Manual for Mindball Game and Mindball Core

A current digital manual is found at our website.

Mindball Game and Mindball Core are essentially the same products. Mindball Game consists of a Mindball Core but also includes the specific Mindball table top and legs. Customers of Mindball Core build their own version of the table top. **If no specific info is required, both products are referred to as Mindball.**

Safety Instructions for Mindball

- Read all safety and operating instructions before operating Mindball.
- Retain the safety and operating instructions for future reference.
- Heed all warnings.
- Install it in accordance with the instructions below.
- Follow all operating and use instructions.

WARNING! Potential electric personal injury or or appliance damage

- Mindball should be used with a grounded outlet power cord and plug.
- Do not use Mindball with a damaged cord or plug.
- Make sure all connections to Mindball are made carefully and inserted into the correct locations only.
- Turn off Mindball before unplugging.
- Always unplug Mindball by holding the plug—not the cord.
- Unplug Mindball from the power outlet before servicing.
- Unplug Mindball from the power outlet during lightning.
- Unplug your display/screen attached to Mindball from the power network during lightning.
- No objects filled with liquids shall be placed on Mindball.
- Mindball shall not be exposed to dripping or splashing.
- Do not handle plugs or appliances with wet hands.
- Keep cord away from heated surfaces.
- Protect the power cord from being walked on or pinched.
- Do not run appliances over cord.
- Do not put any object into openings.
- Do not rapidly turn the power switch on and off.

Mindball hardware precautions

- Refer all servicing to qualified service personnel.
- Do not place Mindball outdoors.
- Do not expose this Mindball to rain or moisture, extreme heat or cold.
- Do not drop, hit, or otherwise abuse Mindball or components.

The Mindball Company
Stockholm ▪ Sweden
info@mindball.se ▪ www.mindball.se

Unpack and Install Mindball

Mindball Game Includes
One Mindball Game table top
One Mindball Core unit including the whole system; mechanics, electronics, PC and software.
Four table legs of metal
Power cable
Two headbands (as standard)
Two balls (one spare)
A manual

Mount Mindball Game:

1. Place the Mindball Game table gently on a stable surface that allows access to the leg mounts.
2. Screw on the four table legs.
3. Remove the tape holding the glass (the playing area).

Do not place Mindball Game on a surface where the table itself can be nudged while the table legs are stuck to the surface.

Mindball Core Includes
One Mindball Core unit including the whole system; mechanics, electronics, PC and software.
Two rails
Power cable
Two headbands (as standard)
Two balls (one spare)
A manual

Make sure that the reach of the magnet is not prohibited by the type of material (no metal) or thickness (max 25mm) of material you chose for the build.
Make sure that the cable to the start button does not interfere with the wagon's movement on the linear unit.

Install Mindball

- Place Mindball at its dedicated place[1]. Make sure that the sockets (Power, HDMI, USB) are at the same side as you place the monitor. **If you don't, the information in the graphics will be reversed.**
- Connect your monitor to Mindball.
- Connect the power cable to Mindball and to the power outlet. Mindball works with power from 90V to 240V. Make sure that the connection is grounded[2].
- Connect the two headbands at each end of Mindball. Make sure that the connectors are inserted firmly and fastened by screwing the outer ring.

[1] Mindball registers the brain waves, which are very weak, seen from an electrical point of view. Mindball may therefore be sensitive for EMC/EMI from other exhibits or electrical installations. Please bear that in mind when deciding a suitable place for Mindball.

[2] Ground refers to a point in an electrical circuit from which voltages are measured, a common return path for electric current. If Mindball is not connected to ground, the system will not work properly.

Functional Description

Mindball is a two-person game controlled by the players' brain waves. The player being most focused wins the game by thus "pushing" a ball into the other player's goal. Focus is basically setting the mind into a state where nothing else but what happens here and now matters.

In Mindball, two players sit opposite each other—either at our Mindball table or your own custom-built surface using Mindball Core - wearing headbands with sensors. A ball is moving on the table back and forth until it rolls into the goal of the player being least focused.

The brainwaves are detected by sensors attached to the headbands. The sensors are connected to a biosensor system. The biosensor system registers the electrical activity in the brain and presents the result in terms of graphics on a screen and the movement of a physical ball on the table. The technique used is called EEG.

