

MixChecker Pro

User Manual

Version 1.2



iOS Remote App download



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Thanks for using AUDIFIED MixChecker Pro.

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What is MixChecker?

MixChecker saves your time. Plug it in the master track of your project as the last segment of your listening chain and quickly turn your studio monitors into classic reference monitors or several consumer devices.

The Pro version adds many new features but the interface isn't more complicated than the original MixChecker.

New in version 1.2

- Redesigned interface
- Improvements in the simulations

Installation

Software Installation

Download the recent version of the plug-in:



<http://services.audified.com/download/mixchecker-pro>

Windows: The downloaded file is packed, unzip it. Run the installer and follow the on-screen instructions. You can select the destination path and the installed plug-in format during the process.

Mac: Mount the downloaded disk image and run the installer. You can select the installed plug-in format by clicking the Customize button. Plug-ins are installed to the standard locations.

Software Uninstallation

Windows: Navigate to the MixChecker Pro program folder in the Start menu and run the uninstaller.

Mac: Open the provided disk image and run the uninstaller.

iLok Protection

- This plug-in is protected by iLok (a software machine license or a USB dongle).
- It requires iLok License Manager 5.0 or newer.
- Please make sure you have activated a valid license in your iLok account.
- **Please refer to this guide:** <https://shop.audified.com/pages/how-to-activate-ilok-license>

Standard workflow

MixChecker Pro works in all main digital audio workstations (recording applications) as a plug-in.

To open the plug-in, locate the plug-in (usually a hierarchic menu). MixChecker Pro is listed in the "Other" group or in the "AUDIFIED" group when the manufacturer sorting is offered in the DAW.

Usually, the checking takes place in the end of mixing and mastering process. Click the selected simulated devices and listen to the results.



Once the checking is finished, we suggest to fully bypass the plug-in (not only deselecting the simulations).

When upgraded from MixChecker to MixChecker Pro

MixChecker Pro offers all functions of MixChecker except of compensations.

If you close the Edit pane and if you use one Button set, the Pro version control is almost the same as of the original MixChecker. But the simulations are much more realistic and there is less latency.

Once you have used MixChecker Pro successfully in its basic mode, you may start utilizing more advanced features.

Start opening the Edit Pane at the bottom and check the new parameters.

Then click EDIT and explore the flexibility of assigning simulations to the buttons, rearrange the button order and adjust additional parameters.



Important: There is one principal difference between MixChecker and MixChecker Pro: The original MixChecker simulates only linear features of the devices but the Pro version Distortion makes the processing non-linear. You never know the volume the listeners set for your recording. But you may calibrate MixChecker Pro, so the listening volume and the distortion of devices is realistic.

Why the compensations disappeared

MixChecker could have average characteristics for simulated devices but it would require exact characteristics of the speakers used for monitoring. The frequency characteristics of real-world devices have many peaks and notches. For a quick check of the recorded material (simulation) we may use the average values of the frequencies with attenuated or increased volumes. For compensation, it is not possible. If we would take a speaker with a peak at 520 Hz and another speaker with 500 Hz, we could not use a compensation with the average value - the result would be decreased volume at 510 Hz (average compensation) for both speakers and the peaks at 500 and 520 Hz would remain. Simply, in some cases, the compensation may make the simulation results even worse.

MixChecker Pro screens

Default screen



The basic MixChecker Pro screen offers the effective and quick setting of various listening environments.

The Adjustment area offers to edit the parameters assigned to the buttons in the bottom line. These settings are independent of the simulated device selection.

Button edit screen

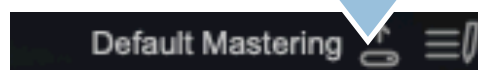


The Edit mode serves for the setup of MixChecker Pro simulations.

Entering the Edit mode, you may assign any of the available simulations to each button and adjust some more parameters for the simulation.

Then you may save the assignment to one of the Button Sets.

You may easily switch various Button Sets in the top bar.



Adjustments pane controls



Noise type and level.

Select the noise and its level for the Noise button.

Auto advance time

Adjust the time for automatic cycling of the simulations.

Mono mode:

The extended channel modes are:

- Mono
- Stereo
- Left channel to both speakers
- Right channel to both speakers
- L-R swapped

Distortion level

Indicates the range, where distortion is applied.

Button Edit mode

Rearrange buttons:
Drag the buttons to rearrange.

