        | 058         |
| 32   | 230 364   | Authorization label ....                                               | 1        | 013         |
| 33   | 228 194   | Loudspeaker matrix cpl. ....                                           | 1        | 033         |
| R 50 | 211 287   | Wire resistor 5 $\Omega$ /1 W/10 % ....                                | 3        | 020         |
| R 52 | 211 287   | Wire resistor 5 $\Omega$ /1 W/10 % ....                                | 3        | 020         |
| R 51 | 228 323   | Wire resistor 1 $\Omega$ /1 W/10 % ....                                | 2        | 019         |
| 34   | 228 195   | Mounting ....                                                          | 2        | 015         |
| 35   | 210 286   | Self-tapping convex fillister head screw with cross-slot ....          | 4        | 012         |
| 36   | 228 189   | Operating instructions ....                                            | 1        | -           |
| 37   | 227 761   | Wooden package box cpl. ....                                           | 1        | 047         |
|      | 229 098   | White package box cpl. ....                                            | 1        | 047         |
| 38   | 228 086   | Wooden loudspeaker box CL 114 cpl. ....                                | 2        | Mdse.gp. C  |
|      | 224 246   | White loudspeaker box CL 111 cpl. ....                                 | 2        | Mdse.gp. C  |
|      |           | <u>Loudspeaker box CL 114</u>                                          |          |             |
| 39   | 230 378   | Wooden loudspeaker case cpl. ....                                      | 1        | 065         |
| 40   | 222 449   | Dual sign ....                                                         | 1        | 023         |
|      | 221 455   | Locking disk 5 ....                                                    | 1        | 013         |
| 41   | 203 777   | Loudspeaker ....                                                       | 1        | 060         |
| 42   | 210 619   | Disk 3.7/8/1 St ....                                                   | 4        | 013         |
| 43   | 227 838   | Backface cpl. ....                                                     | 1        | 032         |
| 44   | 228 083   | Self-tapping convex fillister head screw with cross-slot 3.5 x 13 .... | 8        | 012         |

| Pos.                          | Part. No. | Description                                                          | Quantity | Price group |
|-------------------------------|-----------|----------------------------------------------------------------------|----------|-------------|
| 45                            | 208 811   | Loudspeaker cable cpl. ....                                          | 1        | Mdse.gp. E  |
|                               | 209 433   | Loudspeaker socket ....                                              | 2        | 022         |
| 46                            | 227 852   | Type plate ....                                                      | 1        | 015         |
| 47                            | 215 954   | Protective felt, set ....                                            | 1        | 018         |
| 48                            | 228 090   | Package box ....                                                     | 1        | 022         |
| 49                            | 228 091   | Technical Data Sheet ....                                            | 1        | -           |
| <u>Loudspeaker box CL 111</u> |           |                                                                      |          |             |
| 39                            | 221 177   | White loudspeaker case cpl. ....                                     | 1        | 072         |
| 40                            | 215 888   | Dual sign ....                                                       | 1        | 022         |
|                               | 221 455   | Locking disk 5 ....                                                  | 1        | 013         |
| 41                            | 203 777   | Loudspeaker ....                                                     | 1        | 060         |
| 42                            | 210 597   | Disk 3.2/8/0.5 St ....                                               | 4        | 012         |
|                               | 210 361   | Hexagon nut M 3 ....                                                 | 4        | 011         |
| 43                            | 212 196   | Backface cpl. ....                                                   | 1        | 029         |
|                               | 203 242   | Supporting disk, stamped ....                                        | 4        | 013         |
|                               | 210 335   | Self-tapping convex fillister head screw with cross-slot 3 x 20 .... | 4        | 013         |
| 50                            | 213 589   | Loudspeaker sleeve ....                                              | 1        | 020         |
| 45                            | 208 811   | Loudspeaker cable cpl. ....                                          | 1        | Mdse.gp. E  |
|                               | 209 433   | Loudspeaker socket ....                                              | 2        | 022         |
| 46                            | 224 238   | Type plate ....                                                      | 1        | 017         |
