- Merger & Acquisition Services
- Control Panel Manufacturing Automation
- Scrap E-Waste, Environmental Standards & Certifications
- Cadmium Replacement Coating for Military/Aerospace Connectors



The 2012 Electrical Wire Processing Technology Expo

If you missed the 12th annual Electrical Wire Processing Technology (EWPT) Expo held in Milwaukee last May, you missed quite a show. Held downtown at its permanent home in the Frontier Airlines Center, the show was host to 136 exhibitors, a 20% increase over 2011. The final attendee tally was 1848, representing a 6% increase over last year's total. Attendees came from 22 different countries for this event, and hailed predominantly from the OEM, Contract Manufacturing, and Assembly arenas. (see fig. 1)

First held in 2000, the two day show has become the single biggest gathering of wire processing equipment manufacturers in North America, with attendee and exhibitor growth every year. "This show has really become the starting point for decision makers in our industry," boasted one exhibitor at the show.

Once again, the event's Exhibitor Advisory Committee chose an informative array of free seminars. Don Price from Ford Motor Company and Rakesh Patel of the ISO Electrical Cables Committee were on hand to present the latest on aluminum wiring, including phase-in schedules, termination technology, and technological hurdles. Next was Ruben Lozano of Lakes Precision to explore the mechanical limits of copper and aluminum wire as it is transformed from bulk wire to harness assemblies. Day one seminars concluded with Eric De Jans from Z + F USA covering crimping fundamentals, material specifications, proper geometries, and testing methods for turned contacts and wire ferrules.

The Day 2 seminar schedule began with Lyle Fahning of the WHMA who covered the WHMA IPC/WHMA-A-620 specification for wire processing, with a heavy emphasis on the pending Revision B changes. Keith Nicholas of TE Connectivity followed with his presentation on maintaining quality crimping results under extreme conditions. Concluding the show's seminar schedule was Joe Porter of Grayline who provided an in-depth look at heat shrink tubing, including sizing calcula-

Scrap, E-waste, and Environmental Standards and Certifications

By Joe Tito Wiring Harness News these gases requires capital intensive baghouse systems, and is subject to very strict oversight from OSHA and the EPA. Curious about how wiring harness manufacturers handle scrap, and even if it was worthwhile studying, I sent out a query on the WHMA listserv asking just that. I got some interesting responses that I will share later. But I also became involved in a couple of conversations



tion, and material selection.

The Expo has become known for its hospitality, and this year was no disappointment. Exhibitors were treated to a Beer-N-Brauts party sponsored by Assembly Magazine on set-up day, and an Exhibitors Breakfast sponsored by The Frontier Airlines center on Day 1. The Day 2 Exhibitors Breakfast was presented by *Wiring Harness News*.

Attendees also enjoyed red-carpet treatment with a Day 1 morning break sponsored by Komax and an afternoon break held by Schafer. The spectacular After Hours VIP Party was co-sponsored by Komax and *Wiring Harness News*, and featured incredible buffet stations and live jazz music. The morning break for Day 2 was by Mechtrix, and WHMA provided Lobby Coffee both days. One of the signature events is always the Day 2 Bloody Mary Bar, and was provided by Mecal by Starn.

This year's show was co-located with the Electrical Manufacturing & Coil Winding Expo which was held in an

Continued on page 12

Merger and Acquisition Services for the Wire Harness Industry

Following is an interview Wiring Harness News recently had with Loren M. Smith, CEO of Blue Valley Capital about merger and acquisition services for the wire harness industry.

WHN: When an entrepreneur is thinking about selling his or her business, what questions are you most frequently asked?

Smith: Why should I pay you, or anyone else, to sell my business for me?



Recently, at the EWPT Expo, I ran into several Milwaukee area salvage yard operators who were looking for tools to strip scrap wire for smelting or granulating.As you can imagine, smelting insulated wire produces many toxic gases. Capturing

Continued on page 14

The answer is the price you'll get, pure and simple. A good broker will generate in a price materially above what you could achieve on you own. The difference between the price a good broker brings to the table, and what you could do on your own, will far exceed his fee

WHN: What if an owner is approached by someone who looks to be a good buyer, offering a really good price?

Smith: This is the very worst way to sell a business. In the absence of a competitive process, you have no way of knowing if the price and terms are best for you. While the party contacting you might be well intentioned, and in fact a good fit for your business, the price he offers could be a fraction of your value.

Loren M. Smith, CEO Blue Valley Capital

WHN: How is price determined? Smith: Price is a multiple of EBITDA; (Earnings Before Interest,Taxes, Depreciation, and Amortization). Some factors that effect this multiple are; size (your revenue), customer concentration (percent of business with very few customers), your market (industry served), strength of customer relationships, and, your management team. Size: generally

Continued on page 10

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-n May, I had the opportunity to once again attend the National Electrical Wire Processing Technology Expo in Milwaukee. This is one of the few expositions that I attend each year and mostly because it is so squarely focused on our industry. I enjoy the opportunity to see and meet with customers, suppliers, fellow WHMA members and as well, spend time in the WHMA booth attracting new members to our organization.

Jim Manke and his new bride, Kathi Schlieff, do a terrific job in managing our organization and also never fail to bring a little creativity to our WHMA booth. This year, they dressed as NASA shuttle pilots in order to bring attention to the fact that, this summer, IPC and WHMA will launch IPC/WHMA -A-620 Rev B. They garnered lots of attention, WHMA gained some new members, and one young lady is, I'm sure, convinced to this day that she met "real" astronauts, who she called, "true American heroes!"

The thing that I noticed the most, were the number of people inside the Frontier Airlines Center. I have not yet seen the attendance numbers, but my observation was that attendance was up from the past couple of years. Recent statistics from Bishop and Associates indicate that after growing by 5.7% in 2011, the North American cable assembly market will likely be roughly flat at approximately .4% growth in 2012. On the surface, that seems anemic, but I'm guessing that most WHMA manufacturing members would prefer flat to the wild swings of plus-and-minus 20% in 2008 and 2009!

Having said that, what struck me most intensely, was the amount of booth traffic being enjoyed by supplier-members of WHMA. At all times, the folks



Mark Wood WHMA Chairman of the Board

manning the booths seemed to be occupied with customers or potential customers. This was especially true with the suppliers offering capital equipment. Now, I'm no economist, but it seems to me that if the capital equipment companies are busy either resupplying equipment that was held together with tape and bubble gum during the downturn, or helping folks gear up in anticipation of strong forecasts from their OEM base, I'll take it. To me it's a sign that this industry is poised for terrific future growth, especially given the continued move to re-shoring manufacturing to North America from elsewhere in the world. And to this amateur economist, it seems that if it starts with the capital equipment folks, it quickly moves to the component and wire suppliers, and in the end, leads to a healthier industry for all players.

Does any of this mean that the wiring harness industry is out of the woods and happy days are here again? Maybe not entirely. But I'll take the satisfied looks of salespeople exhausted from a day of promoting their products over the look of boredom that comes from a day of manning an empty booth any day.

If you would like to contact me please email wmarkwood@hotmail.com

2012 Production Schedule

<u>Issue</u> *September/October 2012* <u>Reservations Due Date</u> August 3, 2012

<u>Materials Due Date</u> August 10, 2012



2012 Electrical Wire Processing **Technology Expo**

The show has become the single biggest gathering of wire processing equipment manufacturers in North America.

Scrap, E-waste, and Environmental Standards and Certifications

Curious about how wiring harness manufacturers handle scrap? Joe Tito of Wiring Harness News talks with Jason Teliszczak of JT Environmental Consulting.

Merger & Acquisition Services for the Wiring Harness Industry

Loren Smith, CEO of Blue Valley Capital discusses merger and acquisition services for the wiring harness industry.

Sales & Marketing

"Sales" is an ongoing process that will yield measurable results if you consistently do the right things for your customer, and "Marketing" will help you know what that is.

Control Panel Manufacturing Automation

The manufacturing of control panels is traditionally a labor intensive process with few options for process automation. This article presents some available solutions.

News Plugs

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

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Sales & Marketing – its more than just "Sales and Marketing"

by Paul Hogendoorn

There have heard two quotes in recent weeks that struck me as being incredibly insightful. The first one was "sales is the outcome, not the objective", and the second one was "the question isn't what's in it for me, the question is what's in it for you."

These two quotes struck a chord within me, and I instantly knew they were true. The problem is though, that even if we know deep down inside that these messages are true, we often conduct ourselves and direct our business' activities in the exact opposite way. We structure our sales meetings around the numbers – how much we sold, what our target was, and what we hope to sell next period. The topics of conversation are more likely to be about the reasons why we didn't achieve certain sales figures than they are about what is needed to be done in order to achieve more.

Making a sale usually comes down to one of three things; the customer's desire to purchase from a specific company (they favor the brand or the product), the relationship the customer has with the company (usually the sales person, but it's even better with multiple peer-to-peer relationships), and the price. All too often, the primary focus of the attention is price.

In my 30 years' experience, in multiple markets with a wide variety of products, I found that if a company spent



Paul Hogendoorn

enough consistent and intentional energy on the first two factors (brand and relationship), that price became less and less of a factor. You may not be able to win all the contracts out there, but the best ones to lose are often the ones your competitor won on price. Or looked at another way, if your competitor is winning bids against you with a similar or higher price, it means your company is not doing as good a job on brand and relationship as they are. The focus of the sales meetings should be identifying, planning and then measuring, all of the company's activities that build brand and strengthen relationships, not simply on the sales numbers. This period's sales

_Continued on page 7

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Sales & Marketing – its more than just "Sales and Marketing"

Continued from page 4

numbers are the product of the previous period's sales activity, and next period's sales results will be the product of this period's sales activity - so, the question really is "what sales activity are you doing now, and what should you be doing?" If all the right things are being done, for the right reasons, the only additional "sales" skill required is knowing how and when to ask for the order. Sales is the outcome, not the objective.

The biggest benefit of a strong relationship with your customer is understanding them better than your competitors do, and knowing what's truly important to them. People are quick to use the term "win-win" when they describe negotiations or a deal they just concluded. But "win-win" outcomes are natural consequences of solid and genuine business relationships; they are not the objective in and of themselves. It's possible for each to side to go into a negotiation knowing what they want for themselves and then to call it a "win-win" if both sides achieve all or part of their goals. But, if both sides went into the negotiation knowing and appreciating what the other side needed, and then aim for achieving that, an even better "win-win" would result. Knowing your customer so well that you appreciate "what's in it for them", and they appreciate it for you, is the hallmark of an optimal relationship.

In general, the larger a company is,



the more it tends to focus on "brand". (Think cars, beverages, sports equipment etc.). Small companies get a bigger bang for their buck focusing on relationship development. Medium size companies will do some of both; they will have a solid presence in select tradeshows, advertise in the right magazines, and do whatever they need to do to be perceived as the best brand in their industry. They will also make a consistent and intentional effort to engage their customers to build genuine relationships.

The biggest challenge for many industrial and technical companies is often just establishing an adequate budget for sales and marketing in the first place.All too often, companies are willing and eager to plan and allocate funds and resources towards R&D and engineering to design new products to sell, but not as eager to plan and allocate funds to market and sell them. The tendency is to do the engineering first, and then when that's all done, the marketing and sales afterwards. That common tendency flies in the face of what these two quotes instinctively tell us - that "Sales" is an ongoing process that will yield measurable results if you consistently do the right things for your customer, and "Marketing" will help you know what that is.

Paul Hogendoorn is founder of TPI Associates, an organization established to help entrepreneurs and business leaders define and achieve their vision by developing successful strategies for sales and marketing. He can be reached at paul@tpi-3.com

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Van Miller, North American Sales Representative, Kiesling USA

Christine Knapik Director of Marketing ePlan Software and Services

oday the manufacturing of control panels is traditionally a labor intensive process with few options for process automation. Most operations are done manually including engineering, laying out, punching and drilling the back panels and enclosures; cutting to length, stripping, crimping, and labeling the wires, installing the components and wiring the panels.



Existing Engineering documentations is often manually modified for new projects resulting in long quoting cycles. Often revisions occur during the build cycle and all panel documentation such as drawings, schematics, bill of material, 2D and/or 3D layouts in addition to a wide variety of manufacturing lists and instructions must be simultaneously and manually revised.

