

# SmartBox Pro

## Quick Start Guide

Version 1.02

Updated September 30, 2019

## Contents

Contents .....	1
Introduction .....	2
System Overview .....	3
What's In The Box .....	4
Connect the SmartBox Pro to Your Computer .....	5
Download & Install the Allego software application .....	6
System Requirements .....	6
Activating Allego .....	7
Training with Allego .....	7
Allego Dashboard .....	8
Sample Workflows .....	9

# Introduction

Congratulations on your purchase of the *Smartbox Pro / Allego* acquisition system! This completely new system from NeuroNexus enables and accelerates neuroscience research through its unique combination of performance, ease-of-use, and forward-looking advanced features, including

1. Plug-and-play compatibility with all NeuroNexus probes and electrode arrays
2. High-quality acquisition and recording of up to 512 channels of neural and biological signals
3. Unique, highly interactive, probe-centered user interface that allows the researcher to remain focused on the experiment at hand.

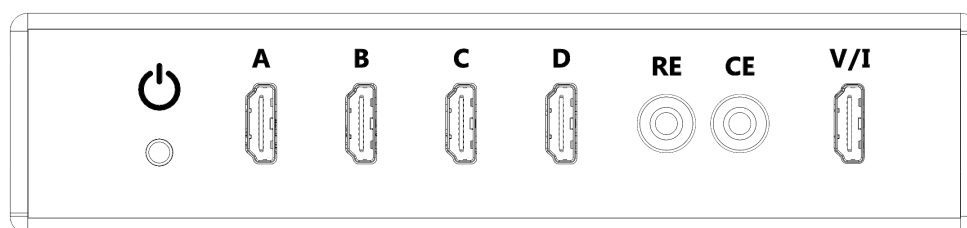
This Getting Started guide is intended to provide a brief overview of the *Smartbox Pro / Allego* system and some of its basic functions.

A note on basic terminology: “Smartbox Pro” refers to the hardware component of the system, i.e., the “Smartbox Pro box”. “Allego” refers to the software application that interfaces with and controls the hardware box.

**IMPORTANT:** Please check the NeuroNexus web site for regular updates of this document and related system documentation, as well as

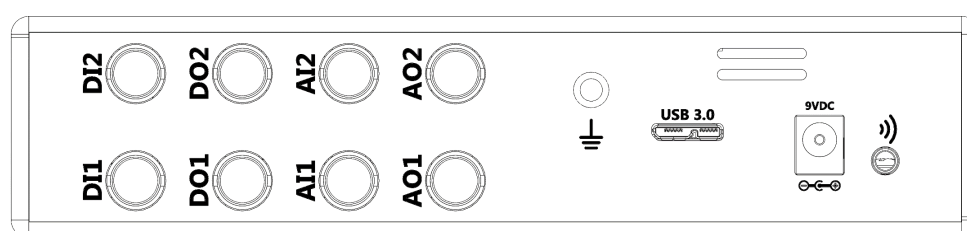
# System Overview

## Front Panel



1	Power LED/Button	Indicates system status.
2	Headstage Input Ports	Proprietary HDMI-style ports for connecting SmartLink headstages to Ports A-D.
3	RE	Banana jack for connection to Reference Electrode (potentiostat/galvanostat).
4	CE	Banana jack for connection to Counter Electrode (potentiostat/galvanostat).
5	V/I	Proprietary HDMI-style multifunction port for connection to the SmartBox Pro MUX adapter to provide access to potentiostat and galvanostat functions.

## Back Panel



1	Digital / Analog inputs and outputs	BNC connectors for connecting auxiliary signals from other instruments.
2	System ground	Banana jack for connecting the box to a low-noise earth ground point.
3	USB 3.0 connector	Connect to a USB 3.0 port on PC/Mac using the supplied USB 3.0 cable.
4	DC power input	Use only the supplied AC power adapter to provide the required DC voltage input.
5	Audio output	Stereo audio Aux jack for connection to speakers to monitor the Analog Output (AO) channels.