| 47                            | 215 954   | Protective felt, set ....                                            | 1        | 018         |
| 48                            | 212 197   | Package box ....                                                     | 1        | 032         |
| 49                            | 224 242   | Technical Data Sheet ....                                            | 1        | -           |
| <u>HF-Panel</u>               |           |                                                                      |          |             |
| 51                            | 231 254   | HF-Panel, cpl. with key unit ....                                    | 1        | 098         |
| 52                            | 231 955   | Contact case cpl. with slide and key MONO ....                       | 1        | 034         |
| 53                            | 231 954   | Contact case cpl. with slide and key TAPE, PU, LW, MW, FM, SW ....   | 6        | 034         |
| 54                            | 231 956   | Contact case cpl. with slide and key AFC ....                        | 1        | 033         |
| 55                            | 231 957   | Contact case cpl. with slide and key POWER ....                      | 1        | 047         |
| 56                            | 223 774   | Cheese-head screw M 2.6 x 6.0 ....                                   | 4        | 012         |
|                               | 227 578   | Crown wheel A 2.8 ....                                               | 4        | 012         |
| 57                            | 222 497   | Anti-heat disk ....                                                  | 1        | 013         |
| 58                            | 223 904   | Electrode radiator ....                                              | 1        | 020         |
| I 301                         | 228 273   | Integrated circuit TAA 991 ....                                      | 1        | 038         |
| I 302                         | 228 274   | Integrated circuit TBA 120 ....                                      | 1        | 032         |
| I 401                         | 228 275   | Integrated circuit TBA 450 ....                                      | 1        | 047         |
| T 101                         | 228 269   | Transistor BF 245 B ....                                             | 1        | Mdse.gp. E  |
| T 102                         | 228 223   | Transistor BF 245 A ....                                             | 1        | Mdse.gp. E  |
| T 103                         | 228 270   | Transistor BF 254 ....                                               | 4        | Mdse.gp. E  |
| T 201                         | 228 270   | Transistor BF 254 ....                                               | 4        | Mdse.gp. E  |
| T 202                         | 228 270   | Transistor BF 254 ....                                               | 4        | Mdse.gp. E  |
| T 301                         | 228 270   | Transistor BF 254 ....                                               | 4        | Mdse.gp. E  |
| T 302                         | 228 271   | Transistor BC 238 A ....                                             | 3        | Mdse.gp. E  |
| T 401                         | 228 271   | Transistor BC 238 A ....                                             | 3        | Mdse.gp. E  |
| T 402                         | 228 271   | Transistor BC 238 A ....                                             | 3        | Mdse.gp. E  |
| T 501                         | 224 277   | Transistor 2 N 2218 A cpl. ....                                      | 1        | Mdse.gp. E  |
| D 101                         | 228 225   | Diode BA 152 A ....                                                  | 1        | Mdse.gp. E  |
| D 202                         | 228 226   | Z-Diode BZY 85 C 2 V 7 ....                                          | 1        | Mdse.gp. E  |
| D 301                         | 228 227   | Diode SFD 037 ....                                                   | 2        | Mdse.gp. E  |
| D 302                         | 228 227   | Diode SFD 037 ....                                                   | 2        | Mdse.gp. E  |
| D 303                         | 228 228   | Z-Diode BZY 85 C B V 7 ....                                          | 1        | Mdse.gp. E  |
| D 501                         | 227 344   | Diode 1 N 4001 ....                                                  | 2        | Mdse.gp. E  |
| D 502                         | 227 344   | Diode 1 N 4001 ....                                                  | 2        | Mdse.gp. E  |
| D 503                         | 228 230   | Z-Diode BZY 85 C 15 V 0 ....                                         | 1        | Mdse.gp. E  |
| F 100                         | 228 266   | Ceramics filter SFW 10.7 MA ....                                     | 1        | 039         |
| F 200                         | 228 267   | Ceramics filter SFD 455 B ....                                       | 1        | 026         |
| L 101                         | 228 276   | Imput coil cpl. ....                                                 | 1        | 027         |
| L 102                         | 228 277   | HF-coil cpl. ....                                                    | 1        | 024         |
| L 103                         | 228 335   | IF-FM-Spule ....                                                     | 1        | 026         |
| L 104                         | 228 278   | Oscillator coil cpl. ....                                            | 1        | 024         |
