1.5 KW 1.8 to 54 MHz 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
- Rear panel jumpers for selecting a 3 to 10 watt watt drive level, or for up to 100w using a built-in 100w 10db attenuator
- Temperature-controlled cooling fans
- Reverse polarity protection
- Front-panel switch for turning on an external power supply
- Front panel band switch with internal lockout sensor for incorrect band switch setting
- Rear panel DB15 connector for connection to an Elecraft K3 radio; this connection also works with other BCD encoded radios (Yaesu), and allows your radio to operate the band select (the amplifier will follow the radio). It also supplies an ALC connection back to the K3 (in this case, you will not need to use the extra ALC connector on the rear panel).

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

The high SWR lockout is set to lock out the amplifier if it detects about 200w reflected power. It can be adjusted for more or less sensitivity, but this is the recommended setting.

The same lockout will occur with an incorrect band switch setting (band switch set to a lower band than you are operating on). Determining which caused the lockout can be a puzzle, but if you check the band switch, and the setting is correct, the cause is most probably high VSWR.

At 1500w out (our legal limit), the amplifier will draw 55 to 70 amps at 50v (depending on the band in use) and can be driven to higher output on all bands. At 1500w, the linearity is excellent, and you will be below the 1db compression point.

As supplied to you, the input attenuator is jumpered in for use with a 100w radio. If you want to drive the amplifier with low power, the rear-panel jumpers can be re-arranged to bypass the attenuator. There's a sliding scale for drive levels…full output can be reached with 2w on 160m; on 6m you'll need 8 to10 watts.

Because the drive requirements vary by more than 3db across the entire set of bands, and the ALC feedback is sampled from input drive level, using ALC feedback to vary input is not recommended; its real purpose is to set a maximum drive level below which the amplifier cannot be damaged. Set up like this, ALC is not active during normal operation.

If your driver is capable of individual power output settings per-band, that is the recommended method for setting drive levels.

At 1500w output, the first red LED segment will just begin to illuminate. Higher than that, and you'll be above legal limits; on several bands I was measuring 1800 to 1900w, and at that point I was limited by my power supply capacity, which is 60 amps continuous/70 amps peak.

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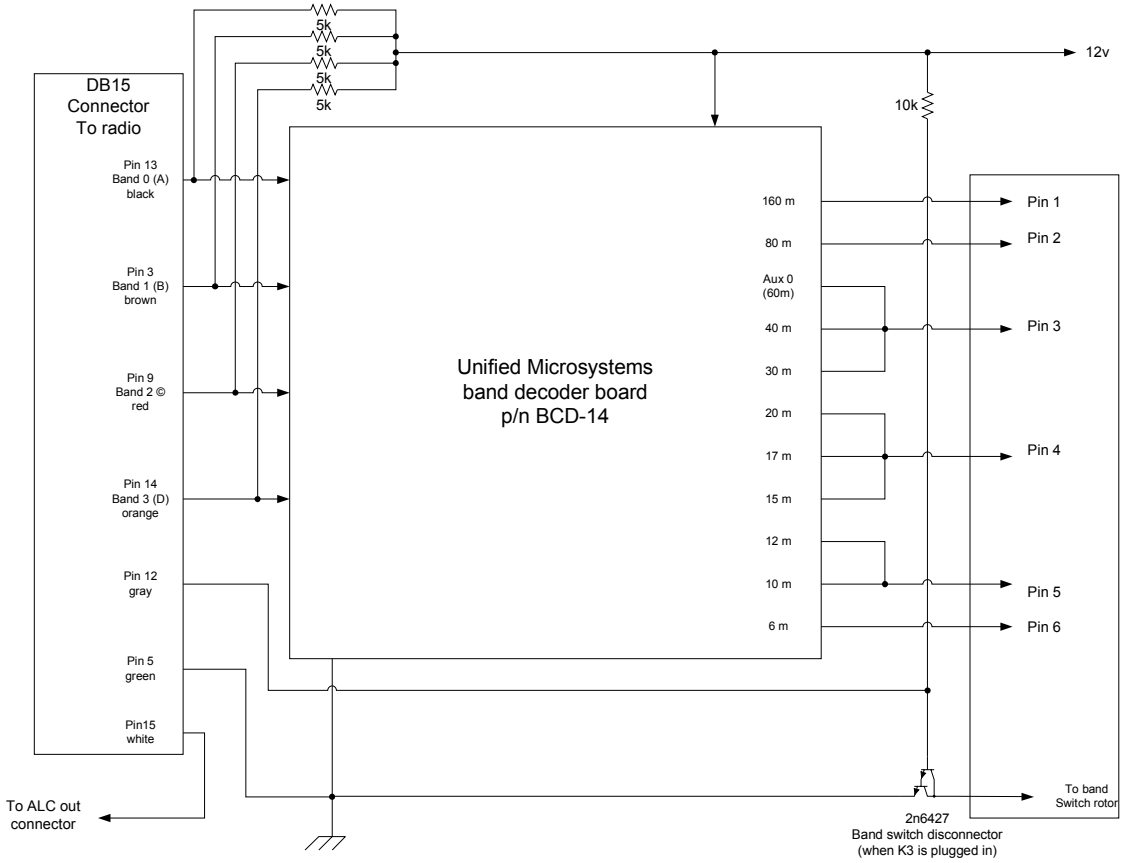
Using the internal BCD band-select interface