## What's In The Box

- SmartBox Pro unit
- AC Power Adapter
- USB 3.0 cable
- (2) Banana-to-banana cables
- (2) BNC-to-BNC cables
- (2) BNC-to-Alligator cables
- Selected SmartLink headstage amplifier(s) and headstage interface cable(s) that are specified in the order
- (optional) Window laptop computer that was specified in the order

## Connect the SmartBox Pro to Your Computer

- Unpack the SmartBox Pro unit from its packaging and place it on a secure surface having adequate ventilation.
- Plug the AC adapter into a standard (120 V) wall outlet and connect its DC power output pin into to the power port of the unit.
- Connect the USB cable to the SmartBox Pro and a USB 3.0 port on your computer.

With the computer on and connected to the internet, press and release the Smartbox Pro power LED switch. Your computer should indicate that it has detected new hardware (Opal Kelly XEM6310-LX45). The necessary drivers should be automatically installed with no further action necessary. If the driver does not install or the Allego recording software cannot detect your SmartBox Pro unit, try downloading and installing the driver located on the NeuroNexus Downloads page (See the link).

Connect a headstage amplifier to a Smartlink cable and then connect the Smartlink cable into one of the Smartbox Pro amplifier ports (ports A-D).

Optional – Use a banana cable to attach the Smartbox Pro ground port to a low-noise earth ground. This may be beneficial for removing extrinsic noise on the signal lines depending on the particular laboratory environment. (Note: Regardless of the ground port connections, the recording reference and ground signals are provided through the configuration of the headstage amplifier(s)).



## Download & Install the Allego software application

Allego is the software application for interfacing with the SmartBox Pro unit. The latest version of Allego can always be found on the downloads page of the NeuroNexus website:

<https://neuronexus.com/products/instrumentation-data-acquisition/smartbox/allego-download/>.

This page is currently password protected with password: SmartboxAllego

Once there, select the link for the appropriate operating system and then select "Download" to begin the transfer.

### Windows

- Launch the installer.
- If you receive a warning against running an unrecognized app, select "Run anyway".
- After the installation completes, Allego will launch.

### Mac

- Download the Allego installer.
- Double-click the installer to launch.
- Drag the Allego icon into the Applications folder.
- Open the Applications folder by double clicking the folder icon.
- In the Applications folder, double-click the Allego icon **while holding down the control key**. Holding down the control key overrides the MacOS security check, which is only needed during the initial launch.
- After the installation completes, Allego will launch.

## System Requirements

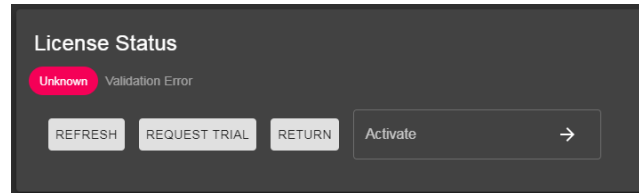
System requirements are as follows:

- Storage: SSD. Traditional magnetic hard disks may not be able to perform sustained write speeds in some configurations.
- USB 3.0
- 3<sup>rd</sup> Generation Intel Core i7 processors or (4 cores), or equivalent.

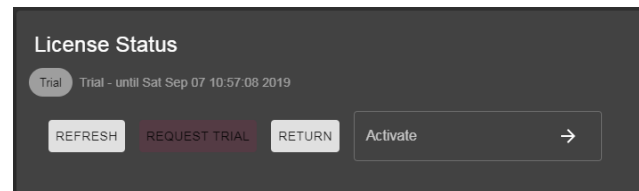


## Activating Allego

- Launch Allego. Once it has finished initializing and the progress bar disappears, navigate to the left side of the interface and hit the Settings button.



- Here, the license status of Allego will be displayed. If the status is unknown or expired, click the request trial or activate button, or contact NeuroNexus Customer Service to request a license key.



- This will grant a license for several weeks and unlock other parts of the application.

## Training with Allego









To familiarize yourself with Allego before using it with a SmartBox Pro, you may download and run the SIMULATOR MODE of the software.

