

10W Power Amplifier for 70cm Handhelds

The current generation of UHF handheld synthesised transceivers have almost all the facilities found in mobile/base rigs; the only major limitation being their output power. For handheld operation 1W or so is adequate, but for mobile to mobile and for use with higher power repeaters, the additional power provided by this amplifier increases the range considerably. This is especially noticeable when on the edge of a repeater's service area.

Want to improve the output of your 70cm handheld? Then try this 10W PA design from Cirkit.

This 70cm power amp will boost the output power of your handheld transceiver up to 12W. It has automatic relay switching between the transmitter and receiver which is provided by the RF sense circuitry. The box provides sufficient heat sinking whilst retaining its small but tough look.

Circuit Description

The amplifier is provided by Q1 which is biased for class C operation, so that the transistor takes zero current with no signal – the

applied drive providing the base bias. Class C operation is inherently non linear, which means that doubling the applied drive power will not necessarily double the output power. Also, the output will be zero until sufficient drive has been applied to supply the base-emitter bias. For CW or FM this does not present major problems and, in fact, provides higher efficiency. With a single frequency drive signal, the only spurious signals generated are harmonics and these are readily suppressed in the matching networks and output filter. The amplifier takes a lower DC supply current for a given power output and therefore runs cooler as less power is being dissipated in the heatsink.

The input is matched to Q1 by the network comprising C1, C2,

Z1, C3, C4. The output from the collector is matched to 50R by Z2, C5 and C6. DC power is supplied via the collector choke, L2. This is decoupled by C12, 13 and 14 and the RC network, C15 and R4. L3 is present for further supply filtering. A two section low pass filter is formed by C6, C7, C8, Z3 and Z4. The cut off frequency of this filter is approximately 490MHz. The stripline inductors Z1, Z2, Z3 and Z4 are printed tracks on the PCB.

The switching circuit operates by applying some RF, via C18, to the voltage doubler, D1, D2, C9, C10. The base current to Q2 is limited by R1 which, in conjunction with C11, smooths the transients (ie the spikes) which are present during switching. The relay current is switched by Q3. D4 provides some reverse polarity protection.

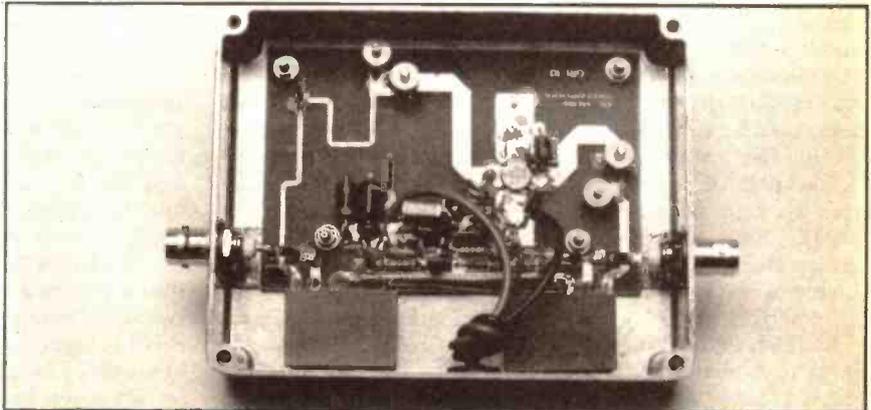


Fig. 1 Circuit diagram of the power amplifier with the test voltages shown with the relays in receive position.

