



Lifelines iEEG

User Manual

Revision 10.02 (2015)

Software Version 2.0

Regulatory Compliance

K143487: FDA 510(k) Clearance for class II medical device.

Product: Lifelines iEEG (software)

Copyright

All rights reserved. This manual contains proprietary information which is protected by copyright and may not be copied in whole or in part except with the prior written permission of Kvikna and Kvikna Medical. The copyright and the foregoing restrictions on the copyright use extend to all media in which this information may be preserved.

This copy of the Lifelines iEEG User Manual shall be used only in accordance with the condition of sale of Kvikna and Kvikna Medical or their distributors.

Kvikna and Kvikna Medical make no representations or warranties of any kind whatsoever with respect to this document. Kvikna and Kvikna Medical disclaim all liabilities for loss or damage arising out of the possession, sale or use of this document.

Kvikna® is a registered trademark of Kvikna ehf.

Lifelines iEEG® is a registered trademark of Kvikna ehf.

Lifelines® is a registered trademark of Lifelines Ltd.

Microsoft Word®, Windows®, and Office® are registered trademarks of Microsoft Corporation.

All other trademarks and product names are the property of their relevant owners.

Kvikna and Kvikna Medical Stórhöfði 21 110 Reykjavik Iceland Tel: +354 578 8400 Email: kvikna@kvikna.com www.kvikna.com
--

Report suggestions or complaints by email: ieeg@kvikna.com

Table of Contents

User Manual..... 1

Intro 8

Intended Use 8

 Indication for Use 8

Disclaimers and Warranties..... 8

Compliance..... 9

 International standards: 9

 European standards:..... 9

Safety and Warning Notices 9

 Third-party Devices..... 11

 Reporting Incidents 11

 Warning Symbols 11

Device Description..... 11

Essential Performance 13

System Requirements..... 13

 Lifelines iEEG Review System 13

Lifelines iEEG Acquire Portable System 14

Acquire Portable Connections and Usage..... 14

 Additional Warnings..... 14

 EEG Electrodes 15

 Use with other equipment 15

 Interference..... 16

 Maintenance and Cleaning..... 16

 Environmental Parameters for Operation 17

 Connections Diagrams 18

 Starting the System 21

 Shutdown of the System 21

 Acceptance Test..... 21

- Explanation of Symbols.....21
- Accompanying Documentation to Acquire Portable.....22
- Wifi Specifications.....23
- Compatible File Formats23
- Accompanying Documentation.....23
- This Manual.....24
- Concepts.....24
 - Visits24
 - Patient Database.....24
 - Exams24
 - Workflow24
 - Permissions.....25
- Login.....25
- Lifelines iEEG Centrum.....26
 - The User Interface.....26
 - Patient List26
 - Patient Visit List.....26
 - Visit Properties27
 - Exam List27
 - Exam Properties29
 - Patient State29
 - Reports and Documents29
 - Patient Properties.....30
 - Permissions.....31
 - Workflow32
 - Patient Admission.....35
 - New Patient35
 - Existing Patient.....35
- Import.....36
 - The Import Tab.....36

- Processing.....40
 - Buttons41
- My Settings41
 - Connection List.....41
 - Settings.....42
- The Admin View43
 - User Administration.....43
 - Reports45
 - Licenses47
 - Definitions48
 - Auditing.....51
- Lifelines iEEG Acquire.....52
 - Intro.....52
 - Starting the Exam.....52
 - Login and Select Patient52
 - Amplifier Setup.....53
 - Impedance55
 - Video55
 - EEG56
 - Lock.....58
 - Patient Mode.....59
- Lifelines iEEG Review61
 - Intro.....61
 - Launch iEEG Review61
 - Exam View and Review61
 - Exam View.....62
 - Exams Tab62
 - Import Tab62
 - Processing Tab65
- Review.....66

Channel Chart.....	67
Timeline.....	67
Toolbar Controls.....	69
Paging.....	69
Sensitivity.....	69
Timebase.....	70
Montage Selector.....	70
Perspective Selector.....	70
Filters.....	71
Prune Preview.....	71
Channel Labels.....	71
Special Channels.....	72
Event Palette.....	73
Place an Event.....	73
Duration Events.....	74
Event Caption.....	75
Annotation Events.....	75
Context Events.....	76
Numerical Events.....	76
Prune Events.....	76
Move an Event.....	76
Delete an Event.....	76
Panel.....	77
Intro.....	77
Video.....	78
Event List.....	79
Measurement Tools.....	81
Artifacts.....	83
Menu.....	85
Save As.....	85

Prune	85
Demographics	86
Seizure Detection	86
Settings	86
Montage	87
EEG Electrodes	92
EEG References	93
Non-EEG Signals	95
Events	96
Perspectives	99
My Settings	101
Appendix 1	102
Trackit Users Quick Guide	102
Setting the Correct Modality	102
Recording with Trackit	103
Importing the Exam	103
Review	103
Appendix 2	103
Editing and Creating Native Report Templates	104
Modify the Default Native Report Template	104
Create a New Native Report Template (advanced)	104
Creating New Report Fields (advanced)	104
Operations (advanced)	105
Appendix 3: Manufacturer’s Declaration	106
EMC Compatibility	106
Index	110

Intro

Intended Use

Lifelines iEEG is an EEG system that allows acquisition, display, archive, storage and analysis of physiological signals. The intended user of this product is a qualified medical practitioner trained in electroencephalography who will exercise professional judgment in using the information.

The Lifelines iEEG system also includes the display of quantitative EEG plots, power spectrum, which is intended to help the user to monitor and analyze the EEG.

This device does not provide any diagnostic conclusion about the patient's condition to the user.

Caution: Federal (USA) law restricts this device to sale by or on the order of a physician licensed by the law of the State in which he practices to use or order the use of the device.

Indication for Use

Lifelines iEEG is used as an aid in the diagnosis of neurophysiological disorders such as epilepsy.

Disclaimers and Warranties

The information in this section is subject to change without notice.

Except as stated below, Kvikna ehf (Kvikna) makes no warranty of any kind with regard to this equipment, including, but not limited to, the implied warranties of merchantability and fitness for a particular purpose. Kvikna shall not be liable for errors contained herein or for incidental or consequential damages in connection with the furnishing, performance or use of this equipment.

Misuse, accident, modification, operating environment, improper maintenance or damage caused by a product for which Kvikna is not responsible will void the warranty.

Kvikna does not warrant uninterrupted or error-free operation of its products.

Kvikna or its authorized agents will repair or replace any products which prove to be defective during the warranty period, provided that these products are used as prescribed in the operating instructions in the user's and service manuals.

No other party is authorized to make any warranty to assume liability for Kvikna's products. Kvikna will not recognize any other warranty, either implied or in writing. In addition, services performed by someone other than Kvikna or its authorized agents or any technical modification or changes of products without Kvikna's prior written consent may be cause for invalidating this warranty.

Kvikna manufactures hardware and software to be used on or with standard PC-compatible computers and operating software. Kvikna, however, assumes no responsibility for the use or

reliability of its software or hardware with equipment that is not furnished by third-party manufacturers accepted by Kvikna at the date of purchase.

All warranties for third-party products used within the Lifelines iEEG system are the responsibility of the relevant manufacturer. Please refer to the relevant documentation on each product for further details.

This document contains proprietary information that is protected by copyright. All rights are reserved. No part of this document may be photocopied, reproduced in any other form or translated into another language without the prior written consent of Kvikna.

Compliance

The system is designed to comply with the following medical safety standards.

International standards:

IEC 60601-1:2006	Medical electrical equipment – Part 1: General requirements for safety.
IEC 60601-1-2:2007	Medical electrical equipment - Part 1-2: General requirements for basic safety and essential performance - Collateral Standard: Electromagnetic disturbances - Requirements and tests
IEC 60601-2-26:2003	Medical electrical equipment – Part 2-26: Particular requirements for the safety of electroencephalographs.
IEC 62304:2006	Medical device software – Software life cycle processes.
IEC 62366:2007	Medical devices -- Application of usability engineering to medical devices

European standards:

EN ISO 14971:2012	Medical devices – Application of risk management to medical devices.
-------------------	--

Safety and Warning Notices

WARNING: Safety of Lifelines iEEG systems cannot be ensured unless all components are provided by Kvikna ehf or an authorized agent. Items not specified as part of a Lifelines iEEG system must not be connected to a Lifelines iEEG system.

WARNING: Lifelines iEEG is intended to be installed, used and operated only in accordance with the procedures given within this manual and accompanying documentation for the purpose for which it was designed. Nothing stated in this manual reduces the user's professional responsibilities for sound judgment and best practice.

WARNING: Users shall only install, use and operate the equipment in such ways that do not conflict with applicable laws or regulations which have the force of law.

WARNING: Use of the equipment for purposes other than those intended and expressly stated by the manufacturer, as well as incorrect use or operation, may relieve the manufacturer or his agent from all or some of the responsibility for resultant non-compliance, damage or injury.

WARNING: This equipment is intended to be used by a healthcare professional.

WARNING: This equipment is intended only as an adjunct device in patient assessment; it must be used in conjunction with other methods of patient diagnosis. This equipment is not be used for the determination of brain death.

WARNING: The Lifelines iEEG system is not intended to be used as a vital signs monitor.

CONTRAINDICATIONS: Do not use the Trackit Mk3 amplifier in an MRI environment, in an explosive atmosphere or during defibrillation.

WARNING: Lifelines does not supply EEG electrodes. The unit accepts standard 1.5 mm touchproof electrodes using DIN 42802-style connectors. To ensure patient safety, the electrodes used must be approved to the Medical Device Directive 93/42/EEC in Europe or to the relevant local standards outside Europe.

CAUTION: The conductive part of electrodes and their connectors, including the Neutral electrode, should not contact other conductive parts including earth.

WARNING: Lifelines does not supply the Nonin sensor. Only use the 'PureLight' sensors specified by Nonin to be used with their Oximeters.

CAUTION: When in close proximity to the Amplifier, do not use mobile phones, transmitters, power transformers, motors, or other equipment that generates magnetic fields. Refer to the Appendix for more information. Medical electrical equipment needs special precautions regarding EMC and needs to be installed and put into service according to the EMC information provided in the Appendix.

WARNING: The function or safety of the equipment could be impaired if it has been subjected to unfavorable conditions in storage or in transit. If at any time function or safety is thought to be impaired, the instrument should be taken out of operation and secured against unintended use.

WARNING: Do not open or modify the equipment without the authorization of the manufacturer.

CAUTION: Do not touch simultaneously any accessible USB or other contacts on the PC or monitor and the patient.

WARNING: Lifelines iEEG may cause radio interference or may disrupt the operation of nearby equipment. It may be necessary to take mitigation measures, such as re-orienting or relocating the Lifelines iEEG system or shielding the location.

WARNING: the use of accessories, transducers and cables other than those specified, with the exception of transducers and cables sold by Kvikna ehf or an authorized agent as replacement parts for internal components, may result in increased emissions or decreased immunity of the Lifelines EEG system.

WARNING: The equipment or system should not be used adjacent to or stacked with other equipment and that if adjacent or stacked use is necessary, the equipment or system should be observed to verify normal operation in the configuration in which it will be used.

WARNING: Non-medical equipment, when used with the system, should comply with IEC/ISO safety standards relevant to that equipment. IT equipment should comply with IEC 60950.

Third-party Devices

Refer to all third-party device documentation and heed all warnings, cautions and safety markings associated with the installation and use of those devices before using this system.

Reporting Incidents

In the event of a malfunction or change in performance of the device that may affect safety, send a report to ieeg@kvikna.com

The lay user should also report any malfunction or incident to the manufacturer at the above email.

Warning Symbols

Additional warnings are indicated by this symbol elsewhere in this document. The text explains its intended use.



WARNING: Users must ensure that the given instructions are followed.

Warnings are directions which, if they are not followed, can cause fatal or serious injuries to a user, engineer, patient or any other person or can lead to a mistreatment.

Device Description

The Lifelines iEEG medical device is intended for acquisition and review of EEG and other physiological data as well as digital video synchronized to the EEG. It offers industry standard features such as re-montaging and band pass filtering. Furthermore it offers spectral analysis in the form of trend analysis and user selected sections of EEG.

The Lifelines iEEG acquisition system consists of

- Proprietary software.
- Off the shelf IT components.
- Medical power supplies.
- EEG amplifier.
- Photic Stimulator.

The EEG amplifier is a medical device (Lifelines Trackit, FDA K010460) and the photic stimulator as well (Lifelines Photic Stimulator, FDA K101691). The off the shelf IT components include a PC, for example a Laptop, a “power over Ethernet” switch, IP video cameras and cables. The PC and the switch are powered by medical power supplies. Cameras are powered through the switch.

The Lifelines iEEG acquisition software which is a part of the Lifelines iEEG software system allows the user to interact with the hardware, i.e. amplifier, photic stimulator and video cameras. Furthermore, it stores and presents the information collected by the hardware following industry standard, user customizable processing. Furthermore it allows the user to annotate the data during recording.

Lifelines iEEG is a software system also used to manage and review EEG examinations. It works on data acquired by the Lifelines iEEG acquisition software as well as data from some third party EEG equipment that is imported into the system. The EEG is presented in a conventional way and conventional signal processing is applied such as re-montaging and band pass filtering. The system is also capable of presenting digital video synchronized to the EEG if this is available. Some advanced analysis methods are provided as an aid: FFT analysis and Artifact Removal.

The software is designed using service oriented architecture enabling the possibility of reviewing data over WAN without the use of additional remote desktop software solutions.

The iEEG Centrum is the main patient and user administration area. It is used to manage patient demographics, keep track of exams and manage user access to clinical data. The system can be configured to allow access from the internet using encrypted communication.

The iEEG Review software is used for review and analysis of EEG data by clinical experts. The user can navigate within the EEG that can be many hours long, filter and re-montage as desired. Furthermore, the artifact removal feature can be used to automatically filter artifacts from the EEG. If video data is available, it can be shown synchronized to the EEG traces. Sections of relevance are manually marked by the user and the relevant sections are archived for long-term storage.

Essential Performance

The medical device is intended to be used as a tool to aid diagnosis of neurological diseases such as epilepsy. It does not provide life-support functions or monitoring of vital physiological signs. The symptoms to be diagnosed and treated are not acute in the sense that delay in the measurement will not result in harm to the patient. However incorrect output from the device could lead to an inappropriate treatment that would present an unacceptable risk to the patient.

Therefore, the Essential Performance of the device is to deliver accurate data in the following ways.

- Correct analog processing, analog to digital conversion, digital processing and host communication.
- Correctly interface to the EEG amplifier and write the data to file.
- Correctly read the data from the previously written file.
- Correctly process the data according to the specification given by the operator.
- Correctly display the data according to the specification given by the operator.
- Associate the data with the correct patient.

System Requirements

Lifelines iEEG Review System

This system includes the Centrum and Review clients. It is based on a standard PC (desktop or notebook) running the Windows operating system. For faster processing and added ease, standard PC equipment can be added, such as a printer, video cards etc. Only PC cards and drives approved by Lifelines Ltd or Kvikna ehf may be fitted into the PC. This also applies to notebooks.

The minimum client system requirements are as follows:

- Computer running Windows 7, 8 or 8.1
- .NET 4.5 Framework (Full Version)
- C++ Runtime Libraries
- 1 GHz or faster Intel Processor 32-bit (x86) or 64-bit (x64).
- 100 MB Disk Space for Client Software.
- LAN Connection.
- 1 GB RAM (recommended: 4 GB)
- Display with 1280x1024 (recommended: 1680x1050)
- Windows Media Player 11
- Optional: Word 2010 for reporting.

- Optional: Microsoft SQL Server (Full Version / Express) 2005 or 2008 R2

Lifelines iEEG Acquire Portable System

All hardware and software components are provided and pre-connected with the purchase of this system. Refer to the following section, Acquire Portable Connections and Usage, to ensure that all parts are supplied and connected properly, and that the additional safety notices and cautions are heeded.

Acquire Portable Connections and Usage

Additional Warnings

The following warnings, in addition to the warnings in the Safety and Warning Notices section must be heeded regarding the installation and use of the Acquire Portable variant of the system.



WARNING: All software components are supplied configured. The power options settings (in the Control Panel) must not be changed or tampered with.



WARNING: Use only medical grade power supply. These are provided with the system.



WARNING: Do not place laptop or tablet pc on a soft surface, e.g. a couch or blanket. This can cause overheating and the system may shut down.



WARNING: Care should be taken in using systems with photic stimulator. The operator should not look into the photic device when it is turned on.



WARNING: Strangulation hazard due to long cables. Keep out of reach of children.



WARNING: Choking hazard due to small parts that may come loose. Keep out of reach of children.

EEG Electrodes

The amplifier connects to standard 1.5mm touchproof EEG recording electrodes arranged in a standard 10-20 pattern, attached to the patient's head.



WARNING: Lifelines does not supply EEG electrodes. The Amplifier accepts standard 1.5 mm touchproof electrodes using DIN 42802-style connectors. To ensure patient safety, the electrodes used must be approved to the Medical Device Directive 93/42/EEC in Europe or to the relevant local standards outside Europe.

CAUTION: The conductive part of electrodes and their connectors, including the Neutral electrode, should not contact other conductive parts including earth.

CAUTION: Degraded or loosened sensors or electrodes can affect the essential performance of the system. Refer to the Impedance section in this manual to learn how to check electrode impedance.

Use with other equipment

Defibrillators and HF surgical equipment

The equipment is not defibrillator proof and should not be used in situations where a defibrillator is likely to be used.

The equipment should not be used with high frequency surgical equipment.



CONTRAINDICATIONS: Do not use the Trackit Mk3 amplifier in an MRI environment, in an explosive atmosphere or during defibrillation.

Other patient-connected equipment

When used simultaneously with other patient-connected equipment, for example a cardiac pacemaker or other electrical stimulator, it is unlikely that a safety hazard will arise. However always consult the documentation supplied with the other patient-connected equipment to ensure that all hazards, warnings and cautions are considered before the equipment is used together.



WARNING: Non-medical equipment, when used with the system, should comply with IEC/ISO safety standards relevant to that equipment. IT equipment should comply with IEC 60950.

Leakage current

This system is designed to comply with IEC 60601-1, the international standard for medical electronic equipment, which specifies the permissible levels of leakage current. A potential hazard exists in the summation of leakage currents caused by connecting several pieces of

equipment together. Because this system can be used in conjunction with standard electronic devices, the total leakage current should be tested whenever the system is modified.

There should be no electrical connections between the system equipment, which is powered via the isolation transformer, and any other equipment powered from a non-isolated mains supply.

Interference

The Trackit Mk3 amplifier will continue to operate in the presence of radio frequency magnetic fields (RF) and the effects of electrostatic discharges (ESD) and other interference, in accordance with the requirements of EN60601-1-2. However, the Trackit Mk3 amplifier records signals of very low amplitude, and these signals themselves are not immune to the effects of RF, ESD and low-frequency magnetic field interference. Such interference may cause signal artefacts.

The Trackit Mk3 may have internal radios fitted. These are approved industry-standard Bluetooth and Wi-Fi types which present minimal risk of reciprocal interference with other equipment.

CAUTION: To avoid interference, when in close proximity to the amplifier (less than 3.3 meters), do not use mobile phones, transmitters, power transformers, motors, or other equipment that generates magnetic fields. Refer to the Appendix for more information.

Note: Medical electrical equipment needs special precautions regarding EMC and needs to be installed and put into service according to the EMC information provided in the Appendix.

Maintenance and Cleaning

The Lifelines iEEG system requires professional cleaning in between uses as described in this section. The system is not intended to be cleaned by the lay-user (patient).

The Trackit Mk3 amplifier requires no routine testing, calibration or maintenance procedures apart from occasional cleaning and checking for wear and damage to all parts including the accessories.

Cleaning

All the outer surfaces of the Trackit Mk3 may be cleaned using a soft cloth moistened with water and gentle kitchen detergent and squeezed dry. A low-pressure air-line or a vacuum cleaner can also be used.

Clean outside surfaces of laptop or tablet computer with a soft cloth or sponge moistened with water and gentle kitchen detergent and squeezed dry before wiping the surface.

Clean keyboard with a small amount of isopropyl alcohol applied to a soft, lint-free cloth.

Clean display with a dry, soft lint-free cloth. If necessary to remove stains, use a small amount of isopropyl alcohol mixed 50-50 with water applied to the cloth.

Clean other accessories with a soft, lint-free cloth with a small amount of isopropyl alcohol mixed 50-50 with water if necessary.



Caution: Do not allow any liquid to enter the case of any instrument or connector. Do not use acetone on any of the instruments. Do not spray cleaner directly onto any instrument.

Carrying case should be vacuumed and wiped clean with disposable disinfectant wipes or with a small amount of isopropyl alcohol mixed 50-50 with water applied to a lint-free cloth.

Environmental Parameters for Operation

The operational and storage/transportation environmental conditions are as follows:

Operational:

Temperature	+10°C to +40°C
Relative humidity	25% to 95% non-condensing
Atmospheric pressure	700mB to 1060mB



WARNING: Do not obstruct any cooling slots. Position the equipment so that air flows freely.

