

be commanded by the University of Surrey, AMSAT command station and two weeks after launch, the ARRL will take over control from AMSAT

Up to date information on the satellite programme can be obtained from the UK net at 1015 local on Sunday mornings on 3780 kHz and from the Sunday evening VHF net on 144.28 MHz at 1930 local. G8CSI (New Malden, Surrey) is MC of the 2m. net and your scribe is usually on too.

### Two Metre Band Plan

In the February feature, your scribe made some comments on the use of the 2m. band and suggested adherence to the band plan. One new reader, Ken Osborne, G8KSS (Bristol) wrote at length on this. He said; "Whilst you have the right to your opinion, which I fully respect, I feel you are wrong to try and force it upon people, especially through a magazine." Well, it is not G3FPK's band plan, is it? It was painstakingly agreed after long discussion by delegates from many IARU Region 1 countries. It was formulated as the best compromise between the various interests and modes. Ken continued; "I have worked 300-plus SSB stations on 2m. with my AM, only two of them refusing to work me. That I think, speaks for itself."

Ken suggests that SSB operators do not tune above 144.50 MHz because of lack of activity there or because some of the commercial rigs cannot tune above 144.33 MHz. He wrote; "I feel it only fair that if they don't come to me, I go to them, but I do so with one thought uppermost in my mind; not to cause unnecessary QRM." On the subject of high power he stated; "Lots of SSB people I hear on 2m. are only interested in DX and usually they are running high power. I still get through with my low power so why run high power?"

To sum up, and having heard G8KSS on AM in the SSB part of 2m. during the 144 MHz Open Contest, one can only conclude that Ken feels the band plan should be waived in his case to increase his number of contacts. If all AM stations followed this example, those of us who get our enjoyment from trying to work *real* DX under adverse or marginal conditions

would have their pleasure ruined. No doubt some readers may wish to comment on the foregoing.

### Twenty-Three Centimetres

G3DAH (Herne Bay) has been busy with building SSB gear for the band having dismantled the CW/FM TX. On the bench, Mike has 25 watts of A3j and is now " . . . tarding it up in cabinets," as he puts it. G8MWR (Coventry) during a recent QSO with your conductor, mentioned that there are some twenty "local" stations interested in 23 cm. operation. Glen referred to G8AIM, G8KYH, G8MD1, G8MFP, G8M1A and himself using it initially as a natter band with simple gear to start with. He has 8 watts of FM from a *varactor* tripler and the "MWR" part of the call indicates the main interest, Micro-Wave Radio.

### Seventy Centimetres

G3CHN passed along the good news that EA1CR in XD square is now fully operational on 70 cm. During the very fine conditions over the weekend March 5/6, it seems that G8AGU (Devon) was working into the Pyrénées so it will

be very interesting to learn if any U.K. station has already contacted EA1CR on this band. G3POI says that F9FT, of *Tonna* aerials fame, has worked EA and in a QSO with your scribe, ON5NY (BK05d) said he is QRV with a 22-ele. aerial.

Writing before the recent spell of good conditions, Alan Scott, G4BYP, (Liverpool) reported fruitless evenings calling "CQ" on SSB. Most of his QSO's have been as a result of a QSY from 2m. G4DGU (Oxon) is now back on the band and G4CMV (Leeds) should be on by the time this appears. From Coventry, Glen Ross, G8MWR, mentioned he has 12 watts of FM available.

Graham Membury, G8DJW, from Dorchester, informs of a fair bit of activity in Dorset. In addition to himself, G8HVY and G8LKP are on from Weymouth, G8BBN from Bournemouth, G3OBD from Poole, G4FAZ from Radipole Spa and G3VPF with SSB from Weymouth. Graham says he is the only Dorchester station at present with SSB on both 2m. and 70 cm.

### Two Metres

Up till the very end of February,

THREE BAND ANNUAL VHF TABLE  
January to December 1977

Station	FOUR METRES		TWO METRES		70 CENTIMETRES		TOTAL Points
	Counties	Countries	Counties	Countries	Counties	Countries	
G8HQJ	—	—	56	14	21	8	99
G3FIJ	20	1	43	9	5	1	79
G8GML	—	—	52	8	14	4	78
G4FOR	—	—	56	11	7	2	76
G4CMV	—	—	62	12	—	—	74
G3FPK	—	—	55	11	—	—	66
G3OHC	7	1	39	8	3	2	60
G8JHX	—	—	50	10	—	—	60
G4FCD	—	—	51	7	—	—	58
GM4CXP	6	2	34	6	1	1	50
G4BYP	—	—	30	4	7	4	45
G4DEZ	—	—	35	5	—	—	40
G8ITS	—	—	35	5	—	—	40
G4ERX	—	—	26	6	—	—	32
G8KSS	—	—	28	3	—	—	31
GD2HDZ	1	1	4	2	6	2	16

the persistent succession of depressions sweeping in from the west had resulted in generally mediocre conditions. From Nottingham, *s.w.I.* Glen Sweeney heard only relatively local stations and expressed regret at the lack of CW activity apart from Monday nights. Colin Chilton is another listener from Nottingham. Since April 1 last year, he has heard 48 counties and 8 countries with a pre-amp, converter and *FR-50B* set up with a rotatable 7-*ele.* Yagi. Ray Elliott, *G4ERX* (Brentwood, Essex) has TVI troubles and found things generally quiet. He wonders if we could publish a list of repeaters and beacons in the U.K. and Europe as they are useful indicators to propagation. Such lists do exist but it is difficult to obtain accurate beacon details since many of the beacon keepers appear reluctant to keep *IARU* informed as to status. It is suggested readers compile their own lists from the details given in this feature each month.

Dr. Peter Skolar, *G4EYV*, is a new correspondent from North London who has been licensed since April 1976. He went straight for the Class "A" ticket and has been *QRV* on 2m. with a *TS-700* and *Magnum* amplifier since last November. The aerial is an 8-over-8 slot fed device, 50ft. a.g.l. Writing before the contest weekend, Derrick Dance, *GM4CXP* (Borders) confesses to the "ultimate sin"—he went on to the HF bands! Most of his activity was weak signal CW into the Midlands and Home Counties. He has just acquired a *Yaesu* FT-221R multi-mode transceiver and has been dabbling in AM and FM as well as SSB.

### Two Metre Open Contest

For once, the legendary Murphy was dumbfounded since, for the period of the contest over the March 5/6 weekend, the conditions were excellent in an arc from east through south and at least 16 countries were worked by U.K. participants, *via*; DL, DM, EA, EI, F, G, GD, GI, GJ, GM, GU, GW, HB9, OE, ON and PA. There were rumours of at least one Italian station being about. The Welsh and Irish stations seemed to be enjoying some super ducting into the low countries and Germany. Several Welsh portables worked literally *hundreds* of continentals.

When the buzzer went—literally!—*GW8BiH/P* on Beacon Hill, Powys, was into the 800th QSO.

There was a high level of activity from the south of France, right down to the Pyrénées. *81WD/P*, operating from Hardy's Monument in Dorset, had a 20 minute QSO with *EA1CR* and confirms the fine propagation to the south. On a somewhat sourer note, operators *G8DJW* and *G8LKP* were appalled at the bad manners of some of the DL and U.K. stations whilst they were doing their best to sort out the pile-ups by calling specific stations.

*G3FPK* heard *G8KOM/P* saying they had worked into DM as well as *OE2CAL* (*GH16c*). An outstandingly consistent signal was *F2QZ/P* in *DI47f*, well into the 900 serial numbers with a couple of hours to go. At *G3FPK*, more listening than transmitting was done, the event being used to seek new QTH squares, counties and countries. This resulted in one new square, thanks to *DA1AA/P* in *EK50c*. Towards the end of the contest, signals from the north and Scotland were much better.

Many operators anxious to work the rare XJ square were asking, "Where is *G4ASR/P*?" David eventually got going about two hours before the end. He told your conductor afterwards that since his previous visit, the farmer, whose field he had permission to use, had gone bankrupt. Not wishing to upset anyone, he got permission from another farmer to use one of his fields. Unfortunately, it was waterlogged and David's car was stuck in the mud for four hours and had to be pulled out by tractor. When he did come on, he was standing in five inches of mud in his "wellies!" The gear used was a *Yaesu* FTdx560, *Europa* transverter and a *Datong* RF clipper. Single handed, he could not manage to put up the two *Quads* so made do with one at 16ft. He made 70 contacts into England and the continent during his brief period of contest working. There's dedication for you!

Summing up then, everyone should have got a lot of satisfaction from this contest after so many months with no really good lifts. Inevitably there were some sub-standard signals. In most cases,

when the offenders were told, they investigated the problem. Perhaps it is high time an extra number was introduced into the serial number in telephony contests, to indicate modulation quality. There is an RSM system, after all. If people gave honest reports, then the judges would be able to pick out those stations which were frequently given poor quality reports. The number could range from 1, indicating a really foul signal, through to 5, meaning a perfectly acceptable signal, free from noticeable distortion and narrow in bandwidth. This would bring the reporting system into line with that for CW where tone reports are given.

### Other News in Brief

To commemorate the Queen's Silver Jubilee. The Home Office has sanctioned the use of the prefix "GE" for *all* the U.K. *e.g.* *GE4CXP*, *GE3FPK*, etc., completely baffling everyone as to country status. This concession is entirely voluntary and *only* applies between 0001 on June 4 and 2359 on June 12. The Lord have mercy on the QSL bureau! The 70 cm. Brighton repeater on RB6 started up on Feb. 12. Details from *G8HVV* (*QTHR* 1977 Call-book). The 31 Phase 2 UHF repeaters are expected to be licensed on April 7 including the Charing Hill, Kent, one *GB3CK*, now to be on RB14.

*Contests*: The 4m. Open event is on April 3 from 0900-1700 GMT and the 2m. CW affair is on April 24.

Readers visiting Cornwall are invited to meet Newquay and District ARS members at the Treviglas School in Newquay. The club meets on alternate Wednesdays at 7.30 p.m. First April meeting is on the 13th.

### Deadlines

Please send all your comments, claims, etc. for the May issue by April 6—note the earlier date due to Easter. For the June issue, the date is May 6. And how about some more mod. details for the *Liner 2 Clinic* series? Everything to:—"VHF Bands," *SHORT WAVE MAGAZINE*, 34 High Street, WELWYN, Herts., AL6 9EQ. 73 *de* *G3FPK*.

## RFI

E. P. ESSERY, G3KFE

**R**FI—Radio Frequency Interference—is becoming daily a bigger threat to our occupancy of the bands, bigger even than ITU frequency allocations; after all, what is the use of having bands to use if they are going to be rendered untenable by the local noise level at the receiver? Lucky indeed the chap who has the advantage of an electrically quiet site for his station, and can keep it that way. For the rest of us, it is a matter of “Doing our Best” just like the Scouts.

Perhaps the time is ripe for some few comments on the subject, so here goes. Firstly, before we go into a muck-sweat over our local local noise-level, it would be as well to try and see what “the form” is like. The important initial step is to try and define what we are talking about, which is: Interfering signal coming out of the loudspeaker which are man-made and not the product purely of having two genuine amateur stations so close to each other that we can’t separate them. Thus, we can include in our list images, receiver overload effects, crackles and bangs from local electrical equipment, and equally we are, for the moment, neglecting natural effects such as fading, rain static, and so on.

As always with such cases, it is well to have one’s own house in order! And, we may add, if a few hours of work on rig and aerials makes a very marked change in the “local QRM” situation, leaving you feeling all red-faced and foolish, don’t let it worry you; thousands of amateurs have had this situation happen to them, and it will go on like this until the day when there is no more amateur radio.

However, before you even think about the station, think about the various electrical items around the house, and the house wiring, both light and power. If the house wiring itself is a bit dicky, the flexes worn and frayed, plug-tops run warm, and so on, start right in there. Even if they aren’t causing any interference, you will have made a big improvement in the *safety* of the electrical gear around the house. Incidentally, never, ever, take the lid off a plug-top without first reaching for a small screwdriver and: checking that all three terminals are making contact with the wires, that the screws trapping the wires are tight, that the fuses are of the right type and rating and that the wires are connected to their proper pins. Green, or yellow-green, depending on the age of “the beast” goes to the earth pin, red or brown likewise to the live pin—which is the one marked L or alternatively the one through which the fused connection is taken. That leaves you either blue or black for the Neutral, or line, connection. While you are about it, *don’t* forget the rig and the test gear. If you guess that last sentence had something to do with personal experience you’d be, as our Aussie friends would say, “too damn right, cobber!” For the record, it came about thuswise: Junior op. has a problem with his bedroom TV, which doesn’t want to lock on frame. Go and look, see revolting mess on screen, and reach for box of tools, multi-range meter, and trusted double-beam oscilloscope, not to mention wide-range signal generator in the form of an electronic calculator. As always, the most important part of the service sheet is the table of voltages

which one has marked up to the readings actually measured with *my* meter *and* this TV. Seems to be largely OK; no voltages far enough away to justify throwing away energy carting umpteen valves to the valve-tester, and then going to the bother of trying them all, sorting them, and putting the good ones back all in their proper sockets—if you, say, mix-up the IF bottles, even though you put all the same set of valves back in the set, you will almost certainly find some deviations. That may be O.K. on the neighbour’s TV, and he probably wouldn’t notice, but this harmonic seems to make a “thing” of watching the test-card pattern! Anyway, the main thing was that things looked to be, by the large, pretty fair, so the next step was the oscilloscope, as normally, using the 10 : 1 probe to make the connection between the ‘scope and the TV. Looking at video waveform which seems just fine, and then pulled the end of the long extension lead to which both ‘scope *and* TV were connected for their mains supply—and the TV set nearly went berserk! Pulled the ‘scope mains plug out, and it all calmed down again; and just as we were re-connecting the scope’s mains-plug to the adaptor—as it happened, the orientation was such that the mains lead was rising vertically from the plug and so we could look straight down, through the cable-entry, and observe, faintly, a blue glow inside. Immediately, we opened up that plug, and we found 1. That the earth lead screw was a bit slack; 2. The blue glow was caused by the current trying to get from the fuse-holder clip to the fuse, and out again the other end; and 3. When we took all the leads off so as to completely rectify the situation, it was found that in the connecting of the “live” connection, the PVC sheath of the wire had been pushed too far into the hole, and so the screw, before it could start even thinking of connecting, had to bore it’s way through the red PVC! Now, all the above is true, and it should be noted that the writer is very much conditioned to safety by his design responsibility for a power-supply project that delivers up to 35 kilovolts at a large number of milliamps DC; and of course he is not “just an amateur” but a professional electronics engineer. In other words, if the writer can “fall in,” so can you!

So; we might already have disposed of weeks of work, especially if yours is an old house and/or if the wiring is in the plaster and not protected by conduit. But, let us for the moment take it as having been done. Now, back to the station. Switch the receiver on, and short the aerial terminals to the earth ones. Wind all the gains on the maximum; hopefully, no “noises off.” Now, switch on each item of test gear, the rig, and everything else in the station, one by one until *everything* is on; you may have to get some help to key the rig on to an internal dummy load if your rig (which includes most) won’t stand being left sending a long dash for ten minutes or so. Anyhow, everything in the shack is now on; and if anything is thermostatically controlled (electric fire, dimmer switches, crystal oven, or whatever), make it to cut in and cut out again. Make a note of every item which causes problems; and we hope there aren’t any!

Now you can cut back down to just the receiver, and start the same sort of play with everything electrical in the house, stressing all the time that if an item has a thermostat, check it and be certain. Most folk have, for example, electric blanket, electric kettle, central-heating

whatever the prime source of the heat, we will be ready to lay a small bet the *control* will be electrical!), the pump in the case of small-bore and micro-bore heating systems, by switching it on and off, the anti-QRM capacitor fitted to some types of pump which, comically enough, can kick up a fiendish electrical noise if its fixings come slack; any electric fires, whether or no they have thermostats, but checking the latter if there is one; electric lights, both of the fluorescent-tube type or the ordinary hot-filament ones; washing-machines, both as to timers and as to heaters, both with extra great care because of the *usage* they get; the spin-drier; and so on.

By now, it is to be hoped that your receiver is quite satisfactorily quiet, and it is a fair bet the XYL will be wondering at the reason for this sudden outburst of enthusiasm! But, you will now know that your station receiver is clear of noise either mains-borne or picked up on the station wiring and you will also have the peace of mind from knowing all the electrical goods are checked and are both quiet *and* safe. The next move is not quite so simple insofar as it very largely depends on you, your attitude to your hobby, and your neighbour's attitude to you and yours! You see, in general, this type of mains-generated interference is pretty local in its effect, and so get your aerial up in the clear and out of the way of the noise generators, bring the signal to and from the aerial by way of screened feeders such as coaxial or "triaxial" which prevent the noise getting on to the signal on the way between aerial and shack.

Perhaps the easiest way to attack this part of the exercise is to take a length of coaxial long enough to connect to one's aerial, and plug it into a tin box fitted with a suitable resistor of 50 to 75 ohms and a connector, and hoist the tin, with feeder plugged in up in to the place where the aerial-feeder connection would be were there an aerial for it to connect to. In this connection, it would be as well to check very, very carefully, the condition of the feeder, the more so if it has been aloft before. When the writer last had his coaxial cable down, and it was inspected, it was found that even though protected by PVC insulation tape as well as we had thought it would need, when unwrapped, the two aluminium-based Belling-Lee coaxial connectors had both rotted away to powder, which we can only assume to have been a combination of slight ingress of moisture coupled with the occasional draught of air from the chimney—any ex-Navy type will tell you how corrosive funnel-gases are, and the output of central-heating boilers is in the same class! Likewise, check for any signs of abrasion in the outer PVC sheath of the cable, right along its length. If you *must* join two or more pieces of cable, don't forget the ever-present risk of corrosion due to the presence of dissimilar metals, and avoid any problems by slathering the whole assembly of two connectors and, maybe, back-to-back adaptor with one of the silicone-rubber compounds available these days at most garages—the clue that you have the right stuff is that somewhere the name mentions silicone rubber, or the letters RTV, and invariably there is a statement that the stuff gives off acetic acid fumes in "curing" or setting. *Hermetite* do a black one, and the writer has also seen and used at one time and another the same stuff in white and "clear" forms always direct from a tube, like toothpaste. This stuff, slathered all over the

connectors until there is no chance of water getting in, and then left for 48 hours to fully cure before hoisting, should stop any more corrosion problems. However, there is one more thing to be noted, which is that in bright sunlight the older "surplus" coaxial cables suffer from a tendency for the plasticiser to leach out of the sheath, which results in corrosion of the coaxial braid, and a higher loss of power in the feeder.

Anyhow, now you should have the feeder up in the final place and no significant noise entering. Your last step is to reconnect the aerials proper, check that the SWR reaches minimum at the middle of the band, and you can say, with some confidence, that you cannot fault the aerial system. You *can* say that—but it wouldn't be true! Before you can warrant that the coax hasn't turned into part of the aerial from the QRM pick-up point of view, you must have a balun at the top of any "balanced" or centre-fed, aerial; and if you have one, you must get it down and check that it is "all ship-shape and Bristol fashion" because most of the ones your scribe has seen make use of dissimilar metals, which are prone to electrolytic corrosion, to the point where in a wind it is not impossible that the balun is making more noise than anything else! The answer is either a good clean-up and remake of all the connections, plus the silicone-rubber treatment already outlined, or, if in doubt, scrap and replace it. There are some handy home-brew baluns about—see Fig. 1 for a simply-made coaxial-cable one due, the writer believes, to W6SAI, which is very easy and also broadband, so that it may be

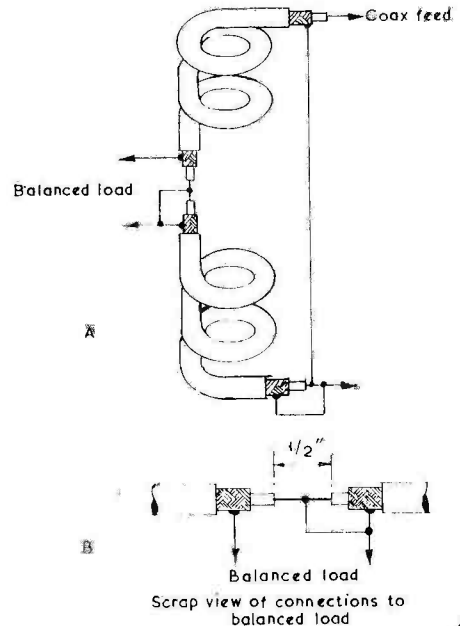


Fig.1 SIMPLE 1:1 BALUN

Wind a length of solid dielectric cable 16ft. 6in. long into a nine-turn coil, first making the centre as shown in "B" and covering with waterproof PVC tape; where the drawing shows "coaxial feed" a suitable coaxial connector should be fitted, to mate with the one on the feeder. Use RG58A/U or UK equivalent for 50-ohm impedance, RG59A/U or UK equivalent for 72-ohm impedance (solid-polythene dielectric).

used between 7-30 MHz. At Fig. 2 is another one, this time having a step-up ratio of four to one.

Now, we have done a lot of talking about finding what is making the din; what do we have to *do* about it? It is often—and truly—said that interference of this sort should be cured at source; we all know it is no good using a low-pass filter if the transmitter is kicking the RF out down the key-leads or the anode meter, and the principle is largely similar here.

However, never forget you are dealing with mains voltages which are *lethal*; so make absolutely certain that your "fix" is as safe as it can be. This writer's own policy is to make as good a job of it as he can, and then ask a professional engineer friend of his to look at the work to see if it can be done better; if there is any doubt, we discuss it in depth before we finalise anything. The point of course is that we can all make a silly mistake (or mistakes!) and miss it in checking.

If you can, suppression gadgets should be fitted inside the machine's housing; capacitors alone may be sufficient, but chokes also may be required, to make, as it were a pi-net in each of the legs of the mains. It *may* be that a good mains filter fitted at the receiver is sufficient; and in any case the shack mains should be filtered in case of the risk of TVI from mains-lead radiation. Winding several turns of the mains lead round a suitable toroid ferrite (*à la* TVI braid-breaker practice) will do the trick in many cases. Thermostats which are noisy should be stripped and any rectification necessary done—they usually are O.K. when new but noisy through arcing after a year or so, in which case proper treatment of the contacts with a fine file, or replacement, may do the trick. Bonding things to earth is worth a try—chain-link fences have been known to play up like this! However, all capacitors used should be either rates for AC mains use, or *at least* 1000 volts DC; and it should be quite impossible to touch any live parts, even if the case of the filter is dented (and that alone rules out the humble tobacco-tin where mains are connected!).

### Take it from Here

Sorry about that heading, but it is so apt! Now you have rid yourself of so much local noise, or at least identified it and done as much as you can about it, you can start thinking about unwanted signals reaching the receiver. In the course of the tests we have already done, we have eliminated pick-up on the receiver mains wiring, and on the receiver's own internal wiring. Now we have the problem of the big signals hitting the nice quiet aerial system; big signals, that is, which we don't want to listen to!

Any receiver of the superhet type will inevitably have some spurious responses. In the case of a general-coverage receiver with its input-end shorted, these will appear whenever a harmonic of the BFO or carrier-injection oscillator beats with the first—and/or second, in the case of a double-superhet—local oscillator feeding the mixer; these will of course occur at predictable spots, and you can work out a few for yourself; calculate the BFO harmonic frequencies up the band, consider what the local oscillator frequency must be (the same, of course!) and, knowing the receiver IF, subtraction of the IF from the calculated oscillator frequency will give the dial reading at which such a spurious may crop up. An amateur-bands-only receiver shouldn't show many such

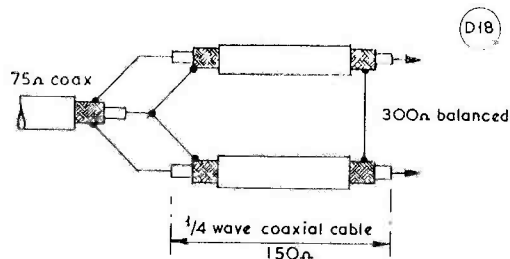


Fig. 2A SIMPLE 4:1 BALUN

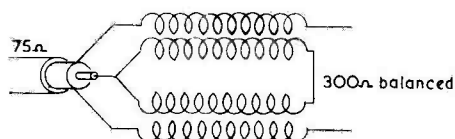


Fig. 2B BALUN 'COILS' DERIVED FROM 2A

(a) Simple 4:1 Balun; a quarter-wave of cable, connected in series at one end and in parallel at the other, to effect the impedance transformation.

(b) As the circuit of Fig. 2(a) is large physically, it is turned into the circuit of Fig. 2(b); the 150-ohm lines are made longer than  $\lambda/4$  at the lowest frequency desired, and then coiled up. Properly made, such a balun may be made to show 4:1 balun properties over a 4:1 frequency range. An example of the type of thing is the G3HJP design.

beats if the second (or only in a single-conversion job) IF is reasonably high; if you have an older double superhet such as the Eddystone 888, with a low second IF, you are going to have possible beats aplenty in the bands, and the quality of the original engineering will show whether these are acceptable in normal use; the more modern box featuring crystal control of the first local oscillator and a tunable IF should have very few beats anyway if the calculations were done properly, as they will have been engineered to fall outside the amateur bands.

