SCP SUITE™

REFERENCE MANUAL

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For use with BioGraph Infiniti version 6.0.4 or later

CLASSIFICATION

- Type BF Equipment
- Internally powered equipment
- Continuous operation

- Read Instruction Manual.

CAUTION

- US Federal Law restricts this device to sale by or on order of licensed health care practitioners.

WARNING

- Do not operate active sensor within 10 feet (3m) of an operating cellular phone, similar radio transmitting device, other powerful radio interference producing sources such as arc welders, radio thermal treatment equipment, x-ray machines or any other equipment that produces electrical sparks.
- All encoders are totally isolated from line (110 or 220VAC) power due to battery operation and fiber optic connections to computers. However, many hospitals and the FDA require that computers, printers and any other equipment used with medical devices be electrically isolated from line voltage to UL or CSA medical safety standards.
- Do not connect inputs or outputs of the encoder or sensors to line powered devices, except through the fiber optic cable.
- The PC used with the encoder must be placed outside the patient/client environment (more than 3 meters or 10 feet) or the PC must comply with EN60601-1.1 (system safety).
- After use, the disposable electrodes may be a potential biohazard. Handle and, when applicable, dispose of these materials in accordance with accepted medical practice and any applicable local, state and federal laws and regulations.
- To diminish the risk of spreading communicable diseases, always use good hygiene practices with reusable electrodes, particularly if abrasive substances are used. In all cases, refer to your facility's infection control procedure.
- Do not use in the presence of a flammable anesthetic mixture with air or with Oxygen or Nitrous Oxide.
- Not to be immersed in water.
- Take care in arranging patient and sensor cables to avoid risk of patient entanglement or strangulation.
- The operator is responsible for ensuring the safety of any devices controlled or triggered by Infiniti equipment or software, or by any software or hardware receiving data from Infiniti equipment. Infiniti equipment must not be configured or connected in such a way that failure in its data acquisition, processing or control functions can trigger patient feedback stimulus that poses an unacceptable level of risk.
- Use of any equipment in a biofeedback context should be immediately terminated upon any sign of treatment-related distress or discomfort.
- Not to be connected to a patient undergoing MRI, Electro surgery or defibrillation.

ATTENTION

- To prevent static discharge from damaging the sensor and/or encoders, use antistatic mats or sprays in your working area. A humidifier may also be used to help prevent static environments by conditioning hot, dry air.
- Not for diagnostic purposes. Not defibrillator proof. Not for critical patient monitoring.
- To prevent voiding warranty by breaking connector pins, carefully align white guiding dot on sensor plug with slot on sensor input.
- Sharp bends or winding the fiber optic cable in a loop smaller than 4 inches (10cm) may destroy the cable.

- A fiber optic cable not fully pushed into its receptacle may cause the unit not to operate; make sure that both ends of the cable are fully inserted into their receptive jacks and the nuts are tightened firmly.
- Make sure to remove electrodes from sensor snaps immediately after use.
- Apply conductive gel only to electrodes; never put gel directly on sensor snaps.
- Always use electrodes between the subject and the sensor.
- Sharp bends or winding the fiber optic cable in a loop smaller than 4 inches (10cm) may destroy the cable.
- Do not plug third party sensors directly into instrument inputs. Plug only Thought Technology active sensor cable connectors into instrument inputs. All electrodes and third party sensors must be connected to active sensors, either directly or through an adapter.
- Remove batteries when the device is not being used for extended period of time. Please dispose of battery following national regulations.

INTENDED PURPOSE

- Biofeedback, relaxation and muscle re-education purposes.

CONTRAINDICATIONS

- None.

NOTE

- No preventative inspections required; maintenance must be performed by qualified personnel.
- The supplier will make available, upon request, circuit diagrams, component parts lists and description or other information required for the repair of product by qualified personnel.
- If a fiber optic or patient cable is damaged or breaks, please replace it.
- Due to the essential performance and intended use of the device, testing for immunity to electromagnetic disturbances was not required and was not performed. The device may be susceptible at levels below IEC60601-1-2 immunity test levels.
- The operator must be familiar with typical characteristics of signals acquired by this equipment, and be able to detect anomalies in the acquired signal that could interfere with treatment effectiveness. Depending on the importance of signal integrity, it may be advisable to continuously monitor the raw signals, in time and/or frequency domain, while the device is being used for biofeedback or other purposes. If anomalies are observed on acquired signals, and if you suspect a problem with electromagnetic interference, contact Thought Technology for a technical note on identification and remediation.

MAINTENANCE AND CALIBRATION

- Wipe encoder with a clean cloth.
- Factory testing and calibration ensure equipment accuracy and frequency response. The user may invoke a self-calibration function that will recalibrate certain device parameters (see section in hardware manual). Contact Thought Technology for factory recalibration if necessary.

STORAGE

- Store in its original case.
- Temperature — -23 to +60C (-9.5 to 140F)
- Humidity (Non-condensing) — 10% to 90%
- Atmospheric Pressure — 70 to 106 Kpa

TRANSPORTATION

- Transport in its original case.
- Temperature — -23 to +60C (-9.5 to 140F)
- Humidity (Non-condensing) — 10% to 90%
- Atmospheric Pressure — 70 to 106 Kpa

Guidance and manufacturer's declaration – electromagnetic emissions		
The Infiniti system is intended for use in the electromagnetic environment specified below. The customer or the user of the Infiniti system should assure that it is used in such an environment.		
Emissions test	**Compliance**	**Electromagnetic environment – guidance**
RF emissions, CISPR 11	Group 1	The Infiniti system uses RF energy only for its internal function. Therefore, its RF emissions are very low and are not likely to cause any interference in nearby electronic equipment.
RF emissions, CISPR 11	Class B	The Infiniti system is suitable for use in all establishments, including domestic establishments and those directly connected to the public low-voltage power supply network that supplies buildings used for domestic purposes.
Harmonic emissions, IEC 61000-3-2	Not applicable	
Voltage fluctuations/flicker emissions IEC 61000-3-3	Not applicable	

Manual No. SA7986 Rev. 0 (October)

TABLE OF CONTENTS

Introduction

The SCP Suite

The SCP Suite is designed to help you do a specialised type of brainwave biofeedback using slow cortical potentials and implements a training protocol defined in a research paper published in 2006 in the journal ***Pediatrics***. (The research paper, and other references, are listed in the ***References*** on page 2.)

Slow cortical potentials (SCPs) are low frequency shifts in the baseline of the electroencephalography (EEG) signal. The neurophysiology involved in causing these slow shifts of potential is beyond the scope of this document but there is some evidence to suggest that learning to voluntarily produce SCPs – both positive and negative shifts – can have measurable health benefits relating to attentional control.

Although the suite is designed to present the material in a simple and accessible way, it still requires a strong understanding of EEG as well as neurofeedback training and experience. The SCP Suite is intended for intermediate and advanced neurofeedback practitioners.

The suite works with the clinical grade ProComp 5 Infiniti encoder for physiological data acquisition and requires an EEG-Z3 sensor to record SCPs, an EEG-Z sensor to monitor eye movement artifact and an AV-Sync audiovisual stimulus device to deliver audio prompts.

Note: *The SCP Suite can also be used with the ProComp Infiniti 8-channel encoder.*

This manual will guide you through the process of learning how to use your equipment, including:

- Connecting the device to the computer
- Hooking up sensors to the client
- Setting up the AV-Sync
- Running SCP neurofeedback sessions
- Using the software to run SCP training sessions
- Using the software to review sessions and generate reports

Biofeedback and Neurofeedback

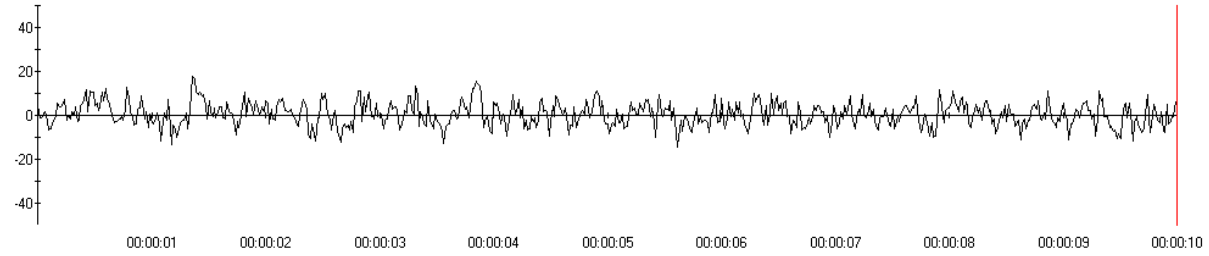
Biofeedback is a non-invasive therapeutic approach which has existed since the 1960s. It involves:

- Measuring physiological processes using specialized sensors.
- Showing a representation of the relevant physiological change to the client.
- Helping the client understand the effects of thoughts and emotions on his physiology.
- Coaching the client to learn new mental strategies and optimize self-regulation responses.

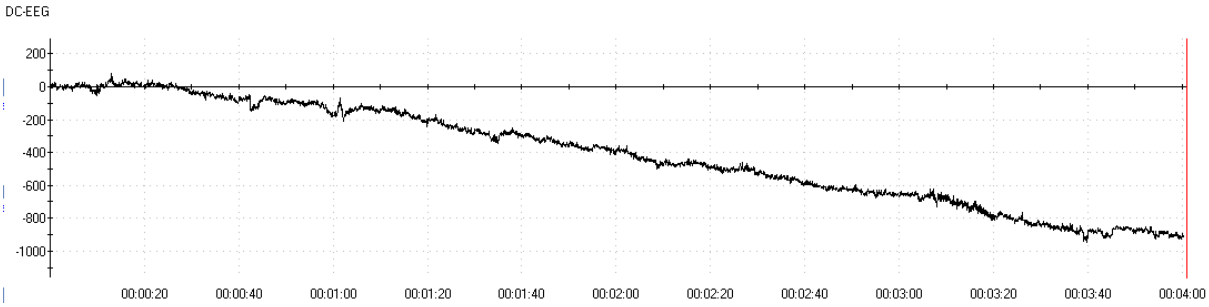
Neurofeedback is a specialised biofeedback method which involves measuring brainwaves from specific locations on the head and training the client to control the frequency or amplitude of selected brainwaves. The frequency range that is generally of interest to neurofeedback practitioners is from 1 to 40 Hertz.

