**ChinStick Build Instructions**

By Aaron Weinstein

* Parts Needed
  + Arduino Leonardo/Micro (mouse and keyboard enabled) with USB cable
  + QuadMouse or equivalent components
    - <http://www.broadenedhorizons.com/quadmouse-switch-enabled>
    - Two joysticks with 4 directional momentary outputs
    - 4 LEDs with current limiting resistors
    - Project Box
      * Sturdy plastic or metal
      * Large enough to house components
      * <http://www.radioshack.com/family/index.jsp?categoryId=2032276>
* Adding Wires
  + QuadMouse
    - Remove Circuitry
      * Leave only joystick switches, status LEDs, and LED resistors
    - Add access wires
      * Establish common ground
        + Connect ground pins of switches
        + Connect the LED resistor ground pins

Test LED direction with 5v supply or Diode tester

* + - * + Connect all grounds to one junction
      * Add long access wires
        + To switch outputs
        + To LED input ends
        + To a common ground junction
        + Color code if possible
  + Custom Build Instructions
    - Box design
      * Joysticks mounted on top
        + Adjust spacing to user before permanent drilling
      * LED holes in front
        + Position and glue LED’s in place
      * USB cable access on any side
        + Use cord strain relief bushing
      * Mounting based on user’s needs
        + Example: Microphone boom stand
    - Add access wires
      * Common Ground
        + Connect ground pins of switches
        + Connect the LED ground pins

Add current limiting resistor between LED ground and common ground (approx. 330 ohm)

Test LED direction with 5v supply or Diode tester

* + - * + Connect all grounds to one junction
      * Add long access wires
        + To switch outputs
        + To LED input ends
        + To a common ground junction
        + Color code if possible
* Add Arduino
  + Temporarily connect to Arduino
    - Switch Output to Arduino Input
      * Specific pinout can be modified in joyStickPins[] array
      * Default
        + Left Up: 5
        + Left Down: 4
        + Left Left: 2
        + Left Right: 3
        + Right Up: 9
        + Right Down: 8
        + Right Left: 6
        + Right Right: 7
      * All listings order above
      * NOTE: WHEN VIEWED FROM ABOVE, ALL SWITCH DIRECTIONS ARE REVERSED
        + The “up” switch is located on the bottom, “down” is on top, “left” is on the right, and “right” is on the left
    - LED input to Arduino Output
      * Specific pinout determined by ledPins[] array
      * Default:
        + {13, 12, 11, 10} from left to right
    - Connect common ground to Arduino ground
    - Plug USB cable into Arduino and computer
  + Test Arduino
    - Consult “Software Guide.docx” for uploading code
    - Leave cable plugged in
    - Test functionality
      * Run with GUI and insure that all functions work properly
    - Directional issues
      * Switches may be backwards, check the pin order compared to the wiring
    - Direction or LED not working
      * Check access wire solder connection and Arduino connection
      * Check common ground connections
      * Check solder joints with resistor
      * Is everything plugged in?
    - Code issues
      * Re Upload code
      * Still not working?
        + Ensure “blink” example code runs
        + Re-upload chinstick code
  + Finalize connections
    - Unplug USB cable
    - Solder wires to Arduino
    - Test again just in case
  + Put in box
    - Open the box
    - Place joystick board and Arduino inside
      * Be careful of bare wires and short circuits
    - Use electrical tape and screws to secure board and Arduino within box
    - Ensure
      * joystick paths are clear
      * LEDs are visible
      * USB cable remains plugged into Arduino
        + Attach strain relief bushing for safety
    - Carefully add the cover
  + Test
    - Run the code and test extensively
    - Adjust speed settings for computer and user
    - Modify scheme and mode settings for personal preference
      * Consult “A Guide to Catalog”