



▶▶ NEUMANN.BERLIN

▶ MA 1

AUTOMATIC MONITOR ALIGNMENT

INSTRUCTION MANUAL



Contents

MA 1 – Automatic Monitor Alignment	3
Hardware requirements	3
Software requirements	3
DSP loudspeakers (network-enabled)	3
Analog loudspeakers (not network-enabled)	3
System setup	4
Connecting the hardware	4
Setting up the loudspeakers	4
Preparing the MA 1 – Automatic Monitor Alignment	7
Starting the process	7
Selecting the network	7
Checking the requirements	8
Selecting and setting up the audio interface	8
Calibrating the MA 1 measurement microphone	10
Selecting the loudspeakers from the network	11
Adapting the output level	12
Positioning the microphone and loudspeakers	13
MA 1 input channel	13
Performing the MA 1 – Automatic Monitor Alignment	15
Starting the measurement	15
Displaying the measurement results	16
Saving the results	19



MA 1 – Automatic Monitor Alignment

This document describes the requirements and procedure for using the MA 1 Automatic Monitor Alignment. This version of the software just supports stereo systems with and without subwoofer.

Hardware requirements

- Loudspeakers
 - 1 pair of KH DSP loudspeakers
 - or
 - 1 KH 750 DSP subwoofer in combination with a pair of analog KH loudspeakers
- Neumann MA 1 measurement microphone
- Computer (Windows 10 (64 bit), macOS Catalina, 10.13, 10.14 und 10.15)
- Audio interface with:
 - Balanced analog input with 48 V phantom power
 - 2 balanced analog outputs or digital AES3 output (only with KH 750 DSP)
- Network switch

Software requirements

- Operating system:
 - PC: Windows 10 64 Bit
 - Mac: macOS 10.13, 10.14 or 10.15
- MA 1 - Automatic Monitor Alignment software
- ASIO driver (for Windows)

DSP loudspeakers (network-enabled)

The following loudspeakers and subwoofers are network-enabled and can be controlled directly by the software:

- KH 80 DSP
- KH 750 DSP

Analog loudspeakers (not network-enabled)

The following loudspeakers are not network-enabled and need to be connected via a network-enabled subwoofer in order to be included in the system setup.

- KH 120 A
- KH 120 D
- KH 310 A
- KH 310 D
- KH 420/KH 420 + DIM 1

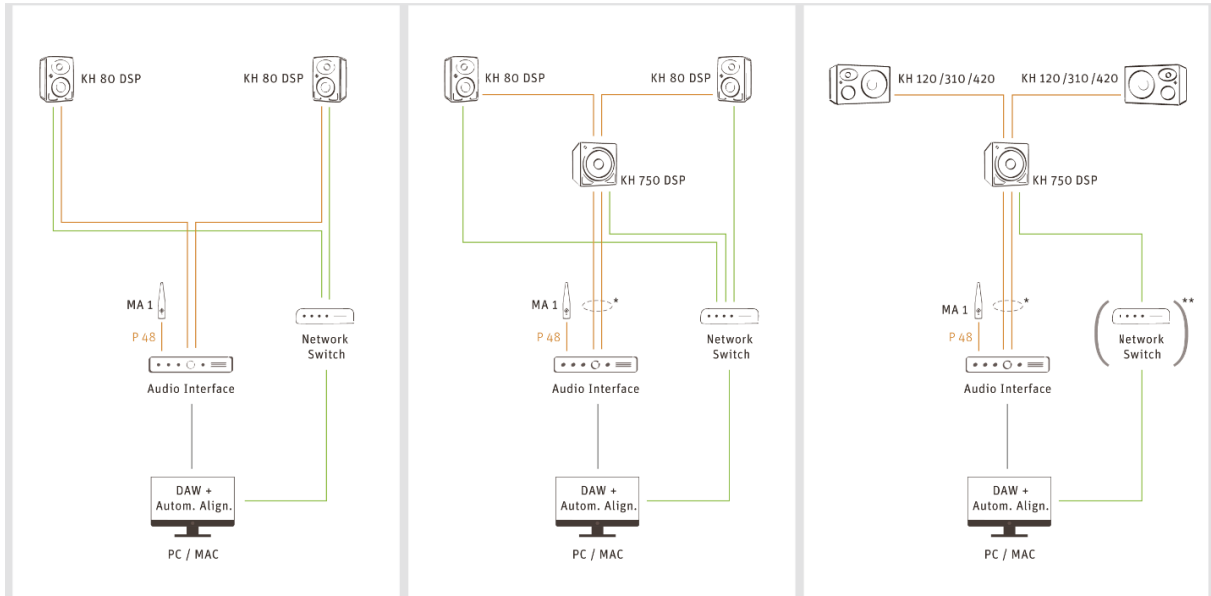


System setup

Proceed as follows to set up the system.

Connecting the hardware

▶ Connect your hardware as shown in this diagram



— Audio (XLR) * Alternatively: AES3 (BNC/RCA) — Network (Ethernet) ** Not necessary if Ethernet cable is used

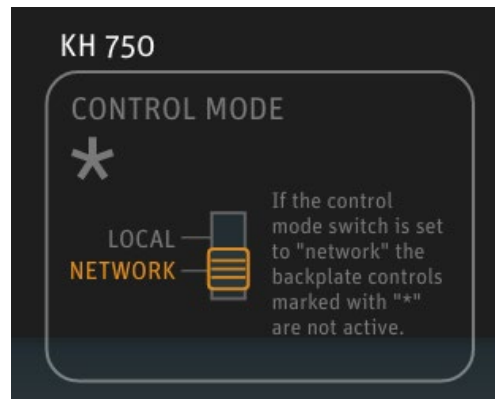
Setting up the loudspeakers

▶ Set the switch positions and level adjustments on the rear of your loudspeakers/subwoofer according to the following instructions.

