Department of Electronics And Communication Engineering

E-SPARSH

Technical Magazine

JAN - JUN 2021

EDITORIAL BOARD

INSTITUTION

Vision of the Institute:

To be a premier center of learning in Engineering and Management education that evolves the youth into dynamic professionals with a social commitment

Mission of the Institute:

M1: To provide quality teaching- learning practices in engineering and management education by imparting core instruction and state-of-the-art infrastructure.

M2: To engage the faculty and students in acquiring competency in emerging technologies and research activities through Industry Institute Interaction.

M3: To foster social commitment in learners by incorporating leadership skills and ethical values through value-based education

DEPARTMENT

Vision of the Department:

To produce technically competent and research oriented Electronics and Communication Engineers to meet the Industrial and Social requirements.

Mission of the Department:

M1: To impart quality technical education in the field of Electronics and Communication Engineering through state-of-the art facilities and effective teaching learning process.

M2: To enrich the faculty and students with research and consultancy skills through Industry-Interaction and Training in Emerging areas of Electronics and Communication Engineering.

M3: To develop lifelong learning, leadership qualities and ethical values in learners to meet the societal and industrial needs.

Program Educational Objectives (PEOs)

PEO-I : Graduates will have the capabilities to analyze, design and develop innovative solutions for the problems in the field of Electronics and Communication Engineering using core competencies.

PEO-II :Graduates will have the ability to engage themselves in research and lifelong learning to achieve professional excellence.

PEO-III : Graduates will have successful career with leadership qualities, ethics and good communication skills in Electronics and Communication Engineering and related fields.

ECE PBRVITS | **DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGINEERING**

Program Outcomes (POs)

1. Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

2. Problem analysis: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

3. Design/development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

4. Conduct investigations of complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

5. Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.

6. The engineer and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

7. Environment and sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

8. Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

9. Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

10. Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

11. Project management and finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

12. Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

Program Specific Outcomes (PSOs)

PSO-1 : Graduates will be able to design and analyze Image Processing and communication systems concepts using appropriate tools.

PSO-2 : Graduates will be able to design and develop solutions for real world problems by applying the concepts of VLSI and Embedded systems.

DEPARTMENT PROFILE

The Department of Electronics and Communication Engineering (ECE) was established in the years 1998–99 with an intake of 60 and currently running with an intake of 240. It is 23 years old now and one of the most well-established departments in our Institution. It is also offering one post graduate programme with the specialization of VLSI Design with an intake of 30 students.

The Department is known for its esteemed faculty members who are renowned for their path-breaking contributions in the field of electronics and communications. It is well equipped with laboratories, audio-visual facilities and software tools such as MultiSim, ModelSim, Lab View, HFSS, MATLAB, and Xilinx.

We offer our students an excellent educational experience that combines intellectual rigor and cross-disciplinary breadth. The course contents are periodically updated to introduce new scientific and technological developments. Electronic design, communication technologies, hands-on programming, a research focus, and entrepreneurship skills are all part of our signature educational curriculum. The ECE domain is often regarded as a challenging culmination of hardware and software. Our curriculum focuses primarily on the knowledge and skills that emerging engineers need.

PROFESSOR DESK

The Department of Electronics and Communication Engineering has always been the gem of the PBR VITS, Kavali. The perirenal zeal of the Department has never left the achievements stagnant. The Department not only gives students the exposure to the regular engineering curriculum but also to the aspirations of today's corporate world, that inculcating professional aptitude in them. The dedication of the faculty members has strengthened the learning process ensuring an environment of collaboration, experimentation, imagination, and creativity.

It is such a prodigious delight in watching the student's cutting edge in technical exploration, enhancing their analytical skills and brushing themselves up for the rapidly changing sector, and establishing themselves as entrepreneurs and engineers.

The Department has always reached new heights and I am looking forward to more wonders and achievements, I wish the very best to the Department of ECE to release E-SPARSH to the official technical magazine of the Department. The magazine beautifully provides an overview of research activities and the other fields explored by our students.

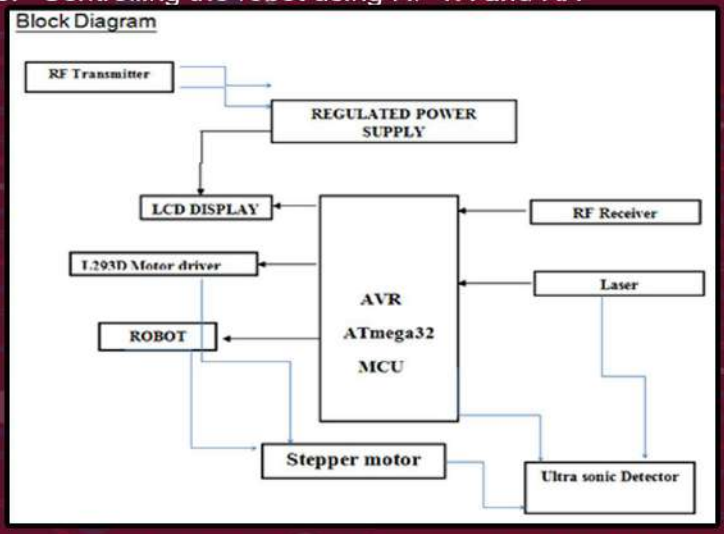
Dr. A. Maheswara Rao
Professor & HOD, ECE.

1. MICROCONTROLLER BASED MISSILE DETECTION AND DESTROYING

This model is to design and construct automatic missile detection and destroying system. The system is designed to detect the target (missile) moving in multiple directions. The destroying system moves automatically in the direction of missile and fires it upon fixing the target. This system consists of a SONAR based object tracking system that continuously monitors the target. Upon detecting the target it sends the target's location to a Central Control System. The Central Control System takes the action of moving the firing mechanism in the direction of target missile. Upon fixing the direction, it sends the control command to firing system to attack the target. This model is divided in three part RF Transmitter, RF Receiver, and microcontroller.

The main objectives of this model are:

1. Monitoring the moving target.
2. Real time monitoring of target
3. Works in any lighting conditions.
4. Automatic target attacking.
5. Controlling the robot using RF TX and RX



This ultrasonic proximity detector comprising independent, battery or AC powered transmitter and receiver section make use of a pair of matched ultrasonic piezo ceramic transducers each operating at around 40 kHz. This circuit is used to get reflected signals of 40 kHz from a missile to feed that to a program to the microcontroller to switch on appropriate load while the program is executed at the microcontroller end. When the AVR microcontroller receives the signal from ultrasonic receiver it activates the door gun by triggering the gate of MOSFET through a transistor.

