FLip
Mouse

Alternative Computer Input Device

User Manual

Preface

The FLipMouse is an open source Assistive Technology module developed by the AsTeRICS Academy project of the University of Applied Sciences, Technikum Wien. The FLipMouse allows people who cannot use standard computer input devices to control a computer mouse cursor or a joystick as well as typing desired keyboard keys or using infrared remote controls. The FLipMouse device can be actuated with minimal finger- or lip-movements and/or sip & puff activities via a dedicated mouthpiece.
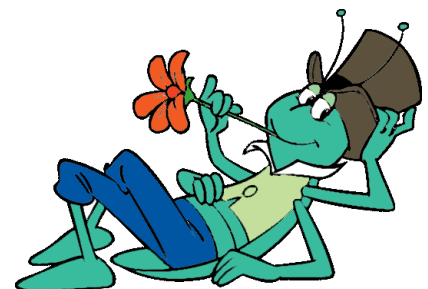
The FLipMouse Graphical User Interface (GUI) is a software application intended for use in conjunction with the FLipMouse device. This user manual includes a description of the Graphical User Interface for the configuration of the different functions of the FLipmouse – as well as explanations how to use those features. A configured FLipmouse module can be used on any computer without installation of special software, because the FLipMouse module behaves exactly like a standard mouse, joystick or keyboard which is plugged into the computer.

Furthermore, this manual covers the installation of the FLipMouse GUI application and important guidelines for using the FLipMouse, in particular cleaning procedures and hygienic precautions.

All design files for electronics and enclosure - as well as the software source code are available as open source and are distributed via the AsTeRICS Academy project website and via GitHub. A construction kit with detailed instructions for building the FLipMouse is available as well.
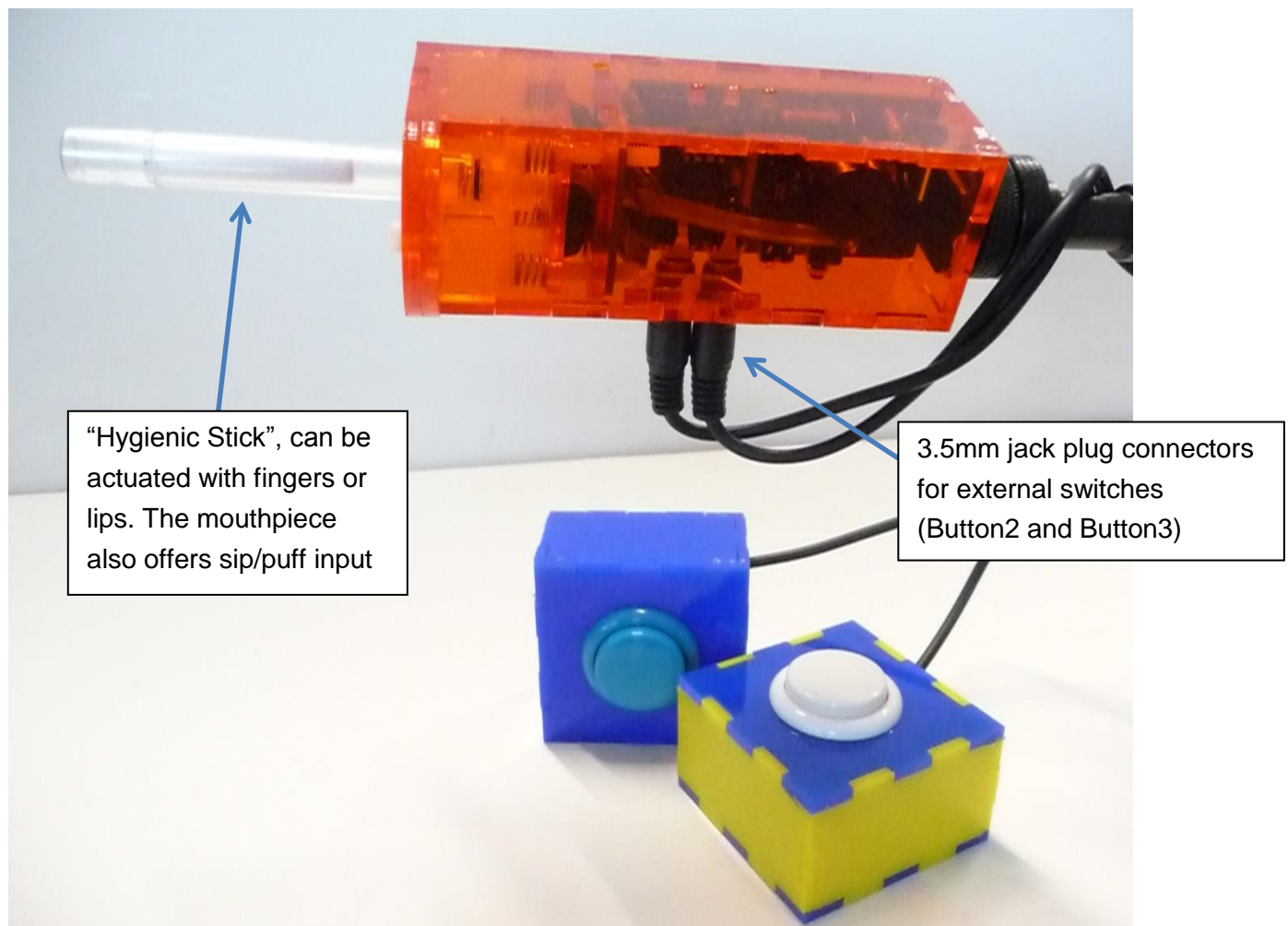
The AsTeRICS Academy project.
http://www.asterics-academy.net

"Flip", the vagabound grasshopper,
cartoon character © by Waldemar Bonsels

Contents

Hardware overview

The FLipMouse alternative input device consists of a several electronic components and sensors which are mounted in an acrylic glass enclosure. The primary method for using the FLipMouse is the transparent stick ("*Hygienic Stick*" or "mouthpiece") which can be attached to the front of the FLipMouse. Additionally, two external momentary switches can be attached to the device for further input capabilities:

"Hygienic Stick", can be actuated with fingers or lips. The mouthpiece also offers sip/puff input

3.5mm jack plug connectors for external switches (Button2 and Button3)

The *Hygienic Stick* is made by the company *QuadJoy.* Replacement sticks can be ordered via the homepage: http://www.quadjoy.com. We want to thank Bill and Debra Street of *QuadJoy* for letting us use their mouthpiece for our FLipMouse construction kit !
Please note the cleaning instruction in the dedicated section of this manual.

**Users can interact with the FLipMouse in several ways:**

- by touching the mouthpiece with the lips or fingers
  and applying small forces in vertical or horizontal direction
- by increasing or reducing pressure in the mouthpiece (puffing or sipping)
- by actuating (up to) 3 momentary switches / pushbuttons
- if desired, a longer plastic tube can be attached to the pressure sensor so that the joystick
 can be used with a finger and a separate mouthpiece allows sip/puff control.

Using the FLipMouse
for computer control
via lip interaction

The hardware features of the FLipMouse:

- "Zero-way"-joystick / mouthpiece:
  very low forces are sufficient to create up/down/left/right movement
    - The zero-way-joystick can be used with fingers or toes etc.
    - It can also be used as a mouthpiece (actuated by lips / mouth movements).
    - If desired, sip / puff activities into the mouthpiece can trigger additional functions

- One function selection switch, to change the active configuration of functions
- Two 3.5mm jack plug sockets for attaching external switches to trigger additional functions
- 3 Indicator Leds for showing the active configuration, calibration procedure etc.
- Universal infrared remote control receiver and transmitter
- "Hot Shoe" Adapter for mounting to a *Manfrotto Magic Arm* or similar mounting system
- Firmware upgrade via Arduino IDE (the reset button is only needed for this purpose)

3 indicator LEDs (red, yellow, green)

Infrared receiver module

Infrared transmitter LED
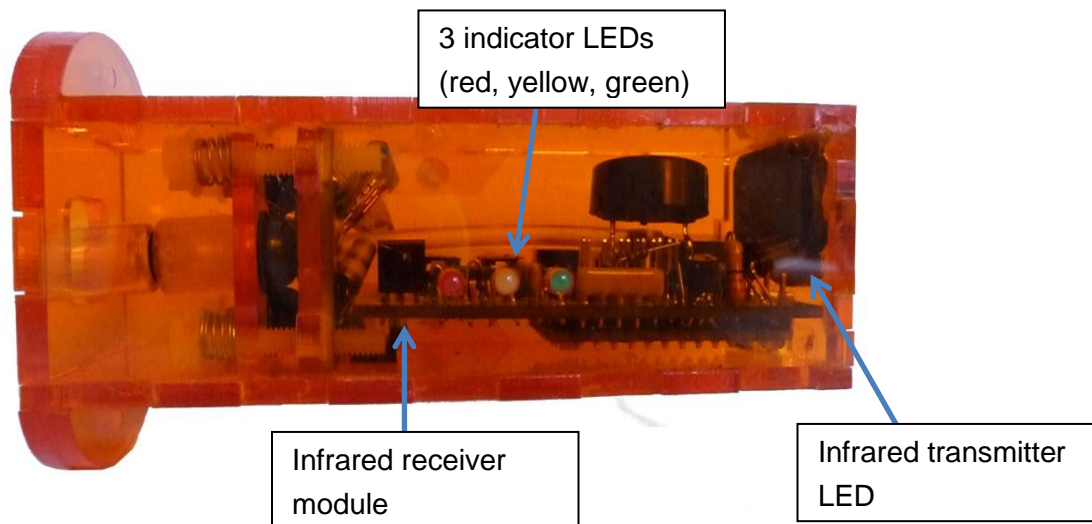
On top of the FLipMouse enclosure, 3 Light Emitting Diodes (LEDs) indicate the current mode of operation (which can be changed to activate different speed settings or functional options). Furthermore, the Infrared (IR-) receiver and transmitter modules are accessible. These modules can be used for recording and replay of arbitrary infrared remote control commands (for example to change volume or channel settings of a TV-set).

internal button (B1)

