

Power Distribution Board Schematic

For our MRSD project we have decided to build an exact copy of robot Blue. Blue uses a 12V/6A voltage regulator circuit to provide power to the controller board. The regulator is not a raw chip and is a module as shown below



https://www.amazon.com/Automatic-Converter-6A-Waterproof-Transformer/dp/B07WFMKMV9/ref=pd_sbs_23_6/133-3419446-1697244?encoding=UTF8&pd_rd_i=B07WFMKMV9&pd_rd_r=0658f77b-5df4-4ea8-96bd-5b48fa606eab&pd_rd_w=Lieed&pd_rd_wg=IP64P&pf_rd_p=7cd8f929-4345-4bf2-a554-7d7588b3dd5f&pf_rd_r=A7DPGE2XJHD3R6DN6WY5&psc=1&refRID=A7DPGE2XJHD3R6DN6WY5

For our PCB we incorporate this regulator circuit and use it to power two different controllers. One will be the rover computer (Jetson / Intel Nuc) and the other will be the dynamixel controller (for controlling camera pan/tilt motors).

Although we are not using a raw chip (voltage regulation IC) we have included reverse voltage protection and spike protection for the regulator module externally. A fuse is also added near the input of the regulator. The two input wires of the regulator will be connected to the screw terminal (named REGULATOR_INP) and the output of the module will be connected to the screw terminal (named REGULATOR_OUT). Finally an LED has been used as an indicator that the regulator does not have zero output and is providing power.

The efficiency specification of the regulator is about 95%. For a max output power of 60W. The input power would be 63.15W. Hence, the loss would be about 3.15W. The regulator has a heat sink for heat dissipation.