The power supply consists of a step-down transformer 230/12V, which steps down the voltage to 12V AC. Then this is converted to DC using a Bridge rectifier. The ripples are then removed using a capacitive filter and it is then regulated to +5V using a voltage regulator 7805 which is required for the operation of the microcontroller and other components.

Op Amps are used for amplification of the weak signals received upon reflection from the obstacle, by the receiving ultrasonic transducer sent by the transmitting one, to switch on appropriate load while the program is executed at the microcontroller end. The model consists of the ultrasonic transmitter and receiver each of which works for the frequency of 40 kHz

At the receiver side the received signal is amplified and given to the microcontroller which is used as to operate the relay driver (ULN2003) for operating the relay to drive the loads.

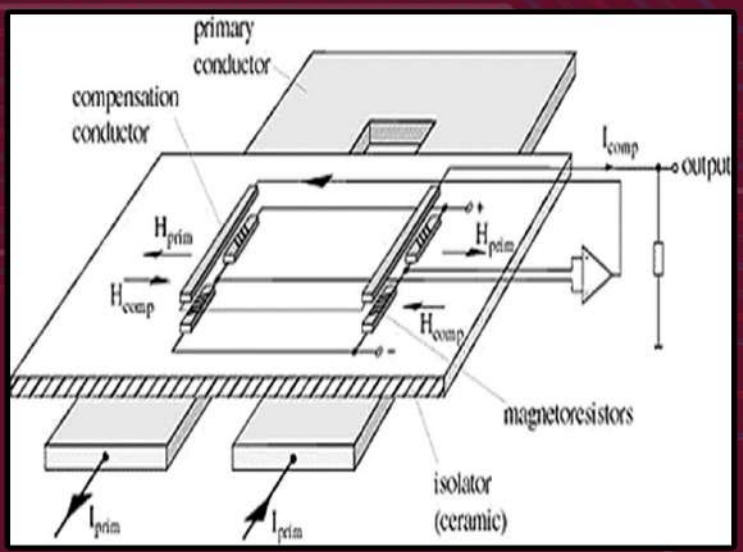
Target acquisition and tracking are frequent domains of active sensing methods such as RADAR, Ultra-sound, or LASER scanning. The ability to track targets at manipulation range can significantly reduce the cost and complexity of manipulator control. Ultrasonic sensors, in particular, provide an ideal platform for experimental development in range detection. They are cheap, readily available, and increasingly possessed of high-resolution sensors. Its various Applications range from robotic security systems to environments such as production lines where distance measurement and obstacle measurement and manipulation of objects are routine tasks with potential for wide-scale automation and defense.

NARRA SURENDRA
(17731A0418)

2. UNIVERSAL MAGNETO RESISTIVE CURRENT SENSOR

Magnetic field sensors based on the magneto resistive effect can be easily fabricated by means of thin film technologies with widths and lengths in micrometer range. For best performance, these sensors must have a very good linearity between the measured quantity and the output signal. Even when improved by the barber poles, the linearity magneto resistive sensor is not very high, so the compensation principle used on hall sensors is also applied here. An electrically isolated aluminum compensation conductor is integrated in the same substrate above the Permalloy resistors.

The current flowing through this conductor generates a magnetic field exactly compensates that of the conductor to be unmeasured. In this way the MR element always work at the same operating point; their nonlinearity therefore becomes irrelevant. The temperature dependence is also almost completely eliminated. The current in the compensation conductor is strictly proportional to the measured amplitude of the field; the voltage drop across a resistor forms the electrical output signal.



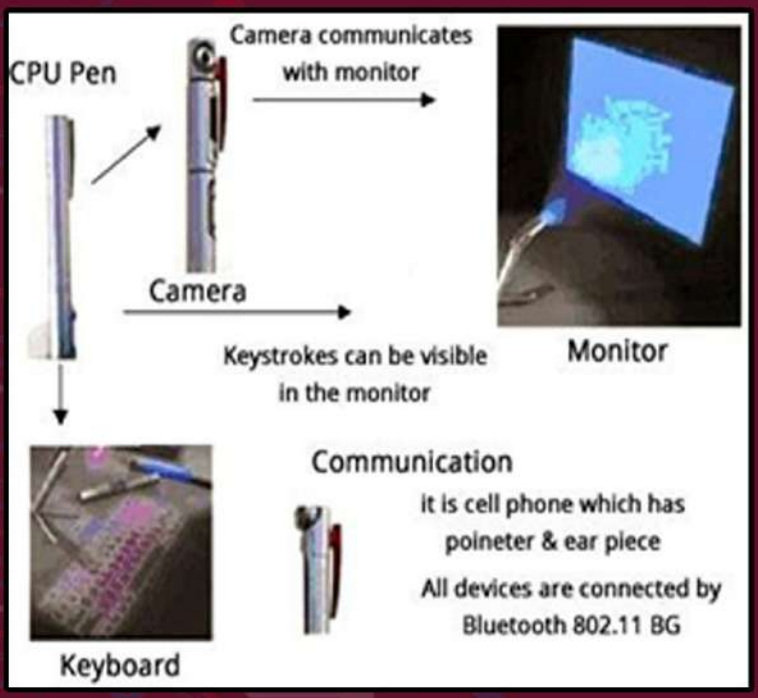
Magneto resistive sensors, as are hall elements are very well suited or the measurement of electric currents. In such applications it is important that external magnetic fields do not distort the measurement. This achieved by forming a full bridge are specially separated. The barber poles have the same orientation in the two arms, so that only a field difference between the two positions is sensed. This configuration is insensitive to external homogenous perturbation fields.

The primary conductor is U shaped under the substrate, so that the magnetic fields acting on the two arms of the bridge have the same amplitude but opposite directions. This way the voltage signals of the two half-bridges are added. The sensors require neither a core nor a magnetic shielding, and can therefore be assembled in a very compact and cheap way. The output is calibrated by a laser trimming process or by a digital calibration.

PACHIPALA V PRAVEEN KUMAR
(17731A0419)

3. 5 PEN PC TECHNOLOGY

When writing a quick note, pen and paper are still the most natural to use. The 5 pen pc technology with digital pen and paper makes it possible to get a digital copy of handwritten information, and have it sent to digital devices via Bluetooth. P-ISM (Pen-style Personal Networking Gadget Package), which is nothing but the new discovery which is under developing stage by NEC Corporation. It is simply a new invention in computer and it is associated with communication field.



