



S E R V I C E M A N U A L
F O R
C A R S U B W O O F E R B 2 - 0 7

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4-80041

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1. TECHNICAL DESCRIPTION

The theoretical Background for the Ace-Bass principle used in Subwoofer B2-07 is described in AES Preprint 1381. Pls also see the users manual for B2-07 Subwoofer.

The functions described below are separated by dotted lines in the Circuit Diagram.

1.1 Power Supply

The power supply filters the voltage from the generator/battery and produces the 6V reference as well as the 11V for the small signal circuits. The battery voltage is directly used for the power-stages.

1.2 ON/OFF - Circuit

The power supply is activated via relay K101 by +12 V on pin P2. This voltage is obtained either from the electric antenna terminal of the car radio or from a separate switch.

The circuit also protects the electronic from damages due to wrong polarity. However, capacitor C101 might be damaged if this has happended.

1.3 Input Stage

Signal applied on pins P4, P5 (left channel) and P6, P7 (right channel) pass through OP-amp Z201, having a gain depending on the setting of the sensitivity control (R 207). The inputs are balanced, and if unbalanced source is used, the -pins should be grounded.

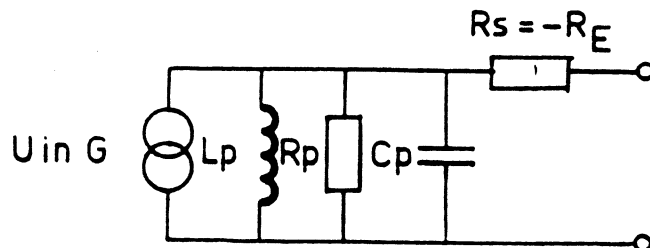
1.4 Filters

Left and right channels are summed by resistors R205, R206 and fed into the variable lowpass filter formed by R208, R209, C207, C208, R210 and amplifier Z202a.

The low frequencies then enter a 40 Hz high pass filter with gain formed by Z202b together with C209, C210, R212, R214, R220 and C211.

1.5 Ace-Bass* Circuits

The Power Amplifier together with Z203a (1, 2, 3) form the Ace-Bass amplifier, which can be represented by the diagram below.



R234 and Z203b (5, 6, 7) sense the current through the drivers.

Z203a (1, 2, 3) works as an active bandpass filter, and also sums the signals from test points (G) and (H).

The upper Power Amplifier is of inverting type, and also acts as a summing amplifier, adding signals (D) and (G).

The lower Power Amplifier has a gain of -1 and is driven from the output of the upper Power Amplifier. The outputs (E) and (F) are thus in antiphase, forming a bridged amplifier output, see chapter 1.6.

