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LOWE ELECTRONICS IN MATLOCK, located on the Chesterfield road out of Matlock, that is the A632 and open Tuesday to Friday from 9 am to 5.30 pm (closed for lunch 12.30 to 1.30) and Saturday, open all day from 9 am to 5 pm. A visit to Matlock can be an outing for the family, the local scenery, the Heights of Abraham, Lovers Walk, etc. Ample free parking in our car park and when you have browsed then lunch in one of the towns pleasant restaurants. Amateur Radio with the family in mind.

Telephone: 0629 2817, 2430, 4057, 4995.

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- The rig you will forget you are carrying...
- With overall dimensions of 140mm high, 69mm wide, 26mm deep and weighing only 260 grams (including aerial and batteries), the LS-20XE fits easily into your pocket giving perfect portable communication.
- Long range communication...
- A newly developed dual gate MOS FET is used in the RF stage of the transceiver which considerably improves receiver performance. The internal 50mm diameter speaker ensures clear audio under difficult portable conditions.
- Full coverage of 2 metre amateur band...
- The transceiver covers 144 to 146 MHz in 5 kHz steps and has repeater shift and automatic tone burst.
- Switchable output power for extended operation...
- In order to extend portable operation, transmission power level is switchable, 1 W, 500 mW and 100 mW, so depending on the terrain and conditions, the most economical level can be selected.
- Simple to operate...
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- CS612 Mobile charger. £6.50
- SH1 Speaker mike. £13.80
- SFT20 Soft case. £4.10
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- CP615 Battery carrying pack. £10.25

the Belcom LS20XE, a new dimension in portable amateur radio.

Now, an opportunity for you to buy at a greatly reduced price the LOWE TX40 c.b. transceiver. Now priced at £29.50 carriage £3.00, the LOWE TX40 is a reliable, well built and popular rig. A deluxe version of the transceiver fitted with an additional filter is available for an additional £8.50. Take this opportunity to buy at this fantastic price a LOWE TX40 c.b. transceiver.
TR9130 TWO METRE ALL MODE TRANSCEIVER
This rig is proof, if one needed it, that TRIO do not bring out new models just for the sake of it. The TR9000 is remembered as a classic rig and today people are still asking for second hand ones, even they are a rarity on our S/H shelf. The TR9130 incorporates the improvements that all amateurs asked for, green display, reverse repeater, tune whilst transmitting, higher power, more memories and of course memory scan. TRIO's answer, the TR9130.

TR9130 ........................................ £433.32 inc vat.

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

TR7930 ........................................ £306.21 inc vat.

TS930S HF TRANSCEIVER WITH GENERAL COVERAGE RECEIVE FACILITIES
Much has been said about the TS930S transceiver and it now has a place high in the affection of those amateurs fortunate enough to own one, indeed it has become the "flagship" of the TRIO range. Providing full amateur bands plus a general coverage receiver (100kHz to 30MHz), the TS930S has every conceivable operating feature for today's crowded frequencies.

TS930S ........................................ £1216.70 inc vat.

TS530S HF AMATEUR BAND TRANSCEIVER
A logical progression from the reliable TS530 series the TS530S was the most popular HF rig in the range, I use the term "was" because TRIO decided to cease production and supplies were no more, however the demand from radio amateurs worldwide for the transceiver have continued and TRIO have reintroduced the rig. A standard HF valve transceiver without the frills but providing today’s amateur with all necessary facilities for reliable world wide communication, the TRIO TS530S.

TS530S ........................................ £595.00 inc vat.

TS780 DUAL BAND BASE STATION TRANSCEIVER
The TS780is the perfect base station VHF/UHF transceiver for the enthusiastic operator. The rig has all the necessary control functions essential for operating on both today's busy two metre band and the wide spaces of seventy centimetres. Full repeater facilities plus reverse repeater are included and the transceiver has the usual memory channels (10), two VFO’s, up/down frequency shift microphone, IF shift, two priority channels, memory and band scan, etc. A superb rig, I have one myself, ring for a full enthuse!

TS780 ........................................ £795.00 inc vat.

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

R2000 ........................................ £398.82 inc vat.

TW4000A DUAL BAND FM TRANSCEIVER
I have been waiting for this rig for the last three years, now it is here and I am using one words fail me. Send for details.

TW4000A ........................................ £469.00 inc vat.

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

TR2500 ........................................ £232.53 inc vat.
TR3500 ........................................ £250.70 inc vat.

just a part of the range

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The IC-751 supercedes the already popular IC-740. Improvements such as the addition of 36 memory channels, do away with mechanical bandswitching and add full HF receive capability (0.1-30 MHz), which is even an improvement on the famous R70, and you get a pretty good idea of what the IC-751 is like. It is fully compatible with Icom Auto units such as the AT-500 and IC-2KL and a further option for computer control can be added. There is also a digital speech synthesizer option which will be ideal for blind operators. For power supplies you have the option of the IC-PS740 (which fits inside) or the PS-15/PS20 range for external use.

As you would expect there is a built in speech processor, a switchable choice of a J-FET pre-amp, straight through or a 20dB pin diode attenuator and two VFOs allowing split frequency operation.

Other standard features include: 36 memory channels with scan facility and start/stop timers, a marker, 4 variable tuning rates, Pass Band Tuning, notch, variable noise blanker, monitor switch, DFM (direct feed mixer) in the front end, full break-in on CW and AMTOR compatibility. The first IF is 70.045 MHz. Any XIT and RIT adjustment is shown on the display. The transmitter features high reliability 2SC2904 transistors in a low IMD (-32dB/100W) full 100% duty cycle. Power is restricted to 40W on AM and adjustable from 10W on all modes. FM and the IC-FL44A crystal SSB filter are both fitted as standard.

As you can see from this brief description the IC-751 is certainly a transceiver worth considering – Why not call us for further details?
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Although cheaper amplifiers have appeared on the market, we seriously advise the potential buyer to consider the following points:

1. Has the Company manufacturing the product been in business since 1969?
2. Is the product manufactured solely in the U.K.? If not what happens when you need service facilities?
3. Does the amplifier you are considering have a "realistic" power output specification? Be sure to check if the power rating is RMS or PEP!
4. Is the product fully guaranteed for 12 months, INCLUDING PA DEVICES?

If the answer to any of these questions is No, then you should telephone us immediately for help!

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That's exactly what the Datong Morse Tutor can do for you, as thousands of satisfied users will confirm.

The Morse Tutor generates a random stream of Morse characters to give receiving practice, but two very important features set the D70 apart from other systems.

First: each character comes at you at its normal speed but with an extra delay between each one. As you improve you reduce the delay until full speed is reached. This way you always learn the correct rhythmic sound for each character and avoid the worst of the notorious "plateau" effect.

Second: you can take it anywhere and use it whenever you like without the bother of a mains lead. Battery drain is so low that you should be able to pass the exam on the battery which we install before shipping!

Supplied complete with internal speaker plus personal earpiece, and with a key jack for sending practice, Model D70 is your passport to a more rewarding hobby.

Price: £49.00 + VAT (£56.35 total)

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These high performance audio filters will improve the performance of any existing communications receiver... in most cases, dramatically.

By selecting "SSB" mode you can remove high pitched monkey-chatter from off-tune SSB stations; remove low pitched noises from other stations on the low side of your signal; remove tune-up whistles with a manually controlled notch filter; at the same time remove tune-up whistles with a second notch filter which tunes itself automatically (this function applies to FL3 only).

What marks out the Datong filters from the rest is the high performance of each of the above functions plus the fact that all four functions are available simultaneously.

By selecting "CW" mode all available filters (except the automatic notch) are automatically harnessed together to give an almost unbelievable ability to pull out a single CW signal from a crowded band.

Whether you are an amateur or a professional and no matter which rig you use, the overcrowding on today's HF bands can spoil your reception. Simply adding a Datong audio filter in series with the speaker may be the biggest single improvement you will ever make.

Note that by retrofitting the FL2/A auto-notch conversion kit you can convert an FL2 to an FL3 at any time. The only difference is the auto-notch filter.

Prices: FL2, £78.00 + VAT (£89.70 total); FL3, £112.49 + VAT (£129.37 total); FL2/A conversion kit, £34.49 + VAT (£39.67 total)

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The ICF76000 is ideal for the man on the move. This completely portable receiver gives true worldwide reception in a package that will fit into a brief case. This programmable receiver has 10 memories, band scanning, electronic tuning, built-in clock, telescopic whip, external antenna connector, etc.; all at an incredibly low price. Stocks are very limited so hurry!

Message from SONY UK: Please insist on the Official Sony UK Guarantee to protect yourself

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H.F. TRANSCEIVERS

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TRIO TEC-ONE Antenna Tuner Units

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<td>YAESU FC500</td>
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WELZ AC138 | 65.00

FRT T700 Short Wave Listening | 42.95

H.F. RECEIVERS

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<td>YAESU FRG770M without memory</td>
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V.H.F. RECEIVERS

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<td>A.O.R. AR2001 25-500MHz</td>
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POWER SUPPLIES

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World Clocks

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<tr>
<td>YAESU QTR 240 Analogue quartz</td>
<td>31.46</td>
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(GB3SWM)

ISSN: 0037-4261

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"Magazine" Articles

Any magazine needs different kinds of material, within its field, if it is to satisfy its readership. However, we know from over forty years' experience that as far as Short Wave Magazine is concerned, constructional articles are one of the most important parts of the contents. Now this is where you, the reader, comes in. We can always use good material, so why not write-up your latest brainchild for publication? If writing isn't your favourite occupation, you could always co-operate with another amateur who would do the writing-up from your notes, and with yet another who has the photography knack.

The articles can be short or long — one page or twenty-plus. We do feel, though, that many readers would like to read about a transceiver which operates at the normal power level used on the bands (around 100 watts output CW or p.e.p. SSB) with stability and readout accurate enough to compete with commercial equipment — and which can be home-built through a blow-by-blow series. This, of course, is a 'top line' suggestion; we still want to see plenty of shorter, and simpler (which can be just as original!), contributions. And of course we pay well for all material published.

So put your ideas and experience together and get cracking!
T
THE month under review seems to have been pretty abysmal — at least for those of us who are restricted in the hours available for operating by the demands of work, eating, drinking, sleeping and other minitiae. At the times when your scribe has been able to get on, the band has varied — from awful to unspeakable; which is not to say that some lucky reporter or reader hasn’t found some DX, so let’s get on and look.

The Bands
The problem seems to have been, in part, declining sunspots, and in part also to geomagnetic field behaviour varying from sub-storm levels to just unsettled. And in the short term as we write this, the outlook does not look much better.

Top Band
It is often said that when things are poor on the higher bands, they pick up on lower frequencies. This hasn’t really been true this time, although to be fair there has been DX about — in this case we suspect that the events of early October on Top Band have made normality an anti-climax.

G3BDQ (Hastings) has his card in to confirm the ZL2BT contact, and since then managed a QSO with HZ1AB. But of even more interest was the relaying by UA3PFPN of an SWL report that the ‘BDQ signals had been heard by the operator at Minny Base, Antarctica — 449 at 2005 on October 5. Needless to say the lads at 4K1B will be rectifying their inability to transmit on Top Band from there, in short order; the relay for this SWL report was UK6LAZ. A second, later, letter makes the point that while November might have seemed to be an anti-climax, there was still DX about — several East coast Ws, VE1ZZ and VE1BVL; their sunset time was of interest and yielded contacts at 2051 and 2148, with VE1ZZ and VE1BVL respectively. UA9COT and ZS5AB provided more interest and enabled John to hear the buzz that 7P8CL was on the band — though later words indicated this might have been some piracy. SN8ARY and JY7IZZ were nice contacts, and then the whole Top Band gang were out after the JAs, between November 21, when JA6IEF was heard at 529 around 1910 kHz, to 23rd when he was a good signal, peaking at 57, and fading away while G3BDQ waited his turn — he was finally relieved to get the last QSO before full daylight at the JA end took him down into the noise again. The CQ WW Contest was not very good to G3BDQ for DX — although an impressive list of countries heard from Europe appeared in DX News Sheet; but just before closing date on December 6, John managed a QSO with AA1K and W3CV, in time to hear GW3YDX working K6SE, followed by G6CJ, who had a bit of a scratch before K6SE faded out. On the morning of December 7, John found TU2TF and W3CV; the latter said he understood that K6SE had heard him and so G3BDQ was able to make his first California QSO on Top Band; and straight afterwards he was called by W5AQ. Thus, the tailpiece is that G3BDQ has now worked all the W call areas on Top Band save for KL7.

Turning to G4AKY (Harlow), Dave is getting ready for a move of house which should come up in mid-January — but he has promised to put up an aerial and power the rig before he uploads the furniture. In a small way this move is a bit of a nuisance, as Dave would have liked to make his 100 countries confirmed from the present place — only eight left to go for that target. November’s list shows 7X2AL, E6G6AW, W9SMY, K5UR, UL7MAN, HZ1AB, UA12CN (Murmansk), SV3SJ, RV0WUCY, Y39XO, Y22TO, T7TM (who is in the Call Book under his old MlC call), CT4BD, 3V8AS (QLS to DJ6QT), VP2KAC and lots of smaller fry; all these were on CW, but SSB made it over to 28AS, DL1YD, and GM4NBZ. Gotaways on CW included SW1JG, 2Z4DX, VK6HD, VE3GAS, KV4FZ, and YV2IF.

G3OUC (Newbury) has been operating between 2100 and 2300z on Top Band with his home brew 25 watt p.e.p. signal and a loaded vertical — 45 feet made to look like 3½ wave and tuned against earth, a set-up which yielded QSOs with YU3BTG, DA1WD, 4X6DK, EA3VY, EA2BGR, OH5NQ, LX1BR and PA0KS during the month, along with some of the more local stuff.

G2HKU ran the rule over the CW end of the band; it measured out at DL1RK/CT3 with the Big Rig, while QRP and four watts dealt with DF9ER.

Your scribe, having been driven downwards by the state of the higher bands, bent an attentive ear to the doings on Eighty CW; but it seems to be the case that the real DX which shows in the earlier part of the evening always disappears under the weight of EUs, a situation that rectifies itself, we are told, about ten minutes after I’ve given up and gone to bed! Nonethe-ce, Ws and JAs have been logged at workable strength.

G2NJ (Peterborough) reports that the band started well for his favourite inter-G afternoon operating, but fell away as the month went on, picking up nearer the deadline, when SMs were noted after DX as early as 1430z. PA3BSA/MM was heard operating near the Isle of Wight on November 7, working PAO1CD. Sadly before G2NJ could call him, he had cut off the contact prematurely and QRT. That QRP station, PA0OG, who was operating in ‘beacon mode’ back in May, reappeared in October, sending “QRP QRP QRP PWR 1 W TEST DE PA0GG PSE QSL” around 3555 kHz many times during November.

G4SXE (Burton-on-Trent) says that his success in October with his QRP rig made him dead keen to get at the November band openings. For the first fortnight not much at all happened, but then it occurred to him to change his ½-wave end-fed to a half-wave also end-fed, and to alter the ATU from a pi-network to a parallel-tuned set-up. This did the trick, and in the three days before he wrote Brian worked Y54PL, F6HPZ, PA3BTH, F5QF and ON5IG, all with the tiny rig.

Forty
This is a sadly neglected band as far as reports are concerned, but that’s not by any means to say the DX isn’t there! There was one evening when even 7 MHz was dead, but relatively local signals are there for the QSO-ing most of the time, and DX of course to be found, usually within pretty narrow limits, although it is worth while to sweep the band right through once in a while, as this just might result in a pleasant surprise.

Just one was enough for G2HKU — DL1RK/CT3 — and from what we could hear from here, we aren’t surprised!
Odds & Ends

G4BUE (Upper Beeding) has various things upon his mind at the moment, not the least of which was — almost literally — his tower and beam. Chris decided to have a bite at the 21 MHz only section on the CQ WW CW contest, using his little STX rig, which he reckons can be built for under £4 plus the cost of the crystals. As the STX rig is VXO controlled around 21060, it was decided to catch up on the chores around the house in between clearing up whatever stations might camp on the crystal frequency. This went quite well on Saturday, and the day ended with some QSOs of interest, and some cupboard’s built and installed. However, the next morning, G4BUE looked out of the shack, and saw the end of an aerial element . . . not possible if it’s in the proper place! A fast look outside, and all was revealed; the top section of the tower had bent through ninety degrees, and both it and the aerial on top were a write-off. Luckily Chris is covered under the RSGB insurance scheme, and so it only remains to decide what to replace it with! The point of this is that, while the G4BUE aerial was falling over, and a nearby building comprising four stables was ripped out of the ground and rolled over completely, (a) Chris wasn’t particularly aware of the wind strength and (b) the Shoreham coastguard said the highest gust they had recorded was 72 mph — clearly it was much higher in the small area in which G4BUE’s aerial is located. The moral, one supposes, is that if one is in doubt the aerial should be cramped down. Anyway, we are pleased to say G4BUE is back on the air with a G5RV suspended from the TV mast at about 30 feet, and has already made his QRP get over the pond on this aerial.

BARTG’s Ted Double, G8CDW, who has for so long been the mainstay of their RTTY contest organisation, has sent in a letter indicating that he has had to give up as from the end of 1983. His place will be taken by Mr. P. Adams, G6LZB, who lives at 464 Whippendale Road, Watford, Herts., to whom all enquiries, doubtless, should be directed. All we can say is that G8CDW set a standard which will be hard to keep up, and he will be sorely missed.

Forthcoming Events

For the interest of this section of the piece we are indebted to DX News Sheet, The DX Bulletin, W1WY, and a set of Mark One ears.

