Mid Sussex Matters

Volume 5 - September Issue 2017

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Mid Sussex Amateur Radio Society 2016— 2017

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E m a i l (c a l l s i g n) @ m s a r s . o r g . u k

(This will only work from a members email address registered with the society)

Mid Sussex ARS Net Times—all times local

Sunday	0800	3.740MHz$^{+}_{-}$QRM
Sunday	1100	145.350MHz
Weekdays	1330	21.330MHz$^{+}_{-}$QRM
Tuesday	2030	3.725MHz$^{+}_{-}$QRM (SCARF)
Wednesday	2000	145.350MHz

GB3HY is now working on the following frequency:

Listen 430.900Mhz, Transmit 438.500Mhz, CTCSS 88.5hz

Chairwoman's Chatter

This month again is full with articles, from Alex M0TOT and the continuation of 'How to make an Antenna for 80 metres' by Louis Varney G5RV

We are also now very near the Society's AGM so if you are interested in the Society and who runs it, this is your time to come and offer your support. The Society always has been and always will be a 'Whole' not a 'Committee' and 'Members' run Society and we do not want it to start now! Without you the Members we would not have a Society and from that there would be no Committee to run it.

Ladies that Lunch!

Antennas and Common-mode Currents by Alex M0TOT

Introduction

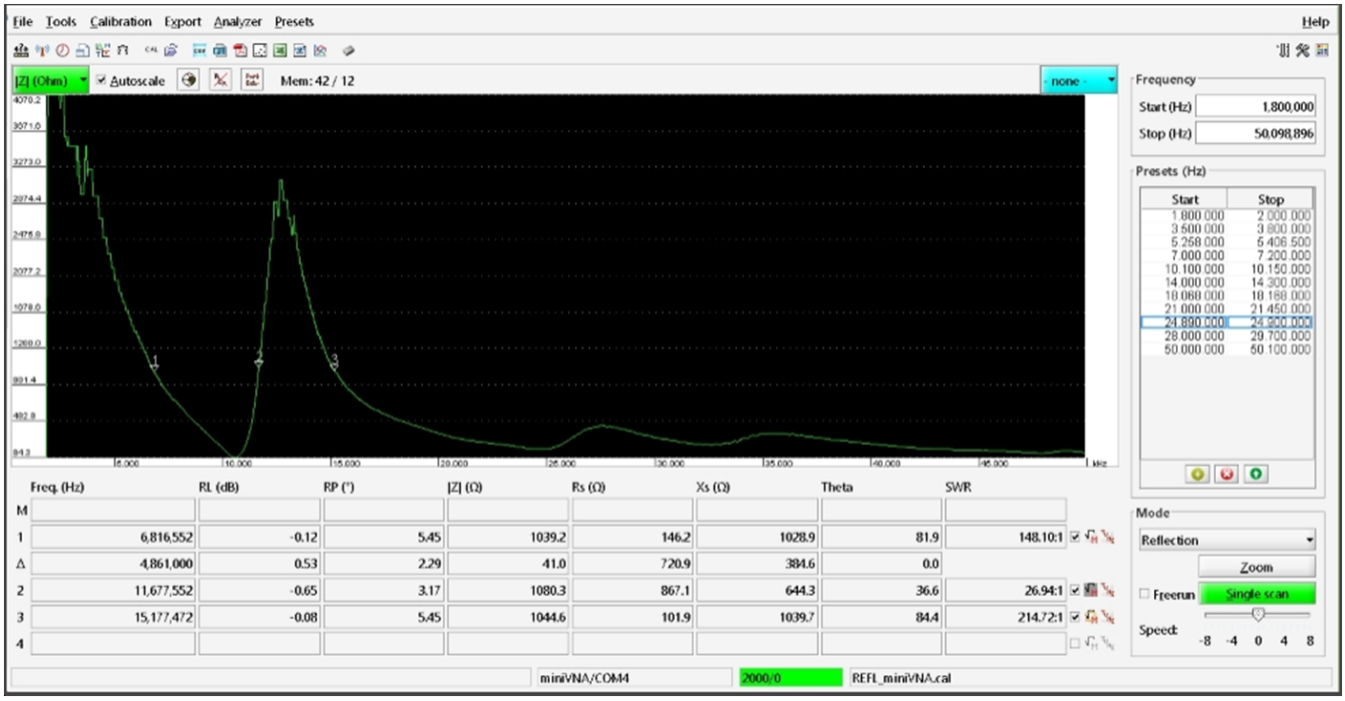
The following comments and actions are a direct result of reading Mike Parkin's (G0JMI) article 'Antennas' in the October 2016 edition of RADCOM.

