



S a n c h a r

Electronics & Telecommunication Department Newsletter



June 2015

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Interesting Terms:

A CAPTCHA (an acronym for "Completely Automated Public Turing test to tell Computers and Humans Apart") is a type of challenge-response test used in computing to determine whether or not the user is human.

Food for Thought

"Don't give up because things are hard, but work harder, when you think of giving up."
--Anthony Liccione

Hello Everyone!!! Even Semester report ahead.

News & Views

- Even Semester started from 1st week of January.
- T.E. students returned from thier academic tour and joined the classes.
- Department obtained a 6 axes Kuka robot which will give our students a chance to familiarize with industry standard robotic arm. The lab is under Prof. Milind Fernandes.
- One-week technical training session for KUKA robot was carried out in the department. The training was attended by faculty members from ETC, Electrical and Electronics and the Mechanical Department and also by Technical Assitants from the ETC Department.
- Two-day workshop on "Introduction to Raspberry Pi" was conducted for students on 7th and 8th of March. It was co-ordinated by Dr. HassanAli Virani, Prof. Nayana Shenvi and Prof. Devendra Sutar.
- Two-day workshop on "Virtual Instrumentation using Lab View, ELVIS II+ , DAQ Systems" was conducted on 13th and 14th of March by Mr. Sivakumar, National Instruments, Bangalore. It was co-ordinated by Dr. HassanAli Virani, Prof. Amita Desai and Prof. Devendra Sutar.
- One-day training programme on "Introduction to PLC" was held for B.E. students on 27th of April by Prof. Devendra Sutar.
- IETE Women's Day celebration was held on 12th March in the Department. The Guest of Honor for the function was Dr. Nicasia Furtado Fernandes, Cardiologist, Goa Medical College.
- TechnoSangram was organised by ASSETS on 26th and 27th of March. Mr. Jaideep Redkar, Country head, Rosenberger was the Chief Guest for the function.
- Intel Galileo boards were acquired by Prof. Chetan Desai under the Intel Univerisity program .
- A set of 10 ARM Discover boards were acquired by Prof. Nitesh B. Guinde through ARM University program.
- Official send-off ceremony was organized by the T.E students for the outgoing B.E. students.
- Semester Examinations were conducted during the month of May and June .

New Member in the Department, the Name's KUKA



Goa College of Engineering, with the help of KUKA Robotics (India), has set up Goa's first Industrial Robotics Laboratory in its campus in Farmagudi, Ponda. The KUKA Industrial Robot Lab is setup to produce highly skilled technical manpower in the field of Industrial Robotics. The trained manpower will help Indian Manufacturing Industry to adopt latest technologies to improve quality and work condition with high productivity.

KUKA Robotics (India) Pvt. Ltd a 100% subsidiary of KUKA Roboter GmbH, based in Augsburg, Germany. KUKA is the world leader in industrial robots technologies. With Indian operations headquartered in Gurgaon, KUKA India has a state of the art Service and Training centre in Pune. Today KUKA India's key clientele include most of the automobile and other engineering as well as non-engineering companies. Some of their clients include Tata Motors, Volkswagen, Daimler, Hyundai, Ashok Leyland and Mahindra and Mahindra.

This effort of the college in setting up this specialized laboratory has the main objective to encourage young professionals to take up this cross disciplinary field as a career of their choice and acquaint them with latest technological developments in the field of Industrial Robotics. The setup aims to train young engineering graduates of any engineering disciplines up to the Industry expectations and foster research in applied robotics field.

The centre is equipped with standard training cell comprising of KUKA KR-16 Industrial Robot with required auxiliary equipments capable of handling upto 16Kg's of payload. This training cell is capable of performing multitude of operations used for welding, painting, gluing, pick and place, palletizing and other essential industrial operations used by the automobile, food & beverages, packaging and other manufacturing/Production industries. In addition to this, a robotics computer simulation lab has also been established with latest industrial robotics simulation Software like SimPro & SimLayout which can be used to design, develop and simulate robotic operations for different manufacturing establishments.

