



# The SHORT WAVE Magazine



September 1986

Volume 44 Number 7

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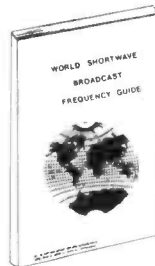
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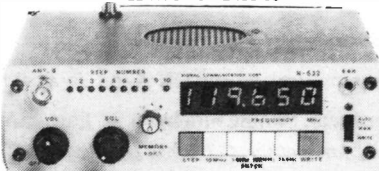
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FOR THE RADIO AMATEUR AND AMATEUR RADIO



## EDITORIAL

## R.I.S. Problem

We have recently received from several quarters comments that indicate a changed attitude on the part of the Radio Interference Service staff; to lend credence to this we have just been sent a copy of a document entitled "Strategy for Dealing with the Problem when Amateur Radio Users Cause Interference to Neighbours" — without any covering letter. From the structure of this 'leaked' document we deduce it was formulated by the R.I.S. management.

The result of full implementation of the ideas contained in this paper would be catastrophic, even to the point of spelling a virtual end to amateur radio activity as we know it today with VHF particularly badly affected. In the recent past R.I.S. staff have intimated that in cases of intractable TVI they would request the DTI to vary the licence conditions to enable them to enforce reduced power to as low as three watts, or even enforce QRT. The document also makes it crystal clear that this change of attitude has been created by the anti-social attitude of a small number of amateur licensees. Couple this with the general notion that television is something akin to God only higher, and therefore cannot be questioned or taken to task for the interference it produces, and you can see that we have a real problem on our hands.

What now arises? First, let it be quite clear that the RSGB have spent, and are spending, hundreds of man-hours on fact-finding and negotiation with regard to this document. So please *don't* descend on RSGB Hq with queries demanding an answer, or you'll bring the entire organisation to a halt. Let them get on with their work for all of us, and give them every support you can. We *must* close ranks or we are lost.

Something which makes this threat so very dangerous is, of course, the idea of passing interference-solving activity to the radio/TV trade — an idea which is, and always was, ludicrous for the simple reason that interference is something of a development engineer's problem, and this is an area in which, by definition, even competent servicing personnel lack know-how.

There was a proposed British Standard covering the question of immunity to interference in the pipeline, but this has gone by the board in favour of a CENELEC (*i.e.* EEC) standard which is in many ways better, though still not nearly good enough. The CENELEC standard lays down immunity of equipment to signals of approximately 1.8 volts/metre, and the intention seems to be to require amateurs to reduce power until that level is met and then continue operation using only that low power for ever after.

Clearly that means that an amateur who lives in an urban area is at serious risk through TVI, because of the inadequacies of cheap-and-cheerful commercial entertainment products — although to be fair, the document does acknowledge that much domestic radio and electronic home entertainment and communications equipment is cheaply engineered with respect to immunity from unwanted radio signals. It also recognises that the amount of such equipment, which unless adequately shielded is sensitive to RFI, is growing rapidly. If we accept that the life of, say, a TV set is around ten years, we can see the average U.K. radio amateur being reduced to QRP at best for the next decade at least.

All we can do at the moment is close ranks behind the RSGB and hope they can get a positive response out of the authorities. Of course if you know of an amateur who is behaving in an anti-social way over TVI and his neighbours, then bring the *strongest possible* pressure to bear on him to either close down or clear the TVI problem; chucking him out of the club is mild compared with all of us having to become QRP — or even QRT.

Looked at from a wider aspect for a moment, the powers-that-be would do well to understand that a 'national QRT' would be disastrous: much of the electronics industry's development work is done by the younger generation of engineers, and we know that many of these gained an initial interest through their early contact with amateur radio, even though they may have later given up their licence. Thus we stand to see sections of the electronics industry put at risk for want of new blood coming up through the amateur fraternity, who almost alone provide the know-how outside the ranks of the digital circuitry merchants.

Finally, as this is the most important issue to hit amateur radio for a very long time, we intend to bring back our 'letters to the Editor' page — "A Word in Edgeways". So letters please!

*Bill Williams*  
G3KFE.

WORLD-WIDE COMMUNICATION

# COMMUNICATION and DX NEWS

E. P. Essery, G3KFE

**W**HAT a month this has been! Although the weather in my part of the world has hardly been summery for most of the month, that hasn't prevented the summer lift on Ten, and there have been some quite interesting days on 14 and 21 MHz. The writer hasn't personally listened much on the LF bands, save for the local club net, but the word here is that things haven't been too bad either. On the other hand, it is also true to say that we haven't reached the bottom of the sunspot cycle yet, and any careful listener to the propagation forecasts on the RSGB News Bulletin on Sunday mornings who also takes note of the daily forecasts given in, say, *DX News Sheet*, can hardly miss the deduction that it isn't like it was back in 1980!

## The Input

As always this is comprised of readers' letters, plus *TDXB*, *DXNS*, *W1WY*'s invaluable *Contest Calendar*, sundry press releases, letters from officialdom, and so on. So — let's have a look at it all!

## Ten Metres

This band has been showing distinct signs of life at times, both in terms of the VHF-style and single hop propagation modes and, at least a couple of times, to DX at a greater distance.

However, our first sad duty is to note a letter from the 10-UK Group's Jeff Harris, G3LWM. In it he states that for various personal and business reasons the organisers have had to give up and the organisation is now defunct. That being the case, the remaining funds (£230.17, less any postage expenses still to come in) will, if no objections are received by *January 1, 1987*, be passed over to the Radio Amateur Invalid and Blind Club as a donation. This seems a very worthwhile thing to do, and we hope no one will raise any objections. However, we are asked to say that any objections should be sent to G3LWM, at 21 Waltham Way, Frinton-on-Sea, Essex CO13 9JE.

The regular report from G4HZW (Knutsford) is a solid standby for this column through sun or snow, DX or nix. Tony does it all, on CW or SSB, with the aid of a two-element Quad for the band and a TS-820. During the evenings the East Coast Ws have been heard, and at other times also there have been the European contacts too. This business of regular transatlantic contacts at the height of summer regardless of the presence of sunspots is becoming so well documented now as to assume the title of *Fact* in Tony's

mind, and indeed in your scribe's, too. For example: July 9 (2230), WB2FSU; July 12, alerted by the presence of very strong short-skip, TF1PS (1736) OH0AM GM4LER, OX3LX, K2ARO (1939), VE1BNN (1948), OY9JD/M (1957), NP4A (2010), N1CQ (2149); July 17, WB2MAN (2214), K2UTC (2258), WB3AUN, KA3CNX (2310); July 19, CE0ERY (Easter Island) and WP4AFG; July 21, VE2EDK (2243). Interestingly enough, Tony mentions at the end of his letter that his Quad has grown another element, but this has done little to the F/B ratio which is poor, although the front-to-side ratio is superb; adjustment is all but impossible once it is up, for geographical reasons, so it looks as if the extra element will have to come off again.

G4VFG (Ivybridge) was involved in a TVI problem, and this is referred to at more length elsewhere in this issue. However, here we are concerned with ten metres, which gave with DL7AN, UC2OAV, OZ1ITT, DJ1ZV, IK4GNH, DK9ZQ, OK1HBT, OH1BAD, T77J, T77C, YU7ACJ, EA9IB, SP0FUX and LA2IJ on SSB; plus CW to CX1DM, EA2JJ, C30CAW, FD6ISB/M, F6HIY, GI0AIQ, GD3AHV, HB9AEO, I1YOD, some American gotaways on July 21, and a strange beacon signing 4N3ZHK, and giving a Maidenhead Square location as JN76MC.

G4ZZG (Warrington) received a visit from the DTI who were, it seems, having a blitz on CB-ers; they were attracted to Charles's place by the presence of a couple of CB 'twigs' of the 'illegal' variety which provide G4ZZG with a vertical directional array. When they commented "Sorry, seeing those radials, we guess you must in fact be an amateur" (the mind boggles!), Charles enquired a bit tartly as to why they hadn't checked their records, and to that the reply was that when the interference side was split off, the records stayed with the DTI, and their only knowledge of where we amateurs live is obtained by a long-distance reference to Chesterfield's computer! After this the conversation reverted to less sensitive topics and an item of interest was that locally, after the confiscation of illegal gear, the RIS store now has quite a lot of illegal gear, some of it QRO way over the *amateur* limit! So, at least something useful is going on. However, do please read and note the editorial in this issue!

G4OBK (Chorley) operated as G0FDX for Central Lancs club during the Field Day on July 20, with YU, SM, CU2CH, OH, and CN2AQ on SSB; plus CW to EA,

C30CAW and HB9DX. From home there was SSB to SM6PU (cross-band to 50 MHz), TK0KP/P (Sanguinaries Is.) and LA0DY, plus CW to EA, HB9, UQ2, OZ, YQ0AYQ, UP2DM, LZ1R, C30CAW and PT7AQ.

## 21 MHz

Very little in the way of useful reports this time my own contribution could well be a reference to the sad affair of the new aerial, which when grid-dipped proved to be well off resonance — after spending several days chasing an elusive fault on the old (25 years) GDO which proved to be no more than electrolytic (dissimilar metals) corrosion under earth tags, despite the GDO living in dry conditions and the metals in question being quite reasonable in combination according to the standard tables on the subject. Perhaps next month . . . !

G2HKU (Sheppey) indicates that he had one contact on 21 MHz, with C3OC on SSB with the QRP rig, and then goes on to discuss the G-QRP Club rave-up at the G4BUE QTH, an event which your humble servant has never before missed and didn't want to miss this time. We honestly believe that G4BUE has the only elastic house there is — some 60 people on the Saturday afternoon!

G4VFG says he found the band very patchy, with a little short skip about plus the occasional longer haul; SSB gave G4UHX/M, and GI0AHZ, while on CW there were SM6PRX, PY2ZAA, DF3FN, SP5PMT.

As for G4OBK, his activities with the Central Lancs FD station, G0FDX, included CW QSOs with T77C, CX5BW, EI9FX and LZ2ZS, plus CX6CB on SSB; from the home QTH, no activity on the band at all!

## Twenty

This is, we always say, where the meat of the world's DX traffic is carried, and we see no reason to alter that opinion — but I have to admit that for most of the time when I switched on the rig the band has been damnably noisy!

G4OBK reckons that long path was the route for his CW contacts with UA0BL, JA7KE and HL1EJ during the FD exercise, while with his own call the same mode went out to GM0/W1DMD, OH0MD/OJO, FM5CX, UV100 (Franz Josef Land), LX1JPQ who was going QRQ in a big pile-up, and FF6KED who was signing /POM from Pomegues Is; SSB made the grade with 3A6F for an all-band new one, FO0FB, IQ2ARI, ZK1XV again for an all-time new one, and 3A2LF.

G3BDQ (Hastings) bewails the fact that when he goes in the shack there is either "non-DX, EU only" propagation, or tremendous QRN — indeed the prevalence of static is a recurring theme in the mail. John's CW went over to RJ8JDV, K9MFO/OH0, OH0MD/OJ0, SV0CJ/SV5, SM0CMH/SV5, 5H3CE, ZS3DM, PT7AA, FP/K1RH, 9J2BO, and lastly C30CAR and C30CAW. As for the latter, they were very strong signals and John says his mower-induced daydreams made him think he was working Andorra rather than Pagalu! One must say the prefixes are distinctly confusing.

It was mainly Twenty CW for G2HKU (Sheppey) when he could find the time off from removing frogs from the kitchen. The mode accounted for XE3AAF, ZF2CD, C30DA1, OE3EMN/YK, J6LAD/9Y, OA4ZV, UL7BAG, UZ9AXB, and U19BWF; the SSB exchanged reports with C30BBP/P.

Twenty for G4VFG was quite interesting, with the highlights including 3C0A, CU2ASW which was to celebrate the Prince Andrew/Sarah Ferguson wedding and honeymoon (true, no kidding!) SO9UD who was a G on holiday in Poland, and EN3D.

## Doings

Pagalu has been pretty well to the fore, and most people seem to have worked it on one band or another.

Earlier this month, a GB call was issued for an operation from Rockall, but in the event it was cancelled at the last moment due to a transport timing problem, which nullified a whole year's work. On the other hand, Rockall could hardly count as a new country thanks to DXCC Rule 2(b), as Don Search has pointed out.

Talking of DXCC, the Pribiloffs argument still festers gently, and the last we heard of the 4U1VIC battle was that it was (a) dead in terms of DXCC status, and (b) still alive in DXCC terms!

On the other hand there was a real country operational again when SMOM station 1A0KM appeared at very short notice.

Readers who have got this far will have noticed that there has been Market Reef activity; it yielded 18257 contacts and many firsts, but they wrote off five Top Band aeriels, a fifty foot tower and a 14 MHz beam. An expensive activity, but it certainly filled up some gaps.

Hankering after XU1SS? This rare one, at least in recent times, is now active on 14025 or 21025, from 0900 to 1000z, with problems working much later due to lack of light; and the station is deep in jungle using battery power to a dipole, which doesn't sound like a recipe for a Big Signal! However, all credit to them for sticking at it.

An interesting snippet suggests that ZL1AMO may be going to activate VK9X, Christmas Is; if true this would fill a gap.

By way of *DXNS*, quoting the *DX Family Foundation* newsletter, comes the proposition that P5AGJ has been active, giving his QTH as PO Box 126, Hungnam, North Korea. If he is on the up-and-up, then he could set the band alight in no mean style!

We have heard of ET3US claiming to be looking for QSLs via KJ0M, who isn't listed in the phone book; about all we can say on that is what we'll believe it when we see it.

The JD/7J Minami Torishima operation seems to have been a little comic, with a vast list being taken so that as propagation changed people had little or no chance of a QSO. If only the DXCC desk would outlaw any list operations, life would be much nicer!

Members of the Cornish Radio Club, it may be recalled, activated GB4IOS, from Great Ganilly in the Isles of Scilly; the *Cornish Link* newsletter has the first part of the saga in the current issue. They tried for Samson Is., but this was 'not on' as it is a protected island during the breeding season, so they ended up going to Great Ganilly, to the South-East of St. Martins. This was approved and everyone dashed around gettings things set up; the biggest snag seems to have been that when they went to collect the pre-arranged 5kVA generator, the shop had forgotten to make a note of the requirement and had nothing available. However, this was rectified when the gentleman concerned arranged a hire from another firm for them. As Great Ganilly is uninhabited, it would have been difficult to operate minus a generator! However it all came together and the trip was made, the QSOs were fun and thanks are due to all who contributed, not least to David Stedeford whose boat took them to the island from St. Mary's when he could have been taking trippers for profit, and to Colin, GOAEA, the St. Mary's harbour-master who did a lot of work in the preliminary stages.

And, as for that proposed operation from ZA, there seems at the time of writing to be no chance; but reading between the lines of the recent newspaper references to Albania, there does seem to be a slightly more liberal approach to the outside world, so who knows what may come in the future? After all, BY was impossible for years, but now there are, if not lots, at least several BY stations who are active and the number is increasing.

## Top Band

The writer is in a distinctly poor spot for Top Band, and the number of low-flying aircraft about means that a kite-flown vertical is a doubtful starter. However, it is nonetheless true that there is activity on the band, even though it is almost all on the 'real DX' front rather than either GDX or middling stuff.

If you are interested in taking part in a Stateside Top Band activity there is the 160

Metre Bulletin SSB Contest; this runs from 0001 September 6 to 2359 on 7th, with single-op and multi-op classes. Exchange RS plus QTH, and score 10 points per QSO. Multiplier comprises one each per State, VE Province, DX country and continent. Certificates to the top scores in each of the above areas, and a plaque to the overall winner in the single-op and the multi-op categories. Mailing deadline for logs is October 31, addressed to: 160 Metre Bulletin, c/o R. Koziomkowski, KA1SR, 5 Watson Drive, Portsmouth, RI 02871 U.S.A.

G4OBK notes in passing that he received Top Band DXCC certificate No. 157 last month, but leaves that to one side while he mentions CW contacts with Y24PA/A, OH0MD/OJ0, OH7C, LZ1R, 4U1ITU, HB0/HB9BZA, PY0FE (Fernando do Noronha) for country no. 115, W1AX, ZF2IR/MM north of the Azores, and UA9CBO.

## "CDXN" deadlines for the next three months:

October issue—September 3rd  
November issue—October 8th  
December issue—November 5th

*please be sure to note these dates*

G2HKU notes that on July 9, at 2210z and 1834 kHz, ON4UN was 599 with 579 clicks, working just one station from each of the many countries in the pile-up; and yet ON4CC says they haven't yet got the band . . . ! Otherwise, Ted noted OZ1HZI, G13GTR, T77C, UP9A, HB0/HB9BZA, OH0MD/OJ0, C30C. On the other hand, like so many others, G2HKU has been battered by the static and wryly remarks that the 'static remover' jollops, applied to the aerial, make no difference to the static, and cause the birds to complain of the slipperiness of their perch. Perhaps David Tong will come up with a Magic Box, who knows? On a different line again, G2HKU notes that he came across G3FXB just back from his Russian holiday and with an interesting range of electronic gear including amateur transceivers, all glossy paper and pictures, data in English and Russian, but no prices given.

G3BDQ reckons it was a rotten month for DX, and awaits the end of September for a return to normality and less static. Hence, there was no night owl stuff, but CW did get through from him to RA4CLZ, UA1DZ, UW3QRJ, UA3QDX, PA6VHS with OT Louis at the key, UB4MD, UA1CHF, TK/DK9IP, and ZF2IR/MM off the Azores. To wrap it up, John noted that he hadn't yet snagged any of the Hungarians on the band yet, only to add a late flash that he had worked HG9R on August 5. It seems that the Hungarians on Top Band are 'special' in some way — probably clubs.

## RSGB Convention

Thanks to G3XTT, the publicity officer for the HF Convention, we can remind you all that this event is to be held, as usual, at the Belfry Hotel, which lies on the A40 about four miles from Oxford, where A40 and M40 run parallel, near M40 junction 7 and about 45 miles from London. One of the many things we like is the 'supervised construction area' ploy — what a way to get the youngsters interested! The lecture programme includes G3XTT himself on antennas for the small garden, between 1030-1130; 1145-1245 is down for a Q and A forum with RSGB officials; 1330-1415, presentation of trophies; 1430-1530, G3RZP talking about HF receivers; and then 1545-1645 for G3OKQ/VR6JR to show slides on his DX-pedition activity to Pitcairn. From 1730 on, those who have booked can attend the Chiltern DX Club Buffet. If there is enough interest, there will be a FCC qualifying tests for U.S. licences on the Saturday. Details on the Convention from G3XTT, QTHR, or 0734-724192 evenings, or 0734-501359 by day. Tickets for the Buffet from G3LQP, QTHR, and if you want to try for the U.S. licence, contact Greg Lambert, G0/KK1J on 01-352 2746. Of course you can stay overnight at the Belfry — B & B for £17.50, or with dinner for £27.50. For the rest of the family, what about Oxford, or Blenheim Palace? Make a note of the date: Sunday, September 28 for the Convention, and the day before for the U.S. tests.

## Contest

From the Loana section of ARI, the Italian national society, we have details of a contest to commemorate the work of Marconi, in the areas of directional aeriels, radio-beacons for navigational purposes, and HF, VHF and microwaves. The contest covers Top Band, Eighty, Forty, Twenty, Fifteen and Ten, plus VHF/UHF. The Loana stations will have the prefixes IO1 or IY1. Between September 15 and 20 IY1EY will be on and will send special QSLs; it can be worked on several bands. Between September 15 and October 15 other IO1 or IY1 stations may be worked, and while you merely give RST, they will give RST plus a QSO number, at one point a QSO. The multiplier is the number of Loana ARI Division stations plus those invited to operate from there. There is an SWL section, and entries in the usual form of a log go to I1YXN, ARI-Loana SV, Italy, by November 15. The prizes include for the first three, a week's stay at a Loana hotel and a certificate; the latter will also be sent to all those who raise a score of 2000 points.

## World War II

G3VG writes to say he is preparing a book on the activities of radio amateurs

during W.W.II, in the three services and particularly in the research and development of radar and radio devices used by the Services. As so many of those involved are now silent keys, we sincerely hope that all those who can assist, or point G3VG towards anyone who might be able to help, will do so. The address is: James Wood, G3VG, 7 Sherring Close, Wick Hill, Bracknell, Berks. RG12 2LD, telephone 0344-54938.

## Eighty & Forty

G2NJ (Peterborough) has first knock here. Nick starts by a mention of the fact that GB6AQ instead of GW6AQ is operational during August to commemorate the 40th anniversary of the TOPS CW club, whose secretary throughout that time has been GW8WJ — a fine record of service. Club nets are on Sundays and Wednesdays, 1400-1600 clock, on 3508 kHz. It is of interest to note that GW8WJ's rig for the net control station is crystal controlled and runs only 10 watts. Turning to the QRP front, G2NJ mentions his contact with his HW-8 at 3 watts with G3JZL/M, who was on top of a hill near Stoke-on-Trent and using a G-Whip aerial.

G4KKI (Swinton) breaks a long silence to say he is back on Eighty after a rebuild, the rig now being the DSB-80 design built out of the junk-box save for the SBL-1, and with IRT added plus a revised front-end tuning arrangement. In addition there is a new antenna, which is a loaded dipole for Eighty fed with 300-ohm slotted twin feeder, the aerial being bent around to fit in the small space available, and tuned by a home-brew ATU. The result has so far been QSOs with G3MBN, GM3OXX, GM4XNQ, GI3PDN, GI4PCY, G3MCK, FD6HSI, ON5AG, all of whom were QRP. In addition OH0MD/OJ0 was worked through the pile-up, PA3BWS, DL3XK, ON6WJ/P, PA3AAV, EI7H and DK1II, all save for the /OJ0 being longish ragchew contacts on CW. Trying the rig on DSB yielded GB2RCS, GB2BYN, G3SSO, G0EWV and G4VDJ, plus lots of more local G stuff. Next month we hope to hear some news of 14 MHz when that part of the rig is completed and tested.

On 7 MHz, the G2HKU CW found CO2VG, 7S1FRO, W3YQ, VE2EDK/MM/Zone 2, and I0SNY/ZB2; 3.5 MHz CW at full output resulted in contacts with W1AXA, C30BAN, DJ0OS, VE2EDK/MM/Zone 2, and KZ2S, while QRP at four watts was enough for PA3CCF, BB2RSA, GW4ALG/P, G4ELZ/P, G2BUV using 1 watt, G0DYX/P, G4MQC/P, G3IGU/P and G3BPM/P.

Eighty CW made it to Y86ST, PY0FE, UA9WZ, UL8LWO and UA1DZ for G4OBK, and SSB connected with YB0JH. On Forty the CW managed OH2DP/OH0, UA2FFA, LZ9ZS,

PY0FE, C30CAW, and RL7QA, while SSB accounted for OH0MD/OJ0 again.

## New Bands

The only mention came from G2HKU who made it to GM6RO and VK3XB. We hope there are more reports next time, although we wouldn't see it as right for these bands to be crammed full of the rubber-stamp DX contacts so prevalent on the other bands.

## QSL-ing

We have a long letter from G1HGD (Kenilworth) on the subject of QSL-ing and the lack of response to his outgoing cards. Obviously G1HGD is hot under the collar, having sent out to some 312 stations, and got back QSLs from 152 stations, out of whom 135 have had at least two cards. That is a return of 48% over a period of two years. The low rate is, in the main, down to those people who are tardy in getting their batches of cards off to the bureau, and of course that is the weak point of the bureau system; equally, those who are remiss with their cards for the bureau are the very ones who don't answer direct cards either, because they lack the interest.

In fairness, it would seem that over the past two decades or more the indications are that QSL returns of between 50 and 66% are the norm. Shouldn't we try to do rather better?

## GM Award

Aberdeen A.R.S. have asked us to mention their Award. The requirement is to work one station in each of the Scottish Regions: Borders, Central, Dumfries and Galloway, Fife, Grampian, Highlands and Islands, Lothian, Strathclyde, and Tayside. A contact with the club station, GM3BSQ, will serve as a substitute for any one of these. QSOs to be since May 1, 1975, and the cost of the Award is £1 or the equivalent in IRCs. The claims should be counter-signed by a club secretary or chairman, and go to GM4BKV, at 67 Greenfern Road, Mastrick, Aberdeen AB2 6TP.

## Close Down

We're done for another month. The deadline is in the 'box', and is for the arrival of your letters, which should be addressed to "CDXN", SHORT WAVE MAGAZINE, 34 High Street, Welwyn, Herts. AL6 9EQ. For next month, can we have some more reports please, to add to the interest — and particularly on Top Band, Forty, and the new bands.



# Practical, Simple Sideband Part 4

*in this special series, these two very well-known designers and constructors get together to unravel its mysteries*

REV. G. C. DOBBS, G3RJV and IAN KEYSER, G3ROO

## The VFO — by G3RJV

THE circuit for the VFO is shown in Fig. 6. It is the VFO circuit beloved of QRP constructors. I (and G3VTT) have used this circuit several times before in *Short Wave Magazine*. An alternative VFO for the board is the "Stable VFO on PCB" by Ian Keyser, G3ROO (*Short Wave Magazine*, May 1986). This VFO is available in semi-kit form from G3ROO at "Rosemount" Church Whitfield, Dover, Kent CT16 3HZ. The price of the kit is £7.45 including postage. I have used this VFO with the MLX board to good effect.