If you do not yet have any saved recordings, you may also download and save the Allego Simulator Data File. **A data file must be present in the data folder prior to launching Allego in simulator mode.**



## Allego Dashboard

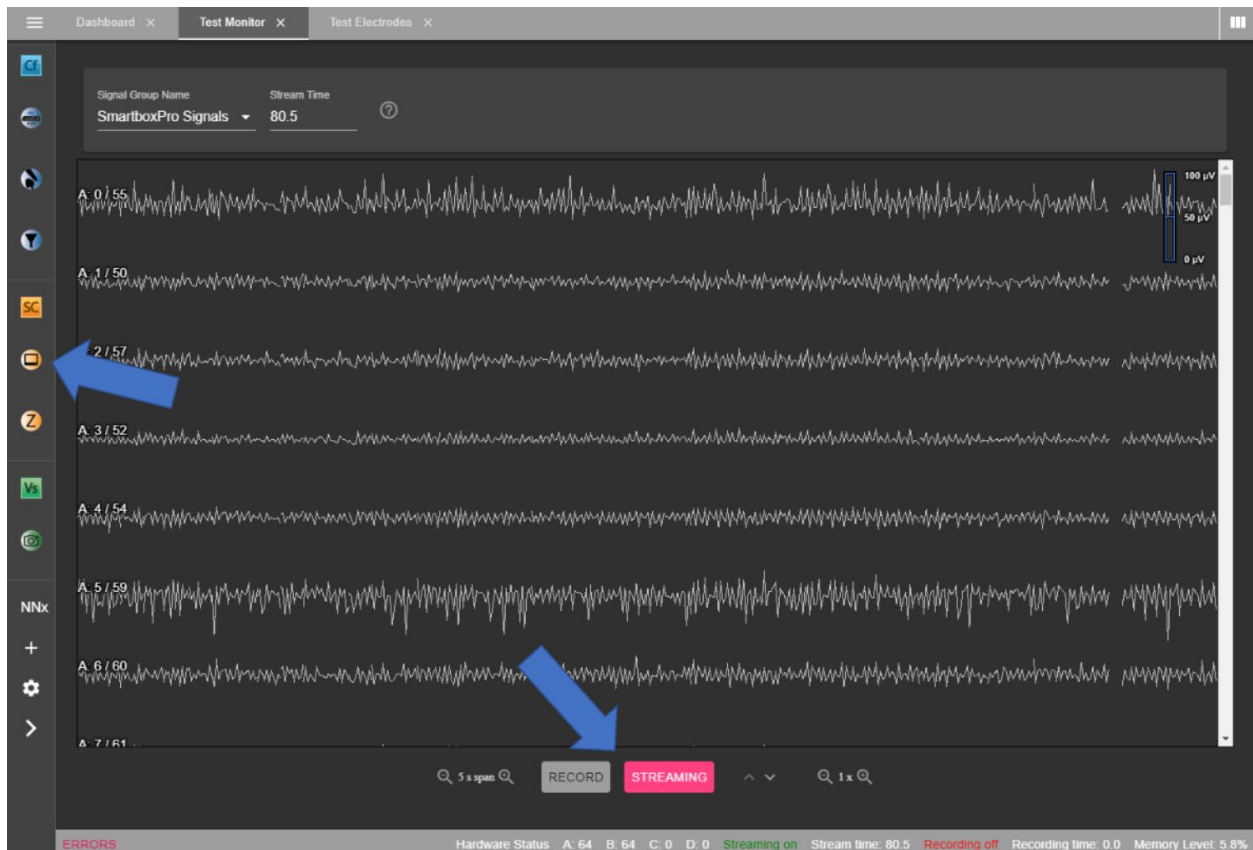


	System	Configure signal sources, which ports will be used, sampling frequency, etc.
	Electrodes	Connected probe designs are selected, along with which port and headstage will be used.
	Signal Processing	Create various filter types and combine them to create DSP groupings.
	Impedance	Various bench tests are located here, including impedance testing.
	Monitor	Shows the signals currently being streamed.
	HD Snapshot	Takes a high detail still picture of signals for closer inspection.
	Settings	Activate the software and set visual themes.
	Terminal	Allows access to the Allego command prompt terminal for advanced functions.