Working Principle:

A computer that utilizes an electronic pen (called a stylus) rather than a keyboard for input. Pen computers generally require special operating systems that support handwriting recognition so that users can write on the screen or on a tablet instead of typing on a keyboard. Most pen computers are hand-held devices, which are too small for a full-size keyboard.

How does it work?
The P-ISM (Pen-style Personal Networking Gadget Package) consists of a package of
5 pens that all have unique functions, combining together to create virtual computing experience by producing both monitor and keyboard on any flat surfaces from where you can carry out functions that you would normally do on your desktop computer. P-ISM's are connected with one another via a short-range (Bluetooth) wireless technology. The whole set is connected to the Internet through the cellular phone function.
The five components of P-ISM:

- CPU pen,
- Communication pen,
- Virtual keyboard,
- LED projector,
- Digital camera

PYDA V SAI KAVYA HARSHITHA
(17731A0423)

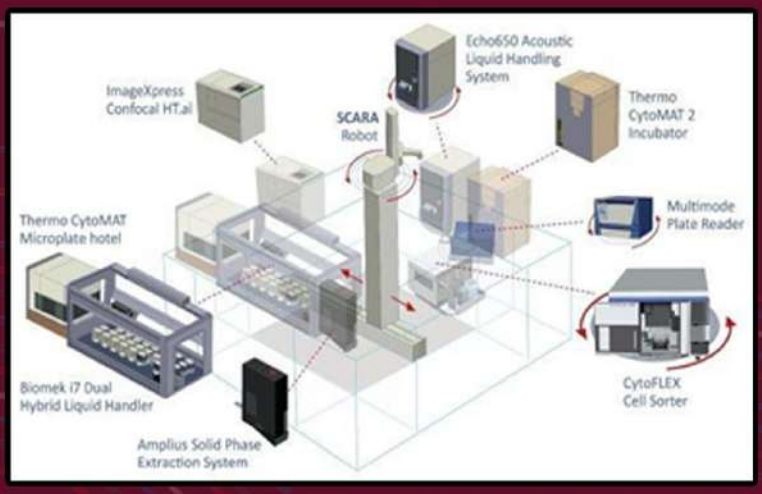
4. SATRACK

SATRACK is a system that was developed to provide an evaluation methodology for the guidance system of the ballistic missiles. This was developed as a comprehensive test and evaluation program to validate the integrated weapons system design for nuclear powered submarines launched ballistic missiles. This is based on the tracking signals received at the missile from the GPS satellites. SATRACK has the ability to receive record, rebroadcast and track the satellite signals.

SATRACK facility also has the great advantage that the whole data obtained from the test flights can be used to obtain a guidance error model. The recorded data along with the simulation data from the models can produce a comprehensive guidance error model. This will result in the solution that is the best flight path for the missile.
The present-day ballistic missiles are all guided using the global positioning system or GPS.GPS uses satellites as instruments for sending signals to the missile during flight and to guide it to the target.

This seminar deals with the measurement concept that tests the missile accuracy. SATRACK receives, rebroadcast, records and tracks the satellite signals sent by the GPS signals. The reception and rebroadcast of the signals is done by a missile hardware called the GPS translator.
The ground telemetry stations consist of the RF antenna and recorders for the data. Post-flight processing and modelling are done later at the SATRACK Facility. Also the major error contributors to the missile flight are determined by the modelling done. There is extensive use of simulated signals in this method.

According to the dictionary guidance is the 'process of guiding the path of an object towards a given point, which in general may be moving'. The process of guidance is based on the position and velocity if the target relative to the guided object.



To simplify the missile hardware, the SATRACK system is based on simply relaying satellite signals to the two support ships (see Fig. 1). The signals from a satellite as received at the missile are converted to a different frequency and retransmitted to the support ships.

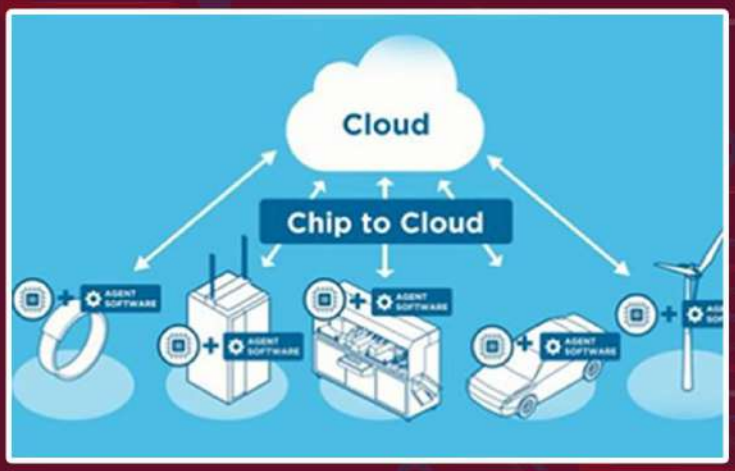
VEERAMREDDY HARSHINI REDDY
(17731A0426)

5. CHIP-TO-CLOUD SECURITY

IOT devices have now turned to be an essential part of our daily lives, which is also transforming our cities, offices, and entire house into a smart habitat. According to researchers, in the coming few years, all the devices will be connected to each other and to accomplish this task, the electronic items require to be extremely smart and secure. Hackers are targeting IoT devices massively on a daily basis and hence, any company utilizing or making an IoT device has to focus and prioritize on top-notch security.

Chips are the most worried aspect because it is now the backbone of every electrical and electronic goods. According to a report of international research and intelligence firm IoT Analytics, in the last 26 years around 100 billion ARM-based chips were shipped, but now the growth has exceeded to such an extent that in the last four years, another 100 billion ARM based chipset were shipped globally. By the end of 2021, there will be 12.3 billion connected devices and towards the end of 2025, the volume will exceed 25 billion. With the escalation of connected devices more chipsets are deployed in the market and they are not at all secured from a hardware perspective.

The more vulnerabilities in the market, the more unsecured will be your deployments, systems, and solutions. Satyajit Sinha - Senior Analyst - IoT Analytics told Circuit Digest, "It is very imperative to secure the IoT ecosystem. Traditionally, securities are only software securities or firewalls, but IT demands a robust security. The systems will generate much more data and more devices will be connected and so, securing just one system will not solve the pain point. Nonetheless, we need to take the approach of four layers of security, hardware, software, network, and cloud.



