

## Thinking outside of the box with Ledia

*In January 2015, and following benchmarking involving three Direct Imaging (DI) systems from leading suppliers, Eurocircuits – one of Europe's largest specialist suppliers of quick-turn low-volume standard technology PCBs – installed a Ledia V5 LED DI system in its principal PCB manufacturing plant in Eger, Hungary. The company's decision was driven by two factors: escalating spend on phototool films, and the limits of conventional exposure technology. Now, Eurocircuits runs all of its innerlayers and outerlayers and over half of its soldermask jobs through Ledia. Yields are higher, and soldermask rework and restarts have been reduced considerably, while based on film costs alone, the company estimates a return on its investment of no more than 4 years. Instrumental in its decision to invest in Ledia was the all-encompassing support it received from Ucamco, Ledia's European distributor.*

**Eurocircuits Managing Partner Luc Smets explains**



“ At Eurocircuits, we tend to think outside of the box – we always have done. Whereas Europe's PCB makers typically target the high-tech sector, and Asian companies go for high volume orders, we have always focused our activities on supplying prototypes and low volumes of standard technology boards. It's a niche market in which very few fabricators are interested, and even if they were, it's one that very few could manage well: in the first 6 months of this year, we delivered over 47,000 orders to more than 7,500 customers, with around 80% of our turnover being made on orders that are turned around in 5 days or less. That's a pretty phenomenal task, and represents a hefty increase over the same period in 2014, which was already a record-breaking year for us. So our orders may be small and our products standard, but our business certainly isn't. And unusually for our industry, it's growing. Today, we are one of Europe's largest specialist suppliers in our sector, employing 140 people at our main manufacturing site in Eger, Hungary and 30 at our smaller facility in Germany. They are supported by 165 engineers in our engineering department in India, who carry out all our CAM work, and by our headquarters in Mechelen, Belgium.

Our success hinges on our being creative and innovative in the ongoing development of our business, management and production practices – for example, very few European PCB manufacturers use online technologies as intensively as we do. We are also unusual in that, because our orders are typically small, we always pool them, optimising our production by placing different boards from different clients and orders on pooling panels in the most efficient way possible.

### Cost drivers for DI

This makes conventional phototool-based exposure very expensive for us, because we use the films to make relatively small numbers of panels, yet we can't re-use them. We realised some years ago that DI would eliminate our film costs, and so we started tracking our materials and processing costs vs. the costs of investment in the technology. Last year, the numbers finally made sense: DI systems costs had decreased sufficiently, and at our Eger plant alone, we used a record 36,000 films for inner and outer layers, and 25,000 films for soldermask. It was time to make the switch.

### Why Ledia?

We had already benchmarked 3 systems from leading DI system suppliers, including Screen's Ledia LED-based system. For each test we prepared 12 panels for dry film tests and 12 panels for soldermask, which enabled us to calculate throughputs and capacities. The Ledia came out on top, for its technology offering and performance, not least for the fact that it was the only system that could process standard soldermasks, and for the all-round support we received from Ucamco. Ucamco was the only supplier that let us carry out our benchmarking tests at one of their customer's sites, and both companies allowed us to conduct the tests ourselves, enabling us to see and understand the process at first hand. Afterwards, they helped us to run a second, fine-tuning test, from which we understood how to tailor the machine's output to our specific needs – Ledia is unique in that it has a broad output spectrum with peaks that can be adjusted to the specific sensitivities of the resists being exposed. The Ledia we benchmarked has 3 heads, making it a good, powerful system, but we felt that we needed a bigger machine with more capacity, so we opted for a Ledia V5 machine with 5 heads, which allows us to process all of our products and still have extra capacity into which we can grow in the coming years.

***Ledia is the only system that could process standard soldermasks.  
We chose it for this,  
for its innerlayer and outerlayer performance,  
and for the all-round support we received from Ucamco***

### **Return on Investment**

We installed the machine at Eger in the first half of January this year. It's the largest investment we've ever made in a single piece of equipment – and yet payback on the machine, just based on our savings on film, is just 4 years! We have also eliminated the process steps needed to plot, inspect and register phototools as well as to register them onto the exposure units, so overall cost savings are even higher. And given our unprecedented growth in 2015, it came not a moment too soon. Now we run all three lines through it – innerlayers, outerlayers and soldermask.

