45p

# The SHORT WAVE Magazine

VOL. XXXVIII DECEMBER 1980 NUMBER 10

# The IC-240 - The start of a revolution in 2 meters transceivers

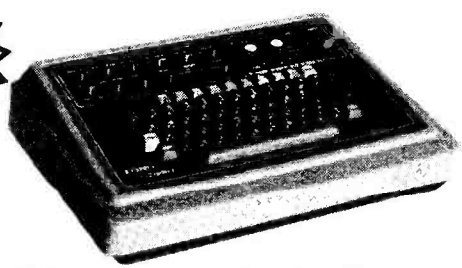
**£169** INCL.

- Easy channel selection with minimum knob twiddling – yet with all the normal FM channels available – an all important safety feature.
- A fully automatic tone burst which operates only in repeat mode with NO buttons to press either on the front or on the back of the set.
- Instant reverse repeat at the flick of a switch without any re-tuning or memory programming.
- A very sensitive receiver with a spurious response performance far better than the average and a very clean transmitter with excellent clear, crisp modulation. (We measured a sensitivity of 0.1 uv pd for 10dB sinad).

**SPECIFICATIONS**

| | | |
|---|---|---|
| GENERAL: | | |
| Semiconductor Complement: | Transistors | 34 |
| | FET | 7 |
| | IC | 13 |
| | Diodes | 33 to 128 depending on channels |
| Frequency Range (for specification) | | 144-146MHz |
| Voltage | | 13.8 VDC Negative Ground |
| Current Consumption | TX | 2.0AMP at 10W |
| | RX | 700MA at MAX Audio |
| | | 400MA Squelched |
| Size | | 58mm (h) x 156mm (w) x 218mm (d) |
| Weight | | 1.9 kilograms |
| Antennas Impedance | | 50 OHMS |
| Number of Channels | | 22 channels selected from any of the 80 channels on 25KHz spacing. |
| Frequency Control | | Stabilized Master oscillator PLL programmed by diode matrix. |
| TRANSMITTER: | | |
| Power Out | | 10 watts |
| Deviation | | 5KHz |
| Microphone Impedance | | 500 OHMS |
| Spurious Level | | Lower than -60dB below carrier |
| RECEIVER: | | |
| Modulation Acceptance | | F3 |
| Type | | Double Superhet, 1st I.F. 10.7MHz, 2nd I.F. 455kHz |
| Receiver Sensitivity | | 0.4uV or better |
| 1 Microvolt S+N/N | | 30dB or better |
| Spurious Response | | 60dB or more attenuation |
| Bandpass | | ± 7.5KHz/-6dB, ± 15KHz/-60dB |
| Squelch Sensitivity | | -8dB below 1 microvolt |
| Audio Output | | 1.5 watts or more into 8OHMS |

FOR ONLY £640.00 INCL.



# Tono Theta 7000E A great computer on offer from Thanet

The new THETA 7000E means that every Amateur can enjoy the visual display of CW, RTTY and ASCII in both transmit and receive modes. Just connect the TONO to any TV set via the antenna terminals or to a page printer from the parallel port provided. Bring up your CW speed in receiving or sending by either watching receiver sent or from recorded cassettes. Connection to the transceiver is via the key, phone and mic sockets.

Some of the Outstanding Features COMMUNICATIONS COMPUTER THETA 0-7000E 0-7000E UHF and Composite Video Output * Printer interface * Wide range of transmitting and receiving speeds – 10CW speeds + 8RTTY * Built-in demodulator for high performance for 170, 425 and 820 Hz shift * Crystal controlled modulator for ASFK – Hi or Lo tone * Convenient ASCII key arrangement * Large capacity display memory – 2 pages 32chr x 16 lines split screen for Rx & Tx if required * Automatic transmit/receive switch * Anti-noise circuit * Battery backed-up memory 7 channels of 64chrs * Send function * Buffer memory – 53 character type ahead, rub out function * Simultaneous access of the memory – 53 character type ah LF (line feed) cancel function * Cursor control function * Word mode operation * Automatic CR/LF (72, 60 or 80 chrs per line) * Echo function * Word Wrap around function * Transmit/receive in ASCII mode or RTTY * CW indentification function * Mark and break (space and break) system * Monitor circuit & CW practice function * Variable CW weights * Cross pattern checking output terminal * Log computer output provided * Test message function (Ry and QBF).

Phone or write for the price list of accessories for this unit.

## IC-202S £169 INCL.

# What a tremendous pair

The IC-202S is a very well designed 2m SSB portable. It offers: 3W pep output on USB, LSB and CW. * Large Battery capacity (HP11 type) or Nicads if you wish * A special VXO circuit to provide smooth tuning and crystal stability needed for SSB operation on 2m * Each of the four 200kHz band positions allows operation anywhere in 2m. (Supplied with 144-144.2 and 144.2-144.4) * Top of the band Oscar xtals available for "cross-pond working" * It has a DC socket and SO239 sockets for mobile or base station working, barefoot or as a prime mover * Mobile mounting brackets, Nicad packs, chargers, cases all available options. You must agree, a very versatile well proved rig.

**Their versatility is well worth an enquiry.**

## IC-402 £242 INCL.

The 70cm twin of the 202S having very similar features, covering the frequency range of 432-435.2 MHz.

**Thanet for ICOM**

# IC-255E– An experts mobile choice

for only £255 INCL.

NOW WITH IMPROVED FRONT-END

**25 Watts – 5 Memories – Scanning – 600kHz**
**AND User Selectable Repeater Shift – Full Coverage in 5kHz or 25kHz Steps.**

- Crystal controlled Tone Burst
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- Four digit LED display
- 25 Watts output or 1W low power
- A superb receiver using grounded gate FET front end
- Scanning over a user programmable range
- Memory scan
- Stop on empty or busy channels
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- 5 Memories – retained while the power is connected to the rig
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- Alternative programmable shift
- Reverse Repeater facilities
- RIT (± 3kHz for those off channel stations)
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- Good loud audio
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- Mobile mount which can be padlocked
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**CAN YOU RESIST SUCH A TEMPTATION**

# Enjoy VHF mobile at it's best-IC-260E

Replacing the IC-245E, the IC-260E offers such extras as full frequency read out, upper and lower sideband, and scanning as well as FM and CW. Thus, it makes an ideal base station, when used with a DC power supply, as well as a mobile. The use of a microprocessor instead of an LSI chip has enabled Icom to offer this at a lower price than the IC-245E.

**£399** INCL.

144MHz ALL-MODE TRANSCEIVER INCORPORATING A MICRO-COMPUTER – CPU control with Icom's original programs provides various operating capabilities. No backlash dial controlled by Icom's unique photo-chopper circuit. Band edge detector and Endless System provides out-of-band protection. No variable capacitors or dial gear, giving problem-free use. The IC-260E provides FM, USB, LSB, CW coverage in the 144-146MHz frequency range. Thus the IC-260E can be used for mobile, DX, local calls and satellite work. Easily extendable to 144-148.
MULTI PURPOSE SCANNING – Memory scan allows you to monitor three different memory channels. Program Scan provides scanning between two programmed frequencies. Adjustable scanning speed. Auto-stop stops scanning when a signal is received, in all modes.
DUAL VFO'S – Two separate VFO's can be used either independently or together for simplex operation, and any desired frequency split in duplex operation.
CONTINUOUS TUNING SYSTEM – Icom's new continuous tuning system features an LED display that follows the tuning knob movement and provides an extremely accurate readout. Frequencies are displayed in 7 LED digits representing 100MHz to 100Hz digits. When in Duplex and using the tuning-knob the two VFO's track together. Automatic recycling restarts tuning at the top of the band, i.e. 145.999.9 MHz when the dial goes below 144.000.0MHz. Recycling changes 145.999MHz to 144.000.0MHz as well. Quick tuning in 1kHz steps is available, and fine tuning in 100Hz steps in the FM mode, is provided for trouble-free QSO.
OUTSTANDING PERFORMANCE – The RF amplifier and first mixer circuits using MOS FET's and other circuits provide excellent Cross Modulation and Two Signal Selectivity characteristics. The IC-260E has excellent sensitivity demanded especially for mobile operation, high stability and with Crystal Filters having high shape factors and exceptional selectivity. The transmitter uses a balanced mixer in a single conversion system, a band pass filter and a high performance low pass filter. This system provides distortion free signals with a minimum spurious radiation level for an output of 10W or more.
ADDITIONAL CIRCUITS – The IC-260E has a built-in Noise Blanker, CW Break-in CW Monitor, APC and many other circuits for your convenience. The IC-260E has everything you need to really enjoy VHF operation, in an extremely compact rugged transceiver.

**AGENTS (PHONE FIRST – All evenings and weekends only, except Barnsley and Burnley)**

| | | | |
|---|---|---|---|
| Scotland | Jack GM8GEC (031-665-2420) | Midlands | Tony G8AVH (021-329 2305) |
| Wales | Tony GW3FKO (0874 2772) | North West | Gordon G3LEQ (Knutsford (0565) 4040) |
| Burnley | (0282 38481) | Yorkshire | Peter G3TPX (022638 2517 Evenings) (0226 5031 Day) |

# SHORT WAVE MAGAZINE


**(GB3SWM)**

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## CONTENTS




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AUTHORS' MSS

*Articles submitted for Editorial consideration must be typed double-spaced with wide margins on one side only of quarto or foolscap sheets. Photographs should be lightly identified in pencil on the back with details on a separate sheet. All drawings and diagrams should also be shown separately, and tables of values prepared in accordance with our normal setting convention — see any issue. Payment is made for all material used, and it is a condition of acceptance that full copyright passes to the Short Wave Magazine, Ltd., on publication.*


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FOR THE RADIO AMATEUR AND AMATEUR RADIO

# The SHORT-WAVE Magazine

## EDITORIAL

### Increase

The economic pressures which affect all of us mean that, regretfully, we have to announce an increase in the cover price of *Short Wave Magazine* to 50p, with effect from the January 1981 issue; direct subscription rate will be £7.50 (2nd class post). The new subscription rate takes into account increased postal charges which also come into force in January, but subscribers should note that, as always, we shall still be carrying part of the cost of posting the *Magazine* ourselves. Current subscribers will not, of course, pay the new rate until their subscription falls due for renewal. Single copies, despatched from Welwyn by first-class post, will cost 70p.

### "A Word in Edgeways"

Don't forget our new monthly letters to the Editor column — "A Word in Edgeways" — starts with the February issue, and that the deadline for your letters to arrive at the *S.W.M.* offices in Welwyn for this first airing of the column is January 2nd. We have quite a clip of letters already, but the more the merrier. So don't be shy, if you have something to say reach for your writing pad — and say it!

### Christmas

The national Christmas holiday means that the January issue is not due to appear until January 2nd.
The festive season is indeed nearly with us, and so it remains to wish all our readers and advertisers a very Happy Christmas and a peaceful and successful New Year.


*WORLD-WIDE COMMUNICATION*

# COMMUNICATION and DX NEWS

*E. P. Essery, G3KFE*

THE bands seem to have slipped a bit and winter conditions seem to be upon us — more or less coincidental with the change from Summer Time. As for the weather, any of us who were thinking of jobs on the aerial "before the gales" were looking aloft with some anxiety! On the other hand, that is not really a comment on conditions — after all, a flat band today is better than anything that one can imagine at the bottom of the 11 year sunspot cycle.

On contests, awards and similar activities, the *Verulam* contest was notified too late for us to mention it last time around, and it's too early for us to indicate the results at the time of writing!

B.A.R.T.G. have sent in data on their 1981 Spring contest which will be of interest to the RTTY chaps. It is over the weekend March 21–23, which gives you lots of time to apply for the details, log sheets and summary sheets, enclosing an envelope of size 9" x 6" either stamped for return postage or, for the overseas chaps, self-addressed and enclosing a couple of IRCs, the address to write to being Ted Double, G8CDW, 89 Linden Gardens, Enfield EN1 4DX. Completed logs to the same address, to *arrive* by May 31, 1981 to qualify for entry.

Top Band types will be interested in the ARRL 160 CW contest, over the weekend December 5–7, 2200 GMT on the Friday to 1600 on the Sunday. Exchange RST and your country or ARRL section. Contacts between people in the same country/section count two points, others five points. The multiplier comprises the number of ARRL sections, plus VE8 and the number of countries worked. Entries to be postmarked not later than December 29, addressed to ARRL Communications Dept, 160 Contest, 225 Main Street, Newington, Conn. 06111, USA. Any newcomers to Top Band DX operation should remember the split frequency scheme, whereby the Americans are listening on 1825–1830 KHz, and Europeans transmit on around 1800–1805 KHz; it should be recalled that some countries have smaller allocations than us, and it helps to note at the end of a call just where you are going to listen. KH6 stations will be on 1990–2000 KHz, and listening at the bottom of the band or, hopefully, in the "DX Window".

The ARRL Ten-Metre contest is on December 13–14, and won't be of much interest to Gs since this one is essentially the world working the Ws, and any QSO other than with a W station doesn't count.

Looking a bit further forward, in February the CWSP CW contest comes up on the first weekend, 48 hours from 0001z Saturday morning to 2359z Sunday evening. QSO same country counts one point, another country in the same continent two points and QSO's with other continents three points. The multiplier is the number of countries worked (ARRL list) plus the number of Brazilian prefixes worked. QSOs will be RST plus serial number for most; CWSP members send RST plus serial and /CSWP, and QRP stations add /power in watts (*e.g.* 579043/5). Logs to be mailed before March 15, addressed CSWP, Contest Committee, P.O. Box 15098, 01000 São Paulo, SP, Brasil. Last year no Europeans figured in the results at all, sad to say, albeit all the other continents were represented.

Next we come back to WAB, and their new Winter Activity Award. The start is December 1 and the finish midnight on the last day of February 1981. Score 1 point for the county, one for the WAB area, one point for the rateable district, and one point if the chap on the far end happens to be a WAB book-holder. A minimum of 250 points are required to apply for the award. Claim sheets ready-prepared are available from G3ABK, 11 Turpin's Chase, Welwyn AL6 0QZ, while the applications for the award should go to K. Draycott, G3UQT, 175 Oliver Road, Kirk Hallam, Ilkeston, Derbyshire DE7 4JW. *An objective of this particular exercise is to raise some money for RAIBC.* Incidentally, we forgot to mention each county, area, district and bookholder can only be claimed once for all, albeit there is no objection to working the same station again if its location changes. Any doubts will be dispelled by having a listen to the WAB nets to be heard around 7060 KHz, 3.760 KHz, and 1930 KHz.

December 14 is the date set for the R.A.F. ARS members contest, 1400–1800z, on 1.8, 3.5, 7, 144, and 432 MHz. Score four for the lower bands, five for 144 MHz and six for Seventycem contacts, between members of course.

On the first full weekend of March we see the ARRL DX Contest, Phone leg, and the third full weekend in February the CW leg. The Rules have gone back, in essence, to the 1979 format, that is W/VE stations *versus* the world. For the full details, drop us a line and we will Xerox you a copy — stamped addressed envelope please.

Now, we must turn from the contests and awards to another scene.

## DX Scene

We hear that Carl and Martha Henson, who have been in Uganda, were due to leave there on November 2 for home, and it sounds as if WB4ZNH and WN4FVU may have some interesting tales to tell of the state of that unhappy country.

If you hear of a Cocos-Keeling operation, the chances are pretty fair you'll be too late! It seems the nature of the business which will take a ham and his gear there are probably such that he won't know until the last minute whether he's going, let alone whether he'll have time to operate! A discouraging scenario for a would-be DX-petitioner. However, a listen around 1000–1200z period, for VK5QX, may at least give a little warning; the spot to look is in the region of 14195 KHz.

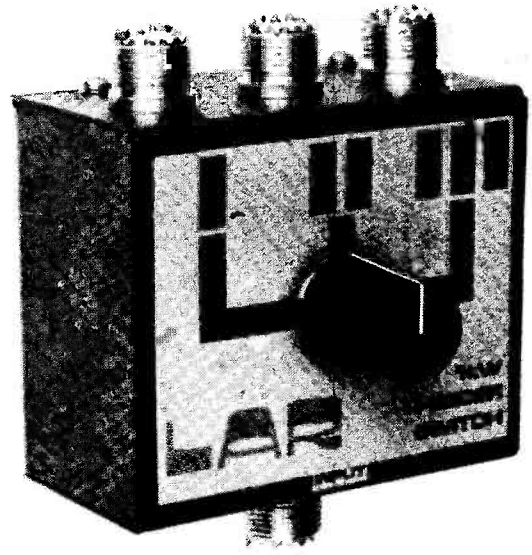
For various reasons the writer wasn't even able to listen to any of the CQ WW Phone contest, but it seems to have been quite a party, with conditions playing it very nicely, and Ten being considered the best band. If the 7 MHz signals during the contest were some of the largest ever heard in the East Coast W area, at umpteen dB over S9, they also had to contend on this side with the high noise level and some very big EU signals as well.

On a different tack, the TA stations are still out of action and the country is virtually in a state of martial law; no one should write to any TA station's address until the air clears a little is about the best advice for the moment — so if you are wanting a TA QSL you'll have to exercise your soul in patience!

During the month we hear of a possible exercise to St. Peter and St. Paul Rocks by some six PYs — but we haven't a date at the time of writing. All the above from *TDXB*.

Now to Geoff Watts' *DXNS*, and of course his very valuable Prefix List. Frankly we were astounded at the number of people who were coming to our stand at Leicester and asking, in effect, for something exactly fitting the "measurements" of the Geoff Watts' list. Look for his advertisement in any issue of *S.W.M.* and see what you are missing!

