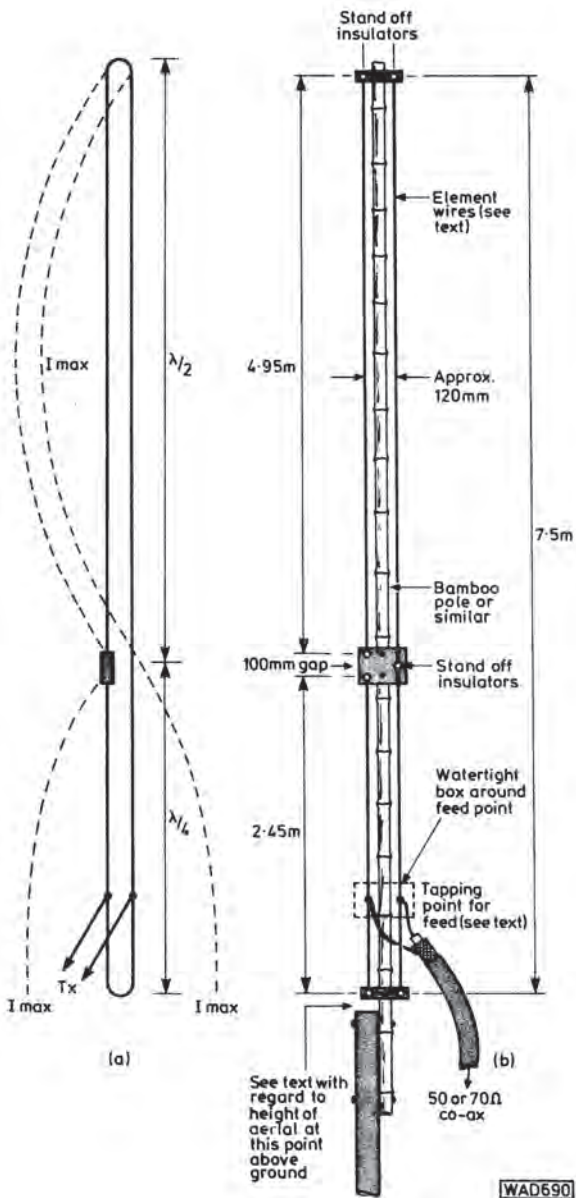


Operating on 10m

Editorial introduction: Roger G3XBM's Part 1 article has been waiting for publication until 28MHz started to show real signs of life! Roger launches *PW*'s series of articles and projects aimed at helping more readers get on to the band – and in Part 2 he'll describe the design of a very effective dedicated 28MHz antenna. **Rob G3XFD.**



For what appears like forever we have been experiencing pretty lousy conditions on the 28MHz (10m) band. In reality, these poorer conditions have only been around for a few years since sunspot cycle 23 took a nosedive and the level of solar activity and amateur activity on the band has been low.

Actually, 28MHz is one of the most rewarding bands we have access to and we have **plenty** to look forward to again in the next few years. So, join me as I do my best to encourage readers to get ready to join in the fun on 10m.

At Its Best

Many newcomers to Amateur Radio will have not experienced the 28MHz band when it's at its best. They'll only know it as a band appearing to be devoid of activity for most of the year and most of the time a casual tune around will probably reveal nothing but noise and some man-made interference from local switch mode power supplies.

In the summer months, Sporadic-E (Sp-E) conditions buck things up a bit and there are usually European stations from some part of the continent workable between the months of May and August. If you strike lucky, you may find some sporadic-E openings at other times, but the peak in the northern hemisphere is early to mid-summer with a much smaller peak around December and January.

Beyond Europe?

What about DX beyond Europe? Well, even in the depths of the sunspot cycle 28MHz is capable of supporting far more F2 layer long distance DX than many Amateurs realise, especially on north-south paths across the equator into Africa and South America.

During the CQWW DX contest in October 2007, the sunspot count was hovering around zero, yet the increased activity that always occurs in a big contest gave rise to two pages of 28MHz s.s.b. QSOs being entered into the G3XBM logbook and spanning four continents. This was despite running only 5-10W to a small end-fed antenna strung down the garden.