About all you can do with them is to tune each band with a well-warmed receiver, and note and log the places where they lie within our bands, and pray they are not too big! Incidentally, when a receiver spec says "internal spuri below the equivalent of 1 microvolt at the input" that sounds pretty small—but a modern receiver giving, say, 10 dB signal-noise ratio on 0.25 microvolt is going to make them seem pretty potent!

The second area where problems can arise, is in the IF, and its ability or otherwise to reject adjacent amateur signals; this is one where you get what you pay for in a sense, and a SSB transceiver used on CW without a CW filter in the IF is going to need very careful driving indeed, because the selectivity you can add will be at audio, which is really far too late in the chain. If you have an older, single-crystal receiver, such as the HRO, AR88, or similar types—one thinks of the Eddystone S640 in the same bracket—and one wants SSB, it is worth considering putting a half-lattice crystal filter in (the wartime RSGB Handbook had some useful thoughts on the subject) or going the other way and using a mechanical filter provided one is available for your IF.

A third area, fortunately not too common, is the presence of *untunable* QRM; the Minimitter receiver the

writer once had in his shack displayed the effect very badly on Top Band—the cause being leakage in to the receiver at the IF of unwanted signal, which in this particular case was supposed to be removed by a front-end trap. Another receiver the writer recalls which had this problem due to leakage of the offending signal in to the receiver by pick-up on a front-panel shaft and straight in to the IF. Curing one of these can be a bit of a brute.

A fourth problem due to the receiver is for it to have an excess of gain, coupled with a bad gain distribution along the receiver; essentially, the ideal is to have *all* the gain behind the filter, so that at no time does a signal reach any of the mixer stages (in particular) in large enough amount to cause that mixer to go away from its proper operating conditions. In other words, nothing should be allowed to hit the mixer other than the wanted signal and the correct local oscillator voltage, in the correct proportions. Obviously, at the present state of the receiver art this is patently impossible at an economic price, and all but impossible anyway! The effect, if it is present, can be best demonstrated by tuning the receiver to, say Forty, and putting on a good aerial. A quick tune round will show the band to be full of just noise; now go down to around 7010 kHz or lower still, and wind up to full audio, BFO on, and some back on the RF gain. If your receiver shows the effect (it will!) then you will find that as you back off the gain control at RF, there will come a point at which the noise drops, almost suddenly, down, and quite a few CW signals become audible, which were not audible before. This says that the noise was due to receiver overload noise swamping the audio with so much mush that the signal has just disappeared below the noise. If you have “separates,”

you could build an attenuator, such as the one diagrammed, which has been pretty well “lifted” from recent years of the ARRL Handbook. However, if you are transceive, then you either have to live with it by the careful use of the RF Gain control, or you have to build in a PIN diode attenuator, plus the necessary pot with which to control the thing.

### Conclusions

What we have been talking about is an activity which was, before the War, probably unheard of and quite unnecessary in most amateur stations. Now, it is a commonplace situation—how many of you, for example are suffering from TV line timebase problems when listening on 14 MHz and below, let alone all the other noises? And, recalling that domestic electrical gear, wonderful though it is, is built down to a price—a price which does not allow long-term environmental testing, and which is not to any significant degree required by U.K. legislation or British Standards, at least in the area of RFI. Thus we have a situation in which we radio amateurs are going to have to combat incoming interference or give up operating; just think how every house is sprouting electrical gadgets, thyristor dimmers for the lights to please milady, thyristor speed controls for the OM's electric drill, the fridge, the freezer, the central heating system (at least three thermostats there!) and so on ad infinitum. We amateurs could turn a blind eye to the TV problem by operating out of hours, or on bands where no TVI was caused; but make no mistake, in a few years the level of RF pollution by faulty domestic and industrial equipments will be such that amateur radio at least on the HF bands will be impossible, unless we are prepared to set about the problem of tracking down the problems and curing them.

## THE MONTH WITH THE CLUBS

By “Club Secretary”

(Deadline for May issue: April 6)

**B**Y the time this comes to be read, winter will be, very definitely, on its way out; but at the moment of writing, winter is equally definitely still with us—and that hardly encourages your scribe to go outside and field the down-lead of his long-wire, which is slatting quite merrily in the breeze as a novel addition to the usual noises of high winds. However, it brought with it the thought that, like aerials, clubs need maintenance if they are to function properly; and most of that maintenance can and should be done at the Annual General Meeting. Just as any committee member who expects to get every member to become “involved” in a club activity is being rather dense, to put it mildly, so also the club member who fails to both turn up and vote at the group's AGM is also being dense, in that there must be feedback between the Top Table and the members and the AGM is precisely the point at which the feedback is executive; if you don't like the Hon. Sec's work, or the things he does for the club, you vote against him and for a different candidate of whose ideas you approve. So simple, and, on the surface, so ineffective

—but if you doubt how effective it is, take a copy of SHORT WAVE MAGAZINE, say, March 1977, and compare it with the first post-war issue. Readers of that age will probably admit to having thought there had been little or no change in the style and format; but when 1947 and 1977 are compared, all the little changes clearly have wreaked in total an enormous change. Not to change is to die, and make no mistake about it.

### New Club

There is a proposal to try and form a new club in **Widnes** so if anyone in that area is interested will they please contact Mr. B. Parsons, 33 Baguley Avenue, Halebank, Widnes WA8 8UY, either by letter or by telephoning (after 9.30 o'clock, please) 051-424 4011. Mr. Parsons says he knows little enough of Amateur radio and little about running a club, so in addition, we hope to hear that local club secretaries drop him a line or talk to him over the phone about the “progressing” of a club from one AGM to the next. For ourselves, all we can add is that we sincerely hope this is yet another group to get off the ground and become a success.

### Newsletters

Many a group runs one of these, as we know from reading them each month; but it is also true that an over-ambitious Newsletter usually falls by the wayside. One



of the ways to beat this problem is for clubs to have a common newsletter between *several* groups, which gives the editor a wider readership on the one hand, and could enable a better costing in these times of high paper and postage costs. One group who are thinking along these lines are *Harlow, Bishops Stortford, and Cheshunt*, and at the time of writing a draft first issue is circulating for member comment. We hope this one succeeds too.

### The Mail

Almost all of it landed on your scribe's mat in one great wodge, and so we are going to "take it from there" straight down the pile.

**Shefford** lead the troops, and their letter-head says that Hq. is at the Church Hall, Amphil Road, Shefford, and the normal arrangement to foregether there every Thursday. However April 7 is a "no meeting" date, followed by 14th when G4BEL will give a talk on the 23, 13 and 9 centimetre bands; on April 21 the stage is G4BBA's, and his topic will be, mainly, WARC in 1979 and its implications to the average amateur, plus no doubt some talk about RSGB, and lots of questions on both topics—sometimes a bind to the speaker when he gets a question he finds it hard to answer, but a sure sign of a relaxed speaker and an attentive audience. That leaves 28th, and on this evening, G8HHO will be showing some films.

Over to **Worcester** and their private room in the Old Pheasant, New Street, Worcester: Monday, April 4 is the Annual Construction Contest, and on April 16 G8IDK will talk about the question of Safety in the Shack. Looking a little way ahead in their programme, we note they have a Magazine Evening in *May 66!*

**Nottingham** have had quite a lot of publicity locally, which can't be bad, and now they are taking part in a

ninety-minute programme on Radio Trent on April 20 at 2000 hours. Returning to the programme—they forget to mention it, and who can blame them if they are a little excited at the prospect of the Radio Trent outing? However, we know they have a place at Sherwood Community Association, Woodthorpe House, Mansfield Road once weekly; and other details can be obtained by getting in touch with the Hon. Sec.—see Panel.

At **Cray Valley** they seem to be outgrowing their Hq. room—ninety-odd attendances seem to make for some cramped feelings! The situation at the time of writing is that they are booked on the first and third Thursdays of each month, at Eltham United Reformed Church Hall, 1 Court Road, London S.E.9.

First and third Wednesdays are the ones for the gang at **Surrey**; in April the meeting on 6th is the AGM, and Presentation, while on 20th there will be some Morse and a discussion on the Club station. The venue is at T.S. Terra Nova, 34 The Waldrons.

GW3IGG indicates that he is still Hon. Sec. of **BARTG** by pointing out that anyone who would like a talk on RTTY should get into contact with him, when he will try and fix up a speaker for them. He also gives an Advance Notice of the BARTG Annual Convention, in the Village Hall, Meopham, Kent on May 21—all the usual attractions and all trains arriving at Meopham station up till 13.15 will be met by a car.

**Cheltenham (RSGB)** are booked in on the first Thursday in each month at the Old Bakery, Chester Walk; the April 7 date is at the time of writing still not all settled, but it is very rare for this group to not have something of interest for the visitor.

A special interest for the **Horndean** crowd comes up on April 14; Ron Ham will be talking about the "Hissing Phenomenon," at HMS Mercury, Leydene. However,

### Names and Addresses of Club Secretaries reporting in this issue:

ACTON, BRENTFORD & CHISWICK: W. G. Dyer, G3GEH, 188 Gunnersbury Avenue, Acton, London W3 8LB.  
 ADDISCOMBE: P. J. Hart, G3SJK, 42 Gravel Hill, Croydon, Surrey CR0 5BD.  
 BARKING: N. Dowsett, 44 St. Annes, Barking, Essex. (01-594 6584.)  
 BARTG: J. P. G. Jones, GW3IGG, Heywood, 40 Lower Quay Road, Hook, Haverfordwest, Dyfed SA62 4LR.  
 BOURNEMOUTH (Wessex ARG): G. D. Cole, G4EMN, 6 St. Anthonys Road, Bournemouth (20127), BH2 6PD.  
 BRISTOL CITY RSGB: B. L. Goddard, G4FRG, 2 Greenfield Portishead, BS20 8NQ. (Bristol 848140.)  
 CHELTENHAM RSGB: G. D. Lively, G3KII, 26 Priors Road, Cheltenham (34785), Glos.  
 COLCHESTER: T. A. Mills, G3YAI, 75 Lymington Avenue, Clacton-on-Sea, Essex CO15 4PL.  
 CORNISH: S. Halliard, G4EIS, Studio 12, Rosewall Terrace, St. Ives (5576), Cornwall.  
 CRAY VALLEY: J. M. B. Tripp, G3YWO, 57 Cathcart Drive, Orpington (38199), Kent.  
 ECHELFORD: R. S. Hewes, G3TDR, 24 Brightside Avenue, Laleham, Staines, Middx.  
 HEREFORD: S. Jesson, G4CNY, 181 Kings Acre Road, Hereford (3237).  
 HORNDEAN: S. Jenkins, G4CHO, 31 Briar Close, Horndean, Hants.  
 HULL: J. Dunnington, G3LZQ, 73 West Hill Garth, South Cave, Brough, Humberside HU15 2HA. (Hall 2700.)  
 MEDWAY: P. J. Poole, G4EVY, 5 River Drive, Strood, Rochester, Kent ME2 3KW.  
 MILTON KEYNES: D. Stimson, G3THC, 108 Cambridge Street, Milton Keynes (316730), MK12 5AII.

NORTHERN RADIO SOCIETIES: G. L. Adams, G3LEQ, 2 Ash Grove, Knutsford, Cheshire WA16 8BB.  
 NOTTINGHAM: M. C. Shaw, G4EKW, 50 White Road, Nottingham NG5 1JR.  
 PETERBOROUGH: L. Critchley, G3EEL, 36 Waterloo Road, Peterborough, Cambs.  
 RAIB: H. Boutle, G2CLP, 14 Queens Drive, Bedford MK41 9BQ.  
 ROYAL NAVY: FCRS M. Matthews, G3JFF, c/o Royal Navy A.R.S., HMS Mercury, Leydene, Hants.  
 ROYAL SIGNALS: Lt.-Col. (Ret.) Sir E. Y. Nepean, Bt., G5YN, Goldens, Teffont (275), Salisbury, Wilts.  
 SCUNTHORPE: H. Garner, G4CFD, 4 Kealholme Road, Messingham Road, Scunthorpe, Lincs.  
 SHEFFORD: M. J. Strange, 19 Wilshers Road, Biggleswade, Beds, SG18 0BU.  
 SOUTHDOWN: B. Chuter, G8CVV, 15 Coopers Hill, Willingdon, Eastbourne, East Sussex BN20 9JG.  
 SOUTHGATE: B. Oughton, G4AEZ, 48 Morley Hill, Enfield, Middx. (01-366 7166.)  
 STOURBRIDGE: A. Dewsbury G4CLX, 10 Rectory Road, Oldswinford, Stourbridge (3530), West Midlands.  
 SURREY: S. A. Morley, G3FWR, 22 Old Farleigh Road, Selsdon, South Croydon CR2 8PB. (01-657 3258.)  
 SUTTON & CHEAM: A. Keech, G4BOX, 26 St. Albans Road, Cheam, Sutton, Surrey. (01-644 4157.)  
 VERULAM: B. H. Pickford, G4DUS, 130 The Drive, Rickmansworth, Herts.  
 WAKEFIELD: I. R. Forth, G3WWF, 6 Eastfield Drive, Woodlesford, Leeds LS26 8SQ.  
 WORCESTER: D. Cowden, G4DXE, 20 Constance Road, Worcester (53017).  
 YORK: K. R. Cass, G3WVO, 4 Heworth Village, York.

**Bury Radio Society—G3VVQ Trophy:** This award is presented annually to the person voted by members to have done the most to help the society during the preceding year. Here Mrs. Melanie Keegan, daughter of the late G3VVQ, is presenting the Trophy to the 1976/77 winner Mr. John Monohan. Behind is the Society's chairman Mike Horrocks, G8GTP.



seats are limited in number, and so anyone who intends to attend this meeting is to *please get in touch with the Hon. Chairman*, Chris Heavens, on Horndean 591871 forthwith. The May meeting, for the record, will revert to the Merchistoun Hall, Horndean.

### Scouts Ahoy!

We have a letter from Scout Hq. in which all Scouts, past and present are asked to pass on their name, address and callsign, the details of their past and present connection with Scouting, special radio fields of interest, and if the organiser of a Scout Radio Club, details of it, to The Activities Secretary, The Scout Association, Gilwell Park, Chingford, London E4 7QW. The idea is to circulate information of interest to the parties concerned on the one hand and on the other to co-ordinate radio activities.

Back now to our last; top of the pile now is the letter from **Southgate**, to advise us on the goings-on there. They are at the Scout Hut, Wilson Street, in Winchmore Hill Green area, on the second Thursday of each month: last month G3TZZ gave them all the griff on planning applications, with an official of the local planning office present to answer questions. This was definitely a bright idea, which could be followed up by other clubs, particularly when they have as in this case a licensed amateur or SWL on the council. Looking on to April, they have a sale of second-hand equipment and Open Evening rolled into one.

**Milton Keynes** are QRT on April 11, owing to their Hq. being closed on the Bank Holiday, so they have gone all informal and you should be able to trail them into the Rose and Crown in Silver street from 2000 hours.

It's quite a while since we last heard from **Medway**; it seems that the current Hon. Sec. was imprudent enough to mumble "yes" to a question and so found himself in the Hot seat before he had a chance to realise what was happening! Whatever the truth of it may be,

he is glad to pass on the word that they are still at the Aurora Hotel, Brompton Road, Gillingham, every Friday (save for Good Friday of course). On a different tack, they had G5MW issued in 1932, but gave it up "temporarily" in 1935, when it was re-issued to a chap in Leeds by the authorities; he died in 1973 or thereabouts and after some negotiating they have finally recovered their old G5MW—and it was recently aired on Two Metres operated by G2MI and G6NU, both of whom were members forty years ago. The Hon. Sec. winds up by saying that if any amateurs are in the Medway towns and would like to visit, if they drop him a line, he will be pleased to supply the latest details.

On the South Coast, we have **Wessex (Bournemouth/Poole)**, who have a large catchment area, from Bournemouth through Salisbury to Bridport; but there is now a Poole group, and so the Hon. Sec. suggests we should now file him under Bournemouth—so be it, m'lud! The gang get together on the first and third Fridays of each month at the Dolphin Hotel, Holdenhurst Road, Bournemouth; April 1 is down for a talk on Raynet by the Hon. Sec., Ron Bassett (Hon. Sec. of Raynet, that is, not the club). He is followed on April 15 by a talk and demonstration by G8CKZ of *SMC Ltd.*, in which he discusses the latest development and tries to forecast what will come next.

Elsewhere in this issue, will be found an advertisement for the **Northern Radio Societies Association Convention** on April 24, at Belle Vue, Manchester; let us here just mention that this joint activity by many clubs each year is something which we down South could well follow up—details of the event generally from G3LEQ, on Knutsford 4040 or QTHR, or if you are going to make an entry in the Home Construction competition your man is G4BVE, who is also QTHR.

Pressing steadily on, we now come to **Barking**; they had a tenth anniversary last December, and yet it seems but yesterday we were writing of their first forma-



tion! They are set up at Westbury Recreation Centre, Westbury School, Ripple Road, Barking, Essex IG11 7PT. Mondays is construction-night, Tuesdays the Morse class, Wednesday the CCTV evening, and Thursdays the evening when the whole body of troops get-together. More details may be obtained by contacting the new Hon. Sec.—see Panel, although with so many meetings each week it is probably as easy to just roll up.

It's years since last we heard of **Bristol RSGB**, but it seems that they are now in new Hq. at Bristol University; on April 25, Mr. Gower of Bristol University will be talking about the uses of the Laser in modern communication. The place to aim for is the small lecture theatre in Queens building, and the Hon. Sec. can supply a map if you care to get in touch with him; he can be found at the address in the Panel.

**Hull's** letter is simply a note that their mobile rally will be running, on May 29 even though the venue is not yet settled. All the latest details, on rally or club, from the Hon. Sec.—see panel.

Pressing on regardless, we next come to the **Royal Signals** newsletter; your scribe always reads it from cover to cover, which is not calculated to help one meet deadlines! However, the current issue of "Mercury" is well worth a year's subscription on its own, without all the other doings. It is open to present and past Royal Signals types, and some other categories—all the details from the Hon. Sec.—see Panel.

**RAIBC** come next, with their "Radial" issue. This group is for all those interested in our hobby in any way; full members are the handicapped or blind, the rest are supporters. Both categories definitely wanted; and the newsletter alone is worth the cost of membership. All the details from the Hon. Sec.—see Panel.

Another service group is the **Royal Navy**, and this one has members in various navies, and MN, both past and present, with the 1000th membership number recently allocated, no less than 136 members having joined between 1975 and 1976 AGM's—which must mean they have quite a bit to offer besides mere nostalgia; and the writer, having at one time and another had quite a bit to do with them, can verify that they have indeed much to offer.

**Stourbridge** give their March dates in the Newsletter currently to hand, but we can't from this fathom out just how the April dates will pan out—or are we being a bit dim? The formal session is at Longlands School, Brook Street, Stourbridge, and the informal is at the Shrubbery Cottage pub, Heath Lane, Oldswinford, starting at nine; the very latest is also to be heard on Beacon Radio during the third Monday and the Sunday evening preceding, at various times. For the rest, it is suggested you contact the Hon. Sec. at the address in the Panel.

**G4AOG** is the speaker at **Acton, Brentford & Chiswick** on April 19, his subject being "What's new in Amateur Radio gear"—and as usual the group will be at 66 High Road, Chiswick (Chiswick Trades and Social Club) to hear him.

A change in routine occurs at **Sutton & Cheam** in April owing to the normal Hq. being closed. This being the case the *AGM on April 20 will be at Ray's Social Club* in London Road. More details from the Hon. Sec.—see Panel for his address.

We have no less than three letters from **Verulam** this time—they are meticulous in making sure we get the "gen" despite anything the posts or Murphy's Law can do to them! On a different tack, it is with surprise as well as sorrow that they report the recent death of **G3PAO**, he having been on the air the previous evening and apparently his normal cheerful self; he was one of the "workers" both for the club and for the hobby generally, and his passing is a severe blow to the **Verulam** team. Turning to the dates, they are down as April 14 and 28; the first is the informal at the **RAFA Hq.** in Victoria Street, St. Albans, and the second the regular formal affair at the Market Hall, in St. Albans, at which various committee members will lead a talk and discussion on Constructional Techniques.

The **Echelford** arrangements are to have meetings in the hall at St. Martins Court, Kingston Crescent, Ashford, Middx., on the second Monday and the last Thursday in every month; as they have just recently had their **AGM** we cannot expect to have the details of the activities on the April dates, but from past form we would think there will be something of interest going on.

At **York** they recently had the pleasure of seeing their ex-member **G3GDA** on one of his occasional visits to the city. For the meeting routine, think of every Friday *except* the third one; and that April 28 is down for a Junk Sale.

For a trial period, the **Southdown** chaps will be having their meetings at the Chaseley Home, South Cliff, Eastbourne. On April 4 they have a discussion on the modification of the Pye Bantam unit for amateur radio and **RAEN** use.

We now move over to **Hereford**, who are based on County Control, Civil Defence Hq., Gaol Street, Hereford. They can be found here every Friday, and we notice that the "big" evening for April is on 1st, when they have a demonstration of Ceefax by Ken Clegg and Grant Cratchley, **G8MZV**.

It is a pleasure to hear again from **Addiscombe** after quite a long lapse. Nowadays they are basically a contest club, and they get together informally every Tuesday evening in the saloon bar of the Spread Eagle, Portland Road, South Norwood from 9 p.m.

The **AGM** is set for the **Cornish** crowd, on April 7, at the usual venue, the **SWEB Clubroom**, Pool, Camborne.

At the time of their letter, the April 7 doings had not been finalised by **Cheltenham RSGB**, but there will no doubt at all be something fixed in good time. The venue will be the old Bakery, Chester Walk, Cheltenham.

Next comes a very brief note from **G2NJ**—a past master in the art of compression is Nick!—to say that the **Peterborough Radio and Electronics** gang have their Hq. in the Scout Hut, Occupation Road, where, on April 15, they have, provisionally, **G5XB** as the speaker, the start being set for 7.30.

**Scunthorpe** have The Shack at Grange Farm Hobbies Centre, Franklin Crescent, Scunthorpe, where they are to be found every Tuesday evening. On April 5, they have a talk on Integral Calculus, followed by Digital IC's on 12th. Complex Numbers are the subject on April 19, and on 26th, they will be hearing all about the **BATC**; **BATC** of course is the group of amateurs who are interested in amateur TV, either fast or slow-scan.

Wakefield have a "free" evening on April 12, and the AGM on April 26, the location being Ings Road School.

A new venue is notified by Colchester, they having moved to a place over Candor Motors, 114 Ipswich Road, Colchester, where they can be found on every Wednesday evening.

## VERTICAL FOR HOME STATION USE

W. R. LONGMIRE, G3TKL

THE results obtained from this whip can be overrated but on average are usually good, and are brought about by paying attention to numerous small details. The quality and strength of materials used, simplicity of design and good weatherproofing are important; every joint from the top of the whip to the transmitter and receiver should be soldered. Resonate the whip assembly after it has been erected outside. The resonating should, of course, be carried out from inside the shack so that the full length of feeder is included in the aerial assembly. It is *most* important that a good earth system is used; also there should be a simple method of tuning the whip up and down the band by employing say, a Roller Coaster.

The whip section, which is 8, 12 or 16 feet long, can be war surplus type but with no thread at the bottom. All points should be tinned and sweated together. When assembly is complete, and after the whip has been soldered into the brass pipe below it, undercoat and paint and then wrap with PVC tape from bottom to top for additional strength and water proofing.

The brass pipe, mentioned above, is now fitted into a brass ferrule having an 0.5 inch diameter hole in its top approximately 1.75 inches deep; the bottom end is tapped  $\frac{3}{8}$  inch BSF 1 inch deep. Next, a brass slug is tapped for  $\frac{3}{8}$ -inch BSF and a brass stud is screwed into this and locked by a nut. This assembly is sweated into the copper pipe below it and the brass ferrule is screwed onto the stud which should protrude above the brass slug.

The coil, on a 1-inch diameter former, is close wound enamelled copper wire (see table). Terminate its bottom end at a stand-off insulator which should be strong enough to take the complete weight of the feeder; Tufnol or similar quality material would be suitable for the former. Where the enamelled wire is joined to other parts of the assembly there should be 3 or 4 inches stranded copper wire to prevent strain and possible breaks in the connection. The top end of the former is glued, by Araldite, into the bottom end of the copper pipe containing the brass slug. After glueing, drill and peg the two together; the ends of the peg, which is brass, could be riveted if the copper of the pipe is counter-sunk before driving the peg.

