

SONY

SH800Z Cell Sorter

The SH800Z is a compact, affordable, and easy to use cell sorter developed using the state-of-the-art technologies from Sony. An array of automated mechanisms makes it an ideal sorter for an individual laboratory or a core facility looking for an easy-to-use system for its routine applications.



 **GOOD DESIGN AWARD 2013**

SH800 Concept

At the heart of the Sony Cell Sorter SH800 is a unique replaceable sorting chip that provides a fresh nozzle and flow cell for each new day. Using expertise developed for reading Blu-ray Disc™, DVD, and compact discs, Sony engineers have designed an automated alignment process that ensures optimal results without requiring user intervention.

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Easy to use

The SH800 is designed to streamline an end users workflow by eliminating complicated sort setup tasks.



Compact

The SONY SH800 is a compact, bench top, personal cell sorter measuring 55cm (width) x55cm (breadth) x72cm (height).

The small footprint was achieved by incorporating an integrated laser technology and a compact mechanical design.



Flexible

Contained within the small frame of the SH800 is an extremely flexible design that accommodates a wide range of applications. The integrated laser engine houses up to 4 lasers, providing excitation lines of 405 nm, 488 nm, 561 nm and 638 nm, which are combined and delivered through a single fiber. Six free form PMTs allow for the detection of fluorescence signals from any laser based on filter selection. A total of 8 parameters that include forward scatter, back scatter and 6 fluorescence parameters can be detected. See the SH800 filter guide for a complete list of optical filter options.



Sorting Chip

The SH800 sorting chip is based on micromachining design technology and acts as an integrated flow cell-nozzle assembly. It contains microfluidic channels for controlling the flow of sample and sheath fluid. The sample is interrogated by the lasers within the chip before it passes through the nozzle for sorting. Chip installation and removal is quick and easy thereby reducing the down-time associated with changing nozzles during setup and removal of clogs.

Simple Setup

Automatic setup is done by scanning a QR code on a sorting chip using the built-in camera on the system's PC. The chip information is read by the computer and provides the system with information about the nozzle size and optimal sort settings. CoreFinder™ technology then automates the laser alignment, droplet formation, side stream setup and drop delay time calculation.



