

In Brief

Legacy Electronics (legacyelectronics.com) named Apera Technologies (aperatech.com) as sales agent in Canada, responsible for its line of component products, including PCB subassemblies and DDR memory modules. Also, Ewing-Foley Inc. (ewingfoley.com) will represent Legacy in Washington and Oregon.

AIM (aimsolder.com) appointed Cluff and Associates as rep for solders and assembly materials in Colorado.

Asymtek (asymtek.com) added four teams of distributors to represent its line of automated fluid dispensing systems in China: D-Tek, headquartered in Taiwan, with offices in Shanghai, Shenzhen, Suzhou and Dongguan, China; Leeport, based in Hong Kong, with offices in Beijing, Shanghai, Shenzhen and Chongqing, China, as well as Singapore, Taiwan, Macau and Malaysia; Beijing-based ATS, with offices in Tianjin and Shanghai; and SSI Shanghai, headquartered in Taipei with locations in Shanghai, Shenzhen and Hsinchu and Kaohsiung, Taiwan.

SMT Resource Group (smtresource.com) and Encore Capital Leasing rolled out a leasing program for buyers of assembly equipment. The companies provide 100% financing and terms ranging from 12 to 84 months. SMT Resource Group sells and supports new and refurbished assembly equipment; Encore provides financing for equipment procurement.

Göpel Electronic (goepel.com) has entered a strategic alliance under which Dansk System Elektronik (dse.dk) will offer design for test, test program generation development and turnkey solutions based on open integration standards in Scandinavia.

DEK (dek.com) has joined eight other companies in Dow Corning's (dowcorning.com) External Equipment Provider Alliance. Dow Corning is streamlining integration of materials and equipment used in assembly and packaging. DEK was chosen for its expertise in stencil printing.

Tin Men: Why Pb-Free Isn't free

Boston – The combination of low supplies and raging demand is pushing tin prices to record highs. After lagging for years at an average of \$4,000 or so per tonne, a year ago prices pushed past \$5,000 and in May peaked above \$10,000 before settling at slightly above \$9,000 this fall. For a time solder vendors ate the price hikes, until last July, when Cookson Electronics Assembly Materials, reportedly the world's largest buyer of tin for electronics solders, said enough – and announced that it would tack on surcharges when tin prices reached \$9,500 on the London Metals Exchange.

Several leading solder suppliers CIRCUITS ASSEMBLY spoke with shared insights on the causes for the price spikes – and how to plan for future volatility. Most fingered – surprise – China's consumption, coupled with refining bottlenecks, as the main culprits. While several factors are at play, most vendors agree with Kester vice president of marketing and business development Dave Torp, who cites "basic market supply/demand relationships." Excess supply in the late 1990s and early 2000s depressed prices, causing suppliers to close mines. (While not outright casting the world's tin suppliers as a cartel, vendors note it's a "relatively tight-knit group.") Since 2000, China, which produces at least half the world's tin, has shifted from a major exporter to a net importer, and that nation's energy crisis has dampened its smelting output. Other forces are the tech comeback and higher tin content in new solders, which are "definitely creating more of a demand," says Rick Black, president of AIM Inc.

Black warns that the ongoing metals inventory purge by the Defense National Stockpile Center could exhaust certain tin stockpiles within two years. But, he says, "When the price goes up, so does investment in infrastructure. More metal will be pulled out of the ground." Indeed, few believe tin supplies will suffer from the transition to lead-free, because supply will increase to meet the anticipated demand. "It's a gradual move," says Henkel Electronics president Pat Trippel. "[I]t could be a different story if everyone switches to lead-free in a short period, but we don't expect that to happen."

What that doesn't mean, however, is that lead-free solders will cost the same as tin-lead ones. Says Cookson Electronics Assembly Materials president David Zerfoss: "We've put millions [of dollars] into research for lead-free capable materials and there's a price tag for that. Also, the products themselves are inherently much more expensive." Bar solder contains a higher tin content than pastes, leaving some suppliers more exposed to tin pricing volatility. Zerfoss notes the shift from 63-37 to over 90% tin means the same joint will require 20% less solder by weight to make, but the alloy composition by the weight of the bar will be 34% more. Bottom line: More consumption of tin and silver. Quips Zerfoss: "You cannot sell lead-free at the same price. Lead-free ain't free."

Buyers should follow *Metals Week* or LME (lme.com) futures, vendors advise, to anticipate sharp changes in prices of tin or other metals used in solder. Hard-core watchers can monitor speculative fund managers who play the tin market, as fund movements often have big impacts on market swings, explains Torp. Still, "you don't really know where [spot market pricing] will go," acknowledges Zerfoss. Kester sees continued pressure on tin supply throughout 2005. Says Aim's Black: "I don't think [pricing] will go back anytime soon. There's definitely a shortage of supply right now."

