MERCURY

THE JOURNAL OF THE ROYAL SIGNALS AMATEUR RADIO SOCIETY

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HEADQUARTER STATION - CATTERICK CAMP - GB3RCS/G3CIO

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E D I T O R I A L

"One Country - One Vote"

We make no apologies for returning to the subject of our July Editorial. Following upon the visit to Catterick of Lt Col Per-Anders Kinnman SM5ZD we received a copy of the International Amateur Radio Union Region 1 Bulletin. We quote from this journal SM5ZD's translation of an article which he wrote for "QTC", the Swedish amateur radio bulletin.

> "Perhaps one is inclined to think that these often small and not economically strong countries (which are only a piece in the world political relations) should not have much to say beside the Great Powers and other highly developed countries. But these developing countries are however all filled by an ambition to take their seat among the other nations of the world and to take an active part in the development. and we must always remember that during a Conference the voting takes place on the principle "one country - one vote". When it comes to a decision the vote of every country counts. We must also remember that during I.T.U. Conferences the Amateur Radio Organisations have no votes. All decisions are taken by the national delegations according to their instructions and therefore it is these delegations that have the future of the Amateur Radio movement in their hands. In judging the best use of the spectrum they must be informed of the frequency needs of amateurs."

The size of this problem is amply shown by some statistics given in the IARU Region 1 Bulletin. Of 22 African nations which have recently gained independence 5 have no amateurs, another 12 have less than 20 resident amateurs and only three have national Amateur Radio Societies. There are 19 European nations whose Amateur Radio Societies are members of IARU.

Sitting here in our quiet village in the Yorkshire Dales it is difficult to see how this problem can be resolved or what Royal Signals Amateur Radio Society can do to help. Perhaps you, our overseas members, are already trying to do something, if so please let us know.

73

Echo Juliet Foxtrot

SOCIETY NEWS

Princess Royal Day activity was good publicity for the Society, column inches in the National and Provincial daily papers, mention on Northeast TV news and a Home Service feature in the "Eyewitness".

Our affiliated club, at the Infantry Junior Leaders Battalion are assisting GW3PDI in setting up a station in the spinal injuries ward of the Oswestry Orthopaedic Hospital.

During a visit to 3 Squadron, 14th Signa1 Regiment by the C.S.O. a three-way contact between the Squadron's club station G3LPC, G3RCJ of 57th Signal Regiment TA and G3CIO provided an excellent demonstration of Amateur Radio.

G3TIA is the call sign of the club of 58th Signal Regiment TA at Fallings Park Wolverhampton. Using a WS36 loaned by the Society and modified by their R.S.M. G3SQB, the club puts out a potent signal from the 10 ton trailer which is their shack.

On Thursday July 23rd a party of Swedish Army Officers visited Catterick Camp. The Society's HQ station was on their programme and a QSO with SM4CEZ was in progress when they arrived. One of the visitors turned out to be none other than Lt Col Per-Anders Kinnman SM5ZD, well known as the Swedish representative at IARU and other international radio conferences. The party also included SM6PV. Following on from the official visit SM5ZD spent much of the same evening at the clubroom discussing the Cubical Quad with its builder, Doug Yerxa G3SJB/VE3ADQ. According to Per-Anders the main difficulty in building a similar antenna is likely to be XYL hostility.

G3SAE who recently visited the HQ station reports that the Post Office Central Training School at Stone will shortly have a full range of KW SSB equipment on the air.

VS1RS, the Singapore club station, run a regular column in SIGNAL the fortnightly newspaper of 18th Signal Regiment. Giving news of club activities and of Amateur Radio in general this column is helping to spread the gospel among Royal Signals in Malaysia.

Having trouble getting Bamboos for your Quad?? Try Messrs Clark & Co Ltd, 65 Scotch Street, Carlisle says G4JT.

92nd Signal Regiment AER (GM3SIG) now have 28 members of the Society in their ranks. Is this a record? During this years annual camp they found Top Band virtually unusable because of QRN but their 2 metre station at Cairn o'Mount, Kincardineshire, was a very successful effort with Birmingham and Nottingham their best DX. The Regimental Top Band net operates on 1825 Kc/s every Friday at 9.30 p.m. and the Officers of their affiliated club are Chairman G3LOY, Secretary G3JNO and Committee Member GM3HIK.

G3HCM, member No. 16, got married recently. Congratulations Dennis.

Paul Scottorn G3RFI, our resident operator at G3CIO for the past year has been replaced by Bob Percival GW3RZQ. Paul has gone to 65th Signal Regiment TA so an increase in activity from affiliated club G3LUN can be expected.

The G3LPC Log Periodic Aerial

By G3LQC R.C. EVANS

Firstly I must start by saying that this aerial was designed after several months of building full scale aerials and without the use of laboratory equipment for checking results. It was only after the final aerial had been built and proven that an aerial analyser was made available and connected to the aerial, proving conclusively that the aerial was performing at least to one of its design features. This was that over the entire frequency range of 13 to 60 mc/s its impedance remained constant at 75 ohms. The other two requirements being those of any other beam aerial, (i) a good back to front ratio, (ii) a good forward gain. I hope in the following article to be able to convince readers that the Log Periodic is the aerial which is the basis for many interesting experiments finalising in an aerial which gives results.

Design Features

If we take a half wave dipole based upon the formula $\frac{468}{f(mc)}$ = length in feet we have an aerial which, dependent on its surroundings, will give us a good match to 75 ohms. Now obviously as f varies so the length of the aerial will vary, and the only way to get from 13 to 60 mc/s would be to have a number of dipoles each of which would have to be switched in and out as the frequency changed. The number , however, would be impracticable, as the frequency range of the dipole is strictly limited. As one moves away from its resonant frequency its impedance varies drastically and standing waves become present, giving us loss of radiated power, etc. However, if we can arrange a number of half wave dipoles so that the characteristics of the aerial, i.e. its impedance and resonance are repeated at a logarithmic period, we should achieve this. This period is then referred to as the design factor. Now it has been stated by experienced engineers that this factor can be from ·8 to ·6, giving input impedances from 70 to 300 ohms, but I have been unable to find any specified factor for a given impedance. It was this important point which necessitated a lot of calculations, building and failures before I found that the only factor I could get to work was ·88. As this is outside the specified figures, I can only assume that the truth has been deliberately concealed. The other problem involved was the calculation of the spacing between the elements. Even assuming that one had the first space and then applied the factor, I came across small differences from the way I now calculate them, but we haven't got the first space and without some system of calculation the whole system becomes impossible to resolve. The first space is arrived at in the following manner. The length of the second element is subtracted from the first, and the third from the second. The two results added. The last element length is when the overall element length is three-eighths wavelength long at the highest frequency. The aerial is fed from the H.F. end and "fires" towards the H.F. end. In other words, the low frequency is the back.

Let us now put all this description down in tabulated steps.

1. Decide on the frequency range.

2. Take a slightly lower frequency $\frac{468}{f(mc)}$ = length in feet and apply the dipole formula

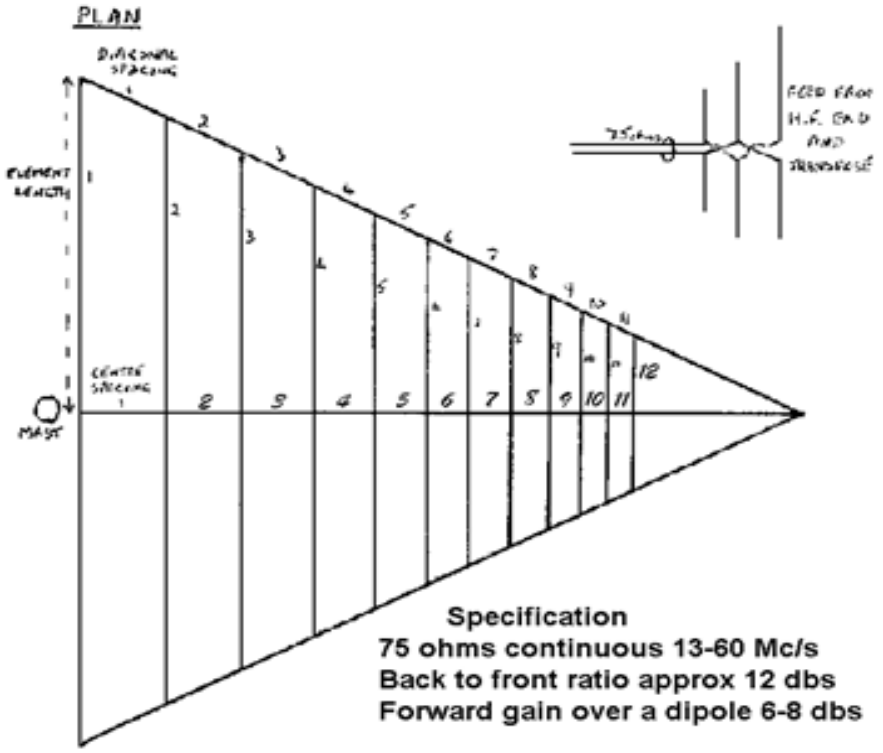
   This is your longest element.

