CalmLink Biofeedback Software
GSR2* Computer Interface
User's Manual

BiofeedbackZone.com

http://www.BiofeedbackZone.com

Mindgrowth.com

http://Mindgrowth.com

<p style="text-align:center">Revision History</p>

REVISION	DATE	CHANGES	AUTHOR
1.0	08/03/03	Original	GK
1.1	08/11/03	Software Release 1.0	VT
1.2	11/20/03	Software Release 1.1	VT
1.3	03/16/04	Software Release 1.2: Added additional features section	VT

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1. Introduction

1.1. Our Age of Stress

 It is ironic that today, when technology and science have provided our society with so much, when so many of us eat better, live better, enjoy so much leisure and comfort more than any other people in history, we suffer from such widespread stress and tension.

Unless we live protected lives as virtual hermits on some island paradise, stress is very much with us – unfortunately for many far too much. The dangers of excessive stress to our mental and physical health are well documented, the all-too-frequent answer being a reliance on alcohol or tranquilizing drugs. Fortunately, people are seeking new ways to cope, and are making everything from active sports to personal development programs, mediation and biofeedback training part of their everyday routines.

The ability to calm down and relax deeply is a powerful antidote t the effects of stress. The problem is that although all of us are born with this ability, it's something we often have to re-learn.

1.2. Body Language

When you're under extreme stress, your body copes in ways that are very noticeable. Your heart pounds, your hands perspire, muscles tense up, and extra adrenaline is released.

But not all stress is so extreme. Unfortunately, what really wear us down are lower levels of stress that occur constantly and that most of us accept as inevitable. Our bodies respond to this type of stress with much lower signals that mostly go unheeded. Now, biofeedback is enabling us to observe and modify these signals.

1.3. Biofeedback Explained

Biofeedback is an exciting field that combines physiology and psychology. The biofeedback techniques use electronics to detect and amplify internal body activities too subtle for normal awareness.

Once you are able to observe these activities, you can then try to modify them. Because you learn immediately whether you have succeeded or not, you can gradually teach yourself to produce the desired results.

1.4. Listen to you skin

One of the principle ways your body reacts to tension and stress is through your skin and what scientists call galvanic skin resistance.

This galvanic skin resistance, or GSR, is a reflection of variations in your sweat gland activity and pore size, both of which are controlled by the sympathetic nervous system. When you become excited, frightened or disturbed to any degree, the system activates chemical and physical changes all through your body. Your GSR level also changes.

Your skin resistance increases when you are calm and relaxed. When you tense up even slightly, your skin resistance decreases.

By letting you hear those increases and decreases; the GSR2 monitor can give you new awareness of the internal stat of your mind and body and help you develop the ability to control tension and stress.

The preceding section is an excerpt from the GSR2 manual.

2.   System Requirements

2.1.   Computer Hardware Requirements

- IBM PC compatible computer. Pentium 1 or later. A Pentium-IV 1.7GHz processor is recommended.
- Sound Blaster compatible sound card with a microphone input jack
- At least 256-color monitor, minimal resolution 800x600.
- Mouse/keyboard
- At least 10Mb of free space on a hard drive
- 128 Mb or RAM (256Mb or more recommended)
- CD Rom player 24X or greater (for installation from CD-ROM disk)

2.2.   Computer Software Requirements:

- Microsoft Windows 98, 98SE, ME, 2000 or XP Operating System

2.3.   Biofeedback Hardware Requirements:

- Thought Technology GSR2 or GSR/Temp2X.
- CalmLink Cable

3.   Software Installation

3.1.   Installing CalmLink Software from CD-ROM

Insert the CD into your CD-ROM drive. The CalmLink setup program should run automatically. If it does not, double-click on the SETUP.EXE icon from your Windows Explorer application on CD-ROM drive.

The SETUP program installs all necessary files and creates a program group for you so can you start up the program by simply clicking on an icon from within the program manager. The default installation directory is C:\Program Files\CalmLink]

You can also add a CalmLink desktop icon to your desktop when installing CalmLink. Or at any time by going to Start / Programs / CalmLink; right click mouse then left click Shortcut.