The main issue is actually Radio Amateurs **thinking** the band is dead and not calling "CQ" at times outside of

Fig. 1: A 'Slim Jim' style antenna for 28MHz, designed by the late Fred Judd G2BCX. Nowadays, a fibreglass fishing rod could be used rather than a long bamboo cane (Reprinted from PW November 1980).

In the first of two articles, Roger Laphorn G3XBM is looking forward to sunspot cycle 24 and increasing activity on 28MHz.

contests. It is always worth checking the band and **putting out a CQ call**. Many people watch the DX clusters for signs of an opening but if we all do this then no-one will ever know the band is open and no-one will work anyone!

The more vigilant 28MHz DXers with larger antennas and reasonable powers are able to work DX in more marginal conditions. Even places like VK (Australia) have been worked in the poorer years.

Sporadic-E conditions are usually thought of as being limited to about 1200 – 2400km (800-1500 miles) i.e. Europe only workable from G stations. However, in recent years people have woken up to the fact that multi-hop sporadic-E openings are not that uncommon in the summer months. This allows paths as far as the Middle East, the Caribbean, northern South America and the USA to be workable using this mode. **Note:** These paths have also been worked on 50MHz (6m) every summer now for many years.

Both HF & VHF

Interestingly, 28MHz is a band that behaves both as a high frequency (h.f.) band when conditions are good and as a very high frequency(v.h.f.) band when they're not. So, not surprisingly, other modes occur from time to time which allow DX to be worked.

Aurora, which people associate with 50 and 144MHz operation is often very good on 28MHz, with much less 'smearing' of signals that render s.s.b. signals unreadable on bands like 144MHz (2m). On 28MHz, auroral openings allow European DX to be worked on c.w. and s.s.b., often allowing contacts with countries that otherwise would be quite hard to work because the skip distance means that signals 'hopping over' them.

Countries and areas including Scotland (GM), Wales (GW), The Netherlands (PA) and Belgium (ON) have been worked from the G3XBM shack using c.w. on 10m with low power. Monitoring of 28MHz European beacons will also confirm that meteor scatter also works on the 10m band.

Inter-G working

The 28MHz band is also surprisingly good for inter-G working. Even a very basic 10m narrow band frequency modulated (n.b.f.m.) station working up around 29.6MHz will be able to work up to 48km (30 miles) or so with a few watts and a CB type half wave vertical antenna.

By swapping over to s.s.b. or c.w., the range will extend quite a bit further. Up the power and stations a few hundred of kilometres away will be within range. In fact I well remember some RSGB evening 10m activity contests many years ago in an earlier sunspot minimum.

Despite only having a maximum of 10W c.w. or s.s.b. available to me – together with a CB half wave or a sloping dipole – I never failed to work stations over 160km (100 miles) away from the south coast up to Yorkshire from my Cambridgeshire location. Again, a lack of activity is the main reason people don't try to work these sorts of paths more often.

Like the v.h.f. and u.h.f. bands, 28MHz is also affected by tropo (Tropospheric) lifts. Many old-time CBers will tell you that getting on the band just after sunrise will allow improved inter-G ranges to be worked in much the same way as seasoned 144MHz contesters will recall on a misty

dawn on a hilltop! Then, factor in weak signal modes – like PSK31 and c.w. – and the ranges possible in 'flat band' conditions across the country can well be imagined.

What To Expect?

Enough about what may be worked at the moment, what about the next few years? What can we expect to work? To start answering the question, most experts now agree that the sunspot cycle has – at last – reached its minimum and it seems a long time since the last peak!

The good news is that predictions for the next cycle are good with some operators even predicting quite a high peak in 2010-2012. The 'climb out' of the minimum is more rapid than the slide towards it, so conditions will rapidly start to improve as the months progress.

Within 12 months the 28MHz band will be returning to its real form with **easily workable** DX even for modestly equipped QRP stations. When the band is at its best 10m DXCC is certainly workable with 5W c.w. or s.s.b. and a simple (non-beam) antenna.

Usually, h.f. conditions tend to be best with lowest signal absorption when operating just below the maximum usable frequency (MUF). Unlike professional short wave users. Radio Amateurs are quite prepared to work 'on the edge' and so are likely to catch openings on marginal bands – just as the MUF reaches the band or just before they fade out. These are the very best times for modestly equipped stations to snag some choice DX!

In the better years, F2 layer conditions will be good until well after dusk, but it is during daylight hours when the band is normally at its best. **Note:** Always remember that h.f. conditions can vary on an almost daily basis – especially on the higher bands – and that the sunspot count and solar flux levels can reach quite high levels periodically even quite early in the new cycle. At such times, and with settled geomagnetic conditions, some choice DX can be worked.

Beacons & CB

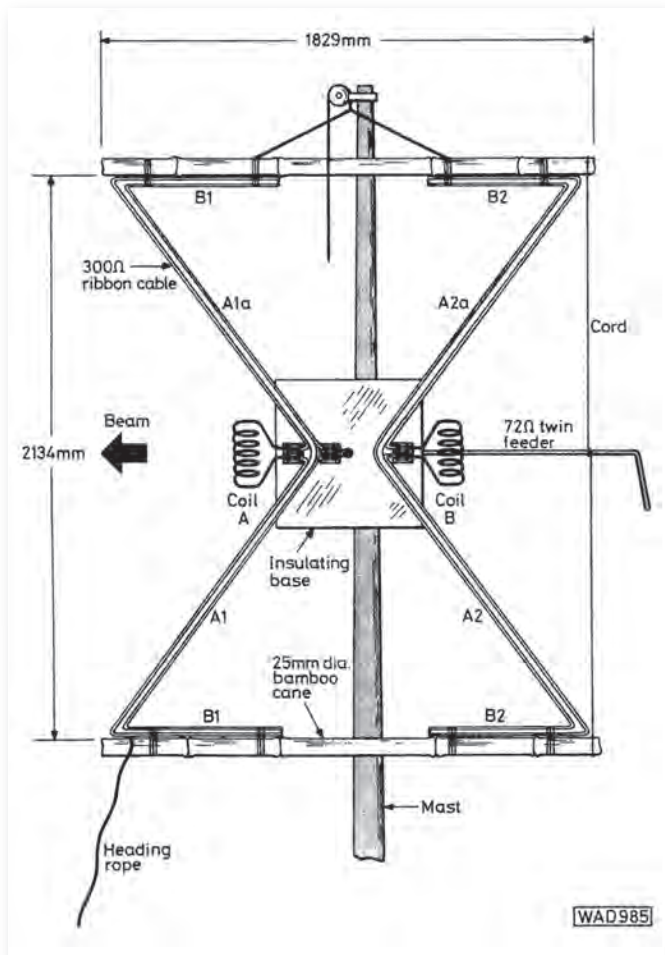
We're fortunate in that the 28MHz band has a large collection of propagation beacons – with the International Beacon Project (IBP) transmitters on 28.200MHz – and it's well worth monitoring these and European beacons to check conditions. Even when there's nobody on the band the beacons allow DX paths to be monitored. Many of the beacons are running modest powers to small antennas, so if they're audible the chances are the path is workable!

Another useful check on conditions is the 27MHz CB band. Certainly in earlier cycles when CB activity was very high worldwide it was always worth checking activity levels just below 28MHz. In the UK and Europe the level of CB activity has dropped but I think checking for DX CB signals will still be worth it.

Equipment For 28MHz?

To get the best from the band in the current part of the cycle there's no doubt that a reasonable power and a decent antenna will certainly help. A 100W 'black box' rig and a small beam will certainly allow you to work DX that a QRP station couldn't, especially in very marginal conditions.

However, as I mentioned earlier, having a much more



modest station does not stop you still having plenty of fun. In fact, this summer (2008) I've worked many stations in Europe with just 50mW (Yes – 50 milliwatts!) of c.w. to a wire halo (details coming in Part 2).

