QUARTZ **PCI**
SLOW-SCAN for ANALOG SEMs

THE MEASURING, ANNOTATING, PROCESSING, REPORTING, ARCHIVING, **DO EVERYTHING** SOLUTION FOR MICROSCOPY

> # ADDING THE LATEST DIGITAL IMAGING CAPABILITIES TO YOUR SEM IMPROVES PRODUCTIVITY AND REDUCES OPERATING COSTS

In today's world, digital imaging is a necessity.

Your clients expect you to be able to e-mail their results,
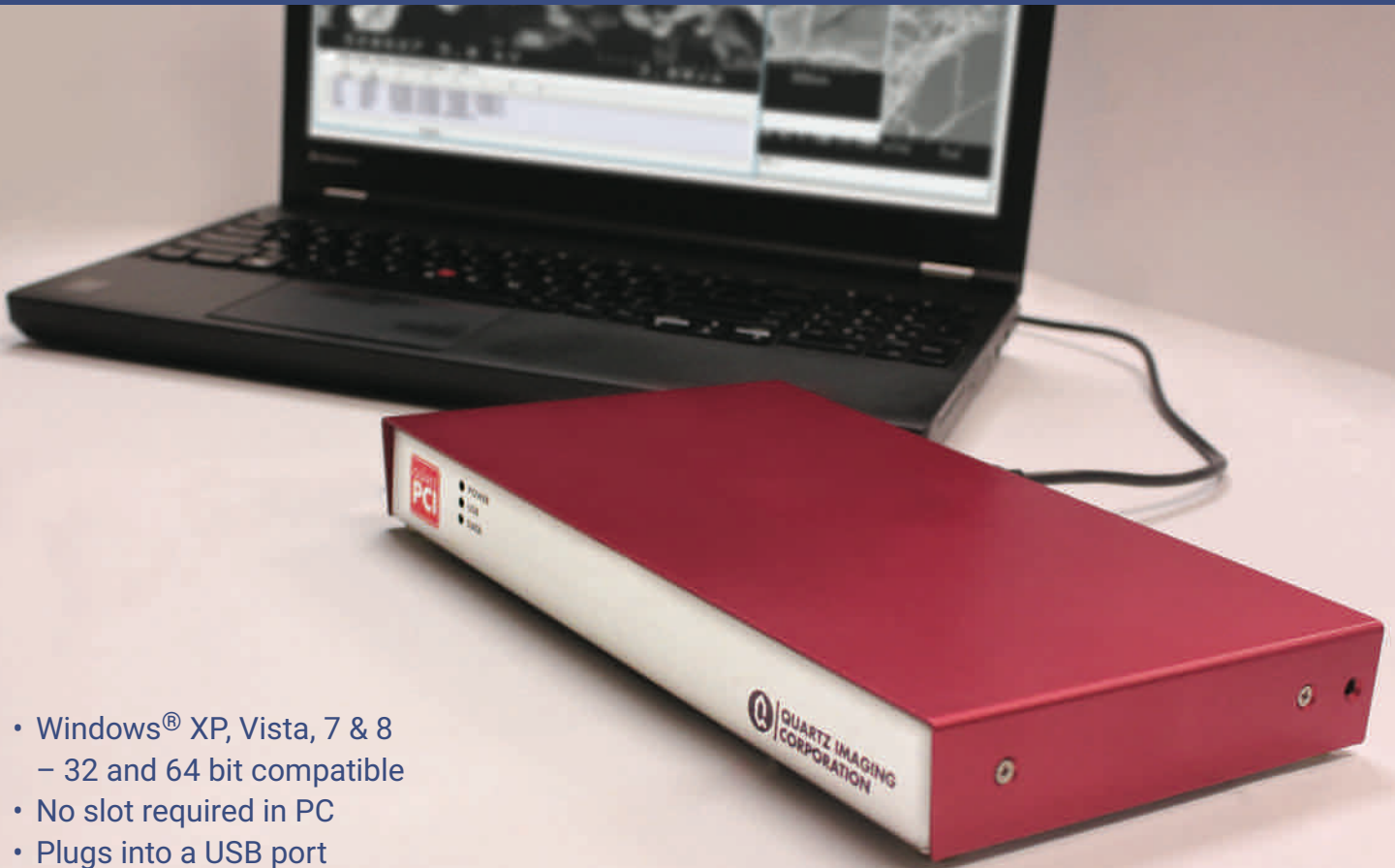include images in reports and be able to easily retrieve historical data.