Assigned simulation:
Assign the simulated device from the list. The same simulation with various settings for multiple buttons is allowed.

New: Custom label:
Type a label appearing in the button and tool tip.

Stereo base:
Adjust the width of stereo base. The leftmost position produces mono signal. The setting applies to one button, unlike the main Mono in the main view.

Distortion:
Adjust the distortion level for the simulated device. This allows to simulate the device distortion as if the listener would use different listening levels, without a need to change the level of the mix.

Save or cancel:
Once the button set is modified, click Save or Save as... to store the whole button set.

Volume correction:
Adjust the volume level for the button.

The interface shows a grid of buttons with icons and labels: 2" Black, HiFi 40 S, 13" Silver, 9" Grey, HiFi 50 V, Smart Home, 5" Black, and Black. Below the grid are two dropdown menus labeled 'Assigned simulation' and 'Custom Label', both currently set to 'TV 37"'. At the bottom are three sliders for 'Stereo Base', 'Distortion', and 'Volume', and two buttons: 'Save As...' and 'Cancel'.

Remote control

MixChecker Pro comes with a Remote Control allowing you to control the plugin remotely:

- From your mobile device using the MixChecker RC mobile app
- From another computer or a mobile device using the web browser

Setting up the remote control



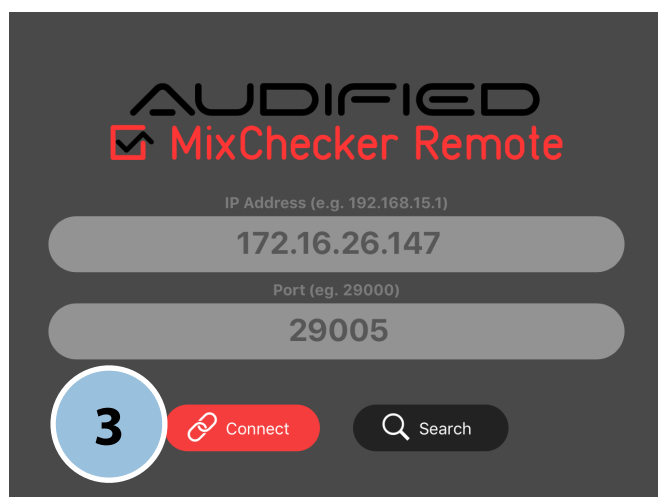
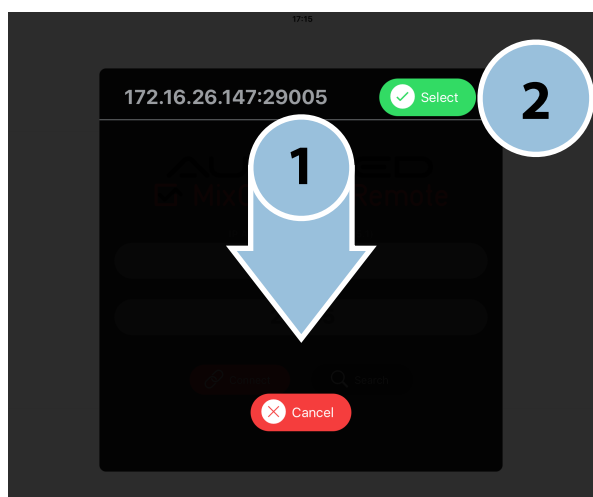
On Windows, make sure you are running your DAW as an administrator.

1. Open the Service Menu -> Remote Control (the wrench symbol)
2. Turn the switch on.
3. A dialog will pop up asking you to add a firewall exception. Click yes.
4. Address and port information will show up.
5. Either use the web remote link or enter the information into the given fields on the mobile app's settings screen and click Connect.



The computer and the mobile device must be connected to the same network.

