

## FEATURES

- Four outputs up to 500mA each
- Rail Splitter provides +/- and 0V from single DC input
- USB 5V supply
- Selectable 3.3V/5.0V/1.2 to 28V adjustable supply
- up to 36V input on rail splitter and selectable power supply
- standard 2.1/5.5mm DC power jacks
- reverse polarity protection
- LED indication for each supply
- terminal block outputs
- 3.70"x2.0" or 94mm x51mm
- #4 or 3mm mounting holes on 1.75" 44.5mm spacing

## DESCRIPTION

The E2980 Power Distribution board eases the problem of connecting adapters to prototype circuits, and also provides the most common options for powering analog circuits with a split supply as well as providing for logic or other requirements. Included are a rail splitter with +/- voltage outputs, a USB derived

5V, and a selectable output voltage regulator providing commonly used 3.3V, 5.0V, and adjustable voltage options between 1.2V to 28V. The rail splitter generates an artificial ground halfway between the DC input voltage. The outputs can be interconnected to obtain different grounding or voltages.

**Table 1. Electrical Characteristics**Test Conditions:  $T_{\text{ambient}} = 25^{\circ}\text{C}$ , unless otherwise specified

| Symbol                          | Parameter             | Min. | Typ. | Max. | Unit               |
|---------------------------------|-----------------------|------|------|------|--------------------|
| Rail Splitter $V_{\text{in}}$   | Supply voltage        | 6    |      | 36   | V                  |
| Rail Splitter $I_{\text{in}}$   | Supply current        |      |      | 1000 | mA                 |
| Rail Splitter $I_{\text{out}}$  | Output current        |      |      | 1000 | mA                 |
| Rail Splitter $I_{\text{diff}}$ | Differential Iout     |      |      | 500  | mA                 |
| USB $I_{\text{out}}$            | Output current        |      |      | 500  | mA                 |
| Adjustable $V_{\text{in}}$      | Supply voltage        | 4    |      | 36   | V                  |
| Adjustable $I_{\text{in}}$      | Supply current        |      |      | 1000 | mA                 |
| DC2 $I_{\text{out}}$            | Output current        |      |      | 1000 | mA                 |
| Adjustable $I_{\text{out}}$     | Output current        |      |      | 500  | mA                 |
| $T_{\text{operate}}$            | Operating temperature | -40  |      | +105 | $^{\circ}\text{C}$ |

**General Precautions**

Charged devices and circuit boards can discharge without warning. Proper ESD precautions should be followed to avoid failure.

This device is not authorized for use in any product where the failure or malfunction of the product can reasonably be expected to cause failure in a life support system or to significantly affect its operation.

Locus Engineering Inc. reserves the right to make changes at any time without notice to improve product features or reliability.

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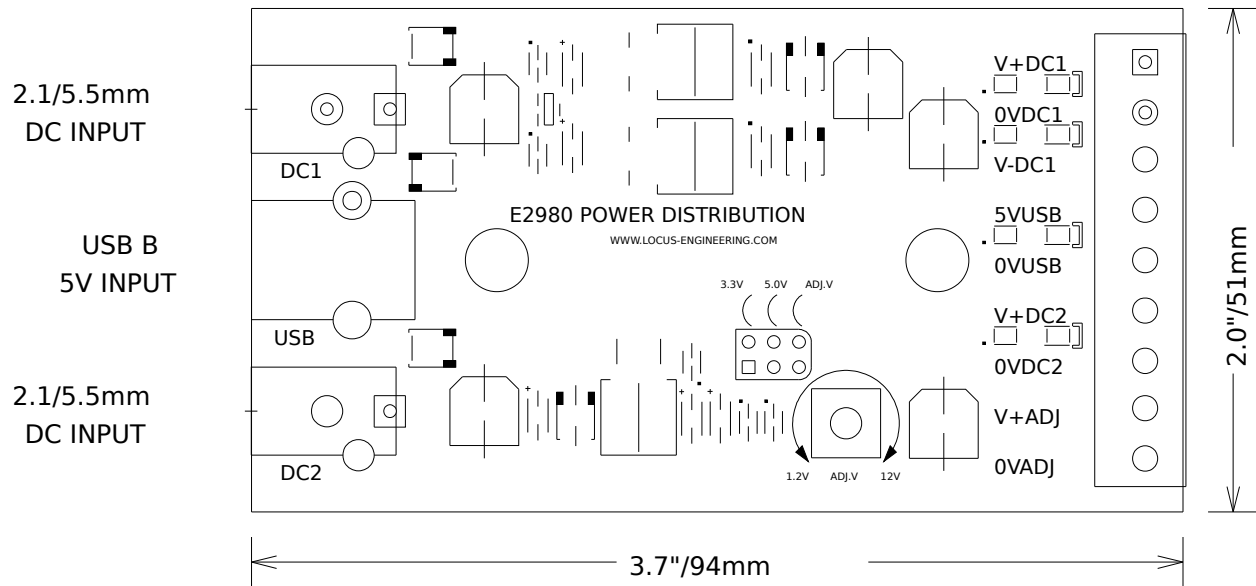


