A Linear A200 amplifier

Written by a FRARS member (http://www.frars.org.uk)

Here is one modification to the A200 amplifier that most people seem to have overlooked. Recently, a couple of A200 amplifiers were purchased for use with various QRP transverters, such as the popular PW Meon. The A200's can produce around 30 watts for as little as 3 watts of drive.

Another reason for choosing these amplifiers besides their power to cost ratio, was the fact that Chris Lorek had, in his books, already done most of the legwork in modifying these beasts from their original E0 band of 66MHz – 88MHz down to the 6M amateur band.

On the Air

After tuning the A200 up, it was tested on the air. The power output showed a reasonable amount of output, around what was expected. The second harmonic was checked, and it was now that problems were beginning to surface. Not being easily put off, a couple of coaxial traps were made and fitted on the output – this reduced the second harmonic to a reasonable level. The A200 as it stands is not a linear amplifier, as it's biasing is operating somewhere between class "C" and class "B" and certainly not up to amplifying an SSB signal with any fidelity!

No Mention!

The Chris Lorek book was referenced again, but surprisingly, no mention of the bias circuitry was made. Looking at the circuit, it was through that it must be a simple job to adjust the standing bias – not so. Having made changes to the resistor networks R22 and R23, it was discovered that these resistors actually form part of a damping network. Raising the values of the resistors does alter the bias, but it also turns the A200 into a power oscillator.

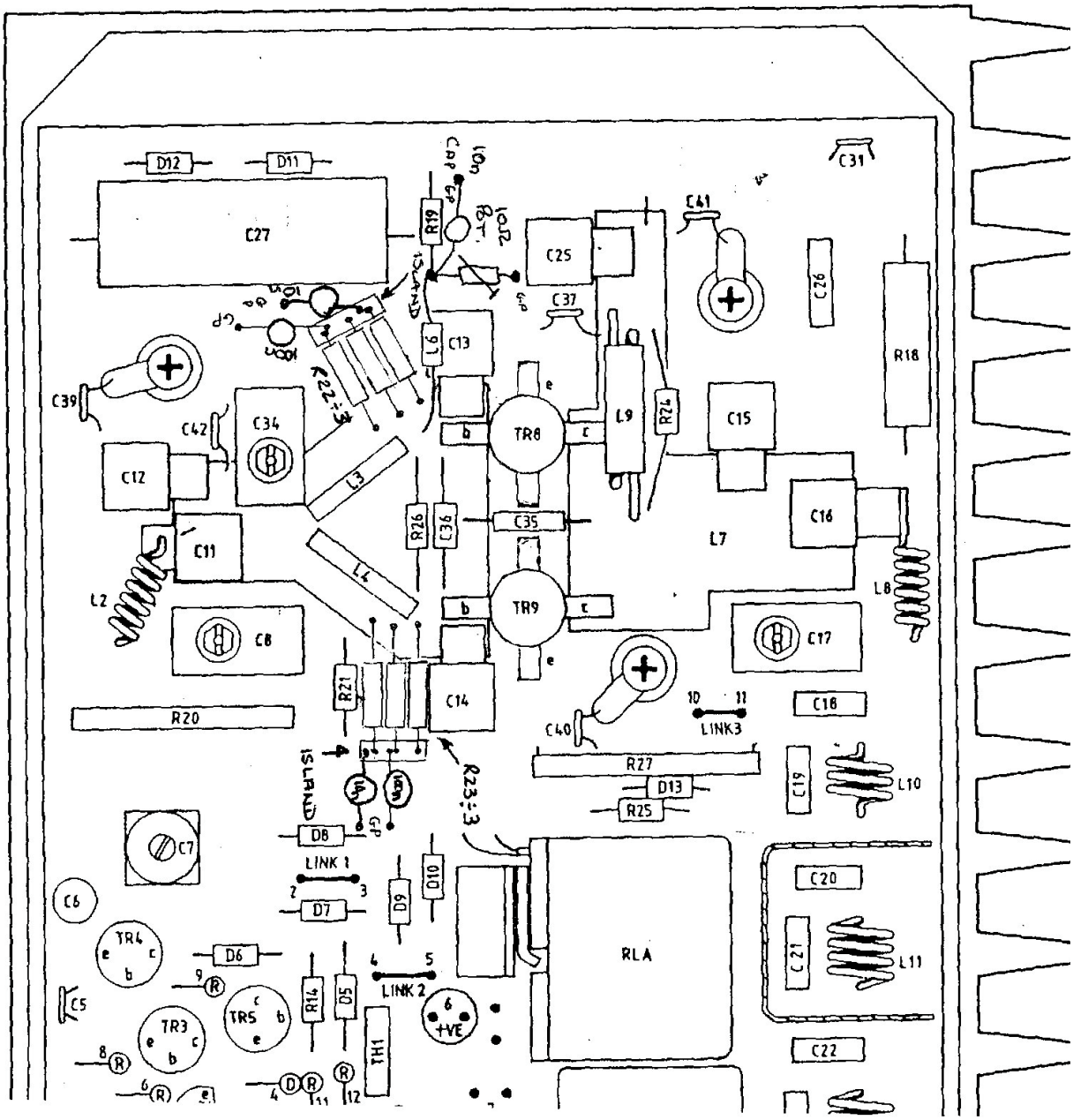
R22 is made up of three separate 12-ohm resistors wired in parallel, likewise with R23. In order to change the bias on the transistors, it is necessary to isolate R22 and R23 from DC ground. This is achieved by removing all six 12-ohm resistors, and mounting them side by side, with the ground end connected to ground via a 0.1uF 50V ceramic capacitor. A 10-ohm preset connected between ground and the R19 end of L6 sets the bias.

