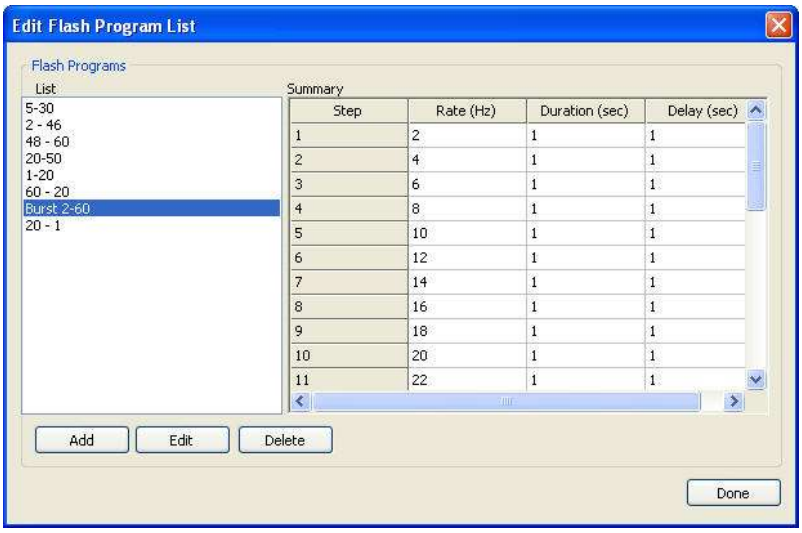


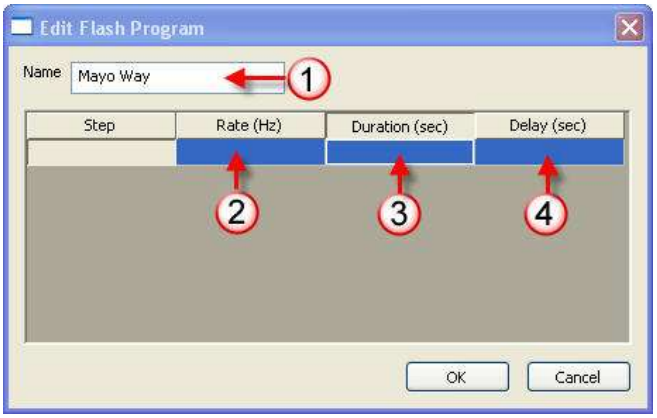
Note the Edit Flash Program dialog below.

1. Enter the name you would like to use for the photic program

2. Enter the Rate you would like to use for step number 1, press the tab button to advance to the Duration box after you have entered the Rate.

3. Enter the Duration; press the tab button to advance to the Delay box after you have entered the Duration.

4. Enter the Delay; press the tab button to advance to the next step. Enter the Rate for the next step. Continue until all steps have been defined. Click on OK when you have completed all steps.



To associate a flash program with the Program 1 or Program 2 button in the Photic Stimulator control box during data collection, you must edit the recording protocol.

Refer to the Protocols section for information on how to configure the photic program for use during data collection.

Data Maps

Data maps allow laboratories to standardize how channels will be displayed and defined. Easy III system will refer to a data map to allow the system to collect data from multiple amplifier types available from Cadwell.

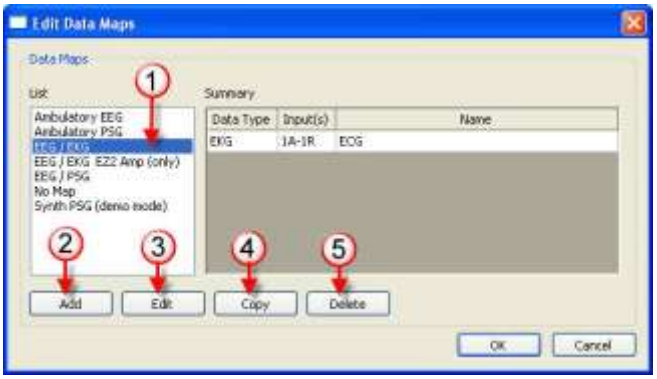
Opening the Data Map Option

To open or create a Data Map, click on the Data Map option.

Editing or Selecting a Data Map (note the menu displayed below)

1. Select the Data Map you would like to review.
2. To add a new Data Map, click on the Add button.
3. To edit the selected Data Map, click on the Edit button.
4. To make a copy of the selected Data Map, click on the Copy button.
5. To delete the selected Data Map, click on the Delete button.

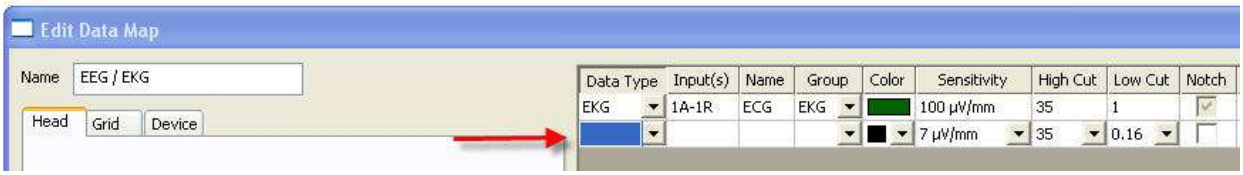
Note: All changes made to data maps will be automatically copied to all systems. Any Data Maps deleted from this list will also be deleted from all systems.



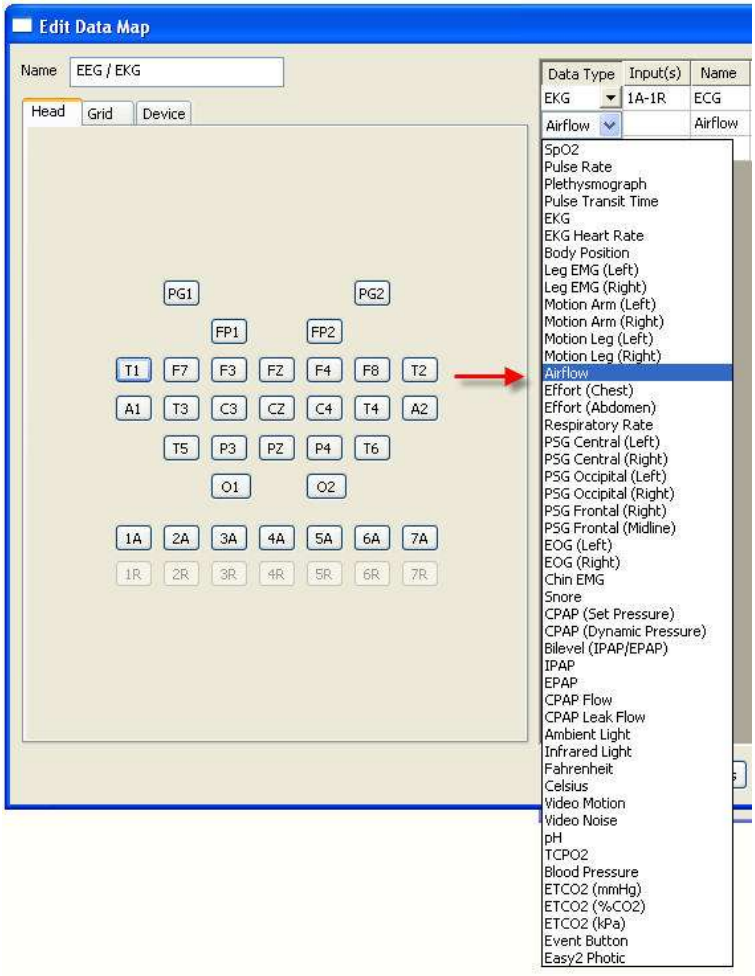
Adding a Channel to a Data Map

Selecting a Data Map from the Data Map list and clicking on Edit will allow the user to edit the selected map.

Click on the Data Type drop down, select a channel type.



In the example below, an airflow channel will be added to the EEG/EKG Data Map.



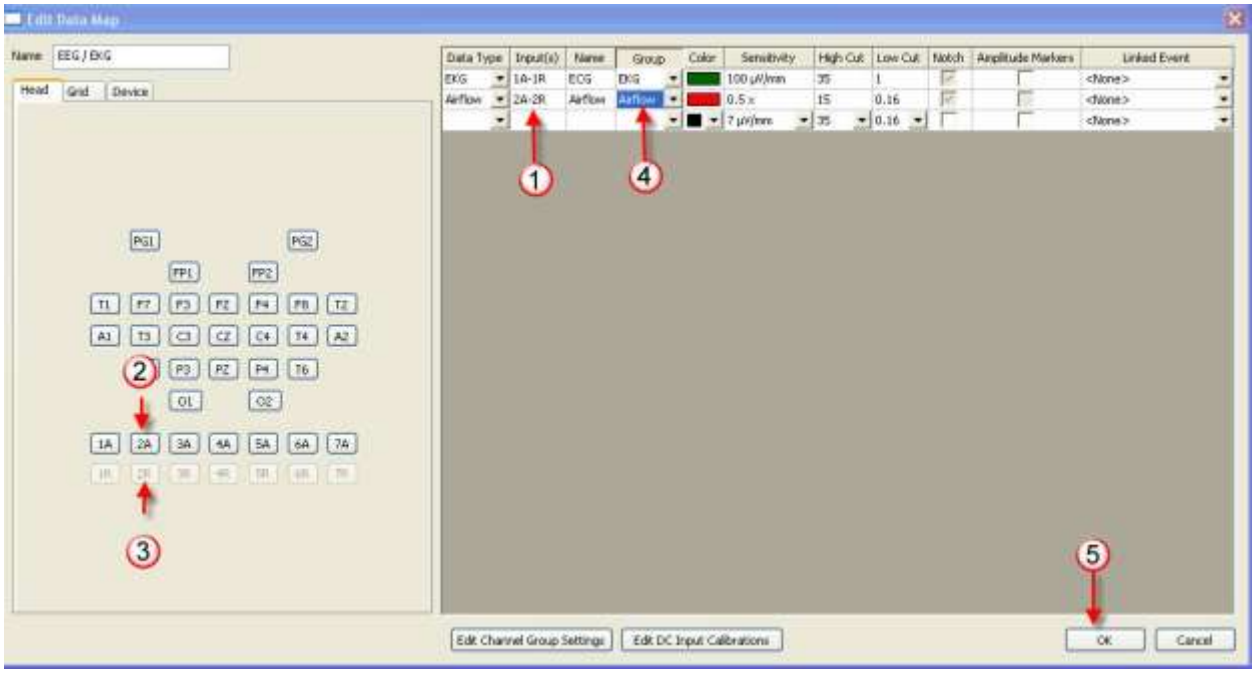
Note the Airflow channel is now automatically placed in the second row of the EEG/EKG Data Map displayed below.

To select the inputs you would like to use:

1. Click in the Input(s) cell
2. Click in the Active input you would like to use (in this example 2A is used)
3. Click on the Reference input you would like to us (in this example 2R is used).

The Inputs box will now display 2A-2R.

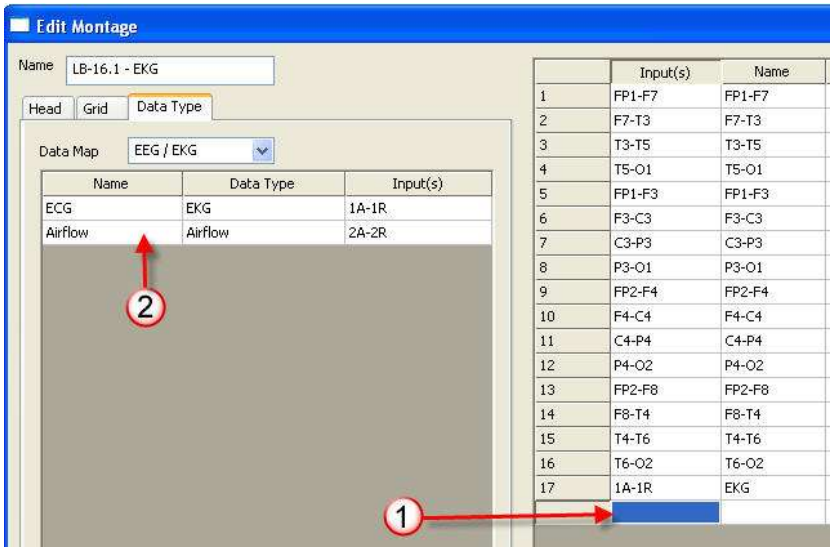
4. Click on the Channel Group and select Airflow.
5. Click on OK to save the changes added to the data map. The 2A - 2R inputs will now be configured for use for the Airflow channel.



Adding a Data Map Channel to a Montage

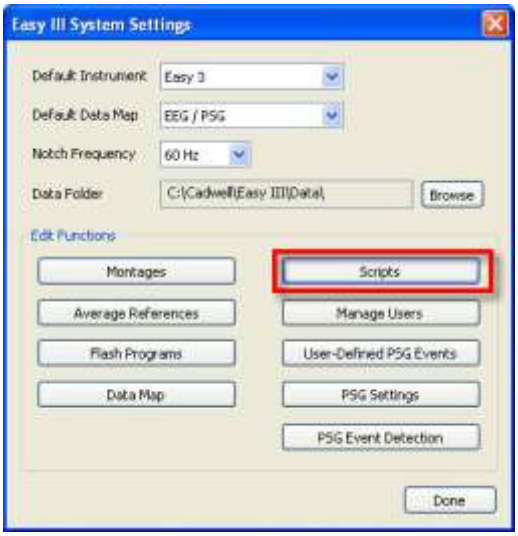
Open the montage you would like to edit. Click on the Data Type tab. Verify you are using the correct Data Map.

1. Click in the Input(s) box in the row you would like to add the channel.
2. Click on the channel you would like to add to the montage (in the example below, the airflow channel will be added to the displayed montage).
3. Click on OK to save.

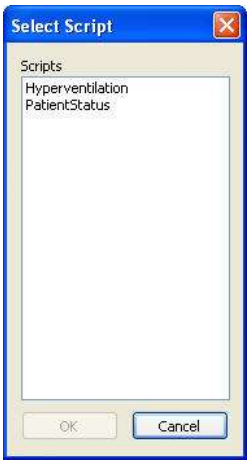


Access Scripts

From the Easy III Start Page, click the System Setup button, and then click the Scripts button.

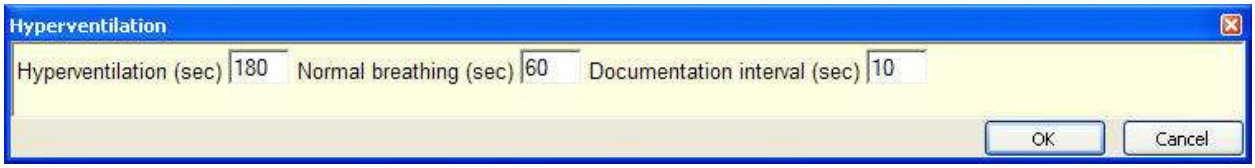


The Select Script window will open. Choose a script and click the OK button.



Hyperventilation

A Hyperventilation window will open.



Hyperventilation (seconds)

Enter the total number of seconds you would like the hyperventilation session to last. Easy III will automatically place a text event (indicating that the patient is hyperventilating) every 10 seconds (or as specified in the Documentation Interval).

Normal Breathing (seconds)

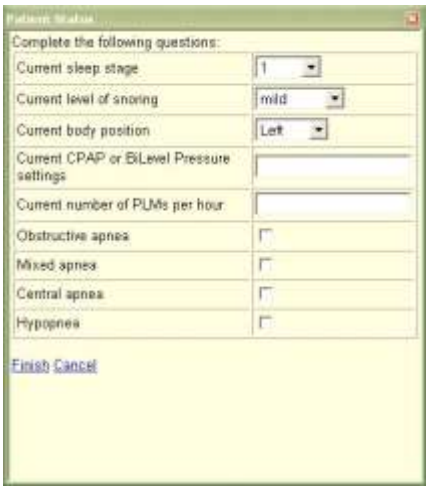
Enter the total number of seconds you would like the post-hyperventilation session to last. Easy III will automatically place a text event (indicating that the patient is in post hyperventilation) every 10 seconds (or as specified in the Documentation Interval).

Documentation Interval (seconds)

Enter the interval (seconds) you would like Easy III to automatically place a text in the trace window during activation.

Patient Status

The following options will be displayed during data collection if the recording technician clicks on the script option. These events can only be entered during data collection in a live window. Cadwell can create a patient status report summarizing these events as they were entered during data collection.



Manage Users

The Easy user can access the Manage Users option to do the following tasks:

1. Add a New User
2. Edit a Current User
    a. Modify User Details
    b. Change Access Rights
3. Delete a User
4. Change a Password
5. Reset a Password

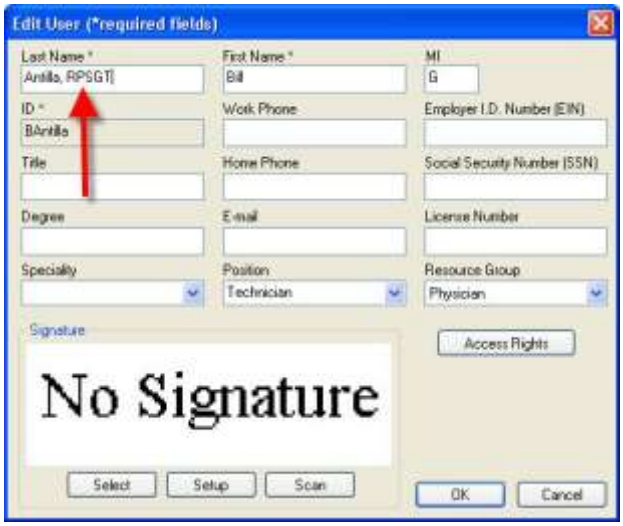
Adding a New User

Click on Manage Users from the Easy III System Settings dialog.

Note the the illustration below. Click on Add to create a new user.

From the Edit User rights dialog, verify the following fields are correctly entered:

- Last Name - Enter the last name of the user. If you would like to include the credentials of the user, include them with the last name. For example, type in 'RPSGT' if you would like to include the RPSGT credential with the users name (see example below)
- First Name
- Middle Initial (MI)
- Position (physician, referring physician, technician)



Assigning Access Rights

Easy III provides powerful user rights options that allow laboratories to provide custom access settings per user. The following User Rights Options are available within Easy III.

Easy III User Permissions - Description of Permissions

General

Administrative- Adding a check mark to the administrative check box will allow the user to reset and access other users login data.

Edit Permissions

Change Default Instrument - Adding a check mark to the check box will allow the user to change the default amplifier displayed in the System Settings dialog (note the illustration below). If your laboratory uses multiple Easy amplifier types, you should add a check mark to this box to allow users to swap hardware as necessary.

Data Maps - Removing a check mark from the check box will prohibit users from changing your default channel configurations for your laboratory. If you place a check mark in this check box, the user can add and remove default channel configurations. Data maps determine what inputs, channel settings, colors, filters, etc will be used for each channel type used in recording montages.

Note: If a user deletes all data maps on a specific system, all data maps on all other networked systems will be deleted also.

Montages - Removing a check mark from this check box will prohibit the user from adding, modifying, or deleting saved montages. Removing this check mark does not prohibit the user from modifying montages during data collection. The user will have the ability to modify existing montages as necessary during data collection and review.

Photic Stim Programs - Removing a check mark from this check box will prohibit the user from modifying, deleting, or creating new Photic Stimulation Programs.

Protocol Events and Buttons Only- Remove this check mark from the check box if you want to prohibit the user from accessing protocols and buttons. If you want to provide the user limited rights to default protocols, place a check mark in the check box. The user will not be able to modify workspace layout (the layout of trace windows and menus); however they will be able to create a new protocol using the existing workspace. The user can create their own custom events and report buttons used while viewing data.

Protocols- Remove the check mark from this check box to prohibit the user from changing the default configurations and views used for data collection. Cadwell recommends that only key users, trained to alter the system configuration be granted access to this option. Default views and configurations are tied directly to the data file. If a data file is collected with a specific view/protocol, that view will always be used when the file is opened.

Restore Defaults - This feature is currently not supported.

System Paths and Drives - Remove the check mark from this check box to prohibit the user from changing the default Data Folder location. Cadwell highly recommends that you remove the check mark from this check box for most users. A possible loss of data can occur if acquiring data on a machine that has a network data folder. If you allow users to change the default data path, the Easy III will automatically move all data files to any new folder immediately after it is selected by the user.

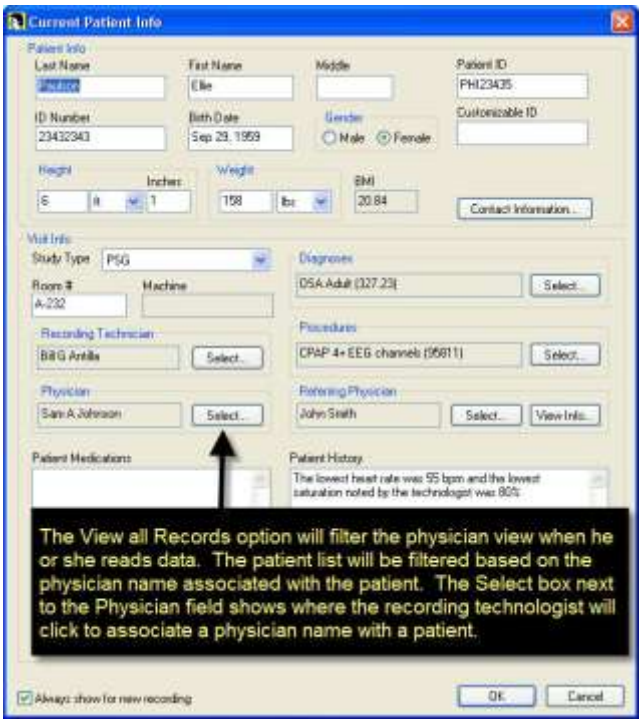
Record Permissions

Access Record Manager - Removing the check mark from the check box for this option will prohibit the user from copying, deleting, archiving, moving, exporting, and importing patient data.

Delete EEG and Video Segments - Removing the check mark from the check box will prohibit the user from accessing the record editor. The record editor allows the user to select sections of a recording for deletion. Note the record editor below. The blue bar represents the entire data file. The green bar above and below the blue bar represents that data marked for saving. If you place a check mark in the user rights for the Delete EEG and Video Segments option, the user will be able to remove portions (or all) of the green line displayed in the record editor. Once segments are marked for deletion, the user can proceed with deleting data. Data can not be recovered after deletion.

Edit Other Users' PSG Scoring- If you are training a new user, you may want to prohibit the user from importing another users scoring. If you place a check mark in the check box for this option, the user will be able to login under their own name, access a record scored by another user, and import their scoring and staging events.

View All Records- This option will filter the Read Data/Select Record view for the physician. This is a powerful option for filtering records. Removing this check mark from the check box will only allow the physician to see his/her own patients. It is critical that the physician have a user name in Easy III. The referring physician must also be selected from the patient information dialog (see below).



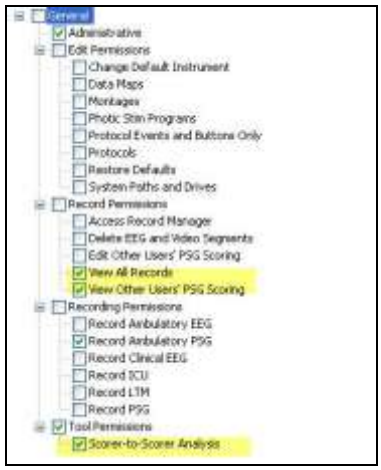
View Other Users' PSG Scoring - If you are training a new user, you may want to allow the user to view another users scoring. If you place a check mark in the check box for this option, the user will be able to login under their own name, access a record scored by another user, and view their scoring and staging events.

Recording Permissions

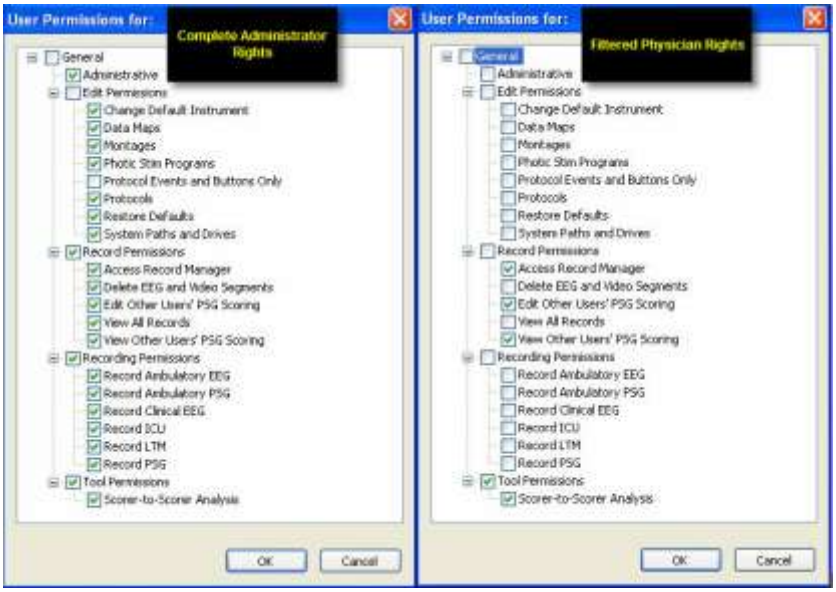
Removing the Recording Permissions check mark from the Check box will prohibit the user from recording data from the selected recording modality.

Tool Permissions

Scorer-to-Scorer Analysis - Add a check mark to this option to allow the user to compare their scoring to another users scoring. Using the Record Permissions, Edit Others Scoring and View Others Scoring, you can further restrict the users access rights. For example, if you wanted to allow a technologist to view another scoring results, but not import them into his/her own scoring results, you could set the permissions as follows:



Sample User Rights



Managing Users - Password Controls

Changing Passwords - Any user can log in under his/her login and modify the default password associated with their user name. Click on Change Password to change your default password. Click on OK to close. Exit the Easy III software and log back in with your new password.

Resetting Passwords - Any user with Administrative rights can reset another users password.

User-Defined PSG Events

Select the User-Defined PSG Events option to edit custom events.

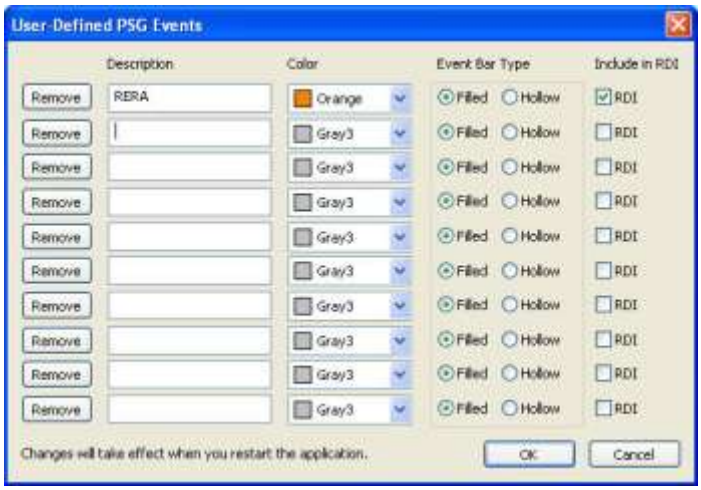
Note the RERA event listed below. The user can define the following for each user defined event.

Description - This is the label that will be used when the event is marked. This label will show up in the event list.

Color - This is the color of the event bar that will be placed on the channel where the event is marked.

Event Bar Type - This is the type of event bar that will be placed on the selected channel. The bar can be filled (solid) or hollow (a rectangle box).

Include in RDI - This option will allow the user defined event to be included in the RDI calculation used by Easy III.



PSG Settings

Edit PSG Settings - Using the AASM Standard

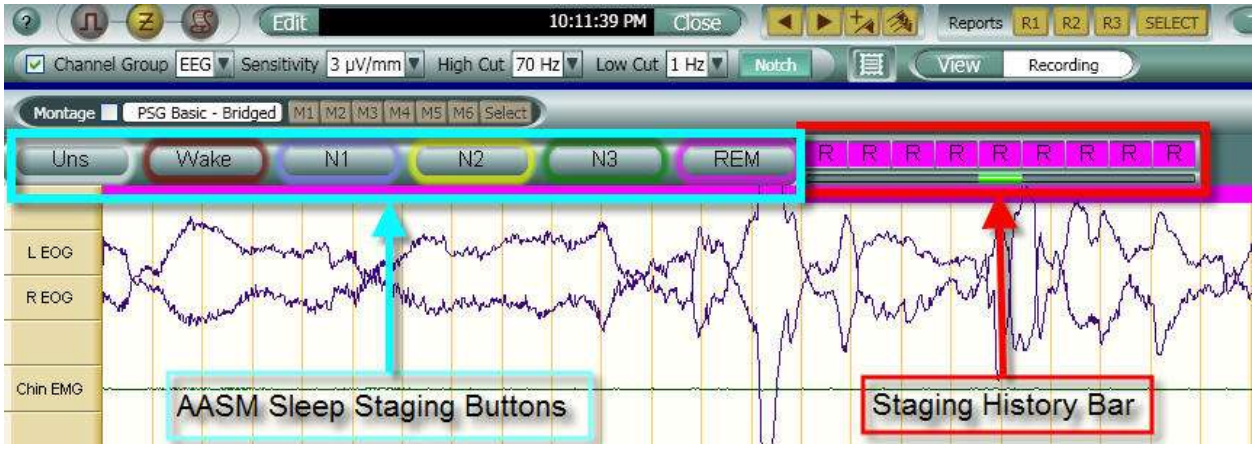
AASM Standard

Add a check mark to the AASM Standard Sleep Scoring check box to use the nomenclature from the AASM Manual for the Scoring of Sleep and Associated Events, published by the American Academy of Sleep Medicine (AASM) in 2007.

The AASM Standard Sleep Scoring defines sleep stages as Wake (W), N1, N2, N3, and REM based on the AASM guidelines. An epoch can also be marked as Unscored (Uns) if it has no staging.

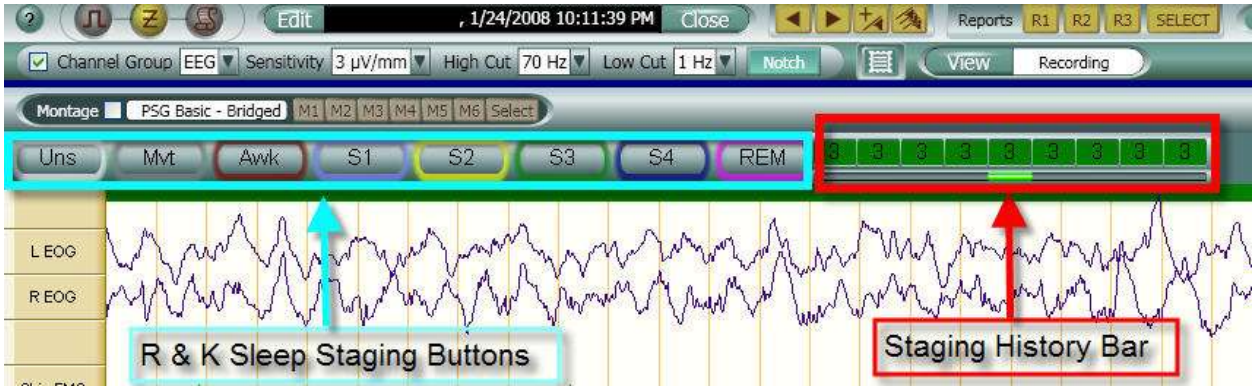
To score a sleep record the montage page speed must be set to 10mm/sec, so that each page is 30 seconds long. You can also an epoch of sleep from a live window. To score a sleep record, go into review mode by selecting a point in time along the position bar, or by dragging the blue scroll across the position bar. Score a sleep record by clicking one of the scoring buttons: Uns, Wake, N1, N2, N3, or REM. The Staging History bar will show the color-coded and labelled scores for each epoch within nine (9) epochs. The displayed epoch will always be in the middle, and will always be highlighted by a light green dash underneath.