I have a home-made Windom H.F. antenna with a 1:4 balun (www.buxcomm.com) at the feed point. In addition when the antenna was erected I put in the feedline a coiled-choke balun 3 metres from the transmitter and another 3 metres from the feed point. For one of the coils see **Photo. No 1**. These were placed here for practical reasons. For the method of winding these see R.S.G.B. 'Radio Communication Handbook'; 12th Edition; Page 14:13; Fig.14.24 (a).

Photo. No 1 Coiled Choke

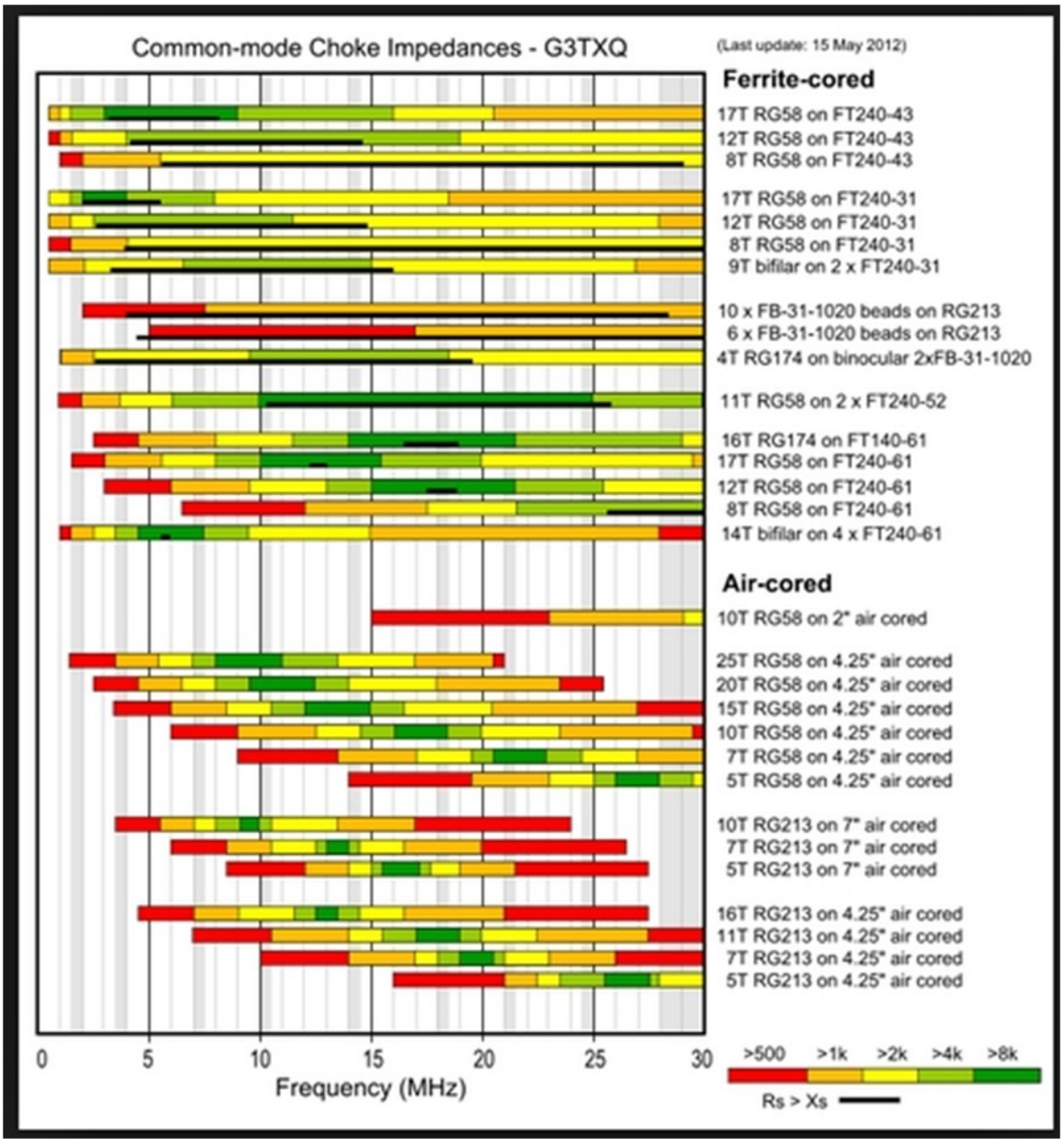
A choke balun coil is in effect a parallel tuned circuit with capacitance formed between adjacent wires in the loop and the cable's inductance. This circuit produces resonance at a particular frequency(s). The impedance is only high at resonant frequency. This limitation makes this type of H.F. choke only suitable for single-band operation. For the effects of this feeder setup see **Fig. No 1. (**Markers have been put on the figure to show where the **Impedance (Z)** is 1000 Ω and above.)

