User Manual for GRS Ultra DOT/BSP Spinner Upgrade Kit

Product Overview

Thank you for choosing the GRS Ultra DOT/BSP Spinner Upgrade Kit! This upgrade enhances the sensitivity of your spinner up to 4096 CPR (Counts Per Revolution) and allows lower sensitivity settings down to 128 CPR. With the flexible customization feature, you can enjoy more realistic, arcade-like roller movement, with refined low-speed sensitivity to fully replicate the original arcade spinner experience.

What's Included

- Upgrade PCB × 1
- PCB Cap × 1
- Screws × 5 (only 3 required, extra provided as backup)
- Screwdriver × 1
- User Manual × 1

Important Notices (MUST READ BEFORE USE)

1. Firmware Upgrade Requirement:

   - If you purchased this upgrade kit alone, you must upgrade the firmware specific to your spinner model (BSP or DOT) before use.

2. **Critical Firmware Upgrade Instructions**:

   - ***Do not disconnect the USB connection during the firmware upgrade process. Interrupting the upgrade will cause the PCB to permanently fail and become unusable***.
   - ***Wait until the upgrade process completes and the spinner device automatically disconnects, reconnects, and finishes initializing in the firmware upgrade software (status at the middle bottom of the UI) before unplugging***.

Changing the PCB

1. Disconnect the spinner from your arcade machine or PC.

2. Unplug all connectors attached to the spinner.

3. Remove the three screws, take the board out, and replace it with the new board.

4. Secure the new board using the three screws, tightening them carefully.

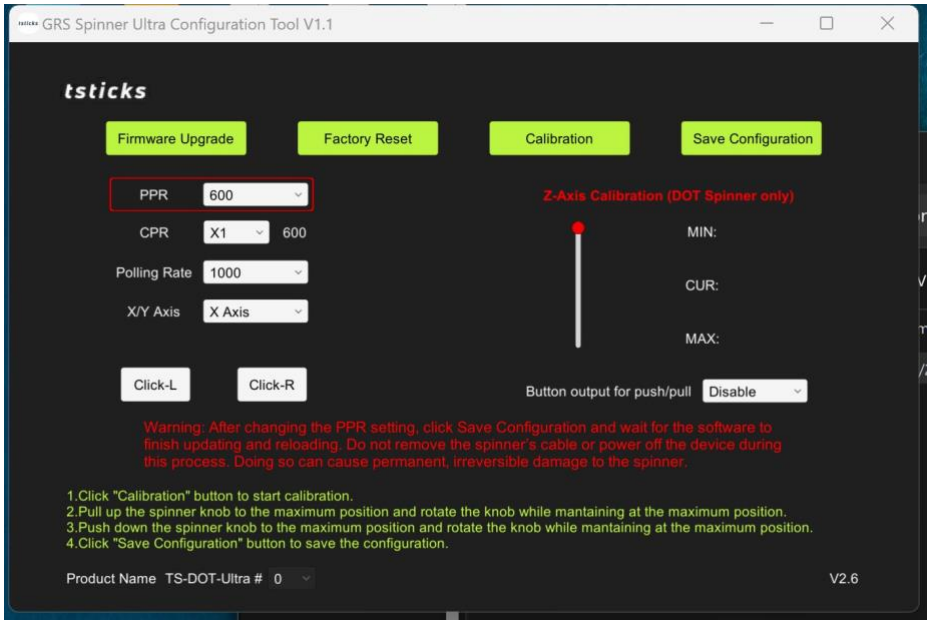
Software Download

To upgrade your firmware and calibrate your spinner, download the GRS Spinner Tool Software from the official website.

Download Link: https://thunderstickstudio.com/tools/GRS-ultra-spinner-configuration-tool.zip

Follow the steps in the **Firmware Upgrade Instructions** section to install and use the software. Ensure you always use the latest version of the software for optimal performance and compatibility.

Software Usage Guide



The GRS Spinner Tool Software provides an intuitive interface for managing firmware upgrades, spinner calibration, and other settings. Below is an explanation of the key features and functions available in the software:

1. Firmware Upgrade

Function: Allows users to upgrade the spinner's firmware. Follow the steps in the Firmware Upgrade Instructions section to complete the process.

Important: Do not disconnect the spinner during the firmware upgrade process to avoid permanent damage.

2. Factory Reset

Function: Restores all settings to the factory defaults. This can be helpful if you encounter issues or want to start over with default configurations.

3. Calibration

Function: Used specifically for DOT spinners. Enables Z-axis calibration for push/pull functions.