The Staging Marker is also color-coded, and shows the sleep stage for the current epoch across the top of the trace window. In the Staging History Bar, the light green colored line displayed under an epoch indicates the stage of the page you are presently viewing.



Using the Older R&K Sleep Scoring Standard

The older sleep stage categories are Awake (Awk), Movement (Mvt), Stages 1-4 (S1, S2, S3, S4), and REM based on R&K Guidelines (1967). An epoch can also be marked as Unscored (Uns) if it has no staging.



Count SpO2 Occurrences Below % Setting

This setting is used in the oximetry report. The total amount of time below this setting will be used in the oximetry report.

Use Pediatric Scoring Rules

This setting is used to specify the age limit for pediatric respiratory event scoring. The patient must be less than or equal to the age in this setting.

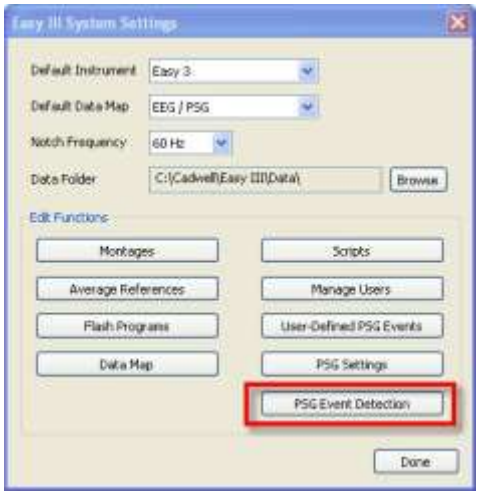
PSG Event Detection Settings

The Easy III system provides time saving tools to help the trained clinician detect events that meet user defined criteria.

NOTE: *It is important to realize that the computerized process of event detection is only an aid for the physician in the establishment of a diagnosis. It does not replace the physician or diminish the requirement to use sound professional judgment when reviewing and marking events.*

Easy III System Settings - PSG Event Detection

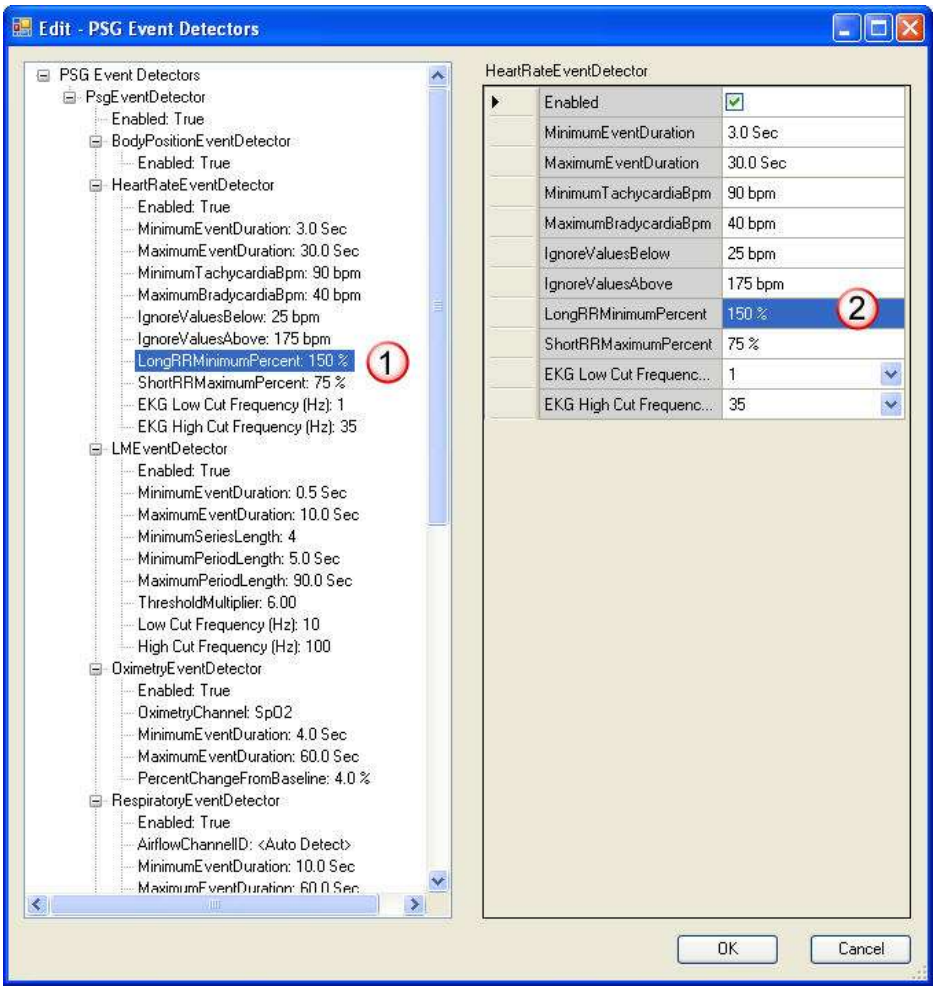
Click on the PSG Event Detection button to access PSG Event Detection settings.



To review settings (note the illustration below) use the scroll bar in the PSG Event Detector column to review detector settings.

1. Left click on a detector category you would like to review

2. To modify a specific user setting, left on the specific setting and type in a new value. In the sample below, clicking in the blue area (where the number 2 is displayed) will allow the user to type in a different Long R-R Minimum Percent. The user could type in 100 and then move on to the next category, or simply click on OK to save the new default setting. The new default setting will be synchronized across all Easy III systems. All PSG records will now use the new setting during data collection and review. NOTE: Systems previously collected with the old RR settings will not be automatically updated to the new settings. Auto-detection for RR to intervals must be re-run to use the new settings.



PSG Event Detector

To enable PSG Event Detection, click on the PSG Event Detector Group. Place a check mark in the PSG Event Detector check box. All event detectors that have been enabled (with a check box setting of True) will be auto detected. Note: If the check mark is removed, no auto-detection of events based on your settings will occur.

Body Position Event Detector

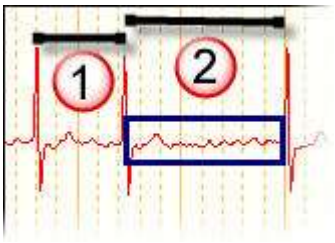
To enable Body Position Event Detection, click on the Body Position Event Detector. Place a check mark in the Body Position Detector check box. Note that the Body Position Detector setting will

display 'True' in the column on the left side of the menu. This will indicate that the event detector has been set to detect body position changes from a body position module.

Heart Rate Event Detector

To enable the Heart Rate Detector, click on the enable heart rate detector check box. Note the heart rate detector will display 'True' on the column on the left side.

- Minimum Event Duration is the minimum number of seconds required for a Tachycardia or Bradycardia event.
- Maximum Event Duration is the maximum number of seconds allowed for a Tachycardia or Bradycardia event.
- Minimum Tachycardia bpm is the minimum heart rate required to trigger a tachycardia event. The default setting is set to 90 bpm as recommended by the AASM (July, 2007)
- Maximum Bradycardia bpm must be at this level or lower for at least the minimum event duration for a Bradycardia event to be detected. The default setting is set to 40 bpm as recommended by the AASM (July, 2007).
- Ignore Values Below. Values recorded below this level will be ignored by the event detector.
- Ignore Values Above. Values recorded above this level will be ignored the event detector.
- Long R-R Minimum Percent. This setting looks at the percent increase in time between R-R waves required to mark an R-wave-to-R-wave interval as "Long R-R." The long R-R algorithm compares the current R-R interval to the previous R-R interval. If the second interval has increased by the percent specified, the second R-wave-to-R-wave (R-R) interval is marked as a long R-R event. A long R-R interval is then ignored in determining the next interval. To reduce the number of Long R-R events detected, increase the Long R-R % setting. In the sample below, the duration of interval 2 is 150% longer than the previous interval. As the detector examines interval 1 and interval 2, the second interval is marked because 150% of the previous interval has been exceeded.



- Short R-R Maximum Percent. This setting looks at the percent decrease in time between R-waves required to mark an R-wave-to-R-wave interval as "Short R-R." The short R-R algorithm compares the current R-R interval to the previous R-R interval. If the second interval has decreased by the percent specified, the second R-wave-to-R-wave (R-R) interval is marked as a short R-R event. A short R-R interval is then ignored in determining the next interval. To reduce the number of Short R-R events detected, decrease the Short R-R setting. In the sample below, the duration of interval 1 is less than 75% of the previous interval.

- EKG Low and High Cut Filter Settings. When artifact is encountered, use these settings as necessary to change heart rate detector results.

NOTE: *It is important to realize that the computerized process of event detection is only an aid for the physician in the establishment of a diagnosis. It does not replace the physician or diminish the requirement to use sound professional judgment when reviewing and marking events.*

Limb Movement Event Detector

To enable the LM (Limb Movement) Event Detector, click on the LM Event Detector. Place a check mark in the LM Event Detector check box. Note that the LM Detector setting will display 'True' in the column on the left side of the menu. This will indicate that the event detector has been set to detect LM events and PLM Series (as defined by the AASM, July 2007).

- Minimum Event Duration is the minimum LM duration required for detection.
- Maximum Event Duration is the maximum LM duration allowed for event detection.
- Minimum Series Length is the minimum number of LM events required for a PLM Series.
- Minimum Period Length is the minimum amount of time allowed between any two LM events in a PLM series. If a LM event is too close to the previous event, it will not be included in the PLM series count, however the PLM series may continue if another LM event meets the minimum period length setting.
- Maximum Period Length is the maximum amount of time allowed between any two LM events in a PLM series. A PLM series will be broken if a LM is greater than 90 seconds away from a previous LM event.
- Threshold Multiplier is used to detect more or less LM events. The default threshold is 6. Set the threshold lower to detect more events, set the threshold higher to detect fewer events.
- LM Low and High Cut Filter Settings. When artifact is encountered, use these settings as necessary to change LM detector results.

Oximetry Event Detector

To enable the Oximetry Event Detector, click on the Oximetry Event Detector. Place a check mark in the Oximetry Event Detector check box. Note that the Oximetry Event Detector setting will display 'True' in the column on the left side of the menu. This will indicate that the event detector has been set to detect oximetry events.

- Oximetry Channel selection allows the user to select the Cadwell EasyNet SpO2 oximeter (SpO2) or any other oximeter calibrated and identified within the Easy III system (SpO2-1, SpO2-2, etc.).
- Minimum Event Duration is the minimum time (seconds) required to detect a desaturation event.
- Maximum Event Duration is the maximum time (seconds) allowed for desaturation events. This duration should be increased if the patient is having events greater than 60 seconds.
- Percentage Change from Baseline is the minimum percentage change in SpO2 level from the baseline SpO2 required to detect an oximetry event.

Respiratory Event Detector

Note the Obstructive Apnea event below. The detector has marked the event as a 13.8 second obstructive apnea.

1. Placing the mouse/cursor on the red event bar will display the event details.

The details are as follows:

- Duration = 13.8 seconds

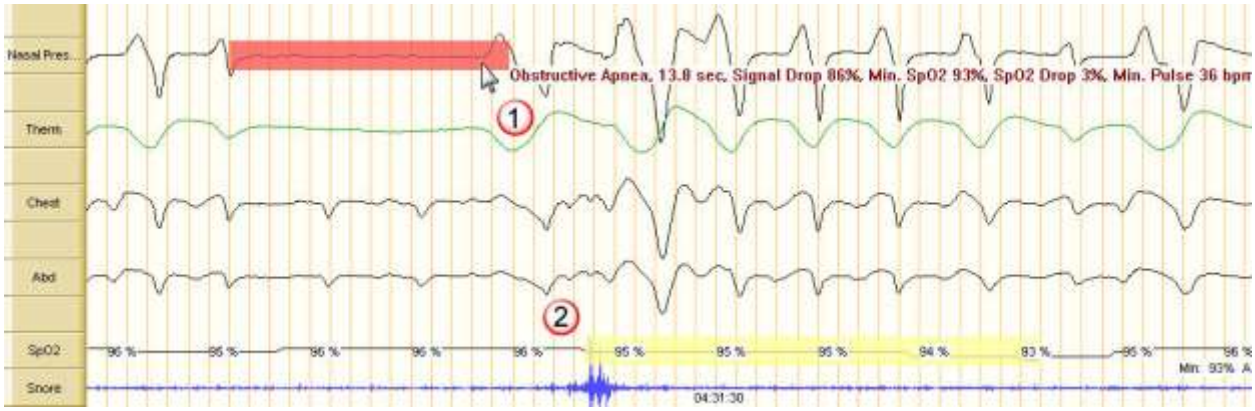
- Airflow Signal Drop = 86%

- Minimum SpO2 associated with the event = 93%

- Total SpO2 drop associated with the event = 3% *

- Minimum pulse rate associated with the event = 36 bpm

2. Note the associated oximetry desaturation event. The patients saturation dropped from 96% to 93%.



Respiratory Event Bar Colors

- Obstructive = Red
- Central = Yellow
- Mixed = Black
- Hypopnea = Green

To enable the Respiratory Event Detector, click on the Respiratory Event Detector. Place a check mark in the Respiratory Event Detector check box. Note that the Respiratory Event Detector setting will display 'True' in the column on the left side of the menu. This will indicate that the event detector has been set to detect respiratory events.

- Airflow Channel ID. Set this to Auto-Detect to have Easy III automatically detect an airflow sensor. Select a specific channel if you would like Easy III to use a specific channel for respiratory event detection.
- Minimum Event Duration. This is the minimum duration (seconds) for respiratory events (apneas, hypopneas).
- Maximum Event Duration. This is the maximum duration allowed for respiratory events. Extend this duration if the patient is have events greater than one minute in duration.
- Post Event SpO2 Interval. This is the period of time after a respiratory event that Easy III will look for the lowest saturation associated with the respiratory event.
- Respiratory Effort Threshold. This threshold will increase or decrease the types of apneas detected. Lower this threshold to detect more central apneas, increase this threshold to detect more central apneas.
- Apnea Airflow Threshold. This setting will increase or decrease the number of apneas detected. Decrease this setting to decrease the number of apneas events detected.
- Hypopnea Airflow Threshold. This setting determines the airflow amplitude drop required to detect a hypopnea.
- Central, Obstructive, Mixed, and Hypopnea Desaturation Threshold. This setting requires that the specified respiratory event have a corresponding desaturation event.
- Airflow and Respiratory Effort Low and High Cut Filter Settings. When artifact is encountered, use these settings as necessary to change respiratory event detector results.

NOTE: *It is important to realize that the computerized process of event detection is only an aid for the physician in the establishment of a diagnosis. It does not replace the physician or diminish the requirement to use sound professional judgment when reviewing and marking events.*

Snore Event Detector

To enable the Snore Event Detector, click on the Snore Event Detector. Place a check mark in the Snore Event Detector check box. Note that the Snore Event Detector setting will display 'True' in the column on the left side of the menu. This will indicate that the event detector has been set to detect snore events.

- Snore Channel ID. Use the Auto Detect setting to have Easy III detect the presence of a snore channel. Select a specific snore channel if you want Easy III to detect events on a specific channel.
- Minimum Event Duration. This is the minimum duration required to detect a snore event.
- Maximum Event Duration. This is the maximum duration for a snore event. A snore event will not be marked if it exceeds this duration.
- Threshold Multiplier. The default threshold is 4. Set this threshold lower to detect more events. Set this threshold higher to detect fewer events.
- Snore Low and High Cut Filter Settings. When artifact is encountered, use these settings as necessary to change snore event detector results.

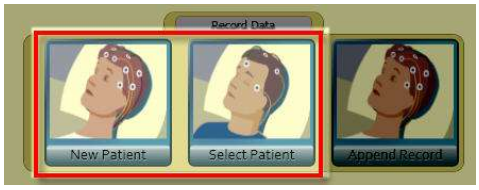
NOTE: *It is important to realize that the computerized process of event detection is only an aid for the physician in the establishment of a diagnosis. It does not replace the physician or diminish the requirement to use sound professional judgment when reviewing and marking events.*

Selecting a Protocol

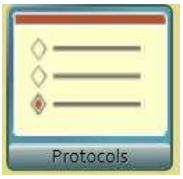
Protocols are used for data collection. A protocol is typically configured for specific modality or recording type. Protocols define the default layout that will be used for data collection and review.

Selecting a Protocol for use with the Record Data buttons

1. When the user clicks on New Patient or Select Patient, the default recording protocol will be user.

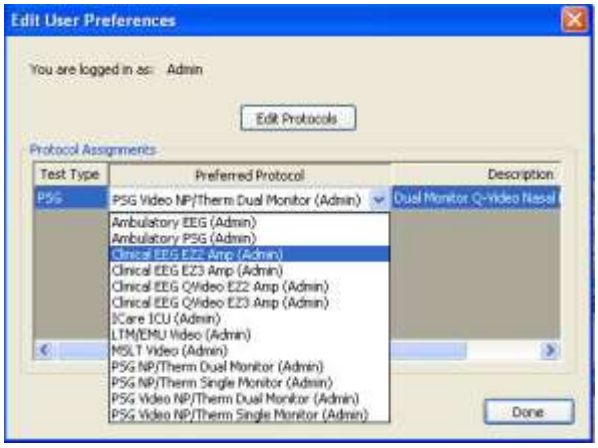


2. To select a default protocol, click on the Protocols button.



3. Click on the drop down arrow in the Preferred Protocol column. Select the protocol you would like to use. Click on Done to save your setting. The selected protocol will now be used when the user clicks on the New Patient or Select Patient button.

Note: The default protocol setting is specific to the User Name. Each user can select his/her default recording protocol.



Editing Protocols

The Easy III software allows the user to define a laboratory specific layouts (workspaces) for data recording and review. The workspace can consist of multiple views. For example, the first view will contain a recording trace window only, however a second view will contain the same recording trace window, a Q-Video patient window, and a event list.

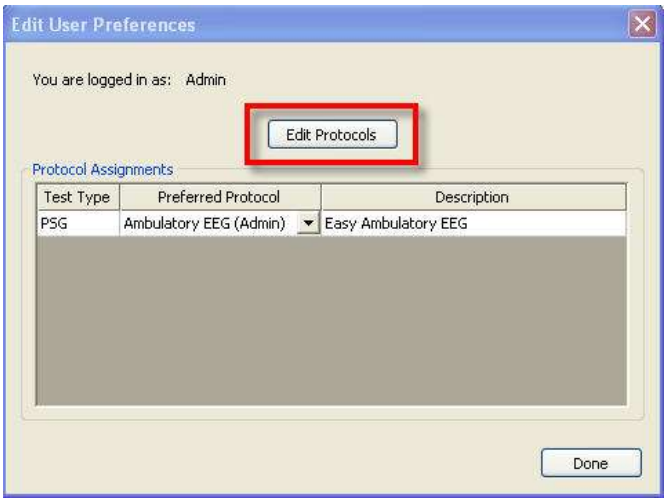
A Recording Protocol Contains the following:

- Default Screen Layout/Workspace (for recording and review)
- Default Event Buttons (specified by the user)
- Default Instrument (Easy III, Easy II, or Ambulatory Amplifier)
- Default Impedance Measurement Time Out duration
- Default Calibration Montage
- Default Page Width
- Default Flash Program

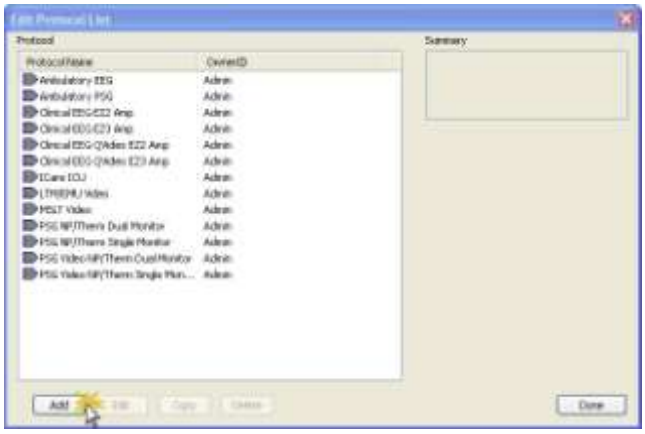
Creating a New Protocol

Click on Protocols

Click on Edit Protocols



Click on Add protocol



Note the Edit Protocol Dialog below.

General Tab Settings

Owner ID - This is the name of the user that created the protocol. If you are logged in under your name, your Easy user name should be displayed in this window.

Protocol Name - This is the name of the protocol that will be displayed in the protocol list.

Description - The user can create a short description about the protocol. For example, the user could enter 'Dual Monitor w/Q-Video'.

Default Instrument - Use this option to select the amplifier you would like to use with this particular protocol. The options include:

- Easy 3
- Easy 2
- Ambulatory
- Default - Use this option if you are likely to use different amplifiers on multiple
- Easy III computer systems
- SynthHardware Server - Do not use. This is a configuration setting for system evaluation.
- EEGSynthHardware Server - Do not use. This is a configuration setting for system evaluation.

Impedance Duration (minutes) - This option determines the length of time the impedance measurement will run. After the user specified duration has been met, the impedance measurement process will stop.

Data Map - A default data map can be selected for the protocol. This allows the user to use specific channel types, colors, and settings for the protocol selected.

Default Calibration Montage - This setting determines how the calibration montage will be displayed with the protocol.

- Current Montage - The trace window will show only those inputs used in the current montage.
- 1 - 32 Channels - The trace window will show inputs 1 - 32.
- 1 - 64 Channels - The trace window will show inputs 1 - 64.
- 1 - 128 Channels - The trace window will show inputs 1 - 128.
- 10-20 + Active/Reference Pairs - The trace window will show all 10-20 inputs and the Active Reference Inputs.

Default Page Width - The user can select the default page width that will be used when a record is recorded or reviewed.

- 1 sec/page - 300 mm/sec
- 2 sec/page - 150 mm/sec
- 5 sec/page - 60 mm/sec
- 10 sec/page - 30 mm/sec
- 15 sec/page - 20 mm/sec
- 20 sec/page - 15 mm/sec
- 30 sec/page - 10 mm/sec
- 60 sec/page - 5 mm/sec
- 120 sec/page - 2.5 mm/sec
- 300 sec/page - 1 mm/sec
- 600 sec/page - 0.5 mm/sec

Display Paper Speed as sec/page - Place a check mark in this check box if you prefer the paper speed units to be displayed as seconds per page.

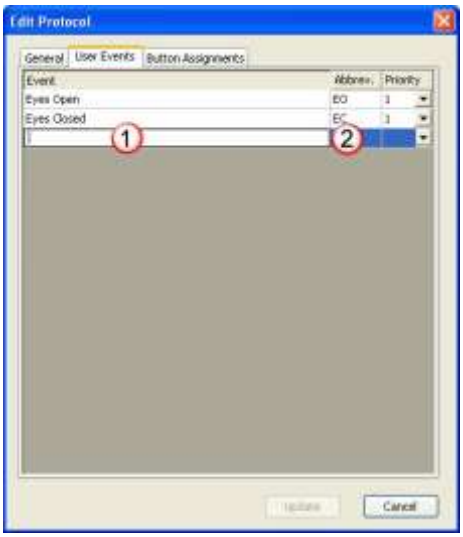
Flash Program 1 & 2 - Click on the Select button to select the default flash program for buttons 1 and 2 in the flash program control (used for EEG activation).

Editing User Events, Default Montages, and Default Reports

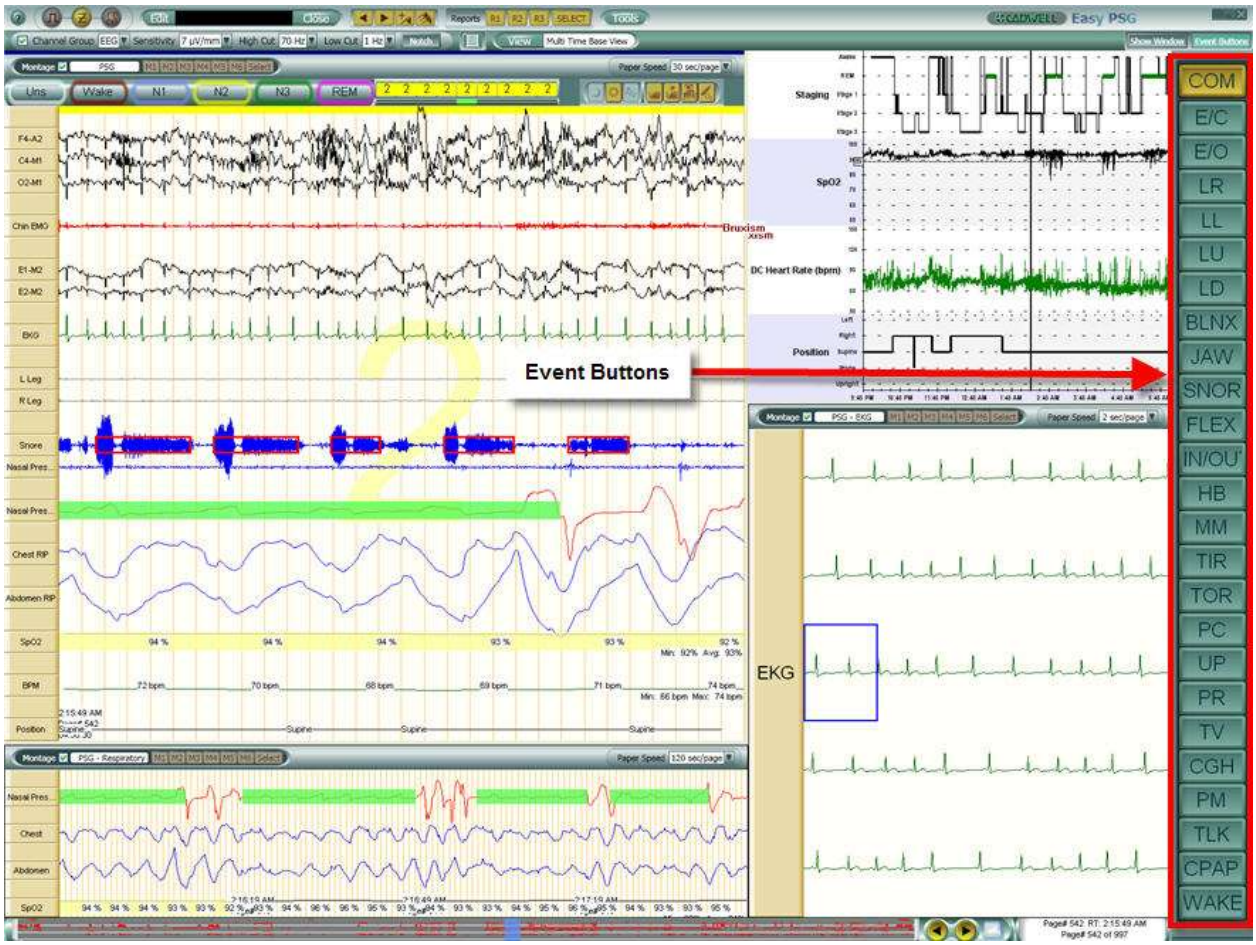
User Events

Click on the User Events Tab.

1. Type in an event that you would like displayed in the user event list.
2. Type in an abbreviation that will be placed on the Event Button.

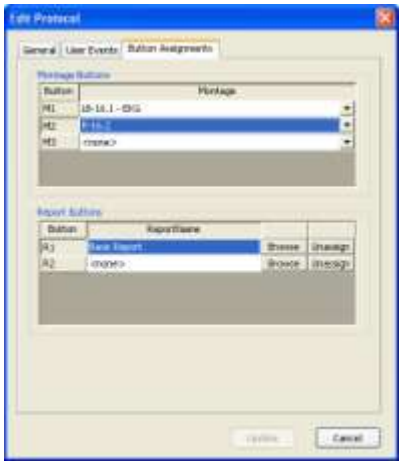


Note the Event Buttons below.

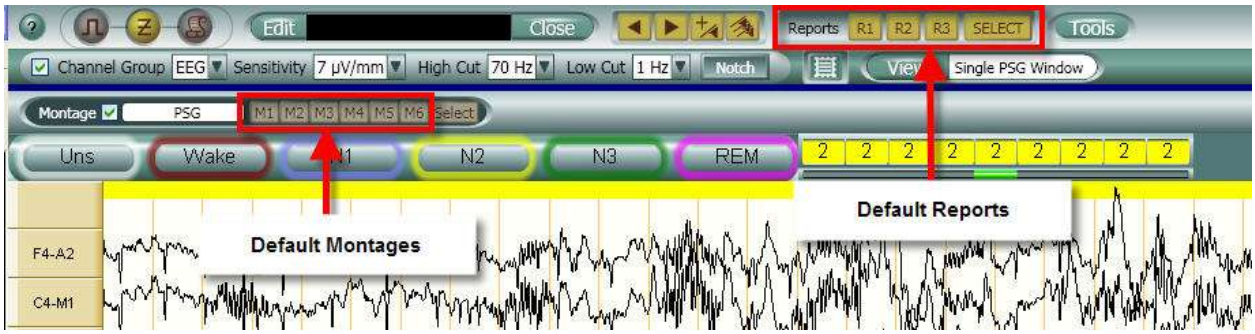


Montage and Report Buttons

Click on the Button Assignments Tab. Click on the Drop down arrow for each button (M1-M6). Select the six montages you would like to associate with the Montage buttons. Select the three reports you would like to associate with the Report Buttons.



Note the Montage and Report Buttons below.



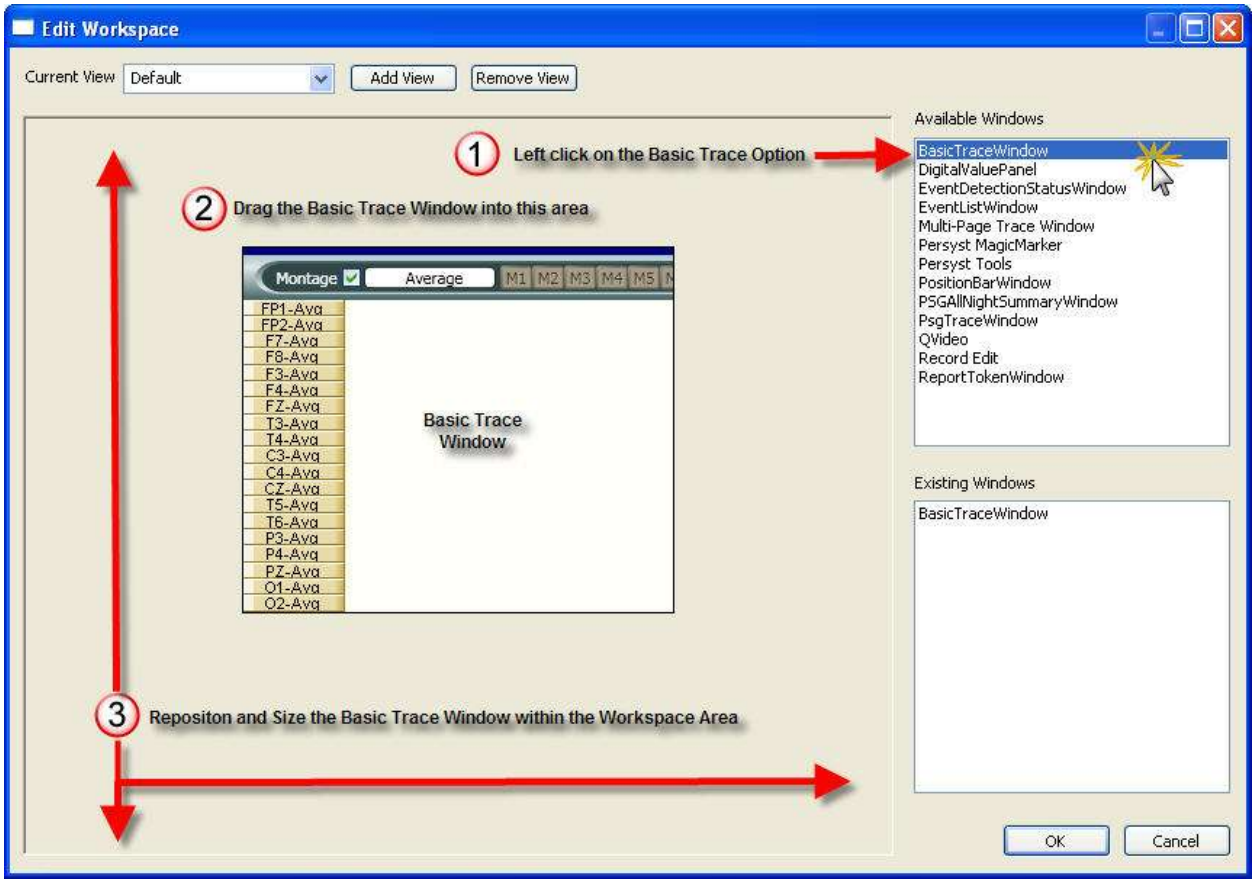
Editing Workspace

Click on the Edit Workspace button.

