• Rowe Electronics
• Heroes Hired Manufacturing
• Building Things to Last
• Anatomy of a Sale
• Cirris Celebrates Employee Ownership
• Wire Wisdom - American Wire Gauge



Heroes Hired Manufacturing

By Fred Noer

Forys, owners of Heroes Hired Manufacturing, building military veterans' self-esteem is as important as building wiring harnesses, cable assemblies and control panels.

The two men, both veterans, are building their new company, located in Shelby Township, Mich., in the Detroit metropolitan area, on the following concept:

"Our mission is to provide a positive difference in the lives of veterans with service-related disabilities. This will be achieved through training, education and employment based on their abilities. Heroes Hired Manufacturing is committed to providing its customers with unsurpassed quality workmanship. It will create self-esteem, responsibility, prosperity and a rewarding new life for our disabled heroes."

Schaffer, 45, hit on the idea for Heroes Hired Manufacturing (HHM) when he was photographing the wedding of a disabled veteran in his mid-20s in November 2012. Schaffer, who has been interested in photography more than 25 years, had a part-time photography business until going full time in January 2009. With the start of HHM, he has discontinued the profession.

Rowe Electronics

From Contract Manufacturer to Proprietary Product

By Joe Tito Wiring Harness News

ricle for a long time, but I was waiting for the main ingredient to come my way. I've worked with many contract manufacturers, both in the wire harness industry, and other disciplines. Many of the same grumblings can be heard about hills and valleys, and the customers' increasingly stringent requests. It can be a juggling act managing varying pressures on pricing, packaging, terms, etc. These conversations often end with some version of the following statement: "I sure wish we had a product line to fall back on."

Recently, I found a company who did just that, and their story was compelling.

I scheduled a chat with Steve Rowe, CEO, Blake Costello, Key Accounts Manager, and Larry Penner, Business Manager, of Rowe Electronics in Norwalk, Iowa. We discussed their genesis as a harness manufacturer, and how they developed the PDM60 Power Distribution Module.

Humble Beginnings

Steve Rowe began his career in the agriculture business. Equipment efficiency and safety concerns led him to seek remote control solutions. "I couldn't find anything on the market that fit the budget," he noted, "so I sought the help of an electronics tech to help me build my own using a commercial garage door opener, and some supporting components." Steve didn't have much time to react when others in the industry began to enquire, but when his business partner sold his half of their business, Steve heard the call. Looking for another career path in 1997, Steve decided to

__Continued on page 19



Crazy Diamond Performance (CDP) builds hot rods and custom engines. Above is the front view of an engine harness that HHM made for one of CDP's hot rods.

Concerned about the groom's future and other veterans' plights, Schaffer talked to Forys, 65, about starting HHM, and it was founded a month later. In January a 2,500-square-foot space in an industrial park was leased, and by mid-July the firm opened for business. When the groom completes rehabilitation of his severe war-related injuries, he will become an HHM employee.

"Our ultimate goal is to branch out and have facilities in different states,"

Schaffer said. "Then we can hire not just from the Michigan vets pool but vets from all over."

The unique business model, perhaps like no other company in the wiring harness industry, fits with Schaffer's and Forys' backgrounds. Schaffer spent five years in the U.S. Marine Corps after graduating from high school. He suffered a disability while in the Marines.

_Continued on page 28

Cirris Celebrates Employee Ownership

We're Connected" reads the banner in the foyer of the Cirris headquarters. Covered in brightly colored handprints of Cirris employees, one might mistake it for a grade school project. However, their banner holds a lot of symbolism.

During September, Cirris officially

became 100% employee-owned. Cirris held a party at the Cirris Headquarters to celebrate their ESOP (Employee Stock Ownership Plan) status. The employees all dipped their hands in paint and stamped their handprints on the banner,

__Continued on page 16



Cirris employees all dipped their hands in paint and stamped their handprints on the banner, signifying that they are connected in their work together, they each hold ownership in the company, and they are giving a big high five to acknowledge it!

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Heroes Hired Manufacturing

To Todd Schaffer and Mal Forys, owners of Heroes Hired Manufacturing, building military veterans' self-esteem is as important as building wiring harnesses, cable assemblies and control panels.

Rowe Electonics

From Contract Manufacturer to Proprietary Product.

Cirris Celebraates **Employee Ownership**

During September, Cirris became 100% employee-owned. Cirris held a party at the Cirris headquarters to celebrate their ESOP (Employee Stock Owners Plan) status.

Building Things to

Building something to last requires two things more than anything else; it requires 'vision' and 'values'.

News Plugs

Read about the latest products on the market and points of interest about companies and people in the industry.

Anatomy of a Sale

Exactly what does the process of selling a company look like?

Wire Wisdom

Anixter's Wire Wisdom discusses the American Wire Gauge (AWG), also known as the Brown & Sharpe Gage, the United States' standard method for denoting the cross-sectional areas of round, solid conductors.

Looking Forward

The benefits of networking your wire processing equipment.

Classified

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<u>Issue</u>	Reservations Due Date	Materials <u>Due Date</u>
January/February 2014	December 6, 2013	December 13, 2013
March/April	February 7, 2014	February 14, 2014
May/June	April 4, 2014	April 11, 2014
July/August	June 6, 2014	June 13, 2014
September/October	August 1, 2014	August 8, 2014
November/December	October 3, 2014	October 10, 2014
January/February 2015	December 5, 2014	December 12, 2014

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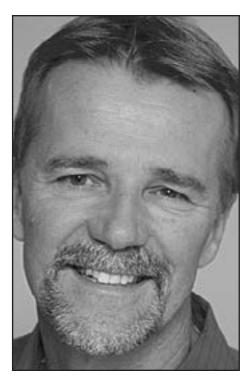


Building Things to Last

By Paul Hogendoorn

ast month, I found myself in my old neighbourhood, with a couple of hours to spare between appointments. I hadn't been back in about 20 years, and it was now over forty years since I lived there. Some things had certainly changed, but other things were exactly the same.

The neighbourhood I lived in was built around 1960, the beginning of the suburban expansion. Long straight roads were replaced with crescents and culde-sacs and streets with random corners and T intersections. There were many different styles to choose from, including side splits and back splits. Schools were strategically planned into these neighbourhoods, as were green spaces and parks. The house I grew up in was a side split, with a school across the street from it and a creek and green space passing by behind it. Forty years ago, it was a great place to grow up, and on my recent visit, I discovered it still was. The school across the street was actually being expanded and I saw mothers out walking their kids in strollers. There were kids playing in the park and all the houses were well maintained - most had cosmetic upgrades, a few had major ren-



Paul Hogendoorn

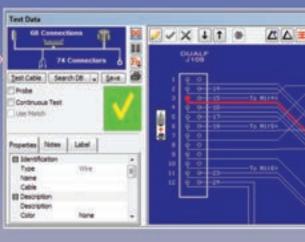
ovations, but some looked exactly the same.

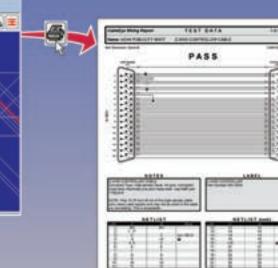
I visited my old high school next. When I first started going there, it was a small 8 or 10 classroom building, built by a generation of Dutch immigrants that wanted something better for their kids. Into my second year there, they expanded and added 4 new classrooms. Since that time, they've expanded many

_____Continued on page 7











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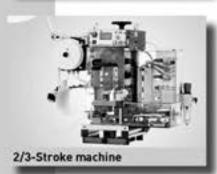
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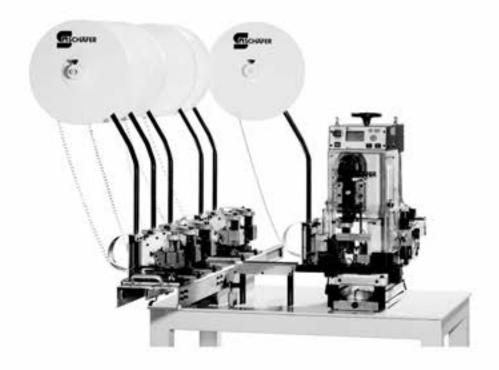












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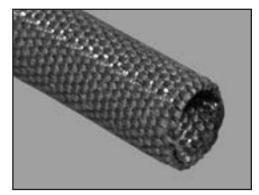
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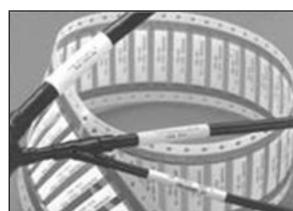


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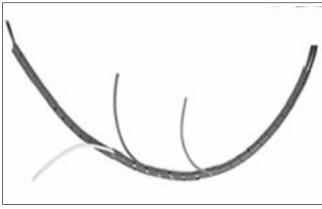


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Building Things to Last

Continued from page 4

more times as the building is now probably 3 times the size it was when I finished there. But, what really caught my attention was the sports field behind the school. The school was built on a sloping property, and there was no sports field when I began grade 9 there. For phys-ed, the entire class would often jog enmasse to a public park a couple kilometers away. The student council of that day (of which I was proud to have been elected grade 9 rep) decided that a new sports field would be a worthy objective for us to strive to achieve, and so we set out to do exactly that. Fund raising activities included a 30 mile walkathon, and we encouraged each other to reach outside of our Dutch immigrant community and into the community at large. As a student body, we were successful at raising the necessary funds, and with the support of staff (and probably parents too), we hired the right contractors to reshape the property and make a level sports field (with natural bleachers), and to purchase all the fixtures and equipment needed for the sports programs. Forty years ago, it was a tremendous achievement for the students of the day. The student body worked together, the community at large was engaged, and a new sports field was built. Forty years later, the field still looks great, although

now it likely serves a student body 4 or 5 times larger.

I was thinking about these things on my drive back to London. What makes a neighbourhood great? What makes a school great? And most importantly, what makes them stand the test of time and remain great forty years later? (After all, time is probably the ultimate test of greatness - we often ask if something can "stand the test of time".) The same questions apply to the companies we build - what makes them great, and, can they stand the test of time?

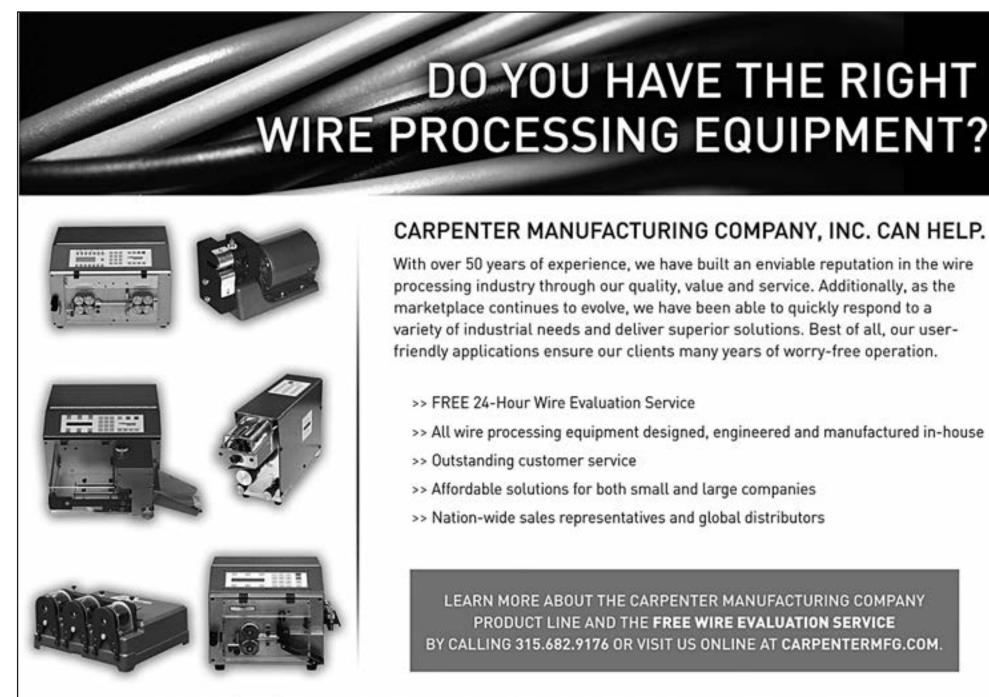
As I pondered it some more, I started sifting through and sorting the ingredients needed for success. Planning, preparation, hard work, commitment, desire, common objectives, team work, opportunity, good people, good leaders, motivation - all of these things made the list for what was needed to achieve something really significant, but none of these things assured continued long term success.

Building something to last requires two things more than anything else; it requires 'vision' and 'values'.

The planners that designed my old neighbourhood had a vision of what healthy families needed to function and grow, not just in their day, but even 40, or

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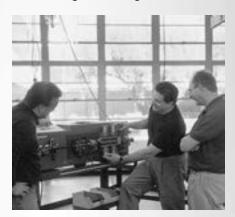
George Price, vice president of J&M Products, for example, writes how Mando takes time to answer questions, explain machine operation and even gave "tips on stripping some shielded cable that others said could not be done."

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Building Things to Last

Continued from page 7 _

perhaps 80 years later. The initial home owners bought into the values of that vision, and whenever a community lives out its values through its actions and decisions, it attracts others of similar values. The same is true for the high school I went to, and the same is true for any organization or company.

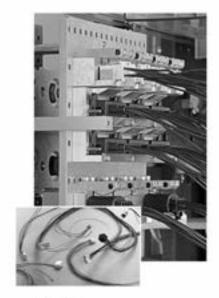
Vision and values are the cornerstones of anything built to last, and decisions and actions need to continually reflect and demonstrate them. I think that's how successful organizations stand the ultimate test of time.

Paul Hogendoorn is a self-described "incurable entrepreneur". He recently launched FreePoint Technologies (www.getfreepoint.com) and was a founding member of the London Region Manufacturing Council. He enjoys writing and speaking on the topics of leadership, entrepreneurism and motivation. He can be reached at paul@tpi-3.com. For more information on these topics, check out www.tpi-3.com

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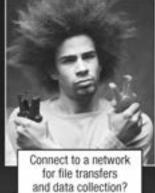
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NEWS PLUGS

Pasternack Releases New Line of 0.195" Diameter Low Loss Test Cables

Pasternack Enterprises, Inc., an industry leading manufacturer and global supplier of RF, microwave and millimeter wave products, introduces a new line of flexible 18 GHz low loss test cables. These new assemblies are terminated with durable stainless steel connectors and are well suited for test environments where a rugged, phase stable cable assembly is required.

