

Description of Core Part of BrainVision File Format 1.0

1 BRAINVISION HEADER FILE IN TEXT FORMAT (.VHDR)

1.1 File Version of header file

The first line must be as follows:

Brain Vision Data Exchange Header File Version 1.0

Note: Neither white spaces nor comments must be before this line!

1.2 "Common Infos" section

Keyword	Meaning	Default Value	Comment
Codepage	Character encoding defined by Codepage. Possible value: UTF-8 Character encoding is done according to UTF-8.	ANSI	In fact, the encoding needs to be known before the file is read. The value ANSI is not available in the BrainVision Core File Format 1.0.
DataFile	Name of the EEG data file. It is assumed that the header file, the optional marker file and EEG data file are in the same folder. The placeholder \$b can be used in the file name. It is replaced by the base name of the header file when the file is read in. <i>Example</i> If the name of the header file is Test.vhdr, the entry Data-File=\$b-EEG.dat is interpreted as DataFile=Test-EEG.dat.	None	This keyword with value is mandatory.
MarkerFile	Name of optional marker file. If exists the marker file	None	

	contains a list of markers assigned to the EEG. It is assumed that the marker file is in the same folder as the header file. For the format of the marker file refer to Marker file section below. The placeholder \$b can be used in the file name (see example above).		
DataFormat	Data format. Possible value: BINARY	ASCII	DataFormat=BINARY is a mandatory entry. BINARY is the only possible value in the BrainVision Core file format.
DataOrientation	Data orientation. Possible value: MULTIPLEXED All the channels come one after the other for every data point. In other words, the data structure is multiplexed.	MULTIPLEXED	DataOrientation=MULTIPLEXED is an optional entry, i.e. if missing the default value is assumed.
DataType	Data type. Possible value: TIMEDOMAIN The data is in the time domain.	TIMEDOMAIN	DataType=TIMEDOMAIN is an optional entry, i.e. if missing the default value is assumed.
NumberOfChannels	Number of channels in the EEG file.	None	Mandatory entry. Value is of type integer.
SamplingInterval	Sampling interval. The interval is specified in μ s in the time domain.	None	Mandatory entry. Value is of type integer.
Averaged	This indicates whether the data set to be read in has been averaged. Possible values are: YES Yes, the data set represents data that has been averaged. NO No, the data set represents data that has not been averaged.	NO	This is an optional entry, i.e. if missing the default value is assumed.
• AveragedSegments	This value is only evaluated if AVERAGED=YES . In this case the value states the number of segments included in the average.	0	The default value corresponds to the case AVERAGED=NO . Value is of type integer.
• SegmentDataPoints	This value is only evaluated if AVERAGED=YES . In this case the value states the number of data points in each segment, i.e. each segment has the same length.	0	The default value corresponds to the case AVERAGED=NO . Value is of type integer.

<ul style="list-style-type: none"> • SegmentationType 	Possible values are: NOTSEGMENTED The data set has not been segmented. MARKERBASED The data set has been segmented on the basis of one or more marker positions. This value is only evaluated if AVERAGED=YES .	NOTSEGMENTED	The default value corresponds to the case AVERAGED=No .
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1.3 "Channel Infos" section

Keyword	Meaning	Default Value	Comment
Ch<x> <x> stands for the channel number. In other words, the keyword for the first channel is Ch1, for the second channel Ch2, etc.	Individual properties for the channel are specified separated by commas: <channel name>,<reference channel name>,<resolution in "unit">[, <unit>] <i>Example</i> Ch1=Fp1,,0.1,µV The first channel has the channel name "Fp1". The common reference channel is taken as the reference channel because no entry has been made. The resolution is 0.1 µV. The resolution is the value by which the value of the data point is multiplied to convert it to the channel unit (i.e. µV or the selected unit).	<channel number>, ,1.0,µV	<ul style="list-style-type: none"> • <channel name> is of type string • <reference channel name> is of type string • <resolution in "unit"> is of type float • <unit> is of type string

1.4 "Binary Infos" section

Keyword	Meaning	Default Value	Comment
BinaryFormat	Binary format. Possible values: IEEE_FLOAT_32 IEEE floating-point format, single precision, 4 bytes per value INT_16 16-bit signed integer	INT_16	BINARYFORMAT=INT_16 is an optional entry, i.e. if missing the default value is assumed.

1.5 "Coordinates" section

Keyword	Meaning	Default Value	Comment
Ch<x> <x> stands for the channel number. In other words, the keyword for the first channel is Ch1, for the second channel Ch2, etc.	Coordinates of an individual channel in the form: <Radius>, <Theta>, <Phi> <i>Example</i> Ch1=1,-92,-72	---	<ul style="list-style-type: none"> • <Radius> is of type float • <Theta> is of type float • <Phi> is of type float

1.6 "Comment" section

Keyword	Meaning	Default Value	Comment
---	Arbitrary content	---	<ul style="list-style-type: none"> • To be used for additional information only. • Data readers cannot interpret these information unambiguously.

Note: Lines starting with a “;” are interpreted as comments and are ignored, except the “Comment” section where “;” has no special meaning.

2 BRAINVISION MARKER FILE IN TEXT FORMAT (.VMRK)

The marker file is based on the same principle of sections and keywords as the header file.

2.1 File Version

The first line must be as follows:

Brain Vision Data Exchange Marker File Version 1.0

Note: Neither white spaces nor comments must be before this line!

2.2 "Common Infos" section of the marker file

Keyword	Meaning	Default Value	Comment
Codepage	Character encoding defined by Codepage. Possible value: UTF-8 Character encoding is done according to UTF-8.	ANSI	In fact, the encoding needs to be known before the file is read. The value ANSI is not available in the BrainVision Core File Format 1.0.
DataFile	Name of the EEG data file. It is assumed that the header file, marker file and EEG data file are in the same folder.	None	

2.3 "Marker Infos" section of the marker file

Keyword	Meaning	Default Value	Comment
Mk<x> <x> stands for the marker number. In other words, the keyword for the first marker is Mk1, for the second marker Mk2, etc	Individual properties for the marker are specified separated by commas: <type>, <description>, <position>, <points>, <channel number>[, <date>] <i>Example</i> Mk1=Time 0,,26,1,0 The first marker in this example has the type "Time 0", no description, its position is at data point 26, its length is 1 data point, and the channel number is 0, which means that this marker applies to all channels. The date is optional. It is only evaluated if the marker type is "New Segment". The date has the following format: 4 digits = year 2 digits = month 2 digits = day 2 digits = hour (24-hour system) 2 digits = minute 2 digits = second 6 digits = microsecond The result is a time resolution of a microsecond. <i>Example</i> 19990311140312003012 means 11 March 1999, 14:03:12.003012	None	<ul style="list-style-type: none"> • <description> is of type string • <position> is of type unsigned integer • <points> is of type unsigned integer • <channel number> is of type integer • <date> see column "meaning" • In case of a "New Segment" marker the date information is provided.