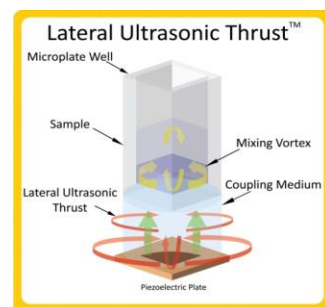


High-Quality Acoustic Instruments Compound Screening Duet: HENDRIX SM100 Ultrasonic Fluid Processor & High-Throughput Acoustic Dispensers

High-Quality Compound Screening Process Roadmap

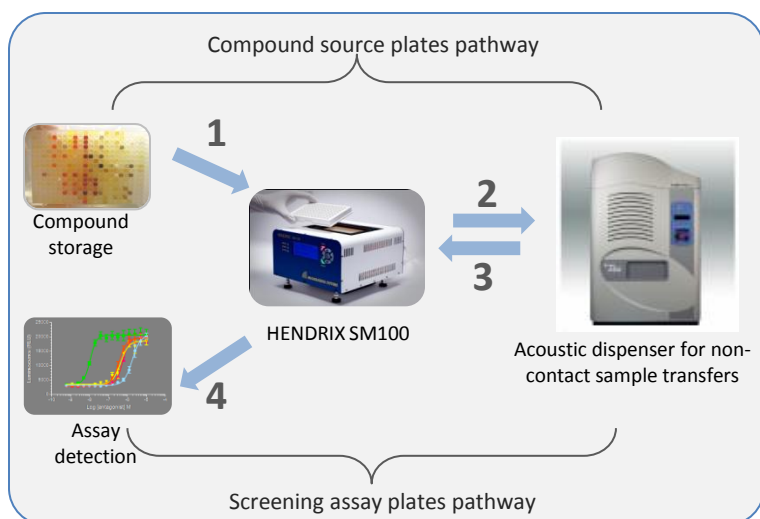
In drug discovery research, both the quantity and the quality of compound screening results are important aspects to researchers. Advances in laboratory automation has enabled high-throughput screening (HTS) and ultra high-throughput screening (uHTS), but issues such as compound precipitation, liquid transfer errors or insufficient assay mixing are still common barriers preventing scientists from reaching precise and accurate screening results. In addition, higher density microplates with ever smaller sample volumes compound these challenges. In this note, we use two novel acoustic instruments to improve the drug screening quality from multiple angles.

The Microsonic Systems HENDRIX SM100 ultrasonic fluid processor uses Lateral Ultrasonic Thrust™ (LUT) technology to create a highly controllable vortex inside a well or a tube. At high power, the LUT energy solubilizes compound precipitates to ensure that downstream liquid handling steps transfer the proper amount of samples. At low power, the gentle vortex mixes components in the assembled assay plates so that the assay results are obtained from a homogenous state. **Figure 1** demonstrates how LUT technology works in a well.



▲ **Figure 1.** Lateral Ultrasonic Thrust™ (LUT) technology creates a controllable vortex inside the sample well that performs rapid compound solubilization or gentle assay mixing.

Once samples are homogenized and free of precipitates, they are ready for the liquid transferring step. Acoustic dispensers such as Labcyte Echo® systems and EDC Biosystems ATS-100 focus ultrasonic acoustic energy at the meniscus of a fluid sample to eject small droplets of liquid from open wells. **Figure 2** summarizes the high-quality compound screening process roadmap combining the use of the HENDRIX system and an acoustic dispenser.



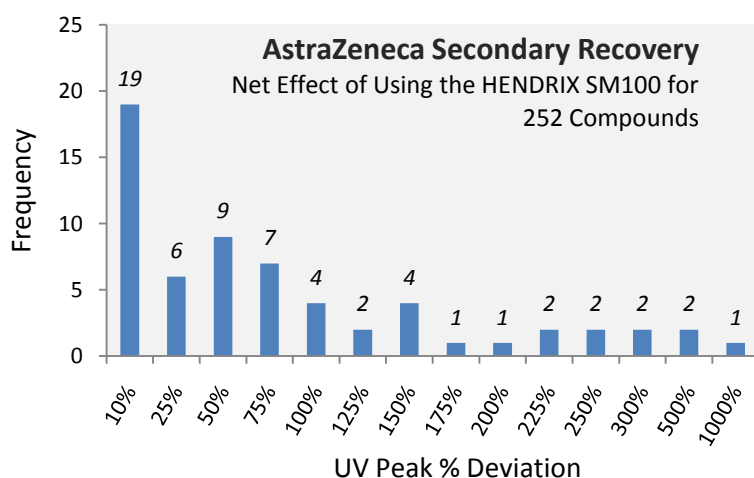
◀ **Figure 2.** As shown in the compound screening process roadmap, compound source plates come out of sample storage, are processed by the HENDRIX SM100 to recover compound precipitates back into solution (step 1) and are then loaded into an acoustic dispenser for transfer into assay plates (2). After transfers are completed, assay plates containing compounds and other assay components can be returned to the HENDRIX SM100 for assay mixing (3). The final homogenized assay plates are now ready for data collection and analysis (4).

Secondary Recovery for Acoustic-Friendly Compound Storage Plates

Processing compound plates with the HENDRIX system ensures that precipitated samples are brought back into solution prior to the liquid transferring step. This has been labeled “Secondary Recovery”. **Table 1** lists the HENDRIX settings for common acoustic-friendly compound storage plate types. In a study by AstraZeneca, researchers measured the UV peaks for compounds in storage plates (Labcyte cat# P-05525) before and after the HENDRIX treatment. To prevent any concentration bias due to pipetting errors, researchers used the Echo system to eject the compound solution for UV measurements. As shown in **Figure 4**, the final results showed that a number of compounds had UV peak deviation over 100% that indicated successful recovery from precipitates.

Table 1. HENDRIX SM100 settings for common compound storage plates.

Compound Storage Plates	HENDRIX SM100 Settings for Compound Resolubilization
Greiner 781801	5s On/1s Off, 10 cycles, 120 Hz, 20 V, 50% duty cycle
Greiner 781201-906	5s On/1s Off, 10 cycles, 500 Hz, 28 V, 60% duty cycle
Labcyte LP-0200	8s On/2s Off, 10 cycles, 120 Hz, 20 V, 50% duty cycle
Labcyte P-05525	5s On/1s Off, 10 cycles, 500 Hz, 28 V, 60% duty cycle
Labcyte LP-03730 & LP-0400	6s On/2s Off, 8 cycles, 1000 Hz, 34 V, 30% duty cycle



► **Figure 4.** Among the 252 test compounds, 24.6% showed positive net effect on UV peak % deviation after the HENDRIX treatment. And 17 compounds had greater than 100% deviation in UV peak measurements.

Conclusion

Acoustic dispensing technology and Microsonics LUT technology provide many advantages to high-throughput compound screening comparing to conventional screening methods. The HENDRIX SM100 ultrasonic fluid processor recovers precipitated compounds in storage plates and homogenizes assay plates, and together with the unmatched liquid transfer precision and accuracy of an acoustic dispenser, the two devices deliver unmatched high-quality compound screening data.

Ordering Information

HENDRIX SM100 ultrasonic fluid processor: sales@microsonics.com