

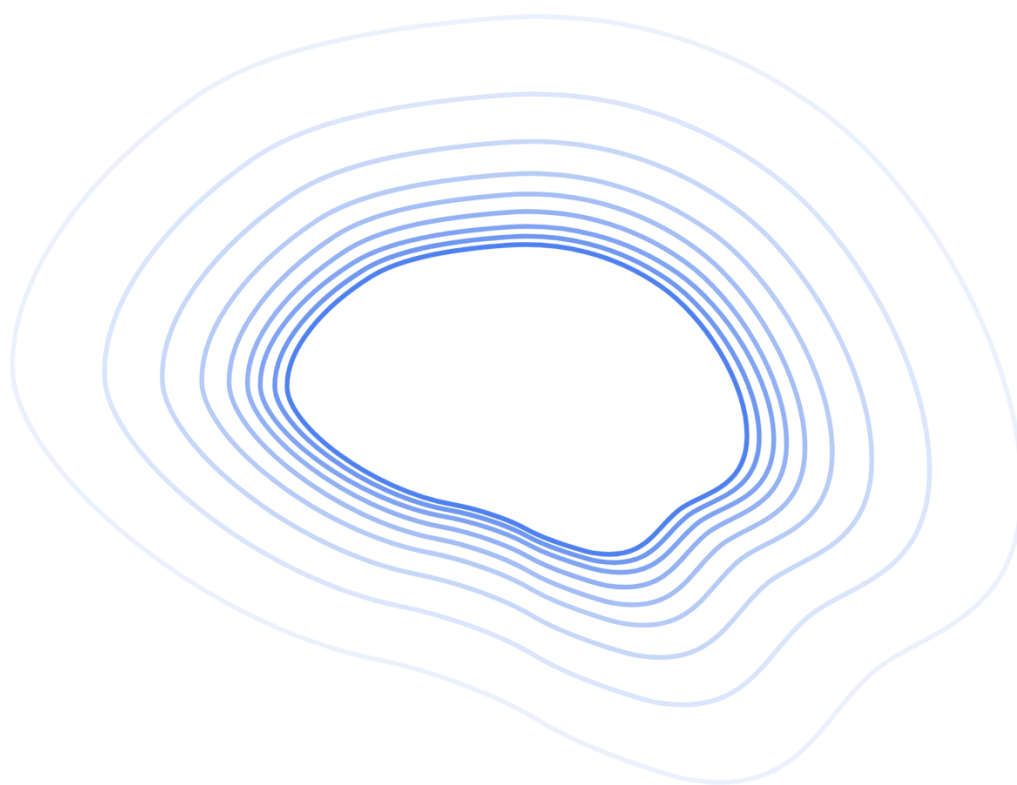


Nordic
Neuro
Lab

EN

nordicAktiva v2.1

User Manual



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1 Introduction

NordicNeuroLab's nordicAktiva is a stimulus presentation and workflow software which controls the presentation of stimuli during fMRI exams.

This document will take you through the steps for configuring the software for your system, testing hardware connections, running experiments, and using the Paradigm Builder to make or modify paradigms. Further resources can be found at our help pages: <https://www.nordicneurolab.com/help-all/nordicaktiva>.

Note that this document pertains only to nordicAktiva for Windows.

The latest version of this document, along with translated versions in multiple languages, can also be found at <https://www.nordicneurolab.com/help-all/nordicaktiva>.

1.1 System information and prerequisites

Intended use/Indications for Use:

The fMRI Hardware System is a stimulus presentation and response collection system intended to be used by trained professionals to facilitate auditory and visual stimulation to be used in functional MR Imaging (fMRI) based on BOLD contrast.

nordicAktiva is a stimulus presentation software intended to be used by trained professionals to facilitate auditory and visual stimulation to be used in functional MR imaging (fMRI) based on BOLD contrast. In addition, it records responses from the NordicNeuroLab ResponseGrips.

The device is indicated for use during BOLD fMRI examinations of individuals over 2 years of age. It is not intended for the diagnosis of disease or for the direct treatment of conditions.

nordicAktiva would be used in an MRI department of a hospital or clinic, when a functional MRI exam based on BOLD contrast is required involving the provision of visual or auditory stimulation to a subject inside the MRI scanner.

1.1.1 System prerequisites

nordicAktiva runs on the stimulus presentation PC to which the NNL fMRI Hardware System is connected. Through the hardware, audiovisual stimuli are presented to, and feedback is collected from the patient, using the components and connections shown in the below diagram:

- PC running Windows 11
- Microsoft Defender Antivirus software is present
- For the purposes of support, Microsoft Quick Assist software is recommended

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Caution: Federal law restricts this device to sale by or on the order of a licensed practitioner.

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1.1.3 Anti-virus software

Windows Defender Antivirus, which runs regular scans automatically, or an equivalent anti-virus software, is required to ensure the PC on which nordicAktiva is installed is monitored for evidence of cybersecurity incidents. If any local policies prevent regular automated scanning as provided by default by Microsoft Defender, an alternative scanning schedule should be configured using the Windows Task Scheduler** at a frequency which is appropriate for the frequency of use of the device.

If it should be suspected that the security of the PC was compromised, a full scan should be initiated as quickly as possible, and the information should be acted upon according to local IT security policies.

For additional information about device security, please see section 13 of this document.

1.2 Installation

Installation instructions are provided as a separate document available here:

<https://www.nordicneurolab.com/help-all/nordicaktiva>

Installation should be performed by an IT professional with administrator privileges. Detailed information is provided in Section 13 of this document.

1.3 Warnings

1.3.1 Software performance

Too many running processes during stimulus presentation may cause performance or timing problems.

1.3.2 Restrictions of use

If functional MRI is to be performed on patients in one of the following categories, a physician should be consulted before use:

- Children under 5 years of age
- Anyone with a history of epilepsy, or a family history of epilepsy
- Anyone who has ever experienced epileptic seizures or sensory disturbances in response to flashing lights or other visual stimulation

Subjects in these categories must be monitored by trained operators at all times whilst undergoing a functional MRI exam involving visual stimuli.

Note:

Some individuals may experience epileptic seizures when exposed to visual stimuli, especially flashing lights, or patterns. Subjects must be prepared adequately, including investigation of any known epileptic history, and any necessary precautions should be taken.

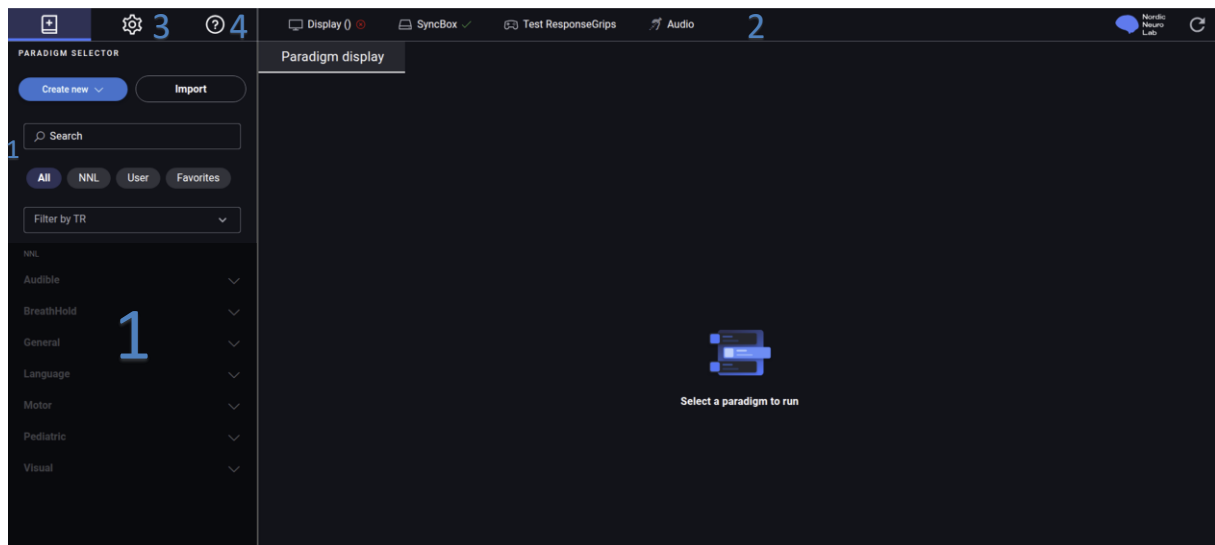
**See instructions at <https://support.microsoft.com/en-us/windows/schedule-a-scan-in-microsoft-defender-antivirus-54b64e9c-880a-c6b6-2416-0eb330ed5d2d#:~:text=Microsoft%20Defender%20Antivirus%20regularly%20scans,and%20frequency%20that%20you%20choose>

2 Launching nordicAktiva and main screen

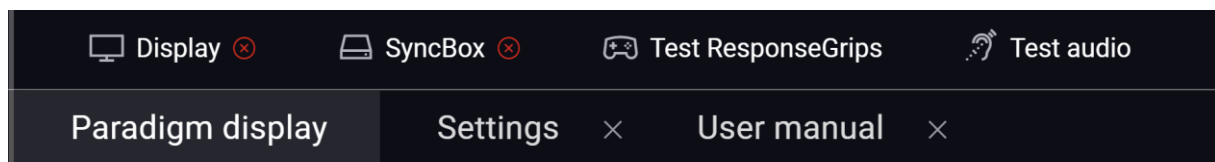
After installation of nordicAktiva and the nordicAktiva paradigms, it should be launched by double clicking on the desktop icon.

The application opens in the main navigation screen, from which the user will be able to directly access the following, as shown below:

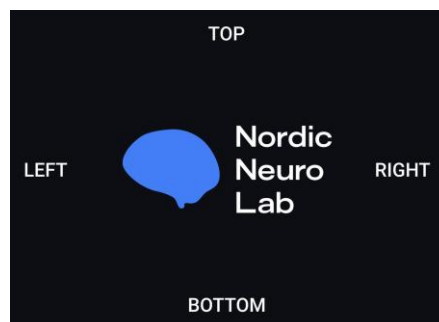
1. Paradigm library
2. Hardware status toolbar and hardware tests
3. Settings
4. Help menu



The screen is divided into several areas known as widgets. When additional widgets open, for example the Paradigm Builder, they will appear as tabs within the central part of the screen:



To facilitate correct display of paradigm content, a preview image containing the NNL logo and 'Top', 'Bottom', 'Left' and 'Right' markers is automatically sent to the patient display.



Once the subject is positioned in the scanner, the operator should confirm that they see the image clearly and with the correct orientation.

3 Software Configuration

Before running fMRI experiments, it is important to configure the software according to your hardware system and your needs. There are three steps required within the software Settings, which can be accessed by clicking on the  icon on the top left.

3.1 Configuring Global Settings

3.1.1 Language

Paradigms are available in a number of languages. Here a default language can be selected, which should be the language applicable to most of the subjects being scanned.

An alternative language can be selected on an individual basis prior to running each paradigm, if different from the default.

Note: Not all paradigms have the same set of languages available. If a default language is selected in the settings, and a paradigm is selected which does not have that language available, it will revert to the English version of that paradigm. Where no English version is available, it will revert to the first available language on the list.

3.1.2 Version

Different types of hardware are available for displaying stimuli to the subject inside the MRI scanner. These have different sizes, resolutions and aspect ratios. We therefore supply different ‘versions’ of paradigms with content which is sized appropriately for the different displays.

Here the default version can be selected which should be applicable to the display used for the majority of fMRI exams.