4.   Getting Started

4.1.   Conventions in this Manual

The following conventions have been used in this manual.

There are screens for the main sections. Sub-screens are shown to clarify complicated screens

Notes and Tips are in italics.

4.2.   GSR2 - Test the battery.

If you have not changed the battery in your GSR2 for 6 months or more it is suggested that you check the battery and change it if necessary before using CalmLink.

4.3.   Connecting the GSR2 to the Computer

The CalmLink cable has a stereo jack at each end. They are of slightly different sizes (2.5 mm and 3.5mm).

Insert the smaller plug on the connector cable to the output jack of the GSR2 (the smaller, front Jack). Insert the other jack (3.5mm) into the Microphone input jack on your computer. Typically this jack is next to the external speaker output jack on the back of your computer. See your computer manual for additional information.

5.   Temperature Capability

CalmLink is designed primarily for use with the GSR2 to do **G**alvanic **S**kin **R**esistance biofeedback. The GSR2 also has the capability of doing temperature biofeedback with the temperature probe (included with the GSR/Temp2X).

5.1.   Performing Temperature Biofeedback

Temperature biofeedback with the GSR2 and CalmLink is nearly identical to doing GSR biofeedback. Follow the instructions for GSR2 biofeedback, with the following changes. Do not put your fingers on the built in GSR electrodes or use the remote GSR electrodes. Instead, plug in the temperature probe and attach to your finger in the regular manner. Follow the instructions for getting "in range".

Note: The tone and graph line will <u>fall</u> as temperature rises. This follows the tone down/line down protocol for positive biofeedback performance.

The change is relative to your starting temperature. For absolute change use a thermometer to give the absolute before and after temperatures.

All other features act the same as with GSR feedback.

6. Main window screen
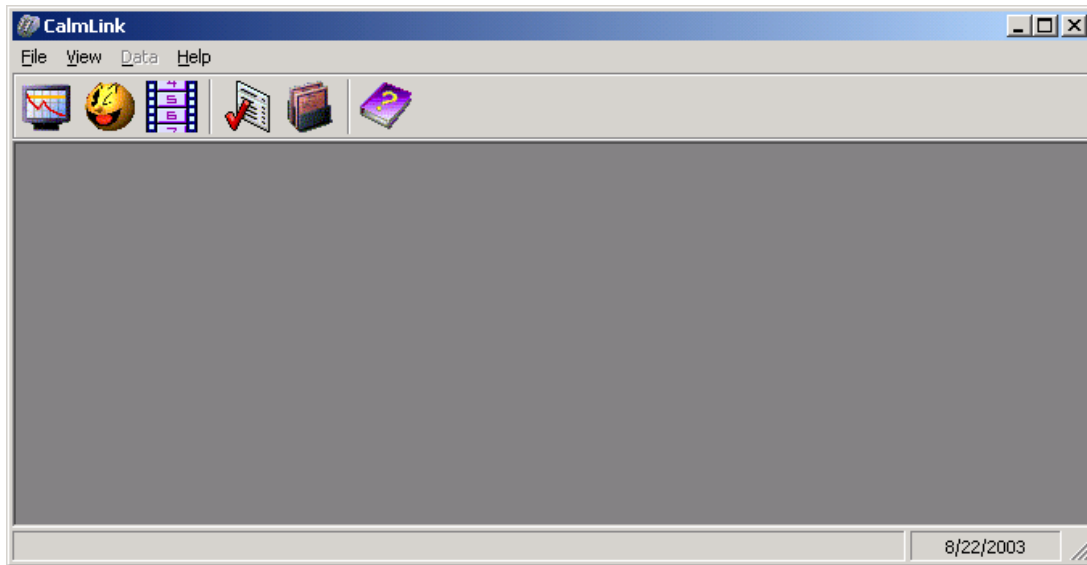
Item	Description
File Menu	Start with…(Graph, Game, Animation), Edit Configuration, Exit
View Menu	Toolbar, Status Bar, Options
Data Menu	Session Data, Data Analysis and Open Report
Help	Contains Help Menu, Contents, Search For Help on…About CalmLink
Graph Icon	Starts Session with Graph
Game Icon (Winking Sun)	Starts Session with Game
Animation Icon (Film Strip)	Starts Session with Animation
Options Icon (Check List)	Opens options Dialog box Preferences, Sound, Graph, Markers, Device
Session Data Icon	Opens session data Dialog box Session data, create report
Help	Help menu