Quartz PCI Slow-Scan adds high quality,
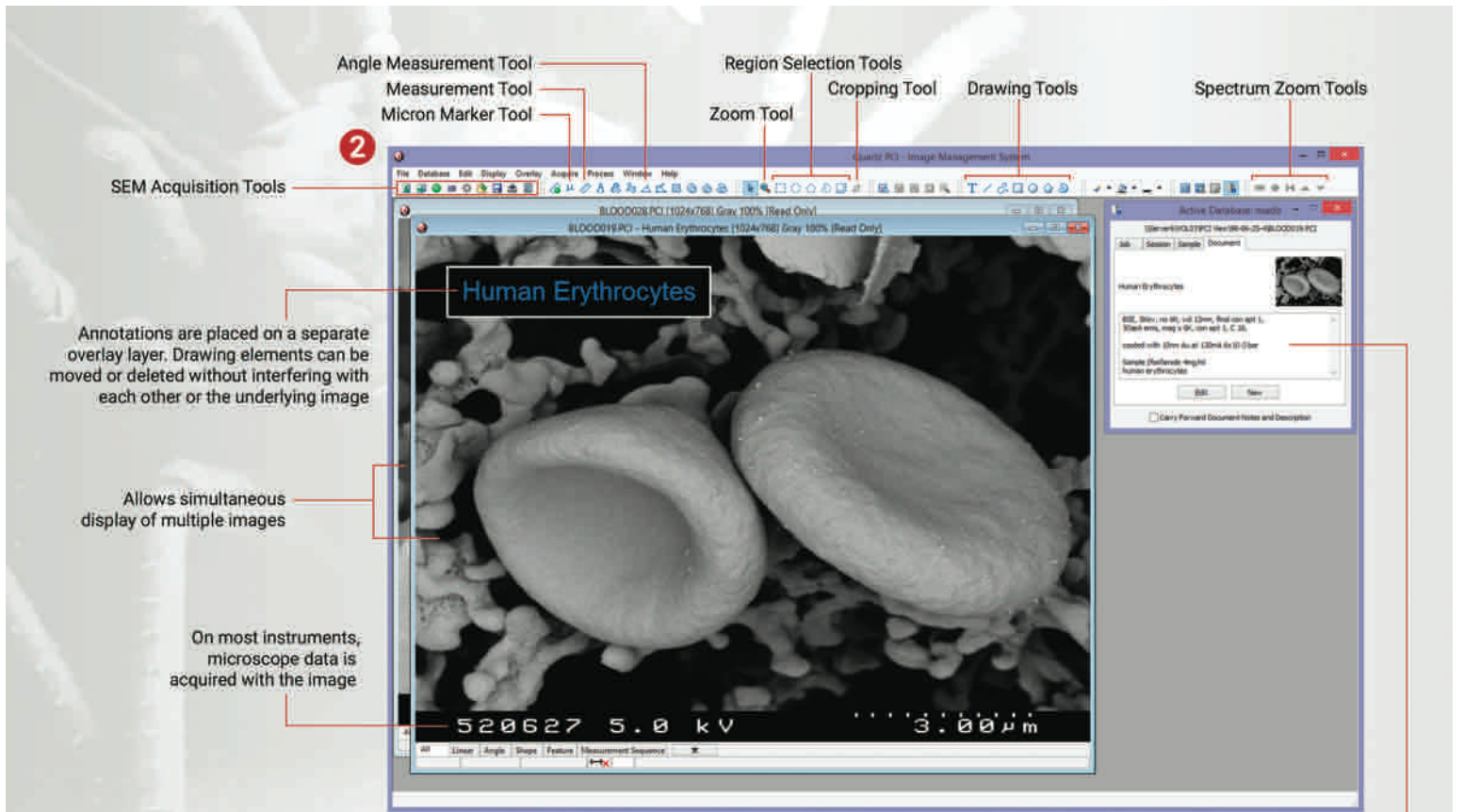digital imaging capability to any SEM or STEM.

