

Re: 0.20 delay in 6v control circuit

Source: <http://sci.tech-archive.net/Archive/sci.electronics.basics/2004-11/0434.html>

From: Bob (*bfraser1www_at_optonline.net*)

Date: 11/10/04

Date: Wed, 10 Nov 2004 03:11:55 GMT

On Wed, 10 Nov 2004 00:06:46 GMT, Robert Monsen
<rcturname@comcast.net> wrote:

>Bob wrote:

>> On Mon, 08 Nov 2004 22:10:19 GMT, Robert Monsen

>> <rcturname@comcast.net> wrote:

>>

>>

>>>(fixed top posting below. Please post replys after the main body of

>>>text. It's just convention here)

>>>

>>>Bob wrote:

>>>

>>>>On Mon, 08 Nov 2004 07:37:01 GMT, Robert Monsen

>>>><rcturname@comcast.net> wrote:

>>>>

>>>>

>>>>

>>>>>Here is a slightly better circuit for you needs:

>>>>>

>>>>> 6V

>>>>> -----o--o

>>>>> |||

>>>>> | - C|

>>>>> | o ^ C| Relay Coil

>>>>>|=| switch | C|

>>>>> | o | |

>>>>> |'--o

>>>>> | |

>>>>> | 10k | /

>>>>> o---/V---o-----o-----|

>>>>> ||| |>

>>>>> ||| |

>>>>> o-----|<-----| | + |

>>>>> | * --- 220uF |

>>>>> / --- |

>>>>> \ | |

>>>>> / 1k | |

```
>>>> \/\
>>>> /\
>>>> /\
>>>> '-----o-----'
>>>> GND
>>>>
>>>> * Schottky Diode
>>>>
>>>> created by Andy's ASCII-Circuit v1.25.250804 www.tech-chat.de
>>>>
>>>> The base will drop immediately from 850mV to about 200mV when the switch
>>>> is opened, due to the 1k resistor and the schottky diode. When the
>>>> switch is closed again, the base will come up from 200mV to about 850mV
>>>> before the transistor conducts, so
>>>>
>>>>  $V(t) = V ( 1 - \exp(-t/RC) )$ 
>>>>
>>>> thus
>>>>
>>>>  $t = -\ln(1 - .65/6) * 10k * 220u$ 
>>>> = .25s += 0.05s
>>>>
>>>> Once the cap is charged up, the current will be about 500uA, so the
>>>> current through the transistor can go up to 25mA (assuming a beta of 50).
>>>>
>>>>
>>>> Thanks again Robert,
>>>>
>>>> Do you have any idea on the specs for the diodes needed. I went to
>>>> pick up the Schottky diode and the one in parallel with the relay but
>>>> was not able to choose from the variety available. Thanks for the
>>>> design.
>>>>
>>>> Bob
>>>>
>>>>
>>>>
>>>> You can use any of 1N4002-1N4007 diodes for both of them. A Schottky
>>>> diode would be nice where the * is (it doesn't have to carry any
>>>> appreciable current, so any of them will do) but isn't necessary. It
>>>> just makes the recovery time a bit better, because it has a lower
>>>> forward voltage drop.
>>>>
>>>>
>>>> As you can probably tell, this is the first time I ever posted to a
>>>> news group. Anyway I built the circuit as you designed. What
>>>> actually occurs is the relay is energized for only .20 seconds instead
>>>> of a delay of .20 seconds then energized until the switch opens. (Did
>>>> you expect this? I checked the path of the circuit 3 times)
>>>>
>>>> Bob
```

>
>*When you close the switch, it should take 0.2 seconds to charge up the*
>*capacitor enough to turn on the transistor. Thus, assuming the relay is*
>*open when you start, the following should happen:*
>
>*1) relay open, switch open*
>*2) switch closed*
>*0.2 seconds*
>*3) relay closed*
>...
>*4) switch open, relay opens immediately.*
>
>*It sounds like you have the 10k resistor and 220uF capacitor swapped.*
>*That would cause it to*
>
>*1) relay open, switch open*
>*2) switch closed, relay immediately on*
>*0.2 seconds (or less!)*
>*3) relay open*
>...
>*4) switch open, relay still open*
>
> *From your reply, I can't quite figure out whether that is what you are*
>*seeing, though.*
>
>*(You probably know this, but closed means passing current, open means*
>*unable to pass current.)*

Thanks so much for all the assistance. I am amazed with your patience with an electronic baby. It appears the Transistor is the culprit. Maybe undersized? I replace a Radio Shack #276-1617 (tiny) with a Radio Shack #276-2020 also known as a TIP3055. The circuit works like a charm. Using a digital video camera, (consumer grade (Sony)), I am able to count a .22 second delay now compared without this delay circuit. Thanks again and my hat comes off for your patience and expertise with this circuit design.

Bob Fraser