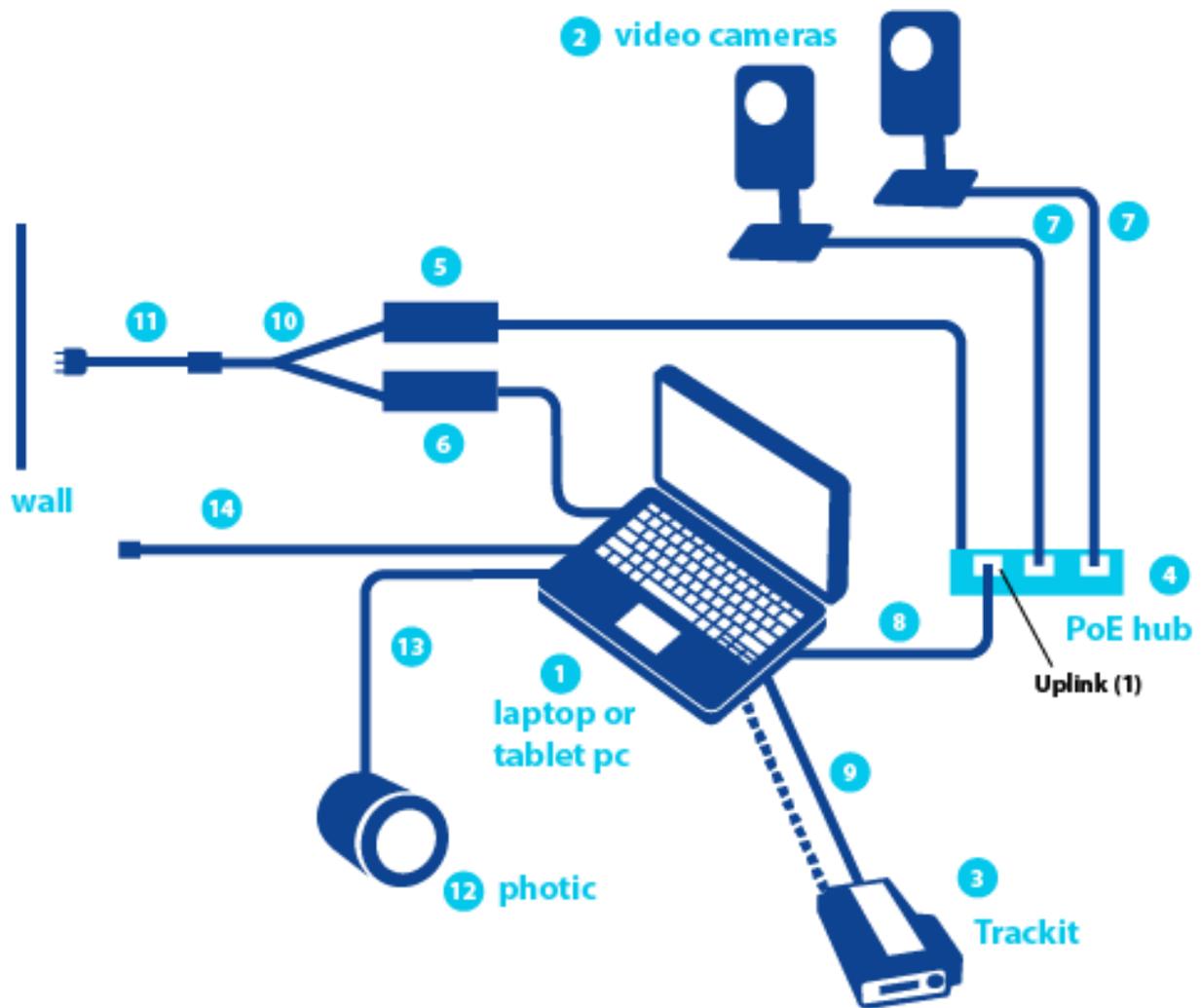
Storage and transport:

Temperature	-10°C to +50°C
Relative humidity	10% to 95% non-condensing
Atmospheric pressure	500mB to 1060mB

Expected Service Life

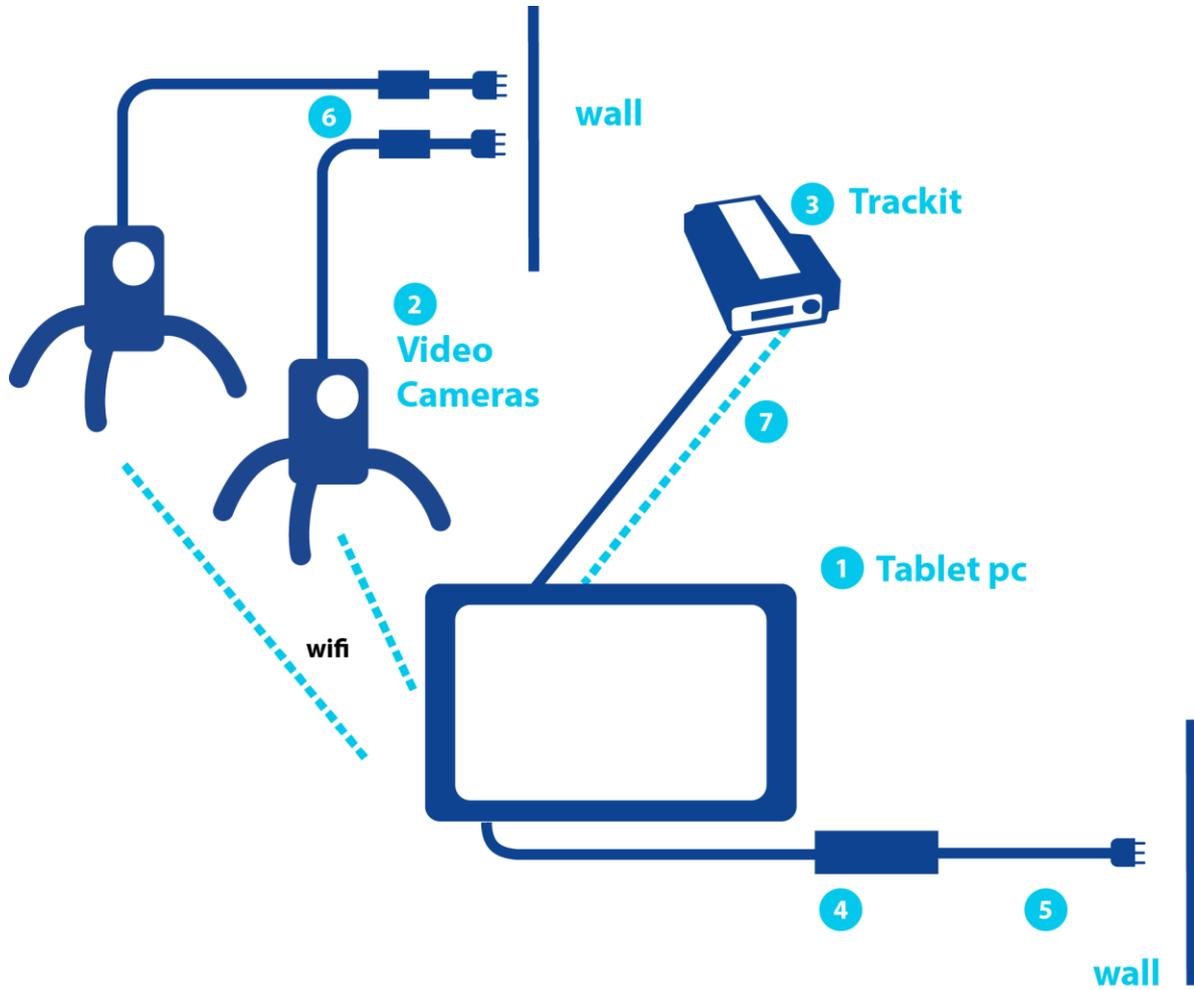
The expected service life of the Lifelines iEEG Portable system is 5 years.

Acquire Portable with Photic



1. Laptop PC
2. Video Camera (1 or 2)
3. Trackit Mk3
4. PoE Hub
5. Medical Grade Power Supply 48V
6. Medical Grade Power Supply 19.5V
7. Ethernet Cable (1 or 2) 3.0m
8. Ethernet Cable 0.5m
9. USB Cable or Bluetooth
10. Splitter Cable
11. Extension Cable 110V/220V
12. Lifelines LED Photic
13. USB Cable
14. Ethernet Cable to Hospital Network

Acquire Portable Wireless



1. Tablet PC
2. Camera (1 or 2)
3. Trackit Mk3
4. Medical Grade Power Supply 19.5V
5. Extension Cable 110V/220V
6. Power Supply (1 or 2) 110V/220V
7. USB Cable or Bluetooth

Connecting Patient to Amplifier

For all systems, connect the patient to the amplifier via electrodes using the setup of your choice.



Starting the System

To start the system, proceed as follows:

- Plug the PC into the mains supply.
- Switch on the PC and wait for the software to load.
- Ensure all components are connected according to the appropriate diagram.
- Follow the steps in the chapter, Lifelines iEEG Acquire.
- These procedures also apply following a mains interruption.

Shutdown of the System

At the completion of a study proceed as follows to shut down the system:

- End the recording following the steps in the chapter, Lifelines iEEG Acquire.
- Switch off the PC and disconnect the mains supply.

Acceptance Test

An acceptance test form is provided with the system. After checking the system against the appropriate connections diagram, sign the form and return it with any comments. If the form is not returned, it is presumed that installation was satisfactory and acceptance is agreed.

Explanation of Symbols



Read the manual



Heed warnings in manual



Manufacturer



Serial Number



2012/19/EU (WEEE directive): Products marked with this symbol cannot be disposed of as unsorted municipal waste in the European Union. For proper recycling, return this product to your local supplier upon the purchase of equivalent new equipment, or dispose of it at designated collection points. For more information see: www.recyclethis.info

Accompanying Documentation to Acquire Portable

Refer to these additional guides for information regarding components of the Acquire Portable system:

- Trackit Mk3 User Manual
- Lifelines Photic User Manual

Wifi Specifications

Wi-Fi Parameters

Wi-Fi standard	IEEE802.11b, 802.11g, 802.11n Draft
Frequency range	2.4 GHz ~ 2.4835 GHz
Communication bandwidth	Support 20/40 MHz
Protocols	802.11b: CCK, QPSK, BPSK; 802.11g/n: OFDM
802.11g/n: OFDM	64/128-bit WEP, WPA/WPA2, WPA-PSK/WPA2-PSK, WPS
Transmission rate	11b: 11Mbps, 11g: 54Mbps, 11n: 150Mbps
Transmit Output Power	11b: 17±1.5dBm @ 11Mbps 11g: 14±1.5dBm @ 54Mbps 11n: 12.5±1.5dBm
Transmission range	Outdoor: 200m, Indoor: 50m(depend on environment)
Wireless Standards	IEEE802.11b, 802.11g, 802.11n Draft

Compatible File Formats

Lifelines iEEG is compatible with the following file formats:

1. European Data Format .edf
2. NicoletOne (trademark Natus) .e and .eeg files.
3. iEEG format

Accompanying Documentation

The equipment needs to be installed in accordance with the information provided in these accompanying documents:

- Lifelines iEEG - Admin Guide
- Lifelines iEEG - Server Installation Guide
- Lifelines iEEG - Client Installation Guide

See the following guide for best practices in using the Centrum administrative features:

- Lifelines iEEG - Best Practices

This Manual

This manual accompanies the system for easy reference. The system described in this manual describes the most extensive configuration and every option may not be configured on your system.

Concepts

Before delving into the details of each feature of Lifelines iEEG, here is a short description of some of the concepts and terms we will be referring to. Some of these are user interface items you will see as you begin using the software.

Visits

Patient Visits are managed automatically by the system. Users cannot specifically add, update or delete visits.

When a patient is admitted into the system, a new Visit is created and a new exam is initiated. Subsequent exams are added to the current visit if the user creating or importing them has full access to the visit. Otherwise a new visit is created. A visit is considered completed once all the exams contained in the visit have been archived. If the patient is readmitted after the visit has been closed, a new visit is created.

In short, each patient in the database can be associated with more than one visit, and each visit can contain several exams.

Patient Database

The Patient Database includes all available patients in the system, past and present plus their demographics. Patients are identified by a distinct Patient ID. The Patient Database is automatically searched when admitting a patient to the system, when importing an exam, and when reassigning an exam to another patient.

Exams

All information and collected data associated with a clinical test make one exam, including reports, external files and workflow state. Each exam is identified by a distinct Exam ID.

Workflow

Each exam type is associated with a customizable Workflow, which includes several stages beginning with Initiate and ending with Archive. The Workflow State refers to the step in the workflow that is in progress or most recently completed.

Permissions

Permissions are granted to patient visits by user group. Individual users can belong to more than one group. Permissions can be either full access, read only, restricted read only, or no access. When a user admits a new patient or creates a new exam where a new visit is created, the current user's default group is given full access to the new visit. Users are only aware of groups they are members of, while administrators have access to all groups.

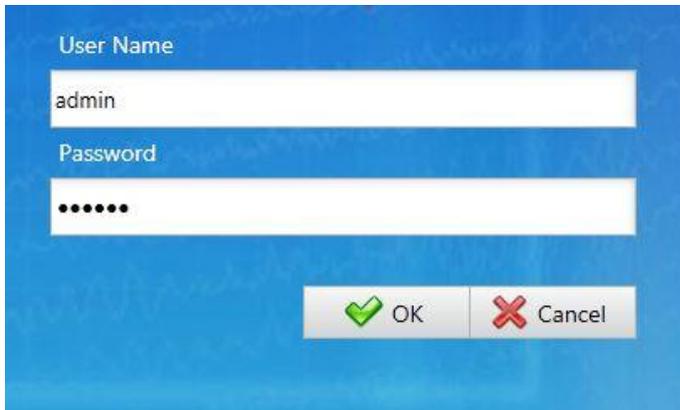
Login

If more than one database is available, select a database then enter user name and password. Click OK.

Database Button



Login

A blue dialog box with a white border. It contains two text input fields. The first field is labeled 'User Name' and contains the text 'admin'. The second field is labeled 'Password' and contains six black dots. At the bottom right of the dialog box, there are two buttons: 'OK' with a green checkmark icon and 'Cancel' with a red X icon.

After successfully logging in, your user name is stored and displayed in the user name field next time you log in.

If the server you attempt to connect to is a newer version than your client (but within the same major version), you will be prompted to upgrade. Click yes to download and install the new version.

To add a new database, click the Manage Connections icon then click the Add button on the Connection List. Under Connection Properties, give the database a name and type in the host path. Click Save to add the database to the Connection List.

Add New Connection



You can also import a database. Click the Import button, browse for the database and click Open.

Go back to the Login via the Login button on the top-left corner of the screen.

Back to Login



Lifelines iEEG Centrum

The User Interface

The main navigation of Lifelines iEEG Centrum is a row of tabs across the top of the screen. Most of these tabbed pages are divided into a left and right pane. The size of the panes can be adjusted, if necessary, by dragging the center divider line to the left or right.

Patient List

The Patient List tab is the main work area of iEEG Centrum and the first thing you see after logging in. Here you can search for current patient visits, view and edit the corresponding patient and exam properties, and schedule new exams within a current visit. You can follow a workflow path associated with each exam, including launching external modality applications. You can also create and view reports or add imported documents to the patient visit. Read on for a detailed description of each section of the Patient List screen.

Patient Visit List

The Patient Visit list shows a list of patient visits currently in progress. Click on a patient in the Patient Visit list to activate the Visit Properties on the right side of the screen. The items on the list can be sorted by clicking on each list header, for example, sort by Patient ID or Last Name.

If the list is very large, it will be displayed in pages. Click the arrows or page numbers at the bottom of the list to scroll through the pages. If you want to change the number of exams that are displayed on each page, type a new number in the Items per page box.

Patient Visit list sorted by last name

PATIENT VISITS						
<input type="text"/>				<input type="checkbox"/> Assigned To Me	<input type="checkbox"/> Include Archived	
<input type="text"/>				From	To	
<Exam Type Filter>				<State Filter>		<Time Filter>
				1.4.2013	30.4.2013	
Patient ID	Last Name	First Name	Date of Birth	Created	Access Level	
RB21033266	Black	Rowan	21.3.1932	6.3.2012	Full Access	
SB0809442365	Browne	Shadey	8.9.1944	5.3.2012	Full Access	
AC0405805521	Crimson	Alizarin	4.5.1980	1.3.2012	Full Access	
AG0912583210	Greene	Amanda	9.12.1944	1.3.2012	Full Access	
RM15101965	Madder	Rose	15.10.1965	1.3.2012	Full Access	

Search

Begin typing a name or search phrase to narrow down the choices displayed on the Patient Visit list. It is possible to search by the following criteria: Patient ID, Social Security Number, Name (Last, First or Middle), Street Address, City, Zip Code, Patient Notes and Exam Notes.

Filters

You can also narrow down the search by selecting filter options. The filters can be used to display only patient visits containing exams of a specific exam type, in a particular workflow state, or within a certain time frame. Select specific dates by typing in the From/To fields or clicking on the calendars. Use the Assigned to Me or the Include Archived check boxes to further filter the Patient Visit list.

Visit Properties

The Visit Properties shows information related to the currently selected patient visit, including exams and exam properties, exam workflow, patient properties and permissions, all described in detail below.

Exam List

To display the Exam list, click a visit on the Patient Visit list to select it. The Exam list appears under Visit Properties (on the right of the display) with the name of the patient above. Click on an exam from the list to reveal the exam properties and workflow associated with that exam, and also to activate the buttons described below.

Exam List & Buttons

Exam ID	Exam type	State	Timestamp	Assigned To	Created
AG101	Video ambulatory	Scheduled	19.11.2014 16:16:02	Administrator	29.10.2014 11:54
AG102	Generic	Recorded	25.3.2010 09:51:20	Administrator	28.10.2014 14:28
AG103	Video ambulatory	Recorded	27.10.2014 15:20:39	Administrator	27.10.2014 15:20
AG104	Video ambulatory	Recorded	23.10.2014 13:51:31	Administrator	23.10.2014 13:42

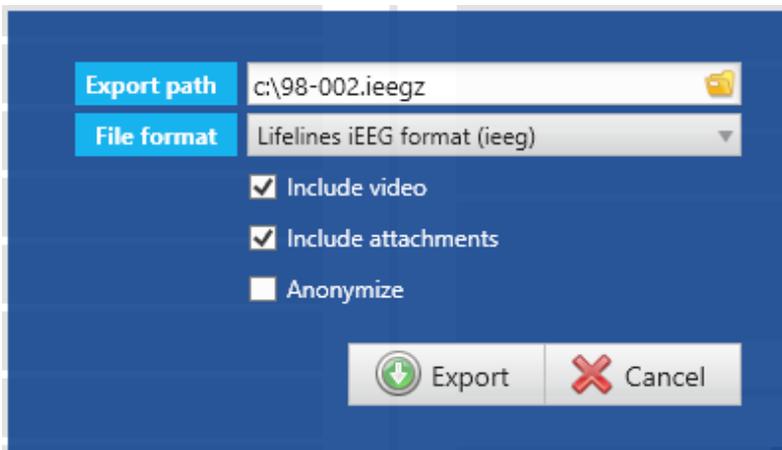
+ Add
👤 Reassociate
📄 Export
📄 Import EEG
👤 Transfer
🗑️ Delete

Click the Add button to initiate a new exam associated with the selected patient visit.

Click Reassociate to assign the selected exam to another patient.

Click Export to open a dialog allowing you to choose the location of the exported file and the file format you want the exported file in (.ieeg or .edf).

If ieeg is selected, you can check whether you want to include video or attachments or whether the exported file should be anonymous. If edf format is selected, the exported file will be anonymous with no video or attachments so those options are disabled.



The Import EEG button is available when the exam has been recorded using the amplifier recording mode. Use it to import the data from the amplifier storage to the local iEEG database; you can then use Transfer to upload the exam to the server.

The Transfer button is available when the exam has been recorded locally. Clicking it uploads the selected exam to the server.

Click the Delete button to delete the selected exam on the exam list.

Exam Properties

Selecting an exam in the Exam list displays the Exam Properties for that exam. The exam properties include Patient State, Reports and Documents, and History. These are all accessible via a tabbed interface. The information in the tabs is editable except for the history, which displays information about the passage of the exam through the workflow states.

To edit information on the Exam Properties or the Patient State tabs, simply type in new information or make selections from the drop-down lists and then click Save. Click Cancel before saving to revert back to the unedited state. Note that not all fields are editable at all times.

Note: The date and time may change between the scheduled and recorded states to reflect the actual time the recording was started.

Exam Properties

Greene, Amanda: AG103

Exam ID	AG103
Exam type	Video ambulatory
State	Recorded
Date	27.10.2014
Time	15:20
Exam Space	Default
Duration	00:04:37
Assigned To	Administrator
Secretary	
Recorded By	Administrator
Reading Physician	
Referring Physician	
Anesthesiologist	
Surgeon	

Patient State

On this tab you can enter information about the Patient's state during the exam, medication or other notes.

Reports and Documents

The Reports and Documents tab allows you to create, edit and publish reports, as well as import externally created documents to associate with the exam.

Click New to create a new report with the report template.

Select a report on the list and click Open to view or edit an existing report.

Select a report on the list and click Publish to create a PDF copy of the report. It is then marked as published on the list and a version number is assigned. The original document remains on the list in case you need to further edit it.

Click Import to browse for a document to import and associate with the exam. Users must have full access to do this.

Click Delete to delete a selected report. Published reports cannot be deleted.

Patient Properties

The Patient Properties tab (next to the Exams tab) shows the patient demographics of the selected patient. You can edit this information and you can also import a photo using the Import button and browsing for a photo. Be sure to click Save after editing or importing.

Patient Properties

Greene, Amanda: AG103

Patient ID	AG101
SSN	<input type="text"/>
Salutation	<input type="text"/>
Last Name	Greene
First Name	Amanda
Middle Names	<input type="text"/>
Date of Birth	<input type="text"/> 
Gender	<input type="radio"/> Male <input type="radio"/> Female <input checked="" type="radio"/> Unknown
Hand Dominance	<input type="radio"/> Left <input type="radio"/> Right <input checked="" type="radio"/> Unknown
Height	<input type="text"/> cm
Weight	<input type="text"/> kg
Street Address	<input type="text"/>
City	<input type="text"/>
Zip Code	<input type="text"/>
Telephone	<input type="text"/>
Mobile Phone	<input type="text"/>
Email	<input type="text"/>
Patient Notes	<input type="text"/>
Clinical History	<input type="text"/>

 Save
 Import

Permissions

Use the Permissions tab to assign access rights to the selected patient visit. Access rights are assigned to user groups. When a user initiates a visit, the user's default group automatically gets full access to the visit.

Users with full access to a visit can give other user groups access to the visit. Be sure to click Save after changing or assigning permissions.

Greene, Amanda: AG103

Patient Properties	Permissions	Visit Reports and Docs	Exam Properties	Patient State	Exam Reports and Docs	Exam History
User Group Name	No Access	Restricted Read Only	Read Only	Full Access		
Default	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>		
Doctors	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>		
LTM	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>		
Students	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>		
Techs	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>		

The permissions options are as follows:

Users with full access can see and edit all patient and exam information, as well as reports and video.

Users with read only access can see all patient and exam information, reports and video, but not edit.

Users with restricted read only access can see the exam and its information, but not any patient information, reports or video.

Users with no access cannot see the visit.

See the The Admin View > User Administration for information on creating user groups, assigning users to groups and selecting the default user group for each user.

Workflow

When an exam is selected on the Exam list, the workflow for that exam appears along the bottom part of the screen. The highlighted (yellow) button indicates the current stage of the exam in the workflow. The next button in the row (blue) is an active button that can be pressed to perform the next stage of the workflow, and a back button is active when it is possible to go back to the previous step.

Workflow Buttons

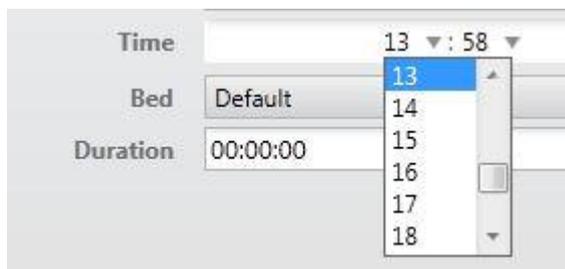


Initiate

When a new patient is admitted or a new exam is created, it is in the initiated state and the Initiate button will be highlighted in yellow. The Schedule button then becomes active.