Yes, many control panel manufacturer today use a variety of software in order to produce these outputs but they rarely have true integration to each other. For example, the schematics may be drawn in a simple CAD system, the bill of material resides in a standard Excel or .csvtype spreadsheet, the 3D representation is drawn in a product such as Solid Works, while the component pricing resides in an ERP system that has little or

no connectivity to the engineering system. It then becomes difficult to maintain revision control between all engineering documents as changes are made to the product. The results can range from a large amount of time spent maintaining the project to quality errors in the finished product.

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__Continued on page 30

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Merger and Acquisition Services for the Wire Harness Industry

Continued from page 1

a \$10M company will demand a higher multiple than a \$2M company. Customer Concentration: this could be a negative, but not necessarily, it depends on who your customers are and the nature of your relationship with your customers. Market: Some markets have greater growth potential and stronger margins than others. Strength of customer relationships: To what degree do your customers depend on you for design input, for short lead "drop ins", for quick turn revisions changes, what share of their business do you have, how long have you been their vendor, how hard would it be for them to re source? Management team: A team that provides a buyer with confidence that past performance will continue, and one which the buyer believes has the potential of taking the business to the next level, will always have a positive effect on multiple.

WHN: What information do prospective buyers need to see?

Smith: You only get one chance for a first impression; a sales document is your first impression. Unless a professional is able to create a document that accurately

paints a portrait of your business, you will spend a lot of painful time explaining to a prospective buyers why it is your business should command the price you are asking. The broker that paints this picture should have some knowledge of the wire harness industry so that he gets it right, without your having to take the time to educate him. Explaining customer relationships and interactions over the history of the business is key. Most entrepreneurs are so busy fostering these customer bonds that they sometimes underestimate the importance of what they have built outside the numbers and the bricks

> and mortar of the business. Typically buyers want to see a 3 or 5-year financial history, as well as a forecast for the next few years. A good broker will be able to put your company's financials in a matrix that enables the reader to quickly understand the numbers, without much need for clarification.

WHN: Is it possible for an owner to stay involved after he sells his company?

Smith: Absolutely. A transaction that keeps you and your team in place, after the sale is always possible. A good broker can find you a buyer to provide you with liquidity, who will finance your growth, and who will not play a day to day role in your company, if that is your preference. The right broker for you should have relationships with wire harness companies, contract manufacturers, private equity firms, venture capital firms, and angel investors whose investment decisions are based solely on backing management teams with solid track records, and compelling business plans. (This is by far our most common transaction; I sold my own business that way)



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WHN: Will the sale process interfere with management's ability to run their business?

Smith: Any good broker should be willing to explain their process in such a way that you are satisfied it will not interfere with management's ability to operate normally. They should be able to gather the required infor-

mation and make initial contact with buyers with a minimal time commitment from you and your team.

WHN: Can you tell an owner up front who the likely buyers for his business might be?

Smith: Unfortunately it is not possible to predict who the most likely buyer might be, because it's not possible to know the challenges and/or opportunities prospective buyers might have on their plate. A good brokers' process should start with the widest range of possible buyers, including; wire harness manufacturers, contract manufacturers, angel investors, private equity, and venture capital firms. Initial contact should be anonymous, i.e. your name and location need not be revealed until a prospec-

tive buyer is qualified by the broker, and approved by you. An experienced broker will almost always have a potential buyer for you as a "fit", but it is my practice to always leave my preconceptions at the door, since more than any other single factor, a buyer's appetite for a deal your size at that point in time is what will drive a successful sale.

WHN: How long does it take to sell a business?

Smith: The time to sell a business ranges from 3 to 12 months, with an average of 4 to 6 months.

WHN: How does Blue Valley Capital differentiate itself from its competitors?

Smith: As CEO of Blue Valley, I make certain we have a "no surprises" policy on every deal. Consequently, Blue Valley's highly successful track record is truly unique among business brokers. We are scrupulously detail-oriented in assessing a business, and focus on a limited number of deals at any one time to ensure a steady path to closing. I am extremely proud of the fact that the great majority of Blue Valley's transactions today are referred from previous parties in previous transactions. Having been both a seller and buyer of numerous wire harness companies, and, having owned, operated, and sold a successful wire harness company, I think I understand the process pretty well, and, I think I understand the thought process of buyers, sellers, and owners; I very rarely get surprised.

If you have further questions for Loren please email: lms@blvcapital.com or visit www.bluevalleycapital.com

~*WHN*~

Wiring Harness News Classified ads Pages 50, 51 and 52 Calendar of Events Page 53



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EWPT Expo

adjoining hall. Attendees to either show were entitled admission to the other at no extra cost. The EMCW Expo provided additional exhibitors for electronic assembly manufacturers interested in coil winding, motor design and fabrication, armature and stator manufacturing, and other magnetic components.

Since its inception, the EWPT Expo has been produced by Expo Productions, Inc. EPI is a full service exposition and management company with a focus on trade shows and event planning. Show Manager Jay Partington, and Sales Manager Cheryl Luck are highly visible on the show floor to maximize the experience for both exhibitors and

Continued from page 1

attendees. Their tireless efforts continue to increase exhibitor ROI while providing attendees the most comprehensive platform for decision makers in the industry.

As a manufacturer in the wiring harness industry, you simply must put next year's show on your calendar for May 8 -9, 2013. If you are considering exhibiting, you should know that demand for floor space is high. EPI has informed Wiring Harness News that plans are in effect to increase floor space for the 2013 show. Time is of the essence though, so contact Cheryl Luck at 800-367-5520 or cheryl@epishows.com for details.

~WHN~



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Today

Scrap, E-waste, and Environmental Standards and Certifications

Continued from page 1

offline concerning environmental certifications, and ways companies can monetize their waste stream in general. A good starting point seemed to be a discussion of industry standards and certifications; specifically R2, e-Stewards®, ISO 14001, BS EN 16001, and the new ISO 50001. To help me better understand these, I enlisted the help of Jason Teliszczak, CEO and founder of JT Environmental Consulting.

Jason is passionate about maneuvering companies through environmental certification saying "its not about gimmicks or just finding the cheapest way to throw your garbage away; now its about getting money back." He thought it would be useful to begin by defining scrap and e-waste. "Some people think its the same thing; and some think scrap is a typical bin of raw metal, and e-waste is computers," he held. "But generally, ewaste is anything that connects to power [like a computer equipment] or something that has a circuit board attached," he advised.

The R2 and e-Stewards[®] certifications are not typically sought by wiring harness manufacturers, unless they want to get into the recycling business. It is, nonetheless, important to understand how they impact recyclers downstream, and how they might dovetail with you

JIH PRID

in-house environmental program or certification. Jason began by saying, "R2 was created with the help of the EPA to better implement a standard to promote environmentally sound recycling." R2 has been around about three years and defines the procedures recyclers must follow in the disassembly or disposal of used electronic equipment. He noted that this certification is popular among recyclers because it was created by the EPA. That gives them a better handle on state and local legislation. Jason mentioned that the R2 certification is becoming particularly helpful, and in some states necessary to be in the recycling business. "Pennsylvania says that if you touch e-waste, you had to be [R2] certified by 2012," he revealed.

The e-Stewards® program is the project of the Basel Action Network, a 501(c) 3 organization that seeks to restrict trade in hazardous waste around the world. It is similar to R2 with many overlapping doctrines. As Jason noted, it too is a platform "designed to enable organizations disposing of electronic equipment to easily identify recyclers who adhere to the highest standards of environmental responsibility, and worker protection." The principle difference is that e-Stewards® has international reach.As such, Jason is not surprised that the ISO 14001 environmental certification is required for e-Stewards® applicants. He noted that e-Stewards® tends

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to be more strict on verifying downstream vendors, as well as exactly where those vendors preform operations.

Almost everyone is familiar with the ISO 14001 environmental certification, as it has been implemented by some 240,000 companies in 159 countries since its inception in 1996. It was developed as an international standard to help organizations of all sizes to minimize pollution, and thus their overall impact on the environment. Jason pointed to some of the limitations of ISO 14001 saying "It just doesn't cut it anymore because it's not specific enough." He qualified this by adding "[ISO] 14001 was about being environmentally friendly where the other standards now include safety, security, quality, and vendor qualification; as well as the environment."

Enter ISO 50001. This standard, released in June of 2011, concentrates more on energy management. It provides organizations specific strategies to increase energy efficiency, reduce costs, and improve performance. Jason noted the potential for ISO 50001 to be the fastest growing standard ever. He's confident of this since, under ISO 50001 guidelines, "companies will see an instant savings in revenue by utilizing energy efficient products and/or programs." He conceded some limitations of ISO 14001 saying "companies couldn't figure out how to get greener, so they went to [ISO] 14001."They began with good intentions collecting all of their glass, cans, paper, etc. He noted, however, "companies began to cheat a bit saying 'well, we've turned out the lights more often, so we are consuming less power, therefore we're greener'." The nice thing about ISO 50001, Jason stressed, "is that it that it lines up with other core ISO standards, so if a company is already certified to ISO 9001 or ISO 14001, they don't have to re-write an entire system; but can merely add the specifics for [ISO] 50001."

The ISO 50001 certification is very similar to the BS EN 16001 standard, and Jason sees it as the internationally recognized replacement. He added, "usually if a standard is deemed to have merit or is working well, ISO will create its own version."

In the next issue of *Wiring Harness News*, we will discuss specific ways you can manage and monetize your waste stream, as I interview Joel Powell of Instream Environmental. Instream is a world-class recycling organization helping companies solve manufacturing waste headaches. I'll also share the responses I received from my query to the industry on scrap.

Special thanks to Jason Teliszczak of JT Environmental Consulting for helping me compile this article. For over ten years, JT Environmental Consulting has been helping organizations become compliant to the standards discussed, as well as Green Building initiatives, quality standards (ISO 9001 and 13485) and safety standards (OHSAS 18001 and SA 8000[®]). For more information, visit their website at jtenv.com. You can contact Jason directly at jason@jtenvironmentalconsulting.com

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HellermannTyton Wins Genie Group "Excellence In Service and Delivery" Award

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edges the supplier who exemplifies the highest level of excellence not only in the provision of quality products and support but also the demonstration of continuous effort toward meeting the individual goals of its distributor members.

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Sonobond's Ultrasonic Metal Spot Welders Custom-Tooled to Meet Specific Needs of Individual Customers

Sonobond provides custom tooling for its made-in-the-USA ultrasonic metal spot welders. With the exception of wire-to-wire applications-which can use Sonobond's standard jaw set and readily-available tips—some amount of tooling customization is usually needed for wire-to-terminal and sheet metal welding. And Sonobond works closely with plant engineers and other manufacturing personnel to make tooling that will accommodate their unique application and production requirements. These tooling modifications ensure fast, cost-effective ultrasonic welding and produce the top-quality, consistent welds the customer demands.

<u>A Step-by-Step Approach to</u> <u>Every Application</u>

Sonobond will first confirm that their ultrasonic metal welder can accomplish the basic tasks demanded of it, including welding wires to terminals involving tinned materials (Sonobond has the only ultrasonic system that is capable of reliable one-pulse welding of most oxidized and tinned metals without pre-cleaning). The company then determines what tooling adjustments are needed for the customer's specific application.

That process begins by carefully considering the geometry and specifications of the finished part. Then tooling is designed that will



Banana Plug Custom Tooling for Blue Jeans Cable

hold the various pieces together in the proper orientation while the ultrasonic weld is being completed—but without unnecessarily complicating the load and unload operations. The finished welds are

checked to be sure the customer's dimensional tolerances, as well as their electrical and mechanical requirements, are all met. The customer is invited to review the operation or is sent parts to check against his specifications before the machinery is shipped. In some cases, a Sonobond technician will be present at the customer's site for checkout and approval before the welder takes its place in their production process.