The versions provided are applicable to the following display screens:

Version name	Display	Resolution
LCD-HD	NNL 32 or 40 inch LCD monitor, set to full HD resolution	1920 x 1080
LCD-4K	NNL 40 inch monitor, set to 4K resolution	3840 x 2160
VisualSystem	NNL VisualSystem goggles	800 x 600
VisualSystemHD	NNL VisualSystemHD goggles	1920 x 1200

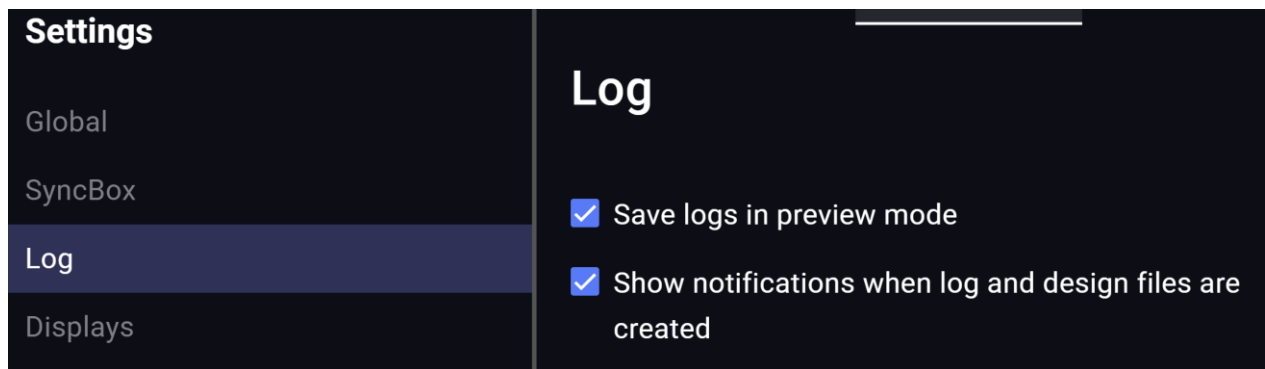
If an alternative display is connected, which is not available to select, the version with the closest resolution should be selected.

3.2 Log Settings

In nordicAktiva v2.1, log and design files are saved automatically when a paradigm is run in synchronization with the scanner.

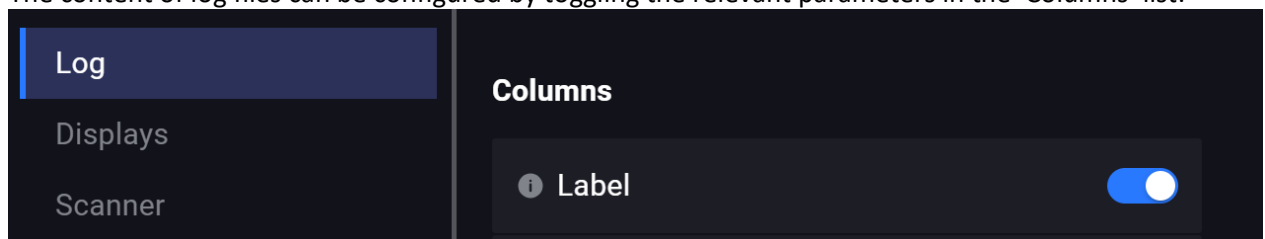
When previewing a paradigm, it may sometimes be necessary to create log and design files, for example during testing.

If log files are required during ‘Preview’, the check box at the top of the Log Settings page can be ticked.



By default, notifications will pop up when log and design files are saved. It is possible to disable the notifications by un-checking the second box in the Log Settings.

The content of log files can be configured by toggling the relevant parameters in the 'Columns' list:



Selectable parameters are defined as follows:

- Label: Shows which event was recorded, e.g., a slide, pulse, or response
- Code: The name of the slide shown, or the code of the pulse received (s = Sync pulse) or button pressed (a, b, c, d)
- Condition: Which condition a slide belongs to (0 = baseline; 1 etc. = active)
- Time: Start time of the event, in ms, relative to the start of the paradigm
- Duration: For how long the slide was displayed, in ms
- ReqDur: The requested duration of the slide, in ms

The file path to the location of saved log files is also written in this Settings window for reference.

3.3 Scanner settings

For BOLD sequences, provided the appropriate licenses are available, the MRI scanner will send out synchronization pulses which are detected by the NNL SyncBox. This in turn forwards the pulses to nordicAktiva in order to control the timing of the stimuli. Depending on which MRI scanner you are using, the sync pulses can be sent out at different intervals, and it is important for nordicAktiva to know the expected frequency of these pulses.

There are three options in the Scanner Settings:

- Every volume: The scanner sends a sync pulse at the start of every volume/measurement. This would be equal to one sync pulse every TR. This applies to Siemens and Philips scanners.
- Every slice: On rare occasions there can be a configuration where a sync pulse is received at the start of acquisition of every image slice. If this is found to be the case, this option should be selected.
- Every block: The scanner sends a sync pulse at the start of every block. This applies to GE scanners using the BrainWave RT license.

NOTE: The paradigms provided by NNL take the first sync pulse as a trigger to start the paradigm, but beyond this they simply run to completion according to the timings specified in the paradigm code. If the scanner settings are incorrect for your system, the NNL paradigms will still be triggered and will run to completion, but the SyncBox will receive incorrect information about the expected number of

pulses. This may result in the SyncBox remaining in a session even after the paradigm has completed. In this case, power cycling the SyncBox will solve the issue and allow another paradigm to be run.

4 Hardware toolbar and Settings

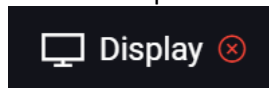
As mentioned, nordicAktiva v2.1 provides the opportunity to easily visualize and test the connections to the associated hardware for stimulus presentation. A hardware toolbar is provided at the top of the screen for this purpose, with buttons for the patient display, SyncBox, Audio and ResponseGrips.

4.1 Display

4.1.1 Display Connection Status

The Display status button relates to the display which will be used to convey visual stimuli to the patient, herein referred to as the 'Patient Display'.

If the PC running nordicAktiva does not have a secondary monitor connected to it (e.g., only detects its own computer monitor), the button will display a red cross icon.



If a secondary monitor is connected, it is assumed to be a patient display. The icon will turn to a green tick, and the name of the connected monitor will be displayed:

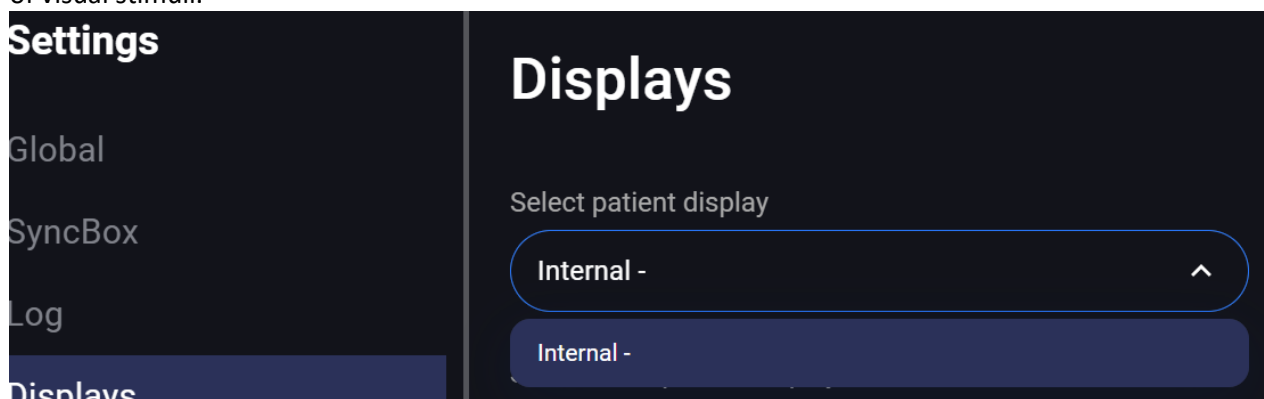


If an NNL monitor is connected, for example the 40 inch or 32 inch LCD, the software will use this as the patient display by default.

Note: If the PC has a second desktop monitor, and a third party device is being used to display stimuli in the MR room, nordicAktiva will not know which of these to use as the Patient Display. The instructions in section 4.1.2 should be used to select the correct display for stimulus presentation.

4.1.2 Display Selection

Clicking on the Display button will open the Display Settings. A drop-down list shows the available displays, including the computer's primary monitor or the laptop's internal display. These are labelled with make and model, allowing for easy selection of which display is to be used for the presentation of visual stimuli.



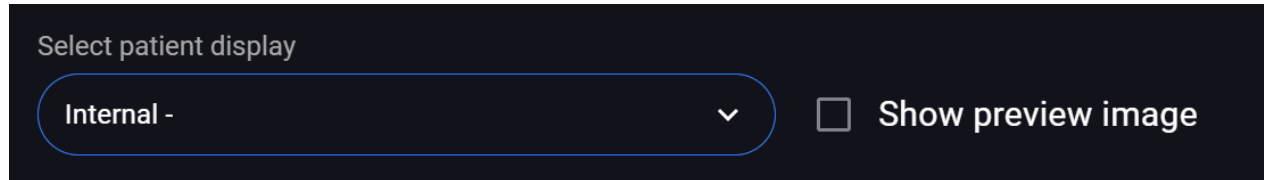
4.1.3 Display Preview Image

Prior to starting an fMRI exam, it is important to check that the subject can see the stimuli on the display. This includes checking they can read text across the whole screen, and that the image is

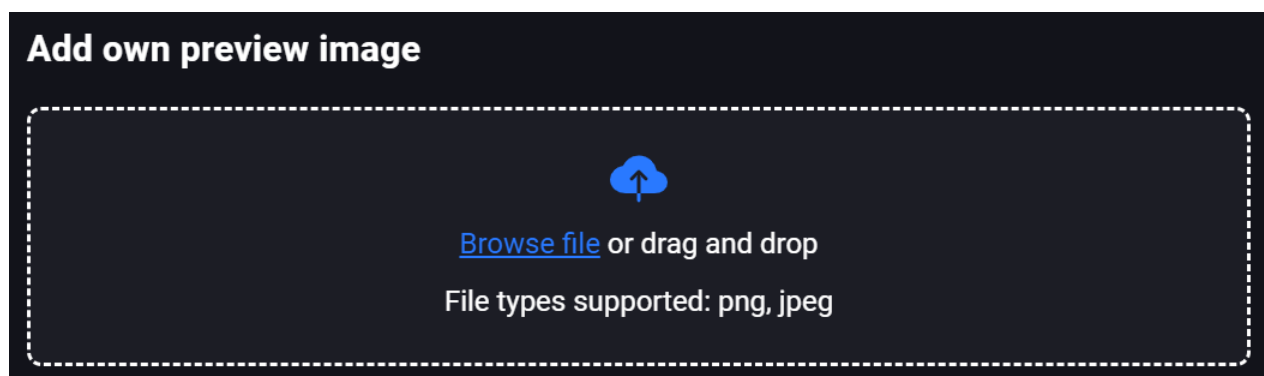
oriented appropriately for the combination of subject's position in the magnet (head or feet first) and the mirror used (single or double mirror).

The Settings -> Displays page allows the operator to control the display of the Preview image described in Section 2.

1. The default Preview image can be removed from the screen by de-selecting the 'Show preview image' check box.



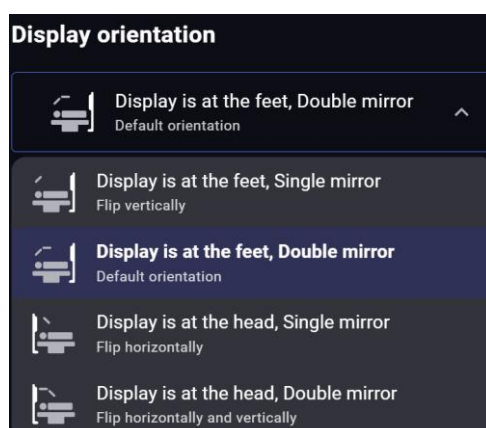
2. The user can upload an image of their own choice by browsing for it or dragging and dropping it into the upload box, then clicking the 'Show preview image' check box.



4.1.4 Display Orientation

The Display Settings tab within nordicAktiva v2.1 provides a software control for changing the orientation of the extended display. For a given combination of patient orientation and mirror type, the display would need to be flipped horizontally, vertically, or both.

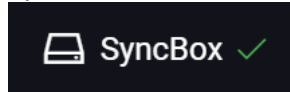
A drop-down selection of options is available, with explanatory icons and text to allow for efficient selection of the most appropriate option.