The values for 80 metres and 160 metres are given in the circuit diagram, Fig. 6. For operation on 80 metres the frequency range is 5.0-5.5 MHz and for 160 metres the range is 7.2-7.0 MHz. The 5 MHz VFO could have a shorter range but the full 500 kHz coverage allows the possibility of the same VFO being used for 80 and 20 metres. These VFO frequencies imply that the BFO is set on 9001.5 kHz.

The frequency determining capacitors, C1, C2, C3 and C4 should be polystyrene types for stability. Silver mica capacitors could be used, but they are more expensive and I find them less effective in VFO circuits than polystyrene. The tuned circuit inductor, L1, is wound on a 3/16" diameter former with a core. The tuning capacitor, VC1, is a good quality air-spaced variable.

The VFO is built on a printed circuit board to the layout shown in Fig. 7. The whole circuit is mounted in a screened box 4 1/2" x 2 1/2" x 1" deep, in my case a diecast box. VC1 has a small in-line 6:1 epicyclic drive for ease of tuning. The power line comes into the box via a 1,000pF feedthrough capacitor. Do not take the output via such a capacitor, it will simply decouple all the precious RF to ground. This has been done!

As with every VFO, the secret of stability lies with the method of construction. The components must be rigidly mounted and the whole circuit shakeproof. Built like a battleship, tank . . . or

whatever, most VFO circuits are stable. Once the VFO has been built it can be tested by connecting the output to a frequency counter and adjusting the core of L1 for the correct range. If a counter is not available the VFO can be tested and adjusted by listening for the signal on a receiver covering the required frequency range.

## The Receive Mixer

The circuit for the receive mixer is shown in Fig. 8. It is a version of a circuit that I have used before in direct conversion receiver circuits (see "Introducing QRP", *Practical Wireless Publications*). Three FET transistors (TR1, 2 and 3) are arranged in a "Y" configuration. TR1 forms an RF amplifier for the incoming signal which is tuned by L1/VC1 and L2/VC2. TR1 is in the source of both TR2 and TR3 which form the mixer. The VFO signal is divided into two components by T1 to feed the gates of TR2 and TR3; the mixed signal appears at the source of TR2/3. L3 and CT1 form a tuned load on 9 MHz for both FETs; L3 is a bifilar wound coil which also provides access to the power supply for both FETs.

The input tuning coils, L1 and L2, are commercial Toko tuning coils sold by CIRKIT HOLDINGS. The type KANK-3333R will tune both 80 and 160 metres with the stated variable capacitor. VC1/2 is a two-gang variable capacitor taken from an old broadcast receiver and is around 350 to 500pF per gang. C1 provides top coupling between the two stages. The value of C1 is rather critical and may need individual adjustment by the constructor. If the value is too large, the overcoupling of the two stages gives a double peak in the tuning of VC1/2. If the value is too low, the sensitivity of the receiver is reduced. The best approach is to begin with a typical value, I suggest 10pF, and when the whole receiver is completed and working, the value of C1 can be optimised for best results with the station antenna.

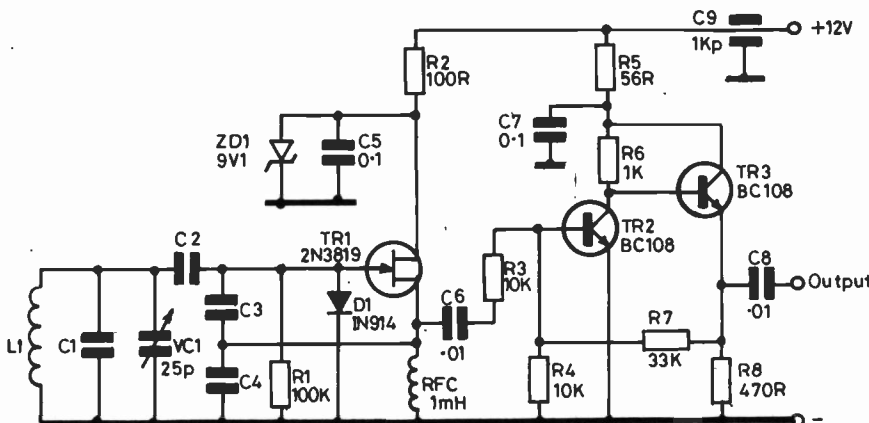


Fig. 6 SIMPLE SIDEBAND VFO

Band	VFO freq.	VFO VALUES				
		L1	C1	C2	C3	C4
80m	5.0	35t	47p	390p	470p	470p
	5.5	32swg	47p	390p	470p	470p
160m	7.2	25t	47p	330p	560p	560p
	7.0	30swg	47p	330p	560p	560p

L1 on 3/16" dia. former with core.  
BFO: 9.0015 MHz

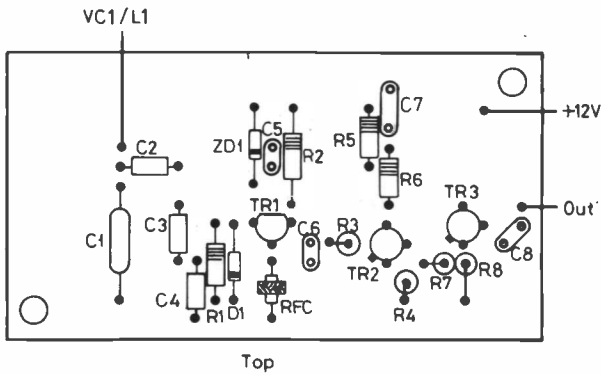
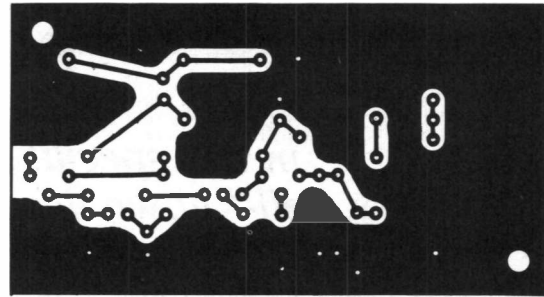


Fig. 7 VFO PCB LAYOUT



PCB (Under)

E 761

Fig. 8 shows the windings of T1 and L3. T1 is wound through two small ferrite beads using 32 swg enamelled wire. The drawing shows the ferrite beads spaced apart for clarity. In practice the two beads are placed side by side. Holding them together with a small piece of sellotape makes the winding process much easier. The best method of winding the little transformer is to tackle the 4-turn winding first. Begin at the centre of a piece of wire about 12 inches long. Double the wire to form a 6 inch "hairpin" and twist the bend end of the wires tightly together for about an inch. Scrape the enamelling off this section of wire and tin the bare copper with solder; this forms the tapping point. Take the two free ends and push each one through one of the ferrite beads. Continue winding one of the free ends twice through the holes of both beads; repeat that with the other free wire in the opposite direction. That has formed the 4-turn centre-tapped section of the transformer. Finally add the single two turn winding as shown in Fig. 8. Take care not to scrape the enamelling off the wire on the edges of the ferrite beads.

The 9 MHz coil, L3, is bifilar wound. That involves twisting two pieces of 22 swg enamelled wire together and then making the 20-turn winding. The wires should have around 8 twists per inch along the whole length. The 20-turn winding must take up about three-quarters of the former. After the winding has been made the start and finish of each wire can be identified with an ohmmeter. The start of one winding is joined to the end of the other winding to make the tapping point. Dots on the drawing and circuit of Fig. 8 identify how the connections are made.

The receive mixer is built on a printed circuit board to the layout in Fig. 9. The connections for the base of the input tuning coils, L1/2, are shown in Fig. 8. In construction take care to make the correct connections to T1 and L3 and the FETs, TR2 and TR3. VR1 is a small preset potentiometer which acts as a balance control. In use on the prototype it made little difference and could probably be replaced by two fixed resistors to form a potential divider with a total resistance of around 500 ohms. The trimmer, CT1 is a small foil trimmer of the range 2-22pF.

### Setting-Up the Receiver

Before the receive section of the MLX board can be tested, the basic board connections must be made. Refer to Fig. 3. The required connections are: An 8-ohm loudspeaker connected to pins 25 and 26; The volume control connected as shown to the provided screened leads; The BFO offset connections made, if the original 8998.5 kHz crystal is being used; The supply voltage (12-13.8 volts) lead to pin 23.

The receive mixer board output must be connected with a screened lead to pins 1 and 2, pin 2 being the ground connection. The VFO output also requires a screened lead to connect it to the VFO input of the mixer board. The VFO board and the mixer board both require a supply voltage line to the appropriate place. That may seem obvious . . . but it is simple to forget and wonder why the receiver is not working!

Begin by applying the power to the MLX board only. The speaker should come to life, the noise being variable by use of the

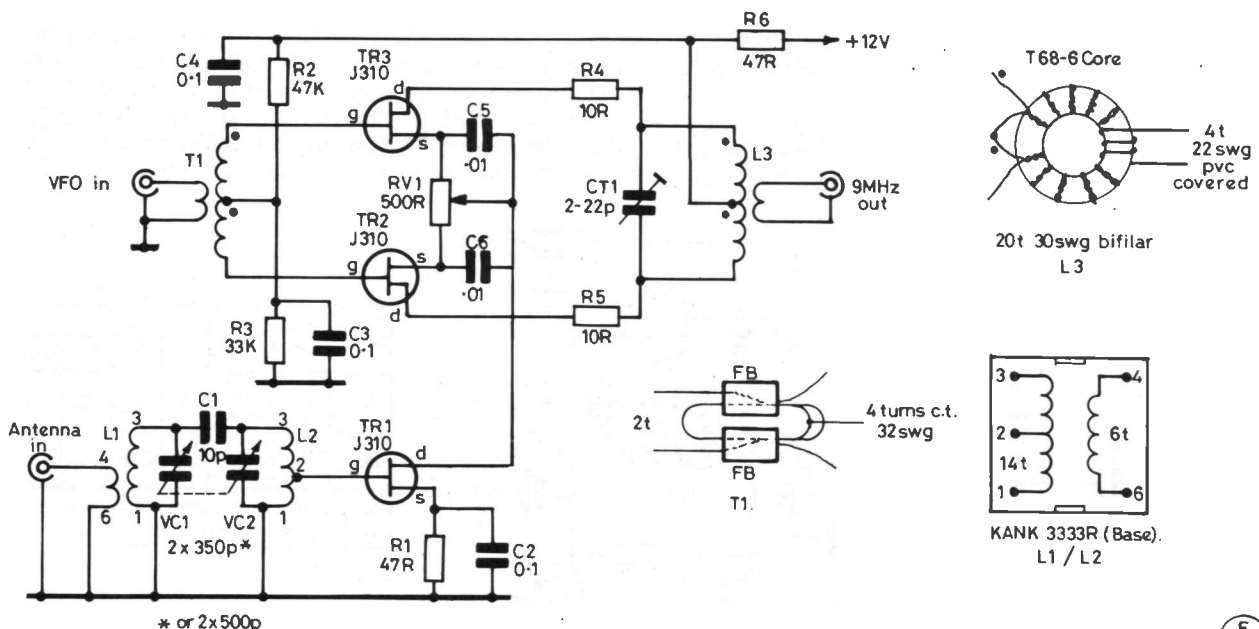


Fig. 8 SIMPLE SIDEBAND RECEIVER INPUT / MIXER

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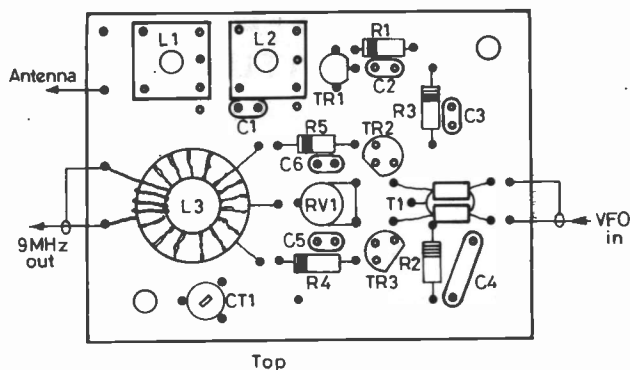
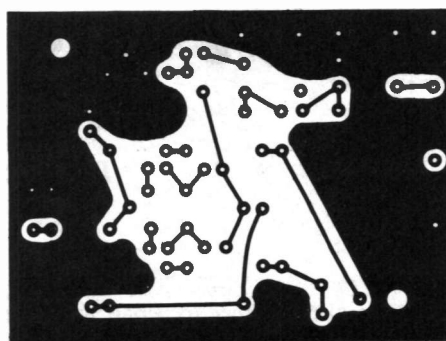


Fig. 9 RECEIVE INPUT/MIXER PCB LAYOUT



PCB (Under)

E  
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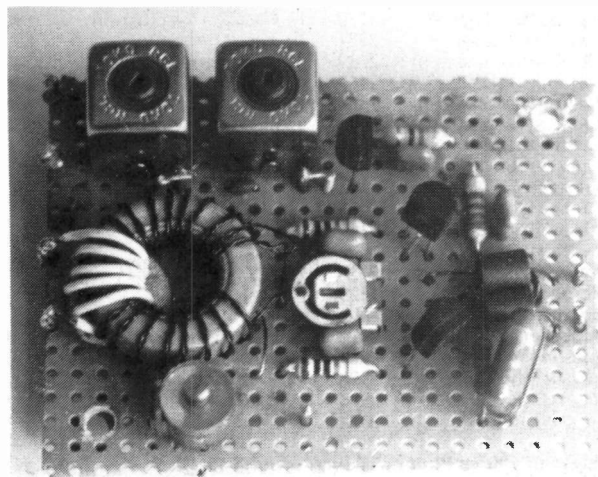
volume control. Touch an antenna lead on pin 1 and listen for an increase in noise. Power up the mixer and the VFO circuits. The rest of the testing depends upon the availability or not of a single generator, or signal source for the chosen band.

If a signal generator is available, apply a small 9 MHz signal to the drain of TR1 and peak CT1 for maximum output. A signal of frequency somewhere near the centre of the chosen band is then applied to the gate of TR1 and the VFO is tuned until the signal is heard. The signal is then applied to the antenna input and VC1/2 rotated for the best peak in the signal. The cores of L1/2 may require adjustment for a reliable peak to be tuned by VC1/2.

Without a signal generator, connect the station antenna to the antenna input point. The VFO is tuned for some sort of signal; VC1/2 may have to be rotated for a noise peak before any signals can be heard. The received signals are then peaked using CT1, then VC1/2 and finally the core of L1/2. This is a much more subjective process and may need repeating a few times to get the best results. It is wise to check that the signal being peaked is in fact in the band.

There is provision for an S-meter on the board. I can only guess at the full scale deflection of the required meter. I put one of those cheap 200µA ex-tape recorder meters in the circuit and it seemed to do the job. There is an S-meter adjustment preset control on the board, VR2, which is worth a twiddle. Like a lot of S-meter circuits on commercial equipment, I was not over-impressed by its readings. However, it is nice to add a meter to the front panel.

That completes the receiver section of the MLX board applications. I was quite impressed by the receiver on 80 and 160 metres. The cheap little mixer circuit gave a good account of itself. Even if the reader does not intend to obtain or cannot obtain an MLX board the associated circuits are worth trying in other applications. Although I show a PCB layout for each of the circuit boards, the photographs are of my first prototype boards. These



Prototype of the receiver mixer board

were built on perf. board and there is no reason why other constructors should not use this method rather than etch printed circuit boards.

The next part of this series describes the additional circuitry required to get the MLX board transmitting and thereby making a complete transceiver.

### This Month's Front Cover

With our front cover now being reproduced in full colour we are able to show you actual off-screen photographs of the first Robot 1200C colour slow-scan television picture transmitted by G3NOX via meteor scatter to GM3WOJ in Ross-shire and LA6QBA in Oslo. (See below.)

These pictures were the result of a series of propagation experiments carried out on 50 MHz by G3NOX during the period covered by the special permits, which allowed higher power to be used than is currently permitted on 50 MHz on the 24-hour basis.

A further series of experiments have just been carried out by G3NOX on 50 MHz using Sporadic E to transmit Robot 72-second colour SSTV to LA6QBA with power limited to 10 watts; excellent results were achieved.

#### First Colour SSTV on 50 MHz via Meteor Scatter

On Tuesday, 7th May 1985, at 0640 GMT during the Piscids Meteor Shower, Jeremy Royle G3NOX (Saffron Walden, Essex) transmitted composite high-definition Robot 1200C colour SSTV to Chris Tran GM3WOJ in Rosemarkie, Ross-shire (1077WO) on 50 MHz via meteor scatter. We believe this is the first time that meteor scatter propagation has been used for picture transmission. GM3WOJ received a single burst of the G3NOX test signal at 59+ lasting over 100 seconds, sufficiently long for two whole frames of high-definition 36-second colour which he recorded on tape.

The tape was then sent to G3NOX for replay and analysis through his Robot 1200 Scan Converter; the received pictures were photographed directly from the colour monitor.

Equipment used for this experiment by G3NOX consisted of an Icom IC-551 transceiver, 100-watt solid-state PA to 2 x 5-ele. Tonna Yagis vertically stacked 1/4-wavelength apart; GM3WOJ used an Icom IC-551 and a single 5-ele. Yagi for this experiment on 50.230 MHz.

The scan converter is the Robot 1200C running in the 36-second per frame rate with 256 pixel x 240 lines and 64 grey levels; luminance and colour are transmitted on each line.





little sick. One suspects that SWL Williams is really saying that he is building the pre-amp with a view to hearing more DX on 28 MHz. However, this end can only be achieved by a better aerial or better siting of the existing aerial. This is because the FRG-7 was one of the most sensitive receivers ever at HF, so that if the aerial can give it a hearable signal it will hear it; thus, as any pre-amp has its own inherent noise, it will degrade the receiving system to a slight extent. In addition of course when the band gets lively or the CB-ers active nearby it may well, by its gain, reduce the dynamic range of the system enough to be a notable nuisance. The answer is to replace the Joystick with a sixty-foot tower and four-element or more 28 MHz beam (nothing if not optimistic is J.C.!). On a different subject, the AD5CM claimed as being in the Lebanon was either an American in the fifth call area or a mis-heard OD5CM, as a look at a prefix list will indicate. That is the sort of slip-up that usually is to G3KFE's address!

Having by that last comment ensured your J.C. will be put out to grass, we turn to the next letter which is from *F. Dunn (Blacon)*, who says his new caravan is definitely slowing his SWL-ing down; first a spell in the West Country and latterly a couple of weeks in North Yorks. As for using the van as a test bed for mobile aerials, Frank says that would upset the family; all they take with them is a selection of choice tapes and some good books, but neither radio or TV.

Thanks to GW4OXB and his International Listeners' Association we have a copy of their recent Newsletter No. 2, plus a list of QSL addresses which will be of interest to those readers who also listen to the BC bands. In addition, it includes details of the construction of the GW4OXB mast and the address of the supplier of the parts.

From *G. Caselton (Orpington)* we have an up-dated list of his prefixes for the All-Time Table, although Graeme says he still has to extract the details from another filled log-book before he is right up to date. One error in it, unless our memory lets us down, is 9L1CISV — a valid prefix surely, but not a valid callsign. Possibly we shall have our aged ears pinned back on this one. On a different tack, Graeme wonders whether he should submit a complete print-out each time. Not essential, but of course it will be realised that your scribe has a mighty pile of people's HPX listings on file in the shack, and if those who have the facility to do a print-out at reasonable speed do a complete one each time it will save filing cabinet space, and give me a little more room in the shack. However a total of the last claim and the present one is called for, and is quite important. For one thing it checks my arithmetic, and for a second it tells us which area of the file to look in when we come to correct and update the Ladder listings each time.

A long letter from *M. Ribton (Gillingham)* who has shot up by no less than 99, of which 39 were from U.S.A., and 13 'specials'. The letter from J. J. Sales last time brought back memories of his own early QSL-ing activities, and Mike says he now has his own black list of dud QSL managers! A good point is this, and perhaps the time has come for QSL managers to indicate in some manner whether or not they will respond to bona-fide SWL cards, and if so what they do with the IRCs or 'green stamps'. Some at least we know will QSL SWL reports but always send them *via* the Bureau system and then pocket the IRCs. And there have been known cases where neither the operator nor the manager have answered any cards. Turning to Mike's queries, the two-number East German prefixes are all 'counters'. The other one concerns old logs; Mike is going through his old ones and wonders whether the prefixes are acceptable still. Of course: the Table is All-Time Post War, but we don't say anything about when an entry is to be put in. Thus it is open to a new entrant to enter the 1986 Ladder until he reaches the top and then to add his old loggings to augment his All-Time score; on the other hand he can score up the lot and maybe go straight in to the Big League.

*P. Oliver (Paisley)* complains about the poor conditions as well as the lack of time thanks to the needs of his garden and other things, when accounting for his low score this time. In fact the



SWL B. F. Hughes' shack at his home in Harvington, near Kidderminster. On the left is the Drake R4-C receiver, next a Russian Rx on top of the cassette deck and a small ATU, then a Hitachi stereo unit with 4-inch TV.

general opinion seems to be that it has been a very good spell, taking into account of course the point in the sunspot cycle.

*S. Field (Barningham)* breaks his silence to indicate that he sat up for the CQ WW WPX Contest — that'll please W1WY! — and in consequence collected up quite a few of the older American prefixes, this being one of the few contest activities he is game for. However, Stuart was having his concentration somewhat disturbed by waiting for the pass-slip from the RAE, and hoping all the work put into his new shack, both heat and sound insulation, was not going to be wasted!

*L. Marquardt (Hereford)* found another 17 to add to his collection of prefixes, and notes some QSLs have come home to roost; more wallpaper!

*W. J. Prior (Lochcarron)* says that plans for new aerials and so forth are on the drawing board — but there are flies to be cast for sea-trout and salmon, now they have come back to the River Carron. And, we must admit, fly fishing is an art even more difficult than SWL, with its need to penetrate the minds of the fish!

*E. M. Gauci (Malta)* mentions again the question of us running an 'unlimited' 1986 Table as a separate ladder, with a view to seeing who can make the best score in one year regardless of knowledge or experience. Obviously, Eddie didn't look at the Annual Table last time! We'll do it if — and only if — we get adequate support. So far, Eddie has 757 in 1986, using an FRG-7000 and longwire.

*P. Davies (Market Drayton)* has another long list, but of the 60 heard since March a couple were duplicates from the far-off 1959-1964 period of listening.

*J. J. Sales (Lancaster)* says his Morse is suffering as a result of the time wasted on SSB prefix chasing, so for this time the list update is only for CW.

*B. F. Hughes (Worcester)*, surprisingly enough for someone at the top of the ladder, has three real oddball ones in CQ6UW, CQ8UW and GR8UW. One supposes the first two are 'possibles' but the GR8UW — we can't imagine a legal operation from Rockall that we wouldn't have heard about, and another McClean piracy job ditto. In any case, we question whether

## ANNUAL HPX LADDER

### Starting date January 1, 1986

SWL	PREFIXES
R. G. Williams (Borehamwood)	484
Mrs. A. Sitton (Stevenage)	458
L. Marquardt (Hereford)	440
B. Musselwhite (Warminster)	338
D. McGlone (Limerick)	208

200 Prefixes to have been heard since January 1, 1986 for an entry to be made, in accordance with HPX Rules, see p. 29, March issue. A score 500, transfer to the All-Time ladder, will be automatic, but for this year those who so wish may continue in the Annual Table, provided a separate listing is sent in (where applicable) from the All-Time list. Thus the 1986 final listing, to appear in the March 1987 issue will show who has heard the most Prefixes in year 1986.

practical operation at reasonable power levels would be possible, as we seem to recall that the last time an operation from there was seriously mooted the intention was to have a power cable running from the support ship to the top of the rock. This, we would have thought, would have negated it as a prefix anyway, and we can't imagine any skipper being daft enough to sit that close to the rock for days on end on seamanship grounds alone.

B. Patchett (Sheffield) has been hobnobbing with our old friend G3KPO at the Wireless Museum, Arretton Manor in the Isle of Wight; Brian notes they have a shortage of old magazines apart from *Radio Communication*. Thus they are looking for old issues of British and American radio Magazines such as *CQ*, *QST*, *Short Wave Magazine*, *Practical Wireless* and so on. Incidentally most of what they have has been presented to them by all sorts of people from all over the country, and wherever possible it is restored to running order by supporters. One of the most useful ways of helping is by bringing stuff down to Portsmouth or indeed right over to the island; Barry himself has a pile of stuff for the Museum which needs transport. If you can help, contact G3KPO. In a second letter a week later Brian wonders about the 'young

mountains' which surround your old J.C. and asks whether they are impervious to 28 MHz FM. That's a good question, as we haven't tried Ten FM, not having a rig for the mode; but we can say that on two metres the local repeater or a trip up in the hills is the only practical answer.

R. Williams (Biggleswade) says he supports home industry, in the form of GBOOS on the Out Skerries, up in Shetland. There was quite a lot of stuff about on all bands, with 28 MHz signals on many days, and on Twenty VK6WC was heard at 1500z — we wonder what propagation mode supported that? It's one of the fascinations of the hobby when one hears stations like that at 'odd' times and, knowing the hearing was correct, wondering how it could have occurred.

The final reporter this time is Mrs. R. Smith (Nuneaton) who still has not got her aerial fixed, but plods on regardless. Ruth seems to have been deserted by all the other YLs who used to compete, as they have all either dropped out totally or passed the RAE and obtained licences of their own.