Pasternack Enterprises' new low loss test cables utilize a 0.195 inch diameter

coax with an expanded dielectric which results in 83% Velocity of Propagation (VoP) performance up to 18 GHz. These coaxial cable assemblies from Pasternack are made with PE-P142LL coax, which operates at higher power with improved phase stability. The double shielded flexible coax provides excellent shielding effectiveness greater than 95 dB and VSWR of less than 1.35:1.

A heavy duty boot and FEP jacket improve strain relief and allow for a minimum bend radius of 1 inch which adds to the durability of these cable assemblies.

Pasternack's new line of PE-P142LL test cables can be ordered with male-straight and right angle versions of Type N, SMA, and TNC connectors as well as female bulkhead versions for each connector series.

The new LL test cables from Pasternack can be ordered in custom lengths and are also available in standard lengths from 19



Low Loss Test Cables from Pasternack Enterprises, Inc.

to 60 inches. Metric lengths can be ordered in 50, 100, 150 and 200 centimeter (cm) lengths. Each assembly is 100% continuity, Hi-Pot and RF tested prior to shipment.

"The smaller 0.195" diameter of these

test cables have a tighter bend radius while offering low loss and higher power when compared to solid dielectric cables," explains Steve Ellis, Interconnect Product Manager at Pasternack. "These cables offer our customers a high performance solution when choosing a low loss cable assembly."

Contact Pasternack Enterprises, Inc., 17802 Fitch, Irvine, CA 92614. Phon (949) 261-1920. or visit http://www.pasternack.com/pages/Featured_Products/low-loss-expanded-diel ectric-pe-p142II-flex-ible-test-cables.htm.

Introbotix Announces Back Drill Testing for CI1000™

Introbotix announces back drill length testing as part of the CI1000 Robotic Controlled Impedance test system. Adding to the already powerful TDR measurement testing capabilities of the CI1000, testing for proper back drill length is a

critical component for manufacturers to minimize signal integrity issues in printed wiring boards.

"Finding a method to measure back drill length has been elusive for the last decade. We have developed the first commercially viable system for measuring back drill length utilizing the TDR measurement capabilities of the CI1000. Not only is back drill length accurately measured at resolution of up to 0.006 inches, but these measurements can also be completed on 100% of batch jobs" says Brian Butler, President of Introbotix.

As printed circuit board frequencies have increased, measuring attenuation, or signal loss, has become an essential metric of product development as well as manufacturing quality control.

The Cl1000 is a trusted solution for testing impedance of boards, coupons, prototypes and 100% testing of batch jobs.

The Cl1000 is an easy to learn and operate system that includes computer guidance software, test results storage, test failure alerts with results reporting locally or over a network.

The CI1000 with back drill testing is available immediately in new configurations and as an upgrade to existing CI1000 systems. More information about the CI1000, including a video demonstration, can be found at introbotix.com.

For further information contact Introbotix, 4208 Balloon Park Rd, Albuquerque, NM 87109. Visit www.introbotix.com or phone (505) 345-7785.

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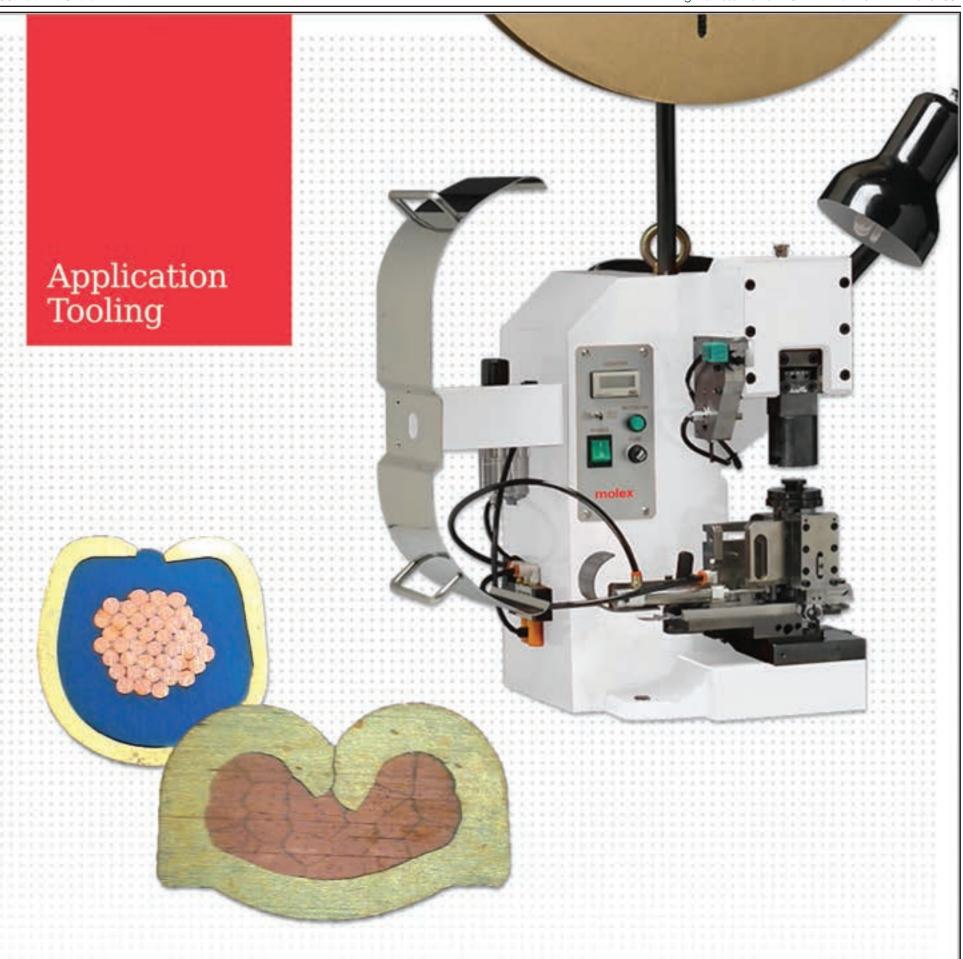
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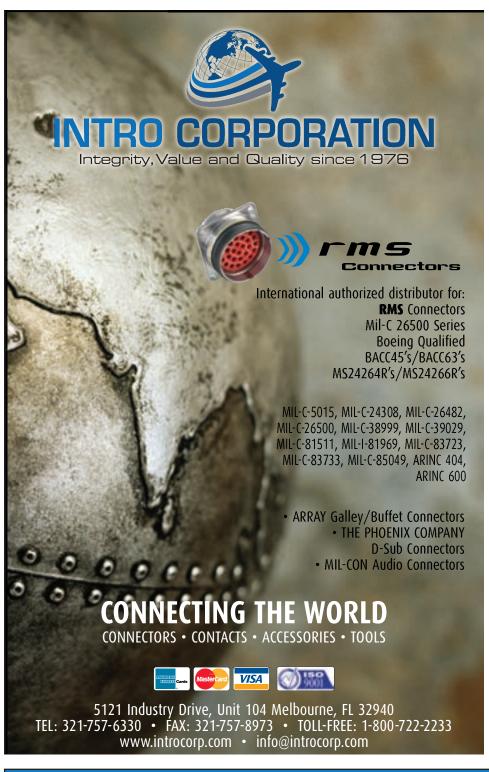


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Anatomy of a Sale

Loren M. Smith, CEO Blue Valley Capital

I'm often asked, "Exactly what does the process of selling a company look like."

I know one reason I get this question is our track record in orchestrating sales, but I imagine another is indecision about whether involving a M&A (Merger and Acquisition) firm is really worthwhile. So before I describe the sale process, let me briefly explain why I believe you are wise to retain a specialist.

A widely accepted (M&A) fundamental is that an owner should not attempt a sale on his or her own. The owner lacks experience in the matter, cannot bring objectivity to the process, and cannot afford to be distracted from priority #1: the day-to-day responsibility of running the business and continually adding value.

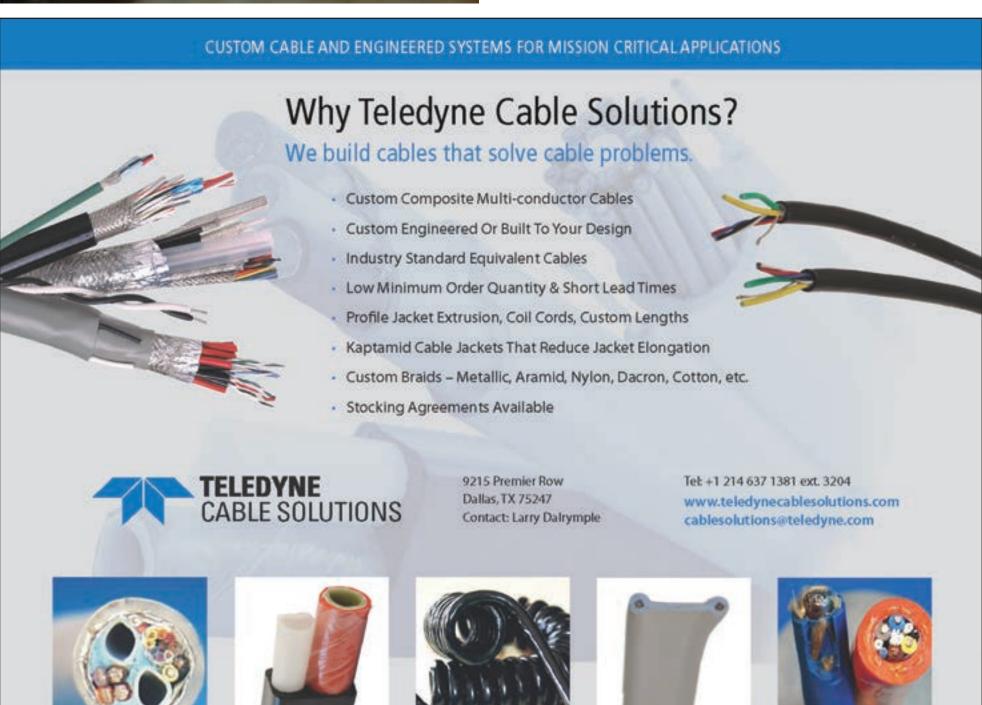
A well-chosen M&A firm, on the other hand, with a solid grasp of your business, your industry, and your firm's major selling points, will be adept at stimulating a confidential, competitive process resulting in an optimal selling price and terms. Meanwhile, your ability to run your business will not be disrupted.



Loren M. Smith, CEO Blue Valley Capital

These are basic M&A principles, but achieving truly exceptional results for an owner is a bit of an art. When we are honored by being retained to sell a business, we apply our experience—and we hope, artistry—to a proven, seven-step process:

1. Establishing price buy-in. It is critical to get on the same page with an owner regarding price expectations. Based on recent experience and widely accepted valuation methodology, we determine a realistic price range [minmax] as well as likely terms. In the event that a seller has price expectations exceeding our most optimistic estimate, we do not over-promise. We wish the owner well and move on.



Helping prospective buyers appreciate the attributes of a company also includes providing context for historic performance, identifying expenses the new owner will not incur post-closing, and a customer forecast--typically cover-

ing three years--of future performance. A key component of the narrative-building process is distilling extensive information that we "download" from the CEO and management team. This data typically reveals a great deal about their market and the way they run their business, but without an insiders knowledge of the industry we wouldn't know what questions to ask. We pose our questions at intervals, rather than taking up concentrated blocks of the executive's time.

- 3. Making initial contact with prospective buyers. During this phase, without revealing the name and location of the selling company, we convey basic information to a broad range of potential buyers including private equity firms, wire harness companies, electronic assembly houses, and connector manufacturers. The wide net reflects the inability to predict likely buyers, seeing as one never knows what a potential buyer may have on its plate.
- 4. Narrowing the buyer list. Gauging interest based on prospect responses and analyzing the strengths of prospective buyers, we narrow the list to no more than a dozen. At this stage we still do not reveal the name of the selling company unless we receive seller approval.
- *Inviting* 5. offers. Once a viable list has emerged, we invite potential buyers to submit bidsfinally revealing the name of the company. Managing the competitive process that ensues requires experi-

ence and judgment. This, too, is a bit of an art.

- 6. Ranking the offers. The key criteria in evaluating offers include price, terms, motivation, and credibility. Although assessing buyer motivation and credibility is somewhat subjective, that determination can be as critical as price.
- 7. Processing a letter of intent (LOI) from the top-ranked buyer and closing. The LOI spells out the price and terms a buyer is committing to. Once this document is signed by the seller, the buyer engages in due diligence. Unless something is discovered in due diligence that materially affects value (such as an undisclosed lawsuit, an

environmental issue, or misstated financial numbers), we move to a closing. Typically this process takes 45 to 90 days.

The cliché in the M&A world, "There's no such thing as an easy deal," is absolutely true because a buyer and seller need to reach agreement on so many issues. But all of the "deal point" hurdles can be surmounted if the buyer and seller both strive for fairness and if both are truly motivated to get a deal done. And receiving outside support from a seasoned sales firm certainly helps.

Loren Smith can be reached at lms@blvcapital.com or www.bluevalleycapital.com



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Cirris Celebrates Employee Ownership

Continued from page 1

signifying that they are connected in their work together, they each hold ownership in the company, and they are giving a big high five to acknowledge it!

A History of Growing People at Cirris

Marlin Shelley was part-owner of a
company that made dot matrix printers.

The company struggled to find an effec-

tive method to test and verify the cables for their printers. Marlin took it upon himself to find a solution to meet this company need and, consequently, he designed, programmed, and built the first Cirris tester on his kitchen table. That was over 30 years ago in 1983.

Since founding Cirris, Marlin has become well known and respected within the cable testing industry. Much of Cirris' success can be attributed to the



Cirris employees said goodbye to Marlin.

