1984 Amateur

RADIO YEARBOOK

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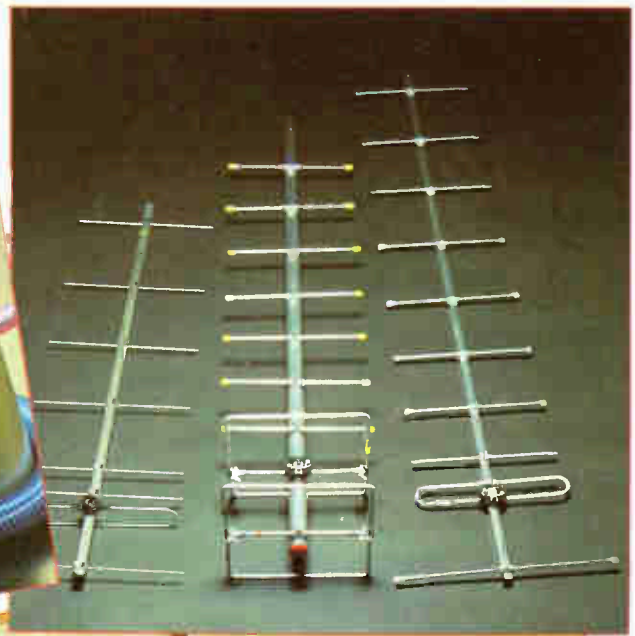

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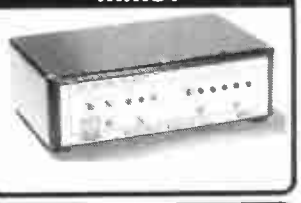

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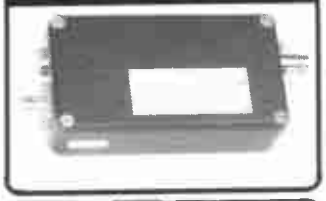

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THE INSIDE STORY...

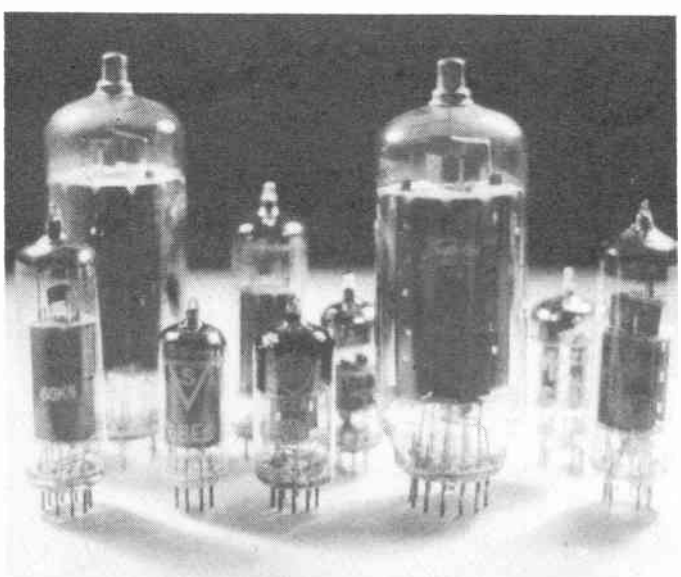
Welcome to what we hope will become THE WORK OF REFERENCE for all amateur radio enthusiasts - the 1984 Amateur Radio Yearbook.

Inside this annual publication, you'll find much to interest you. Keep it beside the rig during the months to come, and use the Prefix List, our special Codes and Procedures section, and with the express agreement of the Radio Society of Great Britain, a number of radio maps (or at least sections of) and instructions on how to use them.

The Amateur Radio Yearbook has endeavoured to provide you, the reader, with as much information as possible in order to enable you to either make a good start in the hobby, or to make your operating more enjoyable and worthwhile.

The front cover says that inside, there is a section on the "Top Rigs of 83" Well, this feature turned out to be a full review of the Icom IC251-E plus Mutek front-end board. The result? No space left over for the remaining rigs to be mentioned. Another point; due to a minor production difficulty, the major antenna guide concentrates on wire aerials for indoor use. It's an article that goes into much more interesting detail than a mere comparison guide to antennas generally, and we hope you find it of interest.

Old and the new. Top of the page is a picture of a computer set up - a growing area of amateur radio, and below, a range of valves, also finding converts even in the 80's.



Amateur Radio magazine has been on the shelves for just over a year by the time you read this, and while as publishers we are "in it for the money" the amateur radio fraternity has really taken a hold of several members of staff here at Bicester. It has become a way of life for many, many thousands throughout Britain and the world, and now the "disease" has spread to Murdock Road!

Further involvement is the name of the game now; recently, Amateur Radio magazine adopted a new Editor in the name of Richard Lamont G4DYA, plus a photographer with the upper-crust name of Jay Moss-Powell G6XIB. Two more are studying for the RAE, and plans are afoot to make the monthly magazine even bigger and better in the months to come.

So you see, Goodhead Publications are not "in it" simply for the money! However, here is the 1984 Amateur Radio Yearbook. I hope you find it useful.

73 de
Chris Drake

CONTENTS

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1983 in retrospect

Nigel Gresley turns back the pages of time to look at the events and incidents of 1983 and what they have meant to amateur radio.

Well, of course, there's no question about the most important event of 1983 — *Amateur Radio* became a monthly publication! Oh well, it was worth a try... In fact come to think of it nothing else happened really, and all seems to be quiet at the time of writing... no wait, was that a UP2 calling CQ on 144MHz? No, it's 10 metre breakthrough. SPLAT.

Sorry about that — let's start again. 1983 was, in fact, a good year for our hobby in all sorts of ways. It had its not-so-hot side as well but mercifully there was not too much of that. We thought we'd take a little look at what happened in 1983 as seen through the eagle eyes of the *Amateur Radio* staff — socially aware journalists to a man, sensitive to all the social nuances and straws in the wind and a pint of Theakston's please, Miss....

We had the 50MHz research licence permits at the beginning of the year — a great step for mankind, this, since the lucky few were able to get on the band that we all hope to be on in a year or two or three and convince the Powers That Be that there really weren't likely to be any problems. As far as we know, the "50MHz experiment" seems to have produced some interesting results. We've discussed the implications elsewhere in the Yearbook — and we're delighted that the RSGB could show the Home Office, the BBC and IBA that amateurs were good chaps who could be let loose on the band without the sudden death of broadcasting as we know it....

We also had MOULD, again discussed in detail elsewhere. Suffice to say that we seem to be quite able to share the 432MHz band with the thing without the security of the country being placed in immediate jeopardy! There were a crop of rumours around at the beginning of the year suggesting that the band was about to be lost for good and all — happily there was no foundation in them but, as was to become apparent later in the year with the Belgian fiasco, nasty things can happen to whole bands when national societies don't play their cards right....

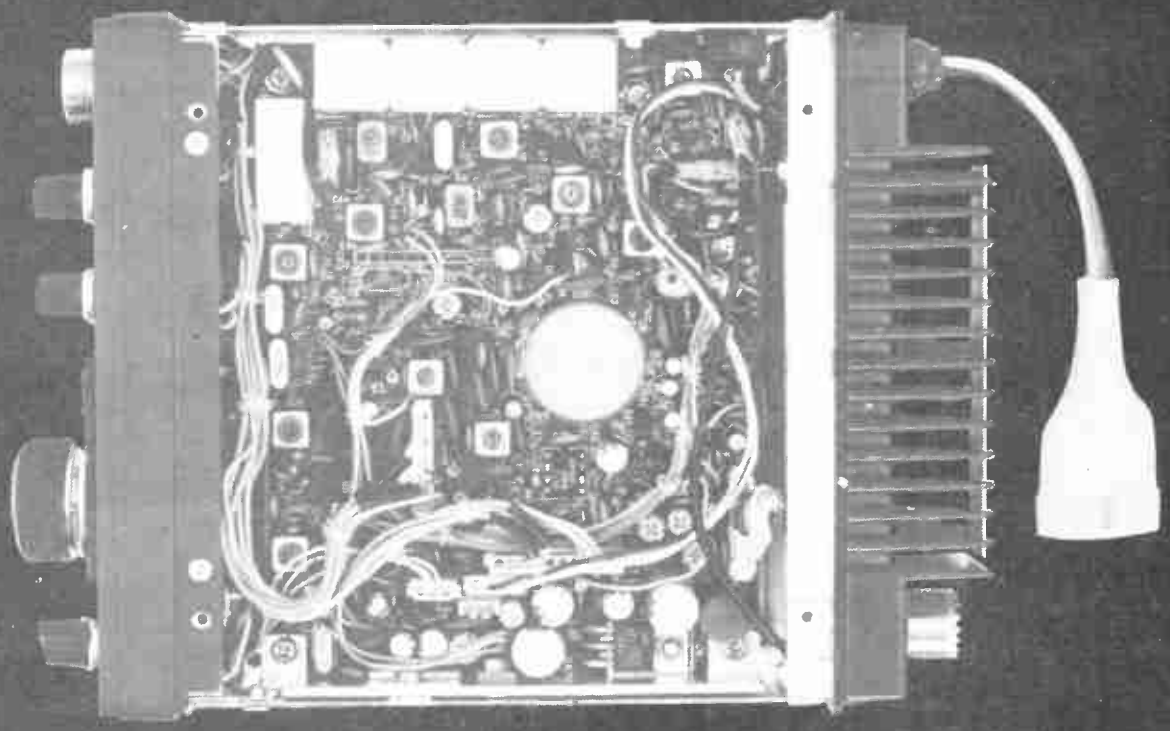
Talking about national societies, our very own RSGB moved to its new headquarters at the end of 1982 and by the beginning of the year they were getting themselves sorted out. In some ways, 1983 has been a good year for the society — they've moved out of that glory hole in Doughty Street and got themselves into a really good modern building at Potters Bar. Good heavens, they've even got their radio station on the air and some antennas on the roof. *Amateur Radio* has a lot of time for the RSGB; their General Manager, David Evans G3OUF, is a professional, very helpful and extremely aware of what needs to be done for the good of the hobby. A couple of lectures given by his deputy, John Nelson G4FRX, to local clubs have been positive, honest and totally frank when questioned. Quite how John Nelson finds the time to work the DX he does we can't imagine; one prerequisite of working for the RSGB is the ability to go without sleep for long periods at a time!

More elbow to the Society, we say — they had a pretty bad patch some years ago, and we must admit that we thought they were pretty irrelevant in those days, but times definitely have changed. Sure, you can criticise them for this and that but our feeling is that they know very much what they're about nowadays and a strong and switched-on national society has got to be good for us all. Make a point of joining them. End of plug.

Let's move on; the next exciting event was the 1983 exhibition at Birmingham, replacing the usual event at Ally Pally. Almost everyone thought that this was an unqualified success and we thought so too — Ally Pally always struck us as a bit of a dump, to be honest, and even the new Pavilion, where the 1982 exhibition took place, didn't seem up to much. The NEC, however, was an excellent venue and the RSGB must have thought so too because they've booked it again for the 1984 event. This is scheduled to happen on April 29th and we'll certainly be there in one form or another.

We had the first mention of the new Telecommunications Bill in March — we've mentioned this elsewhere as well, but it looked as though for the first time in years we were going to get some decent legislation to deal with those who cause trouble on the wireless. Alas! the Prime Minister went and called a General Election before it could make it's way through the Parliamentary processes but watch this space — it's coming up for attention in the current session of that learned body and the Bill could pass into law before you've had this book in your mits for very long.

"Turn the bloody thing on!"



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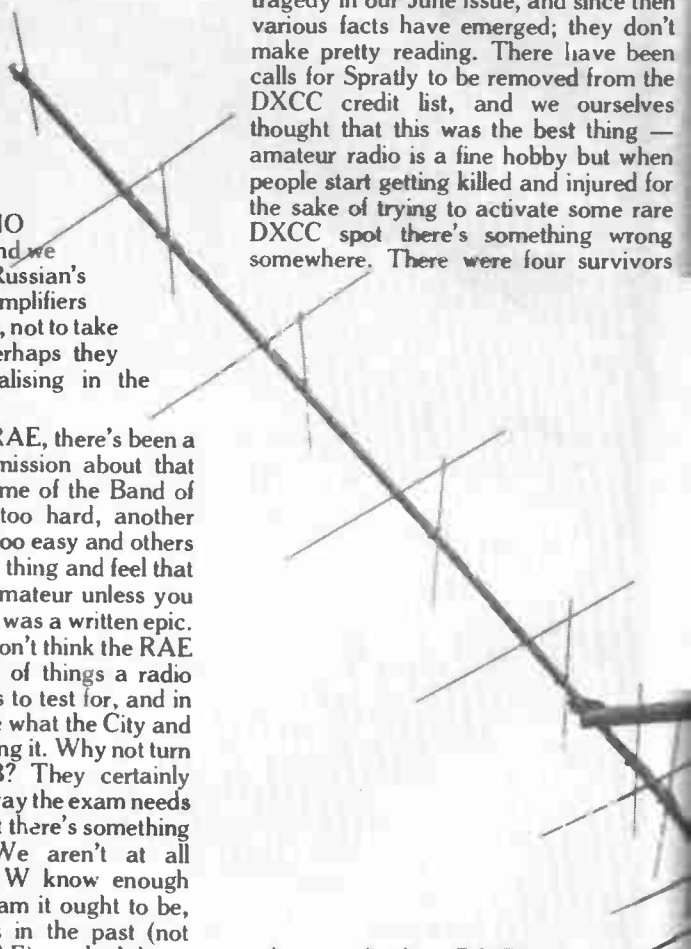
1983 in retrospect

Concurrent with this was the idea which got into people's minds around March that it was somehow illegal to own transmitting equipment if you didn't have a licence — like, if you were an SWL who was studying for the RAE and who was using the receiver section of a transceiver for listening around and getting the feel of the amateur bands and learning Morse, etc. Well, the fact is the same now as it was then. The offence would come in actually *using* the transmitter without a licence — you can own a million transceivers for every frequency under the sun if you so desire and you are not committing an offence. However, if you press the PTT and start yacking to people, don't be surprised if you get the book hurled at you because *that's* the offence; not owning, but using.

There were a few changes in what Raynet could and couldn't do; actually, the changes applied to all amateurs, not just Raynet. It became possible to pass messages concerned with emergency situations on behalf of a third party, provided that no other communications were available. In extremis, you could allow someone else to operate the rig provided that you "supervised the operation of the station", which is fair enough. As we said at the time, that was just legalising what we'd have done without the slightest hesitation in an emergency anyway!

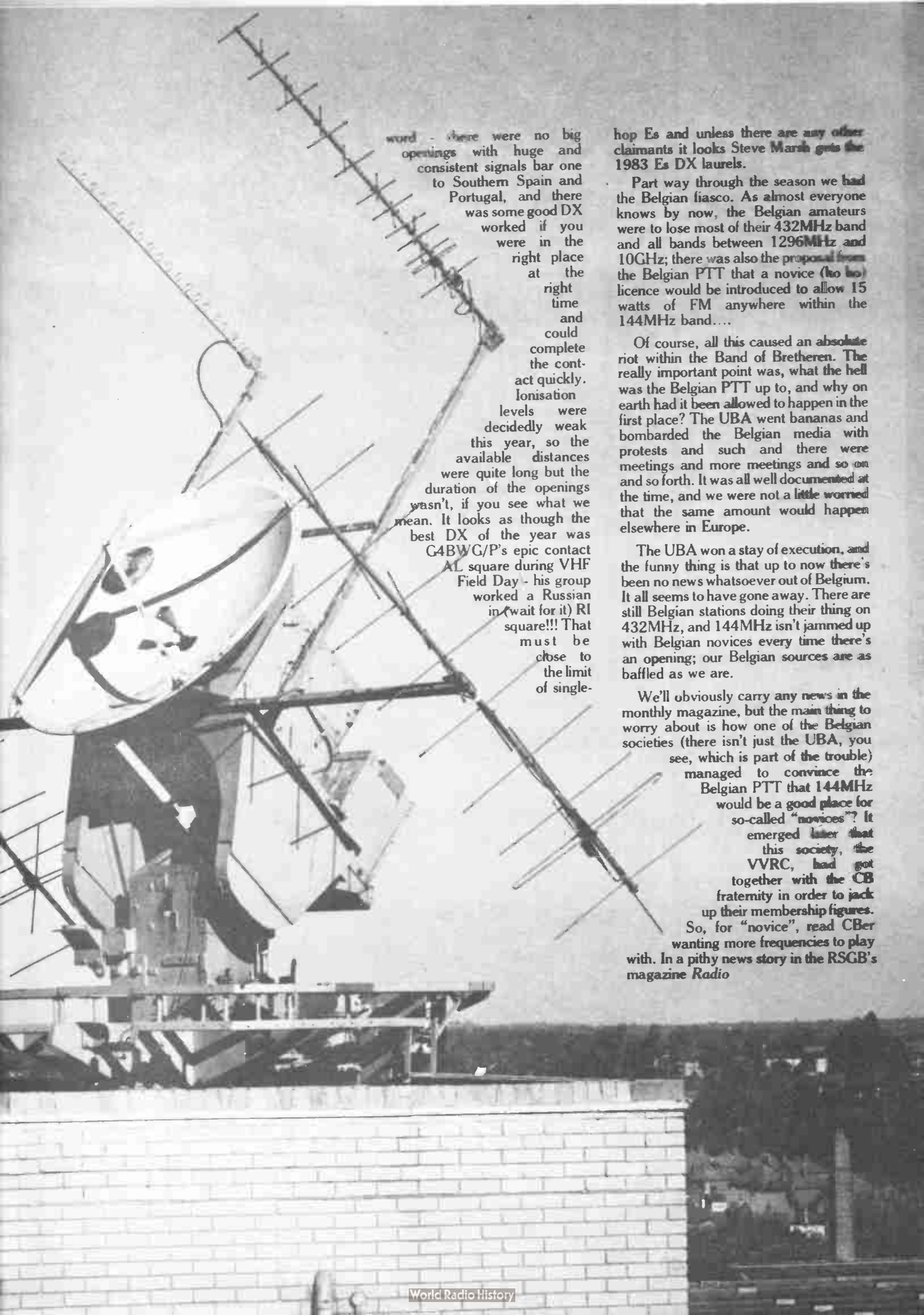
VKOHI did his stuff on Heard Island during March, and removed it from an awful lot of people's "wanted" lists. Some rather smelly operating from some amateurs — swishing carriers, self-appointed policemen and incompetent Italians — but in the main a jolly good show. What is it about Italians and linears? Do *any* of them know how to tune them up? Mind you, we're not convinced that some of the bretheren on 144MHz do either - there's a bit more to 4CX250Bs than tuning for max smoke, so they should play the game and find out how to do it. We still haven't forgiven the G6 who chopped up the band for us in the middle of a contact with a UP2 in MO square last October and we never did get the Russian's report to us. Linear amplifiers are meant to be stable, not to take off speech peaks. Perhaps they don't mention neutralising in the RAF these days?.



Talking about the RAE, there's been a fair bit of electron emission about that exam this year — some of the Band of Brothers saying it's too hard, another faction saying it's far too easy and others who sniff at the whole thing and feel that you're not a proper amateur unless you took the exam when it was a written epic. We don't agree. We don't think the RAE is testing for the sort of things a radio amateur's exam needs to test for, and in any case, we can't see what the City and Guilds are doing running it. Why not turn it over to the RSGB? They certainly ought to know which way the exam needs to go, and if they don't there's something amiss somewhere. We aren't at all convinced that C & W know enough about what sort of exam it ought to be, and from experiences in the past (not connected with the RAE) we don't have too much faith in them anyway. They remind us uncomfortably of what the RSGB used to be like six or seven years ago. Bumbling, incompetent, arrogant and stuffy.

It must have been April when we had the Spratly shocker. It was one of the worst things to happen to amateur radio in years. A group of five German amateurs and one woman chartered a yacht and set sail for Spratly Islands — a rare spot from the point of view DXCC, signing DU1 — and at 0652 on Sunday 10 April they arrived. Or rather, they didn't quite arrive. They were fired on by one or other of the factions which inhabit the islands and their yacht was set on fire and sunk. We carried an article about the tragedy in our June issue, and since then various facts have emerged; they don't make pretty reading. There have been calls for Spratly to be removed from the DXCC credit list, and we ourselves thought that this was the best thing — amateur radio is a fine hobby but when people start getting killed and injured for the sake of trying to activate some rare DXCC spot there's something wrong somewhere. There were four survivors and two deaths; DJ4EI was killed immediately and DJ3NG died a few hours before the rescue. The Panamanian freighter "Linden" found the survivors after ten days on a life raft.

Somewhere along the line we had some 144MHz sporadic E openings. The general opinion was this wasn't a vintage year and that "sporadic" was the right



word - there were no big openings with huge and consistent signals bar one to Southern Spain and Portugal, and there was some good DX worked if you were in the right place at the right time and could complete the contact quickly. Ionisation levels were decidedly weak this year, so the available distances were quite long but the duration of the openings wasn't, if you see what we mean. It looks as though the best DX of the year was G4BWG/P's epic contact AL square during VHF Field Day - his group worked a Russian in (wait for it) RI square!!! That must be close to the limit of single-hop Es and unless there are any other claimants it looks Steve Marsh gets the 1983 Es DX laurels.

Part way through the season we had the Belgian fiasco. As almost everyone knows by now, the Belgian amateurs were to lose most of their 432MHz band and all bands between 1296MHz and 10GHz; there was also the proposal from the Belgian PTT that a novice (ho ho) licence would be introduced to allow 15 watts of FM anywhere within the 144MHz band....

Of course, all this caused an absolute riot within the Band of Bretheren. The really important point was, what the hell was the Belgian PTT up to, and why on earth had it been allowed to happen in the first place? The UBA went bananas and bombarded the Belgian media with protests and such and there were meetings and more meetings and so on and so forth. It was all well documented at the time, and we were not a little worried that the same amount would happen elsewhere in Europe.

The UBA won a stay of execution, and the funny thing is that up to now there's been no news whatsoever out of Belgium. It all seems to have gone away. There are still Belgian stations doing their thing on 432MHz, and 144MHz isn't jammed up with Belgian novices every time there's an opening; our Belgian sources are as baffled as we are.

We'll obviously carry any news in the monthly magazine, but the main thing to worry about is how one of the Belgian societies (there isn't just the UBA, you see, which is part of the trouble) managed to convince the Belgian PTT that 144MHz would be a good place for so-called "novices"? It emerged later that this society, the VVRC, had got together with the CB fraternity in order to jack up their membership figures. So, for "novice", read CBer wanting more frequencies to play with. In a pithy news story in the RSGB's magazine *Radio*

1983 in retrospect

Communication (hasn't that got better this year? It looks almost like a real magazine now...) they described it as "CB enthusiasts seeking access to amateur frequencies without the necessary qualifications", which struck us as elegant understatement. Certainly the RSGB were hopping mad about it at the time, and as far as we know they were frantically trying to establish whether this was a disturbance in the force in Belgium or whether it was a pan-European earthquake and we'd all be in the same boat.

It remains to be seen what happens on ON-lane, but for the moment no one seems to know the score. Perhaps the PTT has decided to forget the whole thing....

OSCAR 10 got into orbit about this time of the year, after a fair share of hassles from the Wuropean Space Agency. OSCAR 10 didn't quite make the planet orbit because there wasn't enough fuel to get it there, thanks to the dastardly French launcher Ariane fetching it a clout as it deployed and breaking a fuel line — what with this and the fact that *not one* QSL card from France has been received at *Amateur Radio* this year despite having worked hordes of them during the Septemeber opening. We're a bit off Brother Frog at the minute.... Why is it that the Germans and Dutch (and so on) QSL when they say they will but not the French? When Hooray Henri says "QSL 100 per cent" you can bet your life that he really means "no way am I sending a QSL card to you, so there, silly English person..." At least that's our experience.

Come to think of it, who *do* people say "QSL 100 per cent"? Can any other percentage be QSLd? Perhaps "QSL 50 per cent" means "I will send you half my QSL card". The East Europeans do it properly; when they send QSLL it seems to mean "QSL absolutely certain" and invariably they appear — at some point.

Anyway, OSCAR 10 is working like a charm and there's even a 15-minute news bulletin over the H1 special service channel on Sunday mornings these days — downlink 145.973MHz. Good, huh?

The other event which should have happened in September but which got postponed was the flight of W5LFL in the Space Shuttle Columbia — we've looked at that in gory detail elsewhere, so we'll just say here that it's another frontier for the hobby. Where do we stop — a repeater on Venus?

Some nice tropo in September and October for the VHF and UHF types — every QTH square in France was audible at Bicester during the September event, although we have not the slightest doubt that very few QSLs, if any, will be received, as discussed hitherto! Some excellent tropo to the east was heard during the October opening — we heard G4BWG at it again working into MO square (confound him) and heaps of people in London and AL square generally were working three or four Poles and some Czechoslovakians. Great stuff — who was the professional at a conference this year who said the VHF was line-of-sight only? He must have good eyesight to see 800 miles....

Oh well; as we write this, 1983 is coming to an end and looking back it's not been a bad old year really. We're looking forward to 1984 now, and we have a predic tion or two elsewhere in this book — perhaps some of them will even happen!

The old and the new? On the left is a useful link-up with a Dragon 32 micro, and on the right a suitcase set popular with those involved in espionage during World War Two.

QWERTY?

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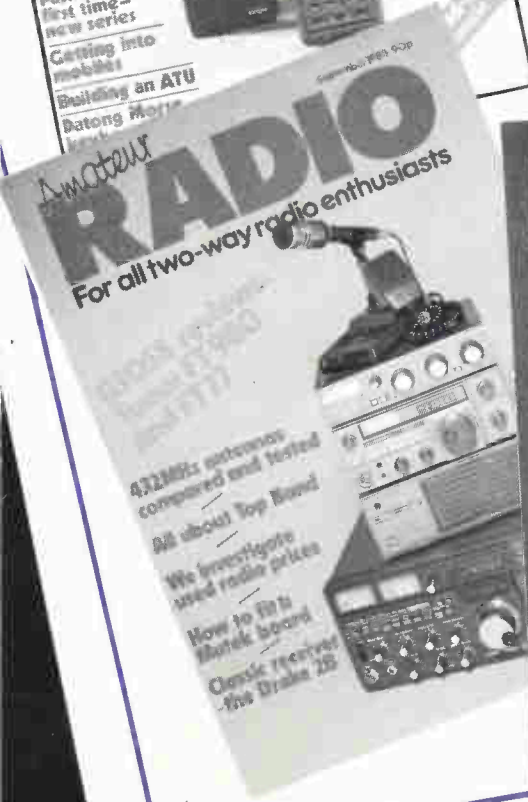
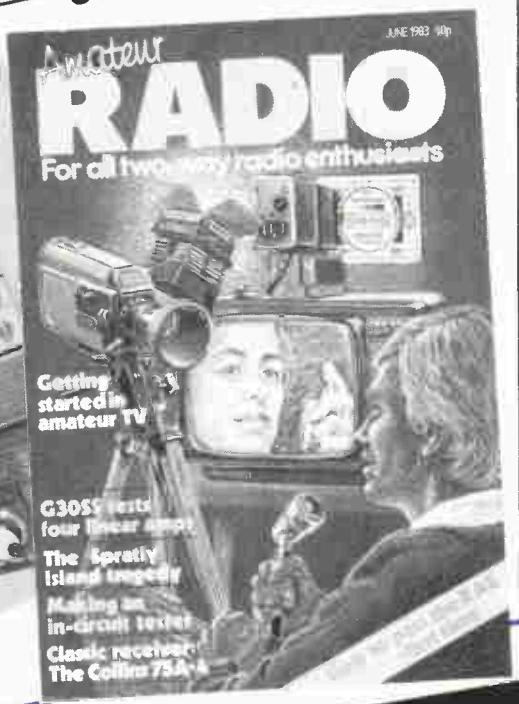
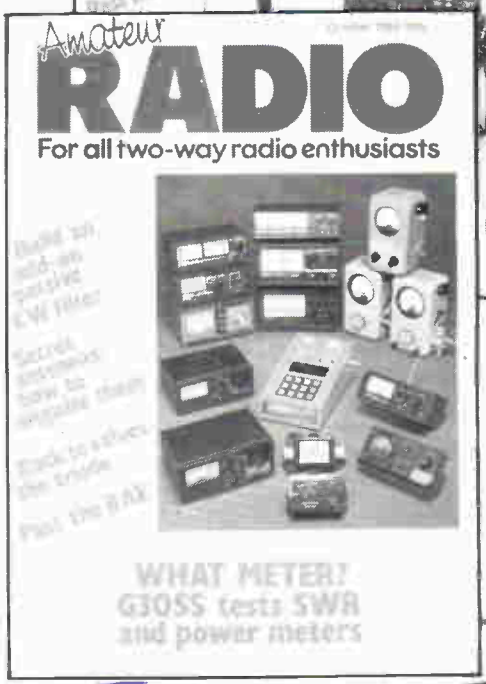






WHAT'S IN STORE IN 84?

A BP oil rig in the Thames? No, we can't believe it either. Mind you, there are probably many things happening that are fairly strange at the moment. And what about George Orwell's year? The Editor makes some wild guesses...

WHAT'S IN STORE IN 84?

Well, we can only hope that VHF propagation favours Oxfordshire a bit more in 1984 — as I write this I can hear stations in London working Polish chaps on 144MHz and giving them 579 and the like! Needless to say, there's no trace of the Poles here.... When I become king I'm going to abolish AL square and make it a radio free zone or something so that we can have a chance of working the VHF DX.

We've dealt with propagation elsewhere in the Yearbook so we won't dwell on this aspect of things. The idea is to take a look at what might be on the way for us and how things might turn out. On the VHF scene, since that's where we came in, there's the question of the 50MHz band — this is due to close as far as broadcasting is concerned on 31 December 1984 and then it's a matter of whether or not amateurs will get any of it.

The RSGB has said throughout 1983 that the interim report of the Merriman Committee has given them good grounds for thinking that there *will* be an amateur allocation somewhere in the 50MHz region, for both Class A and Class B licencees, and our own sources seem to suggest that this may well be the case.

The 40 experimental licence holders must have shown by now that 50MHz is highly interesting and useful to amateurs and that we can use it without causing problems for other radio users; we would hope that 1984 is the year when we get the go ahead. Hopefully we'll see some bit of it open to amateurs as of January 1985, although that might be something of a pious hope — you can rest assured that we'll bring you any news as fast as possible even if the typesetters do throw a fit.

There's a persistent rumour that *if we do get an allocation at 50MHz we'll lose the 70MHz band*. To be honest, we can't see how the two are necessarily connected, and it doesn't seem to follow anyway. Where the rumour comes from we don't know. The RSGB hasn't said anything, and it may be that no one has said anything to them as yet — our usual sources haven't been able to come up with anything either. It might not be a bad swop if push came to shove — at least several other countries have 50MHz. It's a funny band, though; it certainly isn't like either 28 or 144MHz in its behaviour from what we've heard. There's a feeling that the 50MHz band will be absolutely wonderful all day and every day but we're not so sure. However, as an inter-G band it ought to be highly interesting, to say the least. Auroral and sporadic E modes ought to be absolutely fascinating on this band - it's just tropo that we've found a bit dull, at least in 1983.

We don't expect any great changes to the new HF bands — there are quite a few years to go before the transfer procedures are complere so it'll probably still be dipoles and things for a while. These bands are extremely interesting, and it's a pity that more countries don't have them. Compliments to the RSGB for getting access to them for UK amateurs so early on.

1984 looks like being the year of cable television — or so the newspapers would have us believe. There have been some doubts expressed in the trade of late, however, and the feeling seems to be that the technology is one thing, but actually providing the programmes is another. It costs a bomb, or so we're told, and whether there's a big market for cable in a country that's still not out of the recessionary wood remains to be seen. As amateurs, we need to keep a close eye on what happens in this area and to make sure our voice is heard if cable TV looks like presenting a problem to any of our bands.

Bomb-proof front ends

Rig wise, 1984 looks like being an interesting year. As far as HF rigs are concerned, 1983 was the year of the bells and whistles, when there were no real changes in the technology of how a transceiver does its stuff but heaps and heaps of gadgets which might well look nice but don't half make life complicated. We remain convinced that manufacturers should start spending money on basic things like bomb-proof front ends and decent filters, not on pretty digital displays and more knobs. The basic signal path in the average HF receiver could stand some degree of improvement, and we're sure that there must be a market for a transceiver that's electronically superb but which doesn't have frilly bits tacked on to it to make the shack look like the computer room at GCHQ.

The position is that the same at VHF and UHF; the noise figure and front end intercept point of the average 144MHz and 432MHz multimode still falls a long way short of excellence, and if the likes of Mutek can do replacement boards for some popular multimodes, why can't the makers do it in the first place instead of having 32 memories, 10 VFO's and a built-in QSL card printer? If you want to work the DX (real DX that is) on these bands, don't expect an average multimode to be anything like good enough for the job.

"You are 3kHz off channel. Please re-tune me"

Whether 1984 will see any change in this pattern remains to be seen. We have enough trouble keeping up with which model is current at a given time. Quite why the Japanese manufacturers seem to change models with the frequency which some of us reserve for our underwear defeats us — it must be the Marketing Dept at it again. Please let 1984 be the year in which rig purveyors get their act together and get their priorities right. Let's see money spent in the right place, like the filters and the front end, not on another multicolour LCD display. And if anyone brings out a rig in 1984 which starts talking back to me ("You are 3KHz off channel. Please retune me" or "You are causing QRM — please switch me off") I'll turn in my ticket!!

No doubt there will be further developments in the world of the microcomputer this year, and maybe we'll see some growth in things like AMTOR as more folks get terminal units together. The home micro has a lot to offer in this area, and no doubt others, although we expect 1984 to be the year of the shake-out in the home computer manufacturing world and it'll be interesting to see who survives.

We also hope that 1984 will be the year of the Telecommunications Act — not from the point of view of privatising BT, you understand, but from the radio regulatory aspect. As everyone knows by now, there's no way in which the repeater jammers and the pirates and the rest are going to be dealt with under the existing WT Act and there is an urgent need for some tougher legislation. Assuming that the Bill gets through Parliament more or less unscathed, it rather looks as though the Telecommunications Act will at last put some teeth into monitoring and enforcement in the UK. At least, that's the theory; as we went to press there was no news of what was to happen to the Radio Interference Service (you'll remember that the Post Office had said that it no longer wanted to be responsible for the RIS after the end of 1983) although the DoTI had made some noises about appreciating the urgent need, or whatever it was. However good the legislation, someone's got to enforce it and there's no way in which the RIS as it stands at the moment is in a fit state to do anything of the kind. We must just hope that the DoTI organises itself and starts putting some cash in the general direction of enforcement and all that.

1984 looks like being the Year of the Computerised Licence; the amateur licence records are already being handled by the Post Office at Chesterfield and, from what we understand, they're doing quite well. Perhaps this is the year of the Licence that looks like a Licence...!

One thing which does trouble us a little is the availability of components for those of us who still enjoy the odd spot of home brew. We went to most of the rallies in 1983 and it's noticeable that some types of components are getting very hard indeed to find — transformers and capacitors for high voltages, good variable Cs, ceramics spacers, all sorts of little odds and ends. It's easy getting hold of small signal bits and pieces, and semiconductors and ICs are easy enough, but you try finding decent blowers at rallies, for example! Finding bits for QRP work is one thing, but home brew linears are going to become a happy dream if we carry on like this. Why, oh why can't some enterprising manufacturer make some high voltage torid transformers at an affordable price? End of moan.

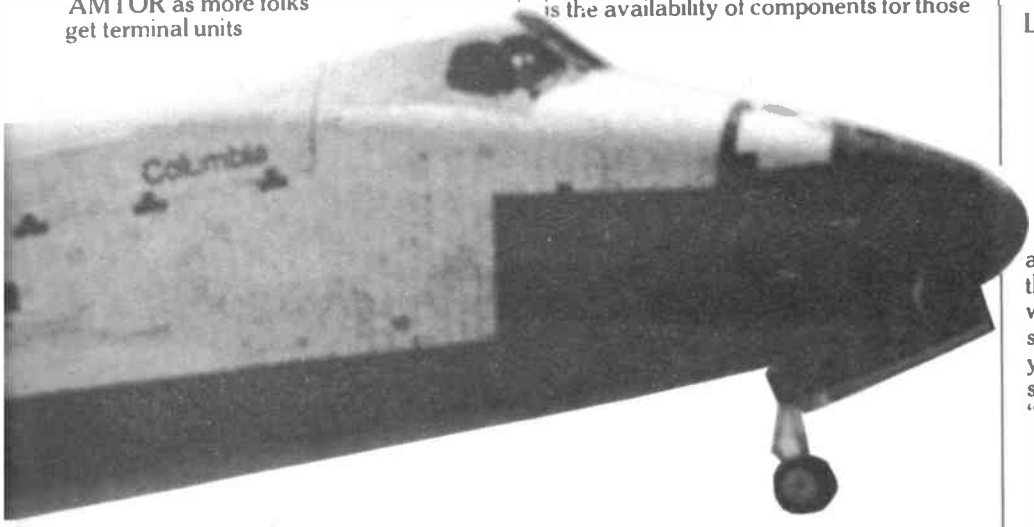
Let's look on the bright side. There are many more amateurs now than there were five years ago; some are good and some are downright dreadful but no doubt that's been the case since the hobby first got started — we bet some of the early operators were just as dense as some of today's are. Here's a special plea from Amateur Radio — can 1984 please be the Year of the Bandplan? We've got OSCAR 10 up there and doing its thing now, and it really is an incredible machine — the big snag is that it only takes one cretin going up that end of the band with his deaf FM rig to talk to his mate ("Here's a nice bit of quiet band, Fred" "Yeah, Bert, can't think who no one uses it") to ruin the satellite and waste an almighty amount of effort and money.

Special plea: Can 1984 be the year of the bandplan?

Let's spell it out:

I WISH PEOPLE WOULD NOT TRANSMIT ON FREQUENCIES BETWEEN 144.840 and 144.990MHz, OR BETWEEN 145.800 and 145.999MHz.

The first bit is the beacon sub-band, and silly people with FM and such up there wipe out weak beacons for those who want to use their wirelesses for something a bit more creative than yacking to Joe down the road. The second bit is the satellite sub-band, and "people" transmitting here spazz it up for



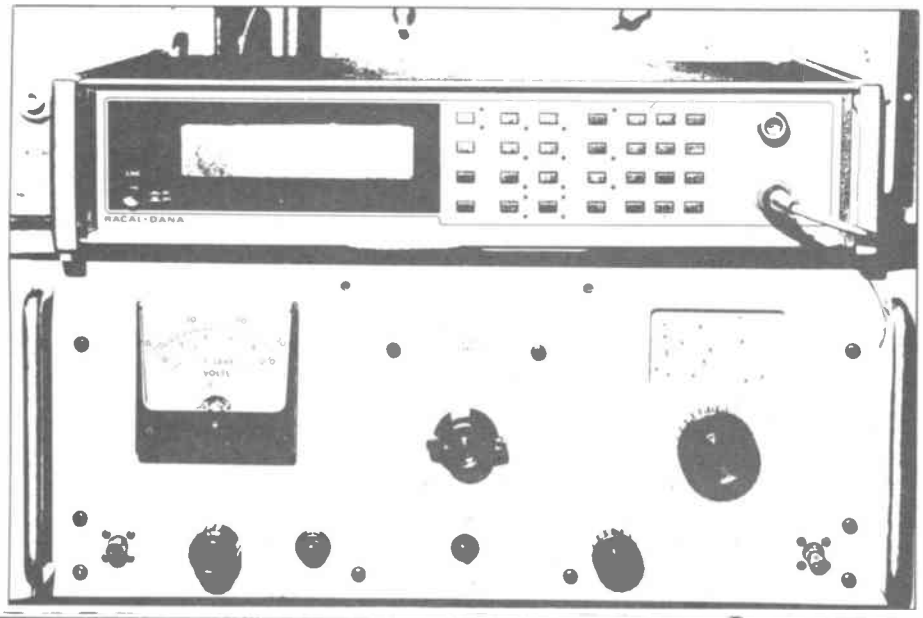
WHAT'S IN STORE IN 84?

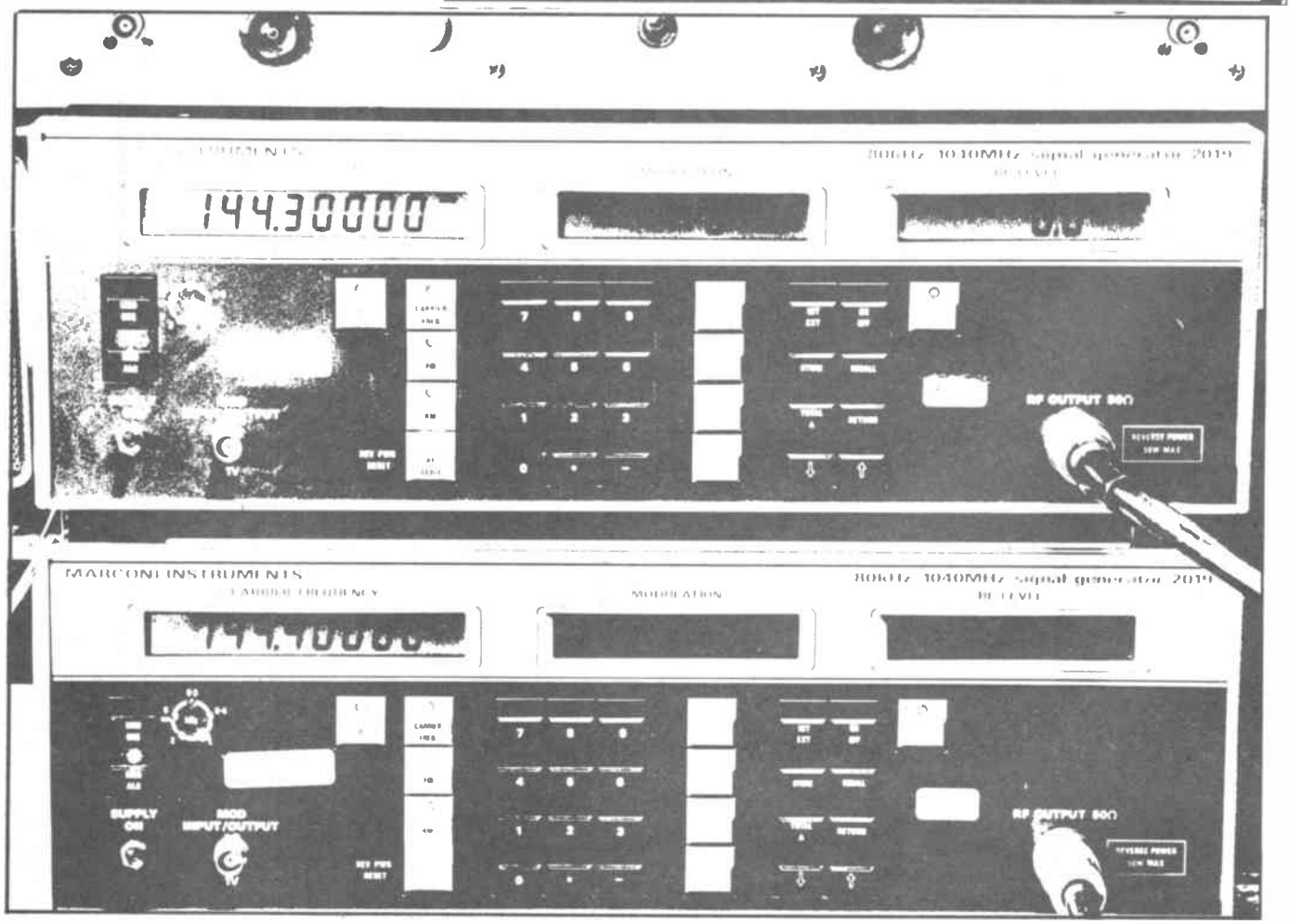
satellite users — the satellite cost time and money to get up there and it's one of the best things ever for our hobby. Are you reading me in London, G8*** and your beastly net on 145.970MHz? Please remember — PLEASE DON'T TRANSMIT BETWEEN 144.84 and 144.99MHz and 145.800 and 145.999MHz — IF YOU DO YOU ARE A LID OF THE HIGHEST ORDER AND YOU DESERVE TO BE KICKED IN THE BEHIND AS HARD AS HUMANLY.

Incidently, there are imbeciles who insist on transmitting FM in the CW end of 144MHz as well, so please can 1984 be the year in which they stop? At least Raynet have moved from 144.875MHz now, which is a step in the right direction.

Of some import is the Year of the Bandplan, then? If 1983 was World Communications Year, perhaps 1984 can be World Bandplan Year. Otherwise we'll begin to think that it ought to be written into our licences as a legal requirement, and that in a way would show that we weren't fit to keep our own house in order.

There it is — a tentative look at 1984. Whatever happens, and however right or wrong we are, we hope that all our readers have a great year on the wireless; may nothing blow up, may the little squares in the QTH Locator Map get crossed off at a rate of knots, may 5BDXCC loom ever closer and may Top Band open up to somewhere interesting every day.





Rig of the year

ICOM IC-251E + MUTEK BOARD

A world-beating combination? We certainly think so, and here Nigel Gresley explains why we've gone unexpectedly overboard.

Ladies and gentlemen, we present Wireless of the Year, fade up string orchestra, images of elegant ladies carrying wirelesses, gentlemen in toppers and tails, elegant ballrooms, etc etc, crackle of static on old AM broadcast radio listening to the British Broadcasting Company (it ought to be "Wahrless of the Yer" in an exquisit accent), all *terribly* tasteful, m'dear.

We thought we'd select the best radio from past reviews and subject it to what amounted to a 10,000 mile test and see whether we still liked it, and whether we'd buy it again if we had the choice. There were actually four candidates for 1983 Rig of the Year but the clear winner is the Icom IC251E with the Mutek front end.

We looked at the IC251E mit der wunder Bartram Board in the July 1983 issue of *Amateur Radio* and those of you who read the review (come on, own up, of course you remember it) will remember that we were more than a little enthusiastic about the beast at the time, even though it cost us an arm and a leg in hire fees for test gear excellent enough to do the measurements with; the device was so good in some areas that it was difficult to be sure of the exact figures.

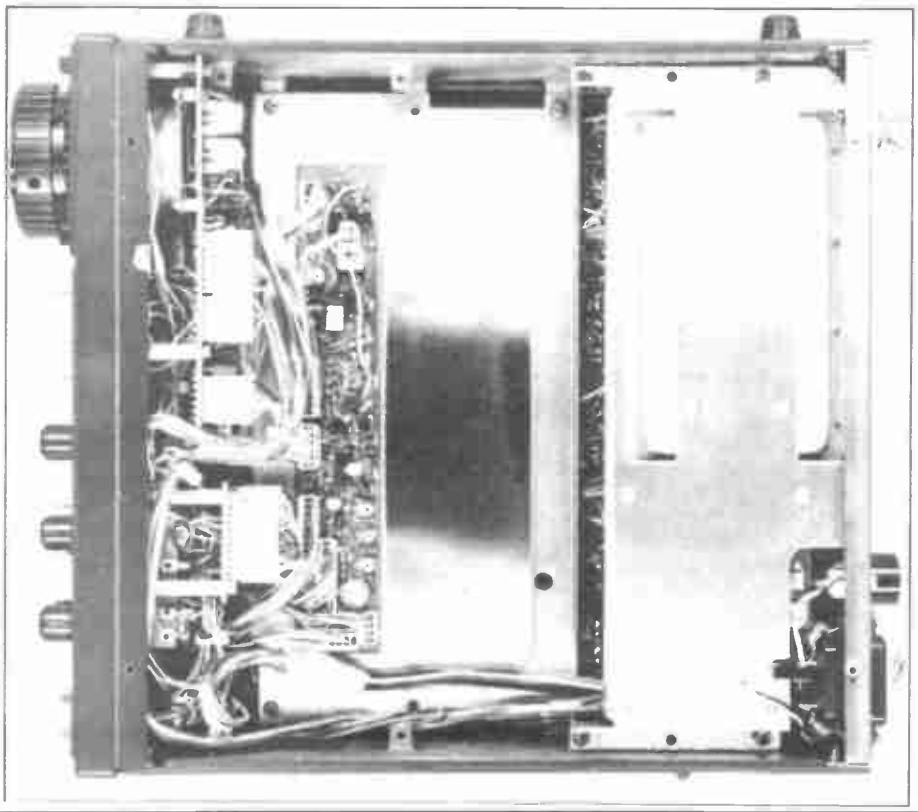
Testing VHF gear that's anything like good can be a real minefield, especially with respect to something called noise figure which we'll come to in a moment. Essentially, it's a minefield because (a) there has been an awful lot of confusing nonsense written in magazines, which means most folks are more than a bit hazy about exactly what noise figure and noise power and sensititivy and noise temperature are all about and how they tie up, and (b) the measurements are difficult to make unless you're extremely careful. We do, in fact, have access to excellent equipment, and people who know how to use it, but we'd be wary of specifying noise figures to better than plus or minus 0.2dB. There's also the other exceedingly important matter of signal handling; there's a case for saying that the dynamic range of a VHF receiver is, if anything, more important than simple matters of how quiet it is (to be precise, something called the spurious-free dynamic range) and people do tend to babble on a lot about third-order intercepts and such without stating exactly how meaningful or not they are.

Let's get back to the 251E. Basically, it's a fairly standard 144MHz multimode with CW,FM and SSB facilities; in fact, it's now been replaced by the essentially similar IC-271E and we'll be looking at one of those later on in the year.

The 251E is transformed into a rig which is a hell of a lot better than most

However, the great thing about the 251E is that it can have something called a Mutek board added to it, and this transforms it from a bog-standard multimode into a rig that is as good as anything in the world and a hell of a lot better than most. Before we get into the review, let's state quite clearly that we're in no way connected with either the gent who makes the said board or with the Icom agents, Thanet Electronics; *Amateur Radio* tests were conducted using 251E loaned to us by Thanet, but the long-term tests were done with two other rigs belonging to members of the staff here and if we say we like it you can rest assured that no one's slipping us a backhander to say as much.

With that out of the way, what's a Mutek board? The "front-end" of any rig (that's to say the first RF amplifier and the first mixer) has a lot to say bout two very important areas of VHF receiver performance; the noise figure and the third-order intercept. The first, really, is a measure of the receiver's ability to make sense of weak signals without them being overcome by internal noise in the receiver itself; looked at the other way round, it's a factor involved in the sensitivity of the receiver. Sensitivity actually refers to the minimum signal level which can be detected in a receiver or, if you like, how



IC-251E sans Mutek front-end board

weak a signal can be when the signal-to-noise ratio is 0dB. Part of the problem in specifying this in rig tests is the different ways in which you can specify the signal level - it can be a power in microwatts, a value of dBm (it decibels relative to a level of one milliwatt), a figure in microvolts across the input impedance of 50ohms or even an equivalent noise temperature. They're all the same except that to define one of them you need to take bandwidth into account.

At the other end of the scale is the matter of the third-order intercept point. This is a little theoretical simply because it's a touch tricky to relate this to how-much-will-my-wireless-take-before protesting practicality, but in essence it's a measure of strong-signal handling capacity.

The important point is that if you want a 144MHz receiver for serious DX-type work, it needs to have these two qualities in abundance; the ability to handle thundering great signals from your locals and simultaneously not to miss the weak ones from many hundreds of miles away. If you're listening to a weak and watery chap on 144.265MHz and matey down the road with a pair of 4CXs and an aluminium overcast comes up on 144.300MHz calling CQ, you don't want the DX to disappear under rude noises and splurges from matey because your blood pressure will go off the clock and you'll hurl the wireless out of the window and incommode some hapless passer-by. Much as you like matey, this is one of those situations where you simply don't want to know he's about; you wish to wait for the DX to say QRZ? so that you can grab him and get him in the log.

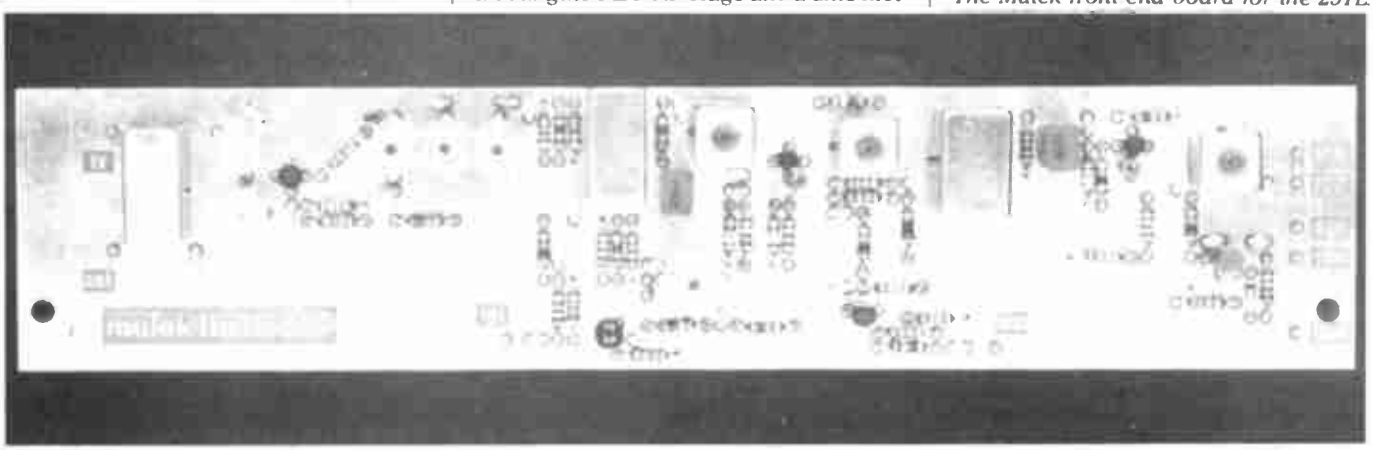
It's the same in a contest. You could be calling CQ Contest and have some juicy morsel come back to you who was more than a bit weak and feeble but he's another 40 points or something. You want to work him; what you don't want is for the mob on the next hill 20kHz away to hit your front end so hard that you can't work someone five miles down the road, let alone some weak DX, when they come on five seconds later calling CQ themselves. Again, bad for the cardiovascular system or something!

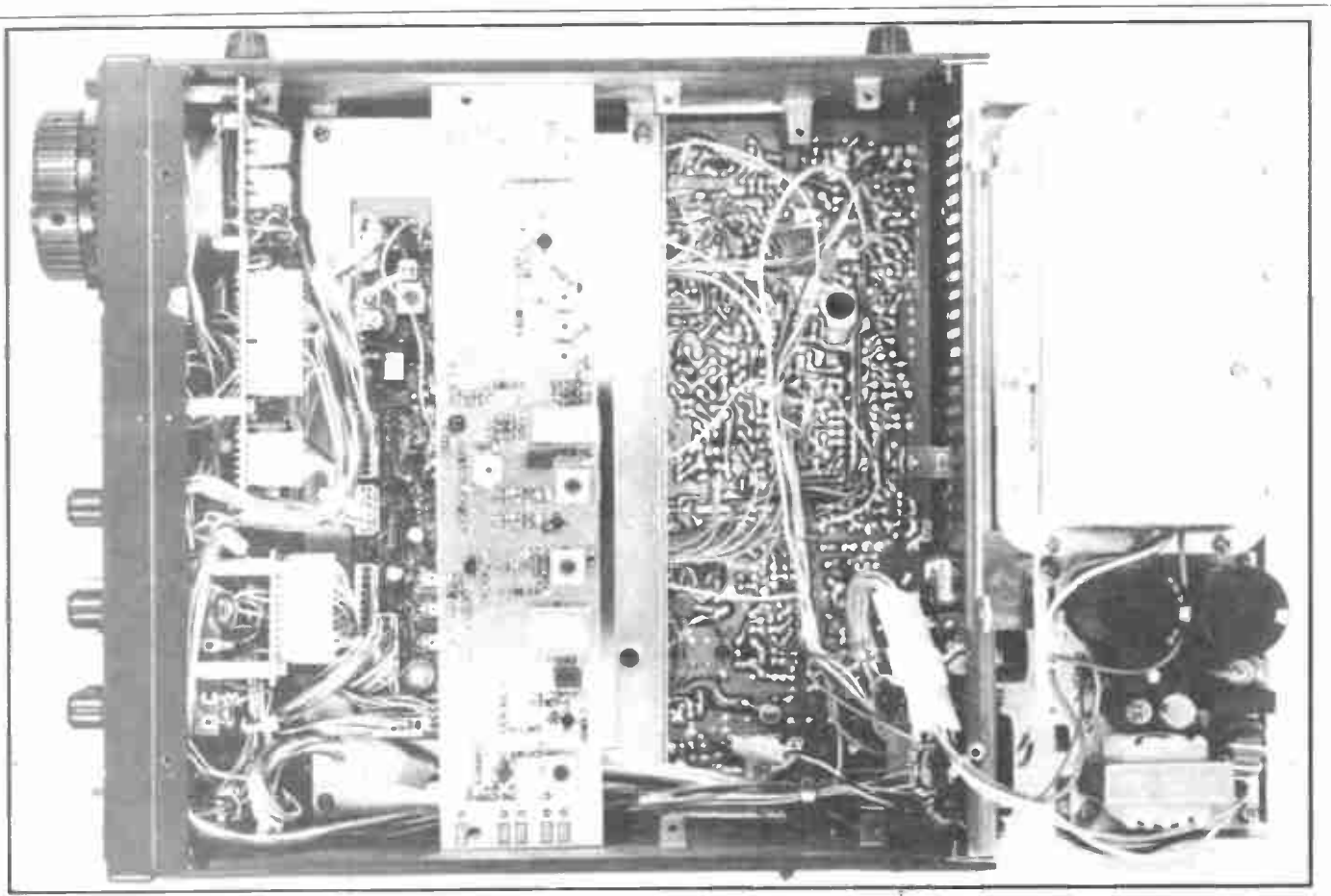
In other words, these two requirements are probably the most important for any VHF receiver worthy of the name. The single most important way to achieve both is to have a good front-end, and this is where the Mutek board comes in.