NEW: Automatic search for IP addresses

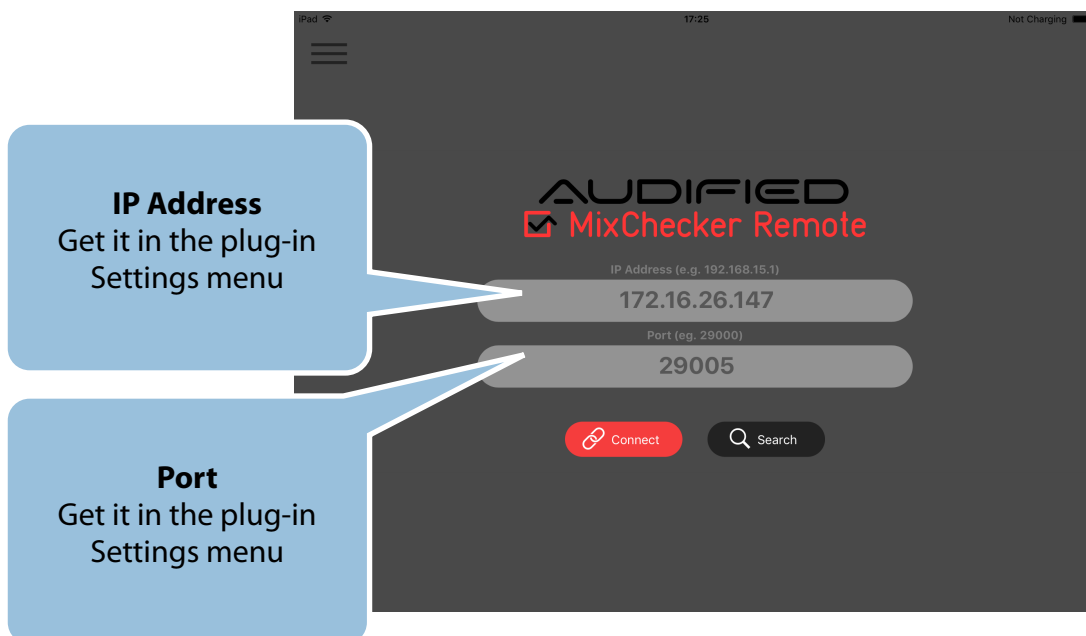
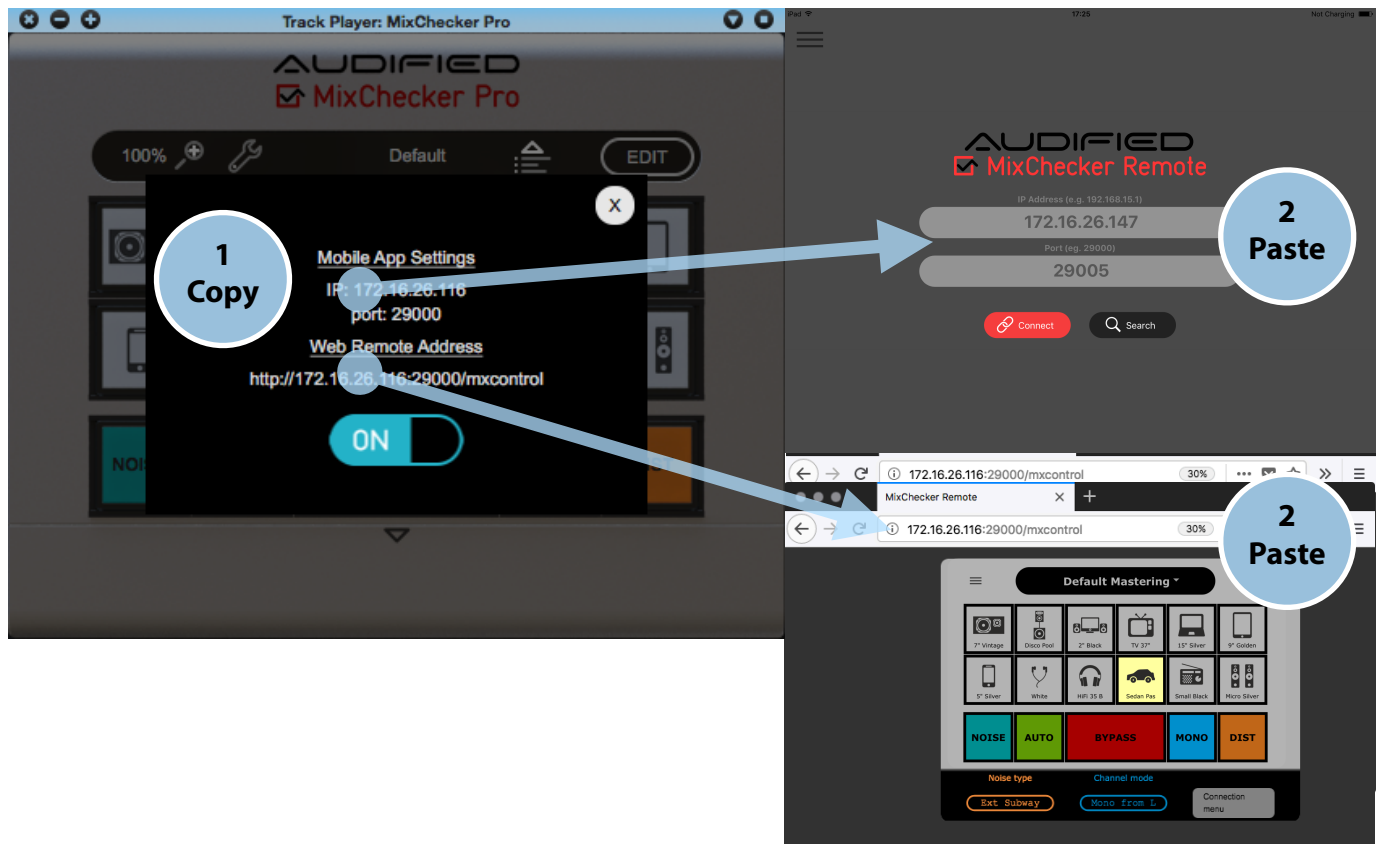