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www.cirris.com/cabletesters.html



fact that Marlin not only had an engineer's perspective, but the perspective of a user as well. He knew firsthand how to make the automated testers user-friendly and efficient. To this day, Cirris aims to produce cable testing hardware and software that makes our customers' jobs easier and safer.

Five years ago, Marlin knew he needed to prepare for retirement. To begin the transition, he made Kevin Denning, who has been with Cirris for 24 years, vice president and general manager. In 2010, Marlin shifted to part-time status and made Kevin president. Then, when it came to making a decision about what to do with the company after he retired, Marlin concluded that he did not want to sell it to someone else. He had spent 30 years building one of the most successful companies in the

From the get go, one of Cirris' internal mottos has been "We Grow People". Marlin wanted his employees to enjoy coming to work every day and grow with the company, not out of it. He clearly succeeded because the average tenure of Cirris employees is about 14 years; many employees have been with the company for 25 to 30 years. Marlin liked the concept of sharing ownership with everyone at Cirris, and that is why he decided to sell the company to his employees. It was the next step in growing people.

industry; he wanted to

leave a legacy.

Benefits of Becoming an ESOP

The National Center for Employee Ownership has found that after establishing an ESOP, the sales, employment, and productivity of companies grow roughly two to three percent faster than before the ESOP. Employees who participate in their company's also have about three times the retirement savings of employees in comparable companies. The sense of investment in their company may also improve employee performance and longevity.

Clearly, there are many advantages to becoming an ESOP. For Cirris, among the most important aspects of achieving employee ownership is that the company may continue in the same way and with the same employees, along with their passion for what they do. When discussing Cirris' employee-ownership status, President Kevin Den-

ning remarked, "In line with the very reason the company was founded, we are determined to identify and fulfill our customers' needs. We have the opportunity to build upon an already successful company, and we are excited about our potential for new opportunities."

Marlin Post-Retirement

Marlin's future is no less vibrant than his career with Cirris. For the past few years, Marlin has been running avidly. He has participated in many marathons and is currently enrolled in a variety of races. What's more, he and his wife Cathy are planning on offering 18 months of humanitarian service in the near future.

If you would like to pass a message on to Marlin, feel free to send it to info@cirris.com.

If you have any questions regarding Cirris' employee-ownership status, please feel free to call us at 800-441-9910. They are happy to share their experience in becoming an ESOP with you.

Cirris Systems produces electrical and networkable benchtop test equipment. Within commercial and industrial markets all over the world, customers purchase Cirris testers to ensure the integrity of their cables and harnesses.



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Rowe Electronics

Continued from page 1 _

peruse the wireless market as a parttime venture. "The company was started in my basement, and we moved to our first office/lab six months later," he recalled.

In 2000, with one additional employee, Steve took the venture full-time. He thus began his journey to build the business through constant evolution, quality improvement, and product enhancement. "It became obvious early on that the wire harness would play an important role in product support," he explained, "and this capability was offered to our wireless customers as an option." In 2003, Steve's small company made the move to contract harness work, and has sustained growth since.

Transitioning from a 5,000 sq. ft. in West Des Moines in 2011, Rowe Elec-

tronics built a 20,000 sq. ft. facility in Norwalk, just south of Des Moines. They now offer a broad line of wireless controls, and wire harnesses. In addition, they produce custom engineered turn key products with supporting software, including their own PDM60.

From Diversification to Product Development

Since Rowe Electronics is located in the heart of agriculture country, much of their work has typically been in that industry. It has been fruitful for the company, but as Steve pointed out, "it has a habit of crashing every so often." He added that Rowe has been able to hedge itself with customers that are large and diverse enough to to have a worldwide footprint.

_Continued on page 20



The crew of Rowe Electronics.



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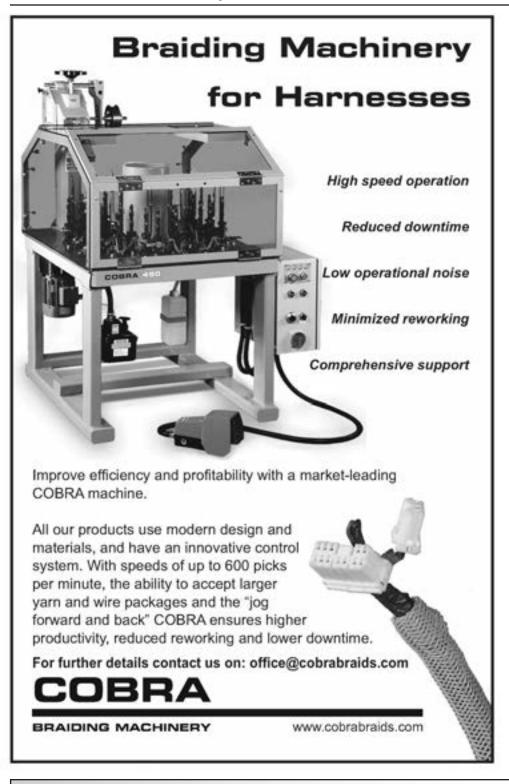
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Rowe Electronics

Continued from page 19

Given the capabilities developed in the agricultural market, Rowe Electronics has been able to venture into trucking, cranes, conveyors, and other industrial equipment. "If it moves and needs to be controlled remotely," Steve boasted, "we can build a product to make that happen."

PDM60

The PDM60 (Fig. 1) is largely an outgrowth of the company's knowledge in 12 volt DC power systems. Since the initial application for the PDM60 was for motorcycles, it comes as no surprised that some on the Rowe team are avid motorcyclists. Larry noted the importance of this saying, "Steve and Blake are both avid motorcyclists, so leveraging that with the company's expertise in DC high-amperage control, led to the PDM60's development."

Blake gave some specifics on the PDM60. As mentioned, PDM stands for Power Distribution Module and can han-



Figure 1. PDM60

dle up to 60 amps worth of accessories on a motorcycle, ATV, car, boat, or any 12 volt system. The unit digitally mimics a fuse box, but has some very special functionality. About the size of a credit card, and less than an inch thick, the unit connects directly to the battery. The PDM60 has lead wires to accommodate up to six accessories, such as specialty lights, GPS systems, or heated clothing.

On the PDM60, there are two trip leads used to turn circuits on and off; an "Ignition Trigger" and a "Ground Trigger". The ignition trigger senses positive voltage, and can be wired into any ignition controlled circuit. This allows for circuits/accessories to be tripped on and off with the vehicle ignition switch. The ground trigger merely senses ground, and can be wired into an external switch, and routed to ground. This allows for external on/off control of all ground triggered circuits.

What makes the PDM60 so unique, and sets it apart from older fuse technology, is that it has an attached USB interface. Using the PDM60 dashboard software downloaded from the website (Fig. 2, page 22), the user can customize the unit's operational parameters. You can program the amperage limit on each circuit to match any particular accessory. You can also set each circuit's on/off triggering method (ignition trigger, ground trigger, both, or either). In addi-

_Continued on page 22



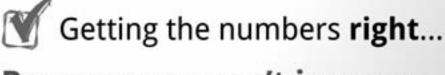
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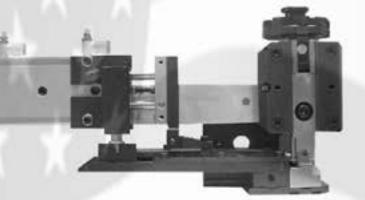




Model 1700

Model 2000

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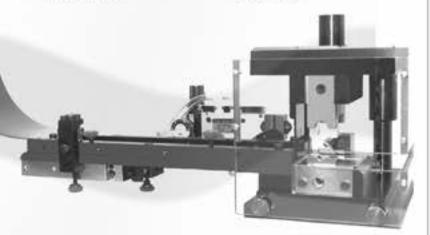




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Rowe Electronics

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tion, the dashboard software can be used to program custom time delay power-on and power-off settings for circuits. For example, you would likely want a delay of a few seconds for power-on to give the battery full strength at engine start. You might also want to delay the power-off of a GPS for a few minutes after the engine is shut down.

Blake was confident the PDM60 is timed right for the motorcycle, marine, and automotive aftermarket sectors. "It seems you can't go a week without hearing about some new gadget; and they all need power." The module allows for protection and a clean installation for all types of accessories. But he was

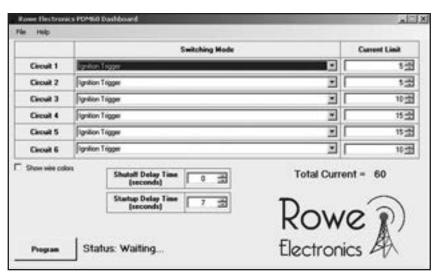


Figure 2. PDM60 dashboard software

also quick to point out that another timely feature of the PDM60, is it's ability to interact with a CAN bus (see What is a CAN bus?). He explained that some BMW Motorcycles have a 5 amp limit on their accessory ports, "so if you plug in your 15 amp heated clothing, the CAN bus will see the excessive draw and shut the circuit down."

The amount of current that the PDM60 draws is so minute, Blake explained, "the CAN bus doesn't even know it's there."

What's is CAN Bus?

CAN (Controller Area Networking) is a serial bus protocol to connect individual systems and sensors. It was developed by Bosch in the 1980s in an effort to reduce automotive wiring by allowing components to communicate on a single networked data bus. It has gained popularity with a wide variety of distributed power systems in power sports, marine, medical, and industrial applications. It is an intelligent solid state module that also eliminates the need for fuses.

Bumps on the Road

I asked the crew what frustrations or obstacles they experienced introducing the product. Larry was quick to point out two obstacles in particular. He noted packaging the product to look attractive on the shelf was certainly a new concern to them. "When you go from a job shop operation where you are loading pallets and containers, to a retail packaged product having just the right look; it's just a different world," he explained. But the biggest hurdle Larry noted, and one they are still working through, is distribution. He explained this saying: "When John Deere or Caterpillar order a certain number of units, that's easy. But how do we get this thing into the market, on the retail shelf, in the



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New Applicator Developed to Provide Improved Precision and Reduced Setup Times

Crimping standards continue to rise to higher levels of quality and repeatability. Taking customer input and market demands into consideration, TE Connectivity (TE) has created the new Ocean Applicator series to meet those higher demands and to take terminal crimping to a new level.

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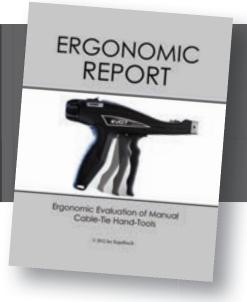


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Rowe Electronics moved from a 5,000 sq. ft. building in West Des Moines into this 20,000 sq. ft facility in Norwalk, just south of Des Moines.

Rowe Electronics

Continued from page 22

many places it needs to be?"

Blake mentioned they started off strategically with a select group of dealers (retailers). From there they moved into distribution, and discovered the pricing mistake many companies make. There has to be enough margin in the pricing model to accommodate each level. This was a lesson Rowe Electronics learned early on. "You make the mistake of pricing to sell directly to dealers, then all of a sudden you add a distribution level, and there's just not enough margin," he lamented. The Rowe team was able to overcome this by introducing the programmable version of the PDM60. Through this strategy, they were able to adjust the front line price and accommodate proper margins for dealers, distributors, and Rowe.

The only other obstacle for Rowe Electronics is dealing with the education process of selling a new product. "It's not like selling a new tire," Steve posed, "where you say, 'here's our new tire, and here's why it's better." It was much more difficult for them to carve out a market for a new product. But Steve is encouraged by Blake's ability to tell the story, and explain the product in simple terms to potential distributors, dealers, and end-use customers.



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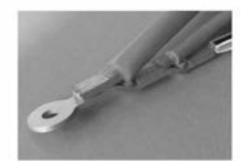






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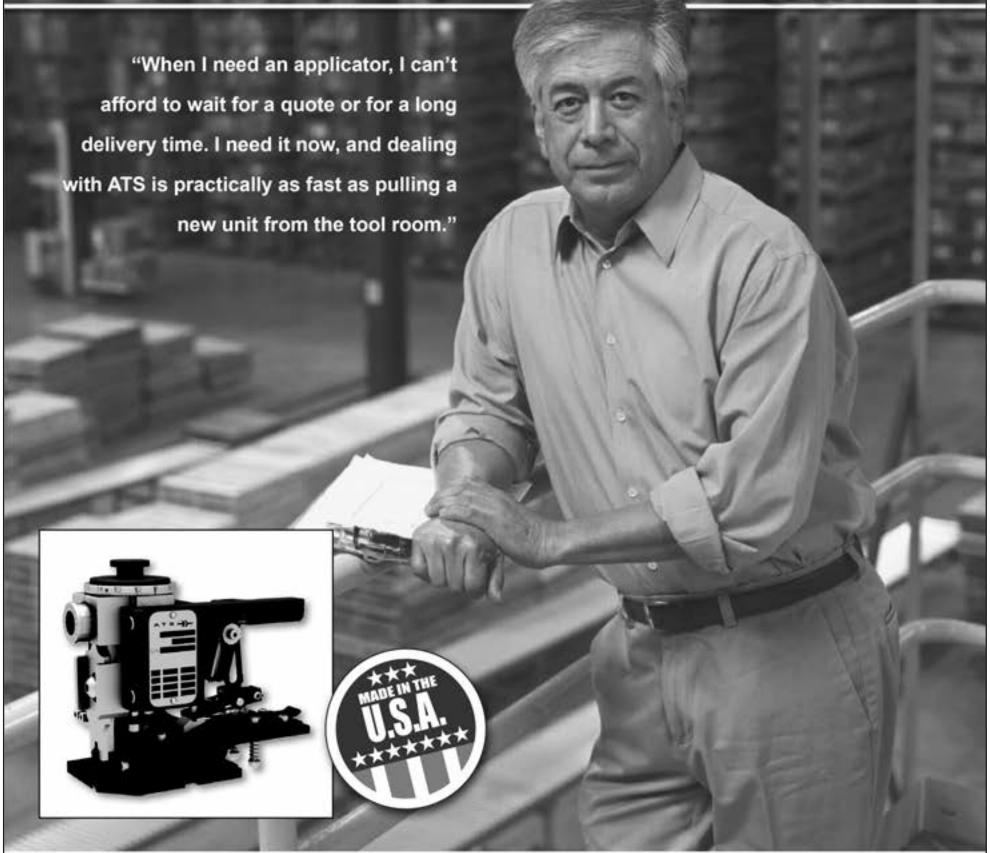
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Moving Forward

Rowe Electronics has realized that as a contract manufacturer, they live and die with the desires of their customers. For them. hedging across OEMs in various industries was not enough. The PDM60 fits into Rowe's core competencies. There are wires, an enclosure, a programmed intelligence, and it's all encapsulated to prevent environmental ingress. These are things Rowe does on a daily basis for their customers, so the development of this specific product was a logical step.

