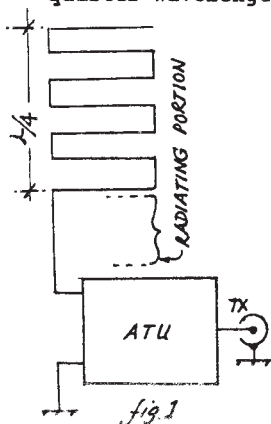


A 10 FOOT LONG ANTENNA COVERING SEVEN HF BANDS

GUS TAYLOR, G8PG

This antenna has been designed as a result of many enquiries about antennas for use in restricted space areas. It is ten feet long, has a 300 ohm or open wire balanced feeder 15 feet long, and can be used on all amateur bands between 7 and 28 MHz, erected either vertically or horizontally. It is non-critical in adjustment, all tuning being carried out with the aid of a balanced output Z-match coupler at the end of the feeder.

The antenna makes use of non-inductive end loading. This idea has been around since early this century, but was brought to the attention of the amateur fraternity by G2MQ in two RSCB "Bulletin" articles many years ago, and was also discussed by G8PG in SPRAT Number 2 back in 1975. All these articles dealt with the improvement in efficiency that could be achieved in short Marconi (monopole) antennas by using non-inductive end loading. The method was simple; to whatever length of wire that could be erected was added a further quarter wavelength of wire, wound in a series of narrow U shapes, so that its radiation cancelled out. This is shown in Fig.1. Adding this non-inductive loading to a monopole produced two important results. Firstly the current maximum appeared at the far end of the wire, out in the clear, and secondly the radiation resistance of the wire was increased, sometimes dramatically. For example at 1.8 MHz the radiation resistance of a 15 foot wire should be increased by a factor of 14, and that of a 66 foot wire by a factor of 4. Both these increases would produce significant improvements in radiated signal strength. When considering operation from a restricted size location such as an apartment block there is one great problem, however. The final efficiency of a monopole depends upon the ratio of radiation resistance to loss resistance, and the latter consists almost entirely of the resistance of the earth and/or counterpoise system which must be used with a monopole. This may often be very high (100 ohms or so) and providing a lower resistance earth in restricted locations is often impossible. In considering this problem a simple solution presented itself. If one replaced the earth connection with a second, similar loaded monopole one would have a dipole which would function without being earth connection dependent at its design frequency, and also function as a tuned doublet on all bands above that frequency and, depending on feeder length, some bands below it. As operation was now as a dipole at the design frequency a modification could be made to the amount of wire required. Each half need only now be a quarter wavelength long, with the surplus wound non-inductively.



To prove the design it was decided to construct an antenna with a design frequency of 14 MHz, and an effective radiating length of 10 feet. Two 16 ft 6 inch lengths of wire were cut, all but 5 feet of each length was folded non-inductively on suitable formers, and the free ends of the 5 foot sections were soldered to separate tags on a small tag strip which acted as centre insulator. The ends of a light weight 300 ohm feeder, 15 feet in length, were also soldered to the tags, thus completing the construction. For the experimental model a shallow cardboard box and its lid were used as formers for the two non-inductive windings, 9 holes, 1 inch apart, being punched at each end, and the surplus wire being wound in a series of narrow U shapes about 1 inch wire and 14

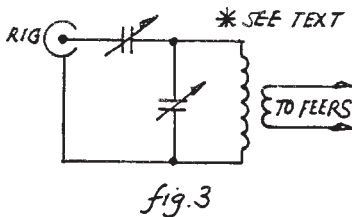
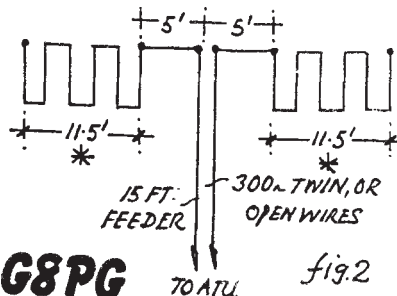
inches long. Cardboard is satisfactory for indoor use, but sheets of plastic or a rectangular plastic frame would be required for outdoor use. One unexpected bonus was that the box lid was fairly loose fitting, so the radiating portion and feeder could be coiled inside the box and the lid put on when the assembly was stored! The wire used for the antenna was 7 x 0.2 mm plastic covered, which is very flexible. The feeder was light, 300 ohm plastic ribbon, although for permanent outdoor use open wire feeder spaced 2 or 3 inches would be more satisfactory. Figure 2 illustrates the set-up. Coupling the antenna to the rig is achieved by means of a Z-match with a balanced output. The basic Z-match is shown in Fig.3. The GM30XX version appears on page 66 of the G QRP Club Circuit Handbook, and an all band version with minimum switching requirements on page 12.50 of the fifth edition of the RSGB Radio Communication Handbook. The latter version was used when testing the antenna described above.

