



## IPP TECHNOLOGY DAYS

Tuesday 12 and Wednesday 13 March 2019

## DISCOVER:

• New technologies • Future concepts • Live hands on demos

Avoid disappointment, register now at

[www.appelectronics.co.uk/ipptechdays2019](http://www.appelectronics.co.uk/ipptechdays2019)

## MACHINERY ON SHOW

Cyberoptics - SQ3000 3D AOI, SPI and CMM  
 Vitronics Soltec - Selective Soldering  
 Universal Instruments - UFLEX assembly cell  
 Nordson Asymtek - 940 Conformal coating  
 Ekra - Serio 400 printer  
 Seica - Laser Soldering  
 Nordson - 920 Premier with IJ for coating  
 Asys - Divisio 2100 Router with cobot

## APP TECH DAYS - 12 AND 13 MARCH 2019

## Tuesday 12 March 2019

- 9.20-9.30 Welcome and Introductions  
 9.30-10.00 Fine Pitch Selective Soldering - Vitronics Soltec - Wim Schouten  
 10.00-10.30 Implementing an Underfill Processes - Valeo - David Scully  
 10.30-11.00 Material Logistics - Smart Factory - Super Dry Totech - Terry Morgan

## Coffee

- 11.20-12.00 New Technologies and Future Concepts in Automation- ASYS - Dr. Sven Hermann  
 12.00-12.40 Micro Conformal Coating - trends and technologies - Asymtek - Linsay Betts

## Lunch

- 13.30-16.00 Live hands-on demonstration in the demo rooms - (7 x 20 minute machine demos)

## Wednesday 13 March 2019

Open Exhibition and one to one project meetings



IPT is now the Irish distributor of Super Dry® Totech, a distribution and technical support channel for ultra-low humidity dry cabinets with patented Zeolite technology.

### NORDSON ASYMEK AWARDS APP ELECTRONICS WITH DISTRIBUTOR RECOGNITION AWARD

Nordson Asymtek awards European distributor APP Electronics its Distributor Recognition Award.

APP Electronics has distributed Nordson Asymtek products for many years.

Managing Director of APP Electronics Jack Daly was delighted to accept the award.

Headquartered in the UK, APP Electronics has sold machinery and equipment to the electronics industry for over 40 years.



## UPCOMING EVENTS - 2019

**Southern Manufacturing and Electronics 2019,**  
5 to 7 February - CyberOptics and APP stand F105

**SOUTHERN**  
**19** Manufacturing  
 & Electronics  
 Farnborough International Exhibition & Conference Centre  
 5th to 7th February 2019



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ELECTRONICS NEWSLETTER



I hope you enjoyed the Christmas holidays, had a good rest, and are refreshed and ready for 2019.

Last year, APP and IPT had a strong performance in the Electronics sector. The main contributors were Nordson Asymtek and CyberOptics, with good business in ASYS routing and Vitronics' Selective and reflow soldering.

Thank you for your business and continued support in 2018.

This year is already lining up to be a busy one with some very large lines close to order sign off stage, even

at this early point. We also have our Technology Days at APP on 12 and 13 March, save the date in your calendars! Brexit is certainly a topic of interest. In preparation, we are working with our suppliers and partners in logistics to try and minimise any disruption to business.

Closer to home, APP in the UK and IPT in Ireland will become one single brand identity this year - IPP Ltd. This will further integrate the UK and Irish teams resulting in a clear brand and stronger customer support. There will be more to follow on this in the coming months.

For now, I wish you all the best for 2019. We look forward to working with you and supporting your business in the coming year.

**Jack Daly** *Managing Director*

### ALL IN ONE: DEPANELING SYSTEM INTEGRATES AND PARALLELISES PROCESSES

The DIVISIO 6000 is the high-end machine among the ASYS depaneling machines. In addition to standard tasks such as cutting, cleaning and ESD control, it can also integrate other processes. The DIVISIO 6000 combines a high functional density with the smallest floor space. With a cycle time of two seconds, the machine produces a 100 percent verified and tested product in a multishuttle or rotary table version.