THE G3LPC LOG PERIODIC AERIAL

DESIGNED AT 28° 0.88 DESIGN FACTOR

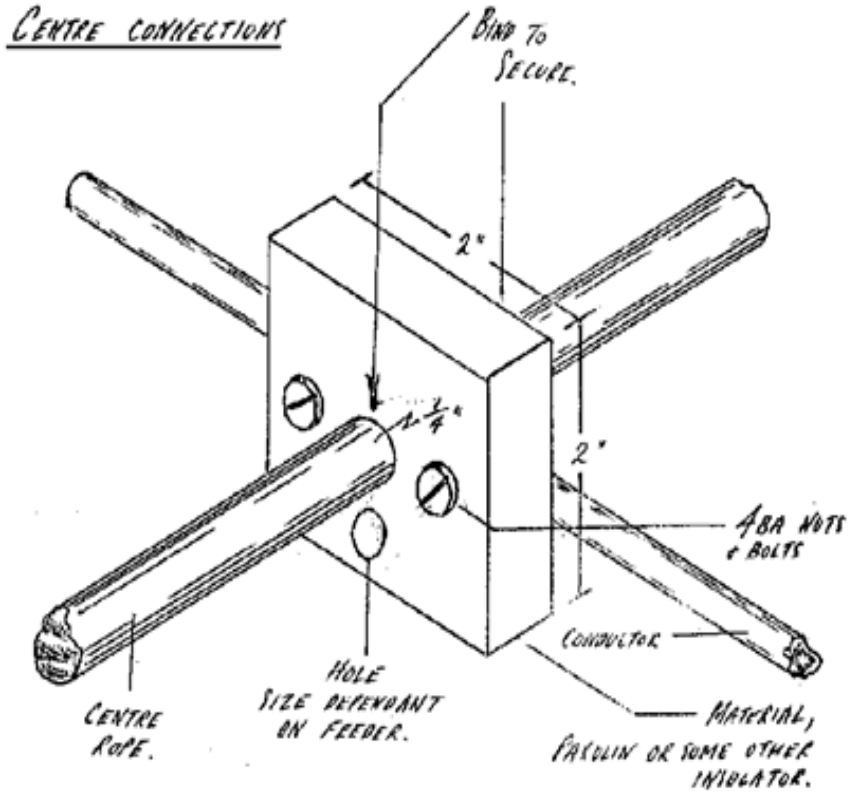
FOR 13-60 Mc/s

(Designed by G3LQC)



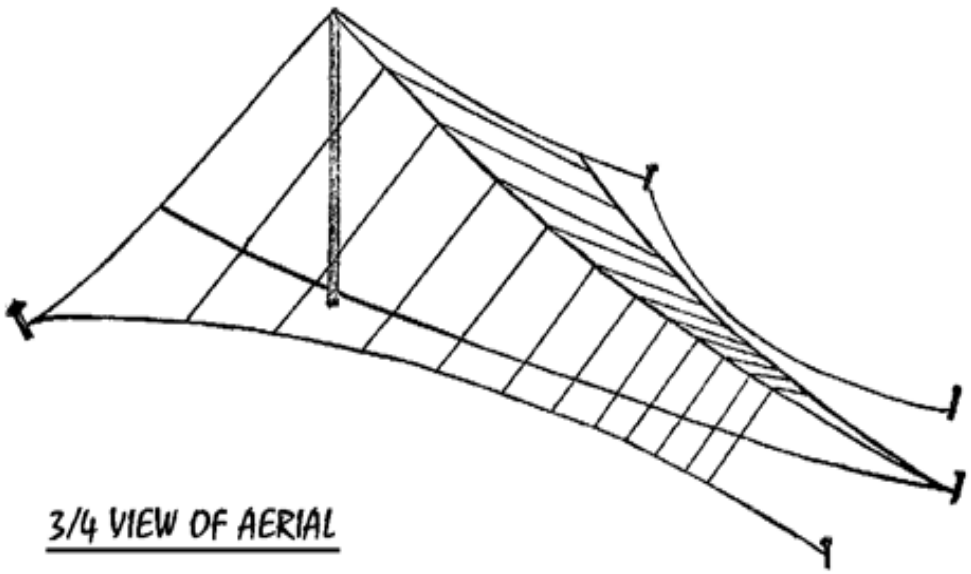
Specification
75 ohms continuous 13-60 Mc/s
Back to front ratio approx 12 dbs
Forward gain over a dipole 6-8 dbs

	Centre Spacing	Diagonal Spacing	Element Length
1.	4' 3¼"	4' 10¼"	19' 0"
2.	3' 9¼"	4' 3¼"	16' 8·6"
3.	3' 4¾"	3' 9¼"	14' 8·5"
4.	2' 11¾"	3' 4¾"	12' 11·37"
5.	2' 7½"	2' 11¾"	11' 4·7"
6.	2' 3¾"	2' 7½"	10' 0·32"
7.	2' 0¾"	2' 3¾"	8' 9·8"
8.	1' 9½"	2' 0¾"	7' 9·1"
9.	1' 6¾"	1' 9½"	6' 10"
10.	1' 4½"	1' 6¾"	6' 0"
11.	1' 2½"	1' 4½"	5' 3"
12.	--	--	4' 7"



System of Erection

Attach centre rope to rear pole and pull out straight until centre is tight.
Make off to ground peg.
Take out long sides as far and high as possible.
Pull down front and adjust until aerial hangs well.



3/4 VIEW OF AERIAL

3. For an input impedance of 75 ohms, multiply this result by the design factor ·88, tabulating results for clarity, i.e.

Elem. 1 = 100 feet	3 = 77·44 feet
2 = 83 feet	4 = 60·14 feet

and so on, multiplying each length by the design factor until the last element is three- eighths of wavelength long at the highest frequency required.

4. Now the next long process of subtracting lengths and adding them, i.e. (Tabulate results)

1st - 2 100 - 88 = 12 12 + 10·56 = 22·56 (1st Space)

2 - 3 88 - 77·44 = 10·56 10·56 + 9·2928 = 19·8528 (2nd)

3 - 4 77·44 - 68·14½ = 9·2928

After having obtained the first space, it is quite accurate enough to apply the design factor to it and consecutive spaces.

This concludes your calculations, and all that remains is to build the beast. This is, for a full-size beam as illustrated, an extremely difficult task and took four men approximately twenty-four hours to find the secret. However, with the knowledge of how we did it at G3LPC, two men should be able to make one in about eight hours. I think the enclosed diagrams are self explanatory, but if anyone should experience any trouble, I should be pleased to answer any queries or perhaps show anyone the finished article.

Although a fairly large ground area some 120 ft by 50 ft is required, only one 30 ft mast is needed. The aerial slopes at approx. 28 degrees and the shortest element, is about 7 feet off the ground.

There are no limits to the variations one can bring out of this design. Even a simple three element beam has been designed and tested with a good back to front ratio of 8dbs and a forward gain of at least the same 8dbs over a simple dipole. The only limit is the frequency range. I will go into details of' this next time.

A Letter from Catterick

The Ham Shack
Vimy Road

Dear OM,

Tuesday June 23rd was pretty near to the longest day but it wasn't long enough for us this year and it was quite dark before construction work on the Cubical Quad was finished. The "Ten Set" tower was still horizontal when we called it a day but during the course of Wednesday morning the sun glinted on the varnished bamboos as the tower was winched upright. This strange new object on the Catterick skyline soon attracted attention, one of our local bobbies pushed his bike up the hill to have a look and Officers bound for the School of Signals drove slowly past peering upwards. It certainly looked impressive but would it work? Princess Royal Day would tell.