The company has plans for complimentary products in the power sports, marine, and automotive aftermarket industries. If you check out their website at www.rowe-electronics.com, you will see that they are also about to springboard into a small gas engine control module that will also become a proprietary product line.

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New PolySwitch™ Circuit Protection **Devices Outlast MINI Fuses & Circuit Breakers**

Waytek, Inc. introduces PolySwitch circuit protection devices as a resettable over-current protection solution in vehicle, heavy truck and equipment wire har-

Waytek's new PolySwitch™ circuit protection devices provide resettable overcurrent protection in a 2.8mm footprint and solid state design. They are an easy drop-in replacement for mini fuses and type II circuit breakers in 12V vehicle sys-

Unlike Type II bimetal circuit breakers, which typically cycle several times before latching, the PolySwitch BD280 devices



New PolySwitch Circuit Protection Devices

features a solid state design with no moving parts or contacts to arc, erode or weld together. This makes resettable Poly-Switches a longer lasting and more reliable circuit protection device than circuit breakers or fuses. The PolySwitches operate with a resistance switching action that latches immediately following an overcurrent tripping condition. Such latching occurs at a lower battery voltage and lower environmental temperature than circuit breakers and fuses.

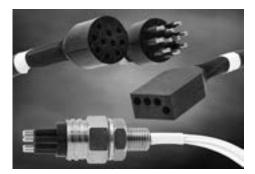
The PolySwitch™ devices provide virtually constant power consumption across a voltage range of 4V to 14V. They have less thermal cross talk between devices than Type II bimetal circuit breakers due to their low power dissipation and flatter thermal derating. Rated for temperatures between - 40°F and +257°F, the Poly-Switch™ BD280 devices pass more current at higher temperatures than bimetal circuit breakers and are suitable for harsh underhood applications.

Bright color-coded housings and rated current values printed on the top of the devices make replacement of automotive fuses and bimetal breakers easy, and help prevent installation errors. PolySwitches also have exposed probe points to facilitate inspection and faultfinding, helping lower labor time and costs.

Waytek, Inc. carries more than 10,000 electrical supplies, including wire and cable, terminals and connectors, circuit protection parts, switches and more, for OEM and MRO mobile equipment markets. Founded in 1970, the company has seen continued expansion in the electrical supplies industry. Waytek carries large quantities of stock items and is able to ship most stock items the same day, allowing customers to carry smaller inventory, yet still have products when they need them. Browse our electrical solutions at www.waytekwire.com, or call 800-328-2724.

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The connector is ideal for use by the military and government, diving equipment manufacturers, remotely operated vehicle (ROV) and autonomous underwater vehicle (AUV) manufacturers as well as deep submergence science and research projects.

The Submariner series is a full line of deep submersion connectors that include dry-mate connectors that are fully compatible with similar products in the industry. For example, these new connectors can be interchanged with existing connections in an ROV, without having to replace all of the vehicle's connections.

Designed to meet the rapid growth and rising demand in the global ROV market, the new Submariner series uses Amphenol's molding and adhesion expertise to offer an optional molded-to-cable feature. This feature ensures that the seal between the cable and connector remains intact under water. All polymer-tometal bonding surfaces are carefully sandblasted, cleaned, primed and molded. The rugged metal shells and recessed pins assure reliable performance in the most demanding environments.

Available in three different shell sizes and a variety of configurations, Amphenol's Submariner series features wire gauges from 10 AWG to 20 AWG, a maximum operating voltage of 600 V and operating temperatures ranging from -5°C to 65°C.

For longer life and prolonged mating cycles, each connector is designed with gold-plated contacts per MIL-G 45204 at 30 microns. Cable assemblies and pigtails are available.

For more information, visit http://www.amphenol-industrial.com or e-mail fyang@amphenol-aio.com

High Power (0.75W) 1206 WK73 Wide Terminal Flat Chip Resistor Now Available from KOA Speer

KOA Speer Electronics, a leading supplier of passive electronic components, has released a new size for their WK73 wide terminal flat chip resistor series, the 2B (0612) package. The WK732B offers a higher power rating and features high reliability and performance with 0.75W power rating as a result of its enhanced heat dissipation, compared to the standard

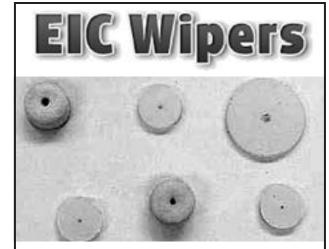
Featuring a wide terminal construction, the WK732B resistor provides superior thermal shock characteristics as well as high solder joint reliability. The WK73S2B offers a resistance range of $10 \mathrm{m}\Omega \sim 9.1 \Omega$, while the WK73R2B offers $10 \Omega \sim 1 \mathrm{M}\Omega$. Other performance characteristics include tolerances of 1% and 5% and TCR values of $\pm 100 \sim \pm 800$ ppm/°C. The WK732B is AEC-Q200 qualified.

The WK732B offers current sensing for power supply circuits, and is ideal for automotive electronics, ECUs, anti-lock braking and air bag systems. Lead time is typically 12 weeks. Samples are available upon request.

(2H), 1218 (2J) & 1225 (3A) sizes of the WK73 wide terminal flat chip current sense resistor.

KOA Corporation, whose global presence includes corporate head-quarters in Japan, and sales locations in the USA, Germany, China and Singapore, offers a wide range of products which include thick and thin film resistors, current sensing resistors and resistor arrays; thermal sensors, fuses and varistors; wire wound, multilayer, power and thin film inductors; LTCC's and modules.

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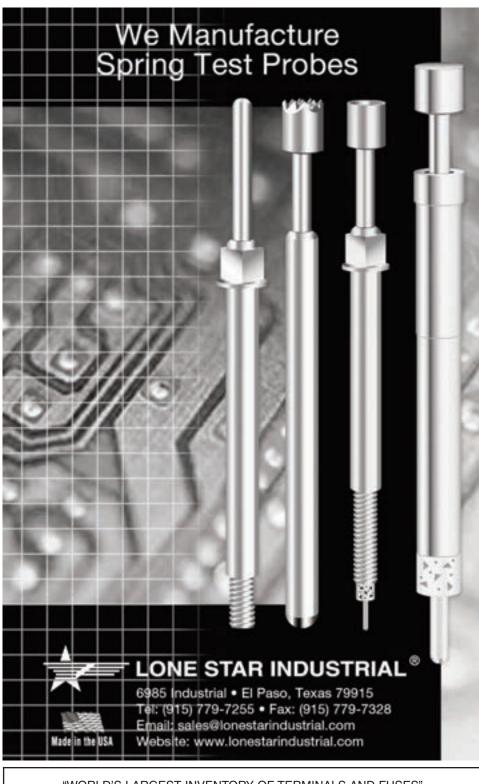


The all-new WT3-200 wire terminal tester is an integrated solution for measuring wire and tube termination pull force. An ergonomic lever easily produces up to 200 lbF (1,000 N) of force for wire diameters up to 0.25 in (6.3 mm). The WT3-200 includes a long list of features and functions, such as data outputs via USB, RS-232, and Mitutoyo, on-board data storage for 1,000 readings with statistical calculations, password protection, and more. It can be operated on a rechargeable battery power, or AC. All at a competitive price of just \$2,195.

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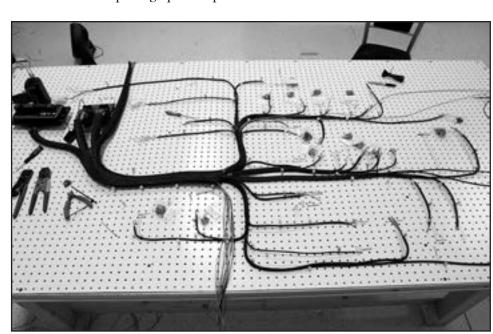
Forys is a retired U.S.Air Force master sergeant, having spent 30 years in the military. He served in the Army, Air Force National Guard and Army National Guard. He wrapped up his service in the Air Force Security Forces.

The two men met at Chrysler Corp. Forys worked there 41 years, retiring in 2009. He had assorted positions, beginning in the service and parts department before going into vehicle production and serving as a supervisor.

Forys transferred to Chrysler headquarters in Highland Park, Mich., and administered the photographic department, giving daily assignments to 14 photographers. He made contact with Schaffer when he worked at the corporation doing product development engineering and motion analysis. He left Chrysler in 2008.

Schaffer also has worked as an avionics technician, employed by Chrysler Aviation, Lear Siegler Services, Corporate Wings and Learjet. At C&D Aerospace he supervised production. He learned about avionics in the Marine Corps and studied mechanical engineering at Oakland University in Rochester, Mich.

Continued on page 30



Engine harness on layout table.



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Continued from page 28

While at Chrysler, Forys served as veterans committee chairman of a United Auto Workers local. His affiliation with the military continues as president of the Air Force Security Forces Association chapter at Selfridge Air National Guard Base in Harrison Township, Mich. The organization provides support for young troops at the base, including those who may encounter financial problems.

Schaffer and Forys complement each other. Schaffer is the technical specialist, so he is doing the designing and engineering. When the two men were interviewed for this article in mid-September, their company had no employees, so he and Forys were building harnesses, too. Forys was focusing on finding and hiring veterans, with the intent of having five on staff by the end of the year.

"We were asking at the state government level for vets for two months, " Schaffer said. "We were told there were hundreds of vets looking for employment, but we did not hear back from the government people. We're leaning toward disabled vets and vets, but we will take regular civilians, too."

Forys is working his connections at Veterans Administration offices and at

Continued on page 34



Todd Schaffer working on an engine harness.

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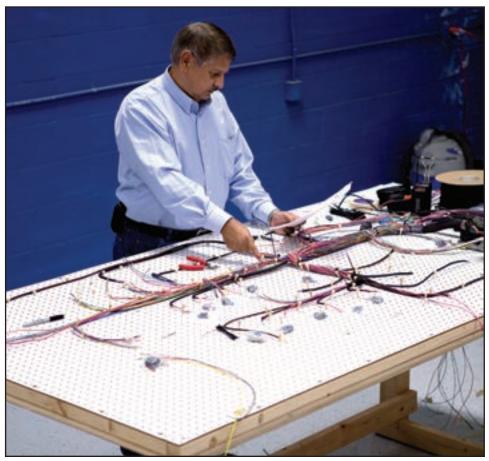
the Selfridge base. He reported a statistic that 20-30 percent of veterans are unemployed even though they have valuable skills.

"I learned at a conference that people prepare resumes when they get out of the military, but civilian employers may not understand the military terminology and think that vets are not qualified," Forys said. "Now, companies have finally recognized what electronic and electrical training and experience people

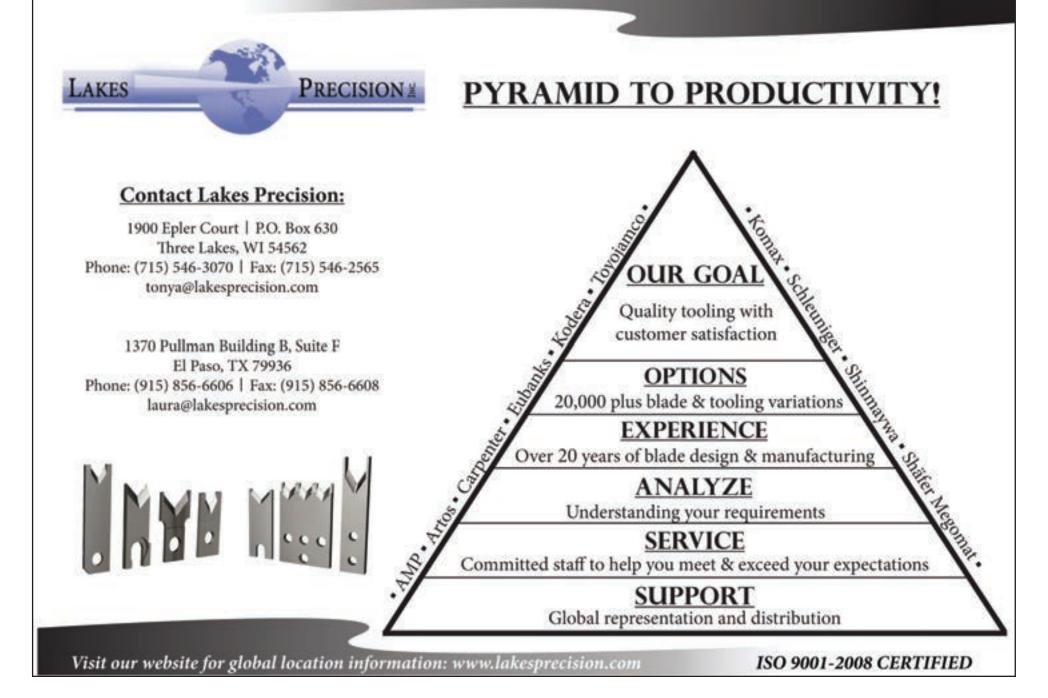
received in the military. What's nice is that Todd and I speak military."

Due to their backgrounds and the HHM location, Schaffer and Forys are concentrating on the automobile industry. Their first customer is an industrial park neighbor, Crazy Diamond Performance (CDP) owned by Kevin Fern. He began the business in 2012 and has worked 18 years on vehicles with alternative fuels, mainly compressed natural gas.

_Continued on page 36



Mal Forys checks inventory for a harness.



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Side view of harness on hot rod.

Heroes Hired Manufacturing

Continued from page 34

CDP builds hot rods and custom engines, retrofits fuel systems, calibrates engines, tests chassis, performs emissions testing and does CNC and CAD engineering and rapid prototyping. The firm also offers engine, transmission and full-vehicle wiring harnesses, and Fern is having them done by HHM. The contract is for 100 harnesses a year, and CDP could contract for 1,000 more if it begins retrofitting school buses to run on natural gas.

