

Re: Need help with intermittent circuit failures – JK Flip Flops

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 - *Date:* Sat, 10 Jun 2006 12:55:02 -0500
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On Sat, 10 Jun 2006 20:51:43 +1000, "Jason S" <jst3712@xxxxxxxxxxxxxx> wrote:

Thanks guys heaps. You been a great help. I haven't had a chance yet to try your schematic John (Petrus and ehsjr, I have noted your observations and advice as well), but I'll let you know as soon as I've totally rewired my breadboard...ugh.

However, do I really need to add another IC to my board (the 2nd 555)? This board has to be as small as possible... I didn't think I'd need so much electronics to do this simple task. Maybe 1x 556 (dual 555 IC) instead of 2x 555 would save a little more space??

The second 555 isn't necessary. After thinking about it for a while, Petrus' suggestion to use unused gates to get the delay turned out to be a good one, so that's what I did. I've posted a new schematic for you on abse which has that change (as well as others) on it. After looking the schematic over, if you need a circuit description I'll be happy to post one here.

By the way – in relation to the way I configured the monostable.... is it still a bad thing to want to be able to trigger the monostable at power on (ignoring the reed switch for arguments sake)? Assume pins 1 and 8 were connected directly to the supply rails... so when power is turned on, the monostable triggers automatically (due to C2).

And `_stays_` triggered, so its output can never go low, U2-2 can never go high, and the motor will never be able to turn!

For a 555 to operate properly, the signal on pin 2 must go more negative than $1/3V_{cc}$ and then go more positive than $2/3V_{cc}$ before

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the the output timeout period elapses.

I understand the correct method of triggering pin 2 with a negative pulse, but then I would need a separate circuit to achieve that as well – the negative pulse.

No, you wouldn't, all that would need to happen is that the circuit be reconfigured. See my schematic.

That is the only reason why I connected the reed relay the way I did – When the magnet comes into contact with the reed, it triggers the 555, doesn't matter how long the reed is in contact with the magnet for. In my circuit, if I made it so that the reed switch triggers pin 2, the 555 would freeze (on 'high') because the motor would have turned off and stopped right in front of the magnet indefinitely.

That's not true. Assuming a normally open reed switch, the way you have it wired now keeps the 555's input low, which keeps its output high until the magnet makes the switch, then the switch closes and forces the output of the 555 low until a switch bounce cause it to start timing out again. That's one of the reasons for the source of your problems.

I was just wondering that's all.

The two 15V zener diodes across the motor opposite each other is critical yeah?

Maybe not critical, but you need them in there to clamp any transients caused by a change of current in the inductance of the motor.

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Is my Q1 transistor overheating because these are absent? Or because of the motor reactivating too soon before the relay switches over??? The Q1 is rated 0.8A.

More than likely because you're not providing enough base current to drive the transistor into saturation. That's why Ed suggested that you change R2 to 1K. The problem you may have with that is that 4000 series CMOS can't supply much current without going out of rail-to-rail. I've paralleled three of the 4069's inverters in order to circumvent that, and you should be able to drive the transistor nicely with that "buffer"

P.S: John, I really appreciate your schematics... makes it a lot easier to understand what you are talking about =).

Thanks, my pleasure. :-)

John Fields
Professional Circuit Designer
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