Nine o'clock on Friday June 26th saw GB3RCS go into action with Paul on 20 sideband and Johnny on 80 AM. All the usual G3CIO gear was available and was augmented by Doug's Johnson Invader and Iain's KW77. The coffee room had been turned into a bar and with the hot sunny weather which held up throughout the weekend did a roaring trade.

Early contacts on 80 included G3LPC (3 Sqn 14 Sig Regt), G3IHH (REME Aborfiield), and G3PQY (RA Larkhill) but on the higher Frequencies things were going rather slowly. It was not until Friday evening that things warmed up with a solid three-way with VE6AMX/SU (Royal Canadian Signals, UN Forces Gaza Strip) and VE3RCS at Royal Canadian School of Signals. This latter station was being operated by Des Barry G3ONU whilst GB3RCS had Doug Yerxa at the mike.

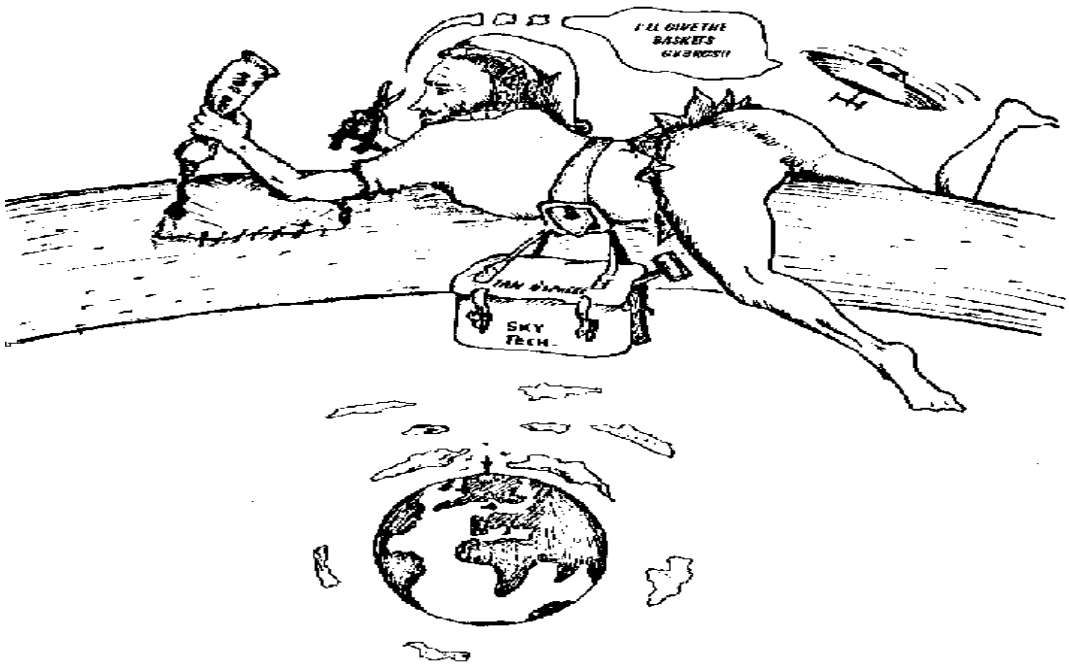
Several times throughout the weekend GB3RCS was operating simultaneously on 160, 80, 20 and 15 metres. The 2 metre gear wasn't getting out at all well and it was some time before a technician traced the fault, the aerial wasn't connected. It was then found that operating the TX without an aerial had ruined the P.A. valves so our VHF activity soon came to a stop. In any case the operators were hard pressed keeping going on the other bands.

Not content with the LG300 the Field Secretary modulated several kilowatts of BBC Home Service in the "eyewitness" programme at seven-fifteen on the Saturday morning, the interview having been recorded in the clubroom the previous day. This stirred up 80 metre activity considerably and the operators on this band were kept busy all day. GI3PUE was operating from an Open Day organised by 66 (Ulster) Signal Regiment TA and the bells of a model railway running past the door were modulating the rig. With true Irish logic the operator pointed out that being an Open Day he couldn't shut the door.

On the HF bands conditions were pretty poor, plenty of Europeans but nothing much else and with only one overseas Royal Signals station in the log someone remembered the Victorian Manual of Army Signalling - "the most reliable method of passing information is by means of an orderly with a written message". Then WHAM!! All of a sudden the band was open; Stan VS9ASS, Ted 5B4CZ, the other Ted VS1MB, the Singapore club VS1RS, Bob VS1LP, RAF Gan VS9MB, one after the other. Later 5B4TJ of Royal Signals and several Royal Canadian Signals stations were worked. We were scheduled to close at midnight but the last contact in the log was at 0230Z and judging by the empties in the bar several of the gang had made a session of it.

By Sunday morning there were plenty of coloured pins on the map of the world, ashtrays were brimming over and the air had that sweet aroma which greets the breakfast seeker the morning after a "do" in the Mess.

After a quick tidy up Jean started the ball rolling on 80 little realising what she had let herself in for. By 2000Z when GB3RCS closed down another 114 stations had been entered in the log on that band alone.



Paul started a QSO with 5B4CZ on 20, QSY'd to 15 then to 10 and finally back to 15, the contact lasting an hour and a half. Amid a gang of DL4's, mostly US Army Signal Corps types, up popped MP4TBA and MP4BEQ, Roy DL2DD, Doug DL2DF, 257 Squadron's club DL2BB, SL3AE of the Swedish Army, so it went on through the long hot day.

Meantime on 80 the pace was so hot that the operator was being assisted by a log clerk. Every hour or so a dry-throated operator staggered into the bar for lubrication; we got quite slick at changing operators, one would sign with a station and say "GB3RCS is now QRZ on 80" the relief would slide into the chair and take the mike. This must have caused quite a few raised eyebrows whenever Jean was one of the two operators concerned. G5PX and G3SZQ both Old Comrades came to Catterick for the reunion and found themselves roped in to do a stint on the rig. Down at RAF Catterick an inspection of ATC cadets was in progress, one of their instructors, was contacted on 160 metres and shortly afterwards turned up to have a look at the source of all the dB's. Considerable spluttering out of callsigns when GB3RCS worked GB3RIS at the RSGB mobile rally, was it the beer or the pace, only Derek knows.

Statistically speaking we had made 472 contacts with 50 countries, worked over a dozen Royal Signals units, Royal Canadian Signals, US Army Signal Corps, RA, REME, etc. etc. we had operated up to 5 stations simultaneously from an area some twenty feet by ten feet with at least two going all the time.

The operators were Derek G3TBP, Doug G3SJB, Iain G3SYW, Jean G3JZP, John G3OAZ, Johnny G3EJF, and Paul G3RFI. Dave and Terry ran the bar, acted as duty tech's and showed visitors round the station.

That was Reunion Weekend for another year, a rather shattering experience for the operators but a lot of fun. Seems strange to be signing G3CIO again and having time to natter with the stations we work.

73 Jimmy

NEWS FROM SINGAPORE

After a lot of hard work 18th Signal Regiment's club station VS1RS is active using a Viceroy and Drake 2B receiver obtained with a Nuffield Grant. The aerial farm consists of' a dipole and a half wave vertical but further developments in this department are in hand.

VS1MB has obtained the BV (Formosa) award for working all the BV1 stations, all three of them.

Licensing conditions are simple in Singapore. Produce your G licence, wait a month and you're in business at the cost of little over a pound. Regulations are based on those in UK but no mobile operation is allowed. As for the various bands 80 is too noisy and is rarely used, 40 is empty apart from the Sunday natter net and 20 and 15 are the DX bands. Gear is not easy to come by unless you know someone who is about to be posted home, silver mica capacitors are unobtainable judging by the frantic SOS received at Catterick recently. More and more people are going SSB throughout Malaysia.

Royal Signals is well represented among Malaysian amateurs with VS1LJ, LL, LS, MB, MK, CW, LM and 9M2ER, and GF. Arrangements to take RAE (in English) can be made in Singapore.

Based on notes from VS1LS, VS1MB and VS1CW.

HEARD ON THE BAND - "I hope they lift the curfew, it's the club meeting on Friday."

