Haptic Library

The Evaluation kit

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1. Objective

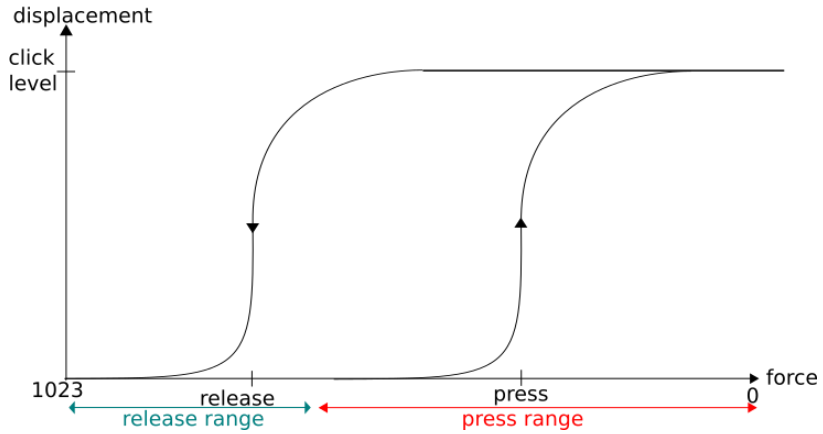
The herein document describes haptic effects of the Haptic Library developed by Actronika and integrated in the Tactronik platform. Each effects is presented into more details including a brief effect description, parameters and presets explanation.
It completes the different commands available in the Tactronik system, as described in API documentation . More details about the parameters settings will be given below.

2. Force click : ID 0

2.1. Description of effect

This is an effect simulating the sensation of a button click. It has been designed to recreate the haptic perception of a mechanical button. A force sensor has been used to trigger the click effect. The curve below presents how the effect reacts with the input sensor.

2.1.1. Press / Release Force



2.1.2. Press / Release Power

It is possible to configure the power of the sensation for the press and the release independently from the press/release force parameter which represents the simulated displacement of the button.

2.2. Configuration of effect:

ID	Title	Description	Min	Max
0	Press Force	A simulated button displacement (switch travel) when pressing	0	740
1	Release Force	A simulated button displacement (switch travel) when releasing	760	1023
2	Press Power	Amplitude of the sensation delivered when pressing	0	100

3	Release Power	Amplitude of the sensation delivered when releasing	0	100

2.3. Sensor and the end module

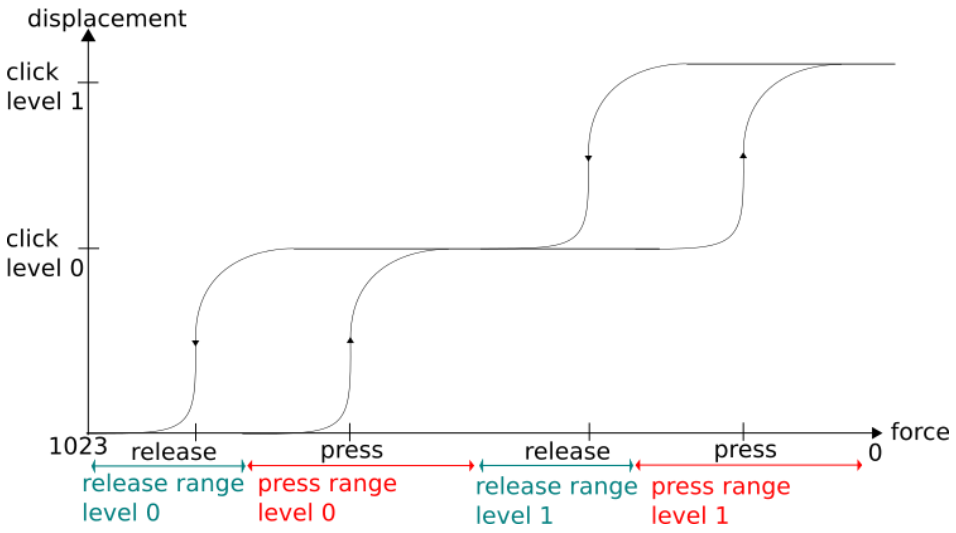
The click effect is controlled by the force applied to a force sensor (Sensor ID = 14). When using evaluation board, you shall use the force sensor module [User Manual, chapter. End modules]. When using an external sensor, you can use the API document to send the appropriate commands to update the sensor values.

3. Double Force Click : ID 1

3.1. Description

Similarly to the Force Click, the Double Force Click simulates a click sensation with two levels of activation on a solid surface coupled to a force sensor.

3.1.1. Press / Release Force (1st and 2nd levels)



3.1.2. Press / Release Power (1st and 2nd levels)

It is possible to configure the power of the sensation for the press and the release independently from the press/release force parameter which represents the simulated displacement of the button.

