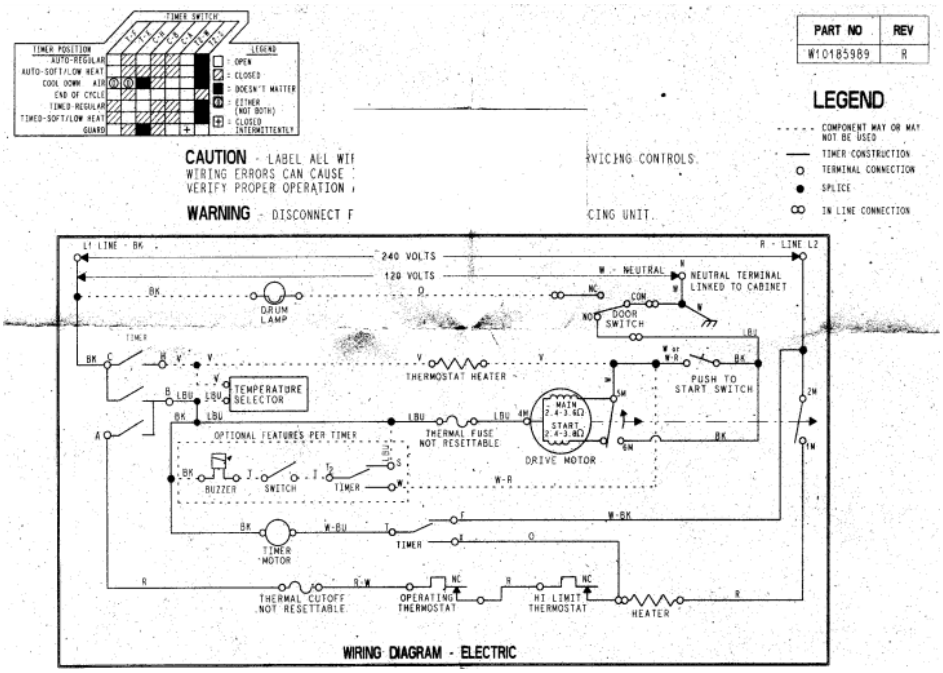
Clothes Drying Done Alarm, Version 1.0

By R. G. Sparber

Our bottom-of-the-line electric dryer died after 19 years of service. Well, I thought it was the one with the minimum number of features. The new model was even more stripped down. It had no light inside the drum and no alarm to tell us when the drying was done. My dear wife is willing to use a flashlight to see inside the drum but wants the alarm.

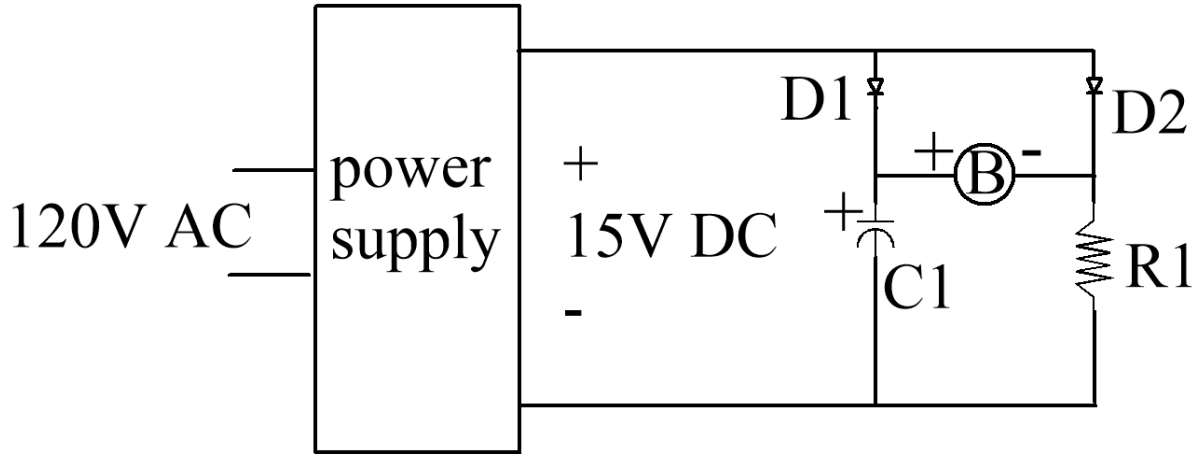


I opened up the back of the drying and found its schematic.

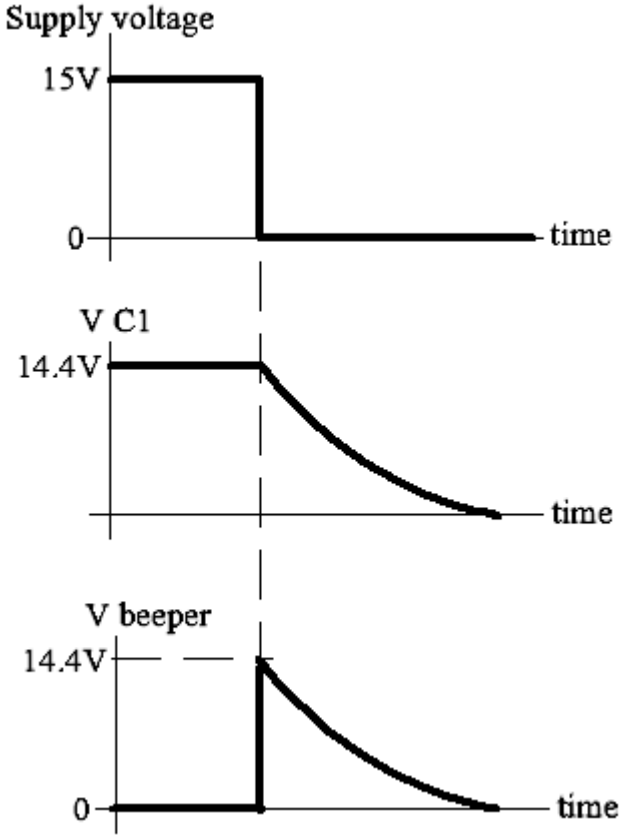
It showed the optional light and alarm, which we didn't get. Fortunately, it was clear from this schematic where the alarm would connect.