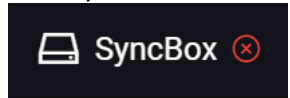
4.2 SyncBox

4.2.1 SyncBox connection status

If a connection to a SyncBox is detected, the hardware toolbar will show a green tick icon on the SyncBox button:



If no SyncBox is detected, the button will show a red cross:

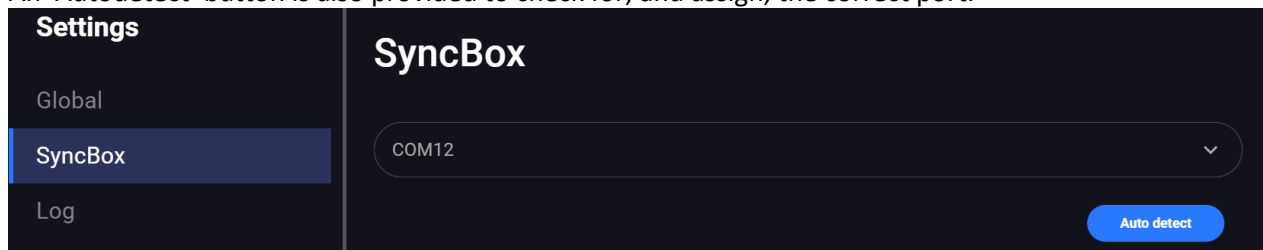


4.2.2 SyncBox Settings

If the status bar unexpectedly shows no connected SyncBox, the button can be clicked to navigate to the Settings -> SyncBox page.

Here the user can see a drop-down menu with all connected COM ports, to allow manual selection of the appropriate port to which the SyncBox is connected.

An 'Autodetect' button is also provided to check for, and assign, the correct port.



4.3 ResponseGrips

4.3.1 ResponseGrips Test

Prior to running an fMRI scan where the subject will be responding to a task using the NNL ResponseGrips, it is important to check the buttons are operational and the subject understands how to use the grips.

Clicking on the ResponseGrips button on the hardware toolbar opens the Settings -> ResponseGrips page.

Clicking 'Play' opens up the communication with the ResponseGrip Interface via the SyncBox, and allows the recording of button presses. All four buttons should be pressed to ensure the correct labels appear in the user interface:

- Left Thumb
- Left Index
- Right Thumb
- Right Index

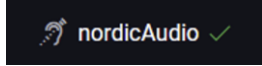
Logs are displayed along with an associated time stamp.

NOTE: Always ensure the 'Stop' button is clicked once the test has been completed.

4.4 Audio

4.4.1 Audio Connection Status

If NordicNeuroLab's nordicAudio system is connected **via USB** to the PC running nordicAktiva, **using the AudioHub v1.2 or later**, the hardware toolbar will show a green tick and the label on the button will show 'nordicAudio'.



When any other headset or AudioHub is connected, **or when the nordicAudio headset is connected via the 35mm audio jack**, the connection status will not show in the hardware toolbar.

4.4.2 Volume and Balance

Controls are available for the adjustment of the volume and balance to the headphones. These controls are directly linked to the Windows audio settings.

Note that adjustment of balance towards one side does not increase the volume on that side. It increases the relative volume by lowering the volume on the other side.

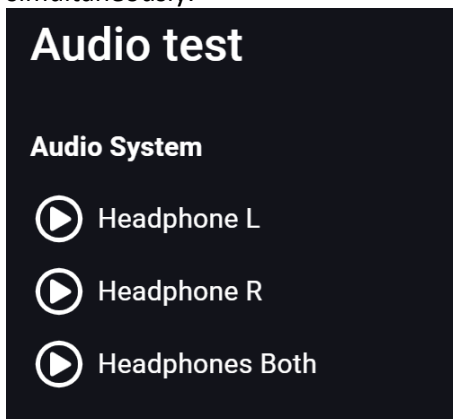
Caution: Exposure to excessive volume for extended periods may cause hearing problems for the subject.

4.4.3 Audio Test

Prior to delivering any auditory stimuli, it is important to obtain the correct balance between the volume levels of the headphone system you are using, and the PC running nordicAktiva.

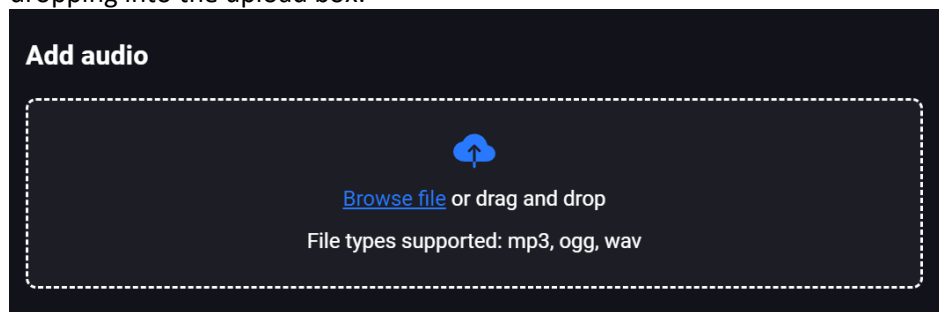
Clicking on the Audio icon in the hardware toolbar will open the Settings -> Audio Test page.

The buttons allow for the transmission of audio to either the left channel, the right channel or both simultaneously.



The included audio files are comprised of a series of low and high tones.

Alternatively, the user can upload their own audio files by browsing their computer, or dragging and dropping into the upload box:



5 Navigating the paradigm library

The nordicAktiva v2.1 paradigm library is located down the left side of the screen, within a 'Paradigm Selector' widget, and is accessed by clicking on the  icon on the top left of the nordicAktiva window. It is split into two main sections: NNL paradigms and User paradigms.

There are four selectable buttons at the top of the paradigm list:

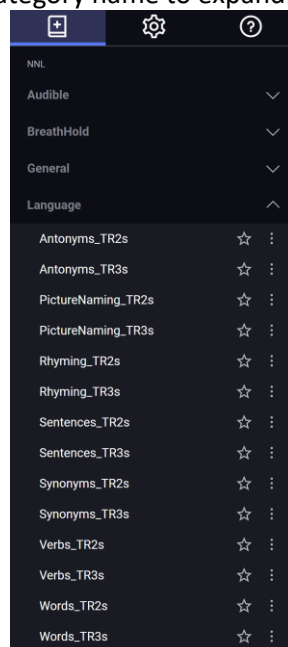
All: This will show all paradigms

NNL: This will show only the paradigms provided within the NNL paradigms installer

User: This will show any duplicated, modified or imported paradigms, as well as those created by the user.

Favorites: This will show paradigms which have been selected as favorites (see below).

Categories of paradigms are displayed on starting the software. To see which paradigms are available within a given category, click on the category name to expand it.



5.1 NNL paradigms

To see all NNL paradigms in the library, click the 'NNL' button at the top of the library. NNL paradigms are those provided by us through the official nordicAktiva Paradigms installer. NNL paradigms cannot be edited.

5.2 User paradigms

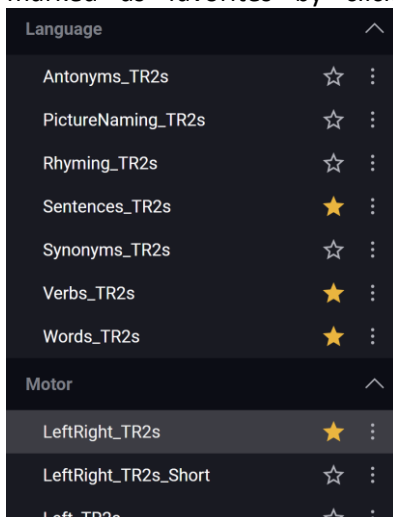
The library has a different section where any other paradigms are located which are not provided via the official nordicAktiva Paradigms installer. These are known as User paradigms, and can include the following:

- Paradigms modified by the User
- Paradigms created by the User
- Paradigms shared by another User and imported into nordicAktiva
- Test or prototype paradigms shared by NNL outside of the official installer

To see only these paradigms in the list, click on the 'User' button at the top of the library.

5.3 Favorites

The nordicAktiva paradigm library allows the user to select a subset of paradigms to be placed into a Favorites menu. If there are a number of paradigms which are most commonly used, these can be marked as favorites by clicking on the star icon to the right of the paradigm name:

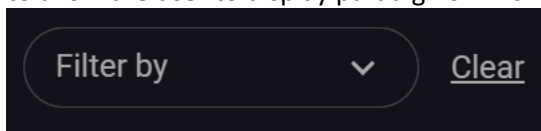


Once clicked, the star becomes orange to indicate the paradigm is a favorite.

By clicking on the 'Favorites' button at the top of the library, the user can simplify the library to show only the selected favorites. This helps to find the required paradigms more easily during an exam. Selected favorites are retained on re-starting the software, so they do not need to be re-selected for each exam.

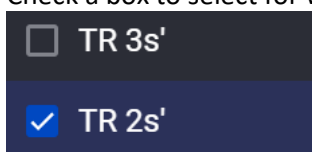
5.4 Filter the library

For the majority of NNL paradigms, more than one TR option is provided. A 'Filter by' menu is provided to allow the user to display paradigms which use a specific TR.



If a newly created, modified or imported paradigm has a different TR from any which are already in the library, this TR will then show as an option in the 'Filter by' menu.

Check a box to select for which TR you would like to display the available paradigms.



5.5 Search the library

Using the Search bar near the top of the Paradigm Selector widget, the library can be searched by keyword.

NOTE: The keyword does not have to be part of the paradigm name. The search also includes the paradigm description.

6 Selecting and running a paradigm

6.1 Selecting a paradigm from the library

Once a paradigm of interest has been identified within the library, click on the paradigm name to select it.

When a paradigm is selected, information about that paradigm is displayed in the main part of the nordicAktiva window, via the Paradigm Display widget. The displayed details include:

- Paradigm name
- Parameters:
 - Volumes: The number of whole brain volumes/measurements to be acquired during the BOLD scan
 - TR: The required Repetition Time for the BOLD sequence
 - Paradigm runtime: The total duration of the paradigm calculated based on the TR * volumes. NOTE that a corresponding MR sequence may run for slightly longer due to dummy scans acquired prior to the synchronization pulse.
 - Language: Language in which the presented text in slides, description and instructions will be displayed (if text)
 - Version: The display hardware for which the appropriate paradigm should be shown. See section 3.1.2 for further details on the available options.
- Description: This section shows the main details of the paradigm to the operator, such as the block design, and an overall idea of the content.
- Instructions: This section provides text which helps the user to know how to instruct the patient about what they will experience, and what they should do, during the paradigm.

NOTE: Preparation of an individual subject should in most cases involve an assessment of the capabilities of the subject and rehearsal with live feedback to the operator, however these instructions provide a useful reminder to prompt the operator in how to conduct the preparation for the given task.

- Sample images: NNL paradigms for standard mapping of eloquent areas come with sample images. These are examples of activation maps produced using the selected paradigm. They should be treated ONLY as examples to guide a novice user during image acquisition.

NOTE: All subjects are different, particularly where pathology is present. Sample images should not be used as a benchmark or comparison with acquired fMRI results.

6.2 Paradigm Preview

During patient preparation, or whilst testing or training, it will be necessary to view a paradigm without relying on the connected hardware. For this purpose, a 'Preview' option is provided, whereby the paradigm can be viewed without a synchronization pulse being detected.

There are two types of Preview available:

- 'Preview without SyncBox' should be used for simply viewing the paradigm. Here the software generates dummy trigger pulses internally which are recorded in the user interface and in the log file (if the user chooses to save this) as though they were real triggers.

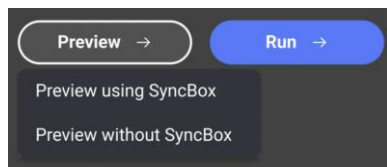
- ‘Preview using SyncBox’ can be used to test the triggering of the paradigm using the SyncBox. In this mode, the SyncBox is programmed to internally generate trigger pulses, as though passing them to the PC from the scanner.

There are a few reasons for using the ‘Preview using SyncBox’ option:

- To test the triggering of paradigm slides without relying on the use of the MRI scanner.
- To activate the ResponseGrips during a preview session, allowing the subject to rehearse their responses, and allowing the operator to visualize the responses on screen, without the use of the scanner.
- To ensure the SyncBox is displaying the correct number of volumes and/or slices for the given paradigm according to the scanner settings (see Section 3.3).

