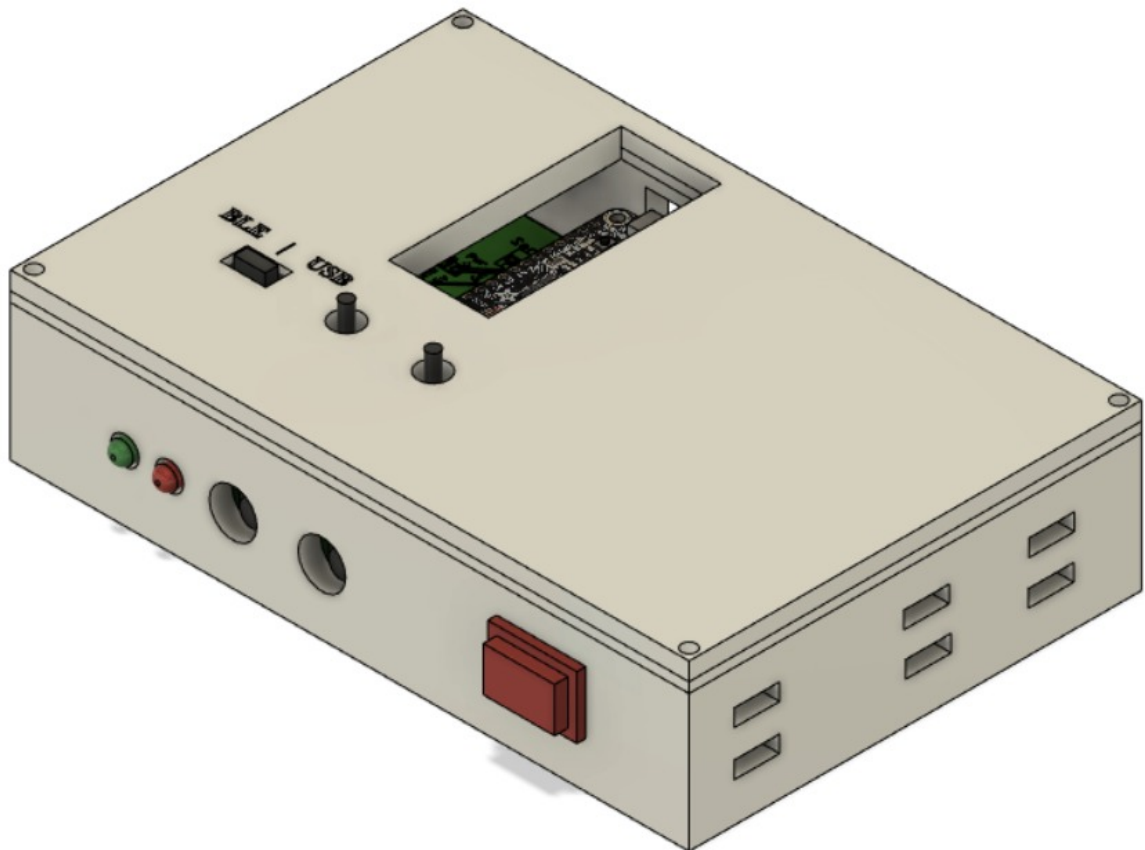


User Manual

Alternate Switch Control Interface



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Introduction:

Please read this User Manual carefully, and take note of all the warnings before using the “Alternate Switch Control Interface” product. This manual aims to instruct the users on how to use the External Switch Control Interface that was created. The product was designed for people with physical disabilities who use an “External Adaptive Switch” as a means to use their electronics devices. This product provides them with a tool that enables them to use their “External Adaptive Switch” with any smart electronic devices such as smartphones, tablets, computers and any other electronic device that has the Switch Control accessibility feature available with either Bluetooth® or USB capability.

