

- 6 Colophon
Who's who at Elektor magazine.
- 8 The PCB Prototyper
Spreads its Wings
- 9 News & New Products
A monthly roundup of all the latest in electronics land
- 12 mbed Has Landed!
Simon Ford's monthly column on the Elektor/NXP mbed challenge
- 14 Economical Energy Harvesting
Presenting several designs that enable circuits to be powered from solar energy
- 18 Thin FAT
An overview of open source FAT file system libraries for embedded applications.
- 24 Nixie Tube Thermometer
This is what you get from combining a modern microcontroller with a truly classic display
- 28 Flight Data Recorder
A speed and velocity recorder for model airplanes, based on our ATMiS microcontroller module.
- 34 Energy Saving Tips
Seventeen ways, some tongue in cheek, to reduce your energy bill and decrease your personal carbon footprint.
- 38 All-Soft-555
Two new software utilities allow an ATtiny microcontroller to act like the celebrated 555 timer, with a few features added!
- 43 E-Labs Inside: Under Scrutiny:
The Xmega Board
A look at Mikroelektronika's latest development system for the Xmega processor.
- 44 E-Labs Inside:
Spotted at Electronica 2010
Some remarkable products seen last November at the world's leading exhibition on state of the art electronics.
- 24 Nixie Tube Thermometer
Nixie tubes have a special charm all of their own. The author's Sputnik-style digital clock using the tubes appeared earlier in Elektor, and many variations on the theme have appeared on the Internet. This digital thermometer, which uses just two tubes, is, well, a little bit different.
- 48 Low-cost Headphone Amplifier
There have of course been numerous designs for headphone amplifiers before this one, either more or less successful and simpler or more elaborate. The design presented in this article is straightforward, sounds quite good and can be built using well-established components.

- 52 Free Energy
Pursuits to make devices move perpetually or to generate energy from nothing still occupy the attention of many people. Is it truly possible to generate free energy, or are we simply deceiving ourselves and others? Here we describe a selection of interesting ideas and projects.
- 56 Wireless ECG
Many devices are available for recording or visualising electrocardiogram (ECG) signals. The circuit proposed here uses a wireless link as an elegant solution to the problem of galvanic isolation, completely eliminating any hazard to the subject
- 45 E-Labs Inside: Here Comes the Bus!
We call on our readers to assist with the development of the Elektor Bus.
- 48 Low-cost Headphone Amplifier
Guess what, it's straightforward, sounds good and consists of dead standard parts only
- 52 Free Energy
Is it truly possible to generate free energy, or are we deceiving ourselves and others?
- 56 Wireless ECG
In this project Zigbee modules are used to build a system for wireless monitoring of cardiac signals.
- 62 Groping in the Dark
Here we try to find out if a webcam is any good for converting into a night vision camera
- 64 Design Tips:
Opamp versus Comparator
These devices look very similar with their + and - labels at certain pins, but
- 66 Support Board for Arduino Nano
In this article, we're proposing a motherboard that was originally designed for a robotics application, but which can very well be used for other jobs too
- 68 Three out of Two Ain't Bad
Adding a tachometer signal to a two-wire fan as used in PCs
- 72 Notch Filters for Intermediate Frequencies
Two simple filters, one RC and one LC, for suppressing noise in communication receivers
- 75 Hexadoku
Our monthly puzzle with an electronics touch.
- 76 Retronics: Tandberg Model 5 &
Stereo Record Amplifier (ca. 1959)
Regular feature on electronics 'odd & ancient'. Series Editor: Jan Buiting
- 84 Coming Attractions
Next month in Elektor magazine