6.1. File Menu

File / Start with/ Choice to start with graph, game or animation

Note: In all feedback modes (graph, animation, and games) the Check Device Pop-Up Window appears after you click on the choice of modality (graph etc.). Follow the directions in the Pop-Up menu to set CalmLink in the useable range. <u>See 6.1 –First Time User</u>.

Edit Configuration

Opens Dialog box for custom configuration. You can name the individual configurations and save them.

Exit

Closes program.

6.2. View Menu

Submenu contains Tool Bar and Status Bar check boxes and Options pop-up window.

Options

The Options Dialog box includes:

User defined default settings for: Settings of graph, game and animation.

Sound. Set sound default setting.

Graph. Default settings for: colors and screen trace time.

Markers. Name the 9 markers available for the graph. Highlight the marker you wish to rename and type in the new name. When all changes have been made click Apply then OK.

6.3. Data Menu

Session Data, Data Analysis and Open Report.

Save Data export it and write notes on your sessions.

6.4. Help Menu

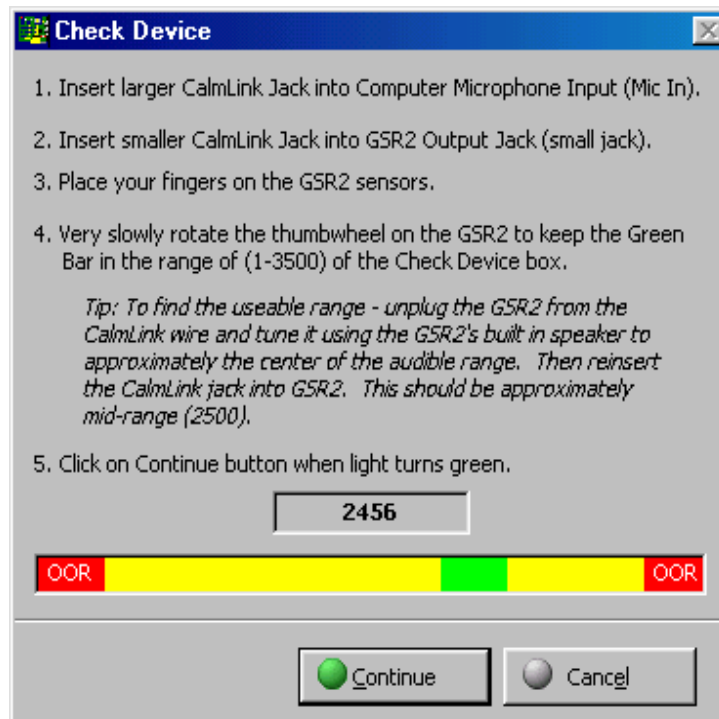Contains the Help Menu, Help Contents, Search for Help, and about CalmLink.

6.5. Toolbar

Icons to start the session with: Graph (graph icon); Game (Winking Sun); Film Strip (Animation).

- Options Dialog Box

- Data Dialog Box

- Help Menu

7. Setting GSR2 / CalmLink - Out of Range (OOR)

7.1. First time user

After opening the program and choosing a feedback modality (graph, game or animation) the "check device" box appears. You must set the level on the GSR2 within the useable frequency range using the thumbwheel on the GSR2.

The simplest way:

- Plug the connector cable into the computer and the GSR2.

- Then unplug the GSR2.

- With your fingers on the GSR2 sensors, listen to the sound from the GSR2's built-in speaker. For the default program – Pentium 4. Tune the sound to the very top of the audible range. For the Pentium 3 version - tune it into the middle of the audible range (approximately).

- Plug the CalmLink jack back into the GSR2.

