This transmitter was designed to provide high output power at absolute minum cost while giving audio quality of broadcast standard.

The crystal oscillator is inductorless and series or parallel C may be added to trim the crystal frequency exactly onto channel. A capacitor in parallel with the 100KΩ grid resistor may also be inserted to suit some crystal types. The PL504 driver is series gate modulated by the triode cathode follower. The five paralleled PA valves are cut off by the negative grid bias line and driven into class C by the drive voltage which is tuned by the trimmer. They feed a conventional PI network, though fewer turns than usual are needed to match the very low impedance of the five anodes. The valves must be matched for cut-off voltage and the most practical way of doing this is to select valves for equally glowing anodes. With no modulation input increase the SET CARRIER control to give high carrier output and observe the anodes after a minute or two in a darkened room. Change any valve which glows more than the others and repeat until all draw similar currents. A check that all valves are working can be made by metering the voltage dropped across the 10KΩ screen resistors. A range of 5-50 volts is normal but no drop means a dead valve or o/c 10K.

The audio input passes through a conventional triode amplifier, the lf roll-off being set by the 4µF cathode decoupling. The next valve acts as a mixer where the audio is combined with audio plus dc from the rectified rf. The gross distortion which results from clamp modulation followed by a class C stage is reduced by this negative feedback. The dc feedback is useful as it tends to stabilise the rf output. This valve is dc coupled to the clamp modulator valve.

The valve heaters are all in series across the mains with no thermistor but they do survive the bright glowing when turned on. The mains is also half wave rectified for the 300 volt line and voltage doubled and stacked on top of this for the 1KV line. The series resistor from the mains to the rectifiers limits the surge current to within diode ratings.

The transmitter is 'live chassis' construction with the chassis intended to be at mains neutral and the aerial output components connected to ground (mains earth plus any antenna system earth). Neutral, line and ground are connected together for rf by 100nF capacitors. The audio input is necessarily at mains neutral also. This presents no problem with plastic cased battery powered equipment but if the audio source must be earthed for safety reasons then insert a 1:1 10KΩ or similar audio isolating transformer in the audio line.

As with all am rigs tuning up can only be done really properly with a scope. Apply 400Hz - 1KHz sine wave input and adjust the audio gain and SET CARRIER to give a slightly flat topped rf envelope. Tune the PI capacitors and select the inductor tapping to achieve the maximum peak envelope voltage. With this rig hum may appear on the envelope as the tune is swung away from the optimum position as the valves draw more current. A meter on the 1KV line will confirm that correct power is being run as it should drop to around 900-930V for a correctly adjusted pa. Progressive adjustments of audio gain and SET CARRIER will be needed as the aerial load is matched. The output power is increased to the point just before the pa valves glow. The negative bias line ensures that the valves are protected should the drive fail or the crystal be unplugged. In such a state, or with the SET CARRIER turned to minimum the 1KV line will read around 1100V.