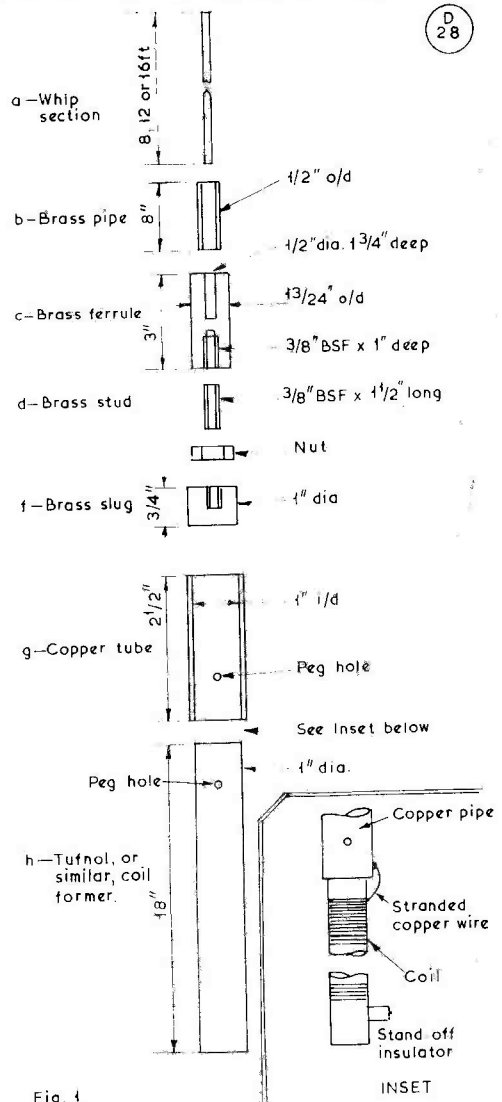
For final weather proofing of the former it should be painted with polyurethane varnish and wrapped with 1-inch wide PVC tape.

## Finale

Which is where we give a deadline for next time around at Wednesday, April 6—one day earlier than it would normally be, to allow for the Bank Holiday—to contain all the details of your doings for May, plus Hq. address and the name and address of your Club Secretary for our files, and a telephone number if he has one. Meantime, on with the gardening!

Reference to Fig. 1, a - h should make the method of assembly clear.

Gauge (SWG) Turns (length of winding, inches)	WIRE TABLE			
	18	20	22	24
	13-14	10-11	9-25	8-5





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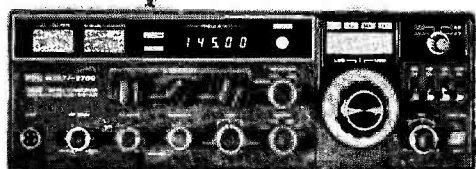
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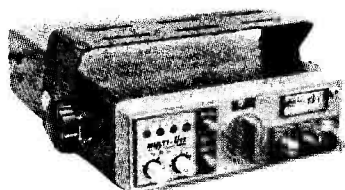
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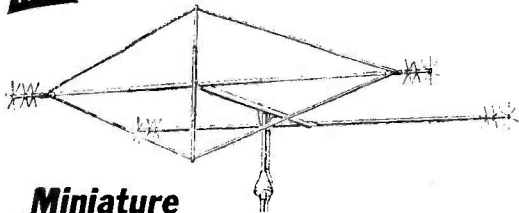
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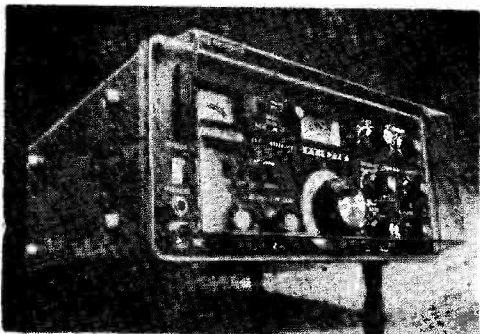
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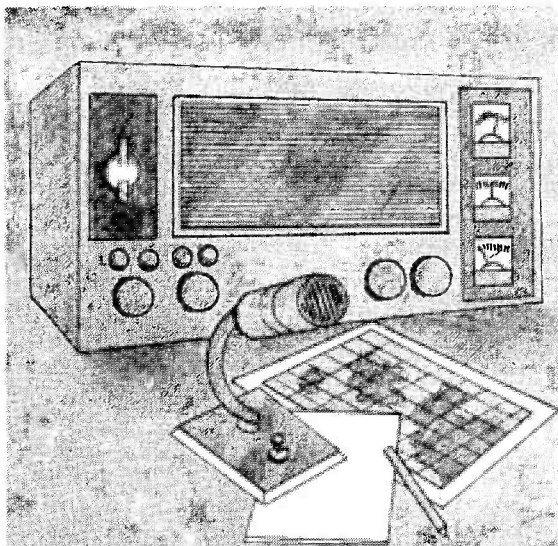
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144-030 ...	b	b	b	b	b	b	b	b	b	b	b	b	b
144-4/433-2 ...	a	a	a	a	a	a	a	a	a	a	a	a	a
144-480 ...	b	b	b	b	b	b	b	b	b	b	b	b	b
144-600 ...	b	b	b	b	b	b	b	b	b	b	b	b	b
144-700 ...	b	b	b	b	b	b	b	b	b	b	b	b	b
145-000/SO ...	a	a	a	a	a	a	a	a	a	a	a	a	a
145-050/R2T ...	a	a	a	a	a	a	a	a	a	a	a	a	a
145-075/R3T ...	a	a	a	a	a	a	a	a	a	a	a	a	a
145-100/R4T ...	a	a	a	a	a	a	a	a	a	a	a	a	a
145-125/R5T ...	a	a	a	a	a	a	a	a	a	a	a	a	a
145-150/R6T ...	a	a	a	a	a	a	a	a	a	a	a	a	a
145-175/R7T ...	a	a	a	a	a	a	a	a	a	a	a	a	a
145-200/R8T ...	a	a	a	a	a	a	a	a	a	a	a	a	a
145-300/S12 ...	b	b	b	b	b	b	b	b	b	b	b	b	b
145-350/S14 ...	b	b	b	b	b	b	b	b	b	b	b	b	b
145-400/S16 ...	b	b	b	b	b	b	b	b	b	b	b	b	b
145-500/S20 ...	a	a	a	a	a	a	a	a	a	a	a	a	a
145-525/S21 ...	a	a	a	a	a	a	a	a	a	a	a	a	a
145-550/S22 ...	a	a	a	a	a	a	a	a	a	a	a	a	a
145-575/S23 ...	a	a	a	a	a	a	a	a	a	a	a	a	a
145-600/S24 ...	a	a	a	a	a	a	a	a	a	a	a	a	a
145-650/R2R ...	b	b	b	b	b	b	b	b	b	b	b	b	b
145-675/R3R ...	b	b	b	b	b	b	b	b	b	b	b	b	b
145-700/R4R ...	b	b	b	b	b	b	b	b	b	b	b	b	b
145-725/R5R ...	b	b	b	b	b	b	b	b	b	b	b	b	b
145-750/R6R ...	b	b	b	b	b	b	b	b	b	b	b	b	b
145-775/R7R ...	b	b	b	b	b	b	b	b	b	b	b	b	b
145-800/R8R ...	a	a	a	a	a	a	a	a	a	a	a	a	a
145-950/S38 ...	a	a	a	a	a	a	a	a	a	a	a	a	a

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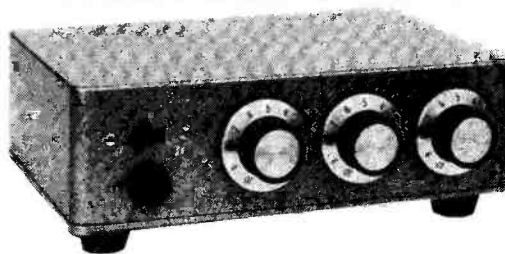
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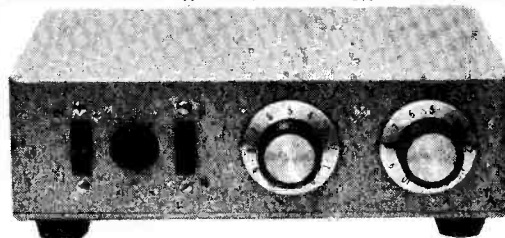
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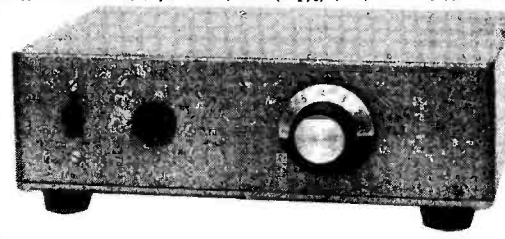
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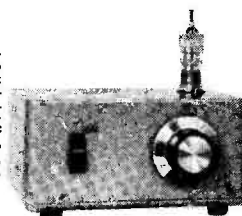
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**Sale:** Electronic Developments two-metre linear amp., as new, £85.—Dowsett, G4EHS, QTHR. (Tel: 057-93 2566, Cornwall).

**For sale:** Trio 9R-59D Rx, with SP-5DS speaker, OA-2, manual, Microwave Modules converter, ground plane, £50. Heathkit HW-30 AM Tx/Rx, with mic., manual and accessories, £15.—G8NAK, 15 Enfield Street, Beeston, Nottingham. (Tel: 0602-259448).

**Selling:** Trio 9R-59D receiver with matching speaker, coverage 0.5-30 MHz, £40.—Ring Wood, 061-790 0709 (Manchester).

**Sale:** K.W. Viceroy Mk.IV, with 160-metres, £75. Two-metre 6-element Yagi, £3.50.—Craske, G3ZLS, QTHR.

**For sale:** FT-75B and DC-75B, only one year old, £200. Two-metre all-mode receiver (same as Arac 102), £60. Two-metres centinel mosfet converter, £10.—Ring Dore, G4CGE, Princes Risborough 5537.

**Wanted:** VHF receivers, 140-250 MHz. Also back-numbers for sale and wanted of "The Radio & Electronic Engineer". — Hughes, 11 Henley Road, Ludlow, Salop.

**For sale:** KW-77 amateur bands Rx with speaker and handbook, £120. Eddystone S.640 Rx, 1.7-32 MHz, £15.—Ring Byrom, Tadworth 3252 (Surrey).

**Selling:** Pye Cambridge, six channels, SO, S20 and RO6 installed, AM transceiver but has FM transmit, needs attention, £30.—Ring Illidge, Llandudno 78229.

**Sale:** Eddystone 1001 communications receiver, mint condition (cost £500), £250. Hamgear preselector/ATU, brand new (cost £21), bargain £15.—Ring Lighton, Guildford 66543.

**Sale:** Trio R-300 Rx, 5 months old, £140.—Ring Clark, Wickford (Essex) 4317, evenings.

**For sale:** Eddystone EC-10, mains/battery, mint condition, £65. Home-built 2m. converter, £5. Buyer collects.—Ring Hart, Kearsney 3093 (Dover).

**Wanted:** Racal RA-17/RA-117 with/without SSB attachment, or late model Collins S-Line Rx. Also ST-6 RTTY T/U. Must be in mint condition. Details and price please.—Scott, 38 The Gardens, Monk-seaton, Whitley Bay, Tyne and Wear NE25 8BG.

**Selling:** Trio R-599S Rx, coverage 160-2 metres, less than 12 months old, nearest offer to £300. Reason for sale: gone VHF and bankrupt. Would suit SWL or G4's etc. going HF; requires matching Tx (or any Tx) to provide first-class twin VFO separates at below present prices.—Ring Oldfield GW8MVA, 0222-862168 (Caerphilly).

**Wanted:** Eddystone 770R, or similar VHF receiver. Details and price please.—Ring Peacock, Witney 2860.

**Wanted:** Redifon GR-470B marine R/T, or other marine gear, working or faulty. Details and price please.—Stopford, 3 Biggins Wood Road, Folkestone, Kent. (Tel: 0303-76623).

**For sale:** TS-700, fitted pre-amp., reverse repeater, auto tone-burst, tailored FM audio, £285. IC-22A, 15 channels, £140. Regulated PSU, 4-15v., 10A., with circuit, £25.—Ring Cragg, G3UGK, Dunstable (0582) 600358.

**Sale** Yaesu FRDX-400 Super Rx, with two and four metres, plus matching FLDX-400 Tx, both in mint condition, £325.—Crabbe, G3CON, QTHR. (Tel: Cheltenham 54357).

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**Wanted:** VHF receivers: MS-2 or MR-2 or monitor AS-6 or Sentry pocket AM receiver.—Ring Bancel, Derby 23809 after 6 p.m.

**May issue: Due to appear April 29th. Single copies at 45p post free will be sent by first-class mail for orders received by Wednesday, April 27th, as available.—Circulation Dept., Short Wave Magazine Ltd., 34 High Street, Welwyn, Herts. AL6 9EQ.**

**For sale:** Codar CR-70A Mk.II receiver, in very good condition, with speaker and manual, £30.—Pearson, West View, Upsall, Thirsk, Yorks.

**For sale:** Yaesu FR-101S with SP-10B speaker, in mint condition, £290.—Ring Matthews, Newcastle-upon-Tyne 864346.

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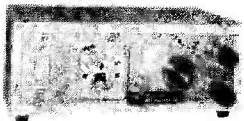
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GREENPAR (GE30015). Chassis Lead Terminations. (These are the units which bolt on to the chassis, the lead is secured by screw cap, and the inner of the coax passes through the chassis), 30p each, 4 for £1.00.

WELLER TCP2 and PU2D PSU. Temperature controlled soldering iron with matching Power Supply Unit, containing sponge and spring stand, £27.00.

SPARE TIPS (for TCF1/2) Three types available: TYPE CC7 (Standard), TYPE K7 (Long fine tip), TYPE P7 (Very fine tip) £1 each.

WELLER W60D mains operated temperature control soldering iron, £13.80.

SPARE TIPS (for W60D) Two types available, TYPE CC7 (W60D) Standard, TYPE AA7 (W60D) Finer tip, £1.15 each.

110v. NEONS, screw-in type 4 for 50p.  
SUPER SERVISOL (SWITCH CLEANER), 65p can.

SUPER FREEZIT (FREEZER), 65p can.

MULTICORE SOLDER. Size 5 Savit, 18 SWG in alloy dispenser, 32p. Size C15A18 Savit 18 SWG, 56p. Size 12 Savit 18 SWG on plastic reel, £1.80;  $\frac{1}{2}$  Kg. (1-1 lb.) 60/40, 20 SWG on plastic reel, £3.00.

ALU-SOL ALUMINIUM SOLDER (Made by Multicore) Solders Aluminium to itself or Copper, Brass, Steel, Nickel or Tinplate, 165WVG with multicore flux with instructions, approx. 1 Metre coil 40p pack. Large Reel £2.75.

SOLDER SUCKERS (Plunger type). Standard model, £4.50, Skirted model, £4.95. Spare nozzles, 60p each.

4 MHz XTAL PACKS (10 assorted xtals between 4 MHz and 5 MHz) our selection only, £1.00 pack.

MAINS ISOLATION TRANSFORMERS. Tapped mains input, 240v. at 6A output, Made by Gardners, £18.00.

PERSEPX TUNER PANELS (for FM Band 2 tuners) marked 88-108 MHz and Channels 0-70, clear numbers, rest blacked out, smart modern appearance, size approx.  $8\frac{1}{2} \times 1\frac{1}{2}$ ", 2 for 35p.

DIECAST BOXES. We still stock these but, owing to frequent price rises from our suppliers, and costly postal charges, it has become quite impossible to publish up to date prices on these items. Please ring or write (with SAE), for latest material prices.

HEAVY DUTY RELAYS, 24v. DC operated (will work on 18v.) heavy duty make contacts (around 10A rating) + 4 change contacts + 1 break contact. New, complete with mounting bracket (ideal for switching HT on Linears). Many uses for this high quality unit, £1.50 each.

CERAMIC TAG STRIPS (4 on 1 mount), 10 mounts for 50p.

TUNED COILS, 2 section coils, around 1 MHz, with a black 'smart tuning knob, which moves an internal core to vary the inductance, many uses, easily rewound, 3 for 50p.

2-6pf. 10mm. circular, ceramic trimmers (for VHF/UHF work), 3 pin mounting, 5 for 50p.

ON/OFF/RX STANDBY SWITCHES for AM10B Cambridge Vanguard control boxes, 40p each, 3 for £1.

VARIABLE STABILISED POWER SUPPLY, mains input, 0-24v. input, stabilised and current limiting at 500mA, 32v. at 50mA. Brand new by British manufacturer. Size approx.  $7\frac{1}{2} \times 2\frac{1}{2} \times 4$ ", complete with external 5kohm 3-turn pot for voltage control. Connection data supplied, £7.00.

TERMS OF BUSINESS: CASH WITH ORDER. MINIMUM ORDER OF £2.00. ALL PRICES NOW INCLUDE POST & PACKING (UK ONLY)

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PLEASE ENCLOSE STAMPED & ADDRESSED ENVELOPE WITH ALL ENQUIRIES.

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## ALL BELOW — ADD 8% VAT

### TRANSISTORS

TO3 TRANSISTOR INSULATOR SETS, 10 sets for 50p.

BSX20 transistors (VHF OSC/MULT), 3 for 50p.  
BC108 (metal can), 4 for 50p.

PBC108 (plastic BC108), 5 for 50p.  
PNP AUDIO TYPE TO5 TRANSISTORS, 12 for 25p.

BFY51 TRANSISTORS, 4 for 60p.  
BF152 (UHF AMP/MIXER), 3 for 50p.

2N3819 Fet, 3 for 60p.  
BC148 NPN SILICON, 4 for 50p.

BC158 PNP SILICON, 4 for 50p.  
BAY31 Signal Diodes, 10 for 35p.

BYX 38/300 Stud Rectifiers, 300v. at 2-5A, 4 for 60p.

BA121 Varicap Diodes, 4 for 50p.  
IN914 DIODES, 10 for 25p.

### VALVES

QQV03/20A (ex equipment), £3.00.

QQV03/10 (ex equipment), 75p or 2 for £1.20.

2C39A (ex equipment), £1.00 each.

DET-22 (ex equipment), 2 for £1.00.

6BH6 (ex equipment), 2 for 50p.

MULLARD 85A2 85v. STABILISER VALVES (Brand New), 70p each or 2 for £1.20.

## ALL BELOW — ADD 12½% VAT

BARGAIN PACK OF LOW VOLTAGE ELECTROLYTIC CAPACITORS. Up to 50v. working. Seatronic manufacture. Approx. 100, £1.50 per pack.

VARICAP TUNERS. Mullard type ELK043/05. Brand New, £4.40.

A large range of capacitors available at bargain prices, S.A.E. for list.

TV PLUGS (metal type), 5 for 50p.  
TV SOCKETS (metal type), 4 for 50p.

TV LINE CONNECTORS (back-to-back skt.), 4 for 50p.

DIN 3-pin LINE SOCKETS, 15p each.

3 PIN DIN PLUGS, 15p each.

DIN 6-pin RIGHT ANGLED PLUGS, 20p each.

### ELECTROLYTICS

ELECTROLYTICS, 50µF, 450v., 2 for 50p.

ELECTROLYTICS, 100µF, 275v., 2 for 50p.

ELECTROLYTICS, 470µF 63v., 3 for 50p.

ELECTROLYTICS, 1,000µF 30v., 3 for 60p.

ELECTROLYTICS, 1,000µF 180v., 3 for £1.

ELECTROLYTICS, 5,000 mfd. at 35v., 50p each.

ELECTROLYTICS, 5,000µF 50v., 60p each.

ITT ELECTROLYTICS, 6,800 mfd at 25v., high grade, screw terminals, with mounting clip, 50p each.

ELECTROLYTICS 10,000 mfd. at 63v., 75p each.

1 Meg. Lin. POTS  $\frac{1}{2}$ " plastic spindle, 2 for 50p.

50k ohm lin. POTS  $\frac{1}{2}$ " plastic spindle 40p each.

TWIN IF CANS, approx.  $1 \times \frac{1}{2} \times 1 \frac{1}{2}$ " high around 3-5 to 5 MHz. 2 separate transformers in one can, internally screened, 5 for 50p.

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# The SHORT WAVE Magazine

VOL. XXXV

APRIL 1977

NUMBER 2

## TRIO R-599D



### FOR THE MAN WHO DEMANDS THE BEST

For this man, the choice in amateur band receivers must be the TRIO R599D. This is the receiver packed with features and facilities which make it the most sought after equipment in the amateur market. All band coverage from 160 to 10 metres also includes the 27 MHz CB section and WWV for accurate frequency checks. Provision is made for fitting optional VHF or UHF converters to extend your listening activities and all the converter switching is built in to the receiver so there are no connectors to fiddle around with.

Local stations—loud and clear with the unique TRIO feature of being able to use any filter on any mode. Weak DX; simply switch to AUTO selectivity and the R599D will match the bandwidth to the mode in use. Noise; just switch in the noise blanker to take out impulse interference. Want to read out the frequency? Just use the 25 kHz calibrator to check the dial and read off the frequency in use to better than 1 kHz. The velvet smooth dual reduction dial drive is a joy to handle

Extensive use of the latest dual gate FET devices endow the R599D with all the sensitivity and freedom from cross modulation that you could wish for. All mode operation is standard, giving AM, USB, LSB, CW and FM with separate detectors for each mode at optimum performance. The AGC time constant can be switched for fast or slow characteristics and can also be turned off for the CW operator. An effective squelch system is fitted for suppressing inter station noise and works on any mode.

The R599D can be used from ac mains supplies or from a 12 volt dc external source using the power cord supplied. Used in conjunction with the matching T599S, you can assemble a station which is second to none.

Contact us soon for full details of the R599D and the other exciting TRIO products. 30p will bring you the full catalogue.

Sole Importers: **LOWE ELECTRONICS**  
 Cavendish Road, Matlock, Derbyshire  
 Tel.: Matlock 2817 or 2430



# The 2m First Family

Where quality is a prime requirement

## TR-7200G

The number one rig when 2m gear is considered. Rugged, reliable, and carrying the unmistakable stamp of TRIO quality. Sensitive receiver, powerful clean transmitter, 22 channel capability with continuous tuning using the VFO-30G.

## VFO-30G

External VFO, permitting continuous tuning through the entire 2m band from 144 to 146MHz in conjunction with the TR-7200G and TR-2200GX transceivers. Precision dial drive and high dial accuracy. Built-in 600kHz frequency shift for repeater operation.

## NEW—TR-2200GX

The superb follow-up model of the world-famous 2m portables TR-2200 and TR-2200G. Numerous technical improvements, higher output power and more versatility than ever before.



## PS-5

Custom-tailored power supply unit for fixed-station use of all 2m, equipment listed above. Supplies filtered and electronically stabilised operating voltage of 13.8v. DC up to 3.2 amps. Built-in electro-mechanical digital clock with 12-hour readout plus programmable 24-hour timer. Line voltage 110-120/220-240v. VAC, 50-60Hz.

## NEW—PB-15 (not shown)

Battery pack, consisting of two rechargeable NiCad units as efficient and economical power source for the TR-2200GX and the 70cm. UHF Transceiver TR-3200. Battery charger is part of the standard accessories supplied with both models.

## MB-1A (not shown)

Special mobile mount for the TR-2200GX, TR-2200G and TR-3200. Can easily be installed under the instrument panel of any car and allows mounting and removal of the transceiver within seconds.

## NEW—VB-2200GX

2m FM Power Amplifier, especially designed for the TR-2200GX and its predecessors. Delivers a minimum output power of 10 watts RF with an input signal of 1 or 2 watts. Built-in voltage stabiliser and overload protection.

The through-circuit switch allows routing of the input signal directly to the antenna without amplification.

## 2m FM Mobile Transceiver TR7200G

The TR7200G is the best selling 2 metre FM mobile transceiver in Europe. Some of the reasons why this is so may not be obvious from the basic specification. It's not just the high sensitivity (0.3µV 15dB quieting) or the superb finish, it's the full range of accessories and the finest service backup in the country. It's the little details like the LED under the channel number indicator that is RF powered and only lights when you have a receive crystal fitted. The "transmit" lamp gives the same function for the transmit crystals. This means that you no longer have to wonder which channels are operational when you are mobile.

Did you know that when you use many 2 metre repeaters in this country the repeater receiver is a TR7200G? Why? because the repeater groups decided that it was the best receiver around—and it is.

Did you know that the SWR protection system is not the "sudden death" variety but gradually reduces the Tx power with increasing SWR so that you are not put completely off the air when your mobile whip antenna gets wet. The same system protects the PA and driver from over voltage damage when the rig is used in a vehicle having a high charge voltage from the alternator.

Only Trio equipment has the unique tuning fork controlled repeater access tone generator to ensure access first time, every time.

All these features and more, can only be provided in equipment made to professional standards by a professional company. The Trio Corporation is the largest electronics manufacturer in Japan offering a range of amateur equipment and you, the customer, benefit every time.

## New price

TR7200G complete with all accessories and fitted ten channels.  
£175 including VAT (12½%)

## 2m FM Portable Transceiver TR-2200GX

The TRIO TR2200GX is the latest model in the most successful line of 2 metre FM handy portable equipment ever produced. Logical development, aided by suggestions from happy owners has produced the best 2 metre portable available today.