### **Ledia's unique all-round capabilities on dry resists...**

All manufacturers wanting to make high-tech products will be bumping up against the limits of conventional technologies and should be looking to move to DI for all their exposure needs. For us, certainly for our inner and outerlayer work, the story was different as 80% of our orders call for class 6 non high-tech boards, which is why the principal driver here was cost. That said, our innerlayer yields are much improved, and we very quickly got used to the ease of working with Ledia.

### **...and soldermasks**

Where Ledia gives us a big technology advantage is in our soldermask work – indeed it is the only system we tested that offers standard soldermask processing capabilities. By the time we get to this point, all the layers have been processed and bonded together in a process that typically introduces linear and non-linear distortions across the panel that depend on board layout, copper distribution and product type, and are very difficult to predict. This is where Ledia really comes into its own, because unlike phototools, it treats each panel individually. It automatically aligns the image to each panel, and then uses fiducials placed wherever we need them on the panel to compensate dynamically for distortion “on-the-fly”, without loss of throughput. It's so precise that the soldermask openings do not have to be much bigger than the nominal size of the pads. It's enabled us to half our pad clearances, so the solder dams are wider, more robust and much more reliable, preventing solder shorts. So here too, Ledia has significantly reduced our scrap rates, and the need for rework and restarts.

### **The ultimate “drop in” technology...**

One of the many things we liked about Ledia is the fact that it was practically a “drop in” technology for us. Its broad wavelength spectrum enabled us to continue to use our existing resists and – with minor tweaks – soldermask inks, so we and our clients did not have to go through major re-evaluation programmes. Because Ledia allows us to work to very tight tolerances, we can optimise our panel usage by working to very narrow borders, and that meant we had to make a few minor adjustments like buying a new more accurate laminator.

### **...with the ultimate support**

We are so happy with Ledia that we are considering installing the smaller V3 system in our German facility, but we are also benchmarking several other systems with similar capacities to get an idea of what is currently available. Here again, we have Ucamco's unwavering support. We've known the people at Ucamco for 20 years. They are real engineering professionals, and it's an honest, open company run by honest, open people whose driver is excellence rather than the quick sale. That's pretty rare, if not unique, in our industry, and it's great for us as clients. The support we get from Ucamco is extraordinary – we see this time and time again, and it was in no small part thanks to this that we decided to go for Ledia. We are currently working with Ucamco on our Visualiser software, which is based on Ucamco's Integrator engine, and we have access to a level of support that I doubt we would find anywhere else in the industry.

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## About Ucamco

Ucamco (formerly Barco ETS) is a market leader in PCB CAM software, photoplotting and direct imaging systems, with a global network of sales and support centers. Headquartered in Ghent, Belgium, Ucamco has over 25 years of ongoing experience in developing and supporting leading-edge photoplotters and front-end tooling solutions for the global PCB industry. Key to this success is the company's uncompromising pursuit of engineering excellence in all its products.

For more information on the Ledia range of LED Direct Imaging Systems please contact Ucamco:



## About Eurocircuits

With its headquarters in Mechelen, Belgium, and manufacturing facilities in Germany and Hungary, Eurocircuits N.V. is a European reference for prototypes and small series PCBs. Drawing on over 40 years' expertise in PCB manufacture, Eurocircuits offers its services through a dedicated online portal that makes PCB procurement fast and easy. Eurocircuits developed an online PCB pre-CAM tool based on UCAMCO's Integr8tor, delivering instant PCB prototype prices and providing a smooth and error-free ordering process to its customers. By pooling multiple orders and by making the most of its broad online presence, as well as ongoing investment and developments in its business and production practices, Eurocircuits keeps its clients' costs down while ensuring that its quality products are delivered fast.

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