### Sunspots

Most readers will be aware we are at the bottom of the sunspot cycle, or at least near it. Many, though, don't appreciate that the end of one cycle and the start of another aren't as clearly marked as we'd like. Thus it is nice to know that the first sighting of a spot of the new cycle has recently occurred, which usually means the upturn will be about a year away.

### SLP

Have a listen on August 31, any period, up to a total of six hours, any band and report your results next time.

### Finale

All for now. Deadline for next time is September 18 to arrive, addressed to "SWL", SHORT WAVE MAGAZINE, 34 High Street, Welwyn, Herts. AL6 9EQ; and of course your questions are what makes it all so interesting. *Don't forget the set listening period!*

# “Practically Yours”

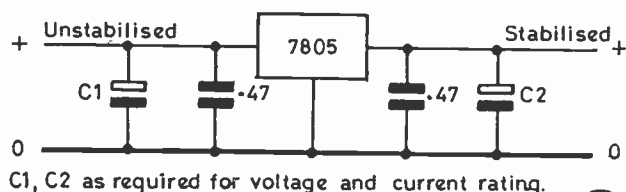
with GLEN ROSS, G8MWR

IN the July issue we looked at the various requirements for on-board voltage regulation and the different ways that this could be simply obtained. This has led to a number of letters from people asking for details of ways of getting more tightly controlled results and also for some general design information for use with bench power supplies. It seems that a lot of people are not prepared to pay the asking prices for commercial PSUs when they know that these units are an ideal home-construction project

which they would happily build — if they could get the details to enable them to design a unit to suit the station requirements.

### More On-Board

The easiest way of getting more accurate on-board regulation is to make use of one of the wide series of “three leg” regulator units such as the 7805 which are now available. These come in both positive and negative supply varieties and with current capability from around 50 milliamps to several amps. The smaller current units are intended to operate without heat sinks and are wired to the board in the manner of an ordinary transistor. The larger, say up to one amp, units are usually mounted on a small board-mounted heatsink.



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780

### Precaution

One precaution that must be taken with this type of unit is to install capacitors from the input and output pins straight to earth

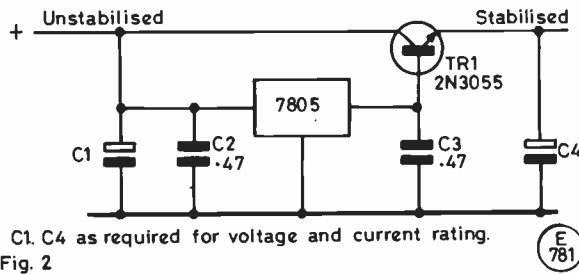


Fig. 2

as shown in Fig. 1. If a "jack-up" resistor has been fitted to increase the voltage output these capacitors should be taken to the earth pin of the regulator, not the board earth. These capacitors are fitted in addition to the normal electrolytic reservoir and smoothing capacitors; without them the units are inclined to oscillate at about 10 MHz. This effect can cause all sorts of problems in the equipment used with the supply and can be the very devil to find if you do not know of this phenomenon. A 'scope connected to the input and output pins will quickly determine if the unit is stable in your circuit.

These units usually have an internal voltage drop of around three volts so for a twelve volt supply the input voltage should be at least fifteen volts and ideally a little more. Most of these units are normally fitted with short-circuit protection, meaning that they will close down if the output is shorted. Do not forget that under short-circuit conditions the units will normally pass the maximum available current, unless they are of the type with foldback protection and any heat sinking requirement should bear that in mind. The stability is excellent and they will normally hold the output voltage constant to within a few millivolts over the whole of the output current range.

### Increased Output

The current rating of even the smallest units may be easily increased by the simple addition of a series pass transistor. Under these circumstances the voltage regulator only provides sufficient current to drive the series pass transistor, the transistor handling the current requirement of the load (Fig. 2). Due to its cheapness at rallies, around 50p, the transistor usually used is the 2N3055 which will handle up to 115 watts on a suitable heatsink; this wattage is derived by dividing the input, unregulated, voltage by the maximum output current.

### More Current

Using the transistor in this way is not good engineering practice and, if this type of current were required, the better method would be to use two or more series pass transistors to share the load. However, you cannot simply connect the transistors in parallel because the transistors are not absolutely identical and one of the group would pass more current than the others, and so would get hotter. As it gets hotter the current it passes would increase and the circle would continue until you had a thermal runaway on your hands, followed by a blown transistor and the next transistor starting the same trick.

The answer is to swamp the internal differences of the

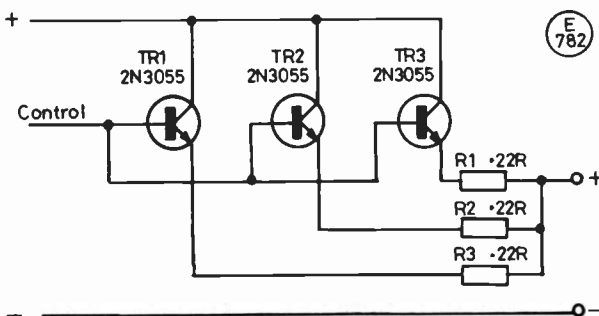


Fig. 3

transistors by connecting low value resistors in the individual emitter leads as shown in Fig. 3. The resistors used must be capable of easily carrying the maximum current that can flow in that particular leg of the circuit plus a fairly generous allowance to allow for the effect of a blown transistor.

### Problems

The blown transistor is always a problem with any supply that uses a simple series pass transistor layout because a short circuit on the output will draw excessive current and blow the transistor. Putting a fuse in the output line is not the answer because the transistor will blow long before the fuse does. (Transistors have been described as being the fastest fuses on three legs!) There are methods of getting around this and they will be discussed later. The other main problem is that the final regulation stability is not as good as that of the basic regulator sub-system. This is due to the varying voltage drop caused by the current flowing through the internal resistance of the transistor and also the current equalising resistors.

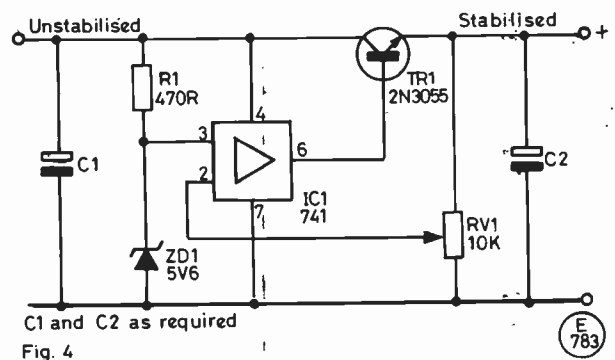


Fig. 4

### Monitoring

The answer to this problem is to use a circuit that actually monitors the voltage at the output terminal of the PSU or, even better, actually at the load end of the connecting leads thereby taking the drop on these into account, and then makes the required alteration to the drive circuit to keep the output voltage constant irrespective of the variation of the load current. This can be done using specialist integrated circuits but the humble 741 can be pressed into service as shown in Fig. 4.

### Operation

This simple circuit makes it easy to follow the operation of this type of control. Essentially the 741 acts as a voltage comparator which checks the voltage sample taken from the output circuit against a voltage which is derived from a zener stabilised supply fed to the other input. When these inputs agree a status quo is reached and the output voltage is steady. If, due to a change of load, the output voltage drops then the output of the comparator moves up so as to counteract the original drop and *vice versa*. This change is immediate, so producing a constant voltage.

### Variation

The actual voltage produced at the output can be adjusted by varying the voltage fed back from the sampling pre-set, the lower the voltage being fed back the higher the resultant output voltage. What you have actually done is to simulate the conditions of a heavy voltage drop due to high current consumption, thereby forcing up the output voltage. The circuit for this unit is shown in Fig. 4 and to this can be added the circuit in Fig. 3 to give higher current capability. The problems of short-circuit protection still remain and these will be discussed next month together with a full workout for the bench type power supply with variable output voltage and both over-voltage and adjustable current protection. Consideration will also be given to the choice of power transformer, rectifier type and how to choose suitable electrolytics for use in your own power supply designs.

# Entering a Contest for the First Time

## *a simple guide*

NIGEL CAWTHORNE, G3TXF

**F**OR the newcomer to the HF bands, contests can be confusing and bewildering. Can I take part? Who works what? What do I say? How do I keep a log? How do I work out the score? Where do I send the log to? These are some of the questions that occur to a newcomer coming across a contest on the amateur bands for the first time. This article is intended as a brief guide for those many amateurs who have never entered a contest, but who would like to know how to go about it.

The very word "contest" puts many people off! The writer along with many other active contesters think of contests firstly as "operating events". The competitive element for the vast majority of participants is only a secondary consideration. First and foremost a contest is an operating event — it is an opportunity to make lots of QSOs.

### Types of Contest

Each contest has its own speciality *e.g.* the two RSGB 7 MHz contests (one on SSB and one on CW) are for U.K. stations to work the rest of the world on just the one band (7 MHz) during a set period of 21 hours. In contrast, the ARRL contests (also separate weekends for SSB and CW) are for the rest of the world to contact American and Canadian stations on all five HF bands (3.5-28 MHz). The ARRL contests are 48 hours long. No two contests are exactly the same; each has its own operating style.

The short sharp type of contests run by the RSGB such as the three 1.8 MHz CW Contests, the 1.8 MHz Town and County SSB Contest and the 80m. ROPOCO CW Contests each has a special characteristic of its own. Short sharp contests, which last only four or five hours are very popular in the U.K.

Because each one is different it is important to know the basic rules and operating procedure for each type of contest. Most contests are run on an annual basis, and generally the rules are very much the same one year as they are the next.

### Fundamental Points

It is worthwhile to dispel a few of the myths about contests in general:

*"Who can enter?"*

Most contests are open to everyone, but note that not all contests are of the worldwide or "everybody works everybody type". Many contests are regional or national. There are also internal contests where stations in one country only take part; for example on the HF bands, the Russian stations hold a number of WSEM contests in which Russian stations only work each other. The U.S. stations similarly have their Sweepstake Contests which are internal to the U.S. only.

There are three major groupings of HF contest that are of interest to U.K. amateurs.

1. Worldwide Contests in which anyone can work anyone else. The major contests in this category are the CQ Worldwide DX and WPX Contests organised by *CQ Magazine* in the U.S., the IARU Radio Sport Contest organised by the ARRL/IARU, and the CQ-MIR Contest organised by the USSR Radio Sport Federation.

2. Open regional contests in which one region, continent or country of the world works the rest of the world. In this category the ARRL DX Contests in which U.S. and Canadian stations

work the rest of the world, the DARC's Worked All Europe Contest in which Europeans work the rest of the world, and the JARL's All Asia Contest in which Asian stations work the rest of the world are the major contests of this type.

There are many national contests of this type, in which stations in just one country or group of countries contact the rest of the world. Some of these are listed in Table 1.

3. RSGB Contests. The RSGB organizes 17 HF contests in the year, catering for all tastes in HF contest operating. There is also a full programme of VHF contests. Most RSGB contests are relatively short in length and are confined to one or two bands. National Field Day (CW only, 24 hours), held annually in June is the only "all-band" contest organised by the RSGB, other than the SSB Field Day, which is an IARU Region 1 event. U.K. participants in RSGB contests must be members of the RSGB. Some of the RSGB's HF contests are listed in Table 2.

*"Do I have to be on for the whole length of the contest to send in a log?"*

No, you don't have to be active for the whole length of the contest to send in a log. In fact in the longer international contests, only a very few operators will be on all the time. Most operators will be part time. They will come on and make a few QSOs when it suits them. Just a few hours or even a few minutes of activity is enough to send in a log — there is no minimum operating time requirement to send in a log (although there may be a minimum operating time for a certificate to be won).

"Contesting" means making QSOs: contests provide the opportunity to work stations that otherwise might be rare or difficult to work. QRP-ers can work DX in major contests that under normal operating conditions would be virtually impossible to work. The speed of the operating during a contest gives everyone a greater chance of working some rare or exotic DX.

*"But, surely contests are only for the Big Guns?"*

Contests are not just for "Big Guns"! If you want to win a major contest you will require special operating skills combined with at least a fair sized station. To be a continental or a world winner, as you would expect, requires a large antenna system and lots of operating skill and experience.

However, the majority of the participants are not out to win. It is the "Small Guns" that provide the majority of the activity in any contest. Without the "Small Guns" the "Big Guns" would soon run out of QSOs to work! Whatever size your station and antenna, there is always plenty of scope for having fun and participating in contests.

*"What is a contest QSO?"*

Contest QSOs are much briefer than even 'rubber stamp' QSOs, and certainly much briefer than natter or rag chew QSOs! The exact content of the QSO varies from contest to contest, but as a general rule it is an RST report plus something else. This other part of the contest exchange might be a serial number (many contests), your transmitter power (ARRL Contests), your CQ Zone number (CQ Worldwide Contests: the U.K. is Zone 14) or even the ITU Zone number (several Eastern European Contests and ITU Contests use this one: the U.K. is ITU Zone 27). The All-Asia Contests use the operator's age as the second part of the



exchange (YLs give 00!). RSGB Contests that involve inter-G working often include a county code as part of the exchange.

VHF Contests usually include a QRA locator code, which identifies the location of the station. QTH details might also form part of the contest exchange on VHF.

The callsign is also part of the QSO too — make sure you get that right! Callsigns often get garbled in contests. Take care to be sure that the other station has got your call correct and that you have got his correct too. Inaccurately logged callsigns will lose you points.

#### “What are Serial Numbers?”

Many contests use serial numbers as part of the exchange. Serial numbers start at 001. The first stations that you work would be (e.g.) 59001. Note carefully the number that you receive. This tells you how many stations the other station has contacted. The time, band, callsign of the station worked, report and serial numbers sent and received all need to be noted down carefully as part of the “Contest Log”. Then for the second station that you contact, give 59002 and so on.

RST reports in contests tend to be meaningless. Most stations give 59 on SSB or send 599 on CW. If you want to give genuine RST reports in a contest please do so, but don't be surprised at receiving 59 from a station that can only just hear you or has to ask for a repeat of the callsign six times before he gets it right! In practice, it is the callsign and the serial number that are the keys to the contest exchange and not so much the RST reports. RST reports are highly subjective at the best of times. Deciding whether a station is S6 or S7 in the middle of a contest is a little academic anyway!

Many contest stations might use only two RST reports during a whole contest: 59 meaning “I can hear you Okay”, and 55 meaning “Boy, you're weak!”. Don't take too much notice of RST reports in contests!

### Mixed Exchanges

In many regional contests, the contest exchange may not be exactly the same in both directions. Several Eastern European contests such as the HA-DX-Contest organised in Hungary use mixed exchanges. For example the Hungarian stations in the HA-DX-Contest give you an RST report followed by the two letter code representing their district. Non-HA stations give a sequential serial number. For the non-HA stations the different districts worked will form the multiplier when working out the score.



Experienced contest operator Dennis, G3MXJ, seen here operating GJ3SXW during a multi-operator entry in a recent CQ Worldwide CW contest from Jersey.

The ARRL Contests are probably the best known example of the mixed exchange contest. American and Canadian stations give an RST report followed by their State or Province (e.g. 59NY on SSB or on CW 599MI), whereas other stations give an RST report plus their power (e.g. 59400 on SSB or 599150 on CW).

### Other Contest Exchanges

A number of contests have introduced an additional element into the contest exchange to increase the amount of skill required. Both CQ and ITU Zone numbers can often be guessed from the callsign alone. Once you've got the callsign, you know the rest anyway! This is thought by many to oversimplify the contest exchange.

For many years the Worked All Europe Contests run by the Germany Amateur Radio Club (DARC) has had a small amount of message handling as part of the contest. The WAE contest is where European stations work only stations outside Europe, and the rest of the world works Europeans. In the WAE contest, points are earned not only for the basic QSO exchange but also for a simple message handling exercise. European stations receive an extract from the log of a non-European station transmitted during the contest in a simplified format. For example a QTC or message

Country or Region	Contest Name	Month/Weekend	Mode	U.K. Stations work:
Hungary	HA-DX	Jan 3rd	CW	HA stations and non-Europeans
France	REF-CW	Jan last	CW	F and many Francophone areas
Yugoslavia	YU-DX	Feb 1st	CW	YU and others
Holland	PACC	Feb 2nd	CW/SSB	PA stations only
U.S.A./Canada	ARRL-DX-CW	Feb 3rd	CW	W and VE stations only
France	REF-SSB	Feb last	SSB	F and many Francophone areas
Bermuda	Bermuda	Mar 3rd	CW/SSB	VP9, W and VE only
Switzerland	H-26	Apr last	CW/SSB	HB stations only
Brazil	SA-DX-CW	Jun 2nd	CW	South American stations only
Asia	All-Asia-SSB	Jun 3rd	SSB	Asian stations only
Roumania	YO-DX-Test	Aug 1st	CW/SSB	YO and others
Asia	All-Asia-CW	Aug last	CW	Asian stations only
Bulgaria	LZ-DX-Test	Sep 1st Sun.	CW	LZ and others
Scandinavia	SAC-CW	Sep 2nd	CW	Scandinavian stations only
Scandinavia	SAC-SSB	Sep 3rd	SSB	Scandinavian stations only
Oceania	VK-ZL-SSB	Oct 1st	SSB	Oceania stations only
Oceania	VK-ZL-CW	Oct 2nd	CW	Oceania stations only
East Germany	WA-Y2	Oct 3rd	CW/SSB	Y stations only
Czechoslovakia	OK-DX-Test	Nov 2nd Sun.	CW/SSB	OK and others

Table 1. Some of the national and regional HF contests open to U.K. participants. The weekend number given is a guide only. Although most contests are held on the same weekend each year, the exact date should be checked to make sure. Similarly, rules may also vary slightly from year to year.

Contest	Month/ Weekend	GMT	Mode	Bands	U.K. stations work:
Affiliated Societies	Jan 2nd Sun.	13-17	CW	3.5	U.K. stations only
RSGB 7 MHz SSB	Feb 1st w/e	12-09	SSB	7	Non-U.K. stations only
RSGB First 1.8 MHz	Feb 2nd w/e	21-01	CW	1.8	Anyone on 1.8 MHz CW
RSGB 7 MHz CW	Feb last w/e	12-09	CW	7	Non-U.K. stations only
Commonwealth	Mar 2nd w/e	12-12	CW	All	Non-U.K. Commonwealth only
Town and County	Mar 3rd Sat.	21-24	SSB	1.8	Anyone on 1.8 MHz SSB
ROPOCO I	Apr 1st Sun.	08-10	CW	3.5	U.K. stations only
Low Power Fixed	Apr 3rd Sun.	07-11	CW	3.5	Anyone: two operating periods
Region Round-up	May 3rd Sun.	07-12	CW	3.5+7	U.K. stations only
National Field Day	Jun 1st w/e	16-16	CW	All	Anyone, with emphasis on portables
RSGB Summer 1.8 MHz	Jun 4th w/e	21-01	CW	1.8	Anyone on 1.8 MHz CW
Low Power Field Day	Jun 3rd Sun.	09-12	CW	3.5+7	Anyone: two operating periods
ROPOCO II	Aug last Sun.	08-10	CW	3.5	U.K. stations only
IARU Reg. 1 Field Day	Sep 1st w/e	15-15	SSB	All	Anyone, with emphasis on portables
RSGB 21/28 MHz	Oct 2nd Sun.	07-19	SSB	21+28	Non-U.K. stations only
RSGB 21 MHz CW	Oct 3rd Sun.	07-19	CW	21	Non-U.K. stations only
RSGB Second 1.8 MHz	Nov 2nd w/e	21-01	CW	1.8	Anyone on 1.8 MHz CW

**Table 2. A brief description of the HF contests run by the RSGB. There is also a series of Cumulative Contests on 1.8, 3.5, 7, and 28 MHz, which are specifically designed as "activity periods" for newer operators. The Cumulative Contests offer an ideal opportunity for the newer HF operator to get acquainted with contest operating in a relaxed atmosphere!**

might consist of W1RM telling you that he worked G3SXW at 0213z and that the serial number received from G3SXW by W1RM was 098. W1RM would give you this information in the format 0213/G3SXW/098. A total of ten QTCs can be received from each non-European station. More skill is required to correctly record these QTCs than for a normal QSO exchange.

The RSGB has also introduced this "mini-message" type of exchange into their very popular ROPOCO contests held for inter-G working on two Sunday mornings of the year. The exchange is RST plus a postcode. Rather than sending your own postcode, what is sent is the postcode that you have just received from the previous station contacted. For the first QSO you send your own postcode, but from then on, you send the postcode as received from the previous station.

#### "How do I send in a Log?"

Having made some QSOs during a contest, the next thing is to send in a log to the organisation running the contest. A "contest log" is a set of purpose-made log sheets sent to the contest organisers setting out the full details of the contacts made in the contest, as well as a calculation of the claimed score and summary sheet.

A contest log requires more information than the basic logbook keeping requirements of the Licence. The exact information required in the contest log will be set out in the rules, but will normally consist of the date, time, band, mode (CW, SSB or FM), callsign of station worked, RST and serial sent, RST and serial number received, details of any other contest exchange (e.g. county code, etc.), points claimed for the contact and an indication of whether the contact was a multiplier or bonus.

All contest organisers are pleased to receive logs. The number of logs received is a measure of the participation and support for the contest. Logs with relatively few QSOs are also appreciated by contest adjudicators, because they allow a more detailed cross-checking of the logs from stations that might be in a position to receive a major award or trophy.

#### "What do I use for a Contest Log sheet?"

Many contest organisers produce their own contest logsheet

formats, which can usually be used for a number of different contests.

One of these formats is the RSGB HF Contest Log Sheet (HFC1) which has room for 40 QSOs on an A4 sheet. For RSGB contests, it is the preferred type of logsheet. It can also be used for many contests run by other societies.

Some points to note when completing a contest log:

- write clearly and legibly.
- eliminate duplicate contacts from your logs. Never claim points for duplicate contacts. Use a duplicate checksheet where more than a few contacts are made. It will save you working the same station more than once on the same band.
- put your callsign on each sheet.
- use a separate sheet for each band unless specified otherwise in the rules (the reason for this is that log checking for multiband contests is usually done by a team of people, who each check different bands).
- always use GMT.
- total up the score on each page.

### Summary Sheet

Log entries are accompanied by a summary sheet which should give the following information:

- Name and date of contest.
- Name, callsign and address of operator.
- Category being entered (many contests have different categories, for example "Single Operator — Single Band" or "Multi Operator — All Band"):
- Computation of claimed score: this should be shown clearly by bringing forward the individual sheet totals. List the individual sheet totals on the summary sheet.
- Summary of multipliers, bonus points, etc. Preparing a summary will help ensure that none are left out.
- Station details: transmitter, receiver and antenna details and power used.
- Declaration: A signed declaration to the effect that the station has been operated in accordance with the terms of the Licence and also within the rules and spirit of the contest. The exact wording may sometimes be specified in the rules.

— Comments: Contest adjudicators are always pleased to receive comments from participants. These should be included in the summary sheet and might relate to the rules, the propagation conditions encountered during the contest, especially interesting or rare contacts made during the contest, etc. Any other relevant or amusing observations about the contest.

### The Results

Check in the rules for both the correct address to send the logs and also the deadline for the receipt of logs. Deadlines are sometimes defined as the date of receipt, or more often the date of posting. Also make sure to put adequate postage on your entry. Overseas contests usually allow enough time for surface mail.

It can take up to a year or fifteen months before the results of some of the major international contests are published in the U.K. magazines. Some contest organisers send every participant a results booklet, which lists the scores of all participants. These results booklets are a useful souvenir of a contest. Major contests that usually send out results booklets are the DARC's WAE Contest, the Scandinavian SAC Contest, the Russian CQ-M Contest and the JARL's All-Asian Contest. Many of the smaller national contest organisers now also circulate all entrants with a copy of the results listings.

### Winning a Certificate

All contest organisers issue certificates (and sometimes cups

and trophies to the leading participants at the continental or world level). Certificates are often issued on a country-by-country basis for each category of the contest. Have a look at last year's results. By carefully studying the results there might be a particular category that is not entered by U.K. stations or in which there are only tiny entries. By choosing your category of entry carefully, you can increase the chances of receiving a certificate for your efforts in the contest!

For the majority of testers it is the taking part and the making of the QSOs that are the fun. The results and the certificates follow up so long after most major international contests, that by the time they arrive, you will probably have forgotten all about the contest anyway!

### Contests — Operating Fun

So the next time that you switch on to find the bands hopping with a contest, don't just turn off again — find out which contest it is. Listen around or ask one of the stations taking part — ask him what the QSO exchange is too, if it isn't obvious. Then listen around for a few minutes to get a feel for what is going on. Have a go! Make a few contacts — reply to some of the testers calling CQ. Even though they probably won't have time to stop and tell you so, they will be pleased that you called!

Contests are a great opportunity for the newcomer to HF to make a lot of interesting QSOs in a short space of time, and possibly to work some new DX. Who knows, you may even win a certificate for your effort!

