SPIRIT MUSIC BOX

INSTRUCTIONS



SPOTTED GHOSTS

Firmware v1.0

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Screen images are reconstructions with illustrative values. These instructions are based on the supplied v1.0 source and have not been hardware-tested.

Get to know Spirit Music Box

Spirit Music Box watches eight sensors and runs its music mechanism for about two seconds when an enabled sensor crosses its threshold. The live screen shows motion and magnetic traces, temperature, humidity, light, proximity and ultrasonic distance, plus the last trigger and play count.

Tap the touchscreen icons and labelled controls. BACK leaves live monitoring and stops the motor and recording. RECAL refreshes comparison readings and resets the play count. SETTINGS opens the four control pages. BOX ON/OFF and LOG ON/OFF show their current states; tap to toggle them.

Power, reset and charging

1. With Spirit Music Box switched off, insert its supplied microSD card. Keep the supplied licence and configuration files on it.

2. Press the left-side power button once. Wait for startup to finish and the menu to appear. Green LED flashes accompany startup checks.

3. To switch off, leave live monitoring with **< BACK**, then hold the left-side power button for about **six seconds**.

4. To charge, connect USB-C to a suitable USB power source. Connecting USB may turn the device on.

5. To charge while switched off, keep USB connected and hold the power button for six seconds. Charging continues while the device is off.

Briefly press the bottom **RST** button to restart an unresponsive device. Holding RST for about three seconds enters hardware download mode; use a brief press for a normal restart. Do not switch off, reset or disconnect power during a firmware installation.

Power and RST button actions are checked against Hardware power reference.

On the live screen the battery indicator is green normally, red at 25% or lower and cyan while charging is reported. **--** means the battery level is unavailable.

Use the main menu

Row	Left to right
Top	Spirit Music Box, Settings, Date, Time
Bottom	Wi-Fi, Files, Update, About



Spirit Music Box main menu. Screen reconstruction; illustrative readings and files.

Start a music session

1. Place Spirit Music Box steadily with its mechanism clear. Aim the ultrasonic sensor at a stable target and keep that scene unchanged during calibration.

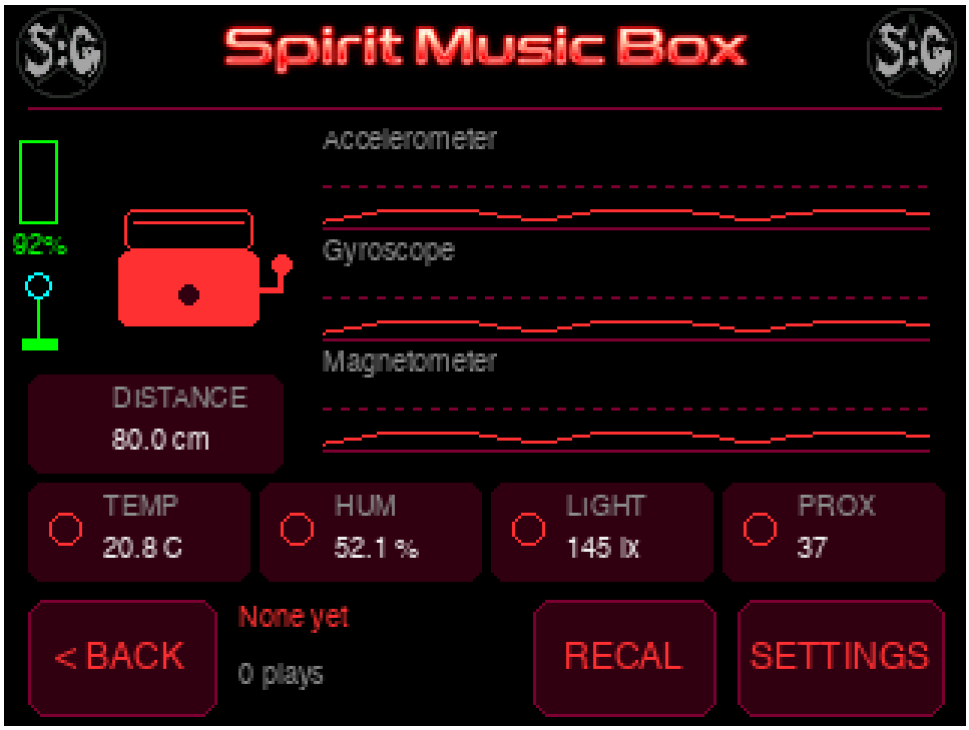
2. Tap the **Spirit Music Box** icon at the top left of the menu.

3. Wait through **Distance: 0/30 readings**, the increasing distance count and **Calibrating other sensors...**. Keep the device still until the live screen appears.

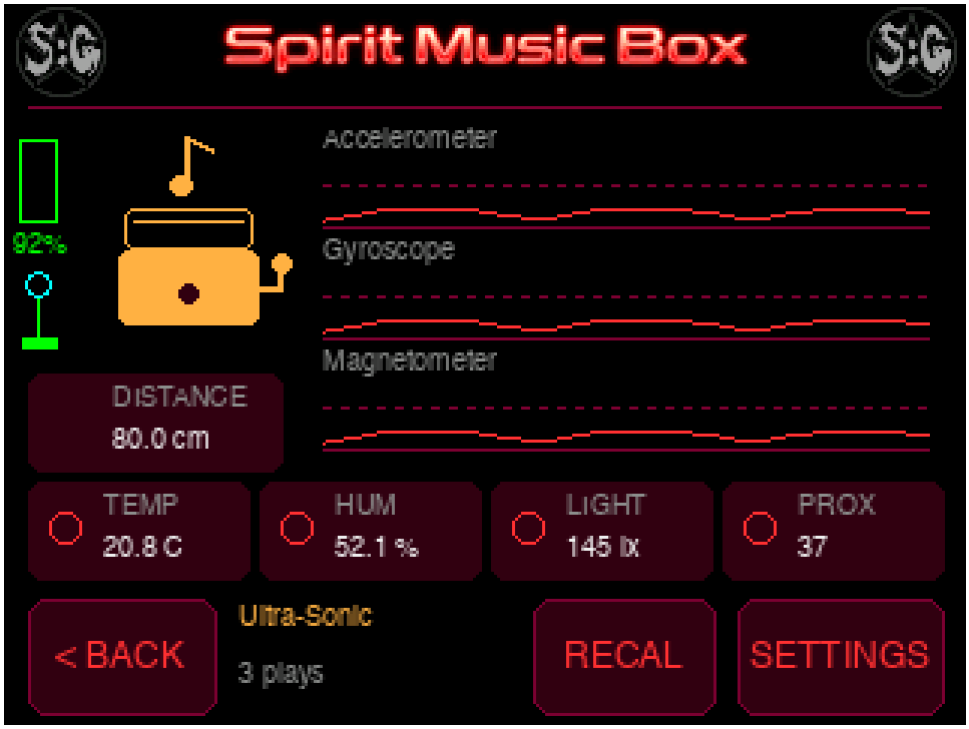
4. Open SETTINGS to check **BOX ON**, the wanted sensors ON and **LOG ON** if recording is required. Saved choices are restored at startup.