The Latest and Current Layers of Security for IoT Devices: If you are deploying a new solution, then it is preferable to deploy an embedded solution, which is embedded within the secured MCU. The point to be noted is that there is already an existing solution, but an embedded solution cannot be implemented on top of that and hence, Hardware Security Module (HSM) always makes sense and it will provide an equal amount of security

Then, the software security can be implemented on top of a secured MCU embedded like an Azure-based device. This implementation tracks and creates the data aberration. Cloud security is also an integral part of hardware security as well. The pillar of hardware security enables the "hardware root of trust" that utilizes asymmetric encryption. A hardware root of trust is the platform on which all secure operations of a computer system rely.

It contains the keys used for cryptographic functions and enables a secure boot process and on the other hand, a secure tunnel is also crafted for the secure flow of data from chip to the cloud, ensuring data security at rest and in transit.

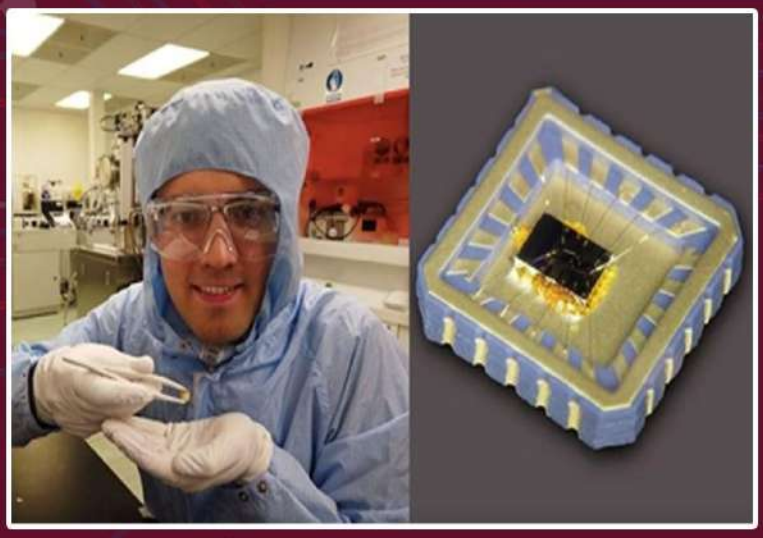
There is a tamper-resistant secure platform, known as Secure Element (SE) that has the potential of hosting various applications in a very secured way and also their cryptographic and classified data following the security necessities and rules established by the verified authorities. Another uniqueness of SE is that it can be utilized in numerous form factors (UICC(SIM), embedded secure element, and micro-SD)

PAIDA HARINI
(17731A0430)

6. HIGHLY-SENSITIVE TERAHERTZ DETECTOR

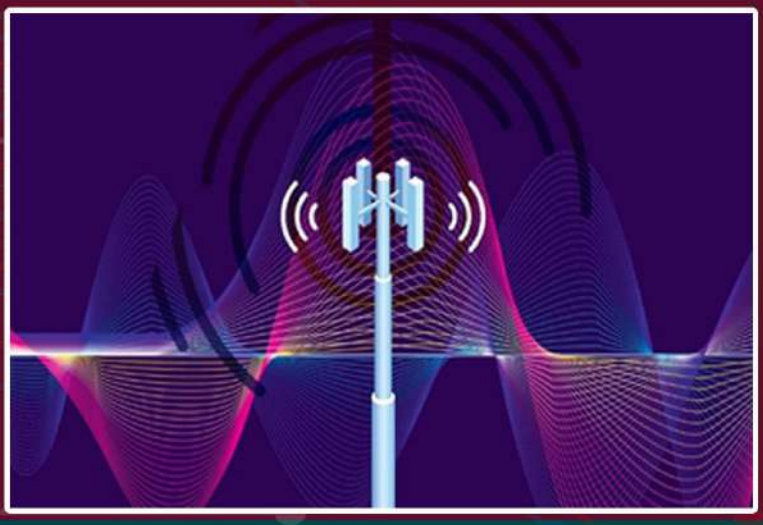
Recently, a team of scientists from Cambridge University, the University of Augsburg, and the University of Lancaster published their findings on a new type of terahertz detector using two-dimensional (2D) electron gas. An electron gas is free to move in two axes but is tightly constrained in the third, thus appearing to exist as a 2D plane in a 3D environment.

The terahertz detector developed by Cambridge researchers. Image used courtesy of Wladislaw Mikhailov and the University of Cambridge By exposing their sensor to terahertz radiation, the researchers were able to read out a much stronger signal than previously theorized. They attributed these findings to the way that electromagnetic waves interact with matter at different frequencies.



Lithium Improves Terahertz Photonic Sources: Another recent development in terahertz technologies, this time in the area of signal generation, comes from a team of researchers from the Nankai University in China and their colleagues at the INRS-ENT in Canada. Led by professors Jiayi Wang, Shiqi Xia, and Ride Wang, a group of scientists developed a single lithium niobate photonic chip for use in a novel terahertz source module.

The material in question is a type of non- naturally occurring crystal with the chemical composition of lithium, niobium, and oxygen. This material is commonly used in engineering, which here particularly in telecommunications and nonlinear optics.



Adopting Terahertz for 6G:

One major obstacle to terahertz adoption is the challenge of designing and implementing transmitter and receiver modules that are efficient, affordable, and operable in a real- world environment. Solving these problems doesn't only carry the weight of advanced medical and security terahertz sensors but also the development of other emerging technologies that are indirectly dependent on faster wireless protocols.

Current wireless technologies don't support holographic, artificial intelligence, and even 4K video streaming on a large-enough scale—even with the theoretical limits of the 5G standard. These two new discoveries by Cambridge University and Nankai University open up the possibility of electronics that use terahertz frequencies, pushing the future of a sixth generation wireless network forward.

