



## Thought Technology Ltd.

8205 Montreal/ Toronto Blvd. Suite 223, Montreal West, QC H4X 1N1 Canada

Tel: (800) 361-3651 • (514) 489-8251 Fax: (514) 489-8255

E-mail: [mail@thoughttechnology.com](mailto:mail@thoughttechnology.com)

Webpage: <http://www.thoughttechnology.com>



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# BioGraph Infiniti Physiology Suite

## Welcome

The Physiology Suite is designed to include all the clinical tools you need for monitoring and assessing physiological functions, performing biofeedback sessions, reviewing recorded data for the purpose of artefact rejection and generating session and trend reports. The suite can be used with any of four encoder types: ProComp Infiniti, ProComp 5 Infiniti, ProComp+ and ProComp 2. Select the encoder type of your choice when you install the Suite.

## Getting Started with BioGraph Infiniti

### *Before You Begin*

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Ensure that BioGraph Infiniti 5.1 and the Physiology Suite have been installed on your computer.

To ensure compatibility with the Windows Vista® and Windows® 7 operating systems, from version 5.0 forward, BioGraph Infiniti installs a different file structure from previous versions. As a result, only the Physiology Suite with the version number 5.0 or later can be installed after BioGraph Infiniti 5.1 has been installed on your computer.

- **If this is the first time that you have installed BioGraph Infiniti**

Confirm that your Physiology Suite is version 5.1. This indicates that the Physiology Suite has been modified to incorporate the changes to the BioGraph Infiniti system file structure and that all channel sets, screens, and scripts are compatible with BioGraph Infiniti 5.1.

- **If you are updating BioGraph Infiniti from a version earlier than 5.0**

The process will also update the file structure of any previously-installed version of the Physiology Suite (i.e., version 4.0 installed with BioGraph Infiniti 4.0). After you have updated BioGraph Infiniti to version 5.1, you cannot install a Physiology Suite with a lower version number than 5.0.

If you need to install an older version of the Physiology Suite after installing BioGraph Infiniti 5.1, or if you have problems installing your Physiology Suite, check for a solution in the FAQ section of the Thought Technology website or contact our Technical Support.

### *First Time Run*

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## Setting up your System

Once the software is installed, you have to configure your system. This takes only a few minutes.

To start the program, simply double-click on the BioGraph Infiniti icon, on the Desktop:



The program always starts by showing the Main Menu screen:

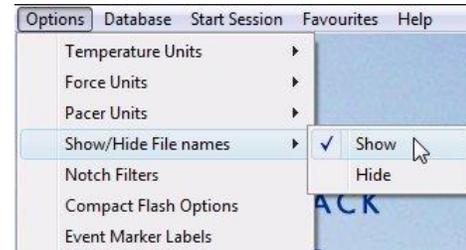
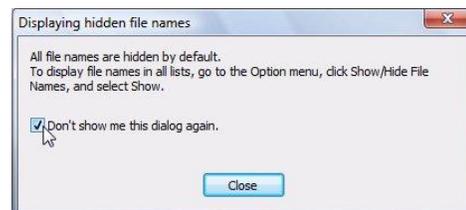


Anywhere in the software, you can access **contextual on-line help** by pressing the F1 key on your keyboard.



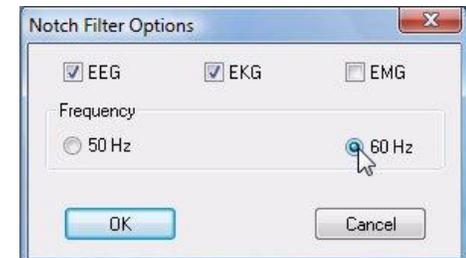
Show/Hide File Names:

- Select **Options** at the top left of the main screen.
- Select **Show/Hide File names** from the drop-down menu.
- Select **Show or Hide**, according to your preference.



Enable the Notch Filter Settings:

- Select **Options** at the top left of the main screen.
- Select **Notch Filter** from the drop-down menu.
- Select **EEG** and **EKG**, and set Frequency to **50Hz** or **60Hz**, depending on the transmission frequency used in your country (60Hz for North America, for instance). Then click **OK**.



**Notch Filter Options dialog box**

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**Note:** *These settings stay in effect unless you change them.*

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Select Temperature Units:

- Select **Options** at the top left of the main screen.
- Select **Temperature Units** from the drop-down menu.
- Select **Fahrenheit** or **Celsius**, as appropriate.

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**Note:** This setting stays in effect unless you change it.

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Select Pacer Units:

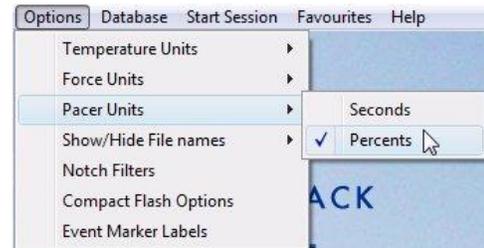
The Respiration Pacer can be set to display user-defined inspiration, expiration, hold in and hold out durations using absolute or relative time units.

- Select **Options** at the top left of the main screen.
- Select **Pacer Units** from the drop-down menu.
- Select **Seconds** or **Percents**, depending on your preference.

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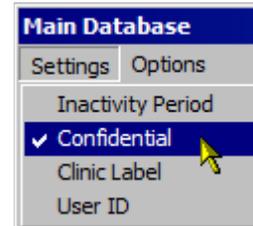
**Note:** This setting stays in effect unless you change it.

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Optionally, enable the Confidential setting. This helps protect the privacy of your clients by masking their names in the client database.

- Click **Database** to open the **Main Database** window.
- From the **Settings** menu, select **Confidential**. The check mark indicates that the setting is enabled.
- If you need to disable the **Confidential** setting, repeat these steps to remove the check mark.



Clients:

Full Name	ID Num...
Ballance, Tara	1
Florimond, Dorian	4
Dorimond, Florian	6
Physiology, Jane	9

With the Confidential setting disabled

Clients:

Full Name	ID Num...
Ba***** T***	1
F***** D*****	4
D***** F*****	6
Ph***** J***	9

With the Confidential setting enabled

## Starting a session

There are three ways to launch a recording session in BioGraph Infiniti. The type of session you select depends on what you need to do. Each type of session will be described in more detail in the next chapters.

**Quick Start:** Use this to run a **Favorite** session. The Physiology Suite includes a number of favorite session configurations for standard biofeedback protocols.

**Start Open Display Session:** Use this option if you want to run a session with your own selection of feedback screens.

**Start Script Session:** Use this option to run a script. The Physiology Suite includes a number of scripts, for baseline measures and for stress assessment.



## Hardware Setup

Before you can start recording a session, you have to set up your hardware. The following section describes how to connect a ProComp Ininiti device but the process is similar when using other encoder types. For more information on using your particular encoder, please refer to the device's hardware manual.

### Connecting TT-USB and ProComp Ininiti



Insert one end of the fiber optic cable carefully into the fiber optic port on the encoder. Tighten the nut gently so that the cable won't slip out.

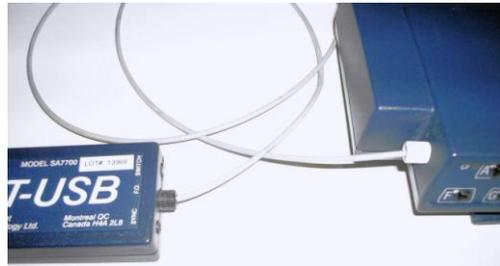


Do the same with the other end of the fiber optic cable and the fiber optic port of the TT-USB interface unit.

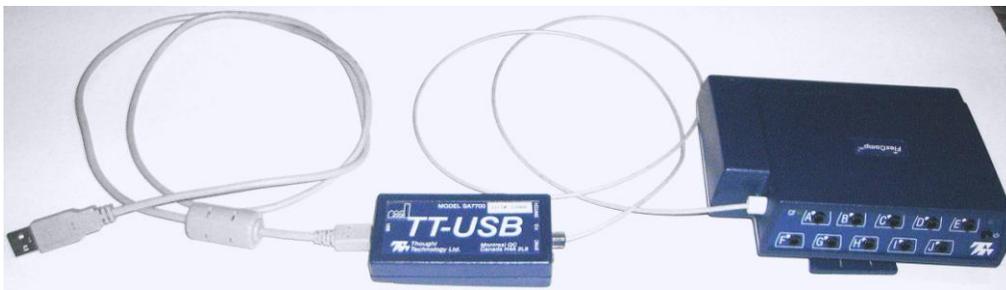


Insert the small connector of the USB cable into the USB port on the TT-USB interface device.

Insert the large connector of the USB cable into the USB port of your PC.



USB ports on a PC are generally located at the back of the base unit. You may also find a USB port at the front of your base unit; you can connect the other end of the USB cable to it. On a laptop, USB ports are usually located at the side or the back of the laptop. It is recommended to always use the same USB port for connecting the TT-USB to your computer.



### Battery Placement

#### Opening the Compartment

Looking at the underside of the ProComp Ininiti device, you will see a long door in the plastic enclosure. Holding the encoder with the connectors facing you and with the door up, push lightly down and back with your thumbs on the door to slide it open.

**Attention:** *The internal workings of the ProComp Ininiti encoder are not intended to be opened for repair except by qualified service personnel. The tamper-evident seal under the batteries in the battery compartment should not be removed or broken. Thought Technology may refuse to honour the unit's warranty if the seal is broken.*



## Polarity

When the compartment cover has been slid out, place four AA batteries in the slots, observing the correct battery polarity as embossed on the inside surface of the compartment.

## Closing The Compartment

Slide the door back into the ProComp Infiniti case, gently pushing it in until you feel the click of the locking mechanism.

## Keeping an Eye on the Battery Level

Since each sensor draws a small amount of power from the batteries when connected to the ProComp Infiniti, it is better to connect only the sensors that are going to be used for a session before you start recording; this will ensure maximal battery life. Most Thought Technology software applications will display a battery power indicator; we recommend that you replace the batteries as soon as this indicator falls below about 50% of the battery power.

## Caring For The Fiber Optic Cable

A fiber optic (FO) cable is used for transmitting the sensor data to the computer. Although this technology provides maximal electrical isolation, signal fidelity and freedom of movement, some care has to be taken when handling the fiber optic cable, as it is much less flexible than a regular electric wire.

Be careful not to bend it sharply or wind it in a loop smaller than 4 inches in diameter.



## Physiological Sensors

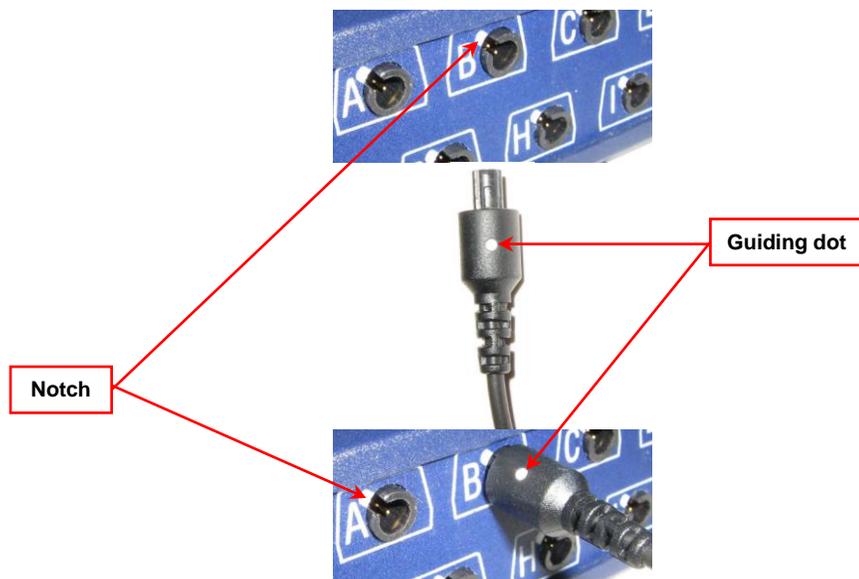
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The Physiology suite is designed to work with a number of sensors. Following is a description of how to connect sensors to your encoder and how to hook them up to your client.

Before a session can be recorded, the correct sensors must be connected to the correct input on your ProComp Infiniti.

### Connecting the sensors

When connecting a sensor to the ProComp Infiniti, make sure to properly line up the guiding dot on the top of the plug with the notch in the protected pin socket. Forcing the plug into the socket in any other position may damage the equipment.



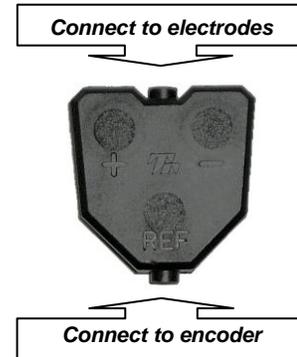
Sensor Connection Tables for each encoder type and channel set you may be using can be found on page 11 (for open display sessions) and page 12 (for script sessions). Refer to these tables to find out which sensors are required and the correct location of each sensor on the encoder's front panel.

