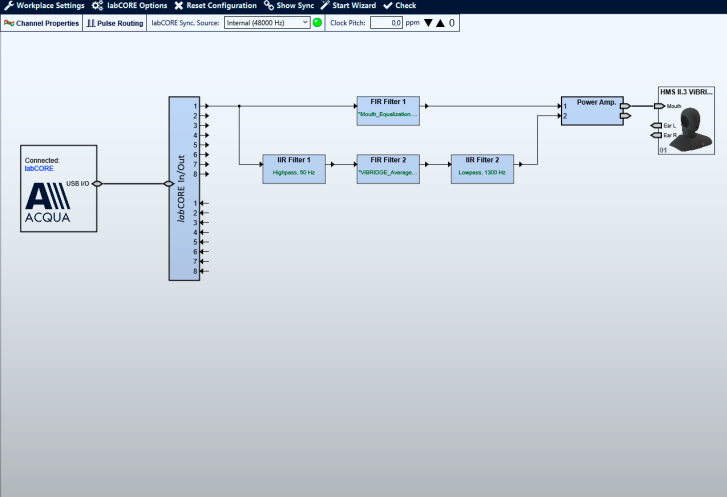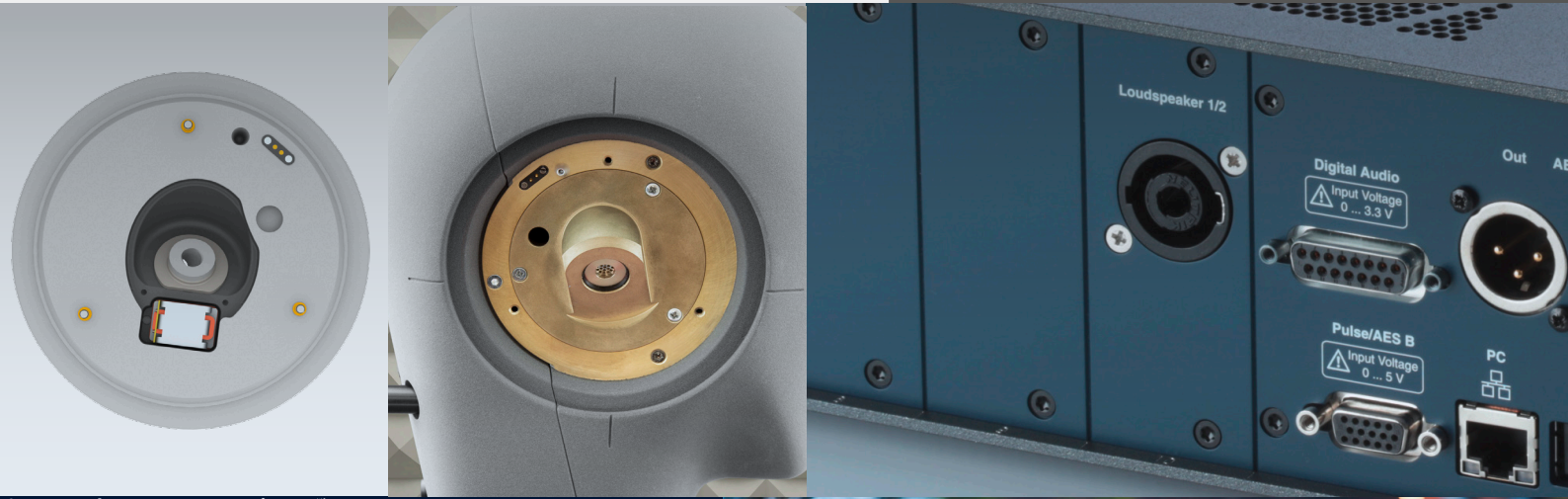# ViBRIDGE

ViBRIDGE application in ACQUA

Application Guide

ViBRIDGE application in ACQUA

Revision 0

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Table of contents

1 Introduction

Headset manufacturers increasingly consider noise-free bone conduction to improve speech transmission in their in-ear headsets. Especially in noise-filled environments, the voice of the near-end talker can be separated better from ambient noise or concurrent talkers if in-ear headsets utilize bone conduction. The consideration of bone conduction is the basis for optimally suppressing noise and thus improving speech quality.

