SMART KIT 1199

200W STEREO POWER AMPLIFIER

This is a final stereo amplifier witch provides 70W per channel or 200W when the two channels are in bridge with simple way. It works in AB class and can cover all necessities from beginner to serious music lover. Here are it's capabilities.

- Stereo or mono operation in bridge mode with simple jumper.
- Start delay.
- Bias adjustment with optical indicator (led).
- Current limiting.
- Simple construction.
- Easy installation in every box.

Technical characteristics

• Input sensitivity:	1V RMS.
• Input resistance:	47KΩ
• Output power:	2X70W (stereo) or 200W (mon
• Frequency response:	10Hz – 60KHz (-3dB).
• Dumping factor:	>100 (500Hz).
• Voltage gain:	21 times.
• Total harmonic distortion:	<0,01% (full power with load).
• Slew rate:	40 V/μsec.
• Signal to noise ratio:	>90 dB.

The amplifier circuit consists of six departments

1. Main amplifier.
2. Bridge network.
3. Current limiting network.
4. Bias adjustment network.
5. Auxiliary supply network.
6. Start delay network.

Main amplifier

This network consists of one differential amplifier (T1, T3 – left, T2, T4 – right channel). From now and then all components in brackets ( ) will refer to the other channel. From collector resistor R3 (R4) of T1 the output signal of differential amplifier drives the common collector stage T5 (T6), and this drives the transistors T9, T11 (T10, T12). The transistor T7 (T8) with the rest components P1 (P2) R15, R17, C7 (R16, R18, C8) consists a "regulated zener" diode network witch ensures the essential bias voltage the transistors T9, T11 (T10, T12. This network avoids the crossover distortion because there are no complementary output transistors stage. Finally there is an output power stage of four 2N 3055 transistors T11, T15 (T12, T16).

Resistors R25, R27 (R26, R28) protects the output transistors form high currents.
The negative feedback network of C3 (C4) R7, (R8), R11, (R12) ensures the operation stability and adjust the gain witch is given by the formula:

A_V= (R11+R7)/R7 (Left) and (R12 + R8)/R8 (Right) and solving this we have the result witch is the number 21 (voltage gain).
There is a "zobel" network L1, C9, R39 (L2, C10, R40) witch prevents the high frequency transient currents in capacitive behavior of load such as piezoelectric tweeters.

Bridge operation
The network witch consists of the components around IC1 (IC2) and they are R49, R50 (R48, R51) and R45, R46, R47, C13 and C14. The first part of IC1 is a unity gain buffer and the second is an inverter. This network changes the two 70W channels in one of 200W.

Current limiter
This network consists of T17, T18, (t19, T20) and resistors R29, R31, R33, R35, (R30, R32, R34, R36) is a voltage divider. It's purpose is amplifier's protection in shortcircuits or bad connection. It has linear behavior and limits at 5,5A.

Bias adjustment
A difficult procedure such as bias adjustment is a simple pushover with this circuit witch consists of the components P1 (P2) Led1 (Led2). Adjusting the trimmers the led's turn on and the bias adjustment is the right and eliminates the crossover distortion.

Auxiliary power supply
Resistors R41, R42, R43, R44 and capacitors C11, C12 and zener diodes ZD1, ZD2 forms a small +12V power supply for frequency shifter networks.

Start up delay network
This network is used to connect the power after e few seconds. This network consists of T21, D1, R58, R59 C16, C17, RL1. The 28V passes through D1 and charges C16. When it has charged keeps a small voltage across witch is enough to turn T21 on and the relay closes giving the power to the amplifier.
This protects the loudspeakers and your ears from abrupt peaks till the circuit reaches it's balanced condition.

Construction
The construction is easy if you are careful and follow our instructions.
First of all solder all resistors capacitors and electrolytics (be careful with it's polarity). After you can put all pins small transistors (not to overheat) and after that the relay the dil socket, and the power resistors and coils. Finally you can fit the transistors with their heatsinks and the power transistors in the aluminum 45° angle heat sink.
You must put the mica insulators between transistors and heat sinks and the insulator bush between the lower side of transistors and the PCB before you put the screws. After you had fix the transistors you must check if there is electrical connection between

transistors' body or transistors-heat sink because the transistors have different voltage and there is the danger of short circuit. The transistors bodies (collectors) MUST be insulated from heat sink.

