

STARLITE

THE NEWSLETTER FOR THE STOURBRIDGE AND DISTRICT A.R.S.



**G6OI
G6SRS**



ISSUE: JULY 2018



G4CVK

**STOURBRIDGE & DISTRICT AMATEUR RADIO SOCIETY
INCORPORATING
OLDSWINFORD HOSPITAL SCHOOL RADIO CLUB**

MEETINGS HELD AT

**OLDSWINFORD HOSPITAL SCHOOL
HEATH LANE
STOURBRIDGE
[8:00 TO 10:00 PM]**

VISITORS ALWAYS WELCOME

**THE SOCIETY HOLDS ITS FULL MEETINGS
ON THE 1ST AND 3RD MONDAYS EACH MONTH**

80TH ANNIVERSARY YEAR

[MARCH 2018 - MARCH 2019]

RSGB AFFILIATED SOCIETY

STARLITE

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StARS Website URLs:-
www.g6oi.org.uk
<http://g6oi.ross-lewis.co.uk/index.html>

StARS Facebook Page:-
<https://www.facebook.com/groups/stourbridge.ars/>

All correspondence/enquiries should
be addressed to the Hon Secretary at:-

StARS
c/o The Mill House
21 Mill Lane
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Kidderminster
DY10 3ND

Forthcoming Meetings

July 2 nd	On Air. Informal. Digi Modes Group.
July 9 th	On Air. Informal. Digi Modes Group.
July 16 th	World War 1 Local Interest with Barbara Price
July 23 rd	On Air. Informal. Digi Modes Group.
August 6 th	On Air. Informal. Digi Modes Group.
August 13 th	On Air. Informal. Digi Modes Group.
August 20 th	Main Meeting – Subject tba
August 27 th	August Bank Holiday – No Meeting
September 1 st /2 nd	RSGB/IARU Region 1 SSB Field Day
September 3 rd	On Air. Informal. Digi Modes Group.
September 10 th	On Air. Informal. Digi Modes Group.
September 17 th	Main Meeting – Subject tba
September 24 th	On Air. Informal. Digi Modes Group.
October 1 st	On Air. Informal. Digi Modes Group.

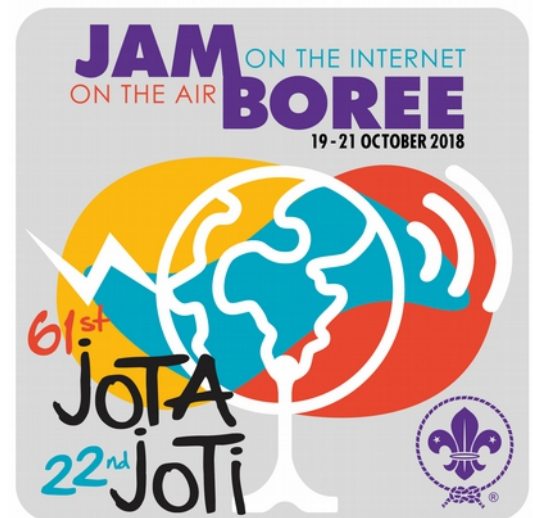
Editor's Notes

I am pleased to announce that the July main meeting will be a talk by Barbara Price entitled “World War 1 Local Interest”. I am sure this will be an informative and entertaining presentation.

Great news. At a recent ad hoc Committee meeting, a representative of the Norton Scouts attended to ask if we would like to do Jamboree On The Air with them. I believe the consensus of opinion was positive, with details to be confirmed soon.

You will see from the logo that JOTA is officially in effect from the 19th to 21st October and we will be hosted at the Alderman Tye Scout HQ.

More details will follow in due course.



You will notice that there are some empty spaces in this issue. May I respectfully suggest that the remedy is in your hands. If I don't get [or can't find] content, the pages may remain blank! Thanks in advance for your input. *Editor.*

SNIPPETS

Here are a couple of things I saw on You Tube.

UK Amateur Radio Station MØXMX demonstrates homebrew "Flowerpot" antenna vs Diamond RH77CA using GB3DC repeater.

<https://www.youtube.com/watch?v=BcCo5OLBrbU&feature=youtu.be>

UK Amateur Radio Station MØXMX demonstrates how easy it is to build a mobile antenna for VHF

<https://www.youtube.com/watch?v=rGbdPMZa9w8>

A Typing Tip

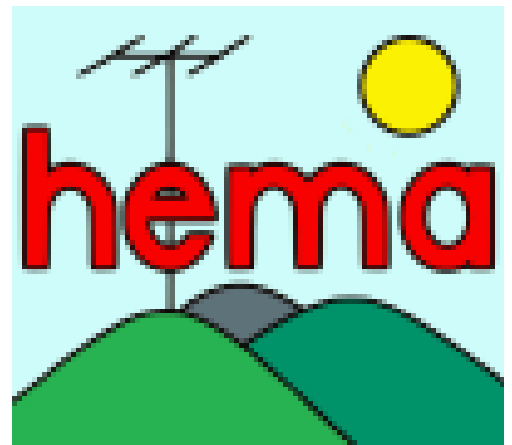
If you would like to type a slashed zero 'Ø' instead of 0 then you need to use the ALT codes within Windows fonts. Here are the steps necessary to do this

- 1, Push the "Num lock" key on your keyboard. Make sure the "Num lock" light is lit on the keyboard.
- 2, You must use the numerical keypad on your keyboard only to do this.
- 3, Type your normal text such as "This is G0OUC". When you get to the "zero" part of the text, press and hold down the "ALT" key on your keyboard. While holding the "Alt" key depressed, enter the code 0216 (Zero, Two, One, Six) on the numerical keypad on your keyboard. When you have entered the above code, release the "Alt" key and you should have a "Ø" in your text. Should now read GØOUC.....

HuMPs Excluding Marilyns Award

You've heard of SOTA [Summits On The Air], but how about HEMA?

HEMA stands for HuMPs Excluding Marilyns Award. To the uninitiated that might look like gobbledegook. A HuMP is a summit that has Hundred Metre Prominence, meaning that it sticks up above the surrounding land by at least 100m. A Marilyn is a summit with 150m prominence. HEMA then is an award for HuMPs with a prominence of less than 150m. Marilyns have there own award scheme through SOTA. The HEMA scheme currently operates in the UK and Ireland, other parts of Europe and Australia.



So HEMA HuMPs are just little hills then? Well it's true to say that on average HEMA HuMPs are probably lower, but the way they are measured means that there are some very high ones. For example, after climbing Pen y Fan, the highest summit in South Wales, you could go on to climb the HuMP GW/HSW-009 Cribyn, which stands at 795m. Some HEMA HuMPS present a few challenges, such as dense tree cover or scrub, but that's all part of the fun! However, there are many that can be accessed easily with a gentle stroll, so there is something for everyone.

The HEMA award scheme is based on 'uniques', i.e. the number of different summits you have activated. That is how the activator league table is arranged, although you still get a point for subsequent activations or 'dupes'. One point is awarded for a successful qualification irrespective of the height of the summit, and there is no winter bonus.

So why activate HEMA HuMPS? Some of our finest hills fall into this group, proving that size isn't everything. Most HEMA HuMPs are not visited that frequently, and so provide a degree of solitude that the bigger summits often lack. If you've ever been on Pen y Fan on a busy day with 300 other visitors you'll appreciate that! Finally, they are generally more plentiful than Marilyn's and so will give you many more hill activating opportunities, and remember, there are still quite a few unactivated ones for you to stamp your name on!

Further information can be found at www.hema.org.uk and already there are a number of activators who have alerted with various bands and modes from summits around the country, but 2m FM and SSB is featuring strongly in that line-up.