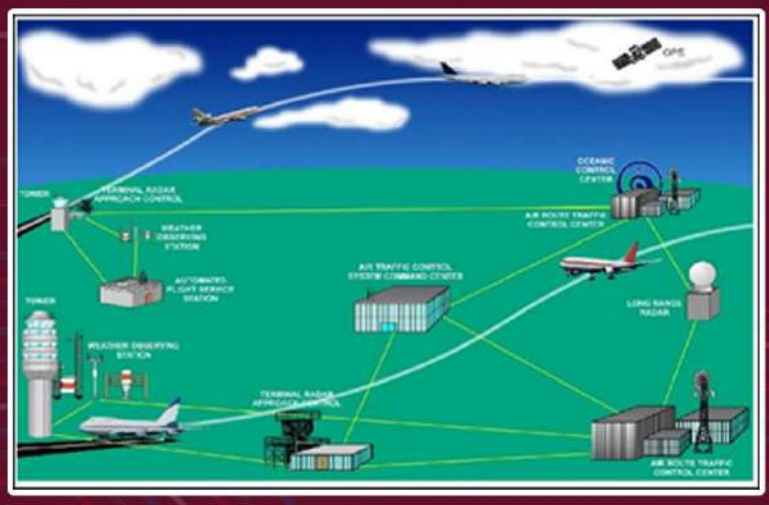
VAVILLA SUBBA RATHNAM
(17731A0433)

7. AIR TRAFFIC CONTROL SYSTEM

Air traffic control systems are various aircraft navigation and communication systems that uses computers, radar, radios and other instruments and devices to provide guidance to flying aircraft. Trained personnel working as air traffic controllers at stations on the ground constantly monitor these systems and track the locations and speed of individual aircraft. Controllers can warn aircraft should they come too close to each other. The goal of air traffic control system is to minimize the risk of aircraft collisions while maximizing the number of aircraft that can fly safely at the same time. Air traffic control systems also provide updated weather information to airport around the country, so aircraft can take off and land safely. This information is important not only to airline passengers but also to industries that rely on aviation for the timely transport of goods, materials and personnel.

Air traffic control (ATC) is a service provided by ground-based controllers who direct aircraft on the ground and through controlled airspace, and can provide advisory services to aircraft in non- controlled airspace. The primary purpose of ATC worldwide is to prevent collisions, organize and expedite the flow of traffic, and provide information and other support for pilots. In some countries, ATC plays a security or defensive role, or is operated by the military.

To prevent collisions, ATC enforces traffic separation rules, which ensure each aircraft maintains a minimum amount of empty space around it at all times. Many aircraft also have collision avoidance systems, which provide additional safety by warning pilots when other aircraft get too close. In many countries, ATC provides services to all private, military, and commercial aircraft operating within its airspace. Depending on the type of flight and the class of airspace, ATC may issue instructions that pilots are required to obey, or advisories (known as flight information in some countries) that pilots may at their discretion, disregard. Generally the pilot in command is the final authority for the safe operation of the aircraft and may in an emergency, deviate from ATC instructions to the extent.



The goal of air traffic control is to minimize the risk of aircraft collisions while maximizing the number of aircraft that can fly safely at the same time. Aircraft pilots and their onboard flight crews work closely with controllers to manage air traffic. Air traffic control systems also provide updated weather information to airport around the country, so aircraft can take off and land safely. This information is important not only to passengers but also to industries that rely on aviation for the timely transport of goods, materials and personnel.

BONDILI NAGA SAI CHARAN SINGH
(18731A0403)

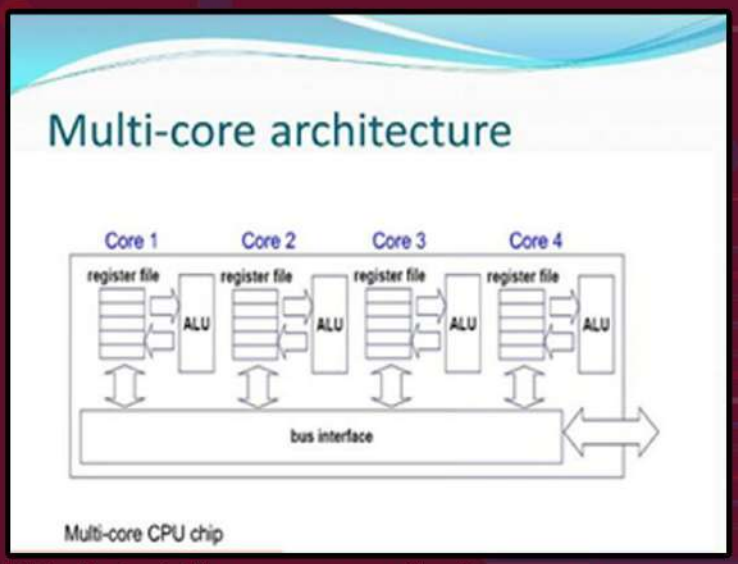
8. MULTI-CORE PROCESSOR

As Multi-Core Architectures begin to emerge in every area of computing, operating system scheduling that takes the peculiarities of such architectures into account will become mandatory. Due to architectural differences to traditional multi-processors, such as shared caches, memory controllers and smaller cache sizes available per computational unit, it does not suffice to simply schedule tasks on multi-core processors in the same way as on SMP systems. Furthermore, current research motivates architectural changes in CPU design, such as multicore processors with asymmetric core performance and so called many-core architectures that integrate up to 100 cores in one package.

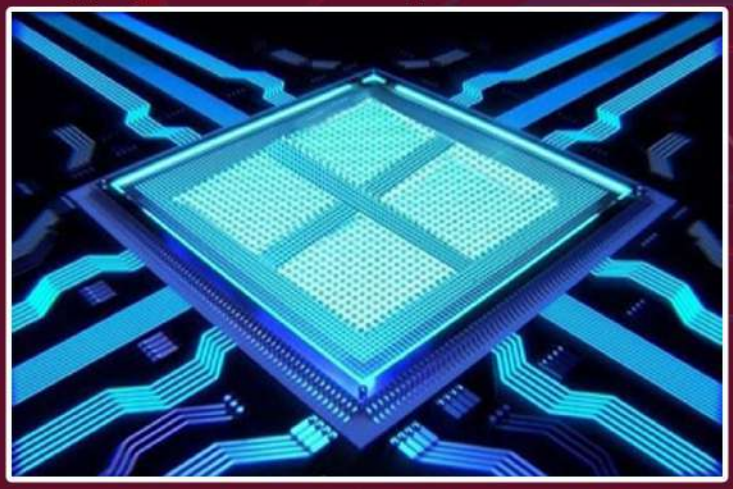
Such architectures will exhibit a fundamentally different behavior with regard to shared resource utilization and performance of non-parallelizable code compared to current CPUs. It will be the responsibility of the operating system to spare the programmer as much platform specific knowledge as possible and optimize overall performance by employing intelligent and configurable scheduling mechanisms.

Multi-core scheduling:

The scheduling process on such multi-core processors wouldn't differ much from conventional scheduling – intuitively the run queue would just have to be replaced by n run queues, where n is the number of cores and processes would simply be scheduled to the currently shortest run-queue (with some additional process-priority treatment, maybe).



