Hints and Tips *Colin Guy G4DDI*

This month, three solutions aimed at improving reception at the author's QTH.

Domestic Appliance QRM

One recent Sunday morning I found Topband to be plagued with a buzzing noise of the type that you used to get on the lower end of the medium-wave band from the older type of switch-start fluorescent lamps. This was continuous for around 40 – 50 seconds then stopped for about 5 seconds before repeating this cycle. Initial efforts to locate the source failed, so I did what I usually do and set up a battery operated receiver (PRC320) and switched off the mains to the house. This eliminated the QRM, which then returned when the supply was switched back on. The penny then dropped, we have had a new *gas* cooker installed and Sunday lunch was in preparation. This cooker, a Stoves 900RPi is one of those all singing affairs, which like most modern appliances is controlled by a microprocessor. Observation showed that the oven temperature control is achieved by switching the gas on and off rather than by reducing the intensity of the flame, as in conventional ovens (switched mode?). Ah you say, "the QRM is from the gas ignition system" – well, holding a receiver near the beast indicated that the QRM *stopped* whilst the spark ignition was operating, and returned as soon as ignition was achieved. Hmmmm… it turned out that the oven fan motor speed is electronically controlled, and the fans stop alltogether whilst the ignition is operating, so I figured that the QRM was coming from the motor speed control.

Tuning with a portable radio near the appliance showed no audible QRM in the MW band, it appearing quite sharply at 1.65MHz and was audible up to around 4MHz. Being a new CE marked device I assume that it was made to comply with some EU directive concerning broadcast interference but the (British) manufacturer of a device costing almost £1000 has obviously cut costs by working to the letter of the directive rather than the spirit.

As the cooker is under warranty I was not minded to open it up to see just what suppression is fitted (not to mention the problem of physically moving it from its mountings) so I sought an alternative solution.

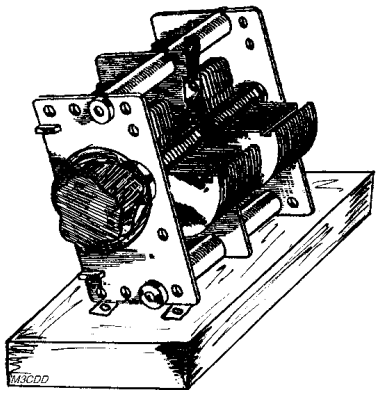
All washing machines (foreign ones anyway) are fitted with a substantial encapsulated mains filter – one of these was purloined from a scrap machine (should be plenty round the back of the local white goods emporium!), mounted into a suitable diecast box, and the mains electrical supply to the cooker routed through it. The box was fixed to the wall below the cooker, well out of the way of everything. (These filters are rated at 16 A, the cooker electrical consumption is considerably less than this – it has a 5 amp fuse in its plug). Result – no QRM at all.

I think that one of these devices connected in the mains supply of an offending appliance would stop virtually any mains-borne QRM from escaping, but do make sure that it is safely installed, and correctly earthed – for best results it should be enclosed in an earthed metal box, and wiring to and from it kept short.

(Incidentally I wouldn't recommend this cooker to anyone – it has several other design flaws that show it to have been designed by someone who has never actually used the thing they are designing before – bit like many "black boxes"!)

Tuning "inductive" aerials.

Last month Richard Hankins mentioned that only certain lengths of longwire aerials can be tuned by the standard military inductive ATU. Here is a simple solution if you find yourself trying to tune such an aerial. Mount a standard broadcast receiver type two-gang variable capacitor onto an insulated board (a piece of wood will do as long as it is dry) and fit it with a large insulating knob. Connect the two stator terminals together and to the output of the ATU, and connect the frame of the gang to the longwire lead-in. By trial and error with the setting of the variable capacitor you should be able to arrive at a point where the aerial will tune. Aim to have as much capacitance in circuit as possible consistent with being able to tune, and mind your fingers while adjusting it with the tx keyed! This arrangement is suitable for up to 25 watts – for higher powers you will need a widespaced capacitor, and a proper enclosure for it.



Locating a noisy contact in an aerial.

My (commercial) multiband trap vertical aerial recently developed an annoying intermittent loss of gain, which would right itself on keying the transmitter. A corroded connection you think – yes, so did I, and I cleaned and tightened every physical connection on the whole system, but still the problem recurred – intermittently, and keying up momentarily always cured it. The fault could sometimes be instigated by shaking the mast, indicating that it was in the aerial and not the feeder (a single run of UR67 co-ax). With the aerial again lowered, and with a multimeter connected between the centre of the feeder coax in the shack and the tip of the aerial, no amount of tapping would cause any noticeable change of resistance. I figured that the current passed by the meter was breaking down whatever was causing the intermittent in the same way that keying the transmitter did, so here is what I did.

With a 1.5 volt cell, a 10 kΩ resistor and a sensitive pair of headphones (DLR type) all wired in series and connected from the tip of the coax to the end of the aerial (there is DC continuity), and wearing the headphones I tapped and prodded all parts of the aerial until I discovered that when I waggled the PL259 connector at the bottom of the aerial I could hear a slight crackle in the headphones (the current of less than 150μA seems to have been insufficient to fully break down the barrier). The cause in fact turned out to be the soldered connection to the centre pin of the socket within the aerial base which, when I managed to get to it was obviously crystalline and dry. Resoldering it has provided a lasting cure. And I thought that commercially manufactured stuff is always perfect (according to those who sell it anyway)…….