Figures:

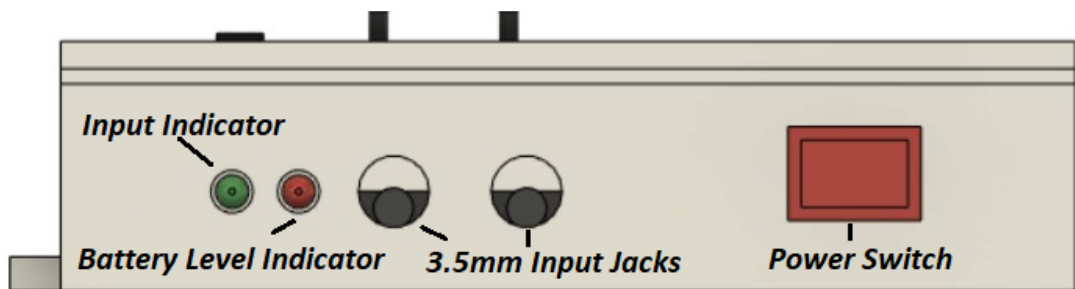


Figure 1: Front View of the Product

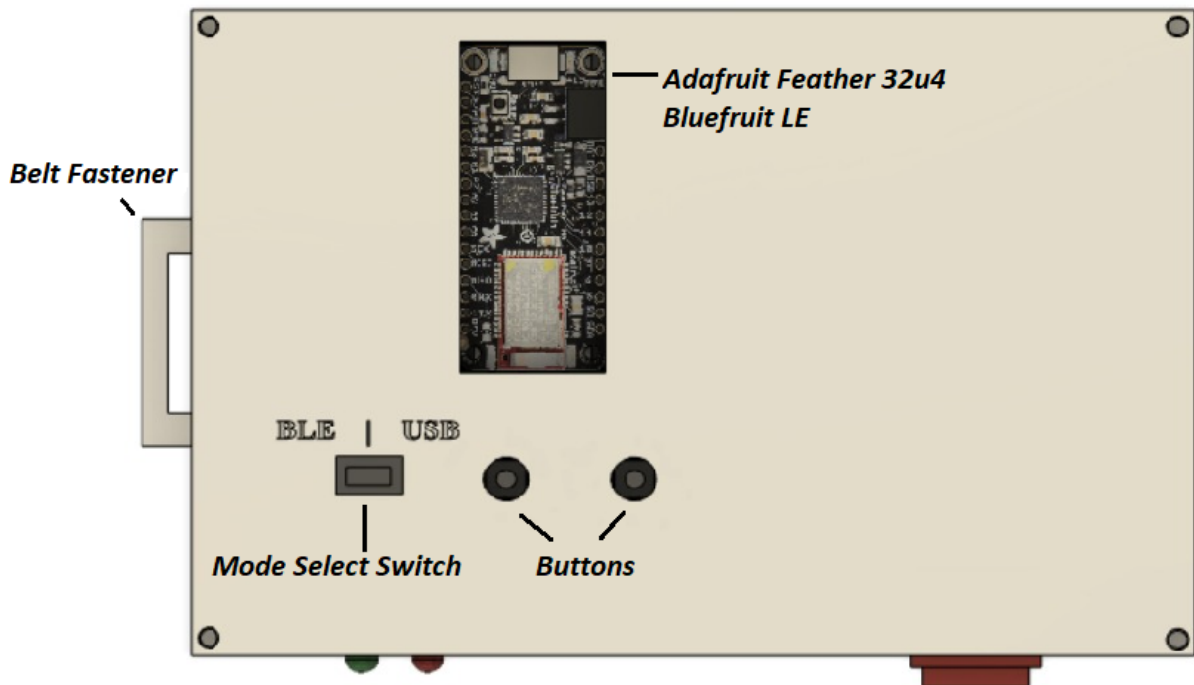


Figure 2: Top View of the Product

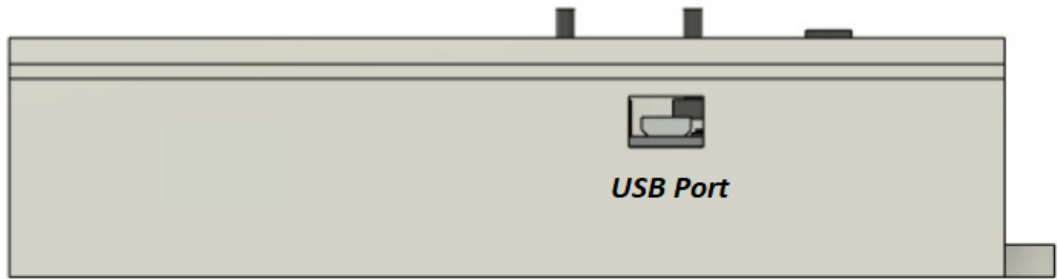


Figure 3: Back View of the Product

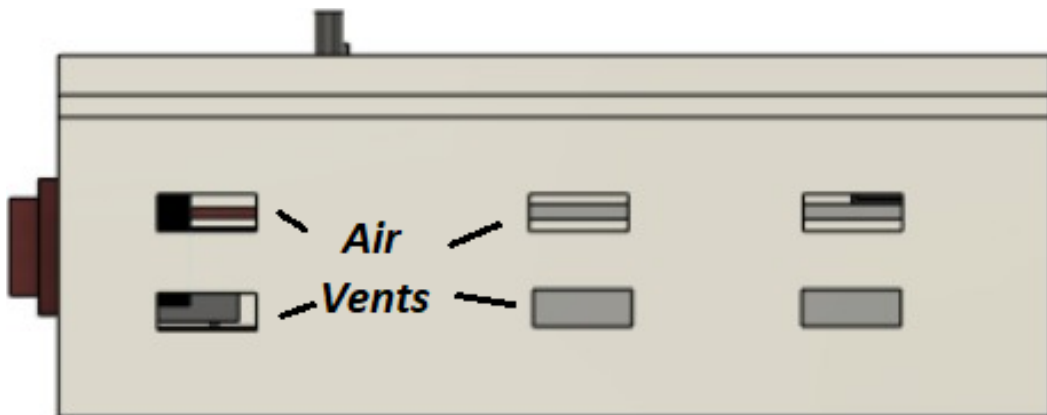


Figure 4: Side View of the Product

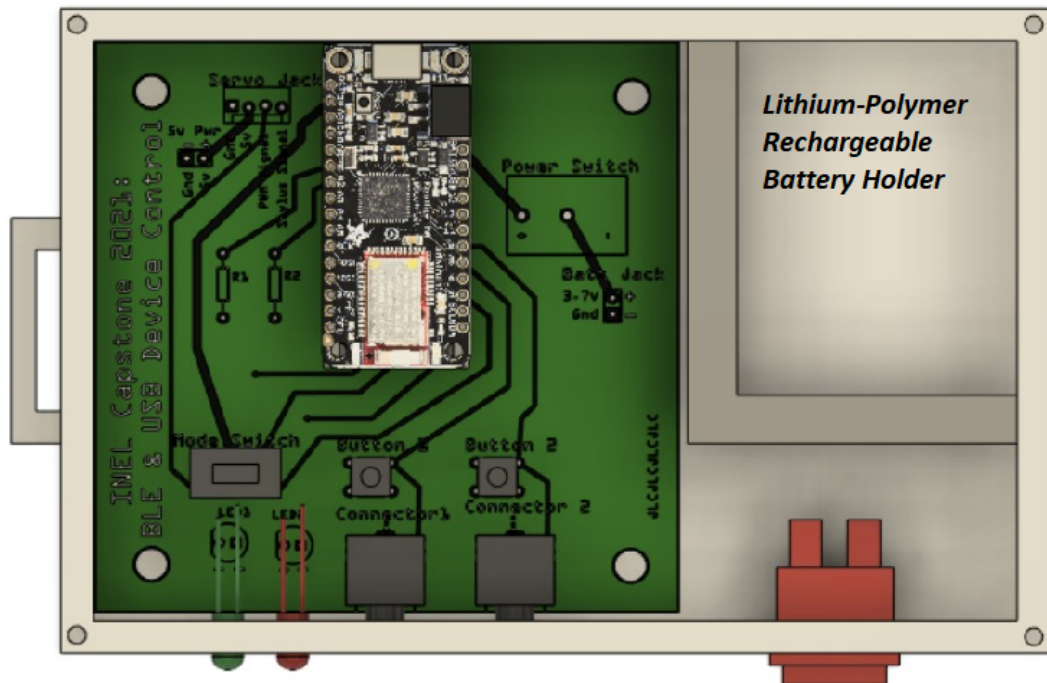


Figure 5: Inside View of the Product

1. Specifications:

The “Alternate Switch Control Interface” product has the capability to connect via Bluetooth® or USB to any modern electronic device. This section of the manual will explain the specifications and limitations of the product that the user may wish to know.

- The device has the capability to connect via Bluetooth® Low Energy technology to any modern device that has Bluetooth® 4.0 onwards capability.
- The device when paired will act as an HID (Human Interface Device) Bluetooth® Keyboard with only two keys, the “w” and spacebar keys.
- The necessary Micro-USB cable is not included with the product, and must be a communication compatible USB cable. If the connected cable is meant to only charge devices, then it is only useful for charging the Battery of the product and “USB Mode” will not work.
- The product has been successfully tested with iOS, Android and computer devices.
- The whole product weighs 378.0 grams (or 0.83 pounds).

