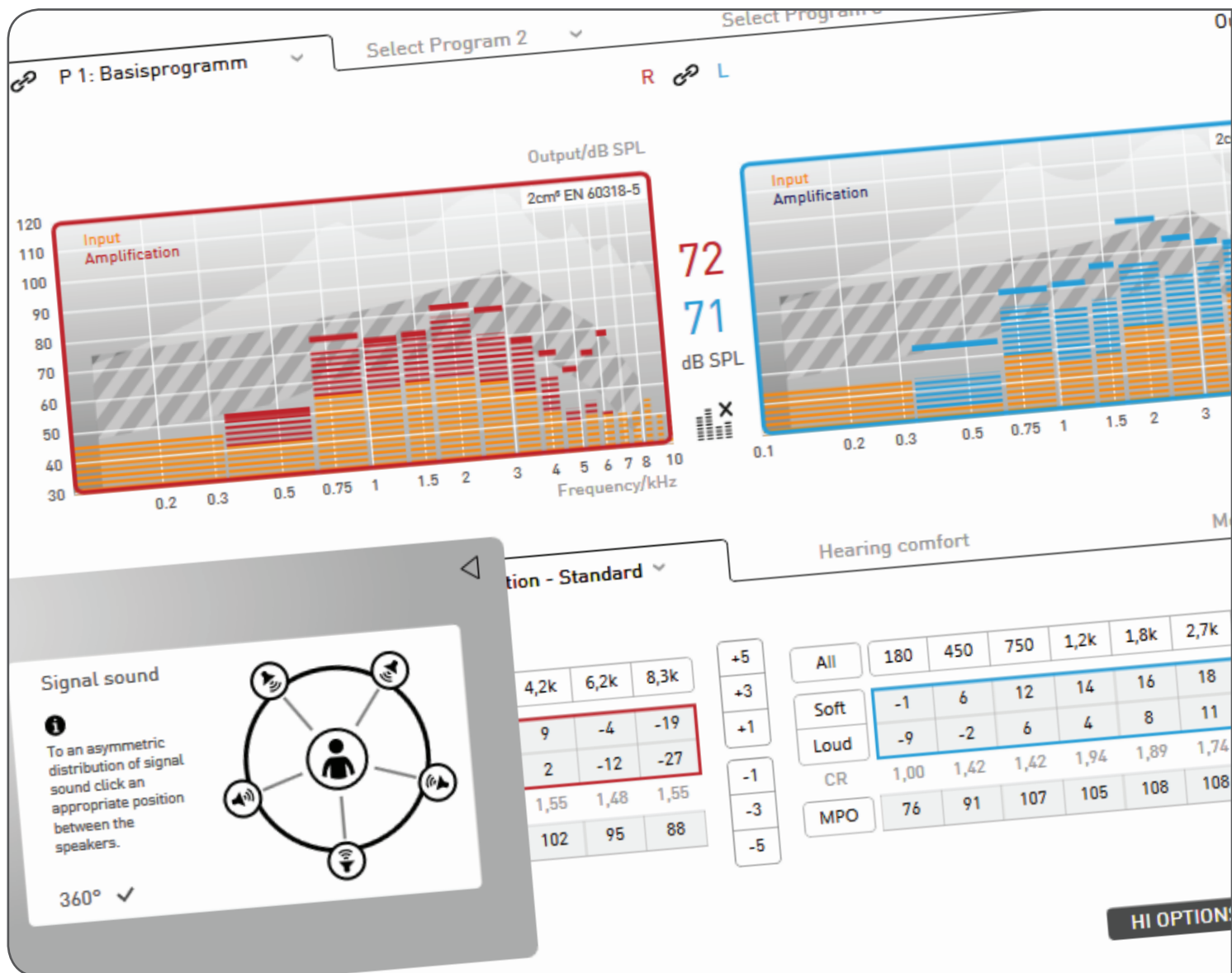


AUDIFIT 5

●● User manual 05/2018



1 Introduction	3
1.1 System requirements	3
2 Fast fitting	4
2.1 Settings after starting the program for the first time	4
2.2 Fast fitting	4
3 User interface	8
3.1 Menu bar section	8
3.2 Fitting mode section	11
3.3 Navigation menu section	11
3.4 ToolBox/MySound! section	12
3.5 Status bar section	15
4 Feedback check	16
4.1 Client management	16
4.2 Hearing devices	17
4.3 Presets	18
4.4 Feedback check	19
4.5 Fitting	21
4.6 Hearing device options	34
4.7 Completion	36
5 Other program options	37
5.1 Follow-up fitting	37
5.2 Exporting/importing client information	37
5.3 User management	38
5.4 Measurement settings	40
6 Troubleshooting	42
7 Key to symbols	45
8 Glossary	46
8.1 Cosma chip platform	46
8.2 Storm chip platform	49

1 Introduction

audifit 5 is a software application used to adjust and configure audifon digital and digitally programmable hearing systems. It was designed for use by hearing instrument experts. The current version, 5.7, supports the following device ranges, including the TRT devices:

- rega
- kami
- sino
- faro
- saga
- libra
- miro
- vico
- sueno
- sueno pro
- via pro

The audifit 5 stand-alone installation features a dedicated database which facilitates efficient management of client data:

- Personal data
- Session list
- Audiogram

In addition, the new GDPR - General Data Protection Regulation – EU 2016/679 (DSGVO - Data Protection Basic Regulation) is supported in both the stand-alone and the Noah version (see 5.3).

1.1 System requirements

audifit 5 can be used on systems that meet the following requirements:

Supported operating systems:

Windows 7, 32- and 64-bit
Windows 8, 32- and 64-bit
Windows 8.1, 32- and 64-bit
Windows 10, 32- and 64-bit

Minimum requirements:

- Hardware: PC with CD drive, 2 GHz CPU, 1.5 GB HDD, 2 GB RAM
- Screen resolution: 1024*768
- Ports: 1 x USB 2.0 for HIPRO USB or NOAHlink
- NOAHlink properties and NOAHlink firmware: Version 1.56.05, Kernel Version 1.55.03, Bootloader 8
- HIPRO: Firmware version 3.00
- Software: NOAH 4, Windows 7, Internet Explorer 6.0, Adobe Acrobat Reader

Recommended:

- Hardware: PC with DVD drive, 2 GHz CPU, 2 GB HDD, 4 GB RAM
- Screen resolution: 1280*1024
- Ports: 1 x USB 2.0 for HIPRO USB or NOAHlink
- NOAHlink properties and NOAHlink firmware: Version 1.56.05, Kernel Version 1.55.03, Bootloader: 8
- HIPRO: Firmware version 3.00
- Software: NOAH 4, Windows 7, Internet Explorer 11, Adobe Acrobat Reader

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Fast fitting

2 Fast fitting

The next few pages outline a fast fitting procedure.

2.1 Settings after starting the program for the first time

After starting audifit 5 for the first time, you must set the following program options (Settings menu → Options):

- Enter user information (name of acoustician, etc.)
- Select the fitting mode, programmer box, wait screen, read protection and languages (the fitting mode must be set to fast fitting)

2.2 Fast fitting

The steps required to fit a hearing instrument are set out below in the quick start guide. Clicking on the appropriate button at the bottom of the screen provides a step-by-step guide for the fitting procedure.

You can also go directly to the desired step by clicking on the menu item.

1. Entering client information and customer audiograms

After the program begins, the client management section appears. Once a new client has been entered or an existing client selected, the client audiogram can be entered by pressing "Add audiogram".

Continue to the next step with "Next session"

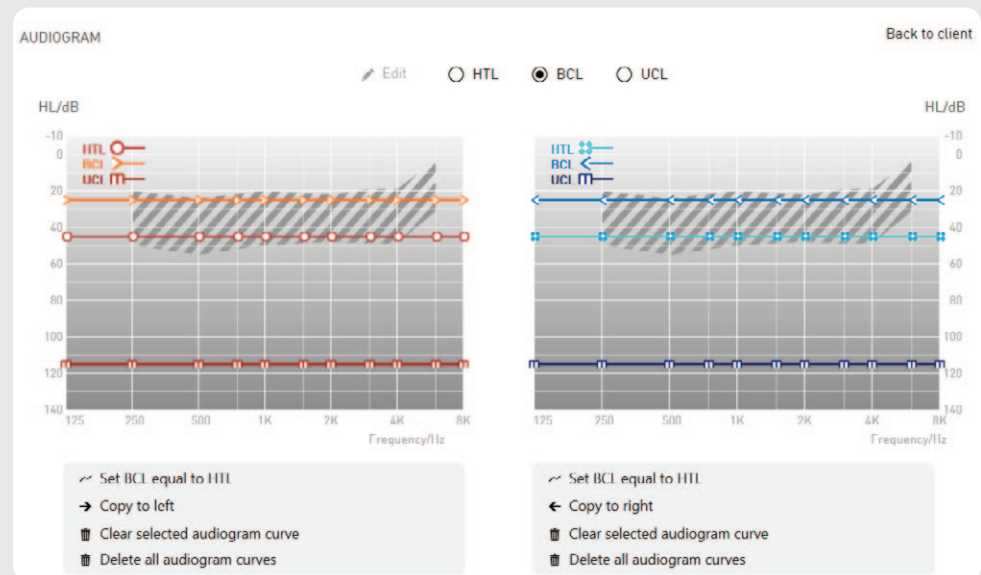


Fig. 1: Stand-alone client audiogram

2. Selecting the hearing instrument

The hearing instrument is selected automatically when it is connected. If you have not yet connected the device, you can select it manually.

Continue to the next step with "Initial fitting"

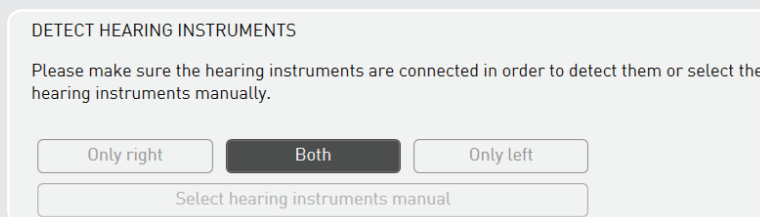


Fig. 2: Automatic hearing instrument detection

3. Selecting the presets

Once the hearing instrument has been selected, the presets "Type of fitting", "Fitting rationale" and "Acclimatisation level" should be selected:

Continue to the next step with "**Fitting – First Fit**"

The screenshot shows a configuration screen for the right (R) and left (L) ears. At the top, there are radio buttons for 'Easy Thin Tube' and 'Standard Tube', with 'Standard Tube' selected. Below this is a 'Venting: Occluded' dropdown menu. The 'Fitting rationale' section has radio buttons for 'Comfort Logix' (selected) and 'NAL-NL1'. The 'Acclimatisation level' section has radio buttons for '1 Novice user' (selected), '2 Experienced user', and '3 Long-term user'.

Fig. 3: Selecting the presets

4. Feedback Check (only available on devices with the "Cosma" chip platform)

The Feedback Check to initialise the Adaptive Feedback Guard is executed before the First Fit and thus individually sets the system to your client's adaptive situation. This optimises the performance of the device in relation to the stability of the gain in conjunction with the selected acoustic connection (ear mould). The duration of the initialisation only takes around ten seconds per side and should be completed at every new fitting.

FEEDBACK CHECK

A measurement signal, to configure the feedback cancellation system in the hearing aids, will be played to the hearing aids.

Please connect the hearing aids to the customer ear and start the test.

The process takes about 10 seconds.

You can also bypass the procedure and start the Feedback Check later out of the toolbox.

Client screen active ✓

Close

Only right

Both

Only left

Fig. 4: Feedback Check start screen

Fast fitting

Feedback Check - Countdown

1


 Client screen active ✓

Fig. 5: Countdown to the start

Feedback Check - Measurement left

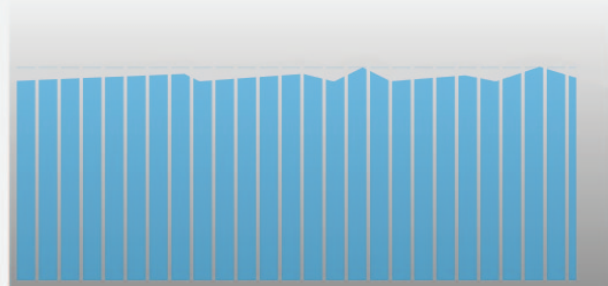


Fig. 6: Feedback Check – right/left test sequence

Apply the settings if the Feedback Check was completed successfully.

Feedback Check - Finalisation


The Feedback Check was successful.



Repeat

Accept

Fig. 7: Feedback check finalisation

 You should also complete the Feedback Check again if you have made major changes to the acoustic connection to the ear (e.g. when switching from Easy Thin Tube to a standard tube with ear mould).

Fast fitting

5. Fitting the hearing instrument

Once the First Fit has been programmed into the instrument, actual fitting can begin. This involves adjusting the following settings in the fitting section: input function, gain, tinnitus module, hearing comfort, equaliser, sound, and compression. The instrument can be fine-tuned with the help of the fitting proposals.

