

# phoenix x|aminer

Easy to use X-ray inspection system for components and PCBA with strong performance

## Key features & benefits

- High-resolution 2 Mpixel realtime image chain
- Unlimited lifetime 160 kV / 20 W X-ray tube to penetrate even high absorbing components
- Intuitive operation and easy to use software
- Live CAD data overlay
- Automated real X-ray sample map for easy orientation on top, bottom and even inside samples
- Full control through large inspection window
- Anti-collision feature to protect samples
- Small footprint



GE imagination at work

# phoenix x|aminer

GE's phoenix x|aminer X-ray inspection system is designed for the special needs of the high-resolution inspection of electronic assemblies, components and PCBA. The system is equipped with an unlimited lifetime 160 kV / 20 W microfocus X-ray tube. Due to the high energy and power of the X-ray tube the phoenix x|aminer meets the requirements for electronic applications including power electronics. The system comes standard with the unique phoenix x|act base software solution. This software offers easiest use and allows manual as well as automatic inspection.

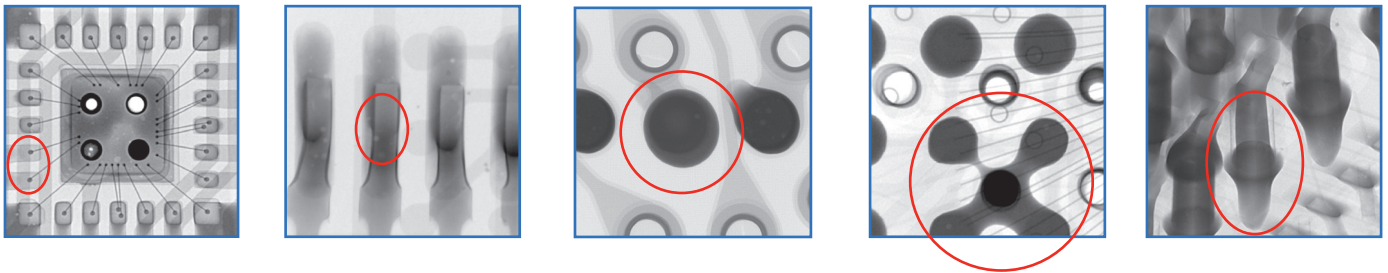
## High quality X-ray inspection to ensure product reliability

The reliability of electronic assemblies strongly depends on solder joint quality. All dimensions and features of the solder joint are imaged: diameter, thickness (grey value), lands and contact areas (darker and brighter circles), voids (bright spots).

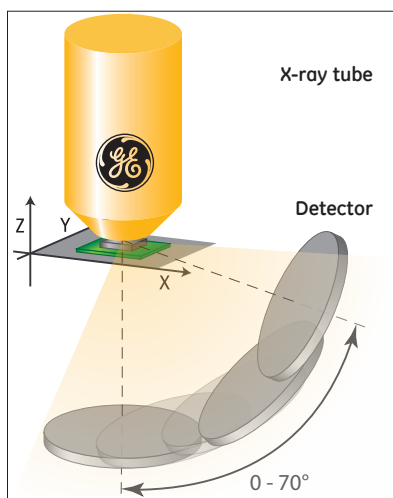
All defects that have any influence on the solder joints shape are detectable. In addition to the visible surface the X-ray image reveals hidden features of the interconnection, which are most important for the reliability of solder joints.

Detectable defects are:

Bridges (in particular at hidden joints), opens, defective paste print, insufficient co-planarity, incomplete fillets, dewetting, insufficient reflow, mis-registration, cracks, missing joints, warping, pop corning, component tilt, voids, diameter deviations, roundness, shape deviations, fuzzy edges, head-in-pillow.



## ovhm-technology - oblique views at highest magnification



Schema of ovhm-technology:  
Oblique views give excellent information on features that can not be revealed in top-down view at highest magnification.

Conventional tilt techniques generate oblique views by simply tilting the sample, which involves moving the region of interest away from the X-ray tube resulting in a decrease in magnification.

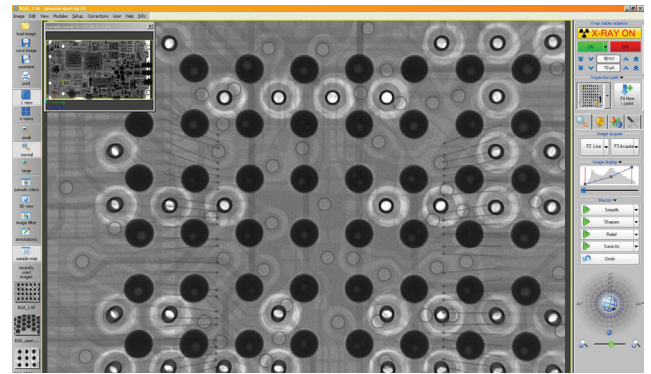
The ovhm|module was specifically designed to enable oblique views of up to 70 degrees and 0 to 360 degree rotations at highest magnification.