- 6 Colophon
Who's who at Elektor magazine.
- 8 News & New Products
A monthly roundup of all the latest in electronics land.
- 14 OSI from ISO
"Seven Bridges You Shall Cross" before you can eat your OSI Cake and have it the ISO way.
- 16 Reradiating GPS Antenna
To keep you headed in the right direction, here's a quick and cheap method to overcome poor GPS signal levels in a car.
- 18 Gentle Awakenings
This circuit has advanced features geared to waking you up 'sunrise style'.
- 24 UltimaticCWKeyer
Morse is not dead and this project is for high speed telegraphers having mastered the Ultimatic 'squeeze' keying method in combination with a CW paddle.
- 32 Educational Expansion Board
Flexible, multi-talented and versatile are some descriptions that fit this expansion board for our popular ATMiS controller.
- 38 Geolocalization without GPS
WiFi spots and triangulation methods can be used advantageously to pinpoint your position with remarkable accuracy.
- 43 E-Labs Inside:
Here comes the bus (2)
The guys at Elektor labs delve deeper into their plans to develop a proprietary bus.
- 45 E-Labs inside: Design tips for instrumentation amplifiers
Input noise and ADC resolution are important considerations in very sensitive measurement systems.
- 18 Gentle Awakenings
The light alarm clock described here is built around a microcontroller and can switch and dim an existing lamp (or lamps) fitted with an incandescent bulb (normal or halogen). It has several advanced features and its purpose is to wake you up without a startle.
- 24 Ultimatic CW Keyer
The circuit discussed in this article was developed specially for the squeeze paddle CW key but works great with single lever keys too. It looks after a lot of time related issues such as the pauses between dots and words, fully supporting the renowned Ultimatic mode.
- 53 TimeClick
TimeClick controls a digital SLR camera without human intervention using a wired connection. It can take photographs at fixed or random time intervals or in response to sensor input, which makes it suitable for various purposes from HDR photography to sound-triggered pictures.
- 60 Linux'ed
Telephone-to-VoIP Interface
Start phoning with no fears of a massive Telco bill. The powerhouse board described here works under Linux using the renowned Asterisk IP PBX software, and at a stroke enables you to use your home telephone set (dare we say 'vintage') to connect to the VoIP world.

- 48 Contactless Thermometer
This thermometer employs an infrared sensor to read an object's temperature without touching it.
- 53 TimeClick
A controller for sensor, sound or time driven photography at an advanced level.
- 58 MI AC Control led
Underfloor Heating System
A stunning application of Elektor's Flowcode powered super PLC.
- 60 Linux'ed
Telephone-to-VoIP Interface
Connect your vintage telephone set to the world of VoIP and start phoning with no fears of a massive Telco bill.
- 65 AphaLED Shaker
This little gadget when shaken prominently shows a letter in the air.
- 68 How to Get your Own USB ID
Less than one LSBof all people designing stuff to work on USB actually manage to get their own ID in chips.
- 70 TEXT Me! From 1, PC junkyard
An old PC and a surplus cellphone together make your very own text messaging system.
- 75 Hexadoku
Our monthly puzzle with an electronics touch.
- 76 Retronics: Slide Rules &
The Electronic Engineer
Regular feature on electronics 'odd & ancient'. Series Editor: Jan Suiting
- 84 Coming Attractions
Next month in Elektor magazine.

- 6 Colophon
Who's who at Elektor magazine.
- 8 News & New Products
A monthly roundup of all the latest in electronics land.
- 14 Everything on a Single Chip
All major silicon brands seem to have one but the term 'SoC is poorly defined. Time to investigate.
- 18 PSoC Designer
A step by step guide to DIY chip design using Cypress PSoC Designer and low-cost evaluation kits.
- 24 SatFinder
Get azimuth and elevation data for your favourite DB satellite TV channels, on the fly and everywhere, within the bird's footprint of course!
- 30 MP3 One-Two-Three
The TMS320C55i5 starter kit from Texas Instruments makes an excellent platform for building a versatile MP3 player.
- 34 Mini Webserver using BASCOM-AVR
Here our MiniModiS microcontroller module is programmed to act as a webserver that helps you do the shopping.
- 40 PSoC Enables Custom Glass LCDs
Demonstrating the incredible ease of using PSoC, if only to design your very own LCD driver.
- 43 E-Labs Inside: Here Comes the Bus (3)
This month the first circuit diagrams start to appear.
- 45 E-Labs Inside: Two Newcomers in the E-Lab
How do the Lecroy WaveAce 224 and the Tektronix TDS2024B compare?
A report from E-Labs.
- 14 Everything on a Single Chip
The term SoC can be used so narrowly as to cover only highly complex industrial controller ICs or so broadly as to cover almost any device capable of computing something, from the humblest microcontroller to a single-chip PC. We will take a wander through the world of smaller and larger devices and try to find out what makes an 1C an SoC.
- 24 SatFinder
Caravan owners and campers on long journeys who crave their home TV channels can now keep up with developments back home with the help of the SatFinder. This GPS based design includes a database containing positional information of a number of popular TV satellites. With the help of GPS data it calculates the precise angles to find the satellite first time!
- 63 A String of 160 RGB LEDs
This project will let you control a string of RGB LEDs using either a touch screen or a colour detector. In the first case, you can use your finger or a stylus; the second will require pieces of red, green, and blue card... Sounds interesting? Then to your boards (ATMiS), you have the green light to start wiring!