3.2. Configuration of effect

ID	Title	Description	Min	Max
0	Press Force 1st click	A simulated button displacement (switch travel) when pressing	250	500
1	Release Force 1st click	A simulated button displacement (switch travel) when releasing	0	220
4	Press Power 1st click	Amplitude of the sensation delivered when pressing the sensor	0	100

5	Release Power 1st click	Amplitude of the sensation delivered when releasing the sensor	0	100
2	Press Force 2nd click	A simulated button displacement (switch travel) when pressing	850	1000
3	Release Force 2nd click	A simulated button displacement (switch travel) when releasing	520	830
6	Press Power 2nd click	Amplitude of the sensation delivered when pressing the sensor	0	100
7	Release Power 2nd click	Amplitude of the sensation delivered when releasing the sensor	0	100

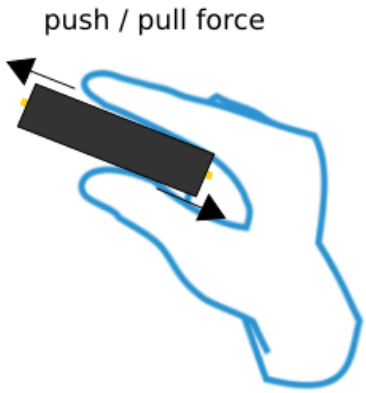
3.3. Sensor and module

The click effect is controlled by the force applied to a force sensor module (Sensor ID = 14). When using evaluation board, you shall use the force sensor module [User Manual, chapter. End modules].
When using an external sensor, you can use the API document to send the appropriate commands to update the sensor values.

4. Rocket : ID 2

4.1. Description of effect

The rocket effect shows an unusual coupling between a vibrotactile and force feedback. It generates a sensation of a push/pull force along the axis of the actuator. When changing the direction parameter you either feel a push or pull force.



4.2. Configuration of effect

ID	Title	Description	Min	Max
0	Amplitude	Amplitude of the sensed force (%)	0	100
1	Direction	Direction of the sensed force created	0	1

4.3. Sensor and module

It is recommended to try this effect holding the actuator in between the index finger and a thumb. No specific sensors or modules are needed for this effect.

5. Waveform generator : ID 3

5.1. Description of effect

A simple waveform generator allowing to test basic signals such as a sinusoidal, triangle and square waves. Each of these signals has their frequency and amplitude configurable.

5.2. Configuration of effect

ID	Title	Description	Min	Max
0	Duration	Period of the played signal (µs)	2000	50000
1	Amplitude	Amplitude of the sensed signal (%)	0	100
2	Waveform	Selection of the waveform (0 : Sinus, 1 : Square, 2 : Triangle)	0	2

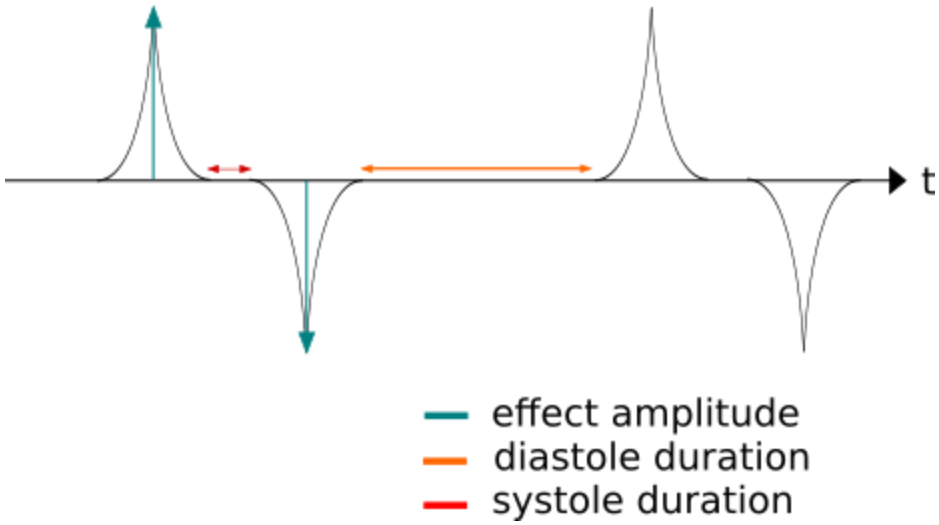
5.3. Sensor and module

No specific sensors or modules are needed for this effect.

6. Heartbeat : ID 4

6.1. Description of effect

The heartbeat effect reproduces the sensation of a heartbeat. Within this effect, the systoles and diastole durations, as well as the amplitude of the effect, can be configured by the user.



6.2. Configuration of effect

ID	Title	Description	Min	Max
0	Amplitude	Amplitude of the effect.	0	100
1	Systoles delay	Delay between two successives beats	300000	2000000
2	Diastole delay	Delay representing the diastole.	70000	250000

6.3. Sensor and module

No sensors or specific module are needed to play this effect.

