65p

The SHORT WAVE Magazine

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April 1984 Volume 42 Number 2

G3ROO adds FM to the FT-707

"Practically Yours" with Glen Ross, G8MWR, begins with an easy power supply

FOR·THE·RADIO·AMATEUR·AND·AMATEUR·RADIO

SHORT WAVE MAGAZINE

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AUTHOR'S MSS

Articles submitted for Editorial consideration must be typed double-spaced with wide margins on one side only of A4 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 at a competitive rate 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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LOWE SHOPS

Whenever you enter a LOWE ELECTRONICS' shop, be it Glasgow, Darlington, Cambridge, London or here at Matlock, then you can be certain that along with a courteous welcome you will receive straightforward advice. Advice given not with the intention of "making" a sale but the sort which is given freely by one radio amateur to another. Of course, if you decide to purchase then you have the knowledge that LOWE ELECTRONICS are the company that set the standard for amateur radio after-sales service. The shops are open Tuesday to Saturday and close for lunch 12.30 till 1.30 pm.

In Glasgow the LOWE ELECTRONICS' shop (telephone 041-945 2626) is managed by Sim GM3SAN. Its address is 4/5 Queen Margaret's Road, off Queen Margaret's Drive. That's the right turn off Great Western Road at the Botanical Gardens' traffic lights. Street parking is available outside the shop and afterwards the Botanical Gardens are well worth a visit.

In the North East the LOWE ELECTRONICS' shop is found in the delightful market town of Darlington (telephone 0325 486121) and is managed by Don G3GEA. The shop's address is 56 North Road, Darlington. That is on the A167 Durham road out of town. A huge free car park across the road, a large supermarket and bistro restaurant combine to make a visit to Darlington a pleasure for the whole family.

Cambridge, not only a University town but now the location of a LOWE ELECTRONICS' shop managed by Tony G4NBS. The address is 162 High Street, Chesterton, Cambridge (telephone 0223 311230). From the A45 just to the north of Cambridge turn off into the town on the A1039, past the science park and turn left at the first roundabout. After passing a children's playground on your left turn left again into High Street. Easy and free street parking is available outside the shop.

The Capital City also has a LOWE ELECTRONICS' shop managed by Andy, G4DHQ. Easy to find, the address is 278 Pentonville Road, London N1 9NR (telephone 01-837 6702) and the shop is located on the lower sales floor of Hepworths. That's only a 3 minutes walk from Kings Cross railway station. So, when you're in the Capital City, visit LOWE ELECTRONICS.

Finally, here in Matlock David G4KFN is in charge. Located in an area of scenic beauty a visit to the shop can combine amateur radio with a outing for the whole family. May I suggest a meal in one of the town's inexpensive restaurants or a picnic on the hill tops followed by a spell of portable operation.

if I am absolutely honest,

I am not certain whether I own a NRD515 because of its unbelievable performance as a general coverage receiver or just for the sheer pleasure of having and constantly admiring probably the finest piece of equipment available today.

Perhaps it comes down to the same thing, certainly the other NRD owners I have spoken to have all expressed the same feelings, that the NRD515 is a receiver in a class of its own.

As a person not owning the receiver, you may ask what sets this particular one above all the others. This is difficult to define—the feel of the equipment when wandering over the crowded band, its signal handling capability and selectivity can only really be appreciated by use. Technically, the equipment is above reproach. JRC's manufacture and production control methods as applied to other items in the range are equally applied to their amateur products. The other items referred to, only a small part of the vast range, are marine radio equipment, Marisat mobile terminal, Omega navigators, Doppler sonar, echo sounder/fish finders, communication satellite earth stations and a complete range of avionic beacons, radar and associated products. Indeed, a wider range application of electronic and radio technology for land, sea and air.

You may be forgiven for associating such advanced technology with complexity of operation, a piece of equipment that needs an operator with an electronics degree. However, this assumption is incorrect. The NRD515 is easy to use with the minimum of controls to ensure the operator really enjoys his listening time. Digital readouts, MHz, mode and filter bandwidth switches together with a VFO knob that will tune the band continuously without using any other control, from 100KHz to 30MHz or vice versa. To assist with difficult band conditions the NRD515 has pass band tuning and the medium wave broadcast section to 600KHz to 1.6MHz has a preselector control to cope with crowded conditions.

To give real "armchair copy" JRC have introduced the NCM515 remote control keypad. As its name suggests the NCM515 enables frequencies to be quickly keyed into the receiver. Four memories are provided, two rates of frequency stepping in increments of either 100Hz or 10MHz and finally the ability to add to or subtract from the operating frequency by any frequency step. Add the optional 600Hz CW filter and the 96 channel memory unit and, as the other NRD515 owners would say, "a joy to own".

the NRD 515

NRD515	monitoring receiver	**£965.00** inc vat.
NDH515	96 channel memory unit	**£264.00** inc vat.
NCM515	remote frequency controller	**£125.00** inc vat.
NVA515	speaker	**£34.50** inc vat.
CFL260	500Hz CW filter	**£39.10** inc vat.
CFL230	300Hz CW filter	**£64.00** inc vat.

LOWE ELECTRONICS

Chesterfield Road, Matlock, Derbyshire. DE4 5LE.
Telephone 0629 2817, 2430, 4057, 4995. Telex 377482.

TR9130 TWO METRE ALL MODE TRANSCEIVER

This rig is proof, if one needed it, that TRIO do not bring out new models just for the sake of it. The TR9000 is remembered as a classic rig and today people are still asking for second hand ones, even they are a rarity on our S/H shelf. The TR9130 incorporates the improvements that all amateurs asked for, green display, reverse repeater, tune whilst transmitting, higher power, more memories and of course memory scan. TRIO's answer, the TR9130.

TR9130..... £442.52 inc vat.

TS780 DUAL BAND BASE STATION TRANSCEIVER

The TS780 is the perfect base station VHF/UHF transceiver for the enthusiastic operator. The rig has all the necessary control functions essential for operating on both today's busy two metre band and the wide spaces of seventy centimetres. Full repeater facilities plus reverse repeater are included and the transceiver has the usual memory channels (10), two VFO's, up/down frequency shift microphone, IF shift, two priority channels, memory and band scan, etc. A superb rig, I have one myself, ring for a full enthuse!

TS780..... £795.00 inc vat.

TR7930 TWO METRE FM MOBILE TRANSCEIVER

Those who have used or owned a Trio TR7800 will know what I mean when I say that Trio, with the introduction of the TR7930 have improved on the unimprovable. The Trio TR7930 improves on the TR7800 by giving a green floodlight liquid crystal display, extra memory channels, both timed and carrier scan hold, selectable priority frequency and correct mode selection (simplex or repeater). The most significant change is the liquid crystal display, but closely following this must be the ability to omit specific memory channels when scanning and the programmable scan between user designated frequencies.

TR7930..... £312.11 inc vat.

R2000 GENERAL COVERAGE RECEIVER

The amateur bands are only a very small part of the radio spectrum, many other transmissions are available for the short wave listener. Broadcast stations provide an alternative source of current information both political and regarding the life style of the country. Fitted with the internal VHF converter the R2000 covers continuously frequencies from 118 to 174 MHz giving access to amateur two metre transmissions (am, fm, ssb and cw) plus a lot more. Having 10 memories, memory scan and programmable scan the R2000 provides in one rig the perfect receiver.

R2000..... £421.36 inc vat.

TS930S HF TRANSCEIVER WITH GENERAL COVERAGE RECEIVE FACILITIES

Much has been said about the TS930S transceiver and it now has a place high in the affection of those amateurs fortunate enough to own one, indeed it has become the "flagship" of the TRIO range. Providing full amateur bands plus a general coverage receiver (150kHz to 30MHz), the TS930S has every conceivable operating feature for today's crowded frequencies.

TS930S..... £1150.00 inc vat.

TR2500/TR3500 HANDHELD TRANSCEIVERS

Two first class hand held transceivers, one for two metres and the other for seventy centimetres. Ten memory channels, band and memory scan, repeater shift, reverse repeater and a low power position make the rigs extremely useful for the radio amateur who wishes to keep in touch with his local scene. A comprehensive range of accessories, base station charger, speaker microphone, mobile mount, etc, can be added to enhance operation, accessories used with one rig being compatible with the other.

TR2500..... £237.82 inc vat.
TR3500..... £256.45 inc vat.

TS530SP HF AMATEUR BAND TRANSCEIVER

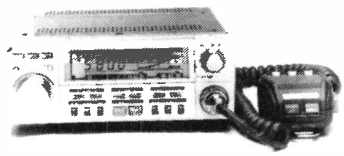
A logic progression from the reliable TS520 series the TS530SP was the most popular HF rig in the range. I use the term "was" because TRIO decided to cease production and supplies were no more, however the demand from radio amateurs worldwide for the transceiver have continued and TRIO have reintroduced the rig. A standard HF valve transceiver without the frills but providing today's amateur with all necessary facilities for reliable world wide communication, the TRIO TS530SP. Now fitted with notch filter.

TS530SP..... £638.00 inc vat.

TW4000A DUAL BAND FM TRANSCEIVER

I have been waiting for this rig for the last three years, now it is here and I am using one, words fail me. Send for details.

TW4000A..... £469.00 inc vat.



just a part of the range

Securicor carriage on the above items £6.00

FOR THE RADIO AMATEUR AND AMATEUR RADIO

The SHORT WAVE Magazine

GUEST EDITORIAL

Novice Licensing

For some time a minor campaign has been waged in favour of a Novice Licence based upon an even simpler Radio Amateurs' Examination. However, many licensed radio amateurs take the opposite view maintaining that the current R.A.E. is far too simple and an inadequate basis on which to assess a candidate's technical competence.

All examinations are a weeding-out process designed to eliminate candidates not reaching the set minimum entry standards. I suggest it is time we demanded a higher minimum standard for those seeking full privileges to operate in the amateur bands, otherwise amateur radio will lose its hard won credibility with the general public.

The present R.A.E. syllabus, setting of questions and marking of papers is handled by the City and Guilds of London Institute. Why? Surely all this should be administered by the national body representing radio amateurs in the U.K., namely the Radio Society of Great Britain. After all, this is the way the professions select their various grades of members and it would be entirely appropriate for us to adopt the same procedure.

I suggest the *present* R.A.E. be regarded as this proposed novice licence examination, the passing of which would entitle candidates to restricted power use — say 25 watts — in parts of the appropriate bands for a maximum of a year, after which the novice licence, akin to a provisional driving licence, would lapse. This would give the novice either time to acquire sufficient technical knowledge and practical experience to attempt Part 2 of the R.A.E., or drop out.

Part 2 of the R.A.E. would test more searchingly the candidates' technical competence and include some old-style, mandatory questions requiring written answers, rather than multiple-choice questions to be answered by a tick. If they felt sufficiently confident, both parts of the R.A.E. could be taken on the same day. Passing Part 2 would entitle the candidate to existing Class A or B licences.

I see nothing wrong in this more elitist approach. Far better that we have 50,000 licensees with a reasonable knowledge of what they are doing, than a quarter million, the majority of whom are little more than CB-type appliance operators. In the January issue of its journal *Radio Communication,* RSGB members were invited to write to the Society's Licensing Advisory Committee about novice licensing. Readers of this piece should consider their views, too, and write their own comments on this important matter. The address is:— RSGB Headquarters, Alma House, Cranborne Road, Potters Bar, Herts. EN6 3JW.

Norman Fitch, G3FPK

"Magazine" Prizewinners

Choosing the winner of the annual *Short Wave Magazine* article competition has proved quite a task this time, with at least six possible names which could have come out on top. In the end, and for the second time in recent years, we have decided to share the prize (for Volume 41) between two contributors.

Congratulations, then, to Ian Keyser G3ROO, and Ed Wetherhold W3NQN, who each receive a cheque for £50.

G3ROO's splendid "Whitfield" transceiver six-part series (March to August, 1983) proved practical and popular, with many examples on the air and yet more still being constructed — while W3NQN's superb two-part series "Low Pass Filters for Attenuating RF Amplifier Harmonics" (December 1983/January 1984) was as much a work of art as of science, and a considerable contribution to amateur radio in many ways. Thank you both very much!

This is also the time when we thank all our other contributors over the past year; their efforts are just as much appreciated and valued. Indeed, we would have been lost without them!

VHF BANDS

NORMAN FITCH, G3FPK

Satellite News

MARCH 1 saw the successful launch of a *Delta 3920* vehicle from the Western Test Range at Vandenburg in California. Part of its payload was the *University of Surrey's* second satellite, *UOSAT-B* which was later separated and placed into the desired orbit. Now known as *UOSAT-2* and *Oscar-11,* the initial period was 98.5648 minutes at an inclination of 98.25967°. The apogee was 690.030 kms. and the perigee 684.236 kms. The semi-major axis was 7,065.31 kms. and the track separation 24.6505° west per revolution. The eccentricity of the orbit was quite small at 4.139783×10^{-4}.

That is the good news. The bad news is that, while the satellite was switched on for the first few orbits, it was working satisfactorily. Then it was switched off but could not subsequently be persuaded to respond to ground command. As this is being written, we have a dead satellite but steps are in hand to regain control. Telemetry QRGs are 145.825 and 435.025 MHz.

Those wishing to make their own computer predictions for any day's orbits can use the "Ninetrack" program, 2.1.6, in *Satellite Tracking Software for the Radio Amateur,* John Branegan's book published by *AMSAT-UK* at £4.90 including U.K. postage. However, some obvious, and several more subtle, changes have to be made to about a dozen lines. Your scribe re-wrote "Ninetrack" and got it working on the terribly slow *Sinclair* ZX-81 borrowed from a friend. After entering the day's reference orbit, it takes two minutes to come up with the list! The latest *Keplerian* parameters are broadcast on the usual *AMSAT* nets.

The only reader mentioning *UOSAT-2* is Adrian Chamberlain, G4ROA, who listened to the actual launch as relayed by WA3NAN in Maryland. He copied its telemetry on 1200 *baud* ASCII on the first three orbits, taking hard copy on the last two. Adrian continues to use *O-10* and reports two more QSOs with KH6IBA who can only reach to England for three days infrequently. Other QSOs were with KL7GNG in Fairbanks, Alaska and PY2GN in San Paulo, Brazil, just before the transponder was switched off. On Feb. 29, on a lowish, easterly pass, JA8FXG in Sapporo was contacted, and at 0145 on March 4, he worked VK5YZL. As soon as the better weather comes, Adrian will be installing a ten-turn helical antenna for 436 MHz.

In a response to requests for more satellite news from readers, Russell Coward, G6HRI, sent in four pages of news after some three months — Nov. to Jan. — when only 30 mins. operating *per* week were possible. He has lately been experimenting with forward scatter on *O-10* when the satellite has been one or two degrees *below* his horizon. This has resulted in up to 2½ hours extra operating time. He attributes this success on westerly passes to his clear take-off from Blackpool, across the Irish Sea, with the help of ducting. Russell uses 30w to two 48-ele. *Multibeams* for these sub-horizon experiments and stresses the need for a really good receiving system. His set-up comprises a pair of 10-ele. *Parabeams,* the Rx being a *Yaesu* FT-290R with a 3SK88 RF stage and a *muTek* preamplifier in the '290. Signals are weak with the characteristics of a DX opening to Europe with fading — and QRM due to his being on the DX end of a pile-up.

G6HRI is up to 36 U.S. states worked. On Feb. 10, between 1336 and 1805, much of the period being sub-horizon, he lists 20 U.S.A. QSOs including AA7A (AZ); N6EEG, W7OTC, NG6P, K6TE, K6TSK (all CA); KO7N (OR) and KB7RV (NV), plus other eastern and mid-west states. On the 11th, K2UYH (NJ) was worked at 1° below horizon, Al using his 28ft. dish and just 30 milliwatts and again contacted the next day on orbit no. 502.

Orbit no. 535 on Feb. 28 was at best on Russell's horizon yet in a two hour period from 1348 ten Ws were worked from California to Florida. Contacts with WA6CTX (CA), W7OTC again and KA0OOQ (MO) were at −1°. the next day, orbit no. 537 was another rather low pass to the west and, in addition to 12 mainland Ws, KH6IBA was worked, sub-horizon, also K9PW/VP2V in the British Virgin Is. for a new country. G6HRI's report ends with Mar. 1, orbit no. 539, when another eight Ws were contacted.

Russell included a few "DX notes", the first of which refers to the recent Clipperton Is. DX trip where they were unable to get a 432 MHz Tx permit, so no *O-10* operation. However, in another trip in April, NA6E says they are trying hard to get authorisation. The second note is about an *O-10* contest on Apr. 14 with exchanges of Maidenhead Squares. That information from WA2RDE (NY) who is in FN02. Thirdly, Carl, KH6IBA, told Russell he is an old timer who gets up at 2 or 3 a.m. to work us, when the opportunity arises. Lastly, K2UYH, K1WHS and K2RIW, all well known *E-M-E* folk, use the satellite for arranging skeds.

Some *AMSAT-UK* notes now. *Oscar News* is now being printed by another firm and includes the orbital calendar as a pull-out supplement. Issue no. 46 was due out on Mar. 6. The *RSGB/AMSAT-UK* Sunday news bulletins from *O-10* in April will be at 1330 on the 8th, 0900 on the 15th and 1030 on the 29th. No transmissions on the 1st and 22nd due to non-availability of access during "social hours". The AGM date is May 12, the venue, as last year, being London House in Doughty Street, London W.C.1. For details of *AMSAT-UK* membership and services, send a large *s.a.e.* to AMSAT-UK, LONDON E12 5EQ, England.

Awards News

Two more readers have been elected members of the 70cm. VHF Century Club. Certificate no. 35, issued on Feb. 16, went to Dave Robinson, G4FRE, from Felixstowe in Suffolk. He started on the band at 1110 on Jan. 22, 1983 and 36 hours later, had already worked 110 stations in 40 squares and 13 countries during what transpired to be one of the most memorable tropo. openings in many years. Dave's station comprises a *Trio* TS-120V with a *SSB Electronics* transverter. On the receive side he uses an MGF1401 *Gasfet* preamp. in the loft, into an SRA1H high level mixer feeding the *TS-120V.* A PA using a 4CX250B valve feeds a 19-ele. *Tonna Yagi* 11m. *a.g.l.,* the QTH being three miles from the sea at 15m. *a.s.l.* The take-off is good from the NE, *via* E to the SE. 40% of Dave's cards were from German stations and 27% from England. The rest were assorted ON, LA, OZs, etc.

Pam Rose, G4STO, from Sturton by Stow in Lincolnshire, was issued with certificate no. 36 on March 2, made out to her old call of G8VRJ. Her station, shared with husband G8CTG, comprises a *Yaesu* FT-301 and *Microwave Modules* transverter running about 14w peak power. The antenna is a *HAG* 23-ele. *Yagi* 75ft. *a.g.l.* fed with 85ft. of *Pope* H-100 coax. On receive, she uses a *Wood and Douglas* preamp. Her cards were from 11 countries, including EI, OZ and SM.

John Hunter, G3IMV, member no. 3 of the QTH Squares Century Club, was sent his "325" sticker on Feb. 18. It took him about a year to collect this latest batch. Only two were tropo. QSOs, the rest a mixture of *Es, Ar* and MS in an even mix of SSB and CW. Two unusual cards were those from EB7MF (XW) and EA4BJL (YY) for Es QSOs on FM in the July 10, 1981 event.

Congratulations to Vaughan Reynolds, G4MVR, from Chislehurst, Kent, who is member no. 33 of the 144 MHz QTHCC, his certificate being handed over personally on Feb. 15. His confirmed total is 104 squares from 23 countries. 90 QSOs were tropo., eight *Ar* and six *Es.* Mode-wise, 93 were on SSB, 10 on the key and one on FM. For details of the VHFCC and QTHCC send an *s.a.e.* to the address at the end of this feature.

Contests Notes

Congratulations to reader Chris Easton, who, operating as GW8TFI/P, won last year's 23cm. Cumulative Contest with a total of 1,866 points. Second was G4APA with 807 and third, G8FEZ with 699 pts.

April 8, 1300-1700 GMT sees the 432 MHz CW contest and it is a single section affair with radial ring scoring. The *BARTG's* Spring VHF/UHF RTTY Contest runs from 1800 GMT on Apr. 14 to 1200 the next day, but a declared four hours break is mandatory. Bands are 2m, 70cm and 23cm and the event is for residents in "CQ" zones 14 and 15. The rules are rather lengthy and copies can be obtained for an s.a.e. to G6LZB, 464 Whippendell Road, Watford, WD1 7PT. The *Stevenage and DARS* is running an FM contest on 2m on Apr. 15 in the sub-bands 144.500-144.845 and 145.200-145.475 MHz. Further information from G6NZC, 82 Lingfield Road, Stevenage, Herts. SG1 5SN. S.a.e. requested.

The *RSGB's* decision to drop the requirement for giving the QTH in its contest exchanges has met with a mixed response. On the one hand, it speeds things up for those capable of making hundreds of contacts, but on the other, those who use contests for county hunting will not know easily which counties they have worked, without asking, and that is not always appreciated anyway.

DX Note

From the 20m VHF net, your scribe learned that LA6QBA will be operating from GV41e from Apr. 14-22, mainly for MS work. The QRG stated is 144.129 MHz and he will have 1kw to four 11-ele. *Yagis*. He will be listening on the VHF net, too.

Beaconry

For a long time there has not been a VHF beacon in Ulster since GB3GI closed down on 2m. It is understood that plans are afoot to provide a new service from WP square with beacons on 6m, 4m, 2m and 70cm, sometime this year.

Repeaters

Bill Wright, GM3IBU, Chairman of the *Orkney-Caithness Repeater Group,* reports the "birth" of a new repeater on Wideford Hill, near Kirkwall, Orkney at 1600 on Feb. 17. It is on R2, callsign GB3OC, and is based on a *Uniden* 2030. The antenna is a ground plane 20ft. *a.g.l.*, the site being 730ft. *a.s.l.* about two miles west of Kirkwall.

Trevor Groves, G4KUJ, Secretary of the *South West Hertfordshire UHF Group,* has sent some notes about their repeaters and beacons. GB3HR is the 70cm relay on RB14, now re-sited at Stanmore covering the St. Albans, Edgware, Harrow and Watford areas. GB3BH is a 23cm FM beacon/repeater station under construction for eventual installation at Bushey Heath. The Tx QRG will be 1,297.0 MHz, the Rx QRG being 1,291 MHz. Horizontal polarisation. The Group also operates the 3cm beacon GB3SWH on 10.368 GHz useful for checking receivers as it has been heard in Hampshire and Suffolk. Antenna polarisation is horizontal.

ANNUAL VHF/UHF TABLE

January to December 1984

Station	FOUR METRES Counties	FOUR METRES Countries	TWO METRES Counties	TWO METRES Countries	70 CENTIMETRES Counties	70 CENTIMETRES Countries	23 CENTIMETRES Counties	23 CENTIMETRES Countries	TOTAL Points
G4ARI	16	1	58	11	—	—	—	—	86
G4ROA	—	—	44	6	31	2	1	1	85
G4TIF	—	—	42	4	32	2	—	—	80
G3BW	11	2	28	8	15	6	*2*	*1*	70
G6HRI	—	—	34	7	23	4	—	—	68
G3FPK	—	—	57	9	—	—	—	—	66
G8TFI	—	—	—	—	47	10	5	3	65
GW4TTU	—	—	51	10	1	1	—	—	63
G4MUT	14	2	22	5	17	2	—	—	62
G6ECM	—	—	51	10	—	—	—	—	61
GW3CBY	5	3	34	6	6	2	*1*	*1*	56
GW8UCQ	—	—	32	4	15	5	—	—	56
G4NRG	10	1	14	8	17	2	—	—	52
G4VXE	—	—	38	4	3	2	—	—	47
GD2HDZ	15	1	13	1	14	2	—	—	46
G8PNN	—	—	3	1	22	4	4	2	36
G8FMK	—	—	3	1	21	2	7	2	36
G6NVQ	—	—	32	3	—	—	—	—	35
G6HFF	—	—	21	5	5	3	—	—	34
G4LZD	—	—	20	3	—	—	—	—	23
G2DHV	3	1	9	2	—	—	—	—	15
G6CSY	—	—	6	1	4	1	—	—	12
GM4CXP	—	—	6	2	—	—	—	—	8
GW4HBK	5	2	—	—	—	—	—	—	7
GU4HUY	—	—	1	2	—	—	—	—	3

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

Six Metres

Paul Turner, G4IJE, (Essex) now has a *Yaesu* FT-690R transceiver for 6m and likes it very much. He is continuing his MS tests with GM3WOJ and they usually complete on SSB in 20-30 minutes. From Denmark, OZ1DOQ has a 6m receiving set-up and is looking for crossband MS proposals from U.K. licensees. He is one of a group of at least five Danish amateurs who plan to operate 4U1ITU in Geneva from July 1 to 8, possibly on 6m.

Issue no. 7 of *Six News,* the newsletter of the *U.K. 6m Group,* dated Feb. 1, has been received and includes the news that Steve Richardson, G4JCC, has given up the jobs of editor and secretary. Their A.G.M. was scheduled for Mar. 24 at which, no doubt, new volunteers will have been elected. One interesting comment on 6m *Auroral* possibilities was from K1TOL in Maine, who is listening for U.K. stations on CW *via* the mode. He has an auto-keyer sending "CQ" on 50.095-50.110 MHz. In case that sounds far-fetched, Lefty has worked several Alaskan stations at a distance much more than that across the Atlantic.