### Correct orientation of sensors

For some sensors, such as the temperature and skin conductance sensors, either the connection cable or the electrode cable forms a permanent part of the item. Other sensors, for example the push button switch, have removable cables but only a single input entrance. This makes it impossible to connect these sensors in the wrong orientation to the encoder.

Certain sensors, however, have removable cables and two input entrances. It is important to orient these sensors to the encoder correctly so that the physiological signal is properly received. These sensors include the EKG, EEG, and EMG sensors, all of which are shaped like the illustration at the right.

Such a sensor is correctly oriented to the encoder when the cable joining them is connected to the bottom entrance of the sensor. If an extender cable with electrodes needs to be attached to such a sensor, it should be connected to the top entrance of the sensor.



The following is an overview of the sensors, electrodes, and accessories used with the system.

### EKG Sensor (P/N: SA9306M)



The EKG sensor is a pre-amplified electrocardiograph sensor, for directly measuring the heart's electrical activity. Connects via extender cables for a single channel hook up.

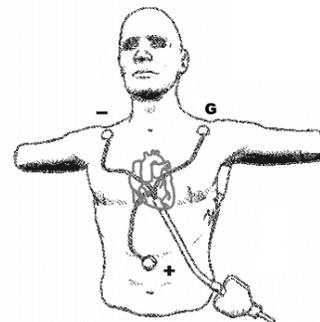
Used for:

- Stress Assessment
- HRV Biofeedback

A 3 snap extender cable is provided with your sensor.

For optimal signal quality, we recommend using UniGel electrodes and placing them on the chest, as shown in the illustration. In case a chest placement is not possible, you can move the black and blue electrodes to the left forearm and the yellow electrode to the right forearm.

Cleaning the skin with an alcohol pad, prior to applying the electrodes helps improve the signal.



EKG Wrist Straps (P/N: SA9325) come in a kit containing reusable medical-grade, non-latex straps and replaceable silver/silver-chloride electrodes.

They provide fast, convenient placement of electrodes for measuring EKG from the wrists.



## HR/BVP Sensor (P/N: SA9308M)



The HR/BVP sensor is a blood volume pulse detection sensor (otherwise known as a PPG sensor) housed in a small finger worn package, to measure heart rate (HR) and provide BVP amplitude, BVP waveform, HR and heart rate variability feedback.

Used for:

- Stress Assessment
- HRV Biofeedback

An elastic strap is provided with the sensor.

Place the sensor against the fleshy part of the first joint of any finger. The middle finger is recommended for better compatibility with the other sensors when they are all placed on the same hand.

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**Note:** Place the sensor label up, so that the electronic sensor components (the two small square openings) on the back of the sensor (not shown) are against the finger.

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With elastic strap

As an alternative, Coban (3M) self-adhesive tape can be used to provide a more secure fit attachment.



With Coban tape

## MyoScan-Pro EMG (P/N: SA9401M-60 or SA9401M-50)



The MyoScan-Pro is a pre-amplified surface electromyography sensor for use on low sampling rate encoder inputs and designed to measure RMS SEMG.

Used for:

- Stress Assessment
- SEMG Biofeedback

Affix a triode on each MyoScan-Pro sensor.

Clean the skin with an alcohol pad and remove the paper cover from the Triode electrode. Line up the Positive and negative electrodes with the muscle fibers and apply the sensor to the skin, making sure it is well over the muscle belly.

The illustration shows sensors placed on the trapezius muscles. Note the orientation shown here.

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**Note:** For small muscles or when a wide placement is desired, you can use the extender cable that is included with your EMG sensor and affix 3 Single strip or UniGel electrodes.

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### Skin Conductance Sensor (P/N: SA9309M)



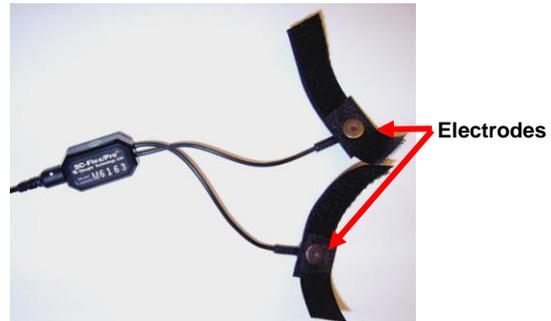
The Skin Conductance sensor measures the conductance across the skin, and is normally connected to the fingers or toes. Supplied with two finger bands.

Used for:

- Stress Assessment
- Biofeedback

There are two finger straps attached to the skin conductance sensor.

The conductive electrode in each finger strap should be placed against the inside part of the finger.



A good choice for placement is to use the index and ring finger. Close the hook and loop fasteners around the fingers so that contact is snug yet comfortable.

Placement with the cables directed inwards (shown) is practical for keeping the cables out of the way.



## Skin Temperature Sensor (P/N: SA9310M)



The Temperature sensor measures skin surface temperature between 10°C – 45°C (50°F – 115°F). It is supplied with a self adhering band for easy finger placement.

Used for:

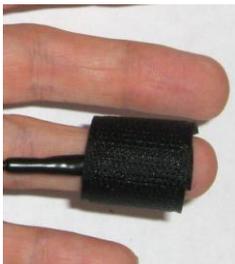
- Stress Assessment
- Biofeedback

A hook and loop fastener is provided with the sensor.



Ensure that the end of the temperature sensor makes solid contact with the finger. Any finger can be used.

Shown here is the ring finger.



With hook and loop fastener

As an alternative, Coban self-adhesive tape (3M) can be used to provide a more secure fit attachment.



With Coban tape

### Using multiple sensors together:

This configuration is suggested for placing skin conductance, BVP and temperature sensors on the same hand. In this configuration, the temperature sensor is tucked under the ring finger strap of the skin conductance sensor.

This is a practical way to combine these sensors, but care must be taken to ensure that the end of the temperature sensor is secured firmly against the skin.

Also note that the cables are all directed inwards and Coban tape is used to secure the cables to the wrist.



Close up view of temperature sensor and skin conductance finger strap.



### Respiration Sensor (P/N: SA9311M)



The Respiration Sensor is a sensitive girth sensor using an easy fitting high durability latex rubber band fixed with self-adhering belt. It detects chest or abdominal expansion/contraction and shows the respiration waveform and amplitude. It can be worn over clothing.

Used for:

- Stress Assessment
- Breathing retraining
- Biofeedback



The rubber strap stretches when the abdomen expands during breathing.



Two-sensor placement

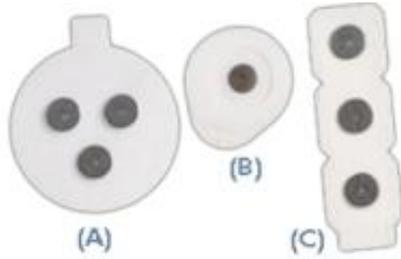
The respiration sensor is fixed to a long hook and loop strap that is placed around the chest or abdomen.

For most applications, placing one sensor around the abdomen is required. Optionally, you can place a second respiration sensor around the chest. Using two sensors is helpful for abdominal breathing exercises.

Unravel the strap and attach it around the abdomen so that the sensor is in the front. Ask the client to breathe out as fully as possible and attach the sensor so there is minimal tension. The fit should be snug enough that the strap stays fixed when the subject is relaxed.

There should also be enough slack in the rubber strap of the sensor so that expansion of the abdomen causes this rubber strap to expand without being overextended.

## Disposable EKG/EMG electrodes



(A) T3402M – Triode™ electrode, with standard 2cm spacing of silver-silver chloride electrodes, backed with nickel plated brass snaps to prevent corrosion.

(B) T3425 – UniGel electrodes, for use with the EKG sensor or EMG, in case of sensitive placements on dry skin.

(C) T3404 – Single strip electrodes, versatile electrodes can be used as strip or separated for wider placements.

Used for:

- Stress Assessment
- SEMG Biofeedback
- HRV Biofeedback

## Recording an Open Display Session

1. Connect your encoder to the computer using the fiber optic cable and the TT-USB Interface.
2. Plug one or more physiological sensor(s) into the encoder as follows.

- **ProComp Infiniti or ProComp+ with an EKG sensor:**

Input A <b>EKG</b>		Input C <b>EMG</b>	Input D <b>EMG</b>	Input E <b>SC</b>	Input F <b>Temp</b>	Input G <b>Resp</b>	Input H <b>Resp</b>
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- **ProComp Infiniti or ProComp+ with a BVP sensor:**

	Input B <b>BVP</b>	Input C <b>EMG</b>	Input D <b>EMG</b>	Input E <b>SC</b>	Input F <b>Temp</b>	Input G <b>Resp</b>	Input H <b>Resp</b>
--	-----------------------	-----------------------	-----------------------	----------------------	------------------------	------------------------	------------------------

- **ProComp Infiniti or ProComp+ with both an EKG and a BVP sensor:**

Input A <b>EKG</b>	Input B <b>BVP</b>	Input C <b>EMG</b>	Input D <b>EMG</b>	Input E <b>SC</b>	Input F <b>Temp</b>	Input G <b>Resp</b>	Input H <b>Resp</b>
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- **ProComp 5 Infiniti with EKG and EMG or Temp sensor:**

Input A <b>EKG</b> <b>EKG</b>		Input C <b>EMG</b> <b>Temp</b>	Input D <b>Resp</b> <b>Resp</b>	Input E <b>SC</b> <b>SC</b>
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- **ProComp 5 Infiniti with BVP and EMG or Temp sensor:**

	Input B <b>BVP</b> <b>BVP</b>	Input C <b>EMG</b> <b>Temp</b>	Input D <b>Resp</b> <b>Resp</b>	Input E <b>SC</b> <b>SC</b>
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- **ProComp 5 Infiniti with EKG and BVP with EMG or Temp sensor:**

Input A <b>EKG</b> <b>EKG</b>	Input B <b>BVP</b> <b>BVP</b>	Input C <b>EMG</b> <b>Temp</b>	Input D <b>Resp</b> <b>Resp</b>	Input E <b>SC</b> <b>SC</b>
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- **ProComp 2:**

	Input B <b>EKG</b> <b>BVP</b>	Input C <b>Resp</b> <b>Resp</b> <b>EMG</b> <b>Resp</b> <b>SC</b>	Input D <b>EMG</b> <b>Resp</b> <b>Temp</b>
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**Note:** Because the ProComp 2 has an integrated EEG sensor in input A and inputs C & D have too low a sampling rate for EKG or BVP, it is not possible to include a channel set with EKG and BVP for this encoder.

3. Launch BioGraph Ininiti.
4. In the Main Menu screen, click the **Start Open Display Session** button.
5. Click **Add New Client** to open the Client Data dialog box.
6. Type in a First Name and Last Name (Ex. Guy Test) and click **OK** to create the client file. The new client's name is automatically selected.
7. Click **Define New Session** to open the screen selection dialog box.
8. In the Encoder Communication Protocol drop-down list, in the upper left corner, select what's appropriate for your encoder:

Encoder	ProComp Ininiti or ProComp 5 Ininiti	ProComp + or ProComp 2
<b>Protocol</b>	<b>ProComp Ininiti</b>	<b>Legacy</b>

**Note:** Because the ProComp 5 Ininiti is a ProComp Ininiti with 5 channels instead of 8, the Encoder Communication Protocol is ProComp Ininiti for both.

9. Now select the desired channel set. There are two channel sets available for ProComp Ininiti and ProComp +, four for ProComp 5 Ininiti and five for ProComp 2. If you have an EKG or a BVP sensor, be sure to select the corresponding channel set.
10. The various screens for that channel set are listed in the table on the right. Click the drop-down list on the top right corner and select a Screen Category: **Skin conductance, Temperature, Respiration, HRV, Surface EMG** for single sensor type screens or **Multi modality** and **Physiological profile** for combinations of sensors.
11. Select up to five screens by pressing the [Control] key while clicking on screen items. Then click **OK**.

**Note:** If this is the first time you record a session, please see the Entering Key Codes section.

12. Start the recording by clicking on the **Start** button  in the toolbar.

## Recording a Script Session

1. Connect your encoder to the computer using the fiber optic cable and the TT-USB Interface.
2. Plug one or more physiological sensor(s) into the encoder as follows.