Schedule

Press Schedule to schedule the exam. The system automatically schedules the exam to the current date and time. The Date and Time fields of the exam properties become active if you want to schedule the exam to a later date and time. The Record button now becomes active.



Record

Clicking Record launches the modality application associated with the Exam Type selected when the exam was created.

The associated modality is defined under Administration>Definitions.

Note that it is not possible to start another acquisition until the current one has completed.

Record Now

The Record Now button allows quick launch of the recording even before the exam has been scheduled.

Record Now Button



Import

Click the Import button on the workflow to import a recorded exam file. See the Import section of this manual for details. Importing moves the exam to the Recorded state of the workflow.

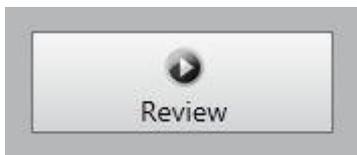
Review

After the recording has been imported, the Record Now button changes to the Review button, which can be used to open the recorded exam in Lifelines iEEG Review. You can also double click an exam on the Exam list to launch iEEG Review.

Online Review

If you are using Trackit, you can also configure your modality (in Administration>Definitions) to allow Online Import. If this option is enabled, you can begin to review the test in near real-time while it is being recorded.

Review Button

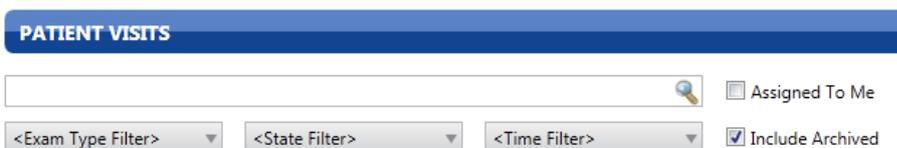


Archive

For an exam to be archived, it must be moved to the Archive workflow state. Doing so finishes the workflow for the exam.



The exam data is then moved to the archive path and the exam is no longer visible on the list of exams unless the Include Archived box is checked.



Patient Admission

Use the Patient Admission tab to enter a new patient into the database, and also to start a new patient visit or initiate a new exam with an existing patient.

Begin by typing a name or Patient ID into the spaces provided under Patient Properties and the system searches the Patient Database for matches. The Patient Database is shown next to the Patient Properties form.

New Patient

If no match is found, continue entering information and click Save to add the patient to the database. You can now enter an Exam ID under the New Exam area of the screen and click Initiate to initiate a new exam. A new patient visit is added to the Patient Visit list on the Patient List tab.

New Exam

Exam ID	<input type="text"/>
Exam type	Generic ▼
Exam Space	Default ▼
Assigned To	Administrator ▼
Referring Physician	<input type="text"/>

Existing Patient

If a match is shown on the list in the Patient Database, click the entry to select it and the rest of the Patient Properties will be filled in. Enter an Exam ID and click Initiate to initiate a new exam. If the patient already has a visit in progress, the exam will be added to that visit which appears on the Patient Visit list on the Patient List tab. If the previous patient visit has already been archived, a new patient visit is created when you initiate the new exam.

Existing Patient Selected on the Patient Database List

PATIENT PROPERTIES



Patient ID AG0912583210

Social Security Number

Salutation

Last Name

First Name

Middle Names

Date of Birth

Gender Male Female

Hand Dominance Left Right Unknown

Height cm

Weight kg

Patient Database

Patient ID	Last Name	First Name	Date of Birth
AG0912583210	Greene	Amanda	9.12.1944

Note: Both the Patient ID and Exam ID are required fields.



WARNING: It is important to enter the correct ID associated with the patient so exams can be interpreted correctly.

Import

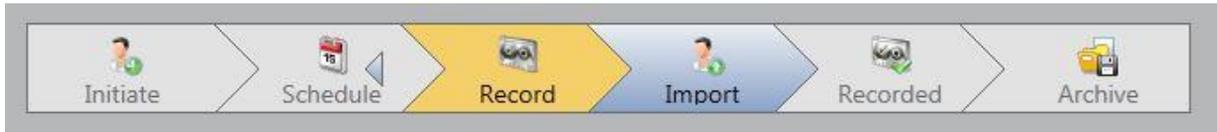
Import makes it possible to import exams recorded on another device into the system. They are then converted into the native format so they can be edited, pruned, etc.

The Import Tab

Navigate to the Import tab to select a file for import along with several other options.

Pressing Import on the Workflow bar will also take you to the Import tab for exams initiated on the iEEG system.

Workflow Bar - Import



Click the browse button to locate the file to import. Select the exam type if it is not already selected.

Check "Enable compression" if you are on a slower connection. This will compress the EEG and video files before transferring to the server.

If the Persyst Spike & Seizure Detection integration is installed on the iEEG Server, check "Spike/Seizure Detection" to run the seizure detection algorithm as a part of the post process imported data task. System detected events will be inserted at the top of the channel chart where the system has detected seizure and will also appear on the Event List.



WARNING: The Persyst User Manual must be read before using the Spike & Seizure Detection feature.

Click Import to start the importation.

Browse to import an exam on the Import tab

The screenshot shows a dialog box for importing a file. It contains the following elements:

- A text input field labeled "Select a File to Import" with a browse button (folder icon) on the right.
- A dropdown menu labeled "Select Exam Type".
- A checked checkbox labeled "Enable compression".
- A table with three columns: "Patient ID", "Name", and "Date of Birth".
- A "Reassociate" button located below the table.

If the patient information associated with the file is not already in the database, the following dialog appears asking if you want to save the information to the database.

Save to Patient Database Dialog

The patient in the exam does not exist in the database. Do you want to save the patient to the database?

Patient ID	Patient ID
Social Security Number	
Salutation	
Last Name	
First Name	
Middle Names	
Date of Birth	<input type="text" value="15"/>
Gender	<input type="radio"/> Male <input checked="" type="radio"/> Female
Hand Dominance	<input type="radio"/> Left <input type="radio"/> Right <input checked="" type="radio"/> Unknown
Height	<input type="text" value="0"/> cm
Weight	<input type="text" value="0"/> kg
Street Address	
City	
Zip Code	
Telephone	
Mobile Phone	
Email	
Notes	

Reassign

If there is no patient information included in the file, or if you need to reassign the exam to another patient, click the Reassign button.

Reassign

Patient ID	Last Name	First Name
ID101		

The Reassign portion of the screen is activated allowing you to enter patient information. If matches are found, suggestions will populate the Patient Database list shown below the patient information. Select a patient from this list and the rest of the info will be filled into the Patient Information form for you. Click Save and then Import.



WARNING: It is important to enter the correct ID associated with the patient so exams can be interpreted correctly.

Permissions on Import

If you want to override the default permissions, you can assign permissions to the selected exam before importing. Click the Permissions button to open the following popup window and select the permission level for each user group.

User Group Name	No Access	Restricted Read Only	Read Only	Full Access
Default	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
Physicians	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Students	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Technicians	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>

Patient Visit

If a current visit exists for the patient that is not read only and that the current user has full access to, then the exam is associated with that visit. Otherwise, a new visit is created.

If more than one open visit exists for the patient, the following window will pop up prompting you to select the visit you want to associate with the exam.

Multiple open visits are available for this patient. Select the one you would like to use.

Created	Number of exams in visit
29.5.2012	1
29.5.2012	2

See the section Visits under Concepts near the beginning of this manual for more information about Patient Visits.

Preview

Click the Preview button to open the data file in a simple viewer if you want to view the EEG before importing.

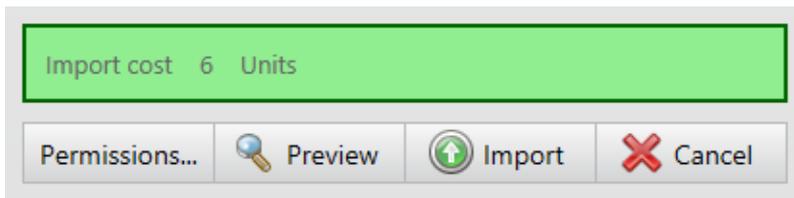
Prune before Import

While previewing the exam, it is possible to use the prune events to import a pruned version of the exam. Insert prune events at the desired locations and click Import in the top left corner. This will close the preview and prompt you to import either the pruned or full exam.

Import Cost

The import cost appears above the row of buttons before importing.

Note: this does not include the cost of running spike and seizure detection even though this option is selected.



Exam Properties

When importing from the Import tab, it is possible to change or add to the current exam properties by typing in new information before clicking Import. In the case of importing from the Workflow bar, exam properties can be modified after the exam has been imported via the Exam Properties on the Patient List tab.

Progress

The importation can take some time depending on the size and complexity of the file. You can monitor the progress on the Processing tab.

Processing

On the Processing tab, you can monitor the progress and results of processes such as file importation, video encoding or archiving, to name a few.

The left side of the screen shows the progress of each action with a progress bar, and the right side of the screen shows the results of the process. The progress bars on the right side of the screen are color coded to match the results, which are also printed in text above each bar along with the process type, file name, and time and date stamp.

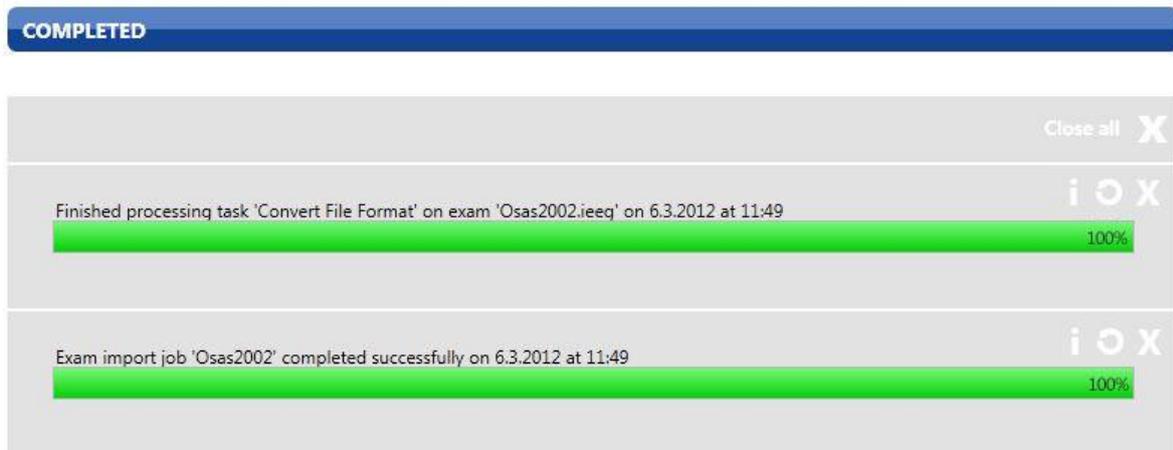
Green = the process completed successfully.

Yellow = the process completed with warnings.

Red = the process failed.

Blue = the process was cancelled.

Completed processes



Buttons

Click the x box of any progress bar while processing to cancel the process.

Click the circular arrow icon to retry a failed process.

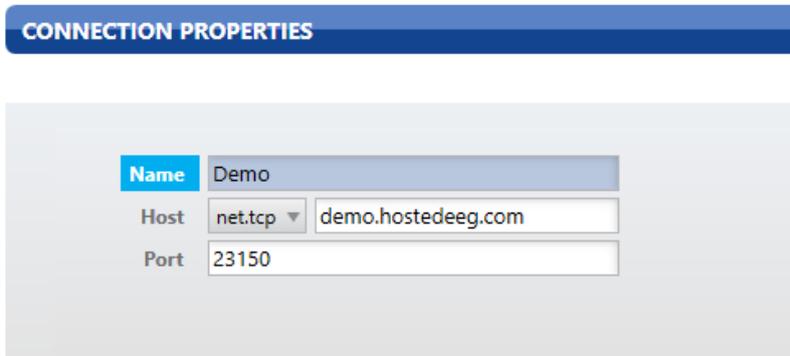
Click the i icon for additional info (if available) about the process.

My Settings

Connection List

Here you can add or import new database connections. Click the Add or Import button and type in a name and path for the database under Connection Properties. (If importing, the path will be filled in already). Select between net.tcp and https from the combobox.

Connection Properties



Name	Demo
Host	net.tcp demo.hostedeeg.com
Port	23150

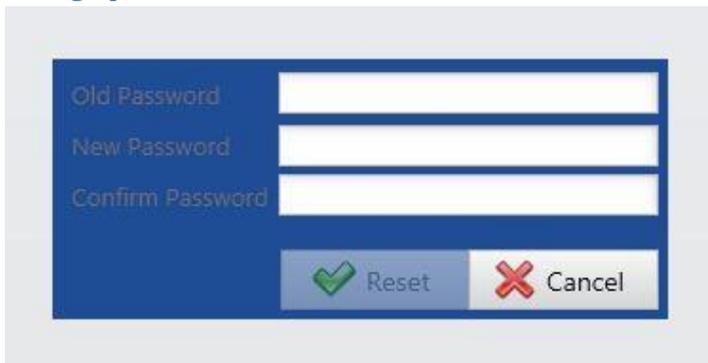
Click Save and the database will be added to the Connection list and will then be available when logging on to the system.

Select a database from the Connection list and click Delete to remove the database from the list.

Settings

Change Password

Change password



Old Password	<input type="text"/>
New Password	<input type="text"/>
Confirm Password	<input type="text"/>
<input type="button" value="Reset"/> <input type="button" value="Cancel"/>	

Click Change Password to change your password. You will be asked to type in your old password, a new password and your new password again to confirm. Click Reset to complete the process.

Language

Choose your default language from the drop-down list.

System Font

The ability to choose a system font becomes available if your default language requires a special font.

The Admin View

If you have administrator access rights, you will see the Admin button on the top-left corner of the screen, next to the tabs. Click this to display the administrator tabs. When you are in admin view, the button on the top-left changes to Patients, to take you back to patient view.

Admin Button



Administrator Tabs & Patient s Button



User Administration

Access to the Lifelines iEEG system is password protected. Only defined Users have access to the system. Users that have administrative privileges can manage user accounts.

Add Users

Before adding users to the system, you first need to add some User Groups and Roles to associate with the new users. See the User Group and Roles sections below if you have not already added user groups and roles.

To add a new user, click the Add button under the Users section of the User Administration tab, then fill in the information in the form that appears below. The email field is optional, but the rest of the fields are mandatory. Note that users can belong to more than one user group. Users (besides administrators) are only aware of user groups they belong to.

User Name	james	Reset Password
Full Name	James Dolittle	
Email Address	<input type="text"/>	
Role	Default	
User Groups	Students , Technicians	
Default group	Students	
	<input type="checkbox"/> Administrator	
	<input checked="" type="checkbox"/> Locked Out	
	<input type="button" value="Save"/>	<input type="button" value="Cancel"/>

If a user belongs to more than one user group, you can select the user's Default Group. That is the group that gets full access to new exams the user creates.

If you want the user to be an administrator, check the Administrator box. Administrators have access to the Admin tabs and can edit everything in there, and they also have full access to all

visits and user groups. Administrators are marked with a red A on the Admin column of the Users list.



To lock a user out of the system, check the Locked Out box. Locked out users are indicated by a lock icon in the Locked Out column of the Users list.



When all mandatory fields have been filled in, the Save button becomes available. Clicking it opens a password dialog box. Enter and confirm the password and click Reset.

The new user is now ready. You can add as many users as you want and it is possible to modify all their properties afterwards.

Search and Filter

Use the Search box to filter the Users list by text string. Select an option from the 'Filter by user group' drop-down list to filter by a specific group or show users from all groups.

The screenshot shows the 'User Administration' tab selected in a navigation bar. Below it is a 'USERS' section with a search bar containing the letter 'J' and a 'Filter by user group' dropdown menu set to 'Show all'. A table lists three users:

Full Name	User Name	Role	User Groups	Admin	Locked Out
James Dolitt	james	Default	Technicians		
Jane Doe	jane	Default	Technicians		
John Smith	john	Default	Physicians	A	

Image shows the Users list filtered by the letter J.

User Groups

Permissions are granted to patient visits by User Groups. To create a user group, click Add on the User Group tab under Settings on the User Administration tab. Type in a name for the user group and click Save. You can add as many user groups as you want and you can change their names afterwards.

Roles

To add a new role, click Add on the Roles tab under Settings on the User Administration tab. Type in a name for the role and click Save. You can add as many roles as you want and you can change their names afterwards.

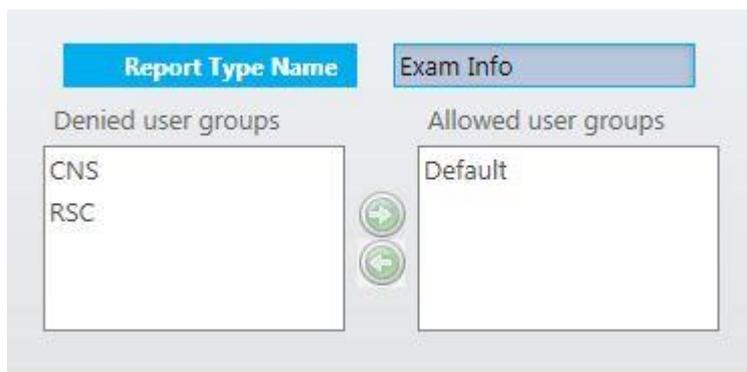
Password Policy

On the Password Policy tab, you can set requirements for passwords such as minimum number of characters, or whether a certain number of special character, numbers or capital letters are required. Click Save to save the changes.

Reports

Lifelines iEEG offers the ability to create custom report templates to allow different reports for different exam types. The custom report templates are then available for selection when adding a new report to an exam. It is also possible to associate a report template with a specific workflow state of an exam type. Then the associated report template pops up automatically when the exam reaches the specified workflow state. (See Definitions > Exam Types)

You can associate selected user groups with a report type by moving them to the Allowed user groups box using the arrow buttons and clicking Save. Only members of allowed user groups (as well as administrators) will see and have access to those report types.



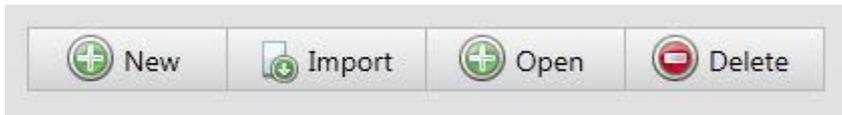
There are two types of reports available in the iEEG system – native reports or Microsoft Word 2010 reports. The Word 2010 reports are recommended for ease of editing the templates to suit your needs. If you cannot use Word 2010 reports, we have also included instructions to modify or create new native report templates in Appendix 2 at the end of this manual. Creating a new native report template requires advanced knowledge of editing xaml flow documents, but making simple changes to the default native report template is described in this section.

Create a Word 2010 Report

In the installation wizard, there is an option to set up the iEEG Report tab in Microsoft Word 2010. This option is checked by default, but if for some reason you cannot install this add-on, you can still create Word reports using the second method described below.

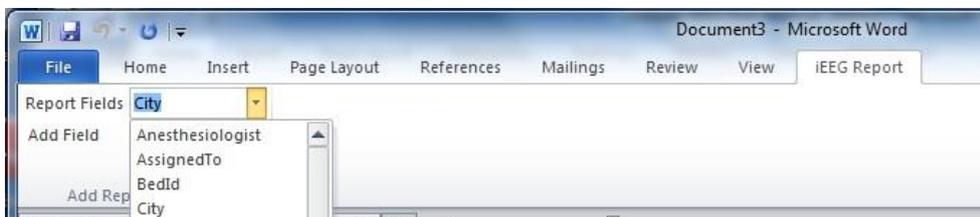
Method One - With the iEEG Report Tab add-on installed

Click the New button on the Word tab to open the new template popup. Give the new template a name and select whether you want to base the template on another template, or use a blank document. Click Add and the report template is added onto the template list and Word is launched.



Edit the document just as you would any other Word document by inserting and formatting text, pictures, tables, checkboxes, etc.

To generate the required fields from the iEEG system, insert fields from the iEEG Report tab. Select the field you want from the Report Fields list and click Add Field. These are the fields that will be filled in automatically by the iEEG system when you add the report to an exam.

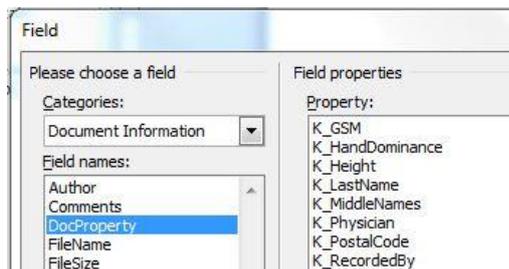


Save the document and your template is now available for selection when adding a new report to an exam. (See the section Patient List > Reports and Documents).

Method Two – Without the iEEG Report Tab add-on installed

If you did not set up the iEEG Report Tab in Word 2010 during the iEEG installation process, you can still insert the required fields by following these steps:

1. Click New to create a new template either based on the default template or a blank one.
2. Edit as desired.
3. To insert the required fields, choose Quick Parts > Field on the Insert tab.
4. Then select the category Document Information and the field name DocProperty in the Field popup.
5. You now have a list of field properties that you can insert into the template. The fields beginning with K_ are the field properties from the iEEG system. These were copied temporarily into Word when you opened Word from the iEEG system.
6. Save and close the template.



Edit an existing Word Template

Select a template on the Word tab and click Open. Make the changes you desire and save and close the document.

Import

You can also open a Word document independently of the iEEG system, save it locally and close it. You must then import the document into the system. To do so, click the Import button, browse for the template you created and click Open.

Modify the Default Native Report Template

If you do not have access to Word 2010, you can still make simple changes to the default native format template. Select the template on the Native tab. Then on the Edit View tab, make simple changes like typing in a new title or uploading a logo. Click Save to save the changes.

Associate a Report Template to Workflow State

This is done on the Definitions tab>Exam Types. (See the section below).

Licenses

On the License tab, Administrators can check the number of cost units for each service, as well as Order History and Usage.

Click an item on the Order History list to display an order summary report which can be printed by clicking the Print button. Click the arrow on the right of the Order Overview bar to close the report.

The Usage list can be filtered by dates using the interactive calendars.

USAGE						
Show usage from	1.9.2013	To	23.9.2013			
Description	Exam ID	Patient ID	Name	Units	Date	User
Import exam (22 ch, 0 hours)	98-002	MP40267	Patterson, Marion	6	20.9.2013 10:21	Administrator
Import exam with video (25 ch, 0,41 hours)	1234-12	AG55123	Greene, Amanda	9	19.9.2013 16:55	Administrator
Import exam with video (25 ch, 0,41 hours)	1234-12	JB46554	Browne, Jackson	9	18.9.2013 17:10	Administrator

Definitions

Exam Types

You can define your own Exam Types and assign a custom workflow to each. To do so, click the Exam Types tab under the Definitions header on the Definitions tab.

Click the Add button.

Enter the exam type name in the Exam Type Name field. Select the modality from the Modality Name list and the Default Perspective you want associated with that Exam Type.