Four Metres

Not a great deal of news of 4m activity. Tim Raven, G4ARI, who proposed the CW Cumulative Table, lists ten different stations worked this year in five counties on CW. Nick Peckett, G4KUX, (Co. Durham) hopes to be back on the band soon using a 3-ele. beam on a separate mast from the 2m array. He has applied for a 6m permit, by the way. Terry Hackwill, G4MUT, (Berks.) heard broadcasting station via *Es* on Mar. 4 for the first time this year.

Arthur Breese, GD2HDZ, was on for the Feb. 12 and 26 *Cumulatives* sessions which produced 13 of this year's counties. Others who are active on 4m include G2DHV, G3BW, G4NRG and GW3CBY, who sent in some tables figures but without further comment.

Two Metres

Bill Hodgson, G3BW, (Cumbria) has not been too active this year yet. During the tremendous gales in Jan. and Feb., he had to lay his tower down for safety. G3IMV caught the *Ar* on Feb. 4 and got GM3XOQ (ZT) for a new square, the other QSOs being with the usual GMs and SMs. G4ARI (Leics.) added another 13 counties and five countries to his annual tally including GM3WOJ (Highlands) and GM4DMA (Grampian) on Feb. 10, and GI4VIP/P (Co. Antrim) on Mar. 4.

G4FRE doubts he will enter this year's four band table. On 2m. he has added a *Yaesu* FT-221R to "the ammunition", with a new "front end" board. A home brewed PA was commissioned just in time for the *Ar* on Feb. 10 and its 80w produced a CW QSO with NV square. Steve Reading, G4LZD, (Devon) has sent his first table entries. In the *Ar* on Feb. 4, he heard four GMs in XP and YP at good strength on CW and GM4NFC on SSB in the evening. Roger Greengrass, G4NRG, (Essex) was on in the Mar. 3/4 contest and

found the conditions below average, being unable to work anyone over 500 kms. away.

G4KUX does extremely well from Co. Durham in *Auroras,* dur particularly to his four 19-ele. *Cushcraft* "Boomer" antennas. They are in a 12ft. x 12ft. box on a 40ft. tower, fed with 25m of airspaced *Heliax* cable. The transceiver is a "muTeked" *Yaesu* FT-225RD, the PA being a pair of 4CX250Bs. In the Feb. 3/4 *Ar,* Nick worked some very choice stations; OY9JD (WV05h), OH2TI (MU65g), SM5BEI (JU72c), OH1AWW (LU42a), LA3BQ (FU77j), UK2RBM (MT43j), SM3AZV (IX79c), UR2RIW (LS02e), UR2NW (LT74d) and UR2RQT (MS80e), along with more usual DL, LA and SM DX.

In the Feb. 10 *Ar,* Nick was on from 1845, his log extract showing QSOs with LA, GM and SM, plus Y22ME (HM53a), OH2MQ (MU25f), UR2NW again and OH6CH (NV01d). On Feb. 13, tropo. conditions seemed favourable and SK1VHF (JR51d) was S1-2. A "CQ" call brought a couple of SMs in Stockholm, then another *Ar* began. SMs were worked both *via Ar* and tropo. at a QTE of 60°. Then came the first OH contacts on tropo. when he worked OH2s TI, BM, BJW and BDF, all in Helsinki. In another *Ar* on Mar. 2, OY5NS (WW) was worked along with a few LAs and GMs, between 0010 and 0040. Follow that lot!

G4ROA mentions the high band occupancy during the fine tropo. conditions at the beginning of February. His best DX to the south was G1DII in Beer (Devon) while to the north, Adrian's best was G6IKB/P in Cumbria. Martyn Jones, G4TIF, (Warks.) also took advantage of the Feb. 11-15 long GDX lift. New 1984 counties were G4LZD (Devon), G3IZD (Cumbria), GU4HUY and three GWs in the Glamorgans, all on the 11th. The 14th brought GW3KJW (Gwynedd) and G1BCL (Suffolk) and in the contest on Mar. 4, GW3OXD/P (Powys).

Congratulations to Tim Kirby, ex-G6TTU, now G4VXE (Gloucs.) and who has been doing some brass-pounding. He reckons CW activity to be on the increase and this has been noticed at G3FPK, where a lot of very new G4 calls are to be heard regularly. Tim's only DX was in the *Ar* on Feb. 4 when he got GM4OBD (YR), and G4NMK in Durham later on with low power to an indoor beam. During the March contest, his call was being used on 70cm and he helped out on 2m with G4ERP/P who notched up 640 QSOs.

Graeme Caselton, G6CSY, (Kent) used QRP in the March contest and got up to G4VKE/P in YO, a new square. Mick Cuckoo, G6ECM, found the conditions poor for both the *Swale ARC* Contest on Jan. 22 and the Mar. 3/4 affair, but even so, he has amassed 51 counties and ten countries so far this year. Brian Hancock, G4NPM, Hon. Sec. of the *Swale ARC,*

ANNUAL CW LADDER

Station	4m.	2m.	70cm	μWave	Points
G4ARI	10	106	—	—	116
G4VXE	—	24	—	—	24
G3FPK	—	13	—	—	13
G2DHV	3	9	—	—	12

No. of different stations worked since Jan. 1.

had received nearly 50 entries for the 2m event up to Feb. 8 and expected more. The club will run the event again next year and the Committee could make a few minor rule changes in the light of comments received. The Club's new QTH is the Ivy Leaf Club in Dover St., Sittingbourne, Kent.

Glenn Bates, G6HFF, (Bolton) enters the annual table. He is member no. 361 of the 2m VHFCC and his station details were published in the January column. He asked a few questions about the tables which others may be asking. Readers can enter all the tables at any time. For example, if you do not send in figures for the annual table till, say, June, you can nevertheless include everything worked from Jan. 1. It is not necessary to list all the counties, countries, stations or squares. For example, several readers just send in the figures with no letter at all, although it is better if some brief comments about band conditions, etc., are included.

G6HRI had little to report, but Russell did work EI8EF (VO) for a new square on Feb. 9. In the Mar. 3/4 contest, his best DX was F1KBF/P (AK30f) at 475 kms. and he also worked GI, GM and EI stations. Gordon Emmerson, G8PNN, seems to have been more active on 70cm, so far, than on 2m, but hopefully he will give the band, and Northumberland, an airing from time to time.

TWENTY-THREE CENTIMETRES ALL-TIME TABLE

Station	Counties	Countries	Total
G3OSS	52	15	67
G8TFI	46	16	62
G8FMK	44	10	54
G3XDY	36	12	48
G8KAX	37	10	47
G3PBV	38	9	47
G8FUO	33	13	46
G3DAH	37	9	46
G8PNN	32	11	43
G4FRE	34	9	43
G4STO	33	9	42
G3COJ	28	10	38
G4ROA	27	8	35
G6NB	28	7	35
G3UVR	30	5	35
G6CSY	30	4	34
G8ULU	23	10	33
G8IFT	28	5	33
GD2HDZ	24	8	32
G8HHI	24	7	31
G4NBS	24	6	30
G8ATK	20	8	28
G6DER	23	5	28
G8KBQ	21	6	27
G8LEF	16	6	22
GW3CBY	7	4	11
G4DKX	7	2	9
G3BW	3	5	8
G8OPR	3	1	4

Based on administrative counties

Philip Hocking, G8ZDS, is another new correspondent, from Camborne in Cornwall who has entered the squares table. He hopes to report on DX from the county in future. GD2HDZ had considered giving the annual table a miss this year but was spurred on to "renew his private war" with his rival, G3BW, after all. It is remarkable how similarly these two friends score in these annual jousts. Arthur asks, "Where have all the old, familiar call-signs gone?" He is one of several readers who deplore the *RSGB's* decision to drop the QTH information from contest exchanges as it make county chasing that much more difficult.

Geoff Brown, GJ4ICD, mentions the excellent tropo. conditions on Feb. 12 to 15. Although no great DX was worked, some interesting contacts took place. He cites a full FM duplex QSO between GJ4ICD on 144.650 MHz and G8YTF (YN30g) who was on 432.650 MHz. S9 each way at 10w over about 500 kms. In the March contest he made 390 QSOs on the band for 5,060 points.

Seventy Centimetres

G4ROA found band conditions rather strange in that, while the big lift was on on 2m, there was very little activity on 70cm. On Feb. 19, in the contest, Adrian listed nine, 1984 new counties by which time the QNH — barometric pressure at sea level — was down to 1,017mb. In this event, G4LOJ (Norfolk) seems to have been his best DX. The March contest was marred by a very wide transmission which commandeered over 40 kHz of the band. The centre frequency was difficult to find, and the station was 60 miles away, too. Adrian thought there were fewer stations on in the event, this year.

During the Feb. 19 contest, G4TIF worked G3DY (Cambs.) for an all-time new county, plus G4LOJ and G8ZHP (Lincs.). During the mid-Feb. lift, Martyn lists some rarer catches as:— G6CBN (Durham), GW6IGY (Clwyd), G6UPZ (Northumberland), G4VCJ (Cleveland) and GW8JLY (S. Glam.). G6CSY's best DX on QRP was G6CVT (YN). In the Feb. 19 contest, G6HRI mentions working G8TFI (YL), G4CQR (AL), G3XDY (AM) and GD2HDZ and GI4GVS in XO. In the March event, Russell worked GI6ATZ/P (WO) for a new square, G4CQR and GW8TFI/P (YL). Ray Cox, G8FMK, (Oxon.) thought activity and conditions in the fixed contest fairly low.

G8PNN did quite well in February. Some of Gordon's longer DX included G4NUT (Bucks.), G3CQR (E. Sussex), G8KGF (Oxon.), G3SHK (Wilts.) and GM8MNG (Lothian) in the fixed contest. On the 13th, he lists OZ9PZ and SM6ESG to bring the year's countries to four.

G8TFI has not been too active from home (Gloucs.) this year except for the fixed contest when he worked 196 stations in six hours in average conditions. 47

QTH LOCATOR SQUARES TABLE

Station	23cm.	70cm.	2m.	Total
OZ1EKI	—	116	345	461
G3IMV	—	91	346	437
G3VYF	—	117	307	424
G3POI	—	—	411	411
GJ4ICD	1	115	230	346
G3JXN	67	108	164	339
DK3UZ	—	—	317	317
G4IJE	—	—	314	314
G8KBQ	22	96	188	306
G3PBV	33	101	171	305
G3XDY	49	100	148	297
G3COJ	40	91	163	294
G4NQC	57	80	157	294
G3UVR	17	79	196	292
EA3LL	—	30	261	291
LA8AK	25	62	200	287
G8TFI	51	109	126	286
SP2DX	—	—	280	280
GJ8KNV	12	76	191	279
G3BW	6	36	233	275
G8VR	2	24	239	265
G4ERG	—	16	243	259
GW3NYY	—	48	209	257
G4MCU	—	77	176	253
G4DEZ	—	—	241	241
G4TIF	—	82	157	239
GJ8SBT	20	35	182	237
G8ATK	23	82	129	234
G8FUO	39	105	88	232
G8HHI	20	77	135	232
GM4COK	—	28	204	232
G8ULU	31	85	115	231
G4KUX	—	36	192	228
G8PNN	41	72	115	228
G8RZO	—	75	148	223
G4RZP	—	76	147	223
9H1BT	—	11	210	221
G4BWG	—	64	152	216
GW4EAI	—	—	210	210
G4OAE	—	31	174	205
G4ERX	7	61	132	200
G4AWU	—	50	150	200
G3FPK	—	—	197	197
G3KEQ	—	—	194	194
G6DER	22	65	105	192
GM4CXP	—	27	165	192
G4STO	29	48	113	190
G3NAQ	—	58	128	186
G4NBS	14	77	94	185
G8FMK	35	68	80	183
G4HMF	2	35	144	181
G4HFO	—	69	112	181
G8KAX	35	57	82	174
G6CMV	1	29	142	172
G6ECM	—	—	172	172
G4FRE	33	91	46	170
GW8UCQ	1	64	105	170
G6ADH	—	35	135	170
G4MUT	—	68	100	168
G8LFB	—	—	165	165
G8SRL	—	53	106	159
G8TGM	—	—	158	158
G4RGK	—	48	108	156
GD2HDZ	13	50	91	154
G4TJX	—	59	90	149
G8WPL	—	54	93	147
G6HKS	—	—	147	147
G4FRX	—	58	87	145
G6DDK	2	13	127	142
GM4IPK	—	—	139	139
G4ROA	19	56	61	136
G4MEJ	—	—	135	135
G4MJC	—	12	120	132
GW4TTU	—	2	130	132
GW3CBY	9	30	90	129
G4MWD	—	1	120	121
G4NRG	—	30	87	117
G4DOL	—	—	116	116
G8XIR	—	—	115	115
G4GHA	—	2	110	112
G6JNS	1	3	106	110
G4BVY	9	100	—	109
G4RSN	2	22	81	105
G6DFT	—	—	105	105
G8ZDS	—	16	86	102
G8VFV	—	—	97	97
GI4OMK	—	—	96	96
GM8YPI	—	—	94	94
G8RWG	—	—	92	92
GW8VHI	—	30	61	91
G6ABB	—	—	80	80
G6HRI	—	26	48	74
G8XTJ	—	—	74	74
G6CSY	15	25	30	70
G6NWF	—	—	67	67
G6PFR	—	13	50	63
G4PEM	—	—	63	63
G8ZYL	—	—	54	54
G4LZD	—	—	50	50
G4IGO	—	—	38	38

Starting date January 1, 1975. No satellite or repeater QSOs.

counties and ten countries were accumulated in this event and Chris worked four GMs. In the March affair, they were out portable in South Wales as GW8TFI/P and worked over 300 stations for a very good score. There was plenty of continental DX, expecially on the Sunday, as the pressure rose to the east. The group comprised G4GFX, G8FUO, G8LJU, G6BBG, G4TXG, G6CQO, G8TFI and G4BVY whose call was used on 2m where they made over 700 QSOs.

GJ4ICD described the mid-Feb. conditions as "fantastic" many northern England stations being worked at great signal strengths. Even so, no new squares were added. The Emley Moor beacon, GB3MLY, was 40 dB over noise. In the March contest, Geoff had 21 QSOs worth 260 pts. in average conditions.

The Microwaves

G4ROA reports low activity but did work two new stations not heard before on Feb. 12; G8UYR and G8SWZ, both in Wolverhampton. G4TXG in Malvern was contacted on the 26th. As reported in previous months, G4STO's rotator was not working, but on Mar. 3, Pam and her husband, Joe G8CTG, lowered the mast and found the gears in the AR-40 mangled again. Fortunately, Joe was able to manufacture some new ones and with some old bits managed to re-assemble the thing. All now works again but Pam has not put up the 7ft. dish for 23cm., rather her smaller 4ft. portable one.

G8FMK found activity low but was very pleased to work G8PNN at 1815 on Feb. 13 for a new county and square on 23cm. A little later, Ray worked GW3CCF (Clwyd) after which conditions reverted to normal. Naturally, G8PNN reports the QSO and it was a new county for Gordon, too. On the 15th, he worked GM8BDX (Borders). G8TFI is QRV on 23cm but has only worked a handful of stations and no DX at all. Chris will soon be on 13cm when the weather improves and a 1.2m dish arrives, probably in early April.

The CW Ladder

G4ARI's idea for an annual CW Ladder for the VHF/UHF bands has attracted only two other entries, apart from G3FPK. Now we have started the ball rolling, hopefully others will join in. The list has been compiled in bands with 1.3 GHz and above lumped together. The starting date was January 1, 1984 and all we need is the number of QSOs with different stations completed on the various bands.

Tim took the trouble to list all the calls worked and he compiled his lists in alphabetical order using the last letter of the main call. E.g. "I" in his case and "E" in the case of G4VXE. He provided an analysis by prefix and the G4s were much the most plentiful at 67, with the G3s next at 27, both three letter suffix series. The remaining 22 were an assortment of G2-plus-2, G8-plus-2, GM and foreign calls.

Computer Interference

A few months back, reference was made to interference caused to reception of HF and VHF signals at G3FPK by a *BBC Model B* computer on the other side of the party wall. This DCI — Digital Computer Interference — is a two-way phenomenon in that program loading *via* tape cassette is impossible in the presence of RF from the Tx. No doubt those who use computers in their homes appreciate the racket most create. The problem is made worse since most all home computers are housed in plastic cases offering no screening at all. At present, there are no official standards concerning the permitted maximum level of radiation. Anyway, it is far too late to introduce legislation in view of the hundreds of thousands of such machines now in use.

Some alleviation of the interference which would be beneficial to both user and sufferer — as in the G3FPK case — can be achieved by screening the "works". In *Oscar News* No. 44, reference was made to a method of zinc spraying the inside of computer cases at a cost of about £12, plus VAT and postage. Any reader interested should request further information from The Secretary, AMSAT-UK, LONDON, E12 5EQ, *enclosing an s.a.e.,* marked "Computer Screening". This service was mentioned under a note, "Beeb Computer", but likely the firm carrying out this work would do it for other computers.

Fibre Glass

In the same issue of *Oscar News,* mention was made of unbendable, thick-wall fibre glass tubes for use in multiple antenna arrays. Undoubtedly, any metal objects close to VHF/UHF antennas are likely to distort the radiation pattern, particularly if they are parallel to the elements. It does not make sense to spend a lot of money on high gain antennas, stack or bay them to get even more gain, and then ruin the performance by using metal booms and stub masts.

Mind you, this material does not come cheap and a price of £3.50 *per* foot was quoted. Lengths up to 6ft. were mentioned. Two firms supplying these fibre glass tubes are:— Bantex Ltd., Abbey Road, LONDON, N.W.1. and Jaybeam Ltd., Kettering Road North, NORTHAMPTON, NN3 1EZ.

Deadlines

The May deadline is **April 4** and the following one is May 2; please note these dates in your diaries. Everything to:— "VHF Bands", SHORT WAVE MAGAZINE, 34 High Street, WELWYN, Herts. AL6 9EQ. *73 de G3FPK.*

Traps and Trapped Antennas for the Home Constructor, Part 3

ALL YOU NEED TO KNOW!

A. P. ASHTON, G3XAP

HAVING discussed trap construction from both the theoretical and practical viewpoints, and seen how to tune and water-proof them, we are now in a position to consider trapped antennas in detail.

Let us consider first a two-band trapped dipole, which will employ one pair of traps resonant in the highest of the two frequency bands which the antenna covers. Fig. 1(a) shows the layout of the antenna, but in order to resonate the device we must fully understand the manner in which the device operates, since from this understanding we can see that the antenna must be resonated on the two bands *in the correct order*. From the diagram we see that the antenna is for frequencies f1 and f2, and that the traps are resonant at f1. If we now apply RF to the antenna at frequency f1 (which is the resonant frequency of the traps), the traps offer a very high impedance to the energy and they act virtually as insulators, preventing the RF from reaching the outer sections of the device. Hence, by adjusting the lengths of the inner sections of the dipole we can resonate this section of the antenna to f1 without any alteration to the lengths of the outer sections. Anyone who has resonated such a device will know, however, that the length of this inner section will be slightly shorter than the length of a single-band dipole resonated to the same frequency. For example, the inner section of a trapped dipole for 40/80 metres will have an overall length of around 64ft., whereas a simple 40-metre half-wave dipole is around 66ft. It would therefore appear that one of the effects of the traps is to "end load" the inner section to a small degree when the antenna is used on frequency f1 — and this is depicted in Fig. 1(b).

Let us now consider operation of the dipole at frequency f2. When we supply RF at this lower frequency, we are no longer at the resonant frequency of the traps and they therefore offer a low impedence to the RF, which flows through them and into the outer sections of the dipole — which are hence operative at this frequency. Fig. 1(c) shows the mode of operation of the antenna when used at frequency f2, and it can be seen that the device is now operating as an inductively loaded half-wave dipole: the traps load each half of the antenna. The device can now be accurately resonated at this lower frequency by adjustment of the lengths of its outer sections and it is clear that this will have no influence on the operation of the device on f1. As mentioned earlier, the L/C ratio of a trap can vary considerably; hence the actual amount of loading of the antenna will also vary and thus two antennas resonated to the same frequency, f2, can be of significantly different lengths. However, a 40/80-metre trapped dipole will have an overall length of about 106 to 110ft. which compares with lengths of around 130 to 135ft. for single-band 80-metre dipoles, and from these figures it can be seen that the effect of the loading is very significant — each trap accounting for a reduction of around 12 or 13ft.

Suppose that we now wished to convert this antenna into a 3-band device to cover 160 metres in addition to the 80 and 40-metre bands. We could add a pair of 3.5 MHz traps to the ends of the existing dipole, plus the appropriate lengths of wire to resonate the device at 1.8 MHz. Fig. 2(a) shows the layout of the 3-band antenna, the first detail of which to appreciate is that due to the fact that the 3.5 MHz traps will add a small amount of loading to the outer ends of the 80-metre section, the antenna will need to be re-tuned at 3.5 MHz. Fig. 2(b) shows the mode of operation on 3.5 MHz: note the small amount of end loading, which is similar to that experienced when operating on f1 with the 2-band device. Again the actual amount of shortening required will depend on the nature of the 3.5 MHz traps, but the length will be around 2ft. on each side of the antenna.

When we apply 1.8 MHz energy to the antenna, both the 7 and 3 MHz traps offer a low impedance and the whole antenna acts as an inductively-loaded dipole — loaded by all four traps as seen in Fig. 2(c). The lengths of the outer sections must be adjusted in order to resonate the antenna on 1.8 MHz, but because the device is now loaded by two pairs of traps, it is even more difficult to quote actual lengths, but approximately 60ft. will be required on each side of the antenna, giving an overall length of around 210 to 240ft.

Before discussing specific antenna types, there is one more property of parallel resonant traps which must be understood, and that is the manner in which they behave when subjected to RF at frequencies higher than their resonant frequency. With the 2

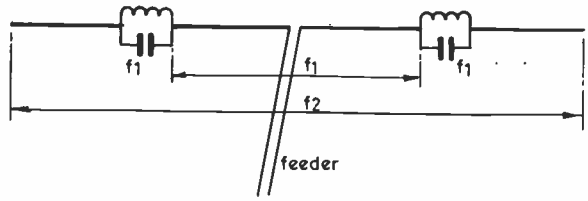


Fig.1a A TWO-BAND TRAPPED DIPOLE

Fig.1b. EQUIVALENT CIRCUIT OF THE TWO-BAND TRAPPED DIPOLE WHEN OPERATED AT FREQUENCY f_1

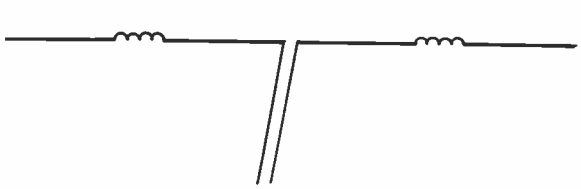


Fig.1c. EQUIVALENT CIRCUIT OF THE TWO-BAND TRAPPED DIPOLE WHEN OPERATED AT FREQUENCY f_2

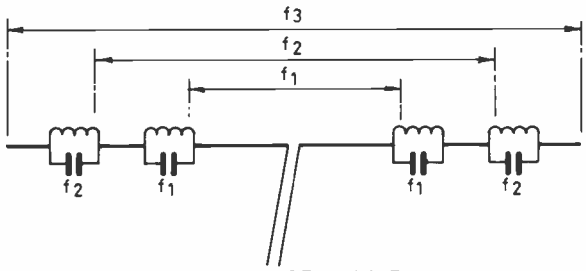


Fig. 2a. A THREE-BAND TRAPPED DIPOLE

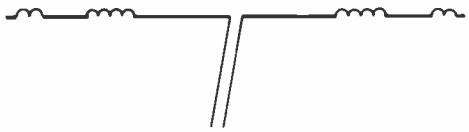


Fig. 2b. EQUIVALENT CIRCUIT OF THE THREE-BAND TRAPPED DIPOLE WHEN OPERATED ON 3·5MHz

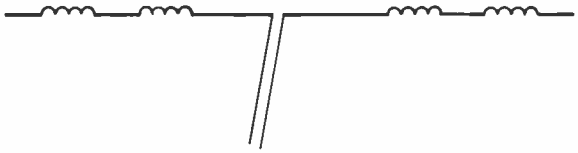


Fig. 2c. EQUIVALENT CIRCUIT OF THE THREE-BAND TRAPPED DIPOLE WHEN OPERATED ON 1·8MHz

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and 3-band dipoles discussed above, we saw that the traps acted as inductances when subjected to RF below their resonant frequencies, *i.e.* they behave as capacitors when subjected to higher frequencies. Fig. 3 shows traps in such a situation. The significance of this fact will become clear when we look at specific antenna types, which we will now do, and put the antennas in separate groups.

Trapped Dipoles

The W3DZZ Trapped Dipole. This is probably the most common antenna used in Amateur Radio throughout the world, and when an operator says that he is using a trapped dipole and offers no further specification, he is invariably referring to the W3DZZ device. The antenna actually appears under a variety of different callsigns and commercial names. The author is saddened by this practice and prefers to see the credit go to W3DZZ who is accredited with the original design; true, different manufacturers use slightly different L/C ratios in the traps and, hence, slightly different wire lengths but these do not alter the fundamental concept of the antenna.

