Unified Microsystems

VR –XX Voltage Regulator Module Kit

Version 1.03 December 2012

- **VR-3.3 3.3V Voltage Regulator**
- **VR-5 5V Voltage Regulator**
- **VR-8 8V Voltage Regulator**
- **VR-9 9V Voltage Regulator**
- **VR-12 12V Voltage Regulator**
- **VR-15 15V Voltage Regulator**

Specifications

- Output voltage regulation: 2% (3% VR-3.3)
- Input voltage range: output voltage + 2 Volts (minimum) to 25 Volts maximum
- Output current: 1A Max (VR-3.3 500ma) **See notes on heat.**

Assembly Instructions

1. Insert and solder the .1uF capacitor at location labeled C3. This capacitor will be labeled 104.
2. Insert and solder the .33uF capacitor at location labeled C1. This capacitor will be labeled 334.
3. Using the supplied hardware, install the heat sink on U1. The metal back of U1 goes against the inside back of the heat sink. Line up the heat sink hole near the middle of the heat sink with the hole in the tab of U1. The other hole goes towards the pins of U1. The screw goes though the heat sink then through the tab of U1. Secure with the lock washer and hex nut.
4. Insert and solder the voltage regulator at location U1. The type of regulator supplied will depend on the voltage. A 7805 is a 5 volt regulator, a 7812 is a 12 volt regulator, etc. The flat backside of the U1/heat sink assembly must be away from the capacitors C1 and C3. The bottom of the heat sink should rest lightly on the circuit board as you solder the pins.
5. Insert and solder a 100uF capacitor at location labeled C2. Be sure to observe to proper polarity.
6. Insert and solder a 100uF capacitor at location labeled C4. Be sure to observe to proper polarity.
7. Examine your soldering to be sure there are no shorts or solder bridges.

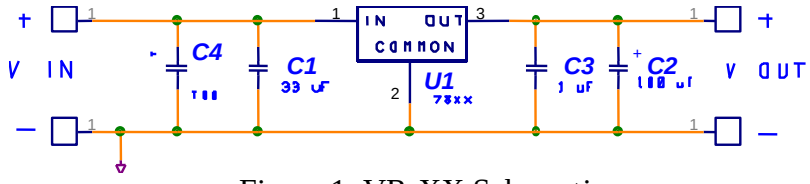

Figure 1. VR-XX Schematic

Input Voltage
You will connect your supply voltage at the V IN connections. Be sure to observe proper polarity. The input voltage must be at least 2 volts higher than the rated output voltage. If the input voltage falls below this rating, the regulator will not be able to do its job.

Note that as the load current increases, the input voltage may drop below the minimum if it is not well regulated. Inexpensive wall-wart type power supplies often have poor regulation. Be sure that your voltage source can provide the required voltage at full load.

Heat Considerations
A linear voltage regulator acts as an automatic variable resistor. At low load currents its effective resistance will be high. As the load current increases, the effective resistance will reduce, keeping the load voltage constant. The voltage difference between Vin and Vout multiplied by the current is the power that the regulator must dissipate as heat.

Example: 12 V input, 5 V output, load current = 200ma (.2A)
Power (watts) = Vdiff * Iload = (12V-5V) * .2 = 1.4 Watts

The temperature of U1 will increase approximately 17° C/watt (30.6° F/watt) in calm air. It is not recommended to run your regulator at more than 3 watts dissipation.

CAUTION! IC U1 AND THE HEAT SINK CAN GET VERY HOT!

Depending on the difference between input and output voltages, and the load current, it may be necessary to use a larger heat sink and/or use a fan to blow air across the heat sink.

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