Just a little test for Phoenix software brought by the SLAX iso image

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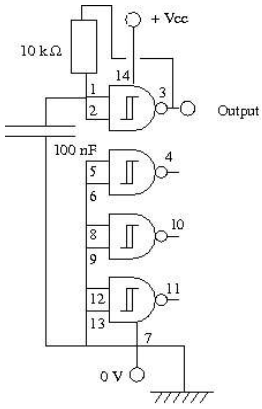
1 Making a little oscillator



I made a simple oscillator based on one fourth of quadruple schmidt trigger NAND gate (chip 4093). According to the abacus found at http://www.priory.bromley.sch.uk/students/electronics/pdf/hef4093b.pdf, (last page of the datasheet), the trigger thresholds should be near 2.7 and 3.4 V for V_{DD} = 6 V. The diagrams found on page 5 show that the peak output current at the operating voltage we use is less than what would be allowed in a 10 kΩ resistor, biased with a voltage of 1 V. So the output of one gate acts rather like a current source than like a voltage source. Therefore, the period should be a little longer than the one we may caculate for a capacitor oscillating between thresholds of 2.7 and 3.4 V, when it is fed by a square signal oscillating between 0 and 6 V.

2 The realisation

The device was soldered « in the air », that is, without PCB. It is alimented with a serie of four 1.5 V batteries .

Illustration 1 - a closeup

Illustration 2 - some tools

Illustration 3 ... in the kitchen

3 Foreseeing the period

The values for the resistor and the capacitor are respectively 10 kΩ and 100 nF, so the relaxation time (τ=RC) is 1000 µs.

When the voltage of the capacitor is driven downwards, the duration is

$$RC\ln(\frac{6}{2.7})-RC\ln(\frac{6}{3.4})=RC\ln(\frac{3.4}{2.3})=391\ \mu s$$

When the voltage is driven upwards, the duration is

$$RC\ln(\frac{6}{6-3.4})-RC\ln(\frac{6}{6-2.7})=RC\ln(\frac{3.3}{2.6})=238\ \mu s$$

so the period should be longer than 629 µs.

4 Using the phoenix software

The CD-R burnt with the ISO file phoenix.iso, dowloaded some days ago allowed to boot smoothly a laptop (PC-TEK series GREEN320). Then I logged in as root and launched python.

The little program used is the following:

```
import phoenix
p=phoenix.phoenix()
l=[]
for i in range(100):
  l.append(p.period(0))
```

The 100 measurements feature the following statistics :

min = 239.8 µs, max = 243.0 µs, average 241.1 µs