| L 105                         | 228 279   | IF-FM-coil ....                                                      | 1        | 026         |
| L 201                         | 228 296   | Inductor 10 mH ....                                                  | 1        | 022         |
| L 202                         | 228 291   | SW-R.F. circuit coil ....                                            | 1        | 026         |
| L 205                         | 228 286   | LW-oscillator coil ....                                              | 1        | 027         |
| L 206                         | 228 287   | MW-oscillator coil ....                                              | 1        | 025         |
| L 207                         | 228 288   | SW-oscillator coil ....                                              | 1        | 025         |
| L 208                         | 228 280   | IF-AM-coil ....                                                      | 1        | 026         |
| L 209                         | 228 281   | IF-AM coil ....                                                      | 1        | 026         |
| L 301                         | 228 282   | IF-AM coil ....                                                      | 2        | 026         |



| Pos.  | Part. No. | Description                                   | Quantity | Price group |
|-------|-----------|-----------------------------------------------|----------|-------------|
| L 302 | 228 289   | IF-AM coil .....                              | 1        | 026         |
| L 303 | 228 282   | IF-AM coil .....                              | 2        | 026         |
| L 304 | 228 284   | IF-FM-coil .....                              | 1        | 026         |
| L 305 | 228 290   | IF-FM-coil .....                              | 1        | 026         |
| L 401 | 228 292   | Decoder coil .....                            | 1        | 026         |
| L 402 | 228 293   | Decoder coil .....                            | 1        | 027         |
| L 403 | 228 294   | Decoder coil .....                            | 1        | 027         |
| L 404 | 228 295   | Decoder coil .....                            | 1        | 025         |
| R 101 | 224 548   | Film resistor 100 $\Omega$ /0.25 W/5 % .....  | 4        | 016         |
| R 102 | 220 539   | Film resistor 47 $k\Omega$ /0.25 W/5 % .....  | 7        | 016         |
| R 103 | 220 539   | Film resistor 47 $k\Omega$ /0.25 W/5 % .....  | 7        | 016         |
| R 104 | 220 547   | Film resistor 8.2 $k\Omega$ /0.25 W/5 % ..... | 5        | 016         |
| R 105 | 224 589   | Film resistor 100 $k\Omega$ /0.25 W/5 % ..... | 2        | 016         |
| R 106 | 224 589   | Film resistor 100 $k\Omega$ /0.25 W/5 % ..... | 2        | 016         |
| R 107 | 216 429   | Film resistor 4.7 $k\Omega$ /0.25 W/5 % ..... | 3        | 016         |
| R 108 | 216 385   | Film resistor 15 $k\Omega$ /0.25 W/5 % .....  | 2        | 016         |
| R 109 | 217 861   | Film resistor 2.2 $k\Omega$ /0.25 W/5 % ..... | 3        | 016         |
| R 110 | 220 548   | Film resistor 1 $k\Omega$ /0.25 W/5 % .....   | 5        | 016         |
| R 111 | 220 548   | Film resistor 1 $k\Omega$ /0.25 W/5 % .....   | 5        | 016         |
| R 112 | 224 593   | Film resistor 220 $\Omega$ /0.25 W/5 % .....  | 2        | 016         |
| R 113 | 220 589   | Film resistor 680 $\Omega$ /0.25 W/5 % .....  | 1        | 016         |
| R 201 | 224 548   | Film resistor 100 $\Omega$ /0.25 W/5 % .....  | 4        | 016         |
| R 202 | 220 526   | Film resistor 3.3 $k\Omega$ /0.25 W/5 % ..... | 7        | 016         |
| R 204 | 220 539   | Film resistor 47 $k\Omega$ /0.25 W/5 % .....  | 7        | 016         |
| R 205 | 220 526   | Film resistor 3.3 $k\Omega$ /0.25 W/5 % ..... | 7        | 016         |
| R 206 | 220 539   | Film resistor 47 $k\Omega$ /0.25 W/5 % .....  | 7        | 016         |
| R 207 | 228 265   | Film resistor 270 $k\Omega$ /0.25 W/5 % ..... | 2        | 016         |
| R 208 | 220 548   | Film resistor 1 $k\Omega$ /0.25 W/5 % .....   | 5        | 016         |
| R 209 | 216 429   | Film resistor 4.7 $k\Omega$ /0.25 W/5 % ..... | 3        | 016         |
| R 210 | 220 526   | Film resistor 3.3 $k\Omega$ /0.25 W/5 % ..... | 7        | 016         |
| R 211 | 224 733   | Film resistor 1 $M\Omega$ /0.25 W/5 % .....   | 4        | 016         |
| R 301 | 220 548   | Film resistor 1 $k\Omega$ /0.25 W/5 % .....   | 5        | 016         |
| R 302 | 228 264   | Film resistor 150 $k\Omega$ /0.25 W/5 % ..... | 3        | 016         |
| R 303 | 211 202   | Film resistor 10 $k\Omega$ /0.25 W/5 % .....  | 3        | 016         |
| R 304 | 216 385   | Film resistor 15 $k\Omega$ /0.25 W/5 % .....  | 2        | 016         |
| R 305 | 211 202   | Film resistor 10 $k\Omega$ /0.25 W/5 % .....  | 3        | 016         |
| R 306 | 216 430   | Film resistor 22 $k\Omega$ /0.25 W/5 % .....  | 3        | 016         |
| R 307 | 228 235   | Film resistor 560 $k\Omega$ /0.25 W/5 % ..... | 2        | 016         |
| R 308 | 216 350   | Film resistor 1.8 $k\Omega$ /0.25 W/5 % ..... | 1        | 016         |
| R 309 | 220 548   | Film resistor 1 $k\Omega$ /0.25 W/5 % .....   | 5        | 016         |
| R 310 | 216 345   | Film resistor 150 $\Omega$ /0.25 W/5 % .....  | 2        | 016         |
| R 311 | 211 202   | Film resistor 10 $k\Omega$ /0.25 W/5 % .....  | 3        | 016         |
| R 312 | 216 326   | Film resistor 820 $\Omega$ /0.25 W/5 % .....  | 1        | 016         |