Adding a Window to the Workspace

Add a Basic Trace Window by clicking on the Basic Trace Window option in the Available Windows Box. Note the illustration below:

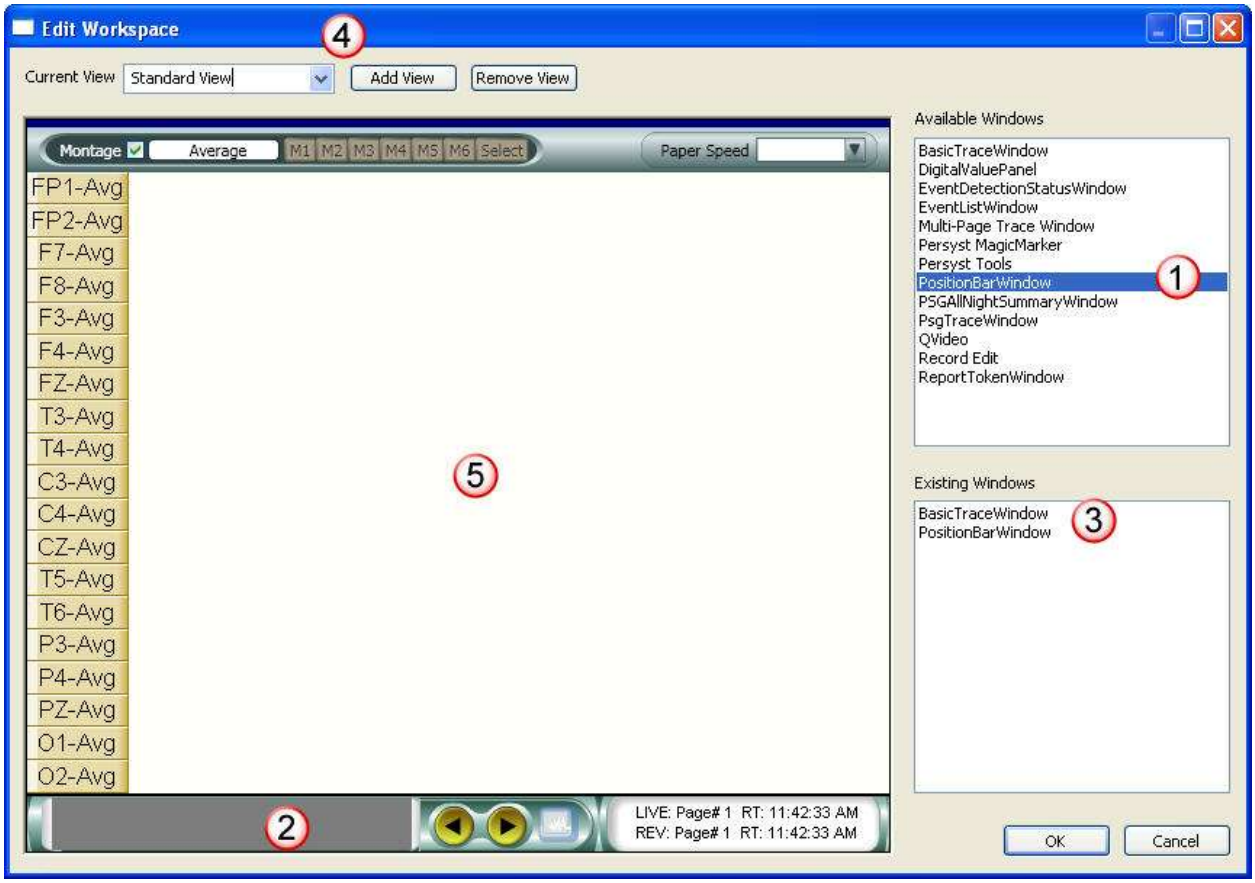
1. Left click and highlight the Basic Trace Window
2. Drag the Basic Trace Window into the workspace area
3. Reposition and size the window in workspace area. This will determine the exact location of the window when you collect and review data.



Configuring a Workspace View

Note the illustration below.

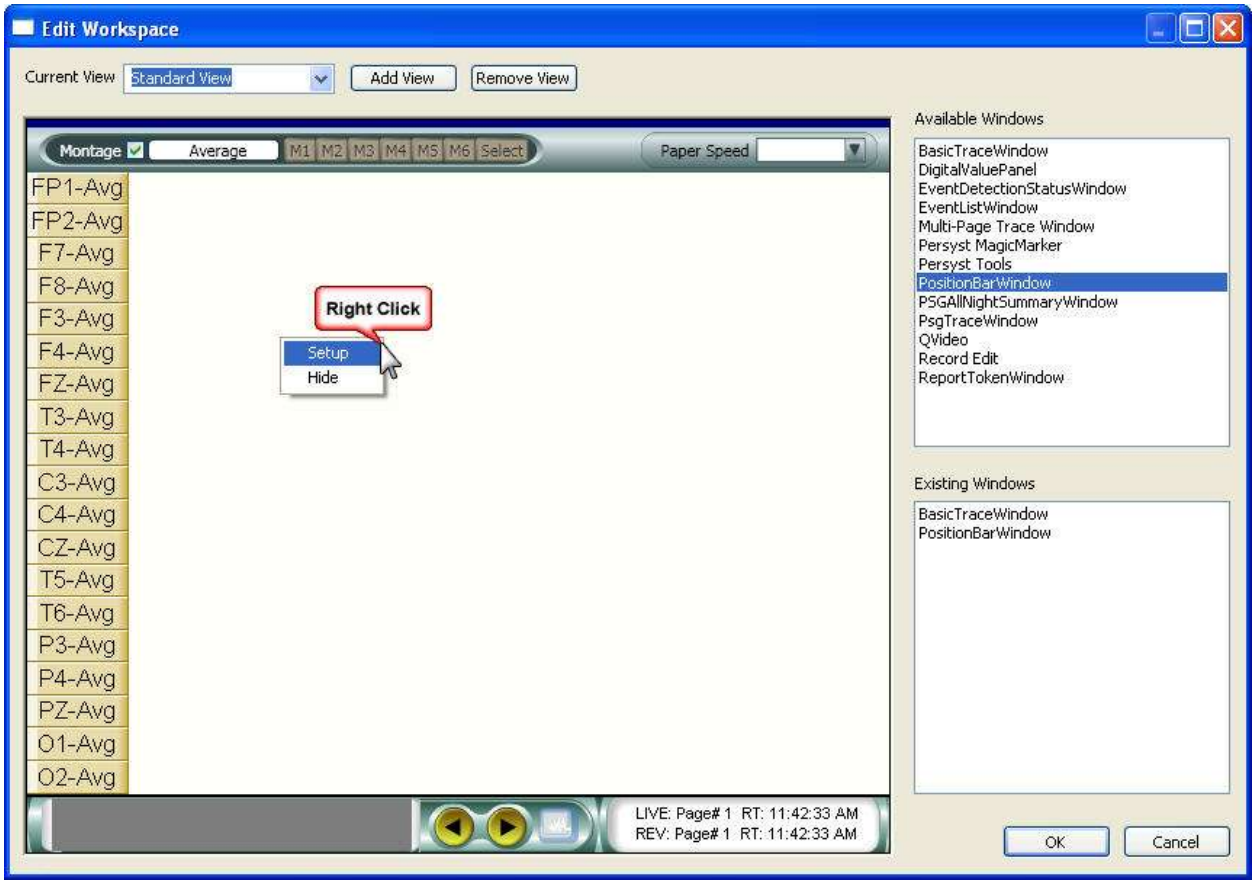
1. Drag the Position Bar option in the Available Windows Box into the workspace area
2. Position and size the Position Bar under the trace window
3. Note the Basic Trace windows that are now included in the workspace are listed in the Existing Windows box
4. Add a custom name to the workspace view you have created. In the sample below 'Standard View' has been entered.
5. Verify the Basic Trace Window is correctly aligned in the workspace.



Setting Defaults for Windows Used in a Workspace

Each available window added to the workspace will need to be setup correctly. After a window is added, right click on the window to determine if any default settings are available. Adjust the settings as required.

Right Click in the Basic Trace Window, Select Setup. (Note the illustration below)



The Trace Window Setup will be displayed. (Note the illustration below)

1. Select the default settings for this trace window. These settings will be used for every recording collected with this specific protocol.

Show Grid Lines - Add a check box to this item to show grid lines in the background of the trace window.

Always Show Live Data - Add a check box to this item to force the window to always show live data during data collection. If the user clicks on the position bar at the bottom of the trace window during data collection, the displayed page will not change. However; after data collection the user can click on the position bar and reposition to the location selected.

Show Page Grid Lines - Add a check mark to this option to show grid lines

Show Page Number - Add a check mark to this option to show the page number in the trace window

Show Time of Day - Add a check mark to this option to show time of day in the trace window

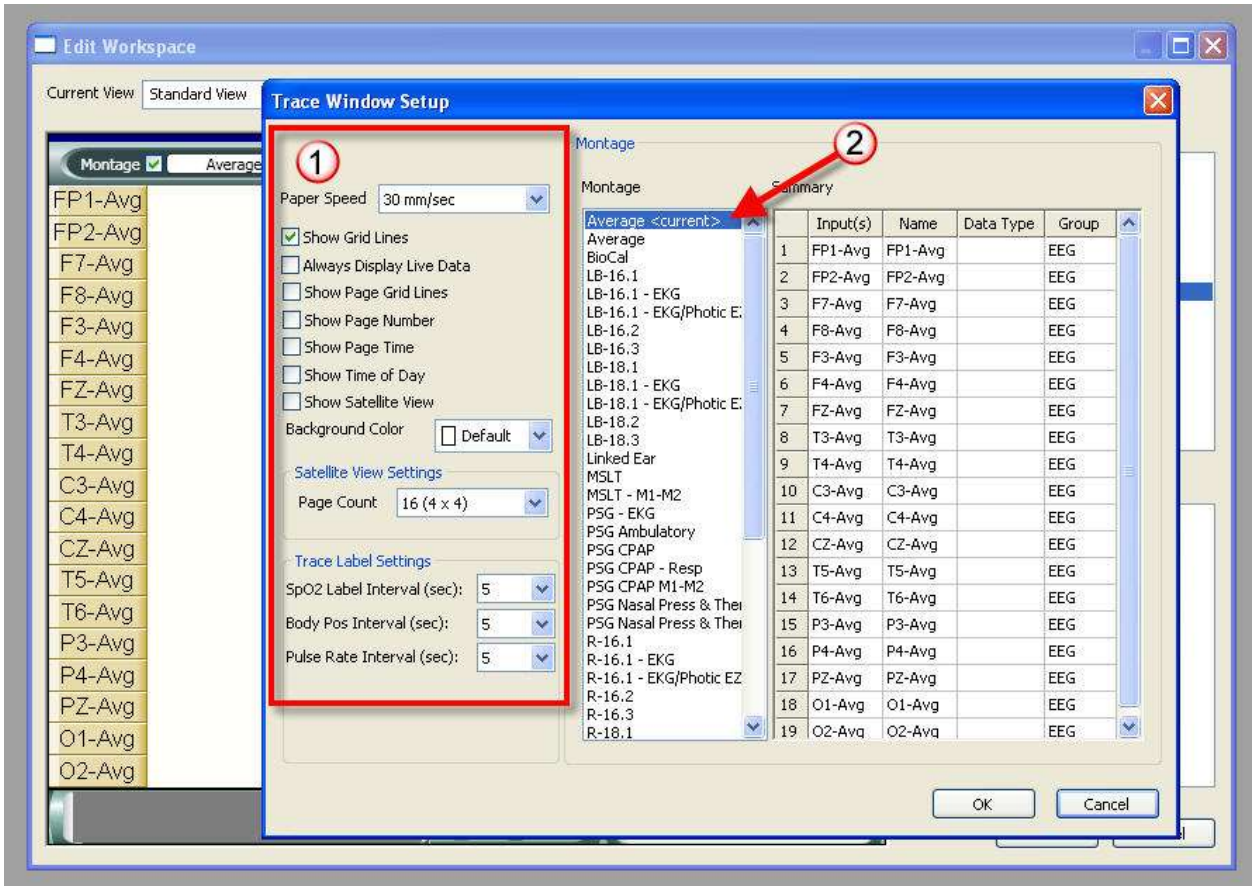
Show Satellite View -Add a check mark to this option to have the trace window display data in a Satellite View. The number of pages displayed will be determined by the Satellite View Settings.

Background Color - Click on the background color option to select a different color for the trace window background.

Satellite View Settings - Click on this option to select the page count used when a satellite view is used. The page counts options include the following grid views:

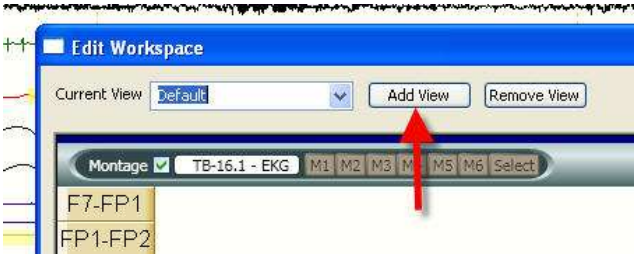
Trace Label Interval (SpO2, Body Position, Pulse Rate) - Select the interval to display digital values on the trace data during review. The digital trace values will not be displayed on the live trace data during data collection. If you look back, or review recorded data during data collection, the trace labels will be displayed.

2. Select the default montage that will be used with the protocol.



Adding another View

Click on the Add View button and repeat the steps listed above to customize your second view.



Important Details When Creating or Editing Views

1. When you are creating additional views, try to reuse windows from the Existing Windows box.
2. If you are creating views for multiple monitors, drag the available window over to the second monitor. The location you placed the window will be used when the protocol is used.
3. Provide useful names when additional views are created. For example, Q-Video View, or Satellite View.
4. When creating workspaces, maximize the edit workspace dialog to a full screen view to more clearly view the workspace.

Setting up Workspace Windows

Basic Trace Window Setup

To Add the Basic Trace window to the workspace, click and drag the Basic Trace Window option from the Available Windows. Right click in the Basic Trace window to enter the setup options. (Note the illustration below)

1. The following setup options are available for the Basic Trace Window. These settings will be used for every recording collected with this specific protocol.

Show Grid Lines - Add a check box to this item to show grid lines in the background of the trace window

Always Show Live Data - Add a check box to this item to force the window to always show live data during data collection. If the user clicks on the position bar at the bottom of the trace window during data collection, the displayed page will not change. However; after data collection the user can click on the position bar and reposition to the location selected.

Show Page Grid Lines - Add a check mark to this option to show grid lines

Show Page Number - Add a check mark to this option to show the page number in the trace window

Show Time of Day - Add a check mark to this option to show time of day in the trace window

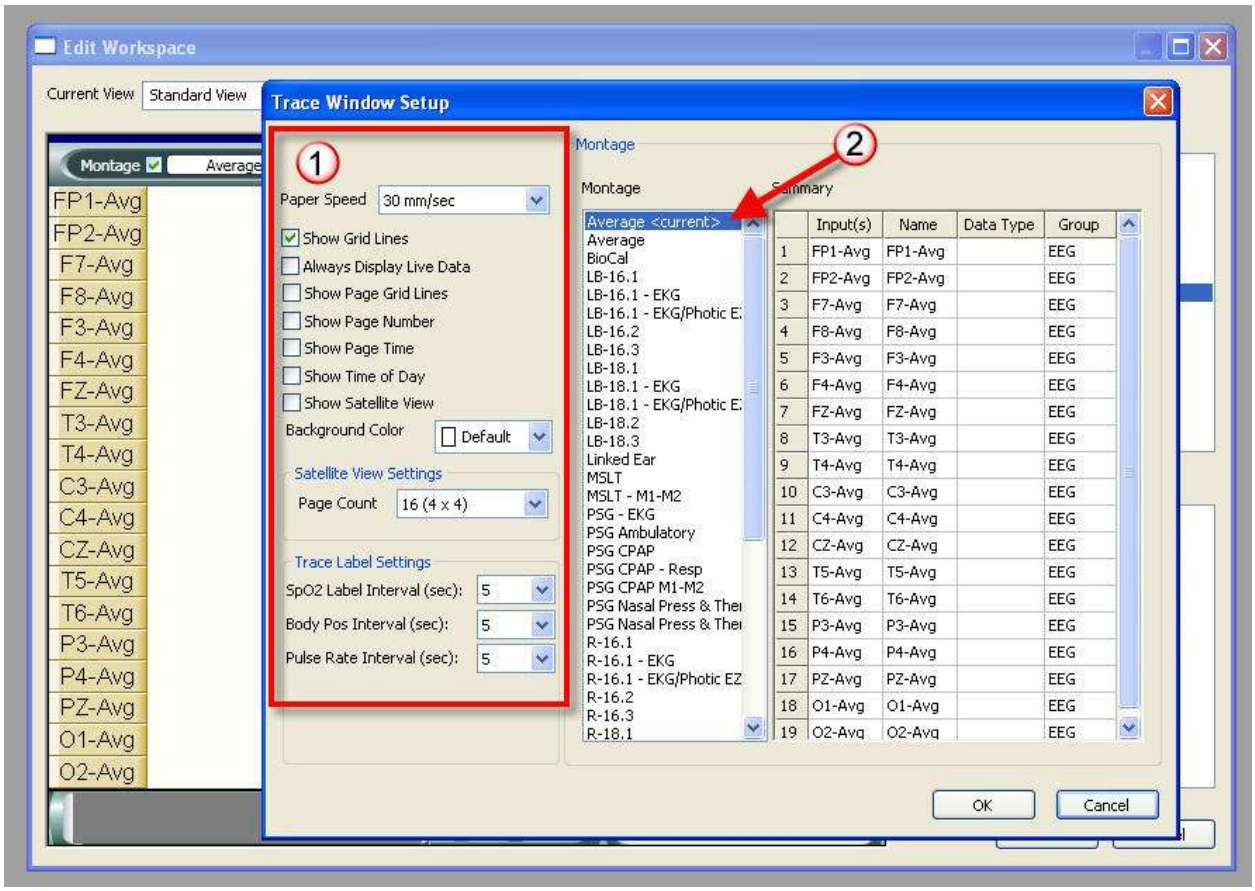
Show Satellite View -Add a check mark to this option to have the trace window display data in a Satellite View. The number of pages displayed will be determined by the Satellite View Settings.

Background Color - Click on the background color option to select a different color for the trace window background.

Satellite View Settings - Click on this option to select the page count used when a satellite view is used. The page counts options include the following grid views:

Trace Label Interval (SpO2, Body Position, and Pulse Rate) - Select the interval to display digital values on the trace data during review. The digital trace values will not be displayed on the live trace data during data collection. If you look back, or review recorded data during data collection, the trace labels will be displayed.

2. Select the default montage that will be used. Click OK to save.

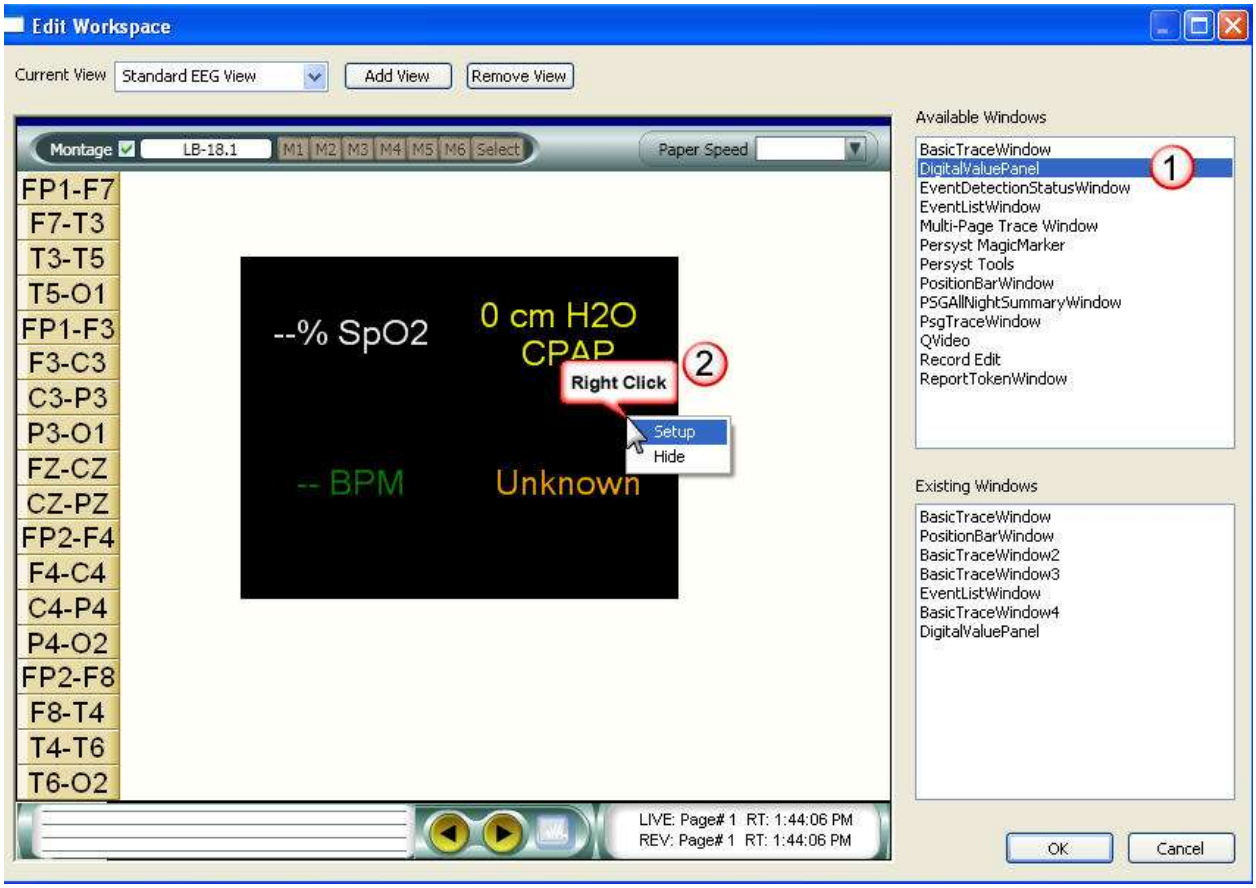


Digital Value Panel Setup

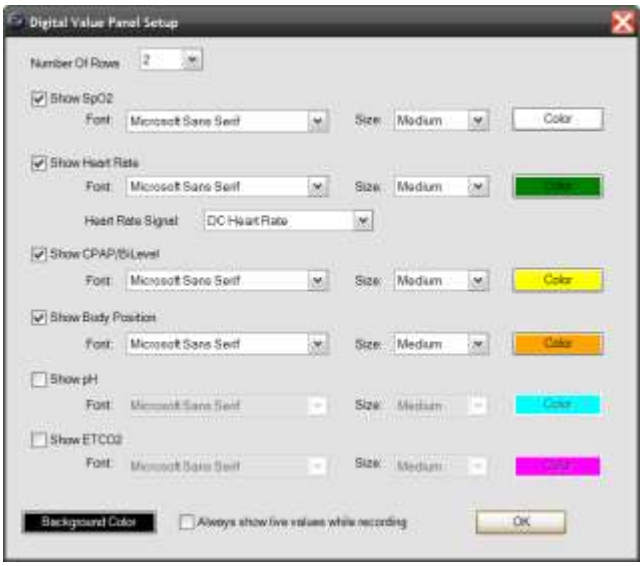
The digital value panel is used during a polysomnogram.

1. To add the panel to a view, drag the Digital Value Panel option from the Available Trace Windows box.

2. Right click on the Digital Value Panel to adjust the setup configuration.



3. Select the font, font size, and color for each channel type. Select the background color and determine if you want the digital value panel to always show live data during data collection. If you do not add a check box to this option, the digital value panel will no longer display live data when reviewing previously collected data. Click on OK to save.



Event Detection Status Window

Display this dialog if you would like to see the status of all detectors during data collection. Note: Most users will not add this dialog to a workspace. The dialog can be viewed by adding it during data collection or review. There are no setup options for this window.

Event List Window

Display this window if you would like to view the event list. There are no setup options for this window.

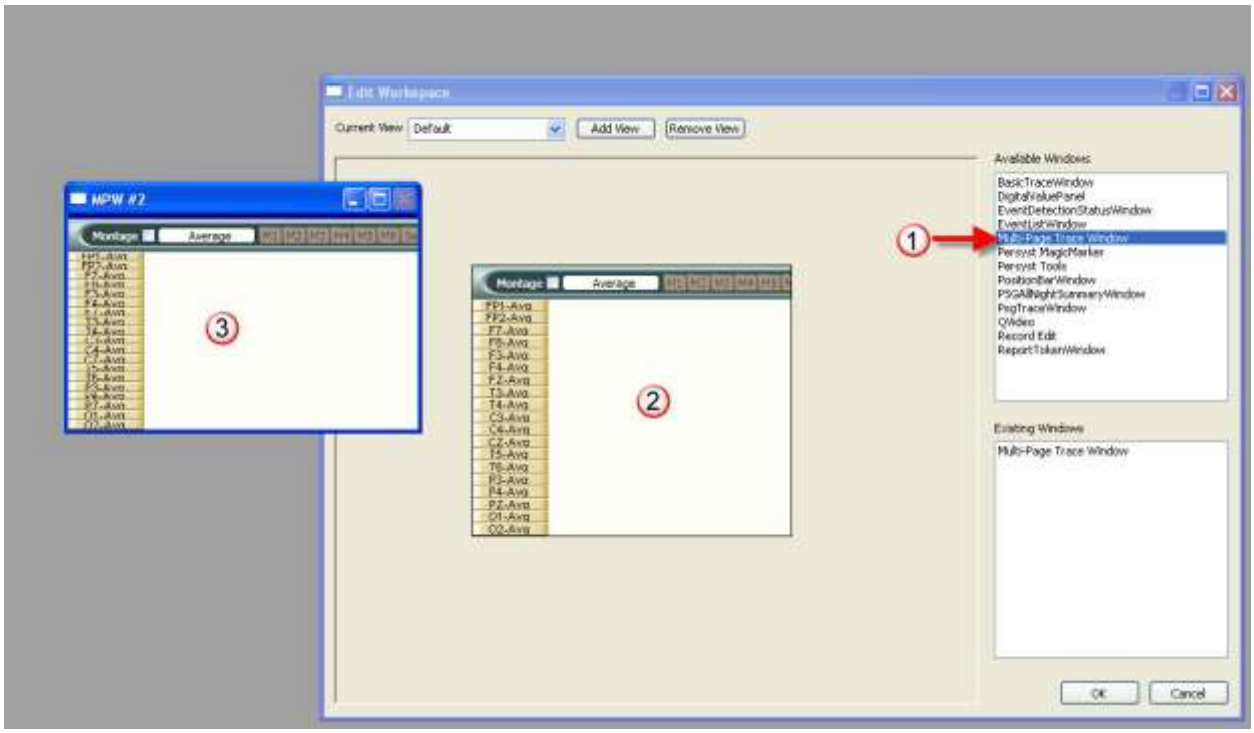
Multi-Page Trace Window

If you are using a dual monitor configuration, you can take advantage of the Multi-Page Trace Window option. Note the illustration below:

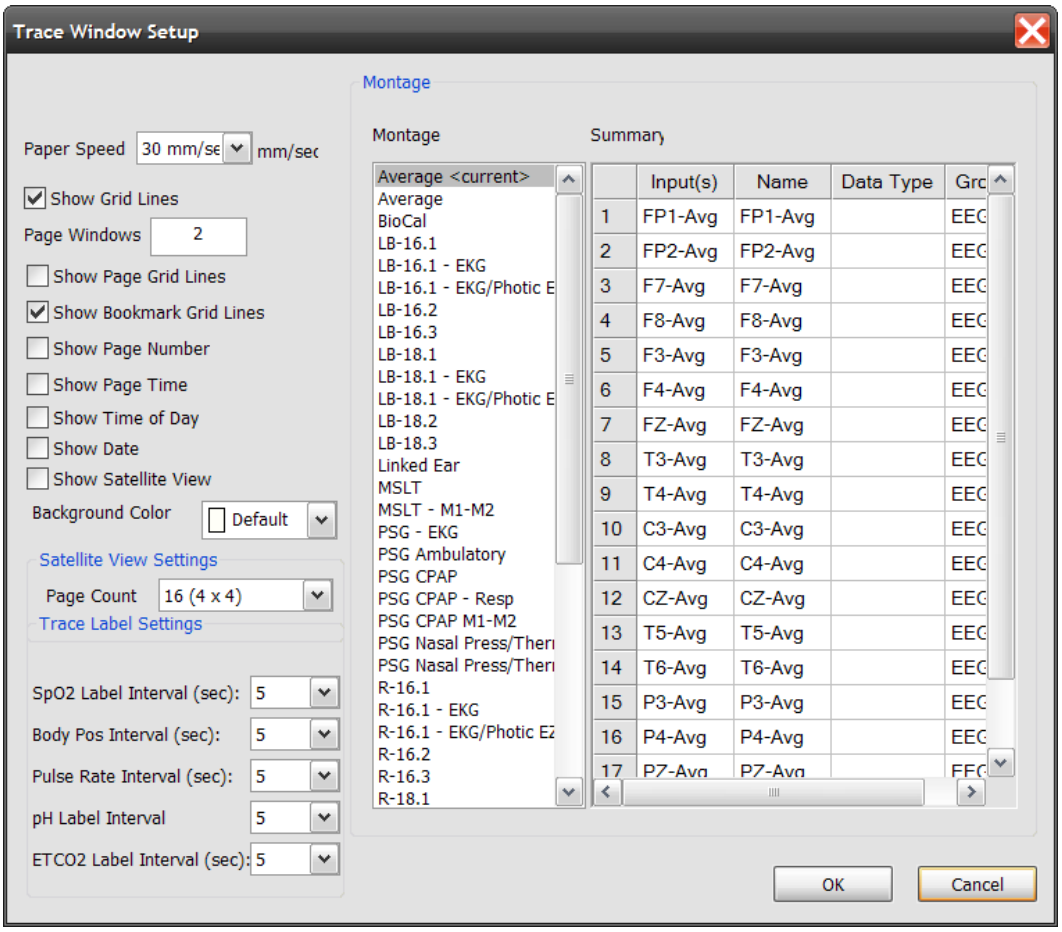
1. Click, highlight, and drag the Multi-Page Window option into the workspace area.

