SECONDHAND EQUIPMENT GUIDE

by Hugh Allison G3XSE

Typical, absolutely typical. The day after I post off last month's copy about the fun I had been having learning about the various cheap microwave heads, a friend says: 'This any use to you?', and gives me a Mullard Technical Communications bulletin (Number 131) in which there is an article on microwave doppler intruder alarms. This recommends RF and dc bias on the receiving (or mixing) diode, such that, for their particular module, the sum of the currents is 42μA. This is made up of 35μA of dc bias and 7μA of RF. It is also interesting to note that they say the exact amount of RF bias may depend upon the material used for the microwave window.

Adding external dc bias to some of my previous experiments seems to result in an improvement in range of about 15%. This is probably as much a result of not using up precious RF energy from the gunn to bias the diode as it is biasing the diode correctly. As I said last month, great cheap fun, although I don't profess to be an expert on the subject at all.

The post

I had an interesting letter from a Scottish amateur regarding a dead Icom rig. A friend of his had an IC240 which was duff, and he confessed to being a computer engineer more than an electronics engineer. It's a bit difficult to repair a rig which you haven't seen that is hundreds of miles away, but several examples I have had to repair have had dodgy joints in and about the synthesizer, so I advised him accordingly. I was very pleased to receive a reply, almost by return of post, saying that he had fixed it. So often I give advice and get no feedback. It's nice to know that, just once or twice, you have scored a hit.

For the book, joints through the board can be bad news; a gentle tap about with the rig on, and a signal up the aerial socket *on a known channel* can work wonders. In this case one of the faults was in fact a poor joint, the other was a totally unsoldered, indeed it never had been soldered, frequency address line.

An obscure problem that I first came across in a 240 is that of coils (IF, VCO, low power Tx etc) going open circuit. The first time this happened to me I thought my sanity had gone. There was no receive, but Tx was OK. I soon found an IF stage with no volts on it, the voltage coming through a coil. I turned it off and checked the coil with the AVO on ohms. Sure enough it was naff, so I whipped it out. I checked it (for some strange reason) when it was out and it appeared OK. After soldering it back in the rotten thing worked! I was sure that the joints to the coil had been OK and it took a couple of other similar sanity shaking repairs before I caught on.

What happens is that the coil proper, ie the wound bit, is wound with ultra fine wire which is terminated onto the pins inside the can by winding the fine wire round it a few times and soldering. This internal joint is the suspect one and now, older and wiser, I deal with open circuit coils by giving each pin of the suspect winding a ten second burst with a hot iron well before even contemplating the coil's removal. This often cures the aggro because the fine wire is self fluxing, and this method seems to make a good joint to the pin without the hassle of getting the can assembly off the board.

Codar

The Codar Radio Company, in Sussex, is no more. It was in its heyday about fifteen to twenty years ago and produced presentable items of amateur radio equipment of fairly simple design. If you had built most of the stuff yourself, you would be justifiably proud of it. Neat little boxes contained such items as Q-multipliers, RF pre-amps, mobile receivers, transmitters etc.

Although long gone as a company, the products live on as a tribute to solid British engineering. I don't think I've ever seen a circuit diagram of any of Codar's stuff, but you don't really need one, the layout is so straightforward. Some of the products are now available ridiculously cheaply on the secondhand market and may be of use to the amateur on a limited budget.

RF pre-amp

This unit contains a single EF183 valve and can pep life into some receivers. If you own a solid-state, state of the art, all bells and whistles receiver, forget this pre-amp. If you have an older valve receiver it's worth a try, and for one of the receivers without any RF stage at all, ie a mixer/IF/detector/audio line-up, they are ideal. Beware, though, because the Codar RF pre-amp was available in two versions: mains powered and unpowered. With the latter variant you had to provide 6.3 volts for the heaters and a couple of hundred volts or so for the HT. This voltage can often be 'robbed' from the host receiver since its requirements are modest. This unit has a tendency to oscillate, especially if run unterminated. To cure, lower the HT voltage. Its secondhand price is £5 to £7.

Q-multiplier

I'll bet there is a generation of amateurs about today which doesn't know what a Q-multiplier is. In the bad old days people couldn't afford such luxuries as crystal filters, and the selectivity of receivers was gained, with the exception of audio filtering, by the IF coils alone. The Q-multiplier was a device that, basically, relied on an RF amplifier about to break into oscillation. In this condition the resonating coil will exhibit high Q, with consequential narrow selectivity.

