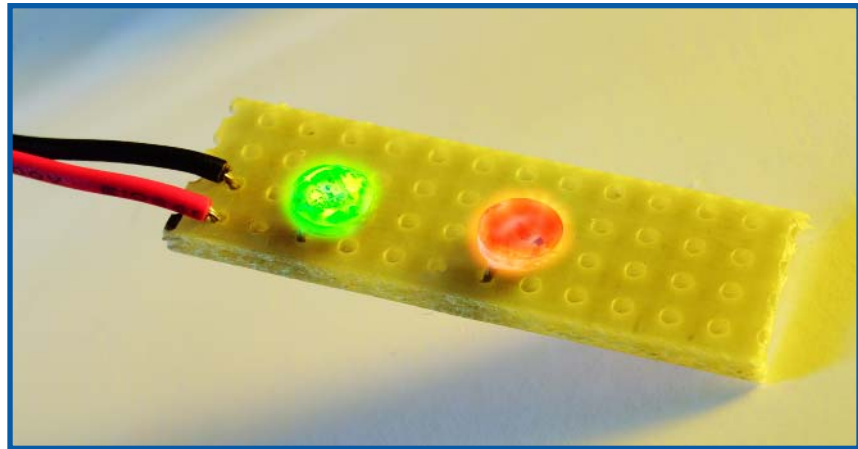# Multi-Colour Flashing LED

Light effects have always been popular. Now that LEDs are available in all sorts of shapes, sizes and colours for reasonable prices, a whole gamut of possibilities has become feasible. Examples are case modding (embellishing PC cases with all kinds of lights, windows, etc.), adorning scooters, motorcycles and cars with various light ornaments, mood lighting in different colours and we could go on.

In *Elektor Electronics* we also regularly feature circuits with LEDs. One circuit flashes LEDs, another drives multicoloured LEDs. On one occasion standard logic (counters, shift registers, etc.) is used to drive the LEDs, on another occasion a microcontroller is used. But there are also solutions that do not require additional driving electronics.

Ordinary flashing LEDs that require no more than a series resistor have been around for donkey's ages. They are quite nice, but spectacular they are certainly not. The company I.C. Engineering offers something much nicer: a three colour LED in a package with a diameter of 5 mm, which also contains all the control electronics. This 'LED' only requires a power supply voltage of 3 V to give a continuous 'light show'. The colours blend slowly from one to another. This effect is even nicer if the components are used next to each other. Because of small variations between LEDs, one LED will change colour a little faster than another, which results in a colourful play of lights. This 'LED' is eminently suitable to make a nice light ornament without too much effort.

(064014-1)

Better by miles

Dear Elektor — referring to 'Antenna Height and Range' in your latest Summer Circuits edition, sometimes the statute mile and feet works better than the meter. If you use 4/3 earth radius and express the distance s in statute miles (1,609 meters) and the height H in feet, the formula reads

$$s = \sqrt{[2H]}$$

In the example, $H = 15$ meters ≈ 50 feet, and the square root of 100 = 10. Hence the radio horizon is 16 km away. The difference between 16 and 13.8 km is due to the commonly used 4/3 earth profile.
It is true that the distance to the radio horizon varies from these theoretical calculations, but the mile/feet formula is much easier to remember and to calculate.
Have a nice summer and best regards from Knut.
Knut I. Bakke (Denmark)

As a rule we print metrical units in Elektor but Knut's remarks certainly deserve a mention.

Charlieplexing update

Dear Editor — I read with great interest your Elektor Summer Issue. Again full of interesting circuits.
However, I found it disappointing that you had included circuit no. 046, 'Charlieplexing', with incomplete information. That may easily fool someone to try it out with an inappropriate driver.
In order to make such multiplexing work, it is essential that each pin can be tri-stated, i.e. all dark segments are then represented by hi-Z logic state. Otherwise the setup does not work. Maxim's application note correctly addresses that.
Heikki Paananen (Finland)

