# GPSTAR II

## Proton Pack & Neutrona Wand

## Operational Guide

# GPStar II Proton Pack and Neutrona Wand Operation Guide

## Standard Features

- The switch underneath the Ion Arm can turn the Proton Pack on or off.
- You can run the pack without the Cyclotron Lid attached.
- The volume for the pack and wand can be controlled via the Crank Generator knob.
  - Clockwise to raise volume, counter-clockwise to lower it.
- When the ribbon cable is disconnected it will activate the alarm mode and degrade the Cyclotron spin.
- The Proton Pack can run without a wand, though it can only be activated via the switch under the Ion Arm.
- Vibration switch in the Cyclotron switch plate enables or disables the vibration motors for both the Proton Pack and Neutrona Wand.
- Theme toggle in the Cyclotron switch plate changes the Proton Pack and Neutrona Wand modes between 1984, 1989, Afterlife, and Frozen Empire.
- The Proton Pack vibrates only while firing. This can be changed to vibrate at all times or entirely disabled. Vibration can be enabled or disabled by the vibration toggle switch in the Proton Pack. Vibration settings can be toggled via the Neutrona Wand menu system.
- The Neutrona Wand vibrates only while firing. This can be changed to vibrate at all times or entirely disabled. Vibration can enabled or disabled by the vibration toggle switch in the Proton Pack. Vibration settings can be toggled via the wand menu system.

- Single (centred) LED per Cyclotron lens for 1984/1989 modes by default.
- This can be toggled back to 3 LEDs per Cyclotron lens via the Neutrona Wand menu system.
- The Power Cell, Cyclotron and other lighting on the Proton Pack can have the brightness independently adjusted.
- 1989 and Frozen Empire sound effects mode are available; they can be accessed from the Neutrona Wand menus.
- Super Hero and Mode Original system operation modes.
- Menu system with the ability to customise various settings for both your Proton Pack and Neutrona Wand.
- Up to 5 different power levels as indicated on the Neutrona Wand bargraph.
- The Neutrona Wand can be configured within the menu system to adjust the overheat settings. When not set to overheat, you can fire continuously.
- The Proton Pack can also be configured within the Neutrona Wand menu system to adjust the duration of smoke effects (for each power level), which smoke effects are activated (for each power level), use of overheating smoke effects (for each power level), or whether smoke is enabled or disabled entirely (for each power level).
- Default settings: The Neutrona Wand will fire forever on power levels level 1 through 4 and overheat on power level 5.
- The Proton Pack will emit smoke effects during longer firing (Default setting: enabled). This can be configured from the Neutrona Wand menu system.

# System Power Readiness Indicator

- When battery power is first applied on the Proton Pack, the lights will flicker and a sound will play to indicate that the system now has power and is ready for use.

# System Power Inactivity Indicator

- The LED at the front of the Neutrona Wand body next to the Clippard valve will start to blink after 1 minute of inactivity while the Neutrona Wand and Proton Pack are powered down to indicate the system is still receiving power from the battery.

# Optional Features

- Support for switches for Cyclotron direction and to enable or disable smoke effects.
- Support for smoke effects with dedicated fans for the Booster Tube and N-Filter.
- Additional Lights available for the Cyclotron panel, internal "cake" Cyclotron and Power Cell.
    - Automatically switches to internal "cake" Cyclotron, if implemented (optional).
    - This supports a 35 LED ring light (by default) to be installed in the "cake". Other size LED rings or LED setups are supported in the configuration settings.
- Video game colours supported if using RGB supported LEDs for the Cyclotron Lid, internal "cake" Cyclotron and Power Cell.
- Support for the Attenuator and other optional add-on devices.

# Toggle Operation Modes

There are two modes available which replicate movie or prop accurate behaviours of the available toggle switches. These system modes can be altered via the EEPROM menus and will affect the startup sequence for your Proton Pack and Neutrona Wand.

# Operation Modes

**Super Hero:** This mode reflects as seen during the closeup operations of the super hero Proton Pack and Neutrona Wand.

**Mode Original:** This reflects the original production documentation from 1984 on how the Proton Pack and Neutrona Wand operate together. Other variation differences are the bargraph animations, Neutrona Wand sound effects and power levels.

# Super Hero Mode Operation Guide

**Super Hero :** This is the default operation mode base on Afterlife and Frozen Empire.

## Activate Toggle

- Activate toggle on the gun box turns on both the Proton Pack and Neutrona Wand.
    - The switch under the Proton Pack's Ion Arm does not need to be engaged for this to work. The switch under the Ion Arm will turn the cyclotron on.
- The green lever near the gunbox acts as a safety and must be pulled to extend the barrel before firing.
- **Button Mash Lockout:** If you press the firing button(s) too rapidly the system will malfunction and lock you out for a period of time proportional to the current power level.

## Right Hand Toggle Switch Behaviour

- The Neutrona Wand will not fire unless these switches are turned on.
- **Boot-Up Errors:** If you boot up the Neutrona Wand while the top toggle switch is on, it will boot into an error mode. Turn the top toggle switch off and restart your Neutrona Wand to boot normally. This is the default behaviour but this feature can be disabled in the Neutrona Wand EEPROM Configuration Menu.
- **Quick Vent:** If the Neutrona Wand is ***ON*** and the Top toggle switch is ***DOWN***, pressing ***Intensify*** will perform a quick vent. Holding down ***INTENSIFY*** will perform a full overheat sequence. This is the default behaviour, though this feature can be disabled in the Neutrona Wand EEPROM Configuration Menu.
- While in 1984/1989 theme modes:
    - Bottom toggle switch turns on the vent light and plays the wand power up sound.
    - Top toggle switch plays a single beep sound.
- While in Afterlife and Frozen Empire theme mode:
    - Bottom toggle switch turns on the vent light and the wand plays a ramp up sound.
    - Top toggle switch turns on the looping beeping sounds.

# Original (Prop) Mode Operation Guide

**Mode Original:** This mode reflects original production documentation from 1984 on how the Proton Pack and Neutrona Wand operate together. Other variation differences are the bargraph animations, Neturona Wand sound effects and power levels. Note that the firing modes from the 2009 video game are unavailable in this mode as they are not accurate to these production notes.

