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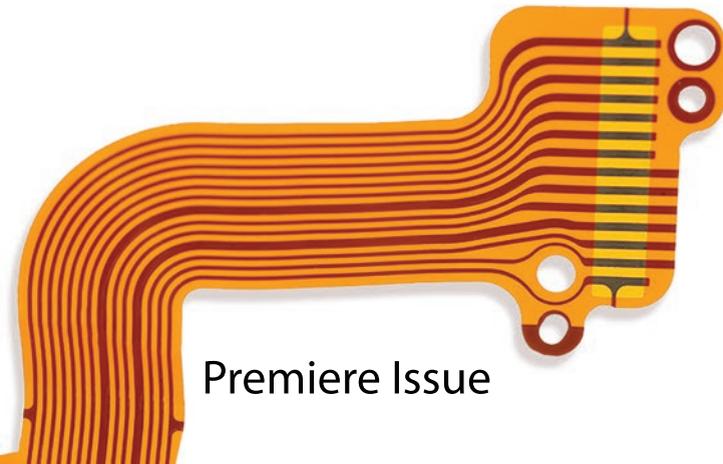
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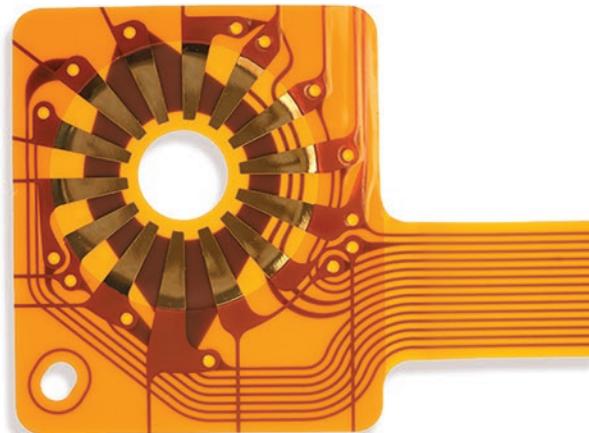


Got Flex?

Flex007 Magazine is
dedicated to flex system designers, electrical
engineers, flex PCB designers, and those responsible for
integrating flex into their products at the OEM/CEM level.



Premiere Issue





APCT Moves into Rigid-Flex with Cartel, Cirtech Acquisition

Feature Interview by Andy Shaughnessy
I-CONNECT007

When I spoke with APCT President Steve Robinson a year ago, he said he was interested in adding flex and rigid-flex capabilities. With the recent acquisition of Cartel and their subsidiary Cirtech, APCT now has a flex and rigid-flex facility, along with military and aerospace certifications. At DesignCon 2018, I asked Steve to discuss these acquisitions and what they mean for APCT and their customers.

Andy Shaughnessy: Steve, good to see you again. Now, as the top guy at APCT...

Steve Robinson: I'm the head janitor. I clean up all the messes [laughs].

Shaughnessy: That's right. Steve, give us a quick background on APCT.

Robinson: APCT was founded in 2008. It was Advanced Printed Circuits before that. This will

be the 37th year of that facility and that operation. When I left Merix, I acquired this operation and we've been focusing on a high level of advanced technology and high engineering support for over eight years now. Business has been great, and we've been very fortunate. I think we picked the right market segment and the right business model that we gleaned at the time. We just had a nice start to 2018 with another acquisition.

Shaughnessy: Tell us about this acquisition.

Robinson: We acquired two business entities. First, Cartel Electronics, run by Bruce McMaster in Orange County, California is a rigid medium-to-advanced technology manufacturer, a high-mix commercial factory. Then we acquired an affiliate of theirs, Cirtech, which has a market niche: defense aerospace, military-focused, with high-level certification, and flex and rigid-flex as well.

One of my charters in 2017 was to provide a solution for our customers in the flex and

rigid-flex arena. And I was happy to get this deal done; we started on it in August 2017 and finally closed in January 2018. It's nice to have the additional capacity and depth from the Car- tel team, along with the additional offering of the flex and rigid-flex. The defense and aero- space certifications of Mil-P-55110 and 31032 were high-value targets, and to be honest, it was easier to acquire than it was to implement them in my current operations. So, we chose that path.