The group who recently visited BY, which included W6AM and several other well-known amateurs were reported to be preparing a write-up for *QST*. We also hear that Cheng Ping, who is ex-BY1PK and connected with CARL, has indicated that the "BY1PK" who is trailing around the bands on occasion is Phoney Phred again. In view of the upswing in BY interest, that particular Slim could be more than just a blasted nuisance . . . On the other hand, there does seem to be indications that genuine China operations may be on the cards — but to decide *when*, would require a crystal ball. It'll come, though, for sure!




**This 1 kW feeder switch is one of the latest products of LAR Modules Ltd., of Leeds. Priced at £16.95 inc. VAT, this switch features rugged construction and silver-plated contacts and connectors for RF use.**

## Top Band

First place must go to W1BB, who indicates that he is going to have to slack off a bit on his commitments, and particularly on operations at night from the W1BB/1 DX location, due to weather, vandals and the toll of age. Reading again through his *Bulletin*, Stew has still plenty of zest for things, even though he has been writing that compilation for close on fifty years! Among the interesting notes, we find a little bit of wisdom from W2EQS, at 108 countries worked and confirmed on 160 — the greatest requirement is to be on the right frequency at the right time. Too darned right, which is why DX columnists aren't often to be seen on the DX Top Band lists! On the aerials front, we hear that W8JI has worked out an arrangement of sixteen phased loops which make a receiving aerial that is just *superb* — surely there just has to be a way of getting it to take power from the transmitter.

Sadder news for Top Band is that K1PBW has taken down his aerials and moved to the city, to devote time to helping homeless and fatherless boys. All we can do is praise the idea, and hope Ernie will make of it the success he made of Top Band DX. Good luck!

Another 100 countries man is G3SZA, who has Top Band DXCC certificate number 16. He'll still have to go a long way to catch old W1BB and his 153 countries; but congratulations.

Over in the Antipodes, we hear of the death earlier in the year of VK3CZ, a keen Top-Band operator who will be much missed. However, there seems to be an upswing of activity down-under under the influence of such as VK5KL and VK5KO and VK3MR. Some twenty are in there chasing the DX, so there is a chance for some Antipodean QSOs this season. We don't forget the ZLs either, and hear that ZL3GQ will be around at the right time.

It seems almost a sense of anti-climax to turn from W1BB and the international scene of Top Band, to the more parochial activities of those of us who haven't any enormous "poke" to the signal. And here one must make the point that the old saw about not being able to work them if you can't hear them is absolutely true and always will be. For Top Band one requires, obviously, a quiet location from the point of noise from neighbourhood electrics and power lines, but also the mysterious "it" which turns an apparently nondescript spot into a real winner.

G3PKS (Wells) seems to have avoided the bandage works for the moment but fears that the pills inside him may resonate at some speed with the keying arm — dodgy, that! The main activity on 160 has been the Monday evening nets, and a few Gs on CW, plus one UA6 coming in at around 559, just in nice time for the aerial change-over relay to decide to turn up its toes. We know the feeling!

Quite a pile of signals heard and worked by G2HKU (Sheppey), with SSB to OK1KPU, YU3EF, OH0NA, PA3AJT, PA0PN, HB9H, EA1VG, EA5HM, EA8AK, DZ7YY, and OZ6XT, not to mention CW QSOs

with UA2FAL, RC2WBP, F9RO, EI9J, UA3DQS, and SP5INQ.

## Eighty

G3PKS says, regretfully, that DX for breakfast was in short supply, starvation only being avoided by lots of QRN. The odd Ws and ZLs were heard, and WB2RNT and ZL4IE worked on CW. During the day, inter-G working seemed pretty fair with less QRM than on 7 MHz.

G2HKU was CW all the way; the Big Rig connected with W4DHZ, W2BA, and W4ZMQ, while the little QRP box made it to DK8GT.

Now on to G2NJ (Peterborough). Nick worked SP1DPA/1 and enquired about the power permitted the SPs, as a result of an earlier QSO. It seems they have 750 watts input on most bands, but like us are at 10 watts for Top Band. G2NJ also noted a brace of G9 signals on 3520 KHz, testing and producing excellent signals.

Over to Dudley, where G3ZPF lurks in wait for DX on 80 once the dreaded summer-time is over. So far his lurks haven't been too successful, although a solitary UA9 was gobbled up with glee.

Nice long letters to read, from G4BUE (Upper Beeding) always contain lots of meat. Chris was at Leicester on the one day the writer was not, but it seems he and G3RJV had a meeting of the clans set up for the Thursday. The QRP club, says Chris, may well be considered to be established, with some 930 members! Chris had a real basinful in the CQ WW SSB contest; after noting the top QRP score last year was 183K, Chris got stuck in and racked up some 500K points, which now gives him something to keep crossed fingers about. Over all bands the weekend's operating collected some 89 countries in all, and Chris speculates on the possibility of a QRP DXCC in one weekend's operating. Eighty yielded GJ, GD, IS0, and LX.

## Forty

Seems to have become a favourite stamping-ground for G4ITL (Harlow) for lunch-time QSOs around Europe, although Bernard rarely omits a quick scan of Ten as well. As he remarks, it is good training in the art of operating a receiver with all those megawatts around, and it ends up with you actually liking the band!

On to G2HKU who seems to have mixed things a bit; SSB to VP5WW, FM7AV, EA8QL, then CW to OX3AX and W4ZMQ, and the tiddler rig's CW collected F6BSQ, K1MA, OR6CP, and F5IE.

At G3PKS the band was found to be quite lively most of the day for inter-G working, but with the odd sudden hiccup in which your G QSO would disappear, to be replaced by a roaring band-full of EUs, and after a few minutes all reverted to normal. Jack noticed the revival of some of that pre-war "spitch" telephony on the band, and says he thinks they are overdriven speech processors of one or another variety and their owners should have them put down! We don't *quite* go along with that, but there can be no doubt that with a compressor or clipper doing its job it should be *reducing* splatter — but if you wind up the audio output too high the result can be splatter *and* unreadability!

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**'CDXN' deadlines for the next three months—**

January issue — December 4th
February issue — January 8th
March issue — February 5th

*Please be sure to note these dates.*

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## 14 MHz

As always, this is where it all happens, albeit one must accept that in these peak years of the sunspot cycle much of the business is creamed off by 21 and 28 MHz. Right now, though, one can put the receiver on at virtually any time of day or night and find something of interest.

As an example, G4BUE, who doesn't much like SSB anyway, found EA9, KL7, FM7, HB0, UF6 and 4X4 with his five watts p.e.p. during the CQ WW SSB.

Brickbat of the month from G3ZPF goes to the W who sent him a QSL for a 1973 QSO . . . David QSL's those of special interest and new countries, so the chap must have been of some interest, but G3ZPF can't recall quite what at this distance!

Twenty for G2NJ meant, primarily, a trip to the Fens with G5NX; G5NX up front with the two-metre Phone and the steering-wheel, while G2NJ has the back seat and the Uniden rig on Twenty CW. They were parked outside a shop when an arm came through the window and the QSL of G3MLP on the end — a nice personal QSO with which to start the trip! Once they got out on to the Fen districts, G2NJ found it ideal for a radio amateur, with a far lower local noise level than, say, Peterborough, and little man-made noise. An interesting CW QSO during this trip was with SR2WI in Gdynia, running 700 watts, followed by HB9BWJ/P near Zurich, and so on and so on — leaving Nick wishing for a shack in the Fens!

A nice long chatty letter from G2HLU (Earley) says he is now pretty well mended and back to normal so long as he doesn't over-do it; but an early retirement is planned for 1982 to enable some of the more interesting facets of life to be pursued. Sounds a good idea!

On the QRP front, G4CQK (Walton-on-Thames) uses 5 watts p.e.p. *input;* on 14 MHz, QSOs included SP0ZDZ, and TA1HY — he must be pleased about the latter since the TAs are all off the air.

G3NOF (Yeovil) like so many others, has been kept off 14 MHz by the attractions of 21/28. However, Don notes the morning openings around 0730 to the West coast Ws are all but gone for this year, and the VK openings peak sharply and quickly go; but openings to the same places were noted around 1700. G3NOF made his SSB number with AH8A, FG0FIS/FS7, JAs, VKs, VK9NC, VK9CCT/VK9Y (Cocos-Keeling), W6KG/SV9 (the Yasme expedition), and ZLs.

This month has seen more activity from G2HKU, as astute observers of the scene will note already, but Ted really went to town on 14 MHz: SSB with CE3PK, ZL1VN, ZL3RS, ZL3SE, ZL3FV, and ZD7AL, while the CW brought in VK3BMJ, KL7MF, PY4ABI, K3UOC/YV4, HC2XA, UL7IBQ, PY2CQM, VK5YD, 3B8CF, 7X4BL, VE7AAR, UM8PAC, 4Z4OL, HV1CN, LU2EMK, U6JOK, CZ6AZB, UH8BD, UK0QAA, UL7BA, UA9ADY, all with the QRO, while the little rig managed to contact HH2VP, VK3BMJ, and UT5CF.

Just a few quick checks to see there was something for everyone, says G3PKS, and one QSO, with W1YC.

For G3FPK (Purley), this was the last month with the FT-707, the review (*S.W.M.*, November 1980) having been completed. However, we have an idea Norman will remain on the HF's a while yet, since he has left the aerial up and still has his good old reliable Halli-

crafters machine. Anyway, on Twenty, SSB locked on to KA6HIQ/KH3 (Johnston Is.) on the morning of October 4; for the rest it was all-CW, and FO0CT (Tahiti), UK8MAA/U8Q, U4W, 1H0FGM, FG0FIS/FS7, N4TO/KP4, XE3RT, JW0EM, HB0LL, VU2BK; and HM1EX at 2230 one evening.

## 21 MHz

Space, like darkness, closes in on us. G4BUE had a gripe about the American QRP club who moved their QSO Party on to the date occupied by the RSGB 21 MHz affair. He thought conditions were well down on last year so that he made 141 QSOs against 237 the previous year, and 35 as against 47 countries. However, after the RSGB event finished Chris hung around until the band folded about 2030; a total of 27 USA stations, with power five watts or less, including W6SKQ. Turning to the CQ WW SSB, as already noted G4BUE made a serious attempt at winning the QRP section; on 21 MHz some 50 countries were worked, including KV4, HK, C6, ZB, VP2M, 9K2, OH0, ZL, VP9, JA, KL7, and KP4. Outside contest hours, we note VP2KAQ, M1C, N4TO/KP4, ZL1AH, ZD8TC, G4CNY/VP9, ZB2EO, AL7H, KV4AA, 9J2BO, and all W call areas.

G2HLU noted that the writer has been working Novice Ws on 21 MHz at 5 w.p.m. and comments that it is a great satisfaction to let one of these have his first QSO out to DX — but they all QSL direct and few if any ever seem to have heard of IRCs!

Your old scribe has to admit that this novice working is fun, and it's about the best rate he can keep up for any long period on the old pump-handle; and of the bugs assorted in the shack none can get down slow enough! Perhaps a side-swiper of the old-fashioned variety will be the answer.

G4CQK is QRP with an Argonaut, which was enough to land HZ1HZ and OH0AM on SSB, and rather more on 28 MHz as we shall see.

Another one to remark on the slide into winter conditions is G3NOF; sadly, we did not have the usual get-together as Don was unable to get to Leicester. He made up for this by working AL7H, C31LQ, CM2RX, EA9EO, F9UW/3A, G3JKI/5A, G3AAE/VP9, G4CWS/ZB2, G4CNY/VP9, FG0FIS/FS7, H44SH, HK0FBF, J3AH, JAs, JW2CF; KC6YC, KC6ZR, both on Yap; KL7Y, TF3YH, UA1PAL, UI8PAL, VKs, VK9NC, VK9NW, VP2EA, VP5TCI, VS6CT, W6EUF/OH0, W6KG/SV9, WD6DGQ/KH6, WN4FVU/5X, XE2AQ, YB2BLI, YC2BJR, YJ8NPS, 3A2EE, 3D2FJ, 9K2EW, and 9X5MH.

On now to G2HKU, who was all-CW; the higher power netted LU9ACZ, K9EF/8R1, ZP5NW, while the little box connected to LZ1YE, WB1AOD, SV0BE, W2AXZ, W2DW, WA2GOS, and WB3BWM.

G3PKS was puzzled by JF2NX/MM near Kalimantan, as he couldn't locate it in his references. This is the Indonesian part of Borneo according to the *Penguin Dictionary of Places*.

G3FPK couldn't see much point in wasting time on 21 MHz when 28 was so good, but he did have an interesting QSO with VE8MC, Mould Bay, Prince Patrick Is. (at 76½ degrees N.) with SSB, while CW picked up FY7BY as a new one on the band, plus FP8HL and 5W1CY.

## Ten Metres

Quite handsome, at times. G3FPK notes that the new VE8AA beacon was audible at 1912 on October 2, with the digital readout saying 28.2254 MHz; this is the most northerly of all the beacons on this band. CW yielded a weirdie in YO0XPO (obviously an exhibition station of some sort), and K6KG/SV9 which last completed the set for WAE 1 on CW. On the SSB front KC6YC was a new one, A4XIU, AP2P, A9DXB, VS6CT and 6W8AR.

G3PKS says he paid a few visits hereabouts, and raised JE1DMS, KV4CI, UA0AGY, JA1AJN, JR1JML, UA9CNM who was using 5 watts into a Quad, K3BV, JA7FS, G3KGB in Taunton at S7-9 over a 25 mile path, W1VOQ, VE1AJJ, ZB2GH, and JA7AS, with the signals varying from just audible up to the S9 mark.

On we go to G2HKU, who mentions SSB with SV0AU, and CW with KV4AA, WB7OUL, K7NHV, 3B8CF, and QRP CW managed K7ABV, UA3PGO, UA3YBO, UT5YV, and UA3ABZ.

G3NOF comments on the suddenness with which winter conditions came in, along with the clock-changing routine. Thus the long-path openings to VK/JA/Pacific have been brief, around 0900, changing to short path around 1000, with the VKs peaking between 1100–1300. Ws and VEs have been in as early as 1100 and as late as 2100, with the Western Reaches best between 1530 and 1730; and a few Africans were noted in the afternoons. SSB QSOs were made with AP2ZR, C5AAP, CO2FRC, CO2OM, EA9EO, FG0DYM/FS7, FM7AV, FP8HL, G3AAE/VP9, GJ5DPY, H44SH, HS1AM1, HZ1HZ, I8GZQ/IH9, K2ON/C6A, KA5BPE/VP2A, KG6RT, KL7D, KL7Y, K7LR (Idaho), JAs, N2BA/HI8, P29NLS, PJ2CC, TA4A, TF3IRA, UI8ZAC, VKs, VS6CT, VP2VDH, VP5WW, VP9AD, W6KG/SV9, W7IAA, UA1PAL (Franz Josef Land), XE2MX, ZLs, 8P6s, 9J2BO, and K2MQ.

The QRP at G4CQK was turned to the SSB mode to work A4XIH, C5AAP, EA9EO, HR1RMG, KB6LO, UA0SKC, UI8LAG, UJ8JGJ, VE6JD, VE7TG, VK4NWM, KA5BPE/VP2A, VP8PP, G3AAE/VP9, VS6CT, and YS9RVE. On CW, just one, a QRP–QRP contact, both using Argonauts at five watts input, with WD2ABL.

During his attempt to take the world in the QRP category in the CQ WW SSB contest, G4BUE hooked some sixty countries on the band. Among the plums, contest or otherwise, all QRP, we find SSB with EA9, JA, KL7, LU, FP8, HI8, HC, YV, A4, XE, CO, C6, 8R, FM7, KV4, PJ2, PY, TF, VP2V, VP5, VP9, 4X4, 9Y4, 1S0, ZS3, ZS, and SV. The ZS3 was a new country on QRP; the favourite mode for Chris is CW, but with the above-mentioned it had to take a back seat, and Chris only keyed with KH6AQ and 5Z4YV.

Our final reporter is G3ZPF. David and his pals had a local net on 28.3 which they had to shift because of some two-metre operators who were hearing the gang on the two-metre SSB calling channel. Luckily the ten-metre lot use CW, so the VHF types didn't understand the rude remarks as they shifted 25 KHz to keep the peace. Outside the local net, Ten yielded C5AAP, OX3AI, PY5EG, CN8MC, ZP5RG, C6ANU, plus Ws and VEs, all on SSB.

## Finis

That's it for another month. Dates are in the 'box', and the address is as always "CDXN", SHORT WAVE MAGAZINE, 34 High Street, Welwyn, Herts. AL6 9EQ. Keep it going!

# THE RABBIT PATCH, PART V

## THE THIRD OF FOUR PARTS DESCRIBING THE CONSTRUCTION OF A MULTI-TEST UNIT

BY "BUCK"

WITH the meter section of the Test Unit completed we turn to the remaining sections which provide facilities for checking:—

*(i)* the serviceability and performance of Field Effect Transistors (FET).

*(ii)* the serviceability of capacitors from 2.2 picofarads up to 250 microfarads or more.

*(iii)* continuity in a manner that is both positive and safe in action.

*(iv)* the type and performance of transistors.

*(v)* the polarity and performance of diodes.

Lest it be thought that the construction of this Unit has placed overmuch emphasis upon checking and testing serviceability and performance levels the suggestion is offered that it is better to know beforehand the condition of the components we take so much trouble to include in our projects than to sweat out a fault-tracing programme when things don't turn out as expected.

