

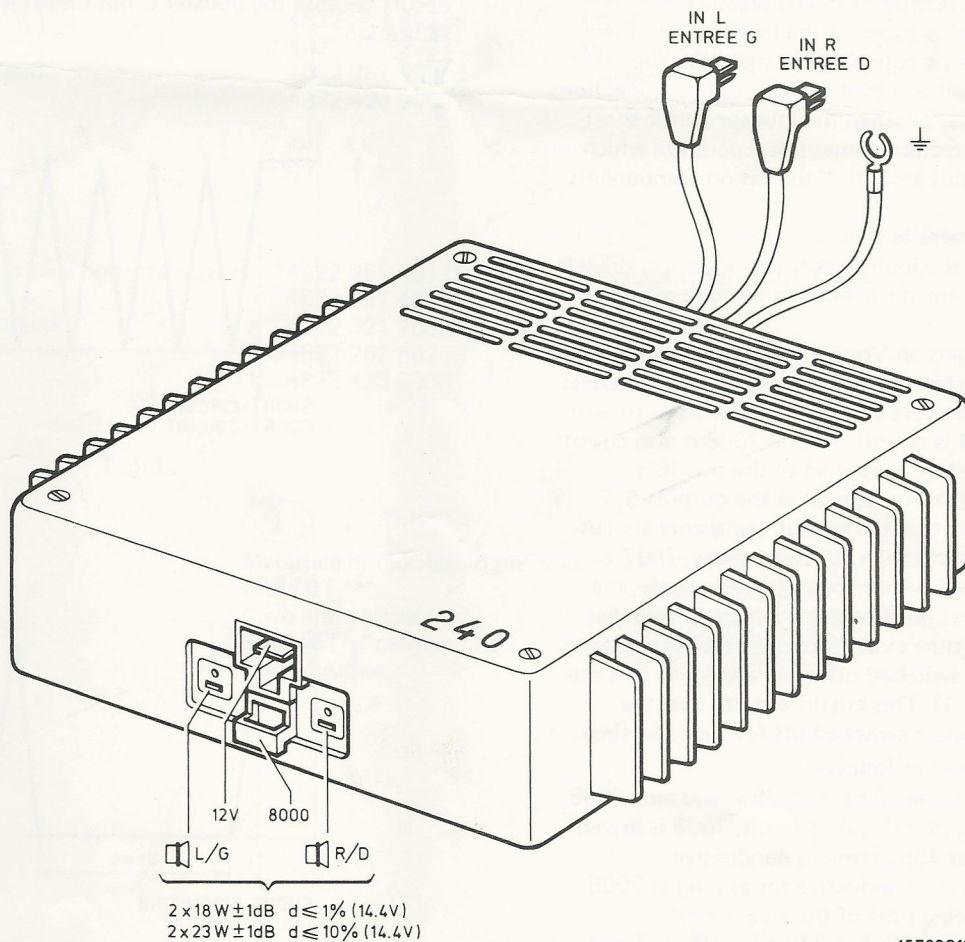
Philips Service Tech Pennis Morris 3/12/80


Booster - Amplificateur 22AP240/00

Service
Service
Service

Service Manual

12 V 



 160 x 152 x 51

15792C12

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



GB

Subject to modification
4822 725 12816
Printed in The Netherlands

PHILIPS

CS 62 513

Circuit Description 22AP240

When the car radio or cassette player is switched on, the amplifier is activated as follows:

The LF-signal on the right channel drives open preamplifier 7001 (this preamplifier is necessary because the amplifier must also operate on a weak LF-signal).

Transistor 7002 starts conducting and 2004 is charged via rectifier 7010. As soon as this elco is charged, 7004 becomes conductive and, in its turn, drives open 7008, so that voltage is applied to IC's 7011 and 7012.

Diodes 7009 and 7030 ensure that the transistors 7001 and 7002 are not damaged by too high negative voltage peaks on their bases. This negative voltage is connected to mass by the diodes.

Because the two amplifiers are fully identical, only the operation for the left channel will be discussed. The LF-signal is supplied to pins 2 and 12 of 7011. The amplified signal is now available at the outputs 6, 7 and 8, 9 while there is 180° phase shift between the signal at pins 8, 9 and that at pins 6, 7.

The signals shifted in phase are now further amplified by the output amplifiers and, next, added together, after which the total signal is reproduced by the loudspeaker. Between pins 6 and 7 of 7011 there are 3 BE-junctions inside the IC, externally only the 2 BE-junctions of 7017 and 7019. To optimize the adaptation of the transistors to the IC, a trimming potentiometer is used. It follows that every time the IC or an output transistor is replaced, the trimming potentiometer has to be readjusted.

