

BrainVision Analyzer Solutions | Overview

(Click on Solution name for more)

- ✓

BESA Generic Reader: Generates Analyzer compatible header files for files in BESA's Generic File Format and updates the current Analyzer workspace to automatically show the new files.
- ✓

Read Coordinates: Imports Cartesian, polar or spherical electrode coordinates from an external text file.
- ✓

Read EETrak Positions: Reads in electrode positions measured with the EETrak electrode tracking system based on Polhemus FastTrak technology.
- ✓

Read Zebris Positions: Reads in text files with polar electrode coordinates in the format generated by Zebris CMS20 systems.
- ✓

BESA AVR Export: Exports the current dataset and its electrode positions for use with BESA.
- ✓

Create MAT File: Exports the current dataset to a Matlab compatible MAT file including Markers, Axes and Properties. Requires Matlab to be installed on the same computer.
- ✓

FFT Band Export: Exports data from a selected frequency band to an external file. Supports segmented data.
- ✓

Heart Rate Export: Exports average heart rate within segments to an external file.
- ✓

IBI Export: Exports the interbeat intervals (IBI) calculated from "R" markers in the current dataset to an external ASCII file.
- ✓

Ledalab Export: Exports EDA data into a Ledalab compatible text file.
- ✓

Peak Export: Exports multiple peak measures including peak to peak, area measures and mean amplitudes from a selected time range. Supports segmented data.
- ✓

Wavelet Data Export: Exports the cumulative sum or average of real or complex valued wavelet data within a given time-frequency range. Supports segmented data.
- ✓

MinMax Markers: Finds the minimum, maximum, first or second derivative in all segments and inserts corresponding markers.
- ✓

Read Markers: Reads markers from an external file in BESA EVT format or in Analyzer's VMRK or EXPORT file formats. Markers can be replaced, and duplicated makers can be removed.
- ✓

Recode Markers: Flexibly recode markers to new categories such as a median split, mean split, upper/lower percent, middle percent and custom category splits.
- ✓

Set Markers: Sets new markers into the dataset at a specified or jittered distance to a selected reference marker.
- ✓

Write Markers: Writes marker information to an external file with multiple formatting and output options.
- ✓

Heart Rate Channel: Calculates heart rate from existing "R" markers in the dataset and creates a new channel containing heart rate in BPM.
- ✓

EKG Markers: Finds and marks all EKG components and waves/peaks. Works with all common EKG derivations and independent of signal polarity.
- ✓

EMG Onset Search: Determines the foot point, onset point and the peak point of stimulus evoked EMG responses.
- ✓

Moving Average: Calculates various moving averages across time points, frequencies or across segments. Allows preprocessing of data e.g. for EMG integration directly inside the Solution.
- ✓

Percent Change: Calculates relative activation indices such as for ERD/ERS analysis or baseline normalizations.
- ✓

Merge Channels: Merges channels across History Nodes from one or multiple History Files.
- ✓

Rename Nodes: Finds nodes of a given name and renames them to a new name. Can add numerical suffices to nodes of the same name. Option to work on current dataset only or on whole workspace.
- ✓

Sleep Scoring: Interface for assigning, editing and inspecting sleep scores and generating a standard sleep report and hypnogram.
- ✓

Navigate Data: Interactively navigate in the current dataset. Allows for zooming in/out of the data and for automatic movement in the data.
- ✓

Show Data Values: Shows the amplitude and position information for two channels. Allows for flexible movement in the data for data exploration.
- ✓

Marker Timing: Creates a new dataset showing the temporal distance between any two subsequent markers of a given type and description as a (virtual) amplitude.
- ✓

Stacked Plot: Rearranges the data of a segmented time- or frequency domain dataset into a stacked display with time/segments or segments/ frequency on the x-/y-axis.

Import
Export / Matlab
Markers
EKG/EMG
Transforms
Utilities
Navigation
Views

BESA Generic Reader

Version: 1.3

File name: AnalyzerSolution-BESA_Generic_Reader.exe



This Solution searches the current workspace's raw files folder for data files with an extension ending in *.MUL, *.GEN or *.GENERIC indicating data files exported as multiplexed ASCII data or in simple binary (generic) format by BESA.

For each of these files, a new BrainVision header file (VHDR) is written which specifies the parameters found in the data file header. Also, if an event file with the same base name and with the extension *.EVT is found, a BrainVision marker file (VMRK) is written.

Read Coordinates

Version: 1.4

File name: AnalyzerSolution-Read_Coordinates.exe



This Solution reads Cartesian, polar or spherical electrode coordinates from an external text file and updates the corresponding spherical electrode coordinates in the currently active dataset.

