40p

The SHORT WAVE Magazine

VOL. XXXVII JUNE/JULY 1979 NUMBER 4/5

LOWE ELECTRONICS LTD

TRIO PRICE LIST

Model		Price inc. VAT £	Carr. £
TS820S	160–10m. transceiver digital	814·00	3·50
TS820	160–10m. transceiver	695·00	3·50
DG1	Digital display	120·00	·86
SP820	Speaker	38·00	1·16
VFO820	External VFO	121·00	3·50
YG88C	8 pole CW filter	37·00	·36
DS1A	12v. inverter	42·00	·86
R820	The ultimate receiver	773·00	3·50
YG455C	500 Hz CW filter	60·00	·36
YG455CN	250 Hz CW filter	67·50	·36
TS520S	160–10m. transceiver	530·00	3·50
SP520	Speaker	17·50	1·06
VFO520S	External VFO	101·00	3·50
YG3395C	8 pole CW filter	39·00	·36
DG5	Digital display/counter	117·00	1·06
DK520	Conversion for older TS520	10·50	·67
TS120V	80–10m. mobile transceiver	399·00	3·50
PS20	AC power supply	51·00	3·50
MB100	Mobile mount	16·50	·67
YK88C	500 Hz CW filter	28·50	·36
SP120	External speaker	25·00	1·06
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AT120	Antenna tuner (100W.)	67·50	1·06
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BS5	Band scanner (520)	46·50	·44
BS8	Band scanner (820)	46·50	·44

TRIO

Model		Price inc. VAT £	Carr. £
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MC50	Desk microphone dual impedance	27·00	1·06
MC35S	Fist microphone 50 K	13·00	·44
MC30S	Fist microphone 500 ohm	13·00	·44
LF30A	HF low pass filter	18·50	·67
TS700S	2m. all mode digital transceiver	537·00	3·50
SP70	Speaker	20·00	·86
VFO700S	External VFO	90·00	3·50
TS770	2m./70cm. all mode dual bander	t.b.a.	
TR7500	2m. synthesised mobile	235·00	3·50
TR7600	2m. synthesised mobile/fixed	265·00	3·50
RM76	Microprocessor control unit	73·00	·86
TR7400A	25W. 800 channel 2m. FM	336·00	3·50
PS6	AC PSU for 7500/7600	58·00	3·50
TR2300	2m. synthesised portable	195·00	3·50
VB2300	10W. PA	58·00	·86
MB2	Mobile mount	18·50	·86
RA1	Rubber antenna	6·75	·36
TR8300	23 channel 70cm. mobile	245·00	3·50
TR3200	12 channel 70cm. portable	186·00	3·50
MB1A	Mobile mount	9·00	·86
PB10	Pack of 10 Nicads	9·72	·36
PB15	Sealed Nicad pack	19·00	·36
TR7010	2m. SSB mobile	189·00	3·50

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G3MCN

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TRIO TS120 TRANSCEIVER

TRANSCEIVER

Freq. 3·5-30 MHz Amateur Bands and WWV. I.F. Shift System, Noise Blanker, Vox, Single conversion system using PLL circuit. Digital display dial.

TRIO

R820 Receiver	£790·19
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Digital readout for TS820	£122·67
VFO820	£123·70
DS1A 12v. DC Inverter	£42·93
SP820 Speaker	£38·83
SM220 Monitorscope	£246·00
TL922 Linear Amplifier	£797·50
TS520S Transceiver	£541·78
VFO520S	£103·25
SP520 Speaker	£17·90
DG5 Digital readout for TS520S	£119·60
TS120V 80–10m. Mobile Transceiver	£408·00
PS–20 AC power supply for TS120V	£52·14
MB100 Mobile mounting bracket	£17·00
TS700S 2m. All mode digital transceiver	£548·98
SP70 Speaker	£20·45
TR7010 2m. SSB/CW Mobile 10 watt	£193·20
TR7400A 2m. 30 watt Mobile Transceiver	£343·47
TR7500 2m. FM Transceiver	£240·22
PS6 Power supply	£59·29
TR2300 2m. Portable Transceiver	£199·00
PB15 Battery Pack	£20·25
TR8300 70cm. FM Mobile Transceiver	£250·00
TR3200 70cm. Portable Transceiver	£190·00
R300 General coverage Receiver	£189·00
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HS4 Headphones	£10·73
MC50 Desk Microphones	£27·60
MC30S Hand microphone 50K	£13·29

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MMT432/144 70cm. Transverter	£173·66
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F.D.K.

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AR40	£54·73
CD44	£109·25
AR22	£49·46
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UR67	65p
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8XY/2m. 8 element crossed yagi	£23·00
10XY/2m. 10 element crossed yagi	£30·48
Q4/2m. 4 element Quad	£19·08
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MBM88/70cms. Multibeam	£33·35
TAS ⅜" 2m. Whip mobile	£14·37
C5/m. Colinear	£35·65
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D15/1296 23cm. Antenna	£26·90

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Solid state Receiver 550 kHz–30 MHz **£175·00**

TEK

5D Multi Band Trapped Dipole 80–40–20–15–10 metres. 50 ohm feed. 23 metres in length. This is complete, not a kit. High quality Traps and wire. 2kW PEP rating
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AR240. 800 Channel Hand Held 2m. FM Transceiver	£195·00
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SECONDHAND EQUIPMENT

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S.T.E. Prices include VAT and postage

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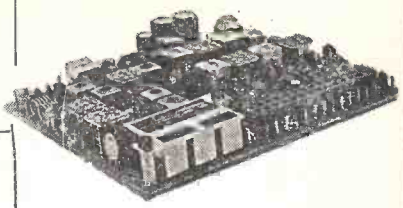
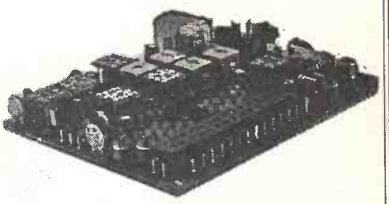
AA1 Audio Module for AR10 ... £4·10
AD4 FM Discriminator ... £5·00
AL8 Linear Amplifier ... ... £27·60
AG10 Tone Generator... ... £4·50
ATAL 2m. AM-FM Tx ... £129·00

The finest value for money on the market.



AR20. 12 channel FM receiver 144-146 MHz. Input impedance 50–75 ohm. AM-FM modes. Sensitivity 0·2uV AF output 3 watts. 12v. DC operation. **Price £50.00**



AT23. 12 Channel FM Transmitter. 3 watts, 144–146 MHz. Frequency deviation 3–10 kHz adjustable. 12v. DC operated AF input sensitivity 2mV adjustable to 50 mV **Price £50·00**

ACCESSORIES

2 way Antenna switch 50 ohm 200 watt PEP	£5·25
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Hy-Mound Morse Keys with base ...	£10·75
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HP3A High Pass Filters	£3·10
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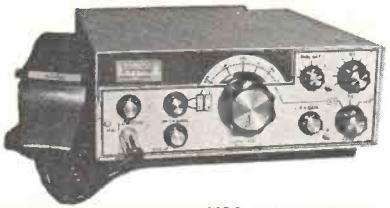
Send S.A.E. for full specifications.



We are now importing these direct from the USA and can offer them at £368 inc. VAT

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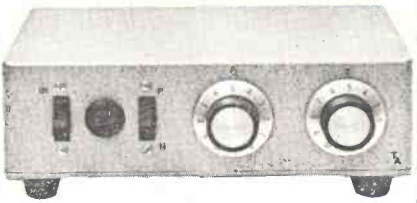
TECHNICAL ASSOCIATES



Rx Band Pass Filter. 9 I.C's. 1 watt output* 8 switched positions of filters* High pass 2·5 kHz–2–00 kHz–1·5 kHz–200 Hz–110 Hz–80 Hz* Ideal for increased selectivity with FRG7, SXR30, ETC ... **Price £30·45**

Printed Circuit Module. Including rotary switch ... ... **Price £17·65**

RX Peak and Notch Filter. Goes between RX and speaker* All I.C's* By-pass switch* Notch width control for optimum width of notch ... ... **Price £30·45**

Printed Circuit Module. Including all pots and switch ... ... **Price £17·65**

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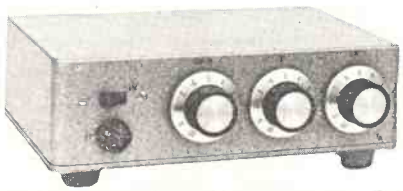
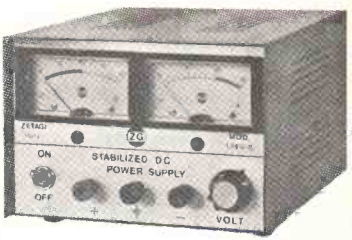
Crystal Calibrator. Seven ranges down to 1 kHz. Selected from front panel. Complete with antenna. ... ... **Price £22·80**

VHF Tunable Pre-amp ... **Price £23·00**



Some Models in New Type Cabinets

These prices include VAT and postage.



Mod. 1210 S

STEPHENS-JAMES LTD.

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SHORT WAVE MAGAZINE

(GB3SWM)

ISSN: 0037-4261

Vol. XXXVII JUNE/JULY, 1979 No. 428/429

CONTENTS

Editor: **PAUL ESSERY, G3KFE/G3SWM**

Advertising: **Charles Forsyth**

Published at 34 High Street, Welwyn, Herts., AL6 9EQ, on the last Friday of the month, dated the month following. *Telephone: 04-3871 5206 & 5207*

Annual Subscription: *Home: £5·50, 12 issues, post paid*
Overseas: £5·50 ($10·00 U.S.), post free surface mail

Editorial Address: **Short Wave Magazine, 34 High Street, Welwyn, Herts. AL6 9EQ, England.**

Prices shown in advertising in this issue do not necessarily constitute a contract and may be subject to change.

AUTHORS' MSS

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

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Vega Selena 210/2 MB
Superhet portable receiving VHF/FM, long, medium and 5 short-wave bands: 19.85-19.4m (15.1-15.45mHz); 25.8-24.8m (11.7-12.1mHz); 31.6-30.7m (9.5-9.77mHz); 50.4-41.0m (5.95-7.3mHz); (marine) 186.9-76.0m (1.605-3.95mHz). Intermediate frequency: 465kHz. Rated Output: 500mW (max. 750mW) 31 semi-conductor circuitry. Independent bass and treble tone controls. Automatic frequency control. Built-in mains convertor. Sockets for: line aerial, earth, tape-recorder, earphone or extension speaker. Inbuilt ferrite rod aerial for long and med waves, 8-section telescopic swivelling antenna for VHF/FM and short waves. Battery condition/tuning meter. Dimensions: 370x250x115mm. Weight: 4.08kg (9lb) without batteries. **Price: £39.34 inc VAT.**

Vega 206 Superhet portable receiving long and medium waves plus 6 short-wave bands: 150-60m (2-5mHz); 60-40m (5-7.5mHz); 32.35-24.8m (9.3-12.1mHz): 19.85-19.4m (15.1-15.45mHz): 16.95-16.75m (17.7-17.9mHz); 14-13.8m (21.45-21.75mHz). Intermediate frequency: 465kHz. Rated Output: 150mW. Circuitry comprises 12 semi-conductors including voltage stabilising diode. plus turret waveband selector, treble control, inbuilt ferrite rod aerial for med and long waves. 7-section telescopic antenna for short waves. Sockets for: line aerial, 9v DC external power source, tape-recorder, earphone or extension loudspeaker. Dimensions: 229x297x105mm. Weight: 2.7kg (6lb) without batteries. **Price: £24.15 inc VAT.**

Vega Spidola 250 Superhet portable receiving VHF/FM, long, medium and 6 short-wave bands: 150-60m (2.0-5.0mHZ): 60-40.5m (5.0-7.4mHz): 31.6-30.7m (9.5-9.78mHz): 25.7-24.8m (11.7-12.1mHz), 19.85-16.75m (15.1-17.9mHz): 14-13.8m (21.45-21.75mHz). Intermediate frequency: 465kHz. Rated Output: 800mW. Circuitry includes 23 semi-conductors. independent bass and treble tone controls, automatic frequency control. Battery condition/tuning meter. Inbuilt ferrite rod aerial for long and medium waves. 8-section telescopic swivelling antenna for VHF/FM and short waves. Sockets for: line aerial. 9v DC external power source, tape recorder, earphone or extension speaker. Dimensions: 250x365x105mm. Weight: 3.4kg (7.5lb) without batteries. **Price: £34.79 inc VAT.**

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FOR THE RADIO AMATEUR AND AMATEUR RADIO

The SHORT WAVE Magazine

EDITORIAL

S.W.M. Schedules

It cannot have failed to reach the notice of readers that over the past few months, publication of the *Magazine* has been continuously delayed. Our efforts to get over our various difficulties of the end of last year were well and truly scotched by the total chaos in the postal service during February and March (a service which is still anything but predictable — and likely to remain so).

We have decided therefore, in order to put matters right, that this issue of *Short Wave Magazine* should be another joint production. As this issue is of standard size (as opposed to the January/February issue which was nearly twice the usual size), naturally all direct subscribers will have their subscriptions extended by an extra issue; this has already been done, and no action is necessary on the part of subscribers. The August issue should appear at the beginning of the third week in August, the September issue at the end of the first week in September, and the October issue should appear on time (*i.e.* the last Friday of September).

We very much want Readers and Advertisers to know that we are just as keen as they are (possibly keener!) to bring our schedules back to normal. Equally, we would like them all to know just how much we appreciate their understanding and forbearance over our difficulties; indeed, the vast majority of 'words' which reach us are sympathetic, helpful and encouraging — we didn't know we had *so* many friends — and this we find both strengthening and moving.

Thank you all very much.

G3KFE.

VHF BANDS

NORMAN FITCH, G3FPK

QTHCC Awards News

THE fourth 2m. certificate for our new QTH Squares Century Award has been won by Roger Thorn, G3CHN, from Devon. He submitted 105 QSLs covering 28 CW and 77 SSB QSO's, which included 15 *via E's* and 4 *via Ar*.

Roger reports a 70% QSL return which seems very good, although he despairs of ever getting cards from some of the rarer ones. None of the OK's worked have ever confirmed and he anxiously awaits a QSL from UR2. G3CHN is located on a cliff at Bolberry Down with a superb take-off to the south enabling contacts to be made all down the French Atlantic coast and into northern Spain under fairly average conditions.

In these days of "black boxes" it is refreshing to report that the station is entirely home-built, consisting of a 2m. transceiver with a QQV06-40A PA, driving a pair of 4CX250B's. The aerial was a 10-ele. long *Yagi*, this now replaced by a 16-ele. *Tonna*. As this was being compiled, Roger submitted more QSL's to bring his confirmed total to 125 squares.

At the time of editing, your scribe does not have any certificates to hand but when they are, they will be back-dated. A copy of the rules and an application form can be obtained by sending a self-addressed, stamped envelope to the Awards Dept. (QTHCC) at Welwyn.

The Beacon Scene

The much-missed Wrotham 2m. beacon, GB3VHF, re-appeared on its new frequency of 144·925 MHz on May 25, complete with new micro-processor keyer. On CW, it gives its call and QTH locator, followed by similar information on RTTY including the latitude and longitude. Keeper Brian Bower mentioned a two months delay due to Home Office paperwork.

According to a news item broadcast over GB2RS on April 29, the 23 cm. Isle of Wight beacon, GB3IOW, was expected to be back by the end of May, with the 3 cm. one on again a month later.

Serge Canivenc, F8SH, kindly sent a comprehensive account of the beacon situation in France, which confirms that the Lannion 2m. beacon FX3THF, on 144·905 MHz, is off the air for good having given good service continuously since 1968. They are now looking for a "clean" exciter giving about 10 watts RF, followed by a transistorized PA possibly being built by amateurs from *TRW-France*.

Regarding the 50 MHz band, Serge mentions that the FX3VHF beacon, which had to be closed down due to interference with other equipment in the same room, will probably be installed in the Bordeaux region. F6FHP has agreed to look after it and has already built a new, solid-state, 100 watts Tx. He is awaiting authorization to install the Tx on top of a water tower. Serge is ready to send the IC keyer and aerial as soon as F6FHP gets the "all-clear" from the authorities. Presumably the call will have to be FX4VHF.

Still on 6m. Serge heard from FY7AS that his beacon was ready to go on the air on 50·095 MHz with 100 watts of RF from the Kourou Space Centre in French Guiana. Again, official authorization was awaited. In West Africa, the Ivory Coast amateurs are becoming enthusiastic about VHF possibilities of a *TEP* nature. TU2GA is keen to join in tests and they would like to commission beacons on 28, 50, 144 and 432 MHz if the necessary permission can be obtained.

F8SH reports that Jimmy Bruzon, ZB2BL, now has the 2m. Gibraltar beacon, ZB2VHF, operating again on 144·145 MHz. Serge has suggested he points the aerial southwards for the autumnal equinox as Gibraltar lies within the trans-equatorial zone. However, the beacon runs only 10 watts so reception in southern Africa would not be too likely.

Now that the *Sporadic E* season has started, it would be worth monitoring 144·840 MHz for IT9G, located on Mount Etna. This one is audible *via* tropo. in mainland Italy.

Contests

Results: The 70 MHz CW contest run on January 21 was won by G3UKV whose 40 QSO's netted 294 points. Runner up was G2AMV with 263 points from 29 contacts, while G3BOC's 28 exchanges gained third place with 224 points.

In the 144/432 MHz contest over the March 3/4 weekend, the winner of the 2m. single operator section was regular contributor Geoff Brown, GJ8ORH, with 1869 pts. from 260 QSO's. G8IQL was runner up with 1246 pts. from 136 contacts. Clear winners of the multi-op. 2m. part were G6HH/P with 4323 pts. from 495 QSO's, runner up being G4GTH/P with 3253 pts. from 421 contacts.

In the single-op. 144/432 MHz section, G3TDG was the winner with 2660 pts. from 108 QSO's. G8OGL was 47 points behind with 159 contacts. The multi-op. part was convincingly won by the G3PIA/G3NNG team with 8414 points with G3PMH/A and G8PMH/A runners up with 6428 pts.

Forthcoming events: Further legs of the 10 GHz *Cumulatives* are scheduled for July 22, August 26 and September 23, all periods 0900-2000 GMT. These coincide with the *Microwave Cumulatives*, in which the July 22 session is for 5·6 GHz; the August 26 period for 24 GHz and the last one for 2·3 GHz. NFD on VHF is over the July 7/8 weekend and the rules are the same as last year.

Satellite Matters

It would seem that the two Russian *Radio Sputniks*, RS-1 and RS-2, must be written off as failures. There have been no reports of QSO's through them for many months now. There seem to have been inferences that the transponders have been ruined by West European QRO fanatics. This is a fatuous suggestion since the Russian designers knew of this phenomenon after six years of *Oscar 6* and *7* experience.

The last telemetry monitoring suggested that the batteries were failing. AMSAT-UK sources suggest that the telemetry transmitters might be switched on infrequently whilst the satellites are over the Soviet Union.

By contrast, after 4½ years and 21,000 orbits *Oscar 7*, is still functioning and providing the dedicated

satellite buffs with good DX QSO's. *O-7* is about one minute *early* crossing the Equator than the time given in the AMSAT Calendar. The command stations are keeping it in Mode "A" as much as possible.

Oscar 8 is working well. However, the effects of *ion drag* caused by strong "solar winds" associated with the high level of solar activity have greatly affected its orbit so that it crosses the Equator some 8m, 15s. *earlier* than predicted in the calendar. The corresponding longitude is 1·7° less than shown. Since June 1, *O-8* has been operating on Modes "A" and "J" simultaneously, until further notice, on Tuesdays and Fridays.