Shaughnessy: So you don't have to train any- one...

Robinson: Yes, you don't have to change the culture of your specific factories either. One is a high-reliability facility, a little bit more metic- ulous with its focus, while the other facilities are more advanced technology-focused and speed-focused. Stopping to complete 20 pages of paperwork every other day is kind of cum- bersome to our task of quick turn, but both strive for high reliability.

And I'm really excited to introduce our quick-turn culture into those arenas. In the ini- tial month, I've been meeting with customers, especially the flex and rigid-flex. Even in the defense and aerospace segments, the technol- ogies are evolving very quickly, and there's a shortage of suppliers. So when you have our established, high-reliability factory and now you introduce our advanced technology, quick- turn capabilities, our meetings have been pretty

eye-opening. Customers now know that they have a source that they can go to that offers a broader range of technology for them. Because they're being pressured, the defense industry is the same as ours—smaller, thinner, lighter, faster, more economical, more affordable, and more efficient. And so that's driving smaller, tighter lines, smaller features, everything that embraces the advanced technology space that APCT has niched itself in.

So far the feedback's been tremendous, and the customer interest is through the roof com- pared to what we expected. So it's really good. We're really excited about it, looking forward to the rest of 2018 and working with it. As I said before, as with any acquisition, you don't buy a company; you buy the team. I'm excited about the depth of the team, and the experi- ence they have. Many of these people have been building printed circuit boards in their industry niche for 20–30 years, so it adds tre- mendous depth to APCT. It still is just people working with people, so to have a huge sur- plus of industry veterans is something special.

Bruce McMaster has been one of the top leaders of our industry for years, since the DDI days. John Stein is running our Cirtech opera- tions, and he has many years in the design and manufacturing of flex and rigid-flex. I thought my team was the strongest team in the indus- try prior to this, so it's really exciting for me. As CEO, my job is team building, right? I put the best players on the field and have a good game strategy, and then execute with a good team. I am about to roll the PCB Patriots into the circuit board industry.

Shaughnessy: You talked before about how you want to reach the designers and design engi- neers on the front end to do high-reliability and the high-tech work.

Robinson: Absolutely. Because as you go to the advanced HDI space, there are still a lot of struggles in the design stages. They don't yet understand the critical steps to have high reli- ability and predictability in advanced technol- ogy builds. It requires balanced constructions, looking at what you can do, and making it



achievable for manufacturers to be successful.

That holds true for the flex and rigid-flex space as well. That industry is evolving, and designers are still struggling to do it right. Our core focus is still engineering at APCT, and that's what we are. We're a service company. We happen to build circuit boards, but this acquisition is still the same. We are a services business. We're working with designers, and we're working with engineers, helping them develop a concept, and then we build the solution for them. And that starts with early involvement, helping them through the design aspects of it. And it's fun. It's been exciting.

We grew 40% last year in that model, which was a big year of growth for us. I think we've found an area that has value, and there is a need. With any business model where you find value and a need, if you don't mess up the execution, you should have a successful opportunity. This is what we're seeing now.

Shaughnessy: And now you have flex and rigid-flex. The last time we talked, you said flex was on your radar screen.

Robinson: Right, we had no flex or rigid-flex. That was really my goal in 2017, to bring that opportunity. You want to diversify your offerings, but you also want to provide something your customers are asking for, and most of my customers were asking me for that. In 2018 we are going to try to perfect that, and now we've got customers asking for new technologies. They're talking to us about some of the thermal conductive materials out there, especially in the automotive and the lighting industries. How do we develop that for them and work on that?

As miniaturization has gone to levels even beyond our capabilities of 40 micron or less trace and space, we're being pushed for more. Our engineering team is now looking at the additive process, buildup processing, and some of those new technologies that are coming out and just starting to emerge. We will continue to chase those processes, as long as there is market behind it. I don't want to chase them just to prove that it can be done; I want

to chase them because there is some value and customers need it and there is a market.

