

**Service Manual**  
**0A-6 type 2a**  
**Loudspeaker**

**Sonab**

## CONTENTS

Technical data	3
Change of mid-range speaker	4
Change of woofer	4
Test of woofer phasing	4
Change of tweeter	5
Change of crossover network	5
Change of connection wire	5
Removal of bass energizer	5
Function of bass energizer	5
Test of the bass energizer	6
Connection to 115 V	7
Final control of complete loudspeaker	7
Assembly drawing and package	8
Bottom view and bass energizer	9
Bass energizer printed circuit board	10
Circuit diagram	11
Crossover network	12
Loudspeaker boards	13
Recommended spare parts list	14

TECHNICAL DATA

Operating principle

Bass reflex type  
Omnidirectional  
Patented

Power handling capacity

50 W measured according to DIN 45500 and 45573

Power requirement

5 W for an acoustic output of 0.025 W operating effect according to DIN 45500

Frequency range

26 - 18000 Hz

Frequency response

29 - 15000  $\pm$  3 dB

Impedance

About 7 ohms, increasing to about 100 ohms at lower frequencies

Speaker elements

Base: 1 dynamic 22 cm  
Midrange: 1 dynamic 22 cm  
Treble: 4 dynamic 5 cm

Internal volume of cabinet

44 litres

Connection

The speaker has a male jack of type Cannon SLP-3-32. One end of the lead supplied with the OA-6 is fitted with a female jack (Cannon XLP-3-11C) for connection to the speaker and the other end with a male jack (DIN 41529) for connection to an amplifier

Mains connection

220 - 240V/50-60 Hz AC, convertible to 115 V  
Power requirement 50 VA

Dimensions

Width 24 cm, depth 43 cm  
Height 68 cm, weight 20 kg

The frequency response curve of the speaker is flat during normal listening conditions in a living room with the speaker standing on the floor with the back close to a wall.

### Cabinet

For stability reasons all parts of the cabinet are glued together and cannot be taken apart. This means that it is impossible to remove top or bottom of the cabinet.

### Change of mid-range speaker

Carefully lift away the metal mesh taking care so as not to do damage to the rubber edge. To remove the midrange speaker loosen the four screws.

Every speaker unit has to be tested before it is mounted.

Instruments required:

Tone generator 20 - 15000 Hz, distortion 0.5%  
Power amplifier 10W/8 ohm, distortion 0.5%  
AC-volt meter

Connect the speaker unit to the amplifier and set the output voltage to 4V measured across the loudspeaker.

Change the frequency slowly from 20 - 15000 Hz and check that the tone is pure without being raw or "sandy". Low distortion that occurs only very occasionally is acceptable. Distortion which disappears when you hold the loudspeaker edge can also be disregarded.

Be careful with speaker phasing when mounting a new unit. Also do not tighten the four mounting screws too tight. See figure 7.

### Change of woofer

Remove the bass-energizer and then loosen the six screws holding the metal mesh and remove it. The loudspeaker can be lifted off when its four screws have been loosened.

Before mounting a new woofer test according to midrange unit has to be done, but restrict the frequency to 1000 Hz. Do not tighten the four fastening screws too much, see figure 7.

When the woofer has been changed the test procedure of the bass energizer has to be made.

### Test of woofer phasing

1. Put a needle gently through the cloth wrapped around the mid-range element so its tip rests against the membrane. Be careful not to puncture the membrane or its suspension.
2. Apply 2 volts DC to lugs 1,2 (negative) and 3,4 (positive). The membrane shall move outwards from the box.

3. Do the same operation with the woofer, except that the voltage shall be applied to lugs 5,6 (positive) and 7,8 (negative) for the membrane moving out of the box.

#### Change of tweeter

Loosen the clamp and then with a soldering iron remove the connecting wires. The new tweeter should be tested with a tone generator. Adjust the voltage to 4V and vary the frequency from 1500 Hz and upwards. Check that the tone is pure. After the test mount the speaker with the clamp. Check the polarity and solder the connection wires.

#### Change of crossover network

It is extremely difficult to change the crossover network. You can only reach it by removing the woofer and the mineral wool in the enclosure. Now you can get access to the network through the woofer mounting hole.

