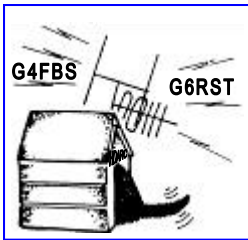


Horndean & District Amateur Radio Club Journal

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FT8 one of many digi modes

Horndean & District Amateur Radio Club
Founded in 1975

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Articles, letters of interest, photographs are always needed and should be sent to the Editor :-

I use Microsoft Publisher to produce the journal so am happy to accept articles/photographs via email. A Word document or Picture attachment. Just use Journal article or Journal picture as the subject matter.

Opinions expressed in the journal are not necessarily those of the HDARC. The editor has the right to reproduce the articles for our affiliated club journals/newsletters. The Editor decision is always final.

Closing date for next journal is : September 4th

Editorial



Well, hello everyone

It's been a difficult time for everyone. With lockdown easing we find ourselves being able to move about a bit.

I, for one, have had a couple of portable days out, even taking FT8 with me. And being surprised at some of the results.

I would like to take this opportunity to thank everyone who has taken the time to participate with articles for the journal; it's very much appreciated.

One good thing to come out of this situation is the participation of people taking part in the various nets we have during the week.

Stay safe everyone. It's not over yet.

Ralph 2E0HES

Club Clothing

Sweatshirts Polo-Shirts T-Shirts Fleeces

Sizes: Small = 36 - 38" - Medium = 38 - 40" - Large = 40 - 42" - XL = 42 - 44"

Available with club logo only or logo, name & callsign

Cap - One Size only: with adjustable strap - Stitching in Yellow

Available with callsign only or callsign and/or name

Some items available in various colours, see **Stuart G0FYX** for details

Getting to know you

Ken Lindsay G0JWL: Chairman of the HDARC.

Like our Secretary Stuart, I was asked by Ralph to comment on my interest in communications. Of all places, it started when I was asked if I wanted to join the civil defence, for those of you older generation who remember that organisation.

At the time I took on a quick job whilst waiting to go into full time training, which just happened to be the Ministry of Defence (MOD); I was just 15 years old then, up to that point my only knowledge of communications was like many others of my age and older, listening to the BBC or Radio Luxemburg on a short wave receiver, Television was around but was rather expensive, in black and white and only two channels, plenty of choice most certainly not and it closed down at late evening.

My job in the civil defence force was to train as a telegraphist using predominately CW which struck me as rather odd, since like most I thought I would be using voice transmissions, that said I became quite good at it, well I thought so anyway. Unfortunately when I started to get to grips with it, my career kicked off and that was it for quite a while, although my interests were still all things technical.

Later on, I decided I wanted a bit of excitement so I enlisted into Her Majesty's forces (Army) this is where my interest in communications was again brought to life. It started of all places in a forward position in the middle of the jungle in a place called Bario, which was then British North Borneo, part of the Malaysian federation; my job was to protect the new state of Malaysia, like our American cousins in Vietnam. The Malay & Borneo campaigns were not by any standards a pleasant experience. It all pretty much kicked off at the end of WW2 and it continued taking in the confrontation with Indonesia, prior to that was the Brunei uprising which was communist inspired, so we not only had the Indonesian forces to worry about, we also had various communists groups to contend with as well, a bit of a mixed bag one might say, sadly which resulted in much loss of life.

Anyway back to the story, some of my colleagues had problems listening to our radio (commercial stations BFBS and the BBC and other English speaking stations) so I designed an antenna system so we could listen to our radio which was a modified military one; it did cut out a lot of static, bearing in mind we were on very high ground surrounded by mountains, most covered in jungle which had to be patrolled continuously searching out the enemy forces.

My regiment was part of the Ghurkha brigade, so we were entitled to wear the cross kukris the Ghurkha jungle knife; myself I carried a Perang an Iban jungle knife, which apart from being an excellent jungle clearance tool was a very effective weapon; the Ibans used it to take heads, they were head hunters. I think you get my drift, really nice people, I was relieved they were on our side and we used them as scouts. As you can imagine a lot of my time was actually in that environment hence the title of jungle bunnies which we were given, so it was great to actually get back to our forward areas from time to time to catch up on civilisation of sorts.

The regiment spent about three years in the Far East. From there it became a complete contradiction, I ended up in Berlin at the height of the cold war, where I was asked if I would like to be a regimental radio operator; I had no choice really. I was told I was to train as an operator end of story. I had to relearn the Morse code again, which I did but like most things the military asked you to do, I never actually used it, instead I used voice, and ended up a rear link operator using both VHF and HF communications. It was interesting insomuch as that as an operator the Russians and the East Germans were doing everything to make life very difficult signals wise so it was constantly changing frequencies and codes to get the messages back to the UK and other friendly players; and no I wasn't always in a nice warm radio room; this was Berlin at the height of winter and very much below freezing sitting in the back of an Auto union equipped radio vehicle; all our vehicles were German, our radios were British, the B42, Larkspur was in the process of being phased out. We never had Clansmen or Ptarmigan then. Like Malaya, it was interesting times then in those days.

From there I was then posted and attached to Royal Signals at Catterick Military Garrison where I undertook more training with both 11 Signal Regiment and then 7 Signal Regiment and also 24 Signal Regiment. Apart from being a very cold and bleak part of God's county (Yorkshire) I was relieved to get away from there ASAP. I was then posted to 10 Signal Regiment (London); it was a girls camp predominately, the less said about that I think the better; I did enjoy it there being close to the City.

However, the good life was short lived, as I was quickly posted, and became a member of the Strategic reserve and ended up in the UN; I have to say my job was interesting, being an aide to the Director of Signals, driving around in a nice staff car. Apart from my main boss, I also worked for two other bosses, one being a Canadian and was in the Canadian contingent and the other was a commandant of the Irish Army, a bit of a mix. I got to know all three well and got on really well with them to the point I was asked if I wanted to join the Canadian Army; in hindsight I wish I had done.

Working for the UN was interesting, since we were tasked to protect two different ethnic groups who had the predilection to want to kill each other, and yes you guessed it we were caught right in the middle of it; take my word for it wearing a blue UN beret did not give too much protection. The radios I used there were Telefunken, good kit. At least it was warm, opposed to Berlin.