- 68 Solar Charger
This little project will appeal to everyone who would feel better charging their mobile or PDA from solar sources. A lithium-ion cell stores the sun's energy in between charging sessions. Smart circuitry in the solar charger monitors the battery voltage and protects the battery from overcharging and deep discharge.
- 48 Debugging the Sceptre using JTAC
Here we prove that using a complex, powerful microcontroller does not necessarily mean you have to invest in expensive debugging software.
- 56 Ultrasonic Directive Speaker
A pulsewidth modulator driving a large array of piezo transducers allows a sound beam to be made highly directive.
- 60 PSoC Evaluation Kits
A brief look at what's around commercially in terms of affordable PSoC kits.
- 63 A String of 160 RGB LEDs
Our celebrated ATMiS AVR module in control of a LED snake with chameleon aspirations.
- 68 Solar Charger
Portable energy for people on the move.
- 74 Design Tips: ADC for the PIC16F84A
- 75 Hexadoku 'Digest'
A special edition of Elektor's puzzle with an electronics touch.
- 76 Retronics:
The Worst TV Set Ever (1962)
Regular feature on electronics 'odd & ancient'. Series Editor: Jan Suijing
- 84 Coming Attractions
Next month in Elektor magazine.

- 6 Colophon
Who's who at Elektor magazine.
- 8 News & New Products
A monthly roundup of all the latest in electronics land.
- 12 The Five Rules... when Choosing a DSO
Factors to consider when you think it's time to move from a CRT to a digital 'scope.
- 16 Non-Contact Temperature Measurement
Things to pay attention to when buying or using an infra-red thermometer.
- 24 Pico C
As opposed to most DMMs and other C meters this low cost instrument is totally at ease with capacitances below 10 pF.
- 30 Wireless OBD-II
Here's a car diagnostics interface with Bluetooth or Zigbee — that's right, it's all cordless.
- 36 Asteroids & E-Blocks
Here we look at how Microchip's 16-bit dsPIC from can be persuaded to run the classic game of Asteroids.
- 40 Guitar Input for Multi-Effects Unit
Showing how the Elektor Multi-Effects Unit can be matched to an electric guitar, with an overdrive effect added.
- 43 E-Labs Inside: Here comes the bus (4)
This month we discuss some reader feedback received for the project. The level is surprisingly high.
- 46 E-Labs Inside: A quick temperature measurement...
Pitfalls and other things to watch out for when doing IR-gun temperature measurements.
- 16 Non-Contact Temperature Measurement
With an infrared ('gun') thermometer, you can quickly measure the temperatures of all sorts of objects at a reasonable distance. Thermometers of this sort are available with prices starting at a few dozen pounds. What do you need to pay attention to when buying or using an infrared thermometer? Here's our critical answer and verdict.
- 24 Pico C
RF and radio repair fans probably do need to be told, but when it comes to measurements below 200 pF or so, modern DMMs will produce coarse if not ridiculous results. Elektor's purpose-designed Pico C does a far better job. Beating many DMMs hands down, this little instrument easily and accurately measures capacitances down to fractions of a picofarad.
- 30 Wireless OBD-II
If you hate cables in connection with cars (literally) an interesting option is a wireless OBD interface with a radio interface to a (laptop) PC. The all-homebrew solution described here allows the choice of using either Bluetooth or ZigBee.
- 48 3 GHz Frequency and Signal Level Meter
Here's a treat for all fans of top notch test and measurement equipment you can build and use in the workshop or at college. Keywords: 50 MHz to 3 GHz, 10 ppm accuracy and a signal level range of -40 dBm to +10 dBm. Readings are displayed on a three-line LCD module, and the instrument is powered by three standard AA cells.

- 48 3 GHz Frequency and Signal Level Meter
A sophisticated instrument capable of measuring frequencies from 50 MHz to 3 GHz with an accuracy of 10 ppm and signal levels between -40 dBm and +10 dBm.
- 56 Altimeter for Micro-Rockets
Ultra lightweight, this circuit has a data recorder logging atmospheric pressure every 25 ms, with a memory capacity of 16 Rvalues.
- 62 GPIB-to-USB Converter
Just when you thought Hewlett-Packard's GPIB bus reached 'vintage' status, watch how it gets retrofitted with a USB interface.
- 68 MIDI Step Sequencer
A low-cost but extremely versatile back beat generator that responds to MIDI commands from your sound processing equipment.
- 70 ATMiS Catches the 1*5-485 Bus
Apparently there's no end to what the Elektor ATMiS module is capable of doing. This month it takes the RS-485 bus.
- 75 Hexadoku
Elektor's monthly puzzle with an electronics touch.
- 76 Retronics: 137 Years of Solid-state Electronics
Regular feature on electronics 'odd & ancient'. Series Editor: Jan Suiting
- 84 Coming Attractions
Next month in Elektor magazine.