Reset switch access

connectors for external buttons (B2,B3)
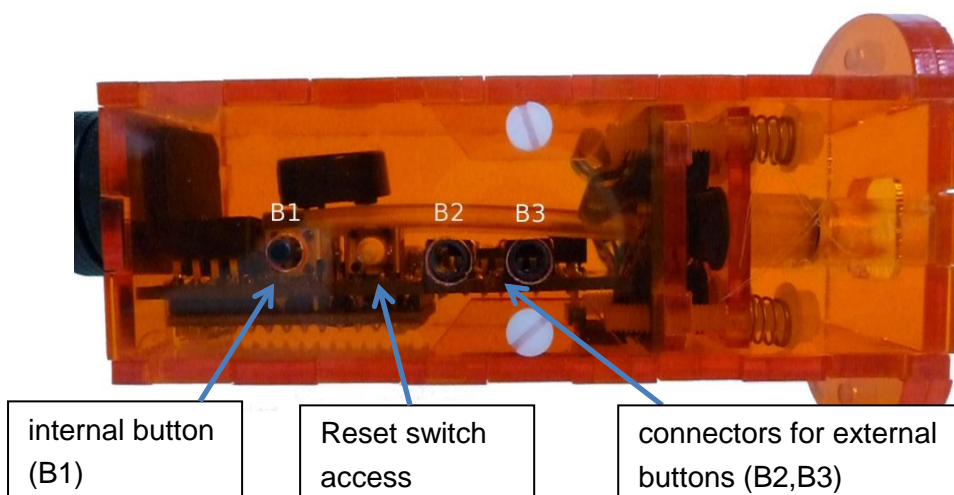
The bottom of the FLipMouse gives access to a button (B1) which offers a configurable function (for example changing the operational mode). Next to this button is a hole which enables to press the reset-button of the built-in microcontroller – this is necessary when you want to update the software of the FLipMouse to a newer version.
Two 3,5mm Jack Plugs marked (B1) and (B2) allow the connection of external momentary switches.
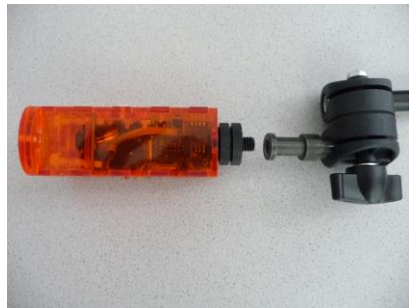
Instructions for proper mounting and use

1. Attach the "hygienic stick"
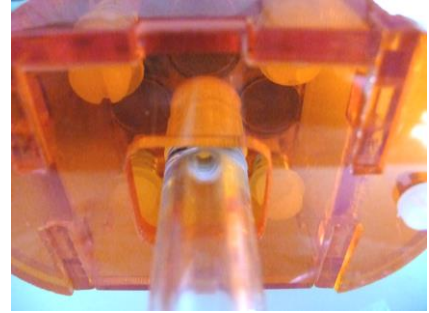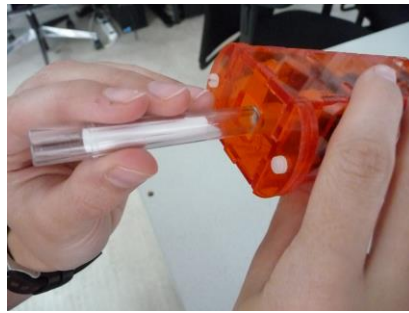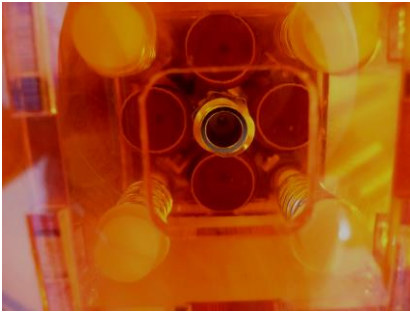
Use a clean "hygienic stick" and attach it to the front connector, turn clockwise (not too hard):

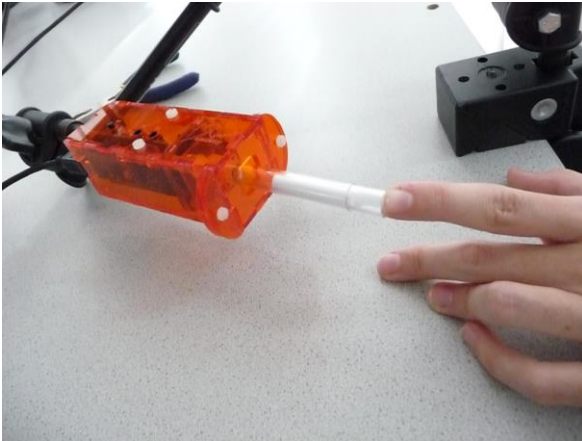**2. Mount the FLipMouse device appropriately for the user**

The picture shows a "Manfrotto Gelenkarm" + "SuperClamp" mount combination. You could also use the *Manfrotto Magic Arm* (http://www.manfrotto.com/magic-arm-kit) or any other kind of mounting solution which fits to the *HotShoe*-Adapter of the FlipMouse. Be careful when attaching the mount to the 3/8" screw of the *HotShoe*-Adapter: hard forces might break the acrylic enclosure of the device.

Using the FLipmouse with Mouth/Lips

Ensure that the head of the user rests comfortably. The mouthpiece should barely touch the lips. It is not useful to insert the mouthpiece into the mouth ! (This could relust in an uncomfortable feeling and makes it harder to control the lateral movement)

Using the FLipMouse with fingers:

If the user desires to actuate the FLipMouse with a finger or the thumb, mount the system appropriately so that the hand is in a resting position and the finger can touch the mouthpiece / joystick without stress. Attach one or two additional external switches if desired, and mount the switches at desired locations (for example at the legs/toes/shoulder etc.)

Using the FLipMouse as a ball-switch interface:
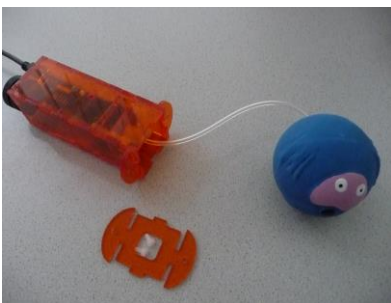
If a soft button interaction method is desired, a plastic tube can be attached to the front connector of the FlipMouse using a *Luer Lock* adapter. This plastic tube can be connected to a soft ball (the picture above shows a cheap dog toy from a pet store). This solution could be used as a soft head-switch or shoulder-switch and can be combined with other external switches. Please note that in this case no direct control of cursor or joystick is possible.

2. Attaching the FLipMouse

When you plug in the FLipMouse via the provided *Micro USB* cable, do not touch the mouthpiece as long as the LEDs are blinking (the initial blinking indicates the zero point calibration phase). Wait until the device is recognized by the computer, then move the joystick / mouthpiece to check correct operation.

Connect this end to a USB port of your computer. If using a smartphone or tablet, attach the *USB-OTG* adapter here

Connect this end of the USB micro cable to the FlipMouse.

Please note that every time you apply power to the FLipMouse device (respectively when you plug it in) the <u>zero-calibration is performed which is indicated by blinking all 3 leds</u>. It is important that you do not touch the joystick / mouthpiece until the leds stopped blinking.

Using the FlipMouse with an Android Smart Phone or Tablets

The FLipMouse should work with any operating system which supports USB HID (Mouse/Keyboard/Joystick) devices, such as Windows, Linux or MacOS. Several Android devices provide an USB port with *USB-OTG* ("on-the-go") functionality. If your device supports "*OTG*" you can attach the FlipMouse using an *USB-OTG*-adapter (see picture below) and it will work as a normal mouse (you will get a mouse cursor) or keyboard. You can test if your Android phone or tablet features the *USB-OTG* function with the "*OTG checker*" app.

Using the FlipMouse with an iOS device (iPhone or iPad)

As the iPhone and iPad devices do neither support a mouse cursor nor a USB port, it is currently not possible to use the standard FLipMouse with these devices – however it is possible to use the *Bluetooth 4.0* – add-on for the FLipMouse to control iPhones or iPads via the built-in switch support. If you are interested in this feature, send an email to office@asterics-academy.net

Hygienic considerations and risks

If the mouthpiece is actuated with the lips, it is important to respect the following hygienic precautions:

a. One mouthpiece must be used exclusively by one person
b. The filter tip must be replaced whenever saliva or dirt have formed
c. The mouthpiece must be cleaned whenever saliva or dirt have formed (see chapter "Cleaning and Maintenance")

With the lack of hygiene concerning the mouthpiece, especially when the mouthpiece is used by more than one person, it is possible that

- skin rashes arises
- viruses and bacteria are transmitted causing diseases
- dirt formats in the mouthpiece, which is dangerous to health.

With wrong positioning of the FLipMouse there is the risk of feeling uncomfortable after longer periods of use, and it is possible that to get muscle cramps or muscle pain due to unusual head positioning – pay attention to a convenient position and schedule pauses if you work for longer time periods !

Installing the Settings Manager (GUI)

The *FLipMouse Settings Manager* application offers a Graphical User Interface (GUI) to change and store settings of the FLipMouse device so that all features and functions can be adapted to personal preferences and needs. The *FLipMouse Settings Manager* sends and receives information from/to the FLipMouse. This information transfer occurs through a communication port (COM port). The COM port driver must be installed before you can use the *FLipMouse Settings Manager*. Please note that the *FLipMouse Settings Manager* is currently only available for Windows and the following instructions apply the Windows operating system only:

To install the COM port driver, start the *serial_install.exe* program which is contained in the software package delivered on USB stick. The software package for the FLipMouse can also be downloaded from: https://github.com/asterics/FLipMouse/releases, alternatively the COM port driver can be downloaded from https://www.pjrc.com/teensy/serial_install.exe

When starting the *serial_install.exe* program, please make sure you have Administrator Privileges, and click the install button. (If your current user account does not provide Administrator Privileges, right-click the *serial_install.exe* file and select "Run as Administrator". The following window will appear:
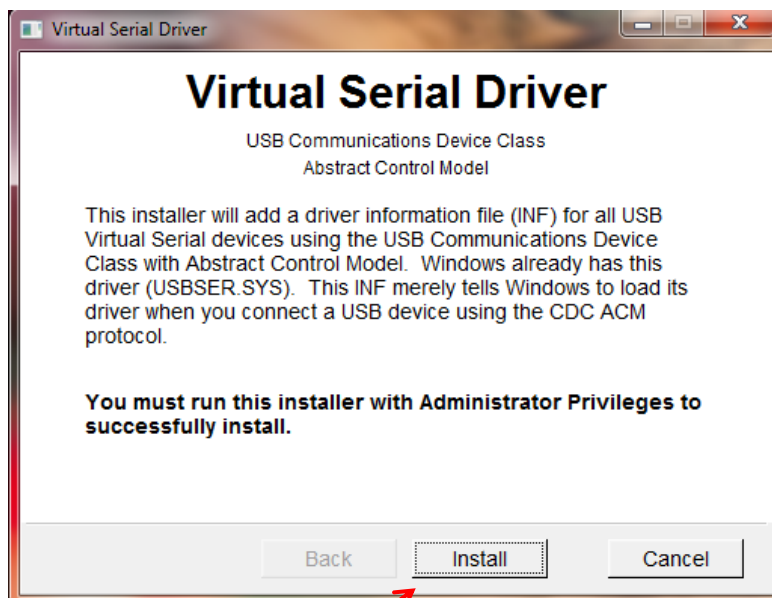
Click "Install" to setup the COM-Port driver for communication between FLipMouse and host computer. After finishing installation, please (re-)connect your FLipMouse device using the micro USB cable.
After making sure that the device is securely connected to the computer, you may check if the device's COM port is successfully detected. The detection might take a couple of seconds.