From there, it was back to the UK, where I again was introduced back into the CW scene using 123 transmitters and Racal receivers, I have to say they were excellent bits of kit, I also got introduced to both high speed Morse, which was then recorded and then sent out in extremely short bursts; if my memory serves me correctly it was transmitted using a D11 fixed in the back of a Commer Cob signals vehicle. I was trained on teleprinters as well but I got a bit bored with that after a while.

From there, I had a brain operation, which required its removal, after a series of little hikes up and down the mountains carrying an extremely heavy Bergan weighting 66lbs + covering many miles in a very short order in what was then a very bad winter, white outs were not uncommon; once I passed that phase I then was dispatched to No1 parachute School Abingdon near Oxford, where a kind gentleman asked me if I wanted to jump out of a perfectly serviceable C130. Before that, as a warm up, I was invited to jump out of a barrage balloon at 800 ft. I think the RAF had a wry sense of humour. Having completed my jumps, which also included night jumps, I have to say jumping from a C130 Hercules was a much more preferable experience. I did very little day jumps, most I did were at night. From there I learned new skills such as blowing things up, like railway lines and other items of transport, to becoming a fully trained medic, where I was in a training hospital and other venues, and then back to basics again as a signaller; the difference was it was all CW and one time pads, using the Clansman system which had to be carried and using a dynamo for power. All OK if you were not transmitting. The conditions I had to work in were not by any standards ideal, but it was a challenge, more so if when we wanted to get resupplied. Again another story.

Then it was back to the land of Civvy Street and the realities of actually finding paid work, which ended up being shipbuilding in Southampton for Vosper Thornycroft and other similar employs, ending up in management, and from there I went back to yet another University to get my teaching degree and further down the line my MA. I remained in teaching for many years teaching in colleges and University and I am still involved in it professionally in both engineering sciences and teacher training. I also am involved as your training manager, which I enjoy doing, more so getting involved in STEM.

So how did I get involved in Amateur Radio? During my time, like most of us, I became a short wave listener. I wanted to be able to transmit as well, so like Stuart, I too sat my RAE licence under the same tutor Len (Newnham G6NZ), who was once also a president of the RSGB, so we were taught well and like Stuart, Simon and Julia, we became members of the HDARC when it was in Horndean many years ago. It was there that both of us were volunteered by Dougie 4 (G4BEQ) who was then the Chairman, to be both Chairman and Treasurer. Dan G4RLE became treasurer then the Journal editor, Sadly taken too soon and became a silent Key.

I don't think either of us had a clue what it involved or for that matter what to do and how to move it forward, all I can say it was a very quick and steep learning curve, but both of us soon learned. I have to say we are still learning. We both have really enjoyed the journey, that said it was not always a smooth path but along with excellent committees we persevered and still strive to achieve what is best for you ,the membership, and the HDARC as a whole.

By this time, having bored you to death with my ramblings you have probably quickly moved on to Mike's construction items, which I have to say are excellent and well thought out, very much in the mould of Russ's.
Thanks for reading, best 73. Ken G0JWL



CAA Knocks It Down

What you doing that for?

You might think we would always want to make our signals bigger so why on earth would you want to reduce them? Well there are actually many occasions when it may be beneficial. For instance, when receiving a signal on a band close to a strong broadcast station where reducing the whole lot can stop the front end being overloaded and improve the reception of the wanted station. Also when testing an S meter, or the low signal performance of a receiver. In my case it was to test the calibration of a power meter I'm building. This a two for the price of one article, describing a fixed and a switched attenuator.

What's a dB attenuator?

Decibels are a logarithmic method of measuring levels. It seems complicated but lots of things in nature behave in a logarithmic way. The way the ear perceives sound for instance as well as the reception of radio signals, so a log scale is much easier to understand.

As far as voltage is concerned, the attenuation is calculated by taking the ratio of the output and input voltages and multiplying by 20 times the log (base 10) of this.

So 10V input and 5V output would give:

$$0.5V / 10V = 0.05, \quad \text{Log}(0.05) = -1.3, \quad 20 \text{ times } -1.3 = -26\text{dB}$$

For power we take the ratio of output and input power and multiply by 10 times the log (base 10) of this. So 2 Watts input and 0.5 Watts output would give:

$$0.5W / 2W = 0.25, \quad \text{Log}(0.25) = -0.6, \quad 10 \text{ times } -0.6 = -6\text{dB}$$

As 10V into 50 ohms is 2W, both the examples above are the same signal.

Are you rolling your own now?

Many years ago, in the age of tobacco tins, I built a switched attenuator for 50 ohm systems. Built for testing receivers it's only suitable for low power use. It has three stages of 6, 12 and 24dBs. This allows an attenuation of zero to 42dB in 6dB steps to be inserted.



The unit consists of 3 stages that are brought in using 2 pole 2 way toggle switches. Each stage is a PI circuit, so has a resistance across the input, a resistance in series, then another resistance across the output. By choosing the values carefully the input and output impedance can be kept to 50 ohms for a given attenuation. I use a spreadsheet with the calculations imbedded so you can play around with the R values. Resistors come in a series of standard values, so in order to get a value close to ideal it is often necessary to put more than one resistor in parallel. The resultant value can be found by the formula:

$$1/\text{Result} = (1/\text{First } R) + (1/\text{Second } R) + \text{etc}$$

The power dissipated in any resistor can be found by first calculating the voltage across it then using the square of the voltage over the resistance.

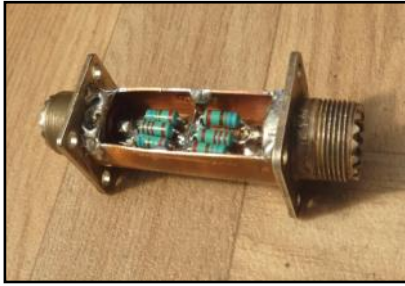
$$\text{Power} = V^2 / R$$

With the values shown the actual calculated attenuation is actually: 6.004dB, 11.962dB and 23.93dB. The worst input impedance is 51 ohms. These values are close enough for almost all applications.