With the DIVISIO 6000, ASYS can react flexibly to any requirements. Thanks to the modular machine concept, standard components can be integrated via simple interfaces. This allows work steps such as ICT function testing, flashing, press-fitting, welding, riveting, assembling, joining or marking to be carried out directly in the depaneling system. The integration of usually outsourced processes leads to an efficient reduction of the overall cycle time. In connection with industry 4.0, it is important to consider traceability aspects. A central requirement is that the value creation process is tracked in every step. This ensures that the DIVISIO 6000 only processes printed circuit boards that function perfectly. A unique

code marking on the individual circuits or the unique space allocation in the tray allows the respective parameters to be stored and allocated for each product after a process step. The value chain is thus fully verified. A 100 percent tested product is forwarded to the subsequent process.

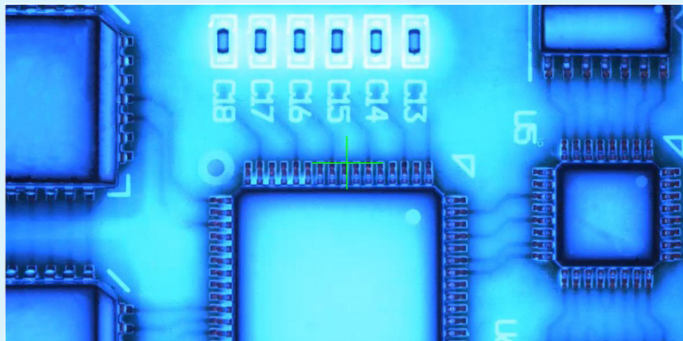
Another core aspect of process optimisation is the parallelisation of the above-mentioned process steps. The DIVISIO 6000 is available in two versions: it can be equipped either with a rotary indexing table or with a multishuttle. Both versions enable processes to be processed in parallel. When it comes to reducing cycle times, the version with multishuttle is the preferred choice. The advantage of this is that the mode of operation is not firmly coupled, so that any non-productive times can be compensated more easily.

If the aim is to achieve the highest possible process density within the machine, the rotary indexing table variant is an ideal choice. The fixed coupling to the longest single cycle offers the best integration of different successive processes. All tasks therefore cycle simultaneously through the system.





## SOLVE CONSISTENCY ISSUES WITH AUTOMATED CONFORMAL COATING INSPECTION



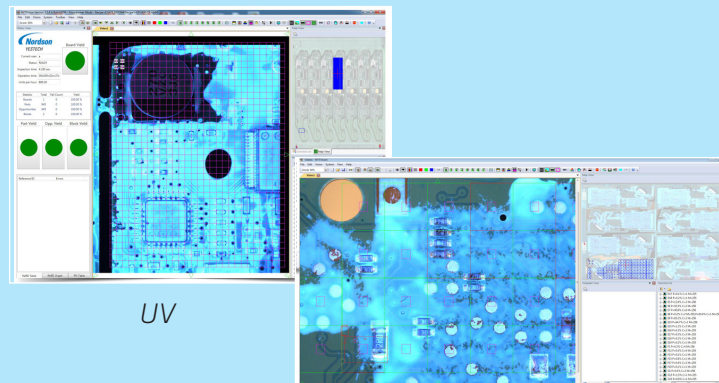
Automation continues to be a driving force behind high-quality electronics manufacturing, and for good reason. It makes outcomes more predictable. Quality, consistency, and operator safety are all improved. More and more production processes are benefiting from automation including conformal coating inspection.

In a manual process, operators inspect coated boards for adherence to keep out zones, accurate coating thicknesses, the existence of bubbles, and consistent coverage. This requires a high-level of skill and experience that's honed over time. How much skill? Let's look at one example. When verifying coating thickness, operators must learn to visually assess the level of light or "glow" emitted from the coating material under UV light. Although an operator can achieve an acceptable level of qualitative accuracy, it would not be possible to match the accuracy of automated inspection. Like any manual process it's difficult to achieve repeatability. Results vary from operator to operator and human error is unavoidable. Other common concerns include over exposure to chemicals and fumes affecting operator safety and damaged boards due to frequent handling. If you're trying to manage any of these concerns, automation is the solution.