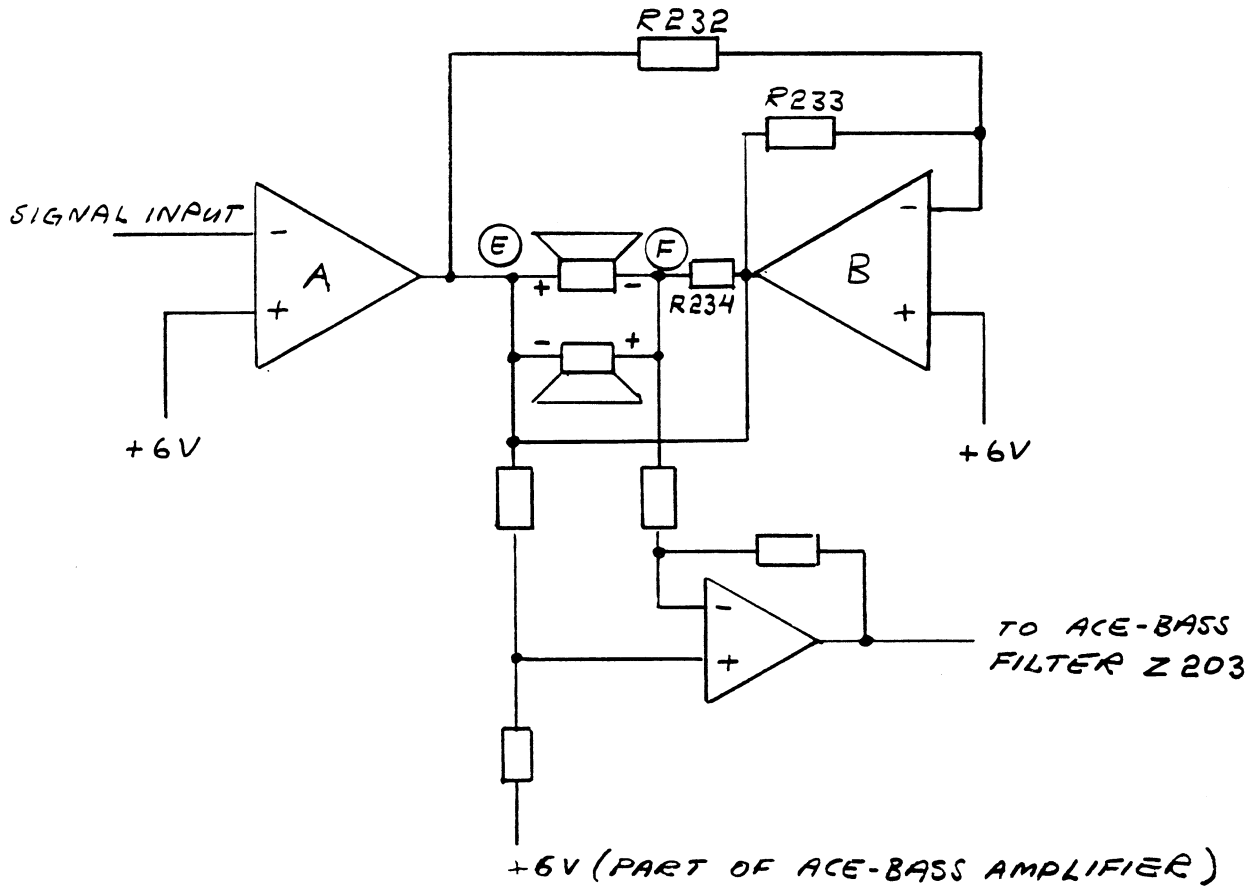
Part of the driver current signal is fed back positively through the Power Amplifier, which gives the Power Amplifier a negative output resistance R_s . The amount of positive feedback, and thereby, the value of R_s , can be adjusted by trimpot (R225).

The parallel circuit L_p , R_p , C_p in the Ace-Bass amplifier is accomplished through negative feedback of the driver current signal via the bandpass filter, Z203 (1, 2, 3)

* ACE-Bass = Amplifier Controlled Euphonic Bass.

1.6 Power Amplifier

Two amplifiers are connected in a bridge configuration to increase power output capability.



Amplifier B gives at point (F) the same signal as in point (E) but 180 degrees out of phase (inverted).

V104 gives the subwoofer a slow turn-on and -off to avoid "bumps".

V303 and V403 gives temperature compensated idling current in respective power amplifier.

R313 and R413 are potentiometers for adjusting the idling current.

2. TROUBLE SHOOTING TIPS

Use pin P12 as reference for measurements of AC and DC voltage.

2.1 B2-07 does not work

Connect a tone generator to one of the four inputs P4, P5, P6 or P7. Ground the remaining three to P12. Use around 5mV input. SENSITIVITY and CROSSOVER FREQUENCY in max position.

Check AC-level at test points acc to table below. Please note that all test points are at 6V DC level.

Test point	20Hz	60Hz	100Hz	200Hz
A/B	12 mV	22 mV	26 mV	28 mV
C	6 mV	11 mV	12 mV	13 mV
D	46 mV	230 mV	170 mV	70 mV
E	380 mV	1,25 V	1,1 V	750 mV
F	360 mV	1,22 V	1,05 V	690 mV

The voltages in D, E and F are with connected drivers (speakers).