The Codar Q-multiplier was only designed for 455-ish kHz, so while ideal for HROs and the like, forget it for anything with an 'odd' IF – viz RA1s and similar. It was quite popular at one time to sharpen up KW2000s on CW. It can be very difficult to connect up, and hell to use (going great guns then suddenly, plop, the damn thing breaks into oscillation and all is lost, often to the accompaniment of howls and screeches), but in their day an economical solution to a difficult problem. Nowadays, again, it can be obtained secondhand for about £5 to £7. Only for masochists.

The AT5 transmitter

Smashing! I can remember as a kid dreaming of owning one. In those days rigs were so big and heavy they could cover a table, and most receivers were bigger than today's transceivers. Codar used to advertise their AT5 transmitter as having a base area half the size of a magazine page, and in those days magazines were smaller than today. Measuring in at 8½ × 5 × 4 inches, and capable of 10+ watts out on 160 and 80 metres AM and CW, they were the business. The bad news was that there was no internal power supply.

Two Codar power supplies were available, a mains one and a 12 volt inverter one. The latter had a tendency to burn out, normally destroying the inverter transformer, which was not a good thing. Remember that you are going to need some form of switching – both aerial change over and 'net' (ie VFO only), 'receive' and 'transmit' – if you are providing your own power supply.

On the subject of power supply, the heaters can be configured for 12 or 6 volts. The power comes into the AT5 via a

B9A plug, and these can be difficult to get hold of at times.

Quite a lot of these rigs were used by naughty people to transmit on the medium wave, and it amazes me that ten plus years after the medium wave pirate craze, at last year's Shuttleworth amateur radio car boot sale they were still surfacing modified to transmit between about one and one and a half megs.

It is no sweat at all to convert them back; normally all that has happened is that the naughty brigade have added capacitors of about 150pF across the VFO, driver and PA coils to tune them down. Snip these capacitors out and it's back to normal, legal operation.

The switch on the back, normally unlabelled, selects CW or AM. Normally this is CW with the slider towards the aerial socket and AM with the slider towards the PSU socket. The big red neon light on the front panel should flash on mod peaks, and is a useful reminder that you have left it in the wrong position. Mikes for this rig should be one of the high impedance crystal types.

A rig that suddenly fails to work has succumbed to the famous AT5 failing of falling out with its VFO valve. This is an EF80, and merely changing it for another example will get it going again. Remember that this dear sweet little rig runs on hundreds of volts and can KILL. Be careful when working inside all valve rigs.

For some reason there is a great demand for these transmitters just now, in fact several recent magazines have even carried 'wanted' adverts. I cannot explain the resurgence in their popularity, but I can give a guide to prices. £15 to £25 will get you a basic transmitter, £30 maximum should get you one with a power supply and, incredibly, I saw one go for £35 with mains and mobile power supplies, switching and harnesses etc. Quite honestly they are of limited value mobile, being big and devouring amps, and AM is all but dead on 160 and 80 metres. However, it's great fun playing with a real valve rig on low power CW. I quite enjoyed using the ex-medium wave one I bought.

T28 receiver

This is a little 12 volt 160 and 80 metre transistorised receiver. Prices seem all over the place for these now, from about £8 to over £20. Never seen a dead one yet, although I've come across some disgustingly filthy ones. Not superbly sensitive, but something to play with.

CR70A receiver

This is a very basic superhet, covering 560kHz to 30MHz. I've had a few letters about the valve line up, so for the record it's ECH81 mixer/oscillator, EF183 IF amplifier, solid-state diode detector. ECC81 first audio and BFO and ECC81 audio output. The rectifier is an EZ80. Drifts like a pig, almost unusable on 20 metres and above on SSB unless an OA1 has been used to stabilise the HT supply to the local oscillator.

The lack of an RF stage makes this an ideal recipient of the RF pre-amp above. The BFO is switched (the actual switch is CW/SSB, then AM, then standby). Since it covers ranges where you would expect to find LSB (below about 10MHz) and USB (above 10MHz) the fact that the BFO is fixed will tell you much about the width of the one IF stage. Also, the receiver suffers badly from second channel, especially above about 12MHz or so (again the pre-amp or an ATU will help). Although only suitable for beginners on a restricted budget, they nevertheless seem to fetch a price well above what I think they are worth. Originally selling for about £20 when new, they still fetch £20 to £25 today, and the number of letters I've had that mention them shows that there are still a number in use.

Common faults are failing valve emissions, no capacity mains smoothing capacitors, and shorted turns on the big, open framed aerial input coil. If this coil is damaged it's fairly easy to straighten out by pushing a scalpel between adjacent turns. One shorted turn here can reduce the set's gain from its normal bad to appalling.