January 21-22 sees two QRP contests; the AGCW-DL affair and the Michigan QRP Club one. The former has five classes: ‘A’ is ‘under 3.5 watts’, ‘B’ under ten watts (both single-op), ‘C’ is multi-op under ten watts, ‘D’ high-power stations over ten watts, and ‘E’ the SWLs. Contest runs 24 hours, starting at 1500z; single operator and SWL entries to take 9-hour break, multi-op stations may go right through. Exchange RST, QSO number, and power input, plus ‘X’ if crystal controlled (e.g. 579001/X), and QRO stations send ‘QRO’ at end of the RST- plus-serial-number. Score 1 point for QSO with your own country, two for a country outside your own but same continent, and five for a country outside your own continent. Crystal controlled stations score double points, but must have no more than three crystals per band. The multiplier is one point for each DX contact defined as outside one’s own continent, and one for each country. Call areas in JA, PY, VE, VK, W/K and ZS are each counted as multipliers. Final score total QSO points on each band times multiplier for that band, adding each band score 10-160 metres. Separate log for each band, and logs to be received no later than six weeks after the contest end. Send them to Siegfried Harl, DK9FN, Spessarstrasse 80, Seligenstadt D-6453, Federal Republic of Germany, and enclose one IRC for the results.

That Jarvis Is. DX-pedition by AD1S/KH5 was a bit of a frost as far as Europe was concerned, as the propagation was so poor only 200 EU contacts were made. If you are still in need of South Orkney, then you may be interested in looking for AZ5ZA, which will be the call used by LU6EIB(SSB) and LU9EIE(CW) for a period of forty days from December 20. The QSLs go to LU2D, Box 100, Buenos Aires 1428.

Now for the latest news on the Clipperton front; the transportation is organised and the dates are given as March 5-23.

Shortly after this reaches you, HI3RST/KP5 is claimed to be looking to a Desecho operation over January 6-8, and maybe a little longer.

The people who want Andaman Is. and also those who need Laccadives will both be interested to hear that VU2TS has announced to the world on Twenty that he has permission for Laccadives, and will be taking an all-Indian group there; the same source indicates that the Andaman situation is opening up.

The news that, due to action on the part of NZART, VK9NS will not be licensed for Kermadec has caused 24 members of the Chiltern DX club to write to NZART urging reconsideration and support for Jim Smith’s proposed expedition; all we can say is that we will bend an ear to the
bands at the appropriate time, but we doubt that we shall hear signals from Kermaande . . . save for those of ZL3AFH/K who has reported on the low bands and is said to be putting up aerials for the HF bands too.

There are various buzzes that indicate 5U7 this month; the Hensons on the one hand and KC7UU on the other. At this writing we can't confirm either as certain.

If you are looking for Indian Ocean countries, you will be interested to hear that the Banyandah has sailed from Cairns, Australia, with Jack and Judith Binder; this is the boat that was involved in the 1978 Mellish job, Spratly in 1979, Kingman Reef, Tokelau and Palmyra in '81, and Mellish again in '82. This time the intent is to base at Mayotte, and run from there to Glorioso and Juan de Nova, in the Kermadec doubt that we shall hear signals from any band where occupancy is reducing as it does the possible spectrum 'channel' system is a retrograde step on various parts of the U.S.A. Although the ten -metre repeaters over the other side from the ex -CB rigs, putting their RF into pagitation on the band went well down into Africa and to parts of the Caribbean. G4HZW (Knutford) operated some 70% SSB and 30% CW; he reckons the conditions between November 3 and 8 were better, but poor for the rest of the time. The CW Activity periods organised by RSGB gave Tony a lot of fun, with contacts down to Surname and up to GM on what sounded like a dead band. In terms of contacts, it added up to an all-time new one by way of 5R8AL, then 3D6AL, 4Z0DX, 9J2FCC, A4XYY, EA5BA/AE8, OH2MM/E8A, HH2CQ, HH2VP, JJY7Z, N4TO/KP4, NP4Z, PY8FZ, SV1OL/SV5, TR8JD, UW1ZD in Murmansk, UA1-2-3-4-5-6-9, U18DAM, UA0AAB, UA0ACK, all W call areas, VE5ACP, VK5AWC, VK5ATN, VS6CT, ZL3ACT, ZS1CT, ZS3TSB/P; and the gear of course was the usual TS-820 two-element Quad aerial.

November 6 was the big day for G2ADZ (Chesterington) who put out a CW call at 0819 and was rewarded by a call from ZL2UW, followed by ZM2RY and VK4LV, and it was noted that other VK and ZL stations were on too; and the next three days were just the same, with ICs in all continents audible. The CW was used to work VS6HI, K1DG/PJ7 (QLS to K1AR), ZL2UW, ZM2RY, VK4LV, VK6OH, TJ7KV, while the following were heard but not worked: VP9LB, VK6UA, TJ1IQS (QLS to F6D2U), VK8HA, 3B8CF, 3B9F, S83H and various South Americans.

G30UC noted quite a bit of activity from the ex-CB rigs, putting their RF into the ten -metre repeaters over the other side of the Atlantic and so working around various parts of the U.S.A. Although the 'channel' system is a retrograde step on any band where occupancy is heavy, reducing as it does the possible spectrum usable and so adding to the QRM, there isn't much activity or many openings on Ten at sunspot minima, so here it can be justified at least until another four years or so have gone; but G30UC is still building up a VFO-controlled machine for his personal campaigning.

Finis

Sad to say more letters arrived after the deadline and so too late to be taken in — among them contributions from G3N0F, GW3YDX and G4LDS. For the next time the deadline is January 5, to arrive, addressed as always to your conductor, "CDXN," SHORT WAVE MAGAZINE, 34 High Street, Welwyn, Herts. AL6 9EQ. Oh, and thanks for all the good wishes! They're much appreciated and heartily returned.
MAIDENHEAD SQUARES
A WORLDWIDE LOCATOR SYSTEM
N. A. S. FITCH, G3FPK

Contests have always been a feature of amateur radio activity and few weekends are free of them on the HF and VHF bands. On the HF bands, the scoring is usually based upon countries, prefixes, or zones of various kinds worked. Conversely, most all VHF/UHF/SHF events use distance as the basis for calculating the points. Furthermore, distance records are compiled for contacts on the many bands above 30 MHz via various propagation modes such as Moonbounce, Sporadic E, tropospheric, etc. To calculate distances over the Earth's surface, and the Great Circle bearing of one station from another, if required, information must be exchanged to, in effect, define latitude and longitude.

Latitude and Longitude

Everyone is familiar with the concept of latitude and longitude whereby a sphere, such as the Earth or Moon, is divided into Meridians of Longitude running north to south through the poles, and Parallels of Latitude parallel to the Equator. Any spot on the sphere's surface can be uniquely defined by the degrees, minutes and seconds method to an accuracy of about ±15′ metres at the Earth's Equator. Knowing the latitude and longitude of any two locations, the actual surface distance between them can be calculated by solving the triangle OAB in Fig. 1. OA and OB represent the radius of the Earth, while AB can be found when the angle AOB has been found. The latter is calculated from the formula:

\[ \angle AOB = \arccos \left( \left( \sin a \times \sin b \right) + \left( \cos a \times \cos b \times \cos C \right) \right) \]

where:
- \( a \) = the latitude of location A
- \( b \) = the latitude of location B
- \( C \) = the longitude difference between A and B.

Notes:
1. \( \arccos \) is the same as \( \cos^{-1} \) and means, "the angle whose cosine is . . ."
2. Latitudes south of the equator must be entered with a minus sign, e.g. 39°S would be entered as "-30" with due allowance made for the sign of the appropriate function. (If using a pocket calculator, this is done automatically).

For amateur radio purposes, the NGR system is too parochial. It is quite satisfactory for calculating the distance from Land's End to John o'Groats, but no use for working out the short distance from Dover to Calais since the NGR system does not extend into France. It will be seen that the NGR system is incompatible with latitude and longitude.

A concept familiar to all serious VHF operators in Europe is the QTH Locator Squares system and which, unlike the NGR one, is derived directly from latitude and longitude. The primary squares are two degrees from east to west and one degree from north to south.
south, being identified by two letters such as "AK" or "CG". These are sub-divided into eighty secondary squares, twelve minutes east to west and 7½ minutes north to south, numbered 01 to 80. Each of these is finally sub-divided into nine tertiary squares lettered "a" and "j" omitting "i." Thus a typical locator would be ZN54c.

Actually the so-called squares are not square since the "sides" converge towards the North Pole. At latitude 51°N, the tertiary squares are 4.662 kms. East-West and 4.631 kms. North-South giving a diagonal accuracy of ±3.286 kms. within a square. The origin of the European QTH Locator System, square "AA," is the Greenwich Meridian at latitude 40°N. Unfortunately, this ingenious system is not unique. For example, the Mediterranean island of Malta is in "HV" square, but there is another "HV" in Sweden and others in Asia.

Maidenhead Squares

Some VHF enthusiasts saw the need for a world locator system that would define any location with reasonable accuracy in as few symbols as possible. During the 1970s, over twenty schemes were proposed and these were studied at a meeting of European VHF Managers in Maidenhead, Berkshire on April 26-27, 1980. Out of these deliberations there emerged the preferred system from a proposal by John Morris, G4ANB. This Maidenhead Squares idea now seems to have been adopted by Moonbounce operators throughout the world.

This system is based upon latitude and longitude, the globe being divided into 324 areas, each twenty degrees from east to west and ten degrees from north to south, known as Fields, and identified by two letters from "AA" through to "RR". The fields are each divided into one hundred Squares two degrees E-W and one degree N-S and numbered from "00" to "99." Thus these squares are compatible with the primary squares of the QTH Locator system, currently in use in IARU Region 1. The squares are finally sub-divided into Sub-squares, each five minutes E-W and two-and-one-half minutes N-S. These 576 sub-squares are lettered from "AA" through to "XX". So a complete locator would be of the form JN45WH, for example, and that would be unique and not repetitive. The accuracy is similar to that of the current five symbol QTHL system. In each, the "height" of the smallest squares is the same, but in the Maidenhead system they are 25% "wider." At latitude 51°N, the sub-squares are 5.828 kms. E-W, giving a diagonal accuracy of ±3.722 kms. The origin of the Maidenhead system is longitude 180° West at the South Pole. All lettering/numbering runs from west to east and from south to north, and the basic idea can be seen by studying Figs. 2, 3 and 4. Referring to the JN45WH example, it will be seen that the 1st, 3rd, and 5th characters, "J," "4" and "W" represent the longitude information, and the 2nd, 4th and 6th characters, "N," "5" and "H" the latitude data.

![Diagram of Maidenhead Squares](image)

Fig. 3 THE 100 SQUARES

Fig. 3. The 100 Squares. Note the west to east, and south to north numbering sequence. For the northern hemisphere use the left-hand, plus, scale and for the southern hemisphere use the right-hand, minus, scale. See text.

![Diagram of 576 Sub-Squares](image)

Fig. 4 THE 576 SUB-SQUARES

Fig. 4. The 576 Sub-squares. Note the west to east, and south to north lettering sequences. For the northern hemisphere use the left-hand, plus, scale and for the southern hemisphere use the right-hand, minus, scale. See text.
Working out a World Locator

The best way to appreciate the Maidenhead World Locator System is to mark the Fields on a large world map, preferably one drawn in Mercator's projection. If you do not wish to do this, you can draw them on a sheet of tracing paper hinged to the top of the map with adhesive tape. To work out any locator, the latitude and longitude must be known. Tables 1 and 2 have been compiled to enable anyone to work out a World Locator from such data. A couple of examples should suffice to illustrate the use of these tables.

Example 1. Derive the locator for Scafell mountain in the English Lake District.

From the Ordnance Survey, the latitude is derived as North 54°.26'. 50" and the longitude West 3°.13'. 23". To avoid ambiguity, longitudes west of Greenwich round to the International Date Line are changed to east of Greenwich, using the formula:- Long. E° = 360° - Long W°. Thus Scafell's longitude is 360° - 3°.13'. 23" = 356°.46'. 23" East. This kind of presentation will be familiar to satellite users, although in amateur satellite work for some strange reason, degrees west of the Greenwich Meridian are used!

Back to Scafell, though. Using Table 1a, we note that 356° lies in the "340-360" line corresponding to letter "I", to give the first character. There is 8°.44'. 39" left over, which yields figure "4" from line "45-50" in Table 1b, for the third character. From Table 1c, with 54°N is in the " + 50-60" row, corresponding to the letter "K". Therefore, the complete locator for Scafell becomes KF 47 IP.

Example 2. To find the locator for a place in the southern hemisphere to the east of the Greenwich Meridian, e.g. 32°.21'.18" South and 28°.44'.39" East in Cape Province, South Africa. Following the same procedure as in Example 1, from Table 1a we derive the first character "K" from the "20-40" line. There is 8°.44'.39" left over which yields figure "4" from line "8-10" in Table 1b, for the third character. From Table 1c, with 44'.39" left over, from line "40-45" we get the fifth character, the letter "I".

Next the latitude data from Table 2. Since we are dealing with a southern hemisphere location, the "minus" parts of these tables will be used. From 2a, the 32°.21' part is in line "- 30 - 40" corresponding to letter "F" for the second character. There is 2°.18' over and from 2b, this lies in line "- 2 - 3", using the right-hand column and gives figure "7". Turning to 2c, we still have 21'.18' over and, again using the right-hand column, this lies in line "- 20 - 22.5" corresponding to letter "P" for the sixth character. This gives the complete locator as KF 47 IP.

Naturally Tables 1 and 2 can be used in reverse to calculate the latitude and longitude, given the locator code. To take an example, let us derive the latitude and longitude corresponding to OJ 11 VH.

The longitude data is given by the 1st, 3rd and 5th characters, "O", "I" and "V". From Table 1a, the letter "O" corresponds to 45°E; remember, always work from the western edge. From 1b, figure "1" corresponds to 2° and from 1c, the letter "V" is in
the “105-110” minutes line. Let us take the mid-point of that sub-square as 107.5° or 1°.47.5’.

So the longitude is the sum of these three figures:—

\[ O = 100° \]
\[ I = 2° \]
\[ V = 1°.47.5' \]

Longitude = 103°.47.5’

The latitude information is contained in the 2nd, 4th and 6th characters, “J”, “L” and “H”. From Table 2a, “J” is in row “+ 1 – 2” since we have established from the “J” letter that the location is a plus one, i.e. in the northern hemisphere. This gives “ + 0 -10” so we start with 0°. From 2b, the figure “1” is in row “105-110” minutes line. Let us take the mid-point of that sub-square. Lastly, from 2c, the “H” is in the “+ 17.5 - 20” row, so the mean figure is 18.75°. Thus the latitude is:—

\[ J = 0° \]
\[ L = 1° \]
\[ H = 0°.18.75' \]

Latitude = 1°.18.75’

This location is in the region of Singapore, in south-east Asia.

**Distance Calculations**

The distance between two locations on the surface of a sphere can be derived from Equation (1) which gives the angle between the mean figure is 18.75°. Thus the latitude is:

\[ \text{Latitude} = \frac{18.75°}{360°} \times 111.13646 \text{ km} \]

\[ \text{Distance} = \frac{18.75°}{360°} \times 111.13646 \text{ km} \]

\[ \text{Distance} = 6.378388 \times \pi \text{ km} \]

which works out to 40,009.125 km. Thus, for every one degree of angle subtended at the centre (point “O” in Fig. 1) the surface distance is 40,009.125 ÷ 360 = 111.13646 km. So to work out the distance between “A” and “B” just multiply the solution to Equation (1) by this constant.

**Accuracy**

Making the perfect sphere assumption, all Fields, Squares and Sub-squares are the same distance from north to south so, for any two locations on the same longitude — say West London and Accra in Ghana — the accuracy is ± 4.631 kms., the “height” of a sub-square. However, in the E-W direction the size of the sub-square is a maximum at the Equator and zero at the Poles. Using the average circumference of 40,009.125 kms., the 5° width equates to 9.261 kms. so the maximum error between two points on the Equator would be ± 9.261 kms. The maximum error would occur between two sub-squares straddling the Equator, e.g. KJ 80 AA and KI 89 BX, being ± 10.355 kms. However, in such cases, local maps would be used for working out short distances.