<u>Custom-Tooling for</u> <u>Blue Jeans Cable</u>

Blue Jeans Cable in Seattle, Washington is a manufacturer of professionalgrade cabling for home audio and video components. The company had been using a mechanical screw joint to produce its speaker cables. However, after learning about the SonoWeld® 1600 Ultrasonic Spot Welder at a trade show, Blue Jeans Cable asked Sonobond to design tooling which could be used to assemble the banana plugs that insert the wires coming from amplifiers or receivers into speakers. Blue Jeans Cable wanted an affordably-priced plug with superior electrical and mechanical integrity. To accomplish this, the SonoWeld had to be able to hold the company's custom-designed banana plugs firmly in place so that the #10 and #12 stranded copper wires could be inserted into the back of the plug and then fused directly to the brass surface. Sonobond worked with the company to



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__Continued on page 20

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Sonobond's Ultrasonic Metal Spot Welders

Continued from page 18

achieve the desired results. In the words of Blue Jeans Cable's management, the banana plugs assembled on their 1500watt SonoWeld 1600 create "a bond of remarkable strength and low electrical resistance" and ensure the "best physical durability and electrical integrity of any speaker cable."

<u>Customization Produces "Outstanding</u> <u>Results"</u>

Lake Cable, LLC in Valparaiso, Indiana encapsulates cables in metal sheathing and extrudes overall jackets over its control, instrumentation, and power cable product line. As part of this process, Sonobond's 2500-watt SonoWeld 1600 needed to make several line welds which would join the end of one roll of sheet metal to the beginning of a new roll of sheet metal in order to permit a continuous cable sheathing operation.

Sonobond designed a custom anvil slide assembly and modified the welder frame. This enabled the 4½ -inch-wide material to traverse into and out of the



SonoWeld. The material approaches the machine on an angle, with the slide assembly moving the metal strip under the welding tip. A series of successive line-spot welds can then be made across the overlapped ends of the two pieces of sheet metal. The modified frame of the welder accommodates the sheet metal flow, allowing the metal to be fed from one roll and taken up on another roll after welding.

Lake Cable has determined that these modifications produce a stronger joint—equal to 90% of the parent material's strength. The company also reports that it takes only a few seconds to create several line welds. In short, they describe their custom-modified SonoWeld 1600 as delivering "outstanding results."

For more information about Sonobond products or their free, no-obligation Ultrasonic Welding Viability Test, visit the company's website at www.SonobondUltrasonics.com, call 800-323-1269 or contact Vice President Melissa Alleman at MAlleman@SonobondUltrasonics.com.

Sonobond custom-tooled their SonoWeld® 1600 Ultrasonic Spot Welder for Lake Cable, LLC. It designed a custom anvil slide assembly and modified the frame so that 4 ½-inch-wide material could traverse into and out of the machine on an angle. The slide assembly moves the metal strip under the welding tip and a series of successive line-spot welds are made across the overlapped ends of the two pieces of sheet metal.



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Another major breakthrough for Artos Engineering: the evolutionary Cr.22 Wire Processing Machine enabling manufacturers to maximize low-volume, high-mix run production.

The best-in-class-value Cr.22 is an advanced version of the company's popular Cr-11 offering up to four processing stations for a wider range of applications such as weather sealing, crimping, twisting and tinning. The Cr.22 is powered by an easy-access single-phase 220 volt supply. Its eco-friendly design reduces energy consumption compared to stepper motors.

Like the Cr.11, the Cr.22 is specifically designed to handle low- to medium-volume runs requiring multiple change outs during production. The new machine also



Cr.22 Wire Processing Machine from Artos Engineering

has the capacity to handle high-volume runs.

"Diversity in production is key. Our customers want options and flexibility. Artos continues to offer this with the Cr.22 ", said John Olsen, company president.

Utilizing the latest digital servo technology, the Cr.22 picks up where the Cr.11 leaves off. "It's the best of all worlds when we start with a winner and add capabilities our customers and the industry tell us they want," Olsen said. "The weather sealing, wire-twisting and tinning needs are prominent and Artos was able to address them with gusto."

Artos Engineering turns 101 years old this year. Not many companies have stood that test of time. Customers world-wide know that Artos stands for quality and reliability. Artos machines are robust workhorses. They are all Windows®-based making them easy to program and easy to operate. The Cr.22 is no exception.

"From our smallest bench top stripper to the Cr.22 and MTX-5-Premiere, Artos doesn't just sell machines, we provide long-

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Founded in 1911 and based in Brookfield, Wisconsin, Artos Engineering Company is a manufacturer of wire processing equipment serving the aerospace, automotive and manufacturing industries. For more information, visit www.artos

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Cadmium Replacement Coating for Military/Aerospace Connectors

ith the last remaining loopholes closing rapidly, the opportunity for connector manufacturers to find an optimum cadmium replacement is here. Even those that produce or distribute aerospace and military-grade connectors are under mounting pressure to meet the tightening requirements of the European RoHS directives, which are pushing towards elimination of cadmium altogether.

"The first European RoHS standard came out in 1996, but excluded the military and some aerospace applications," says John Schnepf, president, Corsair Electri-

cal Connectors, Inc. (Irvine, CA). "Since then, however, the stance of RoHS against cadmium content in electrical and electronic equipment has continued to intensify. The EPA is not quite there as far as the requirements are concerned, but you can see the trend. It is coming."

According to Schnepf, Corsair and other connecmanufacturers are tor more than willing to eliminate cadmium or any other contaminants from products. The issue, however, is finding a suitable alternative to cadmium and nickel-cadmium at a reasonable price point that delivers the equivalent (or better) conductivity, corrosion protection, compatibility, wear resistance, lubricity and low coefficient of friction

"There are any number of platings that meet the corrosion resistance requirements of cadmium," explains Schnepf. "However, most do not meet the electrical requirements for conductivity, or meet the conductivity requirement, but not the corrosion resistance. A few of the more recent alternatives do well in both areas, but still do not meet RoHS standards due to use of Hexavalent Chrome and even Cyanide in the plating process."

advantageous properties include excellent corrosion resistance even in salt atmospheres, lubricity, wear resistance, conductivity, EMI shielding, and galvanic compatibility.

However, Cadmium is particularly dangerous when airborne in dust form. It can cause lung disease, kidney failure, and even death. Any maintenance process that releases cadmium into the air exposes personnel and the environment to this hazardous material. Furthermore, the Cadmium plating process often incorporates the use of cyanide in the process and Hexavalent Chromium as a sealant.

In 1993, cadmium became one of six hazardous substances restricted by Europe through its RoHS directive and the EPA has classified cadmium as a Group B1 compound (probable human carcinogen).

Since then, legislation in Europe and the United States has increasingly focused on banning and limiting the use of cadmium, along with other harmful substances. DOD, US dept of labor, RoHS and REACH policy all intend to restrict, control exposure or ban use of cadmium.

Continued on page 24



www.eccco.com



Dangers of Cadmium

Cadmium, and in particular nickel-cadmium, can be electroplated relatively thinly and evenly on fine and coarse threads and complex geometries, making it ideal for use on connectors. Cadmium's

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*polyolefin, 5" length

The Focus-Lite™ FLG3™ 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 FLG3[™] can be used for high volume benchtop applications and is completely portable and mobile for board mounted harnesses and tight space assemblies.

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[™] products.

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Cadmium Coating for Military / Aerospace Connectors

Continued from page 23

Connector Manufacturers Seek Cad Alternative

To replace the cadmium content while maintaining conductivity and corrosion resistant properties, Corsair is working with CSL Inc. (Santa Clara, CA), a supplier that offers over 40 different

plating processes. CSL is one of the few independent third party processors in the U.S. that develops proprietary custom coatings.

As a manufacturer specializing in circular connectors with crimp-removable contacts for military, commercial aircraft, and other aerospace applications, Corsair's original specifications were



The EN-PTFZ cad-free composite coating exhibits equivalent, or better, properties than cadmium and nickel-cadmium for military and aerospace connectors.







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The WTT-110 is easy to use: Simply insert the wire into the appropriate slot in the terminal fixture (12 slots accommodate a wide range of sizes). Select the Peak-Hold or Continuous Measurement mode via the keypad. Then rotate the easy-glide lever clockwise, clamping the wire and creating a consistent, repeatable pull force with minimal effort.



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For more information, contact Andrew Kaner, Product Manager, at 1-800-645-4330, 1-516-295-4399 (fax) www.checkline.com



INDUSTRIAL INFO-TAINMENT

MIL-C-26482 and MIL-C-5015. Today, however, the company is in the process of qualifying MIL-DTL-38999, one version of which is a circular connector with a cadmium-class finish.

The solution Corsair is currently testing is a nickel Teflon (EN-PTFE) composite coating developed by CSL over a decade ago

This EN-PTFE composite coating is not to be confused with standard nickel Teflon plating which is available from multiple sources. A simple 1-2 layer of EN-PTFE will not suffice in harsh environments.

CSL's EN-PTFE composite coating, on the other hand, forms a monolithic barrier that is self lubricating, scratch resistant, and anti-galling without galvanization. CSL's composite EN-PTFE coatings meet the conductivity and lubricity requirements of Cadmium while reportedly exceeding the wear resistance and corrosion protection attributes of Cadmium or Nickel Cadmium plating. It can cross mate with stainless steel, aluminum, PEI, and PEEK and can be applied to most metals and composites.

"We are currently investigating the composite nickel-PTFE alloy as an alternative to cadmium," says Shnepf. "CSL has developed a plating process that apparently can deliver both electrical conduction and corrosion resistance and is RoHS compliant."

According to Shnepf, Corsair is currently entering the qualification phase of the testing with CSL.

"Given that this coating meets all the

performance characteristics outlined, we expect it will have a very favorable response in the military and aerospace market as a cad alternative," adds Shnepf.

Connector manufacturers are not the only ones testing EN-PTFE. Over the past 15 years, Lockheed, Boeing, and Sikorsky have tested it and it is already a spec for connectors for harsh environments under MIL-DTL-38999. CSL's EN-PTFE products are used on Navy ship programs, the F35 Joint Strike Fighter, Sikorsky helicopters, and Boeing Aerospace programs.

Standardizing on a Cad Alternative

Standardization of product line features can be a major advantage for the connector industry from a manufacturing and marketing standpoint. As the military becomes more of an international collaboration, U.S. connector manufacturers will have to become more responsive to RoHS and some of the other standards adopted by the European nations and other NATO Alliance partners.

By standardizing on a replacement for cadmium plating embraced by both Europe and the U.S., connector manufacturers can enjoy manufacturing economies while making life easier for global distributors by simplifying inventories.

For more information, contact CSL., 529 Aldo Avenue, Santa Clara, CA 95054; Phone: 408-727-0893 or Fax: 408-727-1321; E-mail: mahesh@csl-plating.com; Visit the web site: www.csl-plating.com



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

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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" products.

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NEWS PLUGS continued



Littelfuse Receives "Perfect Order" Award from Arrow Electronics

Littelfuse, Inc., the global leader in circuit protection, announced that it has been honored with a "Perfect Order" award from Arrow Electronics Inc. Arrow uses this annual awards program to recognize suppliers for their continued commitment to quality and superior customer service. Littelfuse received the award at the 2012 Electronic Distribution Show (EDS) in Las Vegas, Nevada, this week.

"We measure our success by our ability to deliver the right circuit protection technology on time, every time, and in perfect condition."

Arrow is a global provider of products, services and solutions to industrial and commercial users of electronic components and enterprise computing solutions.

"We are truly honored to be recognized by a company that values customer relationships and shows the same commitment to product quality as we do," said Gordon Hunter, President and Chief Executive Officer of Littelfuse. "We measure our success by our ability to deliver the right circuit protection technology on time, every time, and in perfect condition."

Arrow works with more than 120,000 manufacturers around the world. Littelfuse received its recognition at the silver award level in the passive electromechanical component category. Arrow recognizes certain suppliers based on their performance in consistently delivering "perfect" orders to customers; for example, delivering the correct products, free from damage, on the expected delivery date and at the correct location. Arrow measures its own orderfulfillment activities using the same perfect-order measurement system.

Founded in 1927, Littelfuse, Inc., a leader in circuit protection, offers the industry's a portfolio of circuit protection products and solutions. Littelfuse devices protect products in virtually every market that uses electrical energy, from consumer electronics to automobiles to industrial equipment. In addition to its Chicago, Illinois, world headquarters, Littelfuse has more than 30 sales, distribution, manufacturing and engineering facilities in the Americas, Europe

and Asia. Technologies by Littelfuse offered include Fuses; Gas Discharge Tubes (GDTs); Positive Temperature Coefficient Devices (PTCs); Protection Relays; PulseGuard® ESD Suppressors; SIDACtor® Devices; Silicon Pro-Arrays(SPA™); tection Switching Thyristors; TVS Diodes and Varistors. The company also offers a comprehensive line of highly reliable Electromechanical and Electronic Switch and Control Devices for commercial and specialty vehicles, as well as underground Power Distribution Centers for safe control and distribution of electricity in mining operations.