Continue to the next step with "**Completion**"

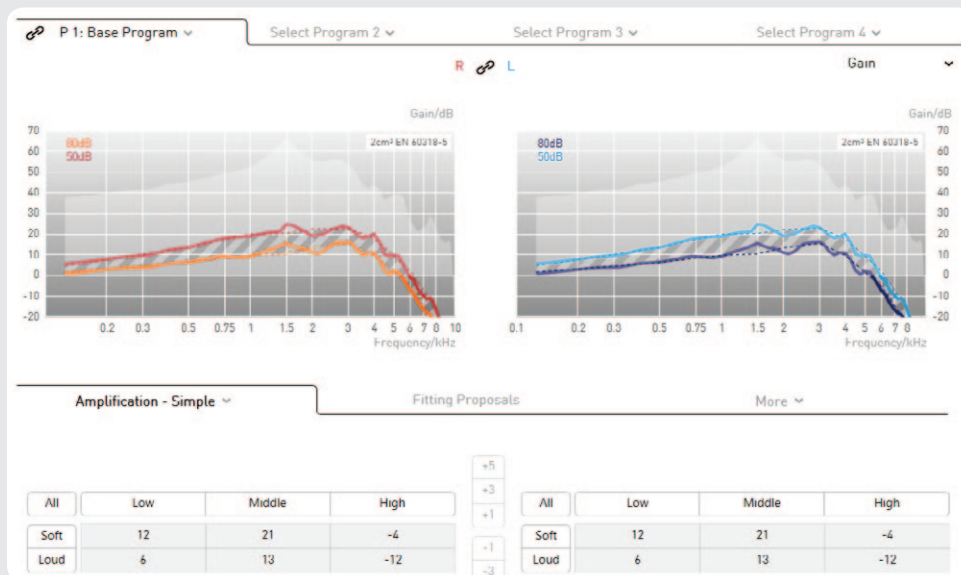


Fig. 8: Fitting the hearing instrument

6. Completing the session

To conclude, information is once again shown about the recent fitting session.

The session is concluded by pressing the "**Burn and save**" button.

User interface

3 User interface

audifit 5 enables the fast and intuitive fitting of hearing instruments. The "Navigation menu" is used to navigate through the fitting session. The "Navigation button" is used to systematically work through the hearing instrument fitting. Once all the settings have been configured in the "Working section", click on the "Navigation button" to go to the next menu item. This guides the user step-by-step through all the menu items.

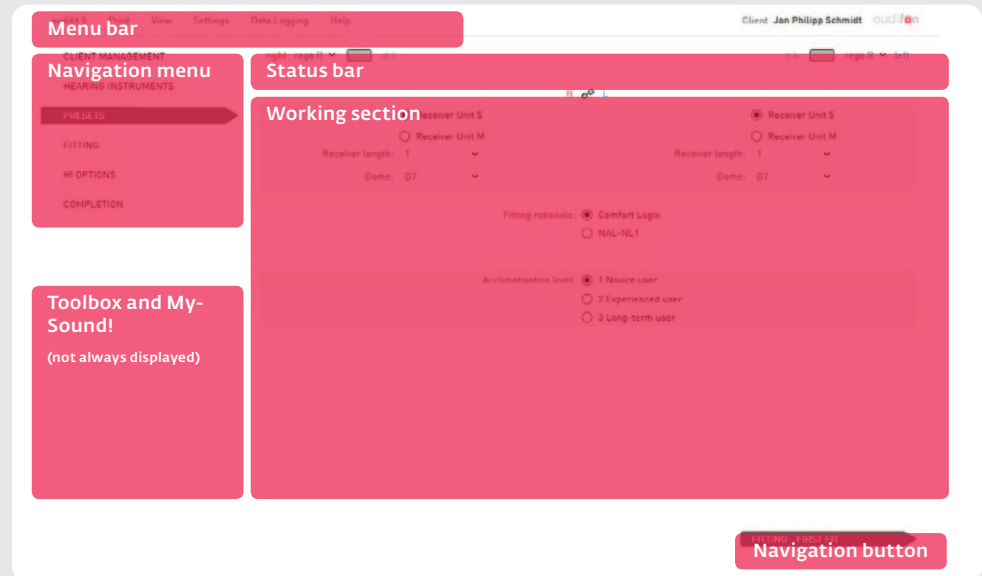


Fig. 9: Screen view

☞ Two additional buttons may appear in the "Navigation button" area. The button with a grey background allows you to make an alternative selection (such as a follow-up fitting). You can return to menu items that have already been worked through at any time by clicking the "Navigation menu".

3.1 Menu bar section

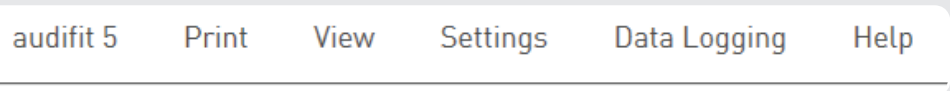


Fig. 10: Menu bar

audifit 5

The menu item "audifit 5" offers the following options:

- Export client information
- Import client information from audifit 4 or audifit 5
- User management
- Save the session
- Exit the program

Print

- Print the fitting report (see page 28)
- Print the appendix to the operating instructions (see page 28)

View

Allows the client screen to be switched on and off on a second monitor.

☞ If a second monitor is available, the client screen will be shown on it by default.

User interface

Settings

Program options are accessed in the menu bar under "Settings" → "Options".
The following settings are available:

- Fitting
- Calibration (MySound!)
- User information

The hearing instruments can be set to maximum test gain under "Measurement settings" (see 5.3).



Warning: Damage to hearing!

The instruments are set to the maximum test gain for measuring purposes. The hearing instrument must not be near the client's ear at this setting! Otherwise there is a risk of damaging the residual hearing.

↳ Fitting

The following settings are available under "Fitting":

- Select default fitting mode
- Programmer box selection
- Wait screen
- Security (read protection)
- Language

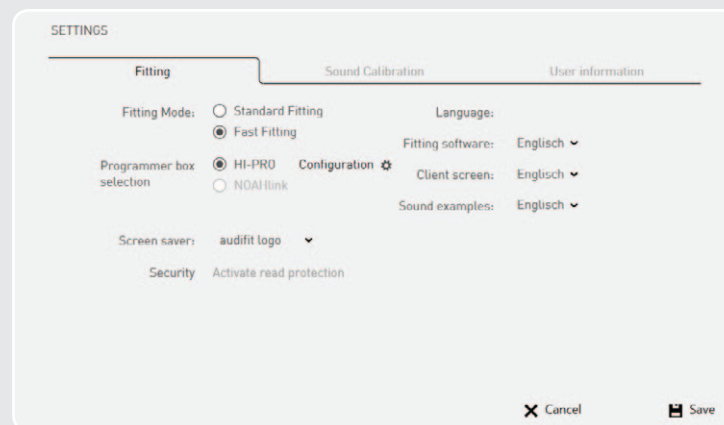


Fig. 11: Program options for fitting

Fitting mode

Allows selection of standard fitting or fast fitting. If fast fitting mode is selected, the "Presets" and "HI options" menu items will be skipped during the procedure (via the navigation buttons). The "Fitting" menu item also has an optimised layout.

You can, however, go to the skipped sections by clicking directly on the menu item. The fitting mode can be changed at any time in the drop-down menu above the menu items.

Programmer box selection

Select the programmer box to be used (such as HI-PRO or NOAHlink).

Wait screen

Allows selection of a logo that (if available) appears on the client screen during the fitting.

User interface

Security

Allows activation or deactivation of readout protection for the hearing instrument. If read protection is to be used for all fittings, a PIN code can be entered here.

Language

Select the language for software, client screen and sound examples. The client screen appears in the client's language, while the fitting software appears in the language of the acoustician. The appendix to the operating instructions is printed out in the client's language. The sound examples are played back in the client's language.

↳ Calibration

Allows calibration of the 5.0-channel MySound! system with any sound level meter. This means that a noise can be played back for each of the five speakers.

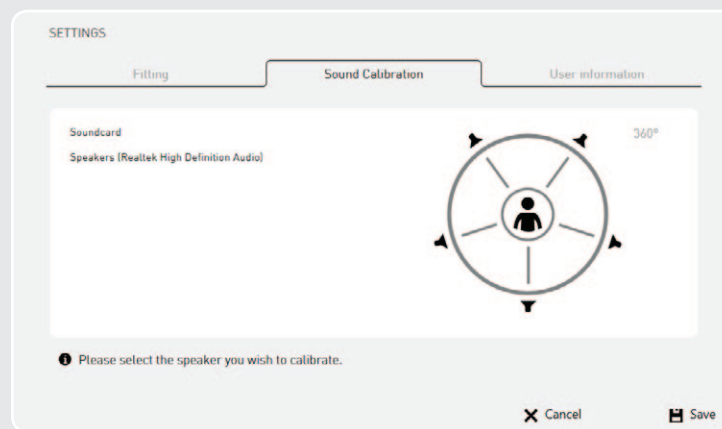


Fig. 12: Calibration of the MySound! system

↳ User information

Enter the name and address of the acoustician and select a logo.

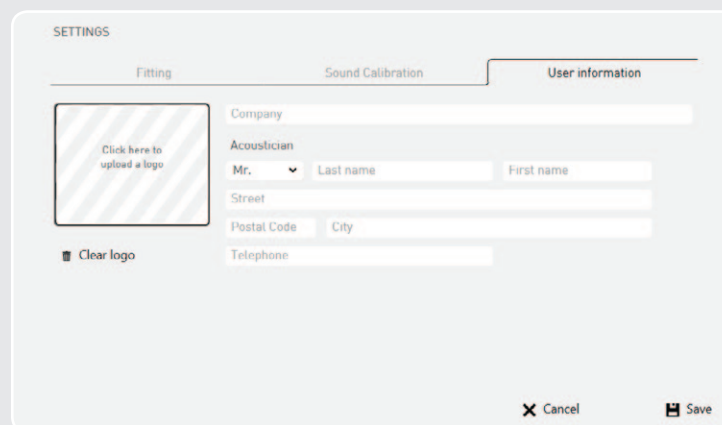


Fig. 13: Entering user information

Data logging

The data logging function records the client's usage behaviour. The recorded data can be displayed and read out by clicking on "Data logging" in the menu bar:

- Display recorded data (shows the data read out from a previously saved session)
- Read out recorded data (reads out and displays data from a connected hearing instrument)

User interface

The graph of the recorded data contains information about the duration of usage, duration of use per program, and Sound Dynamix.

☞ "Data logging" records your client's usage behaviour. Explain the function to your client before you activate it and observe the relevant data protection guidelines in your country.

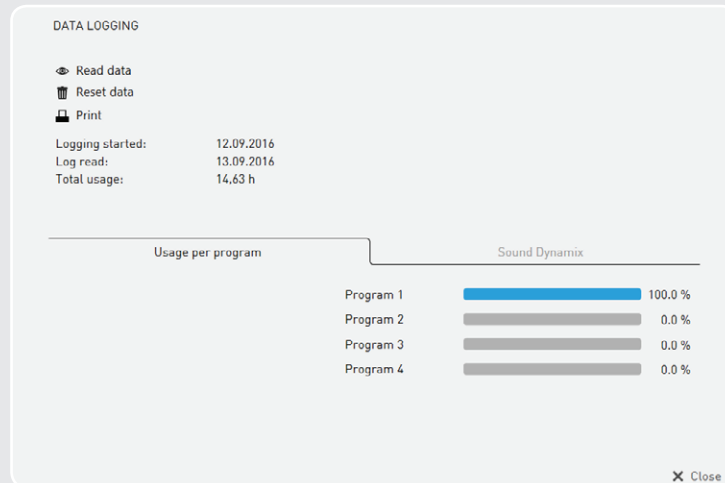


Fig. 14: Display of recorded data

☞ To display/read out the logged data, the "data logging" option, if available for the hearing instrument, must be enabled (see 4.6.4).

3.2 Fitting mode section

Here you can choose between the "Fast fitting" and "Standard fitting" fitting modes.

If fast fitting mode is selected, the "Presets" and "HI options" menu items will be skipped during the procedure (via the navigation buttons). The "Fitting" menu item also has a simplified layout.

You can, however, go to the skipped sections by clicking directly on the menu item. The fitting mode can be changed at any time in the drop-down menu above the menu items.

☞ The desired fitting mode can be set as the default in the settings (see 3.1.4.1).

3.3 Navigation menu section

The navigation menu guides the user step-by-step through the hearing instrument fitting. The individual menu items can be selected directly or accessed with the "Navigation buttons" during a systematic fitting procedure.

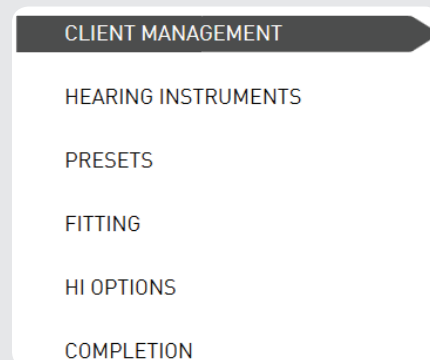


Fig. 15: Navigation menu

☞ Greyed-out menu items can only be selected once the necessary information (such as the audiogram) has been entered.

3.4 ToolBox / MySound! section

ToolBox

The ToolBox offers further selection options during the hearing instrument fitting ("Fitting" and "HI options" menu items):

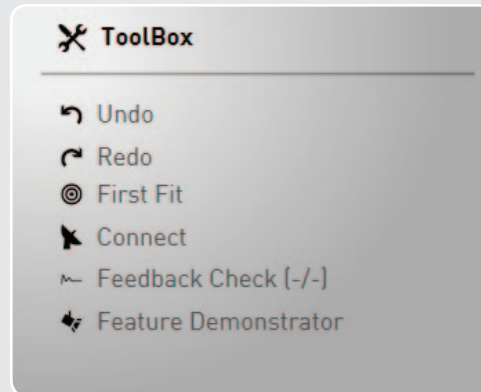


Fig. 16: ToolBox

↳ Undo/redo

Allows device to be reset to the last configured setting or the re-implementation of a setting that has just been changed (such as gain). Both options (undo/redo) will be discarded upon leaving the current navigation section.

↳ First Fit

Creates a First Fit based on the audiogram entered and presets selected.

↳ Connect

Connects to the hearing instruments.

↳ Feedback Check

Starts the Feedback Check to initialise the Feedback Guard.

↳ Read out hearing instrument

Reads out the settings from the hearing instruments.