Thanks for this useful bit of information Heikki.
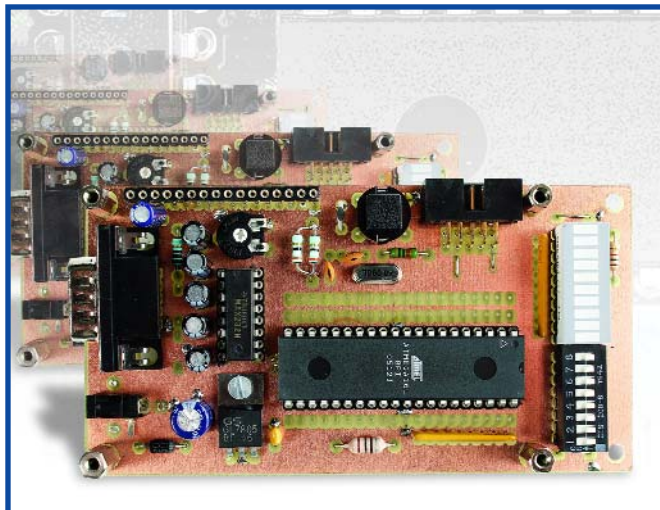
Mini ATMega Board

Dear Jan — I write to question the advisability, from a design perspective, of using JP2 to isolate the R2 resistor array from ground when the switches of S1 are not required. With JP2 open, the resistors become interconnected to all of the pins of PortA. The 8 pins of PortA can be configured independently as either a digital input or output or as an input to a 10-bit A/D converter. The result of interconnecting these PortA pins via the 10-kΩ resistor array elements will be significant 'contamination' of any analogue signal being measured, particularly if its source impedance is not zero, such as from a bridge. If the adjacent PortA pin is configured as an output and toggles between +5 volts and ground, an offset of about 25 mV would be imposed on an analogue signal with a source impedance of 100 ohms. Not 'a good look'. The broad design objective could be achieved by placing JP2 on the 'hot' side of the S1 switch array instead of the ground side of R2. All of the switches would need to be open when using the A/D converter and a scaling allowance would need to be made for the reduction in the analogue signal due to the voltage divider action of the grounded 10-kΩ resistor with the source impedance of the signal being measured.
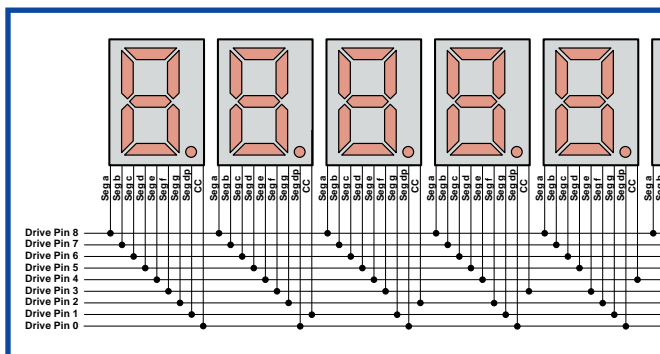Keep up the good work.
Ross McKenzie (Australia)

Thanks for that Ross, our designers fully agree and the word is being passed on.

Multi Colour LEDs

Dear Editor — ref. July/August 2006 issue — project 052 'Multi Colour Flashing LED'. I can't find "i.c.engineering" for supply of LED chips. Can you advise? Many thanks.
Adrian Wood (UK)

We can. See www.fbice.com or order from Conrad Electronics, item code 150700.

AA Cell Characteriser

Dear Jan — several of my colleagues and myself have built this useful piece of equipment (April 2006, *Ed*.) and have found that not only does it check the quality of an AA cell but it also checks the amount of charge that different chargers put into the cells.
I get between 98% and 103% of the rated capacity from my cells but one colleague was only getting 70% or so and blamed his cells. A quick swap of cells and charging on my charger produced in excess of 95%.
The result is that this tester is a good way of checking that your charger is doing what it is required to do. It is pointless getting higher and higher capacity cells if your charger is not fully charging them.
Geoff Moore (UK)

SC Analyser — some feedback

Dear Sir — I just wanted to pass on my experience relating to the Article 'SC Analyser 2005' in the April 2005 issue. My thanks to the author M.Waleczek and Mike Doty of M3 Electronix for their help.
I love your magazine and have built three kits so far:
- DRM Receiver
- Electrosmog Detector
- SC Analyser 2005