❖ Battery Specifications:

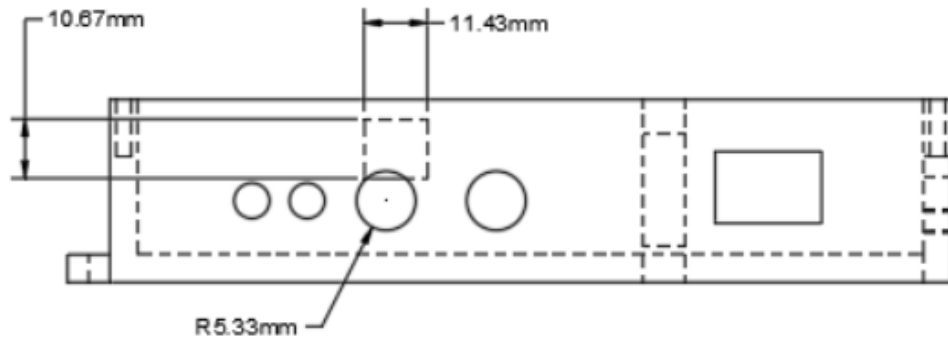
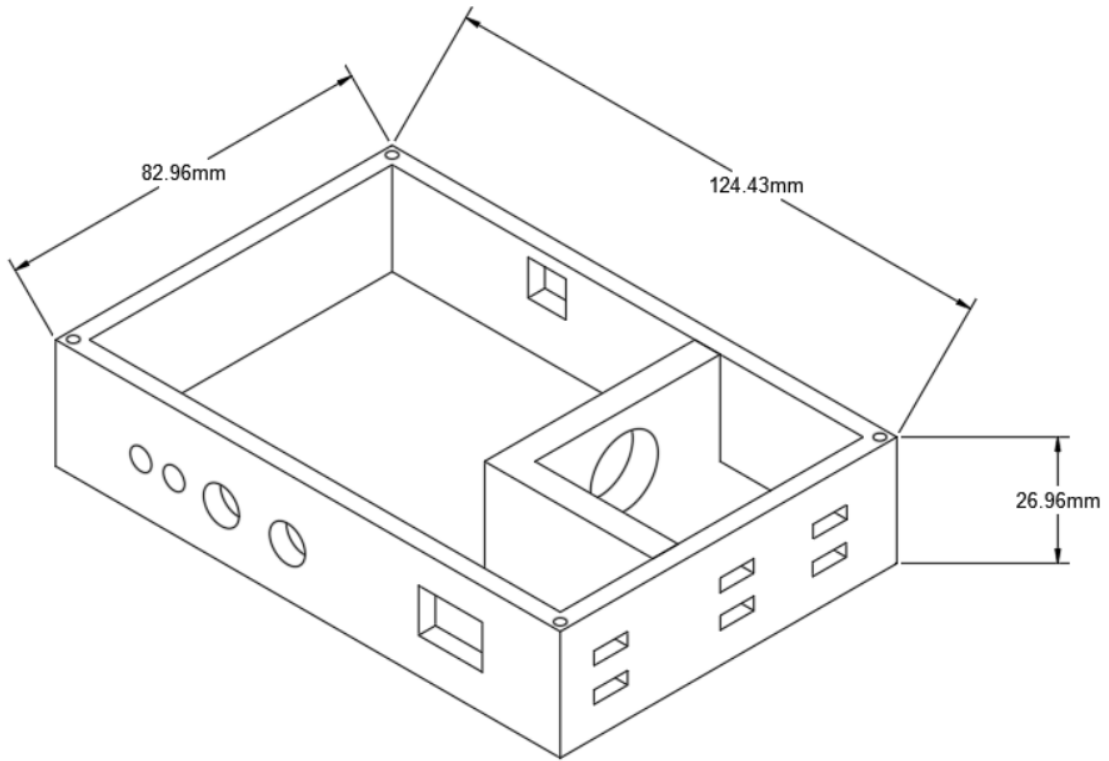
- The product includes a rechargeable Ni-Cd battery, with 1000mAh and 3.7v capacity.
- The battery may last from 22.5 to 60 hours depending on its use.
- Approximate charging time is 7.5 hours when using the product’s USB port.
- Battery must not reach a temperature of 50°C (122°F), or the battery may become damaged.