5. Return to the live screen and watch for sensor-triggered playback. The trigger label and play count update when an event starts.

6. Use **< BACK** on the live screen to stop the session and return to the menu.



Live screen between playback events. Screen reconstruction; illustrative values.



Example ultrasonic-triggered playback. Screen reconstruction; illustrative values.

Automatic playback normally lasts about **two seconds**. New triggers are blocked during playback. Motion, magnetic and optical references refresh when it stops, with no extra timed settling period. The red LED is lit while the motor is powered. A play indicates a sensor threshold event; consider handling, vibration, changing light and nearby objects when interpreting it.

Read the graphs and sensor tiles

Accelerometer, Gyroscope and Magnetometer traces show changes relative to their trigger thresholds. The dotted line marks 100%; the display extends to 150% and holds about 3.6 seconds of history. Higher sensitivity makes a given change appear larger relative to its threshold. Recent triggering readings are highlighted pink; disabled sensors show OFF in grey.

The lower tiles show current temperature in °C, humidity in %, light in lx or klx and raw proximity counts. HIGH means light saturation; -- means unavailable. Proximity is not a distance in centimetres. The separate **DISTANCE** tile shows ultrasonic distance in centimetres; -- cm means a reading is unavailable or stale.

Temperature and humidity refresh about once per second. Other sensors are sampled more frequently. Fingers, nearby objects, illumination, vibration and magnetic objects can affect the readings.

Enable or disable individual sensors

1. Tap a live graph, including its label, to toggle Accelerometer, Gyroscope or Magnetometer.

2. Tap a lower tile to toggle Temperature, Humidity, Light or Proximity. Tap DISTANCE to toggle US-100.

3. Alternatively open Settings and tap the sensor's ON/OFF button.

4. For the seven non-distance sensors, re-enabling establishes a reference from a fresh reading. For US-100, return the target inside its calibrated range to rearm it.

OFF excludes that sensor from automatic playback. Shared hardware can still be sampled and logged. Ultrasonic triggering also needs successful distance calibration. If no usable sensors are enabled, sensor-triggered playback cannot start.

Adjust sensitivity

1. Open SETTINGS from the live screen or Settings from the main menu.

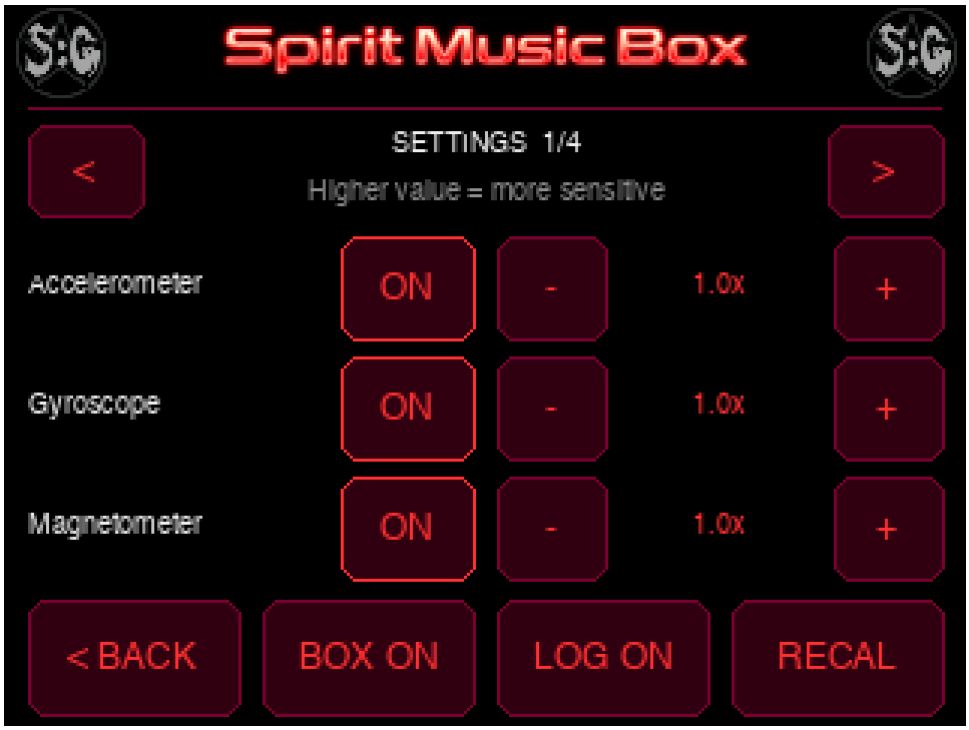
2. Use the upper **< / >** arrows to move between four pages.

3. Pages 1 and 2 contain the first six sensors; page 3 contains Proximity and US-100; page 4 contains manual motor control.

