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SADARC

SHEPPARTON & DISTRICT AMATEUR RADIO CLUB

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Founded 1979

Incorporation No. A6677
P.O. Box 692 Shepparton 3632

STARTING OUT YOUNG



Three month old William "Billy" Corbett might not be old enough to get his amateur licence just yet but it seems his dad, SADARC Club President Toby VL3PNF is going to teach him all he knows early.

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Toby Corbett VK3PNF

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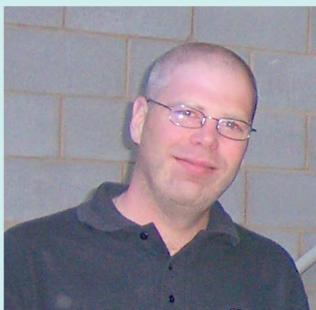
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A WORD FROM THE PRESIDENT

Presidents Report for November 2008



Hello to everyone, Unfortunately I was absent from the last meeting, Thanks to Duncan VK3DCX for taking the chair while I was away. I made a few contacts whilst I was away camped near Mt Buller, Thanks to Steve VK3MUG, Duncan VK3DCX and Tibor VK3FTIB for keeping me company. The weather was mostly kind to us except for the Sunday night when a small trench had to be dug around the camp to save all of us happyampers from floating away. We would have received about 20mm in a couple of hours but poor Duncan VK3DCX who is not too far down the road only got 20 drops.

Various issues are being looked at regarding DSTAR at Mt Wombat, will keep you all posted on how things are progressing. A very big thanks to Ed VK3BG and Rob VK3ECH for giving up their Saturday Morning and conducting exams at the clubrooms before the last meeting. Kevin Cahir VK3FKJC passed his regulations paper in preparation for going for his standard or advanced paper in the up and coming months. Steve Hamer VK3MUG passed his advanced paper and awaiting his new callsign from the ACMA. I think we need to start a completion on who can hold the largest amount of

callsigns in 12 months. FSTE, MUG and now???

Very well done Steve, congratulations mate. A number of members have been talking about getting some new projects on the go at the club. A few ideas have been put on the table already like building a kit for antenna analyzer for the shack and also moving forward with the LED project. I look forward to getting these and many other ideas moving in the New Year 2009.

Les VK3TEX has agreed to research getting some shelving and storage happening in the clubs shack. The corner has become a bit of a hazard and I think we will all

look forward to a clean radio room. As Steve VK3MUG said to me "tidy wires means less fires"

The venue has been booked for the end of year Christmas breakup at the Mooroopna Golf Club. If everyone can get in touch with the club secretary Les VK3TEX with numbers attending ASAP. I believe a meal will be around \$16 per person and as long as members are happy with the following the club will buy the first drink.

Well enough from me, look forward to catching up with you all the Mooroopna Golf Club on Sunday 7th of December at 12 noon.

Cheers and 73s
Toby VK3PNF

MINUTES OF NOVEMBER MEETING

Shepparton and District Amateur Radio Club Inc. A6677S.

Minutes of monthly meeting held on Saturday 1st November 2008 at the Mooroopna Community Hall, Echuca Road Mooroopna.

Duncan VK3DCX opened the meeting at 1305 hours and welcomed all present, and moved a motion to be president for the day only.

Moved by Alan VK3FALN, seconded by Tibor VK3FTIB and carried.

Present: Les VK3TEX, Ron VK3COP, Ed VK3BG, Al VK3FALN, Brian VK3HBW, Kevin VK3HBW, Len VK3BMY, Max VK3DSF, Pat VK3OV, Tibor VK3FTIB, Terry VK3MAR, Wayne VK3XQA, John VK3PXJ, Steven VK3MUG, Les VK3VLG, Rob VK3ECH, Rob VK3MAC, Allan VK3AYD, Jan VK3ALF, Neil VK3XNW, Jack VK3TJS.