Analog monitors in combination with KH 750 DSP

(KH 750 DSP + KH 120/KH 310/KH 420)

▶ Use the following settings for the KH 750 DSP.





► Use the following settings for analog monitors (KH 120 A, KH 310 A, KH 420)

KH 120 / KH 310

OUTPUT LEVEL INPUT GAIN

[dB SPL at 1m
for 0dBu / -18 dB FS]

for 0 dBu

dB

ACOUSTICAL CONTROLS [dB]

BASS MID TREBLE

KH 420

OUTPUT LEVEL INPUT GAIN

[dB SPL at 1m
for 0 dBu / -18 dB FS]

for 0 dBu

dB

ACOUSTICAL CONTROLS [dB]

BASS MID TREBLE

PARAMETRIC EQUALIZER

GAIN [dB] Q FREQUENCY FREQUENCY RANGE [Hz]

Position	25-80	50-160	100-320
1	25	50	100
2	32	64	130
3	40	80	160
4	45	90	180
5	52	105	210
6	65	130	260
7	80	160	320

► Use the following settings for D-version monitors (KH 120 D, KH 310 D, KH 420 with DIM 1)
Note! The digital connection is not supported.

KH 120 / KH 310

OUTPUT LEVEL INPUT GAIN

[dB SPL at 1m
for 0dBu / -18 dB FS]

for 0 dBu

dB

ACOUSTICAL CONTROLS [dB]

BASS MID TREBLE

KH 420

OUTPUT LEVEL INPUT GAIN

[dB SPL at 1m
for 0 dBu / -18 dB FS]

for 0 dBu

dB

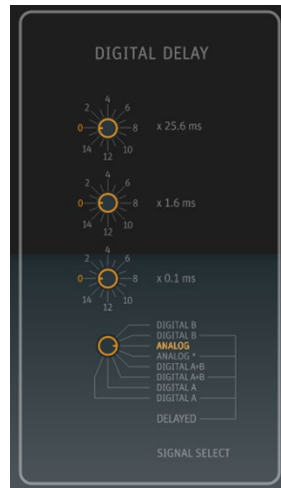
ACOUSTICAL CONTROLS [dB]

BASS MID TREBLE

PARAMETRIC EQUALIZER

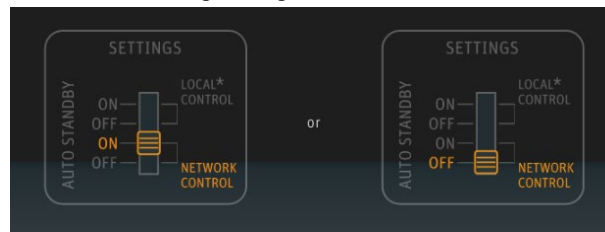
GAIN [dB] Q FREQUENCY FREQUENCY RANGE [Hz]

Position	25-80	50-160	100-320
1	25	50	100
2	32	64	130
3	40	80	160
4	45	90	180
5	52	105	210
6	65	130	260
7	80	160	320



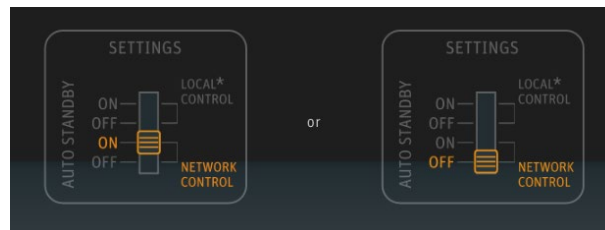
KH 80 DSP without KH 750 DSP

▶ Use the following settings for the KH 80 DSP.

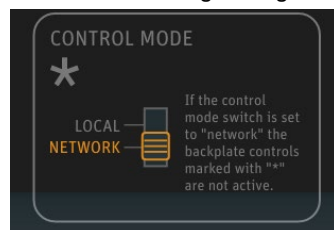


KH 80 DSP with KH 750 DSP

▶ Use the following settings for the KH 80 DSP.

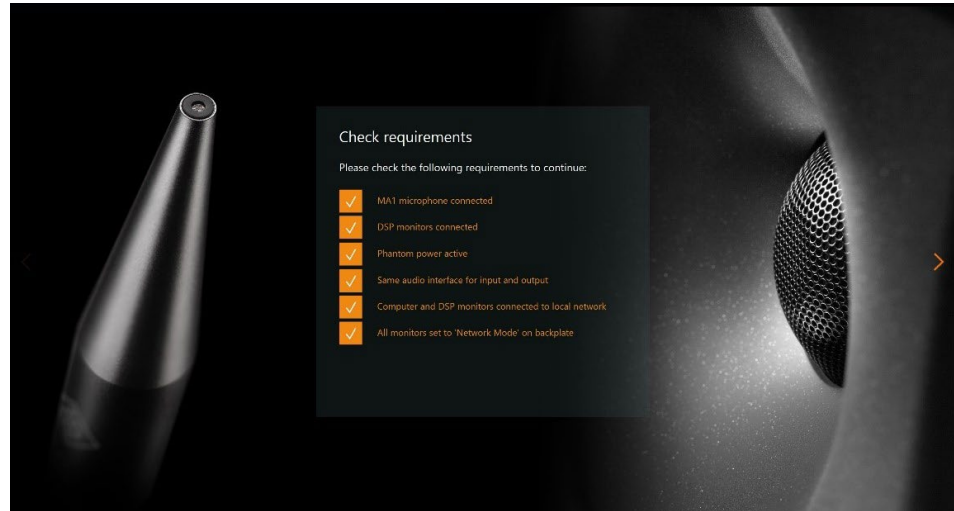


▶ Use the following settings for the KH 750 DSP.





