Integration of LEADseeker Homogenous Imaging System with a Hudson PlateCrane

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INTRODUCTION

The LEADseeker™ Homogenous Imaging System is a CCD-based detector that is used for multiple detection methods in the area of high throughput drug screening. The LEADseeker has proven to be a flexible detection tool for both assay development and high throughput screening. The LEADseeker has three common modes of operation manual, workstation, and robotic interface. To deliver HTS plate capacity, using a workstation or a robotic integration provides a flexible solution.

The decision to select an external robotic controller is made during the installation of AssayVision™ software. Any external robot controlled system can interact with LEADseeker through the provided RS-232 interface.

Here we report the integration of LEADseeker with a Hudson Control Group`s PlateCrane XT™.

Figure 1. *LEADseeker Homogenous Imaging Workstation integrated with a Hudson PlateCrane XT for plate delivery.*

METHOD AND RESULTS

The components used for the integration were a LEADseeker Homogeneous Imaging System Generation III and a Hudson PlateCrane XT. System control is achieved by using the robotic interface module within AssayVision along with Hudson Control

Group`s 'Total Control™ for Windows' (TCW) software configured for use with LEADseeker. Both software packages are loaded upon a single Windows NT™ based computer and communicate via a standard RS-232 connection. Through the flexibility of 'Total Control for Windows' a specially designed LEADseeker device driver was created. This device driver utilises TCW`s embedded "script" language which allows for custom applications. No compiling, linking, or C programming is required to utilise this interface.
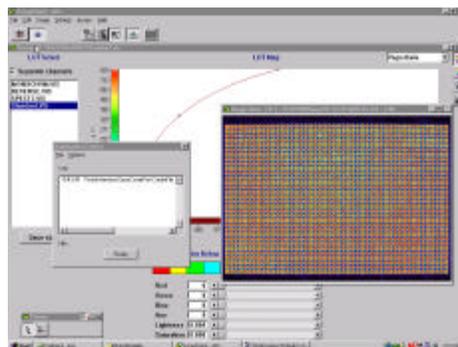

Figure 2. LEADseeker`s AssayVision software configured for external robot control.

The cylindrical robot with a maximum plate capacity of 420 microplates, delivers the selected assay plate to the LEADseeker plate platform. Once this plate has been delivered to the Imager, AssayVision acquires the image with subsequent data extraction and data handling.

The table below gives an estimate of normal completion times for these commands.

Command	Time (seconds)
INTIALIZE	1-20
OPEN	15
CLOSE	15
READ, <name>	10-600 depending on imaging time.
GET_DATA	5
STATUS	1
ABORT	1

Table 1. Approximate default execution times

Figure 3. TCW method editor demonstrated with LEADseeker.

TCW`s Method Editor allows the user to customise the plate processing sequence. Multiple methods can be stored dependent upon device and plate capacity. This flexibility allows for plate capacity defined methods to be generated.
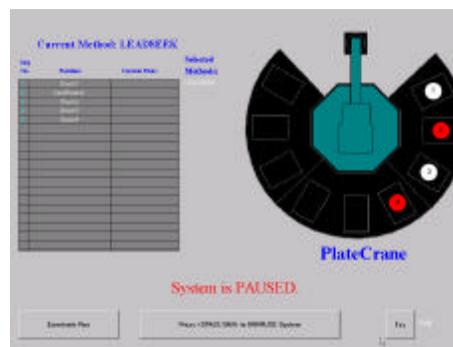

Figure 4. TCW method configured for use with LEADseeker

The robotic workstation was tested for functionality and reliability. High throughput drug screening conditions were simulated by placing 50µl and 10µl of assay buffer in 384 and 1536 well plates, respectively. These plates were then sealed with TopSeal™-A and stacked within their individual plate bases to full capacity (30 plates per stack). A total of 1000 plates were cycled through the Imager without failure.

In this study the PlateCrane XT utilised a unique brush lined stacker, which efficiently prevents sealed plates from sticking together.

Figure 5. *PlateCrane XT delivering a 384 well plate to the LEADseeker plate platform. The Rotating Gripper has great flexibility to place well plates at different angles.*

CONCLUSION

This study describes the integration of LEADseeker Homogeneous Imaging System Generation III with a Hudson PlateCrane XT.

- The LEADseeker PlateCrane integration operated as an efficient and reliable high throughput screening workstation.
- The LEADseeker`s robotic interface module inconjunction with TCW provide a simple to implement integration solution.
- The LEADseeker PlateCrane workstation solution has the necessary plate capacity to be used as a high throughput screening system.