- There are 4 power levels in Mode Original. When the Neutrona Wand is in standby mode (see toggle switch behaviours below), the bargraph settles on the first level.
- The switch under the Ion Arm on the Proton Pack must be switched on. This gives power to the entire system. The Slo-Blo light on the Neutrona Wand will turn solid red to indicate power to the system.
    - If you are using a standalone Neutrona Wand without a Proton Pack, double-clicking the `Intensify` button while the Neutrona Wand is turned off will imitate flipping the switch under the Ion Arm.
- While firing, the default bargraph animations slide the bargraph up and down small increments to indicate the instability and power of the proton stream.
- Button Mash Lockout:* If you press the firing button(s) too rapidly the system will malfunction and lock you out for a period of time proportional to the current power level.

## Right Hand Toggle Switch Behaviours

- The bottom toggle will put the Neutrona Wand into standby mode. The Slo-Blo LED will begin to blink, and the vent lights will turn on.
- The top toggle turns on the bargraph. It will ramp up and back down to the lowest level setting.

## Activate Toggle

- Activate toggle on the gun box turns on the cyclotron of the Proton Pack. To activate the cyclotron, all the right hand toggle switches on the Neutrona Wand must be activated.
- The Cyclotron will not turn on unless all the toggle switches on the Neutrona Wand are activated and the Ion Arm switch on the Pack is in the ON position.
- The green lever near the gunbox acts as a safety and must be pulled to extend the barrel before firing.

# Top Dial Behaviour

- The primary purpose of the top dial on the top of the gun box is to change the power level of the wand, affecting the intensity of the stream effects indicated by increasing or decreasing the bargraph lights.
    - Rotate clockwise to raise power, and counter-clockwise to lower power.
- There are 5 wand power levels in Super Hero mode and 4 in Mode Original.
- For lower power levels, the proton stream is more red. On higher power levels, the stream will appear more yellow.
- When Video Game Mode is active and the Neutrona Wand is ***ON*** and the top toggle switch is ***DOWN***, rotating the top dial will switch between weapon modes. This dial will be used to navigate the menu systems (see "Neutrona Wand Menu System" section). ***Super Hero mode only.***

## Quick Audio Volume Adjustment

- ***System Volume: Super Hero Mode***
    - While the Neutrona Wand is ***ON*** and the top and bottom toggle switches are ***DOWN***, hold the Intensify button while turning the top dial to quickly adjust the Proton Pack and Neutrona Wand overall system volume.
    - While the Neutrona Wand is **OFF** you can independently adjust the system volume of the Neutrona Wand by holding the Intensify button down and turning the dial.
- ***System Volume: Mode Original***
    - While the Proton Pack cyclotron is **OFF** and the Neutrona Wand top and bottom toggle switches are ***DOWN***, hold the Intensify button while turning the top dial to quickly adjust the Proton Pack and Neutrona Wand system volume.
    - While the Proton Pack cyclotron is ***OFF*** and if either the Neutrona Wand top or bottom toggle switch is ***UP***, you can independently adjust the system volume of the Neutrona Wand by holding the Intensify button down and turning the dial.
- ***System: Super Hero and Mode Original***
    - When music is playing while the Proton Pack and Neutrona Wand are turned off, you can use the Top Dial on the top of the Neutrona Wand to easily access the independent music volume control.

# System Modes

## Video Game Mode (Default) Super Hero mode only

- While the Neutrona Wand is **ON** and the top toggle switch is **DOWN**, rotating the top dial will select from the following weapon modes (listed in counter-clockwise order):
    i. Proton Stream (Default)
    ii. Dark Matter Generator
    iii. Plasm Distribution System
    iv. Composite Particle System
    v. [1] Spectral (Rainbow)
    vi. [2] Spectral (Holiday)
    vii. [3] Spectral (Custom)

[1] Spectral Mode (Rainbow) is a firing mode which gives a RAINBOW effect. If your Proton Pack has RGB LEDs, they will change to match.

[2] Spectral (Holiday) is a firing mode which gives a RED/GREEN effect. If your Proton Pack has RGB LEDs, it will match these colours.

[3] Spectral (Custom) is a user defined colour mode. You can independently adjust the Neutrona Wand Barrel, Power Cell, Cyclotron and Inner Cyclotron colours directly from the EEPROM LED Menu system.

📝 **Note:** Spectral modes are disabled by default. However they can be enabled from the EEPROM Menu or flashed directly to the Neutrona Wand board. They take advantage of RGB coloured LED add-ons if installed.

### Proton Stream

- Holding down ***Intensify*** will throw your normal Proton Stream.
    - Pressing the Barrel Wing Button while you are already throwing a Proton Stream will initiate "Cross The Streams"
- Pressing the ***Barrel Wing Button*** will fire a Boson Dart.

### Dark Matter Generator

- Pressing ***Intensify*** will fire a Shock Blast.
- Holding down the ***Barrel Wing Button*** will throw a Stasis Stream.

### Plasm Distribution System

- Holding down ***Intensify*** will activate the Slime Blower.
- Pressing the ***Barrel Wing Button*** will fire a Slime Tether.

### Composite Particle System

- Pressing ***Intensify*** will fire the Meson Collider.
- Pressing the the ***Barrel Wing Button*** will fire an Overload Pulse. Holding down the ***Barrel Wing Button*** allows for rapid-fire.
    - The firing rate is dependent on the Neutrona Wand's current power level.

## Cross The Streams (CTS) / Cross The Streams Mix (CTS Mix)

- The ***Barrel Wing Button*** at the end of the wand acts as an alternate firing button. When Cross The Streams is enabled, Video Game Modes are disabled and you will only have the Proton Stream on both ***Intensify*** and the ***Barrel Wing Button***.
- The overheat features can only be triggered when holding down the ***Barrel Wing Button*** when Cross The Streams mode is enabled.
- Pressing both the ***Intensify*** and ***Barrel Wing Button*** at the same time enables the "Cross the Streams" (CTS) audio and visual effects. Releasing either of the firing buttons will continue these effects as long as one is still held, and will end once both buttons are released.
    - With Cross The Streams Mix, you need to hold both the ***Intensify*** and ***Barrel Wing Button*** at the same time to remain in Cross The Streams. Releasing one of the firing buttons will revert to the normal Proton Stream for that button.

To enable Cross The Streams (CTS) or Cross The Streams Mix (CTS Mix) mode by default, you can set this setting from the Neutrona Wand Menu System.