The first harness for the engine in a

hot rod based on a 1933 Ford coupe is 10 feet long with 400 wires and 50 connectors. The harness has a fuse and relay panel, and connections will be made on such components as fuel injectors and oxygen sensors.

"The harnesses will be top of the line, built to aerospace standards," Schaffer said. "Aerospace is the highest technology and is a lot more complex systemwise than anything in automotive. The trend has been that technology is designed for military and aerospace first and then trickles down to automotive and other markets.

> "The hardest part is that first contract," Schaffer said. "Now we have a product in hand and can talk to GM, Ford and Chrysler and their suppliers on other tiers and show them the work we do and get our foot in the door. I think a lot of doors will open once they hear our

Due to Forys' background, the HHM story will be told at the U.S.Army Tank Automotive and Armaments Command at the Selfridge base. Although the facility no longer builds tanks, it does have an R&D center. He also has a lead for possibly providing harnesses to a Michigan business that restores Chris-Craft cabin cruisers.

Involvement in aerospace, military and medical markets will follow, particularly as HHM is established in other states. An order could be for a prototype, one or two items or 15,000 per month.

"Our jobs will be dependent on our employees' capabilities and how we accommodate people with limited use of their capabilities," Schaffer said. "Our approach is different than many companies."

Hand tools sufficed to build the CDP harnesses. Additional equipment will be acquired as needed. Much of it will be automated and ergonomically correct so veterans with disabilities can do the jobs.

The A-620 quality standards are being followed. Testing is according to crimp pulling, visual inspection and continuity. Eventually ISO 9001 certification will be in place.

HHM will be promoted at trade shows and job fairs. Print advertising, e-mail and direct mail will be part of marketing efforts. The company will become a member of Automation Alley in Troy,





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In every issue of Wiring Harness News Anixter will bring you informative articles about wire and cable technology.

AMERICAN WIRE GAUGE

DEFINITION

American Wire Gauge (AWG), also known as Brown & Sharpe Gage, is the United States' standard method for denoting the cross-sectional areas of round, solid conductors. The cross-sectional area is useful in determining a conductor's current-carrying capacity and resistivity. Rather than using fractional inches, gauges are based on whole numbers with 38 commonly known sizes (4/0 to 36 AWG). Sizes smaller than 36 AWG can be calculated in gauge, but wires larger than 4/0 are commonly expressed in 1,000 circular mils (kcmil or MCM) where one cmil is the area of a circle with a diameter of one mil (1/1,000 inch).

A fact that is often confusing to the beginner is that smaller gauge numbers correspond to larger conductor diameters: physical size and the AWG number are inversely proportional. This relationship was influenced from the number of drawing operations needed to produce a designated gauge size. Smaller wires were required to be drawn multiple times through drawing dies to be thinned out, while larger diameter wires required less processing.1 The relation-

ship between gauge sizes is not linear, but logarithmic. More detailed information about the relationship between sizes can be found in the Anixter Technical Information Handbook.2

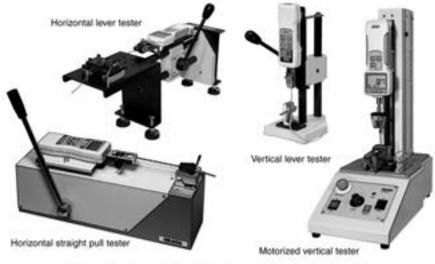
SOLID AND STRANDED CONDUCTORS

The cross-sectional area of a solid conductor is straightforward and easy to calculate. The area of a conductor is found by squaring its diameter in mils. The gauge size can be found by using the cross-sectional area and tables provided in American Society of Testing and Materials (ASTM) 258-08 Standard Specification for Standard Nominal Diameters and Cross-Sectional Areas of AWG Sizes of Solid Round Wires Used as Electrical Conductors.

The gauge size of a stranded conductor is determined by summing the crosssectional areas of the individual solid strands and using the tables provided in ASTM standards. The overall diameter is determined by geometry of the strands. Stranded conductors have larger diameters compared to solid conductors because of air gaps and spacing between the strands. Consequently, the same gauge size solid and stranded conductor can have different diameters.

Continued on page 38

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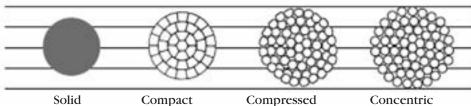
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Figure 1: Comparative Sizes and Shapes of Conductors



Stranded conductors, with the same gauge size, can also have different diameters because of the various conductor strand types. The three most common strand types are compact, compressed and concentric, although hundreds, possibly thousands of combinations of strand types and number of strands exist. Conductors with compact and compressed stranding have approximately 7-9 percent and 2-3 percent smaller conductor diameters respectively when compared to concentric stranding.3 Figure 1 above shows the differences in sizes between common strand types for a 1,000 kcmil conductor.

ELECTRICAL PROPERTIES

The greatest impact AWG has on a wire's electrical properties is the wire's resistance. Wire conductors, such as copper, aluminum and silver, have different

resistances. The cross-sectional area of a conductor is inversely related to the resistance of a conductor. The larger the conductor, the lower the resistance of the conductor.

The electrical resistance of a stranded conductor is a function of the length of lay and is larger than its solid counterpart. Approximate resistance can be found by using increments listed in various ASTM standards. Table 1 below contains increment values for concentric lay stranded conductors. The increase in resistance is found by multiplying the resistance of the solid conductor with the same gauge size, by one of the values shown in the table below.⁴

__Continued on page 40



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Continued from page 38

Table 1: Concentric Conductor's Increment Increase⁴

Incre	ement of Resistance
Type of Conductor	and Mass %
Class AA, Size 1 to 4 AWG	1
Classes AA,*A, B,C, and D,	
2 000 000 cmil and under	2
Over 2 000 000 to 3 000 000	cmil 3
Over 3 000 000 to 4 000 000	cmil 4
Over 4 000 000 to 5 000 000	cmil 5

* No. O AWG and larger

METRIC CONVERSION

 $(\Omega/\mathrm{ft.})$

Outside of the United States, wire sizes are commonly expressed in mm²

and the diameters in mm. Stranded wire notation usually states the number of strands first, followed by the diameter. For example, 7/0.533 means the stranded conductor contains 7 strands, each a diameter of 0.533 mm with an overall cross-sectional area of 1.5 mm₂. Table 2 below lists the conversion factors between the two systems.

For more information, contact your local Anixter sales representative at 1.800.ANIXTER or visit anixter.com.

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Table 2: Metric Conversions			
American <u>Wire Gauge</u>	Metric Units	AWG to <u>Metric Multiplier</u>	Metric to AWG
Inches (in.)	Millimeters (mm)	25.4	0.0394
Circular Mil (cmil)	Square Millimeters (mm2)	0.000507	1973.5
Ohms/1.000 ft.	Ohms/kilometers		

 Warner, Mark. The Electric Vehicle Conversion Handbook HP1568. New York: Penguin Group, 2011. Print.

3.28

2. "Anixter Technical Information Handbook" Anixter Inc. 2013. Print.

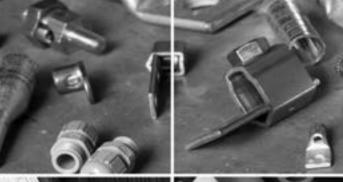
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- "ASTM B8-04 Standard Specification for Concentric-Lay-Stranded Copper Conductors, Hard, Medium-Hard, or Soft." ASTM International.



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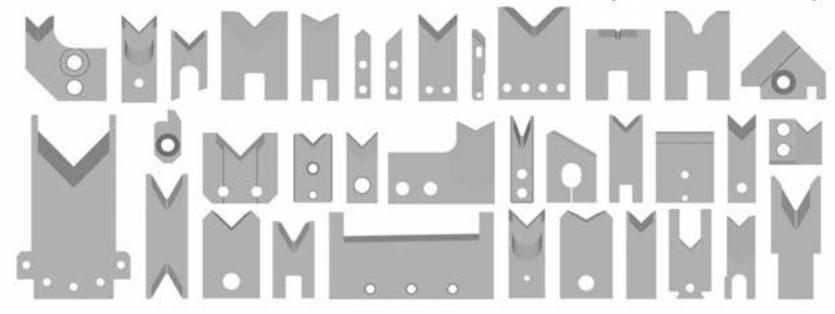
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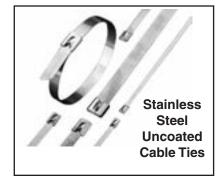


BURNDY Announces the Introduction of ABS compatible Stainless Steel Uncoated, Fully and Partially Coated Cable Ties

BURNDY, a leading manufacturer and provider of connector solutions to the industrial, energy, construction, telecommunication, petrochemical, data center, and transportation industries, announces the addition of Stainless Steel Fully and Partially Coated Cable ties to their wire management system. These ties are designed and manufactured to meet or exceed industry standards to deliver maximum reliability.

Stainless Steel coated and uncoated ties are made of 316 or 304

grade stainless steel with a steel ball type locking mechanism. The smooth and even edges and the polyester coating guarantee safety to the customers as well as the cables. High







strength combined with corrosion resistance makes them an exceptional choice for customers.

These ties offer considerable resistance to UV radiation, extreme temperatures and vibrations. Stainless Steel coated ties are available in black only. Stainless Steel coated and uncoated ties meet the requirements of ABS.

Headquartered in Manchester, New Hampshire BURNDY has over 85 years of dedicated customer support in both service and product. Our customers need to look no fur-

ther than BURNDY for all their connector, tool, and accessory needs with our BURNDY Engineered Systems of coordinating dies, connectors and tools. The three elements have been specifically designed to work together and engineered to meet stringent, accepted quality standards – providing the user complete confidence in the integrity of the connection.

Contact us at 47 E. Industrial Park Drive, Manchester, New Hampshire, 03109, call Customer Service at 1-800-346-4175, or visit website at www.BURNDY.com

Since 2009, BURNDY LLC has been a key brand under the Electrical Systems Platform of Hubbell Incorporated. More information can be found at www.Hubbell.com

Newark element14 Offers New Amphenol RF Connector Line

Newark element14 is stocking Amphenol RF's new line of high-density (HD) BNC connectors. The products deliver true 50 and 75-ohm performance in a footprint 51 percent smaller than traditional BNC connectors with four times the density.

Engineered to enhance the performance of mechanical and electrical devices, the new line features the push-and-turn interface of a traditional BNC with positive locking to guarantee mating.

Amphenol RF's 50 ohm connector is ideal for military applications, instrumentation and medical markets.

The 75 ohm product is designed for broadcast-grade video in ultra high definition, 4K and 6G HD-SDI. It is ideal for both fixed and mobile broadcast studios.

Products in the new line can be purchased on the web at Newark.com.

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Other features include insulation crimp adjustment on most tools for different insulation thicknesses, a locator for properly positioning and supporting the terminal or contact in the tool, a wire stop, and color coding and/or wire size information on the head of the tool or on the handles.

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Continued from page 36

Mich., a technology-centered organization of 1,000-plus businesses, schools and government entities in Detroit and eight surrounding counties.

Vendors in Ohio, Texas and Minnesota have supplied HHM with everything needed to build harnesses. "Service has been awesome," Schaffer said. "We've gotten good pricing and terms. Companies have even been bending the rules by not enforcing order minimums. They have been really generous."

Schaffer and Forys hope to have done \$500,000 in sales by their first year in business and \$1 million their second year. All income will be invested in equipment. The men, who are financing HHM themselves, are prepared not to take paychecks up to two years. Grants are being pursued, too.

"My biggest fear is that we will grow too quickly," Schaffer said. "We want to grow at a pace we can afford, and we want to diversify. If the automobile industry crashes again, we're history, because mom-and-pop-type businesses are the first ones to go." He also noted that competition from businesses that have work done offshore is "a big hurdle."

Schaffer stated he has been inspired by the late Steve Jobs because of his innovation, vision and risk. Schaffer also gains inspiration from TED, the nonprofit organization whose motto is "Ideas worth spreading."

After having worked so long for a huge corporation, Forys is thrilled to have found "a real job," he said. "Working in the corporate world for Chrysler was a total roller coaster since day one. I saw things that would work and didn't work even after you tried to tell somebody above you that they wouldn't. I saw some of the same things in the military.

"Having my own business is a dream come true, and this fits with my dream of being involved with vets," Forys said. "We are bringing back their self-esteem so they can make money by working here, have a better way of life and be useful in society."

For more information, call 888-869-3714, e-mail info@heroeshiredmanufacturing.com, fax 586-580-2379, visit www.heroeshiredmanufacturing.com or write 50490 Central Industrial Dr., Shelby Township, MI 48315.

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A Quality Cable Every Time

he audio industry, like many industries today, is turning to technology to increase the quality of their product. JumperZ Audio, an independent cable manufacturer based in Birmingham, Michigan, is one of the companies paving that path.

After working in the audio industry for many years, Zane Kadro recognized an opportunity to improve the way companies manufactured audio cables. He noticed equipment from Schleuniger, a leading international manufacturer of cable high-precision processing machines, at a trade show and a light went on in his head. By automating the process, Kadro knew he could produce better quality cables, faster. In 2010, with that idea in mind, Kadro founded JumperZ Audio and immediately sought out Schleuniger for the equipment, services and support needed to achieve his goals.

"I wanted a higher standard of quality throughout the entire assembly process," says Kadro. "The high quality and precision of Schleuniger products were the reasons we chose to go with them."