| R 313 | 220 543   | Film resistor 12 $k\Omega$ /0.25 W/5 % .....  | 2        | 016         |
| R 314 | 220 543   | Film resistor 12 $k\Omega$ /0.25 W/5 % .....  | 2        | 016         |
| R 315 | 216 345   | Film resistor 150 $\Omega$ /0.25 W/5 % .....  | 2        | 016         |
| R 316 | 217 861   | Film resistor 2.2 $k\Omega$ /0.25 W/5 % ..... | 3        | 016         |
| R 317 | 216 429   | Film resistor 4.7 $k\Omega$ /0.25 W/5 % ..... | 3        | 016         |
| R 318 | 220 602   | Film resistor 27 $k\Omega$ /0.25 W/5 % .....  | 1        | 016         |
| R 320 | 216 838   | Film resistor 1.5 $k\Omega$ /0.25 W/5 % ..... | 1        | 016         |
| R 321 | 220 524   | Film resistor 120 $k\Omega$ /0.25 W/5 % ..... | 1        | 016         |
| R 322 | 228 243   | Film resistor 270 $\Omega$ /0.25 W/5 % .....  | 1        | 016         |
| R 323 | 220 539   | Film resistor 47 $k\Omega$ /0.25 W/5 % .....  | 7        | 016         |
| R 324 | 228 265   | Film resistor 270 $k\Omega$ /0.25 W/5 % ..... | 2        | 016         |
| R 325 | 224 733   | Film resistor 1 $M\Omega$ /0.25 W/5 % .....   | 4        | 016         |
| R 326 | 220 547   | Film resistor 8.2 $k\Omega$ /0.25 W/5 % ..... | 5        | 016         |
| R 327 | 217 841   | Film resistor 2.7 $k\Omega$ /0.25 W/5 % ..... | 1        | 016         |
| R 328 | 217 861   | Film resistor 2.2 $k\Omega$ /0.25 W/5 % ..... | 3        | 016         |
| R 329 | 228 235   | Film resistor 560 $k\Omega$ /0.25 W/5 % ..... | 2        | 016         |
| R 340 | 228 231   | Adjustor 10 $k\Omega$ .....                   | 1        | 021         |
| R 341 | 228 232   | Adjustor 47 $k\Omega$ .....                   | 1        | 021         |
| R 402 | 220 526   | Film resistor 3.3 $k\Omega$ /0.25 W/5 % ..... | 7        | 016         |
| R 403 | 220 547   | Film resistor 8.2 $k\Omega$ /0.25 W/5 % ..... | 5        | 016         |
| R 404 | 228 260   | Film resistor 39 $k\Omega$ /0.25 W/5 % .....  | 1        | 016         |
| R 406 | 216 382   | Film resistor 470 $\Omega$ /0.25 W/5 % .....  | 1        | 016         |
| R 407 | 216 430   | Film resistor 22 $k\Omega$ /0.25 W/5 % .....  | 3        | 016         |
| R 408 | 228 264   | Film resistor 150 $k\Omega$ /0.25 W/5 % ..... | 2        | 016         |
| R 409 | 224 979   | Film resistor 820 $k\Omega$ /0.25 W/5 % ..... | 1        | 016         |
| R 410 | 220 526   | Film resistor 3.3 $k\Omega$ /0.25 W/5 % ..... | 7        | 016         |
| R 411 | 220 547   | Film resistor 8.2 $k\Omega$ /0.25 W/5 % ..... | 5        | 016         |
| R 412 | 220 539   | Film resistor 47 $k\Omega$ /0.25 W/5 % .....  | 7        | 016         |
| R 413 | 224 979   | Film resistor 820 $k\Omega$ /0.25 W/5 % ..... | 1        | 016         |
| R 414 | 216 430   | Film resistor 22 $k\Omega$ /0.25 W/5 % .....  | 3        | 016         |
| R 415 | 228 264   | Film resistor 150 $k\Omega$ /0.25 W/5 % ..... | 3        | 016         |
| R 416 | 224 548   | Film resistor 100 $\Omega$ /0.25 W/5 % .....  | 4        | 016         |
| R 417 | 220 526   | Film resistor 3.3 $k\Omega$ /0.25 W/5 % ..... | 7        | 016         |

| Pos.  | Part. No. | Description                                 | Quantity | Price group |
|-------|-----------|---------------------------------------------|----------|-------------|
| R 418 | 220 547   | Film resistor 8.2 k $\Omega$ /0.25 W/5 %    | 5        | 016         |
| R 419 | 220 539   | Film resistor 47 k $\Omega$ /0.25 W/5 %     | 7        | 016         |
| R 420 | 224 733   | Film resistor 1 M $\Omega$ /0.25 W/5 %      | 4        | 016         |
| R 421 | 224 733   | Film resistor 1 M $\Omega$ /0.25 W/5 %      | 4        | 016         |
| R 430 | 228 234   | Adjustor 470 $\Omega$                       | 2        | 021         |
| R 431 | 228 233   | Adjustor 4.7 k $\Omega$                     | 1        | 021         |
| R 432 | 228 234   | Adjustor 470 $\Omega$                       | 2        | 021         |
| R 501 | 220 526   | Film resistor 3.3 k $\Omega$ /0.25 W/5 %    | 7        | 016         |
| R 502 | 224 548   | Film resistor 100 $\Omega$ /0.25 W/5 %      | 4        | 016         |
| R 503 | 224 593   | Film resistor 220 $\Omega$ /0.25 W/5 %      | 2        | 016         |
| R 504 | 222 214   | Film resistor 33 $\Omega$ /0.25 W/5 %       | 1        | 016         |
| C 101 | 227 903   | Ceramics capacitor 56 pF/500 V/10 %         | 2        | 014         |
| C 102 | 227 903   | Ceramics capacitor 56 pF/500 V/10 %         | 2        | 014         |
| C 103 | 227 905   | Ceramics capacitor 1 nF/500 V/20 %          | 8        | 015         |
| C 104 | 227 905   | Ceramics capacitor 1 nF/500 V/20 %          | 8        | 015         |
| C 106 | 227 908   | Ceramics capacitor 12 pF/ 63 V/ 2 %         | 1        | 016         |
| C 107 | 227 899   | Ceramics capacitor 47 pF/ 63 V/ 2 %         | 4        | 015         |
| C 108 | 227 910   | Ceramics capacitor 27 pF/ 63 V/ 2 %         | 2        | 016         |
| C 109 | 227 911   | Ceramics capacitor 6.8 pF/ 63 V/ 2 %        | 1        | 016         |
| C 110 | 227 905   | Ceramics capacitor 1 nF/500 V/20 %          | 8        | 015         |
| C 111 | 227 908   | Ceramics capacitor 12 pF/ 63 V/ 2 %         | 1        | 016         |
| C 112 | 227 905   | Ceramics capacitor 1 nF/500 V/20 %          | 8        | 015         |
| C 114 | 227 905   | Ceramics capacitor 1 nF/500 V/20 %          | 8        | 015         |
| C 115 | 227 916   | Ceramics capacitor 5.6 nF/ 63 V/ 2 %        | 1        | 016         |