↳ Program

Saves all the settings to the hearing instruments

↳ Feature Demonstrator

The Feature Demonstrator allows the demonstration of various hearing instrument features by playing back sound examples.

User interface

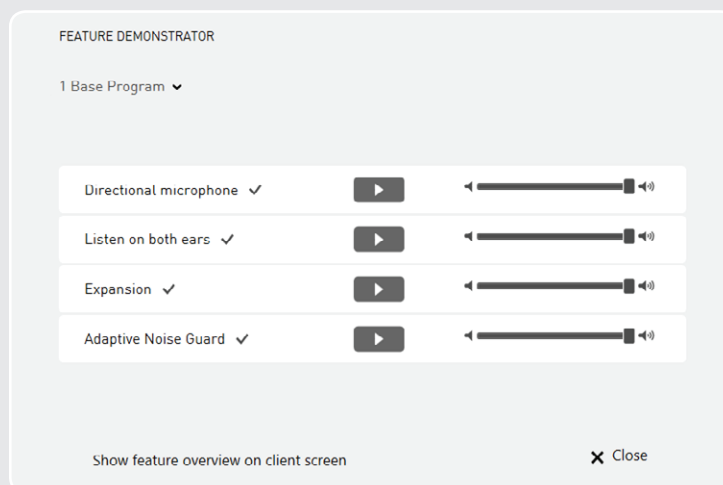


Fig. 17: Feature Demonstrator

The steps below summarise the use of the Feature Demonstrator:

- Select the hearing instrument program in which the feature is to be demonstrated
- Select the active hearing instrument features by clicking on the feature
- Play back the sound example by clicking on the play button of the desired feature
- The nature of the sound examples changes over time. It is therefore recommended that the sounds are played in their entirety.
- During sound playback, the client can activate/deactivate the feature himself on the client screen and experience its effect.

MySound!

Various hearing situations can be compiled and played back in the MySound! box.

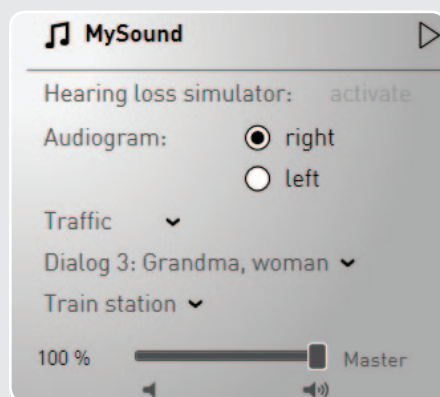


Fig. 18: MySound!

User interface

Hardware setup

MySound! is optimised for the following hardware setup:

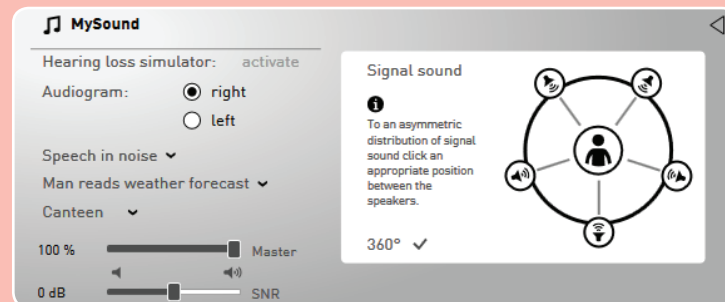
- A special five-channel MySound! amplifier in conjunction with broadband speakers can quickly switch between surround sound and free-field audiometry. The MySound! amplifier allows calibration of the entire system with any audiometer.
- Any standard 5.1 sound system with subwoofer can be used. Please note, that in this case, the system cannot be perfectly calibrated.
- MySound! allows interactive advice and fitting based on a hardware setup with two monitors: one for the hearing care professional and the other monitor (response monitor) for the client. A touchscreen is recommended for the client.

MySound! uses sound examples to enable the interactive fine-tuning of the hearing instruments in three steps (see page 16 ff):

- Mixing ambient noises (such as traffic or a restaurant) and useful sounds (such as dialogue or siren) to simulate realistic sound environments.
- Scale selection (volume or sound) and evaluation of the sound environment by the client.
- Depending on the client's response, the expert system proposes adjustment options. The fitting proposals can be programmed directly into the hearing instruments.

Fitting tip:

Position and move the useful sound around the different speakers. To do this, expand the MySound! box by clicking on the arrow. Use this versatile tool to test the client's spatial and directional hearing.



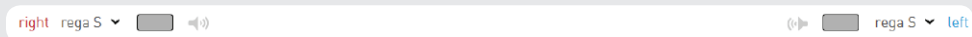
The hearing loss simulator ("Activate hearing loss simulator" button) simulates the client's hearing loss and makes it audible to others. To this end, the audio reproduction of the sound example played back is dampened to the degree reflected by the hearing loss entered in the audiogram. The client's hearing sensation can thus be reproduced for an outsider.

User interface





3.5 Status bar section


The status bar displays the following:

- Selected hearing instruments
- Clicking the down arrow allows individual reading out or connection of the hearing instruments or the performance of a First Fit.
- Communication status of the connected hearing instruments
- Mute the connected hearing instruments (click on speaker button)



The following status information is displayed:

-  The hearing instrument is not connected
-  The hearing instrument is connected and has been modified
-  The hearing instrument is connected
-  A communication error has occurred with the hearing instrument

 The green status indicates that the settings displayed match the settings in the hearing instrument. The yellow status indicates that the settings configured in the software have been transferred to the hearing instrument but have not yet been permanently programmed.

Fitting procedure

4 Fitting procedure

4.1 Client management

Client management appears at the start of every hearing instrument fitting. This is where the following client data can be managed:

- Personal data
- Session list
- Audiogram

Client list

New clients can be created or existing clients selected by double-clicking in the client list.

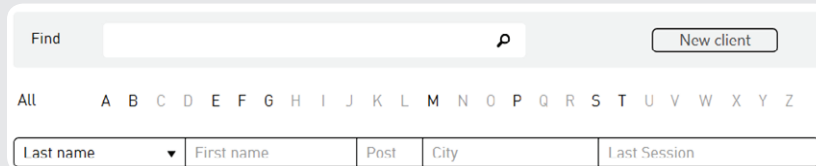


Fig. 20: Client database

Entering client data

When you create a new client or select an existing client, the client data view will appear. Here, the client audiogram can be added or edited. Previous sessions can also be accessed.

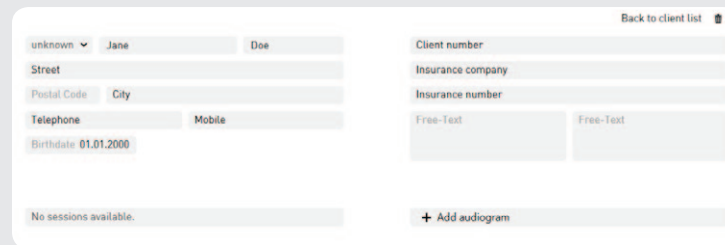



Fig. 21: Entering client data

 To create a client, you need to enter at least a first name and a surname. A hearing instrument cannot be fitted unless audiogram data points have been entered. To delete a client from the client list, click on the adjacent "Delete current client data" button.

Entering an audiogram

Once a client has been created/selected, the audiogram screen can be accessed by clicking on "Add audiogram" or "Edit". Clicking on "Edit" again will open the audiogram data points for editing.

The following threshold values can be entered:

- HTL – Air conduction threshold
- BCL – Bone conduction threshold
- UCL – Uncomfortable level

Fitting procedure

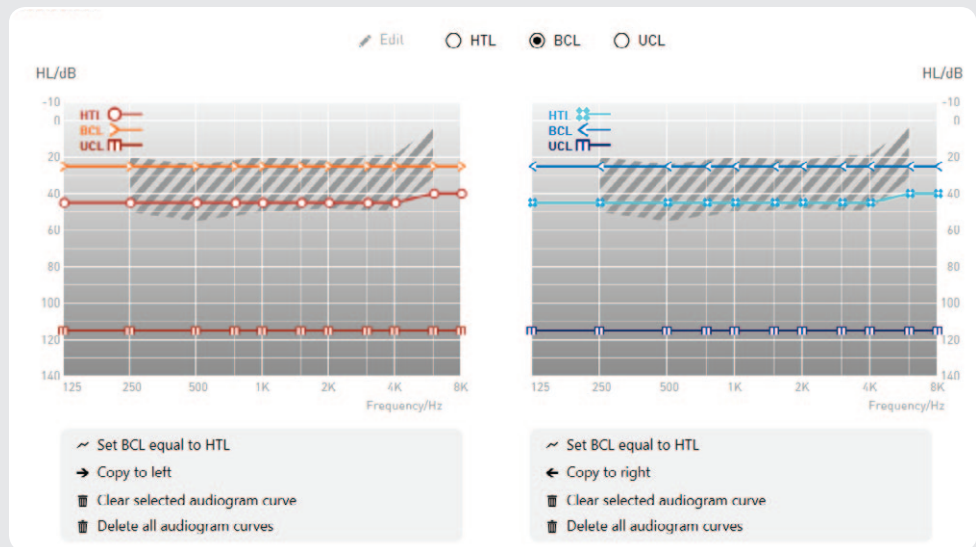


Fig. 22: Entering audiogram data points

Additional data that can be entered:

- "Set HTL equal to BCL" – sets the air conduction threshold equal to the bone conduction threshold
- "Copy to left/right" – copies the audiogram from the other side
- "Clear selected audiogram curve" – deletes the selected curve only
- "Delete all audiogram curves" – deletes the audiogram data points entered

Once audiogram data point entry is complete, continue to the next step by clicking the "Next session" button or enter client data with "Back to client". Either way, the audiogram data points entered will be saved.

4.2 Hearing instruments

The hearing instruments used for the fitting must be selected. This can be done automatically (for both/just right/just left) or manually.

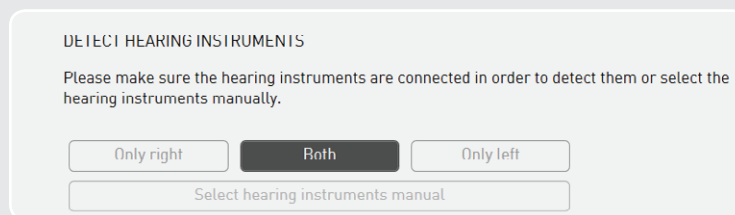


Fig. 23: Detecting the hearing instrument



Warning: Damage to hearing!

The hearing instrument is not yet set for the client at the initial fitting. The hearing instrument must not be placed to the client's ear until after the First Fit! Otherwise there is a risk of damaging the residual hearing.

Automatic hearing instrument detection

To automatically select the hearing instruments, connect them using a suitable programming cable. The detected hearing instruments will be displayed with the serial numbers for the respective side (right/left).

Fitting procedure

RITE hearing instruments (Receiver In The Ear)

☞ Receiver unit S is the default setting for RITE hearing instruments. If another type of receiver unit is used, select it in the next step, "Presets". The follow-up fitting for new sessions is taken on by the receiver unit from the connected device.

CROS/BiCROS hearing instruments

☞ The receiver (Rx) and transmitter (Tx) must always be combined for CROS/BiCROS hearing instruments.

Selecting hearing instruments manually

Alternatively, the hearing instruments can be selected manually. To do so, select the desired hearing instruments.

RITE hearing instruments (Receiver In The Ear)

☞ For RITE hearing instruments, also select the receiver unit used.

CROS/BiCROS hearing instruments

☞ For CROS/BiCROS hearing instruments, always select the receiver (Rx) and transmitter (Tx). The selection is supported by a selection assistant.

Further information

After the hearing instruments have been selected, the following information about them is available:

- Data specification
- Fitting range (with air conduction audiogram)
- Features
- Colour options

☞ If the fitting range area is shaded, the fitting range refers to devices with open fitting.

4.3 Presets

Configure the following settings in the "Presets" section:

- Type of fitting
- Fitting rationale
- Acclimatisation level

R L

Easy Thin Tube
 Standard Tube
Venting: Occluded

Easy Thin Tube
 Standard Tube
Venting: Occluded

Fitting rationale: Comfort Logix
 NAL-NL1

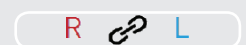
Acclimatisation level: 1 Novice user
 2 Experienced user
 3 Long-term user

Set programs for multistreamer usage ✓

Fig. 24: Presets

Ear pairing

If the hearing instrument fitting is for both ears, the presets for the right and left sides can be linked by pressing "Pairing of settings in both devices".



Fitting procedure

CROS/BiCROS hearing instruments are always fitted online and do not allow ear pairing.

Type of fitting

Depending on the hearing instrument selected, various fitting options are available:

↳ Fitting BTE hearing instruments

- *Closed fitting (with ear mould):*
If an ear mould is used for the fitting, select the closed fitting and specify the vent diameter.
- *Easy Thin Tube (open fitting with thin sound tube):*
If an open fitting with thin sound tube is used, select the sound tube and dome size.

↳ Fitting ITE hearing instruments

Only the vent diameter must be specified for ITE hearing instruments.

☞ If the vent diameter is greater than 3 mm, select "open".

↳ Fitting RITE (Receiver In The Ear) hearing instruments

For RITE hearing instruments, select the receiver unit used and its length and dome size.

↳ Fitting hearing instruments with the multistreamer accessory

For hearing instruments with the multistreamer accessory, the programs for its use can be automatically preset. This entails setting all possible programs to the determined hearing situations.

↳ Fitting CROS/BiCROS hearing instruments

The CROS settings are displayed for CROS/BiCROS hearing instruments. At this point, CROS or BiCROS can be selected. The CROS setting changes the fitting rationale to NAL-CROS, and the acclimatisation level is not available.