- Passive capture for best image quality

- Annotation and processing tools

- Report layout editor

- X-ray spectrum viewing

- Advanced image database

- Network-ready

- Software licenses available for off-line data viewing on office
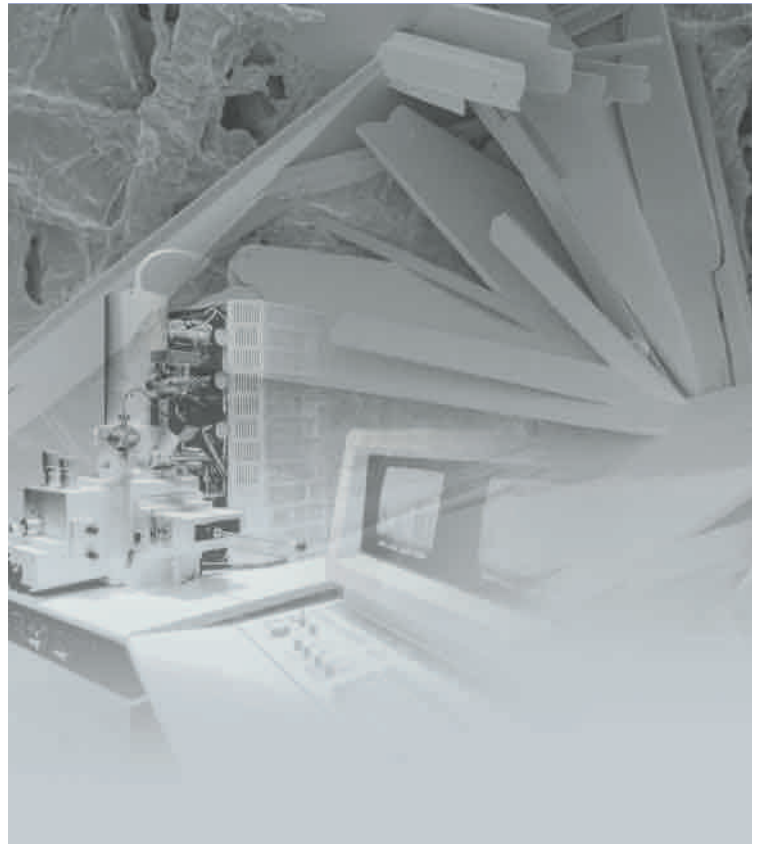
QUARTZ PCI SLOW SCAN USB MODULE

- Windows® XP, Vista, 7 & 8 – 32 and 64 bit compatible
- No slot required in PC
- Plugs into a USB port

Angle Measurement Tool
Measurement Tool
Micron Marker Tool
Region Selection Tools
Cropping Tool
Drawing Tools
Zoom Tool
**Spectrum Zoom Tools**

SEM Acquisition Tools

Human Erythrocytes

Annotations are placed on a separate overlay layer. Drawing elements can be moved or deleted without interfering with each other or the underlying image

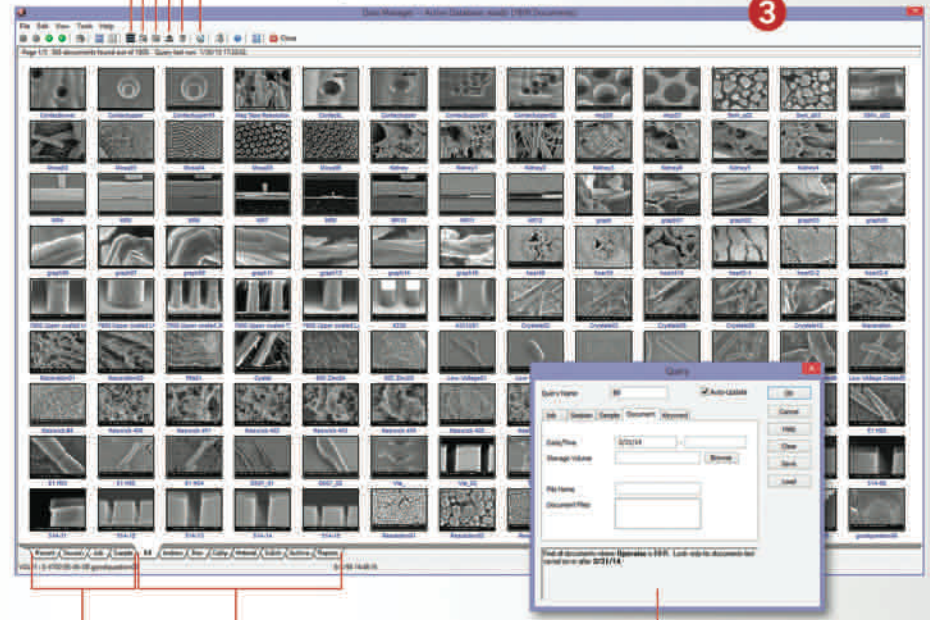Allows simultaneous display of multiple images

On most instruments, microscope data is acquired with the image

520627   5.0   kV   3.00 µm

Image Information Window displays database information about active image
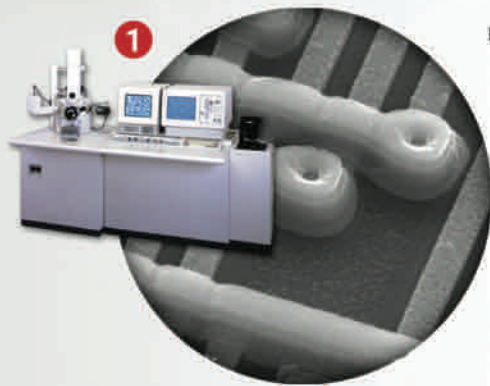
Export
Print
Move
Delete
Print Contact Sheet
Database Query

