

# LabSmith HVS448 High Voltage Sequencer

## Complete electric field control for microsystem analysis

- ▶ Regulate voltage (up to  $\pm 3.0$  kV) while monitoring current
- ▶ Regulate current (up to  $\pm 100$  mA) while monitoring voltage
- ▶ Sense current or voltage like a precision multimeter



The LabSmith HVS448 High Voltage Sequencer drives eight high voltage channels, with agile programmable sequencing for an entirely new level of electrical manipulation. The HVS448 provides complete experiment control for microfluidics, MEMS, piezo-electronic actuators, and more. With innovative voltage supply/sensing and a groundbreaking sequence programming environment, the HVS448 integrates entire MEMs and microsystem experiments, simply and safely.

### Innovative Voltage Control

The HVS448 includes eight high-voltage channels, each of which can switch in a millisecond between regulating and and/or monitoring high voltage and current. Four digital inputs and four trigger outputs integrate the system with the rest of your lab, allowing real-time coordination, synchronization, and control of other apparatus.

### Unique Sequencing Environment

The key innovation of the HVS448 is its ability to switch its channels rapidly through different modes and settings based on real-time calculations, measurements, or programmed sequences. Sequence™ software provides the flexibility and simplicity for creating sophisticated, adaptable, and fault tolerant controls. Use the included wizards to quickly generate control schemes involving multiple channels (Figure 1), and use the code space to access advanced functionality. Multi-channel pulse trains can be started and switched manually or automatically. LabVIEW™ drivers and a free Software Developers Kit support unlimited software control and integration.

### Complete Experiment Control

From outputs to interlocks, the HVS448 commands every aspect of the experiment, replacing an entire rack of uncoordinated high-voltage supplies, multimeters, cables and controls. With the ability to switch between programs and reconfigure in seconds, the HVS448 is an essential tool for cutting edge research.

### Applications

- ▶ Pulsed-Field Electrophoresis
- ▶ Dielectrophoresis
- ▶ Lysis
- ▶ Electroporation
- ▶ Chip-Based Electric Manipulation
- ▶ Array Assays
- ▶ Multi-Channel Separations

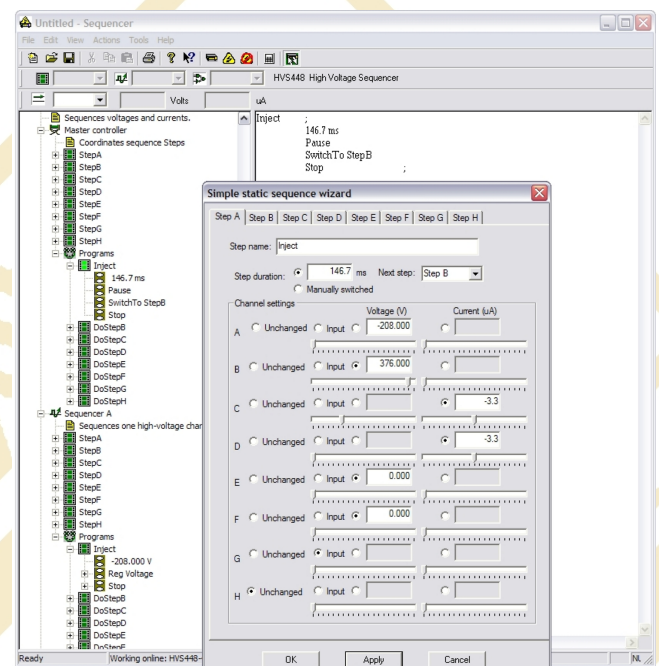


Figure 1. Sequence's intuitive programming interface makes quick work of controlling your microsystem.

# LabSmith HVS448 Specifications



Table 1. LabSmith HVS 448 Specifications

SUPPLY						
Model	Max Output Voltage <sup>1</sup>	Max Voltage Difference	Max Output Current <sup>2</sup>	Max Output Current Per Channel	Current Monitor Resolution	Voltage Monitor Resolution
6000D	±3000 V	6000 V	±3.2 mA	±2.4 mA	0.3 µA	100 mV
3000	±3000 V	3000 V	±6 mA	±4.8 mA	0.3 µA	100 mV
3000D	±1500 V	3000 V	±6 mA	±4.8 mA	0.5 µA	50 mV
1500	±1500 V	1500 V	±12 mA	±10 mA	0.5 µA	50 mV
800	±800 V	800 V	±25 mA	±20 mA	1 µA	25 mV
400	±400 V	400 V	±50 mA	±40 mA	2 µA	12 mV
200	±200 V	200 V	±100 mA	±80 mA	4 µA	6 mV
MONITOR						
Property		Min	Max	Notes		
Monitor time resolution		-	100 µs	-		
Voltage settling time		-	500 µs	Step load change or step voltage change		
Current settling time		-	10 ms	Step load change or step voltage change		
SEQUENCE PROGRAMMING						
Property		Min	Max	Notes		
Number of step programs per sequence		-	8	-		
Total number of instructions		-	2048	-		
Trigger programming		Arbitrary logical comparison of 4 digital inputs and 8 channel outputs. Individual program for each step.				
POWER REQUIREMENTS						
Property	Min	Max	Notes			
Voltage	-	100-250 VAC, 50-60 Hz	External male AC connector with fuse; Internal cooling fan			
Current	1 A	-	Internally fused DC supply			

PHYSICAL		
Dimensions	21 x 24 x 6 cm (8.2 x 9.5 x 2.4") W x L x H	
Enclosure	Black enamel-coated, anti-RFI steel enclosure	
INPUTS AND OUTPUTS		
RS-232 serial cable included; optional USB adaptor sold separately		
115200 baud, 1 stop bit, no parity		
SOFTWARE REQUIREMENTS		
PC-compatible computer		
Sequence™ software for Windows® XP or later, included		
Software Developers' Kit (C, C++) included		
LabVIEW™ drivers included		
VOLTAGE ROUTING OPTIONS		
HVC Cables (8 cables per set)	DIMENSIONS (Figure 2)	
Cable Set	A	B
Standard (A-HVC8-STD)	1.25 m	0.35 m
Long (A-HVC8-LONG)	2.25 m	0.45 m
Micro-Clips (A-MC8-01) connect easily to HVS cables (Figure 3).		
Platinum electrode wire (A-PT-ELECTRODE), 23-gauge (0.58 mm) diameter, 10cm long		

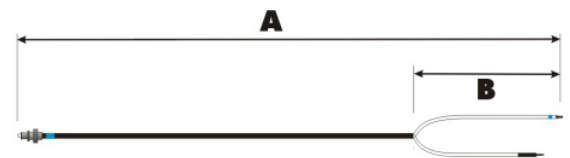


Figure 2. HVC High Voltage Cables.

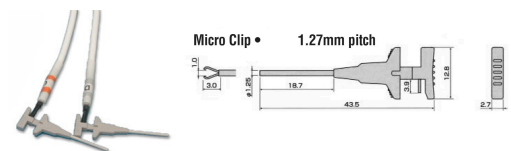


Figure 3. Micro-clip dimensions.

Read about HVS applications and download an example sequence at [www.labsmith.com/applicationnotes.html](http://www.labsmith.com/applicationnotes.html).

<sup>1</sup> Relative to case ground.

<sup>2</sup> Total force or sink current.

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