Orion 565 adjustment procedure TX IC / ALC and PWR/SWR reading

Below at your own risk! I have done my best to describe my experience with this but it has not been confirmed by TenTec. Best regards, Onno de pa1ap.

My Orion 565 worked wonderful for years and years and recently it started behaving weirdly. Output power all over the place and it became unpredictable to work with. After close examination and measurements I found the antenna relais to be faulty, alc potentiometer to make poor contact (just touching it spiked output power) and questionable capacitor. And the passband pcb seemed to have a flaky connection to the motherboard in the center of the orion. No hard evidence for that though but reinserting made a difference. And while I was replacing I also replaced the DC power relay after I found it to be near worn down (melted)... Well components replaced and now I was challenged with adjustments.. Orion firmware 3.032x7

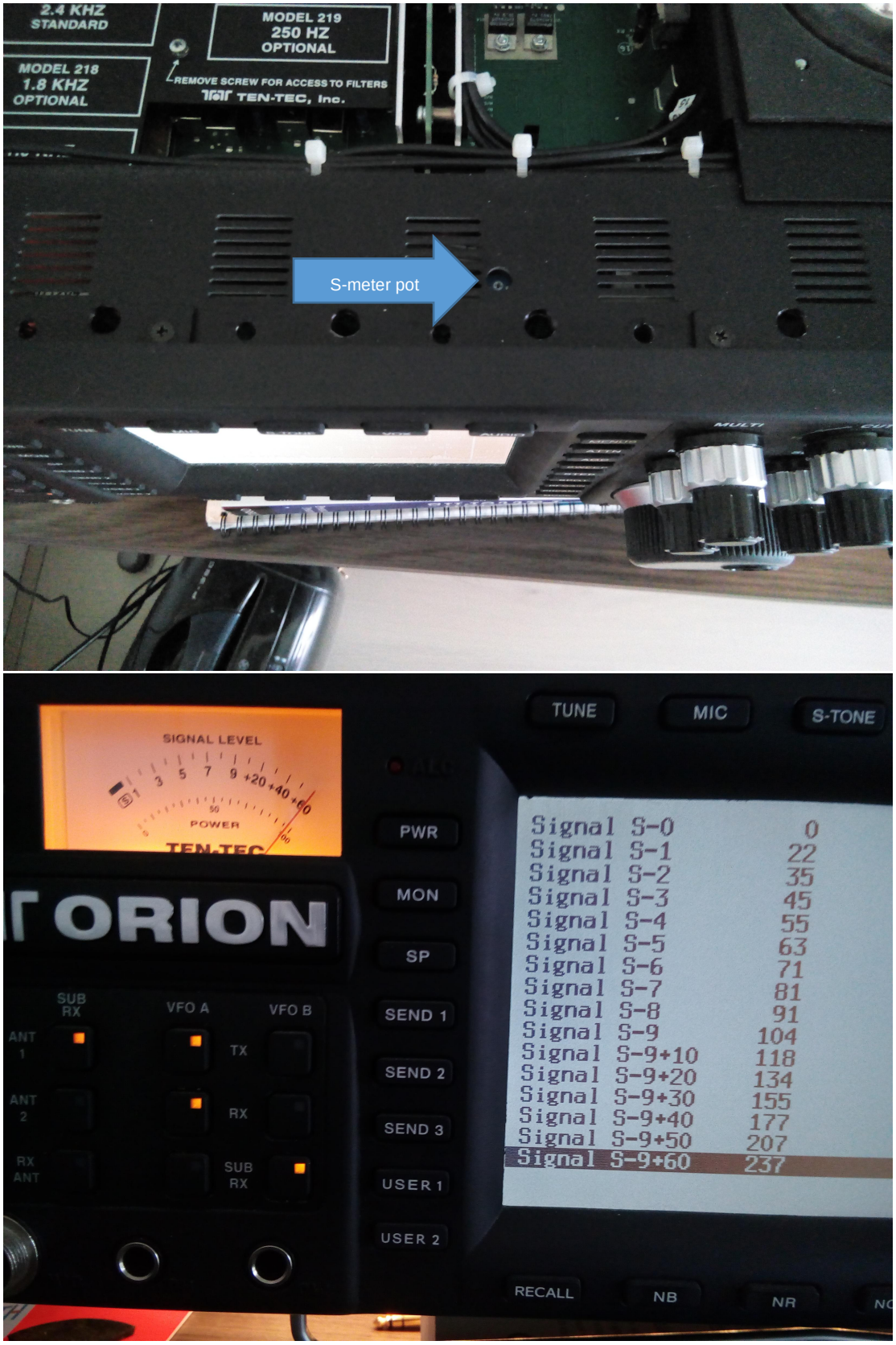
All steps are assuming CW mode with one exception. The PWR procedure specifically requires AM mode.