## Sample Workflows

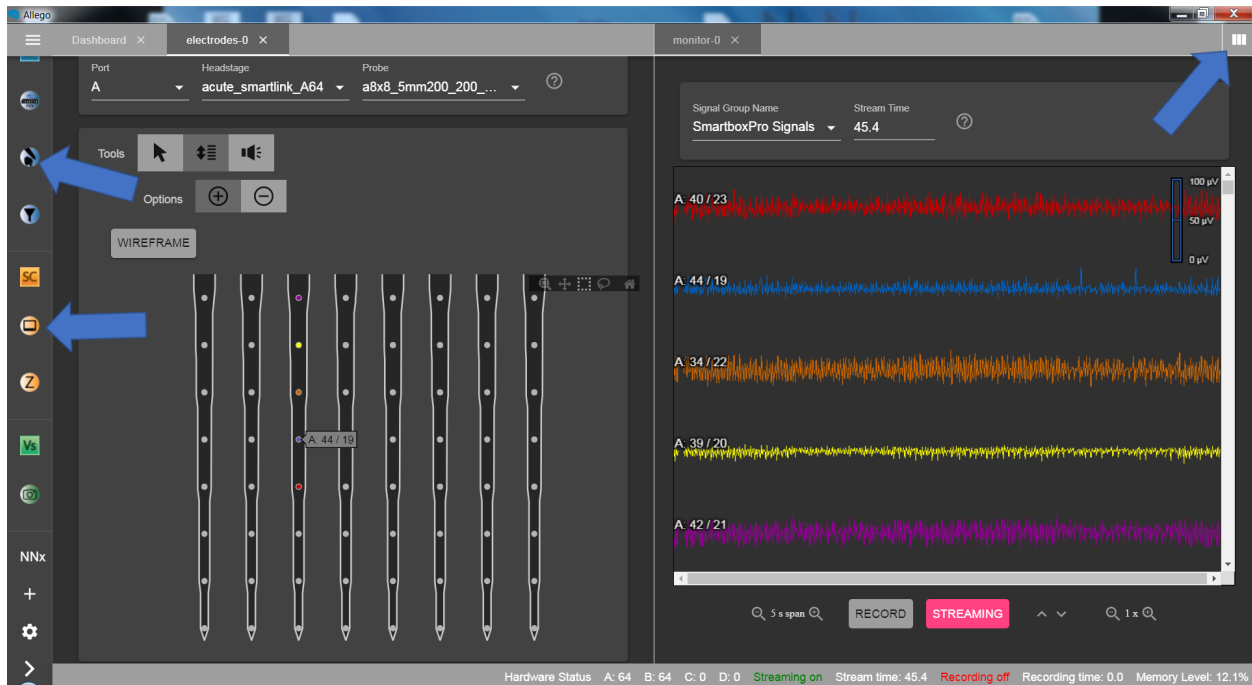
**Quick Streaming and Saving** – Determine if a headstage and probe are connected properly and can stream data



1. From the dashboard, click Monitor.
2. Choose a name for this monitor if desired.
3. Click Stream. Data should begin to populate the window.
  - a. If it does not, navigate to the System view to verify that the SmartBox Pro detects your headstage(s).
4. To save streamed data, click record. The file name and save location are displayed at the bottom of the window.