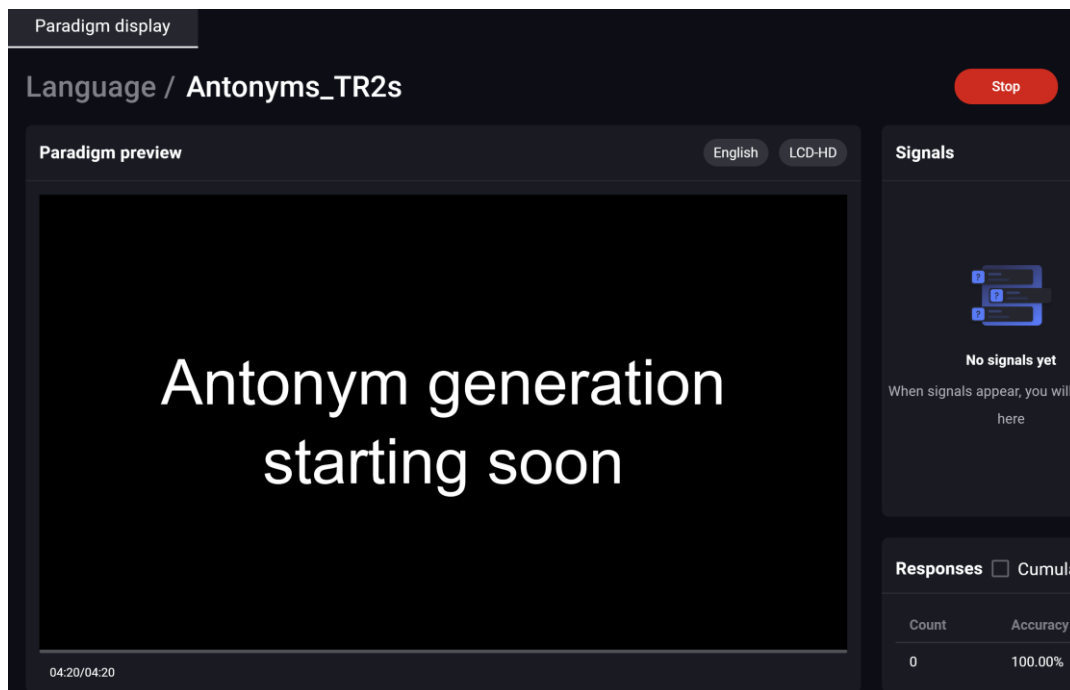
NOTE: The synchronization pulses generated internally by the SyncBox should not be used to judge the accuracy of the stimulus presentation timings. Measurements of the timing accuracy of a paradigm, if required, should only be made when using the scanner as a trigger source.

To start a preview session, click on the Preview button at the top right of the screen. Both modes (Preview without SyncBox or Preview using SyncBox) are then listed, and the desired mode should be selected to proceed.



Note: If no SyncBox is connected, the ‘Preview Using SyncBox’ option will be disabled.

Selection of the desired Preview mode takes you to the Preview window, from where the paradigm will start to play.



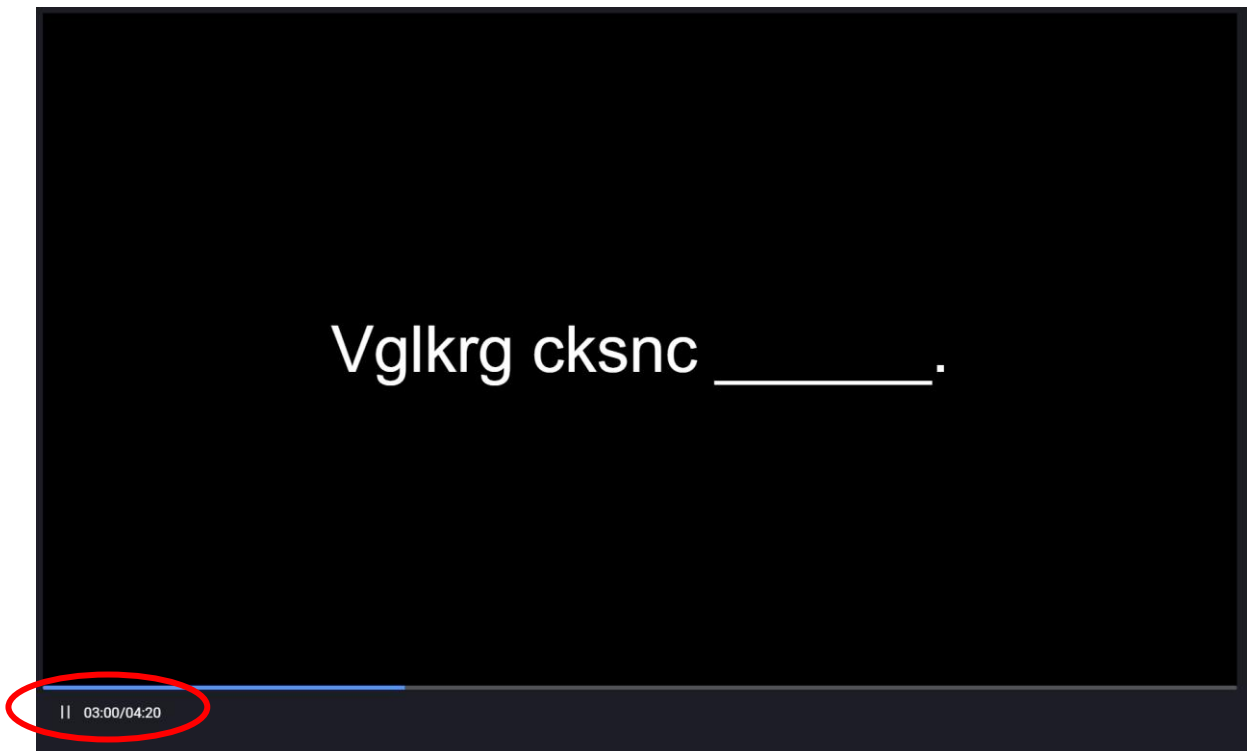
A ‘Start’ slide will be displayed for a few seconds (e.g., a ‘Starting soon’ message, in the case of NNL paradigms), then the paradigm will proceed to run automatically.

Whilst the paradigm is running, a log of software generated (or SyncBox generated, if using 'Preview using SyncBox' mode) synchronization pulses is displayed on the right side of the window:

Logs	
Pulse	Time
Sync	14.0
Sync	12.0
Sync	10.0
Sync	8.0
Sync	6.0
Sync	4.0
Sync	2.0

During a Preview session, a countdown of the remaining time is visible under the slide window. A blue progress bar shows how far through the paradigm is at that moment.

It is possible to pause the paradigm by clicking on the Pause icon, and resume it by clicking the play icon (see below). This can be helpful when explaining a specific slide to a subject and allowing them to rehearse their response.



NOTE: Responses given via the ResponseGrips can only be detected when using 'Preview using SyncBox' mode.

6.3 Run paradigm

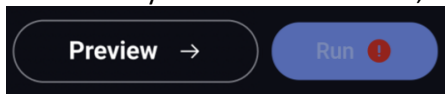
6.3.1 Preparation

Once a paradigm has been selected from the library and the details are visible in the Paradigm Display widget, a 'Run' button will be visible next to the Preview button, on the top right of the screen:



When conducting an fMRI exam, the 'Run' option should be used to synchronize the stimulus presentation with the MR image acquisition.

NOTE: If a SyncBox is not detected, the Run button will not be active, and will appear greyed out:



A warning indicator is present if either the SyncBox or an external display are not detected. It is still possible to use 'Run' without an external display (e.g., in the case that visual stimuli are not required), but it is not possible to enter this screen without a connected SyncBox.

6.3.2 Exam ID

Next to the 'Run' button is a field in which an Exam ID could be entered. This is useful for experiments where it may be necessary to save responses given via ResponseGrips, and associate those back to the specific scan. The Exam ID then gets saved into a log file and included in the log file name.

NOTE: Entering patient sensitive information into this field should be avoided.

If left blank, the Exam ID will be 'Anonymous'.

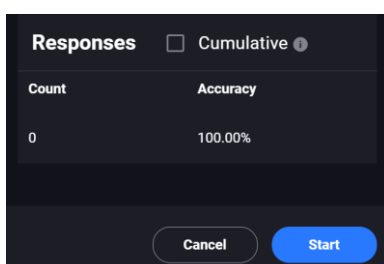
6.3.3 The 'Run' Screen

The 'Run' screen is much the same as the 'Preview' screen. There are two main differences:

1. When the user clicks 'Run' to begin a paradigm, the 'Starting soon' slide (in the case of NNL paradigms) will remain on the screen until the synchronization pulse is received.
2. There is no option to pause and resume the paradigm, as this would result in a loss of synchronization with the MRI scanner.

6.4 Response accuracy

Whilst running a paradigm in synchrony with the MRI scanner, or while running in 'Preview using SyncBox' mode, an on-screen indicator of the count of responses and the accuracy of responses is given on the bottom right of the Preview screen:



The number of button presses of the ResponseGrips will be displayed on the left, under the 'Count' label.

The accuracy of response is calculated based on expected responses programmed in to the paradigm slides. For more details about programming expected responses, see Section 8.7.

There are two options for how the accuracy is calculated:

1. By default, each slide with a programmed expected response will be 'correct' (100% accurate) or 'incorrect' (0% accurate). The overall accuracy during the paradigm will be a measure of the average accuracy of all slides which have an expected response.

Example:

Slide 1 has expected response 'Left Thumb'. No count has been specified, so the default of 1 is used. If the subject presses the left thumb button once during this slide, they will score 100% for that slide. If they do not, they will score 0%.

Slide 4 has expected response 'Right Index' with a count of 3. If the subject presses the right index button three times, they will score 100% for that slide. If they press an incorrect button, or press the right index button an incorrect number of times, they will score 0% for that slide.

2. Cumulative method: By ticking the box 'Cumulative', this gives a 'per click' accuracy. The overall accuracy is then calculated as an average of the accuracy of all individual button presses. (Note: If slides only ever expect 1 button press, this will be the same as option 1).

Example:

Slide 1 has an expected response 'Left Thumb' with count set to 0 (=unlimited button presses are allowed). The subject presses the left thumb button twice, and they score 100% for that slide.

Slide 3 has an expected response 'Right Thumb' with count 2. If the subject presses the right thumb button once only, they will score 50% for that slide. The percentage accuracy will then be:

$$(\text{Total button presses} / \text{Total expected button presses}) * 100 = (3/4) * 100 = 75\%$$

NOTE: The accuracy is not recorded in the log file. It is simply a guide to the subject's performance, to be used as an indicator of compliance during the scan. Due to the many ways in which accuracy of response can be calculated, the user is responsible for making their own calculation of accuracy if needed after the scan, using the log file.

7 Saving Results

7.1 Log files

During each paradigm run, a log of events is created and stored as a tab delimited text file in a folder on the PC. Section 3.2 gives full details about the information which can be stored, and where to find the location of the stored log files.

These log files are automatically saved each time a paradigm is run in synchronization with the MRI scanner, e.g., by choosing the 'Run' option after selecting the paradigm.

During a paradigm preview session, the saving of logs is optional, and the preference for this can be set in the Settings -> Logs screen, as described in section 3.2.

The names of the log files are unique, for the purposes of traceability, and have the following format: ParadigmCategory_ParadigmName_ExamID_Date_Time

When a paradigm run finishes, if a log file is to be saved, a dialog box pops up allowing the user to enter any comment they might wish to record:

Do you want leave a comment?

You can leave a comment here or skip this step

Comments

Enter text here

Skip Confirm

This can be useful as a record of whether the patient complied with the task, or if significant motion was noted, or the scan was aborted, etc. This comment is also saved into the log file.

Type a comment and click 'Confirm', or simply 'Skip' if a comment is not needed.

