

This is a MUST READ for everyone (Copywrite 2018 ©)

We are seeing an alarming increase in the rate of destruction of our Collins gear. This is a result of a good thing causing a bad effect. More new people are coming into the Collins realm and we are really glad to see that. Our membership growth is strong and that is unusual in this day and age.

But, the experience rate regarding tube equipment is going down and in general, the level of understanding of tube gear and how to use/tune it is also going down.

OK to those oldsters that are “experienced”... I say to you, “DO NOT LEAVE ME NOW!” You may still learn something.

Recently we posted an instructional writing on how to tune a 30S-1 amplifier. It is on our website under **RX for Your Collins** - and then scroll down to the 30S-1 section. That writing, in general, also applies to the 30L-1 - or any tube linear for that matter.

But this will go a bit beyond that instructional piece and give you some clear guidelines for more than just tuning. DON'T LEAVE YET!

RULES: (Strongly suggested behavior!)

- **Do not ever run any amplifier for any reason (even in standby mode) without terminating the input and output with a 50 Ohm resistive load.** Amps can get accidentally keyed (hear that relay click during warm up on the KWM-2 or 32S transmitter.) Amps can oscillate if not terminated and lead to death.
- **DO NOT EVER run a “new to you” amplifier (or transmitter) without first giving it a very close inspection inside and out.** Make no assumptions. Check power connections and look for obvious work areas and bad workmanship or loose tubes etc. – Including checking fuse(s) – See below.
- **Do not ever run any piece of tube gear without reading the manual cover to cover several times until all warnings and complete understanding sinks in.** This will also increase your ongoing enjoyment.
- **DO NOT EVER SHIP AN AMPLIFIER WITH PA TUBES INSTALLED.** This can be a death sentence for – at a minimum – the tubes, and in some cases transformers or other parts of the amp. During the inevitable impacts from shipping handling, the acceleration rates acting on a tube that is installed in a heavy piece of equipment are much higher than those applied to a well pack – soft packed – tube.
- **DO NOT EVER RUN AN AMP (or any other piece of electronics) without checking carefully and reading the actual values of the fuses installed on the fuse.** You will be amazed at what you find. AND – if you have not checked the actual values of fuses in equipment you have been running for a long time – check them now. There are idiots out there that will install a 30 amp fuse in a 5 Amp holder just because they are out of 5 Amp... or worse yet, install a 30 Amp so it does not blow when it is blowing the 5 Amp. I see it all the time.
- **Do not ever use that TUNE position on your 30L-1 or 30S-1 amplifier.** I know, I said read the manual, but I also said “Seek understanding”. Collins thought that tuning bridge was a good idea at the time, but IT WAS NOT! On the 30L-1, using the TUNE position on the multimeter means you are not monitoring Plate Current... **BIG BAD!** And, on both the 30L-1 and the 30S-1,

here is the real skinny on that TUNE position. The meter is in a bridge circuit effectively - and you are "balancing the bridge" when you adjust the TUNE and LOAD controls to the "correct" position. Correct is in quotes because that would be the "correct position" for the good oldie days when the amps were limited to one KW Plate Input Power by FCC regulations. That rule is gone and now everyone wants more and goes for more. Then there is the fact that that "bridge" was calibrated and adjusted at the factory in about 1960 or '65 maybe, and components have aged and things have changed in the last 50 plus years and no way can you count on that bridge balancing correctly anyway. Then there is the bridge that has had a component replaced. Correctly calibrating that bridge for the new power levels and new, or aged components is beyond the scope of almost all operators and even most repair people. BUT here is the real gotcha .. as mentioned above. **THERE ARE THREE THINGS YOU SHOULD BE FOCUSING ON AS YOU TUNE THAT AMPLIFIER.** The first is the position of the *carrier control* on the exciter. The second is the *TUNE knob* on the amplifier and the third is that *Plate Current*. You are going to eventually burn up your amplifier if you are not monitoring Plate Current.

- **Procedure:**

Turn up the drive and immediately dip the plate current.

Turn down the drive.

Turn up the drive while monitoring the plate current and sense the linearity and find the saturation (linearity) knee where plate current stops going up linearly with drive application.

Turn Down the drive.

Adjust the loading appropriately (see my article).

Turn up the drive and repeat the above first four underlined steps.

Turn Down the drive.

If you use this method, you will NEVER damage an amplifier.

- **REMEMBER: The two GODS of Tuning an Amp are: 1. Running the drive up and down to promote cooling and 2. Keeping that Plate Current Dipped – ALWAYS ! ! ! ! ! Then, never ever over-load (as in increase loading beyond that required) an amplifier or final PA stage as this allows and encourages the stage to go to higher than allowed plate currents and/or to overheat.**
- **Only adjust the Load Control while the Carrier Control (Drive) is turned down.** This is safer and fosters watching the Plate Current and not changing too many things at once. The sometimes used technique of twisting the TUNE & LOAD controls simultaneously while watching the wattmeter leaves you shy on knowledge about where the amp loses linearity and also gives you too many variables and things to watch.
- **When the manual says "Load to 300 mA", this means put that linearity "Ip vs. drive" knee** right above that 300 mA and then set the drive so that the amplifier draws just below the knee in KEY DOWN carrier operation (CW). This "Load to Point" is different for each amp and should be obtained from the **OPERATION instructions** in the appropriate manual. For reference here though, with the two most common amplifiers we use, the "Load To Point" (Tune Lock – CW) is 550 mA for the 30L-1. For the 30S-1, it is 300 mA (for SSB operation – but TUNE LOCK). The 30S-1 has a separate CW Operating Mode and, per the manual, should be loaded to 400 mA in CW.

- **Once you have tuned your amplifier in Lock Key and found the highest linear drive position for the carrier control (usually the MIC Gain) on the exciter, then do NOT turn up the MIC Gain once in SSB position.** Increasing that MIC Gain assures that you are driving the amp into the non-linear region on voice peaks. This means you are SPLATTERING big time! Meter ballistics and RF averaging in the coupler and the metering circuit mean **that, IN NORMAL SSB OPERATION**, you will never again see the TUNE power or the TUNE plate current you saw during the tuning process. That is normal. RESIST ALL TEMPTATION TO TURN UP THE MIC GAIN. This assumes you do not have a peak reading wattmeter. There is no such thing as a “peak reading” plate current meter. ☺
- **If you are ever in doubt about what to do, or what is happening, just turn that drive down to zero and the amp will be a happy (and safe) camper.**
- **Do not ever use any of the power switches on any of the S-Line gear.** Receivers, Transmitters (516F-2), Transceivers and Amplifiers....they all have unobtaneum switches and they are failing at increasing rates. The S-Line Transmitter and Receiver switches are actually seriously underrated right from the get-go (Collins design error)! Use power strips with switches, external relays – whatever, but do not use the S-Line switches.
- **If you do not understand how your transmitter or amplifier works, DO NOT DO MAINTENANCE on it without getting help from someone who is more knowledgeable.**

Finally, and I have said this a million times and people still don't do it, DO NOT OPERATE YOUR Receivers, Transmitters or Amplifiers without reading and understanding the manual. After doing this, and using available tutorials, if you still have doubts about your knowledge or capabilities, use your local ham club or ask on the reflector and seek a local “Elmer” who can guide you for a while. Smoked EGO smells a whole lot better than burned wiring. It's a lot cheaper too!

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