### Section 'B' — Field Effect Transistor Tester

*Theory:* There are three essential elements in FET: the Source (s), the Drain (d), and the Gate (g). If a negative supply is connected to the source, and a positive supply connected to the drain, current will flow through the device. By varying the voltage applied to the gate, the drain current ($I_d$) can be varied in sympathy. Making the gate voltage ($V_g$) negative will reduce the $I_d$; and *vice versa*. The point at which the $I_d$ becomes practically zero is called the 'pinch-off region'. Similar principles apply to a dual gate FET which has two gates ($g_1$ and $g_2$). The signal normally being applied to $g_1$, with $g_2$ being used to control gain or for the oscillator input when the transistor is working as a mixer.

For the performance of a FET to be checked it is necessary to apply measured voltages to the gate and the source and then to measure the drain current that flows as the $V_g$ is varied. Fig. 13 shows the circuit of such a testing unit. VR1 and VR2 can be 500 ohm or 1 kilohm linear variable resistors, but should not be more than 1K because of the voltage drop that could be introduced by using higher values (especially in the source circuit). R1 is the limiting resistor for the light emitting diode (LED) which serves as an 'on-off' warning device. The value of R1 can be anything from about 1.5K to 2.5K. The connections for gate, source and drain are taken to three terminal posts to allow any transistor to be readily connected into circuit. Instead of this arrangement a number of different sockets could be connected in parallel to accommodate the wide range of packages in which FET's are made. The outputs of the test circuit are also taken to terminal posts to allow them to be patched into the meter section by flying leads.

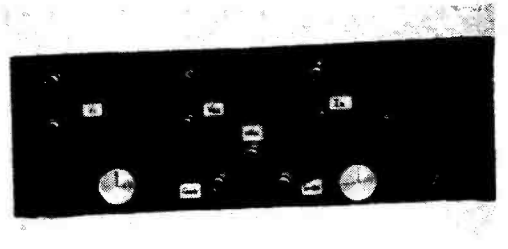


Fig. 11. Front panel showing FET section.

Fig. 12. Close-up of FET section wiring.

*Construction:* With the terminal posts, switch and variable resistors mounted on the panel the wiring is straightforward and is as shown in Fig. 14. To avoid confusion when working 'back-to-front' on the reverse side of the panel it is a wise plan to label each terminal post and connecting point with its identity before beginning to solder.

*Operation:* Flying leads are used to connect the meters to the output terminals. Meter no. 1, switched to the 0–2v. range, being connected to the $V_g$ output; meter no. 2, on the 1–0–1v. range, to $V_{gs}$; and meter no. 3 on the 10 mA range to the $I_d$ output. Connect a FET to the correct 'g', 's' and 'd' terminals and adjust $V_g$ (VR1) to read 1v. on meter no. 1. If $V_s$ (VR2) is now adjusted so that meter no. 2 reads 0v. the voltages on gate and source will be shown to be equal, *i.e.* 1 volt. This, in turn, means that the gate-voltage/source-voltage relationship ($V_{gs}$) is 0. If VR1 is now made to give less than 1 volt, the gate has been made negative relative to the source, and the drain current ($I_d$) shown by meter no. 3 will fall. Making the gate positive relative to the source by increasing the voltage reading on meter no. 1 causes the $I_d$ to rise.

As a simple indication of serviceability it is enough to establish that a variation of $V_g$ produces a variation of $I_d$. The drain current cannot be controlled by the $V_g$ if the transistor is at fault. If, however, some comparison is required between the relative merits of two or more FET's it becomes necessary to tabulate the voltage and current readings over a range of adjustments. Thus, two FET's on test might produce the following results:—

| $V_{gs}$ | $I_d$ (mA) | |
|---|---|---|
| | FET 'A' | FET 'B' |
| 0.4 negative | 1.6 | 1.9 |
| 0.2 negative | 2.2 | 2.4 |
| 0 | 2.8 | 2.7 |
| 0.2 positive | 4.0 | 3.6 |
| 0.4 positive | 4.8 | 4.2 |

In this example FET 'A' has produced a 3.2 mA swing over a $V_g$ change of 0.8 volts, whilst FET 'B' can only manage a 2.3 mA swing over the same range. Which of the two transis-

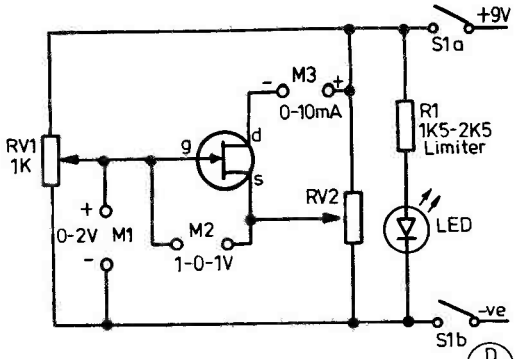



Fig.13 CIRCUIT OF F.E.T TESTER

tors is the better depends, of course, upon the use for which it is required, but the facts upon which the choice can be made are now apparent.

**Section 'C' — Capacitor and Continuity Tester**

*Theory:* If the idea of looking into the why's and wherefore's is thought to be dreary, then skip this part and move straight on to the 'Construction' bit. The thing will operate quite happily whether you know the theory or not — provided the right wire is joined to the right component as illustrated in the wiring diagrams. An oscillating circuit suitably connected to a capacitance and a resistor will oscillate at a frequency determined by the values of C and R, and the circuit is known as an 'RC Oscillator'. Given a certain value for R, changing the value of C will change the frequency of oscillation ($f_o$). In the audio frequency (AF) band this change can be presented as a few cycles per second (clicks), up to several kHz (squeals). The process in this instance is limited only by the value of R. Altering the value of R alters the range of C values that can operate.

If such a circuit is constructed having a functioning oscillator, a choice of selected resistors, and a facility that permits various capacitors to be inserted into the circuit as required, the audio output taken to a suitable speaker/phone circuit will give an indication of the serviceability of the capacitor.

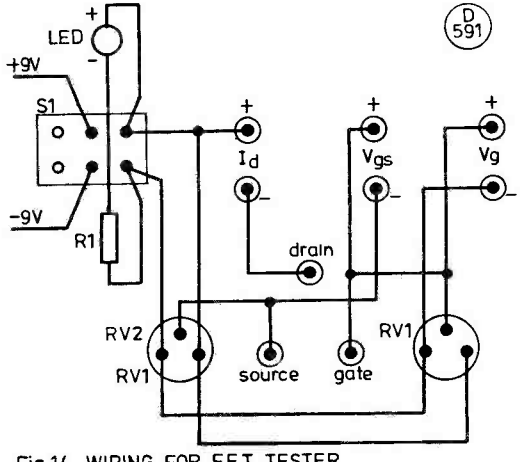



Fig.14 WIRING FOR F.E.T. TESTER

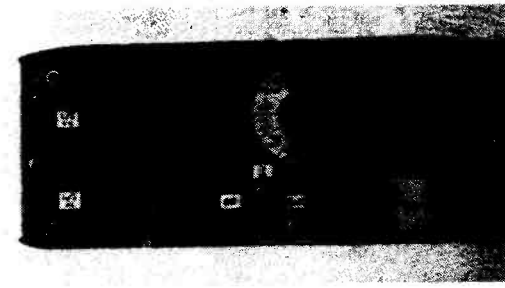


**Fig. 15. Front panel showing capacity and continuity section.**

No sound means no serviceability! Further, if such an oscillator be made having a fixed value of C and R, and a break is made in the circuit wiring, any other circuit connected between the two points of the break will allow the sound to be heard if there is continuity in the second circuit. No sound means no continuity!

*CMOS IC Basics:* As the oscillator in this section of the Test Unit, a Complementary Metal Oxide Silicon Integrated Circuit (CMOS IC) can be used — which despite its grandiloquent name only costs around 20p. "Complementary" because a PNP and a NPN transistor are used to obtain a push-pull output from a common signal input; "metal oxide silicon" because this material is used in the manufacturing process; and an "integrated circuit" because it is a combination of the equivalent of a number of separate (discrete) components — in this case transistors and diodes — that have been made into one miniature device.

The CMOS IC used here is one of the simplest — an inverter. So-called because it is designed to give an output state that is the opposite to its input state; simple, because only two active components are employed. In addition to the main components some diodes are incorporated as a safety measure designed to limit input voltages to a safe level, and to protect the device from the destructive effects of external static charges; so fingers should be kept away from the

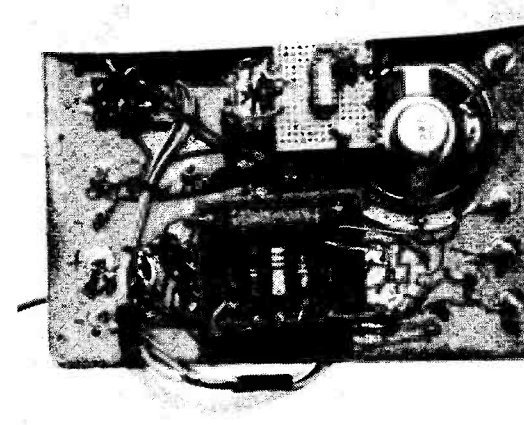


**Fig. 16. Close-up of the capacity and continuity section, and the transistor section wiring.**

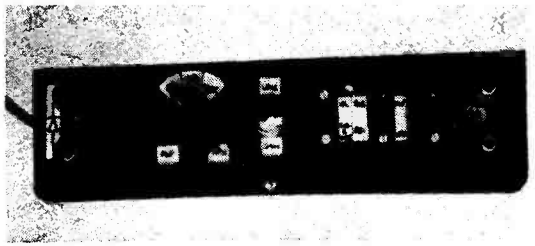


**Fig. 17. Front panel showing transistor section.**

contact pins — just in case. The two main components of the inverter are Insulated Gate Field Effect Transistors (IGFET's), one being a P-Channel and the other an N-Channel; a diagram of these IGFET's is given in Fig. 18 (the diodes being omitted for clarity). The inverter is really a switching device in which the input can be held in either one of two states: a high state when the input is at, or near, the positive supply level, and a low state when the input is at, or near, the negative supply level. The output state can be either high or low, but will always be the opposite (inverted) to that of the input.

When the gate of the IGFET is at a voltage that is roughly equal to that of the source-voltage there is a high drain to source resistance (some thousands of megohms), and practically no current will flow. If the gate is now forward biased (*i.e.* made more positive in the case of the P-Channel IGFET, or more negative in the case of the N-Channel IGFET), the drain to source resistance will fall to a few hundred ohms and current will flow. In Fig. 18 the transistors act as single-pole, single-throw (SPST) switches because when the input is low TR1 is turned on, and TR2 is turned off and the output is in the high state; when the input is high the position is reversed.

The current consumed by the device is mainly affected by the number of times per second that the switches are operated — the faster the change-rate the higher the consumption, until at high frequencies the current can reach many milliamperes per unit. The CMOS IC used in the Tester, although not precisely identical to the type described above, has the same characteristics. First preference goes to a 4011, which is a 'Quad two input NAND gate'. Second choice is a 4001, which is a 'Quad two input NOR gate'. In either case, four inverters can be made from each device and

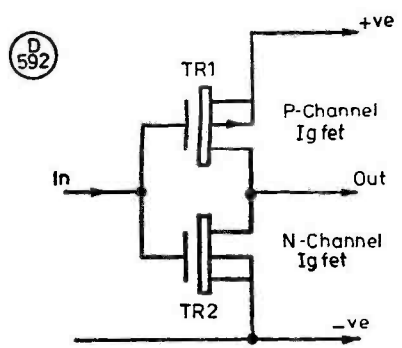



Fig.18 BASIC CIRCUIT OF A CMOS INVERTER

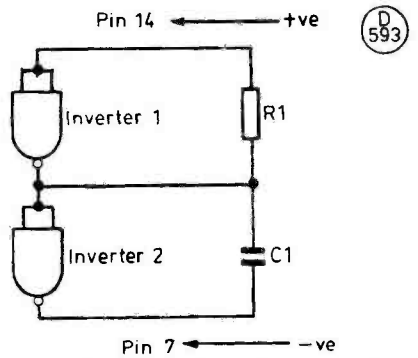



Fig. 19 CIRCUIT OF AN ASTABLE MULTIVIBRATOR

the inputs to each inverter will be connected in parallel when used in this circuit.

*Oscillator Design:* The oscillators are astable multivibrators, which is a compressed way of saying that each circuit will have two stages (inverters), the output of each stage being coupled to the intake of the other and operating at a frequency self-determined by the values of the circuit constants and not by any external 'trigger' source. Fig. 19 shows the circuit of such an arrangement in general terms.

When the supply voltage is connected between pins 7 and 14 of the IC one of the gates will go to the high state, and one to the low state. Which stage does what is unpredictable as it depends upon the characteristics of the two gates concerned. Let us suppose that, when the supply is switched on, the output from inverter no. 1 has gone high, and that from inverter no. 2 has gone low. C1 will charge up *via* R1 from the high output of no. 1; the values of C1 and R1 will determine the length of time taken to raise the voltage of C1 (and thus increasing the input to no. 1), until it reaches transfer voltage level. At this point no. 1 output will switch from high to low, driving no. 2 input low and causing no. 2 output to switch from low to high; whereupon C1 is discharged into the inverters and begins to charge up from the low (negative) output from no. 1. When the transfer voltage level is reached the process repeats itself and the circuit condition returns to the original state. Thus the circuit will continue to oscillate at an $f_o$ determined by the time constants of C1, R1, all the time the supply voltage remains connected.

Which is about as far as we need go in plodding through the fields of theory for the time being and we can push on with the building details.

*Construction:* A close-up view of this Section is given in Fig. 15. While most of the wiring can be done between the components mounted on the panel, there is a need to provide a sub-chassis mounting to carry C1, R6, the transistor BC108, and the CMOS IC; this is shown in the top half of Fig. 16, and has a single stand-off mounting similar to those employed in the meter section. Circuit details are given in Fig. 20 which also shows the pinning of the 4011 IC (the 4001 is identical), and the physical wiring shown in Fig. 21. The sub-chassis can be made from copper-stripped *Veroboard* (15 rows of 14 holes); or from a piece of insulating material about 45 mm. square and 3 mm. thick. If *Veroboard* is used the continuity of the copper strips must be breached between the IC contacts and around the securing screw as shown in Fig. 21.

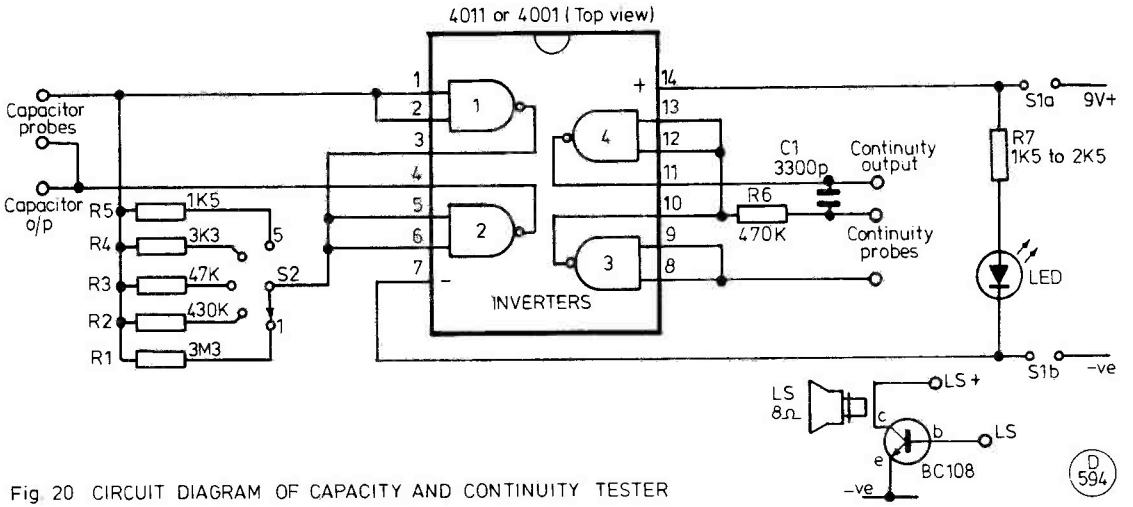



Fig. 20 CIRCUIT DIAGRAM OF CAPACITY AND CONTINUITY TESTER

On the other hand, if plain board is used some of the contact points must be joined by tinned copper connecting wire under the board as shown by dotted lines in Fig. 21. In both cases there are strapping connections to be made with insulated single strand wire on the component side of the board. These straps are to be made between: E6 and E9 (K5 and K8), D10 and D14 (L1 and L7).

The following components are mounted, end-on, on the sub-chassis: C1 (3300 pF) between J1 and J3, R6 (470K) between M3 and M5.

The four pairs of input pins on the IC (pins 1 and 2, 5 and 6, 8 and 9, 12 and 13) are joined by soldering on the underside of the sub-chassis. Despite the provision of an internal protective diode system IC's can be damaged by accidentally applied static voltages; as can excessive heat if a soldering iron is carelessly applied to the pins. To minimise the possibility of disaster a 14-pin DIL (Dual-in-Line) socket is used which enables the circuit to be completed and soldered before the IC is introduced. Until the IC is put into the socket it should be kept in the protective foil or conductive foam in which it was supplied.

*to be continued*

# ANOTHER MODIFICATION FOR THE FRG-7 RECEIVER

## REPLACING THE BFO WITH A CRYSTAL OSCILLATOR

IAN KEYSER, G3ROO

AFTER completing the conversion of my FRG-7 receiver to a transceiver (*Short Wave Magazine*, June 1980), it was found that there was a rather annoying warm-up drift of the LC BFO. This was traced to core heating of the BFO coil, so little could be done other than to replace the coil. Therefore it was decided that the BFO must be replaced by a crystal oscillator.

Firstly, an idea was hatched using the existing components but, although possible, it required rather awkward switching for the crystals. The next idea was to remove the components from the board and mount a new board vertically at that position, but after further investigation it was feared that the stray injection into the IF strip might be too high. The only other alternative was to use a separate board.