Connections

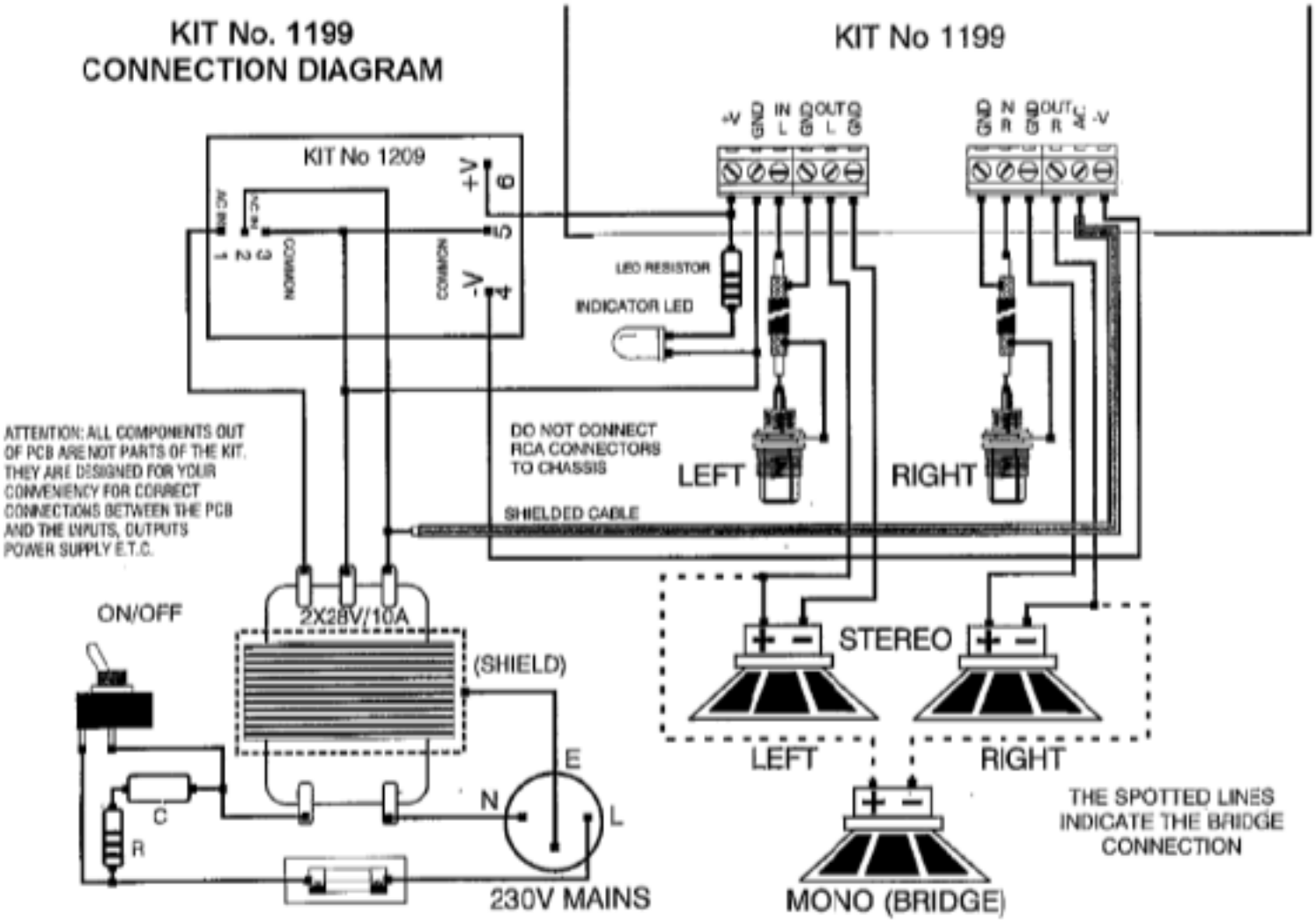
Connect the audio signal in IN L and IN R points of the PCB with coaxial cables. Use RCA type connectors if you want.
Connect the loudspeakers at the OUT L and OUT R points of the PCB. Use heavy duty type cable (red – black 2,5mm Ø).
Connect the +V (positive voltage at the +V point of the PCB.
Connect the -V (negative voltage at the -V point of the PCB.
Connect the 0V at the GND point of the PCB.
From one of the wires of secondary winding of 28V AC voltage (Caution NOT form 230V) connect to the AC point of the PCB. Use a shielded cable to eliminate the AC noise.
Turn the power ON. If all are OK after a few seconds you will hear the music from your audio source loud and clear. If not turn the power OFF and re-check the circuit.

