



OM Power

Exhibit 8: Operation Description

**External Radio Frequency
Power Amplifier OM4000A**

Model OM4000A

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Operational Description

The OM4000A is a complete and self-contained linear amplifier that covers the amateur band 1.8-29.7 MHz and provides 1500W output power with typically 60W exciter drive.

The amplifier's tuning is simplified by a TUNE Indicator which helps the operator to quickly and precisely match antennas and eliminates probability of inadvertent mistune. The antenna impedance matching capability is up to VSWR 3:1 or higher. A fixed matching circuit to the tubes input is employed which results in a very good load to the exciter over the entire frequency band from 1.8 to 29.7 MHz, yielding a good linearity.

Look at the schematic diagram (Exhibit 3). The high-performance ceramic tetrode type FU-728F with a plate dissipation of 1200W is grid driven. The input signal is 50 Ohm/250 W RF swamping resistor (R_{sw}) in the INPUT PCB. This circuit tunes out the input capacitance of the tubes. The swamping resistor is not an attenuator but it is a termination load for the input matching circuit. It could not be eliminated since a severe impedance mismatch to the driver would prevent using the amplifier at all.

The Surge arrester (located on Screen board PCB) in the screen grid circuit protects the tubes screen grid and the voltage regulator in the events of dynatron effect or a tube internal flashover.

The nominal voltages and current of the tubes at rated output power are as follows:

DC plate voltage: 3100V

DC plate current: 0.9A

DC screen voltage: 350V

DC screen current: 0mA

DC grid basis: -68V (adjusted individually for 500mA idling plate current).

The combinations of L1/R2 and L10/R1 in the plate circuits suppress possible VHF/UHF parasitic generation. The output resonant circuit comprises of the tubes output capacitance, L1, C4, C7, C8, C9, C10, C11, C12, C13, L7 and L8, all connected in a Pi-L network. It transforms the antenna impedance to the tubes – optimum load impedance, and besides suppresses the harmonic frequency emissions. The tank is tuned over the bands and the impedance matching is controlled by the ceramic-supported air variable capacitors C8, C9, CL2 and C13. The DC plate voltage is fed through the plate-choke L2, L3 and L9 to the anodes, in a parallel circuit with the tank. The series capacitor C4 prevent the DC voltage from reaching the resonant tank and/or amplifier's output, while the low-pass filter L3, C1, L9, C6 prevents the RF currents from reaching the DC power source.

The output signal is fed through a piece of coaxial cable,, to the "RF OUTPUT" connector through the wattmeter PCB.

The amplifier is controlled by a microprocessor system, based on the Microchip Technology micro-controller , It uses a 20MHz clock, stabilized by a piezo-ceramic resonator.

All supply voltages are delivered from conventional rectifiers and linear regulators and no switching supplies are used. The currents of the tubes control grids, screen grids, and plates as well as the forward and reflected power and etc are continuously monitored by the uP controller. Many software-derived protections are based on this information in order to insure normal tubes regime and antenna tuning, thus drastically reducing the probability of any inadvertent operator's mistakes or apparatus irregularities that could arise during exploitation of the amplifier.