MODIFICATIONS TO THE AR88D

by

S/Sgt D.C. Pocock, G3TBP

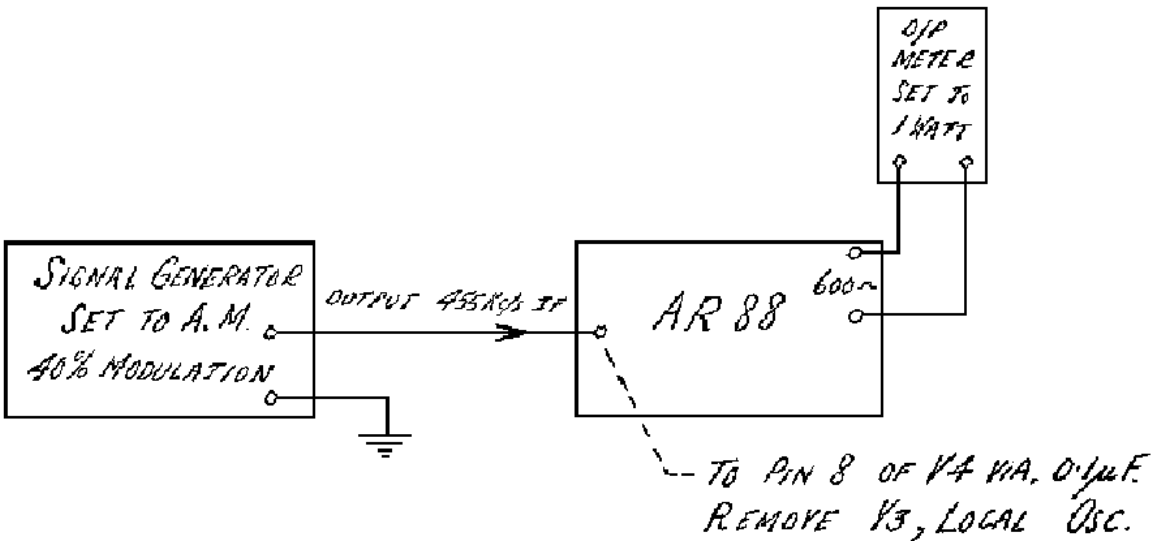
Recently Royal Signals Amateur Radio Society were requested to put on a show at Trentham Gardens, Stoke-on-Trent, the venue of the North Midlands Mobile Rally. One of the displays was a demonstration of Intermediate Frequency alignment of the AR88D. This created a vast amount of interest with regard to the best method of alignment and suitable modifications to the receiver giving the writer good reason for putting pen to paper.

Before going any further it must be said that the specification figures given by the makers cannot be improved upon if the AR88D is to be used in its true role of an all-purpose, general coverage receiver. What can be achieved is an improvement when using the receiver mainly on CW and "ham" speech transmissions.

Let us commence with the correct method of alignment of the I.F. strip. The equipment required is a Signal Generator capable of being Frequency Modulated, an Output Meter able to measure up to 1 watt with an impedance of 600 ohms and a Cathode Ray Oscilloscope with facilities for feeding out a time base of 0 to 100 c/s.

The first step in alignment is to find the exact frequency of the crystal in the crystal filter and to peak all I.F. transformers for maximum output at that frequency.

The test equipment is connected up as follows:-



Now proceed as follows:-

1. Locate the crystal load TR4 (connected between the anode of the mixer V4 and the grid of the first I.F. amplifier V5). Set the crystal phasing capacitor C75 to half mesh. C75 is a small preset capacitor of conventional type mounted under the chassis near TR4.

2. Switch to selectivity position 4, tune the receiver to 535 Kc/s and set the AVC/ANL switch to MAN.

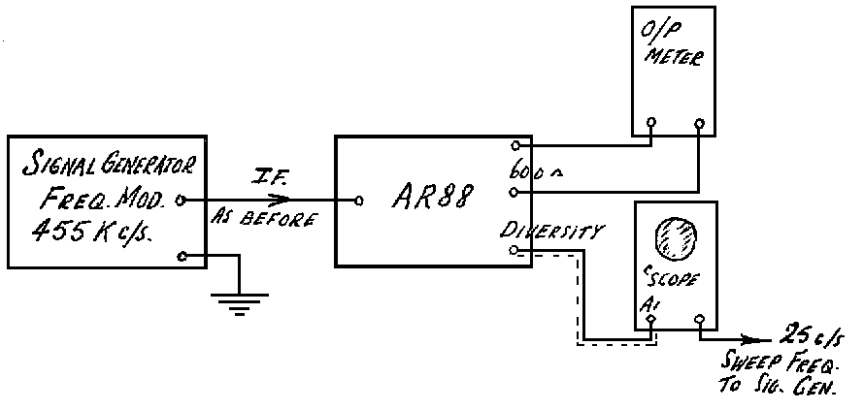
3. Adjust the Signal Generator frequency until maximum reading is obtained in the output meter.

4. Adjust the core of TR4 for further maximum reading.

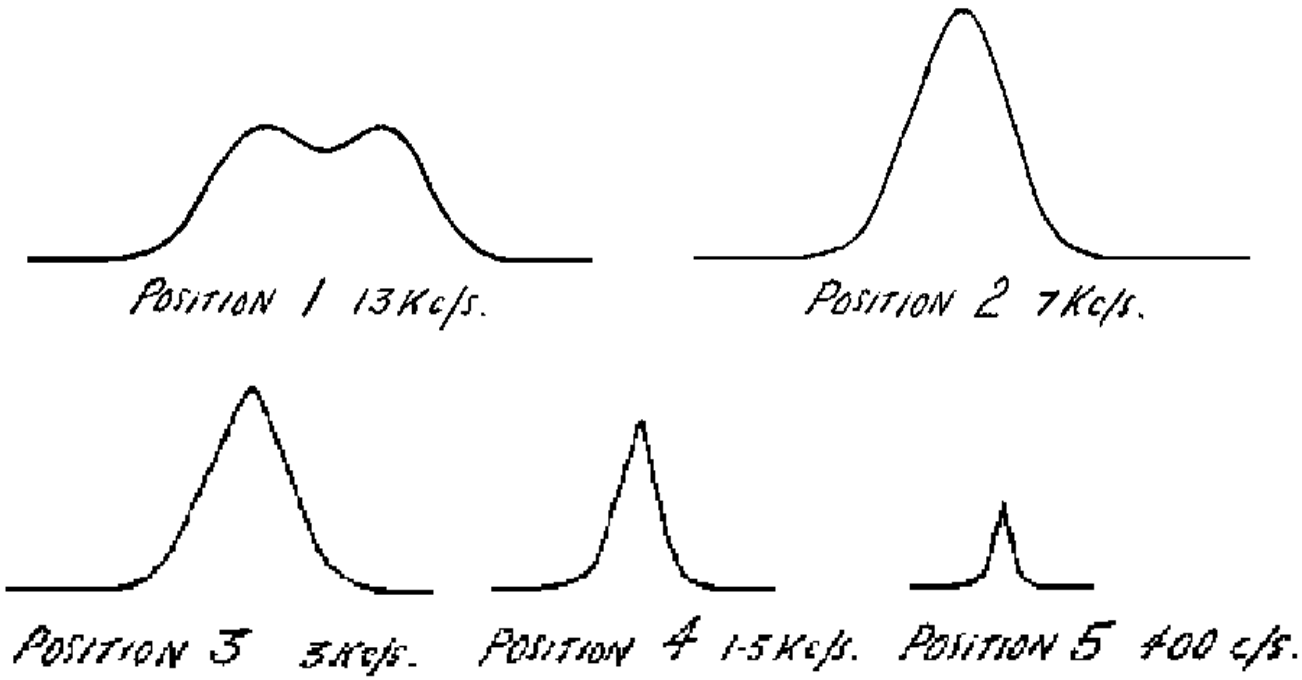
5. Repeat 3 and 4 until no further increase in output is obtained.

Once this procedure is completed the Signal Generator Frequency should NOT be altered as the frequency indicated is that of the crystal. Now peak all primaries and secondaries of the I.F. transformers for maximum indication in the Output Meter.

The equipment should now be set up as shown below.



When these connections are made, on the C.R.O. should appear the response curves of the five selectivity positions. Ideally these should be :-



With the selectivity switch at position 4 the response curve will probably show signs of Crystal Ringing.

This crystal ringing can be cleaned up by adjusting the phasing capacitor C75 until the best symmetrical curve is obtained. Once this has been completed adjustment of the bottom cores of the I.F. transformers and C80, C81 (similar in type to those in the R.F. stages and located near C75) can be commenced until all selectivity positions have response curves as near to the ideal as possible.

That completes the basic I.F. alignment and so to the modifications. The following hints are suitable for C.W. working.

1. Remove the 1 megohm resistor across the crystal load TR4.

2. Remove R15 (15K) across the primary of TR3 in the anode circuit of the mixer V4.

After these components have been removed the alignment described previously may be carried out with the difference of peaking everything on Position 4 and ignoring the response curves obtained on Positions 1 and 2.

