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Quickstart V5.16.00

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CONVENTIONS

Item	Format	Example
String Variables	Courier New	Enter filename e.g. MygRecorderSettings.xml
Menu items	Boldface	Select Save from the File menu

Requirements for this Quickstart

The following equipment is needed to perform this quickstart properly:

For g.USBamp

Hardware	
g.USBamp	To acquire biosignal data from 1 EEG and 1 ECG channel
Accessories	Electrodes and electrode cables
Video camera	Webcam

Software	
g.USBamp Driver	Version 3.16.00

For g.Hlamp

Hardware	
g.Hlamp	To acquire biosignal data from 1 EEG and 1 ECG channel
Accessories	Electrodes and electrode cables

Software	
g.Hlamp Driver	Version 2.16.00

For g.MOBIlab+

Hardware	
g.MOBIlab+	To acquire biosignal data from 1 EEG and 1 ECG channel
Accessories	Electrodes, electrode cables and electrode connector boxes
Bluetooth Dongle	Ezurio Bluetooth Dongle

Software	
g.MOBIlab Driver	Version 1.16.00

For g.Nautilus

Hardware	
g.Nautilus	To acquire biosignal data from 2 EEG channels
Accessories	Electrodes and electrode cables
Video camera	Webcam

Software	
g.NEEDaccess	Version 1.16.01

Quickstart

This chapter will give a short introduction on how to use g.Recorder with g.USBamp, g.Hlamp, and g.MOBIlab+. The controls for other g.tec biosignal amplifiers are very similar, so these examples can be performed with other g.tec devices too.

It is recommended to turn off Microsoft Windows' automatic updates while operating g.Recorder. Concurrent Windows updates could interfere with g.Recorder functionality.

The two examples of this quickstart can only be run in **Administrator Mode**. To activate this mode select **Administrator Mode** from the **Mode** menu.

Mo	Mode View Window He		Help	
~	U:	ser Mode	•	
Administrator Mode 🗼				

If an Administrator Password is set enter it and click OK.

Administrator Authentication	_		×
Please enter the Administrator Password:			
Change Password			
	Cancel	OK	

Using g.USBamp for EEG and ECG including Video recording

The setup of g.USBamp with g.Recorder for acquisition of 1 EEG channel and 1 ECG channel is explained here. This section also describes how to define keyboard markers and record the cerebral function monitor (CFM) and heart rate (HR) from EEG and ECG channels. Digital video recording is synchronized to the EEG and ECG recording.

To perform this quickstart, follow the steps below:

 Connect the electrodes to the g.USBamp in the following way. The picture below displays the front side of g.USBamp. The front side is divided into four groups (A, B, C, D from left to right). Each group consists of four red connectors (1-4, 5-8, 9-12, 13-16) for connecting biosignal electrodes (EEG, ECG, EMG, etc.), one blue connector for the reference electrode (R) and one yellow connector for the ground electrode (G).



For the EEG measurement, all electrodes for EEG are connected to group **A** (first group on the left side of g.USBamp). One EEG electrode is connected to channel 1 of group **A** (red connector), the reference electrode to reference **R** of group **A** (blue connector) and the ground electrode is connected to ground **G** of group **A** (yellow connector).

For the ECG measurement, all electrodes for ECG are connected to group **B** (second group from left). One ECG electrode is connected to channel 5 of group **B** (red connector), the reference electrode to reference **R** of group **B** (blue connector) and the ground electrode is connected to ground **G** (yellow connector).

2. Make sure that your g.USBamp is switched on and connected to the PC. Then click **Select Hardware...** in the **Settings** menu.



Click on the **g.USBamp** menu entry in the **Available Hardware** list and select the serial number of your g.USBamp (e.g. UA-2008.06.37). Add the device to the **Selected Hardware** list by clicking the right arrow button. Click **OK** to close the dialog.

Select Hardware			Х
Hardware Available Hardware:	>	Selected Hardware:	
		Cancel OK	

3. Click g.USBamp... in the Settings menu to perform g.USBamp configuration.



Set the **Sampling Rate** in the **AMPLIFIER SETTINGS** section to 512 Hz and select **Channel 1** and **Channel 5** with the corresponding checkboxes.

In the **CHANNEL SETTINGS** section select the channels 1 and 5 apply a **Bandpass** filter with **HP: 0Hz / LP: 100Hz** and a **Notch** filter with **50Hz** or **60Hz**, depending on your local power line hum. Click **OK** to apply the settings.