CROS-Settings: BiCROS
 CROS

Fig. 25: CROS settings

Fitting rationale

Selecting the desired fitting rule:

- Comfort Logix (fitting rule optimally tailored to audifon hearing systems)
- NAL-NL1 (developed to maximise speech understanding at a comfortable volume for the client)
- NAL-CROS (fitting rule according to NAL for CROS hearing instruments)

Acclimatisation level

Select one of three possible acclimatisation levels:

- Level 1: Novice user
- Level 2: Experienced user
- Level 3: Long-term user (target gain according to fitting rule)

4.4 Feedback Check (only on devices with the "COSMA" chip platform)

The Feedback Check to initialise the Adaptive Feedback Guard is executed before the First Fit and thus individually sets the system to your client's adaptive situation. This optimises the performance of the device in relation to the stability of the gain in conjunction with the selected acoustic connection (ear mould). The duration of the initialisation only takes around ten seconds per side and should be completed at every new fitting.

Fitting procedure


FEEDBACK CHECK

A measurement signal, to configure the feedback cancellation system in the hearing aids, will be played to the hearing aids.

Please connect the hearing aids to the customer ear and start the test.

The process takes about 10 seconds.

You can also bypass the procedure and start the Feedback Check later out of the toolbox.

 Client screen active ✓

Close

Only right

Both

Only left

Fig. 26: Feedback Check start screen

Before starting the Feedback Check near the client's ear, ensure that the device fits perfectly.

Feedback Check - Countdown

1


 Client screen active ✓

Fig. 27: Countdown to the start

Feedback Check - Measurement left

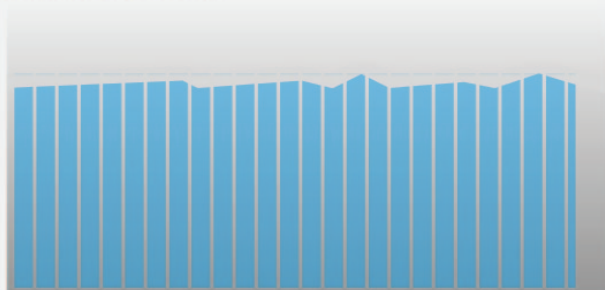


Fig. 28: Feedback Check – right/left test sequence

Apply the settings if the Feedback Check was completed successfully.

Fitting procedure

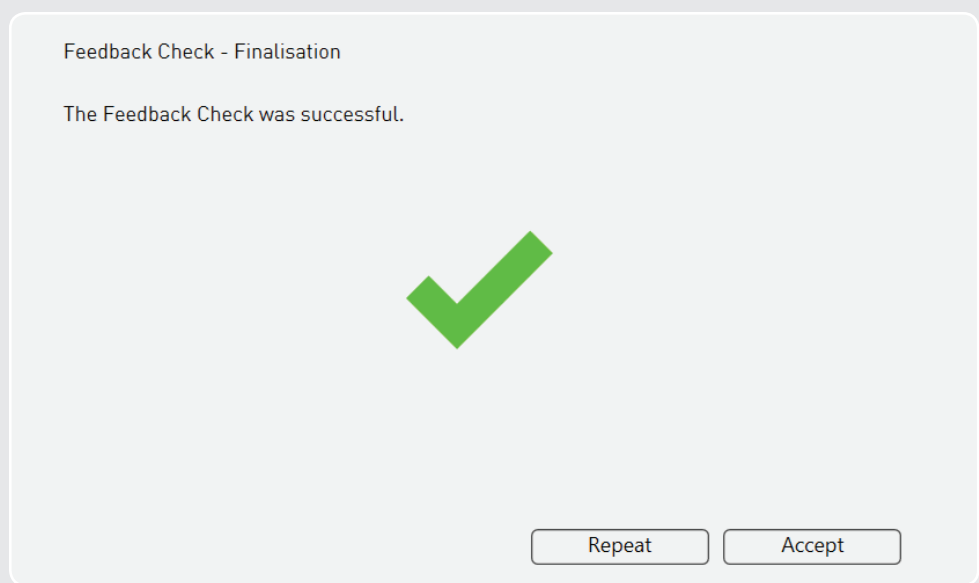


Fig. 29: Feedback check finalisation

☞ You should also complete the Feedback Check again if you have made major changes to the acoustic connection to the ear (e.g. when switching from Easy Thin Tube to a standard tube with ear mould).

4.5 Fitting

The following settings can be configured for the hearing instrument's individual programs in the "Fitting" section:

- Input function
- Gain
- Noise
- Hearing comfort
- Equalizer
- Sound
- Compression
- It is also possible to interactively fine-tune the instrument under "Fitting proposals".

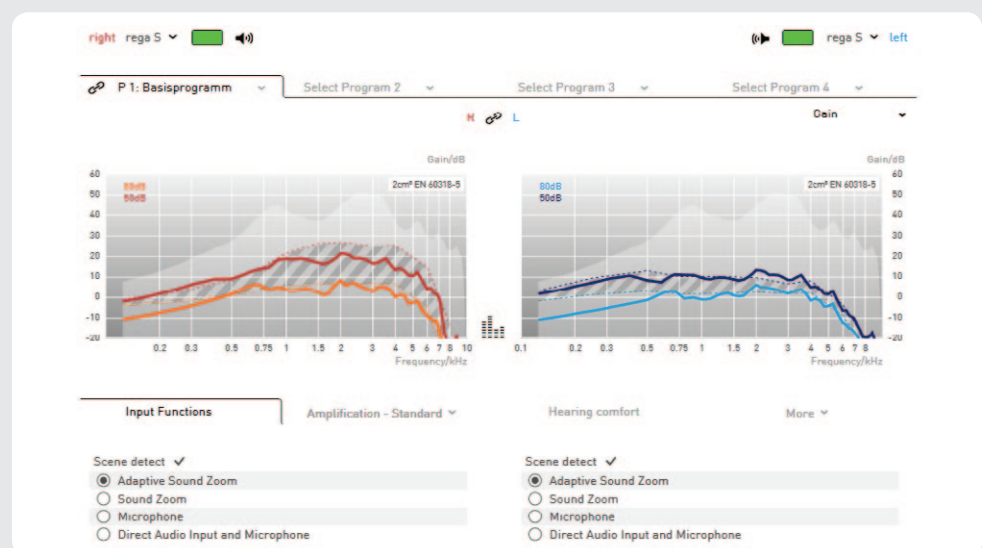


Fig. 30: Overview of the "Fitting" section


The ToolBox and MySound! sections are shown on the left side of the screen during the fitting. The method of displaying the curves can be selected from the drop-down menu in the top right-hand corner.

Fitting procedure

Ear pairing

If the hearing instrument fitting is for both ears, the fitting settings for the right and left side can be linked by pressing "Pair settings on both sides". CROS/BiCROS hearing instruments are always fitted online and do not allow ear pairing.

Program coupling

The settings made in Program 1 (basic program) are transferred to all other programs with the active  button.

Live View

(Cosma chip platform): During fitting, "Live View" can be activated in the "Gain" and "Output" displays. The real level of the sound at the ear is displayed here live. To activate, press the icon between the graphs.

Activate Live View: 

Deactivate Live View: 

Program selection

The individual programs can be selected below the status bar. Clicking on a program opens a drop-down menu from which the desired hearing program (such as "Speech in noise" or "Phone") can be selected.

The following preset hearing programs are available:

- **Speech in noise:** Focuses on speech intelligibility. Speech is retained while background noise is reduced.
- **Music:** Sound-optimised program for playing back music
- **Comfort in noise:** Reduces the output for loud input level -- reduces the gain over the entire frequency range for added hearing comfort in noisy environments.
- **Telephone:** Program optimised for the telephone (activates available telephone loop and microphone)
- **4, 6, 8, 12, and 18 dB lower:** Lowers the gain compared to the basic program.

The following hearing programs are also available for tinnitus devices in the "Tinnitus module" input:

- **Noise combi program:** A combined signal (hearing instrument signal and white noise) is produced to correct the hearing loss and to support tinnitus therapy.
- **Only noise:** Only noise is produced.

faro Program options (only with faro selected as the hearing system)

- faro hearing systems are configured to receive audio signals via multistreamer in Program 3.
- Two options are available in Program 4: Auto T-Coil/Autophone mode or wireless phone streaming (managing phone calls on telephones linked via multistreamer). If the "Binaural T-Coil" hearing situation is selected, "Binaural T-Coil" or "Binaural T-Coil + Microphone" are available as signal sources in Program 4. In these modes, the signal received via the T-Coil is transmitted to the second hearing system so that the signal is audible on both sides.

The following hearing programs can be selected in Program 4 for hearing instruments with the Auto T-Coil or Auto-Phone function:

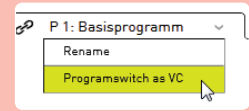
- **Auto T-Coil:** When a telephone receiver is held to the ear, the instrument automatically switches to Program 4 – telephone loop and microphone are activated.
- **Auto Phone:** When a telephone receiver is held to the ear, the instrument automatically switches to Program 4 – a telephone-optimised microphone program is activated.

Fitting procedure

☞ Once the phone call is over (receiver is moved away from ear) the instrument switches back to the last program in use.

☞ Fitting tip: Hearing instruments with just one program switch

If the hearing instrument has just one program switch, the programs available for volume control can be used. To do this, select "Program switch as VC" from the drop-down menu of Program 1.



Input function

Depending on the type of hearing instrument, the desired input function for the selected program can be set:

- Microphone
- Directional microphone
- Line-in
- Line-in and microphone
- Adaptive directional microphone
- Sound Dynamix (including control rate)
- Scene Detect
- Binaural T-Coil
- Binaural T-Coil and microphone

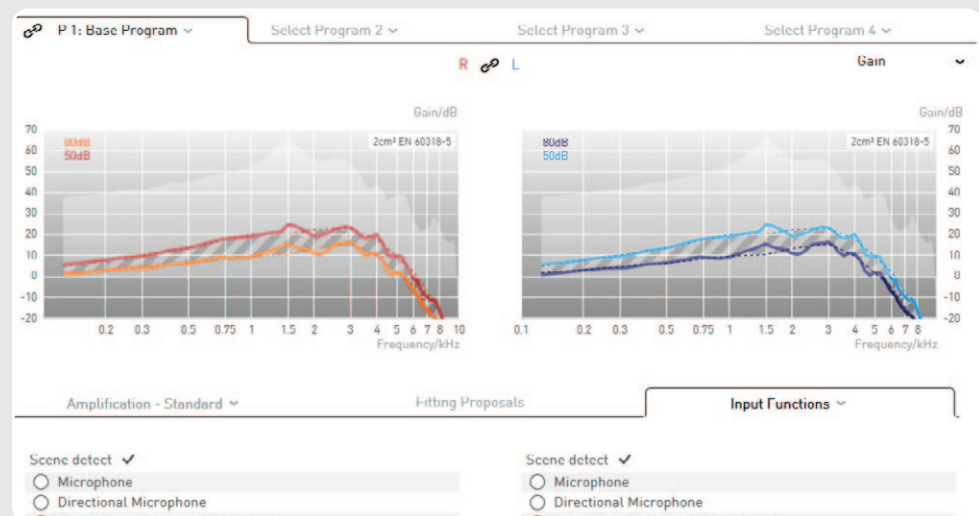


Fig. 31: Input function

☞ Hearing instruments with Sound Dynamix

If the hearing instrument has Sound Dynamix (automatic program toggle), it can be activated as an input function. The hearing instrument will then automatically distinguish between quiet, speech in a quiet setting, noise, speech in a noisy setting, music, and wind. The time it takes to switch programs can be regulated in increments of 5, 10, and 20 seconds. In the individual programs that Sound Dynamix selects, the directional microphones, noise reduction, feedback suppression and gain are affected.

☞ Hearing instruments with Scene Detect

The hearing instruments uses Scene Detect to classify the input signal into seven different categories: Quiet, wind, machine noise, music, speech in a quiet setting, speech in a noisy setting and other noise. Depending on the classification, the settings for the Adaptive Feedback Guard, Adaptive Noise Guard, Machine Noise Guard and Wind Shield are automatically optimised for the hearing situation detected in each case (see 4.5.6. for description of the individual features). A special gain setting is also implemented for the music input signal.

Fitting procedure

- ↳ *Wireless hearing instruments with binaural telephony*
For hearing instruments with binaural telephony, which are selected in Auto-Program/Program 4, the input function options for the T-Coil are with and without microphone.
- ↳ *CROS/BiCROS hearing instruments*
For CROS/BiCROS hearing instruments, the input function is only available on the receiver (Rx) side. In CROS mode, only the microphone is available and always active.

Gain

The gain table shown allows setting of the channel gain.

Select the gain values to be changed:

- Select individual gain values in the table by clicking on a cell or dragging the cursor over several cells.
- The "All" button selects all cells.
- The "Soft" and "Loud" buttons select the entire row.
- Clicking on the frequency selects the entire column.

Clicking on the "+" and "-" buttons changes the selected gain values by the specified increment.



Warning: Damage to hearing!

On devices with an output sound intensity greater or equal to 132 dB SPL, this can damage the hearing. The volume of the hearing instruments must be selected very carefully. Prolonged use at too high a level can impair the residual hearing.



Fig. 32: Setting the gain

Fitting procedure

The gain table view can be simplified by clicking on the "Gain" tab:

All	Low	Middle	High
Soft	12	21	-4
Loud	6	13	-12

Fig. 33: Simplified gain table

☞ If the soft and loud sounds are selected at the same time, the compression ratio in the channels remains constant.

If the gains are set either just for soft or just for loud sounds, the compression ratio is adjusted automatically. The higher (lower) the displayed compression ratio is, the more (less) the input signal is compressed.

Compression is used when the natural dynamic range has to be limited to the client's residual dynamic range.