**A New Award?**

For certificate hunters, one can envisage a new award based upon a “Worked All Fields” concept. The attraction is that it would eliminate any argument about what constitutes a country. The only requirement would be the obvious one that whoever was operating from wherever had a valid licence to do so, in accordance with I.T.U. regulations. This would avoid tragedies like the ill-fated Spratly Islands affair since there would be no need to visit such sensitive areas. The Short Wave Magazine’s QTH Squares Century Club, and the QTH Squares Table in the

<table>
<thead>
<tr>
<th>Minutes North</th>
<th>Square Letter</th>
<th>Minutes South</th>
</tr>
</thead>
<tbody>
<tr>
<td>+ 57.5 - 60</td>
<td>X</td>
<td>- 0 - 2.5</td>
</tr>
<tr>
<td>+ 55 - 57.5</td>
<td>W</td>
<td>- 2.5 - 5</td>
</tr>
<tr>
<td>+ 52.5 - 55</td>
<td>V</td>
<td>- 5 - 7.5</td>
</tr>
<tr>
<td>+ 50 - 52.5</td>
<td>U</td>
<td>- 7.5 - 10</td>
</tr>
<tr>
<td>+ 47.5 - 50</td>
<td>T</td>
<td>- 10 - 12.5</td>
</tr>
<tr>
<td>+ 45 - 47.5</td>
<td>S</td>
<td>- 12.5 - 15</td>
</tr>
<tr>
<td>+ 42.5 - 45</td>
<td>R</td>
<td>- 15 - 17.5</td>
</tr>
<tr>
<td>+ 40 - 42.5</td>
<td>Q</td>
<td>- 17.5 - 20</td>
</tr>
<tr>
<td>+ 37.5 - 40</td>
<td>P</td>
<td>- 20 - 22.5</td>
</tr>
<tr>
<td>+ 35 - 37.5</td>
<td>O</td>
<td>- 22.5 - 25</td>
</tr>
<tr>
<td>+ 32.5 - 35</td>
<td>N</td>
<td>- 25 - 27.5</td>
</tr>
<tr>
<td>+ 30 - 32.5</td>
<td>M</td>
<td>- 27.5 - 30</td>
</tr>
<tr>
<td>+ 27.5 - 30</td>
<td>L</td>
<td>- 30 - 32.5</td>
</tr>
<tr>
<td>+ 25 - 27.5</td>
<td>K</td>
<td>- 32.5 - 35</td>
</tr>
<tr>
<td>+ 22.5 - 25</td>
<td>J</td>
<td>- 35 - 37.5</td>
</tr>
<tr>
<td>+ 20 - 22.5</td>
<td>I</td>
<td>- 37.5 - 40</td>
</tr>
<tr>
<td>+ 17.5 - 20</td>
<td>H</td>
<td>- 40 - 42.5</td>
</tr>
<tr>
<td>+ 15 - 17.5</td>
<td>G</td>
<td>- 42.5 - 45</td>
</tr>
<tr>
<td>+ 12.5 - 15</td>
<td>F</td>
<td>- 45 - 47.5</td>
</tr>
<tr>
<td>+ 10 - 12.5</td>
<td>E</td>
<td>- 47.5 - 50</td>
</tr>
<tr>
<td>+ 7.5 - 10</td>
<td>D</td>
<td>- 50 - 52.5</td>
</tr>
<tr>
<td>+ 5 - 7.5</td>
<td>C</td>
<td>- 52.5 - 55</td>
</tr>
<tr>
<td>+ 2.5 - 5</td>
<td>B</td>
<td>- 55 - 57.5</td>
</tr>
<tr>
<td>+ 0 - 2.5</td>
<td>A</td>
<td>- 57.5 - 60</td>
</tr>
</tbody>
</table>

Table 2c. This determines the sixth column for latitudes north of the Equator, and the right-hand column for those south. See text.

<table>
<thead>
<tr>
<th>Degrees North</th>
<th>Degrees South</th>
</tr>
</thead>
<tbody>
<tr>
<td>+ 9-10</td>
<td>- 9-10</td>
</tr>
<tr>
<td>+ 8-9</td>
<td>- 8-10</td>
</tr>
<tr>
<td>+ 7-8</td>
<td>- 7-9</td>
</tr>
<tr>
<td>+ 6-7</td>
<td>- 6-8</td>
</tr>
<tr>
<td>+ 5-6</td>
<td>- 5-7</td>
</tr>
<tr>
<td>+ 4-5</td>
<td>- 4-6</td>
</tr>
<tr>
<td>+ 3-4</td>
<td>- 3-5</td>
</tr>
<tr>
<td>+ 2-3</td>
<td>- 2-4</td>
</tr>
<tr>
<td>+ 1-2</td>
<td>- 1-3</td>
</tr>
<tr>
<td>+ 0-1</td>
<td>- 0-2</td>
</tr>
</tbody>
</table>

Table 2b. This determines the fourth character. Use the left-hand column for latitudes north of the Equator, and the right-hand column for those south. See text.
VHF Bands feature leave little doubt of the popularity of an impartial "squares" idea, so why not extend it to a global scale? Any such award could become "big business," as has the ARRL's DXCC, so it would need to be sponsored and managed by a large organisation. Since the idea for the described world locator system was born in England, it would be appropriate if the RSGB operated such an awards programme.

Conclusion
The QTH Locator system which has been in use in part of I.A.R.U. Region 1 for many years, while being basically satisfactory, does have the drawback of not being unique. It is not suitable for inter-continental use. Whether or not it is eventually phased out in favour of the Maidenhead Squares system for VHF contest use is up to the VHF fraternity to decide. However, with more long distance contacts being made in the VHF/UHF/SHF bands, via Moonbounces, Transaquatorial propagation, satellites, etc., there is no harm in including your World Locator code on your QSL card.

THOSE of you who have been on for a year or more will have noted how conditions have declined with the falling sunspot count — after a "plateau" lasting for quite a while, the falling trend has accelerated and so brought things nearer to where they would have been expected to be at this stage. However, we have a long way to go yet; the SSN for November should be around the seventies, and at the very bottom we will be looking at an SSN of well below ten! What will this mean to us in the context of the bands? Essentially, Twenty will only ever be open in daylight, 21 MHz will flicker into life once in a while, and Ten will have nothing on it at all in the line of DX. As far as Ten goes, in previous cycles, VHF-type propagation has been available, with its 'lifts' and tropo openings, Spor-E, and so on, but there has always been a sad lack of activity. With any luck, this time round there will be beacons, FM stations and local nets to keep things humming when the DX isn't about — and of course a 'DX' station may be in Europe anyway if his call is rare enough!

And that, of course leads to the old question, "What is DX, exactly?" About the best answer we can give is the one so often given by Cass, WA6AUD, in the late-lamented WCDXB — "DX IS!" If you've never heard, say, an Italian signal before, the first one is DX — even if a few weeks later I prefixes become ten a-penny. The use of the term DX when calling CQ, though, is slightly different; here the implication is that a G calling CQ DX on, say, Twenty when the band is open is looking for a station in a different continent at least, although he may well settle for another G if he doesn't get a decent nibble. On Top Band in daylight, a call from GM in answer to a CQ DX would be quite acceptable, but not so a call from a local only interested in a ragchew across town — although here again a local caller should at least have the decency to wait and see if the DX nets a more distant reply. And, of course, the real top-liner often won't even fire up the transmitter unless there is a 'new one' under that pile-up! In practice, a CQ DX call from a G station is a bit of a waste of time anyway — the proper procedure is to listen for a station of interest and then call him, as most CQ DX calls won't scare up anything of real interest if they emanate from a country with a sizeable radio amateur population.

Competition
What an uncompetitive lot you are! Admittedly we didn't go mad over drumming up support, and in the event we only got a few entries. Be that as it may, Tina Parry (Blackpool) emerged a good winner! Tina wanted a pre-amp, so she scrounged around for the bits: the case, in true amateur fashion, had the odd surplus hole in it, left over from some earlier effort of the OM, and all the bits barring the BFY90 and the miniature power switch came from the junk-box. Tina made the PCB layout herself (having previously done some layouts for the OM), then wired it up and made it go, finishing off with a re-paint of the case, and some appropriate lettering. The only real problem was the eternal one of the 'junk-box builder' of components that the solder won't 'take' to — but patience and persistence earned its just reward. A pity the photographs she sent weren't sharp enough for reproduction — but they showed the writer a simple circuit very well done, and far better than his first apprentice constructions. So Tina Parry scoops the pool, and by the time you read this will be receiving her prize of a copy of the 1984 DX Listings.

The Letters
The top of the pile this time is the one from E. B. Ward (Nottingham). Barry has his fingers crossed for the RAE, and since he is being latted into shape by Alan Lake, G4DVW, we can guess that he is being indoctrinated into the QRP game, as well as taught theory! On the CW side, Barry can take the W1AW Morse at 25 wpm without writing it down, but as for the sending, the bugs have reduced his speed on a pump-handle to 15 wpm; but that ought to be enough for a pass in Morse — and an RAE failure will merit instant excommunication! Meantime, the fall-away in sunspots has induced Barry into some thoughts on a mysterious Wonder-Wire for the low bands.

Turning to the letter from H. M. Graham (Chesham), Maurice found the autumn lift in conditions quite fair, between October 8 and November 10, after which Ten dropped back into the doldrums. However, he is still Outstanding several QSLs for over a year now and has all but given up hope of them; some being rare islands, too.

A very brief note comes in from J. Heath (St. Ives, Huntingdon) who adds a few to his score and says he will be more active soon.

E. M. Gauci (Sliema, Malta) writes in with a first entry to the HPX Ladder — Eddie used the Rules and the Geoff Watts Prefix List as his guides and by the looks of it they've kept him well on the straight-and-narrow.

Sad Story
Letters that go astray! The unfortunate this time was I. F. Thorpe (Bracknell) who has sent several lists in, but none seem to
have arrived. About all we can say is that of course we only know about this because he had the savvy to telephone and enquire. However, we do have Ian's letter of October 25, with a score of 706; since the list to hand shows no errors, we have taken the score in, and written separately to Ian to ask for a repeat of his earlier lists for checking purposes. Meanwhile, can we please ask everyone writing to this feature to be absolutely sure that you get the full address correct, including the postcode.

B. Patchett (Sheffield) is now G4VB — congratulations! Brian uses a Trio TR-2300 on two-metres for the locals, plus a converted Icom IC-B1050 on Ten; the latter has so far got out to Michigan and UK6 with 59 reports while using just one watt, even though the little rig will give five when pushed. We reckon G3KFE and 'CDXN' will be interested in this QRP operation on Ten.

The YL's

Since June Charles got her ticket, we are down to two . . . Mrs. R. Smith (Nuneaton) has just a short note to say she hasn't been too active, but she has managed to add a few new ones to keep her near the top.

We've already mentioned Mrs. T. Parry (Blackpool) earlier; but Tina managed to get some listening time in as well, and indeed managed to hear 9M8DW — a DXCC country for which she had been lurking in wait for a year.

CW

A couple of the CW buffs appear in succession now; first we have A. F. Roberts (Kidderminster) who notes that the HF bands are closing earlier and the low bands are too noisy for his liking — which has slowed up the rate of increase in the scoring. However, all is not completely lost, as the table shows.

J. Goodrick (Newport, I. o. W.) is having a good old moan — and — for expeditions and contests, so one wouldn't see reason to doubt him. Overall, he has even 'done its thing' on Top Band to some considerable effect, with 5N8ARY heard at 2330z — John won't stay up later. The main interests are in contests, and CW ones at that for preference — and we have to admit that it's easier on the ears trying to winkle the one you want out of a CW pile-up than an SSB one, even if it is just as hard on the brains!

Next we turn to the *Sage of Burma* St. Edmunds, E. W. Robinson; he, like so many others, comments on the fall in conditions since the end of the autumn peak; and of course the change from BST to GMT on the domestic clock adds a downwards step-function — suddenly one is travelling home in the dark and by the time one gets to the rig, there's nowt to be found!

A. J. Pilkington (Chesterfield) has been busy with 'A' levels and also the arrangements to go to Sheffield City Polytechnic where he is to do an HND in Electronics and Electrical Engineering. However, he did spend a little time on the air, and the results appear in the table.

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**ANNUAL HPX LADDER**

Starting date, January 1, 1983

<table>
<thead>
<tr>
<th>SWL</th>
<th>PREFIXES</th>
</tr>
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<tbody>
<tr>
<td>C. H. Kirk (Leeds)</td>
<td>C. Burrells (Stevenage) 253</td>
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<td>S. J. Bedford (Wakefield)</td>
<td>J. Singleton (Hull) 234</td>
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<td>T. Kirby (Cheetham)</td>
<td>N. Fox (Wakefield) 219</td>
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<td>E. M. Gauci (Malta)</td>
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200 prefixes to have been heard since January 1, 1983 for an entry to be made, in accordance with HPX Rules; see p. 375, September 1983 issue. At a score of 500, transfer to the All-Time listings is automatic.

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**HPX LADDER**

(All Time Post War)

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<td>B. Hughes (Worcester) 2767</td>
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<td>E. W. Robinson (Bury St. Edmunds) 2233</td>
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<td>H. M. Grahame (Chesham) 1650</td>
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<td>Mrs. T. Parry (Blackpool) 1537</td>
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<td>G. W. Raven (London SE13) 1491</td>
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<td>M. Rodgers (Harwood) 1400</td>
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<td>N. Askew (Coventry) 1288</td>
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<td>N. E. Jennings (Rye) 1238</td>
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<td>D. J. Doughty (Bloxwich) 1190</td>
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<td>A. Pyne (Bradford) 1179</td>
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<td>R. Everitt (Blundisham) 1103</td>
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<td>D. J. S. Williams (Wednesbury) 1051</td>
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<td>Mrs. J. Charles (Colchester) 983</td>
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<td>J. F. Thorpe (Bracknell) 706</td>
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<td>G. A. Carmichael (Lincoln) 627</td>
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<td>A. J. Hall (Alvaston) 624</td>
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<td>D. Woods (Swindon) 589</td>
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<td>T. Morris (Headingley) 578</td>
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<td>A. Pilkington (Chesterfield) 527</td>
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<td>P. Oliver (Paisley) 524</td>
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<td>J. Goodrick (I. o. W.) 1527</td>
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<td>A. F. Roberts (Kidderminster) 1246</td>
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<td>J. M. Dunnett (Prestatyn) 1127</td>
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<td>H. Scott (Wetherby) 1105</td>
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<td>R. Fox (Northampton) 433</td>
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<td>D. J. S. Williams (Romsey) 273</td>
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<td>E. W. Robinson 626</td>
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Over to G. A. Carmichael (Lincoln) who reckons that the last period was "The Age of the Special Callsign!" — he having no less than nine identified specimens of the breed in his listing. Referring to that query about the TE prefix last time round, it is definitely Costa Rica — but the UK5 bit has us completely beat. All we can think, on the weight of the evidence produced by umpteen readers — for which thanks! — is that it was a misreading in the QRM.

P. Oliver (Paisley) says his receiver has been away at Tandy's for over a month with a broken drive cord — we would have thought that such a long a period would well justify some very hard words at a very high level. However, even without the receiver, the aerial improvements which were projected haven't been completed — Pete is an addict of the Scottish sport of curling, and you can't do two things at once, even in GM!

T. Morris (Headingley) is a bit puzzled by his logging of G16UW — the Cambridge University club station often goes off for expeditions and contests, so one wouldn't see reason to doubt this one.

N. Jennings (Rye) says he has a possible third entry for the HPX Ladder lined up — he must be going round with heavyweight armlocks! Seriously, there is no doubt that this sort of enthusiasm is definitely infectious.

B. F. Hughes (Harlington) has a problem with a missing list — we'll try and sort that one out for him. However, he is still hoping for the BY7AA he heard on SSB to turn out to be legitimate — BY4AA, BY8AA and BY1PK are the only ones who have been licensed so far, and only the last-mentioned has seen any significant SSB operation.

W. G. Shipron (Rye) seems to have fair reasons for his shorter list — in order, "bowls, bad propagation and a heart attack." All we can say to that is to wish George a steady recovery to full health and a large score in the HPX Ladder.

C. H. Kirk (Leeds) notes that although we mentioned his letter
last time, we didn’t take his entry into the Table — one of those mistakes that occur, due to a mis-aimed paper-clip. Sorry, Charles!

An entry in all three tables seems likely to come before long from R. Fox (Northampton) — provided he completes sorting out the gear for Oscar 10. Roy has pretty wide coverage of the band, as his list this time shows claims on all bands between 3.5 MHz and 430 MHz.

### Aerials Again

Last time round we talked of a simple home-brew aerial for one’s first tries at VHF; this resulted in an interesting letter from G4UMI (Woking) — if his drawings and writing had been clearer we’d have turned it into a complete article. Anyway, what Peter is saying is that while he was listening for the various slow Morse transmissions on the band, he felt the need for a simple aerial to enable copy on his hand-held two-metre rig. He started with a perfectly normal HB9KCV design, but then there came a heat-wave (remember, gang, those days when it was warm enough to go out without an overcoat?) and hence the need for the garden shack door to stay open while operating. So, G4UMI mounted his beam on a length of dowel of square section and then — this is the delicious bit — made a suitable square-shaped cup for the base of the pole to sit in, and screwed it to the shack door. Now, if you mount the square dowel in the cup, you have four possible directions immediately, just by a quick lift, flip of the wrist, and replace. But, if you open the door, then the 90 degree movement of the door fills in the remaining angles, and lo! the shack door is your rotator. OK, so there aren’t heat-waves all year . . . but the idea is there for an all-the-year-round arrangement with no more than a few minutes of careful thought. It certainly wouldn’t need any serious modification to become handy for a holiday, using the car’s wind-up windows as the clamp mounting.

Another licensed chap, J. M. Coates, G4GYU, of Mansfield, comes in at this point and says he has an answer to the problem of Mr. H. Linton mentioned last time. It seems G4GYU was in Lowe’s at Matlock the day before he wrote, and upon enquiry, established that they had sets of valves and stabilisers, including pilot lamps, for the Trio 9R5DE and DS models, and a reasonable stock situation on spares generally for the older receivers of Trio make.

Congratulations are due to R. Everitt (Bluntisham) who has obtained G1CRH. However, the intention is to continue with SWL activity as a hobby while studying at Leicester Poly; of course, any calls heard from there would be able to count towards the main total.

Oh, dear! We’ve done it again, and given D. B. Shapiro a wrong initial. We will have to go to Prestwich and make our peace some time! Seriously, we had to laugh at the first note this time — just a postcard with “1000+” written as large as possible on one side, and the address on the other! In fact, the second letter bumped the total up to nearly 1100. The second point was about our reader, A. Chadwick — D.B.S. says you must live very near to him, and what about getting in touch? D.B.S. can be found at 1 Butterstile Lane, Prestwich, Manchester M25 8PW.

A first entry for the 1983 HPX Ladder is sent in by C. Burrells (Stevenage) — pretty obviously the local club lads have been laying it on a bit thick about the J.C. red pencil to judge by Charlie’s letter. We wonder which old friend has been winding-up the works?