Shaughnessy: I've talked to a couple of people here who say it's hard to find somebody who can build their flex the right way. One company owner told me that the worst things they have had to deal with is the assembly of flex, because with all the fixturing, it's almost like starting over from scratch.

Robinson: It's different. You know I have a few people on my team who have familiarity with that processing. I think you learn two things in that industry. Number one, you don't see many rigid and flex facilities combined. They've all pretty much abandoned that strategy; you see flex-dedicated or rigid-dedicated factories. Flex requires a little different mentality and a different thought process. I've learned that the upfront engineering and the time associated with developing a plan for flex is a lot more comprehensive than with advanced HDI or other tough technologies we can get on the floor in a couple hours or a day or so. With flex, it takes a few days to coordinate that.

The challenges we see are cycle time, along with miniaturization. You know it's going that route as well. How do you do it right? How do you do design? That's why I am excited about having design guys on my team that are at the early stage with the flex. This gives us an opportunity to lay the board out in the right way. It's all about how you lay your circuitry with the way that product is bending.

Shaughnessy: Do you have some flex designers now?

Robinson: We do, at the Cirtech facility, and they supply designs to customers as well. And the other piece is assembly. We're looking at putting some of that down there, too. Most reputable flex or rigid-flex facilities have some type of assembly in-house as well. We'll look at that maybe for that region. I've never embraced the assembly aspect of it because it is a conflict with a lot of our customers, and I don't want to create that. But with the flex and

rigid-flex, it's a little different model. So we'll see. It's kind of new, so we'll go with it and play with it for a while and see where it takes us. It's exciting—super busy. We had already completely filled our capacity for Q1 in the first two weeks of selling it. That tells me the interest is very high.

Shaughnessy: That's good. So what's the big hole in your capabilities now?

Robinson: We don't really have one. My sales guys love to tell me it would be nice to find a low-cost solution. You know, a really competitive low-cost solution. I'm not sure that's feasible anymore, in North America at least, to try to have that operation that can still sustain itself. There is still a significant need out there for 2-, 4-, 6-, and 8-layer low-tech stuff that is low-cost competitive. That's what the Advanced Circuits of the world have captured.



They own that. Some of the Internet-based model businesses have that and they are thriving on it, and I think you've got to allow them to be in that space. I don't think that is going to change.

We consider our global business a program management business, not a cost-driven business. But more people come to us to manage the recipe and manage the program. I think that will be my next focus area—to try to expand that and align that with more of the demand we are seeing. We've added some distribution in central U.S. so we can support the United States with it. It's a fun model to work with, because its capacity has no limits. So it's really the right program and the right customer partnerships that really look to us for the NPI and the recipe and manage the program for them.

As far as technologies, it's the same. You know, I think we've gone beyond the standard PCB manufacturing techniques. We have everything that you can do it with now, with the additive I think will be our biggest thing

we will look to improve. That process is probably the newest emerging. If you're going to get down to 10 to 15 microns trace and space, we've got to get creative with that. I think that's probably what we are going to focus on in a limited basis now.

Then the other aspect is the cycle time, to continue to focus on reducing our cycle times where we can do multiple lamination cycles. We are currently building three to four lamination cycle products in five to six days. That's from 10 to 12 two years ago, so we have really reduced that cycle time and the demand out there for that. Reducing cost and reducing cycle times of the advanced technology I think is one of my big focuses for 2018 along with the additive. I think that is something my engineering team is going to have to come to me with. Connecticut is already embracing the thermal conductive materials, so we are probably going to roll that out in that operation.

We have a significant automotive and lighting business out of that facility already, so it makes sense for that site to do it. And you know, other than that, you work on the culture and the integration of the new families we now have in Southern California. We'll be bringing them up to speed with the way ACPT does business and what is important to us, and how we focus on our customers. We want to enhance the culture at the new facilities and capitalize on them, and do some of the things always necessary early in the process of an acquisition.

Shaughnessy: Very good. Is there anything else you want to talk about?

Robinson: I think that's it. We'll talk again, I'm sure. Thanks for the opportunity.

Shaughnessy: Thank you, Steve. Great talking to you. FLEX007