- Wait at least 2 full seconds while the computer processes the signal.

Note:

1. We recommend the first time you use CalmLink you begin in Graph mode. When you are comfortable with the program try the animations and game.

2. Depending on your computer and soundcard specifications it can take the program a few seconds to process the signal. Once you are in range the green continue light will show (see diagram). Click on continue. The program will start with the modality you have chosen.
We recommend you begin with the Graph modality in your first few sessions with CalmLink.

Tip: The first time you use the program it may require some experimentation to set the tone in the useable range.

7.2.   Reset Out of Range (OOR) During Sessions

Depending on a number of factors (skin type, stress level, caffeine intake, etc.) you may go OOR one or more times during a relaxation session. This typically happens in the first few minutes of a session while you are setting your base level and beginning your relaxation program

Tip: When using the program you may go above or below the useable (audible) range. If you went off at the top, turn the thumbwheel <u>clockwise</u> 1/8 inch to get back into range. If you were at the bottom of the range and go OOR, turn the thumbwheel <u>counter clockwise</u> to get back into range. Wait a full 2 seconds before turning the wheel an additional 1/8".
If you cannot get back into range unplug the GSR2 and "tune" it to the mid-audible range using the GSR2's built in speaker. Then re-plug in CalmLink cable.

8.   Graph

Use either: File / Start with…/ Graph, or click on the graph icon on the toolbar. The program will load the graph and pop up the Check Device Screen. After you have centered the signal the graph will load with the default settings.

Note: The Windows protocol allows many of the same commands to be accessed through the menu or by clicking on specific icons.
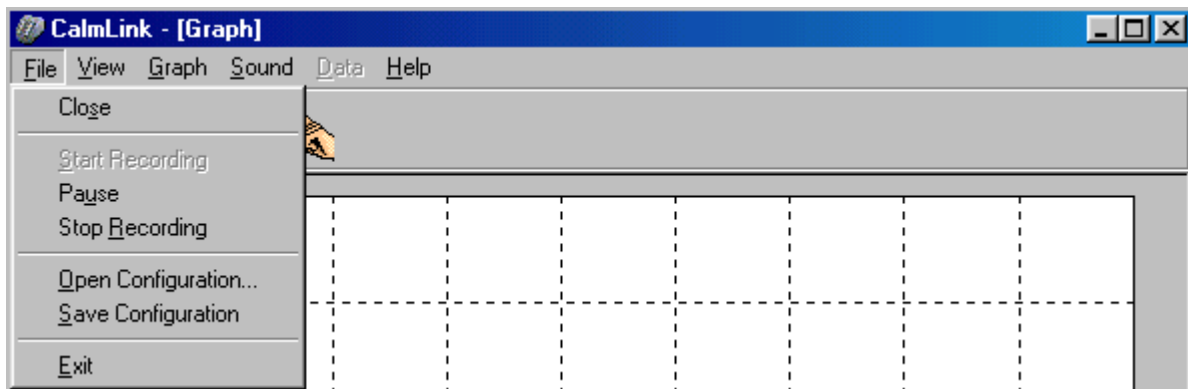
8.1. File Menu

Contains: Close; Start Recording; Pause; Stop; Open Configuration; Save Configuration; Exit.

Close	Closes the session, returns to main menu
Start Recording	Begins recording the session *Note: Sessions begin automatically. You must restart a session by clicking on start if you want to save the data at the end of the session.*
Pause	Pauses the session.
Stop	Stops the session. *Note: If you started the session with Start Recording you will now be prompted to save the session. You can save the session or click on close.*
Open Configuration	Opens the configuration Dialog box.
Save Configuration	Save the new configuration
Exit	Exit the program.

8.2. View Menu

Includes Toolbar and Status Bar checkboxes and Cool Bars and Color Bars drop down lists.

Toolbar Checkbox

Check on /off to insert toolbars above graph. There are 4 toolbars (coolbars) available and they are chosen <u>first</u> as click boxes from the Cool Bars Toolbox drop down list.