Figure 1. E2980 Module Dimensions

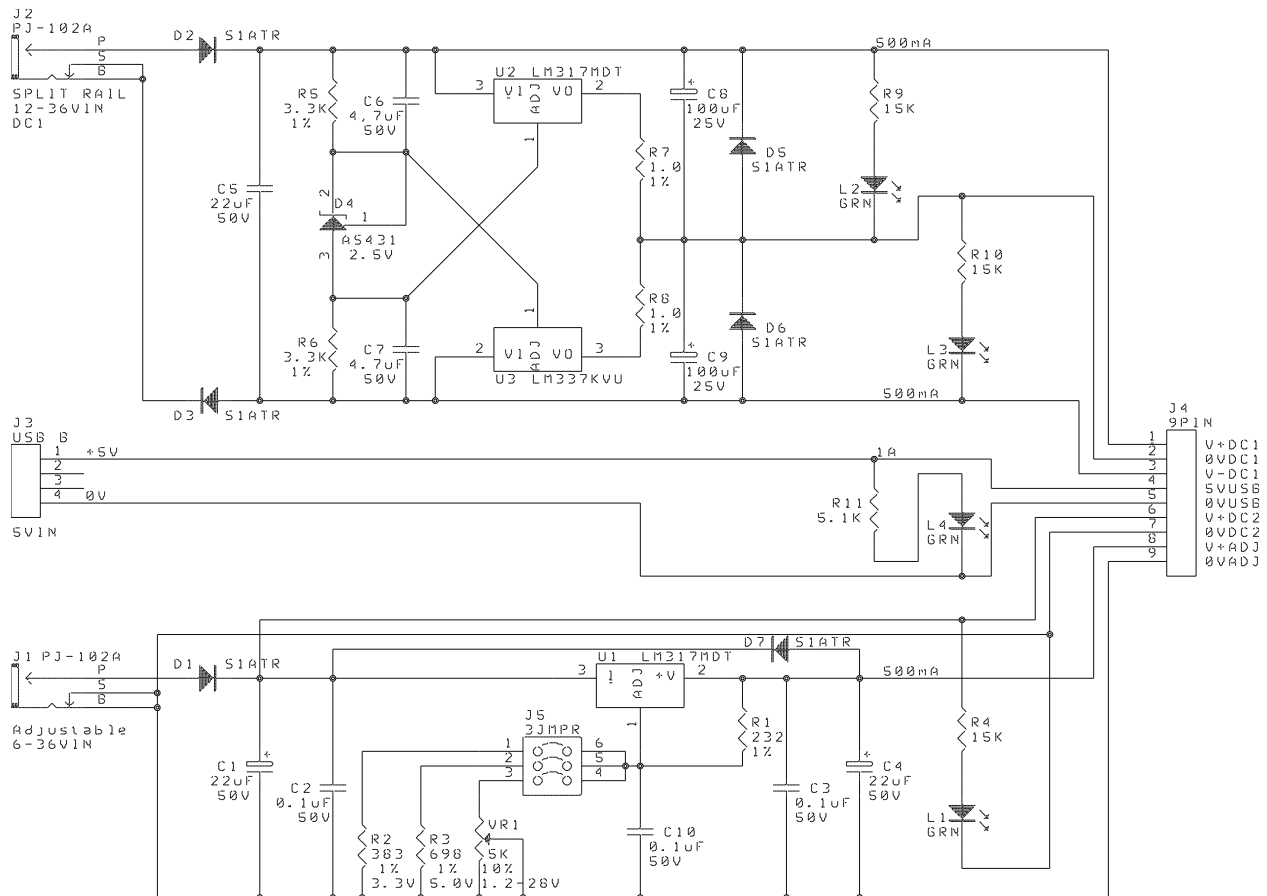


Figure 2. E2980 Schematic

## Module Description

The E2980 Power Distribution board has three power supply sections; a rail splitter, a USB derived 5V, and an adjustable output supply. As long as the DC inputs to the rail splitter and the adjustable regulator are from transformer isolated AC adapters, the output grounds can be combined in any manner. See the schematic in Figure 2.

## Rail Splitter Supply

The rail splitter supply provides op amp and analog circuits with a split +/- and ground supply from a regular single ended 2.1mm/5.5mm DC input adapter. DC input voltages up to 36V can be applied resulting in up to +/-18V outputs. Diodes are used at the input to protect against reverse polarity. The rail splitter generates an artificial ground halfway between the DC input voltage. The circuit uses adjustable voltage regulators to shunt any current imbalance so the artificial ground is kept at  $V_{in}/2$ . Thus for similar currents being drawn from both + and - rails, the regulators will hardly dissipate any power. As the current imbalance increases however between the + and - rails, the opposite regulator to the higher current rail will dissipate more power. Although the differential current can be up to 500mA this should be for short term only as the regulator will be shunting this current at  $V_{in}/2$ . A more realistic differential current is between 50 to 150mA continuous to keep the regulator within a safe temperature range. The regulators will shut down safely if overheated due to excess current. See the Output Current Imbalance Derating curves in Figure 3.