To check if the COM port is detected correctly, open the *Device Manager* of the Windows operating system:
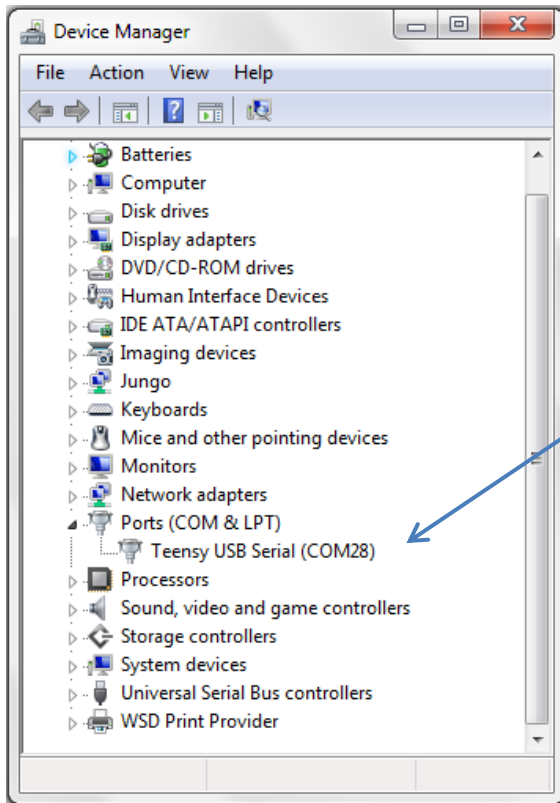
The COM port of your FlipMouse should appear here. The port name is in this example "COM28", however the number is arbitrary and gets automatically selected by your computer.

If you see a COM port as in the example above – congratulations! You are now ready to use the FLipMouse GUI. If you want to update the FLipMouse software (*Teensy* microcontroller firmware) – please refer to chapter "Firmware Update" !

The FLipMouse Settings Manager (GUI)

To use the *FLipMouse Settings Manager*, double-click the *FLipMouseGUI.exe* file.
The window of Graphical User Interface (GUI) will appear:
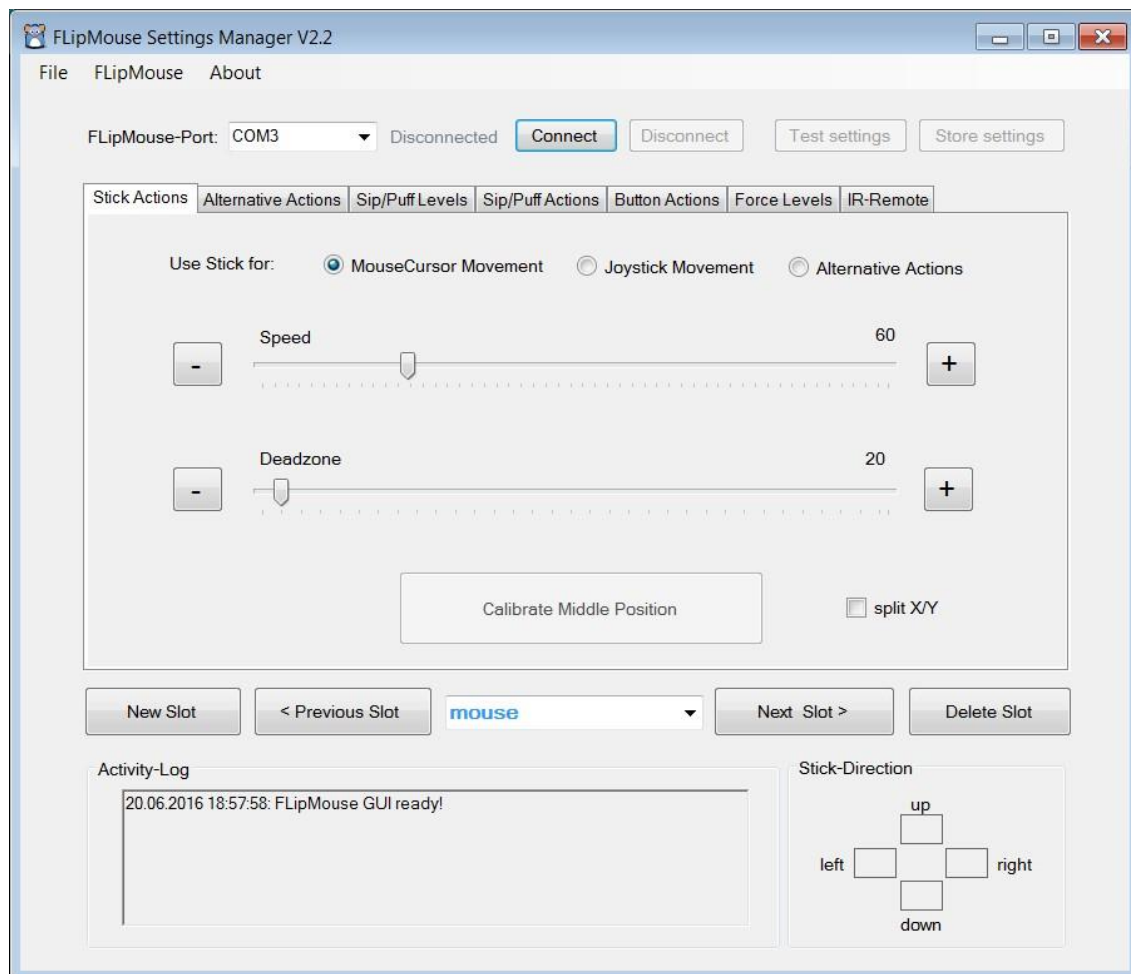
Operational modes – "memory slots"

The *FlipMouse Settings Manager* allows adjustment of all important settings (operational modes). The settings are stored in individual **memory slots** (for example one slot for fast mouse operation, one slot for slow mouse operation, one slot for keyboard key generation etc.). All settings can be stored to (or loaded) from the FlipMouse after it has been connected to the USB port of the computer. The settings can also be saved to (or loaded from) a file on your computer's disk. Settings which were stored into the FLipMouse memory slots stay valid also when the power supply / USB cable is removed. When the FLipMouse is plugged in the next time, the settings will be available – also if you use another computer or operating system !

Managing Slots

The Slot management bar consists of the Buttons "*New Slot*", "*Previous Slot*", "*Next Slot*" and "*Delete Slot*". After starting the FLipMouse Settings Manager, only one default slot named "mouse" exists. When you create a slot using the "*New Slot*" button, you can assign a name that will help you remember the slot's purpose. To write in a new name, click into the drop-down box in the middle of the slot management bar:
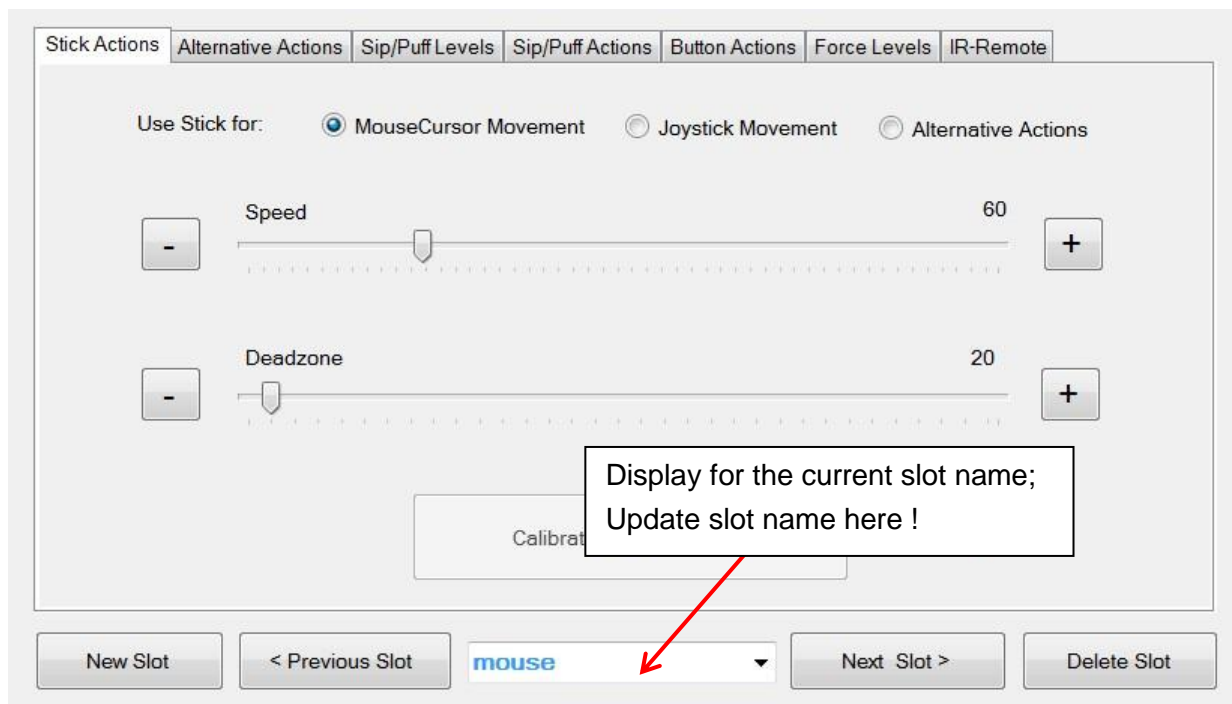
Clicking will highlight the default text, as seen above. You may now the type the new name, as desired. Using the "*Previous Slot*" and "*Next Slot*" Buttons you can change between the existing slots. The settings of the current slot will be stored and remembered when changing to another slot. The maximum slot count is five. The active slot can be removed using the "*Delete Slot*" button.

Changing the settings of the active slot

The functional features and settings of the active slot can be changed by using the sliders and selection boxes displayed on the different tabs of the *FLipmouse Settings Manager* window. These settings tabs will be described in detail in the next chapter.

Loading and saving the configuration to/from disk

The *File* Menu allows transferring all current slots from to a settings (.set) file on your computer. All settings can thus be transferred to the same or to another FLipMouse device. Multiple setups (for example for individual users or use-cases) can be kept on a computer and applied with a single click. A file chooser window will be opened which allows selection of the desired filename for saving or loading the configuration.