Fig. No 1 Coiled Choke - 7-turns - Impedance (Z) Vs. Frequency (MHz).



Antennas and Common-mode Currents by Alex M0TOT continued

The RADCOM article goes on to explain the advantages of using ferrite cores/toroids. (See 'Toroid notes' http://www.catzco.com/toroids.htm for different types of ferrite (MnZn) toroids.) The ferrite cores can increase the balun's impedance in terms of its **Resistive (Ω)** and **Reactive (Ω)** components i.e. **R +/- jX** (X (Ω) is the Reactive portion {inductive or capacitive}). *'This in turn increases the impedance of the coaxial cable shield's outer surface, enabling the Common-mode Current (i_3) to be suppressed'. 'A high resistive component (R) is desirable because this minimises the heat* (Read **Power = i_3^2 x R Watt)** *dissipated by the balun, due to the Common-mode current* (i_3) *flowing*'. The aim of any type of choke is therefore to have high impedance (Z) { Above 1000 Ω }, and Resistive (R) over the frequency bands. However, in addition, these chokes should be predominately Resistive (R), i.e. Rs greater than Xs. For further useful information on this topic see Steve Hunt's (G3TXQ) article on 'Amateur Radio (G3TXQ) – Common-mode Chokes'. See also **Table No 1.**
http://www.karinya.net/g3txq/chokes/



Antennas and Common-mode Currents by Alex M0TOT continued

When looking at the specification for ferrite cores, apart from the impedance and its ingredients, there are two other criteria that can help in making an appropriate choice of core and these are the **Permeability (μ)**: As a generalisation, the higher the magnetic permeability the greater the inductance, and the lower the number of turns of wire around the ferrite core. **Form Factor (Ae/Le):** is proportional to impedance and is a function of the efficiency of the shape of the ferrite core. See 'How to select ferrite cores' http://www.murata.com/en-eu/products/emc/ferrite/basic and also **Table No 4 - Form Factor**. The larger the factor the greater the **Efficiency (η).** It can be noted that the Form Factor for a FT-240 ferrite core is 1.063; the highest in the group. (Fair-Rite Part No 2631803802). Using the information from 'Common-mode Choke Impedance' in the G3TXQ table of ferrite -cored and air-cored chokes (Table No 1), the most appropriate ferrite-cored choke appears to be **FT-240-31 with 8-turns of RG58 coaxial cable.** The 'Material Characteristics' for Type 31 gives an **Initial Permeability (μ_i) = 1500**; this value is perfectly adequate.

Table No 4 Ferrites: Form Factors

$|Z| \propto (A_e/L_e)N^2$

Form Factor = (A_e/L_e)

Also $(A_e/L_e) = H/(2\,\Pi) \times Ln.(A/B)$

A_e = Effective cross-sectional area.
L_e = Effective magnetic path.
N = Number of turns.
H = Depth of core.
A = Outer diameter.
B = Inner diameter.
$\propto$ = Proportional to.
Π = 3.142…

Type	O.D. (mm)	I.D. (mm)	H (mm)	C/S Area(mm2)	Le(mm)	*(Ae/Le)*	Order
FT-50	12.7	7.13	4.77	13.28	31.16	0.426	**1**
FT-50(A)	12.7	7.92	6.35	15.18	32.4	0.469	3
FT-50(B)	12.7	7.92	12.7	30.35	32.4	0.937	**6**
FT-82	20.95	13.10	6.35	24.92	53.5	0.466	**2**
FT-114	29	19.05	7.49	37.26	75.51	0.507	4
FT-140	35.5	22.86	12.7	80.65	91.8	0.879	**5**
FT-240	**60.96**	**35.56**	**12.7**	**161.29**	**151.67**	**1.063**	**7**

Note:
The larger the Form Factor the greater the efficiency (η)

Antennas and Common-mode Currents by Alex M0TOT continued

This choke was wound on a (4 + 4) – turns format with RG58 coaxial cable, and fitted in an A.B.S. box. **See Photo. No 2.** The input and output were separated in order to reduce the possibility of capacitive coupling. The V.N.A. results are shown In **Fig. No 2 (**A marker have been put on the figure to show where the **Impedance (Z)** is 1000 Ω and above) and **Table. No 2.** A useful interpretation of V.S.W.R. results is given by J.G. Lee (W6VAT); 'The Effects of V.S.W.R. on Transmitted Power' http://www.antennex.com/pteview/vswr.htm. **Table No 2** is an improvement on the previous installation of the two coiled-chokes shown in **Table No 3**. In each table there is a frequency where **Xs** is greater than **Rs** (Shown in red). The most noticeable improvement is in V.S.W.R. in **Table No 2.**