MixChecker Remote from version 1.0.1 can find available IP addresses and ports even for more opened instances of MixChecker Pro.

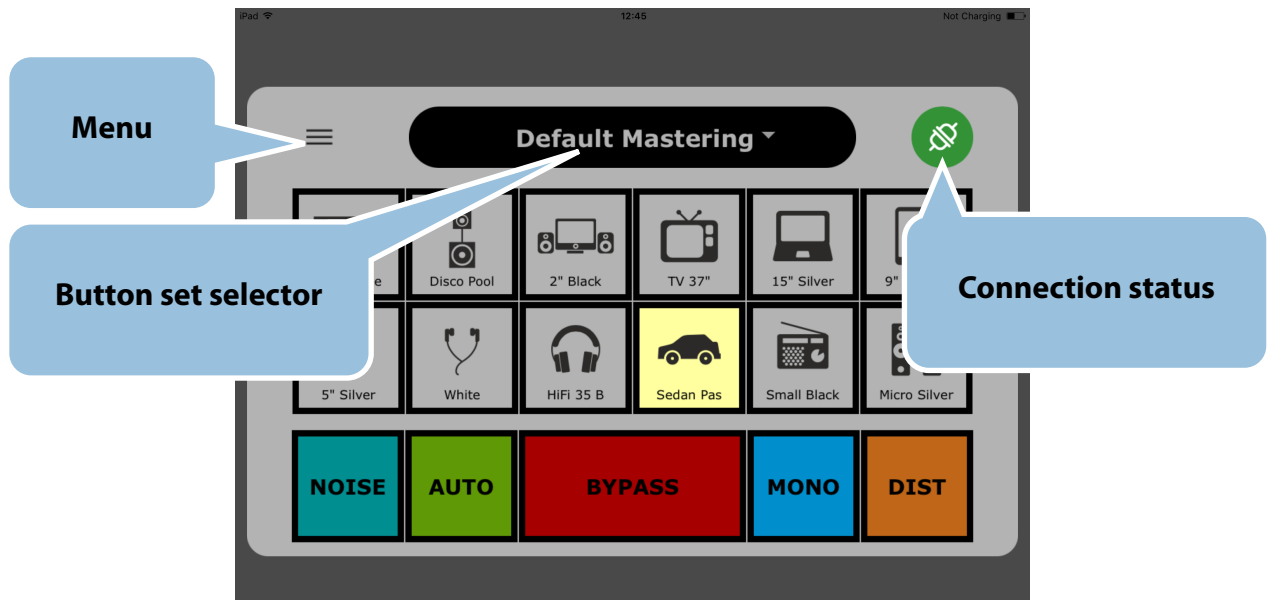
In the mobile app, click the connection settings. Pull the list to refresh the list (the same way as when you refresh the list of mail messages). One or more IP addresses should appear. Select the instance you want to control - tap the Select button. Click Connect in the next dialog.