To determine optimum frequencies for the CIO (carrier injection oscillator) a sked was arranged with G2ACG, and with a counter clipped to the BFO the frequency of the BFO was adjusted for optimum audio for both USB and LSB. In this case, as luck would have it, they were 455 and 452 kHz — requiring only one crystal to be cut, the other being "off the shelf".

### Circuit Requirements

These were fairly simple, there had to be at least two outputs with an amplitude of half a volt r.m.s., one for the product detector and balanced modulator, and the other for a digital dial. The crystal switching had to be "one line" to be compatible with the existing wiring; thirdly, the circuit had to be "sure fire" on the existing 12v. supply.

The circuit, Fig. 1, is fairly straightforward: TR2 is a conventional oscillator, but using diode switches. The cathodes of the diodes are taken "low" for the associated crystal to be switched into circuit. TR3 is a simple DC coupled amplifier to bring the output up to the required level and the emitter, being un-decoupled, is used for the output for the digital dial. (Full details of this are published in the G-QRP Club journal, *Sprat*). TR1 is used as an inverter to enable single-line switching to change from USB to LSB.

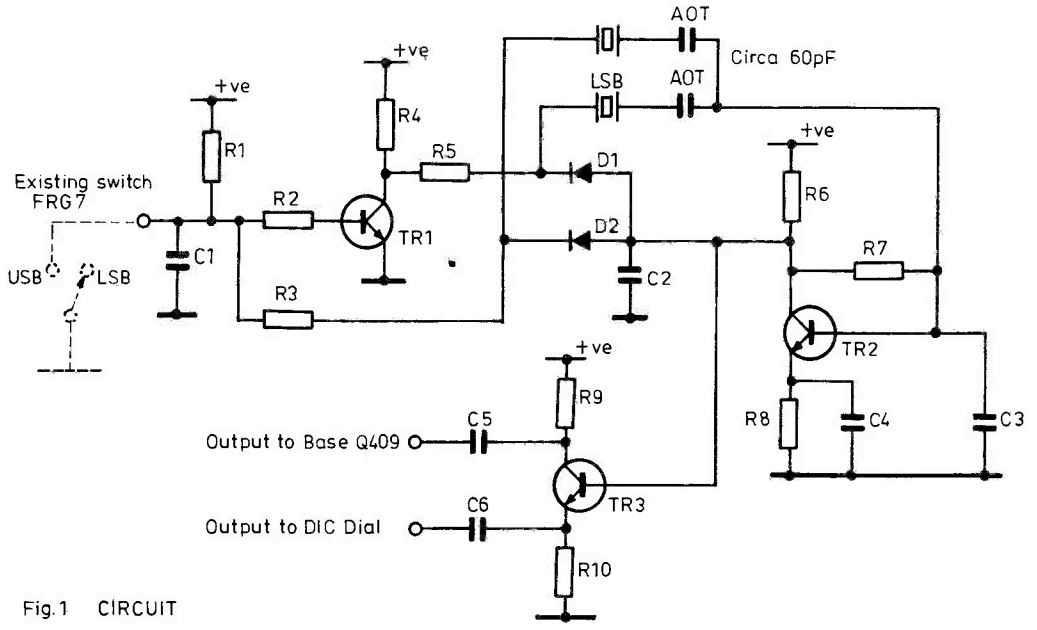



Fig. 1 CIRCUIT

**Table of Values**
**Fig. 1**

| | |
|---|---|
| R1 = 6K8 | R10 = 100R |
| R2, R6 = 47K | C1, C4, |
| R3, R5 = 22K | C5, C6 = 0.01 μF d/ceramic |
| R4 = 8K2 | C2, C3 = 130 pF, poly |
| R7 = 1M | TR1, TR2, TR3 = BC109 |
| R8 = 3K3 | D1, D2 = 1N914 |
| R9 = 1K | Xtals = to suit filter |

**Note:** all resistors are ¼-watt.

## Construction

The board was mounted on the rear right-hand side of the chassis, the battery box already having been removed during the conversion to transceiver. Insulation proved to be very simple: TC404 was removed and this point used for picking up the switching line; Q408, C435 and T406 were removed and the signal fed in the hole where the drain, Q408, was connected.

It is now possible to go on the air without waiting for the set to warm-up, and gone are the days of reports of "toppy" audio!

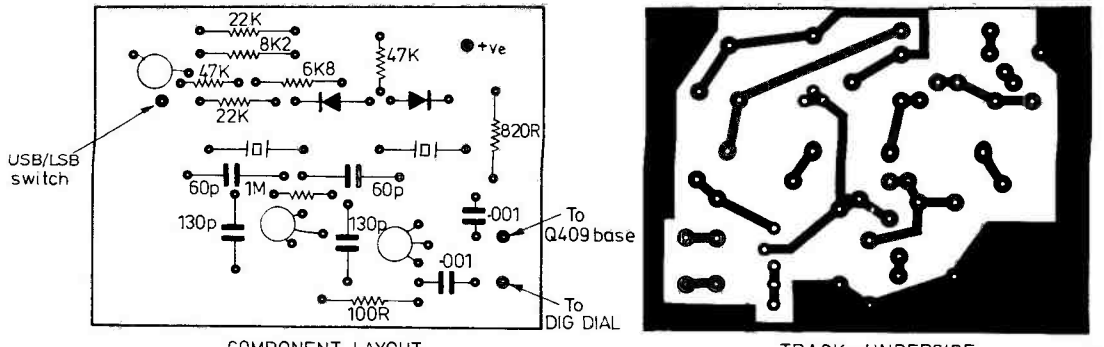



Fig. 2 FRG7 C.I.O PRINTED CIRCUIT

# SEMI-FOLDED DIPOLE

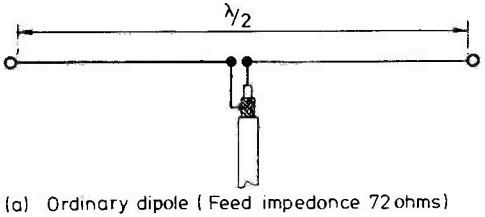
IAN H. MOTH, G8SOH

IT is said that there are only two types of antenna, the "Hertz" and the "Marconi" — all other types being variations on a theme. The antenna described here is a very slight variation on Hertz's simple dipole, but the effects are rather puzzling and should be of interest to the experimenter.

As every successful RAE candidate knows, a simple dipole, Fig. 1a, possesses a resonance according to its length, and such an antenna may be tuned by gradually clipping off the ends until the measured SWR bottoms-out at the required frequency. This is generally sufficient, but in the vast majority of cases there will remain a certain, small amount of mismatch. This arises because the impedance at the centre of such an antenna (assuming it is erected well clear of the ground and surrounding objects) will be 72 ohms, while the amateur will have almost certainly standardised on a 50-ohm system.

## Alteration of 1st Mode Impedance

The aforementioned successful RAE candidate may also know that the feed impedance of a dipole increases four-fold if the elements are folded over as in Fig. 1b. Folded dipoles like this, manufactured from 300-ohm ribbon cable, make a convenient, simple antenna for domestic VHF receivers with a 300-ohm nominal input. What is not so well known is that any feed impedance can be obtained by intermediate folded elements. Fig. 2 shows a 50-ohm dipole, the measurements (mm) corresponding to the author's prototype designed for 145 MHz. Initial work was conducted at 630 MHz (using non-radiative methods, it is hastened to add) and the result scaled up, which indicated that antennas for different frequencies may be scaled *pro rata* for first approximation to better than 5%.




(a) Ordinary dipole (Feed impedance 72 ohms)

(b) Folded dipole (Feed impedance 300Ω nominal)

Fig. 1 D 587

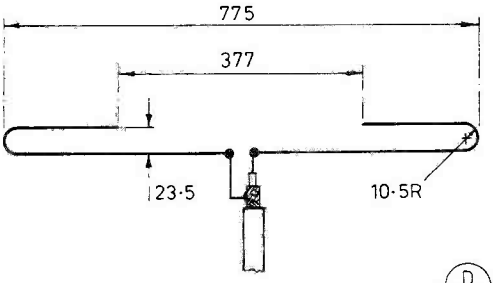



Fig. 2 Semi Folded Dipole (Feed impedance 50Ω) D 588

## Construction

The author's 2m dipole was made from aluminium wire of about 3mm diameter. If hollow tubing is used, the decreased velocity factor will entail some shortening. An inherent difficulty with this antenna is that it is not easily adjusted during the tune up, except for "fine tuning", where the resonant frequency may be lowered by opening out the fold-overs, and *vice versa*. It is suggested that copper wire, perhaps offcuts from domestic house wiring "twin core and earth" be used for experimentation, as it is easier to bend, cut and solder bits back on to, than more brittle materials. Final manufacture should be on some kind of former, which need be no more than an off-cut of wood with a large peg at one end and a small one at the other. The centre connector used by the author was cannibalised from an "Aerialite" UHF TV antenna, which provided a convenient, waterproof and professional finish. Constructors without cast-off domestic antennas may care to adopt the suggestion in Fig. 3, where the elements are secured in a wood block with small woodscrews, and the cable attached with the aid of solder tags. Waterproofing may be effected by a liberal application of bath sealant or similar material.

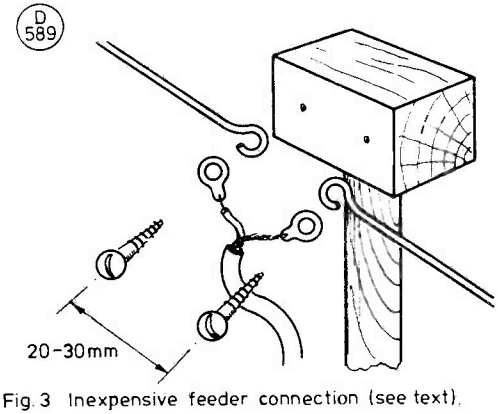



Fig. 3 Inexpensive feeder connection (see text).

When tuned to 145 MHz, the author's prototype showed a match corresponding to an SWR of better than 1.05:1.

*Acknowledgement*

The author is indebted to Mr. D. A. Staniland for advice and theoretical guidance.

# CLUBS ROUNDUP

## By "Club Secretary"

THIS piece is written in the run-up to 'Leicester', and doubtless by the time is is read your scribe will have met many "Hon. Secs." at the stand — these personal contacts are most interesting for the writer, the more so when it is a first meeting after years of seeing the same handwriting regularly, and one can then put a face to a name and a club.

For ourselves, a new way of missing a club meeting has been found: cut it till the last minute before leaving home, and find the car won't start! So, you Hon. Secs, who complain about the stay-at-homes, here is another valid reason.

### Obituary

The Hon. Sec. of IRTS writes sadly to tell us of the death of EI3Z, Patrick Conway. To the EIs, EI3Z was one of the best known and liked, as for some twelve years he read the weekly IRTS News Bulletin on Sunday at noon. Apart from this aspect of the hobby, Pat was interested in the earlier years of radio, and was known also as a knowledgeable chap on many other subjects. He is very much missed by the EI amateurs, who have already sent their condolences to his wife Cathleen. To theirs, we would add our own. *Vale* EI3Z.

### The Mail

Again we will be using alphabetical order, save that the few who come in at the last moment will be in a separate bunch.

So, off we go with **Axe Vale** who seem to like their new home in the Adam room, George Hotel, Axminster. They are at the Hq on December 3, when G3ECH will be the speaker — they reckon things are really looking up for the club now.

**B.A.T.C.** is the group to belong to if you are into amateur television. They have a regular newsletter, with much of interest to the amateur TV enthusiast, and a well-organised sales set-up to cover many of the specialist items required for TV transmission.

**Bournemouth** have a new Hon. Sec. — *see* panel for his address. The meetings are still at the Dolphin Hotel, Holdenhurst Road, Bournemouth on the first and third Fridays of the month.

On to **Brighton:** December 3 is given over to a film night at 47 Cromwell Road, Hove. The general arrangement is to foregather on alternate Wednesdays at this address.

Hq for **Bury** is the Mosses Community Centre, Cecil Street, and on December 9 they have the AGM. This is not to say they are a monthly-meeting group: they have informals on every Tuesday evening.

**Cheltenham** are based on the Old Bakery, Chester Walk, Clarence Street, where they have the AGM on December 4, with a natter session on December 19 which will be a Christmas get-together.

It is a Members Evening at **Crawley** on December 10, with the venue being the usual Trinity United Reformed Church Hall in Ifield.

Down west next to **Cornish** where we find their normal venue to be the SWEB Clubroom, Pool, Camborne on the first Thursday of each month; we do not at the time of writing have the programme, but they never miss — always something going on.

Next we turn to **Cray Valley** where they have the first Thursday in the month at Christchurch Centre, High Street, Eltham, London S.E.9. This gives the date as December 4, and doubtless the Hon. Sec. — *see* Panel — will be only too pleased to tell you what's on.

December 20 is down for **Crystal Palace's** Film Show and Christmas Party, at Emmanuel Church Hall, Barry Road, London S.E.22.

Our next stop is with **Dartford Heath D/F,** who are now ten years old; as far as we can recall they have always used the same Hq, namely the Scout House, Broomhill Road, Dartford, Kent. For December we see they have a club hunt on December 14, and an Extra-ordinary General Meeting at the "Horse and Groom" public house, starting at 2000 on December 16.

At **Derby** they have their own rooms at the top floor of the Oddfellows Hall, 119 Green Lane, Derby. December 3 is a Junk Sale, while the Constructors Contest is on 10th. The Christmas party is on December 17, and the Christmas Eve date is scrubbed in favour of "turkey-stuffing at home" (!). However, they are back together again on December 31 with a natter-nite at Hq.

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

*January issue — November 28th*
February issue — January 2nd
March issue — January 30th
April issue — February 27th

*Please be sure to note these dates!*

Back to the south coast again, this time to **Dover,** where they have a natter session on December 3, and a Technical Talk-in on 10th; the venue is the YMCA, Godmyre Road, Dover, and the club station G3YMD monitors S20 and GB3KR for anyone requiring talk-in facilities.

For **Dudley** we have to refer you to the Hon. Sec. as the newsletter currently to hand doesn't say where or when — his details are in the Panel.

One of the few GM clubs to report in is the **Dumfries and Galloway** gang who are based on the Cargenholm Hotel, New Abbey Road, Dumfries, on the first and third Mondays of each month. That gives us December 1 for the Christmas Social, and the AGM on December 15 — the most important date of any club's year.

Now we have covered G and GM, we go over the water to **East Antrim,** a recently formed group who are still on the lookout for more members — find the club at Carntall Hall, near Mossley, at 2000 on the second Tuesday of each month — the Hon. Sec.'s name and address are to be found in the Panel. We make the reference to him because we notice in the programme we have that they may have the December 9 meeting, which will be the Armagh tape-and-slide show, and a Christmas party, at Whitley's Bar.

**East London RSGB** group are one of the few who use Sunday afternoons — so look for them at Wanstead House, 21 The Green, Wanstead, E.11, on December 21 for the

Annual Business Meeting and Junk Sale. The start time is 1500.

For **Edgware**, December 11 is down for a Junk Sale, at Hq in Watling Community Centre, 145 Orange Hill Road, Edgware. We can understand the December 25 date being scrubbed — a Christmas Day meeting wouldn't be popular with the XYLs and harmonics! On a totally different tack, Edgware members were saddened indeed to hear of the sudden death of Doug Findlay, DFC, G3BZG, who, apart from being a stalwart in the local sense, was also very much in the picture nationally in the years after the war; he was RSGB President in 1957.

North again, up to **Edinburgh**, where they continue to use Calton Hill Observatory as their Hq, at 8 p.m. every Tuesday evening, with the exception of Christmas and the New Year. Details from the Hon. Sec. — *see* Panel.

In **Exeter** they have had an AGM, and a change-around of officers, at the Community Centre, St. Davids Hill, Exeter — but we guess the PRO, whose address appears in the Panel for the moment, will be only too pleased to answer any questions about the new year's meetings; but we'd like the name and address of the Hon. Sec. for the records, please!

The name of the **Ex-G Club** is, we suppose, self-explanatory: for radio amateurs born in the UK and currently domiciled abroad. Contact is maintained with the UK by way of regular nets, and they have a most interesting newsletter — the current one has a delightful tale of skullduggery in the Isle of Wight, culled from the Isle of Wight *Weekly Post* of January 8 last. Details from the UK Hon. Sec., at the address in the Panel.

The **G-QRP Club** is very definitely becoming an international affair, and they now have in excess of 900 members.

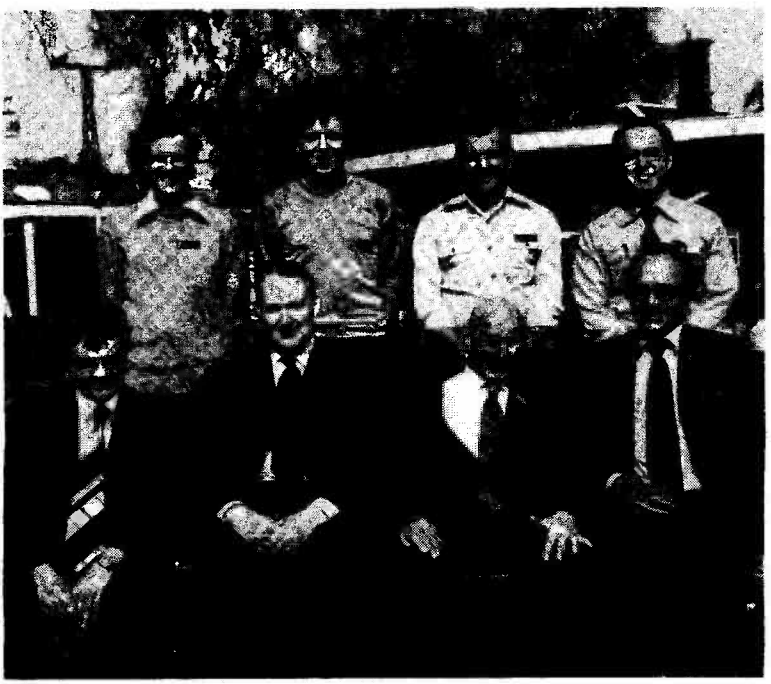
Looking at the **Guildford** newsletter, we note they have a Vintage Wireless and OT's night on December 12; and against December 26, the legend "shall we or shan't we" has been deleted and the word "social" written. Hq of course is the Model Engineers Hq in Stoke Park.