Look at the features:—over 2W output; receive sensitivity of 0.4 microvolts for 20 dB quieting; IF shape factor of 2:1; exclusive tuning fork controlled 1750 Hz access generator; 12 channel capability with factory fitted crystals for S20, S22 and R7; designed for maximum flexibility of use, on internal batteries or external supply for mobile/fixated station operation; built-in telescopic antenna and standard socket for external antenna connection. Built in metering allows checking of signal strength, transmit output and battery voltage. The TR2200GX is housed in a rugged steel case for ultimate protection against accidental damage, with all operating controls placed for maximum operator convenience on the top face of the rig.

The most important asset of course is TRIO quality of design. No other manufacturer can match TRIO's vast experience in producing high quality electronic equipment and as a result, TRIO lead, not only in instruments and Hi-Fi, but also in the amateur field.

Unlike other portable equipment, the TR2200GX is supplied complete with all accessories including a protective carrying case and shoulder strap, external power leads and the all important battery charger for the optional NiCad pack. A set of rechargeable batteries cost £9.72 including VAT. The same option on comparable gear can cost up to £30 so be sure to ask what you get for your money.

TR2200 GX, £130.50 including VAT. (12½%)

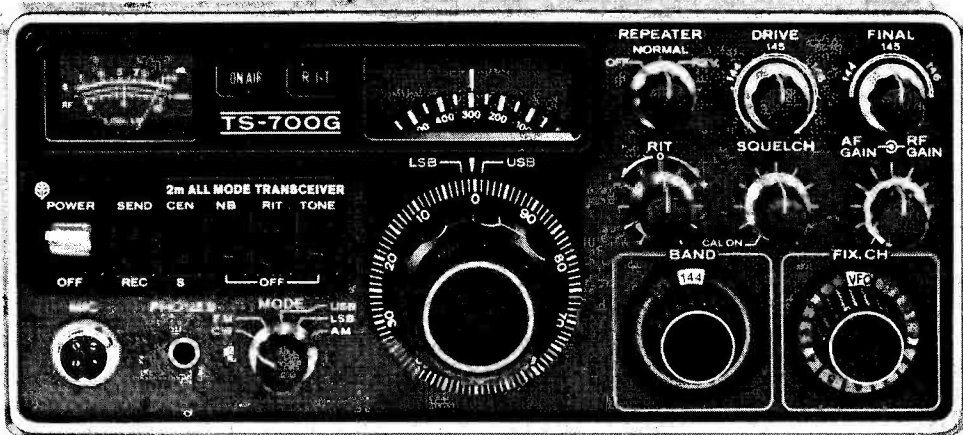
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 **TRIO**

# TRIO TS700G

NOW THE BEST COSTS  
EVEN LESS

(AND INCLUDES AN ADDED BONUS)



## TS700G

### SPECIFICATION

FREQUENCY RANGE  
144-146 MHz

#### MODES

USB, LSB, FM, CW, AM

#### RF OUTPUT

More than 15W. FM  
30W. SSB input power

#### ANTENNA IMPEDANCE

50  $\Omega$  coaxial

#### CARRIER SUPPRESSION

Better than 40dB

#### SIDEBAND SUPPRESSION

Better than 40dB

#### MAXIMUM DEVIATION

$\pm$  5 kHz

FULL BAND COVERAGE 144-146 MHz  
ALL MODE OPERATION, USB, LSB, FM, CW, AM  
240V ac/12V dc POWERED

BEST SOUNDING SIGNAL ON THE BAND  
REPEATER/REVERSE REPEATER FUNCTIONS  
AUTOMATIC TONE BURST

PLUS THE UNBEATABLE TRIO QUALITY AND RELIABILITY



TRIO VOX-3 NOW INCLUDED  
IN THE TS700G PRICE

**£392**

INCLUDING VAT

VAT RATE AT 12½%

#### REPEATER SHIFT

$\pm$  600 kHz

#### TONE BURST

Automatic 1750 Hz

#### MICROPHONE

Dynamic 500  $\Omega$

#### AF RESPONSE/

Speech optimised 400-2600 Hz

#### RECEIVER

SSB, CW, AM, Single conversion

FM Double conversion

#### INTERMEDIATE FREQUENCIES

10.7 MHz, 455 kHz

#### SENSITIVITY

SSB/CW. Better than 10dB S/N

at 0.25 microvolts

FM. Better than 20dB QS

at 0.4 microvolts

#### IF SHAPE FACTOR

Better than 2:1 all modes

#### AUDIO OUTPUT

More than 2W in 8  $\Omega$

#### STABILITY

Within 150 Hz in any 30 minutes

after warm up

#### POWER SUPPLY

120-240v. AC or 12v. DC

All supplies built-in

#### DIMENSIONS

278 x 124 x 320 mm.

#### WEIGHT

11 Kg.

#### Sole Importers

#### LOWE ELECTRONICS

CAVENDISH ROAD,

MATLOCK, DERBYSHIRE

Telephone : 0629-2817/2430

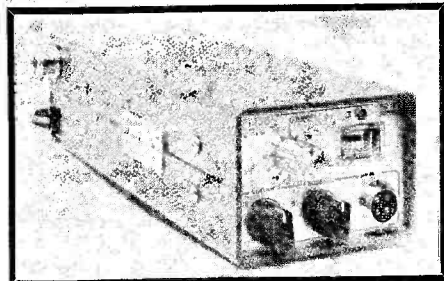
# LOWE ELECTRONICS



## TD224

This amazing little box replaces that clanking old teleprinter that was needed to copy RTTY signals. The TD224 accepts mark/space inputs from your terminal unit (normally TTL but 80-80 can be provided as an option) and converts them into a composite 625 line video signal for display on a TV monitor. A UHF modulator is available as a low cost option to enable use of any 625 line domestic TV set as a monitor. From jingle bells to displayed text—it's easy and silent with the TD224 and a terminal unit DM170.

**TD224 £209.25 inc. VAT**



## KF430

Positively the best buy in 70 cm. FM mobiles. Small size ( $9\frac{1}{2} \times 3\frac{1}{2} \times 2\frac{1}{2}$ " ) and light weight disguise an amazing performance. Transmitter output is 10 watts and receiver sensitivity is 0.4 microvolts for 20dB quieting so it really is good. The KF430 is supplied complete with 9 channels fitted, automatic tone burst, microphone, mobile mount, etc., etc. and costs only **£202** including VAT at 12½%. Super performance. Super value for money.

**KF430 £202.00 inc. VAT**



## NR56

This remarkable little receiver gives the 2m. FM listener everything he wants at a very reasonable price. Excellent sensitivity, stability and selectivity coupled with a built-in VFO and very effective squelch make it the ideal receiver for both beginner and keen listener. Although the built-in VFO more than covers the entire 2m. band, crystal control of FM channels offers many advantages (particularly in mobile operation), so crystals, which are ex-stock, may be fitted for the popular channels and repeaters. It requires 12v. DC for operation and is thus an excellent mobile receiver for mounting in the car, boat or caravan as well as for home use.

**NR56 £54.00 inc. VAT**

THE BEST VALUE OF ALL IS OUR CATALOGUE. JUST SEND 30p IN STAMPS TO RECEIVE DETAILS OF ALL OUR PRODUCTS. MAKE IT 50p AND WE INCLUDE THE ANTENNA BOOKLET THAT EVERYONE IS TALKING ABOUT.



## TR7010

Following the special price offer on the TR7010, more and more operators are discovering the excitement of real DX working on VHF using SSB and CW. The TR7010 with its clean transmitter and sensitive receiver brings long distance capability into your mobile or home station operating. It also allows you to carry out your contacts free from bleeps, call signs, K's and other strange noises in the night. Still at the very advantageous price of **£175** including VAT. Full details in our catalogue.

**TR7010 £175.00 inc. VAT**

### NEWS FLASH

Following the recent successful use of the "leaky feeder" technique for providing radio communication in mine shafts and tunnels, we have been carrying out trials aimed at adapting this system for amateur use.

The idea of underground aerials is not new, having been described by Curzon in the "Submarine Communication Journal" as long ago as 1963, but has not been brought to the attention of the radio amateur fraternity.

The basic requirement is a length of heavy duty coaxial feeder having specially woven loose outer copper braid. This is buried in the ground at a depth of 18" and as far as possible in a straight line. The length of the cable should be a multiple of a half wave of the lowest frequency band to be used i.e. 132' for all band coverage from 80 to 10 metres. Account must be taken of the velocity factor of the cable in use, normally 0.66 for solid dielectric cable. This would reduce the length of the proposed 80 metre aerial to only 87 feet thus making it rather easier to install. The remote end of the cable should be left open circuit electrically but physically well waterproofed before burying.

A good quality SWR bridge should be used between the transmitter and the buried feeder, in order to monitor system operation although the actual value of SWR does not matter too much owing to the unique method by which the signal is radiated. As you know, standing waves on a coaxial feeder can cause radiation from it—this is the heart of the system. Any power fed into the leaky feeder will be completely radiated into the earth and, as we use the earth as one half of the antenna in vertical radiators such as the ground plane, the buried feeder system is simply the reverse of this.

Excellent signal reports have been received using the experimental systems at Matlock and Southampton and we were most pleased to be involved in the trials at the request of the originator Mr. Curzon. The only note of caution in respect of this system is that use of high power may cause some dielectric heating of the ground and damage to grass roots so one must not bury the antenna across lawns or other grassed areas.

Further details on the buried antenna and supplies of the special poor quality loose braid cable can be obtained from Mr. Curzon at Sub-Marine Communications (SMC) Ltd. in Southampton. A HAPPY APRIL TO ALL MY READERS

### HEAD OFFICE BRANCH OFFICES

119 Cavendish Road, Matlock, Derbyshire. Tel. 0629, 2817 or 2430 9 a.m. to 9 p.m

Communications House, 20 Wallington Square, Wallington, Surrey. Tel. 01-669 6700

Soho House, 362-4 Soho Road, Handsworth, Birmingham. Tel. 021-544 0708

27 Cookridge Street, Leeds. Tel. 0532 452657

Alan G WJYSA, 35 Pen-Y-Waun, Efail Isaf, Nr. Pontypridd. Tel. Newton Llantwit 3809

John G3JYG, 16 Harvard Road, Ringmer, Lewes, Sussex. Tel. Ringmer 812071

Sim GMSAN, 19 Ellismuir Road, Baillieston, Nr. Glasgow. Tel. 041-771 0364

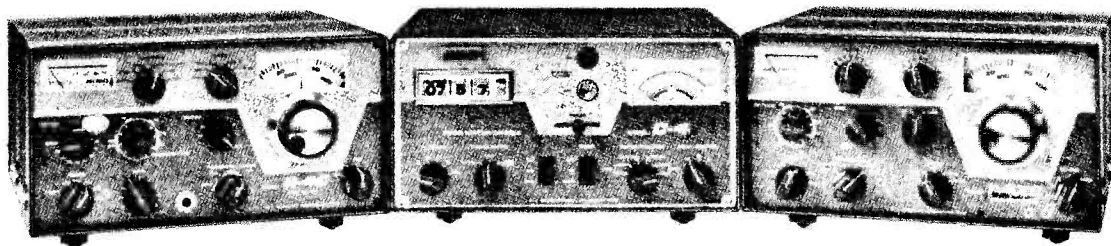
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Still the best way to get from 160 to 10 meters:

## Wide Frequency Range and Selectivity Flexibility



# Drake C-Line

Both the R-4C and T-4XC cover extra 500 kHz ranges throughout the HF spectrum. Additional crystals, which are front panel selectable, provide new bands as they are needed such as those discussed for 10, 18, and 24 MHz.

The excellent performance of the system makes weak signal DXing on 160 meters a pleasure.

Both units employ the famous Drake PTO for super stability and 1 kHz direct dial readout. Calibration remains the same when switching between modes.

With the proper use of the passband tuning, notch filter, and eight-pole crystal lattice filter (SSB supplied, five others for AM, CW, and RTTY available as accessories), the R-4C gives outstanding results in severe QRM as compared to fixed selectivity systems.

Complete transceive capability using either PTO is provided, with spot signal for zero beating.

The C-4 integrates a myriad of functions together, including phone patch, rotor control, remote motor controlled antenna switch, master station control, wattmeter, and many others.

### C-LINE ACCESSORIES

- Standard Crystals for T-4XC or R-4C • Accessory I.F. Filters • AC Power Supply
- Matching Speaker • Antenna Matching Networks • RF Wattmeters
- Station Console • Desk Top or Hand Held Ceramic Microphones • Noise Blanker

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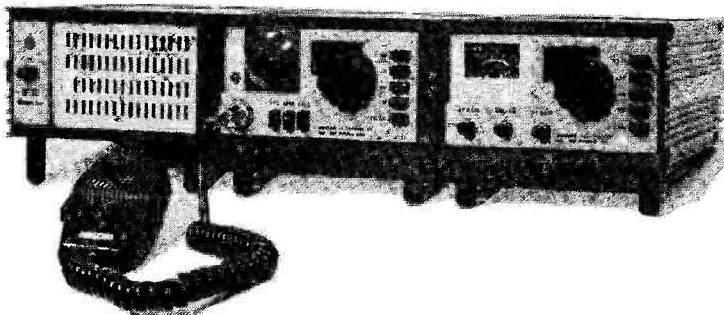
# S.T.E. MILAN VHF EQUIPMENT

We enter our third year as sole distributors for the S.T.E. range in the U.K. The popularity of this equipment is growing all the time. With the kind help of the Directors of S.T.E. we have managed to keep the prices stable for the past three years. This equipment sell for about 20% in some of the ECC countries and to keep cost to the customer down we have not sold to the trade and therefore you get the benefit of lower prices. The quality of these P.C.B's are the finest we have ever seen. Following on from the ARAC 102 receiver for 28-30 MHz and 144-146 MHz fully tunable we now have the ARAC 107 28-30 and 430-440 MHz with AM FM and SSB Facilities. The base station AK20 transceiver will be soon supplied with mobile mount and also available in kit form. We also look forward to many new models from S.T.E. in the next year.

ASP 154

ATAL 228

ARAC 102



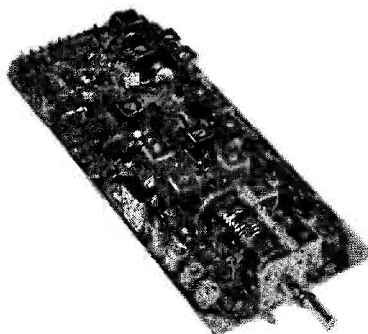
SPEAKER  
AC POWER SUPPLY UNIT

144 - 146 MHz  
AM FM TRANSMITTER  
with Microphone

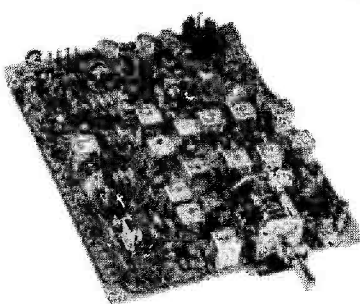
28-30 MHz 144-146 MHz  
AM-FM-SSB RECEIVER

**Price List (including postage)**

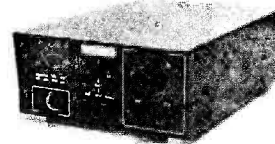
AK20 FM Transceiver	... ..	£170.00
ARAC 102 Receiver	... ..	£100.00
Atal 228 Transmitter	... ..	£126.00
ASAP 154 AC PSU with speaker	... ..	£35.00
ARI0 Receiver Module	... ..	£37.50
AA1 Audio Amplifier	... ..	£4.10
AD4 FM Discriminator	... ..	£5.00
AL8 Linear Amplifier	... ..	£27.00
AT22 Transmitter	... ..	£50.00
AR20 C.C. Receiver	... ..	£50.00
AT23 C.C. Transmitter	... ..	£36.00
AS 15 Stabilised psu D.C.	... ..	£10.00
AG 10 Tone Generator	... ..	£4.50
AC2A Converter 28-30 MHz	... ..	£20.00
AK20 Transceiver Kit	... ..	£110.00



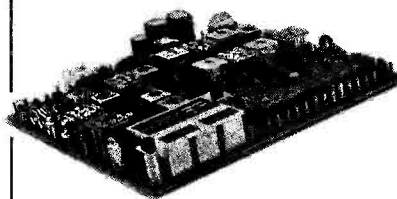
ARI0 Mosfet receiver. 28-30 MHz Double conversion superhet. RF and amplifiers stages are gate protected mosfets for good sensitivity and low intermodulation. Noise limiter and squelch circuit, AM, SSB and CW reception. 12v. DC.



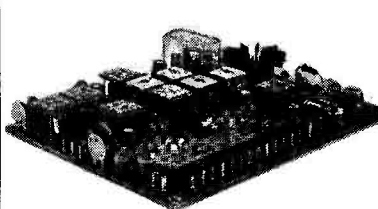
AT22. A complete transmitter exciter unit for 144-146 MHz on AM or FM. VFO controlled or fixed channel operation. Complete with microphone pre-amp., speech processor including active audio filter. 1 watt output. FM. 25 watt AM. Output impedance 50-75 ohm adjustable. Frequency deviation 3-10 kHz adjustable.



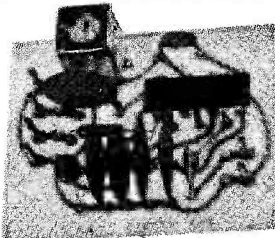
AK20, STE. Latest model from the famous STE Milan range of equipment. 12 channel operation in the 144-146 MHz range. 11-15v. DC operation. 8 watt output. Sensitivity 0.2 uv R.I.T. tone burst. Complete with microphone, and mobile bracket. Price £170.00



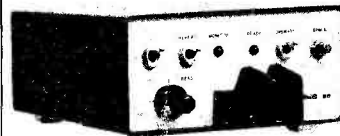
AR20. 12 channel FM receiver 144-146 MHz. Input impedance 50-75 ohm. AM-FM modes. Sensitivity 0.2uV AF output 3 watts. 12v. DC operation.



AT23. 12 Channel FM Transmitter. 3 watts. 144-146 MHz. Frequency deviation 3-10 kHz adjustable. 12v. DC operated AF input sensitivity 2mV adjustable to 50 mV.



455 kHz FM Discriminator Amplifier. Limiting threshold 100uV. Amplitude modulation rejection 40dB. Audio output voltage at 1 kHz 200-300mV frequency deviation + or - 3 kHz.



NEW MODEL ELECTRONIC KEYSER Jambic operation—Weighted transmission—Three memory lengths up to 1024 bits. Internal monitor. Transmitter keyed through internal relay. Silver plated contacts. 220v. AC operation. Price £106.00

## STEPHENS-JAMES LTD.

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Please note new telephone number 0942 - 676790



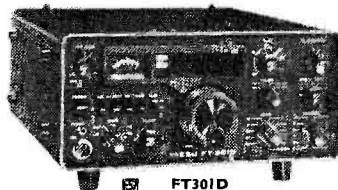


# South Midlands

TOTTON (H.Q.), LEEDS, CHESTERFIELD, LINCS.,

On these pages we make a few suggestions on equipment that you may find suitable or necessary in setting up or maintaining a H.F. station. Items detailed below give some idea of the tremendous range offered by Yaesu Musen for the discerning radio amateur, and brought to you with a two year guarantee, and a technical back-up service second to none by S.M.C.

The new FT-301 transceiver range (with options installed) offers: Full solid state 12v. DC working external matching mains power supplies with speaker, and an external VFO are available. Plug in board construction, 160-10m. operation in 500kHz segments, MSF and CB receive, RF speech processor, noise blanker, front-panel controlled VOX (with M.O.X.) and P.P.T., semi break-in keying with side tone, clarifier with separate ON/OFF switch, 11" x 5" x 13", 25kHz crystal calibrator, internal VFO or 11 crystal per band (or external VFO with same facility) 3W audio to internal or external speaker.



FT301D



FP501

FT501

The digital FT501 (80-10m.) is an engineered blend of old and new techniques: valve front end and PA (for dynamic range and low intermodulation) and solid state devices (for high component density with exceptional reliability) combined with separate, shaped, crystal filters for upper and lower sideband (to avoid carrier shift) (1-6: 1 shape factor!) and the optional CW filter (and switchable AVC). It offers to the discerning user a high power (500W PIP) yet compact home station.

The FT-101E a complete mains or 12v. DC station contained in a compact 30 lb. package, 260W, P.I.P. of SSB (with in-built R.F. speech processor) 180W., CW and 80W. or AM 10 to 160m. (inc. 10 MHz RX). The sensitive and selective (permeability tuned RF stages and 8 pole crystal filter) receiver offers: threshold adjustable noise blanker, switchable 25 and 100 kHz calibrator,  $\pm 5$  kHz clarifier (with separate on/off switch), etc., etc.

The VFO is stable and linear (readout to 1 kHz), external VFO or crystal control can be selected, with LED indicators illuminated accordingly. Carrier level is adjustable for: tune up, AM and for CW operation, whose performance with the semi break in keying, with side tone, and the optional 600 Hz filter installed is of high order. Linear and transverter provisions are made with sockets for: relay contacts, ALC output, all internal HT supplies, low level RF, heater links and switches, etc., etc.



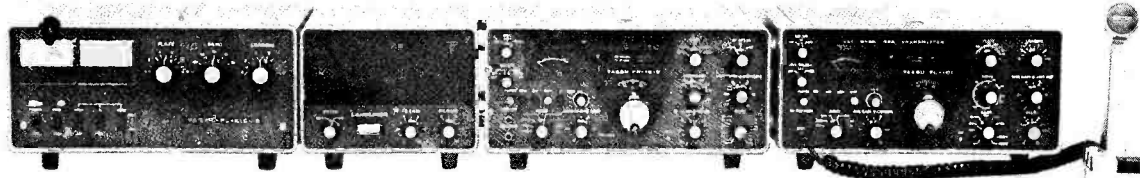
FT101E

The FT200B. The "Best Buy"—260W. PIP (A3), A1) 75W (A3), 80 to 10m. (28.5-29 MHz, 3 other crystals optional) Sensitive and selective 2.3 kHz at 6 dB (1.75: 1SF). Solid state, stable, linear (readout to 1 kHz), gear driven VFO. 100 kHz calibrator. VOX/PPT, clarifier ( $\pm 5$  kHz). Semi break in CW with sidetone, etc., etc. The pre mix oscillator system used, yields: low spurious outputs on transmit, and the good signal handling and low noise capability of a single conversion superhet (whilst retaining a 9 MHz IF with high image rejection) and single range VFO stability.



FP200

FT200



FL2100B

SPI01PB

FL101

FR101

The FR101D (de luxe) wide coverage (23 (from 1.5 MHz), 500 kHz bands + 4 and 2 metres) receiver. Analysis of the signal path shows: —0-20dB switchable attenuator, two section permeability tuned input filter, Mosfet R.F. stage and mixer (crystal controlled), 3 section top coupled bandpass filter, no gain at first I.F., IC balanced mixer, 20 kHz wide crystal filter, shunt diode noise blanker, single FET buffer stage, AM, CW or SSB (RTTY) filter, appropriate detector and audio stage. Add to this, two excellent VHF converters, squelch, FM detector, 1 kHz readout, excellent stability, TX monitor control, crystal control facility, switchable AGC, transceive capability (FT or FL, 101) and that digital readout options are available of this (de luxe), or the standard (less the plug in optionals), converters, broadcast band crystals, filters, etc.) version.

The FL101 transmitter is the ideal companion to the FR101 forming a superb base station. Operation 160 to 10m. (+ two auxiliary bands) using SSB, AM CW or FSK at 260W. PIP, and if desired the optional RF processor.

The FL2100B operates 80 through to 10m. using two rugged 572B carbon anode valves in class B grounded grid, individual tuned input coils for each band and bifilar wound ferrite filament chokes are employed.



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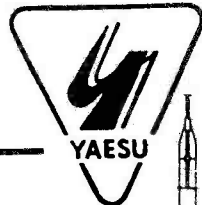
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# Communications Ltd

AGENTS : ENGLAND, N. IRELAND, SCOTLAND, WALES



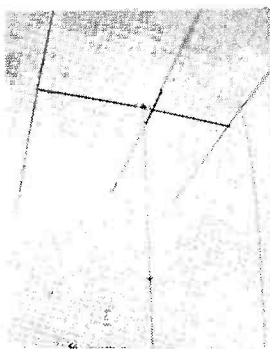
## ANTENNAS THE BIGGER THE BETTER

### ON HF

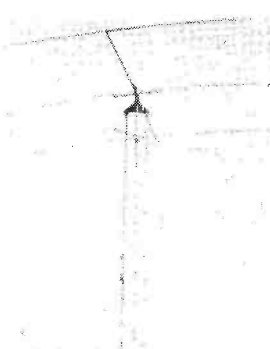
Tune your antennas for best front to back ratio, you will only lose a dB or so in forward gain but the elimination of QRM will be well worthwhile.