The resistor must be non inductive so I used metal film ones, definitely NOT wire wound. These days surface mount resistors would be ideal. Remember the values have a tolerance so won't be exactly what's calculated, I used 2% so it's pretty close. The ones shown will run continuously at 0.5 Watt, so the attenuator can easily cope with 1W input for 20 seconds. The wiring is rather long so not much use above 29MHz. The shields between the sections help to reduce bleed through at maximum attenuation when the tin lid is on.

I need more Power!

For my power meter calibration I wanted to attenuate 5 Watts by 3dB (half power) so used 3 resistors in parallel on the input to share the power.

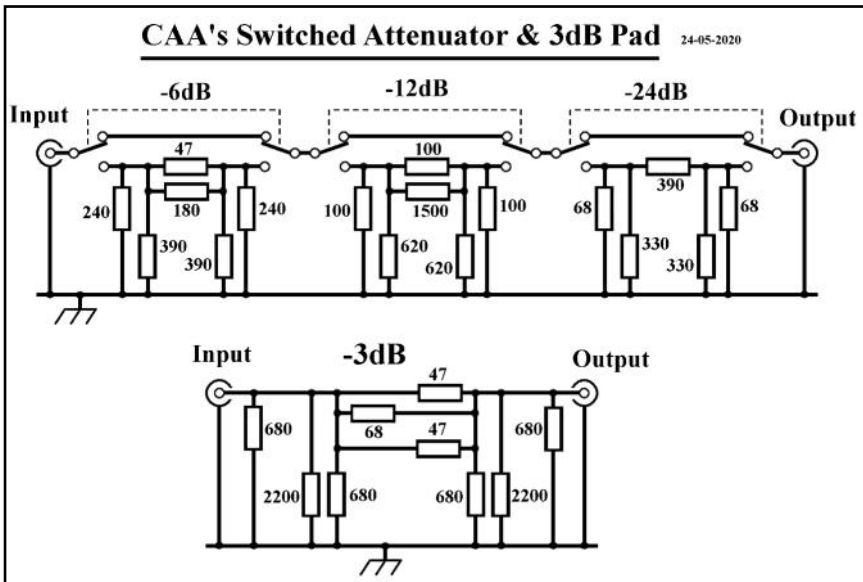


I used a small piece of copper clad board and filed the copper off in two places to give 3 copper pads to solder the resistors to. A piece of 22mm copper pipe was cut down and bent to provide a screened enclosure that could be soldered to the PL259 sockets. Some copper tape on top will finish it off.

In fact it will easily take 10W for 20 seconds with the 47 ohm resistors dissipating 0.88W.

The values shown calculate as 2.976dB and an impedance of 49.98 ohms.

The SWR is good even at 144MHz and is 1.4:1 at 430MHz. Again surface mount resistors and N type connectors would improve that.



All the best and happy hacking - Mike M0CAA & Sue M0BOZ

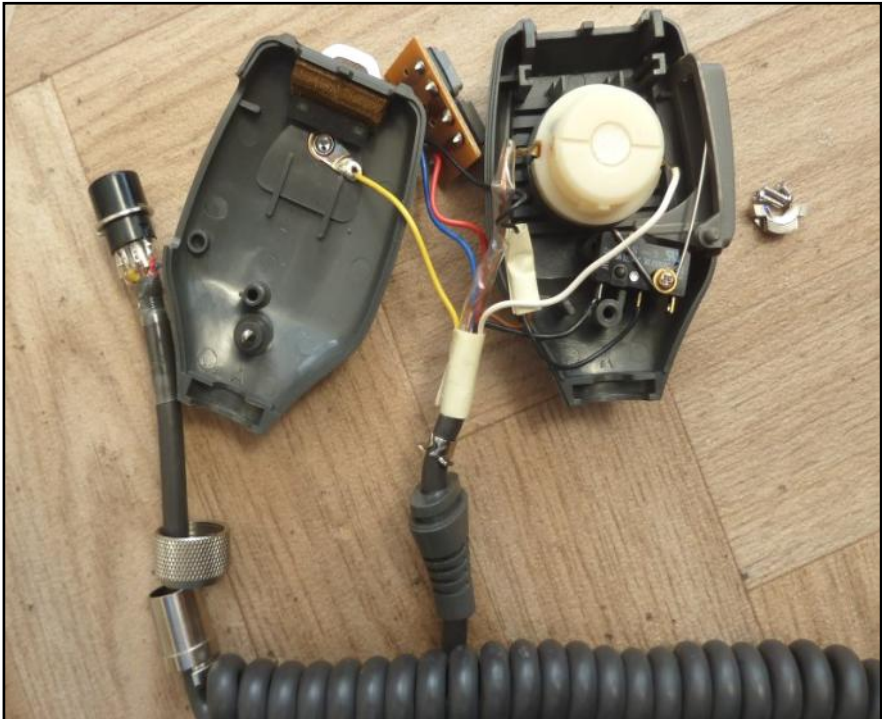
MIKE'S MIC GETS A MIKE MIC MOD!

After my recent purchase of a venerable TS430s transceiver I got some comments on the audio quality being slightly muffled. A while back I did a mod to my FT817 to replace the 600ohm dynamic (moving coil) microphone with a electret (capacitive) insert. The subsequent audio reports were favourable indicating improved quality, so I decided to do a similar mod to the TS430s. The electret insert I used was 10mm in diameter and was recycled from an old cassette recorder, but new ones are very cheap (£1).

The manual shows the pinout of the microphone connector (viewed from the front of the rig :

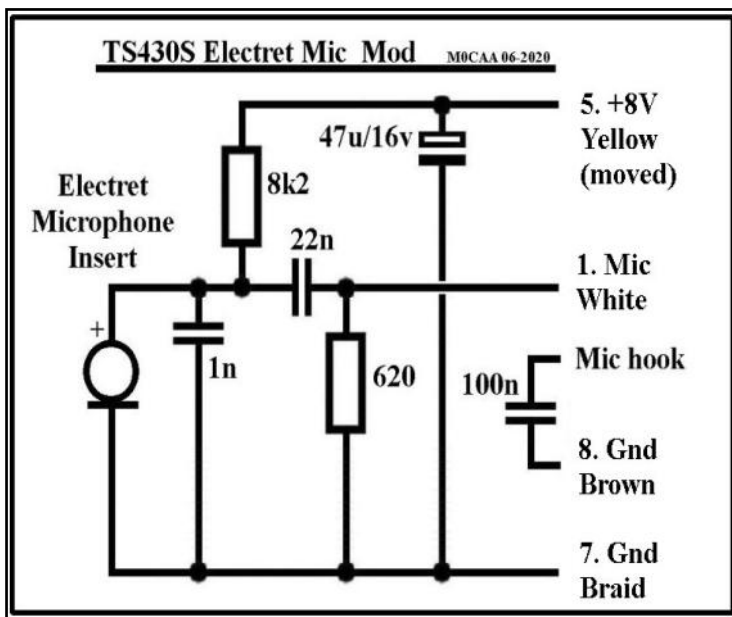
1= Mic, 2= Stby, 3= Down, 4= Up, 5=+8V, 6= nc, 7=Gnd mic, 8= Gnd stby