Status Bar

Check on to insert status bar at bottom of graph. The status bar contains:

1. The point on the range (vertical) axis, as a digital number;

2. The legends: C for center, I (increased) range; O (decrease) range. By pressing the C key the plot centers in the middle of the screen. Press the "I" key to zoom in, magnifying the change in

skin resistance (relaxation). Press the "O" key to zoom out and minimize the sensitivity of the graph.

3. The date.

Cool Bars Toolbar

The Cool Bar toolbar has many useful items to customize and enhance your graph. There are 4 separate toolbars available as click on choices in View Menu / Cool Bars

1. General Coolbar. Choice of graph, game or animation.

2. Process Coolbar: Start, Stop, Pause buttons.

3. Sound Coolbar. Choice of sound options

4. Graph Coolbar: Graph specific buttons and drop down boxes to customize the graph. They are explained separately. Section - 7.6 Graph Toolbars.

Color Bars

The Color Bar shows two check boxes: Gradient and Spectrum. The two color bars are at the bottom of your screen. Both show the changing relaxation level as changes in color. Gradient - as changing hues within one color. Spectrum – as changes in a rainbow of color.

Note: In regular mode both these horizontal bars shrink left as you relax. In reverse they fill right as you relax.

8.3.   Graph Menu

The features on this menu can also be accessed from Graph Coolbar.
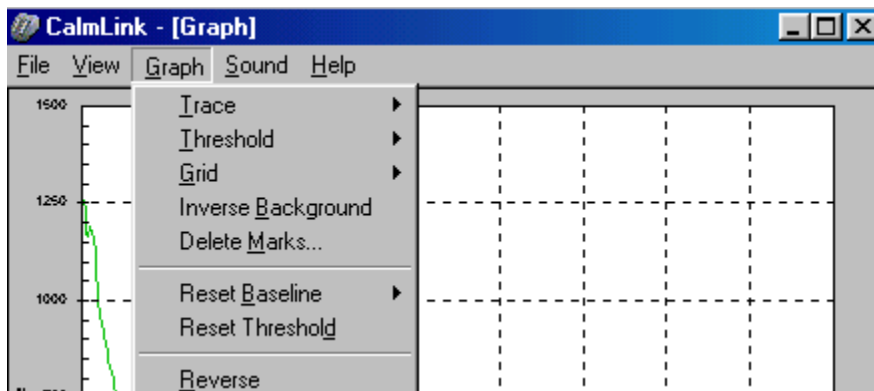
Note: This is one of the most useful sections. Use it to customize the look of your graph. Colors, line thickness and grid lines are just a few of the features that can be customized.

Trace

This feature allows you to specify: colors and thickness of lines, reverse color and plotting method of the graph.
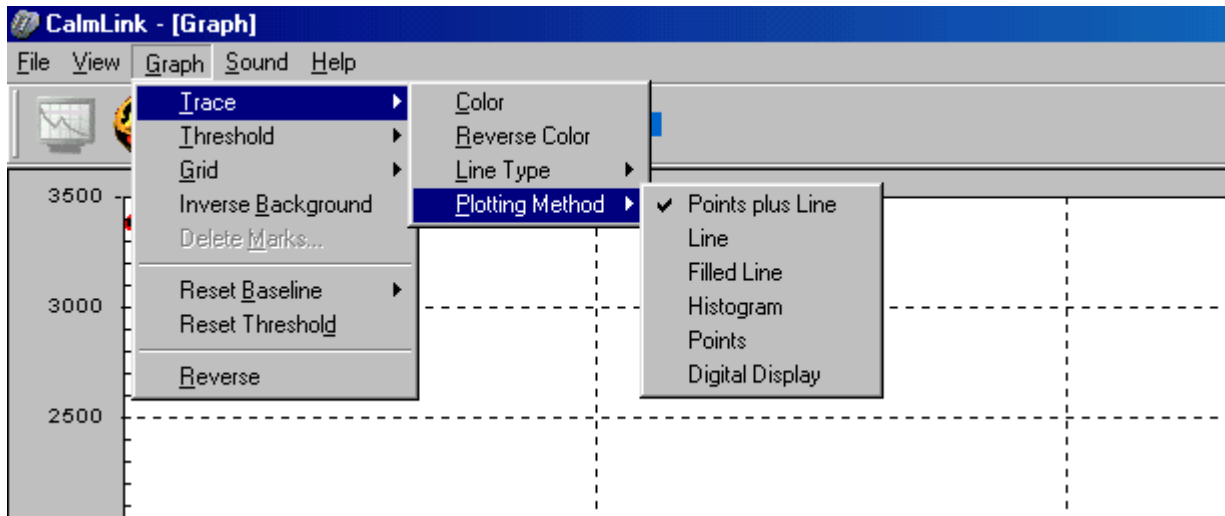
Note: Example of the multiple choices available in graph mode.