The Nordson ASYMTEK FX-940UV Series automates the conformal coating inspection process – working together with the Select Coat SL-940 Conformal Coating system to deliver ongoing coating quality and consistency. Programming and operations methods can be combined to create an efficient coating line that maintains repeatability across batches. The system is SMEMA compatible and available in batch and inline configurations to accommodate varied manufacturing floor space needs. How does it work? There are two powerful modes.

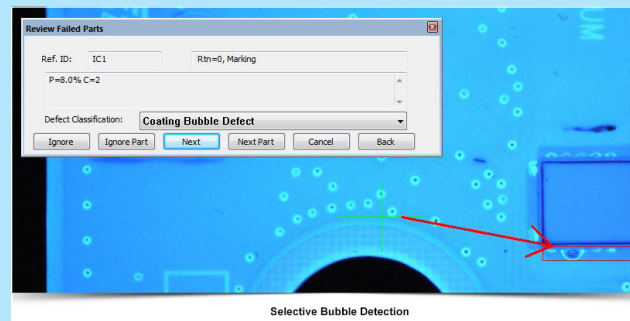
### Large Area Grid Inspection Mode (Auto-Tune)

In Auto-Tune mode, the system scans known good boards and the software "learns" the variations across coated areas to capture the passing criteria. This method is excellent for quick inspection recipe development. The system's automatic learning capabilities enable the inspection of coated and non-coated areas within minutes of scanning the first article.



### Individual Part Inspection Mode *Keep Out Zones*

In this mode, the system analyzes critical areas for coverage, non-coverage, and coating thickness. Areas around fillets can be inspected and selective bubble detection can be performed. When paired with optional side cameras, the sides of components can also be inspected.



The FX-940UV Series makes inspection of conformal coatings simple and convenient – providing complete inspection coverage at unmatched low false-failure rates. Advanced High-Power UV Lighting and image processing technology support coverage inspection, color inspection, normalized correlation, and rule-based algorithms.

### QXI™ PLATFORM REVOLUTIONARY AOI TECHNOLOGY WITH UNIQUE VALUE-ADD SOLUTIONS

**Delivering fastest, inline performance capability with** Strobed Inspection Module (SIM), Cyberoptics' unique image acquisition technology

**Perfect quality images** using white Strobed lighting with flexible illumination for exceptional contrast

**Faster, Image Processing Technology powered by:**

- SAM (Statistical Appearance Modelling) &
- Next generation image analysis technique: AI2 (Autonomous Image Interpretation - optional)

**For more information, contact your local sales manager or email [sales@appelectronics.co.uk](mailto:sales@appelectronics.co.uk)**



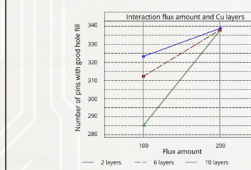
## Selective soldering of fine pitch components on high thermal mass boards

### Good hole fill:

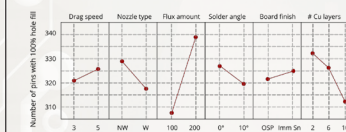
Many factors influence hole fill. Solderability is the key factor. This includes cleanliness of the metal surface and the relative thermal mass of the joint to be soldered.



More Cu-layers absorb heat and make good hole fill more difficult. Non-wettable nozzles have a more efficient heat transfer.



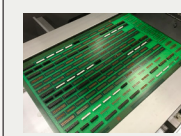
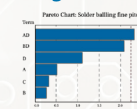
Flux activation is a critical parameter that has an interaction with the number of Cu-layers (thermal mass).



When the boards are stored for a longer time the surface finish will become more critical.

### Reduce solder balling:

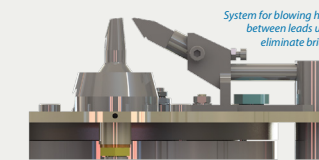
Solder balls are defined by solder resist and flux type. The flux has an interaction with angle and speed.



### Test board

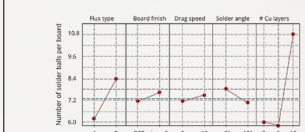
A unique test-board was designed in cooperation with a large automotive customer. The board included fine pitch components (1.00, 1.27, 1.50, and 2.00 mm) soldered on different design parameters including: hole and pad dimensions, number of copper layers, removed solder resist, and solder thieves.