The content of log files appears as follows:

```
Version:      nordicAktiva 2.0.0
Date:        7/3/2023
Time:       9:58:25 AM

ExamId: Anonymous

Settings:
Paradigm:      Language-TR2s AntonymGeneration
Volumes:      130
TR:           2000

Language:     English
Version:      LCD-HD

Comment:
This subject reported successful completion of the task.

Slide  Label  Code  Condition  Time  Duration  ReqDur
-----
1  Slide  Start  0          -7018  7018     Next
2  Slide  R1      0          0      4002     4000
1  Sync   s        0          0
2  Sync   s        2000
3  Sync   s        4000
3  Slide  R2      0          4002  4001     4000
3  Sync   s        6000
4  Sync   s        8000
4  Slide  R3      0          8003  4000     4000
4  Sync   s        10000
5  Sync   s        12000
5  Slide  R4      0          12003  4000     4000
5  Sync   s        14100
6  Slide  R5      0          16003  4001     4000
6  Sync   s        16100
6  Sync   s        18100
7  Slide  AG4     1          20004  4000     4000
7  Sync   s        20100
7  Sync   s        22100
8  Slide  AG2     1          24004  4000     4000
8  Sync   s        24100
8  Sync   s        26100
9  Slide  AG3     1          28004  4001     4000
9  Sync   s        28100
```

7.2 Design files

Design files describe the details of the paradigm design and are used by nordicBrainEx post processing software during analysis of BOLD fMRI data.

A design file is created each time a paradigm is played using the 'Run' option, e.g., in synchronization with the scanner. This means the user will have an exact record of the active and baseline condition trials and/or blocks in order to correctly instruct the analysis.

The design files are saved into the same folder as the log files (see Section 7.1), in a text file format with extension '.des'. They can be viewed in any regular text editor.

To ensure the names of design files are unique, they have the following filename format: ParadigmCategory_ParadigmName_ExamID_Date_Time

Design files should be transferred to post processing workstations manually, for example by saving onto a USB flash drive, or into an accessible networked folder.

Note that there is one circumstance for which a design file will not be created when using 'Run' mode. This can occur if an XML format paradigm from nordicAktiva 1.3.1 or earlier is imported, and the main file does not contain any default BOLD Settings.

7.2.1 Header information

Design files from nordicAktiva contain the following header information:

- Version of nordicAktiva
- Time and date
- Exam ID
- Paradigm name and settings

7.2.2 Pre-processing settings

Design files from nordicAktiva contain the following pre-processing settings which nordicBrainEx uses by default to process the associated BOLD data series:

- Pre-processing on/off
- GLM analysis on/off
- Slice timing correction
- Motion correction
- Gaussian smoothing (with the option to add dimensions for the smoothing kernel)
- Temporal smoothing (with the option to add a cut-off frequency)

A default set of pre-processing parameters is defined within the NNL paradigm code, but the settings are then fully customizable prior to commencing processing in nordicBrainEx. For full details see Section 4 of the nordicBrainEx BOLD Tutorial available here: <https://www.nordicneurolab.com/help-all/nordicbrainex>.

Pre-processing parameters can be found and edited for user paradigms via the JSON file (see Section 8.8).

7.2.3 Contrasts

For the analysis of fMRI data, it is necessary to define a contrast, which states which conditions should be compared to look for an increased signal in response to a task.

Contrasts for the NNL paradigms are pre-defined in the paradigm code, and for user paradigms can be edited through the JSON file (see Section 8.8). It is also possible to freely set the contrasts prior to analysis in nordicBrainEx.

For further information about how contrasts are defined, see Section 4.4 of the nordicBrainEx BOLD Tutorial, available here: <https://www.nordicneurolab.com/help-all/nordicbrainex>

7.2.4 Paradigm design

An example of the format of the paradigm design within the design file is shown below:

```
<Design inSeconds="true">
1  20.004  20.002  1
1  60.008  20.001  1
1  100.011 20.001  1
1  140.013 20.002  1
1  180.016 20.001  1
1  220.018 20.002  1
</Design>
```

The first statement instructs nordicBrainEx to specify the design in seconds, rather than volumes/measurements.

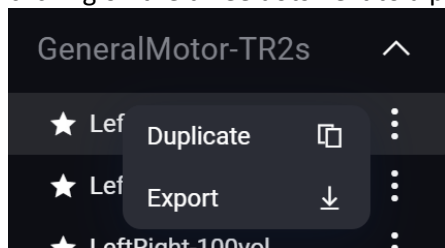
Next, there is a list detailing the onset times and durations of all active condition blocks/trials, and the associated amplitudes of each (in the above case there are 6 x 20 second active condition blocks, all with amplitude of 1).

8 Creation and modification of paradigms

NOTE: For any paradigms which have been imported, created, or modified, it is essential that a full preview and test is conducted before using the paradigm for an fMRI exam, to confirm the content, timings and functionality are as intended.

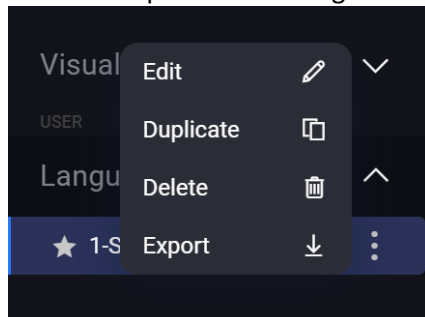
8.1 Duplicating an NNL paradigm

Paradigms provided via the nordicAktiva Paradigms installer are not directly modifiable. To facilitate easy modifications to paradigms, it is possible to make a copy of a paradigm from the NNL library by clicking on the three dots next to a paradigm name and selecting 'Duplicate'.



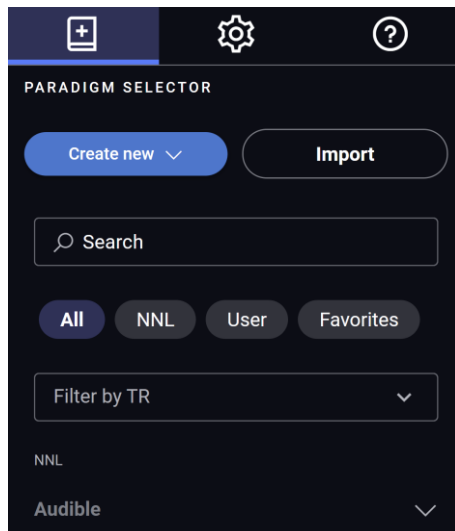
This moves a direct copy of this paradigm into the User library, allowing it to be modified.

This process also causes the Paradigm Builder widget to open ready for editing. Alternatively, for a paradigm in the User library, clicking on the three dots to the right of the paradigm name and clicking 'Edit' also opens the Paradigm Builder.

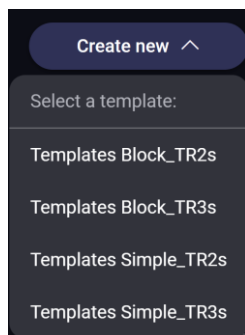


8.2 Creating a new paradigm

First click 'Create New' at the top left of the Paradigm Selector widget:



This activates a drop-down list of possible templates for your new paradigm. The options are as shown:



Either a 'Simple' or 'Block' design can be selected.

- 'Simple': This provides the framework for a paradigm with a single trial. It can be used if a conventional block design is not appropriate.
- 'Block': The block design templates provide a structure of 13 blocks, alternating between 'Active' and 'Baseline', and starting with a 'Baseline' block. Each block in the template contains a single trial, and each trial contains one blank slide.

Two TR options are given for the templates: 2 seconds, or 3 seconds.

All trials, slides, timings and other settings are fully editable.

Initially a pop-up window asks for some basic information:

Create new paradigm

Name ⓘ

Category

TR (Repetition time) ⓘ

Volumes ⓘ

Average block length ⓘ

HW version ⓘ

Language ⓘ

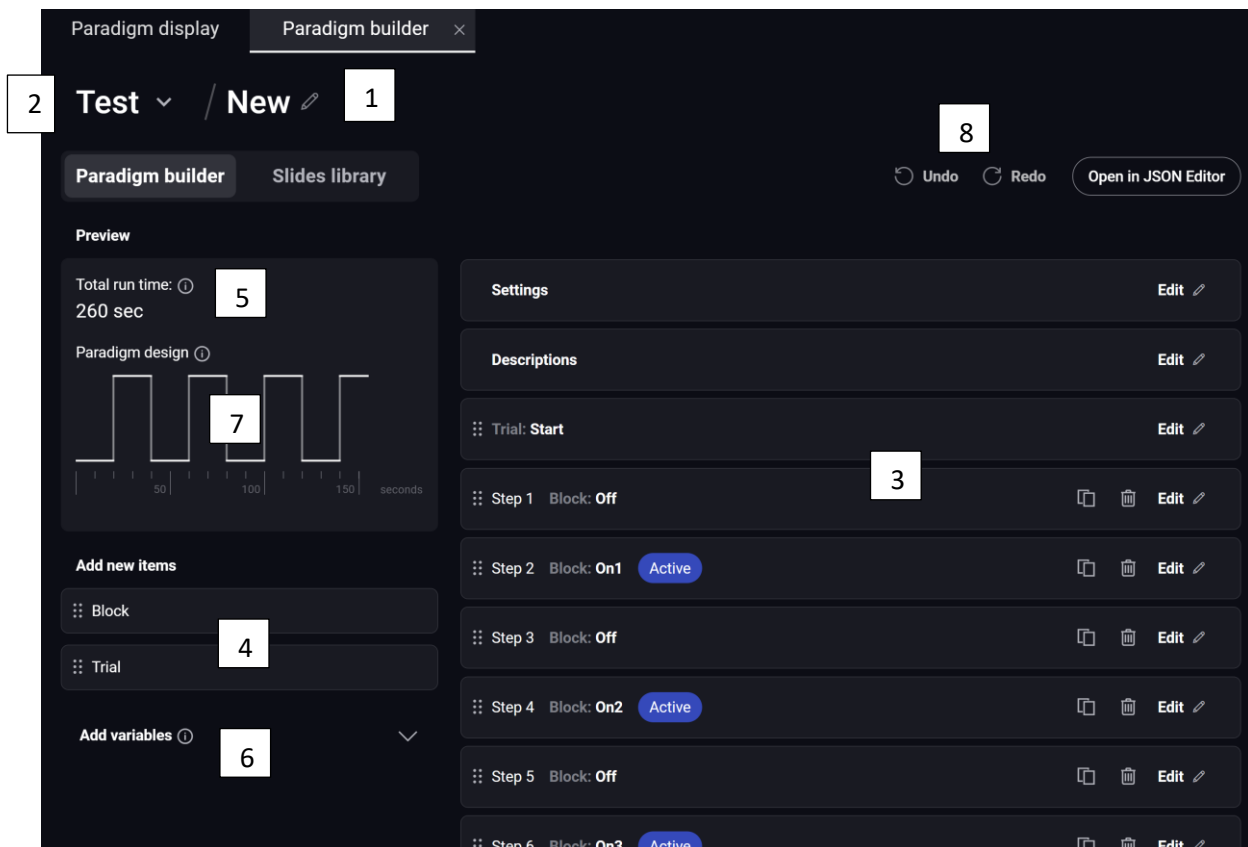
Cancel Confirm

The Hardware Version should be set according to the type of patient display you are using (see Section 3.1.2 for information about the display resolution of the four available Hardware Versions, to determine which is most appropriate). Depending on how many languages you would like for the paradigm slides, those can be selected from a menu. For each language, a separate set of blank slides will be created, allowing to add language-specific content.

Clicking 'Confirm' opens the Paradigm Builder with the created template.

8.3 Paradigm Builder overview

The Paradigm Builder widget contains two tabs – the Paradigm Builder tab, and the Slides Library. The Paradigm Builder tab contains all information about the settings and timings of the paradigm. It is comprised of a number of steps which can be moved and modified. Here you can see a newly created paradigm as visualized in the Paradigm Builder:



The labelled components are as follows:

1. **Name of the paradigm**, which can also be edited in the 'Add Settings' step
2. **The Category** (drop down menu in the library) in which you want to place the paradigm, for example 'Language' or 'Motor'.
3. **The Session**. This is a list of steps which make up the paradigm.
Settings and Descriptions (described in more detail below) are included in the steps, followed by trials and blocks in the order they should be executed. It has the following features:
 - Each step can be edited by clicking on the 'Edit' button to the right of the banner for that step.
 - Trials and Blocks can be used here. They can be dragged up and down the list to change the order, or added by dragging and dropping blank ones from the left side, to any position within the session.
 - Any trial or block assigned with an Active condition (not = 0) will be highlighted in blue, for ease of visualization.
 - Trials can be used in isolation, without needing to be inserted into a block. If trials are needed inside a block, first a block should be added, then edited, and the trials added inside as shown in Section 8.6.
4. **Blank trials and blocks** which can be added to the list of steps by dragging and dropping them into the dashed box at the top.
5. **The current calculated total run time** of the paradigm, in seconds. This is calculated using **TR * number of volumes**, and is independent of the amount or timings of content inside the blocks and trials.
6. **Definition of variables**. Here a variable would be any value which is used multiple times during the paradigm. For example, if a fixation cross is always shown for 5 seconds, a variable 'CrossTime' could be defined with a value of 5000, and whenever the duration of the fixation cross is specified within the paradigm, the word CrossTime can be inserted instead of the

value 5000. This means if the user wants to change the time for which the fixation cross is shown, they can simply edit the variable CrossTime. They do not have to step through and manually change the number at every point where it is used.