## USB 5V

The least expensive 5V supply is from a USB port, so a USB B connector receives power via a user provided USB cable and makes it available at the terminal block. The USB B connector allows up to 500mA to be made available depending on the USB sourcing capabilities.

## Selectable Supply

The selectable supply is routed directly to the terminal block and also to the adjustable regulator, thus the input voltage and regulated output are both available. The selectable supply uses a 500mA voltage regulator with three jumper settings to select between 3.3V, 5.0V, or the trimpot adjustable option. This supply is also protected against reverse polarity with an input diode. The regulator will safely shut down on over temperature due to excess current times the input-output voltage differential. To obtain the maximum output current, the supply voltage should be minimized to ~3-4V above the desired output voltage.

The 3.3V option requires a minimum input voltage of ~6V. See the Output Current Derating for 3.3V curve in Figure 4 for available output current vs input voltage.

The 5.0V option requires a minimum input voltage of ~8V. See the Output Current Derating for 5.0V curve in Figure 5 for available output current vs input voltage.

The selectable option requires a minimum input voltage ~3V above the desired output voltage. The output voltage can be varied between 1.25V and 28V. The trimpot requires a small 2mm flat or Phillips screwdriver to adjust the output voltage. See the Adjustable Regulator Output Current Derating curve in Figure 6.