For now, Cookson seems to be the only major firm to publicly warn of possible surcharges. Henkel, Trippel says, "hasn't decided exactly how we're going to handle it. Our customers are aware of the situation. It's something we all face." Henkel is renegotiating some contracts, he says. Kester claims "constant communications" with customers on pricing and delivery. Black feels many customers are behind the curve. "There's a mindset among many purchasing agents that all incoming merchandise costs must be reduced each year. People kept thinking the price should keep coming down, and ... when prices started to increase, they felt hoodwinked."

Tin is just one of several raw materials hit by price hikes. Prices of isopropyl alcohol, a component in many fluxes, have seen "significant increases." Indium prices have risen from \$50 per kilogram to \$800. Solder vendors are at the mercy of their suppliers. "The only thing [solder vendors] can control is the cost of manufacturing," not the prices from the mines, Black says. "Typically wire and bar solders move with the market. Paste is different because the metal component as a percentage is a much smaller percentage of its value."



'Lead-free ain't free':
Cookson's Zerfoss

In Brief

Molex Inc. (molex.com) acquired Incep Technologies Inc. (incep.com), which provides system-level approaches for power delivery, high-density packaging and thermal management. The companies have partnered for past two years on power delivery for high-performance semiconductors.

Nortek Automation (nortekautomation.com) launched a turnkey packaging line for electronics manufacturing. The new line is geared for packaging digital media products such as secure digital, compact flash, multimedia cards, USB flash drive, DDR memory modules and other products.

Newly founded Avo Photonics (avophotonics.com), specializing in RF and optical packaging, now offers design and manufacturing solutions for communications, military/aerospace and medical/industrial. A suite of modeling tools (RF, optical, thermal and mechanical analysis) supports its custom and standard package designs.

Celestica Inc. (celestica.com) sold its Power Systems business to C&D Technologies (cdtechno.com) for \$52.8 million in cash. Celestica will continue to build certain power products for C&D for the next three years.

Dow Corning (dowcorning.com/electronics) has signed a joint development contract with Scotland's INVINT Ltd (invint.com), to develop a variety of new interconnect technologies. Under the contract, INVINT, which develops conductive polymer interconnect technology, will develop and characterize novel interconnect processes based on Dow Corning's organic- and silicon-based conductive polymer materials.

With the cost of a key constituent of fluxes rising sharply, Cookson Electronics Assembly Materials (alphametals.com) will hike prices for IPA-based fluxes. Effective in October, Cookson raised IPA flux prices 70 cents per gallon, in response to the volatility of petrochemical prices on the world market. The company said that isopropyl alcohol prices have risen 78% since June 2003.

Seminar Poll Shows Slow Progress on Pb-Free Conversion

Boston – A poll of more than 50 attendees of recent workshops on the business implications of lead-free manufacturing revealed just 18% of respondents actively working on alternatives to lead.

The vast majority – 80% – of those responding remains in the beginning stages of preparations for the phaseout. And no respondents indicated they have converted completely.

The European Union has decreed through a pair of mandates known as the Restriction on Hazardous Substances (RoHS) and the Waste in Electrical and Electronic Equipment Directive (WEEE) that all products sold in Europe after July 1, 2006, be free of lead and several other hazardous materials. (For copies of RoHS and WEEE see circuitsassembly.com.)

The poll was conducted during seminars held the week of Sept. 26 in Orange, CA, and San Jose. The seminar, Introduction to Lead-Free, is sponsored by Design Chain Associates (designchainassociates.com) and EPTAC (eptac.com) in conjunction with UP Media Group, publisher of CIRCUITS ASSEMBLY.

Those polled said they are worried about everything from fundamental process issues to component sourcing, how exemptions are granted and contractual liability for recycling.

The seminar scored high marks with attendees: 75% rated the speakers "very good" or "excellent." For more information on the seminar, visit pcbshows.com/leadfree.

SLOW GOING: Pb-Free Conversion Poll

Evaluating need:	13
Developing plan of attack:	19
Plan in place:	1
Going through conversion	7
Completed:	0
Did not respond:	13
Survey conducted Sept. 30-Oct. 1.	

Welcome back



Attendance was up – and moods were upbeat – at the Assembly Technology Expo in late September. See full story at circuitsassembly.com.

BTU Chief Executive Resigns, No Reason Given

North Billerica, MA – Mark Rosenzweig, the top executive at BTU International stepped down Oct. 1, the company said, providing no rationale. Rosenzweig, president and chief executive, also resigned from BTU's board.