The students of all disciplines can be trained on following training programs:

- Robot Programming Basic Level: Training on basic concepts of robot programming, operation of robot system in general
- Robot Programming Advance Level: Training on Motion programming and programming methodology of robot system

The training standards are at par with KUKA standards, the training contents and course material has been designed by KUKA in Augsburg, Germany and is same as used by KUKA College internationally. The college is aware that for promoting applied research in this field, adequate knowledge base of cross-disciplinary technologies is essential along with practical exposure. Considering this, expert faculty members from different Engineering departments have been inducted and trained by KUKA to conduct these training programs & carry out research work.

People willing to see KUKA could contact Prof. Milind Fernandes..

GEC gets 'practical' with ₹1 cr giant robotic arm

Gauree.Malkarnekar
@timesgroup.com

Farmagudi: At a time when a chunk of India's engineering graduates are said to be unemployable, the state-run Goa College of Engineering (GEC) will soon see its graduates being picked up like hot cakes, thanks to its 'giant' acquisition.

A robotic arm, costing nearly ₹1 crore, and presently used in assembly lines of at least six major industrial sectors—mainly automobile—has been installed at GEC to train students. This has made the college only the third educational institute in the country—after Ajay Kumar Garg College of Engineering in UP and Chennai Institute of Technology in Tamil Nadu—to have the industrial robotic arm on its campus for students' benefit.

"The KUKA KR-16 Industrial Robot is the one presently used in industry. So students are ready to work in industry the minute they step out of college. Before we acquired the robot, students could only watch videos to see how programming of such a robotic arm is done," said GEC principal V N Shet.

After the robot was installed in January this year, the institute has begun by training



GEC is only the third educational institute in India to have the industrial robotic arm on campus for students' benefit

its graduate and postgraduate students in the electronics and telecommunication engineering stream. Students of mechanical, electrical and computer engineering will be subsequently trained in programming the robot, as it is used across various industries.

"Goa has a thriving pharma

industry which also makes use of this robot and robots are increasingly taking over automation jobs, so we thought it was the right time to train our students in programming such a robot," said Milind Fernandes, assistant professor and in charge of the industrial robotics laboratory at GEC.

Students are taught to pro-

gram the robot which enables it to accurately perform varied tasks like welding, gluing and picking and placing things in an assembly line, among others.

The training contents and course material being used by the students have been designed by KUKA in Augsburg, Germany. And GEC faculty members from across departments were first trained in the use of the robot by the company as part of the institute's pur-



FALLING IN LINE
Robot arm will help produce highly-skilled technical manpower

KUKA KR-16 industrial robot capable of handling up to 16 kg loads; used in pharma, automobile, food & beverage, packaging and other manufacturing and production industries

KUKA is leading supplier in the world of industrial

robots at present

KUKA-India has robots installed at Tata Motors, Volkswagen, Hyundai, Ashok Leyland and Mahindra & Mahindra

Only other institutes to have robotic arm on campus are Ajay Kumar Garg College of Engineering, UP, and Chennai Institute of Technology, Tamil Nadu

chase agreement with the firm, before the faculty could begin teaching students how to program the industrial robot.

GEC, being a state government institute, the cost of the robot was entirely covered by the

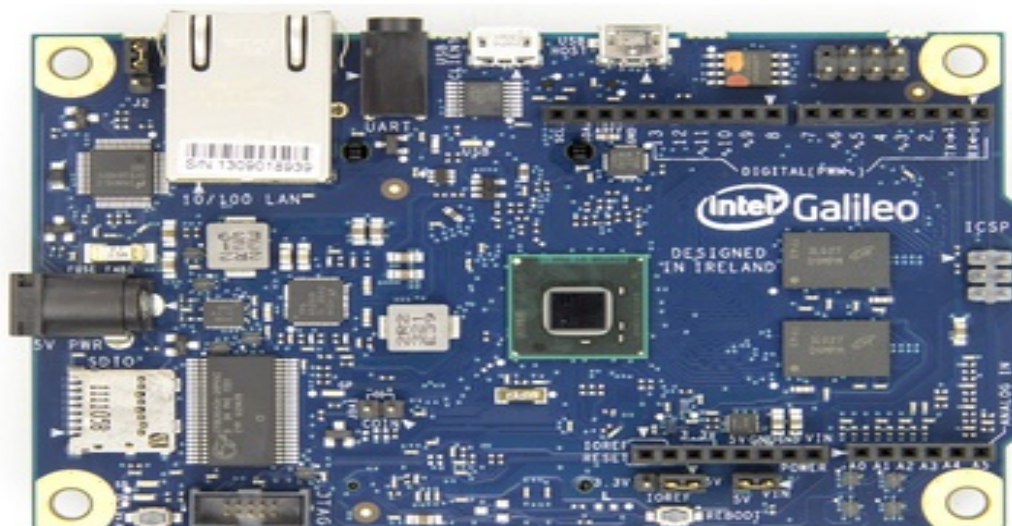
state and it took the institute nearly a year to complete the acquisition process of the industrial robot, said electronics and telecommunication engineering department head, Hassan Ali Virani.