Read EETrak Positions

Version: 1.2

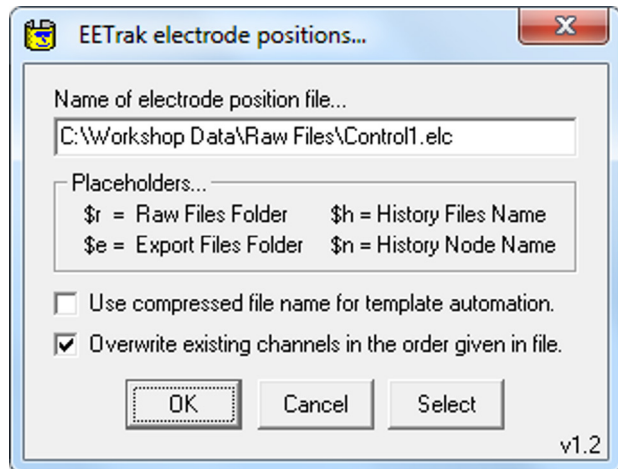
File name: AnalyzerSolution-Read_EETrak_Positions.exe



This Solution collects cartesian electrode position information from an external file in EETrak "ELC" format, generated by the EETrak software which is used to acquire data from a Pholemus FastTrak electrode tracking system.

The positions are converted to spherical coordinates and written to the currently active dataset.

If an EETrak file with the same file name as the current History File exists in the Raw Data folder, it is preselected in the Solutions dialog.



Read Zebris Positions

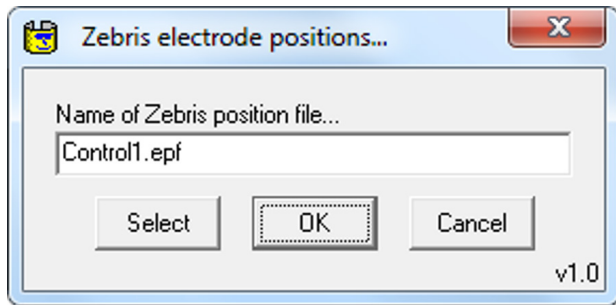
Version: 1.0

File name: AnalyzerSolution-Read_Zebris_Positions.exe



This Solution collects polar electrode position information from an external file in Zebris EPF format. The data is read in, matched to existing channels and written to the currently active dataset.

If a file with the same file name as the current History File and ".epf" extension exists in the Raw Data folder, it is preselected in the Solutions dialog.



BESA AVR Export

Version: 1.1

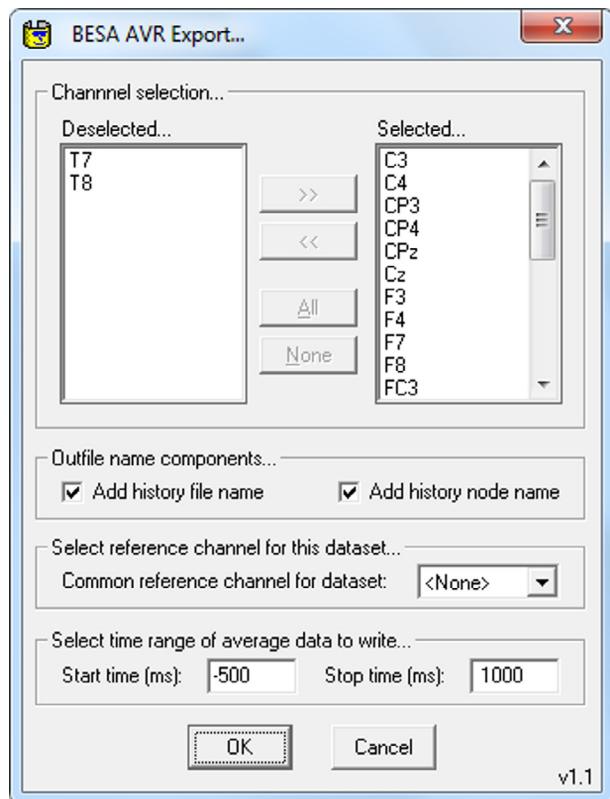
File name: AnalyzerSolution-BESA_AVR_Export.exe



This Solution exports average data and electrode positions to external files for use with BESA.

The average data is written in BESA AVR file format and the electrode positions are written in BESA ELP format.

The user can choose the electrodes to export and the reference electrode to use and can also limit the data export to a certain time stretch, all from a graphical menu.



Create MAT File

Version: 1.3

File name: AnalyzerSolution-Create_MAT_File.exe



This Solution creates a MATLAB® compatible MAT file from the data of the currently active history node. The name of the file is built from the currently active history file's name and the currently active history node's name. The file is written to the current workspace's export files folder.

This MAT file can then be read into MATLAB® to work with the data at the full speed and power of MATLAB®, without having to send the data repeatedly through a direct program connection.