AMPLIFIER SETTIN	is								
Common Ground	Cr	ommon Refer	ence	Options		Mode		– Testsignal Analog	Output
Group A		Group A		Master		Measure		Wave Shape:	Sine V
		Group B		Shortcut			nter on	Arrestitudes Fred / De	240 1
						L chan	nnel 16	Amplitude [mv]:	240 👻
						O Test Sign	nal	Offset [mV]:	0 🔹
Group D		Group D						English and Filmly	10 +
Sampling Rate [Hz]: Channel Selection Channel 1 Channel 2 CHANNEL SETTING	256 Channel 3 Channel 4	✓ ✓ Cha ☐ Cha	annel 5	Channel 7 Channel 8	Channe Channe	19 Chanr 110 Chanr	nel 11 🗌 C nel 12 🗌 C	hannel 13 Ch	annel 15 annel 16
Sampling Rate [Hz]: Channel Selection Channel 1 Channel 2 CHANNEL SETTING	256 Channel 3 Channel 4 S	✓ Cha □ Cha	annel 5	Channel 7 Channel 8 Channel	Channe Channe Bipolar	I9 Chanr I 10 Chanr Highpass	nel 11 C nel 12 C Lowpass	hannel 13 Chi hannel 14 Chi	annel 15 annel 16
Sampling Rate [Hz]: Channel Selection Channel 1 Channel 2 CHANNEL SETTING	256 Channel 3 Channel 4	✓ Cha	annel 5	Channel 7 Channel 8 Channel 1	Channe Channe Bipolar I	I 9 Chanr I 10 Chanr Highpass none	nel 11 C nel 12 C Lowpass 100 Hz	hannel 13 Chahannel 14 Cha	annel 15 annel 16
Sampling Rate [Hz]: Channel Selection Channel 1 Channel 2 CHANNEL SETTING Bipolar: 0	256 Channel 3 Channel 4 S	✓ Cha	annel 5	Channel 7 Channel 8 Channel 1 2	Channe Channe Bipolar I 0 0	I 9 Chann I 10 Chann Highpass none none	nel 11 C nel 12 C Lowpass 100 Hz none	hannel 13 Chi hannel 14 Chi Notch 50 Hz none	annel 15 annel 16
Sampling Rate [H2]: Channel Selection Channel 1 Channel 2 CHANNEL SETTING Bipolar: 0 Bandpass: < 1001	256 Channel 3 Channel 4 S	V Cha	annel 5 annel 6 Apply>	Channel 7 Channel 8 Channel 1 2 3	Channe Channe Bipolar I 0 0	I 9 Chann I 10 Chann Highpass none none none	nel 11 C nel 12 C Lowpass 100 Hz none none	hannel 13 Ch hannel 14 Ch Notch 50 Hz none none	annel 15 annel 16
Sampling Rate [H2]: Channel Selection Channel 1 Channel 2 CHANNEL SETTING Bipolar: 0 Bandpass: <100 I	256 Channel 3 Channel 4 S z	✓ Cha	annel 5 annel 6 Apply> Apply>	Channel 7 Channel 8 Channel 1 2 3 4 5	Channe Channe Bipolar I 0 0 0 0	I 9 Chann I 10 Chann Highpass none none none none	nel 11 C nel 12 C Lowpass 100 Hz none none none 100 Hz	hannel 13 Chi hannel 14 Chi Notch 50 Hz none none 50 Hz	annel 15 annel 16
Sampling Rate [H2]: Channel Selection Channel 1 Channel 2 CHANNEL SETTING Bipolar: 0 Bandpass: <100 I Notch: 50 Hz	256 Channel 3 Channel 4 S	✓ Cha	annel 5 annel 6 annel 6 Apply> Apply> Apply>	Channel 7 Channel 8 Channel 1 2 3 4 5 6	Channe Channe Bipolar I 0 0 0 0 0 0 0 0 0 0 0 0	19 Chann 10 Chann lighpass none none none none none none none	nel 11 C nel 12 C Lowpass 100 Hz none none none 100 Hz none	hannel 13 Chi hannel 14 Chi Notch 50 Hz none none 50 Hz none	annel 15 annel 16

4. Configure the g.Recorder display by opening the **Channels** dialog from the **Settings** menu.



Provide a proper **Name** (e.g. EEG1) and a **Type** (e.g. **EEG**) for the channels selected in g.USBamp configuration dialog. The **Sensitivity** is set automatically, but can be changed manually. However, these changes influence data visualization in the Data Viewer window only. Click **OK** to close the dialog. Use the **Use default values of device** to apply device settings to the data display in the Data Viewer.

ç	👫 Chanr	nels									×	
[Individua	al settings										
	Device- Ch. Nr.	Logical Ch. Nr.	Acq.	Name		Туре		Sensi Low	tivity High	Offset	Unit	
	1 - 1	1	\checkmark	EEG1	EEG		•	-50	50	0	μV •	
	1 - 5	5	\checkmark	ECG1	ECG		•	-1	1	0	mV 🔻	
	Common	settings										
			Туре	EEG	•	Apply ->						
		Sens L.	Sens H	I. Offset Unit	t			Start chann	el: 1	End ch	annel: 2	
		-50	50	0 уч	•		_					
	F	For channe	l type:	EEG	•	Apply ->						
									[Cancel	OK	

5. To configure features click **Feature Definition...** in the **Analysis** menu.

Analysis	Tools	Mode	View								
Feat	ure Defini	ition									
Mark	ær Definit	ion									
Feature D	efinition	1							_		×
Select F Feature Heart F	eatures Rate HR			~	Channel: 5		>	-	Selected 1 CFM 1 CSA 5 HR	Features	
							Cancel		\pply	OF	(

In the Feature listbox, select **Cerebral Function Monitor CFM** and 1 from the **Channel** list. Click the right arrow button to add the CFM feature to the **Selected Features** list. Then select the **Compressed Spectral Array CSA** and 1 from the channel list and add the feature to the **Selected Features**. Finally, select **Heart Rate HR** and 5 from the channel list and add the feature to the **Selected Features**.