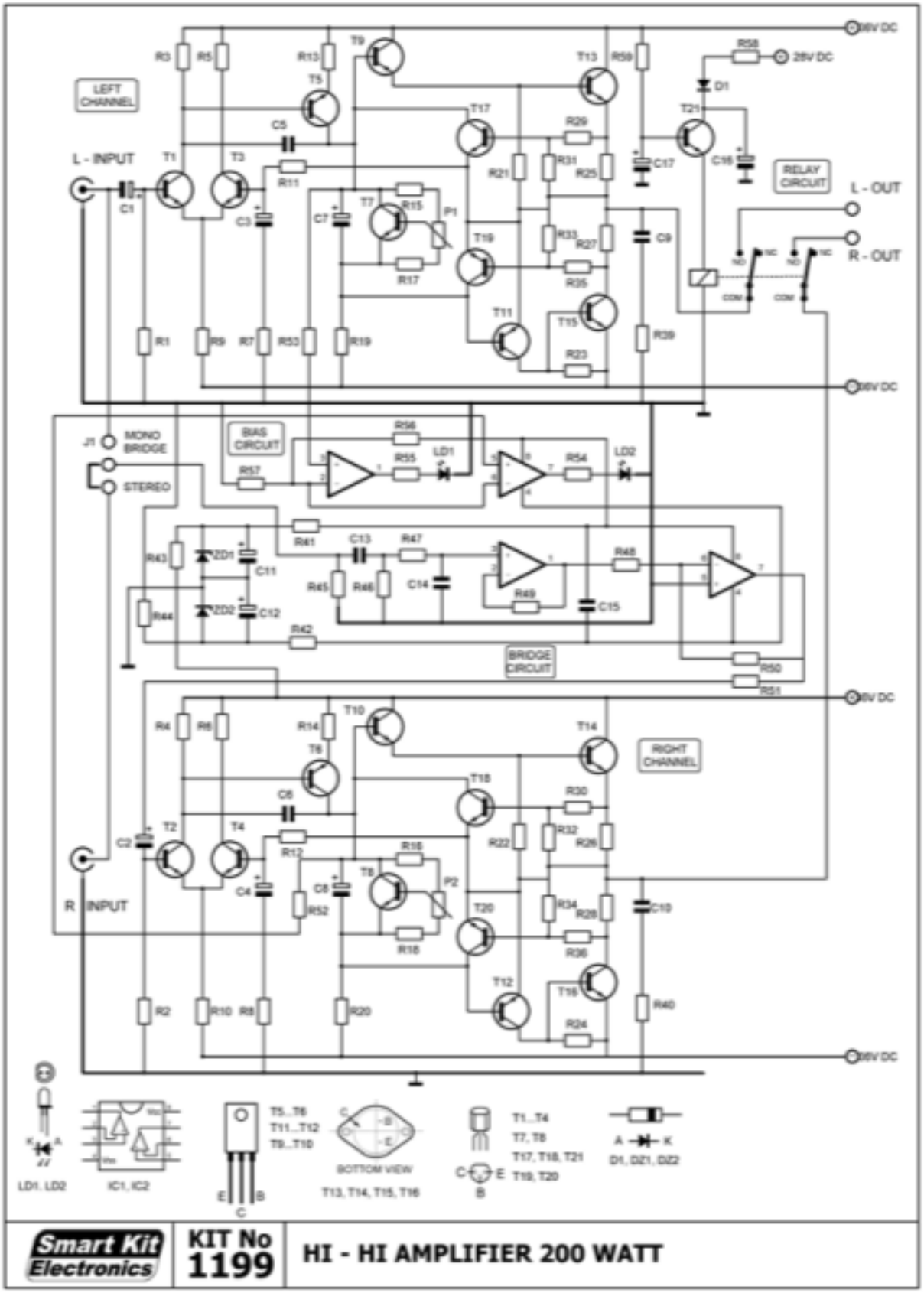
If it does not work

Check all the components (value, location, polarity).
Check for short circuits between PCB tracks.
Check for good connections (voltage, inputs, outputs).
If something is or seems to you like bad change it with another new.
Clean the PCB from solder flux.