Dismantling the microphone and the connector showed only 6 wires were used, with pins 2 & 5 not used. Strangely a yellow wire went from pin 6 (nc) to the clip on the back of the mic, why??



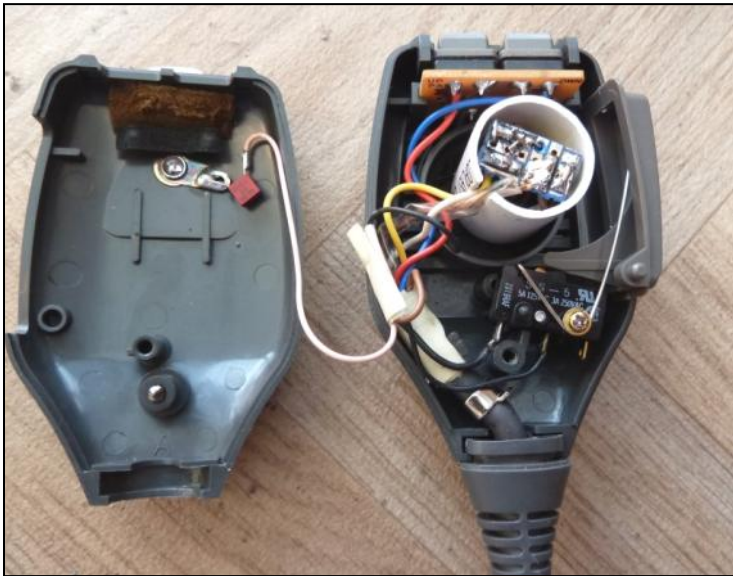
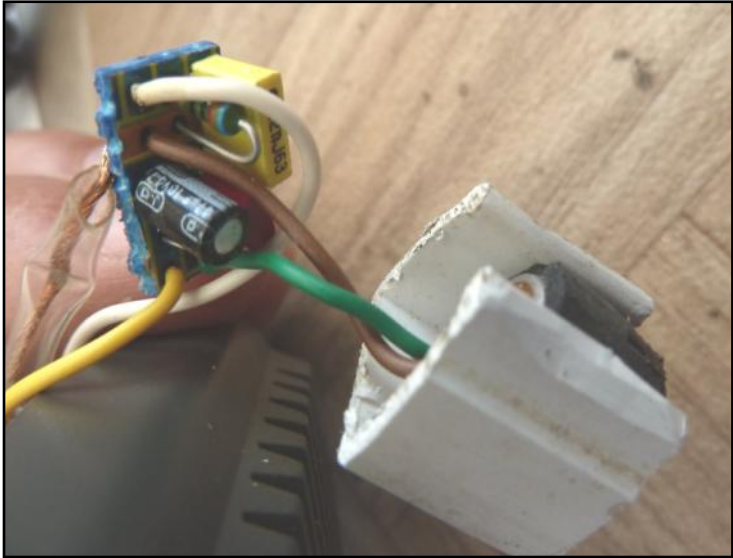
The electret insert requires a DC supply to power it. So the yellow wire from pin 6 was moved to pin 5 (+8V) and the clip originally connected was taken to ground (pin 7) through a 100nF capacitor. The yellow wire now has a DC supply for the insert. The negative connection is linked to the metal can to reduce noise pickup.

The circuit is pretty simple. Power is fed to the insert through the 8k2 resistor. The DC is removed from the audio by the 22nF capacitor which also boosts the treble a bit. The 620 ohm resistor across the output attenuates the signal and matches the impedance of the original 600 ohm microphone. The 1nF across the insert stops RF breakthrough.



The FT817 has a printed circuit board inside which provides somewhere to put the additional components, but the Kenwood doesn't, so a small piece of matrix board was used.

A piece of 20mm plastic overflow pipe was cut to the same length as the original microphone and a slot was cut for the wires to pass out. A piece of small square section conduit, which was a push fit inside the pipe, was cut to the length of the insert. The insert was glued into this so that it was up against the opening in the case. The component board could be fitted behind the insert in the pipe, making a mechanically stable installation.



The modified microphone was tested on the Horndean club's top band net. Reports on the audio quality were good, most comments saying the audio was clearer and less muffled.

Mike & Sue M0CAA/M0BOZ

TRAINING

Simon and myself hope everyone has kept well during this horrid Covid pandemic and that we look forward in meeting up again with the membership very soon. As many of you know, the club started a new Foundation course in January for 8 students of varying backgrounds; this was the first course under the RSGB's new 2019 revised syllabus. Simon and I thank Frank GOLFI for his continued help during all training sessions and to Milan, Ralph, Stuart and our training manager Ken. Various club members who were interested in the training activities came upstairs to see what was happening and sat in to listen which was welcomed. Two practical sessions took place in the conference room upstairs in March but then the Covid situation brought mayhem forcing the country to go into total lockdown with shops, cinemas, sports halls, schools and private hire buildings etc; having to shut down till further notice.

