ELECTRONICS AND INSTRUMENTATION ENGINEERS ASSOCIATION
MUTHAYAMMAL ENGINEERING COLLEGE,
RASIPURAM-637 408, NAMAKKAL(DT).

INSTRONICS

The best INSTRUMENTATION magazine 12th, july, 2010 vol. 5

YEAR: 2010 ISSUE: 1 Vol: 5 July

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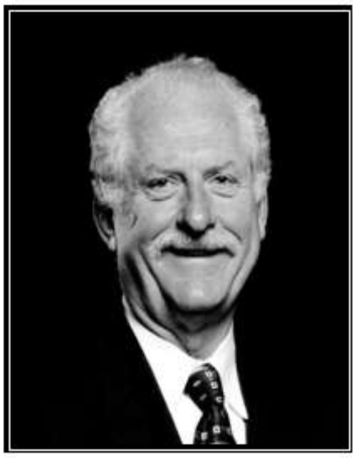


FLOWMETERS:

used to measure linear, nonlinear, mass or volumetric flow rate of a liquid or a gas.

Types of Flowmeters:

Coriolis Flowmeters are twisting meters that are used to measure mass flow as opposed to volumetric flow. These meters are known for their accurate readings however their size is limiting.

Magnetic Flowmeters are generally used for water applications. They are limited to conductive fluids and they operate on a voltage generator.

Mass Flowmeters are designed for use in gas flows where pressure and temperature are variable. They measure flow rate in terms of the mass of the fluid substance.

Mass Gas Flowmeters are less affected by density, pressure, and fluid viscosity. Generally use differential pressure transducers and temperature sensors.

Positive Displacement Flowmeters are used to measure the flow rate of fluids in areas where straight piping is not possible.

Turbine Flowmeters are mainly used for both liquids and gas. They operate best for applications that have steady and high-speed flows.

Ultrasonic Flowmeters are effective for measuring the natural gasses. These meters are non-intrusive and they have no pressure drop. It is important that ultrasonic flowmeters work on clean fluids.

Ultrasonic Doppler Flowmeters are used in slurries and wastewater applications. They use the Doppler Effect principle to measure the flow rate.

Variable Area Flowmeters are more commonly known as Rotameters, they are used to measure the linear flow of gases and clean liquids.

Velocity Flowmeters and flow sensors are measure the flow rate in terms of how quickly the gas or liquid is moving. Velocity meters use units like ft/sec.

Volumetric Flowmeters measures the flow rate in terms of the quantity of material that is flowing and use units like ml/min.

Vortex Flowmeters are mainly used as an alternative to differential pressure flowmeters. These meters only suitable for clean, low, viscosity and high speed fluids

Selecting a Flow Meter:

The basis of good flowmeter selection is a clear understanding of the requirements of the particular application. Therefore, time should be invested in fully evaluating the nature of the process fluid and of the overall installation.

By,
Mr.R.Arun vikkaram,

PIPING & INSTRUMENTATION DIAGRAM:

A **Piping and Instrumentation Diagram/drawing (P&ID)** is a diagram used in the process industry which shows the piping of the process flow together with the installed equipment for processing facilities, the pictorial representation requires such as.

- Key piping and instrument details
- Control and shutdown schemes
- Safety and regulatory requirements
- Basic start up and operational information

List of P&ID items:

- Instrumentation and designations.
- Mechanical equipment with names and numbers.
- All valves and their identifications.
- Process piping, sizes and identification.
- Miscellanea - vents, drains, special fittings, sampling lines, reducers, increasers and swagers.
- Permanent start-up and flush lines.
- Flow directions.
- Interconnections references.
- Control inputs outputs and, interlocks.
- Interfaces for class changes.
- Computer control system input.
- Identification of components and subsystems delivered by others.

Identification and Reference Designation:

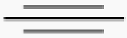
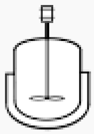
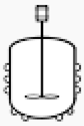
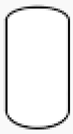
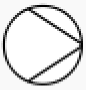
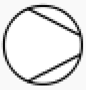
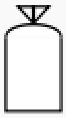
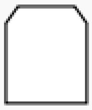
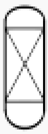
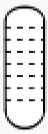
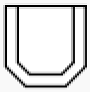
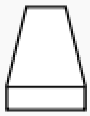
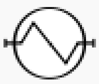
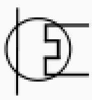
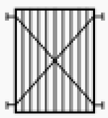
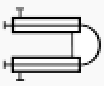
The P&ID is used for the identification of measurements within the process. Identification letters for measurements are based on Standard S5. 1 and ISO 14617-6.