If the accessory Mindball Multiplayer is used, the system calculates a media value of the players' brainwaves, playing on the same side.

To finish a game that the players have left unfinished, press and hold the start button for about three seconds. The system will then interrupt the game and return to the first (idle) screen.

NB! If a game is started - the system analyses and provides output from whatever electrical signals that come into the system via the headband sockets.
All headband sockets must have a headband connected (or a dummy plug inserted - if a Mindball Multiplayer is used).
If a headband is connected there must be a head in the headband. If not, the outcome will be completely random.

Start Mindball
Start Mindball by turning the power switch on. The red lamp inside the switch is lit.
Put on the headbands and press the metal round start button (placed on the table top on a Mindball Game).

The duration of a game
An average game time takes 5 minutes. However, if one of the players is very much better than the other one, a game can take less than a minute. And then again, If the two players are very equal a game can go on until Time Out. The default setting for Time Out is 6 minutes. To change this setting, see Configure Mindball below.

Another way to shorten the duration of a game is to increase the speed of the ball. To change this setting, see Configure Mindball below.

Should you prefer to stop a game before it is finished, press, and hold the start button for about three seconds.

Mindball Graphics

We strongly recommend you to connect a monitor to Mindball as the graphics are a major part of the experience both for the audience and for the players. If you connect a monitor to Mindball, the graphics will appear automatically at power up.

NB! The logic of the graphics is linked to how Mindball is placed. Player 2 is sitting to the right and next to the metal round start button.

Interpretation of Screen 2 - Standard Graphics
There are three rectangles; One for each player's values and one in the middle showing both players' values simultaneously. The Y-axis shows how well a player is focused (without scale). The higher up one the axis, the better focus. The X-axis shows the time (without scale).

The Stress Level bars indicate the level of energy, easily understood as "stress". If you have a high stress Level (yellow to red) you are mentally stressed, or nervous, or giggling – anything but calm really. A green or non-colored bar is the best.

The figure Focus Score displayed at the result screen represents each player's personal average focus level for the session. A high Focus Score figure is to strive for. The figure Focus Score can be compared to your own previous results and other players' results, independent of who you meet and whether you win or lose.

Interpretation of Screen 2 - Floating Ball Graphics
There are two rectangles; One for each player's values. The Y-axis shows how well a player is focused (without scale). The higher up one the axis, the better focus. The X-axis shows the time (without scale).

The color and form of the net in the background indicate the level of energy, easily understood as "stress". The color and the shape near the player represents that player's level of stress.
If you have a high stress level (yellow to red) you are mentally stressed, or nervous, or giggling – anything but calm really. A yellow and orange net represents a stressed person. A green net, a calm person. The high or low "waves" of the net are yet another indicator of the stress level. A calm green net is the best.

The form of the ball in the middle of the graphics kind of floats to one side or the other depending on the players' focus. When a game is over the graphic ball has completely floated to the losers' side.

The graphics Floating Ball has no Focus Score calculation yet.

Maintenance of Mindball Headbands

To keep the headbands fresh, working, and hygienic, there are a few tips to consider:
For cleaning the headbands, use a mild detergent, water, and cloth. Do not use alcohol.
Humid the cloth and rub the headbands gently to clean them.

Caution:

- If the headbands are very dirty, **unscrew them from Mindball**. Then they can be wetted, gently rubbed, and left in open air to dry before attaching again.
- The headbands have wires inside; be careful and do not bend them so that wires disconnect from the sensors.
- When cleaning the headbands, make sure not to wet the connector at the end of the cable.

Troubleshooting Mindball

Symptom: **One side is winning all the time.**
Reason 1: The most common reason is that a headband is broken.
Action 1: Replace the suspected headband. A technician can make a measurement with an ohmmeter between each sensor and the corresponding pin in the contact. The resistance should be less than 2 Ω for each sensor.
Reason 2: The headband is not correctly connected.
Action 2: Make sure that the headbands are firmly connected to Mindball.
Reason 3: Other electrical installations or cables are disturbing Mindball (e.g. a Tesla coil)
Action 3: Move Mindball or the suspected other installation.

