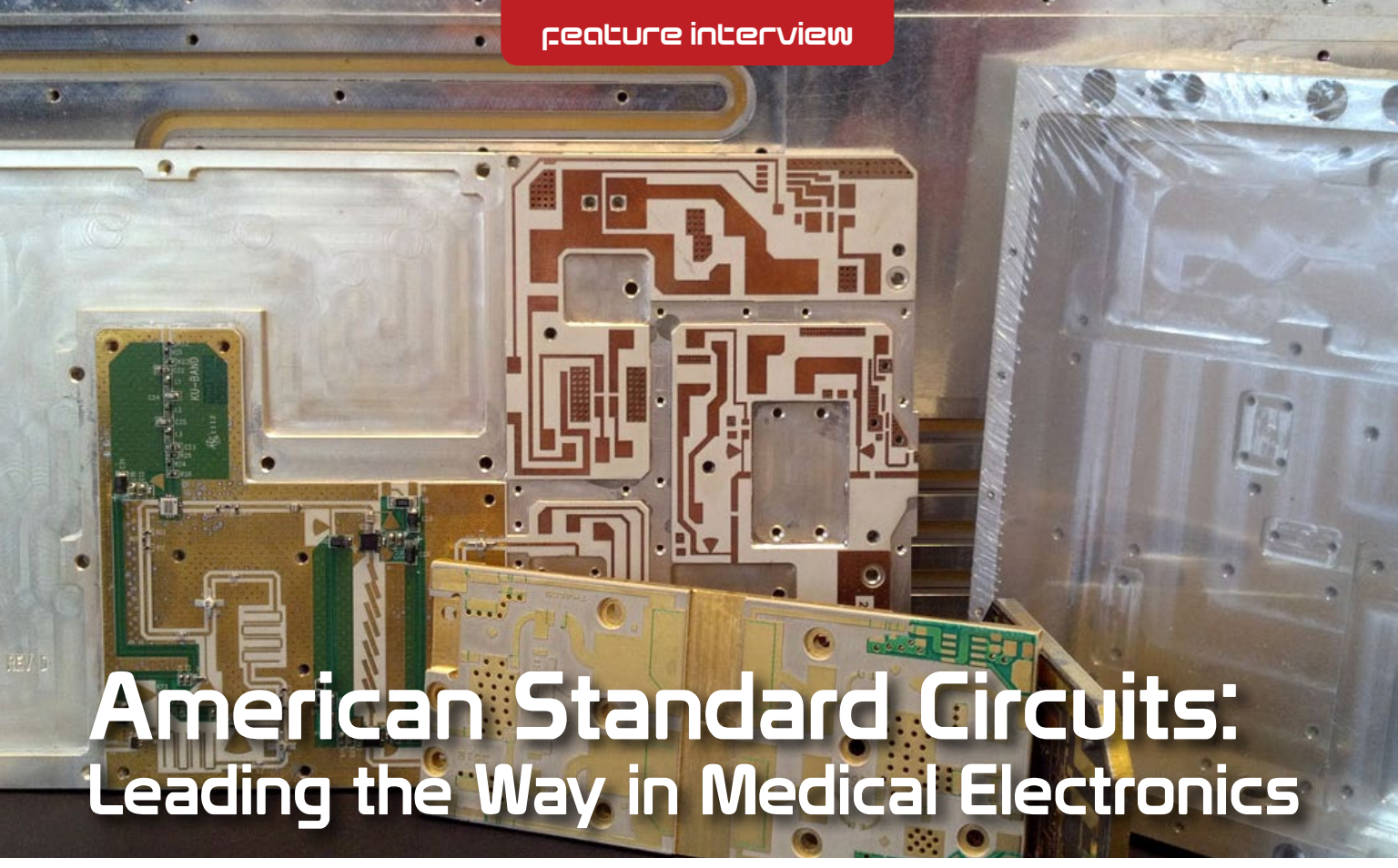

American Standard Circuits: Leading the Way in Medical Electronics

by Dan Beaulieu
D.B. MANAGEMENT GROUP

When it comes to innovative fabricators, American Standard Circuits is always at the front of the pack. Naturally, when Editor Andy Shaughnessy asked me to talk to a fabricator about PCBs for the medical market, ASC was the one company that immediately came to mind. I spoke with CEO Anaya Vardya about fabricating medical PCBs, the medical electronics market, and the future of this fast-growing segment.