[For the Record, our local HuMP is Sheepwalks Hill in the field by our BBQ site. Editor.]

One For The DMR Users?

Saw this on QRZ.com Facebook Page and thought it may be of interest to those of you who use DMR.



Also from the QRZ.com Facebook page

Someone said: "Just an observation, but I've been randomly clicking on call signs that have just been given an award for either DX100 or 50 US state or another award on QRZ and 99% of them have FT8 all over their log books.

So ask yourself this question.. what's the point.. where's the effort in listening on the bands, chasing an elusive call sign, getting a QSO and getting it confirmed if all you have to do is switch on a damn PC and radio and scratch your backside 'til it's logged enough. FT8 is a joke!"

I won't hold my breath, but any comments?? Editor.

Time For A Change?

I saw this on the StARS Facebook page. Editor.

When the roof antennas are serviced it might be worth looking into something better than the G5RV.

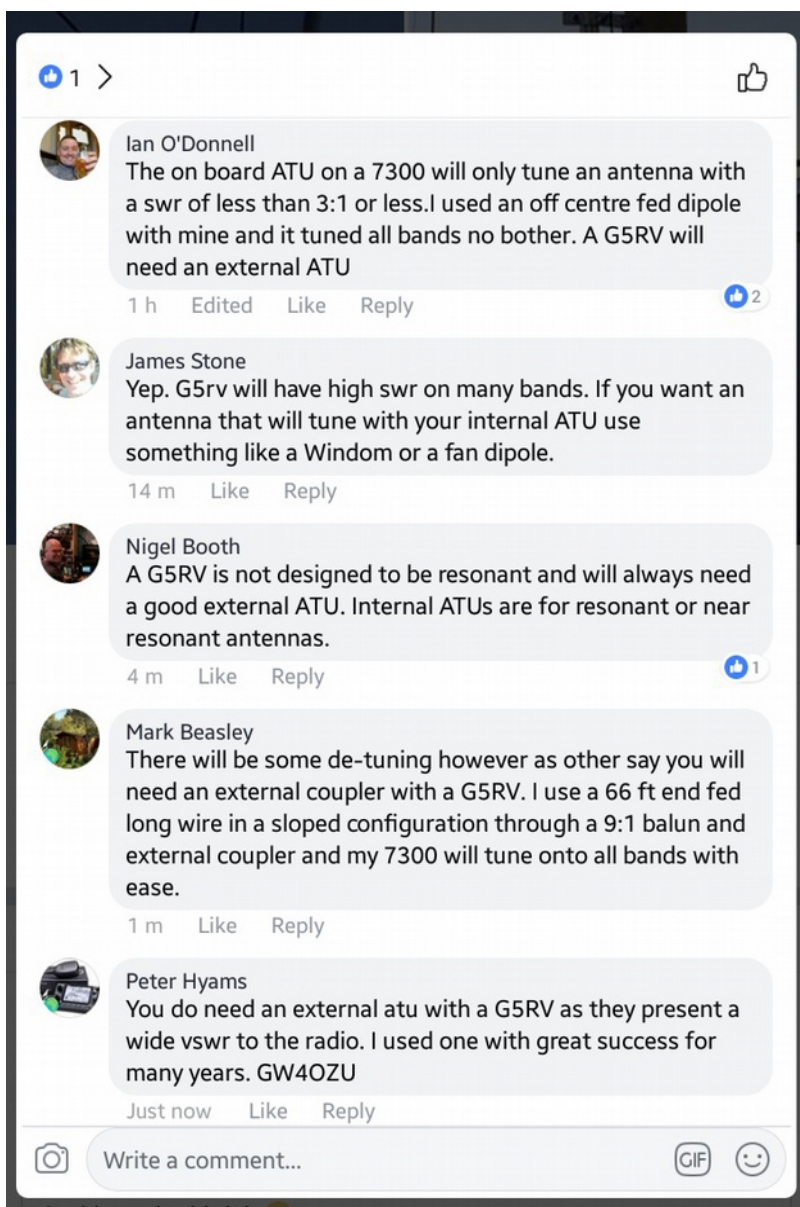
Consensus of opinion is that the G5RV will require an external ATU every time rather than the internal auto tuner of the rig.