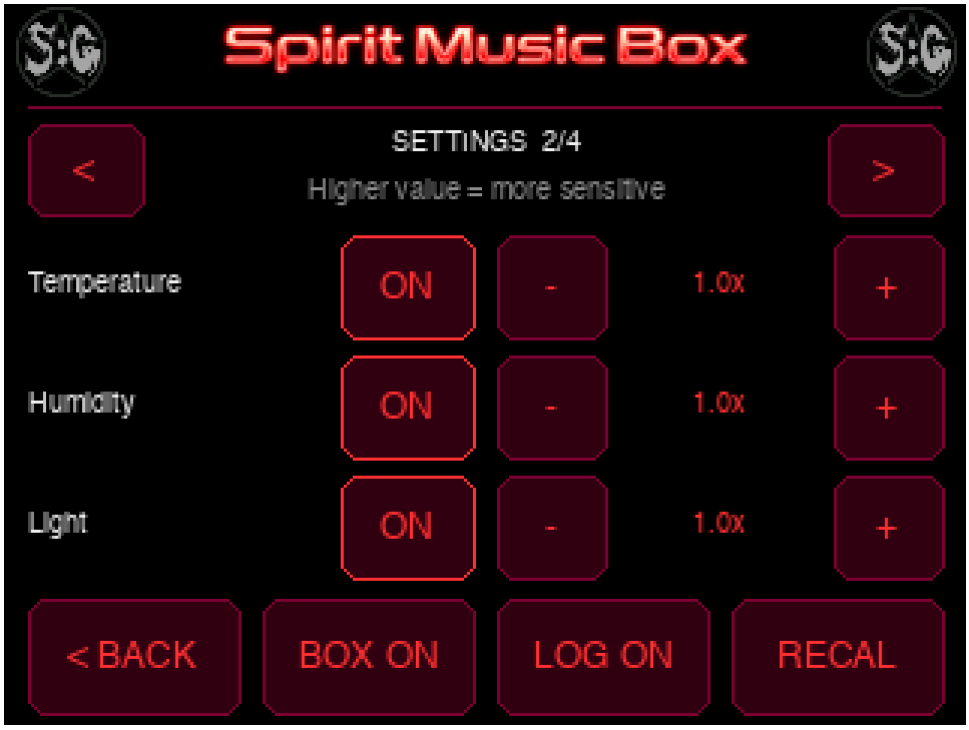
4. For the seven sensors other than US-100, use - / + to choose **0.2x to 5.0x** in 0.1 steps. Higher values are more sensitive: 2.0x needs half the change required at 1.0x.

5. US-100 uses a separate **1-100 cm** distance margin, described below. Lower centimetre values make it more sensitive.

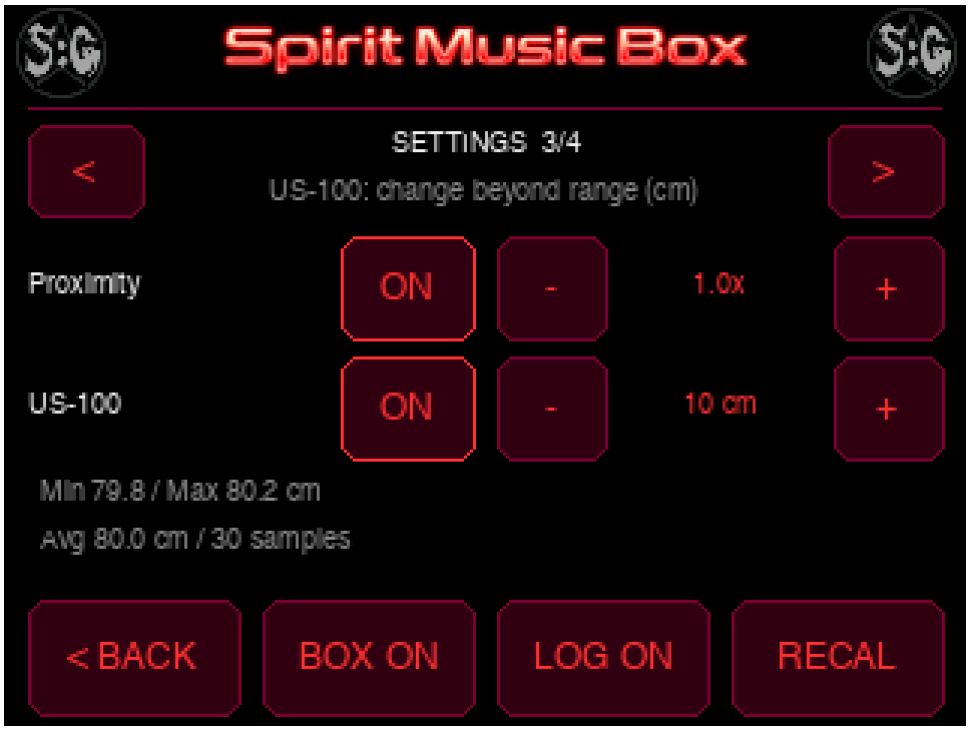
6. BACK returns to the live screen or menu, depending on where Settings was opened.



Settings page 1: movement and magnetic sensors. Screen reconstruction; illustrative values.



Settings page 2: temperature, humidity and light. Screen reconstruction; illustrative values.



Settings page 3: proximity and ultrasonic controls. Screen reconstruction; illustrative values.

Settings opened from live monitoring keep detection and logging running on pages 1-3. Page 4 stops current playback and suppresses automatic triggers while it is open. Settings opened from the main menu do not start a live session. Changes save automatically to the card while the motor is idle; there is no SAVE button. Leave the device powered for a moment after changes.

Switch playback or logging on and off

Tap **BOX ON** on a settings page to change it to **BOX OFF**. This stops the motor and prevents new automatic playback. Live readings and enabled recording can continue. Tap BOX OFF to enable automatic playback again. The manual MOTOR BOOST is a separate action and can run even with BOX OFF.

Tap **LOG ON** to stop CSV recording, or LOG OFF to enable it. This does not change the automatic playback setting. Box state, logging, sensor enables, the seven sensitivity multipliers and the US-100 distance margin are saved to the card and restored after restart when saving succeeds.

Recalibrate the comparison readings

1. Place the device in its intended position and aim the ultrasonic sensor at its stable reference target.

2. Tap **RECAL** on the live screen or a settings page.

3. Keep everything still during distance sampling and calibration of the other sensors. Wait for the normal screen to return.

4. The play count resets to zero and trace history clears. Check page 3 for the measured distance range and calibration sample count.

RECAL stops the motor, takes fresh comparison readings and clears the live history. It does not restore factory settings or erase earlier CSV rows. An existing log file is retained. Opening a live session also

calibrates; use RECAL when you explicitly want a fresh play count.