2.2 DC Levels

Check points E and F for equal level within 50 mV DC, without connected drivers.

Check + 11 V, + 6 V.

Check resistance in voice coils.

3,4 ohms each. In parallel 1,7 ohms.

It is very important that there is no voltage drop in cables or connections to the car battery. Preferably run cables direct to battery terminals.

Example: 30 W output at rated supply voltage 14 V will be reduced to 20 W if supply voltage drops to 12V.

2.3 Fuse

If external fuse, 8A, blows with subwoofer in off mode, check C101.

If fuse blows when subwoofer is turned on, check power transistors V306, V307, V406, V407.

3. ADJUSTMENTS

3.1 Bias current in power amplifier

After replacing any transistor in any of the power amplifiers, the bias current must be readjusted. Setting of the bias current should be done while heatsinks are at room temperature, that is immediately after B2-07 is turned on.

- At no input, no load (drivers disconnected) measure the total current to the B2-07.
- Set potentiometers R313 and R413 at min position (fully counterclockwise).
- Turn one of the potentiometers until the total current has increased by 50 mA.
- Turn the other pot until the total current has increased by another 50 mA and the adjustment is ready.

NOTE: When output transistors are replaced, heat sink compound must be applied to both sides of the insulation mica washers. Check that insulation is adequate and that the power transistors are mounted flat against the heatsink. The heatsink must be screwed on to the PC board before the transistors are soldered in.

4. SPARE PARTS

When ordering spare parts, please refer to serial number of B2-07, and component number per diagram 3-80106.

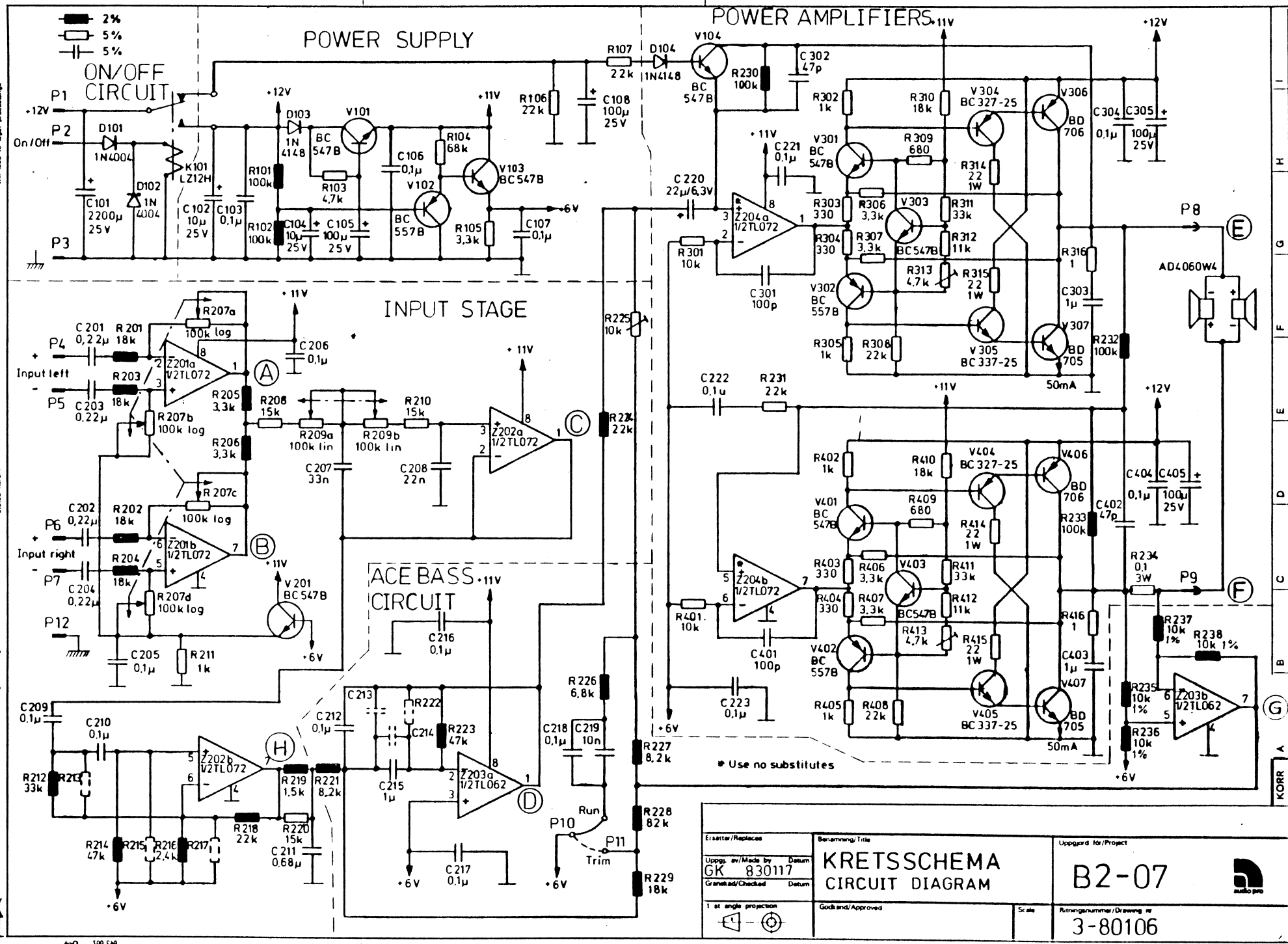
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Material ordered with reference to this specification shall in every respect meet the requirements and data stated herein.