- **ProComp Ininiti or ProComp+ with an EKG sensor:**

Input A		Input C	Input D	Input E	Input F	Input G	Input H
<b>EKG</b>		<b>EMG</b>	<b>EMG</b>	<b>SC</b>	<b>Temp</b>	<b>Resp</b>	<b>Resp</b>

- **ProComp Ininiti or ProComp+ with a BVP sensor:**

	Input B	Input C	Input D	Input E	Input F	Input G	Input H
	<b>BVP</b>	<b>EMG</b>	<b>EMG</b>	<b>SC</b>	<b>Temp</b>	<b>Resp</b>	<b>Resp</b>

- **ProComp 5 Ininiti with EKG and EMG or Temp sensor:**

Input A		Input C	Input D	Input E
<b>EKG</b>		<b>EMG</b>	<b>Resp</b>	<b>SC</b>
<b>EKG</b>		<b>Temp</b>	<b>Resp</b>	<b>SC</b>

- **ProComp 5 Ininiti with BVP and EMG or Temp sensor:**

	Input B	Input C	Input D	Input E
	<b>BVP</b>	<b>EMG</b>	<b>Resp</b>	<b>SC</b>
	<b>BVP</b>	<b>Temp</b>	<b>Resp</b>	<b>SC</b>

- **ProComp 2:**

	Input B <b>EKG</b> <b>BVP</b>	Input C <b>Resp</b> <b>Resp</b> <b>EMG</b> <b>Resp</b> <b>SC</b>	Input D  <b>EMG</b> <b>Resp</b> <b>Temp</b>
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3. Launch BioGraph Infiniti.
4. In the Main Menu screen, click the **Start Script Session** button.
5. Click **Add New Client** to open the Client Data dialog box.
6. Type in a First Name and Last Name (Ex. Guy Test) and click OK to create the client file. The new client's name is automatically selected.
7. Click **Select New Script** to open the Script Database dialog box.
8. In the Encoder Communication Protocol drop-down list in the upper left corner, select what's appropriate for your encoder:

Encoder	ProComp Infiniti or ProComp 5 Infiniti	ProComp + or ProComp 2
<b>Protocol</b>	<b>ProComp Infiniti</b>	<b>Legacy</b>

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**Note:** Because the ProComp 5 Infiniti is a ProComp Infiniti with 5 channels instead of 8, the Encoder Communication Protocol is ProComp Infiniti for both.

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9. Select a script from the list and click **OK**.

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**Note:** If this is the first time you record a session, please see the Entering Key Codes section.

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10. Start the recording by clicking on the **Start** button  in the toolbar.

## Recording a Favorite Session

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The Physiology Suite includes a number of preset open display and script sessions called Favorites. You can find shortcuts to all the favorites in the **Physiology Suite Favorites** program group, on your desktop. You can also find them listed in the Favorites table when you click the **Quick Start** button on the main BioGraph screen.

1. To run a favourite session, do one of the following:
  - **When BioGraph is not running:** Double-click the shortcut for the selected Favorite session configuration.
  - **When BioGraph is already running:** Click the **Quick Start** button on the main screen, select a Favorite from the list and click OK.

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**Note:** If this is the first time you record a session, please see the Entering Key Codes section.

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The Favorite session presets allow you to run sessions with a minimum of mouse clicks. In order to accomplish this, each Favorite contains all the information BioGraph needs to run a session, including a list of recording and reviewing screens, a list of statistics and a number of other configuration elements. Favorite sessions run faster than regular open display or script sessions because you don't have to make the usual selections. Of course, before you can run a Favorite, you have to connect all sensors as described above and your encoder has to be turned on and connected properly.

### ProComp Infiniti or ProComp+ with BVP or EKG sensor:

- **1 EMG Training:** Runs a biofeedback session using recording and reviewing screens for one EMG sensor. Other sensors can be left unconnected.
- **2 EMG Training:** Runs a biofeedback session using recording and reviewing screens for two EMG sensors. Other sensors can be left unconnected.
- **HRV Training:** Runs a biofeedback session using recording and reviewing screens for heart rate variability.

- **Skin Conductance Training:** Runs a biofeedback session using recording and reviewing screens for 1 skin conductance sensor. Other sensors can be left unconnected.
- **Temperature Training:** Runs a biofeedback session using recording and reviewing screens for one temperature sensor. Other sensors can be left unconnected.
- **Stress Assessment (14 min):** Runs the Stress Assessment script with review screens already selected.
- **Pulse Transit Time Training (EKG & BVP):** Runs a biofeedback session using recording and reviewing screens for pulse transit time. Both EKG and BVP sensors are required. Other sensors can be connected or unconnected.

### ProComp 5 with BVP or EKG sensor:

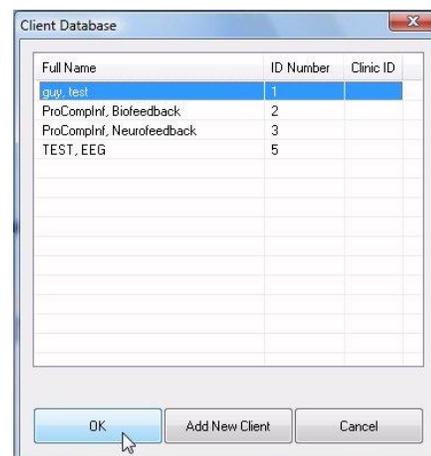
- **1 EMG Training:** Runs a biofeedback session using recording and reviewing screens for one EMG sensor. Other sensors can be left unconnected.
- **HRV Training:** Runs a biofeedback session using recording and reviewing screens for heart rate variability.
- **Skin Conductance Training:** Runs a biofeedback session using recording and reviewing screens for 1 skin conductance sensor. Other sensors can be left unconnected.
- **Temperature Training:** Runs a biofeedback session using recording and reviewing screens for one temperature sensor. Other sensors can be left unconnected.
- **Stress Assessment (14 min):** Runs the Stress Assessment script with review screens already selected.
- **Pulse Transit Time Training (EKG & BVP):** Runs a biofeedback session using recording and reviewing screens for pulse transit time. Both EKG and BVP sensors are required. Other sensors can be connected or unconnected.

### ProComp 2:

- **2 EMG Training:** Runs a biofeedback session using recording and reviewing screens for two EMG sensors. Other sensors can be left unconnected.
- **Skin Conductance Training:** Runs a biofeedback session using recording and reviewing screens for 1 skin conductance sensor. Other sensors can be left unconnected.
- **Temperature Training:** Runs a biofeedback session using recording and reviewing screens for one temperature sensor. Other sensors can be left unconnected.
- **HRV Training (BVP) or (EKG):** Runs a biofeedback session using recording and reviewing screens for heart rate variability.

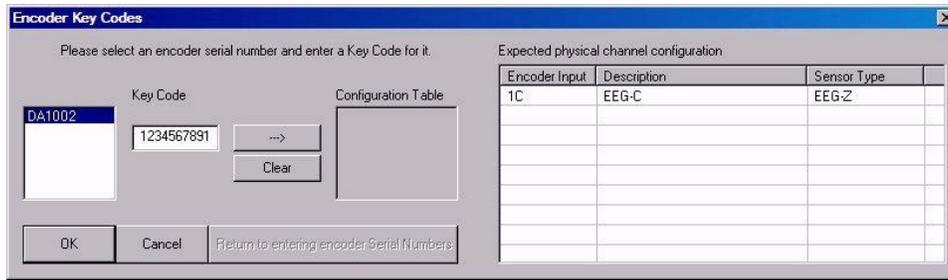
When you launch a Favorite session and there is no problem with your encoder or sensor connection, the first dialog box you see is the Client database popup, where you have to select a **Client** and Click **OK**.

2. Start the recording by clicking on the **Start** button  in the toolbar.



### Entering Key Codes

If this is the very first time you are starting to record a session, you must enter key codes. After you have defined the session you want to record and click **OK**, the Encoder Key Codes dialog box opens.



- Click to highlight your unit's serial number in the left table, for example, DA1002. This is the same serial number you can see on the back of the unit.
- Type the **Encoder Key Code** (found inside the battery compartment) into the **Key Code** text box.
- Click on the arrow key  to move the serial number from the left table to the right table. The serial number should now appear in the **Configuration Table**.
- When done, click **OK**.
- Now enter the **Application Key Code** for your system. This number is found with the encoder key code. Enter the number and click **OK** when done.



**Note:** Even if you are using more than one encoder, you need to enter only one Application Key Code.

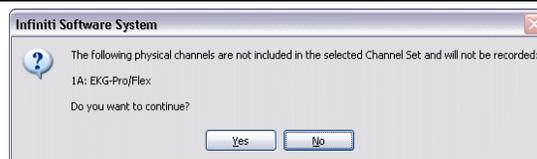


If the key codes have been entered properly and there is no problem with your encoder setup or your sensor connections, you should now see the recording screen.

## Verifying Sensor Connections

If there are problems with your sensor connections, the program will report those, prior to accessing the recording screen. If, for example, you have sensors that are connected but are not required for this channel set, you will get a warning message.

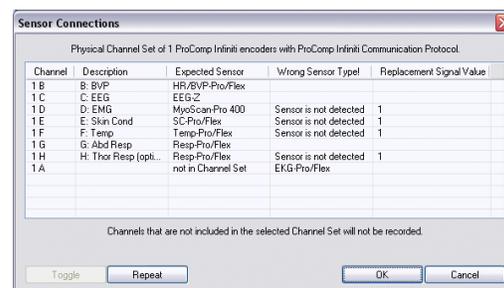
You can remove the sensor if you want, or continue recording by clicking **Yes**. Keep in mind that no data is recorded for sensors that are not defined in the channel set.



**Note:** If there are sensor connection problems in addition to extra sensors, this information won't appear as a separate message. It will display in the Sensor Connections window.

If you have connected wrong sensor types, you will see the Sensor Connections window. All the sensors that are expected will be listed in the Expected Sensor column. The **Wrong Sensor Type** column shows which sensor type was actually detected.

You can remove the wrong sensor or replace it with the right one. Click Repeat to check the sensor connections again until the system no longer detects a wrong sensor type. The program will not allow you to record a session with the wrong sensors.



**Note:** If the Wrong Sensor Type column is empty, the correct sensor has been connected.

If you do not connect all the sensors that are required for the selected channel set, the message "Sensor is not detected" appears in the Wrong Sensor Type column. When a sensor is not connected, the program replaces its signal value by a constant value of 1. It is possible to record a session with missing sensors but the corresponding signal will be a flat line. Any calculations based on that signal will not reflect real physiological changes.

## Stopping a Session

Script sessions end automatically when the script is finished. If you stop a script session before the script has finished running, no data will be saved.

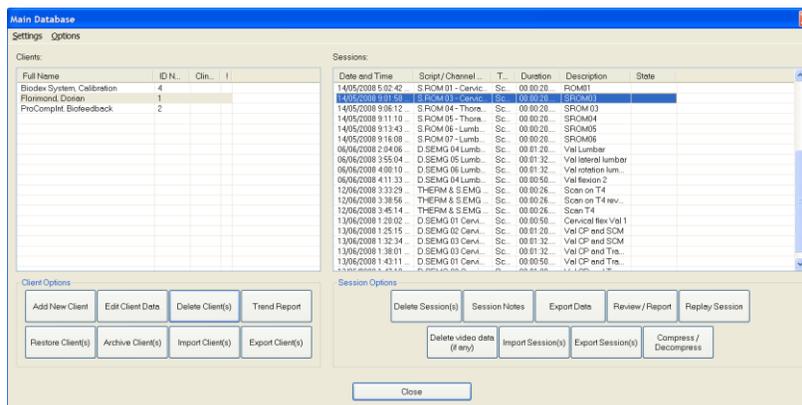
To stop recording an open display session, click the **Stop** button: 

- The program asks if you want to save the recorded data. You can save the session in compressed format but, unless your hard drive has very little space available or you do not need to review the saved sessions, we recommend that you always **Save**, which will use the noncompressed format. Compressed files can't be replayed, reviewed or trended until they are decompressed.
- Then the **Session Notes** pop-up appears where you can enter, if you want, a treatment (CPT) code, a session description and some notes.
- Click **OK** to continue. Next, you are asked if you would like to review the session right away. You can switch to the review mode or the replay mode.
- If you click **No**, the program asks if you want to record another session with the same settings.
- If you click **No**, the program reminds you to turn your encoder off!
- Clicking **OK** takes you back to the Main Menu Screen.

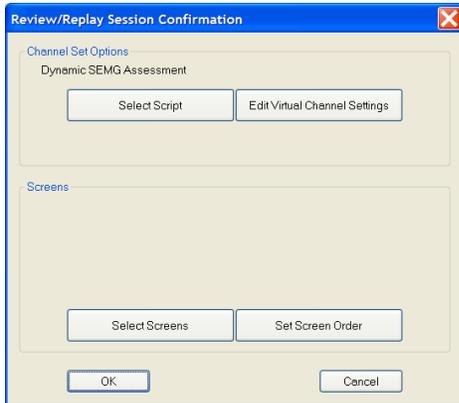
## Replaying Sessions

Replaying a session allows you to playback a recorded session like a movie. This is especially useful if you have recorded video with audio data. You can replay the session from any point in time and skip to event markers or script activities and steps.

- Select **Database** from the main screen.
- In the Main Database window highlight the client whose session you want to replay.
- Select the session from the right-hand table.
- Click on **Replay Session** at the bottom.