2. Note the trace window (number 2) displayed below. Reposition and size this window in the workspace area.

3. Note trace window 3 below. Drag this window over to the second monitor.

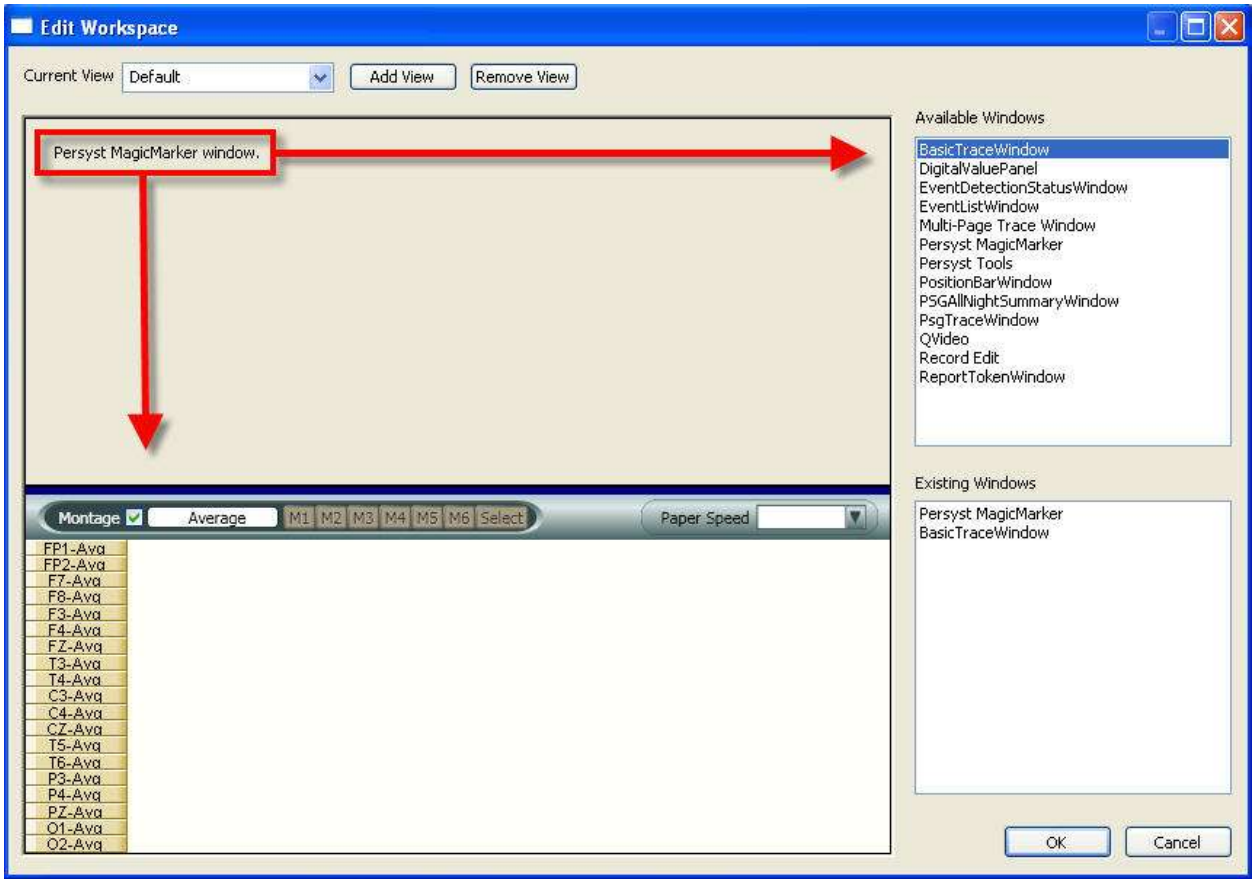


4. Right click in the trace window (number 2 in the illustration above). The dialog below will be displayed. Note the number of Page Windows highlighted below. If you would like to add additional trace windows, enter the total number of windows you would like to use. Click on OK to save.



Persyst Magic Marker

To add Magic Marker to a workspace, click and drag the Persyst Magic Marker option to the workspace window. There are no setup options for this window.



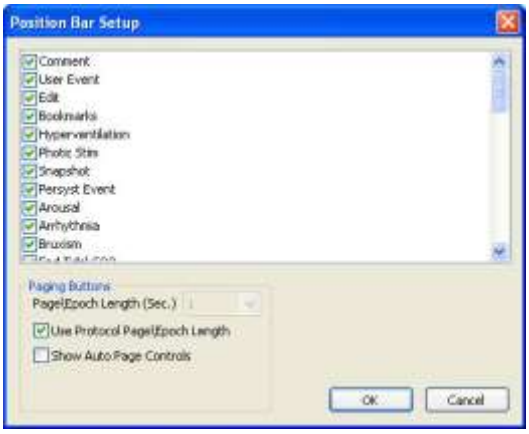
Persyst Tools

To add Persyst Tools to a workspace, click and drag the Persyst Tools option to the workspace. There are no setup options for this window.

Position Bar

To add the Position Bar to a workspace, click and drag the Position Bar option to the workspace. Right click on the Position Bar to set up the default configuration.

Note the Position Bar Setup options below. Add a check mark to those items you would like to display in the position bar. Click on OK to save.



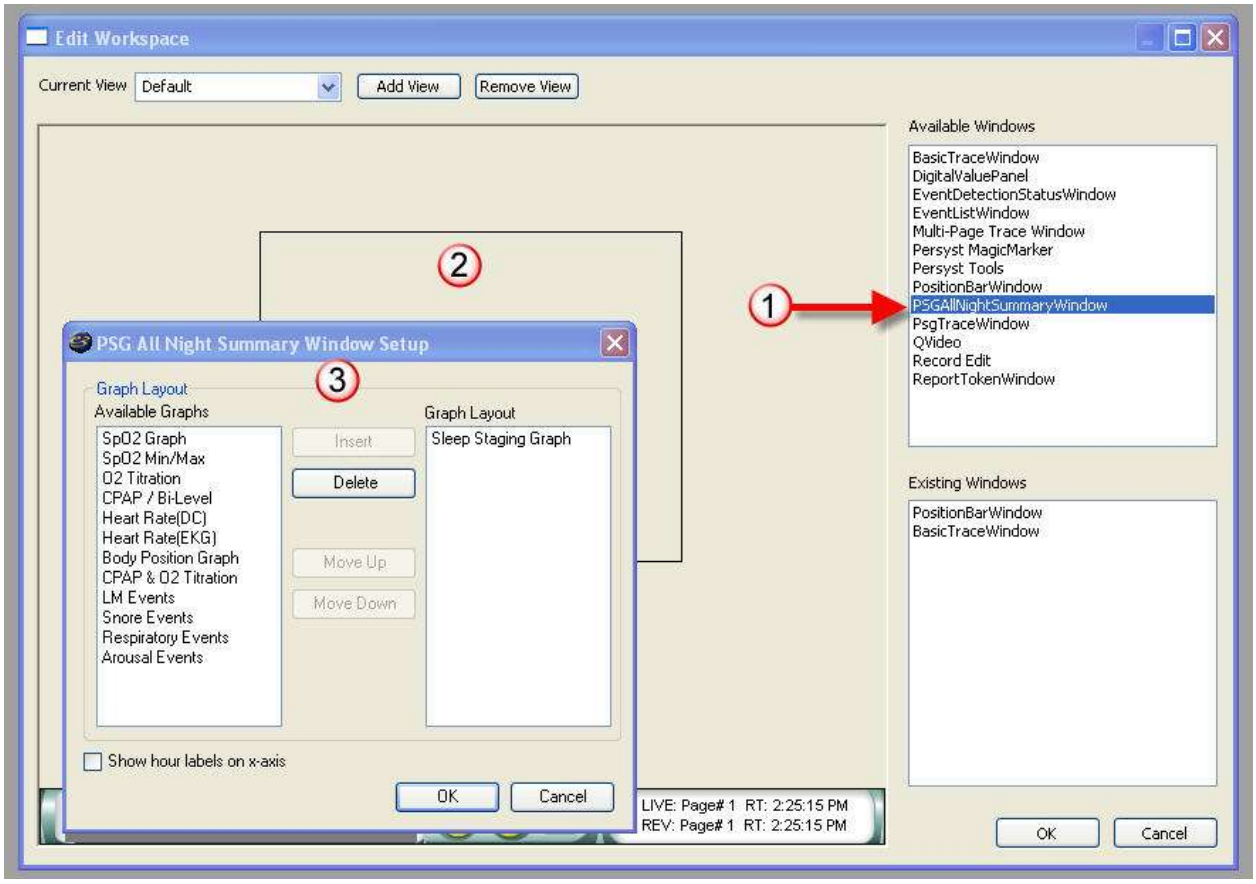
PSG All Night Summary Window (see below)

To add the All Night Summary Window to a workspace:

1. Click and drag the PSG All Night Summary Window to the workspace

2. Note the outline of the window will be displayed in the workspace. Right click in the box and select Setup.

3. Highlight the graphs you would like to use in the Available Graphs box. Click on insert to move the graphs to the Graph Layout box. Highlight a graph and click on the up, down, or delete option. Click on the Show hour labels on the x-axis if you want to display a time marker below the summary graphs. Click OK to save.



PSG Trace Window

To Add the PSG Trace window to the workspace, click and drag the PSG Trace Window option from the Available Windows. The PSG Trace window has a unique toolbar at the top of the trace window that allow the user to enter sleep stages and other sleep events. Right click in the PSG Trace window to enter the setup options. (Note the illustration below)

The following setup options are available for the Basic Trace Window. These settings will be used for every recording collected with this specific protocol.

Show Grid Lines - Add a check box to this item to show grid lines in the background of the trace window

Always Show Live Data - Add a check box to this item to force the window to always show live data during data collection. If the user clicks on the position bar at the bottom of the trace window during data collection, the displayed page will not change. However; after data collection the user can click on the position bar and reposition to the location selected.

Show Page Grid Lines - Add a check mark to this option to show grid lines

Show Page Number - Add a check mark to this option to show the page number in the trace window

Show Time of Day - Add a check mark to this option to show time of day in the trace window

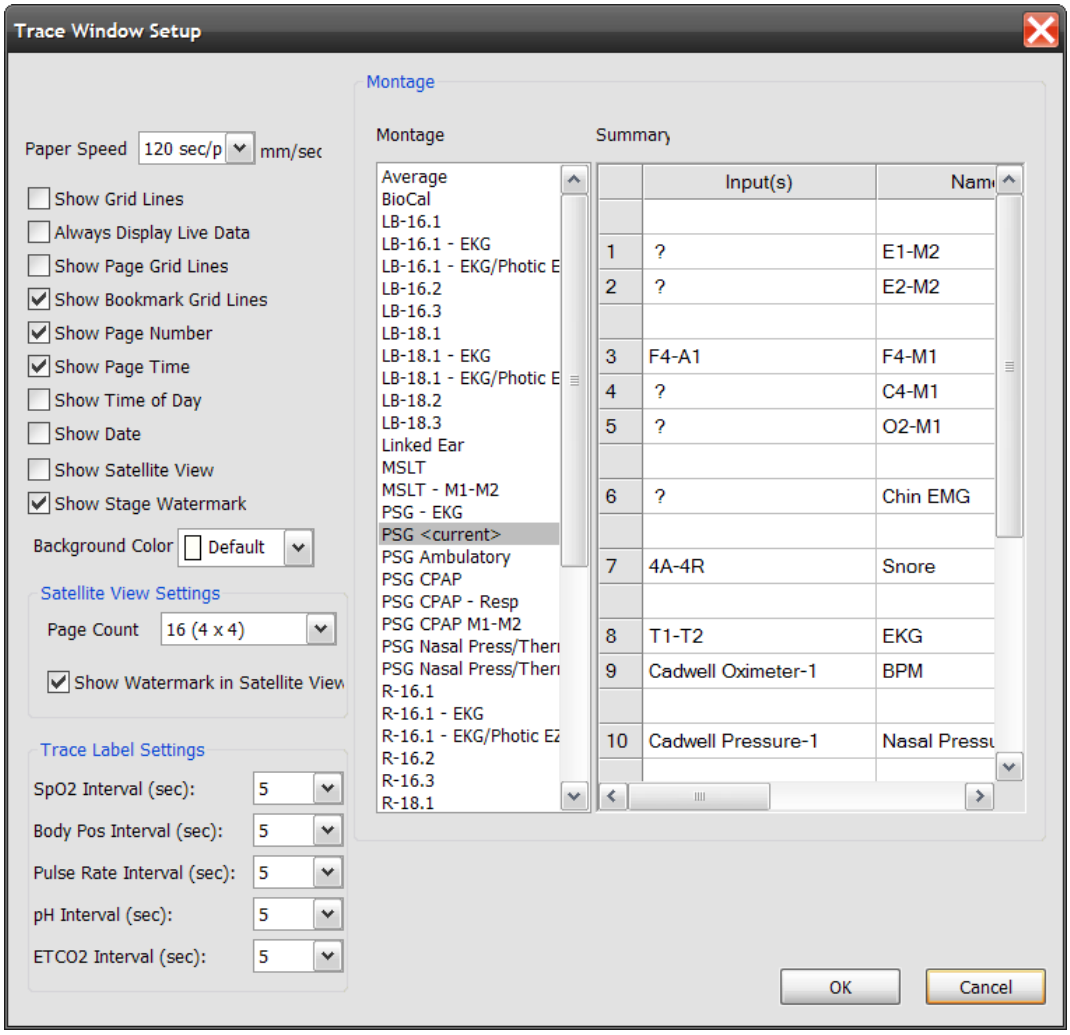
Show Satellite View -Add a check mark to this option to have the trace window display data in a Satellite View. The number of pages displayed will be determined by the Satellite View Settings.

Background Color - Click on the background color option to select a different color for the trace window background.

Satellite View Settings - Click on this option to select the page count used when a satellite view is used. The page counts options include the following grid views:

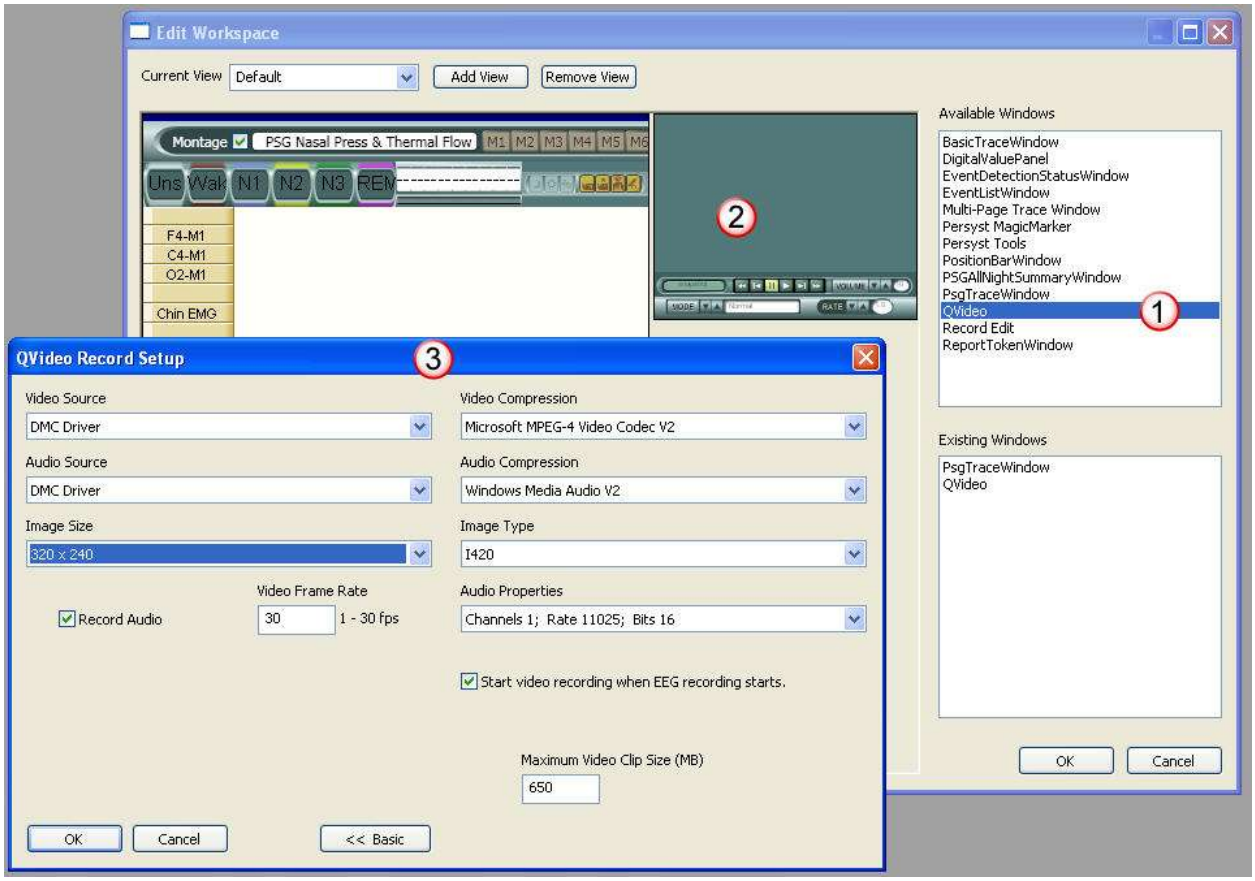
Trace Label Interval (SpO2, Body Position, Pulse Rate) - Select the interval to display digital values on the trace data during review. The digital trace values will not be displayed on the live trace data during data collection. If you look back, or review recorded data during data collection, the trace labels will be displayed.

Select a default montage that will be used. Highlight a montage in the Montage list and click on OK.



Q-Video

To Add the Q-Video window to the workspace, click and drag the Q-Video Window option from the Available Windows. Right click in the Q-Video window to enter the setup options. (Note the illustration below)



Q-Video Options (Click on Advanced to see all options)

Video Source - Q-Video currently requires a video to USB adapter. If you are using a USB camera, you will see the name of the camera in the drop down menu.

Audio Source - Typically the audio from the microphone in on the computer will be used. You can also use audio from your USB camera if it is available.

Image Size - The image size is the resolution used for video. The higher the resolution, the larger the video files.

Video Compression - Cadwell requires that you use Microsoft MPEG-4 Video Codec V2

Audio Compression - Cadwell requires that you use Windows Media Audio V2

Image Type - Cadwell recommends using I420 compression. It is more efficient and reliable than RGB compression.

Audio Properties - Cadwell recommends Channels; Rate 11025; Bits 16

Record Audio Checkbox - Add a check mark to this box if you want to record audio (by default) with video. If you do not add this check mark, the user can add a check mark to a Record Audio option during data collection.

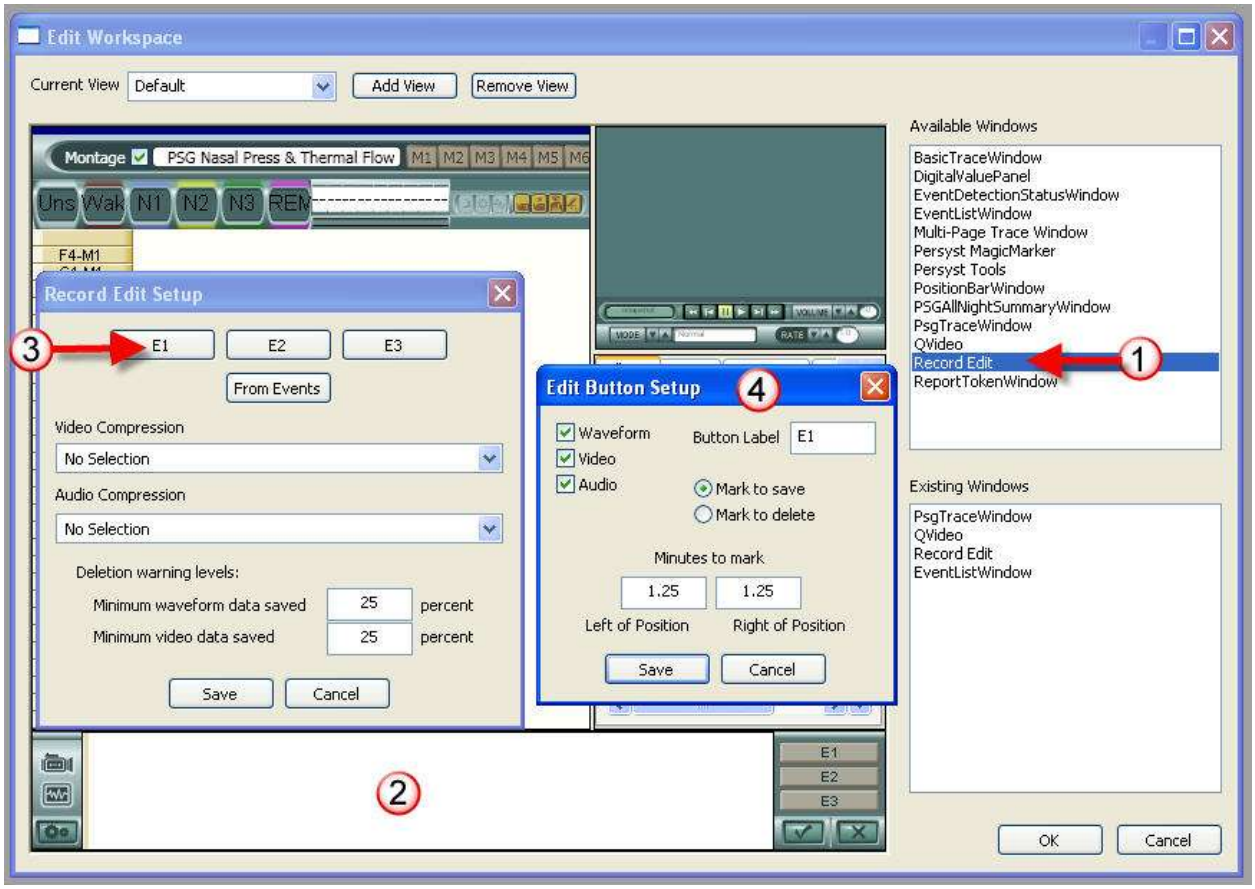
Video Frame Rate - Set this option to a default frame rate between 1-30 fps. NOTE: Some computers (laptop computers) may experience difficulty recording 30 fps. Set the frame rate below 30 if required.

Start Video Recording When Recording Starts - Add a check mark to this option if you want video to concurrently start when a recording starts.

Maximum Video Clip Size (MB) - This option will determine when the Easy software will start a new video file. If the present file reaches this level (650 MB), the Easy software will create an additional video file.

Record Edit

1. To add the Record Edit window to the workspace, click and drag the Record Edit Window option from the Available Windows.
2. Right click in the Record Edit window to enter the setup options. (Note the illustration below)
3. Click on the E1 button to edit the default settings for the E1 button.
4. Note the setup options below. The user can pre-configure the edit button to save or delete data when selected.



Record Edit Setup Options

E1, E2, and E3 Buttons - Each button can be pre-configured. Left click on the button to review the default settings (see number 4 above). Note the Button Label can be user configured. Enter a name that will help you understand the default settings for the displayed button. For example, you could name the button 'Save 1.25'.

From Event - This option will assist the user in automatically clipping waveform and video data adjacent Easy events. Place a check mark adjacent to the events you would like to mark. The Waveform, Video, and Audio check boxes will determine what concurrent data will be marked. The Minutes to Mark settings will determine the amount of time before and after an event that will be marked.

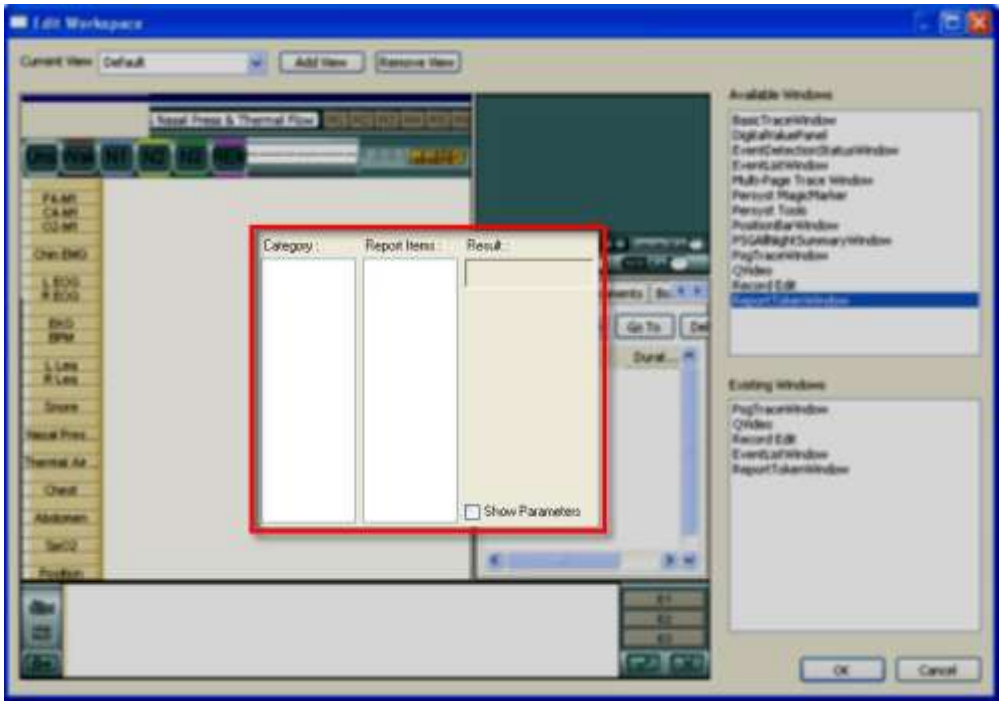
Video Compression - Cadwell requires that you use Microsoft MPEG-4 Video Codec V2

Audio Compression - Cadwell requires that you use Windows Media Audio V2

Deletion Warning Levels - These settings will warn the user if less than 25% (user specified) data will be saved.

Report Token Window

To add the Report Token window to the workspace, click and drag the Report Token Window option from the Available Windows. There are no setup options for this window. Note the window displayed below. The window should be placed and sized to fit in the workspace.

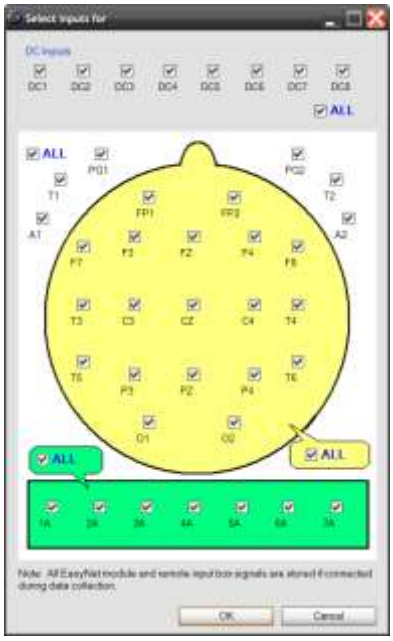


Select Inputs to Enable or Disable

Inputs that are not used during data collection can be disabled. Disabling inputs will reduce file size. Reducing file size will shorten the total amount of time required to archive, move, and copy data files. Some improvement will also be noticed when reading files over a remote connection.

1. Click on Select Inputs
2. Remove the check mark on the inputs you would like to disable.

Note: If a recording is started with the wrong inputs selected, a new recording must be started after the correct inputs have been enabled.



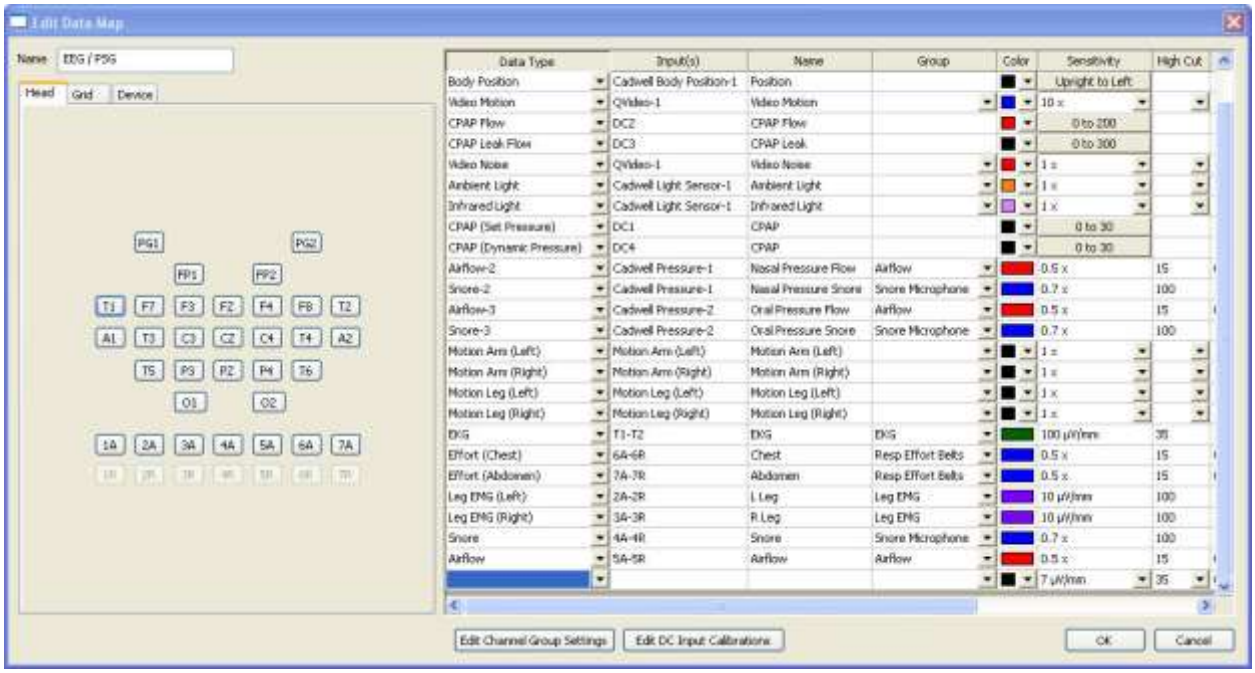
Adding, Modifying, and Calibrating DC Devices

Adding and Calibrating DC Devices

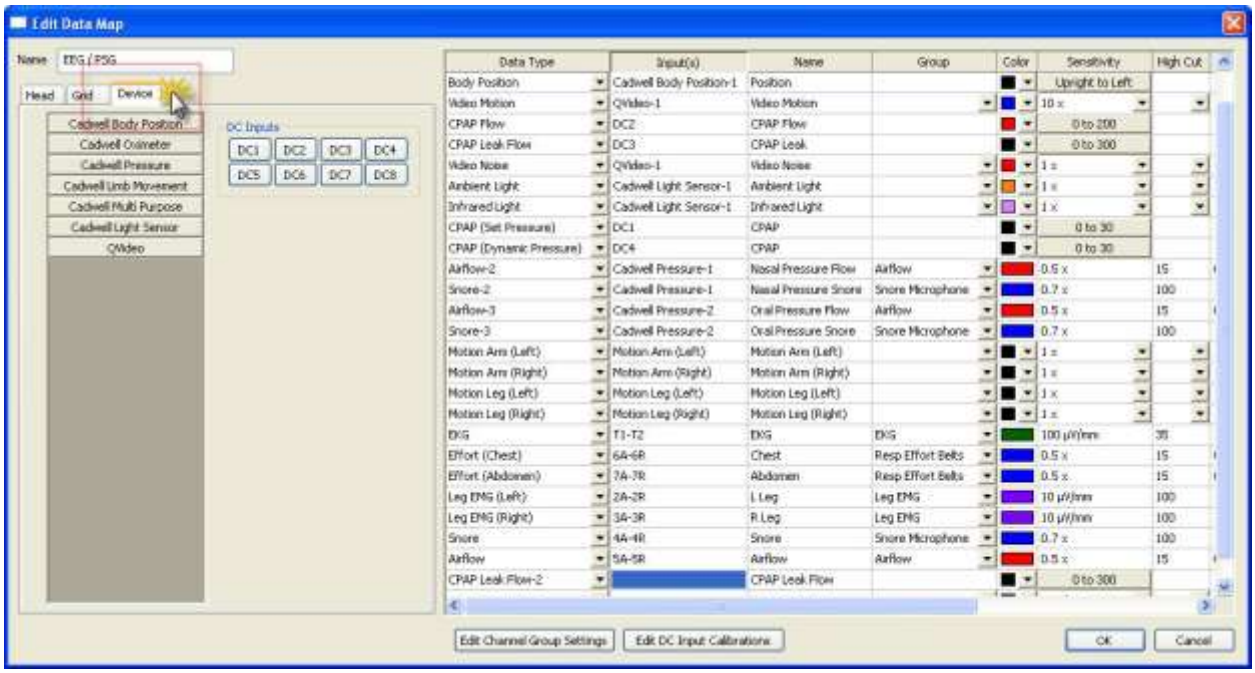
Before an external DC device is used for a recording, it must be assigned to an input that will be used in your recording montage. The DC device should be calibrated to the particular amplifier it will be connected to. Each DC device has unique voltage outputs, even two identical devices of the same brand and model. A unique device definition (calibration) is needed for each combination of DC device, amplifier and input you will use.