Helper Page

The Helper Page option is for Acquire users to be able to create and upload their own custom help page to be displayed on the Acquire Help tab with each exam type. (See also the section Lifelines iEEG Acquire>Patient Mode>Help).

The helper page needs to be in .xps format. This can be easily created in Word by choosing Save As and selecting XPS Document as the type. Browse for the file using the browse button on the Helper Page text box.

Exam Type Name	Generic
Modality Name	Lifelines Trackit
Default Perspective	Default
Helper Page	<input type="text"/>
Disabled	<input type="checkbox"/>
<input type="button" value="Save"/> <input type="button" value="Cancel"/>	

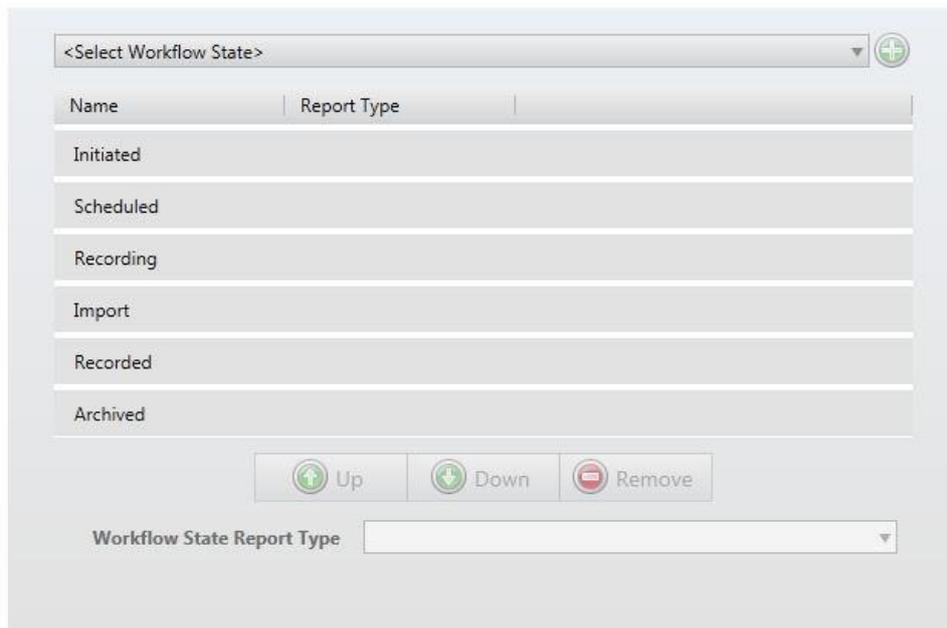
Disable Exam Type

If the Disabled box is checked, the exam type will not be available for selection when adding a new exam.

Click Save to create the new Exam Type, which will now appear on the Exam Types list.

Edit Workflow States

With the exam type selected on the Exam Types list (on the left), you can now edit the workflow states (on the right).



The predefined workflow states are included and they cannot be modified or removed. It is however possible to add user-defined workflow states to the exam type. Select the desired workflow state from the Select Workflow State list and click the Plus button.

The workflow state is added to the list of workflow states and it can be moved up, down or removed using the controls.

Note that some of the predefined workflow states are fixed so user-defined workflow states cannot be added before, after or between them.

A workflow state report type can be added to a workflow state. Select the workflow state then select a report type from the drop-down list. The associated report template pops up automatically when the exam reaches the specified workflow state.

You can add as many exam types as you want and their properties can be changed afterwards.

Exam Types	Modalities	Exam Space	Workflow States
Exam Type Name	Modality Name	Default Perspective	Disabled
Generic	Lifelines Trackit	Default	
NicOne	NicoletOne	Default	
Video ambulatory	iEEG Acquire	Default	

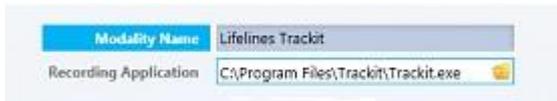
Modalities

Before you can initiate a recording of data from the system you must set the modality application used to acquire the data.

Go to the Modalities tab under Definitions and select one of the applications from the list on the left.

On the right side of the screen under Properties, browse for the selected application.

Browse for modality application



Check the correct modality application checkbox. Click Save. The modality is now set.

Import on Record

Check this box to enable automatic import of the recording, whether online or offline.

Online Import

Select Online Import to enable near real-time review of the exam during recording.

Offline Import

Select Offline Import if you want to start the automatic import after the recording has completed.

Exam Space

Hospitals are equipped with many devices. The ability to track which device was used when recording an exam can be simplified by defining exam spaces. Exam spaces can be room numbers, bed numbers, device numbers, etc.

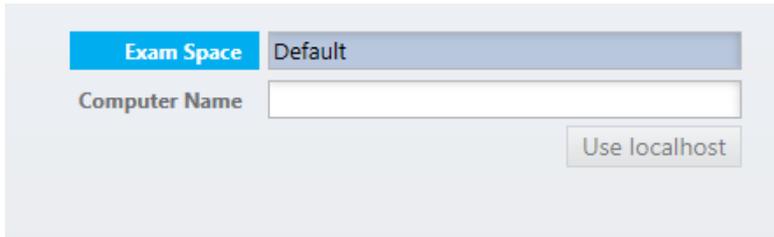
On the Exam Space tab under Definitions, click Add.

Enter a name for the new Exam Space (or bed).

Default Exam Space

It is possible to specify a computer name for a selected exam space (optional). Then when a new exam is created, the default exam space (or bed) is the exam space that is associated with the computer creating the exam.

The computer's short name is sufficient. It is also possible to click the Use Localhost button which then generates the fully qualified name of the current computer.



The screenshot shows a form with two main sections. The first section is labeled 'Exam Space' and contains a dropdown menu with 'Default' selected. The second section is labeled 'Computer Name' and contains an empty text input field. Below the input field is a button labeled 'Use localhost'.

Click Save.

You can add as many exam spaces as you want and their properties can be changed afterwards.

Workflow States

You can create custom workflow states which can then be selected when associating a workflow to an Exam Type (explained above).

Click Add on the Workflow States tab under Definitions.

Enter a name for the workflow state under Properties.

Click Save.



The screenshot shows a single text input field with a blue label 'Workflow State Name' on the left side.

You can add as many workflow states as you want and their names can be changed afterwards.

Auditing

All user actions that deal with patient data must be logged to an audit trail. Administrators can view the audit trail via the Auditing tab.

Under the Search section, you can narrow down the search results by User, Date, Category and Action. Click the Search button to perform the search. The results appear on the right part of the screen. Click Copy to Clipboard if you want to paste the results into an Excel or Word document.

Lifelines iEEG Acquire

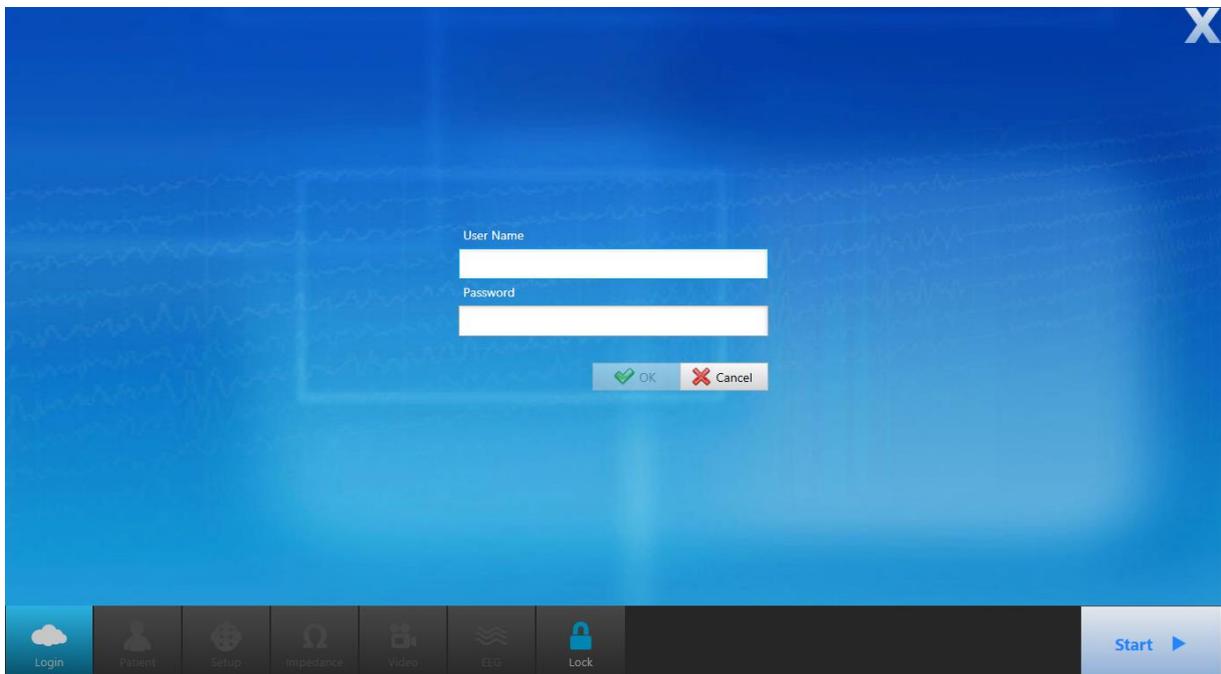
Intro

Lifelines iEEG Acquire allows the acquisition of up to 32 channels of EEG, as well as synchronized digital video from one or two cameras. Acquire comes installed on a laptop or a dedicated touchscreen pc. It includes a protected bedside mode feature so the device can be taken to another location and left unattended for longer recordings.

Starting the Exam

When Acquire is launched, a series of buttons on the lower edge of the display guides you through the steps you'll need to start the exam, moving from left to right.

If you have launched Acquire from Centrum (by selecting Video Ambulatory or any other exam type that uses the iEEG Acquire modality, then pressing the Record button on the Workflow bar), then the first two buttons (Login and Select Patient) are disabled and you can skip to the next step, Amplifier Setup.

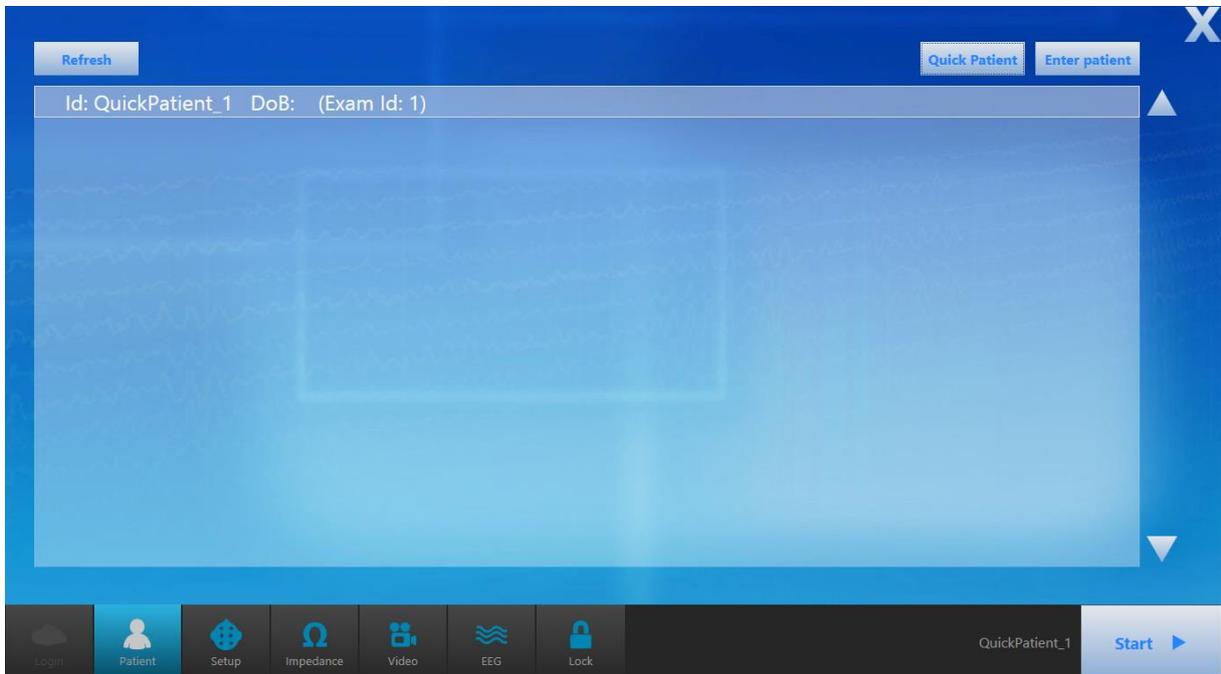


Acquire Login Screen

Login and Select Patient

If you are launching Acquire directly, you will need to log in to your database (this can be either a local standalone database or a cloud service). Once you're logged in, you must select

a patient from the Patient/Exam List. If the patient is not already in the system, press the Enter Patient button to enter a new patient.



Patient/Exam List

A screenshot of the 'Enter Patient Dialog Box'. The dialog box has a blue background and contains five input fields: 'Patient ID', 'Last Name', 'First Name', 'Date of Birth', and 'Exam ID'. The 'Date of Birth' field has a calendar icon to its right. At the bottom of the dialog box, there are two buttons: 'Cancel' and 'OK'.

Enter Patient Dialog Box

Press Quick Patient to continue without entering patient info. A new patient with the Patient ID QuickPatient X (where X is the number of previously generated quick patients plus 1) is created.

Amplifier Setup

Select the setup from the dropdown list at the top of the screen. Press the amplifier setup button to add a new amplifier setup to the list.



Amplifier Setup Button

Then choose the sampling rate from the dropdown list.

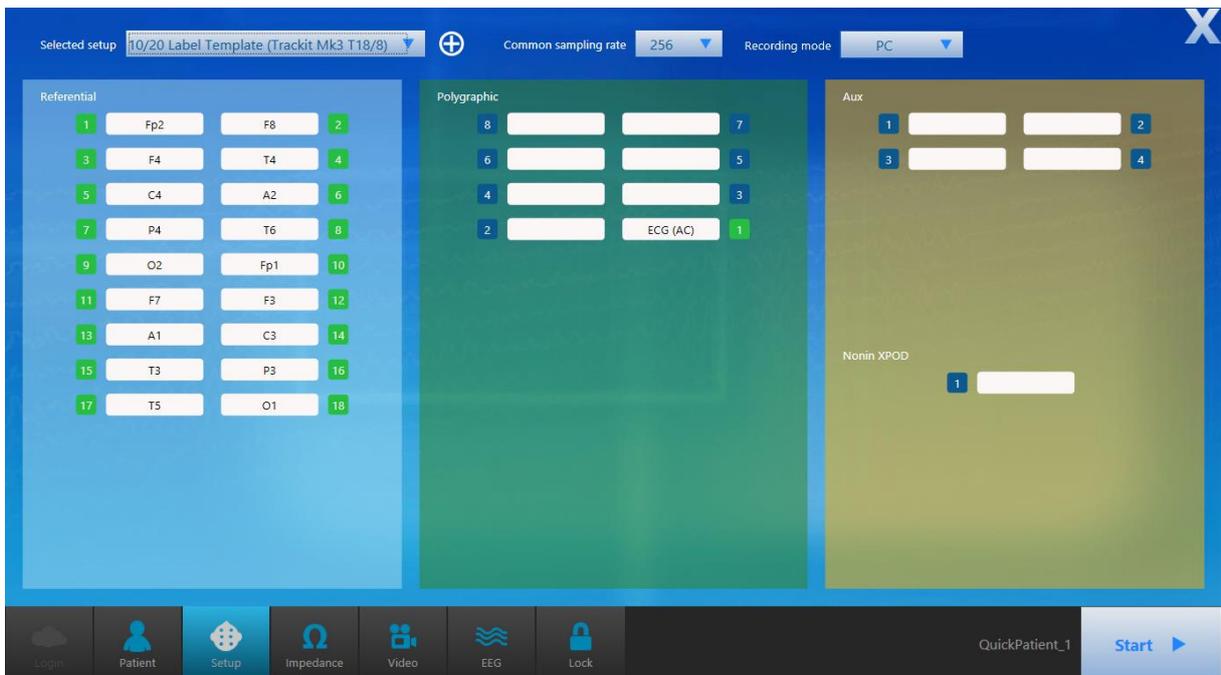
Trackit Recording Mode

Select the desired Recording mode from the dropdown list.

PC mode = EEG, video and events are recorded to the computer hard disk.

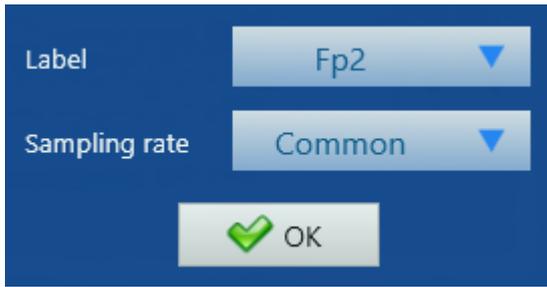
CF mode = EEG is recorded to the Trackit CF card; video and events are recorded to computer.

Dual mode = EEG is recorded both to Trackit CF card and computer; video and events are recorded to computer.



Amplifier Setup Screen

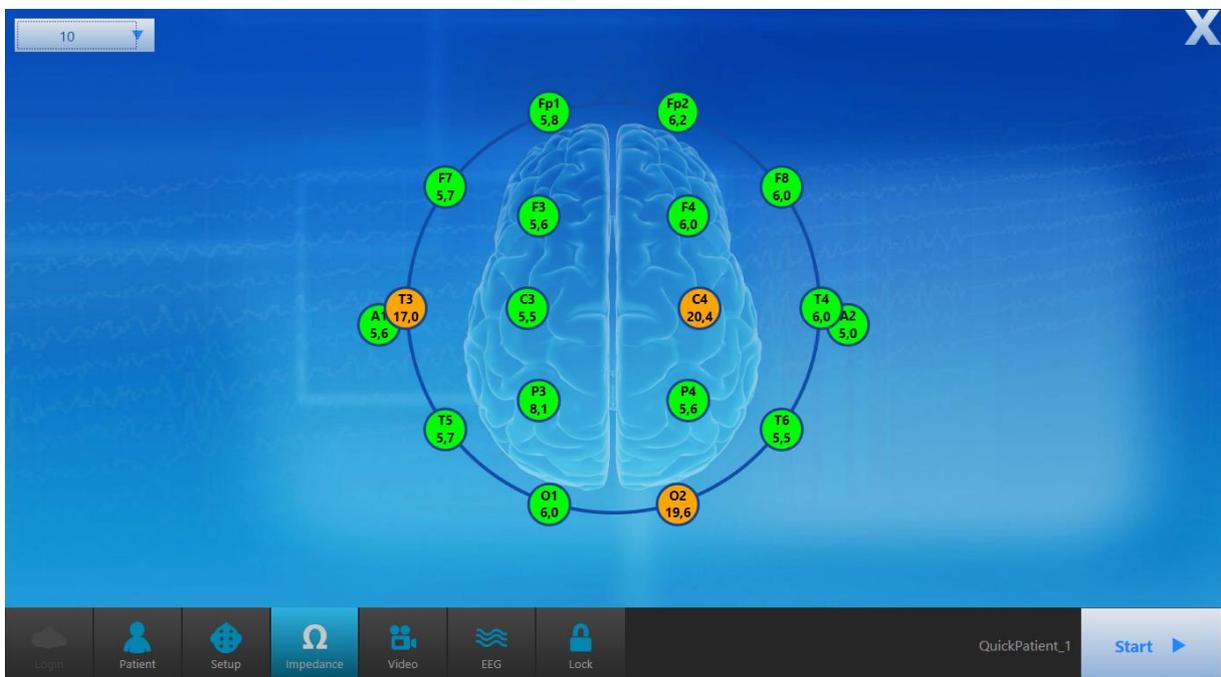
Press the input number to toggle a channel on or off – green indicates on, blue indicates off. Press the white label to display the input settings dialog and choose the desired label and sampling rate. Note that if you toggle on a channel that has not been configured with a label, the input settings dialog is displayed automatically.



Input Settings Dialog

Impedance

Check the impedance on this screen. Select the threshold level from the dropdown list. The green color indicates that impedance is ok within the selected threshold. The color changes to orange when the impedance is above the selected threshold.



Impedance Screen

Note: The Impedance and EEG tabs are disabled if the amplifier is not connected and turned on.

Video

Check that the video is displaying properly.

On the EEG screen, you can add events, change filters, perform a hyperventilation test and view EEG and video.

Events

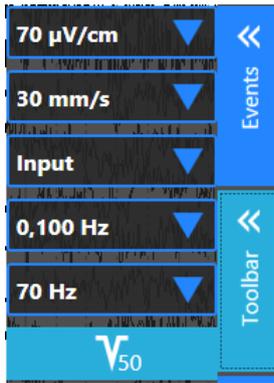


Press the Events button to display and hide the event pallet. Press an event to enter it at the top of the trace display at the point in time of entry. If the event is a duration event, press on the event again to end it.

Annotation events allow you to enter text to the event.

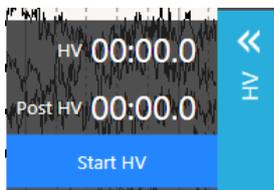
Toolbar

The toolbar allows you to change several parameters on the channel chart. They are: sensitivity, paper speed, montage, low cut filter frequency, high cut filter frequency and the notch filter toggle button.



Hyperventilation

Press Start HV to start the hyperventilation timer. The button changes to Post HV, which you can press when you want to start the post hyperventilation timer. The button then changes to Stop HV which stops the timer. Finally, it changes to Reset so you can reset the times to zero.

