

# Performance Evaluation of the GeneChip® HT Array Plate Scanner

Purpose: To show the high level of correlation customers can expect when the same sample is scanned by both the HT Scanner and HT Array Plate Scanner, as well as by multiple HT Array Plate Scanners.

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## *I. Introduction*

To ensure the smooth transition of customers to the GeneChip® HT Array Plate Scanner, it is critical that data generated using this scanner are comparable to data generated using the current GeneChip® HT Scanner. In other words, there must be a high degree of concordance between experimental data generated using the HT Array Plate Scanner and the HT Scanner.

This white paper describes a set of controlled experiments wherein the data sets generated by these two scanners for the same samples are compared. The results demonstrate conclusively that the HT Array Plate Scanner meets or exceeds the performance standards for the HT Scanner.

In addition to the above experiments, the instrument-to-instrument performance of the HT Array Plate Scanner was also tested.

## *II. Experiment Design*

### **Overview**

The test plan included acquiring and comparing data sets for the same samples on the same GeneChip® HT Human Genome U133A 24-Array Plate as generated by each instrument. Data analyses were conducted using Affymetrix Expression Console™ software. Any differences observed were due exclusively to the scanners. All tests were conducted at Affymetrix.

### **Test Plan**

To conduct these tests, the same set of samples was loaded onto three 24-array plates for a total of 72 arrays. The set of samples used consisted of Brain 20%/HeLa 80%; Brain 80%/HeLa 20%; and HeLa 100%.

Each array plate was scanned multiple times to collect probe-level data. First, each array plate was scanned by two HT Array Plate Scanners; then it was scanned by an HT Scanner. This scanning strategy was possible because photo-bleaching on the HT Array Plate Scanner proved

negligible. Because the same array plate was scanned by each instrument, any differences in performance were attributed to the scanner that generated the image.

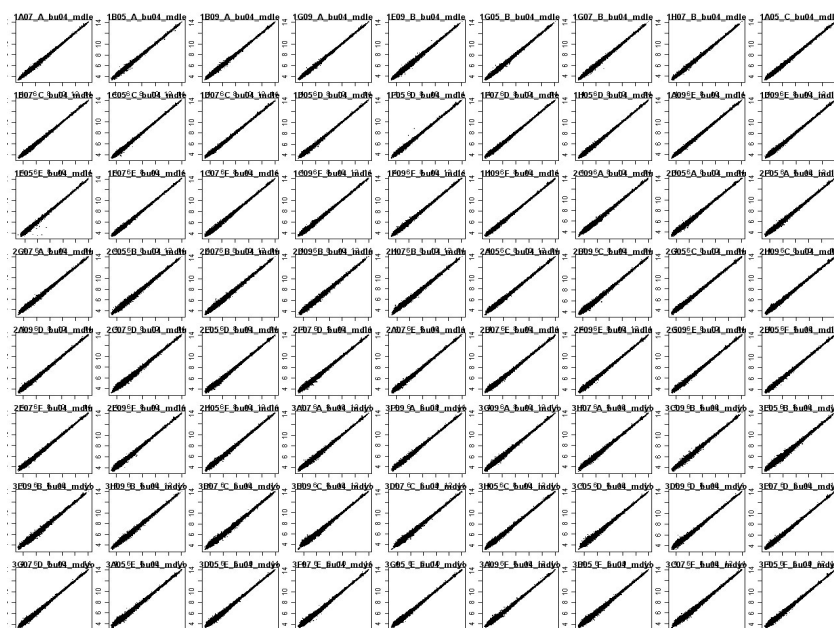
### III. Results and Discussion

Taken together, all array data comparing the HT Array Plate Scanner and the HT Scanner indicate that there is no significant difference in performance between the two scanner types. Both produce high-quality data for Affymetrix GeneChip® expression analysis. In addition, all array data comparing multiple HT Array Plate Scanners indicate that there is no significant difference in performance between scanners of this type.