Usually, neurofeedback systems filter out all slow waves below 1 Hertz to eliminate many electronic affects that may serve as artifacts and to keep the EEG signal oscillating around the zero line. SCP neurofeedback targets brainwaves which are slower than 1 Hertz.

The EEG-Z3 sensor is able to pick up very slow EEG waves (0.01 Hertz) and even direct current (DC) levels.



EEG signal with low frequencies filtered out



EEG signal including low frequencies and DC

The research article on which the SCP Suite is based describes a three-phase protocol used to teach clients to voluntarily produce positive and negative shifts of these cortical potentials. It has been demonstrated that negative shifts of potential represent cortical activation and positive shifts represent cortical inhibition. Cortical activation is related to an increase of physiological resource allocation and favors such processes as attention and cognitive function. Cortical inhibition, on the other hand, is linked to the reduction of cortical excitation, leading to a calming of mental processes. In general, training to voluntarily generate negative or positive shifts of SCP levels helps your clients by improving their self-regulation capabilities.

References

Self-regulation of slow cortical potentials: a new treatment for children with attention-deficit/hyperactivity disorder. Strehl U, Leins U, Goth G, Klinger C, Hinterberger T, Birbaumer N. ***Pediatrics***. 2006 Nov; 118(5):e1530–40. Epub 2006 Oct 23.

Slow Cortical Potentials Neurofeedback. Strehl, Ute. ***Journal of Neurotherapy***. (2009). 13:2,117 — 126.

DC-EEG in Psychophysiology Applications – A Technical and Clinical Overview. Marc Saab, Ms.Eng. ***NeuroConnections*** January 2009.

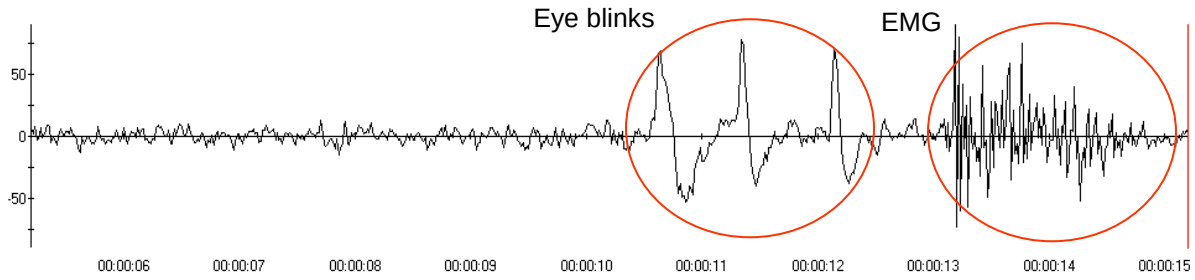
About Slow Cortical Potentials

Measuring SCPs

Properly capturing SCPs requires specialised technology and careful methodology. As with any physiological recordings, it is important to understand what the SCP signal is, what it looks like and what sorts of artifacts can distort it.

Artifacts

All EEG-based biofeedback technology is susceptible to eye blinks and muscle tension (EMG) artifacts but SCP biofeedback is affected by additional sources of artifacts which need to be monitored and controlled.



EEG signal with eye blink & EMG artifacts

DC Drift

If you place electrodes on a client's scalp and watch the signal on a graph, you will notice naturally occurring upward or downward trends in the EEG's baseline level. DC drift (direct current drift) is a very slow and long lasting upward or downward movement of the signal's baseline potential. The principal source of DC drift is electrode polarisation (there are others). This is the electrochemical effect that occurs when a metallic electrode is placed in contact with the skin using conductive paste. A chemical reaction (called the *battery effect*) causes ions in the skin to accumulate at the site of each electrode. Because ions do not accumulate around each electrode at the same rate, differences in ionic proportion are created, which generates a slowly increasing or decreasing electrical charge – or potential – between the electrodes. This is seen as a very progressive shift in the EEG signal's baseline level. In time, the electrode polarisation effect should stabilise, but this can take several minutes to several hours.

It is crucial to use sintered silver-silver/chloride (Ag/AgCl) electrodes as they are the least susceptible to polarization and exhibit the best low frequency characteristics.

Eye Movement

A more significant artifact is eye movement. When working with very low frequency signals, any movement of the eyes, such as looking up, down, or sideways, will shift the signal's baseline up or down because the eye acts as an electrical dipole. Naturally, the front of the eye is more positive and the back of the eye is more negative. When the eye rotates its position inside its orbit, the angle of the dipole shifts and this creates changes in the level of the potential of the EEG signal.

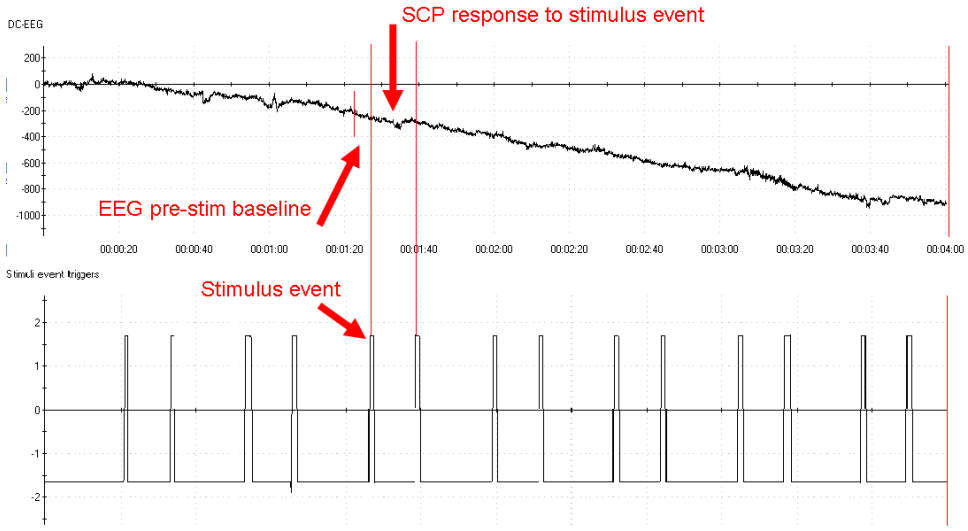
The SCP Suite incorporates real-time artifact rejection based on eye movement. The section ***Monitoring Eye Movement*** on page 9 describes how to set it up.

SCPs

Slow cortical potentials (SCPs) are in the same family of EEG signals as evoked potentials (EP) and event related potentials (ERP). A slow cortical potential is a positive or negative shift of the baseline level of the EEG which occurs in response to a stimulating event. The event that triggers the SCP can be a thought (internally generated event) or something happening in the environment (externally generated event). When simply monitoring the DC EEG signal over the course of a few minutes, many internally and externally generated events will cause the baseline to slightly shift up or down, making the task of

understanding what is happening a challenge. The only way to be certain that an event has generated an SCP is to explicitly provide stimuli at known moments in time and verify that a response was generated.

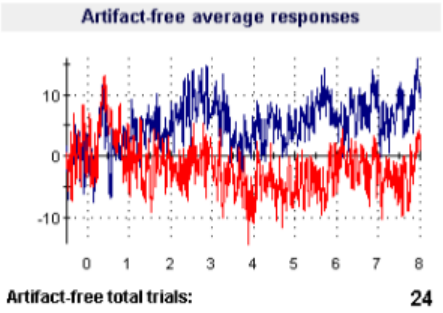
The suite uses a very precise stimulus-response technology which consists of giving a short audiovisual prompt to the client – such as ***Go positive*** or ***Go negative*** – and then monitoring the SCP signal to see if an upward or downward shift occurs in response to the prompt. Closely binding the SCP signal to the event that triggered it allows for high precision measurement of the response. The screen image below demonstrates the elements of SCP analysis:



Elements of SCP analysis

- The top graph shows the EEG signal slowly drifting downward (DC drift).
- The bottom graph shows the stimulus channel. The sharp spikes in the signal show the events which delineate the SCP response with pairs of ***Do*** and ***Stop doing*** prompts.
- The section of EEG signal that is sandwiched between the two events (shown between the vertical red lines) contains the SCP response.
- Each SCP response is measured in relation to a pre-stim baseline, calculated from a section of EEG just before the stimulus.

Because SCPs are mixed with the other frequencies of the EEG signal, individual responses are difficult to discern. In order to properly show that the client is learning how to self-regulate SCP responses, it is necessary to take the average of multiple responses. When enough responses of a given type are averaged together, the SCP waveform and direction become easier to see. The graph below shows the average of negative responses in red and of positive shifts in blue.



Averaged SCP responses

Note: *The standard display method for showing SCPs in published research articles flips the Y axis so the negative direction is upward. The SCP Suite doesn't follow the standard method. In BioGraph Infiniti, negative is down.*

Hardware Setup

This section of the manual describes briefly how to connect the encoder and the sensors, and place the sensors on the client.

Sensors and cables

These are the sensors and cables used with the SCP Suite.

TT-AV Sync

Before its first use with a client, the TT-AV Sync sensor must be connected and configured correctly. Instructions for ***connecting the sensor to the computer system*** begin on page 8. Configure the sensor by ***setting sound defaults*** for your system.

EEG-Z

In the SCP Suite, the EEG-Z sensor is used only to capture eye movement artifacts. Because this requires using gelled electrodes and it is difficult to do much skin preparation so close to the eyes, it is not required to do an impedance check on the EEG-Z sensor channel.