Feature Definition			_		×
Select Features Feature: Cerebral Function Monitor CFM Compressed Spectral Array CSA Heart Rate HR	Channel:	->	Selected	Features	
		Cancel	Apply	OK	

After feature selection, proceed with the feature definition. To do so, select the feature 1 CFM in the **Selected Features** list and click the **Advanced** button.

Feature Definition			_		\times
Select Features Feature: Heart Rate HR ✓	Channel: 1 5	>	Selected 1 CFM 1 CSA 5 HR	E Features	
		Cancel	Apply	lvanced OK	

Provide all settings as shown in the dialog below and click the **Pattern Definition** button.

Cerebral Function Monitor Configurat	ion X
Filter Band	
Lowest Frequency [Hz]: 2,0	Highest Frequency [Hz]: 15,0
Classification	
Classify CFM Pattern	Pattern Definition
Percentile [%]: 5	Epoch Duration [min]: 10,0
Display	
Time on Screen [min]: 60	
	Cancel Apply OK

Define all patterns as shown in the dialog below. Close the **CFM Pattern Definition** and the **Cerebral Function Monitor** dialog by clicking the **OK** button.

Name:	Lower level [u]/]:		Linner level [ωVI:	Color	
BURST Add	From: >10	To: <10	From: >70	To: <70		✓ Visible
Name	Lower level From	Lower level To	Upper level From	Upper level To	Color	Visible
	>0	<5	>=10	<=70		TRUE
CVP				. 70		TOUL
CVP DLVP	>0	<3	>=15	<=/0		TRUE
DLVP DLVP DHVP	>0 >0	<3 <=3	>=15 >=10	<70		TRUE
DLVP DLVP DHVP ISO	>0 >0 >0 >0	<3 <=3 <3	>=15 >=10 >10	<70 <70 <10		TRUE TRUE TRUE
DLVP DLVP DHVP ISO BSP	>0 >0 >0 >0 >0 >0	<3 <=3 <3 <3	>=15 >=10 >10 >70	<70 <70 <10 <70		TRUE TRUE TRUE TRUE

In the **Feature Definition** dialog, select the 1 CSA feature and click **Advanced**. In the upcoming **Compressed Spectral Array Configuration** dialog set all variables as shown below. Close the dialog with the **OK** button.

Compressed Spectral Arr	ray Configuration X
Calculation	
NFFT [n]:	256 🚔
Overlap [n]:	0
Start Frequency [Hz]:	1
End Frequency [Hz]:	30 🚔
Blockoverlap [n]:	0
Epoch Duration [s]:	1
Amplitude Min [uV]:	0,1 🜩
Amplitude Max [uV]:	200 🛓
Number of Colors:	256 ~ Colomap
Display	
Time on Screen [min]:	10.0 🜩
	Cancel OK

6. To configure the heart rate feature, select the 5 HR feature in the Feature Definition dialog and click Advanced.

As for the other	features, provid	le the settings a	s shown below	/ (in this case,	heart rate settings for
an adult person) and close all d	ialogs with their	respective OF	buttons.	-

Heart Rate Configuration		×
QRS Complex Classification		
Base HR [bpm]: 60 Maximum HR [bpm]: 120 Minimum HR [bpm]: 30	Maximum RR Increase [%]: Maximum RR Decrease [%]:	50 🔹 50 🔹
General Calculation Interval [min]: 1	Time on Screen [min]:	60 🔹
Output Calculate Mean HR [bpm] Calculate Standard Deviation of HR [%] Calculate RMSSD [ms]		
	Cancel	ОК

7. In the Analysis menu, click **Marker Definition...** to define markers.



Enter a **Key**, a **Description**, set the **Toggle** checkbox, select a **Color** and click **Add** to add the marker to the **Defined Markers** list. Click **OK** to finish marker definition.

Marker Definition —	
Define Marker Key Description Toggle Color e Event Toggle	Add
e ☑ Enable Event ☑ Toggle m ☑ Enable Movement ☑ Toggle	Remove
Cancel	ОК

8. Video can be recorded if a webcam is plugged into the PC. Click the **Video...** button in the **Settings** menu to view camera settings.

Settings	Analysis	Tools	Mode		
Sele	ct Hardware				
g.U9	Bamp				
g.U9	Bamp Digita	IO			
Vide	0				
Char	nnels	N			
Data	Viewer				
Reco	ording				
Video			-		×
Video De	vice: HP I	HD Webc	am		~
Audio De	vice: Micro	ophone (2	2- Logite	ch USB	He ~
Profile:	Varia	able Bitrate	e fair		~
				Oł	(

In the toolbar, set the **Video** listbox either to **Off** to not show the video, to **Display** to just show the video or to **Record** to store the video to hard disk.