Chip QR code scan



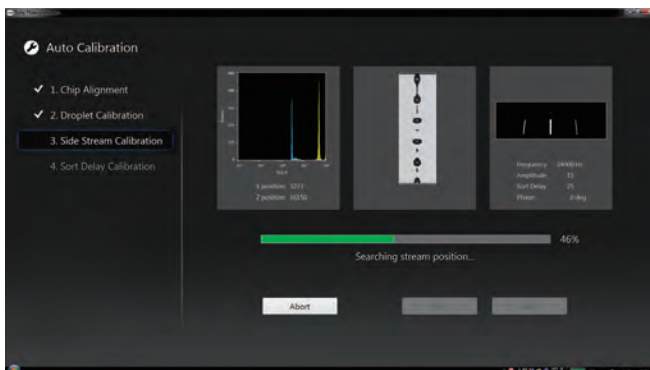
QR code scan of the sorting chip



Chip loading guide



Easy loading of the sorting chip



Automatic setup status

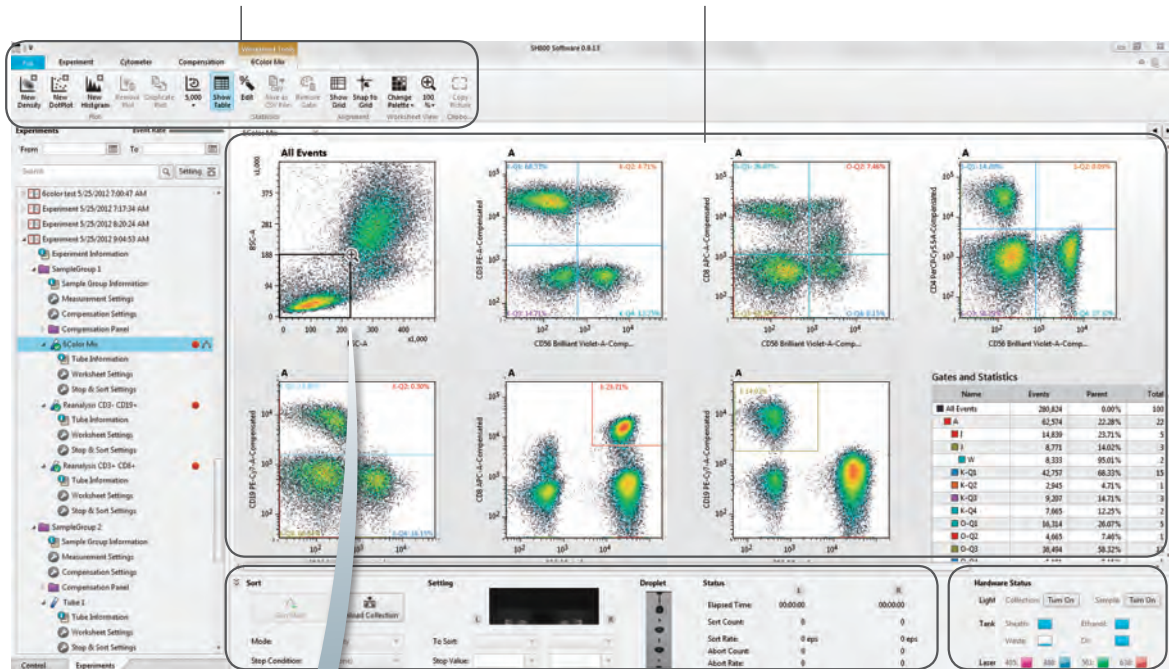
Intuitive Software

With decades of experience in designing user interfaces for consumer electronics, Sony has developed SH800 Software for setup, acquisition and analysis. Clear, easy to understand elements make navigation straightforward and intuitive. Data can be easily exported as FCS 3.0 or 3.1 format for use with 3rd party analysis software.



Intuitive icons within the ribbon interface

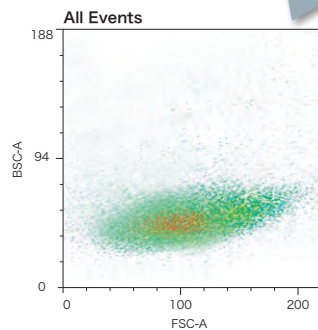
Rich graphical displays with customizable views



Zoom function

Sort settings display

Status display of sheath fluid, waste and lasers



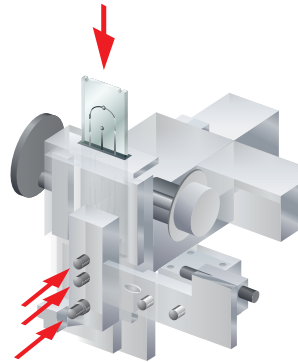
Innovative Technologies

CoreFinder™

Setup automation is achieved with CoreFinder™

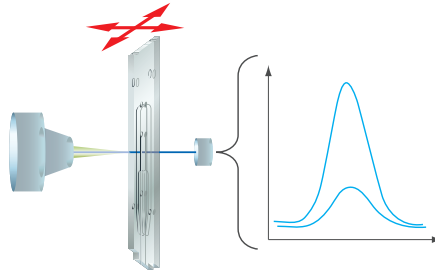
Automatic chip loading

Sorting chip automatically loads when placed into the insertion slot.



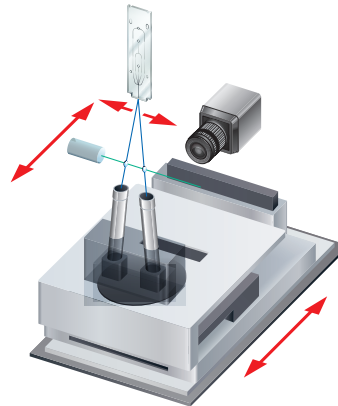
Automatic optical axis adjustment

Sorting chip is optimally aligned to the lasers by measuring the fluorescence signal from the SH800 setup beads (LE-B3001) going through micro flow channels on sorting chip.