## EVENTS

### September Rallies

**September 13, Wight Rally**, Wireless Museum, Arretton Manor, near Newport, Isle of Wight, doors open 2 p.m., talk-in on 80m. (GB3WM), 2m. (G3IOW) and 70cm. (G3KSU). More details from G3KPO, 0983 – 67665. **September 16, Rugby A.R.S. Amateur Radio Auction & Barbecue**, Cricket Pavilion, 'B' Building Entrance, BTI Radio Station, Hillmorton, Rugby, doors open 7.30 p.m., trade stands, refreshments, free admission, large free car park. More details from G8TWH, 0788-77986. **September 21, National Amateur Radio Car Boot Sale** (organised by Dunstable Downs R.C.), Shuttleworth Collection, Old Warden Aerodrome, near Biggleswade, Beds., 10 a.m. to 5 p.m., admission 50p, free parking, talk-in on GB4SC. **September 21, Peterborough Mobile Rally**, Werrina Sports Stadium, Bishops Road, Peterborough, 10.30 a.m. to 5 p.m., free parking, adjacent restaurant, talk-in on S22 and GB3PB. Details from Peter Wilson, G4PNW, 221 Tynesdale, Bretton, Peterborough PE3 6XZ.

### Special Event Stations

To celebrate the 900th anniversary of the Domesday Book, Gloucester A.R.S. will be operating GB9DB for the month of September, transmission commencing on September 6th at 1200 GMT on HF and VHF. QSL cards will be sent, and incoming cards should be sent via the RSGB Bureau or direct to G4AYM.

Welwyn & Hatfield A.R.C. will be operating GB2WHC on September 14th on HF and 2m. from the Welwyn-Hatfield Water Carnival, Stanborough Lakes, Welwyn Garden City. QSL cards for all contacts. Details from G0A11, QTHR.

Borehamwood & Elstree A.R.S. in association with B.B.C. Elstree will be operating GB2TV on September 20/21st to celebrate the 50th anniversary of the first High-Definition TV Transmission in the world. The station will work SSB, CW, and possibly RTTY, on 2/10/15/20/40/80 metres subject to conditions. A special QSL card will be available and it is hoped that contacts will be made worldwide. More information from G4XEW, QTHR.

### Conventions

'Scotam 86', the Scottish Amateur Radio Convention, is being held this year on September 13th at the Lomond Centre, Glenrothes, Fife, doors open at 11 a.m., all the usual attractions. Full details from Ken Riddoch, GM3ZSP, 0334-53336.

This year's Welsh Amateur Radio Convention will be held at the usual venue, Oakdale Community Centre, Blackwood, Gwent, on October 5th. Doors open at 10 a.m. and there will be a wide programme of presentations on offer as well as Morse test facilities (applications in advance to the RSGB), plus trade stands and bring-and-buy. Admission is £1.50 with talk-in on S22. Full details from GW3KYA, QTHR (0495-225825 home, 06333-67711 extn. 348 office).

### Expedition

The 'X' Net DX-pedition to North Wales takes place over 18th to 22nd September, with GB4XXX operating on all HF bands and 4m., and 80m. QRP. Information from G4AUX, G4CAX or G4LPX (all QTHR).

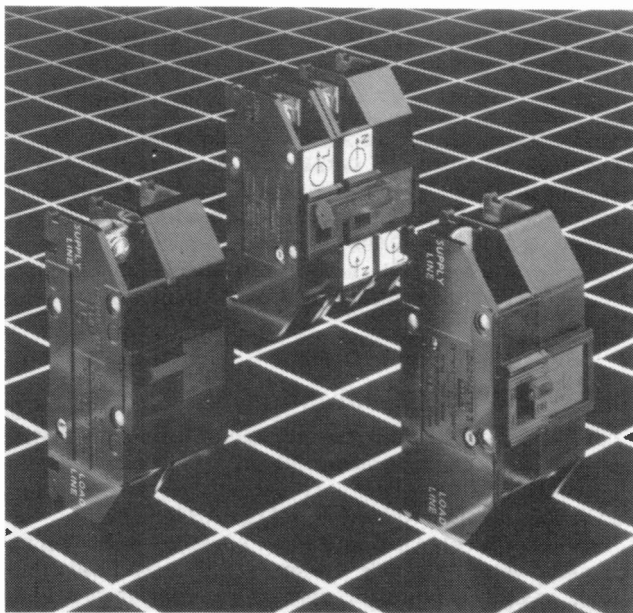
## CONTEMPORARY BRIEFS . . .

### Electrical Safety

FROM time to time, one reads sad newspaper stories of people being electrocuted by faulty, or faultily installed, domestic appliances such as grass cutters, hedge trimmers, smoothing irons. An amateur radio shack can be a source of shock hazards and some earlier U.S. equipment using just two mains wires was potentially lethal due to bypass capacitors being wired from either side of the mains to the metal chassis and case. To take a typical example, when you accidentally cut through the mains lead with your hedge trimmer, the fuse may not blow. So you could have live leads flying around which could come into contact with your body. What is needed is a device which will instantly detect such a dangerous fault condition and disconnect the supply.

Such devices have been around for a long time in the form of circuit breakers, known today as residual current circuit breakers, or RCCBs, and current-operated earth-leakage circuit breakers, or ELCBs. However, the problem of reliable operation is not simple since some electronic circuitry can modify the AC waveform resulting in a complex AC/DC or pure DC leakage current. Submitted for review is the *Loadmaster Safeline 15 MCB/RCD Combination*, the MCB meaning miniature circuit breaker and the RCD denoting residual current device. This is one of a range of safety devices manufactured by **Dorman Smith Switch-gear Limited**.

It is claimed to be sensitive to all forms of leakage current, highly immune to nuisance tripping by high inrush currents and to remain closed in the event of a mains failure. A test button injects a test current equal to that of the particular device's rating, in the case of the submitted model, 30 milliamps. This enables the operation of the device to be periodically checked. The normal place to install an MCB/RCD would be at the mains distribution board. However, it would be ideal to install in the shack, particularly if the shack is a garden shed.



The device described here is the one on the left in the photograph. Included in the range is a 100A Isolator/RCD device, the middle item in the picture, and all are made to the current British Standards, BS4293, 3871 Pt. 1 and 5419 as applicable. A range of enclosures and accessories is offered. The company is a member of the *BICC Group* and full details of these products can be obtained from **Dorman Smith Switchgear Ltd.**, Blackpool Road, Preston, PR2 2DQ. (Tel. no. 0772 728271).

### Bulgin Products

**A.F. Bulgin & Company PLC** has added two new three-pole, 6A fused sockets for PCBs to its IEC 320 range of

connectors and inlets/outlets. Type *PFI PC* has two drilled flanges for bolting to PCBs, while type *PFI PC* is a snap-fit version. Cartridge fuses are accommodated in a drawer in the front of the moulded component. The company has introduced two new injection moulded fuseholders. Type *F330 PC* and *F342 PC* are three and two pin versions, respectively, for use on PCBs. They take 5 x 20mm fuses rated up to 6.3A at 250V accessible under a 13.1mm screw cap. For more information, contact the Company at Bypass Road, Barking, Essex, IG11 0AZ. The telephone number is 01-594 5588 and the Telex number is 897255.

### Defence Spectrum Review

ONE of the recommendations of the *Merriman Report on the Independent Review of the Radio Spectrum* was that the Ministry of Defence and the Department of Trade and Industry should periodically review the MoD's use of the spectrum. Subsequently the *Defence Spectrum Review Committee* was established and it is now asking for evidence from broadcasters, manufacturers, public utilities and lobbyist groups. The first stage of the review will concentrate on the 470 MHz to 3.4 GHz frequency band, running concurrently with a more general survey of the allocations in this band.

Although the MoD's needs must have a high priority, this committee will be able to ensure, as far as security requirements allow, that it makes the most efficient use of its frequencies. One example is the adoption of 25 kHz channel spacings instead of 100 kHz — if radio amateurs can do this successfully, why not the MoD? Organisations or individuals should submit their written evidence before October 3 1986 to:-

Ken Hutchinson,  
Secretary, Defence Spectrum Review,  
DTI, Room 508,  
Waterloo Bridge House,  
Waterloo Road,  
London, SE1 8UA.

The DTI will publish the report of the committee whose members are: Sir Kenneth Corfield (Chairman), Major-General Archibald Birtwistle and David Withers.

### Super Catalogue

THERE can be few readers who have not heard of *RS Components Ltd.*, formerly *Radiospares*. For years they have provided an excellent service of off-the-shelf components to the trade. However, they would never supply goods to private individuals, even those running proper businesses from private houses. This was infuriating, but most people got round this embargo by ordering items via friendly dealers, etc. Now at last *RS* has "gone public," launching *Electromail*, a components supply service for everyone.

Their first, very big catalogue, valid till October, has been received and it follows the familiar *RS* layout. It runs to a massive 688 pages listing over 12,500 products from capacitors to cabinets, batteries to books. It is divided into 27 sections, alphabetically arranged from Batteries to Wiring Systems. The prices are all quoted on the page, exclusive of VAT. As well as just listing the items, there is a lot of information about the products, including drawings enabling designers to plan their hardware layouts. The prices are the same as the trade ones in the *RS Components* catalogues. There is no minimum order value but there is a flat nominal charge of £2.00 plus VAT on all orders.

This service is an ideal one for clubs, whose members can order what they want, thus paying only one handling charge between them. To get a copy of this catalogue, send £2.50 to *Electromail*, P.O. Box 33, Corby, Northants., NN17 9EL. Alternatively, you can telephone them on 0536-204555 with your Access/Visa credit card number. These catalogues are published every four months on March 1, July 1 and November 1 and the current one weighs about 900 grammes.



# A Multi-Memory Keyer

## Part 1

*the fully-featured design for all occasions!*

PAUL WHATTON, G4DCV

**T**HE author, a keen CW operator mainly on the VHF and UHF bands, wanted a multiple-memory keyer that would be equally useful for day-to-day, contest and meteor-scatter (MS) work. Few commercial units seemed to do all that was required, those that did cost far more than was desired! It was therefore decided to develop a keyer tailored to the author's requirements and based on several years experience of using memory keyers, whilst using low-cost components.

The requirements were:

1. Built-in electronic keyer suitable for use with both single and squeeze (iambic) paddles and with switchable dot and dash memories.
2. 4 RAM memories each able to store a message up to 29 words of CW.
3. Push button memory selection, allowing memories to be chained together.
4. Single or automatic message repeat irrespective of stored message length.
5. Both memory output and electronic keyer to be driven from a single clock, so they are always at the same speed.
6. LED indication of memory space used.
7. Built-in sidetone.
8. Solid-state transmitter keying.
9. Optional on-board EPROM for non-volatile message storage (CQ calls etc.).

The keyer has been in use for over a year, both at home and during portable contests and was of great help with G4DCV's first place in the November 1985 144 MHz CW Contest!

For several years the author used the excellent simple memory-keyer designed by G4IJE and described by Ken Willis, G8VR, in *Short Wave Magazine*, April 1981. This device still represents the simplest way that the author knows to generate the high-speed CW needed for MS operation. It used only four ICs but needed an external keyer to drive it (although a hand key could be used) and lacks the versatility of the author's unit for other modes. Many of the ideas (and parts of the circuit!) have found their way however into this much more complex device. The design of the memory-board, outwardly the least complex of the two PCBs used here, proved far simpler than the task of designing an electronic keyer with which to drive it. After much head scratching and great heaps of screwed up paper the author fell back on a design that had been previously published and which solved all the problems using a small number of ICs. This was "The KM4000 Keyer-Memory" published in *Radio Communication*, February 1982. The author wishes to thank the RSGB for permission to reproduce it here.

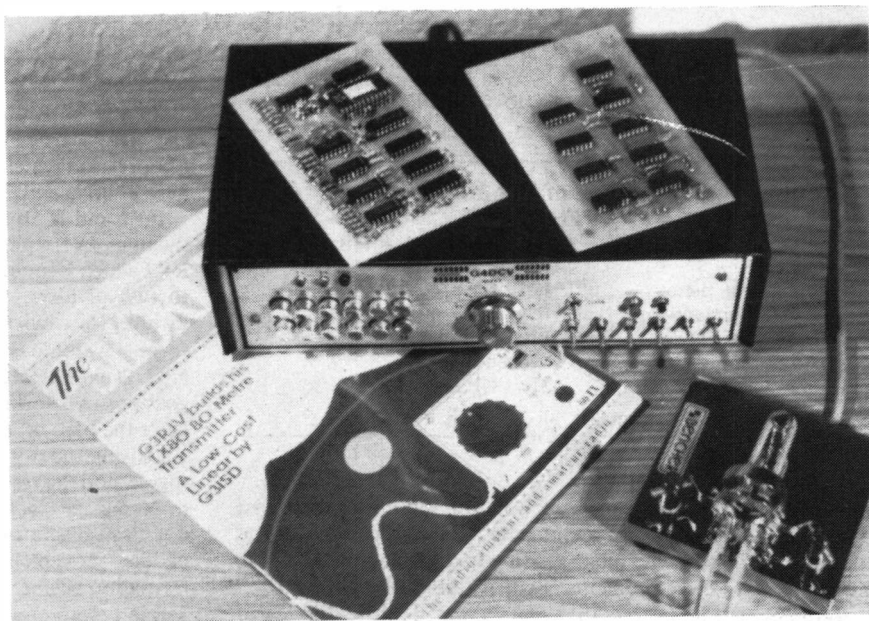
### Circuit Description 1: The Electronic Keyer

The KM4000 by K. L. Kimber, B.Sc(Hons.), and A. Floyd, Grad.Inst.BE, G4GVB, neatly solved the major problems facing the author of this article. The problem is mainly one of providing instant response to a paddle movement and at the same time producing a continuous clock output, synchronous with the outgoing CW, with which to drive the memory addressing. Conventional electronic keyer designs gate the keyer's clock from the paddles, an approach that is not possible when continuous clock-pulses are required. The master-clock cannot be run at dot-

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The completed keyer with the speed control, RV2, in the centre. On top of the case are two completed PCBs prior to their installation in another box. The size of the case is governed mainly by the front-panel space needed by the switches.

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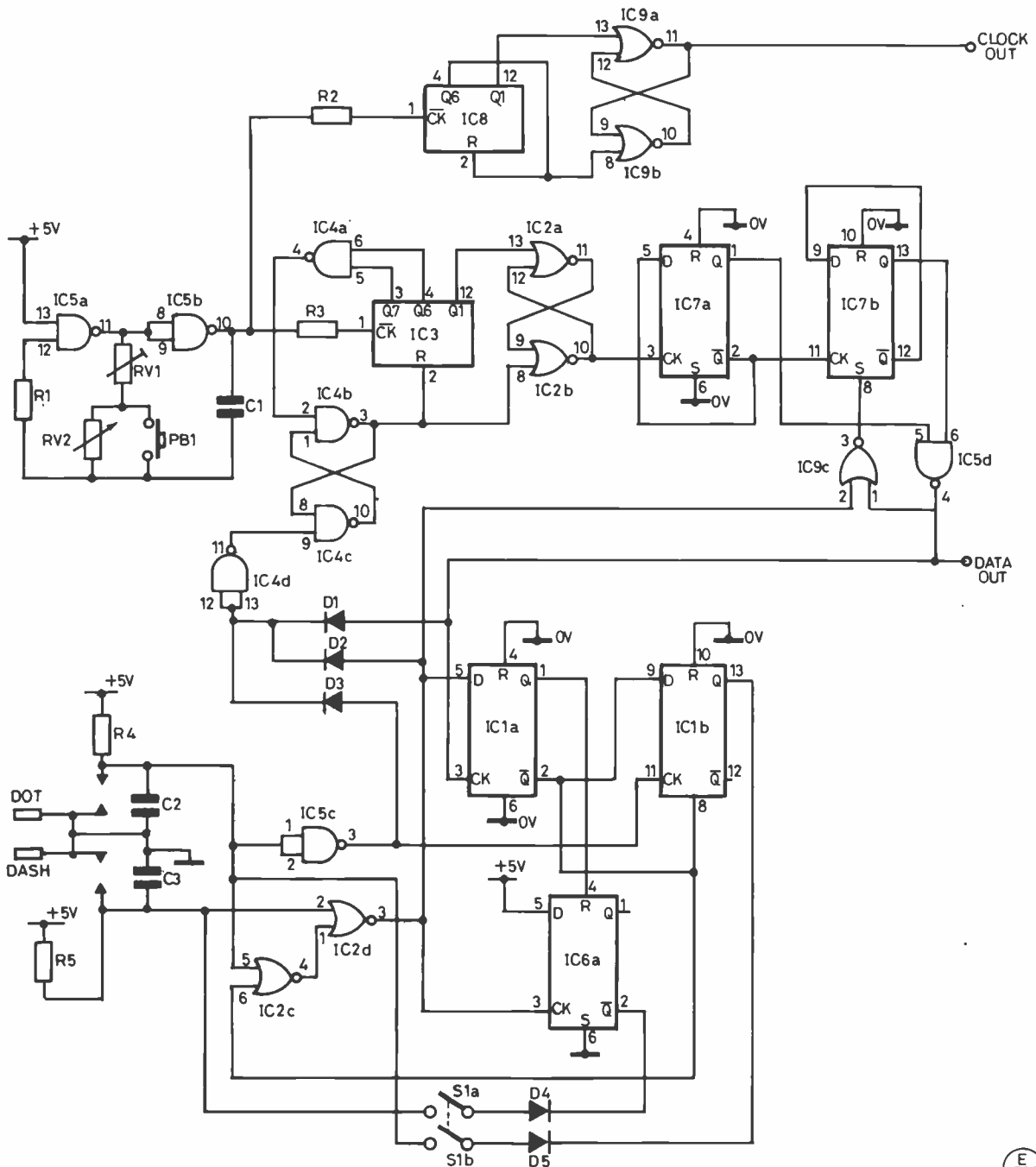


Fig.1 ELECTRONIC KEYSER CIRCUIT DIAGRAM

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**Table of Values  
Fig. 1**

- R1, R4, R5 = 100K
  - R2, R3 = 10K
  - RV1 = 5K, min. preset
  - RV2 = 100K lin. (anti-log preferred if available)
  - C1 to C5 = 0.01µF
  - D1 to D5 = 1N4148
  - IC1, IC6, IC7 = 4013B
  - IC2, IC9 = 4001B
  - IC3, IC8 = 4024B
  - IC4, IC5 = 4011B
  - PB1 = push button, normally open
  - S1 = DPST min. toggle
- Note: all resistors ¼ W or smaller; all capacitors low voltage.

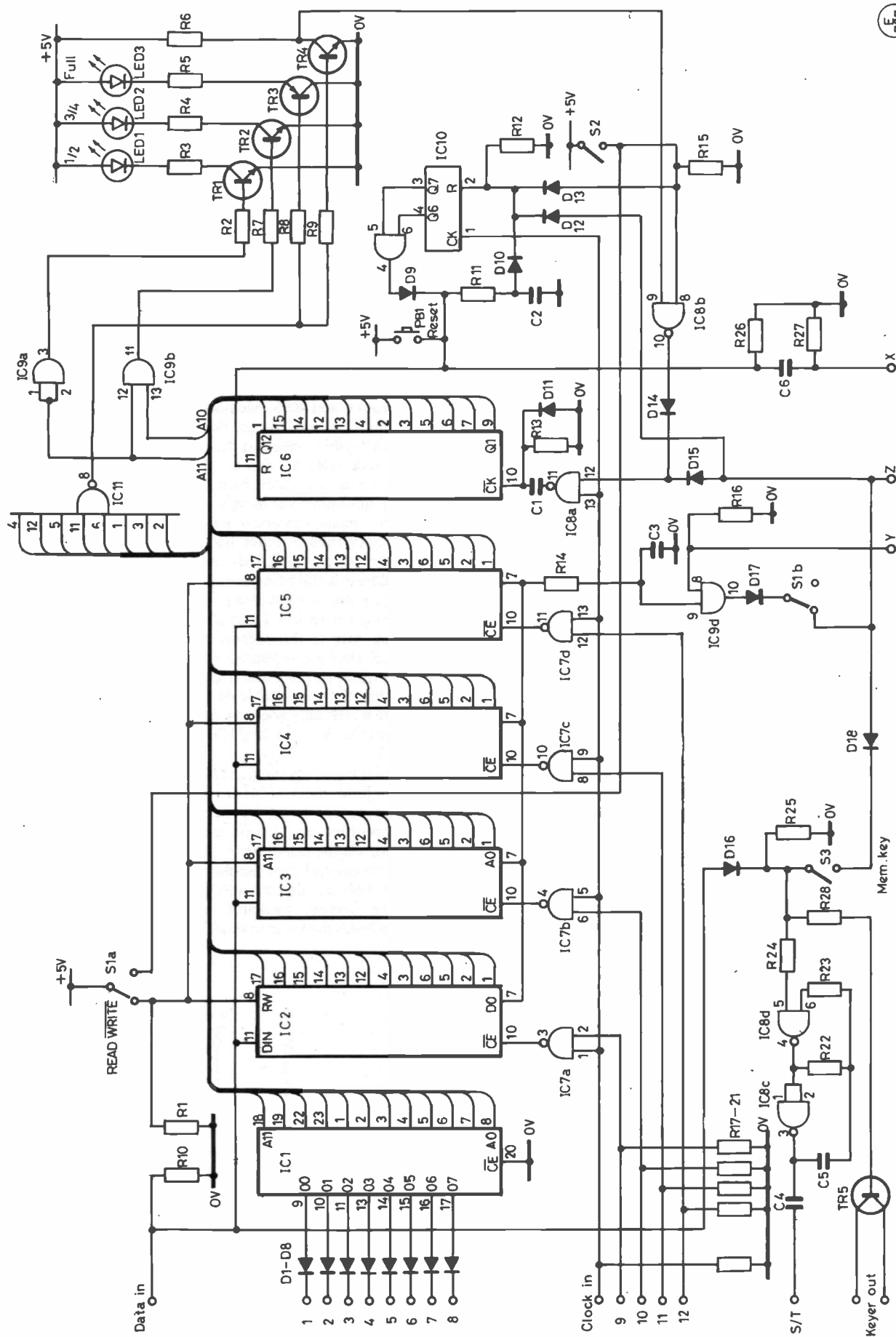
rate as the keyer would have to wait for the next clock-pulse before starting to generate a character. This could be almost as long as a dot, and would make sending very difficult indeed! The KM4000 solves these problems neatly where G4DCV failed!

Reference to Fig. 1 shows the keyer section, a full description of

its operation is included in the *RadCom* article and so is only given here briefly.

IC5a and IC5b form the master clock oscillator which runs all the time, its frequency, and thus keyer speed, being controlled by RV2 which is mounted on the front panel. The clock train is split to two dividers, the first formed from IC8, IC9a and IC9b dividing the clock by 32 to feed the memory board. IC7a and IC7b form the dot/dash generator, their outputs being decoded by NAND gate IC5d to produce the CW data output. The data line goes positive during character formation and can be used later to drive the base of a NPN transistor to key the transmitter.

Closing the dot paddle causes the flip-flop IC4b and IC4c to toggle, and the reset pin of counter IC3 goes low, and it counts up to 96 master clock pulses; IC3's Q1 output is used to clock the dot/dash generator via flip-flop IC2b and IC2a. The response to a paddle movement is perceived as instant since character formation begins within one pulse from the fast master clock, i.e. within 1/96th of a dot length. During dot formation IC7b is held



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Fig.2 MEMORY AND CONTROL LOGIC CIRCUIT DIAGRAM

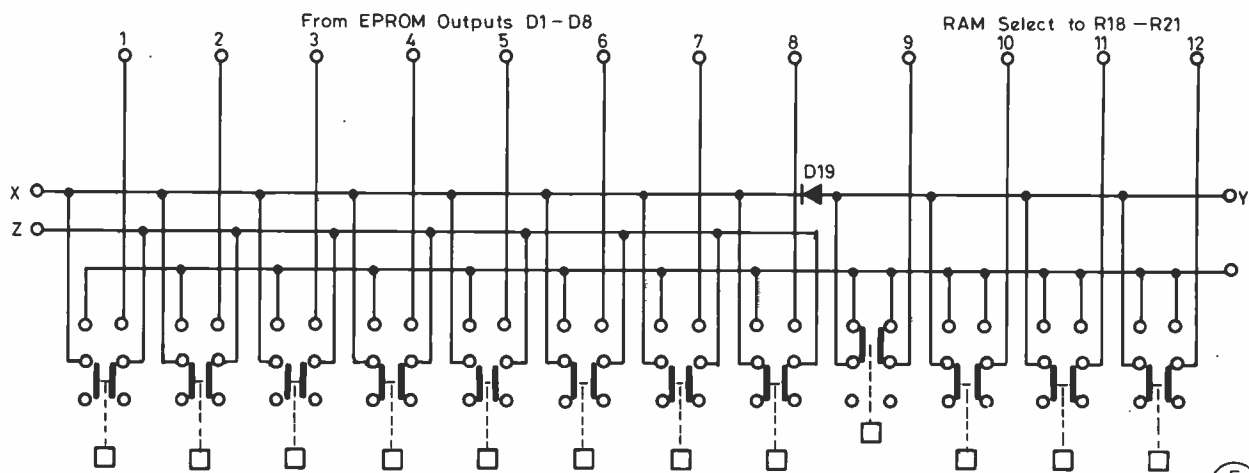


Fig.3 MEMORY SWITCHING METHOD A (See text).

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set, thus a dot is decoded by IC5d. At the end of the dot the data-out line goes low, because this happens one clock period after IC4b has reset IC3 the counter counts a further 95 master-clock periods to form the inter-character space.

