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Engineering at its best...!

Sanchar

THE ELECTRONICS & TELECOMMUNICATION DEPARTMENT NEWSLETTER

turn inside

You will recognize your own path when you come upon it, because you will suddenly have all the energy and imagination you will ever need."

News & Views

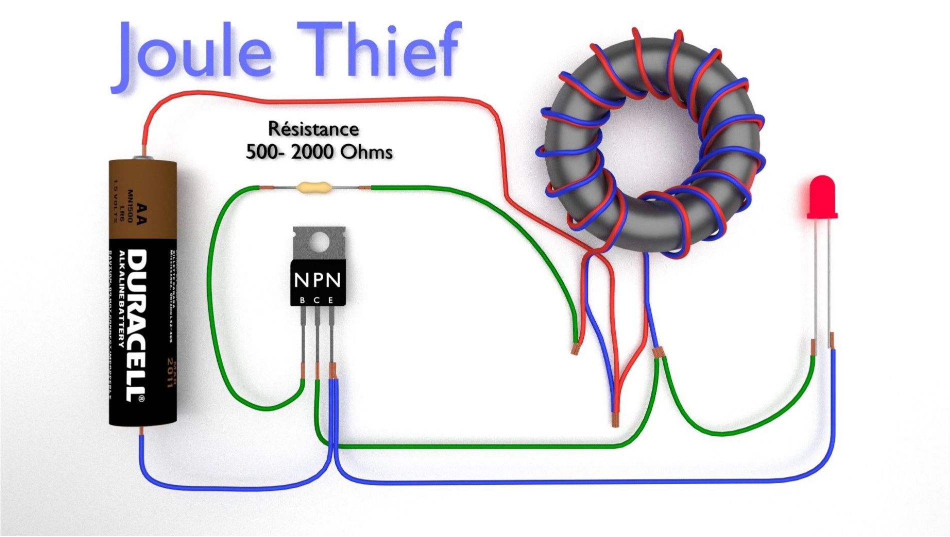
- Faculties joined back the department duties after availing vacation.
- Project dissertation for ME ETC final year students were conducted in the month of January.
- Project exams for BE ETC Semester VII were also conducted during the same period.
- Even semester classes for undergraduate and Post graduate students started from 15th January 2017.
- Results for semester I to IV of undergraduate students were declared in the third week of this month.
- Republic Day was Celebrated in the campus.
- A two day workshop on “DESIGNING WITH FPGA USING VERILOG HDL” was organized in the ETC dept. on 10^{th} and 11^{th} March 2017. The participants were 55 students of Third year ETC. The workshop was conducted by Ms. Sonia Kuwelkar, Assistant Prof, ETC dept.
- IETE student's chapter organized a talk on Robust Industrial design.


In February, ISRO launched 104 satellites using PSLV C37 rocket, a world record!

FPGA WORKSHOP MARCH 2017

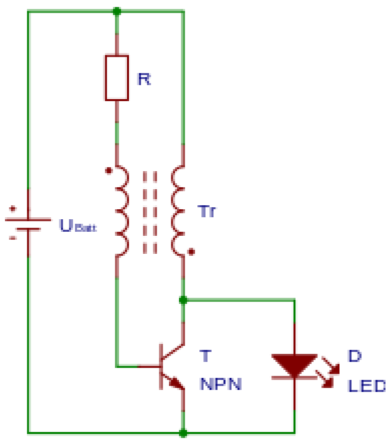
A two day workshop on "DESIGNING WITH FPGA USING VERILOG HDL" was organized in the ETC dept. on 10th and 11th March 2017. The participants were 55 students of Third year ETC. The workshop was conducted by Ms. Sonia Kuwelkar, Assistant Prof, ETC dept. The concept of writing programs in VERILOG HDL was explained. Programs for combinational and sequential digital circuits like MUX, Decoder, Ripple Carry Adder, Counter etc. in Verilog were written. The procedure for programming an FPGA was described. The programs were downloaded on FPGA like Xilinx Virtex5 , Spartan 3, Virtex 4. The software used was XilinxISE 10.1. Mini projects were successfully completed and downloaded on FPGA by the participants.

The Thief, Joule Thief!



A joule thief is a minimalist self-oscillating voltage booster that is small, low-cost, and easy to build, typically used for driving small loads. This circuit is also known by other names such as blocking oscillator, joule ringer, vampire torch.

It can use nearly all of the energy in a single-cell electric battery, even far below the voltage where other circuits consider the battery fully discharged (or "dead"); hence the name, which suggests the notion that the circuit is stealing energy or "joules" from the source



The circuit works by rapidly switching the transistor. Initially, current begins to flow through the resistor, secondary winding, and base-emitter junction (see diagram) which causes the transistor to begin conducting collector current through the primary winding. Since the two windings are connected in opposing directions, this induces a voltage in the secondary winding which is positive (due to the winding polarity, see dot convention) which turns the transistor on with higher bias. This self-stroking/positive-feedback process almost instantly turns the transistor on as hard as possible (putting it in the saturation region), making the collector-emitter path look like essentially a closed switch (since VCE will be only about 0.1 volts, assuming that the base current is high enough). With the primary winding effectively across the battery, the current increases at a rate proportional to the supply voltage divided by the inductance. Transistor switch-off takes place by different mechanisms dependent upon supply voltage.

The gain of a transistor is not linear with VCE. At low supply voltages (typically 0.75 V and below) the transistor requires a larger base current to maintain saturation as the collector current increases. Hence, when it reaches a critical collector current, the base drive available becomes insufficient and the transistor starts to pinch off and the previously described positive feedback action occurs turning it hard off.

To summarize, once the current in the coils stops increasing for any reason, the transistor goes into the cutoff region (and opens the collector-emitter "switch"). The magnetic field collapses, inducing however much voltage is necessary to make the load conduct, or for the secondary-winding current to find some other path.

When the field is back to zero, the whole sequence repeats; with the battery ramping-up the primary-winding current until the transistor switches on.

If the load on the circuit is very small the rate of rise and ultimate voltage at the collector is limited only by stray capacitances, and may rise to more than 100 times the supply voltage. For this reason, it is imperative that a load is always connected so that the transistor is not damaged. Because VCE is mirrored back to the secondary, failure of the transistor due to a small load will occur through the reverse VBE limit for the transistor being exceeded (this occurs at a much lower value than VCEmax).

The transistor dissipates very little energy, even at high oscillating frequencies, because it spends most of its time in the fully on or fully off state, so either voltage over or current through the transistor is zero, thus minimizing the switching losses. —*From Wikipedia*

IEEE Student's Chapter

PhotoGALLERY

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