HEAD acoustics provides the complete all-in-one solution for testing, optimizing, and validating headsets with voice pick up sensors. The measurements require the HMS II.3 ViBRIDGE artificial head including the HEL/HER 4.4 ViBRIDGE artificial ears combined with the *lab*CORE hardware platform. The ACQUA software application provides control and data acquisition for HMS II.3 ViBRIDGE and *lab*CORE.

For applying ViBRIDGE in standalone ACQUA measurements or measurements with ACQUA standards, some adjustments are necessary in the hardware configuration interface. This document presents equipment and procedure for using ViBRIDGE technology with ACQUA and *lab*CORE.

2 Requirements

2.1 Equipment

2.1.1 General

The listed equipment is necessary for accomplishing this procedure. Further equipment may be necessary for including a device under test in the configuration. The instructions in this document require at least basic knowledge about utilizing the ACQUA software.
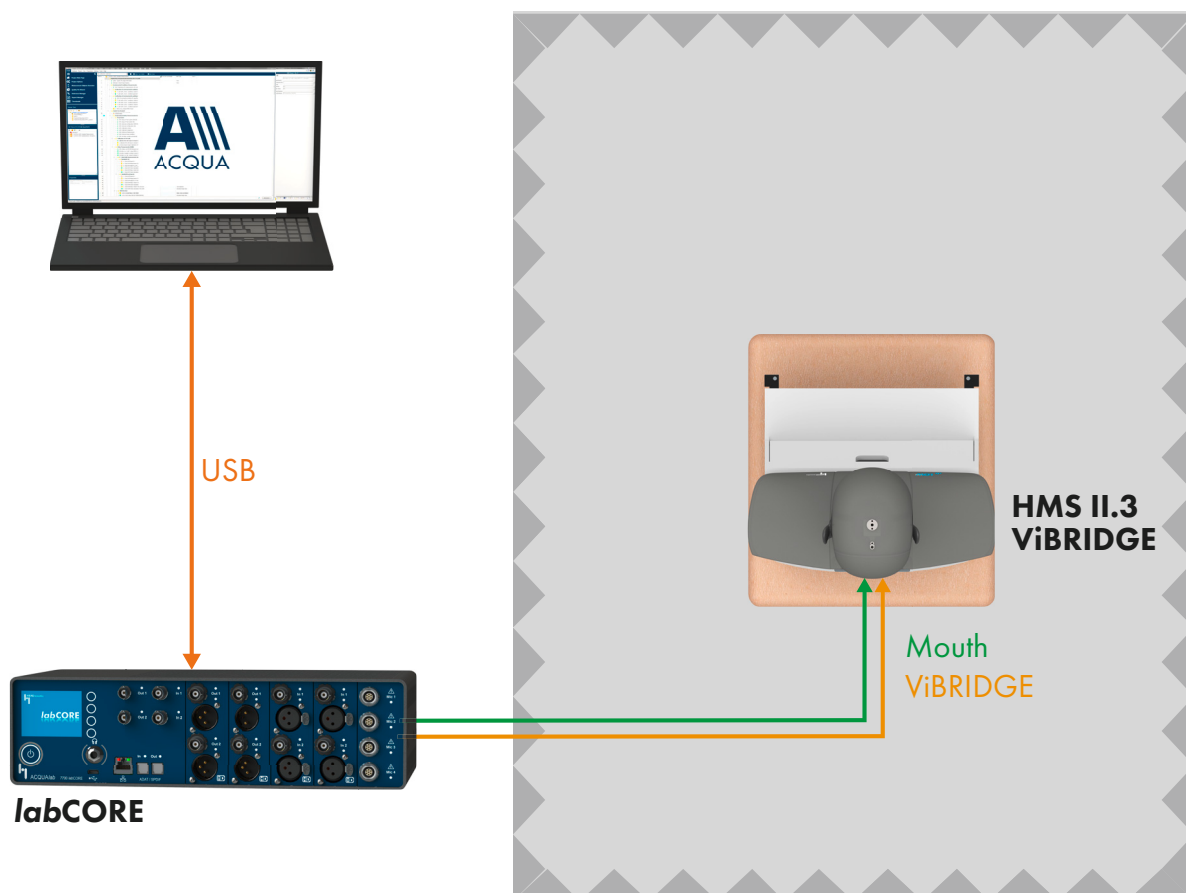
2.1.2 Hardware requirements