Submenus include:

Color: Opens the color Dialog box.

Reverse Color: Reverse the feedback in the spectrum and gradient horizontal bars. I.e. fills right as you relax,

Line Type: Thin, medium and thick lines

Plotting Method: Choice of points plus line, line, filled line, etc..

Threshold: Chose the color and line type of the threshold line.

Threshold

Choose the line type and color of the threshold line.

Grid

Chose grid lines: none; dot; dash; thin or thick

Inverse Background

Reverses the color of the background – black and white

Delete Marks

Opens delete marks Dialog box. Delete any or all Markers.

Reset Baseline

Includes Reset Baseline; Zoom In; Zoom Out and Full Range

Changes the range (vertical axis) of the screen. Increase or reduce the amount of change shown on the screen.

Tip: Begin with the full range (0-3500 Pent3) or (0-7500 Pent4). Then zoom in as you relax to observe smaller changes in your relaxation level. Press the F key to return to full range.

Note: The range numbers show relative change, not absolute skin resistance. The important aspect is the positive (i.e. downward) change on the graph and <u>success in reducing stress levels in each session</u>.

Resets the threshold line

Resets the threshold line to approximately the center of the graph screen.

Note: You can also move the threshold line manually. Move the mouse-cursor over the line. The cursor change to an up/down mark, left click & hold, then move up/down.

Normal or Reverse

Reverses the feedback format for the gradient and spectrum bars. In normal mode they shrink to the left as you relax, in reverse mode they fill right as you relax.
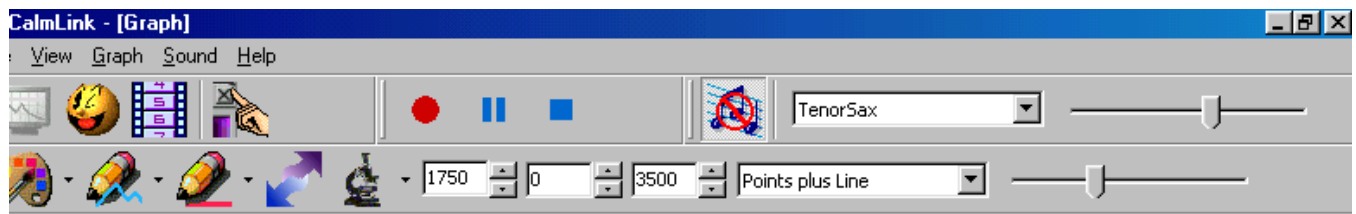
8.4.   Sound Menu

Turns sound On / Off

8.5.   Help Menu

Help menu and index.

8.6.   Cool Bar Toolbar

The toolbar contains the 4 Coolbars, shown here on 2 lines.
Line 1: General; Process and Sound Coolbars.
Line 2: Graph Coolbar

The General Coolbar

Choose between graph, game, animation and stop recording.

Process Coolbar

Start recording; Stop recording and Pause recording

Sound Coolbar

Sound on off, choice of instrument drop down list, volume slider.

Graph Toolbar

Set the color for trace line; reverse; threshold line; and inverse background.

Line Type. Set the trace line thickness

Threshold Line Type. Set the color for the threshold line. Thin, medium, thick or hide.

Reverse icon. Reverse the feedback in the spectrum and gradient horizontal bars.