Checking the requirements

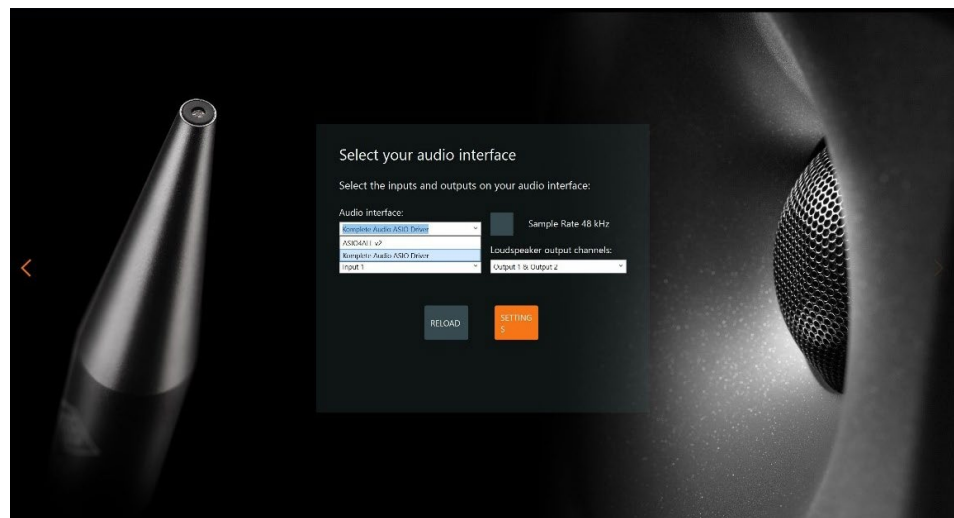


- ▶ Ensure all mentioned requirements are fulfilled and ticked.

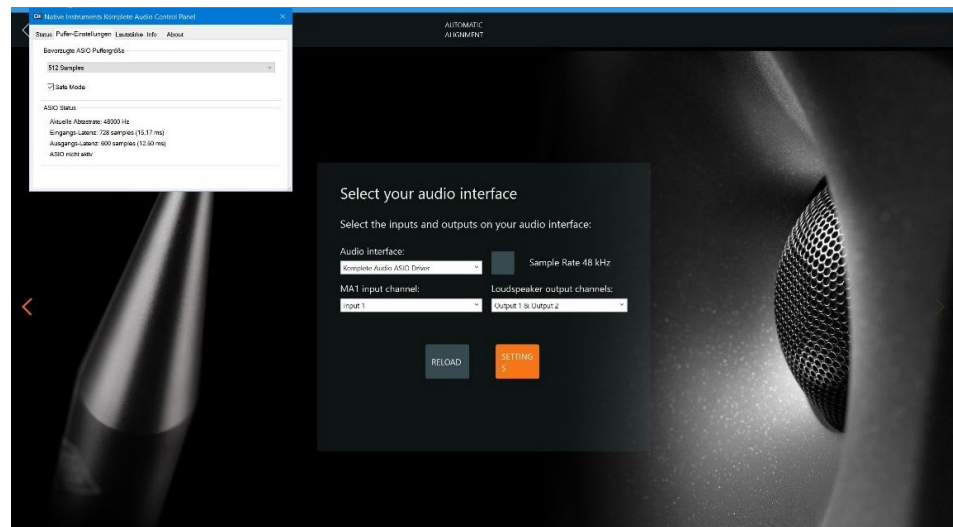
Selecting and setting up the audio interface

Observe the following steps for selecting and setting up the audio interface.

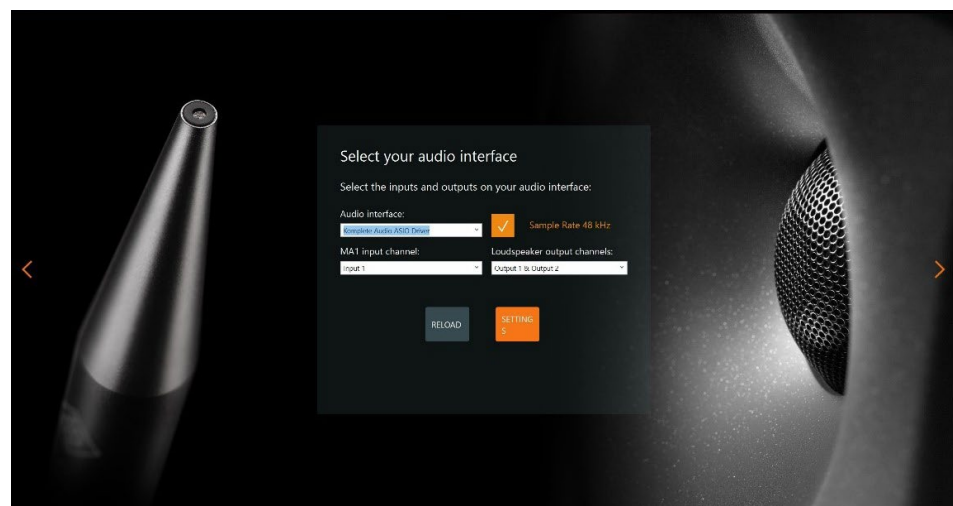
- ▶ Install an ASIO driver on your Windows PC, if not done yet.
If there is no specific ASIO driver available for your audio interface you can try the universal ASIO4ALL driver instead.