JumperZ Audio creates very custom, unique cables and with the Schleuniger StripCrimp 200, a fully programmable stripping and crimping machine, the Company is able to produce a product that is far superior in quality to that of the competition because they are crimp-



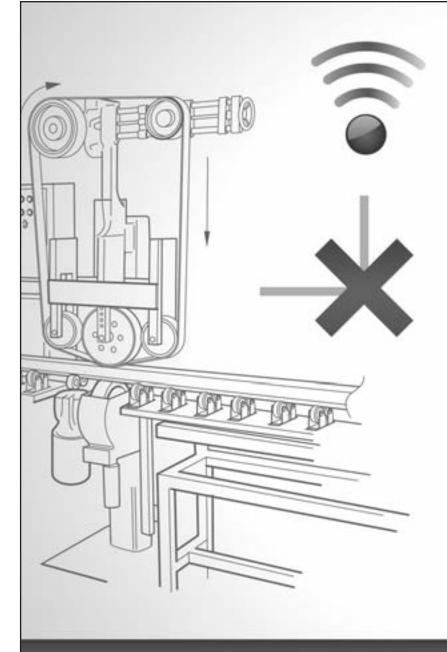
Schleuniger's StripCrimp 200

ing not soldering the cables. Best of all, with an automated process, JumperZ Audio achieves consistent, repeatable results thereby reaching their goal of delivering a quality cable every time.

"We are always striving for perfection. Every cable that comes out of JumperZ Audio has to be perfect. Without Schleuniger equipment, we would not be in business right now," says Kadro.

For further information contact Jumperz L.L.C., 651 Eton St, Birmingham, MI 48009. Phone (248) 792-9695 or Fax: (248) 885-8765. Visit www.jumperzaudio.com.

Contact Schleunier, Inc., 87 Colin Dr. Manchester, NH 03103. Phone (603) 668-8117 or Fax (603) 668-8119. Visit www.schleuniger-na.com.



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NEWS PLUGS continued





New Low Profile, Quick Release Interconnect from Amphenol

New Low Profile, Quick Release Interconnect from Amphenol Offers High Performance

Amphenol Industrial Global Operations, a global leader in interconnect systems, has introduced a low profile, quick release, high power inter-

connect using Amphenol's new R4 RADSOK technology. The new RADLOK product line provides low insertion and extraction forces with a high mating cycle rating for high power interconnects, making it perfect for frequent mating applications.

This high performance connection system features a versatile, low profile, right angle design making it ideal for use in the automotive, heavy equipment, power/battery storage, hybrid-electric system, power interconnect and factory automation markets. An integrated positive mechanical lock/release feature enhances cycle dura-

Amphenol's cost-effective RADLOK product line can be used as a battery interconnect both internally (cell-to-cell) and externally (battery-to-battery or array-to-power storage units); in electric vehicles, hybrid electric vehicles and fuel cell electric vehicles as well as in servers connecting power to the board.

RADLOK employs Amphenol's unique R4 RAD-SOK technology that lowers voltage drop, maximizes contact surface and reduces temperature rise.

The connection system features a rugged, low-profile over mold design making it impact resistant. RAD-LOK is a preassembled 1 piece over mold connector that helps to reduce end user assembly costs. Colorcoded for visual identification, the connectors are easy to install with a simple push and click.

These RoHS compliant connectors have a maximum current rating of

400A, a maximum DC voltage rating of 1,000 V and an operating temperature range of -40°C to +125°C. Available in either crimp-on versions or integrated directly onto cable with customizable lug end configurations.

For more information, please visit http://www. amphenol-industrial. com or send an inquiry through http://tpil.com/sales.html.

New Littelfuse Terra Power Systems Battery Disconnect Switches at Waytek

Waytek introduces new Master Disconnect Switches from Littelfuse Terra Power Systems to help increase the life of your batteries in trucks, emergency vehicles, off-road and industrial mobile equipment.

Waytek carries a new line of Littelfuse Terra Power Systems Battery Disconnect Switches to cut-off electrical power, protect against electrical fires and theft when equipment is not in use, provide reliable shut-down of power during maintenance and protect batteries from excessive drain. New master disconnect switches isolate high current DC circuits from battery sources and are capable of carrying 300 amp continuous current. Ignition protected to SAE J1171 and ISO 8846 for operation in hazardous atmospheric environments in battery box or on vehicles carrying hazardous loads.

Waytek offers three case design options in surface mount, panel mount or floor padding trim mount. Many features on the master disconnect switches were designed for harsh environments, including tinplated copper studs to provide maximum conductivity, stainless steel hardware for corrosion resistance

___Continued on page 52





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By Pete Doyon **VP Product Management** Schleuniger, Inc.

aving been in the wire processing business for 30 years, I have seen a lot of changes and improvements made possible, primarily by advances in electronics and software. Looking ahead, I see continued improvements in efficiency through networking technology.

Most of the wire processing equipment on the market today is fully programmable and features quick-change tooling which allows for quick changeovers between jobs. These cutting and stripping machines (CS) or cut, strip and terminate machines (CST) are typically standalone units with their own user interfaces.



Schleuniger's Di.IT cutting area optimization software.

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Q. What's your track record (closing percentage)?

Q. How many sell assignments do you take on at one time?

Q. Have you ever owned and operated a wire harness company?

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In a typical small to medium size wiring harness shop, operators receive work orders on paper and program the wire processing machine for that job or call up that job from machine memory if it was run in the past. Determining what jobs to run, in what sequence, is usually left up to the operator who tries to minimize changeovers in order to maximize efficiency. In this scenario, it is difficult for anyone else in the company to monitor the status of a given order as it flows through the shop.

By networking all of your wire processing equipment with a central server and dedicated software, a whole host of new possibilities and benefits can be achieved. Some examples include:

- · Interface directly to your existing ERP system
- Eliminate operator keystrokes (and possible errors) since jobs are automatically programmed when the work order is scanned

- · Know exactly when each job is started and completed (using barcode scanners) and average production rate
- · Optimize work orders automatically in the best sequence, taking changeover times, due dates, available machines and personnel into consideration
- Maintain a central database for all crimping specs, material specs, pull force data, engineering change notices, etc.
- Have operator scan the material barcodes (optional) to ensure that the proper wire, terminals, etc. are being used
- Keep track of how many cycles each machine, applicator or tool has produced and when maintenance should be scheduled
- · Integrate mandatory Quality Assurance tests (crimp height, pull test, micrograph, etc.) into the

- · Traceability know what machine, tool or operator produced which circuit and when
- · Reduce lead times and Work-In-Process (WIP)
- · Calculate Overall Equipment Effectiveness (OEE)

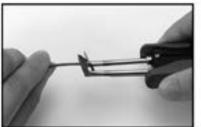
Once your wire processing equipment is networked with a central server and specialized software, the possibilities and benefits become almost limitless. This type of centralized control is already common in the machine tool industry and in large wiring harness operations. As networking technology matures, it is certain that it will also be adopted and cherished by small to medium size wiring harness operations.

For further information visit Schleuniger's website at www. schleuniger-na.com



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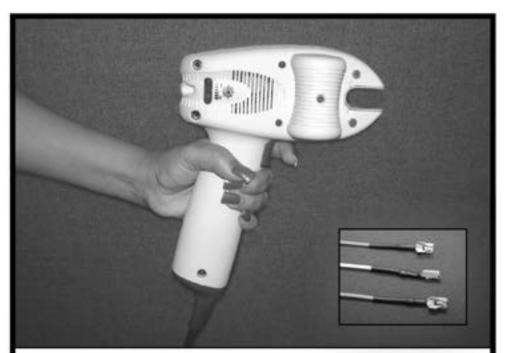












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Deployable Fiber Optic Systems for Harsh Industrial Environments

Deployable systems, often exposed in harsh industrial environments, come battle-tested

s the utilization of fiber optics has increased within the industrial sector, so have the number of "deployable" systems used in applications from oil and gas exploration, drilling and distribution to mining.

As opposed to fixed installations, deployable systems are designed to be quickly installed, retracted, and then relocated in the field and even deep underground in some of the most inhospitable environments on earth.

Given the environments in which they reside, industrial-grade fiber optic systems are typically commercialized versions of field-tested, proven militarygrade products.

As such, the component parts of the system are designed to withstand everything from dust and debris to chemical exposure, temperature extremes, UV, radiation, electrical power transients, interference, fire, moisture, humidity, water, crush, tension, flexing, impact, and vibration.

Rick Hobbs, Director of Business Development at Optical Cable Corporation (OCC), explains that when designing a deployable fiber optic system, it needs to be looked at in its entirety. Unlike fixed applications, a deployable system is designed from beginning to end (plug and play) and delivered to the customer as a complete solution. OCC designs and manufactures fiber optic cable, connectors and assembly solutions for harsh and rugged environments

According to Hobbs, the primary elements of a deployable system include hardened cable jacketing; "genderless" connectors for quick deployment without regard for male or female ends; hybrid systems that include copper along with fiber to deliver data communications and power; and reel systems that speed deployment and retraction while protecting the fiber while not in use, or during transit.

Hardened Cabling

For purposes of deployment, OCC typically recommends its tight bound, tight buffered distribution style cabling, which is ideal because of its small diameter and lightweight construction.

Distribution-style cables have a tightbound outer jacket, which is pressure extruded directly over the cable's core. This combination of a helically stranded

Announcing IPC/WHMA A-620 Rev B

Significant technical updates, greater ease-of-use and compatibility with other key assembly standards are among the many changes users will find in the newly released B revision of IPC/WHMA-A-620, Requirements and Acceptance for Cable and Wire Harness Assemblies. This important industry standard is a joint effort of IPC — Association Connecting Electronics Industries® and the Wire Harness Manufacturers' Association (WHMA).

The revision addresses more than 500 documented comments and recommendations from users throughout the industry and features 125 new or changed illustrations.

IPC/WHMA-A-620B is 400 pages long and features 682 full-color illustrations. IPC/WHMA-A-620B standards are also available on CD-ROM



core, and a pressure extruded outer jacket provides an overall cable construction that offers better crush and impact protection and increased tensile strength. This also reduces outer jacket buckling during deployment.

According to Hobbs, escalating degrees of cable protection are available as needed to meet the specific needs of an application.

Various jacket materials are available, including PVC or polyurethanes, which are specifically tailored to meet the mechanical and environmental needs of the application. Options within each jacket material include coefficient of friction, cold temperature flexibility and temperature range, to name a few.

Water tolerant options are available that take advantage of the qualities of tight buffered cable and super absorbent polymer aramid yarn.

Fiberglass or metal braided jackets not only provide excellent abrasion resistance, but also deliver increased rodent protection. Custom rodent resistant cables are available that include metal or dielectric armor or additives to the outer jacket.

"In deployable applications, exposed cable is often an intriguing temptation for animals, which can, and often do, chew on it." says Hobbs.

Hybrid Cables, Connectors

For applications that can benefit from fiber optics and copper, hybrid connector-cables offer both within the same cabling sheath.

A distinct advantage of hybrid cableconnector solutions is that the customer can bundle both the high performance of fiber with the copper power or control signals in one cable. This reduces the number of cables that must be designed, purchased and deployed into a system.

It also offers distinct savings in labor and cable structure costs for the customer.

Genderless Connectors

"Genderless" connectors have both male and female elements, and perhaps



"Genderless" connectors have both male and female elements, and perhaps are more appropriately described as dual-gender. They are designed for quick deployment allowing the user to unreel fiber cable without regard for male or female ends.

are more appropriately described as dual-gender. They are designed for quick deployment, allowing the user to unreel fiber cable without regard for male or female ends.

Companies such as OCC have further simplified the genderless design with user friendly mating interfaces (the company's EZ-Mate family) capable of "blind mate" and/or applications that require thousands of mating cycles.

In addition, the connector system is designed to resist extreme harsh mechanical and environmental conditions including high vibration, mechanical and thermal shock, and fluid immersion.

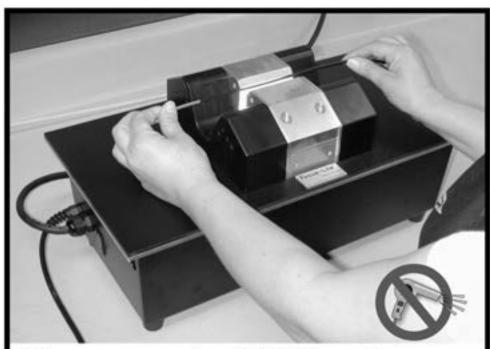
Another benefit of genderless connectors is that multiple identical cable assemblies can be daisy-chained (sequenced) together to extend the distance of a deployable system while maintaining polarity. Polarity can be an issue when connecting an odd number of traditional male to female gender connectors. In such cases, an additional connector is required to correct polarity. However, such connectors are known for high loss and add additional components for the customer. Therefore, genderless connectors are uniquely advantaged over traditional interconnection systems.

Distances of several kilometers are possible, limited only by system link budget (dBm).

"This type of genderless connector

_____Continued on page 50





Save up to 80% of your labor cost on heat shrink operations

The Focus-Lite™ by Judco Manufacturing, Inc., is the solution to all your heat-shrink operations. You can say goodbye to the high labor cost, excessive heat, and inefficiencies of other methods. The Focus-Lite™ reduces the time necessary to shrink most types of heat shrink tubing. It also improves the process control and overall quality of your shrink operation. The The Focus-Lite™ can be used for high volume bench top applications as well as low volume prototypes and laboratory applications.

Focus-Lite™ technology uses radiant energy to shrink heat-shrink tubing in a fraction of the time of traditional methods.

Here's why it works: Dual Quartz Halogen bulbs are focused to direct all of the usable radiant energy to the cable/wire diameter covered by shrink tube. This allows for 10 times the average energy expended by the bulbs to be delivered to the target zone. What you will see is an amazing difference in shrink time!

The Focus-Lite is equipped with an adjustable timer for repeatable shrinking, time after time. It also has a dimmer switch that controls the power for sensitive components. Visit our website at www.judco.net and see our full line of Focus-Lite improducts.

Judco Manufacturing, Inc 1429 W. 240th St., Harbor City, CA 90710 (310) 534-0959 www.judco.net





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Insulate, Seal, Protect.

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Deployable Fiber Optic Systems for Harsh Industrial Environments

Continued from page 49

provides extreme flexibility in the case of redeployment, where the length of the cable assemblies required for the next application are not fixed, or even known," says Hobbs.

Reel Systems

The key characteristics of a reel system in deployable fiber optic applications are that it is lightweight and stackable for storage and transit, says Hobbs.

To meet these requirements, companies such as OCC are providing light-weight alternatives to traditional metal reels. Constructed of durable, yet light-weight, impact absorbing polymers, these modular advanced reel systems

(MARS*) are designed specifically for the demanding needs of harsh-environment fiber optic installations.