For more information, please visit www.littelfuse.com

Belden Appoints New Operations Head for Asia Pacific

Belden Inc., a global leader in signal transmission solutions for missioncritical applications, announced that it has appointed Roel Vestjens to President, Asia Pacific

Terminal / Crimp Pull Testers





(APAC) Operations.

"Roel brings regional experience in operations, marketing and sales within APAC, and he will be a critical asset as Belden works to efficiently manage and expand its operations throughout the APAC region"

Vestjens has a strong history of success within Belden. He joined Belden in 2006 as Director of Marketing for the Europe Middle East Africa (EMEA) region. In April 2008, Vestjens was promoted to

Continued on page 31



THB[®] Applicators by Mechtrix (Starting at \$1675)

Mechtrix is proud to offer the full line of THB Mechanical and Air-feed Applicators. With more than 20 years of tooling experience utilizing our Mechtrix CrimpCADD® design and analysis software, Mechtrix can design and supply you with the perfect solution to even your most difficult wire terminating projects. Ask us about our special reduced pricing on spare tooling with your initial order.



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- Terminal Carrier Strip Cut-off Devices
- Terminal Paper Winding Machines
- Terminal Applicators & Crimping Presses



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The PowerStrip 9550 is a modular cut and strip machine available in four basic configurations to cover a wide range of wire processing applications. Shielded cable and complex multi-conductor applications can be processed in one automated operation. Processing modules, such as the programmable cutter head system and rotary incision unit allow for a customized, application oriented configuration. All processing and functional modules can be retrofitted at a later date, making the PowerStrip 9550 a future-proof investment.

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Innovators in Wire Processing

Spend some quality face time with the new RotaryStrip 2400!



The new **RotaryStrip 2400** is a fully programmable single step rotary wire stripping machine, featuring a color touchscreen, and provides the highest precision and quality available on the market. Wire sizes from 36 - 10 AWG and jacketed cables up to 0.275" (7mm) in diameter can be processed without requiring blade changes or any other mechanical adjustments. It can easily strip Teflon, Kapton and Fiberglass insulated wires with optional twisting of the inner strands. High reliability, flexibility, productivity and userfriendliness, make the **RotaryStrip 2400** a wise investment for the future.

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> > To Be Precise.

Control Panel Manufacturing Automation Continued from page 9

• Laying out, by hand, all components on the back panel.

• Marking the locations and then center-punching them.

• Manually drilling and slowly tapping all required holes, with manual tool and cutting oil, hoping for straight threads.

• Metal must be measured, marked and taped before any cut-out process by punching or sawing can even begin. All these steps represent a large amount of labor for the manufacturers. Of course they have the option of off the shelf enclosures, but these can be expensive thus mistakes and rework can result in unplanned costs.

Traditionally, for wiring the panels and enclosures, wiring assemblers are in front of the work with several small wire spools or pre-cut wire unorganized laying in totes; they also have stacks of



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labels or a hand label unit, loose pieces terminals and ferrules, hand stripping and crimping tools. They have to go through the following steps for each wire:

• Reading and marking the schematics for the wire they will assemble; the



possibility of missing lines on the schematic is high?

• Pulling the wire from one of the reels, striping to approximate length, crimping with hopefully the correct hand crimper and label one end.

• Inserting that end, routing the wire and repeating the above for the second end.

As you can imagine, the above steps involved in wiring the control panel, after the mechanical assembly is complete, accounts for the largest share of labor hours and presents the manufacturer with thousands of opportunities for error.

Continued on page 36



how you need them



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Wiring Harness News JULY/AUGUST 2012 31

NEWS PLUGS continued

Continued from page 26_

Director of Sales and Marketing for the Industrial Connecting Solutions business, and in January 2009, he was appointed General Manager of Belden's Wire and Cable Systems business in EMEA. During his tenure in Europe, Vestjens worked closely with Belden's President and CEO John Stroup.

Given his success in EMEA, Vestjens relocated to Asia in November 2010, and became President of the APAC OEM business where he was responsible for the operational, financial and strategic performance of the business.

"Roel brings regional experience in

operations, marketing and sales within APAC, and he will be a critical asset as Belden works to efficiently manage and expand its operations throughout the APAC region," said Stroup.

Vestjens joined Belden from Royal Philips Electronics where he held various sales and marketing positions and was responsible for the European Sales & Marketing of a business-tobusiness segment. Additionally, Vestjens has prior consulting experience with Cap Gemini and Ernst & Young. Vestjens holds a degree in electrical engineering and a Master of Science and Management degree from Nyenrode Business University in the Netherlands.

Vestjens assumed his new post effective March 19th and is based in Hong Kong.

St. Louis-based Belden Inc. designs, manufactures, and markets cable, connectivity, and networking products in markets including industrial automation, enterprise, transportation, infrastructure, and consumer electronics. It has approximately 6,800 employees, and provides value for industrial automation, enterprise, education, healthcare, entertainment and broadcast, sound and security, transportation, infrastructure, consumer electronics and other industries. Belden has manufacturing capabilities in North America, South America, Europe, and Asia, and a market presence in nearly every region of the world. Belden was founded in 1902, and today is a leader with some of the strongest brands in the signal transmission industry.

For more information, visit www. belden.com.

L-3 Selected as Prime Contractor to Provide C-27J for Australian **Battlefield Airlifter Program**

L-3 Communications announced that it has been selected by the Commonwealth of Australia to provide the C-27J Spartan for the country's Battlefield Airlifter program. The U.S. Foreign Military Sales program has an approximate contract value of \$600 million and includes the supply of 10 new C-27J aircraft worth about \$300 million, plus contractor logistics support, spares and training.

"We look forward to working with the U.S. and Australian governments to deliver this vital capability. The C-27J will serve the Commonwealth of Australia with superb performance, interoperability with international forces, as well as significant total life-cycle savings over the life of the program."

The announcement was made by the Australian Minister for Defence and the Minister for Defence Materiel on May 10.

"L-3 is proud to have been selected for the Australian Battlefield Airlifter program," said John McNellis, L-3 corporate senior vice president and president of L-3 Integrated Systems Group. "We look forward to working with the U.S. and Australian governments to deliver this vital capability. The C-27J will serve the Commonwealth of Australia with superb performance, interoperability with international forces, as well as significant total life-cycle savings over the life of the program."

To support the future force, the Battlefield Airlifter must be a multifunctional aircraft, able to perform logistical re-supply, medevac, troop movement, airdrop operations and humanitarian assistance. The C-27J is equipped to address each of these mission requirements and outperforms every other aircraft in its class, as demonstrated through exceptional performance during the U.S. Air Force's current deployment in Afghanistan. The U.S. selected the C-27J over the C-295 through a competitive tender process in 2007.

Headquartered in New York City, L-3 employs approximately 61,000 people worldwide and is a prime contractor in C3ISR (Command, Control, Communications, Intelligence, Surveillance and Reconnaissance) systems, aircraft modernization and maintenance, and government services. L-3 is also a leading provider of a broad range of electronic systems used on military and commercial platforms. The company reported 2011 sales of \$15.2 billion.



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Hand tools combine ease of use with reliability and precision.

- Applicators and tooling from TE can be your key to productive wire harness manufacturing. These applicators come from a long tradition of quality, reliability, and precision.
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NEWS PLUGS continued



BURNDY® Announces Y6NCP Series of **Pneumatic OEM Crimping Tools**

BURNDY is pleased to announce the release of their new Y6NCP series of pneumatic OEM crimping tools. The Y6NCP pneumatic tools are designed for medium volume OEM production and offer a UL Listed connection for a wide variety of BURNDY connectors and splices ranging from #22 - #4 AWG.

Two (2) different tools are being offered to serve different types of customer requirements and application needs

The Y6NCP1 offers an extended wire range from #22 to #4 AWG while boasting



Y6NCP1 Pneumatic **OEM Crimping Tool**

pull-out forces that exceed Mil-Spec/SAE. As a result, the Y6NCP1 is suited for applications requiring higher wire pull-out forces such as high vibration environments. The Y6NCP1 utilizes the BURNDY J-Die system.

The Y6NCP1-SD offers an industry Standard Die envelope capable of crimping #22 to #10 AWG insulated and uninsulated terminals and splices. The Y6NCP1-SD provides customers with the same profile as the BURNDY MRE- Ergonomic hand tools for customers seeking an affordable UL Listed "system" termination solution.

The Y6NCP tools are packaged with the pneumatic tool, air hose, clear safety guards, fittings and jaw assembly. The Y6NCP1-SD also includes the two (2) die sets capable of covering the #22 - #10 AWG wire range for both insulated and uninsulated terminals and splices. J-Dies are sold separately.

Headquartered in Manchester, New Hampshire with over 85 years of dedicated customer support in both service and product, our customers need look no further than BURNDY for all their connector. tool, and accessory needs with our BURNDY Engineered System of coordinating dies, connectors and tools.

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New Website Connects Engineers in Aerospace, Defense and Marine Industries with TE Experts and **Resources for Smarter Solutions**

TE Connectivity's Aerospace, Defense & Marine business announces its new community-centered website for design engineers, www.DesignSmarterFaster. com.

The new site is meant to be a resource center for design engineers to connect directly with TE Subject Matter Experts (SMEs) who can advise and team up with them early in the design process to help bring their products and systems to market faster with smarter, better solutions.

"Every day, design engineers in the aerospace, defense and marine industries face connectivity challenges in the toughest, most severe application environments imaginable," said Stefanie Harvey, PhD, Principal Scientist, TE Aerospace, Defense & Marine. "As one of the SMEs featured on

> the site, I'm excited to share my knowledge and expertise in nanotechnology, surface science, material interfaces, and thin film processing to assist engineers with better outcomes."

> In addition to being able to connect with TE experts, the site functions as a true industry resource center for the design engineer, according to Dale Reeves, Global eBusiness & Marketing Manager, TE Aerospace, Defense & Marine. "TE has partnered with top technology media outlets to provide instant visibility and links to the latest industry news. Designers will also have access to the full TE product eCatalog, information on new product releases, technical white papers, literature, videos / demos, events and tradeshows. In essence, we are creating a 'one-stop-shop' for the electrical design and connectivity community."

"The earlier we can work with engineers in the design phase, the more we can make a difference designing smarter technologies and systems to fit their needs," said Karl Kitts, Director of Development Engineering for High Performance Relays, TE Aerospace, Defense & Marine. "I think the Design SmarterFaster website is a great way to engage and support engineers in our shared ongoing quest to develop tomorrow's technologies." TE Connectivity and the TE Connectivity (logo) are trademarks of the TE Connectivity Ltd. family of companies.





For 30 years, Thermax's Santa Fe Textiles operation has been satisfying customers with quick turn around of braided solutions to anywhere in the United States. We specialize in harness and assembly overbraiding. You can rely on our braiding expertise and experience with a wide range of materials to provide you with the right balance of mechanical integrity, temperature and abrasion resistance, flexibility and cost for your harness or assembly projects.

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HellermannTyton Introduces Hand-Held Label Printer for Saving Time, Minimzing Expenses and **Eliminating Hassles**

HellermannTyton, a global manufacturer of cable management and identification solutions which secure, route and identify wire, cable, and equipment, presents the SPORT hand-held thermal transfer label printer for creating markers on continuous colored vinyl rolls while on a job site.

The SPORT printer is perfect for producing standardized labels for the solar and wind markets. This portable printer offers the convenience and versatility to generate custom or edit existing labels as needed for an installation or application, essentially eliminating costly interruptions and rescheduled inspections. Not



SPORT Hand-Held Thermal Transfer Label Printer

only is the SPORT printer an efficient and time-saving tool for creating labels on demand, it also offers the added benefit of being pre-loaded with the current label templates as mandated by the National Electrical Code (NEC) and the International Fire Code (IFC). The existing templates stored in the SPORT printer can be modified to meet specific local code requirements which may be required by The Authority Having Jurisdiction (AHJ). Additionally, a large list of electrical symbols and graphics come with the SPORT printer and can be placed and sized easily on the label design.