The MPO (Maximum Power Output) limits the output sound pressure level of the hearing system. Sound pressure levels that exceed the set threshold are reduced in the gain. The MPO should be set according to the client's uncomfortable level.

☞ If the audiogram contains uncomfortable threshold values, the AGCo threshold is automatically set by First Fit.

Some hearing systems with four or fewer WDRC channels allow the crossover frequencies between the channels to be set.

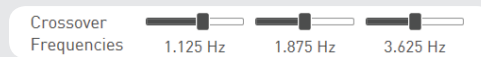


Fig. 34: Setting crossover frequencies

☞ Fitting tip: Changing crossover frequencies

The crossover frequencies can be modified to allow special settings for all parameters in a specific channel. The crossover frequency can, for example, be set to a value that drastically changes the target curve. This allows better fine-tuning of the frequency response.

↳ Live View (Cosma chip platform)

During fitting, "Live View" can be activated in the "Gain" and "Output" displays. The real level of the sound at the ear is displayed live. In the output view, the orange bars indicate the input level on the hearing aid, the red and blue bars indicate the gain through the hearing aid. The values in the middle of the screen indicate the averaged level of the sound at the front microphone.

The Live View screen can also be displayed on the client screen. In this screen, it is possible to explain the device settings to the client by playing sound files.

Fitting procedure

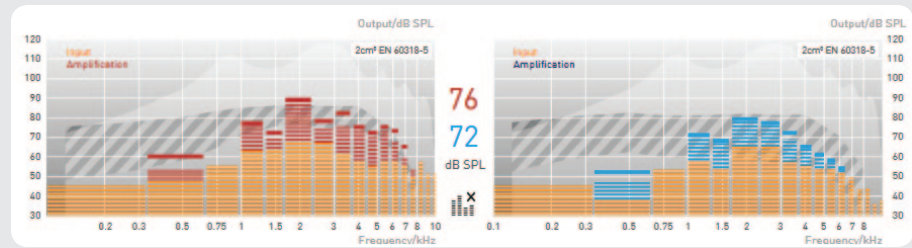


Figure 35: In this view, the red and blue bars indicate the respective gain of the device.

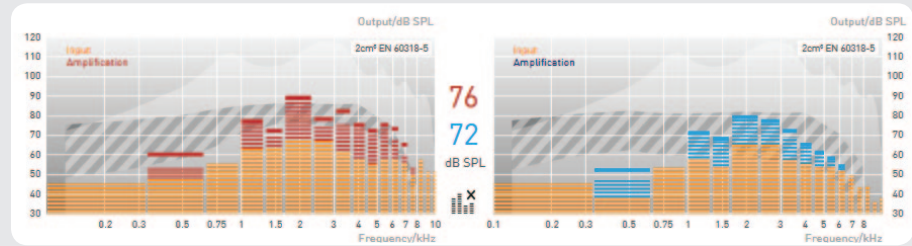


Figure 36: The levels between the graphs indicate the averaged input levels.

☞ Use the view only to display the activity of the device. You should not activate this display while device settings are carried out in order to keep the communication time of the software to the devices short.

↳ CROS/BiCROS hearing instruments

For CROS/BiCROS hearing instruments, the gain is only available on the receiver (Rx) side.

In BiCROS mode, the balance between Tx and Rx can be adjusted on the transmitter side (Tx) regardless of the program. Negative values decrease the transmitter volume as compared to the receiver, while positive values increase it.

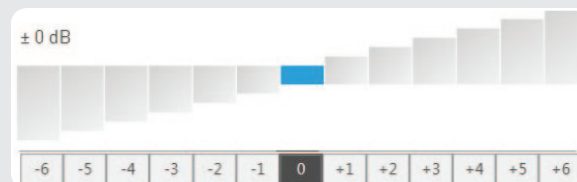


Figure 37: Setting the balance between Tx and Rx

Tinnitus function

Hearing instruments with an integrated sound generator to support tinnitus therapies and pure tinnitus instruments are programmed in the "Tinnitus module" section.

↳ Noise (STORM chip platform)

The noise can also be added to the selected input signal or as a "Only noise" program without an input signal. The following setting options are available:

- Noise level
- Low cut
- High cut

Fitting procedure

The curve displayed shows the spectrum set for white noise.



Fig. 38: Noise level settings

↳ Tinnitus module (Cosma chip platform)

In hearing instruments with the Cosma chip platform, noise levels can be set independently for the tinnitus in new channels via the gain table. There is also an option to choose between three different pre-defined noise types:

- White noise: Noise with the same sound pressure level in all frequency bands
- Pink noise: Noise with frequencies that are too high at a decreasing level
- Sound of the sea: A noise for which the volume swells and subsides (fluctuates) and that simulates the characteristic sound of the ocean. The speed of the fluctuation can be set in three stages via the "Modulation" drop-down menu

The sound and volume of the noise can be adjusted to the individual requirements of your client from the outset or based on the three noise types mentioned above.

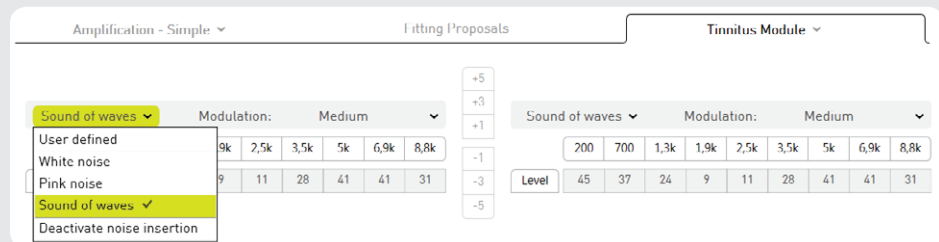


Figure 39: Cosma noise level settings



Warning: Damage to hearing!

The noise level should not exceed 74 dB SPL. Higher noise levels can cause the residual hearing to deteriorate in the long run.

Fitting procedure

Hearing comfort

The hearing comfort section provides the following options for reducing background noise and feedback:

- Adaptive ambient noise reduction (ANR)
- Expansion
- Adaptive feedback cancellation (AFC)
- Notch filter

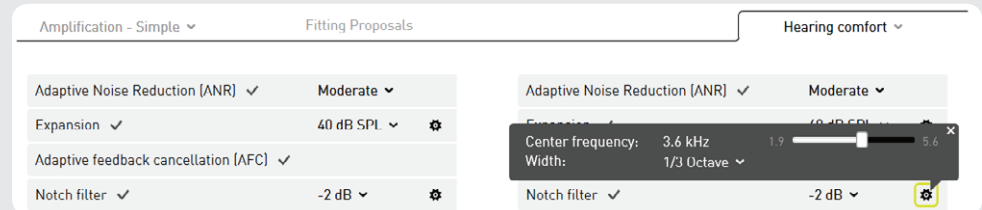


Figure 40: Hearing comfort

↳ Adaptive Noise Reduction (ANR)

Adaptive ambient noise reduction (ANR) automatically lowers the gain in the frequency bands with the poorest signal-to-noise ratio. ANR is particularly effective when the client is dependent on good speech understanding in an acoustic environment with a wide range of background noise. You can choose from three different ANR settings:

- *Soft:*
The gain is reduced by approx. 3-4 dB per band. This setting is used to obtain maximum speech quality.
- *Moderate:*
The gain is reduced by approx. 6-7 dB per band.
- *Strong:*
The gain is reduced by approx. 9-10 dB per band. This setting is used to minimise background noise.

↳ Expansion

The expansion (squelch) reduces the audibility of soft background noise such as air conditioning or computers. The expansion also reduces noises caused by the components of the actual hearing instrument, primarily by the microphone. Clients with normal hearing in the low frequency range can find the inherent noise especially annoying.

In order to activate the expansion in a soft acoustic environment, a threshold value is specified for the input signal. The gain is reduced as soon as the signal falls below this value, reducing the audibility of the microphone noise and improving sound quality. Above the threshold value, the hearing instrument returns to normal gain. The default setting for the expansion threshold is preset to 40 dB SPL.

↳ Adaptive Feedback Cancellation (AFC)

Adaptive feedback cancellation (AFC) estimates the proportion of the signal attributable to feedback and automatically eliminates it. AFC does not reduce the gain. Adaptive feedback cancellation is especially important for open fittings. AFC can be switched on and off.

AFC² contains an improved and more detailed model of the feedback path, allowing more accurate feedback elimination. This makes even higher gains possible before feedback occurs (known as "added stable gain").

☞ The hearing instrument consumes more energy when the AFC/AFC² algorithm is used.

Fitting procedure

↳ Notch filter

Unlike AFC, a notch filter reduces the gain in a certain narrow frequency range to prevent feedback. The notch filter can therefore reduce sound quality. The digital notch filter can be programmed so that its centre frequency lowers the gain of the critical frequency causing the feedback.

The amount by which the gain can be reduced is between 2 and 16 dB. Clicking on the adjacent button selects the frequency at which the notch filter's centre frequency is to be positioned. The width of the notch filter can be defined between one octave for a wide band and 1/12 of an octave for a very narrow band. The notch filter changes the frequency response of the hearing instrument, resulting in poorer audibility in the corresponding frequency range.

Hearing comfort (on devices with the "Cosma" chip platform)

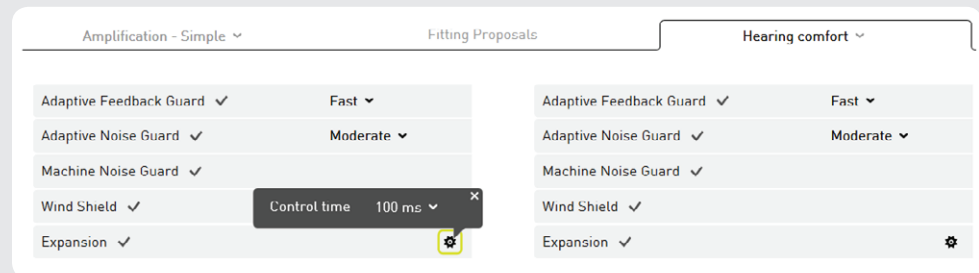


Figure 41: Cosma hearing comfort

↳ Adaptive Noise Guard

The noise reduction on devices with the "Cosma" chip platform continuously estimates the SNR of the input signal on all available channels. If a poor value is detected on one of the channels, the channel gain is temporarily reduced to minimise the impact of the noise. The higher the proportion of the noise, the more the gain is reduced. This makes it possible for speech within the noise to be understood at low concentration levels. At the same time, the adaptive noise guard also effectively suppresses any disruptive noise in simple noise situations.

- *Moderate; client profile*
 - Will rarely be in very noisy hearing situations
 - Wants natural sound and minimal audible controls
- *Strong; client profile*
 - Frequently in very noisy hearing situations
 - Wants to improve understanding of speech in these situations

Use "moderate" as the default setting in the basic program, and the "strong" setting in a separate hearing program for comfort or language during disruptive noise.

↳ Expansion

The expansion enables you to reliably suppress any noise generated by the microphone without affecting important signals and to remove any quiet background noise, such as the noise of a fan on the work or home computer, from the surrounding area.

The setting levels consist of three different control times ranging from 10 ms to 500 ms, which allow you to respond to your client's individual sound sensitivity.

Fitting procedure

↳ *Adaptive Feedback Guard*

The Adaptive Feedback Guard permanently estimates the feedback path, so that it can also react to changing situations and any uncomfortable feedback is avoided. The Adaptive Feedback Guard should always be switched on to ensure that there is no feedback noise even in acoustically difficult situations (brushing hair aside, hat, close to a door frame).

A special mode has been developed to listen to music, it reacts more gently and is thus optimised to the special requirements for suppressing the feedback of the music input signal.

Setting levels: fast and slow

☞ Always leave the Adaptive Feedback Guard switched on and use the "slow" setting in any hearing program for music.

↳ *Wind Shield*

If the person wearing the hearing instrument is in a windy environment, turbulence at the microphone openings can cause rustling background noises. Wind Shield recognises these and reacts by temporarily reducing the gain in the corresponding frequency range.

☞ Always leave Wind Shield activated. Due to the automatic control, it is only implemented when the client is actually in a corresponding situation.

↳ *Machine Noise Guard*

The instruments from the rega range automatically classify the relevant hearing situation that the client is in. If any machine noise is detected, the instrument temporarily reduces the gain for low frequencies to minimise the noise pollution.

MySound! noise example for demonstration purposes: Traffic noise

☞ Always leave the Machine Noise Guard activated. Due to the automatic control, it is only implemented when the client is actually in a correspondingly classified hearing situation.

Fitting procedure

Equaliser

The equaliser allows high-precision correction of hearing loss. Each of the equaliser controllers alters the gain in the corresponding frequency band. The level for the selected frequency can be lowered or raised using the adjacent buttons.

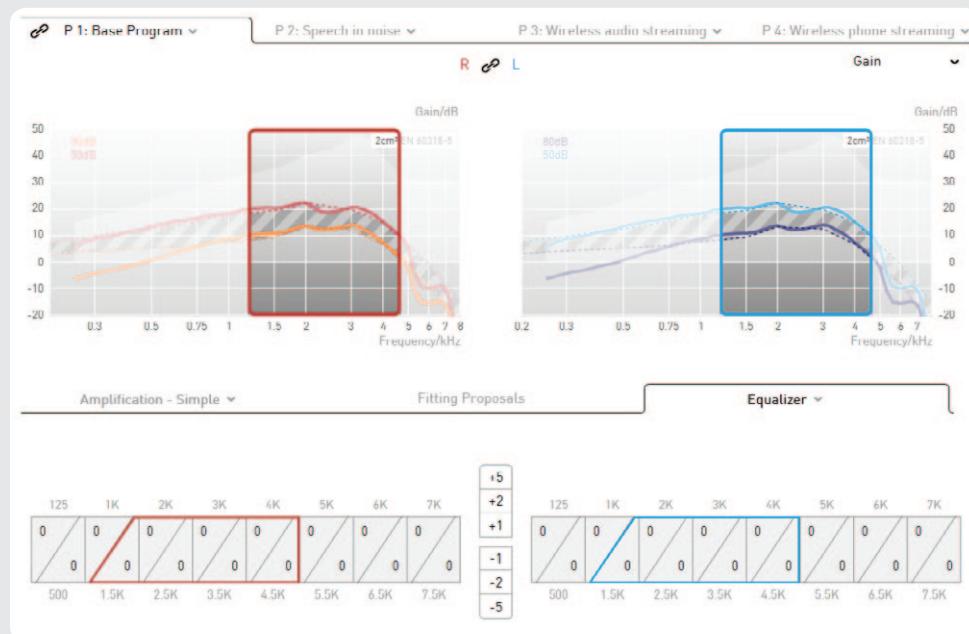


Fig. 42: Equaliser

👉 The default setting for the equaliser is maximum.