It must be nearly twenty years ago that the late G6QB Howard Thomas, told the writer about the closing-down of the Hastings club, and it is therefore a great pleasure indeed to hear that once again **Hastings** are an active and thriving group. They have the third Wednesday in each month, at West Hill Community Centre, Croft Road, in Hastings, while the informals are held in the club's own place at 479 Bexhill Road, St. Leonards. More details from the Hon. Sec. (*see* Panel) about the various activities there.

Next we have the familiar look of the **Hereford** newsletter, from which we gather they have made a decision to have one formal and one informal meeting in each month; thus December 5 is "To Be Arranged" and on 19th there will be a Christmas Quiz (and, we suspect, some hilarity too!). The venue, of course, is the County Control Civil Defence Hq, Gaol Street, Hereford.

The Hon. Sec. of the **Ipswich** group writes to tell us that their problems over Hq have been solved by a move from the beginning of January to a separate clubroom at the "Rose and Crown", Norwich Road, Ipswich; it should be noted that the separate clubroom means the youngsters will be still welcome. So what about December? We suggest you contact the Hon. Sec. — *see* Panel for his address. We might also note that from the start in the new Hq they will be booked in on the second and last Wednesdays of each month — with the informals, Morse classes and so forth, still at the Handford House in Ranelagh Road, during school term-times.

It seems hardly a day since EI2DW, Karen, took over the editing of **IRTS** Newsletter, and now we find we have just read her last compilation — a pity, and the new editor will have something to live up to. We also noted that the Hon. Sec. has grown himself a callsign — congratulations! Now, of course, we come to the hard bit, because we pass any



**A hark-back to summer: some of the RAFARS members at the 1980 Drayton Rally. Top row, left to right: G4EJU, G4DYP, G4AYD and G4AJD; bottom row left to right: G3DCG, G3ZZR, G2FIX and G4DEW.**

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

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G-QRP: Rev. G. C. Dobbs, G3RJV, 17 Aspen Drive, Chelmsley Wood, Birmingham B37. *(021-770 5918)*
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LIVERPOOL: R. Simmons, G3PNS, 62 Daneville Road, Liverpool L4 9RG.
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MID-LANARK: D. Smillie, GM4FKD, 27 Easter Crescent, Cambus Court, Wishaw, Lanarkshire.
MILTON KEYNES: W. Backhouse, G4HZI, 46 Tattenhoe Lane, Bletchley, Milton Keynes, Bucks. *(Milton Keynes 77479)*
NORTHERN HEIGHTS: M. Topham, G8NUC, 1200 Great Horton Road, Bradford. *(73271)*
NOTTINGHAM: M. C. Shaw, G4EKW, 50 White Road, Nottingham NG5 1JR.
R.A.I.B.C.: Mrs. F. Woolley, G3LWY, 9 Rannoch Court, Adelaide Road, Surbiton KT6 4TE.
REIGATE: Dr. J. S. Roberts, G8FDJ, 15 Bakehouse Road, off Horley Row, Horley, Surrey.
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SOUTH DORSET: R. Cridland, G3ZGP, 13 Clarendon Avenue, Redlands, Weymouth. *(Upwey 812893)*
SOUTHGATE: J. Fitch, G8EWG, 16 Kent Drive, Cockfosters, EN4 0AP. *(01-440 7353)*
STEVENAGE: E. Godfrey, 94 Common View, Letchworth. *(Letchworth 72184)*
SURREY: R. Howells, G4FFY, 7 Betchworth Close, Sutton, Surrey SM1 4NR. *(01-642 9871)*
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WEST KENT: B. P. Castle, G4DYF, 6 Pinewood Avenue, Sevenoaks, Kent. *(Sevenoaks 56708)*
WIRRAL: G. O'Keefe-Wilson, G8VPF, 20 South Drive, Upton, Wirral. *(051-677 1531)*
WISBECH: D. Dunn, G8RZN, Five Bells, Parson Drove, Wisbech, Cambs.
WORCESTER: M. Tittensor, G4EKG, 16 Durcott Road, Evesham, Worcs. WR11 6EQ. *(0386 41105)*
YEOVIL: D. L. McLean, G3NOF, 9 Cedar Grove, Yeovil, Somerset.

enquiries about amateur radio in E1 on to him — *see* the Panel for his address.

On the **Isle of Wight,** the locals are to be found in Unity Hall, Wootton Bridge (which is near the Sloop Inn) on every Friday evening.

Further afield yet now, to **Jersey,** where they are comfortably set up in the Communicare Centre, St. Brelade. They can be found here on the second Wednesday in each month, albeit at the moment of writing we don't have any idea of the latest programme details.

At **Kidderminster** they foregather fortnightly on Tuesdays at Aggborough Community Centre, Hoo Road, which is near the College of Further Education and adjacent to the Harriers Football ground. December 9 is down for a talk on Raynet by G8ASO, and on December 23, not surprisingly, the meeting is scrubbed. They don't say so, but it seems the Monday dates have disappeared from the programme, but a call to the Hon. Sec. would no doubt resolve that question. They do, however, have a social evening on December 20 at the "Fox" in Chaddesley Corbett. We might add that the membership of this club is increasing at a truly surprising rate.

**Liverpool** are so certain we can recognise them that they refer to themselves only as "L. & D ARS" — luckily we know enough about what's where in that great city and were able to identify. They live in the Conservative Association rooms, in Church Road, Wavertree, and on December 2 G8NNX will be talking about Computers, while on 9th G3PFZ will be talking about RTTY with particular reference to the Creed 7E 'printer — so watch where you put your feet! (Some of the bits are small and sharp!) December 16 is a Get Together B.Y.O.B. — doubtless the regulars can translate, but for any newcomers we suggest a call to the Hon. Sec. for details; he is in the Panel.

Earlier this year, enthusiasts for our hobby in GW formed the **Meirion** group, based on Dolgellau, at the Ship Hotel on the first Thursday of each month, and covering a quite enormous area. For details, contact the Hon. Sec. at the address in the Panel.

December 19 is the date to set aside for a visit to **Melton Mowbray** club, with a Junk Sale to be followed by the formal matter of the presentation of the G3FDF Trophy. They get together at the St. John Ambulance Hall, Asfordby Hill, Melton Mowbray.

Up to **Mid-Lanark,** at Wrangholm Hall Community Centre, Jerviston Street, New Stevenson, Motherwell; December 5 is a Bring-Buy-Swap night, and on 19th there will be some films to be watched.

**Midland** seem to be making fine progress with their new home in Broad Street, but they seem to have no data as to where they are having their formal meetings meantime; we suspect the University of Aston, but we must refer you to the Hon. Sec. — *see* Panel.

Now to **Milton Keynes**, where they are based on the Lovatt Hall, Silver Street, Newport Pagnell, on the second Monday of the month.

At **Northern Heights** they have taken up the space normally given over to programme arrangements in favour of a full print of W1BB's letter reacting to the news of the death of G3MDW, who despite disability was both a fine club man, and a good business man too. Turning to our cards, we find the venue to be the Bradshaw Tavern, every Wednesday evening, this is at Grid Ref: 303083, and Halifax buses 3 and 26 pass the door.

On to **Nottingham** and Sherwood Community Association, Woodthorpe House, Mansfield Road, Sherwood, Nottingham. December 4 is down for a Forum, while on 11th they have a talk on aerials by G. Dover, G4AFJ: then on December 18 there will be a Christmas Quiz. All kick off at 7.30.

Pressing on regardless, we come to **RAIBC**, who are themselves pressing on regardless in their aim of helping all the blind or invalid types become SWLs or even licensed amateurs. Details from the Hon. Sec. — and how about your club or you yourself doing something to help?

**Reigate** seem to have a problem in getting a replacement editor for their newsletter — we hope it will have been sorted out by the time this comes to be read. They have Hq in the Upstairs Meeting Room, Conservative and Constitutional Club, Warwick Road, Redhill, on the third Tuesday of every month. This gives December 16, for a Constructional Contest.

The **Royal Navy** is a club name that explains itself! Members are drawn from past and present RN or reserves, and from the Merchant or foreign navies – details from the Hon. Sec., at the address in the Panel.

A new meeting place is the prime need for **South Dorset**, or at least it was when they wrote. This being the case, a call to the Hon. Sec. — *see* Panel — might be a good idea before rushing off to the old venue!

It is the second Thursday in each month which is booked at the Scout Hut, Wilson Street, Winchmore Hill, by the **Southgate** crew. Everyone is most welcome to the December meeting — it's the AGM!

Over the years the writer has been a member of many clubs, and he was at Southgate a quarter-century ago; a few years later he found himself at **Stevenage** and again joined the club. Both, be it noted, survived! Seriously, the Stevenage group is going now better than ever, and for December they have a talk on Hospital Radio on 4th, with the Annual Dinner at the Broadway Hotel in Letchworth; that leaves the 18th for a nice quiet old natter session.

A change of dates must be noted for **Surrey**, where they have moved from Wednesdays to Mondays to avoid a clash with the cadets' band-practice and the consequent QRM. So from now on it's the first and third Mondays at *T.S. Terra Nova*, 34 The Waldrons, Croydon. December 1 is down for a visit from Bredhurst Electronics, while on 15th, they have the informal, during which they will have the club station on the air, and an informal Christmas "do".

Up to **Tyneside**, where they have a place at the Community Centre, Vine Street, Wallsend; they are to be found there every Monday evening, and they have a club station complete with a three-element beam which ought to encourage some DX-chasing locally!

For **Verulam** the "main" meeting is now on the fourth Tuesday in each month at the Charles Morris Memorial Hall, Tyttenhanger Green, Tyttenhanger, near St. Albans. This gives December 16 for the AGM. On the informals, from October to April, they are at the R.A.F. Association Hq in Victoria Street, St. Albans, on the second Tuesday of each month.

The letters **WACRAL** stand for World Association of Christian Radio Amateurs and Listeners. They have members in many lands and seem to be growing apace. Details from the Hon. Sec. — *see* Panel.

We head next for **West Kent** where they will be entertaining Techtronics and learning all about choosing an oscilloscope and using it. The venue for this is the Adult Education Centre, Monson Road, Tunbridge Wells, and the date December 5.

**Wirral** use the Sportscentre, Grange Road West, Birkenhead, on the first and third Wednesdays of each month — latest details from the Hon. Sec., *see* Panel.

A new one to us is at **Wisbech**, where they are actively after new members — they foregather fortnightly at the "Five Bells", Parson Drove, near Wisbech, every other Thursday at around 7.30, the next date being December 11. More details from the Hon. Sec. — *see* Panel.

Now **Worcester** where the Hon. Sec. is at pains to explain how their programme dates — first Monday in each month, at the "Old Pheasant" in New Street — are unchangeable and thus no need to check with him if we don't hear. But, for us, that's the point; if we don't have the detail by way of a recent programme or letter, we assume something has gone wrong and refer you, the reader, to the address Panel. That way, a potential new member at least gets in contact, and isn't lost through our making hopeful assumptions. We've seen too many clubs have to change Hq or programme at the last minute! But, thanks for noticing! On January 5, the lads will have Micro-Print of Stoke-on-Trent, showing their do-it-yourself computer kits.

On to **Yeovil** at Building 101, Houndstone Camp, Yeovil, where they are to be found at 7.30 on, every Thursday evening. For December the main meeting will be on 11th when G3MYM discusses the using of an RF voltmeter.

## Last — Not Least

We said at the beginning that the clubs who arrived in the last batch before the deadline would appear in a separate pile.

**Acton, Brentford and Chiswick** are at the Town Hall on Tuesday, December 16 to discuss "members selected items". Incidentally the Town Hall is in Chiswick High Road.

**Chiltern** have a date change for December, to *December 17*, so as to avoid any clash with Christmas arrangements. The Hq is at the canteen of John Hawkins Ltd. (furniture factory), Victoria Street, which is off West Wycombe Road, with plenty of parking space in front of the factory.

## Finale

That's it for another month; deadlines are as set out in the 'box' in the body of the piece, and are for arrival here, addressed as ever to "Club Secretary", SHORT WAVE MAGAZINE, 34 High Street, Welwyn, Herts. AL6 9EQ. Meantime, all our best wishes to clubs and their members, for the Festive Season and the New Year.

# A KILOWATT LINEAR FOR 80 TO 10 METRES

## PASSIVE GRID DESIGN USING 4CX250B'S

R. I. THOMAS, GW4BCD

THE author has built several linear amplifiers for the HF bands and quite a few valve types have been used. 813's, 807's, PL509's, 4-250's and several other types have been employed, and all were found to work with varying degrees of success. In 1976, however, an old STC T.1488 aircraft Tx was acquired and the intestines of this were removed and re-assembled into a HF linear. This used a pair of 4X150A's and when this was tried on the air it worked extremely well, out-performing all previous designs put together by the writer.

Success with this amplifier prompted the author to purchase a pair of 4CX250B's for further experimentation. These were assembled into a HF linear, and results were so impressive that the station at GW4BCD now uses this type of valve for final amplification on all bands from 80 to 2 metres. At HF the valves are very docile and a very simple linear can be assembled using the passive grid mode. As commercial linears are extremely expensive this design has a lot to recommend it, since 4CX250B's are currently in cheap and plentiful supply on the surplus market.

### PA Circuitry

*See* Fig. 1. The two valves are operated in parallel and use a conventional pi-network output circuit. No neutralizing is required as the valves are unconditionally stable with or without a load, provided R1 is less than about 220 ohms. The exact value of R1 at which the amplifier becomes unstable will vary from valve to valve, but in general 220 ohms seems to be the upper limit of R1. Up to this value the amplifier is very well behaved, however. The higher the value of R1 the less drive required by the amplifier, provided of course the exciter can load into this value. Constructors who have low power solid state rigs would be well advised to include some form of matching circuitry between their rig and the linear. A suggested circuit is shown in Fig. 2.

Table 1 gives the value of R1 for different levels of driving power. The anode APCs may or may not be necessary as parasitics seem to vary from valve to valve; they were necessary in the prototype, however. Screen and grid supplies are fed to the valves *via* 2 watt carbon resistors — these are very important and should not be omitted. Note that separate bias supplies for each of the valves are used: this is to be recommended unless one is in the happy position of being able to handpick matched valves. 4CX250B's seem to vary considerably with their bias requirements — one valve needing 50 volts for a given amount of quiescent current, another valve needing 45v. for the same. With separate bias supplies one can set both valves for the same standing current, and be

**Table of Values**
**Fig. 1.**

R1 = 50 to 200R, 20w. (*see* text)
R2, R3 = 50R, 2w.
R4, R5 = 4.7K, 1w.
R6, R7 = 100R, 2w.
C1, C2 = 1000 pF, 10 kV DC, disc-ceramic
C3, C4, C5, C6, C7, C9 = 1000 pF, 1 kV DC, disc-ceramic
C8 = 500 pF, 1 kV DC, silver-mica
VC1 = 250 pF, wide spaced
VC2 = 1000 pF, BC Rx type
S1 = heavy duty, ceramic insulation
RFC1 = 112 turns, 28 swg, on ½-in. dia. former
RFC2 = 2.5 mH standard choke
APC1, APC2 = 6 turns, 16 swg, over 22R 2w. resistor
L1 = 5½ turns ⅛-in. copper tube, 2-in. dia., tapped at 2t
L2 = 30 turns 16 swg, tapped at 3t and 15t from L1
V1, V2 = 4CX250B

