The GRC-9 – some useful hints. *Colin Guy G4DDI*

I have always had a hankering after an "Angry Nine", and soon after publication of Mike Hoddy's description of the set in the December 2003 and February 2004 Newsletter I was lucky enough to acquire a more or less complete station locally. Only missing were the correct whip aerial (a useable Larkspur era whip came with the set) and the long cable used to connect the hand generator to the set. The vendor did include a spare short cable, which was perished internally (as they often are apparently) though it looked alright on the outside.

Once I had replaced the audio bias battery (described in Mike's article) to cure distorted rx audio and a tendency to blocking on strong signals, the station itself was a worker, the DY-88 (looks like a TV EHT rectifier when written like that doesn't it?) power supply whirred away smoothly and quietly when switched to send, and once I had got the hang of the fiddly netting procedure a call into the VMARS net produced a very acceptable report from G3TFC. I also had much success with it on the VMARS 'military' net last summer, using a wire dipole aerial.

However, operating the set is in some ways not easy, the microscopic and almost invisible (to me) tuning dials are one bugbear, but once you have found your station, netting the transmitter to him is a right pain. To start with, you have to switch the receiver to CW then zero the receiver onto your station, then switch to the 'net' position. But, if you are on 'phone' (AM) there is no carrier from the transmitter. You have to switch the transmitter to 'CW' or 'MCW' to get the carrier up, zero the transmitter onto the receiver BFO, then switch both the transmitter and receiver back to 'phone' and hope that you don't catch either tuning control in the process.

By then it's likely that your station has ceased transmitting (unless you are trying to join the Boatanchors group!) Of course this isn't likely to have been much of a problem in the original deployment of the set as it is intended primarily to be crystal controlled, both on transmit and receive, but as MO control is provided, why make it so difficult to use?

Then comes the next problem – on 'phone' there is a 1 – 2 second delay after pushing the pressel before the transmitter comes up. If you are trying to call in on an existing net it is likely that someone else has already started transmitting by then, and with only 10 – 15 watts you don't stand a lot of chance of being heard. Also, I found that if the supply voltage was even slightly low, the protection circuit would trip before the transmitter started. (There may be other reasons for this effect as well.). I also noted that the transmitter dial lamp doesn't operate when switched to 'phone' until you push the pressel, making another excursion to the 'CW' position necessary when setting the approximate tx frequency.

A quick study of the circuits in the manual (Fig. 1) that came with the set soon revealed that for some odd reason the transmitter valve filaments (which includes the supply to the dial light) are switched off on receive only on 'phone', they remain on in 'MCW' and 'CW' modes. In the 'phone' position, the heaters are supplied via a pair of contacts on the main relay K101 whereas in the other modes these contacts are shorted by the mode switch contacts S105-3. The valves are all 'quick heat' types, but quick doesn't mean instantaneous, hence the delay on phone transmit. This may have been an attempt to save a little power, or prolong valve life I don't know, but on this set the dynamotor runs continuously anyway when the transmitter is on, and the power consumption of the filaments must be minuscule in comparison with that of the dynamotor, and I see no other advantage of switching the filaments off on 'phone' when they can obviously be left safely on in the 'CW' and 'MCW' modes. Perhaps someone can enlighten me!