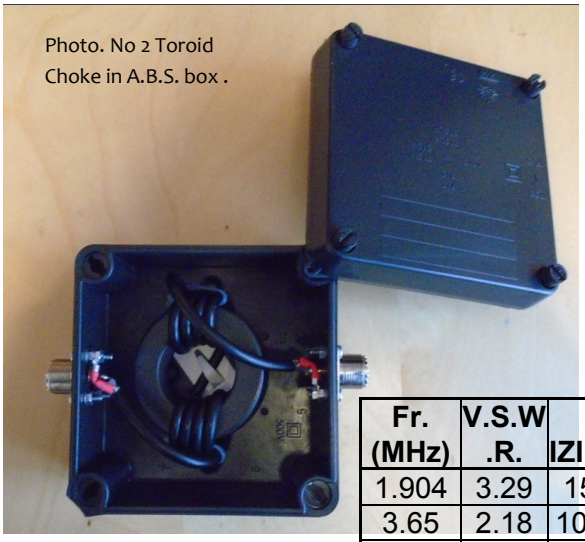


Photo. No 2 Toroid Choke in A.B.S. box .

Table No 2 Windom Antenna with Two Ferrite Toroid Chokes

(FT-240-31 Toroids wound 4 + 4-turns)

Fr. (MHz)	V.S.W.R.	IZI (Ω)	Xs (Ω)	Rs (Ω)	RC (Iρl)	RP (%)	RP (dB)	TL (dB)	Band (m)	A.T.U.
1.904	3.29	15.2	1.1	15.2	0.53	28.5	-5.45	1.46	160	2.9:1
3.65	2.18	108.7	5.7	108.5	0.37	13.8	-8.61	0.64	80	1.51:
5.332	4.03	42.5	37.5	20.1	0.6	36.3	-4.41	1.96	60	N/A
7.1	2.08	76.8	40.1	65.5	0.35	12.3	-9.11	0.57	40	1.2:1
10.125	2.84	19.5	7.4	18.1	0.48	23.1	-6.39	1.13	30	>3.0:1
14.175	2.33	25.7	13.1	23.3	0.4	16.1	-7.97	0.75	20	2.3:1
18.118	2.17	24.5	6.5	23.6	0.37	13.6	-8.66	0.64	17	1.1:1
21.225	2.02	64.9	36.9	53.4	0.34	11.4	-9.43	0.53	15	1.1:1
24.94	1.58	60.4	23.5	55.6	0.22	5.1	-7.33	0.23	12	1.1:1
28.849	1.31	64.3	5.1	64.1	0.13	1.7	-17.69	0.07	10	1.2:1
51.001	1.23	54.8	10.2	53.8	0.11	1.1	-19.73	0.05	6	1.1:1
A	**B**	**C**	**D**	**E**	**F**	**G**	**H**	**I**	J	K

Notes:

A = Mid-frequency point of band (160 to 10m and 6m)

B = V.S.W.R. = (1+Iρl)/(1-Iρl), where 'ρ' = Reflection Coefficient. Iρl = Magnitude of 'ρ' {Greek letter 'rho'}.

C = Magnitude of Complex Impedance = (R+/-jR). IZI = (X^2 + R^2)^0.5.

D = Series equivalent Reactance.

E = Series equivalent Resistance.

F = Reflection Coefficient (Iρl) is proportional to V^2. (0<Iρl<1).

G = Return Power in percentage terms ('Reflection' only).

H = Return Power in dB ('Reflection' only).

I = Transmission Loss = Mismatch Loss in dB.

J = Band (m).

K = Radio's A.T.U. S.W.R.

Antennas and Common-mode Currents by Alex M0TOT continued

Fig. No 2 FT-240-31 (4 + 4)-turns toroid Impedance (Z) Vs Frequency (MHz)

