

# Axon Digidata 1550B *plus* HumSilencer

A high-resolution, low-noise digitizer with up to four single-click 50/60 Hz line-frequency noise elimination channels

## KEY FEATURES

- **Built-in HumSilencer in up to four channels enabled by a single click**
- **Eliminates 50/60 Hz line-frequency noise in less than one second**
- **Learns noise between sweeps for episodic experiments**
- **Supports analysis of very small signals**
- **Eight analog outputs**
- **Includes Axon AxoScope 10.6 Data Acquisition Software for Windows**

The Axon™ Digidata® 1550B Low Noise Data Acquisition System *plus* HumSilencer™ Adaptive Noise Cancellation is the next generation of low noise digitizers from Molecular Devices (patent pending). It offers the same high-resolution, low-noise signal digitization capabilities as the Axon™ Digidata 1550 and 1550A digitizers, with the added benefit of single-click elimination of 50/60 Hz line-frequency noise up to four channels. Intended for precision scientific applications, it is particularly designed for electrophysiology experiments, to send and receive signals from microelectrode amplifiers, and to interact with peripheral instruments such as solution exchangers.

## Built-in HumSilencer

The HumSilencer feature's built-in, software-controlled technology learns and removes local line-frequency noise patterns and associated high-frequency harmonics from incoming signals in less than one second. With a single click, line-frequency noise is subtracted from the incoming signal during data acquisition. The HumSilencer feature provides a fast adaptive rate (within 1 s) for changing noise patterns, digitizes a large range of input signals from -10 to +10 V, and eliminates noise amplitudes at the digitizer's analog input of up to 20 V peak-to-peak. The HumSilencer feature is not a filter and has no effect on acquired signals. The HumSilencer also causes no signal distortion such as frequency change, amplitude attenuation, phase shift, or DC voltage change.

The low digitization noise is maintained in this digitizer. Analog input channel crosstalk is prevented by the use of separate analog-to-digital converters (ADCs) for each of the analog input channels. Additionally, the use of the latest manufacturing processes and precision components contribute to an extremely low-noise 16-bit signal.

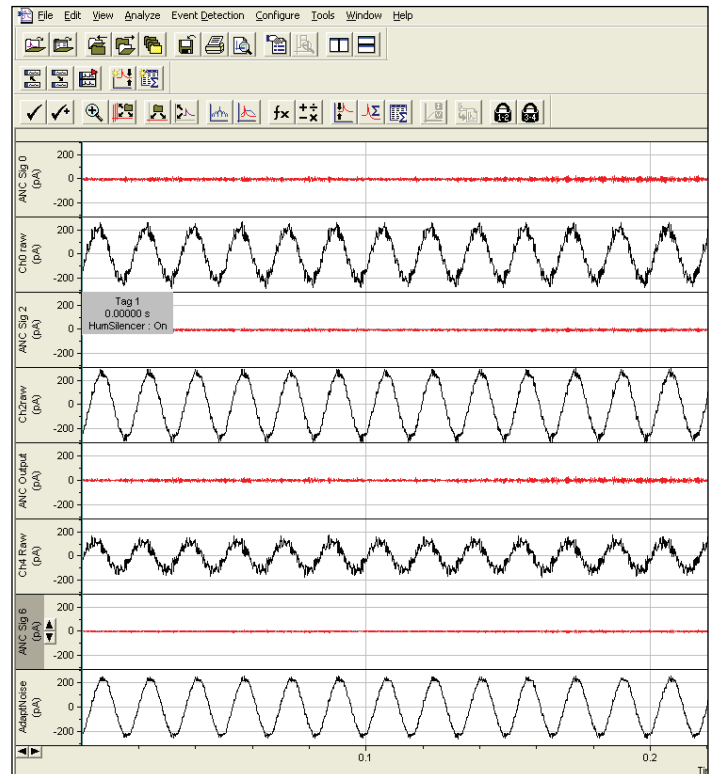
### Superior features

The Digidata 1550B comes equipped with up to four analog HumSilencer inputs, thus allowing stimulation and recording of multiple cells at once without line-frequency noise. All of the eight analog input channels can be simultaneously digitized at the highest sampling rate of 500 kHz for maximum throughput. Multiple triggering options are available via hardware and software.

