GE
Measurement & Control

Your entry to high quality X-ray inspection

phoenix x|aminer

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

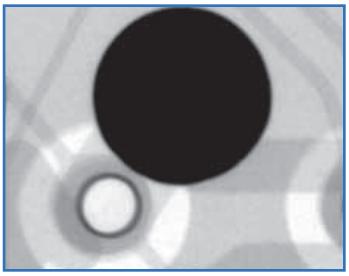
Key features & benefits

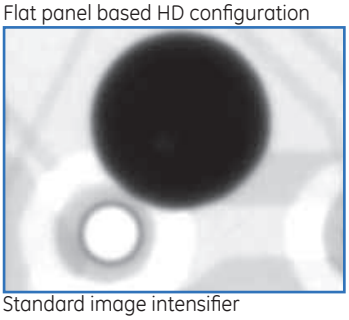
- Unlimited lifetime 160 kV / 20 W X-ray tube to penetrate even high absorbing components
- Improved live inspection capability due to high contrast CMOS flat panel detector option
- Easy and fast computed tomography (CT) due to comprehensive software package
- Intuitive operation and easy to use software
- Live CAD data overlay
- Automated real X-ray sample map for easy orientation on top, bottom and even inside samples
- Anti-collision feature to protect samples
- Small footprint

GE imagination at work

phoenix x|aminer

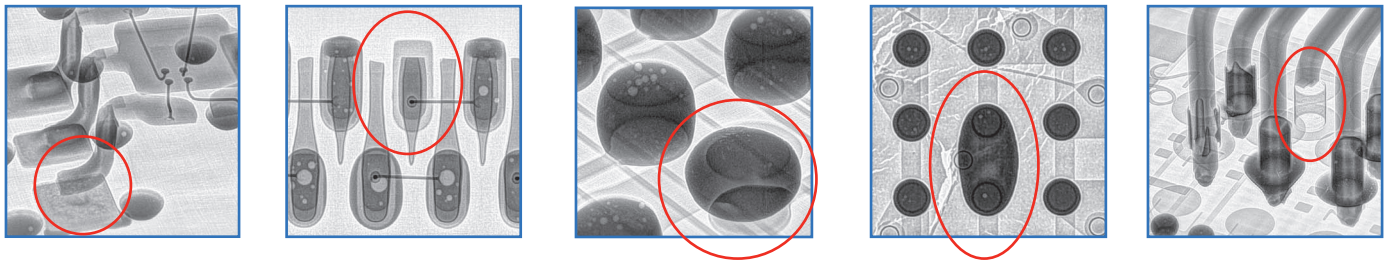
GE's phoenix x|aminer X-ray inspection system is designed for the special needs of the high-resolution inspection of electronic assemblies, components and PCBA. The system is equipped with an unlimited lifetime 160 kV / 20 W microfocus X-ray tube. Due to the high energy and power of the X-ray tube the 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 ease use and allows manual as well as automatic inspection.
In its optional flat panel detector based HD configuration, the phoenix x|aminer outstands with better contrast to noise ratio for live inspection with higher defect coverage, while the x|aminer s configuration allows inspection of larger and heavier pcb boards.


Flat panel based HD configuration

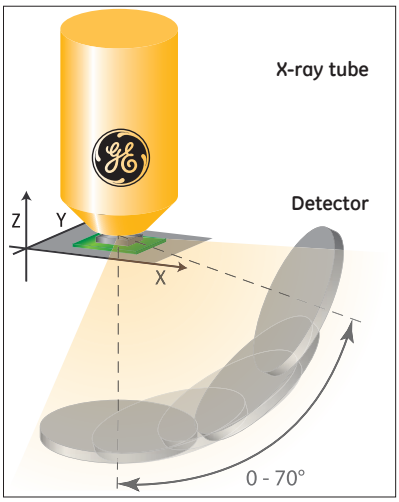

Standard image intensifier

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.



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.

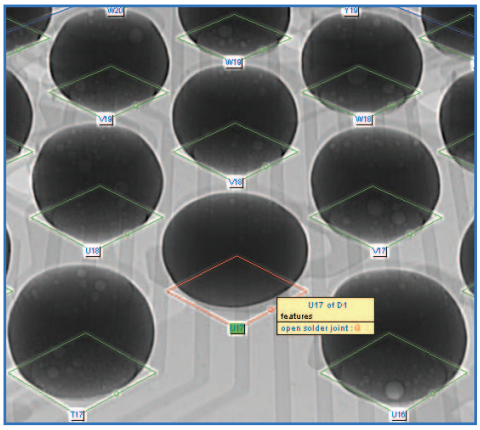
Unlike with conventional systems, the X-ray tube is located above the sample tray allowing the user to move the sample as close to the tube head as needed. Only this guarantees highest magnification in combination with easiest sample handling.