Intel Galileo

Faculty member, Prof. Chetan Desai, acquired a few Intel Galileo boards by applying for university program. Galileo is a microcontroller board based on the Intel® Quark SoC X1000 Application Processor, a 32-bit Intel Pentium-class system on a chip (datasheet). It's the first board based on Intel® architecture designed to be hardware and software pin-compatible with Arduino shields designed for the Uno R3. Digital pins 0 to 13 (and the adjacent AREF and GND pins), Analog inputs 0 to 5, the power header, ICSP header, and the UART port pins (0 and 1), are all in the same locations as on the Arduino Uno R3. This is also known as the Arduino 1.0 pinout.

Galileo is designed to support shields that operate at either 3.3V or 5V. The core operating voltage of Galileo is 3.3V. However, a jumper on the board enables voltage translation to 5V at

the I/O pins. This provides support for 5V Uno shields and is the default behavior. By switching the jumper position, the voltage translation can be disabled to provide 3.3V operation at the I/O pins. Of course, the Galileo board is also software compatible with the Arduino Software Development Environment (IDE), which makes usability and introduction a snap. In addition to Arduino hardware and software compatibility, the Galileo board has several PC industry standard I/O ports and features to expand native usage and capabilities beyond the Arduino shield ecosystem. A full sized mini-PCI Express slot, 100Mb Ethernet port, Micro-SD slot, RS-232 serial port, USB Host port, USB Client port, and 8MByte NOR flash come standard on the board.



The genuine Intel processor and surrounding native I/O capabilities of the Clanton SoC provides for a fully featured offering for both the maker community and students alike. It will also be useful to professional developers who are looking for a simple and cost effective development environment to the more complex Intel® Atom processor and Intel® Core processor-based designs.

- 400MHz 32-bit Intel® Pentium instruction set architecture (ISA)-compatible processor o 16 KBytes on-die L1 cache

- 512 KBytes of on-die embedded SRAM

- Simple to program: Single thread, single core, constant speed

- ACPI compatible CPU sleep states supported

- An integrated Real Time Clock (RTC), with an optional 3V “coin cell” battery for operation between turn on cycles.

