

# Pre-Load and Loading procedure for the Kenwood TS-820S



NR6C credit to K4EAA

***Here are some instructions for how to properly tune your Kenwood hybrid transmitter. It takes longer to describe than it does to actually tune the rig! When you have done it a few times, you can tune up in about 5 seconds total, faster than it took you to read this paragraph!***

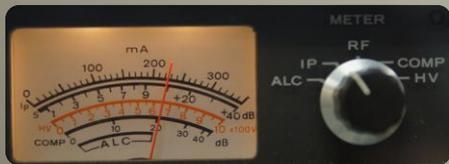


- Begin tuning with the **Mode** Switch in the **Tune** position. That reduces the screen voltage, and mis-tuning won't harm the rig. Start with a dummy load if possible.
- Set the **Load** Control to **Minimum**, and dial in the band (approximately) on the **Plate** control
- Set the **Meter** Switch to **ALC**
- Turn the **CAR** Control (carrier) **up** 1/2-3/4
- Place one hand on the **Send** switch and the other on the **Drive** control
- Flip the **Send** switch and peak the **Drive** control. If the meter pegs, turn down the **CAR** control and peak **Drive** again.
- Switch **Meter** to **Ip** (plate current)
- Flip **Send** switch and tune the **Plate** tuning to **dip** the **Meter** (minimum reading). This is usually the max power output point as well.

***Now you're ready to go for some power! As you perform the steps below, don't leave the rig in Send more than 5 seconds at a time. Give it a rest now & again as you get familiar with this. Most of us can tune a rig in about 5 seconds total, you will too when you've done it a few times!***



- Switch **Mode** to **CW**
- Flip the **Send** switch and re-dip the **Meter** with the **Plate** control
- Note the **Meter** reading - You are looking for about **225ma**, depending on your power needs - About 1/3 to 1/2 less for PSK or RTTY
- It will probably be low. Turn up the **Load** control about 10 degrees, and re-dip the **Plate** control. Continue doing this until you get about 225ma of plate current when dipped. Remember not to leave the rig in **Send** too long while you're learning, give it a 5 second rest every 5 seconds



***You're almost finished! Transmitting at this point would be fine, but you may be able to tune for a bit more power. The next adjustments should be small adjustments, you are "fine tuning" things at this point.***

- Switch your **Meter** to **RF**, or use an external power meter for reference.
- Tune the **Plate** control for maximum power output. You should see about **100W** if you have a power meter.
- Try adjusting the **Load** up or down a bit, re-peaking with the **Plate** tuning after every adjustment.
- When you're satisfied with your tune-up, check  $I_p$ , the plate current, and make sure you're not too far from the 225ma target, and note the position of the controls to use this as a starting point whenever you return to this band.
- For **CW**, use the **CAR** control, and for **SSB**, use the **MIC** control to keep the **ALC** within the range shown on the Meter. This will insure maximum power output without excessive compression



# Preparing for SSB Operation and the use of the Processor

## SSB OPERATION

Tune the TS-820 as described in Sections 4.0 to 4.1. **Set** the MODE switch to USB or LSB and connect a microphone to the MIC connector.

NOTE: International amateur practice dictates using USB or LSB on the following bands

Key the transmitter and speak into the microphone with the tone of voice used in normal operation. Adjust the MIC control until voice peaks are just within the top limit of the ALC range printed on the meter scale. If the transmitter section is driven beyond this range, the IMD (Intermediation Distortion) will cause adjacent frequency interference i.e. splatter and the transmitted signal will be distorted.

3.5 MHz Band	LSB
7.0 MHz Band	LSB
14.0 MHz Band	USB
21.0 MHz Band	USB
28.0 MHz Band	USB

When using the MIC control, Do not allow the voice peaks to deflect the meter beyond the top of the ALC range.



## DX OPERATION (Use of the PROCESSOR)

For DX (long distance) operation, it may be desirable to increase the talk power by using the speech processor. The speech processor on TS-820S, converts voice signals into 455 kHz SSB signals for compression at a quick time constant. It produces little distortion and, unlike the clipper system does not deteriorate the tonal quality. The compression level can be adjusted with the **COMP LEVEL** knob. Set the meter knob to COMP and adjust so that the meter indicates anywhere within the scale (20 - 40 dB). The speech processor is normally used for DX operation. For more local QSO's, push the COMP LEVEL knob in, so that signals will be heard more naturally.

*Tune-up is a good time to check your rig for maintenance requirements. Your Kenwood hybrid is an excellent tube tester, better than commercially made ones, in fact. It exercises the tubes under actual working conditions, and meters the results for you to observe.*

- **Notice how much drive is available.** A fresh 12BY7A will provide more drive than necessary to swing the ALC Meter through its range, even on 10M. Low drive on any band shows that the driver tube is probably falling off in emission. It will continue to function for a while, but you might consider replacing it in the near future.
- **Watch for falling drive level as the rig is keyed for a few seconds.** A 12BY7A near the end of its life will fall off in drive within a few seconds or so of key-down. If you see your drive fall as you are watching, that tube is positively ready for retirement.
- **Check the sharpness of the dip in CW Mode.** A broad, shallow dip means the finals are nearing the end. You will notice reduced power output as well, most noticeable on the higher bands.
- **Check for falling plate current under key down conditions.** Just like the driver tube, final tubes at the end of their useful life will jump to full *Ip* and then quickly start falling off. When you spot this, they are ready for recycling.

# A Few Notes Related to Output Power

- The difference between 50W and 100W is 3db. An S-unit is 6db. Consequently, the difference between a 50W rig and a 100W rig at the receiving end is about 1/2 S-unit. The difference between 90W and 100W rigs is not even discernible at the other end. Likewise between 100W and 110W. Resist the urge to load up your rig "To The Max," as all it does is shorten the life of most everything in the final section of your hybrid.
- A reasonable increase in power, the first step really worth taking, is times ten. This holds for audio amps, HF amps, heck, for most all amps! The difference between 100W and 1,000W is 10db. That is about 1-1/2+ S-units at the receiving end, and is indeed noticeable. About the same as going from a poor antenna to a good antenna.
- The HV position of the meter reads the plate voltage applied to the finals. The Kenwood hybrids utilize a voltage doubler circuit in the HV power supply, and aging High Voltage capacitors can result in low output. To check for this possibility, monitor the HV as you key the rig. It is normal to see perhaps 10% drop in HV when keyed. Anything much in excess of this might indicate failing capacitors.

**Print this page, cut out the briefed instructions  
and keep it near your Hibrid Rig for quick review.**

## Pre Load and Load Brief

1. **Heater** on, **Tune** position, **Plate** control to desired band, **VFO** 14.200, meter on **ALC**, carrier to 10:00 o'clock position.
2. Flip to send and peak the **Drive** control.
3. Switch to **IP**, flip to send and dip the **Plate** control
4. **CW** position, close the Key, flip to send and peak the output with the **Load** and **Plate** controls. Use **Carrier** control to limit IP current to 225 ma.