So, what would be the suggested replacement? Editor.

Here is some of the chatter about it from *UK Ham Radio Group*.

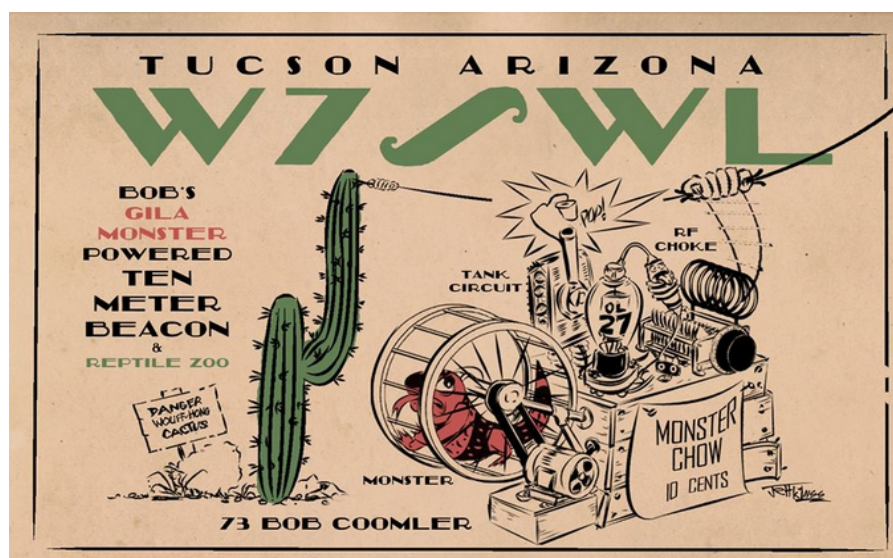
So, the G5RV is not designed to be resonant? Does the guy in the post suggest that Louis Varney's resonant design frequency of around 14.100MHz is incorrect?

It's over to you for your comments.



Vintage QSL Card

Saw this on the internet and thought it might amuse some of you.



I, also, saw this somewhere on the internet and thought it could be a discussion item within the Society. When I returned after my 15-year sabbatical, I was dismayed to learn that the B licence had been removed ... a somewhat surprising move, I thought. Now it appears there may be a return to it. This MUST be a positive step forward if activity on VHF/UHF, etc., would increase. Your thoughts and comments on this would be appreciated. Editor.

Could a new Entry Level Licence boost VHF/UHF activity?

Activity on the 144 MHz and higher bands is at its lowest for decades at a time when commercial interests are prepared to pay £1 million per MHz annually for spectrum

In 2016 the RSGB VHF Manager's report noted: "The general level of 432 MHz activity continues to cause concern with many repeaters remaining unused for much of the day."
http://rsgb.org/main/files/2016/11/5.2_VHF-Managers-report_Oct2016.pdf

In many parts of the country even 144 MHz activity has dropped alarmingly compared to the 1990s, SSB, FM Simplex and even Repeaters can be very quiet for much of the time.

The decline in VHF/UHF activity is not just a UK phenomena, a 72 hour monitoring exercise in Sweden revealed a similar pattern, see

<http://www.southgatearc.org/news/2018/may/study-of-ham-radio-in-sweden.htm>

At the same time as this decline in amateur activity we have seen a rapidly growing commercial interest in UHF and Microwave spectrum. The sums that commercial operators are prepared to pay are eye-watering, up to £1 million per MHz per year.
<http://www.southgatearc.org/news/2018/june/revised-fees-for-mobile-operators-to-use-900-and-1800-mhz-spectrum.htm>

In recent years we have seen significant losses of amateur spectrum and there's a fear of more losses. What can be done to save our valuable VHF/UHF/uW allocations? - Use it or Lose it.

