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## Evaluation kit

Product description

v1.1

## Evaluation kit

### A High-Definition Haptic Platform

Actronika continues to develop a complete value chain that delivers high-end haptics to its clients. An important link in this chain is an evaluation kit that supports High-Definition (HD) haptics. This kit allows you to explore, create, and test new interactions and interaction paradigms that are made possible through HD haptics.

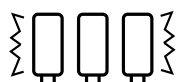
#### The Key Ingredients of HD Haptics



The **HD Haptic Effects Library** is based on over thirty years of research in haptics in the fields of vibrotaction, neuroscience, and tribology (the study of interacting surfaces). The library gives full access to an exclusive collection of HD haptic effects that are all available on the **Unitouch™** Embedded Standard board. The library can easily be augmented with new effects according to your needs.



The **Electronic Driver** facilitates product integration and delivers reliable performance. It can control up to four actuators independently. The 32-bit ARM Cortex™ M4F CPU on board along with UART, SPI, PDM and I2C communication protocols provide you with more than sufficient computing power in an extremely small package, giving integration flexibility.



The lineup of **HapCoil actuators** was specifically designed to enable HD haptic effects. An important feature is a large bandwidth, allowing you to produce arbitrarily complex effects. It has been optimized and packaged in small volumes that deliver the best volume-to-power ratios on the market.



**Interaction** design with physical surfaces is essential to evaluate your haptic creation process and should be done through rapid iterations. The evaluation kit allows you to quickly test haptic interaction designs of typical UIs featuring clicking buttons or scrolling interaction across virtual trackpads. Rapid prototyping facilities let you explore and optimise your design in no time.

### What does the Evaluation Kit Have?

- **GUI:** An intuitive graphical user interface.
- **Installer:** To install haptic applications under Windows, Linux, and MacOS.
- **Streaming:** signal files (.wav or .csv) can be used as an input and played with one or more actuators
- **Effects Player:**
  - **Procedural Basic:** Procedural sound synthesis techniques applied to haptic design
  - **Haptic Essentials:** Convenient access to the effects library stored in the **Unitouch™** Embedded Standard board.
- **Interactive module:** A mechanical module with sensing for design. You can test your designs by applying them to UI interaction paradigms and tweak them on the fly.

### For Whom is the Kit Intended?

- **Newcomers to haptics** can acquire an understanding of what haptics is and how haptics can address their needs.
- **Haptic designers** gain the possibility to test advanced designs on a real hardware.
- **Engineers and scientists** can advance their understanding of complex haptic systems and anticipate the results of finalized designs.
- **Product designers** can realize added values with HD haptics.

## The Modes of Operation

The kit can be used in three different modes.

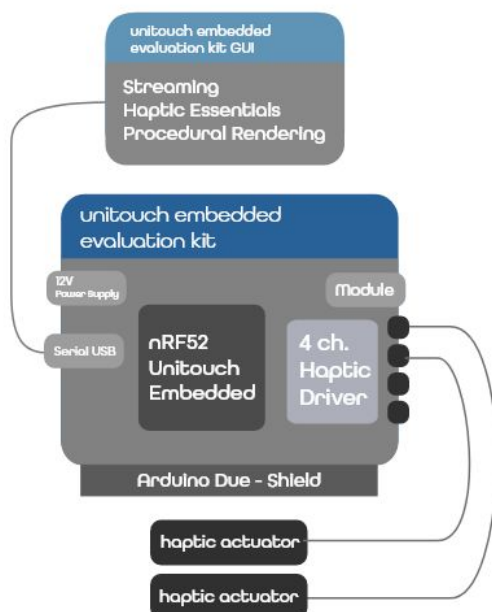
- **Demo mode.** The kit boots in default mode upon connection of a power cable without the need to connect it to a PC.
- **Evaluation mode.** In this mode you can run many different haptic effects in conjunction with the interactive module equipped with capacitive and force sensing.
- **Development mode.** This mode supports the design of new use-cases. The kit is compatible with our **Unitouch™** SDK that enables in-depth exploration and end-user software integration. The board's form factor allows for connectivity to the Arduino platform (Arduino Due).