Main Database window



Review/Replay Session Confirmation window

If you are replaying a Script Session:

- Click **OK** to close the Edit Channel Set Setting for Current Client window and go into replay mode.

If you are replaying an Open Display Session:

- Click on **Select Screens** from the **Review/Replay Session Confirmation** window.
- In the **Select Screens** window select up to 5 screens and click **OK**.
- Click **OK** in the **Review/Replay Session Confirmation** window to enter replay mode.
- Click on the **Start** button  to replay the session.

## Reviewing Sessions

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After recording a session you can analyze the data by going into review mode. This mode allows you to scroll through the graphs, look at statistics, and print out a report displaying the data in graphical and/or statistical form.

### Review

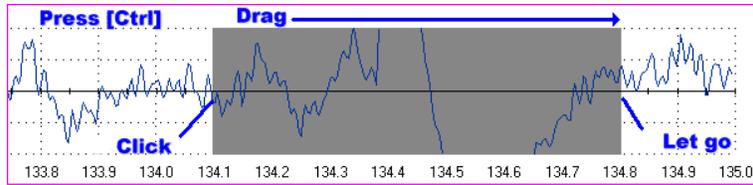
- Select **Database** from the main screen.
- In the Main Database window highlight the client whose session you want to review.
- Select the session from the right-hand table.
- Click on **Review/Report** to open the Review/Replay Session Confirmation window.
- For an open display session, click on **Set Open Display Statistics** and select the statistics you want to be calculated.
- Click on **Select Screens**.
- Click on the column heading for **Category** to reorder the screens into groups, and scroll down to **Report-Review** category.
- Select up to 5 screens and click **OK**.
- Click **OK** in the Review/Replay Session Confirmation window to enter review mode.

### Rejecting Artefacts

The purpose of rejecting artefacts is to have reliable statistics, with the least amount of noise affecting the recording. Rejecting artefacts can be performed while reviewing sessions. It can be done manually by the person reviewing the data.

First review the session to determine where the recording is most affected by noise. Then place artefact rejection segments at these locations, by following these steps:

1. Select the line graph that contains the segment to be rejected. (Only line graphs can be used for artefact rejection. If you get an error message, select a screen containing a line graph to review the data.)
2. Press and hold the **[Control]** Key.
3. Place the cursor over one end of the rejected segment.
4. Click and hold the left mouse button. (You can release the **[Control]** key at this point.)
5. Drag the cursor across the segment to be rejected; it will be highlighted in gray.
6. Release the mouse button at the end of the segment.



## Calculating Statistics

- To calculate statistics for a session, click the **Calculate Statistics** button  in the tool bar.  
A message confirms that the program is processing session data and then the Statistics window opens.
- Click **Close** to close the window.

**Note:** This is the Statistics window for a script session. The Statistics window for an open display session is similar, but does not display a list of rejection durations for individual activities.

Activity	Activity Description	Step	Step Description	Statistic Description	Value
1	Baseline	3	Baseline	A: EKG HR mean (beats/min)	98.72
1	Baseline	3	Baseline	A: EKG IBI std. dev. (SDRR)	27.63
1	Baseline	3	Baseline	A: EKG VLF % power mean	16.86
1	Baseline	3	Baseline	A: EKG LF % power mean	53.06
1	Baseline	3	Baseline	A: EKG HF % power mean	23.97
1	Baseline	3	Baseline	A: EKG VLF total power mean	22.36
1	Baseline	3	Baseline	A: EKG LF total power mean	68.97
1	Baseline	3	Baseline	A: EKG HF total power mean	31.45
1	Baseline	3	Baseline	A: EKG LF/HF (mean)	2.19
1	Baseline	3	Baseline	C: EMG Mean (uV)	2.81
1	Baseline	3	Baseline	D: EMG mean (uV)	1.88
1	Baseline	3	Baseline	E: Skin conductance mean (uS)	1.88
1	Baseline	3	Baseline	E: SC as % of value mean (%)	37.60
1	Baseline	3	Baseline	F: Temperature mean (Deg)	94.25
1	Baseline	3	Baseline	F: Temp as % of value mean (%)	96.18
1	Baseline	3	Baseline	G: Resp rate mean (br/min)	15.84
1	Baseline	3	Baseline	AG: (HR) (b/min) mean (b/min)	4.05
2	Color words	2	Colour Words	A: EKG HR mean (beats/min)	105.30

Activity	Activity Description	Activity Duration	Rejection Durations (sec)	Rejection Durations (%)
1	Baseline	120.00	0.00	0.00
2	Color words	120.00	0.00	0.00
3	Rest 1	120.00	0.00	0.00
4	Math Task	120.00	0.00	0.00
5	Rest 2	120.00	0.00	0.00
6	Stressful Event Recall	120.00	0.00	0.00

## Generating a Session Report

In review mode BioGraph Infinity can generate two types of session report.

- Text reports** are a standard feature of the software. A text report includes general information about the session as well as optional information (session notes, statistics, markers) that you select. Text reports are generated from Microsoft Word templates, and can be saved or printed using the Word functions.

A text report can be generated from any screen which includes line graphs or trend graphs. The Physiology Suite includes many screens designed for generating reports, one for every type of training protocol. The various training and reporting screens are described below, in the **Screen Description** section.

- Excel reports** must be user-defined, and can be customized for specific analytical uses. The Physiology Suite does not contain predefined Excel reports.

### Text Report

This type of report is generated in review mode. You can enter review mode in one of two ways:

- Immediately after recording a session (see **Stopping a Session**).
- From the Database window by selecting **Review/Report** (see **Reviewing a Session**).

When the Main Frame screen opens in Review Mode, follow these steps:

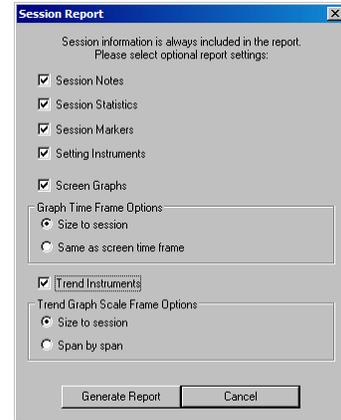
- If this is an open display session, from the **Options** menu select **Set Open Display Statistics** and choose the channels for which statistics should be calculated. (For a script session, statistics are defined in the script.)
- If necessary, perform artifact rejection on the recorded data.
- Click the **Calculate Statistics** icon  in the tool bar to recalculate the statistics.

4. If you have loaded more than one screen, open the screen from which you want to generate the report. Different screens can generate different reports.
5. Click the **Session Report** icon  in the tool bar and select **Generate Text Report**. The **Session Report** window opens.
6. Select report components by placing a check mark in the desired boxes.
7. Click **Generate Report** to generate the report. Word opens and displays your report as a document. You can print or save the report using Word's **Print** and **Save** functions.

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**Note:** *Microsoft Word must be installed on your system for this function to work.*

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## Using the Physiology Suite

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The physiology suite offers a full set of clinical tools to allow you to do three essential clinical tasks:

- **Assessment:** You can evaluate the current state of a client's physiological processes by running the **7-activity Stress Assessment**.
- **Training:** You can teach the client new self regulation strategies through biofeedback by recording open display sessions with one to five **Training screens** or running a **Training script**.
- **Follow-up:** You can perform regular evaluations of your client's progress by running regular **pre-training** and **post-training** baseline scripts and generating trend reports. Trend reports give you a quick overview of your client's outcome and rapidly demonstrate the client's learning curve.

### Assessment: 7 Activity Stress Assessment

The **7 activity Stress Assessment** script is composed of a series of three stress/relax cycles, during which you can observe and evaluate a client's natural responses to stressful situations and his/her ability to return to normal states when the stressing condition is ended. The assessment can be run once, during the initial visit and once or twice, later, during the training period.

- Using the **within session** trend report functions, you can rapidly see how the client's physiology changes during alternating stressful challenges and periods of recuperation across the 7 activities.
- If you also run the script after a number of therapy sessions, you can generate trend reports **across sessions**, to compare "before" and "after" states.

### Pre- and Post-Training Baseline

The **Pre-** and **Post-training** baseline assessment scripts can be run at the beginning and at the end of every visit to give you two types of clinical information:

- **Pre-training baseline** recordings are a quick and easy way to take a snapshot of how your client is doing after a period of time spent back in his/her own environment. By trending pre-treatment baseline sessions, you can get an idea of how much of the learning that occurs during the biofeedback sessions is actually retained from visit to visit.
- **Post-training baseline** recordings show what was learned during each treatment and if incremental learning is occurring from visit to visit. Expertise is gained through learning if training exercises are performed frequently enough for the new knowledge to be integrated. Post-training baseline recordings can demonstrate this by showing increasing levels of learning, as your client is expanding his/her self-regulatory skill set.

### Open display sessions and training scripts

There are two ways to use the Physiology Suite with BioGraph Infinity:

- **Open display sessions** allow you to load 1 to 5 different feedback screens in one session and switch between screens, on the fly, by simply clicking a numbered button in the tool bar. There is no need to stop and restart the session to change the biofeedback experience. You can pause and continue the session, at will, to coach the

client in using different strategies and you can reset counters and percentages by clicking the **Reset** button. Open display sessions give you the most flexibility but are not very good for generating trend reports as the client's physiological state might have been changing a number of times during the session.

- **Script sessions** are time-limited and allow for standardized recordings of assessments and baselines. The Physiology Suite includes a number of assessment and training scripts that can be run at regular intervals to monitor progress. Running a standardized training session allows you to monitor learning during a single session because you can trend statistical means across a number of practice trials.

## Screen Descriptions

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### Categories

The Physiology Suite contains a number of display screens for a variety of purposes, divided into specific categories. Depending on the type of biofeedback training you want to do, the categories classify the types of feedback as:

- **Surface EMG:** Display screens for one or two channels of electromyography. The screens can be used for learning relaxation, stress control and help teach awareness of head, neck and low back muscle tension or to train voluntary relaxation of specific muscle groups.
- **Skin Conductance:** The skin conductance display screens can be used to help develop an awareness of learned stress responses and teach basic self-regulation skills.
- **Temperature:** Use the temperature biofeedback screens to train for increasing peripheral temperature and controlling unconscious stress responses.
- **Respiration:** These screens show one or two channels of respiration and can be used for abdominal and (optionally) thoracic breathing training. Slow deep abdominal breathing helps with relaxation and can be used for lowering the heart rate.
- **HRV:** Heart rate variability training screens monitor respiration and heart rate, using a blood volume pulse (BVP) or an EKG sensor, and are useful for respiratory sinus arrhythmia (RSA) training or to expand the adaptive range of the cardiovascular system (by increasing variability).
- **Multimodality and Physiological profile:** Use these display screens when you need to work with more than one physiological signal.
- **Scripts:** Screens in this category are mainly used as part of the assessment scripts.

### Tasks

Within each category, the display screens are described according to the type of task they are designed to help accomplish:

- **Signal verification:** These display screens can be used at the beginning of a session, to check the quality of the recorded signals and ensure proper sensor placement.
- **Training screens:** The training screens are designed for biofeedback and generally implement a number of multi-media features, ranging from MIDI tone feedback to animation, to DVD playback control, for the purpose of communicating physiological change. Training screens are not usually adequate for reviewing data and generating session reports.
- **Report Screens:** Report screens are designed to facilitate session reviewing and for generating session reports. Some review screens show actual signal graphs. Others show trend graphs.
- **Instruction & Script:** These screens are used as part of the assessment scripts.

### Screen Descriptions

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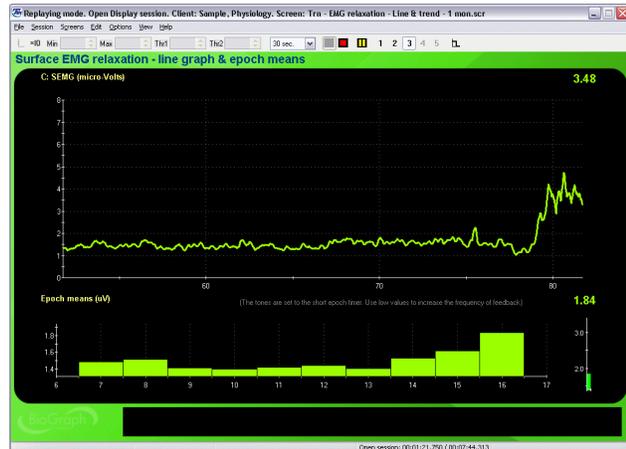
**Note:** *The following screen captures show only screens for the ProComp Infiniti channel sets and using a BVP sensor. Screens for the ProComp + channel sets are identical to these but screens for the ProComp 5 Infiniti and ProComp 2 channel sets may vary slightly because the devices have fewer sensor inputs. Similar screens exist for the EKG based channel set.*

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## Open Display Surface EMG Screens

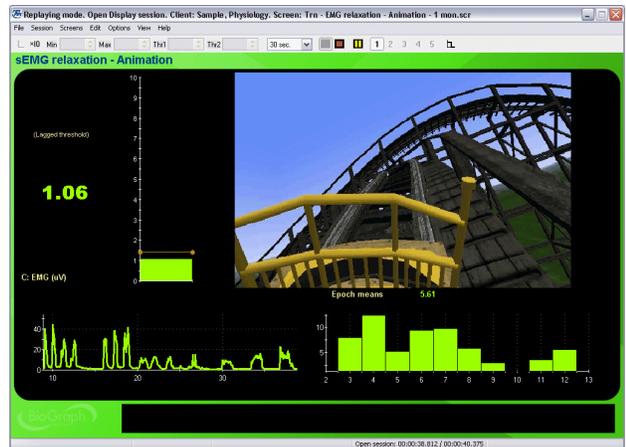
### Training – 1 EMG – Line graph & epoch means

A basic screen with a single line graph showing an amplitude representation of the contraction level (activity) of the monitored muscle group and a trend graph plotting the mean amplitude for a user-definable averaging period (epoch). A MIDI tone, proportional to the mean amplitude, is heard each time the epoch mean is plotted.