There also is a reader for EEGLAB for this specific MAT file format, kindly written by Arnaud Delorme. This makes it possible to use the full power of Analyzer for all of the data preprocessing and then to very quickly send the data to EEGLAB for further analyses.

FFT Band Export

Version: 1.4

File name: AnalyzerSolution-FFT_Band_Export.exe



This Solution requests the input of a frequency range plus a number of parameters relating to the output format and/or the calculation of data to be written to a file.

The data can be output either as raw data values, as the sum of a frequency range, as the mean per spectral line for the given frequency range or as the mean per 1 Hz bin for the given frequency range.

FFT Band Export...

Export parameters...

Start frequency: 7.5 Stop frequency: 13.5

☒ Number of decimal characters to export 3

Export data type...

- ☐ Export area as band value sum ($\mu V \cdot Hz$).
- ☐ Export mean activity per spectral line.
- ☒ Export area as raw sum of band values.
- ☐ Export mean activity per one Hertz bin.
- ☐ Export individual frequency band values.

☒ Write output data in multiplexed fashion.

☐ Interpolate spectral lines at FFT band borders.

☐ Use decimal period instead of local decimal char.

Suffix to add to output file name: 75to135

OK Cancel

v1.4

Heart Rate Export

Version: 1.2

File name: AnalyzerSolution-Heart_Rate_Export.exe



This Solution exports average heart rate from all or a number of segments to an external text file. The heart rate is calculated based on markers indicating the R wave. The markers must have a Marker Description of „R“ and a Marker Type that is either „Peak“ or „Pulse Artifact“.

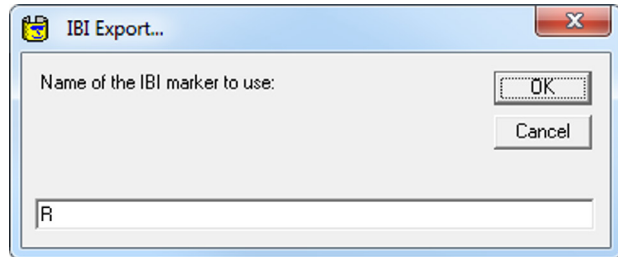
IBI Export

Version: 1.0

File name: AnalyzerSolution-IBI_Export.exe



This Solution exports the inter beat interval (IBI) calculated from "R" markers in the current dataset to an ASCII file. The export is compatible to any program that accepts simple text files with one inter beat interval per line (such as Kubios HRV standard).



Ledalab Export

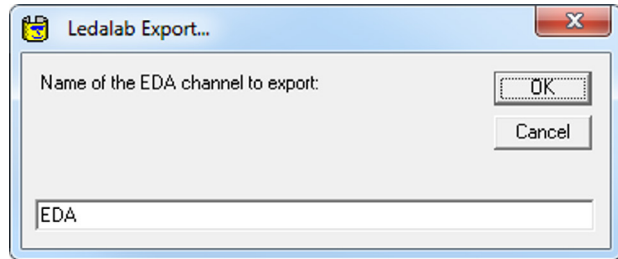
Version: 1.1

File name: AnalyzerSolution-Ledalab_Export.exe



This Solution exports EDA data contained in the currently active history node to a text file.

The export consists of either two or three columns containing information on the time, EDA value and - if relevant - any marker.



Peak Export

Version: 1.5

File name: AnalyzerSolution-Peak_Export.exe



This Solution exports peak or time-average information from multiple or single segments. It requests the selection of individual peaks or peak set combinations and writes Peak or Peak to Peak latencies, area under the Peak, area under curve or time-average voltages to an external file. Up to eight peak sets and area measures can be calculated and exported simultaneously.

Peak Export

Peak Information

Peak action	Peak 1	Peak 2	Start time	Stop time	Area Mode	Baseline	Normalization	Channel(s)
Peak	N1	None	0.0	0.0	None	None	None	All
Peak	P3	None	0.0	0.0	None	None	None	All
PeakArea	P3	None	-20.0	20.0	Absolute	None	$\mu V \cdot ms$	All
TimeArea	None	None	452.0	752.0	Signed	None	Mean	All
None	None	None	0.0	0.0	None	None	None	All
None	None	None	0.0	0.0	None	None	None	All
None	None	None	0.0	0.0	None	None	None	All
None	None	None	0.0	0.0	None	None	None	All

File Name and Export Options

\$e = Export Files Folder \$r = Raw Files Folder \$h = History File Name \$h = History Node Name \$d = Current Date \$t = Current Time

Output file code: Append output file: ☒

Output file name: Confirm overwrite: ☐

Output individual peak latencies: ☐ Write comma decimal points: ☐ Number of decimals places: Verbose labeling: ☒

OK Cancel

v1.5

Wavelet Data Export

Version: 1.4

File name: AnalyzerSolution-Wavelet_Data_Export.exe



This Solution exports the cumulative sum or average of real or complex valued wavelet data within a given time-frequency range.

