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1. General

The X-Dot X can be attached to an object to sense whether it is moving or laying still. Typically, this feature is used to detect if an object, such as merchandize in a store, is picked up or placed back. This document provides explanation of the available functionalities and instructions on how to install and integrate the sensor into your digital signage installation.

The information in this document is created for users who are familiar with the Nexmosphere API and are able to control a basic setup with a Nexmosphere API controller. If this is not the case yet, please read the general documentation on the Nexmosphere serial API first.

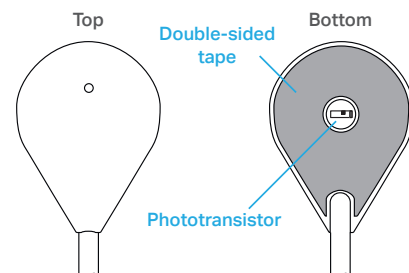
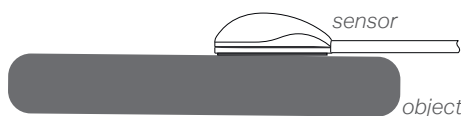
2. Product overview

The X-Dot X wired pick-up sensor is available in multiple variations:

| | XDW-X16 | XDW-X26 | XDW-X36 | XDW-X36C | XDB-X16 | XDB-X26 | XDB-X36 | XDB-X36C |
|----------------------------------|----------|----------|----------|----------|----------|----------|----------|----------|
| Pick-up detection | ✓ | ✗ | ✓ | ✓ | ✓ | ✗ | ✓ | ✓ |
| Security functionality | ✗ | ✓ | ✓ | ✓ | ✗ | ✓ | ✓ | ✓ |
| Color <i>(housing and cable)</i> | white | white | white | white | black | black | black | black |
| Cable | straight | straight | straight | coiled | straight | straight | straight | coiled |

For pick-up detection, the X-Dot X utilizes an accelerometer to detect whether it is moving or laying still. The sensor can be mounted to an object using the double sided tape on the bottom of the sensor.

For security functionalities, the sensor has a phototransistor which can measure the amount of light reaching the sensor. When the sensor is mounted onto the merchandize, no light can reach the sensor. When the merchandize is removed from the sensor (during a potential security breach) light will reach the phototransistor and an Alarm trigger is send. When the X-talk cable is cut, an alarm trigger is send as well.



3. Functionalities and API commands

The X-Dot X wired pick-up sensor provides the following functionalities:

1. **Pick-up and place-back detection** - detect if an object is picked up or placed back
2. **Security alarm functionality** - detect if a product is potentially being stolen

The following sections will cover each of these functionalities in detail. Please note that for each API example in this document, X-talk interface address 001 is used (X001). When the sensor is connected to another X-talk channel, replace the "001" with the applicable X-talk address.

3.1 - Pick-up and place-back detection

When an object is picked up, the sensor will detect the movement and an API command is triggered. Vice versa, when the object is placed back, it will detect that it is laying still and an API command is triggered as well. These API messages have the following format:

X001A[3] *Object is picked up*
X001A[0] *Object is placed back*

In case the Alarm trigger is activated as well, the output will be as follows:

X001A[7] *Object is picked up and Alarm*
X001A[4] *Object is placed back and Alarm*

When implementing pick-up or place-back detection, consider the following:

- The sensitivity of the pick-up detection can be adjusted. For more information please see Settings, page 4.
- At start-up the sensor must lay still in order to make sure it calibrates correctly. For more information please see page 3.
- Typically, during testing/prototyping stages of a project, the sensor is not yet attached to a product. If this is the case and the security sensor is not covered, the triggers will be with Alarm. Please take into account that once the sensor is installed and mounted onto an object, the triggers will be without Alarm. Therefore we advise to always implement both triggers into your application.

3.2 - Security alarm functionality

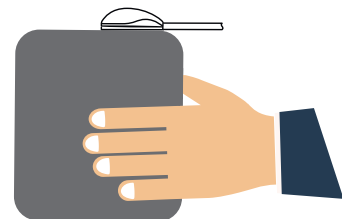
The X-Dot X will give an alarm trigger when the sensor is removed from the product (and the light sensor is uncovered) or when the X-talk cable is cut. The API commands are the same as listed above:

X001A[7] *Alarm, object is picked up*
X001A[4] *Alarm, object is placed back*
X001A[3] *No Alarm, object is picked up*
X001A[0] *No Alarm, object is placed back*

pick-up



place-back



No alarm



Alarm

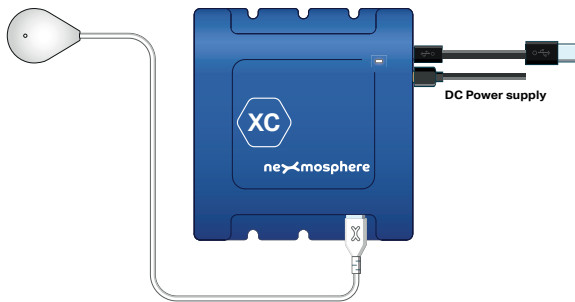


Alarm

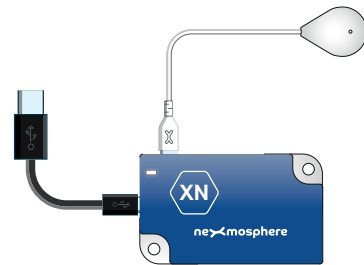


4.1 Connection Diagrams

The X-Dot X wired pick-up sensor can be connected to any X-talk interface and is therefore compatible with all Xperience controllers. Make sure the sensor is connected to the X-talk interface before powering the Xperience controller. Otherwise, it will not be recognized by the Xperience controller and no sensor output will be provided.



Example connection to XC Controller

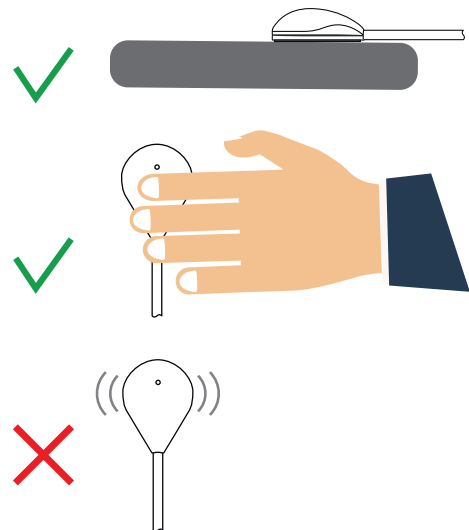


Example connection to XN Controller

4.2 Hardware integration guidelines

Start-up auto-calibration

At start-up, the X-Dot X auto-calibrates itself to its current position. In order to assure the calibration process is executed correctly, please make sure the sensor is laying still in a stable position when powering the Xperience controller to which the sensor is connected. Typically when the sensor is attached to an object, this will be the case due to the mass of the object. However when the sensor is not yet attached to an object, we advise to actively hold the sensor in a stable position for 5 seconds during start-up.



Stable positioning

The X-Dot X triggers based on whether it is moving or not. In order to make sure the place-back triggers are responsive, it is important that both the object to which the sensor is attached, as well as the surface on which the object is placed, are stable and don't move or oscillate. The sensor will only send a place-back trigger once its position is stable. Moreover, a new pick-up trigger can only be sent after a place-back trigger has been sent.

5.1 - Settings

The X-Dot X has multiple settings which determine the behaviour and output of the sensor. The settings can be adjusted by sending X-talk setting commands via the API. After a power cycle, the settings always return back to default.

Setting 1: Status LED behaviour

- | | |
|-------------------------------------|----------------------------|
| 1. LED on, off when picked-up (def) | <code>X001S [1 : 1]</code> |
| 2. LED off, on when picked-up | <code>X001S [1 : 2]</code> |
| 3. LED on, off when Alarm | <code>X001S [1 : 3]</code> |
| 4. LED off, on when Alarm | <code>X001S [1 : 4]</code> |

The setting above applies for the small green status LED in the X-Dot X enclosure.

Setting 2: Status LED brightness

- | | |
|------------------------------|----------------------------|
| 1. Brightness 0% | <code>X001S [2 : 1]</code> |
| 2. Brightness 11% | <code>X001S [2 : 2]</code> |
| 3. Brightness 22% | <code>X001S [2 : 3]</code> |
| 4. Brightness 33% | <code>X001S [2 : 4]</code> |
| 5. Brightness 44% | <code>X001S [2 : 5]</code> |
| 6. Brightness 55% | <code>X001S [2 : 6]</code> |
| 7. Brightness 66% | <code>X001S [2 : 7]</code> |
| 8. Brightness 77% | <code>X001S [2 : 8]</code> |
| 9. Brightness 100% (default) | <code>X001S [2 : 9]</code> |

The setting above applies for the small green status LED in the X-Dot X enclosure.