Instead of the regular DIN extender cable, you will need an EMG extender cable with 3 snap connectors and 3 Unigel electrodes. The signal (blue) and reference (yellow) electrodes are placed on the face and the ground (black) electrode, on the mastoid or forehead.

Electrode placement is described in ***Monitoring Eye Movement*** on page 9.

EEG Z3

Before you start recording any session with the EEG-Z3 sensor, you must run an ***impedance check*** function from within the BioGraph Infiniti software.

You must zero the sensor before its first use on a given channel on a given encoder, and then as required to maintain its accuracy.

Because you will be using the EEG-Z3 sensor in the EP/0.01Hz mode, you will need to use a sintered Silver/Silver Chloride electrode instead of the regular gold plated ones. The signal (blue) lead is placed at CZ.

Attach the reference (yellow) and ground (black) ear clip electrodes to both ears.

Electromagnetic interference and electrostatic discharges

These sensors are capable of detecting very tiny electrical signals (millionths of a Volt) generated by the human body. Therefore they are very sensitive to electromagnetic fields generated by other devices, such as radio transmitting devices, computer monitors, medical devices (for example x-ray machines), and fluorescent, halogen or neon lights.

These devices should be turned off, if they are not needed during the session. If the situation arises, keep the instrumentation 10 feet away from radio transmitting devices and 3 feet away from electronic devices (including monitors) and fluorescent, halogen or neon lights.

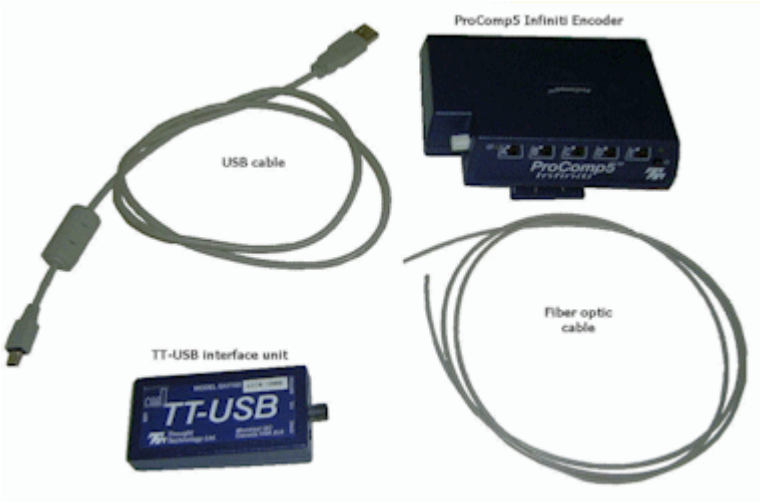
Disconnect all unused sensors from the encoder. If not connected to the examinee, they may act as antennas and capture unwanted signals that would corrupt the signal being recorded.

To prevent static discharge from damaging the sensor and/or encoder, use anti-static mats or sprays in your working area. A humidifier may also be used to help prevent static environments by conditioning hot, dry air.

Connecting the TT-USB and the ProComp5 Infiniti encoder

Note: *The SCP Suite was designed for use with the ProComp5 Infiniti encoder, although it is also compatible with the ProComp Infiniti 8-channel encoder. This manual shows the ProComp5 Infiniti encoder.*

Detailed information about your Infiniti encoder is provided in the device's hardware manual.



Unconnected hardware components

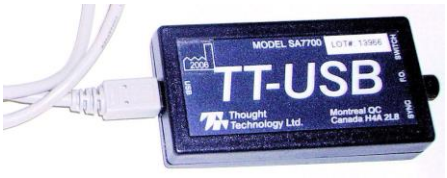
Insert one end of the fiber optic cable carefully into the fiber optic port on the encoder as far as it will go. Tighten the nut gently so that the cable won't slip out.

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

Note*: The fiber optic connectors may break if they are hit directly, for instance, if the encoder falls onto the floor. To prevent damage, it is recommended to use the encoder belt clip to fasten it to the client or to a chair.*

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.



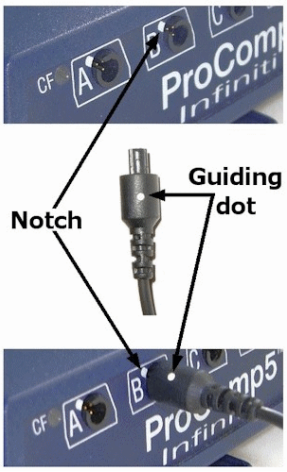
Connected hardware components

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.

Connecting sensor cables to the ProComp5 encoder

The ProComp5 Infiniti encoder and Thought Technology sensors use specially designed connectors that have all metallic surfaces recessed within the plastic casing. These connectors, with protected pins, require care when you are plugging and unplugging sensor cables to the encoder or an extender cable to the sensor head.

When connecting a sensor cable to the ProComp5 Infiniti, make sure to properly line up the guiding dot on the top of the plug with the notch in the encoder input socket, as shown in the illustration. Forcing the plug into the jack in any other position may damage your equipment.



Physical channels

Connect the sensors to the physical channels of the ProComp5 Infiniti encoder (or ProComp Infiniti encoder) as follows:

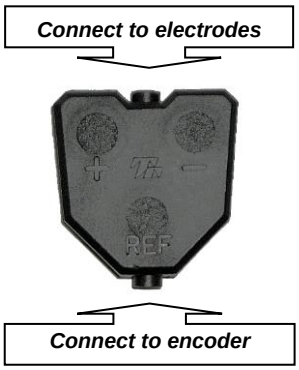
- **EEG-Z3** connects to physical channel **C**.
- **EEG-Z** connects to physical channel **D**.
- **TT-AV Sync** connects to physical channel **E**.

Correct orientation of the EEG-Z sensor

Because the EEG-Z sensor has removable cables and two input entrances, it is important to correctly orient it to the encoder so that the EEG signal is properly received.

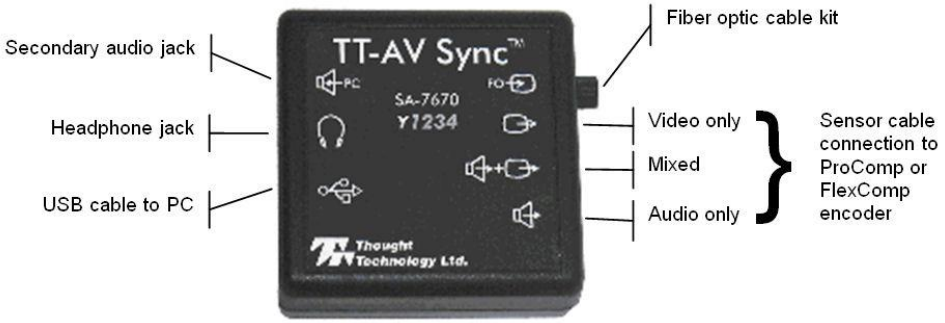
The EEG-Z is correctly oriented to the encoder when the cable connecting them is connected to the bottom entrance of the sensor. If an extender cable with electrodes needs to be attached to the EEG-Z, it should be connected to the top entrance of the sensor.

See the illustration at right.



Connecting the TT-AV Sync Sensor

The TT-AV Sync sensor has a unique cable configuration.



1. Connect the sensor to the PC using a USB cable. This powers the sensor and carries sound signals from the PC to the sensor. We recommend that you consistently use the same USB port on your PC.

   ***Note**: If this is the first time you have connected the sensor to a particular USB port, this step will trigger the automatic installation of the default drivers.*

2. Plug headphones into the headphone jack. These are used to provide audio stimuli to the subject.

   For additional monitoring, the secondary audio jack can be used. Connect a second pair of headphones or the PC speakers to the secondary jack. In both cases, the use of non-powered headphones or speakers is recommended.

3. Connect the AV Sync sensor to the encoder using a sensor cable.

   For recording SCP, the sensor cable must be connected to the *Audio only* input. You do not need to connect the fiber optic cable to the sensor, since you are using only the audio stimuli.

Configuring the TT-AV Sync Sensor

The first time you connect the TT-AV Sync sensor to any given USB port on the PC, the system will automatically install the correct device driver. (If you connect to a different USB port, the system reinstalls the driver and this procedure must be followed again; for this reason, we recommend always using the same USB port.)

Once the device driver has been installed, Microsoft Windows recognizes the TT-AV Sync sensor as a sound device. Before you use the TT-AV Sync sensor for the first time, you must set the sound defaults.

To do this, follow the Windows instructions for accessing your computer's sound playback devices.

- Select the AV Sync sound device driver (identified as **Speakers – *USB audio CODEC***) and set the volume level of this device to its maximum.
- Then select the original sound card for your computer (identified as **Speakers**, followed by the name of your PC sound card) and set this device as your default sound device.

These sound default settings ensure that the TT-AV Sync plays and triggers on audio stimuli, while allowing regular PC and BioGraph feedback audio to be played through the original PC sound card (and hence speakers or headphones connected to the PC audio jacks). Windows will retain these settings as long as you continue to use the same USB port.

Connecting the EEG-Z3 Sensor

The sensor is connected to the client using a black ear clip for the ground, a yellow ear clip for the reference, and a blue electrode for the signal. The signal electrode is placed at CZ.

1. Connect the electrode and ear clips to the sensor using color-coded DIN cables, respecting the color coding indicated in the preceding photograph.
2. Connect the EEG-Z3 sensor to the encoder using a sensor cable (T9385).
3. To select the sensor mode:
   a) Press and hold the **Set/Zero** button for about 3 seconds. The LED lights will begin to cycle through the 3 modes.
   b) Release the **Set/Zero** button when the LED lights up for the mode you want to use. For the SCP Suite, select the EP/0.01 Hz (0.01 Hz frequency cut-off) mode.