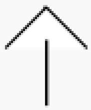
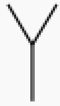
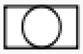
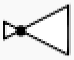
Symbols of chemical apparatus and equipments:

Below are listed some symbols of chemical apparatus and equipment normally used in a P&ID, according to DIN 30600 and ISO 14617.

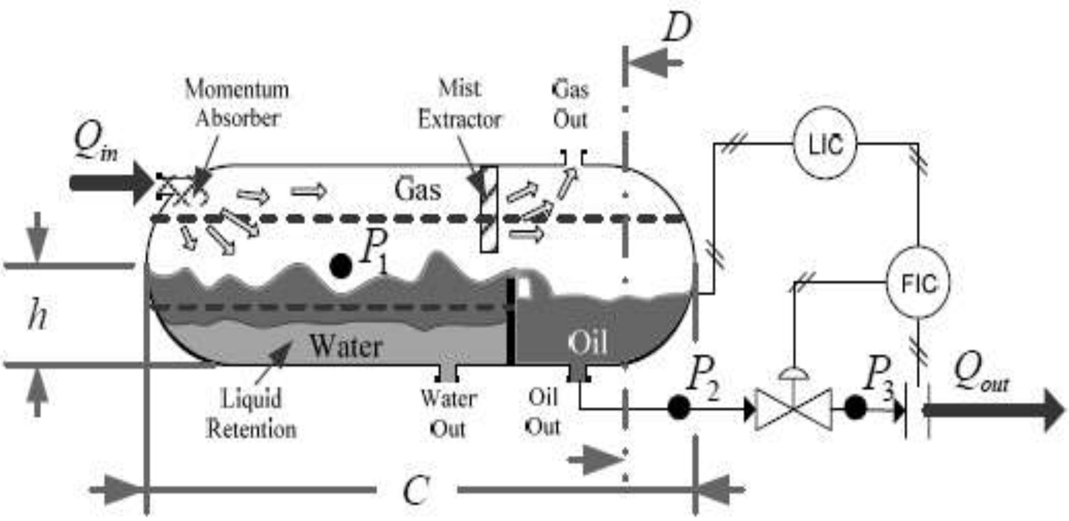
First-Letter	*Measurement*
D	Density
E	Electricity
F	Flow
H	Hand
J	Power
K	Time Schedule
L	Level
M	Moisture
P	Pressure
Q	Quality
R	Radiation
S	Speed
T	Temperature
V	Viscosity
W	Weight

SYMBOLS OF CHEMICAL APPARATUS AND EQUIPMENT

	Pipe		Thermally insulated pipe		Jacketed pipe		Cooled or heated pipe
	Jacketed mixing vessel (autoclave)		Half pipe mixing vessel		Pressurized horizontal vessel		Pressurized vertical vessel
	Pump		Vacuum pump or compressor		Bag		Gas bottle
	Fan		Axial fan		Radial fan		Dryer
	Packing column		Tray column		Furnace		Cooling tower
	Heat exchanger		Heat exchanger		Cooler		Plate & frame heat exchanger
	Double pipe heat exchanger		Fixed straight tubes heat exchanger		U shaped tubes heat exchanger		Spiral heat exchanger

	Covered gas vent		Curved gas vent		Dust trap		Funnel
	Steam trap		Viewing glass		Pressure reducing valve		Flexible pipe
	Valve		Control valve		Manual valve		Back draft damper

Example for P&I Diagram:



By,
Mr. V.Balamurugan,
Final Year (MEIEA).

DCS or PLC? What is the difference?

The **Programmable Logic Controller** (PLC) is king of machine control while the **Distributed Control System** (DCS) dominates process control.

Today, the two technologies share kingdoms as the functional lines between them continue to blur. We now use each where the other used to rule.

However, PLCs still dominate high-speed machine control, and DCSs prevail in complex continuous processes.

The early DCS looked dramatically different from the early PLC. Initially, the DCS performed the control functions of the analog panel instruments it replaced, and its interface mimicked their panel displays. DCSs then gained sequence logic capabilities to control batch processes as well as continuous ones.

DCS performs hundreds of analog measurements and controlled dozens of analog outputs, using multi-variable Proportional Integral Derivative (PID) control. With the same **8-bit** microprocessor technology that gave rise to the DCS, PLCs began replacing conventional relay/solid-state logic in machine control. PLC dealt with contact input/output (I/O) and started/stopped motors by performing Boolean logic calculations.

The big change in DCS over the past 20 years is its move from proprietary hardware to the personal computer (PC) and standard LAN technologies. With each advance in PC power, DCS have moved up in power. PCs gave us speedy, responsive, multi-media, windowed, operator-process interfaces (OPI).

Relational databases and spreadsheet software enhance the ability of DCS to store and manipulate data. Artificial intelligence (AI) technology gives us "smart" alarming. Today's DCS architecturally looks much like the DCS of 20 years ago, but tomorrow's DCS may control through networked "smart" devices-with no I/O hardware of its own.

Most DCS offer redundant controllers, networks, and I/O’s. Most give you "built-in" redundancy and diagnostic features, with no need for user-written logic.

DCSs allow centralized configuration from the operator or engineering console in the control room. You can change programming offline, and download without restarting the system for the change to be effective.

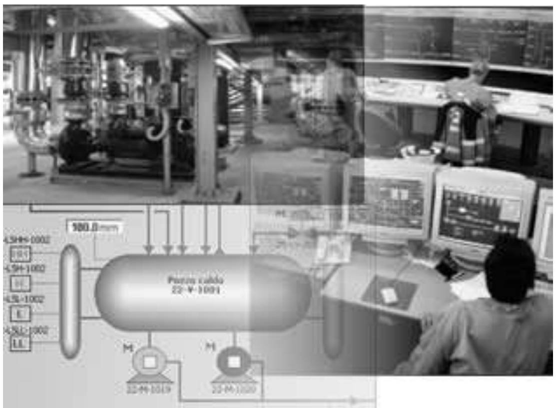
DCS allow inter-controller communications. You can do data exchange in most DCS systems ad hoc (no need for predefined data point lists). You access data by tag name, regardless of hardware or location.

DCS use multi-tasking operating systems, so you can download and run applications aside from the real-time control functions and still do fractional-second control. DCS now come in "micro" systems, to price-compete with PLC-but with full DCS features and capabilities.

The typical DCS has integrated diagnostics and standard display templates that automatically extend/update when your database changes. This database is central to the system-you don't have different databases sitting in the controllers.

DCS have user-friendly configuration tools, including structured English, control block libraries, SFC (sequential function chart), and even RLL

Most DCS allow graphical configuration, provide online



An important difference between DCS and PLC is how vendors market them. DCS vendors typically sell a complete, working, integrated, and tested system; offering full application implementation. They offer many services: training, installation, field service, and integration with your Information Technology (IT) systems.

A DCS vendor provides a server with a relational database, a LAN with PCs for office automation.

diagnostics, and are self-documenting. Most provide for user-defined control blocks or customized strategies. The controllers execute control strategies as independent tasks; thus, making changes to part of the control logic has no impact on the rest.

PLC (Programmable Logic Controllers):

When PLC was solely replacements for hard-wired relays, they had only digital I/O, with no operator interface or communications. Simple operator interfaces appeared, we went from a panel of buttons and I/O-driven lamps to PLC full-color customized graphic displays that run on SCADA software over a network.

PLC now have many DCS-like control functions (e.g., PID algorithms) and analog I/O. They've moved past their birthplace: the digital world (switch and binary sensor inputs and output contacts to run motors and trigger solenoids).

PLC is fast:

They run an input-compute-output cycle in milliseconds. On the other hand, DCSs offer fractional second (1/2 to 1/10) control cycles. However, some DCSs provide interrupt/event-triggered logic for high-speed applications.

PLCs are simple, rugged computers with minimal peripherals and simple OSs. While increasing reliability, PLC simplicity is not conducive to redundancy. Thus, fully redundant ("hot," automatic, bump less) variations of PLCs, with their added hardware and software, sometimes suffer from a reduction in their reliability-a characteristic PLC are famous for.

Data exchange typically requires you to pre-assign data registers and hard code their addresses into the logic.

Typical PLC Relay Ladder Logic (RLL) languages include function blocks that can perform complex control and math functions (e.g., PID algorithms). Complex multi-loop control functions (e.g., cascade management and loop initialization) are not typical. For functions too messy to implement in RLL, most PLCs provide a function block that calls a user-written program (usually in BASIC or C).

PLCs typically operate as "state" machines:

They read all inputs, execute through the logic, and then drive the outputs. The user-written logic is typically one big RLL program, which means you may have to take the whole PLC off-line to make a change of any size.

You also run into database synchronization problems because of the separation of PLCs and the Man Machine Interface (MMI) software packages, as opposed to the central databases of DCSs.

A PLC will run in a stand-alone configuration. A DCS controller normally expects an operator interface and communications, so it can send alarms, messages, trend updates, and display updates.

Many PLC installations use interface software from third-party vendors for improved graphics and various levels of alarming, trending, and reporting. The PLC and MMI software normally interact by sitting on the network and using the register exchange mechanism to get data from and to the various PLCs.

This type of communication presumes you have pre-assigned data registers and can fetch data on an absolute address basis. This can lead to data processing errors (e.g., from the wrong input) you won't encounter with the central database of a DCS.

Some PLCs use proprietary networks, and others can use LANs. Either way, the communication functions are the same-fetch and put registers. This can result in bottlenecking and timing problems if too many PCs try communicating with too many PLCs over a network.

A PLC may have a third-party package for operator interfaces, LAN interface to PCs and peripherals, PLC data highway or bus, redundant controllers with local and distributed I/O, local MMI and local programming capability.

By,
Mr.P.Dheena Dhayalan,
Final Year (MEIEA).

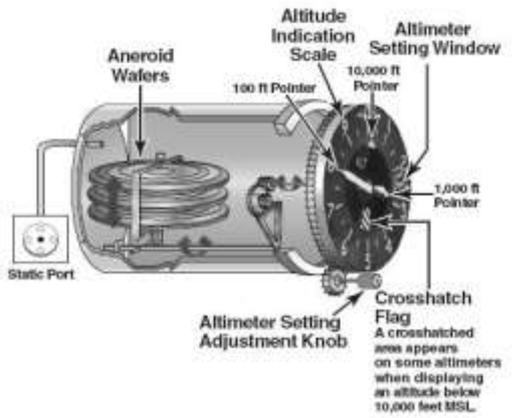
FLIGHT INSTRUMENTS:

Flight instruments are the instruments in the cockpit of an aircraft that provide the pilot with information about the flight situation of that aircraft, such as height, speed and attitude.

The flight instruments are of particular use in conditions of poor visibility, such as in cloud, when such information is not available from visual reference outside the aircraft.

Most aircraft have these flight instruments:

Altimeter:



The altimeter shows the aircraft's height above sea-level by measuring the difference between the pressure in a stack of aneroid capsules inside the altimeter and the atmospheric pressure obtained through the static system.

It is adjustable for local barometric pressure which must be set correctly to obtain accurate altitude readings. As the aircraft ascends, the capsules expand as the static pressure drops therefore causing the altimeter to indicate a higher altitude. The opposite occurs when descending.

Attitude indicator:

The attitude indicator (also known as an artificial horizon) shows the aircraft's attitude relative to the horizon. From this the pilot can tell whether the wings are level and if the aircraft nose is pointing above or below the horizon. This is a primary instrument for instrument flight and is also useful in conditions of poor visibility. Pilots are trained to use other instruments in combination should this instrument or its power fail.

Airspeed indicator:

The airspeed indicator shows the aircraft's speed (usually in knots) relative to the surrounding air. It works by measuring the ram-air pressure in the aircraft's Pitot tube.

The indicated airspeed must be corrected for air density (which varies with altitude, temperature and humidity) in order to obtain the true airspeed, and for wind conditions in order to obtain the speed over the ground.

Magnetic compass:

The compass shows the aircraft's heading relative to magnetic north. While reliable in steady level flight it can give confusing indications when turning, climbing, descending, or accelerating due to the inclination of the Earth's magnetic field. For this reason, the heading indicator is also used for aircraft operation.

For purposes of navigation it may be necessary to correct the direction indicated (which points to a magnetic pole) in order to obtain direction of true north or south (which points to the Earth's axis of rotation).

Heading indicator:

The heading indicator (also known as the directional gyro, or DG; sometimes also called the gyrocompass, though usually not in aviation applications) displays the aircraft's heading with respect to geographical north. Principle of operation is a spinning gyroscope, and is therefore subject to drift errors (called precession) which must be periodically corrected by calibrating the instrument to the magnetic compass.

In many advanced aircraft the heading indicator is replaced by a Horizontal Situation Indicator (HSI) which provides the same heading information, but also assists with navigation

Turn indicator:

The turn indicator displays direction of turn and rate of turn. Internally mounted inclinometer displays 'quality' of turn, i.e. whether the turn is correctly coordinated, as opposed to an uncoordinated turn, wherein the aircraft would be in either a slip or a skid.

The original indicator was replaced in the late 1960s and early '70s by the newer turn coordinator, which is responsive to roll as well as rate of turn, the turn and bank is typically only seen in aircraft manufactured prior to that time, or in gliders manufactured in Europe.

Vertical speed indicator:

The VSI (also sometimes called a variometer) Sense changing air pressure, and displays that information to the pilot as a rate of climb or descent in feet per minute, meters per second or knots.

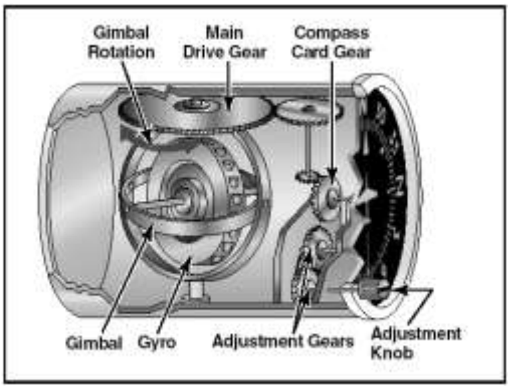
Course deviation indicator:

The CDI is an avionics instrument used in aircraft navigation to determine an aircraft's lateral position in relation to a track, which can be provided by a VOR or a System. This instrument can also be integrated with the heading indicator in a horizontal situation indicator.

Radio Magnetic Indicator:

An RMI is generally coupled to an automatic direction finder (ADF), which provides bearing for a tuned Non-directional beacon (NDB). While simple ADF displays may have only one needle, a typical RMI has two, coupled to different ADF receivers, allowing for position fixing using one instrument.

Heading indicator:



The heading indicator (or directional gyro) is fundamentally a mechanical instrument designed to facilitate the use of the magnetic compass.

Errors in the magnetic compass are numerous, making straight flight and precision turns to headings difficult to accomplish, particularly in turbulent air. A heading indicator, however, is not affected by the forces that make the magnetic compass difficult to interpret.

By,
Mr.P.Vinoth Kumar,
Pre-Final Year (MEIEA).

JAMES TRUCHARD:

Born:

June 25, 1943 (age 67)

Austin County, Texas (USA)

Occupation:

CEO, National Instruments

Spouse(s):

Wanda Inderman

Children:

Michael, John, Anthony, Aimee

Parents:

Joe Truchard and Lillie Schneider

Dr. James Joseph Truchard (born June 25, 1943) is the co-founder and current president and CEO of National Instruments, a company producing automated test equipment and virtual instrumentation software. Truchard is a member of the National Academy of Engineering and the Royal Swedish Academy of Engineering Sciences.

James Joseph Truchard was born in Austin County, Texas, the fourth of seven children born to Joe Truchard and Lillie Schneider. Truchard earned a B.S., and an M.S., in physics, and a Ph.D., in electrical engineering from the University of Texas at Austin. Following his graduation, Truchard worked as managing director of the acoustical measurements division at the U.T.Applied Research Laboratories.

Founding a Company:

After two years of working for U.T., Truchard realized that there was little room for promotion unless one of his coworkers retired. As he often remarks, he "**Didn't see a job I wanted - so I created one**!" Working with colleagues Jeff Kodosky and Bill Nowlin, Truchard was part of a project conducting research for the U.S. Navy that allowed them to use early computer technology to collect and analyze data. Frustrated with the inefficient data collection methods they were using, the three decided to create a product that would enable their task to be done more easily. In 1976, working in the garage at Truchard's home, the three founded National Instruments and began designing an interface board.

The group hired their first employee, Kim Harrison-Hoson in 1977 to process orders and deal with customers. Truchard's job at UT had provided him with some experience in developing products but not with managing employees or a business, so he read many books on the business and management principles in order to learn how to run a company. In 1980, as they reached $300,000 in sales, Truchard was able to leave his job at UT to concentrate on his new company full-time.

In 1986, in conjunction with Kodosky, Truchard played a pivotal role in the development of the LabVIEW graphical development software, which allows scientists to quickly build solutions for their measurement and automation needs.

The graphical programming interface that LabVIEW provided revolutionized the way engineers and scientists worked.

After the release of LabVIEW, the company's future seemed secured. Under Truchard's leadership, NI has seen growth in 29 of its 30 years (as of 2006).

With the goal of balancing the success of customers, employees, shareholders, and suppliers, Truchard has led with a conservative, deliberate approach.

The company focuses on innovation, growth, and expansion and prizes innovation and entrepreneurship, and has been named as one of the *Fortune* "100 Best Companies to Work For" for ten consecutive years (2000-2009).

Affectionately known to his employees as "Dr. T," Truchard insists that he and others in the management structure at NI remain accessible to their employees. Despite his stature as the sole CEO in the company's history, Truchard is still an approachable and down-to-earth individual.

He still drives an old pick up truck to work, where he does not have an assigned parking space. Unless he is scheduled to attend an external business meeting, Truchard wears denim jeans to work every day, and sits in a cubicle in the middle of the 8th floor, where employees are free to walk up and discuss any issues they might have.

Professional Activities and Recognition:

Shortly after the development of LabVIEW, in 1987 Truchard received one of the first Texas High Technology Entrepreneur awards. Twelve years later he was awarded a Texas High Technology Master Entrepreneur of the Year honor.

He was named one of the nation's 50 Best CEOs in three consecutive years by *Worth* Magazine. In 2002, Truchard was inducted into the Electronic Design Engineering Hall of Fame, and the following year he was elected to the Royal Swedish Academy of Engineering Sciences.

He has also been named a University of Texas Distinguished Engineering Graduate, and in 2007 Truchard was elected to the National Academy of Engineering.

Truchard is a member and former chairman of the Engineering Foundation Advisory Council, and is a member of the University of Texas Chancellor's Council. He previously served on the UT Electrical and Computer Engineering Visiting Committee, and was a founding member of the Austin Software Council.

Texas governor Rick Perry appointed Truchard to the state's Advisory Council on the Digital Economy and invited Truchard to chair the Texas Science, Technology, and Math Industry Advisory Council, which seeks to reverse the declining interest of young people in technical careers.

By,
Mr. N.Balasubramaniam,
Final year (MEIEA).

AUTOMATIC ROOM LIGHTS:

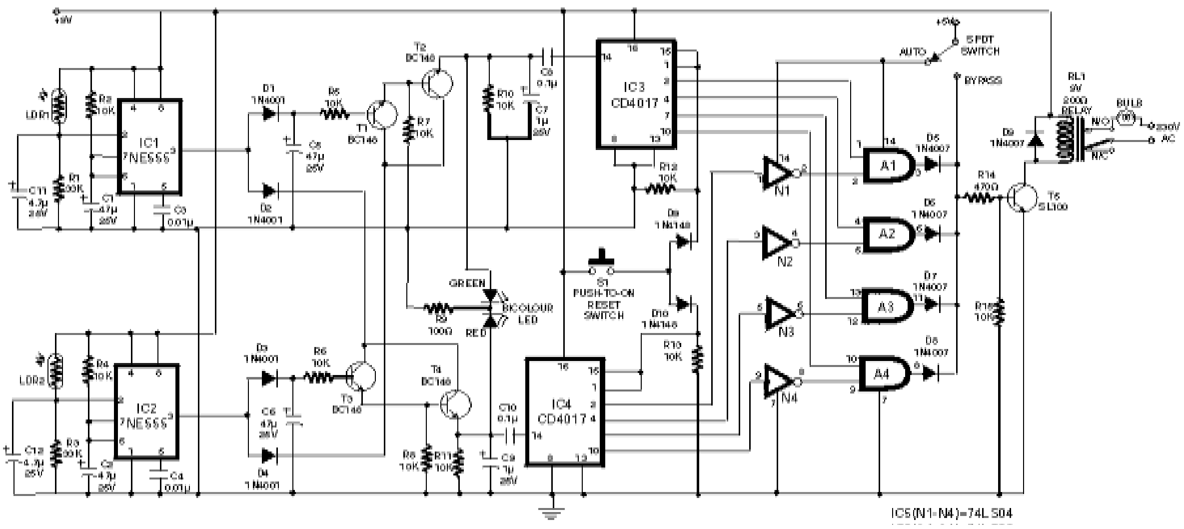
An ordinary automatic room power control circuit has only one light sensor. So when a person enters the room it gets one pulse and the lights come on. When the person goes out it gets another pulse and the lights go off. But what happens when two persons enter the room, one after the other? It gets two pulses and the lights remain in off state.