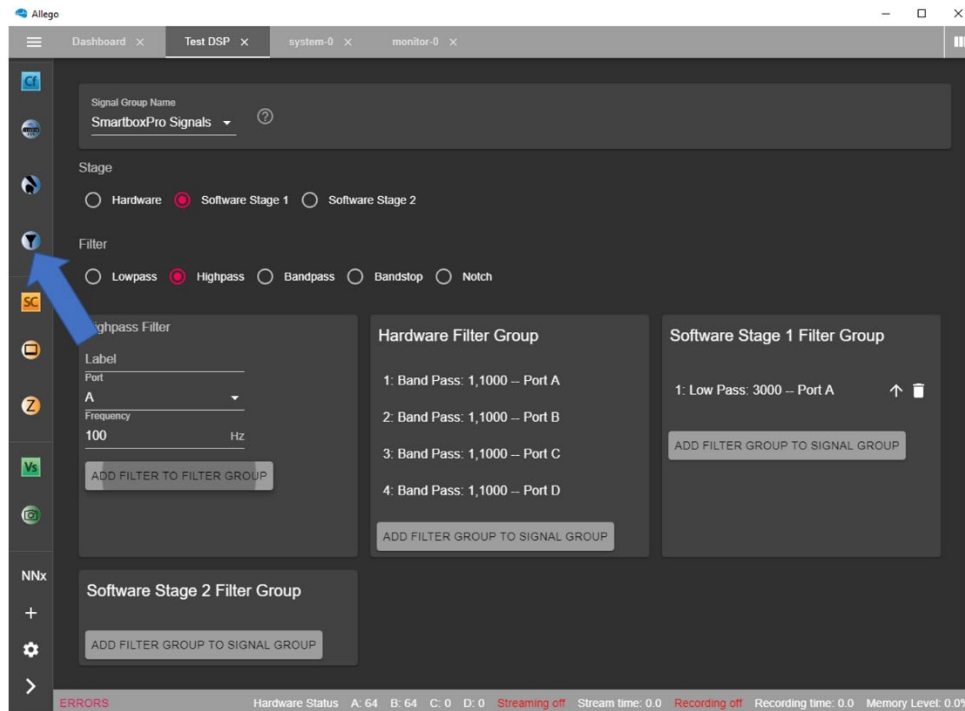
## Configuring Recording Settings – Set the hardware configuration and recording parameters for data acquisition



1. On the left side of the interface, click Electrodes.
2. Choose a name for this tab if you desire. Suggestion: name this according to the port being used on your SmartBox Pro.
3. Choose port, headstage and probe.
4. Toggle + and – signs to enable or disable electrode sites on the probe wireframe.
  - a. Individually selected electrode sites will be colored separately.
  - b. Selected groups of electrode sites will be the same color
  - c. Colors and channel numbering correspond to colors and channel numbering that appear in Monitor view (see below).
5. View signals from the enabled electrode sites by streaming data in the Monitor view.
  - a. Navigate to the top right corner of the interface to split your workspace into two panels.
  - b. With the right panel open, click Monitor from the left side of the interface.
  - c. In the Electrodes view (left panel), click “order” to prioritize viewing your previously selected/colored electrode sites.

6. To review a snapshot of your recently streamed signals in detail, navigate to the HD Snapshot tab.

## Adding filters



- A. From the dashboard, or on the left side of the interface, click Signal Processing.
- B. Choose a name for this tab if you desire.
- C. Stage: select the stage at which the filter is to be applied.
  - a. Hardware filters are applied first, followed by Stage 1 & 2.
  - b. Hardware filters are applied to saved data.
  - c. Software Stage 1 filters are applied to saved data.
  - d. **Software Stage 2 filters are for visualization only.**
- D. Filter: select a filter type.
- E. Enter the parameters for the filter in the box immediately below the filter type.
- F. Click the Add Filter To Filter Group button. This will add and group filters to the stage that was selected in step 1.



## Impedance Testing

Allego

File Edit View Window Help

Dashboard × system-0 × monitor-0 × electrodes-0 × Settings × impedance-0 ×

Port  
A

RUN IMPEDANCE CHECK ?

### Impedances

Native Channel Index	Magnitude (MΩ)	Phase (°)
0	0.16	59.04
1	0.14	50.11
2	0.12	54.97
3	0.25	52.66
4	0.15	58.77
5	0.10	54.67
6	0.22	53.86
7	0.23	55.45

1. From the dashboard, click the Impedance button.
2. In the impedance tab, select the port to be tested from the dropdown menu.
3. Click on Run Impedance Check. Depending on the number of channels in the probe, this may take upwards of 30 seconds to complete.



## Allego Terminal



The Allego terminal provides the user with a command prompt that can be used to directly access various features without the GUI or those that otherwise aren't available. It can be launched by clicking the arrow button in the bottom left of the window. This gives the user access to advanced functions and a terminal window will appear. Some examples are:

1. Choosing any probe site to monitor audio activity by the auxiliary jack or through an analog BNC port.
2. Setting noise suppression filters or a highpass filter in order to accentuate spike activity in audio for easier dup to 4 monitors.