### ON HF/M

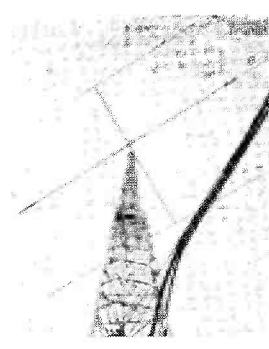
Try an extenda rod with your G whip to boost your LF mobile signal and make sure of a good earth connection.



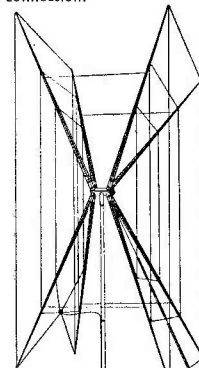
**TELOMAST WITH TA33 TELESCOPIC GALVANISED** 10' sections without or c/w rigging.  
 Carriage £2.75 ex-stock VAT 8%  
 30' £22.85 or £41.75 c/w rigging  
 40' £29.75 or £53.75 c/w rigging  
 50' £37.95 or £69.95 c/w rigging



**HAMTOWER with TH3 Jnr. SELF SUPPORTING**  
 Galvanised lattice 10' sections. Free standing with climbing steps. Carriage £3.50 ex stock 8% VAT.  
 30' c/w base grillage ... £165.50  
 40' c/w base grillage ... P.O.A.



**TELETOWER with TH3 Mk.III TELESCOPIC GALVANISED**  
 Carriage and rigging (RX) extra.  
 42' ... £121.00 (RK £28)  
 57' ... £174.00 (RK £28)  
 79' ... £224.50 (RK £49)  
 101' ... £303.50 (RK £76)



**GEM QUAD VERSATOWERS**  
 Tilt over telescopic (£20ft. sections) post mounted versions ex-stock. Tilting action for ease of maintenance and changes of antennas.

### HY GAIN HF RANGE (Carr. £1.00-£2.50) VAT 12½%

The most common approach to the H.F. band beam is the compromise one of a Tribander. The TH3 range being particularly recommended. A more elaborate multi-bander is the mighty TH6DX which overcomes by a total of 6 elements problems of non-constant spacing. Optimum back to front and gain is offered only by the mono-banders. A 203BA with 4 elements on 20 metres provides a big signal. Many stations are restricted by space, planners, finance or a temporary location. The 18AVT vertical offers coverage 10-80m. with a single slender 25' self supporting radiator. It is probably the most popular single antenna of its type on sale today. For greater power handling elimination of traps ultra low radiation angle for good DX without the use of a rotator, the Hy-Tower standing to a total of 50', entirely self-supporting (occupying only 4 sq. ft. of land) is strongly recommended.

BN86 1 f ferrite Balun £12.00  
 103BA 10m. 3 element ... £43.50  
 153BA 15m. 3 element ... £54.50  
 203BA 20m. 4 element ... £103.40  
 402BA 40m. 2 element ... £146.00  
 18V 10-80 Load Vert. ... £24.50  
 12AVQ 10-20, Trap Vert. ... £33.50  
 14AVQ 10-40m, Trap Vert. ... £47.50  
 18AVT/WB 10-80m. Vert. ... £64.50

TH2MKIII 10-20m. 2 ele. ... £94.00  
 TH3INR 10-20m. 3 ele. ... £96.00  
 TH3MKIII 10-20m. 3 ele. ... £137.00  
 TH6DX 10-20m. 6 ele. ... £164.50  
 HY QUAD 10-20m. 2 ele. ... £151.80  
 DR1015A 10-15m. 3 ele. ... £99.00  
 LA1 Lightning arrestor gas £20.30  
 LA2 Lightning arrestor ... £3.30  
 HY-TOWER Vert. ... £162.80

### CABLES RF FEEDERS (Carriage extra) VAT 8%

Feeders are the point where amateurs often falsely economise. For use : mobile a cable with a stranded centre (UR76 etc.), for fixed a long unsupported run without a catenary, or allowing the cable to slap against the mast are taboo, breakages of the centre conductor will arise with disastrous results. If you are using a 3/16 cable changing to 1/8 can be the most cost effective improvement.  
 UR43 1-6B at 10, 4-1 at 70, 6-5 at 144, 12-3 at 432 MHz per 100'  
 RG8/U 0-6dB at 10, 1-5 at 70, 2-5 at 144, 4-7 at 432 MHz per 100'.  
 UR67 50 ohm Heavy ... yd. 33p  
 UR57 75 ohm Heavy ... yd. 36p  
 75 ohms Flat twin ... yd. 10p  
 300 ohm Ribbon ... yd. 12p  
 UR39 75 ohm Medium ... yd. 24p  
 T327 ohm Distribution yd. 20p  
 UR43 50 ohm Solid Cent. yd. 15p  
 UR76 50 ohm Strand Cent. yd. 33p

### SMC TRAPPED DIPOLES (Post 45)p VAT 12½%

For those with limited space, or restricted interests the SMC trap dipole offers coverage of 10-80 (160M) in 108ft. Suspended as a "V" from the tower excellent results on 80 and 40m. are obtained.  
 S 500W P.I.P. 14 SWG ... £19.60 P500W P.I.P. Cu/Terylene braid c/w 75' feeder, etc. £21.75  
 HPIK P.I.P. 14 SWG ... £21.75

### MOSLEY TRI-BAND BEAMS (Carriage £2.50) VAT 12½%

Ever popular for HF bands are Triband (10-15-20M) beams such as the TA33 (or for higher powers the Mustang) providing DX potential from the typical urban environment.  
 TA33 3 ele. 200W R.M.S. £70.00 TA32 2 ele. 300W. A.M. £49.00  
 MUSTANG 3 ele. ... £90.00 MUSTANG 2 ele. 1kW T.B.A.

### GEM QUAD FIBREGLASS QUAD (Carriage £2.00) VAT 12½%

The advantages gained by boomless quad construction are not only mechanical. By the provision of optimum element spacing, on all bands covered, back to front and forward gain are optimised.  
 GQ3E 2 element ... £119.00 GQ4E 4 element ... £238.00  
 GQ3E 3 element ... £178.00 CK1Q 1 ele. Conv. kit... £66.00

### COAX PLUGS (p. & p. extra) VAT 8%

Whilst it is undoubtedly true that the UHF, PL259 range leave much to be desired over 200 MHz, their mechanical performance is excellent. We offer plugs in standard or P.T.F.E. insulation for 1" or (with reducers for) smaller cables, PL259A for specific cable types, nut, 2 or 4 hole latching sockets and a range of adaptors and converters. For the discerning BNC, N and C types are stocked. For accessory connections we hold from stock phono plugs, plastic or metal barrelled, jack plugs, 1/8" stereo or mono, mic plugs, power plugs (for the Yaesu range), and a wide collection of similar ancillaries.

PL259 Standard UHF plug 48p 258 Back to back (female) 80p  
 UHF fixed reducer plug 56p "T" adaptor (2F + 1M) £1.20  
 "Solderless" UHF RG8U 51p Right angle (1M + 1F) 90p  
 "Solderless" UHF UR43 51p Phono car to SO239 ... 55p  
 UG\*\* Reducers ... 12p SO239 2-hole socket... 37p

SEND A LARGE (10 x 12") S.A.E. OR 15p STAMPS FOR YAESU CATALOGUE, STOCK/PRICE, S/H LISTS, ETC.

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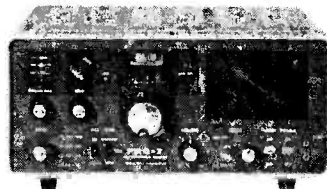
DERBYSHIRE AND LINCOLNSHIRE

## YAESU MUSEN 2 YEAR GUARANTEE '24 HOUR' SECURICOR SERVICE

### THE FRG7, GENERAL COVERAGE RECEIVER Ex-Stock UNPARALLELED IN ITS CLASS AND ONLY £145 (VAT 12½%)

The FRG7 is a general coverage solid state receiver with specifications unparalleled in its price range. It uses a Barlow Wadley Triple-mix, drift cancelling loop for continuous, spin-tuned inclusive coverage of 0.5 to 30 MHz with calibration accuracy better than 5 kHz. Frequency selection is accomplished by setting the RF (pre-selector and range switch), dialling up the required number of megahertz, then tuning the VFO knob as normal.

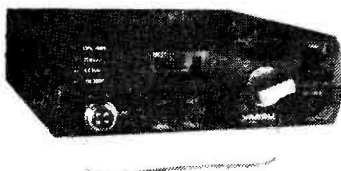
The receiver is sensitive (0.5µV for 10dB S + N/N) (SSB) and stable (within 500Hz for any 30 minutes after warm up) with A.M., SSB and CWV modes catered for A 3 position audio filter, RF attenuator, dial lamp conservation switch, recorder and phone sockets are fitted. It is mains powered, but should the supply fail, or portable operation be required, 8 dry cells are automatically switch in.



### FT223 THE NEW 2M-FM TRANSCEIVER

£139.50, 3 crystal pairs; £152.50, 8 crystal pairs (+ VAT 12½%)

The FT223 is an FM transceiver operating on 23 crystal controlled channels (or by external VFO) across 144 to 148 MHz. For mobile use it is safe, illuminated; meter (Rx "S" and TX out) and main dial (when crystal out). LED's indicate: squelch open, high 10w, or low 1w operation, or air, or if the special frequency is selected. Housed in heavy metal case and supplied complete with mounting bracket cables, connectors, microphone, etc., it is equally at home as a compact (7" x 2½" (3") x 8½" (10½")) base station with a 12v. PSU, (0.45A RX, 1.2A LTX, 2.3A HTX). The dual conversion receiver is sensitive (mosfet RF and mixer), and selective, (12 kHz at 6 dB) delivering 2w. to the internal 3" or an external 4Ω speaker. A switchable repeater access tone burst and a tone squelch option (sub audible selective calling tone T/RX) are all features of this new high quality, low price, transceiver.



### DIGITAL II from KYOKUTO SCANNER AND CRYSTAL T.B. OPTIONS

The Digital II offers complete 5 kHz step coverage across 2 metres and now with the Scanner 33, 25 kHz channels from 145 MHz upwards covered in around 10 seconds. It offers full lock and lockout on all channels. The scanner stops on a required channel for 7 seconds, then unless locked moves on. The bright digital readout comes from 6 seven segment LEDs.

Selectable 10 or 1 watt output for simplex or duplex (up and down shifts), across 144-146 (rx to 149 MHz) from a tiny 6½" x 2½" x 7½". Easily underdash mounted with the supplied mounting bracket, or slipped in place of the broadcast wireless.

For strong handling, and low noise the R.F. mixer, first IF (16.9 MHz) second mixer (and LO) are all FET's. The front end is tuned by varicaps by the DC output of the P.L.L. with superb selectivity provided by a 15 pole (± 8 kHz at -6dB ± 15 kHz at -15 dB) Ceramic filter. LED lamps indicate if the P.L.L. is unlocked or the squelch open. The V.C.O. is directly modulated (for exceedingly linear deviation). Unitary 6 circuit block construction (for serviceability and screening). Selective calling socket.

### The SMC73 General Coverage Receiver

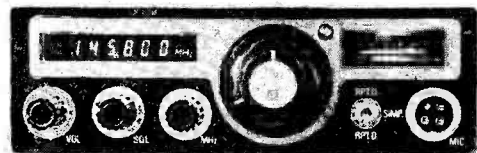
The SMC73 is an all Solid State, Mains and 12v., communications receiver covering 550 kHz to 30 MHz in four overlapping ranges. Frequency readout is by two illuminated dials tuned by coaxial spun aluminium knobs, the larger for general coverage, the inner for amateur dial (40-80m.) band spread (set by use of internal 3.5 MHz crystal calibrator).

FET's are employed in the R.F. Amplifier, mixer, VFO and BFO (these latter two stages being fed from independent stabilised supplies) ensuring good sensitivity, stability (electrical and mechanical) dynamic range, (helped by adjustable RF attenuator), and marked freedom from "pulling" of both the local and beat frequency oscillators. An internal loudspeaker (but with jacks for phones and external speaker), illuminated signal meter, SO239 (UHF) coax. socket and binding posts for antenna switchable envelope (A.M.) and product detectors (SSB/CW) (provision on switch for possible filling of FM demodulator) are all features of this exciting new low price receiver.

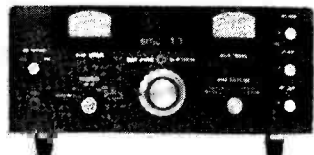
### Microwave Modules Transverters

From Ten, Six or Two Metres (a 101, etc., a 620B or a 221R). 10W output, balanced Tx mixers, low spurious content, high sensitivity with dynamic range. Full converter range stocked S.A.E. details (VAT + 12½%).

MMT 144/28 or 50 2 metres	£79.00
MMT432/28 70 centimetres	£97.00
MMT432/144 Double conversion	£133.00



DIGITAL II £235; CRYSTAL T.B. £10.00; SCANNER £49.50  
All prices exclude VAT at 12½%



SMC 73 Ex-Stock £114.50 (+VAT)

### Yaesu Clock

Analog clock with automatic advancing 24 hour time zone hour disc giving, at a glance, time in principal cities or time zone. Battery powered, self starting, shock resistant.

QTR24 only £13.00 (VAT + 8%) p. & p. 30p



### CRYSTAL FILTERS AND CRYSTALS P & P 20p. VAT EXTRA @ 12.5%

YAESU FM crystals, FT2 Auto, FT224, FT2F,	
FT2FB (£3.75 pair, £2 singles)	
SIMPLEX S (0, 12, 16, 19, 20-24)	
DUPLEX L (0-9) and IR (0-9) (T & R)	
YF30F350 350 Hz F*101 CW W £18	
YF30F600 600 Hz F*101 CW W £18	
YF30F12 12 kHz F*101 FM £18	

TRIO & STANDARD FM CRYSTALS	(£3.75 pair)
TR2200(G), C146A, C826MB	
SIMPLEX S (0, 20-24)	
DUPLEX R (3-7) and IR (3-7) R	
YF90H500 600 kHz 9 MHz CW £16	
YF90H2.4 2.4 kHz 9 MHz SSB £16	
YF90F12 12 kHz 9 MHz FM £18	

YAESU AND OTHER CRYSTALS	(£2.20 each)
FT75(B), 38-666, 42, 50.5 MHz	
FT221(R), FT200(B), FT301(S), FT101(EX)	
SSB carrier crystals (HC18/U) 9 & 10.7 MHz	
YF107M600 600 Hz 10.7 MHz CW £16	
YF107M2.4 2.4 kHz 10.7 MHz SSB £16	
YF107M12 12 kHz 10.7 MHz FM £16	

### G WHIP HF MOBILE (Carriage 90p) VAT 12½%

Tribander 10-20m. (+LF) £14.61	LF 40,80 or 160 ... £4.87
Multimobile 10/20 (+MM) £18.06	MM 40,80 or 160 ... £4.87
Flexiwhip 10m. (+FF) £12.42	FF15, 20, 40,80 or 160 ... £5.04
Basemount ¼" hole mount £2.20	Telescopic whip for coils £1.85

### TAVASU HF MOBILE (Carriage 90p) VAT 12½%

Whip Chrome 2 sect. 60" £3.88	Base heavy duty ... £5.18
Base section chrome 16" £1.94	Complete monobander ... £14.95
Resonators 160-15m. £3.88	Complete 5 bander ... £25.92
Adaptor 24 to 20 thread ... 55p	

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### VAT EXCLUSIVE (8 or 12½%) PRICES ACCESS - BARCLAYCARD - MAIL ORDER

Items on this or other SMC advertisements are available from SMC, SMC Leeds, Tweedy and Agents.

### JACK TWEEDY G3ZY

"Ham Shack," Roughton Lane, Woodhall Spa, Lincs.  
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# AMATEUR RADIO

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## YAESU BARGAINS now in **BIRMINGHAM**

WITH A 2 YEAR GUARANTEE

**ANTENNAS AND ACCESSORIES :** We now have a large range from stock  
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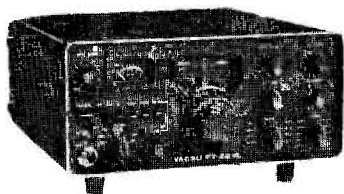
FOR DETAILS AND PRICES SEE THE MAIN SMC ADVERTISEMENTS IN THIS MAGAZINE

We take great pleasure in announcing that in association with S.M.C. we are able to offer the largest range of HF and VHF equipment in the West Midlands.

Our renowned servicing facilities for Eddystone are now extended to cover all SMC's range.

We literally hold millions of components in stock, for the enthusiastic constructor.

Come and browse around, callers are made very welcome.



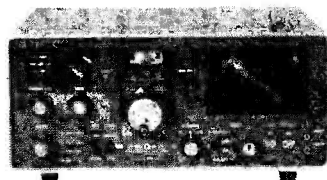
**FT221R**—NOW costs less, we have beaten inflation and can offer at lower prices than last year. As an added bonus all new SMC supplied FT221Rs cover 4 MHz and are equipped with 600 kHz and 1.6 MHz shifts.

YAESU's state of the art, fully modular plug in board, multimode, 2m. transceiver renders over the boards "rats nest" wiring obsolete. A 134 MHz VCO automatic varicap tuning of transmitter and receiver, gives you an exceedingly clean signal sensitive receiver combined with good strong signal handling.

**FRG7**—General coverage receiver unparalleled in its class. Ex-Stock. With 2 year guarantee. NOW IT COSTS LESS.

The FRG7 is a general coverage solid state receiver with specifications unparalleled in its price range. It uses a Barlow Wadley Triple mix drift cancelling loop for continuous spin tuned inclusive coverage of 0.5 to 30 MHz, with calibration accuracy better than 5 kHz. Frequency selection is accomplished by setting the RF (pre-selector and range switch) dialling up the required number of megahertz, then tuning the VFO knob as normal.

The receiver is sensitive (0.5uV for 10 dB. S + N/N (SSB)) and stable (within 500Hz for any 30 minutes after warm up) with AM SSB, and CW modes catered for. A 3 position audio filter, RF attenuator, dial lamp conservation switch, recorder and phone sockets are fitted. It is mains powered, but should the supply fail or portable operation be required, 8 dry cells are automatically switched in.



**YAESU + KEN + KYOKUTO + SMC + BELCOM + MICROWAVE MODULES + KW, etc.**

**ANTENNAS AND ACCESSORIES :** We now have a large range from stock

JAYBEAM, HYGAIN, CUSHCRAFT, MOSLEY, BANTEX, CDE

For details and prices see the main SMC advertisements in this magazine.

**EDDYSTONE SALES AND SERVICE :** Our usual full, personal attention to your requirements  
Manuals for Eddystone receivers are available phone for details.

**Eddystone EB35 Mk. III in stock at £200.00 + VAT**

**Multimeters and Injectors (Carriage 75p VAT 8%)**

80 Microtest ... **£14.50**  
68R Microtest ... **£22.50**

68G Microtest ... **£18.50**  
M63 Injector ... **£5.95**



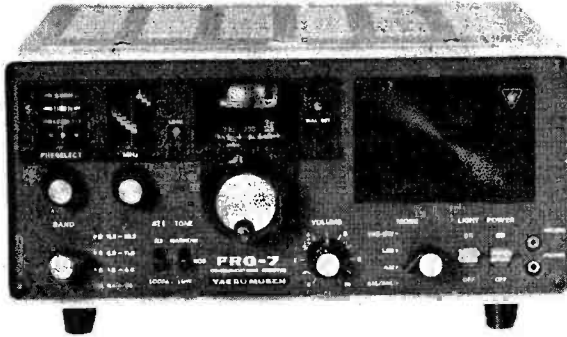
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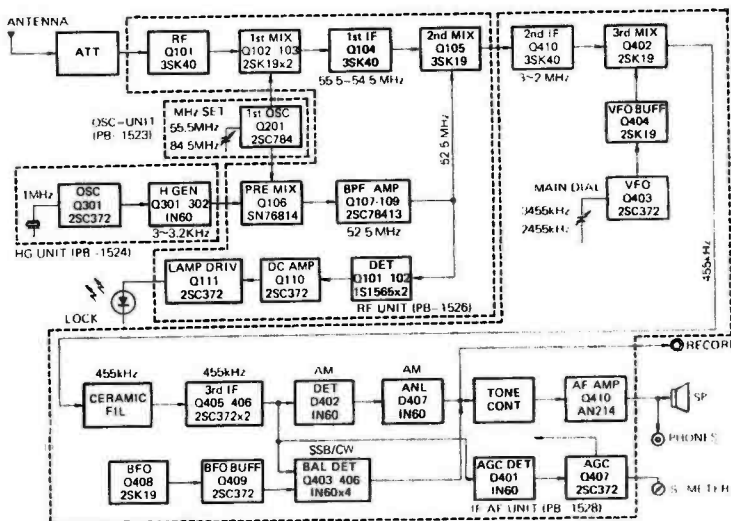
# YAESU MUSEN

## FRG7 Synthesised General Coverage Communications Receiver.



The signal path starts with the choice of 3 antenna connectors : for 1-6-30 MHz, a 50/75 ohm feed (to a SO239 (UHF) coax socket and a binding post) and for 0.5-1.6 MHz (medium wave) a separate high impedance binding post. A 3 position 0-40dB switchable attenuator aids reception of very strong signals and reduces adjacent channel interference. The low noise MOSFET RF amplifier provides a SSB sensitivity of 0.25 $\mu$ V (for 10dB N $\pm$  S/N at 10.5 MHz) and is sharply tuned by a well calibrated "pre-selector" capacitor with 4 band switched coils. Its output is low pass filtered (fc = 35 MHz) removing VHF image problems from the following mixer. This comprises a pair of JFETs, driven by the "MHz set" 55.5-84.5 MHz, oscillator, which upconverts the signal to the band pass first IF to 55 MHz  $\pm$  500 kHz where it is MOSFET amplified. The second IF of 2-3 MHz is produced by a FET mixer by heterodyning with the synthesiser derived 52.5 MHz signal. A 1 MHz crystal oscillator and diode harmonic generator produces a 3-32 MHz comb spectrum. This, with the first heterodyne oscillator (MHz set) is fed to a dual balanced i.c. pre-mixer. The output is expurgated by a multiple stage selective amplifier producing the 52.5 MHz second oscillator. A small fraction of this is rectified, DC amplified and lights the "lock" LED (saving power) when the MHz oscillator is malset. The 2-3 MHz signal is MOSFET amplified and fed to the third mixer (a JFET whose input and output are tuned by capacitors ganged to the main tuning control) where it is heterodyned to the final IF by the main VFO which covers a 1 MHz range (2.455-3.455), is clearly calibrated, to 5 kHz (or better), well buffered, and highly stable. The third (455 kHz) IF starts with the ceramic selectivity element and is followed by two stages of bipolar (the first in the

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have gained world wide acclaim over several years, but to arouse new interest by launching on to the market certain new products such as our 50 MHz and 500 MHz frequency counters, 10 500 MHz prescaler and our latest range of all-mode linear transverters for 144 MHz and 432 MHz. This month we are briefly reviewing this wide range, but please do not hesitate to contact us either by post or telephone for any technical details, or to request detailed data sheets for any of the products mentioned below.