Repeater Notes

The Kent Repeater Group has now fitted a duplexer to its UHF relay at Ashford, GB3CK. (RBØ). This was installed on March 15 and enables a single colinear aerial to be used for simultaneous reception and transmission. It comprises four cavity filters and a ferrite circulator. At the same time, a pre-amplifier was fitted to the Rx resulting in improved coverage.

Initial tests on the VHF repeater at Stockport on R2—GB3MN—have been completed.

Those who live within range of GB3LO will be familiar with the deliberate interference it has suffered from over the years. The Home Office has spent considerable time, effort and taxpayers' money on tracking down some of those who cause this nuisance. On April 19, two former radio amateurs were relieved of a total of £910 between them at Camberwell Green Magistrates' Court for various offences perpetrated on the day of the 1978 VHF Convention. However strong anyone's view might be about certain aspects of amateur radio, there can be no excuse for the kind of behaviour that led to these hefty fines. This case was somewhat of a landmark in that the Home Office, which brought the case, relied upon evidence given by radio amateurs and not their own staff.

DX-Peditions

It seems that the Mediterranean Island of Corsica is to be "invaded" by several high-powered VHF/UHF DX-Peditionaries this summer. Too ate for earlier mention was F1BUU's trip ending on June 7 with 2m. and 70 cm. QRO operation. F1ANH is planning 2m. and 70 cm. activity from EB14 and EC25 from July 16-Aug. 4; and F6CTT likewise from July 22-Aug. 10. The foregoing news *via* GJ4ICD gathered during a recent trip to France.

Edouard Bariteau, F1CYB, has written to confirm that he and René Camus, F6CTW, will be in FC-land from Aug. 4-28. They will operate from EC35c from a site 1,100m. *a.s.l.* with six operators. The proposed schedule is: SSB each evening on 144·390 plus/minus 2 kHz from 1900 to 2400 GMT weekdays, and all-day on Sats./Suns. The gear will comprise a W2GN amplifier and four 16-ele. *Yayis* on 2m. On 70 cm. operation will be on 432·189 plus/minus 2 kHz using a K2RIW amplifier with a four times 22-ele. aerial array. It is not known whether simultaneous, two-band operation is envisaged. Skeds can be arranged by sending a self-addressed envelope to F1CYB at: 20 rue de l'Europe, F-89700 TONNERRE, France.

CW MS QSO's should be arranged directly with F6CTW for the period Aug. 9-15. Operation is planned for 0800-1000; 1800-2000 and 2200-2400 GMT and MS buffs are asked to send René three proposals with self-addressed envelope to: 17 Avenue Jacques Duclos, F-92350 Plessis Robinson, France. QRG's are 144·040 MHz (Skeds) and 144·048 MHz (Random).

Nearer home, John Lovell, G8JHL, (Gtr. Manchester) advises of a trip to the Isle of Man by himself with G4CBW and G8GAJ between Aug. 5 and 16. They will only be QRV on 2m. using the call, GD6UQ/P, the main idea being to provide XO square to all and sundry during the *Perseids* shower. The gear will include a 2×4CX250B amplifier feeding a four times 16-ele. aerial array. They are *not* accepting tropo. skeds, but MS proposals should be sent to John at: 40 Vine Street, Salford, Gtr. Manchester, M7 0PG. They will be QRV on the 20 m. VHF nets for skeds.

Another *Perseids* trip, this time to the Western Isles region, is planned by GM8's NCM, MJV and MNG, followed by a promised week of activity from some of the rarer squares. MS skeds can be arranged through GM8NCM, Alistair Simpson, at: 50 Cheviot Road, Kirkcaldy, Fife.

During a 2m. QSO recently, your scribe was told of proposed operation from VL square in the Irish Republic by PAØLSC (G5BXO) from July 1. Activity from the United Nations in Geneva is promised by a group headed by DF2ZC at the end of October, for those who missed the recent operation from 4U1ITU. The QRG's mentioned are 144·044 MHz on CW; 144·078 MHz for MS skeds and 144·277 MHz for SSB. The same team plans to operate from the Principality of Monaco—3AØ—during the Marconi Memorial Contest next January.

News from Jersey

Lawrence Woolf, ex-GJ8AAZ, writes that, some 20 years after starting to learn the morse code, he has now passed the test and has his old TV call back—GJ3RAX. He hopes to get going on 4m. soon, as does Dennis Robinson, GJ3YHU. Valerie Bown, the only licensed YL on the island, has also passed the morse test and is now GJ4IDA (ex-GJ8MRD). Lawrence admits to having been operating a bit on 10m. and feels he is doing something immoral after being VHF-only since 1962! Nevertheless, he intends to operate mainly on VHF/UHF using SSB, FM, SS/TV and fast scan TV.

Geoff Brown, GJ4ICD, reports the first GJ QSO on 3 cms. between GJ8KNV and GJ8EZA over a 7 kms. path. Geoff is now QRV on 70 cms. with a K2RIW amplifier and anyone wanting a sked can 'phone him on 0534 26788.

Technical Tip

For some reason, certain oriental transmitters and transceivers often sound rather woolly in quality and this impairs intelligibility in difficult conditions. Invariably, this phenomenon is associated with equipment supplied with low impedance—typically 500 ohms—microphones of the moving coil variety. Ron Glaisher, G6LX, passes along the suggestion that a 0·01 μF. capacitor wired in series with the output to the Tx can often result in a more suitable speech passband by attenuating some of the "woofy" lower frequencies.

Four Metres

Drew Givens, GM3YOR, has sent a comprehensive account of band activity north of the border. Those known to be active include: GM3JFG in Fortrose, GM3OBC in Fife, GM3WFJ in Blairgowrie, GM3WOJ in Dumfries, GM3ZXE in Dundee, GM4CXP in Maxton and GM3JDX, GM4COK and GM4DIJ in Edinburgh. Activity seems centred around contests with little being heard at other times. To encourage more use of the band, Drew suggests a weekly activity period and asks for comments from other band users. (N.B. Sunday mornings used to be such a period.)

During 1978, GM3YOR worked 60 different stations in 8 countries from Kirkcaldy. So far this year, Drew has had a number of *Ar* QSO's on March 29 and April 3, 5 and 22. Anyone wishing to arrange a sked can write to Drew at: 41 Veronica Crescent, Kirkcaldy, Fife, KY1 2LH or 'phone him on 0592 200335 and he will try to arrange for other GM's to be on.

Derrick Dance, GM4CXP, confirms the lack of activity these days on 4m. during *Ar* openings. He was on for part of the Open contest on April 30 and worked a few Scottish stations. Around 1730, he was alerted to an *Ar* on 2m. but, having no 2m. gear in a go condition, he went back to 4m. and worked GM4DIJ (Lothians), GM3YOR and G3LDR/P. Mike Allmark (Leeds) listened during the contest and heard GD2HDZ, GW3ITZ/P (YN), GM3WOJ/P (XO), G3WXC (I.o.W.) and many Kent stations.

Two Metres—Sporadic E

As far as the British Isles is concerned, the first reported *E's* in 1979 was on May 11 when Geoff Brown, GJ4ICD—formerly GJ8ORH—worked into the Mediterranean in the evening. The opening was quite short from Sicily and Malta. In a later letter, Geoff mentions that on April 21, French stations in BF square also worked into IT9, 9H1, etc.

The first widespread E's event was that of May 21 notable in that SV2JT was worked by several stations. The resulting bedlam showed up some pathetic operating such as long-winded "three-by-three" calls, followed by such unnecessary phrases as,

THREE BAND ANNUAL VHF TABLE
January to December 1979

Station	FOUR METRES Counties	FOUR METRES Countries	TWO METRES Counties	TWO METRES Countries	70 CENTIMETRES Counties	70 CENTIMETRES Countries	TOTAL Points
G3SPJ	30	3	47	6	25	2	113
G8LHT	—	—	53	11	15	2	81
G3FIJ	17	2	41	8	11	1	80
G4ERG	—	—	57	20	—	—	77
G4DEZ	—	—	58	17	—	—	75
G3FPK	—	—	60	12	—	—	72
G2AXI	13	1	35	6	13	2	70
G8ITS	—	—	35	6	19	3	63
GM4CXP	4	2	33	12	1	1	53
GI8EWM	—	—	38	6	6	2	52
G4GXT	—	—	38	7	—	—	45
G4HAO	—	—	36	6	—	—	42
GD2HDZ	2	2	9	2	20	2	37
G4GHA	—	—	29	8	—	—	37
G4FKI	3	1	6	1	2	1	14

"... is calling you and standing by." Meantime, the Greek had gone back to someone, but to whom? Surely, in such conditions, all one needs do is to just give one's own call a couple of times? A good operator at the DX end will likely pick out part of a call from the cacophony and say, for example, "The G8 bravo station, go ahead." Much time can be wasted giving full QTH locators. As Paul Galea, 9H1BT, recommends, the main square, *e.g.* YK, ZM, etc., is all that need be mentioned during the QSO.

In Jersey, the event began at 1627 GMT when GJ4ICD worked YU2CTG (ID32e), the first "phase" ending at 1701. Geoff reports it started again at 1731 and fizzled out at 1806 with LZ2KBI (LD05a). The sessions produced QSO's with 16 YU's, 2 I's and the LZ, in 16 squares, 8 of which were new, *viz:* GD, ID, IF, JC, JF, KD, KE and LD. SV1AB (Athens) and other Greek stations were heard, along with a 9H1.

The event was not unexpected as Dave Crisp, G8IXG, had telephoned your scribe in mid-afternoon mentioning strong E's signals at 100 MHz. Dave has built a scanning Rx for Band 2 FM and has programmed into it selected stations from various countries. This is proving to be a very useful device. The first *E's* signals were heard at G3FPK at about 1630. IØEIO and IWØAKA, both in GB square were worked just before 1700. SV2JT (LA26c) was a consistent signal but swamped by local QRM. A number of inconclusive QSO's were heard. YU5XEX (KB58c) provided a welcome new square. The last station heard was YU6NGS (JC47g) at 1758.

Roger Thorn, G3CHN, (Devon) worked two LZ's in MC square on the key, and 6 YU's. John Quarmby, G3XDY, (Ipswich) was one of the lucky ones to contact SV2JT and he also managed YU5XEX and YU4VIP (JD12c).

Mike Lee, G3VYF, (Essex) sent in a detailed account of this widespread affair with a list of the various paths worked. These included OZ2GS (Copenhagen) to I, IT9 and 9HI; SM7BAE (GP) to SV2JT (LA) and YU5 and YU6; F6FHP (ZE) to HF, HG, IF, JD, JE, JF, KD and KE squares; F6BVA (DD) to OK, YO and YU in II, IK, JI, KE, KG and KI squares; EA3WC (BC) to HG and YU in IG, IH, JF, JG and JH squares; PAØXWA (DM) to I, IT9 and 9H1; I2VRN (FF) to GI and GM's in XO square.

Mike Allmark (Leeds) logged Italians in HB, IA and IB squares between 1600 and 1700. Spanish TV in Band 1 was copied from 1308 but the most interesting reception was of Italian Channel D on *175·25 MH*

between 1641 and 1644. He writes, "The Tx is Martino Franco (I7 region) and it came up almost snow-free." Around midnight on the 21st, Mike reports reception of Icelandic TV on Ch. E4 which he suggests was *via* forward scatter, *Auroral E.*

Summing up this event—or rather these events—by plotting reported QSO's on the large QTH square map, reveals several distinct areas over which reflexions took place. It seems that the longest DX was G3CHN to MC square and the shortest about 1,000 kms. between F6BVA and an OK.

The next major *E's* opening was on May 29 and G8IXG again alerted your conductor in mid-afternoon. G3CHN phoned to say he had worked a couple of Italians at 1525. Syd Harden, G2AXI, (Hants.) worked IØEIO (GB14c) at 1545, IØAKP and I6WJB (HC42g), the event going out at 1630. In a late-night inquest, Richard Bown, G8JVM, (Wilts.) said that the beacon IØA (GB12d) was S9-plus-30 dB. at lunch time but nobody seemed aware that *E's* propagation was around. It is on 144·147 MHz. In the main event, Richard copied stations between 1550 and 1620.

Graham Badger, G3OHC, (W. Midlands) heard a huge pile-up on IT9ZHA in GX49e so left it to work IC8EGJ (HA32c) on Capri, I8JOQ (HA03j) and 9H1BT (HV03f). Paul Gobey, G8IYG, (Stafford) also worked 9H1BT at 1540 and then got through to the IT9 at 1547. Paul, too, contacted IC8EGJ and I8JOQ, along with I8REK (HA), I8LPR (HB72e) and I8SEK. He heard IW8RFO and IØSVS. Sheila Williams, G8KPL, (Cumbria) was very pleased when she worked 9H1BT especially when her husband, Dave, G8JAG, calculated the QRB as about 2,400 kms. She also contacted Romans IØAKP and IWØAIO in GB square.

The Nottingham University station, G3UNU, was in a local "round table" when 9H1EH chipped in, followed by Henry Souchet, 9H1CD, and 9H1BT. Peter then worked 3 IT9's and 3 IØ's, all between 1520 and 1620. From Ripon, N. Yorks., Dennis Boniface, G4DSC worked IT9IKG at 1606 and heard 9H1BT and IWØAKA. At G3FPK IT9ZHA was a strong signal for 20 mins. from 1536. 9H1BT was worked at 1545, with IT9LYF and I8TWK (HA) heard. It seems that the reflexions were from a cloud too near for great success from the southern parts of England, and the Midlands and Northern stations were doing much better. G3VYF reports that ON5QW (BL) worked ISØBCO (EZ56j) at 1547, and the Pudda's, ISØPUD and PDQ at 1550–55 (EZ66a). The best reception was at QTF 150° which was some way east of the direct path.

On June 1, John Hunter, G3IMV, (Bucks.) called RA3YCR (RN52f) at 1421 and got a 599 report on CW but "G3?" He had another go at

QTH LOCATOR SQUARES TABLE

Station	23 cm.	70 cm.	2 m.	Total
G8HVY	—	71	119	190
G3JXN	34	70	93	197
G3COJ	23	66	80	169
G8GML	11	63	106	180
G8LEF	22	61	101	184
G2AXI	2	52	91	145
G4HYD	—	40	83	123
G8ATK	—	38	88	126
G8EOP	8	36	38	82
G8LHT	3	34	82	119
GD2HDZ	11	34	67	112
G3OHC	4	33	101	138
G4BAH	—	32	92	124
GJ4ICD	—	31	110	141
G4CMV	—	30	140	170
G8BKR	1	30	108	139
G8HHI	—	30	101	131
G4DKX	5	30	68	103
G4BWG	—	29	118	147
G4ERX	1	29	67	97
G4AEZ	3	28	61	92
G3FIJ	—	27	65	92
G4GEE	—	27	56	83
GJ8KNV	—	26	83	109
I4EAT	—	25	217	242
GM4CXP	—	25	134	159
G3BW	3	25	91	119
GJ3RAX	1	24	67	92
G4FCD	—	22	89	111
G8GII	—	22	63	85
G3XCS	—	21	111	132
G3KPU	—	21	84	105
G3SPJ	5	21	63	89
GI8EWM	—	18	61	79
G8IFT	7	18	49	74
G8ITS	—	16	56	72
9H1CD	—	13	127	140
GM8NCM	—	12	84	96
GM4COK	—	9	106	115
G8MFJ	—	9	48	57
GD3YEO	—	8	59	67
G8KPL	—	7	74	81
G8JAG	—	7	73	80
G8KUC	—	7	60	67
G4FBK	—	5	92	97
G8KGF	—	5	80	85
G8KSP	—	2	72	74
G8LGL	—	1	74	75
G8KLN	—	1	62	63
G4GSA	—	1	48	49
G3POI	—	—	265	265
DK3UZ	—	—	182	182
G3IMV	—	—	180	180
G3SEK	—	—	179	179
G3CHN	—	—	174	174
G3FPK	—	—	155	155
G4DEZ	—	—	154	154
9H1BT	—	—	138	138
G3VYF	—	—	111	111
G4ERG	—	—	107	107
G4AWU	—	—	94	94
G8KSS	—	—	93	93
G6UW	—	—	85	85
9H1C	—	—	83	83
G8JHX	—	—	80	80
G8JJR	—	—	79	79
G4GET	—	—	70	70
G4CIK	—	—	62	62
G4GCQ	—	—	61	61
G8JEF	—	—	58	58
GW4FJK	—	—	57	57
OZ9IY	—	—	53	53
G4GXT	—	—	43	43
G4GHA	—	—	42	42
G4EYL	—	—	41	41
G8JGK	—	—	41	41
G8PRG	—	—	15	15

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

1431 and this time the Russian came back ". . . IMV" so poor John is not really sure about this one. That evening there was another fleeting opening in which he worked I7KBI (IB75a) for a new square. G3DSC worked I4EAT in the evening and heard IØSNY at 1747 and IØCUT at 1756.

On June 2, there was another *E's* opening and Ian Harwood, G8LHT, (S. Yorks.) mentions two phases; the first was 1040-1105 when he worked YU2CUT (KF66e) at S9 both ways, and the second was 1115-1119. This one seems to have been missed by most addicts.

The most outstanding contact must surely be that between Ian Simpson, GM8BVD, (YQ74g) from Dalgety Bay in Fife, and Costas Fimerellis, SV1DH, in LX09b. This occurred at 1610 on June 2. Ian heard about five Edinburgh stations calling "blind" on 144·300 MHz for *E's* so he left them to it and called on 144·250 to be answered by SV1DH. S9 reports were exchanged. Ian was running just *10 watts* to a 16-ele. *Tonna Yagi* at 40 ft. The QRB is 2,840 kms. which is somewhat in excess of the maximum single-hop calculated E's range. Therefore, it seems likely that there was some tropo. assistance. Indeed there was a very good tropo. opening across the North Sea on the evening of June 2 and GM8BVD's signal has an unobstructed 600 kms. sea path to the Dutch Coast.

It is interesting to speculate what such a distance means. *E.g.:* The Midlands to Crete; the "W" row of squares in the U.S.S.R. from the East Coast, and the Canary Islands from Southern England and South Wales!

Also on the 2nd., G3VYF mentions *E's* contacts as follows: ON5QW to Spain; SM5AFV to Italy; DK2ZF (FN) to SV1DH (LX); and DK1KO (EN) to EA1CR (XD), the last two around 1625. This reveals two quite separate reflecting layers, one over the Paris region of France which suggests that southern GM's should have been able to work into southern France, and the second in the HA/YU border area. So the *E's* season has got off to a fine start. Please send in your reports, even if you do not work anyone, but try to make sure you get the calls and main locator squares right.

Two Metres—Meteor Scatter

Eddi Ramm, DK3UZ, (EN20c) lists some MS successes from April 5 when he worked I4XCC (GD). In terms of QRB, the best DX was YO5AVN/3 (NE) at 1,560 kms. on Apr. 11 and on the 24th, UA3LAW (PO) at 1,367 kms. A QSO on May 1 with F8OP (ZI) produced square number 182 and the country tally to 37 with 35 confirmed. For John Hunter, G3IMV, May 6 saw a successful QSO with CT1WW for square No. 180 and the 34th country. Other contacts included I2VRN (FF) and SP5JC (KM).

Jerry Goldsmith, G4CJG, (Co. Durham) received a 10 seconds burst of "Rogers" from SM3FGL (IV) on May 7. He complains—as do many others—about "local" stations calling him when he is calling "CQ MS" on 144·200 MHz. Pete Etheridge, G4ERG, (Hull) is another who is now quite active on CW MS. On May 13, he completed with SM5CUI (IT) in under an hour, and the following day worked OH7PI (NW). The G4CIK keyer, as described in the *Magazine* is working well at 600 letters per minute.