- 10/100 Ethernet connector

- Full PCI Express* mini-card slot, with PCIe 2.0 compliant features

- Works with half mini-PCIe cards with optional converter plate

- Provides USB 2.0 Host Port at mini-PCIe connector

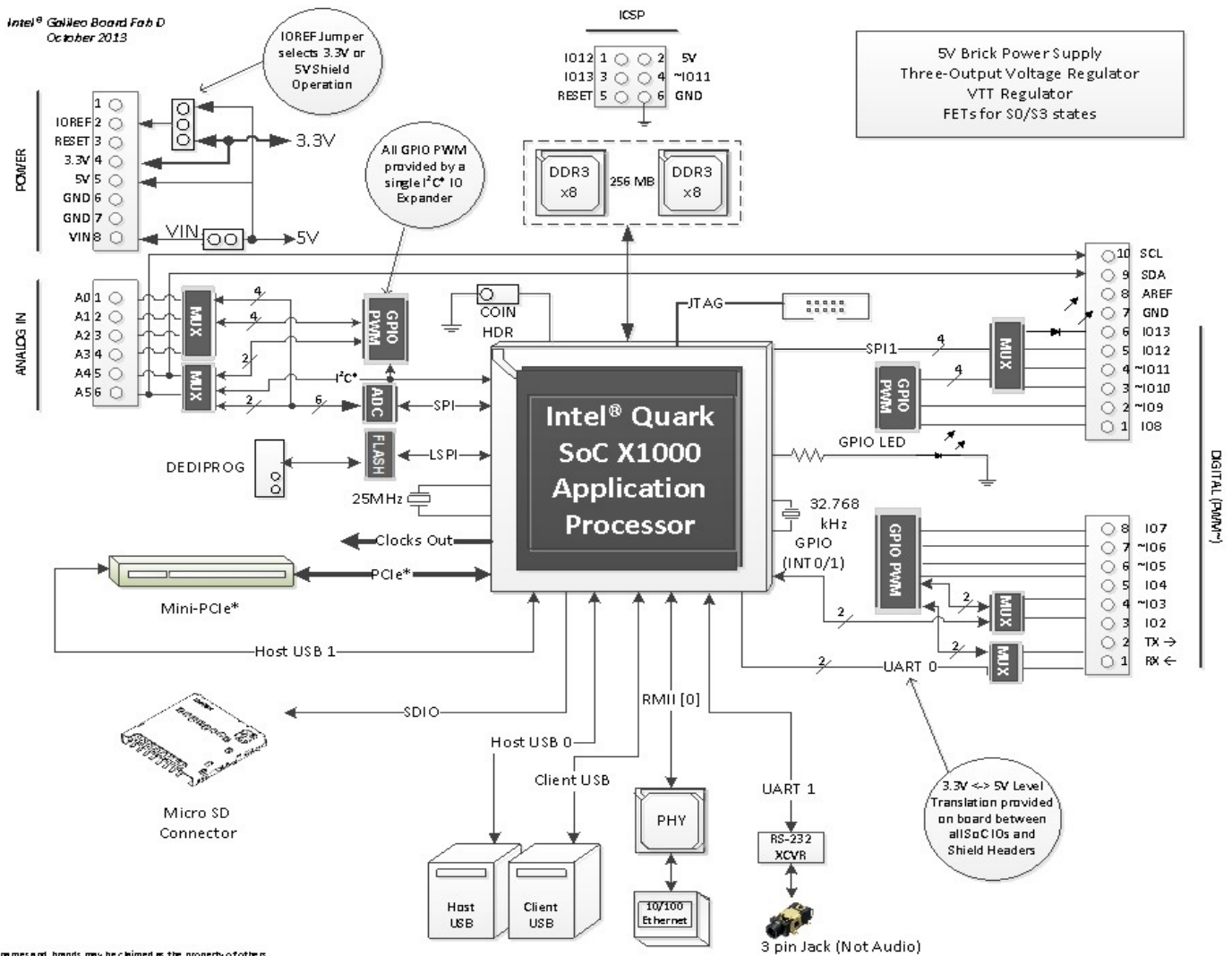
- USB 2.0 Host connector

- Support up to 128 USB end point devices

- USB Device connector, used for programming

- Beyond just a programming port - a fully compliant USB 2.0 Device controller

- 10-pin Standard JTAG header for debugging



** Other names and brands may be claimed as the property of others.

- Reboot button to reboot the processor
- Reset button to reset the sketch and any attached shields
- Storage options:

- Default - 8 MByte Legacy SPI Flash main purpose is to store the firmware (or bootloader) and the latest sketch. Between 256KByte and 512KByte is dedicated for sketch storage. The download will happen automatically from the development PC, so no action is required unless there is an upgrade that is being added to the firmware.

- Default 512 KByte embedded SRAM, enabled by the firmware by default. No action required to use this feature.

- Default 256 MByte DRAM, enabled by the firmware by default.

- Optional micro SD card offers up to 32GByte of storage

- USB storage works with any USB 2.0 compatible drive

- 11 KByte EEPROM can be programmed via the EEPROM library.