#### Change of connection wire

The wire has to be unsoldered from the woofer and pulled away from the crossover network connectors. Then the wire is pulled through the resonator pipe and replaced.

#### Removal of Bass energizer

Loose the mains cable by removing screw A and one of the screws of the midbar (B). Then loosen the two screws (C) that hold the bass-energizer, thereby enabling you to pull it out by the handle. Should it be stuck, loosen the two screws (D) that hold two of the rubber supports and take it out. The wire with the contact can easily be pulled out from the bass-energizer contact.

To remove the printed circuit board, loosen the four screws (1) plus the three screws (2) holding the heat sink. See Fig. 3.

When reassembling be careful not to press the screws (C) too hard otherwise the bushings may be pressed out of the board. Also check that the connection wire is not too long out of the resonator pipe as it may be cut off. The mains transformer is loosened by means of the three screws with washers and a rubber bushing.

#### Function of Bass energizer

The bass energizer has three main purposes:

1. To dampen the upper resonance frequency of the loudspeaker

2. To equalize the frequency response
3. To cut off low frequency noise signals (below 28 Hz)

The energizer works as an operation at amplifier. Its open loop gain and input impedance is very high. The technical data depends on the networks connected between input and output.

The output impedance is negative. This is achieved by the voltage drop over R18 (adjustable) see circuit diagram R19 that is applied to the feedback. The output stage is working in class B. The energizer has two frequency response selector switches. Normally, the most flat response is obtained when both switches are in the "flat  $\pm 3$  dB" position. With the switches the level of the frequency range 25 - 200 and/or 200 - 600 Hz is raised about 2.5 dB.

Because a loudspeaker coil never is in ultimate position in the magnet field the distortion is unnecessary high. To compensate for this a DC-voltage is applied to the woofer to displace the coil to the best position for each speaker. This adjustment is individually made for each speaker with R22.

#### Test of the bass energizer

1. Connect an AF-generator with about 1 volt output to the energizer
2. Connect an AC-voltmeter over the output terminals
3. Locate the frequency, about 100 Hz, that gives a minimum deflection on the voltmeter
4. Adjust the voltage from the generator so that the voltmeter indicates .70 volts
5. Locate the frequency, about 140 to 160 Hz, that gives a maximum deflection on the voltmeter. It should be .83 to .91 volts. If not, alter the value of resistor R18 so the voltage comes as close to .86 volts as possible
6. Connect a distortion analyzer in parallel to the woofer
7. Connect a decade resistance (100 Kohms - 10 Mohms) in parallel with R10. Desolder R22 if it is mounted
8. Feed the energizer with 6 volts 65 Hz and find out what resistance will give a minimum distortion

9. Switch off the energizer and mount a resistor of that value (R22)
10. Switch on the energizer and check that no distortion is heard with an input of 6 volts rms when the frequency is slowly altered from 30 to 15000 Hz
11. Remount the energizer and the top net
12. Listen again to a frequency sweep and check that no rattle is heard

Connection to 115V

The loudspeaker is coupled for connection to 230V AC mains supply, but can be altered for 115V. The mid taps are changed according to Fig. 1.

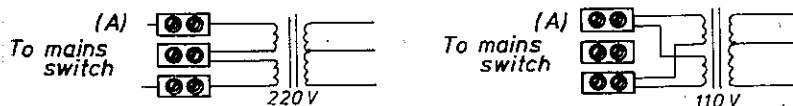


Fig. 1

Final control, complete Loudspeaker

Instruments required:

- Tone generator: 30 - 15000 Hz, distortion 0.5%
- Power amplifier: 10W into 5 ohms, distortion 0.5%
- within 150-8000 Hz AC Volt meter

Connect the loudspeaker to the amplifier and set the output to 7V across the loudspeaker. Vary the frequency slowly between 30 - 15000 Hz and listen for harmonic distortion and other noises. At frequencies above 1000 Hz weak selection half tones may occur and are acceptable. Check that nothing is resonating in the listening room.

Before packing it check that the enclosure has not been damaged.