Set ultrasonic distance triggering

1. Open Settings and select page **3/4**. Check that US-100 is ON and calibration has succeeded.

2. Read the **Min / Max** range, average and sample count. Calibration aims for 30 valid readings within about 12 seconds and requires at least 20.

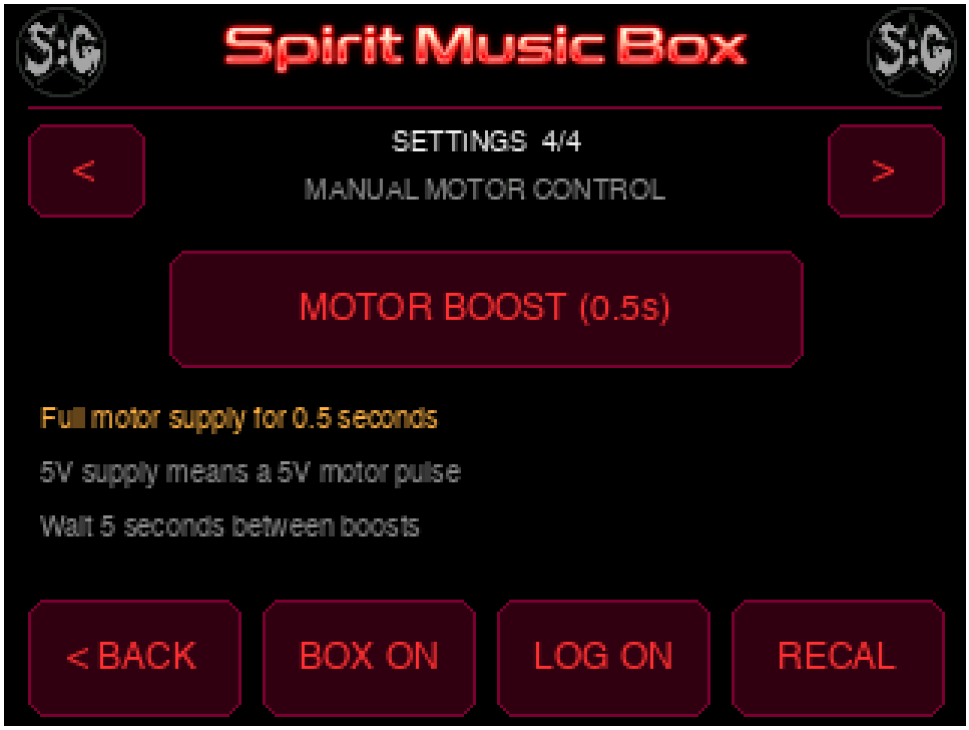
3. Use the US-100 - / + controls to set how many centimetres beyond that measured range must be crossed to trigger, from **1 to 100 cm**. The default is 10 cm.

4. After a trigger, return the target inside the original Min / Max range to rearm the distance sensor before another excursion.

Example: with Min 79.8 cm and Max 80.2 cm, a 10 cm margin can trigger at 69.8 cm or nearer, or 90.2 cm or farther, once armed. Holding the target outside the range does not repeatedly rearm it. Moving the device or changing the intended reference scene calls for RECAL.

If **Distance failed - press RECAL** or **US-100 uncalibrated: press RECAL** appears, aim at a stable target that gives valid readings and repeat RECAL. Other sensors can still operate when ultrasonic calibration fails. The DISTANCE tile can show a reading even while distance triggering is uncalibrated.

Use manual motor boost



Settings page 4: manual motor control. Screen reconstruction; illustrative values.

1. Start a live session once so the motor controls have initialised, then open SETTINGS and go to page **4/4**.

2. Keep the mechanism clear and tap **MOTOR BOOST (0.5s)** when available.

3. The motor runs at full supply for half a second, then stops. This is a brief manual maintenance action, separate from sensor-triggered playback.

4. Wait for the displayed five-second cooldown before another boost. Return to a sensor settings page or the live screen when finished.

Entering page 4 stops current playback and suppresses automatic triggers while that page remains open. Manual boost also works with BOX OFF. It does not add to the sensor-triggered play count or create a trigger-event row. The full motor supply is applied for the pulse; the screen notes that a 5 V motor supply means a 5 V pulse.

Save and review CSV recordings

With LOG ON, an active live session normally records a CSV row about four times per second plus an extra row for a sensor-triggered event. Logging continues through Settings opened from that session, except during brief blocking operations such as calibration or boost. Returning to the menu stops normal session logging. Reopening live monitoring creates a new file when logging is enabled; LOG OFF/ON within a session can continue its existing file.

This firmware still names its recordings `SpiritMusicBox_....` With a valid clock, look in `DateTimeFiles/` for names such as `SpiritBell_2026-10-18_14-30-00.csv`. Otherwise look in `NumberedFiles/` for `SpiritMusicBox_1.csv` and later numbers. Do not mistake these names for recordings from a different device. Duplicate timestamps get suffixes; existing recordings are preserved.

CSV contains uptime milliseconds, motion and magnetic axes, temperature and humidity, sensor changes, optical raw readings and changes, `MusicBox`, `Trigger` and `DistanceCM`. MusicBox=1 marks an automatic trigger row, with its reason such as US100; ordinary rows have MusicBox=0. DistanceCM is the latest valid distance in centimetres; unavailable distance fields are blank. Light CSV values are raw counts rather than displayed lux. LOG ON is a preference, so check the card afterwards to confirm a file was saved.