Symptom: **The ball is removed from the playing area and cannot find its place when placed back.**
Reason: The ball is made of steel and is kept in place by a magnet under the tabletop.
Action: Roll the ball slowly along the playing area and it will find the magnet again.

Symptom: **The ball doesn't move or move very little and the Stress level bars in the graphics are both yellow or red.**
Reason: Both players have equally (and) too high energy (In the graphics called Stress Level). Players that are talking, laughing and/or moving around physically will have too high energy and very low level of focus.
Action: Encourage the players to change behavior.

Symptom: **The ball doesn't move or move very little and the Stress Level bars in the graphics are both uncoloured or green.**
Reason: Both players are calm and also have a very equal level of focus.
Action: Do nothing. Let the game go on. Either one of them will eventually win or the game will go to Time Out.

Symptom: **The ball is moving even if there's no one playing**.
Reason: If a game is started - the system analyses and provides output from whatever electrical signals that come into the system via the headband sockets.
Action: Don't start a game without having a headband connected to each socket AND a head in each headband.

Symptom: **One of the curves is presented as a straight line.**
Reason: The headband is not firmly connected.
Action: Make sure that the headbands are firmly connected to the table.

Symptom: **Both curves are following each other.**
Reason: Mindball is not grounded properly.
Action: Make sure you use grounded cords and outlets.

Symptom: **Mindball does not work at all.**
Reason: Potentially the automatic fuse is released to protect the hardware when a spike in your electrical power network has occurred. If so, the small middle of the button has popped out.
Action: Press the button marked "Fuse 1".

Symptom: **Mindball restarts without ever presenting the graphics.**
Reason: Someone has manipulated the 5V contact for the Multiplayer (found beside the headband contact at each short end of Mindball Core - the box) and Fuse 2 is released to protect the hardware.
Action: Press the 'Fuse 2' button. Ensure the 5V contact is protected from future interference.

Symptom: **The table feels unstable.**
Reason: The table legs are not screwed on properly.
Action: Screw on the table legs.

Symptom: **The connected monitor is black.**
Reason: The HDMI contact does not get contact with the PC.
Action: Make sure the HDMI is well inserted.
Reason: The connected monitor is faulty.
Action: Replace the monitor.

Other Symptoms you might experience

- Power Off Mindball and insert a USB to the USB slot on the PC.
- Power Up Mindball and have it run until “Other Symptoms” have occurred.
- Power Off Mindball and retract the USB.
- Move the log-files now automatically stored on the USB to an external PC and send the files to us on support@mindball.se
- Include the unique serial no of your Mindball unit (found at the back of the core unit beside the contacts), and a description of the (faulty) behavior of Mindball.

