

# Guitarist Ankle Wah Controller

Garrett Baker, Will Black, Matt Boyle, Brett Hartnagel, Rob Hoye, Christine LaBelle, Adam Pflugshaupt, Nick Sannella



## Objective:

Develop a wireless device (Ghost Pedal) that would allow a guitarist to control wah effects (to alter tone and frequency) without being limited by a stationary pedal

## Specific Design Goals:

- Must be a universal accessory not requiring new guitar or Amp
- Employs wireless technology that is not affected by onstage equipment
- Lightweight
- Durable, capable of withstanding intense onstage movement
- Operated by simple motion that does not lead to guitarist fatigue
- Provide accurate and sensitive control of the wah effect
- Must be operated without having to stop playing the guitar



## Solution:

The Ghost Pedal system allows the user to wirelessly control the wah effect anywhere on stage by simply tilting his/her foot up and down

# Ankle Operation

The Ghost Pedal is worn by the guitarist around the ankle. Once turned on, the system enters a 10 s calibration stage. After Calibration there are two modes the user can enable during play:

## Freeplay Mode:

User can change wah level by increasing or decreasing their foot angle from horizontal.

## Sustain Mode:

After a “sustained kick”, wah level is maintained constant until user employs another sustained kick to return to freeplay mode.



**Sustain-Kick Sensor:**

- Allows user to maintain constant wah effect without loss of onstage mobility
- Turns on/off effects of wah pedal
- Has push button switch on inner ankle
- User taps the button on their other leg to sustain the signal
- Button not be affected by onstage movement of type of clothing worn by guitarist

Front of Flat Push Button

Rivet holes to attach to strap

**Flex Sensor:**

- Thin (0.005”) variable resistor
- Durable (life cycle > 35 million without failure)
- Tested at up to 100% humidity

**Ankle Brace:**

- Neoprene or elastic fabric sleeve used to locate and position sensor on user
- Simple design and flexibility do not hinder user’s mobility
- Range of sizes available to ensure snug, non-slip fit on user
- Flex sensor housing sewn into position
- Sleeve may be washed as needed

Calibration LED

XBee

Mirco-Controller

PCB

Battery

Case

Flex Sensor

Sustain Sensor

On/Off LED

**Receiver Box:**

- Case with receiving XBEE, microcontroller, & power supply
- USB charging port
- Two mono jacks for input and output
- On/Off switch for microcontroller
- LED microcontroller Power indicator
- Two knobs for sweep control
- Can be placed on pedal board like a normal stomp box.