**Reverse Voltage Protection 20A Kit - Assembly Manual**

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**INTRODUCTION**

The reverse voltage protection (RVP) circuit is designed to prevent damage to an electronic device when connected to DC power in the opposite polarity for which the electronic device was designed to operate normally. The RVP incorporates a MOSFET switch and some associated circuitry that only allows the switch to conduct in one polarity direction (that being the direction the electronic device was designed for). Visual indications in the form of LEDs are provided to indicate normal (forward) connection and improper (reverse) connection. Screw terminals are for source and load wire connections have a current capability of 20 amps continuous.

A green circuit board with red and blue lights

Description automatically generated

**SPECIFICATIONS**

Input voltage: 10.6-18.0 VDC

Operating Current: 20A continuous, 25A intermittent.

Mounting: Two M4 floating mounting holes

Indications: RED LED on = Indication of reverse power connection,

GREEN LED on = Indication of proper power connection.

Size: 1.00” x 1.58”

**INVENTORY AND PREWORK**

Before you begin, inventory your parts against BOM to make sure you have everything you need to complete the RVP board. The BOM is available on the GITHUB at:

[T41/K9HZ\_KI3P\_Reverse\_Voltage\_Protection/K9HZ\_KI3P\_20A\_Reverse\_Voltage\_Protection\_Kit/Reverse\_voltage\_protection\_20A\_BOM.xlsx at main · DRWJSCHMIDT/T41 · GitHub](https://github.com/DRWJSCHMIDT/T41/blob/main/K9HZ_KI3P_Reverse_Voltage_Protection/K9HZ_KI3P_20A_Reverse_Voltage_Protection_Kit/Reverse_voltage_protection_20A_BOM.xlsx)

A list of electrical components

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**BOARD AND CIRCUIT**

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

A close-up of a circuit board

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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 printouts 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 RVP board with IPA (Iso-propyl or “rubbing” alcohol) to make sure it’s clean.
3. Next, bend the leads and solder the three 4.7K ohm resistors at positions R1, R2, and R3 on the board. Clip the leads on the bottom side of the board:

A row of resistors

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1. Solder D2, the “all black” looking diode with the white stripe on one end. Make sure the end with the white stripe aligns with the white stripe on the board at the D2 position (square pad on the circuit board):

A black and silver metal object

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1. Solder D3, the “glass” 1N4740 Zener diode with the black stripe in its place on the board. Make sure the end with the black band is oriented to align with the white stripe at the D3 position (square pad on the circuit board):

A close up of a metal rod

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1. Solder the two LEDs D1 (RED or “BAD”), and D2 (GREEN or “GOOD”) onto the board. Note the orientation is such that the SHORT LEAD of the LEDs goes through the hole in the SQUARE PAD on the circuit board.

A close-up of a red and green led

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1. Next, solder the two screw terminals to circuit board. Orient the terminal connectors such that the WIRE HOLES point outward from the board:

A close up of a piece of metal

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1. Finally solder the 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

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1. Do not fit anything at the SW1 position.
2. 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.