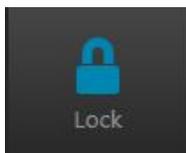


Video

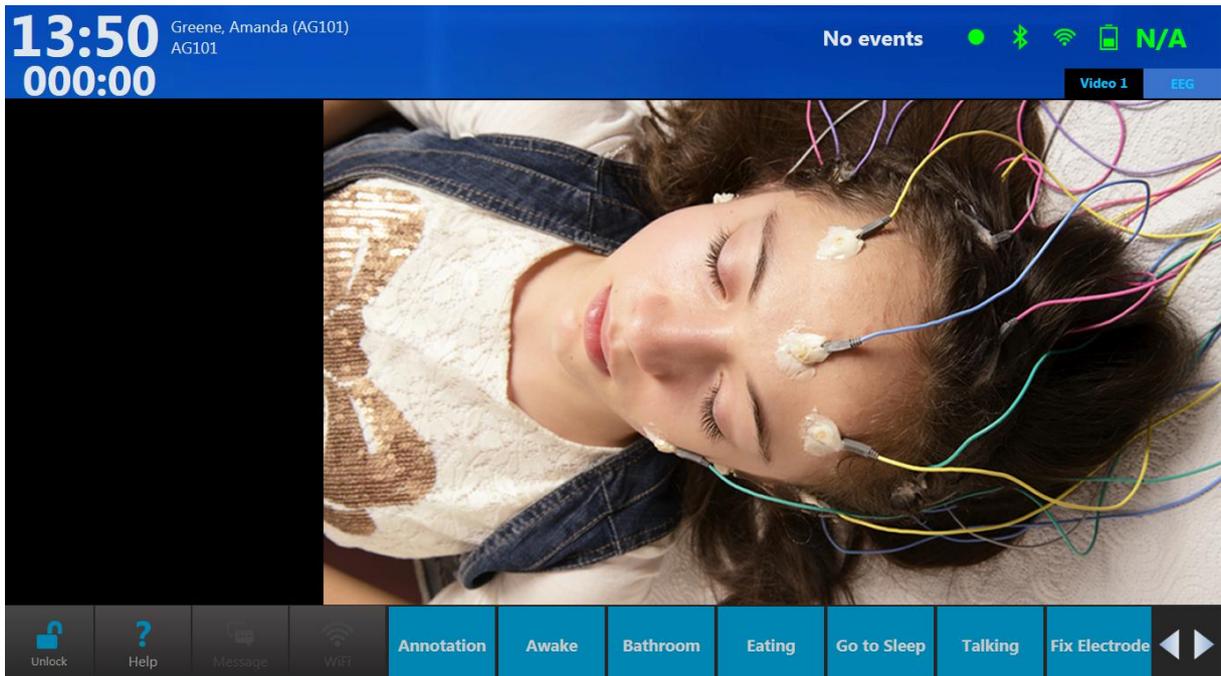
Press the video button to hide or show the live video.

Lock

When you are finished with the EEG screen and everything else is as you want it, press this button to go to the locked patient mode. It will prompt you to create a PIN before changing to patient mode. Note that the patient mode will not be locked if not recording.



Patient Mode



Patient View

In this mode, it is possible to view video, and optionally, EEG, and also to enter events by pressing the event buttons along the lower edge of the screen.

Indicator icons at the top right of the screen indicate the status of recording, connection to the amplifier, wifi and amplifier battery life. If there are any interruptions, the corresponding icon will change color. The words "Not Recording" appear on the screen if the recording connection is lost.

The current time and the patient's name and ID are displayed at the top left of the screen. Elapsed time and estimated time left are displayed next, followed by the most recently entered event.

If you have more than one video camera, you can view one at a time or both using the tabs at the top of the video display. If you have the EEG option enabled, that will also appear as a tab.

Help

A help screen is provided to be able to view custom created documents for each exam type. To create a help document, start by creating the file in Word, then choose Save As and select XPS Document as the file format.

To upload the help document you created, go to Centrum>Admin>Definitions>Exam Types. Under the Exam Type Properties, click the Browse button (folder icon) under Helper Page.

Lifelines iEEG Review

Intro

Lifelines iEEG Review allows advanced review of EEG exams.

Launch iEEG Review

There are two ways to launch iEEG Review:

1. Select a recorded exam in the iEEG Centrum client and click the Review button in the bottom-right corner of the screen. The selected exam opens in the review mode of iEEG Review, ready for review.
2. Launch iEEG Review without selecting an exam in iEEG Centrum first. The iEEG Review client opens in the exam view showing a list of recorded or in-progress exams. Select an exam from the list and press the Review button in the bottom-right corner of the screen. The exam opens in the review mode of iEEG Review. Note that only recorded exams can be reviewed.



WARNING: Before reviewing an exam for the first time on a new screen, or when adding a second screen, the screen must be calibrated according to the instructions in the My Configuration > Screen Calibration section.

Exam View and Review

In the exam view of iEEG Review, you can select exams for review, import recorded exams, and monitor the progress of processes such as importing and pruning.

The review mode is where the actual review of the EEG takes place, including many powerful features, described in detail in later sections. Customizable settings are located in review mode, as well as access to patient demographics and exam properties. You can open as many exams as you want, and switch between them via tabs at the top of the screen.

Switch back and forth between exam view and review by using the button in the top-left corner of the screen. Note: review is only available after at least one exam is opened for review using one of the methods in the Launch iEEG Review section above.

To review from exam view



To exam view from review



Exam View

Exams Tab

On the Exams tab you will find a sortable list of current exams ready to be reviewed. Click the headers (Patient ID, Last Name, etc.) to sort the list by that header.

The list can be filtered by recorded date, exam space, workflow state, and further filtered by checking the Assigned To Me or box. Check Include Archived to also show archived exams. Click the refresh button to make sure the list is always showing the most recent entries or changes.

If the exam list is very large, it will be displayed in pages. Click the arrows or page numbers at the bottom of the list to scroll through the pages. If you want to change the number of exams that are displayed on each page, type a new number in the Items per page box.

Select an exam on the list and press Review in the bottom-right corner to open the exam for review.

Click the clipboard icon to open a popup with the exam history.

Import Tab

The Import tab in iEEG Review works the same as in iEEG Centrum.

Click the browse button to locate the file to import. Select the exam type if it is not already selected.

Check "Enable compression" if you are on a slower connection. This will compress the EEG and video files before transferring to the server.

If the Persyst Spike & Seizure Detection integration is enabled, check "Spike/Seizure Detection" to run the seizure detection algorithm as a part of the post process imported data task. System detected events will be inserted at the top of the channel chart where the system has detected seizure and will also appear on the Event List.



WARNING: The Persyst User Manual must be read before using the Spike & Seizure Detection feature.

Click Import to start the importation.

Browse to import an exam on the Import tab



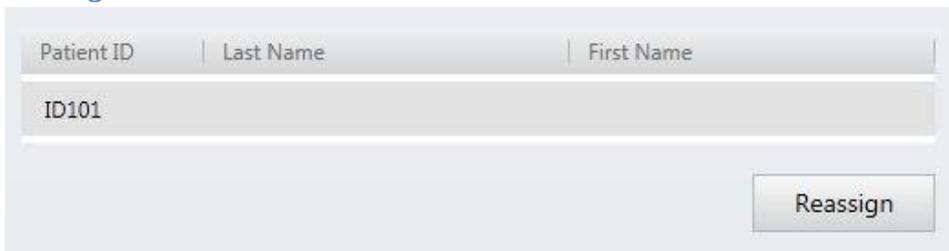
The screenshot shows a web interface for importing an exam. It features a 'Select a File to Import' field with a folder icon, a 'Select Exam Type' dropdown menu, and a checked checkbox for 'Enable compression'. Below these is a table with columns for 'Patient ID', 'Name', and 'Date of Birth'. A 'Reassociate' button is located at the bottom right of the form.

If the patient information associated with the file is not already in the database, a dialog appears asking if you want to save the information to the database.

Reassign

If there is no patient information included in the file, or if you need to reassign the exam to another patient, click the Reassign button.

Reassign



The screenshot shows a 'Reassign' dialog box. It has a table with columns for 'Patient ID', 'Last Name', and 'First Name'. The 'Patient ID' field contains the text 'ID101'. A 'Reassign' button is located at the bottom right of the dialog.

The Reassign portion of the screen is activated allowing you to enter patient information. If a match is found, suggestions will populate the Patient Database list shown below the patient information. Select a patient from this list and the rest of the info will be filled into the Patient Information form for you. Click Save and then Import.



WARNING: It is important to enter the correct ID associated with the patient so exams can be interpreted correctly.

Permissions on Import

If you want to override the default permissions, you can assign permissions to the selected exam before importing. Click the Permissions button to open the following popup window and select the permission level for each user group.

User Group Name	No Access	Restricted Read Only	Read Only	Full Access
Default	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
Physicians	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Students	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Technicians	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>

Patient Visit

If a current visit exists for the patient that is not read only and that the current user has full access to, then the exam is associated with that visit. Otherwise, a new visit is created.

If more than one open visit exists for the patient, the following window will pop up prompting you to select the visit you want to associate with the exam.

Multiple open visits are available for this patient. Select the one you would like to use.

Created	Number of exams in visit
29.5.2012	1
29.5.2012	2

See the section Visits under Concepts near the beginning of this manual for more information about Patient Visits.

Preview

Click the Preview button to open the data file in a simple viewer if you want to view the EEG before importing. The settings from the file are merged with the settings from the server if possible.

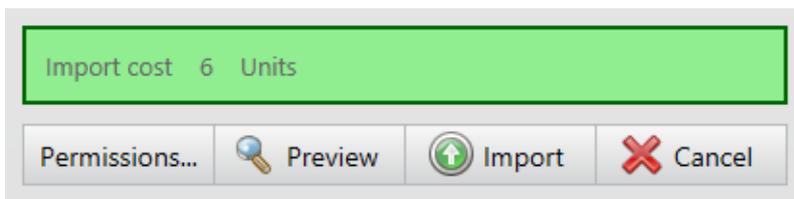
Prune before Import

While previewing the exam, it is possible to use the prune events to import a pruned version of the exam.

Import Cost

The import cost appears above the row of buttons before importing.

Note: This does not include the cost of running spike and seizure detection even though this option is selected.



Exam Properties

When importing from the Import tab, it is possible to change or add to the current exam properties by typing in new information before clicking Import.

Progress

The importation can take some time depending on the size and complexity of the file. You can monitor the progress on the Processing tab.

Processing Tab

On the Processing tab, you can monitor the progress and results of processes such as file importation, video encoding or archiving, to name a few.

The left side of the screen shows the progress of each action with a progress bar, and the right side of the screen shows the results of the process. The progress bars on the right side of the screen are color-coded to match the result, which are also printed in text above each bar along with the process type, file name and time and date stamp.

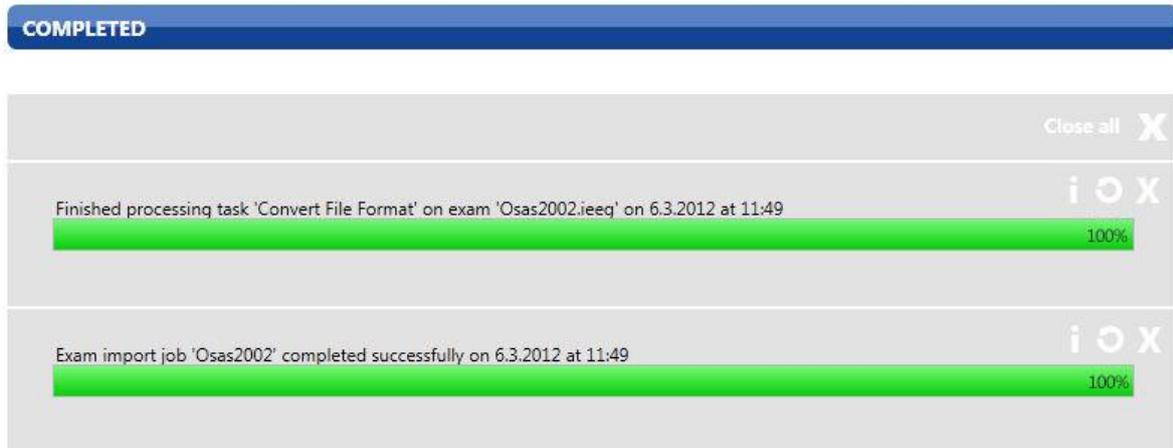
Green = the process completed successfully.

Yellow = the process completed with warnings.

Red = the process failed.

Blue = the process was cancelled.

Completed processes



Buttons

Click the x box of any progress bar while processing to cancel the process.

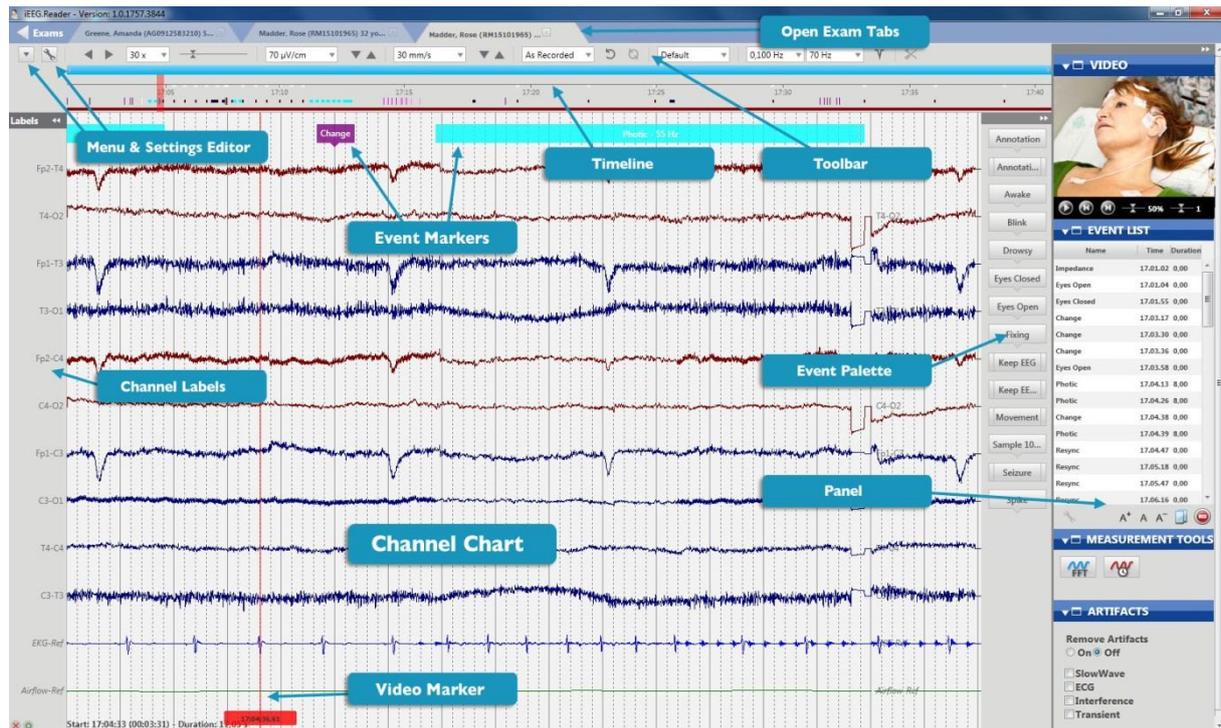
Click the circular arrow icon to retry a failed process.

Click the i icon for additional info (if available) about the process.

Review

The review screen is where the review of exam data takes places. The following diagram shows the review screen with the main components labeled. These components are described in the following sections.

The iEEG Review Screen



Channel Chart

The Channel Chart is arguably the most important part of the iEEG Review as this is where the exam data, such as EEG channels and events, are presented. The display of the chart is highly customizable according to user-defined montage, timebase, filters and even sampling rates and display of individual channels. It is possible to view up to 128 channels at one time.

This section describes the navigation of the Channel Chart and the modifications that can be made quickly during review.

Detailed descriptions of how you can further customize your Channel Chart are found in the Settings section.

Timeline

The Timeline is located above the Channel Chart and provides a visual representation of the duration of the exam.

Tic marks on the timeline show evenly spaced intervals. The actual interval depends on the length of the exam. You can click anywhere on the timeline and the Channel Chart will display that page.

Note: it is also possible to display the timeline below the channel chart. This is done in Settings>My Configuration.

Current Page Marker

A red, translucent marker indicates where the current page is located on the timeline. Hover over the red marker to see a tooltip with the current page's start time.

Timeline with red current page marker



Zoom Bar

The Zoom Bar is located directly over the timeline. Its purpose is to be able to zoom into a long timeline so you can see the overview more clearly. To zoom in, drag either the left or right end of the zoom bar to shorten it. The zoom bar then works a bit like a scrollbar. You can move the zoom bar to the right or left to show later or earlier parts of the timeline.

Resize the Zoom Bar by dragging to zoom in or out



Paging while you are zoomed into the timeline will cause the zoom bar to move so that the red current page marker is always visible.

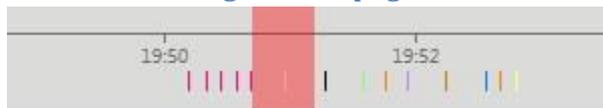
Segment Breaks

Segment breaks in a recording are indicated on the timeline with small white triangles.

Event Overview

Events are indicated on the Event Overview just below the timeline. They appear as a vertical bar in the color of the event marker on the Channel Chart, except for Duration Events, which appear as a horizontal bar. Click on any event on the overview to go to that event in the Channel Chart.

Timeline showing current page marker and Event Overview



Video Overview

If video is present in the exam, a dark red bar appears in the overview just below the Event Overview. A continuous bar indicates that video is present during the entire recording. Breaks in the bar indicate breaks in the video.

Timeline showing segment breaks, events and video overview



Toolbar Controls

Located near the top of the screen just below the tabs area is a toolbar with controls affecting the navigation and display of the Channel Chart. Here you will find controls for paging, sensitivity, timebase, montage, perspective, filters, and prune preview - all described in the sections below.

Toolbar showing channel chart controls



Paging

The left and right arrows are the Auto Paging Buttons. Press once to begin paging forward or back, again to stop. The paging speed can be set using the drop-down list, or use the slider bar to raise or lower the paging speed. The drop-down list is editable: type in a new value and press the Enter key to save. Note: paging may slow down due to heavy data or high network activity.

Toolbar paging buttons, paging speed dropdown and slider



There are some alternative ways to navigate the Channel Chart, described below.

Space Bar: Press the space bar to page forward and again to stop.

Arrow Keys: Step forward or back one second using the right and left arrow keys. Press and hold the arrow keys to page continuously at a high speed.

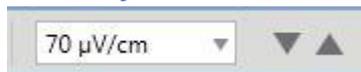
Page Up, Page Down Keys: Use these keys to page forward or back one whole page. Clicking on the right or left half of the Channel Chart does the same thing.

Sensitivity

Use the Sensitivity drop-down menu to select another value, or use the up/down arrows on the toolbar to change the value one step at a time. The drop-down list is editable: type in a new value and press the Enter key to save.

Use the up/down keys on the keyboard to increase/decrease sensitivity by a factor of 2.

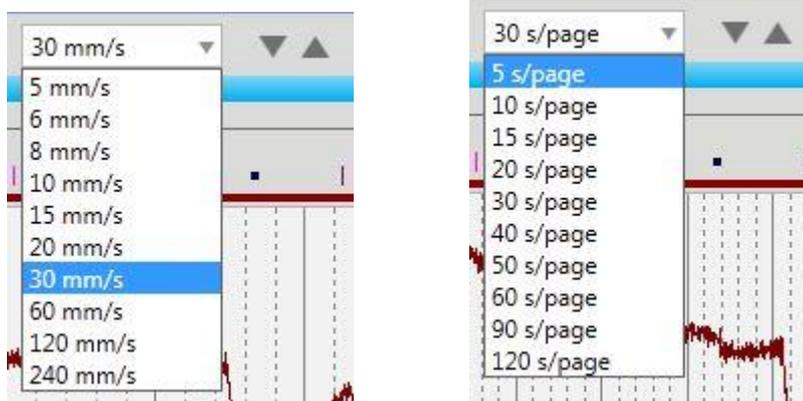
Sensitivity menu



Timebase

You can control how much data is displayed on the channel chart (time-wise) by setting its timebase. According to which default timebase mode has been set (see the Settings>Perspectives to change the timebase mode), you will see either the Paperspeed or Page Duration drop-down menu on iEEG Review toolbar, where you can quickly change the timebase while reviewing. Alternatively, you can use the up/down arrows next to the drop down list to increase or decrease by one step. The drop-down list is editable: type in a new value and press the Enter key to save.

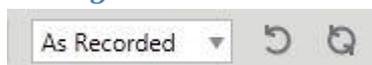
Change timebase controls – Paperspeed and Page Duration



Montage Selector

Quickly change to another montage using the Montage Selector. Select As Recorded to view the montage used during recording minus any applied filters. To view the As Recorded montage plus the filters applied during recording, use the back arrow button. Use the double arrow button to go back to the previously selected montage.

Montage Selector



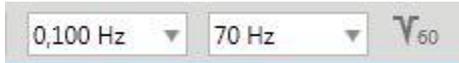
Perspective Selector

Use the Perspective Selector to quickly change the view from one perspective to another. A perspective is a group of settings that you can create and name yourself. (See the Settings section, Perspective, later in this manual).

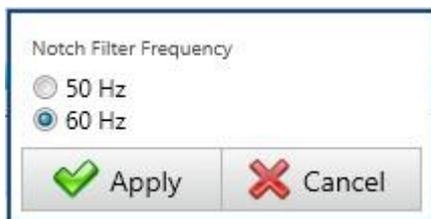
Filters

The next three controls on the toolbar are the filter controls – Low Cut, High Cut and Notch. Select a value for low or high cut. The drop-down lists are editable: type in a new value and press the Enter key to save.

Filter Controls – Low Cut, High Cut and Notch



Click the Notch icon to toggle the notch filter on or off. Click and hold the button to get a popup window where you can change the frequency between 60 and 50. You can also change this under Settings > My Configuration > My Defaults.



Prune Preview

Pruning is used to selectively throw away unwanted parts of an exam. The Prune Preview button is used to view the effects of the prune settings before actually throwing out any data. The button is a toggle button so you can view the effects of pruning and then go back to the previous view.

The Prune Preview toggle button



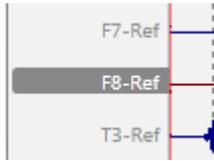
The Prune Preview button becomes active when you have marked certain events as Prune Events. To learn how this is done, see the Events section of the Settings chapter of this manual.

To make the prune effects permanent, select the Prune option on the Menu.

Channel Labels

To the left of the Channel Chart you will see the Channel Labels. You can select one or more channels by clicking on the label and then change a number of display settings or filters on those channels.

Selected Channel Label



You can hide the Channel Labels by clicking the hide/show arrow button at the top of the labels. This display option is stored on the computer between sessions for each user.

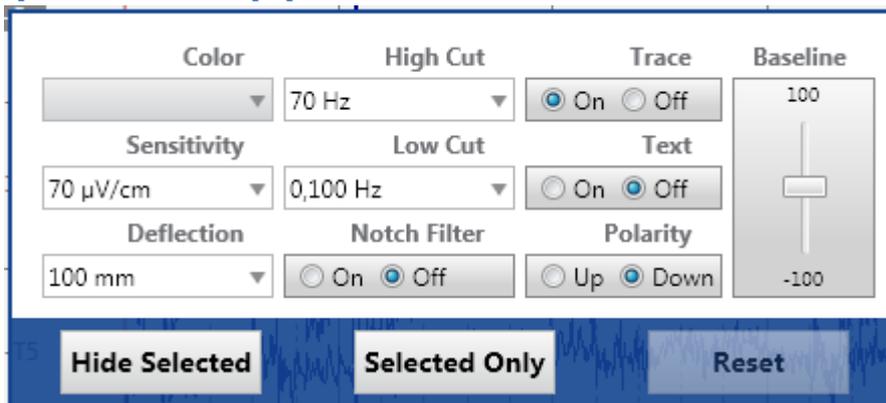


Special Channels

Right-click one of the selected channels to open the Special Channel popup. You can then change the color, sensitivity, deflection, filters, display type, polarity and baseline position by using the corresponding controls. You can also choose to hide the selected label(s) or display only the selected labels(s). Click Reset to remove the special channel settings from the selected labels.