- 6 Colophon
Who's who at Elektor magazine.
- 8 News & New Products
A monthly roundup of all the latest in electronics land.
- 14 Development Tools on the Go
The latest buzzword is 'apps' and for sure some of these are for electronics engineers.
- 20 The Nixie Tube
A must-read for anyone planning to add the Nixie coolness factor to circuits.
- 26 Audio DSP Course (i)
If digital signal processing is All Creek to you, join this course, which covers hardware as well as software!
- 32 Microphone Conferencing System
Wherever the laptop microphone fails miserably, enter this simple circuit. Intelligibility guaranteed!
- 36 Perfectly Balanced
Forever on the wish list of owners of vintage Hifi amplifiers, here's a noise-free volume control.
- 40 Elektor Proton Robot
A DIY robot design marked by an terrific degree of versatility in terms of sensors, actuators and even the CPU used.
- 43 E-labs Inside: Help! I'm stuck...
Eavesdropping on Elektor's technical query phone and email services.
- 44 E-labs Inside: A quick temperature measurement
An introduction to thermographic imaging systems and results interpretation.
- 46 E-labs Inside: One-eared Skype
How the Microphone Conferencing System got adapted to Skype.
- 14 Development Tools on the Go
Software engineering aids like CAD are no longer confined to the PC: today's smartphones and tablet computers already have plenty of apps available for them too. So, we decided to find out what programs are available and how usable they are.
- 20 The Nixie Tube
If you are planning to add the Nixie coolness factor to your next home brew design we give details of their operating principle, power supplies and practical advice on driving the tubes. To inspire you a collection of fascinating readers' projects has been included.
- 26 Audio DSP Course (I) in this course, in addition to introducing you to the properties of digital signal processors (DSPs) for audio signals and the associated programming aspects, we present several applications based on an inexpensive but nevertheless high-performance signal processing module. Hardware and software included!
- 60 Mobile, Text, CallerID
With this project for the Elektor ATMiS module, all you have to do is either identify yourself through the caller ID displayed to the ATMiS or go right ahead and send a text to your favourite board for it to take the appropriate action.

- 46 E-labs Inside: Problems with noise
About a certain kind of transistor that refuses to produce enough noise.
- 48 Here comes the Bus (5)
The Elektor bus is now safely out of the E-Labs Inside section and gets in shape in terms of hardware and software.
- 54 i-Channel DMX Light Dimmer
E-Blocks and Flowcode 4 for PIC together build a powerful dimmer for DMX lighting.
- 60 Mobile, Text, CallerID
This month the Elektor ATMiS module gets connected to the cellphone network with excellent results.
- 66 Wave Sound Generator
Here we mimic the sound of waves and surf to help you fall asleep.
- 69 The Finishing Touch
An in-depth look at Schaeffer AG's new free tool for designing front panels.
- 72 Virtual PCs
Most PCs today are powerful enough to 'run' another PC as a virtual element. This has great potential to the electronically minded.
- 75 Hexadoku
Elektor's monthly puzzle with an electronics touch.
- 76 Retronics:
Tektronix 564 Storage Oscilloscope (1963)
Regular feature on electronics 'odd & ancient'. Series Editor: Jan Suiting
- 84 Coming Attractions
Next month in Elektor magazine.