Manual setting of the IP address

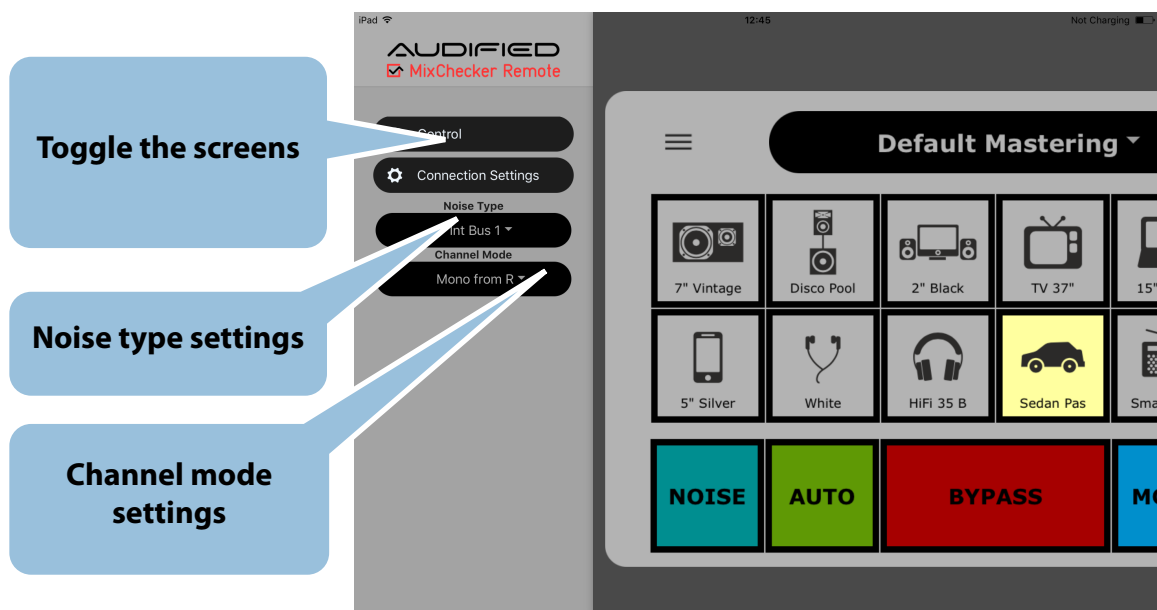
Copy the IP address from the MixChecker Pro settings panel to the web browser or mobile app:



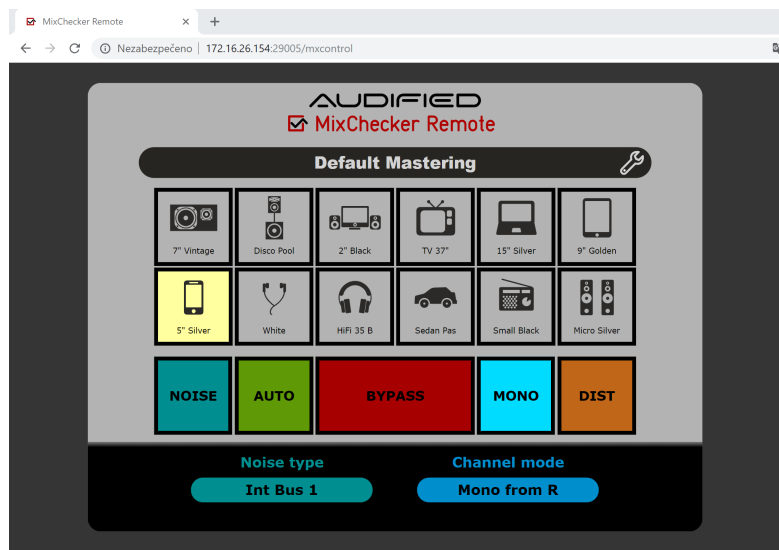
The Main screen allows selection of the simulated devices as well as activation and deactivation of the Noise, Auto, Mono and Distortion functions.



The Noise Type and Mono settings are accessible from a sidebar menu.