Data from current session, job and sample

Custom database queries

Search for data with database queries

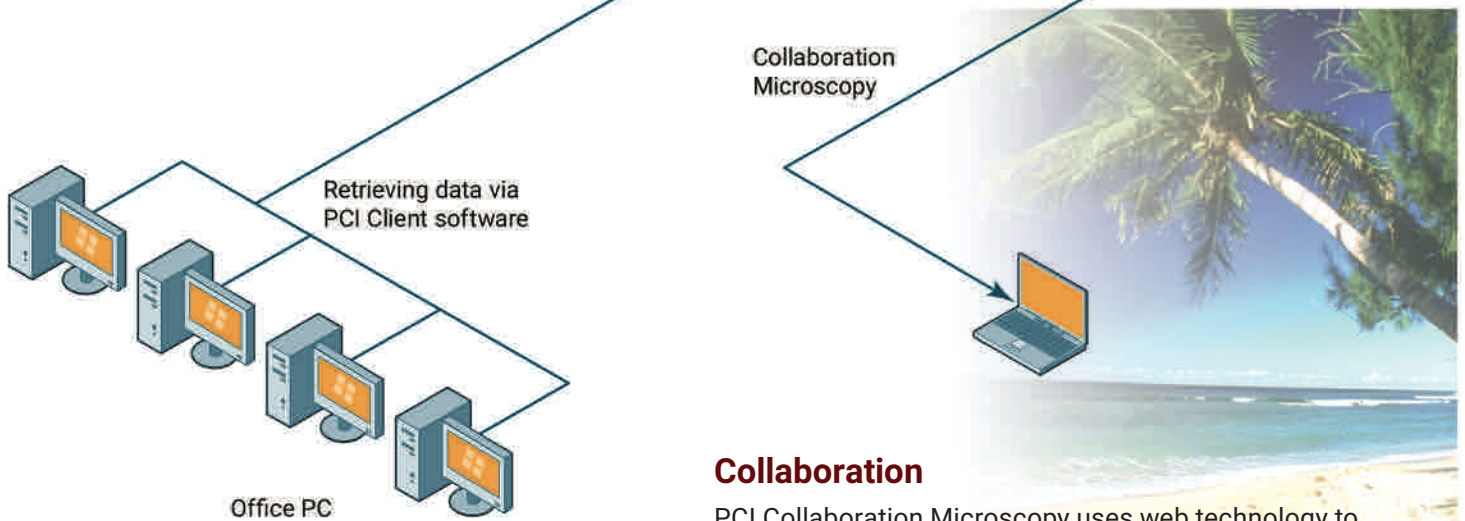**1** PCI acquires high-resolution, slow-scan images from any SEM or STEM.
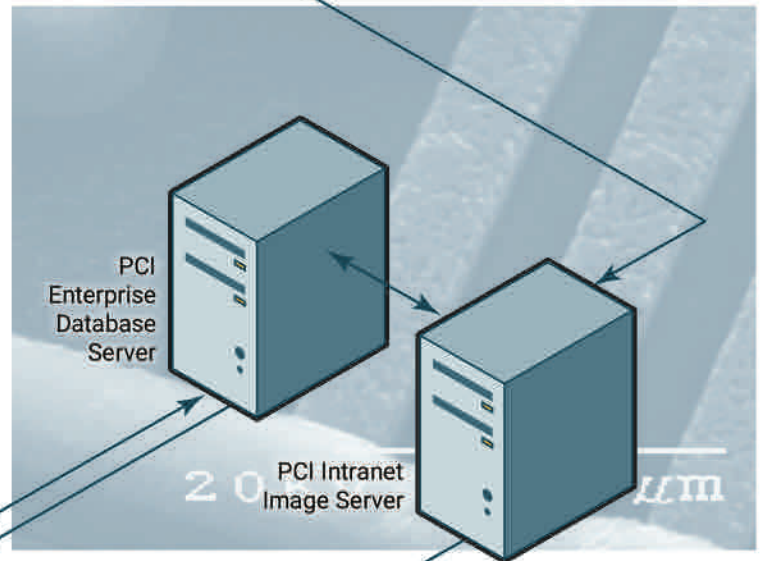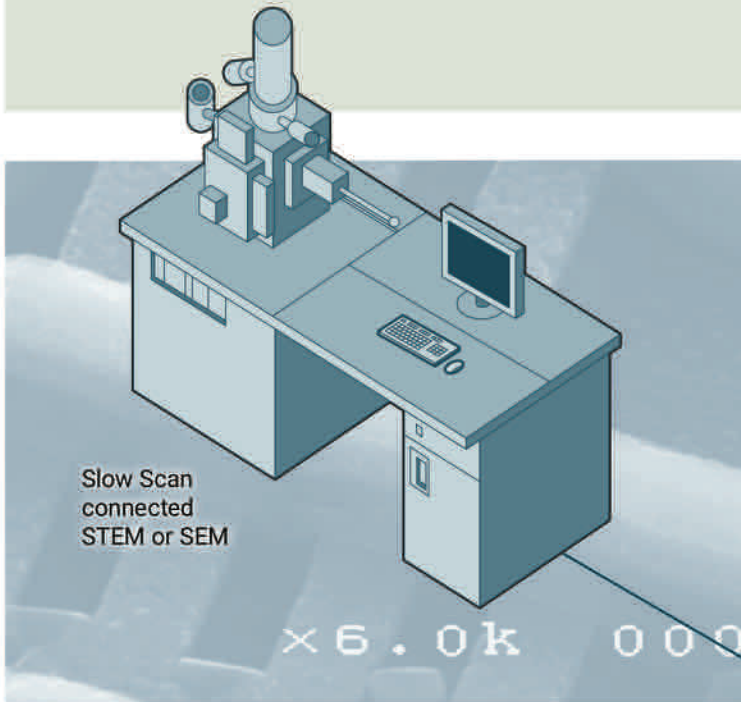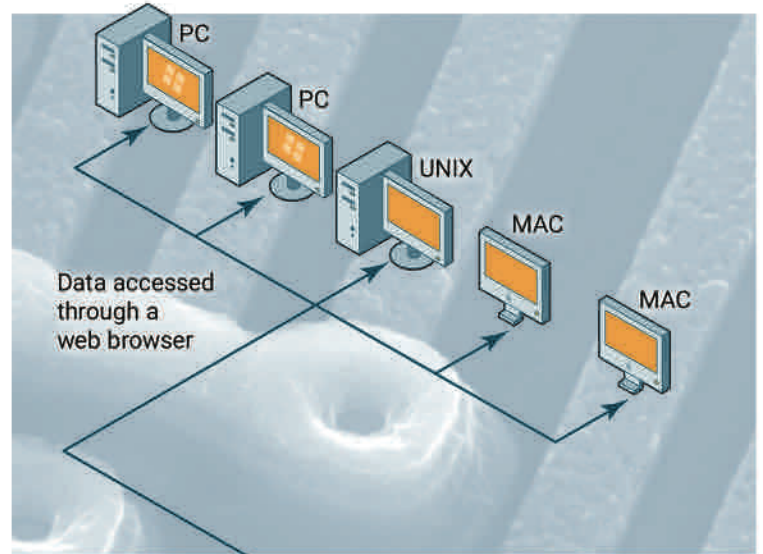
2 A complete suite of image processing, annotation and analysis tools is included.