Reels can be used with simple deployable axle or a flange supported deployment and acquisition system.



Unlike fixed applications, a deployable system is designed from beginning to end (plug and play) and delivered to the customer as a complete solution.

These types of systems include A-Frames, cable acquisition cradles, transit case systems, tripods, bumper mounts, backpacks, backpacks with fiber optic slip rings, and cartridge systems.

The cartridge system, which comes with casters, is an ideal choice in many deployable applications.

"Using a cartridge system, a single person can handle multiple spools at once and can quickly deploy fiber and rewind on the reel without assistance," says Hobbs.

To simplify shipping and transit, cartridge systems, transit cases and reels are designed with interlocking stacking features

Reel systems also provide a measure of protection of fiber optic cabling for unspooled cabling, or when the cabling is retracted.

"In harsh environments, when you can put your fiber optic assemblies in a controlled environment storage system like a reel, any potential damage to the cable or the connectors is minimized," says Hobbs. "This reduces the need to refurbish components regularly, because it the system better protected during its deployment."

Wireless Access/Data Communications

Although deployable fiber optic systems are largely "wired," hybrid cabling (the combination of fiber optic and copper/electrical within the same cable sheath) also allows for installation of wireless access points anywhere, even underground. This is ideal when access points are constantly changing.

Unlike traditional wireless networking devices that require 110-Volt AC power for each device, with a hybrid system power can be supplied in the same cable that also carries voice and data.

As a result, any 802.11-certified devices are able to communicate through the network, including personal devices such as PDAs, laptops, VOIP devices and cell phones.

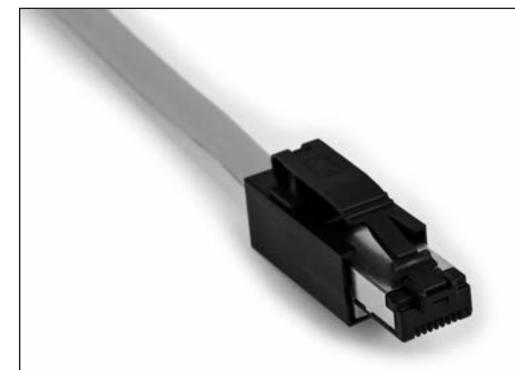
This provides personnel even deep within mines with the means to communicate with each other and even make calls outside the system. In addition, sensor-based data such as temperature, humidity, airflow and gas can also be collected and delivered wirelessly for use by the entire network.

Increasing Conversion to Fiber Optics

According to Hobbs, there are many industrial companies that are converting to fiber optics as the costs for components continue to drop, making fiber a better solution than copper in most applications. Even die-hard copper devotees are moving to fiber and when they do, they rarely look back.

"When System Engineers realize the bandwidth opportunities, they usually expand their capabilities, and identify creative new ways to enhance the solutions for their applications," says Hobbs.

For more information contact Optical Cable Corporation (OCC) at 5290 Concourse Dr, Roanoke, VA 24019; Phone: (800) 622-7711, Canada (800) 443-5262; Visit the web site www.occfiber.com.



3M™ INDUSTRIAL RJ45 MODULAR PLUG, 3R108 SERIES

The 3M Industrial RJ45 Modular Plug is based on the standard RJ45 pin profile and was developed specifically for use in rugged industrial IP 20 environments using double-shielded, four twisted pair enhanced category 5 (Cat5e) cabling. 3M's 50-year, award-winning, insulation displacement contact (IDC) technology incorporated into the RJ45 modular plug allows a reliable and easy termination process without the need to strip the wires. This RJ45 modular plug can be terminated in the field using only a pair of pliers.

The 3M Industrial RJ45 Modular Plug is designed to be used mainly in industrial atmospheres as an interface for industrial ethernet. More and more industrial machines are connected and controlled using ethernet technology to optimize factory and process automation.







Make your mark with Thermomark Roll





Create and print cable labels and markers easily.

Our Thermomark Roll wire marking systems deliver clear, permanent identification of wires and bundled cables. Phoenix Contact offers many different material types and styles, with heat-shrink tubing and self-laminating wire wrap labels being two of our most popular.

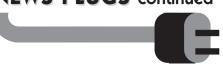
- Save money, decrease inventory with continuous heat shrink tubing
- Customize exact sleeve length using our CLIP PROJECT marking software
- All shrink tubing is halogenfree, MIL-STD-202G, SAE AMSDTL-23053 and SAE AS-81531

To learn more, call 1-800-322-3225 or request a free sample book at www.phoenixcontact.com/ wiremarking





NEWS PLUGS continued



Continued from page 45

and IP67 rated housing for moisture and dust protection.

Waytek, Inc. carries more than 10,000 electrical supplies, including wire and cable, terminals and connectors, circuit protection parts, switches and more, for OEM and MRO mobile equipment markets. Founded in 1970, the company has seen continued expansion in the electrical supplies industry. Waytek carries large quantities of stock items and is able to ship most stock items the same day, allowing customers to carry smaller inventory, yet still have products when they need them. Browse our electrical solutions at www.waytekwire.com, or call 800-328-2724.

Molded Nylon Special Standard Round Spacers

Micro Plastics' announces a new prod-

uct line of "Special Standard Round Spacers". The new line of molded nylon round spacers include over 250 sizes, with diameters of 1/8" through 1 ½" and lengths from 1/8" to 2 ¾". These tough resilient spacers can be used in a variety of assemblies. Useful in electronic and electrical applications, they may also be used as bushings, bearings, rollers, gliders and bumpers.

Micro Plastics' nylon round spacers are resistant to vibration, abrasion and corrosion. They are electrically insulating and have a high strength-to-weight ratio.

Priced relatively low, these spacers can be shipped from an inventory of over 1,500 standard sizes stocked in depth. Custom sizes can be tooled on request.

Micro Plastics' manufactures millions upon millions of fasteners daily. They offer over 20,000 items and maintain an inventory of over 250 million parts.

See their full line catalog #39 for a complete list of nylon fasteners that are available. FREE samples are available upon request. Contents include: standard and metric machine screws, cap screws, nuts,



Special Standard Round Spacers

washers, spacers, insulators, grommets, bushings, rivets, hole plugs, clamps, printed circuit board accessories, suspended ceiling hooks, wire routing kits and many other hardware items.

For a copy of their new full line catalog #39 contact Micro Plastics', PO Box 149, Flippin, Arkansas 72634. Visit www.microplastics.com.

WAGO SPEEDWAY IP67 Incremental Encoder

WAGO Corporation adds an HTL Incremental Encoder/Counter Module to its SPEEDWAY IP67 I/O-SYSTEM. The machine-mountable 767-5202 evaluates incremental encoders and SSI absolute encoders at 24 V signal levels in harsh environments. It also provides a counting function for binary signals up to 250 kHZ. This makes it ideal for counting motor revolutions in applications such as topdrives, line shafts or motion-intensive machinery found in food processing and packaging.

The SPEEDWAY 767-5202 provides two 8-pole M12 encoder ports. Channel configuration options include: type of evaluation and sensor, output format, filters, inversion, latch, gate, preset, cam, simulation and limits. 767-5202 also has two 5-pole M12 ports with four configurable digital inputs/outputs for sensors and actuators. Two of these channels can serve as pulse-width-modulated outputs, with the 100 Hz–10 kHz clock frequency having a pulse-width repetition rate of 0–100%. Users may set previously defined outputs directly as a function of counter readings.

The 767-5202 is configurable via field-bus-independent FDT/DTM, or via field-bus-dependent device descriptions (e.g., GSD or GSDML). It is programmable via

USB interface integrated into the fieldbus coupler, or directly via fieldbus (not applicable to Ethernet-based couplers).

The machine-mountable SPEEDWAY 767 I/O-SYSTEM processes 1000 instructions within 150 microseconds. It features IP67 fieldbus-independent Ethernet controllers (IEC 61131-3 programmable) and couplers, as well as DI, DO and DIO modules. The system accommodates up to 64 modules per node with a 1,650 foot node extension.



WAGO SPEEDWAY IP67 Incremental Encoder

WAGO is a leader in spring pressure connection technology that eliminates loose wires resulting from vibration and temperature cycling, while providing highly reliable, corrosion-resistant and maintenance-free connections. Products: DIN-rail, PCB and chassis mount terminal blocks; signal conditioners; the WAGO-I/O-SYSTEM and more.

For additional information, visit www.wago.us. Contact WAGO at 1-800-DIN-RAIL.

New additions to Push-In Terminal Block Line

Phoenix Contact has expanded its line of push-in technology (PT) terminal blocks to include a smaller version of the popular STIO 2.5 series. The PTIO 1.5/S series is only 3.5 mm wide with a new top-level location for the power wiring. The blocks offer the market's highest density power distribution for field sensors and actuators



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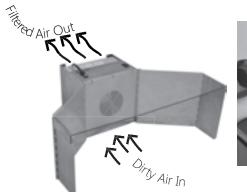
ESD-SAFE SOLDER FUME EXTRACTORS portable | benchtop | wall-mounted | floor models

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Model # SS-100-SS-ST



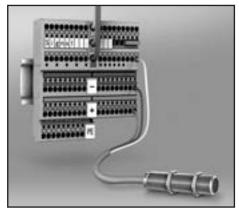
Scan to watch demo video





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The compact double-level terminals are available in three-wire and four-wire versions. The upper level is for signal feed-through and is available with or without an LED. Continuous bridge shafts allow a quick and simple potential distribution of power using push-in bridges.



PTIO 1.5/S Terminal Bocks

The PT terminal blocks allow easy and fast termination of ferruled wire by simply pushing the wire for a complete termination. Stranded wire is terminated by pushing the orange actuator, opening the spring for the insertion of the wire. All new versions are compatible with the Clipline Complete system of bridging, marking and test accessories.

The PT 1.5/S series features up to 50 percent reduction push-in force compared to other push-in type terminal blocks and allows for up to 35 percent faster termination than standard spring cage due to the short push button activation stroke. It is five times the IEC requirement for retention force and is the most compact solution available.

For more information about Phoenix Contact or its products, visit http://www.

phoenixcontact.com, call technical service at 800-322-3225 or email info@phoenixcon.com.

Nelco Products, Inc. Expands Offering Of Heat Shrinkable Tubing

Nelco Products, Inc. (http://www.nelcoproducts.com/), a manufacturer and distributor of cable ties, wire ties, heat shrink tubing, wire connectors, cable tie mounts, HVAC supply products and related wiring accessories worldwide, has announced that the company has expanded its selection of heat shrinkable tubing with the launch of food grade heat shrinkable tubing. Specifically engineered to be used in applications involving contact with food, water, beverages and nontoxic materials, this unique form of shrinkable tubing is specifically for those building beer-brewing or sous-vide projects using Nelco Products' waterproof DS18B20+ digital temperature sensors.

This heat shrinkable tubing is FDA compliant for contact with food and is flexible, non-toxic and resistant to ultraviolet light, moisture, fungus and a wide variety of chemicals and oils. Food grade heat shrinkable tubing is extremely environmentally friendly, as it breaks down to carbon dioxide and water when properly incinerated. Additionally, this tubing meets USP Class IV requirements.

For more information and to view Nelco Products' food grade heat shrinkable tubing, visit http://bit.ly/ 12GkX7P, or call toll-free at (800) 505-6352. Additionally, to view Nelco Products new product video, visit http://www.youtube.com/watch?v=TOV_luveU7Q.

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ECCO specializes in RF, Microwave, and Coaxial connectors from Amphenol® RF. These connectors are ideal for RF, broadband, wireless, microwave, and cellular applications. We stock a wide variety of these connectors including standards; UHF, N, HN, C, Twinax, & Triax Miniatures; BNC, TNC, Mini-UHF, & MHV Sub-Miniatures; SMA, SMB, & SMC Microminiatures; MCX & MMCX as well as precision connectors, adapters, accessories, and assembly tools. Our extensive Amphenol inventory includes many factory special, low volume, and hard to find items allowing us to quickly fulfill your interconnection needs.

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ALWAYS ROHS COMPLIANT





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NEWS PLUGS continued



Burndy Announces Release of Hydent™ OEM Uninsulated Lugs

BURNDY, a manufacturer and provider of connector solutions to the industrial, energy, construction, telecommunications, petrochemical, data center, OEM, and transportation industries, announces the addition of the HYDENT™ YAD uninsulated OEM lug. This lug is constructed of electrolytic copper. Designed with a brazed seam barrel, standard neck, Vgroove inner serrations and electro-tin plated for durable long-lasting corrosion resistance, two or more terminals can easily be stacked on a common stud. The HYDENT™ YAD is ideal for use with code or flex cable. In addition, the round ring tongue provides for a secure termination under the screw head that cannot be removed without the complete removal of the screw.

The HYDENTTM YAD lug works in conjunction with the BURNDY® series of OEM crimping tools designed specifically for

the OEM market. When used together, HYDENTTM YAD lugs and BURNDY® tools make up the BURNDY® Engineered System, which ensures a proper connection with quick, visible inspection.

Headquartered in Manchester, New Hampshire BURNDY has over 85 years of dedicated customer support in both service and product. Our customers need to look no further than BURNDY for all their connector, tool, and accessory needs with our BURNDY Engineered Systems of coordinating dies, connectors and tools. The three elements have been specifically designed to work together and engineered to meet stringent, accepted quality standards – providing the user complete confidence in the integrity of the connection.

For further information contact Burndy, 47 E. Industrial Park Drive, Manchester, NH, 03109, call 1-800-346-4175, or visit website at www.BURNDY.com

WAGO LEVER-NUTS® 10-Year Anniversary

WAGO Corporation's 222 Series LEVER-NUTS® lever-actuated splices celebrate 10 years of reducing wiring time by up to



Hydent™ OEM Uninsulated Lugs

ShinMaywa

Creating Solution Advantages "Gentle to the wire and Operators"



TRD401 Series

New Generation Wire Terminating Machine with Great Variety of Advanced Functions (24-14 AWG)

Excellent precision and quality in wire measuring and crimping.

Thanks to the combination of automatic wire changer and manual

applicator changer, change over time has reduced to 1/6th!



TRD301 Series

To meet Comprehensive Range of wire Processing Requirement (24-14 AWG)

High processing capability and more stable processing precision.