Instructions:

a. Click "Calibration" to start.
b. Pull the spinner knob to the maximum position and rotate it while maintaining the position.
c. Push the spinner knob to the minimum position and rotate it while maintaining the position.

d. Click "Save Configuration" to save the calibration.

4. Save Configuration

Function: Saves any changes made to the settings, including PPR (Pulses Per Revolution), calibration, and more. Ensure this is clicked after any changes are made to apply them.

5. PPR/CPR Setting

Function:
The PPR (Pulses Per Revolution) setting allows users to select the desired sensitivity for the spinner. Available options include 128, 600 and 1024 depending on your specific needs.

CPR (Counts Per Revolution):
CPR is calculated based on the PPR value and the multiplier (1X, 2X, or 4X) you select. This provides the final CPR value displayed next to the dropdown menu. For example:

- If the spinner CPR is set to 1024 and you want to adjust it for a specific game, such as *Arkanoid* in PC MAME, which requires 486 CPR:
  - Use the formula: **(486 × 100) ÷ 1024 = 47.4**
  - Set the analog sensitivity in MAME to **47%**.

This configuration will replicate the exact original gameplay experience, ensuring your spinner behaves authentically for emulated games.

Reference:
For a detailed guide on CPR and its impact on spinner emulation games, visit this resource:
https://wiki.arcadecontrols.com/index.php?title=Spinner_Turn_Count
Special thanks to the author for providing this valuable guide for spinner emulation.

6. Polling Rate

Function: Lets users adjust the polling rate of the spinner. A higher polling rate provides more responsive feedback but may consume more system resources.

7. X/Y Axis Selection

Function: Lets users configure the spinner for X-axis or Y-axis control. Adjust this based on your gaming or application setup.

8. Z-Axis Calibration (DOT Spinner Only)

Tracks and displays the calibration range for the spinner's push/pull (Z-axis) functionality.

Calibration requires using the steps provided above.

9. Click-L and Click-R Buttons

Function: Test the left and right click functions if your spinner includes clickable buttons.

Firmware Options

The upgrade kit is preloaded with the DOT spinner firmware by default. If you are upgrading a BSP spinner, you must flash the firmware to the BSP version before use. Firmware files for each spinner model are provided, and the correct firmware must be applied based on your spinner type:

1. **DOT Spinner Firmware**: Preloaded on the upgrade kit. https://thunderstickstudio.com/firmwares/GRS-Ultra-DOT-Spinner-firmware.bin
2. **BSP Spinner Firmware**: Must be flashed if upgrading a BSP spinner. https://thunderstickstudio.com/firmwares/GRS-Ultra-BSP-Spinner-firmware.bin

Important: During the firmware upgrade process, **do not disconnect the spinner from the USB connection under any circumstances**. Interrupting the upgrade will cause the PCB to permanently fail ("brick") and render it unusable. Always wait for the firmware upgrade process to complete, including automatic device reboot and reinitialization, before disconnecting the spinner.

Refer to the **Firmware Upgrade Instructions** section for detailed steps on flashing the appropriate firmware.

Firmware Upgrade Instructions

1. Download the GRS Spinner Tool Software:

- Visit our website at thunderstickstudio.com for the download link.

2. Install the Software:

- Follow the on-screen instructions to install the software on your computer.

3. Performing the Firmware Upgrade:

- Open the GRS Spinner Tool Software.
- Plug in your spinner via USB. Wait for the software to recognize the device.
- Click the “Firmware Upgrade” button.
- Select the appropriate firmware file for your spinner model and setup, then click “OK.”
- Wait for the firmware upgrade process to complete. Do not disconnect until the device has finished the reboot and reinitialization.

4. DOT Spinner Calibration (Post-Upgrade Only):

- After upgrading the firmware on a DOT spinner, calibration is required.
- In the software, click the “Calibration” button.
- Press the spinner all the way down, hold, and rotate a few times.
- Pull the spinner all the way up, hold, and rotate a few times.
- Click “Save Configuration” to complete the calibration process.

Recommended Setting Selection

- Arcade1Up TRON Cabinets: Use DOT spinner and set it to 128 PPR and X1 CPR. Make sure to enable the Button output feature in the configuration tool

- To mount the DOT spinner onto the Arcade1Up cabinet, you will need to 3D print a mounting hole size converter. You can download the 3D model file for the converter from the following link:

https://cdn.shopifycdn.net/s/files/1/0606/7516/2341/files/Hole_size_convertor.stl?v=1661395519

- PC or Raspberry Pi Setups: Use BSP or DOT Firmware

Troubleshooting & Support

For questions or support, please reach out:

- Email: sales@thunderjoystick.com
- Website: thunderstickstudio.com