Connecting the FLipMouse Device

In order to be able to use the configuration settings on the FLipMouse device, the FlipMouse must be connected to the application. To connect the device, follow these steps:

1. Make sure your device is connected to your computer vie an USB port.
2. Select the appropriate COM port (communication port) in the combo box at the top of the application window. If the combo box appears empty, it means that no port has been detected. In this case, please reconnect the device and wait for the COM ports to be updated, and then click on the drop-down menu to refresh the COM port list or restart the application.
3. Once the COM port is selected, click the "*Connect*" button on the right hand side of the combo box. When the device is connected, a window will pop up, asking if you want to load the current settings from the device. If you confirm this question with "yes", the settings displayed in the GUI window will be overwritten with the settings that are currently stored in your FLipMouse. If you choose "No", the settings will be kept and could be transferred to the FLipMouse. After successful connection of the COM port, the port status at the top right corner of the window will change to "connected":
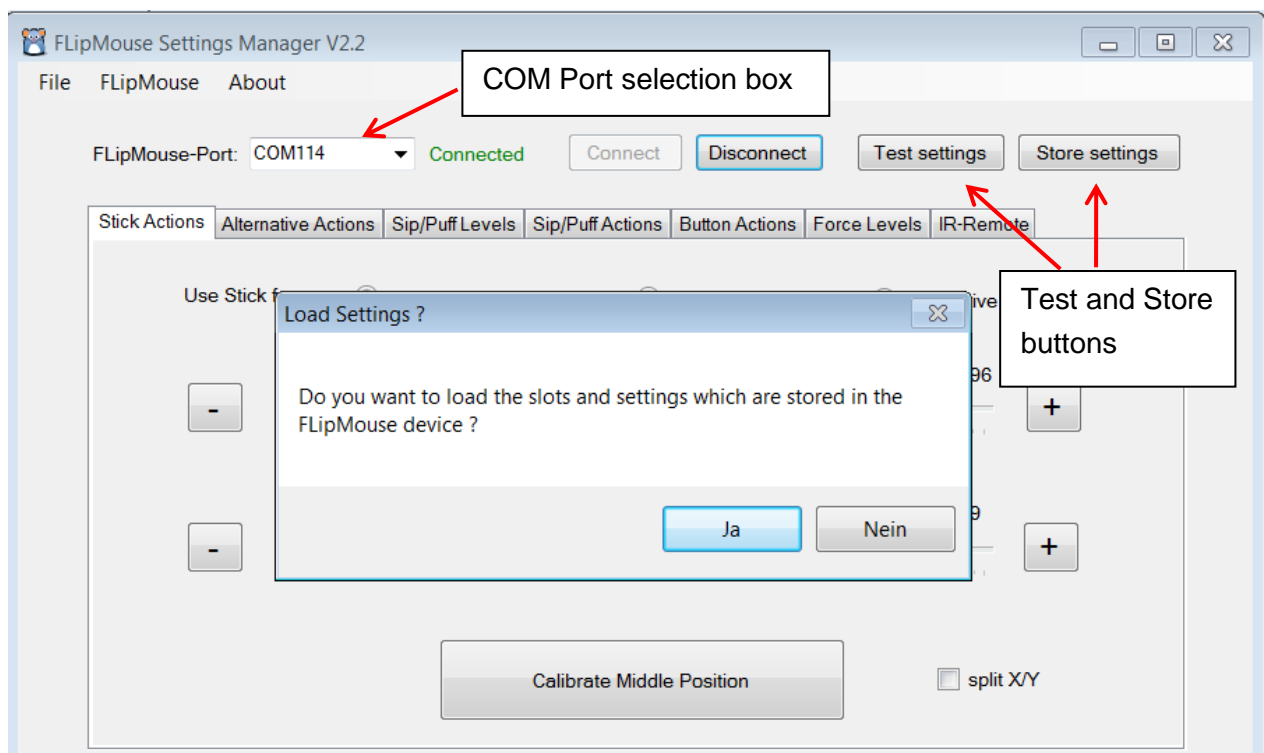
Now you should see live feedback of stick movement and sensor values on the screen.

Testing and Storing current Settings

When the FlipMouse device is connected, the settings of the active slot can be applied to the device for testing by clicking "*Test settings*". Once the settings have been applied, you will receive a confirmation message in the activity log, and you will be able to use the FLipMouse with the new settings. Note that the settings are not stored into the FLipMouse device – to store all current settings (all slots), press the "*Store settings*" button. Storing all slots can take several seconds.

Changing Settings and Features

Cursor Movement

Cursor movement is the default tab of the user interface. On this tab, you will be able to change the function of the FLipMouse stick, change the speed and deadzone of the FLipMouse, and calibrate the middle position.

FLipMouse stick function

By default, the FLipMouse stick is used like a joystick to induce cursor movements. However, stick movements can also be reassigned to other functions, such as pressing the key 'A' when the stick is pushed up.

To continue using the FLipMouse stick for cursor movements, make sure "*Use Stick for Cursor Movement*" is selected, as in the image below. If you would like to assign alternative actions to the stick, please select the "*Use Stick for Alternative Actions*" option by clicking on the appropriate text or the circle on the left side of the text.

Drag the thumbs of the scroll bars to change the speed and deadzone settings of the FLipMouse
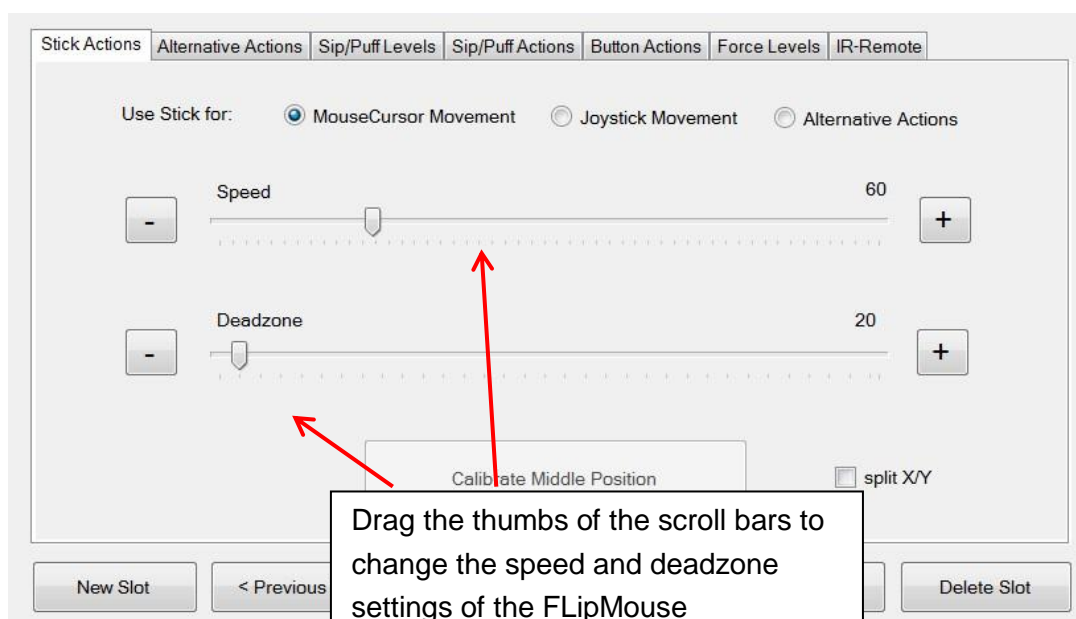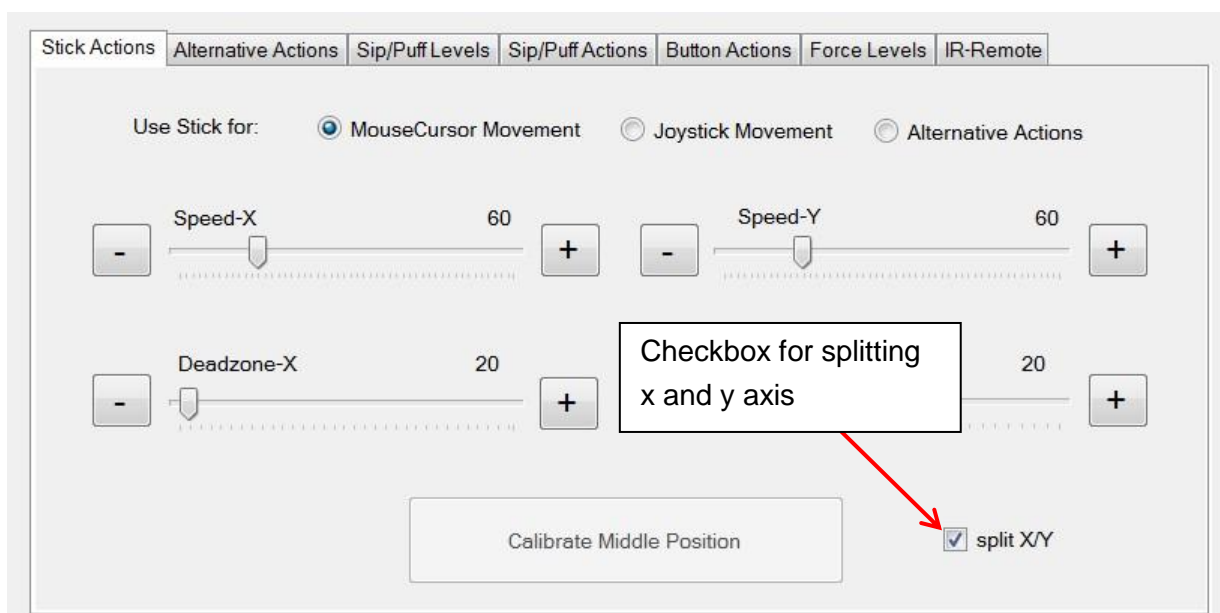
Speed

When using the stick for cursor movement, the cursor acceleration can be adjusted via the *speed* scroll bar. A smaller value results in slower acceleration, a larger value results in faster acceleration. To change the value, click and drag the scroll bar knob or click the bar next to the knob. You can also place the mouse cursor over the "+" or "-" buttons next to each scroll bar so the scroll bar position will decrease or increase automatically (This works for all scroll bars of the FlipMouse Settings Manager).

Deadzone

The *deadzone* setting changes the sensitivity of the stick movements. When the *deadzone* value is low, very slight stick movements will already cause cursor movement (or execute the assigned alternative function in case "*Use Stick for Alternative Actions*" is selected – see following chapters). If the default sensitivity is too high and the cursor starts unintended drifting or alternative functions are triggered unintendedly, the *deadzone* value may be increased so that a greater stick movement will be necessary to cause movement / function triggering.

Split horizontal and vertical

Moving the cursor on the computer is possible both horizontally (left or right movements, also known as x axis) or vertically (up or down movements, also known as y axis). The *speed-* and *deadzone* values for horizontal or vertical movements can be changed individually. In order to do that, select "*split X/Y*", as shown below:


If you decide that splitting the horizontal and vertical movements is not necessary, simply unselect "*split X/Y*", and the *speed* and *deadzone* scroll bars will go back to the default state.

