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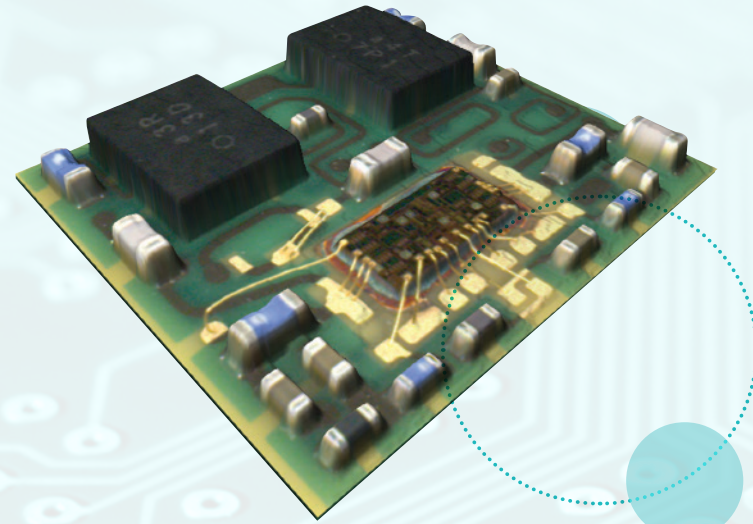
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**INSPECTION AND
FAILURE ANALYSIS
SERVICES**

Cupio
SERVICES

What's hidden from your inspection process?

- Solder voiding
- Stress cracking
- Poor joints
- Delamination
- Poor thermal connections



Three Key Elements

At Cupio and Cupio Services we both sell systems, with support for the lifetime of the product, and provide a full contract inspection and analysis service at our facility in Basingstoke.

It all comes down to three key elements;



COST



TIME



REPUTATION

It can cost millions when products are recalled or returned. The further down the manufacturing process it gets, the higher the cost. A recall being the most costly of all. The sooner the fault is identified the lower the cost involved.

Reputation can be the lifeblood of a company. Don't risk it; protect your brand from the stigma of product return.

State-of-the-Art at Cupio Services

An effective inspection regime depends on having the right equipment for the job. Essentially, if you can't get the correct image you can't see the fault. At Cupio Services we have specialist optical, X-Ray and SAM systems to give high resolution images with definition to see cracks and objects down to 100nm in size.

As well as the necessary equipment we also have the knowledge and experience to be able to detect the, sometimes subtle, indications in the images which make the difference between good and defective. Failure analysis probably isn't something that you need to do every day so our service brings this capability to you as and when you need.