Dan Beaulieu: *Anaya, it's good talking to you again.*

Anaya Vardya: Thanks, Dan. It's great to catch up again.

Beaulieu: *Please give us a little background on American Standard Circuits.*

Vardya: ASC has been in business for more than 27 years. Throughout, we have migrated from a simple double-sided shop to a company that builds a wide variety of products. Today, we build flex, rigid-flex, RF/microwave, metal-backed PCBs and IMPCBs. We are able to build prototypes, quick-turn, high-mix/low-volume and low-mix/high-volume products. We are continuously reinvesting in our business in terms of people and equipment. This year, we have invested over $1.5 million. We are also investing in improving our quality systems.

Beaulieu: *When did you get involved with medical PCBs?*

Vardya: We first started building parts for medical products in 2009. Often, these products start out as prototypes and take quite a few years to ramp up. We have built flex, rigid-flex, RF/microwave and metal-backed product for the medical industry

Beaulieu: *Without getting into specific customers, what sort of medical products do you build PCBs for? What do your boards go into?*

Vardya: That's a good question, because we cover a very wide variety of applications including medical. For example, we build flex boards that are used in a digital inflation device for

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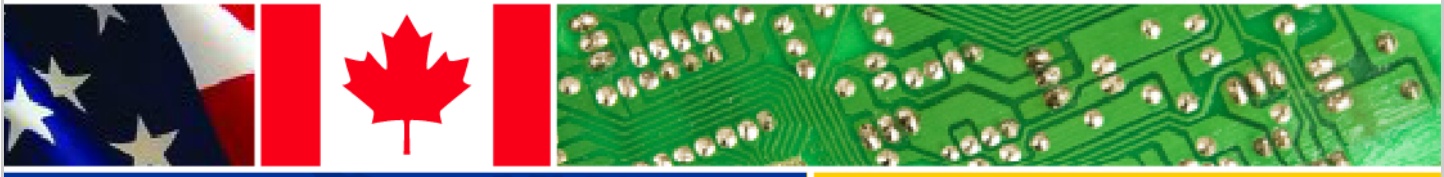

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Anaya Vardya, CEO, American Standard Circuits.

heart stents. We also build boards, both flex and rigid-flex, that are used in blood analyzers. Then we have boards that go into a wide array of markets, such as small boards used as RFID tags in operating rooms. We build metal-backed boards that are used for LED lights for chairs in dentists' offices. One of our most challenging projects was building small rigid-flex boards for a pill camera. These boards are all built from a variety of materials, from Rogers ceramic materials to simple FR-4.

Beaulieu: ***So you pretty much cover the gamut of medical electronic needs. Are there special or unique technologies that apply to this market?***

Vardya: While medical electronics use a wide variety of printed circuit board technologies, there appears to be increasing application of flex and rigid-flex PCBs in this market place.

Beaulieu: ***Can you tell me roughly what percentage of your business is for medical electronics?***

Vardya: Today we estimate about 5% of our business is associated with Medical electronics. We anticipate that this will be a growing market segment for ASC.

Beaulieu: ***Obviously, when you are dealing with medical applications, it is not over dramatic to talk about being a matter of life and death. Can you talk about what you do in terms of quality assurance and reliability to make sure you are giving your medical customers the very best product when it comes to those features?***

Vardya: Dan, one thing that helps us is that we build everything in our facility assuming it needs to be certified to a minimum of IPC Class 3. Reliability is a critical part of what we do especially since we do build a lot of products that are safety related—including boards for active safety automotive electronics. We have invested and trained our quality manager to be an IPC-600-A trainer. We have subsequently certified many of our quality inspectors to IPC-600-A. We are also currently pursuing our AS9100C certification. While this does not directly apply to medical electronics, it is clearly improving our quality system which benefits all of our customers.

