G3JFS describes an indoor antenna for the HF bands

G3RJV takes another look at the S.C.D. Transmitter

UPDATE

S.C.D. Mk.2

3 watts output on 80 metres for the radio amateur & amateur radio
PROBABLY THE BEST DECODER IN THE WORLD

In its standard form the POCOM 2010 is extremely versatile and capable of decoding most signals, yet it costs just £781. However, specialist users may want to be able to decode some of the more unusual transmissions that are around, so for them a range of expansion boards are available. These just plug straight into the 2010 and turn it into what must be the most versatile decoder on the market (the boards marked YES are fitted as standard).

**AFR-2010**

**CW-RTTY ALL MODE**

RTTY Baudot CCITT No. 1 Standard 45/50/57/75/100/150/200 Baud

RTTY Baudot CCITT No. 2 Standard 45/50/57/75/100/150/200 Baud

RTTY Baudot CCITT No. 1 Variable 30-250 Baud, Accuracy 1/1000 Baud

RTTY Baudot CCITT No. 2 Variable 30-250 Baud, Accuracy 1/1000 Baud

RTTY Baudot CCITT No. 1 Bit-Inversion, Variable 30-250 Baud, Accuracy 1/1000 Baud

RTTY Baudot CCITT No. 2 Bit-Inversion, Variable 30-250 Baud, Accuracy 1/1000 Baud

RTTY Baudot CCITT No. 2 Standard 45/50/57/75/100/150/200 Baud

RTTY Baudot CCITT No. 1 Standard 45/50/57/75/100/150/200 Baud

RTTY Baudot CCITT No. 2 Standard 45/50/57/75/100/150/200 Baud

RTTY Baudot CCITT No. 1 Variable 30-250 Baud, Accuracy 1/1000 Baud

RTTY Baudot CCITT No. 2 Variable 30-250 Baud, Accuracy 1/1000 Baud

RTTY Baudot CCITT No. 1 Bit-Inversion, Variable 30-250 Baud, Accuracy 1/1000 Baud

RTTY Baudot CCITT No. 2 Bit-Inversion, Variable 30-250 Baud, Accuracy 1/1000 Baud

RTTY ASCII CCITT No. 5 Variable 30-250 Baud, Accuracy 1/1000 Baud

RTTY ASCII CCITT No. 5 Standard 45/50/57/75/100/150/200 Baud

RTTY 8 Channel 200 (300 Baud) Press Service (SID, KNA, etc.)

RTTY 8 Channel 200 (300 Baud) Press Service (DPA, VWD, etc.)

RTTY 4 Channel 200 Baud Press Service (SID, KNA, etc.)

RTTY 4 Channel 200 Baud Press Service (DPA, VWD, etc.)

NEW RTTY CODE 8 Channel 200 (300 Baud) Press Service (DPA, VWD, etc.)

RTTY ASCII CCITT No. 5 Standard 110/150/200/300 Baud

RTTY ASCII CCITT No. 5 Variable 30-250 Baud, Accuracy 1/1000 Baud

RTTY Baudot Synchron-Printer, Variable 30-250 Baud, Accuracy 1/1000 Baud

RTTY Baudot Mode 32, Variable 30-250 Baud, Accuracy 1/1000 Baud

RTTY Autocope, Variable 30-250 Baud, Accuracy 1/1000 Baud

MORSE (CW) 15-250 Characters Per Minute (CPM)

TOR (SITOR/SPECTOR/AMTOR, ARQ-FEC according to CCIR 476-2), 100 Baud

This ad cannot really do justice to these marvellous pieces of equipment, so next time you are in the area, come in and try them for yourself — you will be convinced.

POCOM decoders are manufactured in Switzerland by the Poly-Electronic company who are known throughout the world for the quality of their products. The 2010 is the flagship of their range and this is the one that we would recommend to professional and commercial users — it covers everything! The AFR 8000 is similar to the 2010 (it uses the same software) but it has the added feature of a built-in LCD display which makes it ideal for mobile or marine use where a video monitor is not really practicable, although a video option is available. The AFR 2000 is again similar to the 2010 but in its standard form it is supplied without CW capability. A CW-expansion board is available as an option. The AFR 1000 is a budget priced ASCII, ARQ/FEC (SITOR/SPECTOR/AMTOR) and CW decoder which has many of the features of the 2010 but which is not upgradeable. Although it is not a decoder, it is worth mentioning that we can also supply the POCOM PFC 100, a versatile frequency controller for radios such as the NRD 515 and the ICOM R70/71.

Whether you are a professional user or a dedicated listener there is a POCOM decoder for you and, although the top of the range model costs about £1500, prices start from as little as £395. They may not be the cheapest on the market, but they are certainly the best! For more details send s.a.e. (at least 8"x6") for a free booklet which gives the full specifications of the entire POCOM range of decoders.

**INTRODUCING THE REST OF THE POCOM FAMILY**

POCOM decoders are manufactured in Switzerland by the Poly-Electronic company who are known throughout the world for the quality of their products. The 2010 is the flagship of their range and this is the one that we would recommend to professional and commercial users — it covers everything! The AFR 8000 is similar to the 2010 (it uses the same software) but it has the added feature of a built-in LCD display which makes it ideal for mobile or marine use where a video monitor is not really practicable, although a video option is available. The AFR 2000 is again similar to the 2010 but in its standard form it is supplied without CW capability. A CW-expansion board is available as an option. The AFR 1000 is a budget priced ASCII, ARQ/FEC (SITOR/SPECTOR/AMTOR) and CW decoder which has many of the features of the 2010 but which is not upgradeable. Although it is not a decoder, it is worth mentioning that we can also supply the POCOM PFC 100, a versatile frequency controller for radios such as the NRD 515 and the ICOM R70/71.

Whether you are a professional user or a dedicated listener there is a POCOM decoder for you and, although the top of the range model costs about £1500, prices start from as little as £395. They may not be the cheapest on the market, but they are certainly the best! For more details send s.a.e. (at least 8"x6") for a free booklet which gives the full specifications of the entire POCOM range of decoders.

**FULL RANGE OF TRIO PRODUCTS STOCKED**

We are also stockists of DAJWA—MET ANTENNAS—MUTEK—WOOD & DOUGLAS—TASCO TELEREADERS—MICROWAVE MODULES—ICS AMTOR—AEA PRODUCTS—DRAE

**Dewsbury Electronics, 176 Lower High Street, Stourbridge, West Midlands.**

**Telephone: Stourbridge (0384) 390063/371228.**

**Telex: 337675 TELPES G**

Instant finance available subject to status. Written details on request.
The New Year brings with it major changes to Short Wave Magazine. With this issue the magazine has new owners and a change of staff and, shortly, a totally new look and direction.

The editorial staff of Practical Wireless have for some years believed that there is a need for a magazine covering the needs of the listener as opposed to the radio amateur. The acquisition of SWM by the publishers of PW provides the ideal opportunity to redirect the editorial direction of SWM towards the s.w.l.

The April 1987 issue of SWM will be completely different in appearance and editorial approach. The format will be changed to full A4 giving a larger type area with a brighter and more modern look. The editorial platform will cover all aspects of the short wave listening hobby — long, medium and short wave broadcasting band DXing, TV DXing, amateur bands, RTTY, FAX, weather satellites, CB and, of course, scanners. There will be in-depth reviews of receivers and accessories carried out using the well equipped Practical Wireless test lab. Although it is not anticipated that we will be publishing the more complex type of constructional projects, kits and simple projects of use to the s.w.l. will be covered, including the ever-popular and essential antenna articles.

At the same time PW will shift some of its emphasis away from listening, relieving some of the pressures on its editorial space. Of course it will not completely ignore the s.w.l. and likewise SWM will still provide the s.w.l. with some amateur radio articles, albeit on a much lower technical level than in the past.

Full details of the changes will be given in next month's issue. In the meantime please note the change of address for all communications with the magazine.

Dick Ganderton G8VFH

COVER DESIGN:
Allan & Co. Ltd., Welwyn

SHORT WAVE MAGAZINE
(GB3SWM)
ISSN: 0037-4261

VOL. 44 FEBRUARY, 1987 No. 520

CONTENTS

Editorial — Changes .................................................. 445
Communication and DX News, by E. P. Essery, G3KFE ....................... 448
G3RJV’s Workshop Notebook ........................................... 451
"Practically Yours", with Glen Ross, G8MWR .................................. 454
An Indoor Aerial for the HF Bands, by P. C. Cole, G3JFS/DA1PE ............... 456
Amateur Radio Computing, by Paul Newman, G4INP ......................... 459
KW Ten-Tec Model 4229 High-Power Aerial Tuning Unit Kit, reviewed by E. H. Trowell, G2HKU ....................................................... 461
Oblast Corner, by Nigel Cawthorne, G3TXF .................................. 466
VHF Bands, by N. A. S. Fitch, G3FPK ..................................... 469
Yaesu-Musen FT-290R Mk. II Handheld Transceiver, reviewed by Glen Ross, G8MWR ....................................................... 474
A Spectrum Wavemeter, by P. B. Brodribb, G3ONL ......................... 475
Clubs Roundup, by "Club Secretary" ....................................... 477

Editor: DICK GANDERTON, C.Eng., MIERE, G8VFH
Features Editor: Charles Forsyth
Art Editor: Rob Mackie
Advertisement Manager: Roger Hall, G4TNT (01-731 6222)

COPYRIGHT © PW Publishing Limited 1987. Copyright in all drawings, photographs and articles published in Short Wave Magazine is fully protected and reproduction or imitation in whole or in part is expressly forbidden. All reasonable precautions are taken by Short Wave Magazine to ensure that the advice and data given to our readers is reliable. We cannot however guarantee it and we cannot accept legal responsibility for it. Prices are those current as we go to press.
CONVERTER to cover LF, MF, HF, VHF, UHF

Our new H.F. CONVERTER opens new horizons for receivers, use with the new all mode V.H.F., U.H.F. receivers PRE72400 and IRC72000. Extends their coverage down to 100KHz, giving you LF, MF, HF, VHF and UHF. You tune your RX from 100MHz up, e.g. 103.5MHz is 3.5MHz. It has two aerial sockets, one for H.F. into the converter and one for V/UHF switches straight through into your RX when you switch the converter OFF, i.e. No plugs to change. All this for £45.00. Ex-stock.

T.F. NOISE BRIDGE. If you are experimenting with aerials you need one of these units. Tells you the resonant frequency and impedance of your aerials and also invaluable for measuring 1/2, 1/3, etc., wavelength of feeders, etc. £45.00. Ex-stock.

WAVEMETER. A pretty little absorption wavemeter, to satisfy the licence conditions. 1.5-30MHz with a meter indication. £39.50. Ex-stock.

IAMBC KEYER. We use the world famous CURTIS chip which eliminates the little idiosyncrasies common in other keyers. Opto-isolators from the chip ensure that R.F. can't get in, a common problem with multi-chip keyers. £45.00. An excellent twin paddle key often mistaken for ones coming several times more expensive.

2 METER LINEAR POWER AMP/PREP-AMP. People are constantly telling us that comparing different makes our Pre-amp is best. (See Pre-amps for spec.) Three models. Sentinel 25-125w power gain e.g. 3W IN-36W OUT. Ideal for FT290 £85.00. Sentinel 50, 50W IN-50W OUT. £95.00. Sentinel 100 100W IN-100W OUT £135.00. All Ex-stock.

AUDIO MULTIFILTER. Has fully adjustable BAND PASS, HIGH PASS, LOW PASS and 2 NOTCH filters. From 2.5kHz to 20Hz. Making the most versatile filter available. £89.50. Ex-stock.

T.V.I. Our Braid Breaker/High Pass Filter cures T.V.I. by plugging into the TV aerial socket. £7.50. Ex-stock.

S.E.M. SWITCH. 3 way ant. switch + 4 position to earth, 1kHz. S0239S D.C.-150MHz. £23.00. Ex-stock.

12 MONTHS COMPLETE GUARANTEE INCLUDING ALL TRANSISTORS.

Prices include VAT and delivery. C.W.O. or phone your CREDITCARD No. Ring or write for further data. Orders or information requests can be put on our Ansaphone at cheap rate times.

E&OE

GOODS NORMALLY DESPATCHED WITHIN 24 HRS.

MAIL ORDER AND RETAIL

SITUATED AT SOUTHERN END OF M23 — EASY ACCESS TO M25 AND SOUTH LONDON

BREDHURST ELECTRONICS LTD
HIGH ST, HANDCROSS, W. SX. RH17 6BW (0444) 400786
STEPSHENS-JAMES LTD.
47 WARRINGTON ROAD, LEIGH, LANCs. WN7 3EA
Turn at the Greyhound Motel on the A580 (East Lancs. Road).

TRIO RANGE

Top of the range for all serious DX and competition users. Designed for SSB-CW-AM-FM and FSK operation. All Amateur bands from 160 to 10metres. The Transceiver also incorporates a 100kHz to 30MHz general coverage receiver having an excellent dynamic range, 40 memory channels. The feature is a green backlit LCD which shows graphical VFO and CF slope tuning positions, can also be used to review the frequencies stored in the memory and the other VFO. Variable power output control. Break in keying on CW. Split frequency working.

J.A.C. NR0525 Solid State General Coverage Receiver

AD29022 Tuning receiver. Replacing the AD29021 receiver which has proved to be the best scanning receiver available. Now with frequency coverage 25 to 599MHz plus 800 to 1300MHz. Improved keyboard. Front panel knob for frequency stepping in addition to the up/down buttons. Front panel LED strip "S" meter.

THE ARGOSY II PHONE/CW TRANSCEIVER

The ARGOSY II phone/cw transceiver. The original KW TEN TEC winner which has proved to be the best scanning receiver available. Now with frequency coverage 25 to 599MHz plus 800 to 1300MHz. Improved keyboard. Front panel knob for frequency stepping in addition to the up/down buttons. Front panel LED strip "S" meter.

KW TEN - TEC LIMITED

Vanguard Works, Jenkins Dale, Chatham, Kent, ME4 5RT
Telephone. 0634 - 815173.
LET me start the column for this month by remarking that it is the first time ‘under new management’: the situation from now on is that Short Wave Magazine has joined up with the Practical Wireless team and in future Dick Ganderton, G8V FH, will occupy the editor’s chair, thus enabling me to slide gently into retirement and sloth. Not completely, though, as there are plans afoot which involve me continuing to write the odd column in the long term, and keeping my nose to the grindstone in the short run! I have greatly enjoyed my ten-year stint as editor of this august journal, which started life 50 years ago next month under the energetic leadership of Austin Forsyth, G6FO, who reigned supreme on S.W.M. for forty years. I wish Dick and Short Wave Magazine every success for the future and offer them every support.

The Bands

It is still not finally certain that we have truly gone through the bottom of the sunspot cycle. At the moment of writing there is 10/10 cloud and the countryside has gone all white and mushy, neither of which encourage serious thoughts of looking at sunspots, or even venturing outside. Not all of us feel the same: in sight of the window, a large Alsatian-sized dog and a small Peke-sized one are playing together and with a pensioned-off plastic cone such as are used at roadworks; they seem quite determined to leave no snow unturbed. Seriously, the period under review has shown the bands displaying all sorts of quirks; W and VK are reported as having been noted on Ten, and DX has been noted on the other bands at appropriate times, and there is even a rumour of a clear channel found on Eighty! Perhaps we should turn to the reports and see what the feelings about it all are.

Ten Metres

G4ZZG (Warrington) kicks off here and Charles notes that some of his recent letters have probably failed to come home to roost — perhaps we need pigeon post! Charles has been as usual monitoring conditions on Ten, particularly by way of lunch-time CQ calls using phased verticals in both E-W and N-S directions. However it was almost a blank month save for Charles’ 40 watts from a pair of 807s. Opened up on the 28th. Charles is now wondering whether lunchtime is the best time, although he does concede that almost any time might produce replies.

GM4WJA (Elgin) comments that although the odd beacon has been heard, the band is usually dead until a contest or similar activity brings the signals on to the band. Activity around G was noted on November 27, and on 29th EA8 JS was working at 1120; on November 30 between 0835 and 1000 UA6GR, SV0CV, and 5E3FXT/7/9 were hooked in, while on December 6 at 1030 there was ZS6BPQ. On 11th between 2115 and 2215 a couple of IKS were raised and the next day a gaggle of DLs and an F around 1900. December 13 was quite a red letter day as around 0500 to 0230 some SUs were worked, followed between 1025 and 1810 by 5B4SA, thirty assorted EUs between 1545 and 1645, L4D, and three local GMs. 35 contacts in the day! December 14 gave G4YLO, YU, I, SV8EP, RA6NMJ, RB5IN1, SV5RW, HA and G stations. In the gotaways we noted that on the same dates such DX as 5B4SA, ZS, EA8, LU, TA2AB, 9J2AF (who was underneath an S9 Italian), 4X6TA, and 9H11F were heard.

G3NOF (Yevoli) didn’t catch the openings, save on December 14, when he noted around lunchtime several Europeans, plus OA4OS and PZ1AC, but no contacts were made.

Reverting for a moment to G4ZZG he notes how, during the Contest, KP2N gave the band a going-over but neither Charles nor G4HZW (who is in groundwave range) could raise the chap; he seemed to have been the only Statesider in the contest who was willing to try the band. The pick of the crop, though, had to be N9AG/J6L working Gs around noon on November 28th.

Eighty

One has to be an operator on SSB in order to work DX on this band as well as having a good aerial and getting RF away. However it isn’t quite so bad at the CW end where for instance the QRP Club members hide out. G2NJ’s notes are always useful of course, and this time are accompanied by a note from GW8WJ of TOPS who says that some joker has been pirating the GW8WJ call; cheeky with it, the character actually has the nerve to come up on the 3508 kHz net frequency when Phil is on and accuse the real GW8WJ of being a pirate! Of course the DTI/RIS have been informed, but meanwhile it should be noted that the real GW8WJ does not ask for QSLs via the Bureau, and the pirate has been known to give QTH as Mold or North Wales. It is believed that the pirate is in fact the holder of a legitimate callsign — be warned, chaps!

To return to G2NJ, Nick notes that G3OLJ of Bangor has met with an accident which may have delayed his return to the Seattle area. On the QRP front, G3BOY (Peterborough) was working on his new QRP rig and Elaine, G0ATS, down in Cornwall. G3KPO was noted on the band using an ancient W.W.I vintage key, although Doug did say he would have liked a little more beef in the return spring. Nick mentions the Straight Key Event on the evening of February 7, 1600-1900 GMT. The exchange is RST plus serial number, call letter, name and age (YLs give age as ‘xx’). Class-A is ten or less watts input, or five watts or less output, Class-B 100 watts input or less (50 watts output), Class-C is 300 watts max. input (150 watts max. output), Class-D is SWL; CW only of course and only straight keys. The Gs will be on 3510-3560 kHz and the scoring is as follows: Class-A—Class-A nine points, Class-A—B seven points, A—C five points, B—B four points, B and C three, and Class-C—Class-C two points per QSO. Send logs to carry time, band, call, serial number in and out, class, station description, points claimed, and a signed declaration to: Freidrich Fabri DFI0Y, VOR DEM Steintor 3, 3017 Pattensen, W. Germany, posted before February 28; if you want a copy of the results, enclose an s.a.e. and 1 IRC. My only comment is the weird power input and output relationships which seem bound to cause trouble; we foresee people being in more than one class depending on how their power level is measured!

G2HKU (Sheppey) offers W2BA and K2MG on CW with the big rig, while on the QRP one he found OK1FFZ, GM3KPD, and PA0RU.

Top Band

The arrival of the ON’s on the band has proved to be the big event of the month and immediately ON4UN was putting out his enormous signal; not surprising when one considers just how much wire he has in the ground, but some of the ON’s jumped the gun and were active as early as December 27.

G3BDQ (Hastings) says that for him the highlight was working KL7Y on the morning of January 2; before this season, KL7s were a mere dream on Top Band for
most of us, the path lying as it does right
over the north polar regions. Not satisfied
with that, on January 4, KL7H was heard
at 579, and G3BDQ wraps it up by saying
that he recommends DX to the elderly as
hooking that KL7 has made him feel ten
years younger! The receiving loop and its
special low-noise pre-amp are found to
give a signal/noise ratio improvement of
up to three S-points over receiving on the
transmitting aerial. During the period
under review some 69 assorted Ws were
worked, including N. Dakota for a new
state, plus nine VE5s. W2XN at around
0110 was worked, while screwing the
power right down to one watt the W was
still reporting RST559. The interesting
part of this month was to note how, when
the West Coast W9, W0, KL7 and so on
signals are present, the East Coast ones
seem to just vanish — just like a skip effect
which it probably in fact is. On a different
tack, last time we mentioned WB9HAD
and his tower plus six miles of radials:
G3BDQ reckons he is always a 59 + signal,
and even such as G3RPB have now got
some 200 radials out.

The thought of the G-QRP Club lads
and lasses is towards establishing a calling
and even such as G3RBP have now got
some 200 radials out.

The thought of the G-QRP Club lads
and lasses is towards establishing a calling
and even such as G3RBP have now got
some 200 radials out.

The thought of the G-QRP Club lads
and lasses is towards establishing a calling
and even such as G3RBP have now got
some 200 radials out.

The thought of the G-QRP Club lads
and lasses is towards establishing a calling
and even such as G3RBP have now got
some 200 radials out.

The thought of the G-QRP Club lads
and lasses is towards establishing a calling
and even such as G3RBP have now got
some 200 radials out.

The thought of the G-QRP Club lads
and lasses is towards establishing a calling
and even such as G3RBP have now got
some 200 radials out.

The thought of the G-QRP Club lads
and lasses is towards establishing a calling
and even such as G3RBP have now got
some 200 radials out.

The thought of the G-QRP Club lads
and lasses is towards establishing a calling
and even such as G3RBP have now got
some 200 radials out.