9. After providing all the settings as described in the step above, the g.Recorder window should look like the picture below.

g.Re	corder													_		×
File	Settings	Analysis	Tools	Mode	View	Window	Help									
🖻 🧉	▶	•	00:00:00	Q	100 %	🔍 🔍 I	w Iw M	Channe	s: 2 🌲	Seco	nds: 10,00	Video:	Off	- <i>i</i>	ss:	⁰⁰ =
🗄 📌 Vi	isualization	n-only Hig	hpass:	none	- Lov	/pass: noi	ne	Notch:	none	- 1	Marker: m	е				
Data Vie	ewer															×
0	0:00:00.0	00:00:01	.0 0	0:00:02.0	00:00:	03.0	00:00:04.0	00:00:05	.0 ₁ 00	:00:06.0	00:00:07.0	00:00:08.0	00:00	09.0	00:00:10	0.0
1 - 1	1															-
-250mV	250mV															
1-2	2															
-250mV	250mV															
																~
	<											2				>
Feature	Viewer							× E	voked			Video Viewe				23
00:00:00	0.1 00	D:06:00. ₁	00:12:	00.,	00:18:00.1	00:2	4:00. ₁	00								
100 ⊽ 25	5															
[크날] 10 전국 8] -															
50 .	1															
00:00:00	0.1 00	D:06:00. ₁	00:12:	00. ₁	00:18:00.1	00:2	4:00. ₁	00								
120 200	1															
ਸੂਰੀ ਨੇ ਬ ਸੂਰੀ ਦੀ ਬ]]															
Ξō «	1											<				>
Mode: St	andard S	ampling[H	lz]: 256	Total Cha	an.: 16 F	ilename:	File Siz	e[MB]:					S	ystem 1	Time: 11:3	2:32:

10. Start data acquisition either by clicking the **Start Data Viewing** button to display data without recording it to the hard disk:



or by clicking the **Record** button to store acquired data to the hard disk:



11. When the **Record** button is clicked, the **Recording** dialog opens.

ecording	- 🗆 X
File Path: C:\Users\USER\Documents\gRecorder Filename: RecordSession_	Browse Record Raw Data
Recording Time	1 🚖
Subject Last Name(s): First Name(s): Date of Birth: 09.11.2016 m mandatory	mandatory
Comment: Load Save	alue
Session Data Session:	mandatory
Run:	ancel OK

File

A **Path** for the data file can be entered or the desired path can be chosen by clicking on the **Browse** button.

The **Filename** defines the name of the data file. The default filename is RecordSession_ with date and time added. When the measurement is started, the data and the time are added automatically to the filename (e.g. RecordSession_2016.11.09_18.47.11.hdf5). The data is stored in HDF5 file format. For more information about this format, see www.hdfgroup.org or refer to the MATLAB help.

The checkbox **Record Raw Data** can be used to decide whether or not the raw data from the amplifier is stored in the HDF5 file. For offline processing after measurement it is recommended to record raw data.

Recording Time

In the **Recording Time** section with the **Enable Time Limitation** checkbox, a time limitation for the measurement can be set. After this time, the measurement is stopped automatically.

Subject

In the **Subject** section information about the subject like **Last Name(s)**, **First Names(s)** and **Date of Birth** can be entered. In the **Comment** section additional information (e.g. medications) can be added.

Session Data

Enter the Session and Run identifier for your recordings.

After finishing these settings, click **OK**.

Note: Mandatory fields (the keyword mandatory is displayed next to this field) must be filled out correctly. Otherwise, the recording cannot be started.

12. The actual mode of data acquisition is shown in the bottom left corner of g.Recorder in the status bar. **Standard** is displayed, if data is acquired without storing it to the hard disk, **Recording** if data is stored to the hard disk.



13. To stop data acquisition, click the **Pause Data Viewing** button, which stops data acquisition in display mode or data display in recording mode.



To finish recording click the **Stop** button.



Using g.Hlamp for EEG and ECG

The setup of g.Hlamp with g.Recorder for acquisition of 1 EEG channel and 1 ECG channel is explained.

To perform this quickstart, please follow the steps below:

1. Connect the electrodes to the g.Hlamp in the following way.

For EEG measurement, connect one EEG electrode to channel 1. Connect the EEG reference electrode to channel 2.

For ECG measurement, connect one ECG electrode to channel 3. Connect the ECG reference electrode to channel 4. Connect the ECG ground electrode to the ground connector (yellow connector).

Note: only one ground electrode is used for both measurements. In this case, the ECG ground electrode is also used as ground electrode for the EEG electrode.

2. Ensure that your g.Hlamp amplifier is turned on and connected to the PC. Click **Select Hardware...** in the **Settings** menu.

Settings	Analysis	Tools
Selec	t Hardware	
Vide	0	
Char	nnels	
Data	Viewer	

Click on the **g.Hlamp** menu entry in the **Available Hardware** list and select the serial number of your g.Hlamp (e.g. HA-2010.08.00). Add the device to the **Selected Hardware** list by clicking the right arrow button. Click **OK** to close the dialog.

Select Hardware			×
Hardware Available Hardware: DAQ Simulator HA-2016.02.01	>	Selected Hardware: g.Hlamp HA-2016.02.01	
		Cancel OK	

3. Click **g.Hlamp...** in the **Settings** menu to configure the g.Hlamp device.



Set the **Sample Rate** in the **Amplifier Settings** section to 512 Hz and ensure that the **Acquire** checkboxes of channel 1 and channel 3 are checked only. You can use the shift key or the control key to select multiple channels. You can use the keystroke combination Ctrl + A to select all channels. To check or uncheck the **Acquire** checkboxes of the selected channels, click the **Acquire** checkbox of one of them.