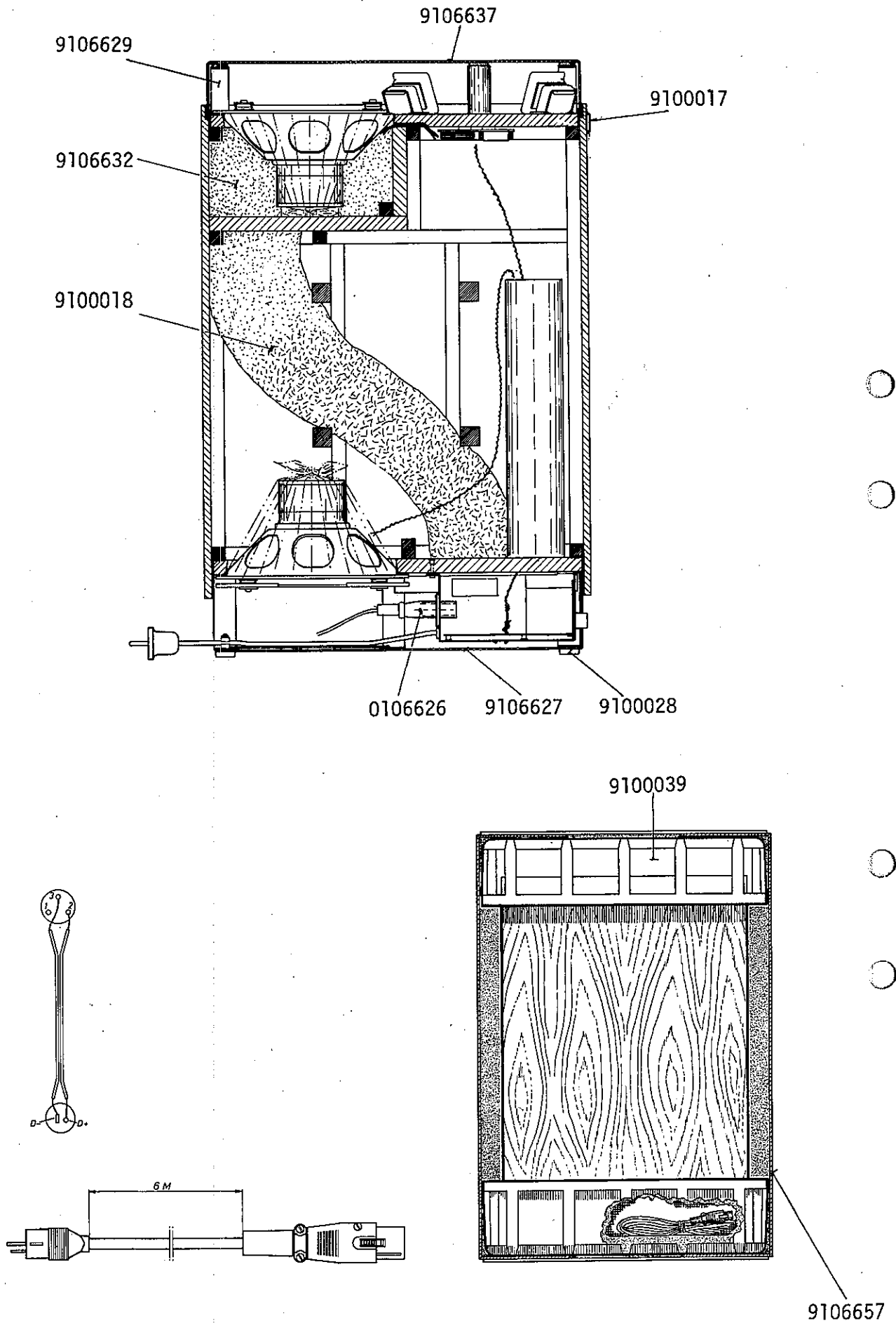


Fig 2. Assembly drawing and package