Beaulieu: ***What do you see for the future of medical electronics?***

Vardya: I believe that the future for medical electronics is very bright.

Beaulieu: ***And what are you doing to continue being on the cutting edge when it comes to meeting technology needs?***

Vardya: We are investing in people and equipment. We recently appointed Jim Zeman, an industry veteran, to be our director of quality. Jim has many years of experience at Ibiden as a quality manager and is well versed in Japanese techniques. In addition, we hired another industry veteran earlier this year, Rob Coleman, as our VP of operations.

Beaulieu: ***So you are putting together a real top-rate team. I know those guys, and they're very strong. Have you invested in technology with equipment as well?***

Vardya: Yes, we have also invested in both software and equipment to improve our capabilities. We invested in TrueChem software to enable us

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Beaulieu: *How much in total dollars have you put into the company by acquiring all of this new software and equipment?*

Vardya: In 2015, we invested more than $1.5 million.

Beaulieu: *What would you say is the single biggest reason why medical customers should consider using a company like ASC?*

Vardya: Dan, we definitely understand this market. We are focused on high-reliability, leading-edge technologies, and quick-turn capabilities. We are continuously making investments in terms of resources and equipment to this end. Our goal is to make the customer experience as easy as possible. For engineers, we are more than willing to work with them on design for excellence. For flex and rigid-flex designs, we definitely recommend that engineers talk to us during the design phase. A lot of times engineers are looking for quick-turns; however, many times the material lead times can be an impediment. If designers work with us during the design phase, we can work with them on materials. We can even order materials prior to placement of the PO to expedite quick-turns. We are also constantly making investments to enable us to do a better job for our customers.

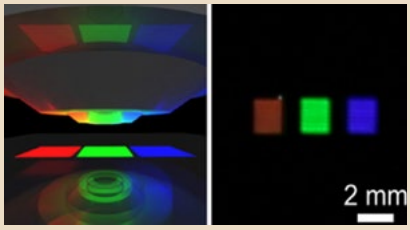
Beaulieu: *Anaya, once again, thanks for taking the time to talk with me today. I appreciate it.*

Vardya: Thanks, Dan. It was a pleasure spending time with you today. **PCBDESIGN**

Aluminum Nanoparticles Could Improve Electronic Displays

Whether showing off family photos on smartphones or watching TV shows on laptops, many people look at liquid crystal displays (LCDs) every day. LCDs are continually being improved, but almost all currently use color technology that fades over time. Now, a team reports in ACS Nano that using aluminum nanostructures could provide a vivid, low-cost alternative for producing digital color.

Conventional color technology used in displays is susceptible to photobleaching, or fading. So researchers have looked toward aluminum nanoparticles that can display colors in electronics, thanks to a property called "plasmon resonance." To create plasmonic color devices, researchers group nanostructures into arrays called pixels. Color is generated by scattering light onto the pixels, with different arrangements creating different colors.



Aluminum plasmonic pixels are advantageous for use in electronic displays because they are inexpensive and can be made in an ultrasmall size, which can increase image resolution. But these pixels create muted and dull colors. In a recent publication, Stephan Link and colleagues developed a method that allows the red end of the color spectrum to be more vibrant.

The researchers used a three-step design approach to create aluminum nanostructure pixels that exploit "Fano interference" — an interaction between the plasmon resonance and the pixel's array structure — to produce vibrant blue-end colors. The researchers then incorporated a set of red, green and blue pixels into a liquid crystal display that could be electrically turned on and off, demonstrating this work's potential use in commercial flat-panel displays.