### Training – 1 EMG – Animation

This relaxation training feedback screen shows the EMG signal on a bar graph and plays a warm tone, as well as an animation (AVI) when the amplitude dips below the threshold. The threshold is set to automatically follow the signal to allow for instantaneous feedback of any change of direction.



### Training – 1 EMG – DVD

This relaxation training feedback screen shows a bar graph representation of the muscle activity and plays any DVD from the PC's DVD drive. The size of the DVD image shrinks when the EMG amplitude moves above the threshold, reinforcing relaxation. As with the previous screen, the threshold is set to automatic.



### Training – 2 EMG line graphs & epoch means

This two-channel EMG training screen is used for bilateral muscle relaxation training. The screen displays the two signals on one line graph, with two bar graphs on the sides and a trend graph of the mean amplitude (epoch) at the bottom. A green light turns ON and a tone is heard when both signals are below the thresholds on the bar graphs.



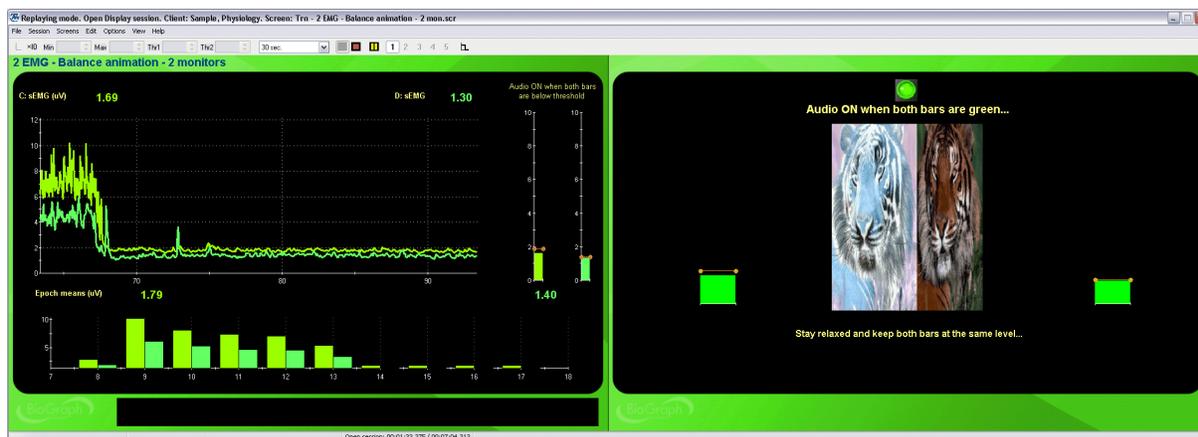
### Training – 2 EMG & balance animation – 1 monitor

This two-channel EMG training screen is similar to the previous screen, but it also shows a balance type animation, representing the ratio of the two EMG signals. When both signals are equal, the animation is centered. A MIDI Song plays when both signals are below their respective thresholds on the bar graphs.



### Training – 2 EMG & balance animation – 2 monitors

This two-monitor screen is similar to the previous one, but designed to work on two-monitor systems. The clinician side screen shows the signal line graphs, with a trend graph of epoch means while the client side shows left and right bar graphs with the balance animation.



### Report – 1 EMG Line graph and trend

Report screen for sessions with 1 EMG channel. The screen shows a line graph of the EMG amplitude and a trend graph of epoch means. Drag the time marker (vertical red line) over the EMG signal and see the value for any data point as a number in the center of the screen. To see the whole session mean, drag the time marker completely to the end of the session.



### Report – 2 EMG Line graphs and trends

This screen is similar to the previous screen, but displays signals and values for two EMG channels.



## Open Display Skin Conductance Screens

### Training – SC – Line graph and number

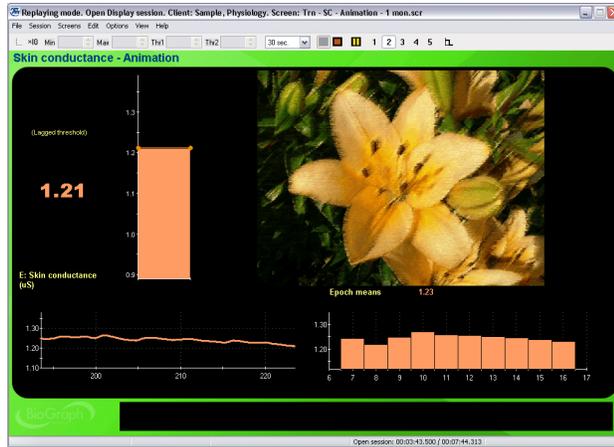
A basic screen with a single line graph showing the raw skin conductance value and a trend graph plotting the mean SC for a user-definable averaging period (epoch). A proportional tone is heard when the raw signal goes up and down.



**Training – SC – Animation – 1 monitor**

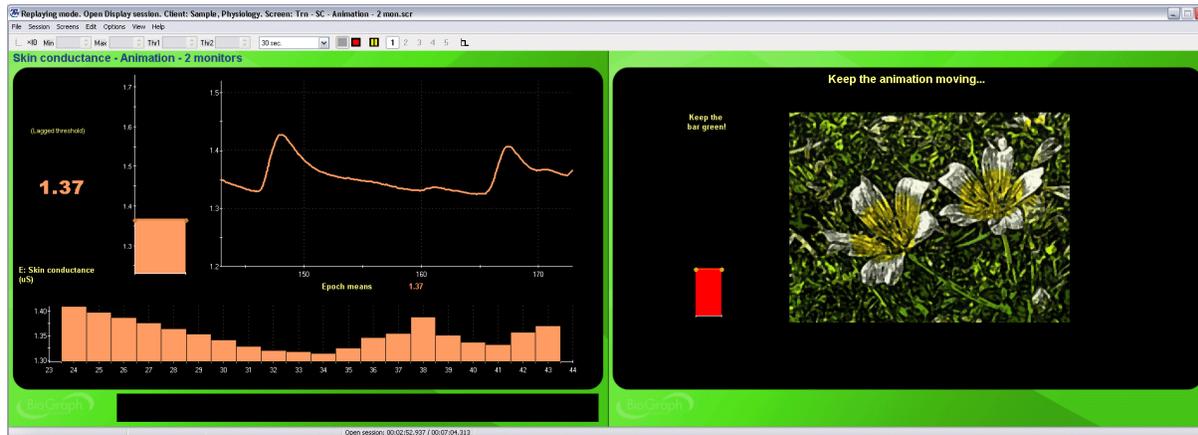
**Training – SC – Animation & volume feedback – 1 monitor**

The screen shows a bar graph of the skin conductance and plays a MIDI song and an animation (AVI) when the SC value dips below the threshold. The threshold is set to automatically follow the signal to allow for instantaneous feedback of any change of direction. The animation & volume feedback screen is similar but turns the music's volume high and low instead of ON and OFF.



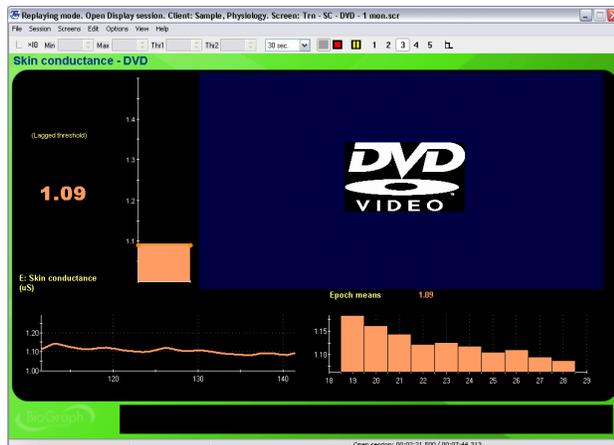
**Training – SC – Animation – 2 monitors**

This two-monitor screen is similar to the previous one, but designed to work on two-monitor systems. The clinician side screen shows the signal line graphs, with a trend graph of epoch means, while the client side shows a simple bar graph with the animation.



**Training – SC – DVD**

This feedback screen shows a skin conductance bar graph and plays any DVD from the PC's DVD drive. The size of the DVD image shrinks when the SC amplitude moves above the threshold, reinforcing a low SC. As with the previous screen, the threshold is set to automatic.



### Report – SC – Line graph and trend

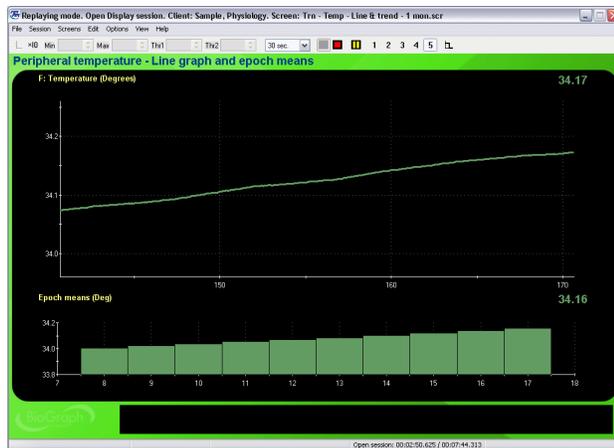
Report screen for sessions with 1 channel of skin conductance. The screen shows a line graph of the raw signal and a trend graph of epoch means. Drag the time marker (vertical red line) over the raw signal and see the value for any data point as a number in the center of the screen. To see the whole session mean, drag the time marker completely to the end of the session.



### Open Display Temperature Screens

#### Training – Temp – Line graph and number

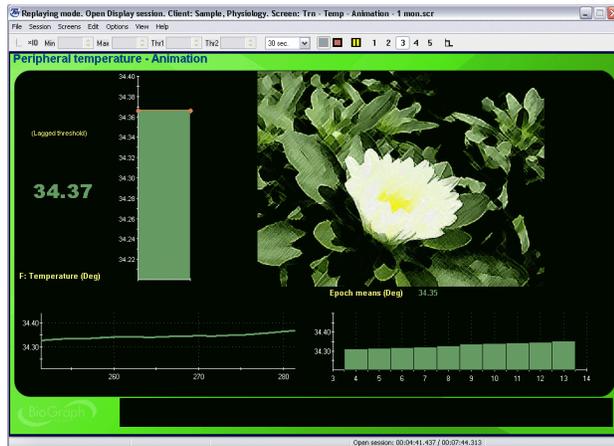
A basic screen with a single line graph showing the raw temperature value and a trend graph plotting the mean temp for a user-definable averaging period (epoch). An inverse proportional tone is heard when the raw signal goes up and down.



#### Training – Temp – Animation – 1 monitor

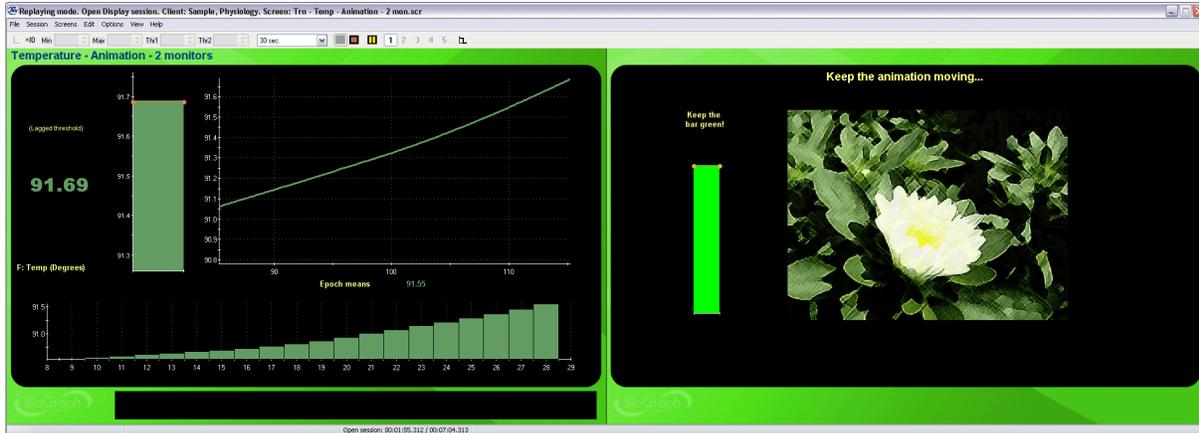
#### Training – Temp – Animation & volume feedback – 1 monitor

The screen shows a bar graph of the temperature signal and plays a MIDI song and an animation (AVI) when the signal value moves over the threshold. The threshold is set to automatically follow the signal to allow for instantaneous feedback of any change of direction. The animation & volume feedback screen is similar but turns the music's volume high and low instead of ON and OFF.