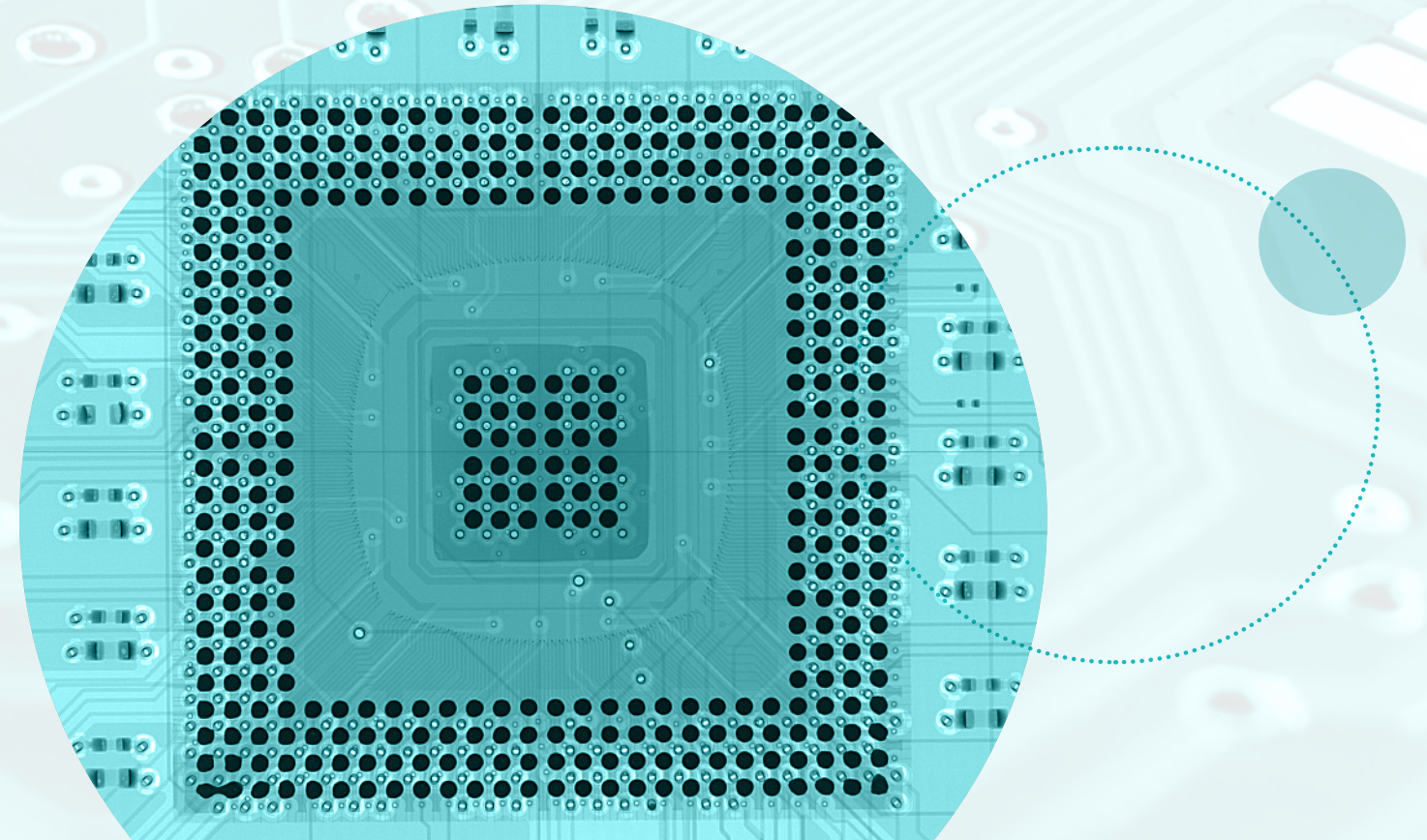
Why do you need Cupio?

Our proposition fits into two main areas.

If you are planning production and have no inspection capability our service lets you try before you buy. This can be invaluable in investigating different processes that can highlight failure mechanisms.

Secondly we support an inspection process that you already have by adding additional capabilities. You may have a fully resourced production capability but be unable to analyse an "escape" that has caused a field return. We can investigate that issue with you and either provide you with a solution for your production process or analyse this type of fault on an ad hoc basis.

Having this necessary equipment and expertise in house can be very expensive if it is only used a few times per year. We have the systems and we have the expertise. We can supply you with this inspection capability in a timely and cost effective manner.



Analysis Tools

Optical Inspection

Optical inspection is more than just having a really good look, although that can be an important part. At Cupio we use both manual high magnification equipment and automated optical inspection (AOI) for analysis. With both approaches it is important to get the correct lighting to see the type of fault that you are looking for. A surface fault, for instance, may not be visible under omnidirectional lighting but be really clear under coaxial light.

The more automated the approach the more important is making the fault visible to the inspection algorithm. For automated inspection we have two Nordson systems, one with super high magnification for inspecting down to faults on wafers and the other with multiple cameras for general assembly faults. When imaging for manual inspection we use Ash camera based systems.

SAM®

Scanning Acoustic Microscopy techniques allow us to non-destructively “see” inside a component or assembly and image parts that the x-ray cannot see. Materials such as silicone or epoxies are not x-ray opaque but the interfaces between these materials and any voiding in them is clearly visible to the acoustic reflection.