- 6 Colophon
Who's who at Elektor magazine.
- 8 News & New Products
A monthly roundup of all the latest in electronics land.
- 14 Elektor OSVP¹
Introducing a state of the art electrical self-balancing vehicle that's open-source to a high degree.
- 16 Developing Apps for Android
Here we explore how to build an App for Android-based smartphones with no more than a TI Beagle board and a PC.
- 22 Measure Gamma Rays with a Photodiode
A highly topical how-to on the use of a humble photodiode type BPW34 to detect X-rays and gamma radiation.
- 28 Picoscope 3000 on Test
We put a Picoscope 32066 through its paces and examined its hardware and software complement.
- 32 Geolocation with the ATMiS
There's no end to what you can do with an Elektor ATMiS module. And now you can find its whereabouts anywhere on the globe.
- 38 Audio DSP Course (2)
In this the second part of the course we tackle the process of DSP programming.
- 43 E-Labs Inside: PCB design: beware the tiny details!
The lab baffled by isthousands of a millimetre, really!
- 44 E-Labs Inside: Hurricane at SMD scale
Taming a hot air reflow solder station to make it suitable for those tiny parts.
- 45 E-Labs Inside: Down to Earth
Ruminations on the use of a device to tackle Phase and Earth issues in AC wall outlets.
- 16 Developing Apps for Android
Current estimates indicate that 350,000 new Android phones go on the air each year. What is the reason for this amazing success? Is it Google? Or the fact that it's open source? Or because it works well? In any case, the specific reason isn't that important; what matters is that you can also join the trend and develop your own Android apps. Here's how!
- 22 Measure Gamma Rays with a Photodiode
Geiger-Muller counter tubes are getting hard to find and expensive, and even if you do manage to get hold of one, you will still need to find a way to generate its operating voltage of several hundred volts, it is less well known that even a humble photodiode such as the BP\A/34 can be used to detect X-rays and gamma radiation.
- 32 Geolocation with the ATMiS
A GPS modem module with a built-in GPS receiver allows its location to be determined very precisely, if you combine it with an Elektor ATMiS module and install the lot in your car, you have a tracking device that can send you e-mail or text messages to let you know exactly where your prize vehicle is.

- 62 VGA Add-on for Microcontrollers
Many projects require a large amount of information to be displayed, but the size of the display itself is often a problem. One solution is to use an old 14" or 15" computer monitor that's been scrapped but is still working. The VGA board described in this article lets you do just this, and is compatible with any microcontroller that has a serial port.
- 46 E-Labs Inside:
Driver plate modification for ElektorWheelie
Strengthening the wheel bolts is necessary in some cases. Here's how.
- 48 Here comes the Bus! (6)
The design has ripened to the extent that a real PCB can be presented to start experimenting for real.
- 54 Inside USB
This is for all of you happy with all the USB pluggin' going on but really wanting to know what's going on under the bonnet.
- 58 E-blocks: Flowcode
E-blocks and Flowcode make a great team when you want to add infrared remote control to your projects!
- 62 VGA Add-on for Microcontrollers
Got an old computer monitor? Then put your microcontroller on the screen with this clever board operating on the basis of serial commands.
- 68 Design Tips:
AVR and 8051 drive 2-colour LEDs
Combine software and hardware to control 2-colour LEDs in ingenious ways.
- 71 Stellaris ARM Controller goes Biological
Design considerations for an egg incubator made from a rice cooker. Microcontroller-driven, of course.
- 75 Hexadoku
Elektor's monthly puzzle with an electronics touch.
- 76 Retronics:
Solid Light: the Remarkable Prehistory of the LED
Regular feature on electronics 'odd & ancient'. Series Editor: Jan Buiting
- 84 Coming Attractions
Next month in Elektor magazine.

REGULARS & FULL-SIZE ARTICLES

- 6 Colophon
- 8 NXPmbed Design Challenge Winners
- 14 Hexley Ball wins first ever mbed competition
- 92 Pictures for the Masses
- 96 100 Mbit/s over Copper Wire
- 100 Rabbit RCM5600W Development Kit for Wi-Fi
- 102 There's More than Sand in the Valley
- 108 Hexamurai Puzzle
- 112 Elektor Shop pages
- 116 Coming Attractions

PROJECT GENERATOR COMPENDIUM 2011

- 27 Audio Level Adapter
- 87 Electric Guitar Preamp, Mixer and Line Driver
- 58 Equalising HEXFETs
- 42 Sixties-style 40 W Audio Amplifier
- 35 Slave Flash for Underwater Camera
- 29 Video Switch for Intercom System
- 41 Voltage Limiter for Guitar Amplifiers

COMPUTERS, SOFTWARE & INTERNET

- 32 MicroSD Card Connectors
- 60 Repeatable COM Port Enumeration
- 17 Upgrade your USB Hub

HOBBY, GAMES & MODELLIN

- 32 Arc Welding Effect for Model Railway Layouts
- 25 Arduino Nano Robot Controller
- 30 Flat Battery Indicator
- 57 Jogging Timer
- 19 Morse Clock
- 46 RGB Solar Lamp
- 83 Roadwork Traffic Signals for Modellers
- 29 Tachometer Pulse Divider
- 22 Timer for Very Long Periods
- 43 Wire Loop Game
- 88 Zero-IC 24-LED Pulsed Light Cycle Light