- Gas flow parameters optimized:
- Gas temperature
  - Distance gas flow to nozzle
  - Gas flow rate
  - Angle of gas to solder joint
  - Solder angle (horizontal/tilt)



Removing the solder resist at the solder joints reduced solder balling significantly.

Wettable nozzles showed less solder balls.



The part with 10 Cu-layers had poor wetting properties. The increased number of solder defects also result in more solder balls.

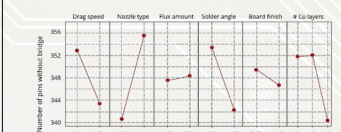
### Avoid bridging:

Fine pitch components are prone to bridging. Drag-speed reduction may contribute to less defects but requires longer contact times. Blowing hot gas (> solder melting point) between the leads eliminates bridging.

With the proper settings this is a very effective process that minimize defects.

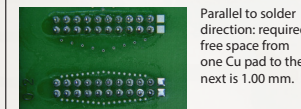


Solder thieves: For lower solder speed (<5 mm/s) the solder has enough time to drain. At higher solder speed (10 mm/s) the solder thieves benefit. Due to the hot gas, de-bridging the protrusion length is less relevant.



With 10 Cu-layers the heat is sucked out of the solder area and rapid solidification results in bridging.

### Design guidelines:

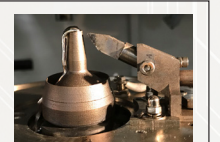


Parallel to solder direction: required free space from one Cu pad to the next is 1.00 mm.

Pitch	Diameter [mm]		Nozzle [mm]	
	Hole	Pad	Wettable	Non-wettable
1.00	0.50	0.90	3.0	4.0
1.27	0.75	1.15		
1.50	0.80	1.30	4.0	
2.00	1.10	1.60		

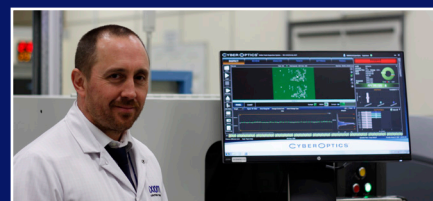
### Future work:

To establish a repeatable de-bridging process, the gas flow should have a fixed position to the wave (angle and distance). Therefore a 3D printed titanium nozzle with integrated gas flow is scheduled for Q2 2019.



**Vitronics Soltec**

### TESTIMONIALS



#### Axiom's new 3D Technology.

Following another highly successful year of strong growth and with a similarly positive outlook for 2019, Axiom continues to invest in automated inspection and process control technologies from CyberOptics. Following an initial "model line" trial, deployment of inline SPI and pre-reflow AOI across all three SMT lines at Axiom has resulted in a 62% overall reduction of defects attributable to the SMT process. This has been achieved over an 18 month timeframe by acting upon the data collected by the inspection equipment to drive process improvement; whether that is print parameter adjustments, modifying stencil designs, service life management of squeegee blades, optimising board support or indeed identifying DFM layout issues with the PCBAs themselves. Axiom's Senior SMT Engineer Richard Penny

explains how reliable the new system is, "Even though our printers have built-in enhanced 2D inspection, the 3D technology used on the CyberOptics SPI unit tells us so much more and presents the data in a much more usable way. When you are dealing with over 300 product changeovers per month and printing features at 0.3mm or less, a reliable and fast set-up for the printing process is essential." "Similarly, the pre-oven AOI inspection alerts us to minor feeder problems or slightly compromised nozzles on our placement machines which have not been captured by the on-board closed loop controls on the placement machines themselves. In fact, the CyberOptics AOI system becomes the new gatekeeper and provides a robust closed loop confidence in our SMT assembly process".

**Gareth Beckett**  
Technical Lead  
Axiom  
Manufacturing Services Ltd.



#### New AOI Machine for Corintech

After purchasing Anglo Production Process's 3D Automatic Optical Inspection Machine, production quality and speed is at a new level of efficiency at Corintech. The extremely high performance of the machine has meant that we are now able to pick up issues that we simply could not detect with our previous 2D machine. The AOI machine is now placed in our assembly line and is implemented at various stages of the manufacturing process to ensure the utmost consistency of product quality. Catching issues early in the process and feeding them back into the production process immediately has reduced errors and costly rework.

**Tim Dench** – Operations Director.