Placing the EEG-Z3 electrode

The EEG-Z3 signal electrode is placed at CZ.

The ground and reference electrodes clip to the ears.

After the initial placement of electrodes on the subject, a "settling time" of 10 to 20 minutes is usually necessary before beginning a session.

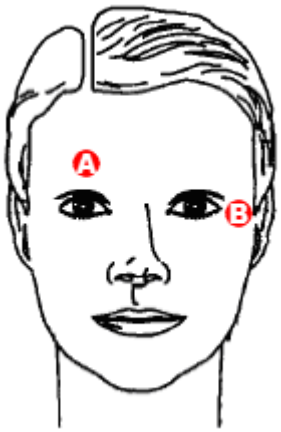
Monitoring Eye Movement

The SCP Suite includes an eye artifact (EOG) monitoring channel which permits automatic rejection of signal artifact due to eye movement. The EEG-Z sensor is used to monitor eye movement.

Although it is possible to use the SCP Suite without monitoring EOG artifact, we strongly recommend doing so because it helps generate cleaner SCP averages.

To make use of this function, do the following:

- Plug an EMG extender cable on the EEG-Z sensor and snap 3 Unigel electrodes on the electrode snaps.
- Place the ground electrode (black) on the forehead or mastoid.
- Place the signal (blue) and reference (yellow) electrodes at positions A and B.



First Time Run

After installing BioGraph Infiniti and the SCP Suite, you have to configure your software before you can record sessions. This takes only a few minutes, and can be done at the same time as you enter the key codes to activate the encoder.

Prior to the first use of specific sensors, you also need to run certain software functions.

Starting BioGraph Infiniti

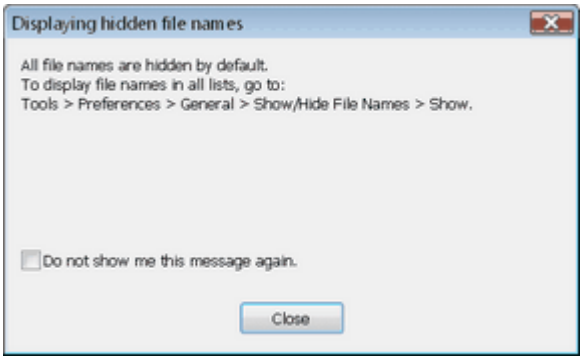
To start the program, do one of the following:

- Double-click on the BioGraph Infiniti icon, on the Desktop.
- Select **BioGraph Infiniti** in the **Start Menu** under **Program Files\Thought Technology\Infiniti**.

The first time you run BioGraph Infiniti, it pops up a message explaining how to display file names.

- Click **Close** to close the message pop-up.

If you don't want to see this message each time you reopen the software, select the check box before you close it.



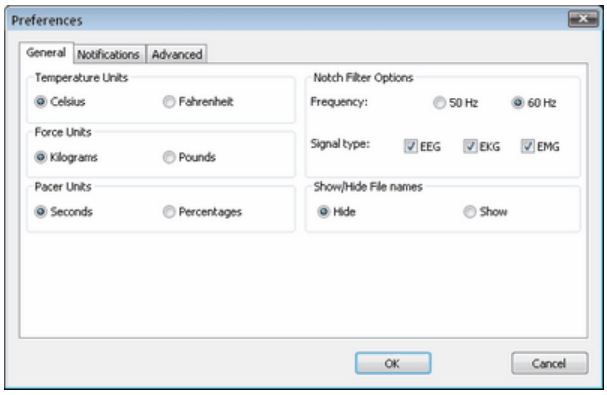
The program always starts in the **Main Menu** window.

To start a session, click the **Quick Start** button, select a client name and a **Favorite**, and then click **OK**.

Setting the Notch Filter

A notch filter removes the specific frequency caused by electrical interference from a raw signal. When using the SCP Suite, EEG signals are susceptible to electrical interference.

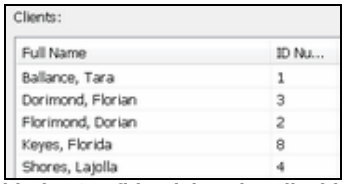
- Select **Preferences** from the **Tools** menu in the Main Menu Screen.
- In the **General** tab, select **EEG** and set **Frequency** to **50Hz** or **60Hz**, depending on the transmission frequency used in your country (60Hz for North America, for instance).



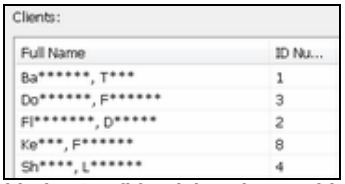
Enabling Confidential Setting

The optional **Confidential** setting helps protect clients' privacy 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.



With the *Confidential* setting disabled



With the *Confidential* setting enabled

Entering key codes

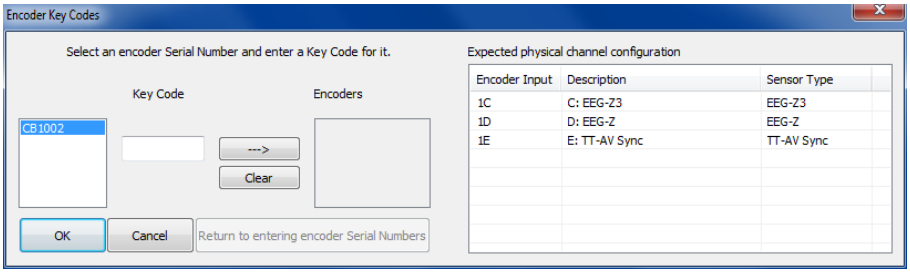
The first time you use a ProComp5 Infiniti encoder to record a session, the BioGraph Infiniti software will check for its key codes and ask you to enter them. This registers the encoder with the software, and you won't need to enter the key codes again.

***Note**: If you have more than one ProComp5 Infiniti encoder, you will need to enter key codes for each unit the first time you use it to record a session.*

1. Click **Quick Start**, select a name from the **Clients** list and a protocol from the **Favorites** list, and then click **OK**.

   The **Encoder Key Codes** dialog box opens.

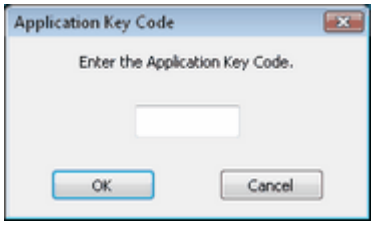
2. Click to highlight your unit's serial number in the left table (in this example, CB1002; this is the same number as on the back of the unit).



The serial number is found on the back of the encoder.

3. Enter the **Encoder Key Code** (found inside the encoder battery compartment) in the **Key Code** text box.
4. Click ---> to move the serial number from the left table to the right table.
5. When the serial number appears in **Encoders**, click **OK**.

Now the **Application Key Code** dialog box opens.



6. Enter the Application Key Code.
   This number is found in the battery compartment with the encoder key code.
7. When done, click **OK**.

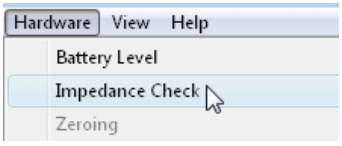
If the key codes have been entered properly and there is no problem with your encoder setup or your sensor connections, the recording screen will open.

***Note**: Detailed instructions for using the software are provided in document SA7913, **Getting Started with BioGraph Infiniti**, which is provided with BioGraph Infiniti.*

If the key codes have been entered properly and there is no problem with the encoder setup or sensor connections, you will enter recording mode.

Impedance check

It is necessary to check impedance values for EEG channels when using EEG-Z3 sensors. Impedance values indicate the quality of contact between the electrodes and the skin. You do this in the Recording Screen before starting to record a session.



From the **Hardware** menu of the Recording Screen, select **Impedance Check**. This opens the **Impedance Check** window.

Then, trigger impedance checking from your encoder. To do this:

- Ensure that the encoder's **power light** is on.
- Press and hold down the **power button** for about 3 seconds, or until the power light starts blinking.

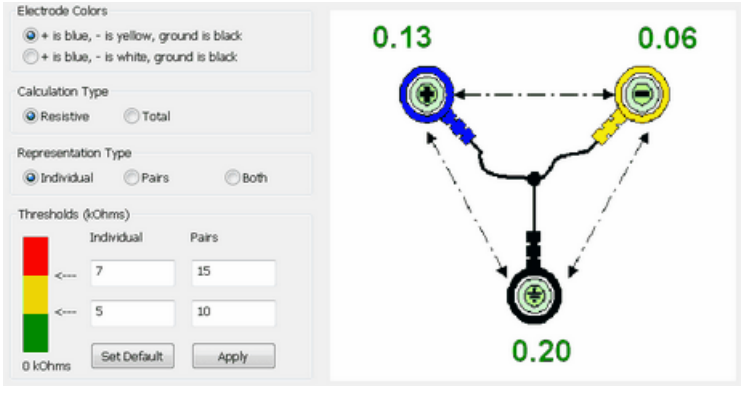
When the power light begins to blink, impedance checking mode is active.

The graphic display shows the impedance values of the selected sensor in green, orange or red.

- Green indicates a low value.
- Orange indicates a medium value.
- Red indicates a high value.

Ideally, all three measurements should display in green.

To exit impedance checking mode, press the power button down for about 3 seconds, or until the power light stops blinking.



Using the SCP Suite

This section is a step by step outline of how to use the SCP Suite. As previously mentioned, the training protocol that is implemented in the suite is described in detail in two articles published in 2006 and 2009. For more information on the scientific and clinical background supporting the protocol, please read the ***referenced articles*** listed in the **Introduction**.

The training goal of the protocol is to teach the client to voluntarily generate either positive or negative shifts in cortical potentials. Just like body building takes a lot of workouts and a lot of time, achieving this goal takes a lot of practice. The whole protocol spans over several weeks, including breaks between training periods.