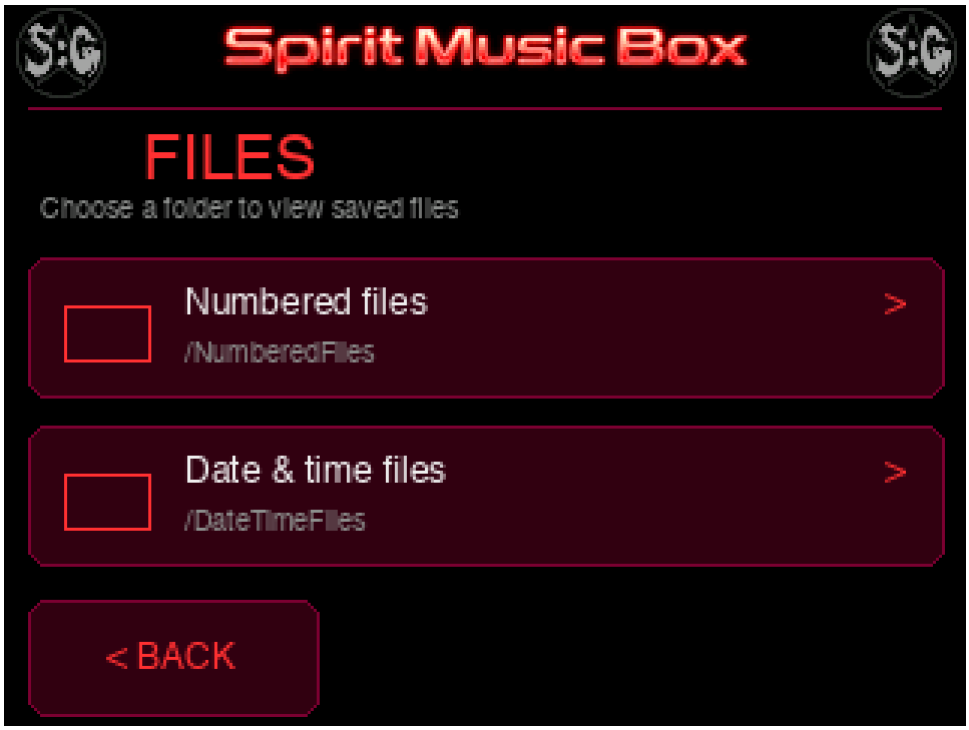
Browse, graph and delete files

1. Leave live monitoring and open **Files**. Choose Numbered files or Date & time files.

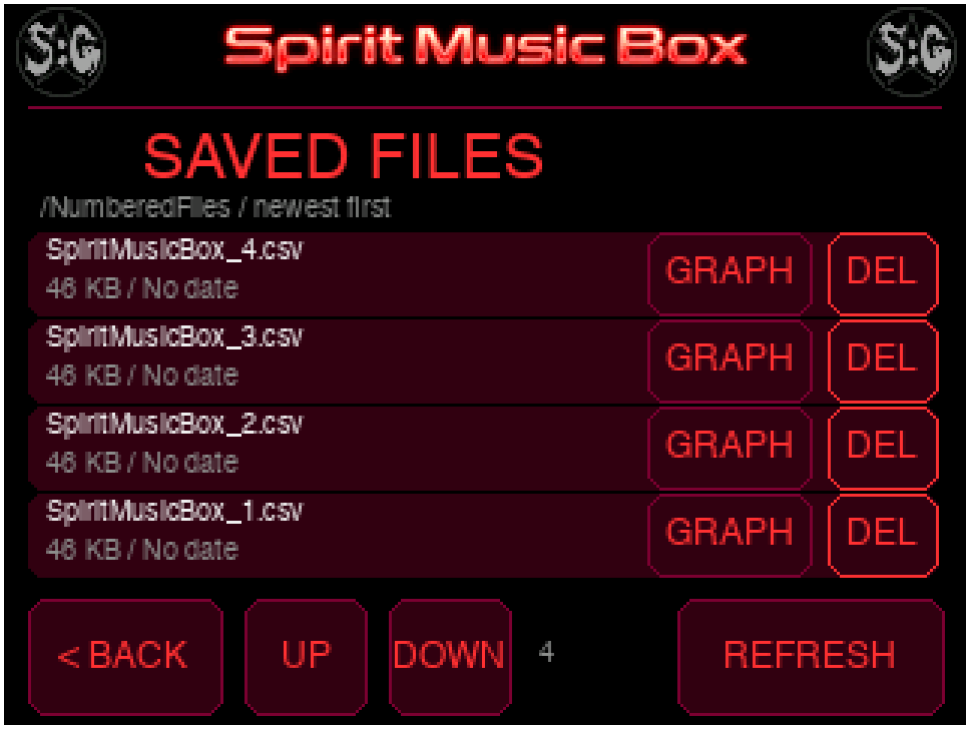
2. Use UP/DOWN or vertical swipes to browse. Tap a filename to read its paged contents. BACK returns; REFRESH reloads the list.

3. Tap GRAPH beside a compatible recording. Use lower < / > controls to cycle through the sensor plots.

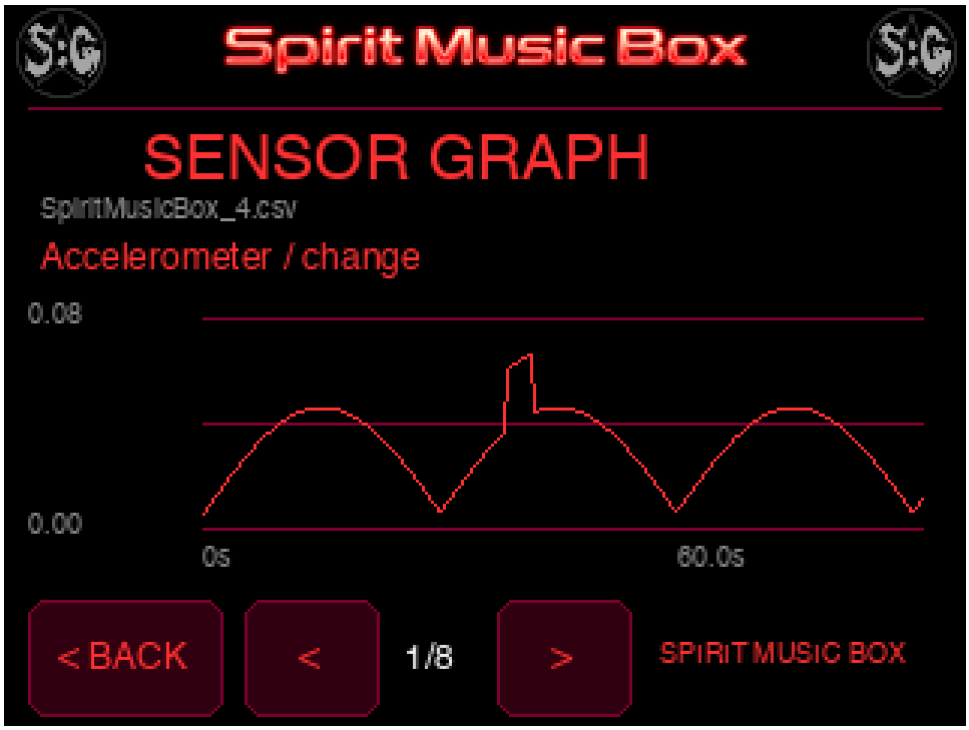
4. For deletion, tap DEL in the list or DELETE in the text viewer, check the filename, then choose CANCEL or confirm DELETE. Deletion is permanent.