Den här handlingen är en teknisk beskrivning och ska inte användas som grund för konstruktion eller för att bestämma tekniska krav utan att först ha konsulterat oss.



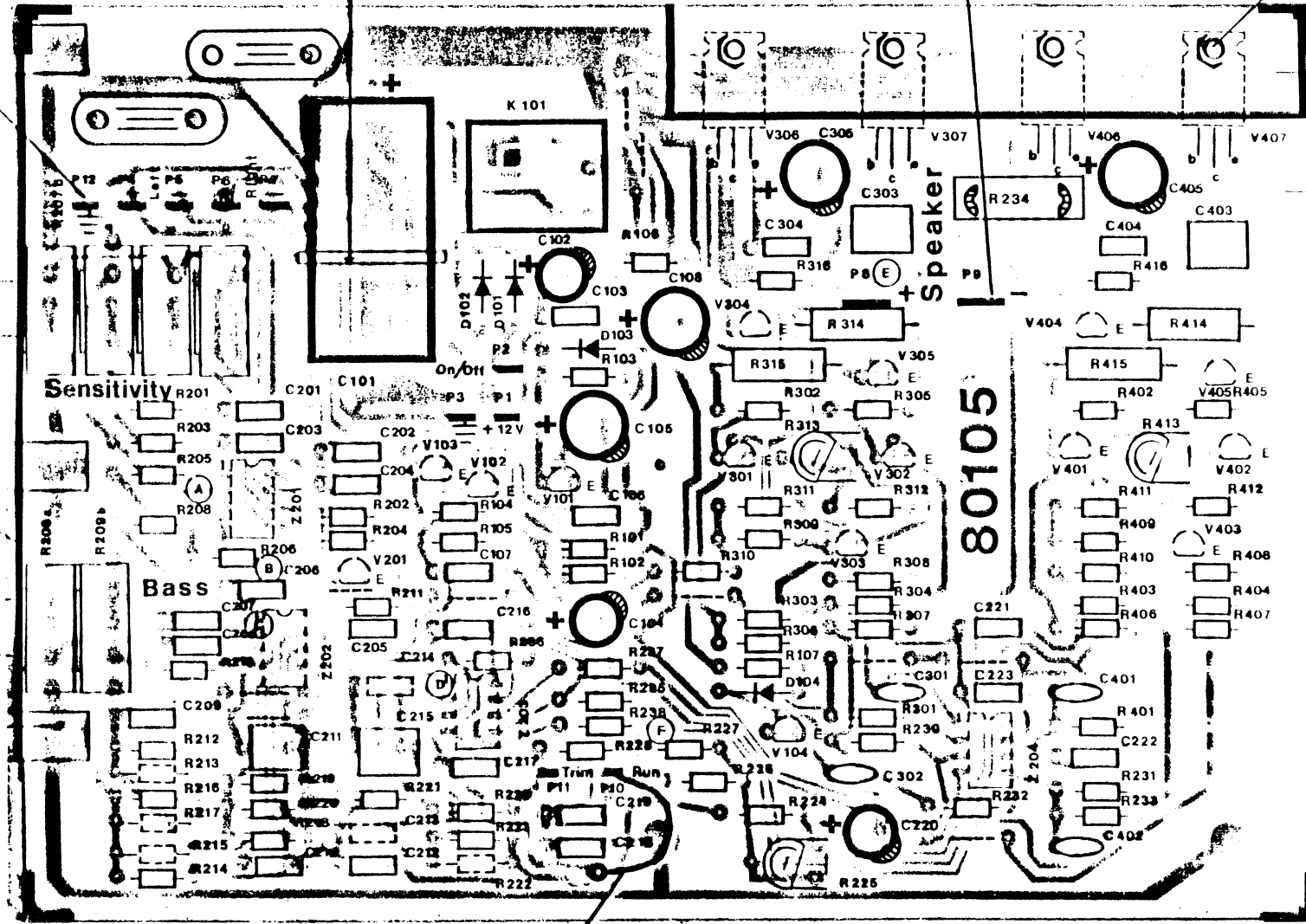
Erstatter/Replaces	Benämning/Title	Uppgagn för/Project
Uppgagn av/Made by Datum GK 830117	KRETSSCHEMA CIRCUIT DIAGRAM	B2-07
Granskad/Checked Datum	Godkänd/Approved	Skala
1:1 single projection		Antagningsnummer/Drawing nr 3-80106