All the kits have worked flawlessly. Many thanks. I am a telecom engineer and also teach telecom and electronics related courses at a Engineering Technology polytechnical college in Toronto, Canada.
One of my class projects was for the students to build the SC Analyser. They all

designed their own boards using an LPKF machine and I programmed their PICs for them. I had several problems using my PICSTART programmer. Essentially when I read the hex file, if I just programmed the chip it would not work. If I read the hex file, then reset the configuration bits as the article stated, then the PICSTART would set both code protect bits to zero and no programming was possible. My procedure is to erase the chip, then set the configuration bits and program them first. After this, I then import the hex file then only program the program memory. This works around the code protection bits being set. This is a great project for students learning electronics.
Jeremy Clark (Canada)

Thanks for the feedback Jeremy. All our recent PIC based projects come with configuration bit information as in many cases the default values supplied by Microchip will not work. In case of problems or older projects, do not hesitate to send an email and one of our in-house designers will help you.

Free program for electronic design basics
[Screendump 065075-11U]
Dear Editor — I have seen that you sometimes publish links to interesting electronic programs. I believe my program is in that category:

Please check the webpage for a description of the program:
www.miscel.dk/MiscEl/miscel.html
The program is a hobby of mine, I have been working on it for many years, when I have spare time. Some years ago I decided to share the program with others and put it on the internet, where everyone can get it for free.
Henrik K. Jensen (Denmark)

A useful and easy to use bit of software, Henrik, thanks for making it available to all of us!

Piano playing aid
Dear Sir — I am in the process of designing a system that allows a person to learn playing the piano much faster using a visual aid. I already own such a system for guitar playing (www.fretlight.com), but a version for the piano does not seem to exist yet.
I have already found some sources that are very close to what I need, but I am still thinking about an LED bar with the electronics built in the case and that consumes almost no power or is powered from an USB port. Some sources I came across during my research: www.members.aol.com/decomidi/index_english.htm and www.midiboutique.com showing the MDEC64 inter-

face. I am thinking of a system with a LED bar that you can place on a piano. The circuit then shows what buttons you have to press with your left and right hand. USB connectivity would be provided and the possibility to wire up a footswitch.
Johan Pyfferoen (Belgium)

Looking forward to seeing that design Johan!

I want to become famous, too
Dear Editor — I have some circuits ready to share with Elektor. How can I do this? I can send you a .pdf, a .doc file or the original Protel99SE work.
F. M. Gouveia (Portugal)

This is one of the most frequently seen questions forwarded to us by email via the Contact form available on our website. The answer is invariably that our Author Guidelines are available for anyone to read at the SERVICE page of our website (www.elektor-electronics.com). Publication of articles received from free-lance authors is subject to acceptance of the Board of Editors & Designers who meet

approximately every month to discuss article proposals.

How many E-Weekly clients?
Dear Jan — just out of curiosity, how many people are subscribing to the E-Weekly newsletter you are sending out? I get mine every Friday and particularly enjoy the pieces you write on what's brewing at Elektor.
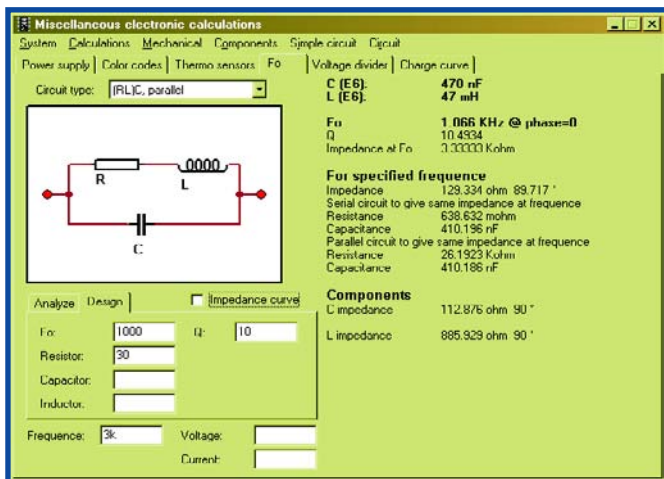**Peter McCullough (UK)**

Thanks for enquiring Peter. Denis, our web editor tells me that currently 7,200 email addresses are supplied with our free newsletter and that the number is growing at a rate of about 2 percent per month. We recently cleaned our E-Weekly client database addresses, removing duplicate, fake, unresponsive and 'bouncing' email addresses.