HOME & GARDEN

- 18 2/4/6-hour Timer
- 68 Automatic AC Power Switch for the Holiday Home
- 60 Cheapest Ever Motion Sensor
- 89 Protecting PE Water Pipes against Frost
- 20 Pump Controller with Liquid Level Detection
- 51 Small Lamp - Huge Bill
- 27 Tandem Doorbell
- 77 Twilight Switch
- 79 Water Level Detector
- 38 WAV Doorbell

MICROCONTROLLERS

- 31 Arduino Shields
- 18 ATM18 and Three 1-Wire Thermometers
- 40 ATM18 Youth Repellent
- 26 Extra Port Connections for the R8C/13
- 16 Getting Started with your Free LPCXpresso Board
- 54 I2C User Interface
- 78 LED Chase
- 86 Make Your R8C/13 Speak CAN
- 21 MHz Oscillator using an ATtinyL 5
- 75 Mini Experimental Board for ATtiny45
- 69 Reanimating Probe for AVR jIC
- 24 RS-232 Level Shifter with Isolation
- 34 'SCAP' AVR Programmer
- 62 Sceptre: Driving a Touch Screen Arduino-style
- 47 Time Transporter

POWER SUPPLIES, BATTERIES & CHARGERS

- 84 Adjustable Low-Dropout Voltage Regulator
- 79 Constant Current Source
- 31 Current Source for Grounded Load
- 63 DC-DC Converter using LT1376
- 76 Floating Supply for Panel Meters
- 28 High Voltage Generator
- 22 LM2931 -5.0 is a Random Noise Generator too
- 45 Power Controller for Electric Convectector Heaters
- 52 Power Supply with High Voltage Isolation
- 56 Regulator for Three-Phase Generator
- 49 Router UPS
- 39 USB Charger using Pedal Power

RADIO (RF)

- 77 Emitter Follower Audion
- 70 Minimalist Dip Meter
- 59 Wideband Receiver for Spark Transmissions

TEST & MEASUREMENT

- 66 Battery Charge Monitor
- 43 Belgian Earth Fault Detector
- 51 IR Tester
- 82 Laser Level Detector
- 36 Measurement Filter for Class D
- 71 Oil Temperature Gauge for 125cc Scooter
- 33 Simple Low Cost Square Wave Generator & Tester
- 58 Triangular Wave Generator
- 90 Universal Tester for 3-pin Devices
- 70 Variable Voltage Injector

MISCELLANEOUS ELECTRONICS & DESIGN IDEAS

- 72 70 A Solid-state Starter Relay
- 53 Analogue LED Chaser Light
- 56 Breakout Board for PIC10F2xx (SOT23-6)

44	Chaos Generator
82	Debouncer for 12V Contacts
50	Dog Whistle for Ronja
68	Experimental Hall Sensor
48	A Few DC Solid-state Relays
46	LED Multi-Flasher
76	Low-cost Wire Stripper
74	Maglev Demo
64	Make Your Own Solder Mask Overlays
67	Mini Flasher
80	NPN Relaxation Oscillators
17	OBD Vehicle Protection
23	Return of the Elex Prototyping Board
61	Ring Oscillator
55	Universal 3-wire Flasher Unit for Scooters

- 6 Colophon
Who's who at Elektor magazine.
- 8 News & New Products
A monthly roundup of all the latest in electronics land.
- 14 ec-Reflow-Mate
This professional grade reflow oven will easily handle all your SMT soldering jobs.
- 16 USB Long-Term Weather Logger
This sophisticated project uses PC sensors to capture atmospheric pressure, temperature and humidity.
- 22 I²C Sensors
This article shows the ease of implementing temperature, humidity and atmospheric pressure sensors in microcontroller projects.
- 26 Milkymist SoC
A remarkably accessible bit of system on a chip capable of performing advanced graphic operations at impressive speeds.
- 32 ATMiS Compass
One more great project added to the long list of applications for the Elektor ATMiS microcontroller board.
- 36 J²B: Universal MMI Module using ARM Cortex-M3
A real jack of all trades, this microcontroller board can be configured in an incredible number of ways with switches, encoders and LC displays.
- 43 E-Labs Inside: A ghost in the machine
What (on earth) happens to an LED when it's about to break down electrically?
- 44 E-Labs Inside: Alibaba
A great website for electronics enthusiasts — just waiting to be discovered.
- 44 E-Labs Inside: Perfect pizzas
Who said that brand new SMT oven can't be used to cook lunchtime snacks?
- 16 USB Long-Term Weather Logger
- 32 ATMiS Compass
- 36 J²B: Universal MMI Module using ARM Cortex-M3
- 58 FT232R USB Serial Bridge / BOB
- 45 E-Labs Inside: Problems under pressure
A design problem that forced the Elektor lab staff to put their thinking caps on.
- 46 E-Labs Inside: Small pitfalls
A word about the 'tombstone' effect you sure want to avoid when reflow-soldering SMT parts.
- 47 E-Blocks go Twitter
Amazing! A set of E-blocks configured to Twitter weather conditions and social messages to members of a sailing club. Automatically!
- 50 Audio DSP Course (3)
Now it gets for real with the description of the DSP board we're using in the course. Pretty advanced stuff!
- 58 FT232R USB Serial Bridge / BOB
This little board will be invaluable if ever you need to examine those elusive signals travelling up and down a USB link.