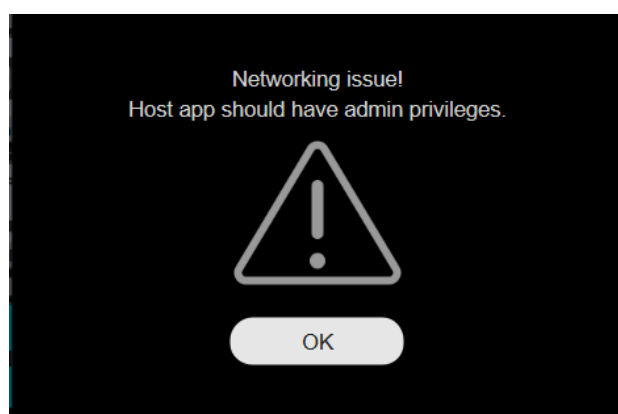


Web browser



Remote control troubleshooting

When a problem occurs while enabling the Remote Control in the plugin, an error dialog will be shown. There are two main reasons for this problem based on the operating system you are running:



Windows:

Your DAW is not running with administrator privileges. To fix this, right-click on the DAW executable and select "Run as administrator". To ensure the app is always running with admin rights: Click on the Advanced label in the Shortcut tab in DAW's shortcut properties and make sure that the "Run as administrator" checkbox is checked.

MacOS:

The plugin is not capable of resolving the computer's hostname. This is mostly caused by having no Sharing service activated. Go to System Preferences - Sharing and enable any service (for example File Sharing). This should allow the plugin to resolve the hostname and start the Remote Control properly.

Reference

Buttons sets

The Button set is a complete configuration for all 12 buttons. Button sets can be:

- ▶ **Loaded:** Click the Preset symbol in the main display.
- ▶ **Edited:** Click the EDIT label on the right of the main display, then edit the contents of the button set in the Edit Mode.
- ▶ **Saved:** Once you have finished the editing of all buttons, click the Save or Save As... button at the bottom. Saving is not organized alphabetically but there are fixed numbered slots for each button set.

Each button has adjustable features:

- ▶ **Assigned simulation** - the simulated device with the related button symbol.
- ▶ **Custom label string** - user defined string that is shown in a tooltip.
- ▶ **Stereo Base** - a possibility to reduce the stereo base.
- ▶ **Volume Level** - custom user volume adjustment.
- ▶ **Distortion** - simulation of nonlinear behavior of the simulated devices.



Some buttons in a button set may have assigned no simulation.



Multiple buttons may have assigned the same simulated device with various volume, distortion, and stereo base levels. We suggest to distinguish them using the Custom label.

Noise

When activated, some background noise is added to the output, simulating the real environment. The amount of noise is adjustable by the Level button.



When the noise is added to the headphones simulations, the noise is processed as if it went through the headphone shell from the outside.



Playing the noise depends on the DAW transport state, it may differ in various DAW's.

Auto Advance

When activated, all buttons are sequentially turned on from the first to the last with a bypassed state included. Each of the buttons is active for the time set by the auto-advance time knob below in the Edit pane.

In this mode, the simulated device type is disconnected from the DAW automation.

Mono

The MONO button has several more modes than just the standard monophonic function. You may also listen to the left channel signal from both speakers, the right channel signal from both speakers or to swap the left and right channels.

Once the MONO button is off, the signal is unaffected. Once the MONO button is on, the signal is processed accordingly to the selection from the menu in the Edit Pane.

Distortion

We've analyzed the behavior of the devices in a wide volume range and we focused on the specific distortion produced by each device when it is normally loaded. This nonlinear behavior was transformed to a model unique for each of the devices, using less or more harmonics depending on the current device harmonic distortion characteristics. Each model was tuned to be as close as possible to the original device, including A/B listening tests, etc.

- ▶ If the signal reaches the level when the distortion is audible, the yellow indicator shines.
- ▶ If the signal exceeds the level which the simulated device could really process, the red indicator shines. In this case, a hard limiting is applied to the signal.

Some of the devices have disabled the Distortion controls - typically the studio monitors, producing negligible harmonic distortion.

Calibration

Calibration adjusts the relation between the digital zero (maximum signal value in digital system) and the analog zero (the value which is used for distortion, affecting the non-linear characteristics of the effect).

The screenshot shows the MixChecker Pro calibration window. At the top, there is a blue callout box labeled "Calibration level" pointing to a slider set at -9.0 dBFS. Below the slider are two buttons: "Save as default" and "OK". A blue callout box labeled "Save as default" points to the "Save as default" button, with the text "Saves the calibration value for all MixChecker Pro instances." A second blue callout box labeled "OK" points to the "OK" button, with the text "Saves the calibration value just for this plug-in instance." To the right of the main window, a vertical menu is visible with options: "Set Calibration", "Copy", "Paste", and "Remote Control". A large blue arrow points down towards the calibration controls.