Unlike with conventional systems, the X-ray tube is located above the sample tray allowing the user to move the sample as close to the tube head as needed. Only this guarantees highest magnification in combination with easiest sample handling.

# phoenix x|act base - Designed to inspect

phoenix x|act base provides a minimal setup time and offers multiple new features:

- Easy macro recording for intuitive programming of inspection tasks:
  - Easy teach in of positioning and image processing parameters
  - All display settings can be saved with one click
- Enhanced sample map functions – once created, the sample map can be used for all boards of the same type
- Clear live image quality – the X-ray image enhancement ensures a higher defect detection

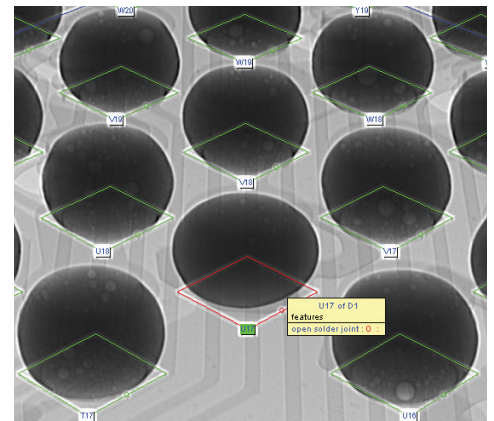


Fast and easy software handling

# phoenix x|act operator - Live CAD data overlay

The x|act operator upgrade package includes additional software features such as a live CAD data overlay, automated saving of results, images and X-ray sample maps and CAD-based programming. The pad IDs can be viewed in the live image as an overlay at any time and from any viewing angle. This always enables quick and precise solder joint mapping even with manual inspection.

To keep programming time to a minimum, x|act operator imports the PCB CAD data and creates a model, which facilitates navigation and enables inspection strategies for the individual components.



Live CAD overlay and inspection results in the X-ray live image - at any time and at any viewing angle

# phoenix x|aminer - Your Advantages

- Extremely high defect coverage to assure highest quality requirements at easiest usage
- Fast and easy sample handling
- Automation capabilities
- No tube exchange necessary because of unlimited lifetime of the X-ray tube



# Technical Specifications & Configurations

<b>System magnification and resolution</b>	
Geometric magnification	up to 2100x
Total magnification	> 23000x
Detail detectability	down to 0.5µm
<b>Submicron X-ray tube</b>	
Type	open microfocus tube, transmission head, 170° cone angle, collimated
Maximum tube voltage	160 kV
Maximum tube power at target	20W
Target	tungsten on non-toxic support, rotatable for multiple use
Filament	tungsten hairpin, pre-adjusted in plug-in cartridges for fast and easy exchange in < 20 minutes
Vacuum system	turbo-molecular and oil-free roughing pump
<b>Detector</b>	
Digital image chain	highly resolving 4" dual-field image intensifier with superior resolution 2 MPixel digital camera
<b>Manipulator</b>	
General construction	high precision vibration-free synchronized 5-axes CNC manipulation
Max. inspection area	410 mm x 410 mm (16" x 16")
Max. sample size / weight	510 mm x 510 mm (20" x 20") / 5 kg (11 lbs.)
ovhm – oblique view rotation	adjustable view angle up to 70° n x 360°
Control	joystick control or mouse (manual mode) and CNC (automatic mode)
Axis speed	(X-Y-Z) 10 micron/s to 80 mm/s
Manipulation aids	sample X-ray mapping, click'n-move-to function, click'n-zoom-to function, automatic isocentric manipulator movement
Anti-collision system	protects the sample from colliding with the tube
<b>Image processing software</b>	
phoenix x act base	comprehensive X-ray inspection software comprising image enhancement functions, measuring functions and CNC inspection programming for automatic inspection
bga module	for automatic BGA solder-joint evaluation
vc module	automatic voiding calculation software package incl. capability of multiple die attach void evaluation
<b>System Dimensions</b>	
Dimensions (W x H x D)	1800 mm x 1900 mm x 1430 mm (70.9" x 74.8" x 56.3") (without console and demountable back side extension)
Height adjustable control panel	400 mm (15.75")
Max. weight	2050 kg / 4520 lbs.
<b>Radiation Safety</b>	
Full protection system	full protective radiation safety cabinet according to the German RöV (attachment 2 nr. 3) and the US Performance Standard 21 CFR 1020.40 (Cabinet X-ray Systems)
Leakage radiation	radiation leakage rate: < 1.0 µSv/h measured 10 cm from cabinet wall
<b>Hardware option</b>	
Tilt / rotate unit	tilt ± 45° and rotation n x 360° for samples up to 2 kg
Positioning aid	laser crosshair
PCB holder for rotation table	max. board size 310 mm x 310 mm (12" x 12")
XY table	increased inspection area 510 mm x 510 mm (20" x 20") without rotation

[www.ge-mcs.com/phoenix](http://www.ge-mcs.com/phoenix)



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