

# More lights!

Many engineers of electronics started with simple moving-lights projects. We took the good old NE555, which provided the clock, and added a CD4017 (counter). Quite a few elements were required for just one possible combination of turning on/off the LEDs. How can we make a simple device that would provide many combinations of moving the lights?

This moving lights project is actually the simplest imaginable use of the AT89C2051, available for a modest price of few US\$.

## Let's turn the light on

There's more than one way to do this. Let me first show you how it's done with a microcontroller. When you open the BASCOM for the first time, first open a new worksheet with the File - > New menu or with the keyboard shortcut (Ctrl+N). Then name your variable and define it. You can define it either as: **bit** (variable value can be either 0 or 1), **byte** (8 bits, its value can be anything between 0 and 255), **word** (two bytes, its value can be anything between 0 and 65535) or **integer** (variable value can be anything between -32767 and +32768). There are more, but we don't need them for now. The apostrophe ' in BASCOM marks a ' comment. Comments do not affect program execution.

Variables are declared by the **Dim command**, as in the example below:

```
Dim LED as bit           'variable LED will be of the Bit type because
                          'it will either be 1 or 0 (LED off or on)
```

This command was used to declare variable "**LED**" and define its type. Since the **LED** will only turn on or off (logical 0 or logical 1) we can use a **Bit** type of a variable. I have already mentioned that the **LED** turns on/off with logical 0 or 1. It seems that we're mostly used to turning LED diodes on with a logical 1, not logical 0. Microcontrollers are another story; ports have an interesting property, they can only source a couple  $\mu\text{A}$  of current in logical 1, but they can sink up to 25mA at logical 0. That's why we usually connect the LED between the Vcc (+5V) and the port. A buffer is required to provide more than 25 mA.

Let's try to continue by turning our variable (**LED**) on and off. This is how its done: