



TRANSMITTER DECEMBER

2016



PRAXAIR Technology Center

This tour of the Praxair Technology Center (PTC) will highlight some of the work that is taking place at the Praxair Tonawanda location.

Praxair, Inc. is a leading industrial gas company in North and South America and one of the largest worldwide. Praxair has 26,000 employees in more than 50 countries with about 10,000 employed in the US. More than 1,200 Praxair engineers, scientists and support staff associates work at the PTC in Research and Development, Logistics, Operations, Global Engineering & Procurement and North America Project Execution.

Innovations in supply systems, operations and applications are essential to maintain Praxair's position as a



Sight Tour

January 23rd, 2017

Tonawanda NY

leading industrial gas company. Participants of the tour will be introduced to Productivity and Global Analytics R&D and Combustion R&D as an example of Praxair's productivity improvement and industrial gas application research, respectively.

A visit at the IMPAC (International Monitoring and Production Assistance Center) will showcase state-of-the-art remote monitoring and control of Praxair's North America on-site production facilities. IMPAC operates a unique and highly sophisticated computerized communications and plant control network that connects to several hundred on-site production plants around the country. It delivers immediate access to those plants and monitors deviating performance and allows taking corrective action, if necessary. Being able to monitor plant performance, unscheduled shutdowns are avoided, providing a very high standard of supply reliability.

The hosts for the plant visit are R&D Directors Dr. Stefan Laux and Dr. Larry Megan. More detail in the January **ISA Transmitter and the Section emails.**



2016-17 Section Calendar

<i>Annual Golf Outing</i>	<i>September 19, 2016</i>	<i>Diamond Hawk Golf Course</i>
<i>Membership Appreciation Family Event</i>		
<i>NEW Niagara Power Vista</i>	<i>October 24, 2016</i>	<i>5777 Lewiston Road, Lewiston NY</i>
<i>Calspan Corporation</i>	<i>November 14, 2016</i>	<i>4455 Genesee St, Buffalo NY</i>
<i>Wind Tunnel & Automotive Testing</i>	<i>5:00pm—6:30pm dinner following at Danny's by the Airport</i>	

Professional Society Holiday Social

Gordon Biersch

December 15, 2016

Walden Galleria Mall



<i>Praxair</i>	<i>January 23, 2017</i>	<i>East Park Drive</i>
<i>Research & Development</i>	<i>5:00pm</i>	
<i>Tech EXPO 2016</i>	<i>April 4, 2017</i>	<i>Marriott Inn</i>
<i>Expo Educational Seminars</i>	<i>April 4, 2017</i>	<i>Marriott Inn</i>
<i>2017 Annual Golf Outing</i>	<i>September 19, 2016</i>	<i>Diamond Hawk Golf Course</i>

Professional Development Hours (PDH) credit

- Available for most Technical Seminars and Technical Tours
- Additional credit is available for those who would like to present or facilitate an Event

Ideas and suggestions for tours and seminars include:

Steuben	Sumotoma/Dunlop
NY Beer Project	Ward Pumping Station
Pierce-Arrow Museum	

For more information, contact Joe Cipriani at: Joe.Cipriani@Emerson.com.
Reserve your place (s) at: www.isa-niagara.org

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Which is your favorite?

Of course, it's

Raspberry Pi



VS



Raspberry Pi is an ARM credit card size SBC (Single Board Computer) developed by Raspberry Pi Foundation. Raspberry Pi runs a Debian GNU/Linux based operating system called Raspbian, however, many other OS exist for this SBC. The newest version of this SBC is Raspberry Pi 3 Model B. The size of the board is that of a credit card with WiFi/Bluetooth HDMI display interface. It has a Broadcom BCM2837 64-bit processor with a quadcore ARM Cortex-A53 CPU core. Practically a super computer - all for a price tag of \$ 35.00.

An Introduction:

Since 2013 about 8 million Raspberry Pi computers were sold. Why the name 'Raspberry'? - Well, the name 'Apple' was already taken. There are other small SBC computers on the market but not at this compactness, performance and price. The Raspberry Pi was developed and built as a low-cost board to help and encourage the understanding, learning and continued study of computing in schools.

he can perform in space.

The University of Southampton put together 64 Raspberry Pi's to build their own supercomputer! Each Pi has a 16GB memory card, making it a 1TB supercomputer. It was put together using LEGO pieces.

There are many already prepared kits available for the Raspberry Pi, one of them is a ready to use camera module. The lens is priced at about \$ 25. Most kits supply a 32 GB MicroSD Card with the NOOBS (New Out Of the Box Software) operating system on it. This is a memory card disk image that features a whole range of OS options for Pi, including Raspbian.

Raspbian is the Raspberry Pi Foundation's official operating system.

As mentioned, memory is provided by SD SDHC cards. Usually 32 GB, but cards with a capacity of 256 GB are available. These cards can be purchased from the Raspberry Pi Store preinstalled with the latest Raspbian image. This includes the typical Linux tools and editors, GNU C and C++ compilers, and the SSH server, which launches on boot by default.

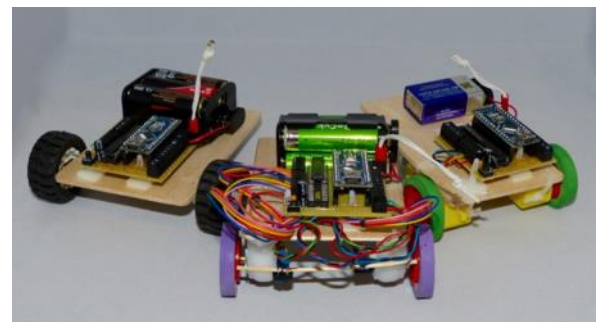
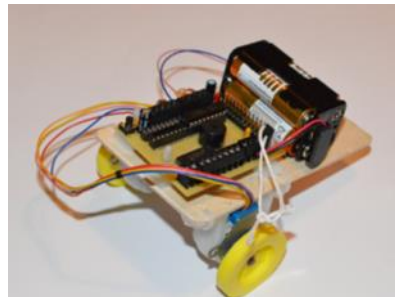
The programs can be downloaded using your computer.

I wonder if you would like to build your very own computer system. With a memory card, a break-out box, a key board and a mouse the cost is less than \$ 100. There is no limit to the possibilities and you may learn Linux programming in the process. Because the SBC is very popular in the education field, program snippets are available for hundreds of applications. Interested????

For more on the Raspberry Pi see:

<https://www.raspberrypi.org/forums/viewtopic.php?f=68&t=26452>

<https://www.raspberrypi.org/help/faqs/#glossarysoc>



Board	Raspberry Pi 3 Model B	Wireless	802.11n WiFi, BlueT. 4.1
Processor	Broadcom BCM2837	USB Ports	4xUSB 2.0
CPU Core	Quad Core, 64 bit	GPIOs	2x20 Pin Header
Clock Speed	1.2 GHz	Camera Interf.	15 Pin MIPI
Ram	1 GB (32GB installed)	Display Interf.	DSI 15Pin/HDMI Out
GPU	400 MHz, Video core IV	Power Requ.	2.5 Amps
Network	1x10/100Ethernet	USB draw	1.2 Amps
Size	2.56" x 1.18" x 0.20"	BB use	400 mA

It is, however, available to anyone who wants to learn.

The Raspberry Pi has won hearts across the globe, from astronauts to hobbyists. In fact, right now, there are two Raspberry Pi's orbiting the earth, conducting experiments aboard the International Space Station. British astronaut Tim Peake is heading the Astro Pi project, challenging UK school students to write code for experiments that



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Get an Energy Audit

An energy audit entails a series of tests, including the blower door pressure test (shown), that tell you the efficiency of your heating and cooling system and the overall efficiency of your home.

A basic part of an energy audit is the blower door test. The auditor closes all the doors and windows and then places a blower fan in a front or back door.



Finding Air Leaks

Locating air leaks can be tricky. They're often so small as to be hardly noticeable. To find them, follow a trail of smoke.

Close all the windows in the house, turn off all the fans and exhaust fans, and shut off the furnace. Light some incense and walk slowly around the outer walls of the house. Anywhere you notice the smoke blowing away from something or being sucked toward something, there's probably an air leak



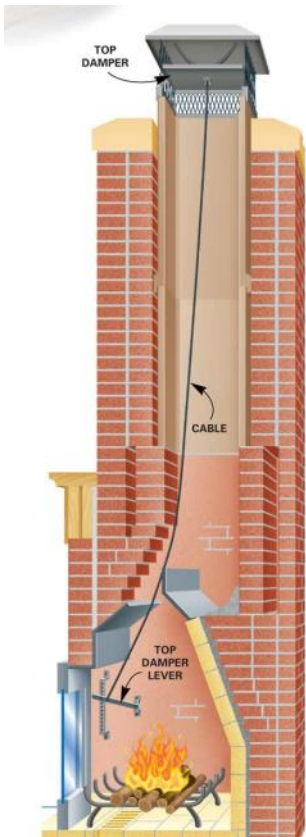
Stop Airflow Up the Chimney

Fireplace chimneys can be very inefficient, letting your warm inside air disappear like smoke up a chimney. If you have airtight glass doors that seal the opening, you're in good shape. (The doors are available at fireplace retailers and home centers.) If not, a special balloon or chimney-top damper will get the job done.

For fireplace chimneys that are seldom or never used, inflate a Chimney Balloon inside the chimney to stop the air leaks. Buy it directly from the company. Partially inflate the balloon by mouth or with a pump, then stick it into the chimney and blow it up the rest of the way.

Putting in and taking out the reusable balloon can be messy, so you don't want to hassle with chimney balloons if you regularly use your fireplace. But that doesn't mean you have to settle for energy loss. Instead, you can install a chimney-top damper system, like the Chim-a-lator, which seals the top of the flue when the chimney's not in use. A lever in the fireplace controls the damper via a long cable.

Installation involves attaching the damper and screened-in cap to the chimney top, then mounting the lever in the fireplace. If you don't feel comfortable working on the roof, hire a chimney sweep or mason, who can install the system for you.




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Change Furnace Filter & Save up to \$60 a Year

Keeping your furnace (gas or electric) tuned up has two big benefits: It makes the furnace run efficiently and it prolongs the furnace's life span. And you can perform the annual tune-up yourself in about three hours

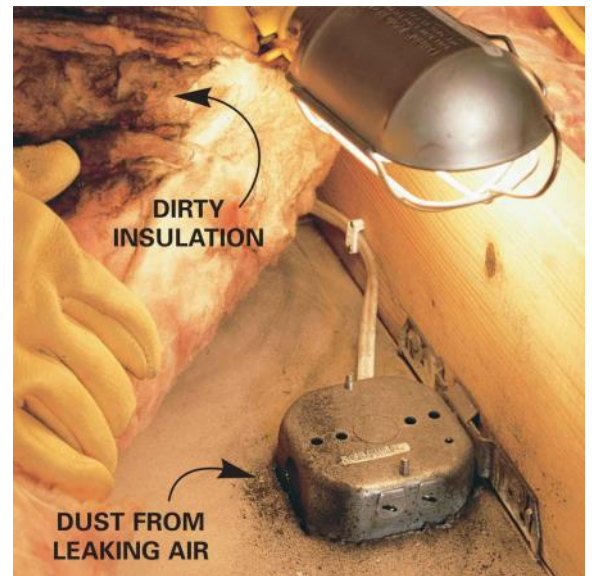
Change the filter every month of the heating season (or year-round if the filter is also used for A/C). Be sure you insert the new one so it faces the right way. The filter protects the blower and its motor; a clogged filter makes the motor work harder and use more power.

How to Find the Gaps

Before you crawl into your attic, make a rough sketch of the floor plan and the ceiling below the attic. Sketch in the walls, the chimney, the main plumbing stack, ceiling electrical fixtures and lower sections of ceiling. They all have high leak potential, and your sketch will help you find them when you're in the attic.

To help generate actual leakage, place a box fan in a window so it blows air into the house. Then close all other windows and doors. Tape cardboard around the fan to eliminate large gaps. When you turn the fan on high, you'll slightly pressurize the house, just like an inflated balloon. Then when you're in the attic (with the hatch closed), you can confirm a leaky area by feeling the air coming through. You may even spot the insulation blowing in the breeze.

Another helpful sign is dirty insulation (photo above). Insulation fibers filter the household air as it passes, leaving a dirt stain that marks the leaky area.



Clean Out the Lint for Dryer Efficiency and Save up to \$25 a Year

A clogged lint screen or dryer duct drastically reduces the efficiency of your dryer, whether it's gas or electric. Clean the lint screen after each load and clean the exhaust duct once a year. The Lint eater (shown) has an auger brush that attaches to a drill to clean out the ducts.



Electric dryers use about \$85 of electricity annually. A dirty lint screen can cause the dryer to use up to 30 percent more electricity, according to the Consumer Energy

Center. Lint buildup is also a common cause of fires.

Dry loads of laundry back-to-back so the dryer doesn't cool down between loads (a warm dryer uses less energy). And only run the dryer until the clothes are dry. Overdrying damages your clothes and runs up your electric bill. If you're in the market for a new dryer and already have a gas line in the house, go with a gas dryer. A gas dryer is more efficient.



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Replace Your Weather Strip

Older wood doors usually rely on a non-adjustable threshold to keep the weather out. If your old door doesn't seal tight against the threshold, you're wasting energy. You could screw a surface-applied weather strip to the face of the door, but a door-bottom weather strip is a less obtrusive way to create a good seal.

The door bottom we're using is available at most home centers and hardware stores. If you can't find a door bottom that's smooth on one side, you can slice off the barbed flanges from bottoms designed for steel or fiberglass doors.

Cut the bottom of the door to allow enough (but not too much) clearance to install the new door bottom. The goal is to create an even 3/8-in. space between the top of the existing threshold and the bottom of the door. Close the door and meas-



ure the largest gap between the door and the threshold. If the gap is less than 3/8 in., calculate how much you'll have to cut off the bottom to equal 3/8 in. Mark this distance on the door at the point you measured. Then use a scribing tool to extend a mark across the bottom of the door.



Remove the hinge pins and move the door to a set of sawhorses. Mount a sharp blade in your circular saw and cut along the line. Protect the surface of the door with masking tape. If you have a veneered door, score along the line with a sharp utility knife before sawing it to avoid chipping the veneer.

Cut the door-bottom weather strip about 1/8 in. shorter than the width of the door and tack it to the bottom of the door with a staple gun. Rehang the door to test the fit. If it's too snug, remove the weather strip and trim a bit more from the door. When the fit is perfect, remove the staples and mount the weather strip.

Seal a Drafty Window

Weather stripping often becomes loose, worn or distorted when the sash drags or when the strip gets sticky and attaches itself to the frame, then pulls loose when the sash is opened. Windows have weather strip on the sash, frame or both. Regardless of its location, the steps for removing and replacing it are the same. Weather stripping is available from your window manufacturer or online. The window brand and glass manufacturer date are etched in the corner of the glass or in the aluminum spacer between the glass panes. You'll also need the height and width of your sash (take these measurements yourself).

If the weather strip is in good shape and loose in only a few places, like the corners, apply a dab of polyurethane sealant to the groove and press the weather strip into place. Otherwise, replace the entire weather strip. First remove the sash and set it on a work surface so you can access all four sides. If the weather strip is one continuous piece, cut it apart at the corners with a utility knife.

Starting at a corner, pull the weather strip loose from the sash. If the spline tears off and remains stuck in the groove, make a hook from stiff wire to dig it out.

Work the new weather strip into the groove, starting at a corner. You'll hear it click as the strip slides into the groove.



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AutoQuiz:

How Do You Avoid a Ground Loop on Shielded Cable?



Today's automation industry quiz question comes from the ISA [Certified Control Systems Technician \(CCST\) program](#). Certified Control System Technicians calibrate, document, troubleshoot, and repair/replace instrumentation for systems that measure and control level, temperature, pressure, flow, and other process variables. This question comes from the Level I study guide, Domain 3, Troubleshooting. Level I represents a professional who has a five-year total of education, training,

A ground loop on shielded cable can be avoided by:

- a) attaching a safety ground to the instrument casing
- b) grounding the shield at only one end of the circuit
- c) attaching a safety ground to the control panel
- d) grounding the shield at both ends of the cable
- e) none of the above

See page 11 for answer

AutoQuiz:

What Does the Function of the Preset Value Determine in a PLC Timer?

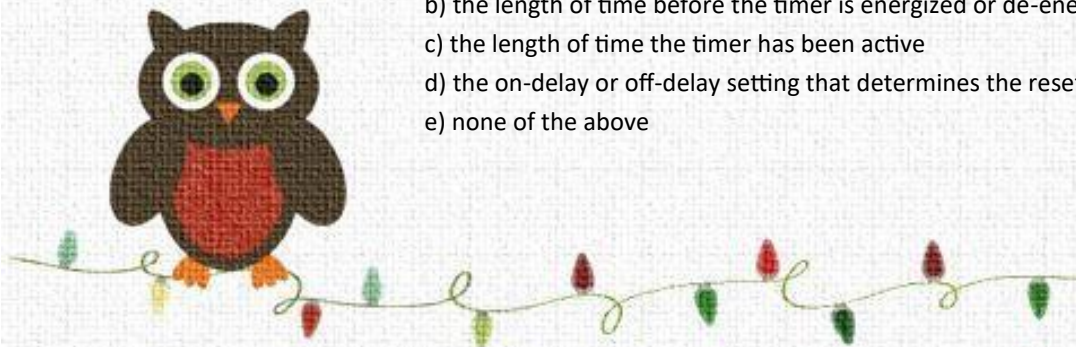


Today's automation industry quiz question comes from the [ISA Certified Automation Professional certification program](#). ISA CAP certification provides a non-biased, third-party, objective assessment and confirmation of an automation professional's skills. The CAP exam is focused on direction, definition, design, development/application, deployment, documentation, and support of systems, software, and equipment used in control systems, manufacturing information systems, systems integration, and operational consulting. The following question comes from the CAP study guide, Performance Domain IV, Development.

In a typical PLC timer, what does the function of the preset value determine?

- a) the resolution of the time base such as 1/10 sec or 1/100 sec
- b) the length of time before the timer is energized or de-energized
- c) the length of time the timer has been active
- d) the on-delay or off-delay setting that determines the reset of the timer
- e) none of the above

See page 11 for answer



How Cloud Computing Delivers a New Industrial Automation Tool for Improving Operations

This excerpt from [InTech magazine](#) was written by [Bill Lydon](#), InTech's chief editor.

The terms “cloud” and “cloud computing” have become popular, particularly in discussions about the Internet of Things (IoT). Cloud computing is now being discussed as a technology beneficial for industrial automation.

The origin of the term cloud computing is unclear. In some sense, it is descriptive of something off in the distance over the Internet—but we are not sure where or what is storing information and performing computing. Some claim the term was used in internal documents at Compaq Computer in 1996. Others suggest the term was first commercially used in 2006 when Google and Amazon began using “cloud computing” to describe the new approach to access software, computer power, and files over the Web instead of from local servers or a desktop computer. Whatever the history, cloud computing, or *cloud* for short, is now a common term. Pictures of local computers networked to the image of a cloud in presentations and literature have become popularized.

