AL811H Tuning Supplement

The first step is to understand the power ratings. The AL-811H is rated at 800-watts PEP voice on a good peak reading meter. The AL-811H is rated at 600-watts CW carrier in normal CW or tune.

The difference in power supply voltages on voice and carrier modes is the major contributor to differences in peak power between voice and carrier modes.

Occasionally, first-time amplifier owners have difficulty understanding manual tuning instructions. **Reading all manual tuning steps and "dry practicing" (without actually transmitting) all manual tuning steps will make initial operation much easier and safer.**

We wish amplifier-tuning instructions could be shorter. Unfortunately, every step is necessary for proper amplifier operation, and we have carefully removed all unnecessary steps. This procedure omits as much as can possibly be omitted and *still properly tune the amplifier*. Some previous supplemental procedures issued do ***NOT*** properly tune the amplifier. Previous supplemental instructions can result in re-tuning when it is not necessary. Previous supplemental instructions also result in improper tuning, that while increasing tube life, also increase splatter.

Short of using a tuning pulser, there is no easy ***correct*** two-step or three-step tuning process. Tuning takes some practice but is something we must learn if we want good amplifier life and a clean signal. Eventually tuning becomes easy.

Requirements

- A wattmeter connected to the amplifier output (this can include the RF power meter in an antenna tuner) must be used to properly tune an amplifier. Be aware that many meters do not read correctly, especially for peak power. Accurate or not, almost all meters are usable for finding maximum power. You may not know the actual power but, with care, the amplifier can still be properly tuned for peak.

- With 811A tubes, while using CW, FM, or RTTY modes for tuning, always limit transmitting time to no more than 5-seconds transmit with a 15-second cool down.

- It is best to use a tuning pulser. A tuning pulser of any type will greatly extend allowable transmitting time while tuning, and all types of pulsers will produce the same results. It does not matter if the pulse is audio-injected, or injected through the CW jack.

- The goal is always to tune for maximum possible output power at maximum safe drive power. Do NOT retune at lower power except in very special cases. Special cases would include RTTY or FM operation.

- Read the manual. Even if you are bored or you are in a hurry to operate your new equipment, read the manual and dry-practice tuning. It takes longer to replace tubes than to read the manual tuning instructions and practice tuning a few times with power off.

Easiest Possible Tuning Steps with Tuning Pulser

Make sure the pulser has the shortest possible pulse duration or "weight" for your radio. If you use dots on a keyer, make sure weight is 35% or less if possible. The shortest possible pulse is one that is just longer than the value that reduces peak output power. ***It is not necessary to use any special ratio of on-time to off-time in the pulser, perhaps as an attempt to simulate relative duty-cycle of voice modulation. It is also not necessary, nor is it generally advantageous, to use an audio injected pulsed tone. The only duty-cycle requirement is the exciter reach full peak power. Use the shortest possible pulse that allows full power. CW pulsers and audio-injected pulsers are equal in results.***

1. Preset the transceiver's power to around 80 watts PEP, or nearly full power with a standard 100-watt transceiver.

2. Preset the PLATE, LOAD and BAND knobs according to the manual's band charts in step 5 of page 6.

3. Transmit and alternately adjust the PLATE and then LOAD controls for maximum RF output meter peak power. Limit time to 15 seconds on, and 15 second no-transmit cool-off times.

4. Set transceiver power to the proper level for the mode you intend to use, but NEVER more than used for tuning.

5. In operation or tuning, never ***exceed or go above*** the following chart currents:

Allowable AL811H Meter Readings

750 mA plate current
200 mA grid current

Note: Do not attempt to force amplifier meters to these values on SSB voice, or pulsed tuning conditions. These are maximum currents shown accurately by meters only in steady carrier modes, although any carrier should be brief.

Easiest Possible Tuning Steps using CW key, FM (PTT), or AM (PTT) Tuning

1. Set the transceiver's power to about 10-20 watts.

2. Preset the PLATE, LOAD and BAND according to the presets listed in the manual.

3. Transmit and quickly adjust the PLATE control for maximum RF output meter power. (DO NOT adjust the LOAD control.) Limit to 5 seconds on, and 15 second no-transmit cool-off on standby.