A checkbox appears in front of the label on special channels. Unchecking the box resets the settings for that channel only.

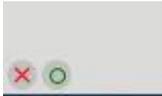
Special Channel Popup



Note: These settings are applied but not saved unless you save them on the Montage tab in the Settings.

At the bottom of the label area are two buttons. The red X clears all selections and the green O selects all labels.

Select or deselect all labels



Event Palette

Located to the right of the Channel Chart is the Event Palette. The Event Palette contains a customizable set of event markers that can be placed either directly onto a channel, or at the top of the Channel Chart at the time of the event. The event changes are automatically saved to the central data storage. You can hide/show the Event Palette by clicking the hide/show arrow button at the top of the palette. This display option is stored on the computer between sessions for each user.



This section discusses the placement and features of different types of events into the Channel Chart. For information on creating and customizing events and event palettes, see the Settings chapter.

Place an Event

To place an event, click the event on the event palette, and then click on the channel chart where you want the event marker to appear. A vertical positioning line and crosshairs appear to help you with the positioning.

To place multiple instances of the same event, double-click the event marker first, and then you can insert an event marker onto the channel chart with each subsequent click, without having to go back to the event palette. Right-click on the channel chart to stop this action.

Note: if the montage is changed such that the channel where the event was placed no longer appears, the event marker will be displayed at the point where the active electrode appears again, or at the top of the channel chart in the case that the active electrode does not appear.

Event Shortcut Keys

Instead of clicking on the event markers, you can also use the F-keys F1-F10, which correspond to the first 10 event markers on the event palette. Press the F-key then click the channel chart to place the event.

Place Event at Video Marker

During video playback or online video review, simply click an event or its shortcut key to automatically place the event at the point of the video marker. The event marker appears at the top of the channel chart.

See addition event placing information under Duration Events and Annotation Events.

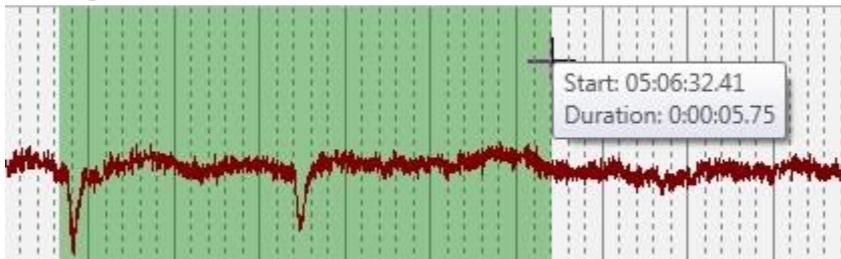
Duration Events

Duration Events are events that happen over a period of time. These event markers can be recognized as they are rectangular in shape with a bar at each end.

Place Duration Event

To place these events, click on the event on the event palette, and then click on the channel chart where you want the event to begin. Before releasing the mouse button, drag to the point where you want the event to end. In addition to the crosshairs, a translucent background color appears to indicate the horizontal area that will be covered by the event.

Placing a duration event

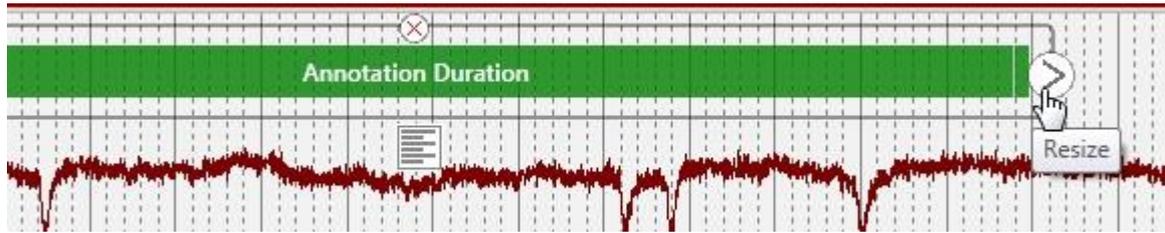


After placing the event, you can adjust the duration by dragging either end of the event marker to extend or contract the area being covered.

Paging during duration event placement

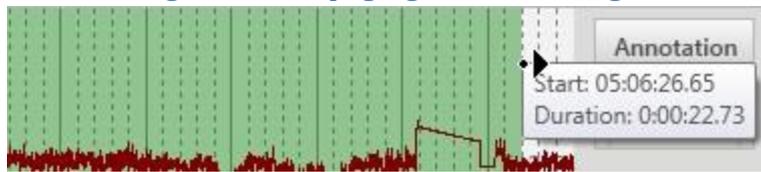
If the duration of the event extends for more than one page, place the event, then hover over the event marker and click the resize arrow that appears to the right of the event. You are now able to extend the length of the duration without holding down the mouse button. You can also click the Resize button and select a place on the timeline. Then click on the original channel again to end the duration event.

Click the Resize button to adjust the length of the duration



When you need to page forward, move the cursor just above or below the channel you are on and it changes to an arrow so you can click to page forward. Click again in the original channel to end the duration event.

Cursor changes to allow paging when hovering above or below the channel



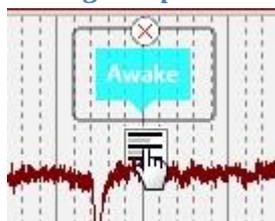
Place Duration Event at Video Marker

To place a duration event while playing video, click the event marker or press its shortcut key to place the beginning of the event at the current location of the video marker, then click the marker or press the key a second time to end the event.

Event Caption

Hover over the event marker on the channel chart and click the small text box icon that appears below the event. You can then type in your own caption for the event which will appear after the event name on the event marker.

Adding a caption to an event



Annotation Events

Annotation events allow you to type in a note which becomes the caption on the event marker.

Place Annotation Event

To place an Annotation Event, simply start typing the annotation. A text box appears automatically for you to type in your annotation. The marker appears at the top middle of the channel chart, or at the video marker if video is playing.

Context Events

Context Events store information about the channel chart settings at the time of placement. Later, you can revert back to these settings by clicking the Context toggle button that becomes visible when you hover over the event marker.

Context events store montage, general channel settings and timebase information.

Context Event toggle button



Numerical Events

Numerical events store numerical information associated with the event. Hover over the placed event on the Channel Chart to select a new numerical value from a drop-down list.

Prune Events

Prune events are used to mark areas of the Channel Chart that you want to keep after pruning the exam. Using the Settings, you can set the number of seconds before or after the event to keep. You can also choose whether the event keeps the EEG and video, or only the EEG.

See also Channel Chart>Prune Preview and Menu>Prune

Move an Event

Drag an event to a new position on the channel chart. This will change the timestamp of the event.

Delete an Event

To remove an event once it has been placed, hover over the event and click the x that appears over the event.

Deleting an event



You can also delete an event by selecting it on the Event List and clicking the delete button.

Panel

Intro

The Panel is located on the right side of the screen and contains additional tools for navigating and analyzing the exam. The individual items on the panel can be expanded or collapsed by clicking the panel headers, and the entire panel can be hidden by clicking the hide/show arrow button on the gray bar at the top of the panel. The hide/show display option is stored on the computer between sessions for each user.



Hide the entire panel by dragging the left edge



Click the small panel icon in the header to open the panel item in a separate, adjustable size window.

Video panel shown popped out

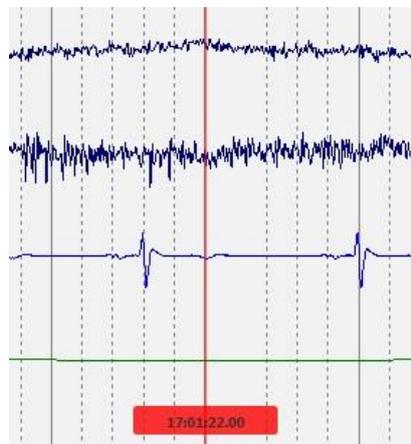


Video

If video is included in the exam data, it is displayed in the panel and can be played in synchronization with the exam data.

Click the play button to start video playback. A red video marker moves across the Channel Chart to show the position of the video in the EEG data. The Channel Chart pages automatically at the rate of video playback. You can also drag the video marker to a point in the EEG to start the video at that point.

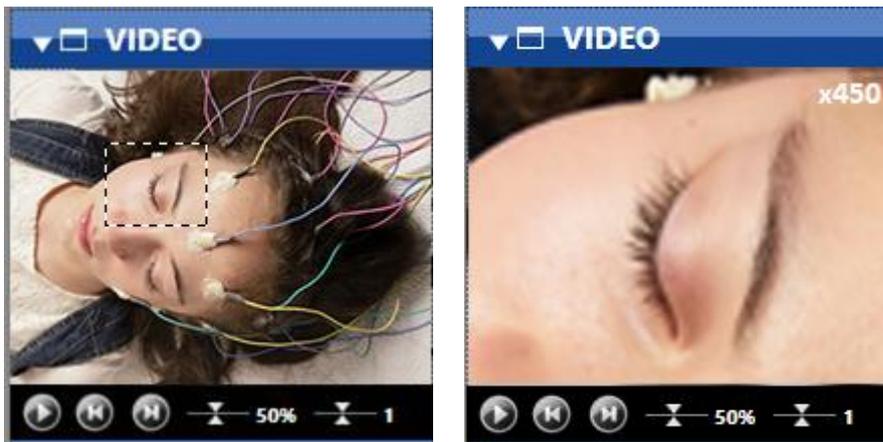
Red video cursor



The play button changes to a pause button while the video is playing, so you can press again to pause the video. The other buttons on the video panel are for stepping back and forward one step at a time, adjusting the volume, and adjusting the playback speed.

Zoom

Select an area of the video display to zoom into that area. The ratio of the zoom in relation to the current video window size is displayed in the top right corner. To see the actual zoom ratio (in relation to actual video size), mouse over the zoom label and the info is displayed in a popup. After zooming in one or more times you can reset the video to the originally displayed size by a right-click with the mouse.



Event List

The Event List displays a list all of the events in the exam by name, timestamp, and duration. Click on any event in the list to go to that event on the Channel Chart.

Sort the list by name, timestamp or duration by clicking on the headers.

Change the font size of the list by clicking the font size buttons at the bottom of the list.

Click the Copy Events to Clipboard button and you can then paste the list, including all columns, to an Excel or Word document.

Click the Delete button to deleted selected events, both from the list and the Channel Chart.

To select multiple events, select an event, then hold down the control key while selecting additional events. To select consecutive events, select the first event, then hold down the shift key while selecting the last event in the row. All of the events in between will also be selected.

Name	Time	Duration
Annotation	28.11.2002 23:29:58	0.00
Photic	28.11.2002 23:30:47	7.06
Photic	28.11.2002 23:31:01	8.03
Photic	28.11.2002 23:33:01	3.00
Photic	28.11.2002 23:33:04	3.01
Photic	28.11.2002 23:33:07	3.02
Photic	28.11.2002 23:33:10	3.00
Photic	28.11.2002 23:33:13	3.02
Photic	28.11.2002 23:33:16	3.01
Photic	28.11.2002 23:33:19	2.99
Photic	28.11.2002 23:33:22	3.02
Photic	28.11.2002 23:33:25	1.99
Photic	28.11.2002 23:33:27	2.01
Photic	28.11.2002 23:33:29	1.99
Photic	28.11.2002 23:33:31	2.01

Event List Settings

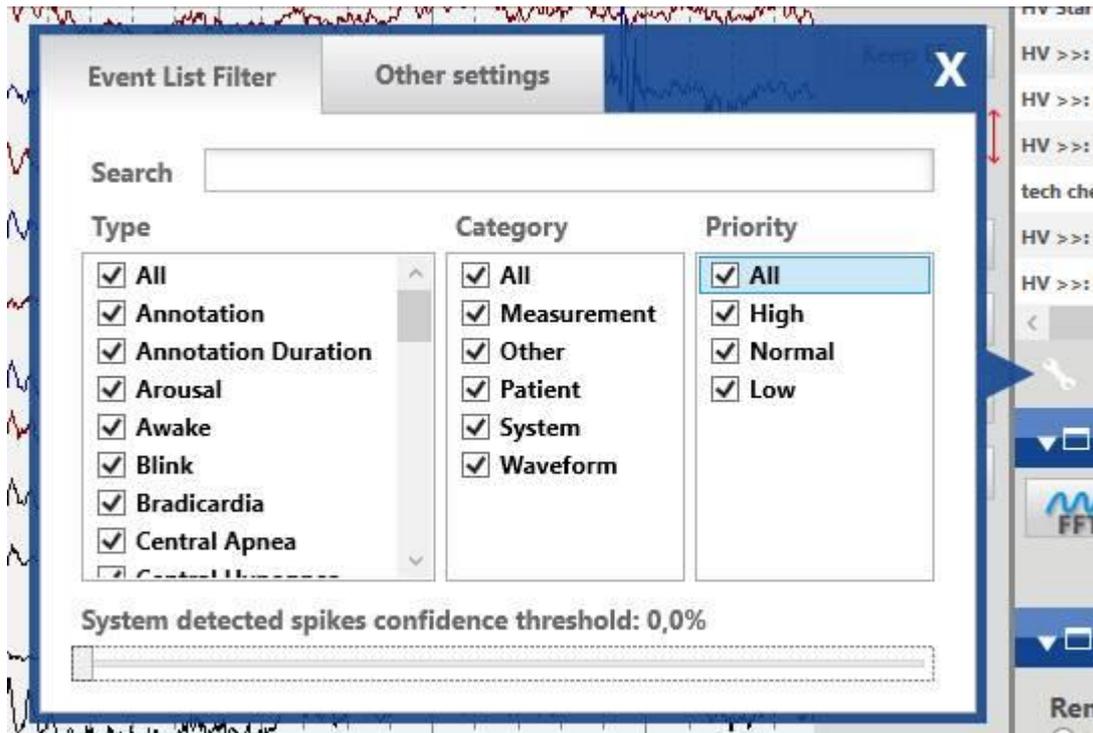
Click the wrench icon to open the Event List Settings popup. On the Event List Filter tab, you can select which events you want shown or hidden in the Event List. You can also filter by free text by typing into the Search field.

If the Persyst seizure detection is enabled, you can also filter by confidence threshold using the slider.

The filtered results are reflected on the Overview and Channel Chart as well as on the Event List.

The events are arranged in columns by type, category and priority. Check or uncheck the “All” checkbox to select or deselect all events in the column.

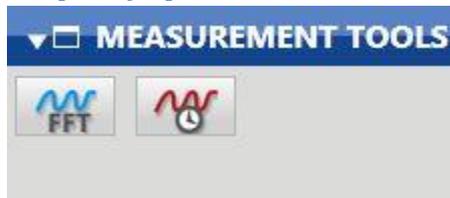
On the Other Settings tab, there is a checkbox to show or hide the date on the Event List.



Measurement Tools

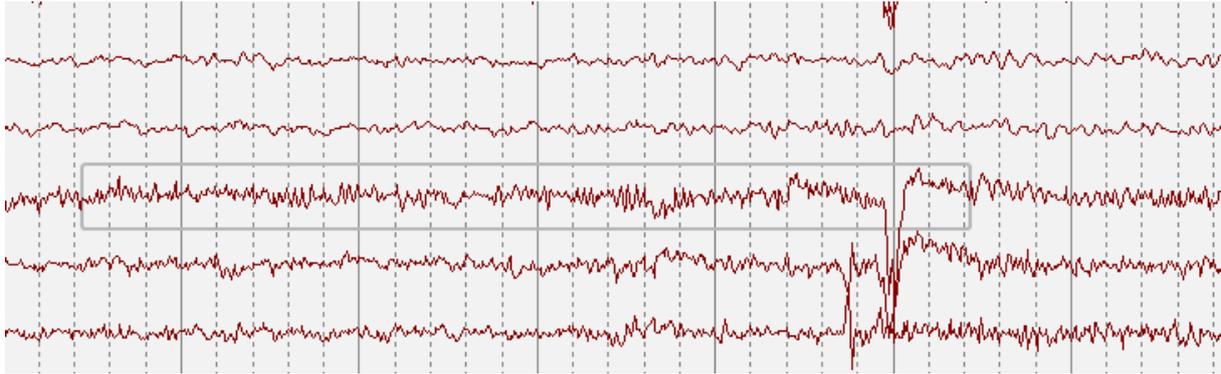
The Measurement Tools panel contains, as the name suggests, tools for taking measurements for further analysis of the EEG.

Frequency Spectrum and Time Domain buttons



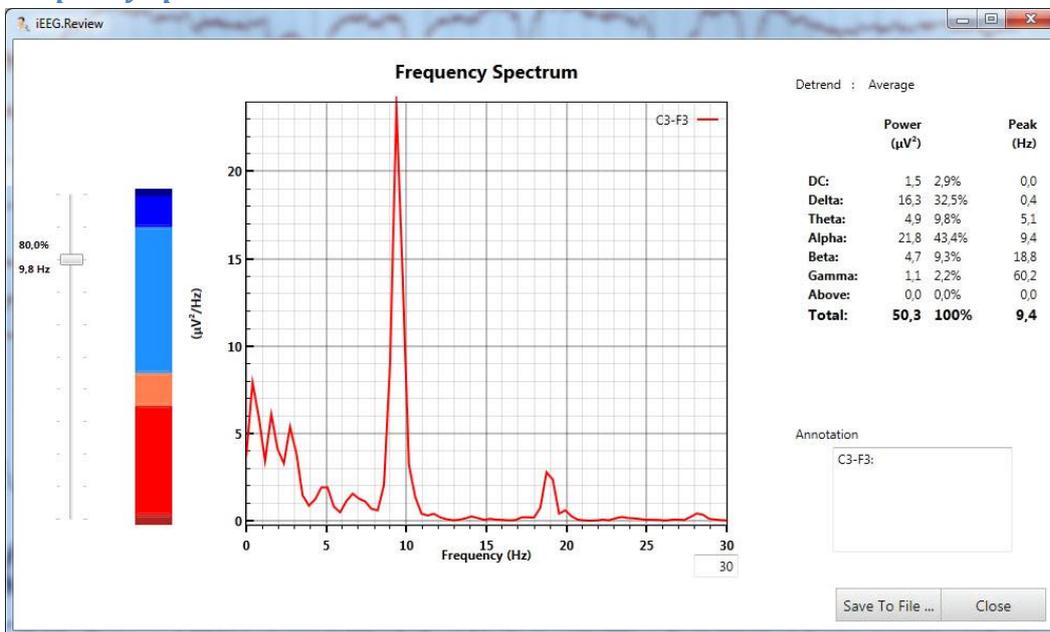
Frequency Analysis

It is possible to perform frequency spectrum analysis on any of the traces as they are displayed in the review screen. To do so, click the FFT button in the Measurement Tools panel, then select a portion of a trace by either clicking on the start point of the channel and then again at the end point, or by dragging from the start point to the end point. A box is drawn around the selected portion of EEG on the channel chart as shown:



A popup window opens with the calculations as shown:

Frequency Spectrum Window



The results for the selected EEG shown in the frequency spectrum window are calculated with the Welch's method:

1. The signal selected by the user and as displayed, i.e with same filtering settings, is divided into 2-second blocks, overlapping by 50%.
2. If the sampling rate is not in power, each block is zero padded until next the power of two samples
3. If the last block is not a full 2 seconds, it is zero padded until it is 2 full seconds.
4. The mean is subtracted from each block (**Detrend: Average** as shown in the results window)
5. Each block is windowed by a Hamming window function.
6. The periodogram is calculated of each block using a standard FFT algorithm with 0.5 Hz frequency resolution.
7. All the periodograms are averaged into the resulting frequency spectrum.

The power in the following frequency bands are calculated by summing the power in the frequency bins within the frequency bands:

- **DC:** 0 – 0.5 Hz
- **Delta:** 0.5 – 4 Hz
- **Theta:** 4 – 8 Hz
- **Alpha:** 8 – 13 Hz
- **Beta:** 13 – 30 Hz
- **Gamma:** 30 – 100 Hz
- **Above:** 100 – Nyquist frequency

The power values for each band is always shown in μV^2 in the first column and the relative percent power in the second column, i.e. power in the band divided by total power in all bands times 100, where total power is the sum of the power in all bands.

The spectral edge shown on the right in the Frequency Spectrum window is calculated as the frequency where the power below the frequency is x% of the total power, where x is 80% by default but can be changed by using the slider.

Click the Save to file button to save the results to disk.

Time Domain

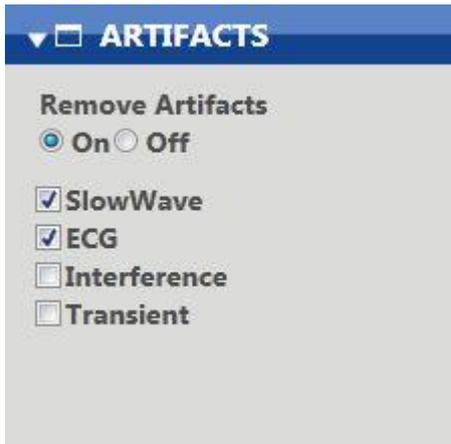
The Time Domain tool is used to measure amplitude and duration of a selected section of a waveform. Click the Time Domain button and then select a section of a waveform on the channel chart either by clicking and dragging, or by clicking first on the start point and again on the end point.

A window opens showing an enlarged view of the selected waveform. Click on the waveform where you want the measurement to begin and again where you want the measurement to end. The amplitude and duration are displayed.

Artifacts

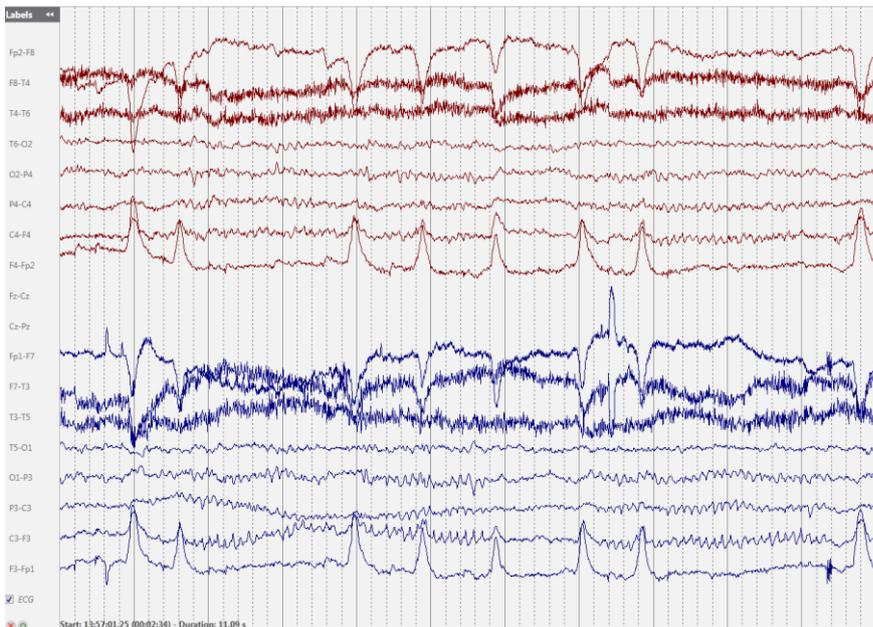
The artifact removal feature uses advanced signal processing methods to remove artifacts from the EEG while leaving the original EEG unaffected.