While that might seem reasonable, there are some properties of current multi-core architectures that speak strongly against such a naïve approach.



First, in many multi core architectures, each core manages its own level 1 cache. By just naïvely rescheduling interrupted processes to a shorter queue which belongs to another core (task migration), parts of the processes cache working set may become unnecessarily lost and the overall performance may slow down. This effect becomes even worse if the underlying architecture is not a multi-core but a NUMA system where memory access can become very costly if the process is scheduled on the "wrong" node.

BONTHALA DEVI KALYANI
(18731A0404)

9. HEART BEAT MONITOR

Health monitoring systems become a hot topic and important research field today. Research on health monitoring were developed for many applications such as military, homecare unit, hospital, sports training and activity emergency monitoring system. In this paper, we developed the wearable and real-time monitoring system of some critical vital signs for elderly people, because Thai people who ages over 60 years old encounter accidental incidents over 60 percent. That system may help doctor or people in family monitor the emergency alarm from patient or elderly people.

The vital signs of health status that are the important parameter in health monitoring system consist of blood pressure, heart rate, oxygen saturation, body temperature and respiratory rate. In this model, two parameters of the vital signs heart rate and oxygen saturation in blood are considered. That vital sign can measure by using device namely; pulse oximeter. The pulse oximetry data are important for doctor to monitor patient's health condition.

Wireless technology was developed in many applications that becoming a part of human activities such as agriculture, military, medical care, smart home system etc. Distinctly, wireless sensor networks (WSN) play a crucial role in such a monitoring system application, for the reason that WSN can offer some advantages over other types of wireless systems, especially its scalability, power management and flexibility of architecture.

As a matter of fact, there are two popular standards in the wireless personal area network (WPAN), namely, Bluetooth and ZigBee. This model was focused on the capability of wireless sensor networks as an efficient tool to monitor health in term of pulse oximetry data for demonstration. This situation makes it difficult to develop and challenge because many applications in WSNs developed for fixing the position of member in wireless personal area network (WPAN).

This model adopted the ZigBee for using as a real-time health monitoring system on a patient. Pulse Oximeter Transmitter Module: A typical oximetry sensor has a pair of light emitting diode (LEDs). The two types of light emitting diode consist of infrared and red light. The infrared has a wavelength of 905 nm and red light has a wavelength of 660 nm. A pair of light emitting diodes (LEDs) facing with a photo detector module on patient's finger.

The photo detector module used is PDI-E832, which combines the two types of light detection in one module for minimizing the size of sensor probe. The entire optical device was assembled on Velcro strip with metal wire frame for easy to be worn by the patient. Figure below depicts block diagram of sensor module unit. The system consists of a microcontroller unit, two series of Li-Ion cells, power supply circuit, photodetector module, ZigBee module, digital to analog converter IC, operating amplifier IC, driver circuit for red LED and infrared LED, couple of light emitting diode (LEDs).

GANESHAM PRAVEEN
(18731A0410)

10. FIBRE OPTIC COMMUNICATION

Fiber optic communication has revolutionized the way we communicate by providing fast, reliable, and secure data transmission over long distances. It is a technology that uses thin, flexible glass or plastic fibers to transmit light signals through total internal reflection, allowing data to be transmitted at very high speeds.

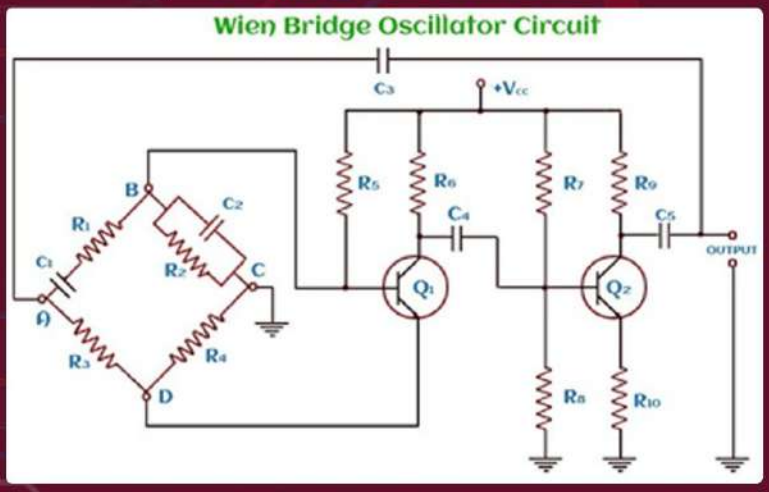
The basic principle of fibre optic communication is the transmission of light signals through the optical fibers. Optical fibres are thin, flexible fibres made of glass or plastic and have a diameter similar to that of a human hair. They are coated with a protective cladding to prevent light leakage and protect the fibre from damage. The light signals travel through the fibres by bouncing off the walls of the fibre in a process called total internal reflection

Another advantage of fibre optic communication is its immunity to electromagnetic interference. Unlike copper cables, which can be affected by electromagnetic interference from other devices, fibre optic cables are immune to such interference. Fibre optic communication is widely used in various applications such as telecommunications, cable television, and the internet. It has revolutionized the way we communicate and has made it possible for people to connect with each other from different parts of the world.

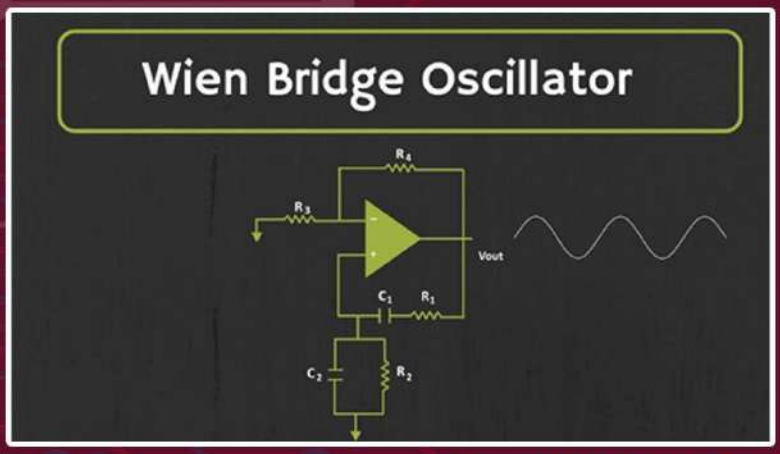
KALYANI HARSHITHA
(18731A0412)

11. WEIN BRIDGE OSCILLATOR

A Wien bridge oscillator is a type of electronic oscillator that generates sine waves. It can generate a large range of frequencies. The oscillator is based on a bridge circuit originally developed by Max Wien in 1891 for the measurement of impedances. The bridge comprises four resistors and two capacitors. A band pass filter that provides positive feedback. Automatic gain control, intentional nonlinearity and incidental non-linearity limit the output amplitude in various implementations of the oscillator.