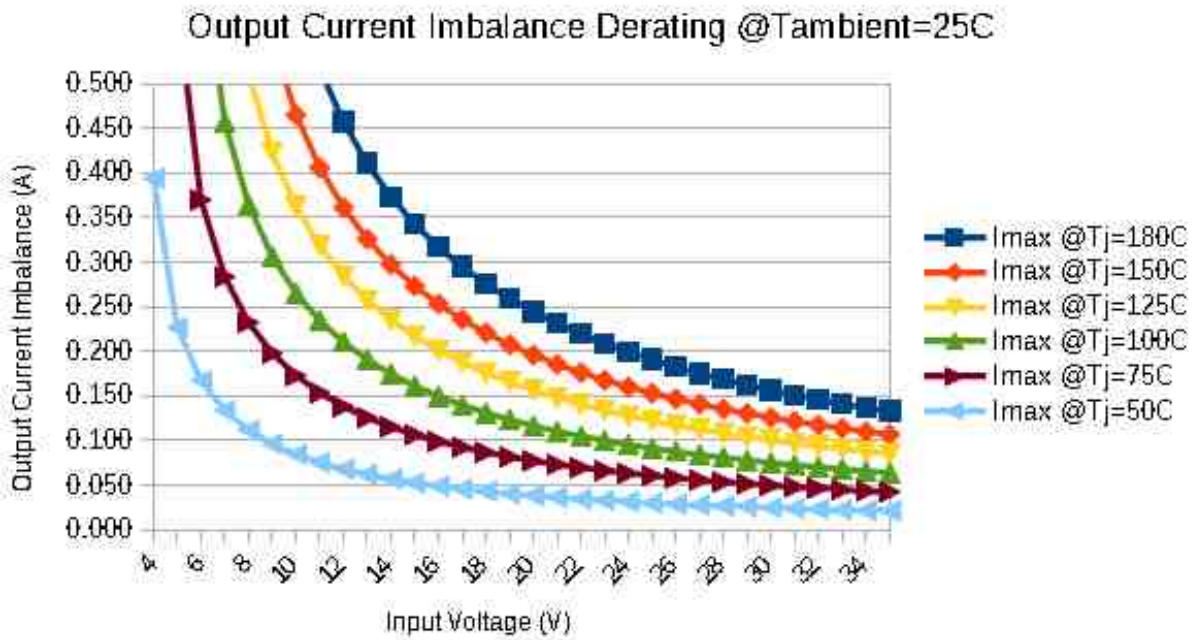


Figure 3

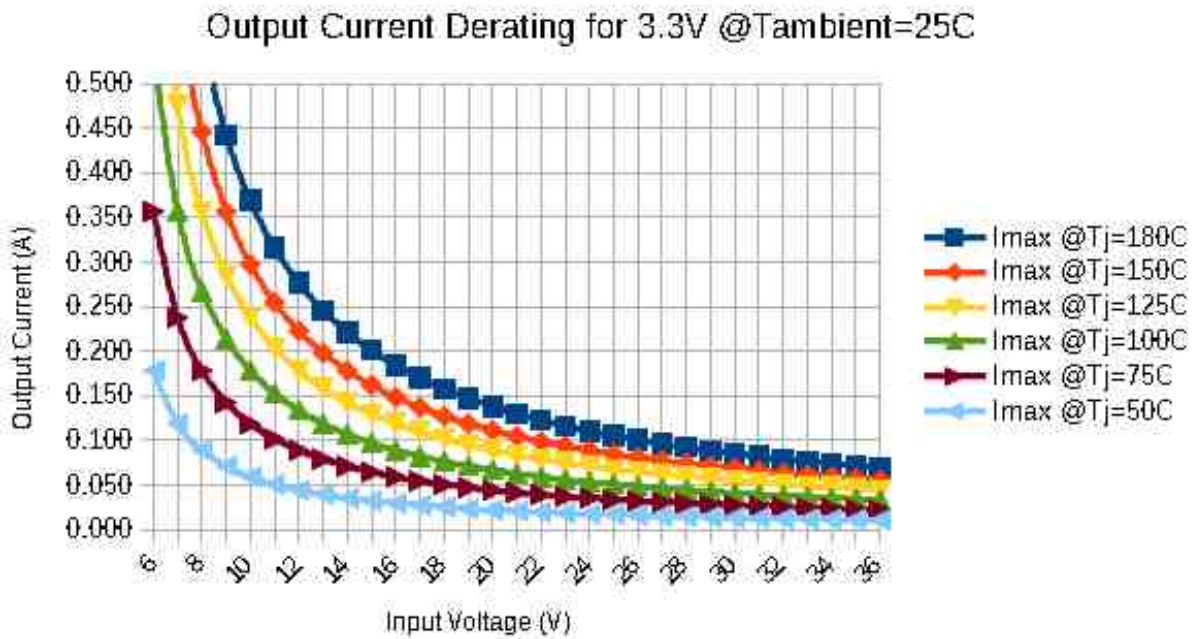


Figure 4

Output Current Derating for 5.0V @Tambient=25C

