

## **GenePix Autoloader 4200AL Microarray Scanner Slide Compatibility Supplement**

### **IMPORTANT!**

THIS DOCUMENT SHOULD BE READ THOROUGHLY BEFORE USE OF THE GENEPIX AUTOLOADER 4200AL SCANNER, AS IMPROPER USE MAY RESULT IN DAMAGE TO THE SCANNER AND/OR THE USER'S SLIDES!

## Introduction

The GenePix Autoloader 4200AL microarray scanner utilizes precision robotics for automated slide handling. Use of non-compatible slides may result in damage to the scanner and/or the user's slides. This document describes each of the three types of interaction that slides will make with the scanner, during the course of normal operation, so that users can better understand slide specifications that need to be met for compatibility with the GenePix Autoloader 4200AL microarray scanner.

In addition to this document, it is recommended that users thoroughly read the included User's Guide before initial use of the scanner.

## Interaction Between Slide and Slide Carrier

As described Chapter 3 of the User's Guide, slides to be scanned are first inserted into a 36-position slide carrier, which is then loaded into the scanner for automated slide-handling.

The slide carrier is numbered front to back, from 1 to 36. Slides should be inserted into the carrier with the arrayed surface facing towards position 1, and the bottom of the slide pointing towards the left of the carrier (Figure 1).

After loading all slides in the carrier, align the slides to the carrier's right-hand side. This will make the position of the scan area consistent across all slides.

**NOTE: The slide carrier can accommodate slides that are between 0.9 mm and 1.1 mm thick, including any labels. Slides thicker than 1.1mm will get stuck in the slide carrier and will cause slide-handling failures, due to the excessive force required to extract the slide from the carrier. When in doubt, check to make sure that the slides move freely in the slide carrier when they are seated. Slides thinner than 0.9mm may not sit up straight in the slide carrier, resulting in an improper pick-up position (Figure 2).**

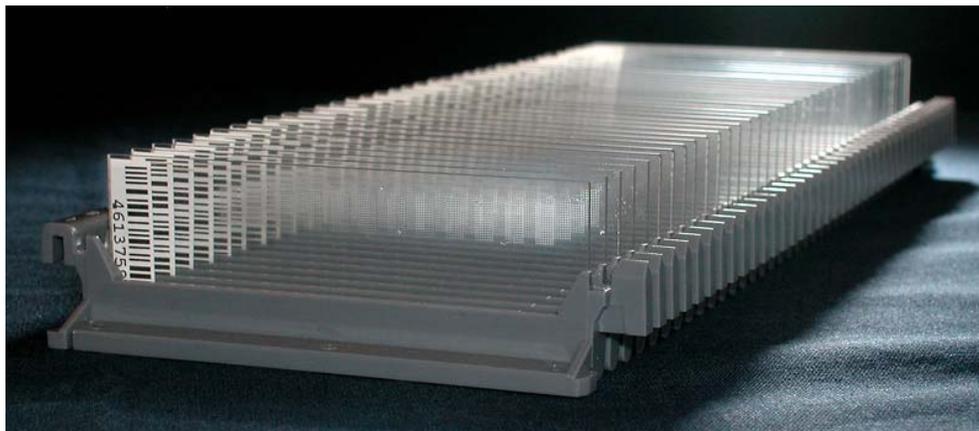


Figure 1. Loaded slide carrier. The nearest slide in view is located in Position 1. The barcode is located at the bottom of the slide, and the arrayed side faces the viewer.