- 62 Here comes the Bus! (7)
This month we discuss a simple application protocol for "our" bus.
- 67 USB Audio Adapter
This project goes to show that interfacing audio and the USB bus is not all black box engineering.
- 70 Compact Warning Flasher
Give your bicycle a rear light that's very visible to traffic coming from behind.
- 72 Retronics: The Chaos Machine (1)
Regular feature on electronics 'odd & ancient'. Series Editor: Jan Suiting
- 76 Light Sensor
A cheap and simple yet reliable circuit to detect dusk.
- 77 Hexadoku
Elektor's monthly puzzle with an electronics touch.
- 84 Coming Attractions
Next month in Elektor magazine.

- 6 Colophon
Who's who at Elektor.
- 8 News & New Products
A monthly roundup of all the latest in electronics land.
- 14 Versatile Board for AVR Microcontroller Circuits
An uncommon encounter, if only visually, with Platino, a "board that came with a circuit".
- 20 The Dream of Electric Flight
Is it true that we've come a long way from the electric airship (1884) to the Green Flight Challenge (2011)?
- 28 Testing using the JTAC Interface
How to check interconnections on complex boards... without test pins!
- 32 Time Domain Reflectometry
Here's a beginners guide to locating shorts and opens in long cables, complete with a circuit diagram for a simple pulse generator.
- 36 2.4 GHz Transmitter and Receiver
Drop the old VHP radio system! Zigbee 2.4 GHz technology can now be applied to remote controlled models.
- 43 E-Labs Inside: Mixed results
A short report by two students attempting to design an audio mixer as part of their electronics education.
- 44 E-Labs Inside: Verification of radiation meter
Elektor's low-cost gamma ray meter got put through its paces in a professional nuclear laboratory.
- 46 E-Labs Inside: Very handy, this display
Tired of breaking those fragile glass LCDs?
- 46 E-Labs Inside: Recalcitrant little bits
The taming and tweaking of a PIC baudrate generator.
- 48 Audio DSP Course (4)
This month we get to testing the hardware with the help of a few small DSP programs.
- 56 Audio Guide
The first application of the Elektor Platino board is an RFID triggered MP3 (no typo) player for use as a personal guide in museums.
- 60 Here comes the Bus! (8)
A few simple components linked to the ElektorBus enable us to look at the protocol for a real control application.
- 65 Fan-Flash Alternative
Old School digital logic mimics a stroboscope that makes the blades of your PC's ventilator appear to stand still.
- 68 Sinewave Inverter with Power Factor Correction
A Readers Project describing a 24-VDC to 230-VAC inverter optimized for driving Osram energy saving lamps up to 100 watts.
- 71 FET driver for Microcontrollers
Circuit configurations for microcontrollers having to drive relatively heavy loads through their port lines.
- 72 Retronics: The Chaos Machine (2)
In this second and closing instalment the chaos machine gets built —with bizarre results!

- 76 Gerard's Columns: Trusting your Instruments
This month we welcome Elektor columnist Gerard Fonte from the USA.
- 77 Hexadoku
Elektor's monthly puzzle with an electronics touch.
- 84 Coming Attractions
Next month in Elektor magazine.