- *lab*CORE with firmware version 3.5.15 (at least)
- *core*BUS
- *core*OUT-Amp2
- HMS II.3 ViBRIDGE

2.1.3 Software requirements

- ACQUA version 6.0.200 (at least)
- ViBRIDGE filter file (*.hdf) for HMS II.3 ViBRIDGE

2.2 Preparations

2.2.1 Interconnections

- Connect HMS II.3 ViBRIDGE to *core*OUT-Amp2 with cable CSS V.3.
- Connect *lab*CORE to ACQUA PC with cable CUSB II.5.

2.2.2 Mouth equalization for HMS II.3 ViBRIDGE

Applying the mouth loudspeaker of HMS II.3 ViBRIDGE requires an appropriate equalization of the loudspeaker. Refer to HMS II.3 Series manual or ACQUA Online Help for instructions to execute the mouth equalization.

2.2.3 Information on HQS-ViBRIDGE

The procedure described in this document does not apply to measurements with HQS-ViBRIDGE. HQS-ViBRIDGE already implements the necessary filters in its single measurement descriptors.

3 ViBRIDGE implementation in *lab*CORE

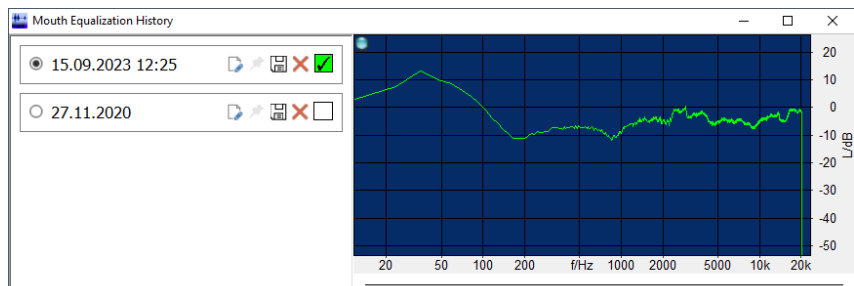## 3.1 Activating mouth equalization in *lab*CORE

1. Start ACQUA.

2. Open the **Hardware Configuration**.

3. Select the **Workplace settings**.

4. Select **Assignments** > **HATS**.

5. Select **+**.
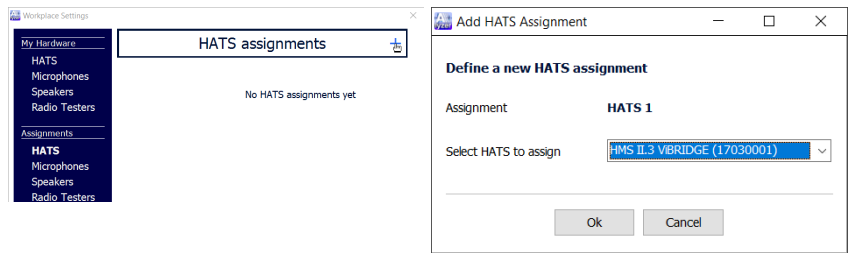
6. Select the desired HMS II.3 ViBRIDGE from the drop-down list.

7. Select **OK** and close the **Workplace settings**.

8. Drag and drop one **HATS block** from **Assignments** to the configuration section to apply the desired HMS II.3 ViBRIDGE.

