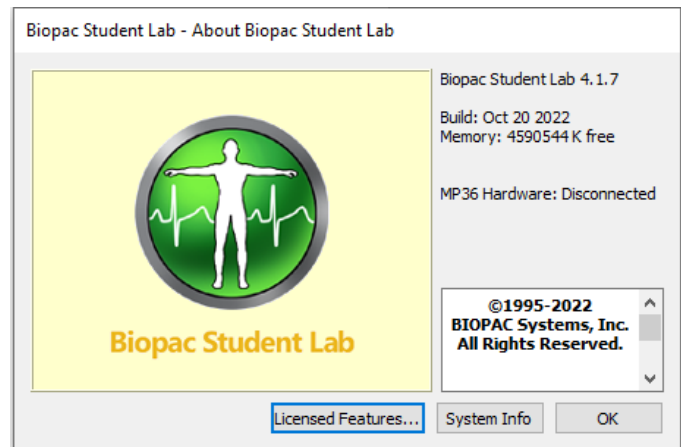


### New in BSL 4.1.7 (build 11.03.2022)

Supported OS: Windows 11 & 10, Mac OS X 10.13-12

Supported Hardware: MP36A/MP36/MP35/MP46/MP41

- Support for MP36A
- 64-bit operation
- Support for saving MP41 (BSL Home) Lesson files to Dropbox
- Updated BSL PRO H40 Lesson files available through the Startup Wizard
- Bug fixes



### New in BSL 4.1.6 (build 02.01.2021)

Supported OS: Windows 10, 8.x, 7, Mac OS X 10.10-10.15

Supported Hardware: MP36/MP35/MP46/MP45/MP41

- Support for MP46 2-channel hardware (replaces MP45)
- Linked Acquisitions officially supported with MP36 hardware
- Measurement presets available for Epoch Analysis
- 3D Visualization
  - Analysis > Find Cycles > output 3D Surface
  - Analysis > Waterfall Plot
- Bug Fixes

### New in BSL 4.1.5 (build 11.10.2020)

Supported OS: Windows 10, 8.x, 7, Mac OS X 10.10-10.15

Supported Hardware: MP36/MP35/MP45/MP41

- Support for upcoming MP46 2-channel hardware (will replace MP45)
- MP41 single-channel hardware support for BSL Lessons
- Chinese Simplified language support for BSL Lessons
- macOS Catalina support (10.15)
- BSL 4.1.4 is superseded by the release of 4.1.5
- Bug Fixes

### New in BSL 4.1.3 (build 02.15.2018)

Supported OS: Windows 10, 8.x, 7, Mac OS X 10.10-10.13

Supported Hardware: MP36/MP35/MP45

- Chinese Traditional language support for BSL Lessons
- Dropbox Version 2 support
- Analysis Shortcuts– allows easy access to specialized analysis options from within a data channel
- Enhanced Lesson Preferences offering easy access to *PRO* menu functionality and other custom features
- Bug Fixes

### New in BSL 4.1.2 (build 01.30.2017)

Supported OS: Windows 10, 8.x, 7, Mac OS X 10.10-10.12

Supported Hardware: MP36/MP35/MP45

- macOS Sierra support
- Arbitrary Wave Output Control
- Lesson videos can now be played back without Flashplayer
- Updated Lessons and *PRO* Lessons
- Bug Fixes

#### **New in BSL 4.1.1 (build 10.14.2015)**

Supported OS: Windows 10, 8.x, 7, Mac OS X 10.10-10.11

Supported Hardware: MP36/MP35/MP45

- Japanese language support
- Collapsible channels – quickly hide and unhide single or multiple channels with one click.
- Updated Lesson Procedures 9, 12, 13, 14, 15, 16, and 17 (Lessons 9 and 14 add support for the new BIOPAC SS57LA EDA Lead, Lessons 12, 13, and 15 add support for the new BIOPAC SS11LB Airflow Transducer, Lesson 16 has a revised calibration procedure and L17 has updated stethoscope placement instructions)
- Bug fixes