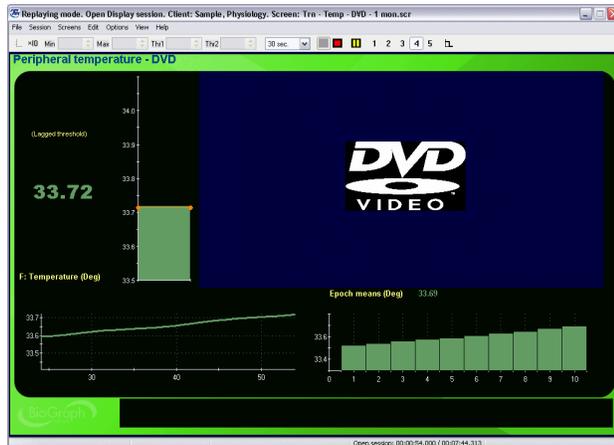
#### Training – Temp – Animation – 2 monitors

This two-monitor screen is similar to the previous one, but designed to work on two-monitor systems. The clinician side screen shows the signal line graphs, with a trend graph of epoch means, while the client side shows a simple bar graph with the animation.



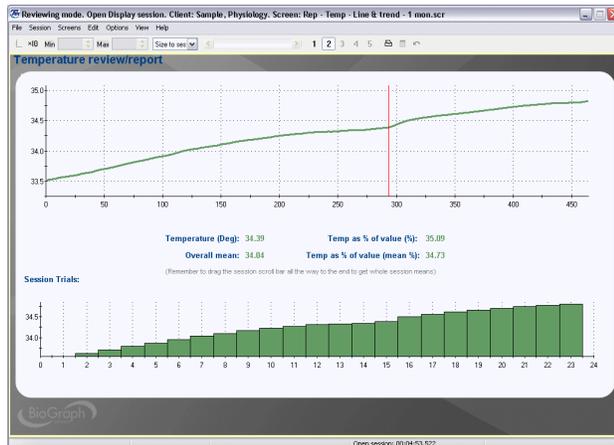
### Training – Temp – DVD

This feedback screen shows a temperature bar graph and plays any DVD from the PC's DVD drive. The size of the DVD image shrinks when the signal moves below the threshold, reinforcing warming up. As with the previous screen, the threshold is set to automatic.



### Report – Temp – Line graph and trend

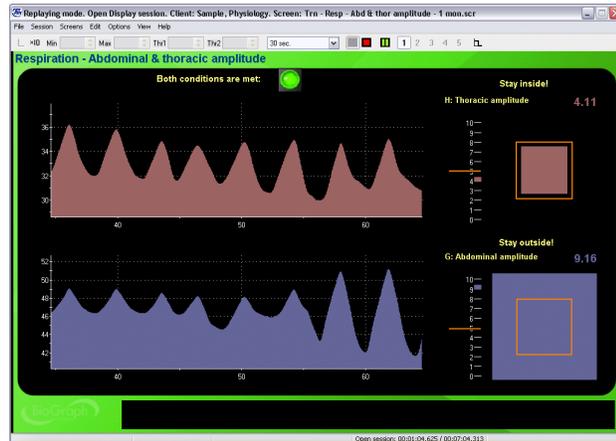
Report screen for sessions with 1 channel of skin conductance. The screen shows a line graph of the raw signal and a trend graph of epoch means. Drag the time marker (vertical red line) over the raw signal and see the value for any data point as a number in the center of the screen. To see the whole session mean, drag the time marker completely to the end of the session.



## Open Display Respiration Screens

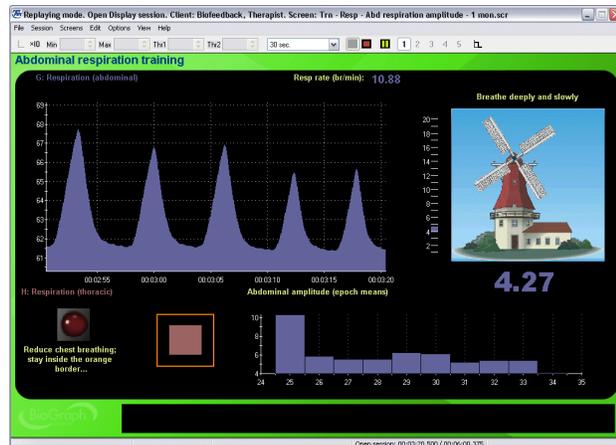
### Training – Resp – Abdominal & thoracic ampli.

A basic screen with two line graphs showing the raw thoracic and abdominal respiration signals. At the right of each line graph, a growing shape instrument with manual thresholds displays the corresponding amplitude value at each breath. A MIDI song plays when the thoracic amplitude is below threshold and the abdominal amplitude above threshold.



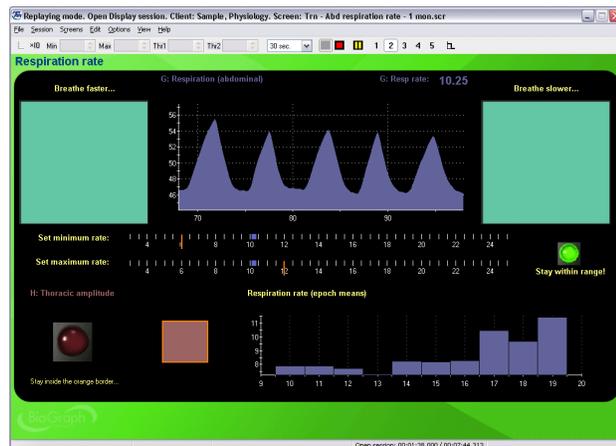
### Training – Resp – Abdominal amplitude

The screen shows a line graph of the raw abdominal respiration signal and an animation instrument, showing the amplitude of each breath. A proportional tone is heard and the animation moves faster or slower, depending on that value. In the lower left corner, a growing shape instrument shows the thoracic amplitude value and inhibits feedback when the value is over a manually set threshold.



### Training – Resp – Resp rate range

A line graph of the raw abdominal respiration signal is in the center of the screen. Below, two horizontal scale instruments allow you to define a min and max respiration rate. A MIDI song plays when the rate is between those thresholds. The animation instruments on each side indicate when the respiration rate is too slow or too fast.



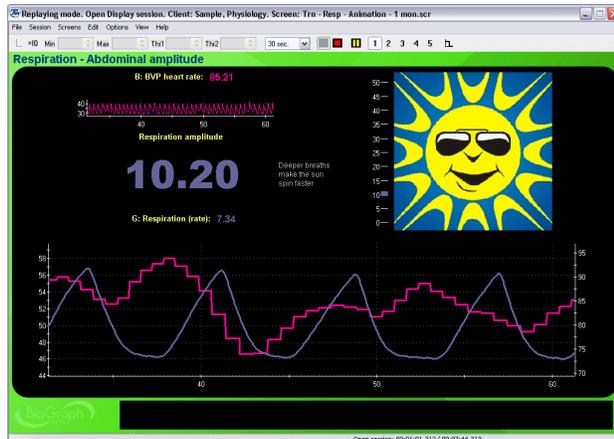
### Training – Resp – Resp rate range – Dual threshold – 1 monitor

A line graph of the raw abdominal respiration signal is in the top of the screen. On the left, a dual threshold scale instrument allows you to define a min and max respiration rate. A MIDI song plays when the rate is between those thresholds. The thoracic respiration amplitude is shown in the lower left quarter. You can set a threshold to inhibit thoracic breathing. The red light becomes bright when the threshold is crossed.



### Training – Resp – RSA & Amplitude

This feedback screen shows a line graph with the raw respiration and heart rate signals (RSA). At each breath, the respiration rate and amplitude values are shown and the animation moves faster or slower, depending on the amplitude.



### Report – Resp – Line Graph and Trend

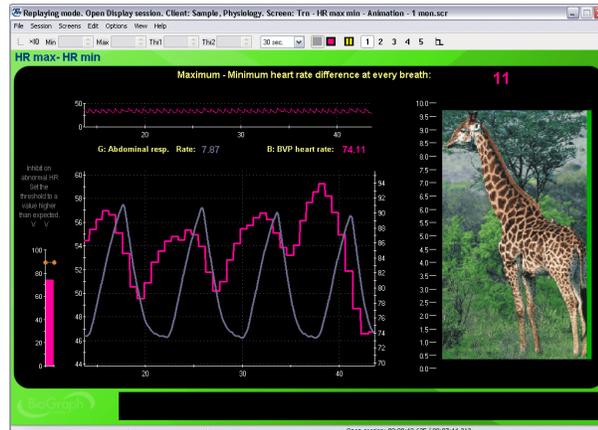
Report screen for sessions with 1 or 2 respiration channels. The screen shows line graphs of the raw signal(s) and of the thoracic-abdominal amplitude difference as well as a trend graph of the respiration rate epoch means. Dragging the time marker over the raw signal allows you to see point values for the rate and amplitude differences. To get whole session means, drag the time marker completely to the end of the session.



## Open Display Heart Rate Variability (HRV) Screens

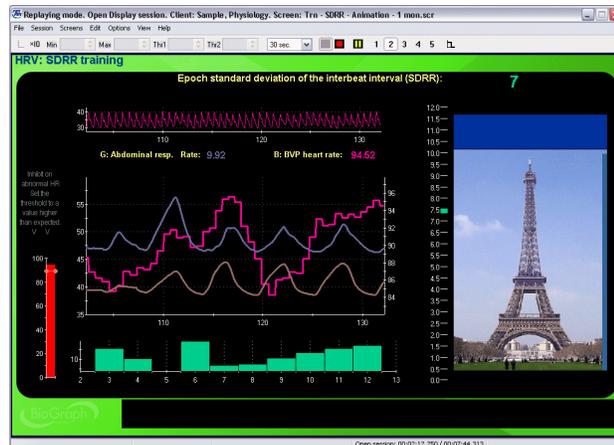
### Training – HRV – HR max – min

This feedback screen shows a line graph with the raw respiration and heart rate signals (RSA). The animation instrument is connected to the heart rate max – min difference channel, which is a measure of breath to breath heart rate variability. As the variability increases, the animation image grows proportionally taller.



### Training – HRV – SDRR – Animation

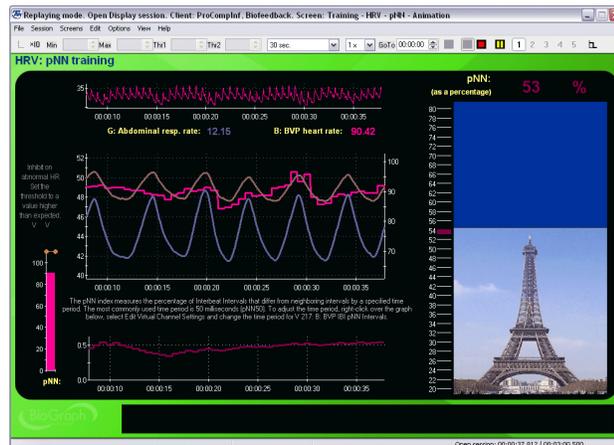
This feedback screen shows a line graph with the raw respiration and heart rate signals (RSA). The animation instrument is connected to the Epoch-based standard deviation of the IBI value channel, which is a standard measure of heart rate variability. As the variability increases, the animation image grows proportionally taller.



### Training – HRV – pNN – Animation

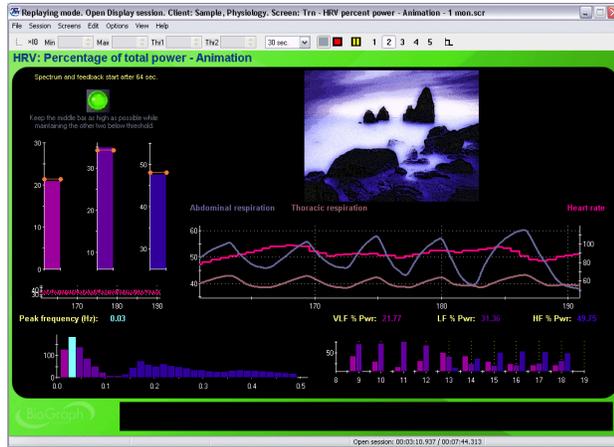
This feedback screen shows a line graph with the raw respiration and heart rate signals (RSA). The animation instrument is connected to the pNN (also called pNNx) of the IBI value channel, which is a standard measure of heart rate variability. As the variability increases, the animation image grows proportionally taller.