| C 116 | 227 891   | Ceramics capacitor 22 pF/ 63 V/ 2 %         | 1        | 016         |
| C 117 | 227 918   | Ceramics capacitor 10 nF/ 16 V/20 %         | 4        | 015         |
| C 118 | 227 918   | Ceramics capacitor 10 nF/ 16 V/20 %         | 4        | 015         |
| C 119 | 227 918   | Ceramics capacitor 10 nF/ 16 V/20 %         | 4        | 015         |
| C 120 | 227 918   | Ceramics capacitor 10 nF/ 16 V/20 %         | 4        | 015         |
| C 123 | 227 910   | Ceramics capacitor 27 pF/ 63 V/ 2 %         | 2        | 016         |
| C 124 | 227 923   | Ceramics capacitor 100 nF/ 12 V/20 %        | 6        | 016         |
| C 125 | 227 923   | Ceramics capacitor 100 nF/ 12 V/20 %        | 6        | 016         |
| C 126 | 228 215   | Rotary capacitor                            | 1        | 050         |
| C 127 | 228 219   | Ceramics trimmer capacitor 2.5 - 6 pF       | 1        | 020         |
| C 128 | 228 224   | Foil trimmer capacitor 4 - 27 pF            | 2        | 022         |
| C 129 | 228 220   | Ceramics trimmer capacitor 3 - 9 pF         | 1        | 020         |
| C 201 | 227 884   | Ceramics capacitor 1 nF/500 V/20 %          | 1        | 015         |
| C 202 | 227 885   | Ceramics capacitor 33 pF/ 55 V/10 %         | 1        | 014         |
| C 203 | 227 886   | Styroflex foil capacitor 680 pF/63 V/2.5 %  | 2        | 016         |
| C 204 | 227 888   | Ceramics capacitor 82 pF/ 63 V/ 2 %         | 2        | 016         |
| C 205 | 227 889   | Ceramics capacitor 150 pF/ 63 V/ 2 %        | 6        | 015         |
| C 206 | 227 951   | Ceramics capacitor 4700 pF/250 V/20 %       | 1        | 014         |
| C 207 | 227 967   | Ceramics capacitor 18 pF/ 63 V/ 2 %         | 3        | 016         |
| C 208 | 227 892   | Ceramics capacitor 47 nF/ 12 V/20 %         | 11       | 016         |
| C 209 | 227 893   | Ceramics capacitor 56 pF/ 63 V/ 2 %         | 1        | 016         |
| C 211 | 227 892   | Ceramics capacitor 47 nF/ 12 V/20 %         | 11       | 016         |
| C 212 | 227 892   | Ceramics capacitor 47 nF/ 12 V/20 %         | 11       | 016         |
| C 213 | 227 889   | Ceramics capacitor 150 pF/ 63 V/ 2 %        | 6        | 015         |
| C 214 | 227 896   | Styroflex foil capacitor 1 nF/ 63 V/ 5 %    | 1        | 016         |
| C 215 | 227 897   | Styroflex foil capacitor 4.7 nF/ 63 V/10 %  | 2        | 016         |
| C 216 | 227 898   | Styroflex foil capacitor 2.2 nF/ 63 V/10 %  | 5        | 016         |
| C 219 | 227 899   | Ceramics capacitor 47 pF/ 63 V/ 2 %         | 4        | 015         |
| C 221 | 227 886   | Styroflex foil capacitor 680 pF/ 63 V/2.5 % | 2        | 016         |
| C 222 | 227 901   | Styroflex foil capacitor 390 pF/ 63 V ...   | 1        | 016         |
| C 223 | 227 888   | Ceramics capacitor 82 pF/ 63 V/ 2 %         | 2        | 016         |
| C 224 | 228 222   | Foil trimmer capacitor 2.8 - 9 pF           | 2        | 020         |
| C 225 | 228 222   | Foil trimmer capacitor 2.8 - 9 pF           | 2        | 020         |
| C 226 | 228 224   | Foil trimmer capacitor 4 - 27 pF            | 2        | 022         |
| C 301 | 227 946   | Ceramics capacitor 46 nF/ 30 V/20 %         | 2        | 017         |
| C 302 | 227 923   | Ceramics capacitor 100 nF/ 12 V/20 %        | 6        | 016         |
| C 303 | 227 948   | Ceramics capacitor 10 nF/ 12 V/20 %         | 3        | 015         |
| C 304 | 227 949   | Elyt capacitor 10 $\mu$ F/ 16 V/10 %        | 2        | 017         |
| C 305 | 227 950   | Styroflex foil capacitor 2.2 nF/ 63 V ...   | 1        | 016         |
| C 306 | 227 951   | Ceramics capacitor 4.7 nF/250 V/20 %        | 1        | 014         |
| C 307 | 227 923   | Ceramics capacitor 100 nF/ 12 V/20 %        | 6        | 016         |
| C 308 | 227 953   | Elyt capacitor 1 $\mu$ F/ 25 V/10 %         | 1        | 017         |
| C 309 | 227 954   | Ceramics capacitor 270 pF/ 63 V/ 2 %        | 1        | 018         |
| C 310 | 227 892   | Ceramics capacitor 47 nF/ 12 V/20 %         | 11       | 016         |
| C 311 | 227 956   | Ceramics capacitor 220 pF/ 63 V/ 2 %        | 1        | 016         |
| C 312 | 227 957   | Ceramics capacitor 330 pF/ 63 V/ 2 %        | 1        | 018         |
| C 313 | 227 958   | Styroflex foil capacitor 1.2 nF/ 25 V/2.5 % | 1        | 017         |
| C 314 | 227 892   | Ceramics capacitor 47 nF/ 12 V/20 %         | 11       | 016         |
| C 315 | 227 960   | Ceramics capacitor 100 pF/ 63 V/ 2 %        | 1        | 016         |
| C 316 | 227 948   | Ceramics capacitor 10 nF/ 12 V/20 %         | 3        | 015         |
| C 317 | 227 905   | Ceramics capacitor 1 nF/500 V/20 %          | 8        | 015         |
| C 318 | 227 963   | Ceramics capacitor 10 nF/ 30 V/20 %         | 2        | 015         |



| Pos.                 | Part. No. | Description                                            | Quantity | Price group |
|----------------------|-----------|--------------------------------------------------------|----------|-------------|
| C 319                | 227 892   | Ceramics capacitor 47 nF/ 12 V/20 %                    | 11       | 016         |
| C 320                | 227 948   | Ceramics capacitor 10 nF/ 12 V/20 %                    | 3        | 015         |
| C 321                | 227 946   | Ceramics capacitor 47 nF/ 30 V/20 %                    | 2        | 017         |
| C 322                | 227 967   | Ceramics capacitor 18 pF/ 63 V/ 2 %                    | 3        | 016         |