The Solution can only be applied to continuous Morlet wavelets created using the Wavelets transformation or nodes containing time-frequency data. Wavelet layers must be log-spaced, linear spacing is not supported.

If the Wavelet node contains complex values two different Sum Modes are available. The magnitude of the time-frequency data can either be exported as the "Real Value Sum" (sum of all positive vector lengths) or as the magnitude of the "Complex Value Sum" (complex sum of the complex values).

The screenshot shows the 'Wavelet Data Export' dialog box with the following settings:

- Export Layer Range:** A table with 3 columns: Layer, Frequency, and Bandwidth. The first row shows Layer 22, Frequency 8.44, and Bandwidth 3.38 Hz. The second row shows Layer 26, Frequency 12.67, and Bandwidth 5.07 Hz.
- Export Time Range:** Start Time: 100 ms, Stop Time: 200 ms.
- Mode Selection and Normalization:** Sum Mode: Value Sum (dropdown), Point Mean Normalization: checked.
- Export Channel Selection:** Available Channels: (empty list), Selected Channels: A1, A2, C3, C4, CP3, CP4, CPz, Cz, ECG, F3.
- Export File Name:** File Name: WaveletDataExport_20201015.txt. Append Export File: checked, Export to CSV: unchecked, Decimal symbol: comma (,): unchecked.

Buttons: OK, Cancel. Version: v1.4

MinMax Markers

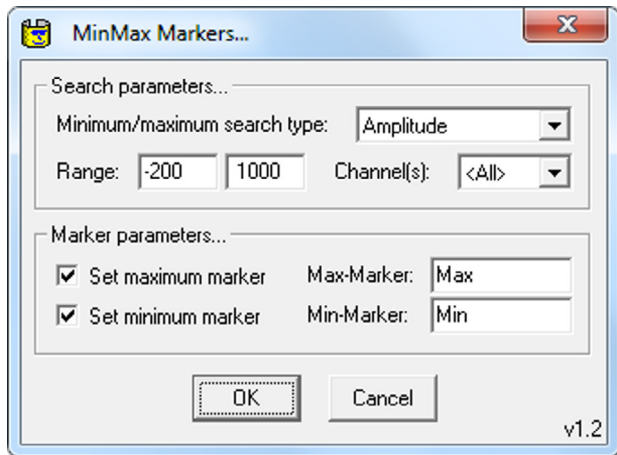
Version: 1.2

File name: AnalyzerSolution-MinMax_Markers.exe



This Solution searches for the minimum and/or maximum amplitude, first or second derivative within a given search window and for a given marker name. It searches for the requested minimum and/or maximum amplitude within all channels and segments.

The corresponding minimum and/or maximum amplitude or derivative value is found and marked in a new dataset.



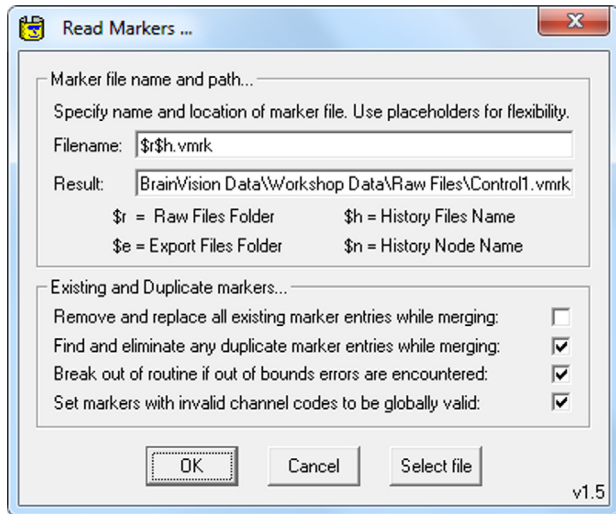
Read Markers

Version: 1.5

File name: AnalyzerSolution-Read_Markers.exe



This Solution reads a marker file in BrainVision Analyzer compatible marker formats or in BESA EVT format and inserts the markers into the currently active dataset. It allows to check and omit duplicate markers and to remove existing markers. The Solution supports template processing by accepting the use of placeholders in the input filename.



Recode Markers

Version: 1.2

File name: AnalyzerSolution-Recode_Markers.exe



This Solution recodes reaction time markers based on their position within a chosen reaction time distribution. Available distributions include median and mean splits, standard deviation-based categories, upper and lower percentages, deciles, quartiles and user defined criteria.

Reaction time is calculated from temporal distance between user-defined reaction time markers and reference markers. For each segment a new marker is placed at the Time 0 position indicating the reaction time group.