One approach would be the introduction of a new Entry Level Licence class that permitted low power (e.g. 10 watts) operation on 144 MHz and all the higher frequency bands.

Some might reasonably say "isn't the Foundation licence Entry Level?" but when you read the ITU Recommendation M.1544 that details the minimum requirements for an Amateur licence you can see that the current UK Foundation is set at a much higher level. A new Foundation syllabus and exam are expected to be introduced in the later half of 2019, this will set the bar even higher.

We sometimes forget how much the Foundation exam has changed over the years. When it was first introduced in 2002 the exam comprised just 20 questions and took 30 minutes to complete. The current exam is 26 questions in 55 minutes (there are of course 12 practical exercises to successfully complete as well).

The "scope creep" in Foundation means it is no longer realistic to run a course over just a

weekend, many so-called "weekend courses" now include part of Friday or else require the candidate to have done some study prior to the course commencing.

If the requirements for a new entry level 144 MHz and Above licence were set at the minimum level needed to meet ITU Rec M.1544 it should be possible to teach it to absolute beginners in about 7 hours, followed by a 20 question 30 minute exam. This would enable a complete course to be taught during weekend. Youth events such as Jamboree On The Air and attendees could leave the event with the necessary qualification for an amateur licence.

Unlike the other levels there would be no compulsion to do this course before Foundation, people could chose at which level they wished to join the hobby either at 144 MHz and Above or take the full Foundation for the lower bands. Foundation should of course have access to all the higher bands as well.

Over the past decade we have seen the increasing use by Experimenters of licence-exempt UHF/Microwave spectrum. Once if somebody wished to carry out wireless experiments they would get an amateur licence, not anymore, it seems these days keen hobbyists are putting together their own equipment for the licence-exempt bands, using SDR technology in many cases, and establishing their own wireless networks. Experimenters are a group we should be encouraging to join amateur radio, a 144 MHz and Above licence may be the way to achieve it.

ITU Rec M.1544 minimum qualifications of radio amateurs

<https://www.itu.int/rec/R-REC-M.1544-1-201509-I/en>

This space left intentionally blank for your contribution.

There is very little input from the membership, so your Editor has been forced to play radio instead of editing!



Memories, photos, projects, general chit-chat, etc., would all be very welcome.

Send input to: robq4xom@outlook.com

Deadline for the August issue is 24th July

POWER LOSS DUE TO VSWR

VSWR	TX POWER TO ANTENNA				
	100W	50W	25W	10W	
1.0	0	0	0	0	\
1.1	0.2	0.1	0.1	0.12	
1.2	0.8	0.4	0.2	0.08	
1.3	1.7	0.9	0.4	0.17	
1.4	2.8	1.4	0.7	0.28	
1.5	4.0	2.0	1.0	0.40	
1.6	5.3	2.7	1.3	0.53	
1.7	6.7	3.4	1.7	0.67	
1.8	8.2	4.1	2.0	0.82	> REFLECTED POWER IN WATTS
1.9	9.6	4.8	2.4	0.96	
2.0	11.1	5.6	2.8	1.11	
2.1	12.6	6.3	3.1	1.26	
2.2	14.1	7.0	3.5	1.41	
2.3	15.5	7.8	3.9	1.55	
2.4	17.0	8.5	4.2	1.70	
2.5	18.4	9.2	4.6	1.84	/

THIS ASSUMES NO POWER LOSS IN THE TRANSMISSION LINE OR ANTENNA ITSELF

MORE ON VSWR

Let's first take the comment that VSWR can only be measured accurately at the load, or at half wave intervals back from the load. The first part of this is correct, owing to line losses. It has to be said, though, that it needs a rather lossy cable to make a major difference. Take the case of using 50ft of H100 cable to feed a 2m aerial. A 3:1 VSWR at the load would be indicated as 2.4:1 at the input; and 1.5:1 at the load would show as 1.4:1 at the input. Given the general accuracies of the measurement concept, these errors are not particularly a matter for concern.