Select channels 1 and 3, apply a **Lowpass** filter <100Hz and a **Notch** filter with 48Hz-52Hz or 58Hz-62Hz, depending on your local power line hum.

For channel 1, apply **Bipolar** derivation with channel 2. For channel 3, apply bipolar derivation with channel 4.

npilfier Settings		Channel	Acquire	Bipolar	Bandpass	Notch	
mple Rate [Hz]:	512 ×	Group A (chappel 1 64) -					
mmon Peference:		Channel 1 (1 in group)		2	< 100 Hz	48 Hz - 52 Hz	
minor reference.	none v	Channel 2 (2 in group)		none	none	none	
tions		Channel 3 (3 in group)		4	< 100 Hz	48 Hz - 52 Hz	
Master	Enable Trigger	Channel 4 (4 in group)		none	none	none	
Master		Channel 5 (5 in group)	Ë	none	none	none	
Enable Counter	Enable Hold	Channel 6 (6 in group)	Π	none	none	none	
et Mode		Channel 7 (7 in group)		none	none	none	
ISL MODE		Channel 8 (8 in group)	Π	none	none	none	
Activate Test Sig	anal	Channel 9 (9 in group)	Ē	none	none	none	
ave Chapes	Causas	Channel 10 (10 in group)		none	none	none	
ave snape.	oquare ~	Channel 11 (11 in group)		none	none	none	
equency [Hz]:	2 🔹	Channel 12 (12 in group)		none	none	none	
nlitude [uV]:	7 622 83 🔺	Channel 13 (13 in group)		none	none	none	
parado (pri).	7.0LL,00 ¥	Channel 14 (14 in group)		none	none	none	
fset [µV]:	-7.622,83 🜲	Channel 15 (15 in group)		none	none	none	
10.00		Channel 16 (16 in group)		none	none	none	
annel Settings		Channel 17 (17 in group)		none	none	none	
oolar:	4 ~	Channel 18 (18 in group)		none	none	none	
		Channel 19 (19 in group)		none	none	none	
	Apply to selection>	Channel 20 (20 in group)		none	none	none	
		Channel 21 (21 in group)		none	none	none	
ndpass:	< 100 Hz 🛛 🗸	Channel 22 (22 in group)		none	none	none	
	An electron este etterniste	Channel 23 (23 in group)		none	none	none	
	Apply to selection>	Channel 24 (24 in group)		none	none	none	
		Channel 25 (25 in group)		none	none	none	
tch:	48 Hz - 52 Hz 🗸 🗸	Channel 26 (26 in group)		none	none	none	
	Apply to selection>	Channel 27 (27 in group)		none	none	none	
	reply to bolobion y	Channel 28 (28 in group)		none	none	none	
		Channel 29 (29 in group)		none	none	none	
		Channel 30 (30 in group)		none	none	none	

Click **OK** to close the dialog.

4. Configure the g.Recorder display by opening the **Channels** dialog from the **Settings** menu.



Provide a proper **Name** (e.g. EEG1 for channel 1 and ECG1 for channel 3) and a **Type** (e.g. **EEG** for channel 1 and **ECG** for channel 3) for the channels selected in the g.Hlamp configuration dialog. The **Sensitivity** is set automatically, but can be changed manually. However, these changes influence data visualization in the Data Viewer window only. Click **OK** to close the dialog.

Ç	👫 Chanr	nels									×
	Individua	al settings									
	Device- Ch. Nr.	Logical Ch. Nr.	Acq.	Name		Туре	Sens Low	itivity High	Offset	Unit	
	1 - 1	1	\checkmark	EEG1	EEG	-	-50	50	0	μV 🔻	·
	1-3	3	\checkmark	ECG1	ECG	-	-1	1	0	mV 🔻	
	Common	settings									
			Туре	EEG	•	Apply ->					
		Sens L. -50	Sens H	H. Offset Uni	t T		Start chann	nel: 1	End ch	annel: 2	
	F	For channe	l type:	EEG	•	Apply ->					
									Cancel	OK	

5. After providing all the settings described in the steps above, the g.Recorder window should look like in the picture below.

g •	g.Record	er														-		×
File	Setti	ngs	Analysis To	ols Mode \	/iew Window	Help	ala 2 🔺 Casa			Videe	011		4		h h h h h	0000		00
	Visuali	ization	n-only Highpas	s: none •	 Lowpass: none 	• Inv Chann • Notch:	none •	inds: 10,00	•	video:	Οff	•	9	Jump to	nnnn:	0000 1	nm: 00	55: 00
Dat	a Viewer																	×
	00:00:	00.0	00:00:01.0	00:00:02.0	00:00:03.0	00:00:04.0	00:00:05.0	00:00:	06.0	00:0	00:07.0	0	0:00:08.0	0	00:00:09.	0	00:00:	10.0
1 - 1		1																
-50n\	/ 5	i0nV ····																
EEG	1 1	EEG																
1.3																		
1.3																		
-1µV		1μV																
ECG	1 6	ECG																
:		<				:	<u>.</u>	:	<u>i</u>									>
Fea	ture Viev	ver									۰	×	Video	Viewer				8
													<					,
Mod	e: Standa	ard S	ampling[Hz]: 5	2 Total Chan.: 2	2 Filename:	File Size[MB]:	1							_	S	ystem '	Time: 16	37:56 .:

6. Start data acquisition either by clicking the **Start Data Viewing** button to display data without recording it to the hard disk



or by clicking the **Record** button to store acquired data to the hard disk.