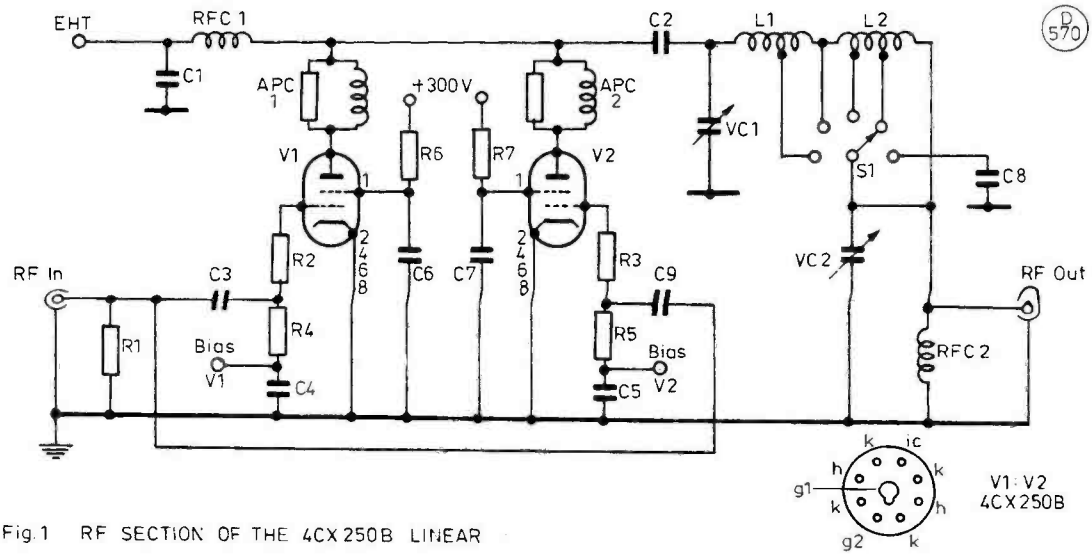
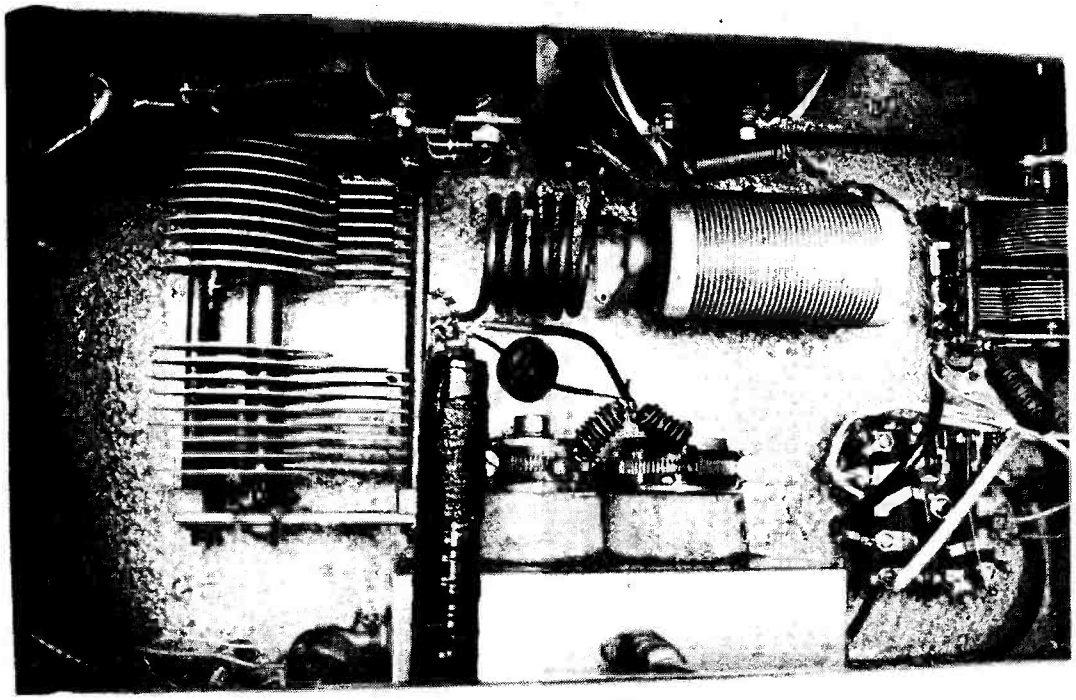



Fig. 1 RF SECTION OF THE 4CX250B LINEAR



**Looking into the tank of the GW4BCD QRO linear**

reasonably confident that the two valves are load-sharing fairly well over the full input cycle.

The filaments take 6 volts and it is better to be on the low side of this figure rather than above it. Odd secondary emission effects can occur if filament voltage is too high, and this can lead to damaging a valve. This effect does not seem so great at HF as it is at VHF, but it can be a problem even on the DC bands. Take care also to interlock the blower with the filament supply as the valves need blowing with only the filaments on; control circuitry is given in more detail later. The anode supply can be anything from 1 to 2 kilovolts, with slightly better efficiency being obtained at the higher voltage.

The anode supply choke RFC1 is fairly critical in design. As can be seen from the photograph the choke in the prototype suffered from overheating when the amplifier was rather unwisely loaded into an SWR of over 4:1. If it is found that this component overheats when the amplifier is loaded into a good match a few turns can be added or removed to stop this. It is probably this component more than any other that dictates that the amplifier should not be used into a load where the SWR exceeds 2·5:1. Screen voltage should be around 300v. stabilised. As screen current should not exceed about 15 mA when the amplifier is properly loaded into a good match, stabilisation is taken care of simply by a pair of VR150 voltage regulators in series.

## Choice of Components

Fortunately at HF one does not have to go to the trouble of obtaining the expensive VHF valvebase — common-or-garden B8F bases work well up to 30 MHz, indeed the author has seen

| *R1* | *Drive for 400 watts output* |
|---|---|
| 50 ohms | 50 watts |
| 75 ohms | 34 watts |
| 100 ohms | 25 watts |
| 125 ohms | 20 watts |
| 150 ohms | 17 watts |
| 175 ohms | 15 watts |
| 200 ohms | 13 watts |

**Table 1. Values of grid resistor, R1, for drive power available.** *Note:* **assumes anode voltage to be 2000v., and screen voltage to be 300v.**

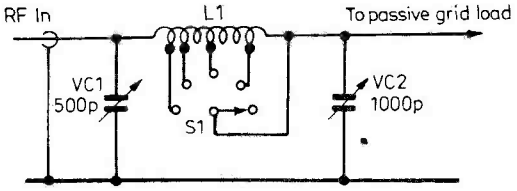



Fig. 2 One method of matching a 50 ohm exciter to a 200 ohm grid resistor. L1 to resonate on the band in use

D 571

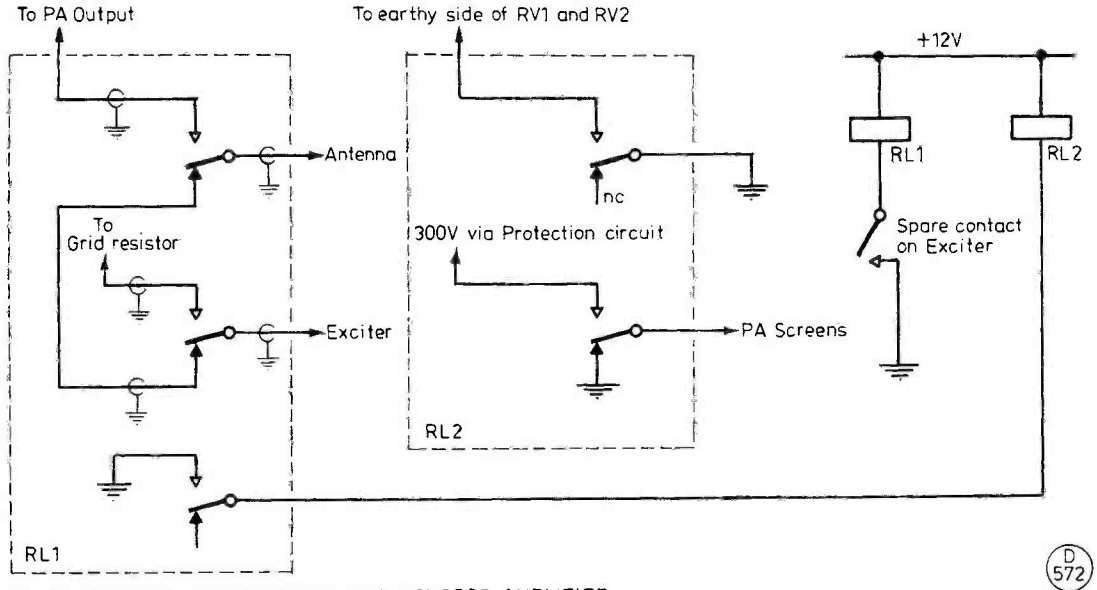



Fig. 3 CONTROL CIRCUITRY FOR THE 4CX250B AMPLIFIER

a 70 MHz amplifier using these bases. Chimneys are necessary of course, but it is fairly easy to make these out of suitable material. The chimneys used in the author's amplifier were cut from ceramic crucibles and glued to the sub-chassis, as can be seen in the photograph.

With regard to a blower, generally the bigger the better. The author's amplifier uses an enormous device which sends a gale through the anodes of the 4CX250B's. It is not necessary to go to this extreme, although both valves in the prototype were bought secondhand in 1976 and are still working well, despite repeated unintentional attempts at destruction. The writer puts this fairly remarkable longevity down to the 'overkill' used in blowing the valves. A suggestion by GW8EHK, who has used these valves at VHF for years, is that if one can hold a sheet of foolscap paper two inches from the anodes and it tends to rise from the airflow, then one has enough airflow. It should be noted that this rule-of-thumb only holds good for the 4CX family, as the 4X series is of glass rather than ceramic construction and subsequently needs a lot more air passing through its anode. For the record the 4CX250B needs 5 cubic feet per minute of air at 200 watts dissipation, whilst by sharp contrast the 4X150A needs 100 c.f.m. if run at its limits.

The choice of tank circuit components is more or less dictated by the surplus market. The anode tuning capacitor needs to be wide-spaced, and the band-change switch should be of ceramic construction. All the tank circuit components shown in the photograph were obtained at one rally for less than £2; but these sort of components are gradually disappearing from the market, unfortunately. The loading capacitor was recovered from a 1950-vintage broadcast Rx. As previously mentioned the anode supply choke is a fairly critical component, and if a different diameter former is used from that specified, then turns may have to be added or taken off to ensure efficient operation. If the load SWR is high this choke tends to get hot anyway, but if it gets hot with a good load this is a sure sign that it has a resonance near the frequency in use; cut-and-try is then the only way of putting things right.

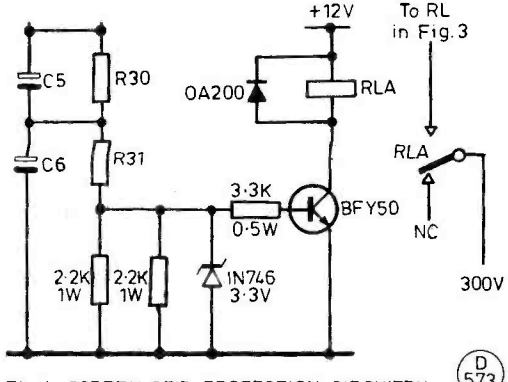



Fig. 4 SCREEN GRID PROTECTION CIRCUITRY

**Table of Values**
**Fig. 5**

D1 to D27 = BY127
D28 = bridge rectifier, 500 p.i.v., 500 mA
*R1 to R24 = 220K*
R25 = 22R
R26 to R31 = 220R
R33 to R35 = 2M, 2w.
R36 = 6.6K, 10w.
R37, R38 = 220R
R39, R40 = 10K, 1w.
R41 to R44 = as reqd. for meter shunts
C1 to C6 = 300 μF, 450v.
C7 = 32 μF, 500v.
C8 = 60 μF, 350v.

RV1, RV2 = 10K, 1w.
VR1, VR2 = VR150 or similar
M1 = 600 mA f.s.d.
*M2 = 500 μA for 3 kV f.s.d.*
M3, M4 = 1mA f.s.d.
T1 = 0-1500v., 500 mA
T2 = 350-0-350v. 100mA, 6.3v. 6A
T3 = 0-125v. 25 mA
FS1 = 5A
FS2 = 500 mA anti-surge
FS3 = 60 mA

S1 = double-pole on-off 240v.

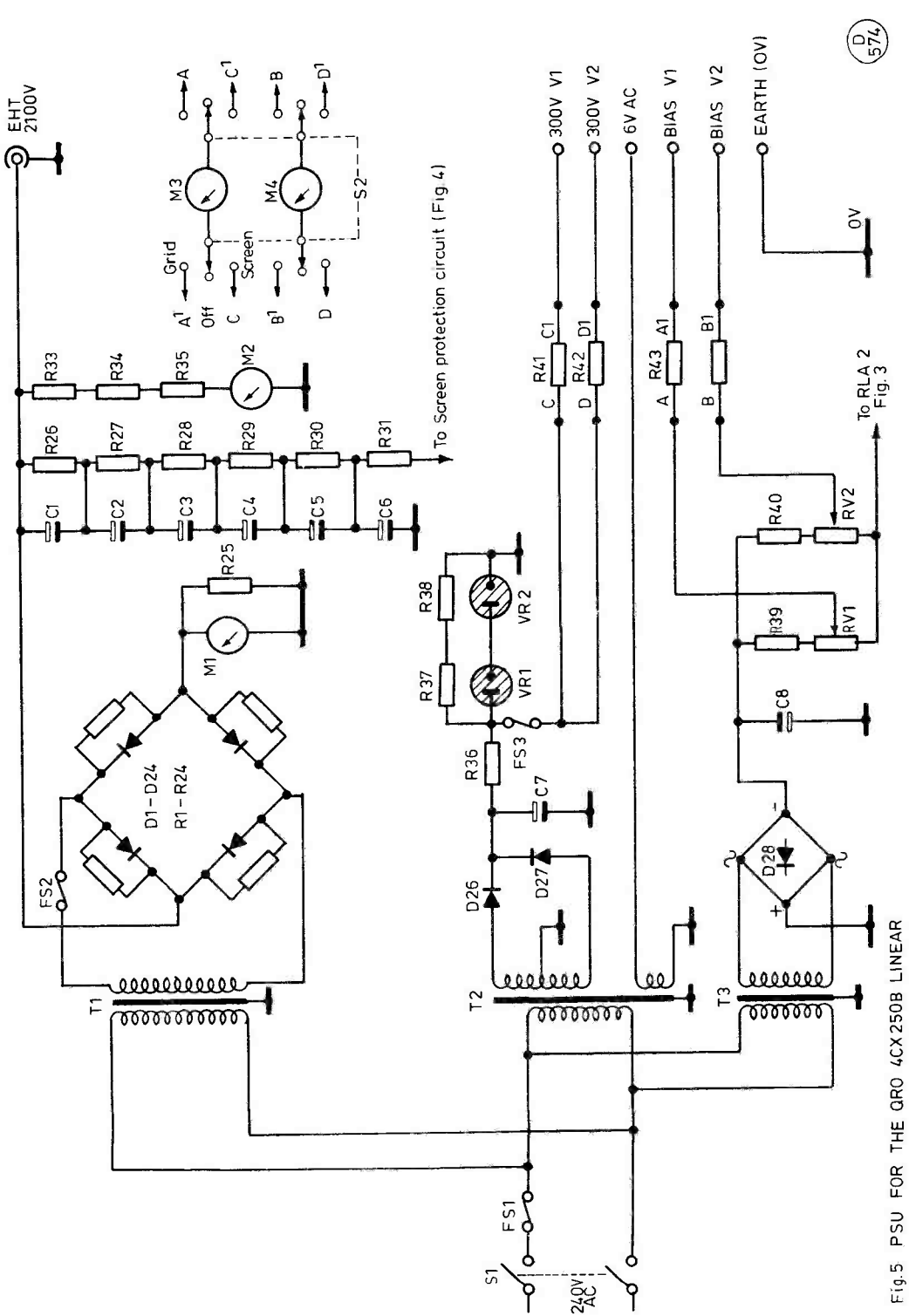



Fig.5 PSU FOR THE QRO 4CX250B LINEAR

The change-over relay used in the prototype is fairly robust, although it is surprising what one can get away with here, providing again the load SWR if fairly low. (The author has seen a minature change-over relay in use in a kilowatt linear, with no apparent problems.) The anode supply decoupling and blocking capacitors are both 1000 pF, 10 kilovolt DC working disc-ceramic types obtainable very cheaply from advertisers in the *Magazine*. They have been in use in the prototype since 1976 with no problems.

## Construction

As can be seen in the photograph, the author's amplifier is built into a commercial cabinet, with two valves mounted on a small air/RF-tight box. A hole to take the blower outlet is in the lid of the box and back of the cabinet, and the blower is then bolted to the back of the cabinet. The only problem with this arrangement is that the front panel gets too hot to touch after a long transmission!

When wiring up the valvebases try to keep all capacitor leads fairly short, especially those which decouple the screen pins. Take all cathode connections directly to earth separately, using fairly stout wire. The screen and grid supply feed resistors should be soldered directly to their respective pins, as this obviates any tendency to parasitics at these electrodes. The anode APCs are soldered directly to the *Jubilee* clips which are clamped around the valve anodes. Here again some experimentation may be necessary to stop any parasitics which may be present.

Feedthrough capacitors are used to take the various potentials into the sub-chassis — not strictly necessary at HF but a convenient way of doing things. Constructors will have their own ideas about pi-tank layout, and provided that leads are kept fairly short this is not particularly critical. Particular care should be taken with soldering in the tank circuit however, as a bad joint here can cause a good deal of loss because of the high circulating current present in this part of the circuit.

## Control Switching

*See* Fig. 3. Apart from signal path switching, it is necessary to earth the screen pins of the valves and apply a blocking bias to their grids if total cut-off is to be achieved during standby periods. This is accomplished by RL2. Note that RL2 is activated by RL1, thus ensuring that the valves cannot conduct until a load is present. It is also of paramount importance with 4CX250B's (as indeed with any tetrode) that screen voltage comes on after anode voltage, an is never applied if anode voltage fails. A protection circuit suggested to the author by GW8EHK is shown in Fig. 4: this has been incorporated in the prototype and works well.

The transistor Tr1 needs around 1mA of base current to operate the relay, this is obtained from the EHT supply *via* the EHT smoothing capacitor network. The two 2.2K resistors and the 3.3v. zener diode ensure that the base of the transistor is never overdriven. The relay, of course, switches the screen voltage to the amplifier, thus ensuring that screen voltage cannot be applied without anode voltage being present. Note that the screens are also protected by a 60mA quick-blow fuse. The other point to watch regarding control circuitry is, as previously mentioned, to make sure that the blower comes on the same time as, or before, the filament supply. This is simply done be supplying the blower from the primary of the filament supply transformer; *see* Fig. 5.