4 x 10

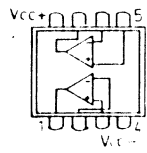
7

5 x 2

8 9 10 11 12 x 4



TL062CP
 TL072/LF353
 TL082/TL072



BC547 B
 BC557 B
 BC327-25
 BC337-25

Bottom view
 Bottom view

R225 R414 R415
 www.etter.com
 Lock with screw
 after disassembly

6 3

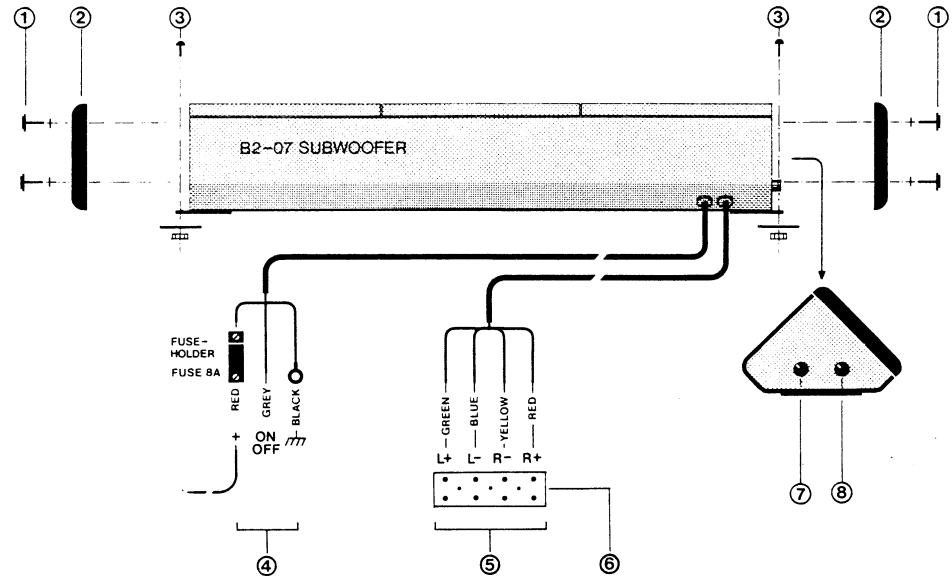
LIMMAS MED 3140

Title: Revision Date: 07 Made By: E 30117 Checked:	Description: Komponentplacering Component layout	Support No/Project: B2 - 07	
Scale: 2:1	Drawing No: 2 - 80102		



B2-07
CAR SUBWOOFER

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- | | |
|--|--|
| <p>① Skruv och bricka för montering av yttergavel.
Schraube und Unterlagsscheibe zur Montage der Seitenabdeckung.
Screw and washer for fastening of endpiece.</p> <p>② Yttergavel.
Seitenabdeckung.
Endpiece.</p> <p>③ Skruv, mutter och bricka (4 st.) för montering av B2—07.
Schraube, Mutter und Unterlagsscheibe (4 Stk.) für die Montage des B2—07.
Screw, nut and washer (4 sets) for fixed installation of B2—07.</p> <p>④ Kablage för spänningsmatning.
Kabel für Stromversorgung.
Power supply cord.</p> | <p>⑤ Kablage för signal.
Kabel für Signalübertragung.
Signal cable.</p> <p>⑥ 4-polig kopplingsplint för signalkablage.
4-polige Steckerleiste für Signalkabel.
4-pole terminal for signal cable.</p> <p>⑦ Känslighetskontroll.
Empfindlichkeitsregler.
Sensitivity control knob.</p> <p>⑧ Kontroll för subwoofers övre gränshäufig.
Regler für die obere Grenzfrequenz des Subwoofers.
Control knob for subwoofer upper crossover frequency.</p> |
|--|--|

Manual

Audio Pro subwoofer B2—07 is a unique product based on new technology. It is very easy to install in spite of the extraordinary performance it provides. **TO GET BEST PERFORMANCE FROM THE SUBWOOFER AND TO AVOID RISK OF DAMAGE YOU SHOULD READ THROUGH THIS MANUAL BEFORE YOU ATTEMPT TO INSTALL IT.**

1. PLACEMENT OF B2—07.

When B2—07 is used in a car, the rear shelf is a good location from a space saving viewpoint, but you are free to place it anywhere from an acoustical viewpoint. Because your ears are unable to detect the direction of a source of low frequency sound, you need not place the subwoofer between the stereo speakers to get good sound.

2. INSTALLATION.

FOR YOUR SAFETY IT IS IMPORTANT TO FASTEN THE SUBWOOFER SOLIDLY. IT MUST NOT BE LEFT LOOSE ON THE SHELF, BUT MUST BE BOLTED DOWN BY MEANS OF THE SCREWS PROVIDED. IF THE SHELF IS NOT SECURELY FASTENED TO THE CAR BODY, SUITABLE REINFORCEMENTS MUST BE INSTALLED.

Unscrew the endpieces with the aid of a coin to get access to the holes for the fastening screws. Place B2—07 where you want to install it and mark the position of the holes. Drill 4 holes (diameter 6.5 mm or 1/4") and mount B2—07 with the screws, nuts and washers provided. Do not forget to place washers under the shelf above the nuts. You can now reinstall the

endpiece at the end where the bass reflex opening is located. The second endpiece should be left off till you have adjusted the settings for sensitivity and crossover frequency.