Dash generation is accomplished in the same manner except that IC9c now allows both flip-flops in the dash/dot generator to toggle and IC5d drives the data line high for 3 dot dashes (one dash).

If desired the dot and dash stores may be enabled by closing switch S1a/S1b. In practice S1a and S1b can be a link across the pins on the keyer board. If a number of different operators are likely to use the keyer, in a contest or club station for example, a slide switch can be fitted on the rear of the keyer box. IC1b, the dot store, and IC6a the dash store, are one bit memories which when enabled pull down the paddle contacts via D4 and D5. Normally iambic paddle operators will want the dot/dash stores off whilst single-paddle users prefer them on. IC1a similarly forms the iambic store, detecting if both paddles have been closed and causing the dot/dash generator to produce an alternating string of dots and dashes as long as the paddles are held closed.

### Circuit Description 2: The Memory Board

Fig. 2 shows the circuit of the memories and their control logic. IC2 to IC5 are the RAMs which are wired in parallel with the exception of their chip-enable pins 10. A 4040 binary counter is used to provide addressing for the memories, on each falling clock edge its output increments by one, generating binary address

codes between 0 and 4095. Memory selection is accomplished by NAND gates IC7a to IC7d, and these serve a dual function. One input to each gate is taken to the memory select push-buttons; any gate not selected causes the chip-enable pin of its corresponding memory to be high, thus turning off the RAM. If the NAND input pin is taken high via switch inputs 9 through 12 then the clock signal is passed to the chip-enable of that particular RAM; the clock train switches that RAM alternately on and off. This is essential, as the RAMs must be disabled while a new memory address is still being set-up by IC6.

The clock pulses are fed into IC6, the address counter via the differentiating network, C1 and R13. This effectively delays the falling clock edge to the address counter. IC6 is a ripple type counter, each time a new address is set up by a falling clock edge the outputs ripple through until the correct value is reached. This happens while the chip-enable of the RAM is held high via its NAND gate which only goes low once the new address is stable; D11 prevents the clock input of IC6 swinging negative because of C1 and R13.

To write data into a memory, S1 is opened and reset button on PB1 pushed; S1a holds the read/write line high when in 'read' mode. Data will only be stored in the memory selected from the frontpanel pushbuttons, the others being unaffected. The CW can be heard via the side-tone oscillator, IC8c and IC8d, and if desired the rig can be keyed simultaneously. The data output line from the RAMs is open-circuited via S1b to prevent garbage reaching the sidetone oscillator and keying transistor during writing; S1a holds the keyer in single mode whilst write is selected.

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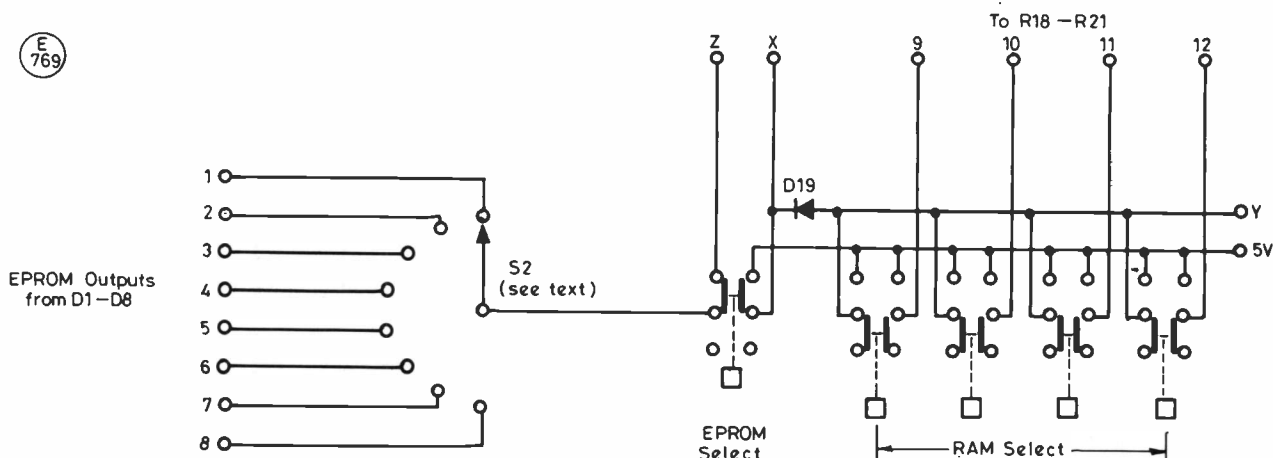


Fig. 4 MEMORY SWITCHING METHOD B





# VHF BANDS

NORMAN FITCH, G3FPK

**A**FTER a rather disappointing June for *Sporadic E* openings, July provided some interesting openings for those lucky enough to catch them. Some rare places have been activated by various individuals and groups, there was a weak *Aurora*, some transatlantic DX on 6m, and the launch of the *JAS-1* satellite was delayed.

## Award News

Two more readers have joined the 144 MHz QTH Squares Century Club this month. Laurence Segal, G6XLL, from North London, (ZL39c) was awarded certificate no. 67 on July 15 and has exactly 100 squares confirmed. 91 were worked on tropo., five by *Ar* and four via *Es* propagation, best DX being IT9TVF (JM68OD) at 1,824 kms. During the accumulation of his QSOs, Laurie's station comprised a *Yaesu* FT-726R with *Mirage* B1016 130W amplifier. The antenna is a 17-ele. *Yagi* from *Tonna* and a *muTek* masthead preamp. is installed. G3XLL is an avid Worked All Britain fan and is the leading U.K. station on VHF.

Member no. 68 is Haydn Barker, G6XVV, from Braithwell in South Yorkshire, (ZN44c). His certificate was issued on August 7 for 117 confirmed. 100 QSOs were on tropo., seven via *Ar*, five via *Es* and four by MS propagation. Haydn was first licensed in August 1983 using a 2½ W transceiver. Serious DX-ing was started in March, 1984 using 70W. The present station comprises an *Icom* IC-251 transceiver with *muTek* "front-end", and 80W amplifier and a 17-ele. *Tonna Yagi*. The site is 375ft. *a.s.l.* with a good take-off in most directions apart from the NW to SW quarter. He also operates on 70cm. and 23cm. and is planning to get going on 13cm.

Alessandro della Casa, I4YNO, (FE25e) was awarded his sticker for 175 squares confirmed for certificate no. 60 on July 18. His mixtures were 18 on SSB and seven on CW; five tropo. contacts, nine by MS mode, 10 via *Es* and one via FA1, the latter being with EA2AKV (ZC) on 18-06-85. When he wrote on July 11, Alex had 214 squares worked in 42 countries and was then off to the T70A DX-pedition to San Marino.

Daniel Schäffler, HB9DDS, from

Zürich in Switzerland (JN47GH) is member no. 385 of the 144 MHz VHF Century Club, his certificate being issued on August 8. He has wide-ranging interests from 160m. to 10m. as well as 144 and 432 MHz. His 2m. station consists of a *Yaesu* FT-480R with an S3030 preamp., a 120W amplifier and an 11-ele. *Flexayagi* antenna. Daniel may get interested in MS and has been using the *Oscar-10* satellite for many years. He is QRV on CW and RTTY and may try some SSTV in the future.

## A Piece of Cake

During the *CQ Magazine* World Wide VHF Contest over the July 19/20 weekend, two stations from Madeira were contacted by several readers. Very confusingly, they were signing CT3BX/DK, so we could be excused for assuming it was a Madeira amateur in Germany. However, it transpired that there were two operators, CT3BX and CT3DK, using the one station. Their locator was IM12OQ. Your scribe is unaware of any previous direct QSOs between Madeira and the British Isles on 2m. These were tropo. contacts and, like the Canary Islands which are further away, count as Africa. More details in the individual reports, later.

## Beaconry

Alex Scott, GM8BDX, has passed along the good news that the Lerwick beacon, GB3LER, (ZU65f) came back on the air on July 4 on 144.965 MHz. It sports a new 3-ele. *Yagi* antenna and should now provide some interesting results during Auroral events.

## Solar Matters

Charlie Newton, G2FKZ, has been studying some papers from Boulder, Colorado, into the Sun's behaviour. Based on a study covering 136 years, their analysis suggests that the Sun exhibits a by-modal cycle pattern, with individual cycles anything from 123 to 140 months duration. The prediction is that the minimum will occur in June/July next year and that the peak of Cycle 22 will only produce sunspot numbers of 100, plus/minus 10. It is suggested that Cycle 23 could be a big one though and Charlie and G3FPK hope they will be around to benefit from it.

## Contest Corner

The weekend Sept. 6/7 sees the 144 MHz contests from 1400 to 1400. The *RSGB's* version is a Trophy and SWL event in three sections; Single-op., Multi-op. and SWL, with radial ring scoring. The *IARU* affair is part of the VHF/UHF/SHF series with scoring at one point *per* kilometre. On Sept. 21, there is the 70 MHz Trophy and SWL contest

from 0900 to 1600 for Fixed, All-other and SWL stations.

The last leg of the Microwave and 10 GHz *Cumulatives* is on Sept. 14 from 0900 to 2000, the microwave band being 5.7 GHz. Three activity periods can be counted for the final points total and entries for both contests go to G4FRE at 15 Ferry Lane, Felixstowe, Suffolk, IP11 8UR postmarked no later than Oct. 1.

Fleming Jul-Christensen, G4MJC, has sent a copy of the 1986 calendar from the Danish society, *EDR*, which shows the dates of the Scandinavian events. On the first Tuesday each month there is the 2m. activity night and on the first Thursday there is the UHF activity night. Unfortunately there is no mention of the times. On Sept. 1 a microwave activity period is listed. On the 27th, there is the *AGCW-DL* CW contest, a Saturday evening affair as in previous years. If any reader has some information about overseas activity periods, like these Danish ones, please send the details.

## "VHF Bands" deadlines for the next three months:—

October issue — September 3rd  
November issue — October 8th  
December issue—November 5th

Please be sure to note these dates.

## The Satellites

The latest news about the launch of Japan's *H-1* rocket carrying the *JAS-1* amateur satellite is that it was due on Aug. 12. If so, there may just be time to squeeze in a Stop Press item. *Arianespace* has informed *AMSAT* that it is unlikely they will be able to launch the *Phase 3C* satellite until mid-summer next year. This would be on mission V-21. This delay is due to the failure of the HM7B third stage on the V-18 mission last May 30.

As *O-10* users will know, the transponder suffered a major failure on May 17 after which Karl Meinzer, DJ4ZC, and his team designed a memory diagnostic package for the on-board computer which produced a memory map of the failed and marginal memory cells. This enabled them to re-write the IPS operating system so as to avoid the affected zones. *O-10* was restored to Mode B service on July 15. Sadly, this state of affairs was short-lived and the spacecraft has suffered a further, serious failure. The latest news will be available via the *AMSAT-UK* nets on 80m. on Sunday mornings from 1015 local time and Wednesday evenings from 7.00 p.m. the station is G0AUK and the QRG nominally 3,780 kHz.

### Packet Radio

Phil Cadman, G4JCP, reports a meeting at G4TEC's QTH at the end of July at which it was decided to form an AX-25 PR group in the Midlands. This was christened *MAXPAK* and they have applied for an unattended AX-25 Level 2 repeater licence. Details of the new group's aims can be obtained from Andy Witts, G1DIL, on Wolverhampton 743164 but he is not *QTHR*. Phil writes that two more Wolverhampton stations have appeared on AX-25; Mick Lindenberg, G1DK1, and Russ Little, G0BOS.

Terry Hackwill, G4MUT, (BRK) is now interested in PR and uses the *BBC Micro Cambridge* system. He found it easy to get going. To quote, "Just a matter of connecting the cassette port on the micro to the MIC and Headphone sockets on the rig, though I put a couple of resistors in the the MIC lead because the high output level from the micro could overmodulate the carrier or possibly damage the rig." He has made quite a few successful contacts and, as the program seems widely available, it is not difficult to find people to work.

### Wet Squares

Following the "de-regulation" of North Sea oil rigs — which are now regarded as off-shore islands by the *D. T. I.* — there are now opportunities to contact several wet squares on a more regular basis. LA1EKO on the *Ekofisk* platform has been around for quite a while, on-and-off, and many have thus worked BQ square. But now amateurs on rigs in the British sectors can operate -/A. However, permission has to be obtained from the lessee of the rig, and from the safety and radio officers.

One who has taken advantage of this is Lawrence Howell, GM4DMA, in AS69e. Nick Peckett, G4KUX, (DHM) worked him around 1025 on Aug. 3 but GM4DMA/A was not audible at G3FPK. He was using a *Trio TS-700* giving out 15W, but with 110m. of UR67 feeder, it is likely only 1 1/2 W will get to the antenna at 144 MHz. There are plans to replace the UR67 with LDF4-50 which should result in about 3dB of feeder loss, and to install an Rx preamp. at the antenna. Rumour has it that in the Ninian Field, there are licensed amateurs on three rigs and AV square has been mentioned. This is good news for those who have run out of "local" squares to work. The *Ar* possibilities from some of the higher latitude locations will be interesting.

### DX-Peditions

David Woodward, G6VIR, has sent an account of the *Manchester University RS* expedition to the island of Mull in WQ square, from June 18 to 24. The station GM8FUM/P was set up at Scoor, 310ft. *a.s.l.*, operation starting on 2m. the evening of the 20th, causing a pile-up of

### ANNUAL VHF/UHF TABLE

January to December 1986

Station	FOUR METRES		TWO METRES		70 CENTIMETRES		23 CENTIMETRES		TOTAL Points
	Counties	Countries	Counties	Countries	Counties	Countries	Counties	Countries	
G1KDF	—	—	93	22	74	12	25	6	232
G4NBS	28	2	68	19	55	15	37	11	205
G6XVV	—	—	83	17	42	7	20	4	173
G1DOX	—	—	76	10	44	7	28	5	170
G4SEU	53	5	57	13	29	4	—	—	161
G6HKM	—	—	72	21	48	11	—	—	152
G4YCD	—	—	79	20	39	7	—	—	145
G0CUZ	—	—	78	30	27	4	—	—	139
G4MUT	31	3	51	13	28	5	10	4	131
G1LSB	—	—	56	12	48	14	—	—	130
G4HGT	21	2	68	16	6	2	—	—	115
G6AJE	—	—	46	12	36	8	3	1	106
G4TIF	50	5	28	12	6	2	—	—	103
G3FPK	—	—	80	21	—	—	—	—	101
G6OKU	—	—	61	9	25	2	—	—	97
G1EHJ	—	—	49	6	36	4	—	—	95
G4WXX	—	—	79	14	—	—	—	—	93
G4DEZ	—	—	48	14	5	1	16	6	90
G1SWH	—	—	76	8	—	—	—	—	84
G4VOZ	38	4	—	—	30	3	—	—	75
GW6VZW	—	—	61	13	—	—	—	—	74
G8XTJ	—	—	60	13	—	—	—	—	73
G4YIR	—	—	55	14	—	—	—	—	69
G4TGK	—	—	55	12	—	—	—	—	67
G6XRK	—	—	58	9	—	—	—	—	67
G1PDW	—	—	55	11	—	—	—	—	66
G8RWG	—	—	45	9	4	1	—	—	59
G1CRH	—	—	46	7	—	—	—	—	53
GW4HBK	44	6	—	—	—	—	—	—	50
G4EZA	—	—	32	10	—	—	—	—	42
G1HGD	—	—	17	4	13	2	—	—	36
GU4HUY	—	—	33	3	—	—	—	—	36
G2DHV	4	1	24	2	1	1	—	—	33
G6CSY	—	—	9	2	6	1	—	—	18

Three bands only count for points. Non-scoring figures in italics.

Dutch and German stations. Several PAs were worked on 70cm. using 10w. Skeds with U.K. stations over the weekend were largely unsuccessful, but a "CQ" call on FM on S20 at 10W resulted in another pile-up of PAs.

Following a sked with G14LGK, good ATV pictures were received but local interference at the GI end precluded a picture being received from Mull. On the 22nd, a group including G4TUA, G0DXS and G6BZD climbed Ben More operating as GM3VUM/P with QSOs to G and GW. Three stations on the island of Staffa were worked. Power was 100w to a 13-ele. *Yagi* on 2m. and 10W to two 19-ele. *Yagis* on 70 cm. The rigs were powered from a steady succession of batteries carted up the hill. The trip was blessed with good weather, some team members getting rather sunburnt.

By contrast, the *Five Bells Contest Group's* trip to the Shetlands from July 20 suffered poor weather much of the time, but radiowise it was very successful with 22 countries and 85 squares worked, mostly by MS. The decision to operate two stations simultaneously proved very satisfactory and during the last three days, they achieved a 100% success rate by MS mode. From 2230 on the 25th, there was an *Aurora* for which the QTE was due north. About 80 stations were worked, including SM2CEW (LZ) via *Auroral Es* at T9. GM4YHF/P worked him twice, on SSB as well as CW. Later it transpired that SM4AXY/LA in PD square called

GM4DHF/A and made a recording of Dave's signal via *Ar Es*. Things were getting rather scratchy by 0045 on the 26th but at 0158, after completing an MS sked, GM4DHF/A worked GM6TKS on SSB at S9A each way. OZ4VV was worked on CW at 0251 and SK4MPI was *Auroral* throughout and well into the 26th proper.

The group did some 70cm. *E-M-E* work and contacted DF3RU and SO1MN but *Auroral* conditions adversely affected the return signals. Running a single 4CX250B PA and four *Yagis*, they copied their own strong echoes off the Moon and LA3EQ called in on tropo. to report their CW signals RST319 off the Moon with a single 9-ele. *Yagi*. They operated on 6m. but there seemed no interest in the band at all.

There were only three operators, Dave Johnson, G4DHF, Julian, G4YHF, and Keith Tatnall, G4ODA. Dave says that Keith is the fellow who organises everything so well and if it was not for his efforts, they would not have gone. Although the idea was to activate ZT square, many DX-ers wanted ZU so Dave did a twelve hours, non-stop stint from there, completing 15 MS skeds from the back of a car, from 8 p.m. one evening. Thanks for another successful operation Dave, Julian and Keith.

### VHF Convention

The *RSGB's* Midlands VHF Convention is scheduled for October 11 at the Madeley Court Centre, Telford, Shropshire, starting at 1100. The

afternoon lectures, etc., commence at 1330 and include a talk on cellular radio, sessions on ATV and MS, ending with a VHF Forum. From 1900 till 2200 there is an evening buffet and bar, tickets for which are £5.00. The entrance fee for the Convention is £1.20 and full details can be obtained by sending an *s.a.e.* to J. P. H. Burden, G3UBX, at 18 Langley Road, Merry Hill, Wolverhampton, WV3 7LH.

### Six Metres

During June, W6JKV operated from CU2, which is the new prefix for the Azores island of Sao Miguel. Jim spent some days in London afterwards and your scribe had a brief chat with him on the telephone. He worked a few Gs but most of the good openings to the U.S.A. were early in the mornings and not in the late evenings, as we hitherto expected. He reported signals from the W7 area in the U.S.A. which immediately raises the question as to what kind of propagation that was? The latitude of the Azores group is too far north of the geomagnetic equator for TEP mode, so could it have been a tropo. duct at the CU2 end finding its way up to the E-layer, thence "waveguide" fashion towards W7?

Now a correction. In last month's piece, p. 231, it was reported that G4ADR had worked OX3LX on June 24. This was not first-hand news and it transpires that it was Eric Parvin, G2ADR, (YSN). Eric runs 10W to a fixed dipole at 28ft. and writes that QRP stations should not despair since he has worked, either direct or crossband, LA, EA, CT, YO, ZB2, HB, OH, OZ, SM, F, D as well as U.K. countries.

Ray Cracknell, G2AHU, (HWR) reports four openings to the U.S.A. in July the best of which was on July 9 which he missed. On the 19th, he had a "private opening" to W4WHK at 1300, lasting 30 mins. but nobody else was about. On the 20th, WA1OUB was contacted around 2000 and pounced upon by many. Several other Ws appeared in a 30 mins. opening. Ken Osborne, G4IGO, (SOM) missed most of a back scatter event on July 12 but heard W2CAP/1 at 2115 for 30 secs. plus bits from K1TRW. At 0808 on the 13th, CT1LN was worked at 2102 to 2118, GB3SIX was copied at RST529 *via* back scatter, beaming NW. KITOL was heard on the 17th, 1958-2056 up to S5 and VE1YX up to S8.

G4MJC (SXE) has been on the band from the start using a *Yaesu* FT-690R with a 3-ele. *MET Yagi* 70m. *a.s.l.* Flemming's best DX is GM3JIJ at 925kms. Jerry Russell, G4SEU (WKS) is up to ten countries worked plus five more crossband, but no Ws up to July 18. Ted Collins, G4UPS, (DVN) sent a most detailed account of 6m. stations and beacons worked/heard from June 2 till July 19. FY7THF was received weakly on June 2 and up to S4 the next day. At 1200 on June 26 a too-weak-to-copy beacon

was detected on 50.085 MHz. From 1200-1220, the TI2 beacon was identified on 50.080. Around the same time another beacon was detected at QTE 270° on 50.070 MHz. At 1415, W6JKV/CU2 was heard briefly on 50.110 MHz. Ted worked KITOL at 2038 on CW and VE1YX at 2045 on SSB on July 17, the latter fading out at 2051. Many Europeans were worked crossband throughout this period and these reports have been sent to G5KW for further analysis.

John Jennings, G4VOZ, (LEC) thinks that many operators only listen on the band, only calling when DX is about, so that local traffic is now very sparse. He remarks that even if 10m. seems dead, it does not follow that 6m. is, too. John Palfrey, G4XEN, (NHM) has moved to another Wellingborough QTH. He reports crossband *Es* QSOs with YU, EA and OH stations, and in-band ones with LA6QBA/P (JP61 = GV) and LA8AK, GM4ODA (IO99) was worked by MS on July 22.

Ken Ellis, G5KW, (KNT) reports the band open all day on July 12 with tremendous signals from EA1MO, ZB2VHF, CT1WW and CT4KQ in the morning, *via Es*. G4BAO (CBE) found W2CAP/1 beacon from 2020 to 2055 and G4GLT (LEC) worked K1JRW at 2120. Ken reports an opening to the U.S.A. on the 21st in which GJ3YHU worked 18 states and G4IJE four stations. Mike Johnson, G6AJE, (LEC) heard WA1OUB on July 21 at 2030 very weakly and wonders where all these RS59 reports come from. He says that the PMR-type signals he has been hearing are 10W cordless telephones from Italy and are very strong during *Es* openings in that direction. He wishes he could understand Italian as the conversations, "... sound like really juicy gossip".

John Baker, GW3MHW, (PWS) already has the QSL confirming his QSO with WA1OUB on July 21 which brought his countries tally to 15. He worked W6JKV/CU2 on July 3 which could be a "first" GW/CU on 6m. He records openings to the U.S.A. on July 9, 12, 17, 19 and 21 and at 2036 on July 16, he copied OX3VHF weakly with slow fading. John reports that GW3CBY worked 4U1ITU, operated by G3NAQ, on June 24, the Geneva station running 40W to a 5-ele. *Yagi*.

Dave Lewis, GW4HBK, (GWT) heard a W at last, WA1OUB at 2018 on July 21. EI6AS was RS59 *via* back scatter but Albert had difficulty copying Dave due to TV QRM. Jonathan Eastment, GW4LXO, (GNS) has nine countries and 16 squares on the band, while Kelvin Weaver, GW4TTU, (GWT) put up a 5-ele. *Yagi*, borrowed a *Yaesu* FT-690R and worked stations in London and East Sussex on July 20. The GB3NHQ beacon is S6 or better in Blackwood, he says. Kelvin is a member of the *Square Bashers*

group now operating from YS square as this is being compiled. They have been QRV as GM4NXO; results next month.

### Four Metres

The GB4MTR call should be with G4WGT (LNH) until Sept. 9 after which G3YKP (NOT) was due to use it till Oct. 7. Pat Billingham, G4AGQ, (SRY) discovered the CW session in NFD by accident and was able to work 14 stations for his ladder total. now at 24. G4SEU worked EI5WAR/P on July 6 for his 30th square on the band and also managed GB4MTR (LDR) after a bit of a struggle. I5CTE was worked crossband to 10m. on June 25 and CT1WW, who was on 6m., on the 12th of July. Jerry is currently leading the 4m. section of the Annual Table.

Martyn Jones, G4TIF, (WKS) has been concentrating on the band and has 80W *p.e.p.* available. A few days before NFD his gear failed but he managed to borrow a transverter from G4WND so was able to work some new ones including EI5WAR/P (Wicklow), G4KOT/P (NLD) and GMs in DGL and SCD. Other new ones were GB4MTR (LDR) and EI9Q (Waterford).

G4VOZ reports more new operators coming on. On June 11, John worked G4SEU, ten miles away, using 10 milliwatts. New stations worked in June were G3WMR (KNT) and G4DUC (SFD) on SSB and G3YMC (BRK) on CW. In contacting GB4MTR (LDR) he kept his 100% record in working this call on July 3. In NFD, John operated G8LM/P (CVE) at IO94ML, but half an hour before the start, the PA packed up leaving him with only 10W. Only 13 squares and four countries were worked and John felt that people were not listening for weak stations. His best DX were EI5WAR/P, G4ALE/P (DVN) and G4ILI/P (GLR). Sometime during September, G8LM/P should be on from Wiltshire. John also operates from LEC, GLR, OFE, NHM and SFD so anyone wanting skeds can telephone him on 0455 209125. Operation is usually on Saturday afternoons, once or twice a month.