Zoom in (microscope icon). Zoom in, out, etc.

Threshold number

Baseline number

Upper value number

Plot line drop down list

Time line slider

Tip: you can set the time line (horizontal axis) from 1 minute to 30 minutes. Just move cursor over slider and drag left/right.

Note: Time on the horizontal (X axis) is marked in minutes. Depending on your computers speed and components the actual time to cover "one minute" on the X axis may take more than one minute. This does not affect the program's sensitivity or usability

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8.7.   Additional Features

The following features are available in Graph mode. Please press the key indicated to access the feature. It is not case sensitive.

1. Print Current Graph Screen. Press the P key.

2. To see full screen. Press the F key.

3. To export data points. Press the D key. This feature will be of most interest to researchers, and students. You can export the list of data points and time to either a Word document or Excel spreadsheet. The latter will allow for statistical examination.

4. To see the screen in Black and White. Press the S key. Useful for laptop computers.

5. To export the bitmap to printer or a file. Press the X key.

9. Game

Start the Pacman style game form the main window either File/Start Session With/Game or click on the Game icon (winking sun).
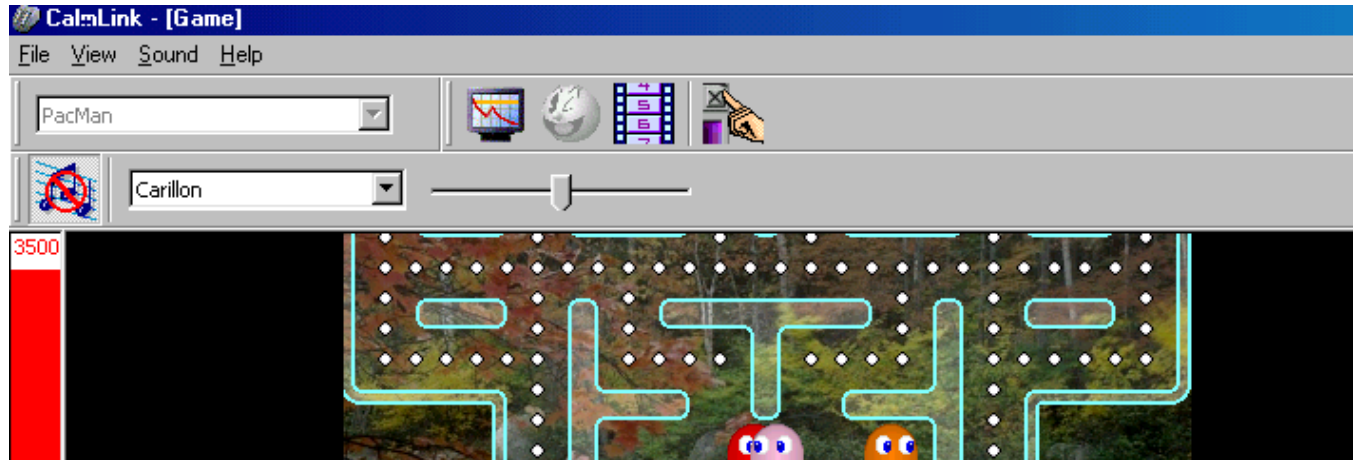
How to Play

For those too young to remember the introduction of Pacman in the 1970's it was a revolution in game playing and an obsession for some.

The game is played with the up/down left/right keys. The object is to move the little yellow icon around the maze "eating" the white dots and red "cherries" while avoiding being eaten by the ghost figures. After going over the cherries Pacman can turn and eat the ghosts for a period of time. While the ghosts are blue you can eat them for points. As the ghosts return to their regular color they go back to chasing you!

Points are earned by "eating" the white dots, cherries and the ghosts when they are blue. You get 3 "lives" per game. At the end of the game your points show on a Dialog box and you can name the session and save. You can view the changes in GSR data thru the data option in the main program.

The changes in GSR are shown by the red bar graph on the left of the screen. If you go out of range during a game the reset box pops and the game is frozen while you reset the frequency (thumbwheel).