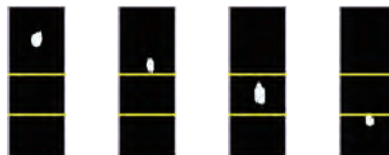
Side stream automatic adjustment

The angle and position of the side streams is automatically calculated, such that sorted cells would be centered in collection tube.



Delay time automatic calculation

The optimum delay time is calculated with real-time analysis of droplet images.

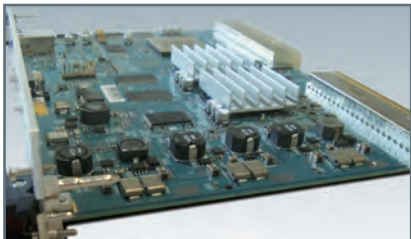


High Performance Sorting

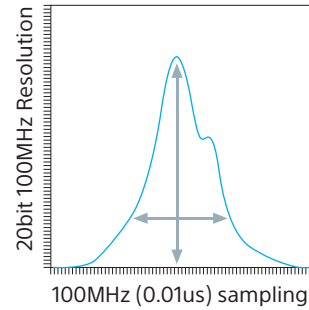
SH800 exploits Sony's consumer electronics technology to enable high-speed signal processing resulting in best sorting performance.



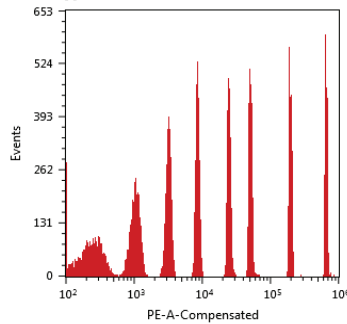
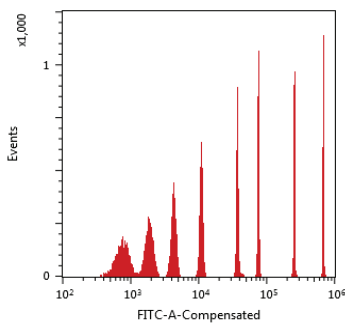
Analog-to-Digital Converter board



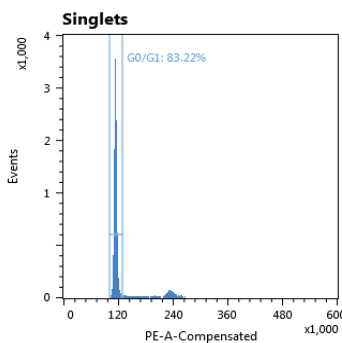
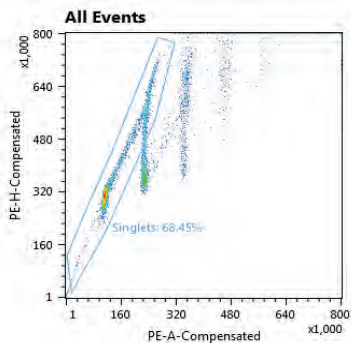
SSE board (Sony Sort Engine board)