The I.F. responses should now be of the order:-

Position 3 should be 2 Kc/s

Position 4 should be 1 Kc/s

Position 5 should be 200 c/s

Positions 1 and 2 were checked and both had bandwidths of approx. 4·5 Kc/s.

With these modifications the improvement in the reception of C.W. was quite considerable but great care must be taken when aligning after removing the resistors otherwise self oscillation will occur.

The specification figures for the input at the I.F. to the grid (pin 8) of V4 with the local oscillator V3 removed are:-

Selectivity Position	Max. input for 500 mW O/P	Bandwidth
1	2·5 mV	13 Kc/s
2	1·0 mV	7 Kc/s
3	1·5 mV	3 Kc/s
4	1·9 mV	1·5 Kc/s
5	4·0 mV	400 c/s

After modification the figures obtained were:-

1	2·0 mV	4·5 Kc/s
2	2·0 mV	4·5 Kc/s
3	1·3 mV	2·0 Kc/s
4	1·5 mV	1·0 Kc/s
5	2·9 mV	200 c/s

These figures can be improved even further by removing- the screen of V6 from the stabilised H.T. line and increasing the screen voltage to about 210 volts. The input required for 500 mW output were then

1	1·5 mV	4·5 Kc/s
2	1·5 mV	4·5 Kc/s
3	900 microvolts	2·0 Kc/s
4	1·0 mV	1·0 Kc/s
5	2·0 mV	200 c/s

This latter modification is not recommended if A.M. reception is still required on Positions 1 and 2 as distortion is very apparent.

There are only two modifications to the R.F. amplifiers that produce any effective improvement in performance.

The first R.F. amplifier valve may be changed to a high-slope pentode such as a 6AC7 but great care must be taken to prevent the stage from "taking off". This is strictly a C.W. modification as even in its original form the AR88D is very prone to Cross-modulation. With the 6AC7 in circuit the Cross-modulation is increased to a very high degree.

The second modification is to the antenna circuit. The normal input impedance is 200 ohms and this may be changed by altering the number of turns in the antenna coils to 3 turns on Ranges 1, 2 and 3 and to 2 turns on Ranges 4, 5 and 6. This will give an input impedance of approx. 75 ohms.

The overall specification for input to the antenna terminals for an output of 500 mW at 600 ohms with a signal to noise ratio of 20 dB are as follows:-

Range	Original Receiver	After modifications
1	9 microvolts	9 microvolts
2	4 microvolts	3·9 microvolts
3	3·5 microvolts	2·5 microvolts
4	3 microvolts	1·5 microvolts
5	3 microvolts	2 microvolts
6	5 microvolts	3 microvolts

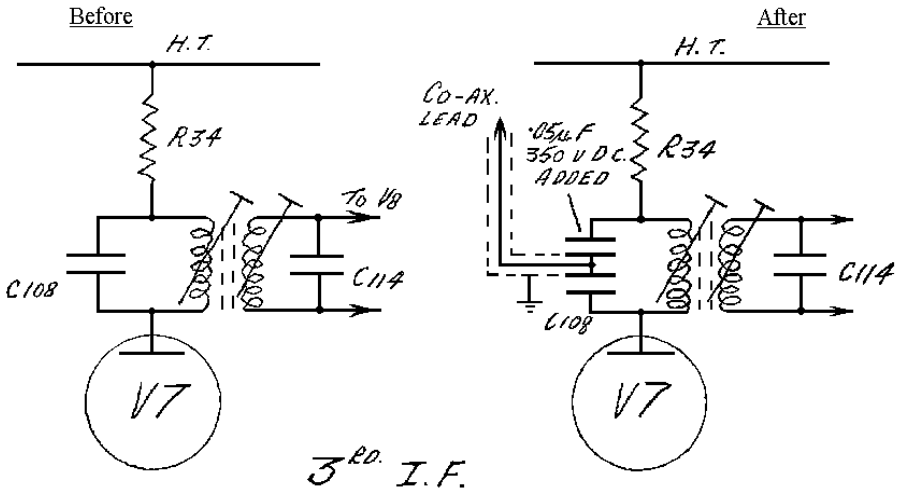
Outputs from the AR88D

Speaker	2·5 ohms	500 mW
Line	600 ohms	better than 400 mW
Headphones	20 K	better than 6 mW

The H.F. Tone control is designed to affect frequencies above 3 Kc/s.

F.S.K. Reception

For the reception of F.S.K. it is best to leave the AR88D in its unmodified condition. To take an I.F. output from the last I.F. amplifier V7 for connection to a Discriminator type of F.S.K. adaptor is quite simple.



The capacitor C108 is located inside the I.F. transformer

S.S.B. Reception

The AR88D suffers from lack of B.F.O. injection when used for S.S.B reception. In the original receiver coupling between the B.F.O. and the last I.F. amplifier V7 is by stray coupling across the valve holder and the base of the I.F. transformer. The lead from pin 4 of the B.F.O. valve to the I.F. transformer should be replaced by a capacitor of 50 to 100 pF. This will make S.S.B. signals much easier to resolve.

The writer would like to point out that all alignments and test figures were taken under ideal test conditions. On the bands there was a decided improvement in QSO efficiency and QRM was less trouble due to the narrower bandwidths available.

A VIEW FROM THE OTHER END

by Major J.E.P. Philp Royal Signals. VS1MB

It is 7.30 p.n. on Saturday 27th June, 1964. It is a hot evening. The curtain opens and shows a typical Singapore bungalow. Two ceiling fans are full on. At left of stage sits Mrs. Philp, a housewife, reading. At centre stage is a large table, well known in the Army as a "Tables GS 6 foot". It is covered by a mass of electronic equipment. Through the large open doors, right of stage, enters Major Philp. He is dressed in a pair of shorts and shirt. There is a smile of triumph on his face...

Now to burn out their receiver coils in Catterick! That G5RV will roast 'em. Now to switch on. Hmm., this little NCX3 is a fire cracker. 20 seems good tonight. Lets see, its 1200 ZULU at home now. Lets tune around 14100..... Oh, yes, usual QRM no Europeans there. Lets try around 250 and up. Crikey, tons of W6 and 7's! Ah, a few DL's. Well anyway Europe is coming through. Lets give the HQ station a call.

"GB3RCS this is VS1MB Singapore....."

"VS1MB this is AC9BF calling and listening."

Oh no, thats a rare one! Never heard an AC9 and I need another country too.... No, must resist this one, after all Catterick is only on once a year.

"AC9BF this is VS1MB You are 5 and 7. Handle is Ted, QSL to K7GCM. 73's must QSY now."

Well I got him but the wolf pack are on him anyway. Lets try calling Catterick again.

"GB3RCS this is VS1MB calling you, GB3RCS ....., do you copy?"

"VS1MB this is BY2CU/BY7 over."

"BY2CU/BY7 this is VS1MB. I am calling GB3RCS, a British station. You are 5 and 7 QSL to....."

Drat these expeditions! I've never heard such good DX before and now I can't afford the time. I need another two new ones for DXCC too!!

"VS1MB, this is W6XYZ, over."

Crikey, that chap is 5 and 9 plus, must have a cool kilowatt there and a 10 element beam for 20.

"W6XYZ this is VS1MB. Please QSY I am trying to call GB3RCS in ENGLAND. You know, that little country in Europe, north of France. 73's·"

Lets tune around now. It's obviously no good calling Catterick. Just because I am a VS1 everybody seems to want to work me.

"5B5..... this is GB3RCS....."

It's him, it's him. They're yacking away, I'll see if I can break in.

"Break, break. This is VS1MB, member number 7 of Royal Signals Amateur Radio Society, over."

Thats a bad bit of procedure but I am sure they will forgive me as they have never made the Far East yet. They are still talking, going over old times now. Why don't they listen for the rare stations? Why the devil can't they keep their QSO's short. I couldn't care less if he knew G2EC. I know he's the Vice President. I know he won a couple of good competitions. Why can't they listen for VS1. Hello, there's a VS9 breaking in now. He's got in, why can't I? I think its Stan Symons.

"Break, break, break. VS1MB, VS1MB, do you copy?"
They must have cloth ears at Catterick.

Two hours later.

These wretched earphones hurt my ears. They are still yacking away. Everybody's getting in on this why can't I? They should listen for the Far East.