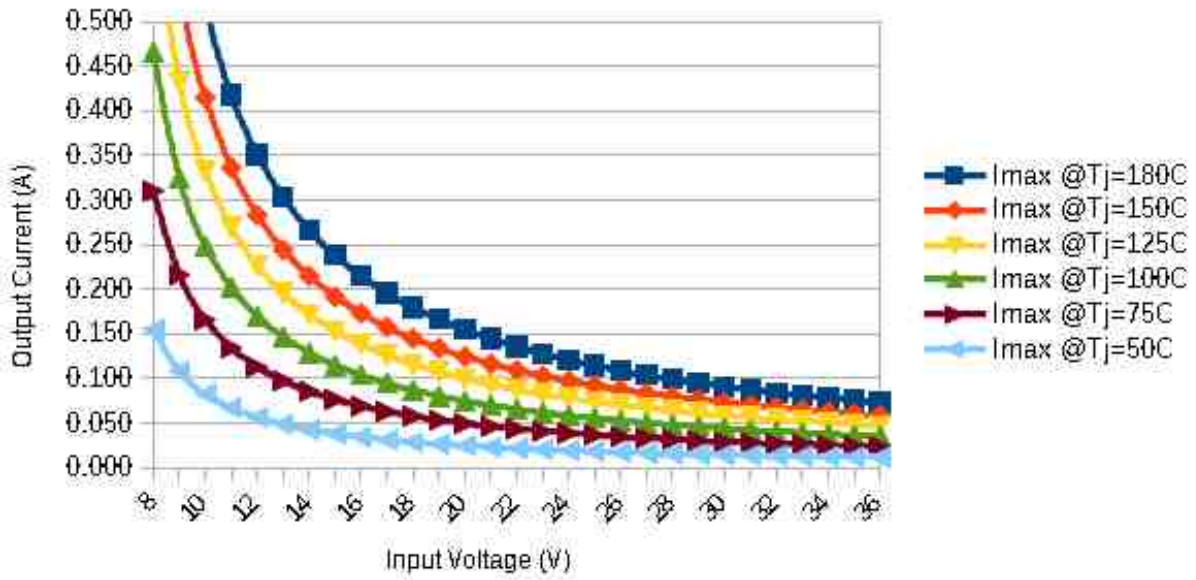


Figure 5

Adjustable Regulator Output Current Derating @Tambient=25C and Tj=100C

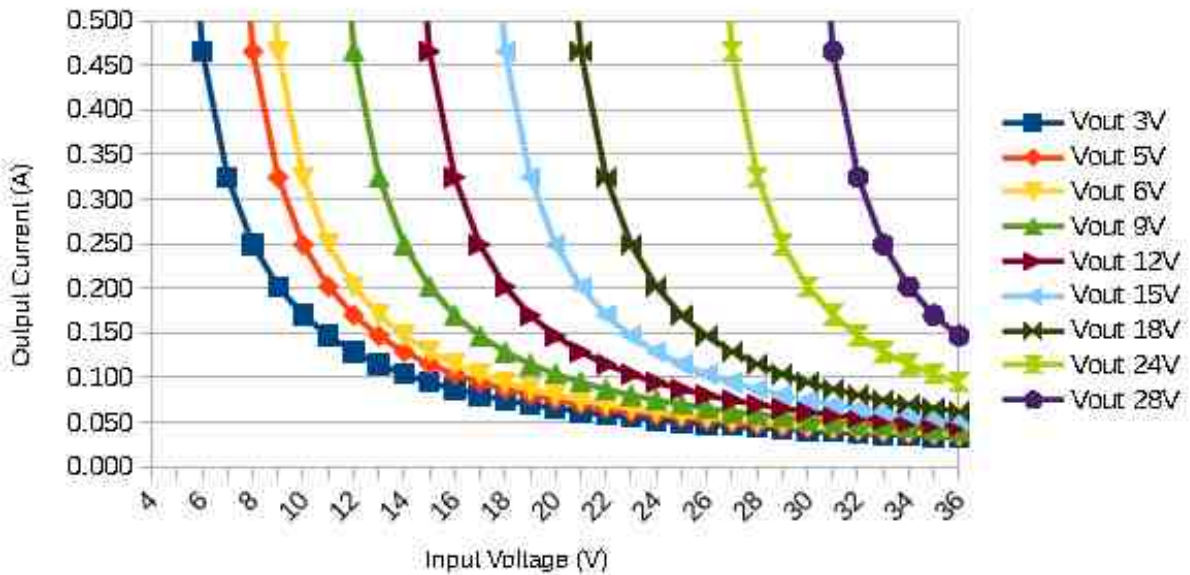


Figure 6