# Re: CD4060 oscillator, max resistor value

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On Fri, 03 Aug 2007 13:32:15 −0700, the renowned Joerg
<notthisjoergsch@xxxxxxxxxxxxxxxxxxxx> wrote:

> Hello Folks,
>
> Got a design here that contains a few 4060 long timers with RC
> oscillators. Battery operated so consumption counts. Some datasheets
> state that the maximum value for any resistor in that area is 1M. Since
> Rs (feedback resistor) must be at least twice Rt (timing resistor) this
> leads to rather lowish timing resistor values. Since this is a logic
> gate oscillator that requirement causes quite some current at voltages
> around 10V.
>
> Anyhow, the TI datasheet does not seem to state that maximum:
> http://focus.ti.com/lit/ds/symlink/cd4060b.pdf
>
> ... while ON−Semi does state a 1M maximum:
> http://www.onsemi.com/pub/Collateral/MC14060−D.PDF
>
> What gives? Why do some specify that max value as low as 1M for really
> low leakage CMOS logic? A remnant from the olden days when this stuff
> was leaky at times?

TI gives the maximum leakage as +/−1uA at 85°C. If we assume a
threshold of 0.5*Vdd, the unit would stop working entirely with a
2.5M resistor and 5V, so the 1M is more−or−less within reason assuming
you could allow something like 30% change in timing and given that the
threshold can be different from 50%, and not necessarily in the
direction that's favorable.

> I usually use my own oscillators around CD40106 but this time those are
> all used up and there ain't no space no more :−(

Using >1M on regular CMOS is living in unspecified land, but you may
well be able to get away with it for a non−critical application. Note

that there's a 4 order of magnitude difference between typical and
maximum at 25°C, which should track over temperature.

Best regards,
Spehro Pefhany
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"it's the network..." "The Journey is the reward"
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