Apologies: John VK3FJHM, Clint VK3CAF, Ian VK3JNC, Roger VK2RO, Toby VK3PNF,

Geoff VK3AHT, Kane VK3HKH, Wes VK3DDT.

Moved by Pat VK3OV, seconded by Tibor VK3FTIB, and carried.

Minutes of the last meeting: Read by Les VK3TEX, and moved that the minutes be accepted, seconded by Wayne VK3XQA and carried.

Business arising from the minutes of the last meeting: Nil

Inward Correspondence: QSL Cards from WIAVIC EMDRC Newsletter November '08 NERG Newsletter October '08 BARG Newsletter October '08

Consumer Affairs Victoria Fact sheet Department of Justice - Working With Children Confirmation for Jack & Steve EMDRC Members List for 2008

Outward Correspondence: Letter & Cheque for \$39.00 to Department Of Justice by the Public Officer-Association Renewal.

Moved: Tibor VK3FTIB, seconded Terry VK3MAR and carried.

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Treasurers Report:

The Treasurer Ron VK3COP presented the report to the club and the projected Budget for 2008/2009. Moved by Ron VK3COP, seconded by Allan VK3FALN and carried.

General Business:

Donation: Wayne VK3XQA kindly donated \$270 from his takings from the HamFest.

General Business....cont'd

Letter of Appreciation: Les VK3TEX said that he would send a letter of appreciation to the CFA Shepparton & the SES Shepparton thanking them for the loan of the tables for the HamFest.

D-Star: Duncan VK3DCX talked about Dstar and the final costings involved in setting the system up, and it was decided that we should defer talk on Dstar until Toby arrives at the next meeting with more information to get a better understanding of what is

involved.

Christmas Breakup:

It was discussed with the members that we have the Christmas Breakup Party at the Mooroopna Golf Club on Sunday 7th December, at 12 noon. The Secretary would let the Newsletter Editor know, and she will bulk e-mail all members with the details. The club will purchase the first round of drinks. Moved by Duncan VK3DCX and seconded by Les VK3TEX. Carried.

PRACTICAL PROJECTS DAY:

It was raised by Les VK3TEX that we should have a projects day at the clubrooms once a month (Third Saturday in month) where any members could get together at the clubrooms and build a kit or other project of their choice and learn from the more experienced

Amateurs. The scouts would be consulted to see if the hall would be available.

Ed VKBG noted that Jaycar sells a huge range of kits and they would be worth a look at.

VK3TEX moved, seconded Les VK3VLG. Carried.

Antennas:Duncan raised the issue of the antennas needed to be reworked at the clubrooms going on Toby's suggestion. Issue to be discussed further at a later date.

JOTA: JOTA was discussed and it was noted that it was not organized very well on the scouts behalf and was suggested that in future that the club approaches the Scouts next time earlier with a firm time on the day and this should be adhered to. Duncan thanked all those who helped out with JOTA.

Exams: Ed VK3BG

Congratulated the two who sat exams on the day, VK3MUG who passed his Advanced theory and Kevin VK3FKJC who passed his regulations exam for the standard License. Well done guys!

Radio Room: Les VK3TEX bought up the topic of shelving and cabinets for the radio room and it was discussed that he would get a quote for the items and present it to the club at the next meeting. Motion was moved by Ron VK3COP, seconded by Tibor VK3FTIB. Carried.

Tocumwal SES: Duncan thanked all those present who help with the SES antenna repairs.

The acting president Duncan VK3DCX closed the meeting at 14:34 Hours:



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Watts New?

The Power Struggle, and Living with PEP

By Steve Katz, WB2WIK/6

Watts New? The Power Struggle, and Living with PEP.

Steve Katz, WB2WIK/6

I see a lot of postings, and hear comments on the air, too, about power output and "talking the rig up" to its rated power. Maybe a short article is worth a write.