An interesting question arises in the letter from A. P. Lincoln (Aldershot). Peter has a rotatable dipole and a vertical and he finds that, in general the horizontal aerial will outperform the vertical. However, it has been noted that when a signal is good on the vertical, the horizontal doesn’t show much directive effect, but if the signal is weaker on the vertical then the horizontal shows directivity to a marked degree. This, we suspect, is largely a question of the angle of the incoming wave to the ground. The vertical will tend to favour the lower angles, at least in theory, while the horizontal, which at these frequencies is relatively low, will tend to prefer the higher angle signals. Hence it is found that the vertical is good for the locals, poor for the short-skip and nearer Europeans, and better again at the DX beyond about 2500 miles. In practice, we think that what happens is that the horizontal is only picking up enough signal for the directive effects to be apparent when the signals are coming down from a high angle. However, the truth of the business is that in a practical situation, about all the real profit there is lies in using whichever aerial comes out with the best signal!

Finally, we must mention a letter from Alcides Pires Lavinas, AVenda Alves Rotapas No. 18, 5000 Vila Real, Portugal. Our friend has noticed in hot weather the presence of distant — usually Spanish — FM stations, and as he is interested in DX reception anyway, he would like to know more about aerial gain and aerial pre-amps, active aerials and so forth. Doubtless some readers will have ideas and practical knowledge on this subject, and would like to write and pass on their knowhow. Thanks!

### Finis

That’s it for another time; the deadline for next time is January 19, 1984, to arrive, addressed to your conductor, SHORT WAVE MAGAZINE, 34 High Street, Welwyn, Herts. AL6 9EQ, and include your closing score for 1983 if you are on the Annual Ladder, and we will take the first score for the 1984 HPX table as well. Thanks to all for your Season’s Greetings, which we, belatedly of need, sincerely reciprocate.
AN ALL-BAND AERIAL WITHOUT TRAPS
AN INTERESTING AND ORIGINAL APPROACH

E. W. HOLT, G3MHQ

As a result of experiments carried out by two Ealing Club members (G3SGT and G3UPW) it was discovered that if a quarter-wave top band 160-metre aerial was earthed at the distant end, it loaded up nicely on 80 metres. By earthing the end, the aerial appeared to lose a quarter wavelength, at twice its frequency. As most amateur bands are harmonically related I wondered if this would hold good for the other HF bands. In other words, would a full-wave aerial load up as a three-quarter wave, and a two wavelength aerial as a one-and-three-quarter wave, etc. This should give a low impedance feed for all bands, 80 down to 10 metres. (The new bands were not included.)

Two 22-ft. wooden poles were set up approximately 90-ft. apart and 132-ft. of aerial cable was stretched between them. Two 5-ft. 1½-in., diameter copper pipes were driven into the earth at points 'A' and 'B', and a 75-ohm feed coax cable connected between the aerial and earth at point 'B'.

The first tests were somewhat disappointing. While it was possible to load up the aerial on all bands, the loading was accompanied with a large standing wave ratio, often as high as 3:1. Comparing field strength readings with those of a half-wave dipole, the readings were considerably lower. The earth connections at 'A' and 'B' were the first suspects. As a DC ohmmeter cannot be used to test earth resistance due to earth polarisation, and a megger type AC earth tester was not available an improvised earth tester was constructed as shown in Fig. 2.

By connecting the 12 volt winding of a transformer, and an AC ammeter in series with points 'A' and 'B' it was found that approximately 0.1 amp was flowing. Ohm's Law gave the total resistance (A + B, plus the connecting wire) as 60 ohms. As the wire was only about 1 ohm it could be ignored. Thus the resistance of the earth rods was approximately 60 ohms each. While this method will give an approximate resistance, it will not give the earth impedance as the rods must have some capacity to earth. However it seemed quite possible that a considerable portion of the RF was being used for heating up the garden. In order to improve the earth a bare copper earth wire was buried to a depth of the spade, thus connecting the earth rods 'A' and 'B', making them a continuous earth connection.

This improved the radiated power but the standing wave ratio did not improve. It was obvious that if the aerial was to be matched successfully with a good standing wave ratio on all bands, then some method must be devised to match the aerial to the coax at point 'B'.

The aerial could possibly be matched by terminating it directly on the Tx loading unit, providing the connection to earth was reasonably short at the shack; a long earth wire could cause excessive RF. However the siting of the poles, and my shack, necessitated a coax feed. As the impedance changes from band to band, a switched aerial tuning unit (ATU) was indicated for point 'B'. See Fig. 1.

In order to keep the earth connection as short as possible it was decided to mount the ATU at the bottom of pole 'B' where the actual earth wire is only 12 inches long, to the earth rod at 'B'. The snag here, of course, is that mounting the ATU out of doors causes problems of weather proofing, and tuning the unit.

The components of the ATU are mounted in a waterproof die-cast box 17 x 12 x 11 cm., the die-cast box in turn mounted in a wooden construction similar to a bird box. (I hope that sparrows don't take a fancy to it!) All switch spindles, etc., coming out of the die-cast box were given a liberal coating of petroleum jelly to prevent moisture creeping in. The aerial, earth wire, and coax cable are all brought into the ATU at the bottom to prevent water running down them and on to the die-cast box. As the ATU is so close to the ground it is convenient to bury the coax cable in a suitable duct, e.g. hose pipe.

The aerial wire consists of 132-ft. of coax cable (of unknown impedance) with both inner connection and outer braiding connected together to make a single wire. The connecting earth wire between 'A' and 'B' is another length of the same coax with the outer plastic cover stripped away allowing the braiding to contact the earth; coax cable was used only because it was available and I am sure that any substantial standard wire would be equally effective. Coax cable when used as an aerial does have a tendency to stretch, and long runs should be supported by a nylon cord, between poles. As a high voltage node will appear on some bands close to the top of the poles (with this configuration), good quality insulators should be used in these positions.

At first, it was thought that this type of aerial would only load up successfully on 80, 40, 20, 15 and 10 metres, and by disconnecting the distant end from earth on 160 metres. As the junk box sported a five-position, 2-pole, ceramic switch and a 35-turn 16 s.w.g. (silvered) copper coil on a 2" diameter, 4" length, ceramic ribbed former, the pi matching unit shown in Fig. 3 was constructed. The first five turns on the coil at C1 end were eased along the former to give double spacing for these turns. (The normal spacing is one thickness of the 16 s.w.g. wire). When the correct coil taps were established it was found by chance that 80 metres and 10 metres both matched nicely on position 1 of the switch. (This may not be so for a different configuration.) It seemed pointless connecting two positions of the switch to one tap on the coil so this left a blank switch position. I would suggest, however, that if six bands are anticipated a 2-pole, 6-position, switch be used in case 80 and 10m. are not together; another trimmer would also be required. Fig. 3a shows the original 5-band arrangement.

I wondered if it would be possible to load the aerial for top Band with the far end earthed — it would be like loading a quarter-wave
aerial at the 'hot' end. As the original 35 turns were not sufficient to obtain the correct match a further 24 turns of 24 s.w.g. enameled wire, close-wound, were added to L1 and connected in series.

The switch connections were moved from point 'X' to 'Y'. It was found that the aerial loaded up nicely now on Top Band but the added resistance of the thin wire of L2 flattened the Q of L1 on the other bands, and it was impossible to obtain a good match on any of them. The switch connection was rapidly moved back to point 'X' and it was thought that Top Band would have to be abandoned. However it was found that Top Band could still be matched in this position, and that C8 had considerable effect on the loading (I suppose this could be considered as matching by mutual inductance): L2 has no effect on the other bands. Fig. 3b shows L2 added for 6-band operation.

Care must be observed when soldering the taps onto the coil to ensure a good contact and that the solder does not short-circuit the turns, Fig. 4 shows the taps counting from C1 end of the coil, i.e. the tap marked '7', is 7 turns from 0. Receiver type components were used as the only band to develop a high voltage is Top Band, and the low power restriction takes care of this. The trimmers are compression type with mica insulation between plates, and the tuning condenser C1 is 160pF air spaced.

The initial matching of each band was a laborious task of trial and error and the coil tappings shown may only hold good for an aerial of similar impedance, and similar impedance co-ax cable. Fig. 5 shows a simple field strength meter useful for the initial stages of the matching — as in my case, where the ATU is remote from the standing wave indicator.

The final adjustments to the trimmer(s) should be made a little at a time and observing if the SWI ratio is improving. When the best ratio has been achieved on the trimmer(s), C1 should be moved one way or the other until as close a ratio as possible is achieved. The calibrated dial reading of C1 should be carefully noted, so that this point can be returned to. In theory a 1:1 ratio should be achievable on all bands. In practice, however, the best that could be adjusted on one band was 1.2:1. This is because the least that can be adjusted on the coil taps, is one turn, as it is not possible to get at all sides of the coil. (The perfectionist should obtain a roller coaster?) If a good SWR cannot be achieved it may mean altering the coil tap up or down one or so turns. The above procedure must be repeated for each band. No attempt was made to load up the new bands as my transmitter does not cover these.

When all bands are adjusted and C1 dial readings noted, it is a simple matter when changing bands to switch to the desired band and set the dial to the correct reading and tune the Tx for maximum power on this band. The only problem is changing bands when it is pouring with rain, but I am sure someone will find a suitable remote control!

In conclusion, the aerial described I believe to be original and unusual. I am a firm believer in the higher the aerial the better and I would have liked to have tried a configuration using 33-ft. poles spaced 66-ft. apart as this should be very directive on 40, 20, 15 and 10 metres. Another possible arrangement is an inverted-V; this would be a possibility for those with limited space, e.g. a central pole on the chimney stack and point 'A' in the front garden and point 'B' in the back — though it may be a bit difficult to arrange a continuous earth from 'A' to 'B' if it is a terrace house. The shape of the aerial will determine the radiation pattern and impedance; co-ax other than 75 ohms could be used but this could mean changes to the coil taps, etc., and much trial and error.

I would like to thank Bill Teale, G3SGT, and Peter Smith, G3UPW, for starting the idea for 80 metres.
DIGITAL DISPLAY FOR THE KW-2000B TRANSCEIVER
AN UPDATE FOR A FINE OLD RIG
PETER J. COOK, G4NCA

In the face of ever-increasing transceiver prices, the prospect of upgradng older equipment becomes increasingly attractive. A popular example of such a piece of equipment is the KW-2000B, offering 5-band coverage, SSB/CW, with an input power of 180 watts p.e.p., usually available at a fraction of the price of its present day counterparts. A comparatively simple transceiver such as the '2000B lends itself to modification (for example, see "Modifying the KW-2000A Transceiver for the 10 MHz", Short Wave Magazine, May 1982).

One feature the author has found very annoying with the rig is the inaccuracy of the analogue dial, it being very difficult to net precisely on any specific frequency. The addition of a digital readout would enable an accurate check on frequency (and also precisely on any specific frequency). The addition of a digital readout would enable an accurate check on frequency (and also precisely on any specific frequency). The addition of a digital readout would enable an accurate check on frequency (and also precisely on any specific frequency). The addition of a digital readout would enable an accurate check on frequency (and also precisely on any specific frequency). The addition of a digital readout would enable an accurate check on frequency (and also precisely on any specific frequency).

A study of the various mixing processes carried out in the KW reveals that the VFO tunes from 2.5-2.7 MHz, producing a 200 kHz allocation for each master oscillator crystal. The output from the VFO is mixed with 455 kHz SSB to produce a variable IF of 2.955-3.155 MHz. This signal is subtractively mixed with a crystal oscillator to produce RF in the appropriate amateur band. A consequence of this mixing process is that as the transceiver is tuned to a higher frequency, the VFO frequency is in fact decreasing. Hence any digital readout must read '200 kHz' when the VFO is at 2.5 MHz, falling to '0 kHz' when a frequency of 2.7 MHz is attained.

**Operation**

The basic operation of the display is probably best described with the aid of Fig. 1, a simplified block diagram. All clock pulses are derived from a 2.7 MHz crystal oscillator, applied to input A, the sinewave output from the VFO being squared off and applied to input B. These two signals pass to the clock and data inputs, respectively, of a D-type bistable, forming a digital subtractive mixer. When the VFO is tuned to 2.5 MHz, a frequency of 200 kHz is produced at the Q output, falling to 0 kHz as the VFO frequency is in fact decreasing. Hence any digital readout must read '200 kHz' when the VFO is at 2.5 MHz, falling to '0 kHz' when a frequency of 2.7 MHz is attained.

The Q output irrespective of 100 Hz clock pulses being applied to the clock input. However, once the clock input has been received, Q goes high. When the next clock pulse is applied to the controller, Q goes high, causing the clock inhibit input to go low, allowing 10mS-worth of pulses from the subtractive mixer to reach the counters. At the same time, the ripple counter is reset to zero, causing Q4 to go low. On receiving its next clock pulse, the Q of the controller goes low, and so the process continues. It will also been noted that as Q4 goes high it opens the way for a 0.1mS reset pulse immediately proceeding a count period, resetting the count to zero.

This control logic at first may seem unnecessary as it would appear much easier to count during all blanking periods. This

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**Table of Values**

Table 2

| R1, R2 | R4, R15 = 10K |
| R3 = 4M7 | C1 = 100 pF |
| R5 to R13 | C2 = 1 nF |
| R17 = 100K | C3 = 100 nF |
| R14 = 47K | C4 = 100 μF |
| R16 = 1K | TC1 = 3-30 pF |
| Q1, Q2 = BC109 |
| D1, D2, D3 = 1N4148 |
| IC1 = 4069 |
| IC2 to IC6 = 4017 |
| IC7, IC8 = 4013 |
| IC9 = 4040 |
| IC10 to IC13 = 4026 |
| Xtal = 2.7 MHz |
| LED Display = four 7-segment common cathode. |

**Note:** For IC1, 7, 8, +8V to pin 14, OV to pin 7; all other IC's, +8V to pin 16, OV to pin 8.

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**Diagram**

![Simplified Block Diagram of the KW-2000B Digital Display](Fig1)
method was originally adopted by the author, but an intolerable amount of jitter occurred due to the 100 Hz (least significant) digit changing alternately between two digits, this change taking place at any frequency from 0 to 50 Hz. With the circuit as shown (Fig. 2), the count rate is one count every 320mS, which is the best compromise between annoying jitter and sluggish tracking of the...
VFO during tuning. For a faster count rate of 160mS, the data input of the controller should be connected to Q3 of the ripple counter, a 640mS rate is available by connection to Q5, etc., etc.

The 2.7 MHz crystal and associated inverters present fast squarewaves to the divider chain, comprising of IC2 (divide by 3), IC3 (divide by 9), followed by IC4, 5, 6—all decade dividers. The resultant 100 Hz squarewave undergoes a further stage of division by 2, IC7b thereby supplying display enable pulses to the counter/display module, IC10, 11, 12, 13. IC7a forms the subtractive mixer, being fed with 2.7 MHz clock pulses and a squarewave representation of the VFO frequency (produced by Q1 and two associated inverters), the mixer output being applied to the input of the counter/display module. The ripple counter, IC9, is fed with 50 Hz clock pulses and is controlled by IC8b, the count interval controller, applying clock inhibit pulses to the counter/display module. DI-4, Q2 and associated circuitry forms a 3-input AND gate and is used to control reset pulses to the counters. It will be seen that a positive potential (supplied via R14), will only be present when all of the diodes are reverse biased, i.e. when pin 11 IC6, pin 11 IC5, pin 3 IC5, are all high. This will only occur during the 0.1mS period before any count period. During this period, Q2 conducts and a high pulse resets the counters.

Fig. 3 shows a suitable power supply for the display, power being drawn from the +12V DC available within the rig, used for relay switching.

Modifications

See photographs. The prototype unit was constructed on Veroboard (using IC sockets and usual CMOS precautions), and mounted in a small aluminium box 100 x 100 x 30mm. in dimensions, in turn mounted on three, 50mm. standoffs above the Tx/Rx relays. The original analogue dial was removed and a 4-digit, 7-segment, LED display mounted on Veroboard and slotted in front of the VFO box was added. To create a more 'professional' look, the perspex window was removed and a grey border (surrounding the display) was added using aerosol spray paint.

Fig. 4 details how RF pickup from the VFO was derived. Initially RF pickup was achieved from the buffered output from the VFO box; this arrangement worked fine on receive, but a 'scope placed at this point during transmit revealed a multitude of frequencies due to the action of close-coupling with the balanced mixer, V4. The addition of Cx (47pF silver mica) into the VFO proved to have no detrimental effects. Removal of the top of the VFO reveals a convenient free tag on which to mount Cx, and a small hole drilled in the side of the VFO box is used to pass the miniature co-ax. Bostik, or a similar adhesive, is used to secure the capacitor and other wiring from the effects of vibration.

Conclusion

The display has been in use at the author's QTH for several months, proving to be invaluable for netting and providing a very economical solution to the problem (the prototype was constructed for less than £15 inclusive). The use of a screened housing eliminated all the usual 'nasties', none being detected whilst running the rig into a dummy load.
The Space Shuttle

The U.S. STS-9 Space Shuttle was successfully launched on time at 1600 GMT on Nov. 28, with Dr. Owen Garriott, W5FL, on board. His first, and the first ever, contact by a radio amateur in space to another on planet Earth took the first ever, contact by a radio amateur in space communicators have equipment for that band, which is far less troubled by the radio vandalism heard daily on 2m. This is a sentiment echoed by Rod Burman, G4RN, (Surrey) who heard W5FL on orbit no. 97 on Dec. 4. John Fitzgerald, G8X7J, (Bucks.) heard him on the 4th from home and on the next day from school on the fourth floor using an Icom IC2-E on its quarter wave whip, at 1206 GMT. L. C. Chandless, G6PLR, (London) is wondering if it was W5FL he heard at 1523 on the 7th, or "... one of the idiots."