When it comes to the 'half wave intervals' concept, one needs to think about what is actually being measured by the 'VSWR meter'. The first thing to note is that the one parameter most positively NOT being measured is the VSWR! In order to make a direct measurement of VSWR it is necessary to probe at intervals along the line and measure the total voltage amplitude. Assuming that the VSWR is not 1:1, it will be possible to find a point where the voltage is a maximum and, 1/4 wave from this, where the voltage is a minimum. The VSWR is the ratio of these two voltages. It is pretty obvious from this that VSWR cannot be measured directly at a single point on the line.

So if 'VSWR meters' are not measuring VSWR, just what are they measuring? First we need to understand what happens when a line is not correctly terminated. When power is first applied, the voltage and current organise themselves according to the characteristic impedance of the line and flow towards the load.

On arriving at the load, the forward waves find that it cannot accept them in their existing relationship. The load accepts what it can and sends the remainder back up the line

towards the source. With a normal transmitter arrangement, when the reflected waves appear back at the source they find a very large mismatch and are reflected back up the line towards the load. After all of the transients have died down, there will be constant amplitudes of forward and reverse waves flowing along the line.

What the 'VSWR meter' is doing is deriving representations of the magnitudes of the forward (VF) and reverse (VR) voltages. To use the meter it is first necessary to set the sensitivity control so that the forward wave representation is full scale on the meter, then switching to the reverse position yields a direct indication of VSWR. If the meter were to be calibrated with a linear scale of 0 to 1 then the reverse reading would actually indicate the fraction of the forward voltage being reflected. This fraction is called the reflection coefficient. The VSWR can be determined from the relationship:

$$\text{VSWR} = (1+P)/(1-P) \text{ where } P \text{ is the magnitude of the reflection coefficient.}$$

Ignoring line losses, the magnitudes of VF and VR and of the reflection coefficient are constant along the length of the line. The phase between the two voltages, and hence of the reflection coefficient, does, however, change along the line - there being a 360 degree phase rotation every half wave travelled. At the points where VF and VR are in-phase the total voltage on the line is VF+VR; and when VF and VR are in anti-phase the total voltage is VF-VR. These are the peaks and troughs mentioned earlier when talking about probing along the line to measure the VSWR.

Since the 'VSWR meter' derives values representing the magnitudes of VF and VR, the phase between them is not relevant. In other words it doesn't matter where in the line the meter is installed, the readings are just the same (line losses apart). There is certainly no need to restrict the placement to half wave intervals from the load.

If a line is terminated with a load impedance not equal to its characteristic impedance, there will, as described in part 1 of this screed, be a standing wave on the line. The question is: does this matter? There are two problems likely to result: firstly, the transmitter may not be able to provide its rated output power; and secondly, any line losses will be increased.

The first of these problems can be cured, if necessary, by the use of an ATU; the second is a characteristic of the line, so one is stuck with it. Let's examine the loss problem first. Fifty feet of H100 coax will have an attenuation of about 0.8dB at 144MHz if the VSWR is 1:1. If the VSWR is 3:1, this loss will increase by about .25dB; with a 2:1 VSWR, the loss will increase by about 0.1dB. A 3:1 VSWR for a 2m aerial is pretty horrendous, and 2:1 is not very much better. Even with these high VSWR figures, though, the additional loss is hardly worth bothering about.

This leaves us with the problem that the transmitter may not be able to deliver its rated power. The reason for this is that the transmitter's output stage is not being presented with the correct load impedance. An ATU at the transmitter output will transform the actual load impedance into that required by the transmitter, and full rated power will be restored. At this point one only needs to worry about the increased line losses resulting from the VSWR and, as mentioned above, this need not be a problem if the appropriate cable for the application is used.