Calibration of the stick's middle position

When using the stick for cursor movement, the cursor should stay in place when the stick is not touched. Sometimes the resting position of the stick may become inaccurate and cause unwanted cursor movements, even if the stick is not used. If this happens, you can either increase the *deadzone* values or initiate a calibration. When the Settings Manager is active, a calibration can be initiated by pressing the "*Calibrate Middle Position*" button. Once you click this button, do not move the FLipMouse stick, otherwise the calibration will be done incorrectly. The LEDs on the device will flash and the speaker will emit a low tone, indicating the start of the calibration. This will last for about 1 second - then the calibration sequence is accomplished. Calibration can also be assigned as an action in response to button pressing, sip/puff actions, or alternative FLipMouse stick actions, so that it can be performed on demand, while using the FLipMouse device.
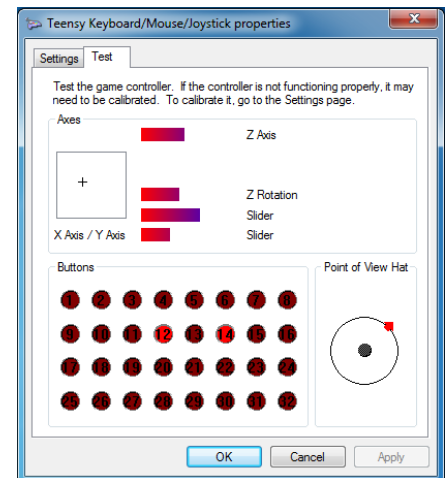
Using the Stick for Joystick Movement

If you select "*Joystick Movement*" as Stick behavior using the dedicated radio button, the FLipMouse stick activities (moving the stick up / down / left / right) will result in joystick activities. The joystick device which is emulated by the FLipMouse provides 6 axis (*X/Y, Z/Z-Turn* and *Slider1/Slider2*). As the stick delivers only 2 axis of information, the desired joystick axis can be chosen from a selection box which appears left the calibration button.
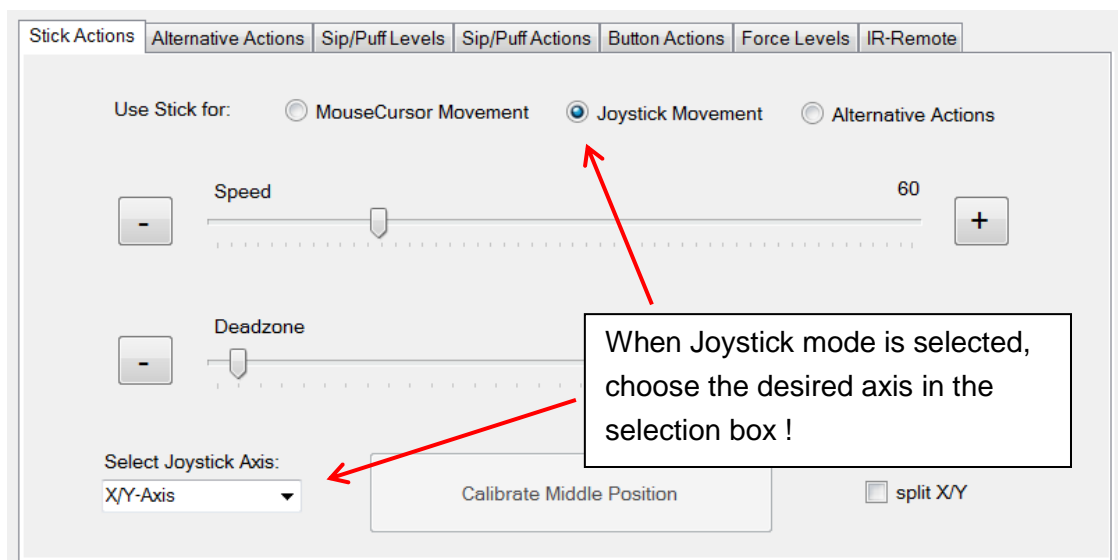
The settings for *speed* and *deadzone* also apply for the joystick functionality.

Please note that the joystick function must be supported by software applications running on the computer (for example games). Windows offers a test software called "*joy.cpl*" – you can start this utility by entering for "*joy.cpl*" into the search dialog.

The joystick controller provided by the FLipMouse is called "*Serial+Keyboard+Mouse+Joystick*". When you select this device in the "*joy.cpl*" utility and display its preferences, the live values of the joystick axis and button activities will be displayed in a window similar to the one shown here:


Desired joystick button activities can be created using sip/puff or other interaction events by choosing "*Press Joystick Button*" from the action menu as described in the following sections.

Using the Stick for Alternative Actions

The "*Alternative Actions*" tab allows the assignment of specific actions to FLipMouse stick activities (moving the stick up / down / left / right). For using these alternative actions instead of mouse cursor movement, the option "*Alternative actions*" must be selected in the tab "*Cursor Movement*".
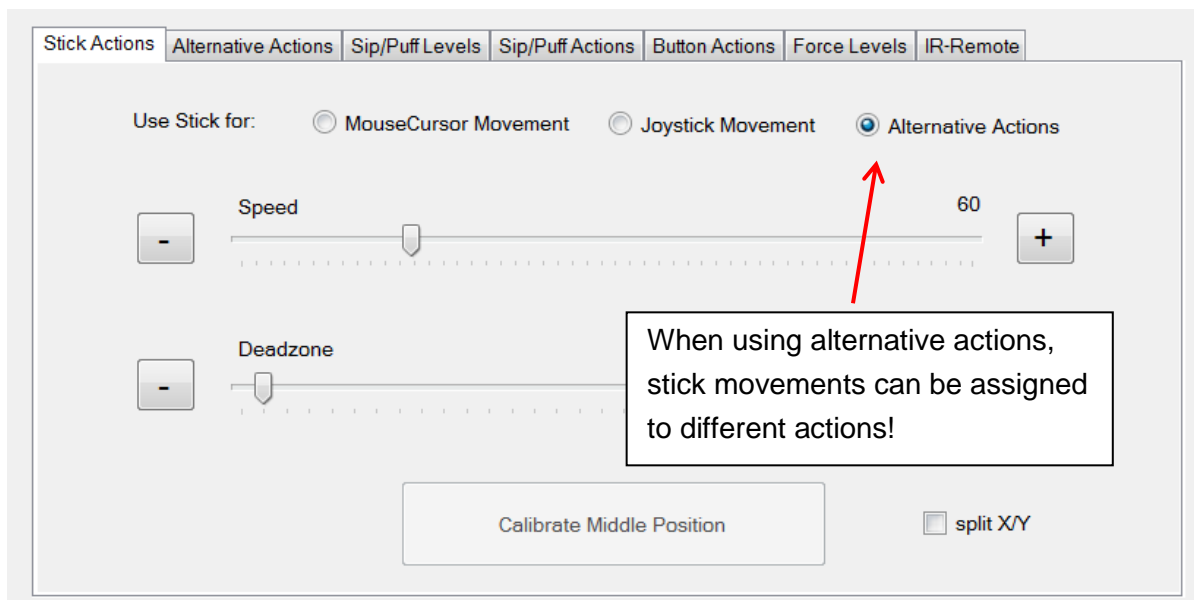

According to the stick activities (up/down/left/right), there are four drop down menus from which you may choose an alternative action for each stick movement. By default, alternative actions for all four possible stick movements are preselected as cursor key presses.

Use the Action menus to select desired actions for stick activities – here for example cursor keys
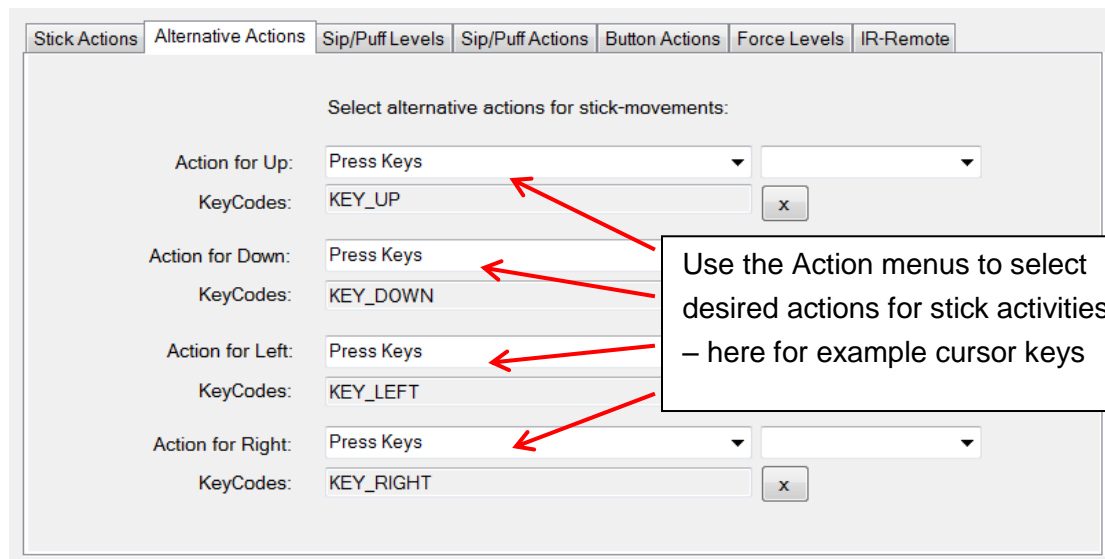
The Action Menus

The Action menus provide different actions which can be assigned to desired user activities – for example to stick movements, sip/puff activity or external buttons. The actions can be selected via drop-down menus which are offered for all supported user activities:
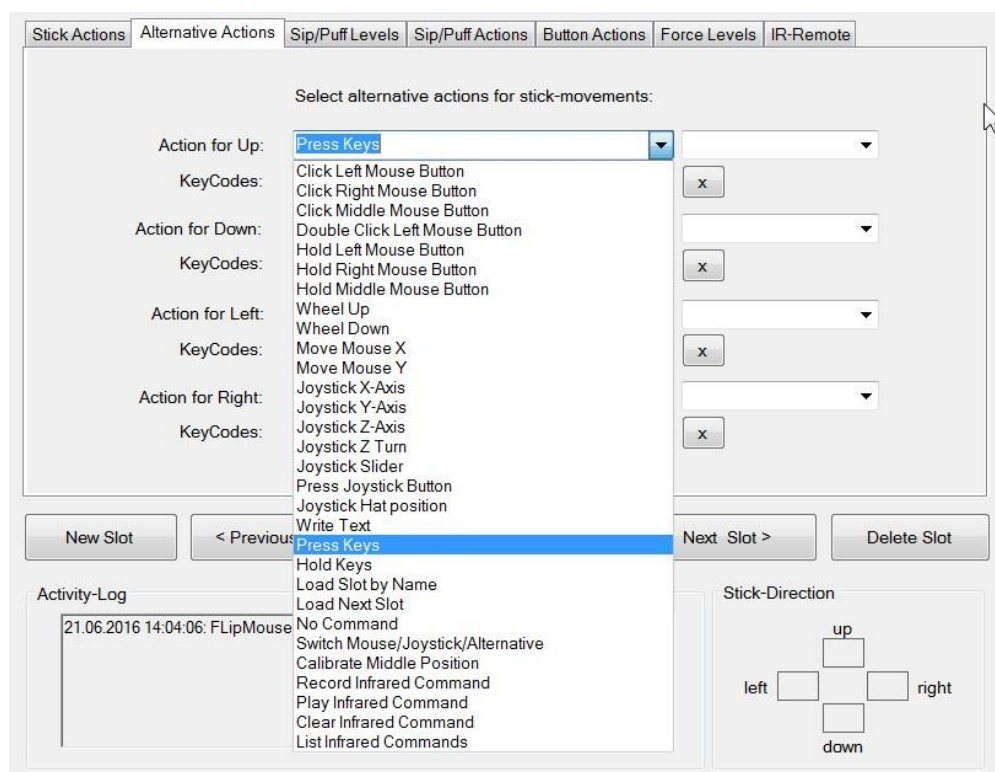
In the following, the individual functions will be briefly described.