In the ordinary 251E, and indeed in every other black box multimode, the front-end is pretty ordinary. It's probably a dual-gate FET RF stage and a ditto first mixer driven by a low-level local oscillator signal. Well, OK, fine. It works. But if you take it out on a contest or if you live in AL square and there's anything resembling a whiff of an opening, you're likely to find about -s5 noise all over the band drowning out the weak DX. These are intermodulation products, both from strong locals and combinations of strong locals, and it's sheer hell. Everybody putting in a strong signal will sound wide and spready and you'll probably froth at the mouth when you hear other chaps working exotic DX which you can't hear for the row.

The Mutek board simply replaces the bog standard front-end with a really high performance one and it transforms the performance of the wireless at both ends of the spectrum. It replaces the existing middling MOSFET with a much better device, the BF981, and - more importantly - it replaces the mixer with a packaged high level device, the SBL-1. This is a Schottky mixer which requires to be hit with a lot of welly from the local oscillator, and the Mutek board makes arrangements to apply some afterburner to the LO so that the switching-type mixer can do its stuff cleanly. The essence of using these things is to make dead certain that all its ports are correctly terminated

The Mutek front end board for the 251E





Above: The Mutek board in place on the spare lugs. There's an instruction sheet which shows you, step-by-step, how to fit one if you're doing it yourself.

in 50ohms, and the Mutek board does this to perfection.

How good is it? On test we found a noise figure of somewhere around 2dB. This is an excellent figure, compared with the 6dB of the unmodded front-end, and indeed on 144MHz there's no real point in anything better because what with sky noise, local noise of one sort or another and so on and so forth, you couldn't use any better noise performance. After the initial review, we spent almost a day with some *extremely* expensive Hewlett-Packard equipment carrying out some precise measurements; as best as we can, and to within about ±0.2dB, the thing has a noise figure of 1.85dB. In other words, it physically couldn't be better for the 144MHz band and the only reason for using a preamp would be if you had a long and lossy cable run from the antenna to the rig. Using a 16-ele Tonna on the roof, we measured about 2.5dB of noise coming from the setting sun, if you please.

At the other end of the spectrum, the signal-handling is terrific. The classical third-order intercept comes at +8dBm with this board, which implies that nothing short of a mobile outside the front door is going to cause trouble for the receiver, and for pretty well any purpose it couldn't be better. The only way to improve on that figure would be to use a different mixer such as the SRA-1H but you need something like +18dBm injection for that and that'd be hard to do. It'd also cost a lot more.

Enough of the theoretical. What happens in the real world of openings and DX and such? The short answer is that if you shove the Mutek board into an unmodded 251 and listen around on an average day, you won't really hear much difference and you wouldn't expect to - the receiver may even sound as though it's got less gain than it had before. But, don't be fooled. For a kick off, you become aware very quickly that beacons which were down in the noise before, are 100% copy much more of the time. You also become aware that strong locals sound a bit different; less wide and spready. The wait for the opening and contest - all we can say is that if you really can't hear the difference, you ought to give up wireless and/or go and get your ears syringed!

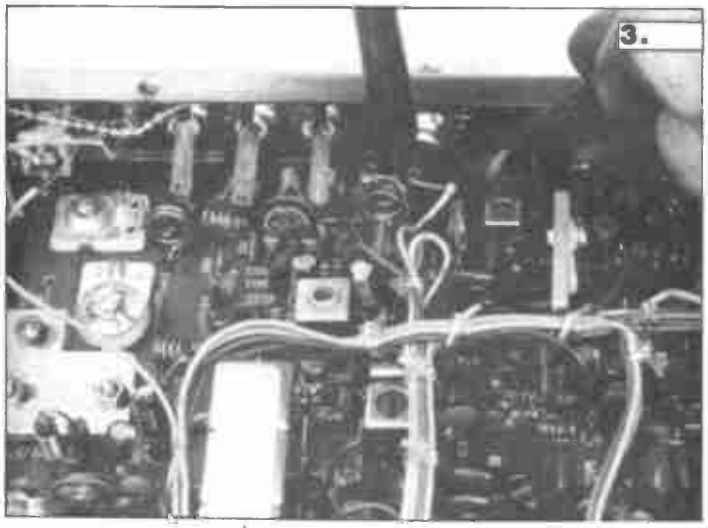
We were able to work some choice stuff we wouldn't otherwise have known existed

Our long term test started with a bang during the Low Power contest, when we worked G6LCL/P when there was a mega-strong local on about 144.318MHz and 'LCL was between him and another massive local on about decimal 295. LCL was about 5 by 3, if you please, but he was perfectly workable on the Mutek rig; however, there were three other radios in the shack at the same time (no names, no pack drill) and leave was no way in the wide world that we'd have even known that G6LCL on his hill in Durham was on the band, let alone workable. This trait of being able to hear and work the weak ones in between big strong locals has come home to us time and time again this year and we don't know of any other wireless which can do it; it's a tremendous asset when the band is crammed full of chaps all after their two penn'orth of DX.

The next interesting event was a goodish tropo opening in mid-June to Scandinavia; we beetled off down the CW end to work some of the squares in SM which hadn't the blue dot in them, which means that they were in the bag. Sure enough, we were able to work some choice stuff which we wouldn't otherwise have known was on the band - OZ1DVV in EP square was very weak but eminently copiable on the 251, whereas he wasn't audible on another good rig in the shack, even in the clear. However, this event showed up the one weakness of the 251 for this type of work. The filter is much too wide for serious CW work - it's a little wide for SSB, actually - and we couldn't get anything like the selectivity we would have liked.

Rig of the year

1. *Remove power supply assembly by removing fixing screws. Disconnect multipole connector and put assembly to one side.*
2. *Remove synthesiser assembly. Do NOT forget fixing screws located through main pcb. Note positions of connectors and remove. Lift assembly clear.*
3. *Remove carefully the wire soldered between antenna socket and main pcb. Solder (as shown) red-coded coaxial cable to antenna socket, braid to associated solder tag.*



We had a Datong audio filter for the next opening, and this was a dream, but there was still a problem if you got a loud local a few kHz away because he got at the rig's AGC and removed the weak DX. This is nothing whatsoever to do with the front end, mark you, and if you were a dab hand with the iron you could probably fit a better filter to the thing - no doubt Messrs Ambit would advise if you asked them nicely. But a switchable CW filter would certainly be nice - when *will* 144MHz multimode manufacturers get around to the notion that serious DX gets worked on the key on this band and provide suitable filters?

It works like the devil and if there's a whiff of DX about it will hear it

Other openings and contests followed the same pattern, but the real proof-of-the-Mutek-pud came in the mega-monster-openings in late September and early October. 144MHz sounded more like 14MHz, and we don't think we've ever heard so many stations on the band - some, alas, sounding pretty dreadful too. But what was amazing was how the 251 coped with it all. You could find little spaces in between strong signals in which there would be a weak German (we knocked off EI square that way) and we spent a very happy 25th September working some all-time new squares.

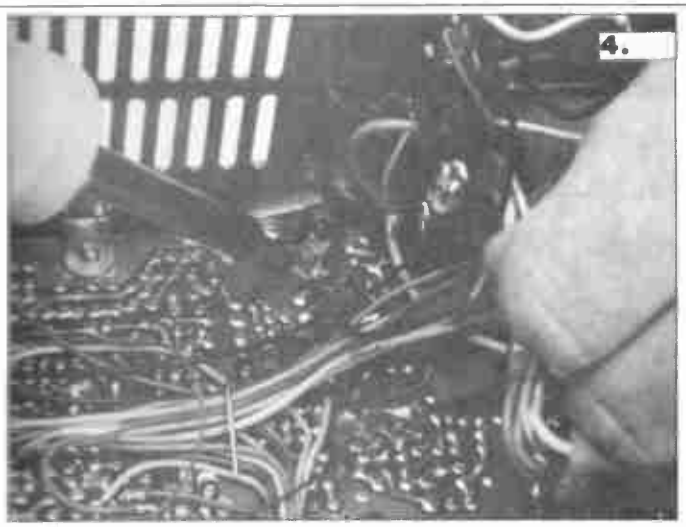
The next day one of the technical chaps came in cursing - he'd been using an FT290 with 100 watts, as opposed to our measly 15, but he'd worked about a quarter of what we had despite a better site. He simply hadn't been able to hear the weak stuff because there'd been about S6 noise all over the band - the dreaded IPs, of course. He'd heard us working EA1KC in XD square and exchanging 579 reports but he simply couldn't hear 'KC because of the crud from elsewhere in the band; he mentioned the callsign of a local who he had thought was 40kHz wide, but in fact the gent in question is renowned for his very narrow QRO signal and it wasn't him at all! Net result - another 251E was sold (Thanet were selling them off at the time to make way for the 271) and another Mutek board found a good home.

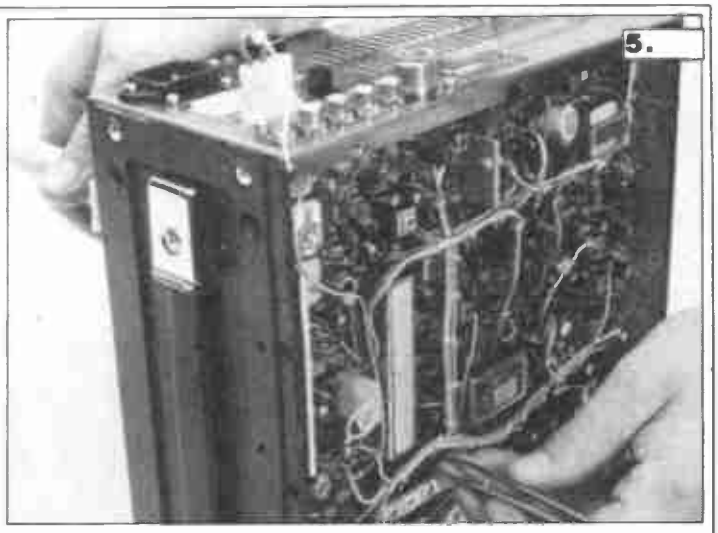
So, there it is. The 251 + Mutek is ergonomically right; it feels right; it works like the devil, if there's a whiff of DX about it'll hear it-that's it in a nutshell. Operationally we like it very much - we grumble about the filters in it from time to time, we wish the PLL didn't go out of lock if you tune too fast (it just slows the tuning rate down, no problem in reality) and we wish the mic supplied with it was nicer, but as a user's instrument it really is a classic.

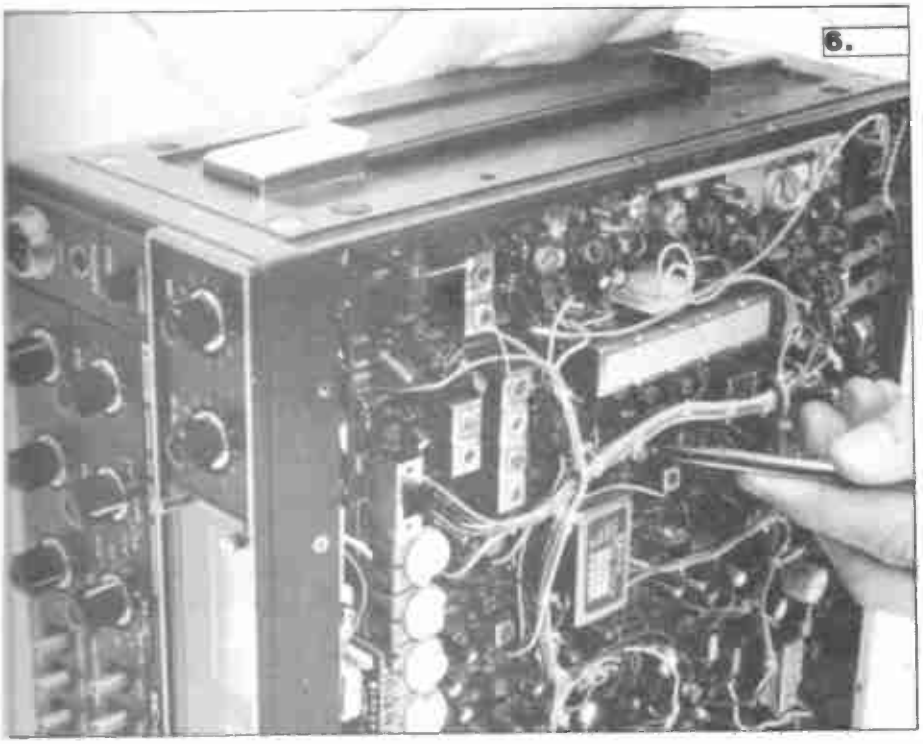
We cannot imagine how we'd survive without it for our DX chasing on 144MHz now, and both the rigs we've had dealings with have been 100% reliable. From feedback, we gather that Icom gear is still hand-built. Certainly one of the 251s we know has been carted up and down hills, thrown into a well-driven semi-rally Escort and run for hours and hours during openings and it's never faltered. It measures the same now as it did when it was new. Short of changing the filter, we couldn't think of a way to improve the thing even after about eight months' hard use, and we take our collective hats off to Chris Bartram, G4DGU, for his exciting achievement. And isn't it noce to see a British product beating the world?

Rig of the year 1984?

In other words, the Icom IC251E with Mutek front-end is Rig of the Year because it now defines the art of the possible in commercial gear for this band. The transmit side is pretty good too, so that doesn't let the side down, and the thing drives out W1SL-cum-G4RFX big linear very nicely indeed for hilltop contests. If the IC271E is even a bit better, there's not going to be too much doubt about Rig of the Year 1984 unless someone somewhere does something incredibly special.







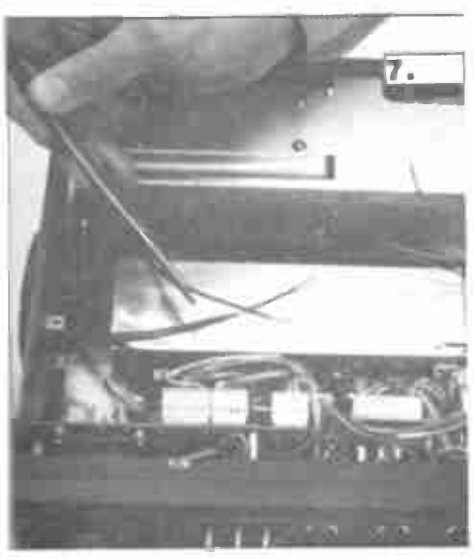
4. *Solder blue-coded coaxial cable to pad on rear of main pcb.*

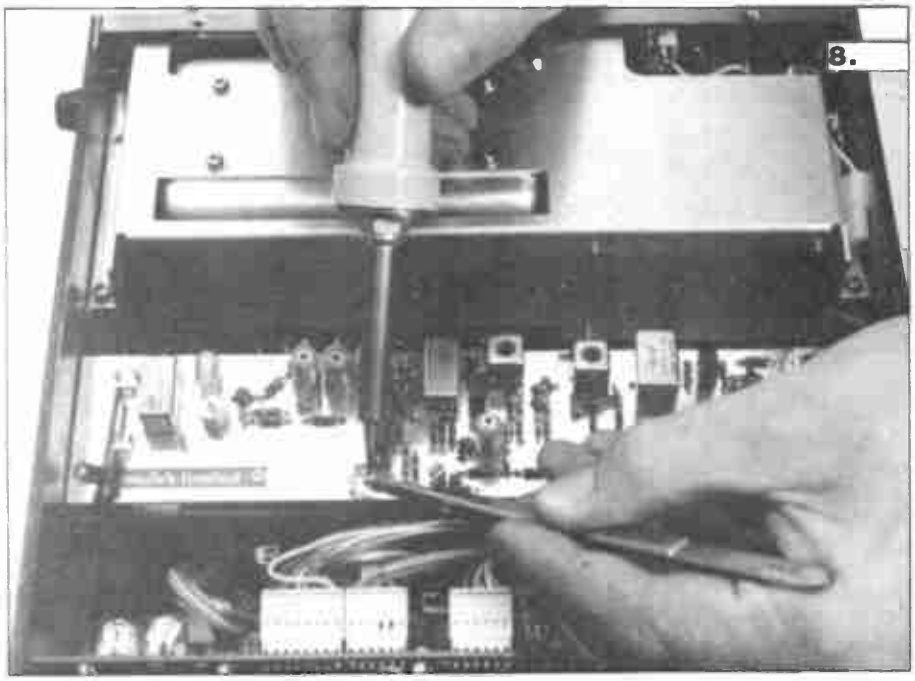
5. *Carefully remove filter FL2 and inductor L55 from main pcb.*

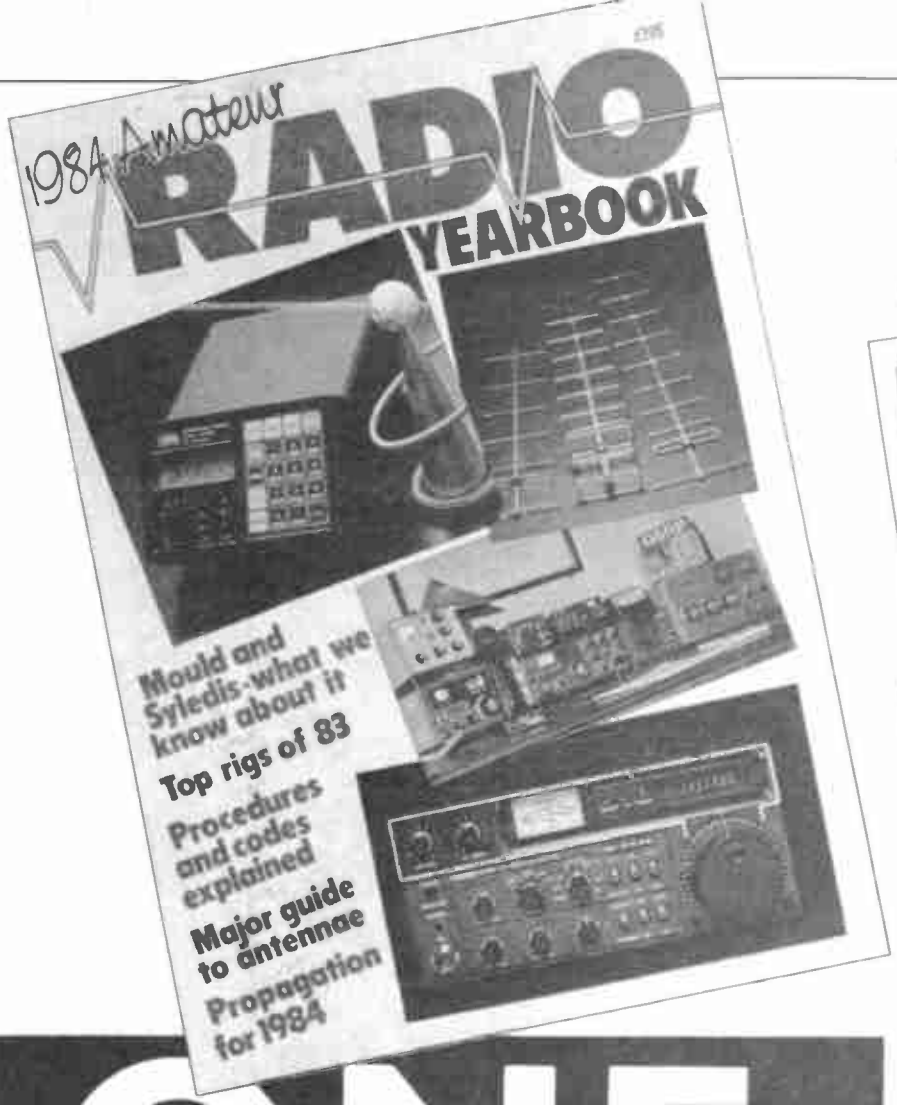
6. *Remove C187 and replace with 47p provided in installation kit.*

7. *Replace both psu and synthesiser assemblies arranging RPCB251ub cables leading from slots on either side of synthesiser assembly.*

8. *Fix Mutek board with two screws provided to existing (unused) diecast lugs, and as per detailed, fixing solder colour coded cables to the appropriate pins. Replace both covers and get out amongst the dx!*







ONE YEAR ON

In actual fact, we're a bit older than that ... and still going strong! Here we look back on the progress of *Amateur Radio* magazine

One year on. On the date this Yearbook hits the newsagents' shelves, *Amateur Radio* will be just 16 months old. What started out as a one-shot magazine has been transformed successfully into a widely read monthly publication that serves the radio amateur market in all the required ways.

Readers and advertisers alike appreciate the usefulness and readability of *Amateur Radio*, providing as it does some solid reading along with the always-necessary construction projects, reviews and so on. The fact that you are reading this article means, in effect, that you, our valuable readers, are involved in the culmination of our year's work. The *Amateur Radio Yearbook* is intended as an annual (naturally...) which will summarise all that has been interesting and worth including in such a worl: of reference as this. The Yearbook also looks forward to the next 12 months - propagation, new equipment on the drawing boards, new rulings, and it takes the opportunity of gathering a large amount of information that is already known (codes, procedures etc) and sets it out in an easy-to-read and digest fashion.

It was obvious there was a gap in the communications market

Reader involvement is all-important to *Amateur Radio*, and we always welcome letters from readers and the trade; complaints and criticism are dealt with through discussion and meetings to find ways and means of solving various problems.

But just as an exercise in memory (if nothing else), let's go back to the middle of 1982, and describe the launch of *Amateur Radio* Number One. With the near-demise of CB, it was obvious that there would be a major gap in the communications magazine market once the hundreds of thousands of "breakers"

decided that CB wasn't for them. A large proportion of these needed something to replace CB, or to provide them with something better in terms of a challenge, interest, and involvement. Becoming a radio amateur was that replacement, of course, and already there are two magazine newcomers to the field, and rumours circulating of one or two more. Whether the trade and readership will be able to support more radio amateur magazines remains to be seen, but you can be sure that *Amateur Radio* will stay at the top of the list!

Newcomer from Argus Specialist Publications entered the market with a low cover price. Currently though, it sells at the same price as *Amateur Radio*, and a year's subscription is £2 more than *Amrad*. And judging by the September issue of the opposition, *Amateur Radio* carries eight pages more.

But enough of comparisons; we prefer to get along with other magazines in the market, rather than become rivals. After all, there is room for at least a small number of magazines in this particular market.

As we said, *Amateur Radio* magazine was launched to absorb the readers and demand made apparent by the demise of CB. And now, the Home Office has distributed thousands of new licences and callsigns, and already plans are being made to begin a new numbering system for licence holders.

Numbers one and three are completely unavailable

The first issue of *Amateur Radio* sold extremely well. Naturally. Even today we receive an average of four letters a week asking for copies of the first few issues; but before you put pen to cheque, numbers one and three are completely unavailable, as is the March 1983 issue. Sold out, they did.

Number one was, of course, mostly written by a certain John Nelson, of the Radio Society of Great Britain, a good chap that most of us know and regard with respect. Pressures of work at the RSGB meant he could not continue writing for *Amateur Radio*, and so it was left to Chris Drake and freelance technical writer Nigel Gresley to produce the magazine until recently when a certain Richard Lamont G4DYA joined the firm.

Future style became an important item for discussion

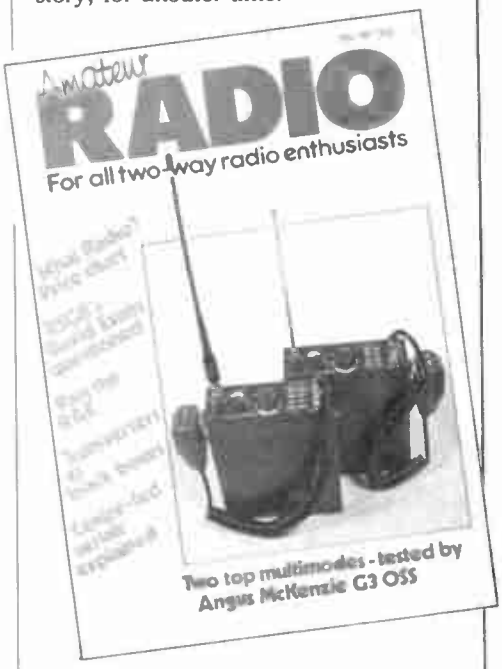
But again we digress; the response to the first issue was so great that a number two was inevitable. It was then that the future style became an important item for discussion. Conscious decisions not to become too technical were made. *Amateur Radio* would be A Good Read, and include some constructional projects, reviews of new (and old) equipment, and generally become a worthwhile publication for all amateurs.

The magazine has become a work of reference for many amateurs

Many readers wanted to take out annual subscriptions right from the first issue, so a rate was decided, and today our subscriptions service is a major part of the *Amateur Radio* business. It also means the magazine has become a work of reference to many amateurs who want to hang on to their copies - judging by the demand for the binders!

They all drink their weight in beer at the Red Lion...

Writers began to contribute from many areas of the communications industry; one works full time for Government Communications Headquarters at Cheltenham, two for Cable and Wireless, at least one for the BBC, and so on. They are all licenced amateurs (of course), and all drink their weight in beer at the Red Lion near Bicester... But that's another story, for another time.



Issue number two also sold extremely well, and it was then that we learned that the radio amateur trade was prepared to support such a magazine, with equipment for review, information on new products, and most important of all, advertising space. There were one or two "grey" areas where encouragement was not forthcoming, but by and large, all traders and manufacturers in the amateur radio business are friendly, supportive, and welcome a new and worthwhile magazine.

ONE YEAR ON

By issue three, we'd discovered Angus McKenzie G3OSS, a well known consultant on audio matters and who has probably the most brilliant laboratory privately owned in Britain. He's blind, but has the most excellent ear, and sometimes the most controversial of opinions on equipment that would otherwise appear to be perfectly adequate and OK for a given job of work. He's a man of strong opinions who tells it like it is, and speaks and writes his mind - just the thing for our technical reviews. He made his debut with a comparison test between the Icom IC740 and the Yaesu FT102 in the third issue. We also discovered George Dobbs G3RJV, of the G-QRP Club. Quite how the Reverend George finds the time to do the things he does defies our comprehension (perhaps you're just lazy - MD) and we take off our hats to George's efforts on behalf of his club, and the work he does for *Amateur Radio*.

The message was clear - go monthly!

Issue three was a sort of watershed for *Amateur Radio* because until this moment the magazine was produced as a quarterly. The message was clear - go monthly young man. And we did, and have never looked back.

Issue four duly appeared, and the doubts about whether readers would be prepared to spend their well-earned cash every month were unfounded. Previously of course, there had been the famous *Amateur Radio* Questionnaire, where, among other things, we discovered that more than 60% of readers *already had callsigns*. Among other things, this told us that the majority of readers were experienced amateurs, and not simply refugees from the world of CB. This major turning point spelled things out clearly for the management at *Amateur Radio* - increase the technical involvement, while still retain the basic reference material, such as codes and procedures. Hence the magazine continues to carry such features as "Starting from scratch", "Pass the RAE", and so on.

We have also managed to offend...

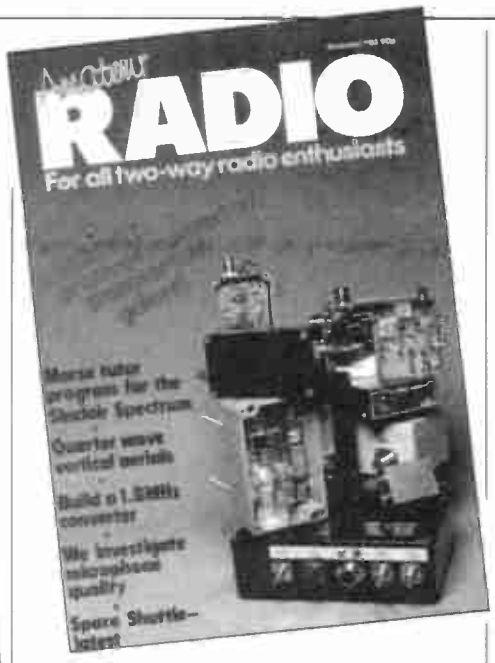
The controversial and honest Angus McKenzie continued on his way and produced an article on the subject of buyers' rights; now, this particular article managed to offend a number of people, but the number of letters from readers (and the trade) praising the magazine for integrity and impartiality gave us new respect in the eyes of many people, and it confirmed that we were not about to be "bought" by anybody who was prepared to put a lot of money our way in return for a favourable review of their particular products.

New respect

If a product is naughty, we'll say so. If it's worthy, we'll say so. If it's indifferent, we'll say so, regardless of whether they are major advertisers, or not.

If a product is worthy we'll say so

Needless to say, *Amateur Radio* has no financial or other type of connection with anyone in the equipment marketplace, and so will continue to be impartial, unbiased and completely honest about equipment reviewed, within comments made in editorial space.



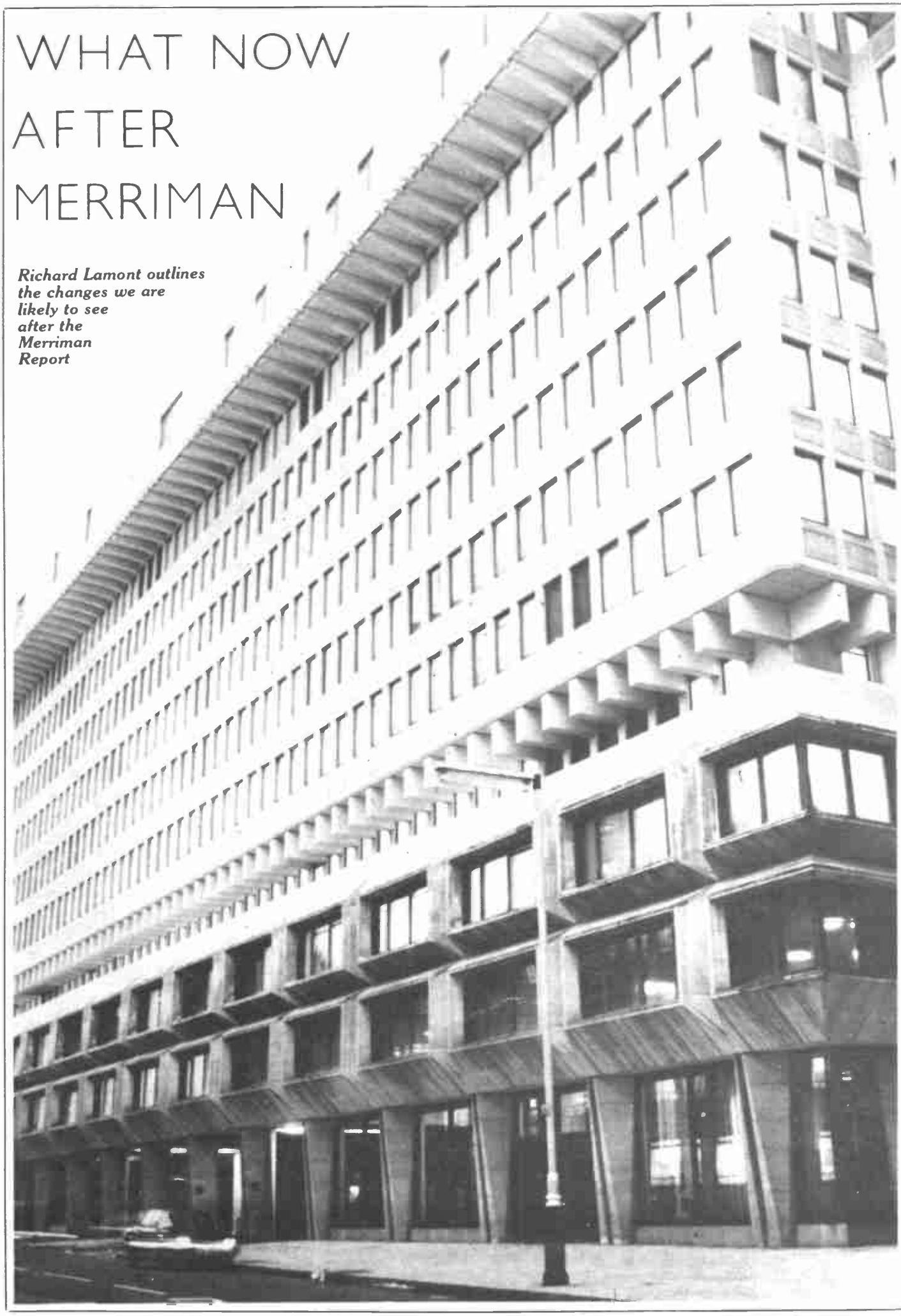
Since the small beginnings, Editor Drake has been promoted to General Manager; Richard Lamont G4DYA comes in as Editor; and the good-looking Rosie Kirtland is elevated to Advertisement Executive under the still-watchful eyes of Linda Beviere, the persuasive Advertisement Manager.

Our policies? Plans for the future? Briefly then, to continue to produce the best amateur radio magazine on the market, to reflect the feelings and thoughts of radio amateurs everywhere, and to act as the work of reference to interested parties who want to be kept up to date on news and views, rumours, new products, new ideas in home brew and constructional projects, and basic instruction on how to make the best of the various modes, and types of equipment available.

Keep reading the magazine for more details!

WHAT NOW AFTER MERRIMAN

Richard Lamont outlines the changes we are likely to see after the Merriman Report



Once upon a time (July 1983) myself and about ten other radio scribes assembled in a Government office block in Victoria Street, London. The occasion? Just over the road the Secretary of State for Trade and Industry was presenting the Report of the Independent Review of the Radio Spectrum (the Merriman Report) to Parliament. Us scribes were there for a press conference about it.

Actually, the whole event was much less grand than that. The Secretary of State for Trade and Industry (Cecil Parkinson — remember him?) didn't present anything at all. It was the deputy-assistant-teaboy-under-Secretary, Alex Fletcher MP, who announced the publication of the report in a written answer. If I remember rightly, the answer consisted of two short paragraphs, and didn't even make "Today in Parliament".

Instead, Dr. Merriman and his two colleagues (Air Vice Marshall Arthur Foden, and Philip Vine) concentrated on the way that radio regulation is organised. In particular, they recommended that a separate telecommunications deparment should be formed. Or, failing that, telecommunications should at least have its own minister. The report did offer a third, last resort: transferring the RRD from the Home Office to the Department of Industry. Guess what... It happened!

The government of telecommunications in the UK is not an elegant animal. The RRD has, in only a few years, been moved from the Post Office to the Ministry of Posts and Telecommunications, then to the Home Office, and now to the Department of Trade and Industry. Other bits of government machinery concerned with telecommunications are scattered around Whitehall and elsewhere like confetti. The Broadcasting Departments stay in the Home Office. The Radio Interference Service is part of British Telecom, which would dearly love to get rid of it. The new Telecommunications Bill, if enacted, would create a new Office of Telecommunications (OFTEL). Also lurking in the wings is a Cable Television Authority. How on earth can a job as complicated as radio regulations be done in a bureaucratic quagmire like that?

The government of telecommunications in this country is not an elegant animal

Us scribes were allowed to see copies of the report some half-hour before the press conference began. Yours truly, having got a copy in my sticky paws, sat down and immediately turned to page 66, where the "Summary of Conclusions and Recommendations" began. I was surprised by what I saw. I had been expecting to see a frequency table showing who was going to get which bit of spectrum. "Are amateurs going to get 50MHz?". That was the number one question on my mind. There was no reference to this, or any other specific frequency or band, anywhere in the report.

BT were saved by the reliability of microwave equipment

The Merriman Committee's terms of reference had been to review the spectrum from 30 to 960MHz. They had already issued an 'interim report' on VHF TV bands I and III (41-68MHz and 174-216MHz) earlier. In that, the only specific mention of an individual allocation was a recommendation that amateurs should have a band in the 50-54MHz range. The final report made no change to that.

I suppose it was rather naive to expect the Committee to attempt to carve up the spectrum between the various conflicting interest groups, when the Radio Regulatory Division (RRD) can only manage the task with great difficulty.

Cable TV

The growth of cable television is likely to place huge new demands on the already crowded microwave spectrum. TV companies will need microwave links to feed outside broadcasts to their studios. They will need more links to feed from their studios to other studios and the local cable companies, both in the UK and abroad. Some of these feeds will be carried by terrestrial microwave links, and some by satellite microwave links. At the moment there are only four national television networks. With, say, twenty networks there will obviously be five times the demand for outside broadcast and distribution links.

British Telecom had difficulty providing such links for Channel 4 in time for the network's launch in November 1982. Buzby's bacon was saved largely by the high reliability of modern microwave equipment, which enabled standby links ('protection channels'), previously kept in reserve for the existing three networks in case of a breakdown, to be used for the new service.

Now, British Telecom, Mercury and Eutelsat (European Telecommunications Satellite Organisation) are hard pressed to meet the video circuit demands of the fledgling cable-TV industry between them. They're all installing new capacity as fast as they can. Nearly all of it relies on microwaves. Imagine the demand that is putting on the spectrum above 1GHz!

Then imagine the pressure on the RRD to 'do a Belgium' on the amateur microwave bands...

WHAT NOW AFTER MERRIMAN

Lower down

The growth in cable-TV will clearly make huge demands on the microwave spectrum. However, in the USA, the main problem for amateurs has been leakage in and out of cheap, grotty co-axial cables at VHF. A single 2m transmitter can wipe out a thousand TV sets in one go. Also, radiation from the cable can make weak-signal work impossible.

Luckily, it looks as though British cable networks will be required to work to a much tighter specification as a condition of their franchises. This will require thorough filtering and screening, so at least 2m looks safe!

The 432MHz band is likely to remain the victim of lustful thoughts of both civil and military interest. Now that it is only available to amateurs on a secondary basis, there may be more fixed, mobile and radiolocation systems put in this band. The Radio Regulatory Division is aware that 70cm is very popular with amateurs, and they will take the amateur view into account when further allocations are made.

On HF, things look quite rosy in some ways. The present restrictions on the 18 and 24MHz bands will be lifted not later than 1st July 1989, when the amateur service achieves primary status on these bands. If all of the existing fixed stations are moved out earlier than 1989, then we could have full power and all modes on these bands earlier. Either way, we shall have full access to them in time for the next peak of the sunspot cycle, expected in 1991.

50MHz is another band that will be extremely interesting at the sunspot maximum. At the moment the RRD is deciding about the 50MHz band, along with the rest of Bands I and III. One of the problems is that these frequencies are still used for television in many European countries. The RRD is negotiating with the UK's neighbours, especially Ireland and France, because of the need to prevent interference to their TV broadcasting. In the near future the RRD will publish a green paper on Bands I and III, in which they'll explain how they intend to allocate them after 405-line TV closes down. The paper will be discussion document, followed by a period of public consultation, when all the various interest groups will no doubt demand three times as much spectrum as they're offered. The paper is expected to concentrate on Band III more than Band I. It will probably offer the lion's share of Band III to land mobile radio, as this part of the spectrum is much less prone to anomolous propagation than Band I. This is more good news for amateurs wanting 50MHz.

MOULD & SYLEDIS

-What we know...

Quite a lot actually, and a lot of what we say in the next few pages may surprise you. If you are a regular user of 432MHz, then you have probably realised something else is out there...

If you're active on 432MHz and spend some of your amateur life chasing DX, messing about with TV or just working through some of the repeaters on the band you'll probably know something about two systems which inhabit the 432MHz band, as well as we amateurs.

First of all, let's deal with one obvious question - what are other radio systems doing in an amateur band anyhow?

That's quite a story in itself. Basically, not all amateur bands are allocated *just* to amateur users. This matter of *what* parts of the radio spectrum are allocated to *what*, forms a large chunk of a big red tome called the "Radio Regulations", which are agreed upon at big meetings of interested countries. The last one was the World Administrative Radio Conference of 1979, which produced the present two-volume piece of bed-time reading. The book costs a fortune too - about £64. The things we do for our readers.....!

Don't quote us at the United Nations!

Anyhow, various parts of the spectrum are divided into what are called "bands" and different categories of user are let loose on them. There are two sorts of user; the "primary" user has various rights and pretty much the freedom to do what he wants, whereas the "secondary" user isn't quite so lucky. The chief difference for our purposes is that the primary user can claim what is called 'protection' which doesn't mean the secondary user having to pay out lots of used pound notes to ensure that their wirelesses don't get broken by Luigi and the boys. It means that the secondary user mustn't cause interference to the primary user's use of the band, whereas the secondary user has to put up with it if he gets it and move frequency if he wants to avoid it. That's condensing whole chunks of the Radio Regs into about two sentences, by the way. Don't quote us at the United Nations, but that's the essence of it. The secondary user can't claim any protection, whereas the primary user can.

Now then. The amateur service is a primary user of many of its bands - indeed it's a "primary exclusive" user of some. The 144MHz band is a case in point. This is a "primary exclusive" band, which means that no other radio service is entitled to use it and must stay well clear of it. In other words, 144-146MHz is allocated to the amateur service alone. This is true pretty well everywhere in the world, by the way, apart from those places which have "footnotes" in the Radio Regs, but we'll come to those in a minute.

Another example might be the 3.5MHz band. Here the amateur service in many countries is a secondary user, with the "fixed" service as primary users. This means that, in practice, various types of transmission, apart from amateur stuff, can be heard in this band - mainly coastal stations of one sort or another talking to shipping, marine radio-telephone services and what-have-you. We, the amateurs, have to give them priority; in theory they can ask us to QSY or QRT (as happened to us a few years back) although it doesn't seem to happen very often. In other words, common sense prevails and we live with each other quite happily.

If you take a look at the Radio Regs you find that in the case of radio amateurs you'd expect them to be primary users of the 432MHz band.

It seems to say so, anyway. However, you'll also see on the opposite page a whole list of "footnotes", which are what different countries use when they want to make a different arrangement. There is no footnote to the effect that the amateur service is a secondary user of 432MHz as far as the military are concerned, or anything else for that matter - so all in all you could be excused for thinking that amateurs had exclusive use of the band. But we don't.

The two other users of 432MHz are MOULD and SYLEDIS. The first is a military system and the second is a radio position-fixing system beloved of the oil industry and similar folks. Now there used to be a footnote in the old edition of the Radio Regs to the effect that the amateur service was secondary to radiolocation on 432MHz but there certainly isn't one now. Why not? Well, we have it on the best authority that the Home Office did something worthy of the Bicester Simpletons at their best, ie they forgot! There was supposed to be a footnote which put radiolocation as the primary user and amateurs as secondary in the UK but someone somewhere had too many beers and late nights or whatever at WARC 79 and simply forgot to put it in. Or so we're told by someone in the HO who jolly well ought to know, and it would explain a lot.

Syledis, for all its cleverness, is a thoroughly nasty system

Fair enough, you might say, someone goofed. How can they get away with it? Isn't it the Radio Regulations a binding document which every country must stick religiously to? Well, no. Life isn't quite so simple.

Finally, may it be said that the introduction of permanent Syledis chains has been successful from just about all points of view. There is still room for improvement but the main aims have been achieved. In the new era the existance of the chains and all the hard work that went into establishing them will probably be taken for granted by those who were not faced with the problems which existed previously. Hopefully the Operators will not be discouraged by the numerous criticisms in hind sight and suggestions for refinement which are bound to follow any significant step in progress and will continue to provide this most useful service.

Extract from Shell UK Exploration and Production official document

MOULD & SYLEDIS

Thing is, you see, there's a catch. Individual administrations reserve the right to make whatever local arrangements they wish **provided that no interference is caused to other countries' use of a particular band.** Write that last sentence out 100 times and commit it to memory because it's the key to what comes next. This is why, although there's no actual mention of radiolocation in the Regs, the Home Office can give the go-ahead to Syledis if it wishes. It could, in theory, give the go-ahead to anything it wanted to - broadcasting or PMR or CB or a special 50 megawatt transmitter broadcasting Goodhead propaganda to the peasants of Lower Albania if it wanted.

Individual administrations can do whatever they desire...

Being quite fair and honest about this, it cuts both ways. You won't find anything in the Radio Regs about an amateur band at 70MHz in the UK, for example - that's a special concession given to us only. You won't find anything about 40 Good Men and True having permits to operate on 50MHz after TV hours either - ditto. So it isn't all bad news. But it is worth bearing in mind that individual administrations can do whatever they so desire, providing that interference to other administrations' services isn't caused.

Obviously there might be snags; one imagines there'd be an outcry if the Government announced tomorrow that they were annexing 144MHz for the police or PMR or something and they might even find it quite difficult to enforce it, but in theory it could certainly be done. You only need to look across the water to Belgium to see an example of what can be done in practice if things go wrong. We don't think it would ever happen here. Again on the highest authority, we gather that the Department of Trade and Industry has a lot of respect for the RSGB and listens very carefully to what they have to say. The RSGB seem to have been quite aggressive in 1983 as far as keeping amateur bands in the UK is concerned, so we must hope that the chaps at Potters Bar keep it up.

It appears from a number of sources that if they hadn't worked rather hard we'd have lost the entire 432MHz band and not just a bit of it, early last year.

So there's no footnote about radiolocation and nothing about the military either. If you look back through older Radio Regs, there's nothing about the military there either. Why can this be?

It's quite simple. Although it was never really written down anywhere, the amateur service had always been a secondary user of the 432MHz band right from Day One of when we got it in 1949 or whenever. The primary user, to no one's great surprise, has always been the Ministry of Defence, or whatever names they've gone under in the last twenty years or so - in fact, we didn't realise until we read recently that this was true of all bands between 432MHz and 24GHz, if you please! No one seems to have ever commented on this or noticed it or whatever, and presumably this was because no one was ever told about it. It was just one of those things which happened. It was probably mentioned in a casual conversation in 1949 or whenever and forgotten by 1950.

It wouldn't have mattered either. Two people in the office here have been keen 432MHz types for years and years, and one of them briefly held the DX record on the band in the early sixties; neither of them have ever heard anything other than amateur signals in the band until late 1981, apart from Syledis of course. As far as we can gather, the Ministry of Defence hadn't wanted to use the band at all until fairly recently.....

It's basically a complicated repeater chain

Which brings us to MOULD. A charming codename (it doesn't mean anything) for a very complicated and clever system which is essentially a command and control network designed to link local army commanders and the like with each other and with their forces more or less anywhere in the country within a few seconds. It's basically a complicated repeater chain - the signals we hear on the half-channels of the repeater end of 432MHz are outputs with inputs 11MHz LF. However, those aren't the only inputs - each MOULD site is linked to its fellows by link frequencies just below 144MHz and there are inputs in the low PMR sectors.

We're patriotic enough to think that maybe we wouldn't be doing a potential enemy any harm by saying a lot more, although believe us, we know quite a lot.

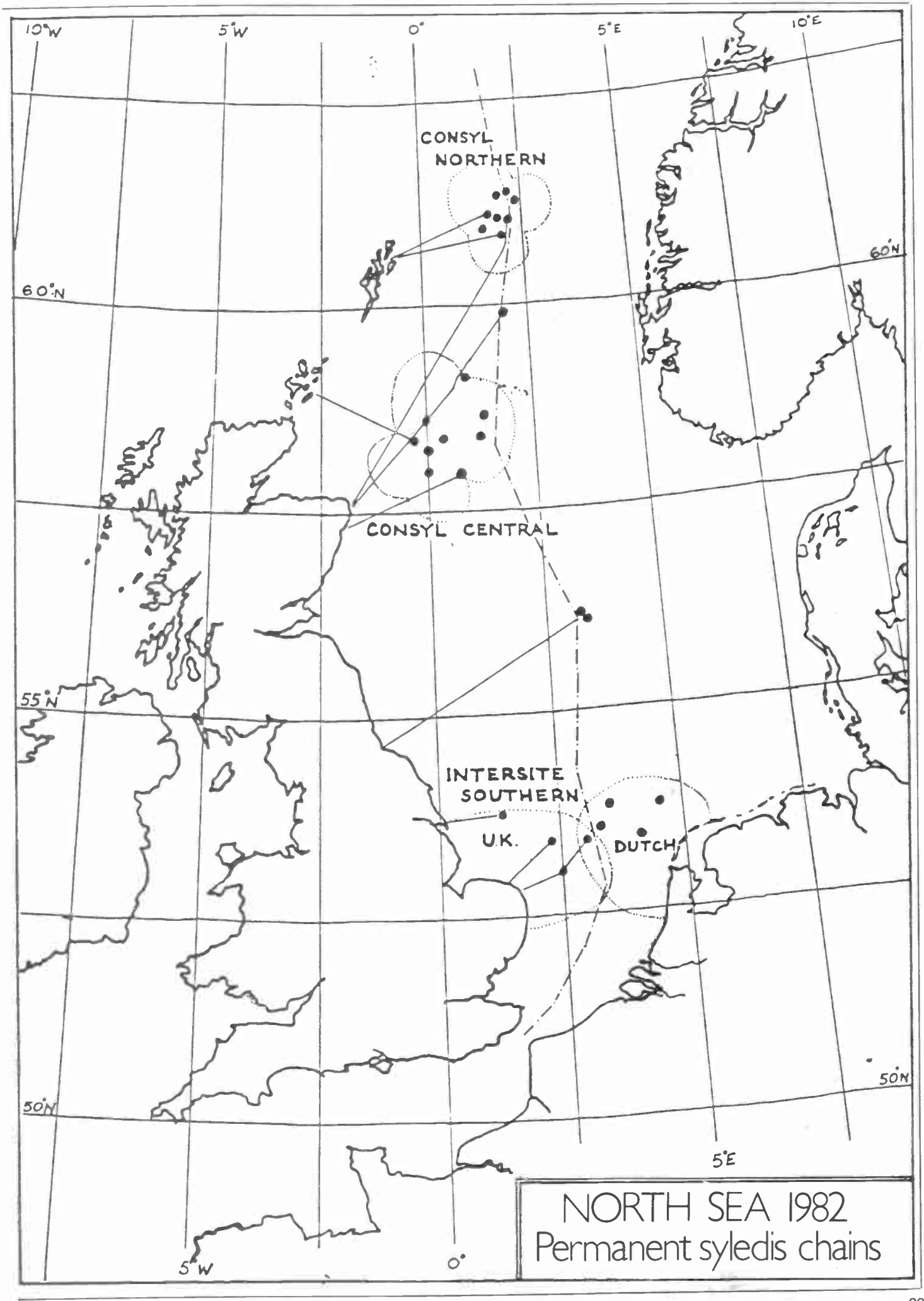
SYLEDIS CHAIN SLOT FORMAT - TYPICAL ARRANGEMENT

● = TRANSMIT 0 = RECEIVE

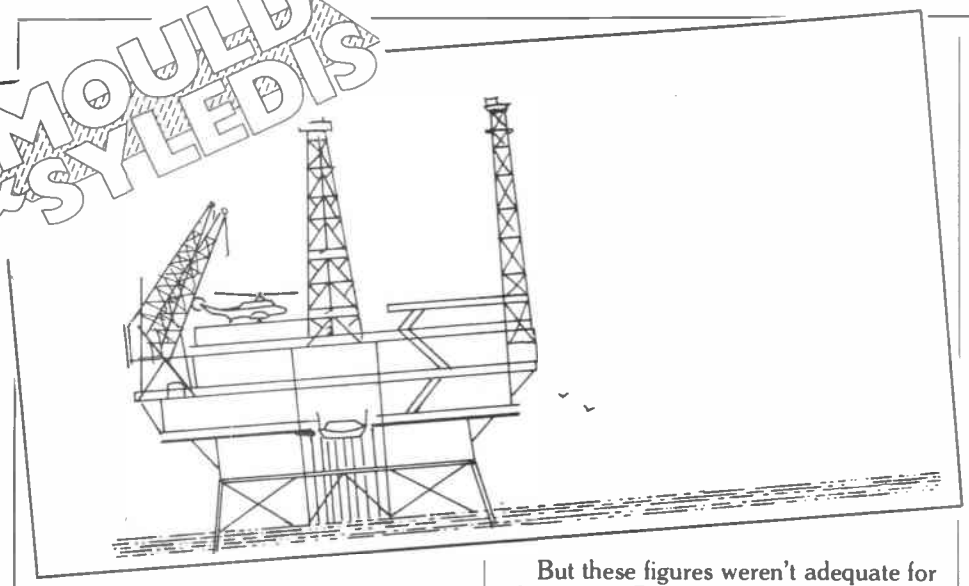
UNIT/SLOT	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
BEACON 1 (SYNC)	●	●					0	●					0	●					0	●						
BEACON 2	0	0	●				0		●				0		●				0		●					
BEACON 3	0	0		●			0			●			0			●			0			●				
BEACON 4	0	0			●		0				●		0				●		0				●			
BEACON 5	0	0				●	0					●	0					●	0					●		
I/R MOBILE 1	0						●	0	0	0	0	0														
I/R MOBILE 2	0												●	0	0	0	0	0								
I/R MOBILE 3	0																		●	0	0	0	0	0		
HYPERBOLIC	0	0	0	0	0	0																				

<---------- 99.9 ms/cycle ----------

30 slots each of 3.33ms = 99.9 ms cycle.
Each slot comprises 2.66 ms Tx/Rx plus 0.67 ms deadtime.
In each 2.66 ms Tx/Rx period, 40 correlation codes are repeated, each code is of 66.6 sec duration.
Maximum time for a range measurement is therefore $\frac{1}{2}$ x 66.6 sec.
Range ambiguity is therefore $\frac{66.6 \times 299776}{2}$ km = 10 km.



MOULD & SYLEDIS



In fact, we don't see MOULD as a big threat to amateur life on 432MHz - we'll just have to learn to live with it. Some pretty silly technical decisions seem to have been taken in terms of where it was put and how it was spaced, but to be quite honest we can't see it causing more than perhaps the odd spot of bother to yer average amateur.

We gather that MoD didn't really want to put it there but they hadn't a lot of choice, and we also gather that the contractor for the system, Pye Telecommunications, did most of the work of interleaving it with the repeater network. We would guess that maybe a few repeaters might have to change frequency at some point when the odd problem crops up but to be really honest about it, we feel that MOULD will cause a lot less aggro to amateurs than lots of other things we could think of. Provided, that is, that the local Foreman of Signals keeps the thing on its spec - our local one seems to wander about a fair bit, and as I'm in my Swinging Bicester office typing this, I can hear that it's about 2kHz low of where it ought to be.

So the verdict on MOULD: fine. As long as it isn't the thin end of the wedge. But as for Syledis - it's a very different story.

A range of 200 miles offshore was asking quite a lot

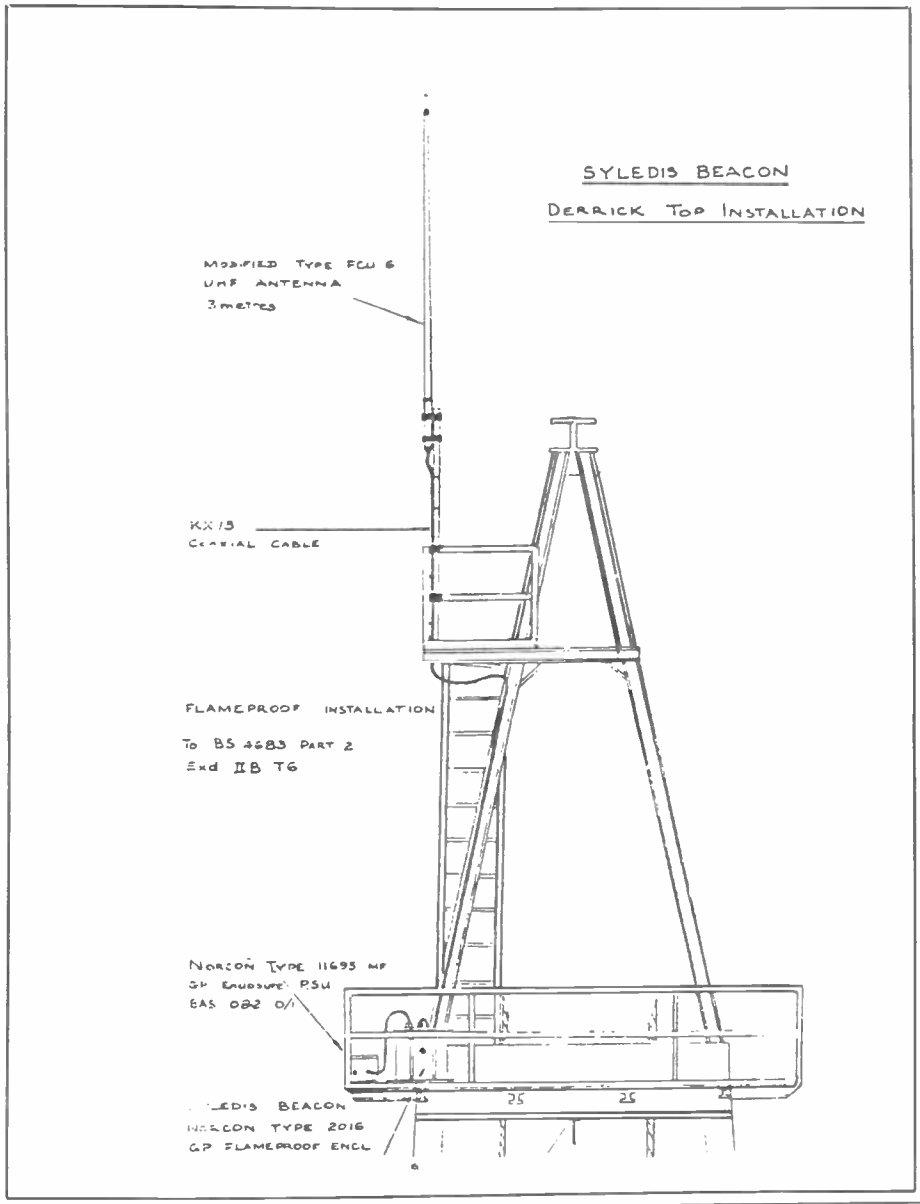
As we've explained, Syledis is a position-fixing system commonly used by the oil industry and similar - it was designed and marketed by a French firm, SERCEL, and received with little squeeks of glee by the oil industry when it first came out in 1975. Basically, there was a need in the North Sea for a good position-fixing system at about that time, when the major oilfields were being set up; most of the exploration work had been carried out using long-range positioning systems such as Decca Main Chain and Pulse-8, which had accuracies of between 25 and 50 metres.