Shown below is the internal wiring to the band select interface card for use with radios employing BCD encoded band data outputs (Elecraft K3 and most Yaesu models).

When you use the DB15 connector between an Elecraft K3 and the amplifier, the front panel band switch on the amplifier must be disabled to prevent conflicts. When band select is controlled by the K3, this disconnect is accomplished by the K3 interconnect cable; it grounds pin 12 on the DB15 connector; if you will use a different radio (such as a Yaesu) to control band select, make certain this pin is grounded when the cable is plugged in. This is also pin 10 on the 12-pin Molex connector.



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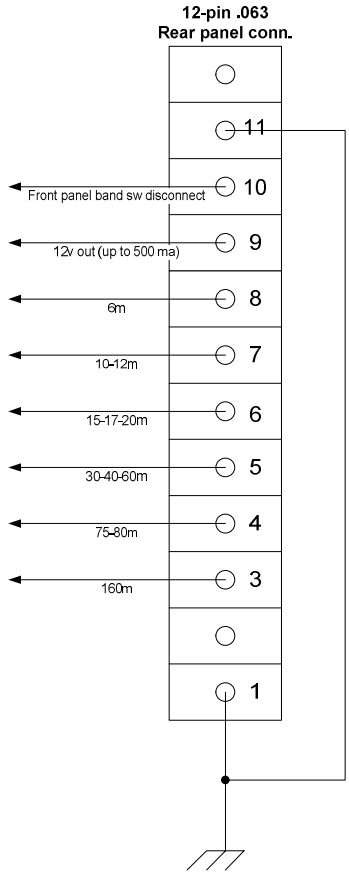
Using an external band-select interface

If you will be using an external interface for controlling band select, a 12-pin Molex connector is provided for this purpose. This will be useful on Icom and other radios which use voltage levels to encode band data, requiring a different interface card.

If you have an SDR radio like the Apache Labs ANAN series, these can control the band select directly by grounding the appropriate relay control line (12v at 60ma) depending on the band selected.

Flex radios using DDUTIL with the appropriate external interface can also be used. 12v at up to 500ma is provided on pin 9 of this connector to operate an external interface card if such a card is needed.

In all cases, make certain your interface cable grounds pin 10 of this connector (this is the front panel band switch disconnect).



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Final notes:

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

RED wires go to 50v POSITIVE

BLACK wires go to GROUND (50v NEGATIVE)

BLUE 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 or 15 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.