Calibrating a New DC Device

1. Connect the DC device to the Easy III Amplifier DC input. Note the DC input number.
2. Select System Setup from the Easy III Start menu.
3. Click the Data Map button. Highlight the Data Map used by your facility. In most cases, the default PSG map (EEG/PSG) can be used. Click Edit to view the data map.



4. This drop down is highlighted blue in the illustration above). Select the channel data type you are looking for. For example, if you are adding a CPAP leak channel, select the CPAP leak flow data type.



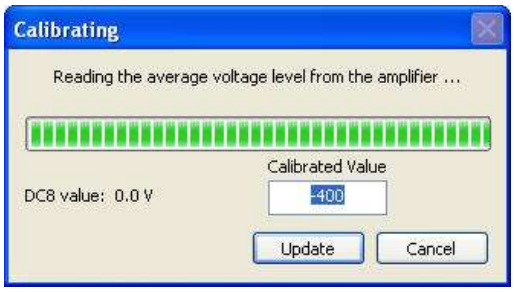
5. Look for the Input(s) cell. In the displayed menu illustration above, note the CPAP Leak Flow-2 channel has been added. The Input(s) cell is in the second column of the CPAP Leak Flow-2 row. Click in the Input(s) cell. The cell should now be highlighted.

6. Click on the Device tab in the upper left hand corner of the Edit Data Map dialog. Note the illustration above. The eight DC input buttons displayed on this tab correspond to the eight DC inputs on the Easy III amplifier. Select the DC input (DC1 - DC8) your device is currently connected to. The DC input should be the same input connected in step 1 above.

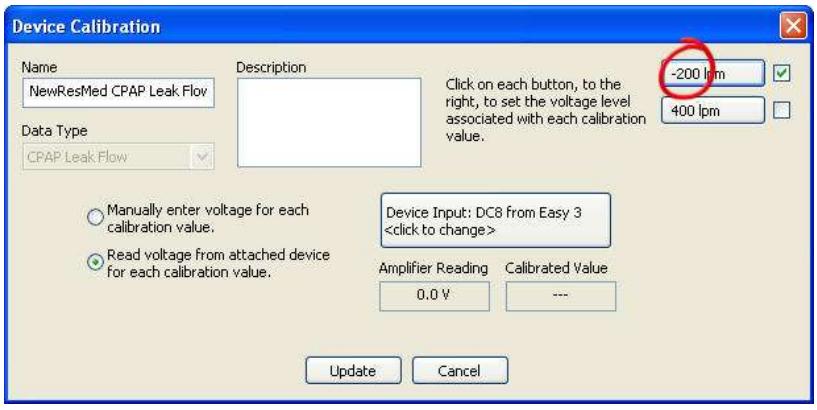
7. Click on 'Add' (note the illustration above) to add your new DC device.

8. Enter the Name of the channel you are calibrating. Select the 'Read voltage from attached device for each calibration value' option. Now select the DC input that the DC device is connected to. In the example below, the DC8 input has been selected by clicking on the Device Input button. Note the cool yellow and red mouse cursor displayed below on this button. Verify you are selecting the correct amplifier and DC input.

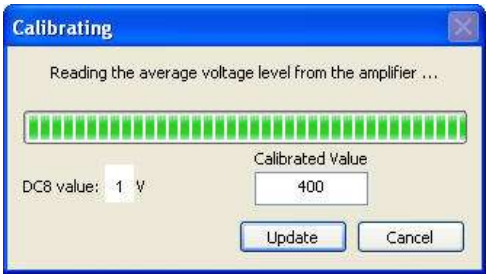
9. To Calibrate the Low Value - Set the DC device (in this example the DC device is a ResMed flow channel) to the lowest flow/calibration setting. Click on the -400 lpm button. Proceed forward until the following prompt is displayed. If you would like to specify a different low calibration value (the default was -400) you can enter it in the calibration value field. In the example below, the calibrated value (-400) will be manually modified to -200. Click on Update to continue.



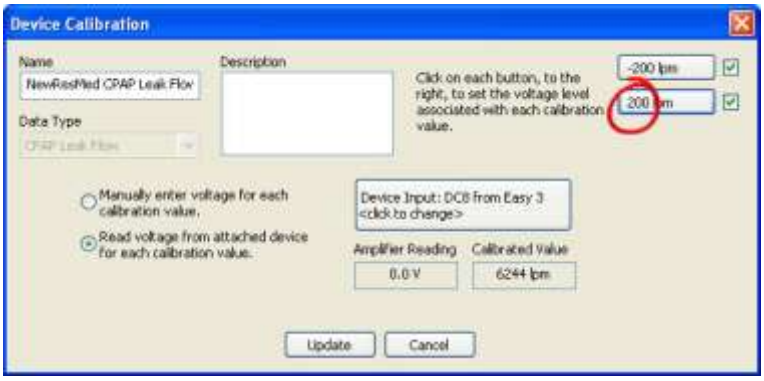
10. Note the illustration below. The low value button is now displayed with the new calibration value. The low calibration value also has a green check mark box displayed adjacent to the low value. This indicates the new low calibration value has been recorded.



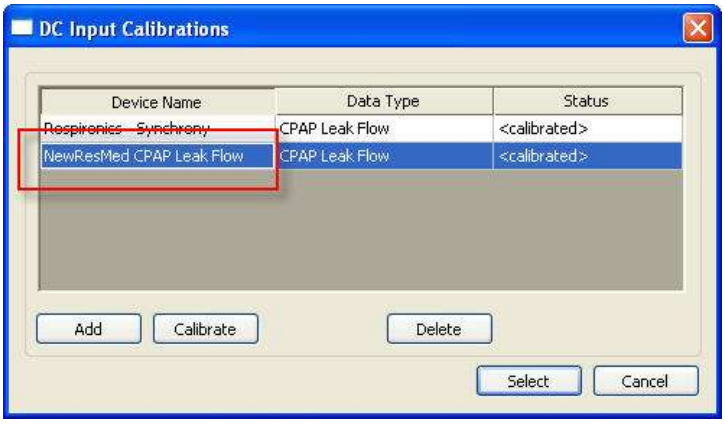
11. To Calibrate the High Value - Set the DC device (in this example the DC device is a ResMed flow channel) to the highest flow/calibration setting. Click on the 400 lpm button. Proceed forward until the following prompt is displayed. If you would like to specify a different low calibration value (the default was 400) you can enter it in the calibration value field. In the example below, the calibrated value (400) will be manually modified to 200. Click on Update to continue.



12. Note the illustration below. The high value button is now displayed with the new calibration value. The high calibration value also has a green check mark box displayed adjacent to the high value. This indicates the new high calibration value has been recorded. Click on Update to save the new calibration.

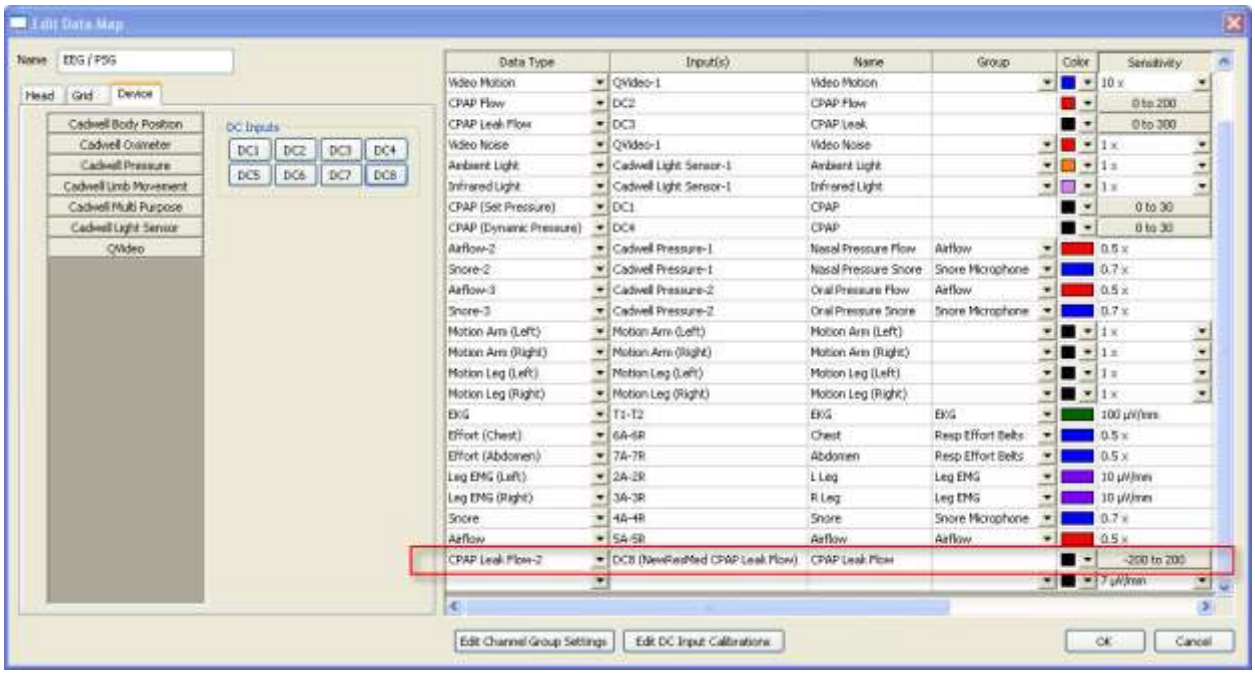


13. The new DC calibration should now be displayed in you list of DC input calibrations. (Note the illustration below)



14. Highlight the new DC calibration and click on Select.

15. Note the illustration below. The calibration has now been added to your default data map. All data maps on all synchronized Easy III systems will now be updated. If you have another Easy III system that will use the same device, or same type of device, you will need to perform another calibration on each specific system. Note: After the calibration has been record for each specific system, the calibration does not need to be repeated unless the DC device, DC device cable, or Easy III amplifier have been replaced.

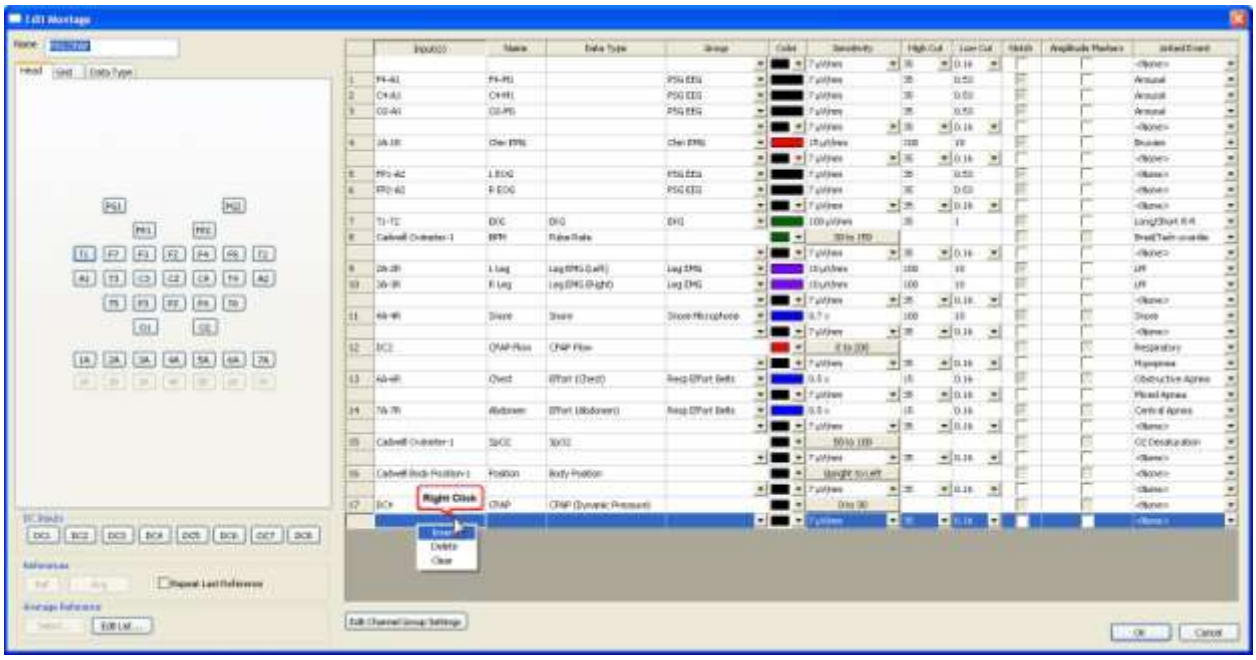


16. Click on OK to save the new calibration in the data map. Verify that your new DC input is correctly configured in your recording montages. Review the information below to verify your configuration is correct.

Verifying the Correct DC Calibration and Input are Used in Recording Montages

1. Click the Montages button in the System Settings window.

2. Select the PSG montage from the montage list. Click the Edit button.



3. To add a new DC input channel to an existing montage, right click in the location where you would like to insert the channel. In the illustration above, the insert option is selected to add another channel to the bottom of the displayed montage.

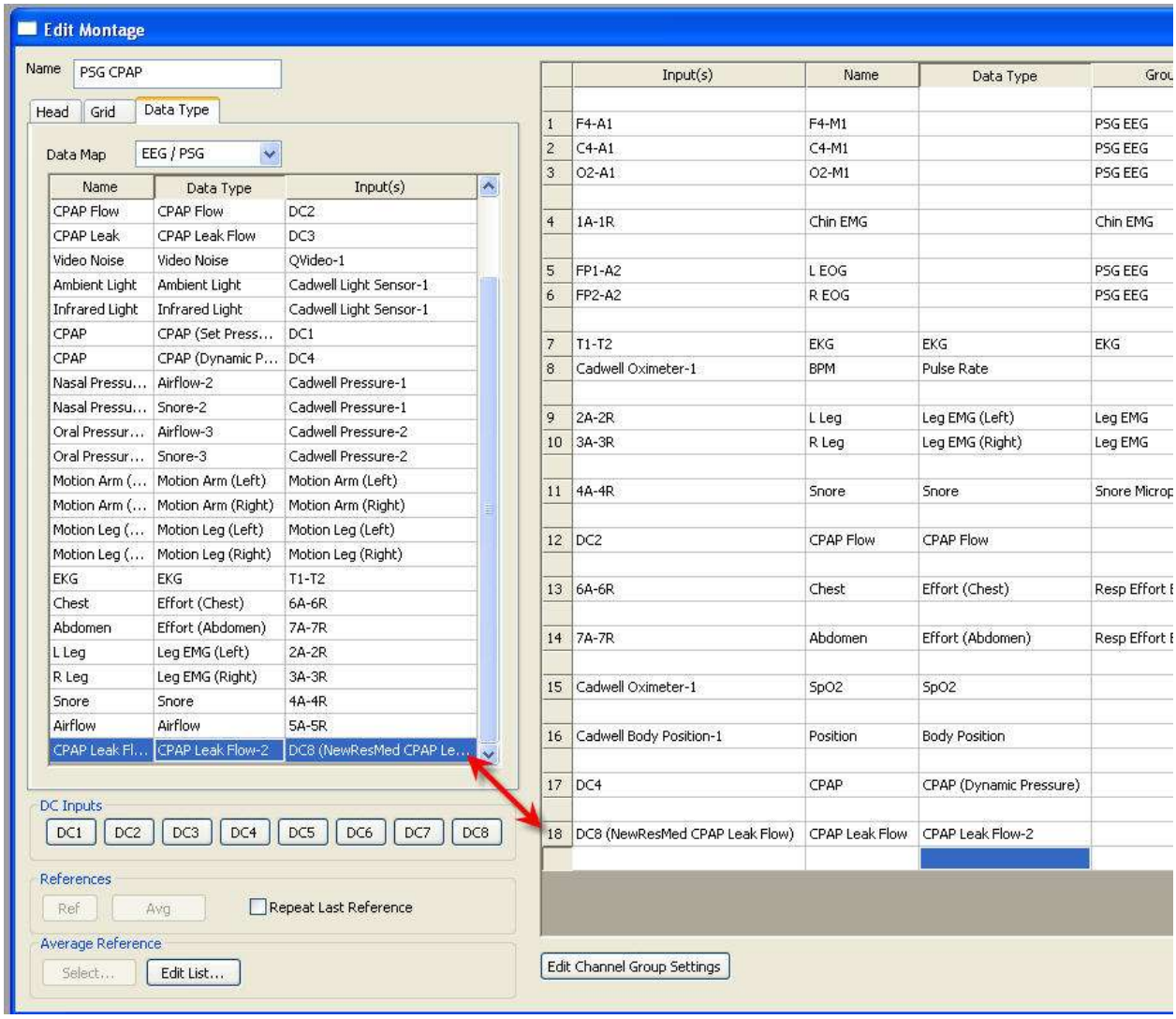
4. Click in the Input(s) box adjacent to the channel. In the illustration above, the channel is added to row 18.

5. Click on the Data Type tab located on the left side of the Edit Montage dialog (note the illustration below).

6. Verify you are using the correct data map. In the example above, the data map with the new DC device channel is EEG/PSG.

7. Look for the new DC device channel you would like to add to the montage. Click on the channel.

8. Note (below) that the new channel will be displayed in your montage.



9. Click on OK to save your changes. The edited montage will be synchronized with other Easy III system

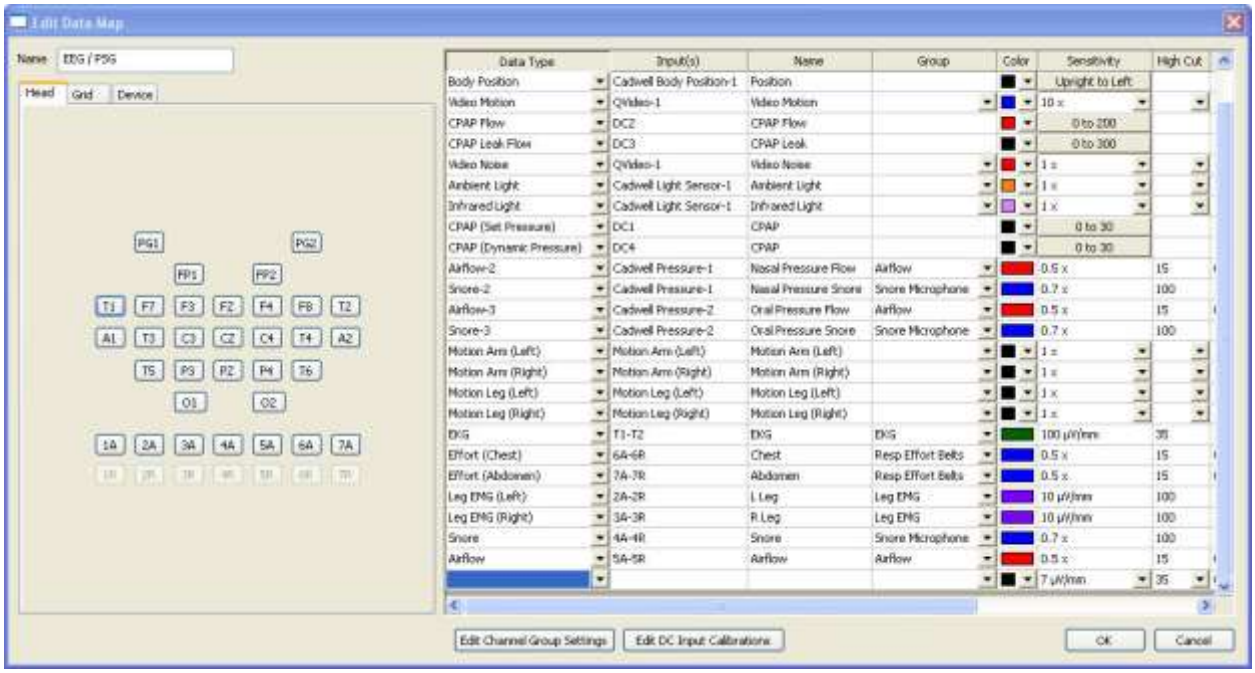
Re-calibrating DC Devices

Re-calibration needs to be performed when an existing hardware configuration has been modified. Devices will need to be re-calibrated when the following occur:

- An existing DC device is exchanged for another DC device of the same type.
- An existing DC device is replaced with a different device that provides the same
- data type (CPAP flow, CPAP pressure).
- A new DC input cable from the DC device to the Easy III amplifier is used.
- A new Easy III amplifier is used.

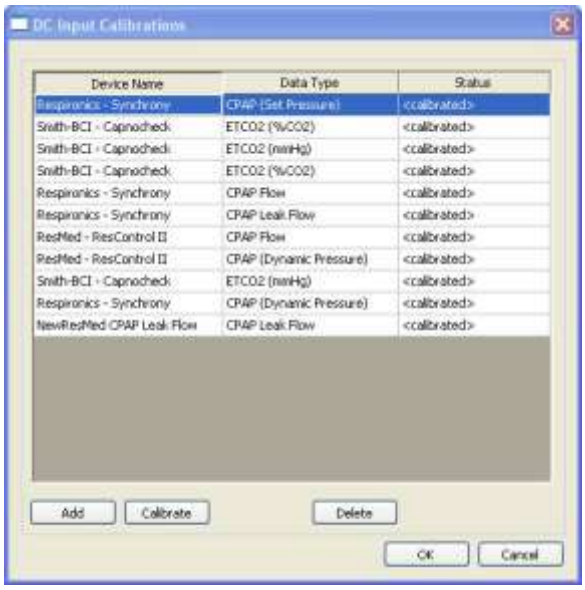
Re-calibration Steps

1. Verify the DC device is connected to the Easy III Amplifier DC input. Note the DC input number.
2. Select System Setup from the Easy III Start menu.
3. Click the Data Map button. Highlight the Data Map used by your facility. In most cases, the default PSG map (EEG/PSG) can be used. Click Edit to view the data map.

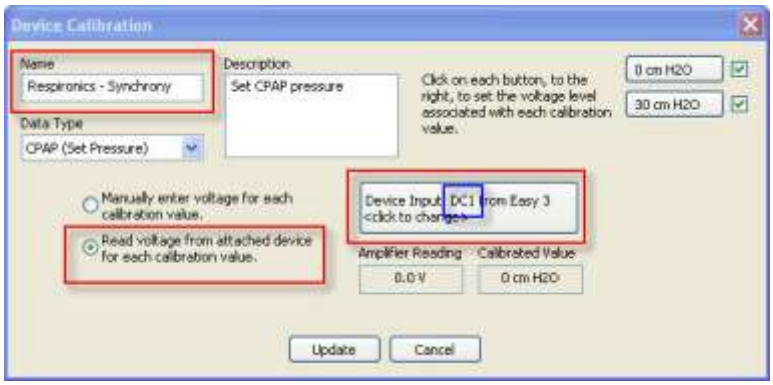


4. Look for the channel you would like to re-calibrate. If the channel is not in the data map, you may be in the wrong data map. If the device needs to be added to the data map, proceed to the Adding and Calibrating a New DC Device section of this Help File.
5. If the channel is in the data map, click on the Edit DC Input Calibrations button.

6. Look for the input you would like to re-calibrate in the DC Input Calibrations dialog. Highlight the channel and click on Calibrate.



7. Verify the name of the channel you are calibrating is correct. Select the 'Read voltage from attached device for each calibration value' option. Verify the correct DC input is being used.

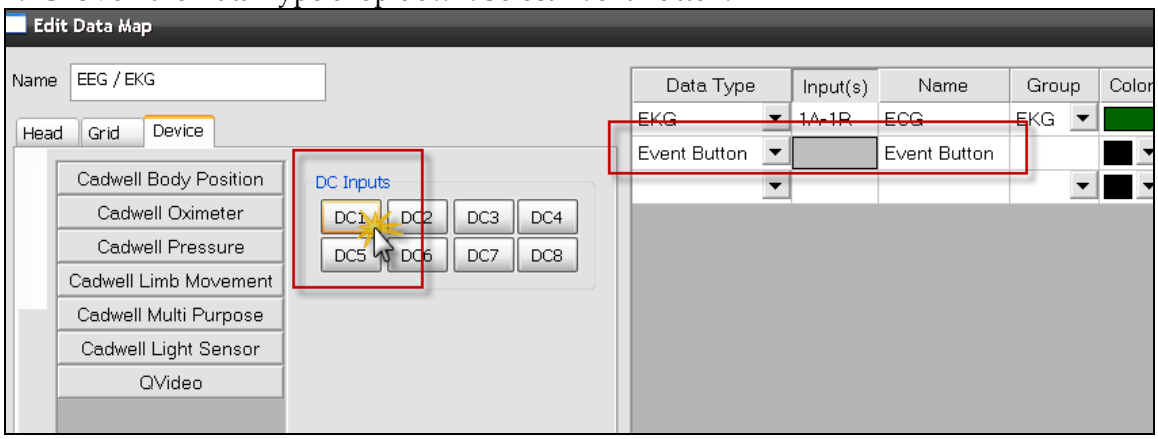


8. To Calibrate the Low Value - Set the DC device (in this example the DC device is a Respironics Synchrony pressure channel) via the PC Direct software to the minimum pressure/calibration setting. Click on the O cm H20 button in the Device Calibration dialog. Proceed through the calibration, clicking on Update to complete the minimum calibration.
9. To Calibrate the High Value - Set the DC device (in this example the DC device is a Respironics Synchrony pressure channel) via the PC Direct software to the maximum pressure/calibration setting. Click on the 30 cm H20 button in the Device Calibration dialog. Proceed through the calibration, clicking on Update to complete the maximum calibration.

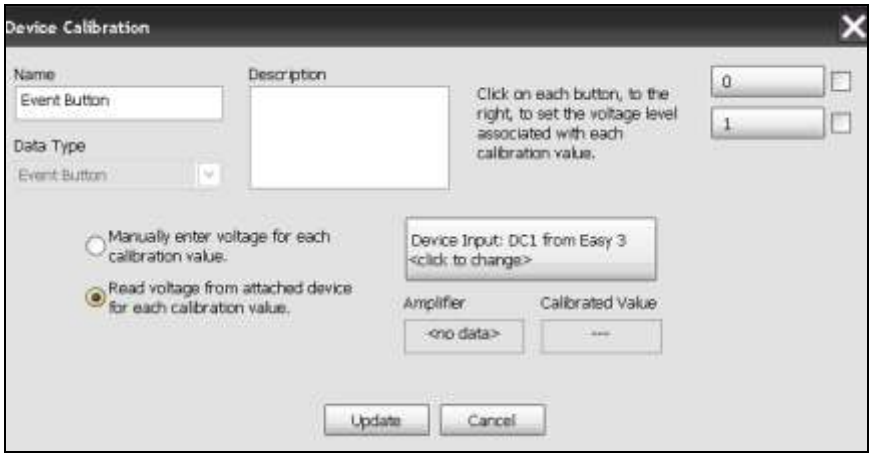
The calibration has now been updated with the new calibration.

Adding a Event Button to a Data Map

1. Select the Data Map you would like to edit. Click on Edit.
2. Click on the Data Type drop down. Select Event Button.



3. Click on the Device Tab. Click on the DC input you would like to use for the Event Button. The DC Input Calibration dialog will be displayed.
4. Look for the Event Button in the list. If the event button is not displayed, click on Add.
5. Type in a name 'Event Button'.



6. Click on the Device Input button. Select the Amplifier and DC input you would like to use. Click on Update.
7. Click on Read Voltages from the Attached Device.
8. Click on the '0' button in the upper right hand corner. Select OK when you are ready. The input voltage should read 15V.
9. Hold the button down on the Event Button. Click on the '1' button in the upper right hand corner. Select OK. The voltage should equal 0V. Click on Update.
10. The '0' button and the '1' button should now have a green check mark next to each button. This indicates that both have been calibrated. Click on Update.

11. Edit the Event Button in the Data Map. Select a trace color. Add trace clipping if you want to restrict the Event Button signal amplitude. Click on OK and close the System Setup dialog.

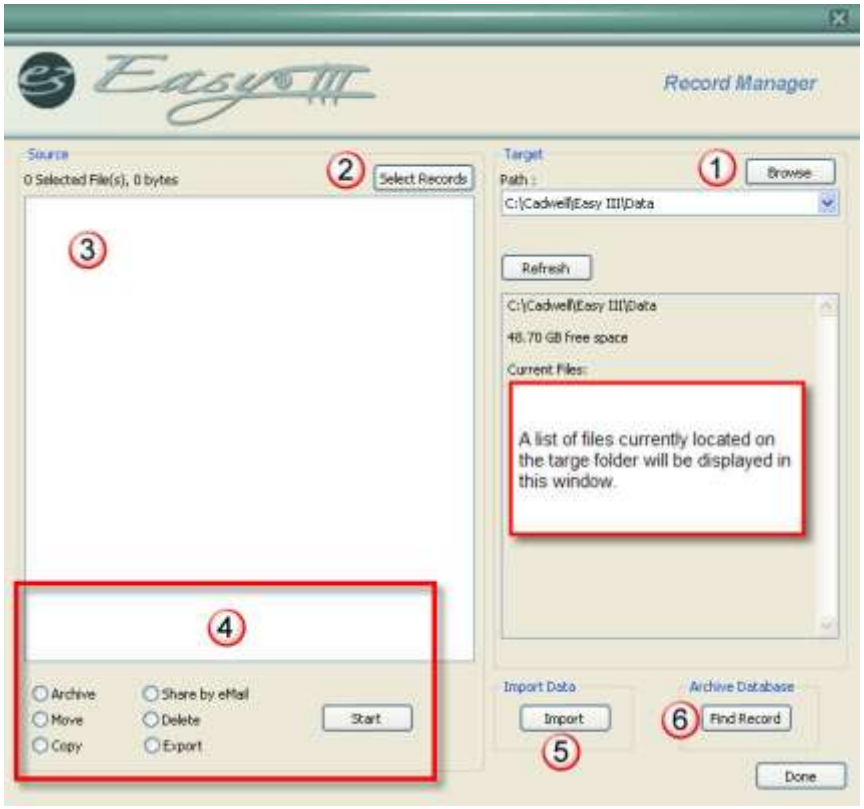
12. Edit Montages from the System Settings dialog. Add the Event Button channel to selected montages by clicking on the Data Type tab. Verify that the correct Data Map is being used.

13. Click on the channel row in the montage where you would like to add the Event Button. Click on the Event Button item in the list displayed on the left side. After clicking on the Event Button, the channel should now be displayed in the selected montage displayed in the right hand panel. Click on OK. Close the Montage Editor.