Old Days vs. New Days

In days of old when men were men, rigs were most all rated for transmitter input power, not any particular output power. There was one technical reason for this, and many marketing reasons. The technical reason was that here in the States (and perhaps in other countries, too), our regulations stipulated only a maximum DC

input power to the final amplifier stage as our legal power limit. Reason for that was that few hams owned Wattmeters, or any good ones that could be trusted, but most anyone could measure DC Input Power, since that's just a calculation of final amplifier voltage times current.

The Part 97 Legal power limit for licensees above the Novice level was 1000 Watts DC input power. If your final amplifier was 50% efficient, as most probably were, that would yield about 500 W output power. However, there was no distinction between modes: We could run 1 kW DC input on CW (probably 500W

output), or on AM, which, with 100% modulation, would yield about 4000 Watts PEP input power, and maybe 2000W PEP output power (!). Then, SSB came about to muddy up the works. SSB had no carrier power to measure, so if you keyed your transmitter and didn't speak, you might be running a few hundred Watts DC Input power (the idling power drawn by the PA to remain linear) and absolutely no output at all!

So, it was deemed by the Powers That Be that a fair amount of SSB power should be 2000 Watts PEP, but still "measured" by DC input power. That's a tall order,

and almost nobody could do this.

But it was an interesting solution, and everyone who made a "1 kW DC Input Power" amplifier or transmitter now automatically rated it for "2000 Watts PEP input power," without any way to actually measure that.

Since linear amplifiers are typically about 50% efficient, or most were in those days, hams pretty much figured if we measured PEP output power using an oscilloscope and a dummy load, we should shoot for 1kW PEP output, and we'd probably be right in there, using the maximum power allowed by law. By estimation!

If you own a transmitter or amplifier from the mid-1970's or earlier, it will be rated for DC Input Power, and not actual RF output power, because that's the way it was, at least until 1978.

The "marketing" advantage of this rating method is that manufacturers could claim almost anything. A pair of 6KD6 TV sweep tubes, normally used in pulse service at about 30W or so in a TV set, could now magically run "300 Watts PEP" (input power) in SSB service. Or, almost anything anyone wanted to claim, since measuring PEP input power is something that almost nobody could possibly do. That led to all sorts of crazy claims in rigs of the late 1960's and early 1970's, as the Japanese manufacturers were just beginning to import rigs to the U.S. to compete with the well-established American rigs, and everyone had to outdo each other. Collins Radio, with their KWM-2 and 32S-series of transceivers and transmitters, did not get caught up in the marketing hoo-hah and continued to rate their transmitters, using dual 6146 power amplifier tubes, at 160W PEP input power, a conservative and very realistic rating. To their credit, Heath Company, with their SB-100, SB-101, SB-400 and SB-401 families, did likewise.

You Can't Hear Input Power

Let's face it, it doesn't matter what your DC input power is, nobody can hear it. It's the Watts that make it to the antenna that count. I think it was in 1978 that the FCC changed the power limit from 1000W DC input power to 1500W PEP output power, and that re-defined what we're really doing. It took a while for hams to conjure that 1500W PEP (output) is also 1500W carrier output power when working CW, RTTY and FM. But 1500W PEP output on AM (standard full-carrier, old-fashioned double sideband AM)

was only 375W carrier power for a 100% modulated signal. Humph! This is the only mode where the "higher power level limit" actually decreased the amount of useful power hams could use.

(This discussion pertains to American hams at this point. I realize legal limit power levels, restrictions, license classes and other things vary country to country.)

It's the PEP, Boys

Most hams don't own accurate PEP measuring instruments. Some do. But the ones that don't are the ones who are always trying to "ahhhhh" or "whistle" up their output power. You can tell. Anytime you tune across someone "hellllloo"ing or "ahhhhhh"ing, or whistling into their microphones, there's a good chance that someone is watching his average-indicating Wattmeter and trying to figure out why his peak output power isn't anything close to what the book said it should be.

Cut it out, guys, it's silly.