Awards News

Another reader has joined the 144 MHz QTH Squares Century Club this month. Certificate no. 30 was issued to G4MJC, Fleming Jul-Christensen from Eastbourne in E. Sussex, on Dec. 9. Of his 101 confirmed, two were via Aurora, five via Sporadic E, the rest on tropo. Apart from two FM contacts, all were SSB. Fleming comes from Denmark, where his call is OZ1EVA, although he has now lived here for 18 years. He was first licensed as G8RMA in October, 1978 and already has VHCC Certificate no. 327 for this band. The 144 MHz VHF Century Club has two new members. The first is Glenn Bates, G6HFF, from Bolton in Greater Manchester, whose certificate no. 361 was issued on Nov. 18. His station consists of a Yaesu FT-290R, home built 15w amplifier and Zetagi 100w PA. A muTek pre-amp. is used on receive and the antenna is a 6-ele. Quad from Jaybeam. Glenn is an RTTY enthusiast and uses a Creed 7E teleprinter, modified home built ST-5 terminal unit and Creed 6S auto-transmitter. The site is 400ft. a.s.l. with only the westernly take-off good, and the antenna is 30ft. a.g.l. His wife, Val, is licensed too; she is G6MMML.

The second new member is John Hermann, G6DJV, in Kent, who was first licensed as G6DJD in June, 1982, the G4 being obtained the following April. The QTH is at sea level on the Romney Marsh and comprises a Trio TR-9000 and Microwave Modules 100w amplifier. The antenna is a 16-ele. Yagi from Tonna, 30ft. a.s.f. John has 21 countries and 77 squares worked, best DX being 9H1 and 9H4 via E's. He is a WAB enthusiast and wishes there was more activity for WAB addicts on VHF. His certificate is no. 362 and was issued on Dec. 8.

VHF Convention

Geoff Stone, G3FZL, has advised that this year's RSGB VHF Convention will be on Saturday, March 24 at the Sandown Park Racecourse in Esher, Surrey. The "recipe" will be similar to that of previous years — all-day exhibition and three afternoon lecture streams — but there will be no evening buffet. It seems that the buffet is not very popular and, if it was not for the attendance by those collecting trophies, few would bother to come. Your scribe is disappointed since it did afford a convenient and convivial opportunity to meet readers and chat. More details later on.

The Tables

Next month will reveal the final placings in the 1983 Annual Table, one feature of which has been the much larger entry on 23cm. Ideally your scores should reach Welwyn by Jan. 4. Alternatively, if they reach your scribe at QTTH by the 7th at the very latest, that will do. The 1984 Annual Table will be in the same format as the 1983 one. The on-going squares table will continue and both tables are based on unconfirmed contacts. Space allowing, it is hoped to publish the 23cm. All-Time table more often.

CW activity on VHF is on the increase and many newer licensees are to be heard every evening on 2m. Tim Raven, G4ARI, has suggested we try a CW Only table, independent of the Annual Four Band listing, in order to encourage more activity during the year. After some discussion, it seems best to base this simply on the number of different stations worked on all the VHF/UHF/SHF bands together. There is no counties, countries or squares content; just count one point for every new station worked, per band, during the year. It is proposed to start in the April issue, by which time there will have been a few contests to get the ball rolling.

Syd Harden, G2AXI

Readers will be saddened to learn of the death of Syd Harden, G2AXI, who passed away in hospital on November 29. He was a regular contributor to this feature for very many years and, in spite of poor eyesight, he was always building his own VHF/UHF equipment. A keen participant in the Annual Tables, he usually...
finished near the top by dint of steady operation on all the appropriate bands. Syd was truly one of that diminishing breed of real radio amateurs and we will miss his cheery voice. Our sincere condolences go to his wife and family.

Contest News

As mentioned last month, The Swale ARC is promoting a couple of contests. The first is on Jan. 22, 1000-1800, on 144 MHz, the second on Jan. 29, from 1400-1800, on 432 MHz. Each is in two sections; Open and Low Power, the latter defined as 25w and below on 144 MHz and 10w and below on 432 MHz. Contest exchanges to include RS(T) plus serial number starting at 001 and postal county. One point per contact except for the club station, GB4SRC, which is worth 10. Countries outside the U.K. to count as extra counties and the final score is points times counties. Entries, post-marked no later than 15 days after the events, go to G4NPM, Leahurst, Augustine Road, Minster, Sheerness, Kent, ME12 2NB. Entrants must be RSGB members and declare they have operated in accordance with their licence conditions. The overall winners will receive cups to keep.

The first leg of the 70 MHz Cumulatives is on Jan. 29, 1000-1200 with the usual, RS(T)/serial no., QTHL and QTH exchanges; radial ring scoring. The 144 MHz CW event is on Feb. 5, 0900-1500 with RST/serial no. and QTHL information only. (Henceforth, in all contests 144 MHz and above, QTHs are not required, only the locators). Radial ring scoring.

The Q Code

The Q Code is extensively used, and sometimes abused, by radio amateurs. The erstwhile use of QRA locator instead of QTH locator is a case in point. Peter Brooks, G4UMI, has queried the use of QTF concerning beam heading, or azimuth, information, pointing out that QTF is used to request position which requires a fix by two or more receiving stations. The correct signal would be QTE, which is a request for a true bearing, useful in reporting Auroral signals. As old habits die hard, it is debatable whether operators will bother to abandon QTF in favour of QTE.

Moonbounce

Clive Penna, G3POI, (Kent) was active over the weekend Nov. 26/27 on 2m. on E-M-E and new stations worked were KXQO in Colorado. HB9SV and WD8ISK, which brings Clive’s squares total to 411. Conditions were quite good, so much so that he got his own echoes back from the Moon with just 50w output to his 160-ele. colinear antenna array.

Because of the much increased 2m. E-M-E activity at perigee periods, some of the operators have suggested an amendment to the Band Plan to expand the mere 10 kHz — 144.000-144.010 MHz — segment to, say 30 kHz. This seems a sensible idea, bearing in mind that the CW portion above 144.100 MHz seems to be rather under-used, and which could accommodate terrestrial traffic.

The Satellite Scene

Oscar-10 continues to give properly equipped users excellent service. To get the best results, right-hand circular polarisation is necessary to overcome fading due to spin modulation, and the antenna should be capable of being elevated. For example, reception of the Sunday news broadcasts is not at all good using a horizontally mounted, linear Yagi, yet is quite satisfactory when using, say, a 6-ele. crossed Yagi and average receiver with a decent preamp.

Adrian Chamberlain, G4ROA, (Coventry) sent a colour print of his Oct. 2 0-10 operation showing his gear sitting on a decorator’s pasting table in the garden and the combined 6-ele. 2m. and 12-ele. 70cm. Yagis on a short pole nearby. With just 10w from a Yaesu FT-780R, he worked JA9BOH. One attraction of satellite working is that you do not need to have the antennas mounted on a high tower. For much of the time in an 0-10 orbit, the satellite is well elevated, so all you need is to mount the antennas on a short pole stuck into the ground and hand point the array towards the “bird”. This will give a few hours use without constant adjustment. What could be simpler?

Derek Brown, G8ECI, works in Saudi Arabia for long periods and operates the station HZIAAB every Wednesday evening/Thursday morning. He says the station is QRV on 0-10 mode “U” and has probably worked into the U.K.

Ron Broadbent, G3AAJ, AMSAT-UK’s secretary, is also the Satellite Co-ordinator for IARU Region 1. He is seeking input for the 0-10 news bulletins from other Region 1 societies. RSGB Headquarters now has a suitable antenna installation, so it may be possible to transmit these Sunday bulletins from Potters Bar, in future, if a suitable operators’ roster can be compiled.

Microwave Bands

Many readers have sent their latest news and scores for the 23cm. band and it is nice to welcome another nine entries in the All-Time Table. Pam Rose, G4STO, (Lincs.) says that 23cm. is her favourite band on which she runs 1.3w to a 7ft. dish some 60ft. a.g.l. and fed with Andrews LDF4-50 cable. However, she has not done as well as she could have due to a broken rotator these past few months. Even so, in the Cumulative on Dec. 2, Pam added 11 1983 counties and a couple more squares.

Dave Sellars, G3PBV, (Devon) was also QRV in the Dec. 2 leg working 9 stations at an average QR of 248 kms. It was mainly inter-G, with only a PA in CL heard at any distance. More counties, plus France and 4 new squares on Dec. 2. Earlier successes were with PAs in CL, CM and DM, and heard DF5LQ (EO) and OZ7UX (FO). Denis Jones, G3UVR, (Merseyside) got 18 more counties, plus France and 4 new squares on Dec. 2. Earlier successes were GW8FKB (NN) in Gwynedd on Nov. 10 and GW8TFI/P (YL) in Gwent on the 16th.

John Quarmby, G3XDY, (Suffolk) made good use of the Dec. 2 contest in which 4 new squares were worked. His list includes G8PPN (Northumberland), G4APA/P (Cheshire), and GUBKFT for the 12th country on 23cm. Graeme Caselton, G6CSY, (Kent) with two watts, lists G4STO, G3AUS (YK), G6GJD (YN), PE1CQQ (DM) and PA3DAQ (CM) for some of the Contest additions. Keith Hewitt’s, G6DER, (S. Yorks.) letter was written before the early December lift so reports the earlier Cumulatives to, “... have been a disaster,” with only 4 stations worked.

Dave Robinson, G4FRE, (Suffolk) was on 13cm. on Dec. 4 and worked G8FUO in Berks., and G3AUS in Devon and says
and that DL0QQ (DL) on 2,320.025 MHz was a colossal signal for hours along with DB0VC (FO). On 9cm. DB0JO (DL48d) on 3,456.150 MHz was copied and the antenna was an array of 4 full wave dipoles etched on a PCB with a gain of 12.7dBi. This was poked out of the ventilation holes on the end wall of the house which faces east. Dave also added some new ones in the Dec. 2, 23cm. event and is a newcomer to the All-Time Table with 43pts. Dick also added some new ones in the Dec. 2-4 period. When last home in Derby on Nov. 12 as new.

G4ROA persuaded F1DED (BI) off 70cm. on Dec. 3 and worked him on 23cm. for a new one, while the previous day brought Adrian another 7 counties for this year. He also joins the All-Time list. Ray Cox, G8FMK, (Oxon.) also concentrated on 70cm. on Dec. 3 and worked him on 23cm. on the end wall of the house which faces east. Dave also added some new ones in the Dec. 2, 23cm. event and is a newcomer to the All-Time Table with 43pts. Dick also added some new ones in the Dec. 2-4 period. When last home in Derby on Nov. 12 as new.

Chris Easton, G8TFI, (Gloucs.) has notched up 16 countries on 23cm. this year and reports very high activity on the band. He did the Cumulatives sessions from Gwent as GW8TFI/P and the Dec. 2 leg was the best with 87 QSOs including 3 OZs and many PA and D stations. The Nov. 16 leg saw average conditions and produced 37 contacts, while on Oct. 31, G conditions were very good resulting in 63 QSOs.

Peter Godfrey, G8ULU, joins the 23cm. table with 33 pts. and all his QSOs were made with one watt and a single 23-ele. antenna. 7 new counties were netted on Dec. 2 from his Kent QTH, including G3YVR (Merseyside) and GW8TFI/P (Gwent). Prize catch on the 4th was SM6AFV (GR) for square no. 31. Arthur Breese, G2HDZ, is reasonably happy with his country’s score of 8 on 23cm. but disappointed as he has not got more counties. All QSOs were with one watt of SSB or 5w of CW.

Derek Brown, G8ECI, should be back home in ANU square over the Christmas period. When last home in July, he enjoyed 23cm. operation with just one watt but plans to up-grade the system when time permits. Four 27-ele. Loop Yagis and a pair of 239 PA valves are suggested. He asks if any readers can suggest a suitable device to give about 6dB. of gain from one watt of drive. (Suggest NECN80490 device — see Lunar Letter Magazine, March 1983. Ed.)

Seventy Centimetres

G3PBV kept an ear on 70cm. during the period Dec. 2-4 and did find a two hour lift to Scandinavia on the Sunday evening. He got OZ3ZW (FO) who was using 10w, and OZ1C1SI (HP) with just 2w, so Dave reckons his 50w must be real QRO! He is now 101 squares worked on the band. G3XYD worked lots of OZs and SM7s in this period, yet only OZ1HTB (HP) was new. John is now 100 sq. worked on the band. On Dec. 4, Jon Stow, G4MCU, (Essex) heard all four OZ beacons, plus several PAs.

John Pilags, G8FUO, (Berk.) enters the All-Time list with 46 pts. He uses 5w from an AM or transverter plus PA with 45ft. of LDF4-50 and UR67 feeding a 43-ele. Mono Yagi at 46ft. An MG41 masthead preamp. is used and a bigger PA with two 239s is planned. On Nov. 11, he lists P1CCQ; on Dec. 3 G3UKFT, with the best day being the 4th which brought Germans in DL and DN, OZ7LX (FP), OZ2LD (FO) and OZ1AEB (GP). He has been QRV on 13cm. since late October with an SSB Products transverter, its 500w output feeding a Quad Loop Yagi at 48ft. More recent DX on 2.3 GHz includes PE1CQO on Nov. 10 and, on Dec. 4, PE1DFX (DM), PA0FRE (CL), G3AUS, PA0EZ (CM), DC0DA (DL), G3LQR (AM) and G4FRE (AL).

John Milgat, G8HII, (Hants.) also worked PA0EZ at 424 kms. on 23cm. and PA0FRE, F6DZK (AI) and some GS. During the Dec. 4 opening, DFS5Q and OZ2LD were at work over 700 kms. John Leney, G8KAX, (Essex) lists G4KCT (N. Yorks.), G4BYV (Norfolk) and G4CCH (Humburdes) as new in the Cumulative on Dec. 2. The weekend produced G4UKFT and OZ7LX. A move of about 20 miles is anticipated soon so, as that is less than 50 kms., his square scores will carry on.

John Moxham, G8KBQ, (Somerset) is now in the All-Time table and operates on 23cm. whenever he has the time. His station runs one watt to four 23-ele. Mono Yagis at 60ft. and over the Dec. 2-4 period, he lists 5 PAs worked. He is contemplating 13cm. activity some time. Gordon Emmerson’s, G8PNN, undated letter was likely written before the lift as he only lists G8HQM in Derby on Nov. 12 as new.

Three bands only count for points. Non-scoring figures in italics.
recks that 70cm. is her poorest band. Pam keeps changing antennas, the current one being a 23-ele. H.A.G. with Pope H-100 feeder. She has built a Wood & Douglas preamp. but is still not satisfied, so another H.A.G. Yagi is being sought. G6CSY only has 5w on the band and lists QSOs with PE1CQO, DF5LQ and DL8QS (EN). G6CI is well set up on 432 MHz with a Yaesu FT101ZD "prime mover," MM28/432 MHz transverter and 4CX250B amplifier to a 23-ele. antenna. A recent move, MM28/432 MHz transverter and 4CX250B amplifier to a 23-ele. antenna is used. 

contributor Gary Tuppeny, G4LOE, from 70cm. in the early December lift to work the south of England noticed at G3FPK was on Nov. 14, from about ten days in November, and the good DX was SM6CMU (FR50b). After the 2m. day brought DK4LI (EO30g), but the best offset by reasonable activity, particularly from the north of England, resulting in 80 Cumulatives. On Oct. 23, Chris's Nympsfield QTH for the annual table. SM7s. Quite obviously, there are going to be some very high scores this time. GD2HDZ lists a couple more 1983 squares, followed by 16 PAs the next day. However, Rod did get SM7WT (GP) at 0736 on the 3rd with OZ6OL (FP) for a square. However, with patience and a bit of luck with E's, it is possible to accumulate 200 without MS mode. G6CSY is only running 5w on 2m. but nevertheless, Graeme did work some DX in the lift:— EI4AQB (VN), DB1LI (FO), OZ1DQM (FP), TO6HRP (YI) and GW6USD/A (XN). G8SLR took part in the Fixed Contest on Dec. 4 as a single operator station and which left him speechless and with writer's cramp. Michael made 360 contacts, many into the "01" and "02" squares, best DX being OZ1KAL (GP54b) at 823 kms. The most pleasing DX was G4FDX/LX (CJ) and after the event, he got SM7NBR (GP48A).

Two Metres

G3PBV reports that, on the evening of Dec. 2, G3JYHU heard a 3V8 station in Tunisia on CW, on 144.05 MHz with a big pile-up of French and Spanish stations. The rough distance from Jersey to Tunis city is 1,700 kms. so it is not record-breaking DX. It would be much appreciated if any of our French and Spanish readers could shed some light on this one. Despite Auroras being heard on about ten days in November, and the good tropo. on Dec. 1 and 2, G3UVR found nothing new for the tables. The only A noticed at G3FPK was on Nov. 14, from 1415-1530, but there was no activity from the south of England. G3XDY took time off from 23cm. and 70cm. in the early December lift to work OZ1FO in GO for a new square to bring his total to 148. Welcome to a new contributor Gary Tuppeny, G4LOE, from Solihull in the W. Midlands. He has recently moved and is now QRV with an Icom IC-251E and 40w amplifier, the antenna being a 9-ele. Yagi at 29ft. On Dec. 2 he worked FIGXO (XI), F1BCH (AJ), FIICX (ZI) and OZ1IWE (EQ). The next day brought OZ1DAO (FP), OZ1DOP (GP), OZ1HFO (EO), DF8BA (DN), and SM7OBY and OZ2YM in GP. On the 4th G3MRJ (GP) was worked. Beacon DLOPR was audible throughout the 3rd and up to lunchtime on the 4th. OZ1IGY and SK7VHF beacons were also copied.