Because the LF-signal is added at the loudspeaker, the loudspeaker may not be connected to mass. On the other hand, if for any reason one of the loudspeaker connections makes contact to mass or when the loudspeaker is short-circuited, then a protection comes into operation which switches off the output amplifier, so that no components can be damaged.

This protection operates as follows:

At a short-circuit of the loudspeaker (for instance, the left channel), a high current starts flowing through resistor 3052 ($\geq 5A$).

So, transistor 7007 gets an $V_{be} = I \times R_{3052} = 5 \times 0.12 = 0.6V$, so that 7007 starts conducting. In its turn, it drives open 7003 so that the base voltage of 7004 drops to near 0V. Transistor 7004 is cut-off, so that 7008 is also cut-off so that no supply voltage is applied to the two IC's.

The LF-signal now does not appear at the outputs 6, 7 and 8, 9 any more, so that the output transistors are cut-off. No current flows through 3052 any more, 7007 is cut-off and the system is energized again. However, the short-circuit is not yet released and the system switches off again. A built-in time circuit provides that the system is not energized and switched off again and again (see the characteristic in Fig. 1). This circuit ensures that the output amplifiers remain switched off for a certain time.

The circuit is explained as follows:

When 7008 is cut-off, the +3 becomes 0V and elco 2005 is charged via 3003 and 3011. As a result, 7005 is driven open. It provides that 7003 remains conductive.

Transistor 7005 remains conductive for as long as 2005 is charged. The charging time of the elco is $\tau = (R_{3003} + R_{3011}) \times C = (27K + 270K) \times 10\mu \approx 3\text{secs}$. So, after 3 seconds 7005 is cut off and the system is energized again. The elco is then quickly discharged via diode 7029. The system switches off again as described above.

We now have a switch-off characteristic as shown in Fig.2. When the short-circuit has been released the circuit will

operate again as soon as 2005 is fully charged. If the short circuit occurs in the right channel, 7006 becomes conductive. It drives open 7003 etc. etc. So both amplifiers are switched off, independent of the channel in which the short-circuit occurs.

When the radio or cassette player is switched off (no LF signal is received any more), then the booster switches itself off after approx. 1 minute. This as a result of the discharging time of elco 2004, so that 7004 and 7008 remain conductive for some more time.

N.B.

This Booster has a variable input impedance. When the bridge wires at 3020 and 3021 are removed, then Z_i becomes $\approx 1000\text{ Ohms}$, with bridge wires $Z_i \approx 15\text{ Ohms}$. This has been done to obtain optimum adaptation to the car radio amplifier used. Is this a transistor amplifier, then Z_i must be $\approx 15\text{ Ohms}$, for an IC-amplifier (TDA1010, TBA10SH) $Z_i \approx 1000\text{ Ohms}$ gives the best result.

When a set with IC output amplifier is connected to a booster with a low input impedance, then greater distortions occur in the LF-signal than for a set connected to a booster with a high input impedance. If, on the other hand, a set with a transistor output stage is connected to a booster with a high input impedance, then power loss occurs because the booster is not driven into full saturation.