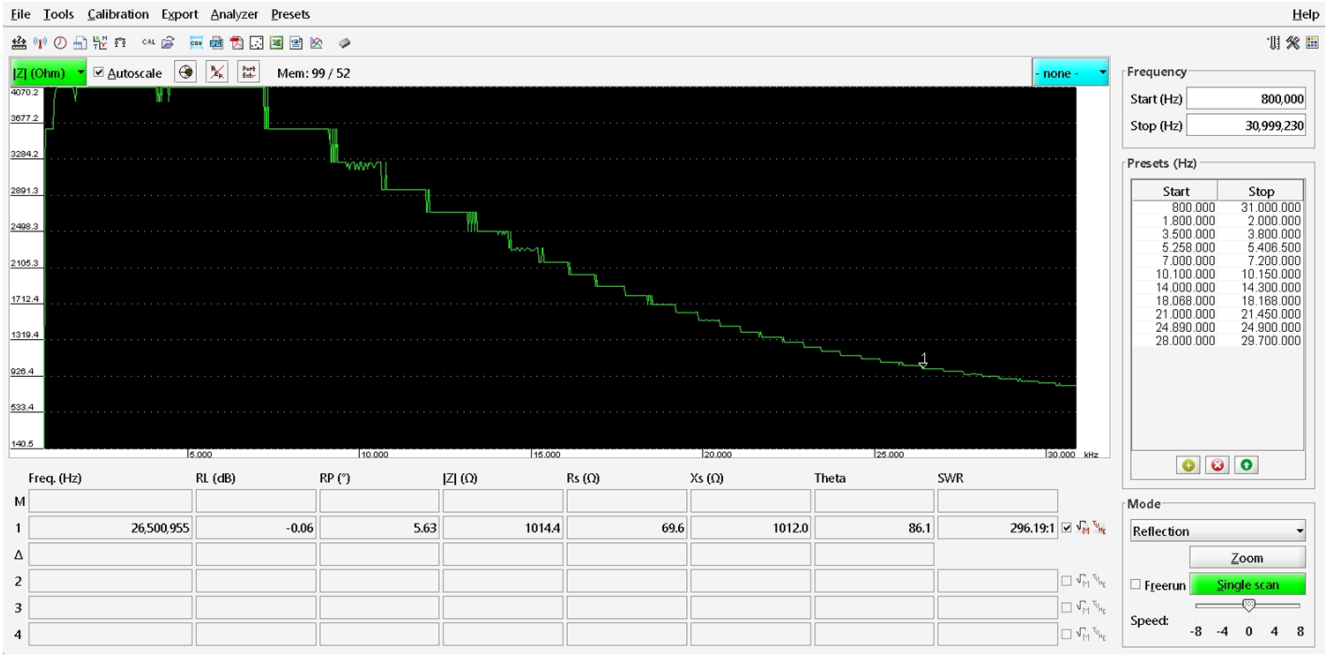


Table No 3 Windom Antenna with Two Coiled Chokes
(R.S.G.B. Radio Communication Handbook 12th Edition ; Page 14.13; Fig. 14.24 (a))

Fr. (MHz)	V.S.W.R.	IZI (Ω)	Xs (Ω)	Rs (Ω)	RC (Iρl)	RP (%)	RP (dB)	TL (dB)	Band (m)
1.904	1.76	88.1	1.9	87.9	0.28	7.6	-11.2	0.34	160
3.65	1.96	76.2	35.7	67.4	0.32	10.5	-9.78	0.48	80
5.332	1.29	63.9	4.1	63.7	0.13	1.6	-17.95	0.07	60
7.1	2.39	64.5	43.7	47.5	0.41	16.8	-7.74	0.81	40
10.125	3.19	81.5	62.7	52.2	0.52	27.3	-5.64	1.39	30
14.175	1.69	34.2	11.5	32.2	0.26	6.6	-11.82	0.31	20
18.118	1.48	33.8	2.1	33.8	0.19	3.7	-14.26	0.17	17
21.225	2.85	15.9	2.2	15.7	0.48	23.1	-6.37	1.14	15
24.94	2.51	36.3	25.1	26.3	0.43	18.5	-7.33	0.89	12
28.849	2.18	52.9	34.4	40.2	0.37	13.8	-8.61	0.64	10
51.001	2.49	85.8	52.1	68.2	0.43	18.2	-7.39	0.87	6
A	B	C	D	E	F	G	H	I	J

Notes:

A = Mid-frequency point of band (160 to 10m and 6m)
B = V.S.W.R. = (1+Iρl)/(1-Iρl), where 'ρ' = Reflection Coefficient.
Iρl = Magnitude of 'ρ' {Greek letter 'rho'}.
C = Magnitude of Complex Impedance = (R+/-jR). IZI = (X^2 + R^2)^0.5. IZI = Magnitude of Z.
D = Series equivalent Reactance.
E = Series equivalent Resistance.
F = Reflection Coefficient (Iρl) is proportional to V^2. (0<Iρl<1).
G = Return Power in percentage terms ('Reflection' only).
H = Return Power in dB ('Reflection' only).
I = Transmission Loss = Mismatch Loss in dB.
J = Band (m).
Note: See Photo. No 2

Above is a photo of Trish Penney who came and gave a very informative talk about the RNLI. It was most enlightening in this day and age that she used no modern technology at all, (just prompt cards) but the talk was still so interesting.