But these figures weren't adequate for things like 3D seismic surveys, pipelaying and platform installation, and something more like plus or minus give metres were needed. At a range of about 200 miles offshore, that was asking quite a lot. MF systems were out in terms of accuracy, and microwave things like Miniranger and Trisponder had much too short a range for the job. So Syledis was the answer to the proverbial prayer.

Syledis is an acronym for Système Légère de Mesure de Distance; the Home Office approved frequency band for it is 431-434MHz. The thing is actually a very clever system indeed; Technical Editor has all the circuits for it and he thinks it's brilliant technically. The basic device consists of two boxes: a Mobile unit and a Beacon unit, and the latter is the thing that sits on the shore and gets interrogated by the former on the rig or whatever. The two basic boxes let you work in Range mode - adding a third Beacon gives you a hyperbolic line of position like that in Decca or Consol or whatever.

Syledis was the answer to the proverbial prayer

The Beacon box onshore is the thing that clobbers chaps trying to do weak-signal work at the botton end of 432MHz. It's a sort of ratchety pulse-type interference which is *very* wideband (we'll come back to that in a bit) and it's a real killer if you're after the weakies.



MOULD & SYLEDIS

We don't doubt that Syledis is accurate. We don't doubt that the oil industry needs a precise system. And we don't doubt that the oil industries are important to this country's future. But oh dear! Syledis, for all its cleverness is a *thoroughly nasty system.*

Syledis is meant to have a bandwidth of 1.8MHz

Like many French products, Syledis is a good example of clever technology applied without any sensitivity to the context it is working in. It's almost like cleverness for its own sake. It is inherently a wideband system, and wideband systems have no place at frequencies like 432MHz; they are too costly of precious spectrum. The thing is supposed to have a bandwidth of 1.8MHz, but, as the poet remarked "like hell it does". It's more like 5 or 6MHz in practice and we've seen some spectrum analyser photographs which make a spec of 1.8MHz quite laughable.

We shudder to think of the effect MOULD and Syledis have on each other

It really is infernally greedy of spectrum, or, if you prefer, very spectrum-inefficient. It may well have been state-of-the-art when it was introduced, but in an age where satellite navigation is cheaply available (a Syledis becaon unit costs £14,000, its mobile unit £20,000 and the power supply and antenna set a mere £1000 - Monsieur Sercel must be laughing all the way to la banque) there is no conceivable point whatever in continuing its existence. Yet the Home Office seem quite oblivious to the nastiness of the system. A wideband UHF radiolocation system simply has no place in a world which is desperately short on spectrum space in that part of the radio arena, and we shudder to think what effect MOULD and Syledis have on *each other* from time to time! MOULD is emphatically not a hostilities-only system; it's fairly general use in those parts of the country where the network is substantially complete, and there's no doubt that it's suffered from Syledis a time or two.

We would dearly love to see some high grade technical decision-making ability at the Radio Regulatory Department; we absolutely agree with the Merriman Committee report that it currently leaves a good deal to be desired. No one with any degree of engineering sensibility would have put a wideband trans-horizon radiolocation system with a weak technical specification in some crucial areas into a part of the RF spectrum which is precious not only to radio amateurs but to many others.

We do not see MOULD as a threat to amateurs on 432MHz

We have physically seen a Syledis beacon running 50 watts into an omni antenna (omni!) and seen a 99% energy density bandwidth of 6.15MHz; we have heard it latch up the Isle of Wight repeater for hours on end. Not good; and neither are the permanent Syledis chains which the European authorities have seen fit to establish. Hasn't anyone heard of NAVSTAR? It's about four times more accurate, and costs £3720.

Oh well, here's to the next opening on 432MHz. In the meantime, let's hope that someone somewhere sees sense.

Operating Frequencies

(Extract from Shell UK Exploration and Production official document)

One of the most time consuming arrangements to be made when temporary navigation chains are established is that of obtaining an operating licence for the system at each new installation. Since this time - constraint is often more important from the Oil Company (End User) point of view (because of its effect on his expensive marine operations), it had become an almost accepted practice to involve the end user either directly or indirectly in supporting the application to the Home Office Radio Regulatory Department. For this reason the UKOOA PFG had already taken the step in 1979 of ensuring that frequencies were available by negotiating a block allocation for the North Sea area. The Home Office approved frequency band for Syledis in the North Sea is 431-434 MHz. Furthermore, in order to minimize the risk of interference within the quite limited band allowed, joint user/manufacturer discussion had taken place as a result of which SERCEL had recommended a set of spot working frequencies which could be used in neighbouring chains without fear of interference. These were:

f1	432.563	MHz	Central)
f2	432.513	MHz	Southern) Primary Group
f3	432.463	MHz	Northern)
f4	432.383	MHz)	Seconday Group not to be
f5	432.303	MHz)	used within 100 km of Primary
f6	432.144	MHz)	Group

The primary group f1,f2 and f3 could, if needed, be used in the same or overlapping areas as could any of the secondary group, but the two groups could not be overlapped without danger of interference. Because of the possibility of such interference, North Sea users agreed to stick to the use of the primary group using a separate frequency for each area. This arrangement gave interference free operation in the Northern and Central Chains but INTERSITE ran into some difficulty in the South. They in fact opted to use two of the primary group frequencies to run two overlapping chains because their area was too wide to cover with just 4 beacons (they have beacons as far apart as Docking in the Wash and Tershelling in Friesland, 5 degrees of longitude apart). The frequency used on the UK side 432.513 (f2) gave no problem. The Netherlands P.T.T. authorised frequency 432.563 (f1) had on the other hand, a serious restriction placed on it so far as those beacons which were set up onshore were concerned. Amateur radio users had been given a band which included this frequency for use at weekends (430-440 MHz). The P.T.T. tried to persuade amateur users to stick to the upper part of the band 435-440 MHz so as to allow INTERSITE unrestricted use of (f1) 432.563 but the ruling was not enforceable and the amateurs for some reason seemed also to prefer the lower range. This unsatisfactory constraint was overcome only by the great expense of purchasing specially modified equipment working at 408 MHz, a frequency available by agreement with the Rijkswaterstaat, a government body with special responsibility for coastal defences in Holland who had this frequency dormant but available for their own occasionally used Syledis chain. INTERSITE have had further problems in this respect more recently because of the need to reactivate this chain with the result that they may again have to change frequency, this time to 437.5 MHz. UK Syledis users should, I think, be thankful that they have been efficiently served in this respect by the Home Office regulation of frequencies.

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YAESU HF EQUIPMENT

FT ONE	Transceiver General Coverage
RAMT1	Nonm volatile memory board
FMUT1	FM unit
FT980	Transceiver General Coverage Rx
SP980	External speaker
SP980P	External speaker phone patch
FT102	Transceiver 9 band multimode
SP102	Speaker with audio filter
SP102P	Speaker and phone patch
FV102DM	Synthesized scanning VFO
FC102	Antenna coupler 1.2KW PEP
AMFMUT102	AM FM unit option
FAS14R	4 way antenna selector
FT77	Transceiver 9 band mobile
FT77S	Transceiver 9 band mobile 10
FMUT77	FM Board option
FP700	External power supply speaker
FC700	Antenna tuner
FL2100Z	Linear Amplifier 1200 W + (PIP)
FT707	Transceiver 100W 10-80M
FP707	Mains power supply speaker
FV707DM	Digital VFO
FC707	Antenna Tuner
FTV707R	Transvertor c/w 2M
FT757GX	Mobile HF General Rx
FP757GX	Switched mode PSU
FP757HD	Heavy Duty PSU
FC757AT	Automatic antenna tuner

YAESU VHF EQUIPMENT

FT726R(2)	Multimode multiband c/w 2M
FT726R	Main frame only
50/726	6m module
21/24/28	HF module for 15m, 12m, 10m
144/726	2m module
430/726	70cm module
SAT726	Full duplex module
FT230R	Transceiver 2m FM 25W
FT730R	Transceiver 70cm FM 10W
FT690R	Transceiver 6m 2 5W multimode
FT290R	Transceiver 2m 2 5W multimode
FT790R	Transceiver 70m 1W multimode
FL2010	Linear amplifier 2m 10W
FL7010	Linear amplifier 70cm
FT680R	Multimode transceiver 6m
FT480R	Multimode transceiver 2m
FT780R+1 6	Multimode transceiver 70cm
FP80A	Power supply unit
FL2050	Linear amplifier 50W
FT720RV	Transceivers 2m 10W FM
FT720RVH	Transceivers 2m 25W FM
FT720RU	Transceiver 70cms 10W FM
720RV	Deck only 2m 10W
720RVH	Deck only 2m 25W
720RU	Deck only 70cms 10W
FT280R	Transceiver Handheld 2 5 2m
FT708R	Transceiver Handheld 1W 70cms
NC8C	Quick charge and PSU

YAESU RECEIVERS AND ACCESSORIES

FRG7700	Receiver 0.15-3D MHz all mode
FRG7700M	Receiver c/w 12 channel memory
FRT7700	Antenna tuner/switch
FRA7700	Active antenna
FRV7700A	Convertor 118-130, 130-140, 140-150
FRV7700B	Convertor 118-130, 140-150, 50-59
FRV7700C	Convertor 140-150, 150-160, 160-170
FRV7700D	Convertor 118-130, 140-150, 70-80
FRV7700E	Convertor 140-150, 150-160, 118,130
FRV7700F	Convertor 150-160, 160-170, 118-130
YM24A	Hand 2K, 6 pin min, speaker/mic
YM37	Hand 600, 8 pin
YM38	Stand 600/50K, 8 pin scan
YM49	Hand 600, 7 pin, speaker/mic
YE7A	Hand 600, 4 pin
YD148A	Stand 600/50K, 4 pin
MH-1B8	Hand 600, 8 pin scan
MD-1B8	Desk 600, 8 pin scan
FSP1	Mobile speaker 8 ohms
FSP2	Mobile speaker 4 ohms
YH55	Headphones padded low z
YH77	Headphones lightweight low z
YH1	Lightweight mobile headset, boom
SB1	PTT switch box for FT208 FT708
SB2	PTT switch box for FT290 FT790
SB3	PTT switch box for FT202
QTR24D	World time clock quartz
FF501DX	Low pass filter

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A SELECTION FROM SMC'S WIDE RANGE OF PRODUCTS

JAYBEAM

4Y/4M	Yagi 4 element
PM112/4M	Phasing harness 2-way
HO/2M	Halo head only
HM/2M	Halo with 24" mast
C5/2M	Colinear omnivert
LW5/2M	Yagi 5 element
LW8/2M	Yagi 8 element
LW10/2M	Yagi 10 element
LW16/2M	Yagi 16 element
14Y/2M	Yagi 14 element
PBM10/2M	10 ele parabeam
PBM14/2M	14 ele parabeam
Q4/2M	Quad 4 element
Q6/2M	Quad 6 element
Q8/2M	Quel 8 element
D5/2M	Yagi 5 over 5 slot
D8/2M	Yagi 8 over 8 slot
5XY/2M	Yagi 5 ele crossed
8XY/2M	Yagi 8 ele crossed
10XY/2M	Yagi 10 ele crossed
PMH2/C	Harness cir polarisation
PMH2/2M	Harness 2-way 144MHz
PMH4/2M	Harness 4-way 144MHz
C8/70	Colinear Omni Vertical
D8/70	Yagi 8 over 8 slot
PBM18/70	18 ele Parabeam
PBM24/70	24 ele Parabeam
LW24/70	Yagi 24 element
MBM28/70	28 ele Multibeam
MBM48/70	48 ele Multibeam
MBM88/70	88 ele Multibeam
8XY/70	Yagi 8 ele crossed
12XY/70	Yagi 12 ele crossed
PMH2/70	Harness 2-way
PMH4/70	Harness 4-way
CR2/23CM	Corner reflector
PMH2/23CM	Harness 2-way

SMC-HS (Hokushin)

SMCGDX1	Discone 80-480MHz
SMCGDX2	Discone 50-480MHz
GDXA	Discone 100-440MHz
SMCVHFL	Discone 65-520MHz
SMCGP23	Colinear 2M 3 × 5/8 wave
SMCGP144W	Colinear 2M Multi 5/8 wave
SMCGP2M	5/8 wave c/w ground plane
SMCSQ144	2M Swiss Quad for vertical
SMCGP432X	Colinear 70cm 3 × 5/8 wave
SMC70M2V	Colinear 2M - 70cm
SMCHS70	144/432 Duplexer 50W
SMC2QW	Element 144MHz 1/4 wave
SMC2NE	Element 144MHz 5/8 wave
SMC2VF	Element 144MHz 1/2 wave
SMC78F	Element 144MHz 7/8 wave
SMC78B	Element 144MHz 7/8 wave
SMC88F	Element 144MHz 8/8 wave
SMC258	Element 432MHz 2 x 5/8
SMC358	Element 432MHz 3 x
SMC70N2M	2M 2.7dB / 70cm 5.1dB

HY GAIN

2 AVQ	Vertical 10 15 20 14.0 H
14AVQ WB	Vertical 10 15 20 40 18.0 H
18AVT WB	Vertical 10 15 20 40 80M 25.0 H
14RMQ	Roof mtg kit for above
18V	Vertical 10,15,20,40,80M 19.0H

EXPLORER YAGI 10,15,20M

103BA	3 ele Yagi 10 mtrs 7.0 LE 6.0 B
105BA	5 ele Yagi 10 mtrs 18.5 LE 24.0 B
153BA	3 ele Yagi 15 mtrs 23.0 LE 12.0 B
155BA	5 ele Yagi 15 mtrs 24.5 LE 26.0 B
203BA	3 ele Yagi 20 mtrs 35.0 LE 16.0 B
204BA	4 ele Yagi 20 mtrs 36.5 LE 26.0 B
205BA	5 ele Yagi 20 mtrs 36.5 LE 34.0 B
402BA	2 ele Yagi 40 mtrs 43.0 LE 16.0 B
DB10/15A	3 ele Yagi 10-15M 23.0 LE 13.0 B
TH3 JNR	3 ele Yagi 10-15-20M 24.2 LE 12.0 B
TH2MK3	2 ele Yagi 10-15-20M 27.3 LE 6.0 B
TH3MK3	3 ele Yagi 10-15-20M 27.0 LE 14.0 B

BNC PLUG 50 ohms

UG88	Standard type 5.5mm
UG599	Large type 11.2mm

BNC SOCKET 50 ohms

UG290	Standard 4 hole type
UG1094	Nut fixing type
UG69	Free cable end 5.5mm

BNC COUPLER 50 ohms

UG914	Back to back female
UG491	Back to back male
UG274	T 2-female 1-male
SMC3FBNC	T 3-female
UG306	Elbow, Male-Female

BNC INTERSERIES ADAPTOR 50ohms

UG255	BNC plug — UHF socket
UG273	BNC socket — UHF plug
UG201	BNC socket — N plug
UG349	BNC plug — N socket
UG606	BNC socket — N socket

UHF PLUG

PL259	Standard type 11.2mm
PL259P	Push on type 11.2mm
UG175	Reducer 5.0mm
UG176	Reducer 5.6mm
PL259R	Reducer type 5.0mm
PL259A	Deluxe type 11.2mm
PL259B	Deluxe type 5.0mm
PL259SL	Solderless 11.2mm
PL259SS	Solderless 5.0mm
PL259E	Angle type 5.0mm
PL259M	Metric type
L42P	For LDF2/50 Heliax
L44P	For LDF4/50 Heliax
PL259PM	Panel mount 4 hole

UHF SOCKET

S0239F	Standard 4 hole fix
S0239F31000	4 hole PTFE Au plate
S0239T	2 hole fixing type
S0239NI	Nut fixing inside type
S0239NO	Nut fixing outside type
S0239E	Free angle type 5.0mm

UHF COUPLER

PL258	Back to back female
PL274	Back to back chassis
SMCPL/PL	Back to back male
M359	Elbow male-female
M358	T 2 female 1 male

UHF INTERSERIES ADAPTORS

UG255	UHF socket — BNC plug
UG273	UHF plug — BNC socket
SO/35	UHF socket — 3.5mm jack
SO/NF	UHF socket — N socket
UG146	UHF socket — N plug
UG83	UHF plug — N socket

N PLUG 50 ohms

UG83	Small type 5.5mm
UG21	Standard type 11.2mm
L42W	For LDF2/50 Heliax
L44/W	For LDF4/50 Heliax

N SOCKET 50 ohms

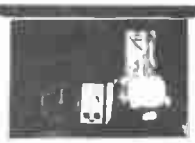
UG58	Standard 4 hole fix
UG1062	Free cable end 5.5mm
UG23	Free cable end 11mm
L42N	Free jack for LDF2/50
L44N	Free jack for LDF4/50

N COUPLER 50 ohms

UG107	T 2 female 1 male
UG28	T 3 female
UG57	Double male adaptor
UG29	Double female adaptor
UG27	Elbow male-female

N INTERSERIES ADAPTORS 50 ohms

UG201	N plug — BNC socket
UG349	N socket — BNC plug
UG606	N plug — UHF socket
UG83	N socket — UHF plug
SO/NF	N socket — UHF socket



SMC400	Offset 3 core Light Duty
AR30	Offset 5 core Light Duty
KP250	Bell 6 core Lighter Duty
9502B	Offset 3 core Lighter Duty
AR22	Bell 4 core Medium Duty
9508	Offset 3 core Medium Duty
AR40	Bell 5 core Medium Duty
BT1	Bell 5 core Preset Medium
KR400	Bell 6 core Medium Duty
KR500	Thro 6 Core Elevation
AR50	Bell 5 position Medium
KR400RC	Bell 6 core Medium Duty
CD45	Bell 8 core Heavy Duty
KR600RC	Bell 8 core Heavy Duty
HAM IV	Bell 8 core Heavier Duty
KR200RC	Bell 8 core Heavier Duty
T2X	Bell 8 core Very Heavy Duty
H300	Bell 8 core Digital Readout

LINEAR AMPLIFIERS

KLM

PA15/160BL	160W out 15W in

MICROWAVE MODULES

MML28/100S	10M/10W in 100W
MML70/50S	4M 10W in 50W out
MML70/100S	4M 10W in 100W out
MML144/30LS	2M 1/3W in 30W out
MML144/50S	2M 10W in 50W out
MML144/100S	2M 10W in 100W out
MML144/100LS	2M 1/3W in 100W out
MML432/30L	70cm 1/3 W in 30W out
MML432/50	70cm 10W in 50W out
MML432/100	70cm 10W in 100W out

TRANSVERTERS

MICROWAVE MODULES

MMT28/144	2M Down to 10M
MMT70/28	10M Up to 4M
MMT70/144	2M Down to 4M
MMT144/28	10M Up to 2M
MMT432/28S	10M Up to 70cm
MMT432/144R	2M Up to 70cm
MMT432/144S	2M Up to 70cm
MMT1296/144	2M Up to 23cm 2W
MTV435	70cm ATV 20W Transmitter

CONVERTERS/PREAMPS

MICROWAVE MODULES

MMA28	10M Low Noise Preamp
MMC28/144	10M Up to 2M
MMC70/28	4M Down to 10M
MMA144/V	2M RF Switching Preamp
MMC144/28	2M Down to 10M
MMC432/28S	70cm Down to 10M
MMC432/144S	70cm Down to 2M
MMC435/600	70cm ATV Up to UHF Ch 35
MMA1296	23cm Low Noise Preamp
MMK1296/144	23cm Down to 2M

MUTEK

SLNA144s	144MHz switched preamp
SLNA144u	144MHz unswitched preamp
SLNA144ub	Unboxed vers. of SLNA144u
SLNA145ab	FT290R optimised preamp
SBLA144e	144MHz Mosfet musthead
GFBA144e	144MHz Gasfet musthead
TLNA432s	432MHz switched preamp
TLNA432u	Unswitched TLNA432s
TLNA432ub	Unboxed TLNA432u
GLNA432u	432MHz Gasfet amplifier

HANSEN

FS710H	1.8-60MHz 15/150/1500W Pep
FS710V	50-150MHz 15/150W Pep
FS50HP	1.8-80MHz 20/200/2000W Pep
FS50VP	50-150MHz 20/300W Pep
FS500H	1.8-80MHz 20/200/2000W Pep
FSOOV	50-150MHz 20/200W Pep
FS300H	1.8-80MHz 20/200/1000
FGS300V	50-150MHz 20/200
FS200	1.8 150MHz 20/200 Pep
FS001M	1.8-30MHz 20/200W Pep
FS601MH	1.8-30MHz 200/2000W Pep
FS800M	50-150MHz 20/200W Pep
FS600M	430-440 MHz 5/20W Pep
FS210	1.8-150MHz 20/200W Auto SWR
FS301M	2-30MHz 20/200W
FS301MH	2-30MHz 200/2000W
FS302M	50-150MHz 20/200W
FS711H	2-30MHz 20/200W Head
FS711V	50-150MHz 20/200W Head
FS711U	430-440MHz 5-20W Head
HB1	FS711H Coupler
VB1	FS711V Coupler
UB1	FS711U Coupler
FS5E	3.5-150MHz 20/200/1000W HF
FS5S	1.8-150MHz 20/200/1000W HF
FS7	145 & (432MHz) 5/20/200 144
SWR3E	3.5-150MHz 20/200/1000W HF
SWR3S	3.5-150MHz F/S Meter ant.
SWR508	3.5 150MHz Twin Meter
FS20D	3-150MHz 5/20W
FS800	1.8-150MHz 6/30/150W

JD

JD110	1.5 150MHz 10/100W

MIRAGE

MP2	50-150MHz 50/500/1500W Pep

SMC

S3-3OL	Mini CB
T3-17OL	3.5-170MHz Relative

MORSE KEYS

BKU1	Squeeze Key
HK703	Straight Key
HK704	Straight Key
HK706	Straight Key
HK707	Straight Key
HK710	Straight Key
HK808	Straight Key
HK711	Key Mounting
BK100	Mechanical Bug
MK701	Single Lever Paddle
MK702	Single Lever Paddle
MK703	Squeeze Key
MK705	Squeeze Key
MK706	Squeeze Key
IKP60	Iambic
SR1	Straight Key

MORSE RTTY EQUIPMENT

KP100	Squeeze CMOS 230/13.8V
KP200	Memory 4096 Multi Ch Mem Back-up 230/13.8V

Datong

D70	Morse Tutor

MICROWAVE MODULES

MM2001	RTTY to Demod./Convertor
MM4001	RTTY Transceiver
MM40001KB	RTTY Transceiver c/w keybd
MMS1	"Morse Talker"
MMS2	Advanced "Morse Talker"
MM1000	ASCII to Morse Convertor
MM1000KB	ASCII to Morse conv c/w keybd

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REVIEW 8

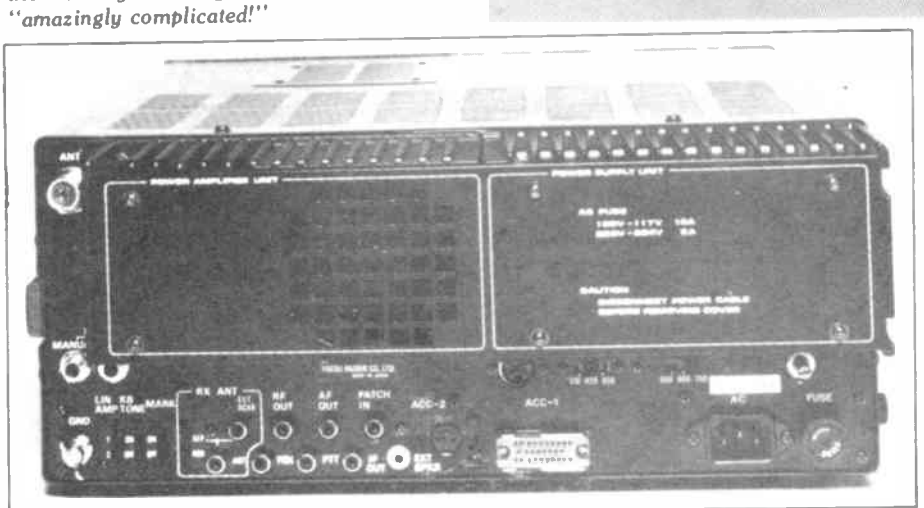
Nigel Gresley selects a few of the highlights from a year of Amateur Radio equipment reviews

This magazine took the plunge and went monthly somewhere near the beginning of 1983. We decided early on that we'd do our best to bring you equipment reviews which were readable, which didn't contain too much in the way of highly technical jargon which you could manage without, and which helped you make a reasonable choice of wireless. So for the Yearbook, we thought we'd have a little retrospective and take a look at some of the things we reviewed with the benefit of hindsight, as it were.

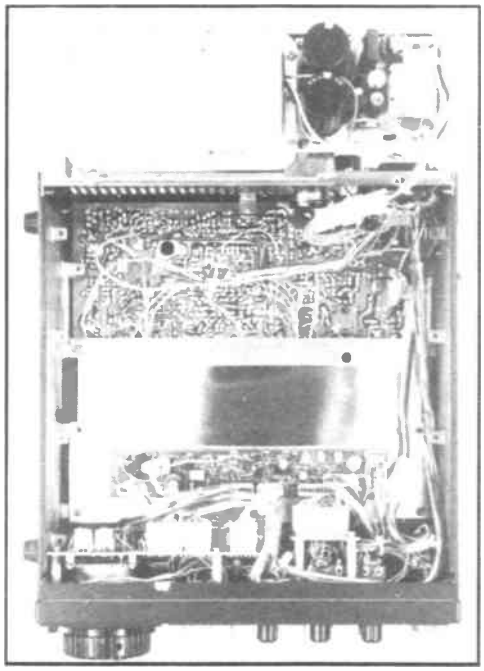
The doyen of reviewers for this magazine has been Angus McKenzie G3OSS. He's done an enormous amount of review work of one sort or another and if your letters are anything to go by, you like what you read. But we kick off with a couple of reviews Technical Editor Nigel Gresley did in-house; the Icom IC4E and the Trio TS820. The IC4E is a 432MHz FM hand-held which has become deservedly popular all over the world. Probably the best thing we can say about it is that three of our staff have had them pretty well since they were announced and they've been 100% reliable and extremely useful. The TS820 HF transceiver is an old classic. You still hear many of them about on the HF bands and they seem to go on and on doing their stuff. We liked our one, and it did us proud.

Angus did a comparative review of the Icom740 and the Yaesu FT102 in our third issue; this was his reviewing debut, and we received a sack of letters as a result. All complimentary by the way. He ended up preferring the Icom (for personal reasons) but he considered them both very good indeed. Curiously enough, the IC740 seems to be much more popular on the HF bands whenever we listen — we seem to hear relatively few FT102s for some reason or another,

The back panel of the Yaesu FT980, described by even Angus McKenzie as being "amazingly complicated!"



F REVIEWS



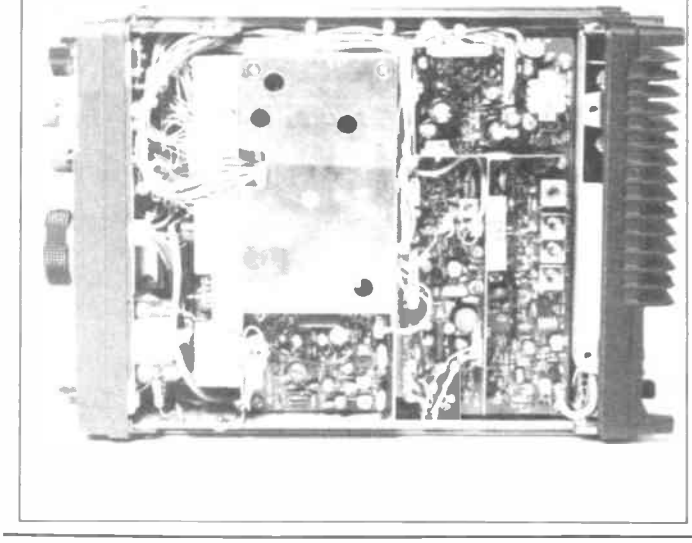
Looking inside the Icom IC-251E with the SMPS removed, ready for the board. It's a doddle to fit, and you can have one for about £65.

but the multiplicity of Yaesu HF rigs might explain some of it. We've never heard a duff 740 and the most common complaint about it is its lack of power at the transverter socket. Certainly they produce excellent audio, and we sometimes hear the RSGB headquarters station GB3RS transmitting lovely audio on 7MHz at lunchtime with one.

These rigs were light and easy to use

Technical Editor Gresley took a look at the Icom R70 receiver in the next issue, and we have to say that we haven't come across a finer general coverage receiver for the HF bands, unless you count Racals and other such pricey rigs. It took a little getting used to since the facilities were so many and the ergonomics a little different from anything else, but at the end of the day we still think this is a cracker of a receiver and not to be beaten at the price. We also looked at a Microwave Modules linear amplifier in the same issue — March 1983 — and this came out of the tests quite well. However, Angus produced a major comparative test of linears and things later on, and we'll come back to the MM linear in half a jiff.

The April issue saw two things — G3OSS did a comparative review of five hand-held 144 and 432MHz machines and we also looked at the Datong Morse Keyboard. We looked at the Yaesu FT208R and FT708R, the Trio TR2500 and the Icom IC2E and IC4E; G3OSS concluded that it wasn't possible to come up with a clear "best buy" since each of them had its merits. He thought that the Icom rigs were nice and light and easy to use provided that you didn't want to change channels very often — the dreaded thumbwheels — and the Yaesu machines were more flexible although somewhat more bulky. He thought that the Trio rig was good, with a superb range of accessories, although slightly spoilt by the 5KHz up/down buttons.



Top side of the Trio TR9130 looking jolly clever and complicated. And they call it wireless!!

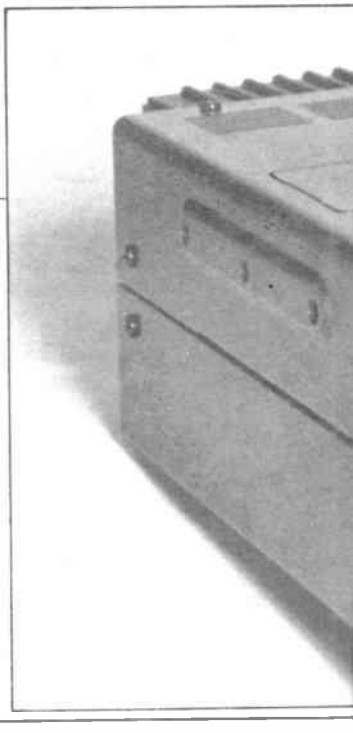
REVIEW O

We looked at the Datong MK and we couldn't quite make up our minds whether it was a good thing or a bad thing. As a piece of kit it's very good indeed in typical Datong fashion. What we couldn't quite decide was whether a keyboard is the best way to send Morse. Since the review incidently, we've become aware of two schools of thought; one uses the keyboard a great deal for contests where the flexible memories and the ability to send similar formatted messages is extremely useful, and the other won't use a keyboard at any price. We gather that many contest types use one; in other words, principally for the facilities it gives them, but we haven't yet come across more than one or two people who use it for general ragchewing. Some VHF DX types have used them as part of a meteor scatter station and they apparently work well in that role. So the verdict is still a bit equivocal. However, there's no doubt that the thing is beautifully conceived and built even if the idea of Morse-on-a-keyboard turns you off.

The FT790 is a superb hand-held - but it eats batteries!

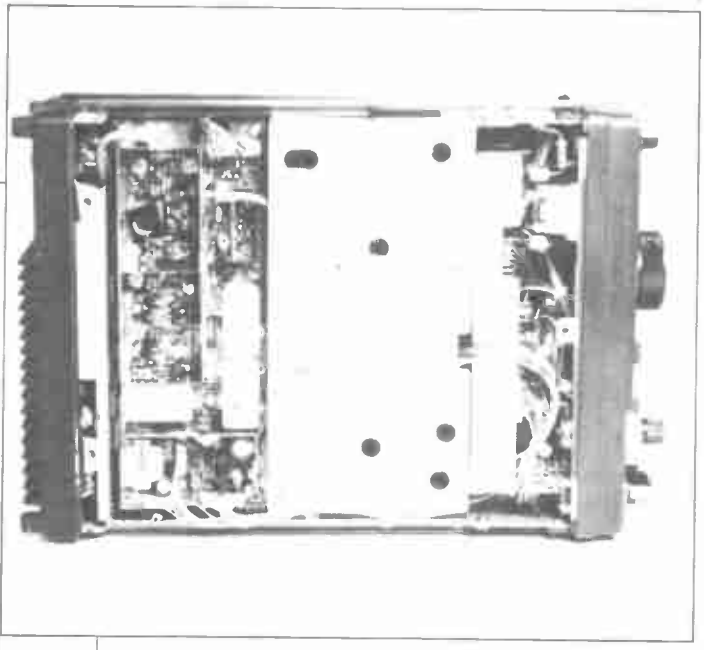
Our chief reviewer did his job again in the May issue, with a review of the FT290R and the FT790R. The FT290R seems to be an incredibly popular wireless — we've heard more of the "FT290-with-a-linear" school on 144MHz this year than almost anything else and they seem to work quite well. We actually found it somewhat deaf, although Mr Mutek does a natty preamp for the beast which transforms its receive sensitivity. Our reviewer admitted to having had tremendous fun with his own one. He thought that the 70cm version, the FT790, was superb as a hand-held, excellent for mobile, and reasonable for a home station, except that it ate batteries!

Then we came to the comparative linear review in which G3OSS looked at two from Microwave Modules (the 144/100LS and 100S), the Tono MR150 and the Mirage B1016. This review caused a few flutters in the dovecot, especially since one of the Bicester Winges in 1983 has been the quality of some SSB signals on 144MHz — in a no-punches-pulled review, Angus explained some of the whys and wherefores. He couldn't recommend a "best buy" as such because they all had their strengths and weaknesses. He felt that research remained to be done to design high power transistor linears with lower IM products. In fact, MM made some design changes to their amplifiers later in the year, which has probably made them pretty well the best there is for the job.



Right: the Yaesu FT-77 - a popular mobile rig sometimes used to drive transverters.

F REVIEWS



Above: all is revealed! The underside of the Trio TR-9500

We had a look at a Microwave Module transceiver in the same issue, and we came to the conclusion that whilst it worked quite well the design was really due for something in the nature of an updating. It had a lot to gain and was fairly quiet, but the signal handling wasn't brilliant and some other aspects of it weren't to the best present-day standards. We suggested in the article that the time had come when the DX fraternity would probably be happy to pay more for something in the Mutek class as far as sensitivity coupled with good strong-signal handling was concerned. One encouraging sign is that we've noticed GaAsFETs creeping into some of their preamps — can this be a hint that they're thinking of updating some of their products? We hope so. They're a good bunch up there in Liverpool and we'd love to see them doing a real world-beater of a transverter for this band. 432MHz is up-and-coming and there's also the point that there's a bit of a use-or-lose situation somewhere in there if we want to avoid a Belgian sitation on this band. Maybe we ought to do a sticker for the car: "Get Your Mate On 70 Today".

Perhaps users will contact us with their comments

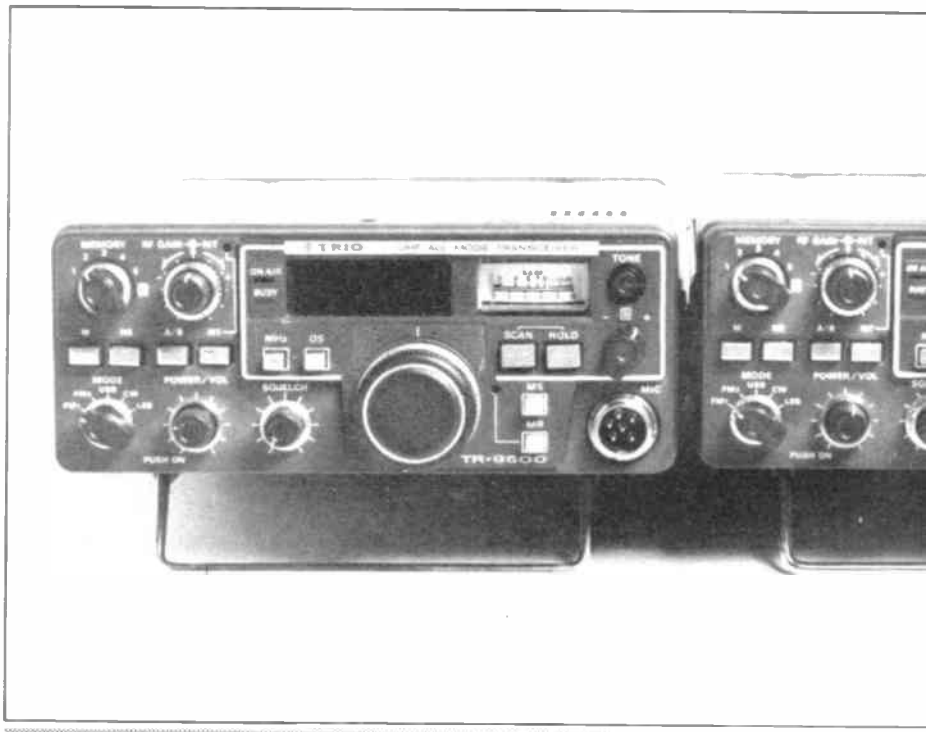
We did the IC251E in the next issue, and we've looked at that in detail elsewhere in the yearbook since it's our Rig of the Year — sorry, in BBC English then, Wahrless of the Yeah. We took a look at the Trio 9130 and 9500 in the same issue; this pair of multimode mobiles went down well. We stongly recommended the 9500 in particular, although both have now been replaced by the new TW series rigs which we'll be looking at in *Amateur Radio* soon.

Amateur Radio didn't review anything in August — we should have published the antennas review but there was a problem at the test range and it was held over, as they so charmingly say in publishing! It duly appeared in September, after we'd taken three 432MHz antennas along and put them through their paces. We thought that they were all pretty good, and the choice between them was likely to be dictated by how you felt about lightweight Tonna versus rugged and heavy Jaybeam. It does seem, listening around the DX end of 432MHz, that a great many are using Tonna antennas — despite the fact that the Jaybeam LW24, the lightweight answer to Monsieur Tonna's creations turned out to be an excellent antenna on test. We've yet to hear from anybody who's actually using one. It's very well made and performs ditto. It's also British. Perhaps users will contact us with their comments. I admit we use the Tonna product here at Bicester, but that's because we always did and we're used to them by now. But if we were starting again from scratch we'd probably have used the Jaybeam 24-ele.

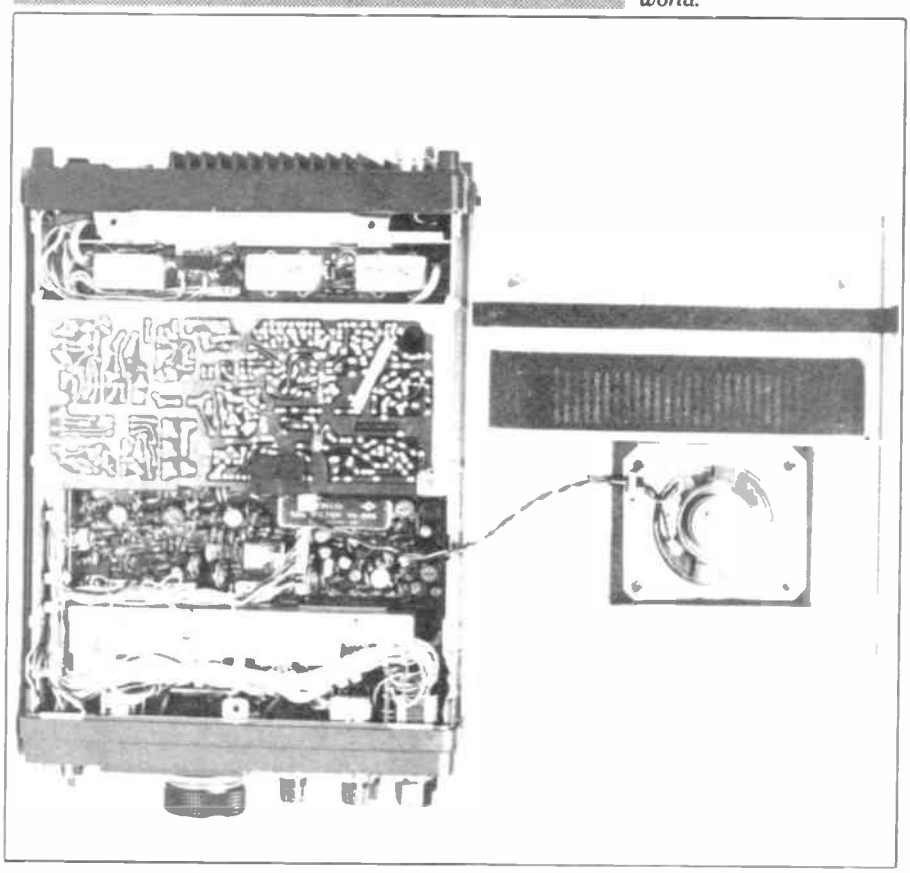
REVIEW C

Angus McKenzie G3OSS had a dekko at two Yaesu HF machines in the same issue — the all-singing all-dancing FT980 and the somewhat more basic FT77. The FT980 went down very well at Finchley, and Angus much preferred it to the FT102 with some minor criticisms. We've heard a lot of them on the HF bands now, especially from Stateside, and their owners speak very highly of them. Most seem to prefer it to the FT1, which several tried, despite the fact that the FT1 is supposed to be even better than the 980 — we haven't yet tried an FT1 and maybe we ought to. The FT980 is certainly a very good rig, and in fact was in the running for W of the Y.

The FT77 is a more basic rig for the HF bands, omitting 160m. It didn't seem to have any performance problems, and our reviewer thought they'd be belting off the production line at a fair old rate. We know of a few people using them to drive transverters, which they do well, and they're also popular as a mobile rig. Apparently they're very reliable, which is good news.



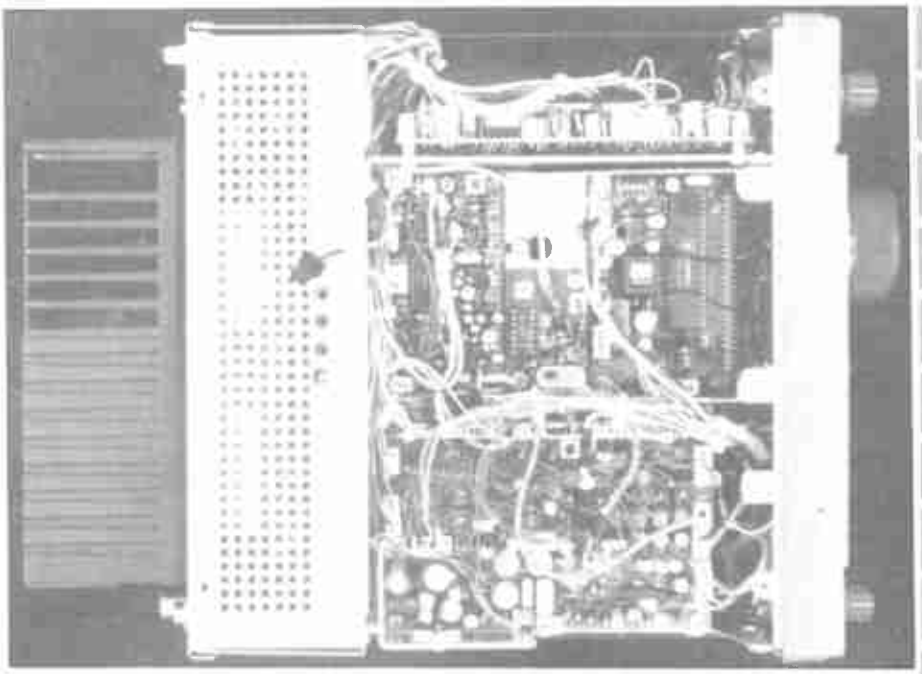
Above: the Trio TR-9500 (left) and TR-9130 (right). Below: the TR-9500 with topside open to the world.



Amateur Radio magazine is always pleased to receive suggestions regarding what you would like to see reviewed

So there it is: our look back at what was reviewed over the course of the year. Modern commercial equipment is obviously very good in many areas, and good value for money. You get a lot of wireless for your money — but it's true to say that there's still room for improvement without it costing the earth. We hope you found our look at what's available of interest, and don't forget that the monthly magazine is always pleased to hear any suggestions as to what you'd like to see reviewed. The policy of the magazine is to try and review new equipment more or less as soon as it comes out, especially if it looks as though it's going to be popular and/or if it looks like a real leap in the state of the art. Let's hear from you if you think there are any areas we've overlooked.

F REVIEWS



Above: view of the Yaesu FT-77 with bottom cover missing. Below: Trio TR-9130, a multimode mobile which went down well with our staff.

Propagati

Technical Editor Nigel Gresley attempts to predict what

Propagation forecasts are tricky things. You can just about get away with it for a month or so in advance as far as the HF bands are concerned but trying to do it for a longer period is really impossible except in general terms; this is because so much depends on what happens from day to day on the surface of the sun. However, we thought we'd stick our collective neck out and take a look at the general trends inso far as they concern the HF man and also the VHF operator.

As is well known by now, we are on something of a downward trend; in fact, we're almost at the bottom of it. This particular trend is that connected with the eleven year cycle of sunspot activity, which broadly speaking influences the highest-frequency amateur bands such as 28MHz. The ex-CB fraternity may have had some fun a few years ago working all round the world on relatively low power and not much in the way of antennas, but this is only something which can be done at times of "sunspot maximum", as it's known, whereas 1984 is very likely to be a year of "sunspot minimum".

28MHz not much use for world DX

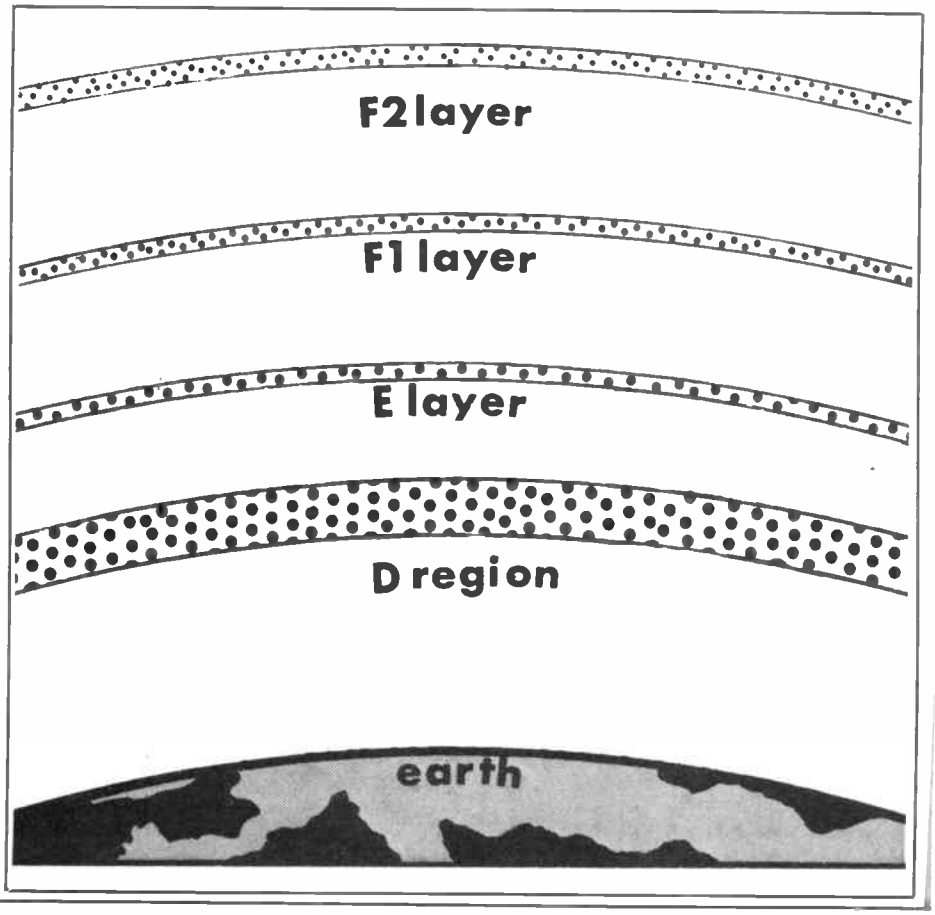
This is another way of saying that apart from occasional openings in the middle of the day on predominently southerly paths from the UK, the 28MHz band isn't going to be much use for worldwide DX. As always, the antenna you use will have a profound effect on what you'll be able to work on this band; the lower the angle of radiation you can muster, the more you'll be able to take advantage of the odd longish-haul path which will open up from time to time. So if you have a six-element beam at 100ft, for instance, as someone we know does, you'll do better than practically anyone else when the band does happen to open anywhere interesting, but we can promise you that except for the odd hour or so near the middle of the day you won't find many such openings!

So 28MHz is going to be a very local band for much of 1984. The only exception to this will be if there's sporadic E, which there certainly will be during the summer, and then you'll find that stations in what could be called "single-hop" range of the UK will come booming in. This means near Europe, Italy, maybe a little of North Africa, Scandinavia and the nearer bits of the USSR.

Apart from that, one thing we really must do is to use this band. This is especially true of the low end, where illicit CB activity is still going on and shows no sign of abating until the legislation changes and the Radio Interference Service gets some teeth. The present 28MHz bandplan puts CW in the bottom of the band, which is a little unfortunate because not everyone wants to conduct local natters on the key - we're wondering whether the RSGB has considered putting a proposition to the appropriate international conference to amend it so that either we all forget about the bandplan in quiet-sun years or that we make the bottom 300kHz, say, the area for local phone use. All the illegal CB rigs we've seen use 5kHz steps starting at 28.005MHz, so that if we could generate some activity on these frequencies we might just persuade them that it is our band, not theirs and that they're not at all welcome.

Other than that, 28MHz can produce some nice inter-G DX in rather the same way that 144MHz or even 70MHz does; you can get some good tropo ducting on this band and you could almost certainly get some auroral propagation taking place on it although we must admit we've never tried to prove it one way or the other! Anyone got any ideas on whether auroral propagation is viable at 28MHz?

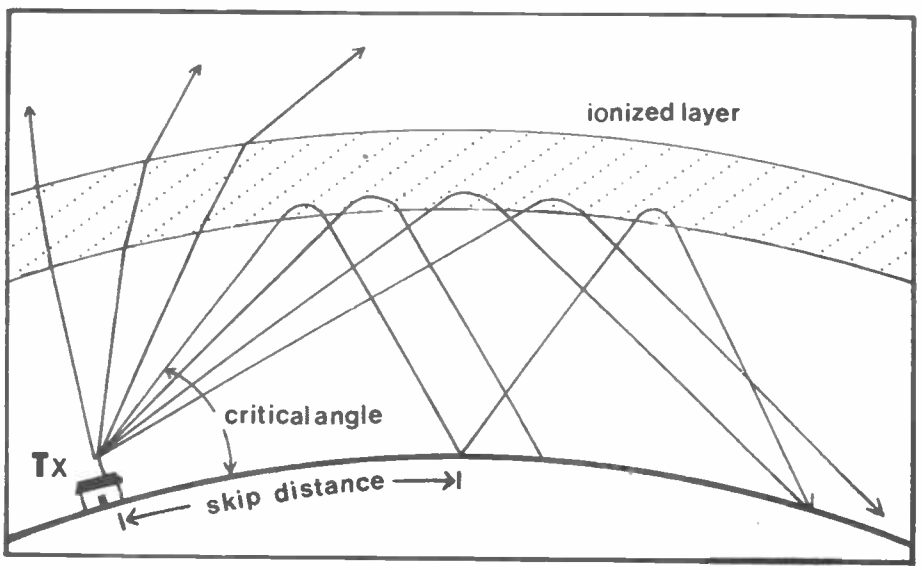
So, that's the score on 28MHz. The 24MHz band will probably behave in much the same way, but there's so little activity on it at the moment it's hard to say much that's very meaningful.



HF (High Frequency) signals can travel the world by bouncing off these layers. See previous issues of Amateur Radio for more details. VHF and microwave signals, however, won't. They'll pass straight through.

on in 1984

will be possible in the months to come.



Left: What radio waves do when they reach an ionised reflecting layer. Receivers within the skip distance won't hear your signal, of course.

Coming down to 21MHz - this is our favourite band in some ways, if for no other reason that it habitually defies the propagation textbooks to a large extent and produces DX when you wouldn't expect any from the solar forecast and so on. Given that 1984 is likely to be a quiet year in terms of solar activity, we'd guess that 21MHz will only be really usable during daylight hours about four hours either side of midday and that it'll open and close on particular paths very suddenly. Here again, we'd expect the southerly paths to work better than east-west ones and we'd also expect conditions to be fairly similar for much of the year. The usual seasonal changes are much less marked as you get towards sunspot minimum - there's been almost no sign of a change from summer to winter conditions in late 1983, for instance - and we wouldn't expect to see sweeping changes on 21MHz through the year.

The north-south path is likely to be more available

Basically, we wouldn't expect this band to be the star performer it was even a couple of years ago when it was open to somewhere in the world practically all 24 hours of the day. However, on past form we would expect some openings to VK and ZL at about 06-07 hours on a few mornings a week, coupled with single hop distances being workable for some time after this. We might then expect to see one or two longer openings to further distances as the time got towards the middle of the day. Here again, the north-south path would be likely to be more available than an east-west one and we wouldn't expect to work the USA (for instance) very often on this band.

Possible to work all of near-Europe

Here again there's a contribution from sporadic E in the summer months and it's possible to work all of near Europe at good strength. We had some interesting contacts with Bulgarian club stations this summer at S9+++ strength - they're always delighted to get a call from a British station, maybe because they love to practice their English, and sporadic E on 21MHz is certainly a good way to go about it. The only problem is that in our experience sporadic C openings on 21MHz can last for hours and then fade out in about thirty seconds, so be prepared!

Other than that, 21MHz tends to defy the rules. You may find occasions when there's some DX coming in from somewhere most unlikely at excellent strength and you're the only person to hear him calling CQ. You go back to him expecting half the world to be calling him but no, he comes back to you with an enormously strong and steady signal. You have a contact and sign with him, expecting a wolfpack to jump in; nothing. The last you hear is the DX calling CQ for five minutes with no takers! We've had this a fair few times on 21MHz. The last time it happened we were calling CQ at about 0800 one morning and a VU2 station called. He was S9 and a beautiful steady signal - we had a natter for about five minutes and then he signed. Now VU isn't all that common a prefix and we confidently expected to hear half Europe call him - but not a bit of it. He called CQ for about three minutes solid, and in the end we gave him a quick call just to tell him that he was still S9 and almost the only signal on the band! A QSL arrived some time later, so he was genuine. But that sort of thing can happen on 21MHz. Quite why we don't know but some form of chordal-hop or single-hop-plus-E seems the best explanation. 21MHz is like that!

14MHz will carry the brunt of amateur traffic for the next year or two

Coming down to 14MHz, it's this band which will cary the brunt of amateur traffic for the next year or two simply because it's far and away the most usable for long-haul DX when the sun isn't too spotty. 14MHz under these circumstances tends to be open to somewhere or other from quite early in

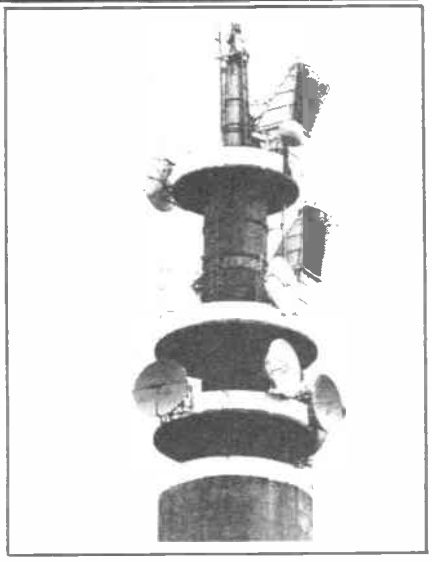
Propagati

the day until about midnight, and our best guess if that it will stay like this for most of the year. Again it'll want to work best to the north and south because MUFs are always higher on north-south paths than east-west ones in minimum years, and it'll certainly open to the north and south before it will to the east and west. There may well be days when it simply won't open to anywhere other than paths about twenty degrees either side of 360 and 180 and it'll usually open earliest and close on those paths.

Other than those points there's not too much to say about 14MHz because it'll simply be the busiest and noisiest band and you'll just have to take it as you find it. In a way the 10MHz band would probably be a good place to go as a refuge, and we predict that 10MHz usage will increase very much in the next couple of years as people discover just how good it can be. The 10MHz band is likely to be open to somewhere or other in the world for about 22 hours out of 24 on most days and signal strengths should be at least reasonable although most countries have power and antenna limits on this band. It's also CW only, so you'll need to use your key.