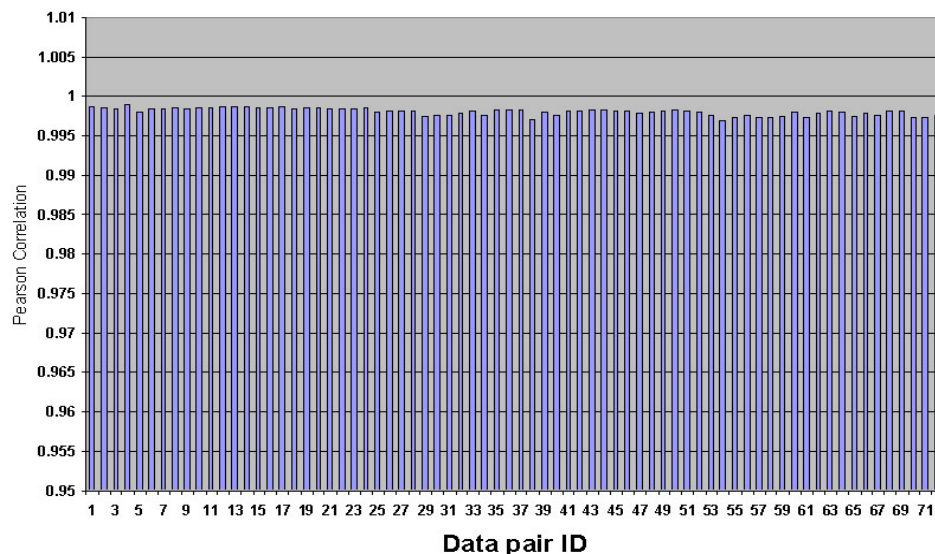
To conduct our comparative analysis, the data sets from each array plate were first normalized using Robust Multi-array Analysis (RMA). The normalized data was then compared using Pearson's Correlation and MA Plots.

#### HT Array Plate Scanner versus HT Scanner

Figures 1 and 2 depict the Pearson's Correlation for the data sets collected from the HT Array Plate Scanner and the HT Scanner. As shown in Figure 2, the resulting R value for each sample was greater than 99.5 percent.

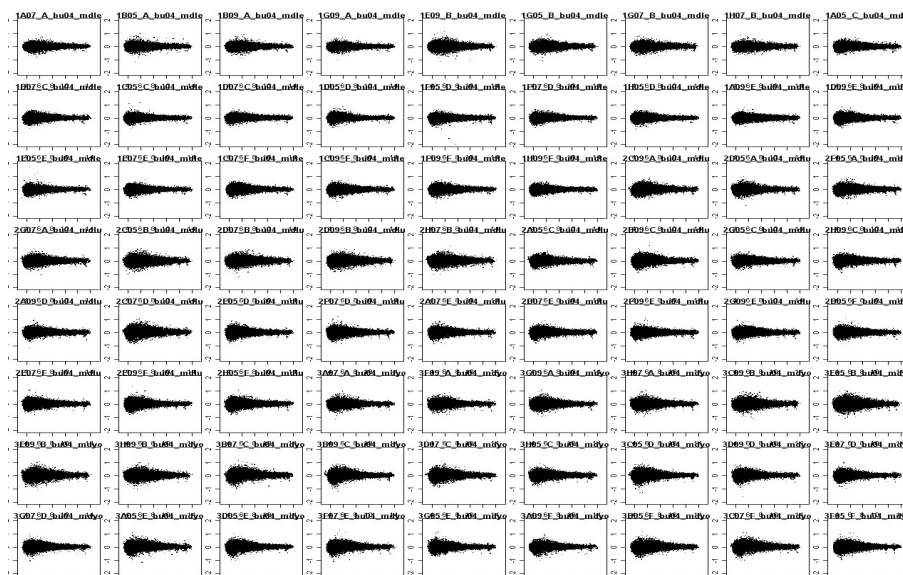


**Figure 1:** Scatter plots comparing 72 arrays scanned by both the HT Array Plate Scanner and the HT Scanner.



**Figure 2:** Bar plot showing a Pearson’s Correlation R value of greater than 99.5 percent for all 72 samples as scanned by both the HT Array Plate Scanner and the HT Scanner