9. Double-click on the **HATS block** to open the **HATS settings**.
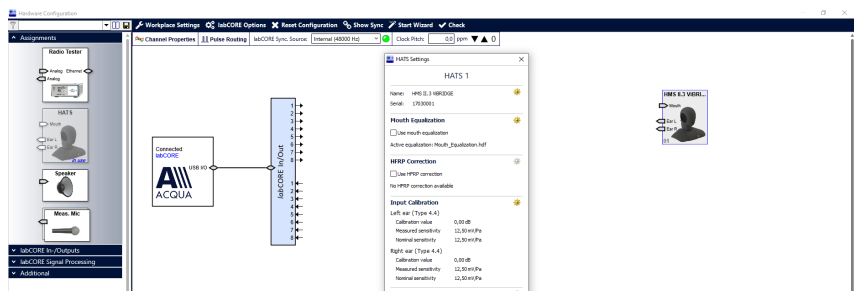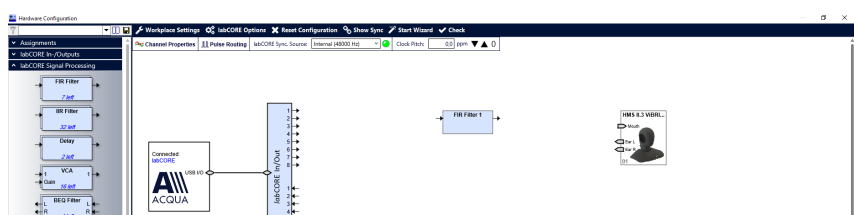
10. Select **Mouth Equalization** > ☀ to open the **Mouth Equalization History**.

11. Select 💾 and save the desired mouth equalization in any directory.

12. Select **OK** to close the **Mouth Equalization History**.

13. Disable **Use mouth equalization** in the **HATS settings**.
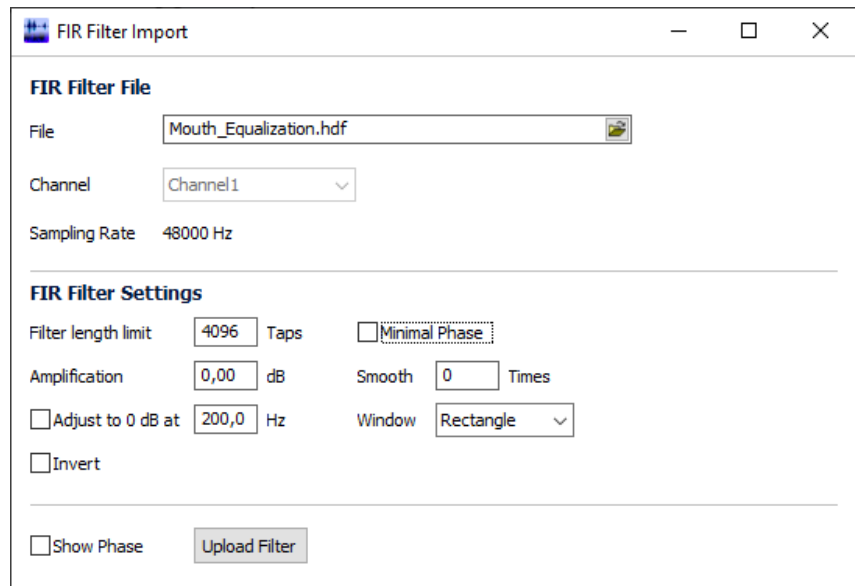
14. Close the **HATS settings**.