Check the types of artifact removal you want to activate, then click On or Off to show or hide the effects of the artifact removal. Note that while artifact removal is On, the system will slow down considerably for actions such as paging.

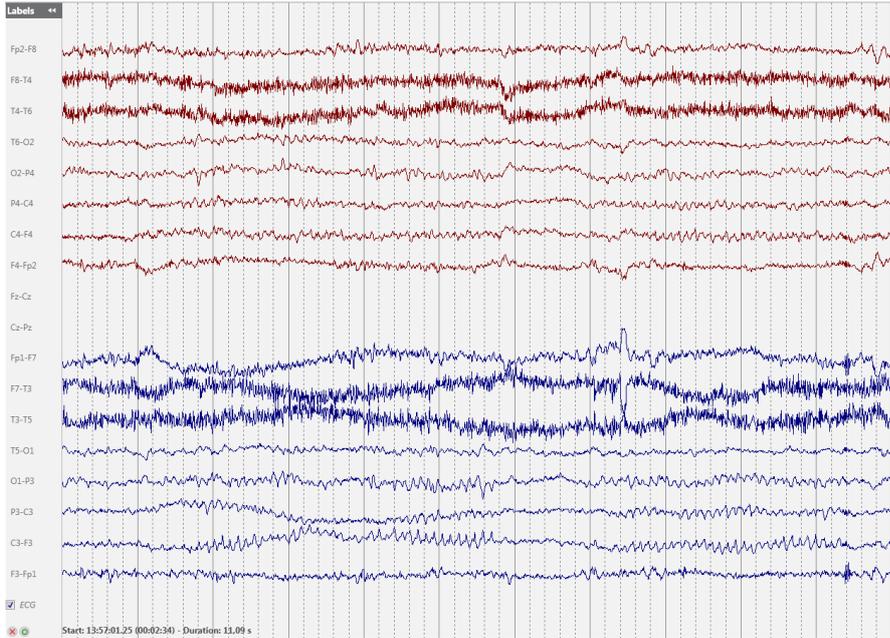


The artifact removal feature is provided as a supplement to conventional EEG processing such as band pass filtering. Artifacts are removed from one page at a time by user request.

The following image shows a page of EEG with eye blink artifact present. The artifact can be clearly seen on channels Fp2-F8, F4-Fp2, Fp1-F7 and F3-Fp1 but it is present on other channels as well to a lesser extent.



The next image shows the same page of EEG with the eye blink artifact removed.



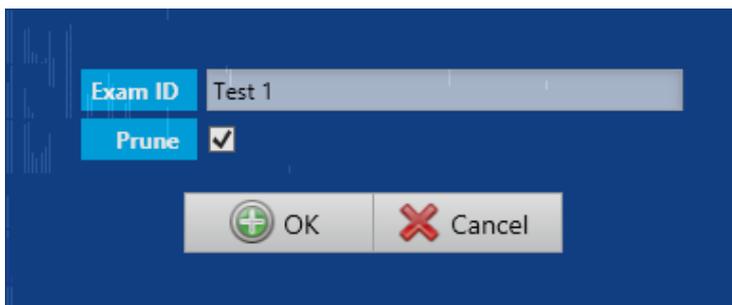
Menu

The Menu button located at the top of the screen holds functions which are typically located on the File menu in common applications, such as Save and Print.

In addition, there are the following functions:

Save As

Save a copy of the exam with a new ID. The copy can also be saved pruned.



Save As Dialog

Prune

Select Prune to trim the exam data down to the sections marked by prune event. The system saves a copy of the exam with only the marked sections and leaves the original exam untouched. You can preview the effects of pruning first – see the Prune Preview section under Channel Chart.

Demographics

Select this option to open the patient and exam properties of the open exam. The patient and exam properties can be edited in the same way as on the Patient List tab in iEEG Centrum.

Seizure Detection

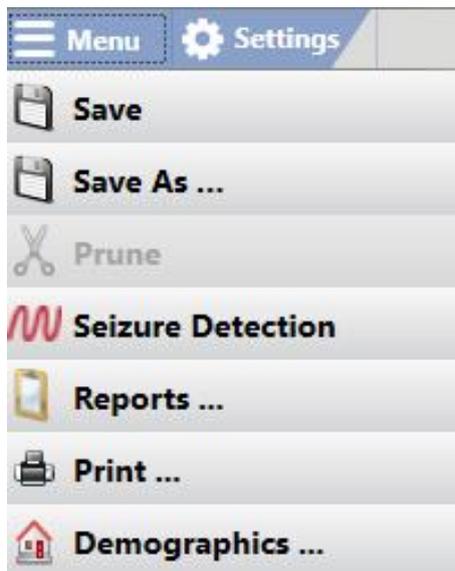
If the Persyst Spike and Seizure Detection option is installed on the iEEG Server, selecting this option on the menu will run the seizure detection algorithm. System detected events will be inserted at the top of the channel chart where the system has detected seizure and will also appear on the Event List.

You can also run the Spike and Seizure detection automatically on import by selecting the Spike/Seizure checkbox on the Import tab.



WARNING: The Persyst User Manual must be read before using the Spike & Seizure Detection feature.

iEEG Review Menu



Settings

Lifelines iEEG Review is highly customizable to the way you review data. You can create montages and event palettes, then save them to settings groups called Perspectives, which allows you to quickly switch between the settings that are available during review.

The Settings button is accessible in iEEG Review when you have an exam open for review. It is located at the top of the screen.

Click the Settings button to open the following set of tabs:

Settings Tabs



Montage

The montage is a way to organize how the information from an EEG exam is visualized. On the Montage tab you can create montages, as well as define EEG labels, reference and other labels.

After a new montage is created, add it to a Perspective to make it available on the Review screen. (See Perspectives, later in the Settings section).

Adding Montages

On the Montage tab, click the Add Item button at the bottom of the Montage list.

Buttons on the Montage list – Add item, delete selected item, duplicate item



A new montage is added to the list. Double click on the montage name to edit it.

Duplicating Montages

Select a montage from the list of montages.

Click the Duplicate Selected Item button at the bottom of the Montage list.

Double click on the montage name to edit it.

Deleting Montages

Select a montage from the list of montages.

Click the Delete Selected Item button at the bottom of the Montage list.

Note that the As Recorded montage cannot be deleted.

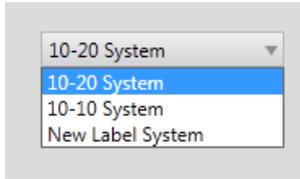
Associate User Groups to Montage

Select the montage from the Montage list, then move the user groups you want to have access to the Allowed user groups box using the arrow buttons and click Save. Only members of allowed user groups (as well as administrators) will see and have access to the montage.

Adding Montage Channels

There are two ways to add channels to a montage – drawing the channels on the Montage Head, or entering the active and reference electrodes in their respective fields.

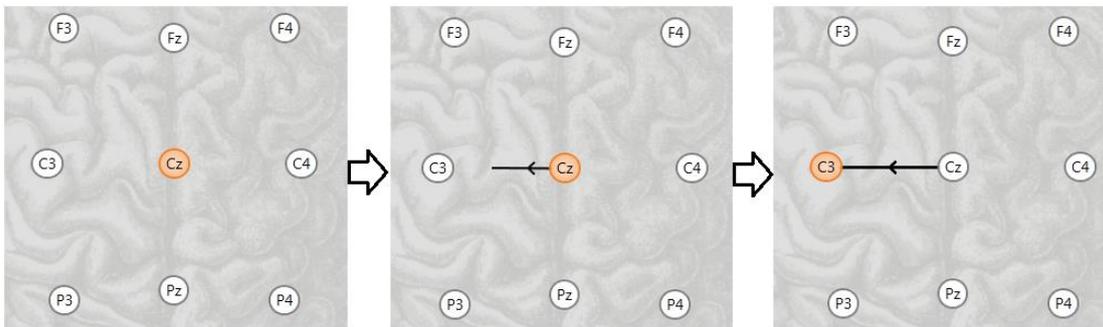
Montages can be made by using any of the available label systems (upper right corner).



You can still use any of the electrodes in the system, even though the selected label system does not include them.

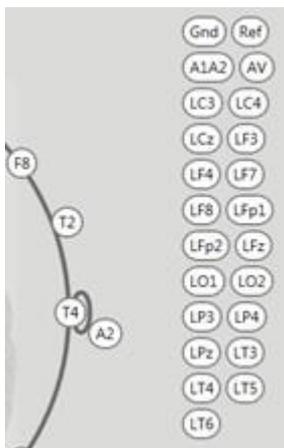
Drawing channels on the Montage Head

Click on the electrode you want as the active electrode, then click on the one you want as the reference.



The channel has now been added to the montage, both to the montage head and to the channel list.

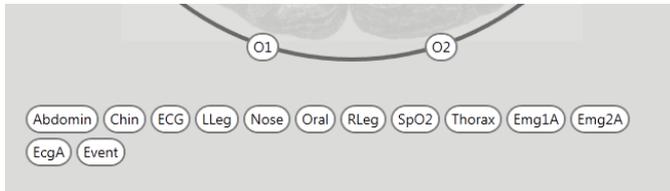
It is also possible to select an active electrode from the head and a reference from the list of References (to the right of the head).



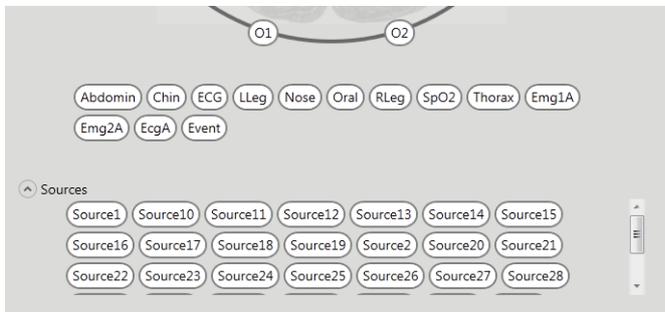
Clicking on a reference activates it so that many electrodes can be selected from the head. Each one then becomes the active electrode against the selected reference in a montage channel.

To deselect a reference, either click on the selected reference again, or select another reference from the list.

It is possible to add Non-EEG signals to the montage (located below the head) by clicking on the electrode. The non-EEG signals do not need to have references.

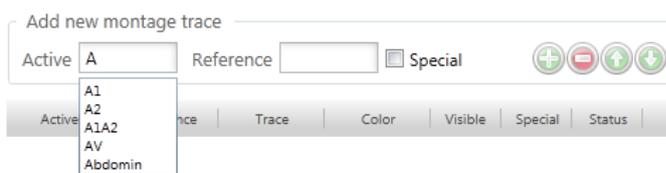


It is possible to add Sources to the montage (located below the Non-EEG signals) by clicking on the electrode. The sources do not need to have references.



Entering active and reference labels

Start entering the name of the active electrode in the Active field. The system displays all available electrodes matching that name. Select the electrode you want. Do the same for the Reference field.



Once valid electrodes have been entered, the Add Item button becomes available.



Clicking the Add Item button adds the channel to the montage, both to the channel list and to the montage head.

Sources and Non-EEG signals can be added this way as well.

Deleting Montage Channels

It is possible to select channels (one or more) from the Channel list and delete them by clicking the Delete Selected Item button.



Rearranging Montage Channels

It is possible to move selected channels in a montage up or down by clicking the Move Selected Item Up or Move Selected Item Down buttons.

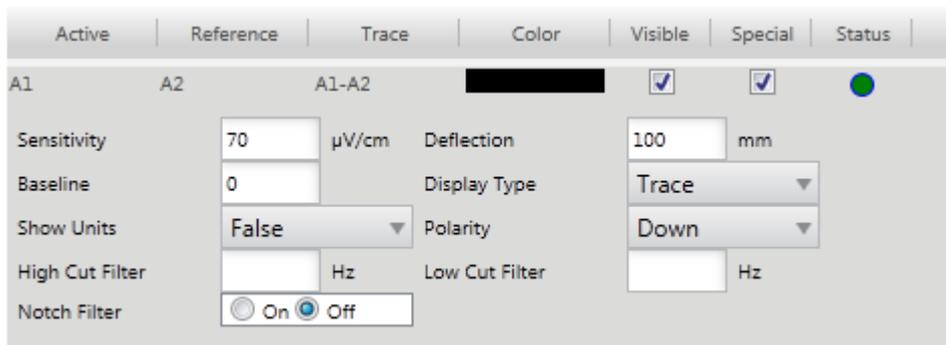


Making Channels Special

Special channels do not conform to the general channel settings, but have their own special settings.

It is possible to make a channel special by checking the Special box when you add the channel. The channel can also be made special afterwards by checking that channel's Special box.

Special settings can be applied to a single channel by clicking the Special box



The settings that can be made special are the following:

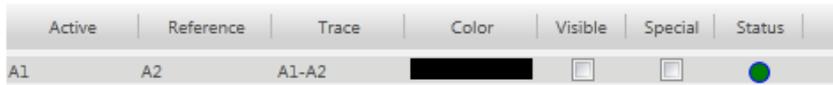
- Sensitivity ($\mu\text{V}/\text{cm}$) or ($\mu\text{V}/\text{mm}$) depending on the system's default setting
- Deflection (mm)
- Baseline
- Display type (Trace/Text/Trace&Text/Off)
- Show Units (True/False)
- Polarity (Up/Down)

- High Cut Filter (Hz)
- Low Cut Filter (Hz)
- Notch Filter (On/Off)

It is possible to remove the Special settings by unchecking the Special box. After that the channel will conform to the general channel settings again.

Visibility of Channels

Channels are visible on the EEG by default but it is possible to make a channel invisible on the EEG by unchecking that channel's Visible box.



Channel Status

The channels show their status with a colored dot, and a tool tip explains the status more thoroughly.

The dark green dot shows if the channel is OK.

The light green dot shows if the channel electrodes have different polarity or different sensor types.

The orange dot shows if the channel electrodes compare AC to DC, compare digital to analog, or match unipolar with bipolar.

The red dot shows if the channel electrodes compare different units.

Channel Color

The color of a channel can be changed by selecting it from the Color drop-down list.

Editing the color of a channel does not make it a Special channel.

Editing Channels

It is possible to edit the electrodes of a channel afterwards. This can be done either in the channel list itself or on the montage head.

On the Channel List

By clicking on an electrode (active or reference) in the Channel list, the name of the electrode becomes editable. Start entering the name of the new electrode in the field and the system displays all available electrodes matching that name. Select the electrode you want and the channel in the list as well as the channel on the head will be changed.

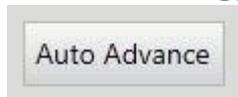
On the Montage Head

When editing channel electrodes on the head, you start by selecting a channel from the Channel list.

If the Auto Advance is off, you can select different electrodes on the head, but you are only editing the active electrode of the channel you selected. To edit other electrodes they must be selected specifically.

If the Auto Advance is on, the system will automatically move to the next electrode in the list for each electrode you select on the head. The move is from the active electrode in the selected line to the reference electrode in the selected line, then to the active electrode in the next line to the reference electrode in the same line, and so on.

Auto Advance toggle button



EEG Electrodes

This tab under Montage is for adding electrodes and creating electrode label systems. All of the electrodes added to the system are available for creating montages whether or not they are grouped into an electrode system.

Adding Electrode Systems

Click the Add Item button at the bottom of the Electrode System list.

Add Item, Delete Selected Item, Duplicate Item buttons



Double click on the system's name to edit it.

Duplicating Electrode Systems

Select an electrode system from the list of electrode systems.

Click the Duplicate Selected Item button at the bottom of the Electrode System list.

Double click on the electrode system's name to edit it.

Deleting Electrode Systems

Select an electrode system from the list of electrode systems.

Click the Delete Selected Item button at the bottom of the Electrode System list.

Note that the predefined 10-10 and 10-20 systems cannot be deleted.

Adding Electrodes to an Electrode System

Select an electrode system from the Electrode System list. Start entering the name of the electrode in the Name field. The system will display all available electrodes matching that name. Select the electrode you want and click the Add Item button.



The electrode has now been added to the electrode system, both to the electrode list and the head.

Deleting Electrodes from an Electrode System

It is possible to select an electrode from the electrode list or from the head and delete it by clicking the Delete Selected Item button.



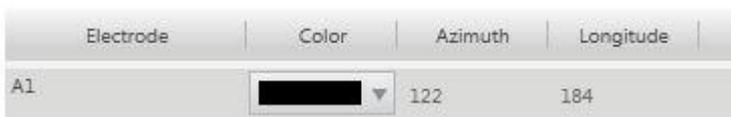
Azimuth and Longitude

Edit the azimuth and longitude of an electrode by clicking to activate the field and typing in a value (between -359 and +359).



Color

Click the color bar to select a new default "active" color for the electrode. This determines the default color of the trace where the electrode is the active one.

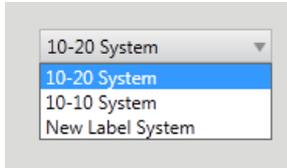


EEG References

This tab under Montage is used to add EEG reference electrodes which are then available when creating montages.

Adding References

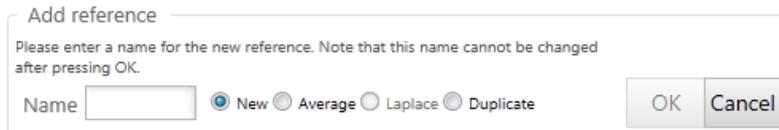
Before you add a reference, make sure you have the correct electrode system selected (upper right corner). The reference you make will only be added to the chosen electrode system.



Click the Add Item button at the bottom of the reference list.



The system will prompt you with a message to enter a name for the reference. Note that the name cannot be changed afterwards.



Enter a name and select a type for the new reference and click OK.

The available reference types are: New, Average and Duplicate.

- Selecting the New reference will create an empty reference. Add combination items to the reference by selecting an available electrode from the Name list. Edit the electrode weight and click the Add Item button.



- Selecting the Average reference will create a reference with every electrode in the selected electrode system, each with the weight 1.
- Selecting the Duplicate reference is only possible when duplicating references (see the Duplicating References section below). Click OK to duplicate the selected reference.

Duplicating References

Select a reference from the list of references (except for the predefined Ref).

Click the Duplicate Selected Item button at the bottom of the reference list.

Enter a name for the reference, make sure the Duplicate type is selected and click OK.

Deleting References

Select a reference from the list of references.

Click the Delete Selected Item button at the bottom of the reference list.

Note that the predefined Ref reference cannot be deleted.

Adding a Combination Item to a Reference

Select a reference from the list of references. Select an electrode from the Name list and enter its weight. Click the Add Item button.

Note that combination items cannot be added to the predefined Ref and Gnd references.

Deleting a Combination Item from a Reference

Select a reference from the list of references. Select a combination item from the list of combination items. Click the Delete Selected Item button.



Non-EEG Signals

It is possible to add signals from other sources to a montage, for example EKG, respiratory and other signal types. Use this tab under Montage to define these sensors so that they are available to add to montages.

Adding Non-EEG Signals

First make sure you have the correct electrode system selected (upper right corner). Type a name for the new sensor in the Name field. Note that the name cannot be changed afterwards. Select a sensor type from the Type list. Click the Add Item button.



If the new sensor has a unit other than μV , the Units/ μV and Offset can be edited.

- Each signal is measured in μV . If however the signal being measured has a unit that is not μV , the units/ μV indicates how many of the signal's unit one μV represents.
- The measured signal may be biased in such a way that the zero point in the measured signal's unit does not coincide with zero μV measured. The offset (in signal units) represents at what point in the unit's scale the zero μV is set.

Changing the Non-EEG Signal Type

Select a sensor from the Non-EEG Signal list, then change the sensor type by selecting another one from the Type drop-down list.

Non-EEG Signal Color

The color of non-EEG signals can be changed by selecting a new color from the Color list.

Deleting Non-EEG signals

Select sensors (one or more) from the Non-EEG Signal list. Click the Delete Selected Item button.

Add electrode
Please enter a name and type for the new sensor. Note that this name cannot be changed after it has been added.
Name Type
 

Events

Events are used to mark the EEG. The most basic events mark a noteworthy incident with a text. More complex events can be used for marking parts of the EEG for pruning, holding annotations and numerical values, and some events even store the current montage at the time of event insertion.

Use the Events tab in Settings to create event types and group them into palettes. You can then assign palettes to different Perspectives to be able to switch between them quickly during review.

Adding Event Palettes

Click the Add Item button at the bottom of the Palette list.



Double click on the palette name to edit it.

Duplicating Event Palettes

Select a palette from the list of palettes.

Click the Duplicate Selected Item button at the bottom of the Palette list.

Double click on the palette name to edit it.

Deleting Event Palettes

Select a palette from the list of palettes.

Click the Delete Selected Item button at the bottom of the Palette list.

Note that predefined palettes cannot be deleted.

Adding Event types

Click the Add Item button at the bottom of the available event types list.



Editing Event types

It is possible to edit events at all times.

Event Settings

The Name and Description fields of the event type can be edited.

A color can be selected for the event type.

The event type category can be selected from a drop-down list.

The event type priority can be selected from a drop-down list for display purposes.

Numerical Events

To set an event type as Numerical, select one of the options from the drop-down list.

Set the Minimum, Maximum and Default values.

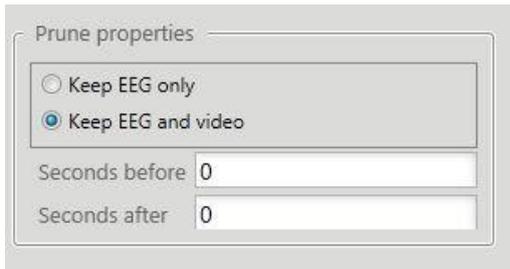
Numerical properties	
Minimum	0
Maximum	0
Default value	0

Annotation Events

If the Annotation Event checkbox is checked, the event will be an annotation event, and display the event's annotation as its caption.

Prune Events

If the Prune event checkbox is checked, the event will be a prune event. It is possible to prune (or prune preview) exams, cutting out unwanted data and only leaving the segments marked with prune events. The Prune Properties that can be edited are whether the event should Keep EEG only or Keep EEG and video when pruning.