Sadly this meant Deverell Hall, had to close with all meetings and training activities having to cease. The students were due to complete two more practical tasks in April with a revision session at the beginning of May then sit their examination mid May. Simon spent time sending homework to the students each week followed by sample exam questions which the students found very useful. I was sent a text message by one of the students half way through April to ask if I had seen the latest RSGB bulletin with regards exams and Covid which at that time we hadn't. I sent Carol at RSGB HQ an email to ask for clarification on that info which was printed within RadCom and on the tutor's forum. The RSGB had decided to offer as a gesture during Covid for students, to sit an on-line Foundation examination regardless of whether or not all practicals had been completed. Because our students had some practical elements still to complete they were placed into the second category of exam dates, with those in the country having already completed all, or had an exam booked and postponed, sitting their exam first. The last category was for any students who had studied but not completed any practicals. On behalf of the HDARC training team, Simon and I are pleased to advise that 7 out of the 8 students have now all passed the exam, some of whom have notified us of their M7 call sign. We haven't been able to make contact with the eighth student so we don't know if he was able to book an exam, or if he was away, so we look forward in seeing him upon our return to club in August.

This is an excellent result for the HDARC and the training team, but more importantly the students, as without their hard work and determination to study they would not have achieved such good results; so well done to all involved.

The students have emailed to say they would still like to complete their missing practicals not done when we return, which is very nice, but before they start an Intermediate course.

Until the RSGB make some important decisions on whether or not practical tasks at Foundation and Intermediate levels are going to be totally removed from the syllabus after Covid, and only on-line courses will be the norm from now on for all levels, we do not know if registered exam centres will be required any longer to provide training! This will be a major blow to HDARC if this is the case.

As the club's Exam Secretary, despite having sent emails to the RSGB on behalf of students who have raised very important questions, I received unsatisfactory answers, so cannot say when, or if, courses will commence upon our return to Deverell Hall or in the future.

We sincerely hope this is not the case, as I have several external candidates on a waiting list for all levels of the licence and this is on top of the existing students waiting for each level.

Some students waiting, one of whom is disabled, have expressed concern that they do not have the facilities to do the on-line course or exam option.

Julia G0IUY
Hon. Exam Sec HDARC

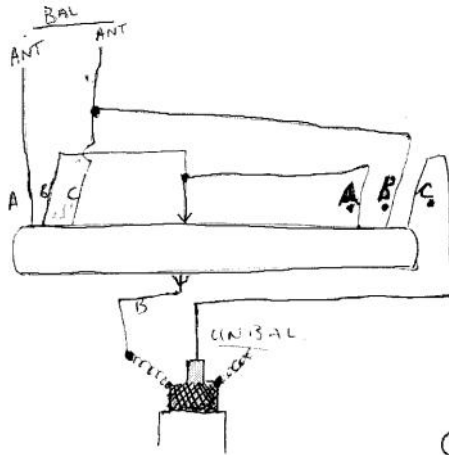


A pair of baluns Alex GODHZ

50/75 Ω coax to a 1-1 BALUN
DIPOLE

Antenna A
A. antenna, twist C + B.
coax braid, twist B + A.
Coax Centre C.

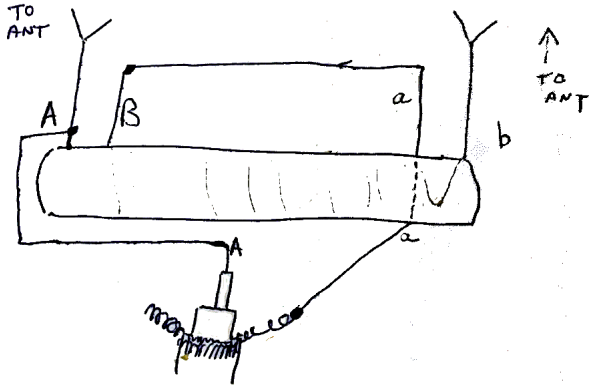
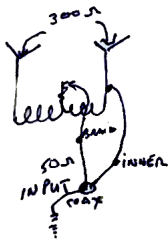
6-7 TURNS
ON
FERRITE
ROD



CONTIN. BAL
ON
ALL POINTS

EXAMPLE:-
300 Ω RIBBON
TO
75/50 Ω

4 TO 1 BALUN TWIST 2 WIRE
6 TO 7 TURNS



4 TO 1 COAX
ONTO

CONTIN. BAL
300 Ω RIBBON/COAX

Simon GOIEY

Hi Radio Users. I have been asked to provide some words for the HDARC Journal as the Editor is light on content.

Well it has been very good to continue meeting members albeit on the air on 2M and 70cm. In fact I have spoken to more members since lockdown than before. Thank you especially to John G4WQZ for running the 2M & 70cm which I have enjoyed, and thank you also to all of the other members who have been running HF and CW Nets/CW training. Sorry I haven't made it on to any of those.

At the Club Meetings I don't often get to see/talk with members as I am usually helping students with help from some very talented other members (I will save them embarrassment and won't mention any names as Frank, Ralph, Milan, Ken, Stuart and Julia may get upset), ha ha, upstairs in the lecture room. The plan was originally to build all of the new practical training equipment necessary for the revised syllabus and complete the electrical out fitting in the club caravan. Well plans are made to be broken! The lockdown was worse than expected so I was restricted even more. Some of the new materials became problematic to obtain.

I did manage to restart sorting 38+ years of 'junk box' that was spread over 4 roof spaces 2 sheds and 2 workshops. Note I did say restart, not finish. My memory not being very good these days (Understatement), as Julia has noticed. I am not sure where she gets the patience to help me looking for things I put down seconds before or when I am wandering around with a lost expression on my face (obviously looking for something) I can't remember what, so am cruising the 'estate' looking for inspiration to trigger memory recall to what I am looking for, or what I was going to do with it having found it!!!

With regard to restart sorting, that produces a problem, as I have restarted so many times now that I can't recall the original plan of where I am putting items sorted. So everything takes longer. (Well that's my excuse).

Before Lock down I had been purchasing clear plastic boxes with clip on lids in various sizes, from a local supermarket. I am not allowed to advertise as an amateur so will leave it that it contains four letters and it is

linked with America. I have been using the smaller sizes to contain small test equipment, adaptors (Audio and RF).

Incidentally there are some very useful multi-compartment boxes with hinged lids that are ideal for sorting/storing RF Connectors. I always look out for these on special deals wherever I go. (Or did before Covid 19 that is).

The sorting has been slow, as you have no doubt guessed by now, but much has now been First Pass Sorted. That means there are a lot of items of a similar type in boxes that now require sorting into sub types and then into specific specified types and catalogued! It can't be that bad? The main problem I lost count of the individual components round about item number 4 million.