G4MCU found OZ3CEW (II) on the 20m. VHF net on Nov. 21 and made an immediate MS sked with Erik which was successful, being completed in 55 mins. By "tail-ending" G3P01, he worked Y30CLA on CW during the lift for new square GO. Two days earlier, on the 1st, Jon used SSB mode to contact EA1OD (XD) and FIGXX (ZF). G4SRN was in on the latter part of the Dec. lift and began at 0736 on the 3rd with OZ6OL (FP) for a new square, after which a fruitless hour was spent trying to work SM7WW. However, Rod did get SM7WT (GP) at 1305 for his first SM and another new square. 

Pam Rose, G4GTO, reckons she will have to think about MS operation to work more squares. However, with patience and a bit of luck with E's, it is possible to accumulate 200 without MS mode. G6CSY is only running 5w on 2m. but nevertheless, Graeme did work some DX in the lift:— EI4AQB (VN), DB1LI (FO), OZ1DQM (FP), TO6HRP (YI) and GW6USD/A (XN). G8SLR took part in the Fixed Contest on Dec. 4 as a single operator station and which left him speechless and with writer's cramp. Michael made 360 contacts, many into the "01" and "02" squares, best DX being OZ1KAL (GP54b) at 823 kms. The most pleasing DX was G4FDX/LX (CJ) and after the event, he got SM7NBR (GP48A).

Chris Easton, G8TFI, and Tony Collett, G4NBS, put their scribe's radio neighbour G8WLV (Surrey) on Oct. 23, and G8CLY (Herts.) on Oct. 23, and G8CLY (Herts.) on Oct. 23.境内
getting into CM, DN and EN squares. He took his gear round to GW6KOJ’s QTH for the contest. With 400w to a 17-ele. Tonna Yagi at 50ft. and 900 ft. a.s.l. they worked 133 Gs, GWs and GUs, 4 ONs, 10 Fs, 32 Ds and 66 PAs.

Four & Six Metres

Very little input this month on 4m. and 6m. G3PBV has added a Trio TS-660 to his collection, described as an “All-mode quad bander,” covering FM, USB, CW and AM modes on 21, 24, 28-30 and 50-54 MHz in 1 MHz bands. Dave says it produces 10w and is a sort of “simplified TS-430.” He has been listening on 6m. using the 4m. 2-ele. beam and logged GU2HML, GJ3YHU, GW4HBK, G3NOX, G3COJ, G3TCU and G6XM. Sounds like an intriguing piece of kit and somewhat of a rarity at the moment.

GW4HBK, in apologising for lack of recent reports, writes that conditions have been very quiet from South Wales, in spite of regular “CQ” calls on 6m. and 4m. Dave says the Dec. lift did not seem to affect the strength of the 4m. beacons, but that 6m. did open up. He got an S9-plus report from GU2HML, and also worked GJ3YHU, G3OHH, GW3LDH and G6XM.

Bristol Resume

Ken Osborne, G4IGO, has written after some time and has moved from his Bristol QTH to Somerset. A keen student of propagation, he has sent a brief account of his activity from the old QTH. From mid-1977 to Sept. 19, 1983, 251 squares and 40 countries were contacted on 2m. On tropo, best DX was UQ2IV (KQ) out of 155 squares and 22 countries, while Aurora! QS0s brought 23 countries in 97 squares. Best DX on this mode were LP, LQ, LR and KH squares, the most unusual being a QS0 with F2PC in AC. Via E’s, 17 countries in 48 squares were worked, best DX being to MZ and HV. F1JG (CD) was a very short skip station contacted.

Ken mentions that in one opening this year, at the end of July or the beginning of August, there was an E’s opening from G/GI to F, moving into the EA5 and EA7 areas. G1QPH was heard and called by G4ICO and others on back-scatter, an extremely rare phenomenon via E’s on 144 MHz. Unfortunately the G1 either did not hear them or ignored them as they were not DX.

On MS, Ken worked 17 countries in 65 squares, best DX being OH3TH (MU). Only 23 squares were added by MS so 228 were worked by “normal” modes. On tropo and Ar, the best DX is found and worked on CW and this is true of most modes of propagation to Eastern Europe. Ken finds that E’s is a “straight line mode” the QTE for each opening varying very little. However, it can alter by 90° or 180° in a matter of seconds if reports in DUBUS Informationen are studied. These are very interesting observations of the kind which add to our general understanding of VHF propagation.

Cable Losses

The latest copy of the AMSAT-UK satellite calendar contains a “Cautionary Tale” from compiler Trevor Stockill, G4GPQ. He suspected his 25 metre run of URM-67 cable at 70cm. was a bit lossy so replaced it with FHJ4-50. Now, 100w fed in results in 82w at the antenna. The URM-67 had been up for less than 18 months and was undamaged. The same 100w fed to the old cable originally provided 45w at the antenna, but when re-tested, this had dropped to a miserable 15w. That represents over 8dB. loss for just 25m. at 435 MHz! Another way of expressing the deterioration is that the cable is some 4.8dB. worse after this short period.

The moral here is that, just because cable looks all right, it does not mean it is. Your scribe wonders what the exact reason is for such deterioration when proper precautions are taken regarding waterproofing, etc. Can any cable experts give us the facts?

Gems of the Month

The following two gems were heard by your scribe on 2m. during November, both from G1B. operators. “My preamp. doesn’t work very well on FM. It’s much better on SSB.” “We’ve got a 5XY antenna, but only the X part is working at the moment; there’s something wrong with the feeder of the Y part.”

Finale

Next issue the final placings in the annual tables will appear, so please be sure to send in your end-of-year figures by Jan. 4. Make a note in your new diaries that the deadline for the March issue, when we start the 1984 annual table, is about as early as it can be, Feb. 1. Send all your news, etc. to:- “VHF Bands,” SHORT WAVE MAGAZINE, 34 High Street, WELWYN, Herts., AL6 9EQ. 73 es Happy New Year de G3FPK.

Subscription rate to Short Wave Magazine is £9.60 for a year of twelve issues, post paid

SHORT WAVE MAGAZINE, LTD., 34 HIGH STREET, WELWYN, HERTS. AL6 9EQ
LOW-PASS FILTERS FOR ATTENUATING RF AMPLIFIER HARMONICS

PART II

A DETAILED EXAMINATION, COMPLETE WITH NECESSARY DATA FOR THE CONSTRUCTOR

E. E. WETHERHOLD, W3NQN

Seven-Element Chebyshev Filter with Standard-Value Capacitors

Two seven-element Chebyshev SVC lowpass filters for the 80-metre band are listed for comparison in Table 1, Nos. 6 and 7. These two designs were selected from Design Nos. 5 and 7 of Table 3 as being representative examples of this filter type and suitable for comparison with the 5-element 80-metre filters. Fig. 3 shows the attenuation response vs. frequency of all the filters. As might be expected, the 7 MHz attenuation is greatest in the two 7-element filters as compared to all the 5-element filters. Although the desired second harmonic attenuation of the 7-element filter does not always meet the attenuation criteria of more than 32 dB, the attenuation provided by this filter type will probably be sufficient for its purpose. The maximum calculated VSWR (from Table 3) is 1.036 for one design and 1.035 for the other. In addition to the better attenuation and VSWR performance of the seven-element filters, the use of standard-value capacitors simplifies purchasing and construction.

To facilitate the use of the 7-element SVC filter for amateur radio applications, thirty designs that were considered most appropriate for second harmonic attenuation were selected from a table of 76 designs having VSWR less than 1.15, and these designs are presented in Table 3. The designs for the 40-metre and higher bands all have second harmonic attenuation greater than 30 dB. All but six of the designs have VSWR levels of 1.100 or less. For the most part, these designs meet the desired performance characteristics previously mentioned, and they are recommended for future applications where harmonic filtering is needed.

Summary and Conclusion

Transistor RF amplifiers require lowpass filters for each amateur band to reduce harmonic levels to an acceptable level. Amateur radio designers apparently prefer the 5-element lowpass filter for this application, but there appears to be no agreement on a specific type of design. For example, five-element designs for the “double-pi”, half-wave and modified Chebyshev filters were recommended in three articles recently published in the U.K. For such a common and reoccurring need, it seems appropriate that a type of lowpass design be available to the amateur that is easily constructed with standard-value capacitors (SVC) and that also has low VSWR in the passband and adequate attenuation at the second harmonic frequency.

Comparisons of performance and ease of construction were made between four different types of five-element filters and a seven-element type. The seven-element Chebyshev SVC type was recommended for all future harmonic attenuation applications because of the advantage of greater harmonic attenuation. Lower VSWR and easier construction out-weighted the disadvantages of the one additional capacitor and inductor that are required as compared to the five-element filter. Thirty precalculated seven-element SVC designs were tabulated for all the amateur bands from 160 to 10 metres, with the recommendation they be used in all future amateur transceiver designs, unless there is some compelling reason to do otherwise.

A table of 5-element SVC filter designs was given for Class-A or AB RF amplifier filtering applications where the greatest attenuation of the 7-element filter is not needed, and where it is desired to minimize cost and the number of components.

Acknowledgements

The author gratefully acknowledges the responses received from Messrs. DeMaw, Keyser, Fare and Rev. Dobbs after they reviewed a preliminary copy of this article. The information provided by Mr. Fare was especially appreciated as he brought out the point that a 5-element filter is adequate for those RF amplifiers operating on the Class-A or AB mode such as discussed in his article (Ref. 1). The author also gratefully acknowledges the assistance of Joseph Gutowski of EWC Inc., in reviewing the material in Appendix ‘A’.

Appendix ‘A’

This appendix contains all the information necessary for you to design an optimum inductor for the filter designs listed in Table 3. Table A1 lists the general magnetic properties of the Micrometals iron powder toroidal cores distributed in the U.K. by Amidon and which are available from TMP Electronics Supplies. The five listed mixes were selected as being optimum for the filters listed in Table 3. Table A2 gives the core mix number, the core

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Table 3. The physical dimensions are useful for laying out the magnetic dimensions of the core sizes selected for the filters in using the inductance value for ten turns, it is possible to calculate inductance for ten turns on five different core sizes. These five colour and the recommended frequency range versus the inductance for ten turns on five different core sizes. These five sizes were selected as being optimum for the filters in Table 3. By using the inductance value for ten turns, it is possible to calculate the turns required for any desired inductance value. A design example following this paragraph demonstrates how the data in the four tables meets the requirements of the Design No. I for a power output of 200 watts.

A design example demonstrates how the data in the four tables are used to select an optimum iron powder core for an RF filtering application. Assume you want to build a lowpass filter (such as Design No. 1 in Table 3) for a 160-metre band transmitter having a maximum power output of 50 watts. To do this, use the following procedure:

(a) Refer to Table A4 and select a core that is optimum for the cutoff frequency range and power level being used. A T68-2 core meets the requirements of the Design No. 1 for a power output of 50 watts.

(b) From Design No. 1 of Table 3, L2 = L6 = 5.415 µH, and L4 = 6.403 µH. Using the Inductance Value at 10 turns from Table A2 and the following equation, calculate the number of turns required on a T68-2 core to give the desired L2 and L6 inductance value: \( N = \frac{L2}{L10} \), where \( N \) is the number of turns required for the desired inductance \( 'L2' \), and L10 is the inductance at 10 turns from Table A2. For a T68-2 core, L10 = 0.57 µH. Thus, \( N = \frac{5.415}{0.57} = 30.8 \) or 31 turns. In a similar manner, the 6.403 µH inductor (L4) requires 34 turns on a

<table>
<thead>
<tr>
<th>Design No.</th>
<th>F-co (MHz)</th>
<th>F-3</th>
<th>F-20</th>
<th>F-30</th>
<th>VSWR</th>
<th>C1,7 (pF)</th>
<th>C3,5</th>
<th>L2,6 (µH)</th>
<th>L4</th>
</tr>
</thead>
<tbody>
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<td>1</td>
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<td>2.34</td>
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<td>3.2</td>
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<td>2700</td>
<td>5.415</td>
<td>6.403</td>
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<td>2.76</td>
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<td>4.0</td>
<td>1.024</td>
<td>820</td>
<td>2200</td>
<td>4.442</td>
<td>5.608</td>
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<td>1300</td>
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<td>43.1</td>
<td>48.7</td>
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<td>160</td>
<td>0.324</td>
<td>0.388</td>
</tr>
</tbody>
</table>

Notes:
1. See schematic diagram, Fig. 2(a), for the location of C1, C3, C5 and C7, and of L2, L4 and L6.
2. F-co is the 'ripple cutoff frequency (F-Ap)', and F-3, F-20 and F-30 are the frequencies of the 3dB, 20dB and 30dB attenuation levels; see Fig. 2(b).

The five cutoff frequency ranges taken from Table 3, and for five RF power ranges up to 200 watts.
Table A2. Inductance at 10 turns for MICROMETALS Toroidal Cores

<table>
<thead>
<tr>
<th>Core Mix Number</th>
<th>Colour</th>
<th>Inductance (µH) at 10 turns.</th>
<th>Recommended Freq. Range (MHz)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Core Size Prefix</td>
<td>T37</td>
<td>T44</td>
</tr>
<tr>
<td>-2</td>
<td>Red</td>
<td>.40</td>
<td>.52</td>
</tr>
<tr>
<td>-6</td>
<td>Yellow</td>
<td>.30</td>
<td>.42</td>
</tr>
<tr>
<td>-7</td>
<td>White</td>
<td>.32</td>
<td>.46</td>
</tr>
<tr>
<td>-10</td>
<td>Black</td>
<td>.25</td>
<td>.33</td>
</tr>
<tr>
<td>-12</td>
<td>Green/White</td>
<td>.15</td>
<td>.185</td>
</tr>
</tbody>
</table>

Notes:
1. The above inductance values have a tolerance of 5% and are based on a single layer of turns evenly spaced around the core.
2. The core prefix gives the nominal outside core diameter in hundredths of an inch.
3. The complete toroidal core is specified by the size prefix followed by the material designation. For example, a T68-2 core has a nominal O.D. of 0.37 inches and an inductance of 0.40 µH at 10 turns. See the design example in Appendix 'A' for the procedure used in calculating the turns for any desired inductance value.

<table>
<thead>
<tr>
<th>Core Mix Number</th>
<th>Colour</th>
<th>Inductance (µH) at 10 turns.</th>
<th>Recommended Freq. Range (MHz)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Core Size Prefix</td>
<td>T37</td>
<td>T44</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1 - 5</td>
<td>7 - 14</td>
</tr>
</tbody>
</table>

References

Table A3. Toroidal Core Dimensions and Maximum Turns for Single Layer Winding.

<table>
<thead>
<tr>
<th>Core Size Designation</th>
<th>Height (inches)</th>
<th>Inner Dia. (inches)</th>
<th>Magnetic Length (cm)</th>
<th>Magnetic Area (cm sq.)</th>
<th>Approximate Turns for Single Layer Winding</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Wire Size (swg)</td>
</tr>
<tr>
<td>T37</td>
<td>.128</td>
<td>.205</td>
<td>2.32</td>
<td>.070</td>
<td>41</td>
</tr>
<tr>
<td>T44</td>
<td>.159</td>
<td>.229</td>
<td>2.67</td>
<td>.107</td>
<td>46</td>
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<tr>
<td>T50</td>
<td>.190</td>
<td>.303</td>
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<tr>
<td>T68</td>
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<td>4.24</td>
<td>.196</td>
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<tr>
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<td>5.15</td>
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*The ‘T’ designates a toroidal core and the number following the ‘T’ designates the outer diameter of the core in hundredths of an inch.
Table A4. Recommended Minimum Core Size *versus* Core Material for Various Power Levels and Frequency Ranges.

<table>
<thead>
<tr>
<th>Cutoff Freq. Range (MHz)</th>
<th>Core Material &amp; Colour</th>
<th>DESIGNATION OF SMALLEST USABLE TOROIDAL CORE</th>
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<tr>
<td></td>
<td></td>
<td>25 - 50 Watts RMS</td>
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<tr>
<td>2 - 5</td>
<td>2 (Red)</td>
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</tr>
<tr>
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<td>7 (White)</td>
<td>T37</td>
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<td>10 - 12</td>
<td>6 (Yellow)</td>
<td>T37</td>
</tr>
<tr>
<td>14 - 24</td>
<td>10 (Black)</td>
<td>T37</td>
</tr>
<tr>
<td>25 - 35</td>
<td>12 (Grn/White)</td>
<td>T37</td>
</tr>
</tbody>
</table>

*The above minimum core sizes may be used for the designs in Table 3. A conservative maximum AC flux density of 200 Gauss was used to determine the minimum core size. Minimum 'Q' of the T37 core will be between 150 and 200 for the -2, -6 and -7 materials, and between 125 and 150 for the -10 and -12 materials. A larger core may be used for higher 'Q' if desired.


Soldering Polyurethane Wire — Safety

Editorial note: when doing much soldering of wire covered with a synthetic enamel based on a polyurethane resin (by “much” we mean the soldering associated with the inductors of, say, ten of W3NQ’s filters) ensure that there is plenty of ventilation. This is because when the resin melts it gives off a small amount of toluene di-isocyanate, which is both irritating and harmful to the eyes and respiratory system. For reference, see the February 1982 issue of Rad Com, page 143.

DATA PROCESSING THE LOG BOOK — ON A MICROCOMPUTER

I. T. WOOD, G4MCN

The growing availability of small, powerful, computers at work, in schools, and now in the home, allows the radio amateur to process the data in their log books into conveniently sorted information. This article attempts to illustrate what an existing 32K computer can do — by means of two programs written in PET BASIC and, to whet the appetite of the complete novice, by a ‘step by step’ description of the first part of the simpler program.

