

## TEST AND INSPECTION SERVICES

Test and inspection capabilities at SMART Microsystems play an important role in the development of processes and testing of microsystem package assemblies for our customers. By using Environmental Life Testing and Test and Inspection in conjunction with a Test Early-Test Often approach in the product development cycle, weaknesses in the design are found early, before too much value is added to the part. For additional information you can visit our website, or you can call or send us an email to discuss your test and inspection needs.

### PRECISION MEASUREMENT

- Programmable high-speed three axis non-contact and contact coordinate measuring machine
- A2LA calibrated and certified
- 250 x 200 x 200 mm measuring envelope
- Non-Contact vision measurement capable
  - 1x and 5x lenses
  - Vision Measurement Accuracy
    - XY-axis: (2.0 + 3L / 1000)  $\mu$ m
    - Z-axis: (3.0 + 5L / 1000)  $\mu$ m
- Contact touch probe measurement capable
  - Renishaw standard force and low force modules
  - Touch Measurement Accuracy
    - XYZ-axis: (2.4 + 3L / 1000)  $\mu$ m

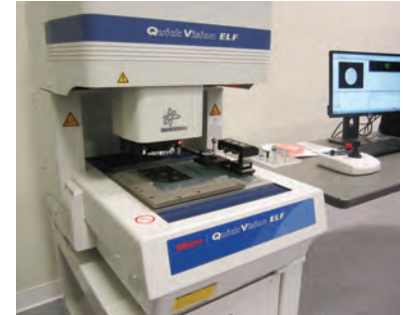
### ACOUSTIC MICROSCOPY

- Available transducers: 15MHz, 30MHz, 50MHz, 75MHz, 100MHz, 230MHz
- Imaging techniques available: Surface, Interface, Bulk, Loss of back echo, tray scanning, Q-BAM, Thru-scan, STAR Mode, and virtual rescanning
- 12" x 12" scan area
- Up to 16K x 16K (268 Megapixels) Very High-Res (VHR™) Enhanced Scanning and Data Acquisition Format with Zoom Enlargement (4K x 4K standard)
- Acoustic Impedance Polarity Detector simultaneously displays both phase (i.e., polarity) and amplitude information

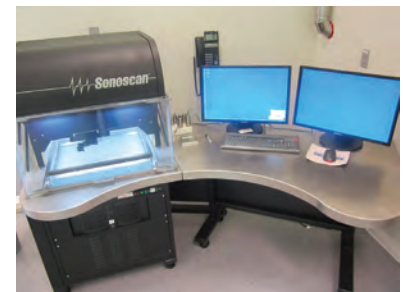
### SCANNING ELECTRON MICROSCOPY (SEM)

- Resolution: 4nm @ 1kV, 1.5nm @ 15kV
- Imaging field: 3.5mm
- Sample size: 50mm diameter max
- Electron gun: cold-cathode field emission
- Robinson Backscattered Electron (BSE) detector
- X-ray EDS

(continued)



Mitutoyo Quick Vision ELF CMM



Sonoscan Acoustic Microscope



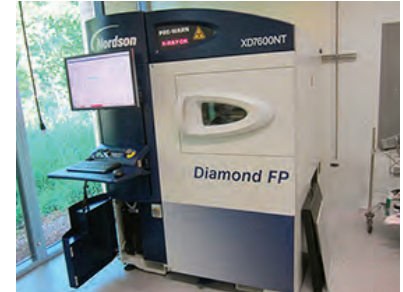
Hitachi Series 4500

## TEST AND INSPECTION SERVICES CONTINUED

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### 3D X-RAY

- $\mu$ CT technique to create 2D X-ray slices in any plane of a printed circuit board assembly without the need to cut the board
  - 160 kV Tube with up to 10 W Tube Power
  - Nordson DAGE 2 Mpixel @ 25fps XiDAT3 Digital Image Intensifier with Real Time Image Enhancements
  - Geometric Magnification 2,000x, System 12,000x and Total 60,000x with Digital Zoom
  - Maximum Board Size: 29" x 22.8" (736 x 580 mm)
  - 70° Oblique Views without Loss of Magnification
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Nordson X-Ray

### INTERFEROMETRY

- Characterizes and quantifies topographical features
    - Surface Roughness
    - Step Height
    - Critical Dimensions
  - Non-Destructive Tests
  - Profile heights ranging from < 1 nm up to 20000  $\mu$ m
  - Vertical Scan Range 150  $\mu$ m
  - Max Scan Area 20  $\mu$ m
  - Maximum Sample Size 89 x 203 x 203 mm
  - RMS Repeatability < 0.01 nm (0.0004  $\mu$ in) RMS $\sigma$
  - Step Height Accuracy  $\leq$  0.75% Repeatability  $\leq$  0.1% @ 1 $\sigma$
  - 5x Objective, 20x Objective, 10x Glass Compensated Objective
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Zygo NewView Interferometer

### BOND TESTING

- Perform destructive and non-destructive force testing to bonds
- Export data and reports into Word, Excel, and .csv
- Customizable data tables and graphs
- Fitted with top down camera for inspection pictures after bond test is performed
- Currently available test cartridges:
  - T1KG – Tweezer and stud pull up to 1 kilogram
  - S250G – Shear up to 250 grams
  - S50KG - Shear up to 50 kilograms
  - P100G – Hook pull up to 100 grams
  - PP50KG – Push/Pull up to 50 kilograms
- Accuracy +/-0.1% of the full scale for the selected range
- Step Height Accuracy  $\leq$  0.75% Repeatability  $\leq$  0.1% @ 1 $\sigma$



Nordson Dage Bond Tester