Below is everybody that went on the last fox hunt (1st Sep), retiring of course in a hostelry. This time it was The New Inn Hurstpierpoint.

A Compact, Unobtrusive & Inexpensive Antenna for 80 Metres.

By Louis Varney G5RV/CX5RV Continued from last issue.

Construction.

Figure 1 shows the construction of the HELICAL antenna which uses two 3 metre (9ft 7ins)long lengths of standard white plastic waste water pipe. The lower section is $1\frac{1}{2}$ inches OD and the upper section is $1\frac{1}{4}$ inches OD. The bottom 2 feet of the upper section has three wrappings of plastic insulation tape at 2, 12 and 22 inches from its lower end to make it a tight push-fit into the top of the lower section. The helical winding of 14 SWG enamelled copper wire consists of160 turns spaced one turn per inch. Starting 2 inches from the top of the upper mast section,drill three holes spaced 120° round the mast to take the inner ends of the three 30" long 14 SWG copper wires forming the capacity hat. At the same level drill a hole, between two of these holes, to take the start of the helical winding,see Fig.3.

160 turns of 14 SWG wire spaced 1 inch per turn will occupy 10 feet of winding space, so at this distance down the mast from the entry hole for the start of the winding a hole to take the 14 SWG wire should be drilled right through the mast to secure the lower end of the helix.

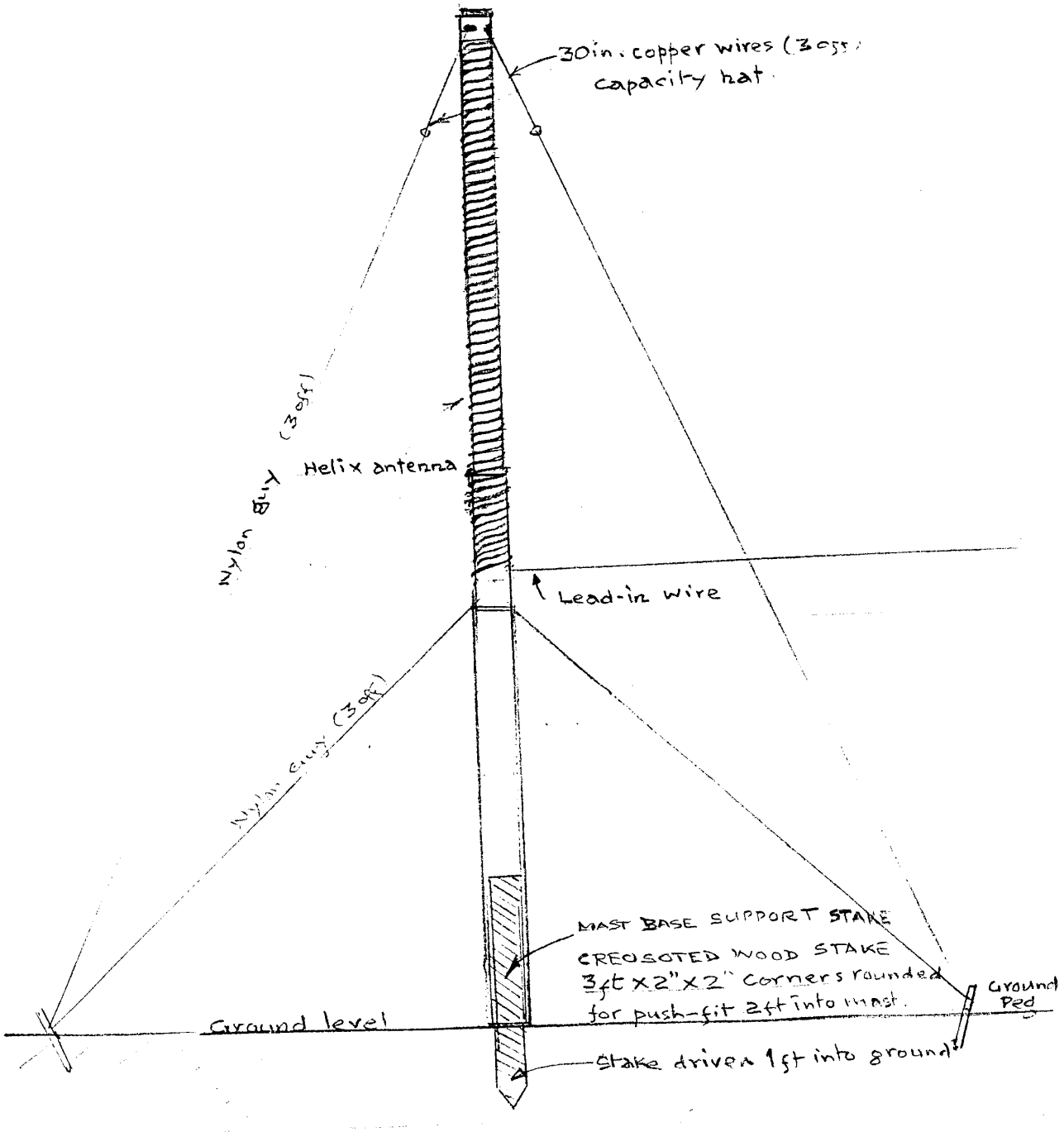
Note: The above winding and drilling instructions assume that a lead-in wire of 20 to 25 feet is to be used. However, if the Helical antenna is to be located only a few feet from the outside wall of the radio room,only about half this length of lead-in wire will be required. In this case, the Helix winding can be increased to 165 or 175 turns and the ATC (Antenna Tuning Coil) tap adjusted until a 1:1 VSWR is obtained at the frequency in use. Whichever winding length is used,the enamel should be scraped off for half an inch at every 5th turn of the lowermost 50 turns and, using a small soldering iron to avoid melting the plastic mast,small L-shaped pieces of 16 SWG tinned copper wire soldered to these turns. When testing the antenna, the "lead-in" wire can be clipped to these tapping points and the VSWR at mid-band frequency observed until a 1:1 VSWR, or very near it, is obtained. The lead-in wire can then be soldered to the optimum tapping point on the Helix.Before raising the mast, a plastic film container should be inserted in the top of the mast to prevent the entry of rain.