14. The Event Button is now ready for use. When the event button is depressed, the Easy III software will detect the event. The event will be added to the trace window and the Event List.

Record Manager

Record Manager Options (note illustration below)



1. Select a location to copy or move your selected files. Click on Browse button to select a location. Click on the drop down arrow in the path to select previous paths used.

2. Select Records you would like to move or copy. Note: Several records can be selected at the same time.

3. All records selected will be displayed in this window. File size will be displayed adjacent to each record. Waveform data will be displayed with red checkmark adjacent to the waveform file. If Q-Video data was recorded with patient data, each video file will be listed in this window. Remove the check box from the video file segment(s) if you do not want to copy or move the file.

4. Record Manager Controls

Archive - The archive feature will move the selected file(s) to the specified target (number 1 in the illustration above). After the file has been archived, the original file will be deleted from the data folder. The file will be placed in the Windows Recycle Bin. Note: The Recycle Bin must configured to save deleted data and have adequate space available. If you are archiving data from a network location to an archive media, data will not be placed in the Recycle Bin. The name of the selected patients will be placed in the Archive Database. Note: The date, time, and user name that archived the file will remain in the record history file.

Move - This feature will move the selected files to another Easy III system selected in the Target options (number 1 in the illustration above). Note: The file will be moved to the new target. After the file is removed from the local machine, it will not be placed in the Recycle Bin. Note: The date, time, and user name that moved the file will be placed in the record history file.

Copy - This feature will copy the selected files to another Easy III system selected in the Target options (number 1 in the illustration above). Note: The date, time, and user name that copied the file will be placed in the record history file.

Share by eMail - This feature will launch your local email client (if available). The selected patient files will be placed as an attachment to the email. Note: The date, time, and user name that emailed the patient files will be placed in the record history file.

Delete - This feature will delete the selected files. The files will be placed in the Windows Recycle Bin. Note: The Recycle Bin must configured to save deleted data and have adequate space available. If you are deleting data from a network location, data will not be placed in the Recycle Bin. Note: The date, time, and user name that deleted the file will remain in the record history file.

Export - This option will allow the user to copy the file to the selected target. If the target is a DVD or CD, an autorun file (Add Easy III Data to My Computer) will be copied to the media (note image below). When the media is placed in another computer with Easy III software, the utility below will automatically run.

5. Click on the Import button to copy a file from another media to the local computer.

- Remove the check mark from the 'Include Video Files When Moving From CD' if you do not want to import video data along with waveform data.
- Click on 'Add One Record' if you want to browse to one record to import.
- Click on 'Add Multiple Records' to copy all records from the selected target.

Note: The utility will prompt you with a message with a message confirming all records have been imported.

6. To review a list of archived records, click on the Find Record button for the Archive Database.

Record Manager Notes

- Easy III does not support re-writable CD and DVD media. You must use CD-R and DVD-R media.
- Write the Media Label on the topside of the DVD/CD using a felt-tip pen.
- International customers: The Easy DVD/CD Archiving does not support the use of large extended language character sets, such as in Asian and Arabic languages, in the Patient Information dialog.

Prepare a Patient for Data Collection

Required Equipment

To prepare for data collection, verify the following equipment is available:

- Easy III PC
- Easy Amplifier & Cables
- Power/Com Module & Cables
- Photic Stimulator & Cable (if required)
- Setup Supplies: Skin Prep, Electrode Paste, Gauze

Verify System Hardware Setup

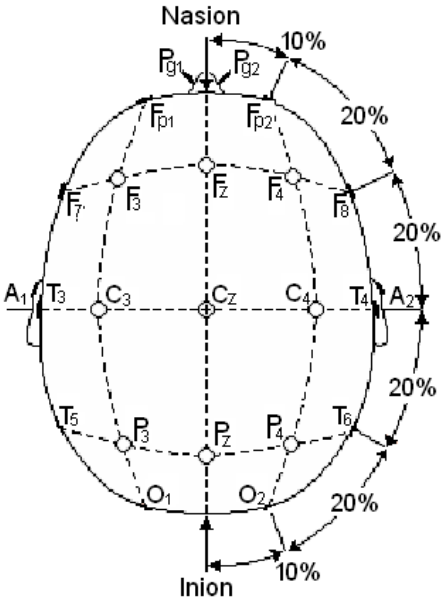
See Setup System Hardware for more information.

Place Electrodes and Sensors

Follow your laboratory protocols for applying electrodes to the patient.

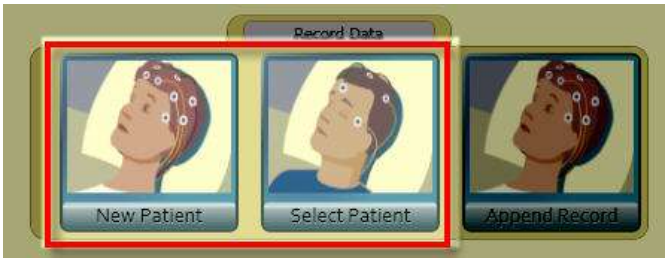
Cadwell recommends adherence to the International 10-20 standards for EEG electrode placement:

1. Attach electrodes to the patient.
2. Verify that the patient will be comfortable and not become entangled in wires.
3. Route the electrode cables to the Remote Input Box.
4. Plug the electrodes into the Remote Input Box. (Do *not* pull electrode wires when removing electrodes from the Remote Input Box. Remove each electrode carefully to avoid damaging the electrode connector).
5. Place respiratory, body position, snoring and SpO2 sensors if required. See EasyNet Modules for more information.



Start Easy III Procedure

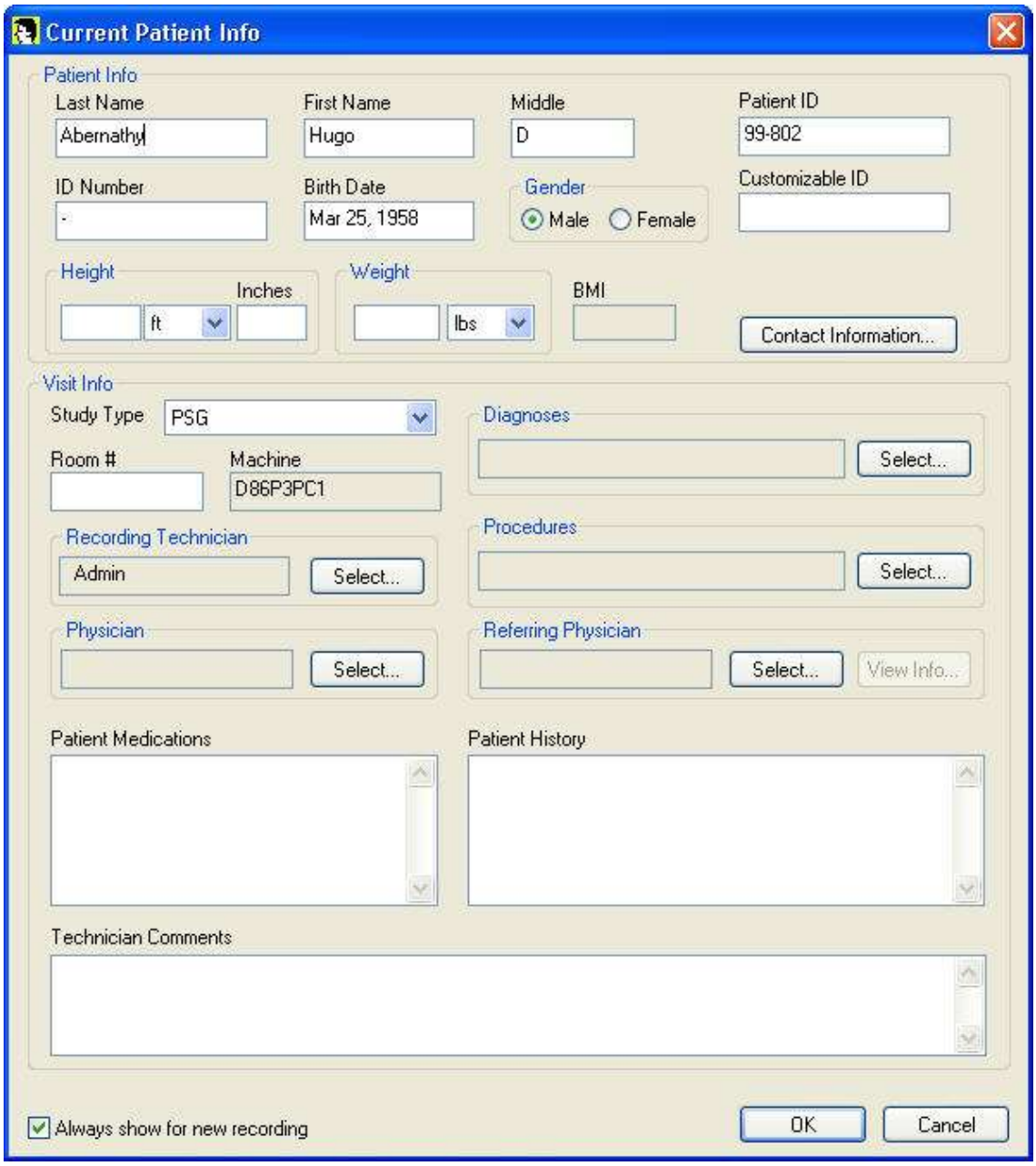
1. Prepare your patient according to laboratory protocol.
2. Verify electrodes are in the correct jacks.
3. Verify the amplifier is connected and ready for use.
4. Start a record by selecting New Patient or Select Patient from the Easy III Start Page.



New Patient Window

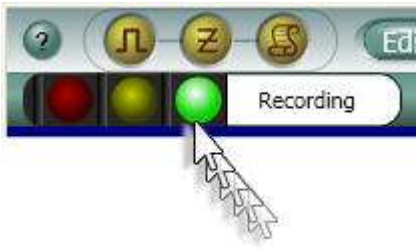
Select Patient

5. The patient information dialog will be displayed next. (see next page)

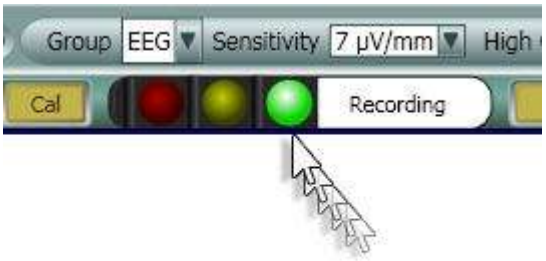


6. Click on OK to close the patient information dialog.
7. To start a recording, click on the start button (see next page).

Start Button for PSG Recording

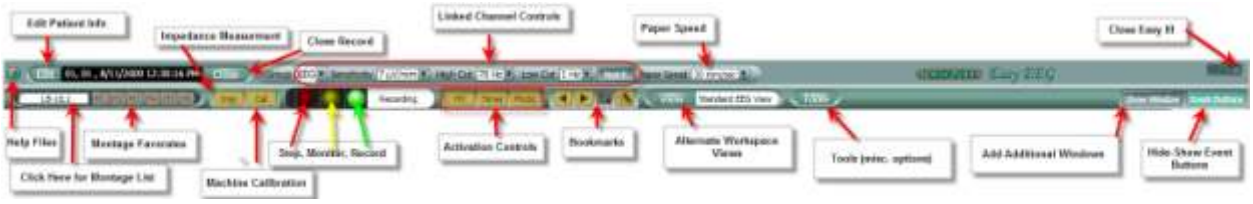


Start Button for EEG Recording

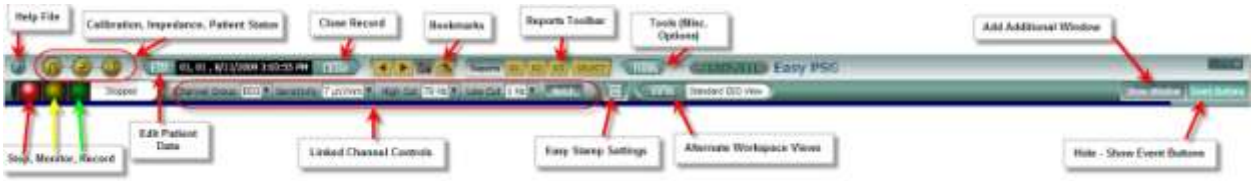


Easy III Toolbar Options

Record EEG



Record PSG



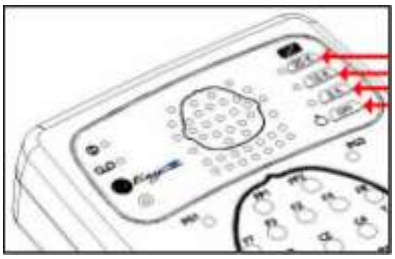
Checking Impedance during Data Collection

The Easy III software will evaluate all inputs displayed in the impedance dialog during impedance measurement. When the impedance dialog is opened, Easy III will test the EEG inputs, then the reference inputs, ground electrodes, and active reference pairs. NOTE: It is important that the user wait at least 10 seconds when the impedance menu is opened. This will allow the program to adequately check all inputs.

NOTE: Waveform data is not recorded during impedance measurement. Check impedance and promptly return to data collection after evaluating impedance levels.

Checking Impedance from the Easy III Amplifier

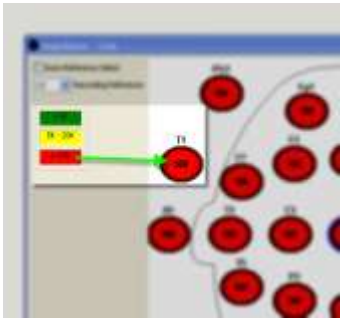
- On the amplifier, press the 20K button while recording to check impedances greater than 20 kilohms. Press the 10K button to check impedances between 5 and 20 kilohms. Press the 5K button to check impedances below 5 kilohms. Each time an impedance button is pressed, the impedance LEDS on the amplifier that correspond to the kilohm level of the button pushed will light up.



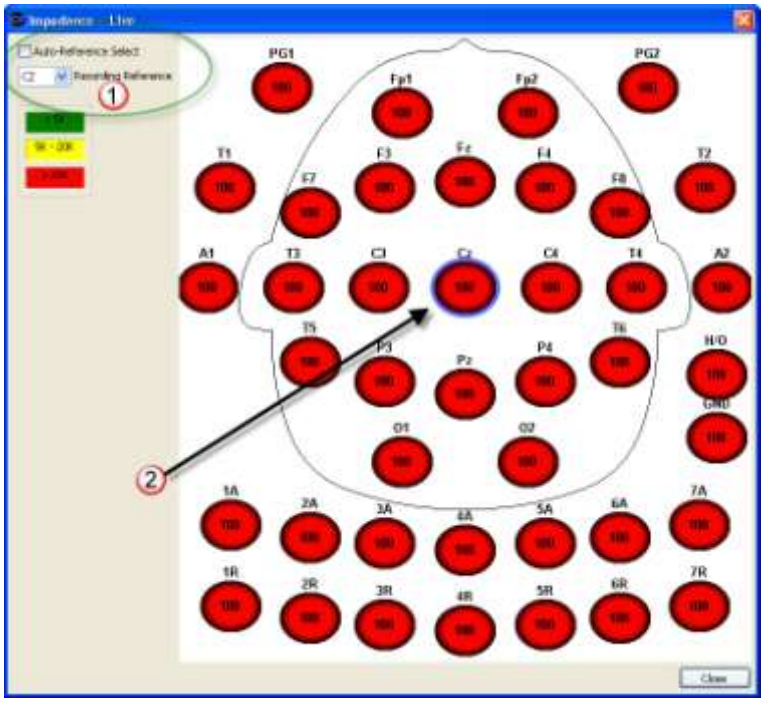
- The Impedance-Live window will open in the Easy III software.
- Press the OFF button on the amplifier to stop impedance measurement. If the OFF button is not pressed, the Easy III software will stop measuring impedance when the maximum impedance measurement interval to obtained. The maximum impedance measurement duration is set in the recording protocol.

Checking Impedance from the Easy III Software

Note the illustration below. Impedance levels that are good will be displayed with green background color in the input. In the sample below, the impedance is greater than 20K, therefor the background color is red.



Click  in the Easy III software toolbar.

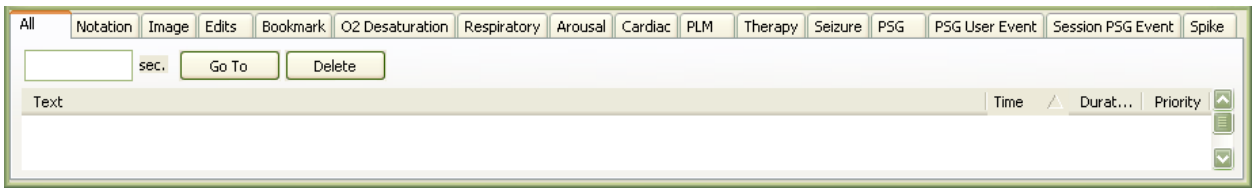


1. Auto-Reference Select - Place a check mark in this box if you would like the Easy software to find the lowest impedance reference electrode for use as a reference electrode. Note: The evaluation and selection of the lowest impedance electrode is only done during impedance measurement. After the reference electrode has been selected and the impedance measurement option is closed, the reference electrode will not be changed unless the impedance measurement option is opened again. The reference electrode can be manually selected by clicking on the drop down Recording Reference option.

2. Note the reference electrode is marked with a blue oval ring around the input. Available Reference Inputs: A1, T3, C3, Cz, C4, T4, or A2.

Marking Events

The Event List window summarizes all events associated with a recording. Click on a tab to select a specific category. Click on a specific event to reposition to the selected event.



Click on an event and click the Delete button to remove it from the Event List.

See Event List Window Setup in Modify Window Settings for setup information.

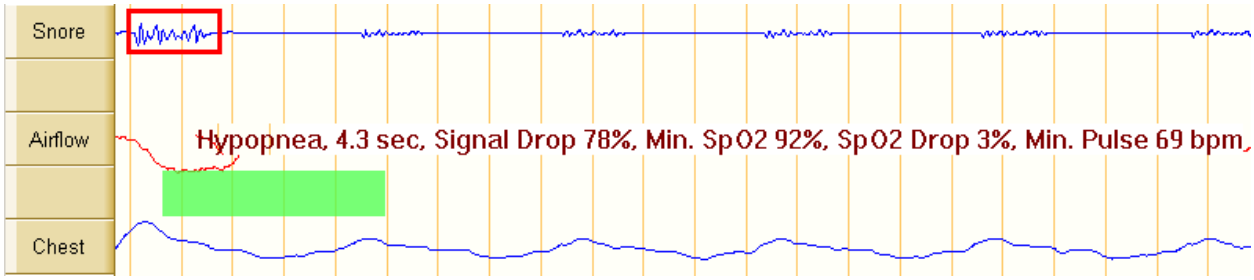
Marking PSG Events

Hold the mouse cursor over any trace in a running procedure to show the option

Respiratory Events

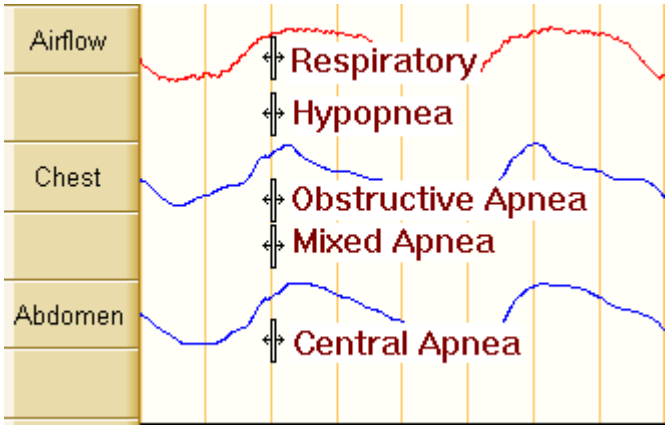
Place the mouse over a respiratory channel, then click and drag across to mark a respiratory event. As shown below, the Easy III software will instantaneously provide the event criteria:

- Duration;
- Percentage Drop in Signal Amplitude;
- Minimum Sp02;
- Percentage Drop in Sp02; and
- Minimum Pulse Rate.



Marking Events by Event Type

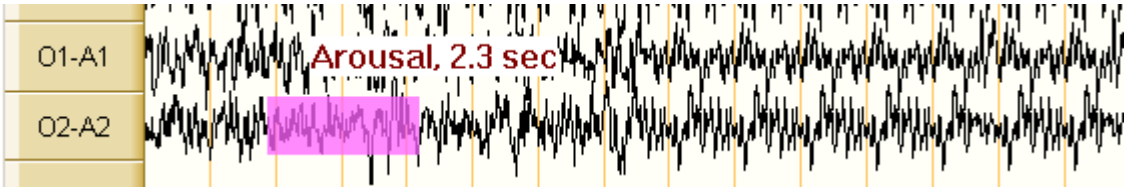
When you mark a respiratory event on the flow channel, a pop-up window will appear asking you to select a respiratory event type. Moving the mouse below the airflow channel will allow the user to select an event type before marking a respiratory event. This simulated image demonstrates the different events that can be marked on a channel by moving your mouse up or down:



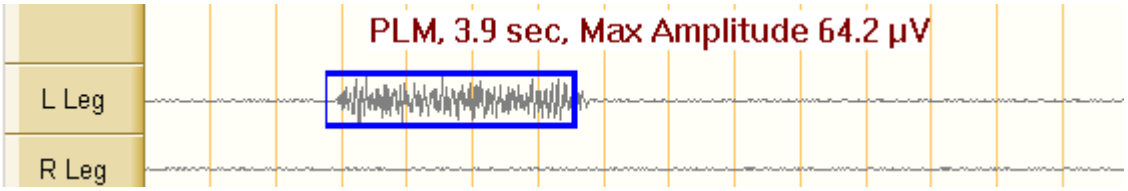
Real-Time Feedback Marking Events

Easy III will display duration and amplitude or range while marking events.

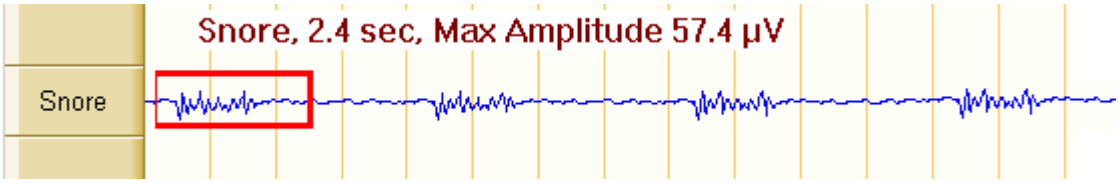
Arousal



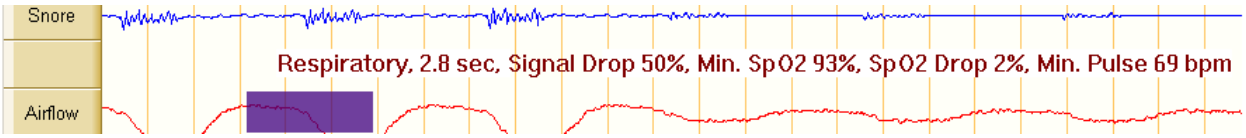
PLM



Snore



Respiratory



EKG

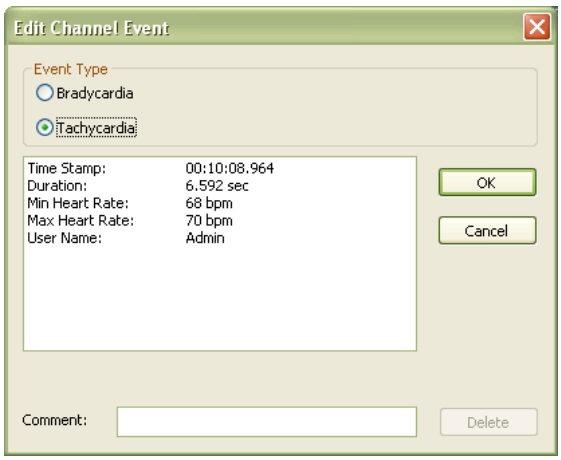
Event Details

Clicking on any previously marked event will display the Edit Channel Event window, which displays event type, event details, and the User's name. The event may be erased by clicking on the Delete button.

Easy Stamp

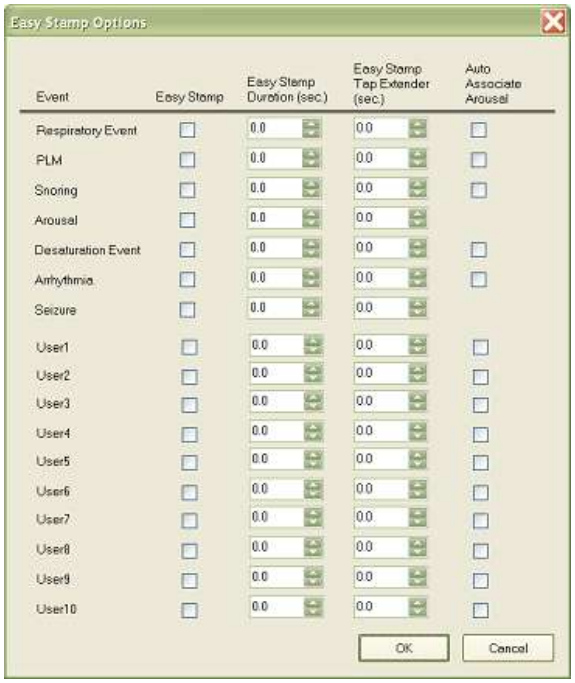
Easy III allows users to mark any event, at any time, in any window. Quickly stamp a sleep event on a particular channel in a trace window. Place the mouse over a sleep channel and right-click to stamp an event start. To extend the duration of the stamped event, right-click on the event bar again. The duration will increase each time you right-click the event.

Some events will automatically pull up an Edit Channel Event window, in which you can select a more specific Event Type, review the event details, and add a comment. The Event will also appear in the Event List window. Click on the Event to review the trace where it occurred.



Easy Stamp Options Menu

- Easy Stamp - Check mark to enable.
- Easy Stamp Duration - Default duration of Easy Stamp event. Use arrows to adjust.
- Easy Stamp Tap Extender - Determines additional duration added to an event when the event bar is right-clicked.
- Auto Associate Arousal - Check mark to automatically associate an EEG arousal with the Easy Stamp Event.
- User Events 1-10 - Configure custom user events assigned to specific channels in a montage in the System Setup/User Defined PSG Events menu.



Sleep Events

Enter Sleep Events

The basic trace window and PSG trace window support marking and editing of PSG channel events. You may mark the channel, start time and duration of the event.

When a new event is marked, the event type is set to the type specified in the Linked Event attribute of the associated display channel. If the Linked Event is a group name, the event type shall be set to a default event type which is a member of the specified group.

If a new event is marked that overlaps the time span of an existing event, the two will merge if the types match, or if the two are of the same group. When events are merged, the time span of the new event will be the union of the time span of the individual events. If they are not of the same event type, the type of the merged event will match the type of the newly marked event.

Easy Stamp

Each user may set up their own EasyStamp data.

EasyStamp works for Respiratory, PLM, Snore, arousal, O2 Desaturation, Arrhythmia, Seizure, and User 1-10 events.

Click on the EasyStamp button to initiate.

Manually Mark User-Defined Events

See EasyStamp to set User-Defined Events. See Mark Events for more information on the types of events that are marked.

A separate set of PSG channel events exist for each scoring session in the PSG recording session. Each PSG channel event is stored persistently with the PSG recording session data.

Manually Mark Session PSG Events

Click on a button in the PSG events toolbar to add a session event. See Lights, CPAP, O2 for more information.

1. Lights Out - Click on this toolbar to enter a Lights Out event. Lights out will be placed at the first second of the present epoch.

2. Light On - Click on this toolbar to enter Light On. Lights out will be placed at the last second of present epoch.

3. Sleep Onset - Click on this toolbar to mark an epoch as sleep onset. Sleep onset will be placed at the first second of the present epoch.

4. CPAP/BiLevel Pressure - Click on this toolbar to place a CPAP event in the trace window.

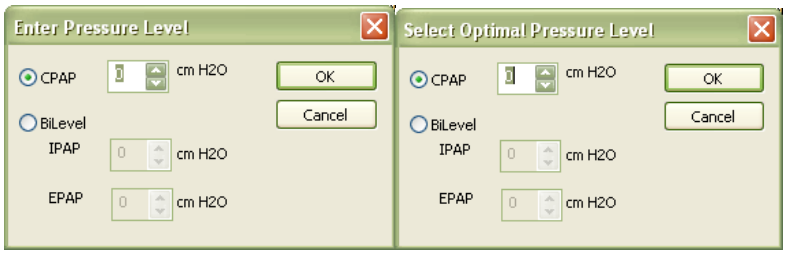
5. Optimal Pressure - Click on this toolbar to place an Optimal Pressure event in the trace window.

6. Body Position - Click on this toolbar to enter a Body Position Change. If you are using a body position sensor, you can use this option to over-ride or resume using the body position sensor.

7. Supplemental O2 - Click on this option to enter a supplemental O2 level.

Edit CPAP/BiLevel Pressure, Body Position Events or Supplemental Oxygen

When you add a session event, windows will open asking you to enter event type, levels, and body positions.



Change Event Length

Once you have clicked and dragged to capture an event, right-click within the rectangle to add a second to its length.

Modify or Delete Event Information

Click on an event to open the Edit Channel Event window. View the event data or add a comment. Click the Delete button to remove the event from the Event List.

Sleep Summary Events

Lights Out

Lights On

Sleep Onset

CPAP/Bilevel Pressure

- The CPAP/Bilevel Pressure settings determine the range for continuous, inhale and exhale positive airway pressures that will be tabulated in Easy Sleep reports.
    - Click on the CPAP button. A vertical line marker will appear; place it at the point of pressure change on the waveform. Enter a pressure level for CPAP between 1 and 30 cm H2O by typing a level in or using the up and down arrows. Enter a pressure level for IPAP and EPAP between 1 and 45 cm H2O. Click the OK button to finish.
- Optimal CPAP/Bilevel Pressure
    - The Optimal CPAP/Bilevel Pressure searches the study for a specific pressure level.
    - Select an optimal CPAP pressure between +1 and +30 cm H2O. Select optimal pressures for IPAP and EPAP between 1 and 45. The IPAP must be between the value of the EPAP and 45. Click the OK button to finish.
- Body Position
    - Click on the Body Position button. A vertical line marker will appear; place it at the point of movement on the waveform. Select Left, Right, Prone, Supine, Upright and click the OK button. The body position will be noted as an event in the Events list.
- O2 Titration
    - Click on the O2 Titration button. A vertical line marker will appear; place it at the point of titration on the waveform. Enter an O2 level between 1 and 12 using the up or down arrows, and then press the OK button.

Computer Assisted PSG Event Detectors

The PSG Real-Time Analyzer has two primary functions:

- To compute a comprehensive set of statistical measures for the PSG recording;
- To assist the user in locating sleep events (i.e. APNEA, PLM and SNORE events).

Easy III allows the Real-Time Analyzer to operate in real-time as PSG data is recorded so that preliminary results are available to the report generator and view windows shortly following the acquisition of the data.

Event Control and Status

Right-click within the trace window, hover your cursor over, PSG Event Detection and click the left mouse button. The PSG Event Detection Status window will open.