The game uses speed change to enhance relaxation under pressure. As the stress level increase (red bar rising), the game increases speed. As you consciously relax the game slows down and becomes easier.

Tip: If you find the gaming going to fast to relax reset the baseline lower to slow down the game. If you plan to view the data results later click on one of the marker keys (number keys 1-9) to show a change in baseline.
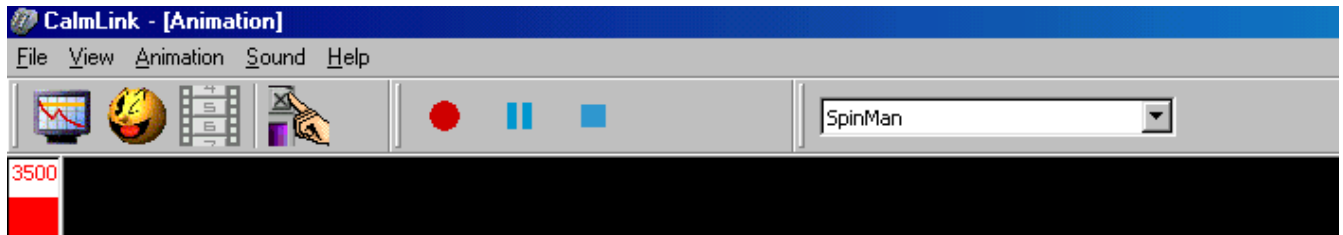
Tip: If part of the game is "cut of", hide the toolbars and Status Bar. (View/Toolbar; View/Status Bar press on/off)).

Note: If the reading on the red bar goes off the screen press the C to center and press the O key a few times to increase the scale showing.

9.1. Menu Bar

The menu bar contains the basic commands used in other sections of the program.

10. Animation

The animation screen is similar to the Game screen. The menu bar contains the same as Game but includes a choice of animations rather than games. The changes in relaxation are shown on the bar graph on the left side.

There are 23 different tunes available as background music to aid relaxation.

10.1. Choice of Animations

There is a number of Animations available in the program to enhance and foster stress reduction during the relaxation period. You can add additional animations created in Windows AVI format by placing them into the Animations folder located in C:\Program Files\Calmlink. Please visit the discussion forums on how to create custom animations for Calmlink.

In all of them, the changing levels of relaxation are shown by the changing bar graph on the left of the screen and pleasant changes in the animations.

Note: The picture cycles through a series of changes then returns to the first scene and repeats as you relax or become tenser.
Animations used with the permission of Thought Technology Ltd.

11.   Frequently Asked Questions (FAQ)

1.   Why is there so much change at the beginning of a session?

This is normal in many cases when calibrating the signal. It will fluctuate less as the session goes on. Also, as you become more experienced the session setup time will decrease.

2.   Can I leave the CalmLink wire connected to the computer when not in use?

Yes. You can leave the CalmLink wire connected to your computer. It does not draw any power or affect the computer.

3.   Can I leave the GSR2 connected to the computer when not in use?

Yes. The GSR2 turns itself off automatically when you remove your fingers from the sensor plates.

4.   Can I use CalmLink with the GSR/Temp2X temperature probe to do temperature biofeedback?

Yes, the change shows as a relative change. You can check your temperature before and after session using a simple thermometer.

Note: The graph line will go <u>down</u> as temperature increases, and the bar graph in Game and Animation will also change "downward" as temperature increases. This is to keep the same as - tone / line down is "Good" or the desired effect as in GSR training.

5. Can I get online help

There is online help for questions and a user group / forum to trade suggestions and comments. Go to: http://www.biofeedbackzone.com. Scroll down to the bottom of the page and click on Forums. Go to CalmLink Software Users forum.

6. When I finish a session the Save Session Dialog box does not appear.

Each session starts automatically when you are "in range" and choose a mode (graph, game or animation). You must press Start from <u>within</u> the mode if you wish to save the session when the relaxation session is completed.

7. The time line – minutes is different than actual time.

Depending on your computer and specific components the processing time may vary from the standard time. This does not affect the efficacy or reliability of the program.