👉 Fitting tip: Working with the equaliser

The most effective way to use the equaliser is as follows:

1. Use the gain table to raise the hearing system gain above the target gain.
2. Open the equaliser
3. Use the equaliser controls to fine-tune the gain values.

Fitting procedure

Compression

The compression tab allows:

- Definition of the trigger points of the AGCi (TK = Threshold Kneepoint)
- Selection of the compression method (not on "Cosma" devices)

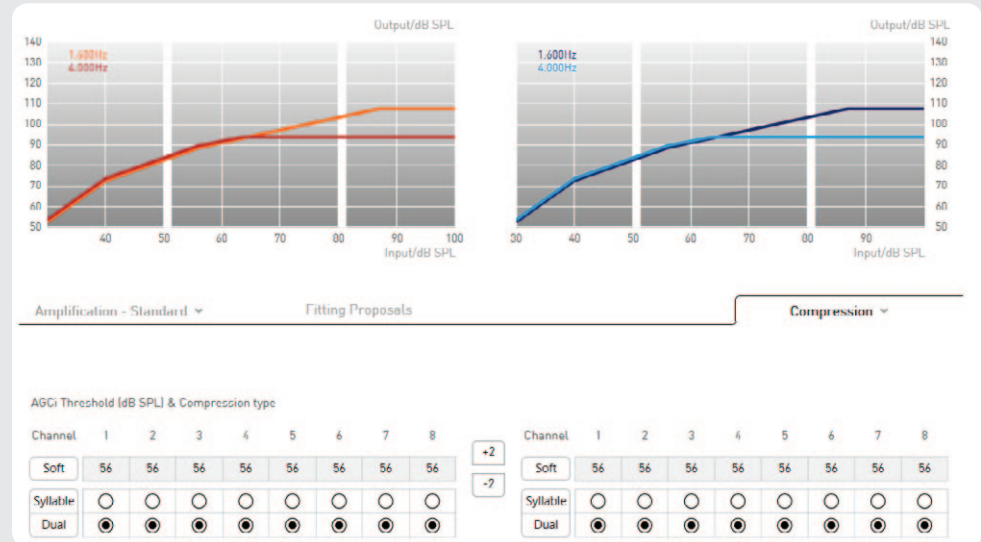


Figure 43: Compression

The AGCi (TK) trigger point refers to the input volume in the respective channel at which the compression is activated. All input signals below the level of the TK trigger point are amplified in a linear manner. Above the TK, the gain decreases as the input level increases in accordance with the compression ratio (CR).

Syllabic or dual compression can be activated for each channel independently or for all channels simultaneously by selecting the corresponding button.

- **Dual compression**

Fast Attack – Fast Release:

fast compression for sudden peaks in the input signal

Slow Attack – Slow Release:

slow compression for adjusting the gain to the acoustic environment

- **Syllabic compression**

Fast time constants for adjusting the gain to the natural fluctuations in level of speech

Fitting tip: Syllabic compression vs. dual compression

If a client with profound hearing loss complains of poor speech comprehension in noise, the hearing instrument is probably staying at a reduced gain for too long due to the dual compression component. Changing to syllabic compression can reduce this effect. If syllabic compression is used for mild to medium hearing loss, the client may hear the "pumping" of the compression.

Fitting procedure

Fitting proposals

↳ Sound-based fitting assistant

A five-channel audio reproduction allows fine-tuning of the hearing instrument in realistic hearing situations. In the MySound! box (on the left-hand side of the screen), various hearing situations can be combined with a useful sound. If the client reports volume/sound sensitivity in the set hearing situation, audifit 5 suggests five specific fitting proposals (such as reducing the volume).

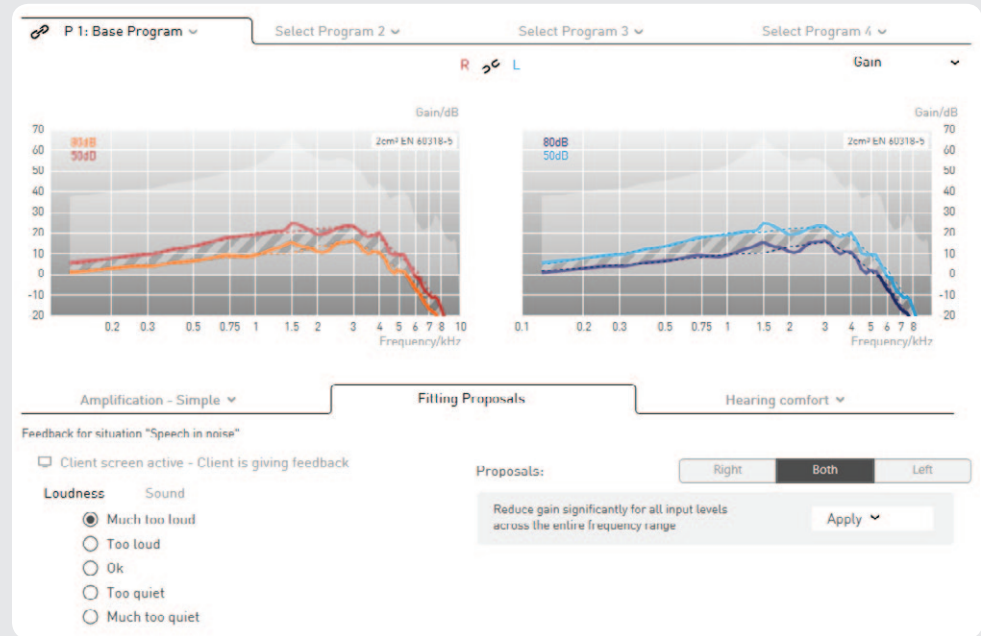


Fig. 44: Fitting proposals

The instrument is fine-tuned in a three-step process:

- **Step 1** – Sound selection: simulation of realistic sound environments by mixing ambient noises (such as traffic or household) and useful sounds (such as dialogue or siren). The option of spatially positioning the useful sound is a versatile tool for demonstrating spatial and directional hearing.
- **Step 2** – Client feedback: the client rates the sound environment on a selected scale (volume or sound).
- **Step 3** – Fine-tuning the hearing instrument parameters: audifit 5 suggests adjustment options according to the client's response. These can be programmed directly into the hearing instrument.

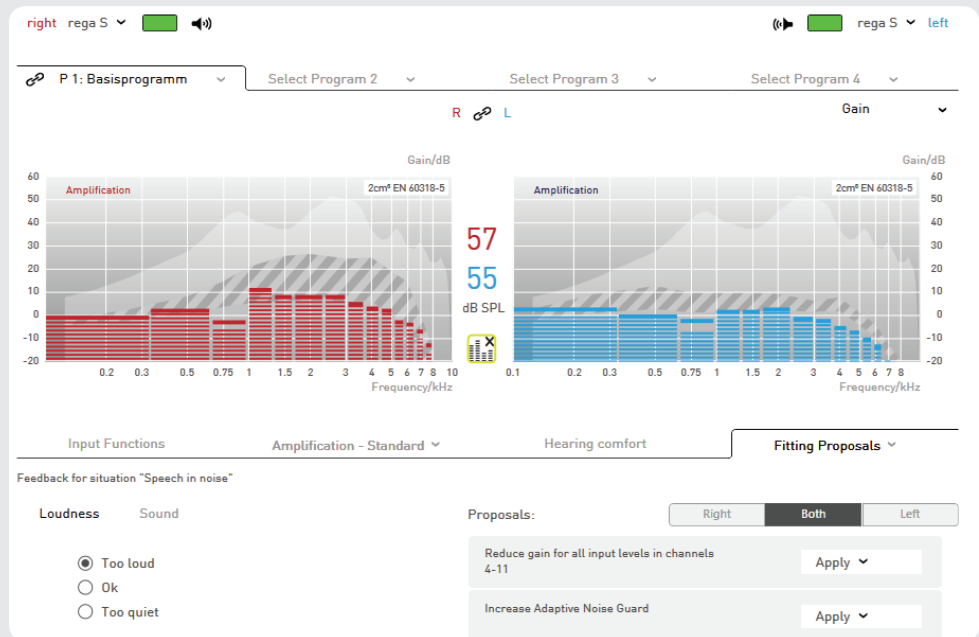
↳ CROS/BiCROS hearing instruments

For CROS/BiCROS hearing instruments, the fitting proposals are only available on the receiver (Rx) side.

↳ Text-based fitting assistant

It is now also possible to use the fitting assistants without playing sounds. The text-based fitting assistant provides a variety of descriptions of different situations with possible customer problems. By selecting the problem, different solutions are offered, which are transmitted directly to the devices by simple confirmation in the adjustment software. This allows you to easily and comfortably adjust the devices to the client's complete satisfaction without detailed expert knowledge.

Fitting procedure



4.6 Hearing instrument options

The following settings are available in the hearing instrument options section:

- Function of the control element (if available)
- Control range of volume control
- Volume of indicator sounds
- Data logging activation (if available)
- Start-up delay
- easyclick (if available)

↳ CROS/BiCROS hearing instruments

CROS/BiCROS hearing instruments are always fitted online and do not allow ear pairing. On the transmitter (Tx) side, only the battery warning signal is available and separately adjustable.

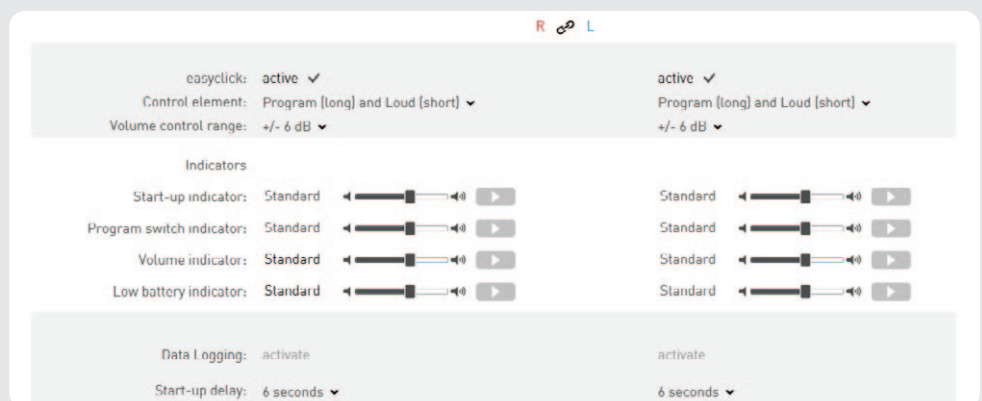


Fig. 45: Hearing instrument options

Function of the control element and control range

If the hearing instrument has a rocker switch, you can choose "Volume", "Program", or "Program (long) and Volume (short)". If "Program (long) and Volume (short)" is selected, pressing and holding toggles through the activated hearing programs, while pressing and releasing adjusts the volume within the set control range.

If the device has a volume control, it can only be enabled or disabled.

Fitting procedure

For hearing systems with tinnitus function, it is possible to choose "Noise volume" in the drop down menu to determine whether the volume change on the control element should affect the audio signal, noise, or both.

Note: If the hearing instrument has a digital volume control, it is disabled during fitting. At the end of hearing instrument fitting and each time the hearing systems are switched on, the volume control is in the neutral position and can be adjusted within the volume control range.

↳ *easyclick (only for hearing instruments with wireless function)*

- easyclick wirelessly synchronises the program and volume settings of two hearing systems.


Control range of volume control

The volume control range can be varied between ± 4 dB and ± 10 dB. It determines the extent to which the client can adjust the volume.

Indicator sounds

The indicator sounds section allows the individual volume setting or deactivation of the following:

- Start-up indicator
- Program switch indicator
- Volume tone
- Low battery indicator

The  "play" button allows indicator sounds to be played directly on the connected instrument.



Warning: Damage to hearing!

On devices with an output sound intensity greater or equal to 132 dB SPL, this can damage the hearing. The volume of the hearing instruments must be selected very carefully. Prolonged use at too high a level can impair the residual hearing.

Activating data logging

If data logging is activated, the client's usage behaviour and program use will be recorded. This data can be read out and displayed under "Data Logging" in the menu.

Start-up delay

The start-up delay is the time between switching on the instrument and instrument activation. A delay is particularly advisable for open hearing instrument fittings and ITE instruments to avoid feedback whistling during insertion.

☞ The start-up indicator sounds after the specified start-up time.