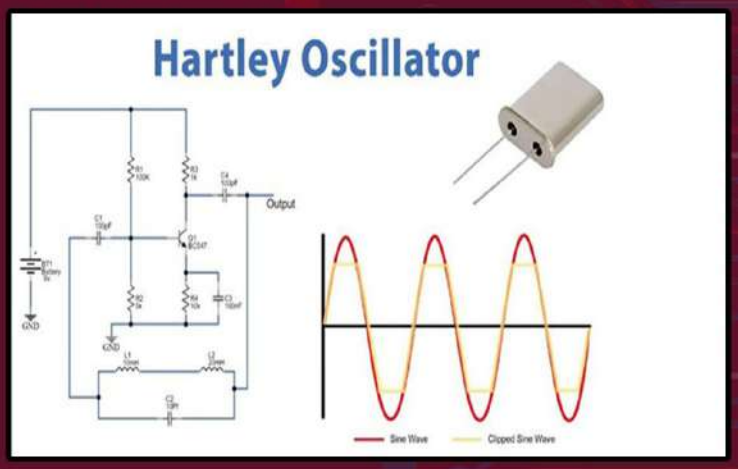
The circuit shown to the right depicts a once-common implementation of the oscillator, with automatic gain control using an incandescent lamp. Under the condition that R1=R2=R and C1=C2=C, the frequency of oscillation is given by: fo=2πRC.



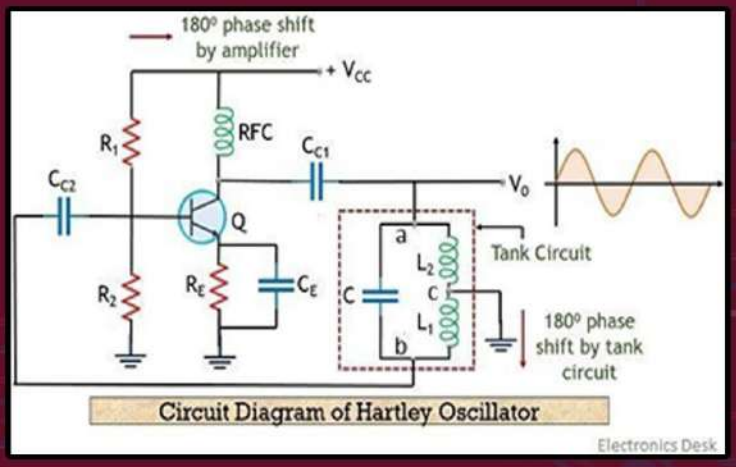
KARANAM CHANDANA
(18731A0413)

12. HARTLEY OSCILLATOR

The Hartley oscillator is an electronic oscillator circuit in which the oscillation frequency is determined by a tuned circuit consisting of capacitors and inductors, that is, an LC oscillator. The circuit was invented in 1915 by American engineer Ralph Hartley.



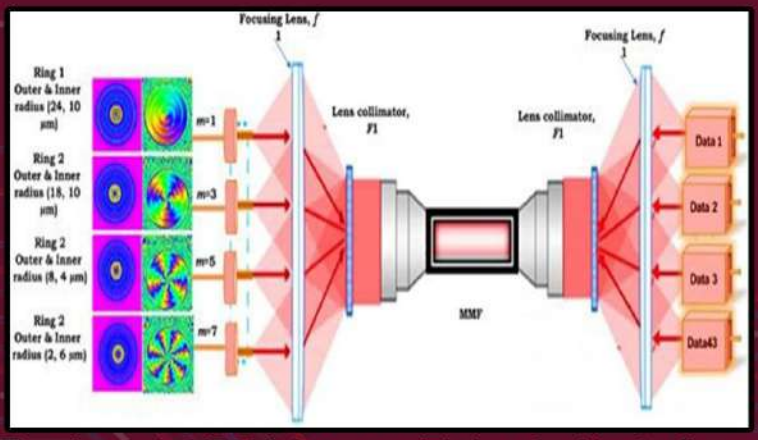
The distinguishing feature of the Hartley oscillator is that the tuned circuit consists of a single capacitor in parallel with two inductors in series (or a single tapped inductor), and the feedback signal needed for oscillation is taken from the center connection of the two inductors we calculate a Hartley oscillator frequency based on the formula, frequency= $1/2\pi\sqrt{}$ LTC where C is the value of the capacitor and LT is the equivalent.



KARRA MADAN MOHAN
(18731A0414)

13. RECENT PROGRESS ON NOVEL DSP TECHNIQUES FOR MODE DIVISION MULTIPLEXING SYSTEMS

This is an overview of latest progress on the novel advanced digital signal processing (DSP) techniques for long-haul mode division multiplexing (MDM) systems with high capacity. Space- division multiplexing (SDM) techniques have been developed for a period to increase the capacity of optical communication system by at least one order of magnitude through MDM techniques using few-mode fibers (FMFs) or multi-core multiplexing (MCM) using multi-core fibers (MCFs).



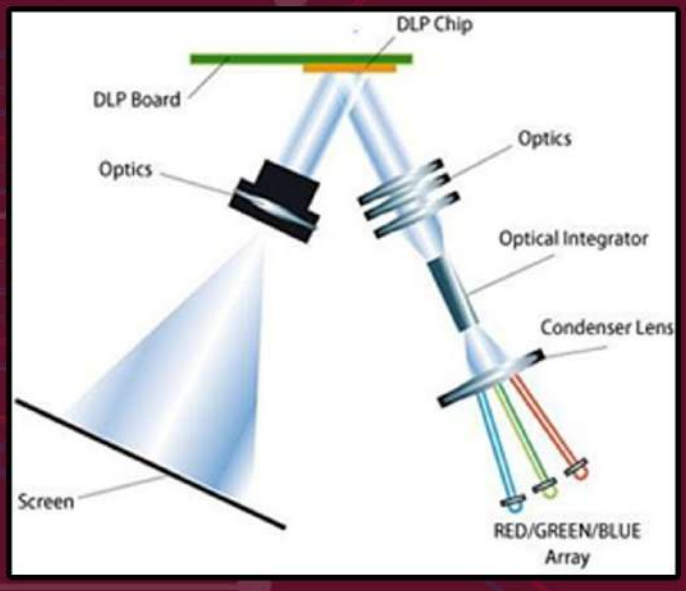
The signals in MDM links are mainly impaired by the linear and nonlinear effects in FMFs, making DSP techniques become necessary to undo these impairments. In this paper, we not only review the advanced multiple-input multiple-output (MIMO) DSP techniques

we focus on the fast tracking of time varying (TV) channels in FMF links through frequency-domain (FD) recursive least square (RLS) algorithm. Besides, we also cover the mainstream DSP solutions for mode-dependent loss (MDL) and several possible methods to compensate nonlinearity in FMF. Moreover, artificial intelligence (AI) technologies are also discussed for its high nonlinearity tolerance