| C 323                | 227 967   | Ceramics capacitor 18 pF/ 63 V/ 2 %                    | 3        | 016         |
| C 324                | 227 969   | Ceramics capacitor 330 pF/ 63 V/ 2 %                   | 1        | 018         |
| C 325                | 227 970   | Ceramics capacitor 220 pF/ 63 V/ 2 %                   | 1        | 016         |
| C 326                | 227 971   | Ceramics capacitor 120 pF/ 63 V/ 2 %                   | 1        | 016         |
| C 327                | 227 972   | Elyt capacitor 0.47 $\mu$ F/ 63 V/20 %                 | 1        | 020         |
| C 328                | 227 892   | Ceramics capacitor 47 nF/ 12 V/20 %                    | 11       | 016         |
| C 329                | 227 905   | Ceramics capacitor 1 nF/500 V/20 %                     | 8        | 015         |
| C 330                | 227 923   | Ceramics capacitor 100 nF/ 12 V/20 %                   | 6        | 016         |
| C 331                | 227 892   | Ceramics capacitor 47 nF/ 12 V/20 %                    | 11       | 016         |
| C 332                | 227 892   | Ceramics capacitor 47 nF/ 12 V/20 %                    | 11       | 016         |
| C 333                | 227 905   | Ceramics capacitor 1 nF/500 V/20 %                     | 8        | 015         |
| C 334                | 227 923   | Ceramics capacitor 100 nF/ 12 V/20 %                   | 6        | 016         |
| C 335                | 227 963   | Ceramics capacitor 10 nF/ 30 V/20 %                    | 2        | 015         |
| C 336                | 227 949   | Elyt capacitor 10 $\mu$ F/ 16 V/10 %                   | 2        | 017         |
| C 337                | 227 892   | Ceramics capacitor 47 nF/ 12 V/20 %                    | 11       | 016         |
| C 338                | 227 892   | Ceramics capacitor 47 nF/ 12 V/20 %                    | 11       | 016         |
| C 401                | 227 925   | Plastic capacitor 10 nF/250 V/ 5 %                     | 3        | 016         |
| C 402                | 227 926   | Plastic capacitor 15 nF/250 V/ 5 %                     | 2        | 016         |
| C 403                | 227 925   | Plastic capacitor 10 nF/250 V/ 5 %                     | 3        | 016         |
| C 404                | 227 897   | Styroflex foil capacitor 4.7 nF/ 63 V/10 %             | 2        | 016         |
| C 405                | 227 925   | Plastic capacitor 10 nF/250 V/ 5 %                     | 3        | 016         |
| C 406                | 227 926   | Plastic capacitor 15 nF/250 V/ 5 %                     | 2        | 016         |
| C 407                | 227 931   | Styroflex foil capacitor 1.8 nF/ 63 V/10 %             | 1        | 016         |
| C 408                | 227 898   | Styroflex foil capacitor 2.2 nF/ 63 V/10 %             | 5        | 016         |
| C 409                | 222 495   | Foil capacitor 0.1 $\mu$ F/250 V/ 5 %                  | 6        | 018         |
| C 411                | 227 889   | Ceramics capacitor 150 pF/ 63 V/ 2 %                   | 6        | 015         |
| C 412                | 227 899   | Ceramics capacitor 47 pF/ 63 V/ 2 %                    | 4        | 015         |
| C 413                | 227 898   | Styroflex foil capacitor 2.2 nF/ 63 V/10 %             | 5        | 016         |
| C 414                | 222 495   | Foil capacitor 0.1 $\mu$ F/250 V/ 5 %                  | 6        | 018         |
| C 415                | 227 889   | Ceramics capacitor 150 pF/ 63 V/ 2 %                   | 6        | 015         |
| C 416                | 227 898   | Styroflex foil capacitor 2.2 nF/ 63 V/10 %             | 5        | 016         |
| C 417                | 222 495   | Foil capacitor 0.1 $\mu$ F/250 V/ 5 %                  | 6        | 018         |
| C 418                | 227 889   | Ceramics capacitor 150 pF/ 63 V/ 2 %                   | 6        | 015         |
| C 419                | 227 899   | Ceramics capacitor 47 pF/ 63 V/10 %                    | 4        | 015         |
| C 420                | 227 889   | Ceramics capacitor 150 pF/ 63 V/ 2 %                   | 6        | 015         |
| C 422                | 222 495   | Foil capacitor 0.1 $\mu$ F/250 V/ 5 %                  | 6        | 018         |
| C 423                | 227 898   | Styroflex foil capacitor 2.2 nF/ 63 V/10 %             | 5        | 016         |
| C 501                | 222 495   | Foil capacitor 0.1 $\mu$ F/250 V/ 5 %                  | 6        | 018         |
| C 502                | 222 495   | Foil capacitor 0.1 $\mu$ F/250 V/ 5 %                  | 6        | 018         |
| C 503                | 227 880   | Elyt capacitor 1000 $\mu$ F/ 40 V ...                  | 1        | 026         |
| C 504                | 227 883   | Elyt capacitor 100 $\mu$ F/ 16 V ...                   | 1        | 017         |
| C 505                | 222 499   | Foil capacitor 0.22 $\mu$ F/100 V/ 5 %                 | 1        | 018         |
| C 506                | 227 881   | Elyt capacitor 470 $\mu$ F/ 25 V ...                   | 1        | 022         |
| <u>AGC Amplifier</u> |           |                                                        |          |             |
| 59                   | 231 253   | AGC amplifier panel, complete set-up .....             | 1        | 074         |
| T 10                 | 209 863   | Transistor BC 173 C .....                              | 2        | Mdse.gp. E  |
| P 10                 | 228 203   | Tandem-Potentiometer 2 x 1.3 M $\Omega$ pos. log. .... | 1        | 042         |