The 2-band dipole using a pair of 7 MHz traps discussed above is, indeed, the W3DZZ, but is normally referred to as a 5-band rather than a 2-band device, because W3DZZ found that it would operate as a harmonic device on 10, 15 and 20 metres. The mode of operation on these three bands is as shown in Fig. 3, but it should be realised that the actual amount of capacitive loading contributed by the traps will be different on each of the three HF bands, since for a given capacitance, reactance is determined by frequency:—

$$X = \frac{1}{2\pi fC}$$ where X = reactance (ohms), f = frequency (Hz), C = capacitance (farads)

When we discussed the construction of traps earlier in this series, we saw that there is a wide range of practical values of capacitance that could be incorporated into a 7 MHz trap; for example we could use 47pF with a 10.5 μH inductance or we could use 120pF with 4.1 μH, both combinations giving a resonant frequency of about 7 MHz. From the formula for capacitive reactance given above it is immediately apparent that a 47pF capacitor will load a W3DZZ to a very different degree to a 120pF capacitor and that, since the physical length of the antenna is determined by resonating the device on 7 and 3.5 MHz, we have little control over the resonant frequencies in or near the 14, 21 and 28 MHz bands, and that different versions of the device will differ considerably in actual performance on these bands. If we compare two antennas, one having traps with 120pF capacitors, and the other 47pF, we see that the former will be slightly longer overall because the traps will contain less inductance and the loading on 3.5 MHz will be lower. Also, because the capacitances are greater, the reactance and hence the loading on 14, 21 and 28 MHz will be smaller than with the 47pF capacitors. Thus the effect on the HF bands is doubled because we have a longer antenna which is shortened to a lesser degree by the trap capacitance, and the actual difference between the two antennas is greater than we might have supposed at first sight.

W3DZZ originally used 60pF capacitors with 8.2μH inductors to resonate his traps to 7.15 MHz which is, of course, the centre of the U.S.A.'s 7 MHz allocation. He then tuned his antenna to 7.20 and 3.75 MHz (again these are more appropriate frequencies for U.S. operators than U.K.) and found resonances at 14.15 and 29.50 MHz with a broad resonance at 21 MHz giving an SWR of less than 2:1 across this entire band. (*N.B.* this was on a 75-ohm feeder — *not* 50-ohm).

Another American worker used 100pF capacitors in 7.2 MHz traps, resonated the device at 7.2 and 3.9 MHz and found resonances at 14.1, 21.5 and 29.9 MHz.

At G3XAP, using 47pF capacitors and resonating the traps at 7.05 MHz, then tuning the antenna to 7.05 and 3.65 MHz, it has been found that the HF band resonances are around 13.8, 21.2 and 29.2 MHz. It can be seen, therefore, that the antenna is to some extent a compromise on the three HF bands, and it is unlikely that the W3DZZ will be truly resonant as a 5-band device.

The author prefers to consider the W3DZZ as a 2-band antenna and to think in terms of an additional device for the three HF bands, but any reader who has insufficient room or ambition to contemplate a separate HF antenna is advised to give serious consideration to the following points:—

1) Use 75-ohm twin feeder rather than coaxial cable (since this will reduce losses on the HF bands) and make the feeder length such that it is a multiple of half waves on 20, 15 and 10 metres in order to present impedances of reasonable magnitude to the transmitter end of the feeder. Allowing for a velocity factor of around 0.7 for feeder of this type, lengths of about 50ft. or 75ft. would be suitable.

2) If one of the three HF bands is a particular favourite, adjust the lengths of the outer sections of the antenna to give a low SWR on this particular band — at the expense of 80-metre resonance and possibly resonance on the other two HF bands as well. For example, if high efficiency is desired on 20 metres, it may prove necessary to shorten the antenna to resonate in this band, and this will move the 80, 15 and 10-metre resonances upwards as well.

As mentioned in the discussion on the principles of trapped antennas, the lengths of the W3DZZ are around 64ft. between the

Fig. 3 EQUIVALENT CIRCUIT OF A TWO-BAND TRAPPED DIPOLE WHEN OPERATED ON A FREQUENCY HIGHER THAN THE RESONANT FREQUENCY OF ITS TRAPS.

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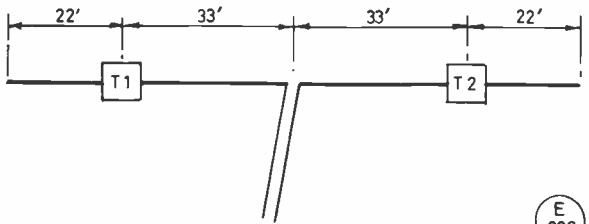


Fig.4 THE W3DZZ MULTI-BAND TRAPPED DIPOLE. T1 & T2 ARE 7MHz PARALLEL RESON
Dimensions are approximate and must be determined by resonating the antenna as described in the text

traps (*i.e.* 32ft. each side of the feeder) and approximately 22ft. for the outer sections, giving an overall length of around 108ft. — this is depicted in Fig. 4. The lengths of the inner sections must be adjusted *first* to resonate the antenna at 7 MHz and *then* the outer sections are adjusted to establish resonance at 3.5 MHz.

A 4-Band Trapped Dipole. This device is depicted in Fig. 5 and consists basically of a trapped dipole resonated on 14 and 7 MHz, but showing resonances near the 21 and 28 MHz bands in a similar manner to that found with the W3DZZ dipole. The inner sections are *first* adjusted to resonate the device on 14 MHz and *then* the outer sections are adjusted to give 7 MHz and *then* the outer sections are adjusted to give 7 MHz resonance. At G3XAP, 22pF capacitors were used in the traps which were resonated at 14.2 MHz, and after tuning the antenna to 14.2 and 7.05 MHz, resonances were found at around 21.3 and 28.9 MHz.

For anyone not having the room to erect a W3DZZ dipole, this antenna offers 4-band coverage with a total span of just 54ft; this figure can be reduced slightly by erecting the antenna in the inverted-vee configuration. 3.5 MHz operation can be achieved by 'strapping' the feeder at the transmitter end (*i.e.* connecting both conductors of the feeder together) and supplying power to it *via* an antenna matching unit — in other words, using the antenna as an end-loaded Marconi system. If the feeder can be made around 30 to 35ft. in length, the overall length of feeder plus one half of the dipole will be such that the device will behave as an end-fed quarter-wave, which will present a low impedence to the transmitter. By adjusting the length of the feeder, the device can actually be resonated on 3.5 MHz and will prove to operate in a very efficient manner. Note, however, that as with any low impedance end-fed antenna, an efficient earth will be necessary and it is suggested that a 70ft. counterpoise should be considered — this can be 'wrapped around' if necessary to fit the space available — even around the skirting board of a room if it proves impractical to install this wire outside the operating room. Fig. 6 shows the antenna used in this configuration.

A Trapped Dipole for 14/21/28 MHz. The two antennas discussed so far have both been essentially 2-band devices, resonance on other bands for which they are used being a little hit-and-miss. For the operator who wants true resonance on the three HF bands, and hence efficient operation, or for the operator who does not have room even for the 54ft. dipole discussed above, a triband dipole is a good choice. This uses two pairs of traps, resonant on 28 and 21 MHz and has an overall span of around 25ft — compared to 33ft. for a single-band dipole for 14 MHz.

The antenna is shown in Fig. 7, but once again it must be stressed that the dimensions given are for guidance only and that actual dimensions arrived at by tuning the antenna to resonance can differ quite widely from those given. As with the previous two antennas the inner sections are adjusted first, in this case to establish resonance on 28 MHz — the actual resonant point being chosen in accordance with the operator's operating habits. G3XAP would resonate his at 28.1 MHz! The sections between the two pairs of traps are then adjusted for 21 MHz resonance, finishing up with the adjustment of the outer sections to resonate the complete antenna on 14 MHz. Note that as we are now somewhat higher in frequency than with the two previous antennas, small adjustments to the antenna's length can lead to quite large changes in resonant frequency (especially at 29 MHz) and a cautious approach is advisable.

The main comment to be made regarding this antenna is that as we have two pairs of traps, trap losses will be higher than for a trapped dipole that employs only one pair of traps, so it is important to consider whether we actually need three-band coverage. It is the 14 MHz band that suffers most from trap losses since both pairs of traps are operative as loading components when the antenna is used at this frequency and, since 14 MHz carries the bulk of DX traffic, an operator should look at his operating habits carefully before choosing this antenna. If 28 MHz was never used, for example, it might be wiser to construct a 2-band 14/21 MHz device, using one pair of traps resonant at 21 MHz.

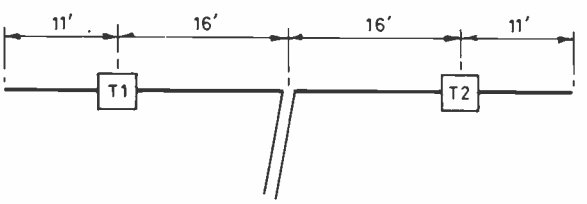


Fig.5 FOUR-BAND TRAPPED DIPOLE FOR 7, 14, 21 & 28MHz. T1 & T2 ARE 14MHz PARALLEL RESONANT TRAPS.
Dimensions are approximate and must be determined by resonating the antenna as described in the text

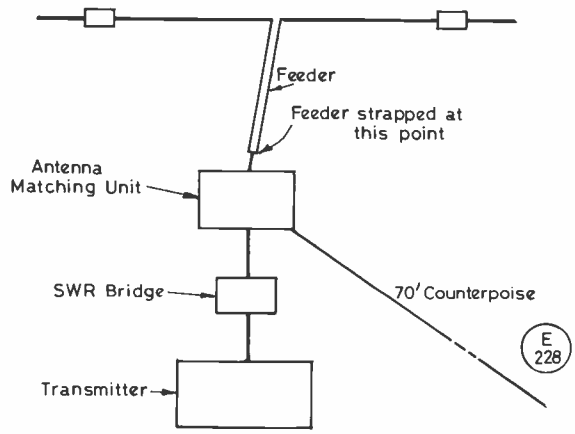


Fig.6 THE 4-BAND TRAPPED DIPOLE OPERATING ON 3·5MHz

A Rotary Dipole for 14/21/28 MHz. The triband trapped dipole just discussed is small enough to make it easily constructed from aluminium tubing instead or wire, and this has two advantages; firstly that it only requires one support point (at its centre) and secondly that it can be rotated. It is considered that coaxial traps are the most suitable type for this application, but a later part of the series will suggest an alternative. Even if the reader decides to use coaxial types and purchases them in preference to attempting the lathe work described earlier in this series, the rotary dipole can still be constructed at a much lower price than the current retail price of commercial models. However, I would urge readers who are still undecided about the construction of coaxial traps to "give it a go" because the final product will give much pride and satisfaction.

The dimensions quoted for the triband wire dipole will be found to be similar to those required for the rotary version,

although the latter will be found to be slightly shorter as a result of its slightly reduced length-to-diameter ratio.

A Trapped Dipole for 3.5/7/10 MHz. By incorporating a pair of 10 MHz traps into an existing W3DZZ dipole, coverage of the new 10 MHz amateur band can be provided — albeit at the expense of 14, 21 and 28 MHz coverage. However, as already stated, the author prefers to think of the W3DZZ as a 2-band dipole and therefore considers it as providing an extra band and not as the loss of three bands! Some writers have said that the W3DZZ dipole is resonant on 10 MHz without modification whilst others have indicated that they do not get acceptable SWRs on this band, and this may reflect the different L/C ratios used by different manufacturers in their 7 MHz traps. Anyway, this approach is a little too hit-and-miss to appeal to me and for that reason this alternative approach is offered.

The layout of the antenna is shown in Fig. 8 and again the actual lengths arrived at after tuning the device may differ significantly from those quoted. As with the previous antennas we start at the highest frequency band (10.1 MHz) and adjust the lengths of the inner sections, then we resonate at 7 MHz by adjusting the sections between the two pairs of traps, and finish up by adjusting the lengths of the outer sections to achieve 3.5 MHz resonance.

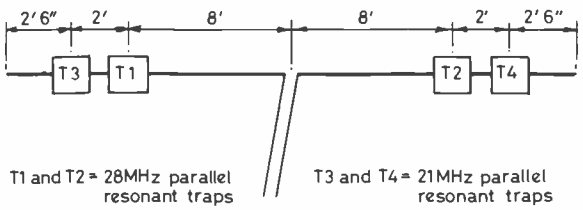


Fig.7 TRI-BAND TRAPPED DIPOLE FOR 14/21/28MHz. (E 229)

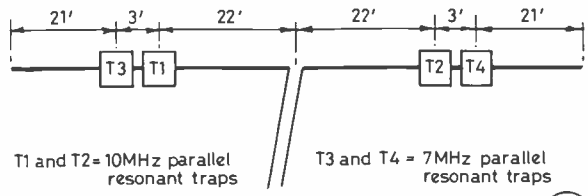


Fig.8 TRI-BAND TRAPPED DIPOLE FOR 3·5/7/10MHz (E 230)

Trapped Verticals and Inverted-L's

As far as the HF bands are concerned, trapped verticals are very popular amateur antennas and their popularity is partly due to the fact that in terms of performance they lie somewhere between Quads and Yagis at the top end of the range, and simple wire antennas at the other extreme. Operators tend to choose them because they wish for better performance than that offered by wire antennas, but do not have the cash, ambition or real-estate for a directive array. For various reasons their performance tends to be nearer the bottom end of the range than the top end, though one of the main reasons is that most of us pay insufficient attention to the provision of an adequate ground system against which to operate them.

The only way to avoid the requirement for an efficient earth system is to use a vertical dipole, and the author would suggest that any reader contemplating construction of the 20/15/10-metre dipoles discussed above (either wire or tubing versions) should consider erecting them in the vertical plane since their performance will be superior to horizontal dipoles, unless the latter can be erected in very high positions. However, we are concerned here with simple base-fed verticals, which are normally resonated as quarter-wave devices.

We can consider a quarter-wave vertical antenna to be one half of a dipole, the ground system replacing the "missing half" of the dipole. A dipole is a balanced device with the current in one half of it equal to the current in the other half, so it is obvious that for a quarter-wave vertical to operate in as efficient manner as a dipole, the current in its ground system must equal the current in the vertical itself. The ground system is provided by installing a radial system, and this must be done regardless of whether the device is mounted in an elevated position or at ground level. W6SAI, in his *Antenna Handbook* (available from *Short Wave Magazine* Publications Department), suggests that the number of radials required for efficient operation is determined by the height at which the antenna is installed and considers that as few as four are required at heights of one wavelength above ground, whilst 100-plus are required for verticals located at ground level! Few of us are going to have the ambition to install 100 radials, but the point of the statement is to emphasize the need to provide a *good* ground system. It is considered that at G3XAP, ground systems tend to be more extensive than at the average station, and the author has certainly achieved much success with ground mounted verticals, perhaps typified by gaining a 9 watt, 1.8 MHz WAC award with a ground mounted inverted-L antenna that had in excess of 70 radials! The author's advice to any would-be constructor or purchaser of a base-fed vertical, whether trapped or not, is to say that unless he is prepared to put time and effort into an effective earth system, he can only expect very mediocre results. Practically all cases of inefficient operation of vertical antennas can be traced to inefficient ground systems!

The minimum ground system that should be contemplated is four radials for each band that the antenna covers — hence the popular 14/21/28 MHz triband vertical would have a minimum of twelve radials. Few amateurs provide anywhere near this number — and few amateurs are really satisfied with the performance of the device!

One other aspect of verticals is that their siting must be carefully considered to avoid having them screened by surrounding structures, especially if it is intended to mount them at ground level. By mounting the vertical on a tall mast, we can obviously alleviate this problem, but at the same time it is more difficult to

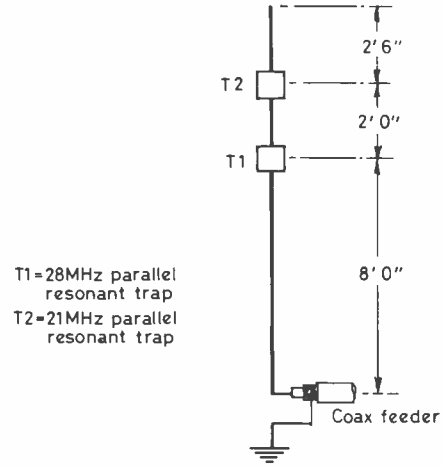


Fig.9 TRAPPED VERTICAL FOR 14/21/28 MHz (E 231)

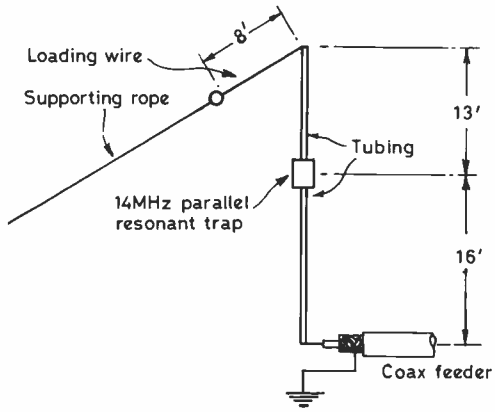


Fig.10 THE "XAP 2V" INVERTED-L FOR 14/21MHz (E 232)

provide sufficient radials to permit the antenna to operate efficiently; we also require somewhat more space if guys are required for the mast. And up goes the cost of the complete assembly at the same time!

Finally, a vertical in a high position makes it somewhat more difficult and possibly more hazardous to resonate, since this operation requires that the mast plus antenna are lowered for each length adjustment, or that we climb the supporting structure. Hence, the siting of our vertical can be a real compromise between cost, performance and convenience, and much thought must be give to the situation before installation. The author favours ground mounting, but, as mentioned above, is prepared to put far more effort into the provision of a good ground system than perhaps many operators are.

14/21/28 MHz Triband Vertical. This is an extremely popular amateur antenna which is produced by just about every manufacturer of HF amateur antennas. It may be constructed as a self-supporting tubing device with coaxial traps, or as a wire device either supported against a wooden mast or suspended from a convenient branch of a tree. Fig. 9 shows the details and close inspection shows that it is simply one half of a triband dipole, mounted as a vertical device! Again the dimensions are determined by resonating the antenna at the required frequencies and may differ considerably from those given on the diagram. By using wire for the antenna plus discrete component traps, the cost of the device will be very low indeed. Anyone wishing to make the device with coaxial traps but who doesn't want to construct the traps themselves, is advised to find an amateur who will build one since coaxial traps appear only to be available in pairs. As said earlier, the author will describe alternatives to conventional coaxial traps in a later part of this series; some readers may wish to await publication of this information before making a final decision!

As with the dipoles discussed earlier, we adjust the length of the lower section first to establish resonance on the highest frequency (28 MHz), then the middle section for 21 MHz, finishing up with adjustment of the top section to resonate the complete antenna on 14 MHz.

One point which must be appreciated with trapped verticals is that their physical length is less than a quarter-wave on each of the bands that they cover — although with the highest frequency the difference is marginal. For example, with the triband device just discussed, the overall length on 14 MHz is about 12.5ft. compared with about 16.5ft. for a simple 14 MHz vertical quarter-wave. The effect of this is to raise the angle of radiation above that which is obtained with a quarter-wave antenna, hence detracting from the low angle radiation.

A High Performance 14/21 MHz Inverted-L: The "XAP-2V." The author constructed a two-band trapped vertical antenna for 14 and 21 MHz using the conventional principles discussed with the triband vertical, *i.e.* a quarter-wave vertical for 21 MHz, a 21 MHz trap plus sufficient extra tubing to resonate the device on 14 MHz. Performance on 21 MHz was reasonable, although 14 MHz performance left a little to be desired — DX was worked on this band but not worked easily. Also the author had considerable interest in 21 MHz at that time, and although the device appeared to work efficiently, thoughts were turned towards getting a little gain on this frequency without going to the expense and complexity of a directive array.

The XAP-2V antenna was hence evolved and is depicted in Fig. 10, from which it can be seen that it consists of an inverted-L configuration. It will also be apparent that it operates as a quarter-wave on 14 MHz, but as a three-quarter wave on 21 MHz and that the trap is resonant on the lowest of the two frequencies covered, not the highest as is usual with trapped verticals. The reason for this is firstly that it permits the 14 MHz section to be practically a full quarter-wave in length, but, more importantly, it means that the complete vertical section is physically 5/8 waves long on 21 MHz — 5/8 waves being the optimum length of a base-fed vertical for low angle radiation. Because the 14 MHz trap is subjected to RF energy at a higher frequency than its resonant frequency, it acts as a capacitor when the antenna is operated on 21 MHz, and hence the overall length of the device is somewhat greater than might be expected for a 21 MHz three-quarter wave antenna.

Had the device been built purely as a vertical, rather than in the inverted-L configuration it would have been over three-quarter wavelengths in physical height on 21 MHz, and, apart from the fact that it would have been getting rather large in terms of mechanical stability, it would have displayed lobes of very high angle radiation when operated on 21 MHz; this was certainly not considered desirable.

The antenna is first resonated on 14 MHz by adjustment of the length of the lower vertical section, and then on 21 MHz by adjustment of the length of the loading wire. This loading wire need not be horizontal and can slope either upwards or downwards depending on the location of a suitable securing point for the supporting rope. The loading wire is connected to the top of the vertical by means of a self-tapping screw, the connection then being waterproofed, The author painted over the screw head with enamel paint and also applied some to the point of the screw on the inside of the tubing; the whole joint was then covered with a generous application of PVC insulating tape.

The performance of this antenna on 21 MHz is extremely good, DX being easily worked, and it certainly outperforms the conventional trapped vertical by a long, long way.

It is suggested that by describing this particular antenna, readers will be able to apply similar principles in getting the best

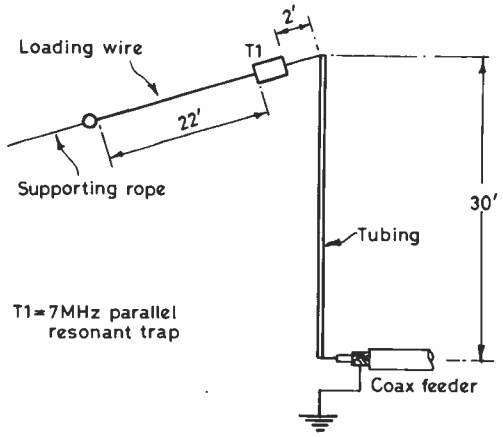


Fig.11 A 5-BAND INVERTED-L (E 233)

out of antennas for their favourite bands.

A 5-Band Inverted-L. The device depicted in Fig. 11 is, of course, one half of a W3DZZ dipole, erected in the inverted-L configuration, and little comment is necessary other than to say that the device is resonated in the same order as the W3DZZ. 7 MHz resonance is first established by adjustment of the length of the wire between the vertical section and the trap, followed by tuning on 3.5 MHz by adjustment of the length of the loading wire. As with the W3DZZ, it will be found that low SWRs will not be achieved on all three HF bands and, since we are feeding the device with coxial feeder, feeder losses can be somewhat higher than with the W3DZZ dipole. Again it is suggested that if one of the three HF bands is a particular favourite, the loading wire can be adjusted to resonant the antenna on that band — at the expense of 3.5 MHz resonance and possibly to the detriment of the other two HF bands.

The vertical section of this antenna is a little under a half-wavelength long on 14 MHz which makes it excellent for DX on this band; on 21 MHz it is about 5/8 waves long which is ideal. On 28 MHz it is somewhat longer — approaching a full wavelength — and although low angle radiation is present, there are lobes at very high angles which tend to limit the usefulness of the device since European signals will be received at extremely high signal levels and can cover up any weaker DX signals which may be present.

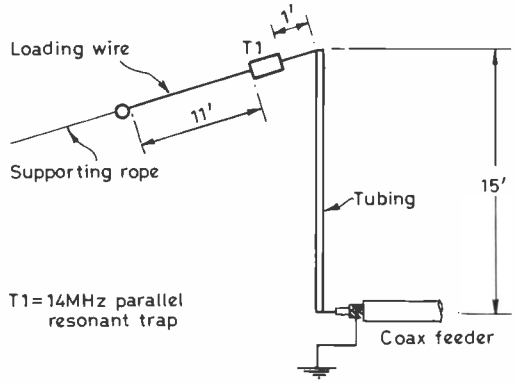


Fig.12 A 4-BAND INVERTED-L

E 234

A 4-Band Inverted-L. This antenna is one half of the 4-band trapped dipole discussed earlier and is shown in Fig. 12. The author has found a low SWR on all four bands when using this antenna, but constructors may find some variation due to the use of different traps which may have different L/C ratios. The vertical section is a little under a quarter-wave on 14 MHz, about 3/8 waves on 21 MHz and approaching a half-wave on 28 MHz, which means that the device makes a good DX antenna on 21 and 28 MHz, with reasonable DX performance on 14 MHz. It is tuned by adjusting the length of wire between the vertical section and the trap to establish 14 MHz resonance and then the length of the loading wire to obtain overall resonance on 7 MHz. It will be found that even with a vertical section of only about 1/8 waves at 7 MHz, some DX will be workable on this band, although for local and semi-local work the antenna will be inferior to a low, horizontal 7 MHz antenna.

Trapped Yagis

Because of the cost of commercially produced trapped Yagis, the serious experimenter may be tempted to "give it a go" and construct such a device, but the author knows of no easily obtainable traps that are suitable for incorporation into parasitic elements, so the constructor must be prepared to make his own traps for the purpose. A 3-element triband Yagi will require the construction of twelve traps, but even if the lathe work required to produce coaxial traps has to be paid for, the whole project, including the cost of suitable tubing for the elements should total under £100, which is considerably lower than the cost of commercial antennas — except for some "mini-beams". However, a home brewed Yagi will outperform a mini-beam hands down, so the author does not consider such a cost comparison to be valid.

A wire beam might be considered — especially if the operator is mainly interested in a specific geographical area such as North America or Australia for example. Such a device could be built very inexpensively and would provide valuable experience to the home-brewer who might later decide to construct a rotatable array.