The circuit described here overcomes the above-mentioned problem. It has a small memory which enables it to automatically switch on and switch off the lights in a desired fashion.

The circuit uses two LDRs which are placed one after another (separated by a distance of say half a meter) so that they may separately sense a person going into the room or coming out of the room.

Outputs of the two LDR sensors, after processing, are used in conjunction with a bicolor LED in such a fashion that when a person gets into the room it emits green light and when a person goes out of the room it emits red light, and vice versa.

Circuit diagram:



The next stage comprises two logic ICs which can combine the outputs of the two counters and determine if there is any person still left in the room or not.

The sensors are installed in such a way that when a person enters or leaves the room, he intercepts the light falling on them sequentially one after the other. When a person enters the room, first he would obstruct the Light falling on LDR1, followed by that falling on LDR2.

When a person leaves the room it will be the other way round. In the normal case light keeps falling on both the LDRs, and as such their resistance is low (about 5 kilo-ohms). As a result, pin 2 of both timers (IC1 and IC2), which have been configured as monostable flip-flops, are held near the supply voltage (+9V).

When the light falling on the LDRs is obstructed, their resistance becomes very high and pin 2 voltages drop to near ground potential, thereby triggering the flip-flops.

Capacitors across pin 2 and ground have been added to avoid false triggering due to electrical noise. When a person enters the room, LDR1 is triggered first and it results in triggering of monostable IC1.

The short output pulse immediately charges up capacitor C5, forward biasing transistor pair T1-T2. But at this instant the collectors of transistors T1 and T2 are in high impedance state as IC2 pin 3 is at low potential and diode D4 is not conducting. But when the same person passes LDR2, IC2 monostable flip-flop is triggered. Its pin 3 goes high and this potential is coupled to transistor pair T1-T2 via diode D4.

As a result transistor pair T1-T2 conducts because capacitor C5 retains the charge for some time as its discharge time is controlled by resistor R5 (and R7 to an extent). Thus green LED portion of bi-color LED is lit momentarily. The same output is also coupled to IC3 for which it acts as a clock.

With entry of each person IC3 output (high state) keeps advancing. At this stage transistor pair T3-T4 cannot conduct because output pin 3 of IC1 is no longer positive as its output pulse duration is quite short and hence transistor collectors are in high impedance state.

When persons leave the room, LDR2 is triggered first followed by LDR1. Since the bottom half portion of circuit is identical to top half, this time with the departure of each person The net effect is that when persons are entering, the output of at least one of the AND gates is high, causing transistor T5 to conduct and energize relay RL1.

The bulb connected to the supply via N/O contact of relay RL1 also lights up. When persons are leaving the room, and till all the persons who entered the room have left, the wired OR output continues to remain high, i.e. the bulb continues to remains on, until all persons who entered the room have left.

The maximum number of persons that this circuit can handle is limited to four since on receipt of fifth clock pulse the counters are reset.

The capacity of the circuit can be easily extended for up to nine persons by removing the connection of pin 1 from reset pin (15) and utilizing Q1 to Q9 outputs of CD4017 counters. Additional inverters, AND gates and diodes will, however, be required your hand with this design that projects the buttons with holograms onto your palm.

The number buttons are specifically projected onto the inside of your fingers so that they are separated by your knuckles.