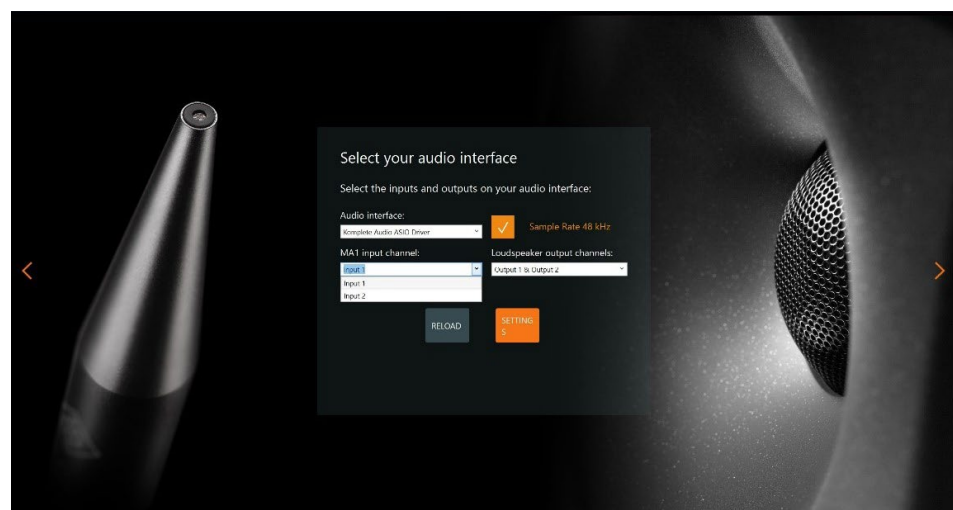
- ▶ Select your audio interface-specific driver in the audio interface selection dropdown.



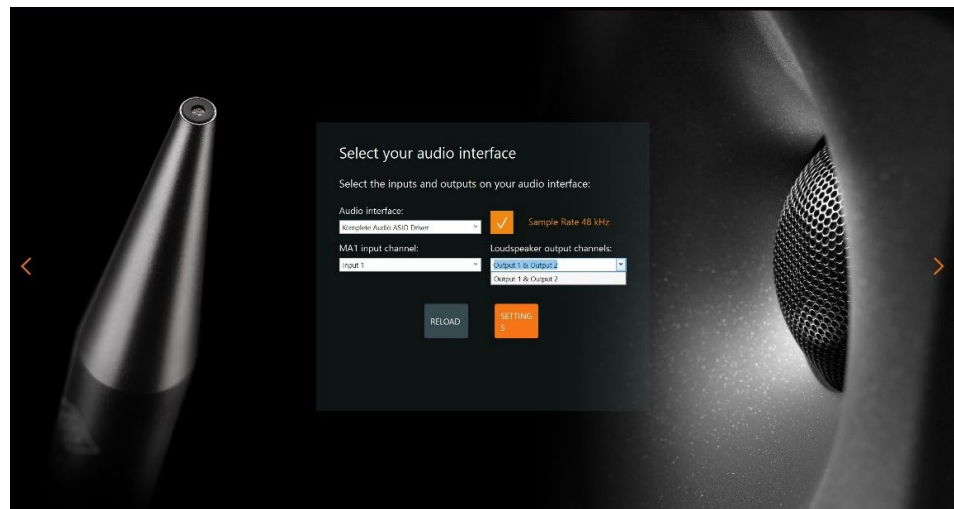
- ▶ Make sure the sample rate of the audio interface is set to 48 kHz. You can check the settings of your audio interface via the **SETTINGS** button.



- ▶ Tick the **Sample Rate 48 kHz** checkbox after verifying the audio interface settings.

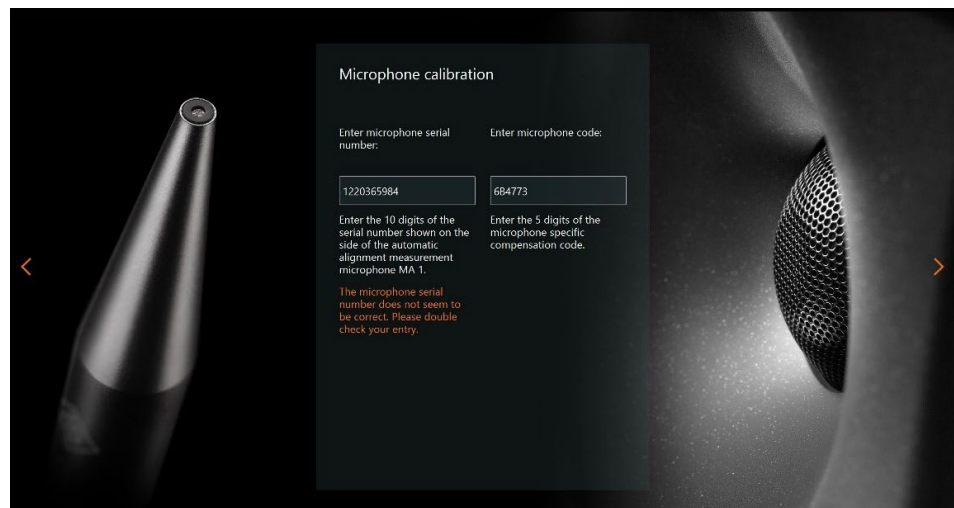


- ▶ Select the input channel your **MA 1** measurement microphone is connected to.



- ▶ Select the output channels your loudspeakers or subwoofer are connected to.

