

2KW 6M LDMOS Custom Amplifier

Here's a list of all major features built into this amplifier:

- Full VSWR and over-temperature protection
- Analog metering for voltage and current, with peak-reading LED bar graph meters for forward and reflected power (relative power indicators)
- Full t/r sequencing
- Low-loss antenna switches
- ALC output for the driver
- Driver RF blocking during T/R switching
- Rear panel jumpers for selecting a 2 watt drive level, or for up to 40w using a built-in 50w 10db attenuator
- Temperature-controlled cooling fans
- Reverse polarity protection
- Front-panel switch for turning on an external power supply

When doing the initial setup, I calibrated the LED power meters, tested the high SWR lockout, high-temperature lockout, ALC feedback and driver blocking. Since you'll be driving the amp with a different radio, you'll need to adjust the ALC feedback for your unique driver.

The high SWR lockout is set to lock out the amplifier if it detects more than 80w reflected power. It can be adjusted for more or less sensitivity, but this is the recommended setting.

At 2kw out, the amplifier draws about 62 amps at 50v, and can be driven to full output with as little as 3.6 watts. Even at 2kw out, the linearity is excellent, and you will still be below the 1db compression point.

As supplied to you, the input attenuator is jumpered in. If you ever want to drive the amplifier with low power, the rear-panel jumpers can be re-arranged to bypass the attenuator.

After performance testing, I turn the ALC blocking feature down to minimum (off). This feature is used only with a remote LNA, and often causes confusion to those operators who don't normally use one.

Initial Setup Procedure for ALC control and driver RF hold-off

1. Setting the ALC feedback adjustment (assumes the use of the internal attenuator)
 - Connect the driver and your antenna to the amplifier
 - Connect the PTT and ALC connections to your driving radio
 - In 'bypass' mode, transmit on FM and turn the drive power down to about 15w
 - Place the amplifier in 'amplify' mode and transmit. Adjust the ALC trimmer (rear panel access hole) for a small reduction in PA current.
 - Set the radio up for full output in bypass mode (up to 40w)
 - Transmit in amplify mode and adjust the ALC for about 53 amps. At this current, the amplifier will be at 1500w output.
 - Reduce the output power of the radio until the output just begins to drop, and leave the radio at this power setting.

Using the attenuator, the amplifier will reach 1500w output with less than

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22w drive. If you cannot get 53 amps with the ALC backed off completely, more drive may be required.

2. If you will use a remote LNA, set up the driver RF hold-off (used for ALC blocking). This adjustment does not interact with the ALC feedback adjustment you previously made.
 - Temporarily unplug the PTT cable from the amplifier
 - Temporarily connect the output of the radio to a wattmeter and dummy load
 - Put the amplifier in amplify mode (RF blocking is now active)
 - Transmit in FM mode and measure the output of the radio. If it is less than 100 milliwatts, no adjustments are necessary. If the output is more than that, the ALC rf blocking trimmer on the control board in the amplifier will need to be adjusted.
 - ✓ Remove the top cover of the amplifier
 - ✓ Locate the “BLOCK ADJ” trimmer on the control board (see photo). It says “ALC” on the one in this photo, but the newest control boards are labeled more correctly (BLOCK ADJ).



- ✓ Adjust for less than 100 mw out of the radio
- Replace the top cover, and reconnect the radio output and PTT lines to the amplifier.

Final notes:

When connecting to your power supply, make certain of these connections:

RED wires go to 50v POSITIVE (use an in-line fuse; four 20a fuses, one in series with each of the red power leads will also work OK)

BLACK wires go to GROUND (50v NEGATIVE)

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BLUE or WHITE-with-black-stripe wires are connected to the front panel power switch, and can be used to turn your power supply on and off.

The power switch in the amplifier is rated at 15 amps, and is protected from high inrush currents (common to switching supplies) by a 12 ohm high-power resistor. As the capacitors in the power supply charge and the inrush current subsides, the 50v output of the power supply rises enough to operate the bypass relay, which then closes and bypasses the limiting resistor. This all happens in less than a second.