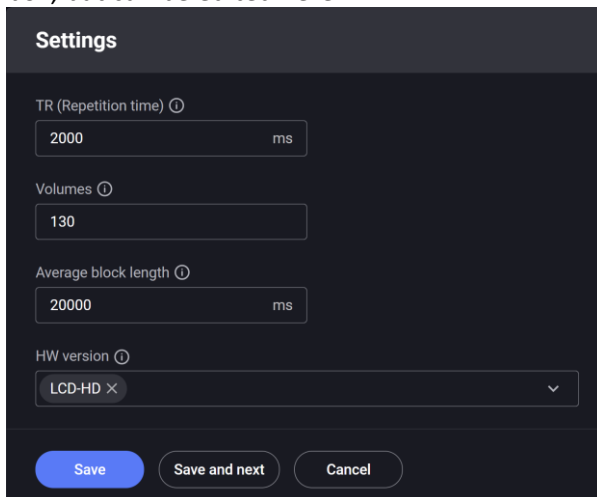
7. **Paradigm design graphic.** This is a depiction of active and rest blocks/trials, calculated from the durations of all trials (either stand-alone or inside blocks) in their specified order in the session.

Once a paradigm has been built, it is advisable to check that the duration within the Paradigm Design graphic matches the Total run time (5) to ensure the paradigm has the correct amount of content for its proposed run time.

8. **Undo and Redo changes.**

8.4 Editing Settings

Step 1 of the paradigm is the Settings. When the Paradigm Builder first opens, the Settings will be shown in an expanded view. The Settings reflect the information entered in the 'Create New' dialog box, but can be edited here:



The fields are defined as follows:

TR: The Repetition Time, in milliseconds, of the MR sequence.

Volumes: The total number of EPI volumes/measurements/dynamics needed for the acquisition.

Average block length: This should be an approximation of the average duration of all blocks in the paradigm, in milliseconds. If a paradigm is made up only of trials, it can be the average of all trial durations. This is used for SyncBox communication in the case where the scanner settings are set to 'Triggers on every block'.

HW version: A drop down list of the NNL provided hardware versions is given, and the user can choose how many versions they wish to have available. For more information about the provided versions, please see Section 3.1.2.

Once the required edits have been made, click 'Save' to save the step, or 'Save and next' to save, automatically collapse the step and expand the next step.

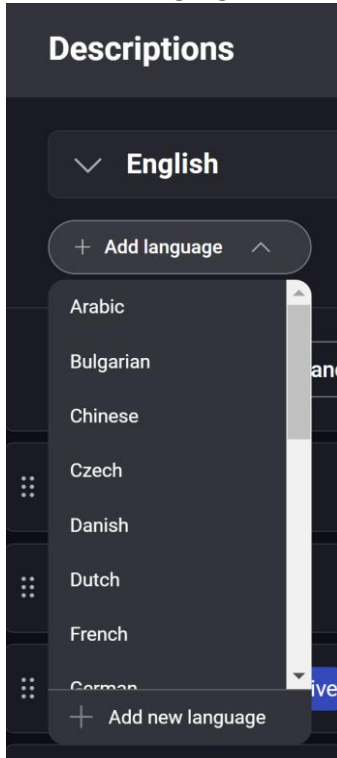
8.5 Editing Descriptions and adding languages

The 'Descriptions' step shows a list of the available languages for that paradigm.

If a copy of an NNL paradigm is being used as a basis for making a new paradigm, it is advisable to delete any languages for which the new paradigm will not apply, to avoid confusion and minimize the risk that another user may assume the newly edited slides have been translated.

For each language there are fields for the '**Description**', which gives an overview of the paradigm and timings, and '**Instructions**', which is a reminder of how to train the patient in the task. These will later appear in the Paradigm Display widget when selecting the paradigm from the library.

Additional languages can be added using the 'Add language' button:



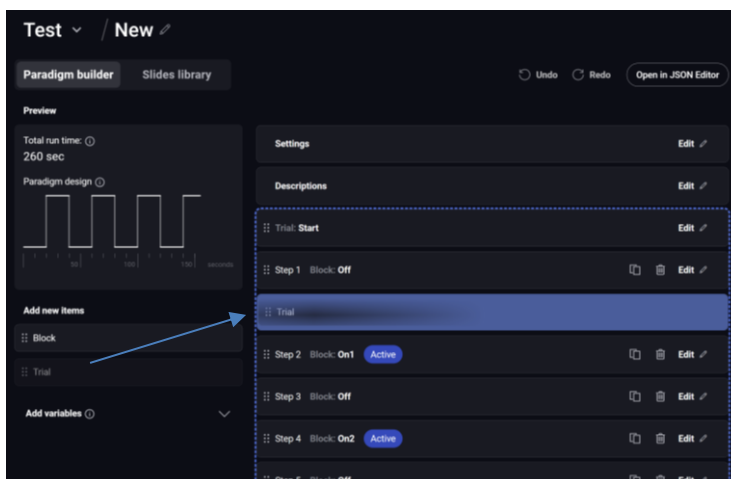
A language can be selected from a list of languages which are available for other paradigms in the library. Alternatively, the 'Add new language' option at the bottom of the drop-down list can be used to type in any name for a new language which is not yet available. This language will then appear in the list and can be selected. Once a language is selected, blank description and instruction fields are provided.

8.6 Editing Trials and Blocks

8.6.1 Trials

A 'Trial' is a set of one or more slides, containing content (images, text, video, audio), each of which has a user-defined duration. Trials can be used on their own within the paradigm session, or they can be inserted into blocks, if a block design is preferred.

A trial can be added to the paradigm session by dragging the 'Trial' element from the left side of the screen to any position within the session:



A regular stand-alone trial step which has been opened for editing has the following components:

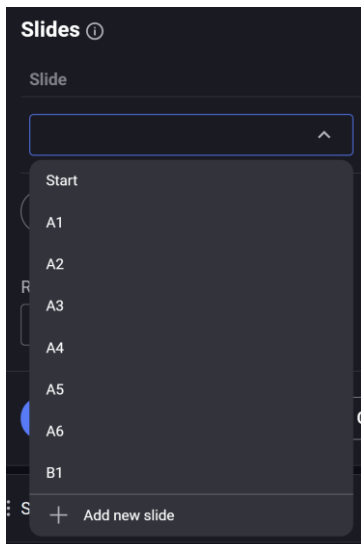
The screenshot shows a dark-themed interface for editing a trial step. At the top, it says 'Step 2' with a list icon. Below that is the trial name 'Trial: Untitled' with a pencil icon for editing. To the right of the name are icons for copying and deleting. The main section is titled 'Condition' with an information icon. It has two radio buttons: 'Baseline' (selected) and 'Active'. The 'Active' option has a text input field containing the number '0'. Below this is the 'Slides' section with an information icon. It features a table with two columns: 'Slide' and 'Duration (ms)'. The 'Slide' column has a dropdown menu with the text 'Select slide (optional)' and a downward arrow. The 'Duration (ms)' column has a text input field and a delete icon. Below the table is a button labeled '+ Add slide'. At the bottom of the main section is a 'Register key' label with an information icon and a text input field. At the very bottom are three buttons: 'Save' (highlighted in blue), 'Save and next', and 'Cancel'.

Name: Every trial requires a name. It is advisable to make this as descriptive as possible. By default, a new trial will have the name 'Untitled', but this should be edited by clicking on the pencil icon and typing a new name into the text box provided.

Actions: It is possible to directly copy a trial within a session, or delete a trial, using the icons on the top right of the name bar.

Condition: Each Trial should have a specified Condition. If a Baseline condition is selected, it will be assigned a value of 0. If 'Active' is selected, a number should be assigned. The default number is 1, but if there are multiple active conditions, the text box should be used to set a number for each one. This is to ensure the different active conditions can be distinguished in the log and design files. It is also used as an input for the design graph (see section 8.3 for details).

Slide: Here a slide from the Slide Library can be selected from the drop-down menu. If a new slide is required, the 'Add new slide' option should be used, which opens the slide editor (see Section 8.7).



Once the new slide has been saved, it will be automatically added to the trial.

Duration: This sets the duration for the slide which has just been selected.

Add slide: If more than one slide is required in a trial, further slides can be added using this button.

Register key: This gives the option to wait for a specified key. Entering 's' will mean that on receipt of the next synchronization pulse, the paradigm will proceed to the next step. The keys 'a', 'b', 'c' and 'd' can also be specified to correspond to the following response buttons:

'a' = Left Thumb

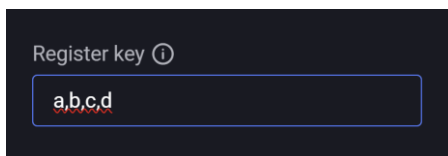
'b' = Left Index

'c' = Right Index

'd' = Right Thumb

This functionality also gives one way for the subject to respond with a decision, based on a specific slide. Currently, it can only be used as a way to progress to the next slide - it cannot currently be used to conditionally alter the flow of slides depending on the response.

If the subject is being instructed to press more than one button, multiple keys can be registered for a trial by listing the keys separated by a comma. For example, if the subject is responding to a prompt such as 'Press any button to continue', the registered keys for all four ResponseGrip buttons should be as follows:



Note: A trial inside a block will contain the same options but should be added by clicking on  inside the block.

Save options: Clicking 'Save' will save the trial, and clicking 'Save and next' will save the trial, collapse the expanded trial, and expand the next step for editing. Clicking 'Cancel' will exit the expanded trial without saving the changes.

8.6.2 Blocks

When a block is opened for editing, the following properties are seen:

Step 4

Block: Off 

Condition 

☒ Baseline

☐ Active

Trials

▼ B1	 Delete
▼ A1	 Delete
▼ A2	 Delete

+ Add trial  

Order 

☒ Consistent ☐ Random

Repetitions Optional 

Save Save and next Cancel

Name: Each block should have an explanatory name, so that the blocks are identifiable from the collapsed view. When a new block is added to a session by dragging from the 'Add new items' list into the session, it will be given the name 'Untitled' by default. It is recommended that the name is changed to something meaningful, which can be done using the pencil icon next to the block name:



Actions: It is possible to directly copy a block within a session, or delete a block, using the icons on the top right of the name bar.

Condition: Similarly to specifying a condition within a separate trial, a block can have one specified condition, either Baseline (assigned a value of 0) or Active (assigned a value of 1 by default, but this can be changed). If different trials need to have different conditions, they cannot be grouped into a single block. Instead, they should be listed as separate trials within the session.

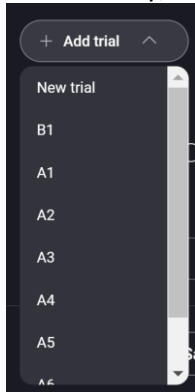
The purpose of assigning a condition is that the different active conditions can be distinguished in the log and design files. It is also used as an input for the design graph (see section 8.3 for details).

Trials: Here is a collapsed list of the trials included in the block. A block must have at least one trial. Use the down arrow to expand each trial and edit the content. See section 8.6.1 for details of the options for a trial.

Repetitions: A sequence of trials within a block can be repeated. The number of repetitions required can be entered in the text box. A value of 1 means the content will be shown once.