The National Institute of Standards and Technology (NIST) defines the term as, “Cloud computing is a model for enabling convenient, on-demand network access to a shared pool of configurable computing resources (e.g., networks, servers, storage, applications, and services) that can be rapidly provisioned and released with minimal management effort or service provider interaction.” NIST also defines essential characteristics of cloud computing:

On-demand self-service

A user can unilaterally provision computing capabilities, such as server time and network storage, as needed automatically without requiring human interaction with each service provider.

Broad network access

Capabilities are available over the network and accessed through standard mechanisms (i.e., Web services) that promote use by various platforms (e.g., mobile phones, tablets, laptops, and workstations).

Resource pooling

The cloud provider’s computing resources are pooled to serve multiple consumers using a multi-tenant model, with different physical and virtual resources dynamically assigned and re-assigned according to user demand. There is a sense of location independence in that the customer generally has no control over

or knowledge of the exact location of the provided resources. Examples of resources include storage, processing, memory, and network bandwidth.

Rapid elasticity



Capabilities can be automatically provisioned and scaled to rapidly meet computing and storage needs based on user demand. To the user, the capabilities available often appear to be unlimited and can be appropriated in any quantity at any time.

Measured service

Cloud systems automatically control and optimize resource use by leveraging a metering capability at some level of abstraction appropriate to the type of service (e.g., storage, processing, bandwidth, applications, and active user accounts). Resource use can be monitored, controlled, and reported, providing transparency for both the provider and consumer of the utilized service.

Remote computing power and storage

With a fast Internet or intranet connection, cloud computing provides virtually unlimited storage and powerful computing resources without the cost and maintenance of owning powerful computers and vast storage locally. This approach achieves economies of scale with shared resources that deliver powerful computing power and massive storage on demand in secure remote data centers with redundancy and power backup. Companies only pay for what they need without a fixed investment in dedicated hardware or the ongoing cost of software administration, maintenance, and upgrades. In contrast, on-site data centers are capital intensive and have a significant physical foot-

(Continued on page 10)



(Continued from page 9)

print, requiring allocations of space, hardware, environmental controls, and support staff. These assets have to be refreshed periodically, resulting in additional capital expenditures.

Another big advantage of cloud computing is it enables mobility, because it is device and location independent. Users can access systems with a Web browser regardless of their location or the device they use (e.g., PC, tablet, smartphone). Google Search is a good example that is a special case of cloud computing financed by advertising. For example, I just searched Google for the term, "cloud computing" on my notebook, and it returned about 136,000,000 results in 320 milliseconds from servers throughout the Internet.

Cloud computing also focuses on maximizing the effectiveness of the shared resources. Cloud resources are typically shared by multiple users and are dynamically reallocated to meet user demand. The advantage is better utilization of cloud computers. For example, a cloud computer facility that serves European users during European business hours may reallocate the same resources to serve North American users during North America's business hours with a different application. This strength is also a reason cloud computing is not suitable for real-time control applications where availability is essential.



About the Author

Bill Lydon is chief editor of [InTech magazine](#). Lydon has been active in manufacturing automation for more than 25 years.

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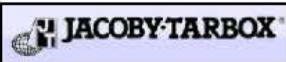
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AutoQuiz Answers: from page 8

CCST Level I study guide, Domain 3, Troubleshooting :

A ground loop refers to an unwanted electrical current in a conductor connecting two points that are supposed to be at the same potential (units are volts), but that are actually at different potentials (not grounded). Ground loops are detrimental to the intended operation of the electrical system.

Potential is the difference in voltage between two points. One of the points should be a ground with voltage equal to 0 (zero).

The best way to avert the ground loop in this question is to ground the shield at only one end of the circuit.

The correct answer is B.

CAP study guide, Performance Domain IV, Development :

A timer preset is a programming value for the timing function. The resolution of the time base relates to accuracy. The length of time before the timer is energized or de-energized is a timer function.

The best answer is B, the length of time before the timer is energized or de-energized.



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