**Note:** *pNNx is the number of times, in a specified period, in which the change in successive normal IBI intervals (NN) exceeds x ms (x is user defined).*



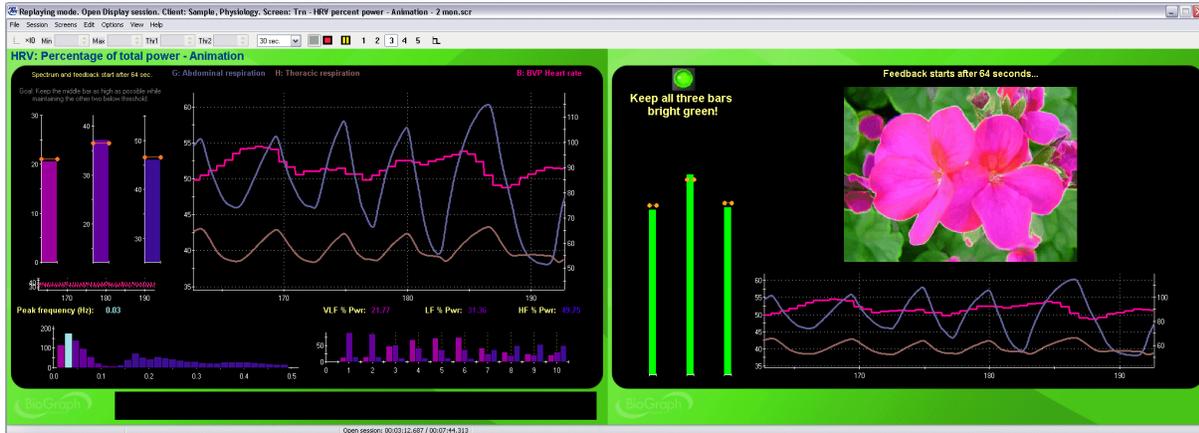
### Training – HRV – % Power & Animation – 1 Monitor (or Total power)

These screens are designed to up-train the low frequency (LF) band of the HRV spectrum while down-training the VLF and HF bands. The three bar graphs on the left are set to automatically follow these values. The green light turns on and the animation starts when the conditions are met. The on-going trends for each frequency band are shown in the lower right corner.



### Training – HRV – % Power & Animation – 2 Monitors (or Total power)

The two-monitor screens are similar to the previous ones, but designed to work on two-monitor systems. The clinician side screen shows the signal line graphs, with a trend graph of epoch means, while the client side shows simple bar graphs with the animation.



### Training – HRV – % Power with DVD (or Total power)

The DVD screens are similar to the two previously described screens except that the feedback is given using the DVD instrument. The green light turns on and the DVD image enlarges when the conditions are met. The ongoing trends for each frequency band are shown in the lower right corner.



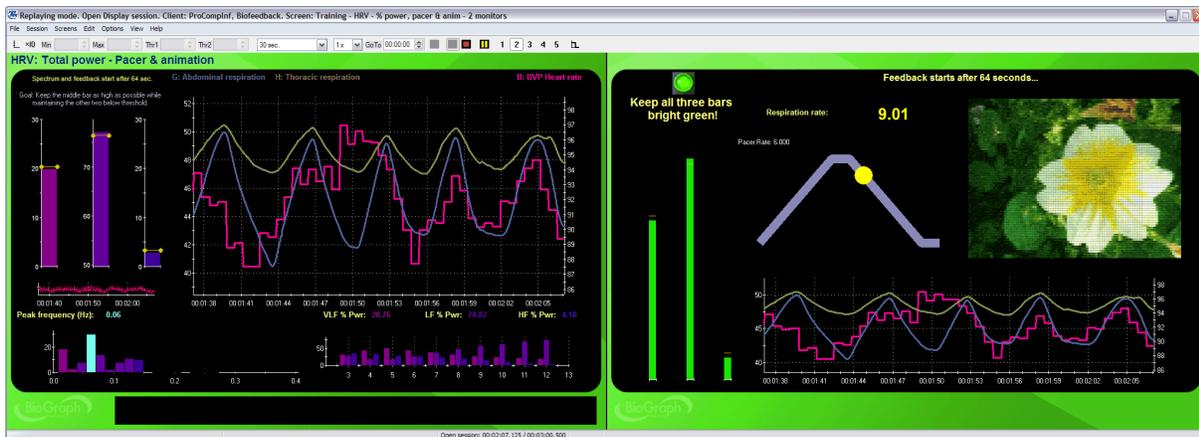
### Training – HRV – % Power, pacer & anim – 1 monitor (or Total power)

This screen is similar to the previously described screens with the addition of a respiration pacer. You can adjust the pacer settings to any respiration rate and adjust the inspiration, expiration and hold periods by pausing the session and accessing the right-click menu. The green light turns on and the animation starts when the conditions are met. The ongoing trends for each frequency band are shown in the lower right corner.



### Training – HRV – % Power, pacer & anim – 2 monitors (or Total power)

The two-monitor screen is similar to the previous one, but designed to work on two-monitor systems. The clinician side screen shows the signal line graphs, with a trend graph of epoch means, while the client side shows the pacer with simple bar graphs and the animation. The respiration pacer settings can be accessed from the client side screen.



### Training – HRV – Adaptive paced breathing

This screen is designed to train a client to modify his/her respiration rate (usually slowing it down) from whatever initial breathing rate the client is at, towards a specified target rate. The screen shows the raw abdominal respiration waveform with the heart rate signal and a large indicator of the actual respiration rate. By default, the pacer leads towards the target rate by decreasing its pacing rate by half a breath per minute, every two minutes, and the target rate is set to 6 breaths per minute. The pacer settings can be adjusted by pausing the session and accessing its right-click menu.



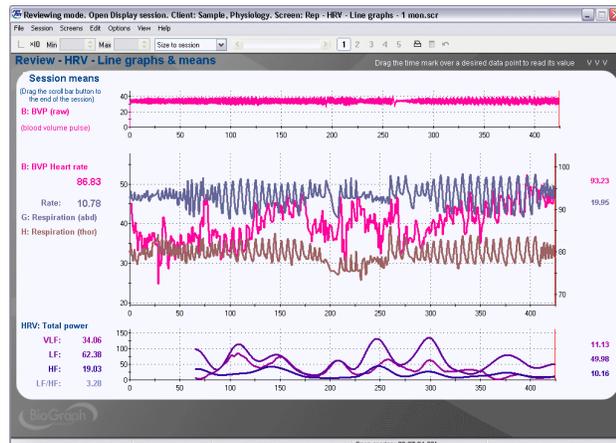
## Training – HRV – Resonant freq. paced breathing

This screen is designed to lead a client through progressively lower breathing rates from 10 breaths per minute to 6 breaths per minute, decreasing its pacing rate by half a breath per minute every two minutes. The screen shows the raw abdominal respiration waveform with the heart rate signal and a large indicator of the actual respiration rate. The pacer settings can be adjusted by pausing the session and accessing its right-click menu.



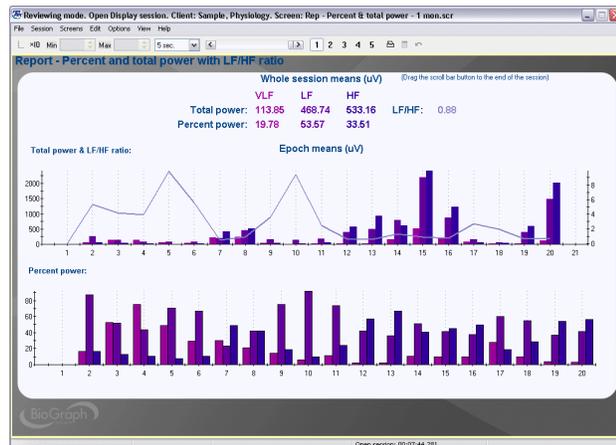
## Report – HRV – Line Graphs & Numbers

Report screen for heart rate variability (HRV) training sessions. The screen shows line graphs of the raw BVP or EKG signal and of the abdominal and thoracic respiration. At the bottom of the screen, a line graph shows the total power output for each HRV band, VLF, LF and HF. Dragging the time marker over the signal lines allows you to see point values for the heart rate, respiration rate and point-by-point power. To get whole session means, drag the time marker completely to the end of the session.



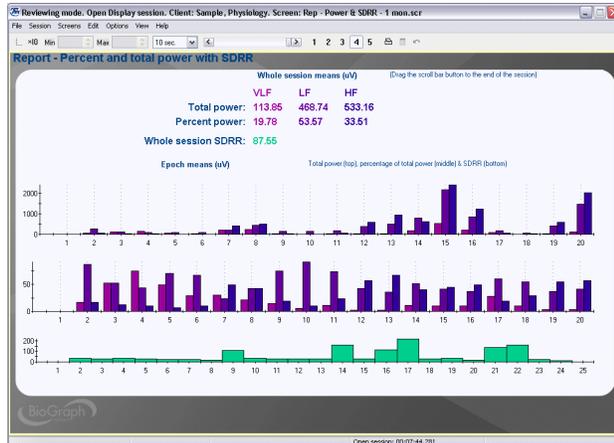
## Report – HRV – % & Total Power – 1 Monitor

Report screen for heart rate variability (HRV) training sessions. The screen shows trend graphs of the total and percent power for the three standard HRV frequency bands, VLF, LF and HF. The LF/HF ratio is shown as a blue grey line on the top graph. To get whole session means, drag the time marker completely to the end of the session.



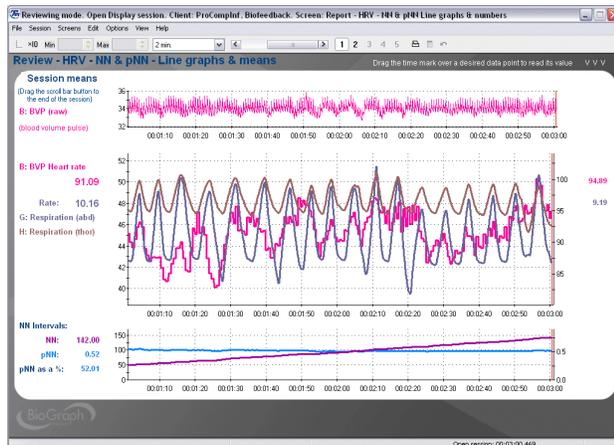
### Report – HRV – Power & SDRR – 1 Monitor

Report screen for heart rate variability (HRV) training sessions. The screen shows trend graphs of the total and percent power for the three standard HRV frequency bands, VLF, LF and HF. The bottom graph shows the epoch standard deviation of the IBI (SDRR). To get whole session means, drag the time marker completely to the end of the session.



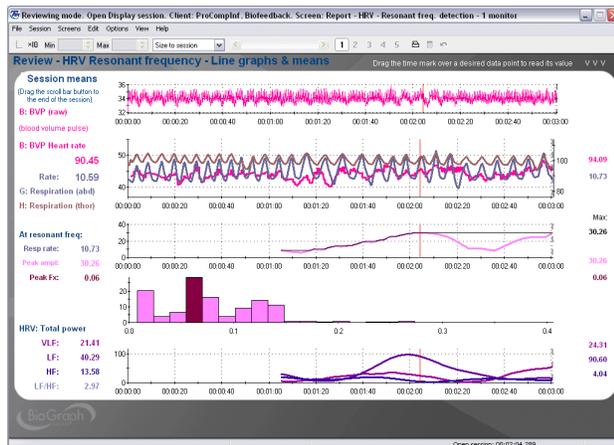
### Report – HRV – NN & pNN Line graphs & numbers – 1 Monitor

Report screen for heart rate variability (HRV) training sessions. The screen shows raw signals for BVP (or EKG) with respiration and heart rate. The bottom graph plots the NNx and pNNx computations. You can change the value of x for either computation by editing the virtual channel settings. To get whole session means, drag the time marker completely to the end of the session.



### Report – HRV – Resonant freq. detection – 1 Monitor

Report screen for heart rate variability (HRV) and resonant frequency training sessions. The screen shows raw signals for BVP (or EKG) with respiration and heart rate. The two middle graphs plot the peak amplitude (amplitude of the peak frequency) and corresponding maximum (in black) with the 2D frequency spectrum. The maximum point in the peak amplitude signal often indicates when the resonant frequency is reached. To get whole session means, drag the time marker completely to the end of the session.