3 PCI's comprehensive workgroup database tracks your images, spectra and related documents.

* SEM image courtesy of R. G. Richards, AOIASIF Research Institute, Davos, Switzerland.

Network Access

When used in conjunction with PCI Office software, data can be retrieved and reviewed at desktop PCs throughout your organization. As soon as images are saved by the operator, they can be accessed immediately by office PCs. When used in conjunction with the PCI Intranet Image Server, the data can be accessed through a web browser on any workstation in your organization.

PC

PC

UNIX

MAC

MAC

Data accessed through a web browser

Slow Scan connected STEM or SEM

×6.0k 000

PCI Enterprise Database Server

PCI Intranet Image Server

20 μm

Collaboration Microscopy

Retrieving data via PCI Client software

Office PC

Collaboration

PCI Collaboration Microscopy uses web technology to bring your lab and its clients together wherever they are located around the world. Transmission of live video from your microscope and saved images from the PCI database permits remotely located clients to participate in live microscopy sessions.

Image Acquisition

PCI acquires high-resolution, slow-scan images from SEM and STEM instruments without interfering in any way with normal microscope operation.

The quality of PCI's SEM and STEM images is unsurpassed. PCI can match the resolution of your microscope's scan generator up to 4,000 lines. Image size is continuously variable up to the maximum size supported by the microscope. PCI can be programmed to match your microscope's aspect ratio exactly, ensuring that pixels are square and that measurements are accurate.

Quartz Imaging pioneered the use of passive capture for high resolution SEM imaging. The benefits of passive capture are now widely recognized.

All microscope controls remain fully operational even while acquiring an image. The micron marker and other data are automatically acquired with the image. And, full advantage is taken of the instrument's own sophisticated filtering and scan generation electronics. The captured image is identical to the film output of the instrument.

Photo Replay

In addition to being able to output images to any Windows® compatible printer, PCI, when equipped with the Photo Replay Option, can send captured images back to your instrument's photo CRT. This way you can collect many images and only produce film output of the important ones—dramatically reducing film use. Replayed output is indistinguishable from original photographs.

Image Enhancement, Measurement and Annotation

Once the images are acquired, PCI provides a complete set of processing and display functions including image zooming, pseudo-coloring and brightness, contrast and gamma adjustment. You can also smooth, sharpen, median filter and perform local contrast enhancement on your images. Anaglyph stereo images can be constructed and aligned.

