

IConnect007

APRIL 2020

DESIGN007

M A G A Z I N E



REPRINTED WITH PERMISSION

FLEX007

Flex Economics

The design economics related to creating flexible and rigid-flex circuits are similar to that of their rigid board counterparts, but the 3D nature of flex can lead to a variety of potential hurdles on the way to cost-aware design. This month, our expert contributors examine the economics of flexible circuit design from a variety of industry viewpoints.

- 82** **FLEX007 ARTICLE:**
DFM for Advanced Technology Rigid-flex
 by MK Hicks



- 72** **FLEX007 COLUMNS:**
Mina: Enabling Soldering to Aluminum
 by Tara Dunn
- 78** **DFM or Design With Manufacturing**
 by Joe Fjelstad

- 75** **FLEX007 SHORTS:**
PTC to Sponsor Global Design Competition, "Robots to the Rescue"
- 86** **EyeOn LifeLine Deployed to Hospital ICUs to Combat COVID-19**

- 76** **HIGHLIGHTS:**
Flex007



DFM for Advanced Technology Rigid-flex

Flex007 Feature by MK Hicks
INFRONT AGENCY

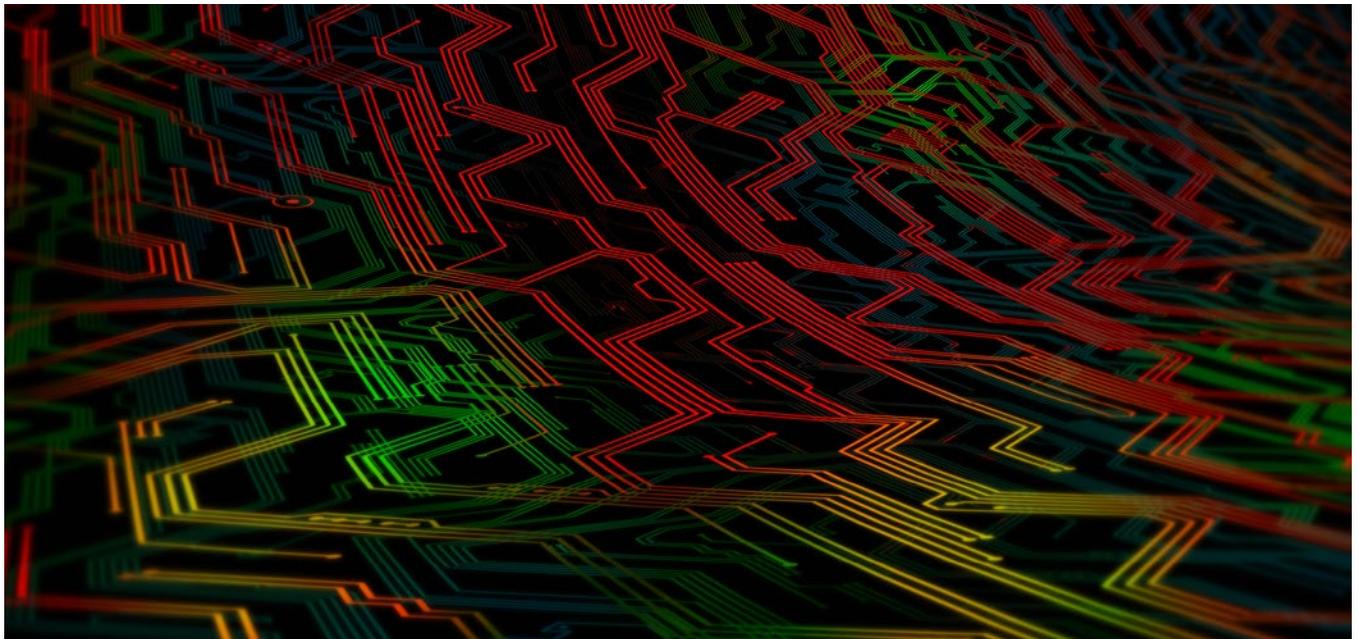
Business as usual is gone. Exponential innovations are the norm. Why are industry leaders aggressively pursuing innovation at a record pace? It's simple—they must. All elements of the technology development chain are advancing at the same time to provide advanced chips, sensors, manufacturing, ever-advancing material and material production methods, and communication networks. How can design companies stay competitive in innovation advancement and gain market share? Collaboration is becoming the essential element that spurs continued and repeated success—especially in groundbreaking, new technologies.