Choose a recording folder. Screen reconstruction; illustrative values.



Saved recordings have a SpiritMusicBox filename prefix. Screen reconstruction; illustrative values.



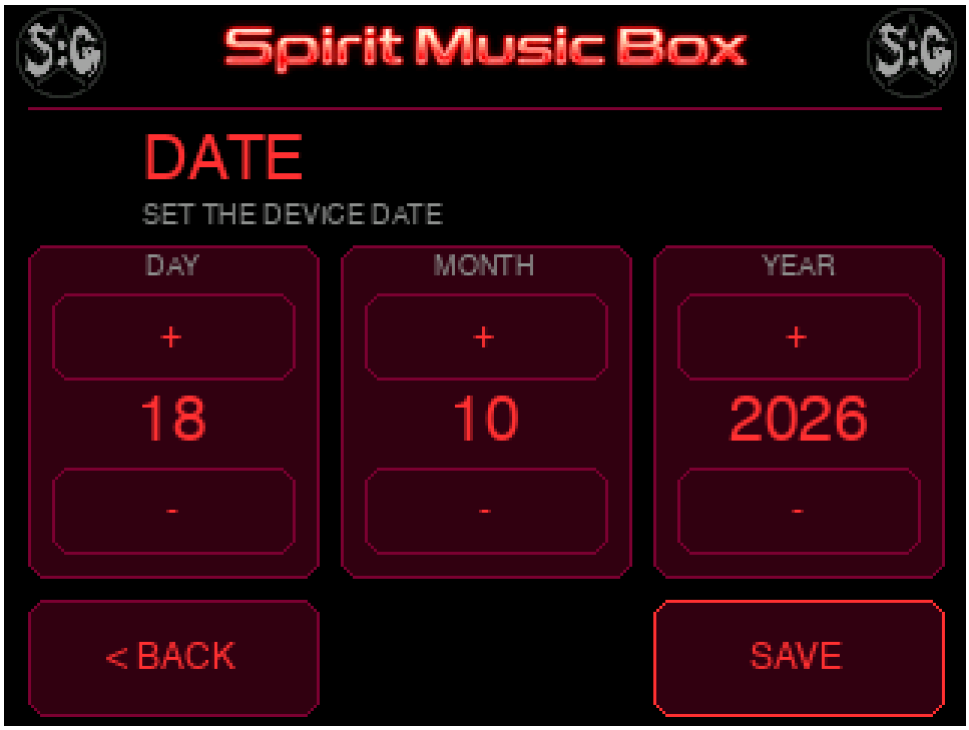
Recorded accelerometer change graph. Screen reconstruction; illustrative values.

Use the lower arrows to cycle eight recorded sensor plots: Accelerometer, Gyroscope, Magnetometer, Temperature, Humidity, Light, Proximity and US-100 distance. The first seven show changes from their comparison readings. The US-100 plot shows measured distance in centimetres over time. Missing or stale distance samples are left blank in the recording. For larger plots or detailed comparisons, open the CSV on a computer.

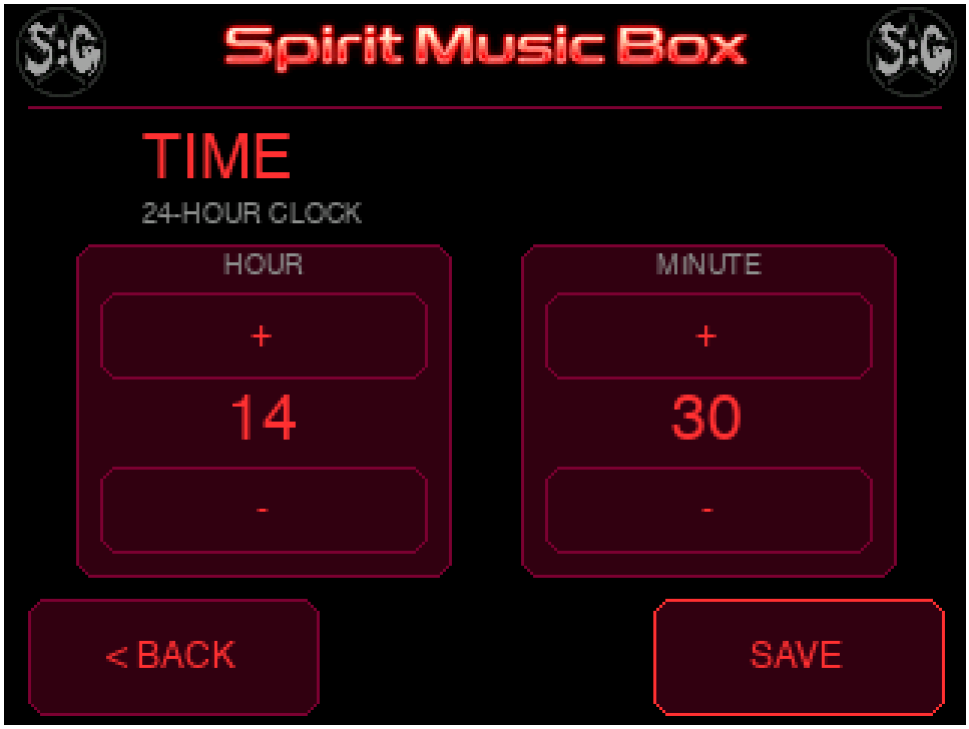
To copy CSV recordings, finish the session, switch off and remove the card. Copy your files using a computer and return the card before switching on.