Mike Allmark, (Leeds) listened in on the May *Aquarids* and heard I2VRN, CT1WW (WB), SMØEJY (IT), EA3ADW (BB), I4BKG, FC6-ABP (EC), I1DMP (DF), UQ2OW (MQ), HB7BBD (EH), LA2PT (FT), and OH7PI. Beacons OY6VHF (WW) and OH6VHF (KW) were also copied. Mike lists the following "natterers" on 144·200 MHz: G8's ERX, KJJ, NUN, NVP and PRF, plus G4HKY. Perhaps some licensed amateurs will be able to persuade them to natter elsewhere.

Bryn Llewellyn, G4DEZ, is due to move from Didcot to the Essex area any time now and promises that one of the first tasks after moving will be to get the VHF station QRV! On June 3, he worked I1DMP and on the 7th, he thinks the QSO with UA3LBO was O.K. The following day produced nothing from UR2RQT and signals from 4U1ITU were very weak. On the 9th, nothing at all was heard from HA8KCP after the first 10 mins., but OH7PI and SP5JC were worked. During a QSO on June 3, Tony Horsfall, G4CBW, (Cheshire) mentioned he had worked 4U1ITU so may have been the first G to do so.

Two Metres—Other

Until the weekend May 11-13, tropo. conditions, as observed at G3FPK, had been pretty flat for a long time. Coinciding with a spell of hot, sunny weather—at least in the south—there are reports of EA's worked from GW and GD and of EA's getting in to the West Wales 2m. repeater. On the evening of the 13th, very strong signals were received from several Channel Islands stations, including GU2FZC, GJ8KNV and GJ8POM.

During the previous UHF contest weekend, 2m. was a contest band in all but the British Isles and a number of U.K. stations took part in this event. There was plenty of activity but most all signals were weak, considering the *e.r.p's* from some of the continentals. The rather rare Luxembourg Principality was worked from G3FPK on CW in the shape of PAØNIE/LX/P (DK71g)—hardly a call for a quick exchange!

G3CHN was in contact with F1CRP recently and Alain told Roger that this summer a French yachtsman plans to operate from several of the "wet" QTH squares in the Bay of Biscay. Roger mentions that G8JDX has received confirmation of a contact he had with the Swedish gentleman on the "Snowflake" some time ago so he lives in hope for his card. G3VYF likes our new QTHCC idea and admits to 111 squares since March 1978 in 29 countries, and no MS, either. So far this year Mike has managed 70 squares, and reckons considerate competition encourages operators to improve their station's DX capability.

John Cleaton, G4GHA, (Dorset) enters our two tables. His Wareham QTH is 8m. *a.s.l.* and the station comprises a *Trio* TS-700S with 180 watts amplifier to a 6-ele. *Quad* 10m. *a.g.l.* John is semi-paralized and a "white stick" operator. Nevertheless, he still attempts some construction projects the latest of which is an oscilloscope nearing completion.

Chris Read, G8MFP, (Warks.) comments upon the very good conditions of June 2 and 3 when he worked many DL, PA and GM stations. He is a keen student of propagation matters, particularly *Auroral* ones, in collaboration with G8FWZ, G3YTW and G4DLB, and

British Astronomical Association members in Dundee and Edinburgh. The latest study is of "sweepers" and *E's*.

Derrick Dance, GM4CXP, (Borders) reports a few *Ar* contacts on May 25 between 1650 and 1739: 1650 GM3WFJ (YQ23a) at QTF 0°; 1655 GM3ZXE (YQ35g) 10°; 1712 GM8FFX (YR80j) 45° and 1736 SM4GGC (GT80c) 0° with beacon DLØPR in EO54c at 1717, QTF 340°. There was no sign of GB3LER during this event. Mike Allmark heard Andrew Veitch, GM8FRB/P on Islay (WP) during May.

After the big *E's* event on June 2, tropo. conditions to northern Germany were excellent with many stations pounding in during the evening at G3FPK. However, they were most all in the EL, EM and EN locators. OZ1ELF (EP43c) was, by contrast, very weak. The GB3NEE beacon, normally very difficult to hear under average conditions, was quite loud off the side of the beam that evening. Conditions to the north were still quite good the following morning with a number of GM's worked from the south. Your scribe was very pleased to contact G8LIC in Co. Cleveland, a rarity indeed on 2m.

Conditions during the portable contest on May 26/27 were poor and many had to put up with very strong winds. Listening towards the end of the affair, it transpired that GW8BHH and GW6UQ had each made 623 QSO's. At 1557, G3OUR gave serial No. 515 and G3EFX ended up with 503 worth 4,951 pts. G6UW made 495 contacts worth about 5½ thousand pts. At 1553, G6HH were giving serial No. 481.

The UHF Bands

The generally mediocre conditions have not encouraged much UHF activity and there are few reports from readers. The general consensus is that during the contest on May 5/6 conditions were really dreadful and most participants were very disappointed. G8MFP now has a new "Polar" amplifier in operation giving 100 watts on 70 cms. Chris used it to good effect in the extended tropo. opening of June 2 and 3, working into GM, LA, ON and PA.

To more esoteric modes, on May 28, the Oxford University team, using the call G3WDG, completed an *E-M-E-* contact with VK5MC on 70 cms. to complete another WAC. Since November last, G3WDG has worked 29 different stations by this method.

Gem of the Month

Would you believe? Overheard on 2m. SSB. A fellow asking if his Rx preamp. bought for FM would work on SSB in view of the fact there was no constant carrier! So much for the R.A.E.!

Deadlines

That's it sewn up for another issue. All your reports, comments and claims for the August feature by July 5 and for September by August 9. Everything to: "VHF Bands," SHORT WAVE MAGAZINE, 34 High Street, WELWYN, Herts., AL6 9EQ. *73 de G3FPK.*

The Hitachi KH-1170E. A review of this somewhat unusual portable receiver, which includes coverage of both Top Band and Eighty metres, will appear in a forthcoming issue of *Short Wave Magazine*.

THE XJK ANTENNA

A SIMPLE, EFFICIENT AND VERSATILE AERIAL

M. P. HUGHES, G3KBH

SEVERAL years ago I found myself living in a small apartment in California, and needless to say the question of a suitable aerial to fit into the roof-space soon arose for my regular skeds with G-land. The apartment was only 16 feet wide and forced a compromise even on 21 MHz; the height above ground was only 15 feet.

I had long been fascinated by the possibilities of the 8JK and since its lack of front-to-back ratio was of little importance on the West Coast, I made one from 300-ohm TV twin lead and supported it in the roof space with nylon string. The ends of the elements were allowed to dangle beside the firewalls that separated my appartment from the ones either side. Four years of regular daily skeds speaks for the success of the antenna.

This antenna was relatively conventional, with the correct phasing provided by a 180° twist in the feed line connecting the centres of the elements. But at the time it occurred to me that the correct phasing of the elements could be obtained by bending the ends of the elements to the centre of the structure and connecting the right-hand end of one element to the left-hand end of the other, and *vice-versa*. (The cubical quad uses a similar technique, in that the ends of the vertically-stacked elements are joined). In the XJK the phased elements are separated horizontally and the correct phasing requires that the opposite ends are connected together, hence the cross-over.

When I returned to the UK a new antenna was called for and I had some time to experiment. Using a model designed for about 90 MHz (for convenience of testing) I found that bending the elements and cross-connecting them made little difference to the impedance at the centres of the elements; it measured approximately 20 ohms on my home-made impedance bridge. Upon adding a second wire to make the elements into folded dipoles, I found that the impedance quadrupled as expected and provided an excellent match to 75-ohm lines.

I built a full-sized folded version for 21 MHz and suspended it from one of the spiders I had saved from my deceased quad; the bamboo poles were arranged to point upwards like a rotary clothes line. This antenna was mounted atop a 10-foot pole and soon showed that it was able to out-perform my dipole despite its substantial disadvantage in height. It was not long before it was hoisted to the top of my 40-foot tower.

Tests with a remote transmitter indicated that the new antenna had an almost omni-directional radiation pattern; it was therefore at first surprising to find that, of stations in the same direction, some were stronger on the dipole and others were stronger on the XJK. After further tests and monitoring several hundred stations, it became clear that the dipole favoured short-skip stations, whereas the XJK almost always provided a stronger signal with DX stations. These results probably stem from the improvement in low-angle radiation and, perhaps more significantly, from the cancellation of high-angle waves from the XJK.

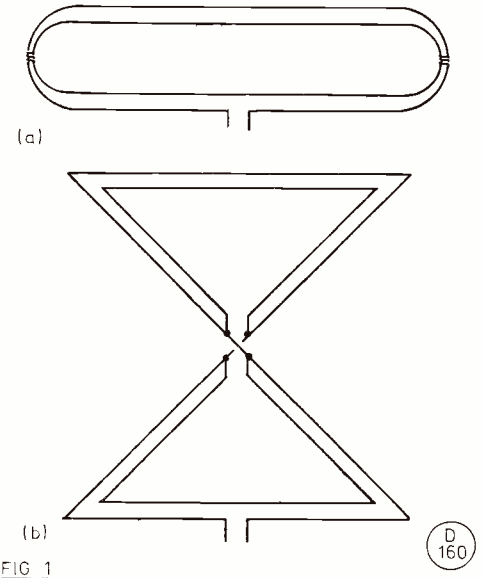


FIG 1

Construction of the XJK Antenna from a length of lighting flex: (*a*) the ends of two equal lengths joined to form a loop; (*b*) the joins cross over at the centre.

Technical

The currents in the two elements of an 8JK flow in opposite directions and so the radiation from them in the vertical direction cancels out. Power that in many other aerial designs is wasted skywards is therefore radiated closer to the horizon, thus giving the 8JK an improved performance for DX. The radiation pattern of an 8JK in the horizontal plane is a flattened figure-of-eight with deep nulls end-on to the elements. When the ends of the elements are bent back, these nulls are filled in and the radiation pattern becomes almost circular. In fact the XJK is an approximation to a current loop or a magnetic dipole, the dual of the electric dipole which is in common use. There are several other well-known antennas that also approximate the magnetic dipole, *e.g.* the Cloverleaf, the Alford Loop, and the Halo. However, these are generally built as single-frequency devices, whereas the XJK is tunable over a wide frequency range. The XJK is equivalent to a pair of phased Halos sharing a common capacitor.

A few minutes studying the vertical plane patterns of different types of horizontal antennas that are given in the handbooks will convince even the most sceptical DX-er that the horizontal dipole and its cousins, the parasitic beams, all radiate over 75 per cent of the power fed to them at angles greater than 25° to the horizontal. Now, the oppositely-directed currents in the 8JK and the XJK cause a partial cancellation of this unwanted radiation, cutting it down by about 80 per cent: all of this power is diverted to lower angles. However, it is spread around

over a greater horizontal beamwidth, and the result is the oft-quoted 4dB gain for the 8JK.

Construction

Turning to practical matters, the construction of the XJK is simple. It takes a little less than a wavelength of plastic-insulated lighting flex and about an hour's work. The flex is cut in half, the four ends are stripped, then joined together in pairs to form a single loop, *see* Fig. 1a. The loop consists of two folded dipoles connected end to end. One of the conductors of one of the folded dipoles is cut mid-way between the joins to allow the feeder to be connected. The loop is then given a single twist and arranged so that the joins are close together at the centre of a square formed by the points where the dipoles are bent back, as shown in Fig. 1b. The joins should be insulated from one another, or connected to the opposite plates of a variable capacitor for tuning purposes. It is a good plan to connect a trimmer at the cross-over to allow exact tuning of the antenna even for a single-band operation.

The XJK is omni-directional so there is no need to rotate it and it can be supported in a variety of ways. As already mentioned, one quad. spider will do the job, or the XJK can be supported from poles or ropes; it comes into its own indoors where it can be stapled to the rafters. Attention should be paid to insulation of the wires if the central part of the antenna near the cross-over needs support. Different configurations such as that indicated in Fig. 2 may suggest alternative ways in which the longer antennas for the lower frequencies can be squeezed into the roof spaces of smaller houses; the elements can be run up and down the rafters if it is not possible to keep them in the horizontal plane. To save climbing into the attic to tune the antenna on the low frequency bands, the capacitor can be located in a fitted wardrobe or airing cupboard and connected to the antenna by a short length of twin-lead or flex.

Feeding

Since the centre of both the elements of a folded version have an impedance that allows a good match to 75-ohm feedline, all that is necessary is to provide for the transition from balanced antenna to the unbalanced coaxial cables that are invariably used with modern transmitters. Any of the common 1 : 1 baluns can be used: coils, chokes, bazookas, stubs, ferrite transformers, etc. If the antenna is to be used over a wide frequency range then a non-resonant device is required and we are left with chokes or transformers: a choke may consist of a coil of coax rolled up near the feedpoint. Such chokes are best suited to the higher frequencies where ten to fifteen turns, some twenty centimetres or so in diameter is usually a satisfactory compromise. At frequencies of 7 MHz and below, the ferrite transformer will probably give better performance, providing low-loss ferrite cores are used. At VHF, where multiband

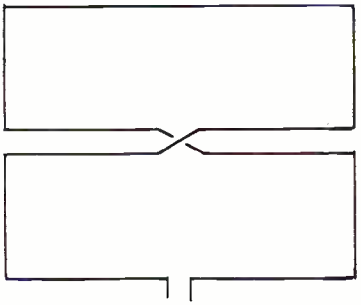


FIG. 2 ALTERNATIVE CONFIGURATION (D 161)

operation is less common, resonant devices would be satisfactory.

Tuning

The antenna can be tuned to any frequency below its unloaded resonant frequency by adding capacity at the crossover. There are practical limitations to the tuning range arising from the decrease in feed-point impedance and the increase in ohmic losses as the circulating currents increase. In general, over a 2 : 1 frequency range it is quite easy to arrange for a VSWR of less than 2 : 1 and to have an efficient, resonant antenna over the whole range. An antenna designed for fifteen metres can be operated on twenty metres simply by switching in a fixed capacitor at the cross-over. The feedpoint impedance would be about 70 ohms on fifteen metres and about 50 ohms on twenty metres. If such an antenna were tuned down to forty metres, it would have an impedance of approximately 20 ohms, so it should be possible to operate it fairly efficiently on these three bands if 50-ohm feed line is used and if the ohmic losses can be kept sufficiently low on forty metres. Under normal circumstances it would be used on forty metres only on a temporary or emergency basis.

An XJK for 3·9 MHz, having a length of 75 metres will perform quite adequately on 160 metres as well as 80 metres. In fact, its performance on 160 metres will surpass that of most end-fed wires that are generally used on that band.

Conclusion

It should be appreciated that even a "full-sized" version of the XJK takes up relatively little space, but even so it is a high-performance antenna. It still works very efficiently even when it is loaded to resonate with sides one-eighth of a wavelength long, and its lack of sensitivity at high angles of incidence reduces the impact of strong short-skip signals which often bounce over the horizontal plane nulls in the radiation patterns of conventional beams. In addition, the ease of matching, the tunability, the lack of need to rotate, and the simplicity of the XJK all add to its appeal.

August issue will appear on Friday, August 17th.

A SIMPLE SSB TRANSMITTER FOR TEN METRES USING THE LADDER FILTER

R. I. THOMAS, GW4BCD

THERE must be many amateurs who are deterred from building their own SSB equipment by the high cost of a good SSB filter. This, coupled with the fact that a multiband rig is quite a complex piece of equipment with its banks of coils and switches, must put off all but the most confident constructor. This need not be so, and the following article describes a simple single-band transmitter built by the author. It is kept as simple as possible, but still emits a high quality upper side-band signal on ten metres. The ten metre band was chosen as, at the moment and for the next couple of years (we hope), good results at DX are obtainable with minimal power.

The high cost of an SSB filter is avoided by the use of a homebrew ladder filter. These have been much written about in the amateur press in the last few years and are, at least in the authors experience, a very practical alternative to spending a lot of money on a commercial design. The filter used in this rig is based on a design by F6BQP and was found to be quite superb, and required no setting up whatever. The author's standard of construction would not win any constructor's contest, so would-be constructors can tackle this rig with complete confidence. Total cost in the author's case, who admittedly has a well filled junk box, was about ten pounds.

Circuitry

In the quest for simplicity and reliability the transmitter uses standard circuitry, *see* Fig. 1. An EF80 carrier oscillator is used at 10·075 MHz. There was no particular reason for this choice of carrier generation frequency other than that the crystals were available very cheaply: any frequency between 8 and 10 MHz would be suitable. The microphone amplifier and cathode follower are a pair of 12AX7's, another well proven design.

The resultant audio and RF signals are passed to the balanced modulator, a pair of OA90 diodes; these were not a matched pair in the prototype, but were found to give around 50 dB of carrier suppression. The 10·075 MHz double-sideband signal is then passed to the ladder filter, *see* Fig. 1A). As previously mentioned this is based on a design by F6BQP and was found to be very good indeed, with an estimated 45 dB of unwanted sideband suppression and a band-width of 2·6 kHz at 6 dB points. Another great advantage of this type of filter is that it needs no setting up whatever; if, however, a different carrier frequency is used (as will almost certainly be the case), constructors are advised to look up the original article by F6BQP, as the filter shunt capacitors will need varying slightly.

With any filter it is of paramount importance to terminate it in its characteristic impedance. This is taken care of in the design by the two transistors, and associated circuitry; this should not be omitted.

Following the filter is the filter amplifier, another EF80. A bugbear with any filter amplifier is instability, but no problems were encountered with the design and would-be constructors are advised to keep to the component values shown. From the filter amplifier, the 10·075 MHz SSB signal is injected into one grid of a 12AU7 balanced mixer, *see* Fig. 2. As shown, the other

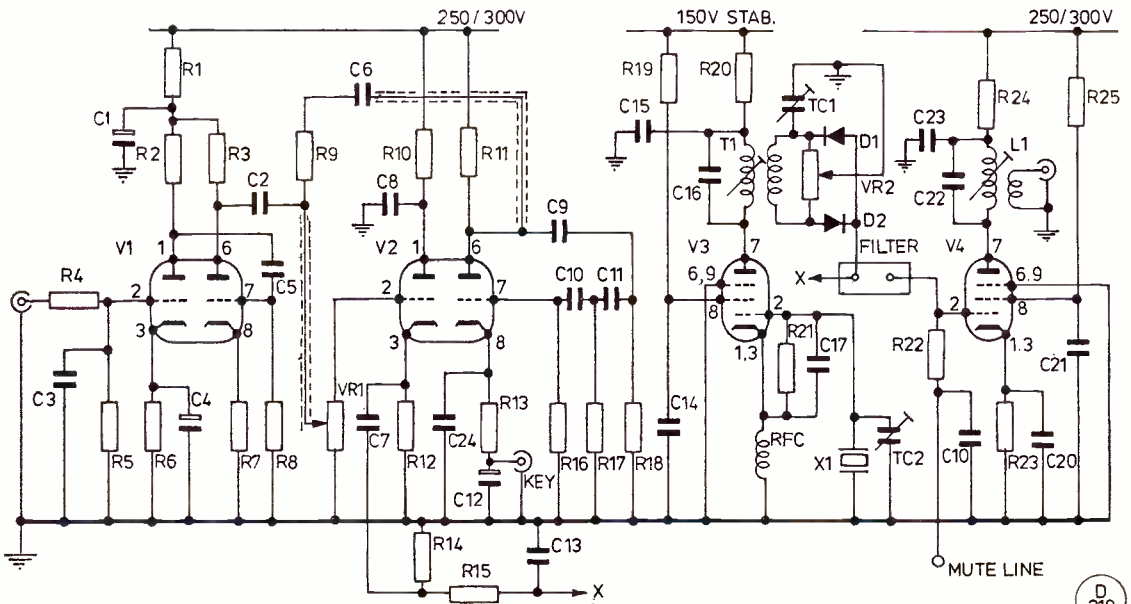


Fig. 1 10·075 MHz SSB GENERATOR AND TONE OSCILLATOR

Table of Values

Fig. 1

R1 = 15K
R2, R19, R25 = 47K
R3, R4, R11, R21 = 100K
R5, R8, R9 = 1M
R6, R7, R12, R25 = 1K5
R10, R20 = 4K7
R13 = 3K3
R14 = 2K7
R15 = 1K
R16, R18 = 150K
R17 = 180K
R22 = 22K
R23 = 220R

VR1 = 0·5M, log
VR2 = 1K lin., carbon
D1, D2 = OA90
X1 = 10·075 MHz, *see text*

C1 = 50 μK, 350v. DC, electrolytic
C2, C6, C7 = 2000 pF
C3 = 47 pF
C4 = 25 μF, 25v. DC, electrolytic
C5, C14, C15, C19, C20, C21, C23 = 1000 pF
C8 = 0·1 μF
C9 = 500 pF, silver mica
C10 = 100 pF, silver mica
C11 = 330 pF, silver mica
C12 = 5 μF, 350v. DC electrolytic
C13 = 10 pF, silver mica
C16 = 47 pF, silver mica
C17 = 25 pF, silver mica
C18 = 220 pF, silver mica
C22 = 30 pF, silver mica
TC1, TC2 = 3-30 pF trimmer
RFC1 = 2·5 mH choke
V1, V2 = 12AX7
V3, V4 = EF80

Note: All capacitors are disc ceramic, 1000v. DC working, unless otherwise stated.