The two programs provide a record of QSOs sorted in some predetermined manner. The first program allows five items of data on each contact (callsign, date, time, band and mode) to be fed into the computer, in a manner facilitating easy editing of any errors, before being transferred to disc. The second program processes the data now held on disc. In order to make the most effective use of computer memory, whilst keeping the program relatively simple, the data is read from the disc into the ‘array’ (an indexed list of the data), which is then sorted before being output to a visible record. As each set of data is fed into the computer it may be rearranged before being stored in the array. Hence if the data is stored in the sequence — callsign, date, time, band and mode — then it will be sorted into alphabetical order starting with callsign. Alternatively, if it is rearranged in order of band, mode and callsign, then sorting will take place on those variables. See Figs. 1 and 2 which illustrate printout of a typical batch of QSOs.

Although BASIC is a programming language common to all small computers, each brand (and even variations of model within a brand) will have its own dialect. Hence whilst most of the instructions in the accompanying programs are written in ‘standard BASIC’ some of the statements (notably those relating to disc) are particular to PET and will need changing to suit other computers.

An idea of what scale of processing may be achieved by these ‘small powerful computers’ may be gauged by the writer’s use of this type of program on a 32K BASIC 4 PET with 4040 disc drive. The five items of data already outlined, for each of 1089 QSOs made during a recent twelve-month period, were keyed into the computer and then stored on a 5-inch disc. When processed with a machine code sorting routine the sort took about six seconds (the standard BASIC sort routine listed in Program 2 will take very much longer — however for home use this is of little consequence). The resulting processed data occupied ten pages of printout for the alphabetic sort, and four pages for the sort by band and mode. The total run time for each activity was about five minutes (reading the data, sorting and printing) using a medium speed 132 column printer. Hence the writer is able to keep a yearly record of DX contacts in sorted form. Those who make many more contacts per year will be able to devise methods based
For the User

*Program 1.* "QSODATA" divides into three parts. First the data for each QSO is read from the data lines numbered 1000 onwards. The data on each contact can occupy a separate line and is updated at convenient intervals, weekly, monthly, or whatever, until the computer memory is almost filled — this will occur after some 600 contacts have been entered. At this point the computer has no room left for processing and the data is offloaded to the backup store (disc). It is extremely simple to edit typing errors out of the data lines, either by retyping them, or by using the screen editing facilities now found on most small computers. The first part of the program reads the callsign back onto the screen to provide a useful check that the data is being read correctly. The part two sorts this array in a manner that will be obvious from inspecting the two Figures. In the listing shown, sorting is achieved by the well-known BASIC 'bubble' sort which may take a few hours to complete. This part of the program may be reduced to one instruction line if a machine code sort routine can be borrowed, lifted from a magazine, or bought for a few pounds. The sort process will then be reduced to a few seconds and will provide a new horizon for ideas on fresh applications of data processing.

Part-three of the program prints out the sorted array in its new sequence. If the first two characters of successive QSOs are the same then printing by callsign will continue on the same line — if different, then a new line will be forced. Users with 80 column printers will reduce the value of GG in lines 470 and 540 and alter the number of blank spaces used. A running total of the number of contacts per band, per mode, is made and printed out at the end of that section. A grand total of contacts terminates the printout. The program lines which are particular to the 'sorting by band' option are shown indented in the listing. This program is capable of handling some 800-plus contacts. The writer obtained the printout of over 1000 QSOs, referred to earlier, by deleting the '/83' in each date and removing the space between the band and the mode (e.g. 28 P became 28P) — he also appended two disc files together to make one larger than can be obtained directly from Program 1. However in the interests of those who wish to preserve the full set of data, and to maintain a more elegant spacing, the accompanying two programs are suitable for up to 650 contacts. The writer obtained the printout of over 1000 QSOs, referred to earlier, by deleting the '/83' in each date and removing the space between the band and the mode (e.g. 28 P became 28P) — he also appended two disc files together to make one larger than can be obtained directly from Program 1. However in the interests of those who wish to preserve the full set of data, and to maintain a more elegant spacing, the accompanying two programs are suitable for up to 650 contacts. Close inspection of the printout will reveal that two callsigns terminate with a '&-' sign — this is part of the writer's personal code in which a '&-' signifies a joint QSO, '!' a contest contact, **an aborted contact (QRM,QSB)** and '!' for contacts under auroral conditions. Also, those with alternative country callsigns appear twice (for example, K1BJ/3B8 is duplicated to appear as 3B8/K1BJ).

For the Newcomer to Computing

Programming is not difficult — it just looks as though it should be! At one British school, thirteen-year-olds are taken off normal

```plaintext
3B8/K1BJ 7/1/83 1009 28 P
3V8AA 17/1/83 1435 28 P
5N6GGJ 31/1/83 0834 21 P 5N6RED 24/1/83 1200 28 P
5Z4CI 1/1/83 1102 28 P
6W8AR 1/1/83 1556 28 P
7X4BL 8/1/83 1240 28 P 7X4BL 21/1/83 1148 28 P
8P6G& 22/1/83 1114 28 P 8P6OL& 22/1/83 1124 28 P
9N1BMK 1/1/83 1253 28 P
19XP 8/1/83 1626 14 P
CE5TH 21/1/83 2135 21 P CE8ABF 24/1/83 1852 28 P
CR9AN 14/1/83 1038 28 P
C12DL 23/1/83 1711 28 P
C7XCG 2/2/83 1914 28 P C8XDV 2/2/83 1946 28 P
DF6DV 1/1/83 1208 10 C
DJ3VM 15/1/83 0436 3.5 P
DK6AP 8/1/83 2154 14 C
DL4AAE 1/1/83 1438 10 C DL5AM 1/1/83 0910 10 C DL9OAD 1/1/83 1502 10 C
EA8QL 29/1/83 1045 28 P
F6GUR 8/1/83 2216 14 C
FY0FOL 4/2/83 1257 28 P
G3AOS 31/1/83 1246 28 P G3KEF 1/1/83 0938 10 C G3NXX 30/1/83 1232 28 P G3VFP 14/1/83 1942 14 P
G3VFP 17/1/83 1253 14 P G3YBD& 23/1/83 2011 28 P
G4HXB 15/1/83 1037 28 P G4KNB& 23/1/83 2111 28 P G4MAG 1/1/83 0018 10 C G4NIN 18/2/83 1805 28 P
H81LC 1/1/83 1535 28 P
24/1/83 1200 28 P
H82YO 19/1/83 1715 14 P
J8/7N7HJ 21/1/83 1030 28 P
JW/SP2BHZ 19/1/83 0352 14 P JWOP 30/1/83 1316 28 P
JX5VAA 9/1/83 1542 14 P
K1BJ/3B8 7/1/83 1009 28 P
KA7BPD 29/1/83 1729 28 P
KB4YT 14/1/83 1932 14 C
```
<table>
<thead>
<tr>
<th>Callsign</th>
<th>Callsign</th>
<th>Callsign</th>
<th>Callsign</th>
</tr>
</thead>
<tbody>
<tr>
<td>10 C DF6DV</td>
<td>10 C DL4AAE</td>
<td>10 C DL5AM</td>
<td>10 C DL90AD</td>
</tr>
<tr>
<td>10 C G3KEF</td>
<td>10 C G4MAG</td>
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</tr>
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<td>10 C 6</td>
<td></td>
<td></td>
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<tr>
<td>14 C DK6AP</td>
<td>14 C F6GUR</td>
<td>14 C KB4YT</td>
<td>14 C 3</td>
</tr>
<tr>
<td>14 P A9XP</td>
<td>14 P G3VFP</td>
<td>14 P JX5VAA</td>
<td>14 P HV2VO</td>
</tr>
<tr>
<td>14 P JW/SP2BH</td>
<td>14 P SP2BH/1W</td>
<td>14 P VU2AU</td>
<td>14 P VY1CC</td>
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<tr>
<td>14 P ZD7HH</td>
<td>14 P 10</td>
<td></td>
<td></td>
</tr>
<tr>
<td>21 P 5N6GGJ</td>
<td>21 P CE5TH</td>
<td>21 P G4HBI</td>
<td>21 P PZ1/W6KG</td>
</tr>
<tr>
<td>21 P VE3FXT/Z2</td>
<td>21 P VP2KBS</td>
<td>21 P VP8ANT</td>
<td>21 P W6KG/PZ1</td>
</tr>
<tr>
<td>21 P ZB2J</td>
<td>21 P ZL1UQ</td>
<td></td>
<td></td>
</tr>
<tr>
<td>28 C N9AHH</td>
<td>28 C W8OQV</td>
<td>28 C 2</td>
<td></td>
</tr>
<tr>
<td>28 P 3B8/K1BJ</td>
<td>28 P 3V8AA</td>
<td>28 P 5Z4CI</td>
<td></td>
</tr>
<tr>
<td>28 P 5N6RED</td>
<td>28 P 6W8AR</td>
<td>28 P 7X4BL</td>
<td>28 P 8P6GG&amp;</td>
</tr>
<tr>
<td>28 P 8P6OL&amp;</td>
<td>28 P 9NI8MK</td>
<td>28 P CE8ABF</td>
<td>28 P CR9AN</td>
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<tr>
<td>28 P EA8QL</td>
<td>28 P FY0FOL</td>
<td>28 P G3NXX</td>
<td>28 P CT2DL</td>
</tr>
<tr>
<td>28 P G4HXB</td>
<td>28 P G4KNB&amp;</td>
<td>28 P G3YBD&amp;</td>
<td>28 P C7XCG</td>
</tr>
<tr>
<td>28 P G4NIN</td>
<td>28 P G4NIV</td>
<td>28 P G4HXB</td>
<td></td>
</tr>
<tr>
<td>28 P H18LC</td>
<td>28 P I8/N7HJ</td>
<td>28 P KIBJ/3B8</td>
<td>28 P KA7BPD</td>
</tr>
<tr>
<td>28 P JW/0P</td>
<td>28 P N2BO</td>
<td>28 P N7ARA</td>
<td>28 P N7HJ/18</td>
</tr>
<tr>
<td>28 P OH2TV</td>
<td>28 P U/A99HE</td>
<td>28 P UK1AAA</td>
<td>28 P UK3DDJ</td>
</tr>
<tr>
<td>28 P VK3PNX</td>
<td>28 P VP9YC</td>
<td>28 P VP8QG</td>
<td>28 P VU2NP</td>
</tr>
<tr>
<td>28 P W1TAK</td>
<td>28 P W7I/WU</td>
<td>28 P WA0UCV</td>
<td>28 P WB7VUL</td>
</tr>
<tr>
<td>28 P ZP5RG</td>
<td>28 P 53</td>
<td>28 P YV3BQ</td>
<td>28 P WD4NDD</td>
</tr>
</tbody>
</table>

TOTAL NO. OF ENTRIES = 87

Lessons for a one week computing course. At the end of that week they can program, use the word processor and program the control of a large model railway in 'real-time'.

Some taste of what is involved will hopefully be gained by reading the following description in conjunction with the listing of Program 1.

Programs in the BASIC language contain a list of instructions written in a form that has some commonsense meaning to the human user and is capable of immediate interpretation by the built-in dictionary inside the computer. The instructions are carried out, one at a time, in sequential order of the line number which prefaces each instruction.

One of the basic concepts of the language was that each instruction line should contain a 'keyword' that conveys the sense of the instruction. For example, line 100 reads:

100 REM program name

The keyword REM is shorthand for 'remark' and allows the programmer to write notes in his program which the computer ignores but facilitates his later reading of the program. As soon as the computer detects the keyword REM it flips to the next instruction.

A blank line such as line 200 serves only to space out the printed list of instructions to improve readability. Line 220 could be typed as:

220 LET N = 0

The keyword LET means 'set a memory location, to be labelled
as \( N \), to take on the value zero’. As BASIC has grown in
popularity some of the original concepts have been abandoned
and most small computers accept the shorter form of the
instruction in line 220. Also it is now common for small computers
to accept multiple instructions prefaced by one common line
number — each instruction being separated by the colon (:) symbol. For example, we could have

\[
220 \text{LET } N = 0 : \text{REM INITIALISE QSO COUNTER}
\]

Thus a computer performs one instruction at a time, in a
predetermined sequence, and most of its working instructions
manipulate the data currently held in defined memory locations.
Data may be entered into these named stores in various ways.

\[
220 \text{LET } N = 0
\]

was one way. This instruction placed the numerical value 0 into
store \( N \). The letters \( A \) to \( Z \) are used to define numerical memory
locations. However much of the data used in real life is not
numerical — packets of non-quantitative information are stored

in locations defined by an initial letter followed by the $ symbol;
for example, we could not put the data “Joe Bloggs” into location
\( N $\). Some computers will allow memory locations to be given long
names — such as CALLSIGN$, DATE$, TIMES, BAND$, MODE$ — all will allow the initial letter to be used; for example,
\( C $, D $, T $, BS and M $$. Hence line 230 of the program instructs
the computer to look for the first item of data found on the first
data line (line 1000) and place it in location \( C $, the second item
into \( D $, and so on. Commas are used to separate the items of data
on each data line. Line 250 tells the computer to print the callsign
onto the computer screen so that we may check the data.

The number of sets of data read are counted in line 260:

\[
310 \text{NEXT I}
\]

\[
320
\]

\[
330
\]

Program 1

<table>
<thead>
<tr>
<th>Line</th>
<th>Instruction</th>
</tr>
</thead>
<tbody>
<tr>
<td>100</td>
<td>REM QSODATA</td>
</tr>
<tr>
<td>200</td>
<td>200</td>
</tr>
<tr>
<td>210</td>
<td>REM COUNT AND CHECK DATA</td>
</tr>
<tr>
<td>220</td>
<td>N = 0</td>
</tr>
<tr>
<td>230</td>
<td>READ CS, DS, TS, BS, MS</td>
</tr>
<tr>
<td>240</td>
<td>IF CS = &quot;END&quot; THEN 280</td>
</tr>
<tr>
<td>250</td>
<td>PRINT CS</td>
</tr>
<tr>
<td>260</td>
<td>N = N + 1</td>
</tr>
<tr>
<td>270</td>
<td>GOTO 230</td>
</tr>
<tr>
<td>280</td>
<td>PRINTN; &quot;ENTRIES&quot;</td>
</tr>
<tr>
<td>290</td>
<td>PRINT &quot;WANT TO SAVE ONTO DISC NOW&quot;;</td>
</tr>
<tr>
<td>300</td>
<td>INPUT R$</td>
</tr>
<tr>
<td>310</td>
<td>IF LEFT$(R$, 1) = &quot;N&quot; THEN END</td>
</tr>
<tr>
<td>320</td>
<td>REM SAVE ONTO DISC</td>
</tr>
<tr>
<td>330</td>
<td>RESTORE</td>
</tr>
<tr>
<td>500</td>
<td>REM COUNT AND CHECK DATA</td>
</tr>
<tr>
<td>510</td>
<td>PRINT CS</td>
</tr>
<tr>
<td>520</td>
<td>OPEN15, 8, 15: PRINT £15, &quot;S1:LOG&quot;: CLOSE15</td>
</tr>
<tr>
<td>530</td>
<td>OPEN2, 8, 8, &quot;1:LOG,S,R&quot;</td>
</tr>
<tr>
<td>540</td>
<td>PRINT CS</td>
</tr>
<tr>
<td>550</td>
<td>READ X$</td>
</tr>
<tr>
<td>560</td>
<td>IF X$ = &quot;END&quot; THEN 590</td>
</tr>
<tr>
<td>570</td>
<td>PRINT X$; CHR$(13);</td>
</tr>
<tr>
<td>580</td>
<td>GOTO 550</td>
</tr>
<tr>
<td>590</td>
<td>CLOSE2</td>
</tr>
<tr>
<td>600</td>
<td>REM SORTING ROUTINE</td>
</tr>
<tr>
<td>610</td>
<td>FOR I = 1 TO N</td>
</tr>
<tr>
<td>620</td>
<td>IF R$ = &quot;B&quot; THEN PRINT LEFT$(X$(I), 1); ( W )</td>
</tr>
<tr>
<td>630</td>
<td>PRINT</td>
</tr>
<tr>
<td>640</td>
<td>IF R$ = &quot;B&quot; THEN PRINT &quot;TOTAL NO OF ENTRIES = ( W )</td>
</tr>
<tr>
<td>650</td>
<td>PRINT ( W )</td>
</tr>
</tbody>
</table>

Program 2

<table>
<thead>
<tr>
<th>Line</th>
<th>Instruction</th>
</tr>
</thead>
<tbody>
<tr>
<td>100</td>
<td>REM QSOPRINT: COPYRIGHT IT WOOD, G4MCN</td>
</tr>
<tr>
<td>110</td>
<td>PRINT &quot;WANT PRINTOUT BY (A)LPHABETIC ORDER OR BY (B)AND&quot;;</td>
</tr>
<tr>
<td>120</td>
<td>INPUT R$</td>
</tr>
<tr>
<td>130</td>
<td>Z$ = &quot;&quot;</td>
</tr>
<tr>
<td>140</td>
<td>OPEN2, 8, 8, &quot;1:LOG,S,R&quot;</td>
</tr>
<tr>
<td>150</td>
<td>PRINT ( W )</td>
</tr>
<tr>
<td>160</td>
<td>INPUT X$(I)$</td>
</tr>
<tr>
<td>170</td>
<td>DIM X$(N)$</td>
</tr>
<tr>
<td>180</td>
<td>FOR I = 1 TO N</td>
</tr>
<tr>
<td>190</td>
<td>IF R$ = &quot;B&quot; THEN PRINT LEFT$(X$(I), 1); ( W )</td>
</tr>
<tr>
<td>200</td>
<td>PRINT &quot;WANT TO SAVE ONTO DISC NOW&quot;;</td>
</tr>
<tr>
<td>210</td>
<td>INPUT R$</td>
</tr>
<tr>
<td>220</td>
<td>IF LEFT$(R$, 1) = &quot;N&quot; THEN END</td>
</tr>
<tr>
<td>230</td>
<td>REM COUNT AND CHECK DATA</td>
</tr>
<tr>
<td>240</td>
<td>PRINT ( W )</td>
</tr>
<tr>
<td>250</td>
<td>PRINT X$(I)$</td>
</tr>
<tr>
<td>260</td>
<td>IF R$ = &quot;B&quot; THEN PRINT LEFT$(X$(I), 1); ( W )</td>
</tr>
<tr>
<td>270</td>
<td>PRINT &quot;TOTAL NO OF ENTRIES = ( W )</td>
</tr>
<tr>
<td>280</td>
<td>PRINT ( W )</td>
</tr>
<tr>
<td>290</td>
<td>PRINTX4:CLOSE4</td>
</tr>
<tr>
<td>300</td>
<td>PRINTX4:CLOSE4</td>
</tr>
<tr>
<td>310</td>
<td>PRINTX4:CLOSE4</td>
</tr>
<tr>
<td>320</td>
<td>PRINTX4:CLOSE4</td>
</tr>
<tr>
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</tr>
<tr>
<td>640</td>
<td>PRINTX4:CLOSE4</td>
</tr>
<tr>
<td>650</td>
<td>PRINTX4:CLOSE4</td>
</tr>
<tr>
<td>660</td>
<td>PRINTX4:CLOSE4</td>
</tr>
<tr>
<td>670</td>
<td>IF R$ = &quot;B&quot; THEN PRINT LEFT$(X$(I - 1), 1); ( W )</td>
</tr>
<tr>
<td>680</td>
<td>PRINTX4:CLOSE4</td>
</tr>
<tr>
<td>690</td>
<td>IF R$ = &quot;B&quot; THEN PRINT &quot;TOTAL NO OF ENTRIES = ( W )</td>
</tr>
<tr>
<td>700</td>
<td>PRINTX4:CLOSE4</td>
</tr>
<tr>
<td>710</td>
<td>PRINTX4:CLOSE4</td>
</tr>
</tbody>
</table>

January, 1984
260 \( N = N + 1 \)
which can be interpreted as, 'increment \( N \) by one'. It started with the value zero — we have read one set of data, hence \( N \) is now 1.

