next system Vertriebsges.m.b.H.

Getting Started

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Revision History

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V0.2	2023-11-06	Chapter 2 & 3 supplemented	TPL/GBo

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Table of Contents

1. Overview

This document will help you to guide you through the first steps in exploring haptic feedback.

Connect the components and feel the difference. 😊

✋ This document is valid for next system HapticTouch™ with piezo elements only!

2. Components

The following chapters will give you a short overview of the components included in the haptic evaluation kit.

2.1. Breakout Board

The breakout board is equipped with 4 piezo modules and can be used as a base for a 7" display application.
For larger or smaller sizes, the breakout board can be divided and the 4 piezo modules together with the carrier board can be positioned accordingly under a display. In this case, the individual elements need to be linked to the connector board via the pads X1, X2, X3 & X4.

For the most rigid mounting possible, the carrier board can be screwed in place using the two diagonally arranged holes.

Pinning of connectors X1, X2, X3 & X4

1	HV-
2	GND
3	CAPSENSE
4	HV+

Pin 1 is marked with a dot.

The 4 piezo actuators are fixed with a mounting bracket. This ensures that the actuator surfaces are aligned in parallel during liquid bonding.
After bonding, the mounting clamp must be removed.
To do this, take the mounting clip by the tab or the holes and pull it in the direction of the red arrow.

2.2. Piezo Controller

The piezo controller is used for driving the piezo assemblies on the breakout board.
The 4 piezo assemblies are connected in parallel to the controller. Separate control of each sensor is not supported.

For more detailed information see Hardware Documentation.

2.3. Piezo Cable

For connection between breakout board and piezo controller

2.4. USB Cable

For connection between computer and haptics controller

2.5. Power Supply

Power supply for haptics controller (12V DC, 1A min)

2.6. Cover glass

The kit also contains a glass plate that can be placed on the 4 piezo modules for initial tests. This provides a first impression of the haptic feedback to be expected.

2.7. Start up

For the first experience with the Haptic Evolution Kit only a few steps are required. Here you can find the steps to do:

- Connect the Power supply.
- Connect the USB cable needs to your PC.
- Remove the mounting brackets.
- Start the application "Haptic Test Tool" and experience haptic feedback. The features of the application will be described in Chapter 3.1.
- Haptic feedback can be felt on the overlaying glass. There are 2 options.
  - When pressing on the glass and reaching a defined threshold haptic feedback will be generated.
  - When pressing the play button haptic feedback will be generated.
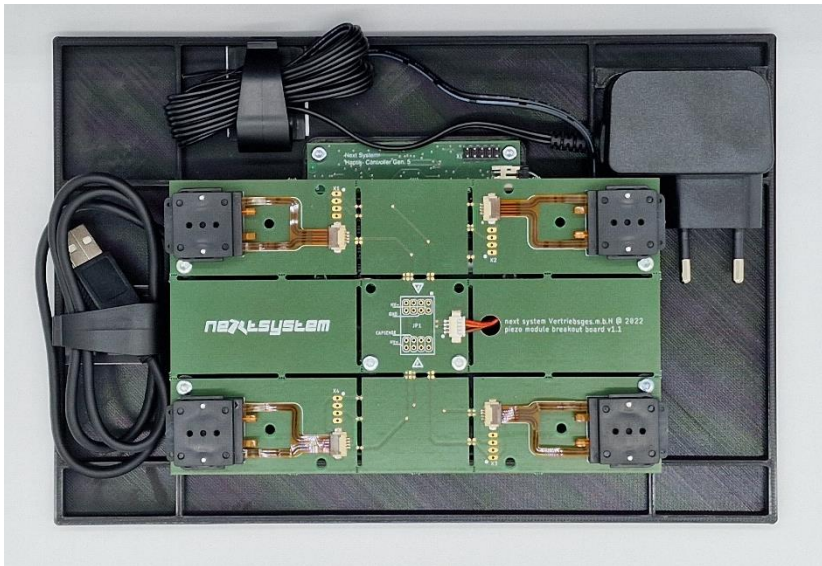
3. Software

The haptics can be controlled actively via computer and the provided program "Haptic Test Tool" or can be used passively. the haptic test tool can be requested from next system via the following link:
https://www.nextsystem.at/haptics/?lang=en/#HapticsForm

In the case of passive, no computer is required. The haptics are only triggered by the force measurement value pre-set in the haptics controller or use the external trigger input to play a pre-set haptic sentence. These features are available on request.

When the controller is connected to the computer, a COM driver is being installed.
A new COM port appears in the device driver. This port is required for establishing the connection in the "Haptic Test Tool" application.
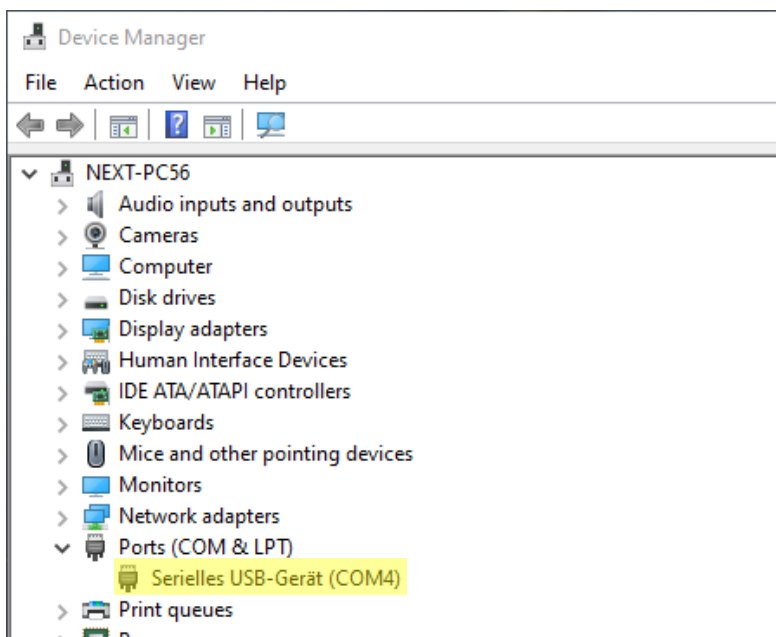
3.1. Haptic Test Tool
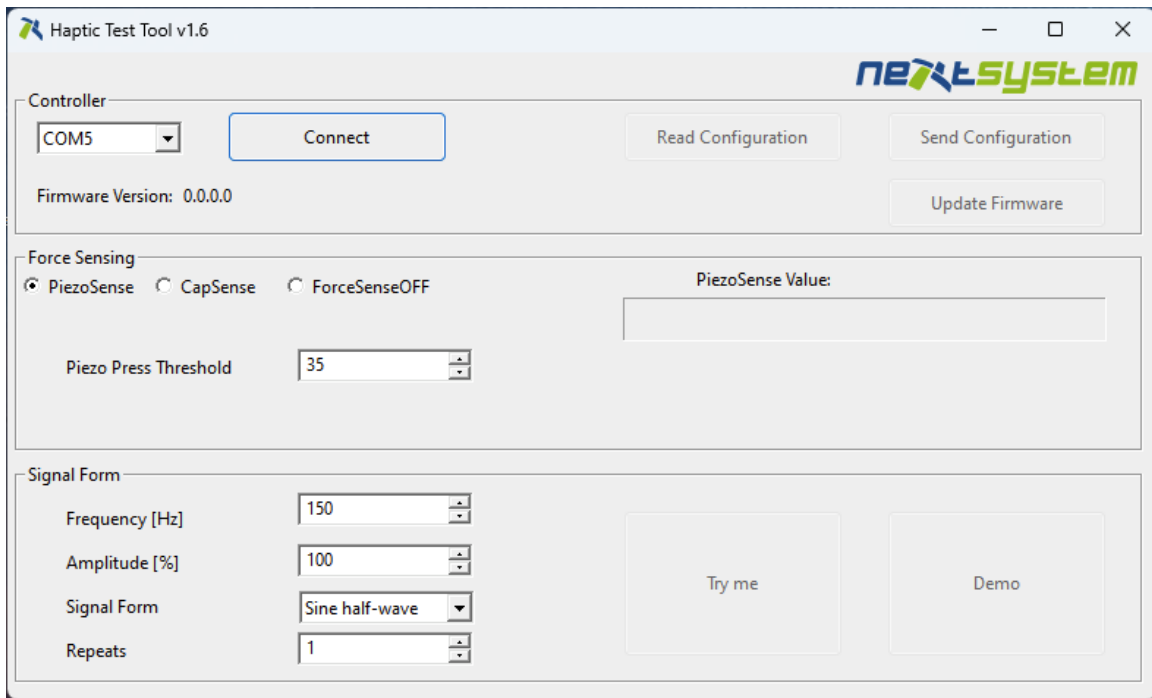
Choose the appropriate COM port from the drop-down menu and click the "Connect" button. Upon a successful connection, the button will turn green, and the current Firmware version will be displayed.