Set date and time

1. Open **Date** from the menu. Tap or hold **+** and **-** to change day, month and year.
2. Tap **SAVE** to apply the date. BACK leaves without applying edits.
3. Open **Time**. Adjust hour and minute using + / -. Hours use the 24-hour format.
4. Tap SAVE to apply the time with seconds set to zero.



Date controls. Screen reconstruction; illustrative readings and files.



Time controls. Screen reconstruction; illustrative readings and files.

The clock can be restored from the RTC and synchronised over the internet. Network synchronisation can replace a manually entered time. Check the displayed clock and new filenames after reconnecting.

Connect to Wi-Fi

Automatic music and card recording can work offline. Wi-Fi is used for network time, firmware updates and ParaLink-Mesh. Enter network details on the card; the Wi-Fi screen displays status rather than a keyboard.

1. Switch Spirit Music Box off before removing the card.

2. Open `wifisettings.txt` in the card's root folder with a plain-text editor.

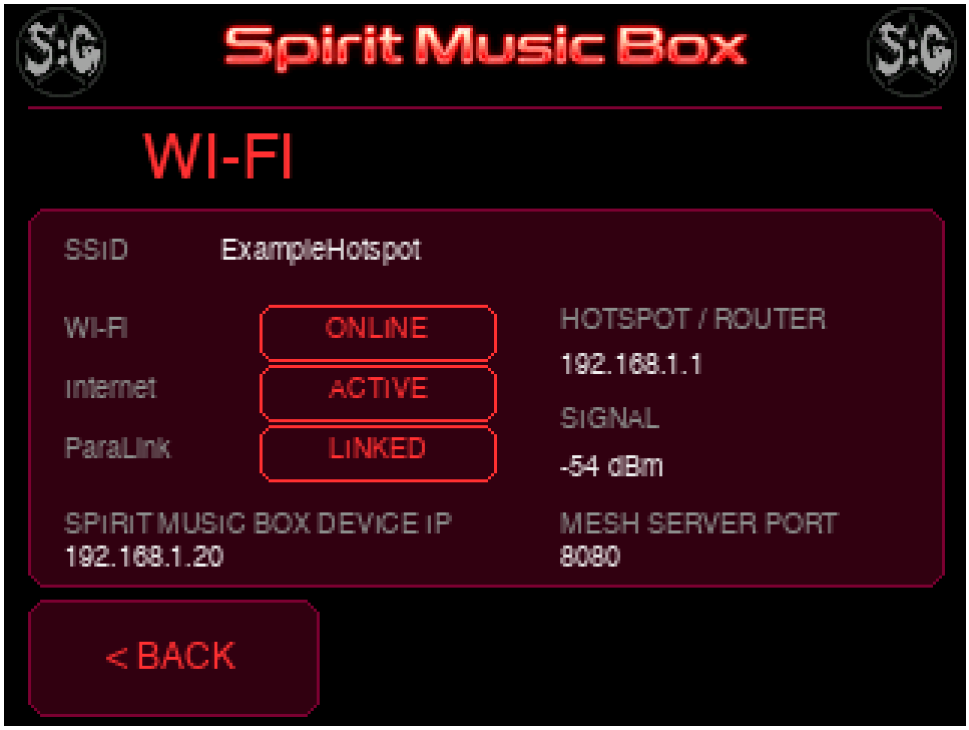
3. Set the following network fields to your own values, preserving other entries.

4. Save and eject the card, put it back and restart Spirit Music Box.

```
WIFIName=YourNetworkName
WIFIPassword=YourNetworkPassword
```

Connect through a phone hotspot

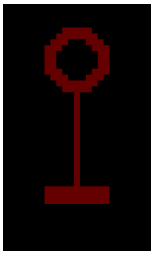
Enable the phone's Wi-Fi hotspot or Personal Hotspot, using 2.4 GHz or its compatibility option. Enter that hotspot's name and password in the same file fields. Keep the hotspot running and nearby, then restart Spirit Music Box. Internet time and firmware downloads also need working internet access on the phone and can use mobile data.



Wi-Fi status with illustrative network details. Screen reconstruction; illustrative readings and files.

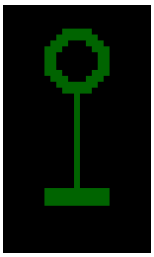
The Wi-Fi page shows network, internet and ParaLink status, addresses and signal strength. The Internet label follows the app's connection state; it is not a continuous independent internet test. The displayed mesh port is connection information, not a file-download website.

Read the aerial icon



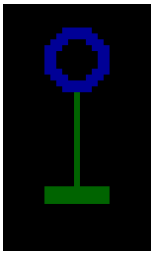
Wi-Fi disconnected

Red aerial: no Wi-Fi connection. Local sensor detection and card logging remain available.



Wi-Fi connected

Green aerial: connected to Wi-Fi; this alone does not confirm internet or a mesh link.



ParaLink-Mesh linked

Cyan ring with green stem: linked to the companion mesh app over Wi-Fi.

Connect to ParaLink-Mesh



Click picture to visit the ParaLink-Mesh webpage

Open the ParaLink-Mesh information and setup page. Run the compatible app on a device reachable over the same local Wi-Fi network or phone hotspot. Spirit Music Box attempts discovery and connection automatically.

Look for LINKED on the Wi-Fi page or the cyan aerial ring on the live screen. Local mesh communication does not require internet. Remote screen touches have the same effects as touching the device; leaving the live screen stops its session.