Setting the calibration: Select a simulation of a cheap device with distortion. Listen to the loudest part of the mix. Increase the calibration level so the red indicator starts to glow. Then slightly decrease the calibration level. With these settings, you simulate the listening at the maximum level. When you need to simulate listening from the device at a lower level, decrease the distortion level in the Edit mode of MixChecker Pro by the same

Modeled devices

Studio monitor	Studio 4" Vintage
	Studio 5" Modern
	Studio 6" Modern
	Studio 7" Vintage
	Studio 5" Vintage
	Studio Cube
LiveSound / PA	PA Disco Pool
	PA Disco Stage
	PA Cheap Satellite
	PA Club Engineer
	PA Club Near
	PA Club Center
	PA Cheap Full-Range
Computer Audio	Desktop 2" Black
	Desktop 3" Wooden
	Desktop 3" Red
	Desktop 5" Black
	LCD Screen 24"
TV	TV 24"
	TV 37"
	TV 22"
	TV 32"
Laptop Speakers	Laptop 12" Grey
	Laptop 13" Silver
	Laptop 15" Black

	Laptop 15" Silver
Tablet	Tablet 9" Grey
	Tablet 9" Golden
	Tablet 7" Black
Smart Phone	Phone 5" Grey
	Phone 4" Black
	Phone 5" Silver
	Phone 5" White
In-Ear Headphones	Earplugs Black
	Earplugs White
	Earplugs Grey
	Earplugs Iso Black
On-Ear Headphones	Studio 30mm Silver
	Studio 40mm Black
	DJ 40mm Black
	DJ 40mm Red
	DJ 50mm Red
	HiFi 35mm Black
	HiFi 40mm Grey
	Studio 45mm Silver
	HiFi 40mm Silver
	Studio 40mm Blue
	Studio 40mm Yellow
	HiFi 50mm White
Car Audio	Wagon Driver
	Wagon Co-driver
	Sedan Driver
	Sedan Co-driver
	Sedan Passenger
	Minivan Driver
	Minivan Co-driver

	Minivan Kid
Radio	Bluetooth Speaker
	Small Radio Silver
	BoomBox Silver
	Smart Home Speaker
	Small Radio Black
HiFi	HiFi Micro Silver
	HiFi Micro Black
	HiFi Mini Silver
	HiFi Floor-stander

Types of noise

Exterior City Street 1
Exterior City Street 2
Exterior Park 1
Exterior Park 2
Exterior Playground
Exterior Railway Station 1
Exterior Railway Station 2
Exterior Subway
Interior Bar
Interior Bus 1
Interior Bus 2
Interior Car 1
Interior Car 2
Interior Shopping Center

Theoretical background and measurement details

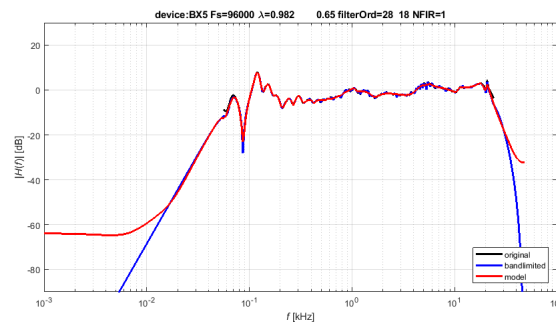
Parallel Warped Filters

The linear part of the model uses transfer function modeling by fixed-pole parallel filters based on the dual-band warped filter design.

More info here: Balázs Bank and Germán Ramos, "Improved Pole Positioning for Parallel Filters Based on Spectral Smoothing and Multiband Warping," IEEE Signal Processing Letters, vol. 18, no. 5.

Thanks to the filter design on a warped frequency scale, the frequency resolution of the model takes into account the frequency resolution of the auditory system. The dual-band design brings even more precise modeling at low frequencies without reducing precision at high frequencies.

The parallel structure of 2nd-order minimum-phase filters brings extremely low latency, minimal phase distortion, and high stability.

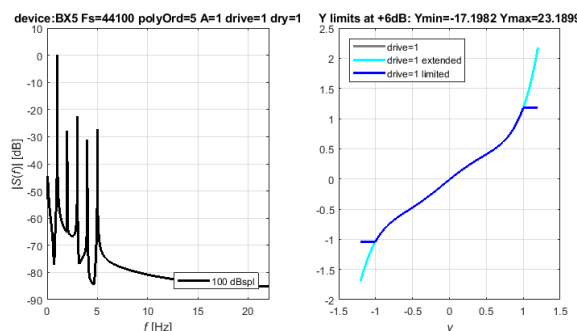


Desktop 5'' Black: magnitude response (measured and model)

Extended Wiener Model

The non-linear part of the model uses a proprietary model based on the Wiener model.