Another good band

7MHz looks likely to be another interesting band for the next few years as well. During the day, of course, it's a superb band for laying down S9 signals all over the UK if you have the appropriate antenna for the job - a fairly



Above: it looms large and is imposing, the Stokenchurch antenna tower. But it's only a repeater for the London Post Office Tower, handling microwave trunk calls to and from the west of the country.

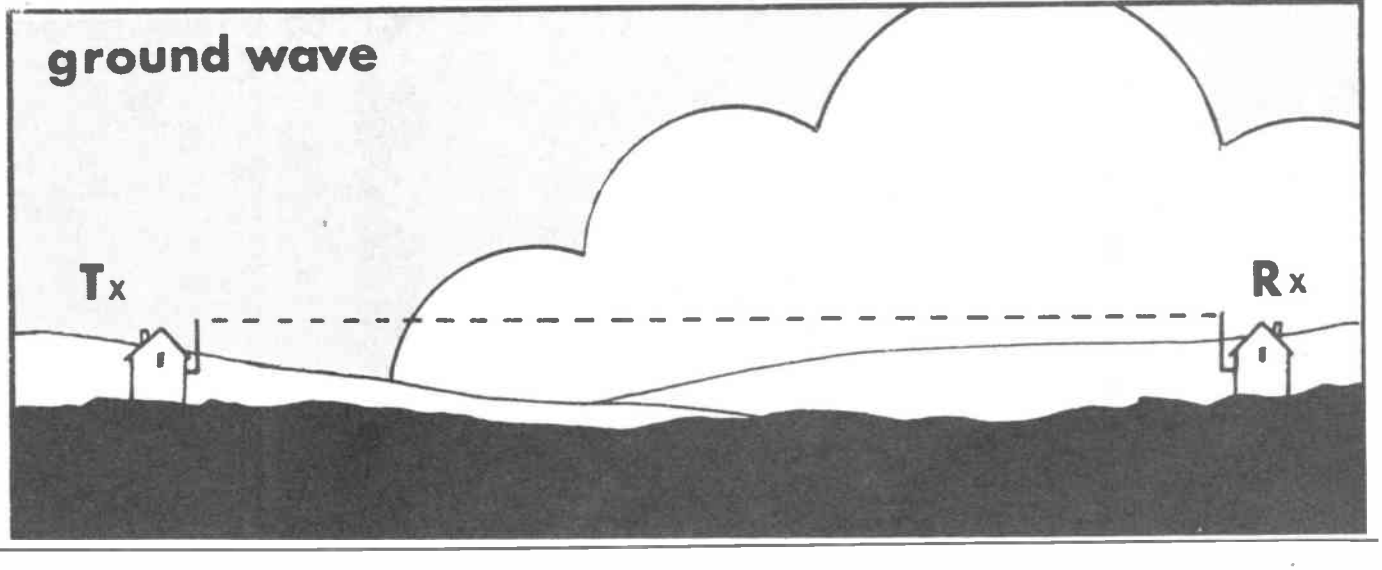
low dipole is the usual recommendation for this. However, low dipoles are not so good for working DX, which can actually be worked on this band contrary to what some pessimistic people would have you believe! From the propagation point of view 7MHz starts to get interesting at about 1700, which is when the E-layer stops being the main determinant of propagation and all the UK and near-Europe stuff tends either to disappear or to be subject to all sorts of QSB. Between about 1700 and about 2000, which is when the broadcast intruders tend to start up in the band - aaargh, curses - there are some interesting things to be worked if your antenna can produce low enough angles of radiation. You can usually hear VK and occasionally JA at about this time, although it isn' very easy to work them unless your antenna is up to the job - you'll also hear some nice DX from the Pacific coming in. We would guess that if your receiver and antenna is good enough 7MHz would be very productive.

Working Stateside

From about midnight, of course, you'll generally be able to work Stateside. Here again, if the antenna can produce enough low-angle radiation. There's a case for at least two antennas for this band; one low dipole so that you can natter to all and sundry in the UK at S9 - 7MHz is a terrific band for this during the day - and then something like avertical with a good radial system or a sloper or inverted-Vee for the DX. The vertical, or phased verticals if you can manage it, do very well on this band and you can have a lot of fun making them work.

As always, the main snag about 7MHz isn't propagation - it's Radio Tirana and such, who have no right at all to be there let alone to run the power they do. I had a lovely idea whilst watching breakfast television a while ago - how about dropping Russell Grant on Albania from a great height?

Artist's impression of a ground wave!



on in 1984

Sorry. As far as the 3.5MHz and 1.8MHz bands are concerned, it's very difficult to say much because a lot depends on how the daily lows at Appleton pan out and what happens from day to day. 1.8MHz in particular will probably behave in very much the same way as it did in 1983 except that what openings do occur may not last as long.

Just to finish with, we'll have a look at the prospects for VHF and UHF DX. This is much more difficult to say very much about because tropo openings on 144 and 432MHz depend heavily on weather patterns and they can't be predicted until perhaps a day to two in advance. The standard textbooks tell you something about what to look for, and an eye on the weather map and the barometer will tell you when tropo might be afoot. What we can say is that there doesn't seem much likelihood of much in the auroral line.

Well worth listening to the propagation forecast on GB2RS

1983 wasn't a good year for auroras, simply because of the way solar activity was - there weren't lots of large and active coronal holes doing their stuff and neither were there any big flares to write home about. We would imagine that what auroras do occur will be fairly weak and confined more to the northern latitudes, since flares and coronal holes are that much less likely now than they were a few years ago, but it's well worth listening to the propagation forecast on the GB2RS news bulletin since they usually have a fair degree of success at predicting major events and they certainly say when anything in the coronal hole line is coming up.

Meteor showers a little disappointing

Meteor showers seemed to be a little disappointing this year, and indeed the sporadic E season wasn't one of the better ones; the ionisation seemed quite thin, so the openings were to some quite nice distances, but they didn't last long and they didn't seem to produce the rock-crushing signals we have heard via this mode of propagation. CT1AYC was the loudest signal we heard one afternoon, but he was such a lousy operator that we almost wish we hadn't heard him at all!

On 432MHz, of course, aurora, MS and E don't really feature so you're down to tropo - the best advice is to watch the weather map. When there is an opening, signals are often stronger than on 144MHz so don't forget to have a look around on that band. Remember, use or lose!

Okay, have a good year, don't forget to write and let us know if you've worked anyone exotic and if you work more DX than we do we'll cut your feeder!

Getting out from the inside!

John D. Heys G3BDQ suggests some simple but very workable indoor antennas that will help you to get some of the more desirable DX.

From the outset I must repeat a point of view expressed in one of my *Amateur Radio* antenna articles; "A foot of wire outside is better than three indoors." If it is at all possible to erect some form of outside wire, all thoughts of indoor aerial farming are best forgotten. After such dire warnings G3BDQ will now launch into the description of a few simple antennas which will perhaps enable some embattled and frustrated operator to have a few contacts, some of which could even be of the DX variety!

The reasons for not using indoor antennas as a general rule are rather obvious; there will be a severe attenuation of radiated signal for a specified output power, the radiation pattern will be weird and unpredictable, and last but certainly not least there will be agreat risk of TVI, BCI, RFI and also the picking up of unwanted noise from domestic electrical apparatus. With so much going against the use of indoor wires it is hard to believe that many amateurs do use them, some achieving quite remarkable results. A final warning is that before any lift clambering begins you must have an initial low expectation factor; for then there is always a chance of unexpected success and the dismal preductions will be discredited. It is even likely that the results will make you quite pleasantly surprised!

Although a fine general purpose type of antenna the end fed wire is not recommended for indoor use. If any kind of antenna is likely to upset your or your near neighbour's TV sets then an end fed indoor wire certainly will. Such wires often wind about into all the corners and recesses of roof space and can become inductively linked to the domestic mains supply. The writer's loft floor is strewn with plastic covered unscreened mains wires which ramble around like a gigantic and untidy cat's cradle. Other amateur's houses are no doubt similarly wired, and the use of an end fed aerial in close proximity to such a set up will invite disaster. Not only will you probably cause TVI and other nasties but much of your radiated power will just soak into the mains system and get lost. 100 watts of RF on the HF bands has been known to upset the solid state timer/controllers of modern central heating systems. It is most disconcerting when the electric clock in such a system starts to run backwards or even accelerate forwards! Such events have actually happened so be warned.

Worked all continents

An average sized house will have enough roof area to contain, in the loft, a half wave dipole cut for one of the higher frequency bands, with perhaps 14MHz as the lowest satisfactory frequency. I have used such antennae with varying degrees of success and they are not uncommon. A chance remark made during a recent 144MHz QSO with G4BSW led to an interesting account of his loft dipole tuned to 14MHz. Nigel kindly sent me the full details and also a diagram of his indoor dipole which has given him fine results. He receives S9 plus reports from all around Europe, has had S9's from North America and has worked all Continents on SSB and CW with good reports. At present it is in constant use for arranging MS skeds. The power at G4BSW has never exceeded 100 watts which reaches the dipole via an SWR meter, a Low-Pass Filter and an ATU. Nigel adds that this dipole cut for 20 metres has in the past also given him good DX on 21MHz and enabled satisfactory 'G' working on 7MHz! He says however that when used on the 'wrong' bands there is a fair bit of RF floating around the shack, and such usage cannot really be advised.

The actual layout of G4BSW's antenna is shown in Fig 1. It is interesting to note that he did not take the centre of the antenna right up to the apex of his roof but instead allowed a short horizontal section of wire to run some feet either side of the feed point. This is the part of the dipole which 'does all the work' for it carries the highest antenna current. The ends are sloped down just below the tiles and are stapled to the rafters. The last few feet at each end where the RF voltage is highest just dangle down in space. The feeder is cheap TV coaxial and no Balun is used. Weathering is no problem with indoor antennas so the coax will stay in good condition for many years. Nigel further says that an accumulation of junk in his loft does not seem to have a detrimental effect upon performance.

If a similar antenna is contemplates place it well away from water tanks, water and other pipes and all electrical wiring. Remember that the dielectric influences of the roof material and the brickwork will lower the resonant frequency of the dipole and it must be pruned to resonate in mid-band, using a Dip Oscillator or preferably a noise bridge. Indoor dipoles do not even have to be up in the roof space! The writer well remembers visiting a former local G3 back in the early 1950's who was knocking off North American stations on 28MHz with a dipole tacked along the picture rail just above his head. The shack was on the ground floor but was located in a house in an elevated position and had a basement at its rear.

End fed wire was not up to the American job

In 1957 the 28MHz band opened up to North America after several years in the doldrums and G3BDQ discovered that at his QTH of that period (a tall four storey Victorian semi) the end fed wire which ran out over his back garden just could not put out any kind of signal in the desired direction. About 60 watts of AM was then in use, the big linears of today were unknown, as was indeed SSB operation to most British amateurs. The house faced north west and it had a

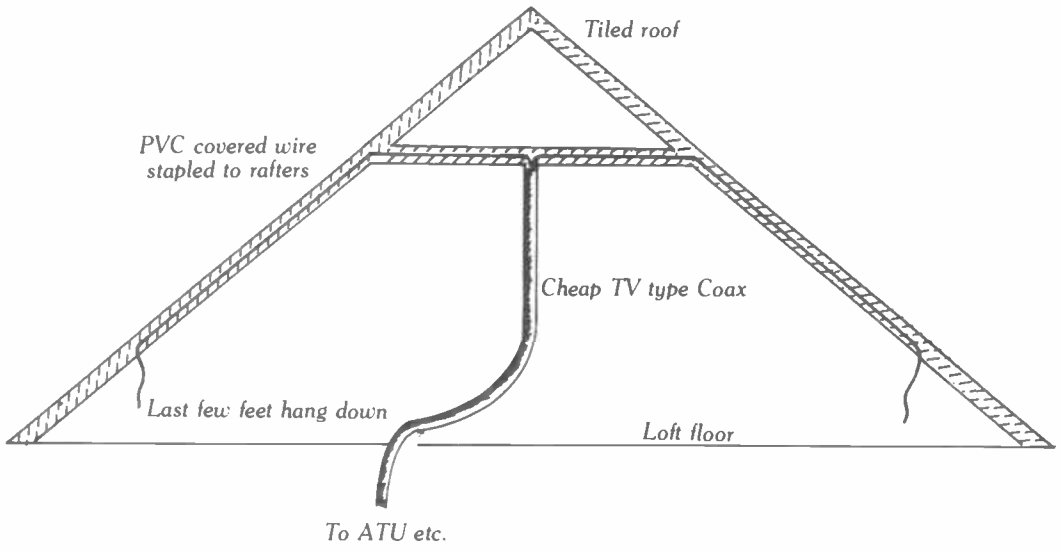


Fig. 1. How the G4BSW Loft Dipole is arranged

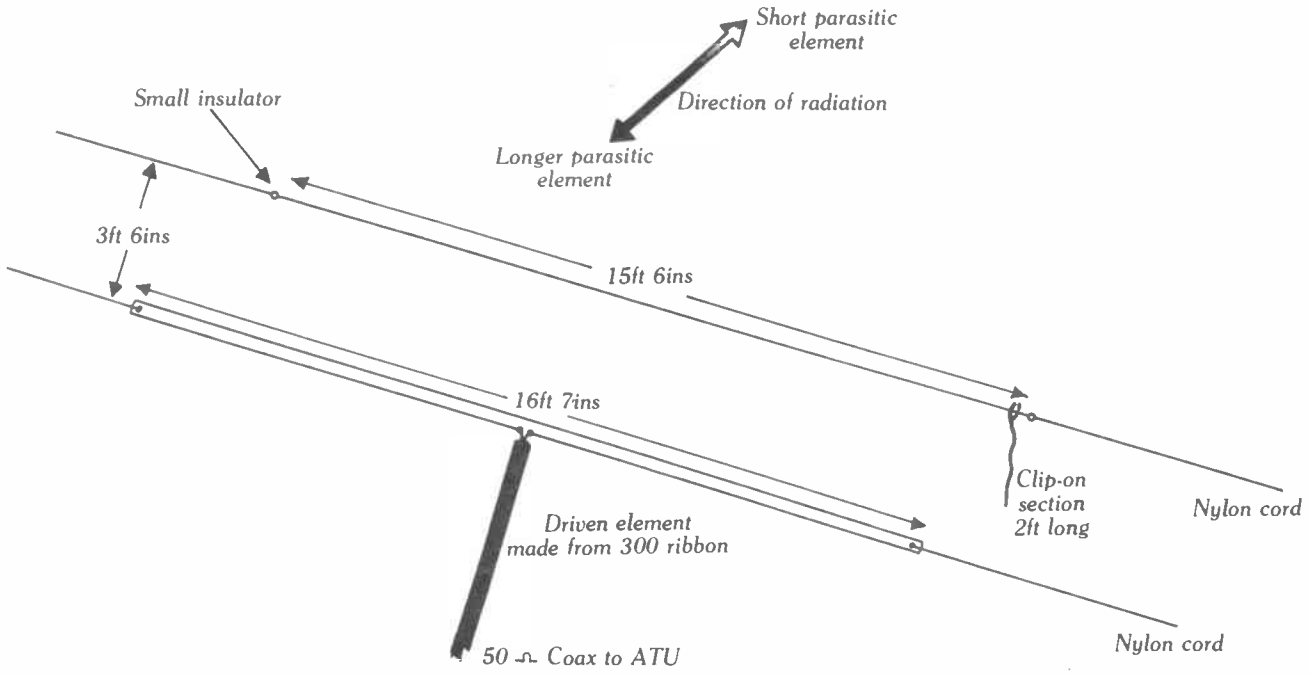


Fig. 2. Constructional details of a two element indoor two-way beam for 28 MHz.

comodious loft, so with the aid of a scrap of paper, a pencil and the 'Bible' of amateur antenna design at that time, *The ARRL Antenna Book*, a simple two element wire beam was designed. This was a straightforward two element parasitic (or Yagi) beam which comprised a folded dipole fed with 52ohm coax together with a wire 'reflector-cum-director' which was spaced 0.1 wavelength behind it. At such close spacing the use of a folded dipole is obligatory for the radiation resistance falls to around 15 ohms. The dipole was fabricated from 300 ohms ribbon feeder.

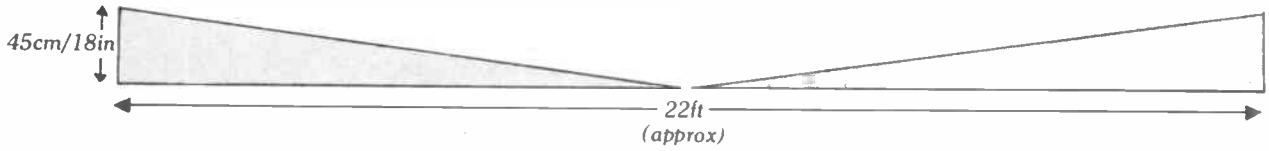
The parasitic element was a length of wire $3^1/_2$ feet from the driven element, and a short length of similar wire with a croc' clip at one end was available to snap on to the end so it could be instantly changed from director to reflector!

Using this element as a reflector the beam worked out towards America and when acting as a director it radiated towards the south east. I did not have an SWR meter or noise bridge (few did) in those days so just ran the coax into the transmitter via an ATU. It loaded up well and brought an immediate response from the North Americans.

Many S9 reports were received and for several weeks until the band closed again a good time was enjoyed by all. All the USA call areas were easily worked on AM phone. Fig 2 shows the two element beam and its dimensions. If a similar simple beam is built make sure that the earlier points regarding pipes etc. in the roof space are noted. The theoretical gain of such a closely spaced two element beam is about 5dB which is well worth having.

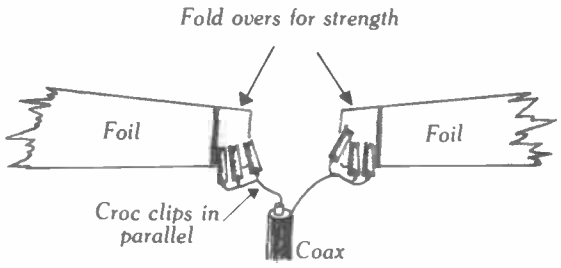
Getting out from the inside!

Fig. 3. Design for a kitchen foil broad band dipole for 14 MHz. The foil is stuck to the loft ceiling or slates.



Cut from 11ft length of kitchen foil

The writer has bever used this type of indoor antenna but nevertheless passes along known ideas on the subject and makes additional suggestions. Aluminium kitchen foil may be stuck to the acutal slates in the loft or if those are covered, to the hardboard or similar cladding. By using wide lengths of aluminium foil the antenna will have an unusually broad bandwidth and will not be so readily affected by metal objects in its vicinity. If the foil is cut into two long triangles (Fig 3) the bandwidth of the completed dipole will be at least 1MHz centred on 14MHz; that is it will exhibit a near unity SWR over that width of band.



CONNECTION DETAIL

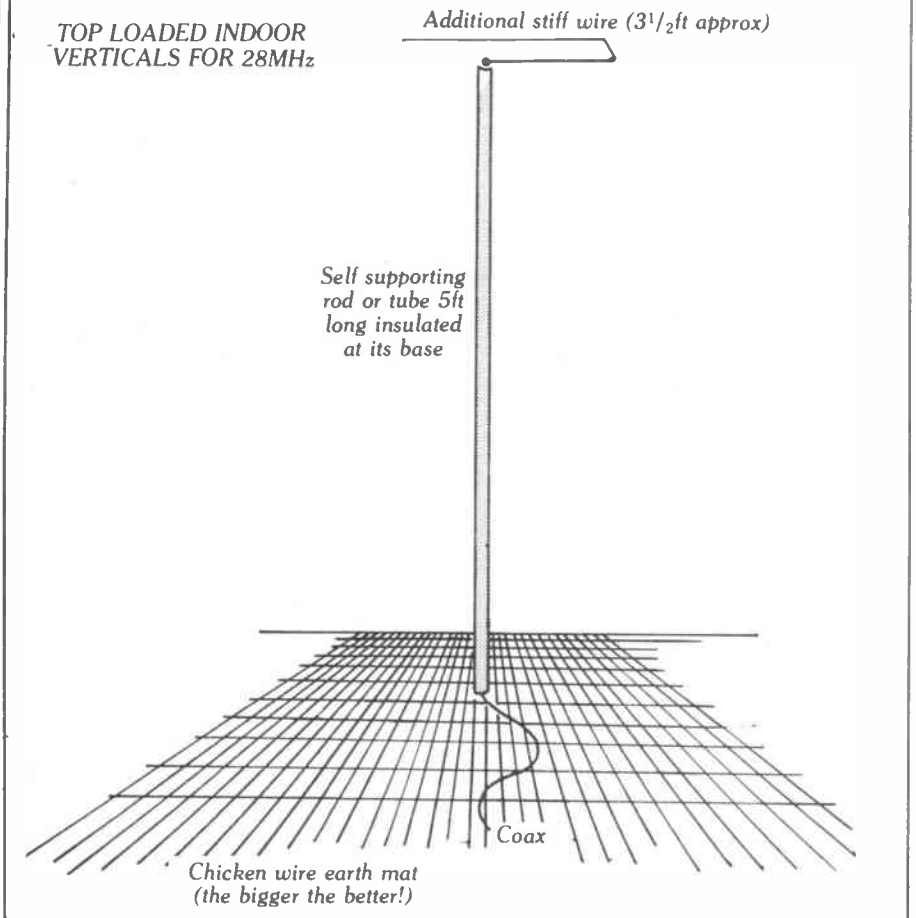


Fig. 4 (i). Shortened vertical for 28MHz

Connecting the feeder (coax) to the foil can be a problem for of course soldered joints are out. An easy way out of this is to have the ubiquitous crocodile clips which are soldered to the end of the feeder and pinched on to the foil at the dipole centre. Experience has taught the writer that the cheap croc' clips made from plated iron can become quite warm even when using transmitter powers of about 100 watts and it is recommended that three or four clips are connected in parallel at each junction point. All RF going to make heat is lost to us for ever and it is certainly not going to stimulate the antenna of a distant station! The length of such wide dipole elements is much less than the norm for ordinary wire aerials and it is suggested that dipole lengths of from 22 to 24 feet should be tried on 14MHz with proportionally reduced lengths on the higher bands. The length is not very critical owing to the wide-band characteristics of the foil dipole.

Vertical polarisation has some advantages indoors

Vertical polarisation has some advantage over horizontal in indoor situations. There is a reduced likelibood that the antenna will interact with the electrical wiring, pipes etc, and there is also more chance that the radiated signal will be at a low angle and so further the opportunities for DX contacts. Unfortunately most lofts do not possess much vertical height. The writer's loft just allows standing without stooping right in the centre under the roof

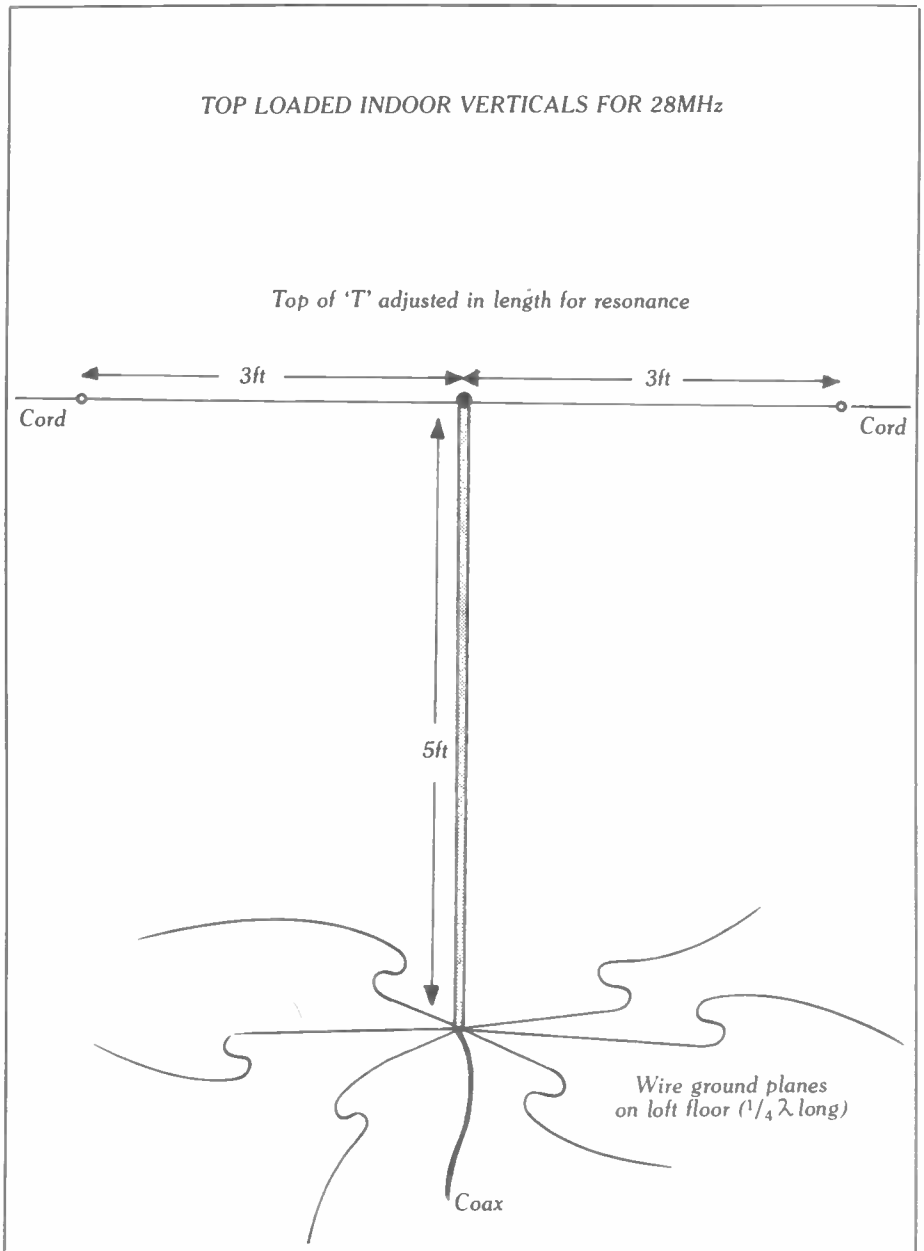


Fig. 4 (ii). Shortened vertical for 28MHz

ridge, and G3BDQ is certainly no giant! Even a quarter wave vertical on 28MHz is too tall to fit into such a situation and some antenna shortening is called for. The worst way to achieve this end is to add loading coils at the base or the centre for so doing will greatly reduce the overall antenna efficiency and in many cases will result in only about 10% of the applied power being radiated.

Zigzagging the top few feet of the antenna horizontally

A more sensible plan is to load up the top of the shortened vertical. This may be done by 'zig-zagging' the top few feet of the antenna horizontally or by cutting short the vertical section and then adding a couple of equal lengths of horizontal wire to the top so making the system into a 'T' aerial. The two horizontal lengths will not contribute much to the radiation as they are self cancelling and the vertical section will do more than 90% of the radiating. Other ways to top load include the addition of radial spokes or metal ball or 'beer can' capacity 'hats'. Experiment is the only way to achieve resonance of the antenna and unfortunately no hard and fast dimensions can be suggested. Personally I would not attempt the construction of such an indoor vertical antenna for any frequency lower than 28MHz. Some experiments on the 27MHz CB band using similar antennas revealed that they certainly worked but were well down on a good out-door ground plane at the same height.

An indoor vertical must have a good earth or ground plane at its base. The usual quarter wave pieces of wire to act as radials may be strung out on the loft floor or instead a large part of that floor may be covered with some of the cheap wide mesh 'chicken wire'. Water pipes and the like can be connected to the earthing system at the point where the coax outer begins at the antenna end and this will help to lower the angle of radiation and improve efficiency.

Rashly, I decided that my hula hoop was to be made for the 3.5MHz band. It was there I needed some good low angle radiation!

Early in 1963 JM Boyer, W6UYH, published details of an unusual new antenna which was called the DDRR or 'Hula Hoop'. Although very similar in appearance to the Halo antennas used on VHF, it is completely different in design and operation for it is *vertically polarised* with all round radiation working against a ground plane in close proximity beneath the hoop. It is supposed to be actually a 'leaky waveguide' type of antenna and is not a member of the conventional loop family. Soon after this Hula Hoop was first described over here I determined to give it a whirl. Rashly I decided that *my* Hula Hoop was to be made for the 3.5MHz band for it was there that I needed some good low angle radiation to hook the DX! Although the ring element was only two feet above my loftspace 'earth', it was 18 feet in diameter and should have been made from five inch diameter tubing. This last point was impossible to fabricate so instead a wide roll of aluminium lawn edging was purchased and this had to suffice.

The bandwidth was very narrow and would not allow a QSY of more than 5kHz without a retune

Although the hoop had a much smaller surface area than the deign data indicated necessary, and my earth mat was not really good enough, the antenna worked and gave quite fair results for an indoor system on such a low frequency. The bandwidth was very narrow and would not allow a QSY of more than 5KHz without a retune up in the loft! This latter disadvantage was most certainly caused by the small surface area of the hoop and would not have been anything like so bad had the published design been followed more closely.

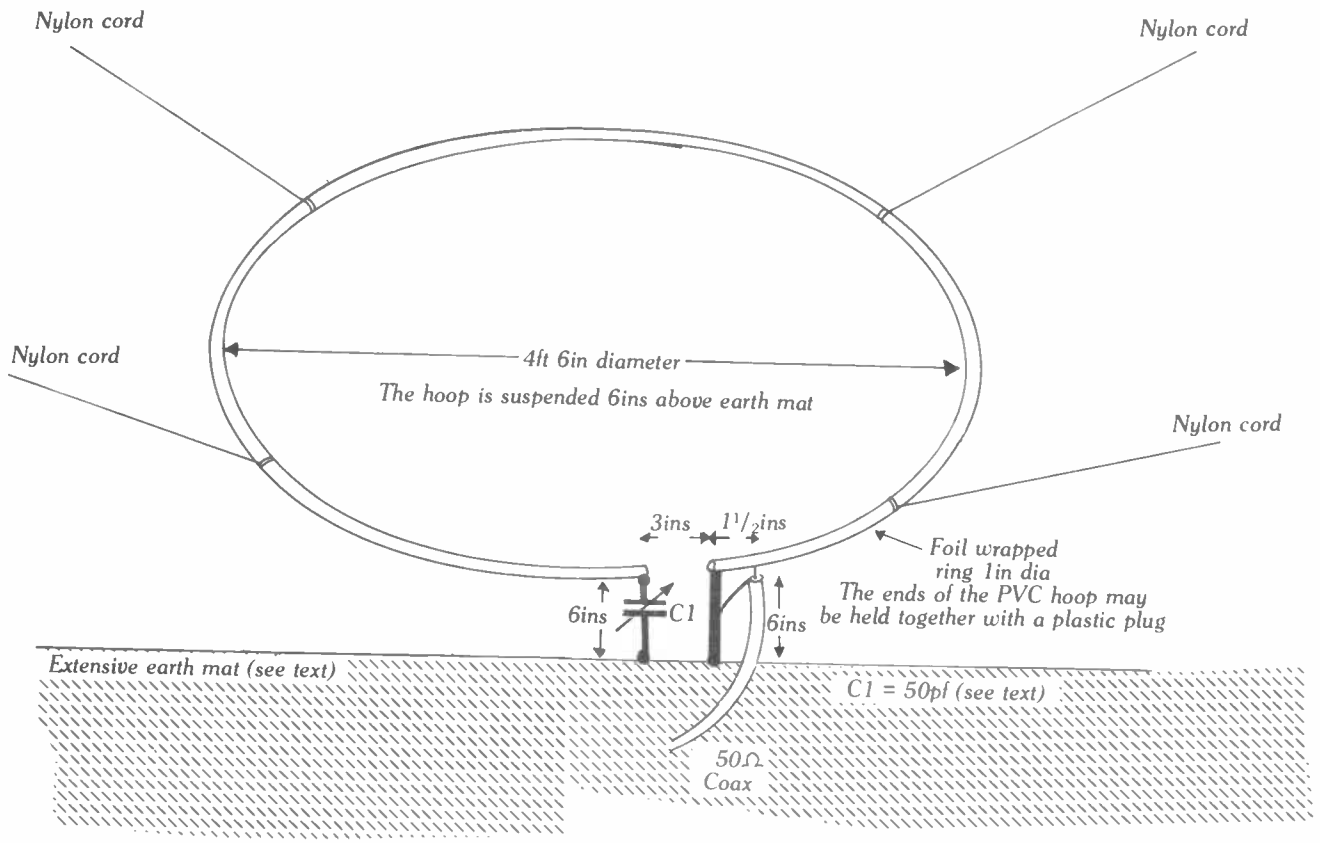


Fig. 5. Constructional details for a 14 MHz Hula-Hoop antenna using foil wrapped PVC tubing

Getting out from the inside!

A Hula Hoop for 14MHz is a practical project for indoor antenna farmers and the details are given in Fig 5. The dimensions are a 'crib' from those suggested in a 'CQ' magazine article by W4MIP almost twenty years ago and no originality for the idea is claimed. A one inch diameter hoop is needed on 14MHz and this would normally be of thin wall copper tubing. Such tubing is, however, very expensive (and heavy) so instead I would suggest using a length of one inch diameter PVC water pipe well wrapped around with kitch foil. A spiral of PVC tape over this wrapping should ensure good electrical continuity of the aluminium foil where it overlaps and also make a tidier job. The connections to the hoop may again be made with crocodile clips as mentioned earlier in this article. The hoop would be best suspended from overhead roof timbers using thin nylon or similar cord.

Hoop can be anchored down with cords

There should be no trouble with sound roofs, but if air movement is suspected the hoop can be anchored down with similar cords going down to the floor. The voltage across the tuning capacitor is very high and a really wide spaced transmitting type is essential for powers of more than 50 watts. It is reckoned that a 100 watts into the antenna will put 4000 volts of RF across the plates of the tuning capacitor!

The effectiveness of the Hula Hoop depends largely upon the quality of the earth mat beneath it. Ideally the antenna should be above a solid sheet of copper or aluminium which has a diameter of at least 25% more than the diameter of the hoop. This should not be too difficult to achieve at 14MHz and a suggestion is to use kitchen foil laid down under some wide meshed galvanised 'chicken wire'. This must be held down to make good contact with the foil by pieces of dry timber or what have you.

My original 80 metre version just used chicken wire over the entire loft floor area. The antenna is tuned to resonance by the capacitor. One way to do this is to apply very low power to the system and then tune the antenna for maximum pick up on an absorption wavemeter or similar device. This should be situated not too far from the 'hot' end of the hoop and sensible meter reading set before tuning begins (ie 5% of full scale). Listening on the station receiver with the hoop in circuit is another way to get approximate resonance. Moving the feeder tap point to either side of the suggested position will enable the lowest SWR to be obtained before full power is applied from the transmitter.

Feedback please! If you use these antennas , let us know how you have got on

The Editor of Amateur Radio and myself will be interested to receive 'feedback' from readers who have made and used any of the antennas described. We obviously cannot be held responsible for any 'loft jobs' which do not perform as expected for as was emphasised in the opening paragraphs the working of indoor antennas is quite unpredictable and depends so much upon a multiplicity of variables and local circumstances.

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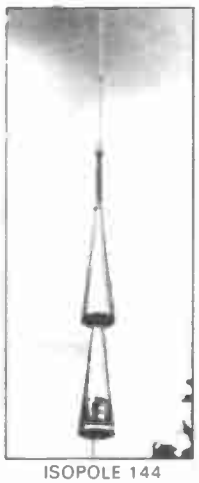

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The hitch-hikers guide to Microwaves

Glen Ross, G8MWR, explains how working on microwave can be a lot cheaper than you may have been led to believe.

You probably think that microwave means the dreaded 'plumbing' and expertise on the lathe and milling machine. Perhaps you are frightened by the idea of working in metal to tolerances of 1/10,000 of an inch. Maybe you are worried at the thought of setting up a dish to a bearing with an accuracy of plus or minus one degree. How about all the high technology test gear that you are going to need to set the whole thing up if you ever get it built? These points always seem to be the reaction of anyone thinking about getting started on microwave. All this may have been true a few years ago, but now ?...

Microwave is simple!

If you can't get on 10GHz for less than £40 and a few hours work you are not really trying. So how is this miracle achieved? Let's start at the basics and see what it is all about and what is involved is getting a system running.

Where is microwave?

In all the good books microwave starts at 1,000MHz and works up. We have allocations right up to nearly 250GHz (250,000MHz) but for our purposes we are going to look at the most commonly used band at 10GHz or 3cms. There are many reasons for the popularity of this band, probably the most important are that waveguide and other bits and pieces are readily obtainable from surplus sources and that the size of completed equipment is small enough to make it easily portable. The second answer to our question is, mainly on hill tops. Some operators are making really excellent contacts from home locations over very obstructed paths but to do this requires very special equipment.

A la mode

All the normal modes are allowed on 10GHz but the most common by far is wideband FM. This is due to the extreme ease with which it can be generated, a total of only ten components being needed. The RF is generated using a Gunn diode which is available for less than £2 and runs from about 9 volts at a current of around 120ma. The power generated is typically 10mw but when the

gain of the aerial is added it results in a radiated power of 5 to 10 watts. SSB is a different matter. The usual method is to use one of the excellent mixer systems developed by G3JVL. The idea here is to generate a crystal controlled local oscillator signal which is then applied to a diode where it is mixed with a few milliwatts of RF at 144MHz. This will produce a typical output of only 1mw (giving a radiated power of about 1 watt). On receive the incoming signal is mixed with the local oscillator frequency and produces an IF at 144MHz. If you do the sums required to find the advantages to be gained from using the narrower bandwidth, etc, you will find that even allowing for the lower power level SSB still has an advantage of around 16dB over the FM system. This represents a tremendous improvement but the costs in terms of complexity and power requirement are severe. This is not suitable project for a newcomer to the band.

What results?

Having generated some RF what sort of results can we expect? Let's look at the wideband FM system first. The range to be expected is 'optical'. This does not mean that you have to be able to see the other end of the path. In fact due to bending the actual range will be optical plus about 30 per cent. The additional amount will be influenced by weather conditions and various other factors but is correct on most occasions. What it does mean is that there must be no obstructions such as trees or tall buildings in the way. These will reduce the signal level to the point where an FM system just has not got enough left to work with and your signal vanishes. Provided that you are operating from a good site with moderately effective gear paths of more than 150Km are easily possible. Finding paths that long is a different matter. Due to the variation in the bending effect, never give up on a path because it has not worked in the past. Today may be the day that it all comes together.

How about SSB? Now we really are into a completely different ballgame. You remember the 16dB advantages we spoke about? This means we can work with signals which are about 35 times weaker than we could on FM, and as we said earlier obstructions do not kill the signal completely they just reduce it. We will also get weak signals arriving due to reflections and also by scatter effects. We find we still have enough signal to work with and the contact is on. In real terms this means that we can now talk of a range of up to 200Kms over really badly obstructed paths. This can be extended tremendously by the use of travelling wave tubes which make it possible to generate as much as 10 watts (10KW radiated) and using Gasfet preamps on receive. As we said not a starter project. The ambition of most operators is to gain the RSGB award for working more than 150Kms and this is a reasonably achievable goal to work towards.

Stokenchurch tower, a familiar sight to M40 travellers.

Is anybody there?

Now it is obviously no use just going out on to a hill top and calling CQ in the hope of getting a contact. So how do you get one? This is where the 'cumulative' contests come into the picture. These are held once a month from April till October and are less like a contest than anything that you have ever heard. True, at the end of the year 'results' are published and I suppose some people take them seriously. Really they just provide you with days when you know that the hills are alive with the sound of "CQ for 10GHz contacts". A typical contact is likely to involve you in a chat that will last at least half an hour whilse you discuss the latest trials and tribulations to affect your equipment or excuses as to why you had the dish pointing the wrong way. You will then attempt to sign which will be followed by a request for a serial number before you go and a reminder that it is a contest. All very enjoyable.

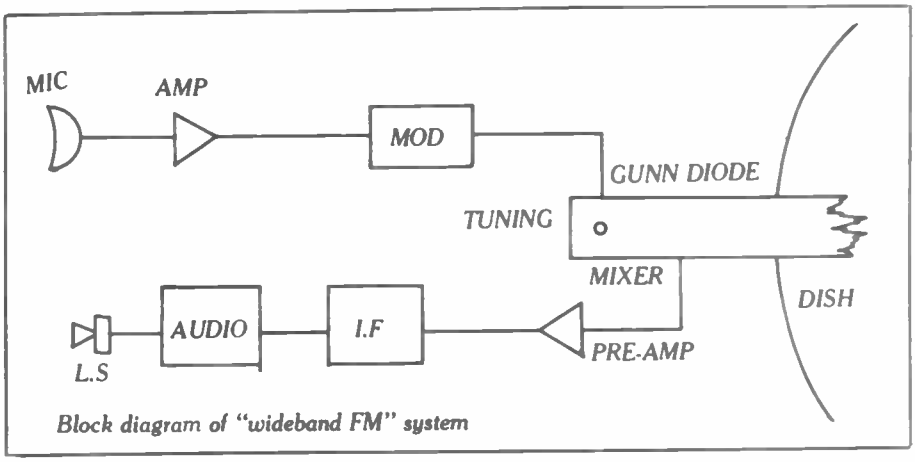
As you get to know more of the people on the band you will find yourself getting involved in many tests and other activities. These are usually arranged by phone a few days in advance and it is true to say that not many weekends go by without activity of some sort.

Because of the width of the band (500MHz) and the directivity of the aerial getting on the band and calling CQ is not likely to bring a lot of results. The chances of you beaming towards someone while they are beaming at you and of both of you being on the same frequency at the same time are rather remote. It has been done but there are easier ways. The usual method is to use two metres as a talkback system. 144.170 1Hz is the recognised calling frequency with a QSY when contact is established. If you are using FM or low power SSB on 10GHz then 144MHz gear can be very modest, something like an FT290 and an HB9CV aerial are more than enough. After all you are several hundred feet up with a clear take off in all directions. The main point is that your talkback capability must be compatible with the sort of path length you anticipate working.

Information

Having established contact on two metres you will then exchange details of where you are located and the frequency you intend to use on 10GHz. If you have used the site before you may be able to give details of the bearing and distance to the remote site (it is always worth keeping a record of these details for each site you use). You will also need to know the National Grid Reference of the site. This is obtained from the appropriate OS map, and also the QRA locator. The location of the site with reference to some well known town is also of use in helping to locate it and in fact is needed as part of the contest exchange. Having passed the information about site and frequency on two metres, activity moves on to 10GHz. One station will send a signal to the other for the purpose of dish alignment. Let's say that the distant station is sending to

The hitch-hikers guide to Microwaves



Block diagram of "wideband FM" system

you. His signal will consist of a carrier with an audio tone on it. When you find it, optimise your aerial in both the horizontal and vertical directions, then tell him on two metres that you have a signal from him. The next step can be done in two ways. You can reverse the above system or you can relay his tone back to him on two. He can then optimise his aerial and you are in contact on 10GHz. The only use for 144 now is in case anything goes wrong on 10GHz. You can if you wish use 144 to talk to him while you listen to him on 10GHz thereby achieving full duplex contact and a telephone-style chat.

The gear

"I knew it! Having softened us up with all that speil about the band, we now get the bit about the plumbing. No way! I think I'll be a traffic warden instead".

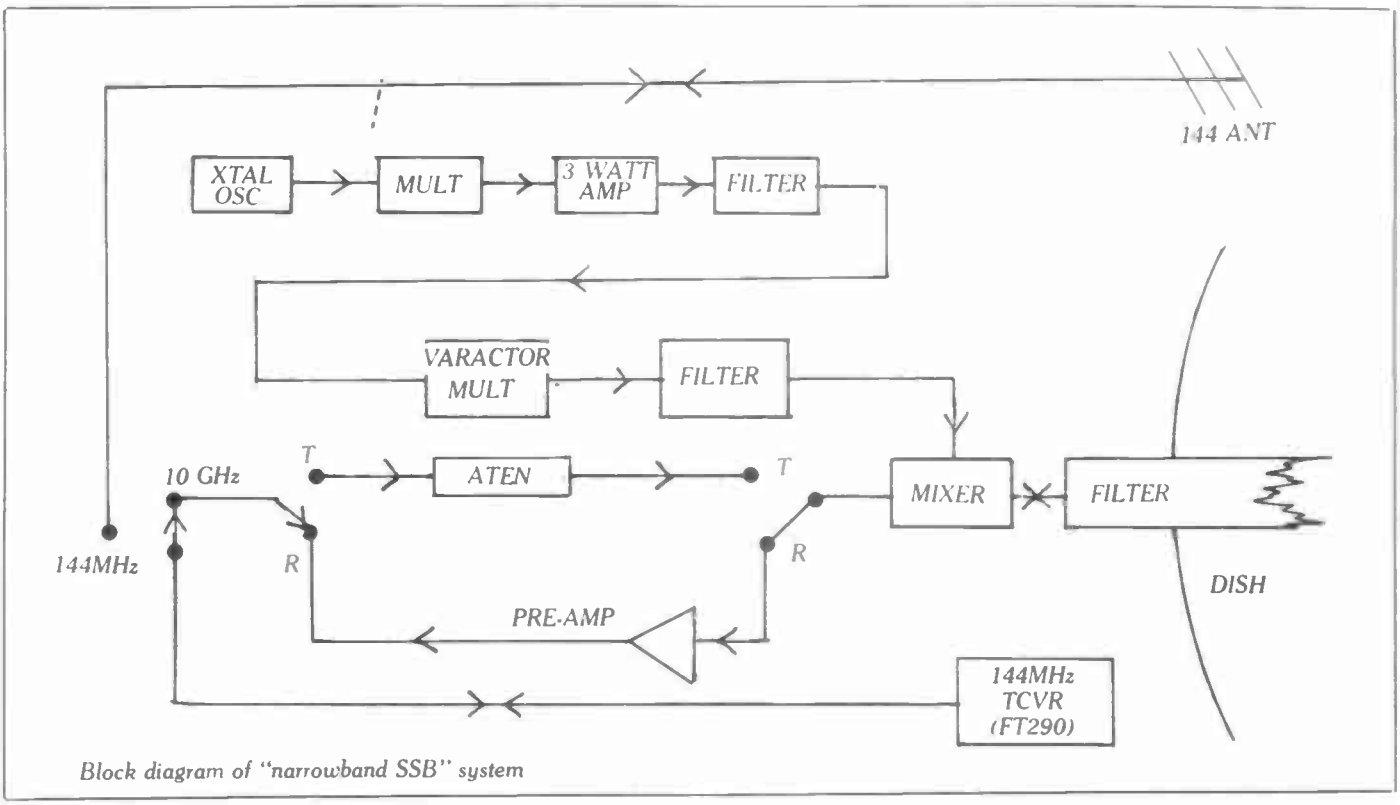
Now that's a pity, because we were just going to tell you that in fact you do not need to do any plumbing at all! Microwave without plumbing, I can hear you all say, how is it done?

Until recently it would have been virtually impossible. The only chance would have been to use a burglar alarm unit. These usually suffer from several disadvantages. One type of unit uses two cavities mounted side by side, one containing the Gunn diode and the second one housing the mixer system, with a small hole in the common wall providing the injection. The big problem with this type of unit is that it is not possible to have the openings to both the cavities located at the focal point of the aerial system. If you try to get round this by halving the difference you will then run into the problem of 'squint'. Because neither of the cavities is on the focal point, the dish will squint one way on receive and the opposite on transmit. If you now line your dish up while receiving the other man's signal when you go back to him you could be as much as 20 degrees off line. You could make up a sliding mount of some sort to get round this problem but it all seems rather impractical. This type of unit is available very cheaply and is useful as a test oscillator for setting up your equipment if you are not working with a local amateur.

A second type of unit has the oscillator and mixer mounted in the same piece of waveguide and these are much more suited to our needs. There can be two problems with this type of unit. Most of them do not have a standard waveguide flange on the end of the unit and so it is difficult to connect them to aerials, etc. A more serious problem is that due to the placing of the mixer diode the current through it is usually far too high for low noise operation and there is often no means of adjusting it. However this type of unit is used by a lot of people who are getting good results from them.

The third type of unit has only appeared on the surplus market in the last few months and has removed all the problems 'at a stroke'. This unit is easily recognisable, consisting of a machine alloy block with a small horn aerial mounted on the end. It contains all that is best in microwave engineering and gives the impression of having been designed for the communication industry rather than as a burglar alarm. The Gunn diode is mounted at the back of the unit in an iris coupled cavity, reflections from the rear of the cavity being suppressed with a piece of attenuator foam. The matching from the oscillator to the rest of the system is set by a matching screw located at the iris. Tuning is by means of a large, threaded, brass screw. The mixer diode is a low noise device and is offset in the waveguide to give correct impedance matching. The injection to the mixer is set by means of a small screw in the mixer cavity. The unit is completed with a standard WG16 flange and a small horn aerial, some of these having a matching screw. Results from these units are superb. Using the unit with the supplied horn aerial and a run of the mill IF strip the GB3LEX beacon has been received at 60Kms and on transmit a report of S9 was received at 120Kms. The best news is that all this is available for a cost of £10!

An unusual view of the Post Office Tower in London, the heart of all UK microwave transmissions.



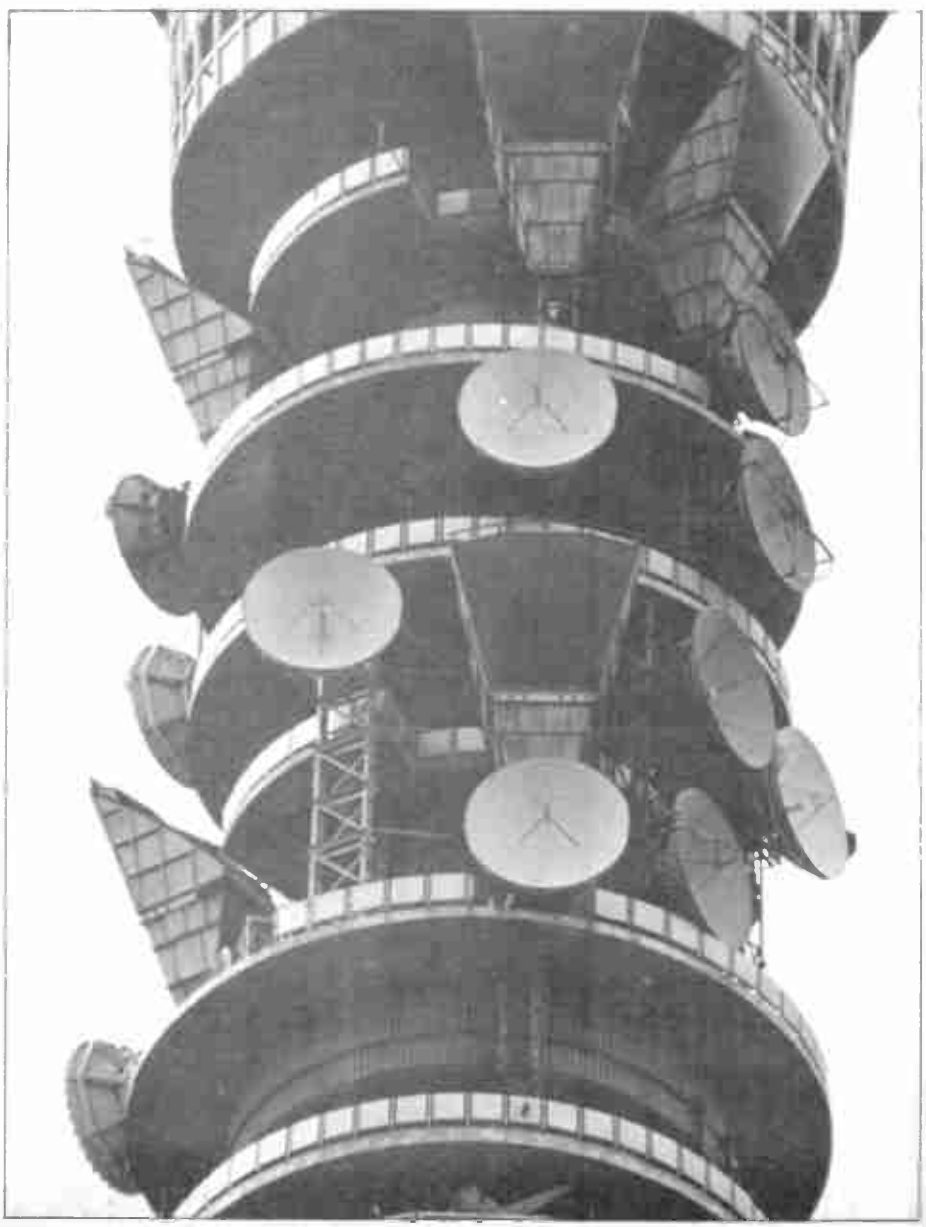
Block diagram of "narrowband SSB" system

Of course the results mentioned above would be vastly improved by using a larger aerial than the supplied horn, which only has a gain of around 4dB compared to the 30dB or more which is normally used.

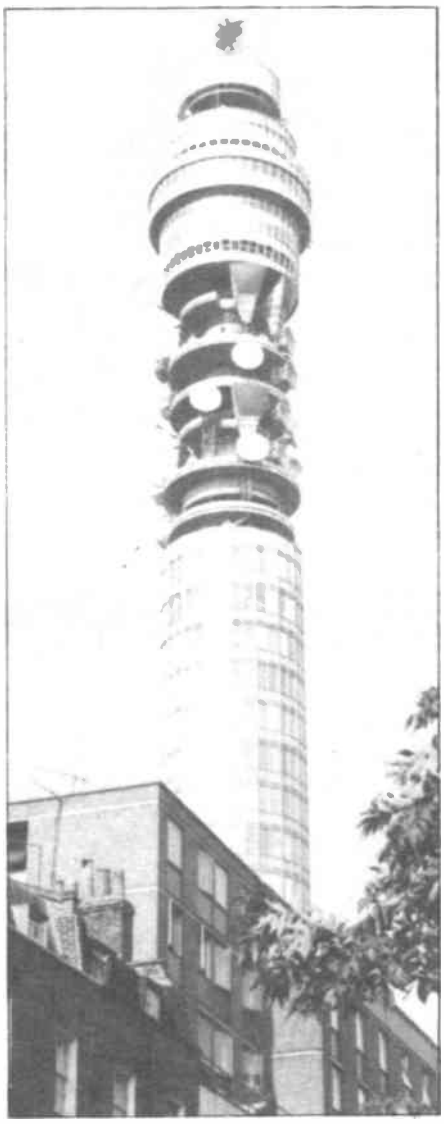
All this and *no plumbing!*

Dishes and things

This is probably the area of microwaving where the greatest amount of ingenuity is to be seen. It really is amazing just what has been pressed into service as an aerial system. The obvious thing to use is a dish. It may not work any better than other ideas, but it gives you the feeling that you have 'arrived' on the band. These are available from various sources at prices from around £10. The most common size is probably 18 inches, which will give a gain of about 30dB. A two-footer will give an extra 2dB or so. Anything much over two feet and you may have problems with mechanical stability on a windy hilltop. Also the dish will have to be set up very accurately due to the reduced beamwidth which comes with the extra gain. The dish contour should be parabolic but small divergences can be tolerated with only a small loss of gain. This is what leaves the door wide open to experiment. Excellent results have been achieved using the bottom of hot water cylinders, smoothly curved dustbin lids and circular snow sledges. The latest thing to hit the scene is the Chinese 'wok' cooking utensil (as developed by G6EWZ) at a cost of about £5. One amateur is using the reflector from a small searchlight and another is using the bowl from an old electric fire. My own system uses a dish that was originally intended for use with microphones.



The hitch-hikers guide to Microwaves



An alternative to the dish is the 'horn' aerial. This is very easy to build and resembles a square shaped funnel. They are a feasible proposition up to about 23dB gain, where you end up with an aerial about 18 inches long with open end dimension of around nine inches by five inches. To try and get another 3dB the dimensions practically double and it makes more sense to use a dish. The horn aerial is very tolerant of dimensional errors and the gain is predictable to within 1dB or so. This makes it an excellent system for test and comparative purposes and because it is virtually self terminating there are no problems with SWR.

Visible means of support

Having got the microwave head and the aerial organised the next question is 'how to support it?' You can use a heavy duty photographic tripod with a small system but a better bet is to try and get an old wooden tripod of the type used by surveyors. Remember that you are going to be operating from a hilltop and there is an awful lot of windload on a dish. If you must use a lightweight tripod hang a weight underneath it to help improve the stability. You will also need a small compass to set the bearing and also a small spirit level to check that the dish is firing horizontally. The dish will have a 3dB beamwidth of about three degrees in both the horizontal and vertical directions. Probably more contacts have been lost due to firing upwards than for any other single reason.

Are you receiving me?