I just need to tap into the black wire running to the timer motor and the white wire going to the start button. When 120V AC drops to zero, I want the alarm to go off for a few seconds.

Sure, I could build an Arduino-based circuit and write a program, but that would be ridiculous. This is an excellent application for analog circuit design techniques. It only took about 3 minutes to realize I could do this function using one capacitor, one resistor, two diodes, a piezoelectric beeper, and a wall wart.



On the left is a wall wart that converts 120V AC into about 15V DC. D1 and D2 are 1 amp diodes. This is far more than I need, but I had them on hand. C1 is 1000 *uf* 30V and R1 is 220 ohm ±10% 2 watts. The symbol with the B in the middle is a piezoelectric beeper. This one has a built-in circuit that causes it to warble when power is applied. It works over a wide voltage range of 5 to 30 volts.



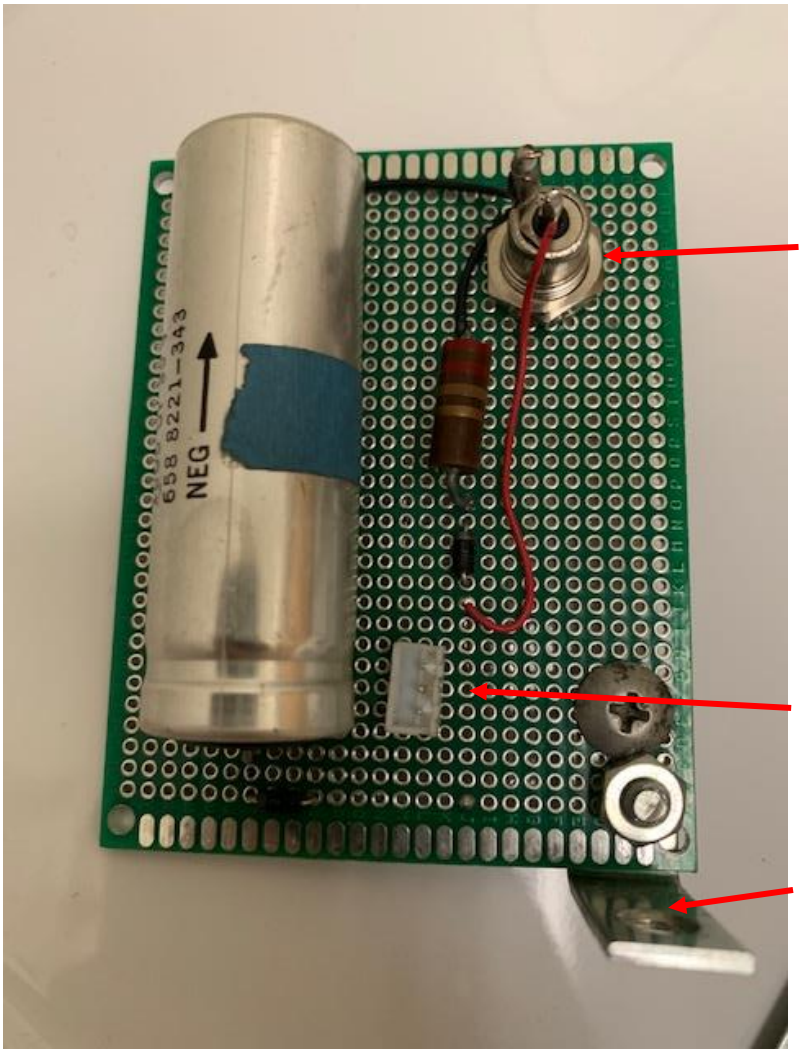
When the supply voltage has been at 15V DC for a long time, C1 charges up to about one diode drop below 15V. Call it 14.4V. Diode D2 conducts current through R1. The beeper sees about zero volts.

When the 120V AC input goes to zero, the supply voltage drops quickly from 15V to near zero due to R1 loading it.

D1 turns off because C1 now has a voltage greater than the supply voltage. The voltage across R1 is near zero.

The beeper initially sees about 14.4V volts, but this decays to zero over the span of about 10 seconds. We hear a very loud series of beeps, and then it tapers off.

There is plenty of space inside the top of the dryer.



With plenty of room, I spread the components out.

I had a barrel connector to match my wall wart's plug, so I used it here. The plug goes in from the other side.

The piezoelectric beeper plugs in here.

This bracket lets me run a screw into an existing hole in the dryer to support the circuit board.

I welcome your comments and questions.

If you want me to contact you each time I publish an article, email me with “Subscribe” in the subject line. In the body of the email, please tell me if you are interested in metalworking, software plus electronics, kayaking, and/or the Lectric XP eBike so I can put you on the right distribution list.

If you are on a list and have had enough, email me “Unsubscribe” in the subject line. No hard feelings.

Rick Sparber
Rgsparber.ha@gmail.com
Rick.Sparber.org