Fitting procedure

4.7 Completion

Before the adjusted settings are programmed to the instrument and the session is saved, the main settings are once again displayed in an overview. The following functions are available at this point:

- Appendix to the operating instructions
- Print fitting report
- Remarks
- Read protection

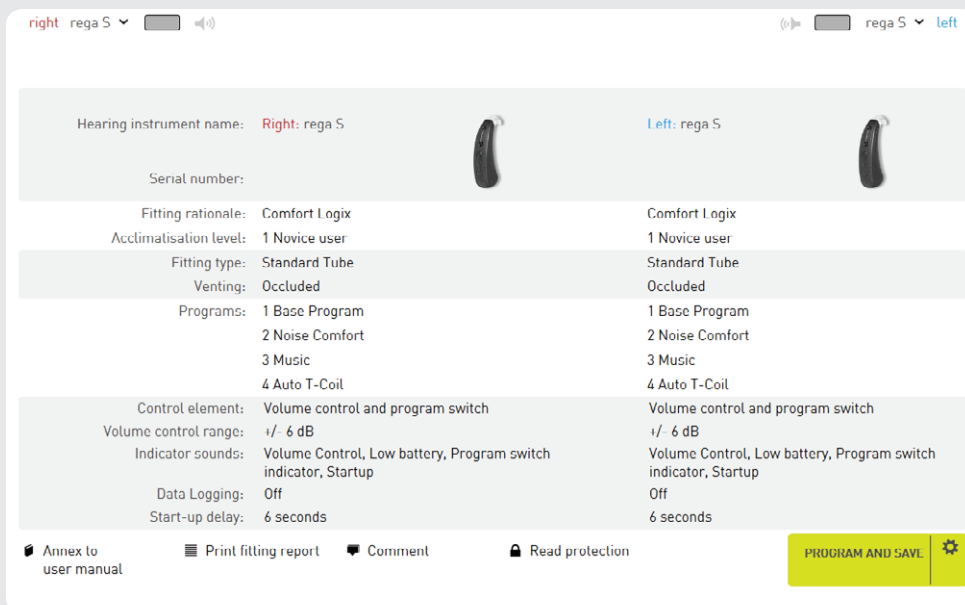


Fig. 46: Completion

Appendix to the operating instructions

This printable appendix contains information about the hearing instrument used and a few points that will be useful to the client (such as program assignment).

Print fitting report

The fitting report contains both client data and all the settings configured on the hearing instruments fitted during the session.

Remarks

Any comments about the current session can be entered here. They can be viewed in the client management.

Read protection

The read protection function prevents third parties from reading out fitting data. A PIN code of up to four digits can be entered.

Program and save

Writes the fitting data to the connected hearing instruments and saves and ends the session. Clicking on the "⚙️" symbol offers the following options: the data is written to the connected hearing instruments, the session data is saved, or both.

Other program options

5 Other program options

Follow-up fitting allows the fitting settings to be adjusted for the following:

- Hearing instruments belonging to clients who have already had a session
- New clients who already have hearing instruments

5.1 Follow-up fitting

To perform a follow-up fitting, proceed as follows:

1. Select the existing client in the client management or create a new client (for new clients who already have a hearing instrument).
2. Choose whether you would like to continue a session or start a new one.

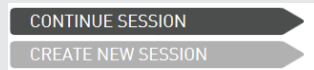


Fig. 47: Open session

3. Under "Hearing instruments" in the menu, choose "Follow-up fitting"

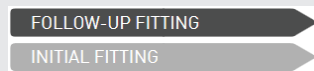


Fig. 48: Begin fitting

When the "Follow-up fitting" button is selected, the data for the connected hearing instruments is read out and compared with the data saved in the session. If there are discrepancies between the two sets of data, decide whether to use the session data or the data currently on the hearing instrument for the follow-up fitting. Once this selection has been made, the "Fitting" menu item appears.

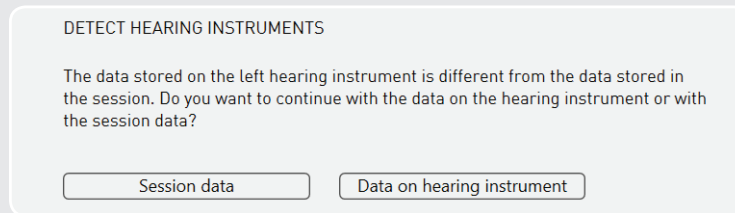


Fig. 49: Discrepancies between session data and hearing instrument data

If there is no session data available or the session data and the data on the hearing instrument are identical, you will be taken directly to "Fitting" in the menu.

The follow-up fitting process is the same as that already explained from Chapter 4.5, "Fitting" onwards.

☞ During the follow-up fitting, the "Preset" menu item, and thus the First Fit, will be skipped, as these steps have already been carried out in a previous session.

5.2 Exporting/ importing client information

audifit 5 enables the export and import of client data. This means that client records from several installations can be synchronised, or client data can be transferred from audifit 4.

Exporting client information

Select "Export clients" from the menu bar:

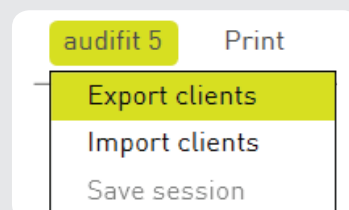


Fig. 50: Exporting client information

Other program options

Once the file name and location have been selected, all client data contained in the client management will be exported as an XML file.

Importing client information

The import function allows clients to be imported from auditit 4 and auditit 5. To do so, select "Import clients" from the menu bar:

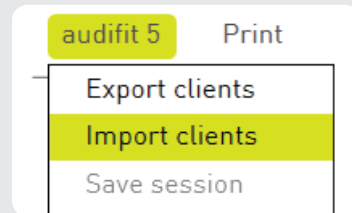


Fig. 51: Importing client information

Once you have selected an XML or AF4 file, all client data it contains will be transferred to the auditit 5 client management.

☞ You can import the following file types:

- AF4 file format: client data exported from auditit 4
- XML file format: client data exported from auditit 5

5.3 User management

To support the new data protection guidelines in the stand-alone version, a user management system has been incorporated in auditit version 5.7 and higher.

☞ If auditit 5.7 is installed under Noah, this function is not visible as Noah already supports and complies with the data protection guidelines with its own user management system.

1. Following installation of the stand-alone version a new login screen is displayed when the software is started.
2. The user cannot be changed until another user has been created in user management.
3. The default password for the administrator is 1234. This password can be changed in user management.

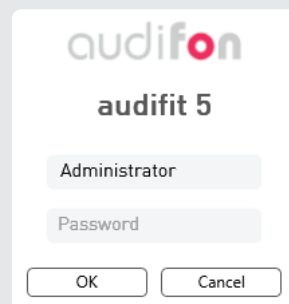


Fig. 52: Administrator login

A password does not initially need to be entered. The software can be started as usual without any further inputs by confirming with "OK". If no changes are required here, the software can continue to be used in this manner.

If you wish to enter a password for the administrator or create a new user, you can do this in the User management menu.

Other program options

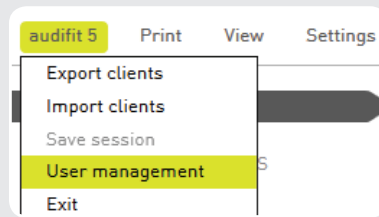
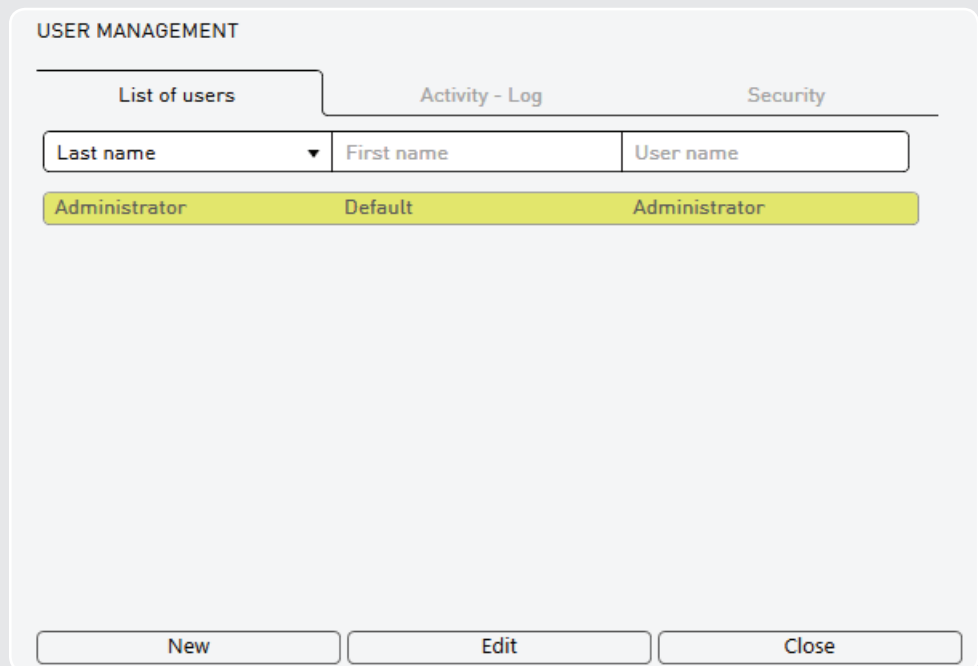


Fig. 53: Select user management

This is opened by selecting user management. You can now create new users or edit existing ones here. You can enter the user's first and last name as well as the user name. A password can be allocated to every user. The password must consist of at least three characters.

A screenshot of the 'USER MANAGEMENT' window. It has three tabs: 'List of users' (selected), 'Activity - Log', and 'Security'. Below the tabs are three input fields: 'Last name' (with a dropdown arrow), 'First name', and 'User name'. Below these fields is a table with one row of data:

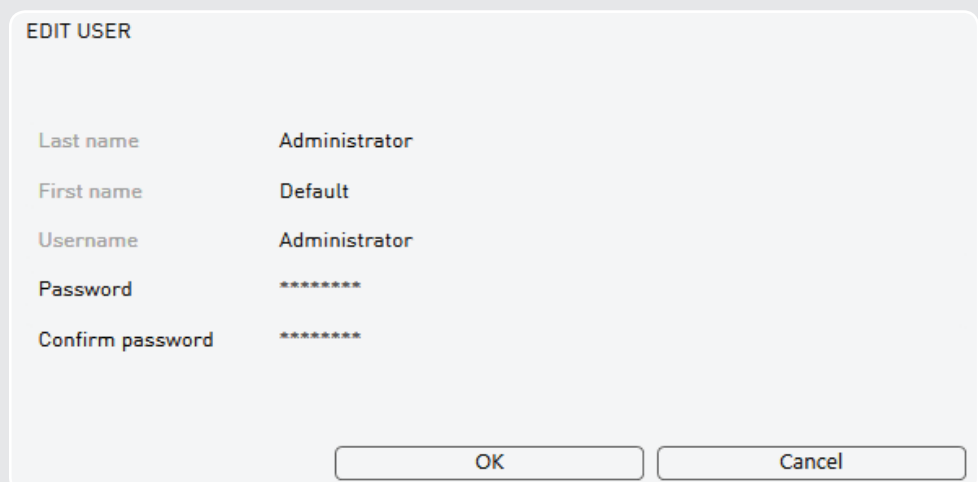
Last name	First name	User name
Administrator	Default	Administrator

At the bottom of the window are three buttons: 'New', 'Edit', and 'Close'.

Fig. 54: User management

Create or edit a new user

Every user created can be edited after starting the software. Confirm your changes with "OK". Edited login data will take effect after restarting the software.

A screenshot of the 'EDIT USER' window. It contains five rows of labels and values:

Last name	Administrator
First name	Default
Username	Administrator
Password	*****
Confirm password	*****

At the bottom are two buttons: 'OK' and 'Cancel'.

Fig. 55: Edit users

Other program options

Password prompt

If you do not wish to enter the password whenever you start the software, you should disable the password prompt in the item Security in user management. This setting is selected by default on new installation.

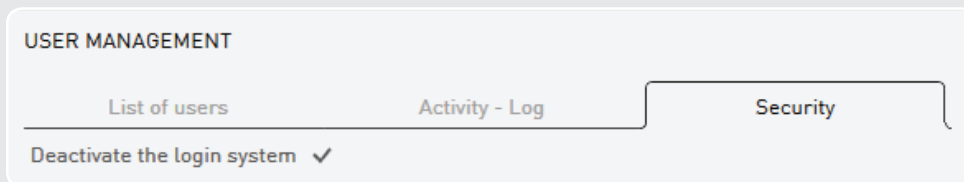


Fig. 56: Password prompt

Activity log

All client-relevant activities are saved in user management.

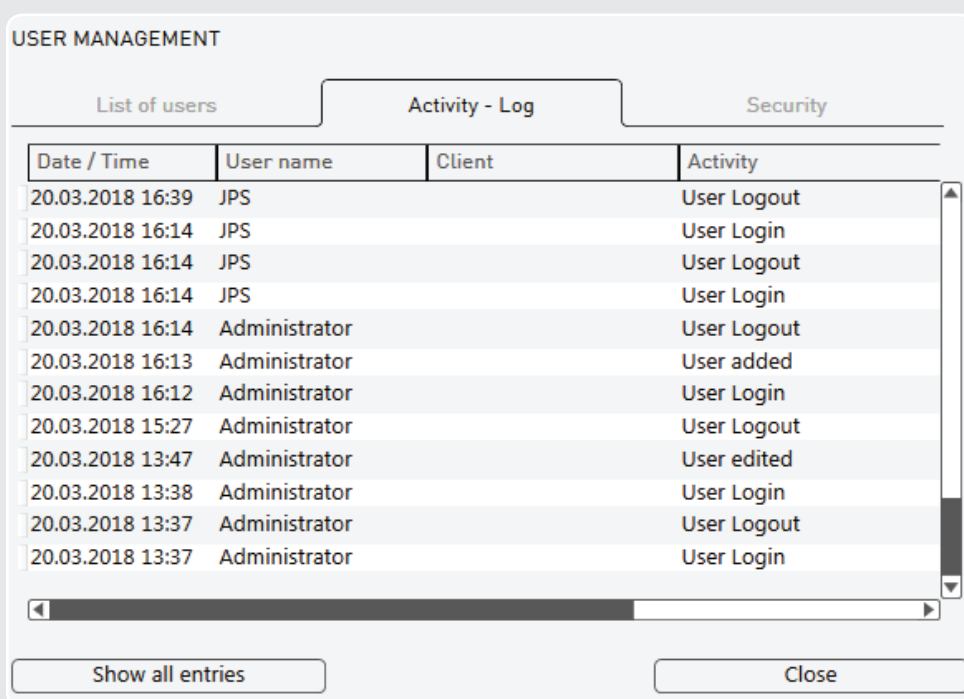


Fig. 57: User management activity log

5.4 Measurement settings

Hearing instruments can be set to maximum test gain as explained below. The values contained in the data specifications can be reproduced with this setting.