Alternatively, the reader could well decide to attempt a 2-element array or a 2-band Yagi — or both. A 2-element Yagi for, say, 14 and 21 MHz requires the construction of only four traps and will certainly provide very good performance on these two bands. It must be appreciated, however, that the elements of a two-band Yagi will be longer than a three-band Yagi's elements since, when operating on 14 MHz, there is the inductive loading of only one pair of traps per element compared with two pairs per element for the triband model. Should 21 and 28 MHz be decided upon for a 2-band Yagi, however, element lengths will be very short (around 20ft.), and this makes such a choice an attractive one. It is again suggested that any reader who is tempted to have a try at trapped Yagi construction should read the later part in this series in which alternative traps for incorporation into tubing antennas will be discussed.

The method of construction of a trapped Yagi is to firstly produce the driven element and resonate this to the required frequencies *before* attaching any parasitic elements to the array — dimensions for a 3-band driven element are exactly as for the 3-band dipole discussed earlier. Tuning should be carried out at as high a point as possible, since resonant frequencies will alter when the antenna is subsequently removed to a higher point. The author suggests that if the device can be mounted on top of a 10ft. pole, it can be resonated 100 kHz lower than the required final frequency and will be found to "move up" to the required frequency when finally mounted at heights of 30-plus feet.

The traps on the parasitic elements must be resonated to the frequencies of the parasistic elements, and as it is not easily possible to alter them after they have been water-proofed, it is important to decide on specific frequencies before construction. It is suggested that reflectors should be 5% lower in frequency than the driven element, and the director(s) 3% higher, and that for a 2-element device the parasitic should be a director. For example, let us assume that we are constructing a 3-element tribander, and that we wish to resonate the device on 14.1, 21.1 and 28.1 MHz for CW operation. Our reflector frequencies will therefore be 13.4, 20.05 and 26.7 MHz and the director frequencies, 14.5, 21.7 and 28.9 MHz respectively. The traps should be tuned to these frequencies during construction (for 21 and 28 MHz only, of course), and the completed parasitic elements should be tuned to the same frequencies in the same manner as with the driven element — that is mounted on their own on a suitable post and tuned "low" if this was done with the driven element, *i.e.* 100 kHz below the required final frequency in the example quoted above.

A method suitable for determining the resonant frequencies of antennas will be discussed in the next article.

to be continued

• • • "Practically Yours" • • •

with GLEN ROSS, G8MWR

This is the first of a new series of articles in which we shall describe the basis of a design and some variations on it. They will not be full "nut and bolt" descriptions but will contain enough information for the average person to complete the project.

Power for the People!

THERE are two primary purposes for requiring a **power supply.** One is to power equipment and the other is as a means of charging Nicads. If we can combine the two functions, so much the better.

The circuit shown in Fig. 1, will do this for us, Let's see how it works. The mains input is taken through the switch and fuse to the primary of the mains transformer (T1). The output of the transformer is then rectified by the bridge rectifier (D1) and smoothed by the electrolytic capacitor (C1). We now have a power supply capable of producing 1 amp. If this is all you require we stop right here. By suitable choice of components you can produce whatever voltage and current you need.

Voltage

The major snag is that as the current taken from the supply varies so will the voltage. (In other words the regulation is poor.) For some jobs this is not important; an audio amplifier would be perfectly happy, for example. Voltage regulator ICs are available to deal with this problem at low cost. They can be used in two ways. The first is to provide a constant voltage when the load varies, and the second way provides a constant current with varying load. The use of the first system is obvious and is achieved by using the 7812 shown in the diagram. Other types are available, the 7805 giving 5 volts. The 0.1μF disc capacitors are to stop any tendency for the IC to self-oscillate and should be fitted close to the IC pins. The 1000μF should be connected to the output terminals on the front panel.

Current

Why should we need constant current? To charge Nicads! For this purpose we make use of the 7805. This unit tries to maintain a constant 5 volts between its output and earth pins. If we put a resistor in series with the Nicad, Fig. 2, the 7805 will maintain 5 volts across it. Remembering Ohms Law, this means that current flowing through the resistor is such as to generate 5 volts and, as the resistor and Nicad are in series, then the current through the Nicad must be the same as that flowing through the resistor. By switching in different values of resistor we can set the charge to whatever is required by the particular Nicad.

Building Options: (*a*) an unregulated power supply; (*b*) a constant voltage PSU; (*c*) a Nicad charger; (*d*) combine (*b*) and (*c*) (both functions can be used together as long as the total drain does not exceed 1 amp).

Link: If you want to dress the unit up a bit you can fit a meter in place of the link. There are two ways this can be done. The easy way is to fit a 1 amp meter, but the circuit in Fig. 3 will allow any cheap meter from 100 microamp to about 5 milliamp to be used. With 1 amp flowing the voltage across R6 will be 2.2 volts. R7 and M1 form a voltmeter that can be adjusted to show this as a full-scale reading. We even have a built-in method of calibrating the meter. Start by setting R7 to maximum resistance, and the charger

Table of Values
Fig. 1

R_x1 to R_x4 = select from Table 1	IC2 = 7812
C1, C6 = 1000 μF, 16VDC	D1 = bridge rectifier
C2 to C5 = 0.01 μF, disc ceramic	T1 = 0-18 volt, 1 amp
IC1 = 7805	S1 = double-pole toggle
	S2 = single-pole rotary
	F1 = 1 amp.

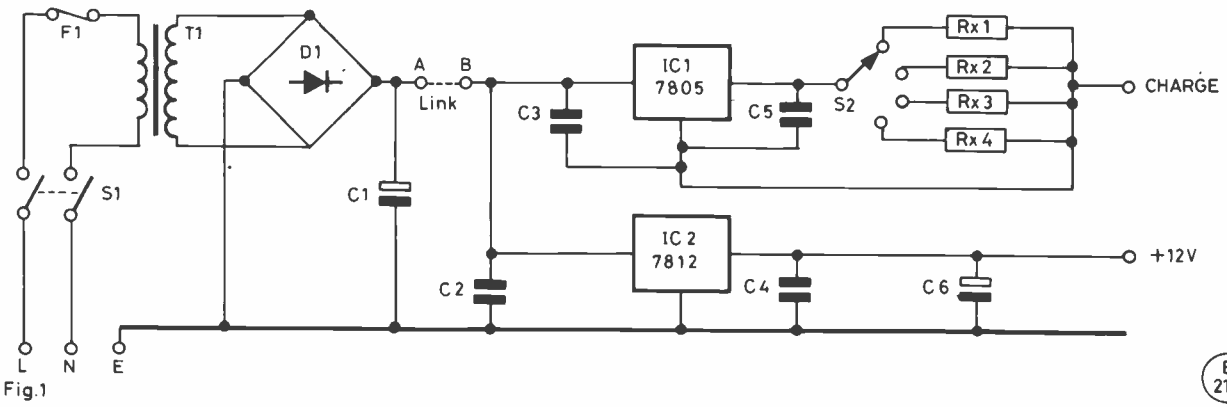


Fig.1

E 217

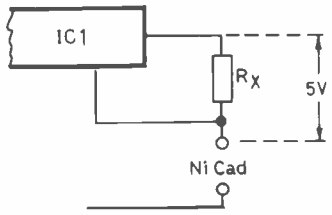


Fig. 2 E 218

section to the 500mA position. Now short-circuit the charger terminals, causing a current of 500mA to flow. Adjust R7 to give a reading of half-scale on the meter. Remove the short circuit. The meter will now read the total current drawn by both sections of the unit, when a load is connected.

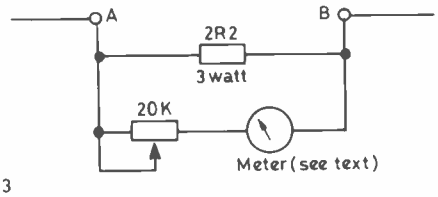


Fig. 3 E 219

Battery	R_x	*Charge*
PP3	560R, ¼W	9mA
AAA	270R, ¼W	20mA
AA	68R, ½W	70mA
C	22R, 2W	250mA
D	10R, 3W	500mA
Max. Battery Voltage = 14 volts		

Table 1. Switch S2 should be chosen to give the number of charging positions required. *Warning:* **Some "D" cells are only rated at 1.2 Ah; charge these as "C" cells.**

Construction

If you have not had much experience of building do not try to build it into the smallest available case, give yourself some space. The circuit can be built on Veroboard but, if this is done, small heatsinks should be fitted to the regulators. A better way is to mount them on to the metalwork, using suitable insulators. Remember there are mains voltages in this unit so take care. Which option will you build?

(Please let us know what you would like to see described in this feature.—Ed.)

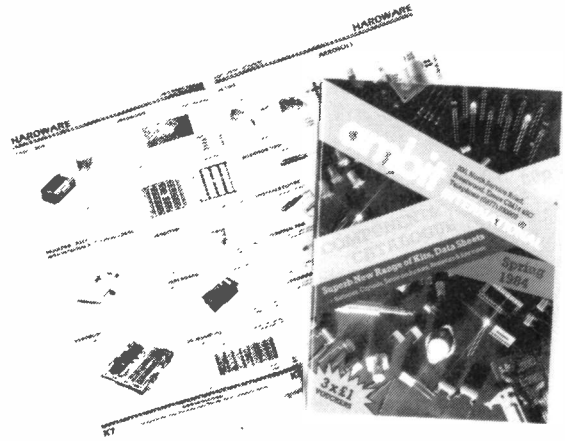
CONTEMPORARY BRIEFS . . .

MUCH equipment these days is battery operated. Batteries need to be housed within the enclosure, for neatness, and **Messrs. A. F. Bulgin & Co. P.L.C.** have produced a brochure illustrating their latest range of battery holders. The range includes panel, PCB and baseboard mounting designs for AA, AAA, C, D, and PP3 size cells, in single and multiple types. Further information from Mr. Brian Diggle. The company's address is, By Pass Road, Barking, Essex IG11 0AZ.

WHILE batteries are very useful, for indoor use mains operation is more convenient and much cheaper. To cater for very small devices, **Messrs. Avel-Lindberg Limited** now offer what they claim to be "the world's thinnest transformers". They are designed for direct mounting on to close spaced PCBs and are only 10.5mm. high. Dual 120V primaries are standard and the load rating is 0.8VA. Six models are listed which provide a range of secondary voltages from 5V at 160mA, to 48V at 17mA. The other dimensions are 57 x 68mm. Other VA ratings are available from 2 to 30 in their "OB" range, all mounted in resin-filled flat thermoplastic cases. Further information from Mr. R. S. Mattin, Avel-Lindberg Ltd., South Ockendon, Essex RM15 5TD.

TWO new 16K-BIT Static RAM ICs have been announced by **Motorola Limited**, featuring as low as 45ns access time. The MCM2167H is organized as 16,384 words by 1 bit, and the MCM2016H is a 2,048 words by 8 bits device. High performance silicon-gate MOS (HMOS) technology is used in their fabrication. No external clocks or timing strokes are required, so stand-by power consumption is much reduced. For further information, contact the nearest sales office or authorized distributor.

COST savings of 90% over the cost of PCBs can be achieved using a novel tape of 99.999% fine copper, produced by **Copperfoil Enterprises**, they claim. The tape comes on rolls 33 metres long in widths of 4, 4.75, 6 and 8 mm. Designed for low voltage projects, the tape is fully tested at 24 volts and 5 amps, suggested uses being repairing PCBs, making capacitances, circuit tracks and bus-bar supplies. The tape is backed by a heat resistant, hi-tack adhesive which will withstand normal soldering temperatures. It can be stuck to almost any insulated surface, including paper, Further information from the company at:— 141 Lyndhurst Drive, Hornchurch, Essex RM11 1JP.



Ambit International's **Spring 1984 Components Catalogue is now available. Priced at 80p, it is obtainable from newsagents, or direct from the company at 200 North Service Road, Brentwood, Essex CM14 4SG.**

An FM Conversion for the Yaesu FT-707 Transceiver, Part 1

RETAINS *AM* AND AVAILABLE IN KIT-FORM

IAN KEYSER, G3ROO

WITH the introduction of the FT-77 and FT-757 into the Yaesu range the FT-707 is now appearing on the amateur market at very reasonable prices, the lowest seen to date being £250. This rig, although originally intended for mobile and portable operation, has also found its home as a base station in many shacks, no doubt due to the number of facilities in such a small box.

There are, of course, failings, and the first was the lack of 160m. This was covered in *SWM* June 1982. In addition, an external VFO and transverter switching were described in *SWM* September 1982, and a mains power unit for the set appeared in *SWM* January 1983. Two further units have been constructed but not yet covered by an article; these are a 2m. transverter and an ATU/aerial switching unit. Having included 2m. into the station and with the advent of Ten FM, an FM conversion has now been carried out, but prior to describing that modification I will cover some less dramatic modifications which will improve the performance of the set and at the same time will give the less experienced constructor a look inside the rig and so gain a little more confidence before diving into the depths of the FM conversion.

I remember when I first opened the set the first impression was of horror, followed quickly with a little inward prayer that nothing would ever go wrong! It was not too long before my prayer was forgotten 'up above' and I was wishing that I had been a little more regular with my Sunday attendances, and that on visits to George, G3RJV, more time had been spent in discussing religion rather than QRP or circuits!

The problem which arose manifested itself while out mobile after about one year of operating. The effect was that of severe instability while on the move which disappeared when stationary. Having removed the covers it was found that this effect could be simulated by shorting the VFO box to the main chassis, and further investigation traced the fault to front-panel earthing. During construction the front panel is, of course, painted prior to fitting and consequently the fixing holes are also painted. After a year of rather rough use mobile, the paint under the screws started to break up and the front panel could now short to the chassis by various paths, depending on how the chassis was flexed. This caused fluctuating earth currents which in turn had the undesirable effect of shifting the VFO frequency. This is easily rectified by removing these screws in turn, cleaning the paint away with a ¼-inch drill and replacing the screws. It is *very* important to do these screws one at a time as the VFO is mounted on the front panel and alignment with the analog dial can easily occur.

As far as CW is concerned the FT-707 has two failings; the first one is common to all 'rice boxes' and is that of hard keying, and the second is the lack of QSK, full break-in operation. The hard keying can easily be rectified, the CW shaping being carried out by C10180 located on the RF PCB. This 10μF capacitor can be increased to 47 μF with considerable softening of the CW.

To accomplish full QSK would require extensive modification of the set; however an acceptable performance can be obtained very easily indeed by decreasing the delay time of the VOX circuit. The timing capacitor C3049 is located on the AF PCB and is a 10 μF tantalum bead; on removing this from the PCB note the

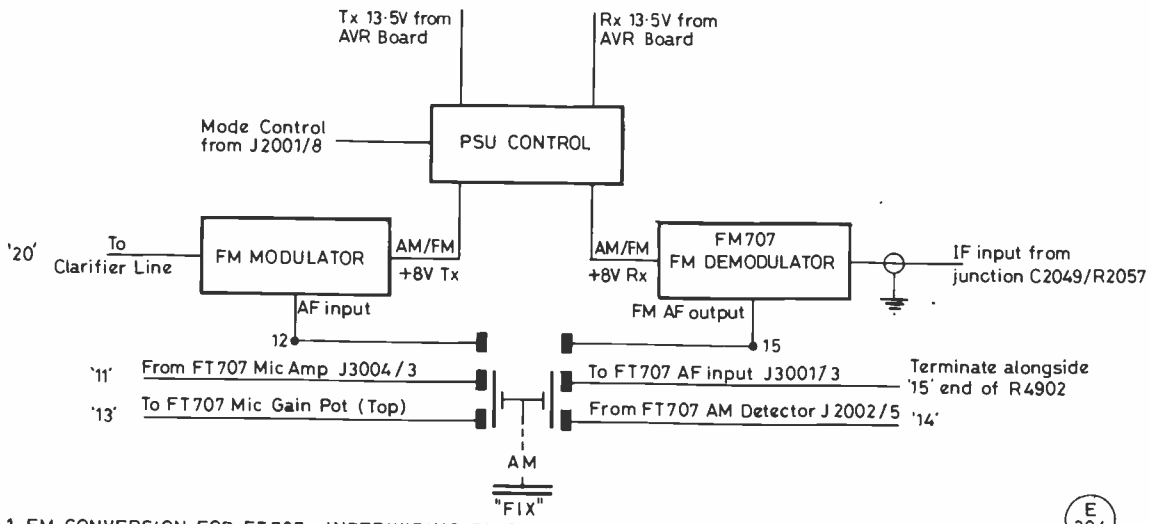
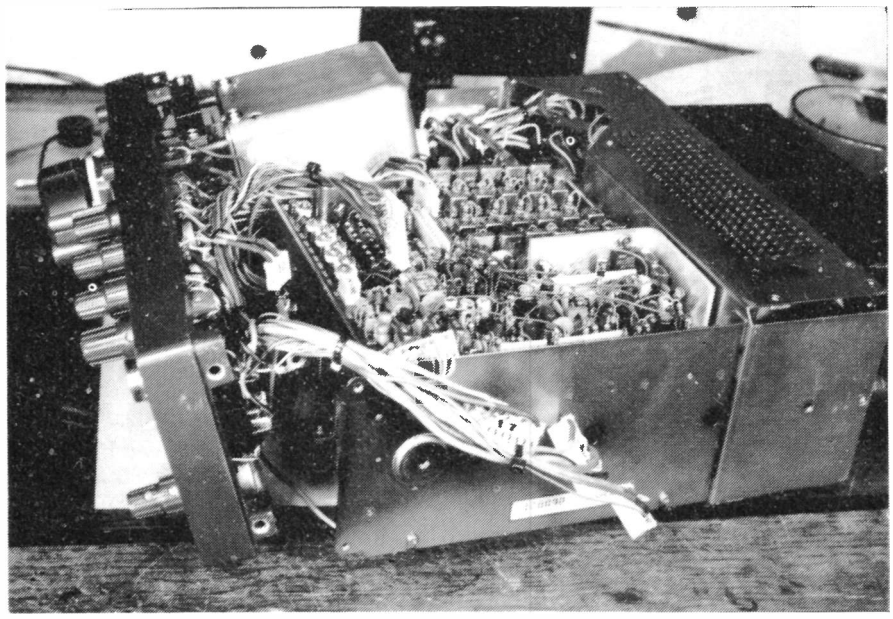


Fig.1 FM CONVERSION FOR FT707 - INTERWIRING DIAGRAM

E 204



Opening-up the FT-707.

Table of Values
Fig. 2

R1 = 100K	C1 = 150 pF
R2 = 10K	C2, C12, C18 = 2.2 μF
R3, R8 = 68K	C3, C4, C6, C7,
R4 = 22K	C10, C11, C17 = 100 nF
R5, R13, R15 = 1K	C8, C9, C15, C16, C19, C20 = 1 nF
R6 = 270K	C5 = 22 pF
R7 = 120K	C13 = 82 pF
R9, R10 = *deleted*	C14 = 47 pF
R11 = 470K	Q1 = BF199
R12 = 47/50K pot.	IC1 = MC3359 (ULN3859)
R14 = 100R	D1 = 1N4148
R16 = 47K	F1 = CFU455
L1 = YHCS11100	X1 = FM707

Also required: *Timestep* PCB, 10-way PCB plug, 10-way shell, 10-off pins, 9-off hollow rivets.

polarity and replace with a 1 μF tantalum bead. Next locate R3177, a 470K resistor, which is across the delay control and is situated on the AF PCB. This was not present in my set although shown on the circuit diagram. With this modification and the AVC set on 'fast' it is possible to listen through up to about 15 w.p.m., and to listen between words above this speed. One must expect wear on the relays as they are working much harder than before — though after a year no trouble has been experienced and the set has been used in this mode for many, many hours.

This modification does lead to another problem that can occur with one of the relays in the AVR unit. Sometimes when going off transmit the receiver failed to come on, and this was traced to the relay that switches the 13.5V to the transmitter section, whose contacts 'weld' together. Yaesu do a modification kit for this problem which includes a new relay and a resistor; I went one step further and included a 0.1 μF capacitor across the contacts.

Another instability problem was finally traced to the plug and socket which feeds the VFO signal to the RF PCB. This is J1005,

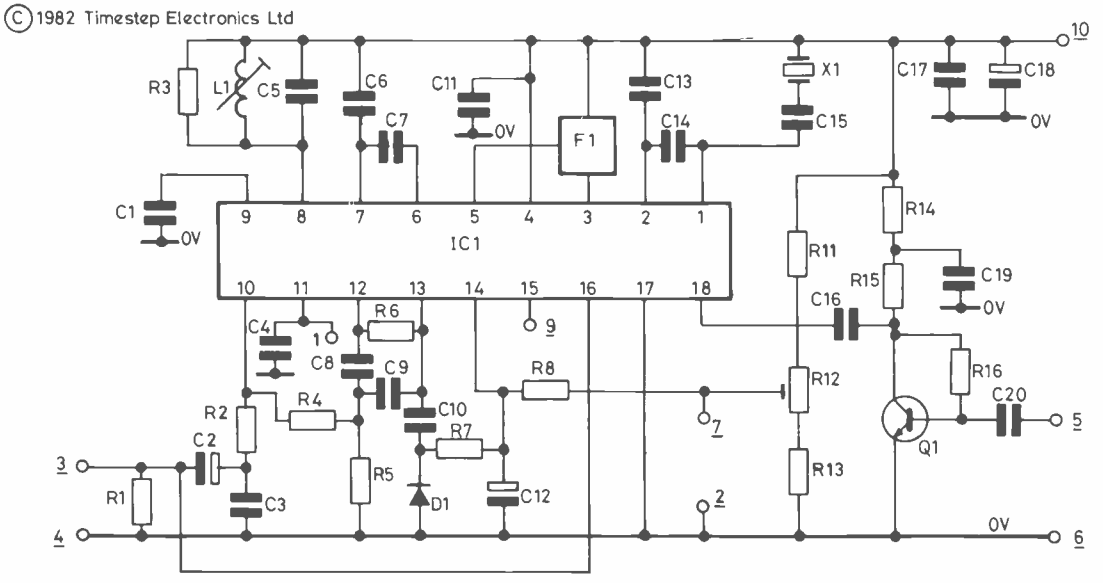


Fig. 2 FM707 DEMODULATOR CIRCUIT

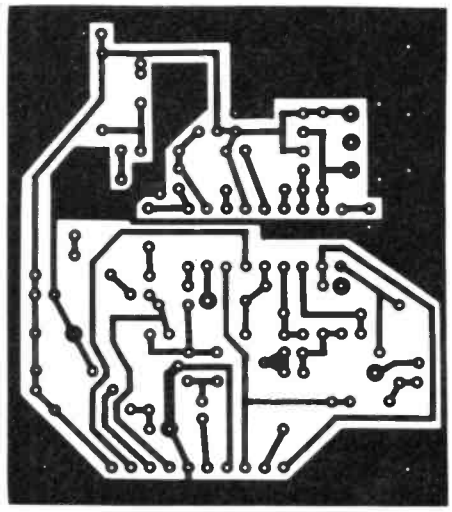


Fig. 3 FM707 PCB FOIL SIDE Full size (E 206)

and involves the screening of the VFO signal line onto pins 8 and 9. The earthing of the braid to the socket insert became poor and had to be remade; extraction of these inserts is described later in this article.

FM Modification

Having investigated the foregoing, considerable confidence should have been gained in the ability to carry out this main modification. However, if this is not the case this is definitely not the modification for you! Prior to unsoldering a single wire give strict instructions to the rest of the family that you are *(a)* not available to help with any homework problems, *(b)* not available for any household repairs of any nature, and *(c)* not to be disturbed *even* if the house is burning down, except for frequent deliveries of coffee or tea. *(No alcohol,* makes one too confident!) Having got this arranged sit down with the set, an assortment of screwdrivers, a good light and the circuit diagram and get really acquainted with the set. This is a good thing to do even if no modification is being done, because when a fault occurs, it is then known how to get into the relevant part of the circuit.

The modification itself is different to other modifications that I have heard of for this set. These all have the common failing that the AM mode is removed for the inclusion of FM; I have always felt that removal of a mode is sacrilege and should be avoided if at all possible. There are two things which I feel are not necessary on the FT-707; firstly the 'FIX' facility which I think has been included for commercial purposes, and secondly the 'MARKER' which, with the digital dial, is superfluous. The 'FIX' switch was decided upon to use as it is simple to change the label 'FIX' to 'FM' (and also the marker has since been used for another modification, but more of that later.)

Method

Having given warnings, now for the description of the modification. To produce an FM transmission the first thing that we require is a carrier to FM. We have this in the AM mode, so all we have to do is to switch to AM, remove the AM modulation and apply FM to the carrier. We are fortunate that in the FT-707 the microphone audio is brought off the PCB to the microphone gain control and this is a good point to intercept the audio; we do not require the gain control in the FM mode as deviation limiting will be included on the modulator PCB, and once set will remain unchanged. This switching is carried out on the audio line that feeds the top end of the potentiometer. One pole of the 'FIX' switch us used so the audio can either be switched back to the AM modulator or to the FM modulator PCB, *see* Fig. 1.

On receive similar switching is carried out with the AM audio. The AF output from the AM detector can be located on pin 3 of J3004, this is routed to the second pole of the 'FIX' switch and with the switch in the depressed position the AM audio is routed back to the audio amplifier of the FT-707 on pin 3 of J3001. When the switch is pressed the AF from the audio AM detector will be disconnected and the input of the audio amplifier will be connected to the output of the FM detector.