The SPORT mobile printer produces ARC Flash labels, wire labels and vinyl signs that can be up to 2" wide, accommodating standard stock labels of ½", 1" and 2". This convenient printer also has a long-life battery that allows for hours of printing between charges, and has an optional soft shell carrying case with shoulder strap for easy transport up ladders and onto rooftops.

HellermannTyton is a recognized manufacturer of cable management products, identification, and structured cabling solutions for the electrical, renewable energy, industrial, commercial data, and telecommunications markets. HellermannTyton, located in 34 countries, offers an integrated approach to design, operation, and delivery to optimize service and solutions for local and global customers.

For further information visit www.hellermann.tyton.com

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NEWS PLUGS continued



Highly Flexible Silicone Power Cables for Military Helicopter Applications

Cicoil's Hi-Flex Single Conductor Silicone Power Cables provide extreme allweather flexibility, perform exceptionally well when exposed to chafe and severe heat & cold (-65°C to +260°C), and excel in tight bend radius applications. This combination of features, make Cicoil's highly reliable silicone power cable the ideal choice for mission critical military helicopter applications.

Cicoil's halogen-free and flame retardant (UL 94 V-0) design is naturally more flexible than other types of single conductor power cable, and is immune to extreme shock, vibration, mechanical stress, salt water, sunlight, acid rain, ice, corrosion, coarse sand, UV light, weld spark, ozone, corrosion, radiation, and most chemicals.

Cicoil's proprietary crystal-clear silicone encapsulation needs no external "armor" or conduit for protection, is tearresistant and will not deform or wear during a lifetime of more than 10 million cycles, even under tight bending radius and high speed motion conditions. Cicoil's ultra-durable silicone is "self-healing" from small punctures and cable jacket damage can easily be repaired in the field.

Rated for voltages up to 42,000 Volts DC, Cicoil's Hi-Flex Single Conductor Power Cables (4 AWG to 30 AWG) are available from stock in continuous lengths,



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THE MOLEX TAPE-TERMINAL CRIMP MODULE AND TAPE TERMINAL PRESS REDUCE TOOLING INVESTMENTS, LOWER SETUP TIMES AND ALLOW YOU MORE PRODUCTION FLEXIBILITY.

Features and Benefits of the TM-4000™ Universal Crimp Press Include:

- · Provides 3.5 tons (31 kN) of crimp force
- Accepts any Molex applicator and most industrystandard applicators
- Can be used with Molex Tape Module (64016-2000)
- Meets OSHA safety and noise requirements and is CE approved
- Two safety interlock switches attached to the guard prevent press from cycling if guard is open during operation

The **Tape-Terminal Crimp Module** efficiently crimps terminals to wires from 4 to 30 AWG with minimal setup adjustments and achieves optimal cycle rates for mid-to-high volume, semi-automatic operations.

Features and Benefits of the Tape Terminal Crimp Module Include:

- Quick-change modular tooling accepts all existing ATP-201 and ATP-301 die sets
- Used in Molex TM-3000[™] and TM-4000[™] presses, which accept Molex applicators and most industry standard applicators

cut to order, or as assemblies, complete with lugs or connectors of your choice, 100% tested and inspected. In addition, Cicoil offers anti-friction coatings, low smoke-zero halogen, custom colors and lower/higher voltage designs by request.

Cicoil's UL Recognized, CE Conforming and RoHS & REACH Compliant cables are manufactured in an automated, climate controlled environment, and exceed the NASA 1124 outgassing specifications for space use and vacuum requirements.

Cicoil has been a leader in designing and manufacturing high performance flat cable assemblies for over fifty years. The company's unique silicone coated flat cables provide 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 automation, and the Space Shuttle.

The **TM-4000™ Universal Crimp Press** is an industry-standard, bench-top press that terminates large lug products on Mylar tape up to 4 AWG insulated and some 2 AWG uninsulated, resulting in lower overall applied costs. The TM-4000™ has electrical requirements of 240 AC 50/60Hz.

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Cicoil designs and manufactures its cable 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.

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More customers choose Cablescan Series 90 Continuity Analyzers with our unique TestRite software than any other continuity test system of its kind. Series 90 circuit analyzers provide exceptional speed, versatility, and accuracy in the testing of wire harnesses, backplanes, and other interconnects. Results are 200 times faster than hand buzzing and shorts are tested in the process. The testers provide resistance and capacitance measurements, diode testing, and guided harness assembly. You can locate wires by touch and verify terminations.

Cablescan's Series 90 TestRite programs run under the most popular Windows operating systems, and can import wire lists, net lists, and CAD data. TestRite's browser window allows you to provide setup and work instructions using HTML, image, and audio files. With a simple click, everything is displayed, stored, and can be printed in seconds. High voltage and high current models are also available. Put simply, you reduce test and assembly cost dramatically. Visit our website or call us at (909) 483-2436 for more details. Cablescan, Inc., 3022 Inland Empire Blvd., Ontario, CA 91764





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Control Panel Manufacturing Automation

Continued from page 30____

The following solutions are available on the market today.

On the engineering side, software such as the ECAD P8 from ePlan Software and Service in combination with the Pro Panel 3D control panel design software allows the user to automate many of the mundane tasks involved in control panel design and also produce accurate data for ensuing manufacturing processes, so engineers can use their time to engineer. The database architec-



Pro Panel ePlan Software For Virtual Prototyping in a 3D Model Live Wire routing, Calculate Duct Fill Levels **Voltage Seperation Logic**



ture of this type of system creates an engineering environment in which all outputs of the controls project are simply representations of the same database. This ensures that any changes made are reflected consistently in all outputs, even when multiple engineers are working on the same project. Utilization of such software, improves continuity in the process chain, consistency in data management, synchronization, and is the ideal support of the engineering workflows.

For the preparation of the control enclosures and back panels, CNC machining centers, such as Perforex technology machine developed by Kiesling Maschinentechnik, are designed for the automated modification of off-theshelf industrial enclosures as well as drilling and tapping the associated component mounting panel. The Perforex system is designed to work on both flat work pieces like mounting panels, doors and modular surfaces as well as all surfaces of three dimensional welded enclosure bodies.

These special CNC centers provide a reduction of up to 30 percent of the total costs on each control panel, even more so when it comes to single piece production. They also improved quality with no rework of expensive painted and stainless steel enclosures; the automated technology drives process standardization on the shop floor with faster lead-times in mechanical prefabrication, meaning faster turn-around overall. Personnel are then available for value added

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Fax : 604-587 3199 Email: info@kawa.com.my


Perforex Machining Center For Panels Fully Automatic Machining Drilling, Tapping and Milling

work such as wiring and testing, in addition to improved job satisfaction and greater motivation.

For the wire preparation, machines such as the wide range offered by Komax Wire; from measuring the wire to length, cutting and stripping with the Kappa line to the advanced Zeta systems for processing wire kits suitable for panel wiring. The Zeta can process up to 36 different wires and can be equipped with up to 8 different processing stations and up to 2 inkjet printers; it selects the wires automatically, cuts them to length, inkjet marks them and terminates them. Termination possibilities can include insulated ferules or compacting the wire ends with ultrasonic or resistance welding.

Chain and normal bundle can be defined for each wire in the same sequence. The wires for back panels or enclosures can be produced and kitted in the ideal order. The optimized order is maintained until the wires are installed in the cabinet, meaning the cabinet is wired quickly and orderly with missing wires being a thing of the past. Components with different terminal contacts such as spring-loaded, push-in or conventional terminals can have one or both ends automatically inserted in the same sequence directly at the machine while at the same time, chain bundling non inserted wires.

Resulting in a reduction of the logistics work load between the part lists and the panel assembly. These eliminated logistical steps consist of:

• Preparing cutting lists from the parts lists

__Continued on page 38

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Small Details

For 12 years, Cheryl has witnessed the evolution of the Small HYDENT[™] connector line from simple copper solderless terminals to the customizable options available today.



With every year, BURNDY continues to invest in and improve our Small HYDENT[™] terminal options with:

- Newer technology that gives Cheryl and her co-workers better quality control
- The full-cycle ratchet HYTOOL[™] that was developed specifically to ensure UL Listed and CSA Certified connections with BURNDY terminals
- Custom built jars that make it easy to see, store and use Small HYDENT^V terminals

Like the teamwork Cheryl finds in her job each day, the BURNDY[®] Small HYDENT[®] line and corresponding tools work together to ensure long-lasting, quality connections.

There is no substitute for the BURNDY[®] Engineered System.

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Made in the USA

Control Panel Manufacturing Automation Continued from page 37

• Preparing wires and terminals according to the cutting list

• Stocking the produced leads

• Producing single leads with an automatic cut/strip or automatic crimping machine

• Selecting specific leads from stock.





KOMAX Zeta 633 Automatic Wire Harness Processing Machine For Wire Processing, Wire Kitting and Marking, Chain Bundlin Ends Insertion Into Terminal Blocks

To provide customers with not only individual technologies but a complete solution for control panel manufacturing, ePlan, Kiesling and Komax are working together. Without further efforts, Pro Panel takes the layout design data and exports the information to Kiesling Perforex system and to the Komax Zeta automatic wire harness processing machine. In a 3D environment, you can layout your design panel, align and position components exactly, follow spacing requirements and automatically calculate wire lengths.





Mini Left to Right



Mini (2 Post) Air Left to Right



Heavy Duty Slide



NEW Mini (Power Drive)



1 Applicator Base, Many Terminals

Run mylar strip, plastic carrier, double or single carrier - all in the same base!

Quick Change Tool Packs Change Over in 5 Minutes or Less! Reduced Cost and Down Time!



Mini End Feed



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Med. Duty Slide



As with any automation technology, correct data is extremely important as there is no longer an opportu-

Quick Change Tool Pack

Quick Change Tool Pack

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nity for manufacturing personnel to make on-the-fly corrections to the engineering layouts due to "tribal knowledge".

Your Benefits:

• Time saving between 30% to 60% overall

- Material cost reduction
- Increase in quality
- Faster turn around
- Production floor load leveling

• Production process standardization

These companies, ePlan Software and Services, Komax Wire and Kiesling Maschinentechnik will demonstrate a combination of their technologies which streamline the quality critical and resource draining activities involved in the control



The Complete Solution

panel industry. Live demonstrations of this solution will be held in Chicago this September 10 – 15, at the Industrial Automation North America show booth #4501 directly across the aisle from the Rittal Corporation.

Van Miller is the North American Sales Representative for Kiesling USA with 10 years of experience in the control panel industry. For more information, please contact Van at miller@kiesling.net Patrick Boyer is the Harness Machine Product Manager for Komax Wire with 17 years of experience in the wire processing industry. For more information, please contact Patrick at patrick.boyer @komaxgroup.com

Christine Knapik is the Director of Marketing at ePlan Software and Services. For more information, please contact Christine at knapik.c@eplanusa.com



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HARTING and Digi-Key **Partnering for the Future**

HARTING® (www.hartingusa.com), a leader in electrical and electronic connectivity, announced that it has signed a new global agreement with distribution leader Digi-Key Corporation[®].

"Our partnership with Digi-Key, one of the fastest growing providers of electronic components in the world, will make it easier and faster for the engineering community to find and specify just the right HARTING solution for their applications," explained Rolf Meyer, President and CEO of HARTING Inc. of North America.

Digi-Key's strong presence in the market will support the expansion of HARTING globally. Given Dig-Key's strong web base, this partnership will advance HARTING's online presence anywhere in the world, allowing 24/7 access.

"Digi-Key's strength in the market is that we focus exclusively on electronic components and the needs of the engineering community and its purchasing agents," said Dave Doherty Digi-Key's Vice

NEWS PLUGS continued President of Global support and product operations. "HARTING's well-known reputation as a driver and leader in the introduction of new interconnect technologies is an important and critical new offering that we are excited to bring to our global customers."

> Electronic connectors are being increasingly used in rugged applications, while requirements also demand smaller package sizes and more efficient assembly processes. Digi-Key's outstanding customer service, married to powerful web-based search tools, provides customers with the opportunity to easily access the breadth of HARTING's innovative solutions.