Unless you have a true peak reading Wattmeter (a PEP meter), which is designed to display PEP power and requires an external source of power to operate, you can't evaluate how much power you're really running when using SSB. One way to have a pretty good guess is to switch your transmitter to the CW mode, close the key, and transmit. Look at the power indicated. Then, switch to SSB and forget about the Wattmeter reading. Your output power on voice peaks should be just about exactly whatever the "CW" power indicated. The meter won't show this.

An oscilloscope will show it, and was the primary output measuring instrument for years after the SSB mode became popular. If you tune up on CW and your scope shows your forward power to be "ten cm," or

whatever - and then switch to SSB and your voice peaks hit the same amplitude (10 cm), your SSB peak envelope power and CW carrier power are the same. It's easy to do, easy to watch, easy to learn. But unless you're using a scope, or a real PEP instrument, you can't tell anything about PEP output power.

The cheapest PEP HF meter on the market that I can think of offhand is the Autek WM-1A, at about \$150. It's a bargain*, and reasonably good through the HF spectrum. But it does require a DC power source, and you have to add that, yourself. I also have a couple of Bird model 43P meters, which are the standard 43 "ThruLine," with a peak reading circuit added. That circuit is powered by two 9V batteries, or an external power supply, and adds about \$100 in cost to the model 43 - so by the time you have the meter, the PEP adapter, and one plug-in detector element, you're up there in the range of \$500 to make your first measurement. Still, not a bad investment.

The little desktop meters that have an AVG/PEAK switch, and do not use a power supply to power them, have no useful peak reading functionality.

But isn't it average power that the guy on the other end hears? Umm, no, not really. SSB is a peak mode, for both transmission and reception. Here's a CW analogy:

If you tune in a CW station transmitting at 20 words per minute, and he's 599, that's good, right? Now, that same station can space his sending differently, so he pauses several seconds between every single element sent. His average power, averaged over a time period (let's say one minute) is now about 10% of what it was before, but his peak power is the same. Is he weaker now, or still 599?

In the example given above, if you measured average vs. peak power, the difference would be amazing. A very accurate way to measure average power is by dissipating it in a load and measuring thermal rise in that load, as all Thermistor or Bolometer type power measuring instruments do. In fact, it's the most accurate method of all, because this technique is not related to waveform or distortion - the load dissipates all power applied, regardless of waveform, and generates heat, which is measured by the instrument. Precisely.

In our example above, the average power of a 1500W output transmitter might be 150W, because the transmitter duty cycle was only 10%. If we return to the normal method of sending code, the duty cycle would be about 50% (average power 750W). That's a five-to-one difference in average power, and the Thermistor-mount, lab-grade, 100% accurate power meter would indicate that astounding difference. But the received signal at the other end of the path would remain exactly the same. If you're S9 with a 50% duty cycle, you'll still be S9 with a 10% duty cycle. Thus, signal reception is not predicated on average power, but rather on peak power.

Keep It Clean

So, PEP is really all that counts for working SSB.

But not entirely! The other thing that counts is signal fullness and fidelity, often described as "punch" and modulation clarity or crispness. Best clarity is rarely achieved with "high fidelity" modulation. It is most always accomplished with modulation quality that is equivalent to how your voice really sounds if it were unaltered by the electronic circuitry of your transmitter and the other station's receiver.

"Punch," or fullness, is

something reasonably easy to achieve in modern SSB transmitters having Automatic Level Control circuits, which they all do. ALC is a control loop, with usually one or more adjustable elements and other preset ones, that allows one to maximize transmitter output power without creating signal distortion, and if you use your ALC within its design limits, you can have all the punch and fullness of a broadcast station, without the undesired side effects of booming bass or piercing treble.