## 144 MHz.

- MMT144/28** : 144 MHz linear all-mode transverter.  
Features : 10 watts RMS output power;  
30dB receive gain;  
2.5dB noise figure;  
Aerial changeover achieved by a pin diode switch.  
I.F. : 28-30 MHz.  
Price : £88-88 inc. VAT.
- MMCI44/28** : Single conversion 144 MHz receive converter with protected dual gate MOSFETs.  
Typical gain : 30dB. Noise figure : 2.5dB  
12-14, 14-16, 18-20, 24-26, 28-30 MHz.  
£20-25 inc. VAT.
- OTHER I.F.'s :**  
Price :
- MMCI44/28LO** : As above unit but has an extra buffer amplifier for 116 MHz for use in transverters.  
Provides 5mW at 116 MHz.  
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- Price :
- MMCI44/2** : Double conversion 144 MHz receive converter which achieves good image rejection at low intermediate frequencies.  
2-4, 4-6 MHz.  
£20-25 inc. VAT.
- OTHER I.F.'s :**  
Price :
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Typical gain : 18dB. Noise figure : 2.5dB.  
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- Price :

## 1,296 MHz.

- MMCI296/28** : 1,296 MHz receive converter utilising a hybrid ring mixer, with a matched pair of schottky diodes driving a MOSFET I.F. amplifier.  
Typical gain : 25dB.  
28-30, 144-146 MHz.  
£28-13 inc. VAT.
- OTHER I.F.'s :**  
Price :
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Will accept up to 30 watts of 432 MHz drive and achieve 60% efficiency.  
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- Price :

## 432 MHz.

- MMT432/28** : 432 MHz all-mode linear transverter.  
Features : 10 watts RMS output power;  
30dB receive gain;  
3-0dB noise figure.  
Aerial changeover achieved by a pin diode switch.  
I.F. : 28-30 MHz.  
Price : £109-13 inc. VAT.
- MMT432/144** : 432 MHz DOUBLE CONVERSION all-mode linear transverter.  
Features : 10 watts RMS output power for 10 watts 144 MHz input.  
10dB receive gain.  
3-0 dB noise figure.  
Aerial changeover achieved by a pin diode switch.  
I.F. : 144-146 MHz.  
Price : £149-63 inc. VAT.
- MMC432/28** : 432 MHz receive converter featuring 2 RF amplifiers and a MOSFET mixer.  
Typical gain : 30dB. Noise figure : 3-8dB.  
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£24-75 inc. VAT.
- OTHER I.F.'s :**  
Price :

## DIGITAL PRODUCTS

- MMD050** : Six digit 50MHz frequency counter.  
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Input sensitivity : Better than 50mV RMS.  
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- Price :
- MMD050/500** : Six digit 500 MHz frequency counter.  
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- Price :
- MMD500P** : Divide by 10 prescaler to give 500 MHz capability when used with MMD050.  
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Output level is 2.5 volts p.p.  
Input sensitivity : Better than 200mV.  
Frequency range : 50-500 MHz.  
£27-00 inc. VAT.
- Price :

## 70 MHz.

- MMC70/28** : Receive converter for 70 MHz.  
Similar to MMCI44/28.  
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£20-25 inc. VAT.
- OTHER I.F.'s :**  
Price :

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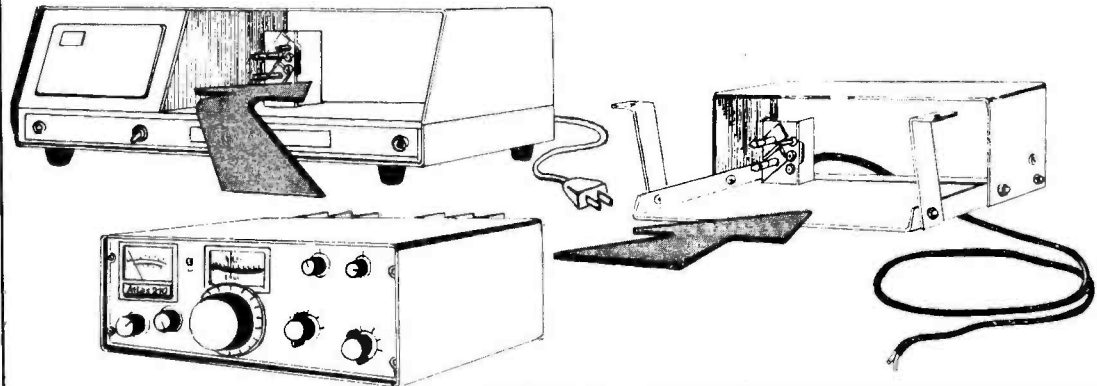
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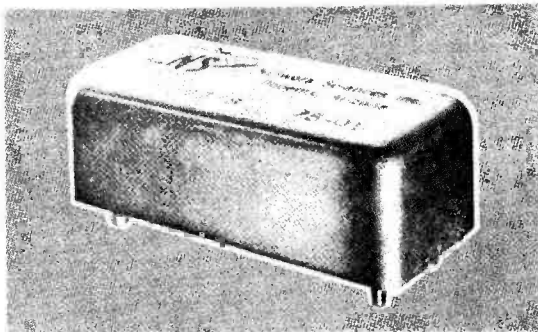
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The Plug-in Mobile Mount has specially designed rear connectors for DC power input, antenna jack, and mic. jack, that match the same connectors on the Atlas transceiver. Thus all necessary connections for mobile operation are made in seconds by merely sliding the unit into the mobile mount.

Fixed station operation is achieved in the same easy manner, since the Atlas Model 220 CS Console Supply has the same rear connector system as the mobile mount. The internal speaker is automatically disconnected and the front facing speaker in the console is turned on. Also the mic. jack is brought out to the front, as well as a headphone jack. The Model 220-CS operates on either 110 or 220 volts. selectable. 50-60 cycles.

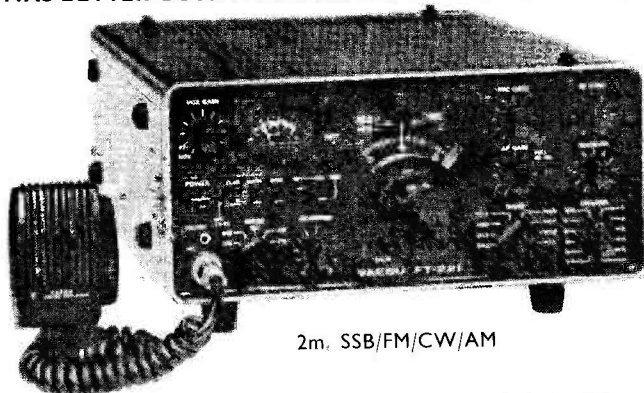


\* **Super Selectivity** : The Atlas transceivers feature an 8 pole crystal ladder filter designed especially for Atlas by Network Sciences of Phoenix, Arizona. This filter represents a major breakthrough in filter design with unprecedented skirt selectivity and ultimate rejection. Its superior selectivity has been tailored to take full advantage of the extremely wide range of signal levels that the Atlas front end is capable of handling.

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# SHORT WAVE MAGAZINE

(GB3SWM)

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APRIL, 1977

No. 402

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Editor: PAUL ESSERY, G3KFE/G3SWM

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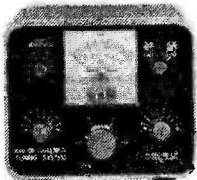
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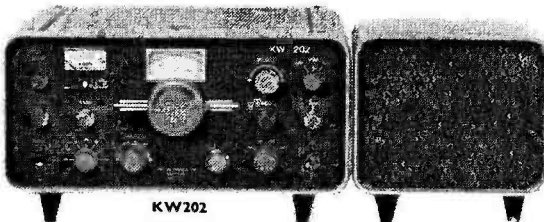
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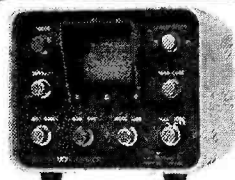
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# *The* SHORT-WAVE *Magazine*

## EDITORIAL

### ***Policy***

Ever since its first issue, the SHORT WAVE MAGAZINE has been independent independent in the sense that it will not act as a mouthpiece for any group of people—many have tried to buy the approval of this column, none have succeeded. That goes for the new regime as much as the old.

We come to our task when the hobby is at the crossroads, both technically and in relation to the world in general. On one hand, ever-increasing sophistication of equipment, to the point where the owner sends it away to be mended because it is beyond his abilities and test gear to repair it. On the other hand, an increasing awareness of elegance in the station, in the beautiful simplicity of some of the QRP gear—a good signal with a minimum component count. On the one hand, a breed of amateur who has never tuned a receiver but simply has a switch to take him from channel to channel, repeater to repeater, with his black box; his ambit depends on his local repeater not failing. On the other hand to this we have the techniques of Moonbounce, and Oscar, taking amateurs right to the limit of their abilities both technically and on the operating plane.

To write fairly, and well, of all these things, is a daunting task; the measure of success the approval of you, the reader, expressed by your continued support. For our part, we will do our utmost to justify that support.

*Ed. H. H. H.*  
*K3KFE.*

## COMMUNICATION and DX NEWS

E. P. Essery, G3KFE

IT is really quite remarkable how all-embracing Mr. Murphy and his (in)famous law are, in the practice of any activity. For example, one morning we noticed the lead-in to the long-wire was snapped-off at the window, leaving the aerial end flying merrily in the breeze, so, we made a mental note to fish it back in and remake it as soon as convenient. However, next time we looked at the gear, it didn't seem to load up quite like it normally does on the HF aerial—not surprising when we discovered the flying end of the long-wire was nicely wrapped around one of the more important parts of the anatomy of the HF aerial.

Luckily no damage was caused to the rig by this mishap, as we always "tune up" the ATU first as near as can be on receive before offering it any RF.

### On the Air

No doubt about it now, things are quite definitely beginning to show a slight upturn. Indeed, at one look at the sun, it had a definitely "measles" look about it, although not much of the sun spots seem to have stamina, with the result that conditions in practice have been somewhat like the curate's egg.

### Ten Metres

One supposes, having made the statement in the previous paragraph, it behoves us to prove our point—and what better way than by mentioning Ten-metre activity? However, before we look at the recent past, let us gaze into the crystal ball. The Ten-metre Activity Day game, designed to ensure retention of the band by demonstrating 28 MHz activity at the bottom of the solar cycle, has been quite entertaining; the next one will be for 24 hours from 0001 GMT, and to add a little to the fun, it will be in the form of a contest with some interesting prizes. *Lowe Electronics* are providing a *Hansen SWR* bridge, *Cambridge Kits* a tunable AF notch filter kit, *Polar Electronics Development* a VHF wavemeter, and G4MH's *Amateur*

*Radio Shop* a copy of Part 1 to the new *RSGB Communications Handbook*; it is hoped there will be another one as well, so that it will be possible to present first and second places in the CW lists, and the same for the Phone types, the while leaving a prize to be picked up by the leading SWL entrant. Even if you don't like contesting as such, please, as many as can, come on and swap a few reports and numbers, and if you have any thought for the retention of the band, show an entry. Swap the usual RS plus three figure serial number; the frequencies to watch should be 28 to 28.1 MHz for CW, 28.5 to 28.6 MHz for the Phone wallahs. Send your logs in to D. A. Whitaker, Hillcourt, 57 Green Lane, Harrogate, N. Yorks, posted to arrive not later than May 31. Even that deadline is going to make some hard work for SWL Whitaker if he is to get some results out in time to be "news."

Turning to the last one, it fell, sadly, on the day when the ARRL Contest was on, and so much activity was syphoned off to 21 MHz. However from the 22 logs, there were a total of 178 U.K. stations active, mainly having groundwave contacts, although the band did open to Africa around 1100 with ZE1AM, and again at 1345 to ZE8JB, and yet again around 1500 to ZS6—this latter opening seemed to have two peaks in short order, ZS60S being reported at 1459 and again at 1511z.

The only other mentions of Ten in the reports came from G3PKS (Wells) and our old friend ex-G2XC. To deal with 'PKS first, Jack worked G31CH near Cullompton in Devon—G31CH has an indoor loft aerial, and clearly the path must be good between them as the QSO was repeated some days later. G3PKS comments that he wonders who was most surprised, G31CH or G3PKS, at the 599 each way! Jack also mentions the Hinckley Point Radio Club, who have a net on 28.9 MHz at 1900z, in which he has been made most welcome; he feels sure they would be pleased to receive other check-ins

from people within range, each Tuesday evening.

### Fifteen Metres

This one seems, in general, to have been more "open" than most of us had realised, with the result that the few users of the band were able to chase their DX relatively easily. Ex-G2XC is still experimenting with his 21 MHz loft aerials, getting them right "on the nose"—he has now built up the "Antennascope" from the September 1976 *SHORT WAVE MAGAZINE*, and finds it an extremely useful tool; one interesting thing he did with it was to use it to measure the input impedance of his SB303, which turned out to be around 100 ohms rather than the "nominal 50 ohms" given by the maker. This is indeed very true, and the writer knows of no receiver, amateur or professional, right up into the very expensive beasts, where the input impedance is always what it should be; and indeed to hold the nominal figure over several bands and across the whole of any individual band is as near as dammit to an impossibility. It is for this reason that yours truly prefers to use a noise bridge for his aerial measurements in which the receiver becomes no more than a null detector, and even then is "padded off" by an attenuator between the bridge and the receiver to make quite sure the receiver input reactance is not yielding false answers. To his DX; Ted noticed this "DX on a dead band" business several times, particularly involving 9M2DQ and his regular 1000 skeds, and again with ZS6CR running his twice-weekly skeds with the Horn-dean club locals. CW has accounted for A2CED, FRØDCK, HK1DP, KZ5VV, VP8PL, this last believed to be in S. Orkney. VS6HY, plus SSB contacts with FMØCOO, FR7ZL/T, PJ2ARI, PJ31DP, ST2SA, VP2AAB, VP2MXW, VP2SAU, VP8HA, VS6DO, VS6EG, XE1KB, YB1CS, ZL2NY, ZL3PX, 5U7AG, and 9D5D.

G3CED/G3VFA with the QRP rig seem to have managed to find a





The husband-and-wife Top Band team of Ludek (OK1HAS) and Dagmar (OK1DDL) Lendl.

bit more time for operating, and the CW made the grade with UA6BF, K4AIZ, WB2SJK, UK6AAJ, and a considerable number of Europeans, not to mention an indication of the presence of the Poltava Pest in the log whenever it surfaced—this last seems a good idea, particularly in the knowledge that the West is also getting ready to test out and operate an over-the-horizon radar if newspaper reports are to be trusted.

Nice to have a log in again from G4EVO (Broadstairs), not a thousand miles from G3CED, and also with QRP and a Joystick. A note in the log indicates that on New Year's Eve the OM went down with flu, and no sooner was he up again that he acquired a poisoned forefinger and thumb on the left hand—a good start to the year! However, once the offending digits were back in condition, they were given, shall we say, an adequacy of exercise in pounding the brass.

A distinct change of tune is to be noted at G4EAN (Nottingham), who is actually finding time to operate—the saltmine must be running dry! Seriously though, it is most frustrating to have a shack well equipped and a good aerial system and have to see it go to waste for want of a few spare manhours. 21 MHz last month yielded a "first" which Ian forgot to mention in KV4CI, while the present crop include EA8OA at noon, WB4VHE and WB2IMU both CW and worked as the "afters" bit of the lunch-break, plus K4DUZ, I8ZFO, and ZS5BH which were all taken at the

time of the afternoon tea break.

Down in Newton Abbot lives G4EDG, who comments on the way the JA's—even the strongest—seem to drop out so suddenly at noon, almost in mid-sentence. However, the bad take-off to S. America on HF didn't prevent Steve from knocking off YB0ACT, OA7BI, 6W8LX, ZD8DO, VP2KJ, WB3BEV/YV1, JA8UI/PZ, W6QL/VP2A, JR3XMG, JA2SE, JR2STX, VP9AT, LU9CV, W's, VU2LO, K0KES (Nebraska), and K4RID/O in Colorado.

G8PG (Wirral) seems to be a real QRP fanatic, with 40 countries worked in five continents; and so far this year the improvement in band conditions has been noticed, 9 watts of RF yielding contacts with UA9, UL7, and EP2; during the CW leg of the ARRL contest, the first weekend saw 3 watts to a long-wire at 22 feet produce some thirty transatlantic contacts in six hours, W1-2-3-4-9 plus VO1AW, the latter being of considerable interest to Gus in that he flew right over it on his trip to the States, and what he saw makes him reckon that VO1AW has the best location in all North America for working Europeans.

Next we have A4XGZ (Salalah) who used 21 MHz quite a lot, and his SSB seems to have been used to satisfy the European demand during the mornings, while after lunch it was the DX trail, over to South America; an odd one noted in the log was BU5CZ—surely not a genuine Chinese station, or was it a typing slip? On an entirely different

tack it is very noticeable how Tony can when the band is open, run through a whole log page without ever moving his own frequency—so much different to logs from, say, G, who are for ever "on the move" around the band in the search for DX.

G3PKS (Wells) has a sense of humour—he remarks that on February 19 there was a contest on and so he "exchanged 599 reports—fairly truthfully—with half a dozen stations in a half-hour!". Pressing on to February 24, W6QL/VP2A was raised, and the first three days of March were productive of LU1HDC, 4X4HQ, W5AC who was lost in noise, WB8HOG, A9XS, PY4BYI, and UA0BL. March 2 also yielded an interesting contact with YU3EO/MM, who sounded as though he was well into the Bristol Channel but in fact was near CT3; he was again 599 on the following day when he was getting close to Gibraltar. On to March 4, and this was a bumper bundle indeed, with JR6RRD, UB5UBM, UJ8AQ, EP2LA, YO9APK, W2MKN, and, after the call to eat had been responded to, PY1DUB was hooked just as the band was dropping out. A Gotaway was VU2BK, who went back to an OH; both sides of this contact were heard and all was set to call him again when the dreaded dinner bell called!

## Twenty

As usual, this is where the big business is transacted; and our first reporter here is G2HKU

(Sheppey), who incidentally seems to have been rather more "radio-active" than your conductor can ever recall; SSB contacts were made with ZLIVN, ZL3RS, ZL3SE, ZL2GG, ZL1AAE, ZLIVE—which at least showed quite definitely that Ted was getting out on the one hand, and on the other that ZL was still there—your conductor, who admittedly cannot be on at the best times for ZL has almost forgotten what ZL means! A rather greater variety of stuff was snapped up on CW, such as JA4AQZ, WA7BSZ (Montana), W7ISY (Utah), VK3UOT, UH8BZ, W6MTJ and ZLIBLR who is ex-G3RHJ.

F9UO is another of the Joystick brigade, and to make life more interesting he lives in one of these enormous tower blocks. This makes his log all the more interesting in that one can hardly imagine a worse location for an amateur station, and yet, like last month, F9UO seems to be quite able to hold his own: all continents were worked with the exception of Oceania: 9D5A, umpteen stations in North America, VE6, a goodly crop of South Americans, and a varied assortment of Asians. Africans were there too, but not in the same quantity—a situation which, one fears, is only too common in this day and age.

G3EVO, once he was operational again, seems to have found his happy hunting-ground on Twenty, and has to a considerable extent left Forty and Eighty alone. Looking through the G4EVO log pages—one can imagine his frustration when the "HM3" turned out to be no more than an HA3 sending Martian Morse! Summing it up, G4EVO seemed to be out of luck over the period under review, working umpteen Europeans but not managing to penetrate further.

On the other hand, G3CED, so close to G4EVO and with, broadly, similar gear, seems to have fared rather better, though to be fair George has comments on his log about "dead lucky here!" on the DX log entry lines. Apart from W's a call to JA7YC/MM was returned, and Aki was way down in the Antarctic; while the UA1ZBQ in Murmansk brought back lots of memories—George's last contact with this area was back in 1928, when he was working from HMS

Godetia in what history will probably call the first cod war; the ship had a rotary spark transmitter, and ashore George also used a Poulsen Arc—but the 2-watt contact of 1977 was much easier to complete, such is the nature of progress!

### Digression

A polite way of saying we've lost the trend of thought! But, seriously for a moment, that remark about spark in the last paragraph rings a bit true—the broad bandwidth of the damped wave from a spark rig would mean that the actual power on a particular frequency was probably pretty low, so that a guy with a narrowband receiver would be at a disadvantage compared with the wider band older receivers. And, come to think of it, the actual rate of progress in the communications field back in the 1920's was much faster than it has been in the last twenty years.

If you are quick on the draw, this reminder of the CQ WW QPX Contest weekend is of use—swap a five-figure number comprising RS plus the usual serial number starting with 001. QSO points are three for each contact on 14, 21, 28 MHz, and six on 1.8, 3.5 and 7 MHz; the multiplier is the total number of different prefixes worked. The contest starts at 0001 on Saturday, March 6, and finishes at 2359 on March 7, which should give you plenty to do: but you must take 18 hours out of this for a rest period, divided into up to five periods all to be clearly marked in the log.

From ARI, we have advance information that to celebrate the 50th anniversary of that society's founding, there will be some form of celebration in Florence in September this year—it all sounds quite interesting, and includes, we note, a session at which the ITU Convention in 1979 can be subjected to international scrutiny. For the rest there would appear to be a nice balance between ceremony, the appetite, history (by way of an exhibition) the future (by way of seminars on this-and-that), an operational station IK50ARI on all the permitted bands, and an effort at both EME and satellite working. 15XRR is the chap with all the data at his finger-tips; but we understand he will in due course send more

details. However for the record Renato Regazzini, 15XRR Via Dell'Agnolo 76, Firenze 50122, Italy, should reach him if you feel you have anything to contribute or want him to make you a reservation.

### Top Band

Gets hardly a mention this time, with only G2HKU showing a goodly number of contacts. SSB yielded GD4BEG, GM3TMA/A (Fair Isle), KIPBW, PA0HIP and PA0PN and YU2HDE; CW was used to work YU2RQG, YU2RTW, OL8CGB, OL0CFI, OL5AT, OL5AUZ, YU2OB, OH3PE/OH0, OE1KTW, KV4FZ, GM3CFS, OK5TLG/P, GM3ZSP, GW3GWX, GM3PFQ, OK1HCH, DL1FL, YU3AR, OL9CGL, DL8CT, E14BK, EI9J, GD3FXN, and OK1DDL.

Steve at G4EDG is intrigued with the band, he having got one of Holdings mod-kits for his FTDX560; it worked out easily on the receive side, but there were some minor snags with the transmit position, which were soon sorted out. An initial trial with the eighty-metre aerial plugged in and the rig on Top Band seems to have been mildly pleasing, with the Europeans in the bag and a couple of W's heard at good strength, so a special exercise now is to build a dedicated Top Band aerial and take a serious interest in the band—Steve seems to have progressed ever downwards in frequency since he has been writing—one begins to wonder whether he'll end up at DC and then turn into a *negative* frequency?

### Eighty

Seems largely to have been only mentioned seriously by the QRP gang on CW—and yet, the more one digs into the letters and logs, the more one realises that a tremendous amount of work is being done on the band in a quiet sort of way. F9UO's use of different coloured pens for his loggings on each band emphasises the point somewhat, Rene having covered all of Europe, and kept a weekly sked with G3VMK which they both seem to have no problem whatsoever in keeping, as the "time" entries in the log attest, not to mention the reports exchanged.

G2NJ (Peterborough) seems to have had a fight with his typewriter:

a close-run battle but Nick eventually beat the machine into submission. However, from your conductor's point of view it was a little odd to receive a report on several sheets of paper each smaller than any standard size, which when married-up in the correct order ended up as a coherent thought! A later letter indicated, as we say, that the G2NJ machine had been cowed into typing whole sheets of paper. Looking at the reports, G2NJ felt the most interesting was with G6AB in Holland-on-Sea, who had a half-watt and a very potent signal. G6MU in Bognor Regis was another QRP chap with a big signal, and G6MU/G2NJ were having QSO's in those halcyon pre-1939 days; and G2FWA, just in the testing process after building an HW8. G2CAS of Harrogate, who had three watts to a bit of war-surplus gear and was getting out well enough for him to be tail-ended just as Nick was closing his own QSO. G3KPT of Birmingham, G3FMW of Harrogate, G3UYM of Hitchin, Herts., and G2CP of Scarborough who disappeared before G2NJ could raise him—all the contacts around the mid-day time.

G2BJY (Walsall) seems to have had fun in the Contest with his CW, with all W call areas worked. VE1-2-3 likewise, VE6 and VE7 escaped. For the rest of the month, under non-contest stations, Geoff worked A9XBC, EA8AT, EA8FO, IKØLYN, ISØIGV, IT9GXE, IK9PBR, and IK9USV, both in Sicily, JA3IG, JA5CP, KV4AA, OH3XT/OH0, TF3YH, lots of UA9's, UH8HBR, lots of UK and UA7's, a rubber-stamp one with UK1ZAA/P, UAØGWB, WWOIX and VE7CM, apart from the W call areas and VE1-3.

Eighty for G4EDG was largely CW, Steve having decided that the SSB QRM is too much for him to be bothered with. The static level has been creeping up a bit over the latter part of the period, but there were some good times; CW QSO's with UH8HA1, 3AØGZ, JW9WT, OY2H, U18CC, ZL1ST, WA8TOB/C6A, ZL4AV, DK4BP/5N/MM, YV1AD and W5UN, and SSB with F8ZZ, FM7WE, 9K2DR, KG4FU, and 9Y4NP.

### Now Forty

A good band, largely wasted. That is, if you *want* QRM! Also, insomnia is required if success with the real DX is desired. That situation suits G4EDG down to the ground, even though his Gotaway list contained such as JD1AFH, HS1ALD, and WA6EGL/VQ9; the latter had the right idea when he went to split-frequency working, but he went just too far for Steve's RIT to cope with; so, an external VFO adorns the rig now, against a repetition of the incident. One bad thing about the band is that the Plague from Poltava appears to have found a new home on the band, in which it is strong enough to compete with the BC stations. With all these problems, G4EDG still managed to communicate with PYØZAE, LU6EF, JW9WT, KP4ECS, ZP5AO, LU2JV, CN8CF, PY7ND, FG7XA, UM8MBA, WIHUY/VP9, AP2MC who said he had ten watts to a dipole, W7ZMD in Arizona, YV1AD, K5RC, 9D5B, ZL2UV and of course the W's.

It was all CW for G2HKU, who tangled with W1DA, W2GW, N3EA, W4DHZ, K2UME/4, W4QM, ZL3LM, and YV1AD.

Blue is the colour to look for in the F9UO log, for his 7 MHz contacts; but one gets the feeling that Rene just switches the gear to Forty for one whole day once in a while, so he can recover strength for the other bands. Be that as it may, the F9UO signal found its way to various European locations.

As for G2BJY, Geoff seems to have concentrated on the I and IK signals, for the ARI award. However, he would have liked to work the VK and ZL signals but they have not been very good to him despite the fact that G4DF in Kenilworth can work them at will.