Coil Data

T1 = Primary 24 turns, 32 s.w.g. Secondary 16 turns, 32 s.w.g., over cold end of primary. One layer of paper insulation between windings. 0·3in. dia. former with dust core.

L1 = Primary 30 turns, 32 s.w.g. Secondary 15 turns over centre of primary. One layer of paper insulation. 0·3in. dia. former with dust core.

Note: L1 can be replaced by standard valve-type IF transformer (10·7 MHz) provided resonating capacitor C22 is increased in value to 50 pF.

and tested using the crystal oscillator, and then the premixed VFO be built.

The VFO uses two ECC88 double triodes for no other reason than the authors junk box was full of them, *see* Fig. 3. The first valve doubles as both VFO and crystal oscillator, the screen effectively separating the two sections. In the authors case a 13·250 MHz crystal was to hand, so the VFO was constructed to tune 5·175 to 5·675 MHz, giving an output from the mixer of 18·425 to 18·925 MHz. This allows the Tx to be tuned from 28·5 to 29 MHz when mixed with 10·075 MHz. A straight 18 MHz VFO could be attempted of course, but the author doubted his ability to build one sufficiently stable at this frequency using valves. Constructors who are into solid-state circuitry could well get away with doing this, and the author would be pleased to hear from anyone who does this successfully.

The output from the ECC88 mixer is pi-coupled into the grid of the EF80 crystal oscillator, which doubles as oscillator or buffer. The driver stage is yet another EF80. (The author has a garage full of old TV sets!). This is perfectly standard and drives the PA, a 6146B, well into grid current if allowed to; the PA uses a conventional pi-tank output circuit, and is bridge-neutralised as per the standard text-books. In the prototype all the PA neutralising components were removed, and the PA was still perfectly stable provided it was terminated with a 75-ohm load. Once anything other than a 75-ohm load was presented to it, however, this happy state of affairs abruptly ceased. With neutralising the PA behaves perfectly into an SWR of 2·5 to 1 or less.

Muting is taken care of by applying a blocking bias to the filter amplifier and PA (Fig. 2a). One contact on

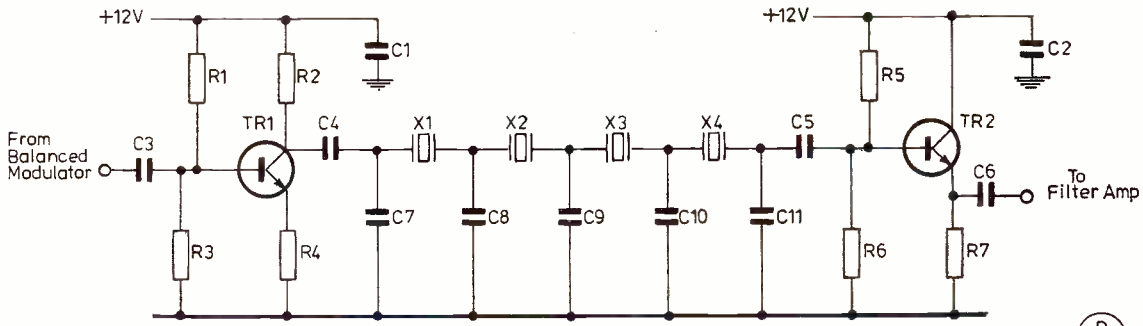


Fig. 1a 10·075 MHz LADDER FILTER AND MATCHING CIRCUITRY

grid receives an 18 MHz signal from either an EF80 crystal oscillator or a pre-mixed VFO. This is a very basic mixer circuit, and should only be used when the signals being mixed are sufficiently far apart not to produce any significant *spurii*. When mixing 10 and 18 MHz however, the selectivity of the tuned circuits in the mixer and following stages reduce any *spurii* to insignificance.

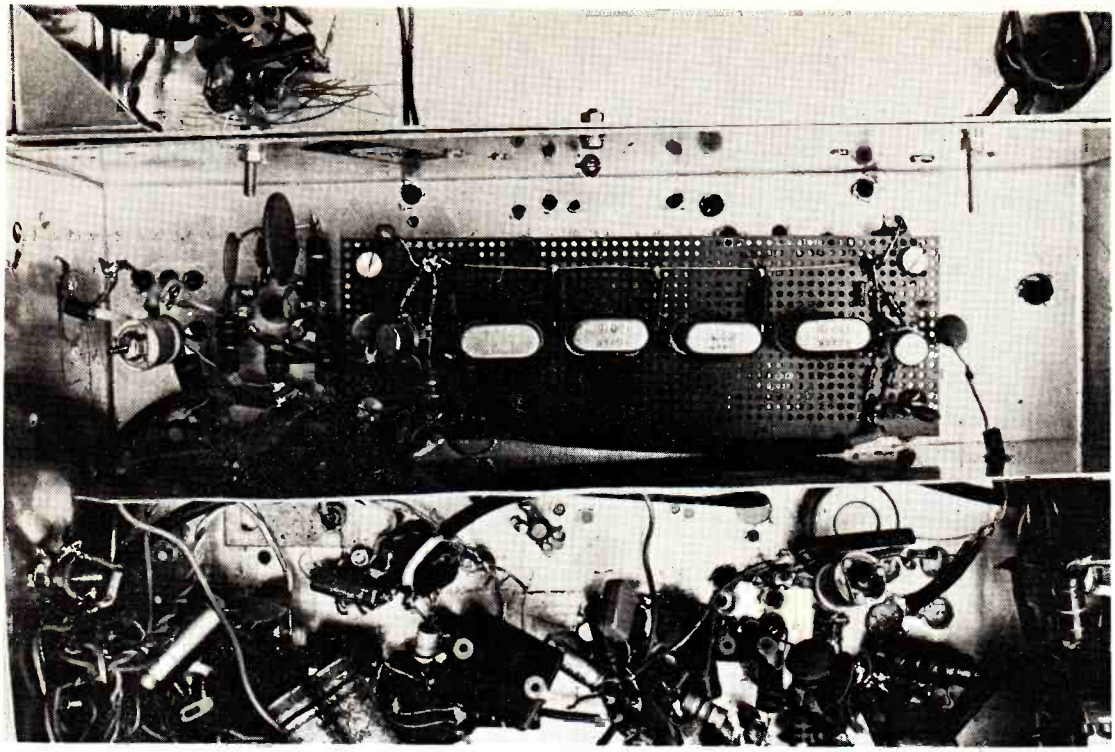
The conversion oscillator is another EF80. This will give sufficient injection into the mixer with 6, 9, or 18 MHz crystals. As shown, a number of crystals can be switched to give several crystal-controlled frequencies in the 28 MHz band. It is suggested that the Tx be built

Tables of Values

Fig. 1a

R1 = 10K
R2 = 820R
R3 = 2K7
R4 = 330R
R5, R6 = 1K8
R7 = 1K

C1 to C6 = 1000 pF, 1000v. DC, disc ceramic
C7, C11 = 8·2 pF silver mica, 1%
C8, C10 = 30 pF silver mica, 1%
C9 = 56 pF silver mica, 1%
TR1, TR2 = BF259
X1 to X4 = 10·075 MHz



Layout of ladder filter and filter amplifier. The carrier balancing pot and trimmer can also be seen to the left of, and just above, the filter.

the antenna change-over relay shorts this out on 'transmit'; CW operation is arrived at by keying a tone oscillator. Not the best way of doing things, perhaps, but this method does ensure a chirp-free T9 note. Note that the heaters are wired as a balanced system with both lines floating above earth (Fig. 4). If one side of the heater supply is earthed serious hum problems can arise, owing to the heater earth return to the power supply being common to the HT earth return lead.

Construction

The author's Tx was built using two 10in. by 7in. chassis bolted together, with a 14in. by 8in. front panel. (Specific mechanical details are not given as most constructors will have their own ideas anyway). All wiring is point-to-point with screened cable being used for all audio and RF connections; keep all wiring carrying RF as short and direct as possible. All earth leads on decoupling capacitors go to the nearest earth tag. Reference to the photographs will give an idea of the general construction (disregard the surplus holes that appear in the chassis which houses the SSB generator: this particular chassis has been with the author many years, and has housed amongst other things, a 160m. Tx, a 2m. Tx, and various power supplies).

One thing that has never bothered the writer, rightly or wrongly, is the appearance of home-brew equipment. As long as the gear is safe, and effective on the air, appearance really does not matter. A lot of people will disagree with this, of course, and will take pains to ensure their gear looks like commercial equipment. The author can only envy them their patience!

Getting back to the Tx, it should be noted that the filter layout is particularly important. Originally the filter was built on a copper circuit board, but it was found that stray capacitance ruined the performance of the filter. When it was rebuilt on plain *Veroboard*, the excellent results previously referred to were obtained. Try and keep to the lay-out shown with the crystals in line rather than side by side; note also the complete lack of wiring around the filter. Use screened, well decoupled supply lines for the filter matching transistors. When wiring the PA use short, direct earthing straps for all cathode connections; take pins 2, 4, 6 and 8 to earth separately. In the PA anode compartment, the anode RF choke, together with the anode HT supply decoupling capacitor, are both mounted near the top cap of the 6146B. The author is convinced that great care in the wiring around the PA stage, together with thoughtful layout, can sometimes do away with the need for neutralising. It must be admitted, however, that this depends a great deal on the type of valve employed, as in the writer's other HF rig a pair of 5B254M's are used, and he has yet to find a method of getting these valves unconditionally stable on 28 MHz, even with neutralising.

Setting-up

Having ascertained that all voltages appear normal on the rig terminate the output of the PA with a 50 to 75

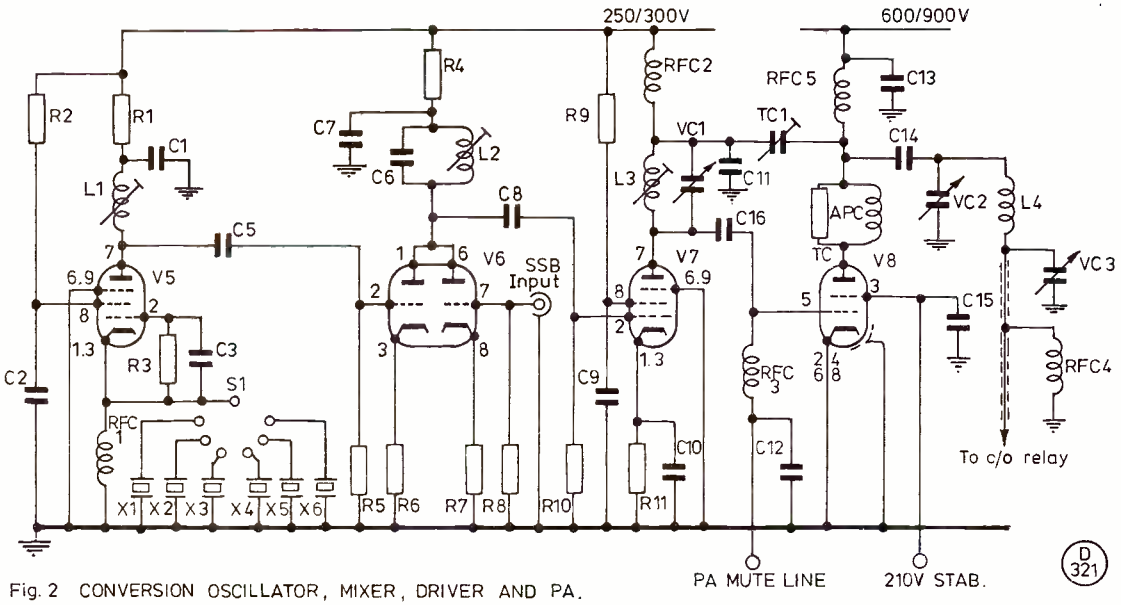


Fig. 2 CONVERSION OSCILLATOR, MIXER, DRIVER AND PA.

Table of Values

Fig. 2

R1, R9	= 4K7	C6	= 30 pF silver mica
R2	= 47K	C8	= 150 pF silver mica
R3, R5,		C11	= 250 pF silver mica
R8	= 100K	C13, C14	= 1000 pF, 2500v. DC working
R4	= 10K	T1	= 20 pF air-spaced variable
R6, R7	= 1K2	VC1	= 25 pF air-spaced variable
R10	= 22K	VC2	= 50 pF a/s variable (pref. double-spaced)
R11	= 220R	VC3	= 250 pF a/s variable (RX type)
V5, V7	= EF80		
V6	= 12AU7	RFC1 to RFC4	= 2·5 mH chokes
V8	= 6146B	RFC5	= 112 turns, 30 s.w.g., on ⅛in. dia. Paxolin former
X1 to X6	= 6, 9 or 18 MHz xtals		
S1	= 1-pole, 6-way		
C1, C2, C7, C9, C10, C12,			
C15	= 1000 pF		
C3	= 25 pF silver mica		
C4	= 220 pF silver mica		
C5	= 50 pF silver mica		

Note: All capacitors 1000v. DC working, disc ceramics, unless otherwise stated.

Coil Data

L1 = 15 turns, 20 s.w.g., on 0·375in. former with dust core
L2 = 8 turns, 20 s.w.g., on 0·375in. former with dust core
L3 = 9 turns, 20 s.w.g., on 0·375in. former with dust core
L4 = 6½ turns 16 s.w.g., 1⅛in. long, 1in. dia., air-spaced

ohm load capable of dissipating 30 watts or so; this should be connected *via* an SWR bridge. Then adjust the carrier null potentiometer to one side of its travel, *i.e.* minimum carrier suppression. Set the PA bias potentiometer so that the PA is totally cut off, then check that both oscillators are working by tuning to their respective frequencies on a general coverage receiver; these should be clearly heard as S9 carriers with very little coupling into the Rx. Peak both oscillators for maximum signal on the Rx 'S' meter, making sure that reliable starting is maintained.

Next tune to the wanted mixer output and make sure that the mixer anode circuit resonates: there should be an unmistakeable peak on the Rx 'S' meter as the core of the mixer anode coil passes through resonance. Now resonate the driver anode circuit by meshing the PA grid tuning capacitor.

By now the signal should be such that the RF gain control on the Rx has to be backed off to avoid overloading. Slowly turn the PA bias potentiometer so that the PA current meter shows a slight rise in PA current to, say, 20mA. Mesh the PA tune and load capacitors and note that a little RF output appears on the SWR bridge (the bridge should be set at near maximum sensitivity for this, of course). With the PA still drawing around 20mA, adjust the neutralising capacitor so that maximum output on the SWR bridge coincides with the middle of dip on the PA current meter. Having accomplished this, adjust the carrier balancing potentiometer for minimum output: the PA anode current should immediately fall to zero. Adjust the PA bias potentiometer so that the PA standing current rises to 25mA; unbalance the carrier potentiometer once more and check that PA current rises to around 110mA. Peak the PA tune and

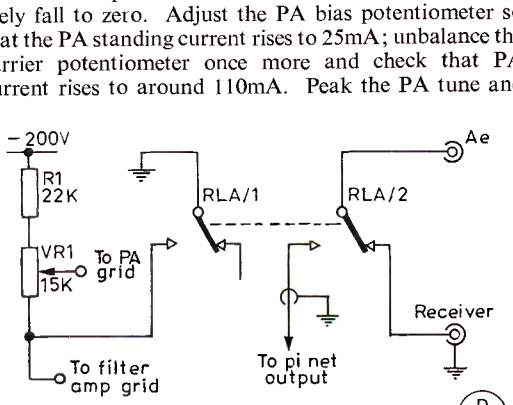


Fig.2a AERIAL CHANGEOVER AND MUTING

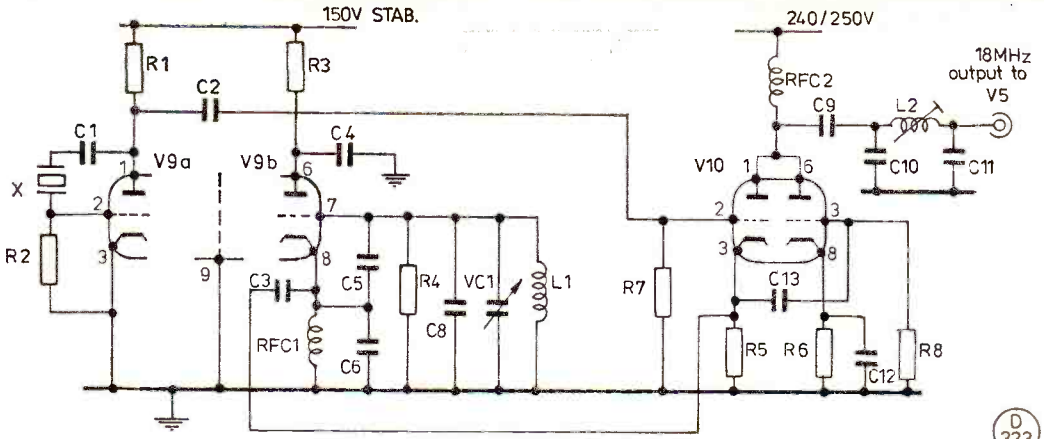


Fig. 3 PRE-MIXED VFO

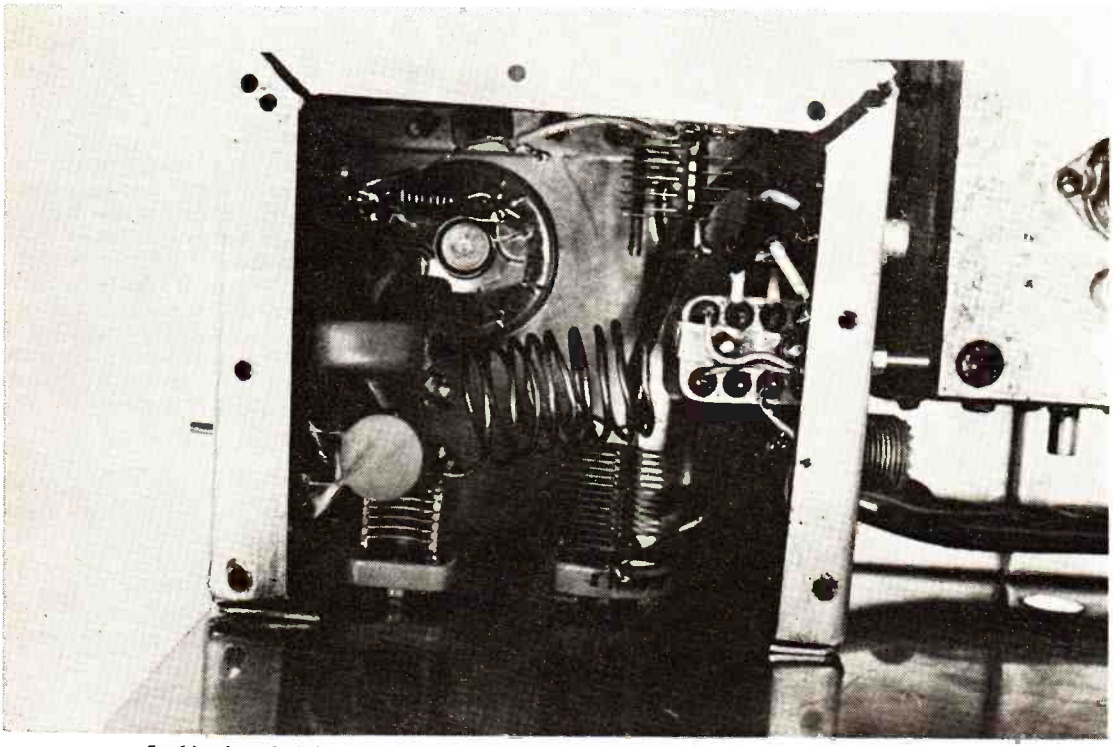
Table of Values, Fig. 3

R1, R3 = 15K
R2 = 47K
R4, R7, R8 = 100K
R5, R6 = 220R
C1, C4, C9, C12 = 1000 pF
C2 = 10 pF silver mica
C3 = 25 pF c/m
C5 = 680 pF s/m
C6 = 1000 pF c/m
C7, C8 = 100 pF s/m
C10 = 15 pF s/m
C11 = 50 pF s/m
RFC1, RFC2 = 2·5 mH chokes
VC1 = 50 pF air-spaced variable
V9, V10 = ECC88