# Optional Wand Features

- Support for additional lights such as the wand hat lights and wand barrel end LED strobe.
- A new barrel wing button can be added.
- Serial connection and power for a 28-segment or 30-segment bargraph.
- Upgraded wand speaker for more clarity and higher sound output.

****Please refer to the GPStar Support Page for links and additional information ****

**www.gpstartechnologies.com**

# Neutrona Wand Menu System

## Entering The Menu System

There are 2 ways to enter the Menu System.

- With the Activate switch ***UP*** and any right-hand switch ***DOWN***, press the ***Barrel Wing Button*** to enter the Neutrona Wand Menu System. Super Hero mode only
- While the Neutrona Wand and Proton Pack are powered down, press the *Barrel Wing Button*.

## Navigation

Use the Top Dial on the top of the wand to navigate up and down through the menu system.

## Actions & Navigation

While in the menu system, the bargraph's LEDs begin flashing. All other functions of the wand will be temporarily disabled. There are 5 different menu settings, which are indicated by bargraph LED segments. 1 through 5 (from bottom to top) with menu level 5 being the default upon entering this mode. For example when 1 LED (or bargraph segment) is flashing/displayed that means you are on menu 1.

Changes are made by pressing either the Intensify button on the gun box or the Barrel Wing Button at the end of the wand.

# Menu Level 1

| Option | Purpose | Intensify Button | Barrel Wing Button |
|---|---|---|---|
| 5 | Music Track Looping | Enable/Disable looping of the current track. [1] | Exit the menu system. [2] |
| 4 | Proton Pack Light Dimming | (Intensify + Top Dial) Increases/Decreases the Proton Pack device LED brightness. | Toggle between the Power Cell, Cyclotron or Inner Cyclotron devices. |
| 3 | Music & SFX Effects Volume | (Intensify + Top Dial) Increases/Decreases the Music Volume. | (Barrel Wing Button + Top Dial) Increases/Decreases the Effects Volume. |
| 2 | Switch Music Track | Cycle forward in the music queue. | Cycle backwards in the music queue. |
| 1 | Play or Stop Music / System Mute | Start Music / Stop Music. | Mute the Proton Pack and Neutrona Wand or revert back to the previous volume. [3] |

[1] LED/Segment #5 will stay solid when the single-track loop is enabled while in the top menu system; it will blink on/off when track looping is disabled.

[2] When you navigate back to Option 5 while in Video Game Mode and press the Barrel Wing Button, the wand will return the proton stream mode (accompanied by an audio cue to indicate this return to firing readiness). When in CTS mode this will exit the menu and allow the wand to be powered on. Note that music will continue to play (and advance/loop) even when the pack and wand are turned off.

[3] Note that the LED/Segment #1 will stay solid when the Proton Pack and Neutrona Wand volume is muted.

# Menu Level 2

To access Menu Level 2, use the Top Dial on the top of the wand to move down and past option 1 on Menu Level 1. When you reach the the next menu level, the Slo-Blo LED will light up to indicate this menu state and also audio cues from the system.

| Option | Purpose | Intensify Button | Barrel Wing Button |
|---|---|---|---|
| 5 | Firing Mode Selection | Cycle through VG/CTS operation modes. [3] | Cycle through VG colour modes. [4] |
| 4 | Overheating / Smoke | Enable / Disable Overheating. | Enable / Disable Smoke Effects. |
| 3 | Cyclotron LED Control | Change the Cyclotron rotation direction. | Toggle between 1 (centered) or 3 LEDs in the Cyclotron Lid for 1984/1989 modes. |
| 2 | Vibration Settings | Enable / Disable Proton Pack vibration or vibration during firing. | Enable / Disable Neutrona Wand vibration or vibration during firing. |
| 1 | Year Mode Selection | Cycle through 1984, 1989, Afterlife and Frozen Empire modes. | Enable / Disable the Proton Stream impact sound effects. |

[3] Switch between Video Game and Cross the Streams (CTS) operation modes. Note that the LED/ Segment #5 will stay solid when CTS is enabled while in the sub menu system.

[4] Enables/disables the video game colour modes for the Proton Pack's Power Cell and Cyclotron lights. This only affects the pack when in Video Game mode, not for CTS modes, and offers the following states:

- Disable all the video game colours (Power Cell remains blue, Cyclotron remains red).
- Enable only the Power Cell LEDs to change colours (requires RGB Power Cell).
- Enable only the Cyclotron LEDs to change colours (requires RGB replacement).
- Enable both the Power Cell and Cyclotron to use video game colours.

To exit the menu system, navigate to the top menu in Option 5 (Slo-Blo LED is no longer illuminated) and press the Barrel Wing Button. A small beep and voice callout will be heard when transitioning between the top and sub menu levels.

**Tip:** When music is playing while the Proton Pack and Neutrona Wand are turned off, you can use the Top Dial on the top of the Neutrona Wand to easily access the independent music volume control.

📝 **Note:** The Neutrona Wand Menu Level 2 can only be reached while the Neutrona Wand and Proton Pack are both turned off.

# Menu 3

To access Menu Level 3, use the Top Dial on the top of the wand to move down and past Menu Level 1 and Menu Level 2. When you reach the the next menu level, the Slo-Blo LED and vent light will light up to indicate this menu state and also audio cues from the system.

| Option | Purpose | Intensify Button | Barrel Wing Button |
|---|---|---|---|
| 5 | WiFi Control | Toggle the Neutrona Wand WiFi on or off. | Toggle the Proton Pack WiFi on or off. |
| 4 | - Reserved - | - Reserved - | - Reserved - |
| 3 | - Reserved - | - Reserved - | - Reserved - |
| 2 | - Reserved - | - Reserved - | - Reserved - |
| 1 | - Reserved - | - Reserved - | - Reserved - |

📝 **Note:** The Neutrona Wand Menu Level 3 can only be reached while the Neutrona Wand and Proton Pack are both turned off.

# EEPROM Menus

There are two EEPROM menus available which can be accessed to adjust and save configurations onto either the Proton Pack and Neutrona Wand EEPROM memory.

- EEPROM LED Menu
- EEPROM Configuration Menu.

📝 **Note:** Both the EEPROM LED and Configuration Menu's System can only be reached while both the Neutrona Wand and Proton Pack are powered down.