Method of winding the Helix.

Support the joined and drilled plastic mast horizontally on two kitchen chairs, outside if weather permits, or in the garage and with one end of the 14 SWG enamelled copper wire passed through the hole at the top of the mast assembly and a helper rotating the mast slowly, feed on the wire,maintaining a turn spacing of one inch.It is a good idea to apply a "dob" of nail varnish or a couple of turns of plastic adhesive insulation tape at every 20 or 30 turns to secure the wire spacing. Upon completing the winding,clean,tin and solder the inner ends of the three 30 in. long wires which form the capacity "hat" to the upper end of the helix.

Figure 1. A COMPACT, UNOBTRUSIVE AND INEXPENSIVE ANTENNA FOR 80 METRES.

THE G5RV HELICAL 80 metre ANTENNA



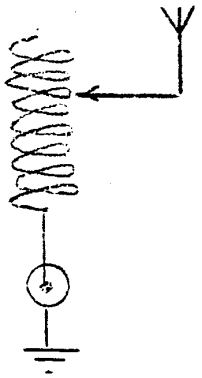
G5RV November 1995

A Compact, Unobtrusive & Inexpensive Antenna for 80 Metres.
By Louis Varney G5RV/CX5RV Continued from last issue.

Results obtained.

Over a period of three months testing and use on the air, the Helical antenna has provided excellent CW and phone QSOs with stations all over Europe on 80 metres. Rapid switching to a double-size G5RV antenna at 42 feet agl often results in a 5 to 10 dB reported increase in signal strength but, conversely, on occasions the Helix produces signal strength reports equal to or 6 dB better than the G5RV antenna! This is, of course, not to say that such an 80 metre antenna of limited dimensions has a performance equal to or better than that of a full size antenna for that band, but that, in circumstances that favour vertical polarisation, it can actually out perform a horizontal full-size antenna for that band.

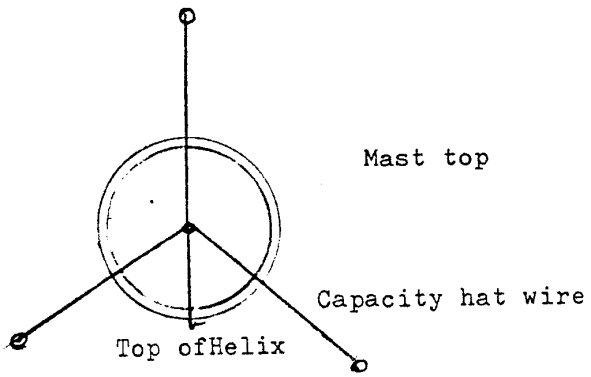
Figure 2. Antenna Tuning Coil.



L 15 turns 14 SWG 2" diameter
Turns spaced 3/16 inch.

50 ohm coax input from Tx/Rx

Figure 3. View of top of mast showing connection of top of Helix winding to the three capacity hat wires.



Louis Varney G5RV.December 1995.