15. Drag and drop one **FIR filter block** from **labCORE Signal Processing** to the configuration section.

16. Double-click on the **FIR filter block** to open the **FIR Filter Settings**.
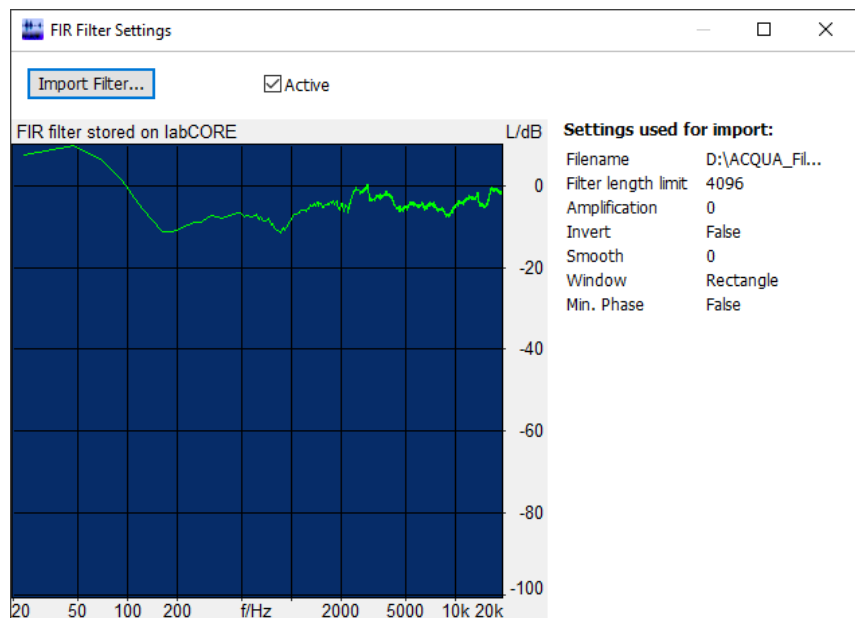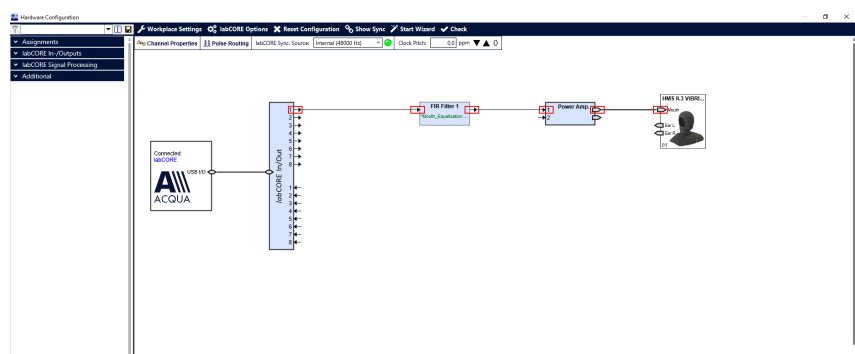
17. Select **Import Filter...**

18. Select **File** > 📂.
19. Browse and select the mouth equalization file from step 11.
20. Set **Filter length limit** to 4096 taps.
21. Select **Upload Filter**. ACQUA uploads the filter to *lab*CORE.
22. Close **FIR Filter Import**.

23. Make sure **Active** is enabled.
24. Close the **FIR Filter Settings**.


25. Drag and drop the **Power Amp. block** from **labCORE In-/Outputs** to the configuration section.
26. Connect output channel 1 (⊢➤) from the **labCORE In/out block** to the **FIR filter block** (➤).
27. Connect the **FIR filter block** (⊢➤) to channel 1 (➤) of the **Power Amp. block**.
28. Connect the **Power Amp. block** output (▷) to the **Mouth** input (▷) of the **HATS block**.
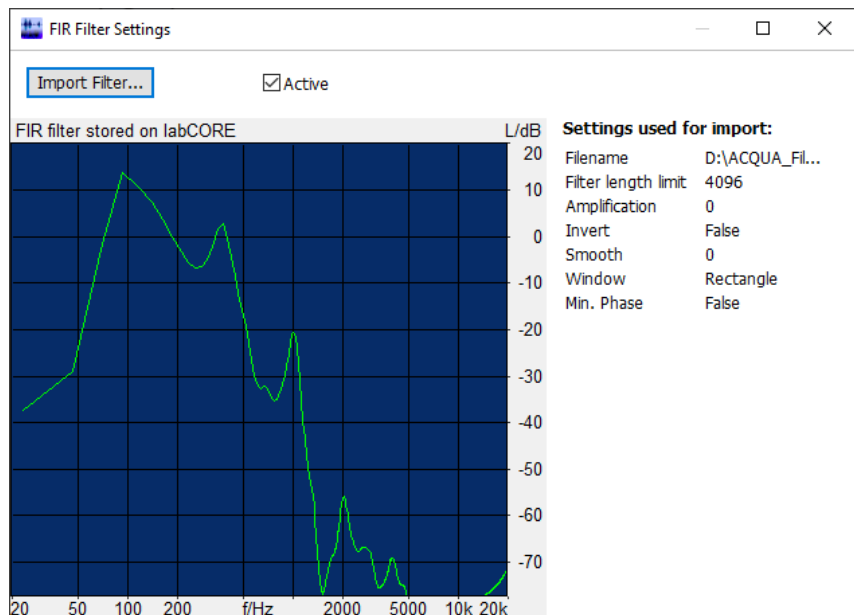
3.2 Activating ViBRIDGE filter in *lab*CORE