## EEPROM LED Menu

The EEPOM LED Menu can be used to configure different LED setups for your Proton Pack and Neutrona Wand. All changes can be saved directly to the Proton Pack and Neutrona Wand EEPROM memory and will be loaded automatically even if you turn off the power to your devices.

To access the EEPROM LED Menu System, hold down the Intensify Button and toggle the right hand Top Toggle button 5 times (up and down).

You will then hear a beep noise and your bargraph will light up to indicate you are in the EEPROM LED Menu System. The Neutrona Wand barrel and all the Proton Pack LEDs will light up to the default Spectral Custom colours when you enter the EEPROM LED Menu.

To access the EEPROM Lighting menus, use the Top Dial on the top of the wand. When you reach a new menu level, the Slo-Blo LED and other lights on the Neutrona Wand will illuminate to indicate these menu levels, along with audio cues from the system. EEPROM Configuration Menu Level Lighting cues:

Menu Level 1 -> No additional wand lights will be illuminated
Menu Level 2 -> Slo-Blo illuminated

## EEPROM LED Menu Level 1

| Option | Purpose | Intensify Button | Barrel Wing Button |
|---|---|---|---|
| 5 | Save or Clear the EEPROM settings | Clear all the LED settings in the Proton Pack EEPROM.<br><br>***The Proton Pack will load the defaults the next time you turn the battery power off.*** | Save the current settings to the Proton Pack and Neutrona Wand EEPROM. |
| 4 | Neutrona Wand Barrel LED Count Toggle / Spectral Custom (Barrel) Colour | Toggle between 2, 5, 48 or 50 LEDs for your Neutrona Wand barrel. | (Barrel Wing Button + Top Dial)<br>Changes the colour hue of the Neutrona Wand barrel for the Spectral Custom mode. |
| 3 | Power Cell LED Count Toggle / Spectral Custom (Power Cell) Colour | Toggle between 15 or 13 LEDs for your Power Cell. | (Barrel Wing Button + Top Dial)<br>Changes the colour hue of the Power Cell for the Spectral Custom mode. |
| 2 | Cyclotron LED Count / Spectral Custom (Cyclotron) Colour | Toggle between 40, 36, 20 or 12 LEDs for your Cyclotron. | (Barrel Wing Button + Top Dial)<br>Changes the colour hue of the Cyclotron Lid for the Spectral Custom mode. |
| 1 | Inner Cyclotron LED Count Toggle / Spectral Custom (Inner Cyclotron) Colour | Toggle Between 35, 24, 23 or 12 LEDs for your Inner Cyclotron Cake. | (Barrel Wing Button + Top Dial)<br>Changes the colour hue of the Inner Cyclotron (Cake) for the Spectral Custom mode. |

## EEPROM LED Menu Level 2

| Option | Purpose | Intensify Button | Barrel Wing Button |
|---|---|---|---|
| 5 | 1984/1989 Cyclotron Fade Toggle | Toggle whether the outer cyclotron LEDs have a fade effect or not in 1984 and 1989 year modes. | Unused |
| 4 | Bargraph LED Count / GPStar RGB Vent Light | Toggle between 28 or 30 segments if such bargraphs are connected. | Enable / Disable the optional GPStar RGB vent / top light.<br><br>** This option is set on by default for GPStar II and can not be changed ** |
| 3 | Power Cell Invert | Change the direction of the Power Cell animation. | Unused |
| 2 | Inner Cyclotron LED Panel Toggle | Toggle the optional Inner Cyclotron LED Panel. | Unused |
| 1 | Inner Cyclotron GRB Toggle | Toggle your Inner Cyclotron from RGB or GRB LEDs. | Unused |

# EEPROM Configuration Menu

The EEPROM Configuration Menu can be used to save certain behaviours of your Neutrona Wand and Proton Pack as the standard settings.

To access the EEPROM Configuration Menu, hold down the Intensify Button and toggle the right hand Bottom Toggle button 5 times (up and down). You will then hear a beep noise and your bargraph will light up to indicate you are in the EEPROM Configuration Menu System.

To access the EEPROM Configuration menus, use the Top Dial on the top of the wand. When you reach a new menu level, the Slo-Blo LED and other lights on the Neutrona Wand will illuminate to indicate these menu levels, along with audio cues from the system. EEPROM Configuration Menu Level Lighting cues:

Menu Level 1 -> No additional wand lights will be illuminated
Menu Level 2 -> Slo-Blo illuminated
Menu Level 3 -> Slo-Blo and vent light illuminated
Menu Level 4 -> Slo-Blo, vent light, and top gun box light illuminated
Menu Level 5 -> Slo-Blo; vent light, top gun box light, and front gun box light illuminated

## EEPROM Configuration Menu Level 1

| Option | Purpose | Intensify Button | Barrel Wing Button |
|---|---|---|---|
| 5 | Save or Clear the EEPROM settings | Clear all the configuration only settings in the Proton Pack and Neutrona Wand EEPROM.<br><br>***The Proton Pack and Neutrona Wand will instead load the software defined defaults the next time the battery power is turn back on.*** | Save the current settings to the Proton Pack and Neutrona Wand EEPROM. |
| 4 | Firing Mode Selection / Spectral Modes | Cycle through VG/CTS operation modes to set as your default. [1] | Enable/Disable the Spectral Modes. |
| 3 | Overheating / Smoke | Enable/Disable Overheating Ability. | Enable/Disable Smoke Effects. |
| 2 | Cyclotron LED Control | Cyclotron rotation direction. Clockwise or counter clockwise. | Enable/Disable the Cyclotron Lid Ring Simulation in Afterlife or Frozen Empire mode.<br><br>***ONLY applies to the use of the 12, 20 or 36 LED hardware options.*** |
| 1 | Sound Effects | Enable/Disable extra Neutrona Wand sound effects to be played by the Proton Pack. | Enable / Disable the proton stream impact sound effects. |

[1] Choose between Video Game and Cross the Streams (CTS) operation modes. The Cross The Streams modes are closer to what is seen in the films, while Video Game mode imitates behaviour seen in the 2009 Ghostbusters: The Video Game. Note that Video Game mode is only available in Super Hero mode.