When operating at 14 MHz and above the antenna acts as a conventional centre fed doublet. on 10 and 7 MHz it acts as a short doublet with the feeders making up the missing length. On 10 MHz the current maximum will be about 5 feet down the feeder, and on 7 MHz at or near the bottom. Incidentally do not coil up any surplus feeder length. Bring it down to the rig in gentle curves or Z shaped bends.

Tests were made with the antenna horizontal in my first floor shack (about 17ft above ground) and with it hanging vertically from the shack window. The first surprise was 7 MHz, with may good QSO's around the UK in both the horizontal and vertical modes, and other contacts well into Europe in daylight. 10 Mhz also produced daylight contacts with Europe. The hf bands produced good contacts at distances of up to around 3000 miles. The tests were made during the summer, conditions were far from outstanding and very hot weather had certainly lowered activity, so they show that despite its small size and simple construction the antenna can put out a signal. Reports were about 1 to 2 S-points down on my loop (with 180 ft of wire in it), but still quite good. The large antenna was taken down during the tests to make sure there was no re-radiation from it.

The design presented is regarded as about the smallest which will provide seven band operation. Larger versions could be made which would have higher efficiency and greater frequency coverage. Using two 33 ft wires, each with a 10 ft radiating system, and a 30 ft feeder would allow operation from 3.5 to 28 MHz. Two 66 ft wires each with a 20 ft radiating section, and a 60 ft feeder would allow operation on 1.8 to 28 MHz.

It is hoped that this article will be of assistance to those who have to operate from restricted space locations. Also that it will encourage members to experiment with the ideas outlined. Do please report your results so that we can build up more data on this type of antenna. All the tests were of course made with QRP, using 3W of CW.



Membership Secretary News

Daphne G7ENA (g7ena@ggrp.co.uk)

Hello and welcome to my first membership news, first off I would like to thank Tony for all his hard work and for making my transition into the post as smooth as possible.

As usual, this is the issue of Sprat that reminds you it is time to renew your subscription. Please go find that label on the Sprat packaging and see if it says “expires end of 2019”. For the various membership rates and method of payment please read the four page insert in the previous Winter Sprat (or look on www.ggrp.com).

UK members with existing standing order arrangements with their banks need do nothing until your Spring Sprat arrives. If your expiry date (on the label) hasn't incremented by then, assume something has gone wrong and contact me. Your standing order mandate must quote your membership number or we won't know who has paid.

In the UK you pay me - not Graham G3MFJ in Club Sales or Steve G0FUW the Club Chairman. It causes much extra work when members do not contact the correct club officer. If you write by post please always include a stamp (or an email address) if you expect a reply. If you send insufficient funds you will receive only one Sprat in 2020 with an underpayment notice on the label. You will receive nothing more until you make up the shortfall.

All members should be aware that the club will not accept payments that take your subscription beyond 2020. PayPal will be returned less charges, cheques will be destroyed and excess standing order payments will be assumed to be donations - but will be returned on request (at your cost).

UK Members: All cheque payments should be to “GGRP club” and not in the name of any club officer. For UK members who wish to switch to automated payment there was a UK bank standing order form in the Autumn issue of Sprat to send to your bank (and not me) in time for your payment which must execute on the 15th January 2020. As well as ensuring the continuity of receiving SPRAT you also help reduce the thousands of letters which I will otherwise have to open in the New Year.

As always *please* no stapled cheques in letters. They do not get lost in the envelope if you don't staple - but they do stick in my fingers while removing them. Also quote your club number as well as your name and callsign in all correspondence – it really does help.

Overseas members: Please refer elsewhere in this issue to the list of DX representatives to whom you can pay in your local currency. For the remainder of the world without PayPal access you can pay by international bankers draft (in UK Pounds) or cash in UK Pounds (to me). Only local currency to your local rep – and I can't accept Euro or U.S. Dollars. Cash is sent at your own risk.

You can also save me much work if you pay using PayPal. Please see www.ggrp.com/paypal for more details. Only the use of the special form on the club website will be accepted. Any other method will be rejected. We do automatically add a little to cover PayPal administration charges – but only what it would have otherwise cost you to buy a stamp to post your subscription.

Finally my sincere thanks to all overseas representatives who give up their time to deal with local members throughout the year.