The screenshot shows a 'Marker Recode...' dialog box with two main sections: 'Reaction time marker parameters...' and 'User defined reaction time recode parameters...'. The first section includes a checked box for 'Use all data segments for recoding' with a range of 1 to 200, a 'Reaction time marker' dropdown set to 'Response' and a text field 'R 1', a 'Reference marker' dropdown set to 'Time 0', a 'Marker recode mode' dropdown set to 'Median split' with a unit of 'msec.', a 'Set recoded marker at following position' dropdown set to 'Time zero', and a field for 'Markers allowed between reaction and reference marker' set to 0. The second section is a table for user-defined parameters with columns for Low, High, Mode, and New marker name, containing five rows of input fields. At the bottom are 'OK' and 'Cancel' buttons, and the version 'v1.2' is in the bottom right corner.

	Low	High	Mode	New marker name
1:	<input type="text"/>	to <input type="text"/>	<input type="text" value="msec."/>	<input type="text"/>
2:	<input type="text"/>	to <input type="text"/>	<input type="text" value="msec."/>	<input type="text"/>
3:	<input type="text"/>	to <input type="text"/>	<input type="text" value="msec."/>	<input type="text"/>
4:	<input type="text"/>	to <input type="text"/>	<input type="text" value="msec."/>	<input type="text"/>
5:	<input type="text"/>	to <input type="text"/>	<input type="text" value="msec."/>	<input type="text"/>

Set Markers

Version: 1.1

File name: AnalyzerSolution-Set_Markers.exe



This Solution makes it possible to set new markers relative to existing markers in the currently active dataset.

New markers can be placed at a constant or randomly jittered distance to the selected reference markers.

The screenshot shows a Windows-style dialog box titled "Set Markers...". It is divided into two main sections: "Reference marker parameters..." and "Target marker parameters...".

Reference marker parameters...

- Reference type: Stimulus (selected in a dropdown menu)
- Reference name: S 11 (selected in a dropdown menu)

Target marker parameters...

- Marker type: Response (text input)
- Marker name: R 1 (text input)
- Marker position: 500 ms (text input)
- Marker visible: ☒ (checkbox)
- Marker length: 4 ms (text input)
- Marker global: ☐ (checkbox)
- Randomize marker position: ☒ +/- 300 ms (checkbox and text input)

At the bottom, there are "OK" and "Cancel" buttons. The version "v1.1" is displayed in the bottom right corner.

Write Markers

Version: 1.8

File name: AnalyzerSolution-Write_Markers.exe



This Solution writes marker information from a dataset to an external text file. It allows to export reaction time data calculated from Stimulus and Response markers for analysis outside Analyzer.

All relevant information about the markers, such as type, name, position, and duration can be written to the text file. This Solution works with segmented and non-segmented data. If data is not segmented, each occurrence of a marker specified as the „New Line“ marker in the dialog triggers a line feed to be placed in the output file.

Marker positions are written either as millisecond or as data point offset from Time 0 or from the „New Line“ marker.

Write Markers...

Choose marker types to be written...

<input checked="" type="checkbox"/> Stimulus	<input checked="" type="checkbox"/> Response	<input checked="" type="checkbox"/> New Segment
<input type="checkbox"/> Voltage	<input type="checkbox"/> Time 0	<input type="checkbox"/> Bad Interval
<input type="checkbox"/> Peak	<input type="checkbox"/> Comment	<input type="checkbox"/> DC Correction
<input type="checkbox"/> Threshold	<input type="checkbox"/> Template	<input type="checkbox"/> Other
<input type="checkbox"/> [Dropdown]	<input type="checkbox"/> [Dropdown]	<input type="checkbox"/> [Dropdown]

Choose parameters to be written...

<input checked="" type="checkbox"/> Type	<input checked="" type="checkbox"/> Description	<input checked="" type="checkbox"/> Position
<input type="checkbox"/> Duration	<input type="checkbox"/> Channel	<input checked="" type="checkbox"/> Amplitude

Parameter options...

☒ Write marker position and point count as millisecond values

☐ Write values with decimal comma instead of decimal point

Newline type and description for nonsegmented data...

Marker type for newlines: [Dropdown: <Any>]

Marker name for newlines: [Dropdown: <Any>]

OK Cancel

v1.8

Heart Rate Channel

Version: 1.0

File name: AnalyzerSolution-Heart_Rate_Channel.exe



This Solution reads “R” markers in the current history node and generates a new dataset with an additional channel containing the ongoing heart rate in beats per minute (BPM).

The new channel is labeled “IBI” (Interbeat-interval).

EKG Markers

Version: 1.11

File name: AnalyzerSolution-EKG_Markers.exe



This Solution searches for R-waves in a selected EKG channel and placed EKG component markers.