The thought of the G-QRP Club lads
and lasses is towards establishing a calling
and even such as G3RBP have now got
some 200 radials out.

The thought of the G-QRP Club lads
and lasses is towards establishing a calling
and even such as G3RBP have now got
some 200 radials out.

The thought of the G-QRP Club lads
and lasses is towards establishing a calling
and even such as G3RBP have now got
some 200 radials out.

The thought of the G-QRP Club lads
and lasses is towards establishing a calling
and even such as G3RBP have now got
some 200 radials out.

The thought of the G-QRP Club lads
and lasses is towards establishing a calling
and even such as G3RBP have now got
some 200 radials out.

The thought of the G-QRP Club lads
and lasses is towards establishing a calling
and even such as G3RBP have now got
some 200 radials out.

The thought of the G-QRP Club lads
and lasses is towards establishing a calling
and even such as G3RBP have now got
some 200 radials out.

The thought of the G-QRP Club lads
and lasses is towards establishing a calling
and even such as G3RBP have now got
some 200 radials out.

The thought of the G-QRP Club lads
and lasses is towards establishing a calling
and even such as G3RBP have now got
some 200 radials out.

The thought of the G-QRP Club lads
and lasses is towards establishing a calling
and even such as G3RBP have now got
some 200 radials out.

The thought of the G-QRP Club lads
and lasses is towards establishing a calling
and even such as G3RBP have now got
some 200 radials out.

The thought of the G-QRP Club lads
and lasses is towards establishing a calling
and even such as G3RBP have now got
some 200 radials out.

The thought of the G-QRP Club lads
and lasses is towards establishing a calling
and even such as G3RBP have now got
some 200 radials out.

The thought of the G-QRP Club lads
and lasses is towards establishing a calling
and even such as G3RBP have now got
some 200 radials out.

The thought of the G-QRP Club lads
and lasses is towards establishing a calling
and even such as G3RBP have now got
some 200 radials out.

The thought of the G-QRP Club lads
and lasses is towards establishing a calling
and even such as G3RBP have now got
some 200 radials out.

The thought of the G-QRP Club lads
and lasses is towards establishing a calling
and even such as G3RBP have now got
some 200 radials out.

The thought of the G-QRP Club lads
and lasses is towards establishing a calling
and even such as G3RBP have now got
some 200 radials out.

The thought of the G-QRP Club lads
and lasses is towards establishing a calling
and even such as G3RBP have now got
some 200 radials out.

The thought of the G-QRP Club lads
and lasses is towards establishing a calling
and even such as G3RBP have now got
some 200 radials out.

The thought of the G-QRP Club lads
and lasses is towards establishing a calling
and even such as G3RBP have now got
some 200 radials out.

The thought of the G-QRP Club lads
and lasses is towards establishing a calling
and even such as G3RBP have now got
some 200 radials out.

The thought of the G-QRP Club lads
and lasses is towards establishing a calling
and even such as G3RBP have now got
some 200 radials out.

The thought of the G-QRP Club lads
and lasses is towards establishing a calling
and even such as G3RBP have now got
some 200 radials out.

The thought of the G-QRP Club lads
and lasses is towards establishing a calling
and even such as G3RBP have now got
some 200 radials out.

The thought of the G-QRP Club lads
and lasses is towards establishing a calling
and even such as G3RBP have now got
some 200 radials out.

The thought of the G-QRP Club lads
and lasses is towards establishing a calling
and even such as G3RBP have now got
some 200 radials out.

The thought of the G-QRP Club lads
and lasses is towards establishing a calling
and even such as G3RBP have now got
some 200 radials out.

The thought of the G-QRP Club lads
and lasses is towards establishing a calling
and even such as G3RBP have now got
some 200 radials out.

The thought of the G-QRP Club lads
and lasses is towards establishing a calling
and even such as G3RBP have now got
some 200 radials out.
being FH4ED. It is understood that when he gets there he will remain for about a month, and be followed by FH4EC who will also spend a month there.

**Twenty**

Our first reporter on this band is VK4CPD/MM aboard the *Mobil Flinders* and stationed in France. His letter indicates that he is now operating an Atlas 210X on CW and SSB and has in addition a two-metre rig, although the latter has just one contact, through the Marseilles repeater to the surprise of the other users! The ship is Australian manned and owned by Mobil Australia, but on time-charter to Exon, regularly running round Western Europe and the Mediterranean area, so he hopes to work many Gs, particularly as he used to be G2KAK, well known in Suffolk and then Buckingham-on-Sea. Looking at the log extract page, on Twenty we find him working G4LGJ, G3MUL, UB4EXP, PA3AOB, DL1EBP, G3WU, H45KK, G0AEP, G3BAZ, IK4HLD, EA2BFE, IK1CC, N5BYR.

G3BQD mentions just one SSB QSO on Twenty with a VK6. A couple of non-DX type amateurs were visiting the station, and just to demonstrate John put out a CQ on Twenty SSB, and right back came Twenty with a VK6. A couple of non-DX users! The ship is Australian manned and owned by Mobil Australia, but on other Pacific stations were noted. The ship is also going to be spent a month there.

It totalled to SSB QSOs with BV2HA, W8JBR, K2AGJ, W7LNI, CX5BW, N4VZ, N4UB3, 4X4DX, K9QB, WA4CNJ, VP8PTG (Walker Creek, Falklands, and ex-G4PTG).

**Fifteen**

G2HKU offers CW with W1WEF, W8JBR, K2AGJ, W7LNI, CX5BW, N4VZ, N4UB3, 4X4DX, K9QB, WA4CNJ, VP8PTG (Walker Creek, Falklands, and ex-G4PTG).

G3BQD offers as his contribution VU7AQJ, N12B, UP2BZZ, SP6TJY, ZC4EE, HBCCZS, G0CBB, G0DGR/M, G4WZX.

Turning to G3NOF, Don made SSB QSOs with A2RLL, D6QL (Yasme), HK1LAQ, T12LTA, VE3FXT/H, VE3FXT/ZS4, V1AQZ, VINVC, VK3EJ, VK3KJ, VK5GH, VK6AHW, VK6CMW, VK7KMR, W81LC/J6L, VP9JI, ZD7CW, ZD8RP, ZS1LW, ZS2JI, ZS2ND, ZS3Z, ZS5JF, ZS5NN, ZS6AJZ, ZS6JCF, ZB3CA, 3CIMB, 7P8BE, and 9J2LG.

**Bits & Bobs**

G3KPO writes from the Wireless Museum on the Isle of Wight, to comment on the amusing cartoon by GW3COI in the January issue. This showed what was supposed to be a Zepp aerial but G3KPO points out that this was a misnomer as it was quite clearly a dipole with open-wire feeder, in the centre. The main characteristic of the Zepp, of course, was that it was always end-fed, normally with a half-wavelength long and whilst one wire of the feeder was connected to the aerial the other was left 'up in the air' so to speak. The aerial was originally designed for use with the Zeppelin airships.

We were highly amused by a letter from G3AAJ, of AMSAT, who wrote to ask whether he could quote from an article in *Short Wave Magazine* dated, would you believe September 1949, p. 530, which discusses the business of an SWL visiting an amateur, in somewhat ironic style.

Next we come to a letter from G4RVV, regarding the question of GB QSLs and the RSGB Bureau. He says that over a year ago he took over the GB sub-manager's duty from the late Mr. Newman, but although this was published in *Radio Communication*, and printed in the 1986 *Call Book*, envelopes are still being sent to the address of Mr. Newman, and indeed to his predecessor! Mrs Newman has in fact now moved. Temporary arrangements have been made to forward any mail to G4RVV, but obviously this cannot continue indefinitely. Would readers therefore please note that all envelopes for collection of cards for GB stations should be sent to G4RVV-QTHR in 1985-on Call Books. If you have any ideas of how many cards there will be, send in envelopes to suit — a 5 x 7½ inch envelope and 13p stamp will hold about 20 cards. Send the cards in to G3DRN or G4RVV as soon as possible, and don't wait for the arrival of the GB station's cards. Cards arriving at G4RVV a year later may well never be collected if it was a one-off event. Uncollected cards are only held for three months and then destroyed.

The G-QRP Club writes to cover the OK-G QRP tests; these will be on January 31 and February 1, 1987 and may thus just be noted. The time and frequency schedules are as follows: 0800-0900, 7030 kHz; 0900-1100, 10106 kHz; 1100-noon, 14060 kHz; noon-1300, 21060 kHz; 1300-1430, 14060 kHz; 1430-1500, 10106 kHz; 1600-1700, 7030 kHz; 1700-1900, rest; 1900-2100, 3560 kHz (or alternative 3570-3580); 2100-2300, 1900 kHz (alternate 1840 and 1815 kHz). The same routine on both days. Send logs to G8PG, 37 Pickering Road, Graysby, Merseyside L49 3ND.

An interesting letter from G2BUV, ex-ON4KT. Ted notes that we made some comments about ZA operations, and he writes enclosing a QSL card which he got from an operation in ZA back in 1957, when DM2ABC had permission to operate from June 12-15 — and G2BUV was one of the lucky ones to make contact.

A letter from G3ATU starts off by remarking that "this is a voice from the past calling G3KFE!" (We wonder whether this in one of these wonderful long-delayed echoes?) Stan has just hooked 5AOA on 21005 CW and wonders whether he is the same as 5AOAA mentioned last month. We don't know for sure.

MISSEL's Contest Calendar next; we see the February 14-16 slot occupied by the YL-YM contest, and on February 21-22 the ARRL DX Contest CW leg, the rules being as per last year. Over the weekend February 28-March 1 a delightful one (but one doubts there'll be any U.K. activity) called the "Rat's Nest and Crooked Stick Sprint" and goes from 2300 to 0400 GMT.

A note from G3ZPF indicates he has nothing to report this time apart from the arrival of the second 5BDXCC plaque to replace the original tatty one; plus the arrival of David's GW4OXB 100 Prefixes plaque which is really superb — except that the engraving shows him to be G32PF!

The last one is a letter from Mr. Heriz-Smith of the DTI RRD who points out the next Class-B licence prefixes will be in the G7 series once the G1 series are used up.

**Finis**

That's it for this time. For the next one, please note the new address for your letters namely "CDXN", *Short Wave Magazine*, Eneco House, The Quay, Poole, Dorset, BH15 1PP. See you next month!
Another Look at the S.C.D. Transmitter

To Quote...

"It is something of an irony that at a time when technology is leap ing ahead at a pace that leaves most of us gasping for breath, groups have arisen in most scientific fields which emphasise simplicity. Most of us have read about "Appropriate Technology" groups, and in America the slogan K.I.S.S. (Keep It Simple Stupid!) has appeared."

So began an article which I wrote for this magazine seven years ago in January 1980. I suppose I could have easily begun an article of today with the same words. Perhaps in 1980 I thought that technology was moving towards greater simplicity and being more appropriate for the tasks in hand. How wrong can anyone be! The opening sentences might not have been prophetic but the article itself was well received. By the way, if you do happen to have a copy of the January 1980 Short Wave Magazine and decide to look at the article, let me tell you that there should not be a capacitor between L2 and the base of TR4. I don't want to start the correspondence on that one again! Nor do I want the letters asking me what "S.C.D." means. At a loss to think of a snappy title for the project I used the initials of my eldest son: Stephen Christopher Dobbs.

The article was the first in a series called "The S.C.D.: A Low Cost, Low Technology, Amateur Bands Transceiver Project". That first part described the Transmitter Board. Later articles went on to additional circuit boards to form a complete simple transceiver. Usually old magazine articles are best left to die a quiet death as they are superceded by the more youthful later contributions. Somehow, the S.C.D. seems to have gone on beyond its years and respectability.

Last year I saw it appear in extracts in the journal of the Australian QRP Club and a few weeks ago I worked a station on 80 metres who was using an S.C.D. transmitter. At about the same time John Beech, G8SEQ, wrote to me about versions of the S.C.D. that had been recently attempted on 80 metres. So that gave me an itch to go back and rebuild the S.C.D. again for myself. I already had a spare etched circuit board: the G-QRP Club used to sell etched S.C.D. boards.

These days there is a lot of QRP CW activity on 80 metres therefore I decided to build the new S.C.D. for that band. In its original form the circuit ran about a 1 watt of RF output on a good day. The power limit for claiming valid QRP QSO's for the G-QRP Club is 3 watts of RF output, so I decided to make the S.C.D. Mk.II capable of delivering the "legal limit".

The circuit diagram of the S.C.D. Mk.II is shown in Fig. 1. The oscillator is still the FET Colpitts circuit of TR1 followed by an FET buffer, TR2. I choose to use the J304 FET transistors that John Birkett has been selling cheaply, although the original 2N3819 transistors or the J310 would both do the job. The variable capacitor, VC1, provides a little upward frequency movement of the crystal to allow TR1 to be a Variable Crystal Oscillator (VXO). The capacitor I used for VC1 is an airspaced variable of around 50pF but my original tests were done with a 65pF foil trimmer. It is only possible to pull the frequency a few kHz (usually about 3 kHz) and if the value of VC1 is too large oscillations will cease if too much pulling is attempted.

TR2 is the driver transistor. This stage needs a little bit of "wellie" to drive the PA, TR4, into Class-C. The original S.C.D. keyed the emitter of TR3 but this technique could give rise to problems if the leads to the key were long. In this version the power supply to TR3 is keyed using a DC switching transistor, TR5. The emitter resistor, R8, is then used to control the drive to the PA. The switching transistor, TR5, is a pnp type and any pnp device capable of handling the current drawn by TR3 would serve the purpose. C9 provides slightly softer keying and C7 decouples the keyed supply line. The RF choke in the collector of TR3 is homemade from 7 turns (try and get the 10 on if you wish) wound through a ferrite bead.

Another change to the PA circuit is the addition of a loading resistor, R9, across the secondary of T1 to aid stability. Usually lower values than 100 ohms are used in this arrangement, the..."
lower the value (10 to 50Ω is common) the more the power dissipated in the resistor, and the lower the output power of the stage. The value of 100Ω used in this circuit seems a decent compromise as the PA has shown no signs of instability even when hooking components into the stage during testing.

The PA collector load is another little homemade choke wound on a ferrite bead. The values given in the circuit, with R8 at 100Ω, gave me almost exactly 3 watts of RF output. One slight problem is that at this power level the impedance of the output, taken from the collector, will be somewhat less than 50Ω so this precludes the use of a 50Ω-in/50Ω-out conventional lowpass filter. It would be possible to wind a suitable matching balun transformer to suit a 50Ω lowpass filter but I just fed the output of the transmitter directly into my Z-match antenna tuning unit. An ATU which provides tuning, hence harmonic suppression, should be enough to clean up the signal prior to transmission.

The S.C.D. Mk II
Building the Transmitter

The original S.C.D. was built on etched circuit board using the technique known as "island construction". In this system the components are soldered onto etched copper pads, these being on the component side of the board, so that no holes are required. Apart from the obvious advantage of not having to drill lots of small holes, the board will accept a wide range of physical sizes of component since they do not have to fit the hole spacings. It can be annoying when following someone else's PCB layout, or using a commercial board, to find that the available components, although of the correct value, do not fit the holes.

Although some constructors shy away from printed circuit board making, this board is very simple to produce. The etch resistant material is sticky backed plastic of the Fablon type. To make a copy of the board shown in Fig. 2, a piece of copper clad board of the correct size is covered with Fablon to mask the copper and the layout is drawn or traced onto the plastic in pencil; a ruler may be used to tidy up the lines and then they are cut using a modelling knife. The positions of the components between the pads are shown: note that each pad becomes a small island of copper. As much copper as possible is left on the board between the non-etched portions to form a ground mat. This not only provides a degree of screening for the circuit elements but also provides plenty of convenient points for short earth returns on grounded components.

The layout for the components is shown in Fig. 2. It is best to build the oscillator and buffer (TR1 and TR2) stages first and test these by listening for the signal on a receiver. Most crystals should oscillate in this circuit although some of the older 10XJ types can be sluggish. I used my range of 80-metre HC6U crystals bought over the years from the surplus stock of John Birkett. It is not a bad idea to test the circuit first without VC1 (short out its position) to hear the oscillator run.

The positions of the windings of T1 are shown in the layout of Fig. 2, (attempt to keep the leads on T1 short). The PA transistor, TR4, requires a heat sink. The layout shows that I mounted my TR4 horizontally which means bending the leads of the transistor; take care if you do this, these leads can fracture if not bent carefully. It is quite helpful to build up the two stages TR3 and TR5 before the PA is added, and they can be tested; this at least
sorts out the driver and the keying stages before the PA is added. The output from T1 could be checked using a diode probe and a meter.

The completed circuit must be tested using a low impedance load for the output, say by feeding it into a wattmeter/load or a 50Ω non-inductive load and measuring the RF output with a diode probe and meter. The value for R8, 100Ω, gave me the 3 watts I required, though this may vary with different examples of the board; R8 can be adjusted to form the required output.

The inset on Fig. 2 shows the switching arrangement I used with the board. It is simply a double pole change-over toggle switch. Half the switch changes the antenna from receiver to transmitter and the other half applies the 12 volts to the board during transmit periods. The RF Change-over circuit I described in December's "Notebook" could be used in this circuit but a switch would still be required to apply the 12 volts on transmit. The board could not be left on the whole time because the oscillator would be heard in the receiver during receive periods. I did not mute the receiver on transmit but turned down the audio gain control and listened to the signal to monitor my keying.

The S.C.D. Mk.II is housed in a Minffordd Engineering aluminium box type A25 which provides plenty of room. The only front panel controls are VC1 and SW1.

Well — the S.C.D. still lives and performs very well on 80 metres. It is worth looking at 3560 kHz as a possible frequency: this is the QRP Calling Channel. 3579 kHz is also used because of the cheaply available crystals on this frequency but sometimes some "heavy" RTTY is on this channel.

SOURCES:
The A25 All-Aluminium Box: Minffordd Engineering, Sun Street, Ffestiniog, Gwynedd. Tel: 076676-2572.
The 2SC1096 transistor (and perhaps 80-metre CW crystals): John Birkett, 25 The Strait, Lincoln, LN2 1JF. Tel: 0522-20767.
3560 kHz crystals in HC25U mountings: P.R. Golledge Electronics, Merriott, Somerset. £4.00 ea. (£3.50 to members of the G-QRP Club).
FT-50-43 cores: TMP Electronics, Unit 27, Pinfold Lane, Buckley, Clwyd. Tel: 0244-99563.

---

**"Practically Yours"**

*with GLEN ROSS, G8MWR*

I HAVE received several letters from readers asking for a simple explanation of the effects of inductive and capacitive loading of aerial systems and how it affects the performance compared with a full size aerial. Let me say straight away that there is no such thing as a simple explanation of these things and that I am not a top authority on aerial systems. If you really want the full inside information you will need to consult the text books, and particularly the writings of Les Moxon, G6XN, and John Heys, G3BDQ. However a simpler introduction may not come amiss before you struggle with weightier tomes on the subject.

**The Basics**

The basic idea of inductive or capacitive loading, or even a combination of both, is to make an electrically short radiator more efficient. This can be taken to the point where an increase of ten times can be achieved. For our purposes a short radiator can be taken as being one whose length is less than a quarter wavelength at the operating frequency. As a quarter wave on Top Band is around 130 feet long there are few amateurs who can use anything but a short aerial on this band, and probably also on eighty metres.

The equivalent circuit of a short aerial is shown in Fig. 1 and this also shows a representation of how the various circuit elements are obtained. C represents the effects of capacity to earth of the system, Re represents the resistance that would dissipate the amount of power lost due to poor earthing arrangements and Rrad is the radiation resistance.

**Problems**

Radiation resistance is a term that causes problems to a lot of people in that it seems to indicate the aerial's wilful refusal to radiate. This is *not* the case, and in fact the opposite is true. As far as the aerial is concerned all power radiated is a loss of power because it is no longer in the circuit (aerial). The efficiency of an aerial can therefore be calculated as the equivalent resistance that would dissipate the power radiated (lost). Obviously, then, the more efficient the aerial and the more power it actually radiates the higher will be the radiation resistance. This sounds all wrong but if you follow the argument through carefully it should become clear.

**Loading**

For our example we will use a four-foot rod aerial and assume that we are going to use it on Top Band. This may sound ludicrous, but it would be around the length that you could
conveniently use as a mobile whip and it does produce some figures which are large enough to grasp and where improvements of a few percent make noticeable changes in those figures.

The usual way to get this aerial to work would be to inductively tune it with a loading coil at the base of the aerial. We now run into a problem; the loading coil itself will have losses due to the resistance of the wire and its capacity to earth, so the available RF power is now shared between the radiation resistance, the earth resistance and the coil losses.

**Earth Resistance**

Let us see what sort of earth resistance we may get in a typical system. It is impossible to give an exact figure as it will depend to a large extent on the nature of the soil and how much moisture there is around the earthing system. If we assume that you have driven four or five one inch copper tubes into the ground to a depth of 10 feet or so, then you would probably find an earth resistance of around ten ohms. This represents power lost and the only way you can get round this is to drive in more pipes or bury a huge earth mat of wires. The use of a counterpoise earth is not a satisfactory answer because this will have capacity to earth and so will generate earth currents, and hence losses.