## Unitouch Embedded Standard

In order to let you explore and become familiar with haptics, the kit gives you access to the features of our platform including:

- **Streaming.** The possibility to use .wav or .csv format files to create haptic sensations
- **Effects Player.** A parametric effect synthesizer that can be used to design new haptic effects in no time. With Actronika's unique methodology you can generate haptic signals using a procedural approach combined with **Haptic Essentials™**.
- **Interactive module.** A hardware add-on for interaction testing and tuning.

## Hardware architecture



Main CPU	nRF52 - Cortex-M4f 64MHz 512kB Flash 64kB RAM
Comm. available	UART
Compatibility	Arduino shield form-factor
Outputs	4 channels 9 bits @ 33,3 kHz
Features	<ul style="list-style-type: none"> <li>• Protected against current spikes</li> <li>• Actuator can be connected by soldering, screw terminals, Molex Mini-fit connectors</li> <li>• Works with and w/o the external power supply (only USB)</li> <li>• Industrial connectors RJ48, Molex Mini-fit</li> <li>• Reference design for Unitouch Embedded PCB</li> </ul>

## Personal Computer Applications

- Cross platform GUI (Windows, GNU/Linux, MacOS)
- Modules available:
  - a. Streaming
    - Stereo / mono audio signals
  - b. Effects Player
    - Update the library via the application
    - Import/export effect's presets
  - c. Interactive Module
    - UART communication with the interactive module
    - Detects Dev mode automatically (Arduino presence)
    - Unitouch and Arduino bootloader available in the application

## Actuators

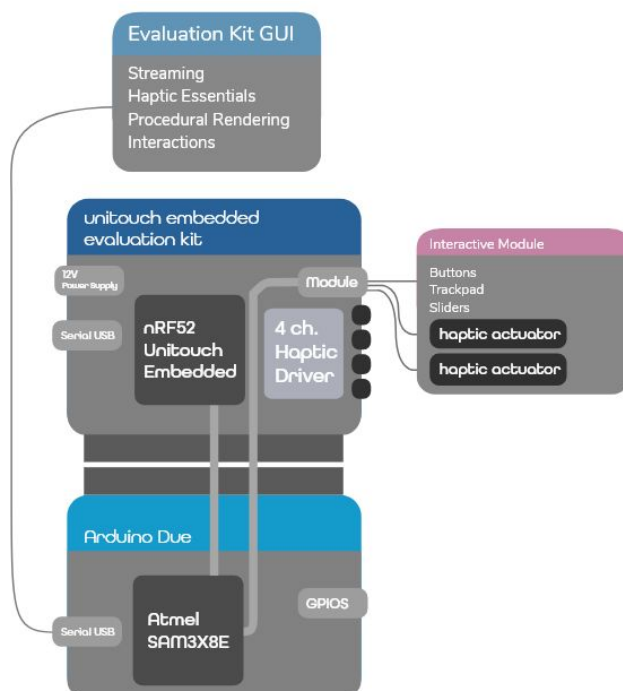
**HapCoil Actuators** delivered with the kit. Datasheet available on our website.

## Interactive Module - Arduino Due

### Features.

- Capacitive and force sensing integrated in small packaging
- Integrated inertial actuator.
- Fast prototyping design.
- Reference design for capacitive sensing.
- Reference design of the module PCB.

## Hardware architecture



## Interaction Design

With the capacitive and force sensing seamlessly integrated into a compact module using 3D printing techniques you can play and explore UI integrations that fit your needs.

## Standard Interactions

- Standard UI - 6 buttons + Trackpad
- Possible interaction
  - Clicking
  - Scrolling
  - Zoom in/out (soon available)
  - Generic texturing (soon available)

## Development mode - Arduino Due

Actronika's evaluation boards as Arduino shields give you access to all the prototyping capabilities of the Arduino platform. Starting from there you can add your own sensors and develop advanced interactions using haptics.

- You can design your own module
- 3D CAD files available for you to play with

## Disclaimer

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