This modification consists of three small printed circuit boards. The FM demodulator, which accepts a low level signal from the IF amplifier, amplifies, limits and demodulates the FM signal; squelch is also included to quieten the receiver when no signal is present. The second PCB is the Tx modulator; this amplifies, clips and filters the signal from the microphone prior to driving the clarifer line—and so frequency modulating the VFO of the FT-707. The third PCB is used for switching the supplies to the other two PCBs; it is necessary to remove the supplies to both boards when not in the AM/FM mode.

Three PCBs were used rather than one due to the severe limitation of space within the FT-707. In fact it is so tight it is not possible to fix these PCBs to the frame of the set and so they are carefully wrapped using cardboard and bookbinding plastic to guard against any possible short-circuits. The outer case of the set holds them snugly in position when the set is finally closed up.

The FM Demodulator

The FM demodulator, Fig. 2, used in this modification is the FM707 module from *Timestep Electronics.* This is their FM42 PCB modified for an IF of 8.9875 MHz; the main device used in this circuit is the famous MC3359 (ULN3859) which has found use in many amateur designs. It is a dual conversion IF strip with a second IF of 455 kHz and the IC is preceded by an IF amplifier, Q1 (BF119), which increases the sensitivity of the FM IF strip to 20dB SINAD for 2μV; this level of signal is obtainable from C2049 on the IF PCB of the FT-707.

There are two possible methods of squelch: the existing preset squelch on the FM707 module or, alternatively, this can be made adjustable by removing the earthing link from the bottom end of R13, increasing the value of R13 to 10K ¼W, and then connecting the bottom end of R13 to the slider of the microphone gain potentiometer (pin 4, J3004). This converts the mic. gain to squelch when in the FM mode. We can do this as the mic. gain is not used on FM and the impedance of the squelch circuit is high and will not therefore affect the audio level on other modes.

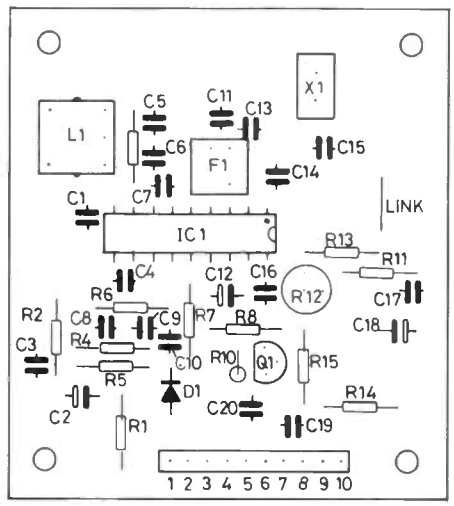


Fig. 4 FM707 COMPONENT LAYOUT (E 207)

The FM Modulator

The circuit of this PCB is given in Fig. 5. Q201 is a preamplifier fed from the mic. amp. of the FT-707 *via* the 'FIX' switch. This increases the signal level sufficiently to drive the diode limiter D201 and D202. Q202 amplifies the clipped signal to a level sufficient to drive the clarifier line, but before we can do this we have to clean up the distortion created in the clipping circuit. This is done by the active low pass filter circuit Q203 (I have had this circuit in my notebook of 'useful circuits' for years but, as usual, I forgot to jot down the originator of the idea; many thanks to whoever it was!) Q204 is an emitter-follower to drive the clarifier line without loading the active low pass filter. This was required as the clarifier line is decoupled by a 0.33μF capacitor (C4335) inside the VFO box (and so inaccessible) which tries to short out any audio applied.

The PSU Control PCB

See Fig. 8. This is required as we need to remove the supply to the FM modulator on receive, and to the FM demodulator on transmit; also the supply must be removed from both on SSB and CW modes. In the AM mode pin 8 of J2001 is earthed and in all other mode positions this pin is held high through a 10K resistor; this is used for filter switching on the IF PCB. We can use this bias to bias Q302 and Q304 on and off and these will short out the zener diodes used for stabilization. This means that the output of Q301 will be zero except on Tx in the AM/FM mode, and the output of Q303 will be zero except on receive in the AM/FM mode.

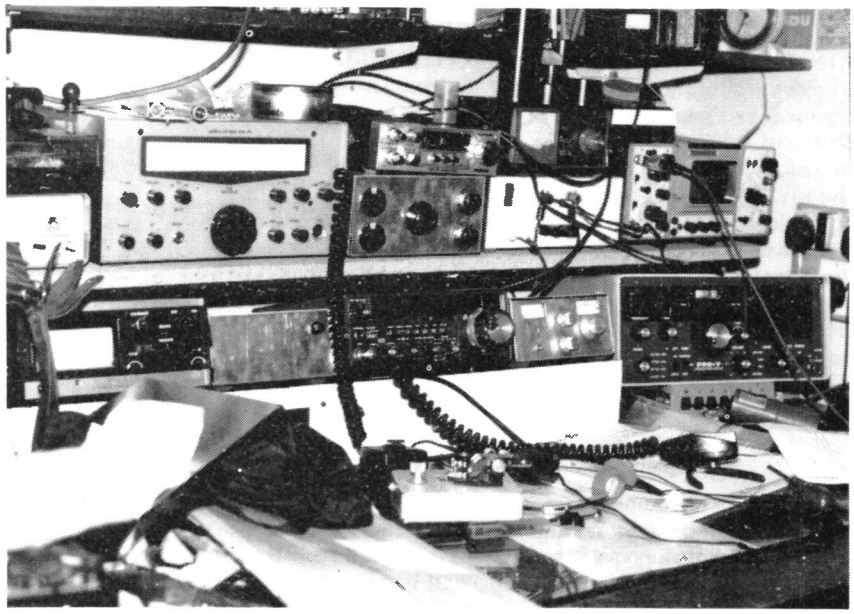
Opening the FT-707

This is part of the operation that takes courage! Firstly remove the outer covers and place the set upside down on the bench. Remove the two screws holding the right-hand side cheek (viewed from front) to the front panel. Now remove the two on the left-hand side, plus the four small screws, and remove the whole side cheek. Unplug all the PCB plugs from the RF PCB and then the front panel can be eased from the rest of the set. To hold the front panel in a stable position I found that a roll of PVC tape pushed between the VFO box and the metal plate holding the frequency counter PCB did the trick.

It will now be possible to locate the connections to the switch PCB, these are shown drawn in Fig. 11. A good steady hand, fine iron, and a bit more courage are now needed to remove these connections; hard wire them as in Fig. 12 and replace them with the new cables. In the following description the colour codes are those found in my FT-707 and there is the possibility that they may not be the same in other units. To guard against any confusion it is necessary to ensure that the terminations have been identified correctly and then check the colour codes against them prior to starting. Having done this re-locate '12' and remove the white/yellow wire from that termination and tape it up. Now remove the red/white from '11' and the blue from '13' and join them together with one end of a 560-ohm resistor; then remove the white/grey wire from '14' and connect it to the other end of the 560-ohm resistor and tape this combination up. Finally remove the white/black wire from '15' and tape it up. That completes the unwiring of the terminations and the wires should be tucked out of the way. It should now be possible to see R4902 to the rear of the terminations, and this should be removed.

At this point it is worth replacing all the plugs into the RF PCB and apply power to check that all is well; after all, it would be a much harder job to locate a wiring error with the other wires in place. Having confirmed that the set still functions properly (phew!) it is now time to start adding wires. For this I used twin (figure-of-eight) microphone screened lead as one core is red and the other blue, so helping with identification during wiring.

The next part of the operation is not so difficult but does require considerable care. We now have to remove several lines from the PCB plugs and replace them with our own. The first one



Eeyore always said Roo's shack was *rather* untidy . . . On the second shelf, second left, is G3ROO's prize-winning "Whitfield" transceiver; *see* the editorial page, this issue.

Table of Values
Fig. 5

R201 = 100K, ¼W	C201 = 22 nF
R202 = 15K, ¼W	C202 = 66 nF
R203, R205, R209 = 1K, ¼W	C203 = 33 nF
R204 = 220K, ¼W	C204 = 1μF tant
R206 = 33K, ¼W	C205, C206, C207 = 470 pF
R207 = 47K, ¼W	C208 = 220 nF
R208 = 4K7, ¼W	Q201 to Q204 = BC548 or BC108
RV201 = 4K7 min. horizontal preset	
RV202 = 1K5 min. h/p	D201, D202 = 1N4148 or similar

to tackle is the AM, audio line on J3001, pins 3 and 4. Using a watchmaker's screwdriver to push down the barb on the plug insert it is possible to remove the insert from the casing. Snip the insert from this yellow screened cable and extract it from the cable form and route it to the switch PCB; connect the inner to the PCB termination 14 and leave the screen floating. Next take a 12-inch length of single screened cable (part a length of figure-of-eight cable into two pieces) and connect the inner to the PCB that originally accepted R4902 alongside termination 15, the screen again left floating. This cable is now routed through the cable form from where the yellow cable was removed, the inserts ensuring that the inner is inserted into termination 3 and the screen into termination 4.

If you wish to check operation of the set at this point replace all

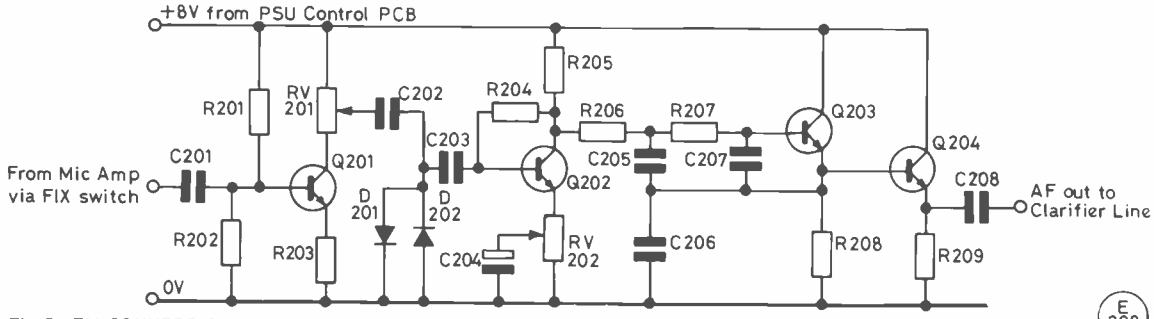


Fig. 5 FM CONVERSION FOR FT-707 MODULATOR CIRCUIT

the plugs and apply power. Switch the mode switch to AM and signals should be heard (use the marker as a signal source to save connecting an aerial). Press the 'FIX' switch and the audio should disappear.

Remove power and plugs and connect another screened lead from termination 15 (about 12 inches long); this will be the audio input on FM. That completes the receive side of the switching, it is now necessary to take the audio output from the mic. amplifier and switch this between the AM and FM modulators.

The wiring of this side of the switch is similar to the other side; however there are two ways that the wires can be connected to the microphone circuit. Either the line from the microphone amplifer can be broken at the plug J3004 pin 3, or at the top end of the microphone gain control. I opted for the plug as there is slightly less chance of the cables getting moved about at that point and perhaps shorting out. In either case the sequence is the same, termination 11 is connected to pin 3 of J3004, termination 13 is connected to the top end of the microphone gain control, and termination 12 should have a 12-inch length of screened cable connected to it so that this can be routed to the input of the FM modulator PCB.

(to be concluded)

COMMUNICATION and DX NEWS

E. P. Essery, G3KFE

AFTER the sickeningly poor period around the turn of the year things have perked up considerably; and at the time of writing we are within ten days of the Equinox with all that implies in terms of band conditions. And, of course, we are well down the slope of the sunspot cycle and everything must be considered in this context.

Around the bands, there has been something to report all the way between Ten — where the FM activity is certainly livening-up what was otherwise an unoccupied lump of spectrum space — right the way down to Top Band.

Forty

This is the band they all love to hate! Seriously, if you have an attenuator, a decent aerial system, and a receiver with a decent dynamic range, then you should be able to hear the stuff. Once you can hear it, *then* you can set about working it! Certainly the preferred scheme is to be on the right spot when the guy makes his first call and then snaffle him before the rest of the world notices, or he'll disappear under the heap of blind callers . . . which implies a need for something no amateur radio shop has yet offered, namely a crystal ball to go atop the transmitter and full operating instructions!

G2HKU (Sheppey) mentions CW contacts with 4D9Y and PA0VDV/PJ2.

Someone who doesn't usually have a go on Forty is G6QQ (Hoveton) but this time David did open up for a spell during the contest and found that almost everyone he called came back — like KM1C, W1RT, KC1F, K1RX, K1ZZ, W2GGE, W2YV, N3BB, KN30, W5WMU, W8YVR and KS8S, all worked between 0700-0800 on the morning of February 19.

G4HZW (Knutsford) is still hard at it with the TS-820 and ten metres, but now he has his indoor wire that loads on Twenty and Forty, Tony is getting considerable entertainment from it. As yet though, he doesn't feel quite able to come to grips with understanding the vagaries of the band and conditions.

G3BDQ (Hastings) does occasionally look on bands other than Top Band or Two — he was heard on Forty CW in hot pursuit of UL7TAQ and VK3MR.

Eighty

Here our first reporter is G4SXE (Rolleston) who has had the best month ever with his QRP rig. It does seem to help things on the transmit side when the ATU is doing its thing *properly* — but of course it also tends to make the receive side work hard too! Brian solved this last problem by reference to the G3RJV attenuator design of April 1981 in *Short Wave Magazine*. Just to prove the point, Brian's best dozen contacts on CW with two watts included ON4IE, F6HXE, Y54PL, GW5TW, GI3ZAD, DJ2KC, LZ1KVV, PA3CRO, SP7KQL, SP9BCH, DJ1MH and GW4TNH who is a YL operator.

Turning to the letter from G2HLU (Reading) we see that once his eyes had recovered from the sight of our first new-style cover, Harold was able to indulge in a play in the AGCW-DL Hand-Key Party, and also the PACC contest, as a preliminary exercise for the real business — which is of course the BERU shindig.

G2NJ (Peterborough) says he has heard from G2CNN, back from his stay up in the arctic at Inverness; it seems that the winds had his aerials away three times. On a different subject, the TOPS CW net on 3592 kHz on Sunday evenings received a bit of interest recently when they were joined by G3PVB in St. Albans who got reports all round on his three-watt HW-8 signal. A week later, just before the net started, the control, G4RAR, worked LA6YV on the net frequency while the latter was running three watts input. From the personal point of view, G2NJ notes the fall away in conditions; no more Scandinavians in mid-afternoon working DX, and the EUs are suffering from severe fading as well. However, an interesting one was the QSO with G4HXB in Stockport. Jim, it seems is a white stick operator and he had made a new year's resolution to have a CW QSO each day — they had a chat for a full hour, and later G2NJ received a QSL direct with his callsign in Braille.

G3ZPF (Kingswinford) had broken his 'duck' at the new QTH by working VP2VA, 6W2EX and VP2KBZ for new ones; the usual Ws and VEs, plus UA9 and UA0, were all there to be taken, but it is quite surprising the size of the pile-up that can appear on an East Coast W signal at times! Two that *didn't* respond to David's blandishments were J37AE and VU2BX — this is the umpteenth time the latter has slipped through the G3ZPF fingers. With regard to the matter of his temporary appearance on two-metres, G3ZPF says that the loaned gear is now back with its owner, as he has had a telephone installed which has a longer range! On a *completely* different tack, G3ZPF wonders if anyone knows who first coined the term 'lid' for a certain type of operator.

Full power CW for G2HKU (Sheppey) meant CW contacts with AA4S, EA8RL and PA0VDV/PJ2, while the QRP four watts managed to come across with DJ5QK and F6HCX.

Top Band

First-off we must mention the letter from W1WY; as regular readers will be aware, Frank passes on to us his Contest Calendar every month from which we can extract details of interest for this side of the Pond. However, Frank is also a long-time Top Band DX operator and he is a bit worried at the present trend of things. As he says, there are some Big Guns appearing on the band over there, and the 'DX Window' is all but useless. The problem is made worse by DX stations who are operating in the Window area, and inviting calls on their own frequency. Just imagine, W1WY says, when a weak DX signal does that, and all the 1 kW Big Guns pile up in that small five-kilohertz segment; anything in the way of DX that might have been there sinks without trace! All we can say is that maintaining the DX-Window idea is, as far as possible, a very good idea and one to be publicised in all possible ways; but we also have to accept that there are some countries which are not only new to the band, but also don't have transmitting privileges in the area of the DX-Window. That doesn't alter the basic fact though — we shouldn't encourage anyone on this side operating in the DX-Window and listening for replies on his own QRG, if the band is open and he knows he can be heard at DX.

Our remarks on the Bordeaux incident last time out sparked-off a rather tetchy letter from GM4KGK of Leith Nautical College. Obviously, he has never operated Top Band, as he thinks a request to QSY would receive the same sort of response that it would get on two-metres — of which he obviously does have experience. A valid point GM4KFK makes is that in most cases the coast stations work duplex and so cannot in fact transmit to ask for amateur QRM to shift. However, we looked in our copy of *Reed's Nautical Almanac* (admittedly not the 1984 issue, but recent enough) and we find that 1820 kHz is one of the Bordeaux transmit frequencies. GM4KFK wonders whether we could tell him of an aerial which would receive signals all over the Bay of Biscay area and yet reject the signals coming in from Cornwall, Cork, Kent and Caithness, as he would be most interested . . . Well, well! Perhaps he's

never heard of directive aerials? Of course, they have just those, as Bordeaux is not normally audible in U.K. The problem, more likely, is that ships in the Bay of Biscay, who obviously won't have directive aerials, can't hear Bordeaux because of QRM from ten-watts amateur signals emanating from U.K. and Europe. If that has suddenly become the case, haven't our French friends established a good case for investigating their transmitter and aerial system for a fault condition *before* shouting? GM4KFK's other point is a very fair one, insofar as he says the use of the fish-phone stations is connected with safety of life at sea; agreed — and we know that the amateur behaviour on Top Band with respect to the fish-phone is infinitely better than the behaviour of the professionals on the continent and in the Bay of Biscay who use the VHF calling and distress channel 16 (156.8 MHz) as a chat channel.

On a pleasanter note, from G3OUC (Newbury), we have a letter enclosing a cutting from his local paper. It seems that Pat got a bit annoyed about those infernal illegal cordless phones which infest Top Band. Pat not only did his homework, but sat and thought about how to make it hurt before he wrote to the paper. The nub of his argument was in implication that every local radio amateur was able to listen to the chatter of the people using these things, and implies that the criminal element have already rumbled the potential profit to them of listening to these open conversations. Anyone who reads the correspondence column of that paper and who owns one of those illegal phones will be very strongly motivated to get shot of it, and quick. Congratulations to G3OUC on his effort. In the meantime he is still able to work a few around 2200z, such as SSB to EA3VY, DL5SB, DJ3VI, DL6WV, DJ6QT, DJ8WL, DF7KD, SP3BIP, SP3IBS, OK1JDX, GM4PXG (Shetlands), and loads of Russians. However, Pat is dusting off his key, partly because he has a pal at the salt-mine who is after a 'A' licence, but more because he has realised how much more effective CW is — in particular on a dead or dying band.

G4AAW (Maidstone) was inspired, he says by G4AKY. Peter says his tally for last month includes AA1K, CT1LN, CT2BQ, EA, EA8, EA9, FC8TT, K5UR, T77V, UL7MAN, VE1YX, VO1MP, W1RR, ZB2EO, 3A2GX, 3V8AL, 4X4NJ and 4Z4MK; all were on CW except for VE1YX. Since moving to the new QTH last year some 58 countries have been worked on the band including VK6HD.

As for G4AKY, Dave has now moved from his Harlow QTH, and, if all is according to plan, at the precise moment we write this paragraph he should be banging holes in the wall of the new place to enable him to install the mast; after that comes the matter of the stick to adorn the far end of the garden, for which some quite novel schemes are being mooted.

G4OBK (Chorley) makes his second offering in 22 months. Phil has the choice of either 190 feet of inverted-L or a sixty-foot vertical for this band, and recently he increased his earthing system from 300 feet of wire to some 2000 feet, and this has brought about a very considerable improvement in the signals. Score so far is 58 countries worked, of which some seven have been hooked in 1984. Phil is also active QRP — crystal-controlled on 1843 kHz, with 700 milliwatts to a BFY51; this rig so far has connected with GI3LFH in Belfast, G5DQ in Cambridge, and G3ZJJ in Devizes. The main log includes such as 9H1CG, Y21UD, FC8TT, SM4APZ, UL7CAO, UA9CBD, 9H1BB, EZ2QAE, OKs, EA5TX, UA3s, AA1K, W2FJ, while a gotaway was K6OJ/C6A who peaked 579 at 0540z on March 4 — and who was in fact worked by GI3OQR; and VK6BC heard at 1955 on February 10, worked by G3RPB and EUs.

Now for G2HKU; he used CW to work VE1YX, PA0PN, OE1DH, HB9AMO, OH3VV, DL1YD, EA7ABW, EA9KF, and ED9EA; while the SSB signal went out and swapped reports with PA0DIN, DL1RK, GM4SID, OZ1W, GM3GMN, EA8QO, W4MJ/MN, DJ2BW, F9LT, DJ6RX, GM3OXC, F3BC, HB9CM, SM3BP, OL9CPG, OL9CPZ, UA9CBR, OL8COS/P, YU2ZZ, and both LX/DF7PN and LX/DF2PI — no reason known for the apparently odd way of expressing the calls.

G3BDQ (Hastings) comments on how rapidly things have changed during the course of the month. On February 1 John worked a second QSO with JA2GQO, but has heard no JA stations since. On the next day W0IFH, in Texas despite his call, was worked at 0716. SV0AA was a new one and then a surprising return to a CQ call in the shape of 9M2AX; G3BDQ has the QSL card and notes that it is claimed to be an 'impossible'' QTH for Top Band DX — in a tower block! Several evening VKs were hooked, and then VK3DGJ, who is actually so strong that a European station accused him of being a phoney! There was a QSO with your scribe on 15th which might have turned into a long natter on the key had we not been interrupted by that pestilential telephone ringing. A couple of new ones were SV5QX (Rhodes) and SV9OA (Crete) while T77V was worked during the Phone contest — sadly G3BDQ was not at home for most of the period of the number-swapping.

New Bands

Not many reports — let's have more! Though what we really want is for more countries to release the band to their amateurs.

G4OBK, as already indicated, is a Top Band man primarily, but he does look on occasion at 10 MHz, where his CW was pushed put to LU1DZ, DLs and G2HW. OZ1EUO was raised on 18 MHz CW.

Another who took a peak at 10 MHz was G2HKU, who managed a two-way on the key with LU6AMW.

G4OBS (Winterslow) says the pick of his month's crop included FY7CP, worked on 24 MHz CW, and a gotaway VK6 on the same band.

Ray Howes, G4OWY (Weymouth) believes in burying his call deep into the body of his letter — we didn't get it at all last time and nearly failed this time too. Ray only mentioning it while giving us a rocket! However, to come to the point, Ray has stuck to 10 MHz, and for a change raised quite a number of G stations, as well as OK4BA, several DLs and a gotaway in the form of VP2ES.

Coming

Which is where we look at the DX we can hope to find in the next few weeks.

From *DXNS* we note that the Kermadec expedition still seems to be progressing, although Jim Smith has dropped out of the party. In addition there is always the chance of snagging ZL8AFH on Eighty!

The Clipperton Is. expedition seems to have hit a snag; nonetheless all the indications are that, sadly it will be over and done with by the time this reaches you all.

"CDXN" deadlines for the next three months:

May issue—April 5th
June issue—May 3rd
July issue—June 7th

Please be sure to note these dates

If you are after Sable Is. look out for CY9SAB; the problem is that Wayne's visits are at short notice, and may be for a day or several days.

Tokelau operation is forecast, with DL1VU there for a stay of at least a month.

A change in the official prefix for Macao is noted; it is now XX9.

On we go to look at the American *TDXB;* here we note that XU1SS is back in the amateur radio business, and so also is BY — if conditions would condescend to give us a break!

Here and There

Nice to hear again from G4BUE (Steyning) who now has his broken tower replaced and a new beam on top *(See* January's "CDXN"); some spare time has been spent with a calculator and all the aerial handbooks, and as a result of this and some practical work, the old Western Electronics DX34 beam has been restored, and has had its 14 MHz performance

considerably improved. So — it's an ill wind that blows no-one any good!

GM4CUX (Edinburgh) reckons he had a drab and patchy winter on his favourite 21 MHz band, and just recently he had the ill (or good, depending on how you look at it!) fortune to be smitten by a 'bug' which was doing the family circuit; so from February 15, for several days, the shack was the place to be, as we shall explain a little further on. But — and this is the interesting bit — GM6KGZ, a close neighbour, popped round to the invalid and operated under supervision for his first time on HF, to raise OD5CN, OA4BS, VE2DGY and VE3WA — which *should* be enough to enthuse him for the Morse test!

Ten Metres

Has been much more lively, occasionally even in the East-West directions. However, we do have a *serious* problem with various illegal CB-ers camping in our band. While it is worse in some places than others, we would suggest that all readers who have ten-metre gear put it to use. Even if you don't actually like CW, a slow CQ call on top of a CB-er with illegal equipment won't take much effort; or if he is in the Phone part of the band, then a SSB contact or CQ call on the *other* sideband and once again on a spot chosen to do as much damage to the CB contact as possible, until he gets the message and goes back to his own area. And of course, who knows you might either work some DX or even a semi-local contact. Whatever you do, do *use* the band as the pressure is increasing by the day, the more so as sunspot activity declines and DX chasing activity on the band decreases while CB activity (and hence QRM) increases to make our band seem like a haven.