7. Generic Texture : ID 5

7.1. Description of effect

The generic texture effect modifies your haptic perception of a surface. It has been designed to be integrated on tactile surfaces such as a trackpad or a tactile screen to modify a default texture sensation. It is driven by the movement of one or several fingers and it is configured to work in only one direction.

7.2. Configuration of effect

ID	Title	Description	Min	Max
0	Effect Power	Amplitude of the sensation delivered to the user while sliding on the surface	0	100
1	Number of fingers triggering the effect	Minimal number of fingers triggering the effect	1	3
2	Resolution	Span of the cues triggering the effect	1	500

7.3. Sensor and module

This effect is binded to the horizontal position of the finger on the surface (Sensor ID = 3). On the evaluation kit, this effect works with the trackpad.
When using an external sensor, you can use the API document to send the appropriate commands to update the sensor values.

8. Scroll : ID 6

8.1. Description of effect

The scroll effect simulates a traditional mouse wheel scroll on a flat surface. It has been designed to be integrated on tactile surfaces such as trackpad or tactile screen and reproduce a scroll sensation. It is driven with the movement of one or several fingers, depending on the configuration, and will produce some impulses according to a vertical shifting of the fingers on the surface.

8.2. Configuration of effect

ID	Title	Description	Min	Max
0	Effect Power	Amplitude of the sensation delivered to the user while scrolling	0	100
1	Number of fingers triggering the effect	Exact number of fingers triggering the effect	1	3
2	Resolution	Span of the cues triggering the effect	1	500

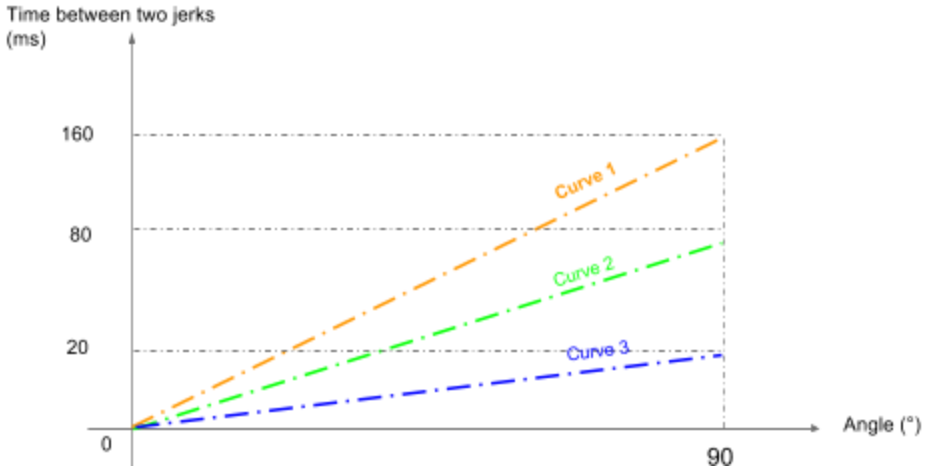
8.3. Sensor and module

This effect is binded to the vertical position of the finger on the surface (Sensor ID = 4). On the evaluation kit, this effect works with the trackpad.
When using an external sensor, you can use the API document to send the appropriate commands to update the sensor values.

9. Jerky Impulses effect : ID 7

9.1. Description of effect

The Jerky Impulses effect generates a series of impulses that varies in time. It has been design to be modulated according to a variation of speed, and be integrated in the system such as drones controllers or model cars. This effect is sensitive to the Y-axis of an accelerometer.
The effect dynamics depends on the delay variation between two jerks which replies on linearly on the Y-axis accelerometer value.



The slope of the delay variation curve is a parameter varying from 1 to 8. The curve 1 corresponds to a slope of 8. The power of the impulses depends on a linearly on the Y-axis accelerometer value.

The slope of the power variation curve is a parameter varying from 200 to 800. When the slope is 200, the power is maximal : 100 % (Curve 1). The power is minimal when slope is 800 : 40% (Curve 2).

When the angle value increases, the power of jerks and delay variation increase until reaching the maximum value at 90°.

9.2. Configuration of effect

ID	Title	Description	Min	Max
0	Amplitude	Defines the maximum variation of the amplitude	800	200
1	Dynamics	Defines the variation of the delay between jerks	1	8

Important: as can be seen in the table above, the minimum of the power is obtained when the parameter ID 0 is equal to 800, and the maximum when this last is equal to 200.

9.3. Sensor and module

The click effect depends of an Y-axis of an accelerometer position (sensor ID 9). When using evaluation board, you shall use the accelerometer module.
When using an external sensor, you can use the API document to send the appropriate commands to update the sensor values.

10. Revision History

Date	Ver.	Ref.	Description	Author	Checked by	Approved by
26/06/2017	1.0		Document creation	Aurélien Zanelli	Jeremy Cheynet	Rafal Pijewski