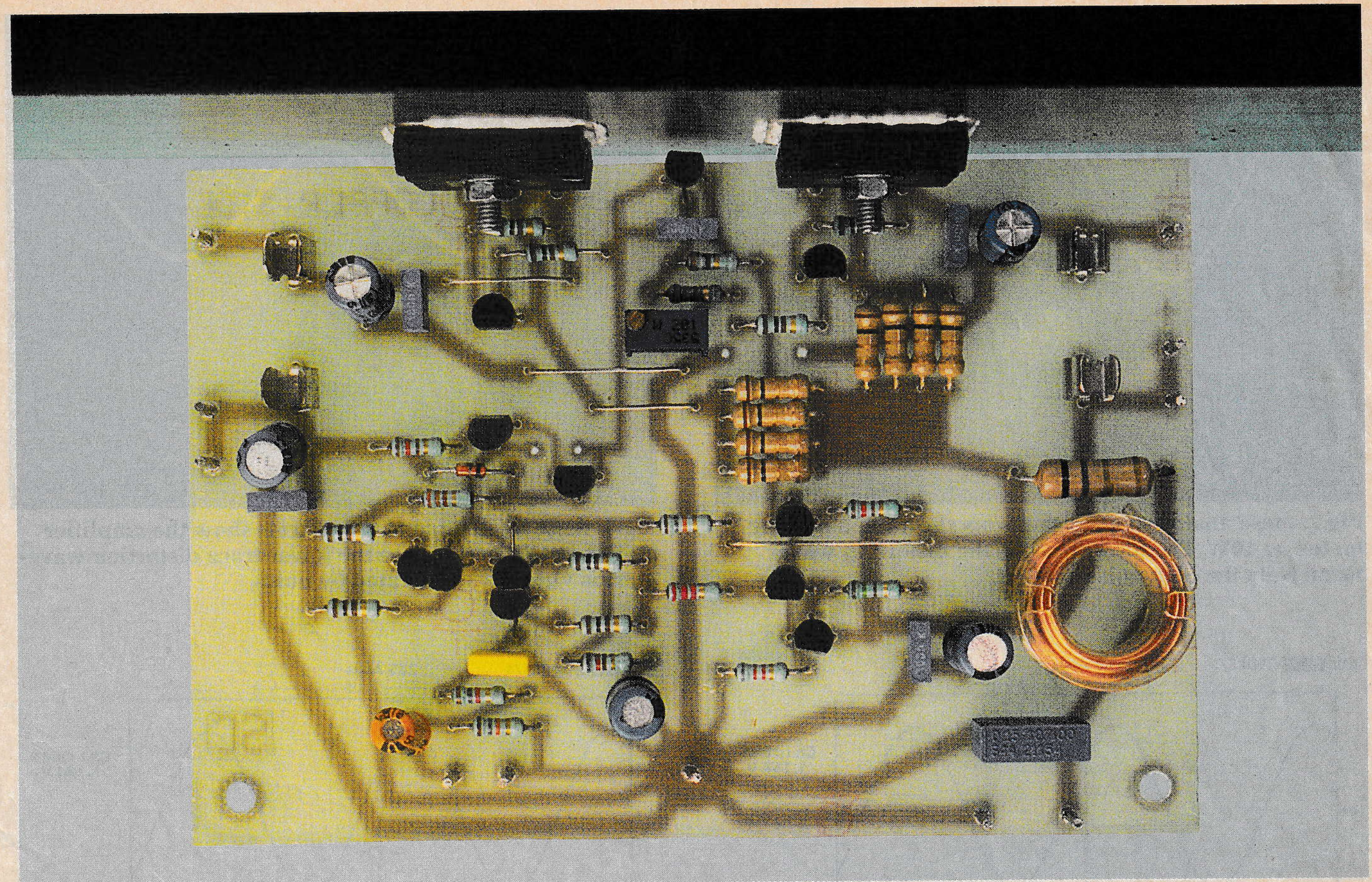

The PC board design is critical to the performance of the amplifier so don't alter it in any way. Note that two pairs of transistors (Q1 & Q2 and Q5 & Q6) are thermally coupled together and don't forget to fit flag heatsinks (not shown here) to Q11 and Q13.

ance between its collector and emitter (390Ω + 150Ω + VR1) to the resistance between its base and emitter (150Ω + VR1). In a typical setting, if VR1 is set to 120Ω (note: VR1 is wired as a variable resistor), the voltage between the collector and emitter will be:

Vce = Vbe x 660/270
= (0.7 x 660)/270 = 1.7V

Note that this is considerably less than the 2V or so which would be provided in typical previous bipolar amplifiers we have published but this reflects the change to the current-feedback pairs used in the output stage instead of Darlington connected emitter followers; only two base emitter junctions need to be stabilised in the output stage.

In practice, VR1 is adjusted not to produce a particular voltage across Q10 but to set the 1A quiescent current in the output stage. This requires a voltage of 0.25V across the 0.25Ω "emitter" resistors.

In previous bipolar amplifiers we have published, the Vbe multiplier transistor would be mounted on the same heatsink as the output transistors, to ensure that it is thermally coupled to these transistors. However, the bias stability in the current-feedback pairs depends only on the base-emitter junctions of Q11 and Q13 and consequently the bias stability is quite good, even without the tight thermal coupling.

Performance

Output power	15 watts into 8Ω
Frequency response	-0.3dB down at 20Hz and -0.5dB down at 20kHz (see Fig.4)
Input sensitivity	680mV RMS (for full power into 8Ω)
Harmonic distortion	<0.004% from 20Hz to 20kHz, typically .0006% (see text)
Signal-to-noise ratio	113dB unweighted (22Hz to 22kHz); 116dB A-weighted
Damping factor	>200 at 100Hz & 1kHz; >70 at 10kHz
Stability	Unconditional

Negative feedback

Negative feedback is applied from the output stage back to the base of Q2 via an 18kΩ resistor. The amount of feedback, and therefore the gain, is set by the ratio of the 18kΩ resistor and the 1.2kΩ resistor at the base of Q2. This gives a voltage gain of 16 times (24dB). The low frequency rolloff is set mainly by the ratio of the 1.2kΩ resistor to the impedance of the associated 47μF capacitor. This has a -3dB point of about 3Hz.

The 2.2μF input capacitor and 18kΩ