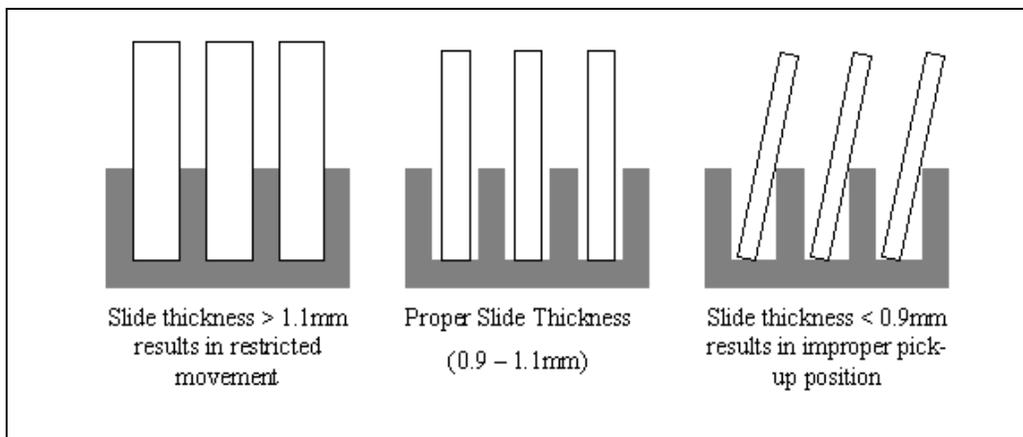


Figure 2. Side view of slide carrier with slides of varying thickness.

### Interaction Between Slide and Robotic Grippers

When the slide carrier is inserted into the scanner, and a scan is initiated (see Chapter 3 of the User's Guide for detailed instructions), the robotic arm approaches the first slide to be scanned, and grippers on both long ends of the slide securely grip the slide for extraction (Figure 3). The grippers will continue to hold the slide through the entire scanning process, until the slide is seated back into the same position of the slide carrier after scanning is complete.

**NOTE:** It is important for slides to be free of sticky substances, which may adhere to the grippers, preventing them from successfully unloading the slide into the slide carrier after scanning.

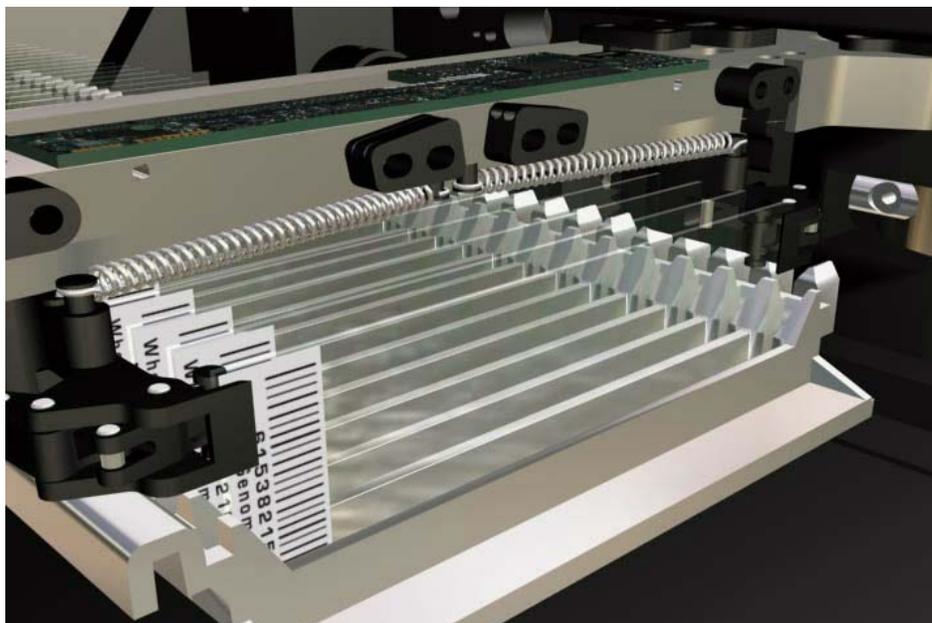


Figure 3. The robotic grippers grasp the edges of the slide for extraction from the slide carrier.

## Interaction Between Slide and Focusing Sensors

The GenePix Autoloader 4200AL features a dynamic, line-by-line autofocus mechanism, which enables unprecedented field uniformity in microarray imaging.