#### **New in BSL 4.1 (build 02.12.2015)**

Supported OS: Windows 8.x, 7, Mac OS X 10.7-10.9.x

Supported Hardware: MP36/MP35/MP45

- FIR Filter Calculation Channel – apply high quality FIR filters in real time
- Slew Rate Limiter – precise real-time or offline tool for denoising and removing motion artifact
- Event-based Rate Measurements – extract the mean, median and standard deviation of online and offline Rate outputs
- Support for four new transducers – (OUT4 Visual Stimulator Controllable LED, SS57LA for EDA, SS25LB Hand Dynamometer, STIMHUM Human-safe Stimulator)
- Elapsed timers – stopwatch, elapsed timers and alarm to time experiment protocols
- Embedded PDF Integration – embed PDFs of procedures, analysis, etc. into graph files and journals
- Dropbox Integration – copy and store data files to Dropbox account directly from BSL application
- Simplified User Interface and UI updates
- Append event boundaries now appear in graph for easier viewing
- New Analysis menu features – Locate Animal ECG Complex Boundaries, Correlation Coefficient, Ensemble Average, Epoch Analysis, define Focus Areas between events or appended segments, and Waterfall Plot
- Curriculum Manager – Instructors may customize analysis procedures, data reports, lesson introduction, recording procedure and onscreen instructions and broadcast the customized content to all student workstations (Licensed Functionality)
- Preset transducer detection – presets automatically check to see if correct transducer is connected
- Simplified calibration for selected presets
- New sample data files
- New Lesson 11A for measuring visual stimulus reaction time
- Updated PRO Lessons with PRO Lesson PDFs now embedded in graph template file
- Bug fixes

#### **New in BSL 4.0.3 (build 07.31.2014)**

Supported OS: Windows 8.x, 7 & Vista, Mac OS X 10.6-10.9.x

Supported Hardware: MP36/MP35/MP45

- Spanish language support

- Updated lesson procedure and intro PDFs
- Bug fixes

#### **New in BSL 4.0.2 (build 01.07.2014)**

Supported OS: Windows 8, 7 & Vista, Mac OS X 10.6-10.8

Supported Hardware: MP36/MP35/MP45

- French language support
- Lessons 16 and 17 now include a headphone output option for monitoring stethoscope sounds through OUT1/OUT1A/40HP headphones via the MP Analog Output or headphone jack
- Bug fixes

#### **New in BSL 4.0.1 (build 06.26.2013)**

Supported OS: Windows 8, 7 & Vista, Mac OS X 10.6-10.8

Supported Hardware: MP36/MP35/MP45

- Consolidated hardware support
- Single executable launches application for all supported hardware types
- Rate detector algorithm improvements
- Rate “signal type” presets
- Adjustable baseline window width
- Adjustable averaging output modes
- Customizable Rate “signal type” presets
- Textual values display and toolbar
- Tabbed graph interface (shows multiple graphs in single window)
- Focus areas for indicating areas of data to be analyzed by the Cycle Detector
- Selection palette toolbar button
- Show most recent data only in XY mode
- Configurable measurement columns
- Linked media files can be imported from BSL 3.x files (Windows only)
- Screencast radio button in Startup Wizard and Help menu
- Journal hyperlinks
- Journal page setup toolbar button
- Application preference to show/hide individual lessons or PRO lessons
- Horizontal split view – allows viewing of two independent horizontal axis areas in same graph
- Updated standard and PRO Lessons/Procedures
- Updates to Journal Data Reports
- Lesson visibility preferences – show, hide or position
- Bug fixes

#### **New in BSL 4.0 (released 04.04.2012)**

Supported OS: Windows 7 & Vista, Mac OS X 10.5-10.7

Supported Hardware: MP36/35/45 (MP30 no longer supported)

##### **Journal enhancements**

- HTML Lesson Journals with example photos and embedded videos
- Editable Lesson Journal Data Reports
- Annotation tool in Lesson Analysis mode

[www.biopac.com](http://www.biopac.com)

- Expressions in Journal
- Tables and Excel® functions
- Docked and independent Journal windows