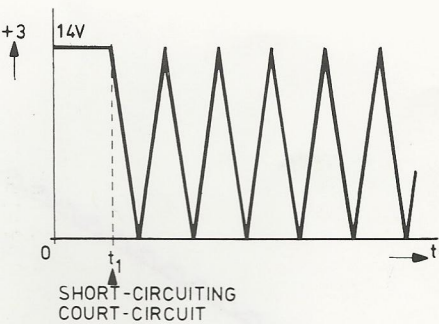


Fig. 1

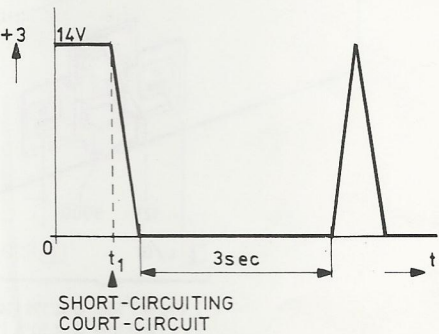
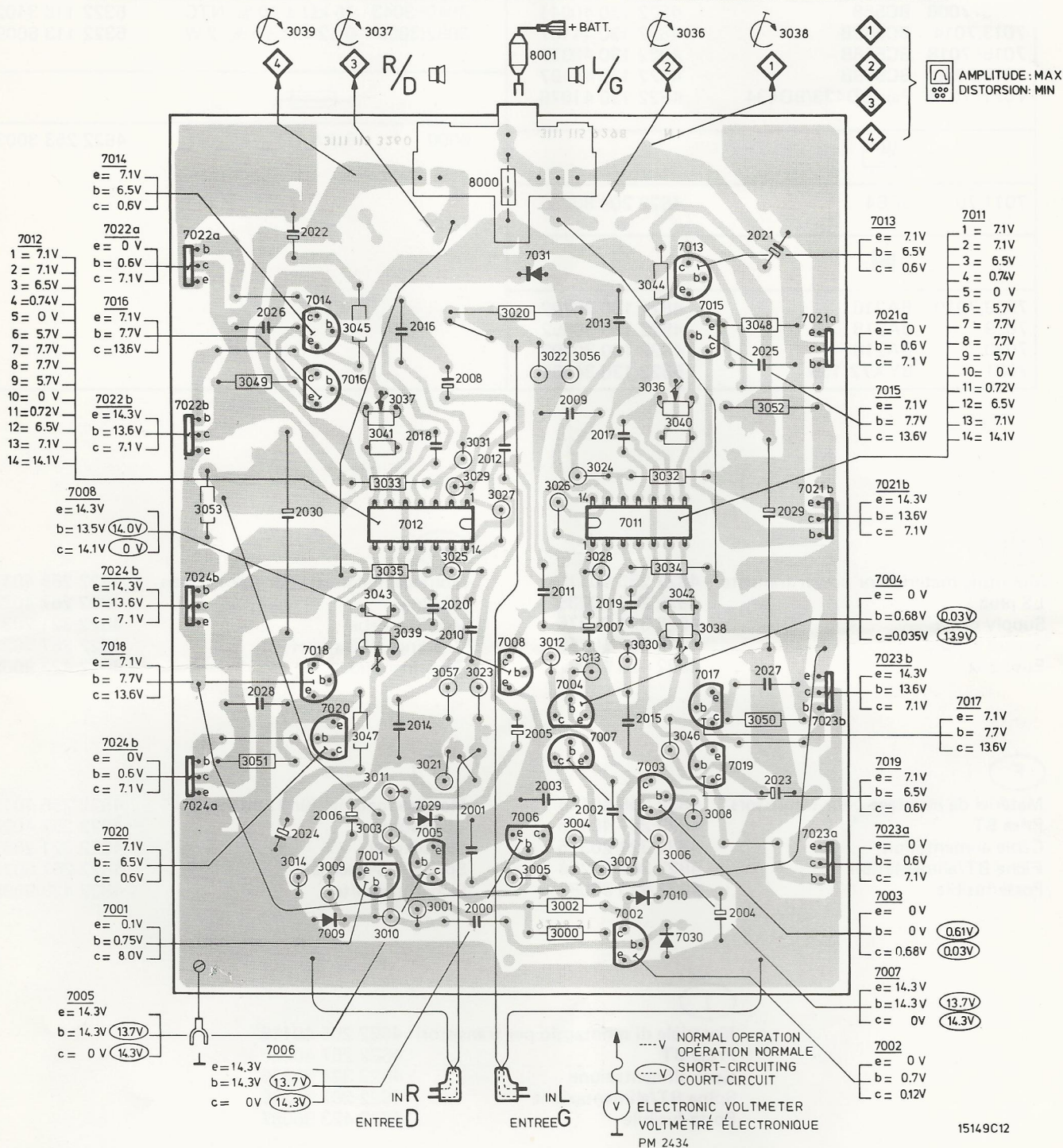


Fig. 2



MISC	7022a.b.7024a.b.7018.7014.7009.7020.7016.7001.7012.7005.7029.7008.7006.7031.7002÷7004.7007.7011.7010.7030.7013.7015.7017.7019.7021a.b.7023a.b
C 2000÷2014	2006 2014.2010.2000.2001.2008.2012.2005.2003.2011.2009.2002.2007.2013.2004
C 2015÷2032	2028.2026.2024.2022.2030.2016. 2020.2018 2017.2019.2015. 2021.2025.2027.2023.2029
R 3000÷3014	3014 3009.3011.3010.3003.3001 3005.3012.3002.3000.3004.3013.3006÷3008
R 3015÷3025	3021.3025.3023 3020.3022 3024
R 3026÷3039	3035.3039.3033.3037.3031.3029.3026÷3028 3030.3036.3032.3034.3038
R 3040÷3057	3053.3051.3049 3041.3045. 3047.3043.3057. 3056. 3044.3046. 3040.3042.3048.3052.3050



With code FD02 week 914 the following parts have been changed.

The value of four capacitors, items 2009, 2010, 2015 and 2016 has been changed into 0,22 μF (●●).

The value of resistor, item 3002 has been changed into 10 k Ω (□).

Reason:

- To decrease the power consumption in rest position.
- To improve the response curve.