For more detailed specifications you can visit:

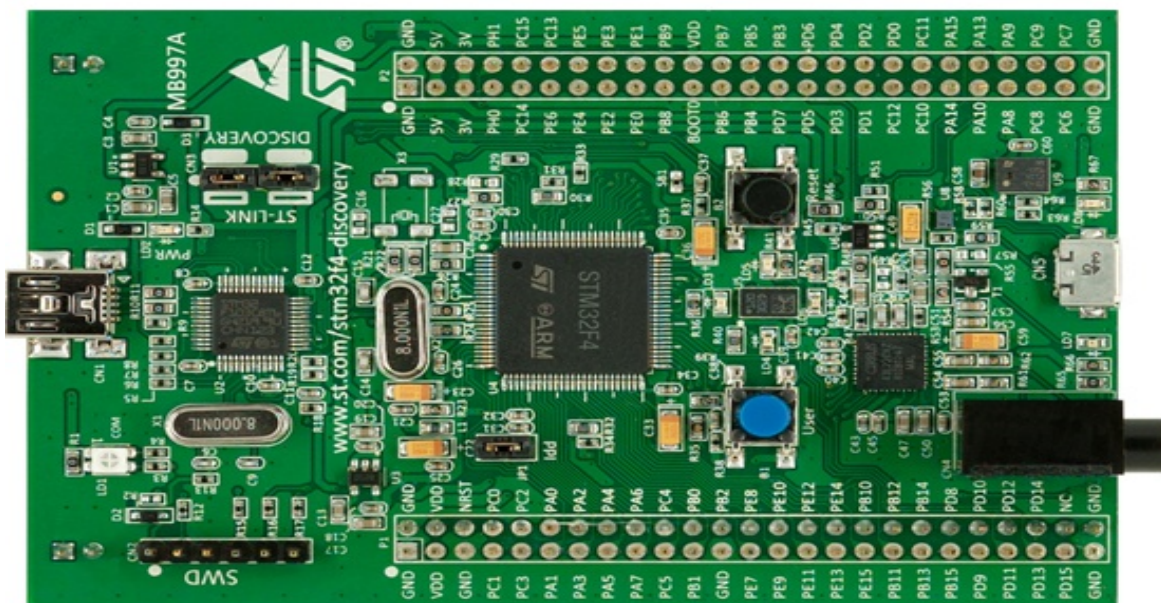
<https://www.arduino.cc/en/ArduinoCertified/IntelGalileo>

ARM Discovery board

ARM Discovery boards were acquired by Prof. Nitesh B. Guinde for the department with the help of ARM university program. These boards will help the students to do a "Do-it-yourself" projects.

Key Features

- *STM32F407VGT6 microcontroller featuring 32-bit ARM Cortex-M4F core, 1 MB Flash, 192 KB RAM in an LQFP100 package
- *On-board ST-LINK/V2 with selection mode switch to use the kit as a standalone ST-LINK/V2 (with SWD connector for programming and debugging)
- *Board power supply: through USB bus or from an external 5 V supply voltage
- *External application power supply: 3 V and 5 V
- *LIS302DL or LIS3DSH ST MEMS 3-axis accelerometer
- *MP45DT02, ST MEMS audio sensor, omni-directional digital microphone
- *CS43L22, audio DAC with integrated class D speaker driver
- *Eight LEDs:
 - LD1 (red/green) for USB communication
 - LD2 (red) for 3.3 V power on
 - Four user LEDs, LD3 (orange), LD4 (green), LD5 (red) and LD6 (blue)
 - 2 USB OTG LEDs LD7 (green) VBus and LD8 (red) over-current
- *Two push buttons (user and reset)
- *USB OTG FS with micro-AB connector
- *Extension header for all LQFP100 I/Os for quick connection to prototyping board and easy probing