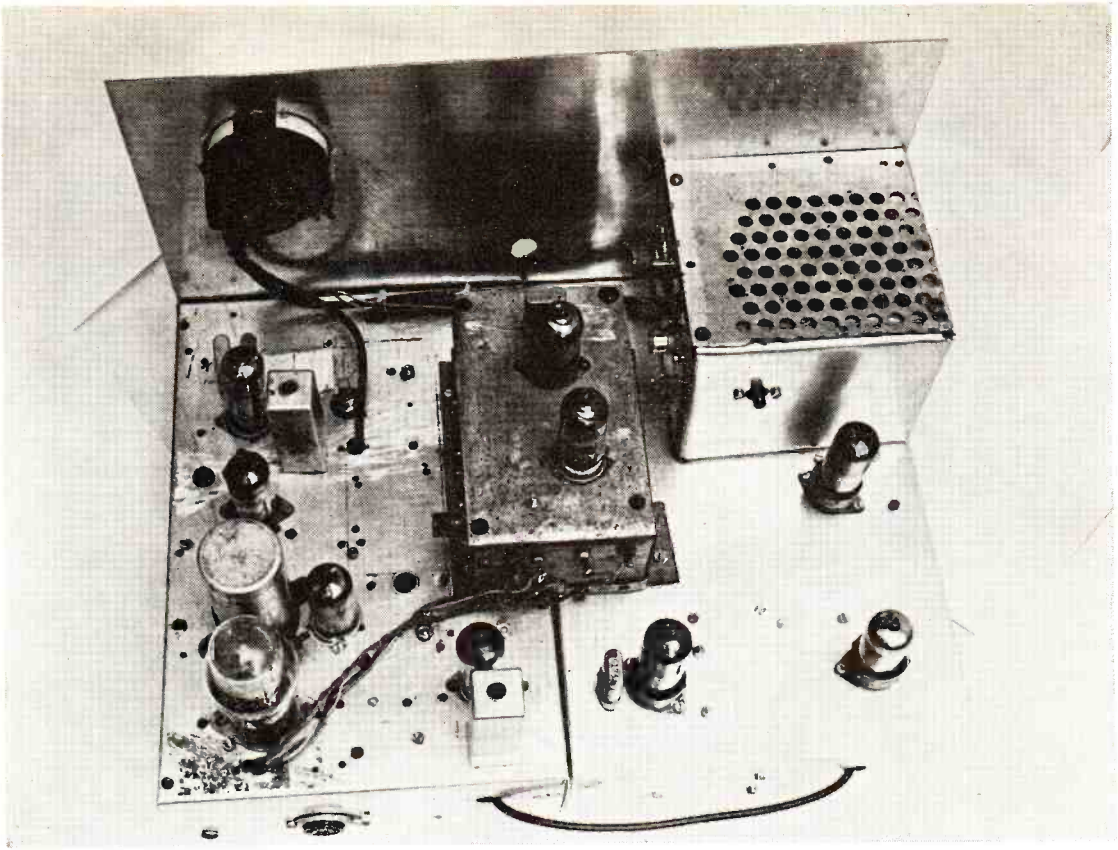
Note: All capacitors are 1000v. DC working, disc ceramic, unless otherwise stated.

Coil Data

L1 = 24 turns, 26 s.w.g., on 0·375in. former
L2 = 8 turns, 26 s.w.g., on 0·375in. former with dust core



Looking into the PA compartment; placement of the various components can be clearly seen.



Back view of the transmitter. *See* **in relation to Fig. 6.**

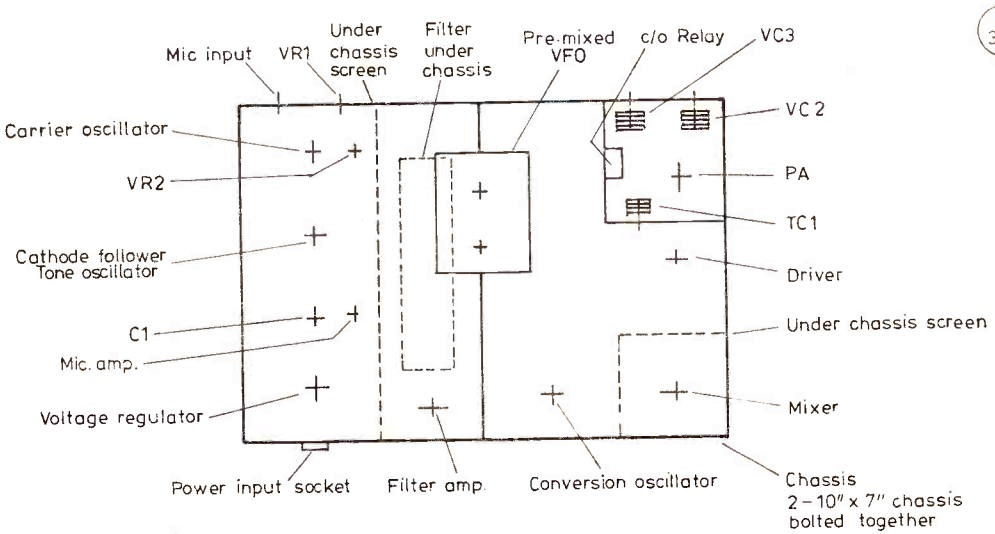
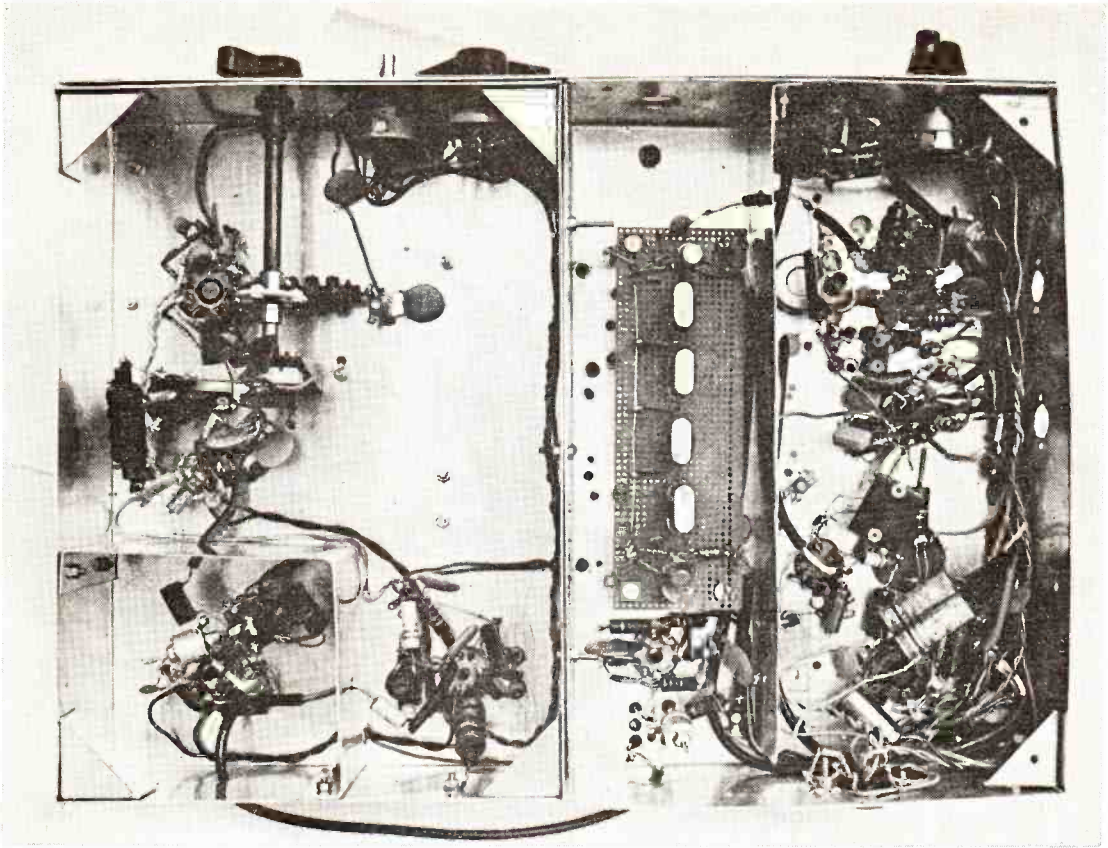


Fig. 6 LAYOUT OF MAJOR PARTS



General view of the underside of the GW4BCD transmitter.

load capacitors for maximum RF output, and adjust the carrier balancing potentiometer so that PA current falls to around 60mA and re-check the neutralising. (In the author's case no resetting of the neutralising capacitor was needed).

Using a 700 volt HT line, the PA should be putting about 30 watts into the dummy load; with the carrier fully suppressed it should be possible to mesh both PA tune and load capacitors and get no indication whatever on the SWR bridge, indicating a stable PA. Adjust the carrier null potentiometer and associated trimmer for maximum carrier suppression. The simplest way to do this is to set the SWR bridge for maximum sensitivity with the PA properly tuned for maximum RF output. (In the prototype it is possible to adjust the trimmer and potentiometer so that no indication of RF output can be seen with the bridge at maximum sensitivity). If it is found that a reasonable level of carrier suppression cannot be attained, simply transfer the trimmer to the other side of the potentiometer; this should correct matters.

Now plug in a microphone and make sure that the signal sounds clean and free from distortion. Adjust

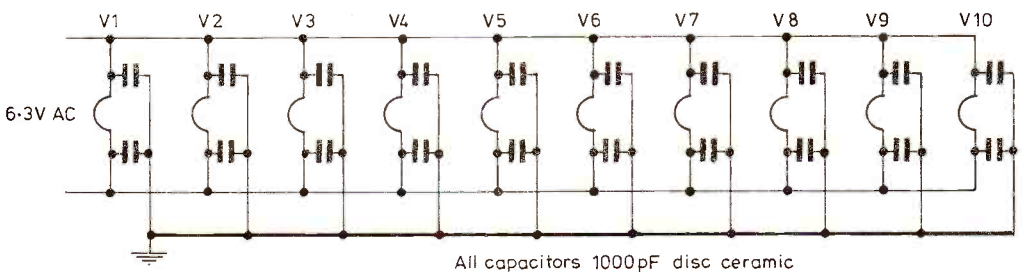


Fig. 4 HEATER WIRING

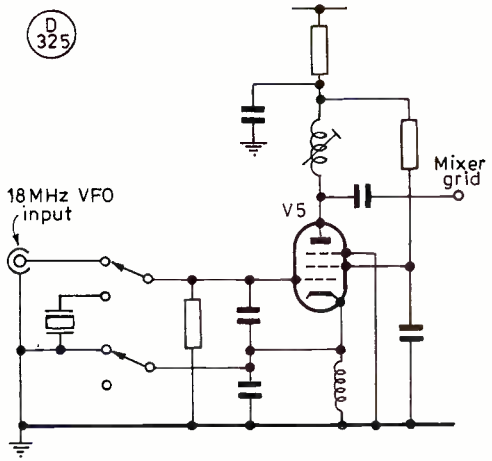


Fig. 5 One method of switching the EF80 conversion oscillator to buffer mode

the carrier oscillator trimmer for most natural speech. When speaking into the microphone the PA current meter should peak around 80mA, rising to about 110mA on a loud whistle. This will of course depend to a large extent on the operator's voice, and the time constant of the meter in use. Do *please* be careful not to overdrive the PA as there is an abundance of both audio and RF drive available in this design, and as no ALC is fitted the onus of radiating a clean signal is well and truly on the operator.

Conclusion

The Tx has had considerable use at this QTH and reports have been most favourable. SSB speech quality is excellent and S9 reports have been received from many countries, with the Tx feeding a ground-plane antenna.

Thanks are due to F6BQP for his most excellent article on which the calculations for the design of the filter were based. It can truly be said that a single-side-band transmitter using one of these filters can be set up using no more than a multimeter, a general coverage receiver, and a SWR bridge. It also proves that one need not spend hundreds of pounds to work SSB DX on one's favourite band! Finally, thanks are due to GW4BCF for his help in constructing the filter, and GW8RJJ who took the photographs.

Reference
"Crystal ladder filters" by J. Pochet, F6BQP, *Wireless World*, July 1977.

• • • SWL • • •

SHORT WAVE LISTENER FEATURE

By Justin Cooper

SINCE your scribe is sitting here waiting for mail, posted from the Office in plenty of time, which has just not turned up, we will have to make at least a start on the piece without mail, and when it eventually turns up (if it arrives in the next post it'll have been all but a week, first class!) there will be a just a few mentions and an up-date of the HPX Tables.

The Editor has a specimen of the Datong Morse Generator in his shack, and has been trying it out on lots of people as a part of the proposed review. Since Morse is a part of the licence for a "proper" ticket to cover all bands, and since most SWLs aim at a Class A (even if the aim is lowered in the final event!) a few words on the business of learning Morse are relevant to this piece. Let's first of all discuss whether the B licence is a lower grade. Yes of course it is, if only for the reason that it doesn't give privileges on all bands although it costs the same and calls up the same technical requirement. Should Morse be deleted from the A ticket? It can't be, if we are to obey the rule of international law; if that law is changed at WARC, then we have a new ball-game entirely. So . . . to talk to VKs you have to learn a second language, Morse. Now, it's a darned sight easier to learn the Morse language than it is to learn to speak from scratch, and yet all you readers have done the latter without even noticing! Not only that, but you did it at about the age of two! The only difference is that by the time we come to Morse, (or to a second language at school, come to think of it) we have full command of our pens-and-paper, and we can talk after a fashion to each other, the fashion depending largely on where we live. Since English is our native tongue, and Morse on our bands is based on English, we have a head start on anyone who has a natural language other than English; they have to gain a working—if far from complete—knowledge of English before they can work other, also non-English-speaking, stations on SSB or CW!

Now, the first step is to realise that what one has to learn first is an alphabet, the numbers, and a few odd symbols like the / and the "long break" which covers all punctuation on the ham bands for most people, or the procedural signals. These can all be memorised *before* one starts to learn in earnest. Next, one needs to have them sent, as individual letters, at a speed of at least twelves, but with a long gap between letters, so that there is an immediate grasp of the *rhythm* of each letter. It is essential to get this rhythm at the earliest moment possible; if you lash out on a Datong Morse Generator (and if you are a loner you should), then you can get the letters sent perfectly at whatever speed you like, and space the letters as far apart in time as you like within the range of the control. This means that you can have a letter at,

say, 20 wpm speed, followed by a long enough gap to run up the list until you find the letter to match the sound; and in the early stages all you will do is to decrease the gap between letters. Make no mistake, rhythm is everything.

Secondly, don't learn Morse by "opposites" or other such groupings, and don't write what you get down in capital letters; the former will plague you for the rest of your life and the latter will hold you back when you get to a speed at which you just cannot form capitals as quickly as you can form writing on the pad. We know a poor chap who has both these problems, and we despair of ever getting him through the test.

Thirdly, do remember that you are learning a language; most of us can't spell for toffee, so if you are to get it right at the test you must, *right from the beginning*, learn to leave a gap if you don't recall a letter by the time the next one is sent. There are two reasons for this: firstly, that you can fill in the missing letter from the rest of the context, which is invaluable in the test, and secondly because the hanging around trying to think of one letter while more flow unheeded through the headphones is a guaranteed way of losing the drift of the whole thing, and failing the test.

Fourthly, remember that what you are trying to do involves concentration on the matter in hand. The learning of the early stages is a downright bore and so it is hard to concentrate. This means that while you use the tapes or records or whatever available to you, you should also spend time on the bands, because if you have an interest in what you are trying to copy then your concentration improves wonderfully. To make a start on the HPX Ladder on CW soon gets you trying to copy through the QRM after that rare DX signal, and speeds your learning no end.

Soon you will find yourself recognising complete groups of letters (key words) and it is then easy to fall into the trap of letting it flow into the mind just like speech, so that you don't write it down. You *must* write it down in the learning phase, and it's no bad thing to write it down fairly frequently even when you are a dab at Morse. Again the analogy with speech; if pressed to recall a conversation word-for-word a moment after it occurred, we would all be able to recall the drift of it but very few could recall it word-perfect. This is where a random letter sequence (five-letter groups, not words) is so handy, in that it means you have to write it down. If you can copy that, you'll copy plain language easily.

Technical

Aerials: the most important part of the station, and the part most neglected. Both true statements! Perhaps we should make a few ground-rules for the newcomer.

Try and avoid the use of an end-fed wire against an earth; but if you must use this configuration then look to the quality of your earthing, make an ATU, and add counterpoises for the favoured bands if this is at all possible—we have "lost" a counterpoise under the shack carpet before now! Buy or borrow a good book on aerials and their fundamentals, and get a grasp of the basics. Then you can turn to the more complex stuff, and look at your site, and use it to the best advantage. A look at a Great Circle map, and another at the polar diagram of your proposed aerial will soon tell you if you are likely to be putting the major lobes into areas of interest rather than vast wastes of unoccupied ocean. It can be mortifying to find that all you can hear are /MMs!