Our Sonoscan system can be configured with different frequency transducers to be able to inspect most material types and thicknesses. By scanning an area the system builds up a picture of the part at a particular depth into it. By layering we can see what is happening at a particular interface or in the body of the component. This technique gives us one of the very few ways of non-destructively looking for faults in areas of underfill, heat sinking connections or bonded materials

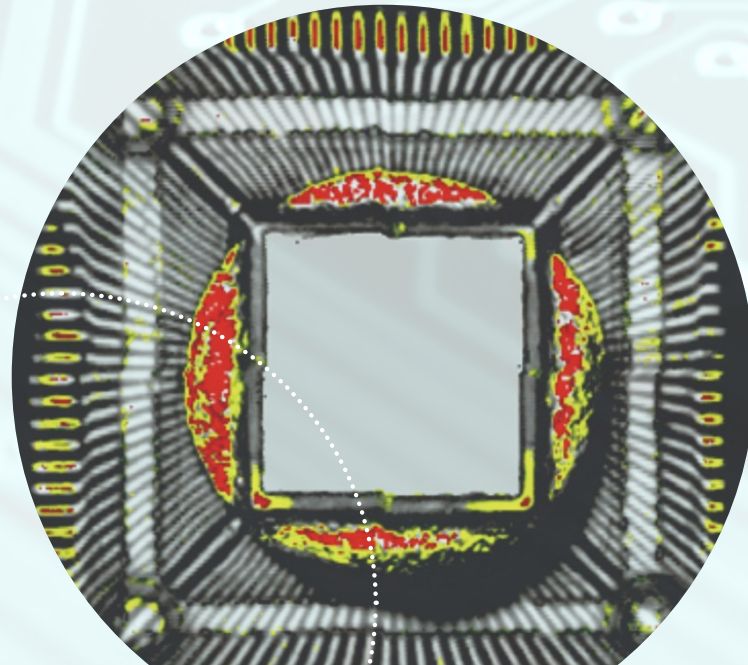
X-RAY

Probably the mainstay of inspection for faults in the electronics market, our X-Ray is capable of orthogonal and oblique imaging, tomosynthesis and computed tomography (CT) with image resolution down to 100nm. Whilst we use some automated features to look for and measure things like voiding, like optical inspection, expertise in understanding what to look for in an image to indicate where a fault is occurring is extremely important.

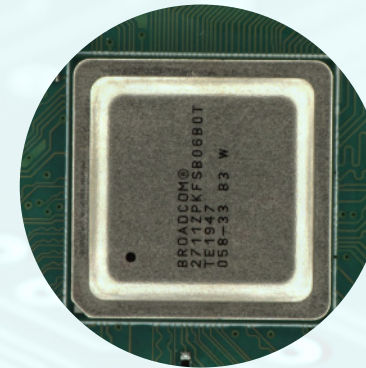
Changing viewing angles, x-ray power and filters can be the difference between seeing a fault and missing it. This takes time to learn and time to carry out but we can bring this to your process as we become an invaluable part of your inspection and analysis programme.

Electrical Test

Whilst we do use electrical test to check some components or boards it is mostly to indicate an area that needs to be inspected. It may be that there is a bad connection between parts or that a bond wire has blown inside a device, and a simple V/I test will show us where, but we would then need further x-ray type inspection to identify and image the exact nature of the failure.

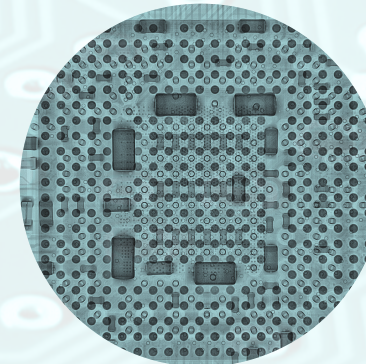


Inspection Techniques



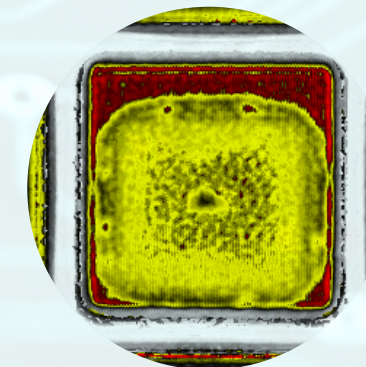
Optical view

- Surface features visible
- Cracking
- Coplanarity / skew.



X-Ray view

- Solder joints and interfaces clearly visible.
- Tomosynthesis to show layers if required
- Voiding and bridging
- Inclusions
- All types of fail within the solder or metallic parts of the device and solder.



CSAM view

- The underfill is clearly visible
- Planarity
- Voiding
- Delamination.