From Wales, GW3MHW reports reception of ZB2VHF on June 11 and 12 and on the 14th, ZB2BL was working Gs at 1140. John's 62 MHz crystal heterodyne oscillator failed so he was unable to try for Jimmy. GW4HBK had a crossband contact with SM6PU on July 12. Dave's best NFD DX were GM3WOJ/P and EI5WAR/P. GU4XEA/P was QRV from Herm Is. but very weak. GW4SEU/P (DFD) was contacted on the 26th and GB4MTR (GRN) was then copied in a 6s. burst. Also *via* MS, GM4ODA/P (SLD) produced a 15s burst on the 29th. GW4HBK's antenna is at 40° elevation and Dave thinks this helps on reception.

Two Metres

First the tropo. scene and Mike Honeywell's, G0ABB, (HPH) idea to work CW folk on 144.085 MHz to avoid the clutter around .050 has not paid off. Other CW Ladder participants reporting this time are Jim Challenger, G4EIB, (WMD) who now sports a *Trio* TS-711E with 35W to a 14-ele. *MET Yagi* at 45ft. He works F6FLB quite often; June Charles, G4YIR, (ESX) who added 35 more including 11 continentals on June 27-29 and Colin Ford, G4ZVS, (WMD) who also hears F6FLB regularly.

Colin Morris, G0CUZ, (WMD) added EI5FK/P (UL30c) for a new square on July 13. On the 19th, the band was open to northern Spain to EA2 between 1300 and 2000. John Acton, G1DOX, (CBA) also got EI5FK/P in UL, and GM3ZBE/P (YQ) on July 20 were a couple of new squares. Bob Nixon, G1KDF, (LNH) contacted G8YYB/A (IOS) on July 3 and EI5FK/P on the 12th and 13th. In the period July 20-25, he spent hours trying to get EJ4ALE (UN) without success. Gerry Schoof, G1SWH, (MCH) has now worked 17 islands including GM4PEL/P (Arran) on June 3, EJ2CA/P (Saltee, off the Wexford coast) and GM1SMI/P (Bute) on June 14.

G4AGQ's main activity is on CW and on July 27, although neither HB9HB nor HB9F were audible, Pat worked HB9ZV/P (DH) and HB9QQ (EH), the former being RST579 using 10W to a 5-ele. *Yagi*. Tony Collett, G4NBS, (CBE) made 130 QSOs in the July 26 Low Power contest, missing the first 1 3/4 hours. His total was 47 counties, seven countries and 21 squares. Only one GM and three GIs were worked and nothing in the west country. Best DX was LX2GB at 2138. Ray Baker, G4SFY, (NOR) after an excellent time in June, found July's tropo. very poor. In NFD he found EI2FMG/P (WM) and EI9ED (WN) and in the CQ VHF contest on July 19 he worked GJ4ICD and Fs in AJ and BJ.

G4XEN got a telephone call at 1.10 a.m. on July 20 from G6WYZ to alert him to CT3DK calling for contest QSOs. John worked him with RS53 reports, the QRB being 2,537 kms., his all-time best tropo. DX. Madeira was a new country, square and continent for G4XEN. G6AJE found G8YYB/A on July 15 before going off to work and in the lunch break, Mike worked GUWRP in an otherwise dull month. Ela Martyr, G6HKM, (ESX) made 158 valid QSOs in the QRP contest. 43 counties and nine countries were worked, best DX being G11JUS at 533 kms. At long last she has worked into Cleveland, G4WUS answering here CW call.

Mike Law, G6OKU, (DYS) lists his best DX in July as EI2FMG (Tipperary), G4PUB/P (DVN), G6OWX/P (SOM), EI9ED/P (Meath), G4WUS/P (CVE) and GM0CLN/P (DGL) on 2 1/2W. Julie Yates, G8MKD, (WMD) reports average

QTH LOCATOR SQUARES TABLE

Station	23cm.	70cm.	2m.	Total
G8TF1	79	141	126	346
G3XDY	77	130	177	384
G3JXN	77	119	172	368
G4NQC	63	99	234	396
G3UVR	61	106	213	380
GJ4ICD	59	117	239	415
G4FRE	56	124	78	258
G6DER	53	95	164	312
G8PNN	53	91	126	270
GW4LXO	45	98	238	381
G6MGL	45	83	133	261
G4MAW	45	106	52	203
G3COJ	43	99	174	316
G3NBS	43	75	67	185
G3PBV	41	106	200	347
GW4TTU	37	87	238	362
G8ULU	36	91	127	254
G4ZTR	35	57	82	174
G8KBQ	34	99	214	347
G1EZF	32	85	189	306
G4RGK	29	86	213	328
G4DCV	25	71	248	344
G4MCU	25	82	201	308
G8HHI	23	96	135	254
G6YLO	20	59	67	146
G4MUT	18	86	137	241
G1KDF	18	73	126	217
GW3CBY	18	46	107	171
G1DOX	18	21	44	83
G6CSY	16	39	34	89
G3BW	15	38	269	322
G8GXP	13	133	296	442
G4DEZ	13	4	244	261
GM8BDX	13	31	41	85
G6XVV	7	38	174	219
G4NRG	5	47	132	184
G6JNS	5	53	119	177
G6AJE	3	43	89	135
G4RSN	2	34	92	128
GW6OFI	1	—	75	76
G3IMV	—	111	391	502
G3POI	—	—	448	448
G4KUX	—	36	306	342
G4IJE	—	—	338	338
G4XEN	—	88	214	302
G8XVJ	—	86	213	299
G4ERG	—	16	278	294
G4DHF	—	—	280	280
G4TIF	—	104	174	278
9H1CG	—	—	276	276
G6HKS	—	65	186	251
GM4IPK	—	—	245	245
G4OAE	—	46	195	241
G6HKM	—	90	142	232
G6DZH	—	82	136	218
G3FPK	—	—	217	217
I4YNO	—	—	214	214
G4SFY	—	—	208	208
G4MEJ	—	—	198	198
G8LFB	—	—	194	194
G6ECM	—	—	194	194
G4HFO	—	70	120	190
G4IGO	—	—	190	190
G4MJC	—	23	165	188
G0CHE	—	—	181	181
G4YUZ	—	—	168	168
G4YCD	—	31	135	166
G4FRX	—	66	99	165
G8ZDS	—	41	123	164
G4VPM	—	46	117	163
G4TJX	—	60	100	160
G8MKD	—	45	113	158
G4DOL	—	—	153	153
G4XEK	—	—	151	151
GJ6TMM	—	22	125	147
GW8VHI	—	48	97	145
G6XLL	—	36	109	145
G6YIN	—	58	87	145
G4CQM	—	52	87	139
EI5FK	—	—	122	122
G1EGC	—	—	121	121
G8RWG	—	13	105	118
G0CAS	—	—	115	115
G1LSB	—	58	46	104
G6XRK	—	—	100	100
G4TGC	—	—	95	95
G6XSU	—	52	43	95
G8XTJ	—	—	94	94
G1IZO	—	—	82	82
G1DWQ	—	—	72	72
G4JZ/P	—	63	—	63
G0BPS	—	—	50	50
GW6VZW	—	—	49	49
G1HGD	—	7	38	45
G8UDV	—	2	42	44
G1JOU	—	—	44	44
GM4WLL	—	—	39	39
G6SIS	—	1	31	32
G2DHV	—	3	24	27

Starting date January 1, 1975. No satellite or repeater QSOs. "Band of the Month", 23cm.

QSOs in the 48 hours netting 86 prefixes. His score was 89,612 pts., twice his 1985 total, and best DX was CT3DK at 2,204 kms. Geoff won the European "single-single" class in 1985 to win the *Microwave Modules Trophy*, as recorded in the June issue of *CQ Magazine*.

Paul Baker, GW6VZW, (GWT) worked some new EI, G and GM counties in NFD in "quite mediocre" conditions. In the CQ contest, various Fs, GJ and GU folk were worked, plus EA2RCU (YD) for a new 1986 country. During the Sept. *RSGB Trophy* contest, Paul will be operating a sponsored station so will be seeking the maximum number of QSOs. The proceeds will go to fund a Christmas party at a local hospital.

Next the *Sporadic E* and after a disappointing June, July was not too bad. On July 12, DK3UZ (EN20c) was getting *Es* from northern Spain when EA8BEX appeared from SN03b. Eddi worked him, the QRB being 3,538 kms. A few other Germans in FN and FO squares worked him, too. I4YNO confirms the early start to the 1986 *Es* season on May 16, when he worked into OZ and LA. The next event was on June 6 to Greece and Alex heard 4X4MH (RS) from Israel, and two days later there was an opening to UB and UA6. Then there was a long gap till July 1 when there was a short event to AF square.

On July 8, I4YNO enjoyed a 1 1/2 hours opening between 1727 and 1900 which brought QSOs with RA1WF (OR), RA1ASK and RA1AMV in PT, RQ2GAG (MQ), URIRY (MS), OH5BM (OV), OHIAWW (LU), LA8SJ (FT), LA5IH (CU) and LAIZE (CS). On the same day, YO2IS reports a three hour opening to OH and F, while on Aug. 5, I3LGP mentioned that the northern Is and YUs worked over to UA6 and to UL7AAX between 1545 and 1736.

G0CUZ started on July 1 with IW9AQS (GX) at 1010. The July 8 event produced such QRM on SSB that Colin went over to CW working five OKs in HK, JJ and KI from 1840-1850, then there was a surprise opening at 1935 to SM1. On the 12th, between 0830 and 0845, EA6FB (AY), and EA5EMM and EB5FSX (ZZ) were contacted. On the 18th, 1700-1800 CT, IT9 and 9H were heard. Philip Everitt, G1CRH, (CBE) heard 9H1BT and an IS0 but omitted to give the date.

On July 8, G1KDF worked HGs in JJ, KI and II squares and an OK2 in IJ between 1840 and 1845, plus YU2KDE (JF) at 1900. Bob got 9H1CG (HV) at 1735 on the 18th. The same day from Dorset Peter Atkins worked I2SRM/8 (HB), I0EIO (GB), I2KXSX/P (HY), IC8EGJ (HA) and IT9DTU/9 (HY) between 1652 and 1759, then at 2041 I0JU (GB) and IC8CQF (HA). On July 24, he heard weak signals between 106 and 114 MHz. The band 108 to 118 MHz is the domain of hundreds of VOR radio beacons for navigational use by aircraft and there are

conditions with best DX G8YYB/A for square no. 113. Her husband, G8RAO, is building a 4CX250B PA which should penetrate any future pile-ups more effectively. Geoff Brown, GJ4ICD, took the CQ contest seriously and made 1,042



certainly no broadcast services in this region, Peter.

On July 18, G4IGO records openings from 1651-1717 and 1741 to 1804 and Ken managed to work I2SRM/8, I0EIO, I2KXS/8 and I0CUT (GB) plus GW4UWR (YL25) by back scatter, then IT9DTU/9, and IW0AKA, IK0AFZ and I0JX all in GB. G4KUX worked 58 stations in the July 8 event in 75 mins. Nick's QSOs were with HG, OE, OK, YO, YU and SP3, 6 and 9 districts, plus a German in GI square. Amazingly, there were no *Es* signals between 90 and 108 MHz.

In Norfolk, the July 8 event was of shorter duration, according to G4SFY; 1755-1810 and 1835-1844 but Ray could hear stations in YL, YM, ZM and ZO working to OK, OH, SM1 and SP till 2000. On CW he got RB5s AO and AL in QL, UB5RCP (PL) and OK2KZR (IJ). On the VHF net, SM5MIX said he worked 58 stations in F, G, UB and UA3/6 from 1600-1900, while OE3JPC enjoyed 4½ hours of *Es*. On the 18th, G4SFY worked 9H1GB and IT9DTH/9 also IT9JLW (GX) at 1648-1705. At 2006 and 2038, 9H1GV was heard on the calling frequency.

G4TIF's sole *Es* QSO this year up to Aug. 3 was 9H1CG at 1744 on July 18, a new country and square and all-time best DX at 2,218 kms. Bob Ainge, G4XEK, (SFD) worked IW9AQS (GX) on July 1 and on the 8th EA6FB, EA6YF (AY) on CW and EB5EHX (ZZ). On the 18th he found CT1LM (WX), IT9JLW and 9H1s BT, CG and GB all in HV. G4XEN also got IW9AQS on the 1st, then EA5DGC (IM97=ZX) on the 12th. On the 18th, 1745-1755, John contacted IT9JLW, IT9WGZ (JM68=GY) and 9H1s CG and GD. Martin Lowe, G4YCD, (AVN) now runs a Dressler D-200S PA and on Aug. 3 heard an IT9 in a five minutes opening. The following day he worked an HG, OE and YO5AXM (KH).

Keith Killigrew, G6DZH, (HWR) heard SP6GWB (IK) and SP9AHB (JK) at 1844 on July 8 for five mins. On the 12th, EA6FB on Ibiza and EA5EMM were both new squares worked, EA6 a new country for good measure. For G6HKM, IT9WGZ/9 on July 18 was an all-time new square and country. Richard Mason, G6HKS, (CBE) got YU4WEU (IE) at 1443 on July 8 and at 1805, RB5AL who sounded like FAI propagation. His signal disappeared on the true bearing, peaking at 70° this is also being reported by John Regnault, G4SWX, (SFK). G6HKS called EA3CAZ on FM on S20 at 0826 on the 12th but no QSO resulted as the Spaniard thought he was being "wound up". He then worked EA5DHC and EA4QV (YA). On the 18th, Richard worked four 9H1s, IT9MHI (HW) and IT9DTU/9 but failed with IS0AGY (EZ) due to QRM.

Dave Gregory, G8JDX, (DVN) worked SM and SP stations on July 8, 1928 to

Station	ANNUAL CW LADDER				Points
	4m.	2m.	70cm	µWave	
G4AGQ	24	267	12	1	304
G0ABB	—	237	2	—	239
G4SFY	—	221	—	—	221
G4YIR	—	213	—	—	213
G4ZVS	—	149	—	—	149
G4EIB	—	140	—	—	140
E15FK	—	116	—	—	116
G4OUT	—	112	—	—	112
G4XUM	—	105	—	—	105
G4PPV	—	86	—	—	86
G0DJA	—	68	—	—	68
G4EZA	—	67	—	—	67
G4TJE	—	52	—	—	52
GW4HBK	45	—	—	—	45
G4VOZ	28	—	7	—	35
G2DHV	4	18	—	—	22

No. of different stations worked since Jan. 1.

1933. Between 1735 and 1824 on the 18th he contacted IW0s AKA and I1J (GD), I2KXS/8, an IT9 in JM78RF and YT3NO. On the 12th, Graham Daubney, G8MBI, (HFD) worked EA3CAZ (BB) and EA5DHC. Philip Hocking, G8ZDS, (CNL) caught the end of the July 8 *Es* and worked SM1MUU (JR) at 1930. At 2027 he got SM6CLU (GS) and SK4EA (HT) for three new squares.

GW4LXO on July 8 worked SP9EWU, SO6AUU (G8AUU on holiday), SP6GVU, SP6LZW and SP9LJE all in IL and JK, plus SM1MUV (JR). On the 18th, Jonathan found I0EIO, IW0BTK, I0CUT, CT1LN (WX) and I2KXS/8. GW4TTU got OE3JPC at 1444 on the 8th and in the evening event Kelvin worked seven SPs in IK, JK and KJ, but lost HG0HO (KH) via FAI at 1905. Between 1928 and 1955 SMs in GQ and JR, UR2RHF (NS), UQ2GMD (LR) and four more SPs in IO, JN and JO were contacted. Then on the 18th he worked CT1LN at 1720, several 9Hs at 1755 including 9H4G (HW) and some I0s from 1905 to round off the day.

G4SWX telephoned your scribe at 1745 on July 8 to say he was working to UB at all the wrong direction, 75° in a heavy thunderstorm. Static rain was S9 at G3FPK but the noise blander in the IC-730 kills it stone dead so RA3YCR (RN) was worked on the key at 1818. The last station worked was SM0KCR (JT) at 1933. The Aug. 4 morning event was mostly missed but QSOs on SSB resulted with OK3LQ (II) and OK3CBU/P (JI). HG and YU were heard.

Finally the MS reports beginning with I4YNO who needs WP square. Alex sent an *s.a.e.* plus IRC to G18YDZ in June requesting a sked, but no reply. A G14 on the VHF net told him that the GI was no longer interested in MS yet a few minutes later the G14 was arranging a sked for G18YDZ with the Dutch T70A expedition group. By contrast, GW6DDB promptly replied to I4YNO and even returned his IRC. In May, June and early July, Alex made 54 MS skeds of which 31 were completed, nine not completed and nil from the rest. Reflections were generally short and the first part of June was best. Alex's telephone no. from the U.K. for

skeds is 010 39 59 236243 for anyone needing FE square.

G0CUZ also thought June particularly good for MS and Colin completed 23 skeds in 22 squares, YU3FM (HG) being worked on random CW, while HV2VO in Vatican City was a new country. July MS was disappointing, but T70A and GM4DHF/P (ZT) were new countries. He is QRV on random CW 2230-2400 weekdays and 0600-0700 at weekends. OK1KRA (HK), DL1GBF (EI) and HG2NP (JH) have been worked this way. John Hunter, G3IMV, (BKS) has recently added LA6QBA/P (GU), F6EYM/EA7 (ZW) and DF5GX/SM in HY and IZ, both the Dutch and Danish T70A expeditions and F6HYE/EA (AA54a).

G4IGO completed with C30BBP (AC39j) on CW on July 12, but G4SFY did not, nor did any of Ray's July skeds get completed. G4XEN made it with T70A and F6EYM/EA7 on July 17 and on the 20th, John completed with HG5OV/7 and HG2NP (both JN97=JH) and with DF5GX/SM3 (JP74=HY). Andy Steven, GM4IPK (YP) worked T70A for the first Scotland to San Marino QSO on 2m MS. GW4LXO got T70A on July 4 and CT1WW (WB) on the 19th for two new countries, bringing Jonathan's total to 44.

## Seventy Centimetres

G1DOX worked GW1MNC (GNM) on July 15 and GW6TEO (XL) the next day for table points. On July 3, G1KDF got to G8YYB/A and on the 6th, in NFD, Bob's best DX were EI5WAR/P and G3YJX/P (CNL). On the 16th he contacted GB4MTR (YR) but was unsuccessful on the 26/27th with GM6TKS (WIL). In the QRP contest on the 27th, he had 59 QSOs with 40 multipliers, best DX being G8DCZ (SXW) and GWOCQX/P (GNW). On the 25th he worked G4KUX, now back on the band with a good signal from Durham.

In NFD weekend, G4AGQ's CW found G3CAR/P, G3WZT/P, G3ZVW/P and G4XWT/P. On July 27 Pat worked G3DCC/P and G6TLI, the latter then being called by GU2FRO (SRK) whom Pat could barely copy. G4NBS's main operation was in the QRP contest in poor conditions. Tony had 80 QSOs but only 35 counties, four countries and 17 squares. Eight GWs and three PAs were worked. G4TIF finally worked G8YYB/A on July 15 after three consecutive days of incomplete QSOs. Martyn now uses the TS-770E instead of the earlier TS-700G/MM transverter combination.

In the QRP contest on July 27, G6HKM made 67 QSOs in 28 counties and four countries. Ela's only Dutch station was PE1EWR who was her first continental contact when she was first licensed. Other July DX were G14GVS (ATN) on the 1st and G8YYB/A on the 15th.

## The Microwaves

Dave Ackrill, G0DJA, (WMD) has managed further 24 GHz tests; a 14 kms. path from Barr Beacon to Coleshill with G8MWR and a 30 kms. one to the GB3LEX site where G8MWR was. Several stations were out on Aug. 2 on a windy day and Dave says that 10 GHz and 24 GHz seem to be taking off in the Midlands. G1DOX is looking for a GD contact on 23cm. John was out -/P in NFD on the band and worked GMs in XO and YP, G8TB/P (SRY) and G0FCT/P (DOR). Mick Allmark, G1EFZ, (YSW) is building the 23cm. transverter published in *Dubus Magazine*.

G1KDF was out with the *Warrington Contest Group* for most of NFD but was home to work GW8IFT/P (PWS), GM4BYF/P (DGL) and GM4OGM/P (SCD) on 23cm. G4AGQ uses an A2521 tripler valve stage to get on 23cm. which restricts Pat to CW and FM. He uses his

2m. and 70cm. beams for antennas which, with only 200mW, does not go very far. G4MXI (AN41g) is reported to have worked DC9XG (EN37f) using the interdigital Rx part of a transceiver modulated to provide a few milliwatts of RF, the antenna being a 49-ele. loop Yagi. G8MKD/G8RAO have built a 23cm. transverter giving 1½W output so should be on the band soon.

## Stop Press

The Japanese successfully launched their *H-1* rocket at 2045 UTC on Aug. 12. Amateur satellite *JAS-1* was separated at 21h.47m.07s and the beacon on 435.795 MHz was received very strongly by in-range stations. The transponder was activated immediately at separation and European stations made QSOs through it in the first orbit number zero. The NASA gave the following orbit parameters at separation epoch:— Inclusion 49.971°;

RAAN 253.07657°; eccentricity 0.001260921; Argument of perigee 144.959°; Mean anomaly 187.270°; mean motion 12.43297910 revs. per day which equates to a period of 115.821 minutes. Thus the range circle for your *Oscarlator* maps will be very similar to that for the Soviet *RS* orbiters. The Epoch quoted was 86 224.9076966 which is two seconds before the stated separation time, by the way. Congratulations to all concerned and welcome *OSCAR-12*.

## Sign Off

Several readers have commented on the idea of an *S.W.M.* sponsored VHF contest. Others views are sought so we can decide something. Please note the copy deadlines in the box and send your contributions to:— "VHF Bands", *SHORT WAVE MAGAZINE*, 34 High Street, WELWYN, Herts. AL6 9EQ. 73 de G3FPK.

# The G3ISD Linear Amplifier

## further notes

E. J. HATCH, G3ISD

JUST about the time that Part 2 of the above article appeared in *S.W.M.* in May 1986, I had a spot of trouble with the antenna/control relay. At that time the amplifier had been in operation about 18 months, so the trouble had taken some time to develop, and took the form of varying contact resistance, amounting at times to an open circuit. Strangely enough, it did not respond to contact cleaning, so I replaced it with the RS Components relay 349-541 referred to in the text of the original article. The replacement relay has contacts of solid silver giving best possible conductivity, with a gold "flashing" to ensure permanent low contact resistance. It is possible that the contact

material on the original relay was a tungsten alloy designed to resist erosion caused by breaking current, when the resulting arc would "burn" away any tarnish forming on the contacts. As used in this application, there would be no current flowing in the antenna changeover contacts at the moments when the relay operated, thus no cleaning action would have taken place.

However, that is not the end of the story, as the replacement relay would not at first operate, and I found it necessary to use an "interposing" relay between the PTT line from the TS-930S and the linear. The reason was that the TS-930S PTT line is switched by an open-collector transistor with a permanent 100-ohm resistor in its collector circuit so that the 12 volt relay supply was divided between the relay coil and the 100-ohm resistor. There was no problem with the original relay because its coil resistance was 300 ohms, but the replacement relay has a coil resistance of only 110 ohms, resulting in a coil voltage of little more than 6! I was reluctant to raise the relay supply to 24 volts as a simple solution, as the 100-ohm resistor would then have had to dissipate around 1.4 watts, and there is no indication of its rating in the handbook.

The revised arrangement is shown in the diagram, Fig. 1, and should be universal in its application. Note that the relay supply has been modified to a full-wave rectifier. Because troubles don't come singly, the interposing relay chattered during modulation, possibly due to RF on the PTT line, which was cured by the 0.05µF disc capacitor across the PTT jack connections. The interposing relay came from the junk box, and is a Maplin YX94C with a 12-volt, 400-ohm coil; the RS Components 345-038 with a 12-volt, 480-ohm coil would be equally suitable.

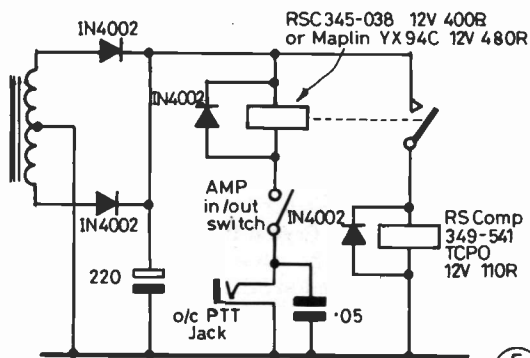


Fig. 1

E  
784

# CLUBS ROUNDUP

By "Club Secretary"

**A**N interesting throwaway remark appeared in the mail this time, to the effect that "I will keep you posted with the programme details in the future — if someone tells *me* what's on!" The moral is pretty clear, and that is the need to be sure the information is passed on to whoever is sending it to the magazines, and in turn for someone to see that he/she actually gets around to doing the posting!