Parameters for R-Wave detection are the threshold of the gradient slope, the interval to be skipped after a detected R-wave and the time range for the R-wave search.

EKG components that can be marked are P, Q, R, S and T.

EKG and marker setting...

EKG and marker channel...

EKG Channel: Marker Channel:

R-wave detection parameters...

Search range (Seconds)

Range start: Range stop:

Mean slope threshold ($\mu\text{V/ms}$) Interval after R-Wave (s)

Threshold: Interval:

Set R-wave polarity manually or automatically:

Marker options...

EKG component markers: ☒ P ☒ Q ☒ R ☒ S ☒ T

v1.11

EMG Onset Search

Version: 1.3

File name: AnalyzerSolution-EMG_Onset_Search.exe



This Solution determines the foot point, the onset threshold point and the peak point of an EMG response. Multiple options to parametrize the EMG Onset search are available.

The underlying algorithm is based on the following publication:

Van Boxtel, G.J.M., Geraats, L.H.D., Van den Berg-Lenssen, M.M.C., & Brunia, C.H.M. (1993). Detection of EMG onset in ERP research. *Psychophysiology*, 30, 405-412.

The screenshot shows the 'EMG Onset Search...' dialog box. It has a title bar with a close button. The main area is divided into several sections:

- EMG channel selection...**: Contains two lists. 'Deselected...' has 'EKG' and 'RESP'. 'Selected...' has 'EMG'. Between the lists are four buttons: '>>', '<<', 'All', and 'None'.
- EMG parameter calculation start and stop time...**: Contains three rows of input fields for 'Start' and 'Stop' times in milliseconds.
 - Baseline Period: Start: -100, Stop: 0
 - Onset Point Period: Start: 0, Stop: 100
 - Peak Point Period: Start: 0, Stop: 500
- Select trigger threshold and direction...**: Contains a 'Base +/- StdDevs' field with the value '4' and a 'Direction' dropdown menu set to 'Positive'.
- Onset search options...**: Contains two checkboxes and a field.
 - 'Search backwards for true onset using second derivative:' is checked.
 - 'Consecutive value count required to qualify true onset:' has the value '1'.

At the bottom are 'OK' and 'Cancel' buttons. The version number 'v1.3' is in the bottom right corner.

Moving Average

Version: 1.2

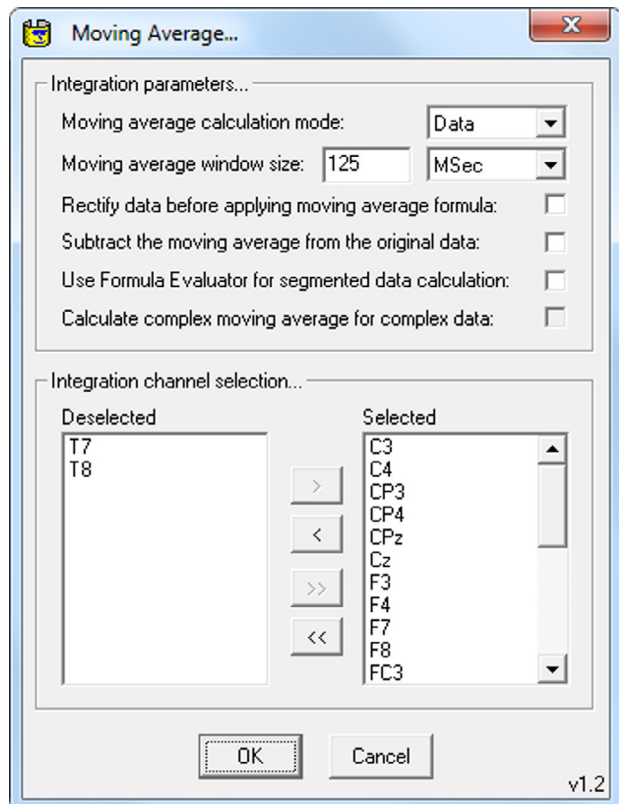
File name: AnalyzerSolution-Moving_Average.exe



This Solution calculates moving averages for time, frequency and time - frequency domain datasets.

It can operate over consecutive data points and over segments. When "Data" is chosen the time domain data or frequency spectrum is smoothed. When "Segment" is chosen smoothing happens across aligned segments.

The Solution can be applied to a specified set of channels and the user can choose to rectify the data or to calculate complex moving average data for complex valued input datasets.



Percent Change

Version: 1.41

File name: AnalyzerSolution-Percent_Change.exe



This Solution calculates the percentage change or ratio of the activation levels at each point in a data set in relation to the mean activity of a baseline reference period.

The results indicate the degree of activation or deactivation over time. This measure is frequently used in analyses such as event related synchronization/desynchronization (ERS/ERD).

Percent change...

Reference period ...