The Protocol

The protocol includes three phases, each comprising a feedback training period and a resting period during which the client practices home training exercises. Each phase involves running 10 feedback sessions within 10 days and then taking a 4 to 6 week break during which the client has to practice home exercises.

Phase 1 training

Training is always done from one EEG location, at CZ. During the session, the client goes through four runs of 40 trials. A break between runs gives you the opportunity to coach the client and assess his success and fatigue level. A trial lasts for 13 seconds and consists of waiting for a prompt and then responding to the prompt by trying to generate either negative or positive shifts in slow cortical potentials. In phase 1, the client receives an equal number of positive and negative prompts (50/50).

The prompt (stimulus) consists of an audio tone (beep) and a visual cue (arrow pointing up or down). Each time the client is prompted, his task consists of figuring out and then practicing the proper conscious strategy (internally generated event) that will generate a shift in the desired direction. This is not an easy task to learn, especially at first. Coaching might include suggesting mental images of activation for negative shifts and relaxation for positive shifts. This is very personal, though, so each client may find a unique method. Allow for individualized strategies.

Trials are of two types. Feedback trials are done with a display which shows the direction prompt ***Go up*** or ***Go down***, the actual response going up or going down and a discrete reward to indicate success when the response was in the proper direction. Transfer trials are done with a similar display except that it doesn't show the actual response going up or down. The purpose of transfer trials is to teach the client to recognise how it feels to generate positive or negative shifts in SCPs without the feedback. They are essential to having the client become able to do this in everyday life. During phase 1, there are 10 transfer trials in run 3.

Phase 1: 4 runs of 40 trials

- Run 1: 50 % negativity tasks. All feedback trials.
- Run 2: 50 % negativity tasks. All feedback trials.
- Run 3: 50 % negativity tasks. 30 feedback and 10 transfer trials.
- Run 4: 50 % negativity tasks. All feedback trials.

Phase 1 rest

After the training period, it is recommended that you allow 4 to 6 weeks of rest during which the client should be encouraged to practice the learned strategies in everyday life. This can be done with visualisation exercises, during which the client should be trying to imagine being connected to the feedback system, sitting in front of the computer and going through a feedback session, especially focusing on remembering how it felt to be generating positive and negative shifts in SCP. To help your clients with this visualisation exercises, you can print and cut out ***the memory-aid card template*** provided on page 25 of this manual.

Phase 2 training

Phase 2 also comprises four runs of 40 trials but each run now includes 30 feedback and 10 transfer trials, after the feedback trials. As in phase 1, the client receives the same number of positive and negative prompts (50/50).

Phase 2: 4 runs of 40 trials:

- Run 1: 50 % negativity tasks. 30 feedback and 10 transfer trials.
- Run 2: 50 % negativity tasks. 30 feedback and 10 transfer trials.
- Run 3: 50 % negativity tasks. 30 feedback and 10 transfer trials.
- Run 4: 50 % negativity tasks. 30 feedback and 10 transfer trials.

Phase 2 rest

As for the previous phase, a 4 to 6 week period of rest and daily practice exercises is recommended. The home training exercises should include visualisation and practicing the “feeling” of doing positive and doing negative SCPs.

Phase 3 training

Phase 3 also comprises four runs of 40 trials with 30 feedback and 10 transfer trials. In this phase, the training is biased towards positive or towards negative prompts (66/34). The suite includes options for both and you can select which bias to run, based on your evaluation of your client’s needs.

Phase 3: 4 runs of 40 trials (2 biasing options):

Negative bias:

- Run 1: 66 % negativity tasks. 30 feedback and 10 transfer trials.
- Run 2: 66 % negativity tasks. 30 feedback and 10 transfer trials.
- Run 3: 66 % negativity tasks. 30 feedback and 10 transfer trials.
- Run 4: 66 % negativity tasks. 30 feedback and 10 transfer trials.

Positive bias:

- Run 1: 66 % positivity tasks. 30 feedback and 10 transfer trials.
- Run 2: 66 % positivity tasks. 30 feedback and 10 transfer trials.
- Run 3: 66 % positivity tasks. 30 feedback and 10 transfer trials.
- Run 4: 66 % positivity tasks. 30 feedback and 10 transfer trials.

Phase 3 rest

This last step marks the end of the protocol. The client should be comfortable with home practice and able to recognise everyday life situations when taking a moment to voluntarily practice positive or negative shifts in cortical potentials would be beneficial. Follow up training sessions can be recommended.

The SCP Suite

The suite is organised in a set of four Quick Start Favorites:

- SCP – Training – Phase 1 – 1 monitor
- SCP – Training – Phase 2 – 1 monitor
- SCP – Training – Phase 3 (negative bias) – 1 monitor
- SCP – Training – Phase 3 (positive bias) – 1 monitor

Phase 3 includes the option of increasing the proportion of positive or negative tasks. Run the appropriate Quick Start based on your client’s needs.

If you use a dual-monitor configuration, choose from the Quick Starts for labeled for “2 monitors”. In this configuration, the clinician’s information displays on the left monitor and the feedback information on the right monitor.

- SCP – Training – Phase 1 – 2 monitors
- SCP – Training – Phase 2 – 2 monitors
- SCP – Training – Phase 3 (negative bias) – 2 monitors
- SCP – Training – Phase 3 (positive bias) – 2 monitors

A practice session Quick Start is included so you can become familiar with the process of running SCP biofeedback sessions, but using the Practice Quick Start for running actual sessions is not recommended.

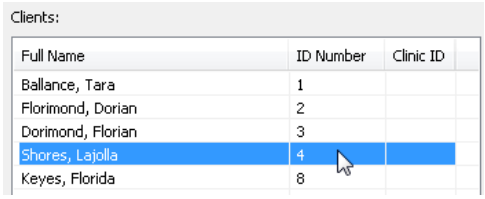
- SCP – Practice – Feedback trials – Phase 1 – 1 monitor

Running a session: Phase 1

Note: *The first time you use a ProComp5 Infiniti encoder to record a session, the BioGraph Infiniti software will prompt you to* ***enter key codes****. Follow the instructions on page 11 to do so. You will only have to do this once.*

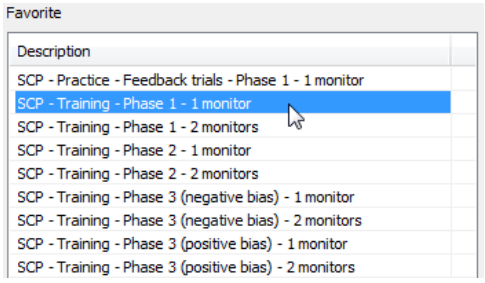
1. Launch BioGraph Infiniti and click on **Quick Start**.

2. In the **Clients** list on the left, select an existing client name or use **Add New Client** to create a record for this client.

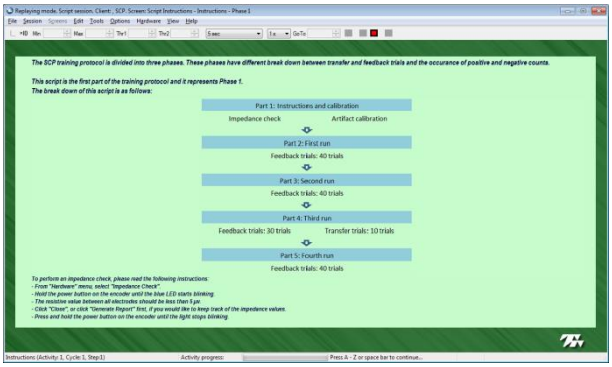
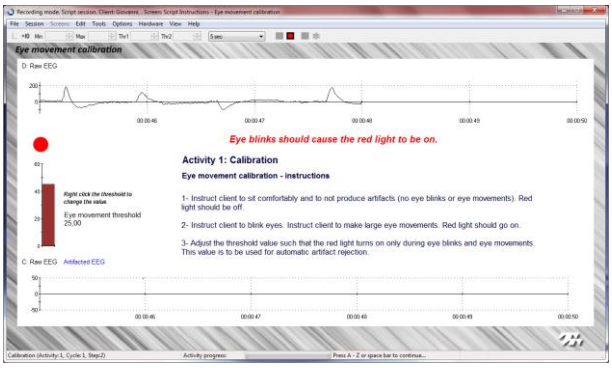
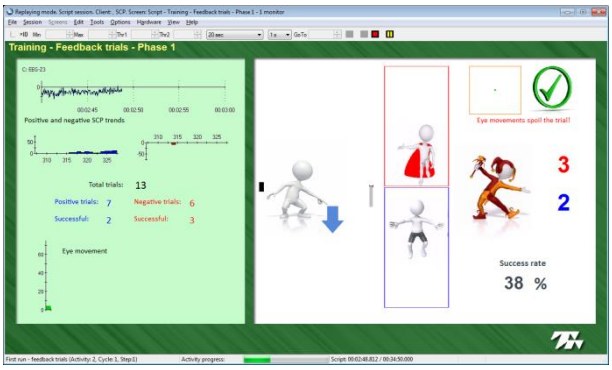


3. If the list on the right is empty, click the **Categories** drop-down list and select **SCP Suite - ProComp5 Infiniti**.

4. In the list of **Favorites**, select **SCP – Training – Phase 1 - 1 monitor** and click **OK**.



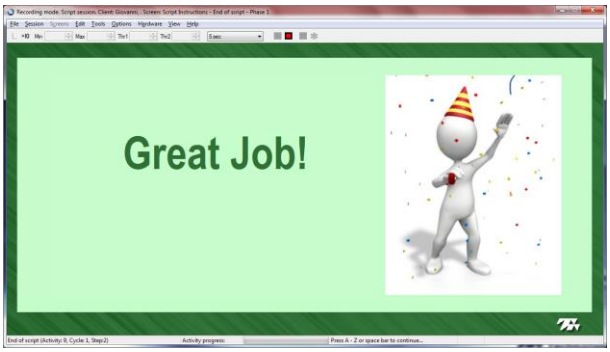
5. Ensure that:
   - The sensors are properly hooked up on the client.
   - The device is properly connected to the PC.
6. Click the **Start** button  to start the session, and follow the instructions in the ***Phase 1 screen sequence*** which follows.
7. When the script ends, click **Yes** to save the session.