Update firmware

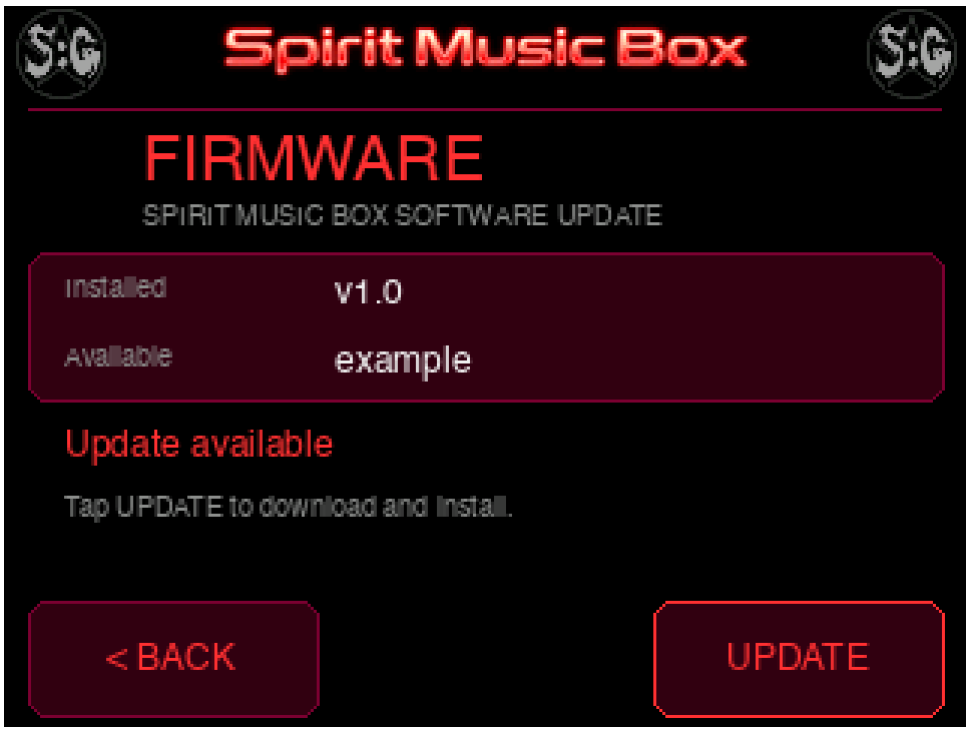
1. Finish the live session and connect stable USB power and Wi-Fi with internet access.

2. Open **Update** from the menu and wait for the installed and available versions.

3. Tap **UPDATE** if offered, or CHECK to check again when up to date.

4. Leave the device powered and connected while it installs. Do not press power or RST.

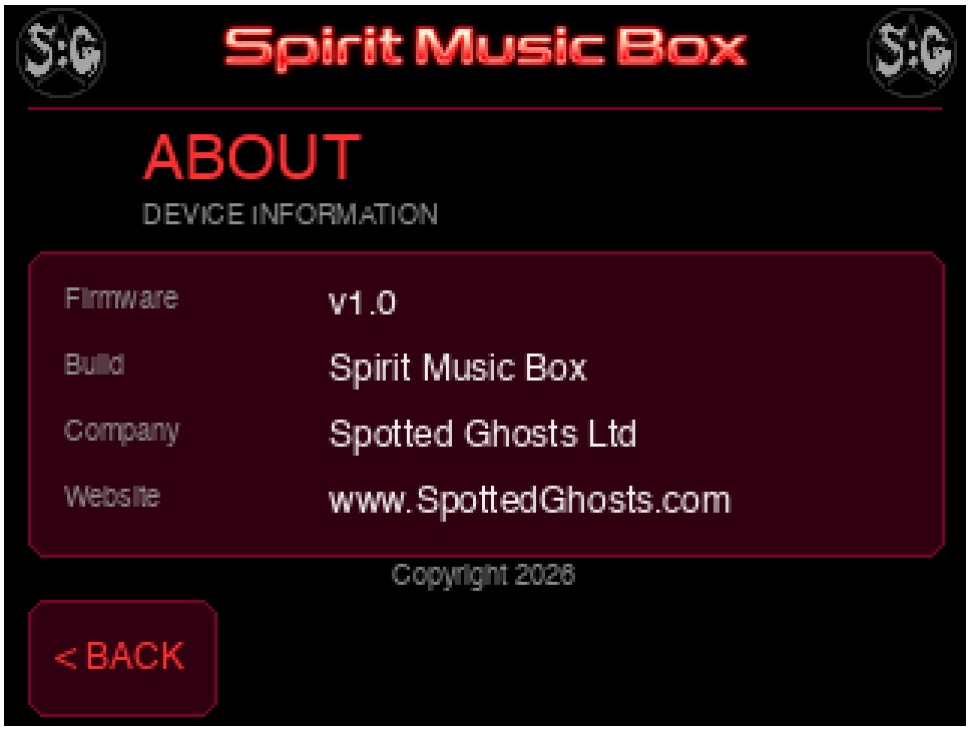
5. After successful installation, the device restarts automatically. If an error appears, restore the connection and tap **RETRY**, or use BACK.



Firmware screen with an illustrative update offer. Screen reconstruction; illustrative readings and files.

About

Open **About** to see firmware version, build, company and website details. Include the version and any error message when requesting support.



Spirit Music Box device information. Screen reconstruction; illustrative readings and files.

Troubleshooting

Problem	What to check
No automatic music	Check BOX ON, wanted sensors ON and suitable sensitivity. Wait for calibration and any current playback to finish. Leave manual motor page 4 to allow automatic triggers.
US-100 will not trigger	Check successful calibration, sensor ON and margin in cm. Return the target inside Min / Max after an event or re-enabling, then move beyond the range plus margin.
Distance calibration fails	Use a stable target with reliable readings, keep the device still and press RECAL. At least 20 valid samples are required.
DISTANCE shows -- cm	No valid recent distance is available. Check the supplied sensor setup with power off, then recalibrate.
No US-100 distance in this log	Choose a recording containing distance measurements. Older files may not include ultrasonic data. Check that the sensor gives valid readings during the session; you can also review DistanceCM on a computer.
Too many plays	Consider movement, magnetic objects, light and nearby hands. Reduce a multiplier or increase the US-100 cm margin, or disable an unwanted sensor. Recalibrate after repositioning.
Motor boost says WAIT	Allow the five-second cooldown to finish. The manual control is unavailable during playback.
Music continues unexpectedly	Tap BOX ON to switch to BOX OFF, or BACK on the live screen. Keep the mechanism clear.
No saved CSV or settings	Check logging, card space and write access after switching off. Leave time for settings to save with the motor idle.
No License!	Check the supplied microSD card and licence file with power off; contact support if it persists.
No Wi-Fi or mesh link	Check saved credentials, 2.4 GHz hotspot compatibility and the running companion app, then restart.
Unresponsive screen	Briefly press bottom RST to restart, except during firmware installation.