You can annotate your images with PCI's drawing tools which operate on a separate "overlay layer." You can move or edit the overlay elements at any time without affecting the image underneath. Tools are also provided for length and angle measurement.

Advanced Acquisition Features

PCI's Advanced Acquisition features let you acquire images up to 12 bits deep from two channels, such as SE and BSE, simultaneously. Each channel can be independently summed or frame averaged and the two channels can be mixed in real-time.

Quartz PCI Database Support

PCI Slow-Scan is one member of the extensive PCI product line. In addition to PCI Slow-Scan for SEMs, PCI provides systems for acquiring images from most image producing devices, as well as sophisticated database software for managing your images.

PCI Slow-Scan includes the PCI Workgroup Database. The Workgroup database allows a group of users to track images, other documents and job, session and sample information. Designed for laboratory use, the system makes it as easy as possible for the operator to enter the required information with a minimum of typing.

For very large volumes of images and large numbers of users, PCI Slow-Scan is completely compatible with PCI Enterprise Database. The Enterprise Database, based on the Microsoft® SQL Server™ or Oracle® database management systems, is the right choice for implementing a company-wide image management system.

X-Ray Spectrum Viewing

In addition to acquiring your images, PCI lets you view and annotate x-ray spectra, both at the instrument and at your office workstations. Data from the Quartz XOne x-ray microanalysis system can be read directly and data from other vendor's equipment can be imported via the EMSA format. Tools are provided to identify elements, label peaks and add other annotations. Spectra can be exported as images and copied via the clipboard into other software packages.
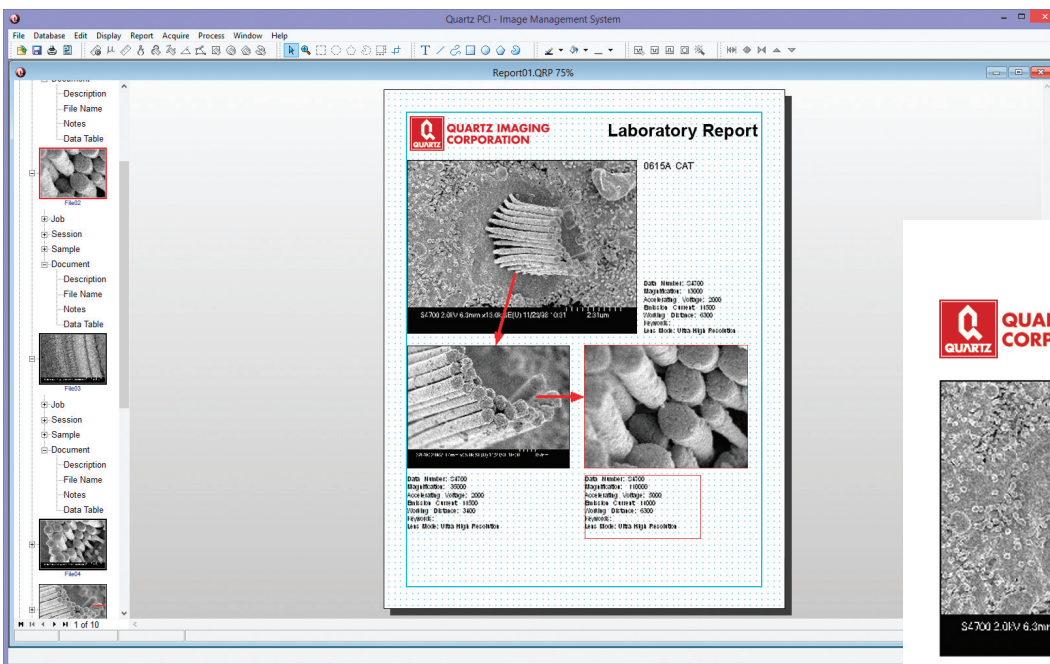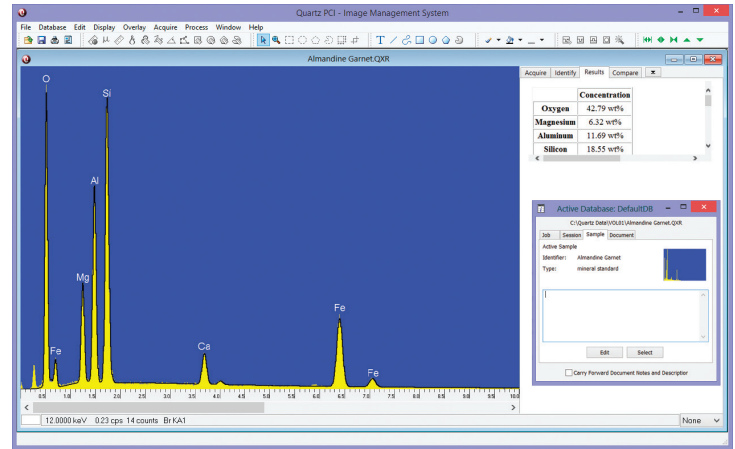
Report Layout

PCI includes a full-featured report layout tool. After you have acquired your images, or even while you are acquiring them, PCI makes it easy to produce polished, professional reports.