Sensitivity and Resolution



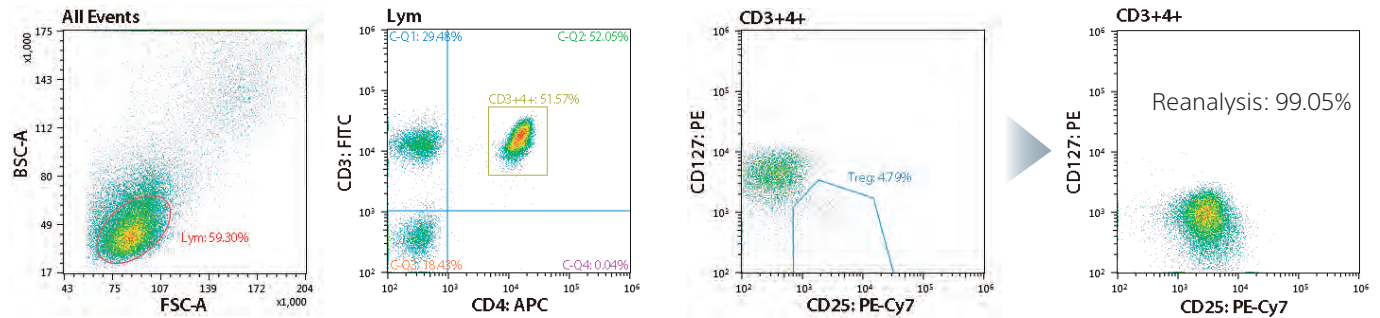
Sensitivity was measured using Spherotech Calibration beads (8 peak). FITC 120 MESF and PE 110 MESF.



Fluorescence resolution was measured using propidium iodide (PI) stained chicken erythrocyte nuclei (CEN). Coefficient of variation of <2.5% was observed for the G0/G1 peak.

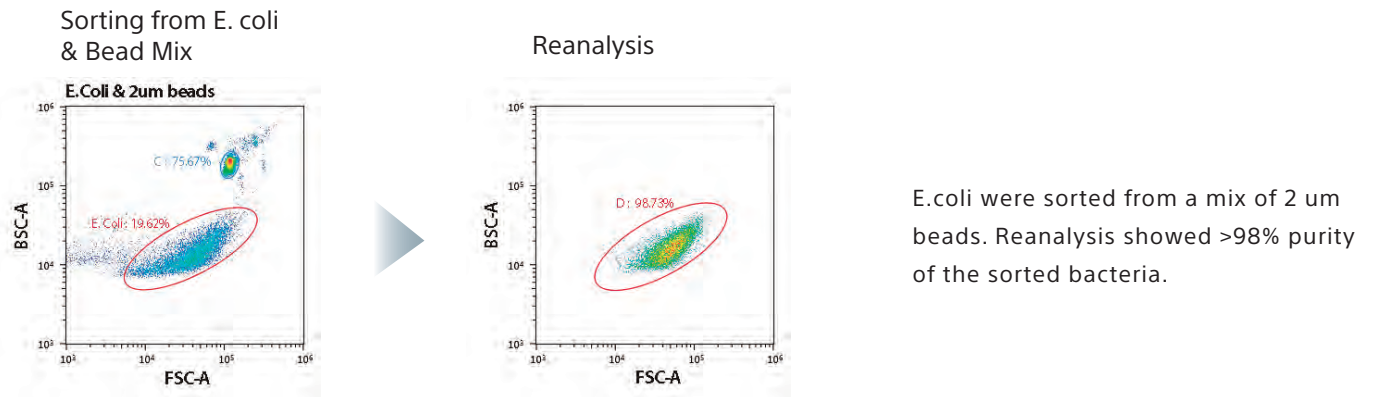
Application Data

T-regulatory cell sorting from PBMC's



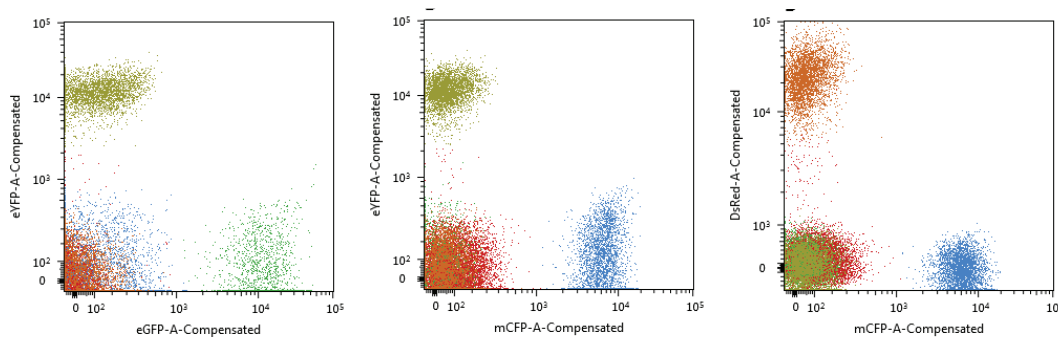
Human peripheral blood mononuclear cells were stained with CD3 FITC, CD4 APC, CD127 PE and CD25 PECy7 CD3+CD4+ cells T regs were sorted. Post sorting purity was 99%.