Warning: Damage to hearing!

The instruments are set to the maximum test gain for measuring purposes. The hearing instrument must not be near the client's ear at this setting! Otherwise there is a risk of damaging the residual hearing.

Set the instrument to the maximum test gain as follows:

1. Connect the hearing instruments to be measured.
2. Select "Settings" and "Measurement settings" from the menu bar (no session may be active!).
3. Select "Apply" (Program 1 is temporarily moved to measurement settings) or "Program" (Program 1 is permanently moved to measurement settings). Other programs on the instrument are disabled in the measurement settings.

Other program options

MEASUREMENT SETTINGS

Left:

Right:


 **Attention! The devices are set to maximum gain. Please do not use these settings on the client's ear.**

Fig. 58: Program measurement settings or use them temporarily

☞ If "Apply" is selected, the measurement settings are only temporarily transferred to the instrument. After the programming connection has been aborted or "Close" selected, the instrument reverts to its original state.

Troubleshooting

6 Troubleshooting

Description	Hardware components	Possible causes	Solution
NOAHlink properties returns "Driver error" report	Programmer box	After the programmer box is turned on, it cannot be reconnected because of a driver error.	Remove the battery from the programmer box. Insert the battery again. Turn the programmer box on and re-connect.
Windows reports "Server is busy" during session	PC	Insufficient PC memory.	Close all unnecessary applications and click "Retry" in the message.
	NOAHlink/HiPro programmer box	The connection to the programmer box, and thus to the hearing instrument, is unstable.	Check the hardware using the following steps:
Hearing instrument is not recognised	PC	NOAHlink driver no longer works	Re-install NOAHlink Properties
Connection to hearing instrument lost during session	PC	NOAHlink driver version or NOAHlink kernel version is outdated	Install the recommended version of NOAHlink Properties and NOAHlink Kernel
		USB connection is faulty/loose contact	Try another USB port on the computer
	USB cable	Cable break, caused by an office chair, for instance	Try another USB cable
		Cable too long	Use a USB cable that is no longer than 1 m
NOAHlink Bluetooth stick	Objects between Bluetooth stick and programmer box are impairing wireless connection	Place the Bluetooth stick within sight of, and at a distance of about 1 m from NOAHlink.	

Continuation →

Troubleshooting

Description	Hardware components	Possible causes	Solution
	NOAHlink/ HiPro programmer box	NOAHlink battery is dead or no longer effective, PC LED lit red	Insert a newly re-charged battery
		When the programmer box is accessed, the PC LED does not flash.	Select the programmer box connected under "Options" in the fitting software. Disconnect and reconnect the USB cable between the PC and programmer box. Pair and connect NOAHlink with NOAHlink Properties. Restart the fitting software.
		When the connected hearing instruments are recognised, the LEDs on the programmer box ("left"/"right") do not flash.	Check the cable connection between the programmer box and hearing instrument. Use the Cable Guide to check selection of the appropriate programming cable and adapter. Verify that a battery has been inserted into the ITE instrument.
	Programming cable, programming cable adapter	Cable selection	Use the Cable Guide to check the selection of the appropriate programming cable and adapter.
		Broken cable	Replace faulty programming cable
		Worn plug contact/connector	Replace faulty programming cable and adapter.

Continuation →

Troubleshooting

Description	Hardware components	Possible causes	Solution
	Hearing instrument	ITE is not recognised	To program ITEs, insert the battery. In the fitting software, the hearing instrument selection will indicate whether the instrument requires a battery to be programmed.
		Plug contact bent or broken	Send hearing instrument in for service.

Troubleshooting

7 Key to symbols



Indicates a situation that may result in serious, moderate or minor injury.



Indicates possible damage to property.



Additional information for better understanding



Manufacturer of the device



Read and observe the instructions in the operating instructions.
It contains important warnings and information about safety precautions.

8 Glossary

8.1 Cosma chip platform



Cosma

Cosma overview

- A sampling rate of 20 kHz for the A/D conversion speaks for itself and allows higher bandwidth
- Unsurpassed sound experience with up to 10 kHz bandwidth
- Detailed fitting and precise pre-calculation enabled by up to 18 compression channels
- Lip-sync sound thanks to a signal delay of only 5 ms



10k HD Sound

With an audio bandwidth of up to 10 kHz, the Cosma chip platform comes very close to natural hearing ability, and helps with better speech comprehension. Up to 18 channels allow precise frequency and dynamic adjustment. Especially when listening to music and in a noisy environment, hearing aid wearers benefit from the high bandwidth of the Cosma chip technology.

- Up to 18 channels allow sophisticated and detailed adjustments
- Up to 18 channels MPO for reliable settings in noisy environments
- Adjustable parameters are AGCi threshold, as well as gain for quiet and noisy signals



Adaptive Feedback Guard and Feedback Check

The Adaptive Feedback Guard is built to react rapidly to changing situations and therefore prevent unpleasant feedback, without impairing speech comprehension or sound quality. To be able to directly react to acoustically challenging situations, a permanent rating of the feedback path is carried out. Thanks to the Adaptive Feedback Guard, sound changes are now being securely prevented even before a feedback is heard. Combined with the Feedback Check, the Adaptive Feedback Guard can realize up to 20 dB more gain for open fittings, and starts to work from just 1kHz.

We have developed a special music listening mode that now reacts gentler and is therefore optimized for the special needs of the incoming signal music (slow option).



Scene Detect

Scene Detect performs an automatic environmental classification of up to seven different acoustic situations, such as "speech in noise", "wind" or "music". Depending on the hearing situation detected, the algorithms will be adapted to enable optimum speech comprehension, and the hearing aid user does not have to perform any manual adjustments.

Environmental classification of situations

- Quiet (level < 50 dB)
- Wind (detected wind noise and level > 60 dB in affected channels)
- Machine noise (machine noise level > 50 dB)
- Music (level > 50 dB)
- Speech in a quiet setting (level > 50 dB)
- Speech in a noisy setting (level > 50 dB speech and noise)
- Noise (level > 50 dB)



Adaptive Sound Zoom

Adaptive Sound Zoom, in addition to Sound Zoom, offers automatic switching of the directionality and adaptation of the directivity, so that the noise coming from the rear is suppressed to a maximum. Adaptive Sound Zoom also controls the frequency-dependent direction of attenuation.

With Sound Zoom, the directional characteristic hypercardioid is permanently set. The time constants are optimized frequency-dependent with Sound Zoom, thus achieving the maximum attenuation in each frequency channel. For better speech comprehension, a slight reduction takes place in the low frequency range.



Adaptive Noise Guard

The noise reduction of the Cosma platform estimates the SNR of the input signal 625 times per second. The signal-to-noise ratio of the front microphone in the respective adjustment channel is separately evaluated in each adjustment channel. Depending on this, the gain for this channel is reduced accordingly. The gain change takes place in the millisecond range and is independent of the level. The Adaptive Noise Guard feature works independently of the additional noise reduction systems triggered by the situation recognition. The strongest setting is used for the respective reduction of the gain. The maximum reduction in the gain can be set in the adjustment software. This value then applies to all adjustment channels. The actual reduction corresponding to the respective interference signal automatically adapts to the selected maximum reduction.

↳ "Moderate" client profile

- Client will rarely be in very noisy hearing situations
- Client wants natural sound and minimal audible controls

↳ "Strong" client profile

- Client will frequently be in very noisy hearing situations
- Client wants to improve understanding of speech in these situations

Machine Noise Guard

If the signal level is uniform and loud, the signal is interpreted as machine noise. The gains are then reduced in all bands in which the noise occurs. The amount of the maximum reduction can be selected incrementally in each hearing program.

The attack and release times are preset with 3 seconds each. An interaction occurs between the wind noise suppression and machine noise suppression. If wind is present at the same time, the stronger value and the time constants for wind are used for the reduction in the bands for low and medium frequencies (100 Hz -1500 Hz).

Wind Noise Guard

In a windy environment, turbulence at the microphone openings can cause rustling background noises. Thanks to the sophisticated Cosma algorithm, any irritating noise is reliably prevented. The system responds with a temporary reduction in gain in the affected channels.

- Detected wind reduces the gain in low and medium channels
- Affected frequencies: 100 Hz – 1,500 Hz
- The Wind Shield algorithm analyzes the environment 625 times per second

The detection time for the wind detection is in the range of 5 seconds to 10 seconds. The response time for the subsequent gain change is 200 milliseconds and the after effect time is 1 second.



Integrated tinnitus module

The tinnitus features of the Cosma platform allow the adjustment of modulation and modulated noise. There are different selectable modes to choose from. Because of the large adjustment range of the noise gauge and the variations of the modulation, the tinnitus module by audifon offers the best precondition for tinnitus therapies. In tinnitus mode, the hearing aid generates white noise. The level of the noise can be set in 9 adjustment channels in 1 dB increments.

The selectable modes in the tinnitus module are:

- White or pink noise
- Individually adjustable noise (adjustable in 9 channels)
- Three types of modulation: slow, medium and fast modulation

Music detection

When the situation recognition detects music, a new programmable setting for the gain for quiet and loud signals are applied. The gain settings for music are available separately for each of the 4 hearing programs.

The response time and the after effect time of the switchover are specified at 6 seconds. The machine noise suppression as well as the SNR controlled noise suppression are deactivated. At the same time, the effect of the adaptive feedback manager is reduced slightly.



Live View

Live View constantly reads the following data from the hearing aid:

- Input level and output level per adjustment channel
- Broadband signal level at front microphone
- Current gain changes per channel triggered by the noise suppression

New data is provided by the hearing aid approximately every 125 ms. The speed at which the data is transferred to the software depends greatly on the transmission rate of the programming box used.

Expansion

At low signal levels, the expansion acts so that the gain is not perceived as unpleasant.

The control times of the expansion are 10 ms, 100 ms and 500 ms. 100 ms are preset.

Compression

The WDRC operates at Cosma with an attack time (start-up time) of 5 ms and a release time (switch-off time) of 100 ms.

8.2 Storm chip platform

Adaptive directionality

During adaptive directionality, the signals from two microphones are offset against one another, to suppress any disruptive noise, that could affect the speech comprehension of the person wearing the hearing instrument, as effectively as possible. In this case, the basic assumption is that the useful signal comes from the front, which is why it is not affected. Adaptive directionality is a tried and tested and important technology for improving speech comprehension in noisy environments.

Adaptive feedback cancellation (AFC/AFC²)

An essential feature and especially provides an efficient feedback management system for open supplies. Adaptive systems continuously evaluate the feedback path to also be able to react to changing and acoustically challenging situations. Depending on the technology, the gain is reduced or inversely phased signals are used to avoid or remove any feedback. Due to these strategies, significantly higher and stable gains can be implemented during fittings.

Adaptive ambient noise reduction (ANR)

Adaptive ambient noise reductions are used to make it easier for the person wearing the hearing instrument to understand speech in noisy situations and to ensure that noisy environments are not as intrusive. In this context, the input signal is continuously analysed over the entire frequency range in relation to the distance of the noise signal and the gain is temporarily reduced in frequency ranges with a poor SNR.

Auto T-Coil

Auto T-Coil is a hearing instrument function that is designed to ensure the hearing instrument automatically activates the T-Coil via a magnetic field (e.g. via a telephone receiver with a magnet glued on, if required).

Auto Phone

Auto Phone functions like Auto T-Coil, although a hearing program for the automatic activation can be implemented as required.

Binaural T-Coil

In this mode, the signal received via the T-Coil is transmitted to the hearing system on the other ear so that the signal is audible on both sides. If desired, the slightly reduced microphone signal can also be added.

Crossfader

audifon hearing instruments offer a crossfader to minimise potential variations in signal strength when switching between programs: As soon as the hearing program is changed, the audio signal fades out, and the program switch tone (if featured) sounds; the audio signal only cuts in again after you have switched to the new hearing program.

Data logging

The data logging function records the client's usage behaviour. The recorded data, such as information about the duration of usage, duration of use per program and Sound Dynamix, can be read out from the connected hearing instrument.

easyclick

easyclick wirelessly synchronises the program or volume settings of two hearing systems.

Expansion (Squelch)

Squelch is an expansion circuit which is intended to reduce or eliminate microphone noise by dimming the gain as the input sound pressure decreases.

Notch filter

The notch filter is an electronic filter used to filter out frequencies within a narrow frequency range. The notch filter can be used to attenuate unwanted feedback and interfering frequencies by reducing the signal level of the relevant frequency.

Sound Dynamix

Sound Dynamix constantly analyses the signal recorded by the microphones and classifies it as one of the following hearing situations:

- Quiet
- Speech in a quiet setting
- Noise
- Speech in noise
- Music
- Wind noise

According to this classification, the parameter settings of the hearing system are always configured to ensure optimum hearing comfort/optimum speech intelligibility.

Wireless Audio Streaming

If Wireless Audio Streaming is activated in Program 3, the hearing system can receive audio signals from the multistreamer.

Wireless Phone Streaming

If Wireless Phone Streaming is activated in Program 4, phone calls can be received directly in the hearing systems with the multistreamer.



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