**Radiated Power**

With a four-foot rod so much inductance is required to bring it to resonance that even a very high ‘Q’ coil may have around twenty to thirty ohms resistance. The rod itself will have a radiation resistance of less than 0.1 ohm and, as all these resistances are in series, only 1 or 2 percent of the available power will be radiated. If we call the losses in the coil Rc then the percentage of the power available which will actually be radiated can be calculated using

\[
\frac{\text{Rrad}}{\text{Rrad} + \text{Re} + \text{Rc}} \times 100 \text{ (percent)}.
\]

The approximate radiation resistance of short aerials on Top Band can be obtained from the following table:

<table>
<thead>
<tr>
<th>Length in feet</th>
<th>Rrad</th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
<td>&lt;0.5</td>
</tr>
<tr>
<td>20</td>
<td>&lt;1</td>
</tr>
<tr>
<td>30</td>
<td>1.5</td>
</tr>
<tr>
<td>40</td>
<td>2.75</td>
</tr>
<tr>
<td>50</td>
<td>4.0</td>
</tr>
<tr>
<td>60</td>
<td>6.0</td>
</tr>
<tr>
<td>70</td>
<td>8.0</td>
</tr>
<tr>
<td>80</td>
<td>12.0</td>
</tr>
</tbody>
</table>

From this table it is obvious that any vertical that the average amateur can put up is going to have a Rrad of under three ohms.

**Analogy**

The idea that a loading coil consists of enough wire to make up the amount needed to increase the length you have up to a quarter wavelength, whilst it may be a simplistic way to grasp what is going on, is not what is actually happening. The inductance in the coil is actually tuned by the capacity existing between the part of the aerial above it and earth. This is shown in Fig. 2, which also shows the three common ways of installing the required inductance and illustrates the way in which the effective tuning capacity which is available decreases as the coil is moved up the rod. When the coil is at the top of the rod it is tuned only by its own self-capacity, there being very little capacity to ground. Under these circumstances the contribution to radiation efficiency would be virtually nil and we could get a greater increase by short circuiting the coil and simply using it as a rudimentary form of "capacity hat".

**The Hat**

This is a device for increasing the capacity of the aerial to earth and means, in the case of a coil loading arrangement, that the number of turns required is less and therefore the losses are lower than without it. If we double the aerial capacity then we need a coil with only half the original inductance to bring the system to resonance. For the same ‘Q’ value this will have only half the losses of the original coil; if the coil losses were originally greater than the earth losses, this can result in a doubling of radiated power. An extra improvement can be obtained because we can now use a larger diameter wire to wind the coil and hence reduce the losses even more.

**Radiation**

Let us put some figures to the example four-foot whip on Top Band and see what we come up with. We will take ground losses as equaling ten ohms, although this would be exceptionally good for a mobile installation and assume a lossless loading coil. Under these conditions the maximum efficiency which could be expected would be around 0.5 percent and so, using a ten watt transmitter, a radiated power of about 20 milliwatts would be obtained. In the real world coils have resistance and a typical loading coil would have a ‘Q’ of around 150. This, using normal construction techniques, would have a resistance of about 50-60 ohms and would give a radiated power of some 5 milliwatts of power and an efficiency of about 0.07 percent. If we were able to make a coil with a ‘Q’ of around 350, and that is far from easy, the coil losses could be reduced again by a factor of some 50 per cent, or perhaps a little more, resulting in a radiated power of about 10-12 milliwatts from our ten watt driver.

**Extension**

The only other solution is to lengthen the whip; let us use an increase to eight feet as our new example. This has an immediate advantage because the radiation resistance increases as the square of the length of the whip. Thus we have, for the same earth and coil losses, quadrupled the Rrad. Even more is to come because the capacity of the whip to earth is now double what it was, and so a significantly smaller coil (and hence even lower losses) can be used to bring the system to resonance. The total effect of all these points is to raise the efficiency to something in the region of 1 percent which is about a tenfold improvement over the original four-foot design. If we increase the length to twelve feet we get another doubling of radiated power without counting in the improvement due to lower coil losses.

**Final Notes**

It is hoped that this article may have cleared up a few points for you. There is a lot more to aerials than this simplified and "bare bones" approach can show. That the figures given are generalised is due to the fact that it is very difficult to be precise. That is one of the joys of aerials; there is still plenty of scope for a "suck it and see" approach. We have used Top Band as an example but the general ideas are applicable to any band; only the figures will change!
An Indoor Aerial for the HF Bands

practical details for a loft-mounted radiator

P.C. COLE, G3JFS/DA1PE

As permission to put up an outside aerial at my present location was not forthcoming, I decided to use a loft mounted system in order to get on the air with my DA1 call. Nothing startling was expected in the way of performance, but considering the poor conditions being experienced at the present phase of the sunspot cycle, results have been very good and these notes are therefore offered in response to pleas for practical information on aerials for use in difficult situations. It is hoped that they will give ideas and encouragement to other operators who are inactive because they do not have the facilities to put up a good outside aerial.

Choice of Aerial System for Indoor Use

Because of the restricted space the choice of an aerial system for indoor use is usually limited to some form of simple wire aerial, except perhaps on 10/15 metres where it might be possible to accommodate a minibeam of some sort. Undoubtedly the simplest aerial for multiband working is a random length end-fed wire with a universal ATU: although this can be made to give reasonable results it is not recommended for normal use indoors as it will almost certainly cause severe interference to domestic radio and TV equipment as well as having a rather unpredictable performance. Past experience has shown that a properly balanced aerial system — one that is centre-fed with a balanced twin feeder and coupled to the transmitter by a suitable matching unit — will give the best results in the conditions under consideration. When compared with an end-fed wire it will create fewer interference problems (though it may not completely eliminate them) and will generally radiate more efficiently simply because it does not have the problems connected with the use of tuned feeders are to be normal operation.

Past experience has shown that a properly balanced aerial system — one that is centre-fed with a balanced twin feeder and coupled to the transmitter by a suitable matching unit — will give the best results in the conditions under consideration. When compared with an end-fed wire it will create fewer interference problems (though it may not completely eliminate them) and will generally radiate more efficiently simply because it does not have to rely on the mass of house wiring and plumbing to form part of the system.

Fig. 1(a) gives the details of the aerial used at DA1PE for operation on the 14 — 28 MHz bands and this is nothing more than a centre-fed doublet aerial with simple broad-band radiating elements fed by 300-ohm twin balanced feeder. The great advantage of this aerial, and what makes it such a good choice for this particular application, is that providing the top is symmetrical and it is fed with a low-loss balanced feeder all tuning adjustments can be done with a tuning unit at the operating position. In this case the length of the top is not at all critical since the radiator and feeder are resonated as a whole, but this does put greater demands on the ATU because it has to cope with very wide variations in impedance at the bottom end of the feeder. However, where a suitable matching unit is employed this aerial is very versatile and will work with good efficiency so long as the overall length of the top is greater than about a quarter of a wavelength at the desired operating frequency.

Construction and Installation

For use indoors, where the aerial is protected from the effects of wind and rain, any light-weight materials may be used so long as the insulation is good and the electrical connections are sound. The actual installation will, of course, depend very much on local circumstances, but the principle aims should be:

(a) To make the dipole element as long as possible.
(b) To get it as high up as possible in the apex of the roof.
(c) To keep the elements clear of metallic obstructions.
(d) Maintain the best possible physical symmetry.

If necessary the elements may be drooped (inverted-V style), or if the Fig. 1(b) style of construction is used, may be fanned in the vertical or the horizontal planes. Don’t worry too much if you can’t meet all of the aims — the aerial isn’t suddenly going to stop working because of a bit of unbalance — just do the best that you can within the constraints imposed by local conditions.

Feeders

Aerials of this type are usually fed with an open wire line in order to keep feeder losses to a minimum, but often this is not very easy to install indoors. Of course, open wire line would be entirely satisfactory from a technical view-point, but 300-ohm ribbon feeder is far more convenient and it can be used without any loss of performance providing it is not too long and is properly installed. That means keeping it at least a couple of inches clear from walls etc., and as far away as possible from other conductors, whilst avoiding sharp bends or kinks in the cable.

Aerial Tuning and Matching

The secret to getting good results with any aerial of this type is in the art of matching the generally unknown impedance at the input of the feeder to the 50/80-ohm output impedance of the transmitter. As noted earlier, the impedance to be matched varies considerably over the operating frequency range and although broad-band elements help to reduce the rate of change of impedance, so avoiding the need to retune after small shifts in frequency, there will still be big variations from one band to another — requiring the use of a very flexible matching unit for normal operation.

Designs for suitable matching units and detailed discussions of the problems connected with the use of tuned feeders are to be found in most handbooks dealing with aerials and transmission lines. However, the subject can be very complex and off-putting to the less technically minded; so, at least to start with, if you are a...
newcomer to tuned feeders it's a good idea not to get too involved with the theory until you have gained some practical experience in the subject.

Fig. 2 gives the circuit of a link coupled aerial tuning unit suitable for use with resonant feeders which will cope with most practical situations providing you are prepared to experiment with the component values, coupling and tapping points. L2 should be a high-Q inductor of similar diameter and wire gauge to the PA tank circuit (assuming a valve PA) and preferably made of air-spaced coil stock so that accurate tapping points can be made to it. The LC ratio of the tuned circuit is not unduly critical but as a simple rule of thumb, 'L' should be chosen to resonate at the operating frequency with a capacity of about 1.5pF per metre, i.e. 30pF for 20 metres (or 60pF per section for a split-stator capacitor) and pro rata for the other bands. For maximum flexibility some control of coupling is essential and a variable or swinging link coil, L1, would be ideal in this respect though it is not the easiest to construct. Satisfactory, but somewhat less versatile, alternatives are tappings on the link, or a resonant link circuit which may be detuned to control the degree of coupling, as shown in Fig. 2(c).

Adjustment of the ATU is largely a matter of trial and error to get a low SWR with maximum efficiency. However, as there are many possible permutations of tuning and tapping points, the procedure summarised below (and in Fig. 3) is suggested as a good starting point:

a) Tune the transmitter into a suitable dummy load using the lowest power needed to operate the SWR bridge.

b) Connect the transmitter to the matching unit, and using miniature probe or crocodile clips to make temporary tappings, set T1, T2 taps across a suitable number of turns for the band in

### Tables of Values

#### Fig. 2 (for 14 MHz operation)

- **L1** = 20 turns, 18 swg, 1 1/2" dia., 10 tpi
- **C2** = 150pF (close-spaced unit is suitable)
- **L2** = 3t at/over centre of L1
- **C1** = 250 x 250pF Tx type, variable
- **C3** = 150pF transmitting type, variable

**Note:** tap L1 and L2 as necessary for the higher frequency bands.

#### Fig. 4 (for 14 MHz operation)

- **L1** = 10t, 16 swg, 1 1/2" dia., 5 tpi
- **C1** = 500 x 500pF Rx type, variable
- **L2** = 3t over the C1 end of L1
- **C2** = 250pF Tx type, variable

**Note:** tap L1 and L2 as necessary for the higher frequency bands.

Fig. 2: The link coupled parallel-tuned matching unit for use with balanced feeders showing: (a) variable or ‘swinging’ link coupling; (b) a tapped link winding; (c) a tuned link winding; (d) the use of a single-ended tuning capacitor.
Balanced output
50/70ohm
from Tx

Unbalanced output
C1a
C1b
C2

Fig. 4 A Z-match type of matching unit suitable for use with low impedance balanced loads. This circuit also works well with a wide range of unbalanced loads.

use. Tap a 300-ohm resistive load across about one-third of the coil (points T3, T4) and adjust tuning, tapping points and coupling for a low SWR with the recommended tuning capacity of about 1.5pF/metre. (N.B. The load does not need to handle a lot of power so could be made up from a number of ordinary carbon resistors in parallel, e.g. 5 x 1500-ohm 1-watt types in parallel would give 300-ohm at 5-watts.)

c) Connect the aerial feeder in place of the 300-ohm dummy load and still using the lowest possible power return and/or reset tappings for a low SWR. Because the input impedance of the feeder is almost certain to be complex, i.e. resistive and reactive, these settings are likely to be quite different from those in (b), but in most cases it will be possible to cancel out the reactance by retuning C1, and new tapping points will take care of the load resistance.

d) Because this ATU is parallel tuned it works best with a medium-to-high impedance load and so it is inevitable that at some operating frequencies the feeder line will present an awkward impedance to the ATU that is difficult to match. If this happens the impedance may be changed by increasing the overall length of the feeder by about \(\frac{\lambda}{8}\) to \(\frac{\lambda}{4}\) at the offending frequency — it might even be possible to find a compromise length that will allow easy matching on all of the bands to be covered.

e) Log the settings for future use.

**Testing the Aerial and ATU**

Having found a suitable combination of ATU settings, run full power through it into the aerial to check for arcing in the tuning capacitor or over-heating of the coil. In the event of arcing the problem will probably be due to insufficient loading of the tuned circuit — which can usually be corrected by retuning with the load tappings further apart. Arcing will, of course, also occur if the plate spacing of the tuning capacitor is too small; as a guide, I find that a properly adjusted ATU using an old-fashioned receiving type twin-gang 500pF capacitor for C1 will handle 100-watts of HF CW/SSB without flashover (though one would normally try to use a much wider spaced capacitor in this position).

Coil overheating, if it occurs, is most likely to be in the link winding and will be due to using too few turns for the link L2, or to too loose a coupling between L1 and L2.

**An Alternative ATU**

As has been noted earlier the link coupled, parallel tuned, ATU doesn’t cope too well with low impedance loads, particularly when they are also reactive. If you have trouble in this respect then try the circuit of Fig. 4 which is a simple form of Z-match based on a pi-section coupler. I’ve used this circuit many times with a wide variety of different loads and it seems able to handle almost anything below a few hundred ohms, although it does tend to be slightly less efficient and less well balanced than the more traditional coupler. This is a small price to pay for greater flexibility, especially as this circuit also has the advantage of being equally useful with a wide range of unbalanced loads from low impedance coax to random length end-fed wires.
Operation at Lower Frequencies

The 24 foot long dipole as described radiates well on all of the HF DX bands but is very sharply tuned on 14 MHz where it is only about \( \lambda/3 \) long. To improve the performance on this latter band, end capacitive loading was added to the dipole elements using the arrangement shown in Fig. 5(a), which with the dimensions given effectively lengthened the aerial so that it was electrically somewhat longer than \( \lambda/2 \) at 14 MHz. No doubt this changes the performance at the higher frequencies (though tests would be needed to find out if this were for better or worse) but it does bring another benefit in that the loaded aerial works quite well on 10 MHz and is usable on 7 MHz where both VK and ZL have been worked (though I wouldn’t claim that this was an everyday happening).

Unfortunately there is a limit, mainly dictated by the available space, to the amount of end loading that can be added and so any further reduction in the dipole resonant frequency must be obtained by inductive loading. Fig. 5(c) shows one possible way, but as an alternative to conventional loading with lumped inductance I can recommend another little-known, but nevertheless interesting approach to shortened aerials based on an article by G2QM in the January 1958 issue of the RSGB Bulletin. Briefly the idea is to take the length of wire needed for a full-sized aerial (\( \lambda/2 \) at 7 MHz in this case), erect as much as possible of the centre portion between available skyhooks and then wind the remaining lengths of wire at each end onto suitable formers in a non-inductive way so as to retain the open self-inductance of the wire.

Fig. 6 shows details of the aerial loaded to \( \lambda/2 \) resonance at 7 MHz using this method. The loading ‘coils’ are made of twin bell wire (used only because it was available) wound onto flat cardboard frames about 2 feet square cut from old cartons brought home from the local supermarket. These are quite good enough for use in a dry loft and they form a nice lightweight unit which can be hung from the end of the aerial or the rafters on a piece of string. As my loft is easily accessible I terminated one end of each loading winding with a heavy duty crocodile clip, so a rapid band change can be made by a quick dash up the stairs to ‘clip’ or ‘un-clip’ as necessary.

Note that there is no special significance in the loading frame dimensions given as these were chosen purely for convenience. In practice it would be a good idea to go for the largest, most open, form of construction possible so as to get the maximum amount of radiation from the loading sections. Also, the length of the loading wire is not at all critical as the object is to get the current maximum near to the centre of the aerial and a few feet either way is not going to make a lot of difference when using tuned feeders.

Results and Final Comments

In the course of 9 months’ operation using the various forms of this aerial which have been described here, I have made over a thousand QSO’s with 75 countries. These have been mostly on 14/21 MHz although I have also had quite a lot of contacts on 7, 10 and 28 MHz (mainly within Europe). Promoted by G3TXF’s “Oblast Corner” column I did a quick check through the log and was surprised to find that I had worked 85 different regions, including many of the more distant and rarer ones. However, no extravagant claims are made for the performance as it must be appreciated that any indoor aerial is very much a compromise and results will depend a lot on local conditions and operating skill, as well as on the care and effort put into the installation. Still, whatever the short-comings and disadvantages, if you cannot put up any form of outside aerial the loft-mounted aerial is the next best thing as it does at least make HF band operation possible and with reasonable DX capabilities. My 1000-or-so contacts are evidence of this.

Reference:

Option 6 is an "edit" mode. Enter the record number for the record to be edited and overwrite each part as necessary. Don't forget the <cr> at the end of each field, whether or not it has been changed.

Option 7 enables records to be saved to tape or disc. Enter a filename when requested. If the disc is used, the save and replace same name is permitted.

Option 8 will print tabulated fields of each record to the printer. Any mistakes in normal data entry, option 3, may be corrected using option 6, the edit mode.

Finish by saving the log with option 7. This can be loaded back for tape operation if required.

Any mistakes in normal data entry, option 3, may be corrected using option 6, the edit mode.

Finish by saving the log with option 7. This can be loaded back for tape operation if required.

Any mistakes in normal data entry, option 3, may be corrected using option 6, the edit mode.

Finish by saving the log with option 7. This can be loaded back for tape operation if required.

Any mistakes in normal data entry, option 3, may be corrected using option 6, the edit mode.

Finish by saving the log with option 7. This can be loaded back for tape operation if required.
REVIEW

KW Ten-Tec Model 4229 High-Power Aerial Tuning Unit Kit

E. H. TROWELL, G2HKU

A REMINDER of the days when KW Electronics, then of Dartford, Kent, had available a range of kits for the home constructor in addition to their ready-built equipment, is the KW Ten-Tec Model 4229 High Power Aerial Tuning Unit Kit rated at 2kW RF power. This unit is also available ready made, individually tested and known as the Model 229 from KW Ten-Tec Ltd., of Chatham, Kent.

The kit is very well packed in some 6 boxes, 18 packets and three heavy gauge polythene bags contained in a transit box similar to those used for the Argosy and Century 22 transceivers. An 8-page Owner’s Manual (as supplied with the ready-built version) and a 20-page Assembly Manual are provided. The latter contains interior and exterior photographs together with detailed assembly drawings and step-by-step instructions. The quality of all parts used is, as one has come to expect from this company, first class.

The ATU

The tuner is described as a reversible “L” circuit covering the entire range between 1.8 and 30 MHz and capable of matching the nominal 50-ohm unbalanced output of transceivers or linears into a wide range of unbalanced or balanced load impedances. The maximum output matching range at full power is 3000 ohms with the maximum balanced load through the balun of 500 ohms. The variable capacitor (only one is used) is rated at 3.5kV.

When assembled the cabinet size is 5 1/2” high by 12 1/2” wide by 13 3/4” deep, finished to match the current KW Ten-Tec range in black with bronze lettering and fitted with the usual stainless steel tilt bail and weighing 9lbs.

Front panel controls are, top left, the illuminated meter reading on the top scale 0-2kW, on the second scale 0-200 watts, the lowest indicated reading being 10W, and the lower one reads SWR. Below this are three push button switches, the left one reading FORWARD/REVERSE power or SWR depending on the position of the third push button which selects either POWER or SWR readings. The centre button selects either of the power ranges. In the bottom left corner is the SWR SET control which has an easy setting feel to it. Next to these is the large CAPACITOR tuning knob, similar to the tuning control of the Argosy and Corsair but graduated 0-10, and is a direct drive to the wide spaced capacitor. Tuning is fairly broad and a reduction drive is not really warranted. Next to this is the eleven position heavy duty silver plated switch offering five low and five high impedance matching positions with a centre by-pass of 50 ohms. Balancing the panel layout the rotary inductor tuning knob is next and controls the illuminated slide-rule type dial which is calibrated 0-30 and is 8 inches in length; this enables very accurate setting of the inductor tuning as each of the 30 scale divisions is sub-divided into a further 10 divisions by the calibrations of the tuning knob. As this is also calibrated in ten half-divisions it means that, in theory, there is a setting accuracy of one-in-six-hundred which should satisfy the most critical operator. For rapid movement this knob is fitted with what could be termed a “rotary handle” by means of which the torque of the ‘roller coaster’ coil connection is reduced for easy tuning. In the bottom right corner is the four position aerial selector switch, the first three positions being for

Front view of the completed KW Ten-Tec Model 4229 high-power ATU kit.
Showing assembled variable capacitor and inductor. Note the position and mounting of the side panels.

c-o-a feed only, while the fourth can be used for single wire, co-
ax, or balanced line systems.

The rear panel contains at top left three wing nut terminals for
balanced line and single wire feed, below these are four c-o-a
aerial sockets and a fifth, to the right, is the input socket. A wing
nut terminal for earthing and a 12 volt DC input phono type
socket for the dial lamps complete the panel which has lettered
connection instructions.

Construction

There is no overall parts list so it is not possible, when
unpacking the boxes and bags, to check if anything is missing. It is
a good idea to separate the nuts and washers into their various
types and sizes as in some cases there is only one-sixteenth of an
inch difference between them.

Assembly of the kit presented no real problems but, as KW
Ten-Tec suggest, read the whole of the manual first and proceed
in the sequence outlined. It is a good idea to mark the assembly
manual with any addendum notes prior
to commencing
construction. The first item is rather unusual being the actual
construction of the 500pF wide-saced variable capacitor rated at
3.5kV. Careful attention to the manual is required here as the
ceramic end plates should not be subjected to too much stress. In
assembling the rotors as shown in the Assembly Manual, ten of
the spacers had to be filed internally to fit over the shaft. When the
variable capacitor is finally assembled it is wise to check for play in
the rotor shaft at the ball-bearing end and adjust as required.