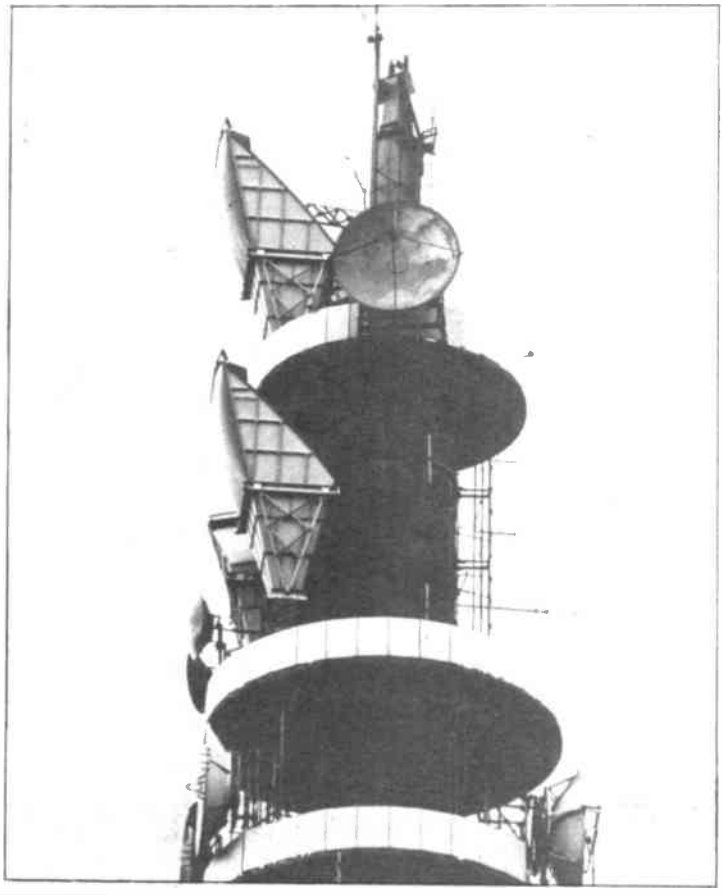
The receiving system can be tackled in two ways. You can build a dedicated system or you can do it the easy way and use a small cheap FM broadcast set. These are available from the larger chain stores for around £7 and you could not buy the components to build one for that sum! To minimise direct pickup of unrequired stations it is advisable to mount the unit in a die cast box and to use screened leads and plenty of bypassing. There is an awful lot of stray RF flying around on a hilltop. Using this approach an IF in the region of 100MHz would be used. If you are going to build from scratch go for 10.7MHz and readily available ICs. Due to the fact that there is no selectivity in front of the mixer there is no real advantage in either of these frequencies and it is only a matter of convenience as to which you use. One thing you will require with any IF system is a good low noise preamp. At 100MHz any of the normal 144MHz designs will work well. Just put an extra couple of turns on the coils.

Help!!

It is obviously not possible, in an article of this nature, to give a 'nuts and bolts' description of how to build the gear, complete with circuit diagrams and full setting up procedures. What we have tried to do is show you that microwaving is simple, cheap and fun. In fact, Amateur Radio the way is used to be.

The organisation that looks after the interests of microwave enthusiasts is the Microwave Society, 81 Ringwood Highway, Coventry. The 'Datepack' which is available from them gives full information on all you need to know to build and operate a system. They also offer expert advice and help if you run into any problems.

Will *you* be on 10GHz next year?



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ICOM

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ICWM9 SP/Mic	£13.00
ICBP2 6V pack	£33.00
ICBP3 9V pack	£23.00
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50 5 ele	£34.00
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INTERNATIONAL BEACONS

FREQUENCY	CALLSIGN	LOCATION	LAT/LON	ERPW	AERIAL	MASL	BEAM DIRECTION	MODE	STATUS
.000				0		0			
.000	GB3CMS			0		0			REFER TO FSG
.000	GB3SX *			0		0			
.000	OZ3ALSA			0		0			
28.175	VE3TEN	OTTAWA		0		0			NON.OP.
28.200	*	COMMON FREQUENCY		0		0			
28.202	ZS5VHF	DURBAN	2944S,3050E	10	INVERTED 'V'	678		A1	
28.205	DL0IGI	MT PREDIGTSTUHL	4742N,1253E	100	DIPOLE	1650	N/S	F1	
28.207	WD4HES	FLORIDA	2656N 8222W	45	GROUND PLANE	0	OMNI	A1	IRREGULAR
28.210	3B8MS	MAURITIUS		0	GROUND PLANE	0			NON.OP.
28.212	ZD9GI	GOUGH ISLAND	4021S,0952W	0		0			
28.215	GB3SX	CROWBOROUGH	5102N,0008E	10	DIPOLE	167	N/S	F1A	
28.217	VE2TEN	CHICOUTIMI, QUE		4		0		A1	
28.220	5B4CY	ZYYI	3445N,3319E	26	GROUND PLANE	20	OMNI	F1	
28.222	HG2BHA	TAPOLCA		10	GROUND PLANE	280	OMNI	F1	
28.225	VE8AA	LAKE CONTWOYTO		0		0			
28.230	ZL2MHF	MT CLIMIE	4109S,17509E	50	VERTICAL DIPOLE	890	OMNI	F1	
28.235	VP9BA	BERMUDA		0		0		F1	
28.237	LA5TEN	OSLO		2	OMNI	0		A1	
28.237	ZS3HL	TSUMEB		6	5/8	0		F1	TEMP NON.OP
28.240	OA4CK	LIMA, PERU		10		0			NON.OP.
28.242	ZS1CTB	CAPE TOWN		0		0		A1	
28.245	A9XC	BAHRAIN	2609N,5028E	0	DIPOLE	0	NW/SE	F1	
28.247	EA2HB	SAN SEBASTIAN	4318N,0158W	3	GROUND PLANE	0	OMNI		NON.OP.
28.252	VE7TEN	VANCOUVER, B.C		4		0			NON.OP.
28.257	DK0TE	EH26C KONSTANZ		40	GROUND PLANE	440	OMNI	F1	
28.260	VK5WI	ADELAIDE		100	.64 VERTICAL	0	OMNI	A1	
28.262	VK2WI	SYDNEY		0		0		A1	
28.265	VK**			0		0			
28.270	VK***			0		0			
28.270	ZS6PW**			0		0			TEP EXPL STN
28.272	TU2ABJ	ABIDJAN		0		0			
28.275	VE3TEN**			0		0			FREQ RESERVED
28.277	DF0AAB		5448N,0933E	0		0			
28.280	YV5AYV	CARACAS		20	TH6	0	EU,W,VK IN 24HR SEQ	F1	
28.282	W9*			0		0			
28.285	VF8ADE	GN. ADELAIDE IS	6734S,6808W	0	V-BEAM	0	TO UK		TEMP.NONOP.
28.287	W8OMV	TUCKASEGEE, NC		15	GROUND PLANE	0	OMNI	A1	NON.OP.
28.290	VS6HK	CAPE D'AGUILAR	2212N,11415E	10	VERTICAL	300	OMNI	A1	
28.292	JA2***	MOUNT ASAMA	3427N13647E	0		0		F1	NOT YET OP.
28.295	VU2BCN	BANGALORE		0		0			
28.302	ZS1STB*	STILL BAY, S.A	3423S,2124E	5	DIPOLE	15	NORTH-SOUTH	F1	
28.312	ZS6DN*			0		0			TEMP.NON.OP.
28.888	W6IRT	N. HOLLYWOOD	3412N,11828W	7	GROUND PLANE	0	OMNI	A1	NON.OP.
28.894	WD9GDE			0		0			NON.OP.
28.992	DL0NF**	FJ47A		1	DELTA LOOP	630	E,W	A1	NOT IBP
29.266	Z22JV*	SALISBURY	1750S 3103E	0		0		F1	NOT IBP.TEP
50.003	PY1RO	RIO DE JANEIRO		0		0			TEMP NON-OP
50.005	H44HIR	SOLOMON ISLANDS		0		0			
50.005	ZS5VHF**		2944S,3050E	10	HALO	670	OMNI	A1	TEMP NON-OP.
50.010	ZS1STB	STILL BAY, S.A.	3423S,2124E	50	2 X DELTA LOOP	15	NORTH	F1	
50.015	SZ2IH	ATHENS		0		0			OP.AFTER 1300
50.020	GB3SIX	XN49F		100	3 ELE YAGI	58	WEST	F1A	
50.025	6Y5RC	JAMAICA		40	3 EL YAGI	80	NW	F1	
50.030	ZS6PW			0		0	N OR NNW	A1A	1000-2000UT
50.035	ZB2VHF*	XW64G		100	5 EL YAGI	0	WNW OR S	A1	
50.039	FY7THF	FR. GUIANA		0		0			
50.040	ZS6VHF			100	4 ELEMENT YAGI	0	NORTH		1400-1900 UT
50.041	WA8KGG	NE OHIO		0		0			
50.062	PY2AA	SAN PAULO		25	GROUND PLANE	0	OMNI	A1	
50.075	VS6HK*	HONGKONG		30	GROUND PLANE	0	OMNI		
50.080	TI2NA	SAN JOSE		0		0			
50.088	VE1SIX	NEW BRUNSWICK		0		0			
50.099	KH6EQI	PEARL HARBOR		0		0			
50.104	FX3VHF	YI13D	4846N,0326W	1000	2 X 6 EL YAGI	165	W OR S	F1	NON-OP
50.500	5B4CY*	QU14G 'ZYYI'	3445N,3319E	100	5 EL YAGI	20	180	A1	
52.200	VK8VF	DARWIN, AUS		15	GROUND PLANE	0	OMNI		
52.300	VK6RTV	PERTH, AUSTRALI		0		0			
52.320	VK6RTT	CARNARVON		0		0			
52.330	VK3RGG	GEELONG, AUS.		4	CROSSED DIPOLES	400	OMNI	F1	
52.350	VK6RTU	KALGOORLIE, AUS		0		0			
52.500	JA2IGY			0		0			
52.500	ZL2VHM	PALMERSTON NTH		0		0			
52.510	ZL2MHF*	MT CLIMIE		5		890		F1	
70.030	GB3CTC	XK46D		40	2 EL YAGI	320	045	F1A	

INTERNATIONAL BEACONS

FREQUENCY	CALLSIGN	LOCATION	LAT/LON	ERPW	AERIAL	MASL	BEAM DIRECTION	MODE	STATUS
70.040	GB3WHA*	AL71D	5102N 0008E	16	2 EL YAGI	168	315	F1A	
70.050	GB3BUX	ZN61A		20	2 X TURNSTILE	460	OMNI	A1/F1	
70.060	GB3ANG*	YQ35C		100	3 EL YAGI	370	160	A1A	
70.112	5B4CY**	QU51B		50	4 EL YAGI	0	TO UK		
70.120	ZB2VHF**	XW64G		50	4 ELEMENT QUAD	0	NORTH		
144.000	GB3SGW			0		0			NOT YET OP
144.126	OE3XAA	II71D		1		840			
144.130	ZS6DN	PRETORIA	2555S,2818E	8000	4 X 13 EL YAGI	1585	N		
144.139	LX0LX	DJ31B		7	TURNSTILE	380	OMNI	F1	
144.139	5B4CY *	QU12B	3451N,3221E	40	6 OVER 6	60	290	F1	TEMP NON-OP
144.140	I1A	DE27H		2		0			QSY 144.830
144.145	FX6VHF			0		0		A1A	
144.145	ZB2VHF	XW64G		40	12 EL YAGI	0	NORTH	F1A	
144.149	EA3VHF	BB26H		500	16 ELE	400	VARIABLE	F1A	
144.149	OZ3VHF	FP53H		1	HALO	35	OMNI	A1	
144.152	EA3XS			5	BIG WHEEL	0	OMNIDIRECTIONAL	F1	
144.157	EA3URE	AA12C		10	HALO	1400	OMNI	A1	
144.160	IT9A	GY74J		0		0			TEMP NON-OP
144.160	Z22JV	SALISBURY	1750S 3123E	0	YAGI	0	NORTH	F1	
144.180	ZS4NN	BLOEMFONTEIN		8000	4 X 13 EL YAGI	0	NORTH		1700-1900 UT
144.425	SP8VHA	LL30D		1		0		A1	
144.430	SP8VHF	LL53D		1	DIPOLE	0	N / S	A1	
144.800	OH8VHF	MZ79H		40	16 EL COLL.	260	N / S	A1	
144.805	DB0*	EK28/38		0		0			P'POSAL STAGE
144.810	IS0A	EA08A		16		0			
144.815	I4A	FE77H		7	TURNSTILE	0			TEMP NON-OP
144.820	PA0JTA	CL03G		50	BIG WHEEL	0	OMNI	PM	NON OP.
144.825	I0A	GB12D		0		0			
144.830	9H1VHF	HV03F		1	TURNSTILE	0	OMNI	A1	
144.835	9H3ML	MALTA		0		0			NON-OP
144.840	IT9G	GY67C		400		0			
144.855	LA5VHF	JD25E		800	4 X 10 EL YAGI	60	210	A1	
144.858	DF0*	FJ/EJ		0		0			P'POSAL STAGE
144.860	LA1VHF	ET13C		12	TURNSTILE	1882	OMNI	A1	
144.865	HB9HB	DH66F		10	10 EL YAGI	1600	NNW	F1	
144.865	LA6VHF	PD21G		0		0			P'POSAL STAGE
144.867	EA1VHF	VD59E		80	4 EL	0	040	A1A	
144.870	LA2VHF	FX43G		300	10 EL YAGI	80	15	A1	
144.875	SK2VHF	JY69H		30	2 STACKED CLOVERLEAF	300	OMNI	A1	
144.877	EA4VHF	YA		0		0			NOT YET OP.
144.880	LA3VHF	DS78F		20	4 EL YAGI	0	SOUTH	F2	NOT YET OP.
144.885	OY6VHF	WW76D		75	4 EL YAGI	350	SE	A1	
144.887	EA7VHF			0		0			NOT YET OP.
144.890	LA4VHF	CU47A		300		100	NORTH	A1	
144.895	FX0THF	AI46H	4827N,0102E	30		0	OMNI		
144.900	OH6VHF	KW59F		40	12 DB GAIN	138	N/S		
144.900	ZS1VHF	CAPE POINT		0		0			
144.900	ZS6PW*	PRETORIA		350		0	NORTH		
144.905	FX3THF	YI13D	4846N,0326W	25	9 EL YAGI	165		F1A	
144.907	EA8VHF	SO		0		0			NOT YET OP
144.910	DL0PR	EO54C		100	4 X 6 EL YAGI	0	N / S		
144.915	GB3CTC *	XK46D		40	3 ELE YAGI	320	045	F1A	
144.917	EA6VHF	AY07J		80	4 ELE	0	045	A1A	
144.920	OE5XBL	GI77B		1	DIPOLE	0		F2	
144.920	SK7VHF	GP38C		40	2 STACKED CLOVERLEAF	190	OMNI	A1	
144.922	OK0ET	KI18A		1	3 EL YAGI	981	WEST	F1	
144.925	GB3VHF	AL52J	5119N;0017E	40	2 X 3 ELE YAGI	268	288/348 (MAX 318)	F1A	
144.925	ZS3VHF	ORANJEMUND,S.A	2837S 1625E	20	14 EL VERT 6 EL HOR	22	355,175	A1	
144.925	ZS5VHF*		2944S,3050E	40	7 ELEMENT YAGI	670	321 DEGREES	A1	
144.927	EA9VHF..	YV		0		0			NOT YET OP.
144.930	OZ7IGY	FP39B		50	BIG WHEEL	96	OMNI	A1	
144.935	DM2ACM	GL53G		1	DIPOLE	120	SSW	A1	
144.935	GB3NEE	ZD12A		30	2 X 5 EL YAGI	360	NW/SE	F1	NON-OP
144.935	SP9VHI	JK80C		1		0		A1	
144.937	TF****			0		0			NOT YET OP
144.940	DL0UH *	EL68F		1	4 DIPOLES	385	OMNI	A1	
144.940	FX7THF	IH15G		60		0	OMNI		
144.945	GB3GI	XD41J	5427N,0553W	40	2 X 4 EL YAGI	191	045 / 135 IN SEQ.	F1	TEMP NON-OP
144.945	SP3VHG	HL08J		6		0		A1	
144.950	FX5THF	AC08D		0		0			
144.950	SK1VHF	JR41D		20	2 STACKED CLOVERLEAF	30	OMNI	A1	
144.950	ZS1VHF*	KLAWER		0		0			
144.955	FX8VHF	AF79H		0		0			
144.960	SK4MPI	HU46D		1000	4 X 6 EL YAGI	510	NORTH	A1	
144.960	YU3VHF	IF47D		0		0			

INTERNATIONAL BEACONS

FREQUENCY	CALLSIGN	LOCATION	LAT/LON	ERPW	AERIAL	MASL	BEAM DIRECTION	MODE	STATUS
144.965	GB3LER	ZU65F		50	4 ELE YAGI	107	022	F1A	
144.966	DLONF***	FJ47A		1	'?'	630	OMNI	F1	
144.966	SP6VHF	HK29B		1	2 EL YAGI	1602	NE	A1	
144.970	OH2NUA	MU52J		1	TURNSTILE	40	OMNI	A1	WAS 144.305
144.970	OK0ER	HI12A		1	BIG WHEEL	1083	OMNI	F1	
144.975	DL0SG	GJ77J		60		0	OMNI	A1	
144.975	GB3ANG	YQ35C		20	4 EL YAGI	370	160	F1A	
144.980	SP2VHC	JO33E		35		0			
144.985	ON4VHF	CK23E		0		0			
144.985	Y41B	FN28F		0		0		F1A	
144.990	DMOVHF	FN28F		1	BIG WHEEL	95	OMNI	A1	
145.002	UK5UBZ	FK52C		3	DIPOLE	0			
145.450	PI3UHF	CL09		3	5DB	100	OMNI	A1	
145.900	YO3KAA	NE42J		1	DIPOLE	0			
145.960	OK1KVR/1	HK28C		0		0			
145.980	LZ2F	ND40F		25		295	OMNI		
145.988	YU1VHF	JD29G		0		0			
145.990	YU2VHF	IF47D		0		0			
431.976	DM2BEN	GK05G		1	2 X QUAD	150	NW / SE	A1	
431.998	SP6VHF *	HK29B		1	2 EL YAGI	1602	NE	A1	
432.000	DJ2HF	DL68A		0		0			
432.001	DB0AA	DL64C		1	OMNI	0			
432.010	DL0BQ	EJ23D		0		0			
432.015	DB0AC	DJ55J		15		370			
432.015	DB0AH *	FN65J		3	DIPOLE	118	OMNI	A1	
432.035	DL7HGA	GM47J		1	4 X DOUBLE QUAD	0	OMNI		
432.050	ON4UHF			0		0			QSY 432.985
432.050	YU3UHF	HG61A		0		0			
432.070	IV3B	GF30H		3		0			
432.093	SP9VHB	JJ16F		5	3 DIPOLES & REF'TORS	1600	W,NW,N	A1	
432.103	OK0EA *	HK18D		1	3 X 8 EL YAGI	1450	NW, SW, SE	F1	QSYING TO .96
432.122	ISB	FD25H		80		0			
432.192	I2B	EF16G		70		0			
432.280	SP8VHA*	LL53D		1		0		A1	
432.370	OH2NLA	MU64J		1		40	OMNI		
432.378	OE3XXA *	II71D		1	4 EL YAGI	15			
432.417	LX0LX *	DJ31B		7		0			
432.432	I1H	DF58C		16		0			
432.450	OZ2UHF	EP03H		10	BIG WHEEL	85	OMNI	F1	QSY 432.865
432.495	PI2RTD	CL03		4		40	OMNI	F1	
432.585	DK0WZ	EJ20J		5	12 EL YAGI	0	NW		
432.675	OE3XMB		4759N,1536E	1	9 ELEMENT YAGI	1246	WEST	A1	
432.800	OH8UHF	MZ79H		50		260	N/S		NOT YET OP.
432.805	DB0**	EK28/38		0		0			P'POSAL STAGE
432.810	GB3WHA	AL71D	5102N,0008E	75	2 X 8 OVER 8 YAGIS	165	NNW,E	F1A	
432.830	FX1UHF	BI21B		0		0		F1	QSL TO F1KBS
432.840	OH6UHF	LK33J		0		0			
432.850	DF0**	FJ/EJ		0		0			P'POSAL STAGE
432.850	GB3GEC			0		0			NOT OP
432.855	LA5UHF	JD25E		50	2 X YAGI	60	310	A1	
432.855	SK3UHF	IW40B		20	4 X DOUBLE QUAD	180	OMNI	A1	
432.860	LA1UHF	FT05A		12	MINI WHEEL	364	N / S	F3	
432.870	FX4UHF	ZD52C		50	2 X 10 EL YAGI	900		A1	QSL VIA F6CBC
432.870	LA2UHF	FX43G		1	DIPOLE	80	OMNI	A1	
432.875	OH7UHF	NW09F		50		328	225/340		
432.880	LA3UHF	DG80B		80	15 EL. YAGI	15	180	A1	
432.885	OY6UHF	WW76D		50	5 EL YAGI	350	SE		
432.890	GB3SUT	ZM31B		60	2 X 8 OVER 8 YAGI	270	N / 120	F1A	
432.890	LA4UHF	CT47C		6	SPECIAL DIPOLE	0	180/270 DEG	A1/F1	
432.895	OZ4UHF	HP75J		20	BIG WHEEL	20	OMNI	A1	QSY 432.865
432.900	OH3UHF	LV39J		130	10 DB GAIN	364	N/S		NOT YET OP.
432.900	PA0OHN**	CM53		2		20	OMNI	F1	
432.906	DB0AD	DK20D		2	11 ELEMENT YAGI	290	NNE	F1	
432.910	GB3EM	ZN32B		50	8 OVER 8 YAGI	600	150	F1A	
432.925	SK6UHF	GR61A		40	4 X 'BIG WHEEL'	75	OMNI	A1	
432.930	OZ7IGY *	FP39B		50	BIG WHEEL	94	OMNI	A1	
432.935	OK0EA*	HK18D		0		1400		F1A	
432.940	OH1UHF	LU		0		0			NOT YET OP
432.945	FX***	IF11J		50		1700	OMNI		NOT YET OP
432.950	FX3UHF	ZH53A		0		0		F1A	
432.950	SK1UHF	JR41D		0		0			NOT YET OP.
432.955	OZ1UHF	EQ09A		50	X MALTESE CROSS	85	OMNI	A1	NOT YET OP.
432.960	SK4UHF	HT55J		20	EL LOG PERIODIC	285	SSW	A1	
432.965	DL0NF	FJ47A		1	LOVERLEAF	630	OMNI	F1	
432.970	GB3CTC **	XK46D		5	ELE YAGI	320	045		

INTERNATIONAL BEACONS

FREQUENCY	CALLSIGN	LOCATION	LAT/LON	ERPW	AERIAL	MASL	BEAM DIRECTION	MODE	STATUS
432.974	DL0SG*	GJ77J		1		1310	OMNI	A1	
432.975	SK5UHF	IU78D		12	2 X CLOVERLEAF	30	OMNI	A1	
432.980	GB3NEB	ZO22H		0		0			P'POSAL STAGE
432.983	OZ2ALS	EP79C		10	BIG WHEEL	32	OMNI	A1	
432.984	HB9F	DG40C		15	CORNER REFLECTOR	3573	NORTH/SOUTH	F1	
432.990	GB3ANG**	YQ35C		100	9 ELE YAGI	370	170	F1A	
433.000	DL0UH	EL68F		0		385	OMNI	A1	
433.143	DL1XV	GH25C		10	11 EL YAGI	0	NW		
433.500	ZS1UHF			0		0			
433.895	PA0DSW	CM35F		1	MALTESE CROSS	10	OMNI	A1	
1294.995	LA2SHF	FX43G		5		90		A1	?QRG 1295.985
1295.990	DB0FB	EH11H		4	DIPOLE	0	N/S	A1	
1295.990	LA3UHG			0		0			
1295.995	LA1UHG	FT63G		3	BIG WHEEL	75	OMNI		
1296.010	DB0FT**	EK63H		2	4 X SLOT	880	OMNI	F1	
1296.024	DJ2LFA *	DL38J		0		0			
1296.042	DB0AH	FN65J		1		118	OMNI	A1	
1296.060	OZ3UHF	FR43J		25	HB9CV	0	SOUTH-EAST	F2	
1296.100	DK0DE	DK12F		1	15 EL	165	NNE	F1	
1296.105	I1I	DF58C		1	SQUARE-CORNER	625	S	A1	
1296.128	DL7HGA *	GM47J		1	HELICAL	86	OMNI	A1	
1296.180	DB0AJ	FH19A		10	PARABOLIC	0	NW	A1	
1296.270	SP9VHB*	JJ16F		5	3 DIPOLES & REFL'ORS	1600	W,NW,N	A1	
1296.730	FX1SHF	BI146		10	ALFORD-SLOT	0	OMNI	F1	
1296.800	SK6UHI	GQ45H		10	BIG WHEEL	220	OMNI	A1	
1296.805	DB0GP	EI30G		0		0			
1296.810	GB3NWK	AL51B		100		180	WNW	F1	OPERATIONAL
1296.830	GB3RPO	AM77J		700	SLOTTED WAVEGUIDE	80	E/W	F1	OPERATIONAL
1296.835	SK0UHG	IT60H		1	2 X HELICAL	30	OMNI	F1	NOT YET OP.
1296.840	DB0KI	FK68B		0		0			
1296.850	DL0UB	GM47B		0		0			NOT OP.
1296.850	GB3FRS	ZL57J		3	DISC	120	OMNI	F2	OPERATIONAL
1296.854	DB0JO	DL48A		350	4 X 15/15	258	275 DEGREES	F1	
1296.855	OZ7YDB	EP09H		10	BIG WHEEL	235	OMNI	F1	NOT YET OP
1296.865	OZ2UHF*	EQ64J		10	BIG WHEEL	85	OMNI	F1	NOT YET OP.
1296.870	GB3AND	ZL63B		50	STACKED SLOTS	85	OMNI	F1	OPERATIONAL
1296.875	PA0EHG	CL48J		5		0		F1	NOT YET OP
1296.880	ON5SHF	IK39J		5	SLOTTED WAVEGUIDE	86	OMNI		
1296.885	OH7UHF*	NW09F		0		0			NOT YET OP
1296.890	GB3DUN	ZL08E		2	HB9CV	263	NORTH	F1	OPERATIONAL
1296.895	DB0JC	EK08F		2	4 EL STACKED YAGI	620	OMNI	F1	
1296.900	DB0AN	DL08B		1	BIG WHEEL	100	OMNI	F2	
1296.900	DB0MP	GH22H		1	CORNER REFLECTOR	1560	NNW		
1296.900	GB3IOW	ZK34A		1	SLOTTED WAVEGUIDE	250	OMNI	F2	TEMP. NON-OP.
1296.900	GB3IOW*	ZK34A		100	ALFORD SLOT	250	OMNI	F1	
1296.910	DB0JB	EI03A		1	BIG WHEEL	0	OMNI		
1296.910	GB3CLE	YM48H		20	2 X 15/15 SLOT YAGIS	540	NORTH/SE	F1	OPERATIONAL
1296.920	DB0VC	FO51J		10	2 X BIG WHEEL	230	OMNI	F1	
1296.920	PA0DHN	CM53J		4	SLOT	20	OMNI	F1	
1296.920	SK7UHG	HR21J		2	BIG WHEEL	250	OMNI	A1	
1296.925	SK6UHG	FR29G		50	4 X CLOVER LEAF	0	OMNI	A1	
1296.930	GB3MLE	ZN32B		50	CORNER REFLECTOR	600	160 DEG	F1	OPERATIONAL
1296.930	OZ7IGY*	FP39B		5	BIG WHEEL	95	OMNI	A1	
1296.940	DL0UH*	EL68F		0		0			
1296.940	OH1UHF*	LU		0		0			NOT YET OP
1296.945	HB9F*	DG09H		15	2 X CORNER REFLECTOR	937	NE/SW	F1	
1296.950	OZ5UHF	FP		10	BIG WHEEL	0	OMNI	A1	NOT YET OP
1296.960	PA0THT	DM63		10		50	OMNI		
1296.960	SK4UHG	GU79D		100	2 X 15 ELEMENT YAGIS	450	SOUTH		
1296.965	DL0NF *	FJ47A		2	4 X DOUBLE QUAD	630	OMNI	F1	
1296.975	DB0JU	DL11B		0		0			
1296.975	OK0EA	HK18D		1	2 X 10 EL	2400	NW/SE	F1	NOT YET OP.
1296.975	OK0EA **	HK18D		1	2 X 10 EL YAGI	1450	NW, SW	F1	
1296.975	PA0ZM/A	DM65		5	20 DB PARABOLIC	34	NE	F1	
1296.975	PA1ZM/A	DM65		5	20 DB PARABOLIC	34	NE	F1	
1296.985	OZ3ALS	EP79C		10	BIG WHEEL	33	OMNI	A1	NOT YET OP.
1296.990	GB3EDN	YP05G		25	2 X CORNER REFLECTOR	117	NE/NW	F1	OPERATIONAL
1297.040	DB0LB	EI06D		1		367		F1	
1297.040	EI06D	EI06D		2		267		F1	
1297.252	LX0LX **	DJ31B		0		0			
1298.000	DB0KI *	FK70D		0		677	OMNI		
1298.025	OE3XMB*		4759N,1536E	1		1246		A1	NOT YET OP
2304.000	OH1SHF	LU		0		0			NOT YET OP
2304.010	GB3AND*	ZL63B		100	STACKED SLOTS	85	OMNI	F1	OPERATIONAL
2304.016	DB0FT *	EK63H		2	8 EL COLL.	880	N/S	A2	

INTERNATIONAL BEACONS

FREQUENCY	CALLSIGN	LOCATION	LAT/LON	ERPW	AERIAL	MASL	BEAM DIRECTION	MODE	STATUS
2304.035	DB0VC*	FO51J		5	BIG WHEEL	230	OMNI		
2304.050	GB3LDN	AL41A		5	STACKED TURNSTILES	140	OMNI	F1	TEMP.NON-OP.
2304.075	OZ7IGY**	GP23C		1		0			
2304.139	DL7QY/P	EJ80B		1	2 ELEMENT YAGI	450	NE	A1	
2304.805	DB0****	EK28/38		0		0			P'POSAL STAGE
2304.820	DB0AS	GH22H		1	28 EL	1560	NNW		
2304.850	DF0****	FJ/EJ		0		0			P'POSAL STAGE
2304.920	PA0GHN*	CM53J		8	SLOT	20	OMNI	F1	
2304.965	DL0NF****	FJ47A		1	4 X DOUBLE QUAD	630	OMNI	F1	
2305.000	DC6MR *	DL48A		1	HELICAL	238	EAST		
2320.025	DL0QQ	DM		0		0		F1	
2320.840	DB0KI*	FK68B		0		0			
2320.895	PA0TCA	CL10		0		0			
2320.920	PA0TGA	CL20		10		25	NW + W	F1	
2320.955	GB3LES	ZM24J		30	SLOT	220	160 DEGREES	F1	OPERATIONAL
2320.999	DB0JU*	DL11B		0		0			
3456.000	GB3UOS	ZN42C		4	SLOTTED WAVEGUIDE	400	N/S	F2	TEMP. NON-OP.
3456.115	DB0MP*	GH22H		1	12 EL QUAD	1560	NW	A1	
3456.209	DL7QY/P *	EJ80B		1	2 ELEMENT YAGI	450	NE	A1	
3456.360	DC0DA	DL38E		120	0.7M PARABOLIC	220	N	F1	
5760.192	DB0MP**	GH22H		1	6 DB HORN	1560	NW	F1	
5760.600	DC0DA*	DL38E		9	0.7M PARABOLIC	220	N	F1	
10120.000	GB3ALD	YJ30H		1	SECTORIAL HORN	90	030 DEG	F2	OPERATIONAL
10140.000	PA0HSM	CM53J		1	4 X HORN	0	30/120/210/300 DEG	F2	
10350.000	DB0JX	DL63A		1	10 DB	115	OMNI	F2E	
10368.000	GB3SWH	ZL29F		1	SLOTTED WAVEGUIDE	187	NE/SW	F2/F3	OPERATIONAL
10368.000	ON4RUG	GHENT		1		0	OMNI		
10368.045	PA0MS/A	CL48		1	21 DBI	45	NW	F1	
10368.100	PA0DBQ	CM72		1	20 DB	75	W	F1	
10368.200	PE1BLE	CM55		1	14 DB	35	SSW	F1	
10368.250	GB3SCX	ZK21B		1	SLOTTED WAVEGUIDE	65	OMNI	F1-F2	NOT YET OP.
10368.345	DB0MP***	GH22H		1	10 DB HORN	1560	NW	A1	
10368.628	DL7QY/A	EJ80B		1	HORN	450	N/E	A1	
10368.800	SK6SHG	FS58F		10	20 DB HORN	80		A1	
10368.830	GB3MHX	AM77J		1	1.2 METRE DISH	80	EAST	F1	OPERATIONAL
10368.880	GB3CEM	ZM31C		1	SLOTTED WAVEGUIIDE	137	OMNI	F1	OPERATIONAL
10400.000	GB3GBY	ZN40C		1	SLOTTED WAVEGUIDE	100	180	F2	OPERATIONAL
10400.000	GB3LEX	ZM24J		1		220		F2	OPERATIONAL
10400.000	GB3MLE*	ZN32B		1	SECTORIAL HORNS	600	NORTH/SOUTH	F2	OPERATIONAL
10400.000	GB3XGH	YN67B		1	OMNI	100		F2	OPERATIONAL
24100.000	GB3ALI*	YJ30H		8	SECTORIAL HORN	0		F2	NOT YET OP.
24100.000	GB3IOW**	ZK34A		8	SECTORIAL HORN	0		F2	NOT YET OP.
24192.805	DB0MP****	GH22B		1	15 DB HORN	1560	NW	A1	

TOTAL NUMBER OF RECORDS PROCESSED 343

MAPS HOW TO USE THEM

This grid system indicates the position of stations and is used primarily on the VHF bands. It consists of two capital letters, two figures and a small letter, e.g. EH68f. The capital letters mark the square between *two* degrees longitude and *one* degree latitude. These large squares are subdivided into 80 smaller squares, which are numbered continuously from 01-80 from top left to bottom right in eight horizontal lines of ten squares. The squares thus formed are again divided into 9 even smaller squares and marked with the small letters a-h and j.

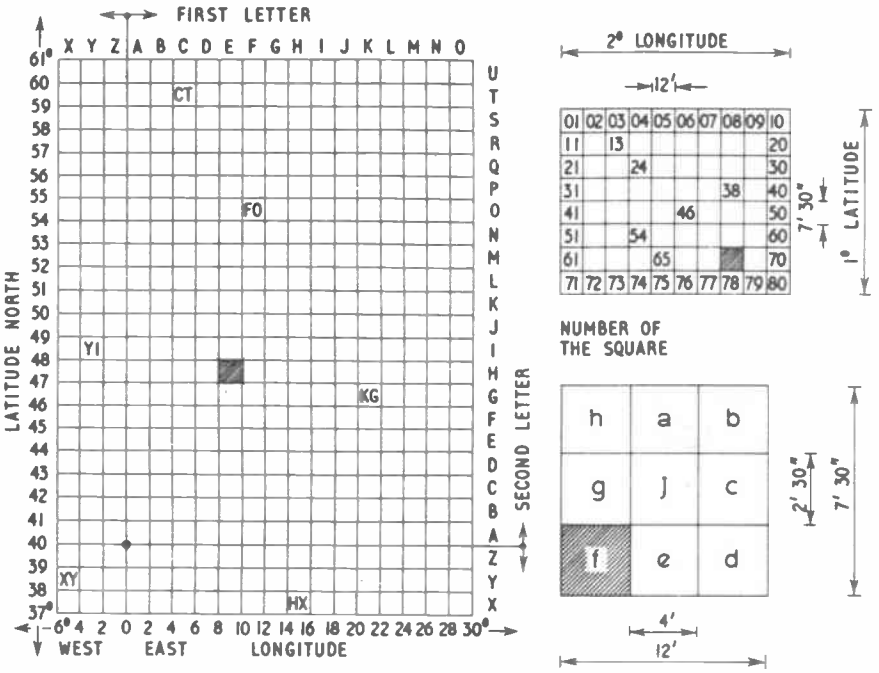
The lines of longitude start at Greenwich and run in *two* degree distances to the East with A B C..., to the West with Z Y X....

The lines of latitude start at 40 N and run in *one* degree distances with A B C... northward and Z Y X to the South.

The international alphabet of 26 letters is used.

Example: EH68f

1. letter for vertical row	E
2. letter for horizontal row	H
3. number of square	68
4. letter for small square	f



Locating squares

Conversion of QTH locator to latitude and longitude

LATITUDE

Second letter	Mid-square latitude
A	40°30'N
B	41°30'N
C	42°30'N
D	43°30'N
E	44°30'N
F	45°30'N
G	46°30'N
H	47°30'N
I	48°30'N
J	49°30'N
K	50°30'N
L	51°30'N
M	52°30'N
N	53°30'N
O	54°30'N
P	55°30'N
Q	56°30'N
R	57°30'N
S	58°30'N
T	59°30'N
U	60°30'N
V	61°30'N
W	62°30'N
X	63°30'N
Y	64°30'N
Z	65°30'N

Figures	Increment of latitude Final letter A, B, H	C, G, J	D, E, F
01–10	+28¾'N	+26¼'N	+23¾'N
11–20	+21¼'N	+18¾'N	+16¼'N
21–30	+13¾'N	+11¼'N	+08¾'N
31–40	+06¼'N	+03¾'N	+01¼'N
41–50	−01¼'N	−03¾'N	−06¼'N
51–60	−08¾'N	−11¼'N	−13¾'N
61–70	−16¼'N	−18¾'N	−21¼'N
71–80	−23¾'N	−26¼'N	−28¾'N

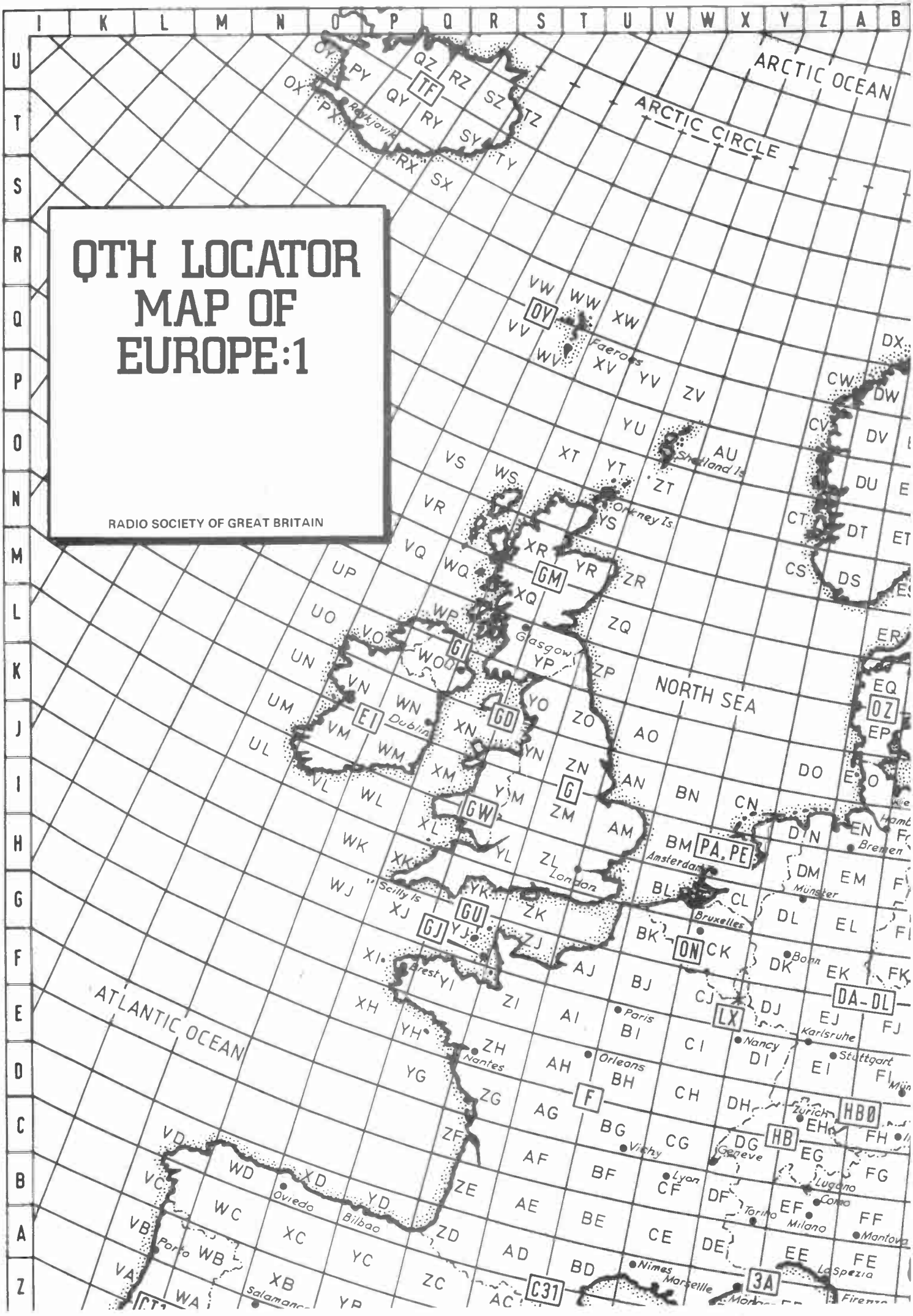
Examples:
(1) YM70C
Long 03°00'W − 58'W = 02°02'W
Lat 52°30'N − 18¾'N = 52°11¼'N

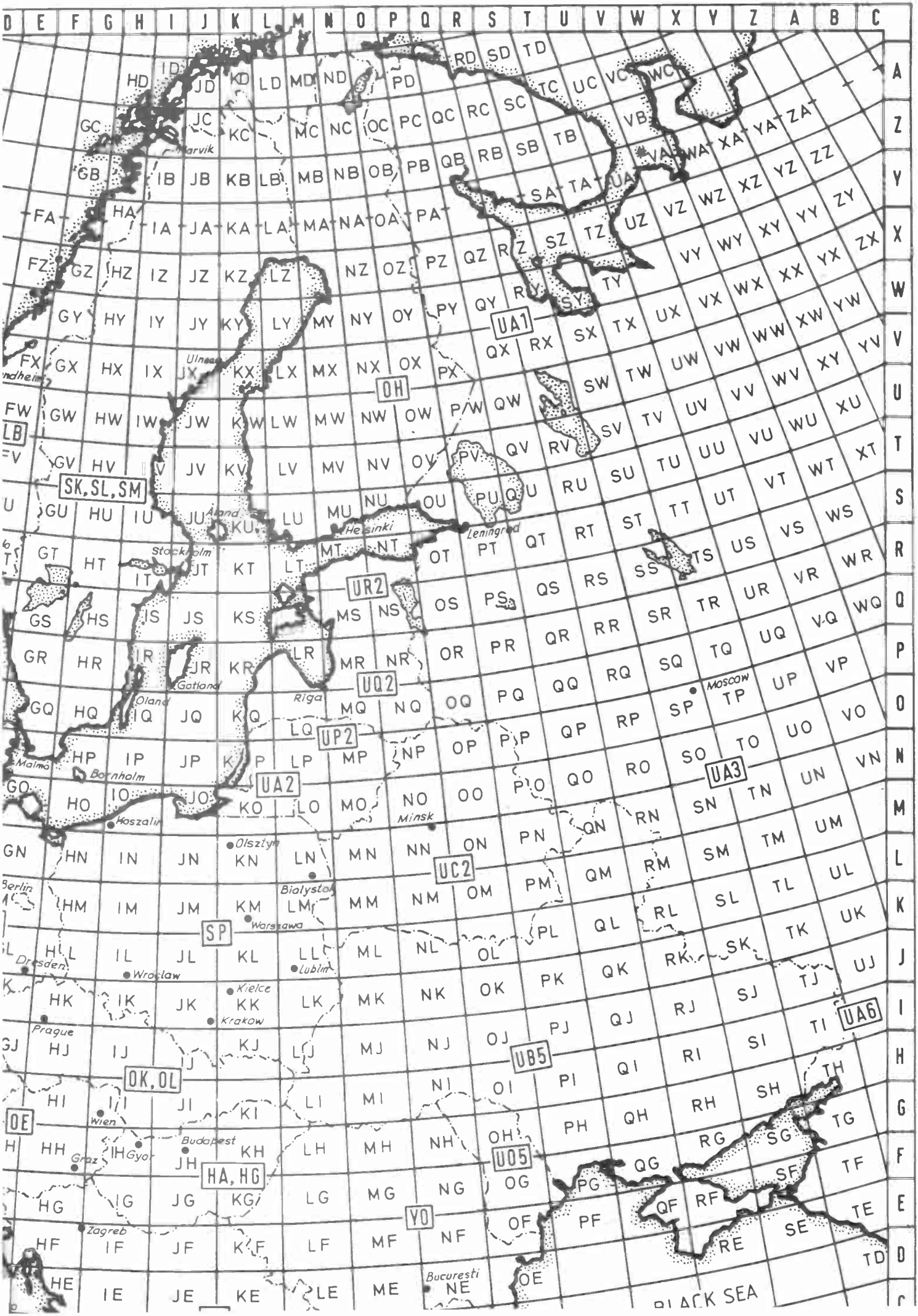
(2) MB34H
Long 25°00'E − 22'E = 24°38'E
Lat 41°30'N + 05¼'N = 41°35¼'N

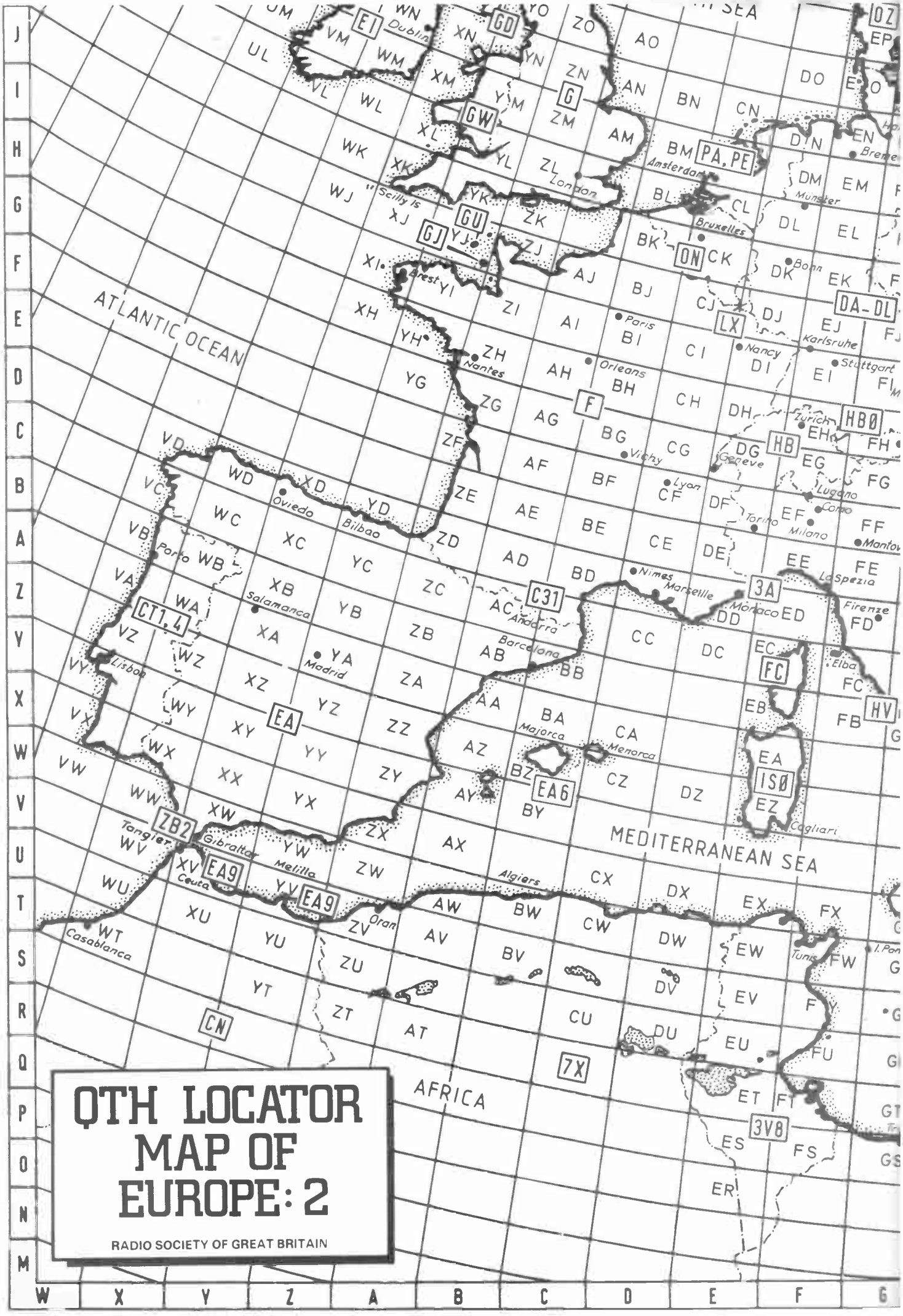
LONGITUDE

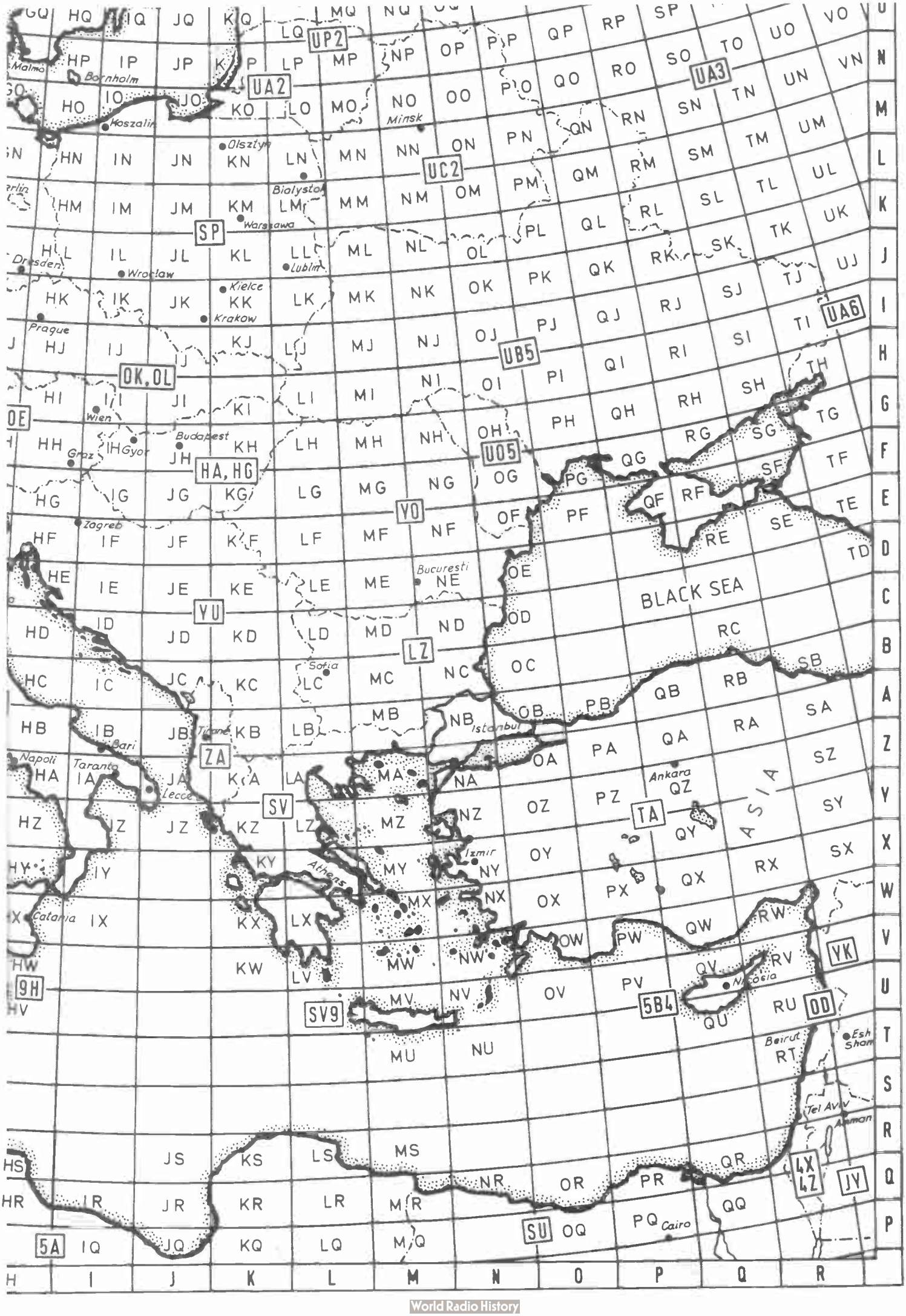
First letter	Mid-square longitude
A	01°00'E
B	03°00'E
C	05°00'E
D	07°00'E
E	09°00'E
F	11°00'E
G	13°00'E
H	15°00'E
I	17°00'E
J	19°00'E
K	21°00'E
L	23°00'E
M	25°00'E
N	27°00'E
O	29°00'E
P	31°00'E
Q	33°00'E
R	35°00'E
S	37°00'E
T	39°00'E
U	11°00'W
V	09°00'W
W	07°00'W
X	05°00'W
Y	03°00'W
Z	01°00'W

2nd figure	Increment of longitude Final letter F, G, H	A, E, J	B, C, D
1	−58'E	−54'E	−50'E
2	−46'E	−42'E	−38'E
3	−34'E	−30'E	−26'E
4	−22'E	−18'E	−14'E
5	−10'E	−06'E	−02'E
6	+02'E	+06'E	+10'E
7	+14'E	+18'E	+22'E
8	+26'E	+30'E	+34'E
9	+38'E	+42'E	+46'E
0	+50'E	+54'E	+58'E
1	+58'W	+54'W	+50'W
2	+46'W	+42'W	+38'W
3	+34'W	+30'W	+26'W
4	+22'W	+18'W	+14'W
5	+10'W	+06'W	+02'W
6	−02'W	−06'W	−10'W
7	−14'W	−18'W	−22'W
8	−26'W	−30'W	−34'W
9	−38'W	−42'W	−46'W
0	−50'W	−54'W	−58'W