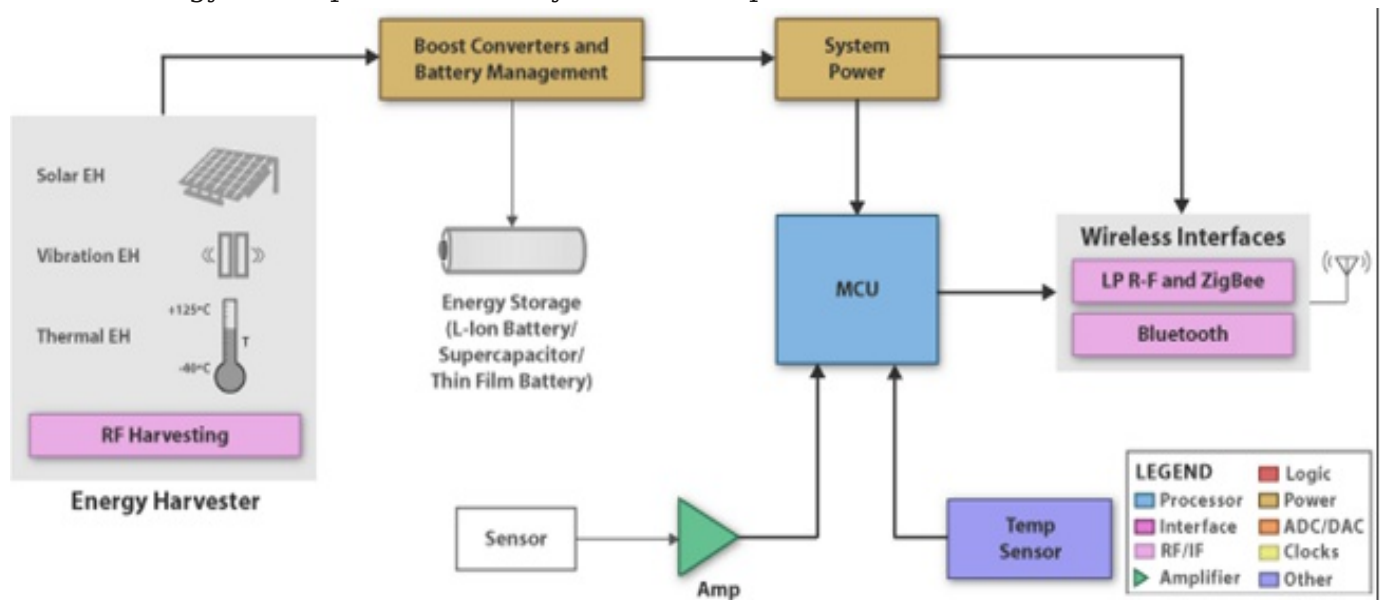
For more details visit :www.st.com/web/catalog/tools/FM116/SC959/SS1532/PF252419

Reaping the benefits of Energy Harvesting

By Greg Quirk

Energy harvesting is a rapidly growing industry. It is estimated that energy harvesting components will exceed \$4 billion by 2020, which is significant considering that the market was \$79.5 million in 2009 resulting in an average annual growth rate of over 73%. The current market leaders are Europe, North America, Japan and China. There are a number of reasons why companies are investing in energy harvesting. Some are looking to reduce the cost associated with powering systems. Depending on the life expectancy of the system an upfront cost to use energy harvesting could pay off in the long run, even if the energy generated is not substantial. Alternative energy sources are a way to extend the life of an industrial system. Instead of having to access the system to change batteries or hardwire power, having a different type of energy source enables the application to be placed in otherwise inaccessible areas and operate longer without requiring maintenance.

One of the key applications for energy harvesting is wireless sensors. These are already deployed in many areas, specifically for smart meters, but the applications are growing as the technology develops and new ways to use the power are devised.



Example Energy Harvesting Application from T.I.

When power is created, using whichever method is chosen, it has to be stored. This is necessary because there is a fluctuation in how my power is generated.

Storage devices include capacitors for low cost and spike power, supercapacitors for high energy output with a fast recharge time, and batteries for sustained power distribution. A battery like the Cymbet Electronics EnerChip CBC 3150 can store power to be used as the system requires in a thin-film package. This thin film battery is rated at 50 uAh and features integrated battery management.

Photovoltaic (Solar) Panels: Photovoltaic, or solar, panels are one of the most common types of alternative energy sources. This method of energy harvesting has been used in a number of applications, the most common and basic of which is the calculator. Photovoltaic panels are positioned to be in the sunlight which is converted into energy and stored in a battery. The Texas Instruments eZ430-RF2500-SHE is a development tool that helps

designers apply this type of technology to wireless networks. This kit is based on the ultra low power MSP430 MCU and includes a Cymbet solar panel that is optimized for operation from low intensity fluorescent lighting to power a wireless sensor application.