❖ Microcontroller Specifications:

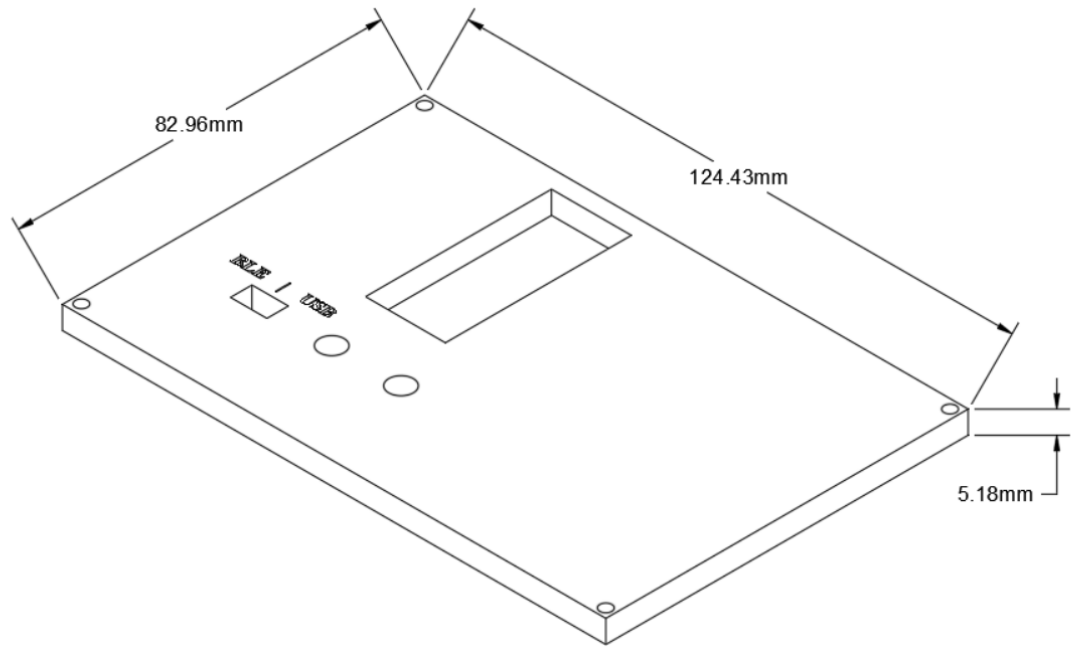
This product currently uses an “Adafruit Feather 32u4 Bluefruit LE” microcontroller unit (MCU). Which is an Arduino IDE programming compatible MCU, with an integrated Bluetooth® Low Energy (BLE) module, built in Micro-USB port, and other specifications that were not used for this product. Some of its more technical specifications from the adafruit website <https://www.adafruit.com/product/3379> are;

- Weights 5.7 grams
- Measures 51mm x 23mm x 8mm (2.0" x 0.9" x 0.28"), without headers soldered in.
- Atmel's low-power 8-bit AVR RISC-based microcontroller “ATMega32U4” @ 8MHz with 3.3V logic/power
- Bluetooth® Low Energy module is an “nRF51822” chipset from Nordic
- USB native support, with USB bootloader and serial port debugging
- Built in 100mA charging capability for any connected rechargeable battery, with a yellow LED charging status indicator on the Microcontroller.
- Red and blue LEDs for indicating Bluetooth® pairing status on the Microcontroller.

❖ Main Box Specifications:



❖ Lid specifications:



2. Product's Instructions:

❖ Mode Select Switch

The user may select what type of connection to use with the “Mode Select Switch” shown in [Figure 2: Top View of the Product](#) , and [Figure 1: Front View of the Product](#). Depending on the position of this switch the user may connect the product to an electronic device via Bluetooth® (BLE Mode), USB cable (USB Mode), or just verify battery life (Battery Mode).

Note: When changing between the 3 available modes the product will still be paired with the smart device until disconnected on the user's device.

➤ **BLE Mode:**

When the switch is aligned to the “BLE” text on the box (positioned to the left when looking at the product from the [Top View](#) or [Front View](#)), then the BLE mode will be enabled. When in BLE Mode the product will act as a Bluetooth® HID keyboard only.

The microcontroller includes a blue and red LED that the user can see through the small transparent window on the [top of the box](#). Both the red and blue LEDs will be blinking when the device is ready to pair, and the blue LED will stay on when it is connected to a device.