Introduction screen When you launch the **SCP – Training – Phase 1 – 1 monitor** Quick Start, after selecting a client and clicking **OK**, the introduction screen appears. Describe how the session is sequenced and how the Phase 1 feedback screen works to your client and click the **Start** button when your client is ready to go.	
Instruction screen The instruction screen gives a quick overview of the protocol and what stage of it this training session represents. Use this step of the protocol to run an impedance check. Press a key to continue.	
Eye movement calibration screen This screen gives you an opportunity to instruct the client about artifacts, specifically eye movement artifacts. Follow the instructions on the screen to set the rejection threshold. Press a key to continue.	
Feedback trials screen The feedback screen shows two sections. The green area on the left includes all the clinician related information. The white area on the right is where the client gets the direction prompt and feedback. Monitor the client's success and coach him to try various internal strategies until he experiences success.	

End of script screen

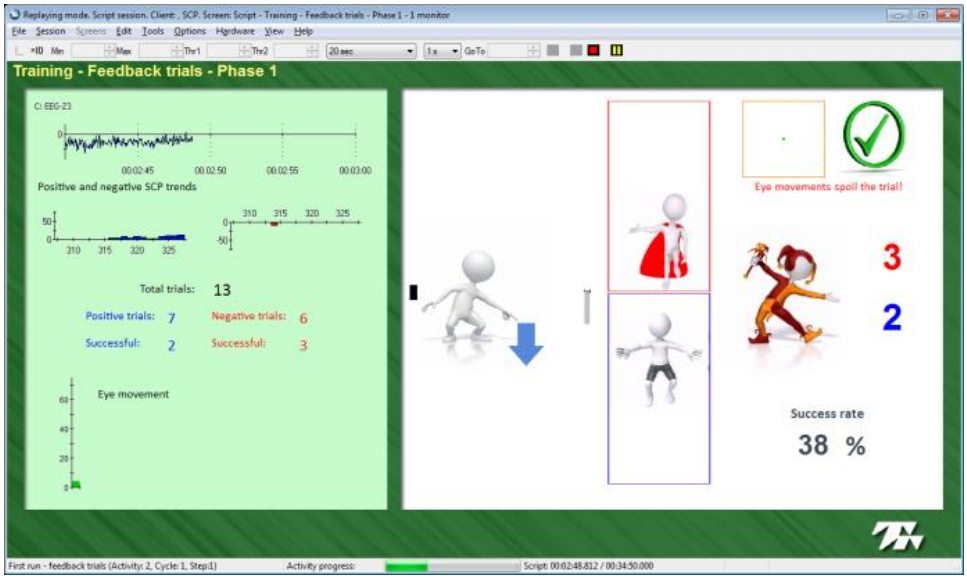
The ending screen appears at the end of the session.

Thank the client for having done a great job and carefully remove the sensors from his head.

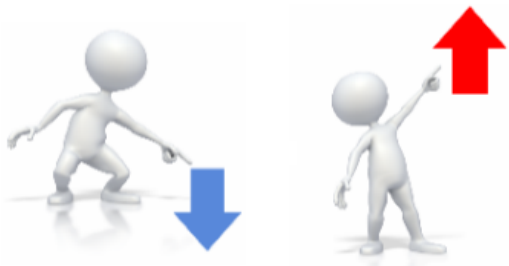


Client side information: Feedback

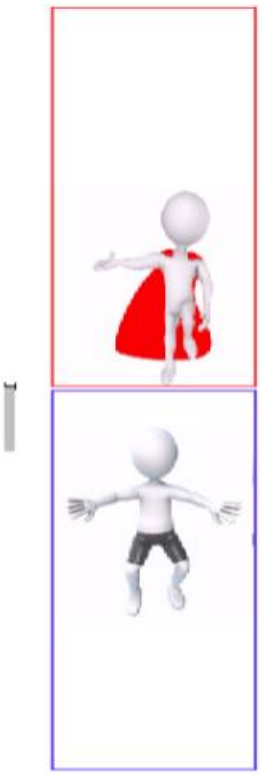
The feedback method for slow cortical potentials differs significantly from regular neurofeedback methods because of the need to closely tie the stimulus event with the physiological response. The feedback screen includes a number of components for each step of the process.



Every 13 seconds, a stimulus event is generated by the software. Each time, a short audio tone is generated through the AV-Sync device and a character pointing up or down appears on the left side of the feedback area.



From the moment of the stimulus prompt, the client has 8 seconds to try to create an upward or a downward shift in cortical potential. The success of his efforts is shown with two animations. A red character moves upward with a positive response and a blue character moves downward with a negative response. A thin grey bar, along the left side of the animations also moves up or down to show the client's actual response. If the generated potential is in the wrong direction, the animations may not move but the grey bar will always show the actual response.



Artifacts are picked up from the EEG-Z sensor electrodes that are placed near the client's eye. During the 8 seconds after the stimulus prompt, the system monitors artifacts. If the client moves his eyes during that period and the artifact level goes over the threshold that was set during the calibration period, feedback stops and the trial is cancelled. During the trial, the client can see the green square vary in size. An orange border indicates the danger zone beyond which the threshold may be crossed and the trial failed. A green check mark turns into a red X when this happens and the red and blue characters return to their original position.

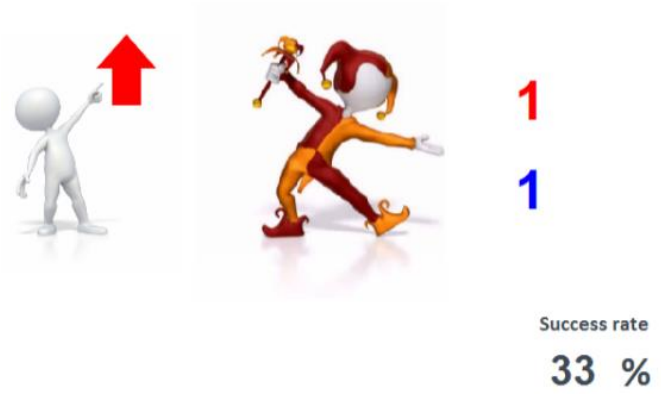
***Note**: Occasionally, an eye movement artifact that happens immediately before a trial will trigger the cancellation of the trial.*

Setting the artifact threshold: During the artifact calibration step, ask your client to blink, move their eyes around, clench their teeth and frown a few times. Have them look at the moving bar graph to help them understand what artifacts do. When setting the threshold, be sure to place it at a level that is not too low, because otherwise trials will be cancelled with the smallest amounts of artifact, which could be very discouraging to a beginner client. During Phase 2 and 3, you can consider making the artifact threshold a bit more stringent.

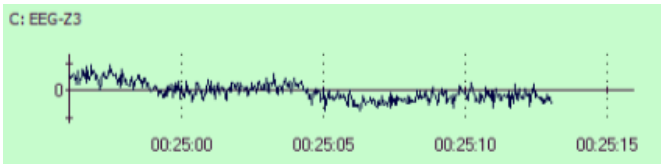
After the stimulus prompt, if the trial was successful (i.e. going in the right direction) and there was no artifact during the trial, a discrete reward is given in the form of a short Jester dance and a success sound. The red or blue counter increments when this happens.

Below the Jester animation, a number shows the success rate value. This is the percentage of all successful trials (positive + negative) compared to the total number of trials (positive + negative + failed).

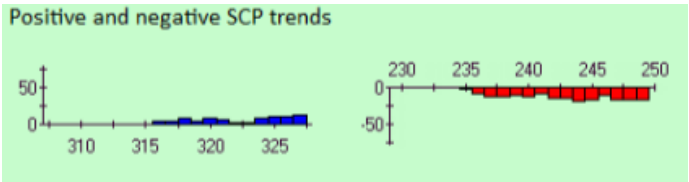
During transfer trials, the feedback screen doesn't show the red and blue characters going up or down. The feedback only consists of the final discrete reward being given if the trial was successful.



Clinician side information



The clinician side of the feedback screen shows the raw EEG signal in the top graph. Visualising the raw signal is essential because it allows you to monitor the quality of the recorded EEG and assess the level of artifact and noise. If an electrode gets unstuck, for example, this will immediately distort the EEG signal and you will be able to stop the session and correct the problem right away.

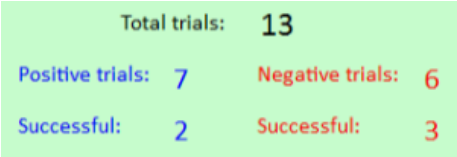


Below the raw EEG graph, two trend graphs show the actual client's SCP responses. Positive shifts are shown on the blue graph, going up and negative shifts are shown on the red graph, going down.

***Note**: On dual-monitor screens, since the prompt information is on the client side, a blue and red dot appears in front of the trend graph where the expected response should be seen.*

Looking at the feedback side, negative shifts are represented by a red character going up and positive shifts are represented by a blue character going down. This inversion can be confusing to you or to the client but the reason for it is that, intuitively, it is easier to understand **cortical activation as an increase** and **cortical inhibition as a decrease**. You do not need to explain this reversal of direction to the client but you need to understand it yourself.