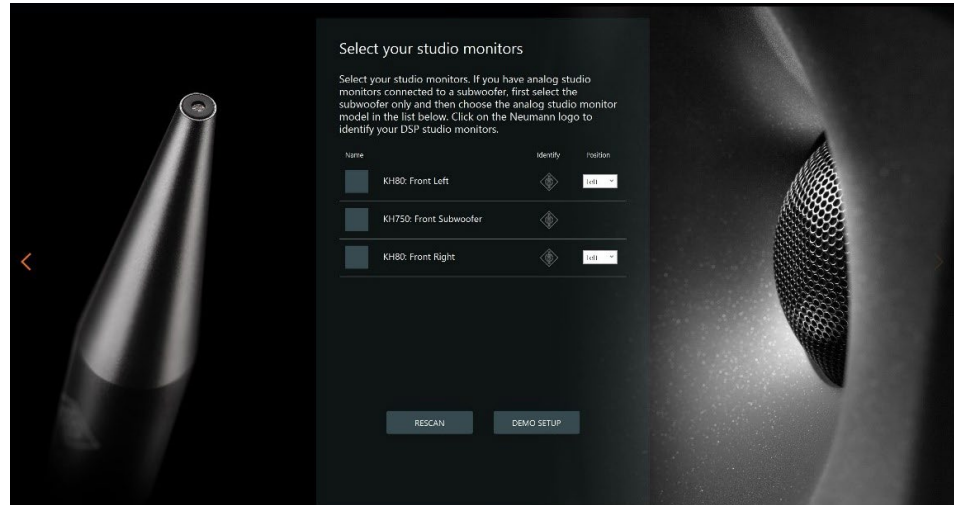
Calibrating the MA 1 measurement microphone



- ▶ Enter the 10 digit serial number printed on your MA 1 measurement microphone.
- ▶ Enter the 6 digit HEX code printed on your MA 1 measurement microphone. This code provides the microphone-specific calibration information to linearize your measurement microphone.



Selecting the loudspeakers from the network

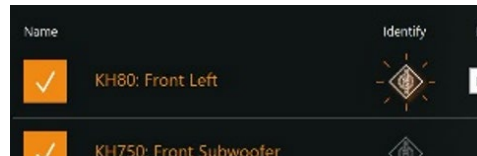


The software lists all loudspeakers/subwoofers found in the network.

If there are loudspeakers missing in the list or no loudspeakers at all, check the following aspects:

- ▶ Make sure that the selected network is the same as the network your loudspeakers are connected to (see “Selecting the network”).
- ▶ Make sure that all loudspeakers/subwoofer are properly connected to the network.
- ▶ Make sure that all loudspeakers/subwoofer are set to Network control (see “Setting up the loudspeakers”).
- ▶ Switch your loudspeakers/subwoofer off and on.

In order to identify which loudspeaker/subwoofer in the list is which loudspeaker/subwoofer in your room you can click on the Neumann logo next to the loudspeaker/subwoofer.



The logo on the front of the loudspeaker/the power LED on the subwoofer rear will flash rosé.


Selecting loudspeakers in a setup with DSP loudspeakers only

- ▶ From the list, select the loudspeakers which belong to your system.
- ▶ Choose the position the loudspeaker is placed.





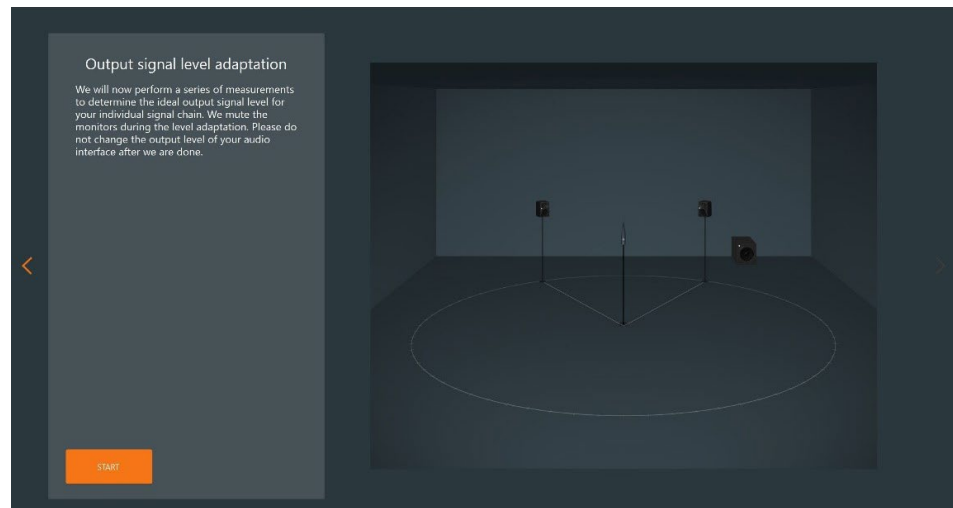
Selecting loudspeakers in a setup of a DSP subwoofer with analog loudspeakers

- ▶ From the list, select the subwoofer which belongs to your system. 
- ▶ Select the input signal option of the subwoofer.



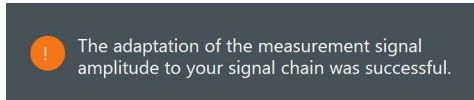
- Automatic (default): The subwoofer automatically chooses between analog or digital AES3 input signals. Digital signals have priority over analog signals.
 - Analog: If analog is selected, only analog input signals will be received even if there are digital signals connected.
- ▶ Choose the corresponding analog version if you use D-versions of the loudspeakers (KH 120, KH 310, KH 420).
 - ▶ Make sure the loudspeakers are connected according to their physical position (left output of KH 750 DSP to left loudspeaker, etc.).

Adapting the output level



- ▶ Click START to start the output signal level adaptation. The system identifies the correct signal level which is then applied to the loudspeakers. During this process the loudspeakers are muted. If the output level of your audio interface is too high or too low, the system will ask you to adapt it accordingly.