### Easy setup

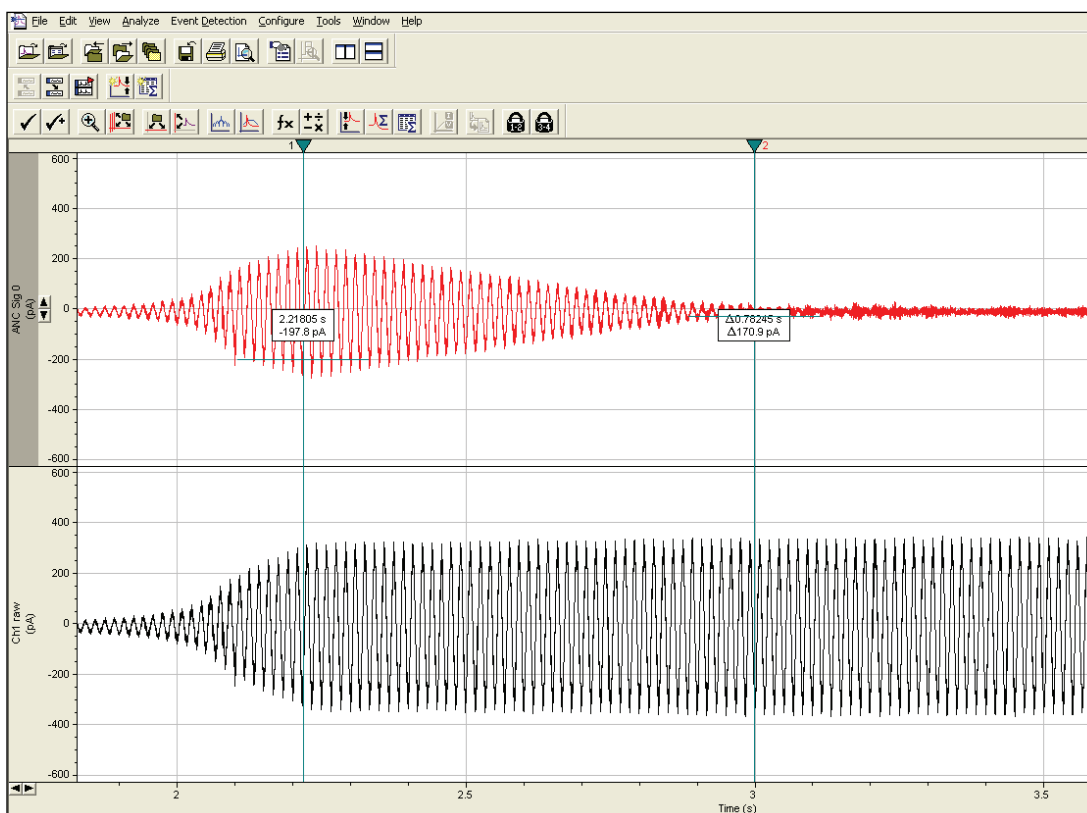
Simply load the software and plug into a USB 2.0 port to connect to desktop or laptop computers. Connect the power cord to the wall socket and then to the rear panel AC power input connector. All signal connections are conveniently accessible on the front panel.