1 - S-METER procedure

Alright, best thing to adjust the s-meter potentiometer first. Perform a full reset to bring the Orion back to factory default. The processor seems to remember stuff.. Important not to skip this step!

First select the s-meter calibration procedure (press menu / rx / pwr) and check full indication; s9 +60 dB should be at 100 on the meter (after factory reset the s-meter table shows 237 for S9+60dB). If not, turn the s-meter potentiometer to adjust the maximum level. The s-meter potentiometer is reachable at the top. Look at the audio button and move about 2 cm’s towards the back. There is only one potentiometer here. Its located at the logic board and reachable through the top front frame.

Do not touch or change S-meter potentiometer anymore.



2 - IC procedure

Connect power meter and dummy load to ANT 2 (to avoid going through

tuner).

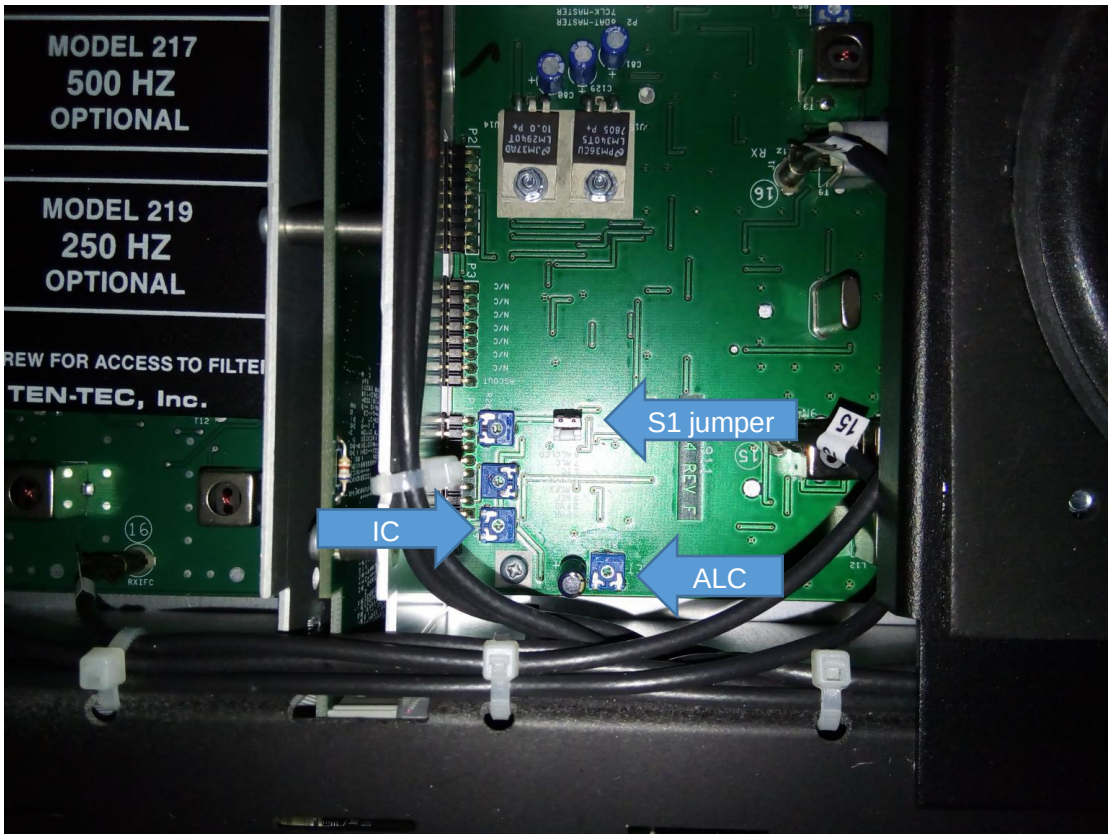
- Operating band 20Meters, CW mode.
- Turn IC fully clockwise (right)
- Turn ALC fully counter-clockwise (left)
- Set MENU PWR out at 1 Watt
- Remove S1 jumper