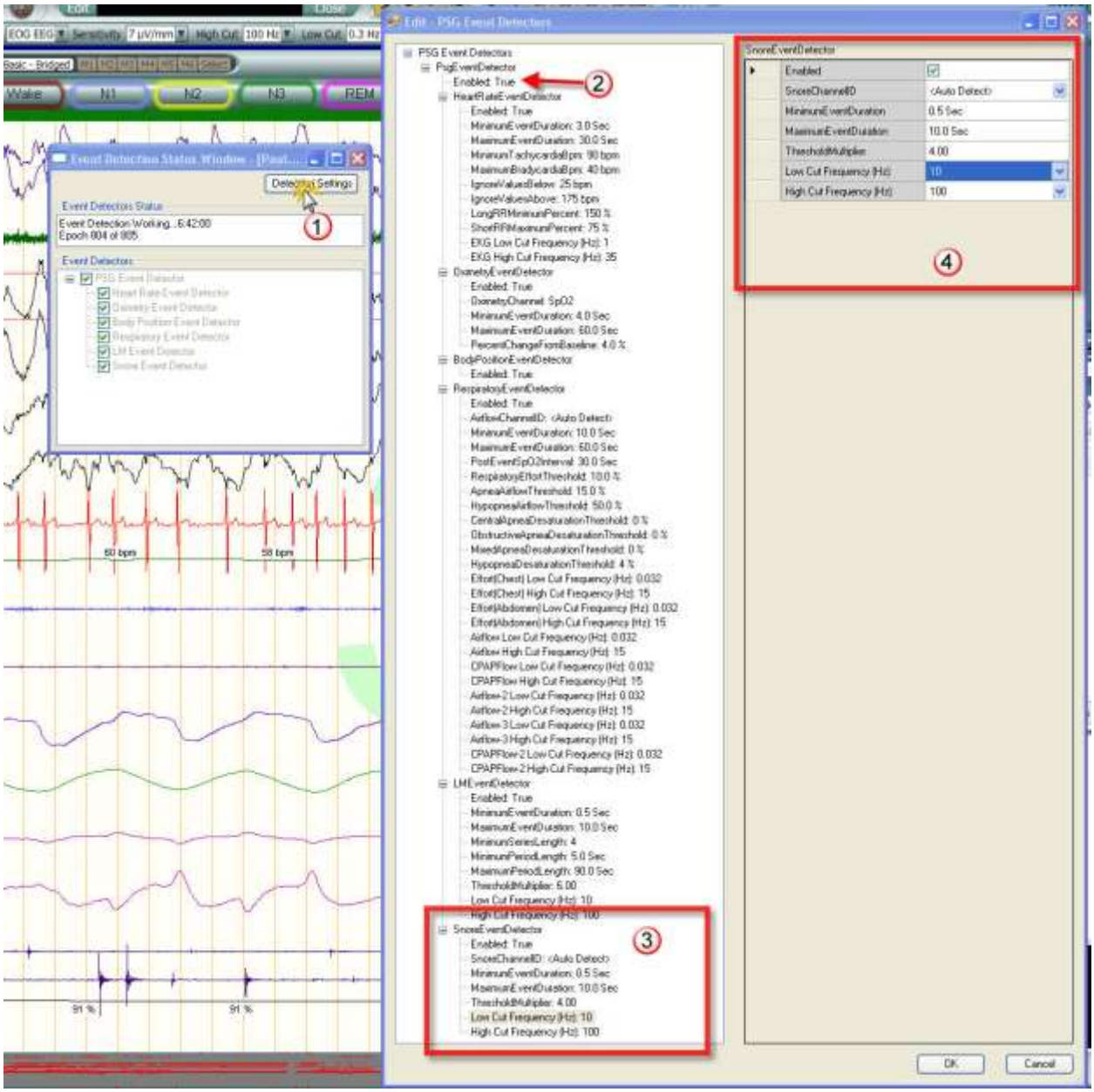
The Event Detection window will display the pages that have been analyzed. Easy III event detectors perform event detection during data collection. Typically, the event detectors are detecting events within 1 minute of real time data during data collection.

A check mark must be displayed in the Event Detector, PSG Event Detector check box for event detection to be enabled. Event detectors that also have a check mark will be detected during data collection.

To change the events that will be detected, click on the Detection Settings option (refer to PSG Event Detection section of this manual for information related to the detection settings).

NOTE: It is important to realize that the computerized process of event detection is only an aid for the physician in the establishment of a diagnosis. It does not replace the physician or diminish the requirement to use sound professional judgment when reviewing and marking events.

If the detection settings are modified from their original settings, the Easy III will prompt the user that changes have been detected.



Re-scanning Channels

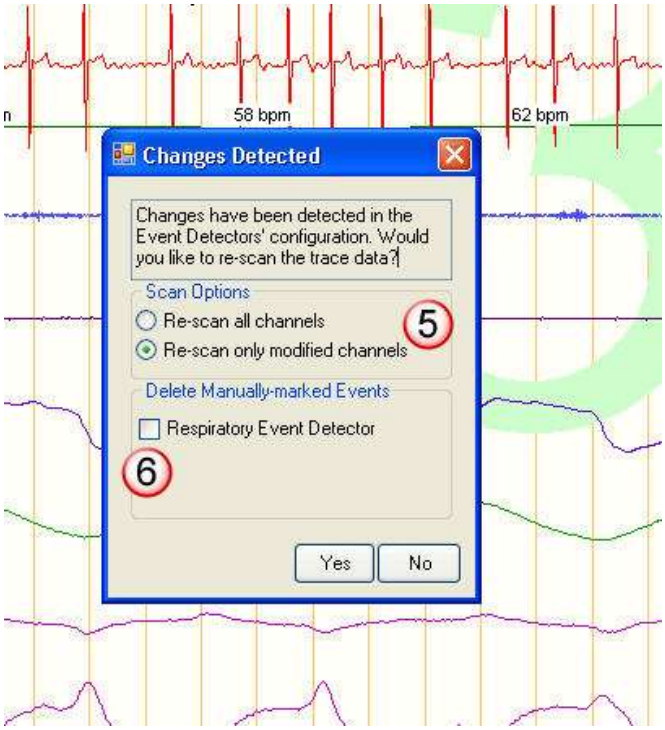
Right click in the trace window, select PSG Event Detection.

1. Click on Detection Settings

2. Event Detection must be enabled. Verify the PSG Event Detector is set to True (on).

3. In the sample above, the Low Cut filter setting has been highlighted in the Snore Event Detector values.

4. The Snore Event Detector settings are displayed in the right hand column. Click on a value to modify the current settings. When you have completed modifying the present settings, click on OK.



5. If any setting in the Detection Settings has been modified, the 'Changes Detected' dialog will appear (note the illustration above) If you select the 'Re-scan all channels', all previously 'auto-detected events for the selected event type will be re-scanned. This option will delete all manual and computer assisted events. The current detection settings will be used to scan all channels with event detectors enabled. If you select 'Re-scan only modified channels', only modified detectors will be used.

6. Delete Manually-marked Events - If a check mark is placed in this option, all manually marked events will be deleted. The auto-detector will re-scan the channel to detect events with the new settings.

Bookmarks

A bookmark marks a segment of the recording, noting its current montage, filter, sensitivity and paper speed settings. Bookmarks allow users to quickly review notable sections of the EEG record, and are also used for including segments of the EEG in reports.

Review a Bookmark

Use the right/left arrows to scroll through bookmarks within a trace window. Click the flagged button to view a list of bookmarks. Select a bookmark from the list and click the Go To button to see the bookmark in the trace.

Add a Bookmark

Bookmarks are on a per-trace window basis. To specify the trace window to bookmark, open the Montage Toolbar and click the Add a Bookmark button.

Enter a title and adjust the elapsed times as desired. Bookmark1, Bookmark2, etc. are default titles, but are not dependent on elapsed times. If you move backward and place a new bookmark, the default title will contain the next sequential number. The default times correspond with the beginning and ending times of the page being viewed on the screen. The length of the bookmark segment may be increased or decreased.

The current montage, filter, sensitivity and paper sped will be saved with the bookmark. More than one bookmark may be created at the same location if they have different settings.

Delete a Bookmark

Click the flagged button to view a list of bookmarks. Select a bookmark from the list and click the Delete button to remove the bookmark from the trace.

Print a Bookmark

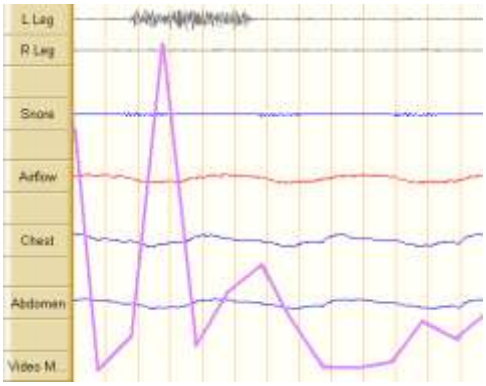
Click the flagged button to view a list of bookmarks. Select a bookmark from the list and click the Print button to print a bookmark.

Q-Video

Q-Video as a Trace

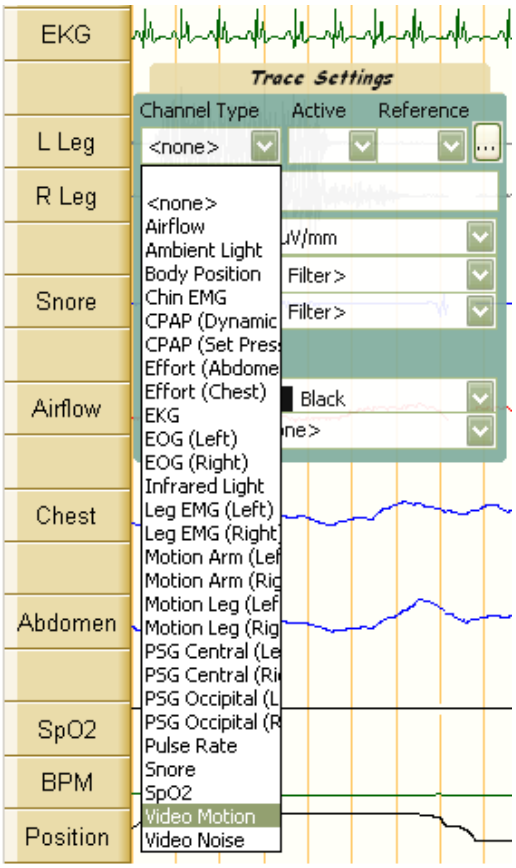
Q-Video is enabled with a motion detection algorithm that detects and quantifies movement from a video signal. By adjusting the Color options on Q-Video, movement can be accentuated with color and displayed in the video picture to assist clinicians in detecting subtle movements which reviewing data faster than the speed of data collection.

When Video Motion is selected as a channel, patient movement caught on camera is turned into a trace. As shown here, the Left Leg motion is quantified by both the anterior tibialis EMG signal *and* the Video Motion trace. Both Video Motion and Video Noise may be set up as channels and recorded as traces within the recording montage. This feature allows users to review epochs of data without video, when video movement is detected, the Q-Video player can be viewed for patient observation.



Set Q-Video as a Trace

Open the trace settings of a blank channel. Open the drop-down Channel Type menu and select Video Motion. Select a trace color to set it apart from the other traces.



Q-Video Record Setup Window

Access Q-Video Record Setup

Within a procedure file, select a view with Q-Video. Right-click within the Q-Video screen and select Setup, *or*

When you Edit a Workspace, access Workspace Setup Options.

Set Up Q-Video

Video Source Select a camera.

Audio Source Select a microphone.

Image Size Choose a resolution. The lower the resolution, the smaller the file size but the grainier the image. The higher the resolution, the larger the file size but the clearer the image.

Record Audio Check this box to automatically record audio when video is being recorded. It can also be checked or unchecked from the Advanced button in the Q-Video window within a procedure.

Video Frame Adjust the frame rate in frames per second (fps). The lower the fps, the smaller the file size because the record is gathering less information. The higher the fps, the larger the file size because the record is gathering more information. Easy III defaults to 30 fps.

Advanced Increase your preference changes to include the following:

Video Compression Only use the Microsoft MPEG-4 Video Codec V2.

Audio Compression Only use the Microsoft Windows Media Audio V2.

Image Type Choose I420 for color preferences.

Audio Properties Select the Channel, Rate and Bits for the audio file.

Start video recording when EEG recording starts Check this box to automatically record video when data collection begins.

Maximum Video Clip Size Set a limit to the size of a Q-Video file (for archiving/storage space purposes). Easy III will create multiple video clips during data collection. The maximum file size per clip will be determined by this setting.

OK Save your changes and close.

Cancel Close without saving changes.

Use Q-Video

Setup Q-Video in Edit Workspace. Open a procedure, and select a view that includes Q-Video.

Zoom. Click and drag the mouse over the Q-Video image data subset that you wish to enlarge. When you release the click, a floating Zoom window will appear. Move and resize the Zoom window as necessary during a procedure or review.

Snapshot. Click Snapshot to capture a still photo from the video. Enter a comment, such as an event associated with the action in the photo. The snapshot will appear as an event in the event list.

Record/Stop. Press the Record button to begin recording video feed. It will turn into a Stop button. Press the Stop button to end recording video feed.

Volume. Adjust the speaker output volume in a range of one (1) to ten (10) using the up and down arrows. To further adjust speaker volume, double click on the speaker icon in the system tray on your computer desktop.

To record video audio, click the Advanced button.

Modes. Q-Video collects and displays video data in a standard view. At any time during data collection or review, enable motion controls to accentuate movement in the video. This assists clinicians in quantifying movement during sleep studies or EEG recordings.

Click through the Mode up and down arrows to choose color accentuation.

Normal

Dark Gray

Light Gray

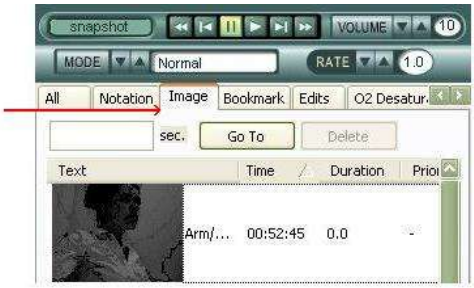
Black and White

Motion Highlight

Advanced. Click the Advanced button to select Record Audio, view or change the video frame rate (in frames per second) at any time during a recording, or use the sliders to adjust the brightness and saturation of the image. Advanced also displays disk status: real time memory space used to store Q-Video files, the memory capacity of the hard drive, and the remaining memory space.

Review Q-Video

In Read Data, you can access Q-Video data files in the Event List Window under the All tab or the Image tab. Double-click on the file to open.



Play

Press the Play button to watch the recorded Q-Video.

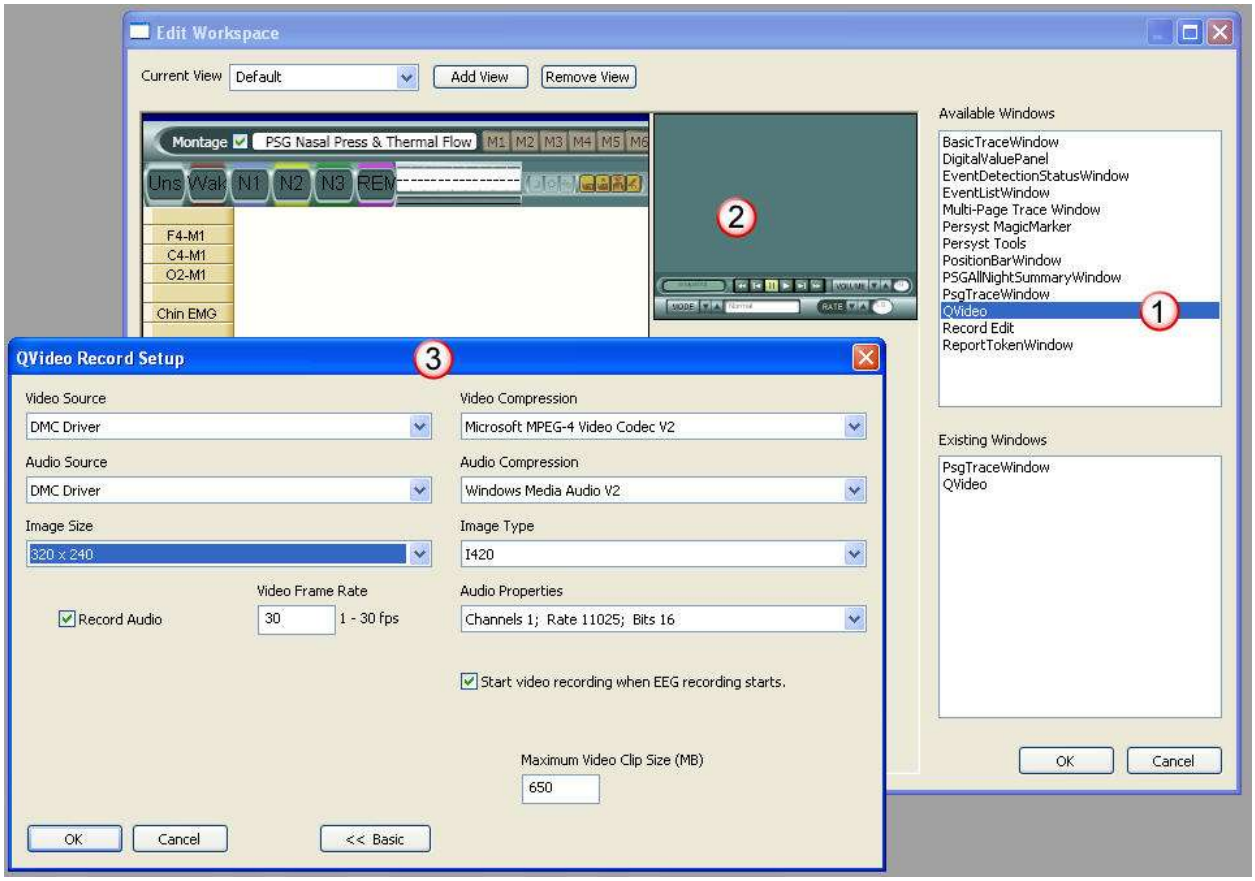
During the review, you may:

- Take a snapshot,
- Use the Volume control arrows to adjust speaker output from within Easy III software,
- Adjust the Mode to change the color accentuation of movement within the Q-Video file,
- Adjust the Rate of playback between 10 and 200% of real time, and
- Use the Zoom feature to enlarge sections of the Q-Video file.

Q-Video Record Edit

To efficiently edit video data, you must add the Q-Video window and the editor to your workspace. If you need to configure the Q-Video settings, enter the Protocol editor to configure Q-Video settings.

1. Click and drag the Q-Video Window option from the Available Windows.
2. Right click in the Q-Video window to enter the setup options. (Note the illustration below)
3. Configure the Q-Video Record Setup Settings.



Q-Video Options (Click on Advanced to see all options)

Video Source - Q-Video currently requires a video to USB adapter. If you are using a USB camera, you will see the name of the camera in the drop down menu.

Audio Source - Typically the audio from the microphone in on the computer will be used. You can also use audio from your USB camera if it is available.

Image Size - The image size is the resolution used for video. The higher the resolution, the larger the video files.

Video Compression - Cadwell requires that you use Microsoft MPEG-4 Video Codec V2

Audio Compression - Cadwell requires that you use Windows Media Audio V2

Image Type - Cadwell recommends using I420 compression. It is more efficient and reliable than RGB compression.

Audio Properties - Cadwell recommends Channels; Rate 11025; Bits 16

Record Audio Checkbox - Add a check mark to this box if you want to record audio (by default) with video. If you do not add this check mark, the user can add a check mark to a Record Audio option during data collection.

Video Frame Rate - Set this option to a default frame rate between 1-30 fps. NOTE: Some computers (laptop computers) may experience difficulty recording 30 fps. Set the frame rate below 30 if required.

Start Video Recording When Recording Starts - Add a check mark to this option if you want video to concurrently start when a recording starts.

Maximum Video Clip Size (MB) - This option will determine when the Easy software will start a new video file. If the present file reaches this level (650 MB), the Easy software will create an additional video file.

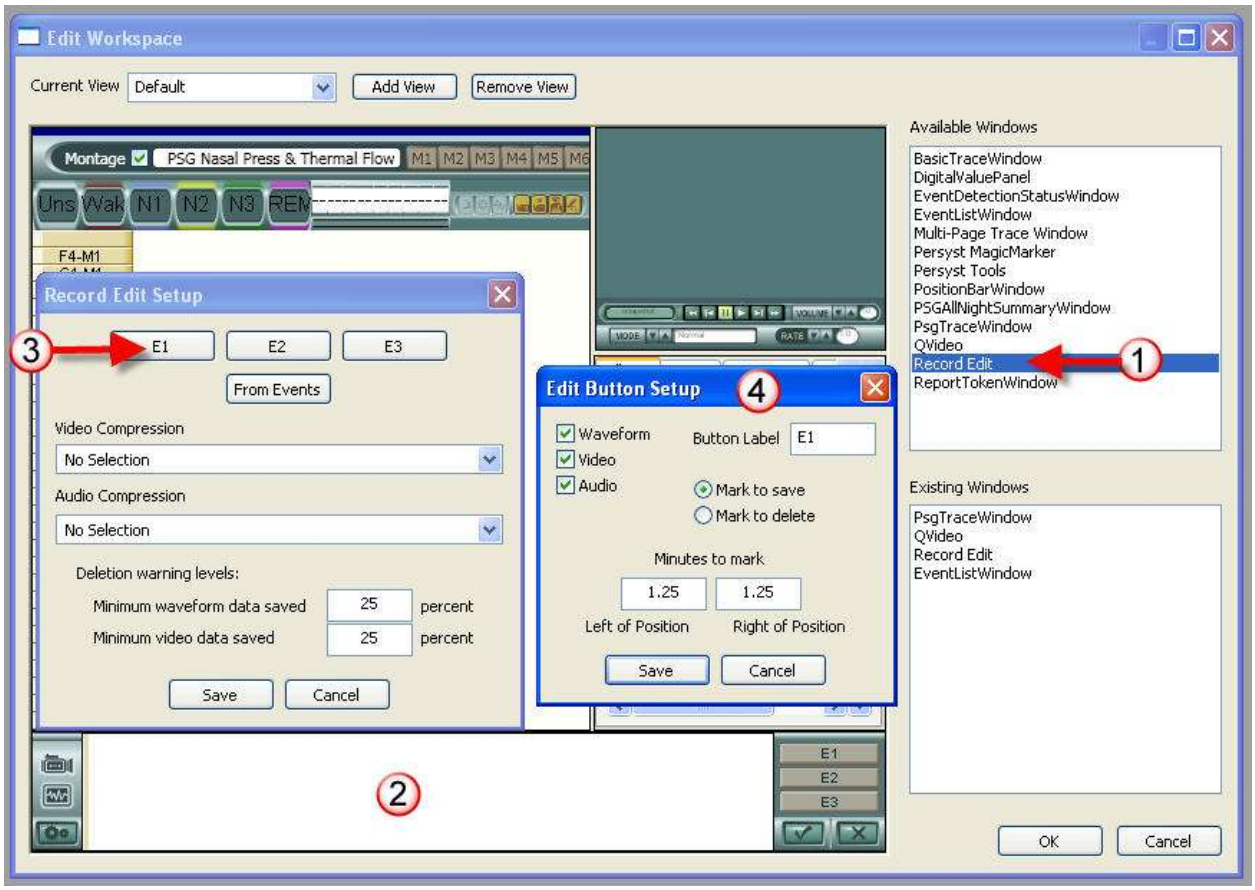
Record Edit Settings

1. To add the Record Edit window to the workspace, click and drag the Record Edit Window option from the Available Windows.

2. Right click in the Record Edit window to enter the setup options. (Note the illustration below)

3. Click on the E1 button to edit the default settings for the E1 button.

4. Note the setup options below. The user can pre-configure the edit button to save or delete data when selected.



Record Edit Setup Options

E1, E2, and E3 Buttons - Each button can be pre-configured. Left click on the button to review the default settings (see number 4 above). Note the Button Label can be user configured. Enter a name that will help you understand the default settings for the displayed button. For example, you could name the button 'Save 1.25'.

From Event - This option will assist the user in automatically clipping waveform and video data adjacent Easy events. Place a check mark adjacent to the events you would like to mark. The Waveform, Video, and Audio check boxes will determine what concurrent data will be marked. The Minutes to Mark settings will determine the amount of time before and after an event that will be marked.

Video Compression - Cadwell requires that you use Microsoft MPEG-4 Video Codec V2

Audio Compression - Cadwell requires that you use Windows Media Audio V2

Deletion Warning Levels - These settings will warn the user if less than 25% (user specified) data will be saved.

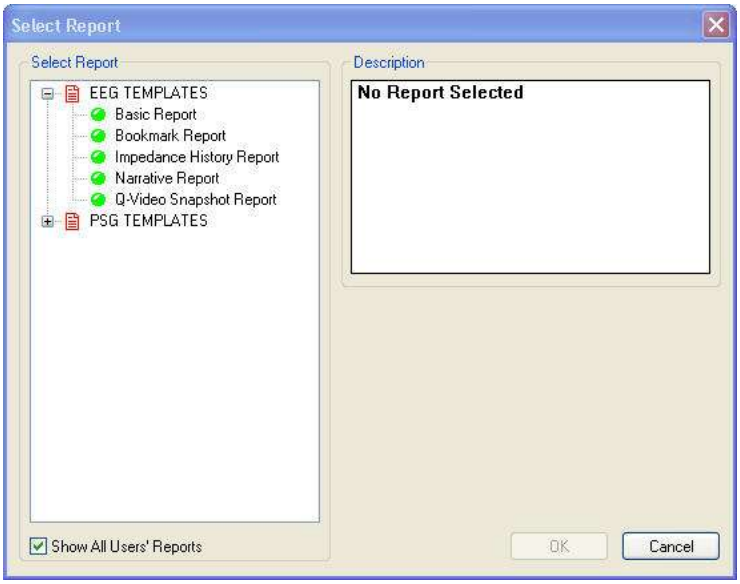
Generate a Report

Reports Overview

Easy III reports allow you to print patient information, record information, and pages of EEG specified by bookmarks. Reports can also include technician comments, impedance history, file access history, and Q-Video snapshots. The Report Generator can be launched during data collection and review.

Click on the Report Toolbar to access reports.

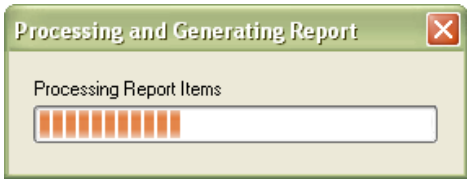
Click on a report template to generate a report.



Select Report

1. Click on the plus sign to access the list of available report templates.
2. Click on a template to view the Description. A blue ball with a yellow arrow will designate which template is selected.
3. Click the Show All Users' Reports box to access the list of all report templates available.

4. Click the OK button.
5. Wait while the Report loads and collects its tokens.



QuickReport Document

The QuickReport document will open in a Word formatted file. From here, you may edit data, change headers and footers, view automatic spell check, run grammar check, change font colors, etc.

- Save or Print report using the Word tools.
- Click the Finish button to save or close before exiting.

Save the Report

From the Document view, perform one of the following.

- Click the diskette icon to save to the default location.
- Select Save from the File menu to save to the default location.
- Reports will be automatically saved to the following destination: C:\Cadwell\Easy III\Reports

File Names

The filename of the report document is automatically created based on the patient's last name, first name, the date of the exam, and the patient's birth date. The report will be saved to the C:/Cadwell/Easy III/Reports. Save the reports to C:/Cadwell/Easy III/Data if you would like the reports to be archived with the patient data. Note: Do not rename the report file names. When reports are copied to the Data folder, the Easy III software will specifically look for system generated (patient specific) report file names.

Close QuickReport

From the Document view, perform one of the following.

Select Exit from the File menu.

Click the Finish button at the bottom right of the screen.

Click the Red X in the top right-hand corner. 

If the report has not been saved, you will be prompted to save the report before exiting.

Report Header

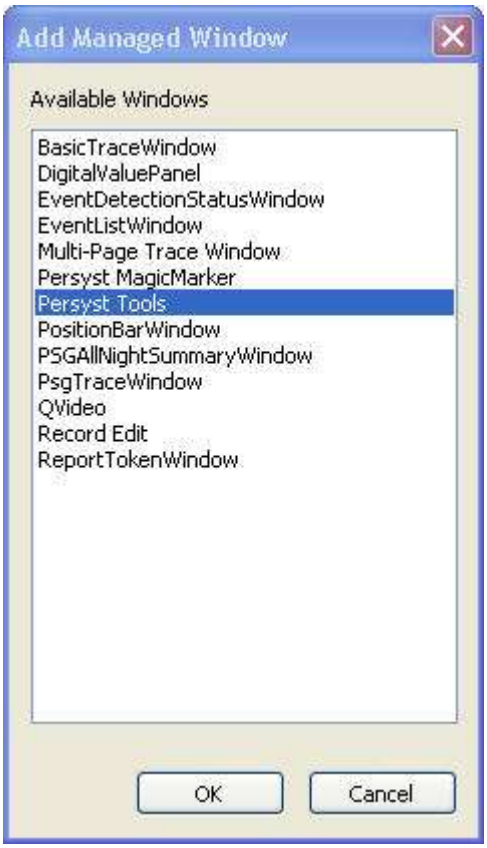
The Report Header is the information that appears at the top of the first page of the report document. The report header is named Easy III Report Header.doc. The report can be found in the C:\Cadwell\Easy III folder.

To modify the report header, open and edit the report. You must modify the report header on each Easy III system.

Persyst Tools

Click on Show Window

Click on Persyst Tools



Three separate programs are available from Persyst.

1. Spike Review
2. Reveal Spike Detector
3. Voltage Plot

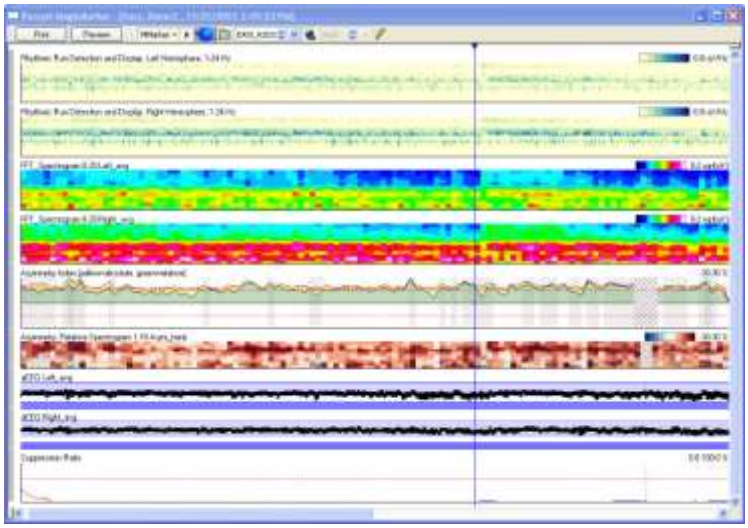
Magic Marker

Magic Marker can trend physiological monitoring data simultaneously with EEG. A single trend panel can be displayed concurrently with EEG data.