➤ **USB Mode:**

When the switch is aligned to the “USB” text on the box (positioned to the far right when looking at the product from the [Top View](#) or [Front View](#)), then USB mode will be enabled. If in USB mode, the product will only work as an HID keyboard to a device when connected through a USB cable to the user's device.

For USB mode to work with smart devices like smartphones and tablets (almost any small smart device that does not have the usual standard USB type A port), then the user must connect a USB cable from the Micro-USB port on the product, to the user's electronic device with the use of **an adapter**. If the user tries to connect the product directly with just a USB cable the smart device will not detect it, but this is not a problem if using a computer.

➤ **Battery Mode:**

When the switch is centered, Battery Mode is selected and the device will not transmit anything to the connected device, but will turn on the Red or Green LED depending on the battery status (please see the [Battery Level Indicator](#) section for more information).

❖ Power Switch (ON/OFF Switch)

The power switch will disconnect and reconnect the battery from the product's circuitry when turned OFF or ON. This is optimum for when you wish to turn on and off the product, plus it is necessary for charging purposes. Take in mind the following;

- If the user will use the device in **USB mode** there is no need to turn the switch ON, because the external device will power the microcontroller. This applies to computers, smartphones, tablets or other electronic devices.
- We **highly recommend** that you turn the power switch to the OFF position if you are connected via USB to a smartphone, tablet or other small electronic device. Since this will try to recharge the rechargeable battery, and discharge the battery of the small electronic device.
- If you wish to use the device while connected to Bluetooth®, you need to turn the power switch to the ON position. Doing so will allow the rechargeable battery to power the microcontroller.
- The product battery may also be charged when in BLE mode by connecting a USB cable to the product and then to a power source (see [Charging the battery](#) section for more information), the product will continue to work on with the user's device that was paired with.
- To charge the battery in the product, you will also need to turn the power switch to the ON position.

❖ Battery Level Indicator

The “Alternate Switch Control Interface” product has a Green and Red LED, as seen in [Figure 2: Front View of the Product](#). These LEDs are also used to indicate the battery status, but only when in “USB mode” or “Battery Mode” the battery

Note: If the product is charging or generally connected through the USB the LED indicators will NOT accurately state the status of the battery. The LED's will also be unable to detect battery status if the power switch is OFF.

- Red LED will turn on and stay on when the battery level is lower than 25% . When this happens it is recommended to charge the battery soon.
- The Green LED will turn on and stay on when the battery level is higher than 25%, and have Although
- When in BLE Mode only the Red LED will turn on and stay on when the battery level is low. When in USB mode this Red LED will not turn on, since when the battery is charging it is difficult to accurately detect the battery levels.
- The Green LED will always flash ON everytime the user activates their external adaptive switch, or presses either of the test buttons, when in “USB Mode” or “BLE Mode”.

❖ Charging the battery

The USB port is located at the back of the box (see [Figure 3: Back View of the Product](#)), and this port is also used to charge the product's battery. Although the user must be wary of where they connect the other side of the USB cable when going to charge the battery.