Once the slide arrives to the scanning area, the slide moves slowly in the y-direction (i.e. down the length of the slide), while the array is rapidly scanned in the x-direction (i.e. across the width of the slide).

As the slide moves in the y-direction during a scan, the arrayed face of the slide rides atop two small focusing sensors, which are positioned 2mm in from both long edges of the slide. These sensors detect non-uniformity in the slide surface, allowing real-time compensation in focus position (Figure 4).

**NOTE: A 2mm-wide area along each long edge of the slide should be kept free of any material that may prevent the focusing mechanism from moving smoothly across the arrayed face of the slide. This includes, but is not limited to, labels, adhesive residues, attached superstructures, waxy coatings (e.g., Pap Pen residue), or polish. Coverslipped slides are not recommended.**

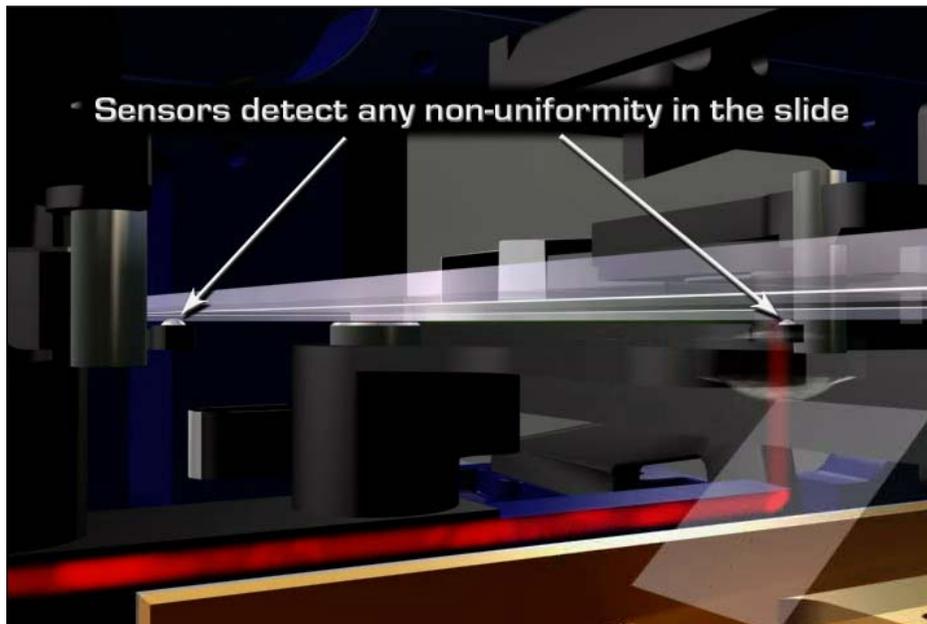


Figure 4. During scanning, the arrayed side of the slide (facing down) rides atop two focusing sensors.

### Summary of Slide Compatibility Requirements

Slide Dimensions	Minimum	Maximum
Length	74.5mm	76.5mm
Width	24.8mm	26.0mm
Thickness (including labels)	0.9mm	1.1mm

- A 2mm-wide area along each long edge of the slide should be kept free of any material that may prevent the focusing mechanism from moving smoothly across the arrayed face of the slide. This includes, but is not limited to, labels, adhesive residues, attached superstructures, waxy coatings (e.g., Pap Pen residue), or polish (see below).
- It is important for slides to be free of sticky substances, which may adhere to the grippers, preventing them from successfully unloading the slide into the slide carrier after scanning.
- Arrays should be positioned at least 4mm from each end of the slide, to ensure that they are not obscured by the robotic grippers during scanning (see below).
- Barcode labels should be positioned so that at least 2mm of the barcode is exposed for reading (see below).
- Coverslipped slides are not recommended.
- Slide edges should be either square-cut or rounded. Beveled edges are not recommended.

**NOTE: Damage caused by use of improper slides will not be covered by warranty or service contract. If you are unsure if your slides are compatible, contact Molecular Devices Technical Support for assistance.**

