Remote Controlled Power Outlet

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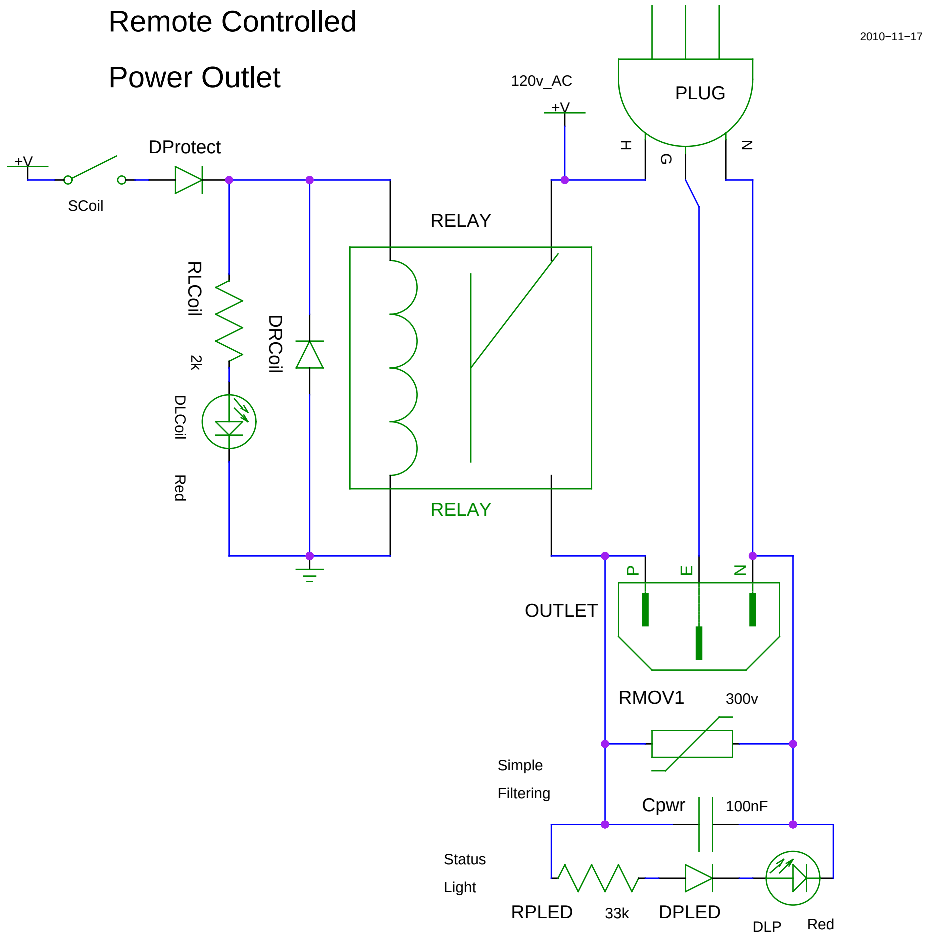

High Voltage Warning: High voltage can kill. If this is your first electronics project, find something else or only use the relay to swith low voltage.

This is a pretty standard layout for a power outlet controlled by a relay. Choose a relay that can properly handle the desired voltage and current. Do not take the current all the way up to the relay's limit as this does not allow for surge overhead of devices turning on. A general rule of thumb is don't go over 3/4 current rating. This will also help prevent switch arc'ing and over heating of the contacts. Choose the relay coil voltage and current carefully for the needs. Long term coil usage could heat it up and shorten the life. Choose the relay switches carefully. I prefer normally closed (NC) switches as opposed to normally open (NO) since most of my equipment plugged in should be running (the relay is used as a power reset in case one starts screwing up).

Warning: Make sure the relay interrupts the hot/live lead and NOT neutral or ground. Doing this wrong can lead to a nasty shock, electrocution, and the circuit not working as expected.

The wall outlet (bottom right) is also shown to have MOV protection, a noise filtering capacitor, and a status LED. Most protection MOV's are rated for 300v for 120v AC lines. This may be high for some. Standard 120v AC will peak at 170v, so do not drop the MOV below 200v. Multiple MOV's can be paralleled for added protection. The noise filtering capacitor should be AC rated, not over 100nF (higher messes with the sine wave), and rated for a minimum of 300v AC. If anticipated surges or noise will be higher than 300v AC, obviously increase the capacitor rating. The status LED shows that the outlet is active and is generally desirable for a switched outlet. Calculate the resistor to not deliver more than about 5mA at the peak voltage (170v for 120v AC). Of course a full on surge protector circuit could be wired up instead of the half one shown here. My standard wall outlet made this design trivial to implement, so that is the way I went.

Be sure to mount all the high voltage side in a suitable electrical box. I used a cheap single gang plastic box from the hardware store with the usual face plate. Make sure the power cord and relay coil signal cord both have adequate strain relief. Make sure any exposed wires or terminals in the box that might bump into something and short out have adequate insulation.

The relay coil has the standard protection diode across it (DRCoil). This is to prevent flyback when the coil (being an inductor) disengages. DRCoil should be directly across the coil terminals. DProtect makes sure that damage doesn't occur if the power is connected backwards (DRCoil would form a short and burn out). The optional status LED is useful to see if the coil is active.

The SCoil switch is the most minimal way to implement relay control. It is adequate for simple implementations, but this design tends to lend itself towards more advanced MCU or computercontrol. Look for my parallel port relay control circuit for a full example. In short, the data pin connects to an opto−isolator which controls a transistor to control the relay coil. There is a high degree of isolation and protection in that circuit that makes it hard to screw up.

A solid state relay could be used in an application like this, but I didn't need the extra complexity of the control circuit. A standard relay switch defaults to either NC or NO without any power and works well for most of what I want to do.