And, we hear you murmur, what in blazes is a 'polar diagram'? Good question. Let us put a dipole in free space, and plot the signal strength in all directions and three dimensions; and let us make a three-dimensional model using our figures as the dimensions. We would find ourselves looking at an object like a doughnut, with the dipole poking through the hole. If we make the dipole horizontal and take a section horizontally through the

HPX RULES

(1) The object is to hear and log as many *prefixes* as possible; a prefix can only count once for any list, whatever band it is heard on.
(2) The /M and /MM suffixes create a new series; thus G3SWM, G3SWM/M and G3SWM/MM all count as prefixes, and where it is known to be legal, /AM also.
(3) Where a suffix determines a *location* the suffix shall be the deciding factor, thus W1ZZZ/W4 counts as W4. Where the suffix has no number attached, *e.g.* VE1AED/P/SU, VE2UJ/P/SU, they are arbitrarily counted as SU1 and SU2 respectively, and the same holds good for similar callsigns.
(4) When the prefix is changed both the old and the new may be counted; thus VQ4 and 5Z4 both count.
(5) The object is to hear *prefixes* not countries, thus there is no discrimination between say MP4B and MP4K which count as one prefix.
(6) Only calls issued for Amateur Radio operation may be included. Undercover and pirate callsigns will not be credited, nor may any MARS stations be claimed.
(7) G2, G3, G4, etc., all count separately, as do GW2, GW3, GW4, etc., and in the same way K2, W2, WA2, WB2, WC2, WN2, all count separately, even though they may be in the same street.
(8) Send your HPX list, in alphabetical and numerical order showing the total claimed score. With subsequent lists, it is sufficient to quote the last claimed score, the new list of prefixes, and the new total. Give your name and address on each sheet, and send to "SWL," SHORT WAVE MAGAZINE, 34 High Street, Welwyn, Herts., AL6 9EQ, if possible to arrive before the SWL deadline for that particular month.
(9) Failure to report for two consecutive listings, *i.e.* four months, will result in deletion from the Table, although there is no objection to a "Nil" report to hold your place.
(10) Starting score 200. Phone Table is mixed AM/SSB, with a separate CW Table. No mixed Phone/CW Table, nor will AM-only or SSB-only entries be accepted.
(11) Lists will be based on those shown in the current "Radio Amateur Prefix-Country-Zone List," published by Geoff .Watts (*see* Advertiser's Index in any recent issue of SHORT WAVE MAGAZINE).

doughnut we end up with the polar diagram, which will be a figure-of-eight in essence. If we turn the dipole to the vertical, then a horizontal section taken as before through the centre of the aerial would give us a circle as the polar diagram. A beam aerial will give us a free-space polar diagram with, in 3-D, the appearance of a wartime barrage-balloon, and as a horizontal section of large main lobe and several minor ones. The convention is to take a horizontal section, but there is no reason why one cannot draw a section through the 3-D in another direction and see what it looks like, provided only that the chosen plane goes through the centre of the feedpoint (or, if they differ, the electrical centre of the array). But of course a free-space polar diagram is a theoretical thing at best, the practical result being the result of the theoretical polar diagram interacting with the aerial's surroundings, all in 3-D. Also, of course the surroundings may alter the feed impedance markedly, so that on certain headings a Yagi or a Quad, or other rotating array, may need retuning at ATU or transmitter if the output power is to remain at the desired level.

If one cannot run to any form of directional array (that means most of us!) then we must consider how our aerial wire will run because, as we have seen, the dipole receives and radiates at right-angles to the wire if the latter is horizontal. We can also be aware of the fact that a horizontal dipole at a quarter-wave high will be soaking up most the the high-angle signals to the detriment of the DX; the half-wave or multiples thereof are to be sought after is one is after DX. Probably the best compromise is the roof-mounted vertical with its radials draped over the roof. The same aerial that up there wants three quarter-wave radials for good operation will need up to 120 half-wave ones when it is mounted at ground level. The snag with the vertical is the fact that most man-made interference is vertically polarised, and that rain static affects the vertical far more than the horizontal. The formula for finding the length of the quarter of half-wave is:

L=468/f(MHz) for the half-wave, and

L=234/f(MHz) for the quarter-wave, where L is in feet and fractions of a foot.

Returning to the subject of reading-matter on aerials, you could do no better than to thoroughly digest our current multi-part article "Antennas—The Weak Link", by A. P. Ashton, G3XAP.

The Mail

Still not to hand, although we have a few early birds in the in-tray. One of these is *P. J. Hussey*, who lives at 18 Bredon Grove, Poolbrook, *Malvern*, Worcs., and is available by telephone on Malvern 4968. Reader Hussey is looking for a loan or purchase of a handbook for a Trio 9R59 (he doesn't say whether he has the plain number, the DE or the DS models). We suggest that if anyone can help, the easiest way would be for copies to be made; most public libraries have a copier available. But, in view of the doubt about the one required, a call or letter first would be a good thing.

P. Ford (*Longlevens*) wants to know the polite term for the characters who take lists for DX stations, or otherwise act as relays. Nuisances! The trouble is that some DX stations like them around. On a different tack, reader Ford is wondering whether his aerial is too directional; to judge by his list and the details he supplies, we think he had best leave well alone, at least until he has become used to his new FR-101D, and taken it through at least one autumnal peak. Firing in general *E-W* is about the optimum for a horizontal.

D. Basson (*Earley*) wants to know about an OHZOS—either OH30S mis-heard or a Phoney Phred again!

F. Wood (*Felixstowe*) is an old hand, since leaving the Merchant Navy back in 1946 as an R/O; and he says he thinks it is a bit daft—and certainly un-enforceable—to bar listening to the "utilities". These include such as the 500 KHz distress channel. The writer feels that so long as one does not disclose anything one hears, save to a police station should a distress call be noted going apparently unheard, then there can be no harm done. After all, the RYA yachting courses all mention coast stations as possible sources of weather reports, and *Reed's Nautical Almanac* makes reference to coast stations in the same context, and of course distress calls. Frank also wants to know the HPX Rules, which are reprinted in the piece this time.

We can't miss the next one—*Judith and Dave Brooks* of *Loughborough* are now respectively G4IAR and G4IAQ, for which our congratulations. They are to be

HPX LADDER

(All-Time Post War)

SWL	PREFIXES
PHONE ONLY	
K. Kyezor (Brandon)	2087
B. Hughes (Worcester)	1770
S. Foster (Metheringham)	1735
R. Shilvock (Kingswinford)	1650
J. Fitzgerald (Gt. Missenden)	1610
E. W. Robinson (Bury St. Edmunds)	1491
M. J. Quintin (Wotton-u-Edge)	1416
M. C. P. Bennett (Datchet)	1385
H. A. Londesborough (Swanland)	1381
J. H. Sparkes (Trowbridge)	1164
H. M. Graham (Harefield)	1145
M. Rodgers (Harwood)	1063
D. Taylor (Harborne)	942
P. L. Shakespeare (Foulness)	927
M. Law (Chesterfield)	918
J. Nicol (S. Croxton)	916
K. A. Burch (Plymouth)	911
M. Shaw (Huddersfield)	881
M. Ribton (Oxted)	866
K. Linge (Willington)	861
D. Brooks (Loughborough)	837
R. Towlson (Nottingham)	764
A. Twelves (Rhos-on-Sea)	751
D. Hill (Crawley)	707
K. Kniveton (Kingswinford)	706
L. Stockwell (Grays)	670
P. Leather (Camberley)	669
G. Brazil (Dublin)	635
R. Jacobs (Margate)	617
D. G. Sim (Southampton)	599
D. C. Casson (Reading)	591
J. Doughty (Birmingham 44)	551
T. Anderson (Stroud)	549
B. Shepherd (Staines)	549
R. C. Mackay (New Romney)	516
Mrs. J. Brooks (Loughborough)	500
CW ONLY	
H. A. Londesborough (Swanland)	1164
D. W. Waddell (Herne Bay)	963
H. Scott (Wetherby)	674
P. L. Shakespeare (Foulness)	671
K. Kniveton (Kingswinford)	310
D. L. Hill (Crawley)	298

Minimum score for an entry is 500 for Phone, 200 for CW. Listings only include recent claims, and to be in accordance with HPX Rules. A "Nil" return is permissible in order to hold a place.

ANNUAL HPX LADDER

Starting Date, January 1, 1979

SWL	PREFIXES
D. W. Waddell (Herne Bay)	499
S. B. Harris (Coventry)	449
G. F. Green (Middlesbrough)	374
P. Ford (Longlevens)	332
C. Stevens (Spondon)	253
M. Pilsbury (Leyton)	241
R. Miller (Chelmsford)	209

200 Prefixes must be heard before an entry can be made, all since January 1, 1979. See also HPX Rules.

heard on Eighty and Forty and would be pleased to receive reports.

J. Nicol (*South Croxton*) is a bit uptight, and we feel rightly so. Seems his daughter Sheena is G4HYL, and has had her knuckles rapped by the local monitoring station for using the phonetics "Happy Young Lady". We don't know which the monitoring station is, but we do know there is nothing whatever that contravenes the rules in that. There is a recommendation that a certain phonetic alphabet be used in the Appendix, and a regulation that no offensive phonetics be used; neither applies. We hope Jim and Sheena press for an apology from the officer who wrote the letter.

A. Twelves (*Rhos-on-Sea*) missed out on our combination Jan/Feb issue, which we can't do anything about as it was a sell-out. Has anyone got a spare copy? Alan's address is 'Obertal', 21 Bodnant Road, Rhos-on-Sea, Colwyn Bay, Clwyd, LL28 4SU.

The Rest

As we predicted in our first paragraph, so it turned out! A very quick run through these: *J. Waters* (*Derby*) didn't get any useful reply to his query last time on the Datong Active Aerial. A little bird tells the writer that a review of this might well be coming along in the next few months.

J. Timms (*Barking*) has his doubts as to an EE3ITU he heard, but we think this is quite possibly genuine. On the same tack Briant Shepherd had his doubts about H44JD, but G8MY put him right on it—a friendly lot in Staines, clearly!

M. Ribton (*Oxted*) has a couple of letters in the pile, and his second one enquires about a "thing" that he hears on occasion swishing the 21/28 MHz bands—he describes them as "burbling signals which swim up and down". He is compiling as much data as he can on it and how it reacts when it meets a QSO—react it does for sure. We don't know what this is, unless it is a description of the Poltava Thing.

Others

Thanks for other letters from: *K. Linge* (*Willington*); *H. Londesborough* (*Swanland*); *M. Rodgers* (*Harwood*); *S. B. Harris* (*Coventry*); *J. Doughty* (*Great Barr*); *E. W. Robinson* (*Bury St. Edmunds*); *A. E. Moffatt* (*London N.4*); *H. M. Graham* (*Harefield*); *M. Shaw* (*Huddersfield*); *M. Pilsbury* (*London E10*); *M. Law* (*Chesterfield*); *G. F. Green* (*Middlesbrough*); *K. Kyezor* (*Brandon*); and *S. Foster* (*Metheringham*).

Deadline for the September issue is August 2nd. Meantime, keep smiling, and we'll be seeing you.

Send your letters and Table entries, please, to "SWL", SHORT WAVE MAGAZINE, 34 High Street, Welwyn, Herts. AL6 9EQ.

REDUCING TV TIMEBASE INTERFERENCE

RON BARKER

MOST licensed amateurs and SWL's have to tolerate interference on the HF bands emanating from the line output stages of colour TV receivers. The interference results from harmonics of the 15,625 Hz sawtooth waveform energy applied to the scanning coils around the neck of the TV tube. Some idea of the power required to energise these coils can be gained from a study of the specifications of valves used for the purpose: for example the Mullard PL505 which is rated at 7·5 kV. peak anode volts, 1·4A peak anode current and 32 watts anode plus grid dissipation. These are the sort of characteristics normally associated with high power transmitting valves and indeed valves designed for TV line output work are successfully used in some popular HF amateur band transceivers. It is, therefore, only to be expected that this powerful source of sawtooth energy should produce a rich abundance of harmonics. What is surprising to the writer (who admits to a rather limited knowledge of TV) is that in the few sets he has had the misfortune to examine, there appears to have been no consideration given to the containment of these harmonics which can be readily detected up to 31 MHz—the highest frequency his station is equipped to receive. If TV receiver designers *do* take steps to limit spurious harmonic radiation, then all that can be said is that in most cases their efforts are unsuccessful! Although these harmonics are generally too weak to be a serious problem on 10 metres, they can be devastating on all bands from 15 to 160 metres; they occur at intervals of 15·625 kHz and carry a characteristic rasping modulation.

At the writer's QTH where the main interest is in 10, 15 and 20 metres, indoor dipoles aligned due East-West are used for each band. The dipoles are close spaced just under the ridge of the rather low pitched roof at a height of about 25 feet and share a common coaxial feeder. The nearest TV receivers, other than the writer's own set, are off the ends of the dipoles at a distance of about 30 feet and the nearest sets in a direction broadside to the dipoles are at a distance of about 90 feet. With this antenna system the strength of the harmonics from these neighbouring TV receivers on 15 and 20 metres is only about 2 μV (*See* appendix), a level which is generally tolerable unless the bands are very quiet. Experiments with other antenna systems, which have included either vertical or North-South components in the elements, have shown that the harmonics from neighbouring TV receivers can be stronger by 20dB-plus and were all discarded for this reason. Anyone with a problem from a neighbouring TV receiver may be able to obtain a useful degree of improvement merely by reorientation of the antenna.

Having got a situation where the interference from neighbouring TV receivers was tolerable, there remained the problem of the writer's own set. The harmonics from this were about 20 μV. on 20 metres (slightly less on 15 metres), which was not really surprising since there is a

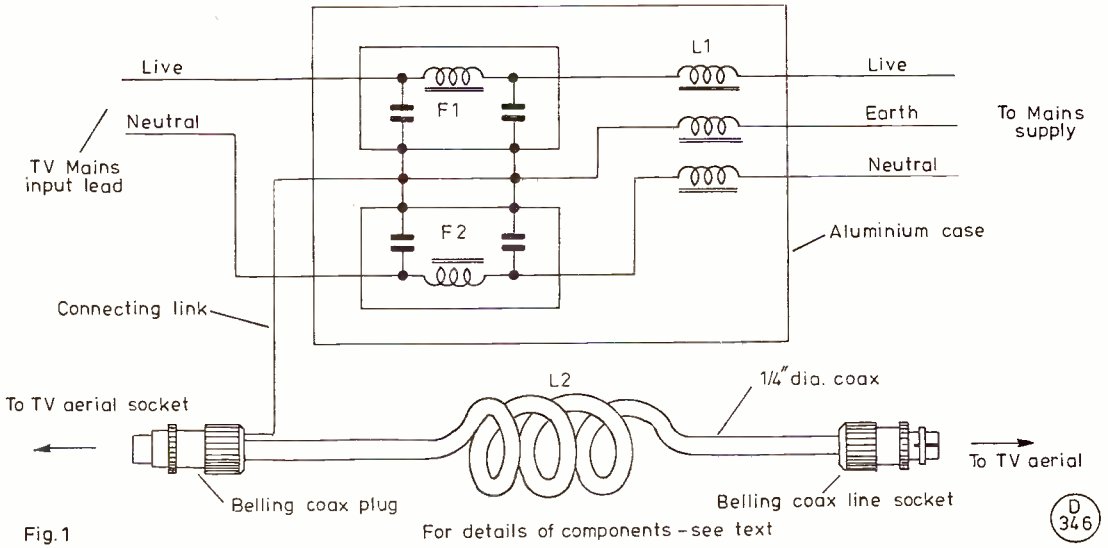


Fig. 1 For details of components – see text

horizontal run of coax feeder to the TV antenna only about 5 feet below the dipoles; furthermore there is a whole network of mains wiring separated by the same 5-foot gap. This level of interference made both 15 and 20 metres virtually unusable for DX listening with the TV in use. Some of the most interesting listening on 20 metres is the long path opening to VK, ZL and the Pacific in the morning and it is unfortunate that on Saturdays this overlaps the BBC's "Swap Shop" programme by about two hours. Any readers with school age children will appreciate the problem only too well! The only satisfactory answer was to reduce the harmonic output of the TV to an acceptable level and a target was set of reducing the interference to not more than that picked up from neighbouring TV receivers—which meant that on 20 metres the harmonics had to be 2 μV. or less at the receiver input terminal.

A Harmonic Suppression Unit

Before attempting to reduce the output of harmonic energy from a TV receiver it is necessary to consider how this harmonic energy is transferred from the TV to HF receiving antenna. There are three possible escape routes. Firstly, the line output circuit wiring could be radiating the harmonics directly. Secondly, there could be sufficient stray coupling between the TV antenna coaxial cable and the scanning circuitry for the braiding of this cable to be acting as a transmitting antenna for the harmonics. Thirdly, there could be similar coupling between the mains lead and the scanning circuits for the mains to be acting as a transmitting antenna for the harmonics. In most cases it would be expected that all three of the above mechanisms would be contributing to the total harmonic energy radiated, and it would also be expected that the proportion of the total radiation from each source would vary from one model of TV receiver to another.

Taking first direct radiation from the scanning circuitry: if this were a significant source of the radiated energy, it would present an almost insurmountable problem because in order to eliminate the direct radiation it would be necessary to provide effective screening for the scanning circuitry—which would almost certainly require the plastic or wooden cabinet of the TV receiver to be lined with metal screening. The writer would not be prepared to consider such a project. In the other two cases where the TV antenna or the mains are acting as transmitting antennas for the harmonics, it should be possible, in theory, to use filters in both to block the harmonic radiation. The author's original attempts at this sort of filtering made only a marginal difference to the strength of the harmonics and could in no way be considered successful; after a considerable amount of experimentation the set-up shown in Fig. 1 was devised and has proved extremely effective on the writer's GEC C2111 22in. colour receiver.

F1 and F2 are ready-made RF filters which are advertised in *Short Wave Magazine* by *G.W.M. Radio Ltd.*, 40-42 Portland Road, Worthing, Sussex, at £1·25 each or 5 for £4·00 inclusive of postage and packing; these are oil filled sealed units rated 2·5A at 250v. AC and are ideal for this application. With the availability of these filters there would seem to be no point in making them up from discrete components, but for anyone preferring to do so suitable values for the capacitors would be 0·01 μF, 1000v. DC working, and suitable values for the inductors would be 10mH, 1A rating.

L1 and L2 are toroidal inductors, each inductor requiring two Mullard FX1558 or equivalent cores. These are available from *TMP Electronic Supplies*, Britannia Stores, Leeswood, Mold, Clwyd, CH7 4SD, who also advertise in *S.W.M.*; the price for a set of 4 cores is £2·50 inclusive of postage and packing. To make L1, take two of the toroidal cores and join them together with *Sellotape*. then take the 3-core mains lead and wind a toroidal coil with as many turns as possible. With normal 3-cored plastic covered cable of suitable current rating it is possible to wind 15 turns, which should be

evenly spaced; F1, F2 and L1 can then be mounted in an aluminium box 5½in. x 3in. x 2½in., and the wires connected up. To make L2, similarly join two toroidal cores and using ¼in. diameter coax (which need not be of the low-loss type) wind a toroidal coil; again it should be possible to wind 15 turns evenly spaced. Leave a few inches of coax on both ends and connect a Belling plug to one end and a Belling line socket to the other. Use a few inches of braiding stripped from TV coax to make the link which connects the Belling plug to the mains filter case; trap one end of this braiding in the back of the Belling plug, ensuring good electrical contact with the outer of the coax, and secure the other end to the mains filter case—again taking care to obtain good electrical contact. This link is absolutely essential for effective harmonic suppression and must be as short as possible, which means that the mains filter unit has to be mounted close to the antenna socket of the TV receiver; this should present no problems. The 2-core mains lead between the filter box and the TV should also be no longer than is necessary.

It is *extremely important* to note that with this unit the function of the mains earth connection is to ensure that there is no 50 Hz AC voltage on the mains filter case and TV antenna. If the earth connection is not made, the TV antenna and mains filter case will take up a potential of 120v. AV relative to earth due to the susceptance (reactive conductance) of the capacitors in the filters. For safety reasons, therefore, the unit *must not* be used without the earth connection. The mains earth cannot be expected to provide effective earthing for RF, and it was thought that effective RF earthing of the mains filter to a good earth might provide additional harmonic suppression. At the writer's QTH the TV is positioned adjacent to a French window and it was possible to provide a good RF earth with a lead only 4 feet long, connecting the filter case to a spike pushed 3 feet deep into very wet earth. No difference was noted but it could be that in some cases a good RF earth would be advantageous.

One point of caution to any readers contemplating making tests to determine the source of harmonic radiation. If the TV antenna is disconnected from the set when it is receiving a signal, the line timebase will almost certainly change frequency slightly as it loses the sync. pulses and starts to run free at its natural frequency of oscillation. This change in the fundamental frequency obviously changes the frequency of the harmonics. If an HF band receiver is tuned to one of the harmonics and the TV antenna lead is removed it is almost certain that the harmonic will disappear from the HF receiver. Don't be misled into thinking that the disappearance of the harmonic resulted from the fact that the TV antenna was the sole source of the harmonic radiation. It may have been, but a much more likely explanation is that the harmonics have shifted in frequency. Before jumping to what could be a false conclusion, try returning the HF receiver; the chances are that the harmonic will be found on a different frequency, possibly at reduced strength.