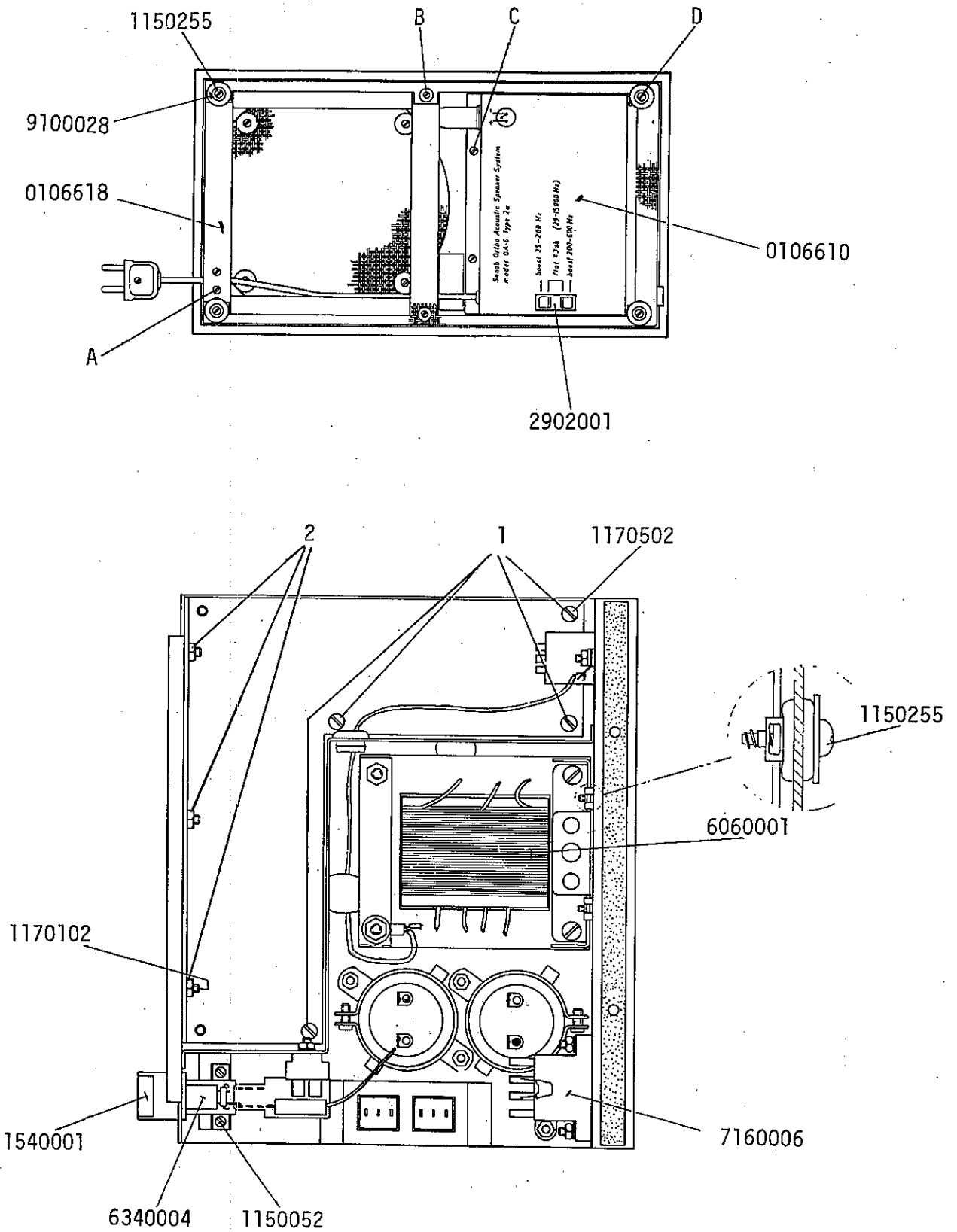


Fig 3. Bottom view and bass energizer

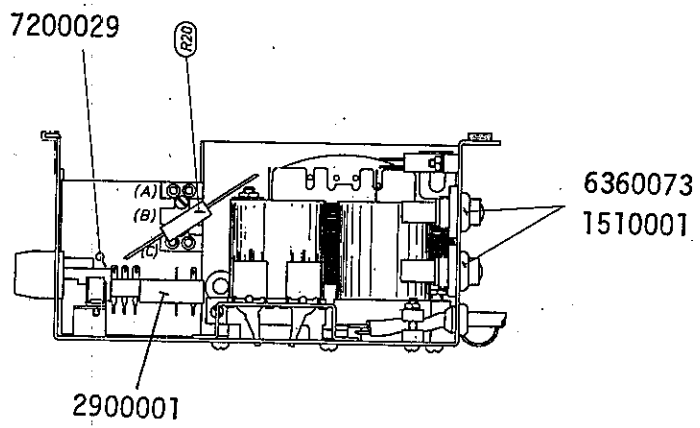