3. POWER CONNECTIONS.

B2—07 has its own built-in power amplifier, so it must be connected to 12 V supply voltage. If you need to extend the power cord, it is important to use a heavy conductor (1.5 mm² (15 AWG) or larger), and you must also make sure you get a good ground connection in the car chassis. The best way is to have heavy wires directly from the battery to both the ground (—) and the + terminals for the B2—07. Voltage drop because of too thin conductors will lead to loss of power output. On/off = control cable for the subwoofer should be connected to the electric antenna terminals in the car radio. If your car radio does not have this feature, you can install a separate switch between this control cable and + 12V for manual control of the subwoofer On/Off. + 12 V to the On/Off wire activates a relay in B2—07, which turns on the built-in amplifier. Please note that the + supply to B2—07 never should be interrupted. The subwoofer should only be turned on and off via the On/Off control wire. This wire is not sensitive to voltage drop, so it can be extended by thin wire, e.g. .5mm² (20 AWG).

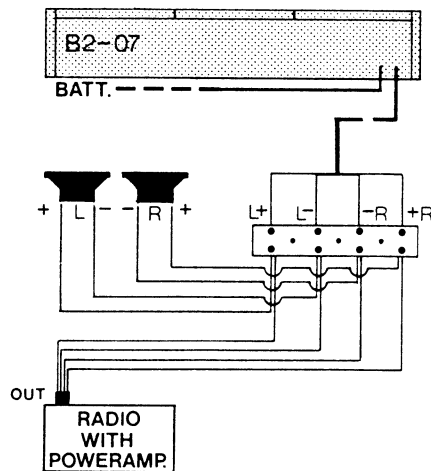
4. SIGNAL CONNECTIONS.

The terminal **ⓑ** is used for connecting the signal cable from your

radio/amplifier to the shielded 4-conductor cable from the B2-07. Take care to follow the color coding exactly when you connect the wires. Two alternative connections are described below.

(The shield of the 4-conductor cable from B2-07 is NORMALLY NOT CONNECTED. Only in very unusual cases should this shield be connected — e.g. when the radio/amplifier used as signal source does not have the same ground or (—) as the B2-07. This is the case when B2-07 is driven from a regular AC powered stereo system, which has no connection to the battery powering B2-07. In this case the shield of the signal cable from B2-07 must be connected to the shield of the stereo system cable or to the chassis to avoid hum).

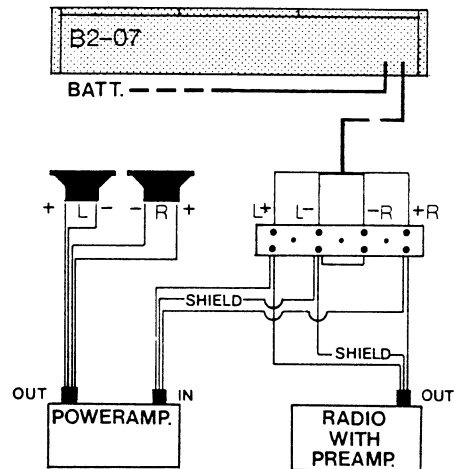
Alternative 1.
Signal from the power amplifier.



The signal can be taken from the output terminals of the power

amplifier/booster or from the speaker terminals. Ordinary speaker wire can be used.

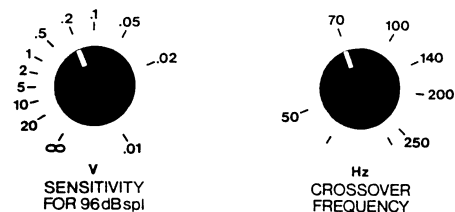
Alternative 2.
Signal from the preamplifier.



The signal can be taken from the output terminals of the tuner/preamp or from the input terminals of the power amplifier. (Use shielded stereo cable).

If it is possible to use alternative 2, this solution is recommended. In alternative 2 the signal to the B2-07 is taken ahead of the power amplifier so possible distortion or clipping in the power amplifier will not affect the sound from the subwoofer.