Check with short TX key if the output power is very low, such as 2 watts. If much higher something wrong with the IC circuit and / or IC potentiometer setting.

Adjust output power to +/- 110Watts (reading external PWR meter) by turning IC slowly counter clockwise. You will notice a sudden jump in power output level and after that point it just needs a very small turn. To avoid burning your finals, use a key to key the transmitter in short bursts. Turn IC a bit, key TX for a second, read power level.. Continue.. If you go to far the output will jump to above 140Watts. Turning back does not help due to apparently charged capacitors and/or influence of the processor. If you exceed the stable 110 Watts level, release the TX key, turn IC fully clockwise and start over again.

Once done check on 160, 20 and 10 meter band if output is approximately 110 Watts. If so, all it good for IC adjustment. IC is a current protection circuit which works parallel to the ALC setting. Power level will not be able to exceed the value as set through IC.

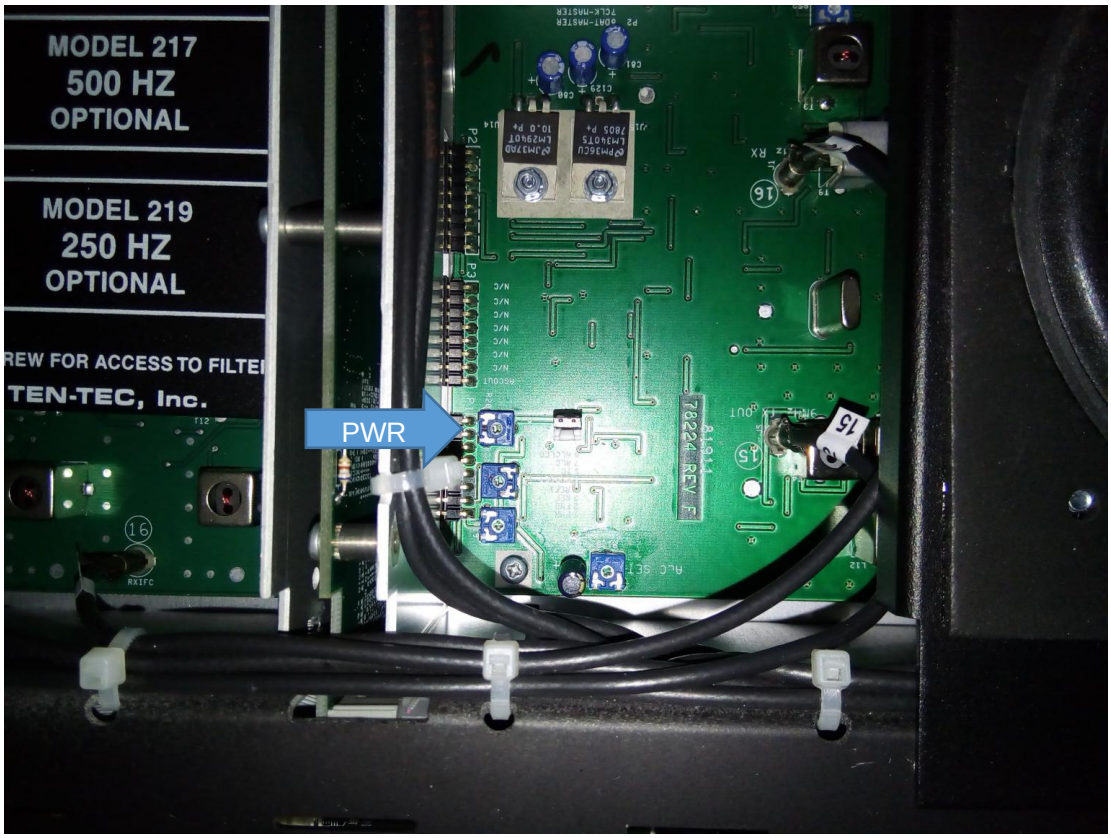
- Reposition S1 jumper
- Do not touch or change IC potentiometer anymore.