## Letters

Right up north for the first call, which is to **Aberdeen**, where they get together every Friday evening at 7.30 at 35 Thistle Lane, Aberdeen. September 5 is a junk sale, 12th a Raynet presentation, and on 19th they will tackle their Morse keyer project with Sid Will. That leaves September 26 for a talk by GM4GXD and GM3WTA on computers in amateur radio. In addition the local Morse Tests are on 25th, they have SSB FD over September 6/7, and a bus trip to SCOTAM at Glenrothes on September 13.

Every Thursday evening **Abergavenny & Nevill Hall** members make their way to the room above Male Ward 2 at Pen-y-Fal Hospital, Abergavenny, and on September 16 they have a visit to the earth station at Madley.

The monthly meeting of **Acton, Brentford & Chiswick** is on September 16; G4GD is to open their discussion on home construction techniques. The venue is Chiswick Town Hall, Chiswick High Road, London.

It's a long while since we last heard from **BARTG**, but the Hon. Sec. has remedied the omission this time, to tell us they now have 2357 members and are still growing! So — if you are into RTTY or any of the various data modes, then this is the one for you. Details from the Hon. Sec. — see Panel.

On to **Barry College** and to meet this crowd you need to find the College Annexe at Weycock Cross, Barry, on a Thursday, between 7 and 10.30 p.m. and sometimes later. This is a group which we know welcomes new members, despite already having over seventy on books. Details from the Hon. Sec. at the address in the Panel.

The **Basingstoke** crew have their main meeting on September 1 for a talk on 'Surface Mounted Devices', and on October 6 for the AGM. Informal for September is the demonstration station on September 13 at Bishops Channoler School Fete. More details from the Hon. Sec. — see Panel.

Now **Biggin Hill**, who hope to have a talk about the work of the RIS on September 16, starting at 7.30 p.m. — the earlier time for the benefit of the younger members. The venue is Downe Village Hall, 24 High Street, Downe, next door to the "George and Dragon".

The **Bishops Stortford** group has its Hq. at the British Legion Club in Windhill, on the third Monday of each month, and in addition they are to be found in the saloon bar of the "Nag's Head" from around 9.00 every Thursday evening.

**Borders** details are that they get together on the first and third Friday at the Tweed View Hotel in Berwick-on-Tweed. September 5 is NFD preparation, and on 19th several members get together to talk about Top Band working.

Turning to the **Braintree** newsletter we find they have their base at Braintree Community Centre, Victoria Street, next door to the bus station; meetings are on September 1 for G3PEN to talk about power supplies, and on 15th when they have a visit from G3LST of *Arrow Electronics*.

On September 4, **Bredhurst** has a visit from G3RJV, and on 18th 'something' will happen which at the time they wrote was not completely finalised. That leaves September 11 and 25 when they

have 'natter'/construction evenings; all are at Parkwood Community Centre, Rainham, Kent.

The first and third Wednesday each month are booked by **Brighton**, in the Seven Furlong Bar of the Racecourse. Details from the Hon. Sec. — see Panel.

On September 9, **Bury** will be listening to Peter Smith of *Microwave Modules*, who will be talking about ultrasonic and Doppler applications. This is just one of the weekly meetings which occur every Tuesday at Mosses Centre, Cecil Street, Bury.

The **Central Lancashire** club now has its own club call sign, and has affiliated to RSGB. Meetings are on first and third Mondays — get the details from the Hon. Sec., see Panel. Venue is the Priory Club, Broadfield Drive, Leyland.

Some clubs like to hide their light under a bushel; one such is **Chelmsford** whose Newsletter No. 245 gives no indication of venue or dates for September, so please refer to the Hon. Sec. — see Panel.

If you want to join the **Cheltenham** club, you must find Charlton Kings Library, Charlton Kings, where they book the Stanton Room; September 5 is down for a session on test equipment, and on 19th they have their informal.

The venue for **Chesham** is Bury Farm, Pednor Road, Chesham. For more details contact the Hon. Sec., or ring Liz on 09278-3911.

There have been quite a lot of improvements to the Hq. of the **Cheshunt** crowd of late thanks to some devoted efforts on Saturday mornings; thus they can now actually operate the club station on any of the Wednesday evening meetings at Church Room, Church Lane, Wormley, near Cheshunt.

## Deadlines for "Clubs" for the next three months—

October issue—August 28th  
November issue—September 25th  
December issue—October 30th  
January issue—November 27th

Please be sure to note these dates!

The crowd at **Chester** foregathers at the Rugby Union Club, Hare Lane, Vicars Cross; on September 9 G3PFR will introduce members to microwaves, and on 16th they have some videotapes by BARTG members. September 23 is down for Julie Hallam of *Marcher Sound* to talk about how IBA local radio really works, and on 30th they have a visit by *Lowe Electronics* of Matlock.

It's the first and third Tuesday of each month for **Chichester**, and these days they get together at the North Lodge Bar, County Hall, Chichester.

Down west we go now, to **Cornish**, at the Church Hall, Treleigh, on the old Redruth by-pass; on September 4 they have videos of the '85 and '86 rallies, but for October 2 the meeting was not completely finalised at the time of the newsletter we have at hand — the next one, due before publication will doubtless have the details.

The **Coventry** crowd is based on Baden Powell House, 121 St. Nicholas Street, Radford, Coventry, where they normally meet every Friday evening. September 5 and 19 are 'on the air' and September 12 is a treasure hunt plus barbecue. September 26 is to be a visit — details not announced at the time of writing.

The Leisure Centre, Crawley, is now the **Crawley group's** Hq., and they have September 24 for a talk on RSGB by G4VEC. They also have informals at members' homes each month.

On September 20 the **Crystal Palace** chaps will hear Mr. C. Jones, on the history of the valve; this one is at All Saints Parish Rooms, Beulah Hill, London SE19, opposite the IBA mast.

Now we turn to **Dartford Heath D/F**, and the routine is mainly D/F hunts at weekends and a meeting to give out the details on the previous Tuesday. Thus on September 9 the pre-hunt meeting is at the "Horse & Groom", Leyton Cross, Dartford Heath, with the

hunt proper on Sunday, September 14. Details from the Hon. Sec. — see Panel.

**Denby Dale** is where the famous 'pie' comes from, and the locals meet in the Pie Hall every Wednesday evening. They have a special event by way of a car boot sale on September 17.

Also on Wednesdays are the **Derby** meetings at 119 Green Lane, Derby, where the club occupy the top floor as their own shack.

There is another Derby club, this one at **Nunfield House** Community Centre, Boulton Lane, Alvaston; find them in Room 7 every Friday evening.

It's the first and third Thursdays at **Douglas Valley** nowadays, and the Hq. is now Standish Conservative Club, School Lane, Standish, Wigan.

Weekly on Mondays is the routine at **Dover**, where the club is based at (and takes its formal name from) the Dover YMCA, Godwynehurst, Leyburne Road, Dover. September 3 and 17 are natter sessions, but on 10th they have a talk on Raynet; and on September 24 they have a talk on 'Scarab'.

Turning to the **Droitwich** letter we find they meet on the second Monday of each month at 17 Ombersley Street West, and on the fourth Monday of each month at the Scout Hq. in Union Lane.

Next we have **Eastbourne**; this crowd is based at the Archery Youth Centre, Seaside, Eastbourne, where they go on Sunday evenings; more details from the Hon. Sec. — see Panel.

The **East Lancashire** members have the first and last Tuesday at the Conservative Club, Cliff Street, Rishton; usually the first is a talk or demo; the last then is the informal.

September 11 is the G3GC lecture to **Edgware** at Watling Community Centre, 145 Orange Hill Road, Burnt Oak. On September 25, G0CAJ will be talking about floating QTH construction at their informal.

'Officially' we don't know where **Fareham** foregather; however, we understand that they are still at Portchester Community Centre. September 3 and 17 are natter nights, and on 10th G1MCP talks about mountaineering. September 24 is down for G4XZL to talk about homebrewing the legal limit on 144 MHz. So — it's every Wednesday evening.

September 10 is down for a pre-AGM discussion at **Farnborough**, where it looks to be the second and fourth Wednesday. Venue is the Railway Enthusiasts Club, Access Road, off Hawley Lane.

September 8 is a social and September 26 a talk by G3NYK at **Felixstowe**, where the Hq. is in the back room of "The Feathers" pub in Walton High Street, Felixstowe.

Up to **Fylde** and here September 2 is a visit to Blackpool Airport Fire Station, and September 16 the informal. They meet at the Kite Club, Blackpool Airport.

The **Glossop** Hq. is at the "Nags Head", where they will be foregathering on September 25, when *Lowe Electronics* will be paying them a visit. More details from the Hon. Sec. — see Panel.

Next we mention the **G-QRP Club**; this must be the one for all the keen QRP operators and the home-construction buffs too; get the details from the Hon. Sec. — see Panel.

Over to **Grafton** and here the lads now meet at *TS Wizard*, White Hart Lane, Haringey, opposite Haringey Football Ground. Find them on second and fourth Fridays.

On September 25 the **Greater Peterborough** crowd will be at Southfields Junior School, Stanground, for an RSGB video — an event which was postponed from last April.

At **Guildford** the locals meet on second and fourth Fridays at the Model Engineers' Hq. in Stoke Park, Guildford.

Now **Harrow** and this means Harrow Arts Centre, High Road, Harrow Weald. They assemble there every Friday evening but we don't know what the programme detail is; they have been 'having a purge' to get the programme organised well ahead.

Turning to **Harpden** now, they are to be found at the "Silver Cup" pub on second and fourth Tuesdays, from 8 p.m. although we hear that members get there at 7.30 for a 'quick one' before the meeting starts.

At **Hastings** there is a main meeting on the third Wednesday of each month, at West Hill Community Centre; but they also have a weekly informal or chat night at Ashdown Farm Community Centre, Downey Close.

Over to **Hereford** where the venue is County Control, Civil Defence Hq., Gaol Street; September 5 is a talk on VHF working, and September 19 is the informal.

The **Holyhead** gatherings are at the "Forresters Arms", Kingsland Road, Holyhead, on alternate Sundays at 7.30 p.m. More details from the Hon. Sec. — see Panel.

The normal routine for **Ipswich** is to meet on the second and last Wednesday, but this may be changed just before special events; the venue being the upstairs room of the "Rose and Crown", 77 Norwich Road, Ipswich. We hear that there is often something doing on the other Wednesdays too — details from the Hon. Sec. — see Panel.

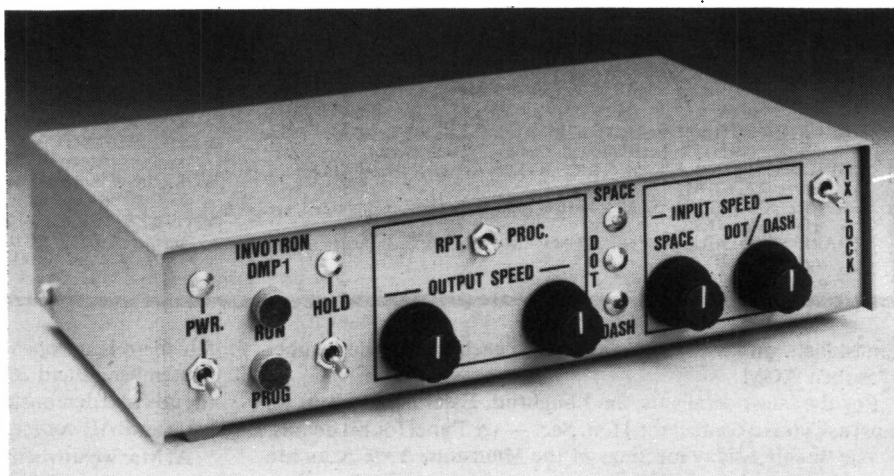
Over in Eire, the national society is **IRTS**; for anyone going to EI this is the place to address queries on amateur radio in that country, and about local clubs — see Panel for the name and address of the Honorary Secretary.

The **Isle of Man** crowd seems to have 'gone fissile'; they now gather on Monday evenings at the Howstrake Hotel, Harbour Road, Onchan, for the main meetings, plus Thursdays at the British Legion, Douglas Street, Peel, and Fridays at Perwick Hotel, Port St. Mary; all commence at 8 p.m. and welcome visitors.

September 2 is AGM time for **Kidderminster** at Harriers Vice-Presidents Club, Hoo Road; on September 16 there is a talk on VHF propagation by G8BKL, and on 30th they have an evening with G3PGQ.

The **Lough Erne** crowd is to be found at the Railway Hotel in

*Invotron Ltd.* has commenced production of the **DMP-1 Digital Morse Processor** which interfaces between a Morse key and a transmitter so that with a conventional up/down key it becomes possible to send perfect Morse. The unit decodes the input, buffers it in an 8K static RAM store before outputting it as a continuous Morse stream with all mark and space durations precisely correct. Among other features the DMP-1 is also a powerful Morse trainer, enabling high speeds to be generated from low input speeds for receiving practice. For further information contact the Company at Brookfield Avenue, Blackrock, Co. Dublin, Eire. (Tel: Dublin 884993/831938).



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

- ABERDEEN:** D. Travis, GM4GX, Gorse, Kirkton, Chapel of Garioch, Inverurie AB5 9HF. (*Pitcaple 04676 251*)  
**ABERGAVENNY:** J. B. Davies, GWXQH, 109 Croesonen Parc, Abergavenny, Gwent NP7 6PF. (*0873 4655*)  
**ACTON, BRENTFORD & CHISWICK:** W. G. Dyer, G3GEH, 188 Gunnersbury Avenue, Acton, London W3 8LB. (*01-992 3778*)  
**BARTG:** P. & J. Beedie, GW6MOJ/GW6MOK, Ffynnonlas, Salem, Llandeilo, Wales SA19 7NP. (*0558 822286*)  
**BARRY (College):** J. Cooper, GW0ACH, 'Meerhay', Church Street, Wick, Nr. Cowbridge, S. Glam.  
**BASINGSTOKE:** D. A. Birleigh, G4WIZ, 14 Winchfield Gardens, Tadley, Basingstoke, Hants. RG26 6TX  
**BIGGIN HILL:** R. Senft, G0AMP, Mill Hay, Standard Road, Downe, Kent BR6 7HL. (*0689 57848*)  
**BISHOPS STORTFORD:** S. Mammatt, G6HKK, 11 Twyford Gardens, Bishops Stortford, Herts. (*0279 52297*)  
**BORDER:** Mrs. M. Bottomley, GM1IRN, 4 Home Farm Cottages, Ladykirk, Nr. Berwick-on-Tweed, Northumberland.  
**BRAINTREE:** D. Willcombe, 355 Cressing Road, Braintree, Essex.  
**BREDHURST:** K. Fay, G0AMZ, 37 Sandringham Road, Rainham, Gillingham, Kent ME8 8RP. (*Medway 0634 376991*)  
**BRIGHTON:** P. Turner, G4HIL, Flat 6, 132 Marine Parade, Brighton, Sussex BN2 1DE. (*Brighton 607737*)  
**BURY:** M. Sivieri, G4ZTB, 47 Ramsay, Bacup, Lancs.  
**CENTRAL LANCs:** D. W. Fowler, G4YWG, 22 Larchwood Crescent, Leyland, Lancs. (*0772 432275*)  
**CHELMSFORD:** A. C. Mead, G4KQE, 9 Abraham Drive, Silver End, Witham, Braintree, Essex CM8 3SP.  
**CHELTHAM:** T. Kirby, G4VXE, 29 Tivoli Road, Cheltenham, Glos. GL50 2TD. (*0242 36723*)  
**CHESHAM:** J. Aldridge, G6LKS, 95 Rose Drive, Chesham, Bucks.  
**CHESHUNT:** J. & T. A. Watkins, G4VMR/G4VSL, "One Ash," Frogs Hall Lane, Haultwick, Herts. SG11 1JH. (*Dane End 250*)  
**CHESTER:** A. Warne, G4EZO, 113 Queens Road, Vicars Cross, Chester. (*Chester 40055*)  
**CHICHESTER:** C. Bryan, G4EHG, "Marmanet", Salt Hill Road, Fishbourne, Chichester, Sussex PO19 3PZ. (*Chichester 789587*)  
**CORNISH:** N. Pascoe, G4USB, Bosuathick Farm, Constantine, Falmouth, Cornwall. (*Falmouth 40367*)  
**COVENTRY:** R. Tew, G4JDO, 4 Chetwode Close, Coventry CV5 9NA. (*Coventry 0203 73999*)  
**CRAWLEY:** D. L. Hill, G4IQM, 14 The Garrones, Worth, Crawley, West Sussex. (*Crawley 882641*)  
**CRYSTAL PALACE:** G. M. C. Stone, G3FZL, 11 Liphook Crescent, London SE23 3BN.  
**DARTFORD HEATH D/F:** A. R. Burchmore, G4BWV, 49 School Lane, Horton Kirby, Dartford, Kent.  
**DENBY DALE:** G. Edinburgh, G3SDY, 37 Westerly Lane, Shelley, Huddersfield HD8 8HP. (*Huddersfield 0484 602905*)  
**DERBY:** J. Anthony, G3KQF, 77 Brayfield Road, Littleover, Derby. (*0332 772361*)  
**DERBY (Nunsfield House):** J. Robson, G4PZY, 31 Melton Avenue, Littleover, Derby. (*0332 767994*)  
**DOUGLAS VALLEY:** D. Snape, G4GWG, 30 Culcross Avenue, Highfield, Wigan, Lancs.  
**DOVER (S.E. Kent YMCA):** A. Moore, G3VSU, 42 Nursery Lane, Whitfield, Dover, Kent CT16 3HG. (*0304 822738*)  
**DROITWICH:** E. G. Tayloe, G4HFP, 6 Marlborough Drive, Stourport-on-Severn, Worcs. (*0299 33818*)  
**EASTBOURNE:** R. Peirce, G1BRC, 69 Bridgemere Road, Eastbourne, East Sussex. (*Eastbourne 29913*)  
**EAST LANCs:** S. Westell, G6LXU, 19 Sussex Road, Rishton, Blackburn, Lancs. (*Great Harwood 0254 887385*)  
**EDGWARE:** J. Cobley, G4RMD, 4 Briars Close, Hatfield, Herts. (*Hatfield 64342*)  
**FAREHAM:** A. S. Chester, G3CCB, Deva Wood, 44 The Ridgway, Down End, Fareham, Hants. (*0329 288139*)  
**FARNBOROUGH:** P. S. Mugford, G4XHA, 6 Cullen Close, Yateley, Hants. GU17 7HB.  
**FELIXSTOWE:** P. J. Whiting, G4YQC. *Details wanted.*  
**FYLDE:** H. Fenton, G8GG, 5 Cromer Road, St. Annes, Lytham St. Annes, Lancs. FY8 3HD. (*Lytham St. Annes 725717*)  
**GLOSSOP:** E. Calvert, G4ETC, 6 Barber Street, Padfield, Hadfield, via Hyde, Cheshire SK14 7EQ.  
**G-ORP CLUB:** Rev. G. Dobbs, G3RJV, St. Aidans Vicarage, 498 Manchester Road, Rochdale, Lancs. (*Rochdale 0706 31812*)  
**GRAFTON:** J. Kaine, G4RPK, 74 Camden Mews, London NW1 9BX. (*01-267 1000*)  
**GREATER PETERBOROUGH:** F. Brisley, G4NRJ, 27 Lady Lodge Drive, Orton Longueville, Peterborough, Cambs. (*0733 231848*)  
**GUILDFORD:** C. R. Baigent, G4PLO, 19 Elles Avenue, Mero, Guildford, Surrey GU1 2QH.  
**HARPENDEN:** E. P. Simons, G1BJC, Balford Farm, Common Lane, Harpenden, Herts.  
**HARROW:** D. Atkins, G8XZB, 25 Maxwell Close, Rickmansworth, Herts. (*0923 779942*)  
**HASTINGS:** D. Shirley, G4NVQ, 93 Alfred Road, Hastings, Sussex. (*Hastings 420608*)  
**HEREFORD:** F. E. G. Cox, G3WRQ, 35 Thompson Place, Hereford. (*Hereford 54064*)  
**HOLYHEAD:** Mrs. B. Anziani, 12 Beach Close, Morawelon, Holyhead, Anglesey, Gwynedd.  
**IPSWICH:** J. Tootill, G4IFF, 76 Fircroft Road, Ipswich, Suffolk IP1 6PX. (*0473 44047*)  
**IRTS:** G. Gervin, E18CC, 185 Elton Court, Leixlip, Co. Kildare, Eire.  
**ISLE OF MAN:** Mrs. A. Mathewman, GD4GWQ, 20 Terence Avenue, Douglas, I.o.M. (*0624 22295*)  
**KIDDERMINSTER:** A. F. Hartland, G8WOX, 22 Granville Crescent, Offmore Farm, Kidderminster. (*Kidderminster 61584*)  
**LOUGH ERNE:** W. Ward, G14NRE, 6 Brackvede Park, Enniskillen, Northern Ireland. (*0365 24905*)  
**LOUGHTON:** D. Thorpe, G4FK1, 44 Townfield Road, Flitwick, Beds.  
**MAIDSTONE (YMCA):** P. Martin, G0BUW. *Address Wanted.*  
**MAXWELL TOWN:** C. D. S. Rodgers, GM4NNC, 5 Elder Avenue, Lincluden, Dumfries DG2 0NL.  
**MEDWAY:** D. Axford, G4LHU, 141 Nelson Road, Gillingham, Kent.  
**MIDLAND:** N. Gutteridge, G8BHE, 68 Max Road, Quinton, Birmingham B32 1LB. (*021-422 9787*)  
**NENE VALLEY:** M. R. Byles, G6UWS, 108 Kingsway, Wellingborough, Northants. (*Wellingborough 71189*)  
**NORTH CHESHIRE:** P. Kirsop, G4WCE, Peel House, 5 Planetree Road, Hale, Cheshire WA15 9JJ.  
**NORTH WAKEFIELD:** S. Thompson, G4RCH, 2 Alden Close, Morley, Leeds. (*Leeds 536633*)  
**NOTTINGHAM:** J. Towle, G4PJZ, 63 Digby Avenue, Mapperley, Nottingham NG3 6DS.  
**ORMSKIRK:** R. Nixon, G1KDF, 4 Weldon Drive, Ormskirk, Lancs. (*0695 74868*)  
**PEMBROKESHIRE:** P. O'Neill, G4UZZ, Panteg, Ambleston, Haverfordwest, Pembrokeshire.  
**PLYMOUTH (Poly):** D. Salter, G1ERM, Room 105, Maritime Hall of Residence, Plymouth Poly.  
**PONTEFRAC:** C. Mills, G0AAO, 27 Pendennis Avenue, South Elmsall, Nr. Pontefract, West Yorks.  
**POOLE:** P. Dykes, G4YX, 68 Egmont Road, Poole.  
**RAIBC:** Mrs. C. Clark, G1GQJ, 9 Conigre, Chinnor, Oxford OX9 4JY.  
**SHEFFIELD:** P. A. Cardwell, 223 Chesterfield Road, Meersbrook, Sheffield S8.  
**SOUTH BRISTOL:** L. Baker, G4RZY, 62 Court Farm Road, Whitchurch, Bristol, Avon.  
**SOUTHDOWN:** T. Rawlance, G4MVN, 18 Royal Sussex Crescent, Eastbourne.  
**SOUTHGATE:** D. C. Elson, G4YLL, 200 Churchgate Road, Cheshunt, Herts.  
**SOUTH MANCHESTER:** D. Holland, G3WFT, 32 Woodville Road, Sale, Greater Manchester. (*061-973 1837*)  
**STAFFORD:** J. J. Brown, G6DAT, 33 Bush Drive, Rugeley, Staffs. (*Stafford 08894 2453*)  
**STOCKPORT:** M. Beets, G4FFW. *Address Needed.*  
**STOURBRIDGE:** C. S. Williamson, G1IEB, 7 Hanbury Hill, Stourbridge.  
**SURREY:** J. Simkins, G81YS, 18 Riding Hill, Sanderstead, Croydon. (*01-657 0454*)  
**SUTTON & CHEAM:** A. Keech, G4BOX, 26 St. Albans Road, Cheam, Surrey.  
**TELFORD:** T. Crosbie, G6PZZ, 41 Culmington, Stirchley, Telford. (*Telford 597506*)  
**THAMES VALLEY:** J. Pegler, G3ENI, Brook House, Forest Close, Horsley, Leatherhead KT24 5BU.  
**TODMORDEN:** Mrs. V. Mitchell, G1GZB, Parrock Farm, Shore Green, Todmorden, West Yorks. OI 14 8SF. (*Todmorden 7572*)  
**TORBAY:** B. Wall, G1EUA, 48 Pennyacre Road, Teignmouth TQ14 8LB. (*Teignmouth 78554*)  
**VALE OF EVESHAM:** M. J. Butler, G4UXC, 16 Clevedon Green, South Littleton, Evesham, Worcs. (*0386 831508*)  
**VERULAM:** G. Wimpenny, G4OBH, 30 Faircross Way, St. Albans, Herts. (*St. Albans 52003*)  
**WARRINGTON:** P. Forster, G0CBN, 6 Birchdale Road, Paddington, Warrington, Cheshire. (*0925 814005*)  
**WELWYN-HATFIELD:** D. Fairbank, G0AII, 2 Sandpit Road, Welwyn Garden City, Herts. (*Welwyn Garden City 326138*)  
**WIMBLEDON:** G. Cripps, G3DWW, 115 Bushey Road, Raynes Park, London SW20 0JN. (*01-540 2180*)  
**WOLVERHAMPTON:** K. Jenkinson, G1OIA, 40 Avondale Road, Wolverhampton WV6 0AI. (*0902 24870*)  
**WORTHING:** R. Jones, G4SWH, PO Box 599, Worthing, West Sussex BN14 7TT. (*Worthing 208752*)  
**YEovil:** E. H. Godfrey, G3GC, Dorset Reach, 60 Chilton Grove, Yeovil, Somerset. (*0935 75533*)  
**YORK:** K. R. Cass, G3WVO, 4 Heworth Village, York.