Julia and I have now made 2 journeys to the Club Caravan and nearly installed the main cable trunking run. No problem at the Fort Site with social distancing (I think those people that have pointed out on the TV that there is no way distancing is Social, are right, it is obviously antisocial).

I had hoped to finish the trunking installation off, but time and health issues all take their toll on when I can operate safely. Even holding a screwdriver can be dodgy at times. Before lock down (I use this statement a lot, sorry. In fact I am going to shorten it to BLD it is quite catchy I think), Frank (GOLFI), Christine (M6UBI), Julia (G0IU Y), and myself used to go to the Fort to continue work on the ATV set up and fitting out the caravan.

The caravan and station have always been intended, apart from usual club use, to carry out what the RSGB are now calling/promoting 'Beyond the exam practical training' (or something similar), so they pinched our idea. I know how useful practical help can be, because back in the good old days of the RAE, no practical training was given; it was all theory. It was essential to join a club to find out more and get help. It is still a good idea to join a club for the same reason. Even the 'old hands' can learn new techniques that are rapidly becoming the norm. I know I need to learn more or even relearn what I have forgotten through lack of use, etc...

I have been finishing off several jobs that have been on hold around the workshop, garden, etc.

My late father's lathe is now functioning again, so accuracy is back on the plan and I might even find time to carry out the modifications to my own lathe. The main work shop needs reorganisation, which needs help from my sons due to lifting/moving some too heavy pieces of equipment that I originally, some 30 years ago, thought nothing of placing. I am sure I am not alone in finding it is difficult to get enthusiasm going to carry out tasks as years go by and health issues arise. Every task hurts/causes physical and mental damage and has to be weighed against the need!



Two weeks ago, my Aerial arrangement, which is mainly for VHF and above needed maintenance; the Elevation Rotator was not functioning, so the aerial support was lowered with help from Julia and some unexpected damage was found. Water had entered so called 'water proof boxes' and damaged connectors and coax cable. I think the answer is to drill a small hole in each box at the bottom side when the aerial support is raised to allow the boxes to breathe with temperature changes. Unfortunately this was not the cause of the rotator not working. New boxes were ordered and work started on tracing the rotator fault. Annoyingly the weather has not allowed further testing to be carried out.

It may be the static discharge devices have broken down or the interconnecting cables have been damaged by our young family of foxes that reside in our garden; this year 3 cubs and 1 female adult. They do like to play and chew, so time will tell. It is fun to watch them grow and play hunting. Sadly the local pigeon population and squirrels are taking a hit this year that I haven't noticed in previous ones. There have been foxes residing in our garden for over 24 years as a direct result of a previous next door neighbour keeping a horse and storing hay, etc alongside the fence in a shed. The foxes moved in under the shed with an escape exit in our garden. The horse disappeared when the neighbour moved and the new resident next door removed the shed and the foxes moved into our garden and have stayed.

So the end result during BLD, I have achieved quite a lot considering, not necessarily what I thought or planned for several reasons. I still have to finish many planned tasks. I am trying to finish sorting my junk so that my family don't end up dumping it when I am not looking. I have earned plus points from my family over the last year for throwing real junk (ouch) away at the tip. Sadly at the moment the tips are out of bounds for me. What a shame.

Stay Safe.

73 de Simon GOIEY

Q: Why can't a woman ask her brother for help?

A: Because he can't be a brother and assist her, too.

Q: Did you hear about the guy who stole the judge's calendar?

A: He got twelve months.

Q: What can you make by putting two banana peels together?

A: A pair of slippers.

Q: Do you know why people keep going to see Lord of The Rings over and over???

A: Because it's Hobbit forming.

Q: Why is mayonnaise never ready?

A: Because it's always dressing.

Q: What is the penalty for breaking the law of gravity.

A: A suspended sentence

Acknowledgement to ZL3AI

Sporadic E

Sporadic E propagation, by its name is sporadic and unpredictable by nature, but it enables radio signals to travel over much greater distances and often at higher frequencies than would normally be possible via the ionosphere.

Sporadic E, or Es is a mode of radio propagation that occurs on occasions. As the name indicates, sporadic E is not easy to predict. It occurs on an occasional basis, and can affect radio communication on frequencies from a few MHz up to those much higher than would normally be expected.

It can often affect frequencies into the low end of the VHF spectrum where services such as VHF FM broadcasting, and PMR may experience increased levels of interference. On some occasions it can affect radio communication on frequencies of around 150MHz and sometimes even above this.

Sporadic E is not normally used for radio communications purposes (although radio amateurs use it) because of the sporadic nature of its occurrence, and it cannot be relied upon. Instead its occurrence should be noted as it can result in raised levels of interference as signals are propagated over much greater distances than would normally be expected.

Sporadic E, Es, arises when intense clouds of ionisation form in the E region of the ionosphere. The level of ionisation is up to about five times that of the levels reached during the peak of a sunspot cycle when they would normally be at their highest. The high levels of ionisation resulting from Sporadic E enable signals well into the VHF region of the spectrum to be refracted by these ionised clouds - frequencies up to 150 MHz may be affected. The levels of ionisation also mean that losses are particularly low - often low power transmitters may be heard via sporadic E.

When sporadic E ionisation clouds form, the intensity builds up steadily. First this affects frequencies in the lower part of the radio spectrum, and then rises. The highest frequencies that may be affected will depend upon a number of factors including the level of ionisation - this will vary from one cloud to the next. Another factor that is found with Sporadic E clouds, is that they can become opaque below a certain frequency, dependent upon the state of the cloud. Also the critical frequency varies significantly in time and space making it very difficult to utilise for commercial radio communication systems.

The level of ionisation for any given cloud will rise steadily, reach its peak and then fall away again. As a result they may affect the higher frequencies for only a short time. At the higher frequencies, signals may be propagated for periods of a few hours, whereas at other times the conditions may only occur for a few minutes. Sporadic E clouds vary greatly in size and also in the intensity of the ionisation.

Some clouds may be a few metres across, whereas others have been seen that are over 200 km across. They typically occur in the regions between about 90 and 120 km, although they can extend much higher than this. The shape also varies - some are approximately circular having approximately the same dimensions in both directions across them, while others are long and thin. While the actual shapes are not of great importance, they explain to some degree why some stations may experience sporadic E propagation whereas others may not experience it or the areas where stations they can hear are totally different.