Single end, both ends seal insertion can be processed by TRD301WPSA/TRD301WPA



TR201 Series

High Precision Crimping for Small and smart Wire Gauges 35-18 AWG Both twisting / tinning and crimping can be changeable with quick change (TR201SS). Lead-free and regular tinning can be handled with the tinning unit.



TR202 Series

High Precision Crimping For Medium and Large Wire Gauges 28-16 AWG

Stylish body with white and stainless steel color. Single end twisting/tinning and crimping can be changeable with quick change(TR202S). Lead-free tinning can be also processed.

ShinMaywa automatic wire terminating machine guarantees high quality not only in automotive industries but in household appliances. Halogen free wires can be processed by above all series.

ShinMaywa

ShinMaywa (America), Ltd.

10737 Gateway West. Suite 240 El Paso, Texas 79935, U.S.A TEL:+1-915-594-9862 FAX:+1-915-594-9866 E-mail: Info@shinmaywaamerica.com HP: http://www.shinmaywa.co.jp/english/index.htm 50%. A versatile, labor-saving alternative to twist-style splices, LEVER-NUTS® orange lever eliminates twisting, taping and crimping. Simply lift the lever, insert a stripped conductor and lower it. This also provides reusability, giving LEVER-NUTS® a unique, cost-effective edge over traditional splices.

UL Listed, touch-proof LEVER-NUTS® carry ratings up to 600 V, 20 A max current capacity and 105°C insulating material temperature. CAGE CLAMP® Compact Spring Pressure ensures maintenance-free, vibration-resistant connections. Every model, from 2–5 conductors, accommodates solid and stranded conductors AWG 12–28 (one conductor/pole) in one unit. Soon, a prominent WAGO logo will join the molded-in ratings on LEVER-NUTS® housings, symbolizing safety, usability and long-term contact quality.

Worldwide approvals and intuitive,

tool-free operation have made LEVER-NUTS® a staple among electricians, OEMs and DIYers. Unique applications include:

- Controls PLC wiring for reverse osmosis water purification system.
- Vehicular Interconnect lighting/communication devices aboard military vehicles.
- Machinery Fan motor power leads with capacitor to limit electrical "noise."
- Appliances Internal wiring, e.g., commercial laundry, food service and HVAC.

Facts:

- 5,000 miles. If all LEVER-NUTS® sold were lined front-to-back, they'd stretch from Brookings, Ore. (Westernmost contiguous US city), to Eastport, Maine (Easternmost contiguous US city), and return to WAGO's Germantown, Wis. HQ.
- 480 A and 5 G. LEVER-NUTS® withstands 480 A Short-Circuit Currents (for one second), and vibration from 5Hz–2,000Hz, 5G.
- 5–2,500 pieces. LEVER-NUTS® packs for all projects from clamshells (select DIY stores), to JUGO-NUTS jars and bulk cartons (electrical distributors and OEMs).

For additional information, visit www.wago.us. Contact WAGO at 1-800-DIN-RAIL or info.us@wago. com

BURNDY® Announces the Release of GCB63T13G1 for Static Grounding Applications

BURNDY®, a leading manufacturer and provider of connector solutions to the industrial, energy, construction, telecommunication, petrochemical, data center,

and transportation industries introduces a temporary grounding stud GCB63T13G1 for static grounding applications.

This connector can be used on use on rail cars, chemical trucks, hazardous waste tankers or a petroleum vehicle to allow for static grounding protection, while in operation.

The GCB type connector, which is easy to install, provides a convenient contact point, allowing the rail car, truck or tanker to be grounded.

The connector is made of bronze and is supplied with silicon bronze hardware. The grounding stud can be secured using the provided ½" hexagonal nut and split lock washer.

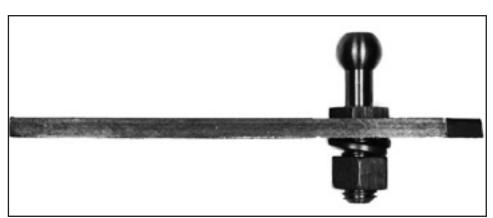
Used with universal clamps or ball stud clamps, the GCB63T13G1 can be grounded to an equipotential grid using static reels or ground cables.

Headquartered in Manchester, New

Hampshire BURNDY has over 85 years of dedicated customer support in both service and product. Our customers need to look no further than BURNDY for all their connector, tool, and accessory needs with our BURNDY Engineered Systems of coordinating dies, connectors and tools. The three elements have been specifically designed to work together and engi-

neered to meet stringent, accepted quality standards – providing the user complete confidence in the integrity of the connection.

Contact BURNDY at 47 E. Industrial Park Drive, Manchester, New Hampshire, 03109, call Customer Service at 1-800-346-4175, or visit our website at www.BURNDY.com



BURNDY® has introduced the new grounding stud, GCB63T13G1



METRIC RING TERMINALS

Introducing high-quality metric-size solderless ring terminals featuring insulated Avikrimp™ and un-insulated VersaKrimp™ seamless barrel types. The terminals provide maximum electrical performance for metric crimps using studs up to 10mm in diameter and wire size up to 6mm².

Solderless ring terminals meet UL requirements only when crimped using Molex recommended tooling; however terminals may be crimped with a variety of industry-standard tooling.

Applications:

Industrial - Electrical panels, Wiring harnesses, Terminal blocks

Automotive Aftermarket - Wiring harnesses, After-market audio or video

Consumer - Appliances / white goods, Consumer electronics / brown goods



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NEWS PLUGS continued



Cicoil Introduces New High Temperature FireWire Cable and Assemblies

Cicoil, a leading manufacturer of High Performance Flexx-Sil™ Flat Cables and Assemblies, is pleased to announce the introduction of its ultra-flexible FireWire Cable. Unlike typical FireWire cables, the Cicoil cable has been designed for high flexibility, mechanical stress, temperature extremes (-65 °C to +165 °C) and harsh environments. And the flat cable construction guarantees clear, high speed data transmission, even in the toughest of environments.

Cicoil's patented extrusion process allows 2 individually shielded 28 AWG 100 Ohm pairs and 2 shielded 22 AWG power wires to be placed in a flat profile, precisely controlling the spacing of each component, insulation thickness and the overall cable shape. The compact, Flexx-Sil™ encased cable solution is engineered to provide weight & space savings, consistent electrical characteristics, premium current carrying capacity, reduced skewing effects and EMI/RFI suppression.

Cicoil's tear resistant Flexx-Sil™ jacket is self-healing from small punctures and will not wear, crack or deform due to long term exposure to vibration, water, ice, weld spark, steam, humidity, ozone, UV light, autoclave and many chemicals. The halogen-free & flame retardant flat design is an excellent alternative to bulky round cables in tight routing, continuous motion and mission critical applications.

Standard "off the shelf" FireWire cables are available for immediate delivery and cable assemblies, complete with connec-

tors are offered in 3 foot, 6 foot and 12 foot lengths. Custom designs are also available with minimum lead times. In addition, Cicoil offers anti-friction coatings, impact resistant Super TuffTM jacketing and custom shape designs by request.

Cicoil's Flexx-Sil™ Jacketed Cables are UL & CSA Recognized, CE Conforming, RoHS & REACH Compliant, Class 1 Clean Room Rated and are manufactured in an automated, climate controlled environment.

Cicoil has been a leader in designing and manufacturing high performance cable assemblies for over fifty years. The company's Patented Flexx-SilTM Flat Cable Technology provides high flexibility, extremely long life, and they can withstand temperature extremes from -65 degrees to +260 degrees Celsius. Cicoil's flat cables are used in thousands of demanding applications; including aircraft fuel control cells, semiconductor automa-

tion, and the Space Shuttle. Cicoil designs and manufactures its Flexx-Sil™ jacketed cables and cable assemblies in an automated facility in Valencia, California. Cicoil's quality assurance system is certified to the ISO 9001 (AS9100) standard. Visit www.cicoil.com for more information, or call 661-295-1295 to speak to an application engineer.

Nelco Products, Inc. Expands Offering Of Heat Shrinkable Tubing

Nelco Products, Inc. (http://www.nel-coproducts.com/), a manufacturer and distributor of cable ties, wire ties, heat shrink tubing, wire connectors, cable tie mounts, HVAC supply products and related wiring accessories worldwide, has announced that the company has expanded its selection of heat shrinkable tubing with the launch of food grade heat shrinkable tubing. Specifically engineered to be used in applications involving contact

with food, water, beverages and non-toxic materials, this unique form of shrinkable tubing is specifically for those building beer-brewing or sous-vide projects using Nelco Products' waterproof DS18B20+ digital temperature sensors.

This heat shrinkable tubing is FDA compliant for contact with food and is flexible, non-toxic and resistant to ultraviolet light, moisture, fungus and a wide variety of chemicals and oils. Food grade heat shrinkable tubing is extremely environmentally friendly, as it breaks down to carbon dioxide and water when properly incinerated. Additionally, this tubing meets USP Class IV requirements.

For more information and to view Nelco Products' food grade heat shrinkable tubing, visit http://bit.ly/12GkX7P, or call toll-free at (800) 505-6352. Additionally, to view Nelco Products new product video, visit http://www.youtube.com/watch?v=TOV_luveU7Q.

New DVD Helps Industry Understand Requirements of Conflict Minerals Regulation

As the first filing deadline approaches, electronics manufacturers and suppliers preparing for compliance with the U.S. SEC conflict minerals regulation have a new resource for answers and facts with IPC's 2013 Conflict Minerals Conference Proceedings. IPC's Proceedings DVD is a compilation of audio and slide presentations recorded during its popular summer conflict minerals conference and features top experts on the conflict minerals regulation.

For companies seeking guidance on compliance with the new regulation, IPC's 2013 Conflict Minerals



Conference Proceedings provides the facts on regulatory requirements, customer requirements and emerging industry practices. In addition to a brief history of the conflict minerals rule and an overview of regulatory requirements, topics covered include due diligence and audit preparation, risk mitigation, data management, enterprise social responsibility and building compliance roadmaps.

"The Proceedings DVD gives those who could not attend the event the opportunity to benefit from the knowledge shared by industry experts and the experiences of those in the trenches who are developing or have developed compliance plans for their companies," said Fern Abrams, IPC's director of government relations and environmental policy. She adds, "IPC is fortunate to work with these experts and tapping into their wealth of knowledge is a clear benefit we can share with our industry members."

IPC's 2013 Conflict Minerals Conference Proceedings is available for \$100 for IPC members; \$200 industry rate. For more information or to purchase the DVD, visit www.ipc.org/proceedings-conflict-minerals.

connectPower from Weidmuller

Wider Protection with

In efforts to strengthen an already extensive circuit protection product offering, Weidmuller introduces two new models to the connectPower line of DIN-rail mounted circuit breakers. Weidmuller's new BR Series circuit breakers are UL 489 Branch rated and the new SU Series circuit breakers are UL 1077 approved for Supplementary protection.

Weidmuller's lever-operated breakers use thermal-magnetic technology, having ratings up to 277/480V and 60A in 1, 2 and 3 pole formats, and are available immediately with C or D trip characteristics. The ranges are designed for industrial control applications, especially where the control equipment may be in an environment that needs to resist vibration and mechanical shock.

A compact 17.5mm width on the rail is part of an attractive package for the connectPower circuit breakers. Weidmuller's BR Series and SU Series circuit breakers give users the option of using either wire-end ferrules or ring lug terminations for the supply and load, as well as UL-approved bus-bar accessories to simplify and reduce the installation time. To maximize security and safety, the operating lever can be locked, off or on, and even the IP20 connections can be supplied with optional touch protection caps.

Weidmuller supports customers and partners around the world with products, solutions and services in the industrial environment of power, signal and data. The company develops innovative, sustainable and useful solutions that set standards in Industrial Connectivity today and continually work toward providing solutions for the technology challenges of tomorrow.

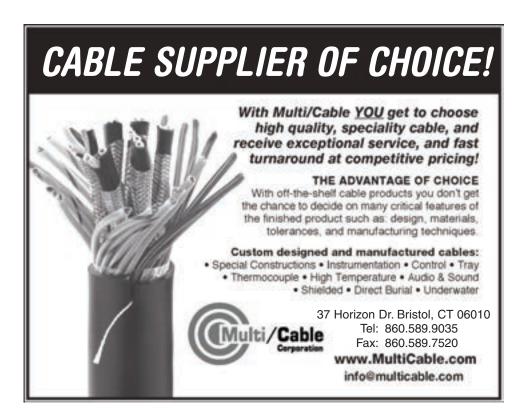
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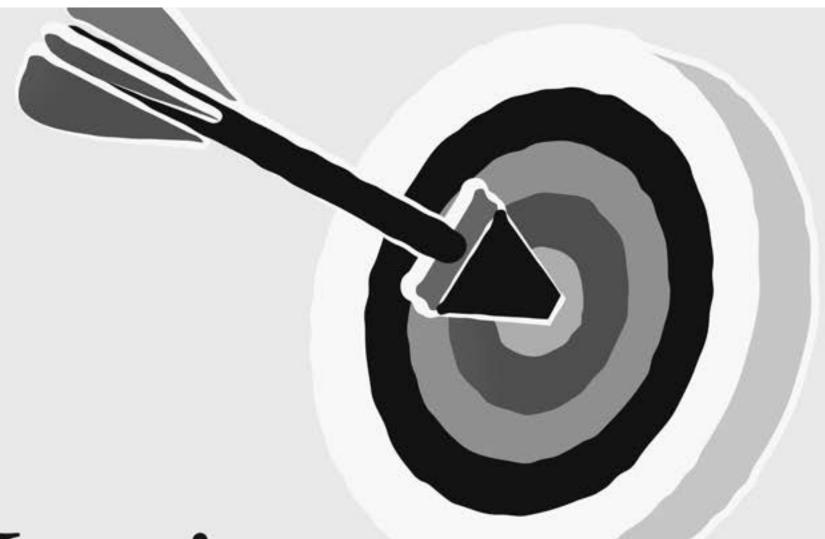
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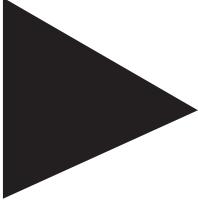
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