Elimination of line-frequency noise on 4 channels



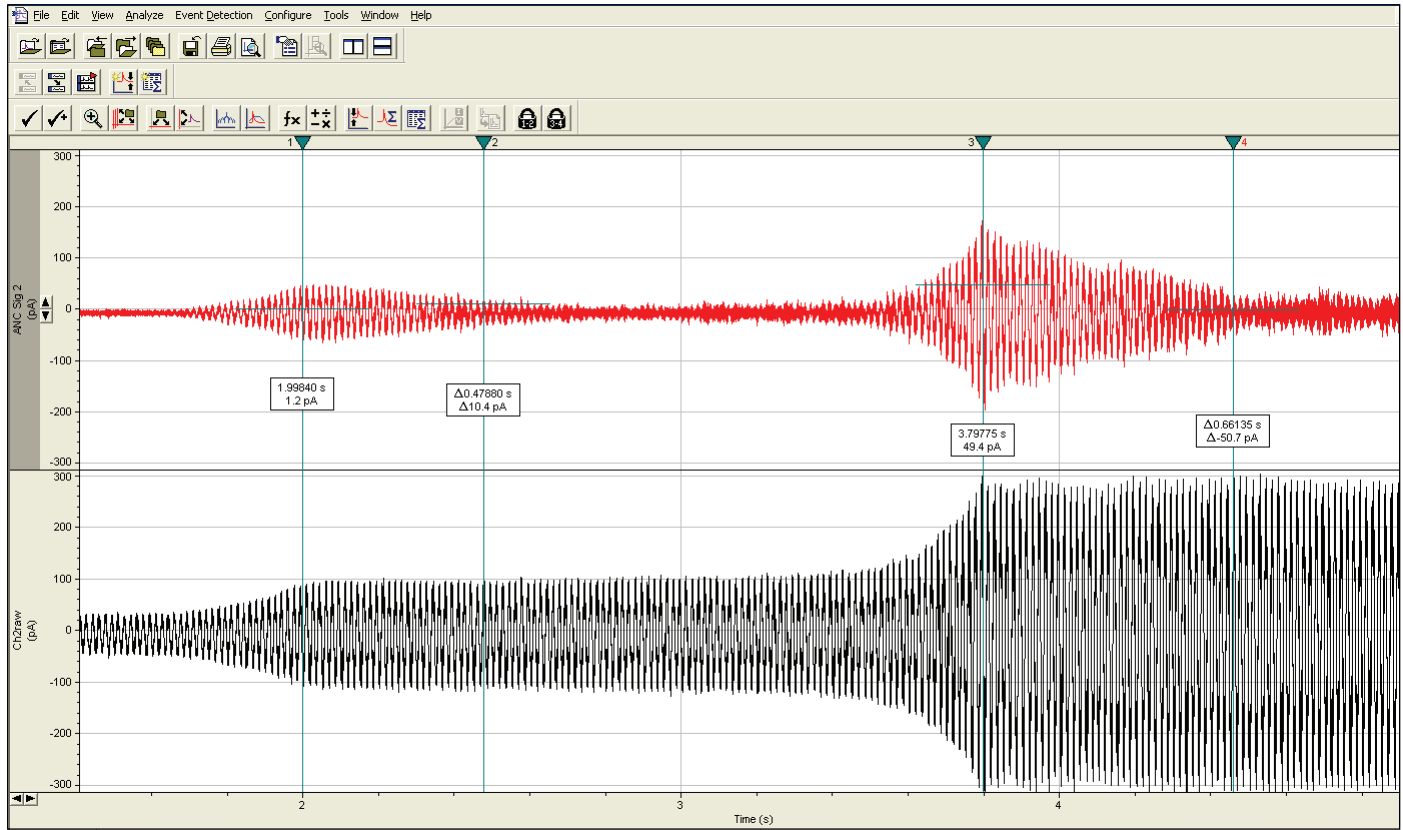
**Figure 1. HumSilencer elimination of 60 Hz line frequency noise on four channels.** Recordings made from four model cells attached to a MultiClamp 700B amplifier with 60 Hz line-frequency noise introduced by a noise generator placed next to the model cell. Signals were digitized by a Digidata 1550B *plus* HumSilencer. **Black traces:** raw data; **red traces:** same data with HumSilencer enabled.

Fast noise learning

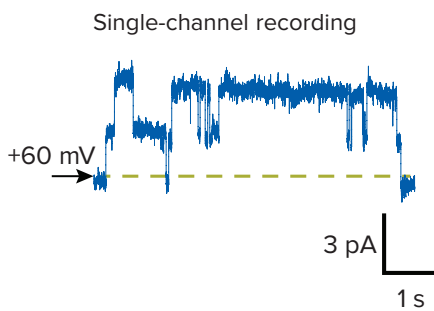


**Figure 2. The HumSilencer quickly learns the noise pattern.** Recordings made from a model cell attached to a MultiClamp 700B amplifier with 60 Hz line-frequency noise introduced by a noise generator placed next to the model cell. Signals were digitized by a Digidata 1550B *plus* HumSilencer. **Bottom trace:** raw data; **top trace:** same data with HumSilencer enabled. Vertical green lines indicate the time it takes HumSilencer to learn and eliminate noise (0.78245 s). Even if HumSilencer is only enabled after noise appears, it quickly learns and eliminates the noise once it's turned on.

