



# Clear Focus Imaging System

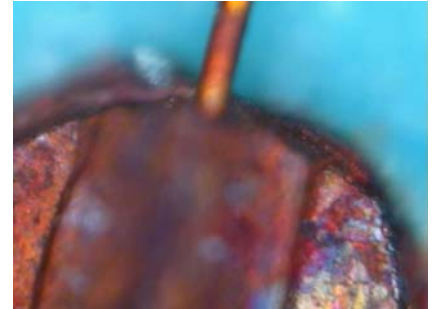
**If the image on your microscope looks like**



← **this**

**or**

**this →**



**Clear Focus can  
make it look like  
this!**



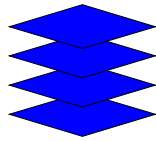
**Breakthrough Technology Provides Affordable  
Visible Light Alternative to Laser Confocal  
Microscopy**





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## How Does Clear Focus Do It



Automatic control of focus motor acquires a “stack” of images throughout the vertical extent of the sample

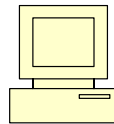


Image Processing of the “stack” determines at what point each pixel is in focus



Composite “Clear Focus” image is created from in-focus pixels throughout the “stack”

### Adjusting for Lack of Depth of Focus

High magnification microscope optics have limited depth-of focus. This is due to the limitations of the lenses that make up the microscopes. Most texts on either microscopy or optics can speak to the details of this phenomenon.

When looking at a sample under high magnification and if your sample has any vertical structure in it, under normal conditions you can only view a portion of the sample in focus at a time. To get an idea of what a sample would look like, you would have to adjust the focus through the vertical structure of the sample to look at different portions of the sample.

Clear Focus is designed to correct for insufficient depth-of-focus effects when viewing a sample under high magnification.

### Stacks of “Slice” Images

Clear Focus controls the operation of a motor attached to the fine focus knob of your microscope. You specify the height of the sample and the size of the interval you wish to sub-divide the height into. Clear Focus controls the focus motor to acquire a stack of “slice” images. Each image will contain the image of the sample at that focus.

### Integrating A Stack of “Slices” Into a Composite Image

Once the stack of images has been acquired, Clear Focus will integrate these slices into a single composite image. Clear Focus uses a proprietary algorithm that determines at what point any given pixel in the stack is in focus. Once Clear Focus determines a pixel is in focus, it becomes part of the composite image.

### Z Height Measurements Provide Insight

Clear Focus provides on-screen display of Z height above a reference point while adjusting the focus. On the composite image, Clear Focus measures point-to-point Z height differences and Z height cross sections.