> Founded in 1945 in Minden, Germany, the HARTING Technology Group is privately owned and employs approximately 3,400 people globally across more than 40 subsidiaries and branch offices. With production facilities in Europe, Asia and the United States, the HARTING portfolio of connectivity solutions focuses on multiple levels, from the machine to the device and into the communication infrastructure. Product offering includes electrical and electronic interconnect products, backplane solutions, network components and cable harnesses for various industrial and high reliability markets. HARTING

strives for the next design challenge to help serve its' customers better.

IEWC Opens Distribution Center & Sales Office in Brazil

IEWC is pleased to announce the June 1st 2012 grand opening of its new sales and distribution facility near São Paulo, Brazil. With the opening of its doors, the São Paulo office represents IEWC's 16th distribution center, and will be essential in the growth and support of IEWC's customer base in the South American marketplace.

David Nestingen, Chief Executive Officer of IEWC, stated, "In continuing our vision to be the premier provider of global solutions for wire, cable and wire management products, this move will be the 4th continent in which IEWC conducts business. São Paulo is not only Brazil's largest and most vibrant city, but it is also a key manufacturing center for all of South America. We already have strong partnerships with our suppliers in this region and we look forward to bringing our supply chain solutions to the Brazilian marketplace."

Gilmar Rodrigues, Managing Director, will be charged with leading the Brazilian business. Since 2010, Mr. Rodrigues has been championing the develop-



TR201 Series

High Precision Crimping for Small and smart Wire Gauges 36-18 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.

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E-mail: Info@shinmaywaamerica.com HP: http://www.shinmaywa.co.jp/english/index.htm ment of customer relationships in Brazil for IEWC. With over 25 years of experience in the automotive and interconnect markets in Brazil, Mr. Rodrigues has observed a strong growth potential for IEWC in the capital city of São Paulo and its surrounding areas. Overseeing Mr. Rodrigues' initiative is Ricardo Garcia, President of IEWC CALA (Caribbean & Latin America). IEWC's Brazilian distribution office is located at Avenida Independência, No. 1544 Bairro do Eden, Cidade de Sorocaba Estado de São Paulo, Brasil 18087-101. Phone +52 (15) 3218-1347

IEWC is a provider of global solutions for wire, cable and wire management products to manufacturers and sub-assemblers. Visit www.iewc.com

Molex Unveils Two New Versions in its Premo-Flex™ Line of Jumpers

Molex Incorporated announced the addition of two new products in its Premo-Flex[™] line of flat flex cable (FFC) and etched polyimide jumpers. Both products ultra-flexible, provide durable PCB connections for a variety of applications including medical devices, consumer electronics and automotive electronics.

"As electronic devices continue to shrink in size, we are committed to designing complex, microminiature products that maximize board space while providing the ultimate in flexibility, reliability and cost savings"

"As electronic devices continue to shrink in size, we are committed to designing complex, microminiature products that maximize board space while providing the ultimate in flexibility, reliability and cost savings," said Dan Kreger, product manager, Molex. "Premo-Flex products from Molex not only solve complex board-to-board interconnection challenges in confined spaces, but because they are off-the-shelf they help designers reduce lead times and avoid custom tooling costs." Molex has added an ultra-thin, ultra-flexible 0.12 mm cable to its line Premo-Flex FFC of jumpers. The complete line is available in 0.50, 1.00 and 1.25 mm pitch; multiple circuit sizes, from 4 to 60; and standard cable lengths, from 30 to mm, providing 305 designers with virtually limitless options. Molex can also accommodate custom requirements for FFC cable jumpers in lengths of over 305 mm. All Molex FFC jumpers can be terminated to Zero Insertion Force (ZIF), non-ZIF or Low Insertion Force FFC connectors and are ideal for complex board-to-board interconnections in confined spaces.

The Premo-Flex polyimide jumpers from Molex feature etchedcopper circuitry, allowing designers to achieve the tight tolerances required for a reliable link to finepitch, 0.30 mm and smaller microminiature connectors. By terminating with Molex's 0.30 mm pitch EasyOn[™] and BackFlip[™] FPC Connectors, the solution meets the needs of designers looking for a dual-contact ZIF connector that enables them to utilize the same PCB pattern on adjoining, parallel PCBs. It also maximizes board space and allows design flexibility for compact applications such as digital cameras and handheld medical equipment.

For more information on the Premo-Flex line of products please visit here. To receive information on other Molex products and industry solutions, please sign up for our enouncement newsletter at www.molex.com/link/register/.



SHRINKAGE UP TO 6:1

Shrinkage is our business! Thermosleeve USA has partnered with China's largest manufacturer of heat shrink tubing to produce a comprehensive range of products in various colors and shrink ratios. Everything to meet your shrinkage needs! Manufactured under TS16949 Quality System and ISO14001/IS9001 Environment System certifications, Thermosleeve USA's products are produced to meet or exceed UL/224/MIL approval requirements. Thermosleeve USA products are also certified under the following agencies, U/L, TUV, VDE, C-UL, F-Mark and are registered "Green Partners" with Sony and Samsung Electronics.

If you're manufacturing wire harnesses, rest assured Thermosleeve USA probably offers a tubing to meet your requirements. Our products are certified under the following standards: ROHS, AMS-DTL-23053/4/5, SAE-AS81531, MIL-STD-202 whether your primary focus is

- Aerospace
- Appliance
- Automotive

97

SP

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RoHS

- Electronics/Computer Peripherals
- Energy Power Utilities
- Food and Chemical
- Industrial/Commercial

- Medical and Instrumentation
- Marine
- Military/Defense
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For more information about Thermosleeve USA, our expanding product line, or your local Thermosleeve USA sales representative, feel free to contact us.

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

What?... A Power Cable Doesn't Have an Ampicity Rating?

That's right...a power cable doesn't have a single ampacity, it has many, even hundreds of different ampacities depending on how and where it is installed.

As the amount of current (measured in amperes or more simply amps) passing through a conductor is increased, the amount of heat produced in the conductor increases. This heat is created by what engineers call "I squared R" (I2R) losses in the conductor. The heat being created in the conductor must be dissipated to the environment.

If it isn't, the temperature of the conductor would continue to increase until the cable exceeds its temperature rating and it would eventually self-destruct in a "puff of smoke". The rate at which heat is dissipated to the environment depends on the ambient temperature, whether the cable is installed in conduit or cable tray, whether other heat producing cables are nearby and so on.

To prevent an unfortunate and hazardous "puff of smoke", the NEC

(National Electrical Code) as well as other industry groups such as IEEE (Institute of Electrical and Electronics Engineers) and ICEA (Insulated Cable Engineers Association) have published tables of ampacities that cover many of the installation conditions frequently encountered in real life. IEEE for example, has published a book affectionately referred to as the "black book" which contains thousands of pages of ampacity tables!

Putting it another way, the ampacity of a cable is the maximum amount of electrical current a given conductor in a given situation can handle without exceeding its temperature rating.

The most common temperature rating is 90C (90 degrees Centigrade) but it can go as low as 60C or as high as 1200C for some special purpose wire and cables. So when your customer asks you for the ampacity of a cable he is about to buy, he is not just "blowing smoke". It is a key factor in selecting the right conductor size for your application (voltage drop is another, but that's another subject for another day).

So remember – a power cable has only one temperature rating and only one voltage rating, but it has hundreds of different ampacities depending on how and where it is used.



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Zuken to Launch Newest Version of E³.series Electrical CAD Software

Zuken, an industry leader in wire harness, control system, and fluid design, has announced that E³.series 2012 will be released at the end of July 2012. This latest version contains many new productivity tools including: enhanced search capabilities, expanded table-driven data entry for cable and wire type modifications, extended support for cable and harness design, and new industry-specific configurations for a wide range of industries. These improvements build on E³.series' long track record of innovation and will provide additional benefits that enhance our customer's productivity.

Watch for further announcements about E³.series 2012 over the coming months. For more information, visit www. zuken.com/e3

EcoWire™ Now Available in Large Put-Ups

Due to growing success of EcoWire in the marketplace, and increasing customer demand, Alpha Wire is now offering the environmentally friendly hook-up wire in 5,000-foot and 25,000-foot put-up lengths.

"EcoWire's continued success has led to numerous requests from our customers for larger and more efficient put-ups. Adding larger put-ups was an obvious next step as EcoWire continues to displace PVC hook up wire in the marketplace," states Kristen Berard, Product Manager at Alpha Wire. "Adding these lengths to our standard selection allows EcoWire to appeal to contract manufacturers as well as other large volume customers."

EcoWire is an engineering breakthrough that combines increased performance in hook-up wire with minimized environmental impact. EcoWire derives its advantage from its unique modified polyphenylene ether (mPPE) insulation. This produces a wire that is up to 45% smaller and 40% lighter with 10x the abrasion resistance of PVC wire. The eco-friendly wire contains no halogens, phthalates, or heavy metals, and meets the RoHS and WEEE requirements for the elimination of hazardous substances and recyclability.

The 5,000-foot spools and 25,000-foot drums are available for EcoWire part numbers 6710 through 6717 and will be available in all standard colors.

For additional information, contact Alpha Wire at 800-52-ALPHA (522-5742) in North America, 800-288-8809 in Europe, and 21-61498201 in Asia. Also, please visit our website to download data sheets, access search filters, and place free sample requests for EcoWire.

For over 80 years, Alpha Wire has designed and manufactured industryleading wire, cable, and tubing products for factory automation, packaging, automotive, alternative energy, and other technically advanced applications. Beyond giving our customers the cables they trust for quality and reliable high performance, we give them the committed service they deserve. We help customers find the best possible solutions to production and manufacturing challenges with small putups, logistical excellence, and broad inventory for dependable, same-day shipment.

Classified Ads Pages 51-52

Calendar of Events page 53

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E

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Molded In-line Fuse from Amphenol **Protects against Ground Fault Damage**

Amphenol Industrial Global Operations, a global leader in interconnect systems, now offers a molded in-line fuse that helps to protect photovoltaic (PV) systems from ground fault current damage. Used by PV system engineers, EPCs, solar contractors and design engineers, Amphenol's HelioFuse is rugged and easy to install.

This new fuse was developed to address the need for a cost-effective solution to ground fault protection in PV systems without the need for a combiner box that houses the solar panel's fuse links. Its molded construction provides weather

Low Maintenance

Simple Operation



HelioFuse from **Amphenol Industrial**

tight housing that prevents moisture from getting into the fuse and further protects it from harsh weather.

The UL-approved HelioFuse is designed for rapid removal and replacement with minimal system downtime should a ground fault occur. This molded in-line fuse is fully intermateable with industry standard PV connectors.

The IP68-rated HelioFuse is offered in two configurations, a connector version that plugs into an industry standard solar connector like the Helios H4 connector and a wire overmold version for custom harnesses.

The HelioFuse operates at a maximum of 1000 V DC with a 20 A rating and a 10,000 A current withstand rating.

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

Allied Wire & Cable Co-Presidents/ Owners Tim & Dan Flynn are Ernst & Young Entrepreneur Of The Year® 2012 Finalists in Greater Philadelphia

Allied Wire & Cable announced that Co-Presidents/Owners Tim and Dan Flynn were named finalists in the Ernst & Young Entrepreneur Of The Year® 2012 program in the Greater Philadelphia region. The award recognizes outstanding entrepreneurs who demonstrate excellence and extraordinary success in such areas as innovation, financial performance and personal commitment to their businesses and communities. Awards will be presented at a special gala on June 21 at the Terrace Ballroom of the Pennsylvania Convention Center, Philadelphia.

Now in its 26th year, the Entrepreneur Of The Year Program has expanded to recognize business leaders in more than 140 cities in more than 50 countries throughout the world.

Regional award winners are eligible for consideration for the Ernst & Young National Entrepreneur Of The Year Program. Award winners in several national categories, as well as the Ernst & Young National Entrepreneur Of The Year Overall Award winner, will be announced at the annual awards gala in Palm Springs, California, on November 17, 2012. The awards are the culminating event of the Ernst & Young Strategic Growth Forum, the nation's most prestigious gathering of high-growth, market-leading companies.

Founded and produced by Ernst & Young LLP, the Entrepreneur Of The Year Awards are nationally sponsored in the United States by SAP America and the Ewing Marion Kauffman Foundation.