G6QQ (Hoveton) says he hasn't done too well this month; he offers RL7PAD, ZD7CW, W3LB, N4UH, W8GRZ/4, VE1ATP, PY1HQ, VE3LKU/HI8, KQ0U, LU4DFM, JH6ERA, PY2BW, N5AST, plus 33 Stateside QSOs during the Contest weekend.

That TS-820 and two-element Quad at G4HZW (Knutsford) must go on working for a while yet — Tony so far forgot his priorities as to get a new car! Shame on you! The old rig still does its thing on Ten, though, as shown by the SSB contacts with G4DUW/DU1, EL0AB, GM4AWW (*via* an Aurora manifestation!), JF6DPE, JR6EFE, LU8FT, PI4DEC/P by backscatter, SV1SN, TR8JLD, UA2-3-4-5-6-9-0, UF6, UJ8SAD, VE1-2-3, VO1AW, VO1MP, VK2VSY, VK2ZQ, VK5SKK, VP8AIB, VS6CT, all W call areas, YB3ARL and ZS6CC.

"All over the place", says G2ADZ (Chessington) — at least at the times when he has been able to listen. Conditions can peak from dead flat in thirty minutes, or on the other hand there have been times when three VK beacons have been on but no stations active. Bill has done more listening than operating, and heard all the UA call areas, JAs, Ws, PYs, LU, ZS, plus N5RM/C6A, XT2BJ, F6KDE/OD5, Z23JO (nice to know Mal is still about), KC2GE/PJ3 and VK6AFW. Best of the heard ones were 9U5G, W6QL/ZP5, K4FW/VP2KK, VU2MAR, VU2LO, FM7CT, 9J2BO, YV7QP and CX2AD.

G4OBS found Ten 'giving' with 3X4EX on SSB, while FM was the thing for NP2AH, and 5B4JE, and CW managed XT2BJ.

Now G4OBK, who took a bit of time off Top Band to hunt up CW contacts with LU7ONN, W1-5, W9, N4BP/C6A, N5RM/C6A, PY2MIK, HH2VP, ZY8BI (= PY8BI), PP1AEA, UA9FCL, YV1AVO and K3ZO/HK3.

Forty watts p.e.p. of RF operated mobile serves for G3OUC. This managed DH6MAR, UA6ARE, UB5IJK and UK6LKK. As Pat says, "roll on cycle 22!"

Another of the FM-ers to encounter some DX is G2DHV, who heard 4X6FK, 5B4JE, a couple of PAs, and WB8YCB, all among the G4s worked and entered in the log.

G3URA (Cheshunt) wryly remarks that the CB-er's in his area are getting worse by the day, and it seems the only mode they don't use on 28 MHz nowadays is RTTY! The local lot have completely clobbered the beacon section of the band. However, CW still works the odd one or two, notably K4FW/VP2, FM7CT, F6KDE/OD5, TR8IG, and J28CR. On a different tack Dick asks what precisely is the noise that covers Ten from 9.0 a.m. to 5 p.m. on most weekdays? A good Question. Perhaps a D/F exercise is indicated!

Fifteen & Twenty

Not a lot of reports on these bands for this time. Both have been like the dear old curate's egg — but of course you need to be able to get in the shack while the band is open to make any DX contacts, and most of us have to work!

G2HKU used his SSB to work GJ2LU, ZL3FV and ZL3RS — and indeed the writer would have chipped in to the ZL contacts one morning, but for another commitment. On CW, Ted got out to K4LTA/PJ7, UK0BAE (a polar station on Cape Chelyuskin), VK2SA, JR4GGT, JA2DOH, JA7IC, W1RM and EK0KP. On the QRP front, W0FO, EA2FAA and KA3CS were all worked with four watts. All this was on Twenty, while on 21 MHz CW there was HH2VP and W2MEL.

GM4CUX picks out his SSB contacts with the following as his best during the month: J87BS, C6AEY, 5N6BLM, CN2AQ, VP8MT, AP2P twice, WA1DVE/4, W3MJF, 5B4MF, FM7WD, SV1UN, OD5ST, VS6CP, JR6YAH, VE3BSA, JE1FIG, VK2FU, KK9A/P/V2A, and VP2KBU.

Perhaps the most active of our reporters in the absence of G3NOF was G6QQ; David offers on 21 MHz SSB, 7P8DD, UI8ZAC, PT7CAW, ZP5LET, HP1JXN, YB3KK, VE5VJ, and W6VLH; CW accounted for NP4G, ZS1TH, 8P6NX, N4BP/C6A, UA0AAE, UA0SLN, K4FW/VP2K, 4Z4DX, JD1BCO, JA6OPP, and some 73 assorted Ws during the contest. As for Twenty, there was a CW QSO with VE7CLZ, plus some 21 assorted W contacts during the contest weekend.

Contests

A week before this hits your doormat will have seen the CQ WW WPX SSB Contest. April 21-22, from noon zulu to midnight zulu — 36 hours — is the ARCI QRP Spring Contest. Any 24 hours, and send RS(T), plus country, plus either membership number or power. Score 5 for a member, and 4 for a station in another continent if a non-member, or 2 for a station in one's own continent (that's how we read it anyway!). There is a multiplier of states/countries worked, and a second multiplier for the power level output (4 – 5W out x 2, 3 – 4W out x 4, 2 – 3W out x 6, 1 – 2W out x 8, and below 1 watt x 10) There is a bonus multiplier of 2-times if entirely solar-powered, and 1.5-times for 100% battery operated. Final score, then, is QSO points times country multiplier times power multiplier, times bonus multiplier if applicable. Logs to go to KA5NLY, 16 Fairmont Drive, Little Rock, Arkansas, 72204, to arrive by May 21. Frequencies to look at are 1810, 3560, 7040, 14060, 21060 and 28060 kHz, while novices are to be found on 3710, 7110, 21110, and 28110 kHz.

Looking ahead a bit, there is of course the CQ WW WPX CW contest; this one is over the weekend May 26-27.

QRT

This is the finish of the pile for another month; for next time the deadline date is in the 'box', and the address, as always, "CDXN" SHORT WAVE MAGAZINE, 34 High Street, Welwyn, Herts, AL6 9EQ.

May issue due to appear on Friday, April 27th

Using the Icom IC-730 Transceiver with a VHF Transverter

N. A. S. FITCH, G3FPK

WHILE many VHF/UHF operators use equipment specifically made for the various bands above 30 MHz, others use transverters driven by HF bands transmitters or transceivers. In the author's case being a Class A licensee with assorted HF bands gear, it seemed a waste of money to buy an expensive VHF transceiver when all that was needed was a 28/144 MHz transverter.

For many years, the 144 MHz station comprised a separate receiver and transmitter of 1960s vintage which, while quite adequate, nevertheless lacked the extra facilities, convenience and compactness of the modern solid-state equipment. These "separates" were used with a hybrid solid-state/valve transverter which needs about 200 milliwatts of 28 MHz RF to drive the transmitter section. The HF Tx was modified by switching off the PA valve, taking the 28 MHz power from the 12BY7A driver valve, the amount of drive being controlled by varying the negative grid bias on an earlier stage.

Missing Decibels

When an Icom IC-730 HF bands transceiver was acquired, one of the many optional accessories was the EX-205 Transverter Unit, the installation of which simplifies connexion to a VHF or UHF transverter. However, the RF output level is a miserable 150 milliwatts into 50 ohms, equivalent to less than half a milliwatt of drive. Thus some 26dB extra gain was necessary. The dealer could not come up with any solution in the way of simple modifications to the IC-730, so an alternative approach was considered.

ALC to the Rescue

The IC-730 is a well-designed piece of equipment and the Icom engineers have produced a versatile circuit, one feature of which is an ALC input socket for use when a linear amplifier is installed. The circuit diagram shows this socket to be connected to the signal gates of two buffer amplifier stages in the transmitter chain, one operating at 9 MHz, the other at 39 MHz. Both are 3SK74 devices, dual gate FETs.

It is common practice to control the gain of dual gate FET amplifier stages by altering the DC gate voltage, the equivalent to varying the grid bias of valve amplifiers. A test circuit was set up to ascertain if feeding a negative voltage into the ALC socket would control the gain without distortion of the signal and, if so, what voltage values were necessary. A positive five volts stabilised supply was used with the positive rail earthed and a voltage divider network was connected across the output. It was discovered that a negative voltage swing of 0.73 to 0.88 varied the transceiver's output power from 100 watts to nothing. The IC-730 was then connected to the transverter's 28 MHz Tx input and the power control turned down to about 200mW output. The system worked satisfactorily and sounded alright into a dummy load when monitoring on a separate receiver.

Final Realisation

On air tests also proved that the idea worked so the circuit of Fig. 1 was wired up. In view of the small range of the control voltage, a stabilised supply is essential. The RF choke was included to prevent any stray RF getting onto DC lines and screened wire is used for the ALC lead. Capacitors C2 and C3 are necessary to preclude likely destructive self-oscillation in IC1. There is nothing critical about the parts layout and the author made his version up on a piece of Veroboard. The completed board is installed inside the transverter power supply.

Interfacing

As used with the original "separates," the author's transverter did not need an input relay as there were separate 28 MHz connexions to the Rx and Tx. However, with a transceiver a relay is required and a suitable one was found in the junk box. It came from a six volts PMR unit so a dropping resistor was used in series. The multifunction changeover relay in the transverter is a nominal 12V component and the additional PMR relay and its dropping resistor was wired across it. These two relays are now powered from the 13.8V stabilised PSU which is used for the IC-730. The live side is wired to pin 2 on the IC-730's accessory socket and the return lead to pin 3. In transmit mode, pin 3 is grounded by a relay in the transceiver.

The transverter does not have an antenna changeover relay and an external, 6V AC operated Dow Key device is used. Power for this is obtained from the transverter's PSU and this relay is also switched by the IC-730. The Icom engineers made provision for switching an external power amplifier and to use this facility the phono socket marked "MEMO (SEND)" is employed following the simple internal modification procedure described in paragraph 5.5.7. in the Instruction Manual. All that is involved is to change wander plug P37 on the Accessory Board from J1 to J3 and this is clearly illustrated on page 10. The interfacing is shown in Fig. 2 and the 6dB attenuator network, R5, R6 and R7, was included to provide a proper fifty ohms load for the IC-730 PA stage.

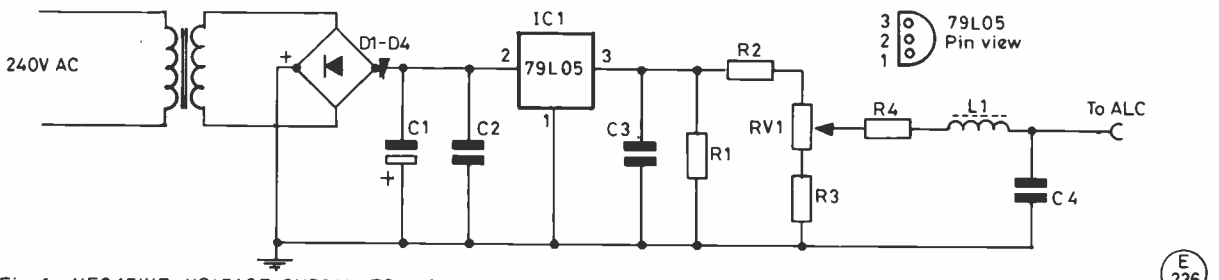


Fig. 1 NEGATIVE VOLTAGE SUPPLY FOR IC-730 POWER CONTROL

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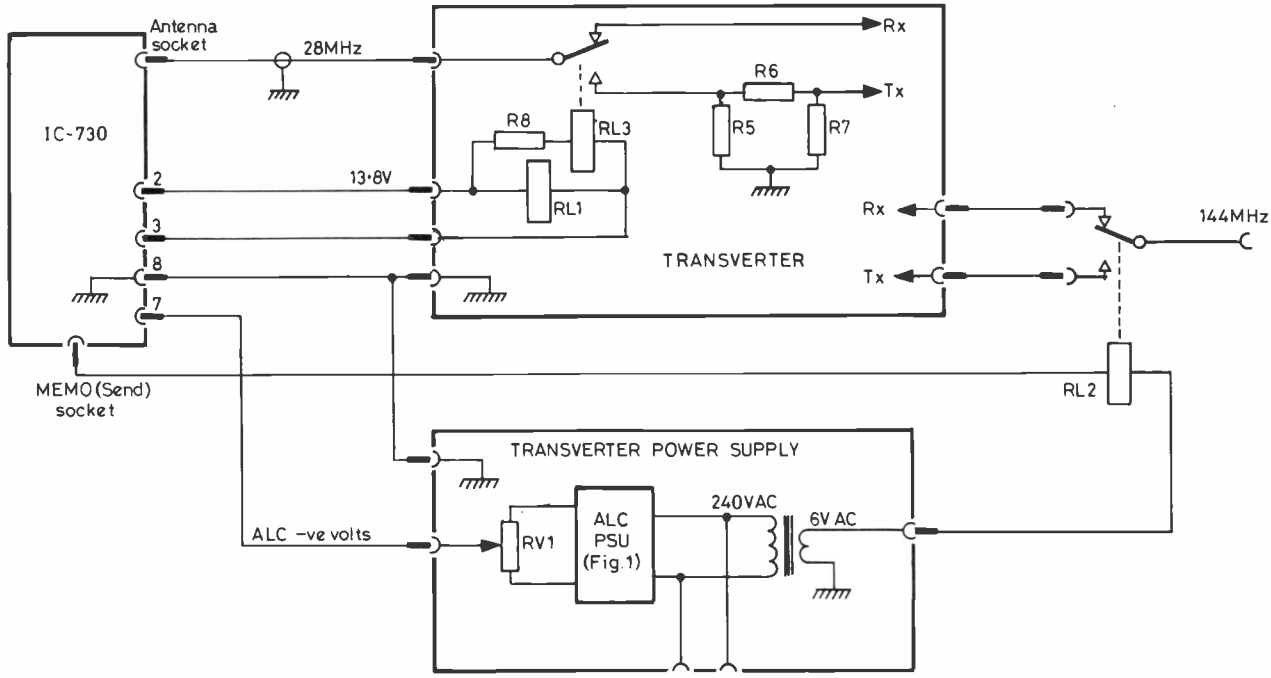

Fig. 2 TRANSCEIVER, TRANSVERTER AND POWER SUPPLY INTERCONNECTIONS
The figures on the IC-730 diagram are the pin numbers on the accessory socket.
An internal modification has to be made in the IC-730 to the "MEMO" socket (see text).

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Tables of Values
Fig. 1

R1 = 5K6
R2 = 24K
R3 = 4K3
metal film, 0.4W 1% tolerance
R4 = 100K
C1 = 470μF, 16V elec.
C2, C3, C4 = 0.02μF disc ceramic
L1 = 220μH RF choke, value not critical
D1 to D4 = 1N4002 or equivalent
RV1 = 1K wirewound linear
IC1 = 79LO5, −5V voltage stabiliser
T1 = 6-0-6V sub-miniature mains transformer

Fig. 2

R5, R7 = 150R, 1W carbon
R6 = 39R, 1W carbon
R8 = 100R, 1W wirewound (not required if RL3 is a 12V relay)
RL1 = changeover relay in transverter
RL2 = antenna changeover relay
RL3 = input changeover relay (not required if one already provided in transverter)

The Proof of the Pudding

Initial tests with the final unit were carried out with the transverter terminated in a dummy load and monitoring the SSB and CW signals both aurally and on a tape recorder using a separate receiver. No "nasties" were found so the system was launched into the antenna. Exhaustive tests were carried out with John Nelson, G4FRX, who reported a peak signal into his receiver of some 330 microvolts.[1] This represents a very strong signal, sufficient to cause non-linearity in some of the more mediocre "black boxes," However, the G4FRX system has a third order intercept point of +7dBm[2] so is perfectly linear way beyond the 330μV — approximately −57dBm — level. When correctly loaded, at this −57dBm level, all traces of the signal were lost at +4.4 kHz and −5.1 kHz.

At first some odd-order intermodulation distortion products were reported on the LF side of the SSB signal. These were removed, "like magic" by carefully adjusting the loading of the PA stage. Now this suggests a serious drawback of commercial solid-state amplifiers which are set up for a fixed 50 ohms output impedance with no adjustable loading control. This could explain why so many seem to produce rather rough signals since it is very unlikely that any antenna will look like a nice 50 ohms resistor across an entire amateur band.

Conclusions

This system has been used since the beginning of this year and the ideas herein could be adapted for other HF transciever and VHF transverter combinations. Some observations about the IC-730, though. First, in AM mode, the power control does not work so, if you inadvertently select that mode and go over to transmit, you will be firing 40 watts of RF into your transverter — definitely not recommended! Second, the setting of the power control for maximum carrier power on CW is quite different from the setting for maximum output on SSB mode, for which latter far more drive seems to be needed. So, if changing from SSB to CW *don't* press the key until you have drastically reduced the drive, otherwise the attenuator network, R5, R6 and R7, will likely "fry." But the system could be refined to overcome these minor problems.

To revert to normal HF operations, it is only necessary to change the antenna lead from the back of the IC-730 from the transverter, to the HF antenna circuits. The ALC lead does not need to be disconnected as there is no negative voltage present when the tranverter PSU is not switched on. However, the ALC meter on the IC-730 behaves slightly differently when this lead remains connected although there is no reported difference to the received HF signal. Future modifications will include a master "HF/VHF" switch which will take care of these various refinements.

Notes:

(1) On VHF, a standard signal input of 5 microvolts across a 50 ohms input inpedance has been proposed for an S9 S-meter reading, equivalent to −93dBm. Thus 330μV is equivalent to 20 $\log \frac{330}{5}$ = 36dB over S9. Alternatively −93 + 36 = −57dBm.

(2) The G4FRX receiving system used in the tests comprises an MGF 1200 Gasfet RF stage with 10dB of negative feedback. The mixer device is an MCL Schottky Diode Balanced Mixer type SRA1H, fed with a +16dBm local oscillator signal.

Russian DX'ing — Oblast Chasing Can Be Fun!

N. S. CAWTHORNE, G3TXF

NO matter what HF conditions are like, from the U.K. at least, it is nearly always possible to work USSR stations on one band or another at any time of day or night. Russian DX'ing or "oblast chasing" can add a lot of interest and fun to what are usually rubberstamp-type QSOs. The following few notes are intended as a brief guide for the SWL or transmitting amateur to introduce this somewhat specialised but interesting form of DX'ing.

What are Oblasts?

The USSR is currently divided into 180 administrative regions (in Russian, a region is 'oblast'), similar to the counties of the U.K. or the states of the U.S.A. DX-chasing and QSL collecting from Russian oblasts on the HF bands is similar to working towards the Worked All States for the U.S.A. or towards the Worked All British Counties or WAB Areas in the U.K. Different oblasts vary greatly in size and population and are correspondingly more or less difficult to find on the DX bands. The nearer European oblasts tend generally to be the easier ones with the most difficult being on the far eastern side of the USSR. Of the 180 current oblasts, 86 are in Europe, 92 in Asia and then one each in the Arctic and in Antarctica.

How to Recognize an Oblast

Table 1 gives a list of the current oblasts with their corresponding callsign grouping. This listing makes it easy to identify directly from the callsign the oblast from which a particular USSR station is operating. The oblast is identified from the combination of the figure in the callsign with the first letter that follows; as an example, UK9AAN, a well-known contest station, is located in oblast 165. This is found by looking for UA9A in the table.

To identify the oblast, it does not matter if the station is an individual station UA, UB, UC, UD etc., a club station UK, or a 28MHz/VHF-only station RA, RB, RC, RD etc., since it is the combination of the figure and the letter that follows that is the signicant part of the callsign. In the case of UK9AAN the significant part of the callsign is "9A".

The only exceptions to this oblast identification rule appear to be some of the older two-letter calls as well as some of the older special event calls, *e.g.* UM50B. However the more recent special event calls, of which there is an ever increasing number, such as U1A, R4L, R5M, EW6V and RG6G are still readily identified by the same method (being oblasts 169, 164, 59, 13 and 4 respectively). Similarly, stations that may be portable or on an oblast DX-pedition sign with a suffix after the home-call that indicates the oblast of operation; *e.g.* UK9YBD/U9Z, where the "9Z" part of the suffix indicates oblast 100.

The highest oblast number currently is 185; there are 5 deleted oblasts (11, 32, 35, 61 and 116), making a current possible total of 180 oblasts.

New Oblasts and Large Population Oblasts

There are two very new oblasts, 184 and 185 that appear to be subdivisions of existing oblasts, namely 177 (UM8PA-) and 48 (UI8LA).

Where the amateur population is very high and the numbers of callsigns required cannot be covered by one single oblast identification figure-letter group, then further groups are used; for example the Moscow City oblast 170, which can be UA3A or UA3B. There are seven oblasts that use more than one significant figure-letter group to identify the oblast; these additional oblast codings have been included in the table.

Oblasts of Special Interest

Oblast 171 covers the Arctic region in which occasionally floating ice-stations such as UPOL 15 can be worked. Similarly oblast 172 is Antarctica, which is currently identified by the 4K1 prefix. A particular oblast to watch for is oblast 159, UA0Y, which is in the only part of the USSR in CQ Zone 23 (a CQ Zone shared with BY and JT1); there has been oblast DX-pedition activity from this rarer oblast from a group using the special call U0Y.

Keeping Records and Oblast DX-chasing

When tuning around the HF bands, the author finds it useful to have a "wanted oblast" list close to hand. The "wanted oblast" checklist is extracted from the oblast record system, a sample of

UA1A	169	UA3M	168	UB5I	73	UF6F	12	UI8F	47	UA9U	130
UA1B	169	UA3N	132	UB5J	67	UF6O	15	UI8G	54	UA9W	84
UA1C	136	UA3P	160	UB5K	72	UF6Q	14	UI8I	51	UA9X	90
UA1F	136	UA3Q	121	UB5L	77	UF6V	13	UI8LA	48	UA9Y	99
UA1N	88	UA3R	157	UB5M	59	UG6G	4	UI8LN	185	UA9Z	100
UA1O	113	UA3S	151	UB5N	57	UL7A	179	UI8O	50	UA0A	103
UA1P	114	UA3T	122	UB5P	58	UL7B	16	UI8T	52	UA0B	105
UA1Q	120	UA3U	123	UB5Q	64	UL7C	28	UI8U	55	UA0C	110
UA1T	144	UA3V	119	UB5R	81	UL7D	29	UI8V	181	UA0D	111
UA1W	149	UA3W	135	UB5S	74	UL7E	25	UI8Z	56	UA0F	153
UA1Z	143	UA3X	127	UB5T	79	UL7F	27	UJ8J	40	UA0H	106
UA2F	125	UA3Y	118	UB5U	65	UL7G	18	UJ8K	182	UA0I	138
UC2A	9	UA3Z	117	UB5V	66	UL7I	17	UJ8R	42	UA0J	112
UC2C	9	UA4A	156	UB5W	68	UL7J	19	UJ8S	41	UA0K	139
UC2I	8	UA4C	152	UB5X	62	UL7K	24	UJ8X	183	UA0L	107
UC2L	5	UA4F	148	UB5Y	82	UL7L	26	UM8M	36	UA0O	85
UC2O	7	UA4H	133	UB5Z	69	UL7M	22	UM8N	34	UA0Q	98
UC2S	10	UA4L	164	UO5O	39	UL7N	31	UM8PA	177	UA0S	124
UC2W	6	UA4N	131	UA6A	101	UL7O	20	UM8PN	184	UA0T	174
UP2B	38	UA4P	94	UA6E	109	UL7P	23	UM8Q	33	UA0U	166
UP2P	38	UA4S	91	UA6H	108	UL7R	178	UA9A	165	UA0V	175
UQ2G	37	UA4U	92	UA6I	89	UL7T	21	UA9C	154	UA0W	104
UQ2Q	37	UA4W	95	UA6J	93	UL7V	30	UA9F	140	UA0X	129
UR2R	83	UA4Y	97	UA6L	150	UL7Y	176	UA9G	141	UA0Y	159
UA3A	170	UB5A	75	UA6P	96	UH8B	180	UA9H	158	UA0Z	128
UA3B	170	UB5B	76	UA6U	115	UH8E	44	UA9J	162	4K1-	172
UA3D	142	UB5C	80	UA6W	86	UH8H	43	UA9K	163	Arctic	171
UA3F	142	UB5D	63	UA6X	87	UH8W	45	UA9L	161		
UA3E	147	UB5E	60	UA6Y	102	UH8Y	46	UA9M	146		
UA3G	137	UB5F	70	UD6C	2	UI8A	53	UA9O	145		
UA3I	126	UB5G	78	UD6D	1	UI8C	49	UA9Q	134		
UA3L	155	UB5H	71	UD6K	3	UI8D	173	UA9S	167		

Table 1. To identify the oblast of a USSR station, check the figure in the callsign and the first letter that follows the figure against the list. For example, to identify the oblast of UK9AAN look for the significant part of the callsign, namely "9A" in the table, which identifies oblast 165.

Fig. 1. Suggested layout of an operating aid to keep track of the oblasts worked/heard as well as of the first QSL received to confirm the oblast.