"Break, break, VS1MB, VS1MB, this is Singapore, member number 7....."

"VS1MB this is. GB3RCS. Were you calling?"

I've got 'em, I've got 'em, I've got 'em. The first Far Eastern member of the Society to contact the Headquarters station. Now lets go over and give them a report. Hello, the rig is dead. The little lights gone off. Oh no, what's happened? It looks like a fuse. Never mind I'll soon fix it. Lets see, where are those spare fuses? I need a 2 amp one. Lets see now, here's a 100 milliamp, here's a 500 milliamp, here's a 2 amp. It's the wrong size, it won't fit the fuse holder. Blast these odd American size fuse holders. Never mind a bit of silver paper should do it. Must get through, Certa Cito and all that you know, the Royal Corps always get through. Now, lets find some silver paper. Why do I always buy cigarettes in tins of fifty? Why can't they put some silver paper in these tins?

"Darling, have you got any silver paper?"

"I think there is some upstairs in the bathroom. That nice bottle of perfume was wrapped in some."

"OK, nip up and get it for me please, I've got Catterick at last but the rig has blown a fuse."

Now the silver paper is fitted. Let's pop the fuse back in. It won't go in. Let's see where's that screwdriver? That's got it. Now to switch on. Ah, it works.

"Darling, the dogs got a piece of wire in his mouth, would you like to see what it is."

"That's my antenna, it must have fallen down,"

A housewife and a dejected VS1MB go into the garden. The thirty-six foot mast is lying across the garden. It is pouring with rain. The housewife holds a torch whose battery is on its last legs. Between them the mast is put up and the aerial hoisted. The halyard gets stuck half way up. The co-ax feeder is caught around the top of a tree. The dejected amateur climbs up the tree in the dark, swearing furiously, end finally frees the feeder. The aerial is re-erected. A very wet house wife and VS1MB return to the house. There is water everywhere.

There is only one thing for it, I will have to change. It's 1500 G.M.T. now, I'm sure they will be gone. I don't reckon I'm going to make it. Still, let's have another go.

"Darling, make me some coffee, please, or perhaps a stiff brandy would be better."

"Let's both have a brandy."

"GB3RCS this is VS1MB." I am calling blind now, I can't hear them....

"VS1MB this is GB3RCS. You are 5 and 5 My name is Ian, how do you copy?"

"GB3RCS this is VS1MB. You are also 5 and 5. My handle is Ted. I am running an NCX3 and a G5RV antenna. Very, very, glad to have made it at last and many greetings to you in Catterick from all members of Royal Signals in Singapore. Back to you now, go ahead."

"VS1MB this is GB3RCS. OK Ted. You and I have met once at Headquarters station. I was VS9....."

"GB3RSC this is VS1MB. Is Johnny there? Could you fetch him to the set?"

"Johnny here, Ted. Thanks for the letter. Do you still want that 2 meg crystal? We are going great guns here. Hold on, here's somebody else who would like to speak to you.....Hello, Ted. This is Jean, (Johnny's wife, a licensed amateur). How are Ann and the children? Give them my love. I must get back on 80 now. Johnny here again Ted. Many congrats. This is the first time we have made the Far East. Have you heard VS1RS and are there any other Far Eastern members of the Society on this afternoon? GB3RCS to VS1MB"

"GB3RCS this is VS1MB. Don't need the crystal now Johnny. VS1RS is around somewhere. Hold on I will try and get them on to you..... They're on the frequency now Johnny. I'm going to sign. Greetings from us all to you there in Catterick. Thanks very much and I am delighted to have made it. 73's. VS1MB signing off and clear with GB3RCS and GB3RCS please listen in for VS1RS."

"GB3RCS this isVS1RS....."

Well, what an evening! The first VS1 to have contacted GB3RCS on SSB. Still, Colonel Cocks boys will have made it no doubt, and that new gear I got for them should give them a good report.

"Darling I see you made it. It's gone midnight and there is an awful lot of water on the floor, There's mud all over the carpets, do you think we could clear it up now?"

"Anything you say, darling. Anything. Let's just finish the log off."

"You look very pleased. How about that electric frying pan and the camphorwood chest you promised me?"

"Darling, they're yours. Go and buy them tomorrow."

The curtain closes on a happy housewife and VS1MB.

SOCIETY QSL CARDS

There are still plenty of the Society QSL cards available at 31/- for 500 post free. Members only have to get their call sign, name and address overprinted on the card at their local printer. According to the price list of a well known firm of QSL printers it would cost you 92/- to buy 500 similar cards as an individual. Even after you've paid for the overprinting that's a nice saving.

Orders to the Field Secretary, please.

SOCIETY MEMBERSHIP LIST

We regret that circumstances have prevented us from sending out new membership lists with this issue of MERCURY. We shall do our best to enclose them with our January issue.

BIGGER AND BIGGER

This issue of MERCURY runs to 26 pages, our biggest ever. Keep sending us your news and articles and we'll try to keep it up.

THE PRESIDENT VISITS G3CIO

On Wednesday afternoon the second of September the Society's President Brigadier R.H.E. Robinson OBE, ERD visited the Headquarters station. Quite a few members were busy in the workshop at the time and G3CIO was on the air being operated by a member of the ACF who was on a course at School of Signals, several other ACF NCO's were also in the shack.

The V.P.M. Beam

Ron Briggs BEM, 5N2RSB

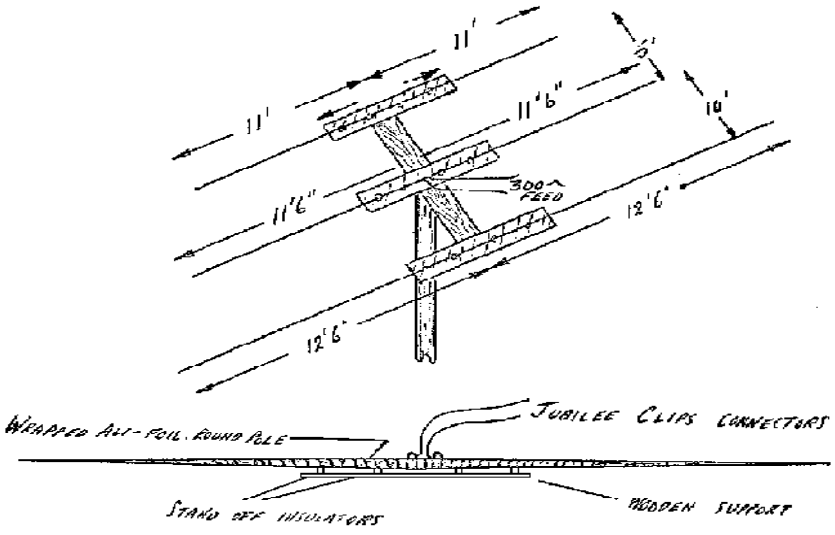
Finding that the poor conditions on the DX bands called for some sort of beam an attempt was made to build one to the orthodox designs published in the handbooks. This attempt soon failed due to the simple fact that there just didn't seem to be any dural tubing available in Nigeria. There was however plenty of bamboo and so the V.P.M. (Very Poor Man's) Beam took shape.

The bamboo poles were found at a small river near the author's QTH and were cut when young and pliable. They were straightened by placing the poles on the ground and pegging either side in several places. The boom for the beam consisted of a 15 foot length of 1½ inch diameter water piping bargained for and finally obtained for the princely sum of two and sixpence.

Having a collection of old electrolytic capacitors in the junk box these were broken open and the foil carefully removed. Starting at either end of the pole the foil was wrapped round taking care that successive turns overlapped each other to maintain a continuous connection throughout. Jubilee clips were used to secure the ends of the foil and to provide connections for the feeder. The next job was to weather-proof the elements and a further sum of 7s.6d. was spent on a can of weather-proofing solution.

The poles were then secured to stand-off insulators (ex junk box) and to supporting pieces of wood which were in turn fixed to the boom by U-bolts. Measurements on the beam showed that the SWR was about 1·5:1, the back to front ratio was 15dB and the gain over a dipole about 5dB. Results were remarkable, W.A.C. being soon achieved with good signal reports. Some idea of the construction of the VPM Beam together with its dimensions are given in the diagrams.

Whilst the chance of cutting your own bamboos is limited to members with exotic callsigns there is a source of cheap bamboo poles in U.K. Most firms supplying fitted carpets do so by wrapping the carpet round quite stout bamboos which are then often throw away.