In Greater Philadelphia, sponsors include Ballard Spahr LLP; Merrill Corporation; Molewski Financial; Morgan Lewis; Murray, Devine & Company, Inc.; NSM Insurance Group, ParenteBeard LLC; Pepper Hamilton LLP; Philadelphia Business Journal; PNC Bank; Scherzer International; SolomonEdwards; and Sovereign Bank.

Allied Wire & Cable is a family owned and operated wire and cable distributor and value-added manufacturer. Allied services many of the largest markets in the country, including the government, military, and the aerospace, automotive, and telecommunication industries. Dedicated to providing the best and most personalized service possible, Allied offers customization services, including cut and strip, printing, dyeing, striping, twisting, and more. For more information on Allied Wire & Cable, visit www.awcwire.com.

Ernst & Young Entrepreneur Of The Year is the world's most prestigious business award for entrepreneurs. The unique award makes a difference through the way it encourages entrepreneurial activity among those with potential, and recognizes the contribution of people who inspire others with their vision, leadership and achievement. As the first and only truly global award of its kind, Entrepreneur



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Of The Year celebrates those who are building and leading successful, growing and dynamic businesses, recognizing them through regional, national and global awards programs in more than 140 cities in more than 50 countries.

TE Connectivity's C-Lite Cable Provides Reduced Size and Weight Without Compromising Performance

TE Connectivity's C-Lite cable family of lightweight marine cables has been awarded the Germanischer Lloyd (GL) Approval Certification. The C-Lite cable is the first and only thin-wall lightweight cable to be awarded this prestigious approval.

C-Lite cables use TE's advanced materials technology to deliver a thin-wall insulation that dramatically reduces the size and weight of cables – without reducing the electrical or mechanical properties. From general power and lighting to communication, control and instrumentation applications, the C-Lite cable family is designed for use in a variety of commercial marine, offshore and military marine applications.



C-Lite Cable from TE Connectivity

Germanischer Lloyd (GL) is a technical supervisory organization that conducts safety surveys and is ranked as one of the top classification societies. The group offers certification, inspection and consulting services. GL's reputation is highly regarded amongst the maritime industry.

"Our engineers have developed innovative materials that significantly reduce the size and weight of marine cables while maintaining the performance to meet the needs of harsh environments," said Mark Casselton, Product Manager, Global Aerospace, Defense & Marine, TE Connectivity. "The C-Lite family of cables is a significant advancement for the industry, delivering the market with vastly smaller, lighter cables."

The C-Lite cables install up to 30 percent quicker into a vessel or module, permit tighter bend radii and enable smaller cable trays and ancillaries, allowing more equipment to be connected within the same space. The thin-wall technology uses low-smoke and zero halogen wire and cable – which emits lower levels of toxic gases and generates considerably lower levels of smoke so that visibility is preserved in an emergency. The highly flame retardant cables are resistant to oils, solvents, fuels and petroleum mud.

For more information on TE's C-Lite cables, contact the Product Information Center at (800) 522-6752 or visit www.te.com/offshore.

L-com Reports Counterfeit Cables Are a Disturbing Trend

L-com, Inc., a designer and manufacturer of wired and wireless connectivity products, took a public stance on the hot-button issue of counterfeit cables, posting an extensive article on its web site. The article both educates and alerts cable buyers to the many ways unscrupulous manufacturers and distributors have flooded the market with sub-standard connectivity equipment.

The issue of counterfeit cables has plagued the connectivity industry for years, but has greatly expanded in the past twelve months. Several other major cable manufacturers and industry publications have already come out with information, articles and alerts on the subject. L-com's post is their first publicly posted alert, though they have been advising customers about it for years. It comes with detailed information on the types of counterfeiting that L-com has encountered and the dangers of using sub-standard cables. It also includes a link to a 14-page independent report to qualify the exact characteristics and problems.

"I think the base of the problem is education," said David Gallagher, Lcom Product Manager. "When buyers know and understand the consequences for buying just the cheapest cable without checking the actual construction, they are spared the

Continued on page 47



The CT4 Coastelmatic Pneumatic Tool Holder

The CT4 Coastelmatic hand tool holder is a device that uses air to activate spring retracted hand tools. The CT4 Coastelmatic is a great low cost alternative to automatic crimping, stripping, and cutting machines. The CT4 Coastelmatic can be set up to work crimpers, strippers and cutters. The patent pending tool holder in the applicator securely holds all tools in place, allowing the operator to use his hands freely. This new and improved cylinder delivers 10% more power through dual activation for tough jobs. Each unit is pre-assembled, tested and ready for use.

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When Armando Zacarias goes out on a Eubanks service call, unusual things happen.

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"Another time, while driving to a customer's site, our rep's car caught fire. We eventually arrived there that night and finished the job in time for the morning shift," Mando reports.

Customers report something unusual too: Mando's "can-do" attitude.

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."

"Can't be done" is not in Mando's vocabulary—either English or Spanish. On his own initiative, he solves problems, leads training classes, helps boost plant

efficiencies, and makes lasting friendships while doing it.

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enormous expenses and damages that could occur."

L-com posted its alert in the White Papers section of its Technical Resources page. David Gallagher also pointed out the availability of free engineering drawing downloads on L-com's web site so buyers can be clear on the details of their products.

L-com, a global designer and manufacturer of wired and wireless connectivity products, offers a wide range of solutions for the electronics and data communications industries. The company's product portfolio includes cable assemblies, connectors, adapters, computer networking components, and custom products, as well as the Hyperlink line of wireless products. L-com, Inc. is headquartered in North Andover, Mass., and is ISO 9001: 2008-certified. For more information, please visit: http://www.L-com.com/

TE Connectivity's AMPLIMITE Ultra-Lite D-Subminiature connectors Deliver Criticl Weight Savings

TE Connectivity's AMPLIMITE Ultra-Lite D-Subminiature connector is 15-20 percent lighter than its brass counterparts, delivering a critical weight-saving solution for space applications, including satellites and launch vehicles.



AMPLIMITE Ultra-Lite D-Subminiature connector

"TE's AMPLIMITE Ultra-Lite connectors are excellent when saving weight is critical," said Alana Martin, Product Manager, TE Global Aerospace, Defense & Marine. "Designed to meet NASA 311P requirements for space, the connector's onepiece aluminum shell design not only offers significant advantages in weight, but improved EMI performance compared to standard brass connectors."

AMPLIMITE Ultra-Lite connectors deliver a 10-20 dB improvement in EMI performance and meet the requirements for M24308. The non-magnetic connector features a one-piece lighter weight aluminum shell. The connector is intermateable with other D-Subminiature connectors, comes in shell sizes 1-6 and is offered in both standard- and high-density configurations.

The connector has a temperature range of -55°C to 125 C°, and is available in vertical and right-angle PCB mount versions. Crimp snap contacts speed wire termination and the connectors incorporate additional features for ease of assembly. Combination connectors with both power and signal contacts are also available, as is a rear grommet for strain relief.

For more information on TE's AMPLIM-ITE Ultra-Lite D-Subminiature connectors, contact the Product Information Center at (800) 522-6752 or visit www.te.com/catalog/menu/en/17834?BML=10576,26435.

Edward Trackman Joins IPC as Vice President of Special Projects

 IPC — Association Connecting Electronics Industries $^{\scriptscriptstyle \oplus}$ announces that Edward

Trackman has joined the IPC staff as vice president of special projects.

"Ed is a consummate professional and visionary," says John Mitchell. "His engineering experience, knowledge and management savvy are a powerful combination. I look forward to utilizing these skills for IPC's continued advancement."

Trackman began his engineering career

_Continued on page 48





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Continued from page 47

in the automotive industry at General Motors Research Laboratories. His experience includes positions of increasing responsibilities with the automotive operations division of Rockwell International, the OEM group at Harman International and Panasonic Automotive.

In 2003, Trackman joined Bose Corporation where he worked with John Mitchell. He was responsible for establishing the strategic direction for a major initiative to broaden the automotive division's product offering.

Most recently, Trackman served as senior vice president of development at Golden Key International Honour Society,

instituting new goals and strategies for corporate partnerships.

Trackman earned a B.E. in mechanical engineering from The Cooper Union for the Advancement of Science and Art; an M.S. in engineering design from California Institute of Technology, and his Ph.D. in mechanical engineering from Northwestern University. He also received an M.B.A. from the Advanced Management Program at Michigan State University.

Trackman has six U.S. patents and related foreign patents, and has published more than 20 articles.

Updated Deutsch DT Series LE21 Modification

LADD Industries Inc., the exclusive authorized US distributor for Deutsch Industrial environmentally sealed electrical connectors, announces the release of the updated LE21 receptacle modification to the DT product family. Deutsch Industrial

DT Series connectors are designed for harsh environment applications where even a small degradation in connection may be critical.



LE21 Receptacle Available from **Deutsch Industrial**

The updated LE21 modification incorporates a new one-piece thermoplastic receptacle/flange design that accepts twelve size 16 contacts. Two stainless steel mounting inserts and a heavy-duty rubber gasket tightly secure and seal the receptacle to electrical panels, keeping out moisture, dirt, salt, sand, and road debris. To further enhance design flexibility, the LE21 modification includes a pro-



TE OCEAN APPLICATOR SERIES

NEW APPLICATOR FEATURES 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.

By consolidating our past applicator offering, TE was able to provide design consistency and tooling standardization to the market. One of the resulting benefits to customers of this consolidation is flexibility in the choice of feeding options: new and improved mechanical and pneumatic feeds along with the innovative and precise servo feed option. The new Ocean Applicator series design also allows customers to perform field upgrades to system III and Smart Applicator technology. It provides an upgrade path for terminal intelligence that allows the machine to obtain set-up features as the applicator is upgraded.

- One applicator platform modular family design

tective end cap and reduced diameter insert cavities.

The Deutsch Industrial product line and the updated LE21 modification offer innovative connector solutions for harsh environments where failure is not an option. LADD Industries, the exclusive authorized US Deutsch Industrial distributor, is pleased to offer the updated LE21 modification to meet your industrial connector requirements. Please contact LADD at 1-800-223-1236 or visit www.laddinc. com for more information on the LE21 modification and all your Deutsch Industrial connector needs.

Belden Introduces MCM VFD Cables to Support Large Horsepower Motors

Belden (NYSE:BDC), a global leader in signal transmission solutions for missioncritical applications, announces the extension of its proven line of variable frequency drive (VFD) cables to include 250

> MCM, 350 MCM and 500 MCM sizes. MCM VFD cables support installations of up to 250 horsepower motors at 460V for use in oil & gas, petrochemical, power generation, water/ wastewater treatment and other demanding industrial environments.

Belden MCM VFD cables are rated for use in exposed-run cable trays, direct burial and in wet or dry conditions. Belden's MCM VFD cables are designed to provide superior performance in noisesensitive applications or in any damp or wet environment where reflected wave voltages may degrade PVC/nylon conductors. The cable is suitable for use with virtually all variable frequency drives, as well as for use as shielded power cable for other solid-state devices.

VFDs reduce facility energy consumption and thus operating costs; however, VFDs can be a significant source of noise, most particularly electromagnetic interface (EMI), in a facility. In addition, VFDs are usually operated in close proximity to sensitive instruments, critical networks and safety systems. Proper cable selection from cables specifically designed to connect to VFDs can mitigate adverse effects on nearby cable systems and reduce the likelihood of cable or motor failure. Belden's MCM VFD cables are designed to provide superior common mode current protection. They help protect a system against damage from reflected wave voltages and capacitively coupled current for maximum safety and reliability. Design fea-

- Two ram interface styles
- Three interchangeable feed options (mechanical, pneumatic or servo)
- Smart Applicator Integration

For all your application tooling needs, contact Heilind Electronics or visit heilind.com/rpages/te_oceanapp.



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tures of Belden MCM VFD cables include symmetric bare grounds, dual copper tape shield, enhanced XLP insulation, industrial-grade PVC jackets for longer life and a TC-ER (Exposed Run) rating that allows cable to run from cable tray to point of utilization per the NEC to reduce the need for additional support or protection.

Belden's MCM VFD cable carries the following ratings: 2000V UL 1277 Type TC-ER per 2005 NEC Article 336, 1000V CSA TC C22.2 No 230, 90°C wet/dry, Class I & II, Div. 2 hazardous locations, UL 1685 vertical tray flame test, FT4, IEEE 1202 vertical tray flame test at 70,000 BTU/hour. The cable is rated UL direct burial, oil and sunlight resistant, RoHS compliant and CE approved.