Oblast Number	*Callsign Identity*	*Station Worked/heard*	*Station Worked/heard*	*Station Worked/heard*	*Station Worked/heard*	*QSL received from:*
001	UD6D	UD6DAZ	UK6DAJ	UD6DHC		UD6DHC
002	UD6C	UK6CAA	UD6CN			UD6CN
003	UD6K	UK6KAB	UK6KAA			UK6KAB
004	UG6G	RG6G	UG6GDS	UK6GAB	UG6GAI	RG6G
005	UC2L	UC2LBE				
006	UC2W	UK2WAC	UK2WAY	UC2WAZ	UK2WAF	UK2WAC
007	UC2O	UC2OQ	UC2OCS	UC2OBA		UC2OCS
008	UC2I	UC2ICQ	UK2IAS	UK2IAJ		UK2IAJ
009	UC2C	UK2CAZ	UC2CFZ			UK2CAZ
010	UC2S	UC2SMI				UC2SMI

which is shown in Fig. 1. This simple record system makes it easy to keep a tally on the number of oblasts worked as well as a check on the oblasts that have been worked but for which QSL cards are still awaited.

DX oblast chasing can become quite a challenge, even some of the nearer European oblasts can be hard to find (the Russian equivalents of Rutland in the old WABC days?) There are occasional internal DX-peditions within the USSR that activate the rarer oblasts, usually recognised by callsigns such as UK8TAA/U8C and UK9OAA/U8C, which have both recently been active from the rare oblast 49.

Oblast Awards and QSL'ing

The Central Radio Club, the famous Box 88 in Moscow, issues the R-100-0 award for having confirmed contacts or confirmed SWL reports from 100 different oblasts. There is also a special award for those who achieve the very difficult task of collecting cards from all the current oblasts. The QSLs themselves need not be sent with the application, but there should be a list of the QSL certified by two other amateurs, preferably club officers, that the cards have been checked. For further details on the methods of applying for awards, reference should be made to an awards manual such as the RSGB's *Amateur Radio Awards*.

As all QSLs for Russian amateurs go *via* the CRC QSL bureau, it can take several *years* for cards to come through; although in some few cases cards have been received *via* the bureau just two to three months after the QSO. Because of the inherently erratic nature of QSL'ing, the author prefers to keep a separate list of the different stations worked in each oblast, until a QSL is finally received. As an example, seven different stations were worked in not very rare oblast 131, UA4N, before a card came through for one of the earlier contacts! When the QSLs do eventually arrive, there is very rarely any problem with checking the oblast as this is usually marked on the QSL itself.

Working the Oblasts

As the author's main interest is CW on the HF bands, it is with the key that the majority of USSR contacts have been made. During HF contests it is very easy to QSO a large number of USSR stations, some of which may be in rarer oblasts; the oblast can be immediately recogized by using the callsign decoding procedure described above.

Once a year, during the first full weekend of May, there is the CRC organised CQ-M worldwide SSB/CW contest. As part of the contest exchange, USSR stations give their oblast number; several of the rarer oblasts are usually active during the CQ-M contest.

As HF conditions continue to decline over the next few years it will still be possible to work some of the rarer oblasts even when conditions to more DX-otic parts of the world are no longer open.

News on forthcoming rare oblast expeditions within the USSR can sometimes be found in the DX news-sheets and in the DX columns; for the real oblast DX-er there is a specialist DX news-sheet published on an *ad hoc* basis by K1KI a few times per year.

Pictured is a small collection of QSLs from some of the special-event USSR stations that have been active in the past few years. The oblast, or geographic region, can be identified directly from the callsign as described in the text.

K1KI's news-sheet contains items of interest for "oblast-chasers", including details on new oblasts and rarer oblast activity.

Even if you are not at the point of looking for the last few rare oblasts, oblast-chasing can still be a lot of fun, mainly because of the large amount of Amateur Radio activity within the USSR and because of the relative ease with which a large number of USSR stations can be contacted or heard from the UK.

So next time you work or hear a Vlad, Boris or Yuri check out his oblast and see if it's a rare one. It might just be be!

Logic Controlled P-T-T with Toneburst

A USEFUL ADDITIONAL FACILITY

C. H. KAUFMAN, G1CHK

THIS circuit was designed to aid the amateur operator and solves a prominent problem: the necessity of having to hold the p-t-t continuously when transmitting, which is not only tiring but also at times very inconvenient, particularly during long 'overs'. The unit not only solves this problem but also provides a voluntary toneburst.

On successive short operations of the p-t-t the transceiver will alternate between the receive and transmit modes. To send a toneburst, all one has to do is hold the p-t-t for a slightly longer time than normal; this threshold may be preset, as may the toneburst duration. The only requirements are that the p-t-t line goes to ground on transmit (most do), and that there is a supply of between 8V and 15V. The toneburst facility is particularly useful for repeater access, when mobile.

Circuit Description

See Fig. 1. The existing p-t-t switch is connected to the p-t-t input (pin 'C') and provides a 0V level when the p-t-t is operated. This is connected, *via* R2, to the inverter IC1*a* whose input is normally pulled-up by R1; thus the output of IC1*a* is high when the p-t-t switch is pressed. R1, R2 and C1 provide immunity against 'bouncing' p-t-t switches. From here there are two, mostly separate circuits: the p-t-t logic and a toneburst controller. They will be described in that order.

IC2*c* and IC2*d* form a bistable whose input function (set or reset) is dependent on its preset output; IC1*b* and IC1*c* re-route the input signal appropriately. Therefore, on successive input pulses it will change state. C3, C4, R4 and R5 give the bistable a time constant that is longer than that of the input pulse and are essential to prevent multiple triggering. The input pulse is derived, *via* differentiation network C2/R3, from the output of IC1*a*. The output of the bistable, when set, biases TR1 into conduction and takes the p-t-t output (pin 'H') low, thus keying the transceiver. D3 sinks any back e.m.f. that would be produced by an inductive load, and could otherwise damage TR1.

When a bistable is first powered, its output state is unpredictable, so IC1*d* disables the bistable (in the reset state) until C6 has charged *via* R8. This takes about 5 seconds after switch-on, and prevents accidental initial transmission. This would be most undesirable as you can imagine!

The toneburst controller is enabled by IC2*a* when the bistable is set. Therefore a toneburst may only be produced when transmitting; this prevents any consequent confusion. If the p-t-t is held whilst in the transmit mode then IC2*b* output will be high. This causes C5 to charge *via* R6/R7. If the p-t-t is held for longer

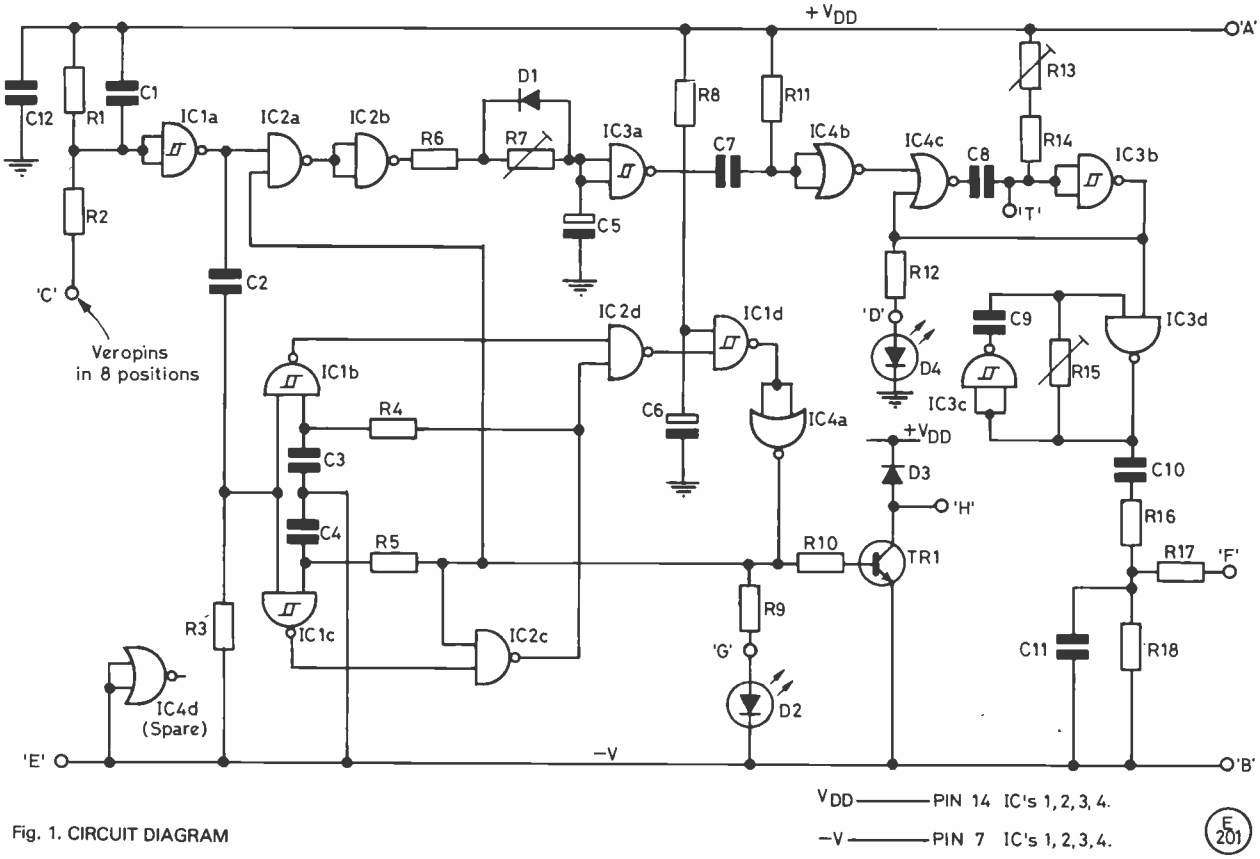


Fig. 1. CIRCUIT DIAGRAM

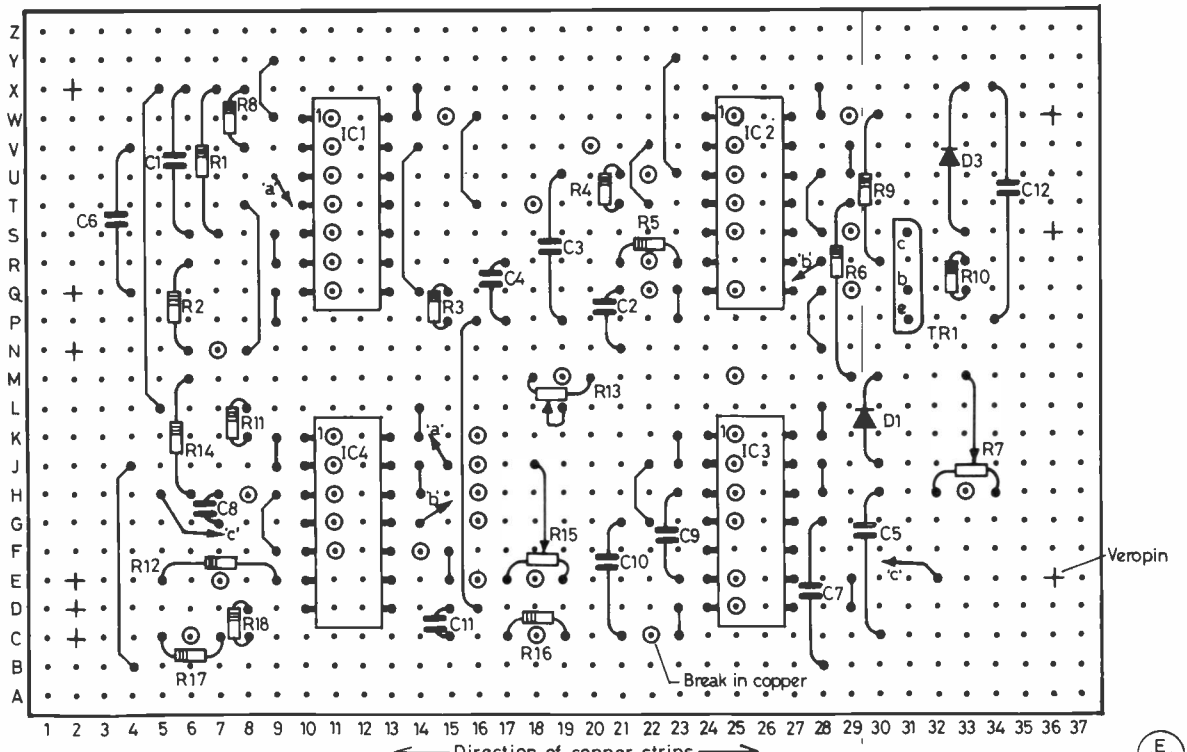


Fig. 2 COMPONENT LAYOUT

Table of Values
Fig. 1

R1, R4, R5 = 10M
R2, R3, R8, R11, R14 = 1M
R6 = 1K
R7 = 470K horizontal miniature preset
R9, R12 = 820R
R10 = 4K7
R13 = 10M vertical miniature preset
R15 = 10K horizontal miniature preset
R16, R17 = 100K
R18 = 10K
C1, C2, C7 = 4nF mylar
C3, C4 = 3n3 mylar
C5, C6 = 220nF tant., 25V
C8, C10 = 100nF mylar
C9 = 68nF mylar
C11 = 10nF mylar
C12 = 1nF mylar
D1, D3 = 1N4148
D2 = red LED
D4 = green LED
TR1 = ZXT304
IC1, IC3 = 4093B NAND Schmitt trigger
IC2 = 4011B NAND gates
IC4 = 4001B NOR gates

Noted: all fixed resistors are ¼W carbon types.

than the threshold, set by R7, then the output of IC3*a* will go low. C7 then presents a negative pulse to the input of IC4*b* which inverts it. This positive pulse triggers a monostable formed by IC4*c*, IC3*b* and their associated components. The time period of this monostable is made variable by R13; D4 lights when the monostable is triggered.

The actual tone is generated by an astable comprised of IC3*c*, IC3*d*, C9 and R15, the latter is used to set the oscillation frequency. This oscillator is enabled when the monostable is set, so by correct adjustment of R15 and R13 a toneburst of correct frequency and duration is produced. The output, a square-wave is filtered by the succeeding R/C network to a near sine-wave, and is then fed into the audio input of the transceiver *via* R17. C12 is included to prevent RF intervention, which could otherwise upset the oscillators stability.

Schmitt trigger gates have been used where the inputs are derived from rising and falling waveforms.

Construction

The circuit is built on 0·1" pitch *Veroboard,* the size of which is a standard 37 holes by 24 strips; *see* Fig. 2. The copper side is first cleaned with a light abrasive paper, to prepare it for soldering.

Before soldering can commence, 49 breaks have to be made in the copper strip, on the underside of the board. Care is needed here as mistakes can be very difficult to rectify — that is if they can be found at all! The longest task follows, and that is the insertion of 28 wire links. Fortunately it is not necessary to use insulated wire for these, tinned copper wire is ideal. The four integrated circuit sockets are now soldered in place, followed by the nine *Veropins.*

Next all the resistors are inserted. I would suggest starting with R1 and proceeding in ascending order, so as not to miss any of them out; R7 and R15 are miniature horizontal presets and R13 is of the miniature vertical variety.

Now insert the capacitors making sure that the tantalum types, C5 and C6, have their positive leads connected as shown (to the top of the board). D1, D3 and TR1 are all heat sensitive devices, so do not apply excessive heat to them while soldering them into place. Refer to the layout diagram with these three components, as they must be correctly orientated (cathodes or collector to the top of the board).

The final three on-board connections can now be made, these are between U9 and J15, G14 and R28, H5 and E32; they must be

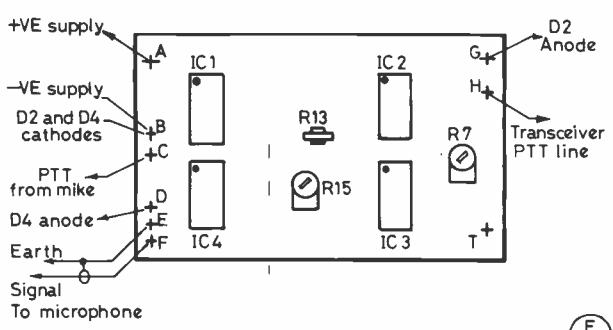


Fig. 3 INSTALLATION DIAGRAM

made with insulated wire. Before continuing, check your construction carefully.

Installation and Final Adjustments

See Fig. 3. An AF frequency counter is invaluable in the setting up of the unit, but not essential. Firstly insert IC1, IC2 and IC3 (omit IC4 for the present), making sure that they are correctly orientated. As these integrated circuits are CMOS types, avoid touching the pins, as their inputs are prone to damage from static electricity.

Connect the positive and negative rails of the host transceiver to the board, *via* pins 'A' and 'B' respectively (the supply voltage must lie between 8V and 15V), and apply power. Temporarily connect pin 'T' to pin 'B' and connect a frequency counter to pin 'F' using pin 'E' as the earth. Adjust R15 for a reading of 1750 Hz.

If a frequency counter is not available then, connect a crystal earpiece across pins 'E' and 'F' and whilst listening to a toneburst (from another transceiver) adjust R15 for the same tone in the earpiece. This is quite a satisfactory method — for all but the tone deaf!

Disconnect the supply, remove the temporary link and insert IC4. Next connect the anodes of D2 and D4 to pins 'G' and 'D' respectively (the anode of an LED is usually indicated by the longer of the two leads). Both their cathodes go to pin 'B'. D2 provides a 'transmit' indication and is red, D4 is green and lights when a toneburst is being sent.

Now the original p-t-t line has to be interrupted and the mic. end of this is connected to pin 'C' on the board. Leave the transceiver end disconnected for now.

Turn R7 fully counter-clockwise, and turn R13 (when viewing it with IC2 on the right) fully clockwise. With power applied, trigger the toneburst using the p-t-t and whilst observing D4, turn R13 counter-clockwise until a period of about 300ms is obtained. Now turn R7 to the middle of its travel. The circuit should now be functioning as described in the introduction, and by adjustment of R7 the time for the toneburst to trigger, after depression of the p-t-t, may be set to your own taste.

Finally connect pin 'F', with screened lead to the microphone (using pin 'E' for the earth), and the p-t-t line of the transceiver to pin 'H'. The output can withstand 70V and can sink 300mA; if these limits are exceeded then a relay will have to be used to key the transceiver, its coil being connected between pins 'H' and 'A'.

R17 was chosen as 100K in the prototype, but if over modulation does occur then this may be increased in value (and *vice versa*). If a low impedance microphone is used, then a simple transistor buffer may be added to the output, to increase the signal level.

CLUBS ROUNDUP

By *"Club Secretary"*

DON'T forget, club scribes, that we need an update at least once every three months, which must include the club Hq. address, the name, address and telephone number of the Hon. Sec., and the dates and details of the programme. Of course we welcome entries that come in the form of the club newsletter, and we enjoy reading them; but please make certain *all* the information we need is in there, preferably on a little note pinned to the newsletter. Nothing too formal is needed — just a clear and unequivocal statement of the needful plus, of course the *name of the club(!)*

Anyone for Radio?

Tony Wilson, G3MAE, is interested in gauging the interest in forming a club in **Northallerton** in North Yorkshire. To that end, he would appreciate a contact, personal or by phone, to him at 8 The Paddock, Appleton Wiske, Northallerton, North Yorkshire; phone Great Smeaton 530. We might add to that the idea of an ad. in the local paper — they are usually glad to publicise this sort of thing.

The Letters

It's AGM time again for **Abergavenny & Nevill Hall**; the date is Thursday, April 12 in their club room above Male Ward 2, Pen-y-Fal Hospital, Abergavenny, where the club foregather every Thursday evening. On Tuesday evenings they have a booking for the Seminar Room, Nevill Hall Hospital, for their R.A.E. class which seems to be highly successful.

April 17 is the date for **Acton, Brentford & Chiswick**; the Hq. address is the Town Hall, High Road, Chiswick, and the topic for the evening will be QRP, starting at 7.30 p.m.

The **Axe Vale** gang now hold the club call G8CA — this was once held by a founder member and tireless worker for the club. April 6 sees a talk on construction techniques — with a challenge! — while on April 28 they have a coach trip to the NEC for which they have a few spare tickets. See you there, gang. The club meets at the "Cavalier Inn", West Street, Axminster, which is on the A35, just west of the parish church.

The venue for the **Bangor** club is the Sands Hotel in Bangor, with the first part of the programme a video tape by Yaesu which has been organised by GI3KDR, and then GI3MBB will be talking on slow-scan TV; this talk will be aimed at the beginner in particular, so visitors doubly welcome. Come on April 6.

Another AGM for mention; this one is at the "Englishcombe Inn", Englishcombe Lane, **Bath**, and the date Wednesday, April 18. In more general terms, we understand they have a booking on alternate Wednesdays.

We don't have the latest details for the **Belfast College of Technology** gatherings, so we must refer you to the Hon. Sec. — *see* Panel for his details.

Over to **Biggin Hill** and here the new Hq. is at St. Mark's Church Hall, Church Road, Biggin Hill. On April 17 they have a trade demonstration, by C. M. Howes.

Bridgend group have a booking on the second Wednesday of each month at the NCB Hq., Tondu; the April event is a bring-and-buy.

At the recent AGM at **Bishops Stortford** a new Hon. Sec. took office, and his details appear in the panel. The main meeting is at the British Legion club, Windhill, on the third Monday of each month, and there is a natter evening on the first Thursday of each month at the Nag's Head pub which lies on the A120 road out of the town towards Dunmow.

The **Bromsgrove A.R.S.** crowd have moved Hq. to the British Legion Club, Birmingham Road; April 10 is an informal discussion on computers between members, and on 24th an informal gathering.

Bury have an evening of nostalgia on April 18, when G8YF will be talking about early radio; but you can find them informally gathering on every Tuesday evening at the Mosses Community

Centre, Cecil Street, Bury, except the second in each month which is reserved for the formal stuff.

Now we turn to **Cambridgeshire Repeater Group**; details on them and their activities from the Hon. Sec. — *see* Panel.

At **Cheltenham** the gatherings are at Stanton Room, Charlton Kings Library, Cheltenham; April 6 is a Computer Night, and members will bring along their boxes (and an adequacy of mains adapters!) to demonstrate. The natter evening is down as April 20.

We head now for **Cheshunt**, where the weekly meetings are on Wednesdays at the Church Room, Church Lane, Wormley; April 4 is down for G3NEE to talk about his trip to Australia, and on 18th they have G8LXB on the Royal Observer Corps. Between these dates are the informal natter sessions.

Chichester seem to be settled in at Fernleigh Centre, 40 North Street, Chichester, on the first Tuesday and third Thursday. April 3 is the AGM, taken in the Long Room; and on April 19 they will be gathering in the Green Room.

April 5 is the night for the home-constructors at **Colchester**, where they have their competition; the venue is the Colchester Institute, Sheepen Road, Colchester.

April 5 at **Cornish** is the date for the AGM; and the place the Church Hall, Treleigh, on the old Redruth By-Pass.

On the third Saturday in each month the **Crystal Palace** group foregathers at All Saints Parish Room, Upper Norwood; this is at the junction of Beulah Hill and Church Road, opposite the IBA mast. April 21 is one of their rare informal evenings.

The routine for **Dartford Heath D/F** is to have a meeting during the week prior to one of their Sunday hunts. Thus we see they are at the "Horse and Groom" on April 10, and the Sunday hunt is on April 15; the usual start is at NGR525730 on Dartford Heath. For the latest details we suggest you contact Pete on Greenhithe 844467 — he seems to be the internal contact man in the club — but there is always the Hon. Sec., *see* Panel.

Up to **Derby** now, which means Wednesday evenings at 119 Green Lane, Derby. April 4 is a junk sale, and on 11th they have a night-on-the-air. April 18 is down for a talk and demonstration of AMTOR, and on April 25 there is a talk by the RSGB Region 4 Representative.

On the second and fourth Monday in each month we hear the **Droitwich** club gather at the Scout Hq. in the town. Details from the Hon. Sec. — *see* Panel for the details.

Dudley has April 10 at the Central Library, when they have a talk by G6FK on VHF/UHF operation. Details from the Hon. Sec.

We are now to **East Kent** and here the venue is given as "The Cabin", Kings Road, Herne Bay; April 5 is a talk on interference but on April 19 the topic was not, at the time they wrote, finalised. However, we don't doubt they'll have something going on.

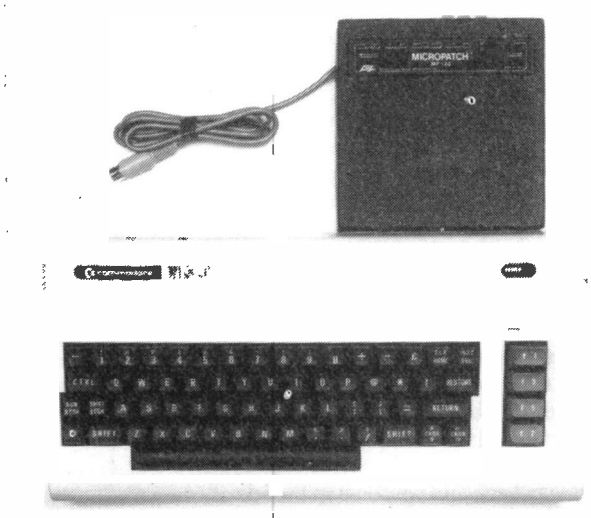
East London RSGB group is now going to meet on a quarterly basis, the first of these being on Sunday, April 15, at 2.30 p.m., at Wanstead House, Wanstead; this is 100 yards behind the Wanstead Underground. On this date the speakers will be G8VR and G3VPK, for questions and answers on RSGB matters. Incidentally, the group is not confined to RSGB members; others may of course join.