BTU chairman Paul van der Wansem, 64, assumed the role of chief executive. van der Wansem was the equipment manufacturer's CEO from 1979 through mid 2002.

People

John Waryold, a 44-year veteran of electronics manufacturing, has retired as VP and general manager at HumiSeal. He will continue to advise the company in a lesser role. Waryold was chairman of the task group responsible for most conformal coating standards in use today, and he invented 1B31 and several other products that are now industry standard.

Benchmark Electronics has split its chief executive and chairman roles. President and COO **Cary Fu** will now also be chief executive. The current chairman and CEO, **Donald E. Nigbor**, remains chairman. CFO and treasurer **Gayla J. Delly** is now also executive vice president.

Tyco Electronics Automation Group promoted **Mike Tam** to marketing manager, Asia/Pacific. He was global application tooling division marketing manager.



Preco Electronics named **Thomas Goehl** test engineer manager. He was in test engineering management at Glenayre Electronics. Also, Preco manager of quality systems **Jason Janssen** has been awarded a Six Sigma Black Belt.

Datacon named **Steve Shermer** product manager, North America, responsible for customer requirements, product positioning and technical sales support.



Shermer was product development director for Amkor's Advanced Product Development Group.

Advanced Circuits CEO **Ron Huston** was recognized by *Fortune Small Business* as one of the nation's best bosses for his innovative reward-based management practices. Six executives were picked from 210 nominees that excelled in employee tenure, benefits and management challenges.

Agere's 'Nickel' Defense

Allentown, PA – Agere Systems (agere.com) has discovered a mix of ingredients said to eliminate lead from component packages. The solution calls for adding a layer of nickel to tin over copper packaging.

While most chip packages use a layer of tin and lead over copper, lead-free substitutes will likely use tin over copper and will be processed at higher temperatures. Research at Agere has shown that tin-copper packaging meets current standard tests developed for leaded product. However, commercially available tin-copper packaging forms tin whiskers, which are known to cause electrical shorts and other system failures.

Three tests proposed by JEDEC (jedec.org) with guidance from NEMI (nemi.org) effectively screen for susceptibility to tin whiskers. Of the three tests, two display no discernable difference between matte-tin on copper and nickel-undercoated matte-tin on copper. According to Agere, a layer of nickel between the copper and tin provides "dramatic improvements" using real-world environment.

Agere evaluated packages from multiple sources using various tin-plating processes. Tin whiskers were observed on packages following lead-free assembly onto boards with tin plating. Adding a layer of nickel between the layers of tin and copper mitigated tin whisker growth, Agere found.

Early results from an independent study conducted by NEMI corroborate the findings, Agere said. NEMI will publish its own findings next year.

Motorola Qualifies Henkel Pb-Free Paste

Industry, CA – Following three years of intensive evaluation Motorola has qualified a lead-free solder paste from Henkel Electronics. "I think the great advantage of this material is that it provides a very wide process window, which gives us tremendous flexibility," says Vahid Goudarzi, a member of the technical staff at Motorola (motorola.com). "From printing to reflow, we really stressed the material and it was able to meet our rigorous technical requirements."

Multicore LF320 requires a minimum peak reflow of 229°C, about 11°C lower than standard lead-free pastes. (Higher Δt assembly designs can be reflowed in air at up to 260°C.) The difference provides a safety margin when reflowing temperature-sensitive components. According to Henkel (henkel.com/electronics), LF320 is classified as a ROMO per J-STD-004 and meets or exceeds Bellcore GR-78-CORE tests for electromigration.

Solectron, Plexus Find Extra Capacity

San Jose – Solectron Corp. (solectron.com) expects to take fiscal fourth-quarter restructuring charges of up to \$25 million due to company shutdowns in Europe and North America. The company will also layoff 500 employees, the firm said in a Sept. 16 filing with the SEC.

Separately, Plexus Corp. (plexus.com) will take up to \$13 million in charges and close its Bothell, WA, plant by the end of its fiscal 2005 second quarter, laying off 160 workers. Plexus also said startup costs of its Malaysia facility are higher than expected, due in part to a slower-than-expected rate of customer qualifications.

Speedline Awarded Paste Detection Patent

Franklin, MA – Speedline Technologies (speedlinetech.com) has been awarded U.S. patent no. 6,738,505 for a texture-based method of analyzing potential bridge defects on circuit boards during post-print inspection.

The patent describes the use of so-called texture-based image acquisition algorithms and a digital camera to assess the quality of paste deposits. The patent itself describes the method of using texture in the detection of paste in a region of interest between printed deposits.

Speedline markets the process as part of the MPM BridgeVision brand.