PCI database fields can be placed on the report and automatically filled with database information pertaining to the associated image. The same tools that are available for annotating images are available for adding annotations to the report. Master pages and templates facilitate the development of standard reports for your organization, incorporating elements such as corporate logos.

Finished reports can be exported in the popular PDF file format for easy distribution to your colleagues and clients.

QUARTZ Family of Products

FA-LIMS

- The only LIMS system designed specifically for Failure Analysis and Materials Characterization labs
- Highly configurable to your specific workflow and needs
- Laboratory performance reporting

FA▸LIMS

PCI-AM Automated Measurement

This new module for Quartz PCI provides automated measurement features for engineers who measure different types of semiconductor device features on a single image or a batch of similar images.
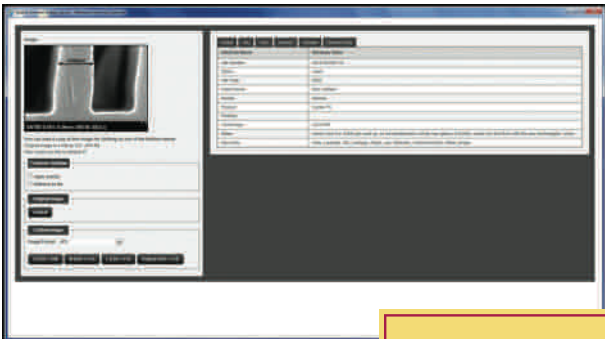
Automatic feature measurement:

- Saves time
- Increased accuracy
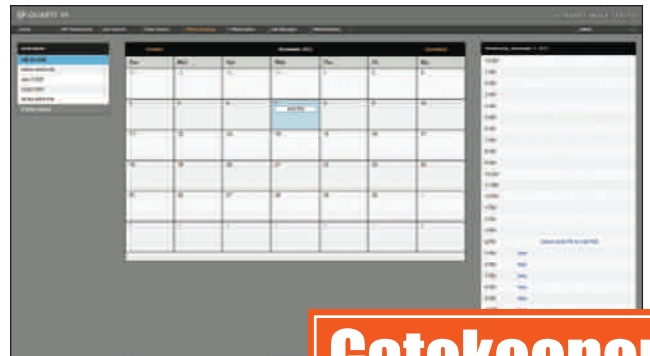- Consistent results
- Easy access to data
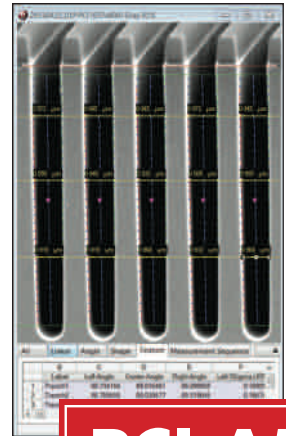
PCI-AM

AL-LIMS

- Web-based job request submission
- Easy, secure data retrieval
- The 'Image Smart' LIMS system

AL▸LIMS

Gatekeeper

- Web instrument booking system
- Instrument access control
- RFID system (option)
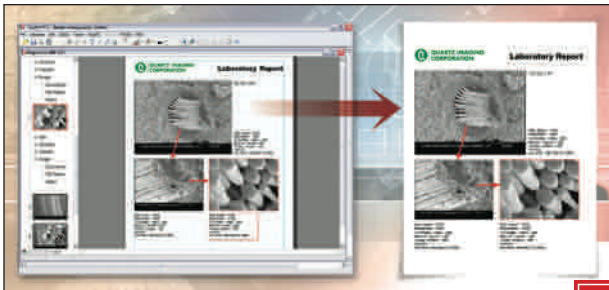- Increase instrument use
- Decrease instrument damage

Gatekeeper

QUARTZ Family of Products

PCI Office

Imaging Software - used for offline (away from instrument) viewing, processing and analysis of images acquired with Quartz PCI Lab.

Also reads images from most EM manufacturers already calibrated – Hitachi, FEI, Zeiss and others.

QUARTZ PCI

PCI CFR

Helps You Comply with 21 CFR Part 11

- An audit trail is maintained of all operations carried out on images by the user
- All versions of image files are retained by the system. If the user saves a new version of an image, it is assigned a version number in sequence and does not overwrite the original data.
- Data files are encrypted to discourage tampering and are protected using a "digest" to detect tampering.
- Digitally signed PDF files may be exported.