THE RESERVE ARMY

One of the objects of the Society as stated in its rules is "to encourage the recruitment of radio trades ....." and it is with this in mind that the following article by Major (TOT) D.A.W. Clark T.D. G4JT is published in MERCURY. We shall be pleased to receive similar articles from any member who is serving in the AER or TA. (Ed)

SURVIVAL

Firstly I should thank the Editor of MERCURY for agreeing to give us space for this article. Secondly I ought to explain that it is written by a pre-war ham who has served many years in the Territorial Army and now at times philosophises.

This in some ways is the history of a Regiment, old in years of service to the Crown, undoubtedly the oldest Regiment in Royal Signals, but like the well known whisky - still going strong. Nowadays we are known as the 41st Signal Regiment. (Princess Louise's Kensington Regiment) T.A. but this was not always so.

In the beginning, before records were quite as accurate as they are today, some of the earlier generations of Clarks, Jones and Smiths, being honest and sober citizens in and around the City of London, gathered together in a Volunteer Force to serve the Crown, in some ways, I suspect, for much the same reason as today's volunteers. We began our life as a Volunteer Force in the year 1798 at the time of the Napoleonic Wars when invasion threatened. Naturally enough when the threat passed we were disbanded, the muskets and pipe-clayed equipment were handed in and the boys lost an excuse to tell their wives when they were late home.

In 1859 a later generation joined the 4th Middlesex Volunteer Rifle Corps on its formation. In those days volunteers paid to join a Regiment and paid for their equipment. The 4th Middlesex may be looked upon as the Great Grandfather of the present Regiment for on the formation of the Territorial Army in 1908 it amalgamated with the 2nd South Middlesex to form the 13th Battalion County of London Regiment (Kensington). The following year we received our second set of Colours which are kept to the present day in the RHQ Officers' Mess. The first set, given to the earlier Volunteers is still in existence. The Battle Honours of the Regiment, borne on its Colours read like a history of three wars.

Shortly before the First World War HRH Princess Louise gave her consent for her name to be add to the title of the Regiment and maintained a close interest in its activities until her death in 1939. When the T.A. was reconstituted after the Second World War the Regiment became part of Royal Signals and today has its Headquarters at Hammersmith and Squadrons at Bournemouth, Portsmouth and Coulsdon.

London is a cosmopolitan city and the Regiment is a team which contains a very good Chinese Radio Technician. The battery charging vehicle is run by a Nigerian and a coloured gentleman from the Southern States of the U.S.A. The Regiment and its associated LAD contain many nationalities representative of the capital today. Basically we are an H.F. Radio unit. Most of our equipment is familiar but what other T.A. Regiment has in its possession and knows how to use the D 11 and its associated equipment.

Now like all T.A units we still require recruits. What you have been does not matter, there is always a niche for you either in a technical trade or behind the scenes with those members of the 'B' Echelon, the Cooks and Q Blokes, without whom no Regiment could function. In any Regiment the T.M. Troop is always the best and we are always willing to train anyone.

Thus this is addressed to all the ex-service members of the Society in the form of a simple question -

COULD YOU HELP? Because, in these troubled times I reckon the old citizens should be gathering together again once more.

OTHER PEOPLE'S PR DAY

Didn't appear to be much Signals activity from here. From this end of the island all I worked was MP4BEE, VS9ASS and GB3RCS, the last on all three days and all three bands, 20, 15 and 10.

5B4CZ

The Regiment ran a very successful "At Home" on the Saturday afternoon. The club station GI3PUE: was reinforced by the loan of a Viceroy and a Radiovision Commander receiver. The kiddies miniature train, well fitted out with bells, produced so much QRM and QRN that our contacts on 80 were limited. Twenty metres was just opening when we had to QRT.

The operators were Bill Douglas Gl3IWD, Ron Parsons GI3HXV and Walter Caughey GI2DZG all members of the Society, The CSO and our CO visited the Club stand just after our QSO with GB3RCS,

GI3IWD

We organised a CW operator for every minute of GB3RCS operation. The first day things were normal - YU's and UA's, at readability 3 - fair enough, it was just a matter of waiting for QSY of the nearby QRO rigs. Dave Bullard spent the night listening - YW, W, PY even a G in Selby but no GB3RCS. We knew by now that our only hope was in the evenings so Saturday had JA, VU, PY, HK, W, YV and miraculously VK6 at 2000GMT. Sunday evening followed the same pattern, a few W's, occasional G's but nowt else. Then came the dawn of Monday, Tom at 5B4TJ had worked GB3RCS on Saturday evening, "pounding in" were his exact words, and 5B4CZ had worked 'em on three bands. By now you must appreciate that we can never be found at the right time, we always seem to miss the boat, but how we can work W's without getting into G is a mystery.

5B4TX

ANTENNA IMPEDANCE METER

By Walter G.Borland (GW3NXM)

Some time ago when reading about Quad antennae, reference was made to an Antenna Impedance Meter or "Antennascope" for adjusting the T- Gamma match. This was a new one on me and after a considerable amount of searching around, I found an excellent and comprehensive article in "CQ Anthology 1945 - 1952". (There is a subsequent edition 1952 – 1959, which does not contain the article). So I built one and now I cannot think what I did before I had one. It seems to be an instrument few amateurs in this country know anything about, and I hope therefore, that this article will arouse some interest in a very useful piece of test equipment.

The circuit of the Antennascope is shown in Fig.2. The original circuit specified a 1N34 diode and I used GEX34 because I had one; probably an OA70 or an OA31 would do as well. Secondly, the meter specified was a 200 microamp one with an internal resistance of about 1000 ohms and I used a 50 microamp meter of internal resistance of 800 ohms, again because I had one. Otherwise the circuit is as published in "CQ Anthology".

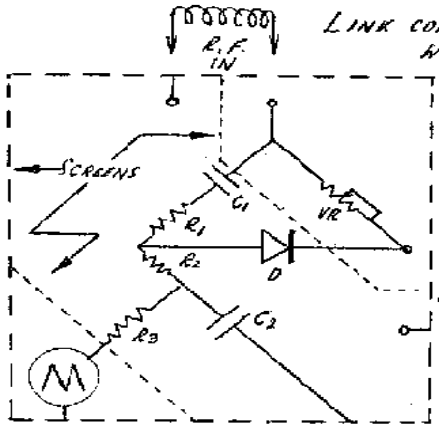
It will be seen that the circuit is a form of bridge, The values of R1 and R2 should be close to 200 ohms each; the actual value is not critical but they must be matched closely together to form a pair. The variable resistor VR used is 600 ohms. This limits impedance measurements to 600 ohms but there is no reason why VR could not be increased to 1000 ohms or even more for increased range. To prevent the instrument being frequency conscious, all resistors must be carbon including the variable one, and the condensers preferably mica or alternatively, ceramic. The screens shown dotted are only necessary for measurements above 30 Mc/s but you might as well put them in when constructing the circuit.

I managed to build the whole Antennascope with the exception of the meter in a 1-oz. tobacco tin, with the screens soldered across. I then mounted the tin together with the meter in a larger box, but even so, the result was a compact instrument. As R1 and R2 are equal, VR should be fitted with a scale, which can be directly calibrated in ohms using an Avo or similar meter. If you are doubtful of R1 and R2 being exactly the same value, or if you wish very great accuracy, energise the Antennascope with a G.D.O. as described below and mark the VR scale according to carbon resistors connected across the "out" terminals.

The theory of operation is simple. The "in" terminals are connected to a source of H.F. such as the low power stage of a transmitter or a G.D.O. the "out" terminals are connected to a load such as an aerial; and VR is adjusted for null reading. The value read off the VR scale is the impedance of the load.

Such a bald statement may not be very explicit so let us take a couple of examples. A dipole has been erected and is fed by a certain length of feeder. As it is not very high, its resonant frequency and its impedance need to be ascertained. The set-up is shown in Fig.2. Connect a three or four turn link coil to the "in" terminals and the end of the feeder to the "out" terminals of the Antennascope. A G.D.O. will provide adequate R.F. power and it is moved towards the link coil until there is about an 80% deflection on the Antennascope meter. Adjust the G.D.O. for dip in the usual way and this gives the resonant frequency of the aerial system. Adjust VR for null reading in the meter and read off the value on the VR scale. This is the impedance of the aerial system.

If only a minimum reading can be obtained, not a null, the result is still the impedance but it shows that there is capacitive reactance present. (Try this test on your dummy load to see if it is a pure resistive one. You may be surprised!).