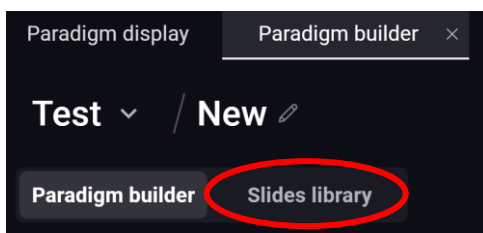
Order: A set of trials can be displayed either in Consistent order (in the order they appear listed), or in a random order. Only trials within a block can be randomized.

Add trial: Within a block, new trials are not added by dragging and dropping them from the 'Add new item' list. Instead, they are added to a block by clicking the 'Add trial' button. This activates a drop-down list of existing trials, making it easy to add a trial which has already been used elsewhere. Alternatively, the 'New trial' option adds a new blank trial.

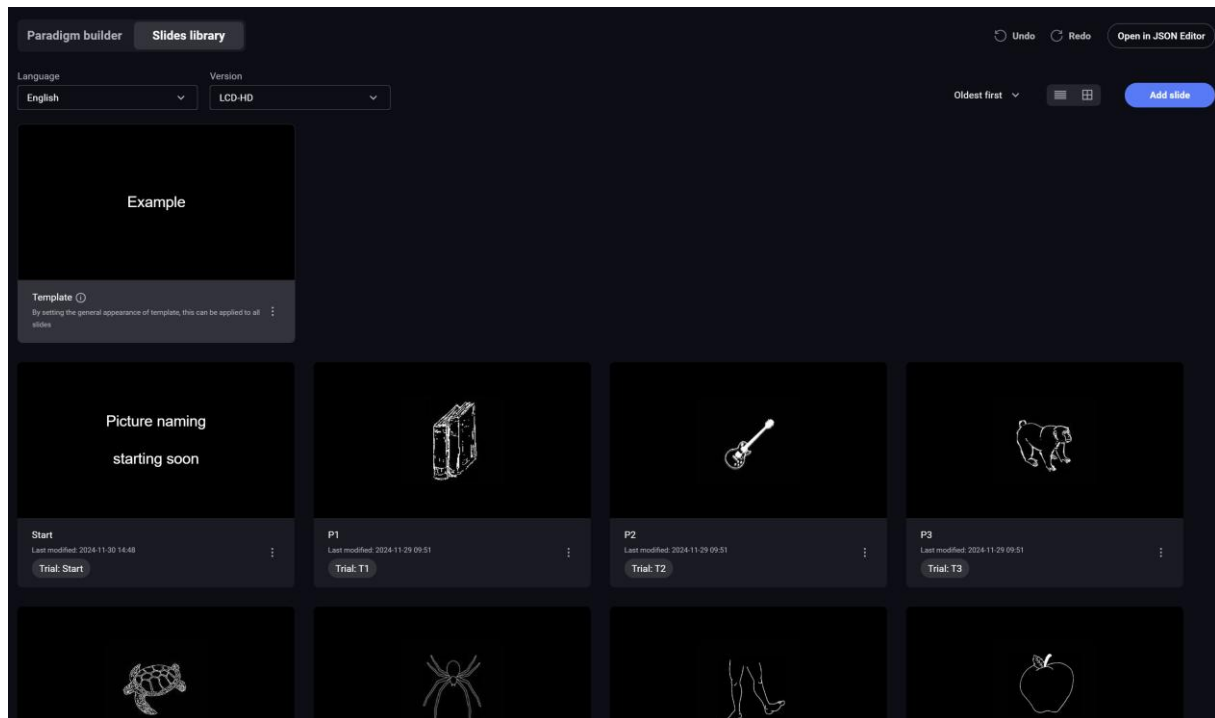


8.7 Slides

To view the available slides within a paradigm, click on the Slides Library tab underneath the paradigm name:

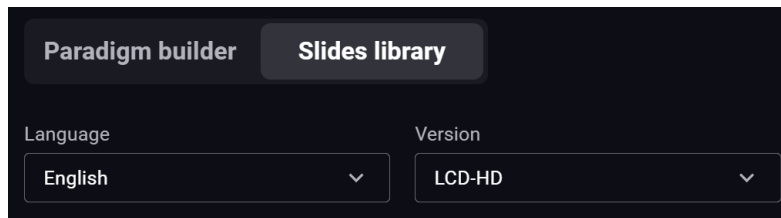


The Slides Library shows all available slides, either in a thumbnail / table view  or a list view .



Note: It may be helpful to shrink the content on the screen to allow more slides to be visualized at any one time. This can be done using 'Ctrl –' on the keyboard. To reverse the change, use 'Ctrl Shift +'.

Slides are shown only for the Language and Version specified at the top of the page:

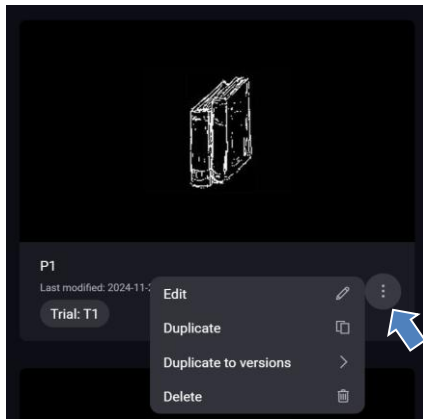


If multiple languages/HW versions exist, there will be multiple sets of the **same** slides with the **same** names. This means slides can be added to trials, without the need to specify which language/version of the slide is required. When the language/version is specified in the main Paradigm Display screen before running a paradigm, the correct language/version-specific set of slides is called.

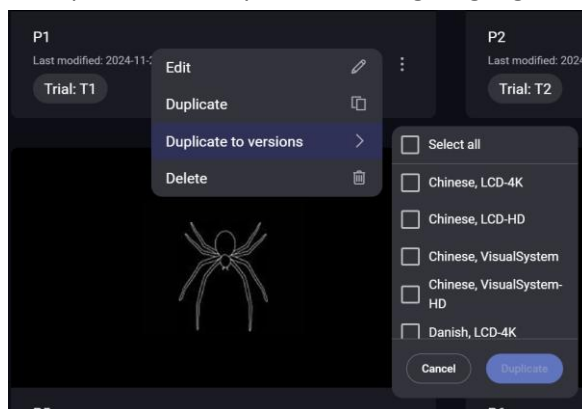
To view or edit slides for a given language and/or version, first select these from the drop-down lists.

The slides library defaults to the tile view. Here some basic information about each slide is shown, including the name, last modified date and time, and an icon indicating in which trial/s the slide is currently used. If there is no 'Trial' icon, the slide is currently unused.

The 'Add slide' button on the top right of the slides library screen can be used to add a new slide. The options for existing slides are activated by clicking on the three dots icon at the bottom right of the tile:



- **Edit:** This opens the slide for editing
- **Duplicate:** For more complex slides, it may be easier to duplicate an existing slide and edit it, than to add blank slides. If a slide is duplicated, a pop-up window appears asking for a name for the duplicate slide, to ensure every slide has a unique name.
- **Duplicate to versions:** If more than one language or HW version of the paradigm exists, creating multiple sets of slides is complex and time consuming. When a new slide is added, it is possible to duplicate it to any other existing languages/versions using the check boxes provided.



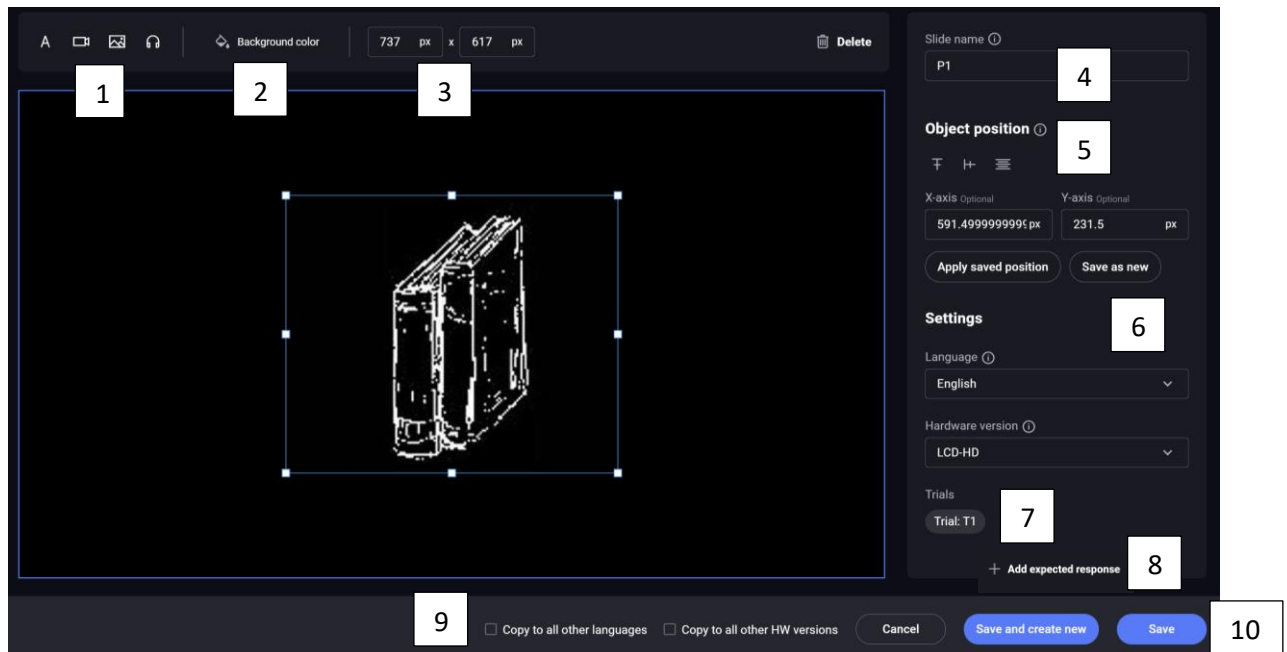
Note that if a slide is duplicated to another language or HW version, it may be necessary to translate text, and change the size of content by viewing and editing the slides in that language/version. Fonts and colors can be quickly changed for the entire set of slides using the Template slide (see Section 8.7.2).

- **Delete:** This is used to delete any slide. Be aware that deleting a slide will delete all instances of slides with that name. If multiple languages/versions exist, be sure that the slide is not required before deleting.

8.7.1 Editing slide content

Slides can contain text, images, audio files and video files, or combinations of those elements.

Once the slide editor is open, various options are available:



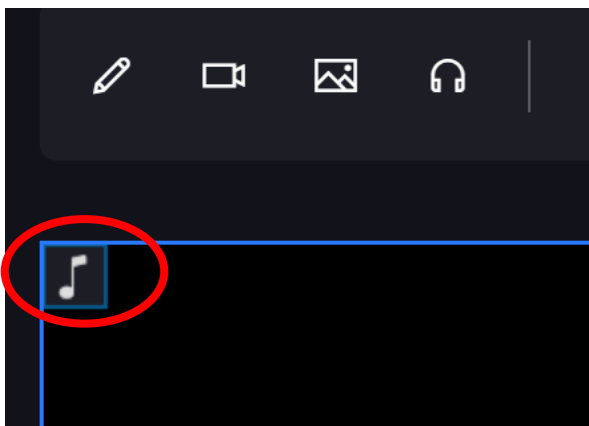
1. On the top left are buttons allowing content to be added:

-  Insert new text box
-  Import video file
-  Import image
-  Import audio file

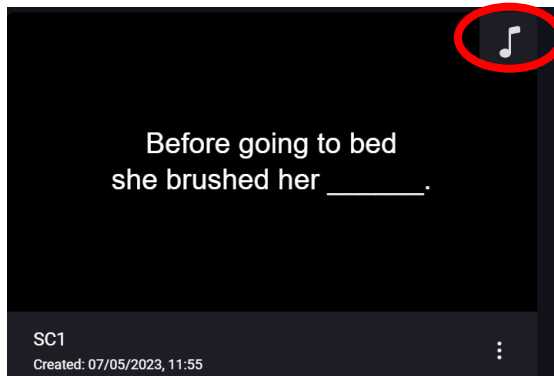
Supported media file formats are as follows:

Images	JPEG, BMP, PNG
Videos	MP4, WebM, Ogg Theora
Audio files	MP3, AAC, Ogg Vorbis

If a slide contains a video or audio file, it will be marked with the relevant icon both in the slide editing screen:



and in the tile view:

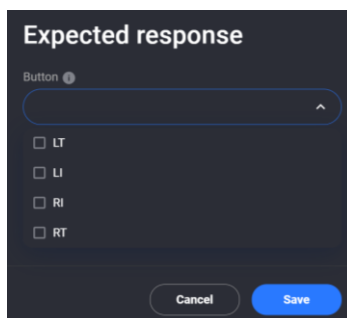


A note about large media files: Very large videos (>500MB) cannot be added to slides automatically via the slide editor. When an attempt is made to add a large video and save the slide, a pop-up window will appear. This provides instructions for saving the video into a specific paradigm folder, before adding and saving again within the slide editor.