Comparison reference period start time: -500

Comparison reference period stop time: 0

Calculation parameters ...

☐ Ratio ☒ Percent ☒ Activation index

☐ Use old ERD activation formula $\left(\frac{(R-A)}{R}\right) \times 100$.

☒ Calculate relative percent or ratio values.

☐ Write reference period as flat 100 or 0% values.

☐ Rectify input data before making comparison.

☐ Square input data before making comparison.

Complex dataset options...

☐ Calculate complex valued percent changes.

☐ Write complex valued data to the result node.

OK Cancel

v1.41

Merge Channels

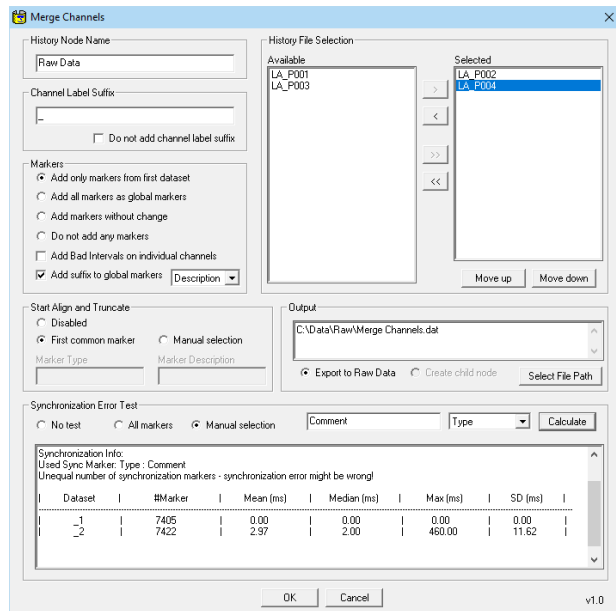
Version: 1.0

File name: AnalyzerSolution-Merge_Channels.exe



This Solution allows to merge channels from different History Nodes across and within History Files.

It features options to add channel label suffixes with dataset ID's, multiple options to transfer and relabel markers, correcting for offsets, performing synchronization error tests and exports to Raw Data to optimize memory usage.



Rename Nodes

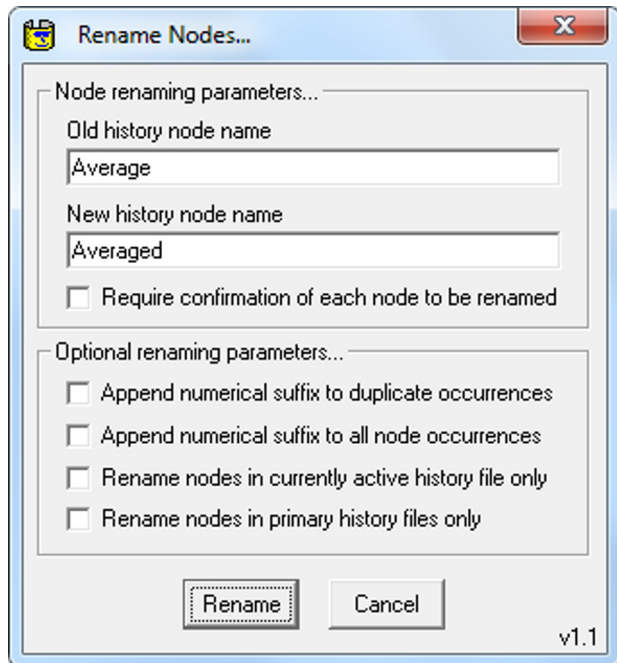
Version: 1.1

File name: AnalyzerSolution-Rename_Nodes.exe



This Solution renames existing history nodes and allows to add a numerical suffix. Renaming can be restricted to either the current history file or to the group of primary history files.

The renaming process can be done automatically or requesting confirmation for each file.



Sleep Scoring

Version: 2.1

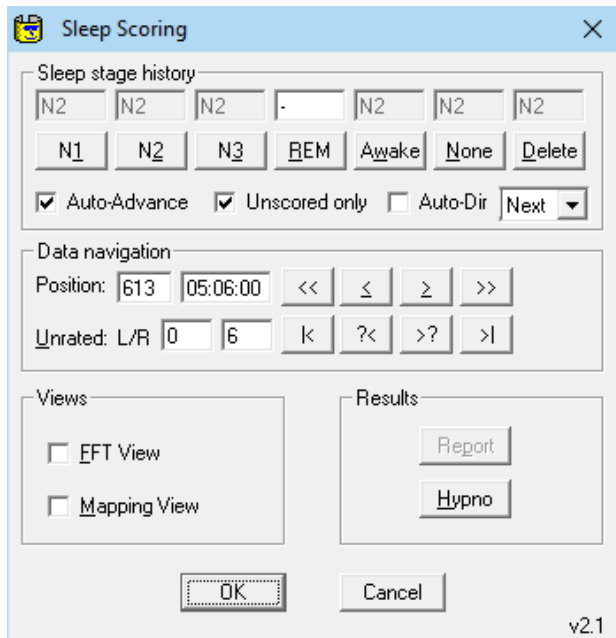
File name: AnalyzerSolution-Sleep_Scoring.exe



This Solution allows to assign, edit, and inspect sleep stages in sleep recordings.