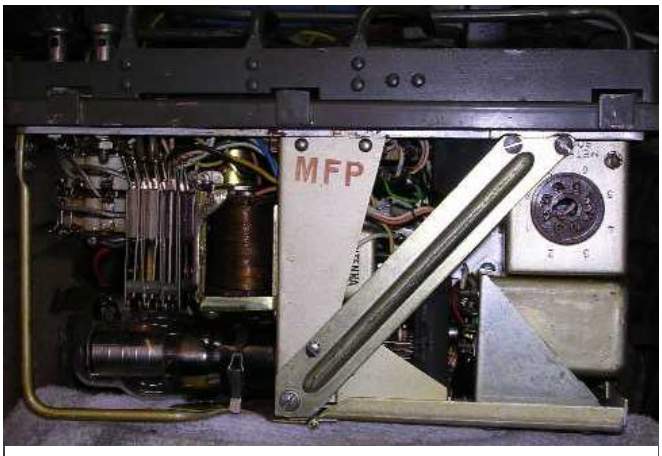

Fig. 2. Side view of the transmitter chassis

So, I decided to decided to see if there was an easy way of non-destructively correcting this apparent design error. The transmitter is not easy to work on, being very compact and well screened, so it took a little while to locate the physical location of the relevant wiring and switch/relay contacts. Once found, however, the necessary mod was so simple it wasn't true – the relevant contacts on the mode switch are easily accessible through a hole in the side of the transmitter screening and it was a simple matter to link them together by soldering a 1 inch length of wire between them. Figs 2 and 3 should guide you to the correct contacts.

The wiring to the relevant contacts is white, one having just a red tracer and the other having red and blue tracers, but I can't guarantee that all

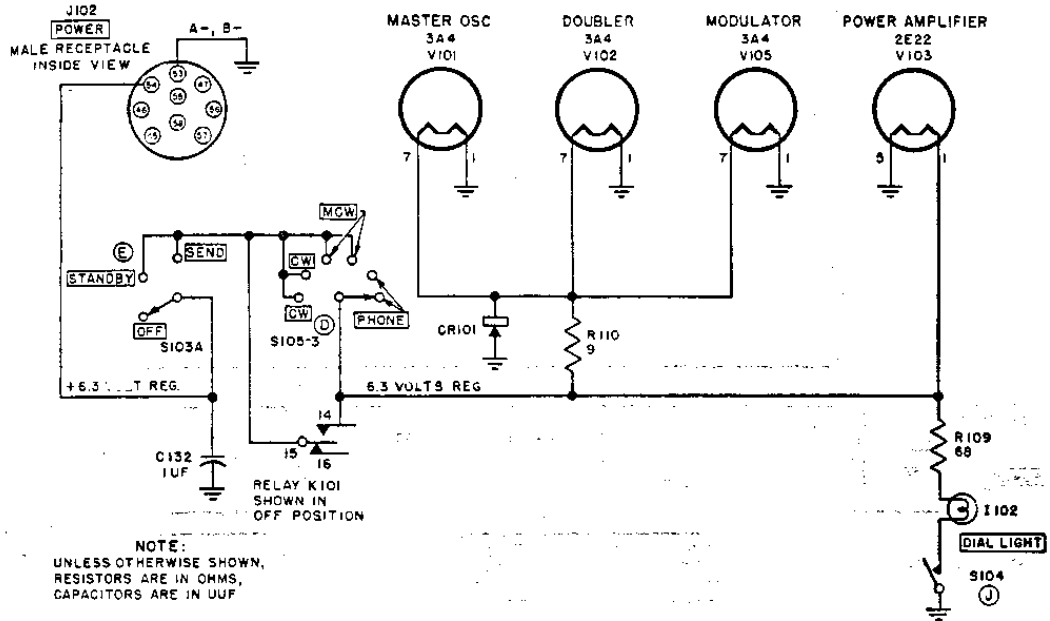

Fig. 1. GRC9 transmitter filament circuit.

sets are the same so you must be very sure that you have got the correct contacts first – with power removed, connect a low reading ohm meter across your suspects, there should be a short between them in all of the 'CW' and 'MCW' positions of the mode switch, and a resistance of several hundred or more ohms with the switch set to 'phone'. Then apply power, (keeping your fingers clear!) and check that 6.3 volts DC is present on both contacts on 'CW' and 'MCW', and one only on 'phone' (with the set in standby). Once you are sure, remove the power, link the contacts and power up again. You should find that you have netting and dial lights on 'phone', and instant transmit!