The clouds are also remarkably thin. The E region itself spans altitudes of several tens of kilometres. Many Sporadic E clouds may be only a few tens of metres thick. As a result the reflections occur as a result of an extremely sharp change in electron density. Other clouds may be much thicker and have a much more defined level of ionisation which leads to reflections in the normal way.

Not only is the formation of the Sporadic E clouds almost random, but they also move as a result of the winds in the upper reaches of the atmosphere. The winds reach speeds of up to 400 km per hour. This movement can result in the sporadic E skip changing relatively quickly - the source of signals heard/interference will change over a relatively short period of time.

Sporadic E clouds form in the lower areas of the E region. As a result the maximum distances over which signals are normally heard is around 2000 km. Obviously shorter distances are more normal, although the minimum distance is governed by the amount of refraction required. For shorter distances, higher angles of radiation are needed and these require a greater amount of refraction for the signals to be reflected back to Earth. Although sporadic E clouds tend to be random and not as widespread as normal E region or F region ionisation, double hop propagation has been detected, especially on lower frequencies where reflection from clouds is more widespread. Although Sporadic E may appear to give an improvement in some HF communications, while also allowing communications/interference to propagate on frequencies well into the VHF portion of the spectrum, it can also have the effect of degrading some HF communications. The very high levels of ionisation in the clouds will reflect any signals in the HF portion of the radio spectrum. This may prevent them from reaching the higher F regions, thereby preventing them from being able to achieve much greater distances. Under these circumstances short range signals will be detected when longer range signals would be expected. However the intermittent nature of the sporadic E clouds and the fact that the clouds are very mobile means that any effects are likely to be relatively short lived.

The occurrence of sporadic E is very hard to predict. However a large amount of statistical data has been collected regarding its occurrence. It is found that the occurrence of sporadic E varies according to the region of the planet:

Temperate regions: In temperate regions, i.e. those in the mid latitudes between the equatorial regions, it is found to occur mainly in summer. In the northern hemisphere the months of May to August yield the highest number of openings with a peak in June. A small peak is also noticed in December. A similar pattern is also apparent in the equivalent months, November to February in the southern hemisphere. Generally the frequencies well into the VHF portion of the spectrum are only affected in the middle of the sporadic E season, i.e. mainly in June and July in the northern hemisphere.

Polar regions: In Polar Regions what is often termed Auroral sporadic E occurs, and again there is little difference between the seasons with it usually occurring in the morning.

Equatorial regions: In equatorial regions the occurrence of sporadic E is primarily a daytime phenomenon, and as might be expected because of the location, there is little difference the year round. Its occurrence is also more frequent than in temperate regions and as a result it is believed the mechanism behind its formation may be somewhat different.

The time of day also has a major impact on the occurrence of sporadic E. Two main peaks can be seen during the course of a day for temperate zones. One occurs around midday, and the other is around 19.00. In the afternoon there is a slight fall in the number of openings, and in the early morning and at night there are far fewer openings.

The mechanism behind sporadic E is not well understood. It is thought that there may be several phenomena that give rise to its formation:

Meteors: There is some evidence for believing that one phenomena that gives rise to sporadic E is the entrance of meteors into the atmosphere. Typically meteors burn up in the E region, and there could be some connection.

Electrical storms: These may extend high in altitude and there are electrical effects well above the clouds. It is believed these could supply energy for the formation of sporadic E clouds.

Auroral activity: The occurrences of Sporadic E in the winter at night have also been linked to auroral activity. This is certainly the case for auroral sporadic E that is the result of energetic electrons entering the atmosphere from the magnetosphere.

Upper atmosphere winds: Some theories suggest that shearing forces caused by the fast moving winds in the upper atmosphere may give rise to these intense clouds of ionisation, particularly in temperate regions.

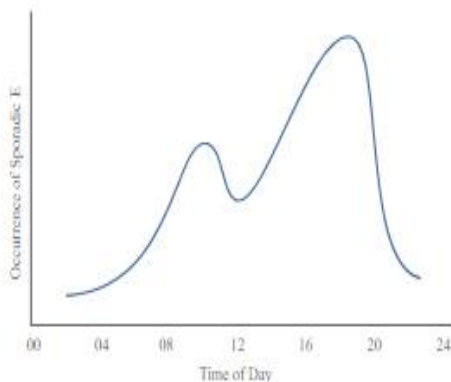
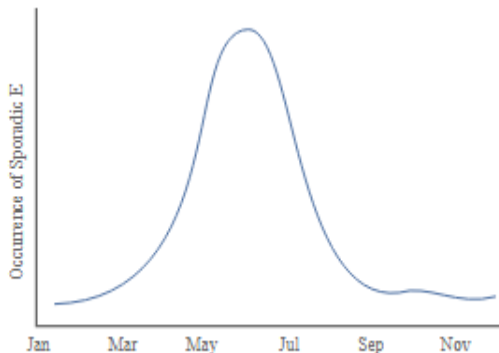
There are many theories about the nature of their formation. What is quite possible is that several different physical phenomena cause very similar forms of sporadic high levels of ionisation in the E region. Accordingly there may be several types of sporadic ionisation phenomena that are all lumped under the same Sporadic E heading. This idea is supported by the fact that Sporadic E occurring near to the equator is more stable than the sporadic E that occurs at higher latitudes. There are also other differences.

More data is being collected regarding its occurrence and this is likely to increase our understanding of this phenomenon and enable predictions to be made more accurately. One interesting link has been noted as it appears that the sunspot cycle has some effect on temperate zone sporadic E. It has been seen that the number of openings increases during the period of the sunspot minima.

Sporadic E is a particularly interesting form of radio communications propagation. Being sporadic in nature, it is more difficult to study and understand - linking the effect to the cause is not easy and as a result Sporadic E is surrounded in a degree of mystery.

With acknowledgement to www.electronics-notes.com

Stuart GØFYX



Horndean & District A.R.C Information.