I GUI.	C·\Lleare\LISE		rder	Browse
-		LIN (Documents igneco		
Filename:	Record Sessio	n_		Record Raw Dat
Recording 1	ìme			
Enable	Time Limitation	Hours 1	🚖 Mir	nutes 1 🚖
Subject				
Last Name(i):			mandatory
First Name(s):			mandatory
Date of Birth	09 11 2	016 🔤 🗆 ma	ndatory	
			inducity .	
Comment:		Key	\/=	lue .
Load		Ney	Va	
Save				
3446	- H.			
Session Dat	a			
Session Dat Session:	a			mandatory

7. When the **Record** button is clicked, the **Recording** dialog opens.

This dialog has already been described in the chapter *Using g.USBamp for EEG and ECG including Video recording*. See that section for a detailed description of the available options.

Click the **OK** button to start data acquisition and recording.

8. The actual data acquisition state is shown in the status bar at the bottom left corner of g.Recorder. **Standard** is displayed, if data is acquired without storing it to the hard disk, **Recording** if data is stored to the hard disk.

Mode: Standard	Sampling[Hz]: 512	Total Chan.: 2	Filename:	File Size[MB]: 0	System Time:	11:16:15 AM 👒
		•	•			

9. To stop data acquisition, click the **Pause Data Viewing** button, which stops data acquisition in display mode or data display in recording mode.



To finish recording, click the **Stop** button.



Using g.MOBIlab+ for EEG and ECG

The setup of g.MOBIlab+ with g.Recorder for acquisition of 1 EEG and 1 ECG channel is explained here.

g.MOBIlab+ can stream its data either to the recording PC or notebook via Bluetooth or directly to the built-in SD Card. These two recording modes are described in this chapter.

To perform this example, please follow the steps below:

1. Make sure that your g.MOBIlab+ is switched on and connected to the PC. Click **Select Hardware...** in the **Settings** menu.



Click on the **g.MOBIlab+** menu entry in the **Available Hardware** list and select your g.MOBIlab+ (e.g. MP-2007.10.06 COM Port : COM12). Add the device to the **Selected Hardware** list by clicking the right arrow button. Click **OK** to close the dialog.

Select Hardware			×
Hardware Available Hardware: DAQ Simulator g.Hlamp g.MOBllab+ MP-2010.05.06 COM	A Port : COM4	Selected Hardwa	are: .0.05.06 CO
< >		< Cancel) OK

2. Click **g.MOBIlab+...** in the **Settings** menu to perform g.MOBIlab+ configuration.



In the **Analog Channels** section select the checkboxes of **Channel 1** and **Channel 5**. Select the checkbox **Enable streaming to SD card** in the **Operation Mode** section to record data acquired by g.MOBIlab+ to the built in SD card of g.MOBIlab+. To start data acquisition see step 6. Leaving this checkbox will either let the user record data to the hard disk or just display data in g.Recorder, see step 8. Click **OK** to apply the settings.

g.MOBIIab+ V2,04	4				\times
Info Select Port: CC)M4	Carial Number: M	P 2010 05 00		
Status: De	vice connected.	Senai Number: Mi	P-2010.00.06		
- Analog Channels	Sensitivity	HP-LP [Hz]	Polarity	Notch [Hz]	
Channel 1	500uV	0,5-100	Bipolar	none 🗸	
Channel 2	500uV	0,5-100	Bipolar	none ~	
Channel 3	2mV	0,01-100	Bipolar	none v	
Channel 4	2mV	0,01-100	Bipolar	none v	
Channel 5	5mV	0,5-100	Bipolar	none v	
Channel 6	5mV	0,5-100	Bipolar	none v	
Channel 7	250mV	0-100	Unipolar	none 🗸	
Channel 8	250mV	0-100	Unipolar	none v	
Sample Frequent Sampling Frequent Operation Mode	cy ency [Hz]: 256 st signal ⊡ En	SD SD SD Spa	Card card status: Ca ace left on SD car SD card Status	ard inserted rd: 1887 MB s: Not streaming	
			Cancel	OK	

- 3. Set features and markers as needed. To see how to configure markers and features, see steps 7 and 8 in the previous section.
- 4. Click on **Channels...** in the **Settings** menu.



Set the Individual Settings as shown in the image below.

