16 Build a NeoPixel LED Tree
The NeoPixel LED tree is beautifully made from laser cut Baltic birch plywood and is powered by a NodeMCU
Amica ESP8266 32-bit Wi-Fi enabled processor. It's got 93
individually addressable NeoPixel LEDs and is remote
controllable from any browser on your Wi-Fi network.
By Craig A. Lindley

24 Designing Your Own Digital ICs
— Part 2
The Field Programmable Gate Array (FPGA) is a marvel
of modern electronics engineering. Last time, FPGA history,
technology, and uses were covered. In this concluding
article, we'll delve into hardware description languages
(HDLs) used by FPGAs to configure programmable logic
device and the hardware/software environments for
application development.
By Faiz Rahman

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06 Q&A
Reader Questions Answered Here
Topics discussed this month:
• Stable PWM integration
• Fixing a Dead Power Supply for an XBOX 360

08 The Ham's Wireless
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Practical Technology from the Ham World
Vacuum Tubes
For audiophiles, musicians, and ham radio operators, the
soft glow of the vacuum tube filament is not only an
indication of function, but a nostalgic trigger for memories
of simpler times. Though they may have been outpaced
by tiny transistors and integrated circuits, these
workhorses still may have something to offer in many
modern devices.

30 Arduino PID Temperature Control
The magic of Proportional Integral Derivative (PID)
process control can be mystifying. In this article, we'll
take you through using an Arduino in a hands-on exercise
using a solid-state relay to control a 1,500 watt hotplate
for a real-world solution to a tricky problem.
By Ross Winters

36 Meet the BITX40: A Single
Sideband Transceiver
If QRP is your cup, the
BITX40 10 watt transceiver
may be just what you’re
looking for! Priced at a
very competitive $59, the
BITX40 kit comes with
the main board completely
built and tested, so you
can get up and running
talking actually) in no
time.
By Steve Jackson

42 The Spin Zone
Adventures in Propeller Programming
XBees Beyond the Basics
By now, everyone reading this should know that XBee
doesn’t refer to a deceased insect, but rather a ubiquitous
short-range radio system used in a myriad of residential
and commercial products. Though most folks use the ease
point-to-point “transparent” mode for projects, when it
comes to rolling your own XBee system, the most flexible
and rewarding approach is the more complex API path.

52 The Design Cycle
Advanced Techniques for Design Engineers
Up Close and Personal with the ME Labs
Advanced PIC18 D-Stick
The ME Labs Advanced D-Stick provides all the
functionality of Microchip’s 40-pin PIC18F47K40 in a
hardware module that includes an onboard USB and a
virtual COM port. The D-Stick is a compact,
simple, and easy-to-use
alternative for connecting
devices to a solderless
breadboard for project
development.

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