Enniskillen, on the third Wednesday in each month; September 17 is their AGM.

For the latest details on the **Loughton**, Essex, goings-on, we must ask you to contact the Hon. Sec. — see Panel for his details.

The weekly Friday meetings of the **Maidstone YMCA** lot are naturally enough at the 'Y' Sportscentre, Melrose Close, and on

5th there is an open evening for beginners and new members. September 12 and 26 are both natters, leaving September 19 for the talk and demonstration of ATV. On the natter nights they also have an RAE course.

At **Maxwelltown** the lads have meetings on September 3, 10 and 17 in the Tam o' Shanter Inn, Dumfries, to prepare for the big

event on September 20-28 when they will have GB800 on the air to celebrate 800 years of Dumfries. The station will be at St. Michael's Church Hall, and aerials will be strung from the top of the spire some 200 feet high.

Every Friday night, from 7.30 onwards, you can find the **Medway** group in St. Luke's Church Hall, Gillingham, Kent. This is one of the older clubs, with 65 years to be celebrated.

Now to **Midland** and this means looking for Henstead House, Henstead Street, Birmingham, where on September 16 they have a surplus sale. Get more details from the Hon. Sec. — see Panel — or ask G8GAZ on S17.

Now for **Nene Valley** which means the "Prince of Wales", Well Street, Finedon, every Wednesday evening from around 8; we understand the routine is to alternate natter evenings with more formal events.

### Boot Sale

This event is being run by the **North Cheshire** gang, at Morley Green Social Club, Morley Green, Wilmslow, Cheshire, on September 21. For more details on the club, we counsel a contact with the Hon. Sec. — see Panel.

Another outside event is the Mobile Rally being run by **North Wakefield** on October 5, at Outwood Grange School, Potovens Lane, Wakefield, with doors open at 11 a.m. or 10.30 for any disabled visitors. Details of this, and of course the club meetings, can be obtained from the Hon. Sec. — see Panel.

Turning to **Nottingham** we find them at Sherwood Community Centre, Woodthorpe House, Mansfield Road, Sherwood, Nottingham; September 4 is a VHF foxhunt, and on 11th they have a talk by G4NZU who says "CW is the best thing since sliced bread", while on 18th they have a talk on narrow-band TV. That leaves September 25 for the activity night.

On the first Thursday each month the **Ormskirk** members head for the local Community Centre, in Chapel Street; we hear they have a programme more or less complete for the next year, to include visits and talks and so on.

The letter we have from **Pembroke** refers to their DX-pedition, but doubtless the Hon. Sec. — see Panel — would love to give you details of the club as well!

The **Plymouth Polytechnic** Hon. Sec. wrote with details of his new address — see Panel — and we suggest that he should be contacted for details of the autumn term events.

On to **Pontefract** where they have the top floor of Carleton Community Centre; Mondays are informal, with the main meetings on Thursdays. We believe the room, and indeed the shack may have been moved to the ground floor for the benefit of the older members.

There are to be several birthday activities for the **Poole** club which will be ten years old in September. The normal meetings are on the last Friday of the month at Commanders House, Constitution Hill Road, Poole; for the extra activities we suggest you contact the Hon. Sec. for the needful information.

For anyone interested in amateur radio but disabled or blind, membership of **RAIBC** is a 'must' — but to make it all happen, they also need members in the supporter or representative categories — details from the Hon. Sec. at the address in the Panel.

Over to **Sheffield** now, and they gather at Firth Park Pavilion on the first and second Monday and the last two Wednesdays; for September the first Monday has a SS/TV demonstration and discussion, and the second is a slide show by G3PHO, "Walking in Iceland". September 17 is RAE and Raynet, and on 24th they have a committee meeting.

For **South Bristol** you need to find Whitchurch Folk House, East Dundry Road, Whitchurch, Bristol, on a Wednesday evening. September 3 is the AGM, and on 10th they will learn all about cellular radio. September 17 is a bring-and-buy for the computer buffs, and on 24th they prepare for the Bristol Rally.

On the first Monday in the month, and every Friday, the **Southdown** meetings occur. The main one is the first mentioned and is at Chaseley Home for Disabled Ex-servicemen, South

Cliff, Eastbourne, while the Friday informals are at Wealden District Council Offices clubroom, Vicarage Fields, Hailsham, Sussex.

The **Southgate** crowd meet in Holy Trinity Church Hall, Green Lane, Winchmore Hill. On September 11 G3ZVW talks about the quick and easy way to learn Morse, while on September 25 there is an informal.

Friday nights are the ones for **South Manchester**, at Sale Moor Community Centre, Norris Road, Sale, but we are not told what the club activities are except in general terms. You can get this information by contacting the Hon. Sec. — see Panel — or, better, by just turning up!

The "Coach and Horses", Weston, near Stafford is host to the **Stafford** society; at the motel they have the business meetings on September 2, G8MWR talking about RSGB on 9th, and G4ZZS on home-brew beer and wine for 16th. That leaves September 23 for a night-on-the-air, using the club FT-101, and an 'open box' for 30th.

The **Stockport** letter advises of a new Hon. Sec. — see panel for half his details(!), and also tells us that the SSB FD post-mortem is on September 10, and on 17th there is an informal natter in the bar. That leaves September 22 for a talk on 'Shocks and Socks' by G4SSN. All at the "Magnet Inn", Wellington Road North.

September 1 is informal and September 15 to be arranged, says the **Stourbridge** newsletter; meet the members at the Robin Woods Centre, School Street, off Enville Street, Stourbridge.

The **Surrey** Hq. is at *TS Terra Nova*, 34 The Waldrons, South Croydon, where they have the use of the first floor mess deck on the first and third Monday, the former being the main and the latter the informal meeting.

**Sutton & Cheam** has its session on September 19, by way of a visit to the Police Hq. at Guildford. The natter session is on the first Monday each month. Both are at the Downs Lawn Tennis Club, Holland Avenue, Cheam.

The **Telford** crowd is to be found at Dawley Bank Community Centre, Bank Road, Dawley, Telford. On September 4 they have a visit to Ironbridge Power Station, and on 10th there is an open meeting. On September 17 G3USF will discuss HF propagation, and on September 24 they have G2CZD to talk about home-brew testing and measuring.

On the first Tuesday of each month you can find the **Thames Valley** crowd in session at the Thames Ditton Library, Watts Road, Thames Ditton. For September there is a surplus disposal sale.

Both the September 1 and 15 dates for **Todmorden** are chat nights, with both October dates 'arranged' to balance things up. Look for them at the Queen Hotel in Todmorden.

The weekly meetings of **Torbay** vary between Thursdays and Fridays at ECC Social Club, Ringslade Road, Highweek. However there is no doubt about the next main meeting which is on October 18, for some RSGB videos. We suggest there could well be meetings in September, so you should check with the Hon. Sec. — see Panel

In the **Vale of Evesham** there is a village called Badsey, near Evesham itself, where there is a watering-hole known as the "Round of Gras"; the locals meet there on September 5 for a talk by G5UM on 'VHF Then and Now'. The informal session is on the third Thursday, and this is at "The Anchor", Fladbury.

The venue for **Verulam** is the R.A.F.A. Hq. in New Kent Road, St. Albans, where they have the second and fourth Tuesday. Details on September's events from the Hon. Sec. at the address in the Panel.

The Tuesday sessions of **Warrington** club are at the Grappenhall Community Centre, Bellhouse Lane, Grappenhall, and start at 8 p.m. September 2 is an open forum, and on 9th there is a junk sale. September 16 is a talk on home-brew test equipment, by G0CNH.

The **Welwyn-Hatfield** club is based on the Welwyn Scout Hq. in Knightsfield, Welwyn Garden City, where they can be found on September 1 and 15.

The **Wimbledon** group writes to mention their change of Hq;



they will now be at St. Andrew's Church Hall, Herbert Road, Wimbledon, London, SW19. Details of the September dates from the Hon. Sec. — see Panel.

Next we have **Wolverhampton** where G4WAS will test rigs with his 'magic box' on September 2; on 9th there will be a discussion about Discone aerials, and on 16th a committee meeting. September 23 will be a talk on aerials and feeders by G8MWR, and on 28th they have a VHF D/F event, starting from Tettenhall Rock at 11.00. September 30 is down for a night-on-the-air; and all are based on Wolverhampton Electricity Sports and Social Club, St. Marks Road, Chapel Ash, Wolverhampton.

Lancing Parish Hall, South Street, Lancing, is the Hq. of the **Worthing** group, where they foregather every Wednesday evening.

**Yeovil** have September 11 down for G3MYM's talk on the 'Transmission Equation', and on 18th he takes the stand again,

this time to discuss inductance. The matter is on September 25, and on October 2 G3MYM chairs an amateur radio quiz. Meetings are at the Recreation Centre, Chilton Grove, Yeovil.

The accent at **York** has always been been, in summer, on running special-event stations, and at the time of writing they will be at Tollerton Show signing GB2TS. Their next outing, in November, will be to a brewery but in the meantime they can be found at the United Services Club, 61 Micklegate, York, every Friday evening from 7.30.

### Finished

That's it for another month; your letters and data, newsletters and chat, should be arranged to arrive by the dates shown in the box, addressed as ever to your Club Secretary, SHORT WAVE MAGAZINE, 34 High Street, Welwyn, Herts. AL6 9EQ. Be seen' ya!

## COURSES for the R.A.E., 1986-87

- Amersham:** Amersham College, Tuesdays 7 p.m., starting Sept. 16th, tutor Mrs. Shirley Hesketh, G4HES. *Morse course:* Mondays 8 p.m., starting September 15th, beginners to advanced, tutor Ron Ray; G3NCL. Enrolment for both courses on Sept. 3rd.
- Borehamwood:** De Havilland College, Elstree Way, Borehamwood, Herts. (01-953 6024), Tuesdays 7-9 p.m., starting September 16th, enrolment Sept. 8/9 2-8 p.m., lecturer G.L. Benbow, G3HB. More information from the College.
- Brighton:** Brighton College of Technology, Pelham Street, Brighton BN1 4FA (0273-685971), commencing in September, enrolment Sept. 8/9 4-8 p.m., lecturer P. D. Simmons, G3XUS. More information from R. Bravery, G3SK1, at the College.
- Bristol:** Twyford House (West Bristol A.E. Area), High Street, Shirehampton, Bristol BS11 0DE (0272-822400), Wednesday evenings starting Oct. 1st, enrolment by post. Ring Twyford House for more details.
- Derby:** Derby College of F.E., Wilmorton, Derby DE2 8UG (0332-73012), commencing in September, enrolment Sept. 8/9th, also Advanced radio amateurs' course. For further details contact the tutor, F. Whitehead G4MLL, at the College (extn. 52).
- Fareham:** Adult Education Centre, Wickham Road, Fareham PO16 7DA (0329-280709), full course Fridays 7-9 p.m., starts Sept. 26th, short course Mondays 7-9 p.m., starts Sept. 15th. More details from the Centre, or the tutor A. S. Chester, G3CCB (0329-288139).
- Farnborough (Hants.):** Wavell School, Lynchford Road, Farnborough, starts Sept. 25th. Also Beginners' Morse starts Sept. 22nd, and Advanced Morse starts Sept. 25th. Ring 0252-540084 or 0252-518305 for details.
- Guildford:** Guildford College of Technology, Stoke Park, Guildford, Surrey GU1 1EZ (0483-31251), Monday evenings starting Sept. 15th, enrolment Sept. 8/9 2-4 p.m. and 6-8.30 p.m. For more information contact B. Purse at the College.
- London (Hendon):** Hendon College of F.E., The Burroughs, Hendon NW4 4DE (01-202 3811), enrolment Sept. 10th 2-8 p.m.
- London (Islington):** Islington Institute, Rising Hill Street, London WC2, starting Sept. 22nd 6.30-9.30 p.m., enrolment Sept. 15th from 6 p.m., tutor Brian Bond, G3ZKE. Also Morse class, Wednesdays 7-9 p.m. Ring 01-485 7065 for more details.
- London (Kingston-upon-Thames):** Kingston College of F.E., Kingston Hall Road, Kingston-upon-Thames, Mondays 7-9 p.m., commencing in September, also Morse class on Tuesday evenings, enrolment Sept. 8/9. For more information ring 01-546 2151 and ask for Paul Farmer.
- London (Paddington):** Paddington College, 25 Paddington Green, London W2 1NB. classes twice weekly starting Sept. 16th, enrolment Sept. 8/9/10 1-4 p.m. and 6-8 p.m., tutors David Peace, G4KKM, and David Hunt, G6MFR. For further details contact the College on 01-402 6221, or David Peace on 01-892 7585.
- Manchester (Stretford):** North Trafford College of F.E., Talbot Road, Stretford, Manchester (061-872 3731), commencing in September, Mon. or Tues. evening or Wed. afternoon (Theory), Tues. evening or Wed. morning (Morse), Mon. evening (Advanced Morse), enrolment Sept. 3/4/5, tutor J. Beaumont G3NGD.
- Manchester (Swinton):** Pendlebury High School, Cromwell Road, Swinton, Mondays 7.30 p.m., starting end of September, tutor P. Whatmough G4HYE. Also Morse class, Tuesdays 7.30 p.m., tutor W. Stevenson, G4KK1. Details from G4HYE (061-794 3706), or from Swinton A.E. Centre (061-794 5798).
- Princes Risborough:** Princes Risborough A.E. Centre, Thursdays 7.30 p.m., starting Sept. 25th, tutor Ron Ray G3NCL. Also Morse class, beginners to advanced, Thursdays 7.30 p.m., starting Sept. 25th, tutor Chris Norton, G0AZV. For enrolment details contact G3NCL, 21 Parish Piece, Holmer Green, High Wycombe, Bucks. HP15 6SP.
- Stockport:** Avondale Evening Centre, Edgeley, Stockport, Tuesday evenings, enrolment week commencing Sept. 15th, tutor R. Whittaker, G4WAU. More information from G4WAU on 061-427 4730, or 0663-47260 (Saturdays only).
- Stockport:** Reddish Vale Evening Centre, Reddish Vale Road, Stockport SK5 7HD (061-477 3544), Mondays 7-9 p.m., starting in September. Also Morse course, Thursdays 7-9 p.m., starting in September. Enrolment for both courses Sept. 15/16/18th 7-9 p.m. For more details contact Dave Wood at the Centre (extn. 237).
- Welwyn Garden City:** De Havilland College, Applecroft Centre, Applecroft Road, W.G.C., Herts., Thursdays 7-9 p.m., starting Sept. 18th, enrolment Sept. 8/9th 2-8 p.m. at De Havilland College Campus (0707-326318/331344).
- Canterbury:** Canterbury College of Technology, Mondays 6.30-8.30 p.m., starting Oct. 6th, fee £40.20. Morse class, Wednesdays 6.30-8.30 p.m., starting Oct. 1st, fee £22 per term. Enrolment Sept. 15th. Contact the College for further details.
- Leamington Spa:** Mid-Warks. College of F.E., Warwick New Road, Leamington Spa CV32 5JE (0926-311711), Thursday evenings, starting Sept. 11th, enrolment Sept. 1/2nd.

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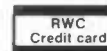
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### TRADE

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**G3LLL's September offers** (phone re: September holidays before calling) for **FT-101E/B/Mk.II**: Three WARC bands kit, £15.50; Double-balanced mixer (quieter Rx), £16.50; Spare tuning drive, 6:1 epicyclic, £4.25. **Valves**: 6JS6C, original N.E.C. matched pair, £27; 12BY7A, N.E.C., £8; 12BY7A, G.E.C., £5.50; 6146B, G.E.C., as fitted FT-901/902/101ZD/102, matched pair, £26.50 (three, £40). Black Star 600 MHz counter, £139 (super unit, send s.a.e. for leaflet). All prices include post/packing. Special offer on FT-290R, FT-757, FT-726 etc.—**Holdings/Amateur Electronics**, 45 Johnston Street, Blackburn BB2 1EF. (Tel: 0254-59595). *Access/Barclaycard.*

**Service Manuals**: most makes, models, amateur, test, televisions, vintage etc., s.a.e. with enquiries please;—**Mauritron (SWL)**, 8 Cherrytree Road, Chinnor, Oxon. OX9 4QY.

**A Guide to HF Amateur Radio Equipment**. Giving description of model, new and used prices, reviewer's test and source, modifications and source, £2.50 inc. post/packing;—**S. Foster**, 91 Copthorne Road, Leatherhead, Surrey KT22 7EF.

**October issue: due to appear on Friday, September 26th. Single copies at £1.70 post paid will be sent by first-class mail for orders received by Wednesday, September 24th, as available.**—Circulation Dept., Short Wave Magazine, 34 High Street, Welwyn, Herts. AL6 9EQ.

**Amidon toroidal cores**, ferrite rings and beads. Send s.a.e. for data and prices. Business hours: 10-5 p.m. Tues., Wed., Fri.; 10-4 p.m. Sat. — **SMC (TMP Electronics)**, Unit 27, Pinfold Workshops, Pinfold Lane, Buckley, Clwyd CH7 3PL.

### FREE READERS' ADS

*see Information Panel on page 283*

**For Sale**: ITT Creed 2300/5 teleprinter, only 200 hours use, also ITT pedestal and two line terminals, excellent condition, only £100. Can deliver southeast.—**Simon, GJ4ODX**, c/o Kendal Close, Tonbridge, Kent TN9 1LY.

**Wanted**: Codar Type 250/S AC power unit. Details and price please.—**Marris**, 35 Kingswood House, Farnham Road, Slough, Berks. SL2 1DA.

**For Sale**: Trio TR-9130 multimode mobile, mint condition, only 3 months old, £425.—**Dave, G4CGZ, QTHR.** (Tel: 01-684 7313, day).

**Wanted:** Copy of RSGB book "Amateur Radio Awards", any condition.—Hudson, 29 Priores Road, Canterbury, Kent CT2 8NX. (Tel: Canterbury 458464).

**Offering:** KW Ten-Tec Omni-C Model 228 ATU, Model 280 PSU, Model 215PC mic., Heathkit DX-40U. Offers please.—Surman, G3FPD, QTHR. (Tel: 040372-3205).

**Selling:** Three Dymar portable VHF transceivers in working order, 5 nicad batteries for above, 4-way auto charger, the lot to clear £150.—Ring Orpington 39386.

**Sale:** Type 234A mains power unit suitable for ex-R.A.F. R.1332 receiver, modified, original front panel and case, sell or exchange for anything concerning 19 Set, e.g. rotary PSU, headphones, mic, etc. Callers only, heavy item!—Heslop, 75 Alder Park, Brandon, Durham DH7 8TU.

**For Sale:** Yaesu FT-One general coverage transceiver, all factory mods. and options including FTV-107 transverter with 2m., very good condition, boxed, with mic. and manuals, £850.—Ring G4PCM, 0386-830614.

**Wanted:** Circuit diagram for Avo 8 Mk.V, copying expenses etc. paid for. Also pair of tong type valve extractors.—Marshall, GM4RKA, QTHR. (Tel: Tranent (0875) 610778).

**Silent Key Sale (G3PZP):** FR-DX400, FL-DX400, speaker, mic., £200. FT-707, very good condition, £375. TR-2300 2m. FM handheld, with nicads, charger and leads, £95. Datong FL1, £10. S.E.M. reflectometer/power meter, £10. BC-221, very good condition, with charts and mains PSU, £20.—Ring Ian, G3ROO, Dover (0304) 821588.

**Exchange or Sell:** 80-foot telescopic tower, trailer mounted, recently overhauled, exchange for 40-ft. trailer mounted, or will consider selling. (Pontefract & D.A.R.S.).—Ring Mills, G0AAO, 0977-43101.

**Selling:** Regret must sell my two Eddystone receivers, space needed so must go. Ex-govt. establishment 830/9 double-superhet, 9 bands, 0.3 to 30 MHz, 8 crystal positions, synthesiser input, RIT, with full circuit and bench manual, serviced by maker, £130. Ex-R.N. 770R Mk.II, 6 bands, 19-165 MHz, serviced, with full mods. and bench manual, £110.—Ring Moore, 0706-218290 after 7 p.m.

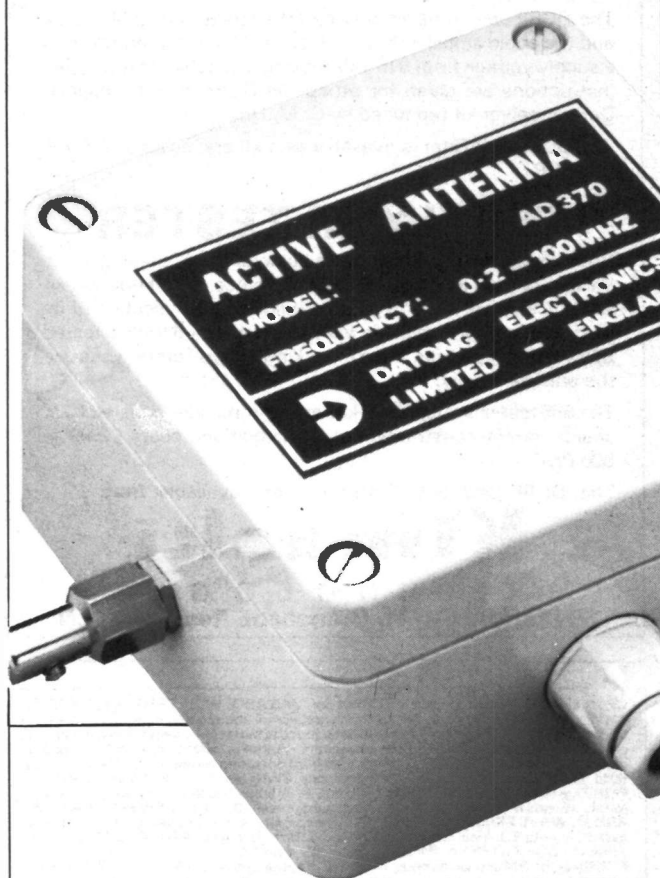
**Wanted:** AC-230X or AC-230XC power unit for Swan 350, also Swan Mk.I grounded grid linear amp. and Eddystone EC-10 handbook.—Don, G0ESR, 12 Wolverley Avenue, Wollaston, Stourbridge, West Midlands DY8 3PJ.

**Wanted:** Drake Rx and details of any video tapes on amateur radio.—Seaward, 7 St. Olaf's Road, Stratton, Bude, Cornwall EX23 9AF.

**For Sale:** "World Radio TV Handbook" 1980, '81, '82 and '83, all in very good condition, £12 the lot.—Ferne, 6 Mere Road, Oatlands Village, Weybridge, Surrey.

**Sale:** Drake TR-7 with PS-7 power supply, £600. Shure 444D, mic., £25. Kenpro KR-400 rotator, £65.—Mackinven, G4TFH, QTHR. (Tel: 01-885 1162).

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**Selling:** Mizuho KX-3 receiver ATU, 0.5 to 30 MHz, hardly used, £30. Datong AD270 active receiving antenna (head unit only, not complete system), excellent condition, £25. **Wanted:** Datong D70 Morse Tutor.—Williams, 2 Swanbourne Close, Biggleswade, Beds. SG18 8EN.

**For Sale:** Icom IC-720A, with PS-15 PSU, as new, original packing. 4CX250B (U.S.A.), QQVO6-40A, both new and unused. First sensible offer for any of the above secures.—Ring Ratcliffe, Worcester (0905) 830164.

**Wanted:** LR1 or C5, or similar, 144 MHz vertical gain colinear antenna.—Barnes, G3AOS, 3 Church View, Sutton Lane End, Macclesfield, Cheshire SK11 0DT. (Tel: 02605-2764).

**For Sale:** Icom IC-3200E 144/432 MHz mobile transceiver, £399. Icom IC-505 50 MHz transceiver, £250.—Ring Chris, G3TUX, 0428-56255 office hours.

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**For Sale:** Yaesu FRG-7700 receiver, without memory, with FRA-7700 active antenna, £320 or near offer. Heathkit SW-717 Rx, £60. Aiwa 6-band Rx, FM/LW/MW/SW, £5.—Wood, Sylvania, Enzie, Buckie, Banffshire AB5 2BN.

**Wanted:** Circuit diagram and tuning meter for Type T.1392D receiver. Also Heathkit 3395 kHz CW filter. Details and price please.—Baker, Ty-Top, Castle Caerinion, Welshpool, Powys.

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**Wanted:** "A Guide to Amateur Radio", by G3VA, 18th edition only.—Trowell, G2HKU, QTHR. (Tel: 0795-873100).

**For Sale:** Yaesu FT-221R 2m. multimode, LSB/USB/CW/AM/FM, VFO tune, mains or 13.8VDC, with mic, and handbook, £300. MET 432/17T long Yagi, new and unused, bargain £20.—Ring Hilleard, G4CQM, 01-928 5879, or Hindhead 6802.

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