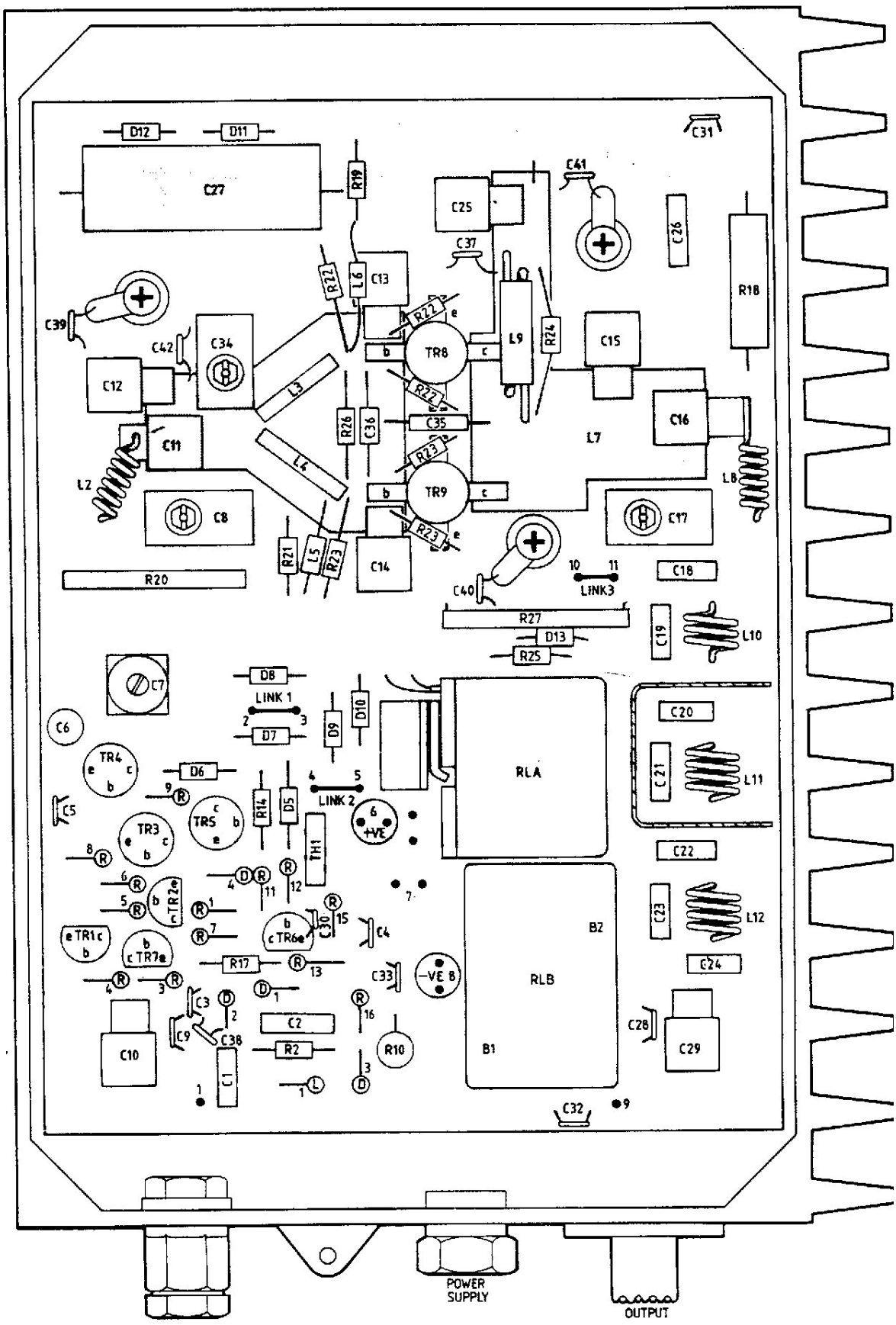
Setting Up

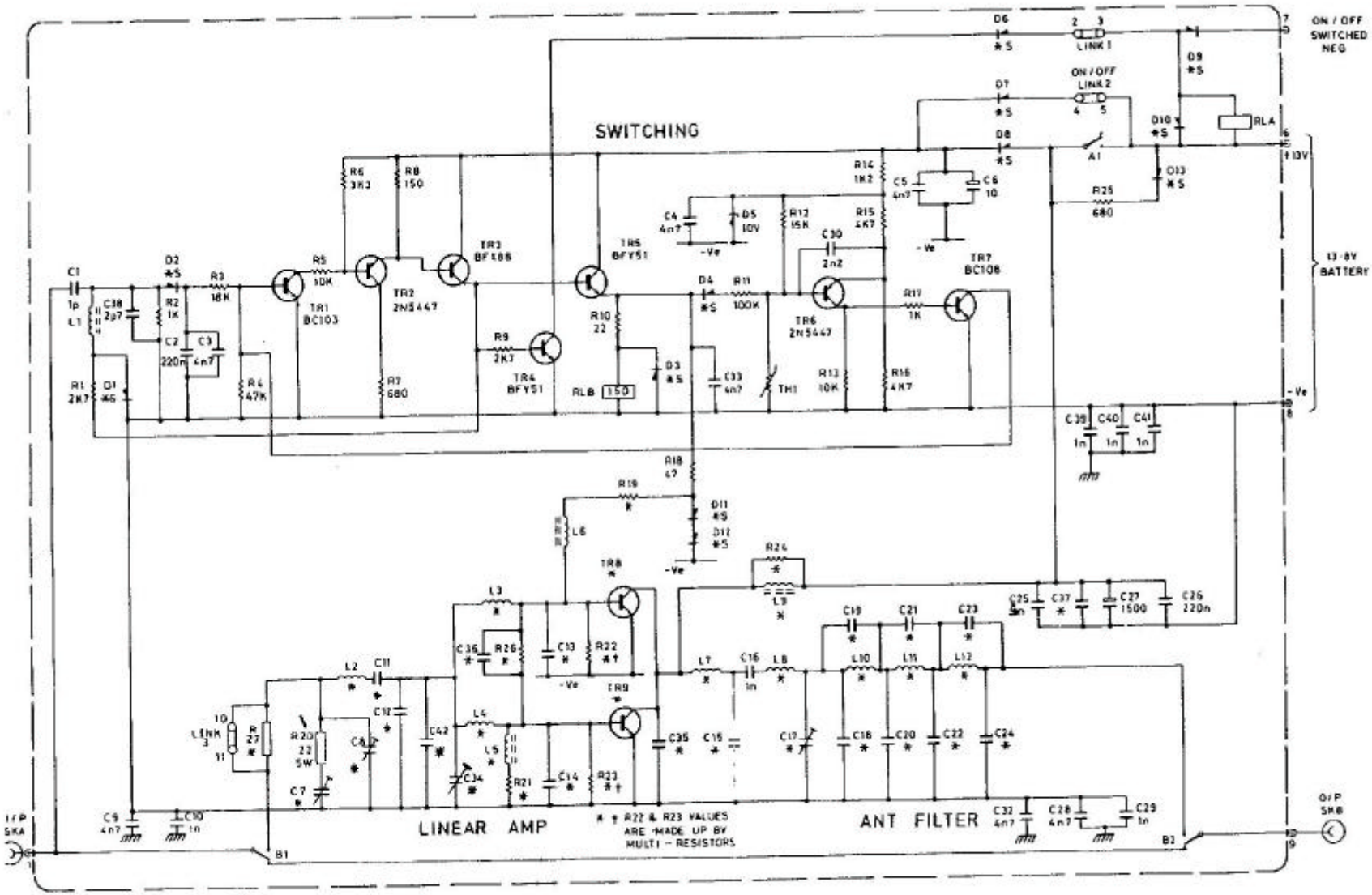
To set the bias of the A200, L9 must be lifted at the C25 end, and an amp-meter connected in series, set to 1 amp FSD. Having done this, the 10-ohm preset is set half way, and 13.8V applied to the DC input of the amplifier. The amp-meter will show the combined current consumption of the two RF output transistors. If all is well, the amp-meter reading should not exceed 1 amp. The 10-ohm preset should be adjusted for around 125mA collector current. After setting the bias, remove the 13.8V power, and re solder L9 to the pad adjacent to C25.