* Not available for phoenix x|aminer s

phoenix x|act - designed to inspect

phoenix x|act is a powerful image processing software to program automatic test cycles. Manual as well as fully automated X-ray inspection can be done easy and self-explanatory. It is available in three versions: base, operator and pro and offers multiple new features like:

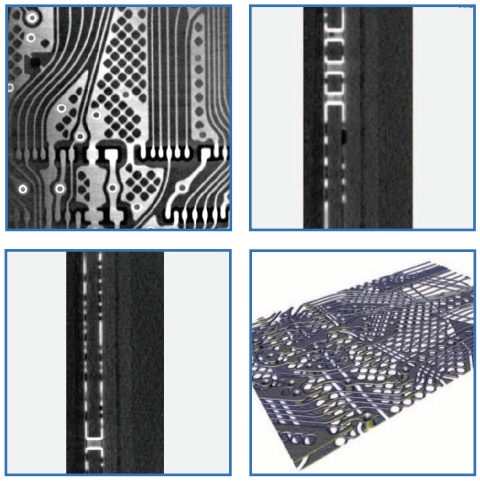
- Easy macro recording for intuitive programming of inspection tasks:
  - Easy teach in of positioning and image processing parameters
  - All display settings can be saved with one click
- Enhanced sample map functions – once created, the sample map can be used for all boards of the same type
- Clear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



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

datos|x base* - computed tomography with CMOS

datos|x base is a comprehensive software package for computed tomography applications. The software controls and monitors all components of the CT system such as tube, detector and manipulation. All relevant steps during the CT imaging can be controlled e.g.: the creation of projection data sets, reconstruction of volumes as well as visualization of volumes and projections. The software enables the user to perform a CT scan easy and fast because of its high automation including an automated scan optimization. A simultaneous acquisition and reconstruction of data is possible.



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**

* Not available for phoenix x|aminer s

Technical Specifications & Configurations

	phoenix x|aminer s	phoenix x|aminer
Geometric magnification	up to 2,100 x	up to 2,100 x; > 2,000 x in HD configuration
Total magnification	up to 23,000 x	up to 23,000 x; > 7,000 x in HD configuration
Detail detectability	down to 0.5 µm	
Submicron X-ray tube: Type	open microfocus tube, transmission head, 170° cone angle, collimated. Target tungsten on non-toxic support, rotatable for multiple use. Turbo-molecular and oil-free roughing vacuum pump	
Maximun tube voltage / power at target	160 kV / 20 W	
Filament	tungsten hairpin, pre-adjusted in plug-in cartridges for fast and easy exchange in < 20 minutes	
Detector (standard configuration)	highly resolving 4" dual-field image intensifier with high resolution 2 MPixel digital camera	
Detector (optional HD configuration)	—	High contrast 1536 x 864 pixel flat panel detector, 75 µm pixelsize
Manipulator	3 axes (x, y, z)	5 axes (x, y, z, tilt, rotate)
General construction	high precision vibration-free synchronized CNC manipulation	
Max. inspection area	510 mm x 510 mm (20" x 20")	410 mm x 410 mm (16" x 16")
Max. sample size / weight	510 mm x 510 mm (20" x 20") / 10 kg (22 lbs.)	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, active anti-collision system	
Image processing software phoenix x|act base	comprehensive X-ray inspection software comprising image enhancement functions, measuring functions and CNC inspection macro programming for semi-automatic inspection	
bga|module (included in basic package)	intuitive automatic BGA solder-joint evaluation	
vc|module (included in basic package)	automatic voiding calculation software package incl. capability of multiple die attach void evaluation. Manual inspection even of unregulary shaped area solderings.	
CT Option: software	—	3d|arv for image intensifier datos|x for CMOS
basic CT axis	—	high mechanical precision rotation unit for optimized high-resolution CT applications
easyfix CT axis	—	rotation unit including a counter bearing to fix even extended spatial samples
Min. system dimensions (W x H x D)	1800 mm x 1900 mm x 1430 mm (70.9" x 74.8" x 56.3") (D without console and demountable back side extension)	
Height adjustable control panel	400 mm (15.75") adjustable range	
Max. weight	approx. 2000 kg / 4410 lbs.	approx. 2050 kg / 4520 lbs.
Radiation Safety	The radiation safety cabinet is a full protective installation without type approval according to the German RöV. It complies with French NFC 74 100 and the US Performance Standard 21 CFR Subchapter J. For operation, other official licenses may be necessary.	
Leakage radiation	radiation leakage rate: < 1.0 µSv/h measured 10 cm from cabinet wall	
Options		
phoenix x|act operator software	Advanced image processing software incl. view based inspection programming	
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	standard in x|aminer s configuration	increased inspection area 510 mm x 510 mm (20" x 20") without rotation and ovhm

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