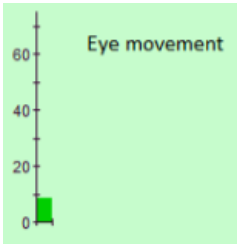
- Negative SCPs = cortical activation = upward prompt & feedback
- Positive SCPs = cortical inhibition = downward prompt & feedback



Below the trend graphs, the screen shows a number of counters:

- The ***Total trials*** value shows how many prompt events have occurred so far.
- The blue ***Positive trials*** value shows the number of ***Go down*** prompts.
- The red ***Negative trials*** value shows the number of ***Go up*** prompts.
- The blue ***Successful*** value shows the number of successful positive trials.
- The red ***Successful*** value shows the number of successful negative trials.

At the bottom of the screen, you can see a bar graph of the eye movement artifact.



Running a session: Phases 2 and 3

Training sessions for phases 2 and 3 follow a similar sequence. To launch a training session for phase 2, run the Quick Start favorite **SCP – Training – Phase 2 – 1 monitor**.

Remember that phase 3 gives you the choice of biasing the training towards more positive or more negative trials, depending on your client's needs. To launch training sessions for phase 3, run either the **SCP – Training – Phase 3 (negative bias) – 1 monitor** or **SCP – Training – Phase 3 (positive bias) – 1 monitor** Quick Start favorite.

You will notice that all screens relating to a given phase have the same background color. This color coding helps you keep track of the phase that you are currently training for. Phase 1 screens are green, phase 2 screens are blue and phase 3 screens are purple.

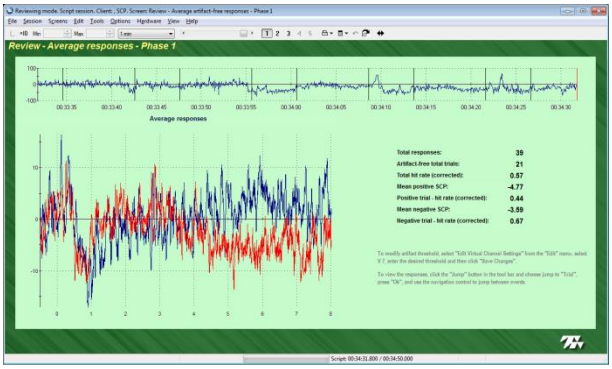
Reviewing sessions

The SCP Suite includes a number of screens that you can use to review recorded SCP data. Unlike with other neurofeedback applications, reviewing SCP Suite data is not absolutely essential because the suite is designed to automatically reject trials that were distorted by artifacts, therefore there is no need for manual artifact rejection. The various counts and statistical values that are calculated for the session are automatically generated from clean data. Reviewing sessions is nonetheless a good way for you to understand how SCP training works and see how individual and averaged SCP responses change over the course of the training.

Review – Average responses – Phase 1

This report screen shows the raw EEG signal graph, at the top, where you can also see the events demarcating each SCP response. The graph below shows the average responses in red (negative) and blue (positive). The table of values, on the right, lists all the key SCP metrics.

You can use the **Jump to Event** tool to skip from SCP to SCP and see how each response affects the average.



Review – Average processed responses – Phase 1

This report screen shows the raw EEG signal graph, at the top, where you can also see the events demarcating each SCP response. The graph below shows the average responses in red (negative) and blue (positive). These signals are generated from the processed EEG that is used to generate SCP feedback during training (using a sliding window average). The table of values, on the right, lists all the key SCP metrics.

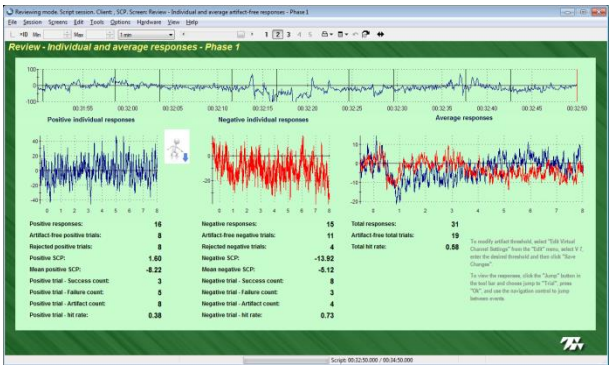
You can use the **Jump to Event** tool to skip from SCP to SCP and see how each response affects the average.

Review – Individual and average responses – Phase 1

This review screen is similar to the previous screen but also shows graphs of the individual responses. As you jump from one trial to another, you can see the stimulus image that the client saw when generating the selected SCP response.

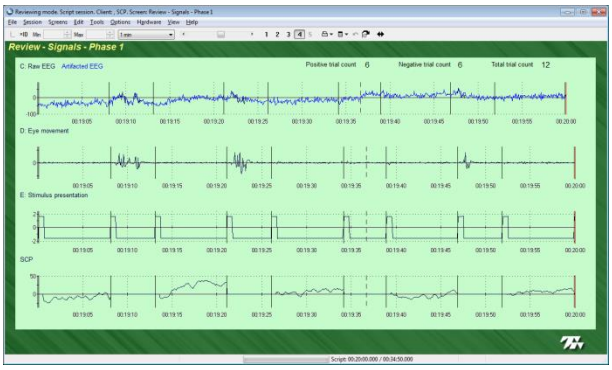
***Note**: If the trial was cancelled because of artifacts, the graphs will not be updated.*

A detailed table of values, at the bottom, lists all the relevant SCP metrics.

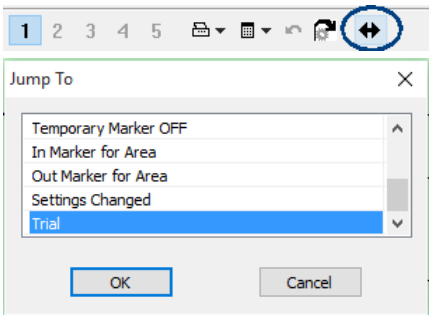


Review – Signals – Phase 1

This review screen shows the raw components of SCP. The top graph shows the raw and artifacted EEG. The graph below shows the eye movement signal. Below that, you can see the stimulus presentation events, delineating individual responses. At the bottom, you can actually see individual responses clipped from the raw EEG and shown from a zero baseline.

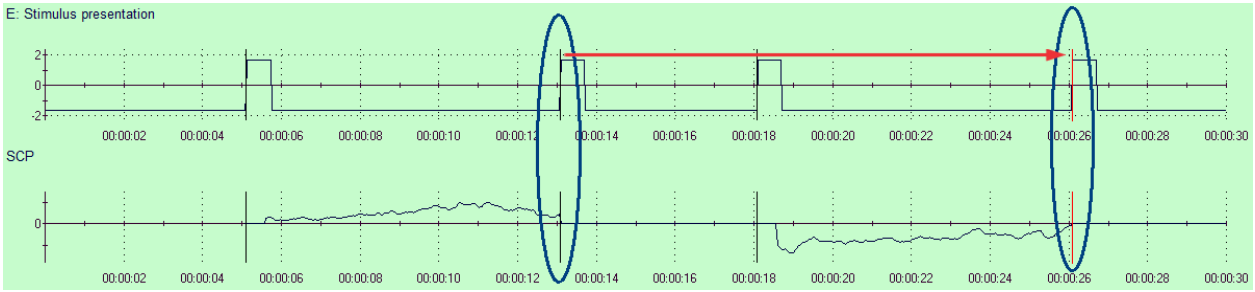


When reviewing a session, you can open the BioGraph Infiniti **Jump to Event** tool to help you review each event, one at a time. To do this, click on the **Jump** button in the toolbar, then scroll down and select the event type **Trial** from the list and click **OK**.



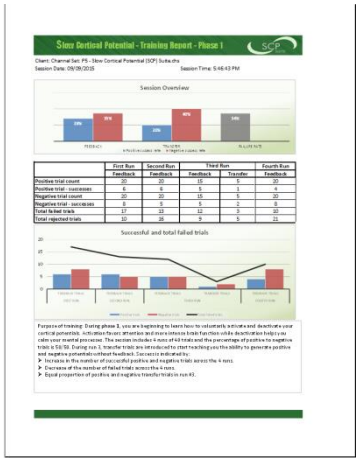
The **Jump To Event** tool works like a video recorder. Click on the buttons **First**, **Previous**, **Next** and **Last**, to scroll through the session, one SCP at a time.

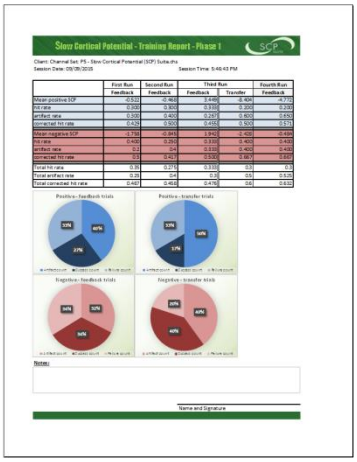
The red vertical line on the graph is the time marker. Each time you click **Next**, the time marker jumps to the end of the next SCP response. As you do this, any SCP average graph is updated to include the new response in the average. You can use the ***Jump Tool*** on any of the review screens.



Reporting on sessions

There is a specialised Excel report for each phase of the SCP feedback training protocol. Excel reports include a smaller set of metrics than are shown on the review screens. The purpose of these reports is to provide you and your clients with an easy to understand print-out of a training session. You can print out a report for each training session or one at the beginning of the training period and one at the end.





Ideally, as the client learns to voluntarily generate positive or negative SCP responses, this success translates into visible changes that you can use as further reinforcement to encourage the client to continue with the training sessions.

As with feedback screen backgrounds, the Excel reports are also color coded, so phase 1 reports are green, phase 2 reports are blue and phase 3 reports are purple.

Excel Reports include:

- A session overview at the top, showing the percentages of successful positive and negative feedback and transfer trials, as well as the percentage of failed trials.
- A table and graph of the run-by-run comparison of total number of positive and negative successful and failed trials – for both feedback and transfer trials.
- A general description of the clinical goals that are to be achieved during this particular phase of training.
- A table of hit rate statistics for the 4 runs.
- Pie charts showing the proportions of success, failed and cancelled trials for the whole session.