Gr Char	nels							×
Individu	ual settings							
Device Ch. Nr.	- Logical Ch. Nr.	Acq.	Name	Туре	Sensi Low	tivity High	Offset	Unit
0 - 1	1	\checkmark	EEG1	EEG •	· -50	50	0	μV 👻
0 - 2	2	\checkmark		•	-100	100	0	μV 🔻
0 - 3	3	\checkmark		•	-0.5	0.5	0	mV 🔻
0 - 4	4	\checkmark		•	-0.5	0.5	0	mV 🔻
0 - 5	5	\checkmark	ECG1	ECG •	-1	1	0	mV 🔻
0 - 6	6	\checkmark			-5	5	0	mV 🔻
0 - 7	7	\checkmark			-5	5	0	۷ 🔻
0 - 8	8	\checkmark			-5	5	0	۷ 🔻
Commo	n settings	Туре	EEG	▼ Apply ->]			
	Sens L. -50 For chann	Sens H	H. Offset Unit	✓Apply ->	Start chann	el: 1	End ch	annel: 8
						[Cancel	ОК

 After selecting the Enable Streaming to SD card checkbox in step 2 it is possible either to stream data to SD card or just display data acquired by g.MOBIlab+ in g.Recorder. Click the Start Data Viewing button.



The **Start Streaming to SD Card** dialog asks the user to provide a **Filename** for the data recorded to the SD card.

Default filename is SESSION, characters entered are set to uppercase automatically. Characters not allowed for a filename are <, >, \, /, :, *, |, ? and ". Numbers can also be used.

The Space left on SD card in MB is also displayed

To confirm streaming to SD card click **Yes**. Click **No** to simply display data in g.Recorder.

😮 g.M	IOBIIab+ Start St	reaming t	o SD	—		×
?	Start streaming to	o SD card ?	?			
SD Care	d Info					
Space	e left on SD card:	1887MB	Filena	ame: [SESSION	
			No		Yes	

6. If the **Enable Streaming to SD card** button in step 2 is selected, data acquisition is stopped with the **Pause Data Viewing** button.



The **Stop Streaming to SD Card** dialog will pop up asking the user whether to stop streaming or not. If streaming is not stopped with the **No** button, g.MOBIlab+ will continue to acquire data to the SD card but g.Recorder will stop displaying and can even be closed. To stop streaming click the **Yes** button.

🕜 g.M	OBIIab+ Stop Streaming To SD	_		×
?	Stop streaming to SD card ?			
	No		Yes	

7. If the checkbox in step 2 is not selected, recording data to hard disk is stopped with the **Stop** button.



In this mode the **Pause Data Viewing** button stops data display in g.Recorder, but does not stop recording data to hard disk.

8. To reconnect to g.MOBIlab+ click the **Start Data Viewing** button in g.Recorder.



A message box will give the information that g.MOBIlab+ is streaming. Click **OK** to display data in g.Recorder again.



9. To proceed return to step 7.

Using g.Nautilusfor EEG

This section describes the setup of g.Nautilus for EEG data acquisition with g.Recorder.

To perform this example, please follow the steps below:

1. Connect the g.Nautilus Basestation to the PC and open the Hardware selection dialog by clicking **Select Hardware...** in the **Settings** menu.

Select Hardware		×
Hardware Available Hardware: DAQ Simulator 	Selected Hardware:	
	Cancel OK	

Click on the **g.Nautilus** menu entry in the **Available Hardware** list and select the serial number of your g.Nautilus (e.g. UA-2014.07.03). Add the device to the **Selected Hardware** list by clicking the right arrow button. Make sure that the g.Nautilus base-station and headset are paired and close the dialog with OK. If the devices are not paired, an information dialog will pop up. Turn the g.Nautilus headset on, then wait until base-station and headset are paired. Finally, terminate the dialog with **Retry.**

Error	\times
Could not connect to device 'NB-2014.07.03'. Check if headset and base station are paired.	
Retry Cancel	

2. Click g.Nautilus... in the Settings menu to configure the g.Nautilus device.



Set the **Sample Rate** in the **Amplifier Settings** section to 500 Hz and ensure that only the **Acquire** checkboxes of channel CZ and channel PZ are checked. You can use the shift key or the control key to select multiple channels. You can use the keystroke combination Ctrl + A to select all channels. To check or uncheck the **Acquire** checkboxes of the selected channels, click the **Acquire** checkbox of one of them.

Select channels CZ and PZ, apply a **Bandpass** filter **0.1 Hz – 100 Hz** and a **Notch** filter with **48Hz-52Hz** or **58Hz-62Hz**, depending on your local power line hum.

nplifier Settings		_		_		10		
Noise Reduction Accel CAR Count	eration Data er	Link	Quality ery Level	Digital Inputs Validation Indic	ator	Electrode V	Sample Rate: 500 Hz V	Network Channel:
nannel Settings	Channel	Acquire	Input Range	Bipolar Channel	Bandpass Filter	Notch Filter	CAR	Noise Reduction
put Bange (Resolution):	FP1		187.5 mV	none	none	none	No	No
2250 mV (260 22 mV)	FP2		187.5 mV	none	none	none	No	No
2200 mV (200.22 mV)	F3		187.5 mV	none	none	none	No	No
Apply to selection>	FZ		187.5 mV	none	none	none	No	No
	F4		187.5 mV	none	none	none	No	No
polar:	T7	\checkmark	187.5 mV	none	none	none	No	No
one 🗸	C3		187.5 mV	none	none	none	No	No
	CZ		187.5 mV	none	0.1 Hz - 100 Hz	48 Hz - 52 Hz	No	No
Apply to selection ->	C4	\checkmark	187.5 mV	none	none	none	No	No
	T8	\checkmark	187.5 mV	none	none	none	No	No
andpass:	P3	\checkmark	187.5 mV	none	none	none	No	No
.1 Hz - 100 Hz 🗸 🗸	PZ	\checkmark	187.5 mV	none	0.1 Hz - 100 Hz	48 Hz - 52 Hz	No	No
Apply to selection>	P4	\checkmark	187.5 mV	none	none	none	No	No
Apply to adjection ->	PO7	\checkmark	187.5 mV	none	none	none	No	No
ntch:	PO8	\checkmark	187.5 mV	none	none	none	No	No
0.0- 52.0-	OZ	\checkmark	187.5 mV	none	none	none	No	No
6 H2 - 52 H2 V								
Apply to selection>								
AR:								
lo ~								
Apply to selection ->								
se for Noise Reduction:								
lo ~								
Apply to selection>								