Setting 3: Functionality control

- | | |
|---------------------------------------|----------------------------|
| 1. Pick-up enabled, Alarm enabled (d) | <code>X001S [3 : 1]</code> |
| 2. Pick-up enabled, Alarm disabled | <code>X001S [3 : 2]</code> |
| 3. Pick-up disabled, Alarm enabled | <code>X001S [3 : 3]</code> |
| 4. Pick-up disabled, Alarm disabled | <code>X001S [3 : 4]</code> |

Via the setting above, both pick-up and alarm detection can be enabled or disabled. In case the sensor model (see overview on page 1) does not include pick-up or alarm detection, it can't be enabled.

Setting 4: Sensitivity level

- | | |
|------------------------------|----------------------------|
| 1. Sensitivity level 1 | <code>X001S [4 : 1]</code> |
| 2. Sensitivity level 2 | <code>X001S [4 : 2]</code> |
| 3. Sensitivity level 3 | <code>X001S [4 : 3]</code> |
| 4. Sensitivity level 4 | <code>X001S [4 : 4]</code> |
| 5. Sensitivity level 5 (def) | <code>X001S [4 : 5]</code> |
| 6. Sensitivity level 6 | <code>X001S [4 : 6]</code> |
| 7. Sensitivity level 7 | <code>X001S [4 : 7]</code> |
| 8. Sensitivity level 8 | <code>X001S [4 : 8]</code> |
| 9. Sensitivity level 9 | <code>X001S [4 : 9]</code> |

The lower the sensitivity level, the least movement is needed for the sensor to detect a pick-up, and the more stable the sensor needs to be before it detects a place-back. Vice versa, the higher the sensitivity level, the more movement is needed for the sensor to detect a pick-up and the less stable it needs to be before it detects a place-back.

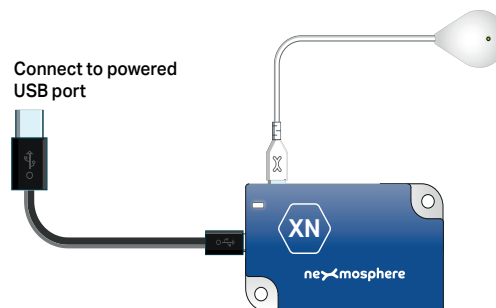
6. Quick test

In order to test if the X-Dot X wired pick-up sensor is installed correctly, please follow the test procedure below:

Step 1 - Setup

First, connect the X-Dot X to an Xperience controller. Secondly, power the Xperience controller.

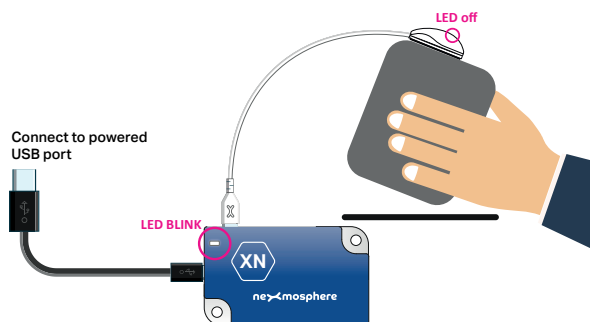
The green status LED of the X-Dot X should go on. The status LED of the controller will start to blink and once power-up is completed will be lit continuously.



Step 2 - Pick-up detection

Pick-up the sensor, or the object to which the sensor is attached.

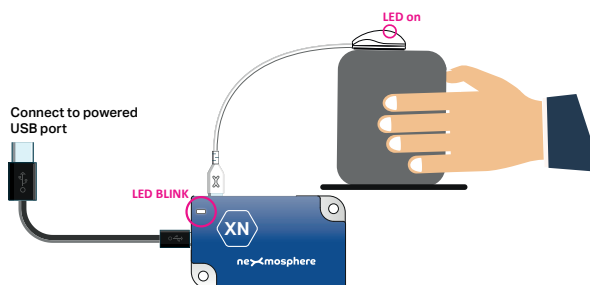
The green status LED of the sensor should go off and the status LED of the controller should blink.



Step 3 - Place-back detection

Place the sensor back down, or the object to which the sensor is attached.

The green status LED of the sensor should go on and the status LED of the controller should blink.



In case any of the steps above does not provide the expected result, please check the installation guidelines in this document.

For a full test we recommend to connect the setup to a media player or PC and test all API commands listed in this document (see section 3, page 2). For more information on how to setup a test for your controller, please see the Quick Start Guide of the Xperience controller you are using. These are available on nexmosphere.com/support-documentation

Please contact support@nexmosphere.com for any support questions you may have.