SCP metrics

When reviewing and analysing slow cortical potentials, there are a number of metrics that you can use to assess your client's outcome and evaluate his success at learning how to voluntarily generate negative or positive SCP changes when prompted. Except as noted, these numbers are shown on both the review screens and the Excel Reports.

Definitions:

Since the stimulus-response process used for SCP feedback is a bit more complicated than the regular neurofeedback methods, it is important to understand what each term represents.

Trial: In general, this term is used to describe the "task" that the client has to perform upon request. In the SCP suite, a trial is the "stimulus" and includes an audio cue, the "beep" tone, and a visual prompt, showing an image of a blue arrow pointing down or a red arrow pointing up. The term "trial" is often used to represent the stimulus-response complex as a whole, including both the stimulus and the response.

Response: The response is whatever happens in the EEG signal during the 8 seconds following the stimulus. The cortical potential is affected by the client's efforts at generating shifts in the desired direction. A successful response depends on how well the client has learned to do this, and it has to be (1) in the desired direction, (2) of sufficient amplitude and (3) not distorted by artifact. Each element represents a different skill that needs to be learned.

Count: Progress over time is measured by keeping track of a number of key elements. By comparing the number of successful responses, from run to run and session to session, you can tell that the client is learning if the Success Count increases, for example.

Event count metrics:

Total trials: The total number of stimuli, positive and negative, presented to the client during the session.

Positive/negative trials: The total number of positive or negative stimuli presented to the client.

- Positive trials+ Negative trials= Total trials.

Artifact-free positive/negative trials: Total number of positive or negative trials, with successful or failed responses, with NO artifacts.

Rejected positive/negative trials: Total number of positive or negative trials that were rejected because of artifacts.

- Artifact-free positive/negative trials + Rejected positive/negative trials = Positive/negative trials.

Positive/negative trial – Success count: Of all positive/negative responses, this is how many were successful (shift in the desired direction with no artifacts)

Positive/negative trial – Failure count: Of all positive/negative responses, this is how many had no artifacts but were not in the right direction.

Positive/negative trial – Artifact count: Of all positive/negative responses, this is how many were cancelled by artifacts.

- Positive/negative Success + Positive/negative Failure + Positive/negative Artifact = Total trials.

Positive/negative trial – Hit rate:

The hit rate values are ratios which indicate learning when compared from session to session. An increasing hit rate means that the client is becoming more successful at achieving the desired goal.

- Hit Rate = Positive/negative success count ÷ Positive/negative trials.
- Hit Rate (corrected) = Positive/negative success count ÷ Positive/negative artifact-free trials.
- Positive/negative Artifact hit rate = Rejected positive/negative trails ÷ Positive/negative trials.

***Note**: All three hit rates are shown in the Excel report. Only the corrected hit rate is shown on the review screen.*

Artifact-free total trials: Total number of artifact free trials.

- Artifact-free positive trials + Artifact-free negative trials = Artifact-free total trials.

Total hit rate (corrected): This hit rate reflects how successful at both positive and negative shifts the client is. This is the ultimate clinical goal.

- Total hit rate = Positive success count + negative success count ÷ Artifact-free total trials.

Micro-Volt metrics:

A couple of metrics qualify the actual EEG signal recorded during the response. These values are calculated in microvolts.

Positive/negative SCP: This value is the average amplitude of the selected positive/negative response. Because the EEG signal can be slowly drifting upwards or downwards, the SCP suite calculates the mean EEG amplitude over a 1 second period prior to the stimulus, in order to calculate the SCP amplitude from the relative position of the baseline (and not its absolute value on the microvolt scale).

Mean positive/negative SCP: This is the running average of all positive/negative SCP values.

SCP Training Cards

Technical Specifications and Support

Technical specifications

EEG-Z3 Sensor (SA7680Z)

Accuracy	≤ 1%, ±0.3μV_{RMS}
Input Impedance	Differential: 100GΩ paralleled with 270pF Common-mode: 100GΩ paralleled with 200pF
Noise	< 0.5 μV_{RMS}
CMRR (excluding CM signal active cancellation)	> 100dB
CM active cancellation effect	> 40dB @10-120Hz
Electrode offset tolerance (Slow AC and DC modes)	±100mV
Bandwidth, lower cutoff, 3dB EP/.01Hz mode	0.01 Hz
Bandwidth, lower cutoff, 3dB, EEG mode	1.5 Hz
Bandwidth, upper 3dB (all modes)	1600KHz

TT-AV Sync Sensor (T7670)

Audio detection accuracy (silence-to-sound transition)	<200µs
Audio detection recovery (sound-to-silence transition)	<200ms **Not intended** for sound to silence detection.
Audio headphone impedance	16Ω, single headphone 8Ω, dual headphones
Visual trigger delay time (black to white)	<200µs
Visual trigger recovery time (white to black)	<150ms **Not intended** for white to black detection.
Isolation (PC side to encoder side)	4kV VAC($_{RMS}$)

EEG-Z Sensor (SA9305Z)

Size	37mm x 37mm x 12mm (1.45” x 1.45” x 0.45”)
Weight	25g (1oz)
Input impedance	≥10GΩ paralleled with 10pF
Signal input range	0 - 200μV_{RMS}
Sensitivity	<0.1μV_{RMS}
CMRR	>130dB
Channel bandwidth	2Hz - 1kHz
Accuracy	±0.3µVRMS ±5% of reading @10°C to 40°C

ProComp5 Infiniti (SA7525)

Size (approx.)	130mm x 95mm x 37mm (5.1” x 3.7” x 1.5”)
Weight (approx.)	200g (7oz)
Power source	4AA batteries, single use alkaline or NiMh Rechargeable
Supply voltage	3.6V – 6.5V (fiber optic), minimum 4.0V (Compact Flash)
Battery life, Alkaline cells	30h typical, 20h minimum
Low-battery warning	20 – 30 minutes of battery life remaining
Sensor supply voltage	7.260V ± 2mV
ADC output	14bits
Full-scale input range, DC	2.8V±1.696V
LSB magnitude	207µV
Encoder channel bandwidth (3dB) and sample rate	DC – 512Hz @ 2048 samples/second DC – 64Hz @ 256 samples/second DC – 64Hz @ 200 samples/second DC – 8Hz @ 32 samples/second DC – 8Hz @ 20 samples/second
Anti-aliasing filter	5th order Butterworth
Alias rejection	30dB typical
DC gain accuracy	±0.5% (initial, or after self-calibration)
DC offset	±3LSB (initial, or after self-calibration)
Overall system accuracy	5%
Offset drift, calibration temperature ±10C	±5 LSB
Encoder noise	150µVRMS, 1mV p-p typical, offset removed
Temperature (operation)	+10C – +40C
Humidity (non-condensing)	10% – 90%
Atmospheric pressure	700 – 1060 KPa

Ordering and Support

Placing Orders

Outside USA

Tel: 1-514-489-8251

Fax: 1-514-489-8255

E-Mail: mail@thoughttechnology.com

Or contact your local authorized distributor.

In USA Toll-Free

Tel:1-800-361-3651

Technical Support

Outside USA

Tel: 1-514-489-8251

Fax: 1-514-489-8255

E-Mail: techsupport@thoughttechnology.com

Or contact your local authorized distributor.

In USA Toll-Free

Tel: 1-800-361-3651

Warranty

The hardware (encoder and sensors) is guaranteed to be free from defects in material and workmanship for 1 year from the date of purchase.

In the unlikely event that repair is necessary, contact Thought Technology Ltd. to receive a Return Authorization number. Then send the unit back by a traceable method. Thought Technology will not be responsible for items not received. We will repair or replace your unit(s) that are still under warranty free of charge.

This warranty does not apply to damage incurred through accident, alteration, or abuse.

This warranty does not cover damage to the ProComp5 encoder or the sensors caused by obvious mechanical mistreatment of the system.

Software Return Policy

All Software and Suites are non returnable/non refundable unless a complete system, including hardware, is returned at the same time. If a customer thinks there may be a possibility of returning the items, then they can ask for a 30-day temporary key code at the time of sale, which would allow them to use the software on a thirty day trial basis. If the customer chooses to keep their system, at the end of 30 days, a new permanent key code will be issued. If not, the software usability will expire. This applies to the BioGraph Infiniti, the Developer Tools and all Suites and/or additional software CDs sold by Thought Technology and Authorized Distributors of these products.

Returning Equipment for Repair

Before returning the equipment, please contact first our service department and get an authorization number (RA number).

 Canada and International +1 514 489-8251

 USA 1-800-361-3651

 service@thoughttechnology.com

Then fill in the return form (the form can be found at the end of the manual). You must provide a detailed description of the problem you are experiencing, and your telephone/fax number and e-mail.

The unit(s) must be sent **postage prepaid** and **insured**, with proof of purchase to one of the addresses below.

All customs and duties charges will be billed to the customer if incurred by sending the unit to the **wrong** address.

In the USA, ship insured to:	In Canada, ship insured to:	For international, ship insured to:
Thought Technology Ltd. Cimetra LLC 8396 State Route 9 West Chazy, New York 12992, USA	Thought Technology Ltd. 8205 Montreal/ Toronto Blvd. Suite 223 Montreal West, Quebec Canada H4X 1N1	Thought Technology Ltd. 8205 Montreal/ Toronto Blvd. Suite 223 Montreal West, Quebec Canada H4X 1N1 Package must be marked “Broker: Livingston International – 133461”.

Repair Return Form

Be sure to call for authorization before returning any equipment!
Copy and complete this form and include it with the unit(s).
Include a copy of the original invoice and return to the address in the Returning Equipment section.

Name _____

Company _____

Address _____

_____

_____

Phone No. _____

Fax No. _____

Date Purchased _____

From Whom _____

Model Name _____

Serial No. _____

Problem _____

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