

# Re: Quest for the simplest zero voltage switching

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All,

I'd like to do proportional control on a 120VAC, 1.5kw heating element (capacitive load) as simple as is possible. Ideally, I'd like to have a single pot that I could adjust from zero to one hundred percent duty cycle input to a zero voltage switching controller chip. This ZVS controller chip would then control the Triac switching the load. I've found several chips out there that provide zero voltage switching but only one that DIDN'T require a dc voltage for operation AND simply allowed a pot to be connected to the control pins, the Motorola CA3059. Or at least, it was the only one that had a circuit in the data sheet showing such a configuration. Unfortunately, its discontinued and I cannot find any suitable substitute for its operation. The MOC3081 seems like a possibility however it requires a digital input control. This would mean some kind of timer circuit (again DC would probably be required) unless I'm missing some obvious passive solution to providing this input. Any help from the power circuit design pro's out there would be greatly appreciated.

The most simple zero cross switching can be obtained by buying a solid state relay with a build in zero cross switch. Building a timer to controll it will be a little bit harder. I ever build one using a classic 555 with a stereo potmeter and some other passives and diodes. The 555 was used in astable mode and set to about 10Hz. The potmeter controlled the duty cycle from about 1 to 100%. As the zero cross switch only switched on zero voltage, I could controll power by the half cycle. Unfortunately I had to add a small power supply. The old 555 required 10-15mA at 15V and the solid state relay added another 5mA. Using a resistor directly from the mains would have made me to get rid of over 3W heat (220-230V/50Hz mains). As you have only 120V mains and can use a CMOS 555, powering via a series resistor will not be difficult.

Nevertheless, this days I'd go for a PIC10F200 and a normal 10k lin potmeter

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to build the timer. With one or two extra components and a little effort you can build the zero crossing switch into it as well.

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