Mid Sussex Amateur Radio Society

NOTICE is hereby given to all voting members that the 52nd Annual General Meeting of the Mid Sussex Amateur Radio Society will take place as follows:-

Date 13th October 2017; Time 20.00hrs

Venue:- Millfield Suite, Cyprus Hall, Cyprus Rd, Burgess Hill, West Sussex. RH15 DX

Notice of nominations for Officers/committee members

There will be several vacancies this year including the need to replace our retiring PROGRAME SECRETARY and two ordinary committee members. You can nominate any person/s on the night who are willing to stand, providing that person or persons are willing to do so. Please make sure ***they are!*** Perhaps you could give something back to the society?

If you are unable to attend the AGM and wish to record a proxy vote or nomination, you may do so by e-mail to secretary@msars.org.uk or by post to the following address:-

A. A. Cragg
28 Damian Way
Keymer
Hassocks
BN6 8BJ

Please return any nominations/proxy votes to the address or email shown no later than 9th October 2017.

A. A. Cragg
Hon Sec.

Mid-Sussex Amateur Radio Society

Annual General Meeting Friday 13th October 2017

Nomination Form

Name Proposed By Seconded By

Chairperson _____

Treasurer _____

Secretary _____

Programme Secretary _____

Committee _____

Committee _____

Committee _____

Committee _____

Committee _____

Please check with the nominee that they are willing to stand for the position before nominating.

Completed forms may be handed to me at any meeting before the A.G.M. or on the 13th October 2017 before the start of the meeting.

A.A. Cragg

Hon Secretary MSARS


M.S.A.R.S.
MID SUSSEX AMATEUR RADIO SOCIETY
www.msars.org.uk
G1ZMS G5RV G3ZMS
R366 ULR

The last five photos have been taken from Mike KMP during our time at Haywards Heath Town Day on 9th September. There was just a small handful of members there but we were able to connect to some people.

You will see that he has taken some general photos as well as those of the Society stand. The ponies and stagecoach was great fun for the little ones to have a ride in.

Then it rained! 'Brollies at the ready' and what a colourful spectacle it made.

Diary Dates Oct 2017 and Dec 2017

06 Oct Friday Millfield Talk from Police
13 Oct Friday Millfield AGM
20 Oct Friday Millfield Radio Night & Table Top Sale
27 Oct Friday Millfield "On Air Night"
03 Nov Friday UPSTAIRS Surplus Equipment Sale
10 Nov Friday Millfield Radio Night
17 Nov Friday Millfield Radio Night & Table Top Sale
24 Nov Millfield How I Became a Radio Amateur – Members Input
01 Dec Friday UPSTAIRS Christmas Dinner in house
08 Dec Friday Millfield "On Air Night"
15 Dec Friday Millfield Christmas Quiz
22 Dec Friday Millfield Radio Night & Table Top Sale

Copy

I am hoping to go to print each month. For this I need copy from any one of you however small and it **may or may not be** radio related.

All articles and photographs are the copyright of the authors. Contributions are invited from Society members and should be sent to newsletter@msars.org.uk

Otherwise you can use Snail mail to my address at: 28 Damian Way, Keymer, Hassocks, West Sussex, BN6 8BJ. If you have some great old pics that need to be aired I can share them with the rest of the club. Request for copy around 6th—10th with copy to me nominally by the 15th of each month.

If I get no copy there will be no MSM, it is as simple as that.

73

Stella, Editor of MSM

Amateur Radio Insurance
General Information
South West Broking Ltd Insurance Brokers

South West Broking Ltd is pleased to offer insurance for radio amateurs.

Cover

Insurance is available to individuals, clubs and Raynet Groups

Cover is provided for "All Risks" of loss or damage to your amateur radio equipment including masts, aerials and ancillary equipment by theft, water damage, lightning strike and other accidental damage.

- Cover at your home or club house.
- Anywhere in the United Kingdom.
- Anywhere in the world.

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Basis of Claims Settlement

- New for Old

Significant Exceptions and Limitations

- Wear and tear, gradual deterioration, frost, faulty or defective design or materials or workmanship.
- Mechanical or electrical breakdown or derangement.
- Losses from unattended vehicles unless certain conditions are met.
- An excess of £50 applies if you have cover restricted to your premises only but this is increased to £75 if you have selected cover for anywhere in Great Britain or worldwide. In respect of outdoor antennae and masts, you will be responsible for the first £250 each and every loss.

Third Party Personal Liability

Personal Liability providing cover against injury to third parties or damage to their property arising from your negligence is included as standard whilst you are engaged in any amateur radio activities.

For further information, please contact Julian Dent
Telephone: 01454 806503
Email: julian@southwestbroking.co.uk
www.southwestbroking.co.uk

Scan here for more information

www.msars.org.uk

Mid Sussex Amateur Radio Society

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