UK REPEATER STATIONS

CALL	CHAN.	LOCATION	GTHL	INFO FROM	ADVISED STATUS
GB3AA	RM 0	ALVESTON, AVON	YL38A	G4CJZ	OPERATIONAL
GB3AB	RB14	ABERDEEN	YR70E	GM4BYT	OPERATIONAL
GB3AE	R5	BARNOLDSWICK,N.W.YORKSHIRE	YN18F	G3RXH	LICENCED - NOT YET OPERATIONAL
GB3AH	RB13	NR SWAFFHAM, NORFOLK	AM35A	G8VHW	AWAITING D.T.I. APPROVAL
GB3AM	R6	LONGBRIDGE, S. BIRMINGHAM	ZM51J	G4KZH	OPERATIONAL
GB3AR	R4	ARFON, NR CAERNARFON, GWYNEDD	XN79E	GW3MZY	OPERATIONAL
GB3AS	R1	CALDBECK, CUMBRIA	YO15E	G3WJH	OPERATIONAL
GB3AV	RB 2	AYLESBURY, BUCKINGHAMSHIRE	ZL16C	G6NB	OPERATIONAL
GB3AW	RB10	ASHMANSWORTH, BERKSHIRE	ZL53C	G4EFE	OPERATIONAL
GB3AY	R2	15 KM SE AYR, SCOTLAND	XP48F	GM3KJF	OPERATIONAL
GB3BB	R4	BRECON, POWYS		GW3FKO	AWAITING DTI APPROVAL
GB3BC	R6	8 KM NNW NEWPORT, GWENT	YL35A	GW8COK	OPERATIONAL
GB3BD	RB 6	BEDFORD, BEDFORDSHIRE	ZM78G	G8ELA	OP FROM NEW SITE AND CHANNEL 12 OCT 1983
GB3BE	RB15	BURY ST.EDMUNDS SUFFOLK	AM54E	G8XXX	AWAITING D.T.I. APPROVAL
GB3BH	RM 0	BUSHEY HEATH, HERTS	ZL29F	G4NUJ	LICENCED-NOT YET OPERATIONAL
GB3BI	R5	NEAR INVERNESS	XR39A	GM4OIJ	AWAITING D.T.I. APPROVAL
GB3BK	RB11	10K W.OF READING,BERKS.	ZL45H	G4CCC	OPERATIONAL
GB3BL	1.3G	BRACKNELL, BERKS		G8JWD	PROPOSAL STAGE - 1.3 GHZ PHASE 2
GB3BM	R5	BIRMINGHAM, WEST MIDLANDS	YM50A	G8AMD	OPERATIONAL
GB3BN	RB 0	BRACKNELL, BERKSHIRE	ZL47F	G8JWD	OPERATIONAL
GB3BP	R6	HORSHAM.W.SUSSEX	ZL79F	G4EFO	OPERATIONAL
GB3BR	RB 6	RACE HILL, BRIGHTON SUSSEX	ZK20J	G4EFO	OPERATIONAL
GB3BS	RB10	BRISTOL, AVON	YL48A	G4MCQ	OPERATIONAL
GB3BT	R4	BERWICK-UPON-TWEED	YP10G	GM4BDJ	OPERATIONAL
GB3BW	RM 6	BEDFORD	ZM65E	G8ELA	AWAITING D.T.I. SITE CLEARANCE
GB3BX	R2	NORTH BIRMINGHAM	YM30B	G4JLI	OPERATIONAL
GB3CA	RB13	CARLISLE, CUMBRIA	YO05G	G3WJH	AWAITING D.T.I. APPROVAL
GB3CB	RB14	BIRMINGHAM, WEST MIDLANDS	ZM41A	G8IMN	OPERATIONAL
GB3CE	RB14	WIVENHOE, COLCHESTER, ESSEX	AL05D	G3WRT	OPERATIONAL
GB3CF	RO	LEICESTER	ZM24J	G4AFJ	OPERATIONAL
GB3CH	RB 2	25 KM NW OF PLYMOUTH	XK37D	G4DGU	OPERATIONAL
GB3CI	RB 2	CORBY, NORTHAMPTONSHIRE	ZM37E	G8AMG	OPERATIONAL
GB3CK	RB 0	CHARING, ASHFORD, KENT	AL65H	G4RVV	OPERATIONAL
GB3CL	XXXX	NEAR ABINGDON, OXFORDSHIRE		G4DPA	PROPOSAL STAGE-LINEAR REPEATER
GB3CP	RM 3	5 KM E. CRAWLEY, W. SUSSEX	ZL69D	G4EFO	LICENCED, NOT YET OPERATIONAL
GB3CR	RB 6	MOLD, CLWYD	YN75A	G3LEQ	OPERATIONAL
GB3CS	R6	BLACKHILL, NR MOTHERWELL	YP11A	GM8LBC	OPERATIONAL
GB3CW	RB 6	NEWTOWN, POWYS	YM43B	GW4NQJ	OPERATIONAL
GB3CY	RB13	YORK	ZN05C	G8KAH	AWAITING D.T.I. APPROVAL
GB3DA	R5	DANBURY, ESSEX	AL23B	G8MJJ	OPERATIONAL
GB3DS	RB13	WORKSOP, NOTTINGHAMSHIRE	ZN55J	G3XXN	AWAITING D.T.I. APPROVAL
GB3DT	RB 0	WIMBORNE, DORSET	YK20D	G8AAY	OPERATIONAL
GB3DY	RB10	NR WIRKSWORTH, DERBYSHIRE	ZN73E	G3ZYC	OPERATIONAL
GB3ED	RB14	EDINBURGH	YP04C	GM3GBX	OPERATIONAL
GB3EK	RB 2	MARGATE, KENT	AL48F	G4RVV	OPERATIONAL
GB3EL	RO	HAVERING, EAST LONDON		RSGB HQ	OFF AIR PENDING SITE CHANGE
GB3ER	RB10	DANBURY, ESSEX	AL23B	G8MJJ	OPERATIONAL
GB3ES	R7	HASTINGS, E.SUSSEX	AK03D	G3ZFE	OPERATIONAL
GB3EV	R4	APPLEBY, CUMBRIA	YO38E	G3WJH	OPERATIONAL
GB3EX	RB 0	EXETER,DEVON	YK23E	G8XQQ	OPERATIONAL
GB3FC	RB 2	FYLDE COAST, LANCASHIRE	YN15C	G4EZM	OPERATIONAL
GB3FE	RB 6	FIFE, SCOTLAND	YQ64C	GM3OLK	OPERATIONAL-TEMPORARILY OFF AIR
GB3FF	RO	BURNTISLAND, FIFE	YQ66H	GM8LBC	OPERATIONAL
GB3FN	RB15	FARNHAM, SURREY	ZL62H	G4EPX	OPERATIONAL
GB3FR	R7	OLD BOLINGBROKE, LINCS.	AN61G	G3NNQ	OPERATIONAL
GB3GC	RB 4	GOOLE, HUMBERSIDE	ZN26A	G3VBI	LICENCED - NOT YET OPERATIONAL
GB3GD	RB12	LEICESTER	ZM25F	G4MQS	RTTY/DATA, AWAITNG D.T.I. APPROVAL
GB3GF	RB13	GUILDFORD, SURREY	ZL68H	G4EML	OPERATIONAL
GB3GH	RB *	GAINSBOROUGH, LINCS		G8TDU	PROPOSAL STAGE - UHF
GB3GL	RB14	GLASGOW	XP19A	GM3VTB	OPERATIONAL
GB3GN	R7	ABERDEEN	YR79F	GM4BYT	OPERATIONAL
GB3GR	RB11	NEAR GRANTHAM, LINCS	ZM07J	G4FUO	OPERATIONAL
GB3GU	RB15	GUERNSEY	YJ48G	GU4EON	AWAITNG D.T.I. APPROVAL
GB3GV	RMT1	LEICESTER	ZM25F	G4MQS	1.3GHZ AM TV REPEATER-WITH D.T.I.
GB3GY	RB11	GRIMSBY, SOUTH HUMBERSIDE	ZN40C	G4DXB	OPERATIONAL
GB3HA	RB 6	HORNSEA, HUMBERSIDE	ZN10F	G4IGY	LICENCED - NOT YET OPERATIONAL
GB3HB	RB15	ST AUSTELL, CORNWALL	XK56B	G3WKC	OPERATIONAL
GB3HC	RB 6	HEREFORD	YM77D	G3WRA	OPERATIONAL
GB3HD	RB 2	HUDDERSFIELD,W.YORKS	ZN22F	G3SDY	LICENCED - NOT YET OPERATIONAL
GB3HE	RB14	HASTINGS, SUSSEX	AK03D	G3ZFE	OPERATIONAL
GB3HG	R1	N. YORKS	ZO55H	G4ATZ	OPERATIONAL
GB3HH	R4	BUXTON, DERBYSHIRE	ZN61A	G3RKL	OPERATIONAL
GB3HI	R4	ISLAND OF MULL, SCOTLAND	XQ42G	GM3RFA	OPERATIONAL
GB3HK	RB14	HAWICK,BORDERS	YP47G	GM4BDJ	AWAITING D.T.I. APPROVAL
GB3HM	1.3G	HORSHAM, SUSSEX	ZL79F	G4EFO	PROPOSAL STAGE - 1.3 GHZ PHASE 2

UK REPEATER STATIONS

CALL	CHAN.	LOCATION	QTHL	INFO FROM	ADVISED STATUS
GB3HN	RB11	HITCHIN, HERTS		RSGB HQ	LICENCE BEING REALLOCATED
GB3HO	RB14	HORSHAM, SUSSEX	ZL79F	G4EFO	OPERATIONAL
GB3HR	RB14	STANMORE, MIDDX	ZL29F	G4KUJ	OPERATIONAL
GB3HS	R2	LITTLE WEIGHTON, HUMBERSIDE	ZN18G	G3KOC	OPERATIONAL
GB3HT	RB *	HINCKLEY, LEICESTERSHIRE		G8CGW	PROPOSAL STAGE - UHF
GB3HU	RB10	HULL, HUMBERSIDE	ZN18G	G3ZRS	OPERATIONAL FROM 23.10.83
GB3HW	RB13	GIDEA PARK, ESSEX	AL32G	G4GBW	OPERATIONAL
GB3HZ	RB 4	NR HIGH WYCOMBE, BUCKS	ZL27J	G4CYR	OPERATIONAL
GB3IH	RB 4	IPSWICH, SUFFOLK	AM76C	G8CJL	OPERATIONAL
GB3IW	RB 4	ISLE OF WIGHT		G3WXC	OFF AIR PENDING SITE CHANGE
GB3KB	RB0	BIGGIN HILL, KENT	AL51G	G3YMK	AWAITING D.T.I. APPROVAL
GB3KL	RB 4	KINGS LYNN, NORFOLK	AM13F	G8KOC	OPERATIONAL
GB3KN	R4	NR MAIDSTONE, KENT	AL54E	G4RVV	OPERATIONAL
GB3KR	RB4	KIDDERMINSTER.WORCS.	YM49D	G8NTU	AWAITING D.T.I. APPROVAL
GB3KS	R1	DOVER, KENT	AL67D	G4RVV	OPERATIONAL
GB3LA	RB11	LEEDS	ZN13G	G3KKP	AWAITING D.T.I. APPROVAL
GB3LB	RB *	LEIGHTON BUZZARD		G8GIK	PROPOSAL STAGE - UHF (RTTY)
GB3LC	RB13	LOUTH, LINCOLNSHIRE	AN51H	G4IPE	OPERATIONAL
GB3LD	R3	ULVERSTON, LAKE DISTRICT		G6KEF	OFF AIR PENDING SITE CHANGE
GB3LE	RB 4	LEICESTER	ZM24J	G4AFJ	OPERATIONAL
GB3LH	RB15	LYTH HILL, NEAR SHREWSBURY	YM27F	G3UQH	OPERATIONAL
GB3LI	RB10	LIVERPOOL, MERSEYSIDE	YN45B	G3LEQ	OPERATIONAL
GB3LL	RB 0	LLANDUDNO	YN51C	G3LEQ	OPERATIONAL
GB3LM	R5	LINCOLN	ZN68H	G8VGF	OPERATIONAL
GB3LN	RM15	LONDON		RSGB HQ	LICENCE BEING REALLOCATED
GB3LR	XXXX	RHOSESMOR, CLWYD	YN65H	G3LEQ	PROPOSAL STAGE-LINEAR REPEATER
GB3LS	RB 2	LINCOLN	ZN68H	G8VGF	OPERATIONAL
GB3LT	RB10	LUTON, BEDFORDSHIRE	ZL08D	G4CPE	OPERATIONAL
GB3LU	R3	SHETLAND ISLES	ZU65E	GM4LBE	AWAITING D.T.I. APPROVAL
GB3LV	RB 2	ENFIELD, NORTH LONDON	ZL30E	G3KSW	OPERATIONAL
GB3LW	RB 6	CENTRAL LONDON	ZL40E	G6MEH	OPERATIONAL
GB3LY	R0	LIMAVADY, CO LONDONDERRY	WP76A	GI3GGY	OPERATIONAL
GB3MA	RB 4	CENTRAL MANCHESTER	YN39H	G3LEQ	OPERATIONAL
GB3MB	R0	MANCHESTER	YN39B	G3LEQ	OPERATIONAL
GB3MC	RM 0	BOLTON, LANCS	YN28E	G3LEQ	LICENCED, NOT YET OPERATIONAL
GB3MD	RB *	MEDWAY TOWNS, KENT		G4LZV	PROPOSAL STAGE - UHF
GB3ME	RB 6	RUGBY, WARWICKSHIRE	ZM54B	G8DLX	OPERATIONAL
GB3MF	1.3G	NR.MANCHESTER		G3LEQ	PROPOSAL STAGE - TV REPEATER
GB3MH	R3	MALVERN HILLS, WORCS	YM79A	G3NUE	OPERATIONAL
GB3MK	RB 0	MILTON KEYNES, BUCKINGHAMSHIRE	ZL06C	G4BPX	OPERATIONAL
GB3ML	RB10	BLACKHILL, CENTRAL SCOTLAND	YP11A	GM3VTB	OPERATIONAL
GB3MM	RM6	WOLVERHAMPTON	YM40B	G4OKE	OPERATIONAL
GB3MN	R2	STOCKPORT CHESHIRE	YN60C	G3LEQ	OPERATIONAL
GB3MP	R6	MOEL-Y-FARC, CLWYD	YN64A	G3LEQ	OPERATIONAL
GB3MR	RB14	PARK MOOR, STOCKPORT, CHESHIRE	YN60C	G3LEQ	OPERATIONAL
GB3MS	RB 0	MALVERN HILLS, WORCS	YM79A	G4TXG	OPERATIONAL
GB3MT	RB12	BOLTON, LANCS	YN28E	G3LEQ	LICENCED, NON-OP, RTTY - VNC
GB3MW	RB10	LEAMINGTON SPA	ZM53E	G6GSI	OPERATIONAL
GB3NA	R3	BARNSLEY, YORKSHIRE	ZN33A	G4LUE	OPERATIONAL
GB3NB	R1	WYMONDHAM, NORFOLK	AM36D	G8YAL	OPERATIONAL - TEMPORARILY OFF AIR
GB3NC	R5	ST AUSTELL, CORNWALL	XK56B	G3WKC	OPERATIONAL
GB3ND	RB14	NR ILFRACOMBE, DEVON		RSGB HQ	LICENCE BEING REALLOCATED
GB3NF	RB11	7 KM SOUTH OF SOUTHAMPTON	ZK14H	G4KCM	OPERATIONAL
GB3NH	RB14	NORTHAMPTON	ZM66A	G8LHR	OPERATIONAL
GB3NI	R5	NORTHERN IRELAND	XO32H	GI3TLT	OPERATIONAL
GB3NK	RB 4	WROTHAM, KENT	AL52J	G4RVV	OPERATIONAL
GB3NL	R7	ENFIELD, NORTH LONDON	ZL30E	G8IUC	OPERATIONAL
GB3NM	RB 6	MAPPERLEY, NEAR NOTTINGHAM	ZM05A	G4AFJ	OPERATIONAL
GB3NN	RB2	NORTH NORFOLK		RSGB HQ	CLOSED DOWN
GB3NR	RB 0	NORWICH, NORFOLK	AM37A	G8GTZ	OPERATIONAL
GB3NS	RB10	BANSTEAD, SURREY	ZL59C	G8CUX	OPERATIONAL
GB3NT	RB 0	NEWCASTLE-UPON-TYNE		G4PFE	OFF AIR PENDING SITE CHANGE
GB3NX	RB 2	5 KM E OF CRAWLEY, W.SUSSEX	ZL70E	G4EFO	OPERATIONAL
GB3NY	RB 0	SCARBOROUGH, NORTH YORKS	ZO58A	G4EEV	OPERATIONAL
GB3OC	R2	ORKNEY IS.	YS05B	GM3IBU	AWAITING D.T.I. APPROVAL
GB3OH	RB 4	STIRLING, SCOTLAND	YP02B	GM4OMT	OPERATIONAL
GB3OM	RB15	OMAGH, N.I.	WO33B	GI4SXV	AWAITING D.T.I. APPROVAL
GB3OS	RB 2	STOURBRIDGE, WORCS	YM50G	G8JTL	OPERATIONAL
GB3OX	RB15	OXFORD, OXFORDSHIRE	ZL24B	G8SIN	OPERATIONAL
GB3PA	R1	PAISLEY,SCOTLAND	XP28J	GM4FDM	AWAITING D.T.I. APPROVAL
GB3PB	RB10	PETERBOROUGH, CAMBRIDGESHIRE	ZM39C	G4FMG	OPERATIONAL
GB3PD	RB10	PETERHEAD, SCOTLAND	ZR41B	GM8HGD	LICENCED - NOT YET OPERATIONAL
GB3PF	R6 0	PENDLE FOREST, BLACKBURN-LANCS	YN18D	G4BLH	OPERATIONAL
GB3PH	RB 2	PORTSDOWN HILL, HAMPSHIRE	ZK15A	G8GNB	OPERATIONAL
GB3PI	R6	BARKWAY, HERTFORDSHIRE	AM71F	G8XMS	OPERATIONAL

UK REPEATER STATIONS

CALL	CHAN.	LOCATION	QTHL	INFO FROM	ADVISED STATUS
GB3PO	R3	MARTLESHAM HEATH, SUFFOLK	AM77J	G3ZNU	OPERATIONAL
GB3PP	RB15	PRESTON, LANCASHIRE	YN17E	G8GLS	AWAITING D.T.I. APPROVAL
GB3PR	R3	PERTH, SCOTLAND	YQ53B	GM8KPH	OPERATIONAL
GB3PS	RM 3	BARKWAY, HERTFORDSHIRE	AM71F	G4HCL	LICENCED,NOT YET OPERATIONAL-VNC
GB3PT	RB12	BARKWAY, HERTFORDSHIRE	AM71F	G8XMS	OPERATIONAL - RTTY
GB3PU	RB 0	PERTH	YQ53B	GM8KPH	OPERATIONAL
GB3PW	R3	NEWTOWN, POWYS	YM43B	G3UQH	OPERATIONAL
GB3PY	RB14	NEAR CAMBRIDGE, CAMBS	AM61G	G8HVV	OPERATIONAL
GB3RD	R3	10K W.OF READING.BERKS	ZL45H	G4CCC	OPERATIONAL
GB3RF	R7	BURNLEY, LANCASHIRE	YN19E	G3RXH	OPERATIONAL
GB3RU	RM 9	10K W.OF READING.BERKS.	ZL45H	G4CCC	LICENCED, NOT YET OPERATIONAL
GB3RY	RB12	EALING,WEST LONDON	ZL39E	G3THQ	PROPOSAL STAGE-UHF (RTTY)
GB3SB	R2	DUNS, BERWICKSHIRE	YP34F	GM4BDJ	OPERATIONAL
GB3SC	R1	BOURNEMOUTH,DORSET	ZK21B	G3VPC	OPERATIONAL
GB3SD	RB14	WEYMOUTH, DORSET	YK28C	G3EGV	OPERATIONAL
GB3SF	2M	SHEFFIELD UNIVERSITY	ZN43E	G3RKL	SSB REPEATER - LICENSED, NOT OPERATIONAL
GB3SH	RB11	5 KM EAST OF HONITON, DEVON	YK15J	G8AOJ	OPERATIONAL
GB3SI	R1	ST IVES, CORNWALL	XK63J	G3NPB	OPERATIONAL
GB3SK	RB 6	FOLKESTONE, KENT		G4RVV	OFF AIR PENDING SITE CHANGE
GB3SL	R2	SOUTH LONDON	ZL50J	G3PAQ	OPERATIONAL
GB3SM	RB13	NR LEEK, STAFFORDSHIRE	ZN71H	G3LFQ	OPERATIONAL
GB3SN	R5	FOURMARKS, HAMPSHIRE	ZL75B	G8CKN	OPERATIONAL
GB3SO	RB 0	BOSTON, LINCS.	ZM10B	G3NNQ	OPERATIONAL
GB3SP	RB 4	5.5 KM E. OF PEMBROKE, DYFED	XL26C	GW4CBR	OPERATIONAL
GB3SR	R3	WORTHING, SUSSEX	ZK18C	G4EFO	OPERATIONAL
GB3SS	R0	16K SE ELGIN, SCOTLAND	YR25G	GM4ILS	OPERATIONAL
GB3ST	RB 2	STOKE ON TRENT, STAFFS	YN80E	G3LEQ	OPERATIONAL
GB3SU	RB15	SUDBURY, SUFFOLK	AL04B	G4IZA	NOT YET OPERATIONAL (EX-GB3WS)
GB3SV	RB 0	BISHOPS STORTFORD, HERTS	AL01D	G8HHV	OPERATIONAL
GB3SW	RB 6	SALISBURY	ZL71J	G3YWT	LICENCED, NOT YET OPERATIONAL - VNC
GB3SY	RB 6	BARNSLEY,SOUTH YORKSHIRE	ZN33J	G4LUE	OPERATIONAL
GB3SZ	RB15	BOURNEMOUTH, DORSET	ZK21B	G8MCP	AWAITING D.T.I APPROVAL
GB3TD	RB13	SWINDON, WILTSHIRE	ZL32F	G4LDL	OPERATIONAL
GB3TH	RB13	TAMWORTH, STAFFS	ZM32A	G8OSX	OPERATIONAL
GB3TR	R2	TORQUAY, DEVON	YK33F	G4FCN	OPERATIONAL
GB3TS	RB14	MIDDLESBOROUGH, CLEVELAND	ZO35F	G8MBK	OPERATIONAL
GB3TV	RMT2	LUTON, BEDFORDSHIRE	ZL08D	G3WLM	1.3GHZ FM TV REPEATER-WITH D.T.I.
GB3TW	R5	TYNE AND WEAR	ZO12J	G4PFE	OPERATIONAL
GB3TY	R6	NR HEXHAM, NORTHUMBERLAND	YP80D	G8VDM	LICENCED - NOT YET OPERATIONAL
GB3UB	RB 4	BATH, AVON	YL49E	G3VEH	OPERATIONAL
GB3UD	RMT2	NR STOKE ON TRENT	YN79B	G3LEQ	1.3GHZ FM TV REPEATER-WITH D.T.I.
GB3UL	RB 2	N. IRELAND	XO32H	GI4BWM	OPERATIONAL
GB3US	RB 0	SHEFFIELD	ZN43E	G3WXI	OPERATIONAL
GB3UT	RMT1	BATH,AVON	YL49E	G4JQP	1.3GHZ AM TV REPEATER-WITH D.T.I.
GB3VA	R4	16 KM W. OF AYLESBURY, BUCKS	ZL15J	G6NB	OPERATIONAL
GB3VH	RB13	HATFIELD, HERTS	ZL29B	G8FPR	OPERATIONAL
GB3VR	RMT2	WORTHING, WEST SUSSEX	ZK18B	G6AIW	1.3GHZ FM TV REPEATER-WITH D.T.I.
GB3VS	RB13	BRIDGEWATER, SOMERSET	YL65D	G3VEH	OPERATIONAL
GB3VT	R1	STOKE ON TRENT	YN80E	G3LEQ	OPERATIONAL
GB3WD	R4	PRINCETOWN, DEVON	XK40C	G6IEP	OPERATIONAL
GB3WF	RB14	LEEDS	ZN02E	G3KKP	OPERATIONAL
GB3WG	RB 6	PORT TALBOT, WALES	YL32H	GW3VPL	OPERATIONAL
GB3WH	R2	NR.SWINDON	ZL32F	G4DPA	OPERATIONAL
GB3WI	RB15	WISBECH, CAMBS	AM22C	G4NPH	AWAITING D.T.I. APPROVAL
GB3WL	R1	HILLINGDON, WEST LONDON	ZL38D	G8WDY	OPERATIONAL
GB3WN	RB 0	WOLVERHAMPTON	YM30E	G4OKE	OPERATIONAL
GB3WP	RB11	WEST PENNINE		G4LUL	LICENCED - NOT YET OPERATIONAL
GB3WR	R0	MENDIP, NR WELLS, SOMERSET	YL67B	G3ORE	OPERATIONAL
GB3WT	R7	WEST TYRONE . N. IRELAND	WO24C	GI3XCZ	OPERATIONAL
GB3WU	RB15	WAKEFIELD, YORKSHIRE	ZN33C	G3SPX	OPERATIONAL
GB3WW	R7	4K N OF CROSSHANDS,DYFED	XL30A	GW3VPL	OPERATIONAL
GB3WX	RM 9	RACE HILL, BRIGHTON, SUSSEX	ZK20J	G4EFO	OPERATIONAL - TEMPORARILY OFF THE AIR
GB3WY	RB10	QUEENSBURY, W. YORKS	ZN11E	G8NWK	OPERATIONAL
GB3XX	RB15	DAVENTRY	ZM65A	G4MTP	OPERATIONAL
GB3YJ	R7	LEAMINGTON SPA	ZM53F	G6GSI	OPERATIONAL - TEMPORARILY OFF AIR
GB3YL	RB14	LOWESTOFT, SUFFOLK	AM39D	G8TAD	OPERATIONAL
GB3YS	RB2	YEOVIL, SOMERSET	YK07C	G4JRH	AWAITING D.T.I. APPROVAL
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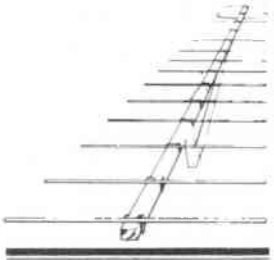

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WORLI

Decreed legal time in each territory, standard time normally kept, and the (DST) or summer time. This lasts fro the opposite in the Southern Hemis ahead of GMT, and a plus sign later does not

Territory	Standard	DST
Admiralty Is	-10	*
Afghanistan	-04½	*
Albania	-01	-02
Aleutian Is	+11	+10
Algeria	-00	-01
American Samoa	+11	*
Amirante Is	-04	*
Amsterdam Is	-05	*
Andaman Is	-05½	*
Andorra	-01	*
Angola	-01	*
Argentina	+03	*
Ascension Is	00	*
Australes Is	+10	*
Australia		
(i) Western Australia	-08	*
(ii) South Australia	-09½	-10½
(iii) North. Territory	-09½	*
(iv) Victoria, N.S. Wales, Tasmania	-10	-11
(v) Queensland	-10	*
Austria	-01	-02
Azores	+01	00
Bahamas	+05	+04
Bahrain	-03	*
Balearic Is	-01	-02
Bangladesh	-06	*
Barbados	+04	*
Belgium	-01	-02
Belize	+06	*
Benin	-01	*
Bermuda	+04	+03
Bolivia	+04	*
Botswana	-02	*
Brazil		
(i) Eastern	+03	*
(ii) Central	+04	*
(iii) Territory of Acre	+05	*
Brunei	-08	*
Bulgaria	-02	-03
Burma	-06½	*
Burundi	-02	*
Cambodia	-07	*
Cameroon	-01	*
Canada		
(i) Newfoundland	+03½	+02½
(ii) Atlantic Zone (New Brunswick, Nova Scotia, Quebec, Anticosti E of 63°W)	+04	+03
(iii) Eastern Zone (Eastern NW Territories, Ottawa, Ontaria, Quebec, Anticosti W of 63°W)	+05	+04
(iv) Central Zone (Manitoba, Central NW Territories)	+06	+05
(v) Mountain Zone (Alberta, Saskatchewan Mountain NW Territories)	+07	+06
(vi) Pacific Zone (Br. Columbia, Yukon, Western NW Territories)	+08	+07
Canary Is	00	-01
Cape Verde	+01	*
Caroline Is		
(i) West of 150°E	-10	*
(ii) 150°E to 160°E	-11	*
(iii) East of 160°E	-12	*

Territory	Standard	DST
Cayman Is	+05	*
Cen. African Rep.	-01	*
Chad	-01	*
Chagos Archipelago	-05	*
Chatham Is	-12¾	-13¾
Chile	+04	+03
China	-08	*
Christmas Is (Indian Ocean)	-07	*
Clipperton Is	+07	*
Cocos-Keeling Is	-06½	*
Columbia	+05	*
Colón, Arch de	+06	*
Comoros	-03	*
Congo	-01	*
Cook Is	+10½	+09½
Corsica	-01	-02
Costa Rica	+06	*
Crete	-02	-03
Crozet Is	-05	*
Cuba	+05	+04
Cyprus (North)	-03	*
Cyprus (South)	-02	-03
Czechoslovakia	-01	-02
Denmark	-01	-02
Djibouti	-03	*
Dominican Rep	+04	*
Easter Is	+07	+06
Ecuador	+05	*
Egypt	-02	*
El Salvador	+06	*
Equatorial Guineas inc. Pagalu (Annobon Is) and Macias Nguema Biyogo Is (Fernando Póo)	-01	*
Ethiopia	-03	*
Faroes	00	*
Falkland Is		
(i) Port Stanley	+04	+03
(ii) remainder	+04	*
Fernando do Noronha	+02	*
Fiji	-12	*
Finland	-02	-03
France	-01	-02
Franz Josef Land	-05	*
French Guiana	+03	*
Gabon	-01	*
Gambia	00	*
Gambier Is	+09	*
Germany, W (FRG)	-01	-02
Germany, E (GDR)	-01	-02
Ghana	00	*
Gibralter	-01	*
Gough Is	00	*
Grahamland	+03	*
Greece	-02	-03
Greenland		
(i) Scoresby Sound	+01	00
(ii) Except Danmarkshavn, Scoresby Sound and Thule	+03	*
(iii) Thule	+04	*
(iv) Danmarkshavn	00	*
Guam	-10	*
Guatemala	+06	*
Guinea	00	*
Guinea-Bissau	00	*
Guyana	+03	*
Haiti	+05	*
Hawaiian Is	+10	*
Honduras	+06	*

Territory	Standard	DST
Hong Kong	-08	*
Hungary	-01	-02
Iceland	00	*
India	-05½	*
Indonesia		
(i) Western Zone (Bali, Bangka, Belitung, Jewa, Mandura Lombok, Sumatra)	-07	*
(ii) Central Zone (Flores, Kalimantan, Sulawesi, Sumbawa, Timor)	-08	*
(iii) Eastern Zone (Aru Is, Kai Is, Molucca Tanimbar Is, West Irian)	-09	*
Iran	-03½	-04½
Iraq	-03	*
Ireland, Rep of	00	-01
Israel	-02	*
Italy	-01	-02
Ivory Coast	00	*
Jamaica	+05	+04
Jan Mayen Is	+01	*
Japan	-09	*
Johnston Atoli	+10	*
Jordan	-02	*
Juan Fernandez	+04	*
Kenya	-03	*
Kerguelen Is	-05	*
Kermadec Is	-12	*
Kiribati (Gilbert Is)		
(i) Except Banaba	-12	*
(ii) Banaba	-11½	*
Komandorsk Is	-12	*
Korea, North (DPRK)	-09	*
Korea, South (RK)	-09	*
Kuril Is	-11	*
Kuwait	-03	*
Laccadive Is	-05½	*
Laos	-07	*
Lebanon	-02	*
Leeward Is (Dominica, Guadeloupe, Antigua, St. Kitts, Nevis, Anguilla)	+04	*
Lesotho	-02	*
Liberia	00	*
Libya	-02	*
Line Is (Christmas, Fanning, Washington Is)	+10	*

TIME

iown are the departures from the eferred to as daylight saving time 1/April to September/October, and . minus sign indicates legal times MT. An asterisk means a territory DST.

Territory	Standard	DST time
Lord Howe Is	-10	*
Loyalty Is	-11	*
Luxembourg	-01	-02
Macau	-08	*
Madagascar	-03	*
Madeira	00	*
Malawi	-02	*
Malaysia		
(i) West Malaysia (Malaya)	-07½	*
(ii) East Malaysia (Sabah, Sarawak)	-08	*
Maldive Is	-05	*
Mali	00	*
Malta	-01	-02
Mariana Is	-10	*
Marquises Is	+09½	*
Marshall Is	-12	*
Mauritania	00	*
Mauritius	-04	*
Mexico		
(i) East	+06	*
(ii) West except Baja California N of 28°N	+07	*
(iii) Baja California N of 28°N	+08	+07
Midway Is	+11	*
Monaco	-01	-02
Mongolia		
(i) West	-07	*
(ii) Central	-08	*
(iii) East	-09	*
Morocco (inc. El Aaiún)	00	*
Mozambique	-02	*
Nauru	-12	*
Nepal	-05⅔	*
Netherlands	-01	-02
Netherlands Antilles	+04	*
New Caledonia	-11	*
New Zealand	-12	-13
Nicaragua	+06	*
Nicobar Is	-05½	*
Niger	-01	*
Nigeria	-01	*
Niue Is	+11	*
Norfolk Is	-11½	*
Norway	-01	-02
Novaya Zemlya	-05	*
Novosibirsk Is	-10	*

Territory	Standard	DST time
Oman	-04	*
Pakistan	-05	*
Panama	+05	*
Papua New Guinea (inc. New Britain, New Ireland, Bougainville)	-10	*
Paraguay	+04	+03
Peru	+05	*
Pescadores Is	-08	*
Philippines	-08	*
Phoenix Is	+11	*
Pitcairn Is	+08½	*
Poland	-01	-02
Portugal	00	-01
Pribilof Is	+11	+10
Puerto Rico	+04	*
Qatar	-03	*
Rapa Is	+10	*
Réunion Is	-04	*
Rodriguez Is	-04	*
Romania	-02	-03
Rotuma Is	-12	*
Rwanda	-02	*
St. Helena	00	*
St. Paul Is	-05	*
St. Pierre and Miquelon	+04	*
San Felix Is	+04	*
Santa Cruz Is	-11	*
São Tomé and Principe	00	*
Sardinia	-01	-02
Saudi Arabia (see note)		
(i) Dhahran	-04	*
(ii) Jidda	-03	*
Note: Clocks are reported to be set to 0000 at sunset each day, apart from at certain ports.		
Senegal	00	*
Seychelles	-04	*
Sicily	-01	-02
Sierra Leone	00	*
Singapore	-07½	*
Society Is	+10	*
Socotra	-03	*
Solomon Is	-11	*
Somalia	-03	*
South Africa	-02	*
Southern Yemen (PDR)	-03	*
South Georgia	+02	*
South West Africa	-02	*
Spain	-01	-02
Spanish Possessions in N. Africa (Alhucemas, Ceuta, Chafarinas Melilla, Peñon de Vélez)	-01	-02
Sri Lanka	-05½	*
Sudan	-02	*
Suriname	+03½	*
Svalbard	-01	*
Swaziland	-02	*
Sweden	-01	-02

Territory	Standard	DST time
Switzerland	-01	-02
Syria	-02	*
Taiwan	-08	*
Tanzania	-03	*
Thailand	-07	*
Togo	00	*
Tokelau Is	+11	*
Tonga Is	-13	*
Trinidade Is	+02	*
Trinidad and Tobago	+04	*
Tristan de Cunha	00	*
Tuamotu Is	+10	*
Tunisia	-01	*
Turkey	-03	*
Turka and Caicos Is	+05	+04
Tuvalu	-12	*
Uganda	-03	*
United Arab Emirates	-04	*
United Kingdom	00	-01
United States of America		
(i) Eastern zone	+05	+04
(ii) Central zone	+06	+05
(iii) Mountain zone	+07	+06
(iv) Pacific Zone Alaska	+08	+07
(i) SE coast to 137.5°W	+08	+07
(ii) 137.5°W to 141°W	+09	+08
(iii) 141°W to 162°W	+10	+09
(iv) West of 162°W (inc. Aleutian Is)	+11	+10
Upper Volta	00	*
Uruguay	+03	*
USSR Zone 2 (Riga, Leningrad, Odessa)	-03	-04
Zone 3 (Arkhangelsk Batumi)	-04	-05
Zone 4 (Sverdlovsk)	-05	-06
Zone 5 (Tashkent)	-06	-07
Zone 6 (Tomsk)	-07	-08
Zone 7 (Irkutsk)	-08	-09
Zone 8 (Yakutsk)	-09	-10
Zone 9 (Okhotsk, Vladivostok)	-10	-11
Zone 10 (Magadan, Sakhalin Is)	-11	-12
Zone 11 (Petropavlovski)	-12	-13
Zone 12 (Anadyr)	-13	-14
Vanuatu	-11	*
Venezuela	+04	*
Vietnam	-07	*
Virgin Is	+04	*
Wake Is	-12	*
Western Samoa	+11	*
Windward Is (Grenada, St. Vincent, St. Lucia, Martinique)	+04	*
Wrangel Is	-13	*
Yemen (YAR)	-03	*
Yugoslavia	-01	*
Zaire		
(i) East	-02	*
(ii) West	-01	*
Zambia	-02	*
Zimbabwe	-02	*

BAND PL

IARU Region 1 HF band plan

Band (MHz)		Type of emission
3.5-3.6MHz		cw (2)
3.6	±20kHz	rtty (1)
3.6-3.8		cw and phone (2,3)
7-7.04MHz		cw
7.04	±5kHz	rtty (1)
7.04-7.1		cw and phone
10.1-10.15MHz		cw
10.145	±5kHz	rtty (1)
14-14.1MHz		cw
14.09	±10kHz	rtty (1)
14.1-14.35		cw and phone
18.068-18.11MHz		cw
18.105	±5kHz	rtty (1)
18.11-18.168		cw and phone
21-21.15MHz		cw
21.1	±20kHz	rtty (1)
21.15-21.45		cw and phone
24.89-24.93MHz		cw
24.925	±5kHz	rtty (1)
24.93-24.99		cw and phone
28-28.2MHz		cw
28.1	±50kHz	rtty (1)
28.2-29.7		cw and phone

UK 70MHz band plan

70.025		
Beacons only		
70.075		
CW only		
70.150		
SSB and cw only	70.200	SSB calling frequency
70.260		
	70.260	National mobile calling frequency
All modes	70.300	RTTY calling frequency
	70.350-70.400	Raynet
70.400		
FM simplex only	70.450	FM calling frequency
70.500		

UK 432-440MHz band plan

432.000		
CW only	432.000-432.015	Moonbounce
	432.050	CW calling frequency
432.150		
SSB and cw only	432.200	UK ssb calling frequency
	432.300	IARU ssb calling frequency
432.500		
All modes non-channelized	432.600±	RTTY working (fsk)
	432.600	RTTY calling frequency
	432.675	Data transmission calling frequency
	432.700	FAX calling frequency
432.800		
Beacons		
433.000		
	433.000	R80
	433.025	R81
	433.050	R82
	433.075	R83
	433.100	R84
	433.000	RB0
	433.025	RB1
	433.050	RB2
	433.075	RB3
	433.100	RB4
	433.125	RB5
FM repeater outputs in UK only	433.150	RB6
	433.175	RB7
	433.200	RB8/SU8 Used by Raynet
	433.225	RB9
	433.250	RB10
	433.275	RB11
	433.300	RB12/SU12 RTTY repeater and rtty afsk working

ANS

	433.325	RB13
	433.350	RB14
433.375		
	433.375	SU15
	433.400	SU16
	433.425	SU17
FM simplex channels	433.450	SU18
	433.475	SU19
	433.500	SU20 FM calling channel
434.600		
	434.600	RBO
	434.625	RB1
	434.650	RB2
	434.675	RB3
	434.700	RB4
	434.725	RB5
FM repeater inputs in UK only	434.750	RB6
	434.800	RB8
	434.825	RB9
	434.850	RB10
	434.875	RB11
	434.900	RB12 RTTY repeater- afsk
	434.925	RB13
	434.950	RB14
435.000		
	434-440	ATV-frequencies chosen so as to avoid interference to other band users and in particular, the amateur satellite service
	435.438	Amateur satellite service
440.000		

UK 144MHz band plan

144.000		
	144.000-144.015	Spot frequency Moonbounce
CW only	144.050	CW calling frequency
	144.100	MS cw reference frequency
144.150		
	144.250	Used for GB2RS and slow morse transmissions
SSB and cw only	144.260±	Used by Raynet
	144.300	SSB calling frequency
	144.400	MS ssb reference frequency
144.500		
	144.500	SSTV calling frequency
	144.540	Spot frequency (UK use forbidden)
	144.600	RTTY calling frequency
	144.600±	RTTY working (fsk)
All modes non-channelised	144.650	Raynet
	144.675	Data transmission calling frequency
	144.700	FAX calling frequency
	144.750	ATV calling and talkback
	144.775	Raynet
	144.800	Raynet
	144.825	Raynet
144.845		
Beacons		
144.990		
	145.000	RO
	145.025	R1
	145.050	R2
	145.075	R3
FM repeater inputs	145.100	R4
	145.125	R5
	145.150	R6
	145.175	R7
145.200		
	145.200	S8 Raynet
	145.225	S9 Used by Raynet
	145.250	S10 Used for slow morse tone modulated transmissions
	145.275	S11
	145.300	S12 RTTY-asfk
	145.325	S13
	145.350	S14
FM simplex channels	145.375	S15
	145.400	S16
	145.425	S17
	145.450	S18
	145.475	S19
	145.500	S20 FM calling channel
	145.525	S21 Used for GB2RS fm newscasts
	145.550	S22 used for rally/exhibition talk-in
	145.575	S23
145.600		
	145.600	RO
	145.625	R1
	145.650	R2
FM repeater output	145.675	R3
	145.700	R4
	145.725	R5
	145.750	R6
	145.775	R7
145.800		
Satellite service		
146.000		

MAJOR METEOR SHOWERS

A meteor is a piece of rock or metallic ore which can be anything from dust-particle size to a dirty great chunk of rocky stuff weighing about 50 pounds or so. They originate from somewhere in space and are bits of planets, asteroids and assorted debris from the Hitch-Hiker's Guide to the Galaxy. As Mother Earth whistles round in orbit every day, some meteors get "intercepted", as it were, and are captured by the earth's gravitational field. You tend to find that, although this happens every day to some extent, there are well-known periods of a few days or indeed a few weeks in some cases when there seem to be more meteors than usual.

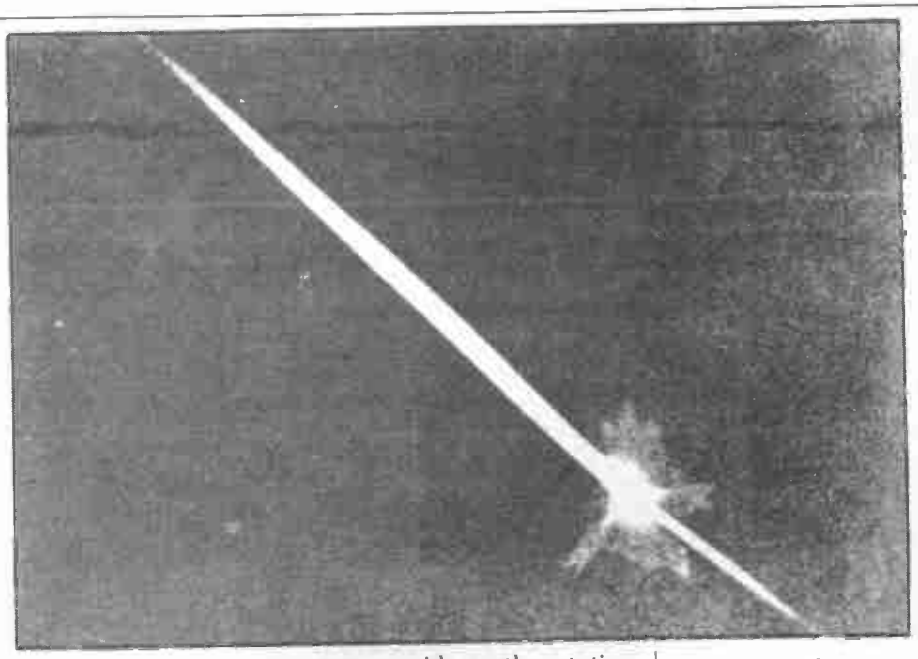
These periods are called "showers" and there are about a dozen of them every year.

When a meteor comes within about 150 kilometres of Earth, they start to run into its atmosphere, and when they get about 100 kilometres out they start getting rather hot as the friction generated by their speed (they're doing a fair old lick) meeting more and more of the atmosphere heats them up somewhat. By the time they get within about 80 kilometres of the Earth they're more or less frazzled (actually, the technical term is ionised) and the ionised trail they leave behind them is what some amateurs can use to "scatter" their radio signals from.

Now this is where the fun starts, because obviously ionised trails like this don't exactly last for ages; about a second or so is par for the course. There's no way

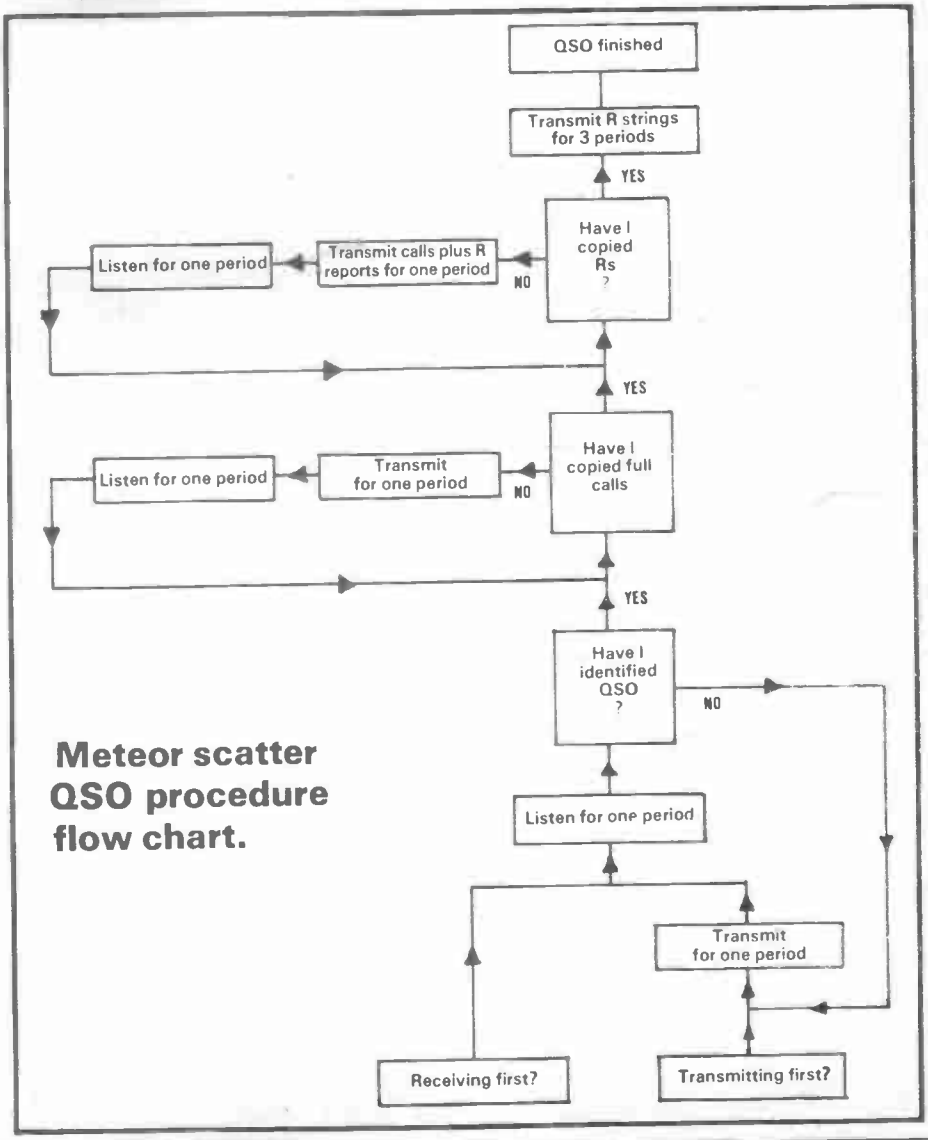
Major meteor showers

Shower name	Limits	Max	ZHR	N-S	NE-SW	E-W	SW-NW
Quadrantids	1-5 Jan	3-4 Jan	100	02-06 (W) 11-16 (E)	11-17(SE)	23-03(S) 15-17 (S)	24-05(SW)
April Lyrids	19-25 Apr	22 Apr	12	22-02 (W) 06-10 (E)	23-03 (NW) 08-11 (SE)	03-06 (N)	22-01 (SW) 05-08 (NE)
Eta Aquarids	1-12 May	5 May	25	03-04 (W) 10-11 (E)	04-09 (NW)	05-11 (N)	08-12 (NE)
Piscids	3-10 May	7 May	30	05-09 (W) 12-17 (E)	06-11 (NW) 14-17 (SE)	09-13 (N)	05-07 (SW) 11-16 (NE)
Nu Piscids	11-14 May	12 May	20	03-08 (W) 12-16 (E)	05-09 (NW) 14-16 (SE)	08-11 (N)	04-08 (SW) 10-14 (NE)
Arietids	30 May 18 June	8 June	60	04-08 (W) 11-15 (E)	05-09 (NW) 14-16 (SE)	08-12 (N)	04-06 (SW) 10-14 (NE)
Zeta Perseids	1-16 June	8 June	40	05-10 (W) 13-17 (E)	06-11 (NW) 15-17 (SE)	09-14 (N)	06-07 (SW) 11-15 (NE)
June Perseids	22-30 June	26 June	30	04-09 (W) 12-17 (E)	06-11 (NW) 14-17 (SE)	10-11 (N)	03-07 (SW) 11-14 (NE)
Nu Geminids	9-15 July	12 July	60	06-10 (W) 13-18 (E)	07-11 (NW)	10-14 (N)	11-17 (NE)
The Perseids	20 July 18 Aug	12 Aug	65	23-04 (W) 09-13 (E)	08-17 (SE)	11-01 (SE)	18-04 (SW)
Taurids	10 Oct 5 Dec	1 Nov	16	02-05 (E) 20-22 (W)	20-01 (NW)	22-03 (N)	24-05 (NE)
Geminids	7-15 Dec	13-14 Dec	55	04-09 (E) 20-01 (W)	22-02 (NW) 05-09 (SE)	01-04 (N) 03-07 (S)	03-07 (NE) 19-23 (SW)
Ursids	17-24 Dec	22 Dec	18	—	07-01 (SE)	00-24 (S)	16-09 (SW)

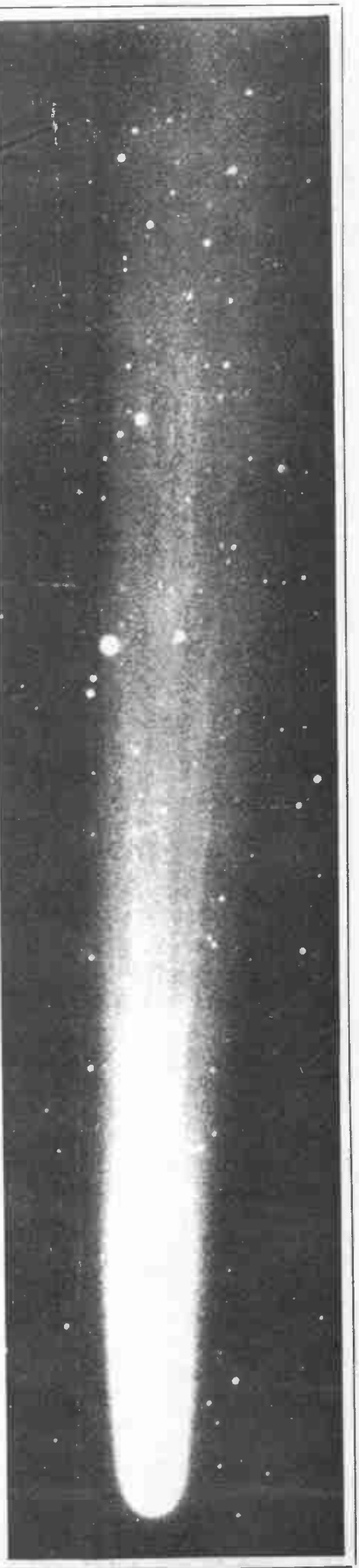


you can have a two-way contact with another station in a second or so, so an MS (meteor shower) contact is rather an intermittent affair. You need rather special operating procedures to make it work for you - our chart should give you a fairly reliable idea of when particular showers are likely to crop up and the flow chart outlines the procedures which should be adhered when working MS. Best of luck with the heavenly bodies, and ..... beam me up, Scottie!

Like the one above, some meteors actually explode when entering the upper atmosphere.



Meteor scatter QSO procedure flow chart.



MAJOR METEOR SHOWERS

Basic operating procedure

1. All ms enthusiasts living in the same area should agree to transmit simultaneously, as far as possible, to avoid mutual interference.
2. If possible, north-bound and west-bound transmissions should be made in periods 1, 3, 5 etc, counting from the full hour. South-bound and east-bound transmissions should be made in periods 2, 4, 6 etc.
3. When arranging schedules, which are normally of two hours, use *even* hours, eg 0000-0200, 0200-0400, and *not* odd hours such as 0100-0300. This makes the best use of everyone's operating, and in non-scheduled operation it indicates how much time a station may have before the next scheduled contact.

Sked duration

Every uninterrupted sked period must be considered as a separate trial. This means that it is not possible to break off and then continue a QSO. Sked periods are usually in the range of 1-2h.

Choice of frequency

The choice of frequency for scheduled contacts should avoid popular transmission channels. For non-scheduled operation the last* letter in the callsign will decide on which frequency a station is supposed to call CQ.

'A' will mean +1kHz from reference frequency
'B' will mean + 2kHz from reference frequency
'C' will mean +3kHz from reference frequency.

(etc to Z which is +26kHz)

* The last letter of the callsign will be used except in cases where the last letter denotes some geographical or other special factor. Then *and only then*, the middle or first letter may be used.

The *reference* frequency for cw is 144.100MHz.
The *reference* frequency for ssb is 144.400MHz.

Examples

SP5JC	'C' will mean +3kHz from reference frequency (so for cw the CQ frequency will be 144.103MHz)
SM7FJE	'E' will mean +5kHz from reference frequency (so for ssb the CQ frequency will be 144.405MHz)
LA2PT	'T' will mean +20kHz from reference frequency
G3WSN	'N' will mean +14kHz from reference frequency

Note. In the case of a /P or other suffix such as /7 the last letter of the basic callsign will be used.

eg PAOMS/P	*'S' will mean* +19kHz from reference frequency
SM5LE/7	'E' will mean +5kHz from reference frequency

A reply to a CQ call should always be made on the same frequency as that on which the CQ is received.

This system will result in a spreadout of 26kHz. The spreadout will be random and avoids the risk of concentrated activity on specific frequencies, which has so often occurred when the choice of frequency has been left to human choice.

In addition, by knowing a callsign the frequency which that station will be using for a CQ call will be known. Minimal *local* QRM will occur since with no geographical consideration many stations may be operating within one locator 'square' but their frequencies will be spread. The use of split receive/transmit frequencies is also avoided.

CW speeds

Speeds from 200 to 2,000 1pm are now in use, but in non-scheduled ms work a speed of more than 400 1pm is not recommended. In scheduled work the cw speed should always be agreed upon before the QSO, especially if one station does not have a multi-speed tape recorder. Some operators cannot reach the higher speeds that are now in use. Note that in some countries the national PTT requires the callsigns to be sent at a slower speed at the start and finish of each transmission.

Check that the message is correct and readable before and during the transmission.

QSO procedure

1. *Calling*
   The QSO starts with one station calling the other, eg 'SM3BIU DL7QY SM3BIU DL7QY...' The letters DE are not used unless required by the national PTT.

   In non-scheduled meteor scatter operation the call is 'CQ DL7QY CQ DL7QY...
2. *Reporting system*
   The report consists of two numbers:

First number (burst duration)	**Second number (signal strength)**
2: bursts up to 5s	6: up to S3
3: bursts 5-20s	7: S4-5
4: bursts 20-120s	8: S6-7
5: bursts longer than 120s	9: S8 and stronger

3. *Reporting procedure*
   A report is sent when the operator has positive evidence of having received the correspondent's or his own callsign, or parts of them. The report is given as follows: 'UA1WW|1BEP 26 26 UA1WW|BEP 26 26...' The report should be sent only **two times** per set of callsigns. The report must **not** be changed during a QSO, in spite of the fact that the signal strength might well justify it.
4. *Confirmation procedure*
   (a) As soon as either operator copies both the calls and the report, he can start sending a confirmation. **This means that all letters and numbers have been correctly received.**

   Confirmation message: 'SM7FJE G3SEK R26R26 SM7...' A station with an R at the end of the callsign could possibly send 'GW3ZTH I4BER RR27 RR27 GW...'

   (b) When either operator receives a confirmation message (eg R27) and all other required information is complete, he must confirm with a string of Rs, inserting his own call after every 8th R. Example: 'RRRRRRRRHG5AIRRR...' When the other operator has received Rs the QSO is complete, and he may respond in the same manner, usually for three periods.
5. Requirements for a complete QSO: **both** operators **must** have copied **both callsigns**, the **report**, and also an 'R' to confirm that the other operator has done the same.

Missing information (cw only)

If one of the operators receives the confirmation report at an early stage of the QSO, the other operator has all the information he needs. The following strings might then be used to ask for missing information:

YYY...	your call missing
SSS...	duration and signal strength missing
OOO...	all information incomplete

The operator should now respond by transmitting the required information only. This approach must be used with great caution in order to prevent confusion.

Meteor scatter work on ssb

QSOs are conducted in the same way as on cw. Letters are generally spelt in the ICAO alphabet, but may be spoken without phonetics during a sked. The letter R in confirmation reports is pronounced 'Roger'.

Further information in the RSGB's "Operating Manual"

Q-CODES

QRA What is the name of your station? The name of my station is . . .

QRB How far are you from my station? The distance between our station is . . .

QRG Will you tell me my exact frequency (*or* that of . . .)? Your exact frequency (*or* that of . . .) is . . . kHz (*or* MHz).

QRH Does my frequency vary? Your frequency varies.

QRI How is the tone of my transmission? The tone of your transmission is . . .

QRK What is the intelligibility of my signals (*or* those of . . .)? The intelligibility of your signals (*or* those of . . .) is . . .

QRL Are you busy? I am busy (*or* I am busy with...).

QRN Are you troubled by static? I am troubled by static.

QRO Shall I increase transmitter power? Increase transmitter power.

QRP Shall I decrease transmitter power? Decrease power.

QRQ Shall I send faster? Send faster (. . . words per minute).

QRR Are you ready for automatic operation. Send at . . .words per minute.

QRS Shall I send more slowly? Send more slowly (. . .words per minute).

QRT Shall I stop sending? Stop sending.

QRU Have you anything for me? I have nothing for you.

QRV Are you ready? I am ready.

QRW Shall I inform ... that you are calling on ... kHz (*or*MHz). Please inform ... that I am calling him on ... kHz (*or* MHz)

QRX When will you call me again? I will call you again at . . . hours (on . . . kHz (*or* MHz)).

QRY What is my turn? Your turn is Number . . .

QRZ Who is calling me? You are being called by . . . (on ... kHz (*or* Mhz)).

QSA What is the strength of my signals (*or* those of . . .)? The strength of your signals (*or* those of . . .) is . . .

QSB Are my signals fading? Your signals are fading.

QSD Is my keying defective? Your keying is defective.

QSI I have been unable to break in on your transmission *or* Will you inform . . . that I have been unable to break in on his transmission (on . . . kHz (*or* MHz)).

QSK Can you hear me between your signals and if so can I break in on your transmission? I can hear you between my signals; break in on my transmission.

QSL Can you acknowledge receipt? I am acknowledging receipt.

QSN Did you hear me on ... kHz (*or* MHz)? I did hear you on ... kHz (*or* MHz).

QSO Can you communicate with . . . direct (*or* by relay)? I can communicate with . . . direct (*or* by relay through . . .).

QSP Will you relay to . . .? I will relay to . . .

QSR Shall I repeat the call on the calling frequency? Repeat your call on the calling, frequency; did not hear you (*or* have interference).

QSS What working frequency will you use? I will use the working frequency . . . kHz.

QSU Shall I send or reply on this frequency (*or* on . . . kHz (*or* MHz)) (with emmissions of class ...)? Send or reply on this frequency (*or* on . . . kHz (*or* MHz)) (with emissions of class . . .).

QSV Shall I send a series of Vs on this frequency (*or* . . . kHz (*or* MHz))? Send a series of Vs on this frequency (*or* ... kHz (*or* MHz)).

QSW Will you send on this frequency (*or* on ... kHz (*or* MHz)) (with emissions of class . . .)? I am going to send on tis frequency (*or* on . . . kHz (*or* MHz)) (with emissions of class . . .).

QSX Will you listen to ... on ... kHz (*or* MHz)? I am listening to . . . on . . .kHz (*or* MHz).