Small particle sorting (E.Coli)



E.coli were sorted from a mix of 2 um beads. Reanalysis showed >98% purity of the sorted bacteria.

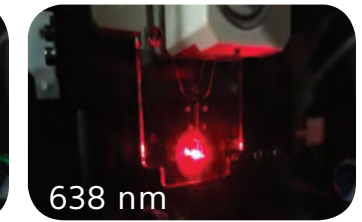
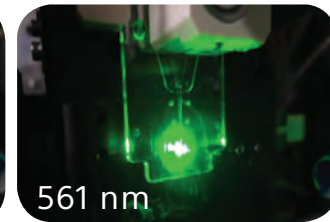
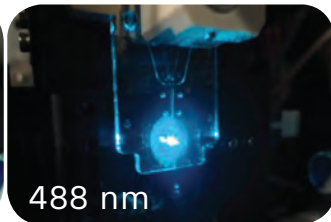
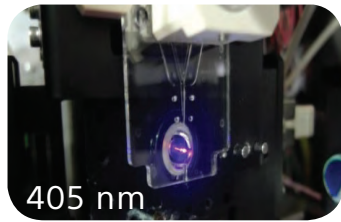
Fluorescent Protein Analysis



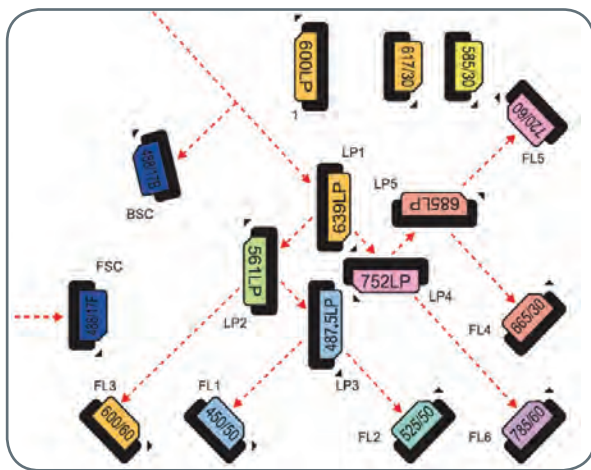
Human cell lines expressing GFP, YFP, CFP and dsRed were analyzed using the fluorescent protein filter set.

