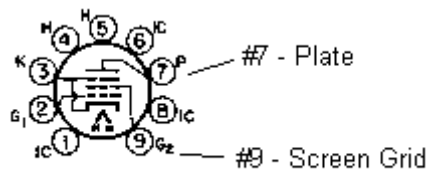


SWR Interstellar Overdrive Bias Procedure

- Multi-meter w/ clip leads
- Calculator
- Pen and paper
- Non-conductive flat head screw driver

DISCLAIMER: I AM IN NO WAY RESPONSIBLE IF YOU SHOCK YOURSELF OR BLOW THE UNIT UP; THIS INFORMATION IS TRUE TO MY KNOWLEDGE AND HAS BEEN PERFORMED SUCCESSFULLY BY MYSELF. I just have to add this since we're dealing with lethal voltages. If there is too much doubt; DON'T attempt it.

PREFACE: BEFORE CONNECTING ANYTHING MAKE SURE THE POWER AND STANDBY IS OFF AND THE UNIT IS UNPLUGGED!!!



EL84 Tube Pinout Solder Points

Notes:

To bias the IOD, both the Pin #7 PLATE and Pin #9 SCREEN GRID solder points must be located on the tube socket.

The EL84 has 9 pins with a larger gap/space between pin 1 and 9. The first pin to the left of the gap is Pin #1 and the last pin to the right of the gap is Pin #9. This view is looking at the wiring side of the socket inside the IOD, and not from the tube point of view.

The Plate voltage at Pin #7 and chassis will be measured for both EL84. The Plate current between Pin #7 and Pin #9 will be measured for both EL84. Plate Dissipation Power will be calculated, and the higher value of the two EL84 will be used. This power should never exceed 8.4 watts, and should be kept less than or equal to 7.0 watts in the IOD.

Plate Voltage Measurement

Both EL84 plates are connected to both primaries of the output transformer. If it's hard to count the pins, then you can trace the wires out of the output transformer.

- Set multi-meter to DC Voltage – 250 volt scale
- Insure the Standby switch is ON (not in standby mode)
- Attach black lead to chassis ground
- Power on the IOD and wait until stabilized
- Attach red lead to Pin #7 Plate of first EL84, record voltage
- Attach red lead to Pin #7 Plate of second EL84, record voltage

EL84 #1 DC Plate Voltage: _____

EL84 #2 DC Plate Voltage: _____

Notes:

Insure the Standby switch is set to ON and power on the IOD. Allow the IOD to stabilize for at least one minute. Some fluctuation is normal. Measure the DC Plate voltage of both EL84 tubes and record here for later use.

Prepare for the current measurement step by leaving the Standby switch unchanged (ON) and turning off the IOD main power. This procedure drains the filter capacitors and prevents electrical shock.

Transformer-Shunt Plate Current Measurement

The IOD has no screen grid resistors, so the center tap of the output transformer connects directly to Pin 9, SCREEN GRID. Trace this wire back to the output transformer. The center tap wire of the output transformer attaches to Pin 9 of one of the EL84. Another jumper wire connects this Pin 9 to the other Pin 9.

WARNING:

INSURE BOTH LEADS ARE NOT TOUCHING ANYTHING ELSE.

WARNING:

DO NOT HAVE ANY SIGNAL GOING INTO THE PREAMP. THIS CAN DAMAGE THE METER AND OTHER COMPONENTS.

- Insure power is off
- Insure Standby switch is ON (unchanged from above)
- Set multi-meter to current – 320 mA scale
- Attach red lead to Pin #9 SCREEN GRID of one EL84 tube
- Attach black lead to Pin #7 PLATE of the same tube
- Set Drive to full off
- Set Master Volume to full off
- Power on the IOD

EL84 #1 Plate current in mA: _____

EL84 #2 Plate current in mA: _____

Notes:

Power on the IOD and allow a several minutes for warm-up and stabilization. The meter reading should be rising slowly and will eventually stabilize. Keep the drive and master volume fully off (counterclockwise) to insure a static current measurement.

Measure and record the current value for later use. Move the BLACK plate lead to the other EL84's Pin #7 PLATE. Measure and record this second current reading. They should be within 3-5ma's of each other. If the variation is larger than 7mA, consider replacing both EL84 with a matched pair.

Calculating Plate Dissipation Power

Watts = Volts x Amps

Convert milliamps to amps for calculating. 25mA = 0.025 Amps.

EL84 #1 power in Watts: _____

EL84 #2 power in Watts _____

Notes:

The EL84 data sheet specifies the maximum plate dissipation power as 12 watts. This does not mean how much power the tube puts out.

A good rule of thumb is never exceed 70% of plate dissipation power when the tube is idle or "static". This value is a maximum of 8.4 watts for the EL84 tube. Always use the higher Wattage value of the two EL84.

Worked Example:

- 228v plate voltage
- 25mA plate current
- Power = 228 volts x 0.025 Amps
- Power = 5.7 watts
- Maximum EL84 dissipation is < 8.4 watts, this example is within spec
- Extra conservative dissipation is <= 7 watts

If not, go back and do this; always use the higher number for your calculations. It's not uncommon for the EL84's to be "off" by about 5ma so I wouldn't worry. If they're off by more than 7ma's I would buy another matched pair of EL84's.

As a general rule, more plate voltage = greater headroom, and less distortion. Reducing the plate voltage by increasing the plate current provides more distortion and crunch. The IOD is limited in plate voltage due to the power supply and the design. SWR probably wanted a lower plate voltage so the EL84's would grind up easily as this is their primary function.

Experiment by increasing the plate current 10% and examine the tube plates. If any cherry red spots are visible, reduce the current immediately. Repeat all measurements and calculate the plate power dissipation wattage.