**DiDEL SA**

www.didel.com/diduino/MiniLogicPen.pdf

# Mini Logic Pen *LoPen* – handy and efficient

A logic probe or logic tester shows the state of a logic signal. If that state is zero or one, a simple LED can be used. A logic signal can also be floating, that is not connected or in three-state mode. It can can also be a short pulse your LED will not see, or it is pulsing too fast for your eyes.
LoPen takes care of these situations: A yellow LED shows floating signals. Visible blinks are given for glitches as short as 100 nanaoseconds, A slow blink shows a high frequency signal.
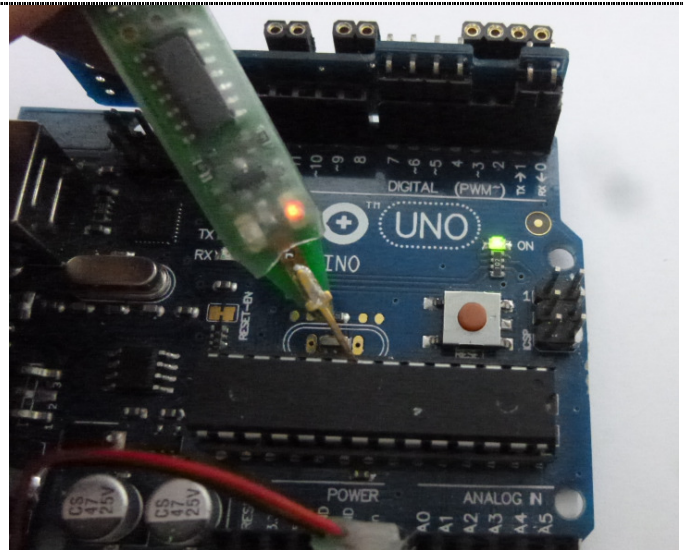
Logic levels and input impedance

Let's consider a 5V micrcontroller design. Most signals are digital. Zeroes with a voltage close to 0V (< 1V to be safe), ones with a voltage close to 5V (> 3V to be safe).
Floating signals have any voltage. The tip of LoPen is floating when not touching a signal. This is detected with 100 KOhm resistances that assign the tip voltage to 2.5V.

For a "good zero", the red LED is on, for a "good one" the green LED is on.
It does not correspond exactly the the circuits specifications, anyway all slightly different, but it is sufficiant for debugging. And it works from 2 to 6 Volts.
The shematic includes one-shots and 100 nanosecond pulses are converted to 0.3s red or green blink. You even can get a good feeling of pwm percentage, but notice the red/green blinking frequency is not related to the PWM frequency.
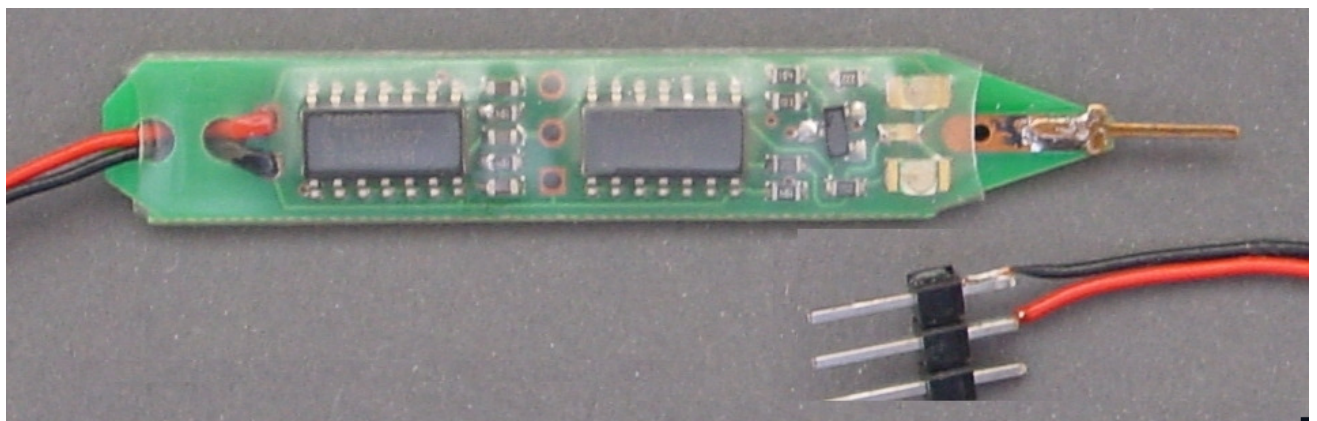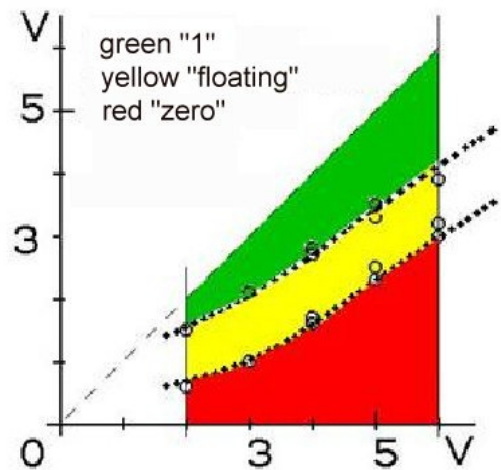
Power

Power is 2 to 6V. Use a red wire for the positive supply and a black wire for the Gnd.
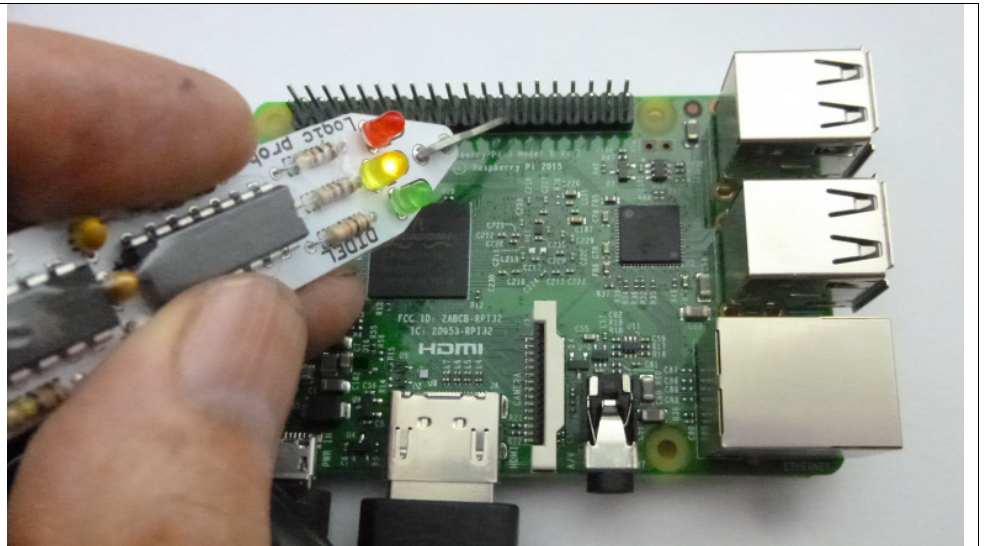A diode protect the circuit in case of inverted polarity.
The connector is a 2–pin 2.54mm male strip that get power from 2 next-by power pins. Easy
to change, but we recommend to make an adapter with a female plug.
You can also power the Logic pen from two signal pins, one with a logic zero for the Gnd
and one with a logic 1; current is less than 5mA.

Logic tester kit

Easy kit, same schematic, same features. Also available on Tindie.	

Doc in French : http://www.didel.com/microdules/LogicTester.pdf