## EEPROM Configuration Menu Level 2

| Option | Purpose | Intensify Button | Barrel Wing Button |
|---|---|---|---|
| 5 | Quick Vent / Wand Boot Errors | Enable / Disable the Quick Venting feature. When enabled, you can manually vent your Proton Pack by pressing the Intensify button while the top right toggle switch is switched down.<br>📝 Super Hero mode only | Enable to disable the Wand boot error mode. When enabled, if you turn on the Neutrona Wand while the top right toggle is up and activated, the Neutrona Wand enters an error mode and remains locked out until the switches are all turned off.<br>📝 Super Hero mode only |
| 4 | Vibration Settings | Cycle through the Proton Pack vibration options. | Cycle through the Neutrona Wand vibration options. |
| 3 | Beep Loop / VGA Colour Mode Toggles | Enable / Disable the looping beep sound effect in Afterlife and Frozen Empire Mode. | Cycle through VG colour modes. [2] |
| 2 | Overheat Lights | Enable / Disable the N-Filter LEDs from strobing during overheating. | Enable / Disable the Proton Pack lights to turn off during overheating. When disabled, after ramping down to a slower pace, the lights stay on. |
| 1 | Default Year Mode / Overheat Sync to Fan | Set your default year mode between 1984/1989/Afterlife/ Frozen Empire/Default. When set, the system will ignore the year mode toggle switch during bootup. However the toggle switch can still be used while the Proton Pack is on. If set to Default, the system picks the year mode based on the position of the year mode toggle switch in the Proton Pack. | Enable/Disable the overheat sync to fan. When enabled, the fan connections in the Proton Pack will only activate at the same time as the smoke connections. When disabled, the fan connections activate slightly after the smoke connections which allows some build of smoke before the fans activate. |

[2] Enables/disables the video game colour modes for the Proton Pack's Power Cell and Cyclotron lights. This only affects the pack when in Video Game mode, not for CTS modes, and offers the following states:

- Disable all the video game colours (Power Cell remains blue, Cyclotron remains red).
- Enable only the Power Cell LEDs to change colours (requires RGB Power Cell).
- Enable only the Cyclotron LEDs to change colours (requires RGB replacements).
- Enable both the Power Cell and Cyclotron to use video game colours.

## EEPROM Configuration Menu Level 3

| Option | Purpose | Intensify Button | Barrel Wing Button |
|---|---|---|---|
| 5 | System Default Volume / Neutrona Wand Year Mode | (Intensify + Top Dial)<br>Hold the ***Intensify Button*** down while turning the ***Top Dial*** to adjust and set the default volume for the system. (Uses audio beeps for indication of volume.) | Set the year mode your Neutrona Wand operates in. Options are: 1984/1989/Afterlife/Frozen Empire and System Default. When set to System Default, the Neutrona Wand matches the same year mode as that the Proton Pack is in. |
| 4 | Invert Bargraph / Bargraph Overheat Blinking | Toggles inverting of the bargraph in the Neutrona Wand (depending on installation orientation). | Enable/Disable the bagraph blink sequence during overheat. When enabled, the bargraph will blink and an error sound will play while overheating. When disabled, the bargraph will ramp down to off without error sounds while overheating. |
| 3 | Bargraph Animations / Bargraph Firing Animations | Toggle between animation modes as default for the idle bargraph: **Super Hero**, **Bargraph Original**, or **System Default.**<br><br>System Default chooses the default animation based on the year mode and system mode. | Toggle between animation modes as default for the bargraph when firing: **Super Hero**, **Bargraph Original**, or **System Default**.<br><br>System Default chooses the default animation based on the year mode and system mode. |
| 2 | Demo Light Mode / Cyclotron 3 LED Toggle | Enable / Disable the Demo Light mode. When enabled, the Proton Pack will automatically boot up as soon as the system has power. | Toggle between 1 LED or 3 LEDs in each cyclotron lens in 1984/1989 year mode. |
| 1 | System Mode / CTS Override | Toggle between the available system operation modes:<br><br>**Super Hero** or **Mode Original** | Toggle between options for default CTS mode: **1984**, **1989**, **Afterlife**, Frozen Empire or **System Default**.<br><br>System Default automatically chooses the CTS mode based on the current year mode of your system. |

## EEPROM Configuration Menu Level 4

Adjust the vent smoke duration during overheat events and overheat start delay for each wand power level.

| Option | Purpose | Intensify Button + Top Dial | Barrel Wing Button + Top Dial |
|---|---|---|---|
| 5 | Power Level 5 | Smoke vent duration during overheat.<br>Range: 2 to 60 Seconds<br>Default: 6 seconds | Overheat start delay.<br>Range: 2 to 60 Seconds<br>Default: 30 seconds |
| 4 | Power Level 4 | Smoke vent duration during overheat.<br>Range: 2 to 60 Seconds<br>Default: 5 seconds | Overheat start delay.<br>Range: 2 to 60 Seconds<br>Default: 35 seconds |
| 3 | Power Level 3 | Smoke vent duration during overheat.<br>Range: 2 to 60 Seconds<br>Default: 4 seconds | Overheat start delay.<br>Range: 2 to 60 Seconds<br>Default: 40 seconds |
| 2 | Power Level 2 | Smoke vent duration during overheat.<br>Range: 2 to 60 Seconds<br>Default: 3 seconds | Overheat start delay.<br>Range: 2 to 60 Seconds<br>Default: 50 seconds |
| 1 | Power Level 1 | Smoke vent duration during overheat.<br>Range: 2 to 60 Seconds<br>Default: 2 seconds | Overheat start delay.<br>Range: 2 to 60 Seconds<br>Default: 60 seconds |

### ⚠ WARNING

Running your smoke devices for long periods can potentially damage them, and/or reduce battery life. Adjust these settings with caution and use at your own risk!

## EEPROM Configuration Menu Level 5

Toggles overheating ability and continuous smoke effects during firing for each wand power level. The continuous smoke effects will randomly activate for very short bursts while continuously firing for long periods.

| Option | Purpose | Intensify Button | Barrel Wing Button |
|---|---|---|---|
| 5 | Power Level 5 | Enable / Disable Overheating.<br>Default: enabled | Enable / Disable continuous firing smoke effects.<br>Default: enabled |
| 4 | Power Level 4 | Enable / Disable Overheating.<br>Default: disabled | Enable / Disable continuous firing smoke effects.<br>Default: disabled |
| 3 | Power Level 3 | Enable / Disable Overheating.<br>Default: disabled | Enable / Disable continuous firing smoke effects.<br>Default: disabled |
| 2 | Power Level 2 | Enable / Disable Overheating.<br>Default: disabled | Enable / Disable continuous firing smoke effects.<br>Default: disabled |
| 1 | Power Level 1 | Enable / Disable Overheating.<br>Default: disabled | Enable / Disable continuous firing smoke effects.<br>Default: disabled |

# Support & Troubleshooting

Please visit www.gpstartechnologies.com to download the latest firmware and software updates for your Proton Pack and Neutrona Wand.