Once the level is set correctly, the system will inform you.



If this test failed please check the following points:

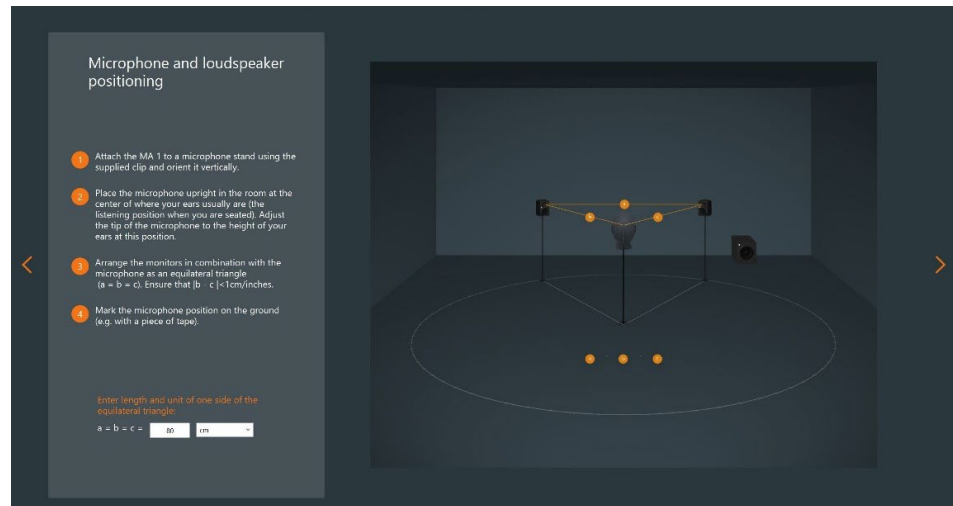
- ▶ Loudspeakers/subwoofer are set to network at their back
- ▶ Proper audio connection from audio interface to loudspeaker/subwoofer
- ▶ Source output not muted



Positioning the microphone and loudspeakers/subwoofer

Before the alignment you need to ensure that your loudspeaker system is set up correctly.

- ▶ Arrange the loudspeakers and the listening position as an equilateral triangle. The distance between the tweeters of the loudspeakers and between tweeter and listening position is identical.
- ▶ Place the loudspeakers and all equipment/furniture as symmetrical as possible with regard to the listening axis.
- ▶ Angle the loudspeakers horizontally and vertically towards the listening position.



- ▶ Measure the distance between the left and right tweeter and enter it in the text field. Give in the measured distance between left and right tweeter (same as between tweeter and listening position).

MA 1 input channel

Measuring the signal chain and background noise

Before starting, make sure that:

- ▶ The microphone input gain of your microphone preamplifier is set to a reasonable value.
- ▶ All windows are closed.
- ▶ No fans, air conditioning devices or other noise generating devices are running.
- ▶ Nobody is talking or walking around.
- ▶ The phantom power of your microphone preamp is switched on.

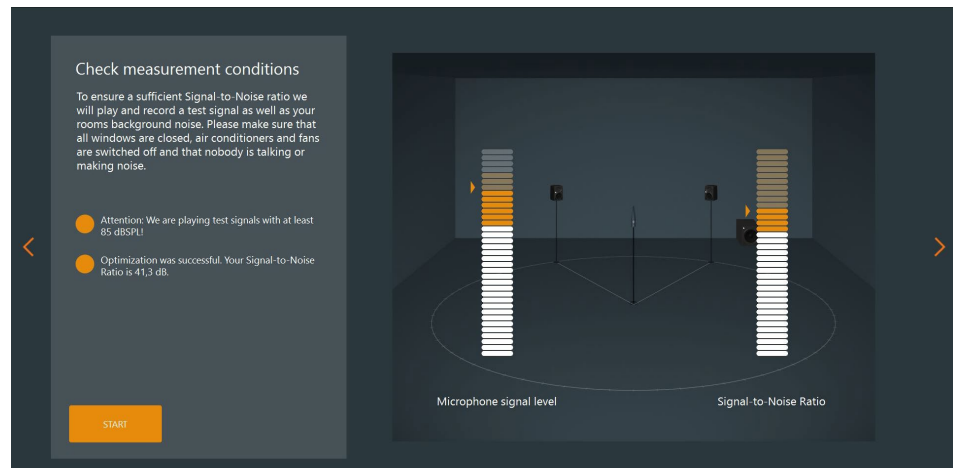
The system will check if:

- ▶ The input gain of your microphone preamplifier is set correctly.
- ▶ The input signal is overloaded.
- ▶ The background noise of your environment is low enough.
- ▶ The signal-to-noise ratio of the entire measurement chain is sufficient.



CAUTION
Danger of hearing injury!

The system will play a loud pink noise signal.