The variable inductor is supplied ready wound with silver
plated wire on a ceramic former. A nice point here is that the roller
contact pulley and the contact shaft upon which it travels are also
silver plated. Page 7 also starts the assembly of the inductor, and in
"item 2" it was noted that the 5/16" machine screws mentioned
were in fact 3/16" and therefore not long enough to enter the
tension springs. Two suitable BA screws solved the problem. A
further point in this section puzzled the writer, this being the
reference to 'flat end of each spring' as there did not appear to be a
'flat end!' If, however, the word 'flat' is replaced by 'open' then
the operation is obvious.

The assembly of the SWR board on page 9 (not numbered in the
writer’s manual) was straightforward apart from C25 and C26
which were not marked with their capacity. This had to be
determined by a process of elimination as other components were
mounted on the board. After completion of step 1 the threaded
stand-off spacers were soldered to the foil. (A 60W iron was
found necessary here.)

Fig. 7 on page 10 of the manual shows the meter switch board
and assembly. In "item 7" the black caps would not snap in place
and no reasonable amount of pressure would encourage them to
do so. Glueing in place proved quite satisfactory. Contained in the
parts box for this unit was a metal plate with two screws, no
mention of these items being made in the assembly instructions.

However on page 16 their purpose was explained during the
course of assembling the front sub-panel.

The balun coil assembly instructions need to be read carefully
and the 16 s.w.g. Teflon-coated, silver plated stranded wire used

should be kept under tension as much as possible during the actual
winding process. The remainder of this wire is used for all wiring
connections except for the dial lamps. (An interesting point here is
that this Teflon-coated wire is actually recommended by the
ARRL for RF wiring use.)

In the side plates assembly (items 4 and 5), the clips can best be
fitted by inserting the flat blade of a screwdriver through the
square holes (after the clips have been started in position) and
bearing down on the clip. The flanges on these clips actually space
the side panels from the cabinet.

In wiring the rear panel assembly "item 1", page 14, reference
is made to 'length of blue Teflon wire' while in further items 'lead
wire' is mentioned: these are both the same wire, i.e. blue Teflon.
In "item 7" the 'flat solder lug' is the type which has internal
locking teeth, while in "item 14" the switch tag should be
supported when enlarging the hole. In "item 7", page 16, under
Rear Panel Assembly, no locking washer was supplied.

Front Sub-Panel Assembly "item 1", page 16, the hole for
mounting the potentiometer is at the bottom left of the panel. In
"item 3" the 3/16" long screw was not long enough to
accommodate two pilot lamp holders and a 3/8" was used.

On page 19 under Final Wiring and Assembly, "item 5", it was
found that the lexan plastic panel was slightly oversize when
offered up to its fixing position together with its painted

Internal view of rear panel with SWR board in position; note the coil located above S1.

Inside view of front sub-panel showing switch panel in position on right.
aluminium front panel. This resulted in a slight bowing of the plastic and was overcome by temporarily bolting the plastic panel to the aluminium one and very carefully filing the plastic panel to the exact size of the panel to which it is bolted. The plastic protective film should remain in place until filing is completed; if the lexan panel is marked — it's permanent!

On completion, the wiring and rotation of the controls for free movement was checked. The final alignment and testing was carried out in accordance with the instructions in the Owner's Manual with no problems encountered.

The 'L' type matching network has, to some extent, been ignored for amateur use as, in order to cover both a wide range of aerial loads and also a wide range of frequencies, two differing circuits are required. If the aerial impedance is less than 50 ohms the variable capacitor needs to be across the transmitter, whereas if the impedance is higher the capacitor must be across the aerial. The diagrams in Fig. 1 illustrate the variety of matching circuits available in this tuner, all being selected by the low/high impedance switch on the front panel between the two large capacitor and inductor tuning knobs. Within the circuits shown, and still switched by this same switch, are a variety of fixed capacitors in parallel with the variable capacitor. These can be switched into circuit if required as the frequency is lowered, and more capacity is necessary to match a given load. An advantage of this type of tuner is that it always provides a two-pole low-pass response to aid harmonic rejection.

The writer has for many years used the G5RV aerial and quite apart from being a personal friend of Louis and therefore biased(!) has had excellent results on all bands between 1.8 and 30 MHz, including all the new bands using a variety of tuner units. However the KW Ten-Tec unit described proved to be easily the most versatile used with this aerial and has enabled a better match to be obtained and retained than with any of the other units. It was possible to achieve a virtual 1:1 SWR on any band and, after noting the readings, to return to the same position. Little, if any, adjustment was required when moving frequency within a band (the impedance switch setting once determined for a particular band does not, of course, require further adjustment anywhere within the band in use).

Various other aerials were tried including the Cushcraft ATV-5 vertical on the new bands, J-Beam 4-over-4 two-metre slot(!), long wire and 15 feet of wire. Surprisingly it was possible to obtain a reasonable match with all of these. However this does not suggest that either Messrs Cushcraft or J-Beam would be happy to have their aerials used in such a manner! It was not possible to try loading up the proverbial bed spring as although two are already in use, they form part of the earthing system.

The transceivers used had outputs variable from 3 watts to the maximum output from the homebrew linear and no problems were encountered using the tuner either in matching or signs of overheating. Continuous checks for TVI were carried out with a colour TV monitor, none was encountered. The unit was a pleasure to build and operate and can be confidently recommended.

A final thought — could KW Ten-Tec be persuaded to resurrect the Argonaut, in kit form?
Practical, Simple Sideband
Part 7

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

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

MLX Board Update — by G3RJV

"A Little Knowledge is a Dangerous Thing"

In Parts 3, 4 and 5 of this series (Short Wave Magazine, Aug./Sept./Oct. 1986) I described the use of the MLX Board, a surplus SSB Processing board from the U.S.A., to build a simple single-sideband transceiver for one amateur band. The G-QRP Club imported several batches of these boards and the feedback from those who were lucky enough to buy the boards indicates that successful transceivers have been built from the circuitry I supplied.

When that circuitry was evolved all that G3ROO and I had to work on was an application circuit of the board for a range of transceivers called the MLX Transceiver. So the circuits came from our understanding of how the boards had been used by a particular manufacturer and the circuit diagrams of the boards themselves. Since that time I have received some information issued by the actual manufacturers of the boards, Mizuho, and another application circuit for the board used by Dentron in the U.S.A.

The information came through the kindness of "Mike" Michael, W3TS, an avid amateur radio constructor and reader of Short Wave Magazine. Mike also included circuits which he has used with the board. It seems that the board was once issued as an item in its own right and called the SG-9 Board, but to save confusion I will stick to our own invented designation: the MLX Board.

Useful Information from The Manufacturer

The manufacturer's manual, although useful, is written in "Japanese" English and contains several repeats and obvious points. I have attempted to glean the most useful items from the text.

Preset Controls

There are three preset variable resistances on the board, designated VR1, VR2 and VR3. On the samples of the board which have appeared in the U.K., VR3 is missing. In Part 3 of this series I advised constructors to use the screened leads which are connected to terminations for VR3 to provide a front panel control, or find a suitable preset control which fits the board hole spacing and replace the missing VR3. The latter is the best choice as once set this control should not require re-adjustment. I advised a value of 10KΩ, although a higher value, up to 100KΩ, may be required for some microphones.

VR3 is the microphone gain adjustment and is factory adjusted in examples of the board which include the control mounted for the Mizuho M-1 microphone, which is a dynamic microphone of 600Ω impedance at 1kHz and –68dB sensitivity at 1kHz.

VR1 is the carrier balance adjustment which should be factory set, although I could gain some improvement by careful further...
adjustment on most of the samples of the boards I tested. VR2 is the S-meter zero adjustment control; this should set the meter to zero under no-signal conditions but in practice I found it had to be set a little higher to register anything like meaningful readings of signal strength. We were right in our guess of the required meter, the manual quotes 200μA, which makes most of the cheap surplus tape recorder meters suitable for the job.

**Brief Description of Board Functions**

See Fig. 1.

**Transmitter:**

The voice signal from the microphone is amplified by a two-stage microphone amplifier (Q5/6) and fed to the SN76514N, double-balanced mixer integrated circuit. The resultant double-sideband signal is fed to the crystal filter to produce a 9 MHz SSB signal. This signal is then amplified by the first MOSFET IF amplifier (Q2) and a source-follower buffer stage (Q1) provides a low impedance output.

**Receiver:**

The 9 MHz signal at the input is filtered by FL1 and then amplified by three MOSFET IF stages (Q2/3/4). Part of this signal is used to provide an AGC voltage, rectified by D4/5, to control the voltages on the IF amplifier gates. An AGC voltage line is available at pin 11 to control external RF stages. This voltage varies from 0 to approximately −1.5 volts depending upon the signal strength. The amplified IF signal is fed to the SN76514N for balanced detection; during transmission this device is diode switched for balanced modulation. The detected output is amplified by a 575C2 integrated circuit audio amplifier.

**Standby Circuit:**

Two transistors, Q10 and Q11, provide switched 12 volt lines to control the voltages on the IF amplifier gates. An AGC voltage line is available at pin 11 to control external RF stages. This voltage varies from 0 to approximately −1.5 volts depending upon the signal strength. The amplified IF signal is fed to the SN76514N for balanced detection; during transmission this device is diode switched for balanced modulation. The detected output is amplified by a 575C2 integrated circuit audio amplifier.

**Manufacter's Specification**

<table>
<thead>
<tr>
<th>TRANSMITTER:</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Output Frequency:</td>
<td>9.00 MHz</td>
</tr>
<tr>
<td>Modes of Operation:</td>
<td>A3J and A1 (SSB/CW)</td>
</tr>
<tr>
<td>Carrier Oscillator:</td>
<td>8.9985 MHz</td>
</tr>
<tr>
<td>Carrier Suppression:</td>
<td>Better than 40dB</td>
</tr>
<tr>
<td>Side-band Suppression:</td>
<td>Better than 40dB</td>
</tr>
<tr>
<td>Output:</td>
<td>120mV into 50Ω</td>
</tr>
<tr>
<td>Microphone Input:</td>
<td>Low Impedance (600Ω advised)</td>
</tr>
</tbody>
</table>

**RECEIVER:**

| Input IF Frequency: | 9.00 MHz |
| Input Impedance: | 500Ω |
| Selectivity: | Less than 4.8 kHz at −60dB |
| Preadjust Bandwidth: | More than 2.4 kHz at −6dB |
| Audio Output: | 1 watt at 8Ω |
| Power Requirements: | Transmit — 60mA (max) |
| | Receive — 60mA (under no signal condition) |

**Table of Values**

| MLX Board (see SWM Aug. '86, pp. 224-225) |
|---|---|
| R1, R42 = 560Ω |
| R2, R6, R13, R17, R39, R43, R46, R47, R51 = 10K |
| R3, R12, R18, R20 = 15K |
| R4, R28, R29, R41 = 22K |
| R5, R16 = 100Ω |
| R7 = 6K8 |
| R8, R21, R44 = 51R |
| R9, R19 = 470K |
| R10, R11, R14, R15, R22, R25 = 220Ω |
| R23 = 4K7 |
| R24 = 390Ω |
| R26 = 76Ω |
| R27, R31, R34 to R38, R40, R42, R45, R47, R51 = 0.01μF disc |
| C1 to C4, C6 to C13, C15, C17, C27, C29, C30, C34, C35, C37 to C40, C47, C49, C52, C54 = 0.01μF disc |
| C5 = 2pF disc |
| C14 = 6.8μF taut. |
| C16 = 100pF disc |
| C18, C19 = 0.47μF disc |
| C20, C32, C43, C44 = 4.7μF elec. |
| VRI = 100K P.C. trim pot |
| VR2 = 500Ω P.C. trim pot |
| VCI = ICN618 |
| IC2 = 575C2 |
| Q1 = 2SK19 |
| Q2 to Q4 = 2SK49 |
| Q5 to Q10 = 2SC945 |
| Q11 = 2SA719 |
| D1 to D3, D10 = MC301 |
| D4, D5, D9 = 2N60 |
| D6, D8 = RD82EB |
| D7 = 1S158B |
| CH1 to CH4 = 1nH |
| CH5, CH7 = 470μH |
| CH6 = 10μH |
| T1 to T3 = 3F can variable |
| X1 = 8.9985 MHz xtal |
| FL1 = filter, xtal 9 MHz |

**Size:**

22mm high x 102mm wide x 87mm deep.
for transmit and receive functions. For the operation of external circuits the maximum currents available are:
Transmit circuits: 160mA. 
Receive circuits: 50mA.
If a larger current is required for external transmit function circuits, the transmit supply line may be used to energise a relay to switch on 12 volts directly from the main power line. Such a relay (12 volt coil) would be added between pin 24 and ground. In practical terms this means that external driver and power amplifier stages could not be powered directly from the onboard 12 volt transmit line.

**CW Operation**

As we guessed, but had not seen circuits for, the frequency offset facility provided for the carrier oscillator at pin 22 is designed for shifting the carrier frequency for CW operation. As the manual says:

"During reception, the carrier frequency is the same as that for SSB (8998.5 kHz). During transmission the carrier frequency is shifted up approximately 800 Hz with a diode switch. Therefore, a "zero-in" position can be obtained by setting the dial to produce an 800 Hz beat with the signal of the received station".

In Part 1 of this series, we described how this offset facility could be used to provide sideband switching for multiband SSB operation or choosing the high side carrier frequency (9001.5 kHz) for lower band operation. Slight modification of the oscillator circuitry around Q8 is required to shift the frequency this far. Refer to Fig. 5 on page 227 of Short Wave Magazine, August 1986, for this circuit change.

Fig. 2 shows the CW operation circuit used by W3TS based upon this information. It is important to note that this system uses the original 8998.5 kHz carrier insertion crystal supplied with the board, so the VFO signal required on bands up to 7 MHz must be set CVT1 trimmer to 8999.0 kHz.

**CW or SSB Transmit:**

Well — I hope the above adds to the body of information available for this useful little SSB Circuit Board. It is an easy way to get a homebuilt SSB transceiver onto an amateur band. There are several about — listen out for them.

---

**OBLAST CORNER**

NIGEL CAWTHORNE, G3TXF

**CHASING oblasts on the HF bands provides an interesting challenge for newcomer and old-time DX'er alike. The USSR is divided into 184 administrative regions called 'oblasts'. A station's oblast can usually be identified directly from the callsign.

Table 1 which can be used for identifying oblasts worked or heard has two check columns. One is for "All-Time" and the other for "1987 In-Year". The "1987" column is for keeping a record of those oblasts worked/heard during the year. The "All-Time" is for the all-time score (including 1987). For the "In-Year" table everyone starts off at 'zero' on January 1st each year. Old-timers and newcomers start out the year on an even footing.

**1986 Table Results**

Congratulations to Mike, G4AYO, and to Brad BRS1066, leaders of the 1986 In-Year Oblast Worked and Heard tables respectively. G4AYO's 166 in-year oblast worked score (only 18 away from a full-house of 184) was well up on last year's leading score of 150, as was Brad's 162 in the SWL section. Brad wins the SWL table for the second year running.

Thanks to all those who regularly sent in entries. You can use your 1986 score as your target for 1987. The promised turn-around in HF propagation for 1987 should help get a few more oblasts on the HF bands.

**Rare Oblast News**

There have been several reports of activity from super-rare oblast 175, UA8V. Barry, VK5BS, worked UZ9QWM/UA8V during the CQ WW CW contest. QSL info. was given as UA9OBA. Mike, G4AYO, and G3TXF (who was operating at the time from GJ0AAA as part of a contest DX-pedition to Jersey) both report hearing the same station from elusive 175 oblast during CQ WW CW, but were both unable to get a QSO. According to the table of U.K. "wanted" oblasts based on info. supplied by readers of Oblast Corner, no-one so far has made a QSO with UA8V (175), and only one has with UA8T (174).

**Mailbag Reports**

Brad, BRS1066, reports some good 160m. openings with UA9QDA (134), UA9JEL (162), UA9XQ (90), UF6VBC (013), UL8CWW (028), RA6YAG (102) and UA6YHQ (102) all in the
<table>
<thead>
<tr>
<th>Oblast</th>
<th>ALL TIME 1987</th>
<th>Oblast</th>
<th>ALL TIME 1987</th>
<th>Oblast</th>
<th>ALL TIME 1987</th>
</tr>
</thead>
<tbody>
<tr>
<td>1A</td>
<td>169</td>
<td>6P</td>
<td>96</td>
<td>B-E</td>
<td>60</td>
</tr>
<tr>
<td>1C</td>
<td>136</td>
<td>6U</td>
<td>115</td>
<td>B-F</td>
<td>70</td>
</tr>
<tr>
<td>1N</td>
<td>88</td>
<td>6W</td>
<td>86</td>
<td>B-G</td>
<td>78</td>
</tr>
<tr>
<td>1O</td>
<td>113</td>
<td>6X</td>
<td>87</td>
<td>B-H</td>
<td>71</td>
</tr>
<tr>
<td>1P</td>
<td>114</td>
<td>6Y</td>
<td>102</td>
<td>B-I</td>
<td>73</td>
</tr>
<tr>
<td>1Q</td>
<td>120</td>
<td>8T</td>
<td>174</td>
<td>B-J</td>
<td>67</td>
</tr>
<tr>
<td>1T</td>
<td>144</td>
<td>8V</td>
<td>175</td>
<td>B-K</td>
<td>72</td>
</tr>
<tr>
<td>1W</td>
<td>149</td>
<td>9A</td>
<td>165</td>
<td>B-L</td>
<td>77</td>
</tr>
<tr>
<td>1Z</td>
<td>143</td>
<td>9C</td>
<td>154</td>
<td>B-M</td>
<td>59</td>
</tr>
<tr>
<td>2F</td>
<td>125</td>
<td>9F</td>
<td>140</td>
<td>B-N</td>
<td>57</td>
</tr>
<tr>
<td>3A</td>
<td>170</td>
<td>9G</td>
<td>141</td>
<td>B-P</td>
<td>58</td>
</tr>
<tr>
<td>3D</td>
<td>142</td>
<td>9H</td>
<td>158</td>
<td>B-Q</td>
<td>64</td>
</tr>
<tr>
<td>3E</td>
<td>147</td>
<td>9J</td>
<td>162</td>
<td>B-R</td>
<td>81</td>
</tr>
<tr>
<td>3G</td>
<td>137</td>
<td>9K</td>
<td>163</td>
<td>B-S</td>
<td>74</td>
</tr>
<tr>
<td>3I</td>
<td>126</td>
<td>9L</td>
<td>161</td>
<td>B-T</td>
<td>79</td>
</tr>
<tr>
<td>3L</td>
<td>155</td>
<td>9M</td>
<td>146</td>
<td>B-U</td>
<td>65</td>
</tr>
<tr>
<td>3M</td>
<td>168</td>
<td>9O</td>
<td>145</td>
<td>B-V</td>
<td>66</td>
</tr>
<tr>
<td>3N</td>
<td>132</td>
<td>9Q</td>
<td>134</td>
<td>B-W</td>
<td>68</td>
</tr>
<tr>
<td>3P</td>
<td>160</td>
<td>9S</td>
<td>167</td>
<td>B-X</td>
<td>62</td>
</tr>
<tr>
<td>3Q</td>
<td>121</td>
<td>9U</td>
<td>130</td>
<td>B-Y</td>
<td>82</td>
</tr>
<tr>
<td>3R</td>
<td>157</td>
<td>9W</td>
<td>84</td>
<td>B-Z</td>
<td>69</td>
</tr>
<tr>
<td>3S</td>
<td>151</td>
<td>9X</td>
<td>90</td>
<td>C-A</td>
<td>188</td>
</tr>
<tr>
<td>3T</td>
<td>122</td>
<td>9Y</td>
<td>99</td>
<td>C-C</td>
<td>9</td>
</tr>
<tr>
<td>3U</td>
<td>123</td>
<td>9Z</td>
<td>100</td>
<td>C-I</td>
<td>8</td>
</tr>
<tr>
<td>3V</td>
<td>119</td>
<td>0A</td>
<td>103</td>
<td>C-L</td>
<td>5</td>
</tr>
<tr>
<td>3W</td>
<td>135</td>
<td>0B</td>
<td>105</td>
<td>C-O</td>
<td>7</td>
</tr>
<tr>
<td>3X</td>
<td>127</td>
<td>0C</td>
<td>110</td>
<td>C-S</td>
<td>10</td>
</tr>
<tr>
<td>3Y</td>
<td>118</td>
<td>0D</td>
<td>111</td>
<td>C-W</td>
<td>6</td>
</tr>
<tr>
<td>3Z</td>
<td>117</td>
<td>0F</td>
<td>153</td>
<td>D-N</td>
<td>2</td>
</tr>
<tr>
<td>4A</td>
<td>156</td>
<td>0H</td>
<td>106</td>
<td>D-D</td>
<td>1</td>
</tr>
<tr>
<td>4C</td>
<td>152</td>
<td>0I</td>
<td>138</td>
<td>D-K</td>
<td>3</td>
</tr>
<tr>
<td>4F</td>
<td>148</td>
<td>0J</td>
<td>112</td>
<td>F-F</td>
<td>12</td>
</tr>
<tr>
<td>4H</td>
<td>133</td>
<td>0K</td>
<td>139</td>
<td>F-O</td>
<td>15</td>
</tr>
<tr>
<td>4L</td>
<td>164</td>
<td>0L</td>
<td>107</td>
<td>F-Q</td>
<td>14</td>
</tr>
<tr>
<td>4N</td>
<td>131</td>
<td>0O</td>
<td>85</td>
<td>F-V</td>
<td>13</td>
</tr>
<tr>
<td>4P</td>
<td>94</td>
<td>0Q</td>
<td>98</td>
<td>G-G</td>
<td>4</td>
</tr>
<tr>
<td>4S</td>
<td>91</td>
<td>0S</td>
<td>124</td>
<td>H-A</td>
<td>191</td>
</tr>
<tr>
<td>4U</td>
<td>92</td>
<td>0U</td>
<td>166</td>
<td>H-B</td>
<td>180</td>
</tr>
<tr>
<td>4W</td>
<td>95</td>
<td>0W</td>
<td>104</td>
<td>H-E</td>
<td>44</td>
</tr>
<tr>
<td>4Y</td>
<td>97</td>
<td>0X</td>
<td>129</td>
<td>H-H</td>
<td>43</td>
</tr>
<tr>
<td>6A</td>
<td>101</td>
<td>0Y</td>
<td>159</td>
<td>H-W</td>
<td>45</td>
</tr>
<tr>
<td>6E</td>
<td>109</td>
<td>0Z</td>
<td>128</td>
<td>H-Y</td>
<td>46</td>
</tr>
<tr>
<td>6H</td>
<td>108</td>
<td>B-A</td>
<td>75</td>
<td>I-A</td>
<td>189</td>
</tr>
<tr>
<td>6I</td>
<td>89</td>
<td>B-B</td>
<td>76</td>
<td>I-B</td>
<td>53</td>
</tr>
<tr>
<td>6J</td>
<td>93</td>
<td>B-C</td>
<td>80</td>
<td>I-C</td>
<td>49</td>
</tr>
<tr>
<td>6L</td>
<td>150</td>
<td>B-D</td>
<td>63</td>
<td>I-D</td>
<td>173</td>
</tr>
</tbody>
</table>

Table 1. Operating aid and checklist for oblast chasing. Use this list to keep your "All-time" and "In-Year 1987" oblast records. Send your "All-time" and "In-Year 1987" totals to G3TXF to appear in the next "Oblast Corner" in the April issue. Deadline and address at the end of the article.