3 - PWR procedure

Set Menu PWR to 100 Watts. Switch to AM mode. Key the transmitter and check the power output level. It should indicate 25 Watts. If not, adjust the PWR potentiometer to get 25 Watts output on AM mode. Keep in mind no audio should be able to get into the transmitter. The next step (ALC procedure) will adjust the potentiometer which controls ALC. You will find that for AM mode the ALC potentiometer makes no difference towards the AM output power!

- Do not touch or change PWR potentiometer anymore.



4 - ALC procedure

Switch back to CW mode. With ALC fully counter clockwise and jumper S1 repositioned the output power should be very low. Around 2 Watts.

Set MENU PWR out at 20 Watts. Turn slowly the ALC potentiometer clockwise (right) until power output level is at 20Watts. This while keying on/off after a small change. Just to avoid overshooting to much. After this ALC should be set and you can validate the power output level with different MENU PWR settings. It should be pretty accurate except for value below 10Watts. My minimum power output level is about 5 Watts when the MENU PWR is set to 1. But 30/40/80/100 Watts follows correctly. Please keep in mind that the analog power indication is not accurate at all.

- Do not touch or change ALC potentiometer anymore.

5 - PWR / SWR reading

The PWR reading on the s-meter is not accurate at all. When the procedure above has been followed the power meter indicates approximately 85 for 100Watts output. And approx 50 for 50Watts output. Do not change the PWR potentiometer to attempt correcting it (it won't work)!!

Menu PWR value	Analog pwr indication orion	External pwr meter
100	85	101
80	75	81
50	50	52
30	30	28
10	10	9
1	0	4.4

The REF potentiometer drives the Menu based SWR indication. Is it accurate? Well sort of indication if the swr is acceptable or way above good. At least that's on my Orion. When connected to a dummy load the REF potentiometer is not going to do much since its driven by return voltage which is expected to be very low. Connect the rig to an antenna, through a reliable swr meter and on 20 meter band compare swr indication.

If the Menu swr indication is not similar just turn the potentiometer to get close. Vary frequency and bands to do some cross checks.

If the SWR indication is way wrong than you might need to null the SWR meter circuit capacitor. Other than looking for lowest return voltage when connected to a good dummy load is all I can suggest.

6 - Odd behavior

The Orion has odd behavior regarding initial output power after a fresh band switch. When I switch from any band to 10M band the first time I key (CW mode) the output power has to build up to full output in about 2 seconds. Second key does not have this odd power rise. Other bands have similar behavior but far less noticable. With the expection of running AM mode. If I run AM mode on 10M it gives a steady 25Watt carrier. Switching to for example 20M (still AM mode) shows a start at about 80Watts and than it drops down to 25 watts after 1..2 seconds. Only at first key by the way. I have no idea why this happens.

Assumption; it seems the orion measures the output power through the swr circuit and it seems to use this voltage to drive the output signal prior to electronic ALC. The swr bridge might be less sensitive on 10M band hence it shows different build up time?

7 - Other pictures