4. On ***standby*** (so amplifier is bypassed), increase radio power to 60 watts.

5. Transmit through the amplifier and quickly adjust the LOAD control for maximum RF output power. (Never exceed 5 seconds of transmission time).

6. After 15 seconds of cool-off, transmit and quickly turn the PLATE control back and forth a small amount to make sure the PLATE is at peak output power. Take no longer than five seconds to do this without 15 seconds cool-off time.

7. After 15 seconds cool-off, transmit a steady carrier and quickly make sure the plate and grid current meters never go beyond the maximum rated values listed here. This paper supersedes all other maximum current ratings.

8. If grid meter and plate meter currents are ***below*** maximum allowable values, increase the transceiver's power until the grid meter reaches the maximum level for the tubes. If plate or grid current is too high, stop here and reduce transceiver power to bring the meter in safe range.

9. In operation or tuning, never ***exceed or go above*** the following chart currents:

Allowable AL811H Meter Readings

750 mA plate current
200 mA grid current

Note: Do not attempt to force amplifier meters to this value on SSB voice or under tuning-pulser conditions.

10. After 15 seconds cool-off, if you have not reached maximum allowed plate or grid current, transmit and re-peak the LOAD control for maximum output. Do not transmit for more the 5 seconds without a suitable 15 second cool-down.

As a final adjustment, moving the **LOAD** control very slightly clockwise of maximum produces a cleaner SSB signal. Move the LOAD no more than ½ of a number position clockwise. It also helps to reduce the transceiver's power a few watts from tune power.

SSB Operation

The amplifier's meters are not fast enough to follow SSB voice (or normal Morse code) signals. Never increase the transceiver's power after tuning the amplifier to make amplifier meters go higher. The transceiver power control setting used in the last tuning procedure adjustment must be the same or less for normal operation.

A good, accurate peak meter will show a voice RF outputs about 10-20% higher than obtained with FM, RTTY, or CW carrier tuning methods. This is because amplifier high voltage on voice is closer to no-load voltage.

Depending on your voice and the amount of speech compression or ALC you use, amplifier front-panel meters will indicate about 1/5 to 1/2 of actual peak current. This is also true with average reading RF wattmeters.

RF Wattmeters

There are two types of RF power, ***average power*** and ***peak envelope power***. Both average and peak powers are envelope power, although we rarely hear the term average envelope power. Average power is the longer time average of envelope power, while PEP or peak envelope power, is the highest short-term peak of envelope power.

There is no such thing as "RMS power". Audio marketing people created RMS power, along with other useless fictitious power types.

RF wattmeters reading true peak envelope power (PEP) generally require a power source of some kind to make the peak system work. Cheap PEP wattmeters often show only 50% of actual PEP when operating voice SSB. If a PEP meter is working properly, the meter will show more power on SSB voice than a steady, clean whistle or CW carrier indicates. The AWM-30 Ameritron is a very good peak reading meter, as are meters in Ameritron tuners. Many other meters do not accurately read peak envelope power.

Cheap or poorly designed RF power meters may read half or less of actual PEP on SSB voice.

Antenna SWR

Normally the amplifier will match up to a 2:1 VSWR or higher. You must use an external tuner between the antenna and the amplifier if your antenna's VSWR is too high for proper amplifier loading. When tuning or operating the amplifier, be sure VSWR does not change. Do not use your transceiver's internal tuner when using an amplifier.

ALC Adjustment and Operation

Never use ALC as a primary power control. The ALC control is another way to reduce the transceiver's output power. Unless connected to the radio, ALC has ***no effect***.

1. Leave the ALC disconnected and tune the amplifier to the desired output level, not to exceed maximum plate or grid currents, or maximum output power.

2. Connect the ALC line with the ALC adjust fully clockwise (facing the back of the amplifier).

3. Transmit with amplifier operating and adjust the ALC until the grid meter or output power starts to drop. Stop at the point when the meter starts to drop.

4. The ALC is now adjusted for the desired power limit.

Increasing the transceiver's power control beyond this set point should not increase meter readings on the amplifier. This will verify the ALC is controlling the transceiver. We do not recommend depending on simple basic ALC systems for operating power control. It is only a safety measure.

Taken from http://www.w8ji.com/al811h_and_811_tuning_supplement.htm