Click Left / Middle / Right Mouse Button

Creates mouse button clicks. (The left/right or middle mouse button is pressed and released again after short time).

Double Click Left Mouse Button

Double clicking the left mouse button may be necessary in cases such as opening a file. However, producing a double click with the regular click mouse button function may not be convenient, so you may assign a double click to a desired user activity.

Hold Left / Middle / Right Mouse Button

The *hold* action creates a continued pressing of a particular mouse button (for example, when dragging a file, continuously pressing the left mouse click is necessary). The mouse button is released when the assigned user activity ends (for example when the sip/puff activity ends, the stick is moved back to middle position or the external button is released).

Wheel Up / Down

The actions "*Wheel up*" or "*Wheel down*" emulate the mouse scroll wheel. The picture below displays an example of a scroll wheel. Triggering the "Wheel up" option results in upwards scrolling, while "wheel down" results in downward scrolling.


Scroll wheel on a typical computer mouse; allows scrolling in both directions

Move Mouse X or Y

Cursor movements on the computer screen occur in horizontal direction (X-axis) and vertical direction (Y-axis). The "*Move mouse X*" and "*Move mouse Y*" actions emulate computer mouse movements. When triggered a mouse movement in the selected direction starts.

These two actions also offer a speed parameter to indicate how quick the cursor should move. The input field for the speed parameter appears once the mouse move action is selected:
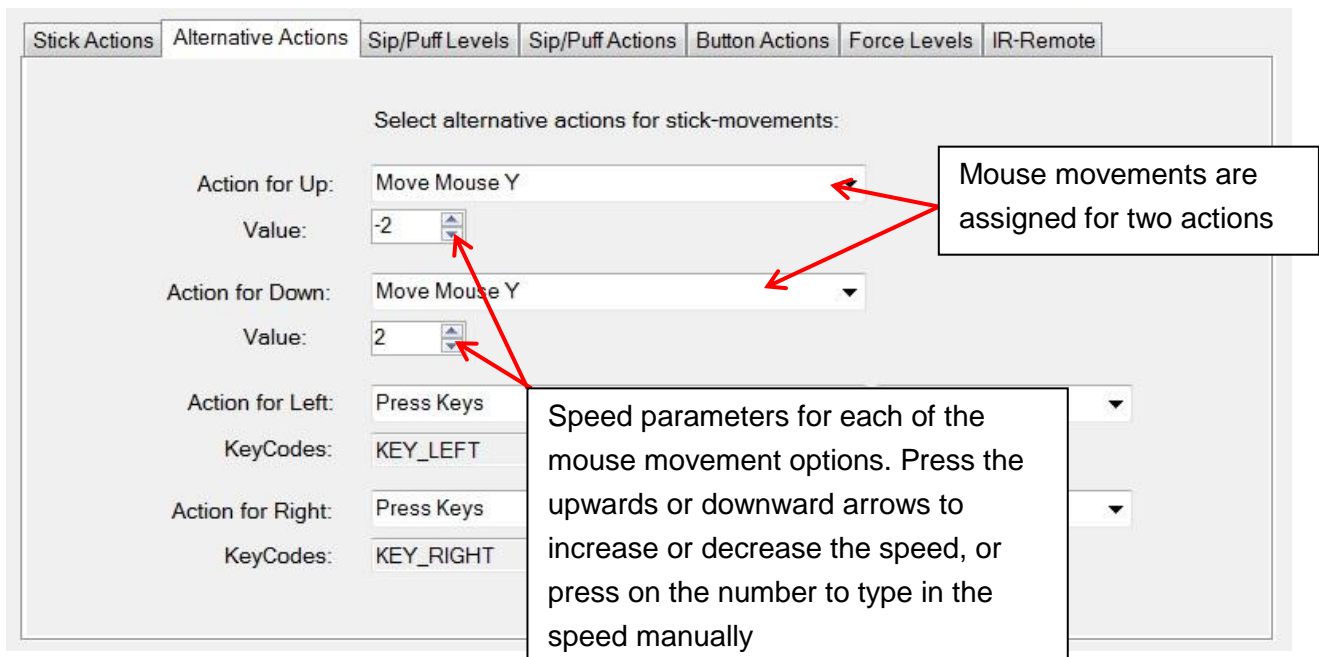
Similar to the "*Hold Mouse Button*" action, the movement of the mouse cursor stops when the associated user activity ends (when the sip/puff activity ends, the stick is moved back to middle position or the external button is released)

Joystick X/Y/Z/Slider movement

These actions can be used to send a desired value to the joystick axis. The selectable joystick axis are: X / Y / Z / Z-Turn / Slider1 and Silder2. Entering the desired value for the axis works as described above for the "*Mouse Move*" action. The joystick is moved back to middle position when the associated user activity ends.

Joystick hat postition
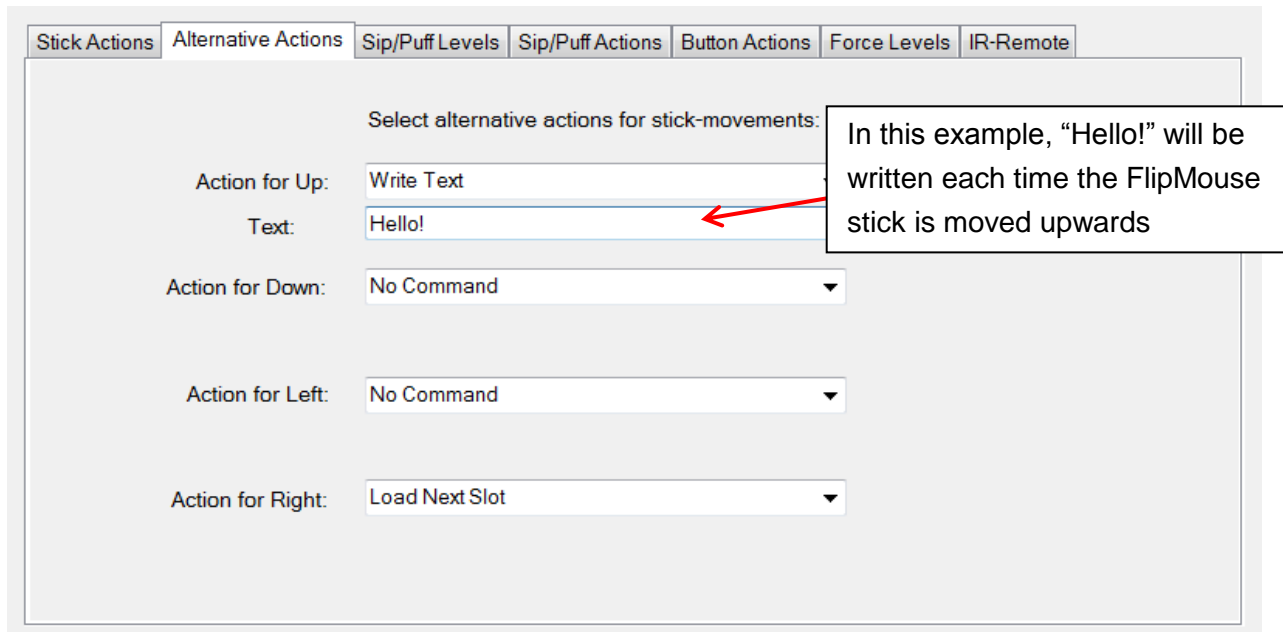
This actions sets the orientation of the joystick hat (in degrees). Allowed values are:
-1, 0, 45, 90, 135, 180, 225, 270, 315. The value of -1 sets the hat to the middle (idle) position.
The joystick hat is moved back to middle position when the associated user activity ends.

Press Joystick Button

This actions can be used to press a desired joystick button. The FLipmouse device supports 32 buttons, so any value from 1 to 32 is allowed. The joystick button is released when the associated user activity ends.

Write Text

The "*Write text*" action allows typing a particular text/phrase whenever a user activity occurs (for example: write "Hello" whenever you move the FLipMouse stick up). Selecting this action displays a blank text box under the drop-down menu where the text can be entered, as shown below:
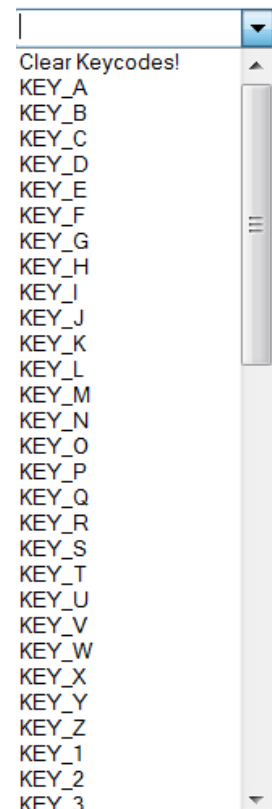

In this example, "Hello!" will be written each time the FlipMouse stick is moved upwards

Press Keys

The "*Press Keys*" action allows pressing and holding one or multiple keyboard keys. A second drop-down menu with possible key identifiers is displayed. When a key is selected from this menu, it will be <u>added</u> to the *KeyCodes* text field. Thus, multiple keyboard keys can be pressed simultaneously. The keys are released when the associated user activity ends. If you would like to remove or change the assigned keys, you must clear the currently assigned keys by pressing the "X" button next to the *KeyCodes* field.