1. Drag and drop a second **FIR filter block** to the configuration section.
2. Double-click on the second **FIR filter block** to open the **FIR Filter Settings**.
3. Select **Import Filter...**
4. Select **File** > 📂.
5. Browse and select the ViBRIDGE filter file of HMS II.3 ViBRIDGE.
6. Set **Filter length limit** to 4096 taps.
7. Select **Upload Filter**. ACQUA uploads the filter to *lab*CORE.
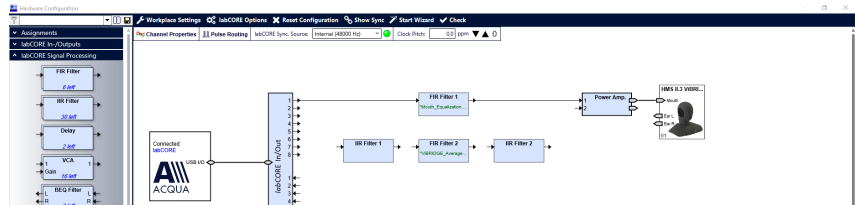8. Close **FIR Filter Import**.
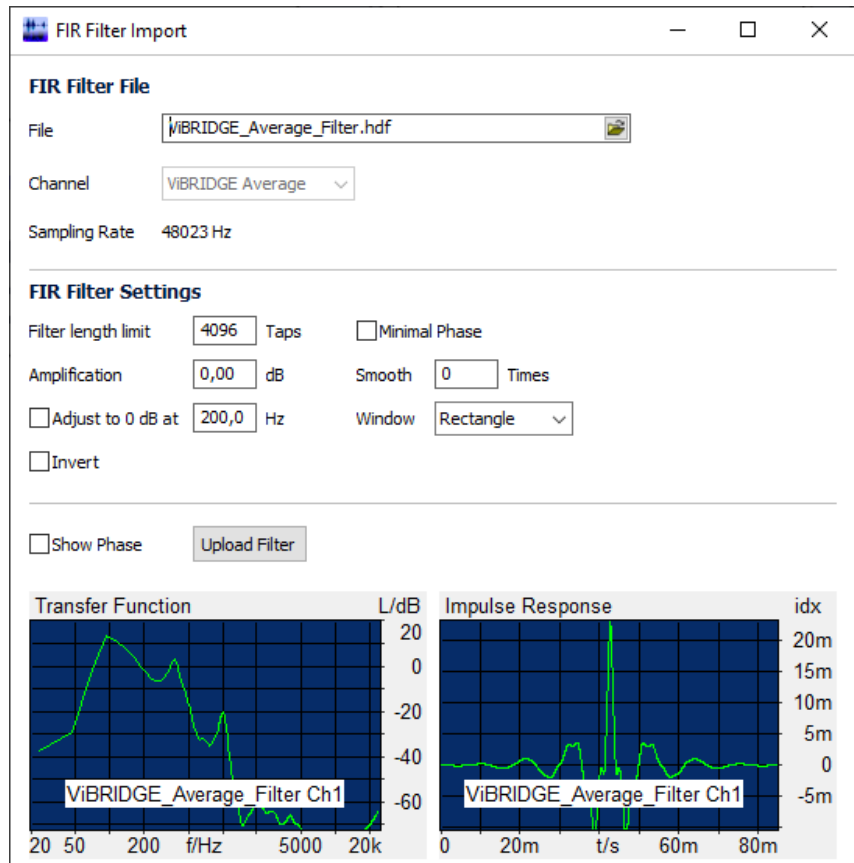
9. Make sure **Active** is enabled.
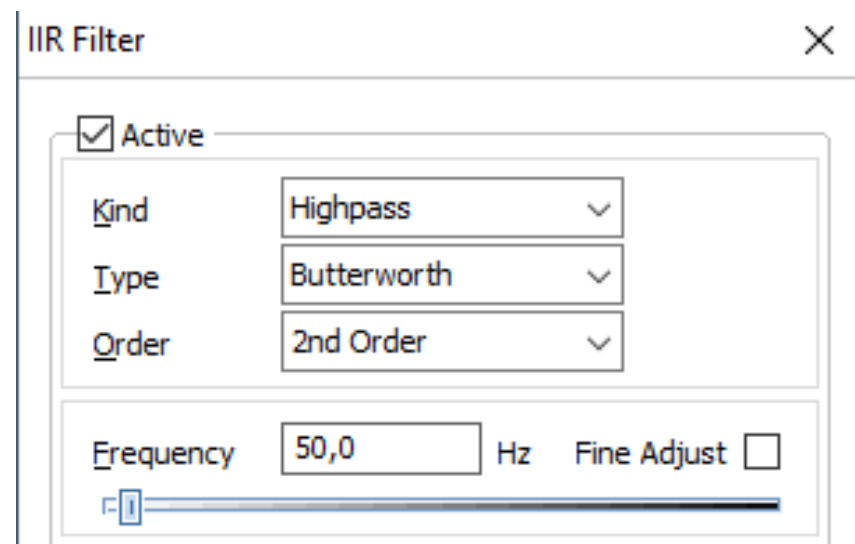10. Close the **FIR Filter Settings**.