QUARTZ PCI-CFR

PCI Lab

Laboratory Imaging Software – Suitable for most image producing instruments including:

- SEM, TEMS, STEM
- PC based instruments
- 3rd party EDX systems
- Tabletop SEM
- Cameras
- Scanners

QUARTZ PCI
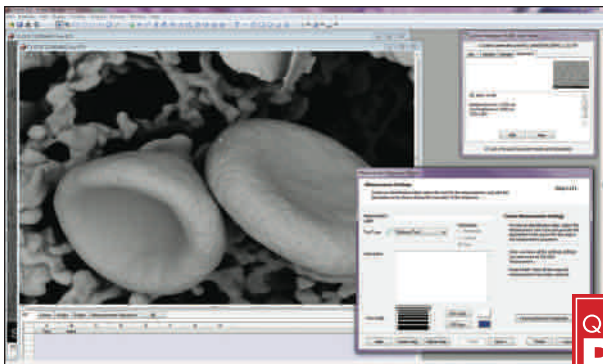
FAB Automation

- Remote control from outside of Fab
- Remote data collection
- Rapid ROI

Custom Development

- Software & hardware solutions
- Laboratory solutions
- Automated inspection
- Metrology & image processing

TECHNICAL FEATURES

PCI Slow-Scan

- Connects to any SEM or STEM.
- Passive system – digital beam control not required.
- Matches resolution of microscope's scan generator up to 4,000 lines.
- Continuously variable image size.
- Accommodates any image aspect ratio.
- 8- or 12-bit acquisition.
- Frame averaging, integration.
- Simultaneous two channel acquisition.
- Real-time signal mixing.
- USB 2.0 computer interface.
- Power Input: 100 ~ 240 V, 50 ~ 60 Hz
- FCC Class A device.

Measuring

- Complete set of measurement tools for measuring distances, angles and shapes in the image.
- Values automatically update when measurements are adjusted with the mouse.
- Measurement results displayed in spreadsheet grid and can be easily pasted into Excel or other software.
- Numerous options for displaying arrow heads, extension lines, projections etc.
- Micron marker function for adding micron marker to images, such as from light microscope, that do not contain a micron marker.
- Measurement Sequence Function allows repeated sequence of measurements to be pre-programmed.

Archiving

- Images can be stored in most popular file formats including TIFF and JPEG.
- Workgroup Database included as a standard feature. Enterprise Database available as an option. Workgroup Database can be easily upsized to Enterprise version.
- Database tracks jobs, sessions, samples, images and external documents including multimedia files.
- Permits composition of sophisticated database queries.
- Robust record locking and file sharing in networked environments.
- "Send To" feature allows documents from other applications to be sent directly to the database.
- Scan feature automatically searches disks and network devices for images and allows them to be added to the database.
- ODBC compliance ensures compatibility with third-party tools such as Microsoft® Access.
- Burn CDs and DVDs from inside PCI
- Full support for removable media.
- Auto-Save Acquired Images.

Processing

- Image resizing and fine image rotation.
- Ability to reverse raster rotation, using angle information contained in image file.
- SEM resolution measurement.
- Image mixing using various arithmetic operators.
- "Plug-in" interface for user-developed processing and analysis code.
- Histogram functions for contrast, brightness and gamma adjustment.
- Smoothing, sharpening and median filtering functions.
- Display functions for zooming, panning, false coloring and slide show display.
- Construction of anaglyph stereo image from separate left and right images. Includes ability to align stereo pair.
- Spectrum zooming/scrolling with mouse wheel.
- Spectrum auto-scaling and default display region.
- Spectrum automatic peak labeling.
- Spectrum automatic peak identification.
- Spectrum KLM line markers.
- Spectrum cursor displays energy, counts and possible x-ray lines.

Annotating

- Complete set of tools for adding text, arrows and geometric shapes to images.
- Drawing tools operate on separate overlay layer. Overlay elements can be moved or deleted without interfering with each other or the underlying image.
- Drawing elements can be rotated.
- Grid overlay can be displayed on image.
- Default overlay burn-in option allows all images to be permanently marked, such as with company logo or confidential indicator.

Reporting

- Comprehensive built-in report editor.
- Permits layout of images, text and drawing elements.
- Any number of pages.
- Grid/Snap-to-grid features.
- Master page.
- Automatic population of database fields in the report.
- Automatic generation of reports from templates.
- Export reports in PDF or Microsoft Word and PowerPoint formats.
- Secure PDF Export.

Other

- Dual Monitor and Widescreen Support.
- Runs on Microsoft Windows XP, Vista™ and Windows 7 & 8.
- Runs on 32 and 64-bit operating systems.
- Output to any Windows®-supported printer.