Click **OK** to close the dialog.

3. Configure the g.Recorder display by opening the Channels dialog from the Settings menu.

Settings	Analysis	Tools	M				
Select Hardware							
g.Na	utilus						
g.Na	utilus Digita	IIN					
Vide	o						
Data	Viewer						
Cha	nnels						

The channel **Name** of each in the configuration dialog selected channel should be assigned automatically. Provide a proper **Type** (e.g. **EEG**) for the selected channels. The **Sensitivity** is set automatically, but can be changed manually. However, these changes influence data visualization in the Data Viewer window only. Click **OK** to close the dialog.

🕂 Chanr	nels										×
Individua	al settings										
Device- Ch. Nr.	Logical Ch. Nr.	Acq.	Name		Туре		Sensi Low	tivity High	Offset	Unit	
1-8	8	\checkmark	CZ	EEG		•	-50	50	0	μV	•
1 - 12	12	\checkmark	PZ	EEG		•	-50	50	0	μV	•
	Sens L.	Type Sens I	EEG H. Offset Unit	•	Apply ->		Start chann	el: 1	End ch	annel: 2	
	-50	50	0 µV	•							
F	or channe	l type:	EEG	•	Apply ->						
									Cancel	OK	

4. After providing all the settings described in the steps above, the g.Recorder window should look like in the picture below.

/ Visualization-only Highpass: none + Lorpass: none + Netch: none + Det Viewer 00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000 000000000 000000000 000000000 000000000 000000000000000000000000000000000000	Gr g.I File	Recorder Settings	Analysis Tool	ls Mode V 00 @ 100	iew Window % @ 🔍 E	Help	nels: 2 📤 Seco	nds: 10.00	Video: Off	-		- 🗆	×
000000000000000000000000000000000000	📥	Visualizatio	n-only Highpass:	none -	Lowpass: none	• • Notch	none 🔻						
50,V 50,V CZ EEC L 12 12 50,V 50,V S0,V 50,V Feeture Viewer C C 22 Feeture Viewer C C 23 Feeture Viewer C C 23 For the seture Viewer C C 23 Feeture Viewer C 23 Feet	1 - 8	00:00:00.0	00:00:00.0	00:00:00.0	00:00:00.0	00:00:00.0	00:00:00.0	00:00:00.0	00:00:00.0	00:00:00.0	00:00:00.0	00:00:	00.0
CZ EEG 1.12 12 50,V 50,V FZ EEG Feature Viewer COX Fooked Potentials COX Video Viewer	-50µV	50µV											
I - 12 12 SO _V V SO _V V PZ EEC ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■	cz	EEG											
PZ EEG Feature Viewer Evoked Potentials Video Viewer	1 - 12	12											
Feature Viewer	PZ	SOUV											
Feature Viewer Image: Second		<	<										× >
	Featu	ure Viewer				Evoked Potenti	als			Video View	ver		×

5. Start data acquisition either by clicking the **Start Data Viewing** button to display data without recording it to the hard disk



or by clicking the **Record** button to store acquired data to the hard disk.



r Gun.	C:\Users\US	ER\Documents\gRecorder		Browse
Filename:	RecordSessio	on_		Record Raw Data
Recording T	me			
Enable	Time Limitatior	n Hours 1	÷ Minute	es 1 🔺
Subject				
.ast Name(s):			mandatory
First Name(s)	:			mandatory
Date of Birth	09.11.2	2016 🔲 🔻 🗌 mandato	лу	
Comment:		Кеу	Value	
Load				
Save				
	_			
Session Data	3			
Gession Data Gession:				mandatory

6. When the **Record** button is clicked, the **Recording** dialog opens.

This dialog has already been described in the chapter *Using g.USBamp for EEG and ECG including Video recording*. See that section for a detailed description of the available options.

Click the **OK** button to start data acquisition and recording.

7. The actual data acquisition state is shown in the status bar at the bottom left corner of g.Recorder. **Standard** is displayed if data is acquired without storing it to the hard disk, while **Recording** is displayed if data is stored to the hard disk.

Mode: Standard	Sampling[Hz]: 500	Total Chan.: 2	Filename:	File Size[MB]:	System Time: 1	6:05:24:
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8. To stop data acquisition, click the **Pause Data Viewing** button, which stops data acquisition in display mode or data display in recording mode.



To finish recording, click the **Stop** button.





contact information

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