### Miscellany

A letter from A4XGQ (Masirah) indicates that he is now QRT, as his gear is all packed away for the trip home even though he himself does not expect to be away until April 12 or thereabouts.

The first Malpelo effort for some years will have come and gone by the time you read this, HKØTU having been operational over the

weekend March 12-13. They were allowing a goodly margin for landing and leaving, and when one looks at the photograph of the place that appeared in the columns of West Coast DX Bulletin, one rapidly realises why! QSL's should go to Liga Colombiana de Radioaficionados, P.O. Box 584, Bogota, Colombia. VR3AH and VR3AR look to be hitting the DX-pedition trail, taking in such places as VR3 (Tuvalu), VRI (Gilberts), 3D2 (Fiji), FK8 (New Caledonia), FW8 (Wallis), 5W1 (Western Samoa) and ZK2 (Niue) if the plans fall into place as they should.

That S8AAA on whose authenticity we quibbled last time does look to be the Real McCoy.

At the time of writing F6BBJ was planning to go to Comoro, either with his own call or to visit D6AA, and play over the contest weekend; so again by now he will have departed, and, if all goes well, will surface at Mayotte, and then, if the augurs are on his side, Geysir Reef, followed in its turn by a session on Glorioso.

Looking a little more forward (why the blazes do we always get to know just in time to tell you it's all over?), we see an operation from Kure being planned, KM6EB being the instigator of the plot.

The problem of the Southern Sudan and its country status is now complicated a little more in that DL7FT reports that he will handle cards for ST2RK/ST0, and STØRC (the latter will be the "proper" call once the licence has been sorted out), and Frank also says the papers will be forwarded to ARRL for their DXAC to decide—which may well mean that at long last they will declare the Bill Irindone's ST2SA/ST0 was also legal.

### Sign-Off

Our deadline for next time will be April 8; if you are in any doubt on a given month the rule is: Look for the *last* Friday in the month, and then work back 17 days. This will give you the deadline for the month concerned. Then, write out your reports (not forgetting a Table entry!) and send them to: CDXN, SHORT WAVE MAGAZINE, 34 High Street, Welwyn, Herts., AL6 9EQ.

## 40-WATT P.E.P. LINEAR AMPLIFIER FOR TWO METRES

D. JOHNSON, G4DHF

WITH the similarity in power output from most commercial VHF equipment, it is often desirable to be able to increase power to overcome QRM, and to increase the DX working potential of the existing SSB transceiver. The unit described was designed as an "add on" unit to be driven by a 10 watt SSB transceiver, is of small size, and can be switched in and out of operation easily.

Several thousands of PT4176 series VHF power transistors have poured onto the market in recent years. The PT4176D is a 60-watt dissipation device, designed originally for Class-C operation and has a maximum rated power input of 240 watts around 80 MHz. This device has retailed for under four pounds! The unit described utilises this single device, but similar transistors may also be used provided that HT voltage and bias arrangements are altered accordingly.

### Circuit Description

When no voltage is present on relays RL1 and RL2, transmit power and receive input are unaffected to the transceiver. When RL1 and RL2 are wired into the 12 volt p.t.t. line of the transceiver, on transmit drive is applied to the base of Tr1 via the impedance matching network consisting of C1, C2, L1 and C3. TR1 operates as a Class-A amplifier, receiving bias from the potential divider of VR1 and R2. For reasons of stability in the bias network it is important that a "trimpot" of the specified value is used. Miniature carbon presets are not suitable. The RFC's in the base and collector circuits provide isolation from RF travelling to the HT rail. Miniature ceramic capacitors C4, C5, C7, C8 and C9 provide the necessary decoupling. It is important that

C6 is not omitted and is of the type specified, as without it there would be a great tendency for LF oscillation of the PA.

The collector circuit of Tr1 is matched into 50 ohms by means of C10, L2, and C11. No switching of HT to the PA is provided. This was found unnecessary as in operation the PA idles during receive at about 50 mA. Only when drive is applied on transmit does the PA draw about 4 amps on speech peaks. Relays RL1 and RL2 are miniature 12 volt s.p.c.o. relays which were chosen because of their large change-over contacts. Although obviously not the "state of the art" method of switching they have proved entirely satisfactory, and have simplified construction.

### Construction

The PA is built on double sided fibreglass circuit board. Large earth planes are provided for the large circulating currents around Tr1. Islands etched into the earth plane allow components to be mounted directly on the board. The unit is housed in a diecast box which provides both adequate screening and suitable material for dissipating heat with the aid of a large heatsink mounted on the box. Tr1 should be the final component

### Components List Linear Amplifier

C1, C2, C10, C11	= 3-30 pF trimmers	RFC1	= 8t 20g e.c.w. 1/4" i.d. self supporting
C4, C5, C7, C8, C9	= 1000pF miniature ceramic	RFC3	= 5t 20g e.c.w. 1/4" i.d. self supporting
C6	= 0.22 $\mu$ F polyester	L1	= 1.5t 16g e.c.w. 1/4" i.d. self supporting
VR1	= 2k "trimpot"	L2	= 3.5t 16g e.c.w. 1/4" i.d. self supporting
R2	= 47 ohms 1/2w. carbon	RL1, RL2	= see text
Tr1	= PT4176D		Die-Cast box type 6908P (Eddystone)
RFC2, RFC4	= 5t 26g e.c.w. on Fx1115 ferrite bead		

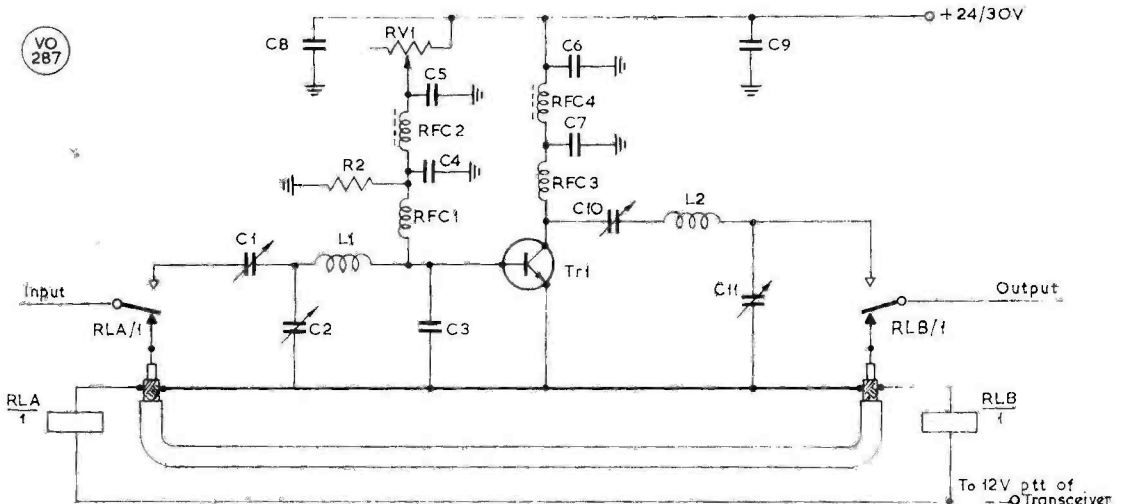


Fig. 1



## ALL-FET TRANSMITTER FOR TOP BAND

CW FOR THE QRP ENTHUSIAST  
VFO CONTROLLED

P. DEWHURST, B.A. (Hons.)

**T**HIS very low power transistor transmitter began as an oscillator-buffer chain for a Top Band direct conversion receiver. The receiver used a four diode ring demodulator which required rather more power than a transistor oscillator could conveniently provide, so a buffer amplifier was added followed by a tuned amplifier with a low impedance link winding on the final tuning coil so as to give a reasonable power output at the correct low impedance for the ring demodulator. The power output was found to be enough to light a small bulb connected across the link winding; the bulb was rated at 3v, 40mA which is 120mW. Now, 120mW of RF on Top Band can be made to go places; anyone who

doubts this should look through their old copies of *S.W.M.* for the Fifties and read the regular feature then entitled "Transistor Topics" in which will be found accounts of many long distance contacts using such QRPP; anyone who hasn't got those copies is recommended to borrow them and read them anyway as they will be found to make fascinating reading these days.

As the author is not licensed and is mainly interested in reception anyway, the rig was given to a local Amateur, G3UJO, who very kindly tested it with the aid of several other Amateurs in the Oxford and Abingdon area. It was found, generally speaking, that if phone communication was possible between G3UJO and other station using the usual transmitter, about 6 watts, then the other station could read G3UJO on the FET CW rig.

### The Circuit

The circuit is shown in Fig. 1. As can be seen, this is more or less an FET equivalent of a normal valve arrangement; FET's can in fact replace valves in most circuits. The VFO is a straightforward Clapp circuit tuning from 1.8 to 2.0 MHz. The bias resistor is not necessary with all FET's but as many seem to prefer a small amount of bias it was included so that any FET wired in would oscillate—this has, in fact, been found to be the case. The output for the buffer is taken from the source just as it would usually be taken from the cathode of a valve. The buffer is quite normal except for the variable bias resistor in the source; this is adjusted to give maximum RF output, though the increase is so small that it can be left out without much loss of power simply by connecting the source straight to chassis. The output from the drain of the buffer then passes to the power amplifier—using the term "power" very relatively, of course—which is just like its valve counter-part. Although strictly speaking the FET is a "triode," neutralization was not found necessary, this is presumably because the drain-to-gate capacity is not nearly so large as the anode-to-grid capacity in a valve triode, so that the FET, although looking like a triode, in fact operates more like a pentode. Keying takes place in the source of the power amplifier, again in a manner analogous to a normal valve arrangement.

### Table of Values

Circuit of All-FET Transmitter for Top Band

Circuit Fig. 1

C1 = 120 pF	TR1,
C2, C3,	TR2,
C12 = 0.001 $\mu$ F	TR3 = 2N3819, 2N5248,
C4, C8,	etc.
C10 = 100 pF	L1 = 45 turns 36 swg
C5, C6,	enamelled wire
C9, C11 = 0.01 $\mu$ F	closewound,
C7 = 25 $\mu$ F	1 in. dia. with
R1, R4,	adjustable dust
R5 = 68,000 ohms	core
R2 = 1,200 ohm	L2 = 30 turns plastic
R3 = 470 ohm	covered connect-
VR1 = 10,000 ohm	ing wire close-
variable	wound 1.25 in.
VC1 = 100 pF variable	dia.
VC2 = 500 pF variable	L3 = 5 turns 26 swg
T1 = 3-30 pF trimmer	enamelled wire
RFC1,	closewound over
RFC2 = 2.5 mH, preferably	earthy end of L2
physically	
dissimilar	

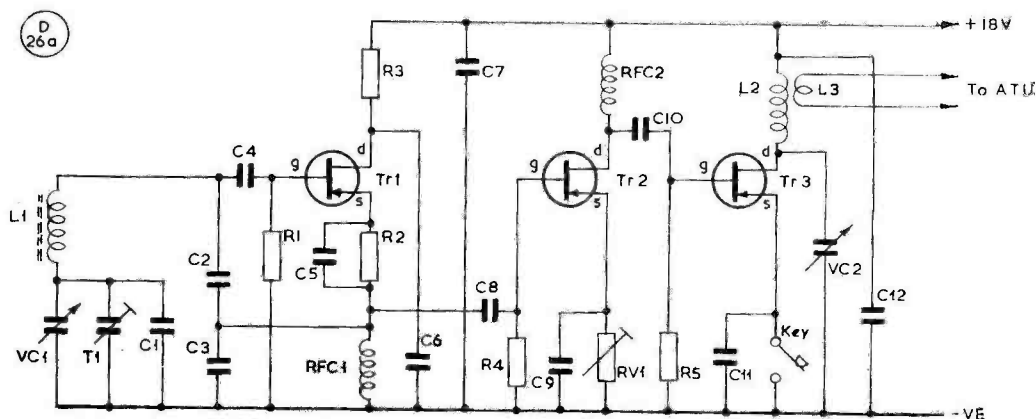


Fig.1 F.E.T. transmitter for Top Band.



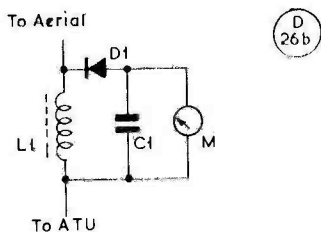


Fig. 2 Aerial tuning indicator for very low power tx.

### Tuning Up

The link winding on the PA tuning coil should be taken via the normal aerial matching arrangement to the aerial. With such low power as much aerial as possible is probably the best rule. During tests by G3UJO the usual 132-footer, tuned against earth Marconi-fashion, was used connected direct to one end of the link winding, the other end being connected to earth. As tuning a very low power transmitter by the usual "dip" method is

most difficult and apt to be rather misleading, tuning up was performed by using a small fieldstrength meter. An even better method, adapted from the 18 Set sender used in the Second World War, is to use the circuit shown in Fig. 2. The number of turns on the coil is adjusted to give a useful indication on the meter, which can be anything from a 50 $\mu$ A to a 10mA unit. This enables one to tune exactly, knowing that everything is "on the nose." Finally, the set will give a reasonable output using a supply of 9 volts but the RF output is about quadrupled by using two 9 volt batteries in series; the 18 volt supply is therefore recommended if anything other than cross-town working is envisaged.

### Table of Values

Circuit of All-FET Transmitter for Top Band		L1
Circuit Fig. 2		1 (or possibly more) turns insulated wire on small piece of ferrite rod
C1	0.01 $\mu$ F	
D1	Crystal Diode	

### THE RADIO AMATEUR EXAMINATION, CITY AND GUILDS OF LONDON INSTITUTE

THE Radio Amateurs examinations from 1979 will be in the form of Objective Tests containing multiple-choice questions.

If you are preparing for your Amateur Licence on your own and live in the London area, you may be able to assist the City and Guilds of London Institute.

In the preparation for this change it is the Institute's policy to pretest objective questions, trying them out on candidates who have reached examination standard. Pretests are intended to test the performance of individual questions and syllabus coverage. Information is obtained which assists the Institute's reviewing panels in judging whether each individual question should be included in the question bank for use in future examinations. In order to obtain reliable information, pretests must be administered to a sample of students which is as representative as possible for those who will take the examination. Many would-be Radio Amateurs prepare for examinations without following a college course, and the Institute invites such candidates who live in the London Area to assist in these pretests.

The Pretests are to be held at City and Guilds of London Institute, 75 Portland Place W1 on Tuesday, May 3, 1977 from 10.15 a.m.

As well as helping the City and Guilds, the tests may help would-be examinees to revise their work and gain some examination experience.

If you are willing to assist please contact Miss Jackie Clifford (01-278 2468 Ext. 491). Invitations will be issued to eligible candidates.

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## SIMPLE RECEIVE ADAPTOR

USES VFO OUTPUT TO PRODUCE  
A DIRECT-CONVERSION  
RECEIVER

G. C. DOBBS, G3RJV

A LOT has been written, and said, about the use of direct conversion techniques in amateur bands receivers. Their use has frequently been in the field of QRP operating. The real vindication of the technique perhaps came in its commercial use in amateur equipment. Heath used direct conversion in their popular QRP transceiver the HW7 and it has been used by Ten Tec in the U.S.A. for their range of QRP transceivers and for an amateur bands receiver the RX10. The argument goes on. Can such a simple technique compete with the superhet? Meanwhile, the many direct conversion receiver users appear to smile and get on with successful operation on the amateur bands.

The direct conversion technique is simple to understand. Whereas in the superhet, the incoming signal is converted to an intermediate frequency (IF) and thence demodulated to give an audio output; in the direct conversion receiver, there is a single conversion from the incoming signal to the audio frequencies. A local oscillator produces a signal, different from the incoming signal by the required audio frequency, and this is mixed with the incoming signal. The sum or the difference between these two signals appears at the output of the mixer where it passes through an audio filter to extract the required audio output.

Another way to put this would be to say that the receiver converts in one stage, from the input signal to the modulating frequency, by heterodyning. The incoming signal is applied directly to a product detector, a very familiar technique to the CW or SSB user with a conventional superhet. This means that the direct conversion technique is really only suitable for reception of CW and SSB signals (are there any others?) although it is possible to demodulate AM signals by zero-beating.

Like most simple systems, direct conversion has its limitations. The product detector must be designed to keep noise and cross-modulation to a minimum. This usually calls for some form of balanced mixer, although such techniques are now common in amateur radio use. The sensitivity of the receiver is governed by the overall gain of the audio stages, but once again low noise, high gain audio amplification is becoming commonplace. The local oscillator must also be very stable, but this is a usual design requirement for all receiver and transmitter oscillators.

It is common to have no RF stage in a direct conversion receiver, but to have a good aerial input tuned circuit. This means that the selectivity can only be improved in the audio stages. For reasonable selectivity, a direct conversion receiver requires a fairly sharp audio filter. This is discussed later in the text. The use of

audio filters to increase receiver selectivity has greatly increased in recent times. There are several commercial filters on the market, and simple filters are not difficult to build.

The unit described here is a simple way to "get one's feet wet" in this technique, with a very small financial outlay. The unit is merely a simple, but effective, product detector and first audio stage. The local oscillator can be any popular circuit, or the VFO of an existing transmitter. This unit combined with a simple transmitter, like the Codar AT5, can provide a ready transceiver with little extra cost.

This circuit is shown in Fig. 1. A dual-gate mosfet acts as a product detector, providing a low noise conversion with the minimum of cross-modulation. The circuit is designed around the diode-protected 40673 mosfet. The prototype used an inexpensive type substitute sold by J. Birkett of Lincoln, who advertises in this magazine.

The input is tuned by L1 and is coupled via C2 into one gate of the mosfet. The VFO is coupled via Cx into the other gate. The value of Cx will have to be determined by experiment. In the prototype a 160 metre VFO was used and Cx was found to give enough signal injection with 47 pF. The two signals are mixed in the mosfet and appear across the load resistor R4. There is no sophisticated filtering in this simple circuit. C5 decouples the RF and C6 couples the AF to an

### Table of Values

Fig. 1. Circuit of Simple Receive Adaptor

R1	47K ohms	C4	0.02 $\mu$ F
R2	33K ohms	C5	0.01 $\mu$ F
R3	1K ohms	C6, C7	22 $\mu$ F
R4, R7	4.7K ohms	C8	100 $\mu$ F, 16v. wkg., electrolytic
R5	220 ohms	VC1	100 pF variable
R6	1.2M ohms	Cx	see text
C1	200 pF	L1	see text
C2	100 pF	Tr1	40673, or see text
C3	25 $\mu$ F 16v. wkg., electrolytic	Tr2	BC109

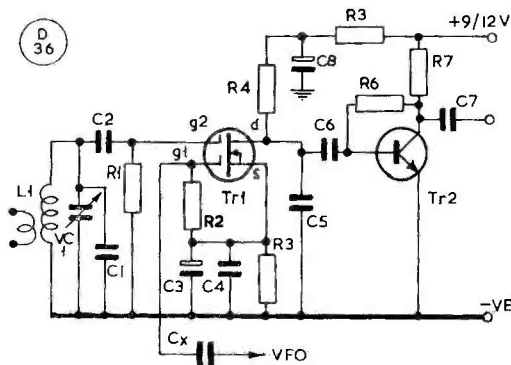


Fig. 1. Simple receiver adaptor circuit

audio pre-amplifier TR2.

This unit only provides the basic direct conversion function, and the output from TR2 is fed to an audio amplifier, although it is possible to connect high impedance headphones between C7 and earth. The prototype was fed into a small audio amplifier, via a simple audio filter. The filter was the circuit featured in *SHORT WAVE MAGAZINE*, June 1976, under the title "Simple Active Filter."

At the first attempt, this unit was built on 0.15-inch matrix perforated board—without copper strips. Later a simple PCB was made using the dimensions of the prototype. This is shown in Fig. 3. The component layout is shown in Fig. 2. This layout could apply to a perforated board or PCB layout; in the case of the perforated board component interconnections are made with suitable wire.

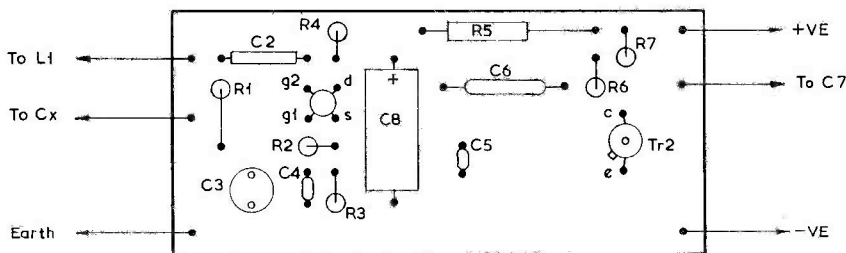


Fig. 2 Component layout

D  
37

A lot has been said about the techniques of handling mosfets, and protection against static. The 40673 is diode protected and appears to be quite robust. The inexpensive version I used was subjected to a fair amount of abuse. Originally I wired it the wrong way round in the circuit, and had to remove and resolder it back into place. In spite of this clumsy treatment it still functioned without problems.

The input of the unit is tuned by the simple network L1 with VC1 and C1. These will depend upon the frequencies the unit is required to cover. My unit was

used in conjunction with a 160 metre transistor transmitter and therefore the input circuit was designed to tune 1.8 to 2.0 MHz. The coil was 50 turns of 30 s.w.g. wire close wound on a  $\frac{3}{8}$ in. former with a ferrite core. VC1 was 100 pF and C1 was 200 pF. A poorly tuned circuit could give trouble with strong local broadcast break-through. I tried bandpass tuning with a couple of tuned circuits, but a single circuit was found to be adequate. In the case of a home built VFO, it may be possible to repeat the tuned circuit of the oscillator for the input circuit.

The unit is very simple to build and there should be no problems in getting it to work. Once the level of injection has been found from the VFO, it is also simple in use. VC1 is used as an RF peaking control, and may remain untouched for small excursions of the VFO. One small problem occurs when using direct conversion

for SSB reception in that both the sum and the difference between the two signals are demodulated. This produces both sidebands either side of the zero beat and one has to tune in the signal on the correct side to resolve the modulation.

This unit should, for a modest outlay of money and time, provide an interesting introduction to direct conversion techniques for those who have yet to try the system.

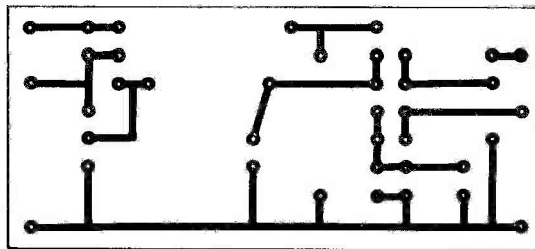


Fig. 3 Printed circuit board (foil side) or 'Veroboard' (see text).

## WEATHER-PROOFING A DIPOLE OR INVERTED-VEE AERIAL

NEAT AND CHEAP

M. J. FROST, G3GNL

FOR a long time the writer has been unhappy with the deterioration of the feed-point connections of his dipoles or inverted-vee aeri-als, from the ravages of the English climate. Some thought was given to the problem, and a satisfactory result obtained. The sketch—see Fig. 1—is more or less self-explanatory. The suspension cap can be of SRBF, or suitably strong metal, with, in the case of an inverted-vee type of dipole, the support arrangements as shown. The body is a heavy-duty bottle of the plastic variety, turned upside down, with a hole cut in the bottom through which access is gained for making-off the connections, and a hole in the cap for bringing out the coaxial cable; and small holes in the side walls serve to carry away the two legs of the dipole. The wrapping of plastic tape round the coaxial cable is to ensure the coaxial cannot slide down far enough to bring stress on to the connections. Once the connections are properly made, the suspension cap is fitted on, to cover the hole in the bottle bottom, by way of three or four 4BA brass nuts and bolts; to avoid any risk of cold-flow problems, oversize washers should be used on the inside of the bottle, and on final assembly plenty of sealant should be used to ensure all is watertight.

The end result is a long-lasting and effective dipole centre junction.

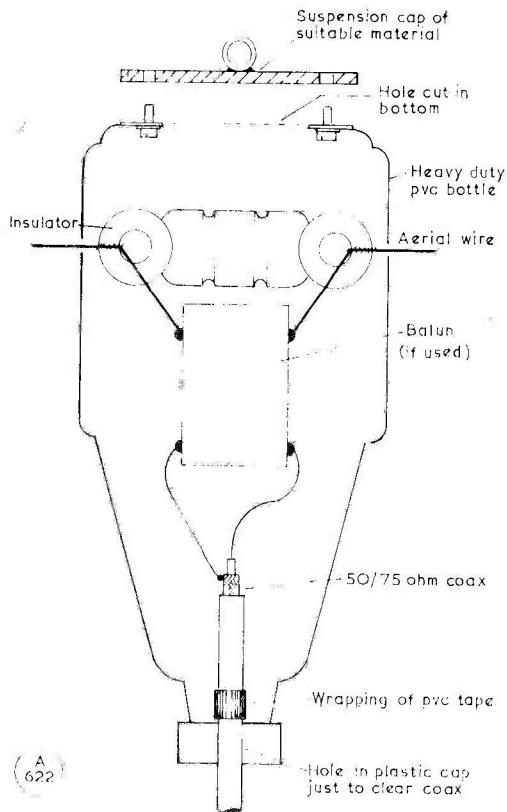


Fig. 1. Shows the use of a plastic bottle to weatherproof a dipole, as discussed in the text.