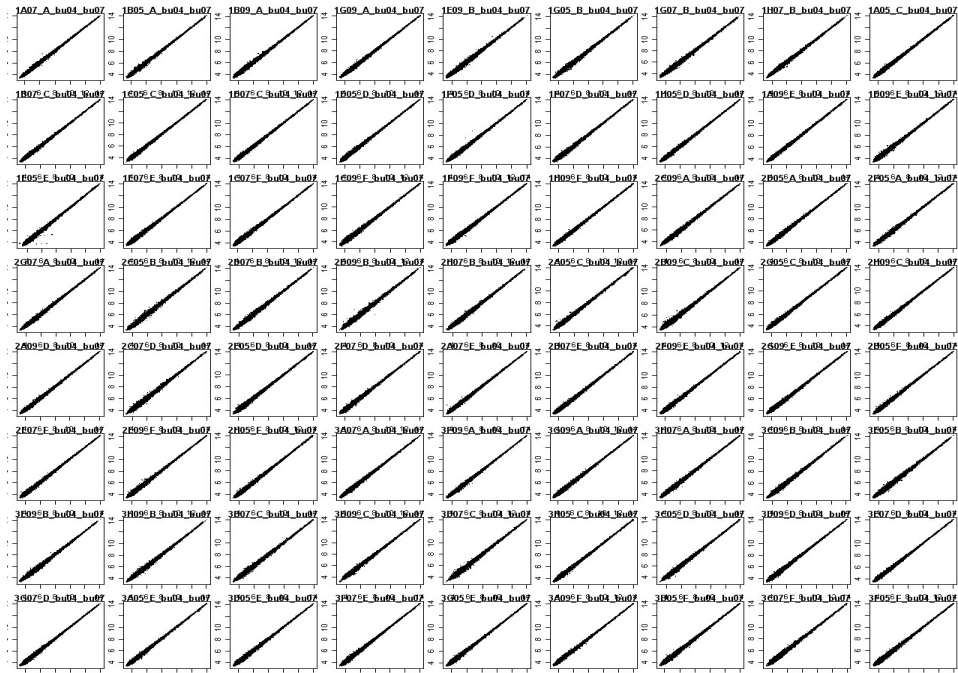
The MA Plot in Figure 3 below is another comparison of the data sets generated by the HT Array Plate Scanner and the HT Scanner.



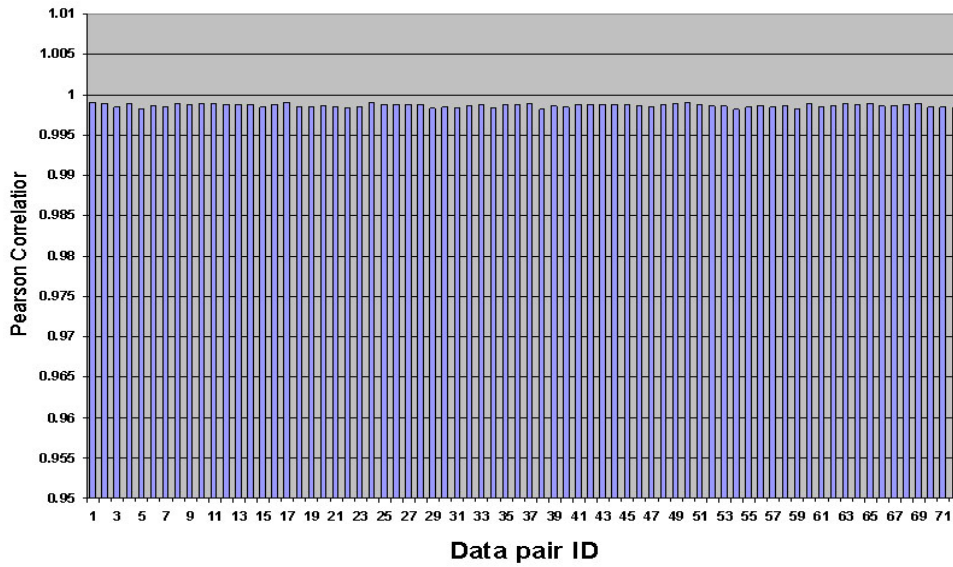
**Figure 3:** MA Plot comparing the 72 arrays scanned by both the HT Array Plate Scanner and the HT Scanner.