The unique palm phone design is a concept only at this stage - but as the next best thing to surgical implantation of your phone to your palm

REFERENCE: www.efy.com

By,
Mr.R.Sathish Kumar,
Final Year (MEIEA).

PRODUCTS:

AirPod - Car Runs On Air:

Guy Nègre, a former aeronautics and formula one engineer is hoping to change all that. He has invented a compressed air technology for cars.

The AirPod is a small four-wheel mini-car that uses compressed air to move pistons in a ***5.45 hp*** internal combustion engine. It has a range of ***60 miles*** on a single tank of air and uses a small motor to compress outside air to keep the tank full.

The compressor can operate on gasoline, diesel, biodiesel, ethanol or vegetable oil, but can also be plugged into an electrical outlet for recharging. With regular gasoline fueling the compressor, the Airpod averages an amazing 106 mpg with a range of 800 miles.

With the demand for inexpensive, user friendly, ultra high mileage vehicles that have zero emissions related to global warming the Airpod is getting a lot of attention.

Air France and KLM airlines are using AirPods to transport passengers between arrival and departure gates at airports in Paris and Amsterdam. Automaker, Tata Motors has purchased the manufacturing rights for India.

Wind Turbines:

The Bahrain World Trade Center is the first skyscraper to have wind turbines integrated into the structure of the building.

Three large wind turbines are suspended between two office towers. The towers are aerodynamically tapered to funnel wind and draw air into the turbines. This airfoil tapering allows the wind to enter the turbines at a perpendicular angle and increases air speed as much as 30 percent in each of the 95 ft wide turbine rotors. The turbines supply about 15 percent of the electricity used by the skyscraper

Transparent electronics:

Inventors, Jung Won Seo, Jae-Woo Park, Keong Su Lim, Ji-Hwan Yang and Sang Jung Kang, who are scientists at the Korean Advanced Institute of Science and Technology, have created the world's first transparent computer chip. The chip, known as (TRRAM) or transparent resistive random access memory, is similar to existing chips known as (CMOS) or metal-oxide semiconductor memory, which we use in our electronic devices. The difference is that TRRAM is completely clear and transparent. This technology is expected to be available within 3 to 4 years.

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Aptitude and Technical questions

1. In 10 years A will be twice as old as B was 10 years ago. If A is 9 years older than B, the present age of B is:
(A) 19 years (B) 29 years
(C) 39 years (D) 49 years

2. Kunal bought a suitcase with a 15% discount on the labeled price. He sold the suitcase for Rs. 2880 with 20% profit on the labeled price. At what price did he bought the suitcase?
(A) Rs. 2040 (B) Rs. 2400
(C) Rs. 2604 (D) Rs. None of this

3. The fourth proportional to 5,8,15 is:
(A) 18 (B) 24
(C) 19 (D) 20

4. Which of the following ratio is the greatest?
(A) 7:15 (B) 15:23
(C) 17:5 (D) 21:29

5. The last day of century cannot be
(A) Monday (B) Wednesday
(C) Tuesday (D) Friday

6. Sachin is younger than Rahul by 4 years. If their ages are in the respective ratio of 7:9, how old is Sachin?
(A).16 years (B).18 years
(C). 28 years (D). None of these

7. In a game of 100 points A can give B 20 points and C 28 points. Then, B can give C:
(A) 8 points (B) 10 points
(C) 14 points (D) 40 points

8. How many cubes of 10 cm can be put into a cubical box of 1 m edge?
(A) 10 (B) 100
(C) 1000 (D) 1000

9. In a 200 m race, A can beat B by 31m and C by 18 m. In a race 0f 350m, Can beat B by:
(A) 22.75 m (B) 25 m
(C) 19.5 m (D) 55.14 m

11. A farmer built a fence around his seventeen cows, in a square shaped region. He used 27 fence poles on each side of the square. How many poles did he need altogether?

12. What is the highest number that can be expressed in three figures?

13. What is the square of a natural number that is square of some other natural number?

14. 12 and 21 are numerical reversals of each other so are the squares of each of these numbers; 144 and 441. How many more numbers can you think of which have this property?

15. Here is a logical pattern:
O.T.T.F.F.S.S.E.N
What are the next nine letters?

PHOTO FIND

Clue: He is an Indian scientist worked with Albert Einstein, Madam Curie and other scientists of world renown.

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