## Proton Pack

Since all connections to the Proton Pack utilise standard JST-XH connections to the available devices, please re-check any connections for incorrect seating and polarity before continuing. If these are in place then at a minimum you should be able to turn on the pack using the red switch under the ion arm which should cause the Power Cell lights to activate. This will be the primary means of validating that the pack controller is enabled.

## Pack will not power on (no lights or sounds)

Confirm that the battery pack is sufficiently charged, switched to the on state, and USB-to-JST connection is in place.

## Pack has lights but does not play audio

- Re-check the 3.5mm audio cable is connected to the audio amplifier, and that the audio amplifier has power, is connected to at least 1 speaker, and volume has been turned up to at least 30%.
- If possible, connect the 3.5mm audio cable to a known-good audio source such as a smartphone, Alexa device, or similar to confirm that the amplifier is capable of receiving a signal.

If there is still no sound from your Proton Pack, please refer to the GPStar Support Page.

## Neutrona Wand

The wand assumes successful operation of the pack, so please only proceed once that has been established.

## Wand will not power on (no lights or sounds)

The wand is expects to communicate with the pack and will only power on when that connection is successfully established. If no lights or audio are observed when using the Activate switch, please consider the following options.

- Re-check the Power/GND connections in the hose to make sure they are not reversed. Also check if the ends of the wires are making contact on the Neutrik connectors when clamping down. You can tin the ends of the wires to make it a bit thicker or simply fold them over to double them up. Just make sure the Neutrik connectors are not clamping down on the rubber part of the wire.
- If your Neutrona Wand is equipped with 28 Segment bargraph, make sure the connection cables are plugged into the proper connectors. If the power cable for the bargraph is plugged into the SCL/SDA connector on the wand board and the communication cable is plugged into the 5V power connector on the wand board, then the wand will not start up.

## Wand has a blinking vent light but does not start up

When the wand is trying to establish communication to the GPStar Proton Pack controller, the LED beside the vent light blinks. When a successful connection is made, the light will stop blinking.

- Re-check the TX/RX serial connections in the hose to make sure they are not reversed.
- If you are using the Neutrik quick disconnect system, check if the ends of the wires are making contact on the connectors when clamping down. You can tin the ends of the wires to make it a bit thicker or simply fold them over to double them up. Just make sure the Neutrik connectors are not clamping down on the rubber part of the wire.

# Support & Troubleshooting

## Wand has no audio

- Re-check the connection to the speaker. Polarity should be observed for the best audio quality, though a reversed connection should still support some form of audio playback.
- Re-flash the latest software to both the pack and wand controllers. These devices must be in agreement for the communication layer to operate correctly.
- Re-check the Tx/Rx connections to the pack. If these are reversed it will prevent proper communication. Attempt to switch the wires at the pack-side connector which use screw terminals, and retry the Activate switch.
- Re-check the power connection to the wand. If you have a digital multimeter available, set the device to the DC power measurement and check that the 5V-OUT connection is supplying the expected voltage. Be careful to not short out the pins and mind the polarity.

## Wand has audio briefly before it cuts out

- Re-check the connection to the speaker terminal blocks on the Audio board. Make sure the wires seat well, if needed, add a dab of solder onto the ends.
- If your Neutrona Wand is equipped with the 49 Barrel LEDs option, please plug the power source for your Neutrona Wand into a 5V connector in the GPStar Amplifier inside the Proton Pack.

## The music I added is not playing back

- Make sure to following the naming conventions that are indicated in the Loading the Audio Files guide. Links can be found on the GPStar Support Page.
- Remove any metadata that may be embedded in your wav files. This can cause problems with loading the music.

## I'm firing but no overheating is happening!

- If your pack and wand are on default settings (you may test this by entering the EEPROM Configuration Menu then pressing Intensify to clear all settings, then turn off the battery so the changes take effect), only Power Level 5 will overheat by default, and will do so after 30 seconds. If you have made changes to EEPROM settings, here are common reasons why overheating may not occur as expected.
  - If you are in Cross The Streams or Cross The Streams Mix instead of Video Game Modes, overheating will only occur when using the alternate fire button (Barrel Wing Button). No overheating will occur if you hold Intensify by itself.
  - Check to make sure you have the global Overheating setting enabled. If this is disabled, no overheating will ever occur.
  - Check to make sure that the overheating toggle for the specific power level you are in is also enabled (enabling overheating generally will not automatically enable it for all power levels).
  - Check to see what you have the Overheat Start Delay for the specific power level you are in set to. For example, merely enabling overheating for Power Level 1 will mean it will take 60 full seconds before overheating triggers by default.

# GPStar Proton Pack II WiFi Connectivity

If you have a Attenuator connected, the GPStar Proton Pack II will turn off its WiFi for power saving. You may also manually turn off or turn on the WiFi from the Neutrona Wand menu system.

To connect to the GPStar Proton Pack II over WiFi, a private WiFi network (access point) will appear as **GPStar_Pack2** and this will be secured with a default password of **555-2368.**

Once connected, your computer/phone/tablet will be assigned an IP address starting from 192.168.1.100 with a subnet of 255.255.255.0. Please remember that if you intended to have multiple devices connect via this private WiFi network, you will be assigned a unique IP address for each client device (ex: phone, tablet or computer).

A web based user interface is available at http://gpstar_pack2.local or http://192.168.1.4 to view the state of your Proton Pack and any connected GPStar Neutrona Wand II, in which you will be able to manage specific actions.

## Tab 1: Equipment Status

The equipment status will reflect the current state of your Proton Pack and Neutrona Wand. It will update in real time as you interact with those devices. This information is available as either a graphical display, text based or both, which can be set in the preferences menu.