Flexibility

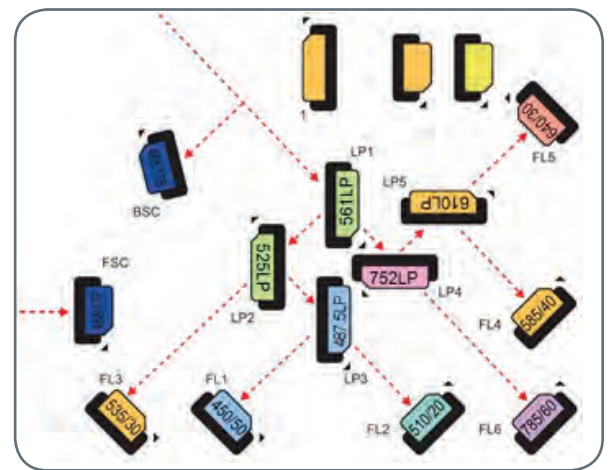
Laser Options



Filter Configurations

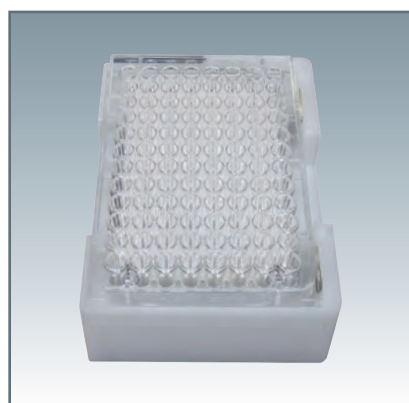
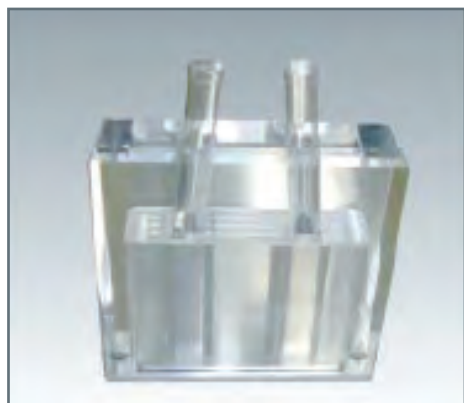


Standard configuration



Fluorescent protein configuration

Sort Collection Devices



Sort Deposition System

The sort deposition system is available as an option with the SH800Z. End-users can sort into PCR tube strips and 96 well plates



SH800Z plate sort deposition system

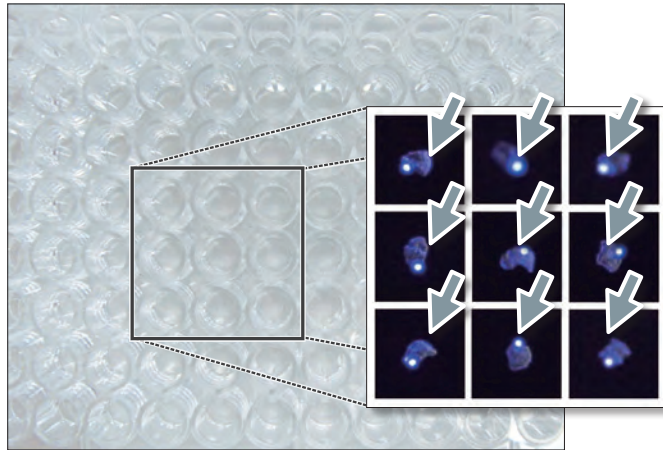
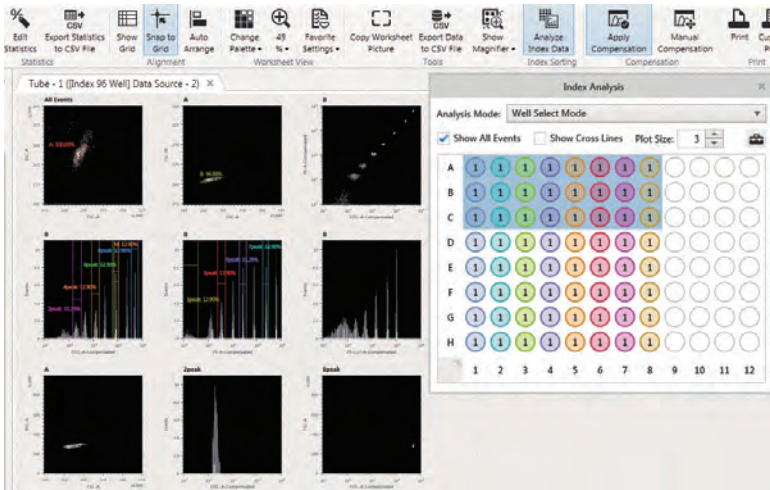