Transmitters and transceivers vary by design, but I've always found the best way to adjust ALC is to follow the manufacturer's recommendations, and then listen to myself with a separate receiver (using tight-fitting headphones to prevent acoustic feedback) and adjust for the sound I like best. The controls that most closely guide how the ALC loop responds, and how you sound on the air, are your mike gain and speech processing controls. Those usually interact to some degree. Another component that guides the way you sound on the air is your microphone, and of course anything you do externally to your transmitter to alter it. Monitoring, and headphones, help a lot. And believe what people tell you when they provide on-the-air reports. If you get a few complaints of crappy audio, believe them.

If you're one of the Newbies (or even a not-so-Newbie) who likes to watch your Wattmeter as you operate SSB, stop that. Lousy habit, and for the tenth time, the meter reading doesn't mean anything unless you have a real, honest PEP meter. "Talking up" your transmitter to increase the power indicated on the meter results in lousy sounding audio that will not help you get through any better.

ALC Your AMP

And do it PDQ. Amplifiers which have an ALC output that is compatible with the ALC input of your transmitter work best when that loop is connected, and everything's adjusted properly. It makes a lot of difference, usually.

Watt's to Gain?

If you want to reduce output power of your transmitter and the rig doesn't have adjustable output power when using the SSB mode (most transmitters and transceivers of earlier vintage did not), don't simply turn down your mike gain and assume you've done it. This is a really bad idea, for many reasons.

First, although the average power displayed on a Wattmeter will indeed indicate lower output power when you turn the mike gain down, in fact the PEP output may be the same as it was: Remember, your Wattmeter isn't responding to PEP unless it's a specialized PEP instrument. Next, turning down the mike gain will usually render the ALC dysfunctional, rendering a "skinny" sound to your modulation, and not the full, rich, punchy sound that's easier for stations to copy. Also, when you reduce "power" this way, you've caused a deterioration in carrier suppression, since the only thing that might be reduced by turning the mike gain down is the power of your signal while it's being modulated; if you had 50 dB carrier suppression when running full power, and you reduce power 10 dB by turning down the mike gain, now you have 40 dB carrier suppression, since the suppressed carrier isn't impacted at all by the mike gain setting.

Worse still is what can happen if you turn down the mike gain in order to reduce drive to an external amplifier: This is an accident waiting to happen. Without ALC activity,

your transmitter is out of control. An occasional voice peak can hit "full" power output, even with reduced mike gain, and that peak will still overdrive the amplifier, causing splatter and distortion - or worse, destruction of the amplifier. This method cannot be trusted for reducing SSB power, period.

Most all commercially built amateur power amplifiers have an ALC output which is compatible with most all commercially built amateur radio transmitters. Connect that, and use it to control your output power. No ALC? Build a circuit, or add a power attenuator between the transmitter output and the amplifier input. But whatever you do, don't turn down the mike gain to control output power. The mike gain control is there to adjust the preamp gain for compatibility with your microphone and ambient noise conditions, and that's all it's there for.

Mike gain should be set (in conjunction with speech processing controls, if applicable) for normal ALC activity when speaking in a conversational tone about an inch from your microphone, while checking for signs of background noise modulation. In a noisy environment, you want to use the lowest mike gain setting possible when close-talking the

microphone, to maximize punch and minimize undesired modulation. In a quiet environment, you can get away with more latitude of adjustment.

Conclusions

ALC works. PEP is what counts. Staring at your Wattmeter as you talk is a silly habit. Don't try to "talk up" your average power. You'll sound worse on the air, and all those "ahhhhs" are goofy. If you like watching meters, invest in a good PEP Wattmeter. 95% of all power meters sold into the amateur radio market are not PEP meters.

Don't use your mike gain to adjust anything except setting mike preamp stage gain for compatibility with your mike and your environment. It's not a power output control.

Catch you on the air! I'll be the one not "ahhhh"ing.

[*Note: I have no association with Autek or anybody else selling ham gear. This is just my opinion. However, the \$150 "bargain" meter is easily surpassed in value by the purchase of a \$150 surplus wideband oscilloscope, which can not only be used to monitor PEP output power, but a lot of other stuff. Worth considering.]

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