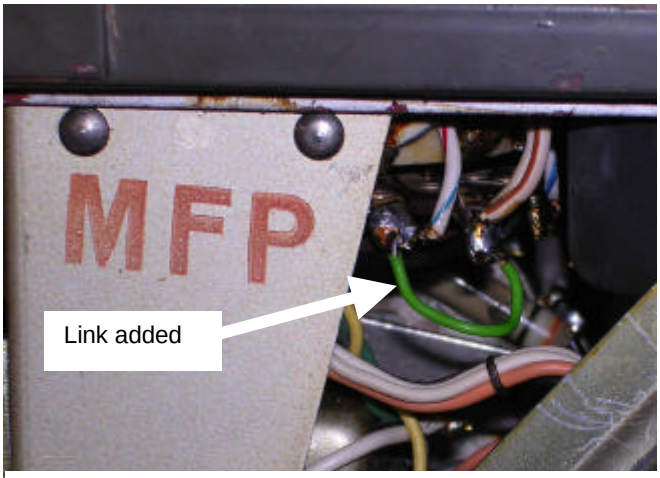

Fig. 3. Closeup of the mode switch, where the link wire can be clearly seen.

That perished cable.

As mentioned earlier it appears to be quite common for the rubber insulation within the power cable to become perished whilst the outside of the cable (also rubber) looks fine. I needed a long (7 feet according to the manual) cable to connect to the hand generator so I removed the connectors from the faulty one and looked around for a suitable substitute. There are nine cores in the cable, which ruled out 7-core trailer cable, useful stuff in many such situations. Some of the cores have to carry quite substantial current without introducing voltage drop, I didn't think that the common types of multi-core control cable would be substantial enough, nor would it look right with the connectors designed for a cable with an outer diameter of a little over ½ inch.. Hunting around I came across a length of plastic garden hose that was exactly the same outer diameter as the original cable and, though green rather than black, had a nice smooth appearance and was reasonably flexible.

I cut nine eight foot lengths of 1.5mm stranded wire (which you can get from auto-electrical factors in various colours) and laid them out in a straight line across the back yard. It was clear that these were going to be a tight squeeze in the hose, so I passed a single additional length through the hose, soldered one end of it to one end of all the other lengths, and with the free end of the single length tied round the shed door handle, managed to pull the nine lengths through the hose. That performance gave the neighbours some entertainment on boxing day! That done, it was just a matter of re-fitting the connectors, but again be very careful that you get it right – the valves, particularly that very expensive 2E22 – don't take well to having HT applied to their filaments! The male and female connectors are numbered differently, and if you hold them as if to connect them together (which you actually can't), the wiring is actually in what the computer boys would call a 'crossover' format. In other words the pin of the plug isn't connected to the pin of the socket with which it would mate if they were connected together, it goes to the one on the opposite side. Fig 4 shows the wiring by pin numbers from

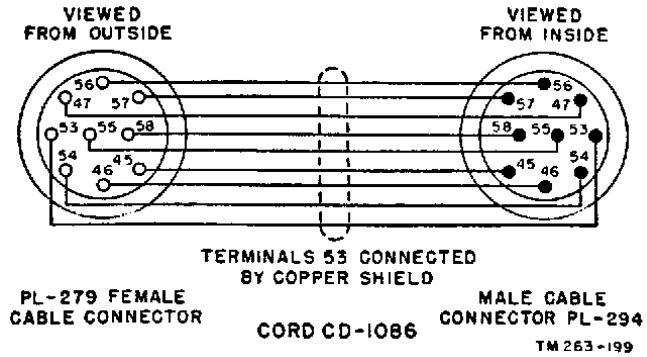

Fig. 4. Power cable wiring

the manual, however the connectors I had were numbered differently from this and each other, so if you still aren't certain, use an avometer to compare with a known good lead.

Aerial connections.

Bearing in mind that the GRC 9 is designed to connect to either a whip aerial, a longwire or a doublet with balanced feed, what do you do if you want to connect to a coax fed aerial or ATU?. I use a standard amateur bands 1:1 balun of the type normally used in the centre of a dipole aerial connected across the 'doublet' terminals. I'm not certain what the intended output impedance is when used in this way, but it seems to be possible to match it to 50Ω coax.

Results I have had some good contacts with the GRC-9, both from the shack and outdoors and I hope to be using it from some demonstration stations this year. Listen out for the 'dwah – dwit' note on 40m CW!