##### **Lesson enhancements**

- New text and figures for all lessons
- Updated lesson procedures with Introductions included in Help menu
- Additional measurements in Analysis mode

### **Output Control enhancements**

- Pulse Sequence Output Control
- Sound Sequence Output Control
- Sound Feedback

### **Event enhancements**

- Event Palette
- Event Tool for inserting events on waveforms
- New Event types
- Zap tool for removing events on waveforms
- Global Event label printing
- Customizable Event markers
- Customizable append segment labels
- Sequential Event labels
- Sorted Event summary
- Mark selection from Events

### **Measurement enhancements**

- Single point measurements
- X/Y measurement label display
- Revised invalid measurement display

### **User Interface Tools**

- Most Recently Used options
- Analog Channel scaling units adapt to gain
- Simplified Hardware Filtering options
- Variable rate sampling support
- Startup Wizard for launching application
- Check for MP hardware function
- Email graph image as attachment
- Media playback —automatic segment advancement
- Preset menu separators
- Keyboard data selection enhancement
- Enable tools during acquisition (Preference)

### **Multichannel Event Marking System**

Event marking system is now combined with Cycle/Peak Detector, allowing automated measurements around specific events and additional event marking based on measurements taken. For example, mark when a dose or task occurs and automatically measure and mark the maximum response.

### **Cycle (Peak) Detector interface**

Advanced Cycle/Peak Detector combines with powerful new Event Marking System. Perform amplitude, time, or event-based measurements. New output options for measurements, averaging, events, and 3D surface (cycle data, histogram, FFT, and DWT).

- Cursor tools sub-menu
- Mouse scroll-wheel zoom support
- Custom toolbars for transformations and analysis
- Toolbar position retention and changes
- Data Views
- Typed event label drawing improvements
- Button Transparency
- Vertical axis scaling buttons
- Long channel labels and units
- Customizable Chart Track Dividers
- Graph window tooltip improvements
- Menu item tooltips

### **Analysis Packages**

- Power Spectral Density
- Detect and Classify Heartbeats
- Locate ECG Complex Boundaries
- Heart Rate Variability
- Histogram
- FFT
- Find Cycle

### **Graph file display enhancements**

- Select channel background
- Select line plot thickness
- Data Playback enhancements
- Start/End axis adjustment
- X/Y display crosshairs enhancement
- Customize default graph window position and size
- Default analog channel unit display preference

### **Grid enhancements**

- Channel independent grid settings
- Grid presets

### **Calculation Channel enhancements**

- Adaptive Filter
- Comb Band Stop Filter
- Metachannels

## **Transformations**

- Most recently used files, transformation and analysis
- Adaptive template matching transformation
- Normalized Cross-correlation Template Transformation
- Remove projection template
- Delay transformation
- Cubic spline resampling options
- Spectrum analyzer/real-time FFT

## **Calculation Channels**

- Calculation metachannels—daisy-chain calculations, such as Filter and Difference, on one channel
- Dynamic digital filter options

## **Measurements**

- Expression enhancements—online and post-acquisition
- Interpolated measurements
- New measurement options to optimize event marking system

## **User Interface – Display and control of data**

- Text annotations—add zest to publication screen shots or annotate the file beyond marker notes
- Print functions—adjust data range for printing; print waveform data in black; print file to PDF
- Adaptive scaling—vertical scale updates in real time to optimize data display
- Grids—Friendly grid scaling; Flexible grid options Grid Tool
- Balloon Help
- Multiple levels of Undo
- Jump tool
- Rescale operations
- Selection palette—place cursors at specific time points
- Mouse scrollwheel support
- Keyboard Shortcuts added (accelerator keys)
- Cursor Tools Contextual Menu
- Replay data

## **Data processing**

- Large file support
- Batch acquisitions
- Multithreaded operation

## **File Formats**

- Excel Export (for reports with tabular data)
- Save Selection As moved to File menu and added Wav, EDF, JPEG; removed Metafile (\*.WMF)
- Open Mac Biopac Student Lab 3 Graph
- BSL file import
- EDF file import and export
- Igor Pro Experiment import/export
- WAV file format import/export