Magic Marker Trends

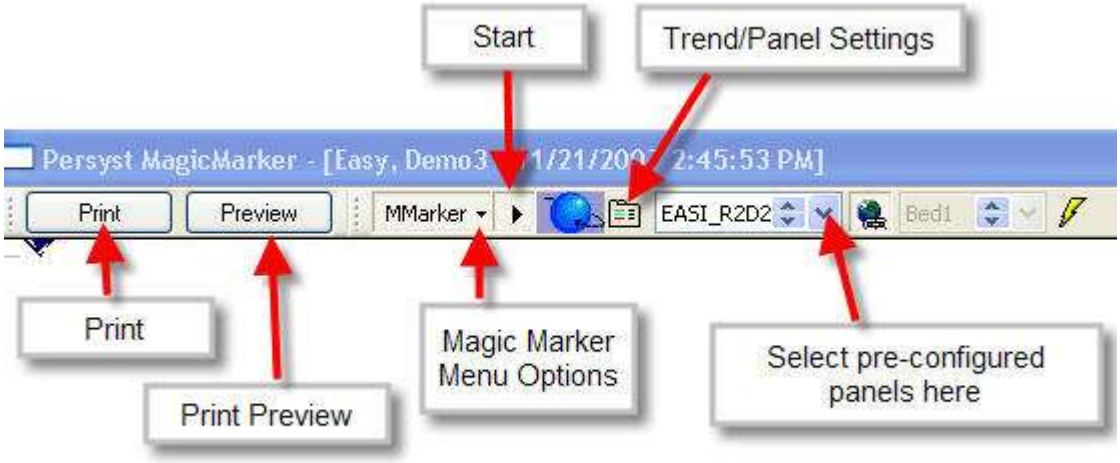
- Rhythmic Run Detection and Display
- EEG Asymmetry (absolute and relative)
- Relative Alpha Variability
- Alpha/Delta Ratio
- Spectral edge trends
- Power Ratio (any bands)
- Power Difference (any bands)
- Amplitude (amplitude-integrated, DC average, zero-crossing frequency)
- Coherence
- Event Density (e.g., spike density functions from Reveal on-line spike and seizure detection)
- Compressed Spectral Array (CSA), Coherence CSA, Peaks CSA
- Trend relationships between EEG changes vs. physiological trends (MAP, HR, etc.)
- Multi-Epoch—compare foreground to background with optional lag and apply Standard
- Deviation, Maximum or Minimum, Average Ratio, TStat, and more…

Typical Magic Marker Trend

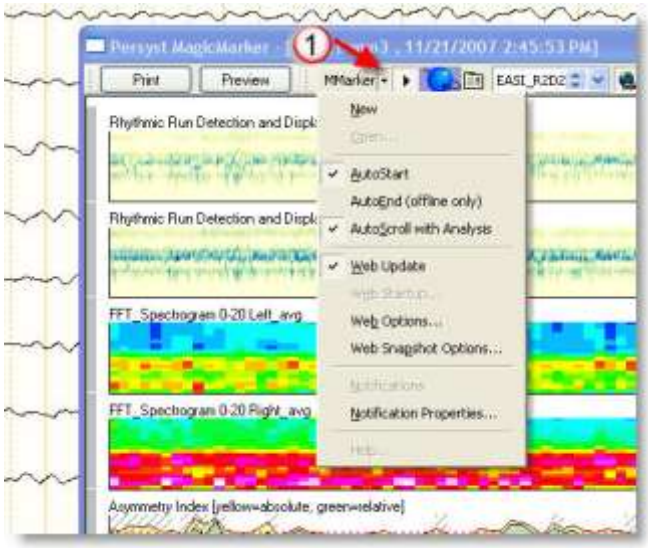


Magic Marker Menu Options

Configuring Magic Marker



1. Click one Magic Marker Menu to configure default settings.

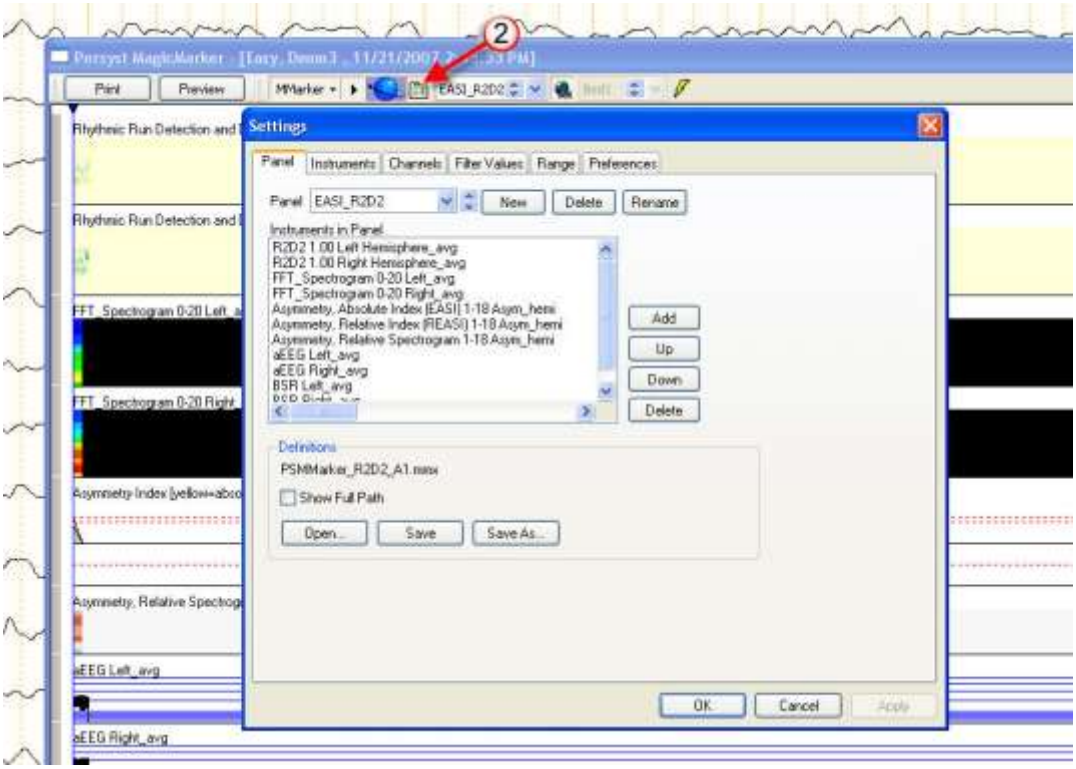


The settings selected in the Magic Marker Menu will be retained the next time Magic Marker is used.

- AutoStart - Use this option to automatically start trending Magic Marker data when a new recording is started.
- Auto-Scroll with Analysis - Use this option to display trend analysis data during data collection.
- Web Update - Use this option to stream trend and waveform data to a folder. Remote users can remotely access the web folder to review recorded data.

- Web Options & Web Snapshot Options - Use these options to pre-configure trend and waveform data display.

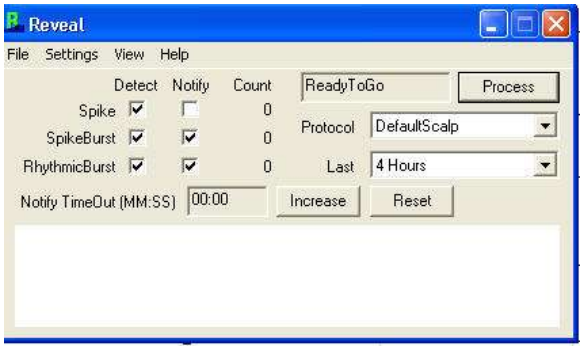
2. Click on the Settings tab to configure trend panel settings.



- Panel Tab - Use this tab to select the Instruments you would like to use in the Magic Marker panel.
- Instruments Tab - Use this tab to select or create custom trends (instruments) that can be displayed in the Magic Marker panel.
- Channels Tab - Use this tab to select or configure channel lists. For example, you can create a custom channel group called 'Frontal Sleep', including F3, Fz, and F4 in a group.
- Range Tab - Select the Range Tab to determine the duration of time to display in the Magic Marker panel.

Reveal Spike Detector

Reveal Spike Detector from Persyst.

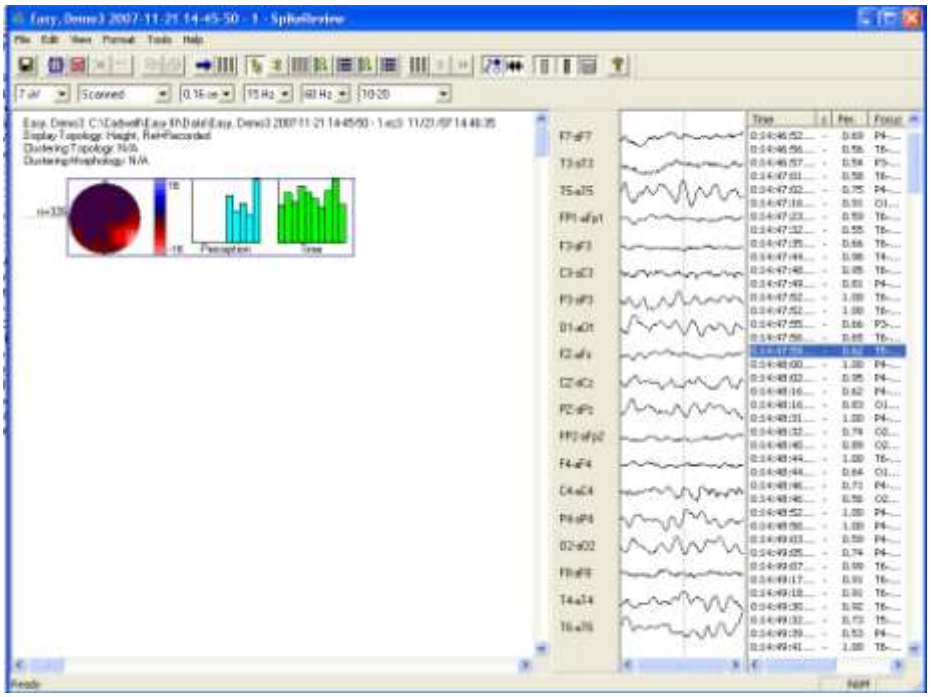


1. Click on the Reveal button from the Persyst Tools dialog.
2. Click on process to begin detecting events.
3. To modify the detection montage click on the Settings menu option.
4. Click on Protocol to select a different scanning montage.
5. After detecting events, click on the Spike Review button from the Persyst Tools dialog.

Spike Review

Click on the Spike Review button from the Persyst Tools dialog.

Spike Review will allow the user to highlight, review, confirm or delete detected events.



Review Records

Select Record

Review or Append to a Patient File by clicking the Read Data button or the Append button on the Start Page. The Select Record window will open.

Select a Patient by Name

Organize the lists by Last Name, First Name, Patient ID, Date, Description, Status, Type or Instrument by clicking on the column header.

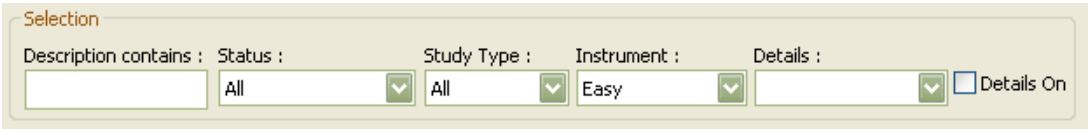
Narrow down the search results by entering in Patient name or ID.

By Date

Narrow down the search options by entering Patient information in the Last Name, First Name or ID fields, by narrowing the Select Date Range, or by entering descriptive information in the Selection fields.

By Filter Selection

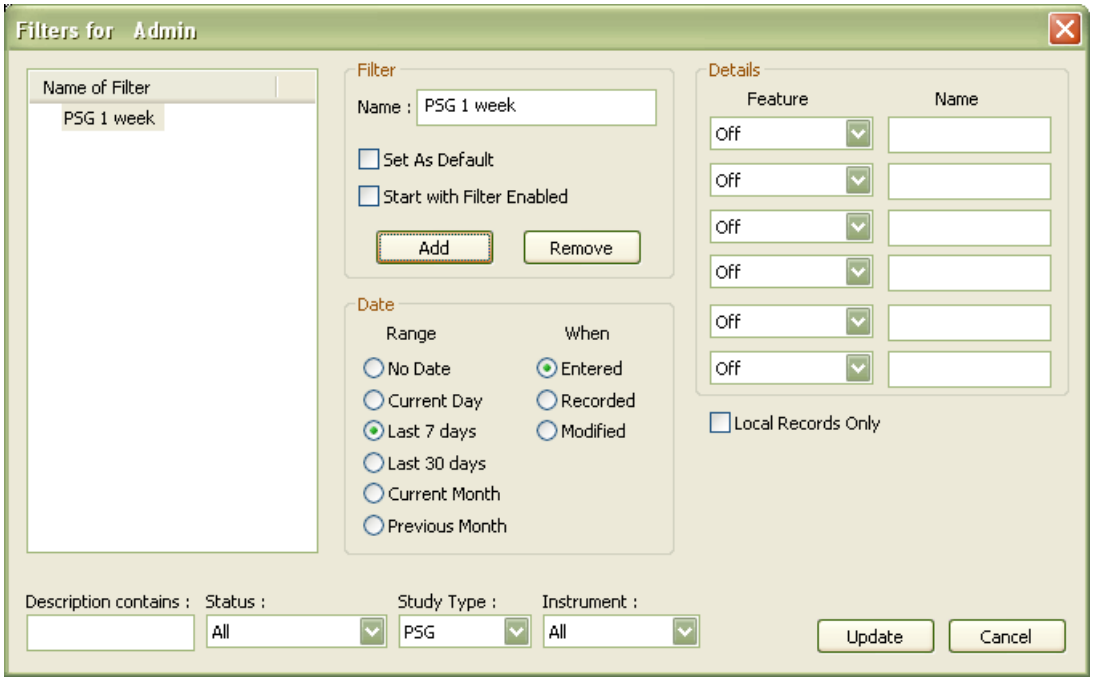
Type in descriptors and select Status, Study Type, Instrument and Details to narrow down the search results.



Filter Details: Edit Details

To set the Details, click the Edit Details button.

Add a filter by typing in a Name, setting the Date range and details, and then clicking the Add button. Repeat for additional filters.



Click the Update button to return to the Select Record window. In the Selection section, select the filter from the Details drop-down menu, and then checkmark the Details On box to turn the filter on.

Summary of Selected Record

The summary for each patient file records the patient ID, description of procedure, status and computer on which the procedure took place. The History will show when the file was created, when recording began and ended, when the file was closed, and which user performed each event.

Scroll through Records

Adjust Parameter Toolbar

Adjust the Channel Group, Low and High Filters, Sensitivity, and Notch Filter Frequency,

Scroll Through Records

From the position bar

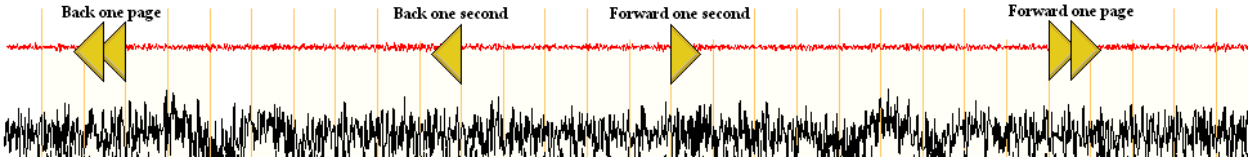
The position bar can be configured in differently as needed by the user. Right click on the position bar and enter the setup dialog menu to change the configuration of the position bar. The position bar can be configured with and without the auto paging controls.

The position bar displayed above shows the auto paging tools. Click on the red auto paging button to enable auto paging. The gold up and down arrows determines if the paging tool will skip pages during the paging process. The green LED bar shows the current paging speed. Increase the number of bright green LEDs to increase the paging speed. Click on one of the left or right arrow buttons to automatically page through the recording. Press the space bar to stop the auto paging process.

The position bar displayed above is configured without the auto paging tools. Click the yellow arrow buttons to move back or forward one page at a time, or click and drag along the position bar to manually move through pages. During recordings, click the View live data button to return to live recording.

From the waveform display

To scroll through the pages using only the mouse, position your cursor between channels. The horizontal placement of the cursor determines the scroll commands:

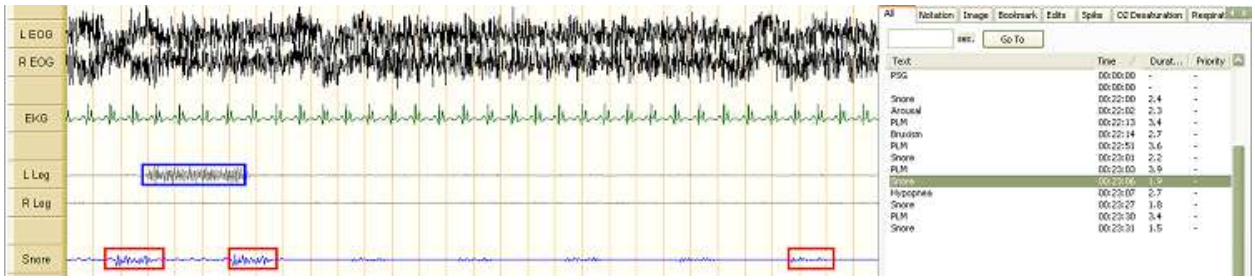


From the keyboard

Forward one page	Page Down, →, or space bar	To last event in Event list	End
Back one page	Page Up or ←	To first event in Event list	Home

From the Events dialogue box

Click on an event in the Events List to jump to that event in the trace.



Click the View Live Data button to return to live data.

Event Definitions

Sleep Epoch Categories Sleep Stages are (W) Wake, N1, N2, N3, N, & REM based on the May, 2007 AASM Guidelines. The older sleep stage categories are (A)Awake, (M) Movement, Stage 1, Stage 2, Stage 3, Stage 4, REM based on R & K Guidelines (1967). An epoch can also be marked as unscored if it has no staging.

Arousal 3- (or more) second event marked on an EEG channel.

LM (formerly called a PLM or PLM burst) An EMG burst occurring on a limb movement channel. Concurrent LMs that occur on both legs are scored as one LM. If the LMs are 5 seconds apart, they can be scored as 2 LMs.

PLM Series (formerly called PLM Episode) A series of LM events that occur rhythmically during sleep.

Respiratory Events:

Central Apnea A cessation of airflow with no respiratory effort.

Index Count x 60/TST

Lights Out This time that indicates the beginning of a recording. The exact time is associated with the first second of a 30 second epoch where the lights out event has been added.

Lights On This time indicates the end of a recording. The exact time is associated with the last second of a 30 second epoch where the lights on event has been added.

Minimum Respiratory Event SpO2 The lowest saturation value associated with a respiratory event.

Mixed Apnea A cessation of airflow with a no respiratory effort, followed by a resumption of effort.

Obstructive Apnea A cessation of airflow with continual or increasing respiratory effort.

PB Periodic Breathing At least 3 episodes of central apnea separated by no more than 20 seconds of normal breathing

REM Latency The elapsed time from sleep onset to the first epoch scored as REM.

Sleep Efficiency (TST/TRT) x100

Sleep Onset or **Sleep Latency** - Always the start of the first epoch scored as any stage other than Wake (W) after Lights Out.

Snore A burst of high frequency data recorded from a snore microphone or nasal pressure signal.

SPT Sleep Period Time - The elapsed time between Sleep Onset and the end of the last epoch marked as sleep, before Lights On.

TIB Time in Bed - Lights Out to Lights On.

TRT Total Recording Time – Total amount of time from Lights Out to Lights On.

TST Total amount of sleep time during TIB (from Lights Out to Lights On).

WASO Wake After Sleep Onset – (Stage W during TRT – Sleep Onset) in minutes (this includes time that the patient may have been out of the bed).

Safety Information

General Discussion

The application of modern electronic technologies in medical practice has led to systems of medical and non-medical electrical equipment being used together for the diagnosis and monitoring of patients.

Medical electrical equipment complying with IEC 6060-1-1 such as Cadwell equipment and accessories are often connected to other non-medical electrical equipment such as computers and printers. Non-medical electrical equipment may fully meet the requirements applicable to their specific field, but may not comply with isolation or leakage requirements for medical electrical equipment and thereby impact the safety of the entire **medical electrical system.**

> ***Medical electrical equipment*** *describes electrical equipment: provided with no more than one connection to a particular supply mains; intended to diagnose, treat or monitor the patient under medical supervision; which makes physical or electrical contact with the patient, transfers energy to or from the patient, and/or detects such energy transfer to or from the patient.*
>
> ***Medical electrical system*** *describes the combination of items of equipment in which at least one must be medical electrical equipment and interconnected by functional connection or an isolation transformer.*

The following configurations ensure that combinations of Cadwell devices with non-medical electrical equipment comply with the electrical safety requirements for medical electrical systems.

Allowable Cadwell System Configurations

1. All Cadwell equipment and accessories are permissible in the **patient environment** without incorporating a **isolation transformer**.

   > ***Patient environment*** *describes any volume of space (area) in which intention or unintentional contact can occur between the patient and parts of the system or between the patient and other persons touching parts of the system. This is a diameter of 1.5 meters, or 5 feet, around the patient.*
   >
   > ***Isolation transformer*** *describes a medical separating transformer designed to limit transfer of unwanted leakage current and allow non-IEC 60601-1 devices to be located in the patient environment.*

2. A double-insulated laptop computer powered from Cadwell equipment is permissible in the patient environment without incorporating a isolation transformer.
3. Other computing devices such as desktop computers, monitors, printers, cameras, and Infrared illuminators are *not* allowed in the patient environment *unless* an isolation transformer is used to power such devices.
4. Non-medical devices such as those listed above may be used outside the patient environment within the **medically used room** with a isolation transformer, or *without* incorporating a isolation transformer *if and only if* each individual device is plugged into a **fixed mains socket outlet**.

   > ***Medically used room*** *describes the room in which the patient environment is located.*
   >
   > ***Fixed mains socket outlet*** *describes a permanently installed (hardwired) grounded outlet in a facility.*

5. **Power strips** and other multiple portable socket outlets are *not* permitted in a medically used room unless connected to the output of a isolation transformer.

   Power strips *describe a combination of two or more socket outlets intended to be connected to, or integral with, flexible cables or extension cords.*

5. Connection to hospital networks is allowed *without* incorporating an **isolation device** *if and only if* the network server and the medical electrical system are connected to circuits powered from and grounded to the same electrical service entrance.

   Isolation device *describes a component or arrangement of components with input and output parts that, for safety reasons, prevent a transfer of unwanted voltage or current between parts of the medical electrical system.*

System Requirements

1. Non-medical electrical equipment used in medical electrical systems must meet their respective IEC electrical safety requirements, i.e. IEC 950 for computing devices.
2. **Enclosure leakage** must not exceed 500uA in any **single fault** condition within the patient environment.

   Enclosure leakage *a potential electrical shock hazard from contact with the enclosure of a medical device.*

   Single fault *describes the condition in which a single means for protection against a safety hazard in the system is defective, or a single external abnormal condition is present.*

3. Enclosure leakage must not exceed 100uA in normal condition.
4. **Earth leakage** must not exceed 500uA in any single fault condition within the patient environment.

   Earth leakage *describes the potential of an electrical shock hazard from the electrical current flowing through the ground wire of a power cord of a medical electrical system.*

5. The medical electrical system must provide a minimum of 1500 volts isolation between the patient and earth.
6. The medical electrical system must provide a minimum of 4000 volts isolation between patient applied parts and mains voltage.
7. The medical electrical system must provide a minimum of 1500 volts isolation between non-patient contact parts of the system and mains voltage.

Contact the Cadwell Regulatory department at 1.800.245.3001 or 1.509.735.6481 with any questions regarding these requirements.

General Warnings and Precautions

	Federal law restricts sale of this system to, or on the order of, a physician.		Do not try to service internal parts of the Easy III system. Only service by Cadwell, Inc. or authorized bodies.
	The operator must be trained to recognize the difference between signal artifacts and valid bio-signals caused by movements, interference, or misplacement of sensors or electrodes.		Inspect all cables before and after each use. Discard cable if insulation is damaged or if the cable or connectors are damaged in any manner.
	This manual provides an operational summary for the Easy III system. It does *not* provide clinical training. It is assumed that the user has adequate clinical training.		The proper use of this device, for its intended use, can only be assured once all instructions have been read and understood. Contact Cadwell with questions about operation of Easy III.
	The system is not defibrillator proof.		Do not use the system in an MRI environment.
	The system is not designed to operate in an explosive environment.		Strictly adhere to cleaning instructions in this manual.
	Do not immerse the amplifier, remote input box, power-communications module, flash stimulator, and system cables in liquid.		Do not use power strips with the system unless they are connected downstream of an isolation transformer.
	The system is designed to be used with one patient at a time. Do not connect multiple patients to one amplifier.		Do not connect items which are not specified as part of or for use with the Easy III system.
	Never place an isolation transformer on the ground.		Do not exceed the medical isolation transformer placarded maximum load.
	When attaching the Easy III system to a patient, verify that the subject will not become entangled in the wires. Do not allow the electrode wires to wrap around the patient's neck.		Do not use the system isolation transformer to power non-system components. This can overload the transformer or defeat the separation by providing additional leakage sources.
	Do not plug non-medical electrical equipment in the patient environment directly into a wall outlet. This may cause excessive leakage current in the patient environment.		

Electromagnetic Compatibility

The Easy III system requires special precautions regarding Electromagnetic Compatibility (EMC) and must be installed and put into service according to the EMC information provided here.

Portable and Mobile RF communications equipment can affect medical electrical equipment.

Easy III Cables and Accessories

- Remote Input Box
- Remote Input Box Cable
- Photic Stimulator Cable
- Isolation Transformer

Use of accessories and cabling other than these specified, excepting those sold by Cadwell as replacement parts, may result in increased emissions or decreased immunity of the Easy III system.

The Easy III system should not be used adjacent to or stacked with any other equipment. If such use is necessary, performance of the Easy III system should be observed to verify normal operation in the configuration in which it will be used.

Maintenance

Warranty and Service Information

Excerpted from Cadwell document Warranty & Service Information part number 829001-000 Rev 01.

What is covered

Cadwell Inc. guarantees this unit against defects in materials and workmanship for one year from the date shipped. During the warranty period, we will repair or, at our option, replace any unit that proves to be defective. *For complete warranty info, refer to your sales contract.*

What is not covered

This warranty does not apply if the product has been damaged, abused, or misused, or if unauthorized attempts have been made to modify or repair the equipment which may impair the performance of the instrument. This warranty is non-transferable and applied to the original purchaser only.

Call for help

If you have a problem with your Cadwell instrument, please follow these instructions:

- Have the unit, serial number and your customer identification number with you.
- Call Cadwell, Inc at **1.800.245.3001** or **1.509.735.6481.**
- For applications or operational support, ask for the Clinical Applications Department.
- For equipment repair, ask for the Technical Service Department.

Service or Applications personnel may be able to direct you through basic diagnostic procedures on the unit.

After the problem is diagnosed

If a repair part must be sent or the unit returned for repair, you will be issued a return merchandise authorization (RMA) number. You will need the RMA# when requesting info about the repair. Repair parts are shipped second-day air service. Overnight and weekend services are available for an additional charge.

Exchange the part

Turn the unit off and disconnect it from AC power. Exchange the part with the replacement supplied. Plug the replacement unit into AC power and turn the on to verify operation. Please return the defective part promptly using the original shipping carton. Shipping materials and instructions will be included with the replacement part.

Return the unit for repair

Return the unit in the original, or an appropriate, shipping container with the RMA number written on the box. Air-freight is recommended. Second-day return air-freight cost is included on a warranty-covered repair. Repairs normally require 2-3 business days to complete.

Service Warranty

Equipment not covered under the original warranty or service contract will be charged from a "flat rate" schedule for repair. Billable repairs carry a 90-day service warranty (covering only those items repaired). For continued and complete coverage of your entire system, call Cadwell and ask about service contracts.

Clean the Easy III System

Always disconnect all components from AC power before cleaning. Do not use acetone to clean the surface of the system components.

Clean the amplifier, photic stimulator, power communications module, and remote input box with a damp cloth. Ethanol may also be used for the exterior of the system units. Do not allow direct contact of liquids to the inner parts of the Easy III system.

Part	Cleaning Instructions
Amplifier	Wipe down with a damp cloth with non-conductive distilled water or electronically non-conductive inert surfactants.
Remote Input Box	
Power/Com Module	
Photic Stimulator	
Amplifier Cables	Wipe down with a damp cloth with Isopropyl alcohol, non-conductive distilled water or electronically non-conductive inert surfactants.
Photic Stimulator Cables	
Electrodes and Accessories	Rinse all surface electrodes with warm, soapy water or liquid sterilizing agents; ensure all pastes and gels are cleaned from the electrodes and their cables.
EasyNet Modules	Wipe down with a damp cloth with Isopropyl alcohol, non-conductive distilled water, or electronically non-conductive inert surfactants.

Cadwell recommends the following cleaning supplies:

- Antiseptic Towelettes
- Alcohol Pads
- Envirocide™ Electrode Cleaner
- Cotton Swabs
- Sterile Cotton Balls

While the Easy III system has been carefully designed and manufactured to be reliable and durable, regular cleaning and inspecting of the system will promote long-term trouble-free operation of the system. Avoid extremes of physical stress such as dropping the unit or exposing it to extreme temperatures.

Reusable Items

Clean reusable items after each use. The Easy III cables can be wiped down with a damp cloth or ethanol. Do not allow direct contact of liquids to the connectors on the EasyNet cables.

The Cadwell EEG electrodes can be washed with a hospital grade cleaner such as Envirocide®. Allow the electrodes to air dry prior to reuse.

Technical

Compliances

The Easy III amplifier inputs are type CF rated. CF rating ensures that no current higher than 50uA flows to or from the applied part if mains voltage is inadvertently connected to the patient. All EasyNet modules are BF rated.

HIPPA Compliant access rights and auditing. Each time a patient file is accessed, the user ID is added to the user channel events. Manually entered sleep events are stamped with the user ID.

Environment

The Easy III system should be stored in a clean, dry place. Handle the system with care.

Transport and Storage Limits (ambient conditions)

Temperature:	-20º C (-4º F) to 65º C (149º F)
Relative Humidity:	10% - 90% non-condensing
Atmospheric Pressure:	500 hPa to 1060 hPa

Operational Limits (ambient conditions)

Temperature:	+10º C (+50º F) to +40º C (+104º F)
Relative Humidity:	30% - 75%
Atmospheric Pressure:	700 hPa to 1060 hPa

Factory Calibration

Regular preventative maintenance never involves access to the interior of the Easy III system. It involves regular inspection and cleaning of Easy III components.

Recommended Factory Service Interval

In general Cadwell recommends yearly factory service and calibration verification to help assure continued top performance from the equipment. However, the service interval may be lengthened or shortened as device performance history dictates. Refer to your facility's in-house equipment calibration policies and procedures for further guidance on this subject.

For service issues that require corrective maintenance and/or internal component service, contact Cadwell Service Department at 1.800.245.3001.

Troubleshooting

If you are unable to solve a technical problem, contact Cadwell Service team. If yours is a clinical or software-related call, contact Cadwell Clinical Support. Call Cadwell at 1.800.245.3001.

Please provide the following when you call:

- Your account name.
- Your account number.
- The device serial number.
- Detailed information about the issue.

Customer Support

www.cadwell.com

Domestic customers:

Phone: **800.245.3001** *or* **509.735.6481**

Fax: **509-783-6503**

International customers:

Please contact your distributor (listings available at **www.cadwell.com**) or email **International@cadwell.com**

Support hours

Service department support: Monday through Friday from 6:30 A.M. to 5 P.M. PST.

Application support: Monday through Friday from 6:30 am. to 5 P.M. PST.

Contact Easy III Customer Support If:

- You continue to experience difficulty after troubleshooting a problem. Cadwell Laboratories has a rapid, cost-effective method for troubleshooting and servicing equipment. Most problems can be diagnosed over the telephone, and repairs can be performed by sending in the defective part.
- You wish to order optional equipment.

To contact Cadwell for a problem

1. Have your **customer identification number** and **serial number** near the phone. Have a person who runs the equipment be prepared to speak to a service technician. This person should be able to provide an accurate description of the problem. It is best if the person calling is in front of the equipment when they call.
2. Call the customer support number, and ask for the **service department**. The Cadwell service technician will determine if an exchange or repair of parts is necessary and instruct you on appropriate shipping arrangements.

Using Help Files

By accessing the Easy III help files, you can get the same information about the operation, terminology, and capabilities of the Easy III as are found in the Operator's Manual.

Access

The help files can be accessed during operation of the Easy III software by clicking. 

An electronic copy of the Operator's Manual is available on the software installation CD included with your Easy III system. To access the file, insert the CD into the computer's CD-ROM . When prompted "**Do you want to run the Easy III Installer**," click the No button. Go to the My Computer file, right-click on the Easy III icon, and click Open.

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