Monitored Audio

Once the A200 PCB has been reassembled into the case / heat sink, RF testing can begin. Drive the amplifier with a few watts of RF with the amplifiers output being connected to a dummy load. Monitor the signal on a separate receiver to ensure the audio sounds reasonable clear, and free from any detectable distortion. If there are any traces of distortion, increase the bias using the 10-ohm preset. Once the preset has been adjusted, the collector current should be checked again to ensure that is hasn't exceeded 175mA.




D12
D11
C27
R19
C25
C41
C31
C26
R18
C37
R22
L6
C13
C39
C42
C34
TR8
L9
R24
C15
C12
L3
R27
C35
C16
C11
L4
R26
C36
R23
L7
L2
L8
TR9
C8
C17
R21
L5
R23
C14
C40
10
11
LINK3
C18
R20
R27
D13
R25
C19
L10
C7
D8
LINK 1
D10
C20
C6
D7
D9
RLA
TR4
D6
C21
L11
C5
R14
D5
LINK 2
TR3
TR5
TH1
+VE
C22
TR2
C23
L12
TR1
TR6
C30
C4
B2
TR7
R17
C33
-VE B
C24
RLB
C3
C9
C38
C2
C28
C10
R2
R10
C29
C1
B1
C32
POWER
SUPPLY
OUTPUT


SWITCHING
LINEAR AMP
ANT FILTER
* † R22 & R23 VALUES ARE MADE UP BY MULTI - RESISTORS
ON / OFF SWITCHED NEG
ON / OFF LINK 2
LINK 1
RLA
+13V
13-8V BATTERY
-Ve
I/P SKA
O/P SKB
TR1 BC103
TR2 2N5447
TR3 BF188
TR4 BFY51
TR5 BFY51
TR6 2N5447
TR7 BC108
TR8
TR9
RLB 150
TH1
B1
A1