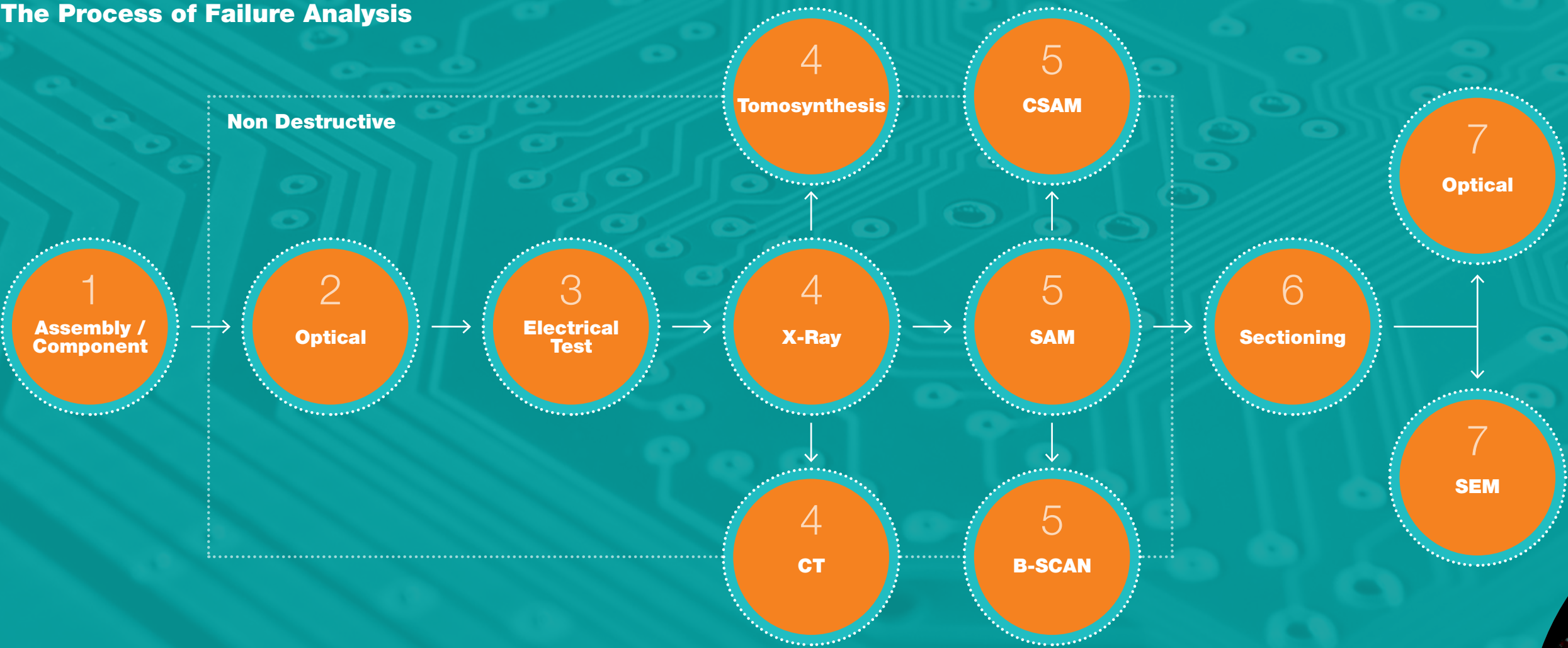
Our Coverage

Our 3,000 sq ft facility is located within Chineham Business Park in Basingstoke and services clients across the UK.

As well as supply and installation, we offer a dedicated servicing department for our customers.



The Process of Failure Analysis



- 1 Electromechanical assembly/ component/ material
- 2 Optical inspection either manual or automated to find visible defects
- 3 Electrical test to check functionality and isolate a faulty area.

- 4 X-Ray to detect hidden faults in joints or components or differences in material or construction. Also for voiding or mismatch. Tomosynthesis to look at slices through the assembly. CT to examine full 3D reconstructions for volumetric analysis.

- 5 SAM to look for delamination, voiding, inclusions and material interface errors. Detects faults that are transparent to X-Ray.
- 6 Sectioning to expose a fault that is suspected or previously detected.
- 7 High magnification optical or SEM inspection to examine the faults or analyse the materials in the defect.