Belden offers a wide range of VFD cable gauges, giving drive manufacturers the most options possible for specifying the appropriate sizes for their specific

applications. For more information on MCM VFD cables, see Belden's Product Bulletin #368, visit www. Belden.com, or call 1-800-BELDEN-1 (1-800-235-3361).

Alpha Wire Introduces UL and CSA Tray-Rated Flexible VFD Cable

Alpha Wire has added the "V-Flex," a flexible version of its Series V VFD cable, to its line of Industrial Series cable. The new V-Flex cables are the latest innovation in cables designed specifically for variable-frequency drives (VFD). Featuring both UL and CSA tray cable ratings, a low temperature rating of -40°C, and a bend radius that is 5x that of standard VFD cable, the V-Flex offers the best combination of ruggedness and routability in the market.

The cable's cross-linked insulation polyethylene offers superior resistance from corona discharge, low capacitance for longer runs, and excellent low temperature properties to -40°C. Its premium TPE jacket can hold up to everything from corroding solvents (UL Oil Res I/II) to intense sunlight. The 5x static bend radius allows V-Flex to be bent to fit in tight corners, greatly improving ease of installation. The round, symmetrical design also reduces the diameter of the cable and increases its flexibility for easier routing and handling. "We designed the V-Flex to be the most complete VFD cable on the market," says Kristen Berard, Product Manager at Alpha Wire. "The XLPE core is far superior to PVC and allows for longer cable runs. Moreover, the UL and Canadian tray ratings



V-Flex Cable from Alpha Wire

expand the market for this product, making it ideal for everyone from machine builders in the U.S. to oil refineries in Western Canada."

The V-Flex cable has a TPE jacket and is available in sizes ranging from 16 AWG to 4 AWG, with a temperature range of -40°C to +90°C. The cables use a double shielding system to provide maximum EMI protection over a wide frequency range. The shielding is a combination of aluminum/ polyester/aluminum foil and copper braid with 85% coverage.

Compatible with systems from all major VFD manufacturers, the new Series V-Flex cables are approved to a wide range of standards, including CSA CIC Control and TC and UL TC-ER, 1000 V Motor Supply Cable, and Sunlight Resistance. In addition, this series is suitable for use in NFPA 79 applications. For additional information, contact Alpha Wire at 800-52-ALPHA (522-5742) in North America, 800-288-8809 in Europe, and 21-61498201 in Asia. Also, please visit www.alphawire.com/V-Flex to download data sheets, search for products using advanced search filters, and place free sample requests for Series V-Flex cable.

IPC Midwest Exhibition & Conference August 22-23, 2012

Renaissance Schaumburg Convention Center Hotel Schaumburg, IL WWW.ipc.org

ETCO Has Your Back

ETCO's new patented* fully insulated flag terminal provides a new level of safety for manufacturers, end users and service personnel. This type of insulator, commonly used on household appliances meets the new UL 749 standard, one of the first connectors of this type to do so in the industry.

Historically, these housings have been open in the back posing a potential safety hazard to service personnel in particular.



ETCO's revolutionary fully insulated flag terminal has a flat back that is shaped to fit into the terminal opening and is secured in place by tabs that fit into apertures in the housing. The cover is installed by a machine that pushes the cover into the back of the flexible terminal housing, thereby snapping it securely in place.

Call 800.689.3826 or visit ETCO.com/closed-back for more information.







*US Patent # 8,057,261 Bl

IPC-4204A Provides Guidance on High Speeds and Fine Lines

As chip speeds skyrocket and system sizes diminish, designers and manufacturers face new and complex challenges. To help them address these challenges and ensure that products meet performance and reliability requirements, IPC – Association Connecting Electronics Industries® released the A revision of IPC-4204, Flexible Metal-Clad Dielectrics for Use in Fabrication of Flexible Printed Circuitry. The updated standard now details materials that let designers and manufacturers move to far higher frequencies.

"We need to know that each material will still work at high frequencies, that there won't be any crosstalk or any other problems," said Clark Webster, an application engineer at All Flex LLC and chair of the IPC flexible circuits base materials subcommittee that worked on the revision. Along with enabling the reach of higher frequencies, the revised standard focuses on improved dimensional stability, particularly for adhesiveless assemblies. Enhanced dimensional stability is very important in environments like cell phones, where flex circuits must match up with traces on glass that can be smaller than 12 microns, Webster noted.

"In the past, designers knew the dimensional stability and the shrinkage and other factors that impacted stability, and they could modify the artwork to meet changing parameters," Webster explained. "It's a lot easier to meet today's requirements if you have better stability and don't have to guess how much the material will change during processing."

IPC-4204A addresses the basic aspects

of flexible circuit board design and also includes more focused information. Specification sheets at the end of the document provide users with information for classes of materials, including polyimides, liquid crystal polymers and polyesters. "Within these families of materials, people can see the requirements, parameters and test methodologies. Specification sheets make it easy for people to see the best material for their applications," said Webster.

Now that IPC-4204A is available to industry, committee members are moving on to tackle another flex technology, revising IPC-4203, Adhesive Coated Dielectric Films for Use as Cover Sheets for Flexible Printed Circuitry and Flexible Adhesive Bonding Films. IPC-4203 is often used by flex manufacturers in conjunction with IPC-4204A. IPC-4203A is expected to be released this fall.

For more information or to purchase the standard, visit www.ipc.org/4204.



Cerro Wire LLC, a manufacturer of copper electrical building wire and cable, announces its large print Max Print® wire labeling system, available now on all sizes of its True Sequential Footage™ sequentially printed cables. Max Print enables contractors to easily identify the wire manufacturer and size and view the sequential footage in large print, making installation and inspection easier and faster.

With Max Print, gauge size is printed 300 percent larger than standard labeling. This makes it easier and quicker to read gauge size which reduces errors and aids in the inspection process. Max Print is available on 1 AWG – 750 MCM THHN-2/THWN-2 products.

Max Print is used in conjunction with Cerrowire's True Sequential Footage ${}^{\rm TM}$, a sequentially printed cable reel that pro-



True Sequential Footage uses a footage mark to document remaining wire, beginning with zero at the bottom of the reel and ending with the finished length at the top. The accurate footage mark allows for quick identification of the re-order point, guaranteeing the full purchased wire length and reducing random lengths. This better controls end-of-reel scrap.

The need to carry excess inventory is reduced with precision cutting allowed by True Sequential Footage. Wire normally lost on each cut made with less accurate counting systems (3 to 8 percent) is saved when True Sequential Footage's precision footage marking system is used.

True Sequential Footage uses Doppler lasers to ensure precision far more accurate than a mechanical counter. The non-contact



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.



capabilities allow for zero slip and zero wear compared to a contact counter during the cutting process. "Cerrowire developed True Sequential Footage to address a problem that plagues every electrical distributor - the need to carry more inventory to cover wire cutting inconsistencies," says Rick McDonald, President of Cerrowire Electrical Distribution. "Adding Max Print improves the product further, eliminating problems and errors associated with printing wire size and footage in very small print."

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With many new manufacturing technologies coming to market (including vertical IPCAPEX Expo is the largest event in North America featuring advanced and emergtransistors, 3D IC, advanced materials, 450mm, and EUV) and with the continued ing technologies in printed board design, electronics and test Show highlights growth of emerging and adjacent microelectronics markets (including high-bright- include: ness LEDs, MEMS, power semiconductors, and flexible electronics), 2012 is already shaping up to be an important year for the global microelectronics supply chain. For further information visit www.semiconwest.org

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See new technologies and processes and evaluate suppliers all in one convenient location. Meet the Leaders! Expand your industry network by meeting the technical See www.ipcapexexpo.com for more information. experts creating IPC standards and technical programs.Get solutions at the technical conference, featuring competitively selected papers. Contribute to the industry standards your customers, competitors and suppliers rely on. For more information visit www.ipc.org.

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MD&M Minneapolis 2012 October 31-November 1, 2012

Minneapolis Convention Center Minneapolis, MN

For 20 years, MD&M Minneapolis has been the trusted resource for what's next in medical design and manufacturing. Regardless of your particular design and development objectives, MD&M offers everything you need to drive your project to the finish line. For further information visit http://MDMminn.com

Contract Manufacturing Expo November 14-15, 2012

Palais des congres de Montreal Montreal, Quebec, Canada

The Contract Manufacturing Expo features leading providers of contract R&D service, custom molding, custom CNC metals processing, specialty electronic contract manufacturing and full service, turnkey contract manufacturing. Alongside Design and Manufacturing Montreal that features leading suppliers of CAD/CAM systems Productronica 2013 and software, enterprise software, rapid prototyping, design services, custom molding, machining and components and fastening and joining systems.

See www.canontradesbows.com for further information.

San Francisco, California February 19-21, 2013

San Diego Convention Center San Diego, CA

Georgia World Congress Center

- More than 400 exhibitors showing equipment, materials and services for printed boards and electronics manufacturing
- The industry's most technically proficient programs in electronics manufacturing and assembly.
- The largest technical conference for our industry in the world
- FREE! Industry poster sessions-catch up on the latest research and meet the authors.
- And much, much more!

Interwire 2013 April 23-25, 2013

Atlanta, GA Introduced in 1981, Interwire is the largest and longest-running wire and cable marketplace in the Americas. It is an international trade event that includes exhibiting companies, speakers and attendees from more than 50 countries around the world. The show crosses dozens of vertical industries including automotive, construction, aerospace, transportation and communications among others. For more information see www.wirenet.org/events.

May 1-2, 2013

Del Mar Fairgrounds Del Mar, California

The Cosmopolitan

A high value design and manufacturing show, this event serves the electronics, medical and biotech industries. The show will play house to an impressive list of exhibitors. For further information or a listing of the seminars available visit www.vts.com.

EDS 2013 May 6-9, 2013

Las Vegas, California Every year, the manufacturers of electronic components, instruments and accessories, as well as distributors and manufacturer's representatives, come together to meet, make contacts and build their businesses. Suppliers of industry goods and services also are on hand to market their products. The emphasis at EDS is on forging and maintaining business relationships through scheduled, one-on-one meetings, but the event is also filled with important product exhibits educational, educational programs and networking opportunities. For further information or a listing of the seminars available visit www.edsconnects.com

National Electrical Wire Processing **Technology Expo** May 8-9, 2013

Since 2001, the National Electrical Wire Processing Technology Expo continues to be the exclusive showcase for the latest technology for the electrical wire harness, wire & cable processing and related industries. Meet over 100 world class suppliers of equipment, instruments, tools, materials and supplies used in wire & cable harness assembly, inspection and repair. For further information visit www.expoproductionsinc.com.

MD&M Minneapolis 2013 October 30-31, 2013

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November 12-15, 2013

New Munich Trade Fair Centre Munich, Germany

Minneapolis Convention Center

productronica is THE leading trade fair for electronics production. It showcases the entire value chain for electronics manufacturing- from software to process control,

Frontier Airlines Center Milwaukee, Wisconsin

Electronics West February 12-14, 2013

Anaheim Convention Center Anaheim. CA

Meet face-to-face with electronics professionals offering the best solutions. Explore first-hand the latest developments, technologies, products and services affecting your industry including: components, subassemblies, software, contract service, assembly, test and inspection products and much more. 350 exhibitors will display the latest electronics-related products and services. Visit www.canontradeshows. com/expo/atxw13 for exhibitor or attendee information.

Wiring Harness Manufacturer's Conference **Renaissance Las Vegas Hotel** February 20-22, 2013 Las Vegas, NV

Once a year WHMA sponsors a conference that offers members the opportunity to participate in committee sessions, attend educational programs and check out the industry's latest at the supplier's technology exhibits. For further information visit www.wbma.org or call (952) 253-6085.

from technology to applications, and from products to system solutions - under a single roof. It also focuses on the latest innovative and future-oriented highlight themes. Take advantage of this added value and profit from the effects of synergy. In short: productronica is an outstanding gathering for leading German and international manufacturers and newcomers who give other participants a look at both the present and the future. For further information email info@productronica.com

If you have an event you would like to have listed here, send it to Marilyn Magowan marilynmagowan@yahoo.com

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