When using the graphical display, most components of the Proton Pack and Neutrona Wand are represented by colour coded overlays on the components which may be affected by runtime actions:

- The top of the display will indicate the mode (**Standard = Mode Original, Upgraded = Super Hero**) along with the year theme (V1.9.8x or V2.0.2x).
- When the Ion Arm switch is engaged for Mode Original, the overlay for the Ion Arm will be green to indicate a ready state. When in Super Hero mode, this overlay will be green when the Proton Pack is powered on.
- When the Proton Pack is powered on:
  - The Power Cell, Booster Tube and Cyclotron overlays will be green as their default state.
  - When the Cyclotron is in a normal state, the overlay will be green. It will change to yellow then red as it goes through the pre-warning and overheat states. During venting, the overlay will be blue to indicate the recovery period.
  - The colour state of the Booster Tube is linked to the “Output” text value which is the voltage measured at the Proton Pack in volts but displayed as GeV. During high power draw events such as smoke generation, the voltage can drop briefly and will be reflected as a red overlay when that value is below 4.2V.
- When the Neutrona Wand is powered on, the overlay above the Activate/Intensify portion of the gun box will indicate if the barrel is retracted (red) or extended (green).

- The current power level for the Neutrona Wand will be indicated by the “L-#” beside the barrel.
- The type of firing mode will be displayed below the Neutrona Wand and will be colour coded via the barrel. Colour intensity increases with the power level.
  - Proton Stream: Red (includes Spectral modes)
  - Plasm System: Green (includes the pink slime of 1989)
  - Dark Matter Generator: Blue
  - Particle System: Orange
  - Settings: Grey
- When using the power detection feature with a stock Hasbro Neutrona Wand, the default stream will be Proton with a power level of 5. Instead of the stream type being displayed, there will be a wattage value displayed as Gigawatts (GW).
- If the Ribbon Cable is removed, a warning icon will appear over that component to indicate an alarm state.
- When the Cyclotron lid is removed, a radiation exposure warning will be displayed at the bottom of the CRT display.

📝 **Note:** When using the text based display, if you see a “—“ (dash) beside the labels, it can indicate a potential communication issue. Simply refresh the page and or check your WiFi connection to the device.

📝 **Note:** Below from left to right are the radiation colour warnings states when a Proton Pack is about to overheat.

## Tab 2: Audio Controls

The audio controls section allows full control of the system (overall) volume, effects volume and music volume along with the ability to mute / unmute all devices. The current volume levels will be shown and updated in realtime whether adjusted from the web UI, the Proton Pack or the Neutrona Wand.

For playback of music, you can use the Music Navigation controls at the bottom.

| Indicator | Track Action |
|---|---|
| ◀◀ | Previous |
| ▢ ▶ | Start / Stop |
| ❚❚ ▶ | Pause / Resume |
| ▶▶ | Next / Skip |

You may also jump directly to a specific track for playback from the track selection field (switching immediately if already playing, otherwise the track will be started with the Start / Stop button).

By default, only the track numbers are known to the audio device as all music tracks must begin at a value of "**500**" per the naming convention used by the GPStar software. However it is possible to add a track listing to the device's memory so that user friendly song names can be displayed. See the **Special Device Settings Section** described below for more information.

## Tab 3: Pack Controls

Controls will be made available on a per action or per state basis.

Shown in the example, the Proton Pack and Neutrona Wand are both in an idle state while in the "**Super Hero**" operational mode which allows the Proton pack to be turned on or off remotely. The options to remotely vent or to "**Attenuate**" are only enabled when the devices are in a specific state.

**Vent:** This can only be triggered remotely when in the "**Super Hero**" mode and while the Proton Pack state is "**Powered**".

**Attenuate:** When firing, the Cyclotron state must be either "**Warning**" or "**Critical**" to enable this button.

**Smoke:** Enable or disable smoke effects.

**Vibration:** Enable or disable Proton Pack vibration.

**Cyclotron Rotation Direction:** Set your Cyclotron rotation from clockwise or counter clockwise.

**Theme:** Set the theme mode of your Proton Pack between: 1984, 1989, Afterlife or Frozen Empire.

## Tab 4: Preferences / Administration

The preferences and administration provide a interface for managing options which are accessed from the LED or Configuration EEPROM menus. The settings are divided into several sections: **Special Device Settings**, **Proton Pack**, **Neutrona Wand** and **Overheat / Smoke**. On the Bottom we have another 4 sections.

- **Update Firmware:** Allows you to update the firmware using over the air updates.
- **Secure Device WiFi:** You can change the default password for the devices WiFi network.
- **Change WiFi Settings:** This provides an optional means of joining an existing, external WiFi network for access of your device.
- **Restart / Re-sync:** You can remote restate the software by performing a reboot of the device.

At the bottom of the screen is a timestamp representing the build date of the firmware, the current firmware version of your GPStar Audio and along the name of the private WiFi network offered by the current device. If connected to an external WiFi network, the current IP address and subnet mask will also be displayed.

## Special Device Settings

The special device settings allow you to change the graphical user interface, the private network name and adding track names to the music.

## Proton Pack Settings

These are settings related specifically to the Proton Pack. Options such as the colour / saturation sliders will only take effect if you have installed upgrades to the RGB Power Cell and Cyclotron light kits.

📝 **Reminder:** The ability to update settings or save to the EEPROM will be disabled as long as the Proton Pack and the Neutrona Wand are running. Turn off all physical toggles to set these devices to an idle state before adjusting settings. Refresh the page to get the latest values for preferences.

📝 **Note:** When changing options such as the count of LEDs in use for a device or some other options such as the Operational Mode, a full power-cycle of the equipment is required after saving to the EEPROM.

## Neutrona Wand Settings

Set options related specifically to the Neutrona Wand. These can be accessed from the GPStar Proton Pack II or by connecting directly to the GPStar Neutrona Wand II over WiFi.

📝 **Reminder:** The ability to update settings or save to the EEPROM will be disabled as long as the Proton Pack and Neutrona Wand are running. Turn off all physical toggles to set these devices to an idle state before adjusting settings. Refresh the page to get the latest values for preferences.

📝 **Note:** When changing options such as the count of LEDs in use for a device or some other options such as the Operational Mode, a full power-cycle of the equipment is required after saving to the EEPROM.

## Overheat / Smoke Settings

You can adjust the overall smoke effects on or off. You can also adjust by per-level effects. These options will have no effect on operation without a smoke kit installed.