- 6 Colophon
Who's who at Elektor.
- 8 News & New Products
A monthly roundup of all the latest in electronics land.
- 16 Super Arduino
This article should put you in pole position for the DesignSpark chipKIT™ Challenge organised by RS Components, Elektor and Circuit Cellar.
- 20 Improved Radiation Meter
Gamma, beta and alpha radiation levels get measured with this instrument based on a cheap and cheerful PIN photodiode.
- 26 Simple Bat Detector
Build this circuit over the winter period and next spring you'll be able to listen to bats flying to and fro.
- 30 Audio DSP Course (5)
This month we take a look at the important matter of structuring your DSP programs.
- 38 OnCE/JTAC Interface
This adapter was originally designed for the Elektor DSP courseware board but is compatible with other Freescale DSPs too.
- 42 Economical Voltage Monitor
This circuit monitors the voltage output of a solar cell while consuming precious little power itself.
- 44 E-Labs Inside: Working with Stencils
A step by step guide to making perfect SMD boards as far as applying solder paste is concerned.
- 46 Here comes the Bus! (g)
This month HTML and Javascript are used to make a control station running on a Smartphone.
- 54 Spice It Up!
An introduction to LT's renowned simulator —so easy to follow it will get you hooked on Spice!
- 58 Temperature Gradient Meter
This instrument reports and records the tiniest temperature changes with a resolution of 1/1000th of a degree centigrade.
- 62 Resistive Bolometer
An innovative use of two electric bulbs you were about to trash.
- 64 RGB - YPbPr (or YUV) Converter
This circuit proves that analogue video is not dead; in fact it's wide open to making your own converter projects.
- 68 Lifelike Lighthouse
A ring of LED chaser lights successfully mimic a rotating light beam.
- 70 Flashing Light for Model Cars
Blue LEDs and a handful of parts make a nice flashing light for your model ambulance.
- 72 Dual Linear PSU for Model Aircraft
Here's how to double the power supply in a remote controlled model.
- 74 Gerard's Columns: Teaching Yourself
From our monthly columnist Gerard Fonte.

- 75 Hexadoku
Elektor's monthly puzzle with an electronics touch.
- 76 Retronics: Exotic Tubes Facebook
Old friends hail from this month's Retronics pages. Series Editor: Jan Suiting
- 84 Coming Attractions
Next month in Elektor magazine.

- 6 Colophon
Who's who at Elektor.
8News & New Products
A monthly roundup of all the latest in electronics land.
- 16 Android as a Development Platform
Tablet PCs are cheap and make excellent embedded devices. Here's how.
- 20 Time-lapse Photography with an Android Tablet
With an Android tablet and a handful of hardware, you can put together a remote control for a still camera doing time-lapse photography.
- 24 The PCB Prototyper in Practice
Here's a user report on the advanced PCB milling machine sold by Elektor.
- 26 Robusta: a Satellite built by Students
Montpellier University's cubesat picosatellite carries a scientific experiment of interest to the space community.
- 32 Xport your Ideas to the Web
Lantronix' Xport Pro device proves remarkably simple to configure and use as an advanced network interface module.
- 38 Here comes the Bus! (10)
This month we come to grips with interfacing a high precision ADC to the bus, using a slick HTML interface.
- 43 E-Labs Inside: Work in progress
Some pictures taken in the Elektor Labs of projects under active development.
- 44 E-Labs Inside: LED Exorcism
The riddle solved of the 'LED that flashed before-itdied'.
- 45 E-Labs Inside: Pins to length
How to prevent DOCM displays from being damaged when fitting them on a board.
- 46 E-Labs Inside: Itsy Bitsy Spider...
Here's how we solved another fine mess caused by a mixup between TSSOP and SOIC packages.
- 46 Smelly Bus
Nasty fumes and odours from a blown electrolytic capacitor, but no major worries!
- 48 Pick-proof Lock
Here we show how the very secure 128-bit AES encryption scheme can be applied to an infrared remote control.
- 52 Audio DSP Course (6)
This month we use our DSP board to build a lab-grade DDS signal generator.
- 60 Electronic LED Candle
The unique feature of this ersatz candle is that you can actually blow it out!
- 64 Turn your Oscilloscope into a Reflec-tometer
Combine an oscilloscope and a signal generator to do measurements on (long) cables.
- 66 USB Data Logger
Got a USB stick? And a microcontroller outputting serial data you want to store? Then this design is for you.

- 70 LED Cycle Lamp
It's Lithium-Ion powered and has 600 lumen on tap. Check it out.
- 74 Gerard's Columns: Speaking out Loud
From our monthly columnist Gerard Fonte.
- 75 Hexadoku
Elektor's monthly puzzle with an electronics touch.
- 76 Retronics: RCA Cosmac Development System IV (CDP18S008) (ca.1978)
HELLO wORLD from Embedrock City. Series Editor: Jan Buiting
- 84 Coming Attractions
Next month in Elektor magazine.

Oprac. BPK