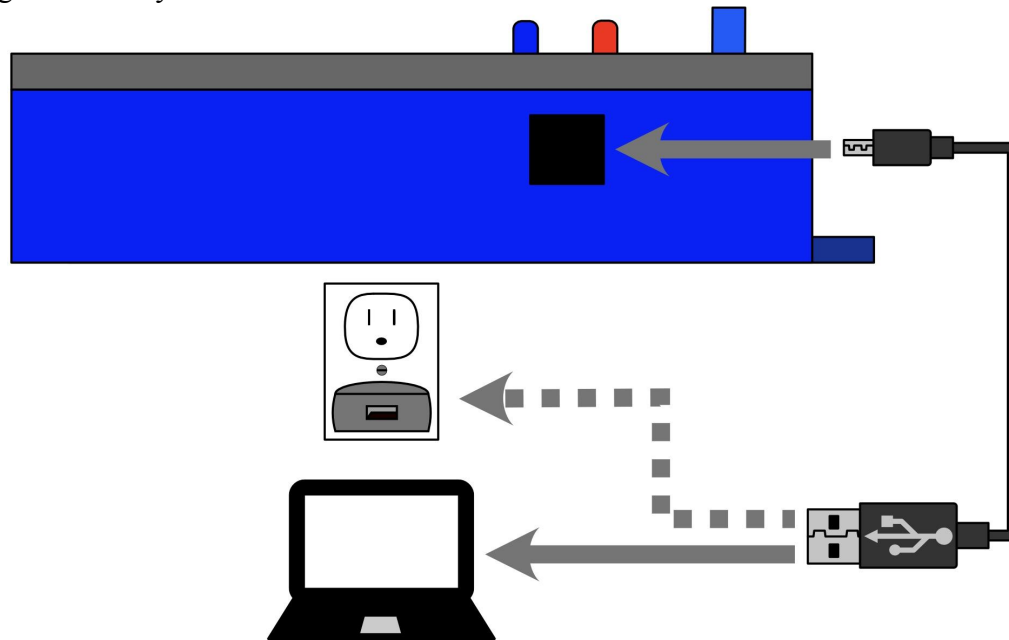


Figure 7: Illustration of how to charge device

- To charge the device's battery, connect a Micro-USB cable to the USB port located in the back of the casing (see [Figure 3: Back View of the Product](#)) and insert the other end to a standard USB charging plug adapter, or computer.
- When the battery is charging the yellow LED on the microcontroller will turn on. The user can see this light through the small transparent window on [top of the box](#) (see [Figure 2: Top View of the Product](#)).
- Do not use a smartphone, tablet or any other small capacity electronic device to charge the battery. Since it will discharge the battery of the small electronic device quickly, and may damage the user's device's battery. (which is why we instruct to turn the power switch to the Off position when in "USB Mode")
- The battery should last at least 22.5 hours of continuous use, but could last up to 60 hours depending on the use.
- If the Red LED battery indicator on the front of the product is on, charge the battery for up to 7.5 hours. It should be fully charged then.
- You must leave the Power Switch ON when charging the battery, and otherwise when in USB mode keep it in the OFF position.
- The user can charge the battery and use the device in Bluetooth® mode at the same time. Note: the user may only charge the battery and use the "USB mode" if it is connected to a computer or any other big capacity device.

3. Product's Components

● 3.5mm External Switch Inputs Jacks

- The device brings the capability for connecting up to two External Adaptive Switches that use the standard 3.5mm cable plug. The user can connect their external switches to either or both input jacks called Connector #1 and Connector #2.
- The Input Jack to the left, when looking at the [front of the box](#), is known as Connector #1 , and is programmed to send a “w” key press as an HID Keyboard in either BLE or USB Mode.
- The Input Jack to the right, when looking at the [front of the box](#), is known as Connector #2 , and is programmed to send a spacebar key press as an HID Keyboard in either BLE or USB Mode.
- Set up the Switch Control accessibility feature in your device depending on which switch you use and how. Long Press will also be detected, but must be set up on the user's device.

● Buttons

- There are two buttons in the top of the box, one for each input jack. These are designed for the caretaker to test if the device is working properly.
- The buttons can also be used to control the device using the Switch control Feature. When either button is pressed they will send a key press signal corresponding to either Connector#1 or Connector #2, just as if an external adaptive switch is being used.
- The button on the left of the box, when looking at the [front of the box](#), is known as Button #1 , and is programmed to send a “w” key press as an HID Keyboard in either BLE or USB Mode.
- The button to the right of the box, when looking at the front of the box, is known as Button #2 , and is programmed to send a spacebar key press as an HID Keyboard in either BLE or USB Mode.

● External Switches Inputs Indicators (Green LED)

- Green LED turns on when a user's input is registered by either the two external switches inputs or buttons. It lets the user know that the signals are getting read by the microcontroller.

- Belt Fastener

- The Belt Fastener seen in [Figure 3: Top View of the Product](#) is designed to be a type of handle, designed for strapping down the device with any Hook-and-loop fasteners, or hook-and-pile fasteners (often referred to just as velcro straps).

4. Warnings:

- △ Do NOT let the electronics inside the product get wet.
- △ Do NOT let the battery in the product become too hot when in use.
- △ The Ni-Cd rechargeable battery must NOT reach a temperature of **50°C (122°F)**.
- △ Do Not use if any conducting material (i.e. metal staples) are inside the product's casing, as this may cause a short circuit and damage the circuitry.
- △ Never leave the battery charging continuously for more than 7.5 hours.
- △ When connecting the product to a smartphone or tablet with a USB cable, the user must use a USB adapter. In general if the electronic device does not have the standard USB connector (USB-A) then an adapter is needed, or the product will not work.
- △ When in "USB mode" and using a smart device make sure to turn the power switch "OFF".