

Issue #294 — January 2015

PROJECT FILES

All of the project files for this issue are available: ftp://ftp.circuitcellar.com/pub/Circuit_Cellar/2015/294/

ARTICLE MATERIALS

Current Tracking

How to Monitor Current Flow Under Various Operating Conditions

By Jeff Bachiochi

SOURCES

MAX4069 Bidirectional amplifiers
Maxim Integrated | www.maximintegrated.com

PIC16F1829LIN Microcontroller
Microchip Technology | www.microchip.com

Series 10
Ohmite Mfg. Co. | www.ohmite.com

Brute-Force Universal Motor Control

By Ed Nisley

RESOURCES

E. Nisley, "Current Sensing: Powered Iron Toroid," <http://softsolder.com/2014/09/18/current-sensing-powered-iron-toroid/>.

— — —, "Gapped Ferrite Toroid: 5 A Calculations," <http://softsolder.com/2014/08/14/gapped-ferrite-toroid-5-a-calculations/>.

— — —, "Universal Motor Control vs. Transistor SOA," Circuit Cellar 292, 2014.

Universal AC-DC Motors, https://en.wikipedia.org/wiki/Universal_motor.

SOURCES

MCP4725 DAC Breakout board
Adafruit Industries | www.adafruit.com/products/935

SS49E Hall effect sensors
Honeywell | http://sensing.honeywell.com/product-page?pr_id=36526

Essential Electromagnetic Compliance (Part 2)

A Look at EMI Causes & Signal Types

By George Novacek

RESOURCES

K. Armstrong, Interference Technology Webinars, www.interferencetechnology.com/webinar-series/

O. Hartal, Electromagnetic Compatibility by Design, R&BV Enterprises, 1993.

Adaptive Applications for Energy Efficiency

By Ayse K. Coskun

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[1] H. Hoffmann, S. Sidiroglou, M. Carbin, S. Misailovic, A. Agarwal, and M. Rinard, "Dynamic Knobs for Responsive Power-aware Computing," Proceedings of the Sixteenth International Conference on Architectural Support for Programming Languages and Operating Systems (ASPLOS), 2010.

[2] H. Hoffmann, J. Eastep, M. D. Santambrogio, J. Miller and A. Agarwal, "Application Heartbeats: A Generic Interface for Specifying Program Performance and Goals in Autonomous Computing Environments," Proceedings of the 7th International Conference on Autonomic Computing (ICAC), 2010.

[3] C. Hankendi, S. Reda, A. K. Coskun, "vCap: Adaptive Power Capping for Virtualized Servers," Proceedings of IEEE International Symposium on Low Power Electronics and Design (ISLPED), 2013.

[4] C. Hankendi, H. Hoffmann, and A. K. Coskun, "Adapt&Cap: Coordinating System and Application-level Adaptation for Power Constrained Systems." To appear in IEEE Design & Test, 2015.

Build a Duodecimal Clock

By Devlin Gualtieri

REFERENCE

Microchip Technology, "PIC16F630/676 Data Sheet: 14-Pin, Flash-Based 8-Bit CMOS Microcontrollers," DS40039F, 2010,

www.microchip.com/downloads/en/DeviceDoc/40039F.pdf.

SOURCES

LDS-AA12RI Display

Lumex | www.lumex.com

PIC16F630 Microcontroller

Microchip Technology | www.microchip.com

PIC Basic Pro

microEngineering Labs | www.melabs.com

The Twin-T Oscillator Configuration

An Audio Oscillator and Stereo VU Meter

By Larry Cicchinelli

RESOURCES

L. Cicchinelli, "DIY Function Generator," Circuit Cellar 270, 2013.

———, "Calibrated Decibel Meter Design," Circuit Cellar 236, 2010.

———, K3PTO Published Articles, www.qsl.net/k3pto.

DiscoverCircuits.com, <http://discovercircuits.com/Andy/Twin-Toscillator.pdf>.

eSSB Hi-Fi Audio, www.nu9n.com.

A. Morris, "Twin-T Oscillator," <http://discovercircuits.com/Andy/Twin-Toscillator.pdf>.

OSH Park, www.oshpark.com.

Wikipedia, "Line Level," http://en.wikipedia.org/wiki/Line_level.

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[1] Wikipedia, "Line level," http://en.wikipedia.org/wiki/Line_level.

SOURCES

PCB design software

DipTrace | www.diptrace.com

LM3916, LM3915, and LM3914 Circuits

Texas Instruments, Inc. | www.ti.com

Webcam Mouse

By Alex Leung & Miles Pedrone (US)

RESOURCES

D. Henriksson and A. Cervin, Tiny Real Time, www.control.lth.se/Staff/AntonCervin/tinyrealtime.html.

J. Lecoq, "Real-Time Processing in MATLAB," www.MATLABtips.com/realtime-processing/.

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[1] A. Bhargav Anand, "Tracking Red Color Objects Using MATLAB," www.mathworks.com/MATLABcentral/fileexchange/28757-tracking-red-color-objects-using-MATLAB.

SOURCES

ATmega1284 Microcontroller

Atmel | www.atmel.com

MATLAB

MathWorks | www.mathworks.com

Virtual Instrumentation

A Tool for Characterizing NMOS Transistors

By Ahron Emanuel, Shlomo Engelberg, and Dvir Ophir (Israel)

REFERENCES

[1] Wikipedia, "Virtual Instrumentation," http://en.wikipedia.org/wiki/Virtual_instrumentation.

[2] Wikipedia, "MOSFET," <http://en.wikipedia.org/wiki/MOSFET>.

RESOURCE

Analog Devices, "ADuC841: Precision Analog Microcontroller: 20 MIPs 8052 Flash MCU + 8-Ch 12-Bit ADC + Dual 12-Bit DAC," 2003, www.analog.com/en/processors-dsp/analog-microcontrollers/aduc841/products/product.html.

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ADuC841 Microcontroller

Analog Devices | www.analog.com

MATLAB

MathWorks | www.mathworks.com

Measuring Small Circuits

By David Ludington