5. SETTING THE CROSSOVER FILTER.



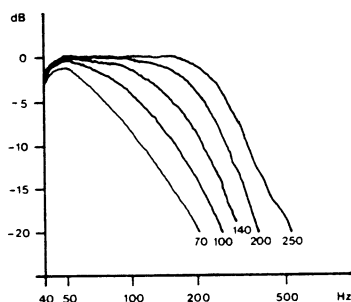
The electronic crossover filter in B2—07 has two control knobs. Advice on how to set them is given below, but this should only be regarded as guidelines. Your ears are the final arbiters on when the settings are right.

A. SENSITIVITY SETTING.

The sensitivity knob (7) lets you determine how loud the B2—07 will sound relative to the stereo speakers in your system. The graduations indicate how many volts input is required for 96 dB SPL from B2—07 in halfspace at 1 meter. If you use connection per alternative 1, set the sensitivity knob at 5 V as a starting point. For alternative 2 use .05 V as starting point.

B. UPPER CROSSOVER FREQUENCY SETTING.

The lower cutoff frequency for the B2—07 is fixed at 40 Hz, but the upper crossover frequency is adjustable in the range 50—250 Hz. The knob (8) lets you adjust a second order (12 dB/octave) low pass filter as illustrated in the graphs below.



The crossover setting knob should be set to the frequency where your stereo speakers are down 3 dB in

sound pressure level. If you do not know this frequency, try 100 Hz as a starting point.

For final adjustment of the two control knobs you should rely on your ears. The settings are right when the sound is right.

When you are satisfied with the sound, you should mount the second end piece to protect the knobs from unintended changes in settings.

6. SERVICE.

Audio Pro subwoofer B2—07 is designed and built for long term reliability. If you still should encounter any problem with it, you should contact the dealer who sold it to you, or the nearest dealer if you have moved.

TECHNICAL DATA

Frequency response:

40—250 Hz with less than 2 dB deviation from graphs on following page. Upper crossover frequency adjustable 50—250 Hz.

Sound pressure level:

At least 95 dB SPL at 1 meter in halfspace (2π steradian solid angle). In a car up to 10 dB more. (Requires battery voltage 12.6 V minimum which is a typical value with running generator).

Signal inputs:

Balanced inputs for left and right channels for direct connection to car radio, preamplifier, power amplifier or booster.

Input impedance 18 kohm. Sensitivity adjustable .01—20 V for 96 dB SPL.

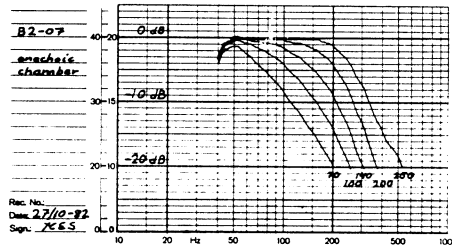
Power supply:
10—16 V.

Current consumption:
.15—5 A.

Dimensions:
Width: 744 mm (29 1/4")
Depth: 195 mm (7 5/8")
Height: 133 mm (5 1/4")

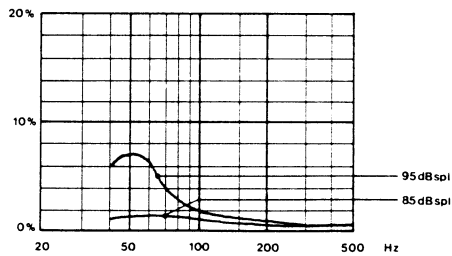
Weight: 6.5 kg (14.3 lbs.).

Frequency response at different crossover settings:



Measured with pure sinewave signal in a large (approx. 1000 m²) anechoic room.

Typical distortion at different sound pressure levels:



The sum of 2nd and 3rd harmonics measured in anechoic room with pure sinewave input and 1/3 octave filter. Distortion less than .5% cannot be measured.