## Metering

On the prototype four surplus meters are used; Fig. 5. refers. One is permanently displaying EHT volts, this being primarily a safety precaution. Anode current is also permanently displayed, and here rather than apply nearly two kilovolts to the panel meter, the meter is placed in the earthy leg of the bridge rectifier. The 22 ohm resistor across the meter is a safety precaution: if the meter open-circuits for some reason, the resistor holds it at only a few volts above earth. The other two meters display grid or screen current and are switched to display, one or the other.

## Power Supply

This is shown in Fig. 5. Obviously here availability of components dictate what is to be used, and the circuitry shown used components the author had available. Not much comment on the circuitry is needed as it is perfectly standard. Do *please* be careful with the EHT supply, as one does not get a second chance with this sort of voltage! Note that the 6v. filament supply is obtained by applying 240v. mains to the 250v. tap on the primary of the filament transformer. This, coupled with a slight voltage drop on the heater supply cable, gives 5.97v. at the filament pins on the prototype.

## Setting Up

Attach a 50 ohm dummy load to the output of the amplifier. This should be capable of handling the full output of the amplifier, although if care is taken in keeping the tuning procedure down to short intervals, a load capable of handling 100 watts should suffice; this should be connected *via* a power meter.

Before placing the valves in their holders it would be advisable to check them for inter-electrode shorts, especially if second-hand valves are to be used. Place the valves in their sockets and check that filament voltage is 6v. or slightly less. Apply anode voltage and actuate the relay that places the valves to "transmit"; set standing current to 50mA for each valve. Screen current should indicate 2 or 3mA negative — this is normal. If parasitics are present they will make themselves known by appearing as RF output on the power meter with no drive applied, or anode current will tend to vary slightly as the tune and load capacitors are adjusted. With a low value resistor at R1 it is highly unlikely that the amplifier is oscillating at signal frequency, so any sign of spurious output will almost certainly be the result of a parasitic oscillation. This can be dealt with by modifying the anode APCs.

If there are no signs of any *spurii*, a little drive can be applied and the tune and load capacitors adjusted for maximum output on the power meter. Anode current should rise smoothly as drive is applied, and as resonance is found screen current should rise to 4 or 5mA positive. When loading the amplifier initially take care that screen current is kept within safe limits — say 40mA for the two valves; screen dissipation for a single 4CX250B is only 12 watts, and this can easily be exceeded, especially when initially aligning the amplifier, as the LC ratios in the pi-tank may not be quite optimum. In the author's amplifier screen current can be set to any value between 5 to 25mA by a minute adjustment of the loading capacitor, this having almost no effect on RF output; screen current is normally set to around 5 to 10 mA by this method. Apply full drive and peak the pi-tank capacitors for maximum output on the power meter. Anode current is dependent to some extent on EHT voltage, and in the author's amplifier

peaks to 470mA at 1900v. at 400 watts output. This figure is more or less the same over the five bands. No grid current should be allowed to flow of course, although in the prototype the grid current meter is seen to just move slightly on speech-peaks. This is estimated at 100 micro-amps.

Around 45% efficiency is all that can be expected from an AB1 linear, and the author's amplifier approaches this on all bands. Note that the pi-tank LC values given in the tables have been optimised for a 1900v. EHT supply, and if anode voltage differs from this to any great extent some experimentation should be done with these to obtain best efficiency. If less voltage is used, then slightly less inductance is called for, if a higher voltage is applied the reverse applies. It is very instructive to watch output power gradually increasing as the optimum values of L and C are approached: on 10 and 15 metres tapping 1 or 2 turns up or down the coil can make a large difference in power output, even though the tank circuit was resonant at the previous position.

## Conclusion

The amplifier has been in use by the author for nearly four years, with no problems. A home-brew 25 watt exciter is used to drive the amplifier, and the difference in reports when switching in the amplifier is significant, to say the least. As Cyril, GW3KSQ, put it when testing the amplifier initially, "from a whisper to a roar".

Finally thanks are due to GW8EHK, GW4HNT, GW4BCF for their help, and GW4IMC who took the photograph.

# MODIFICATION TO THE ICOM IC-211 TO PERMIT TIME-OUT ALERT

ANTHONY GREEN, VP2EZ, A4XGR, VS6EZ, G4HRD

WHEN the Hong Kong Amateur Radio Transmitting Society installed its first 2-metre repeater recently, they also set the transmission timer to two minutes. I decided that I didn't want the ignominy of timing out the repeater so, after a little thought, I evolved a circuit which fits snugly inside the IC-211 microphone and gives a 10 to 15 second warning before time-out occurs.

Very little modification needs to be done to the IC-211: all that is required is a 12v. source attached to pin 3 of the microphone socket, and this is obtained from J5 of the power unit.

Some modifications are necessary in the microphone plug. There are three wires and a screen braid, and the screen must now be wired to provide the only earthing wire for the microphone: the now spare wire is used to carry the 12v. supply to the time-out unit.

The values of R2 and C1 may need slight adjustment to compensate for variations in voltage and capacitance; it should only be necessary to select R2 to give time-out alert 10 to 15 seconds before the repeater switches off. The green LED is mounted on the top of the first microphone and it is very noticeable when it starts to flash its warning.

**Tables of Values**
**Fig. 1**

R1 = 10K
R2 = between 560K and 1M, select on test.
R3 = 100K
R4 = 10M
R5 = 100R
C1 = 50 µF. 16v.w.
C2, C4 = 0.01 µF
C3 = 0.04 µF
D1 = 1N914, or general purpose silicon diode
D2 = green LED

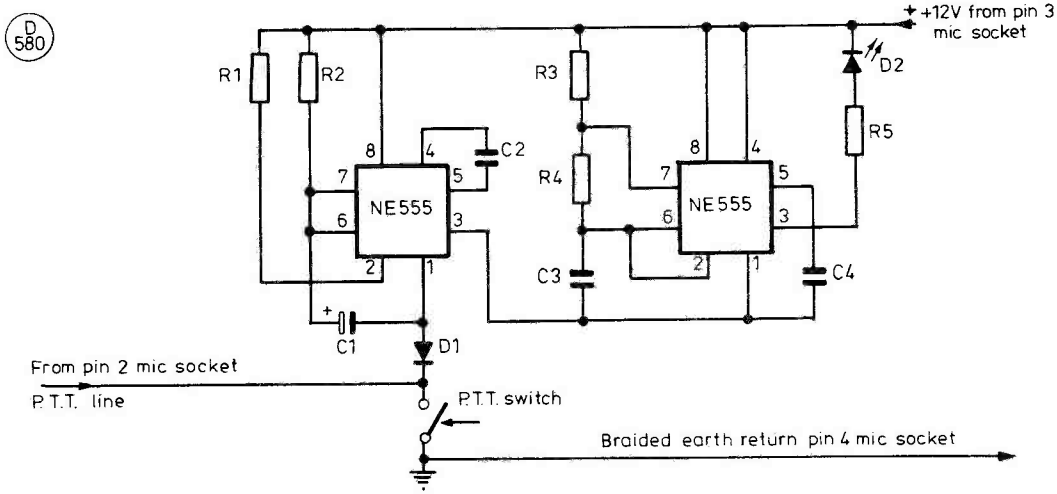



Fig.1 ONE MINUTE, FORTYFIVE SECOND TIME OUT ALERT

# VHF BANDS

NORMAN FITCH, G3FPK

## Honest Reporting

LISTENING around the two metre band in particular, one is disappointed at the number of sub-standard signals. This applies to FM, CW and SSB alike. In many cases the operators are quite unaware that their signals are anti-social, and for two reasons. First, they cannot monitor their own transmissions, and second, nobody has told them about their hum, key clicks, distortion, excessive bandwidth or whatever.

From the licence point of view, Clause 4(2) clearly states we should make periodic test transmissions to ensure we are not over-modulating, causing key clicks, etc, recording these tests in the log book. How many of us *ever* do so? The majority of radio amateurs are reasonable folk and, if told in a polite and helpful manner that something is not quite right, or even horribly wrong, are willing to find a quiet spot in the band on which to carry out some tests to put matters right.

Of course, one has to convince oneself and the fellow whose signal is being criticised, that one's own receiving system is not contributing to the effect. To this end, it is fairly easy to establish the input level at which a receiver starts to behave non-linearly and to ensure that any tests are carried out below this level.

The most common types of nuisance on CW are key clicks and here it must be stated that certain transceivers generate very clicky keying which has proved very difficult to cure. Other signals have a *white noise* noise content giving rise to a wide transmission. On SSB, some commercial rigs never sound right and have a raspy sound even when one is assured the microphone gain control is well backed off. Obviously, when such signals are amplified by ten or more dB., the problem becomes worse. The simple test of the quality and freedom from unacceptably high third order products of an SSB signal is to tune carefully away from it and listen. With a good signal, the speech should disappear cleanly as one tunes it out of the passband of the filter. For example, when receiving upper sideband, and tuning away slowly to the low frequency side, the audio should rise in pitch cleanly and without any spikey or spitchy peaks. If it does not, then there are third order distortion products present at too high a level.

The most common complaint about FM signals is excessive deviation which results in an unnecessarily wide signal. However, your scribe has heard some FM transmissions with an incredible hum content. It could be that the practice of operating a transceiver from a battery connected to a charger is responsible for this.

Particularly if large amounts of RF are involved, one should be very careful when using external speech processing gadgets. Quite often, a whiff of RF getting in on speech peaks results in some nasty distortion as well as reducing the readability such devices are supposed to enhance. G6LX aptly refers to this as "speech *de*-processing!"

Finally some comments about so-called "linear amplifiers". Unfortunately, many of these are decidedly anything but linear, and this applies particularly to solid state devices used for SSB purposes. The very nature of the transfer characteristics of solid state amplifiers makes it very difficult to keep the third order products at a low level and achieve good efficiency at the same time. In this matter, it would seem advisable to employ valves of the 4CX250B class to generate powers in excess of 100 watts. It is possible to get the intermod. products 40-50 dB. down with valves of the '250B and '350F type, whereas it is not easy to achieve -30 dB. with a transistor amplifier. Moreover it is not only the third order intermod. products that are the prime concern with solid state devices: quite often, the 5th, 7th and higher products are considerable.

A definitive article on this topic is being prepared by John Nelson, G4FRX, which it is hoped to publish at a later date. Meantime, it is to be hoped that some honest reporting of signal *quality* will result from these comments.

## Technical Notes

Many 2m. operators own the popular *Nag 144* amplifier but John Nelson, of Cambrian Electronics, is receiving a stream of inquiries from users concerning the short life of the valve. The problem stems from the fact that the 4CX350FJ valve was never designed for grounded grid operation. John says: ". . . this is not helped by the fact that, particularly when used on CW or FM, the existing blower is rather inadequate. Our current recommendation is to change the 4CX350FJ for a 4CX250F. This will produce less power output but will last somewhat longer. It will be necessary also to carry out minor re-tuning. This modification is still a compromise, since performance will not be outstanding. It is really necessary to re-arrange the input circuit for grounded cathode operation, probably in a passive grid configuration, for correct performance parameters to be met."

## Awards News

Ken Homewood, G8NPC, from Hastings, E. Sussex, receives 2m. VHF Century Club Certificate no. 328. His station consists of a *Trio* TS-700G and solid state amplifier using a 2N6084 giving 40 watts output. The aerial is a 6-ele. *Quad* in the attic. Although 200ft. *a.s.l.*, the QTH is screened to the west, north and south by 400ft. hills and to the southeast by a block of flats. Ken is a member of a couple of clubs and repeater group and does his stint as a contest operator with the Hastings Electronics and Radio Club, G6HH.

Jon Dougherty, G4FUT, from Sunderland, has been awarded 2m. VHFCC certificate no. 329 for all-auroral QSOs. It took 3½ years to get the cards, the return rate being a miserable 30% with the greatest lack of response from those sent direct with IRC. Jon began as an *s.w.l.* at the age of 12 using an R-1155 Rx, given to him brand new in 1951. Military service in the Malayan Army as a Regimental Signaller in the late 1950s kept the radio interest alive. In 1958, he managed to carve up a military net on Salisbury Plain while operating in the jungle with 20 watts of AM, even though he failed to raise his own base but 30 miles away.

Jon obtained his amateur licence in 1976. The equipment consists of a *Trio* TS-700G, a choice of two, home made amplifiers, one using a QQV06-40A,

the other a QY3-65, with a 6-ele. *Quad* at 40ft. for 2m. For 70cm., there is 8 watts of CW to a home made 12-over-12 *Yagi* with which it is hoped to get 100 cards for a 432 MHz VHFCC. He also operates on the HF bands with home made Tx's, supported by a *Yaesu* FT-401 transceiver which is ". . . always blowing up!"

## Contest News

*Results:* The RSGB Region 1 VHF Contest which took place on Sept. 14 attracted over 80 participants of whom only 10 bothered to send in logs. Norman Horrock's, G2CUZ, report understandably describes this as "most disappointing". Winners of Section 1 for Region 1 multi-op. stations were PACT/G4BVE, with a total of 7,458 points. The Wirral Radio Society were second with 3,074 pts., both using 70, 144 and 432 MHz. Reader John Wilkinson, G4HGT, won the single-op. Region 1 section with 1,366 pts. and G80EG was second, with 933. They only used 144 MHz. The outside Region 1 winner was another regular contributor, Dave Cox, G80PR, (Hants.) with 906 pts., ahead of G8NQP who notched up 660; again on 144 MHz only.

*Coming events:* The 2m. leg of the Verulam ARC's Tx and Rx Contest is from 0900 to 1300 on Nov. 30. Exchanges to consist of report/serial number and *administrative* county, which is not often the postal one. Scoring is one point per QSO with G3VER worth 10. Multiplier is the total number of counties worked with countries outside the U.K., like Belgium, counting as another county. Logs, postmarked Dec. 15 latest, to G3JKS, 115 Marshalswick Lane, St. Albans AL1 4UU.

The popular 144 MHz Fixed Contest is on Dec. 7, 0900-1700. All modes, radial ring scoring and two sections, single- and multi-op. Entries to G3XDY, 16 Pearcroft Road, Ipswich IP1 6PJ.

## SSB Repeater — Again

Several years ago there was a proposal by G3RKL for an SSB repeater in the SSB part of the 2m. band, coupled with a plan to "channelise" the SSB sub-band. These proposals met with near universal opposition and were subsequently buried. However, G3RKL has now proposed that an SSB relay in Sheffield be established in the FM part of the band with input around 145.185 and output 145.785 MHz. The views of local amateurs are sought on this controversial suggestion, in particular it would be instructive to ascertain if there *is* any great demand for such a repeater, which is *not* intended to be a linear transponder like the *Oscar* satellites carry, by the way.

THREE BAND ANNUAL VHF TABLE
January to December 1980

| Station | FOUR METRES | | TWO METRES | | 70 CENTIMETRES | | TOTAL |
|---|---|---|---|---|---|---|---|
| | Counties | Countries | Counties | Countries | Counties | Countries | Points |
| G4CMV | 50 | 6 | 72 | 20 | 54 | 12 | 214 |
| GD2HDZ | 45 | 6 | 60 | 14 | 40 | 7 | 172 |
| G4HNS | 41 | 5 | 59 | 12 | 43 | 9 | 169 |
| GJ4ICD | — | — | 68 | 26 | 47 | 17 | 158 |
| G8GXE | — | — | 67 | 19 | 53 | 14 | 153 |
| G3PBV | 18 | 4 | 58 | 15 | 44 | 10 | 149 |
| G8OPR | — | — | 65 | 23 | 51 | 8 | 147 |
| G8TFI | — | — | 63 | 20 | 47 | 12 | 142 |
| G3BW | — | — | 72 | 25 | 37 | 7 | 141 |
| G8VLQ | — | — | 68 | 17 | 40 | 10 | 135 |
| G3CO | 45 | 6 | 46 | 12 | 17 | 6 | 132 |
| G8IFT | — | — | 61 | 14 | 43 | 10 | 128 |
| G8FMK | — | — | 62 | 14 | 43 | 9 | 128 |
| G4BYP | 36 | 5 | 49 | 11 | 23 | 4 | 128 |
| G3FIJ | 40 | 6 | 46 | 12 | 17 | 4 | 125 |
| G4BWG | 13 | 3 | 56 | 20 | 23 | 8 | 123 |
| G8MFJ | — | — | 64 | 19 | 31 | 8 | 122 |
| G8HHI | — | — | 55 | 11 | 40 | 9 | 115 |
| G4DEZ | — | — | 71 | 29 | — | — | 100 |
| G4IGO | — | — | 65 | 28 | — | — | 93 |
| G8KAX | — | — | 43 | 11 | 31 | 8 | 93 |
| G8VR | 5 | 1 | 53 | 24 | 8 | 1 | 92 |
| G8JJR | — | — | 42 | 15 | 27 | 7 | 91 |
| G4FKI | 38 | 5 | 23 | 7 | 11 | 7 | 91 |
| G4ARI | 27 | 4 | 48 | 12 | — | — | 91 |
| G3FPK | — | — | 68 | 21 | — | — | 89 |
| G8KGF | — | — | 48 | 14 | 17 | 6 | 85 |
| G4ERX | 15 | 2 | 30 | 10 | 18 | 8 | 83 |
| GW3CBY | 20 | 5 | 30 | 9 | 10 | 5 | 79 |
| G4HGT | — | — | 64 | 11 | — | — | 75 |
| GM8TSI | — | — | 53 | 13 | 5 | 2 | 73 |
| G3KPU | — | — | 33 | 5 | 28 | 6 | 72 |
| G8RWG | — | — | 58 | 14 | — | — | 72 |
| G8TIN | — | — | 51 | 15 | — | — | 66 |
| G3EKP | 22 | 5 | 18 | 6 | 8 | 5 | 64 |
| G8VJJ | — | — | 50 | 13 | — | — | 63 |
| G8RZA | — | — | 43 | 11 | — | — | 54 |
| G8VFV | — | — | 45 | 8 | — | — | 53 |
| G8JGK | — | — | 35 | 13 | — | — | 48 |
| GM8MNG | — | — | 39 | 6 | 1 | 1 | 47 |
| GW3MHW | 40 | 5 | — | — | — | — | 45 |

## Beacon Notes

From Brian Bower, G3COJ, and Mike Lee, G3VYF, some notes about 70cm. beacon FX4UHF. It is located in Department 64, right near the Spanish border — ZD52c. The QRG is 432.87 MHz, the power 50 watts *e.r.p.* and the aerials two 10-ele. *Yagis*, slightly depressed towards the horizon and phased to give a broad pattern. The *a.s.l.* of the site is 900 metres and it is supposed to transmit some telemetry. This information was given to our correspondents by F6CBC.