Image of single cells sorted into 96 well plate using SH800Z

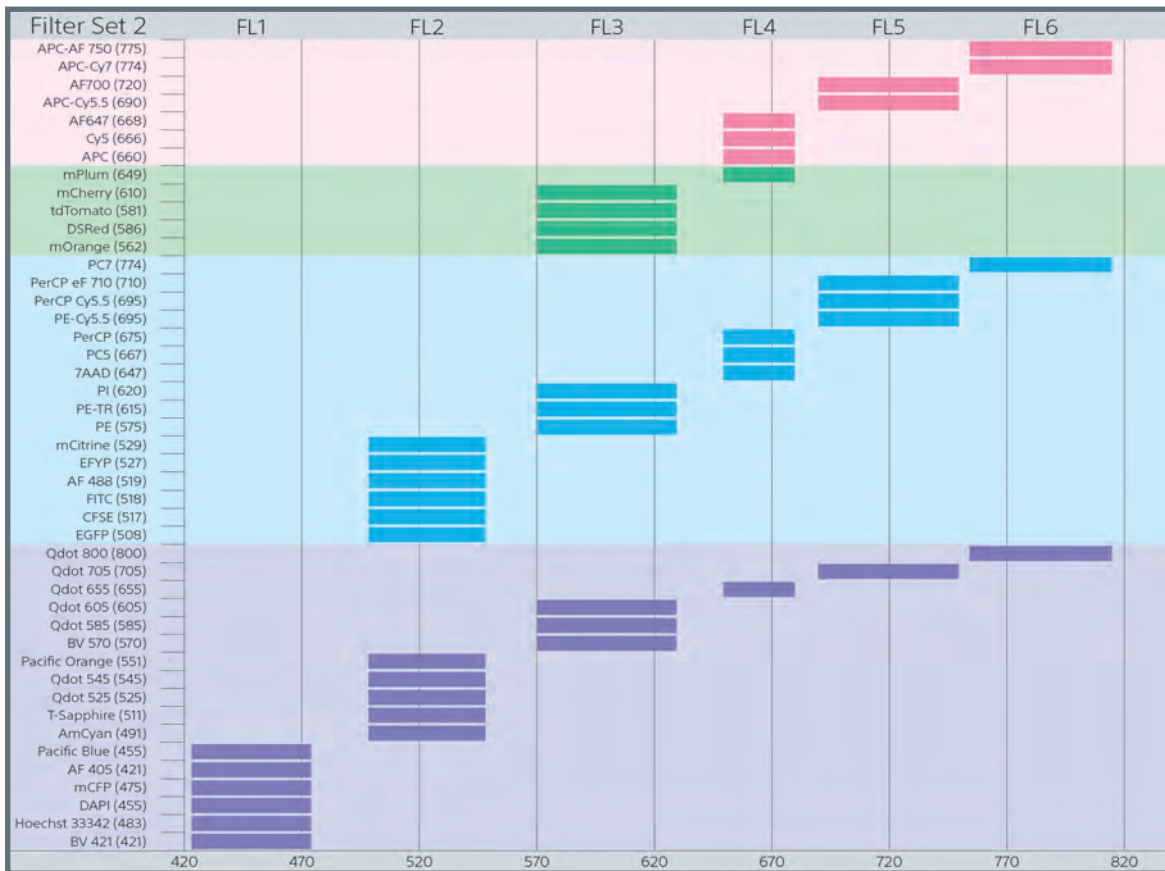
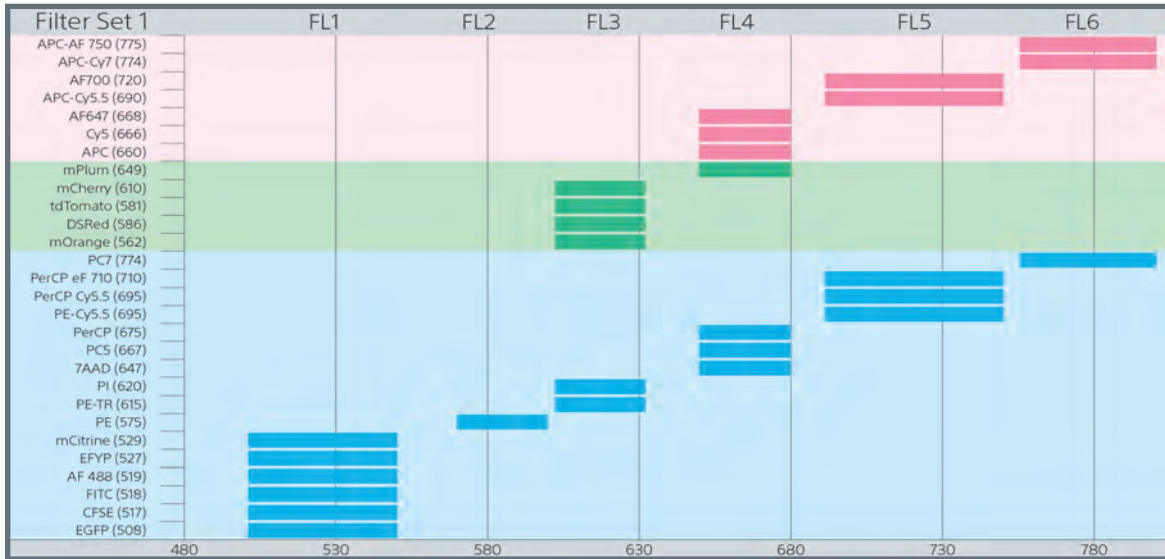
Index Sorting Analysis