Lots of light-hearted banter about the AGM appears in the current **Edgware** newsletter; but in it we note that G3SJE is not only chairman, but that he has been doing slow-morse on the air in the district for around twenty years — another of the unsung heroes. Turning to the club, we see they have a place at 145 Orange Hill Road, Burnt Oak, on the second and fourth Thursday of each month. April 12 is down for G3GC's talk "Aerial Radiation Patterns", and on 26th there is the informal.

Exeter next, and we see that they have a visit on April 9 to the Radio Devon studios at St. Davids Hill, Exeter. As numbers are restricted, a rapid contact with the Hon. Sec. seems to be indicated — find his details in the Panel.

The 6th Exmouth Scouts' Hut is home to the **Exmouth** crowd, where they are to be found on alternate Wednesdays at 7.30 p.m. This Hq. is at Marpool Hill, Exmouth.

To put together a year's programme ahead, in a club that gets



The Micropatch, shown above, is a new Morse, Baudot and ASCII software/hardware computer interface package. The Micropatch Model MP-20 or MP-64 incorporates the complete MBATEXT software ROM for either the VIC-20 or Commodore 64 computers, and all circuitry and software is incorporated on a single plug-in cartridge module which includes many interesting features. Price of either MP-20 or MP-64 is £129.00 inc. VAT, and full details are available from *I.C.S. Electronics Limited*, P.O. Box 2, Arundel, West Sussex BN18 0NX. (Tel: 024365-590).

together every week is some achievement, but it has been done by the Hon. Sec. at **Fareham.** The club Hq. is at Portchester Community Centre, Wheatlands Grove, and their evening is Wednesday. April 4 and 18 are set aside for operating and nattering. April 11 will be "The History of Naval Communication" by G3YTQ, and on 25th they have a junk sale.

April 11 is a bring-and-buy sale at **Farnborough,** and on 25th there is a brains trust. These are at the Railway Enthusiasts Hq., Access Road, Hawley Lane, Farnborough, Hants., near the M3 bridge.

The **Fylde** club has grown by leaps and bounds since they got their present Hq. at the Kite Club, just inside the main entrance of Blackpool Airport. April 3 is down for a talk by G4RSA on RTTY, while on 17th they have the informal and Morse class. Details from the Hon. Sec. — *see* Panel.

Glenrothes now, at Provosts Land, Leslie, Fife. April 15 is a talk on mountaineering for the 'formal' session, but they also have informals every Wednesday evening.

The **G-QRP Club** is very definitely the success story of the decade; it is open to all who are interested in low-power operating, or indeed home-building of QRP equipment for our bands. Details from the Hon. Sec. — *see* Panel for his details.

Greater Peterborough group have a junk sale and quiz all together on April 12, at Southfields Junior School, Stanground, Peterborough.

April 12 and 26 seem to be the dates for the **Great Yarmouth** crowd, at the STC Sports and Social Club in Beevor Road, South Denes. Sad to say, no details of the programme.

Harrow Arts Centre is home to the **Harrow** club, where they alternate between the Belmont and Roxeth Rooms for their weekly gatherings. Informals and practical evenings are on April 6 and 20 in the Roxeth Room; the talks are on April 13 and 27 in the the Belmont Room.

Hastings could be remarked on as the place where it all happens . . . the main meeting is on the third Wednesday, which gives us April 18 for a junk sale; this is at West Hill Community Centre. However, on just about every other weekday evening, if you go to Ashdown Farm Community Centre you will find some of the lads

doing their thing, particularly on Fridays which are the regular weekly chat nights.

Havering's April shows a quarterly business meeting on April 4, and informals on 11th and 25th. That leaves April 18 for a talk on kites and kite aerials by G3MWF. The venue is Fairkytes Arts Centre, Billet Lane, Hornchurch.

As they have just had an AGM we don't have any data for **Hereford,** save that they foregather at County Control, Civil Defence Hq., Gaol Street, Hereford, on first and third Fridays.

April 2 is the date for **Horndean,** at Merchistoun Hall, London Road, Horndean, Portsmouth. The talk is by G4BEQ.

Now we head for The Mill, Atwick Road, **Hornsea,** where the locals get together every Monday evening. More from the Hon. Sec. — *see* Panel.

I.R.T.S. is the national society for Eire; and thus it is the place to contact if you want to know anything about local clubs and amateur radio in EI-land. Details from the Hon. Sec. — *see* Panel.

Part way back and we come to the **Isle of Man;** the locals head for the Keppel Hotel, Creg-ny-Baa every Monday evening, but they seem to have lots of other activities on the go, too.

One is always entertained by the contents of the **Midland** newsletter. On April 17 we see they have got G3RJV talking about QRP, at 294A Broad Street, Birmingham; but we think you can try the door on almost any evening and find someone in the clubroom.

We seem to be a bit adrift with the **Mid-Sussex** doings at Marle Place Centre, Leylands Road, Burgess Hill, and so we must refer you to the Hon. Sec. — *see* Panel for his details.

April 10 sees a talk by G3BA on radio in a PoW camp, at the **Mid-Warwicks** club, followed on April 24 by a natter night; both are at 61 Emscote Road, Warwick.

A natter night is also on the card for **Nene Valley** on April 4; they then have GB4WBB on the air over the weekend April 7/8 for the Boys Brigade 'Anchor Chain' event. April 11 is a video evening, with "World at their Fingertips" and "World of Amateur Radio". April 18 is down for a talk by the County Emergency Planning Officer, but the usual meeting on April 25 is cancelled as it falls in the Easter holiday. All meetings are at the "Dolben Arms", Finedon, near Wellingborough, with the transmitting events at the nearby 1st St. Mary's Scout Hall.

The **Newquay** club are off to visit the Coastguard Centre at Falmouth on April 11, meeting at Pendennis Castle at 7.30 p.m. On April 25 they are at The Drill Hall, Crantock Street, Newquay, for a talk on making and testing VHF D/F aerials.

If you want to meet the **Norfolk** lads, try the Valley Drive Community Centre, Plumstead Road, Norwich, on any Wednesday evening. Arising from this change of Hq., a new programme is in the process of being assembled, and doubtless the Hon. Sec. would be pleased to bring you up to date — *see* Panel.

Every Thursday evening the **Pontefract** club gathers in Carleton Community Centre, with Mondays also in use for Morse tuition.

Reigate are based on the Constitutional and Conservative Centre, Warwick Road, Redhill, in the Upstairs Meeting Room, on the third Tuesday of each month, and we notice April 17 is the AGM.

April 2 at **Rhyl** is an activity night, and on 16th they have a D/F Hunt. The headquarters address is the 1st Rhyl Scouts Hq.; contact the Hon. Sec. to find out where it is!

Now to **Salisbury** and Grosvenor House, Churchfields Road, where they get together every Tuesday; the Hon Sec. indicates they are busy putting the programme together after the AGM.

An ever-growing club is the one at **South Bristol;** Whitchurch Folk House, East Dundry Road, Whitchurch, will find them. On April 4 they have a talk on the RS232 arrangement by G4MCQ, and an HF night is on 11th. April 18 is set aside for a VHF NFD preparation night, and on 25th they have a ten-metre FM evening.

Readers in the **South-East Derbyshire** area should be aware that there is a club which meets in term-time at S.E. Derbyshire College, Ilkeston Road, Heanor, every Tuesday evening. For details, contact the Hon. Sec. at the address in the Panel.

South Manchester means Sale Moor Community Centre, Norris Road, Sale. Friday, April 6 sees their Spring D/F Hunt, and on April 13 Mrs. C. Barker, G3WEN, will talk about radio signalling in British Rail — visitors specially welcome to this one. April 20 they are shut down for the Easter break, and on 27th they have a home-brew (equipment, not booze!) contest. Besides all this, they can be found on Monday evenings for a natter at the same place.

S.W. Herts. UHF Group is the group responsible for the GB3HR, GB3SWH and GB3BH beacon/repeaters, and they indicate they are always willing to send members to give talks at other clubs. For details on this, and on joining, contact the Hon. Sec. — *see* Panel.

The venue for the **Spalding** crowd these days is the White Hart Hotel; on April 13 G6RNY will be talking about the radio control of models.

Next we turn to **Stourbridge** and their new Hq. at the Robin Woods Centre, School Street, off Enville Street, on the first and third Monday of the month.

Sad news at **Surrey,** namely the death of Sid Morley, G3FWR. Sid was a Past President, and Hon. Sec. for a long time, not to mention having been a member since 1935. He will be greatly missed by the members. The club must go on, though, and so you will find them at *TS Terra Nova,* on the first and third Monday evening of each month.

Deadlines for "Clubs" for the next three months—

May issue—March 30th
June issue—April 27th
July issue—May 25th
August issue—June 29th

Please be sure to note these dates!

Sutton & Cheam next, and here we see that the topics for April 6 and April 13 had not been finalised at the time of their newsletter; however, they always do have something set up at the Downs Lawn Tennis Club, Holland Avenue, Cheam. While that is the venue for the main April doings, they also have bookings at Sutton College of Liberal Arts. Contact the Hon. Sec. for full details.

Swale have changed their Hq. to the Ivy Leaf Club, Dover Street, Sittingbourne, on Monday evenings, as a result of a fire at the old place. It's an ill wind that blows no-one good — the consensus seems to be that the new venue is an improvement if anything!

Thanet are based at the Grosvenor Club, Grosvenor Place, Margate, on the second and fourth Tuesdays: April 10 is a video on commercial satellites and on 24th the subject was still to be finalised at the time of their letter.

April 2 is "Home-Brew Evening" for **Todmorden** group, at the Queen Hotel in Todmorden. This is a new club and we hope that is has got off to the good start that its founders hoped for.

A preview of G3SEK's talk to the VHF Convention at NEC is the fare for the **Vale of White Horse** club on April 2. The general routine is to gather at the Landsdown Club, Milton Trading Estate, Abingdon, on first and third Tuesdays in each month.

Nice to hear again from **Verulam,** and to know they are still active; April 24 sees G8DKK giving a talk called "Improvements in Modern Mixer Systems" at the R.A.F.A. Hq. New Kent Road, off Marlborough Road, St. Albans. The routine is second and fourth Tuesdays in each month.

Wakefield has a place at Holmfield House, Denby Dale Road, Wakefield. On April 3 they have the AGM, and on 17th they have a visit to the West Yorks Police Hq. at Bradford.

Our note from **West Kent** doesn't cover April, but we do know it is the first and third Friday in the month at the Adult Education

Names and Addresses of Club Secretaries reporting in this issue:

ABERGAVENNY: D. F. Jones, GW3SSY, 80 Craesonen Parc, Abergavenny, Gwent NP7 6PE. *(0873 78674)*
ACTON, BRENTFORD & CHISWICK: W. G. Dyer, G3GEH, 188 Gunnersbury Avenue, Acton, London W3 8LB. *(01-992 3778)*
AXE VALE: P. L. Peach, G3GOS, The Firs, Goldsmiths Lane, All Saints, Axminster, Devon. *(Axminster 34259)*
BANGOR: S. Mackay, GI4OCK, 11 Dellmount Park, Bangor, BT20 4UA, Northern Ireland. *(Bangor 54059)*
BATH: C. Ashley, G4UMN, 57 Stonebridge Drive, Frome, Somerset. *(Frome 63639)*
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BIGGIN HILL: I. Mitchell, G4NSD, Greenway Cottage, Tatsfield, Westerham TN16 2BT. *(Biggin Hill 376)*
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BISHOPS STORTFORD: S. Mammatt, G6HKK, 31 Atherton End, Sawbridgworth, Herts. CM21 0BS. *(0279 724669)*
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BURY: B. Tyldesley, G4TBT, 4 Colne Road, Burnley, Lancs. *(Burnley 24254)*
CAMBRIDGE (Repeater Group): C. Lorek, G4HCL, 11 Bevills Close, Doddington, March, Cambs. *(0354 740672)*
CHELTENHAM. Mrs. G. Harmsworth, G6COH, 42 Leckhampton Road, Cheltenham, Glos. *(Cheltenham 25162)*
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CORNISH: J. J. Vinton, G6GKZ, 1 Gill-an-Creet, St. Ives, Cornwall. *(Penzance 795860)*
CRYSTAL PALACE: G. M. C. Stone, G3FZL, 11 Liphook Crescent, London SE23 3BN. *(01-699 6940)*
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DROITWICH: E. G. Taylor, G4HFP, 6 Marlborough Drive, Stourport-on-Severn, Worcs. DY13 0JH. *(S-on-S 3818)*
DUDLEY: Mrs. C. Wilding, G4SQP, 92 Ravenhill Drive, Codsall, Wolverhampton, W. Midlands *(Codsall 5636)*
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EAST LONDON RSGB: C. Ramsey, G8VZD, 45 Bulwer Court, Bulwer Court Road, Leytonstone, London E11 1DB. *(01-539 7590)*
EDGWARE: J. Cobley, G4RMD, 4 Briers Close, Hatfield, Herts. *(Hatfield 64342)*
EXETER: R. Tipper, G4KXR, 11 Chancel Court, Chancel Lane, Pinhoe, Exeter. *(Exeter 68065)*
EXMOUTH: D. F. Thompson, G8SBU, 'Four Winds', 131 St. Johns Road, Exmouth, Devon.
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FARNBOROUGH: I. Ireland, G4BJQ, 118 Mychett Road, Mychett, Camberley, Surrey. *(Farnborough 543036)*
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GLENROTHES: A. Givens, GM3YOR, 41 Veronica Crescent, Kirkcaldy, Fife KY1 2LH. *(Kirkcaldy 200335)*
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GREATER PETERBOROUGH: F. Brisley, G4NRJ, 27 Lady Lodge Drive, Orton Longueville, Peterborough. *(0733 231848)*
GREAT YARMOUTH: A. D. Besford, G3NHU, 49 Blake Road, Gt. Yarmouth, Norfolk.
HARROW: D. Atkins, G8XBZ, Address wanted. *(0923 779942)*
HASTINGS: G. North, G2LL, 7 Fontwell Avenue, Little Common, Bexhill-on-Sea. *(Cooden 4645)*
HAVERING: J. R. Gibbs, G4UQR, 40 Bridge Avenue, Upminster, Essex RM14 2LX. *(Upminster 26904)*
HEREFORD: S. Jesson, G4CNY, 181 Kings Acre Road, Hereford. *(Hereford 273237)*
HORNDEAN: P. Phelps, G6IOV, 152 Cherrytree Avenue, Cowplain, Portsmouth, Hants.
HORNSEA: N. A. Bedford, G4NHP, 39 Hamilton Road, Bridlington, Yorkshire YO15 3HP.
I.R.T.S.: S. Nolan, EI7CD, 68 Ratoath Estate, Ratoath Road, Dublin 7.
ISLE OF MAN: Mrs. A. Matthewman, GD4GWQ, 20 Terrace Avenue, Douglas, Isle of Man. *(0624 22295)*
MIDLAND: N. Gutteridge, G8BHE, 68 Max Road, Quinton, Birmingham B32 1LB. *(021-422 9787)*
MID-SUSSEX: R. Hodge, G4MMI, Corner House, Manor Gardens, Hurstpierpoint. *(Hurstpierpoint 833559)*
MID-WARWICKS: Mrs. C. Finnis, G4TIL, 37 Stowe Drive, Southam, Warks. CV33 0NZ. *(Southam (092681) 4765)*
NENE VALLEY: L. Parker, G4PLJ, 128 Northampton Road, Wellingborough, Northants NN8 3PJ.
NEWQUAY: A. Angove, G6ZWI, 22 Bramble Close, Newquay, Cornwall. *(Newquay 4285)*
NORFOLK: P. Forster, G3VWQ, 12 Thor Road, Thorpe St. Andrew, Norwich NR7 0JS. *(Norwich 37709)*
NORTHALLERTON: A. Wilson, G3MAE, 8 The Paddock, Appleton Wiske, Northallerton, N. Yorks. DL6 2BE. *(Gt. Smeaton 530)*
NORTH WAKEFIELD: S. Thompson, G4RCH, 3 Harlington Court, Morley, Leeds LS27 0RT. *(0532 536603)*
PONTEFRACT: R. Tams, G4TCG, 1 West Drive, Chequerfield Estate, Pontefract, W. Yorks. WF8 2RQ.
REIGATE: C. S. Barnes, G8FEE, 25 Hartswood Avenue, Woodhatch, Reigate, Surrey RH2 8ET.
RHYL: J. McCann, GW4PFC, 67 Ashley Court, St. Asaph, Clwyd, LL17 0PL. *(0745 583467)*
SALISBURY: A. C. A. Newman, G2FIX, 74 Victoria Road, Wilton, Salisbury, Wilts. SP2 0DY.
SOUTH BRISTOL: L. Baker, G4RZY, 62 Court Farm Road, Whitchurch, Bristol, Avon BS14 0EG.
S.E. DERBYSHIRE: W. F. Peck, G4VNB, 2 Sandfield Avenue, Ravenshead, Nottingham NG15 9AR.
SOUTH MANCHESTER: D. Holland, G3WFT, 32 Woodville Road, Sale, Greater Manchester. *(061-973 1837)*
SPALDING: Mrs. B. Whitley, G6YBL, 45 Exeter Drive, Spalding, Lincs. PE11 2DY. *(0775 2781)*
STOURBRIDGE: M. Davies, G8JTL, 25 Walker Avenue, Quarry Bank, Brierley Hill. *(Lye 4019)*
SURREY: R. Howells, G4FFY, 7 Betchworth Close, Sutton, Surrey SM1 4NR. *(01-642 9871)*
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VALE OF WHITE HORSE: I. White, G3SEK, 52 Abingdon Road, Abingdon, Berks. *(0235 31559)*
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WEST KENT: P. Reeve, G4GTN, 2 Court Road, Tunbridge Wells, Kent. *(Tunbridge Wells 24689)*
WESTMORLAND: F. Burrow, G8BME, Holly Trees, Church Close, Levens, Cumbria. *(Sedgwick 60803)*
WIRRAL: N. B. McLaren, G4OAR, 596 Woodchurch Lane, Oxton, Birkenhead. *(051-608 1377)*
WORCESTER: A. C. Lindsay, G4NRD, 11 Durcroft Road, Evesham, Worcs. *(Evesham 41508)*
YEOVIL: E. H. Godfrey, G3GC, Dorset Reach, 60 Chilton Grove, Yeovil, Somerset BA21 4AW. *(0935 75533)*
YORK: K. R. Cass, G3WVO, 4 Heworth Village, York.

Centre, Monson Road, Tunbridge Wells. In addition, the second and fourth Tuesdays are informals at the Drill Hall, Victoria Road, Tunbridge Wells.

If you are within striking distance of Kendal, you should go along to the **Westmorland** meetings, which are at the "Strickland Arms", Sizergh, near Kendal on the second Tuesday of the month.

For **Wirral** the venue is the Irby Cricket Club on the Wirral, on the second and fourth Wednesdays of each month. They also have informals at various pubs in the area, for details of which we must refer you to the Hon. Sec. — *see* Panel.

At **Worcester** the meetings are split between two venues; April 2 and 16 are both at the "Old Pheasant" in New Street — the former is a construction contest plus skittles evening, and the latter informal. On April 30 they move over to the Oddfellows Club in the same street, for a talk on electricity by the local Electricity Board.

April 5 is the **Yeovil** AGM; on April 12 G3MYM talks on simple SSB receivers, April 19 G3GC on contest operating techniques, and on 26th the first meeting of the R.A.E. class. All are at the Recreation Centre, Chilton Grove, Yeovil.

Finally we head for **York** and 61 Micklegate, where the local club has a weekly booking on Fridays and visitors are always welcome; the name of the place by the way is the United Services Club. On a different tack we hear that, sadly, conditions have scuppered their sked with G4MIY/MM for the moment.

Microwave Society

The Microwave Society, which looks after the interests of all those operating on, or interested in, frequencies above 10 GHz, has enjoyed a period of growth recently with nearly 200 new members joining during 1983. Their well-known "Datapack", which includes all you need to know to build a complete system for under £40, has been completely revised and is now in its 5th edition. The society produces a newsletter, *Waveguide,* and this year sees the start of awards and certificates for achievements above 10 GHz. Meet them on their stand at the N.E.C. Exhibition, April 28/29th. For more details about the society, write to The Microwave Society, 81 Ringwood Highway, Coventry CV2 2GT.

Stevenage A.R.S. 2m. FM Contest

Stevenage & District A.R.S. will be running a 2m. FM contest on **April 15th,** 1300 to 1700 GMT, in the 144.500-144.845 MHz and 145.200-145.475 MHz sections of the band. The contest is open to both members and non-members and there will be three classes of entry: stations running up to 25 watts output; stations running more than 25 watts output; short wave listeners. Further information is available from the Contest Secretary, Bernard Dean G6NZC, 82 Lingfield Road, Stevenage, Herts. SG1, 5SN; please enclose an *s.a.e.*

Special Event Station at Didcot

Vale of White Horse A.R.S. will be operating GB4GWR at Didcot Railway Centre, from **15th to 23rd April.** The station will be located in a former Great Western Railway saloon carriage, No. 9005, built in 1930. During this Easter period, the Railway Centre will be open to the public and former GWR steam trains will be in action, together with other attractions of the steam-train age. Special QSL cards will be sent to all contacts, and activity will be on both VHF and HF bands. Didcot Railway Centre is attached to Didcot British Rail station, on the London to Bristol *Inter-City 125* route.

Mobile Rallies, 1984 — a first listing

April 8, Buxton Mobile Rally, Pavilion Gardens, St. John's Road, Buxton, 11 a.m. to 5.30 p.m. (from 10.30 a.m. for RAIBC), admission 50p (children under 14 free), trade stands, family attractions, catering, ample parking. Full details from D. Cooper, G6MIF, on 0298-6174. **April 8, Swansea** A.R.S. Rally, Patti Pavilion (next to St. Helens Cricket Ground on A4067 Swansea-Mumbles road), Swansea, 10.30 to 5 p.m., trade stands, RSGB bookstall, local repeater groups, bring-and-buy, licensed bar, refreshments, good parking, talk-in on S22. Further details from Roger Williams, GW4HSH, QTHR (tel: Swansea 404422). **April 15, Lough Erne** Mobile Rally, Killyhevlin Hotel, Enniskillen, doors open 12 noon, trade stands, bring-and-buy, wide range of family attractions, admission £1, full hotel facilities. More information from Joe Maguire, GI4UHA, 124 Hillview Road, Enniskillen. **May 13, Swindon** Amateur Radio & Electronics Rally, Park Further Education Centre, Oakfield School, Marlowe Avenue, Swindon, Wilts., doors open 10 a.m., trade stands, BARTG display, children's entertainment, refreshments many items of general interest, ample parking. Further information from K. Saunders, G8SFM, QTHR. **May 27, East Suffolk** Wireless Revival, Civil Service Sportsground, The Hollies, Straight Road, Ipswich. Full details from J. Tootill, G4IFF, QTHR (tel: 0473-44047). **June 3, Welsh** Amateur Radio Rally, Barry Leisure Centre, Greenwood Street, Barry, South Glam., 11 a.m. to 5 p.m., trade stands, bring-and-buy, refreshments, licensed bar, family attractions, talk-in on S22, free parking. For more details, ring Reg. Rowles, GW4FOM, 0222-565656, evenings. **July 21, West Kent** A.R.S. Radio & Electronics Fair, Royal Victoria Hall, Southborough (between Tonbridge and Tunbridge Wells), 9.30 to 5 p.m., trade stands, special event station, adequate parking. Full details from D. Green, G4OTV, 13 Culverden Down, Tunbridge Wells, Kent (tel: 0892-28275). **July 22, Anglian** Mobile Rally, Stanway School, Colchester, doors open 10 a.m., talk-in on 2m. Full information from D. Sellen, G3YAJ, on 020639-3938. **August 5, East Kent** Mobile Rally. Full details from S. Alexander, G6LZG, 66 Downs Road, Canterbury, Kent. **August 12, Derby** Mobile Rally, Lower Bemrose School, St. Alban's Road, Derby, all the usual attractions, free admission and parking. More information from G4EYM (0332-556875) or G3SZJ, both QTHR. **September 23, Lincoln** Hamfest, Lincolnshire Showground (4 miles north of Lincoln on the A15), 11 a.m. to 5.30 p.m., trade stands, many family attractions, facilities for the disabled, talk-in on 144 MHz (S22) and 432 MHz (SU8), refreshments, licensed bar, ample parking, caravan and camping facilities. Full details from J. Middleton, G8VGF, c/o City Engineers' Club, Central Depot, Waterside South, Lincoln.

More rally dates will appear in subsequent issues. If you have not yet notified us of *your* rally, now is the time to do so! Send the information to our Club Secretary, marking the envelope "Mobile Rally". And don't forget, we are always glad to receive photographs of rally events for possible publication.

Finale

It has been put to us that in some areas, chaps are missing meetings early in the month because they are over before the local newsagent stumps up with the copy of the *Magazine.* One answer to that is to have a subscription, and another is to thump the newsagent hard! However, in future we will, if requested, include details of the goings-on for the first week of the following month if we receive them. Thus, you will just have sent us the May details, and if there is anything for the first week of June (NFD?), we will try and note it here. For the future, the deadlines for the arrival of your letters are in the 'box', and they should be addressed to your scribe, SHORT WAVE MAGAZINE, 34 High Street, Welwyn, Herts. AL6 9EQ. *Adios!*

"Cambridge Kits" Tuner Offer

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Correction

Peter Cook, G4NCA, author of "Digitalisation of the KW-2000B Transceiver, Phase II" on page 638 of the February 1984 issue, writes to tell us that the values of RA and RC (ref: Fig. 4) should have been 470K in his original manuscript, not 10K as given, and apologises for the error.

("SITUATIONS" AND "TRADE")

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