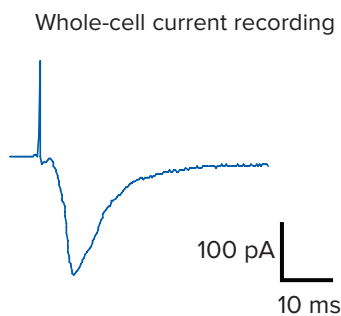
### Fast noise adaptive rate



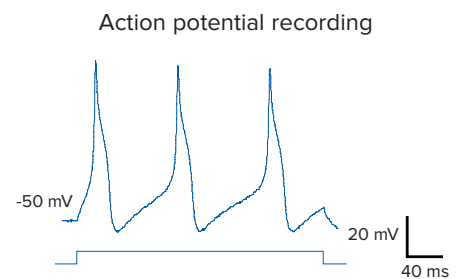
**Figure 3. HumSilencer quickly adapts to changing noise conditions.** Recordings made from a model cell attached to a MultiClamp 700B amplifier with 60 Hz line-frequency noise introduced by a noise generator placed next to the model cell. Signals were digitized by a Digidata 1550B *plus* HumSilencer. **Bottom trace:** raw data; **top trace:** same data with HumSilencer already enabled. At 1.9 and 3.9 s, the amplitudes of the noise increase. In less than one second (time indicated by two vertical green lines, 0.47880 s and 0.66135 s, respectively), HumSilencer learns, adapts, and eliminates the increased noise.



**Figure 4. Single-channel recordings from a membrane patch excised from an HEK293 cell transfected with the  $\alpha$ -subunit of an olfactory cyclic nucleotide-gated channel.** Membrane was clamped at +60 mV in the presence of 2  $\mu$ M cGMP.



**Figure 5. An evoked excitatory postsynaptic current recording from a corticostriatal neuron in a brain slice preparation.** The stimulation electrode was placed in the layer V/VI region of the cortex. Membrane was clamped at -70 mV.



**Figure 6. Action potential recordings from a neuron in an isolated dorsal root ganglia of a rat brain.** Action potentials were evoked by injecting a current step of 110  $\mu$ A. The resting membrane potential was at -50 mV.

## Ordering information

Axon Digidata 1550B Data Acquisition System *plus* HumSilencer

Part Number: Digidata 1550B4 (four HumSilencer channels)

Part Number: Digidata 1550B1 (one HumSilencer channel)

Part Number: Digidata 1550B0 (without HumSilencer)\*

- Axon Digidata 1550B Digitizer *plus* HumSilencer
- Power cord
- USB 2.0 cable
- Axon AxoScope 10.6 Software CD
- User Guide (electronic)
- Quick Start Guide (printed)

\* Digidata 1550B1 digitizer replaces the Digidata 1550A and provides the same functionality and specifications.

## Technical Specifications

### Performance Specifications

Analog outputs	8 channels, 8 DACs, $\pm 10$ V range, 16-bit resolution, 1 Hz–500 kHz sampling rates
Analog inputs	8 channels, 8 ADCs, $\pm 10$ V range, 16-bit resolution, 1 Hz–500 kHz sampling rates
Digital outputs	8 bits, BNC and DB-25F connections
Digital triggers	Start input, tag input, scope output
Telegraphs	4 BNC input channels or via internal Windows messaging for supported software
Analog output impedance	$< 0.5 \Omega$
Analog input resistance	$> 1 \text{ M} \Omega$
Digital output current	$\pm 4$ mA source
Analog crosstalk	$< 1$ mV Avg peak-to-peak
Digitization noise	$< 1$ mV Avg peak-to-peak

### HumSilencer Specifications

Maximum input signal (total of noise + signal)	$\pm 10$ V
Maximum noise amplitude	20 V peak-to-peak (on a 0 V signal)
Noise cancellation	Line-frequency (50 Hz / 60 Hz) and harmonics to 10 kHz
Cancellation response time	$< 1$ second

### General Specifications

Dimensions (in.)	4.3 (H) x 19 (W) x 14.3 (D)
Dimensions (cm)	10.9 (H) x 48.3 (W) x 36.3 (D)
Weight	8.8 lbs. (4.0 kg)
Communications	USB 2.0
Rack use	Standard 19" rack mount (2U) with handles
Power	100–240 Vac 50–60 Hz, 50 watts (max.)
Safety	CE marking (Conformité Européenne)
Computer	PC with 2 GHz CPU (or faster), Windows 7 (32-bit or 64-bit), 2 GB RAM (or more), 1024 x 768 display, CD-ROM drive, 3 high-speed built-in USB 2.0 ports
Software	Axon AxoScope 10.6 Software (included) Axon pCLAMP 10.6 Software (optional)

## Contact Us

Phone: [+1-800-635-5577](tel:+18006355577)

Web: [www.moleculardevices.com](http://www.moleculardevices.com)

Email: [info@moldev.com](mailto:info@moldev.com)

Check our website for a current listing of worldwide distributors.