Table of USSR in Zone 23. A QSL received from UA9AN/UI in UF (047) was a surprise new one for John, who runs 40 watts to a half-size G5RV.

Steve, GW4BKG, has made a year-end count of USSR calligns.
worked which has reached 1,551 different USSR callsigns and 153 different USSR prefixes. Steve wonders if anyone else keeps this sort of record, and if so what their totals might be.

The writer doesn't keep a summary record of individual calls worked, but a recent count-up of cards in G3TXF's QSL shoe-boxes totalled 1,713 different USSR callsigns for which cards had been received.

Rupert, G4XRV, found UA4C (152), UC-O (007), UC-W (006), UT-J (187) and UT-U (186) for new ones. Rupert will be using his year-end score of 65 as his target for next year.

Jim, G0CGV, uses a G5RV at 33’ a.g.l. and has a number of oblasts on his first entry. He will be hunting more UA stations in 1987.

Richard, G4ZFE, logged UA0WW (104) and U19GWA (054) for all-time new ones. He enjoys trying out some Russian on CW and says that this turns a ‘rubber-stamp’ QSO into a more interesting contact.

Barry, VK5BS, notes that there were good conditions from South Australia to UA during October and November; Barry says that the tough areas from VK5-land are UA6, UF, UG, HU, UI, and UM. VK5BS was looking forward to a hot Christmas with temperatures approaching 40°C!

The last five for the year worked by Russ, GM0CBX, were UA31GO (126), UA3ZELJ (117), UB5GGL (078), UB5TCS (079) and UA3SEO (151) bringing his score for the year to 76.

Ted, G0BZV, found EK4AH (oblast 133) and U3KM during CQ WW CW; he has found that oblast chasing has added more interest to DXing!

Alex, G4UNH, is still waiting for a QSL from a UD to complete his USSR republics. A QSO with U18OAN (050) was Alex’s last new one for 1986.

**Speedy QSLs**

Ted, G3DRN, the RSGB’s hard-working QSL Manager, has supplied some interesting statistics following those published in the December ’86 Oblast Corner concerning QSLs from the USSR.

Of a random bundle of 100 in-coming USSR cards analysed at the RSGB Bureau in early December, Ted found that three were for QSO’s made in the previous month, 26% were up to six months old, 50% up to nine months, 19% up to twelve months and just 2% were for older QSOs. The average, according to Ted’s calculations, was about eight months; over 50% of cards arrive within eight months of the QSO.

But as Ted reminds us, a chain is only as strong as its weakest link, and if users of the QSL Bureau do not keep properly stamped envelopes with their sub-manager, there will be delays.

G3DRN tells the story of the two amateurs who complained to RSGB Hq. One said he hadn’t received any cards for three years. When this was looked into, it was found that the amateur hadn’t ever sent any envelopes to the Bureau. The other was also complaining of non-receipt of QSLs. This time it was found that there were indeed envelopes in the Bureau but that only six cards had accumulated for the amateur in a year. The Bureau sub-managers usually wait until there is a reasonable number of cards to fill an envelope before posting it, unless it is marked otherwise on the envelope.

**Helping the QSL Bureau**

There are several things that QSL’ers can do to help the QSL Bureau manager deal with his cards as quickly as possible. Probably the most important is to send the cards to the Bureau in order and not just in a random pile. The better they are sorted (alphabetically by country), the faster the QSL Bureau manager will be able to sort them into the correct out-going piles.

It is much easier and quicker for the QSL manager to go through a pile of accurately sorted cards, than it is to handle a pile of totally jumbled out-going QSLs. It is also equally important to keep a good stock of sensibly sized stamped and self-addressed envelopes. The callsign of the station to whom the card is addressed must be obvious at first glance and not hidden away in small writing. The callsign of the station to whom the card is being addressed clearly on both sides of the card.

Also make it easier for the QSL manager by writing the call-sign to whom the card is being addressed clearly on both sides of the cards. Avoid having a jumble of callsigns on the card in similar writing. The callsign of the station to whom the card is addressed must be obvious at first glance and not hidden away in small writing in among the text of the card. Bold, clear callsigns will help speed your cards through the Bureau to their destination.

Parcels of cards are sent out from the RSGB Bureau to the major bureaux on a weekly basis, including Box 88.

**Table Entries**


Many thanks to Tom K1KI (USSR Tidbits), IARU/ARRL and Dex W4KM (translations from Radio) for items extracted. Good hunting es DSW!

**OBLASTS ‘WORKED’ TABLE**

<table>
<thead>
<tr>
<th>Station</th>
<th>1986 (max 184)</th>
<th>All-Time (max 184)</th>
</tr>
</thead>
<tbody>
<tr>
<td>G4AYO</td>
<td>166</td>
<td>174</td>
</tr>
<tr>
<td>G4QH</td>
<td>159</td>
<td>167</td>
</tr>
<tr>
<td>G3TXF</td>
<td>152</td>
<td>172</td>
</tr>
<tr>
<td>G4WSX</td>
<td>147</td>
<td>154</td>
</tr>
<tr>
<td>G4ZFE</td>
<td>141</td>
<td>145</td>
</tr>
<tr>
<td>G0BZV</td>
<td>138</td>
<td>138</td>
</tr>
<tr>
<td>G4PW</td>
<td>137</td>
<td>175</td>
</tr>
<tr>
<td>G3PMR</td>
<td>129</td>
<td>135</td>
</tr>
<tr>
<td>G4UNH</td>
<td>127</td>
<td>145</td>
</tr>
<tr>
<td>GW4BKGG</td>
<td>126</td>
<td>152</td>
</tr>
<tr>
<td>G4UNH</td>
<td>120</td>
<td>144</td>
</tr>
<tr>
<td>G3YRW</td>
<td>106</td>
<td>135</td>
</tr>
<tr>
<td>G40BK</td>
<td>96</td>
<td>152</td>
</tr>
<tr>
<td>G4DJX</td>
<td>87</td>
<td>115</td>
</tr>
<tr>
<td>G4XRX</td>
<td>84</td>
<td>140</td>
</tr>
<tr>
<td>G4ZGG</td>
<td>82</td>
<td>84</td>
</tr>
<tr>
<td>GM0CBX</td>
<td>76</td>
<td>85</td>
</tr>
<tr>
<td>G0CGV</td>
<td>66</td>
<td>67</td>
</tr>
<tr>
<td>G4TWX</td>
<td>65</td>
<td>120</td>
</tr>
<tr>
<td>G4XRV</td>
<td>65</td>
<td>65</td>
</tr>
<tr>
<td>G4LZZ</td>
<td>53</td>
<td>90</td>
</tr>
<tr>
<td>G4XTM</td>
<td>51</td>
<td>93</td>
</tr>
<tr>
<td>G4VF</td>
<td>44</td>
<td>77</td>
</tr>
<tr>
<td>G3URA</td>
<td>42</td>
<td>91</td>
</tr>
<tr>
<td>G4YIR</td>
<td>36</td>
<td>53</td>
</tr>
<tr>
<td>VK5BS</td>
<td>-</td>
<td>116</td>
</tr>
</tbody>
</table>

**OBLASTS ‘HEARD’ TABLE**

<table>
<thead>
<tr>
<th>Station</th>
<th>1986 (max 184)</th>
<th>All-Time (max 184)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Brad BRS-1066</td>
<td>162</td>
<td>176</td>
</tr>
<tr>
<td>Frank BRS-88557</td>
<td>153</td>
<td>174</td>
</tr>
<tr>
<td>Eddie 9H1-15357</td>
<td>131</td>
<td>149</td>
</tr>
<tr>
<td>Tony BRS-87156</td>
<td>120</td>
<td>135</td>
</tr>
<tr>
<td>SWL Philip Davies</td>
<td>115</td>
<td>127</td>
</tr>
<tr>
<td>Norman BRS-28198</td>
<td>105</td>
<td>116</td>
</tr>
<tr>
<td>Ken BRS-88465</td>
<td>77</td>
<td>77</td>
</tr>
<tr>
<td>SWL Ray Williams</td>
<td>76</td>
<td>108</td>
</tr>
<tr>
<td>Maurice BRS-32601</td>
<td>67</td>
<td>148</td>
</tr>
<tr>
<td>SWL Angela Sitton</td>
<td>66</td>
<td>66</td>
</tr>
<tr>
<td>SWL Mrs G. Cooke</td>
<td>60</td>
<td>112</td>
</tr>
<tr>
<td>Graeme BRS-44984</td>
<td>48</td>
<td>105</td>
</tr>
<tr>
<td>Luciano G1YDW</td>
<td>47</td>
<td>88</td>
</tr>
<tr>
<td>SWL Neil Melville</td>
<td>-</td>
<td>158</td>
</tr>
</tbody>
</table>

Table 2. Send your entries for the '1987 In-year' and 'All-time' tables to reach G3TXF by February 28th for the April issue. The 'All-time' table is based on oblasts heard only (max 184).
activity. G6XVV was third with 113 points and eleven readers contacted more than 20 countries. An interesting statistic is that average scores were up from 70 in 1985 to 77 last year.

26 readers operated on 70cm. and once again, G1KDF led the field with 96 points, one more than his 1985 total. In second place was Paul Brockett, GILSB, from Spalding, (LCN) with 83 points, while G4NBS was joint third with G6XVV on 80 points. GILSB and G4NBS each notched up 21 countries and nine entrants worked more than ten countries in 1986.

The 23cm. band attracted nine entries and G4NBS came first by a wide margin with 66 points — 48 counties and no less which, with his 24 countries, gave G6XVV the 1986 total which earned him fourth place. Four readers scored over 200 points in 1986 but this was not expected. It is times like these when the advantages of working from home are fully appreciated. Although the barometric pressure is high, these winter, polar anticyclones do not usually bring good tropo. conditions.

Finally to the 1986 CW Ladder, top of which was Pat Billingham, G4AGG, from Farnham, (SRY) the only participant using all four bands. He scored 482 points, 435 of them on 2m. In second place was Mike Honeywell, GA0BB, from Warsash, (HFP) with 384 points and who operated on 2m. and 70cm. June Charles, G4Y1R, (ESX) used only 2m. and her 318 points earned her third spot. 20 readers entered this table, four using 4m. and eight 70cm.

The existing tables seem quite popular at the start of what could be a long spell of northwest right across London. The scene at the start of what could be a long spell of northwest right across London. The scene

<table>
<thead>
<tr>
<th>Station</th>
<th>Final Placings at December 31, 1986</th>
</tr>
</thead>
<tbody>
<tr>
<td>G4AGG</td>
<td>33 435 13 1 482</td>
</tr>
<tr>
<td>G0NBB</td>
<td>382 2 384</td>
</tr>
<tr>
<td>G4KFB</td>
<td>318 1 318</td>
</tr>
<tr>
<td>G4JZS</td>
<td>249 1 249</td>
</tr>
<tr>
<td>G4SFL</td>
<td>221 1 221</td>
</tr>
<tr>
<td>G4OUT</td>
<td>217 1 217</td>
</tr>
<tr>
<td>G4ARI</td>
<td>164 43 2 207</td>
</tr>
<tr>
<td>G4EIB</td>
<td>207 1 207</td>
</tr>
<tr>
<td>G1FEK</td>
<td>142 1 143</td>
</tr>
<tr>
<td>G4PPV</td>
<td>133 1 133</td>
</tr>
<tr>
<td>G4Q02</td>
<td>38 1 110</td>
</tr>
<tr>
<td>G4EZA</td>
<td>109 1 109</td>
</tr>
<tr>
<td>G4NUM</td>
<td>105 1 105</td>
</tr>
<tr>
<td>G2DJA</td>
<td>100 1 100</td>
</tr>
<tr>
<td>G2DHH</td>
<td>62 1 76</td>
</tr>
<tr>
<td>G4HWHK</td>
<td>56 1 56</td>
</tr>
<tr>
<td>GLH4LY</td>
<td>53 1 53</td>
</tr>
<tr>
<td>G4TJE</td>
<td>52 1 52</td>
</tr>
<tr>
<td>G0B1</td>
<td>42 1 45</td>
</tr>
<tr>
<td>G/PA</td>
<td>32 1 34</td>
</tr>
</tbody>
</table>

No. of different stations worked in 1986.

Haydn Barker, G6XVV, member no. 68 of the 144 MHz QTHCC, was awarded his 125 sticker on Jan. 2 and now has 139 confirmed. 22 cards were sent and two were for MS contacts, EAIYV (VC) and HG8IH (KG), one via Ar with GM 1 JKJ/P (YP), the rest being tropo. QSos. The 42nd. VHF Century Club certificate for 70cm. has been issued to Tony Collett, G4NBS, on Jan. 9. His station now comprises a Trio TS440, an HBW transverter from SSB Electronics using a high level mixer, an MM 100W amplifier and Gasfet masthead preamp. The antenna is a 21-ele. Yagi at 33ft. The site being 200ft. a.s.l. 8 kms. west of Cambridge. Tony was first licensed as GB7XE in 1971 when he was living in Slough. He moved to the present QTH in March, 1984 but did not get going until April, 1985.

G4NBS has also been issued with 2m. VHFC certificate no. 390 on Jan. 9. He has two station options on the band, the
first an old Yaesu FT-221 with the muTek board, the second a Trio TS-711E which can give out about 30W. A solid state PA is used with either set-up to give a maximum of 180W, the antenna being a 9- ele. Yagi at 30ft. Certificate no. 391 was issued to GJ6TMM, with his QTHCC award, on Jan. 10. For details of SWM awards, send an s.a.e. either to the new address at the end of this feature or to G3FPK, (QTHR).

Beacon Note

On May 16 last year, there was an early Es opening towards Russia in which John Palfrey, G4XEN, (NHM) reported hearing a beacon U0501D on 144.310 MHz. This could not be found in any current lists but John has now solved the mystery, thanks to Y04BZC, on the 20m. VHF net. It is located at KN24DL which is OG square, the QRB from John’s QTH being 2,180 kms. No other details were forthcoming as to power and antennas, though. More beacon data in the next section.

Repeater News

Geoff Booth, G8DZJ, has sent a press release concerning GB3SE. This is a repeater at Stoke-on-Trent (SFD) although the exact QTH was not stated, the locator is given as IO82WV. The licence was granted in early November and it was switched on at 2100 on Nov. 21. It receives on 1,291.075 MHz and can be heard on 1,297.075 MHz, i.e. RM3. Access is by a 1,750 Hz toneburst and if the received signal is more than 5 kHz high or low, the letter “H” or “L” is sent in Morse code. The callsign is given in MCW.

GB3SE incorporates a crystal oven designed to keep the temperature constant within plus/minus 0.2°C, “... regardless of the exterior air temperature.” The TX and RX frequencies are derived from the same crystal so that the difference is a constant 6 MHz. The RX uses a PLL audio discriminator which can follow off channel signals, reproducing the recovered audio with minimum distortion. The repeater is currently running 6W e.r.p. and the antennas are two Alford slots giving omni-directional, horizontal polarisation.

When not in repeater use, GB3SE becomes a beacon sending its callsign in FSK once every 35 seconds. Every eighth callsign is sent in MCW. When switching from beacon to repeater mode, the letter “T” is sent and when the repeater mode has finished, a 400 Hz tone of one second duration is sent. For more information, send an s.a.e. to G8DZJ who is QTHR.

The Satellites

The memory condition of O-10’s OBC continues to deteriorate but nevertheless, this satellite is still giving a reasonable service. However, QRP use is essential which means 100W e.r.p. or less. Due to current eclipse problems the transponders should not be used between Mean Anomaly values of 200 to 020.

The Japanese are still experimenting with PO-12 before concluding a proper operating schedule. There are no reader reports about this latest “bird.” The Soviet satelites RS-5 and RS-7 have survived a long eclipse period but their batteries are now badly degraded, the one in RS-5 not being able to hold a charge. When the load on the power supply increases, the voltage quickly drops and the transponder shuts down. It has to be commanded back on by a ground station. According to PA0DLO, the long rumoured launch of RS-9 and RS-10 could have been in January, but we will believe that when we hear them.

Colin Morris, G0CUZ, was so bored with the poor tropo. conditions over the Christmas holiday that he operated through RS-5 and RS-7 when they were in continuous sunlight. Using CW, he worked D, G, HG, I, OK, OX, OZ, OE, UA1, 3, 4, 6 and 9, UBS, UOS, UL7 and W1.

On the hardware side, AMSAT-UK secretary Ron Broadhemb, G3AAJ, advises that the PCBs for the PO-12 demodulator are available and that the similar ones for O-10, which will be perfect for the Phase 3G satellite, are on the shelf. An s.a.e. to AMSAT-UK at 94 Herongate Road, London, E12 9EQ will bring all the details. The group is now reachable by Telex, no. 295141. Answer TXLINK G. Key 0198967461 and send message.

Contests

The 70 MHz Cumulatives get underway on Feb. 1 with the remaining sessions scheduled for Feb. 15, March 1, 15 and 29. There is only one section and the times are 1000 to 1200 local. The 144 MHz CW contest is on Feb. 8, from 0900-1500 and will enable some useful points to be accumulated for this year’s CW Ladder. This is another one section affair.

On Feb. 22 there is the 432 MHz Fixed Station and Affiliated Societies Contest from 0900-1500. This is a Single-op. and Multi-op. event and the “team” part follows the lines of the 144 MHz event which was introduced in 1985 except that a team is three instead of five stations. However you can still enter on an individual basis as in any other contest. The complete rules were in the January RadCom.

The weekend March 7/8 sees the first major event, the 144/432 MHz and SWL Contest, 1400-1400 being in three sections: Single-op., Multi-op. and SWL. Single band entries for 144 MHz only will not be accepted but do not let that stop anyone from participating so that points can be given to others.

The German DUBUS Magazine is sponsoring five VHF/UHF Contests this year with the aim of furthering DX activity. They are open to all European amateurs and are scheduled for the first weekend in March, May, July, September and October from 1400 to 1400 GMT. This means that the first one coincides with the aforementioned 144/432 MHz event. The various sections are made up from the band, single or multi-op., and CW only or mixed mode, so, for example, a phone only 2m. operator would be in the 144/Single/Mixed section — as there is no phone only category. You call “CQ DX test” on CW or “CQ DX Multi” on phone. Exchanges are the usual RS(T) and serial number and the European QTH locator not the Maidenhead one, so if you are a newcomer weaned on Maidenhead, better work out your E-QTHL.

The scoring is based on one point per QSO, regardless of distance multiplied by the total number of primary locator squares worked, e.g. ZL, AM, EI, etc. so 300 QSOs with 41 squares would be worth, 12,300 points. Only after contacts are valid; no repeater, satellite or E-M-E QSOs. Entries for each contest should be sent no later than the last day of the month in which they occur. The 144 MHz entries go to DK3UZ at P.O. Box 38, D-2358 Kaltenkirchen, German Federal Republic, and entries for 432 MHz and above go to DL4EA at Velberer Str. 9, D-4000 Duesseldorf 1, German Federal Republic. So to repeat, if you hear stations calling “CQ DX Contest” please do them the favour of giving your European QTH Locator and not the Maidenhead one.

Concerning the idea of a Short Wave Magazine contest of some sort, this has been put on the proverbial back burner for a while since our new owners, PW Publishing Limited, already sponsor a contest through Practical Wireless.

Packet Radio

Andy Witts, G1DIL, secretary of the Midlands AX-25 Packet Radio Users Group, MAXPAK, has written to say that the group is working with the RSGB to provide a live demonstration of PR at the National Convention on March 27 and 28. In conjunction with BARTG and NAT.NET, three stations will be operational in the hall with activity centred on the WJNETisland stand in the middle of the hall. The group is seeking support for its GB3AP Digipeater project. Further inquiries to G1DIL at 56 Stephenson Drive, Perton, Wolverhampton, WV6 7UY.
Nordic Meeting

In the December VHFB, brief mention was made of the Scandinavian VHF/UHF Meeting on June 5-7. More information is to hand now and the venue is the Övernäsagarden Motel at Mariehamn in the Åland Islands. The motel is about ten minutes walk from the ferry and lodging there costs £100 per night.

