

## 80/40 meter CW Transmitter with 6BM8/ECL82

by Jan, SM5GNN

Credit Line:

<http://www.algonet.se/~janax/ecl82bug.htm>

**This** is my own variation of the triode/pentode family of glowbug transmitters. It features a Pierce oscillator which runs continuously during transmit to avoid chirp. The PA is grid block keyed and since the negative is there, fixed bias. The bias setting is not critical, grid rectification will provide additional bias and form a sort of regulation network. The PA is biased into class C, adjust bias for about -24V at keydown, measured at the junction of the 3 resistors. Plate current should be around 35-40 mA when fully loaded, depending on crystal activity. Power output is 5 to 8W at 12W input which is a healthy 66% efficiency (not counting the screen current) and a nice blue glow comes from the innards following the keying. My original plan was to use a Pi-L tank to meet the modern demand of spectral purity but with loaded Q higher than normal, not really needed in this power class. The idea with grid blocking was to enable me to use my keyer without any relay in between. It has a negative keying line with a 250V filledstate device behind.

When tuning up, mesh the loading condenser C2 fully and dip the plate with the tuning condenser C1, quickly! Plate current should dip down to around 20 mA. Unmesh the loading condenser C2 until the current just stops rising or maximum 40 mA. Redip the plate. Repeat until the dip is shallow, a few mA. Do not tune for maximum output, the PA is not neutralized and will run beyond maximum tube ratings if this is done. If maximum output goes over 9W or loaded plate current over 40 mA, lower the plate supply or back off the grid condenser a little or mesh the loading condenser a little. The plate current should not exceed 40 mA fully loaded (ah, well, the tube is still available from Russia :^), maximum allowed cathode current is 50 mA for this tube. I have installed a 100 mA meter in the wire going to the plate of the PA. The glowbug is free from chirp and runs smooth. Keyline filtering seems to be unnecessary but check the envelope if you are driving a power amplifier with it. I have found that the grid condenser could be replaced with a 47 pF fixed for FT243 rocks and 15-22 pF for modern tin can rocks.

**T/R switch?** I use a rotating switch with 3 poles, one for switching the antenna, one for +300V on/off and one for the receiver mute. If you use a regenerative tube receiver, antenna switching isn't really necessary, use a separate short wire as RX antenna or couple lightly to the TX tank. The regen grid leak and coupling condenser should be adjusted for proper recovery between the code elements (full QSK)

or perhaps between words. Only a simple rocker for the +300V is needed.

**Spotting?** Well, my Heath SB301 gives this away for free. Set the RX in receive mode and engage the T/R switch without keying. You will hear the triode oscillating in the receiver. Tune it in and reset the RX in standby mode again. Advantage, gridblock!

**Sidetone?** Many ideas here. I use my new keyer's sidetone. My previous keyer did not have sidetone, instead I used my TS-830 as a growler, he, he... Or use a small 50 mA lamp in series with the PA plate as a sidelight :-), at least at QRS speeds.

**Circuit layout?** Not very critical. Only one tuned element except the rock is present. As a starter, keep the triode circuit on one side of the tube socket and the PA section on the other. Use the middle stud on the tube socket as a common grounding point if there is one. Keep the rock at least 2 inches away from the tube envelope to avoid heating it. The schematic does not show the heater, ground one side and decouple the other side at the socket with a 0.01 ceramic condenser. Heater voltage is 6.3V. If it exceeds 6.6V when loaded by the tube, add series resistance until below for maximum tube life. My own is built in a aluminum cast box with all circuitry inside it except L1, C2 and the output choke. If you use loads other than 50 ohms, some fiddlin' with the tank may be called for. You can also replace the pi tank with a link coupled parallel tank. For data and pinout on the tube, see [ECL82 tube data](http://www.algonet.se/~janax/secl82.htm) (<http://www.algonet.se/~janax/secl82.htm>)

**Running rock bound?** Not easy. You call CQ. Don't wait on the rock QRG for others unless others knows about you. Sometimes you hear another station calling CQ near your rock QRG. Give him a try, he may hear you. It might be easier to use the QRP QRG 3560 kHz. In US, 3579 kHz is a common rock QRG. Use a 3579R545 kHz color burstie rubbed down a tad. In EU at night, most glowbugs seem to stay around 3560-3565 kHz.

**AM?** Well, I have not tried. You gotta reduce input power a lot. 2-3W carrier output would be appropriate. Feed plate and screen through a modulation iron of around 7-8 kohms secondary impedance. Avoid AM on 80M during dark hours in EU, there ain't room enuff.

**A little warning:** Lethal voltages are present in this circuit. Be careful. Do not omit the output-to-ground choke. The -100V present at the key is not dangerous if the resistor values in the schematics are used and are of adequate quality and voltage rating.

The circuit could use a 6GW8/ECL86 but the high mu triode section is a tad hard to tame. It requires less bias voltage. I'll try another glowbug with this tube but with a Colpitts oscillator instead. Stay tuned, I will make a 6GW8/ECL86 bug also, perhaps after I have finished the Eurobug (EL83+EL34).

This glowbug has been on air for some time now and the reports are good, no chirp and no clicks. "Very good sound" is the normal report.