## QRO POWER SUPPLY FOR TRANSISTOR EQUIPMENT

J. MACASSEY, OZ91Y/G8LUK

TRANSISTORISED transmitters are becoming more and more powerful and the total array of Amateur equipment requiring twelve volts is increasing.

This means that if you wish to be QRV these days you can be mobile-only and steal the volts and amps. from the car battery, or cope at home with accumulators and chargers. But the easiest solution is to build yourself a power supply that can handle the escalating amps as extra PA's, transceivers, receivers, and bits of test gear clutter up your shack.

The power supply described is not one of those designer's wonders with more transistors than your QRO transmitter and more trim pots than a large communications receiver. This power supply can give up to 16 amps. at twelve volts with only two active components.

Exactly how many amps you can pull from this supply is dependent on your wallet, the transformer, the rectifier diodes and the transistor you use.

The circuit diagram should be self-explanatory, the components specified are the ones needed for a full 16 amps; with a cheaper pnp power transistor you can pull fewer amps out of the circuit, so the resistor wattage and filter capacitor C1 can be derated.

Regulation and ripple are very much dependent on the amount of capacitance you put after the rectifier; if you want less ripple and better regulation, put in a bigger filter capacitor.

If you have put in a twelve volt regulator IC and want a couple more volts out, or the regulator does not actually give twelve volts as it should, place diodes between pin three and ground (Fig. 3), silicon diodes will raise the voltage by about 16 volts per diode.

The regulator can be obtained in various voltage ratings so using the same basic circuit you can build a supply for almost any voltage you want.

The transistor may go into oscillation, even if you have bypassed the regulator as shown in the diagram, this is easily handled with a 0.1  $\mu$ F capacitor between the base and ground.

You may still have some germanium pnp power transistors lying around and wonder what you can do with them. They can be used in this circuit, bearing in mind that a germanium transistor will need better heat sinking for a given current. The base resistor should be around 1 ohm for germanium transistors.

For real economy and not so much current an MJE 2955 (plastic) transistor can give you an excellent power supply for up to 6 amps. But the final rule of thumb for finding the transistor for your current needs is that its collector current rating should be a little over double the maximum current you wish to pull from the supply.

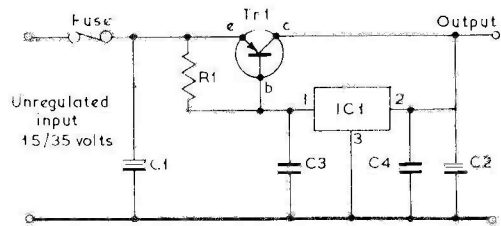
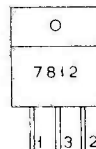


Fig. 1

The circuit, discussed in detail in the text, of OZ91Y/G8LUK's power supply



Note: Pin 3 to case

Fig. 2

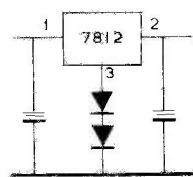


Fig. 3



Fig. 1. Table of Values

C1	30,000 $\mu$ F	IC1	7800 series type
C2	100 $\mu$ F		7812 (Fairchild, National, Motorola)
C3, C4	0.33 $\mu$ F		
R1	3 ohm, 5 watt	Fuse	25", over maximum current rating
TR1	2N 4398		

## CALIBRATING YOUR REFLECTOMETER

### HANDY CONVERSION CHART — METER — SCALES TO VSWR

L. J. CARPENTER, G4CNH

It is possible that some readers have winced at the thought of calculating where the exact ratios of SWR, fit onto the scale of the particular meter that they have used. The table below should solve your problems once and for all. SWR ratios are listed on the left with columns A, B and C on the right, indicating the correct scale positions for the ratios when using meters scaled 0-1, 0-3 and 0-5 respectively.

If your meter is 0-500  $\mu$ A, you would use column C multiplying the answer by 100 (shifting the decimal point two places).

e.g. 2:1 = 1.67 x 100 = 167  $\mu$ A

The same treatment would apply if the meter was scaled 0-100 or 0-300, but this time one would obtain the figure from the appropriate column A or B. If the meter has an odd scale like 0-750, then take the figures of column A and multiply by 750.

e.g. 1.5 : 1 = 0.2 x 750 = 150  $\mu$ A

If your meter has no scale, then assuming that the movement is linear, you may work on the total angular movement of the pointer. A protractor would then be used to establish the correct positions of SWR markings.

e.g. Meter movement = 110°  
 SWR of 2.5 : 1 = 0.429  
 (from column A) x 110° = 47.19°  
 from zero point.

As you can now probably see, the figures from column A are the main working figures, those of columns B and

C are added to save you the job of multiplying, assuming of course that most meters are scaled 0-1, 0-3 or 0-5!

In all respects the figures are accurate only if the bridge is adjusted to full scale deflection when taking the "Forward" reading, and properly "nulled" in "Reverse" using an accurate non-inductive reference dummy load resistor. The bridge must be working correctly of course!

SWR Ratio: 1	Scale 0-1	Scale 0-3	Scale 0-5
	Column A	Column B	Column C
1	0	0	0
1.25	0.111	0.333	0.555
1.5	0.2	0.666	1
1.75	0.273	0.819	1.365
2	0.334	1.002	1.67
2.25	0.385	1.155	1.925
2.5	0.429	1.287	2.145
2.75	0.467	1.401	2.335
3	0.5	1.5	2.5
3.25	0.529	1.587	2.645
3.5	0.556	1.668	2.78
3.75	0.579	1.737	2.895
4	0.6	1.8	3
4.25	0.619	1.857	3.095
4.5	0.636	1.908	3.18
4.75	0.652	1.956	3.26
5	0.667	2.001	3.335
5.25	0.680	2.04	3.4
5.5	0.692	2.076	3.46
5.75	0.703	2.109	3.515
6	0.714	2.142	3.57
6.25	0.724	2.172	3.62
6.5	0.733	2.199	3.665
6.75	0.742	2.226	3.71
7	0.75	2.25	3.75
7.25	0.758	2.274	3.79
7.5	0.764	2.292	3.82
7.75	0.771	2.313	3.855
8	0.778	2.334	3.89
9	0.8	2.4	4
10	0.818	2.454	4.09
15	0.875	2.625	4.375
20	0.905	2.715	4.525
30	0.935	2.805	4.675

## LECHER LINES

### USES — CONSTRUCTION — BACKGROUND

F. G. Rayer, T.Eng. (C.E.I.), A.I.E.R.E., G3OGR

TO check multipliers, the order of harmonics, and frequencies generally and above about 100 MHz, a lecher line is highly practical. It is much less discussed than in earlier years, but is one of the few pieces of gear which can be built in ten minutes and from which we can directly read frequency with a metric rule.

It can be used as an absorption wavemeter, or with the aid of a hook-up VHF oscillator, can calibrate an absorption or indicating wavemeter. The latter can then be used to tune oscillators or multipliers for correct harmonic and best output, in converters or transmitters, and similar RF sniffing purposes.

The lecher line needs a clear length of substantially over a half wave at the lowest frequency wanted. As a half wave is 15 cm. at 1,000 MHz, 30 cm. at 500 MHz and 60 cm. at 250 MHz, we see that it is a reasonable device for VHF, but not for Top Band. So a 4 x 1 in. or similar stout plank, 6ft. or 7ft. long is suggested. Fit stand-off insulators or tag-strips on blocks, so that the two wires will be an inch or so from the wood, and an inch or so apart. Spacing should be uniform. The wires (20 swg tinner copper can be used) are strained like a 2-string fiddle. At one end use a few inches of insulated wire to make a coupling loop, and solder this on. The length here is not significant.

To use the device, place it so that the loop gets a little RF from the circuit to be checked. Some means of showing that the line is drawing RF power is also required. One way is a DC meter in the power supply to the oscillator or other stage considered. Or some means of indicating RF can be used—such as a DC meter with diode, connected to a loop which is a little clear of the lecher line loop.

With everything prepared, move a metal edge which shorts the lines along from the looped end, until a flicker on the meter shows resonance. Place "zero" on the metric rule level with the shorting edge, and move

this on until a second indication arises. Now, 15,000 cm. (distance between two indications) = MHz. If a start is made with tight coupling to get a good indication, subsequently loosen coupling to the minimum required, for best accuracy. If the frequency is high for the line length, a further indication may be found, Fig. 1.

It is convenient to cut a strip of card and to calibrate it directly in MHz with the metric rule. Set zero at the first indicating point, and read frequency from the second indication.

The lecher line offers a ready-made means of calibrating a homebrew VHF dipper. Fig. 2 is an easy circuit for the latter. Resonance won't make the meter jump off the bench, but it can operate up to some hundreds of megahertz.

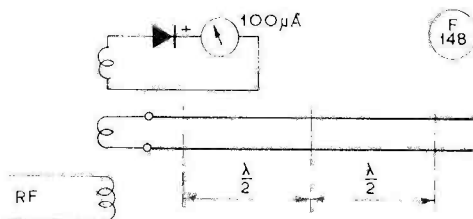


Fig. 1 Lecher line with RF indicator coupled to loop

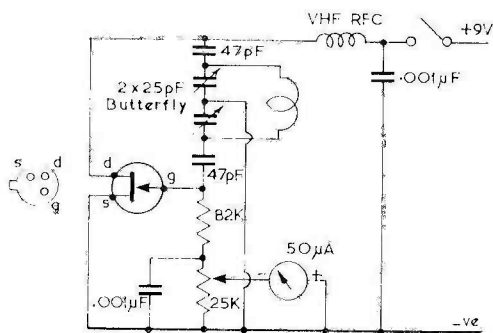


Fig. 2 Circuit for FET VHF Dipper.

## DIAL LIGHTING THE TRIO 2200GX

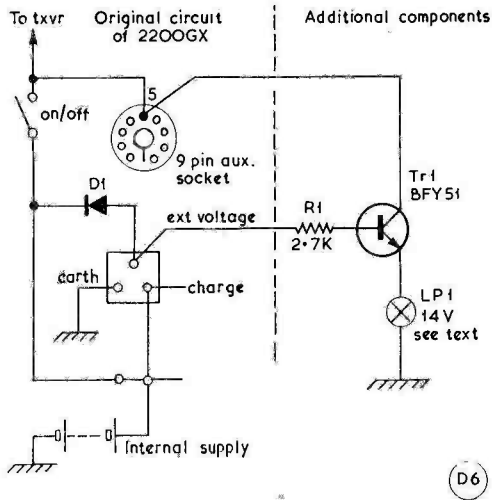
### SIMPLE MODIFICATION SAFER /M OPERATION AFTER DARK

I. M. CAGE, G4CTZ

ONE disadvantage of the Trio 2200GX transceiver as a mobile rig is the lack of any panel illumination after darkness falls. After putting up with this inconvenience for a time, the possibility of illuminating the twelve-position channel selector switch was investigated.

Conveniently, on the 2200GX there is a white plastic insert and cut-away behind the channel selector, and with a little effort a small lamp of the type found in many car radios can be fitted in here. By so doing, the lamp's position is such as to illuminate both the dial and the meter. To avoid unnecessary drain on the internal batteries, the lamp only operates when the external power lead is inserted. The circuit, Fig. 1, shows how this is achieved. The transistor, Tr1, conducts when there is a voltage present at its base of a suitable level, as there is when the external supply is connected; but the diode D1, already incorporated in the transceiver prevents the transistor operating to the internal battery,





it is well to notice that this slight extra drain can occur if prolonged "fixed-station" operation from batteries is contemplated, the simple remedy being to always remove the external power lead as part of the switching-off procedure in the shack.

### The TR2200G

The dial on the 2200G is slightly different from that of the 2200GX, in that there is no cutaway in the metal plate, and the dial markings are not quite the same. However, it should be possible, given careful workmanship, to cut a hole behind the dial and embody the modification. In this case also, the positive supply for Tr1 would have to be taken from some convenient point in the set, by reference to the circuit diagram and Handbook.

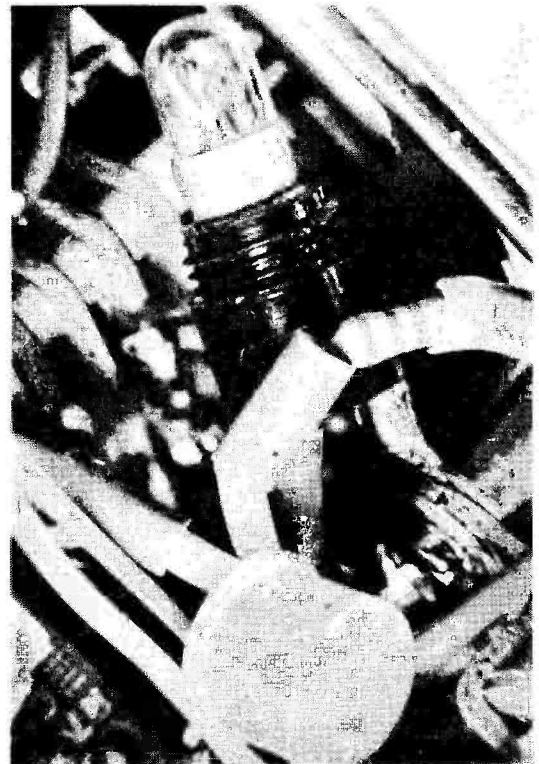
### Table of Values

Tr1	BFY51	LP1	14v. pilot and holder
RL	2,700 ohm $\frac{1}{2}$ watt		

The photograph shows how the additional few components are incorporated. The lamp in the prototype model was attached by means of a spade tag to one of the screws which hold the meter in position. The positive supply to the collector of Tr1 is obtained from pin 5 on the nine-pin socket on the rear of the transceiver. The voltage for the base of Tr1, is obtained from the top pin on the power socket on the rear of the transceiver. Access to both these points can be obtained by removing the loud-speaker.

The only drawback to the modification occurs when the transceiver is switched off; if the external supply is connected via the power lead, a small current, of the order of five milliamps is still drawn with the 2200GX switched off. No current is used in this manner when the external power lead is withdrawn, thanks to the action of D1 as already discussed.

This disadvantage, such as it is, is far outweighed by the advantages gained in mobile operation, the more so as the "external lead would be wired through the ignition switch anyway under normal conditions; but



A close up view, showing the method of fixing the lamp.

May issue will appear on Friday, April 29th.

# VHF BANDS

NORMAN FITCH, G3FPK

## VHFCC Awards

TWO readers have qualified for membership of the VHF Century Club this month, both for 2m. activity. Award number 276 goes to Nigel Roberts, G8JEF, from Prescot, Merseyside. First licensed in 1974 at the age of 16, he began operating in May the following year using an Icom IC-21XT and indoor aerial. However, disappointed with the lack of DX on 145.0 MHz FM a Yaesu FT-200 was acquired in August, 1975 which is used with a 100 watts transverter and Datong RF clipper. The aerial is an 8-ele. Jaybeam at 15m., the site being 76m. a.s.l. The country score has accumulated to 13 with 45 QTH squares worked. Nigel lists the high point of his amateur career as getting the licence, the low point being when he heard IT9ZHA in last summer's E's season at S9-plus, plus on FM in the SSB part of 2m. and being unable to call on that mode. Future plans include going for the Class A licence for excursions on to the HF bands.

Bryn Llewellyn, G4DEZ, receives certificate number 277 for 2m. to go with No. 186 issued to him under his old call, G8DOT, in April, 1973 when he was living in Essex. Current operation is from Dideot in Oxfordshire and Bryn's list of stations comprised confirmations from a dozen countries. All the contacts were made with 10 watts of SSB using a *Liner 2* initially but more recently a *Microwave Modules* transverter driven by a *Trio TX599/JR599* combination. The aerial is a 10-ele. Yagi at 35 feet.

## Beacons, A Maltese View

In the January column, reference was made to a proposal to set up a 2m. beacon on Malta. Our correspondent Henry Souchet, 9HICD, who gave so many readers their

first 9H1 contact last summer, disagrees with the proposal both as to frequency and power. On the matter of frequency he writes: "144-120 MHz is certainly . . ." a part of the band monitored by the DX fraternity." You will agree with me that the real DX fraternity monitors not only that part of the band, but goes to much greater trouble and effort monitoring other bands, carefully watching developments in the MUF. Consequently it should not be considered as being too much trouble to tune up to just below 145.00 MHz for a beacon check. In this fashion, the DX portion would be safeguarded from unnecessary and avoidable QRM for the locals. The small size of our island would add further weight to my counter proposal to keep the beacon QRG as far away as possible from the DX portion."

Concerning power levels, Henry says; "The reference to 50 watts e.r.p. induces me to believe that some form of directivity is being contemplated. I do not agree that such a beacon should bear any particular directivity and most of all, such a power. My counter proposal would be an omni-directional 'big wheel' with no more than about 4 watts e.r.p. When we reach a stage of having accumulated a significant amount of long distance propagation information, then it would certainly be most interesting to pick up on various particular routes and directions leading to further research. You will agree with me that we have not as yet reached such a stage."

Your scribe merely passed on this Malta beacon proposal from G3COJ and had naturally assumed it would have been discussed with the Maltese VHF fraternity. However, it seems that this was not the case as Henry wrote that he; " . . . was literally shocked stiff and dumb at G3COJ's proposal to set up a 2m. beacon on Malta having such characteristics as stated."

It is to be hoped that all parties will get together to conclude a mutually satisfactory solution since all seem to agree that a 2m. beacon in the central Mediterranean area would be a very useful to E's studies.

## Other Beacon News

The French beacon service has now been rationalised. Eventually,

call signs of 2m. beacons will be in the form FX0THF, the number corresponding to the REF region the beacon is in. There are ten of these. G3CHN has heard FX0THF in AI46h (Dept. 28). Roger said this was on 144.74 MHz and quite strong. FX0THF was also heard at G3FPK in flat conditions on Feb. 8 about midday. From the February edition of *Radio-REF* it would appear that F7THF in DH15g is now on a QRG of 144.940 MHz and not its IARU assigned one of 144.985 MHz. The aerial is a simple dipole.

The average strength of the Durham beacon, GB3NEE, seems to be higher lately with G3CHN in Devon, also at G3FPK, so maybe it is now on full power?

## Intruders

In the January column, mention was made of a nasty buzzing noise that is heard from time to time in the 2m. band. G8HUY, our sleuth from Ripon who is determined to ascertain the source, played your scribe a tape recording of the racket and it certainly must be very potent in North Yorkshire. John's latest theory, suggested by an astronomer acquaintance, is that it could be a Russian satellite operating between 143.6 and 144.86 MHz, for what purpose we know not. G8HUY reckons to ask the Kettering School pupils for assistance. Readers may recall that they have chalked up some notable "firsts" in detecting new Russian and Chinese space shots and calculating when and from where they were launched.

Another source of annoyance noticed occasionally by many London area amateurs is "The Burbler." This comes in two varieties. The first has been dubbed, "The Happy Wanderer" and it gurgles its way majestically down the 2m. band, passing through ones frequency in a few seconds. The more objectionable form, however, sits around one frequency all day. A few weeks ago, one of these beasts was parked on the SSB calling frequency with an S7 signal, masking all weak stations that might have been calling, thereunder.

With the BFO off, the signal is a deep hum with a rhythmical cycle of some kind. G8GGK, G8CUQ, G8JHX and G3FPK attempted to take some bearings on one of these

intruders, but errors of a few degrees can give misleading results. Discussing these phenomena with other amateurs up and down the country suggests that these things are prevalent. One theory is that they are faulty dust extractor devices on top of tall chimneys. Have readers any reports and/or ideas on this? If these noises affect the amateur band they could well be a nuisance to the aircraft and police frequencies in adjacent areas of the spectrum.

**The Phantom Aurora**

In last month's column mention was made of a reported *aurora* on January 9. Mike Dormer, G3DAH, has offered a solution to this mystery. It seems he mentioned to someone that he had heard two Swedish stations talking about an auroral event that day on an HF band. Somewhere along the line this was wrongly elaborated and Mike confirms that he, like the rest of us, heard nothing that day.

The GB2RS News Bulletin on Feb. 27 mentioned an *aurora* on the 23rd from 1630 to 1845 GMT but there are again no reports of anything in the U.K. so far. *A propos* the January 30 *aurora*, a very fleeting affair in the south of England, G3POI reports that his QSO with LA3UU was heard by SM3CUI in IT09b.

**DX Notes**

The DB5NA trip to the Aland Islands, OH0, is scheduled for July 30 to August 28. Operation is planned from JU, KT and KU squares with 450 watts HF and a receive system with a 1.2 dB noise factor. Those seeking CE square should listen for ON6ID who will be operating portable there from April 1 to 20, presumably with an FO call. Those looking for QTH squares YH and ZG should listen for F1BLO and F5JC respectively.

**Satellite News**

Your conductor's "Beginner's Guide to Oscar" in the March issue seems to have helped a few readers judging by comments received over the air. On page 33, the 5th line from the bottom in the right hand column should have read "145-85-145-95 MHz" of course. The address of the secretary of the AMSAT-UK was omitted. It is:—J. H. Keeler,

G4EZN, Church Farm Cottage, Banningham, Aylsham, Norwich, NR11 6LS.

The satellite linking tests on Feb. 9-11 were not too successful, mainly due to users clobbering *Oscar 6* with direct 2m. signals. G3IOR had 8 contacts in all with S6 signals, but only one of these was possible in the evening periods. The tests on the last day were cancelled due to the low battery voltage of *O-6*. This satellite now has two duff battery cells but still manages to relay good signals although the passband is very noisy at times. *O-6* was on for orbit no. 20,000 and your scribe celebrated this by working 6W8AK in Senegal on SSB for a new country. Please note that *O-6* is *not* now available for use on the descending orbits on Sunday mornings. The operating schedule is Monday, Thursday and Saturday, *ascending* orbits only.

*Oscar 7* is now back on alternate

**QTH LOCATOR SQUARES TABLE**

Station	23 cm.	70 cm.	2 m.	Total
G3POI	—	—	173	173
G8FUF	[	79	172	252
G3CHN	—	—	131	131
G3FPK	—	—	125	125
G4BWG	—	23	110	133
9HICD	—	2	110	112
G4CDF	—	—	109	109
GM4CXP	—	21	107	128
G3OHC	—	27	94	121
G4BAH	—	32	92	124
G8HVV	—	10	92	102
G6UW	—	—	85	85
G3XCS	—	14	82	96
G8BKR	[	6	79	86
G8GML	[	34	75	110
G8IWA	—	17	74	91
G8HHI	—	7	71	78
G3JXN	[	51	66	132
G4DKX	[	23	66	91
G4DEZ	—	—	65	65
G3COJ	[	47	63	127
G8JJR	—	—	63	63
G8GH	—	11	62	73
G8KLN	—	[	62	63
G4CIK	—	—	62	62

G8HAF	—	—	61	61
G3KPU	—	—	60	60
G8KSP	—	—	60	60
G2AXI	[	34	59	94
G8KKX	—	—	59	59
G8JHX	—	—	59	59
G3FIJ	—	25	57	82
GJ8AAZ	—	[	54	65
OZ9IY	—	—	53	53
GD3YEO	—	—	52	52
G8LHT	[	—	48	48
GW8HVP	—	—	48	48
G3BW	—	21	47	68
GD2HDZ	8	24	45	77
G4AEZ	—	[	44	59
G8ITS	—	[	44	45
G8JEF	—	—	44	44
G4EYL	—	—	41	41
G8EOP	8	36	38	82
G8IFT	8	16	35	56
G8JAH	—	[	35	36
G8LLG	—	[	24	25
G8JAJ	—	—	24	24
G4CIK/A	—	[	23	24
G8KA	—	—	21	21

Starting Date January 1, 1975. No satellite or repeater QSO's. "Band of the Month" 2m.

Mode "A" and "B" schedule. For those wishing to calculate which mode any day, April 1 will be Mode "A." Note that neither *O-7* nor *O-6* should be used on Wednesdays, even if they appear to be on. On Feb. 20, *O-7's* *Codestore* was transmitting the following message: —"To implement control of A-O-7 to rectify mode jumps pse send times and dates to AMSAT and/or VE3SAT" which says it all. The AMSAT address is:—P.O. Box 27, Washington, DC 20044, U.S.A.

The latest date for the launch of *A-O-D* is now November 15, the third anniversary of the launch of *O-7*. If successful, it will become *Oscar 8*. It will carry two transponders, one with a 2m. uplink and 10m. downlink as *O-7* Mode "A," the other again 2m. uplink but with a downlink in the 435 MHz part of the 70 cm. band. This latter is the JAMSAT transponder and it will have a 100 kHz bandwidth. *O-8* will