Three Metres

Dave Ackrill, G0DJAJ, (WMD) has just completed a Practical Wireless “Meon” 144/50 MHz transverter and with half a watt has worked locals and G0CPJ in Nottingham. His antenna is a Quad Loop, and a small amplifier is contemplated plus getting the antenna onto a rotator. Dave hears the GB3NHQ beacon and copied pings from GB3SIX on Dec. 12 in the 2000 to 2015 time slot. Paul, G0FRT, suggests that a similar amplifier is required for the antenna being a 7-ele. ZL-Special with 30ft of 1/4 inch line and 6-7 dB gain antenna at least 30ft above ground level. His all-time MS total on 6m. is now 637 QSOs.

Finally, Paul would like to hear from any GM or GI on 6m. who uses a BBC low band FM transceiver and with half a watt. Paul would also like to try some packet radio experiments. He has written to software tailored for MS use but not compatible with AX-25, more like the Cambridge system. Tests with LA6QBA are contemplated and Paul is QTHR in the 1986 Calbrook.

Four Metres

In an end-of-year report, John Wilkinson, G4HGT, (YSW) who led the 1986 table, reports no hearing of ZB2BL last year. John’s equipment consists of an Icom IC-202, 144/28 MHz transverter and power “Meon” to 4m. The PA is a home made 4CX250B and the antenna a 3-ele. Yagi. Jerry Russell, G4GSEU, (WKS) managed to work GB4MTR in all 3 locations, at GM4ZUK’s QTH by MS and at GI9ZTL’s “by a miracle” he reckons. He would like to thank all the operators of this unique callsign and all those 4m. folk interested contact either him or G4SEU for the name of the supplier. G3CUN has a QQV06-40 with no emission and has advertised for “a good secondhand one.” He has worked EI2CA, G2AKO, G3CUN, G3UKV, G3APPY, etc. though.

Finally, Dave Lewis, GW4HBK, (GWT) has written to the Geminids, he has made about 1,350 QSOs since Feb. 1, 350 of which were with a secondhand packet radio transmitter including requests from foreign stations for cross-band skeds to 6m. He is “driving hard” for a 4m. number of certificates will be issued by the ARLS.

Four Metres

In the December VHFB, brief mention was made of the Scandinavian VHF/UHF Meeting on June 5-7. More information is to hand now and the venue is the Övernäsagarden Motel at Mariehamn in the Åland Islands. The motel is about ten minutes walk from the ferry and lodging there costs £100 per night.

Three Metres

Dave Ackrill, G0DJAJ, (WMD) has just completed a Practical Wireless “Meon” 144/50 MHz transverter and with half a watt has worked locals and G0CPJ in Nottingham. His antenna is a Quad Loop, and a small amplifier is contemplated plus getting the antenna onto a rotator. Dave hears the GB3NHQ beacon and copied pings from GB3SIX on Dec. 12 in the 2000 to 2015 time slot. Paul, G0FRT, suggests that a similar amplifier is required for the antenna being a 7-ele. ZL-Special with 30ft of 1/4 inch line and 6-7 dB gain antenna at least 30ft above ground level. His all-time MS total on 6m. is now 637 QSOs.

Finally, Paul would like to hear from any GM or GI on 6m. who uses a BBC low band FM transceiver and with half a watt. Paul would also like to try some packet radio experiments. He has written to software tailored for MS use but not compatible with AX-25, more like the Cambridge system. Tests with LA6QBA are contemplated and Paul is QTHR in the 1986 Calbrook.

Four Metres

In an end-of-year report, John Wilkinson, G4HGT, (YSW) who led the 1986 table, reports no hearing of ZB2BL last year. John’s equipment consists of an Icom IC-202, 144/28 MHz transverter and power “Meon” to 4m. The PA is a home made 4CX250B and the antenna a 3-ele. Yagi. Jerry Russell, G4GSEU, (WKS) managed to work GB4MTR in all 3 locations, at GM4ZUK’s QTH by MS and at GI9ZTL’s “by a miracle” he reckons. He would like to thank all the operators of this unique callsign and all those 4m. folk interested contact either him or G4SEU for the name of the supplier. G3CUN has a QQV06-40 with no emission and has advertised for “a good secondhand one.” He has worked EI2CA, G2AKO, G3CUN, G3UKV, G3APPY, etc. though.

Finally, Dave Lewis, GW4HBK, (GWT) has written to the Geminids, he has made about 1,350 QSOs since Feb. 1, 350 of which were with a secondhand packet radio transmitter including requests from foreign stations for cross-band skeds to 6m. He is “driving hard” for a 4m. number of certificates will be issued by the ARLS.
at the time. I7HCB (JN71) was worked on Jan. 2 at 01-02. Nil from YO3JW or SW0EF on the 3rd and UR1RWX not completed. The shower really got going from 1200 and worked were EA6FB on Ibia, HG6KV8 (KN07) on one SSB burst, SM4POB on random CW and UB5BAE (MJ) on random CW 2225-2310; 17s. burst.

Your scribe had adapted DL5MCG’s MS Efficiency program from DUBUS issue 1/86 for the little ZX-81 and it is proving a very useful one. It was a bit of a squeeze getting his 40 col. program to fit the 32 cols. maximum on the Sinclair machine, though.

Next the tropo. happenings which were a non-event in December judging from your letters. Gerry Schoof, G1SWH, (MCH) worked GU2FRO (SRK) on Dec. 23 for his last table point in 1986. In his round up of 1986 letter, G4HGT mentions he has never worked LX but comments that it took G8GXG 15 years to do it so reckons he has plenty of time. His station consists of an Icom IC-202 and 4X250B PA, 150W to an 11-ele. Yagi.

The only significant DX for G4NBS was OZ1BJF (HP) on Bornholm Is. on Dec. 1. The following weekend, Tony was on for a short time in the contest and GUIHTY and GD4IOM were the only noteworthy DX. In the Fixed station event on Dec. 7, G4XEN had 199 QSOs, best DX being DL5BCA at 658 kms. Colin Ford, G4ZVS, ended the year with 249 on CW. On Dec. 16, he contacted GM3BQP/M (DGL) who was 1,200ft. a.s.l. under flat 7s.

For Mike Johnson, G6AJE, (LCE) new ones for 1986 in December were G1SEW, (HWR), G6ZME (SPE) and GW4WXD (GNM) all on the 7th. Ella Martyn, G6HKM, (ESX) worked nothing new in December but mentioned that the OZs were in fact 2m. QSOs. To her surprise, she found she had won the Zone C section were in fact 2m. QSOs. To her surprise, she found she had won the Zone C section among all the gear on the operating desk but prefers a Sainsburys cardboard box to snore in all day long. Mike’s station comprises a Yeasu FT-225RD with muTek board, two times 4X250B amplifier, 62ft. mast and two “Chinese copies” of the Cushcraft Boomer antenna, all the latter home made. His QTH is 450 ft. a.s.l., well out in the country.

In the December contest, Paul Baker, GW6WZW, (GW) in spite of the mediocre conditions, worked G1GEY (TWR), G4KUX (DHM), GD4IOM and GUKHTY. He has got off to a flying start this year, the first five days bringing 22 counties and five countries, the latter G, GW, GU, GJ and ON.

**Seventy Centimetres**

First the bad news via G1KDF that EI8EF (Co. Donegal — VO) has probably ceased operation on the band as he plans to start up on 6m. instead. The last table points for GI5SWH last year were provided by GI4ASM (SWN) on Dec. 24 and G4GEXI on the 28th to make it 17 counties and five countries. John Quarmby, G3XDY (SFK) worked EI5FK (VL) in the early hours of Nov. 30 and is now up to 131 on the band. As on 2m., G4NBS’s only DX was another Bornholm Is. station, OZ1IFYW, on Dec. 1 after QSYing from 2m. Tony has been doing some research through his logs and finds he has not worked EA and GJ on the band even though 1986 brought him 21 other countries in 72 squares.

---

**70 CENTIMETRES ANNUAL TABLE**

<table>
<thead>
<tr>
<th>Station</th>
<th>Counties</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>G1KDF</td>
<td>80</td>
<td>16</td>
</tr>
<tr>
<td>G6DU</td>
<td>90</td>
<td>20</td>
</tr>
<tr>
<td>G4NBS</td>
<td>90</td>
<td>20</td>
</tr>
<tr>
<td>G4BIE</td>
<td>90</td>
<td>20</td>
</tr>
<tr>
<td>G4GEXI</td>
<td>90</td>
<td>20</td>
</tr>
<tr>
<td>G1KDF</td>
<td>90</td>
<td>20</td>
</tr>
<tr>
<td>G3XDY</td>
<td>90</td>
<td>20</td>
</tr>
<tr>
<td>G1BIE</td>
<td>90</td>
<td>20</td>
</tr>
<tr>
<td>G4GEXI</td>
<td>90</td>
<td>20</td>
</tr>
<tr>
<td>G1KDF</td>
<td>90</td>
<td>20</td>
</tr>
<tr>
<td>G3XDY</td>
<td>90</td>
<td>20</td>
</tr>
<tr>
<td>G1BIE</td>
<td>90</td>
<td>20</td>
</tr>
</tbody>
</table>

By the middle of the year, G8ZVM hopes to be QRV on the band using a home made amplifier with an RCA 7650 and two long Yagis — 24ft. booms, to boost Cornish activity. GW4HKB has built a 70cm. ATV converter and 150W transmitter using PCBs from BATC. Both items are working and Dave is now looking for a cheap vision source.

**Microwaves**

GODJA is planning to tidy up his microwave equipment this winter and is planning to mount a spare 10 GHz head and small Short Backfire Antenna on his mast. This SB4 is only about six inches in diameter but has a gain of 15dBd on 3cm. To encourage discussion about microwave activity, there is a new net on 144.575 MHz the first Wednesday each month at about 8pm local time; other enthusiasts are welcome to call in. Dave is contemplating building a TNC for packet radio now that
the local PR repeater, GB3AP, is on on 144.650 MHz. There are plans to link it to PR repeaters on 1.3 GHz.

G3XDY mentions FC1GXX (ZP) on Nov. 29 and G3AUS (DVN/YK) on 23cm. and 13cm. respectively. G4NBS’s only 23cm. activity was in the Cumulatives. Tony made 23 QSOs on Dec. 2 in above average conditions E/W as the sun started but on the 18th, he only had 13 contacts in flat conditions with low activity. In the five sessions, he worked 55 different stations. G3IQG, G4DEZ, G6OYL, G8HII and PE1EWR were contacted in every one and best DX was G1DOX on Dec. 2 at 300 kms. Nothing was heard from the NE in any session.

G6AJE is building for 23cm. after working some excellent DX on the October contest out portable with the Warrington Contest Group, G3CKR. Graeme Caselton, G6CSY, does much portable work and plans to have 5W of RF on 23cm. this year. He also hopes to get going on 13cm. with the goal of perhaps achieving the first ever WAB Basic Award on the band. Keith Hewitt, G3DER, (YSS) has not written for some time and sent a brief note outlining his squares tally at the beginning of December. He now has 70 squares on 23cm. and 60 points in the All-time 13cm. list.

G6HKM and her husband Roy, G3PMX, are now QRV on 23cm. using Icom IC-1271E and 25-ele. loop antenna loaned by a friend. The antenna is presently on a temporary 12ft. mast and a masthead pre-amp. is on order. Colin Redwood, G6MXL, (DOR) started up on 23cm. from home in VHF NFD, best DX thus far being HB9AMH/P using just 2W through 25 metres of H-100 cable to a 23-ele. Tonna Yagi at 25ft. His QTH is just 15ft. a.s.l. and badly screened; the 600ft. Purbeck Hills are only two miles to the south. G6XV is another reader who is building equipment for 13cm.

Miscellany

Congratulations to Mervyn Rodgers, ex-GM6XPI, now GM0GDL in Alva (CTR). In his letter, G4AGQ mentions the topic of sex on CW, meaning how do you tell the gender of the person you are talking to on the key? Names like Arthur, Harry, etc. are obviously male, but what about Pat, Sam, Chris, Terry, Jo, etc.? Pat himself usually mentions something like “Name is Pat. OM...” Your scribe has observed a similar effect on SSB when the person with the girlish voice says its name is Nigel and he is 14 years old.

The item on noisy Ambassador telephones in December VHF set John Fitzgerald, G8XTI, (BKS) off on a hunt to track down his local nuisance to some office premises nearby. He telephoned BT on Dec. 9 but no action had been taken up to Jan. 7 following the usual, “We’ll look into it” promise. At 400m. distance, the QRM from this instrument makes 2m. untenable to the west with 100 kHz of QRM. "B"'s man from Special Faults suggested there could be six systems in the building.

Finale

This sub-heading has a more poignant meaning this time now that the title of Short Wave Magazine has been sold to PW Publishing Limited. However, although nothing definite has been agreed yet between the new owners and your scribe, this feature, with your support, will continue, along with the long-established awards programme. For the immediate future, all that changes is the address to which you should send your news which is:—“VHF Bands,” SHORT WAVE MAGAZINE, Eneco House, The Quay, Poole, Dorset, BH15 1PP. 73 de G3FPK.
REVIEW

Yaesu-Musen FT-290R
Mk. II Handheld Transceiver

GLEN ROSS, G8MWR

THE FT-290 is dead, long live the FT-290 seems to be the shout going up from Yaesu as they replace the existing Mk. I model with the new Mk. II. Who can blame them? The original model took virtually all the market for a rig of its type, the only competition coming from the Standard stable with a rig running less power and using smaller batteries. Trio gave up right from the competition coming from the Standard stable with a rig running a model took virtually all the market for a rig of its type, the only model with the new Mk. II. Who can blame them? The original just a cosmetic facelift of the original with a larger LCD and the signal to move it and anything over S8 sent it round the end stop. The S-meter needed a strength 5

The New Model

At first glance one could easily get the impression that this is just a cosmetic facelift of the original with a larger LCD and the various buttons repositioned, but a glance inside, or even better at the circuit diagram, will show that for all practical purposes this is a brand new rig firmly based on the principle features that made the old one such a big hit world wide.

Gone is the terrible recessed aerial socket that you could not get the plugs into or out of. It has been moved to the front panel location of the original whip aerial. (Did anyone manage not to break a whip on a FT-290?) The socket itself has been changed to a location of the original whip aerial. (Did anyone manage not to break a whip on a FT-290?) The socket itself has been changed to a separate pack which clips on to the back of the rig. This can be removed and a 25-watt PA module clipped on in its place. When this is done all the connections such as the ALC are made automatically and the rig even switches the dial lights on for you. You cannot use the battery pack with the high power PA, for obvious reasons, and the rig is capable of making use of external power supplies ranging between 8 to 15 volts. The clips which retain the packs are made of plastic and do not inspire a great deal of confidence in their lasting ability, but one must assume that Yaesu have done the homework and that things will not fall apart with time.

Power Supply

The battery pack is no longer an internal fitting but comes as a separate pack which clips on to the back of the rig. This can be removed and a 25-watt PA module clipped on in its place. When this is done all the connections such as the ALC are made automatically and the rig even switches the dial lights on for you. You cannot use the battery pack with the high power PA, for obvious reasons, and the rig is capable of making use of external power supplies ranging between 8 to 15 volts. The clips which retain the packs are made of plastic and do not inspire a great deal of confidence in their lasting ability, but one must assume that Yaesu have done the homework and that things will not fall apart with time.

What Will It Do?

The modes on offer are USB, LSB, FM and CW and the tuning rate varies with the mode selected. Instead of the old "two speed" rates of tuning we now get three. For FM these are 12.5, 25 and 50 kHz, while on SSB and CW the rates are 25 Hz, 100 Hz and 2.5 kHz. These are well selected and on SSB the 25 Hz is a great improvement over the old 100 Hz steps and gives the feel of a real VFO instead of the pan-pipes effect when tuning through a carrier. As if this were not enough, new panel buttons allow the use of 100 kHz and 1 MHz steps on all modes for quick QSY'ing around the band.

The Memories

A modern rig without the all-singing, all-dancing bit is unthinkable and we get them all in full measure here. There are two VFOs each displaying frequency, mode, step and offset information on the LCD. All the information on mode, etc., can also be stored in the memories and if, for some strange reason, you should want to use a strange frequency split this can be done by using memories 1 and 2 to store the information. There is also the facility to have a priority frequency stored in memory 1 and this is checked every two seconds, the rig locking on to it if a signal is found.

There is the usual array of memory and band scanning using the VFOs or memories in various frequency steps depending on the mode in use.

LEDs and Things

We get the usual two LEDs to indicate 'busy' and 'transmit' states, but there is an unexpected bonus here in that the green LED doubles as a modulation level indicator and the red one also gives service as a low voltage indicator. It starts flashing when the supply volts drops to 8.5 volts, although this is in fact about the same point at which the rig stops operating. The S-meter is the same small one used in the earlier version but at least it now seems to have a rather more sensible scaling than it did before.

Getting Technical

Trying to wade your way through the eight sheets of circuits is a little daunting and the handbook provides no information on servicing or setting-up from which useful information can be obtained. The unit contains two main circuit boards mounted in the conventional fashion and a control board mounted on the front panel mouldings. Most of the small components are now of the chip variety taking you one step nearer to dealer-only servicing.

The receiver is a double conversion job with IFs at 13,988 MHz and 455 kHz, the second IF only being used on FM. The first two stages in the receiver are dual-gate FETs and these are followed by two monolithic filters to give a good roofing characteristic. The signal then passes through the noise gate and splits and goes separate ways depending on whether it is FM or SSB. On FM the signal continues through an MC3357 which does all the usual chores like down conversion to 455 kHz, where the signal passes through a ceramic filter before demodulation. It then passes through a squelch system which is derived from the residual noise and then goes to the communal AF amplifier and output stages.

On SSB and CW the signal passes through a multipole crystal filter and then through more IF amplification before being demodulated. The AVC is the usual audio derived variety. Injection frequency to the demodulator is varied according to the mode in use and for CW the offset is 700 Hz, resulting in a beat note that may be a little low for some tastes.

Frequency Generation

This is a complex procedure indeed and is generated by an MC145145 under the control of a microprocessor which also looks after all the other functions of the rig. A VCO generates the final frequency minus the first IF. On FM transmit a VCXO is
frequency modulated with input from the microphone after it has been tailored and clipped, and on CW we have the luxury of a sidetone generator feeding signals into the audio system.

The Spec.

First of all a few general comments. With the possibility of a forthcoming shift to 12.5 kHz spots on the band it was interesting to see that the filters in the rig would be adequate for the job. The strong signal handling was considerably improved over the Mk. I version and the transmit linearity was also much better. The sensitivity was good and there should be no need for a preamp even if the 25-watt PA is used. The transmit power and receive sensitivity are very complimentary. The SSB filter was not as good as the old one and Yaesu at least admit this as the spec. is reduced from 4.8 kHz to 60dB down to 5.2 kHz; except under severe lift conditions this should not present a problem. The transmit audio on FM was a little strange, there being a certain amount of over-deviation at low frequencies and a very marked roll off above about 2 kHz; these effects combine to give a slightly heavy and somewhat muffled quality to the speech, although the effect is not excessive. On transmit the rig is remarkably short of spurious outputs and obviously a lot of work has gone into cleaning up this aspect of the rig.

Some Figures

The receiver sensitivity figures for 12dB SINAD are 0.14 microvolt on SSB and 0.17 microvolt on FM, and these figures were obtained right across the band.

The power output on transmit was essentially the same across the band at 2.7 watts on high power and 0.35 on low. These powers hardly changed when the supply voltage was changed from 13 to 9 volts. The current consumption on high power was 1 amp and about 0.6 amp on low power. Again changing the voltage made little difference.

The adjacent channel selectivity was measured as the level of signal required to degrade a wanted signal by 6dB from an original 12dB SINAD. At plus 12.5 kHz the increase of level was 54dB and at minus 12.5 kHz 46dB was measured, which indicates some asymmetrical shape factor on the filters. The figures at plus and minus 25 kHz were both 78dB.

Spurious emissions were measured at not less than -67dB and at the fifth harmonic they were down to -88dB; these figures are really excellent.

S-meter calibration was checked at 0.5 microvolt for S1, 5 microvolts at S9 and 24.7 millivolt at end of scale. The FM deviation was a little high at nearly 7 kHz at 350 Hz and about right, at 5.1 kHz, at 1.5 kHz. The tone burst was definitely down at only 2.9 kHz but the local repeaters did not seem to mind. The frequency calibration was excellent, showing a measured plus 63 Hz compared to the frequency counter after a warm-up period of 10 minutes from a cold start.

General Comments

What can one say except that it will continue the tradition of the earlier version? Yaesu have got another world-beater on the market. It is easy to drive, it has all the facilities one could reasonably want in a rig of this type and the performance is better than the original in every way. On the minus side there is the rather thin 'plasticy' feel to the clip-on add-ons and an incredibly crude plastic rod to do the dial light switching when the PA is plugged in. To balance things up the noise blanker works well and the back-lit display with larger digits and more information is excellent, being very easy to read at night. All the usual facilities are provided by buttons on the microphone and the extra clarifier knob is a delight.

In two words then, "buy one." I did.

A Spectrum Wavemeter

P. B. BRODRIBB, G3ONL

ONE of the most useful items of test equipment for frequency measurement is the absorption wavemeter. Consisting basically of an inductor and a capacitor, it indicates the presence of a signal and does not itself generate spurious signals that can mislead; it is this simplicity that makes it mandatory for the radio amateur.

Unfortunately the simple absorption wavemeter must be inductively coupled to the circuit under test. This makes it difficult to use where no inductor is present or in those awkward situations that abound in modern compact circuitry. Its sensitivity is low and depends upon the sensitivity of the indicating device, yet there are many instances where knowledge of the frequencies present in a circuit would be useful. It is all too easy to forget that oscillators, mixers and even amplifiers can generate unwanted frequencies. When peaking tuned circuits it is comforting to know
that the indicating device is responding to the design frequency and not to a harmonic or some other unwanted product.