Performance of the Harmonic Suppression Unit

The performance of this unit on the writer's TV receiver is such that the harmonics are now of insufficient strength to move the 'S' meter on the FRG-7 using the indoor dipoles. This is indicative of suppression in excess of 20 dB and the writer can now listen on the HF bands whilst the family watch TV. The toroidal inductor in the TV antenna lead produced no noticeable loss of strength of the Band 5 TV signal. It is possible that in some TV sets harmonics could be coupled into the antenna and mains leads beyond the toroidal inductors; if this is suspected there is no reason why a second pair of toroidal inductors should not be added several feet away from the TV receiver. One final point, any system which is effective in stopping HF energy getting *out* of a TV should also be effective in stopping HF energy getting *in*! Although it has not been tried, this suppression unit might be expected to be effective against TVI from an HF transmitter.

Appendix

The 'S' meter of the writer's receiver, a modified FRG-7, has been calibrated using a government surplus Type 106 Signal Generator of mid-1940's vintage, made by *Salford Electrical Instruments*. It is hoped to provide further details in an article on the FRG-7 in the near future.

" . . . the mike mounting here is unusual . . . "

CLUBS ROUNDUP

By "Club Secretary"

The Mail

Our first entry is from **Acton, Brentford & Chiswick,** who are at Chiswick Trades & Social Club, 66 High Road, Chiswick, on the third Tuesday each month.

Addiscombe are mainly a contest group; they gather informally in the Spread Eagle, Portland Road, S. Norwood, on Tuesday evenings from around 9.15.

AMSAT-UK are the British arm of the international group of amateurs who have organised and/or use, the *Oscar* satellites—not to mention the Russian ones.

A.R.M.S. One for the mobileer, whether at VHF or UHF, or Top Band for that matter. They even cater for the few of us who play mobile wireless on 14/21/28 MHz!

Next, **Ashford,** Kent; to find them on Tuesday evenings climb to the top of Hart Hill, near Charing.

Barking are most definitely not "up the creek!" They are a very live and active lot, with Hq at Westbury Recreation Centre, Westbury School, Ripple Road each Thursday, and we believe they also have Tuesdays for Morse tuition and practice. GB3TDS, over July 14/15, on HF and VHF, will be the club station at the Dagenham Town Show.

Now we come to the smart chaps, who hold /T licences (or watch the /T pictures as SWLs); they are members of **B.A.T.C.** which covers all activities in the amateur television line of country, be it B/W or colour, slow or fast scan. How anyone could ever get an ATV station on the air without being a member, heaven knows!

Now we turn to **B.A.R.T.G.**—the teleprinter chaps. Again, we have to say we wonder whether anyone could get going without membership. Of course you could go to the all-electronic teleprinter/display: but again you'd need to have membership to get to know about it unless you happened to be a professional in the field.

New Club

Not *absolutely* new but reporting for the first time. **Braintree & District** is the name, and they have a place at Braintree Community Centre, which is adjacent to the Bus Park in Victoria Road. The dates are the first and third Mondays, and they would like to rope in more of the local amateurs and SWLs. Details from the Hon. Sec., at the address in the Panel.

Back now to our regulars, and not far from Braintree we find **Bishops Stortford,** who have a place at the British Legion Club, Windhill, on the third Monday. We can add that while we don't know exactly what is going on, we are aware that the programme is all but complete for the rest of 1979.

Bournemouth are a very popular and active group, based on the Dolphin Hotel, Holdenhurst Road, Bournemouth, on the first and third Friday. You need to be there on time as we hear they are filling the room to bursting!

British Rail as a title explains itself; open to all those who are members of the BR organisation and are either licensed or SWL.

Bury are booked through on the second Monday of each month until the end of the year at Mosses Community Centre, Cecil Street; but they also have an informal get-together on the other Tuesdays, with a club transceiver available for those qualified to use it, and an up-to-date library as well.

At **Cheltenham** the *Newsletter* indicates that they have a place at the Old Bakery, Chester Walk, which is at the rear of the library in Clarence Street, which they fill on the first Thursday and the third Friday, the latter being the natter session and the first the one for which there is an organised programme.

We still don't have a note of the address of the Hon. Sec. of the **Chester** gang, but we do have a note to the effect that the booking is made at the YMCA on each Tuesday *except* the first one in each month, and an indication that there is something set up for most weeks.

Cornish next, still at their long-time Hq. at SWEB Clubroom, Pool, Camborne, on the first Thursday in each month—and this another of those rare clubs that can fill a large room to overflowing, and keep it up for years on end.

Cheshunt now foregather at the Church Room, Church Lane, Wormley, Herts., every Wednesday.

Chichester are in Room 34A, Lancastrian Wing, Chichester High School for Boys, Basin Road, on the first Tuesday and the third Thursday.

On the last Wednesday in each month, **Chiltern** are to be found at the canteen of John Hawkins Ltd. in Victoria Street, which is off the Oxford (A40) road.

Chippenham are 'liberal'—they foregather at the local Liberal Club, 20 Gladstone Road, where they may be found on any Tuesday evening.

One of the most successful clubs in a New Town is without doubt **Crawley** who are at Trinity Church, Ifield. However, we suggest you check with the Hon. Sec.—*see* Panel—if you've not been before, because they alternate between the venue already mentioned and gatherings in the houses of various members.

Our next port of call is at **Cray Valley,** at Christchurch Centre, High Street, Eltham, for a talk on the first Thursday in the month and a natter on the third one.

A club that acknowledges that it has gained quite a few members as true beginners of late is **Crystal Palace** where this is reflected in the mix of basic topics and more advanced stuff. They are at Emmanuel Church Hall, Barry Road, London SE22 on the third Saturday in the month; there is also an informal in a member's home on the first Tuesdays.

Possibly the only club in the U.K. to make a major thing of direction-finding is the **Dartford Heath D/F;** they are based on the Scout Hut, Broomhill Road, Dartford, where they can be found on the first and third Fridays—unless they are out on a hunt! For this reason we suggest a call to the Hon. Sec.—*see* Panel.

Every Wednesday evening the **Derby** amateurs and SWLs foregather at 119 Green Lane, where they have the top floor.

At last we seem to have sorted ourselves out about the situation at **Exeter;** they are meeting at the Community Centre, St. Davids Hill, in Exeter, on the second Monday, and the Hon. Sec. is now as shown in the Panel.

Another of the 'nationals' now, in the shape of the **G-QRP Club.** If you are interested in low-power stuff,

or in home-brew equipment, this is the club for you. Operating QRP sharpens up the wits no end, and once the knack is learned there can be no doubt at all that five watts can work the world. To learn to be a better operator *and* have the satisfaction of operating your own tackle—what more can anyone want from his hobby?

We seem to be a bit behind the times with our data on **Guildford,** the more so as they are celebrating a Diamond Jubilee year. All the details from G4BHQ, at the address shown for the Hon. Sec. of the club.

Up to Scotland now, which is a very rare event indeed for this column, to meet the **Helensburgh** lads at their place in East Clyde Street School, Helensburgh, on the first and third Wednesdays.

Our next stop is at **Hereford** where things seem to be booming at the Civil Defence Hq in Gaol Street with a record membership total. Meet them on the first or third Friday in the month.

On to **I.R.T.S. (Region 1)** now. IRTS is the Irish equivalent of RSGB, and Region 1 is the Dublin area; however, we suspect that the Hon. Sec. would be pleased to put you right no matter what part of the Emerald Isle you are talking about, and he can be reached from the address in the Panel.

From EI to GW, and the **Loughor** chaps who have a spot at Loughor Boating Club. Full details from the Hon. Sec. at the address in the Panel.

Back on the mainland, we now visit **Maidenhead** at their Hq in the Red Cross Hall, The Crescent, Maidenhead.

Possibly a record is noted in the **Northern Heights** *newsletter*, which indicates that G8SDE made his first-ever QSO—with G8CHN, on the 10 GHz band! And you can meet him if you turn up at the British Sub-Aqua Club Hq, Mountain, Queensbury, Halifax.

Now we go back to the M's, to **Maidstone YMCA** in fact, to note that they are at the 'Y' Sportcentre, Melrose Close, Cripple Street, Loose, every Friday.

Next we go to **Melton Mowbray;** they get together once a month (on the third Friday) at the St. John Ambulance Hall, Asfordby Hill, Melton Mowbray.

The **Milton Keynes** base is at the Lovat Hall, Newport Pagnell, where they are booked in on the second Monday of each month.

Ormskirk foregather in the members' homes, in rotation, so this is a case where we must suggest that initial contact be made by way of the Hon. Sec.—*see* Panel.

We are asked to make clear that there are two clubs at large in the **Peterborough** area, of whom the one we are reporting now is the Radio and Electronics Society. This one is to be found at the Scout Hut, Occupation Road, on the third Friday.

Rather interesting, **Reigate**—they have two AGMs in April according to our copy! In fact, they are at the Constitutional Centre, Warwick Road, Redhill, on the third Tuesday of every month. As the AGM will be past by the time this comes to print, the new programme will be in the making.

We mustn't forget the **Royal Navy**—membership open to serving and ex-R.N. types, not to mention associate members from the M.N. and foreign navies. Details from the Hon. Sec. at the address in the Panel.

Deadlines for "Clubs" for the next three months—
(*August issue—June 29th*)
September issue—July 27th
October issue—August 31st
November issue—September 28th
Please be sure to note these dates!

As far as we know at the moment, the Hon. Sec. of **Saltash** is as shown in the Panel, and the venue is Burraton Toc H. However, if this has changed, try to get in touch with G3XCS for the latest situation.

Silverthorn are at Friday Hill House, Simmons Lane, South Chingford, on Friday evenings.

Solihull are to be found at the Manor House, High Street, Solihull, on the third Tuesday.

Reading that the **South Birmingham** crowd collect waste paper for it to be turned into cash for the club funds reminds this old scribe of wartime collections of the stuff using a scout group's trek-cart. Heavy work, that! The gang are very active, though, with a formal on the first Wednesday, and an informal every Thursday on the air, plus a natter session on Friday evening.

Chaseley Home, South Cliff, Eastbourne, is the venue for **Southdown,** on the first Monday each month. For the rest, contact the Hon. Sec.—*see* Panel.

As for **Southgate,** they are based at the Scout Hut, Wilson Street, Winchmore Hill, on second Thursdays.

Now to **Stevenage** where they have a programme all mapped out for December right through to August—save that the Editor made a mess of it by not being able to turn out in January, so causing lots of shuffling to be done. Be that as it may, they are at what used to be known as the Hawker Siddeley Dynamics works, in the senior staff canteen, on the first and third Thursday in each month.

The **Stourbridge** club, with the previous two, makes a group of three of which your scribe has at one time or another been a member. Nowadays they have the use of the library in Longlands School, Brook Street, on the first and third Mondays.

Pressing on with the list we come next to **Surrey** who will at the time of writing have just completed their AGM, so we don't know the detailed programme; but we can say that they live at *T.S. Terra Nova,* 34 The Waldrons, South Croydon, and meet on first and third Wednesdays.

On to **Swansea** and Sketty Park Sports & Social Club, which is the home of the local group on alternate Tuesdays.

Giggs Hill Green has a library serving Thames Ditton, and this is the Hq address of the **Thames Valley** chaps, the booking being for the first Tuesday in each month.

Now **Verulam** who have a new Hq—Jubilee Centre, Catherine Street, St. Albans. From May to September they also have an informal at Salisbury Hall, London Colney on the second Thursday in each month.

Any practising Christian could well do to think about joining **WACRAL,** which has its outposts all over the world; details from the Hon. Sec.—*see* Panel.

Now to **West Kent** at their place in the Adult Education Centre, Monson Road, Tunbridge Wells, for the formals. These formals are alternated with open evenings, also on Tuesdays, at the Drill Hall, Victoria Road.

Names and Addresses of Club Secretaries reporting in this issue:

ACTON, BRENTFORD & CHISWICK: W. G. Dyer, G3GEH, 188 Gunnersbury Avenue, Acton, London W3 8LB.
ADDISCOMBE: P. J. Hart, G3SJX, 42 Gravel Hill, Croydon, Surrey CR0 5BD. (*01-656 9054*)
AMSAT-UK: R. Broadbent, G3AAJ, 94 Herongate Road, Wanstead Park, London E12 5EQ.
A.R.M.S.: N. A. S. Fitch, G3FPK, 40 Eskdale Gardens, Purley, Surrey CR2 1EZ.
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DERBY: Mrs. J. Shardlow, G4EYM, 19 Portreath Drive, Darley Abbey, Derby DE3 2BJ.
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ORMSKIRK: P. J. Kay, G4GCB, 24 Laurel Avenue, Burscough, Ormskirk, Lancs. (*Burscough 892416*)
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SALTASH: J. Reynolds, G8LLR, 47 Lulworth Drive, Roborough, Plymouth. (*Plymouth 771135*)
SILVERTHORN: C. J. Hoare, G4AJA, 41 Lynton Road, South Chingford, London E4 9EA. (*01-529 2282*)
SOLIHULL: R. Hancock, G4BBT, 80 Ulleries Road, Solihull, West Midlands B92 8EE.
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SOUTHGATE: J. Fitch, G8EWG, 16 Kent Drive, Cockfosters EN4 0AP. (*01-440 7353*)
STEVENAGE: E. Godfrey, 94 Common View, Letchworth.
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SUTTON & CHEAM: J. Korndorffer, G2DMR, 19 Park Road, Banstead, Surrey. (*01-255 8729*)
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WIRRAL (W. Kirby): M. McIntosh, G8NMG, 8 Brancote Gardens Bromborough, Wirral. (*051-334 1027*)
YEOVIL: D. McLean, G3NOF, 9 Cedar Grove, Yeovil, Somerset.
YORK: K. R. Cass, G3WVO, 4 Heworth Village, York.

Our next port of call is the **Wireless Preservation Society**; G3KPO is putting on another hat to let us know about the annual Isle-of-Wight get-together, to be on the afternoon of September 9—and if you contact him at the address in the Panel, he'll be delighted to tell you about the collection and the membership.

Wolverhampton have a place at Neachells Cottage, Stockwell Road, Tettenhall, and they are to be found there on any Monday evening.

The Old Pheasant, New Street, Worcester, is home to the **Worcester** club on the first Monday in the month, and details of what's on may be obtained from the Hon. Sec.

On now to **Wirral (West Kirby)**—what's happened to the other Wirral group of late?—where they are based on the Sports Concourse, West Kirby on the second and fourth Wednesdays.

Yeovil live in Hut 101, Houndstone Camp, and are open for business every Thursday evening—we are assured there are no RSMs lurking around for the older ones!

Finally, **York** and the United Services Club, 61 Micklegate, which is their Hq address. There is, they say, something going on every Friday, *except* the third one in each month, and they would welcome a visit.

Finale

That's it for another month. Updates please, by the dates shown in the 'box' in the piece, addressed to "Club Secretary", SHORT WAVE MAGAZINE, 34 High Street, Welwyn, Herts. AL6 9EQ.

COMMUNICATION and DX NEWS

E. P. Essery, G3KFE

STRANGE adaptations the human mind can make in its reaction to external stimuli—a thought provoked by a note in the log about a QSO the previous day which said rude things about "conditions" which a few years ago would have been regarded as superb. Again, thinking rude thoughts about a 572B which has lost half its filament and so is not a useful part of a linear, despite the fact that the resulting QRP is still, exciter-only, putting out very much more RF than the tiddler-transceiver sitting on the operating table; which suggests that QRP is fine when you do it voluntarily, but a damn nuisance when 100 times more power is all one can run because of an equipment failure!

But enough—let us address ourselves to the question of DX, in all its interesting forms; never the same thing twice running. For example, your conductor fell out of bed a mite early one morning recently, and it occurred to him to investigate the noises which might be on offer on 14 MHz, that being the place where the brute had last been used (you understand, of course, that he does not feel competent to tune up a transmitter at 0630z, which does restrict things a bit!). One hears a VK and a W6 nattering, one visualises a globe and their place upon it, and one wonders how the blazes they come to be S9 plus some in the UK, since they both indicate they have beams. Or one works, one evening, an AC4—shades of the "forties!"—only to hear him say that he is in Miami, which hardly comes into the category of "far-away places with strange sounding names".

On the other hand, we have to admit that in the days when AC4 signals came from Tibet there were some prize rock-crushers about, signals for whom a report of T2 would be a compliment; most of us just had to home-brew because there was no other way of getting back at the signals creeping into the receiver. And of course some people, whatever side of the Curtain they may be, have an uncanny knack of making the best components into an electronic raspberry-noise.

Last time around the Spratly exercise was being talked about, with some wondering about just how they were going to get there, the Spratly group being something of a bone of contention between Hanoi and Peking. They went, but were turned back without a landing on Amboyna Cay, shots being fired across their bows. They took the hint and returned to Brunei. There they decided to have another try, this time aiming for Pearson Reef, the assumption being that with an elevation of three feet above high tide it was unlikely to be inhabited. Wrong again—there were buildings and small vessels to be seen. Rather than close in and risk being booted out again, the gang went to Barque Canada Reef, which is a sand-bar about 150 feet long and about zero feet above high-water. There they operated for some sixty hours, with some 13,300 QSOs on 14/21/28 MHz, which is an *average* of 222 an hour if one assumes no time for a quick nap. We guess the cost of the trip must have escalated more than a little after the first turnround, so donations to K2TJ at 33 Shore Drive, Manahakin, New Jersey 08050, would be very much appreciated. As for QSLs, the route for these is by way of VK2BJL.

The rumours of some BY activity (other than piracy, we mean) continue. The latest one, which sounds rather more likely than most, suggests an exercise by another Eastern country rather along the lines of the YU job which resulted in YI1BGD activity. If this is true, signals out from BY this autumn are something of a possibility.

Another one which could do with being re-activated is Mount Athos, and again it sounds as if there may be some quiet forward planning going on.

At the moment of writing this it looks as though the Abu Ail operation is on the point of ripping the bands open; gear has been provided by King Hussein of Jordan, JY1, and the group, comprising OE6EEG, DJ9ZB, I2CBM, I2FGM, and J28AZ, are to make an eight day stay of intensive operating.

To revert to the YU operation which put YI1BGD on the air, we hear that a somewhat similar situation is arising in the Democratic Republic of Sudan; YU2DX and some thirty members are around from 6T1YP, the club call. Tom, YU2DX has 6U2DX, 6U2AA is operational, and 6T2NI is a YL, Nadia. The club station would appreciate surplus gear of any kind, maps, call books, etc; contact YU2DX in the first place. All QSLs go to 6T1YP, Radio Palace, P.O. Box 80, El Morada, Omdurman, Dem. Rep. of Sudan.

'CDXN' deadlines for the next three months—

August issue—July 5th
September issue—August 2nd
October issue—September 6th
November issue—October 4th

Please be sure to note these dates.

ZS2MI on Marion may well experience a flurry of activity, as a new operator is reported to be there in the shape of ZS6BNN. A possible frequency is said to be 14330 KHz.

To end this section of the piece, a note that Lloyd and Iris Colvin are back in the States after their latest DX-pedition. This one involved some 50,000 QSOs from 6 stops. Adding this to their previous efforts, they now have held some 104 calls and visited 135 countries; a total QSO count of half a million has resulted in a collection of some 250,000 QSL cards all filed alphabetically!