Start With Advanced DFM

The competitive nature of technology—especially hardware—is requiring shorter design-to-commercialization cycles. If the initial con-

cept can be designed with manufacturing efficiencies at its core, not only does this bode well for confirming the buildability of a design, but it also shortens the time to commercialization.

Designs are becoming all too sophisticated. PCB designers need to embrace working with advanced DFM engineers from the initial moment of the design concept. These are leading experts at the foundation of hardware design whose job it is to show up every day, stay informed of the latest materials and new processes, and be constantly challenged to deliver new capabilities. Expert DFM engineers thrive on applying advanced technologies and are driven to design them for the highest yield in the most essential and profitable way. DFM experts in rigid-flex are few, due to the unique experience required with upfront engineering and manufacturing capabilities such as details to put a build plan in place, perform test runs and proof-of-build. Relying on these experts is



the key to continued collaborative success as technology races forward.

Who's Leading This Dance?

Today's cutting-edge technology is demanding 20+ layer rigid-flex, flex with stiffeners, rigid-flex HDI, and rigid-flex platforms by nearly all industries—from defense and aerospace to medical devices and commercial. The needs of these different industries once-segmented manufacturers and the technologies that each offered. But now, manufacturers who are becoming dominant solutions providers excel in collaboration as they ramp up to offer the same high level of technology, capabilities, reliability, quick-turn applications, testing, and appropriate certification across all industries.

Perhaps the delivery expectations that we have grown accustomed to in our personal lives are also influencing expectations in our business lives. However it started, shorter lead times and quick turn are becoming the norm, not the exception. Where once 40-, 50-, or 60-day lead times were typical for the defense and aerospace industries, for instance, the demand for decreased lead time continues down to 15 days or less. To meet speed demands, manufacturers are being challenged to create more efficient processes and to increase discipline by constantly monitoring key production KPI to meet demands without sacrificing quality or economics. They don't want shorter lead times or quick-turn to live in isolation but to be a companion with advanced technology solutions, reliability, and capacity.

Views From the Industry

We asked three technology leaders to provide their views of today's manufacturing challenges and changes.

Sherry Barone CEO/Co-founder of ATPP

"The most challenging thing for the defense industry is the manufacturing process."



It takes a long time to develop the most sophisticated designs. The most critical determinant of development-to-deployment time is manufacturing. As an example, it can take up to three to six months to develop a design, which then may take a year or two to test, integrate, and potentially field test. Another challenge in manufacturing is for designs to become lighter and stronger, functionally advanced with capabilities that are modular. You want to have software that is adaptable for the smaller modules so that you can add on features as you continually advance the software applications.

The defense industry is highly focused on flex designs for mobile applications with 5G. Mobile technology is going to expand to enable more software applications and more data exchange at higher speed with signal integrity and enabling advanced cybersecurity. 5G is an energy alternative application that uses significantly less energy. The new 5G technology and current applications are projected to be a \$35 billion industry over the next couple of years.

Flexible PCBs are going to be in high demand for the development of defense industry applications. Innovation in the PCB industry is going to need to get faster to keep up with a growing demand for product speeds. It is a unique opportunity for designers and manufacturers to come up with capabilities that offer high speeds, quicker and cheaper.

Steve Robinson CEO/president of APCT

"We are committed to continually investing in the future."



In the last 18 months, we have been in conversations with our defense, aerospace, and medical industries customers, to name a few, listening to what they value the most from a North American supplier. All of our customers are driving their technologies to new levels, and in support, this has allowed us the flexibility to launch QTA and quick-turn, reduced cycle time offerings in the flex, rigid-flex with stiffeners, and rigid-flex platforms.

PCB manufacturers are needed to implement solutions with a combined suite of technology options—including rigid, rigid-flex, advanced materials, stiffeners, HDI, complex stack-ups, panelization, trace and space, HDI-specific laser microvias, stacked microvias, multilayer processing, sequential LAM processing, coverlays, overlays, and mylar—all while producing a more reliable product and mitigate costs.

