

# Procurement Technical Services (PTS)

Analytical Lab  
Core Capabilities

**UNISYS**



A scanning electron microscope (SEM) image showing a rectangular component with a central square hole. The component is surrounded by a complex, multi-colored pattern of small, irregular shapes, likely representing a failure site or a material structure. The colors range from blue and green to yellow and red, indicating different material properties or damage levels.

# Core Capabilities

- "Quick-turn" first-level part and assembly analysis that provides an assessment of the most likely causes of failure.
- Root cause analysis that utilizes electrical, mechanical, chemical, and microsectioning techniques to expose isolated failure sites. Contact us for specific analysis needs.
- SEM, optical, thermal, and x-ray imaging and thickness measurement techniques for materials characterizations.
- Basic electronic bench measurements.

*We provide component failure analysis, materials characterizations, and qualification testing support to Engineering, Manufacturing, and suppliers. Our goal is to provide sufficient information to team with our customers to drive corrective actions.*

The following examples illustrate our ability to provide

- Field Failure Analysis
- In-Process Failure Analysis
- Qualification Support
- Supplier Support

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#### Field Failure Analysis

An R-Net failed in a Keystone NX580141-MOD at a customer site during power-up following preventive maintenance. The pin 3-4 short was caused by chlorine-induced tin dendrites. The source of the chlorine is unknown, but is believed to have been introduced prior to device encapsulation. **Action:** Teamed with supplier to identify and eliminate possible sources of chlorine contamination.

**Tools/techniques:** Mechanical decap and SEM/EDAX

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#### Field Failure Analysis

A CWP50021 PC failed at a customer site. Field service identified a burned FET. Carbonized plastic above the die without evidence of electrical overstress indicated that the die was running hot. **Action:** We recommended that engineering review the thermal management of the FET and the possible use of thermal grease.

**Tools/techniques:** X-ray radiography and optical microscopy

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#### In-Process Failure Analysis

PowerScan LTI boards failed at Unigen with BGA opens and intermittent opens. Laboratory analysis determined that the cause of the opens was nonwetted BGA solder balls. The failures were attributed to process issues: contamination on the BGA balls or nonhomogeneous flux distribution in the solder paste inhibited wetting. **Action:** Teamed with Engineering and Commodity Management to identify a new assembly supplier.

**Tools/techniques:** X-ray radiography, microsectioning, and optical microscopy

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#### Qualification Support

An 8-pin surface mount passive delay line was submitted for evaluation. The device appeared to be a typical hand-assembled delay line that was injection molded. Quality concerns included typical workmanship issues such as damage to wires from handling, chip cap damage, and solder issues. Of most concern was the exposure or near-exposure of the coil through the bottom of the molding epoxy.

**Action:** Teamed with Component Engineering in selection and qualification of an alternate part.

**Tools/techniques:** Optical microscopy, x-ray radiography, chemical decap, and microsectioning

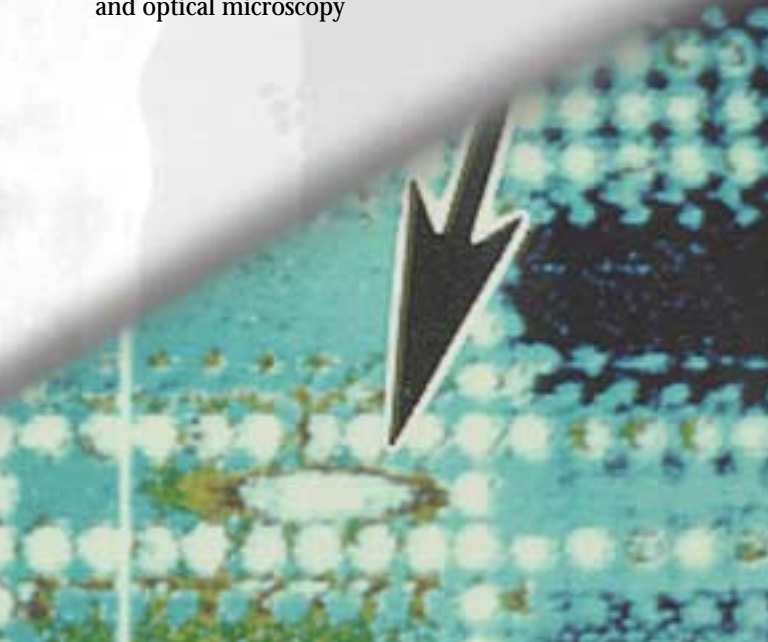
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#### Supplier Support

A PM4 card with a high-resistance via was submitted by an assembly supplier for analysis. A microsection analysis through the failing via in the laminate revealed insufficient copper plating as the cause of failure.

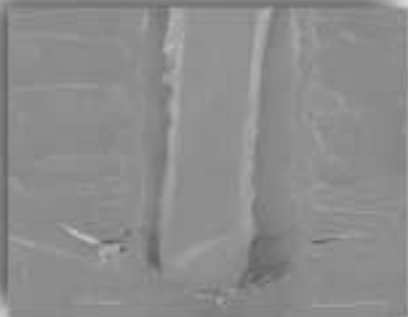
Adjacent vias are normal, suggesting that the cause was a random plating defect. **Action:** Teamed with supplier to source laminate from another second tier supplier.

**Tools/techniques:** X-ray radiography, microsectioning, and optical microscopy



# Laboratory Tools

<b>Task</b>	<b>Tools</b>
Scanning Electron Microscopy and X-Ray Microanalysis	JEOL 6400 SEM EDAX Energy Dispersive X-Ray JEOL Wavelength Spectrometers
X-Ray Radiography	LIXI Real-Time, HP Faxitron, and Large Chamber
Thermal Imaging	UTI 9000 Thermal Imager
Optical Microscopy	Zeiss Metallurgical, XY Measuring and Inverted; Olympus Metallurgical, Wild Atereo with Digital Photography
Microsectioning	Grinding/Polishing Wheels and Diamond Saws
Chemical Deprocessing	Technics Plasma Etcher and Wet Chemistry
Plating Thickness	Twin Cities X-Ray Fluorescence
Mechanical Measurements	Accuforce II and Chatillion Force Gages, Dage Bond Tester
Environmental Testing	Autoclave, High-Altitude Chamber, Ovens
Microprobing	Micromanipulator and Signatone Microprobers, Florod LFA Laser Cutter
Electrical Bench Testing	Hi-Pot, TDR, Insulation Resistance, Curve Tracer, Oscilloscopes, Milli-Ohm Meter Pulse Generators, RLC Impedance Analyzers



PM4  
Inadequate  
Via Repair

# Typical Cycle Times

<i>First Level</i> .....	1-2 working days
<i>Root Cause</i>	
• Opens/shorts .....	<5 days
• Packaging .....	<5 days
• Parametric, isolated .....	5-10 days
• Parametric, .....	Depending on supplier test turnaround time
<i>Qualification Testing</i> .....	5-10 days
<i>Construction Analysis</i> .....	5-10 days
<i>Bench Testing, Photographic,</i> .....	1-2 days
<i>Thermal Imaging and X-Ray Services</i>	



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