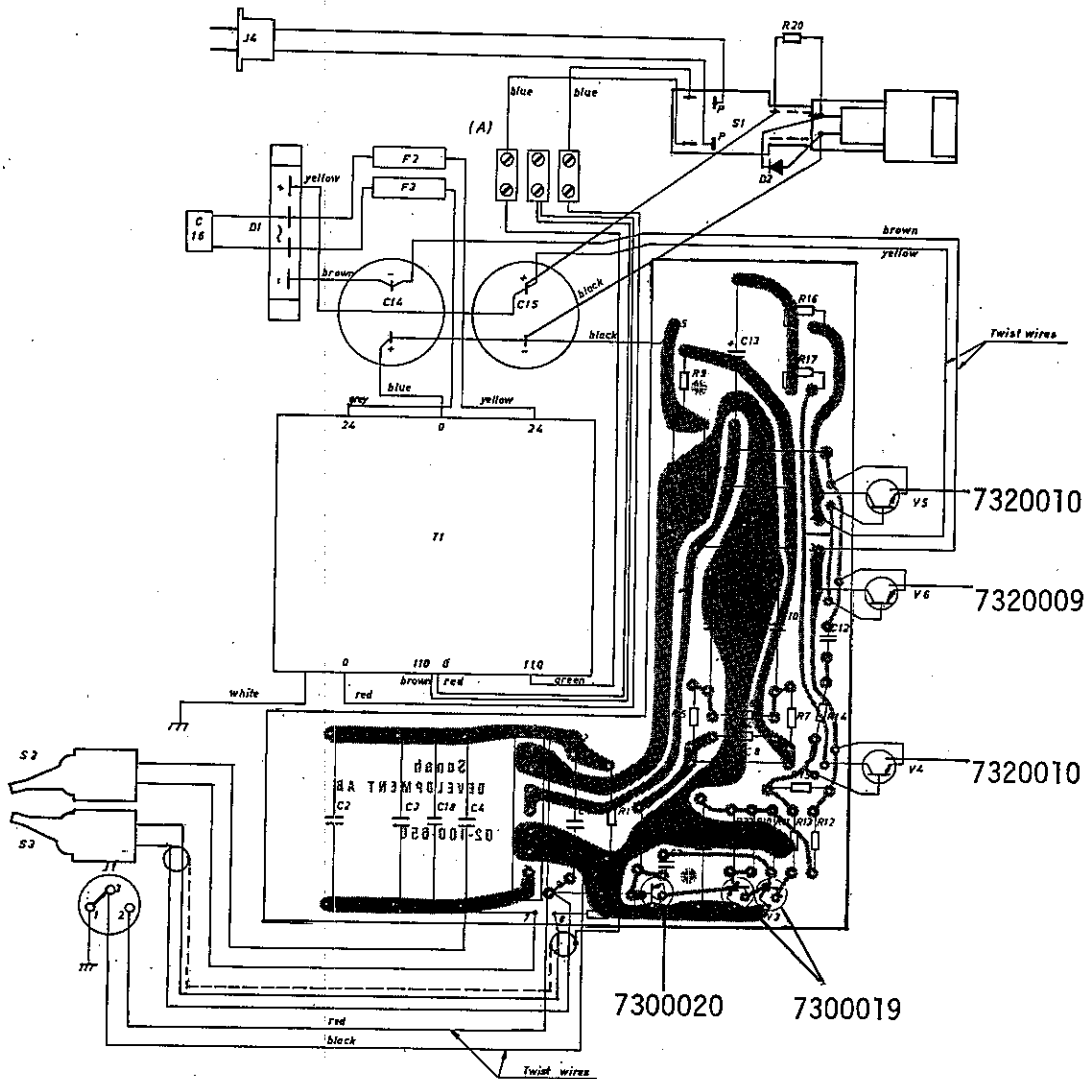


Fig. 4 Bass energizer printed circuit board.