Check your power source if it gives the correct voltages.

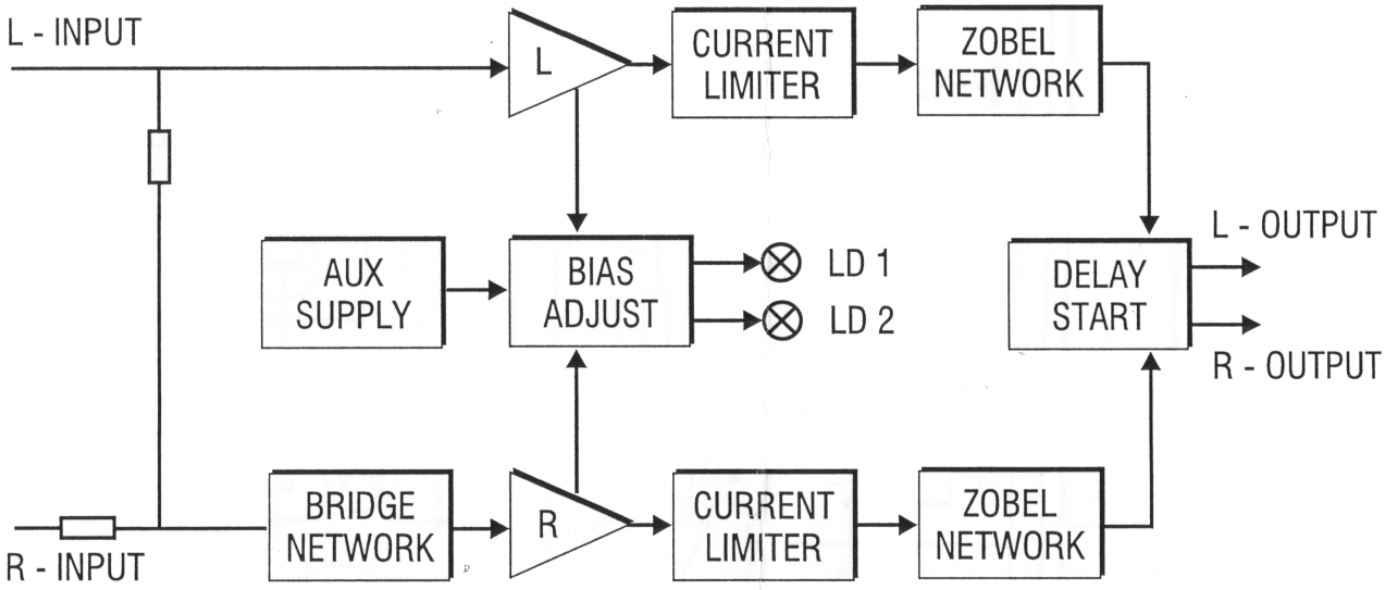
If all are OK and the circuit is not works please contact to nearest Smart Electronics distributor for help.

KIT No. 1199
CONNECTION DIAGRAM





Smart Kit Electronics	KIT No 1199	HI - HI AMPLIFIER 200 WATT



SMART KIT No 1199 BLOCK DIAGRAM