The instrument described here is basically an absorption wavemeter with input taken from a wideband probe and an amplified output to increase sensitivity.

Input is taken to one of three tuned circuits selected by a rotary switch. The unused circuits are short circuited to prevent unwanted resonances. Tuning is accomplished by a two-gang capacitor: one section has a capacitance of 150pF and the other section has a capacitance of 300pF. These capacitors may be junk box two-gang types with plates removed or separate capacitors ganged together. With the inductors shown these capacitors give tuning ranges of 1.8 to 3 MHz, 3 to 12 MHz and 12 to 52 MHz. The lowest range is covered by switching in additional capacitance across the middle range inductor. Higher Q-factor, and hence greater discrimination, could be obtained on this range by switching in an entirely separate inductor instead of additional capacitance but this would entail more complicated input circuit switching. The arrangement shown seems to be adequate. A 6:1 drive mechanism and Letraset numbering complete the tuning assembly.

The signal is amplified by an FET, TR1, whose high input impedance helps to maintain a high Q-factor for the tuned circuits, thus helping to discriminate between signals. However the instrument is not intended for examining close-in components.
and may be used to drive a digital frequency meter; this enables a control allows a reference signal (e.g. a fundamental) to be set to a DC amplifier to feed the indicating meter. The sensitivity balance are necessary for this!

such as sidebands. A spectrum analyser and a healthy bank which are mounted on the switch.

Output is taken from the source of TR1, rectified and passed to a strip of Veroboard except for the inductors and the 1000pF capacitor that once contained twist drills; again construction is on a strip of Veroboard which holds all the probe components including the transformer. It may be helpful to use 1/4 W resistors unless a larger cylinder is available. A larger container would permit a switched attenuator to precede the probe input (Fig. 4). This would be a worthwhile addition enabling the probe to be used in situations where more than a few millivolts exist.

The ‘Mk. 1’ version of the wavemeter had only two ranges. The ‘Mk. 2’ version described in this article adds the range 1.8 to 3 MHz and brings the ‘set zero’ control out to the front panel. The probe is the larger version incorporating the switched attenuator (Fig. 4); it is built into a container which once housed solder.

Fig. 3 PROBE OUTPUT TRANSFORMER T1

such as sidebands. A spectrum analyser and a healthy bank balance are necessary for this!

Output is taken from the source of TR1, rectified and passed to a strip of Veroboard except for the inductors and the 1000pF capacitor that once contained twist drills; again construction is on a strip of Veroboard which holds all the probe components including the transformer. It may be helpful to use 1/4 W resistors unless a larger cylinder is available. A larger container would permit a switched attenuator to precede the probe input (Fig. 4). This would be a worthwhile addition enabling the probe to be used in situations where more than a few millivolts exist.

The ‘Mk. 1’ version of the wavemeter had only two ranges. The ‘Mk. 2’ version described in this article adds the range 1.8 to 3 MHz and brings the ‘set zero’ control out to the front panel. The probe is the larger version incorporating the switched attenuator (Fig. 4); it is built into a container which once housed solder.

Fig. 4 PROBE SWITCHED ATTENUATOR

such as sidebands. A spectrum analyser and a healthy bank balance are necessary for this!

Output is taken from the source of TR1, rectified and passed to a strip of Veroboard except for the inductors and the 1000pF capacitor that once contained twist drills; again construction is on a strip of Veroboard which holds all the probe components including the transformer. It may be helpful to use 1/4 W resistors unless a larger cylinder is available. A larger container would permit a switched attenuator to precede the probe input (Fig. 4). This would be a worthwhile addition enabling the probe to be used in situations where more than a few millivolts exist.

The ‘Mk. 1’ version of the wavemeter had only two ranges. The ‘Mk. 2’ version described in this article adds the range 1.8 to 3 MHz and brings the ‘set zero’ control out to the front panel. The probe is the larger version incorporating the switched attenuator (Fig. 4); it is built into a container which once housed solder.

Next we have BARTG and here the interest is RTTY, AMTOR, packet radio and other modes falling under the general heading of ‘Data Comms’. Details from the Hon. Secs. at the address in the Panel.

Again, for details of the Basingstoke HQ. and activities, we have to refer you to the Hon. Sec. — see Panel for his details.

BATC is for the amateur TV enthusiasts, whether colour or monochrome, fast scan or slow. Details from the Hon. Sec. — see Panel.

At Biggin Hill the gang is based at Downe Village Hall, which is next to the ‘George and Dragon’ at 24 High Street, Downe, Kent. Although we aren’t told so in as many words, it looks like the third Tuesday of each month; however, a check with the Hon. Sec. is indicated as the newsletter hints at the possibility of a move of HQ.

At Borehamwood they say they meet on the second Tuesday of each month, but give no other details, save that the telephone contact is G0DDJ on 01-207 3809 for details, and the Hon. Sec’s. address (see Panel).

Turning to Braintree we can hunt for the Community Association Centre, next door to the bus station in the centre of Bredhurst, on the first and third Monday of each month, starting at 7.30 p.m.

Every Thursday evening the Bredhurst group members foregather at Parkwood Community Centre, Rainham, Kent. On February 5 G3FXB will talk about amateur radio in Russia, and on 19th Tony Skinner demonstrates antique broadcasting receivers. The Rainham Radio Rally is on Saturday 28th. Thursday dates not mentioned are natter and construction nights.

Our next entry is from North Bristol which has a place at Self-Help Enterprises, 7 Braemar Crescent, Northville, Bristol, every Friday evening. If you go there on February 13, you will also find the Bristol TV FM Group giving their lecture and demonstration; however, a check with the Hon. Sec. is indicated as the newsletter hints at the possibility of a move of HQ.

At Borehamwood they say they meet on the second Tuesday of each month, but give no other details, save that the telephone contact is G0DDJ on 01-207 3809 for details, and the Hon. Sec’s. address (see Panel).

Our next entry is from North Bristol which has a place at Self-Help Enterprises, 7 Braemar Crescent, Northville, Bristol, every Friday evening. If you go there on February 13, you will also find the Bristol TV FM Group giving their lecture and demonstration; so you can join two clubs at once!

On to Bristol City RSGB where the events are in the Small Lecture Theatre, University of Bristol, University Walk, Clifton, Bristol. On February 23, G8JMB will be talking about packet radio, starting at 7.30 p.m.
All the Bury detail available in the newsletter is that they are to be found at the Mosses Community Centre, Cecil Street, Bury, every Tuesday evening; the formal main meeting is on the second Tuesday, and the details are given in the ‘events calendar’, a page which seems to have been omitted from our copy of the newsletter. Oh, well!

We turn now to Central Lancs where first and third Mondays are booked at Trinity Club, Broadfield Drive, Leyland; other details from the Hon. Sec., or go along for a visit.

On February 3 the Chelmsford group has a rig testing session with Steve Oakman, G8MRO, while on March 3 they have a talk on kite antennas. The venue is Marconi College, Arbour Lane.

Stanton Room, Charlton Kings Library is home to the Cheltenham crew and they are there on the first and third Fridays of each month, alternating natters with formals. We know they have several items already set up, but the AGM may produce others, so why not go and see?

Every Wednesday the Chesham group heads for Bury Farm, Pednor Road, Chesham. More details from the Hon. Sec. — see Panel.

The Chichester members all hurry towards North Lodge Bar, County Hall, Chichester on the first and third Tuesdays of each month. More details from the Hon. Sec.

For the current details of what is going on at Chiltern we must refer you to the Hon. Sec., though we believe they still meet in the Science Block, Sir William Ramsey School, Rose Avenue, Hazlemere, High Wycombe, on second and fourth Wednesdays.

Colchester has a talk on a private aeroplane flight to the South of France by G3CO, on February 5, and a talk on BBC Radio Essex on February 19; both are at the club HQ at Colchester Institute, Sheepen Road, Colchester, starting at 7.30 p.m.

Coventry meets every Friday evening at Baden-Powell House, 121 St. Nicholas Street, Radford. February 6 is a quiz night, and 20th is down for mini lectures; the 13th and 27th are both nights-on-the-air.

For the details on Crawley doings in February at Crawley Leisure Centre, Haslett Avenue, we have to refer you to the Hon. Sec. — see Panel — as our listings stop in mid-January!

All Saints Parish Rooms, at the junction of Beulah Hill and Church Road, London SE19 (opposite the IBA mast) is the HQ. of the Crystal Palace group; on February 21 they have their AGM and Constructional Contest, starting at 8 p.m.

The Derby ‘hymn sheet’ is yet another one to stop dead at the end of January... but at least here we can say that they are at 119 Green Lane, Derby every Wednesday; they have the whole top floor to themselves.

The Dover area is served by the club called SE Kent YMCA, meeting as they do at the YMCA, Godwynehurst, Leyburne Road, Dover, each Wednesday. February 4 and 18 are natter sessions, and on 11th they have an evening of films. February 25 is down for a talk on air traffic control.

Up to Dunmurry where the club HQ, is still the Cargenholm Hotel, New Abbey Road, Dunmurry; the gang is there on the first and third Monday of each month and we are promised that shortly we will have a sight of the future programme.

Dunmurry now for the details we must refer you to the Hon. Sec. — see Panel for the vital statistics.

On February 4 at Edgware the talk will be on electromagnetic compatibility (EMC) given by G4IUZ. February 26 is the informal, with the station on-air, and some Morse by G4IUZ too.

The venue is at Watling Community Centre, 145 Orange Hill Road, Burnt Oak, Edgware.

Now the Exeter details; the main meeting on the second Monday is at the Community Centre, St. Davids Hill, Exeter. February 9 is a talk by Mr. Credgington on BBC engineering techniques. However, they also get together informally at the Scout Hut, Emmanuel Road, on the first, third and last Mondays.

The Farnborough crowd meets at the Railway Enthusiasts’ HQ., 103 Hawley Lane, Farnborough, apparently on the second and fourth Wednesday — but a forty-plus page newsletter doesn’t even mention the forward programme dates! Hence we must refer you to the Hon. Sec. — see Panel.

The Scout Hut, Bath Road, Felistowest is now the HQ. of the Felista group; February 9 is the social evening and the month’s visit is on February 16 when they go to the Raynet Centre at Ipswich Police HQ. February 23 is also shown as a social session, and on March 9 they have a joint ‘do’ with the CSMA, visiting the Sainsbury Superstore at Warne Heath.

Up at Fylde they have the meetings at the Kite Club, Blackpool Airport, on first and third Tuesdays. February 3 is the second part of a talk on Amateur TV, and on 17th G3AEP and G8GG get together for a talk on simple D/F.

At Gravesham the membership is rising again after the move to the new HQ. at TS Wizard, White Hart Lane, London; meetings are on the second and fourth Fridays of the month.

For details of the Grimsby HQ. address and programme details each Thursday we must refer you to the Hon. Sec. — see Panel for the needful.

The third Tuesday of each month the Halifax crowd foregather at the “Running Man”, Pellon Lane, Halifax; on February 17 they have a junk sale, and on March 17 they entertain GSBG’s RR2, G4EJP.

“The Silver Cup” pub, St. Albans Road, is home to the Harpenden group, the formal meetings starting at 8 p.m. February 3 sees a talk on AX25 achieved on a BBC computer for packet radio, while on 17th they try and put it all into practice.

The Harrow crowd is to be found nowadays at Harrow Arts Centre, High Road, Harrow Weald, where they are in session on Fridays, normally in the Roxeth Room.

The third Wednesday of each month is the Hastings formal meeting, at West Hill Community Centre. In addition they have informal sessions at Ashdown Farm Community Centre every Friday evening, not to mention RAE classes, a Raynet group meeting and so on at the same place.

The Hereford HQ. at the Civil Defence HQ., Gaol Street, Hereford, is used on the first and third Friday of each month. At the time of writing we don’t have details on the programme because they have a meeting, due about when this is being written, to call up a programme for the year to come.

Turning to the Ipswich listings we find them at the “Rose & Crown” 77 Norwich Road, Ipswich, where they have a room separate from the bars, so juniors are welcome; they are there on the second and last Wednesday, although dates are sometimes altered to avoid a clash with another club with a special attraction, or occasionally one finds some of the gang in the club room on Wednesdays when no meeting is shown, when they are usually doing Morse.

Over the water now, to Eire, and this means IRTS; this one combines the function of a national society, and a local club, and either way it is the proper route for any enquirers about amateur radio in Eire. Details from the Hon. Sec. — see Panel.

Still over the water, the club has changed its meeting place to be at The Harmony Hill Arts Centre, 54 Harmony Hill, Lisburn, Co. Antrim, where they are normally to be found on the second Monday each month. Visitors welcome, of course.

The Lincoln HQ. is at the City Engineers’ Club, Central Depot, Waterside South, Lincoln. On February 4 and 18 they have activity nights; on 11th they hope to have G0BTA and G6IGM on 10 GHz TV, while on 25th there is a junk sale. Additionally, they hope to have GBORAG operating during the week February 21-28 for the Bishop Grosseteste College rag week, at the college.

Now we go on to Loughton where the locals have a place at Loughton Hall, Rectory Lane, Loughton, Essex. On February 13 they have a talk on kite antennas. The venue is Marconi College, Arbour Lane.

For details of the Maclesfield where the HQ. is at Fermain Club, Oxford Road. February 3 is a construction evening, and on
Names and Addresses of Club Secretaries reporting in this issue:

ABERDEEN: D. Travis, GM4GXD, Gorsebed, Kirkton, Chapel of Garioch, Inverurie, AB5 9HF. (Pipetone (04167) 251)
ABERDEEN: E. Davie, G4XHO, 109 Coosnacon Parc, Aberdeenshire, Gwent NP7 6PE. (0733 787647)

ACTON, BRENTFORD & CHISHICK: W. G. Dyer, G3GEH, 188 Queensway, Acton, London, Acton W3 9EB. (01-922 3779)


BARTG: P. J. Beedie, GW6M0J/GW6MOK, Fyrarnroads, Salem, Liquidate Panel.

BASINGSTOKE: A. Windsor, G1QGO, 28 Mendip Close, Bursingtong, Hants RG2 2SB.

BAYC: T. Brown, GC9CS, 25 Gaunbridge Drive, Adel, Leeds LS16 7PF.

BIGGIN HILL: R. Senf, GM409, Mill Hall, Standard Road, Downe, Kent BR6 7HL. (0387 574844)

BIRMINGHAM: P. Brown, Sonn, 11 Parkside Drive, Edgware, Middlesex.

BRAINTREE: D. Brades, 3 Coldnailhurst Avenue, Braintree CM7 7SL. (0206 894009)

BREDHURST: K. Fay, GOAM7Z, 37 Sandingham Road, Rainham, Gillingham, Kent ME8 6PF. (0775 376991)

BRISTOL CITY RSGB: C. Hollister, G4SQQ, 34 Battersby Way, Henbury, Bristol BS10 7RU. (0272 508431)

BRISTOL (NORTH): A. Booth, G4YQQ, 56 Southmead Road, Filton Park, Bristol BS31 2RD. (0272 690446)

BURY: M. Siveri, G4ZTB, 47 Ramsay, Bacup, Lancs.

CENTRAL LANCs: D. W. Fowler, G4YWG, 22 Larchwood Crescent, Leyland PR5 1JR. (0772 432725)

CHELMSFORD: A. C. Mead, G4QKE, 9 Avenue Drive, Silver End, Writtle, Essex CM8 3QP.

CHELTENHAM: T. Kirby, G4VZG, V29 Tivoli Road, Cheltenham, Glos, GL50 2TD. (0422 367263)

CHEMM: J. Aldridge, G6LKS, 91 Rose Drive, Chesham Bucks HP5 1QJ.

CHICHESTER: B. Bryan, GE4HC, Maureen, Sallhill Road, Fossebourne, Chichester, Sussex PO19 1SP. (Chichester 765877)

CHILTERN: C. Dunn, G4KVI, 24 Mynchen Road, Beaconsfield, Bucks. (0296 789586)

CHERTSEY: J. Simkins, G8IYS, 18 Riding Hill, Sanderstead, Croydon CR2 6BD.

COVENTRY: W. Hahn, G4UJL, 9 The Chevies, Coventry CV3 9NA. (0206 696608)

CRAWLEY: D. L. Hill, G4QIM, 14 The Garroes, Worthway, Crawley, West Sussex RH11 9YD.

CRAY VALLEY: C. Dunn, G4KVI, 11 Liphook Crescent, London SE2 3BN. (01-699 6401)

DERBY: J. Anthony, G3KQF, 27 Bryford Road, Littleover, Derby DE5 8GK. (0312 732361)

DOVER: J. Saureruss, G0AKD, 8 The Ridgway, Dover, (Dover 022226)

DUMFRIES & GALLOWAY: J. Young, 22 Hallmeadow Place, Annan, Dumfrieshire DG12 6BZ.

DUNFERMLINE: D. Young, GMODYD, 4 Primrose Avenue, Rosyth, Fife KY11 4TU.

DUMFRIES: J. Young, 22 Hallmeadow Place, Annan, Dumfrieshire DG12 6BZ.
their Hq. at Carleton Community Centre, where our letter says they have the top floor, but we believe they may be on the ground floor, so best check on arrival. February 19 is the formal session and this is the Raynet AGM.

Now to Powys and here again it is Thursday evenings, at the Cricket Pavilion, Lymore Park, Montgomery. To find this, take the road out of Montgomery towards Chirbury, B4386, but just before you come to the end of the built-up area turn right down the private road and carry on for a mile, until the cricket field and its pavilion appear on your left.

The Poole group has had problems in nailing down their speakers in time to advise us, but they now have February 27 for the RSGB tape/slide talk on Solar Cycle 21, and on March 27 an ‘Introduction to 10 GHz.’ Find them on the last Friday of the month at Commander’s House, Constitution Hill Road, Poole.

RAIBC is the one for those who are invalid or blind, whether licensed amateurs or SWls. This month we must mention their member Charles Kirk of Yeadon, who at the age of 83 has passed both parts of the RAE and regained his old call G4CL first issued in 1938. We hope his effort encourages many more OTIs to get back on the air. Details on RAIBC from the Hon. Sec. — see Panel.

Talking of old-timers, their own club is RAOA and to qualify you have to demonstrate an interest in amateur radio for twenty-five years; get the details from the Hon. Sec. — see Panel.

Meetings of the Reading club are held at the “White Horse” in Emmer Green, Reading, on alternate Tuesdays, and the first meeting of 1987 was on January 6, so we make the dates February 3 and 17. More details from the Hon. Sec. — see Panel.

SARUG is the group which is interested in application of Sinclair micro-computers to amateur radio activities in any way; details from the Hon. Sec. — see Panel.

At South Bristol we can find the locals every Wednesday evening at Whitchurch Folk House, East Dundry Road, Whitchurch, Bristol. February 4 is a talk ‘Can I repair it?’ by G4VBU, and on 11th they have a 70cm. activity evening. February 18 is a magazine exchange evening, and on 25th they have an HF activity evening. The lecture on March 4 is on cables and connectors.

The Southdown crowd has a main meeting on the first Monday of each month at Chaseley Home for Disabled Ex-Servicemen, Southcliff, Eastbourne, plus informal sessions on Tuesdays and Fridays of each week, at Wealden Council Offices, Vicarage Field, Hailsham. However, the current issue of the newsletter gives January 7 for the AGM and February 4, which are Wednesdays... Perhaps you should contact the Hon. Sec. for the current situation — see Panel!

The South Essex group is based on Canvey Island, at The Paddocks, every Wednesday evening. This is the venue for their Mobile Rally, slated for March 15. February 4 is another talk on PMR by Dave Pring, and on 11th G3OA gives a history of Top Band. February 18 is a junk sale, and on 25th G0ASN talks about a 50 MHz transverter.

Holy Trinity Church Hall (Upper) in Green Lanes, Winchmore Hill, is the Hq. of the Southgate club, where on February 12 they have a talk by G4KZD on computer technology, and on February 26 an informal gathering.

Our next stop is South Lakeland and here they have a place at the Norweb Sports & Social Club room at the rear of the Ormsgill Hotel, Barrow-in-Furness, where new members and visitors are welcome on the first and third Thursdays of each month.

Old Bank Working Men’s Club, Mirfield is the home of Open Valley on Thursdays; on February 5 the talk is of satellite TV, and on 19th bee-keeping, by G4PHR. The evenings in between are ‘noggin and natter’ dates.

New Home

Stockport now meets at the Blossoms Hotel at the junction of Bramhall Road and the A6. February 11 is a junk sale, and on 18th they have an informal session in the bar. February 25 was still to be finalised as to programme at the time of their letter.

Doubtless the difficulty will have been resolved by now but you could check with the Hon. Sec. — see Panel.

Now to Stourbridge where they gather at the Robin Woods Centre, School Street, off Enville Street, Stourbridge, on the first and third Monday of each month.

The Surrey crowd is to be found at TS Terra Nova, 34 The Waldrons, South Croydon, on the first and third Monday from 7.45 p.m. the latter usually being the informal.

Now we must head for Sutton & Cheam and Downs Lawn Tennis Club, Holland Avenue, Cheam. On February 2 they have a natter night in the bar, and on 20th a video on QRP. February 26 is down for a visit to the UoSAT control station at Surrey University, and on March 2 there is another natter night in the bar.

February 9 at Sutton Coldfield is down for a talk by G4AAL on Operation Raleigh, and on 23rd they have a computer evening. Both are at Sutton Coldfield Public Library.

February 2 is the AGM for Todmorden, at the Queen Hotel, Todmorden, and on 16th they have a chat night at the same venue.

New One

This one is called Twickenham & Teddington and for more details the contact man is shown in the Secretaries Panel — he will be pleased to pass on details of dates, venues, activities and so forth.