RF Energy: One alternative to photovoltaic panels is to convert RF energy into usable power. This is advantageous over solar power because it works in conditions where sunlight is not available. This type of technology has been used in the past for RFID systems, but it is also being explored for other applications. This is a unique way to generate energy as it is charged with RF energy allowing the system to be placed anywhere that a 2.4GHz signal can reach. And if you have a wireless network in your home you will realize that this means it can be placed nearly anywhere. For companies looking to implement this type of technology there are development kits available, such as the Powercast Lifetime Power Energy Harvesting Development Kit. Included with this kit are a RF receiver board powered by the Powercast P2110 Powerharvester receiver, a 915 MHz RF transmitter, and wireless sensor boards which operate without battery power. The energy collected by the kit is stored in a supercapacitor.

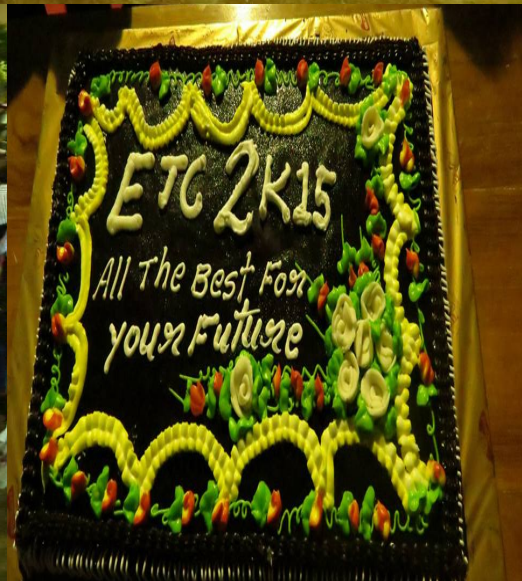
Thermoelectric Harvesting: A third way to generate power is by using thermoelectric energy, or heat. Power is generated when there is heat created. While the power generated is typically low, it can be useful to capture the wasted energy from Piezoelectric Power: s. The Micropelt TE-Power PROBE Thermoharvesting Power Source can create up to 4.5V given enough heat, which is sufficient to recharge capacitors or thin film batteries. With a temperature difference of 75 C, this kit can produce up to 10mW of energy, equivalent to 30 AA batteries.

Piezoelectric Power: The final method for generating microelectricity is through the change in a substance as pressure is exerted. For example, piezoelectric power can be created by putting a thin layer of material under a walkway which contracts and expands as people walk overtop it. One novel idea of piezoelectric power was to operate a remote control simply by pressing the buttons to generate the power necessary to send the IR signal.

Conclusion

While micro-energy harvesting may not generate a lot of power, what is created can be enough to offset, or even replace, the reliance on traditional power supplies. This is particularly true when the proper type of alternative energy is selected based on the environmental conditions to optimize generation. Please visit Mouser's Energy Harvesting Page and Product Knowledge Center for the latest in micro energy harvesting technologies and products.

Farewell 2015 in Pictures



TechnoSangram 2015 in Pictures



Workshops/IETE Women's Day in Pictures



QUIZ



Technical

1. A red-red-red-gold resistor in series with an orange-orange-orange-gold resistor produces?
2. What is the center frequency of a band-pass filter always equal to?

Logic (Singapore Math Olympiad)

Albert and Bernard just met Cheryl. "When's your birthday?" Albert asked Cheryl.

She wrote down a list of 10 dates:

May 15, May 16, May 19, June 17, June 18, July 14, July 16, August 14, August 15, August 17

Then Cheryl whispered in Albert's ear the month — and only the month — of her birthday. To Bernard, she whispered the day, and only the day. "Can you figure it out now?" she asked Albert.

Albert: I don't know when your birthday is, but I know Bernard doesn't know, either.

Bernard: I didn't know originally, but now I do.

Albert: Well, now I know, too!

When is Cheryl's birthday?

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