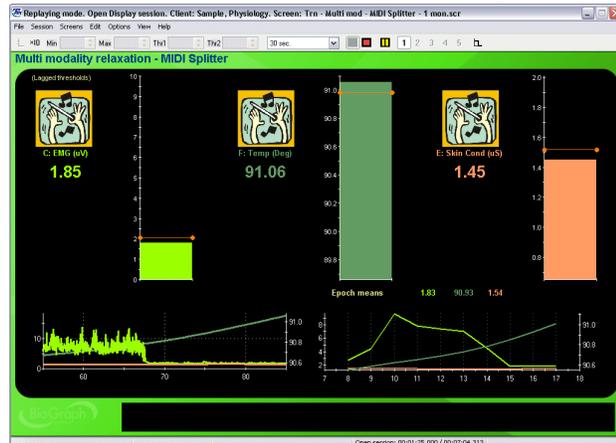


## Open Display Multi-Modality Screens

### Training – EMG SC Temp – MIDI Splitter

### Training – EMG SC Temp & manual thresholds – MIDI Splitter

This feedback screen shows two graphs with signal lines and epoch means at the bottom and three bar graphs, for EMG, SC and Temp. Feedback is defined with a MIDI splitter instrument. Each signal plays one musical voice and all three voices are heard when the three conditions are met. Two versions of this screen are available, one with automatic and one with manual thresholds.



### Training – Temp & BVP – Line Graph & Growing Shape

Temperature training screen with blood volume pulse (BVP) amplitude. When the pulse amplitude is increased, the temperature follows. The growing shape instruments play inverse proportional tones when each signal moves over its threshold. When both signals are in condition, the green light turns on and a low background tone is heard.



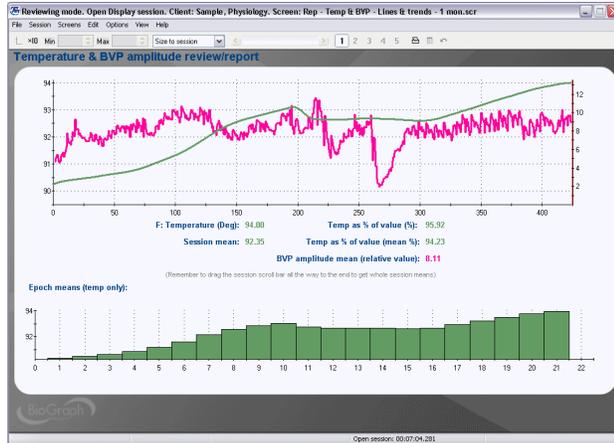
### Rep – EMG SC Temp – Lines & Trends – 1 mon.scr

Report screen for multimodality sessions with EMG, SC and Temp. The top graph shows the signal graphs while the bottom graph plots epoch means. To get whole session means, drag the time marker completely to the end of the session.



## Report – Temp & BVP – Line Graphs and Trends

Report screen for multimodality sessions with BVP (amplitude) and Temp. The top graph shows the signal graphs while the bottom graph plots epoch means for the temperature channel. To get whole session means, drag the time marker completely to the end of the session.



## Open Display Physiological Profile Screens

### Signal verification – Single Line Graphs – 1 Monitor

This screen is intended for signal verification purposes. It shows the raw signal from all the sensors defined in the channel set with numeric instruments along the left edge.



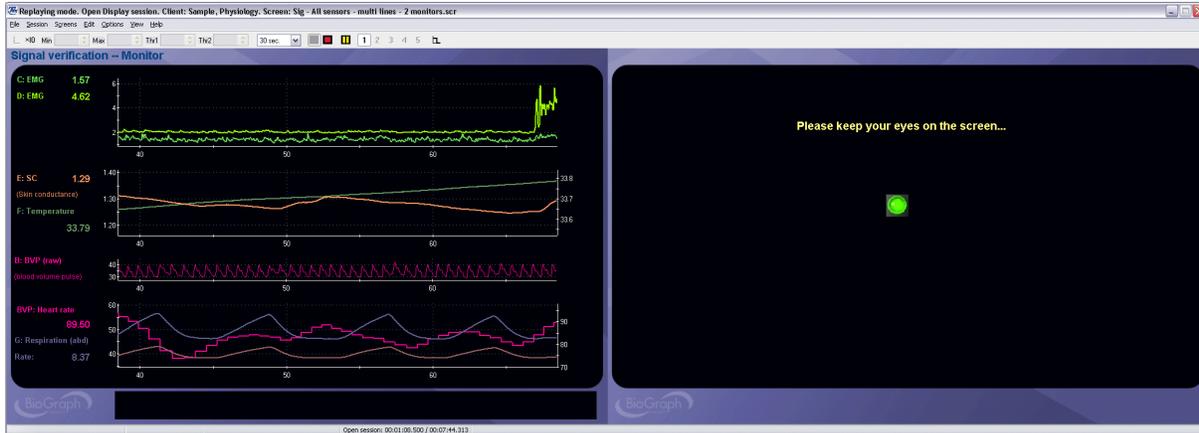
### Signal Verification – 1 monitor

This screen is intended for signal verification purposes. Similarly to the previous screen, it shows the raw signal from all the sensors defined in the channel set but combines lines on multi-line graphs.



### Signal Verification – 2 monitors

This two-monitor screen is similar to the previous one, but designed to work on two-monitor systems. The clinician side screen shows the signal line graphs, with a trend graph of epoch means, while the client side shows a blinking green light animation to provide something to focus on while recording baseline data.



### Signal Verification & Video – 1 Monitor

This screen is intended for signal verification purposes. Similarly to the previous two screens, it shows the raw signal from all the sensors defined in the channel set but it adds a video capture instrument in the upper left corner. To use this screen, you must have a Web Cam connected to your PC. (Use this screen for reviewing data as well.)



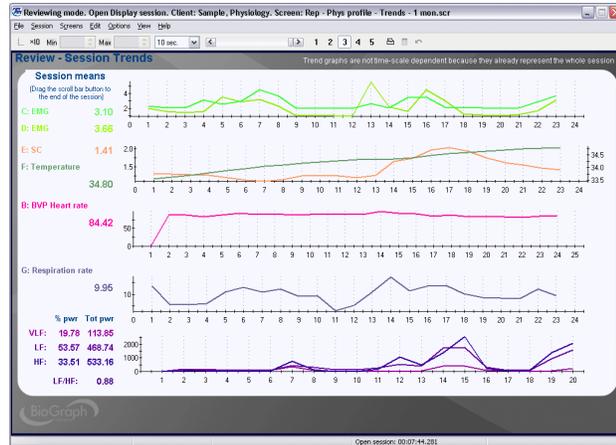
### Report – Line Graphs & Numbers

This report screen shows all the raw and some processed signal traces for all the sensors defined in the channel set on multi-line graphs. Drag the time marker along the signal lines to get point-by-point values, on the right side of the screen. Drag the time marker all the way to the end of the session to get whole session means on the left edge.



## Report – Trend Graphs & Numbers

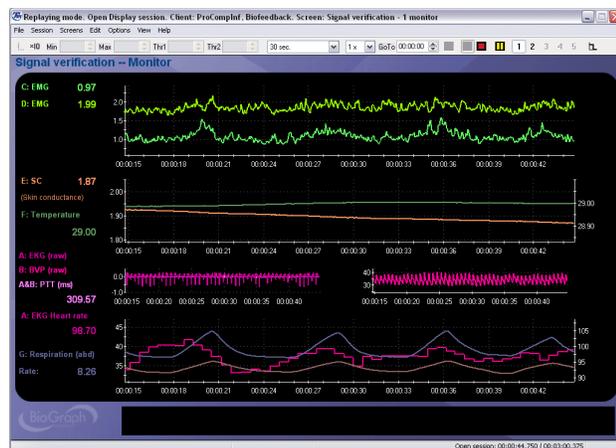
Report screen similar to the previous one with epoch mean trend graphs instead of line graphs. Epoch-based means are useful for reviewing long sessions because they reduce the number of data points to plot on one graph. Drag the time marker all the way to the end of the session to get whole session means on the left edge.



## Physiology EKG & BVP channel set: Open Display Pulse Transit Time

### Signal verification – 1 monitor

This screen is intended for signal verification purposes. It shows the raw signal from all the sensors defined in the channel set with numeric instruments along the left edge.



### Training – Pulse transit time – 1 monitor

Training screen for pulse transit time (PTT). The beat-by-beat PTT is shown on the top graph. You can adjust the threshold on the graph to define a visual target. The bar graph on the right edge is set to produce inverse proportional tones – so longer PTT values produce lower tones. The training goal is to lower the tone (increase the pulse transit time). The bottom graph shows the epoch-based mean PTT and is useful for showing long time trends.



## Report – Pulse transit time – Line graphs & trend

Report screen for pulse transit time (PTT) training sessions. The top graph shows the raw EKG and BVP signals. The middle graph shows the pulse-by-pulse time between the EKG R-spike and the BVP pulse maximum. The bottom graph shows the epoch-based mean PTT. Drag the time marker all the way to the end of the session to get whole session means.



## ProComp 5 Infiniti Channel Set configurations

Since the ProComp 5 Infiniti is a five-channel device, the screens have been divided in a number of subsets, including:

- **Physiology BVP & EMG:** This channel set includes all BVP based HRV screens with the 1 EMG training and report screens and a number of modified Signal verification screens.
- **Physiology BVP & Temp:** Same as above but with temperature screens, instead of EMG.
- **Physiology EKG & EMG:** Same as above with EKG based HRV screens.
- **Physiology EKG & Temp:** Same as above but with temperature screens, instead of EMG.
- **Physiology EKG & BVP:** Mainly used for pulse transit time feedback.

## ProComp 2 Channel Set configurations

Since the ProComp 2 is a two-channel device, the screens have been divided in a number of subsets, including:

- **Physiology 2 EMG:** This channel set includes all the 1 and 2 EMG training and report screens, along with some modified Signal verification screens.
- **Physiology 2 Resp:** This channel set is for two respiration channels and is used for abdominal and, optionally, thoracic breathing training. It includes all the 1 & 2 respiration training and report screens, along with some modified signal verification screens.
- **Physiology BVP & Resp:** This channel set incorporates BVP with 1 channel of respiration. The set includes all the HRV training and report screens, along with some modified signal verification screens.
- **Physiology EKG & Resp:** Same as above, but for EKG.
- **Physiology SC & Temp:** The channel set includes screens for both SC and Temp training and reporting and also some modified signal verification screens.

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**Note:** Because the ProComp 2 has an integrated EEG sensor in input A and inputs C & D have too low a sampling rate for EKG or BVP, it is not possible to include a channel set with EKG and BVP for this encoder.

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## Script Descriptions

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### Assessment: 7 activity stress assessment – 1 or 2 monitors

- Duration: 14 minutes
- Sequencing: Seven 2-minute activities
  1. **Baseline**
  2. **Color Words**

3. **Rest 1**
4. **Math Task**
5. **Rest 2**
6. **Stressful Event Recall**
7. **Rest 3**

- Each activity is preceded by an instruction step during which recording is paused. The clinician has to press a key to continue with the rest of the activity.
- The 1-monitor version gives instructions to the clinician and requires that the monitor is turned towards the client during the **Color Words** activity and away from the client during the **Math Task** and other activities.
- The 2-monitor version shows clinician and client instructions on the left and right monitors and does not require that the monitor is turned away from the client.

**Note:** *Because it requires monitoring more than two physiological signals simultaneously, the 7 Activity Stress Assessment script is only available for the ProComp Infiniti, ProComp+ and ProComp 5 Infiniti.*

### **Assessment: Physiology pre- and post-training baseline**

- Duration: 1 mn 20 sec
- One activity: Baseline
- The script starts with an instruction step and the clinician has to press a key to start the recording.

### **Training**

The training scripts all follow the same structure: 1 Instruction step, followed by 10 trials of identical durations. Using the Edit Script functions in BioGraph Infiniti, you can easily change the duration of the training steps as well as the actual training screen that is used for the 10 trials.

There are 6 training scripts:

- 1 EMG relaxation training 10 trials
- 2 EMG relaxation training 10 trials
- Respiration relaxation training 10 trials
- Skin conductance training 10 trials
- Peripheral temperature training 10 trials
- Skin conductance relaxation script – 2 monitors

The last training script is the SC Relaxation Exercise script, which runs for 20 minutes and is composed of two activities, **Baseline** and **Relaxation Exercise**, which, in turn, is built of four steps:

- Instructions
- Relaxation Induction (461 seconds – duration is defined by audio clip duration)
- Relaxation (duration can be modified by user)
- Relaxation Recovery (102 seconds – duration is defined by audio clip duration)

During the induction and recovery steps, the script plays audio clips from a standard relaxation exercise tape. Because of this, the duration of these steps should not be modified and pausing of the session should be avoided. The relaxation step doesn't include audio prompting, so its duration can be adjusted as desired. The script uses two-monitor screens to allow the clinician to see all the physiological changes and show only client instructions on the second monitor.

**Note:** *Because it requires monitoring more than two physiological signals simultaneously, the Skin Conductance Relaxation script is only available for the ProComp Infiniti, ProComp+ and ProComp 5 Infiniti.*