Configure Mindball

Introduction

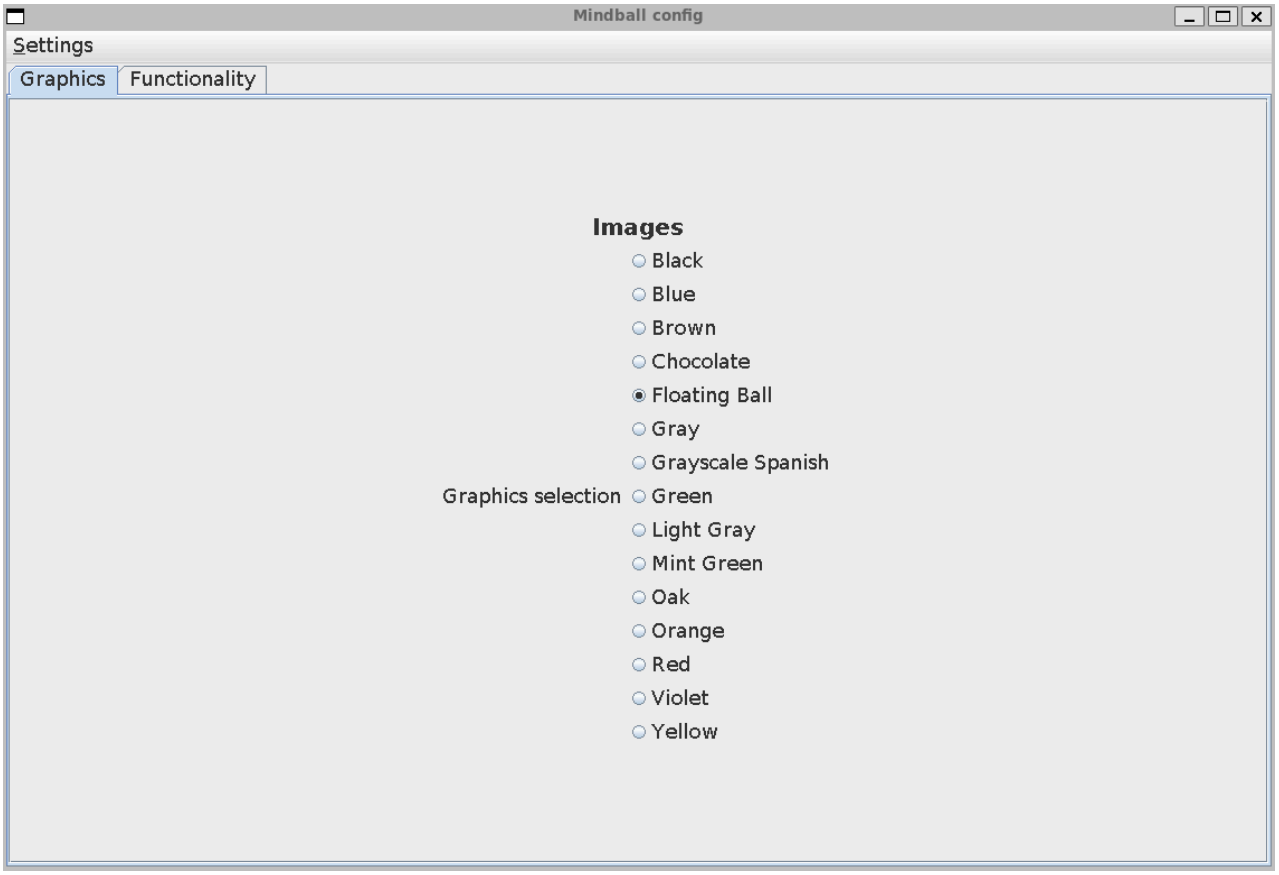
To configure Mindball you need to connect a monitor and a USB keyboard. For even easier management, also connect a USB mouse. The connections are found at the back long side of the electronic box.

1. Power off Mindball.
2. Connect a monitor (HDMI), a keyboard and a mouse, (both USB)
3. Power up Mindball.
4. Click Esc
5. A window named **start.sh** will appear. Close it by clicking the **X** in the upper-right corner.
6. Right-click on the background and select “Mindball Menu” and then “Consumer Configuration”.
   NB! Changing options under “Producer Configuration” may harm the unit and may void the warranty.