QSY Shall I change to transmission on another frequency? Change to transmission on another frequency (*or* on ... kHz (*or* MHz)).

QSZ Shall I send each word or group more than once? Send each word or group twice (*or* . . . times).

QTH What is your position in latitude and longitude? My position is . . . latitude . . . longitude.

QTQ Can you communicate with my station by means of the Code? I am going to communicate with your station by means of the Code.

QTR What is the correct time? The correct time is . . . hours.

QTS Will you send your callsign for tuning purposes or so that your frequency can be measured now (*or* at ... hours) on ... kHz (*or* MHz)? I will send my callsign for tuning purposes or so that my frequency may be measured now (*or* at . . . hours) on . . . kHz (*or* MHz).

QTV Shall I stand guard for you on the frequency of . . . kHz (*or* MHz) (from . . .to . . . hours)? Stand guard for me on the frequency of . . . kHz (*or* MHz) (from . . . to . . . hours).

QTX Will you keep your station open for further communication with me until further notice (*or* until . . . hours)? I will keep my station open for further communication with you until further notice (*or* until . . . hours).

QUA Have you news of . . .? Here is news of . . .

QUM May I resume normal working? Normal working may be resumed.

RST CODES

RECOMMENDED PHONETIC ALPHABET

A	Alpha	J	Juliet	S	Sierra
B	Bravo	K	Kilo	T	Tango
C	Charlie	L	Lima	U	Uniform
D	Delta	M	Mike	V	Victor
E	Echo	N	November	W	Whiskey
F	Foxtrot	O	Oscar	X	X-ray
G	Golf	P	Papa	Y	Yankee
H	Hotel	Q	Quebec	Z	Zulu
I	India	R	Romeo		

Examples of how to use the codes are as follows: QRM means "There is interference". QRM? means "Is there interference?" While QRM5 indicates that there is "extreme interference". In this case, interference is measured as follows: 1 — very slight; 2 — slight; 3 — moderate; 4 — severe; 5 — extreme. Other codes, explained in the charts on these pages, explain the codes for readability, signal strength, and tone.

Readability

R1 Unreadable
R2 Barely readable, occasional words distinguishable
R3 Readable with considerable difficulty
R4 Readable with practically no difficulty
R5 Perfectly readable

Signal strength

S1 Faint, signals barely perceptible
S2 Very weak signals
S3 Weak signals
S4 Fair signals
S5 Fairly good signals
S6 Good signals
S7 Moderately strong signals
S8 Strong signals
S9 Extremely strong signals

Tone

T1 Extremely rough hissing note
T2 Very rough ac note, no trace of musicality
T3 Rough, low-pitched ac note, slightly musical
T4 Rather rough ac note, moderately musical
T5 Musically modulated note
T6 Modulated note, slight trace of whistle
T7 Near dc note, smooth ripple
T8 Good dc note, just a trace of ripple
T9 Purest dc note

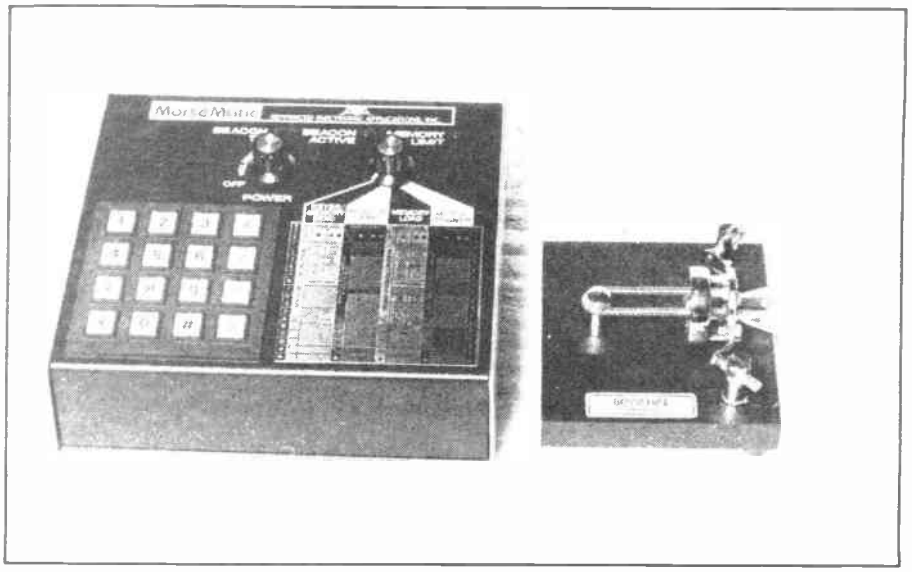
If the note appears to be crystal-controlled, add X after the appropriate number. Where there is chirp add C, drift add D, clicks add K.

CODES & PROCEDURES

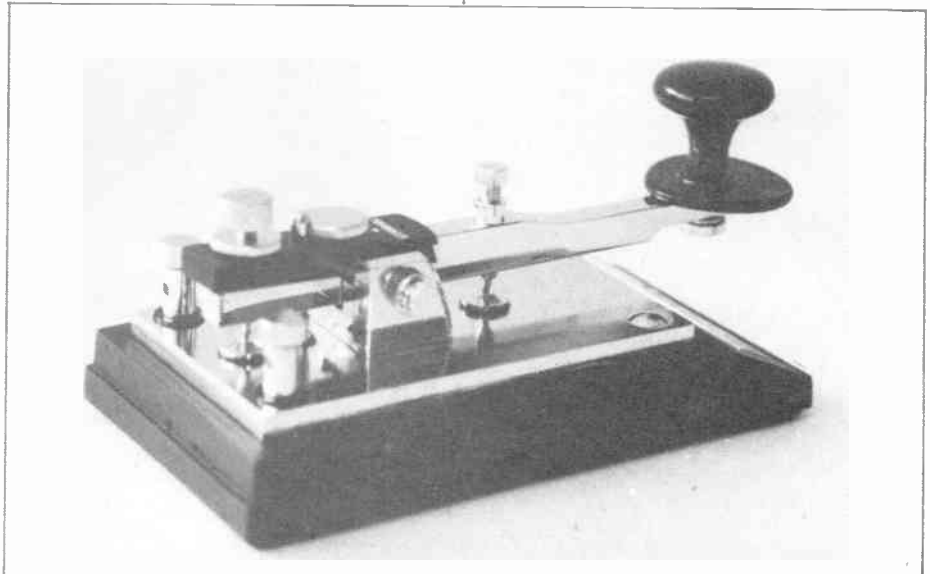
MORSE CODE

Morse, or CW as it is often called (continuous wave, if you're interested), is the language of the dedicated DX man. When a verbal contact breaks up, you can almost be sure Morse will get through. The problem comes in mastering the art.

Everybody knows that Morse is a way of communicating information with a sequence of dots, or short bursts, and dashes which are slightly longer. Basically, Morse offers two things. A transmitter which can be used to send Morse code is the essence of simplicity, since all you need to be able to do is to turn it off and on (by means on a "Morse key" - see practically any war film ever made if you're not sure what one looks like) and in electronic terms, this is a doddle; a transmitter which is required to send your dulcet tones on their merry way is inevitably a bit more complicated. To put it a bit more formally, you don't need to modulate the carrier wave - you just need to switch it on and off. Admittedly, you do need a little extra gubbins in the receiver, but that's no real problem.



Above: automatic Morse key. Below: conventional key of the type available from SMC.



The other thing about Morse which makes it still a very popular mode amongst the amateur fraternity is that it will get through where other signals won't. Now if you are interested in DX, for example, this is important because you may often be in the situation whereby you can *just* about detect that he is there but you can't really get the information you want like how strong your signals are with him and where to send the QSL card. This is the time to forget the microphone and resort to the Morse key, because it will probably get you there. The reasons for this are quite complicated, but they're true. Only the other week I was trying to have a contact with a station in Southern Ireland on 144MHz SSB. I could just about understand his callsign, and I could hear odd fragments of mine, but I couldn't copy his location or my signal report. However, when we switched to Morse (or CW, as it's often called; it stands for Continuous Wave, which is just an old-fashioned reference) we had about a ten-minute contact with no real problems.

CODES & PROCEDURES

Alphabet and numerals

A	di-dah
B	dah-di-di-dit
C	dah-di-dah-dit
D	dah-di-dit
E	dit
F	di-di-dah-dit
G	dah-dah-dit
H	di-di-di-dit
I	di-dit
J	di-dah-dah-dah
K	dah-di-dah
L	di-dah-di-dit
M	dah-dah
N	dah-dit
O	dah-dah-dah
P	di-dah-dah-dit
Q	dah-dah-di-dah
R	di-dah-dit
S	di-di-dit
T	dah
U	di-di-dah
V	di-di-di-dah
W	di-dah-dah
X	dah-di-di-dah
Y	dah-di-dah-dah
Z	dah-dah-di-dit
1	di-dah-dah-dah-dah
2	di-di-dah-dah-dah
3	di-di-di-dah-dah
4	di-di-di-di-dah
5	di-di-di-di-di
6	dah-di-di-di-dit
7	dah-dah-di-di-dit
8	dah-dah-dah-di-dit
9	dah-dah-dah-dah-dit
0	dah-dah-dah-dah-dah

Continental letters

à,á,â	di-dah-dah-di-dah
ä	di-dah-di-dah
ç	dah-di-dah-di-dit
ch	dah-dah-dah-dah
è, é	di-di-dah-di-dit
ê	dah-di-di-dah-dit
ñ	dah-dah-di-dah-dah
ü	di-di-dah-dah

Abbreviated numbers

1	di-dah
2	di-di-dah
3	di-di-di-dah
4	di-di-di-di-dah
5	di-di-di-di-dit
6	dah-di-di-di-dit
7	dah-di-di-dit
8	dah-di-dit
9	dah-dit
0	daah (long dash)

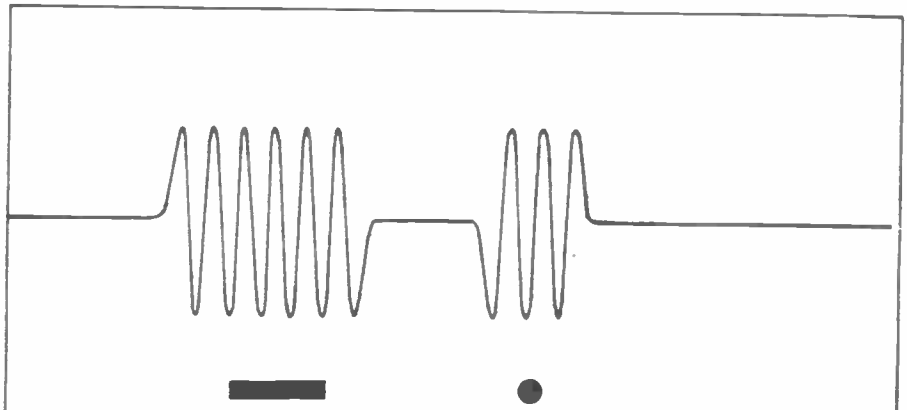
The only problem with Morse is learning it. There are arguments for and against it keeping this requirement, but irrespective of these, the facility of knowing and using it when it's necessary seems to be very handy. It's also a good part of the "self-training" bit of the licence. It *is* true to say that some people do have problems when it comes to learning to decode the meaning of the

Most amateur clubs have Morse sessions

dots and dashes coming out of the speaker, and there's no real substitute for practice. Most amateur radio clubs have Morse practice sessions at some of their meetings, and there are some very clever aids available - some of them will send you random Morse characters, and a couple will even send you acharacter and then a synthesised voice tells you what was sent!

Don't heave a big sigh and forget it all once you've passed the test

Different people learn Morse in different ways, and a little listening around and talking to a few amateurs will soon help you find your best way. It'll then be time to take the test and you can do this at several places - the little book available from the Home Office Radio Regulatory Division or from the RSGB gives a list and even contains an application form. And when you pass the test, don't heave a big sigh and forget it all - Morse is a very useful weapon to have in the armoury and even if you intend to stick to VHF and UHF the Class A licence will open the door to things like meteor scatter and aurora.



Morse (letter 'n')

Punctuation

Full stop (.)	di-dah-di-dah-di-dah
Comma (,)	dah-dah-di-di-dah-dah
Colon (:)	dah-dah-dah-di-di-dit
Question mark (?)	di-di-dah-dah-di-dit
Apostrophe (')	di-dah-dah-dah-dah-dit
Hyphen or dash (-)	dah-di-di-di-di-dah
Fraction bar or solidus (/)	dah-di-di-dah-dit
Brackets — Open [(]	dah-di-dah-dah-dit
— Close [)]	dah-di-dah-dah-di-dah
Underline (before and after the words or part of sentence	di-di-dah-dah-di-dah
Double hyphen (=)	dah-di-di-di-dah
Quotation marks (")	di-dah-di-di-dah-dit
Error	di-di-di-di-di-di-di-dit

Spacing and length of signals

1. A dash is equal to three dots.
2. The space between the signals which forms the same letter is equal to one dot.
3. The space between two letters is equal to three dots.
4. The space between two words is equal to seven dots.

CALLSIGNS

with information on bearings

This list is intended to help in determining the country, continent, zones and true bearing of a station from its callsign.
The prefixes given are those for standard stations; special stations may use other prefixes although these should nevertheless conform with the ITU allocations given in the first column.
The country given on the same line as an ITU allocation is the holder of that allocation.

ITU alloc	Prefix	Country	Deg
A2A-A2Z	A22	Botswana	157
A3A-A3Z	A35	Tonga	350
A4A-A4Z	A4X	Oman	104
A5A-A5Z	A51	Bhutan	72
A6A-A6Z	A6X	United Arab Emirates	103
A7A-A7Z	A71	Qatar	103
A8A-A8Z		Liberia	
A9A-A9Z	A9X	Bahrain	103
AAA-ALZ		USA	

ITU alloc	Prefix	Country	Deg
	AA-AG	USA (see W)	
	AH10	Northern Mariana Is	35
	AH1	Baker Is	349
	AH1	Howland Is	349
	AH2	Guam	36
	AH3	Johnston Is	11
	AH4	Midway Is	358
	AH5	Jarvis Is	339
	AH5	Palmyra Is	339

ITU alloc	Prefix	Country	Deg
	AH5K	Kingman Reef	339
	AH6	Hawaii	338
	AH7	Kure Is	338
	AH8	American Samoa	346
	AH9	Peale Is	13
	AH9	Wake Is	13
	AH9	Wilkes Is	13
	A1-AK	USA (see W)	
	AL7	Alaska	348
AMA-AOZ		Spain	
APA-ASZ	AP	Pakistan	87
ATA-AWZ		India	
AXA-AXZ		Australia	
AYA-AZZ		Argentina	
BAA-BZZ		China	
	BV	Taiwan	50
C2A-C2Z	C21	Nauru	17
C3A-C3Z	C31	Andorra	172
C4A-C4Z		Cyprus	
C5A-C5Z	C5A	Gambia	207
C6A-C6Z	C6	Bahamas	278
C8A-C9Z	C9	Mozambique	148
CAA-CEZ		Chile	
	CEOA	Easter Is	266
	CEOX	San Felix Is	247
	CEOZ	Juan Fernadez Is	241
	CE1-5	Chile	235
	CE6-8	Chile	232
	CE9	Antarctica (Chile)	209
	CE9	S Shetland Is	209
CFA-CKZ		Canada	
CLA-CMZ	CM	Cuba	279
CNA-CNZ	CN	Morocco	196
COA-COZ	CO	Cuba	279
CPA-CPZ	CP1	Bolivia	243
	CP2-7	Bolivia	243
	CP8-9	Bolivia	243
CQA-CUZ		Portugal	
	CR9	Macao	58
	CT1-4	Portugal	208
	CT2	Azores	248
	CT3	Madeira Is	220
CVA-CXZ	CX	Uruguay	224
CYA-CZZ		Canada	
D2A-D3Z	D2	Angola	160
D4A-D4Z	D4	Cape Verde	216
D5A-D5Z		Liberia	
D6A-D6Z	D68	Comoros	171
D7A-D9Z		Korea (RK)	
DAA-DRZ	DA-DL	Germany (FRG)	96
DSA-DTZ		Korea (RK)	
DUA-DZZ	DU	Philippines	57
EAA-EHZ	EA	Spain	199
	EA6	Balearic Is	167
	EA8	Canary Is	213
	EA9	Ceuta	193
	EA9	Melilla	193
E1A-EJZ	E1,EJ	Eire	303
EKA-EKZ		USSR	
ELA-ELZ	EL	Liberia	195
EMA-EOZ		USSR	
EPA-EQZ	EP	Iran	96
ERA-ESZ		USSR	
ETA-ETZ	ET	Ethiopia	129
EUA-EWZ		Byelorussia (USSR)	
EXA-EZZ	EZ	USSR	

ITU alloc	Prefix	Country	Deg
FAA-FZZ	F	France	
	FB8W	Crozet Is	145
	FB8X	Kerguelen Is	137
	FB8Y	Terre Adelie	165
	FB8Z	Amsterdam Is	124
	FB8Z	St Paul Is	124
	FC	Corsica	141
	FG7	Guadeloupe Is	258
	FH8	Mayotte	171
	FK8	Chesterfield Is	45
	FK8	Loyalty Is	25
	FK8	New Caledonia	25
	FM7	Martinique	256
	FO8	Clipperton Is	291
	FO8	Gambier Is	313
	FO8	Marquesas Is	313
	FO8	Rapa Is	313
	FO8	Society Is	313
	FO8	Tubuai Is	313
	FP8	St Pierre et Miquelon	286
	FR7	Europa Is	130
	FR7	Glorieuses Is	130
	FR7	Reunion Is	130
	FR7	Tromelin Is	130
	FR7	Juan de Nova	137
	FS7	St Martin	261
	FW8	Wallis Is	356
	FW8	Futuna Is	356
	FY7	French Guiana	242
	FY7	Inini	242
GAA-GZZ		UK	
	G	England	
	GD	Isle of Man	321
	G1	Northern Ireland	317
	GJ	Jersey	215
	GM	Scotland	345
	GU	Alderney	224
	GU	Guernsey	224
	GU	Sark	224
	GW	Wales	285
H2A-H2Z		Cyprus	
H3A-H3Z		Panama	
H4A-H4Z	H44	Solomon Is	28
H6A-H7Z		Nicaragua	
H8A-H9Z		Panama	
HAA-HAZ	HA	Hungary	100
HBA-HBZ		Switzerland	
	HBO	Liechtenstein	118
	HB	Switzerland	125
HCA-HDZ	HC	Ecuador	261
	HC8	Galapagos Is	270
HEA-HEZ		Switzerland	
HFA-HFZ		Poland	
HGA-HGZ	HG	Hungary	100
HHA-HHZ	HH	Haiti	268
H1A-H1Z	H1	Dominican Republic	267
HJA-HKZ	HK	Colombia	260
	HKO	Baja Nuevo	271
	HKO	Malpelo Is	266
	HKO	Providencia Is	272
	HKO	San Andres Is	272
HLA-HLZ		Korea (RK)	40
HMA-HMZ		Korea (DPRK)	
HNA-HNZ		Iraq	
HOA-HPZ	HP	Panama	267
HQA-HRZ	HR	Honduras	277
HSA-HSZ	HS	Thailand	72
HTA-HTZ	HT	Nicaragua	274
HUA-HUZ		Salvador	

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HVA-HVZ	HV	Vatican	132
HWA-HYZ		France	
HZA-HZZ	HZ	Saudi Arabia	137
IAA-IZZ	I	Italy	128
	ISO	Sardinia	147
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J4A-J4Z		Greece	
J5A-J5Z	J5	Guinea-Bissau	207
J6A-J6Z	J6	St Lucia	260
J7A-J7Z	J73	Dominica	260
J8A-J8Z	J88	St Vincent	260
JAA-JSZ	JA	Japan	35
	JD	Minami Torishima	34
	JD	Ogasawara	34
	JE-JR	Japan	35
JTA-JVZ	JT	Mongolia	45
	JT	Mongolia	45
JWA-JXZ		Norway	
	JW	Svalbard	25
	JX	Jan Mayen Is	9
JYA-JYZ	JY	Jordan	113
JZA-JZZ		Indonesia	
KAA-KZZ		USA	
	K	USA (see W)	
	KA	Japan (USA personnel)	35
	KA	USA (see W)	
	KA1	Minami Torishima	34
	KA1	Ogasaware	34
	KB	USA (see W)	
	KB6	Baker Is	349
	KB6	Howland Is	349
	KC	USA (see W)	
	KC4	Navassa Is	270
	KC6	Eastern Caroline Is	32
	KC6	Eastern Caroline Is	32
	KC6	Western Caroline Is	49
	KD-KG	USA (see W)	
	KG4	Guantanamo Bay	272
	KG6	Guam	36
	KHO	Northern Mariana Is	35
	KH1	Baker Is	349
	KH1	Howland Is	349
	KH2	Guam	36
	KH3	Johnston Is	11
	KH4	zMidway Is	358
	KH5	Jarvis Is	339
	KH5	Palmyra Is	339
	KH5K	Kingman Reef	339
	KH6	Hawaii	338
	KH6	Kure Is	338
	KH7	Kure Is	338
	KH8	American Samona	346
	KH9	Peale Is	13
	KH9	Wake Is	13
	KH9	Wilkes Is	13
	K1,KJ	USA (see W)	
	KJ6	Johnston Is	11
	KK	USA (see W)	
	KL7	Alaska	348
	KM-KO	USA (see W)	
	KP1	Navassa Is	270
	KP2	Virgin Is	262
	KP3	Roncador Key	272
	KP3	Serrana Bank	272
	KP4	Desecheo Is	263
	KP4	Puerto Rico	263
	KP6	Jarvis Is	339
	KP6	Palmyra Is	339
	KQ-KS	USA (see W)	
	KS4	Serrana Bank	272
	KT-KV	USA (see W)	
	KV4	Virgin Is	262
	KW	USA (see W)	
	KW6	Wake Is	13
	KX	USA (see W)	
	KX6	Marshall Is	14
	KY,KZ	USA (see W)	
L2A-L9Z		Argentina	
LAA-LNZ	LA,LB	Norway	23
LOA-LWZ	LU A-U	Argentina	229
	LU V-X	Argentina	229
	LUY	Argentina	229
	LUZ	Antarctica (Argentina)	209
LXA-LXZ	LX	Luxembourg	108
LYA-LYZ		USSR	
LZA-LZZ	LZ	Bulgaria	108
MAA-MZZ		UK	
NAA-NZZ		USA	
	N	USA (see W)	
	NA-NG	USA (see W)	
	NHO	Northern Mariana Is	35
	NH1	Baker Is	349
	NH1	Howland Is	349
	NH2	Guam	36
	NH3	Johnston Is	11
	NH4	Midway Is	358
	NH5	Jarivs Is	339
	NH5	Palmyra Is	339
	NH5K	Kingman Reef	339
	NH6	Hawaii	338
	NH7	Kure Is	338
	NH8	American Samoa	346
	NH9	Peale Is	13
	NH9	Wake Is	13
	NH9	Wilkes Is	13
	N1NK	USA (see W)	
	NL7	Alaska	348
	NL7	Alaska	348
	NM-NO	USA (see W)	
	NP1	Navassa Is	270
	NP2	Virgin Is	262
	NP3	Roncador Key	272
	NP3	Serrana Bank	272
	NP4	Desecheo Is	263
	NP4	Puerto Rico	263
	NP6	Jarvis Is	339
	NP6	Palmyra Is	339
	NQ-NZ	USA (see W)	
OAA-OCZ	OA	Peru	249
ODA-ODZ	OD5	Lebanon	109
OEA-OEZ	OE	Austria	106
OFA-OJZ	OH	Finland	42
	OHO	Aaland Is	42
	OJO	Market Reef	42
OKA-OMZ	OK,OL	Czechoslovakia	94
ONA-OTZ	ON	Belgium	94
	OR4	Antarctica (Belgium)	
OUA-OZZ		Denmark	
	OX	Greenland	340
	OX	Greenland	340
	OY	Faroe Is	343
	OZ	Denmark	48
P2A-P2Z	P29	Papua New Guinea	47

ITU alloc	Prefix	Country	Deg
P3A-P3Z		Cyprus	
P4A-P4Z		Netherlands Antilles	
P5A-P9Z		Korea (DPRK)	
PAA-P1Z	PA-P1	Netherlands	73
PJA-PJZ		Netherlands Antilles	
	PJ2	Curacao	262
	PJ3	Aruba	262
	PJ4	Bonin	262
	PJ5	St Eustatius	262
	PJ6	Saba	262
	PJ7,8	St Maarten	261
PKA-POZ		Indonesia	
PPA-PYZ	PP1,2	Brazil	221
	PP5	Brazil	221
	PP6,8	Brazil	230
	PR7,8	Brazil	230
	PS7	Brazil	230
	PT2	Brazil	229
	PT7	Brazil	230
	PT9	Brazil	230
	PU8	Brazil	230
	PV8	Brazil	230
	PW8	Brazil	230
	PYO	Fernando de Noronha	218
	PYO	St Paul Is	215
	PYO	St Peter Is	215
	PYO	Trinidade Is	208
	PYO	Martin Vaz Is	208
	PY1-5	Brazil	221
	PY6-8	Brazil	230
	PY9	Brazil	230
PZA-PZZ	PZ	Suriname	245
RAA-RZZ		USSR (see UA etc)	
S2A-S3Z	S2	Bangladesh	74
S6A-S6Z		Singapore	
S7A-S7Z	S79	Seychelles	121
S9A-S9Z	S92	Sao Tome, Principe	171
SAA-SMZ	SK,SM	Sweden	42
NSA-SRZ	SP	Poland	79
SSA-SSM		Egypt	
SSN-STZ	ST	Sudan	132
	ST	Sudan	132
SUA-SUZ	SU	Egypt	128
SVA-SZZ		Greece	
	SV9	Crete	121
	SV	Greece	119
	SV5	Rhodes	115
	SY	Mount Athos	119
T2A-T2Z	T2	Tuvalu	2
T3A-T3Z	T30	Kiribati	13
	T31	Northern Line Is	332
	T31	Line Is	320
	T32	Phoenix Is	350
T4A-T4Z		Cuba	
T5A-T5Z	T5	Somali Rep	126
T6A-T6Z		Afghanistan	
TAA-TCZ	TA	Turkey	103
TDA-TDZ		Guatemala	
TEA-TEZ		Costa Rica	
TFA-TFZ	TF	Iceland	331
TGA-TGZ	TG	Guatemala	280
THA-THZ		France	
T1A-T1Z	T1	Costa Rica	272
	T19	Cocas Is	271
TJA-TJZ	TJ	Cameroun	166
TKA-TKZ		France	
TLA-TLZ	TL8	Central African Rep	152
TMA-TMZ		France	

ITU alloc	Prefix	Country	Deg
TNA-TNZ	TN8	Congo	161
TOA-TQZ		France	
TRA-TRZ	TR8	Gabon	165
TSA-TSZ		Tunisia	
TTA-TTZ	TT8	Chad	151
TUA-TUZ	TU	Ivory Coast	187
TVA-TXZ		France	
TYA-TYZ	TY	Benin	176
TZA-TZZ	TZ	Mali	187
UAA-UQZ		USSR	
	UAOA	RSFSR	24
	UAOB	RSFSR	24
	UAOC	RSFSR	24
	UAOD	RSFSR	24
	UAOF	RSFSR	24
	UAO1	RSFSR	24
	UAOH	RSFSR	24
	UAO1	RSFSR	24
	UAOJ	RSFSR	24
	UAOL	RSFSR	24
	UAOO	RSFSR	24
	UAOQ	RSFSR	24
	UAOS	RSFSR	24
	UAOT	RSFSR	24
	UAOU	RSFSR	24
	UAOV	RSFSR	24
	UAOW	RSFSR	24
	UAOX	RSFSR	24
	UAOY	RSFSR	24
	UAOZ	RSFSR	24
	UA1	RSFSR	51
	UA1N	RSFSR	51
	UA10	RSFSR	51
	UA1P	RSFSR	13
	UA1Z	RSFSR	51
	UA2	RSFR	66
	UA3	RSFSR	63
	UA4	RSFSR	67
	UA4H	RSFSR	67
	UA4N	RSFSR	67
	UA4P	RSFSR	67
	UA4W	RSFSR	67
	UA6	RSFSR	77
	UA9A	RSFSR	60
	UA9C	RSFSR	60
	UA9F	RSFSR	60
	UA9G	RSFSR	60
	UA9H	RSFSR	49
	UA9J	RSFSR	30
	UA9K	RSFSR	30
	UA9L	RSFSR	30
	UA9M	RSFSR	60
	UA90	RSFSR	49
	UA9Q	RSFSR	60
	UA9S	RSFSR	62
	UA9U	RSFSR	49
	UA9W	RSFSR	62
	UA9X	RSFSR	30
	UA9Y	RSFSR	49
	UA9Z	RSFSR	49
	UB5	Ukraine	82
	UC2	Byelorussia	71
	UD6	Azerbaijan	70
	UF6	Georgia	91
	UG6	Armenia	91
	UH8	Turkmen	81
	U18	Uzbek	77
	UJ8	Tadzhik	77

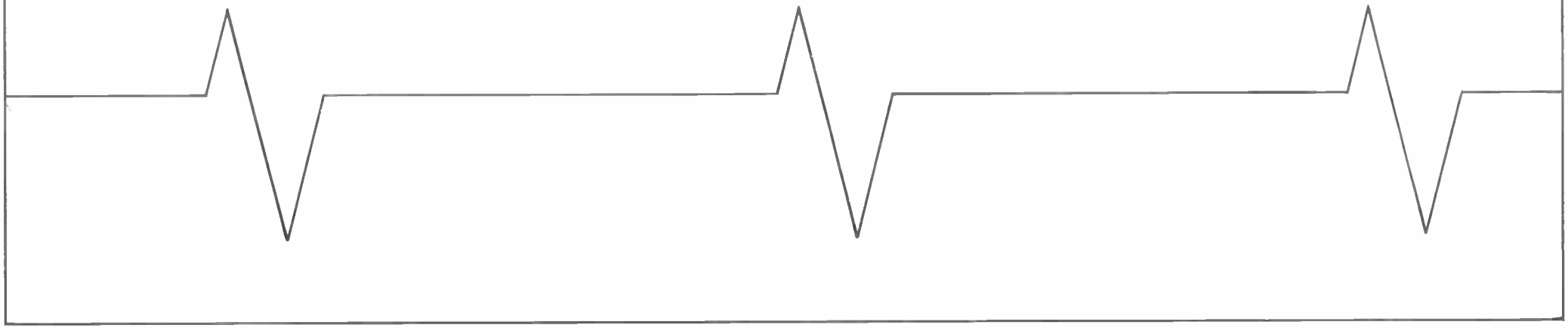
ITU alloc	Prefix	Country	Deg
	UL7	Kazakh	67
	UM8	Kirghiz	69
	UN1	RSFSR	48
	UO5	Moldavia	91
	UP2	Lithuania	66
	UQ2	Latvia	58
URA-UTZ		Ukraine	
	UR2	Estonia	54
	UT5	Ukraine	82
UUA-UZZ		USSR	
	UV	RSFSR (see UA)	
	UW	RSFSR (see UA)	
	UY5	Ukraine	82
	UZ	RSFSR (see UA)	
V2A-V2Z	V2A	Antigua	260
V3A-V3Z	V3A	Belize	280
VA-VGZ		Canada	
	VE1	Canada	290
	VE2	Canada	293
	VE2	Canada	293
	VE3	Canada	308
	VE4	Canada	315
	VE5	Canada	319
	VE6	Canada	323
	VE7	Canada	329
	VE8	Canada	328
	VE8	Canada	328
	VE8	Canada	328
	VE8	Canada	328
	VE8	Canda	328
	VE8	Canda	328
VHA-VNZ		Australia	
	VKO	Heard Is	138
	VKO	Macquarie Is	113
	VK1	Australia	63
	VK2	Australia	65
	VK3	Australia	76
	VK4	Australia	75
	VK5	Australia	79
	VK7	Australia	83
	VK8	Australia	675
	CK9N	Norfolk Is	27
	VK9X	Christmas Is	84
	VK9Y	Cocas Kneeling Is	92
	VK9Z	Willis Is	45
VOA-VOZ	VO	Canada	288
VPA-VSZ		UK	
	VP2	Leeward Is	260
	VP2	Windward Is	260
	VP5	Caicos Is	270
	VP5	Turks Is	270
	VP8	Falkland Is	216
	VP8	S Georgia	202
	VP8	S Orkney Is	202
	VP8	S Sandwich Is	195
	VP8	S Shetland Is	208
	VP9	Bermuda	274
	VQ9	Chagos Is	108
	VR6	Pitcairn Is	285
	VS5	Brunei	67
	VS6	Hong Kong	58
VTA-VWZ		India	
	VU	Andaman Is	81
	VU	India	85
	VU	Laccadive Is	97
	VU	Nicobar Is	81
VXA-VYZ		Canada	

ITU alloc	Prefix	Country	Deg
	VX9	Sable Is	285
	VYO	St Paul Is	287
	VY1	Canada	338
VZA-VZZ		Australia	
WAA-WZZ	WO	USA	305
	W1	USA	290
	W2	USA	290
	W3	USA	289
	W4	USA	288
	W4	USA	288
	W5	USA	292
	W6	USA	317
	W7	USA	316
	W7	USA	316
	W8	USA	294
	W8	USA	294
	W9	USA	297
	WA-WG	USA (see W)	
	WHO	Northern Mariana Is	35
	WH1	Baker Is	349
	WH1	Howland Is	349
	WH2	Guam	36
	WH3	Johnston Is	11
	WH4	Midway Is	358
	WH5	Jarvis Is	339
	WH5	Palmyra Is	339
	WH5K	Kingman Reef	339
	WH6	Hawaii	338
	WH7	Kure Is	338
	WH8	American Samoa	346
	WH9	Peale Is	13
	WH9	Wake Is	13
	WH9	Wilkes Is	13
	W1-WK	USA (see W)	
	WL7	Alaska	348
	WL7	Alaska	348
	WM-WO	USA (see W)	
	WP1	Navassa Is	270
	WP2	Virgin Is	262
	WP3	Roncador Key	272
	WP3	Serrana Bank	272
	WP4	Desecheo Is	263
	WP4	Puerto Rico	263
	WQ-WZ	USA (see W)	
XAA-XIZ	XE	Mexico	294
	XF4	Revilla Gigedo Is	299
XJA-XOZ		Canada	
XPA-XPZ		Denmark	
XQA-XRZ		Chile	
XSA-XSZ		China	
XTA-XTZ	XT	Volta	182
XUA-XUZ	XU	Kampuchea	71
XVA-XVZ		Vietnam	
XWA-XWZ	XW	Laos	68
XXA-XXZ		Portugal	
XYA-XZZ	XZ	Burma	75
Y2A-Y9Z	Y2	Germany (GDR)	96
YAA-YAZ	YA	Afghanistan	81
YBA-YHZ	YB-YD	Indonesia	81
Y1A-Y1Z	Y1	Iraq	102
YJA-YJZ	YJ	Vanuatu	20
YKA-YKZ	YK	Syria	106
YLA-YLZ		Latvia	
YMA-YMZ		Turkey	
YNA-YNZ	YN	Nicaragua	274
YOA-YRZ	YO	Romania	101

ITU alloc	Prefix	Country	Deg
YSA-YSZ	YS	Salvador	278
YTA-YUZ	YU	Yugoslavia	113
YVA-YYZ		Venezuela	
	YVO	Aves Is	259
	YV	Venezuela	256
YZA-YZZ		Yugoslavia	
Z2A-Z2Z		Zimbabwe	151
ZAA-ZAZ	ZA	Albania	118
ZBA-ZJZ		UK	
	ZB2	Gibraltar	196
	ZC4	Cyprus (UK based)	111
	ZD7	St Helena Is	186
	ZD8	Ascension Is	196
	ZD9	Gough Is	188
	ZD9	Tristan da Cunha Is	188
	ZF	Cayman Is	276
ZKA-ZMZ		New Zealand	
	ZK1	Manihiki Is	331
	ZK1	Cook Is	324
	ZK2	Niue Is	342
	ZL	New Zealand	5-68
	ZL1/K	Kermadec Is	355
	ZK2	Miue Is	342
	ZL4/A	Auckland Is	95
	ZL4/A	Campbell Is	106
	ZL5	Antarctica (NZ)	
	ZM7	Tokelau Is	345
ZNA-ZOZ		UK	
ZPA-ZPZ	ZP	Paraguay	230
ZQA-ZQZ		UK	
ZRA-ZUZ	ZR,ZS	South Africa	160
	ZS2	Marion Is	154
	ZS3	South-West Africa (Namibia)	164
ZVA-ZZZ		Brazil	
2AA-2ZZ		UK	
3AA-3AZ	3A	Monaco	143
3BA-3BZ	3B	Mauritius	125
3CA-3CZ		Equatorial Guinea	
	3CO	Pagalu Is	173
	3C	Equatorial Guinea	193
3DA-3DM	3DS	Swaziland	152
3DN-3DZ	3D2	Fiji	3
3EA-3FZ		Panama	
3GA-3GZ		Chile	
3HA-3UZ		China	
3VA-3VZ	3V8	Tunisia	150
3WA-3WZ		Vietnam	
3XA-3XZ	3X	Guinea	195
3YA-3YZ		Norway	
	3Y	Bouvet Is	178
3ZA-3ZZ		Poland	
4AA-4CZ		Mexico	
4DA-41Z		Philippines	
4JA-4LZ		USSR	
	4K1	Antarctica (USSR)	
4MA-4MZ		Venezuela	
4NA-4OZ		Yogoslavia	
4PA-4SZ	4S7	Sri Lanka	93
4TA-4TZ		Peru	
4UA-4UZ	4U1	United Nations	
4VA-4VZ		Haiti	
4WA-4WZ	4W	Yemen (YAR)	120
4XA-4XZ	4X4	Israel	113
4YA-4YZ		ICAO	
4ZA-4ZZ	4Z4	Israel	113
5AA-5AZ	5A	Libya	143
5BA-5BZ	5B4	Cyprus	111
5CA-5GZ		Morocco	
5HA-51Z	5H	Tanzania	137
5JA-5KZ		Colombia	
5LA-5MZ		Liberia	
5NA-5OZ	5N	Nigeria	171
5PA-5QZ		Denmark	
5RA-5SZ	5R8	Madagascar	137
5TA-5TZ	5T5	Mauritania	200
5UA-5UZ	5U7	Niger	163
5VA-5VZ	5V7	Togo	178
5WA-5WZ	5W1	Western Samoa	13
5XA-5XZ	5X5	Uganda	140
5YA-5ZZ	5Z4	Kenya	137
6AA-6BZ		Egypt	
6CA-6CZ		Syria	
6DA-6JZ		Mexico	
6KA-6NZ		Korea (RK)	
6OA-6OZ		Somali Rep	
6PA-6SZ		Pakistan	
6TU-6UZ		Sudan	
6VA-6WZ	6W8	Senegal	207
6XA-6XZ		Madagascar	
6YA-6YZ	6Y5	Jamaica	272
6ZA-6ZZ		Liberia	
7AA-71Z		Indonesia	
7JA-7NZ		Japan	
7OA-7OZ	70	Yemen (PDRY)	119
	70	Socotra Is	120
7PA-7PZ	7P8	Lesotho	156
7QA-7QZ	7Q7	Malawi	145
7RA-7RZ		Algeria	
7SA-7SZ		Sweden	
7TA-7YZ	7X	Algeria	175
7ZA-7ZZ		Saudi Arabia	
8AA-81Z		Indonesia	
7JA-8NZ		Japan	
	8J1	Antarctica (Japan)	
8OA-8OZ		Botswana	
8PA-8PZ	8P6	Barbados	254
8QA-8QZ	8Q	Maldives	101
8RA-8RZ	8R	Guyana	247
8SA-8SZ		Sweden	
8TA-8YZ		India	
8ZA-8ZZ		Saudia Arabia	
	8Z4	Neutral Zone	106
9AA-9AZ	9A	San Marino	125
9BA-9DZ		Iran	
9EA-9FZ		Ethiopia	
9GA-9GZ	9G1	Ghana	188
9HA-9HZ	9H	Malta	140
91A-9JZ	9J	Zambia	151
9KA-9KZ	9K2	Kuwait	103
9LA-9LZ	9L	Sierra Leone	197
9MA-9MZ		Malaysia	
	9M2	West Malaysia	78
	9M6	Sabah	72
	9M8	Sarawak	73
9NA-9NZ	9N	Nepal	75
9OA-9TZ	9Q5	Zaire	160
9UA-9UZ	9U5	Burundi	145
9VA-9VZ	9V	Singapore	78
9WA-9WZ		Malaysia	
9XA-9XZ	9X5	Rwanda	144
9YA-9ZZ	9Y4	Trinidad, Tobago	254

INTERNATIONAL PREFIX LIST

For your edification and delight, we present the definitive Prefix List for every country in the world today! Courtesy of Geoff Watts, we bring you several pages of everything you always wanted to know about callsigns, allocated prefixes, ITU zones, CQ zones and even the dreaded Russian Oblasts which no-one can decode. You'll see everything you could possibly want here. So for all those who wondered where everything was on the HF bands – look no further.



1.

This list gives all amateur radio prefixes currently in use, and also for reference purposes, others used during the past 10 years, including those now obsolete. If one hears a strange prefix, the location of the station (if genuine) is as indicated by the ITU Callsign Block Allocation (given in 3rd column). Keep your list up-to-date by adding new 'special' prefixes in the (2nd) column provided. Extra space has been allowed for new ITU allocations.

RADIO AMATEUR PREFIX normal	special	I.T.U. ALLOCATION	COUNTRY & CONTINENT		DXCC status	"CQ" ZONE	I.T.U. ZONE
A2		A2A-A2Z	Botswana	AF	DXCC	38	57
A3		A3A-A3Z	Tonga	OC	DXCC	32	62
A4		A4A-A4Z	Oman	AS	DXCC	21	39
A5		A5A-A5Z	Bhutan	AS	DXCC	22	41
A6		A6A-A6Z	United Arab Emirates	AS	DXCC	21	39
A7		A7A-A7Z	Qatar	AS	DXCC	21	39
	A8	A8A-A8Z	(see EL)				
A9X	A9Z	A9A-A9Z	Bahrain	AS	DXCC	21	39
		AAA-ALZ	(see W)				
AA-AC			(see W)				
	*AA1-AAØ		(see W) (AA = was used by WA-stations during USA Bicentennial Year)				
	*AB1-ABØ		(see W) (AB = was used by WB-stations during USA Bicentennial Year)				
	*AC1-ACØ		(see W) (AC = was used by W-stations during USA Bicentennial Year)				
AC3 (un-official prefix used before 1976 by Sikkim, now part of India)							
AC5 (un-official prefix used before 1973 by Bhutan, now uses A5)							
AD-AG			(see W)				
	*AD1-ADØ		(see W) (AD = was used by K-stations during USA Bicentennial Year)				
	*AE1-AEØ		(see W) (AE = was used by WD-stations during USA Bicentennial Year)				
	*AF1-AFØ		(see W) (AF = was used by WR-stations during USA Bicentennial Year)				
	*AG1		(see KW6) (novices)				
	*AG2, AG3		(see KB6) (AG3 = novices)				
	*AG5, AG6		(see KG6) (AG5 = novices)				
	*AG7		(see KW6)				
AH1-AHØ			(see KH1-KHØ)				
	*AH1		(see KH6) (novices)				
	*AH2		(see KW6) (novices)				
	*AH3, AH5		(see KS6) (AH5 = novices)				
	*AH6		(see KH6)				
	*AH7		(see KW6)				
AI-AK			(see W)				
	*AIØ		(see KP6)				
	*AJ1		(see KJ6) (novices)				
	*AJ2, AJ3		(see KV4) (AJ2 = novices)				
	*AJ4		(see KP4)				
	*AJ5		(see KJ6)				
	*AJ8		(see KP4) (novices)				
	*AK1-AKØ		(see W) (AK = was used by WN-stations during USA Bicentennial Year)				
	*AL1		(see KL7) (novices)				
	*AL4		(see KC4)				
AL7	*AL7		(see KL7)				
	AM-AO	AMA-AOZ	(see EA, EA6, EA8, EA9)				
AP		APA-ASZ	Pakistan	AS	DXCC	21	41
	AU	ATA-AWZ	(see VU)				
	AX	AXA-AXZ	(see VK)				
	AY	AYA-AZZ	(see LU)				

2.

THE "DXNS" PREFIX - COUNTRY - ZONE LIST

RADIO AMATEUR PREFIX normal	special	I.T.U. ALLOCATION	COUNTRY & CONTINENT		DXCC status	"CQ" ZONE	I.T.U. ZONE
		BAA-BZZ	China (see BY)				
BV			Taiwan	AS	DXCC	24	44
BY			China	AS	DXCC	23,24	42 = West of 90.E 43 = 90-110.E 44 = East of 110.E 33 = Manchuria
C2		C2A-C2Z	Nauru	OC	DXCC	31	65
C3		C3A-C3Z	Andorra	EU	DXCC	14	27
		C4A-C4Z	(see 5B)				
C5		C5A-C5Z	Gambia	AF	DXCC	35	46
C6		C6A-C6Z	Bahamas	NA	DXCC	08	11
		C7A-C7Z	(World Meteorological Organization)				
C9		C8A-C9Z	Mozambique	AF	DXCC	37	53
CE		CAA-CEZ	Chile	SA	DXCC	12	14 = CE1,2,3,4,5 16 = CE6,7,8
CE9 (Chilean bases in Antarctica)				SA	see note A	13	73
CE9 (Chilean bases in S.Shetland Is.)				SA	see note D	13	73
CEØA			Easter I.	SA	DXCC	12	63
CEØX			San Felix and San Ambrosio	SA	DXCC	12	14
CEØZ			Juan Fernandez Is.	SA	DXCC	12	14
	CF-CK	CFA-CKZ	(see VE,VO)				
CM	CL	CLA-CMZ	Cuba	NA	DXCC	08	11
CN		CNA-CNZ	Morocco	AF	DXCC	33	37
CO		COA-COZ	(see CM)				
CP		CPA-CPZ	Bolivia	SA	DXCC	10	12 = CP1,8,9 14 = CP2,3,4,5,6,7
		CQA-CUZ	Portugal				
	CQ-CR		(see CT1, CT2, CT3, CT4)				
CR3 (obsolete)			(see J5)				
CR4 (obsolete)			(see D4)				
CR5 (obsolete)			(see S9)				
CR6 (obsolete) (also CQ6)			(see D2)				
CR7 (obsolete) (also CQ7)			(see C9)				
CR8 (obsolete)			Portuguese Timor (now part of YB-YD) (counted for DXCC before 15 Sept.1976)				
CR9			Macao	AS	DXCC	24	44
	CS		(see CT1, CT2, CT3, CT4)				
CT1	CTØ		Portugal	EU	DXCC	14	37
CT2	CT8		Azores Is.	EU	DXCC	14	36
CT3	CT9		Madeira Is.	AF	DXCC	33	36
CT4	CT5-CT7		(see CT1)				
	CU		(see CT1, CT2, CT3, CT4)				
CX	CV-CW	CVA-CXZ	Uruguay	SA	DXCC	13	14
	CY-CZ	CYA-CZZ	(see VE,VO)				
D2		D2A-D3Z	Angola	AF	DXCC	36	52
D4		D4A-D4Z	Cape Verde	AF	DXCC	35	46
		D5A-D5Z	(see EL)				
D6		D6A-D6Z	Comoros	AF	DXCC	39	53
		D7A-D9Z	(see HL)				
DA-DO		DAA-DRZ	Federal Republic of Germany	EU	DXCC	14	28
DF-DH			(see DA-DO)				
DJ-DL			(see DA-DO)				
DM (was used by German Dem.Republic before 1980, now uses Y2-Y9)							
DPØAA (W.German base in Antarctica)				AF	see note A	38	67
DPØLEX (W.German base in Antarctica)				AF	see note A	38	67
		DSA-DTZ	(see HL)				
	DT (obsolete)		(see DM)				
DU	DX	DUA-DZZ	Philippines	OC	DXCC	27	50
EA		EAA-EHZ	Spain	EU	DXCC	14	37
EA6			Balearic Is.	EU	DXCC	14	37

3.

THE "DXNS" PREFIX - COUNTRY- ZONE LIST

RADIO AMATEUR PREFIX normal	special	I.T.U. ALLOCATION	COUNTRY & CONTINENT		DXCC status	"CQ" ZONE	I.T.U. ZONE
EA8			Canary Is.	AF	DXCC	33	36
EA9			Ceuta and Melilla	AF	DXCC	33	37
EA9			Spanish Sahara (now part of CN)		(counted for DXCC before 8 Jan.1976)		
EC	ED-EH		(see EA, EA6, EA8, EA9)				
EI	EJ	EIA-EJZ	Ireland	EU	DXCC	14	27
	EK	EKA-EKZ	(see UAA-UZZ) (for exact location see Note on Sheet 9, under Oblast List)				
EK1P			(see UA1PAL)				
EL		ELA-ELZ	Liberia	AF	DXCC	35	46
ELØ (Liberian /MM stations)							
	EM-EN	EMA-EOZ	(see UAA-UZZ) (for exact location see Note on Sheet 9, under Oblast List)				
EP	EQ	EPA-EQZ	Iran	AS	DXCC	21	40
	ER	ERA-ESZ	(see UAA-UZZ) (for exact location see Note on Sheet 9, under Oblast List)				
ET		ETA-ETZ	Ethiopia	AF	DXCC	37	48
ET3ZU/A			(see J2Ø/A)				
	EU-EY	EUA-EZZ	(see UAA-UZZ) (for exact location see Note on Sheet 9, under Oblast List)				
EZ (USSR novice stations)			(see UAA-UZZ) (for exact location see Note on Sheet 9, under Oblast List)				
		FAA-FZZ	France, including overseas territories				
F			France	EU	DXCC	14	27
FØØW			Crozet Is.	AF	DXCC	39	68
FØØX			Kerguelen Is.	AF	DXCC	39	68
FØØY (French bases in Antarctica)				OC	see note A	30	70
FØØZ			Amsterdam I. and St.Paul I.	AF	DXCC	39	68
FC			Corsica	EU	DXCC	15	28
FG			Guadeloupe	NA	DXCC	08	11
FH			Mayotte	AF	DXCC	39	53
FK			New Caledonia	OC	DXCC	32	56
FL (obsolete)			(see J2)				
FLØOM/A			(see J2Ø/A)				
FM			Martinique	NA	DXCC	08	11
FO			French Polynesia	OC	DXCC	32	63
			Marquesas Is.			31	
FOØX			Clipperton I.	NA	DXCC	07	10
FP			St.Pierre and Miquelon	NA	DXCC	05	09
FR			Reunion I.	AF	DXCC	39	53
FR---/B			Bassas da India	AF	(FR---/J)	39	53
FR---/E			Europa I.	AF	(FR---/J)	39	53
FR---/G			Glorieuses Is.	AF	DXCC	39	53
FR---/J			Juan de Nova	AF	DXCC	39	53
FR---/T			Tromelin I.	AF	DXCC	39	53
FS			French St.Martin	NA	DXCC	08	11
FW			Wallis and Futuna Is.	OC	DXCC	32	62
	FX		(see F)				
FY			French Guiana	SA	DXCC	09	12
	FZ		(see F)				
		GAA-GZZ	United Kingdom				
G			England	EU	DXCC	14	27
G5ACI/AA			(see J2Ø/A)				
	GB		(see GAA-GZZ)				
GC (obsolete)			(see GJ and GU)				
GD			Isle of Man	EU	DXCC	14	27
	GE		(see GAA-GZZ)				
GI			Northern Ireland	EU	DXCC	14	27
GJ			Jersey	EU	DXCC	14	27
GM			Scotland	EU	DXCC	14	27
	GT		(see GD)				
GU			Guernsey and Dependencies	EU	DXCC	14	27
GW			Wales	EU	DXCC	14	27
		H2A-H2Z	(see 5B)				
	H3	H3A-H3Z	(see HP)				
H4		H4A-H4Z	Solomon Is.	OC	DXCC	28	51

4.

THE "DXNS" PREFIX - COUNTRY - ZONE LIST

RADIO AMATEUR PREFIX normal	special	I.T.U. ALLOCATION	COUNTRY & CONTINENT		DXCC status	"CQ" ZONE	I.T.U. ZONE
H5		H5A-H5Z	Bophuthatswana	AF	(ZS)	38	57
	H6-H7	H6A-H7Z	(see YN)				
	H8	H8A-H9Z	(see HP)				
HA		HAA-HAZ	Hungary	EU	DXCC	15	28
HB		HBA-HBZ	Switzerland	EU	DXCC	14	28
HBØ			Liechtenstein	EU	DXCC	14	28
HC	HD	HCA-HDZ	Ecuador	SA	DXCC	10	12
HC8	HD8		Galapagos Is.	SA	DXCC	10	12
	HE	HEA-HEZ	(see HB)				
		HFA-HFZ	(see SP)				
HFØPOL (Polish base in S.Shetland Is.)				SA	see note D	13	73
HG		HGA-HGZ	(see HA)				
HH		HHA-HHZ	Haiti	NA	DXCC	08	11
HI		HIA-HIZ	Dominican Republic	NA	DXCC	08	11
HK		HJA-HKZ	Colombia	SA	DXCC	09	12
HKØ			Bajo Nuevo (counted for DXCC before 1982, now counts as San Andres)				
HKØ			Malpelo I.	SA	DXCC	09	12
HKØ			San Andres and Providencia	NA	DXCC	07	11
HKØ			Serrana Bank (counted for DXCC before 1982, now counts as San Andres)				
HL-HM		HLA-HLZ	Korea (Republic of)	AS	DXCC	25	44
		HMA-HMZ	(see P5A-P9Z)				
		HNA-HNZ	(see YI)				
HP		HOA-HPZ	Panama	NA	DXCC	07	11
HR	HQ	HQA-HRZ	Honduras	NA	DXCC	07	11
HS		HSA-HSZ	Thailand	AS	DXCC	26	49
HT		HTA-HTZ	Nicaragua	NA	DXCC	07	11
	HU	HUA-HUZ	(see YS)				
HV		HVA-HVZ	Vatican	EU	DXCC	15	28
	HW	HWA-HYZ	(see FAA-FZZ) (HW7G operated from FG)				
HZ		HZA-HZZ	Saudi Arabia	AS	DXCC	21	39
I		IAA-IZZ	Italy	EU	DXCC	15	28
IA5			Tuscan Archipelago	EU	(Italy)	15	28
IBØ			Ponziane Is.	EU	(Italy)	15	28
IC8			Napoli Is.	EU	(Italy)	15	28
ID9			Eolie Is.	EU	(Italy)	15	28
IE9			Ustica I.	EU	(Italy)	15	28
IF9			Egadi Is.	EU	(Italy)	15	28
IG9			Pelagian Is.	AF	(Italy)	33	37
IH9			Pantelleria I.	AF	(Italy)	33	37
	II		(see I)				
IJ7			Cheradi Is.	EU	(Italy)	15	28
	IK		(see I)				
IL7			Tremiti Is.	EU	(Italy)	15	28
IMØ			Maddalena Archipelago and other Sardinian islands	EU	(Sardinia)	15	28
IN3			Trentino-Alto Adige	EU	(Italy)	15	28
	IO-IR		(see I)				
ISØ			Sardinia	EU	DXCC	15	28
IT9			Sicily	EU	(Italy)	15	28
	IU		(see I)				
IV3			Friuli-Venezia Giulia	EU	(Italy)	15	28
IW			(see I)				
IX1			Aosta Valley	EU	(Italy)	15	28
	IY-IZ		(see I)				
J2		J2A-J2Z	Djibouti	AF	DXCC	37	48
J2ØA,J2Ø/Z			Abu Ali, and Jabal-at-Tair	AS	DXCC	21	39
J3		J3A-J3Z	Grenada	NA	DXCC	08	11
	J4	J4A-J4Z	(see SVA-SZZ)				
J5		J5A-J5Z	Guinea-Bissau	AF	DXCC	35	46
J6		J6A-J6Z	St.Lucia	NA	DXCC	08	11
J7		J7A-J7Z	Dominica	NA	DXCC	08	11
J8		J8A-J8Z	St.Vincent and Grenadines	NA	DXCC	08	11

5.