| P 11                 | 209 653   | Tandem-Potentiometer 2 x 50 k $\Omega$ linear .....    | 2        | 043         |
| P 12                 | 209 653   | Tandem-Potentiometer 2 x 50 k $\Omega$ linear .....    | 2        | 043         |
| P 13                 | 224 516   | Potentiometer 100 k $\Omega$ linear .....              | 1        | 029         |
| R 10                 | 224 600   | Film resistor 39 k $\Omega$ /0.30 W/5 % .....          | 2        | 016         |
| R 11                 | 224 602   | Film resistor 4.7 M $\Omega$ /0.50 W/5 % .....         | 2        | 016         |
| R 12                 | 224 605   | Film resistor 18 k $\Omega$ /0.25 W/5 % .....          | 2        | 016         |
| R 13                 | 220 547   | Film resistor 8.2 k $\Omega$ /0.25 W/5 % .....         | 4        | 016         |
| R 14                 | 220 548   | Film resistor 1 k $\Omega$ /0.25 W/5 % .....           | 2        | 016         |
| R 15                 | 217 861   | Film resistor 2.2 k $\Omega$ /0.25 W/5 % .....         | 2        | 016         |
| R 16                 | 220 547   | Film resistor 8.2 k $\Omega$ /0.25 W/5 % .....         | 4        | 016         |
| R 17                 | 216 352   | Film resistor 6.8 k $\Omega$ /0.25 W/5 % .....         | 1        | 016         |
| C 10                 | 224 607   | Ceramics disk-type capacitor 56 pF/500 V/10 %          | 2        | 015         |
| C 11                 | 217 863   | Foil capacitor 6.8 nF/400 V/20 %                       | 2        | 020         |
| C 12                 | 216 671   | Foil capacitor 0.1 $\mu$ F/100 V/20 %                  | 2        | 021         |
| C 13                 | 222 219   | Elyt capacitor 4.7 $\mu$ F/ 25 V ...                   | 2        | 019         |
| C 14                 | 222 498   | Foil capacitor 33 nF/250 V/ 5 %                        | 4        | 019         |
| C 15                 | 222 499   | Foil capacitor 0.22 $\mu$ F/100 V/ 5 %                 | 2        | 019         |
| C 16                 | 217 981   | Styroflex foil capacitor 4.7 nF/ 63 V/ 5 %             | 2        | 017         |
| C 17                 | 222 498   | Foil capacitor 33 nF/250 V/ 5 %                        | 4        | 019         |
| C 18                 | 220 265   | Elyt capacitor 47 $\mu$ F/ 26 V ...                    | 1        | 022         |

| Pos.                                                                                                                                                    | Part. No. | Description                                        | Quantity | Price group |
|---------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|----------------------------------------------------|----------|-------------|
| 60                                                                                                                                                      | 225 473   | Power amplifier panel, complete set-up .....       | 1        | 073         |
| 61                                                                                                                                                      | 213 174   | G Fuse link 0.5 A F .....                          | 2        | 018         |
| T 30                                                                                                                                                    | 220 535   | Transistor BC 252 B .....                          | 2        | Mdse.gp. E  |
| T 31                                                                                                                                                    | 231 066   | Transistor BC 338 - 25 .....                       | 2        | Mdse.gp. E  |
| T 32/33                                                                                                                                                 | 209 856   | Complementary pair of transistors AC 181L, AC 180L | 2        | Mdse.gp. E  |
| D 30                                                                                                                                                    | 216 027   | Diode BZX 62 .....                                 | 2        | Mdse.gp. E  |
| D 31                                                                                                                                                    | 222 759   | Diode SE 30 .....                                  | 4        | Mdse.gp. E  |
| D 32                                                                                                                                                    | 222 759   | Diode SE 30 .....                                  | 4        | Mdse.gp. E  |
| D 33                                                                                                                                                    | 222 759   | Diode SE 30 .....                                  | 4        | Mdse.gp. E  |
| D 34                                                                                                                                                    | 222 759   | Diode SE 30 .....                                  | 4        | Mdse.gp. E  |
| R 30                                                                                                                                                    | 224 590   | Film resistor 220 k $\Omega$ /0.25 W/ 5 % .....    | 3        | 016         |