Club Call signs ***G4FBS (Held by MØKTT); G6RST (Held by G4WQZ)***

Club Website **<http://www.hdarc.co.uk>**
(Maintained by Neil 2E0LNX)

Club Groups.io site *Administrator is Stuart GØFYX*

Club Facebook Page **<https://www.facebook.com/hdarc1975/>**

Club Twitter Account **@HorndeanARC**

Club Meetings *Held at Deverell Hall, 84 London Rd, Purbrook,
Waterlooville, Hants. PO7 5JU, on the 1st and
3rd Friday of each month. Commencing at 1900.*

Club Nets ***All times are local and frequencies plus/minus QRM.***

Sunday *0900 CW until about 0930 then SSB on 1950 kHz.
Net controller:- Stuart GØFYX*

*2000 FM 433.450 MHz
Net controller:- John G4WQZ*

Monday *1930 SSB 1950kHz
Net controller:- Stuart GØFYX*

Wednesday & Friday
*1930 FM 145.375 MHz
Net controller:- John G4WQZ*

Club Membership

Joining fee £2 . Annual fee £26. Those aged 10-18 pay half this rate, and under 10's have free junior membership. For Europe and rest of the World fees please contact the Membership Secretary. All annual fees payable on November 1st. If fees not paid by the following January 31st, membership is ended.

News of club members

Another reminder about the HDARC 2m nets, now Wednesday and Friday on 145.375 MHz at 1930 local time. Come and join in.

Diary

At the time of writing this (early July), Deverell Hall is closed due to the Coronavirus situation. We think that the Hall will re-open in August, and we may then resume club meetings, but there are likely to be specified operating conditions. I will keep you informed via the weekly emails.

We are hoping that by September we may be able to run our special event station GB4MHR from Ropley station on the Watercress Line for Railways-On-The-Air on September 26th/27th.

This 'n' that

Congratulations to those club members (and non-club members) who passed their Foundation Licence exam by taking advantage of the RSGB Remote exam programme, which was very successfully run.

The RSGB Club Championship series of contests finishes in July. The Autumn series of contests starts in September, with SSB on the 7th, CW on the 16th and Data on the 24th.

Full details at: <https://www.rsgbcc.org/hf/rules/2020/rautumn.shtml>

Need CW practice? - contact John MØHTE via john.taylor177@ntlworld.com , or check out the many free CW training programs available on the internet. At present, the Fareham club are running a Saturday morning CW training session starting around 0930, on 28.350 MHZ with talkback on 145.475 MHZ.

In October we will be holding our AGM, hopefully. With the next issue of the club journal there will be a nomination form for officers and committee, and an entry form for the John Taylor-Cram Scribe award.

For club clothing enquiries and RSGB book orders, please contact me (Stuart GØFYX).

The Denby Dale Amateur Radio Society (Kirklees, West Yorkshire) have put a series of their club talks on YouTube. Talk subjects include, Operating pedestrian mobile in Spain, G-QRP Club, Morse code, Heil microphones, HF propagation, Amateur Television etc.

The link is <https://m.youtube.com/channel/UCq9nFTkJJAjOdPZVytoPOcg>

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LFA-5	5 element LFA 11.76 dBi	£280.95
DES-50	5 element Opt 9.16 dBi	£190.95

Ceskcraft

A50-6S	6 element rugged 11.6 dBi	£290.95
A50-5S	5 element rugged 10.5 dBi	£210.95

Hy-Gain

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Sirio

SY50-5	5 element 10.5 dBi	£120.95
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Connet

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Diamond

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70 MHz Antennas

Innov Antennas

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LFA-Q	2 element Quad 6.8 dBi	£84.95
Owl-70	6 element Wband 11.02 dBi	£130.95

Sirio

SY-68-3	3 element 7 dBi	£70.95
CX-4-68	Vertical 4.15dBi	£60.95

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144-Owl-4	4 element 8.58 dBi wideband	£40.95
144-LFA-8 Xpol	8 element crossed 9.49 dBi	£130.95

Hy-Gain

LFA-2M6EL	6 element 14.04 dBi 4.46m boom	£230.95
LFA-2M12EL	12 element 15.82 dBi 7.07m boom	£230.95
LFA-2M16EL	16 element 17.3 dBi 10.9m boom	£340.95

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A-124-WB	4 element	£167.95
A-148-105	10 element	£160.95
A-148-35	3 element 7.8dBi 0.85 boom	£74.40
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A719B	19 element 15dBi 4.1m boom	£240.95
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Diamond

A430S10R	10 element 13 dBi 1.09m boom	£54.95
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PA5070-11-6 BG	6m 5el 4m 6 element 6m boom	£250.95

4M Yags

PA70-5-3	4m 5 element Yagi 3m boom	£190.95
PA70-6-4	4m 6 element Yagi 6m boom	£210.95

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PA144-432-17-2	2m 6 element 70cms 12 element	£140.95
PA144-432-19-3-2C	2m 7 element 70cms 12 element	£190.95
PA144-432-21-3B	2m 7 element 70cms 14 element	£190.95
PA144-432-13-1.5A	2m 5 el. 70cms 9 el 1.5m boom	£134.95
PA144-432-3-4-6-2CBG	2m 11el, 70cm 23 el. 2 con.	£240.95
PA144-432-38-6-6BG	2m 11 el. 70cms 28 element	£225.95

2M Yags

PA144-5-1.5	2m 5 element Yagi 1.5m boom	£94.95
PA144-6-2	2m 6 element Yagi 2m boom	£110.95
PA144-8-3	2m 8 element Yagi 3m boom	£135.95
PA144-9-5A	2m 9 element portable 4.67m	£174.95
PA144-11-6BG	2m 11 element Yagi 5.72m	£190.95
PA144-12-7BGP	2m 12 element Yagi	£250.95

70cms Yags

PA432-8-1.2R	70cms 8 element Yagi 1.2m boom	£80.95
PA432-14-3	70cms 14 element Yagi 3m boom	£145.95
PA432-23-6	70cms 23 element Yagi 6m boom	£190.95
PA432-30-8BG	70cms 30 element Yagi 8m boom	£260.95

23cms Yags

PA1206-13-1R	23cms 13 element 1m rear mount	£90.95
PA1206-18-1.5AR	23cms 18 el 1.5m rear mount	£130.95
PA1206-36-3BRG	23cms 36 element 3m RG Balun	£160.95
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