In essence, we are making a huge shift in changing the legacy DNA of the PCB industry—such as the technology, service, engineering support, broad range of technologies, ability to be flexible and nimble, many manufacturing capability options, cycle time offerings, and delivery capability. All industries are feeling the same demands to catapult technology.

Andra Keay
*Managing director of
 Silicon Valley Robotics*

“Embracing new opportunities for radical collective change.”



Many companies and manufacturers had too much invested in current processes to want to change things. But now, there’s too much

that they have invested in their businesses, and they can’t afford not to change. That’s the real difference right now. Until now, the cost of failure was too high. Today, the threat of failure for companies is so high that they need to become more innovative. I think that means that those companies that are providing suites of services to a variety of companies will do quite well.

The next trend is to have networks in place that can provide benefits for small operations that are immediately located in a whole range of different areas. There is a strong pull in technology to follow the example of retail and move toward microfulfillment, which comes in many different offerings. To stay competitive, companies know that they have to reshape manufacturing, change their business model to engage in innovative logistics, and support collective networks to engage in smaller operations—especially for emerging hardware. FLEX007



MK Hicks is the co-founder of inFRONT Agency. She is a hardware engineer turned international marketer, layered with finance.

EyeOn LifeLine Deployed to Hospital ICUs to Combat COVID-19

EyeTech Digital Systems has launched FDA-registered EyeOn LifeLine—a potentially life-saving eye-tracking communication tablet for hospital ERs and ICUs—so that doctors, nurses, and caregivers can easily and quickly communicate with their critical COVID-19 patients who are unable to speak while confined to their hospital beds.

The stand-mounted tablet faces the patient who simply looks at word squares to express pain level or a request, and the tablet voices it through speakers for nurses and doctors.

EyeOn LifeLine is ultra-portable, so it can be utilized with multiple patients during this pandemic to improve patient outcomes. EyeTech launched the EyeOn

self-calibrating augmented and alternative communication (AAC) device earlier this year for people with ALS, cerebral palsy, muscular dystrophy, spinal cord injuries, Rett Syndrome, traumatic brain injuries or stroke, as well as those on the autism spectrum.

“As a long-time eye-gaze user with hand disabilities, I was devastated to see doctors and nurses not being able to communicate with ICU patients under a ventilator,” EyeTech CEO Robert Chappell said. “If we can save one life, it will be a huge contribution. I just wish we had enough units to serve all the ICUs around the country.”

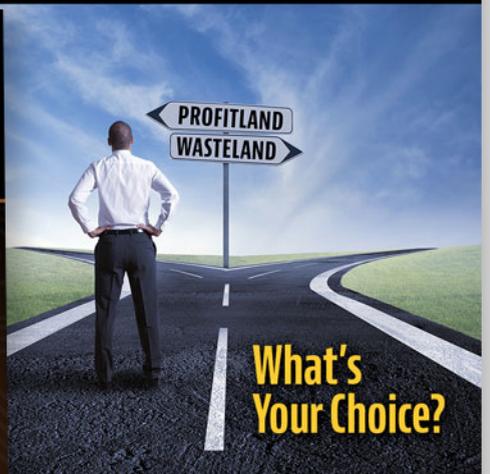
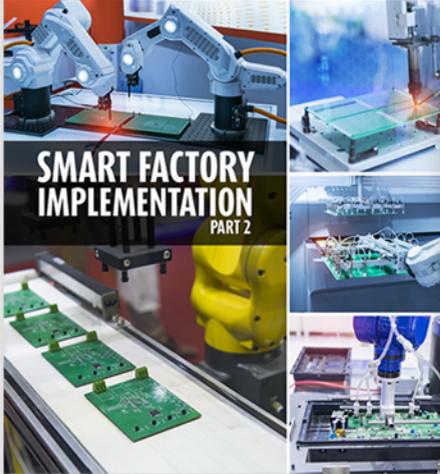
(Source: EyeTech Digital Systems)



Image credit: EyeTech Digital Systems

I-Connect007

GOOD FOR THE INDUSTRY



FREE SUBSCRIPTION



myconnect007.com

EDITORIAL CONTACT

Andy Shaughnessy
andy@iconnect007.com
+1 404.806.0508 GMT-5



mediakit.iconnect007.com

SALES CONTACT

Barb Hockaday
barb@iconnect007.com
+1 916 365-1727 GMT-7



www.iconnect007.com