| R 31                                                                                                                                                    | 224 590   | Film resistor 220 k $\Omega$ /0.25 W/ 5 % .....    | 3        | 016         |
| R 32                                                                                                                                                    | 224 589   | Film resistor 100 k $\Omega$ /0.25 W/ 5 % .....    | 1        | 016         |
| R 33                                                                                                                                                    | 224 591   | Adjustor 500 $\Omega$ .....                        | 1        | 018         |
| R 34                                                                                                                                                    | 224 592   | Film resistor 18 $\Omega$ /0.25 W/ 5 % .....       | 2        | 016         |
| R 35                                                                                                                                                    | 216 352   | Film resistor 6.8 k $\Omega$ /0.25 W/ 5 % .....    | 2        | 016         |
| R 36                                                                                                                                                    | 220 526   | Film resistor 3.3 k $\Omega$ /0.25 W/ 5 % .....    | 4        | 016         |
| R 37                                                                                                                                                    | 220 264   | Film resistor 47 $\Omega$ /0.25 W/ 5 % .....       | 4        | 016         |
| R 38                                                                                                                                                    | 220 264   | Film resistor 47 $\Omega$ /0.25 W/ 5 % .....       | 4        | 016         |
| R 39                                                                                                                                                    | 220 526   | Film resistor 3.3 k $\Omega$ /0.25 W/ 5 % .....    | 4        | 016         |
| R 40                                                                                                                                                    | 224 594   | Film resistor 82 $\Omega$ /0.25 W/ 5 % .....       | 2        | 016         |
| R 41                                                                                                                                                    | 209 902   | Thermistor 40 $\Omega$ .....                       | 2        | 023         |
| R 42                                                                                                                                                    | 224 595   | Film resistor 0.33 $\Omega$ /1 W/10 % .....        | 2        | 016         |
| R 43                                                                                                                                                    | 224 593   | Film resistor 220 $\Omega$ /0.25 W/ 5 % .....      | 2        | 016         |
| C 30                                                                                                                                                    | 216 671   | Foil capacitor 0.1 $\mu$ F/100 V/20 %              | 2        | 021         |
| C 31                                                                                                                                                    | 220 265   | Elyt capacitor 47 $\mu$ F/ 16 V ...                | 1        | 022         |
| C 32                                                                                                                                                    | 224 596   | Elyt capacitor 220 $\mu$ F/ 6 V ...                | 2        | 018         |
| C 33                                                                                                                                                    | 216 404   | Ceramics disk-type capacitor 82 pF/500 V/10 %      | 2        | 018         |
| C 34                                                                                                                                                    | 224 597   | Elyt capacitor 220 $\mu$ F/ 10 V ...               | 2        | 018         |
| C 35                                                                                                                                                    | 224 598   | Elyt capacitor 470 $\mu$ F/ 10 V ...               | 2        | 022         |
| C 36                                                                                                                                                    | 216 651   | Elyt capacitor 2200 $\mu$ F/ 20 V ...              | 1        | 033         |
| C 37                                                                                                                                                    | 222 760   | Ceramics disk-type capacitor 20 nF/ 50 V ...       | 2        | 016         |
| C 38                                                                                                                                                    | 222 760   | Ceramics disk-type capacitor 20 nF/ 50 V ...       | 2        | 016         |
| <p>The spare parts as well as description and fault-search chart for the automatic turntable Dual 1211 are to be found in service manual Dual 1211.</p> |           |                                                    |          |             |

Changes may be made without notice!