BADE MANASA
(19731A0402)

14. DIGITAL LIGHT PROCESSING

Digital Light Processing is the one of primary display technologies driving this rapid growth and maturation .it is a revolutionary way to project and display information based on the Digital Micro Mirror Device (DMD) Digital Light processing was invented in 1987 by Texas Instruments it creates the final link to display digital visual information. Digital Light Processing creates deeper blacks, conveys fast moving images very well and uses a single, replaceable, white -light bulb . it is available in both front-and rear-projection models DLP is an excellent choice for people who watch a lot of sports or fast-action movies because of the speed at which it creates an image.



DLP Structure:
A Digital Micro Mirror Divice chip is the heart of Digital Light Processing projector, DMD can be described simply as a semiconductor light switch. The micro mirrors are mounted on the DMD chip and it tilts in response to an electrical signal. Other elements of a DLP projector include a light source, a colour filter system, a cooling system, illumination and projection optics. The signal goes through DLP video processing and becomes progressive Red (R), Green (G) and Blue (B) data. The progressive RGB data is then formatted into entire binary bit planes of data.

BANKA SRI KEERTHI
(19731A0539)

TECHNICAL QUIZ

1. An RLC series circuit is underdamped. To make it overdamped, the value of R
A. has to be increased
B. has to be decreased
C. has to be increased to infinity
D. has to be reduced to zero

2. Which of the following oscillators is suitable for frequencies in the range of megahertz?
A. RC phase shift B. Wien bridge
C. Hartley D. Both (a) and (c)

3. Which one most appropriate dynamic system?
A. y(n) + y(n - 1) + y(n + 1) B. y(n) + y(n - 1)
C. y(n) = x(n) D. y(n) + y(n - 1) + y(n + 3) = 0

4. At very high temperatures the extrinsic semiconductors become intrinsic because
A. drive in diffusion of dopants and carriers
B. band to band transition dominants over impurity ionization
C. impurity ionization dominants over band to band transition
D. band to band transition is balanced by impurity ionization

5. The vectors of the electromagnetic wave propagation can be expressed in
a) Dot product b) Cross product
c) Unit vector d) Perpendicular vector

6. ZL = 200 Ω and it is desired that Zi = 50 Ω the quarter wave transformer should have a characteristic impedance of
A.100 Ω B.40 Ω C.10000 Ω D.4 Ω

7. A broadside array consisting of 200 cm wavelength with 10 half-wave dipole spacing 10cm and if each array element feeding with 1 amp current and operating at same frequency then finds the half power beamwidth
A.4° B.2° C.10° D.15°

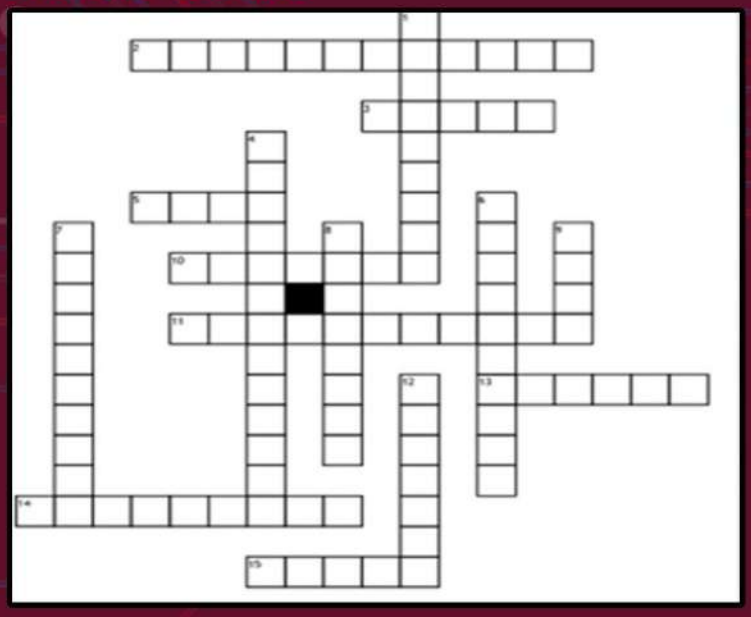
8. Refractive index of glass is 1.5. Find the wavelength of a beam of light with a frequency of 1014 Hz in glass. Assume velocity of light is 3 x 108 m/sec in vacuum.
A.4 μm B.3 μm
C.2 μm D.1 μm

9. The function f (x - volt) represents which of the following?
A. A stationary wave
B. A wave motion in forward direction
C. A wave motion in reverse direction
D. None of the above

10. A broadside array operating at 100 cm wavelength consist of 4 half-wave dipoles spaced 50 cm apart. Each element carries radio frequency current in the same phase and of magnitude 0.5 A. The radiated power will be
A.196 W B.73 W C.36.5 D.18.25 W

KOLLI BHAVYA
(17731A0413)

CROSS WORDS



Across:
2. An electric current identifier
3. Measure of inductance.
5. A basic component of an electronic device
10. The term used to designate electrical pressure.
11. Used to simplify algebra expressions [two words]
13. A device that opens or completes an electrical path.
14. A material that opposes the movement of free electrons
15. Measure of inductance

Down:
1. A measure of total Opposition to current.
4. A phenomenon that occurs when a vehicle sounding a siren approaches, passes, and recedes from an observer [two words]
6. A resistive component that is designed to be temperature sensitive.
7. Occurs when an atom or molecule gains either and positive or negative charge
8. Used as a capacitor to control voltage
9. An often-repetitious code sequence
12. Italian physicist Alessandro Volta (1745–1827) is credited with inventing the first one of these

UPPALA HARIKA
(17731A0464)