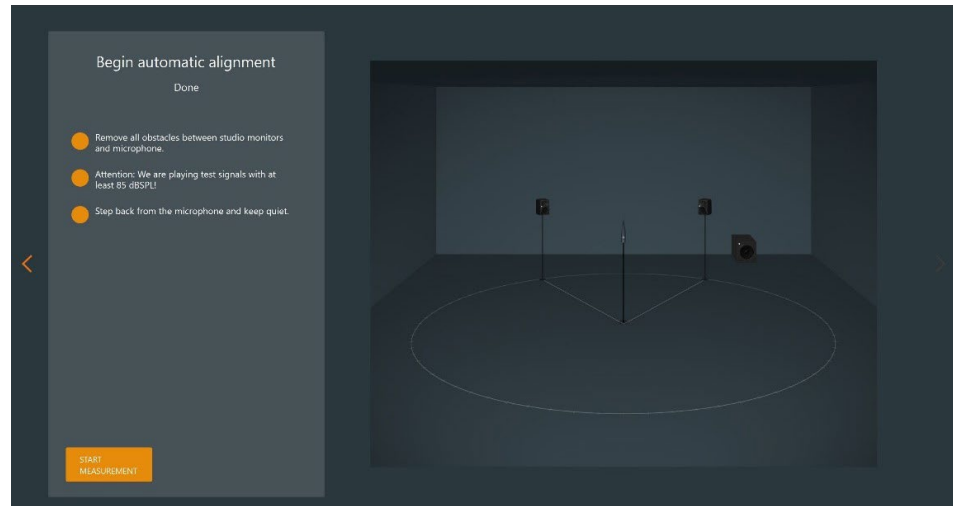
If any of these results do not meet the requirements, the system will inform you accordingly. If the noise level of your room is too high the system continues to measure. If it is not possible to reduce your environmental noise level you can skip this test. This then may lead to worse results. So please do anything possible to achieve a good signal to noise ratio.



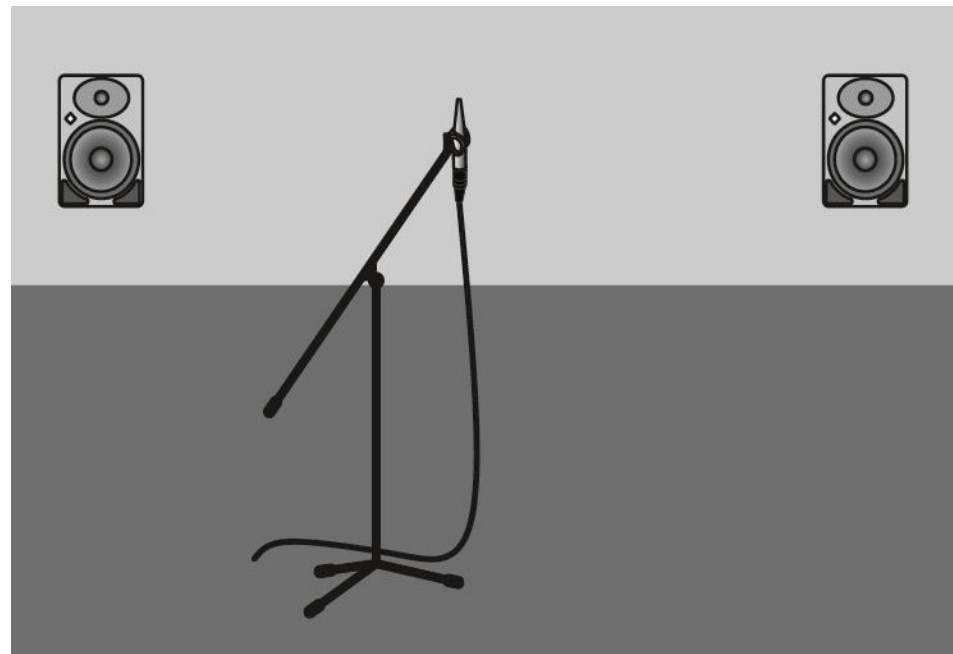
Performing the MA 1 – Automatic Monitor Alignment

Starting the measurement

The software will now start measuring the loudspeakers in your system. For that purpose, sine sweep signals will be played out to every individual loudspeaker/subwoofer.



- ▶ Follow the instructions on the screen.
- ▶ Step back or to the side.
- ▶ Remain quiet.
- ▶ Start measuring at the main listening position with the microphone on a stand in an upright position.



- ▶ Any loudspeakers which are not playing signals will be muted and shown in red.

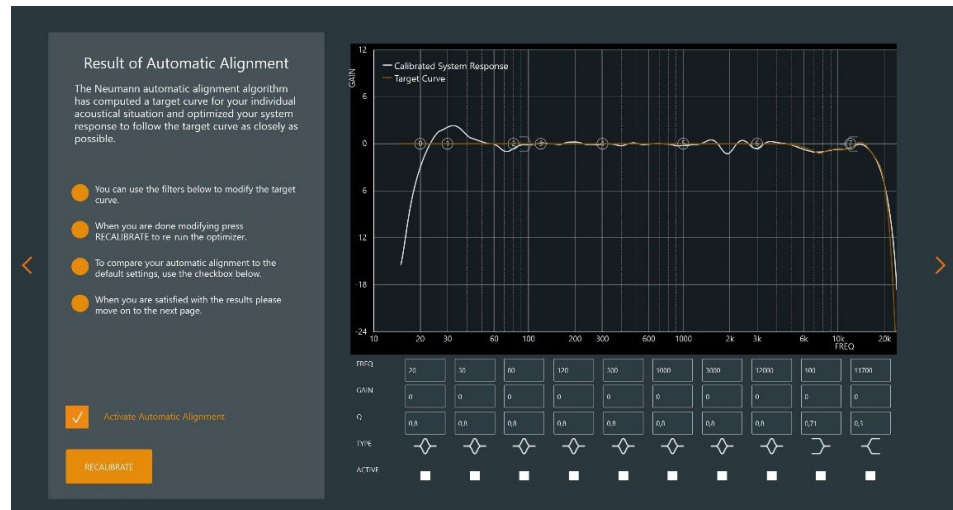
We highly recommend performing the measurements at every proposed microphone position in order to ensure the best possible results.

However, it is possible to skip the measuring procedure after each of the 7 measurements. This might be useful if any potential for improvement in terms of repositioning the loudspeakers or other optimizations have been identified.