📝 **Reminder:** The ability to update settings or save to the EEPROM will be disabled as long as the Proton Pack and Neutrona Wand are running. Turn off all physical toggles to set these devices to an idle state before adjusting settings. Refresh the page to get the latest values for preferences.

## WiFi Settings

It is possible to have your device join an existing WiFi network which may provide a more stable network connection.

1. Enable the external WiFi option and supply the preferred WiFi network name (SSID) and WPA2 password for access.
    1. Optionally you may specify an IP Address, subnet mask and gateway IP if you wish to use static values. Otherwise the device will obtain these values automatically from your chosen network via DHCP.
2. Save the changes. This will cause the device to reboot and attempt to connect to the network up to 3 tries.
3. Return to the “Change WiFi Settings” section to observe the IP address information. If the connection was successful, an IP address, subnet mask and gateway IP will be shown.
4. While connected to the same WiFi network on your phone / computer / tablet, use the IP address shown to connect to your device’s web interface.

Use of an unsecured WiFi network is not supported or supported.

# GPStar Neutrona Wand II WiFi Connectivity

The WiFi on the GPStar Neutrona Wand II is disabled for power saving measures when it is connected to a GPStar Proton Pack II. You can manually turn on or off the WiFI for the GPStar Neutrona Wand II from the Neutrona Wand menu system.

When a GPStar Neutrona Wand II is connected to a GPStar Proton Pack II, all the Neutrona Wand settings can be accessed from the GPStar Proton Pack II.

To connect to the GPStar Neutrona Wand II over WiFi, a private WiFi network (access point) will appear as **GPStar_Wand2** and this will be secured with a default password of **555-2368.**

Once connected, your computer/phone/tablet will be assigned an IP address starting from 192.168.1.100 with a subnet of 255.255.255.0. Please remember that if you intended to have multiple devices connect via this private WiFi network, you will be assigned a unique IP address for each client device (ex: phone, tablet or computer).

A web based user interface is available at http://gpstar_wand2.local or http://192.168.1.6 to view the state of your Neutrona Wand and to manage specific settings.

## Tab 1: Neutrona Wand Status

The Neutrona Wand status screen will display the real time rotational coordinates and other sensor data in real time. Moving your Neutrona Wand UP, DOWN and or rotating will automatically update visually on screen. Two buttons at the bottom of the screen allow you to re-centre the 3D representation of your Neutrona Wand and also manually trigger a Infrared Signal if you have a GPStar Infrared sensor attached to your Neutrona Wand II.

## Tab 2: Audio Controls

These are the same audio control as seen in the Proton Pack settings.

## Tab 3: Sensor Calibration

The GPStar Neutrona Wand II is equipped with a gyroscope and magnetometer. The sensors can be even more finely calibrated to provide more accurate data after it is fully installed into your Neutrona Wand, taking into account any nearby magnetic sources such as a speaker.

You can begin a sensor calibration by pressing the **Enable Calibration** button. You will then start by relatively slowly rotating your Neutrona Wand in all directions. A visual calibration monitor will appear on the screen to show your progress. Rotate the Neutrona Wand to fill in the dots until the coverage is as close to least 60% or more.

📝 **Tip: Point the Neutrona Wand down and slowly raise it up in an arc motion. Turn slightly and then arc back to full down. Repeat this process until you have done 360 degrees of rotation.**

Press the **Disable Calibration** button when you are finished to save the newly calibrated settings into the system memory.

📝 **Note: You must have at least 60% coverage in order for the calibration data to be more effective. If you exit the calibration process before reaching 60%, you will be given a confirmation to either continue collecting data or to stop the process and no calibration values will be calculated.**

## Tab 4: Preferences / Administration

The Preferences / Administration interface provides the ability to manage options which are accessed from the LED or Configuration EEPROM menus. The settings are divided into several sections: **Special Device Settings**, **Neutrona Wand**. On the bottom we have another 4 options of selections.

- **Update Firmware:** Allows you to update the firmware using over the air updates.
- **Secure Device WiFi:** You can change the default password for the devices WiFi network.
- **Change WiFi Settings:** This provides an optional means of joining an existing, external WiFi network for access of your device.
- **Restart / Re-sync:** You can remote restate the software by performing a reboot of the device.

At the bottom of the screen is a timestamp representing the build date of the firmware, the current firmware version of your GPStar Audio and along the name of the private WiFi network offered by the current device. If connected to an external WiFi network, the current IP address and subnet mask will also be displayed.

## Special Device Settings

In the special device settings for the Neutrona Wand, you should see magnetic offset information which display Hard Iron geo-magnetic corrections and Soft Iron, nearby magnetic interference. These values will be used to provide a customised magnetic profile for your Neutrona Wand.

With the **Controller Installation Orientation Menu** option, you can further fine tune the sensor settings by telling the GPStar system which way the GPStar Neutrona Wand II is installed inside your Neutrona Wand body. For example, with Hasbro Neutrona Wands, it will be **Components Down, USB Front.** For a Mack's Factory Neutrona Wand, it will be in a different orientation such as the **Components Left and USB Front**.

Also in this section is the ability to rename the Network ID for the Neutrona Wand.

Lastly, you can configure the music track names for the GPStar Neutrona Wand II in stand-alone mode, which is using it without a GPStar Proton Pack II attached.

## Neutrona Wand Settings

This is the same as seen in the Neutrona Wand settings accessed from the Proton Pack.

# WiFi Password Reset

If you have forgotten the password to your GPStar Proton Pack II or GPStar Neutrona Wand II WiFi network, you can reset it from the Neutrona Wand menu system.

Once reset, the default password will be **555-2368**

# Increasing WiFi Performance

When using the WiFi in a crowded environment, such as a convention, the signal may become overwhelmed by competing RF devices. When possible, you can configure the Proton Pack or Neutrona Wand to connect to a stronger more stable wireless network as a client rather than relying on the built-in access point. This may improve the range and performance.

- For **Android** devices offering a cellular hotspot, these devices may utilise a feature called **Client Isolation Mode**. This will prevent hotspot clients from seeing each other. Unless you can disable this option on a rooted device, you will not be able to reach the web UI from the hotspot network.
- For **iOS** devices offering a cellular hotspot, please make sure that the **Maximise Compatibility** option is enabled. This will ensure your device offers a 2.4GHz radio and will be seen by the GPStar Proton Pack II and GPStar Neutrona Wand II.

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