C1,2	1000 pF MICA
R1,2	180 TO 200 OHMS CARBON MUST BE MATCHED PAIR
R3	1000 OHMS CARBON
VR	600 OHMS CARBON
D	GEX34 DIODE
M	50 MICRO-AMPS, 800 OHMS INTERNAL RESISTANCE

FIG. 1 CIRCUIT DIAGRAM

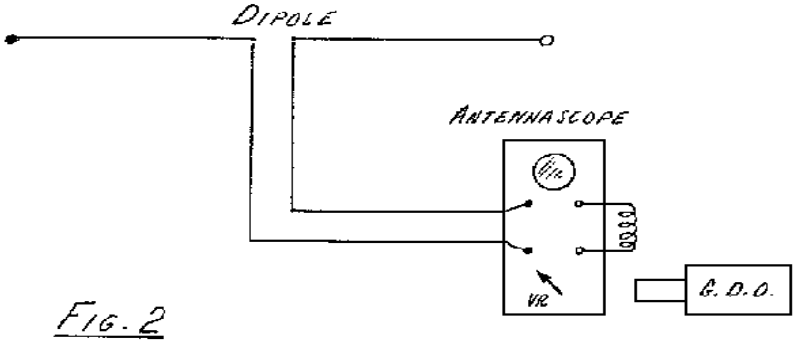


FIG. 2

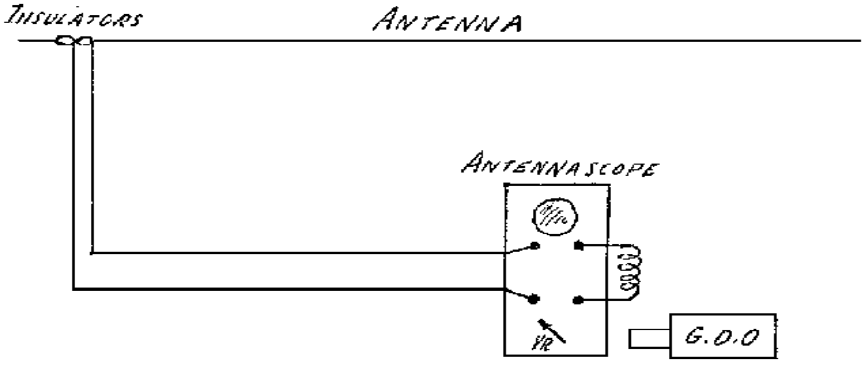


FIG. 3

For a second example, let us take a random length of wire as an aerial, fed with twin feeder, and we wish to ascertain its impedance at a particular frequency. The arrangement is shown in Fig.3. Connect the feeders to the Antennascope and energise with a G.D.O. as before. Set the G.D.O. to the required frequency and adjust VR for minimum reading. This will be the impedance of the aerial system. You will note I said "minimum" not “null" reading as with a set-up as described, it is extremely unlikely that the aerial will be resistive only.

A word of warning! There is no sensitivity control for the meter and the diode also has its limitations. Be careful you do not use too much R.F. with a G.D.O., the amount fed into the Antennascope can be altered by moving the G.D.O. closer or further away from the link coil. If you want to use a transmitter, even the low powered stages, you will require an extremely loose coupling by such a method as a pickup wire.

To mention only a few other uses, you can check your aerial to see if it is still functioning after that last gale; is your pi-coupler output matching into the aerial; adjustment of T-Gamma. matches; and I have even used the described set-up to check my TV aerial. To those who experiment with aerials I would strongly suggest that they obtain a copy of "CQ Anthology 1945 - 1952" which shows many more applications than can possible be described in a short article.

It is hoped that this article will raise some interest in a most useful instrument. Many checks, tests, and adjustments previously made with the transmitter switched on, can be made with a G.D.O./ Antennascope arrangement with the resultant greater safety, not forgetting less QRM.

Subsequent to writing the above I purchased a copy of CQ Anthology II which shows a somewhat more complicated circuit. This article goes into considerable detail concerning the sensitivity of diodes and is well worth reading on that score alone. One interesting change is that two carbon potentiometers are used in series, one of a low value and one of a higher value. This of course extends the range of the instrument considerably but at the same time allows comparatively accurate readings for co-axial lines of 50 or 75 ohms. Alternatively, the potentiometers could be switched though I am against avoidable switching of r.f.

My aerials have always had a 75 or 300 ohm feed and my antennascope has been most useful. If I was to rebuild it I think I should probably use a 1000 ohm carbon potentiometer in order to cover 600 ohm lines as well. Also, they can be obtained for about 5s. plus postage!

The hour or two spent in building an Antennascope will be amply repaid. Efficient matching cannot be obtained unless you know your aerial impedance.

RUMOUR HAS IT:- That during Reunion Weekend a Signalman wandered up Vimy Road with his transistor set belting out pop music. Sudden deafening burst of noise and the set packed up !!

POINTS FROM YOUR LETTERS

Apart from the gear what interested me was the fact that the HQ station is in what was in 1925, when we first went to Catterick, the Adjutant's office of the old Training Battalion and in which, on an occasion, I received notification that a certain senior officer thought I should be more interested in horses rather than in ham radio.

The telephone pole outside is in the same place as that, up which in a snowstorm, I spent my 21st birthday regulating the route which went up the road in those days. My climbers slipped just as the CO came out of his office; I thought his amusement rather misplaced.

Lt Col Bill Horniman G2WH

We have had a bit of a hangover here in the shape of a Mosley TA33 Junior beam and for the last two weeks we have been surveying, rigging erecting, dropping raising, wiring and by next week it is hoped working this antenna.

Last Monday afternoon all preparations were complete for the erection of the mast - five sections of 3" diameter tubing, an old disused type of mast that normally has four sections (36ft) that the OC kindly allowed us to borrow. The fifth section was a completely unaccounted for piece and was probably dragged off the "Bondu" where it had been since the days of yore. That fifth section was the cause of the trouble. After strapping the beam and rotator neatly to the mast it was raised onto a high pair of stepladders at one end and bolted in one place to a concrete column that used to be a feeder route support, the idea being to back a "one tonner" under the mast and using its height as a vantage point to lift the mast so that it would pivot about the bolt, the other end of the mast beyond the concrete post was to be pulled by Charlie, one of the chaps on Dave Bullard's shift. It must be admitted that it looked perfectly feasible but when we had the thing at about 30 degrees it bent in the middle, the aerial doing a smart nose dive. Our additional section needless to say was eaten by rust inside. We had to call it a day as yours truly was turning an alarming shade of pink from exposure to the sun and suffered for it afterwards. Two days later when I could move again, I knocked the bent section from the mast and drove the remaining pieces together. Now we had a 36ft mast which was wired up and the antenna elements very gently persuaded back to their original shape, no harm done. So by last Thursday morning I had persuaded Cpl Cowie and his linemen to give me a hand and even got his 3-tonner backed up under the mast for another shot at the big lift and this time success, it went up first time and I had the guys all staked out within the next half-hour.

259 Signal Squadron 5B4TX

reported by Barrie Clark 5B4CL

Fortune seems once again to have smiled on the National Field Day efforts of the Famagusta Group of the Cyprus Amateur Radio Society. By all accounts Limassol and Nicosia groups didn't take the field, we were lucky as our site was within the Sovereign Base area.

Thanks are due to Lt Col (TOT) Fairman and Les Kynch for the trouble free generators and the Racal RA17 not to mention the riggers who put up three of their 75ft masts to support our Vee beam on the UK. It was very hard (and hot) going and only 90 odd UK stations worked. We heard plenty and were called by all DX under the sun.

The crew included 5B4CA,CZ, IH, GF, WS, KG, LK, RO and NG. As GF said it wasn't Field Day without rolling our own grub but we could get home for a shower and a kip between shifts and we didn't have the usual 40 mile drive before erecting things. Nevertheless a good time was had by all.

Ted Ross 5B4CZ

ATTENTION AFFILIATED CLUBS

The Society has available for loan to affiliated clubs a number of WS36 transmitters and AR88 receivers. This equipment is located at Catterick and it is regretted that clubs must collect as we have no facilities for crating and despatching. Any affiliated club wishing to borrow equipment (on signature of course) should contact the Field Secretary. The WS36 is capable of modification to make quite a good amateur transmitter.

LATE FLASH

With effect from 1 Sept. 64 Singapore stations sign 9M4..... our friends at 18th Signal Regiment become 9M4RS, Ted Philp becomes 9M4MB etc. etc..