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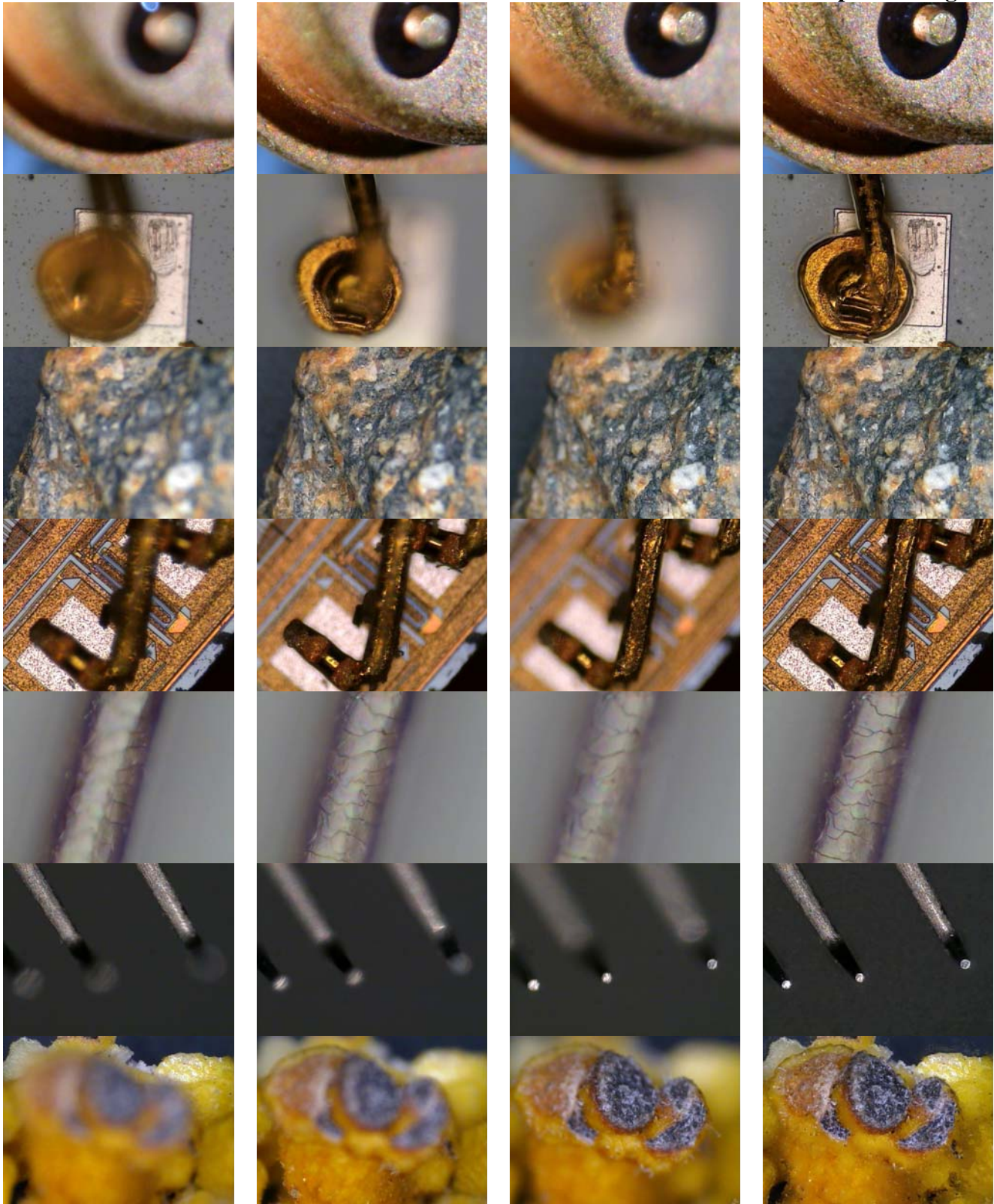
## Examples of Clear Focus Imaging in Action

Bottom Image on Slice Stack

Middle Image on Slice Stack

Top Image on Slice Stack

Clear Focus Composite Image





# Clear Focus Imaging System

## Clear Focus System Specifications

The Clear Focus Imaging System comes fully integrated and ready for use with the following equipment and software:

### Optical System

Clear Focus provides 2 standard optical systems options for applications that require low and high magnifications.

- High Magnification Optical System – Wesco DZ2 zoom microscope with stand, focus block, 6"x6" stages, 5-50X objective, and coaxial lighting
- Low Magnification Optical System – Thales Optem Zoom 125 system with stand, focus block, 6"x6" manual stages, coaxial and ring light lighting options

Custom optical systems such as existing compound microscopes from Nikon, Zeiss, Leica, or Olympus can be accommodated. Consult your dealer for more information.

### Z-Axis Focus Mechanism

A motor to automatically drive the Z-axis focus block is fully integrated onto the focus block. The motor system contains the motor, driver, and PC interface for the system.

### PC Control Computer

The control computer supplied with the system is a Dell Optiplex GX-270. The computer contains a 3.2 Ghz or faster processor, 1 GB of RAM, 120 GB hard disk, and a DVD/CDRW drive. The computer's operating system is Windows XP Pro. The computer's monitor is the Dell Ultrasharp 2001FP. This is a 20" flat panel monitor. The video camera interface frame grabber card is supplied and installed into this system.

### Video Camera

A Sentech STC-620CC video color camera and associated cabling is supplied standard with the system. Options for 3-CCD color cameras can be accommodated. Consult you dealer for more details.

### Mega Pixel Digital Camera

Options to use a mega pixel digital camera with the system are available. Consult your dealer for details and pricing.

### Clear Focus Imaging Software

The Clear Focus Imaging Software is supplied fully installed on the control PC. This software has the following features:

- Real-time acquisition of images from the microscope camera.
- Real-time control of Z-axis focus motor to acquire image stacks for analysis
- Analysis of image stacks to produce fully in-focus composite images at high magnifications
- Z-height profile measurement on composite images
- Point-to-point measurement of Z-height on composite images.
- Save image stacks for later analysis.
- Export image information to other programs.
- Email images to colleagues

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