**Amplifier Driver Kit - Assembly Manual**

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**INTRODUCTION**

The Amplifier Driver (AD) circuit was designed to be a buffer and a low resistance driver circuit between a low voltage - low current switched input like the keying line (PTT) from a radio, and a high voltage - high current amplifier keying circuit. The AD has an optional polarity inverting FET front end that, when used, inverts the input from the radio and drives the gate of the high current MOSFET output capable of switching up to 200 VDC at 8A. The AD is perfect for keying older “boat-anchor” amplifiers that require a high voltage, high current switch.



**SPECIFICATIONS**

Source voltage: 10.6-18.0 VDC @ < 2 mA

Output Voltage Maximum: 200VDC (switching capability)

Output Current: 8A

Input voltage: LOW or 0.0-0.6 VDC (State = OFF)

High or 3.3-48 VDC (State = ON)

Input Current: < 2 mA, sink or source

Mounting: Two M4 floating mounting holes

Size: 1.55” x 1.78”

Truth Table:



**INVENTORY AND PREWORK**

Before you begin, inventory your parts against BOM to make sure you have everything you need to complete the AD board. The BOM is shown below:

|  |  |  |
| --- | --- | --- |
| **Qty** | **Ref** | **Description** |
| 2 | C1, C2 | 0.1 uF 50V Leaded Capacitor |
| 1 | C3 | 15 nF 50V Leaded Capacitor |
| 1 | D1 | 1N4738 8.1V 1.0W Leaded Zener Diode |
| 1 | J1 | IDC1x5 Male Headder Pins |
| 1 | Q1 | IRF630 TO-220 FET |
| 1 | Q2 | 2N7000-D26Z |
| 2 | R1, R4 | 10K Ohm 1/4W Leaded Carbon Film Resistor |
| 1 | R3 | 1K Ohm 1/4W Leaded Carbon Film Resistor |
| 1 | Board | Custom Circuit Board |

**BOARD AND CIRCUIT**

Refer to the unpopulated circuit board and the schematic for building the AD kit:

A green circuit board with white and yellow dots

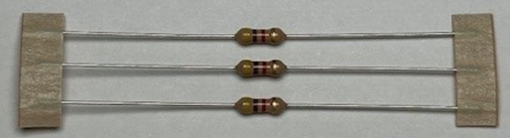
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A diagram of a circuit

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**BUILDING THE BOARD**

1. Find a place where you can spread-out your work, including a printout of the schematic and BOM. Your workstation should be such that you can leave it overnight without having to "clean up". The workspace should also be kid and cat-proof. If you get tired, stop. Come back to it tomorrow. Rushing the assembly rarely works out saving time.
2. Start by cleaning the AD board with IPA (Iso-propyl or “rubbing” alcohol) to make sure it’s clean.
3. **IMPORTANT:** *Decide if you need the inverter section of the AD. Most commercial radios close a set of contacts when the PTT is activated, and the amplifier expects a switch closure to key the amplifier. From the Truth Table above, you must build the inverter section for this case. But, for radios that provide a positive voltage when transmitting, do not build the inverter circuit. Once you have decided if you need the inverter circuit, continue to the next building instruction. Contact the author if you still have questions.*
4. Solder a 10K (brown-black-orange) resistor at positions R1 and R4. Clip excess leads short.



1. Solder a 1K Ohm (brown-black-red) resistor at R3. Clip excess leads short.
2. Solder D1, the “glass” 1N4738 Zener diode on the board. Make sure the end with the black band is oriented to align with the white stripe at the D1 position (square pad on the circuit board):

A close up of a metal rod

Description automatically generated

1. Solder 0.1uF 50V capacitors at C1 and C2. Clip the leads short.
2. Solder a 15nF 50V capacitor at C3 and clip the leads short.
3. Solder the IRF630 MOSFET into its position at Q1. Note that the metal tab is oriented to correspond as shown below:

A close-up of a black electronic device

Description automatically generated A close-up of a piece of electronic equipment

Description automatically generated

1. Solder the five IDC pins with the shorting at the J1 position.
2. Finally, do one of these two things (**but NOT BOTH!**):
   1. If you decided to **USE THE INVERTER** section of the AD: Solder Q2, the 2N7000 FET into place on the board and clip the leads short. **OR**
   2. If you decided **NOT TO USE THE INVERTER** section of the AD: DO NOT place Q2. Instead, solder the two pads together at JP1.
3. The board is now complete. Use IPA again to clean the flux off the board. If done right, It should look like this:

A green circuit board with red and blue lights

Description automatically generated

**USING THE BOARD**

Connect incoming power to the RVP board at J1. Mind the connection polarity. Apply power to test the RVP. The GREEN LED should light. Remove power and connect the load (radio or other piece of electronic gear) to J2 minding the connection polarity to the load. Now apply power to the PRV and the load should be active. Note that this board is small enough to fit inside most projects and will protect the project from voltage reversals. A quick check of the LEDs will tell you if there is a connection problem.

You can remove the jumper at SW1 and replace it with a small/ remote SPST (NO=OFF) switch to make the EVP board a solid state power switch capable of switching more than 20A at 12VDC.

NOTE: No heatsink is normally required on Q1. The on state of the device results in less than a 4 milliohms resistance in series with the load, and therefore it dissipates about 1.6 watts at the rated 20A load. The device is capable of dissipating greater than 100W with a heat sink.