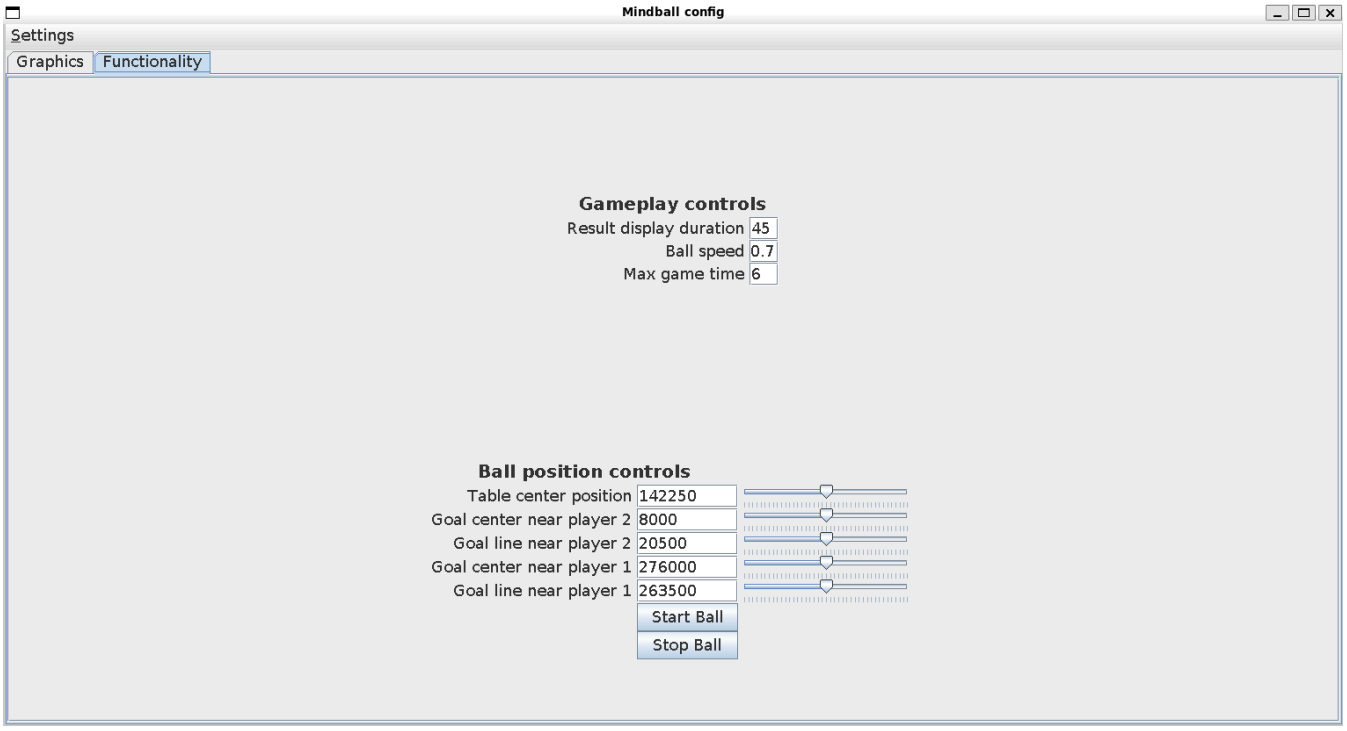
Please note further down how to save, close and possibly restart Mindball after your new settings.

Graphics

Choose the graphics you prefer (if other than delivered from us). **NB!** “Floating Ball” does not have the feature Focus Score (yet).



Functionality
This window changes the ball's alignment and some other functionalities. The calibration controls are mainly of use for you if you have purchased a Mindball Core and thus built your own playing area.



Gameplay controls

Result display duration: Set the time (in seconds) of how long the third display screen remains visible, before the system returns to the first screen.
Ball speed: The higher speed the shorter games (with the same input from the players).
Max game time: Set the time (in minutes) for how long a game can go on (before Time Out if no one wins).

Ball position controls

NB! These controls need to be adjusted for Mindball Core with customer built table tops only.
As you move the sliders, the ball will go to and stop at the position indicated by the slider.

Table center position - the location of the ball when the start button is pressed before the competition starts.
Goal line near player 2 - when the ball passes this position the game is over in favour of player 1.
Goal center near player 2 - set this value so the ball stops in the center of player 2 goal.
Goal line near player 1 - when the ball passes this position the game is over in favour of player 2.
Goal center near player 1 - set this value so the ball stops in the center of player 1 goal.

Start ball - Start the ball to initiate a test of last saved ball position values.
Stop ball - Stop the ball while adjusting the positions.

Save, Close and possibly restart Mindball

After configuring Mindball to your preferred settings,

1. Chose “Settings” (main heading to the upper left) and “Save all changes”
   On saving, the new settings will be used the next time Mindball starts.
2. If you want to see the implementation of your new settings before disconnecting your keyboard and mouse, right-click on the background and select “Mindball Menu” , select “Mindball Menu” and then “Start Mindball”.

Disclaimer

Mindball gathers and analyzes brainwave signals to provide real-time visual feedback in an engaging and educational experience.

Mindball is neither a medical device nor a toy. Mindball is not intended for clinical, diagnostic, or therapeutic use.

Mindball does not provide medical advice, diagnosis, treatment, or therapeutic benefits, and no such claims are made by The Mindball Company.

The system is completely passive and non-invasive, requiring no physical intrusion into the user.

The Mindball Company makes no warranties, express or implied, including but not limited to implied warranties of merchantability or fitness for a particular purpose. It is the responsibility of the user and/or the purchaser to determine whether the product is suitable for their intended application and environment.

The Mindball Company reserves the right to modify, update, correct, or improve the information provided, as well as the products and programs described, at any time without prior notice.