THE "DXNS" PREFIX - COUNTRY - ZONE LIST

RADIO AMATEUR PREFIX normal	special	I.T.U. ALLOCATION	COUNTRY & CONTINENT		DXCC status	"CQ" ZONE	I.T.U. ZONE
JA		JAA-JSZ	Japan	AS	DXCC	25	45
JD			Minami Torishima (Marcus I.)	OC	DXCC	27	90
JD			Ogasawara Is.	AS	DXCC	27	45
JE-JO			(see JA)				
JR			(see JA)				
JT		JTA-JVZ	Mongolia	AS	DXCC	23	32
		JWA-JXZ	(see LA)				
JW			Svalbard	EU	DXCC	40	18
JX			Jan Mayen	EU	DXCC	40	18
JY		JYA-JYZ	Jordan	AS	DXCC	20	39
		JZA-JZZ	(see YB-YD)				
K		KAA-KZZ	(see W)				
*KA-KZ (see Note opposite)							
*KA			(see JA)				
KA1AA KA1CG KA1MI KA1NC KA1S			(see JD Minami Torishima)				
KA1IJ KA1IW KA1IWO			(see JD Ogasawara Is.)				
*KB6 (KH1)			Baker, Howland, and				61 = Baker, Howland.
			American Phoenix Is.	OC	DXCC	31	62 = Canton
*KC4 (KP1)			Navassa I.	NA	DXCC	08	11
*KC4 (USA bases in Antarctica)			KC4AAA South Pole	SA	see note A	13	74
			KC4AAC (KC4USP) Palmer	SA	see note A	13	73
			KC4AAD Siple	SA	see note A	12	72
			KC4AAE Vostok	OC	see note A	29	70
			KC4USB Byrd	OC	see note A	32	72
			KC4USV McMurdo	OC	see note A	30	71 (also KC4USY)
			KC4USX Williams Field	OC	see note A	30	71
*KC6			Belau (W.Caroline Is.)	OC	see note G	27	64
*KC6			Micronesia (E.Caroline Is.)	OC	see note G	27	65
*KG4			Guantanamo Bay	NA	DXCC	08	11
*KG6 (KH2)			Guam	OC	DXCC	27	64
*KG6R,S,T (KHØ)			North Mariana	OC	DXCC	27	64
*KH1-KH5 (see Note above)							
KH6			Hawaiian Is.	OC	DXCC	31	61
*KH6 (KH7)			Kure I.	OC	DXCC	31	61
*KH7-KHØ (see Note above)							
*KJ6 (KH3)			Johnston I.	OC	DXCC	31	61
KL7			Alaska	NA	DXCC	01	01
*KM6 (KH4)			Midway Is.	OC	OXCC	31	61
*KP1-KP2 (see Note above)							
KP4			Puerto Rico	NA	DXCC	08	11
KP5 (formerly KP---/D)			Desecheo I.	NA	OXCC	08	11
*KP6 (KH5)			Palmyra, and Jarvis Is.	OC	DXCC	31	61 = Palmyra
							62 = Jarvis Is.
*KP6 (KH5K)			Kingman Reef	OC	DXCC	31	61
KS4 (obsolete)			Serrana Bank (see HKØ)				
*KS6 (KH8)			American Samoa	OC	OXCC	32	62
*KV4 (KP2)			U.S. Virgin Is.	NA	DXCC	08	11
*KW6 (KH9)			Wake I.	OC	DXCC	31	65
*KX6			Marshall Is.	OC	DXCC	31	65
KZ5 (obsolete)			Canal Zone (counted for DXCC before Oct.1979, now part of HP)				

* Note:- Since Mar.24 1978 all new stations in certain USA territories have been issued with the KH or KP prefix given in brackets below. Although stations in the USA territories still use the other prefixes listed, since 1978 the complete block KA-KZ (less KH KL KP) is now being issued to stations in the U.S.A.

Before 1978, prefixes in the block KB1-KZØ (except those below) were used for special event purposes by stations in the U.S.A.

6.

THE "DXNS" PREFIX - COUNTRY - ZONE LIST

RADIO AMATEUR PREFIX normal	special	I.T.U. ALLOCATION	COUNTRY & CONTINENT		DXCC status	"CQ" ZONE	I.T.U. ZONE
	L2,L8	L2A-L9Z	(see LU)				
LA-LB	LC	LAA-LNZ	Norway	EU	DXCC	14	18
LF	LG-LI		(see LA)				
LJ			(see LA)				
LU		LOA-LWZ	Argentina	SA	DXCC	13	1st suffix-letter:-
							14 = LU-A- to LU-U-
							16 = LU-V- LU-W- LU-X-
							14 = LU-Y-
LU-Z- (Argentine bases in Antarctica)				SA	see note A	12	73
LU-Z- (Argentine bases in S.Orkney Is.)				SA	see note B	13	73
LU-Z- (Argentine bases in S.Sandwich Is.)				SA	see note C	13	73
LU-Z- (Argentine bases in S.Shetland Is.)				SA	see note D	13	73
LX		LXA-LXZ	Luxembourg	EU	DXCC	14	27
		LYA-LYZ	(see UAA-UZZ)				
LZ		LZA-LZZ	Bulgaria	EU	DXCC	20	28
M1 (un-official prefix)			(see T7)				
		MAA-MZZ	(see GAA-GZZ)				
MP4B (obsolete)			(see A9)				
MP4M (obsolete)			(see A4)				
MP4Q (obsolete)			(see A7)				
MP4T (obsolete)			(see A6)				
N		NAA-NZZ	(see W)				
NA-NG			(see W)				
NH1-NHØ			(see KH1-KHØ)				
NI-NK			(see W)				
NL7			(see KL7)				
NM-NO			(see W)				
NP1-NP4			(see KP1-KP4)				
NQ-NZ			(see W)				
OA	OB-OC	OAA-OCZ	Peru	SA	DXCC	10	12
OD		ODA-ODZ	Lebanon	AS	DXCC	20	39
OE		OEA-OEZ	Austria	EU	DXCC	15	28
OE6XG/A			(see J2Ø/A)				
OH	OF-OG	OFA-OJZ	Finland	EU	DXCC	15	18
OHØ	OFØ		Aland Is.	EU	DXCC	15	18
	OI		(see OH)				
OJØ			Market Reef	EU	DXCC	15	18
OK-OL		OKA-OMZ	Czechoslovakia	EU	DXCC	15	28
ON	OR-OT	ONA-OTZ	Belgium	EU	DXCC	14	27
OR (Belgian bases in Antarctica)				AF	see note A	38	67
		OUA-OZZ	(see OZ)				
OX			Greenland	NA	DXCC	40	05
OY			Faroe Is.	EU	DXCC	14	18
OZ			Denmark	EU	DXCC	14	18
P2		P2A-P2Z	Papua New Guinea	OC	DXCC	28	51
		P3A-P3Z	(see 5B)				
	P4	P4A-P4Z	(see PJA-PJZ)				
		P5A-P9Z	Dem. People's Rep. of Korea	AS	(HL-HM)	25	44
PA-PB		PAA-PIZ	Netherlands	EU	DXCC	14	27
PD-PE	PF-PG		(see PA)				
PI			(see PA)				
PJ1,2,3,4,9		PJA-PJZ	Netherlands Antilles	SA	DXCC	09	11
PJ5,6,7,8			Sint Maarten	NA	DXCC	08	11
		PKA-POZ	(see YB-YD)				
PP	PQ	PPA-PYZ	(see PY)				
PR-PW			(see PY)				
PY			Brazil	SA	DXCC	11	15 = PY1,2,3,4,5,9
							13 = PY6,7,8

Note:- Before 1978, prefixes in the block NA-NZ were used for special event purposes by stations in U.S.A.

7.

THE "DXNS" PREFIX - COUNTRY - ZONE LIST

RADIO AMATEUR PREFIX normal	special	I.T.U. ALLOCATION	COUNTRY & CONTINENT		DXCC status	"CQ" ZONE	I.T.U. ZONE
PYØ			Fernando de Noronha	SA	DXCC	11	13
PYØ			St.Peter and St.Paul Rocks	SA	DXCC	11	13
PYØ			Trindade I. and Martin Vaz	SA	DXCC	11	15
PZ		PZA-PZZ	Suriname	SA	DXCC	09	12
		QAA-QZZ	(Service abbreviations)				
	R	RAA-RZZ	(see UAA-UZZ) (for exact location see Note on Sheet 9, under Oblast List)				
	RA-RZ		(see UAA-UZZ) (for exact location see Note on Sheet 9, under Oblast List)				
RA,RB,RC,etc (USSR VHF-stns)			(see UAA-UZZ) (for exact location see Note on Sheet 9, under Oblast List)				
S1 (un-official prefix)			Sealand ("Bates Island")	EU	not DXCC	14	27
S2		S2A-S3Z	Bangladesh	AS	DXCC	22	41
S4 (un-official prefix)			Ciskei	AF	(ZS)	38	57
		S6A-S6Z	(see 9V)				
S7		S7A-S7Z	Rep. of Seychelles	AF	DXCC	39	53
S8		S8A-S8Z	Transkei	AF	(ZS)	38	57
S9		S9A-S9Z	Sao Tome and Principe	AF	DXCC	36	47
SK-SM	SJ	SAA-SMZ	Sweden	EU	DXCC	14	18
SP	SN-SR	SNA-SRZ	Poland	EU	DXCC	15	28
		SSA-SSM	(see SU)				
ST		SSN-STZ	Sudan	AF	DXCC	34	48
STØ			Southern Sudan	AF	DXCC	34	48
SU		SUA-SUZ	Egypt	AF	DXCC	34	38
SV		SVA-SZZ	Greece	EU	DXCC	20	28
SV5			Dodecanese Is. (Rhodes)	EU	DXCC	20	28
SV9			Crete	EU	DXCC	20	28
SV---/A			Mount Athos	EU	DXCC	20	28
	SW-SZ		(see SVA-SZZ)				
T2		T2A-T2Z	Tuvalu	OC	DXCC	31	65
		T3A-T3Z	Rep. of Kiribati				
T3Ø (formerly T3A,T3K)			West Kiribati (Gilbert Is.)	OC	DXCC	31	65
T31 (formerly T3P)			Cent.Kiribati (Brit.Phoenix)	OC	DXCC	31	62
T32 (formerly T3L)			East Kiribati (Line Is.)	OC	DXCC	31	61 = Northern Line Is. 63 = Central and South
	T4	T4A-T4Z	(see CM)				
T4 (un-official prefix used by Vendaland before 1982, now uses V9)							
T5		T5A-T5Z	Somalia	AF	DXCC	37	48
		T6A-T6Z	(see YA)				
		T7A-T7Z	San Marino	EU	DXCC	15	28
TA	TC	TAA-TCZ	Turkey TA1 = EU. TA2-9 = AS		DXCC	20	39
	TD	TDA-TDZ	(see TG)				
	TE	TEA-TEZ	(see TI)				
TF		TFA-TFZ	Iceland	EU	DXCC	40	17
TG		TGA-TGZ	Guatemala	NA	DXCC	07	11
	TH	THA-THZ	(see FAA-FZZ) (THBJM operated from TL)				
TI		TIA-TIZ	Costa Rica	NA	DXCC	07	11
TI9			Cocos I.	NA	DXCC	07	12
TJ		TJA-TJZ	Cameroon	AF	DXCC	36	47
	TK	TKA-TKZ	(see FAA-FZZ) (TK7G & TK7GAS operated from FG, TK7YAA from FY				
TL		TLA-TLZ	Central African Republic	AF	DXCC	36	47
		TMA-TMZ	(see FAA-FZZ)				
TN		TNA-TNZ	Congo	AF	DXCC	36	52
	TO	TOA-TQZ	(see FAA-FZZ) (TQ8FC operated from FO)				
TR		TRA-TRZ	Gabon	AF	DXCC	36	52
		TSA-TSZ	(see 3V)				
TT		TTA-TTZ	Chad	AF	DXCC	36	47
TU		TUA-TUZ	Ivory Coast	AF	DXCC	35	46
	TV	TVA-TXZ	(see FAA-FZZ)				
TY		TYA-TYZ	Benin	AF	DXCC	35	46
TZ		TZA-TZZ	Mali	AF	DXCC	35	46

8.

THE "DXNS" PREFIX - COUNTRY - ZONE LIST

RADIO AMATEUR PREFIX normal	special	I.T.U. ALLOCATION	COUNTRY & CONTINENT		DXCC status	"CQ" ZONE	I.T.U. ZONE
	U	UAA-UZZ	U.S.S.R. (for exact location see Note on Sheet 9, under Oblast List)				
UA			European Russian S.F.S.R.	EU	DXCC	as below	1st suffix-letter:-
						16	29 UA1A-- B-- C-- F--
						16	19 UA1N-- O--
						16	20 UA1P-- (except Franz-Josef Land)
			Note:- USSR call-signs issued since 1 Jan.1970 have 3 suffix-letters, and conform to the information given in this list. It also applies to the majority of earlier calls (only 2 suffix-letters), but not in every case.			16	29 UA1Q-- T-- W--
						16	19 UA1Z--
						16	29 UA3 (all)
						16	29 UA4A-- C-- F--
						16	30 UA4H--
						16	29 UA4L--
						16	30 UA4N-- P--
						16	29 UA4S-- U--
						16	30 UA4W--
						16	29 UA4Y--
						16	29 UA6 (all)
						16	30 UA9S-- W--
UA			Asiatic Russian S.F.R.S.	AS	DXCC	as below	1st suffix-letter:-
						17	30 UA9A-- C-- F-- G--
						18	31 UA9H--
						17	20 UA9J-- K--
						17	21 UA9L--
						17	30 UA9M--
						18	31 UA9O--
						17	30 UA9Q--
			Note:- UA9S-- & UA9W-- are in European Russian S.F.S.R. (see above)				UA9S-- (see note)
						18	31 UA9U--
							UA9W-- (see note)
						17	20 UA9X--
						18	31 UA9Y-- UA9Z--
						18	22 UAØA-- B--
						19	34 UAØC-- D-- F--
						18	22 UAØH--
						19	24 UAØI-- West of 155.E
						19	25 UAØI-- 155-170.E
						19	26 UAØI-- East of 170.E
						19	33 UAØJ--
			Note:- An up-to-date USSR Oblast List is also available, (see Note on Sheet 9), price 25p (U.K.), 2 IRCs (overseas).			19	26 UAØK--
						19	34 UAØL--
						18	32 UAØO--
						19	23 UAØQ--
						18	32 UAØS-- T--
						18	33 UAØU-- V--
						18	32 UAØW--
						19	25 UAØX--
						23	32 UAØY--
						19	35 UAØZ--
UA1PAL (also see UK1PAA etc)			Franz-Josef Land	EU	DXCC	40	75
UA1PAM			(see UA1PAL)				
UA2			Kaliningradsk	EU	DXCC	15	29
UB			Ukraine	EU	DXCC	16	29
UC			Byelorussia	EU	DXCC	16	29
UD			Azerbaijan	AS	DXCC	21	29
UF			Georgia	AS	DXCC	21	29
UG			Armenia	AS	DXCC	21	29
UH			Turkoman	AS	DXCC	17	30
UI			Uzbek	AS	DXCC	17	30
UJ			Tadzhik	AS	DXCC	17	42

9.

THE "CQWPX" PREFIX - COUNTRY - ZONE LIST

RADIO AMATEUR PREFIX normal	special	I.T.U. ALLOCATION	COUNTRY & CONTINENT		DXCC status	"CQ" ZONE	I.T.U. ZONE
UK1 (except Franz-Josef Land)			(see UA1)				
UK1PAA UK1PGO (UK1ZFI)			(see UA1PAL)				
UK2A--			(see UC)				
UK2B--			(see UP)				
UK2C--			(see UC)				
UK2F--			(see UA2)				
UK2G--			(see UQ)				
UK2I-- L-- O--			(see UC)				
UK2P--			(see UP)				
UK2Q--			(see UQ)				
UK2R--			(see UR)				
UK2S--			(see UC)				
UK2T--			(see UR)				
UK2W--			(see UC)				
UK3			(see UA3)				
UK4			(see UA4)				
UK5 (except UK5O--)			(see U8)				
UK5O--			(see UO)				
UK6A--			(see UA6)				
UK6C-- O--			(see UD)				
UK6E--			(see UA6)				
UK6F--			(see UF)				
UK6G--			(see UG)				
UK6H-- I-- J--			(see UA6)				
UK6K--			(see UD)				
UK6L--			(see UA6)				
UK6O--			(see UF)				
UK6P--			(see UA6)				
UK6Q--			(see UF)				
UK6U--			(see UA6)				
UK6V--			(see UF)				
UK6W-- X-- Y--			(see UA6)				
UK7			(see UL)				
UK8A--			(see UI)				
UK8B--			(see UH)				
UK8C-- O--			(see UI)				
UK8E--			(see UH)				
UK8F-- G--			(see UI)				
UK8H--			(see UH)				
UK8I--			(see UI)				
UK8J-- K--			(see UJ)				
UK8L--			(see UI)				
UK8M-- N--			(see UH)				
UK8O--			(see UI)				
UK8P-- Q--			(see UH)				
UK8R-- S--			(see UJ)				
UK8T-- U-- V--			(see UI)				
UK8W--			(see UH)				
UK8X--			(see UJ)				
UK8Y--			(see UH)				
UK8Z--			(see UI)				
UK9			(see UA9)				
UKØ			(see UAØ)				
UL			Kazakh	AS	DXCC	17	30
UM			Kirghiz	AS	DXCC	17	42
UN			(see UA1N--)				
UO			Moldavia	EU	DXCC	16	29
UP			Lithuania	EU	DXCC	15	29
UPOL (USSR Arctic floating bases)			(obsolete) (see 4KØ)				
UQ			Latvia	EU	DXCC	15	29
UR			Estonia	EU	DXCC	15	29
UT			(see U8)				
UV-UW	UX		(see UA)				
UY			(see U8)				
UZ			(see UA)				

Note:- USSR call-signs issued since 1 Jan.1970 have 3 suffix-letters, and conform to the information given in this list. It also applies to the majority of earlier calls (only 2 suffix-letters), but not in every case.

Note:- UK-stations are Club-stations. Before 1 Jan.1970 all USSR Club-stations used the normal prefix, but had 3 suffix-letters, the first letter being K, e.g. UA1KAA, UA3KBE, UB5KAA, UR2KBO, etc.

Note:- An up-to-date USSR Oblast List is also available, (see Sheet 8 for price). The location of special stations (with prefix EK EM EN R U etc), also novice stations (prefix EZ), and VHF-stations (prefix RA RB RC etc), is normally indicated by the prefix-numeral & 1st suffix-letter, the same as for Club-stns (prefix UK) listed on this page, but given more fully in the USSR Oblast List.

10.

THE "CQWPX" PREFIX - COUNTRY - ZONE LIST

RADIO AMATEUR PREFIX normal	special	I.T.U. ALLOCATION	COUNTRY & CONTINENT		DXCC status	"CQ" ZONE	I.T.U. ZONE
V2		V2A-V2Z	Antigua and Barbuda	NA	DXCC	08	11
V3		V3A-V3Z	Belize	NA	DXCC	07	11
V9 (un-official prefix)			Vendaland	AF	(ZS)	38	57
VE		VA-VD VAA-VGZ	Canada	NA	DXCC	05 = VE1	09 = VE1.2
							04 = VE3
						05 = VE2 45-50.N	03 = VE4.5
						02 = 50-63.N	02 = VE6.7
						04 = VE3.4.5.6	75 = VE8 80-85.N
						03 = VE7	VE8 60-80.N
						02 = VE8 60-102.W	04 = 60-90.W
						01 = 102-137.W	03 = 90-110.W
							02 = 110-137.W
VE	(VX9A)		Sable I.	NA	DXCC	05	09
VE	(VYØA)		St.Paul I.	NA	DXCC	05	09
VEØ (Canadian /MM stations)		VF-VG	(see VE, VO)				
VK		VHA-VNZ	Australia	OC	DXCC	30 = VK1.2.3.4.5.7	59 = VK1.2.3.5.7
						29 = VK6.8	55 = VK4.8
							58 = VK6
VK2---/LH			Lord Howe I.	OC	DXCC	30	60
VK9 (was also used by New Guinea before 1974, now part of P2)							
VK9 (was also used by Papua before 1974, now part of P2)							
VK9N (also VK9J & VK9R)			Norfolk I.	OC	DXCC	32	60
VK9X			Christmas I.	OC	DXCC	29	54
VK9Y			Cocos-Keeling Is.	OC	DXCC	29	54
VK9Z			Mellish Reef	OC	DXCC	30	56
VK9Z			Willis Is.	OC	DXCC	30	55
VKØ			Heard I.	AF	DXCC	39	68
VKØ			Macquarie I.	OC	DXCC	30	60
VKØ (Australian bases in Antarctica)			(as listed below)				
			Casey, Wilkes	OC	see note A	29	70
			Davis, Mawson	AF	see note A	39	69
VO1	VO3 etc	VOA-VOZ	Newfoundland	NA	(Canada)	05	09
VO2			Labrador	NA	(Canada)	02	09
		VPA-VSZ	British Commonwealth				
VP1 (obsolete)			(see V3)				
VP2A (obsolete)			(see V2)				
VP2D (obsolete)			(see J7)				
VP2E			Anguilla	NA	DXCC	08	11
VP2G (obsolete)			(see J3)				
VP2K			St.Kitts, Nevis	NA	DXCC	08	11
VP2L (obsolete)			(see J6)				
VP2M			Montserrat	NA	DXCC	08	11
VP2S (obsolete)			(see J8)				
VP2V			British Virgin Is.	NA	DXCC	08	11
VP5			Turks and Caicos Is.	NA	DXCC	08	11
VP7 (obsolete)			(see C6)				
VP8			Falkland Is.	SA	DXCC	13	16
VP8			South Georgia	SA	DXCC	13	73
VP8 (British bases in Antarctica)				SA	see note A	13	73
VP8 (British bases in S.Orkney Is.)				SA	see note B	13	73
VP8 (British bases in S.Sandwich Is.)				SA	see note C	13	73
VP8 (British bases in S.Shetland Is.)				SA	see note D	13	73
VP9			Bermuda	NA	DXCC	05	11

11.

THE "DXNS" PREFIX - COUNTRY - ZONE LIST

RADIO AMATEUR PREFIX normal	special	I.T.U. ALLOCATION	COUNTRY & CONTINENT		DXCC status	"CQ" ZONE	I.T.U. ZONE
VQ9			Chagos Is.	AF	DXCC	39	41
VQ9 (was also used by Seychelles before 1977, now uses S7)							
VQ9--/A (obsolete)			Aldabra I. (now part of S7) (counted for DXCC before July 1976)				
VQ9--/C (obsolete)			(see VQ9 Chagos Is.)				
VQ9--/D (obsolete)			Desroches I. (now part of S7) (counted for DXCC before July 1976)				
VQ9--/F (obsolete)			Farquhar I. (now part of S7) (counted for DXCC before July 1976)				
VR1A (obsolete)			(see T3Ø)				
VR1P (obsolete)			(see T31)				
VR2 (obsolete)			(see 3D2)				
VR3 (obsolete)			(see T32)				
VR4 (obsolete)			(see H4)				
VR5 (obsolete)			(see A3)				
VR6			Pitcairn I.	OC	DXCC	32	63
VR8 (obsolete)			(see T2)				
VS5			Brunei	OC	DXCC	28	54
VS6			Hong Kong	AS	DXCC	24	44
VS9 (obsolete) (VS9A,P,S now part of 7Ø. VS9H,O see A4. VS9K now part of 4W. VS9M see 8Q)							
VU		VTA-VWZ	India	AS	DXCC	22	41
VU			Laccadive Is.	AS	DXCC	22	41
VU7			Andaman Is. and Nicobar Is.	AS	DXCC	26	49
	VX-VY	VXA-VYZ	(see VE)				
VY1			Yukon	NA	(Canada)	01	02
		VZA-VZZ	(see VK)				
W		WAA-WZZ	United States of America	NA	DXCC	05 - W1,2,3	08 - W1,2,3,4
						04 - W4 Alabama	07 - W5
						05 - Florida	06 - W6,7
						05 - Georgia	08 - W8,9
						04 - Kentucky	07 - WØ
						05 - N.Carolina	
						05 - S.Carolina	
						04 - Tennessee	
						05 - Virginia	
						04 - W5	
						05 - W6	
						03 - W7 Arizona	
						05 - Idaho	
						04 - Montana	
						05 - Nevada	
						05 - Oregon	
						03 - Utah	
						05 - Washington	
						04 - Wyoming	
						04 - W8 Michigan	
						04 - Ohio	
						05 - W.Virginia	
						04 - W9,Ø	
WA-WG			(see W)				
	*WG6		(see KG6)				
WH1-WHØ			(see KH1-KHØ)				
	*WH6		(see KH6)				
WI-WK			(see W)				
WL7	*WL7		(see KL7)				
WM-WO			(see W)				
	*WM6		(see KM6)				
	*WN		(see W)				
WP1-WP4			(see KP1-KP4)				
	*WP4		(see KP4)				
WQ			(see W)				
WR (repeater stations in USA & territories)							
WS-WZ			(see W)				
	*WS6		(see KS6)				
	*WV4		(see KV4)				
	*WW6		(see KW6)				

* Note:- From Oct.1 1976 the FCC ceased to issue special prefixes for Novice stations. Before that date, they used the special prefixes marked thus *.

Before 1978, prefixes in the groups WC WE-WQ WS-WZ (except those marked thus *) were used for special event purposes by stations in U.S.A.

12.

THE "DXNS" PREFIX - COUNTRY - ZONE LIST

RADIO AMATEUR PREFIX normal	special	I.T.U. ALLOCATION	COUNTRY & CONTINENT		DXCC status	"CQ" ZONE	I.T.U. ZONE
XE-XF	XB,XD	XAA-XIZ	Mexico	NA	DXCC	06	10
XF4			Revilla Gigedo Is.	NA	DXCC	06	10
	XG,XI		(see XE-XF, XF4)				
	XJ-XO	XJA-XOZ	(see VE, VO)				
XP		XPA-XPZ	(see OX)				
	XQ-XR	XQA-XRZ	(see CE)				
		XSA-XSZ	(see BY)				
XT		XTA-XTZ	Upper Volta	AF	DXCC	35	46
XU		XUA-XUZ	Kampuchea (Cambodia)	AS	DXCC	26	49
XV		XVA-XVZ	Vietnam	AS	DXCC	26	49
XW		XWA-XWZ	Lao People's Dem.Republic	AS	DXCC	26	49
		XXA-XXZ	(see CQA-CUZ)				
	XX6 (obsolete)		(see D2)				
	XX7 (obsolete)		(see C9)				
XZ		XYA-XZZ	Burma	AS	DXCC	26	49
XZ5 XZ9			(see 1Z)				
Y2-Y9		Y2A-Y9Z	German Democratic Republic	EU	DXCC	14	28
YB3ANT (G.D.R. base in Antarctica)				AF	see note A	38	67
YA		YAA-YAZ	Afghanistan	AS	DXCC	21	40
YB-YO		YBA-YHZ	Indonesia	OC	DXCC	28	51 - East of 130.E
							54 - West of 130.E
YI		YIA-YIZ	Iraq	AS	DXCC	21	39
YJ		YJA-YJZ	Vanuatu (New Hebrides)	OC	DXCC	32	56
YK		YKA-YKZ	Syria	AS	DXCC	20	39
	YL	YLA-YLZ	(see UAA-UZZ) (for exact location see Note on Sheet 9, under Oblast List)				
YL1P			(see UA1PAL)				
	YM	YMA-YMZ	(see TA)				
YN		YNA-YNZ	(see HT)				
YO	Y3-YR	YOA-YRZ	Romania	EU	DXCC	20	28
YS		YSA-YSZ	El Salvador	NA	DXCC	07	11
YU	YT	YTA-YUZ	Yugoslavia	EU	DXCC	15	28
YV		YVA-YYZ	Venezuela	SA	DXCC	09	12
YVØ			Aves I.	NA	DXCC	08	11
	YW-YY		(see YV)				
	YZ	YZA-YZZ	(see YU)				
Z2		Z2A-Z2Z	Zimbabwe	AF	DXCC	38	53
ZA		ZAA-ZAZ	Albania	EU	DXCC	15	28
		ZBA-ZJZ	British Commonwealth				
ZB			Gibraltar	EU	DXCC	14	37
ZC			(see 5B)				
ZD3 (obsolete)			(see C5)				
ZD5 (obsolete)			(see 3D6)				
ZD7			St.Helena	AF	DXCC	36	66
ZD8			Ascension I.	AF	DXCC	36	66
ZD9B			Tristan da Cunha	AF	DXCC	38	66
ZD9G			Gough I.	AF	(ZD9B)	38	66
ZE (obsolete)			(see Z2)				
ZF			Cayman Is.	NA	DXCC	08	11

13.

THE "DXNS" PREFIX - COUNTRY - ZONE LIST

RADIO AMATEUR PREFIX normal	special	I.T.U. ALLOCATION	COUNTRY & CONTINENT		DXCC status	"CQ" ZONE	I.T.U. ZONE
		ZKA-ZMZ	(see ZL)				
ZK1			Cook Is.	OC	DXCC	32	63
ZK1			Northern Cook Is.	OC	DXCC	32	62
ZK2	ZK9		Niue	OC	DXCC	32	62
ZL			New Zealand	OC	DXCC	32	60
ZL---/A			Auckland I. and Campbell I.	OC	DXCC	32	60
ZL---/C			Chatham Is.	OC	DXCC	32	60
ZL---/K			Kermadec Is.	OC	DXCC	32	60
ZL5 (New Zealand bases in Antarctica)				OC	see note A	30	71
ZM7			Tokelau Is.	OC	DXCC	31	62
		ZNA-ZOZ	British Commonwealth				
ZP		ZPA-ZPZ	Paraguay	SA	DXCC	11	14
		ZQA-ZQZ	British Commonwealth				
ZR		ZRA-ZUZ	(see ZS)				
ZR3			(see ZS3)				
ZS			Rep. of South Africa	AF	DXCC	38	57
ZS1ANT (S.African base in Antarctica)				AF	see note A	38	67
ZS2MI			Prince Edward and Marion I.	AF	UXCC	38	57
ZS3			Namibia (South-West Africa)	AF	DXCC	38	57
	ZV-ZZ	ZVA-ZZZ	(see PY)				
1A0KM (un-official prefix)			Sovereign Military Order of Malta, Rome	EU	DXCC	15	28
1S (un-official prefix)			Spratly Archipelago	AS	DXCC	26	50
1Z (un-official prefix)			Karen State, East Burma	AS	not DXCC	26	49
		2AA-2ZZ	(see GAA-GZZ)				
3A		3AA-3AZ	Monaco	EU	DXCC	14	27
		3BA-3BZ	(see 3BB)				
3B6			Agalega Is.	AF	DXCC	39	53
3B7			Cargados Carajos (St.Brandon)	AF	(3B6)	39	53
3B8			Mauritius	AF	DXCC	39	53
3B9			Rodriguez I.	AF	OXCC	39	53
3C		3CA-3CZ	Equatorial Guinea	AF	DXCC	36	47
3C0			Pagalu (Annobon I.)	AF	OXCC	36	52
3D2		3DN-3OZ	Fiji	OC	OXCC	32	56
3D6		3OA-3OM	Swaziland	AF	OXCC	38	57
	3E-3F	3EA-3FZ	(see HP)				
	3G	3GA-3GZ	(see CE)				
		3HA-3UZ	(see BY)				
3V		3VA-3VZ	Tunisia	AF	OXCC	33	37
		3WA-3WZ	(see XV)				
3X		3XA-3XZ	Rep. of Guinea	AF	OXCC	35	46
		3YA-3YZ	(see LA)				
3Y			Bouvet I.	AF	OXCC	38	67
3Y (Norwegian bases in Antarctica)				AF	see note A	38	67
	3Z	3ZA-3ZZ	(see SP)				
	4A-4C	4AA-4CZ	(see XE-XF, XF4)				
	4D	4DA-4IZ	(see DU)				

14.

THE "DXNS" PREFIX - COUNTRY - ZONE LIST

RADIO AMATEUR PREFIX normal	special	I.T.U. ALLOCATION	COUNTRY & CONTINENT		DXCC status	"CQ" ZONE	I.T.U. ZONE	
	4J-4K	4JA-4LZ	(see UAA-UZZ)					
4K1 (USSR bases in Antarctica)			4K1A Molodezhnaya	AF	see note A	39	69	(also 4K1HK 4K10C)
			4K1B Mirny	OC	see note A	29	69	
			4K1C Vostok	OC	see note A	29	70	
			4K1D Novolazarevskaya	AF	see note A	38	67	
			4K1E Komsomolskaya	OC	see note A	29	69	
			4K1G Leningradskaya	OC	see note A	30	70	
			4K1H Russkaya	SA	see note A	12	74	
			4K1J Druzhnaya	SA	see note A	13	73	(also 4K1CR)
4K1 (USSR bases in S.Shetland Is.)			4K1F Bellingshausen	SA	see note D	13	73	(also 4K1GM)
4K0 (USSR Arctic floating bases)								
	4L		(see UAA-UZZ)					
	4M	4MA-4MZ	(see YV)					
	4N-4O	4NA-4OZ	(see YU)					
4S		4PA-4SZ	Sri Lanka (Ceylon)	AS	DXCC	22	41	
	4T	4TA-4TZ	(see OA)					
4U		4UA-4UZ	United Nations Organization		see note E			
4U1ITU	4U2ITU etc		United Nations HQ, Geneva	EU	OXCC	14	28	
4U1UN	4U36UN etc		United Nations, New York	NA	OXCC	05	08	
	4V	4VA-4VZ	(see HH)					
4W		4WA-4WZ	Yemen Arab Republic	AS	DXCC	21	39	
4X		4XA-4XZ	Israel	AS	DXCC	20	39	
		4YA-4YZ	(International Civil Aviation Organization)					
4Z		4ZA-4ZZ	(see 4X)					
5A		5AA-5AZ	Libya	AF	DXCC	34	38	
5B		5BA-5BZ	Cyprus	AS	DXCC	20	39	
		5CA-5GZ	(see CN)					
5H1 (obsolete)			Zanzibar (counted for DXCC before June 1974, now part of 5H3)					
5H3		5HA-5IZ	Tanzania	AF	DXCC	37	53	
	5J-5K	5JA-5KZ	(see HK)					
	5L	5LA-5HZ	(see EL)					
5N		5NA-5OZ	Nigeria	AF	OXCC	35	46	
		5PA-5QZ	(see OZ)					
5R		5RA-5SZ	Madagascar	AF	DXCC	39	53	
5T		5TA-5TZ	Mauritania	AF	OXCC	35	46	
5U		5UA-5UZ	Niger	AF	OXCC	35	46	
5V		5VA-5VZ	Togo	AF	DXCC	35	46	
5W		5WA-5WZ	Western Samoa	OC	OXCC	32	62	
5X		5XA-5XZ	Uganda	AF	OXCC	37	48	
5Z	5Y	5YA-5ZZ	Kenya	AF	OXCC	37	48	
		6AA-6BZ	(see SU)					
	6C	6CA -6CZ	(see YK)					
	6D-6J	6DA-6JZ	(see XE-XF, XF4)					
		6KA-6NZ	(see HL)					
6O (obsolete, 1981)		6OA-6OZ	(see T5)					
		6PA-6SZ	(see AP)					
6T-6U		6TA-6UZ	(see ST, ST0)					
6W	6V	6VA-6WZ	Senegal	AF	DXCC	35	46	
		6XA-6XZ	(see 5R)					
6Y		6YA-6YZ	Jamaica	NA	DXCC	08	11	
		6ZA-6ZZ	(see EL)					
		7AA-7IZ	(see YB-YD)					
		7JA-7NZ	(see JA)					
7J			Okino Torishima (Parece Vela)	AS	see note F	27	64	
7O		7OA-7OZ	Yemen People's Dem.Republic	AS	DXCC	21	39	
7O			Socotra I.	AF	(Yemen)	37	48	
7P		7PA-7PZ	Lesotho	AF	DXCC	38	57	
7Q		7QA-7QZ	Malawi	AF	DXCC	37	53	
		7RA-7RZ	(see 7X)					
	7S	7SA-7SZ	(see SM)					
7X	7W	7TA-7YZ	Algeria	AF	DXCC	33	37	
7Z		7ZA-7ZZ	(see HZ)					

15.

THE "DXNS" PREFIX - COUNTRY - ZONE LIST

RADIO AMATEUR PREFIX normal	special	I.T.U. ALLOCATION	COUNTRY & CONTINENT		DXCC status	"CQ" ZONE	I.T.U. ZONE
		8AA-8IZ	(see YB-YD)				
	8J	8JA-8NZ	(see JA)				
8J (Japanese bases in Antarctica)				AF	see note A	39	67
	8O	8OA-8OZ	(see A2)				
8P		8PA-8PZ	Barbados	NA	DXCC	08	11
8Q		8QA-8QZ	Maldives	AS	DXCC	22	41
8R		8RA-8RZ	Guyana	SA	DXCC	09	12
	8S	8SA-8SZ	(see SM)				
		8TA-8YZ	(see VU)				
		8ZA-8ZZ	(see HZ)				
8Z4 (counted for DXCC before 1982)			Iraq-Saudi Neutral Zone				
9A		9AA-9AZ	(see T7)				
	9C-9D	9BA-9DZ	(see EP)				
	9E-9F	9EA-9FZ	(see ET)				
9G		9GA-9GZ	Ghana	AF	DXCC	35	46
9H		9HA-9HZ	Malta	EU	DXCC	15	28
9J	9I	9IA-9JZ	Zambia	AF	DXCC	36	53
9K		9KA-9KZ	Kuwait	AS	DXCC	21	39
9L		9LA-9LZ	Sierra Leone	AF	DXCC	35	46
		9MA-9MZ	Malaysia				
9M2			Malaya (W.Malaysia)	AS	DXCC	28	54
9M6			Sabah (E.Malaysia)	OC	(9M8)	28	54
9M8			Sarawak (E.Malaysia)	OC	DXCC	28	54
9N		9NA-9NZ	Nepal	AS	DXCC	22	42
9Q		9OA-9TZ	Zaire	AF	DXCC	36	52
9U		9UA-9UZ	Burundi	AF	DXCC	36	52
9V		9VA-9VZ	Singapore	AS	DXCC	28	54
		9WA-9WZ	(see 9MA-9MZ)				
9X		9XA-9XZ	Rwanda	AF	DXCC	36	52
9Y	9Z	9YA-9ZZ	Trinidad and Tobego	SA	DXCC	09	11
Abu Ail, and Jabal-at-Tair			(see J2Ø/A)				

"CQ" Zones

Before 1980 all Antarctica stations counted as Zone 13 (S.America) for the WAZ Award. Since Jan.1980 the boundaries of "CQ" Zones 12 13 29 30 32 38 39 have been extended to the South Pole. The "CQ" Zone (and continent) of Antarctica stations in this Prefix List have been amended to comply with the Jan.1980 revised WAZ Award rules.

DXCC notes:-

A. ANTARCTICA. All bases (CE9 FBB KC4 LU VP8 etc) count as just one DXCC country.

B. SOUTH ORKNEY IS. All bases (LU VP8 etc) count as just one DXCC country.

C. SOUTH SANDWICH IS. All bases (LU VP8 etc) count as just one DXCC country.

D. SOUTH SHETLAND IS. All bases (CE9 LU VP8 4K1 etc) count as just one DXCC country.

E. UNITED NATIONS. All /4U stations (except 4U1ITU 4U1UN 4U2ITU 4U36UN etc) count for the country of operation, e.g. /4U Golan Heights = YK, /4U Sinai = SU.

F. OKINO TORISHIMA. As from Dec.1980 this counts as JD Ogasawara Is.

G. YAP ISLANDS. Before 1981 these were part of the W.Carolines group(now Belau), but since 1 Jan.1981 they are part of the E.Carolines group(now Micronesia).

16.

U.S.S.R. CALL-SIGNS - LOCATION - OBLAST No.(for R-100-O Award etc). also UA9 & UAØ Zone Nos.

three-letter suffixes only.(from 1 Jan.1976)

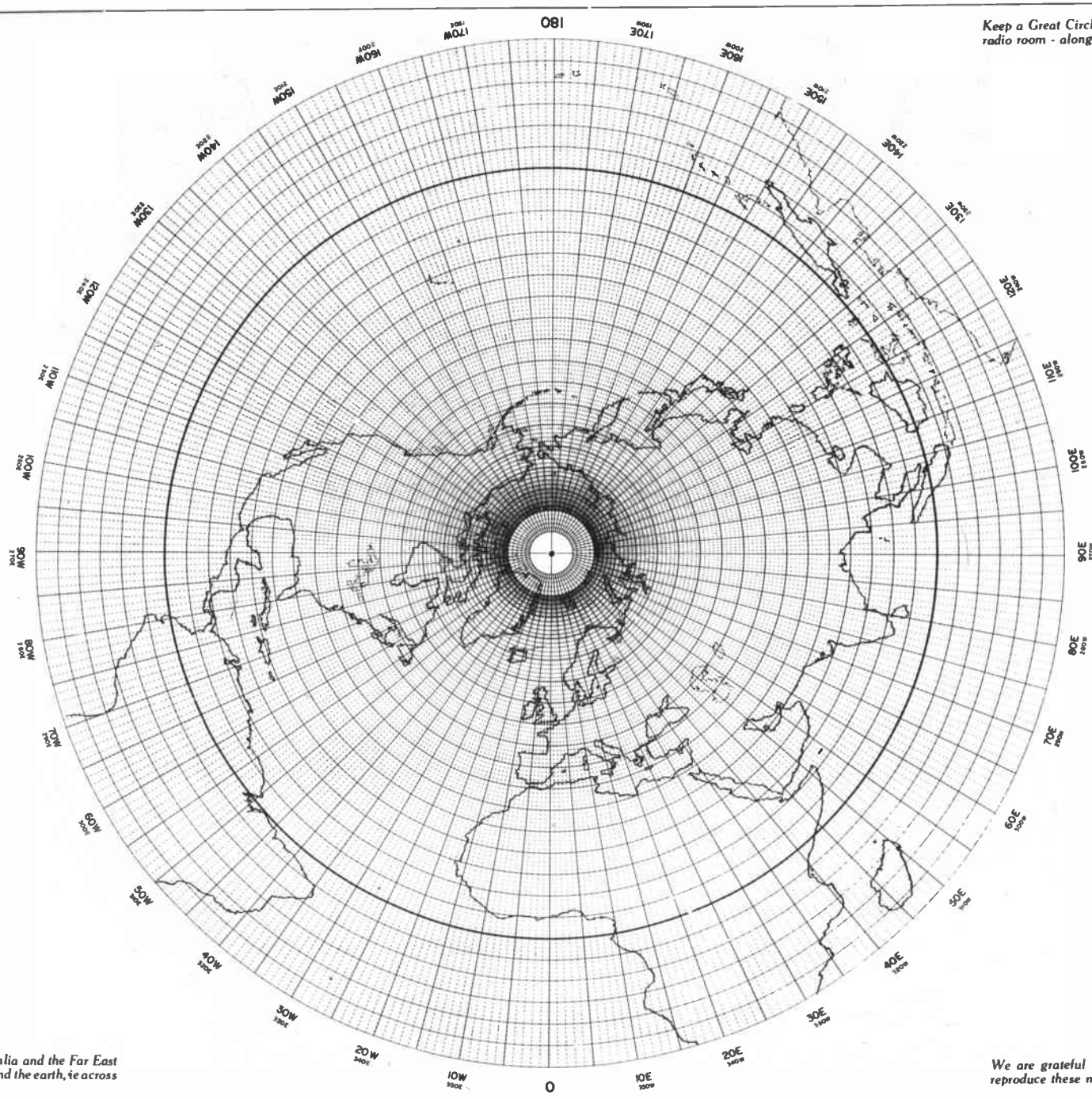
Klub-stns all use the prefix UK, individual stns use the prefixes UA UB UC etc, (for Novice stns substitute prefix EZ), (for VHF-stns substitute RA RB RC etc).

prefixes		suffix	oblast & location		prefixes		suffix	oblast & location		prefixes		suffix	oblast & location	
UK1	UA1	AAA-AZZ	169	Leningrad city	UK1	UA1	NAA-NZZ	088	Karelia	UK1	UA1	TAA-TZZ	144	Novgorod
UK1	UA1	BAA-BZZ	169	Leningrad city	UK1	UA1	OAA-OZZ	113	Arkhangelsk	UK1	UA1	WAA-WZZ	149	Pskov
UK1	UA1	CAA-CZZ	136	Leningrad oblast	UK1	UA1	PAA-PZZ	114	Nenets	UK1	UA1	ZAA-ZZZ	143	Murmansk
UK1	UA1	FAA-FZZ	136	Leningrad oblast	UK1	UA1	QAA-QZZ	120	Vologda					
UK2	UC2	AAA-AZZ	009	Minsk city	UK2	UC2	IAA-IZZ	008	Grodno	UK2	UR2	RAA-RZZ	083	Estonia
UK2	UP2	BAA-BZZ	038	Lithuania	UK2	UC2	LAA-LZZ	005	Brest	UK2	UC2	SAA-SZZ	010	Mogilev
UK2	UC2	CAA-CZZ	0 9	Minsk oblast	UK2	UC2	OAA-OZZ	007	Gomel	UK2	UR2	TAA-TZZ	083	Estonia
UK2	UA2	FAA-FZZ	125	Kaliningrad	UK2	UP2	PAA-PZZ	038	Lithuania	UK2	UC2	WAA-WZZ	006	Vitebsk
UK2	UC2	GAA-GZZ	037	Latvia	UK2	UQ2	QAA-QZZ	037	Latvia					
UK3	UA3	AAA-AZZ	170	Moscow city	UK3	UA3	LAA-LZZ	155	Smolensk	UK3	UA3	TAA-TZZ	122	Gorky
UK3	UA3	BAA-BZZ	170	Moscow city	UK3	UA3	MAA-MZZ	168	Yaroslavl	UK3	UA3	UAA-UZZ	123	Ivanovo
UK3	UA3	DAA-DZZ	142	Moscow oblast	UK3	UA3	NAA-NZZ	132	Kostroma	UK3	UA3	VAA-VZZ	119	Vladimir
UK3	UA3	EAA-EZZ	147	Orel	UK3	UA3	PAA-PZZ	160	Tula	UK3	UA3	WAA-WZZ	135	Kursk
UK3	UA3	FAA-FZZ	142	Moscow oblast	UK3	UA3	QAA-QZZ	121	Voronezh	UK3	UA3	XAA-XZZ	127	Kaluga
UK3	UA3	GAA-GZZ	137	Lipetsk	UK3	UA3	RAA-RZZ	157	Tambov	UK3	UA3	YAA-YZZ	118	Briansk
UK3	UA3	IAA-IZZ	126	Kalinin	UK3	UA3	SAA-SZZ	151	Riazan	UK3	UA3	ZAA-ZZZ	117	Belgorod
UK4	UA4	AAA-AZZ	156	Volgograd	UK4	UA4	LAA-LZZ	164	Ulyanovsk	UK4	UA4	UAA-UZZ	092	Mordovia
UK4	UA4	CAA-CZZ	152	Saratov	UK4	UA4	NAA-NZZ	131	Kirov	UK4	UA4	WAA-WZZ	095	Udmurt
UK4	UA4	FAA-FZZ	148	Penza	UK4	UA4	PAA-PZZ	094	Tatar	UK4	UA4	YAA-YZZ	097	Chuvash
UK4	UA4	HAA-HZZ	133	Kuibyshev	UK4	UA4	SAA-SZZ	091	Mari					
UK5	UB5	AAA-AZZ	075	Sumy	UK5	UB5	JAA-JZZ	067	Crimea	UK5	UB5	SAA-SZZ	074	Ivano-Frankovsk
UK5	UB5	BAA-BZZ	076	Ternopol	UK5	UB5	KAA-KZZ	072	Rovno	UK5	UB5	TAA-TZZ	079	Khmelnitskiy
UK5	UB5	CAA-CZZ	080	Cherkassy	UK5	UB5	LAA-LZZ	077	Kharkov	UK5	UB5	UAA-UZZ	065	Kiev
UK5	UB5	DAA-DZZ	063	Transcarpathian	UK5	UB5	MAA-MZZ	059	Voroshilovgrad	UK5	UB5	VAA-VZZ	066	Kirovograd
UK5	UB5	EAA-EZZ	060	Dnepropetrovsk	UK5	UB5	NAA-NZZ	057	Vinnitsa	UK5	UB5	WAA-WZZ	068	Lvov
UK5	UB5	FAA-FZZ	070	Odessa	UK5	UO5	OAA-OZZ	039	Moldavia	UK5	UB5	XAA-XZZ	062	Zhitomir
UK5	UB5	GAA-GZZ	078	Kherson	UK5	UB5	PAA-PZZ	058	Volin	UK5	UB5	YAA-YZZ	082	Chernovtsy
UK5	UB5	HAA-HZZ	071	Poltava	UK5	UB5	QAA-QZZ	064	Zaporozhe	UK5	UB5	ZAA-ZZZ	069	Nikolayev
UK5	UB5	IAA-IZZ	073	Donetsk	UK5	UB5	RAA-RZZ	081	Chernigov					
UK6	UA6	AAA-AZZ	101	Krasnodar	UK6	UA6	IAA-IZZ	089	Kalmyk	UK6	UA6	UAA-UZZ	115	Astrakhan
UK6	UD6	CAA-CZZ	002	Nakhitchevan	UK6	UA6	JAA-JZZ	093	North Ossetian	UK6	UF6	VAA-VZZ	013	Abkhazia
UK6	UD6	DAA-DZZ	001	Azerbaijan	UK6	UD6	KAA-KZZ	003	Nagorno-Karabash	UK6	UA6	WAA-WZZ	086	Dagestan
UK6	UA6	EAA-EZZ	109	Karachai-Cherkes	UK6	UA6	LAA-LZZ	150	Rostov	UK6	UA6	XAA-XZZ	087	Kabardino-Balkar
UK6	UF6	FAA-FZZ	012	Georgia	UK6	UF6	OAA-OZZ	015	South Ossetian	UK6	UA6	YAA-YZZ	102	Adygei
UK6	UG6	GAA-GZZ	004	Armenia	UK6	UA6	PAA-PZZ	096	Chechen-Ingush					
UK6	UA6	HAA-HZZ	108	Stavropol	UK6	UF6	QAA-QZZ	014	Adzhar					
UK7	UL7	AAA-AZZ	179	Mangyshlak	UK7	UL7	IAA-IZZ	017	Aktyubinsk	UK7	UL7	PAA-PZZ	023	Karaganda
UK7	UL7	BAA-BZZ	016	Tselinograd	UK7	UL7	JAA-JZZ	019	East Kazakhstan	UK7	UL7	RAA-RZZ	178	Dzhezkazgan
UK7	UL7	CAA-CZZ	028	North Kazakhstan	UK7	UL7	KAA-KZZ	024	Kzyl-Orda	UK7	UL7	TAA-TZZ	021	Dzhambul
UK7	UL7	DAA-DZZ	029	Semipalatinsk	UK7	UL7	LAA-LZZ	026	Kustanay	UK7	UL7	VAA-VZZ	030	Taldy-Kurgan
UK7	UL7	EAA-EZZ	025	Kokchetav	UK7	UL7	MAA-MZZ	022	Uralsk	UK7	UL7	YAA-YZZ	176	Turgay
UK7	UL7	FAA-FZZ	027	Pavlodar	UK7	UL7	NAA-NZZ	031	Chimkent					
UK7	UL7	GAA-GZZ	018	Alma Ata	UK7	UL7	OAA-OZZ	020	Guryev					
UK8	UI8	AAA-AZZ	053	Tashkent	UK8	UJ8	KAA-KZZ	182	Kulyab	UK8	UJ8	SAA-SZZ	041	Leninabad
UK8	UH8	BAA-BZZ	180	Krasnovodsk	UK8	UI8	LAA-LMZ	048	Bokhara	UK8	UI8	TAA-TZZ	052	Surkhandaria
UK8	UI8	CAA-CZZ	049	Kashka-Darya	UK8	UI8	LNA-LZZ	185	Novoya	UK8	UI8	UAA-UZZ	055	Khorezm
UK8	UI8	DAA-DZZ	173	Syr-Darya	UK8	UH8	MAA-MZZ	036	Kirghiz	UK8	UI8	VAA-VZZ	181	Djizak
UK8	UH8	EAA-EZZ	044	Mary	UK8	UH8	NAA-NZZ	034	Osh	UK8	UH8	WAA-WZZ	045	Tashauz
UK8	UI8	FAA-FZZ	047	Andizhan	UK8	UI8	OAA-OZZ	050	Namangan	UK8	UJ8	XAA-XZZ	183	Kurgan-Tyubinsk
UK8	UI8	GAA-GZZ	054	Fergana	UK8	UH8	PAA-PMZ	177	Naryn	UK8	UH8	YAA-YZZ	046	Chardzhou
UK8	UH8	HAA-HZZ	043	Ashkhabad	UK8	UH8	PNA-PZZ	184	Talass	UK8	UI8	ZAA-ZZZ	056	Kara-Kalpak
UK8	UI8	IAA-IZZ	051	Samarkand	UK8	UH8	QAA-QZZ	033	Issyk-Kul					
UK8	UJ8	JAA-JZZ	040	Tadzhik	UK8	UJ8	RAA-RZZ	042	Gorno-Badakhshan					
UK9	UA9	AAA-AZZ	165	Chelyabinsk	17	UK9	UA9	KAA-KZZ	163	Yamal-Nenets	17	UK9	UA9	UAA-UZZ	130	Kemerovo	18
UK9	UA9	CAA-CZZ	154	Sverdlovsk	17	UK9	UA9	LAA-LZZ	161	Tumen	17	UK9	UA9	WAA-WZZ	084	Bashkir	16
UK9	UA9	FAA-FZZ	140	Perm	17	UK9	UA9	MAA-MZZ	146	Omsk	17	UK9	UA9	XAA-XZZ	090	Komi	17
UK9	UA9	GAA-GZZ	141	Komi-Permiak	17	UK9	UA9	OAA-OZZ	145	Novosibirsk	18	UK9	UA9	YAA-YZZ	099	Altai	18
UK9	UA9	HAA-HZZ	153	Tomsk	18	UK9	UA9	QAA-QZZ	134	Kurgan	17	UK9	UA9	ZAA-ZZZ	100	Gorno-Altai	18
UK9	UA9	JAA-JZZ	162	Khanty-Mansi	17	UK9	UA9	SAA-SZZ	167	Orenburg	16						
UKØ	UAØ	AAA-AZZ	103	Krasnoyersk	18	UKØ	UAØ	JAA-JZZ	112	Amur	19	UKØ	UAØ	UAA-UZZ	166	Chita	18
UKØ	UAØ	BAA-BZZ	105	Taimyr	18	UKØ	UAØ	KAA-KZZ	139	Chukotka	19	UKØ	UAØ	VAA-VZZ	175	Aginsk Buriat	18
UKØ	UAØ	CAA-CZZ	110	Khaberovsk	19	UKØ	UAØ	LAA-LZZ	107	Primorye	19	UKØ	UAØ	WAA-WZZ	104	Khakass	18
UKØ	UAØ	DAA-DZZ	111	Jewish	19	UKØ	UAØ	OAA-OZZ	085	Buryat	18	UKØ	UAØ	XAA-XZZ	129	Koryak	19
UKØ	UAØ	FAA-FZZ	153	Sakhalin	19	UKØ	UAØ	QAA-QZZ	098	Yakutsk	19	UKØ	UAØ	YAA-YZZ	159	Tuva	23
UKØ	UAØ	HAA-HZZ	106	Evenk	18	UKØ	UAØ	SAA-SZZ	124	Irkutsk	18	UKØ	UAØ	ZAA-ZZZ	128	Kamchatka	19
UKØ	UAØ	IAA-IZZ	138	Magadan	19	UKØ	UAØ	TAA-TZZ	174	Ust-Orda Buriat	18						

Oblast 171 = Arctica (4KØ) Oblast 172 = Antarctica (4K1) deleted Oblasts:- 011 032 035 061 116

GREAT CIRCLE MAP

Based on the North Pole, this is how the planet Earth looks to your transmitter. To the novice the map is a revelation, because, among other things, it shows that the shortest route to Australia (for example) is ENE, and not south!



Keep a Great Circle Map on the wall in front of you in the radio room - alongside your list of timezones.

Note: Even short distances (say, between London and Belfast) can make a difference to the directions your signals will travel across the earth. That to the antipodes, for example.

The Great Circle Map should be consulted along with the radiation pattern of your antenna for long distance DX work. Such a map is absolutely essential if you are planning a proper antenna installation. Remember, incidentally, that in the mornings, signals from (and to) Australia and the Far East can sometimes travel the other way round the earth, ie across South America.

This map, and a larger colour version based on London, is available from the Radio Society of Great Britain, Alma House, Cranbourne Road, Potters Bar, Herts, EN6 3JW.

We are grateful to the RSGB for granting permission to reproduce these maps in our Yearbook.

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73 de G3LST and Staff.

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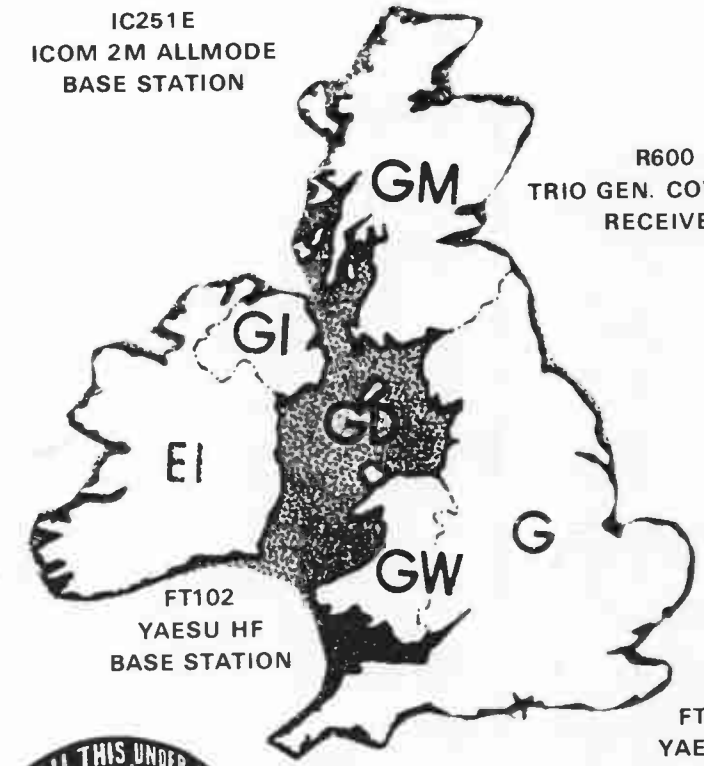
ICOM 2M ALLMODE
BASE STATION



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YAESU 2M
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