The Mail

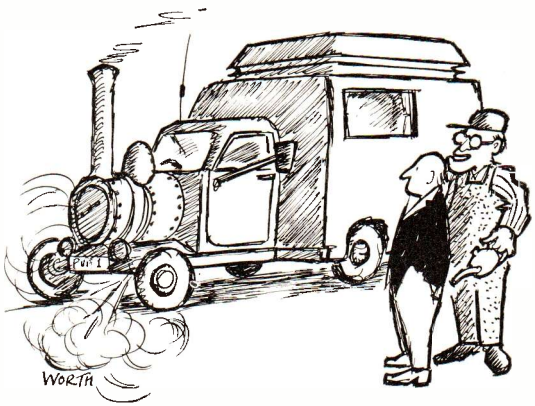
Not surprisingly, after *Magazine* schedules having been so upset, it's a bit thin this time, so we will copy

the Justin Cooper method for once.

G2BJY (Walsall) is still at it, both operating and building gear; on the latter front a direct-conversion receiver using valves is on the go, and has resulted in a couple of tips for reducing BC breakthrough. The first is to loosen the coupling to the aerial a bit, by putting 50 pF in series with the coaxial inner at the receiver end (the receiver of course having the benefit of the ATU as well). The second one is not quite so obvious, and so all the more worth a mention: across the HT secondary winding of the PSU and before the rectifier diodes, add 1000 pF in each leg to ground. We would add our own suggestion that similar medicine on the primary side with 1000-volt capacitors may also help. The chap who says RF signals can't go through mains transformers clearly doesn't think about the "hidden" components of stray coupling! On the operating front there has been a lot on Ten, and rather less on 21 MHz, not to mention trials of the DC receiver already mentioned which is a one-band device for 7 MHz—Geoff likes doing it the hard way! The 21 MHz list mentions EA8IE, J28BR, JAs, JE, JG, JH and other such JA variants, LJ2Z, LZØL, PS7TA, PY2SD, SV0AK, UA1LP/U2T, UAOIAW, UF6VAG, UH8BZ, UJ8AQ, UK1ZAA/P, UK7TAA, UK8FAA, VX3EDC, VX3HFS, YO7NK/MM off ZS3, YO9BGW/MM near Mauritania, 9H1FA, and 9H1MAR.

GW3GWA (Wrexham) used to contribute, back in the 'fifties, until a QRT in 1962 which lasted until 1974. The initial CW efforts on return were made with a modified pocket-paging transmitter at five watts and an EC-10 receiver, which between them gave much entertainment until it was decided to go QRO, and a 60-watt rig for CW-only was built. At the time of writing the shack contains an FT-DX400, an FT-221, and an HW-7, while in the car there is an FT-227R. Most of the operation is phone on VHF, but the DX band effort is 99 percent CW. The HW-7 into a dipole on 14 MHz are noted as having yielded JA and W6 among some 24 countries worked on the little 'un. Overall the picture is of an effort to make a DXCC/CW, with 92 confirmed and some 109 worked, since the resurgence of interest. Aerials used are the dipole already mentioned and an 18-AVT which, at least on 14 MHz, doesn't seem to do as well as the dipole.

G3NOF (Yeovil) was among the ones whose mail was delayed; Don was in among the good stuff during March, but found things rather blacked out at the end of the period. 28 MHz was found open at times varying between 0700z to 2200z, with USSR signals in mornings and afternoons, long-path VK/ZL/JA from around 0730-1030z, short path propagation bring them back in again between 1100 and 1300, with the addition of SE Asia and VS6. The Ws appeared on the scene as early as 1100, and were heard as late as 2200. SSB QSOs were made with AA7C, AX6PM, AP2ASM, CE1BLL, CT3BX, FGODYM/FS7, HL9KE, HL9KF, HM2GS, HP1KC, HV3SJ, JA3RRN, JH7JGG, JR6-RAY, K5ADQ, K7UT, KØWIQ/DU2, KA2EE, KA7CBO, the former in Tokyo and the latter in Oregon, KL7HCC, KL7JFJ, KL7-JHI, KP4AM/D, KZ5RO, N6PO/TG7, P29LS, UI8ZAC, UJ8XCW, UL7IBC, OX3BX, VKs, VK2AKV/VK9 (Norfolk Is.), VP2DXA, VP2DXB, VS6EZ, VS6FI, VS6GV, VU2RX, W2AEE/C6A, W7AO, WØMKX, WØOCQ, WB7WBX, WA7NHP, WB7RFA, WB7SZN, XE1EFT, ZL2RP, ZP5PX, ZS1OU, ZS2BK, and 6D1LCH. Turning to 21 MHz, G3NOF reckons they were behaving rather similarly; SSB again and QSOs with EA6BG, HL9KE, HV2VO, IP5CJA, JA3JXJ, JG1-ASX, K1CO/PJ7 (Saint Maarten), KP4AM/D, OK3TAB/C6, UK7-LAH, VE5RA, TF3CW, ZS1J, and 6W8HB. On 14 MHz the activity has been there almost right round the clock; in summary, east coast Ws at 0700 at good strength, along with the west coast Ws (who were still audible till 1000z); 0700-1000 has also been the right time for the VK, ZL and some Pacific stations, all long-path at these times of course. 1000z till noon has been about right for the Alaskans. Those same KL7s, VK, ZL, JA and the Pacific have also been notable from 1800 onwards, and a few African signals were noted around 1800. Don mentions QSOs with EA0CF, FW8-AD, HC2GR, HH2MC, HK0BKX, IP5CJA, K1CO/PJ7, JT1AN, JT1BF, JX9WT, JY8AG, KC6GF,



" . . . my only trouble is wheel static . . . "

KL7PJ, KP4AM/D, OK3TAB/D2A, VP2DXF, VP8SO, VQ9TC (Diego Garcia), W7LQT, W7ZGA/KH2, ZD7PL, ZD9GH, ZSs, 5W1AX, and 6Y5RM.

G4EAN (Nottingham) comes in now; on 21 MHz he managed just VE3FQV and CT3AF, but nothing at all on 28 MHz, thanks to the work problem. However, there is now a workbench on which to build the HW-7, and a Datong Morse tutor, which Ian reckons to be very good, especially the facility for varying the gap between letters while sending the letters at a steady speed. The writer would certainly agree—this is the easiest way to get the "rhythm" of the code into the brainbox.

Our next stop is with G2HKU (Sheppey) who seems to have taken a peep at most bands with some success. Top Band SSB was with PAØPN, while CW worked with GM3HBT, OK3LL, F8IH, PA0INA. 7MHz SSB managed YS9RVE, and YS9PBE, with CW to VR6HI, W9HIL and WA5ZBE. SSB on Twenty next, for the regular morning sessions: ZL1VN, ZL3SE, ZL3RS, ZL3FV, ZL1QQ, VP8SB (Adelaide Is.), VK3BIE, and C5ACQ who is G4AKQ. CW worked the trick with UF6FDB, K5WTA/MM, VE6AMR, VK3YT, WB6PBI, VE3KQW, N400, KV4AA, and VE3BVD. Yet a third variety of operation appeared on this band, with QRP getting out to UB5LIC and IN3FNT. Then Ted just had to take a peek at 21 MHz, where CW accounted for PAØL0U/ ZP5, W1BIH/PJ2, VE3BVD.

At G2NJ (Peterborough), there has been quite a lot of interest on Eighty; CW with ON6WR/LX/P at Steinfort, and DF9BW/M operating the key near Wilhelmshaven, not to mention GI5DX out /P in England, Northumberland way. G2CAS has also been worked out /P, this time from Beckwithshaw not far from Otley. 25 years ago to the day G2NJ worked G3JFF/MM when the latter was on *HMS Triumph*, "the day" being his Easter QSO with G3JFF as the op. working GB2RN aboard *HMS Belfast* moored opposite the Tower of London. This latter was an exercise your scribe had planned to attend, thanks to G3HZL, but in the event everything went wrong and we didn't get beyond the end of the road!

It's a long time since last we heard from G4GMZ (Greenford, Middx.) but he has been quite 'radio-active' with one thing and another. Apart from demonstrations, it has been pretty well all CW on 7 MHz with the usual result of Russians, Europeans and UK signals. The highlight was the occasion when K0QC came back to a CQ. Planning-permission for a 25-foot mast having been received, a weird arrangement of a 7 MHz 'sloping on one leg' dipole and an all-sloping 14 MHz dipole resulted, the pair of them falling to seven feet at the low end. This last has given much pleasure with W2VUM, UH8CE, and ZS6-ME, and was a bit of a surprise packet in that G4GMZ was called by the ZS at the tail-end of a QSO with a UB5RS. The latter stayed on frequency and was a great help in relaying lost bits of information to complete the contact before trying for a QSO himself. The Spirit of Amateur Radio does still lurk around on the bands, at least on CW!

The writer acquired himself a wooden mast from a large dinghy, originally with the idea of replacing the existing gunter rig on his own craft in due course. However, in the meantime he now has an aerial support which even a town-hall planner could hardly call a permanent structure, and with guys and blocks all ready for use. Just as soon as the weather becomes a little more accommodating, there will be a Delta Loop for 21/28 MHz aloft, albeit rotated by the 'armstrong' method. We have remarked before on the way in which the 14-AVQ lost its 28 MHz trap and was pieced out to suit. turning it into a 7/14/21 MHz aerial; it functions very well on 21 MHz, where a CQ may be expected to bring back, say, a W or suchlike, and it can work them on 14 MHz (albeit a CQ will only rake up a European). As for 28 MHz, the low dipole we hung up is quite effective, but it is interesting to note that the 14-AVQ, despite the lack of its 28 MHz trap, will load up quite happily on the band *and* radiate. In sum it added up to Ws and Europeans on 14 and 21 MHz, plus proof of radiation from the aerial on 28 MHz—and the CQ calling has done much to loosen up a wrist with "the screws" in it!

Snippets

Most amateurs are aware of the Jamboree-on-the-Air activity and its enormous success over some 21 years. We received a report on the 1978 activity which indicates that on a conservative estimate, some 21000 scouts were involved. Along with the report, there was a note that an Australian Rover leader, Adrian Blake will be at Mawson Base, Antarctica, throughout 1979, signing VKØAB, and operating 14150 KHz at 0930z, mainly Tuesdays, Thursdays and Sundays, with some other operating possible.

W1BB wrote to send in a picture of the OK Top Band QRP DX Club, with many of the well-known OK Top Band merchants about; Stew also notes he will be hosting G6CJ during the latter-end of May.

An answer to a query from an SWL in Andover about a VQ6PM in a time zone 8 hours from GMT, there could only be one place—Canada.

We have a copy of the first issue of the Radio Club of Iberia Newsletter, based on Madrid, with some interesting items—if you are going to Madrid, they can be contacted by way of P.O. Box 116, Madrid.

An interesting point arises in the letter from G4EAN, who comments that he seems to hear more short-skip on 21 MHz of late, and recalls that when he first got his ticket there was nothing like as much. Probably true, and an interesting sidelight on the propagation on the band when MUFs are high.

Finale

That's it for another month; deadlines are in the 'box', as usual, and they should be addressed "CDXN," SHORT WAVE MAGAZINE, 34 High Street, Welwyn, Herts. AL6 9EQ.

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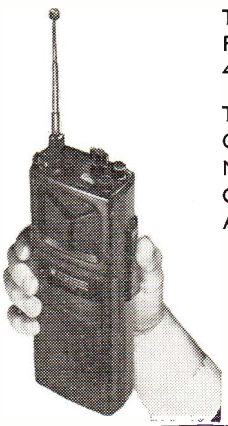

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Wanted: Instruction book and circuit diagram for Roband RO-50 oscilloscope, purchase or hire.—Hardy, G8PIA, Green Lane House, Fordingbridge, Hants. (Tel: Fordingbridge 52093 evenings.)

Offering: Hammarlund SP-600JX. Offers?—de Courcy, 27 Highbury Avenue, Salisbury, Wilts.

Wanted: Marconi Mercury receiver with power pack, in good condition. Full details, and price including carriage please.—Sykes, 21 Highroyd, Lepton, Huddersfield HD8 0EB.

Exchange: Canon 35-2 35mm. half-frame camera *for* a receiver: *anything* considered if it covers 80m.—Elsworthy, G4AYG, QTHR.

Sale: HRO with 6 coils and power pack, £55. *Wanted:* Trio VB-2200G amplifier.—Ring Williamson, 051-334 2295.

Selling: National Panasonic DR-2800LBS, digital and dial readout on FM/LW/MW and 3 SW (3·2 to 30 MHz), with BFO and AFC, mains/battery, latest model, never used, £160. (Surrey).—Box No. 5695, Short Wave Magazine Ltd., 34 High Street, Welwyn, Herts. AL6 9EQ.

Sale: Whip aerial, 15-ft., heavy duty with base mounting, glass-fibred, two-section, £40.—Ring Harknett, Portsmouth 731962.

August issue: Due to appear August 17th. Single copies at 50p post paid will be sent by first-class mail for orders received by Wednesday, July 25th, as available.—Circulation Dept., Short Wave Magazine Ltd., 34 High Street, Welwyn, Herts. AL6 9EQ.

For sale: R.A.F. aerial masts, 45-ft. tube type, complete with base plate, steel guys, pegs and top mount for whip, all in canvas case, £25 plus carriage.—Ring Brighton 508573.

Wanted: Information on Courier CTR-1 HF SSB transceiver (handbook, circuit, anything). Copy and return, or buy; expenses paid.—Ring 01-648 5895 daytime.

Wanted: For private collection, W.W.II Wireless Sets, Nos. 18, 38, 46, 68, 22, 19, ZC1, MCR, RBZ, TBY4-8, and any German equipment.—Ring Brighton 508573.

Wanted: Back numbers of "Short Wave Magazine", "T & R Bulletin", "RSGB Bulletin" and "Radio Communication".—Stanton, 54 Monks Road, Exeter, Devon.

Wanted: Racal RA-137 LF converter in first class condition. Details and price please.—Ziedainis, 20 Hall Royd, Shipley, West Yorkshire.

Sale: FT-401B, mint, used only as a stand-by rig, complete with fan, ceramic mic., two spare finals, bargain, £340. **Adonis** amplifier mic., unused, in original packing (cost £39), accept £32.—Ring Lee, G5FH, 04252-5974.

Wanted: Yaesu FRG-7 communications receiver, in good condition. Details and price please.—Ring Fiander, Ryde (0983) 66322, I.o.W.

For sale: Yaesu FR-101 de luxe, analogue display, boxed, used only once, offers around £500 in writing.—James, 14 Laurel Close, Mepal, Ely, Cambs.

Selling: AR88D, fitted product detector, £60. Eddystone 640, £35. BC-348L with mains PSU, £26. HRO coil pack for 0.9-2.05 MHz, £4. Pye 12v. PSU for C.12 Tx/Rx, £5. 12v./24v. PSU for No. 19 Set, £5. All above in good condition and fully tested and overhauled where necessary.—Ring Allinson, Aspatria 20243.

Selling: Eddystone 770R, 19-165 MHz, fully overhauled by maker, with plinth speaker, spare valves, manual, superb condition, offers around £200. Buyer collects.—Roberts, 27 Mumbles Road, Swansea. (Tel: 0792-24146).

Wanted: Joystick and tuner.—Coombes, 46 Tan-y-bryn, Maerdy, Mid. Glam. CF43 4TP.

For sale: Latest Sony 31-band receiver Model ICF-6800W, battery/mains/car, digital readout etc. (list £378), asking £250. Reason for sale.—Ring Berry, Hereford 65222.

Selling: Eddystone EC-10 Mk. II receiver, with built-in mains PSU and switchable FM discriminator, £90.—Bryant, G3WBC, QTHR. (Tel: 0582-606187).

Selling: Heathkit SB-102 transceiver, unfinished. HP-23 power unit and speaker. 18-AVG vertical full-band aerial. Various books and manuals.—Ring Searle, Rustington 4166.

Wanted: SSB adaptor unit for Grundig Satellit 2000.—Ring Reardon, Nottingham (0602) 818975 evenings.

Selling: Drake TR7, DR7 (serial no. 503), PS7 (serial no. 648), with two fans, four filters (three fitted) SL-300, SL-500, SL-1800, SL-6000, MN7 (serial no. 105), Drake microphone 7072, immaculate, will not separate, £1200 no offers.—Routledge, G8LTU, QTHR. (Tel: Maryport 984271).

For sale: Yaesu FR-101D with 18-AVT/WB antenna, mint condition, £450. **Icom** 215E, brand new in maker's box, £130. **Yaesu** Sigmasizer with PSU and antenna, £150.—Ring Allsopp, 0632-462606.

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Selling: Marconi CR-150/3, 2-60 MHz, with PSU and handbook, £35.—Baldock, 39 Hales Close, Snitterfield, Stratford-on-Avon, Warks. (Tel: Snitterfield 516).

Sale: Eddystone 880/4 SSB receiver, 30 bands, superb mint condition, with manual and speaker, £325. 51J-4 receiver, with manual, £275. TF-1041B valve voltmeter, mint, manual, £35. Teletype TDMS units, mint, £25. R.D.O. receiver with CV253/ALR, coverage 38-1000 MHz, £75. **Wanted:** Hewlett-Packard UHF attenuators. T. R. W. Electronics 6-way coaxial 24v. DC switch.—Fletcher, 62 Moorbridge Lane, Stapleford, Nottingham. (Tel: 0602-397446).

Sale: Realistic DX-160 Rx, 150 kHz/30 MHz, all modes, 12/240v., with speaker and manual, £65.—Ring Wakeman, Chipping Sodbury 318539.

Wanted: Transceiver or Rx, non-working, to repair/rebuild. Can inspect and collect. Please write or phone.—Dixon, 41 Heathwell Road, Newcastle-upon-Tyne (746723), Tyne and Wear NE15 7UQ.

Wanted: Circuits using the EF50 valve (radios, amplifiers, tuners). Also 1930's American "Majestic" radio receivers. Details and price please.—Roberts, 26 Beech Avenue, Brentwood, Essex. CM13 2DX.

For sale: Eddystone 840C receiver in good condition, complete with phones and set of spare valves, £72. Buyer to collect and inspect.—Ring Chandler, 01-223 4335.

Sale: Drake TR7/DR7 and PS7, perfect in every respect, circumstances compel sale. Sensible offers invited.—Robinson, G2KF, QTHR. (Tel: 072-681 2337).

Exchange: Complete HF station including 80m. transceiver, 10-160m. Rx, 2m. transverter, antennas, SWR meter, etc. (all equipment home-brew) for two-metre SSB 12v. mobile transceiver. Delivery up to 50 miles. (Ripon).—Box No. 5693, Short Wave Magazine Ltd., 34 High Street, Welwyn, Herts. AL6 9EQ.

Sale: Yaesu FL-101 Tx, 160-10 metres, SSB/AM/CW/RTTY, fitted RF processor, complete with mic., £350.—Morriss, G4GEN, QTHR. (Tel: 082-571 2205).

Selling: Superb Racal receiving station: RA-117 with LF adaptor, SSB adaptor and RF selector protector unit, in original Racal rack cabinet, covers 10 kHz to 30 MHz, £700.—Morriss, G4GEN, QTHR. (Tel: 082-571 2205).

For sale: Trio 7500 FM synthesised Tx/Rx, as new, £190. F.D.K. Palm II hand-portable, all accessories, as new, £110. Pye Westminster, 70cm., 6-channel, working on RB4 and SU8, good condition, £80 or near offer.—Ring Ferguson, Bedford (0234) 60549.

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(Counter Service. 9.30-5.00. Mon. to Fri.)

(GIRO A/C. No. 547 6151)

Printed by The Courier Printing Co. Ltd., Tunbridge Wells for the Proprietors and Publishers, The Short Wave Magazine Ltd., 34 High Street, Welwyn, Herts., AL6 9EQ. The *Short Wave Magazine* is obtainable abroad through the following: Continental Publishers & Distributors, Ltd., William Dawson & Son Ltd.; AUSTRALIA AND NEW ZEALAND — Gordon & Gotch, Ltd.; AMERICA—International News Company, 131 Varick Street, NEW YORK. Registered for transmission to Canada by Magazine Post. *June/July 1979*