3.3 Activating IIR filter for ViBRIDGE in *lab*CORE

1. Drag and drop two **IIR filter blocks** from **labCORE Signal Processing** to the configuration section and position them left and right of the second **FIR filter block**.

2. Double-click on the left **IIR filter block** to open the **IIR Filter** settings.
3. Enable **Active**.
4. Set **Kind** to **Highpass**.
5. Set **Type** to **Butterworth**.
6. Set **Order** to **2nd Order**.
7. Set **Frequency** to **50 Hz**.
8. Close the **IIR Filter** settings.

9. Double-click on the right **IIR filter block** to open the **IIR Filter** settings.
10. Enable **Active**.
11. Set **Kind** to **Lowpass**.
12. Set **Type** to **Butterworth**.
13. Set **Order** to **2nd Order**.
14. Set **Frequency** to **1300 Hz**.
15. Close the **IIR Filter** settings.
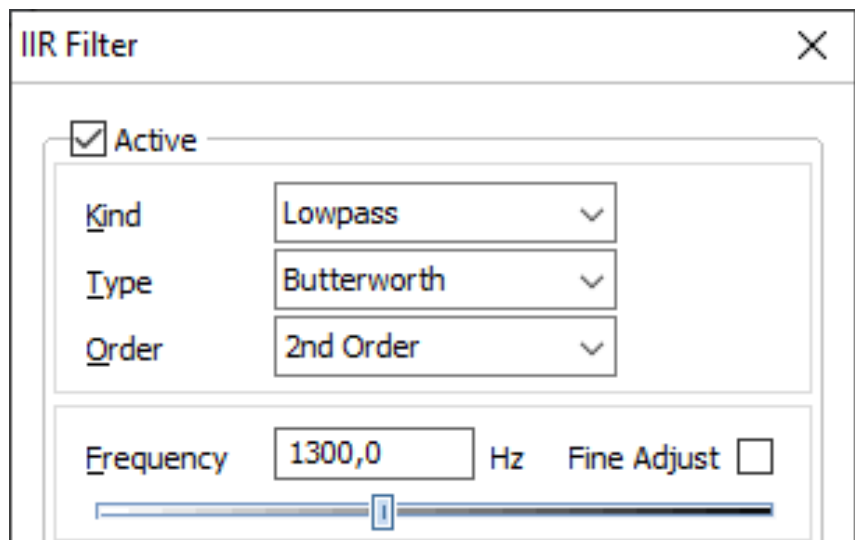
3.4 Final configuration

1. Connect output channel 1 (⊢▶) from the **labCORE In/Out block** to the block **IIR filter Highpass, 50 Hz** (─▶│).

2. Connect the block **IIR filter Highpass, 50 Hz** (⊢▶) to the second **FIR filter block** (─▶│).

3. Connect the second **FIR filter block** (⊢▶) to the block **IIR filter Lowpass, 1300** Hz (─▶│).

4. Connect the block **IIR filter Lowpass, 1300 Hz** (⊢▶) to channel 2 of the **Power Amp. block** (─▶│).

5. The arrangement of the blocks (red box) and the specification of the filters are required for the successful application of ViBRIDGE in ACQUA. Further blocks and connections depend on the application and the device under test.