Common key combinations include:

      KEY_CTRL + Z: triggers undo function
      KEY_CTRL + C: triggers copy function
      KEY_CTRL + V: triggers paste function
      KEY_CTRL + KEY_ALT + KEY_ DELETE

This gray text field is read-only and is automatically filled when selecting a key combination from the drop down menu on the right

This drop down menu includes all the possible key identifiers to be added to the *KeyCodes* field.

Load Slot by Name

This action allows switching to another slot by its name. The name can be specified in the text field. This action is only relevant if you have stored multiple FLipMouse configuration slots. The Leds indicate the slot number as described below.

Load Next Slot

This action switches to the next slot. If the last slot is already reached, triggering this action will switch to the first slot. This action is only relevant if you have stored multiple FLipMouse configuration slots. When you switch the slot, the built in LED bulbs will change accordingly, showing the active slot.

There are three built in LEDs (red, yellow-orange, green), which will display the binary number for the slot position of the configuration that you have selected. In other words, if you saved two configurations: Game settings and Mouse, game settings will be position 1 and Mouse will be position 2.

Additionally to the LEDs, an acoustic signal will indicate the change of the slot.

The following list shows the color codes of the LEDs for each slot position:

Position 1 will be displayed as 1 shining bulb:

🔴

Position 2 will be displayed as 1 shining bulb:

🟡

Position 3 will be displayed as 2 shining bulbs:

🔴🟡

Position 4 will be displayed as 1 shining bulb:

🟢

Position 5 will be displayed as 2 shining bulbs:

🔴 🟢

Position 6 will be displayed as 2 shining bulbs:

🟡🟢

Position 7 will be displayed as 3 shining bulbs:

🔴🟡🟢

No Command

If the action "*No Command*" is selected, no action will be assigned to the respective user activity.

Switch Mouse / Joystick / Alternative

This action switches between the FLipMouse stick modes – so that the mouse, joystick or alternative functions can be used within a single configuration slot (note that speed, deadzone and other settings settings stay the same).

Calibrate middle position

This action starts the calibration sequence for the middle position of the stick. Please refer to the description "Calibration of the stick's middle position" on page 18.
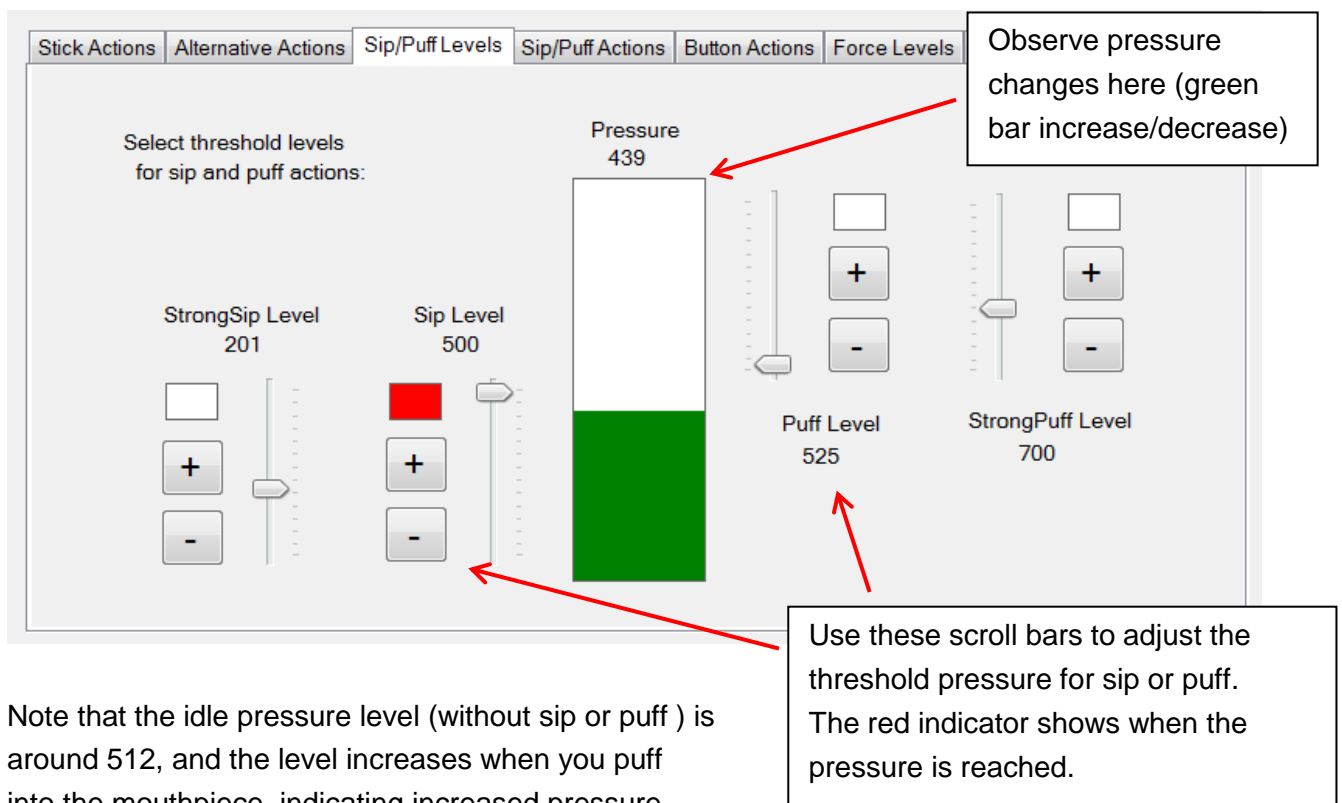
Play Infrared Command

This action plays an infrared code of given name. The name can be entered in the text field. For more information about infrared codes please refer to section "*Infrared Code Recording and Replay*"

Sip/Puff Actions and Levels

When using the FLipMouse stick with the mouth, the user can trigger actions by sipping or puffing through the tube. The tube is connected to a pressure sensor, which outputs a value that corresponds to the detected pressure. When the user sips, the sensor value decreases, and when the user puffs the value increases.

You may assign actions for sipping or puffing using the tab "*Sip/Puff Actions*". You can select the thresholds for sipping and puffing as desired, using the tab "*Sip/Puff Levels*". When the FLipMouse is connected, you can monitor the pressure values and the triggering of sip / puff actions in the graphical user interface:

Observe pressure changes here (green bar increase/decrease)

Use these scroll bars to adjust the threshold pressure for sip or puff. The red indicator shows when the pressure is reached.

Note that the idle pressure level (without sip or puff) is around 512, and the level increases when you puff into the mouthpiece, indicating increased pressure.

StrongSip and StrongPuff

To enrich the functionality of the FlipMouse especially for persons who cannot access external switches, the StrongSip and StrongPuff modes are available. These modes allow additional actions which can be performed via strong sip or puff activities followed by a stick movement (up / down / left / right). These actions will only be triggered once – then the mode switches back to normal. Entering StrongSip or StrongPuff mode is indicated via an acoustic signal (high tone). If the stick is moved within one second, the corresponding combined action (for example "StrongSip+Up" is triggered.) If the stick is not moved within one second, the single StrongSip or StrongPuff action will be triggered. Thus, a total of 10 additional actions can be performed.

Sip and Puff Actions tabs

The actions assigned to the sip- and puff activities can be defined in the "*Sip/Puff Actions*" tab. This works in exactly the same manner as selecting alternative action for stick movements or button actions– via the drop-down action menus for the assigned functions. The Sip/Puff actions tab features three sub-tabs for the assignment of the combined "StrongSip+" and "StrongPuff+" actions which are followed by a stick movement.
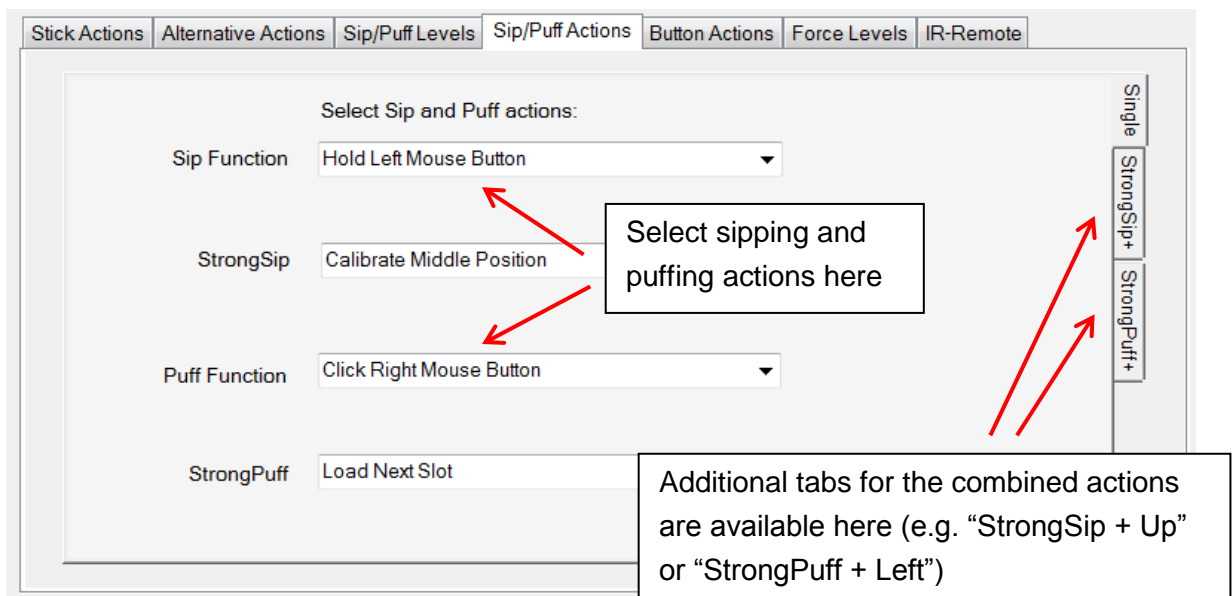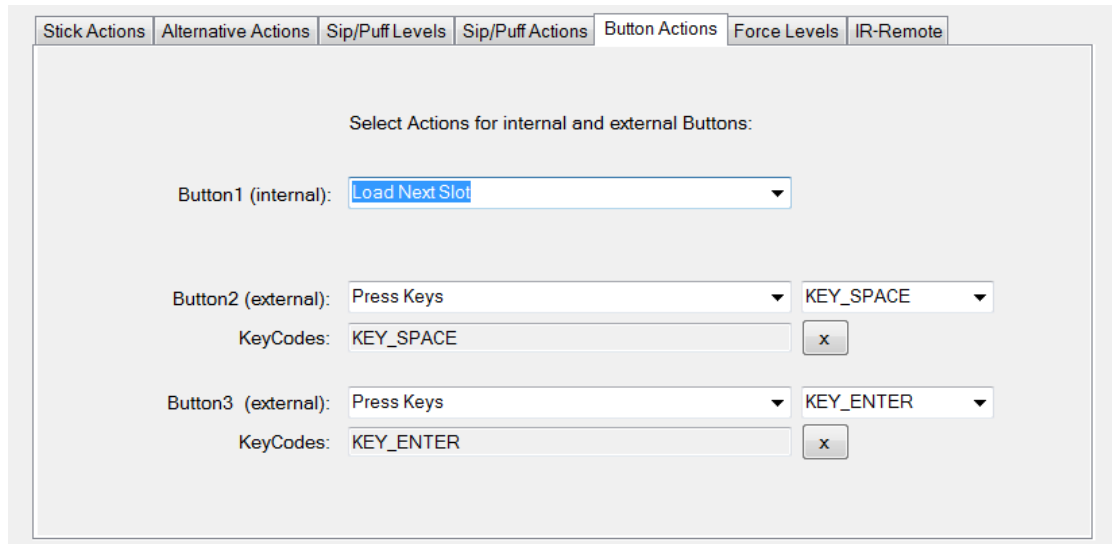