The tool consists of three main sections or panels:
- Controller panel manages device connection, displays the firmware version, and facilitates the exchange of current configurations.
- Force Sensing panel handles the sensing methods. Use the radio buttons to select either PiezoSense, CapSense, or stop sensing altogether. Each sensing method offers adjustable parameters and displays the current sensing values.
- In the Signal Form panel, you can adjust feedback signal parameters and perform tests. Clicking the "Demo" button will open a new window, as detailed in Chapter 3.2.
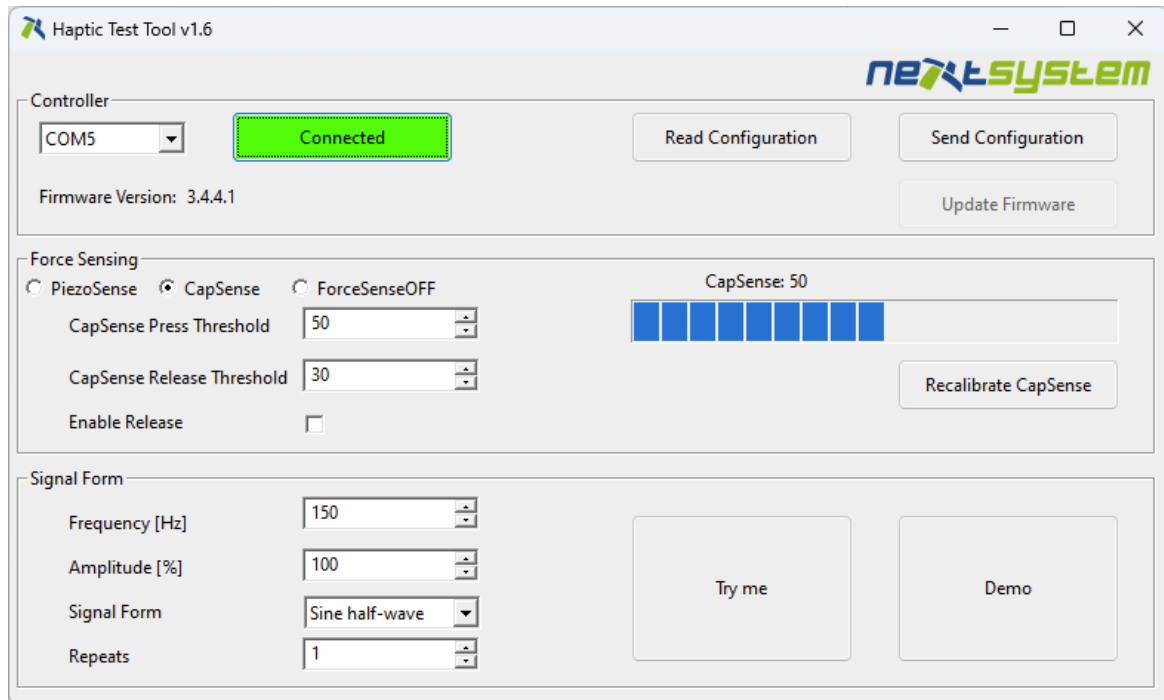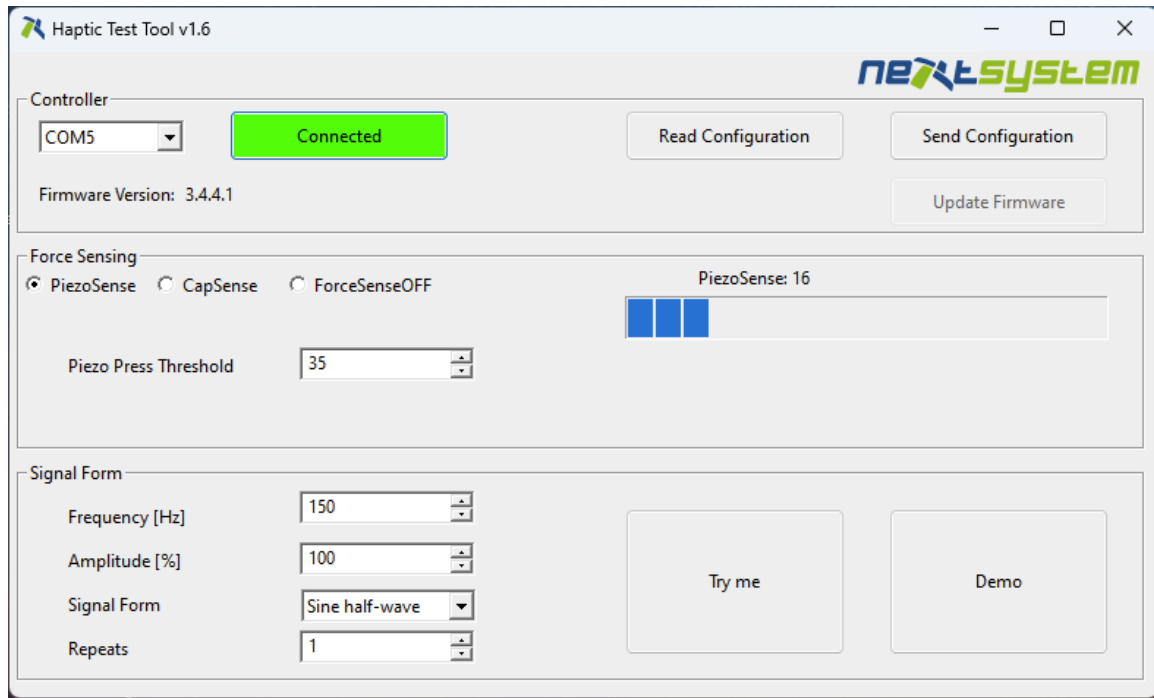
3.1.1. Force Sensing Functions