More data is read because of the jump instruction

270 GOTO 230

The computer is told to go back to the instruction on line 220 — read more data, then increment the counter \( N \) by one, and then go back to read more data. . . . And carry on reading until the test in line 240 is found to be true; i.e. when all the real data has been read, the dummy callsign END is placed in \( C^S \) and the program is then diverted to line 280 which prints out onto the VDU screen the number of QSOs for which data has been read.

Line 290 uses the keyword PRINT followed by some text enclosed within quotation marks. At this instruction the computer slavishly copytypes onto the screen whatever text is held enclosed within quote marks.

At line 300, a further method of entering data is used. In response to the question now on the screen

DO YOU WISH TO SAVE ON DISC NOW?

the computer invites the user to reply yes or no. If the response starts with letter \( N \) (for no, nay, non, nein and so on) the instruction on line 310 tests for the initial left-hand letter and terminates the program if it is found to be an 'n'. If any other response is made the program continues to the next instruction line.

The three most important ways of injecting data into a program have been described — LET, READ and INPUT — program loops have been seen — GOTO a linenumber — and the powerful conditional jump statement, IF some condition holds THEN go to another line. These few instructions, together with the variations on the PRINT instruction, allow very powerful programs to be written. However no matter how complex the program the microcomputer can do only one instruction at a time as it manipulates the information stored in its user defined memory locations.

The remainder of the program reads the data once more, printing it onto a disc file named ‘LOG’ instead of onto the screen. In the data file LOG we have the number of contacts followed by the set of data for each QSO.

The second program reads the data from disc and joins it together as requested by the user, before being sorted and displayed in the rearranged format.

**CLUBS ROUNDUP**

**By "Club Secretary"**

**FIRSTLY,** thanks to all those regular contributors to this piece for their Christmas and New Year greetings, so much appreciated by your scribe.

Secondly, a bit of a beef. . . . our crystal ball has broken down, and we can't find a competent serviceman. So please include in your letter the name and address of the Hon. Sec. With a pile of eighty or so club letters to deal with, the chap who says "Hon. Sec. so-and-so, \textit{QTHR}" to save himself a moment can cause considerable delay here, where time is of the essence and even minutes count towards the deadline. Worse still is the chap who says "\textit{QTHR}" and yet owns a call too recent to be in the Call Book! Either he doesn't know what \textit{QTHR} means, or he has forgotten his entry in the book is against his now-discarded ‘B’ licence call.

**The Letters**

We've turned the pile upside down this month, so we can kick off with a new club: \textit{308 Club} is so named because of the room number in which many of the members are studying RAE at Kingston College of Further Education; but their actual Hq. is in the ‘Coach House’ behind St. Mark’s Church in Surbiton, every Tuesday evening at eight. They would like some offers of talks, as well as visitors for a natter — “all welcome” is the motto.

We turn now to \textit{York} which has its Hq. at the United Services Club, 61 Micklegate, York, meeting there every Friday evening. Contact the Hon. Sec. for details — see Panel.

On Thursday evenings at 7.30 the \textit{Yeovil} lads gather at the Recreation Centre, Chilton Grove, Yeovil; January 5 sees G3MYM discussing his own feelings on the Chordal Hop question, and on 12th he talks about “Your Amateur Radio Career". January 19 is down for G3GC to look at “History — from Semaphore to Satellite". Finally, on January 26 there is a natter night.

January 9 for \textit{Worcester} is at the Oddfellows Hall in New Street, for a discussion evening; the informal is at the Old Pheasant Inn, New Street on January 23.

The Canteen and Social Club, Milton Trading Estate, Milton, Abingdon, is the Hq. of the \textit{Vale of White Horse} gang on the first and third Tuesday of each month, with the latter usually the natter session. For details of how to get there we must refer you to the Hon. Sec. — see Panel.

Second and fourth Tuesdays are the ones booked by \textit{Thetan} at the Grosvenor Club, Grosvenor Park, Margate. G8SBS has the floor on January 10 to talk about satellite working, and on January 24 there will be a computer evening.

We are ‘up against it’ for details of the \textit{Sutton & Cheam} events this month — the newsletter deals with December and March but . . .
nothing in between! So for the details on the January meetings

For the Surrey chaps the routine is fairly easy to remember, as it is always written across the top of their newsletter! First and third Mondays, 7.45 for 8 p.m., first floor mess deck, T.S. Terra Nova, 34 The Waldrons, South Croydon; and there is, at the bottom of the page, a note of a possible party at Warrington on January 2.

Away from London now to Stratford-on-Avon, where the locals now foregather in the Control Tower, Bearley Radio Station, which lies about three miles north of Stratford in the general direction of Henley-in-Arden. The formal on January 9 is down for G3MXH to talk about maritime radio services.

January 2 and 16 are the dates for the Stourbridge lads, at “The Folkhouse, East Dundry Road, Whitchurch, Bristol, every

nothing in between! So for the details on the January meetings and their venues, we refer you to the Hon. Sec. — see Panel for his details.

Havering has an open date on January 3, and we don’t have any official late news as to what it has been filled with, even though the grapevine says they have fixed it up. January 10 is the constructors’ evening, and on 17th they have their Grand Auction; all are at T.S. Andromeda, Fairlands Valley Park, Sheffhall View, Stevenage.

South-East Kent YMCA could be regarded as another name for the Dover club; but the name is sensible in view of the venue, Dover YMCA, Godwynhurst, Leybourne Road, Dover, where they are to be found on Wednesday evenings for the club meetings. They are also there on Mondays and Tuesdays for the club meetings. They are also there on Mondays and Tuesdays for the club meetings.

A bit to the westward and one comes to Southdown, based on this time, foregathering at “The Gunnersbury Avenue, Acton, London W3 BLY. (01-292 3778)

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January 2 and 16 are the dates for the Stourbridge lads, at “The Folkhouse, East Dundry Road, Whitchurch, Bristol, every
Wednesday evening, and first formed a couple of months ago. January 3 is down for a talk on early radio, on the 10th there is a lecture and demonstration on CW operating. January 17 is two-metre night, January 24 G4KUQ's home-brewing equipment talk, and on January 31 they will be on 432 MHz.

It is years since we last heard of the Salop gang, back in the days when G3WNI was their reporter. They are now based in the Albert Hotel, Smithfield Road, Shrewsbury, where they are to be found on Thursdays. January 5 is a discussion/calibration night, January 19 a talk by G8ARS, and January 27 the club social at Shelton Hall Hotel, Shrewsbury. Dates not mentioned are filled by natters.

Membership of the Royal Navy group is open to present and past RN and Merchant Navy types and those from foreign navies; details from the Hon. Sec. — see Panel for his details.

The group called RATEC is the Radio Amateurs Technical Engineering Club, and they are based on the British Legion Club, Moor Lane, Woodford, Cheshire, albeit they have some associate members in other parts of the country. Find them at their Hq. on any Monday evening from eight onwards.

R.A.I.B.C. cater, for all those who are invalid or blind and interested in our hobby; and of course there have to be other kinds of members, like Supporters and Representatives... details from the Hon. Sec. — see Panel.

A change of venue is noted for the Plymouth group, who now forager at Hyde Park Junior School, Hyde Park Road, Mutley, Plymouth. For the other details on the club, contact the Hon. Sec. — see Panel.

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Deadlines for “Clubs” for the next three months—

February issue—December 30th
March issue—January 27th
April issue—February 24th
May issue—March 30th

Please be sure to note these dates!

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North Wakefield have a good idea — a standard card with all the essential data pre-printed and a space for insertion of the current meeting data; both labour saving from their point of view and efficient from ours. January 5 sees them in session for a talk on hi-fi techniques by G3TDAZ. Find the club at Carr Gate Working Men’s Club every Thursday evening.

The January 4 date is deleted from Nene Valley’s 1984 calendar. January 11 is a matter session, and on 18th Gordon Adams will talk about R.A.F. communications. January 25 is the AGM, and presentation of trophies.

Over now to Mid-Warwickshire, and 61 Emscote Road, Warwick. Meetings are on the second and fourth Tuesday in each month; more details of the programme from the Hon. Sec. — see Panel.

Mid-Sussex have dates of January 12 for a talk on the use of basic test equipment, and 26th for their AGM. The Hq. is at Marle Place Adult Education Centre, Leylands Road, Burgess Hill.

The Midland place is their own, at 294A Broad Street, Birmingham, which we are told is opposite the Repertory Theatre. January 17 is down for a talk on nuclear power, although it rather looks as though you would not be unlucky if you called at Hq. on any evening of the week. To be sure, try any Wednesday.

Lincoln has its corporate being in the City Engineers’ Club, Central Depot, Waterside South, Lincoln; on January 11 there is the G2FKZ tape-slide talk on Aurora, and January 25 is an activity night. The intervening Wednesdays are used for RAE and Morse training.

Jersey’s January meeting is on 11th and is a talk on the BBC Micro, by GJ4TBW, at the Communicare Centre, St. Brelade. For anything you want to know about amateur radio in EI...
January 5 is a natter evening for East Kent, and on 19th they have a talk on crime prevention and the marking of equipment. But — they don’t say where they have Hq! Get that from the Hon. Sec. — see Panel.

Now Dudley a new Hon. Sec. takes over — see Panel; and the same letter tells us that they are to be found at Dudley Central Library, on January 24 for a talk on running a successful cinema by Michael Jackson, who is doing just that. Meetings are on second and fourth Tuesdays.

Derby recently had a coach trip all the way to London to visit the RAF Museum while the ladies interrogated the Brent Cross shopping centre — and doubtless the depth of the OM’s pockets too! Normally they are to be found on any Wednesday evening at their Hq., on the top floor of 119 Green Lane, Derby. January 4 is a junk sale, and on 11th they take a backwards look at the last twelve-month; Henry Balen talks about his secret war on 18th and the month rounds off with a natter night on January 25.

The Crystal Palace group gather themselves in the All Saints Parish Room, Upper Norwood, at the corner of Beulah Hill and Church Road, opposite the IBA mast. On January 21 they have a talk by G300U on “Computers for the Radio Amateur”; and looking ahead to February, on 18th, there is the AGM.

For the details of the Crawley meetings at Trinity Church Hall, either Crawley, we must refer you to the Hon. Sec. as our data does not go far enough forward; but past experience over many years says by this time they’ll have fired something up for your entertainment. Find the Hon. Sec.’s name and address in the Panel.

It is about now that, if all goes well, the Cornish club should move back into their old Hq. address (but new building), the SWEB Clubroom. However Murphy’s Law will no doubt dictate the continued use for a little longer of Treleigh Church Hall on the old Redruth by-pass. The only answer seems to be to contact the Hon. Sec. at the address in the Panel, for the very latest details of where to celebrate the first Thursday of the month.

Deep-sea diving is the topic for the Colchester club on January 19, John Barnard being the speaker. January 26 will see the RSGP presentation, “The Repeater Network and its Administration”. The venue is the Colchester Institute in Sheepen Road.

Turning now to Chichester, who have Hq. at Fernleigh Centre, 40 North Street, Chichester, we find them in the Long Room on January 3; and on 19th they head for the Green Room for a software evening.

Every Wednesday the Cheshunt gang is to be found at Church Room, Chuch Lane, Wormley; we can’t tell you what is to happen in January, because the Hon. Sec. sent us the wrong issue of the club newsletter, with programme details up to December just past!

Over now to Chesham, the gang foregather every Wednesday at the Stable Loft, Bury Farm, Pednor Road, Chesham. Contact the Hon. Sec. for more details — see Panel for the needful.

Turning now to Cheltenham we see they have January 6 for a talk “Getting In 1296 MHz”; and a natter on January 20, in the Stanton Room, Charlton Kings Library, Cheltenham.

Quite a while since we last heard of Cannock Chase; these days they have their Hq. at Bridgetown War Memorial Club, 60 Union Street, Bridgetown, Cannock, every Thursday.

There is no meeting for Cambridge on January 6 as the Hq. is closed; however they will be there on January 13, for G8OFA to talk about getting operational on 10 GHz. January 20 is an informal, and on 27th G6A1Z is showing how to get going on satellites.

Turning now to Bury we find they have a base at the Moses Community Centre, Cecil Street, where they are to be found every Tuesday; the second Tuesday is the ‘main’ meeting. January 10 is down for G3RSM to explain the art of fault-finding.

Bromsgrove A.R.S. is based on Avoncroft Arts Centre, on the second Friday of each month; for more details on the programme, contact the Hon. Sec. — see Panel.

Bromsgrove A.R.C. is a newish club, and is based on Rigby Lane School, Rigby Lane, Bromsgrove, in the second Tuesday in each month.

B.A.R.T.G. is the one for all you RTTY buffs; the newsletter has to be one of the best ever to come across this desk. Details of membership from the Hon. Sec. — see Panel.

Now we come to Brighton, who now have their place in the Seven Furlong Bar of Brighton Racecourse. For all the other details we must refer you to the Hon. Sec. — see Panel.

January 2 is the next meeting date for Braintree and is down for a talk “Power Supplies, Theory and Practice”; January 16 is G3OLU’s for a talk on DX operating. The Hq. is at the Community Centre, Victoria Street, next to the bus station.

Bishops Stortford have the AGM on January 16, with several changes in the committee to be dealt with; and the informal is on January 5 at the “Nag’s Head”, on the A120 Dunmow Road, just before the golf course.

Over the water again now, to Belfast (College of Technology), and first we must congratulate the Hon. Sec. on his new callsign, GICET. There seems to be quite a lot going on with the club, although alas they have fallen foul of bureaucracy over their proposal for a multi-element HF array atop the building. More from the Hon. Sec. — see Panel for his details.

At Biggin Hill we find the local activities in the Memorial Library in Church Road, Biggin Hill; January 24 is the AGM. After January’s meeting they seem to have organised a change to St. Mark’s Church Hall, also in Church Road. Details from the Hon. Sec. — see Panel.

Again we cross the water, this time to Bangor where the locals have the first Friday of every month at the Sands Hotel, Bangor. And their newsletter is quite an interesting little effort — we hope they can keep it rolling.

Acton, Brentford & Chiswick have their place at the Chiswick Town Hall, in High Road, Chiswick, London W4. January 15 is the AGM and all members are asked to make a special effort to be there.

Abergavenny and Nevill Hall have every Thursday evening booked in the room above Male Ward 2, Pen-y-Fal Hospital, Abergavenny. A major activity here is the RAE and Morse classes, for which the club is now an exam centre.

**Finale**

That’s it for another month; the deadline for next time is given in the ‘box’, and is to arrive, addressed to your “Club Secretary”, SHORT WAVE MAGAZINE, 34 High Street, Welwyn, Herts. AL6 9EQ. Meantime just remember it’ll soon be Spring!

**R.A.E. Course**

Walshall: Barr Beacon Comprehensive School, Pheasen (about 1 mile from the M5/M6 junction), Thursdays 7.30 p.m., starting January 19th, £7.50 per term (free to the unwaged). Further details from the course teacher, F. A. Fear, G8CVR, on Aldridge 52706.

**Intermediate Morse Class**

Beckenham: For students who can already read about 8 w.p.m. a Morse course commences on January 10th (7.30-9.30 p.m.) at Beckenham Adult Education Centre, 28 Beckenham Road, Beckenham, Kent (01-650 1383); the tutors are Peter Grant and Steve Palmer. Contact the Centre for full details.

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January, 1984

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Need more information? — then an enq or 'phone call will do the trick.

GFBA 144e (incl. ATCS 144e) £129.90 incl. vat, p&p £2.50.

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