There is certainly no need to locate the ATU at the feed point to the aerial unless the feed point impedance is miles away from the characteristic impedance of the cable being used. The 5/8 vertical aerial so often used on 2m is a good example of where an ATU at the aerial is employed. The feed impedance of such an aerial is well away from 50ohms - apart from anything else, it is highly reactive. It is normal with such aerials to include a simple arrangement to transform the feed impedance to something close to 50ohms resistive. With a short line between the aerial and the transmitter, though, the ATU could just as well be at the transmitter end with no noticeable loss of performance.

Perhaps it needs to be said that an ATU of sorts is always in use! The output device of a transmitter, whether a valve or a semiconductor, requires a specific load impedance in order to deliver its rated power. This load impedance will be much higher than 50ohms for a valve and much lower for a semiconductor. The PA stage includes a network to transform the 50ohm nominal load into the value needed by the output device. An external ATU can be considered as being merely an extension of this internal network.

It is interesting to consider the readings on an 'SWR meter' when it is inserted in different places in the system. Assume that a transmitter feeds an ATU via a short length of coax and the output of the ATU feeds a line with a VSWR of 2:1 on it. With the 'swr meter' between the transmitter and the ATU, the latter's controls can be twiddled so that the meter reads a VSWR of 1:1. Now set the transmitter's output power so that the forward power reading on the meter is 100W, the reverse power reading will be zero. Move the meter so that it is between the ATU and the line to the aerial. A 2:1 VSWR will be indicated, as expected, but the forward power reading (assuming no ATU losses) will be 112.5W and the reverse power will be 12.5W. The power in the load is the difference between these, 100W.

The conclusion is that the introduction of an ATU allows the full rated power to be delivered to the load, wherever it is fitted in the system - the best place for an ATU is actually where it is easiest to get at to twiddle the knobs.

I hope to feature another article about VSWR in a future issue of Starlite. Editor.

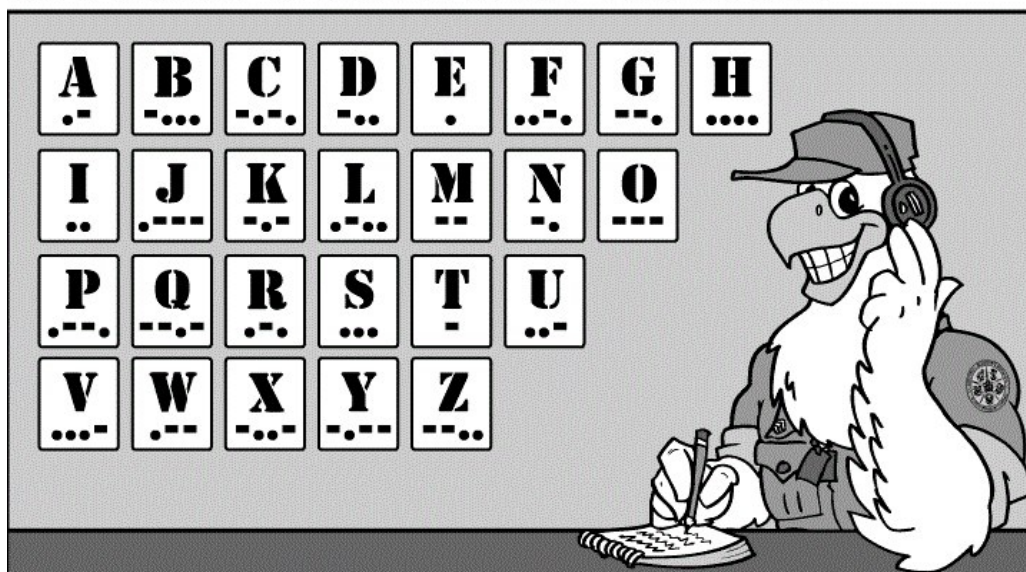
Just For A Larf

OK, so it's mildly computer-related, but was a very helpful hint in my household!!