### HT Array Plate Scanner versus HT Array Plate Scanner

Figures 4 and 5 depict the Pearson's Correlation for the data sets collected from two HT Array Plate Scanners. As shown in Figure 5, the resulting R value for each sample was greater than 99.5 percent.

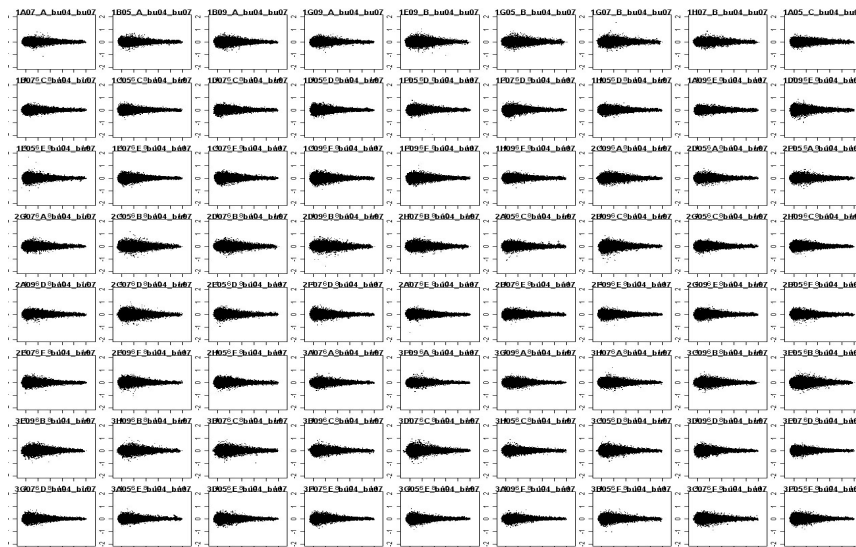


**Figure 4:** Scatter plots comparing the 72 arrays scanned by two HT Array Plate Scanners.



**Figure 5:** Bar plot showing a Pearson’s Correlation R value of greater than 99.5 percent for all 72 samples as scanned by two HT Array Plate Scanners.

The MA Plot in Figure 6 below is another comparison of the data sets generated by two HT Array Plate Scanners.



**Figure 6:** MA Plot comparing the 72 arrays as scanned by two HT Array Plate Scanners.

#### ***IV. Conclusion***

The results of these tests clearly indicate that the performance of the GeneChip® HT Array Plate Scanner is equivalent to the performance of the HT Scanner. The results also indicate consistent instrument-to-instrument performance between HT Array Plate Scanners.

At Affymetrix, we take pride in the high quality of products we develop and support. We are pleased to introduce an advanced scanning system with the Affymetrix GeneChip® HT Array Plate Scanner.

As this white paper supports, current HT Scanner users may easily transition to the HT Array Plate Scanner with no sacrifice to their current experimental designs and projects. In addition, the use of the HT Array Plate Scanner will position Affymetrix customers to take full advantage of upcoming technological advancements within the Affymetrix GeneChip® platform and to address the needs and requirements of emerging applications.

For further information on the HT Array Plate Scanner, please visit [http://www.affymetrix.com/products/instruments/specific/ht\\_array\\_plate\\_scanner.affx](http://www.affymetrix.com/products/instruments/specific/ht_array_plate_scanner.affx).

For answers to additional questions and purchase information, please call 1-888-DNA-CHIP (North America) or contact your local Account Manager. In other regions, please contact your local Affymetrix representative.