It assists manual scoring by displaying current scoring intervals and corresponding mapping and frequency views.

It creates a standard sleep report and a Hypnogram in an external file and places markers into the active dataset that indicate the sleep stages, sleep onset/offset and detected sleep cycles.



Navigate Data

Version: 1.1

File name: AnalyzerSolution-Navigate_Data.exe

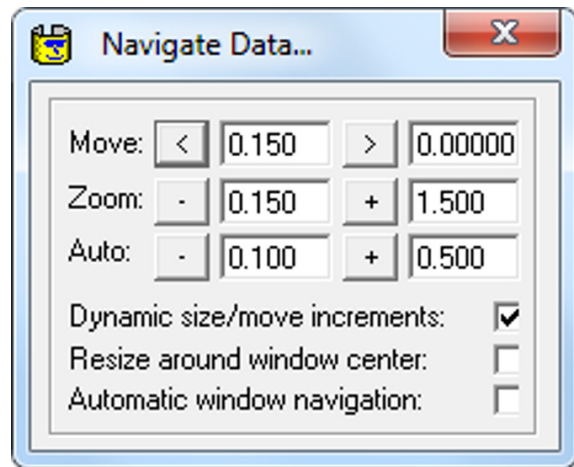


This Solution allows for easy and very flexible navigation in the currently displayed dataset. It opens up a small window in the lower left of the screen and lets the user move very quickly and at easily selectable step sizes.

It allows to zoom the dataset either from the left or from the middle of the window, which comes in very handy when trying to zoom into something in the middle of a display.

Both the zoom and the navigation features can be set to either stay at fixed increments or to always work with the same proportion of the current data window size.

The module also has automatic and timed advancement of the data window built in, making it possible to e.g. move ahead one page every second.



Show Data Values

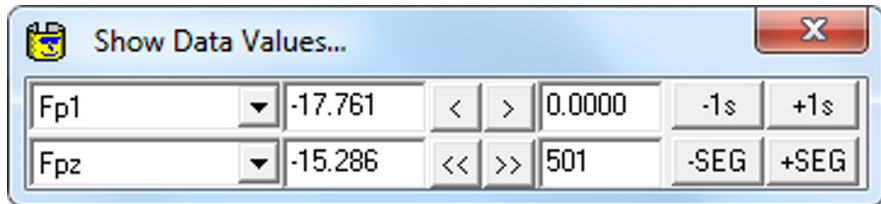
Version: 1.4

File name: AnalyzerSolution-Show_Data_Value.exe



This Solution shows a window that sets a marked interval of one data point in the current dataset window and allows for easy navigation within the dataset with the marked interval functioning as a cursor.

The latency of the cursor is shown as a time and datapoint value and the amplitudes at two channels freely selectable from drop down lists are also shown for the current cursor position.



Marker Timing

Version: 1.6

File name: AnalyzerSolution-Marker_Timing.exe



This Solution collects all markers of a user specified type and name, calculates the temporal distance between each successive pair of such markers and writes a new dataset with the time distance represented as amplitude data.

The time distance between each of these markers and its predecessor is written to the new dataset either as a datapoint or as a millisecond value.

Several options are available from the graphical menu that allow to shape the output data for use with different further processing schemes such as for Heart Rate Variability analysis.

Marker Timing...

Marker type and name...

Target marker type: Stimulus

Target marker name: S 10

Skip markers at start: 0 at end 0

Output parameters...

Data rate: ☒ 1 msec. ☐ Mean time

Data values: ☐ Data points ☒ Milliseconds

☐ Subtract first marker time from subsequent times.

☐ Subtract mean time from marker time information.

Min/Max indicators...

☒ Set marker at minimum time difference location.

☒ Set marker at maximum time difference location.

☒ Limit min/max search to Mean +/- StdDevs: 2

OK Cancel

v1.6

Stacked Plot

Version: 1.3

File name: AnalyzerSolution-Stacked_Plot.exe



This Solution creates a stacked plot view from the current, segmented dataset orientation.

It works with time and frequency domain data and with real valued as well as complex datasets. The output data for time domain datasets is oriented with time on the x-axis and segments on the y-axis. For frequency domain data the orientation is transposed and shows segments on the x-axis and frequency on the y-axis. Both data types show amplitude as color.