The index sorting feature available in SH800 software indexes each sorted event based on the X and Y position of the sorting device. End-users can reference the scatter and fluorescence data of the sorted events as well as determine the location of a sorted event in a multi-well plate.



Index sort analysis using the well select mode on SH800 software

Fluorochrome Chart



Specifications

Optics	Laser Specification	
	Excitation laser sources (depending on the model)	405 nm diode laser 488 nm diode laser 561 nm diode-pumped solid-state laser 638 nm diode laser
	Output power	30 mW (max.) optical fiber output
	Beam alignment	Collinear optical system
	Beam type	9 µm x 50 µm
	Detection Module	
	Number of data channels	1 x forward scatter (FSC), 1 x back scatter (BSC), 6 x fluorescence (FL)
	Analog-to-digital converters (ADC)	8-channel 20-bit, 110MHz
	Pulse measurement	Height, Area, Width
	Fluidics	Sample
Sample loader		Single, auto-loading tube
Sample tubes		0.5ml and 1.5ml micro tube; 5 ml and 15 ml conical tube
Temperature control		5°C, 37°C (Electric Cooling Method)
Agitation unit		Eccentric rotation Magnetic drive 300 rpm speed
Sorting and Collection		
Collection tubes		5.0 ml round tube, 15.0 ml conical tube
Sort Devices		2-way tube, multiwell plates and slide holder
Temperature control		5°C (Electric Cooling Method)
Sorting Chip		
Dimensions (Width x Height x Thickness)		0.9 in (2.5 cm) x 2.9 in (7.5 cm) x 0.08 in (0.2 cm)
Weight		0.02 lb (9.9 g)
Nozzle size	100 µm and 130 µm	
Performance	Event rate	100,000 eps (max.)
	Sorting Speed	10,000 eps (max.)
	Scatter resolution	0.5 µm
	Fluorescence resolution	< 2.5% Half-peak coefficient of variation (HPCV)
	Fluorescence sensitivity	FITC 120 MESF, PE 110 MESF
	Sorting recovery	> 80% of Poisson's expected yield
	Sorting purity	> 98%
Utilities	Dimensions (Width x Depth x Height)	21.7 in (55.0 cm) x 21.7 in (55.0 cm) x 28.4 in (72.0 cm) Fluidics Cart: 30.9 in (78.6 cm) x 20.5 in (52.1 cm) x 22.8 in (58.0 cm)
	Weight	216 lb (98 kg) Fluidics Cart: 71 lb (32 kg) (Dry weight)
	LCD panel	7-inch color liquid crystal 800 x 480 pixels
	Power supply	100 V 50/60 Hz, 120 V 60 Hz
	Power consumption	500 W (max.)
	Operating temperature	17.5 to 27.5°C
	Relative humidity	20 to 80%
	Operating System	Microsoft® Windows® 8 Professional, 64 bit
	Data File Structure	Flow Cytometry Standard (FCS) 3.0 or 3.1
	Safety Standards Compliance	UL, CE, CSA

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