Example of combined actions selected in the StrongSip+ tab:
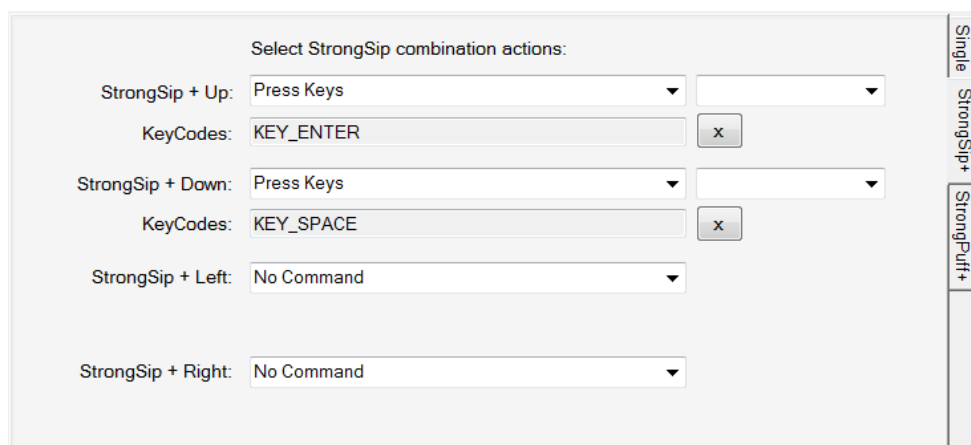
Buttons Actions

The FLipMouse has one built-in button which is ready to use - referred to as "*Button 1 (internal)*" in the tab "*Button Actions*", and two 3,5mm jack plugs where two external buttons may be connected (referred as "*Button2*" and "Button3").

These three buttons can trigger actions that are be assigned in the "*Button Actions*" tab:

View Force Levels

The FLipMouse stick is attached to four force sensors – one for each movement direction (up, down, left, right). The numeric value of each of those sensors is displayed in the "*Force Levels*" tab. The live values can be monitored when the FlipMouse device is connected. Whenever the stick is moved, the sensor values change. Specifically, a movement in each direction increases the respective sensor value. The sensor values also depend on how tightly the device is assembled, therefore when assembling the FLipMouse, this tab can be used as guidance. When not touching the stick, the values should look similar to the following screenshot:
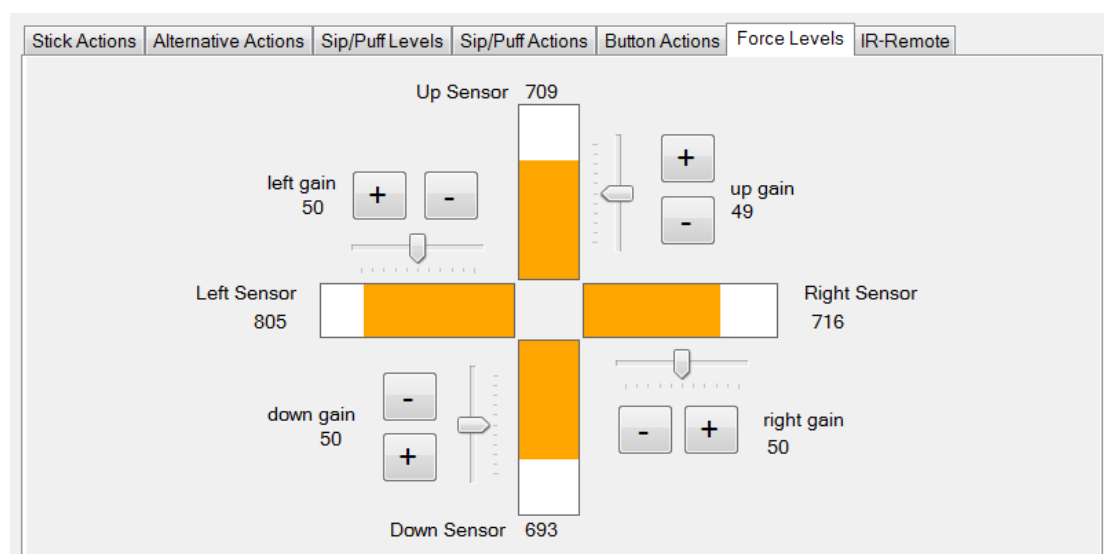

(the gain values are currently experimental and should not be used)

Infrared Code Recording and Replay

The FLipMouse device includes an infrared remote receiver module and a high current IR LED so that it can record and replay remote control codes of many remote controls used in consumer electronic devices. If you want to use this feature of the FLipMouse, make sure that the IR sending LED is mounted so that is points to the device you want to control. (Usually the IR LED points to the direction the user looks when using the FLipMouse). For instructions how to connect an external IR LED to increase the transmit power, please visit the FLipMouse Wiki pages: https://github.com/asterics/FLipMouse/wiki
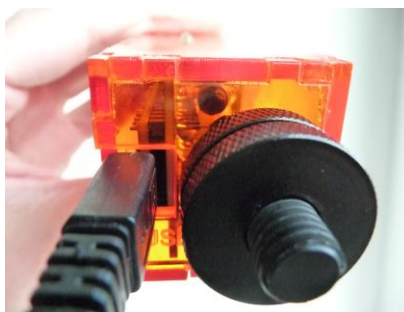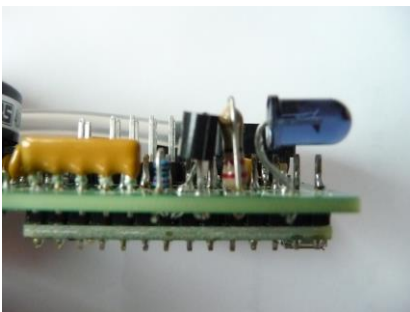
To recording a new IR code enter the intended command name and press "Record new command" - then point your IR remote to the side of the FLipMouse where the leds stick out and send the IR command (you have 10 seconds for this). The new command is now stored in the FLipMouse and can be chosen and replayed using the selection box in the GUI window. Additionally, the command can be entered as text parameter for the "Play Infrared Command" action. If the command is not correctly replayed, try to increase the IR-Code timeout – for example to 250 milliseconds.

Mod your Mouthpiece?

Several users reported that they would prefer a different shape of the mouthpiece. It is of course possible to apply your own modifications and extensions which feel comfortable to you. Here we want to give some suggestions using affordable, disposable cigarette holders. The link between the *Hygienic Stick* and the cigarette holder is established with a small brass tube. It is also possible to cut the cigarette holder and insert it into the *Hygienic Stick* so that a tight fit is ensured.

Regardless of your desired mouthpiece modifications: Always take care for a hygienic operation and apply the cleaning procedures as described in the following chapter !

Instructions for cleaning and maintenance

If the mouthpiece is used to actuate the cursor movements via lip/mouth movements, a careful cleaning procedure is essential to avoid bacteria and health problems! Read this section carefully and apply the needed cleaning procedures whenever necessary.

Exchanging the saliva filter:

The saliva filter is placed inside the hygienic stick. Usually, no (or nearly no) saliva should enter the stick – but it strongly depends on the person using the mouthpiece and his/her condition. If saliva enters the *Hygienic Stick*, the saliva filters prevents the moisture entering the inner parts of the FlipMouse (respectively the pressure sensor). The filter can be replaces as follows:

Removal of the saliva filter, using a normal screw to grab the filter

The removed filter

Inserting a new filter (pushing it back into the hygienic stick)

Disinfection of the mouthpiece/hygienic stick:

To disinfect a mouthpiece, use boiling water. Place the *Hygienic Stick* (without saliva filter) in boiling water for at least five minutes. Then let the *Hygienic Stick* dry before the next application.

Ordering replacement sticks and filters:

Saliva filters and *Hygienic Sticks* can be directly ordered from the *Quadjoy* online shop: https://quadjoy.com/shop. We would like to thank Bill and Debra Street for letting us use their *Quadjoy Hygienic Stick* together with our FlipMouse device – you guys are great !!

Updating the firmware / GUI software

The software which runs on the Teensy microcontroller inside the FlipMouse must match the version of the GUI software running on the PC. You can update both, the firmware and the GUI software, to the most recent version by downloading the latest release from
https://github.com/asterics/FLipMouse/releases
Unzip the FlipMouse.zip package and start the teensy.exe program (the Teensy Loader)

The Teensy Loader user interface should look as on the picture on the left side. If there is any security warning (related to Windows User Access Control), please ensure that the Publisher is "PJRC.COM, LLC" and click on "Run".
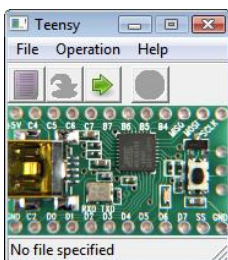

As next step, activate the "download mode" of the FlipMouse by using some pointed tool (needle, small screwdriver,…) to press the reset button which is accessible via the small hole on the bottom side. After a few seconds (driver installation), the Teensy Loader GUI should indicate connection to the FlipMouse as shown on the left side.

Choose *"File→Open HEX file"* and select the file "FLipWare.hex" from the FLipMouse folder (or location where you downloaded the release .zip file).

Select *"Operation→Program"*. After a few seconds, you should see the notification "Download complete", as on the left handed picture.
(If this step does not work in first place, try to unplug and replug the FLipMouse and restart the Teensy Loader software.
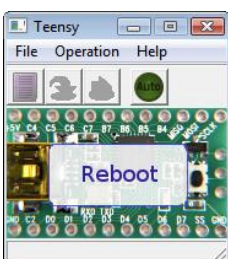
To finish the firmware installation, select *"Operation→Reboot"*.
You should read "Reboot" and the FlipMouse should beep for a short time.

To update the GUI software, copy the file "FlipMouseGUI.exe" from the zip package to the desired location (replacing the old FlipMouseGUI.exe file.

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