Displaying the measurement results

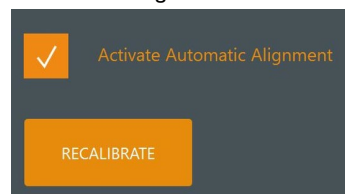
After the measurement procedure the system will display the results.



The following curves are displayed:

- ▶ **Orange curve:**
This shows the room-specific target response used by the system to align the measurement results.
Please note that this curve is not necessarily ruler flat. The system will create a target response optimized for the character of the room. This target response depends on the acoustical behavior of the room, on the distance between the loudspeakers, the listening position and on the placement of the loudspeakers in the room.
- ▶ **White curve:**
This curve shows the combined magnitude response of the entire system. It represents the acoustical result after the alignment.

When you unselect the checkbox you can see and hear the system response with the default monitor settings.





The combination of all measured loudspeakers/subwoofer with their default settings is shown in white.



Editing the target response

After the automatic alignment you can play any signal through your audio interface to your loudspeakers and listen to the result.

By selecting and unselecting the ACTIVATE AUTOMATIC ALIGNMENT checkbox you can switch between with and without alignment.

Please note it will take a few seconds until all parameters have been transferred completely to the loudspeakers.

The EQ section below the graph now allows you to modify the result.

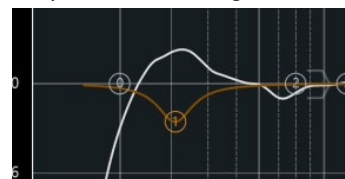
Please note that you can only modify the orange target response, not the measured curve. The target response can be modified with 8 fully parametric and two fixed shelf EQs.

Activating an EQ

- ▶ Select the EQ-specific checkbox



- ▶ Enter frequency, gain and Q
You can also change gain and frequency by grabbing the highlighted EQ number and moving it up, down, left, or right.



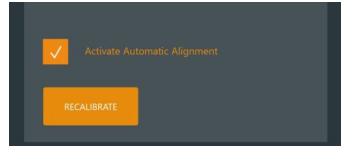
The effect will become visible immediately on the orange target response for all selected filters.



Applying the EQ modification

Once the modifications of the target response have been applied, you can recalibrate the loudspeaker setup with these changes.

- ▶ Click the RECALIBRATE button.



The software will use the original measurements to align your system to the modified target response.

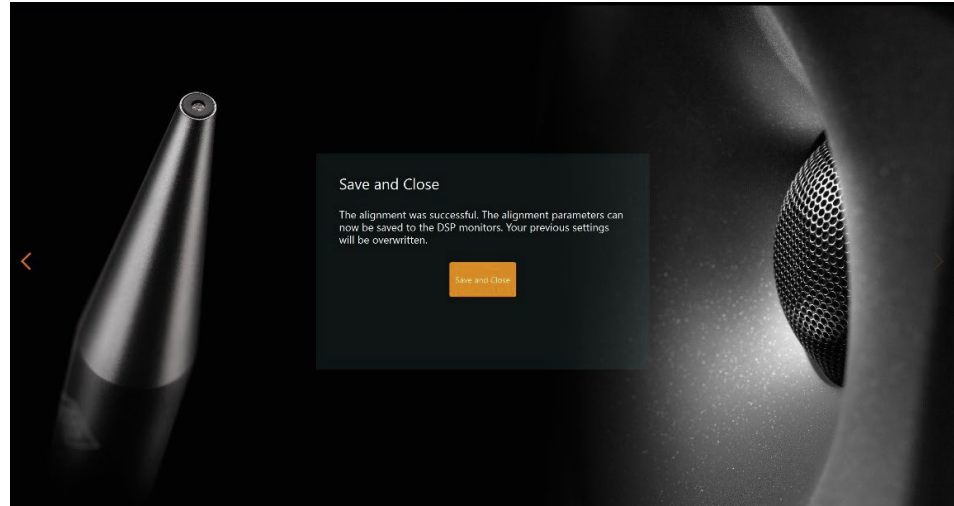
Please note that the system will optimize the measured results as closely as possible to the new target response. It will take all deviations including those from the original alignment into account. Therefore, small adjustments of the target response may not lead to a different result because the available filters have already been used for more relevant optimizations.

- ▶ Select / unselect the ACTIVATE AUTOMATIC ALIGNMENT checkbox to switch between the default monitor settings and the modified alignment.



Saving the results

After performing all modifications the results need to be stored permanently in the loudspeakers.



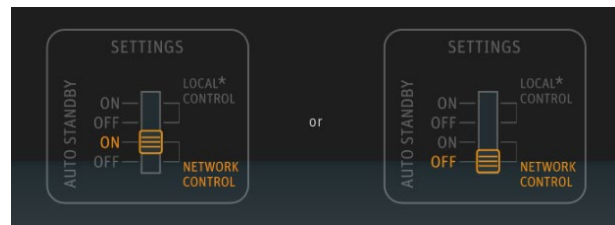
- ▶ Click Save and Close.
The alignment process is now finished. The loudspeakers will permanently use the alignment.

You can now disconnect the loudspeakers from the network.

To compare with the local backplate settings of the connected DPS loudspeakers/subwoofer, you can set the Network switch on their back to LOCAL.

All monitors and subwoofers need to be set to local, as the KH 80 contains room alignment filters as well as the KH 750.

Note! Do not change any settings at the backplate of the DSP loudspeakers/subwoofer during the alignment process.



If you set the switch back to NETWORK, the previously stored calibration will be active again. Please note that if you want to recalibrate the system, the alignment process needs to be started from the beginning.

You cannot recall the result screen after the application has been closed.