Furthermore, large media files in general should be added with caution, and paradigms tested fully before use, to ensure they run smoothly. This will be dependent on the memory on the PC.

Other options within the slide editor as shown above include:

2. Set background colour
3. Properties of the selected object. For example, the size of a picture, or the size, colour and style of font within a text box.
4. Name of slide
5. Position of selected object, and positioning options:
 - a. Toggling position: Objects can be moved to pre-set positions – either using pre-defined left-right , top-bottom  or centering 
 - b. Specifying object position manually: Required position of an object can be written in pixels into the x-axis and y-axis fields
 - c. Saving and applying positions: After placing an object, its position can be saved. If another object should be placed in an identical position within another slide, the saved position can be applied to it.
6. Settings: Which Language and Hardware Version the slide belongs to. It is possible to switch between different language and version slides using the drop-down menus.
7. An icon shows which Trials currently use the slide
8. Adding expected responses. These feed into the Accuracy measure reported during a paradigm run. Clicking this button brings up a pop-up, where the expected button presses can be defined:



- Select the relevant button(s) by checking the boxes.
- LT = Left Thumb
- LI = Left Index

- RT = Right Thumb
- RI = Right Index
- It is then possible to define the number of expected button presses in the 'Count' field:

- If no number is defined here, the expected Count is assumed to be 1.
 - If the Count is set to 0, an unlimited number of button presses are allowed.
 - By checking the box for 'Clear expected response at start of slide', this resets the accuracy starting with the current slide. This can be helpful if monitoring accuracy on a per-block basis, for example.
 - There is an option to 'Expect no button press'. For example, if it is important for the accuracy calculation to capture that no button press dictates a specific decision, then this checkbox can be selected. If a button is then pressed during this slide, the response will be considered incorrect.
 - Remember to click 'Save' after defining the expected responses.
9. Copying the slide to other HW Versions or Languages: If multiples of the slide exist, for example in different languages or HW versions, it is optional whether the changes made to the slide should be copied to other instances of the slide. For example:
- If editing a picture, and the paradigm exists in multiple languages, copying the change automatically to other languages is faster than manually editing the picture for all languages of the slide.
 - If editing text, and the same slide exists for multiple HW versions, copying the slide to the other HW versions is faster than manually changing the text for all versions.
- Note: When copying changes to any other language/HW version, it is important to check each instance of the slide in case any translation or resizing of text/images is required.**
10. Saving options: Exit the slide editing screen by clicking 'Save', to save changes, or 'Cancel', to return to the slide builder preview window without saving changes. 'Save and create new' saves the current slide and re-opens the slide editor with a new blank slide.

8.7.2 The Template slide

A Template slide is always provided, and can be found at the top of the list of slides in the Slides Library. The Template slide gives the ability to control the following attributes for all slides:

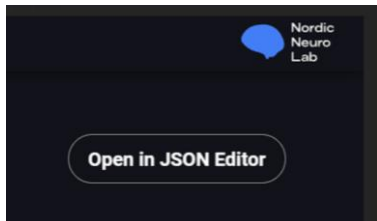
- Background colour
- Font style
- Font size
- Font colour
- A default position for text or images within the slide
- A default size for any inserted pictures

If slides already exist, but it is decided that the appearance should be altered (eg background colour, or font size) for all slides, open the Template slide for editing, make changes, and click 'Save and apply'. On returning to the slide builder preview screen, the changes should be seen for all slides.

8.8 Advanced editing

More advanced paradigm functionality is available than is supplied via the Paradigm Builder. For each paradigm, a single JSON file is available. It is possible to implement more advanced options through an integrated JSON editor.

From the Paradigm Builder, the JSON Editor can be opened by clicking on 'Open in JSON Editor' on the top right:

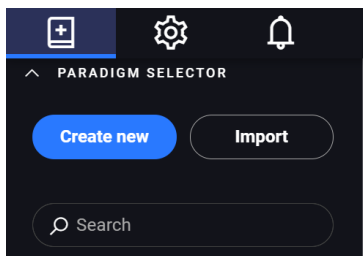


For further details on the possibilities available, please consult the nordicAktiva v2.1 Syntax Description document in the nordicAktiva Resources page – accessed via the built-in Help menu.

9 Importing paradigms

Paradigms may be shared by other users or migrated from previous versions of nordicAktiva.

Prototype paradigms may also be shared by NNL. Paradigms can be imported into nordicAktiva v2.1 using the 'Import' button located at the top left of the main navigation screen:



A dialog box opens to guide you through the required steps, as shown below:

Import paradigm

Format of paradigm

XML (nordicAktiva v1.3.1 or earl... ▼

Place your paradigm folder into the following folder: C:/Program Files (x86)/nordicAktiva2.0.1/assets/xml.
The name of the paradigm folder must match the name of the main file in it.

Selected paradigm

▼

Please ensure your paradigm is running as expected following conversion.
For further support, please contact applicationsupport@nordicneurolab.com

Cancel Confirm

The steps for importing a paradigm are as follows:

1. Specify the format of the paradigm to be imported, by selecting one of the following from the drop-down menu:
 - a. JSON: Paradigms in nordicAktiva v2.0 and later versions are in JSON format.
 - b. XML: Paradigms from nordicAktiva v1.3.1 or earlier are in XML format. A conversion is built in to allow these to be imported.
2. Place the paradigm into the relevant folder on the PC. Depending on whether you are importing a JSON paradigm or an XML paradigm, after completing step 1 the dialog box will provide a file path to an XML or JSON folder, which sits inside a nordicAktiva Assets folder.
3. The second drop-down menu lists any available paradigms within the JSON or XML folder. Clicking on the name of the paradigm you wish to import will add that paradigm to the 'Selected paradigm' field, and on clicking Confirm, an attempt will be made to import the paradigm into the User library.

If successful, a pop-up notification will appear stating that the paradigm has been added to the User library.

NOTES ABOUT PARADIGM CONVERSION FROM XML:

Naming: Before importing, check that the name specified in the Settings inside the main file is identical to the main file name, and to the paradigm folder name.

Structure: It is assumed that a standard structure of XML files, similar to the NNL provided paradigms, will be used. This includes the use of separate files for defaults and for slide definition. It may be necessary to make small modifications to XML paradigms in order for them to be successfully converted.

Syntax and definitions: Although most syntax will be recognized, there are certain rules for paradigms in nordicAktiva v2.0 and onwards which are different. Please see the Syntax Description document on the Resources web page for more information.

Versions: User-defined 'Versions' pertaining to different displays will not be visible in the drop down menu for 'Version' when a paradigm is selected. Only the Versions pertaining to NNL hardware will

be possible, therefore it may be necessary to add a Version to your paradigm in the Paradigm Builder Settings.

Scaling: Dimensions used for positioning have been re-defined in nordicAktiva v2.0 and onwards. Please check all slides after conversion, and re-position objects using the slide builder where necessary. The 'Center' position remains the same.

Similarly, font sizes are not directly translatable. Please also check the font sizes for your text using the slide builder, and adjust where necessary.

Media files: Importantly, the accepted media file formats have been updated. It may be necessary to convert media files prior to importing.

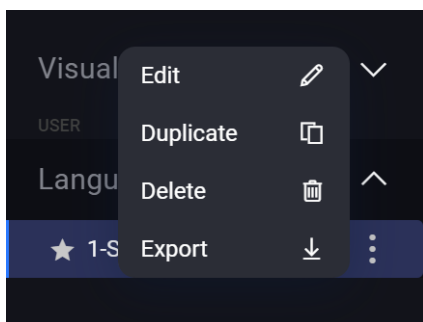
Videos: Some video formats will be converted to MP4 as part of the conversion process, but this can be a lengthy process. It may be necessary to wait a number of minutes for a notification of successful conversion, or an error message if the conversion was unsuccessful.

Further support for paradigm conversion should be sought by emailing applicationsupport@nordicneurolab.com.

10 Backup and recovery of user paradigms

In case of any failure of the software, it is necessary to back up user paradigms to enable them to be recovered.

After creating or modifying a user paradigm, click on the three dots next to the paradigm name in the library and you will see the following menu:



Clicking on the Export button will allow you to save a copy of that paradigm as a compressed JSON file to your preferred backup location, such as a USB drive.

To re-insert them into the user library at a later time, use the Import feature by following the instructions in section 9 of this user manual.

11 Help

A help menu is provided and can be accessed by clicking on the  icon. The menu contains the following:

1. A PDF of this User Manual in English
2. An information pane with details about the software, including the version.

3. A link to the nordicAktiva Resources web page, where further materials can be found, including translated versions of the User Manual.

12 Contact

If you have any questions or problems, please contact us through any of the following communication channels:

If you purchased your system through one of our international distributors, please contact the distributor first, especially if your system is under warranty.

For questions about the use of nordicAktiva, please contact applicationsupport@nordicneurolab.com.

Please contact productsolutions@nordicneurolab.com if you have any other questions or to get assistance with technical problems.

For Sales related questions, please contact your local distributor, or contact us at sales@nordicneurolab.com

13 Security information for IT personnel

13.1 Sensitive information

It is assumed that nordicAktiva v2.1 is installed within an access controlled environment such as a hospital or research institution MRI department. It may be installed on a pre-existing PC within the department which may be connected to internal networks or the internet.

nordicAktiva v2.1 does not communicate with any other devices or software applications such as those which may contain sensitive patient or user related personal information. Nor is it required for personal information to be entered into the software at any time.

13.2 Installation process

nordicAktiva v2.1 can be provided in one of two ways:

1. A PC is provided by NordicNeuroLab with the software pre-installed.
2. Via a secure download link to an installation package for installation on site by an IT professional.

The following information relates to the installation of the software by an IT professional.

An installation package is provided via a secure link, and takes the form of an encrypted, compressed folder (zip file). The link will have been provided by e-mail, along with separate e-mails containing the following required information:

- A password for de-encryption of the zip file
- A hash identifier, which will be used to verify that the file downloaded matches the original file provided by NordicNeuroLab.

Prior to de-encryption of the file and installation, a checksum process is required. This is detailed in the installation instructions provided here: <https://www.nordicneurolab.com/help-all/nordicaktiva>.

13.3 Cybersecurity incidents

nordicAktiva v2.1 is monitored periodically for the presence of any vulnerabilities within the code which could pose a security threat. If any such vulnerabilities are detected, a notification will be sent via e-mail within 30 days with details of actions required. If a software update is required, an additional notification will be sent by e-mail as soon as the update is available, containing instructions on how to perform the update.

Although unlikely, cybersecurity incidents may occur which could affect any networks or systems to which the PC running nordicAktiva may be connected. All possible actions having been taken in the development and deployment of the software to ensure its security.

If the checksum processes results in a hash identifier which does not exactly match that originally provided by NordicNeuroLab, please contact us at productsolutions@nordicneurolab.com with full details and do not proceed with the software installation.

If unusual behaviour is observed within nordicAktiva or on the PC on which it is installed, or if a security breach involving the PC is suspected, please contact us at productsolutions@nordicneurolab.com.

13.4 Software updates

Security related updates such as those triggered by the scenarios detailed in Section 13.3 will be provided via the same mechanism by which the software was originally deployed. Installation instructions will be provided with the update.

13.5 Decommissioning

If at any time nordicAktiva v2.1 will no longer be used (for example following an update, a recall, once it reaches an end-of-life state, or if the department no longer requires the use of the software for any reason), the Windows Uninstall app should be used to remove the software from the PC.

There are no assets or data stored on the PC which require protection; therefore no specific processes are required to ensure safe removal of data from the PC after de-installation.



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