Club Information – Who Does What

(email & postal addresses are on the club website)

Sprat

| | |
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| Editor | G1TEX |
| Any non-membership comments & queries | G0FUW |
| Members news for news column | G4BUE |
| Communications news | M1KTA |
| VHF news | G8SEQ |
| Sprat Delivery | G7ENA |
| Sprat Index | K7WXW |

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| Treasurer | G3MFJ |
| EUCW representative | M1KTA |

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| General items & back issues of Sprat. | G3MFJ |
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| Antenna advice | G3VTT |
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| Internet GQRP club reflector & web site | G4WIF |

Please quote your membership number (and email if you have it) in all correspondence and include an addressed envelope with postage if you need a reply.

SUBSCRIPTIONS FOR 2020 ARE NOW DUE

Your SPRAT label tells you your current status. Your receipt is the updating of your status code on your Spring 2020 SPRAT address label. The labels for your SPRAT are printed 4/5 weeks ahead of publication so if you pay promptly your Spring Sprat label will be correct.

SUBSCRIPTIONS FOR 2020 – please see options below.

| UNITED KINGDOM | EUROPE | DX |
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| <ul style="list-style-type: none"> £6.00 Cheque / Postal Order sent to G7ENA (payable to "GQRP") £6.00 - Standing order PayPal | <ul style="list-style-type: none"> £12 sent to G7ENA (Cash in GBP [<u>no Euro or Dollars</u>] *², Cheque or money order*¹) €15 (to Euro rep.) PayPal | <ul style="list-style-type: none"> £13 to G7ENA (Cash in GBP [<u>no Euro or Dollars</u>] *², Cheque or money order*¹) Send to DX rep. (see list) PayPal |
| PayPal - (Mandatory) - only use www.gqrp.com/paypal Notes: (* ¹ Payable to "GQRP"- drawn on a UK bank). (* ² At own risk) | | |

You can pay by direct transfer but you must provide your membership number as a reference. Our bank account details are:- G-QRP CLUB NO. 1 ACCOUNT, NATIONAL WESTMINSTER BANK PLC, ROCHDALE BRANCH (SORT CODE 01-07-44 a/c 04109546).

UK

*members can use the form provided in the Autumn Sprat (but see membership secretary news page) if they would like to pay by standing order or to amend their existing standing order to the 2020 subscription rate of £6.00. This payment must be in place with your bank to execute on the 15th January. **If your standing order does not quote your membership number then your payment can only be treated as an anonymous donation and your membership will expire.***

All UK cheques must be made payable to "G-QRP CLUB"
EU & DX cheques – see "Overseas Subscription" page.



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enclose this form with your payment write your callsign & number on the cheque do not staple your cheque to this form. Send to GQRP Club, 33 Swallow Drive, Louth, LN11 0DN

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- Did you make your cheque out to the GQRP club?
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 (For representative email addresses see www.gqrp.com – membership renewals page).
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| U.S.A Dave Yarnes W7AQK, At the time of writing Dave is in the process of moving and he cannot accept payments at this time. Therefore PayPal is the only option until Dave has a new (or temporary) address which will be posted on the club website (http://www.gqrp.com/memb_usa.htm). This will be before subscriptions are due on January 1 st | \$22.00 |
| Germany: Dirk Krause, DL1GKD, Hauptstraße 4, D-78597 Irndorf. Konto: Sparda-Bank Baden-Württemberg, Dirk Krause. IBAN: DE17 6009 0800 0107 9124 16 BIC: GENODEF1S02 In der Zeile Verwendungszweck bitte unbedingt angeben: NAME, VORNAME, CALL, GQRP Nr. Schecks und Bargeld werden nicht entgegen genommen! | €15 |
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| France. Richard Sayer, F5VJD, Vignouse, 35380, Paimpont, France (cheque perso [SAYER Richard] avec votre indicatif, numéro de membre et adresse E-mail indiqué au verso). | €15 |
| Denmark. Ole Rasmussen OZ1CJS: Fornylse af abonnement af GQRP: Venligst foretag en kontooverførelse af 115 Kr. senest d. 1. Januar til : Ole Rasmussen Danske Bank, Haslev Reg. nr. 0575 Konto nr. 3531127749 Venligst vedhæft følgende information: navn, call, medlemsnummer Undgå venligst at fremsende kontanter og checks. Har du et problem mht. bankoverførelse, så kontakt mig så vi kan finde en løsning. Nyt abonnement af GQRP: Ønsker du at blive medlem af GQRP og modtage medlemsbladet SPRAT, så send mig venligst en email med dit navn, adresse og evt. kaldesignal. Så skal jeg med glæde sørge for at du bliver kontaktet. | 115DKK |
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Any other overseas to Daphne Neal G7ENA, GQRP Club, 33 Swallow Drive, Louth, LN11 0DN, England [Europe: £12 GBP / DX: £13 GBP]