I've worked most continents, at close to sunspot minimum time, with just 5 to 10W and similar small antennas – it's just a bit harder when you don't have the power and large antennas but the feeling of achievement is wonderful! When conditions really pick up we can forget about the high power and big antennas as a modest QRP rig like the FT-817 and a small antenna will allow inter-continental DX to be worked on almost all modes.

Working Ten AM

When the band returns to its good shape – don't forget to take a listen just above 29MHz where activity using amplitude modulation (a.m.) is centred, especially from the USA where there are enthusiasts using restored rigs from the golden ages of the 1950s and 60s. Indeed, listening between 29-29.2MHz when the band is open to the States is like going back through a time warp, with 'warmly' modulated a.m. rigs with nice strong carriers (and heterodynes!) to be heard. It always reminds me of my first days in the hobby when most people were using a.m. rigs and s.s.b. was relatively rare.

Another bonus on 10m is the small size of antennas. A wire dipole or vertical half-wave antenna is only just over

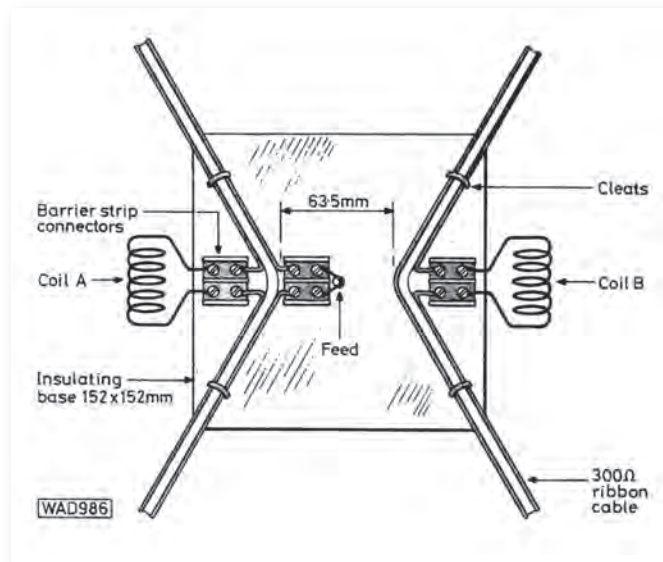


Fig. 2: The Mini-X beam, designed by F. C. Smith GW2DDX. this beam antenna can be used either vertically (as shown) or horizontally. (Reprinted from PW March 1982).

4.9m (16ft) long. A wire halo antenna can be just a few feet square, almost omni-directional in its radiation pattern and very effective.

Even a 28MHz beam antenna is relatively small when compared with a 14MHz equivalent. 'Ten' also makes an excellent band when mobile using CB whips and for portable operation antennas – such as base loaded whips – can be very effective when used on rigs like the FT-817 as long as a small counterpoise wire is used. Indeed, I've worked stations as far away as the USA, Argentina, Brazil and Venezuela on 28MHz s.s.b. with a hand-held rig and without much difficulty during good conditions.

Bandwidth available

The other thing to remember about 10m is the space available as it's 1.7MHz wide. This allows plenty of space for all modes to spread out across the band.

Even at the peak of the sunspot cycle you should be able to find places to operate without interference.

Simple QRP Rigs

The 28MHz band is an excellent band on which to build and fire up a simple homebrew QRP transmitter. Indeed my very first experience of the band was with a small, crystal controlled, 1W c.w. rig.

With just a wire dipole in the loft, I worked plenty of DX and often with 599 reports! On 10m don't expect to struggle too hard to work stations using QRP when the band is open!

So, why not build a simple 10m transmitter or transceiver and get ready for the exciting times just ahead? A rig like **George Burt GM3OXX's** famous variable crystal oscillator (VXO) controlled, c.w. mode, 'OXO' rig using just a couple of transistors will give around 500mW output. Connect this to a wire dipole or halo antenna and working the world will be your prize.

The 28MHz band is about to spring into life and **now** is the time to get ready to enjoy working the DX. Go on – give it a go and you'll not regret it! In part 2 I'll be introducing my own antenna for 28MHz – the Homebase 10. In the meantime there are a couple of *PW* 'classics' to encourage you to get on the air.