## Gigahertz Bands

There is a possibility of 23cm. activity from Spain according to Alan Bellfield, G4GLN, who heard this from Rubén González, EA1CR. Rubén is very keen but said that the only QSOs he would be likely to have would be with British stations since French amateurs are denied the use of much of the band we use. Rubén also admitted to an interest in 3cm. narrowband techniques. If that should develop, the sea path from northern Spain to southern Ireland would be a very tempting one to try to beat the Italian 10GHz world record of QRB of 757 kms.

G4GLN can generate an easy 400 watts of RF on 23cm. with his six 3CX100A5 valves. Alan has just put up four of the latest *Tonna* 23ele. *Yagis* which he says are much more "bird-proof" than the loop *Yagis*. He mentioned the many operators now using the *S.O.T.A.* and *Microwave Modules* QRP transverters and reckons that, considering some of them

are using *UR-67* feeder and likely losing half the power at the aerial, they are doing quite well. G4GLN made about a dozen contacts in the Nov. 3 leg of the *Cumulatives*.

John Lovell, G8JHL, (Gtr. Manchester) devotes most of his operating time to the UHFs now and runs a pair of 7289s on 23cm., developing a measured 150 watts of RF. The aerial array is four 15-over-15 *Jaybeam Yagis*. During the Nov. 3 *Cumulative* period, John worked 17 stations and in just three weeks had notched up 19 counties and three countries. He uses an *NEC64535* masthead preamp. and *LDF-4* feeder cable.

Dave Sellars, G3PBV, (Devon) is busy "collecting the bits for an SSB transverter", and proposes using dual conversion to 28 MHz, with a 97.538 MHz crystal to avoid 2m. breakthrough problems. In another beginning-of-the-month tropo. lift, on Nov. 1, the beacons were coming in well with GB3CLE heard only for the fourth time. GB3WHA, not usually heard, was quite a good signal, but GB3DUN has never been heard by Dave. GB3I0W is the most consistent beacon in flat conditions.

Tony Collect, G8GXE, (Berks.) is participating in the *Cumulatives*, the first three legs producing 8, 12 and 10 QSOs respectively, all under 50km. except for G4HWA/P near Newbury, which gave the first Berks. contact. The October UHF/SHF Contest gave Ian Gordon, G8IFT, (Birmingham) a new county — Essex — thanks to G4GLN/P, at 219km. GW4CBW/P and G4HWA/P were also good signals. He has clocked up 23 counties and 4 countries this year so far, the *Cumulatives* having thus far provided reasonable activity. YL square, a new one, was worked, thanks to GW8HZK/P with only 1½ watts. Ian's best DX has been G8BFX and G3DY, both around the 130km. mark.

Ed Baker, the general editor of the I.S.W.L.'s magazine *Monitor*, has informed us of the death of Walter Tomlin, G8AII, on Aug. 27. He used to be the editor of the VHF Bands feature in *Monitor*, and was a contributor to this column in the past and a participant in the 23cm. All-time Table.

## Seventy Centimetres

The November 1 lift brought G3COJ, (Bucks.) his first Spanish QSO, with EA1CR, plus a couple of new French squares, *F1AJD (AF)* and F6CBC/P (ZD). The F6 relayed GB3VHF back, crossband! G3PBV was copying FX4UHF at S4 on Nov. 1 but could not hear "Wandering Willie", in AC square at all. On the home front, Dave added Cheshire, G4GVI, and Cleveland, G8LZH, while from France, F6CBC, F8SM/P (ZF) and F6CCH (ZG) were worked. Others from the south were heard busily working Gs in the ZO area. HB9F was a good signal but no amateur activity was heard from the southeast and Dave has noticed this before. He wonders if HB9F was getting into a secondary, high-level duct, all on its own?

G8GXE wrote before the lift that things had been quiet, despite the beacons coming in quite well. QRM from a radio neighbour has limited his *Cumulative* activities as he cannot use his preamp. On Oct. 18 and 26, 36 contacts were made but the weaker stations were buried in the QRM. G8IFT mentions some strong French signals in the October contest, plus PE0MAR/P (CL) and GM3SPJ/P (XO). Ian reckons *Cumulatives* activity to be down on last year, though.

Chris Easton, G8TFI, (Middx.) is still seeking his first GM and GI contacts on the band but has done quite well in the *Cumulatives* with some 40 QSOs completed and some new counties added. Nov. 3 was the best session so far. The Nov. 1 lift produced EA1CR (XD) whose 10 watts gave a fine signal into Britain. More DX was worked in the shapes of F8RZ (ZF); F1FHI (ZH) and F6FRR (ZF). Ken Willis, G8VR, wrote from his Connecticut QTH on Oct. 26 that he is building the K2RIW amplifier in his Naugatuck workshop. Incidentally, this amplifier is now being offered completely built or in partial kit form, by Geoff Brown, GJ4ICD. It incorporates a few improvements and inquiries should be directed to P.O. Box 100, Jersey, Channel Is.

Arthur Breese, GD2HDZ, had a call from G3BW on Nov. 1 to say that GJ4ICD was on the band looking for him. But neither could hear a whisper of the other. A little later Midlands and Manchester stations were giving S7 reports to PAs which were inaudible in the Island. GJ4ICD got a couple of new squares out of the Nov. 1 affair; G8PWX (ZP) and G3BW (YO), to bring the tally to 82.

**QTH LOCATOR SQUARES TABLE**

| Station | 23 cm. | 70 cm. | 2 m. | Total |
|---|---|---|---|---|
| G3VYF | — | 83 | 187 | 270 |
| G8HVY | 22 | 83 | 141 | 246 |
| GJ4ICD | — | 82 | 182 | 264 |
| G3JXN | 39 | 81 | 107 | 227 |
| G3COJ | 24 | 74 | 112 | 210 |
| G8LEF | 22 | 62 | 101 | 185 |
| G3PBV | 9 | 59 | 102 | 170 |
| G4CMV | 13 | 58 | 156 | 227 |
| G8ATK | 5 | 56 | 111 | 172 |
| GJ8KNV | 2 | 54 | 119 | 175 |
| G2AXI | 2 | 54 | 93 | 149 |
| G8GXE | 8 | 51 | 84 | 143 |
| G8FMK | 13 | 49 | 54 | 116 |
| G8TFI | — | 47 | 95 | 142 |
| G4HFO | — | 46 | 68 | 114 |
| G4ERX | 5 | 45 | 92 | 142 |
| GD2HDZ | 12 | 41 | 83 | 136 |
| G8HHI | 1 | 40 | 107 | 148 |
| G8KAX | 2 | 40 | 74 | 116 |
| G8LHT | 7 | 39 | 98 | 144 |
| G4BWG | — | 37 | 137 | 174 |
| G8OPR | 1 | 36 | 102 | 139 |
| G8IFT | 15 | 32 | 79 | 126 |
| G4AEZ | 5 | 29 | 61 | 95 |
| GJ3RAX | 1 | 27 | 74 | 102 |
| G3FIJ | — | 27 | 68 | 95 |
| G3BW | 3 | 26 | 140 | 169 |
| I4EAT | — | 25 | 238 | 263 |
| GM4CXP | — | 25 | 136 | 161 |
| G8LGL | — | 25 | 121 | 146 |
| G3KPU | — | 25 | 91 | 116 |
| GI8EWM | — | 25 | 67 | 92 |
| G8VLQ | — | 25 | 63 | 88 |
| G8MFJ | — | 23 | 113 | 136 |
| G4AWU | — | 22 | 110 | 132 |
| G8JJR | — | 20 | 98 | 118 |
| G8KGF | — | 20 | 95 | 115 |
| G4ERG | — | 16 | 174 | 190 |
| EA3LL | — | 15 | 185 | 200 |
| 9H1CD | — | 13 | 178 | 191 |
| GM4COK | — | 12 | 154 | 166 |
| 9H1BT | — | 11 | 163 | 174 |
| G8KPL | — | 7 | 87 | 94 |
| G8JAG | — | 7 | 79 | 86 |
| G4GSA | — | 6 | 51 | 57 |
| G4FBK | — | 5 | 100 | 105 |
| G8RMA | — | 5 | 66 | 71 |
| G8VR | — | 3 | 88 | 91 |
| G6UW | — | 1 | 89 | 90 |
| G4GXT | — | 1 | 56 | 57 |
| G3POI | — | — | 298 | 298 |
| DK3UZ | — | — | 252 | 252 |
| G3IMV | — | — | 236 | 236 |
| G3CHN | — | — | 196 | 196 |
| G3SEK | — | — | 182 | 182 |
| G3FPK | — | — | 168 | 168 |
| G4IJE | — | — | 161 | 161 |
| G4IGO | — | — | 160 | 160 |
| G3KEQ | — | — | 159 | 159 |
| G4DEZ | — | — | 134 | 134 |
| G8IXG | — | — | 115 | 115 |
| G8LFJ | — | — | 106 | 106 |
| G4GHA | — | — | 86 | 86 |
| G4JZF | — | — | 85 | 85 |
| G8TGM | — | — | 76 | 76 |
| G8JGK | — | — | 62 | 62 |
| G8RWG | — | — | 50 | 50 |
| G8VFV | — | — | 33 | 33 |

Starting Date January 1, 1975. No satellite or repeater QSOs. "Band of the Month" 70 cm.

## Two Metres

Mike Allmark, (Leeds) lists some nice DX heard during the Oct. 3 lift including seven HBs in EH square and a couple of OKs in GK. On Oct. 19 he listened in to G4IDR's *E-M-E* QSO with K1WHS and was delighted to hear his very first signals bounced off the Moon. His Rx was a tuned line 3SK48 preamp. to an *IC-202* with *Datong* FL1 filter. Jack Kay, G3CO, (Essex) was

pleased to work EA1CR again after a 15 years interval, along with a lot of other DX to the south and southeast on Nov. 1.

G3PBV only had a couple of QSOs in the Nov. 1 lift, with G3SQN (Cumbria) and G8LZM (Cleveland), the latter after a QSY from 70cm. Although G8LZM was running ten times the power on 2m. he was three S-points weaker. Dave reckons the only way he will ever be able to work into EI, GI, GM and Tyne and Wear would be *via* MS, so wonders if anyone would care to offer a sked? He heard several GMs in the *Perseids* and has a big amplifier on the stocks, to be followed by a keyer.

On the MS scene, G3VYF made it on SSB on Oct. 20 with YO7VS (LE). Dave Thorpe, G4FKI, (Essex) had a go in the Nov. 2 CW contest and added some new counties, but thought conditions the previous evening better. The super opening in early October did not seem to reach G4FUT in Sunderland, leading to, "a growing suspicion that the Continent does not exist!"

John Wilkinson, G4HGT, (Liverpool) dragged out the key to work some nice middle-France DX on Nov. 1/2 to AE, AF, AG, BF and BG squares, plus HB9AMO/P in DG. Graham Taylor, G4JZF, (Staffs.) thought he would have nothing to report, till the Nov. 1 event. The signals from F to GM seemed to be going over his head, but he did manage a contact with EA1CR, and a few new squares in France. Congratulations to Steve Cottis, (N. Yorks.) who has traded in G8TFR for G4KMH. His *Yaesu* FT-480R/4CX250B amplifier combination with 12-ele. *ZL-Special* at 30ft. has been doing him proud. The *Aurora* of Oct. 30 saw QSOs on the key with GM4JJJ and GM4BYF at 1655 and 1707 followed by a goodly selection of distant squares on the Nov. 1/2 lift, when SSB produced F1DV (BG); F6CCH (ZG), etc.

George Gullis, G8MFJ, (Wilts.) lists some choice stuff collected on Oct. 3 including Y24TN (GK); three Germans in Berlin (GM); OK1AIY/P (HK); OZ1DPR and OZ1ELF in EP; Y25QL/A (GL) together with a couple of PAs and 22 other Germans. G8TF1 worked EA1CR on 2m. as well as on 70cm. on Nov. 1 and found conditions very good to the north of Britain, too, with Grampian folk GM8FFX and GM8MBP worked. Chris managed to organise a QSO between GM8MBP and F6FRR (ZF) and was able to copy both sides when beaming north. On the following morning, GM8BDX (YP) was contacted and Alex was indeed an enormous signal in London.

Roger Gregory's, G8TIN, (Oxon.) activities are seriously curtailed by studies and overtime, so he has not added much recently apart from OE5XPL (HI) on Oct. 3. G8VR writes: "Just to show how clinical MS can be, on the evening of Oct. 9 I worked LA7KK on the 14 MHz VHF net and told him I had never managed to work LA on 2m. A MS sked — CW, of course — was immediately arranged for the same evening, and by midnight I had got his 'Rogers' and another country and new square were in the bag."

GJ4ICD is now up to 182 squares on the band, the latest editions on Nov. 1 being LA1EKO (BQ) and G8PWX (ZP). At long last, your scribe has worked ZG square *via* F6CCH on Nov. 1.

## Four Metres & Up

G3PBV only managed about 45 minutes in the Oct. 26 Fixed Contest, working 8 stations including three all-time new counties. G4FKI is still looking for skeds. with EI and GI stations; any offers? Dave thinks a *Cumulative* contest would be a good idea on 4m. John Baker, GW3MHW, (Dyfed) writes that the GM3WOJ transverter has now arrived *chez*-ZB2BL. Jimmy has tested it and reports it TVI-free on his own set. John was on during part of the 4m. contest and worked about ten stations, but both he, and G4CG, ask that people point their beams towards Dyfed and Devon. If anyone will donate a suitable Tx, he suggests it may be possible to have a 4m. beacon in Cornwall. (GB3CTC has been allocated 70.675 MHz, long since. *N.A.S.F.*)

G3COJ reports that 6m. has been coming to life with all continents except Australasia heard between Oct. 26 and Nov. 1. Brian had 10/6m. crossband QSOs with EL2FY and 5B4AZ and heard VP2VGR. GW3MHW reports that on Oct. 25, EL2FY worked 47 JAs, and four more on the 31st. The EL has worked extensively into the U.S.A. ZD8TC is also QRV and is frequently on 28,888 kHz seeking cross-band contacts. OZ7JV has received 5B4CY on 50.499 MHz at S2 on Oct. 25.

6m. started to open up around mid-October. ZS6PW heard U.K. Ch. 2 TV and copied Euro-TV up to 62.25 MHz on the 16th, the same day that VE1AVX got his signals across to DK1PZ. G2AOK just about copied VE1AVX's beacon the following day. On the 22nd, GW3MHW had a fine cross-band QSO with Ed Tilton, W1HDQ, of erstwhile *QST* VHF fame, and then contacts with other W1, 2 and 3 stations. John says that one of the first stations heard when the band opens is W2UTH, whose daughter, WD2AKA, is also QRV with 500 watts. He now has his 6m. beam higher and seems to be hearing more from the south as a result. Three ZS6 beacons, 5B4CY and ZB2VHF have all been received.

Mike Allmark has been copying a lot of Band I TV of late, *via* F2 layer. Oct. 25 was very good with stations from Russia, Dubai, Zimbabwe, and possibly Nigeria / Ghana and Australia? Zimbabwe TV is received some times around 1130-1200 and Mike queries if the propagation mode is *T.E.P.?*

## Tabular Stuff

The Squares Table is a little shorter this month as the entries of those who have not reported since last December have been deleted. They can always re-enter at a later date and carry on from where they left off. Incidentally, if you move *less* than 50 kilometres from the original QTH, there is no need to start all over again for this table: this is in line with the rules of the QTHCC award.

## Sign Off

That about wraps it up for another month. Have fun in the *Geminids*. All your reports and claims to: "VHF Bands," SHORT WAVE MAGAZINE, 34 High Street, WELWYN, Herts., AL6 9EQ by Dec. 3 for the January issue. The following deadline will be January 7, just after the *Quadrantids*. A very Happy Christmas to all readers and may there be a super lift during the holiday. *73 de G3FPK.*

**January issue due to appear on Friday, January 2nd.**

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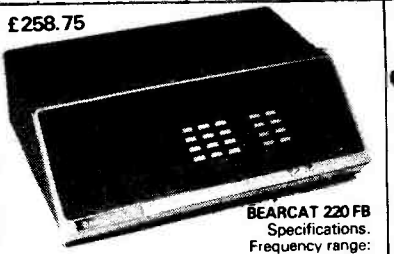

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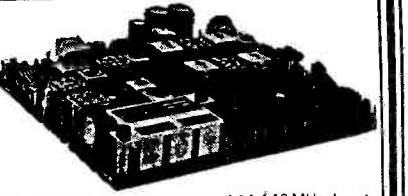

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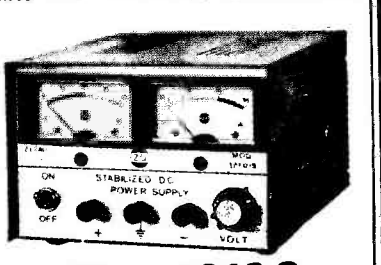


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