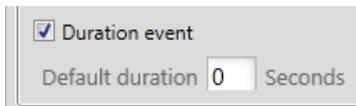
Also, seconds before and after can be edited. These are seconds right before and after the prune event that the system will keep when the exam is pruned.

Context Events

If the Context event checkbox is checked, the event will be a context event. The system then saves the montage, general channel settings and timebase of the exam at the point of insertion. After a context event has been added to an exam, it is possible to toggle its context button and the system will display the event's settings.

Duration Events

If the Duration event checkbox is checked, the event will be a duration event. The Default Duration of the event type can be set.



Duplicating Event Types

Select an event type from the list of available event types.

Click the Duplicate Selected Item button at the bottom of the available event types list.

Deleting Event types

Select an event type from the list of available event types.

Click the Delete Selected Item button at the bottom of the available event types list.

Note that predefined event types cannot be deleted.

Adding Event Types to Palettes

Select the palette you want to edit from the list of palettes. Double click on the event type you want to add to the palette in the available event types list.

Removing Event types from Palettes

Select the palette you want to edit from the list of palettes. Double click on the event type you want to remove from the palette in the event types in palette list.

Perspectives

Sometimes you need the same combination of event palette, montages, general channel settings and more. You can store these combinations into a settings group called Perspectives. It is then possible to easily switch between perspectives during review, resulting in increased efficiency if you need to change the EEG environment frequently. Perspectives can be easily added and modified.

If no Perspective is created, the Default perspective is used, and its settings can be modified on this tab.

Adding Perspectives

Click the Add Item button at the bottom of the perspectives list.



Double click on the perspective name to edit it.

Duplicating Perspectives

Select a perspective from the list of perspectives.

Click the Duplicate Selected Item button at the bottom of the perspectives list.

Double click on the perspective name to edit it.

Deleting Perspectives

Select a Perspective from the list of perspectives.

Click the Delete Selected Item button at the bottom of the perspectives list.

Note that the predefined perspectives Default and PSG cannot be deleted.

Associate User Groups to Perspective

Select the perspective from the Perspective list, then move the user groups you want to have access to the Allowed user groups box using the arrow buttons and click Save. Only members of allowed user groups (as well as administrators) will see and have access to the perspective.

Editing Perspectives

It is possible to edit perspectives at all times. To edit, select the Perspective you want to edit from the list. Then modify the following settings.

Montage for Perspective

Select a montage from the Available Montages list and click the Add montage to perspective (right arrow) button to move the montage to the perspective. Montages can be removed from a perspective by selecting the montage from Montages for Perspective and clicking the Remove montage from perspective (left arrow) button.

Note that the As Recorded montage cannot be removed from any perspective.

Event Palette

Select an event palette for the perspective from the Event Palette list.

Default Montage

The default montage is the one that will be selected by default on the toolbar in Review. The other montages in the perspective will be available on the drop-down list.

Default Sensitivity

The perspective's default sensitivity is selected from the Sensitivity list. The list can be edited by typing in a new value (between the upper and lower limits) and pressing Enter.

Default Deflection

The perspective's default deflection is selected from the Deflection list. The list can be edited by typing in a new value (between the upper and lower limits) and pressing Enter.

Default High-cut Filter

The perspective's default high cut filter is selected from the High Cut list. The list can be edited by typing in a new value (between the upper and lower limits) and pressing Enter.

Default Low-cut filter

The perspective's default low cut filter is selected from the Low Cut list. The list can be edited by typing in a new value (between the upper and lower limits) and pressing Enter.

Default Notch Filter

The default notch filter position can be on or off.

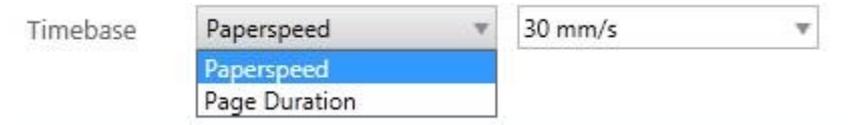
Timebase

You can control how much data is displayed on the channel chart (time-wise) by setting its timebase. Choose between two modes: paperspeed (represents the length of the page used to display each second of the data) and page duration (represents the number of seconds per page).

Set the default timebase mode by choosing either Paperspeed or Page Duration under Timebase. Then select the default paperspeed or page duration from the second drop-down

list. The list can be edited by typing in a new value (between the upper and lower limits) and pressing Enter.

Select the default timebase in Settings>Perspectives

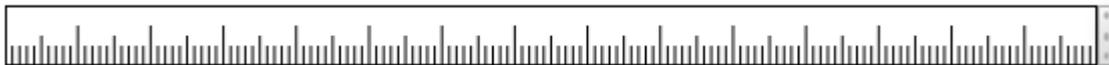


My Settings

Screen

Here you can calibrate the screen for accurate representation of the onscreen channel chart. When calibrated, 1 cm displayed on the channel chart will actually measure 1 cm. The screen calibration must be performed for every new computer screen.

Using a real ruler, drag the handles on both system rulers, vertical and horizontal, so they match exactly 10 cm.



WARNING: It is important to calibrate the screen so exams can be interpreted correctly. The screen calibration must be performed for every new computer screen.

Settings

Units

It is possible to set default units for each user.

The unit for sensitivity can be either $\mu\text{V}/\text{cm}$ or $\mu\text{V}/\text{mm}$.

The unit for paper speed can be either cm/s or mm/s .



Values

It is possible to set default values and display layouts for each user.

The default paging speed can be typed in.

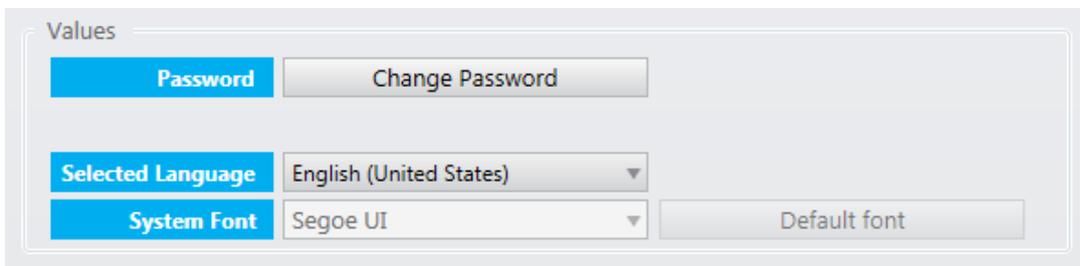
The notch filter frequency can be set to either 50 Hz or 60 Hz.

The position of the timeline on the screen can be set to either Top or Bottom.



The screenshot shows a settings panel titled "Values". It contains three sections: "Default Paging Speed" with a text input field containing "30" and a small "x" icon; "Notch Filter Frequency" with two radio buttons, "50 Hz" (unselected) and "60 Hz" (selected); and "Timeline's position" with two radio buttons, "Top" (selected) and "Bottom" (unselected).

Additional system values can also be set here (these options are also available through the iEEG Centrum client under the My Settings tab). They are Change Password, Selected Language, and System Font (available if the selected language requires a special font).



The screenshot shows a settings panel titled "Values" with three rows of options. The first row has a blue header "Password" and a "Change Password" button. The second row has a blue header "Selected Language" and a dropdown menu showing "English (United States)". The third row has a blue header "System Font" and a dropdown menu showing "Segoe UI", followed by a "Default font" button.

Gridlines

Check whether you want to display the major or minor gridlines.

Default Perspectives

For each exam type, you can select which perspective you want to be used as the default one.

Appendix 1

Trackit Users Quick Guide

This appendix is supplied for users of the Trackit software for acquisition.

Setting the Correct Modality

Before it is possible to start a Trackit recording using Lifelines iEEG, an administrator must set the correct modality application.

This is done in iEEG Centrum by going to the Admin>Definitions>Modalities.

Select Lifelines Trackit from the list. Under Properties, browse for the Trackit application in the Recording Application field.

Click Save.

Recording with Trackit

- In iEEG Centrum, go to the Patient Admission tab and add a new patient, or use an existing patient from the Patient Database. Edit the exam information. Be sure to select an Exam Type that is associated with the Trackit modality. Initiate the exam.
- It is also possible to select a visit from the Patient Visits list on the Patient List tab and add a new exam to it. Be sure to select an Exam Type that is associated with the Trackit modality. The new exam will be in the Initiated workflow state.

The exam can now be moved to the next workflow states using the workflow buttons at the bottom of the screen. When you select the Record state, the system opens the Trackit modality.

Before starting the recording in Trackit, it is necessary to “Send Setup”. (Press Send Setup in the Trackit control panel).

Importing the Exam

After the recording is completed using Trackit, the memory card is connected to the computer’s card reader.

In iEEG Centrum, you can now select the exam and move it to the Import workflow state. Browse for the TRACKIT.EDF file and click Open. The importation of the Trackit file starts and is associated with the exam. It is also possible to import the Trackit file using the Import tab. Browse for the TRACKIT.EDF file from the memory card and click Open. The system connects the exam to the correct patient and starts the import.

Review

Once the import has finished successfully, you can review the exam in iEEG Review by going to the Patient List tab>Visit Properties>Exams. Select the exam and click the Review button next to the workflow buttons.

See the Patient List, Patient Admission, and Import sections of this manual for more detailed information about using iEEG Centrum.

Appendix 2

Editing and Creating Native Report Templates

Modify the Default Native Report Template

To make simple changes to the default template, select the template on the Report Type tab. Then on the Edit View tab, select the template title and type in your own title. Delete the Add Logo Here text and browse for a new image by clicking the image icon from the text editing tools above the template. Click Save to save the changes.

Create a New Native Report Template (advanced)

Note: The following sections require advanced knowledge of editing xaml flow documents.

On the Report Type tab, click Add. Type a name for the Report Type in the space below and click Save. The new report template is added to the list. Select the new template on the list. You can now insert fields into the selected template using the Edit View tab and edit the xaml in the Xaml View tab. It is recommended to use an external xaml editor and then paste or import that code into the Xaml View tab. Click Save to save the changes.

Writing the Flow document can be done in any editor. Here is a link to get started:

<http://www.codeproject.com/Articles/37368/WPF-Flow-Document-For-Beginners>

Creating New Report Fields (advanced)

Go to the Report Field tab. Click Add and give the report field a name under the Report Field Properties. Choose a Value Type, either TypeBool or TypeString. Click Save. The report field is saved to the database and is now available to be added to a report template. The Field Calculator selection is only for filtering purposes (deciding where the report field will show up in report field tree).

One usage scenario would be to implement a questionnaire that uses these extra report fields. The questionnaire report would be added to a state in the workflow and would automatically pop up when the exam reaches that state. After the user has filled out the questionnaire report and clicked save, the answers are saved to the database on a report field basis.

An SQL report could then be run on all instances of the questionnaire, giving useful statistics.

Examples

To get i.e. the height of a patient, use the syntax:

```
<aprp:InlineField FieldName="Height"  
CalculationAgent="PatientCalculator"> </aprp:InlineField>
```

To get some exam information, i.e. the date the exam was recorded, use the syntax (the Value is the default value if nothing is in the field):

```
<aprp:InlineField CalculationAgent="ExamCalculator" FieldName="RecordedDate"
Value=""> </aprp:InlineField>
```

To add extra fields, i.e. smoking, the syntax would look like:

```
<aprp:InlineField CalculationAgent="ExtraFieldCalculator" FieldName="Smoker"
Value="False"> </aprp:InlineField>
```

Operations (advanced)

Advance users can add formulas into the template xaml editor. Then report fields can be used in simple questionnaire calculations, i.e. using weight and height to calculate the BMI index of patients.

Example

To add a formula that calculates using report fields, i.e. calculating the body mass index, use this syntax:

```
<aprp:InlineFormula Formula=" {1} / ( ({2}/100) * ({2}/100) )" FormulaName="BodyIndex"
Format="0:0.##">
  <aprp:InlineFormula.Parameters>
    <aprp:ParameterField FieldName="Weight" CalculationAgent="PatientCalculator"/>
    <aprp:ParameterField FieldName="Height" CalculationAgent="PatientCalculator"/>
  </aprp:InlineFormula.Parameters>
</aprp:InlineFormula>
```

Where the first report field (Weight) is represented as {1} in the formula to calculate, etc.

The user can specify the format of the numerical result using the standard Microsoft format style: <http://msdn.microsoft.com/en-us/library/0c899ak8.aspx>

Appendix 3: Manufacturer’s Declaration

EMC Compatibility

This section contains specific information regarding the device’s compliance with EN 60601-1-2.

Note: Medical electrical equipment needs special precautions regarding EMC and needs to be installed and put into service according to the EMC information provided here.

WARNING: The use of accessories, transducers and cables other than those specified, with the exception of transducers and cables sold by the manufacturer of the equipment as replacement parts for internal components, may result in increased emissions or decreased immunity of the equipment.

Guidance and manufacturer’s declaration – electromagnetic emissions		
The Lifelines iEEG system is intended for use in the electromagnetic environment specified below. The customer or the user of the Lifelines iEEG system should assure that it is used in such an environment.		
Emissions Test	Compliance	Electromagnetic Environment Guidance
RF emissions CISPR11/EN55011	Group 1	The Lifelines iEEG system uses RF energy only for its internal function. Therefore, its RF emissions are very low and are not likely to cause any interference in nearby electronic equipment.
RF emissions CISPR11/EN55011	Class B	The Lifelines iEEG system is suitable for use in all establishments, including domestic establishments and those directly connected to the public low voltage power supply network that supplies buildings used for domestic purposes.
Harmonic emissions EN 61000-3-2	Class A	
Voltage fluctuations/ Flicker emissions EN 61000-3-3	Complies	

Guidance and manufacturer’s declaration – electromagnetic immunity			
The Lifelines iEEG is intended for use in the electromagnetic environment specified below. The customer or the user of the Lifelines iEEG should assure that it is used in such an environment.			
Immunity Test	EN 60601 Test Level	Compliance Level	Electromagnetic Environment Guidance
Electrostatic	+/- 6 kV: Contact	+/- 6 kV: Contact	Floors should be wood,

discharges (ESD) EN 61000-4-2	+/- 8 kV: Air	+/- 8 kV: Air	concrete or ceramic tile. If floors are covered with synthetic material, the relative humidity should be at least 30%
Electrical fast Transients/burst EN 61000-4-4	+/- 2 kV: AC mains +/- 1 kV: Signal lines	+/- 2 kV: AC mains +/- 1 kV: Signal lines	Mains power should be that of a typical commercial and/or hospital environment
Surge EN 61000-4-5	+/- 2 kV: Common mode +/- 1kV:Differential mode	+/- 2 kV: Common mode +/- 1kV:Differential mode	Mains power should be that of a typical commercial and/or hospital environment
Voltage dips, short interruptions and voltage variations on power supply input lines EN 61000-4-11	<5% 230 V (>95% dip in 230 V) for 0.5 cycle 40% 230 V (60% dip in 230 V) for 5 cycles 70% 230 V (30% dip in 230 V) for 25 cycles 95% dip in 230 V) for 5 sec <5% 230 V (>95% dip in 230 V) for 5 sec	<5% 230 V (>95% dip in 230 V) for 0.5 cycle 40% 230 V (60% dip in 230 V) for 5 cycles 70% 230 V (30% dip in 230 V) for 25 cycles 95% dip in 230 V) for 5 sec <5% 230 V (>95% dip in 230 V) for 5 sec	
Power frequency (50/60 Hz) magnetic field EN 61000-4-8	3 A/m	3 A/m	Power frequency magnetic fields should be at levels characteristic of a typical location in a typical commercial and/or hospital environment

Guidance and manufacturer's declaration – electromagnetic immunity

The Lifelines iEEG system is intended for use in the electromagnetic environment specified below. The customer or the user of the Lifelines iEEG system should assure that it is used in such an environment.

IMMUNITY test	IEC 60601 TEST	Compliance	Electromagnetic environment
---------------	----------------	------------	-----------------------------

	LEVEL	level	- guidance
			Portable and mobile RF communications equipment should be used no closer to any part of the Lifelines iEEG, including cables, than the recommended separation distance calculated from the equation applicable to the frequency of the transmitter.
			Recommended separation distance:
RF Common mode/ Conducted Susceptibility EN 61000-4-6	3 Vrms 150 kHz to 80 MHz	(a) 0.78 Vrms : 150 – 250 kHz (b) 3 Vrms : 0.25 – 35 MHz (c) 1 Vrms : 35 – 80 MHz	$d=4.5 \sqrt{P}$ $d=1.2 \sqrt{P}$ $d=3.5 \sqrt{P}$ Note: using unshielded input leads (c)
Radiated RF Electromagnetic Fields EN 61000-4-3	3 V/m 80 MHz to 2.5 GHz	(a) 0.15 V/m : 80 – 130 MHz (b) 0.5 V/m : 130 – 309 MHz (c) 1 V/m : 309 – 2500 MHz	$d=23.3 \sqrt{P}$: 80 MHz to 130 MHz $d=7 \sqrt{P}$: 130 MHz to 309 MHz $d=3.5 \sqrt{P}$: 309 MHz to 800 MHz $d=7 \sqrt{P}$: 800 MHz to 2.5 GHz Note: using unshielded input leads (d)
			where P is the maximum output power rating of the transmitter in watts (W) according to the transmitter manufacturer and d is the recommended separation distance in metres (m). Field strengths from fixed RF transmitters, as determined by an electromagnetic site survey (a), should be less than the compliance level in each frequency range (b). Interference may occur in the vicinity of equipment marked with the following symbol:

			
NOTE 1 At 80 MHz and 800 MHz, the higher frequency range applies.			
NOTE 2 These guidelines may not apply in all situations. Electromagnetic propagation is affected by absorption and reflection from structures, objects and people.			
<p>(a) Field strengths from fixed transmitters, such as base stations for radio (cellular/cordless) telephones and land mobile radios, amateur radio, AM and FM radio broadcast and TV broadcast cannot be predicted theoretically with accuracy. To assess the electromagnetic environment due to fixed RF transmitters, an electromagnetic site survey should be considered. If the measured field strength in the location in which the Lifelines iEEG is used exceeds the applicable RF compliance level above, the Lifelines iEEG should be observed to verify normal operation. If abnormal performance is observed, additional measures may be necessary, such as re-orienting or relocating the Lifelines iEEG.</p> <p>(b) Over the frequency range 150 kHz to 80 MHz, field strengths should be less than 3 V/m.</p> <p>(c) The immunity levels for conducted RF are for unscreened input electrode leads 1 m in length and worst-case coupling, including any resonances across the frequency band. The interference is less when the coupling plane of the interference source is not in the same plane as the electrode leads.</p> <p>(d) The immunity levels for radiated RF are for unscreened input electrode leads 1 m in length and worst-case coupling, including any resonances across the frequency band. The interference is less when the polarisation plane of the interference source is not in the same plane as the electrode leads.</p>			

Recommended separation distances between portable and mobile RF communications equipment and the Lifelines iEEG system			
The Lifelines iEEG system is intended for use in an electromagnetic environment in which radiated RF disturbances are controlled. The customer or the user of the Lifelines iEEG system can help prevent electromagnetic interference by maintaining a minimum distance between portable and mobile RF communications equipment (transmitters) and the Lifelines iEEG system as recommended below, according to the maximum output power of the communications equipment.			
Rated maximum output power of transmitter	Separation distance according to frequency of transmitter m		
W	150 kHz to 80 MHz $d=1.2\sqrt{P}$	80 MHz to 800 MHz $d=3.5\sqrt{P}$	800 MHz to 2.5 GHz $d=7\sqrt{P}$
0.01	0.12	0.12	0.23
0.1	0.38	0.38	0.73
1	1.2	1.2	2.3
10	3.8	3.8	7.3
100	12	12	23
For transmitters rated at a maximum output power not listed above, the recommended separation distance d in meters (m) can be estimated using the equation applicable to the frequency of the transmitter, where P is the maximum output power rating of the transmitter in watts (W) according to			

the transmitter manufacturer.

NOTE 1. At 80 MHz and 800 MHz, the separation distance for the higher frequency range applies.

NOTE 2. These guidelines may not apply in all situations. Electromagnetic propagation is affected by absorption and reflection from structures, objects and people.

Index

- Add Users, 41
- Admin View, 41
- Archive, 32
- Artifacts, 81
- Auditing, 49
- Auto Advance, 90
- Cautions and warnings, 9
- Change Password, 40
- Channel Chart, 65
- Channel Labels, 69
- Current Page Marker, 66
- Definitions, 46
- Demographics, 84
- EEG Electrodes, 90
- EEG References, 91
- Electrode systems, 90
- Event List, 77
- Event Overview, 66
- Event Palette, 71
- Event, annotation, 73
- Event, caption, 73
- Event, duration, 72
- Event, placing, 71
- Events, context, 74
- Events, numerical, 74
- Events, prune, 74
- Events, settings, 94
- Exam List, 25
- Exam Properties, 27, 38, 63
- Exam Space, 48
- Exam Tab, 60
- Exam Types, 46
- Exam View, 59
- Exams, 22
- Existing Patient, 33
- Filters, 25, 69
- Frequency Spectrum, 79
- Import, 34
- Import Tab, 60
- Initiate, 30
- Language, 40
- Launch IEEG Review, 59
- Lifelines iEEG Centrum, 24
- Lifelines iEEG Review, 59
- Login, 23
- Measurement Tools, 79
- Menu, 83
- Modalities, 48
- Modality, setting, 100
- Montage, 85
- Montage Selector, 68
- My Configuration, 99
- My Information, 39
- New Patient, 33
- Non-EEG Signals, 93
- Paging, 67
- Panel, 75
- Password Policy, 43
- Patient Admission, 33
- Patient Database, 22
- Patient List, 24
- Patient Properties, 28
- Patient State, 27
- Patient Visit List, 24
- Permissions, 22, 29
- Perspective Selector, 68
- Perspectives, settings, 97
- Processing, 38
- Processing Tab, 63
- Progress, 38, 63
- Prune, 83
- Prune events, 74
- Prune Preview, 69
- Record, 31

Record Now, 31
Report Fields, 102
Report Template, 45, 102
Report Template Operations, 103
Report Templates, native, 102
Reports, 43
Reports and Documents, 27
Review, 32, 59
Review, main screen, 64
Roles, 42
Safety standards, 8
Schedule, 31
Screen Calibration, 99
Search, 25
Segment Breaks, 66
Sensitivity, 67
Settings, 84
Special Channels, 70
System Requirements, 13
Timebase, 68
Timeline, 65
Toolbar Controls, 67
Trackit, 100
Trackit, Importing, 101
Trackit, recording, 101
Trackit, review, 101
Units, 99
User Administration, 41
User Groups, 42
Values, 99
Video, 76
Video Overview, 66
Visit Properties, 25
Visits, 22
Warranty, 8
Workflow, 22, 30
Workflow States, Custom, 49
Zoom Bar, 66