And is anyone learning (or brushing up on) Morse Code? Could this be helpful to you?

MORSE CODE ALPHABET



Dual Band Half-Wave Flower Pot Antenna

The basic half-wave version of the Flower Pot antenna can be readily modified to dual band the antenna for operation on a band that is the (approximate) third harmonic of the fundamental resonance.

Operation on the third harmonic is achieved by using a sleeve technique so as to form quarter wave phasing sections (at the higher frequency) to end feed two half waves in phase at the third harmonic.

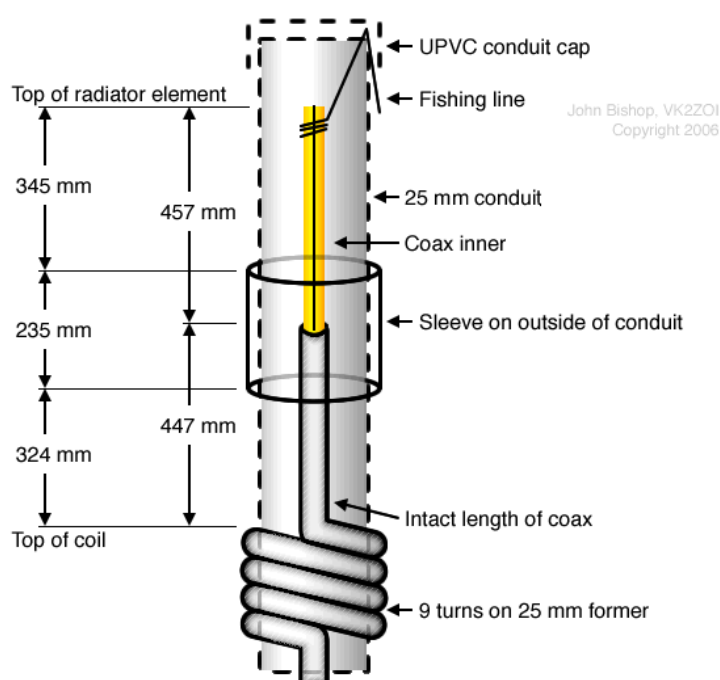
This arrangement provides useful gain (3dBd) on the higher band. The sleeve technique maintains the impedance matching for both bands and (probably fortunately) there is sufficient longitudinal impedance in the choke coil to provide the required isolation at the third harmonic.

The sleeve is applied after the basic antenna has been constructed.

Dimensions shown are for the (basic) 2m half-wave Flower Pot. The modification involves placing a co-ax phasing sleeve around the outside of conduit, positioned as shown.

Dimensions for a 2m half-wave Flower Pot

The sleeve material can be aluminium (kitchen) foil, copper foil, brass shim, roof/building alfoil sarking or salvaged co-ax braid.



Before fixing the sleeve in place, check VSWR on 2m. The sleeve should cause little if no change to 2m VSWR although it may appear to very slightly raise the resonant frequency; With the sleeve fitted, the VSWR should not be greater than 1.15:1 across the FM portion of band).

Then check VSWR across the 70cm (430 – 450 MHz) band. Expected VSWR readings will be less than 1.2:1 at band edges and less than 1.1:1 in band centre.

If VSWR is outside these limits, adjust position of sleeve (+/- 5mm max) and, if necessary, trim sleeve length to lower VSWR. When trimming sleeve length (dimension B) adjust dimensions A and C accordingly to keep centre of sleeve adjacent to feedpoint of the inner 2m dipole. However, little, if any, adjustment to the sleeve should be necessary. When satisfied with the VSWR, fix in place and protect the sleeve with UV protected PVC tape or heatshrink.



Methods of dual banding the other versions are being developed and will be added to this website when available.

Coming next month: Single 5/8 Flower Pot Antenna

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