

operating at 69.722MHz is amplified and the third harmonic (209.18MHz) selected. This is coupled out at L3 to drive a BFR91. This is doubled and tuned with a couple of parallel lines in a screened compartment. A second BFR91 is concealed in a hole in the screen and the third harmonic (1255.08MHz) is tuned in the second pair of lines, from which the output is taken to the test generator's output socket. The unit is supplied with 12 volts, with zener stabilisation for the early stages.

Construction

Most constructors will wish to 'lose' the unit in a diecast box, but to avoid any problems of detuning it is best to build a primary screening of printed circuit board (or tinplate) around the generator. Usually these articles include a warning saying that you must adhere to all the dimensions, used the specified components and use normal high quality construction techniques. I thought I could ignore all this... well, suffice to say I wasted my time the first time round. Rally bargain ceramic or plastic trimmers just don't work at around a Gigahertz, so you must use the proper Johansen or Airtronic *gigatrim* types, but if you look at microwave 'junk' PCBs in the boxes under the stands at rallies you can strike gold at a lower cost. I picked up a 900MHz preamp for £2.50 — it was loaded with the things. NB: most rally dealers don't understand microwaves, thankfully, so they put the mystery gear in old boxes under the stand...

OK, we start constructing. The first stages are built on a PCB (see Fig. 2) and you can use plastic trimmers on this board. The coils are

wound with 21swg silvered copper wire from the Scientific Wire Co. (PO Box 30, London E4). Thinner wire did not work (insufficient Q). Screens of PCB or tinplate one inch high should be built all round the boards, and don't forget to bond all surfaces to together with pieces of wire or copper foil to ensure everything is at RF and DC ground potential. The crystal comes from Quartslab (PO Box 19, Erith, Kent) — it will be made to order and will take about three weeks. You should file a notch where the first BFR91 is fitted in the PCB, together with a smaller notch on the other side of the screen in the main board (for the collector to poke up).

This main board is not etched but cut to size. The lines are cut from copper, brass or nickel-silver shim or from tinplate: their thickness is not critical but their width and height above the ground-

plane are. By using the correct trimmer you will ensure that these lines lie parallel to the groundplane (and thus at the right impedance). Power for both BFR91s is brought up through the groundplane by feed-through capacitors; the 150 ohm resistors (with sleeved wires) run below the boards. Output connector is a BNC (*Subclie* SMB or N if you prefer).

Alignment

Construction will probably take you about four hours, from start to finish. (Painting the diecast box, lettering it neatly with dry transfers and making it look smart is extra). Tuning up is something else, though, and this is where the self training comes in. The method to be described works, though if you are looking for an inspired explanation you will be disappointed.

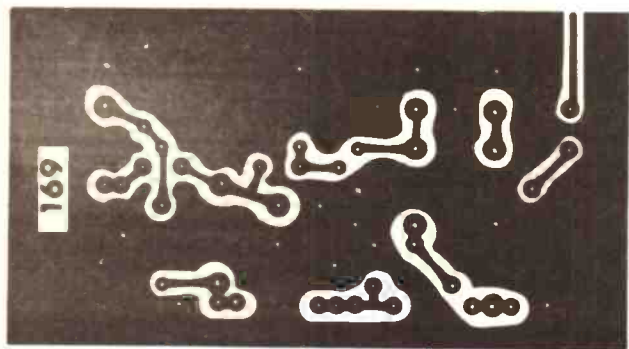
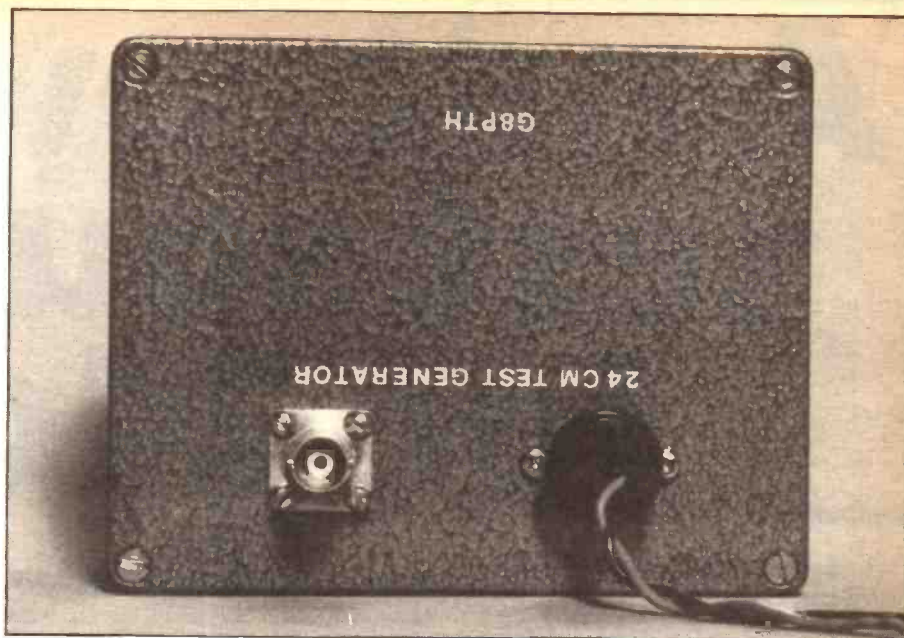
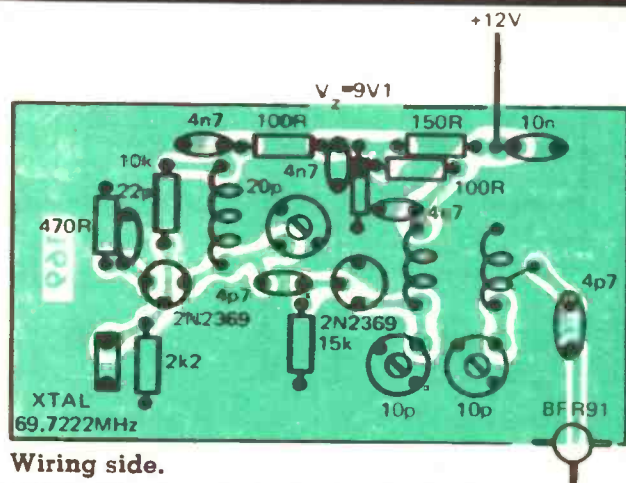


Fig. 2 PCB track side.



Wiring side.