For PiezoSense, only the "press threshold" parameter can be adjusted. In the case of CapSense, both the "press" and "release thresholds" are adjustable. Additionally, CapSense includes an "Enable Release" checkbox. When this checkbox is selected, it activates release feedback; otherwise, only press feedback is generated.

If changes are made to any threshold parameter, pressing the "Send Configuration" button in the first panel is required for the changes to take effect.

3.1.2.   Haptics Profile

The haptic profile of the feedback signal can be any combination of values within range of the following parameters:

- **Frequency:** number in range of 20 to 1000 (Hz)
- **Amplitude:** number in range of 0 to 100. 100 means 120V output
- **Signal form:** defines the used signal form for haptic impulse, the signal form has impact on haptic impression but also influences the generated audible sound.
  - Half sine
  - Trapeze
  - Sawtooth
- **Repeats:** defines how often a haptic pulse will be repeated, 1 means a single pulse.

Once the signal parameters are adjusted there are two options:

- Click the **Try me** button and instantly hear or feel (if the glass is touched) the haptic feedback or
- Hover over the **Try me** button and then press on the glass to properly feel the haptic feedback.

3.2. Demo

Pressing the Demo button will open the following window:
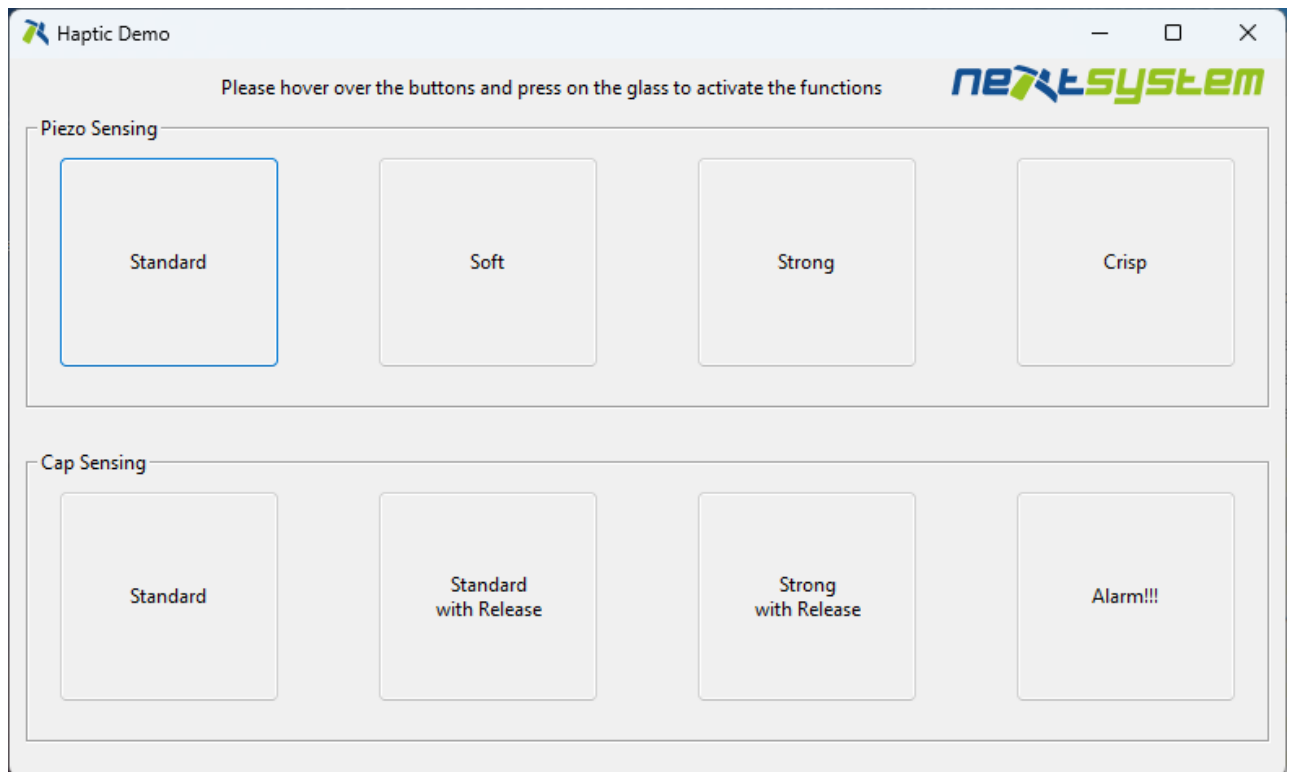
In this window, you'll find eight distinct "buttons," each representing a particular haptic feedback configuration. To view the configuration details, hover over a button to reveal a tooltip.

This window is divided into two sections. The top section features four buttons exclusively utilizing Piezo Sensing. The bottom section also contains four buttons, all dedicated to Cap Sensing.

3.3.   API

The API can be used to control the haptic in your own application.
For details, please check Application Interface Description Haptics Controller.

4. Best practice

For getting a better feeling of the performance we suggest following steps:
- Check out the Demo
- Try different values for frequencies.
- Change of the amplitude
- Choosing Half Sine as signal form generates a pleasant sound

CapSense is a static measurement and allows the finger to dwell on the actuator when pressed.
PiezoSense only detects dynamic/rapid changes.