Turning to UK FM Group (Northern) we find them on the first Sunday of every month at the Royal Hotel, Church Street, Brighouse. More details from the Hon. Sec. — see Panel.

‘The Round of Grass’ (yes, that’s the right spelling!) is host to the Vale of Evesham group on the first Thursday of each month for the main meeting, some two miles east of Evesham, at Badsey. The informals are on the third Thursday of each month at the “Gardener’s Arms”, Charlton, two miles NW of Evesham.

February 5 is a talk on used equipment by Allan Kelly, and on March 5 G3PGQ and G3DEF combine forces to ‘Test your Spec.’

It’s the second and fourth Tuesday of each month for Verulam at the R.A.F. Association Hq., New Kent Road, St. Albans. February 10 will be an activity evening, and on February 24 they have a talk on radio control of models by Ian Bradbury.

Every Tuesday evening the Warrington members are gathered in Grappenhall Community Centre, Bellhouse Lane, Grappenhall, Warrington; the general form seems to be to alternate between informal chat nights and the more formal sort of thing with a speaker or films, or whatever.

Another change of Hq. now: Welwyn/Hatfield has its main meetings on February 2 and March 2 at their new home at Lemsford Village Hall, Brocket Road, Lemsford, near Welwyn Garden City; however the informalers are still at the 9th Welwyn Garden City Scouts Hq. Knightsfield, Welwyn Garden City, on February 16 and March 16.

On the second and last Friday of every month the Wimbledon crowd is at St. Andrews Church Hall, Herbert Road, Wimbledon. February 13 is a mini-lecture and natter, and on 27th, they have G3YA talking about IBA television broadcasting.

On now to Yeovil where the locals have Thursdays booked at the Recreation Centre, Chilton Grove, Yeovil. On February 12, G3MYM talks about the L-match, and on 19th G3GC deals with D/F for the radio amateur. February 26 is a natter night, and on March 5 G3MYM returns to the fray, to discuss the grey line propagation phenomenon.

QRT

Signals the end of another pile of mail; your letters should be addressed to “Club Secretary”, SHORT WAVE MAGAZINE, Enefco House, The Quay, Poole, Dorset BH15 1PP. Note the change of address for your letters!
MARCH '87 ISSUE — RECEIVER SPECIAL

- REVIEWED
  Lowe Electronics’ HF-125 Communications Receiver
  It’s Made in Britain, Geoff Arnold G3GSR puts it to the test

- TWO RECEIVE CONVERTERS
  Use Your Scanner to Listen to the h.f. Bands
  AND
  Use Your h.f. General Coverage Receiver to Listen on u.h.f./v.h.f.

- PLUS
  ANOTHER PRE-PUBLICATION BOOK OFFER
  The Latest Edition of Guide to Broadcasting Stations

and lots, lots more

On Sale Feb. 12 — Order Your Copy Now!!
THE SHORT WAVE MAGAZINE

THE HAMGEAR PMX PRESELECTOR

Introducing our new HF band preselector and antenna tuning unit combined, covering 1.7 to 34 MHz completely. The ATU section allows endless experiments with various lengths and types of antenna and offers correct matching of these antennas to your receiver.

The pre-amp section has a gain of 20 DBS which can be controlled down to zero gain, then on down to minus 15 DBS, allowing a boost just where the RX might need it or an attenuation where the band dictates. This unit represents the two most popular pieces of receiver ancillary equipment in one case and has been deservedly popular since we introduced the original version in 1964.

The case is all metal with brushed aluminium panel; unpowred, it requires 12 volts at 40 m/A; guaranteed for 12 months and priced at £69.00 post paid U.K.

Why not send for full details?

HAMGEAR ELECTRONICS
125 Wroxham Road, Norwich, NR7 8AD.
Tel: Norwich (0603) 405611.

THE SHORT WAVE MAGAZINE

REG WARD & COL LTD
The Southwest's largest Amateur Radio Dealer

1 Western Parade, Axminster, Devon EX13 5NY

- appointed agent for
  * Yaesu, Trio, Icom, FDK
- Complete range stocked
- Full demonstration facilities
- Barclaycard, Instant Credit, Access

Ancillary equipment by Adonis, AXO, AOR, Bencher, BNOS, Cap Co., Datong, Diawan, Drac, Hansen, Himund, Jil, Kenpro, Microwave Moduless, Mustek, SEM, Shure, Tokyo Hypover, Tono, Toyo, TSCO, Wood & Douglas

Aerials by: G. Whip, Hygain, Jaybeam, Mini Products, MET, Revco, Tonna

Opening hours:
full range of Wood & Douglas kits:
Tel. Axminster (0293) 34918

THE SHORT WAVE MAGAZINE

Morse Tutor

- Letters
- Numbers
- Mixed
- Variable Speed
- Volume Control
- Earphone Socket
- Practice Oscillator

Learn morse the easy way.

NO STAMP NEEDED

B. A. JONES
FREEPOST
(Gr 1863)
CHELTENHAM
GLOS
GL50 3BR

£29.95

RADIO AMATEUR PREFIX-COUNTY-ZONE-LIST

published by GEOFF WATTS
Editor of "DX News-Sheet" 1962-82

The list you have always needed, the list that gives you everything, and all on one line! For each country:-

a. its DSCC "xxxx"

b. the normal prefix

c. the special prefixes
d. the ITU callSIGN block allocation

Full information on Antarctic stations, USSR club stations, obsolete prefixes used during the past 10 years, and much more.

The list is completely up-to-date, and includes all the latest information. Everything arranged alphabetically and numerically in order of prefix, ideal for Contest operators and SWL's.

Tell your Club-members about it. Order an extra copy for that overseas friend. 15 pages. Price £1.00(UK), overseas air mail £2.00 or EBCs.

GEOFF WATTS
62 BELMORE ROAD, NORWICH NR7 0PU, ENGLAND
**TRADE**

Samson (German) CMOS El-Keyers, integral adjustable paddles, silver contacts, used by professionals worldwide: ETC-5C, £89; ETC-8C (4096 bit memory), £142. Send s.a.e. for details.

**Quality walkie-talkies, private, long range, satisfaction or refund,** Watts, G4BM, QTHR. (Tel: 0531-820960).

ETM-8C (4096 bit memory), £142. Send s.a.e. for details.

Samson (German) CMOS El-Keyers, integral adjustable paddles, Dorset BH15 IPP. Prices include VAT.

**FREE READERS’ ADS**


For Sale: Marconi MK-223 Tx, 2-30 MHz, complete with PSU and manual, £65. RA-17 general coverage Rx, 0.5-30 MHz, with manual, very good condition, £100. Farnell power supply, 0-20V 3A, £8. DC power pack, 13.8V 25A, £15. S. G. Brown headphones, £5. DGT-91 2½" CRT, boxed, with holder, £8. Solartron double-beam scope, 15 MHz, with probes and manual, faulty EHT, hence £20. Wire dipole kit, 135ft., with heavy-duty insulators, wire balun, pulley and lanyard, £12.

Heathkit decade capacitance box, 100pF to 1µF, £5. HF whip aerial, 10ft., £6. Five 807's, new and boxed, £6.26 copies of Short Wave Magazine, May '75 to Sept. '76, £5. — G4FZG, QTHR. (Tel: 0242-580329).

For Sale: Icom IC-R70 receiver, mint condition and works-fitted 2.3 kHz IF filter, £470 or near offer. (Sussex). — Box No. 5826, Short Wave Magazine, Enefco House, The Quay, Poole, Dorset BH15 1PP.

Wanted: Purchase or borrow, manual for Marconi “Pacific” receiver. — Box No. 5827, Short Wave Magazine, Enefco House, The Quay, Poole, Dorset BH15 1PP.

Sale: Westminster W15AM low band, with accessories, £30 plus delivery. Valves: QQV03-10, -20, and most communication types for mobiles, also ceramic bases. High-voltage transformers, — Burge, G16OTU, 6 Ashley Park, Bangor, Northern Ireland. (Tel: 0247-473759).

For Sale: Westrex RTTY PSU, 80-0-80v. at 150mA, with circuit, £10 or near offer. — Ring Kay, G4GCB, Belper 6851 (Derbys.).

**Selling:** Super Sony ICF-7600D all-mode, all-wave receiver, complete with leather case, mains power unit, earpiece, batteries, external aerial etc., two months old, with free all-in maintenance contract included, £145. — Barnes, 14 Coalpit Lane, Langley, Macclesfield SK11 0DQ. (Tel: 02605-2287).

For Sale: FT-101ZD Mk. III, new WARC bands, with mic., fan box and manual, good condition, £495. — Ring Terry, 0462-35248 after 6 p.m.
REVIVE THE 70MHz AMATEUR BAND – WITH OUR SUPER DEALS –

PYE WESTMINSTERS FM OLYMPICS 12 channels dash mounting complete with Mic. speaker, control box & lead, power lead, mounting cradle, we also supply the few capacitors needed for modification to 4 metres. All tested before despatch, with mod. details, circuits, & alignment data, all units in very good condition ONLY £40.00 inc. carriage.

PYE M202 FM OLYMPICS 12 channels dash mounting complete with Mic. speaker, only 7 capacitors to solder across coils for modification to 4 metres, supplied with caps, circuits & alignment data. ONLY £45.00.

NOTE: crystals not supplied but will be available, please ring for prices.

DYMAR 5 channel FM hand portables ‘P’ band can be modified to 4 metres (but we have not converted this one yet) supplied complete with speakers/mic. battery, carry strap with built in antenna, & circuits. ONLY £36.00. A few available needing repair at £20.00. All prices include post and packing or you can collect from our shop.

Opening hours:
Mon. to Fri. 9.30am – 1pm. 2.30 – 5.30pm. Open all day Sat.

S.W.M. DX ZONE MAP

Latest 10th Edition!

Great Circle Projection on durable, quality, paper for wall mounting, 33¾ in. wide by 24½ in. deep. Giving essential DX information – bearing and distance of all parts of the world relative to the U.K., the Zone areas into which the world is divided for Amateur Radio purposes, with major prefixes listed separately. Distance scale in miles and kilometres. Time scale in GMT. Marking of Lat./Long. close enough for accurate plotting. Hundreds of place names, mainly the unusual ones, and most of the rare islands.

Price £4.35 inc. p/p

SHORT WAVE MAGAZINE LTD.,
Enefco House, The Quay, Poole, Dorset BH15 1PP.

Selling: Philips D.2999 receiver, many facilities including scan, memories, direct entry, 4 months old, immaculate condition, boxed, with manuals. Offers? Looking for HF rig. — Ring Shaun, 021-525 1254.

Exchange: Blautopunkt “New York’ car radio/cassette, system, with six speakers, graphic equaliser, 80-watt amplifier, superb finest top quality system (cost over £900), also as-new 9” monitor for HF linear or any amateur radio equipment. — Ring McCallum, G4VNG, 0733-231639.

Wanted: Belcom LS-201L, good price paid for transceiver in perfect condition. — Ring Belfast 795783.

Wanted: FRV-7700 VHF converter for FRG-700 Rx, must include 118-130 MHz and 140-150 MHz. Also out-of-date issue of International Listings Callbook. — Dunn, 24 Ashfield Crescent, Highfield Road, Chester CH1 5AU. (Tel: 0244-373132).

QRT Sale: TS-120V with DFC-230 VFO, £250, muTek TVVF144a transceiver, £180, FC-700 ATU/dummy load, £75. BNOS L144-10-100 linear, £75. Homebrew 12v. 25A PSU, 2m. linear and PSU parts, SK600, transformers, caps, built RM-1 modern PCB, plus more, offers? — Ring Kevin 0243-828402, 6-8 p.m. only.

For Sale: Icom IC-202S 2m. SSB portable, fully crystallised, £125. Yaesu FT-7900 70 cm. hand-held with FNB-3 power pack, soft carrying case and charger, £220. Trino TH-41E 70 cm. h/held with VOX headset, DC/DC converter and charger, £200. All in excellent condition. — Banks, G4WND, QTHR. (Tel: Tamworth 894464).


Wanted: Ex-government MK-123 Tx/Rx complete with spices and accessories, in working order. Your price will be paid! All s.a.e.’s will be answered. — Leaman, G3POP, 26 Prospect Road, Birchenhill, Kent CT7 9RP.

Wanted: Old or new style RF PCB for FT-707. — Ring Tony, 0304-820118, or Ian, 0304-821588.


Selling: UR43 coax relays, 12v., 460 MHz, £3.50 ea. — Barnes, G3AOS, 14 Coalpit Lane, Langley, Macclesfield SK11 0DQ. (Tel: 02605-2287).

Wanted: List of pre-W.W.I radio amateurs, wartime and pre-war copies of Radio Times, Listener, etc. Knobs — any variety! — G3KPO, QTHR. (Tel: 0983-67665).

For Sale: Microwave Modules 70cm., 2m. and 4m. (inc. 4m. 4-ele beam) transverters, £60, £85 and £80 respectively. Exchange: Yaesu FRG-7 in mint condition, no mods., with 12v. lead, for any 2m. equipment, FM hand-held etc. But would love to swap it for an Icom IC-202L — Ring Fox, G4MDQ, 0909-566724 after 5 p.m. weekdays.

Selling: Books old and new, send s.a.e. for list. Fourteen Type FT243 crystals between 7005 and 7040 kHz, £24. Wanted: Solartron stabilised AC/PSU’s — W-H-Y? — Codar 250/S PSU and AC/PSU for Marconi “Mercury” Rx. — Marris, 35 Kingswood House, Farnham Road, Slough, Berks. SL2 1DA.

ELECTRONICS (G8AQN)

151a BILTON ROAD, RUGBY CV22 7AS
Tel: Rugby (0788) 76473.
(0788) 71066 evenings.

ARROW AUCTIONS (REDDITCH 66393)

By direction of Bristow & Sutor (Certificated Bailiffs)

SERVONICS LIMITED (IN LIQUIDATION)

FORCED SALE BY PUBLIC AUCTION

Stock briefly comprising of:— over 14,000 transistors, 400 + diodes, Zenna diodes, large qty. of springs, screws and switches, over 11,000 various size resistors, over 500 assorted integrated circuits plus transformers, erasing heads, ceramic miniature discs, thick cover spring, Potentiometer Tuning 100KS. felt paper for handsets, crystals, coil, LED displays, slow blow fuses, drive belts etc. etc.

SALE TO BE HELD ON
THURSDAY 12th FEBRUARY 1987
commencing 11.00 a.m.

At our sale rooms in Arrow Road, North, Lakeside, Redditch, Worcs.

Viewing: 10.00 a.m. – 4.00 p.m. Wednesday 11th February 1987 and on day of sale.

Terms: All lots offered are subject to prior satisfaction of warrants. No cheques unless by prior arrangement with the Auctioneers.

TEL: REDDITCH (0527) 66393.

“S.W.M.” DX ZONE MAP

February, 1987
Wanted: For new project (QRP?) for the New Year, 4CX1500 or 4CX1000 valve and/or base for same. Please write with price, age, etc. — Dick, 3 Limes Road, Folkestone, Kent CT19 4AU.


Wanted: New, unused and boxed Hy-Gain TH6DXX. Details and price please. — Girvan, GM2FVV, QTHR. (Tel: 0786-811237 after 7 p.m.).


Wanted: For Sale: Yaesu FT-290R, with nicads, charger, case, manual, VHF mobile antenna and 2m. colinear antenna, the lot £320. — Ring 0256-882486.


Wanted: Top Band transceiver, must have AM/CW, including SSB would be accepted, anything considered. Also Kenwood T-595S HF Tx. — Peter, GI6X1, QTHR. (Tel: Norwich (0603) 748338).

Wanted: S.E.M. Visa 3.5 MHz receiver. S.E.M. Transmatch/Ezitune with dummy load if possible. — Barnes, G3AOS, 14 Coalpit Lane, Langley, Macclesfield. (Tel: 02605-2287).

Wanted: Components for HF linear amp., including pair of 813’s with ceramic bases, 1.5kV transformer, tuning capacitors, etc. — Ring McCarthy, Ipswich 689982.

Wanted: Service manuals and sheets for most amateur radio rigs, also 14AVQ antenna. — Ring 0288-4892 after 5 p.m.

For Sale: Yaesu FT-290R, with nicads, charger, case, manual, VHF mobile antenna and 2m. colinear antenna, the lot £320. — Ring 0256-882486.


I am engaged! So must reluctantly sell my Yaesu FT-480R, complete with PSU, desk mic., rotator, HB9CV and coax, yours for only £365. Hallicrafters SX-140 Rx, amateur bands only, £50. Buyers collect. — Ring Mike, G1HGD, 0926-55158 evenings only.

Wanted: Top Band transceiver, must have AM/CW, including SSB would be accepted, anything considered. Also Kenwood T-595S HF Tx. — Peter, GI6X1, QTHR. (Tel: Norwich (0603) 748338).

Wanted: S.E.M. Visa 3.5 MHz receiver. S.E.M. Transmatch/Ezitune with dummy load if possible. — Barnes, G3AOS, 14 Coalpit Lane, Langley, Macclesfield. (Tel: 02605-2287).

Wanted: Components for HF linear amp., including pair of 813’s with ceramic bases, 1.5kV transformer, tuning capacitors, etc. — Ring McCarthy, Ipswich 689982.
## Technical Books and Manuals (English and American)

### AERIAL INFORMATION
- Antenna Handbook (Ori and Cowan) | £7.75
- Beam Antenna Handbook | £6.50
- Cubical Quad Antennae - 3rd Edition | £6.90
- Simple Low Cost Wire Antennas, by Orr | £6.20
- Aerial Projects (Penfold) | £2.30
- Antenna Book (ARRL) latest 14th Edition | £8.00
- The (ARRL) Antenna Anthology | £4.50
- Two-metre Antenna Handbook, F. C. Judd | £6.35
- HF Antennas for All Locations (RSGB) | £6.65
- 25 Simple Shortwave Broadcast Band Aerials (E. M. Noll) | £2.25
- 25 Simple Amateur Band Aerials (E. M. Noll) | £2.25
- 25 Simple Indoor and Window Aerials (O'Sullivan) | £2.05
- 25 Simple Tropical and MW Band Aerials | £2.05
- The ARRL Antenna Compendium, Vol. 1 (new title) | £8.95

### BOOKS FOR THE BEGINNER
- Amateur Radio (Lutterworth Press) | £9.60
- Solid State Short Wave Receivers for Beginners (R. A. Penfold) | £2.25
- Beginners Guide to Radio (9th Edition) | £5.45
- Beginners Guide to Electronics, 4th Edition | £5.45
- Beginners Guide to Amateurs Radio (Newnes) | £5.45
- Beginners Guide to Integrated Circuits, 2nd edn. | £5.00
- Morse Code for the Radio Amateur (RSGB) | £1.70
- Understanding Amateur Radio (ARRL) | £5.45

### GENERAL
- The Complete DX'er, by W9KNI | £8.25
- Weekend Projects for the Amateur Radio (ARRL) | £3.05
- Projects in Amateurs Radio and Short Wave Listening (Newnes) | £4.20
- How to Build your own Solid State Oscilloscope (Rayer) | £2.25
- How to Design and Make Your Own PCB's (Newnes) | £2.25
- Better Short Wave Reception, 1st ed. | £2.05
- FM & Repeater Notes for the Radio Amateur (ARRL) | £4.35
- Easybinder (to hold 12 copies of "Short Wave Magazine" together) | £0.50
- The World's Radio Broadcasting Stations and European FM/TV (Newnes) | £8.10
- Guide to Broadcasting Stations (18th Edition) | £5.50
- International Radio Stations Guide (new ed.) | £3.25

### HANDBOOKS AND MANUALS
- Radio Communication Handbook, 5th ed., Vols. 1 and 2combined (paperback), RSGB | £14.00
- Teleprinter Handbook, New 2nd Edn. (RSGB) | £12.70
- TVI Manual (2nd Edn.) (RSGB) | £2.20
- The ARRL 1986 Handbook for the Radio Amateur, hardcover | £8.70
- TVI Test Equipment for the Radio Amateur (RSGB) | £2.40
- Amateur Radio Operating Manual (RSGB) 3rd Ed | £6.10
- Oscilloscopes - How to Use Them, How They Work (Newnes) | £5.90
- Practical Handbook of Valve Radio Repair (Newnes) | £17.15

### USEFUL REFERENCE BOOKS
- Foundations of Wireless and Electronics, 10th Edition (Scruggs) | £10.05
- Amateur Radio Techniques, 7th Edn. (RSGB) | O/P
- U.K. Call Book 1986 (RSGB) | £4.30
-Hints and Kinks (ARRL) | £2.40
- Radio Frequency Interference (ARRL) | £6.20
- Electronics Pocket Book, 4th Edition (Newnes) | £6.90
- Radio Data Reference Book, new 5th edition (RSGB) | £8.90
- Amateur Radio Software (RSGB) | £8.60
- The Radio and Electronic Engineer's Pocket Book (Newnes) new title | £5.90

### VALVE AND TRANSISTOR MANUALS
- Towers' International Transistor Selector, latest 1985 Edition (Up-Date No. 3) | £14.50
- Semiconductor Data Book, 11th Edition (Newnes) | £3.90
- International Transistor equivalents Guide | £2.60
- International Diode Equivalents Guide | £2.60

### VHF PUBLICATIONS
- VHF/UHF Manual (RSGB) 4th edition | £11.20

**O/P (Out of print) orders despatched by return of post**

**THE ABOVE PRICES INCLUDE POSTAGE AND PACKAGING**

**O/S (Out of stock)**

Many of these titles are American in origin (Terms C.W.O.)

Prices are subject to alteration without notice.

---

**Available from SHORT WAVE MAGAZINE**

Enufco House, The Quay, Poole, Dorset BH15 1PP. (0202-678558)