The nonlinear model extends the standard Wiener model and introduces dynamic nonlinearity and frequency-dependent nonlinearities while keeps the computing demands low.

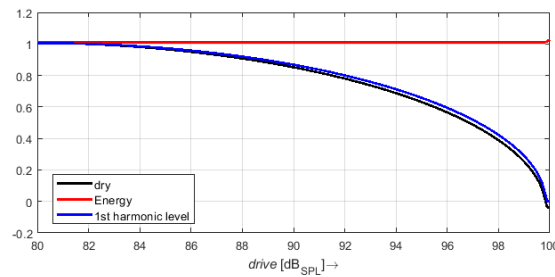


Desktop 5'' Black: non-linear model - spectrum of excitation harmonic signal, nonlinear transfer function

Constant-Energy Distortion

The extended Wiener model contains technology that keeps the constant energy of the output signal for all distortion levels. It allows to simulate distortion produced by the device at higher SPL

without increasing SPL produced by your studio monitors. This also protects your studio monitors against mechanical damage.



Desktop 5'' Black: Dependence of 1st harmonic amplitude and dry parameter on the drive that preserves constant energy of the output signal

Constant Loudness

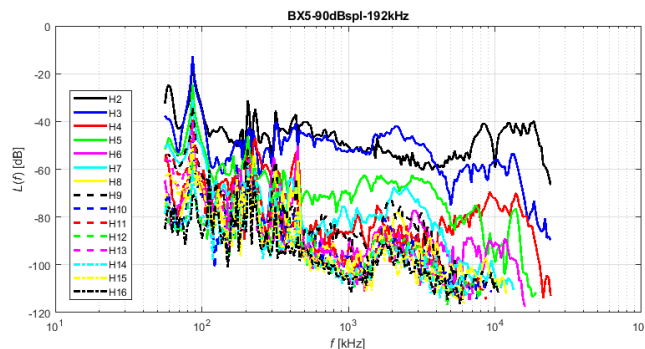
For the seamless switching among devices, the overall gain of all devices is normalized to the same objective loudness using an algorithm derived from Loudness Unit (LU) meter (ITU-R BS.1770-3)

Acoustic Calibration

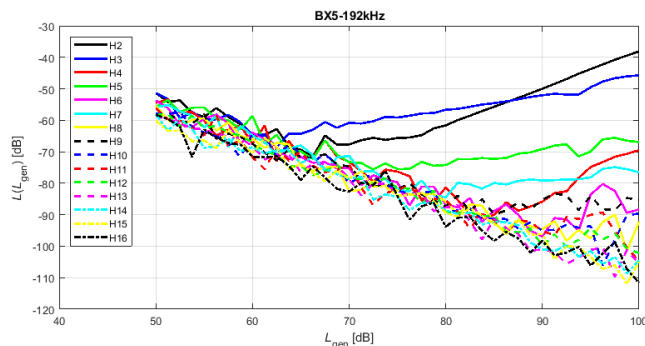
The scale of the distortion level is calibrated in real SPL measured in 1m distance in free field.

Measurement

All characteristics of the devices used for identification of model parameters were measured using APx525 Audio Analyzer with an acoustic option in the anechoic chamber. Headphones were measured using B&K Type 4128-C.



Desktop 5'' Black: Measured dependence of higher harmonics ratio on input signal frequency



Desktop 5'' Black: Measured dependence of higher harmonics ratio on input signal level

SW Specifications

- ▶ AAX, AU, VST3
- ▶ macOS, Windows
- ▶ Android, iOS or a web browser on any OS for remote control

SW Requirements

- ▶ macOS 10.11 and newer, including macOS 12, Apple Silicon native
- ▶ Windows 7 and newer
- ▶ Android 4.4 and iOS 10-15
- ▶ 400 MB disk space required
- ▶ iLok License manager 5.0 and newer

Conclusion

We are sure that you can work with the MixChecker Pro now. However, if anything seems unclear or you need assistance, feel free to contact us at



<http://services.audified.com/support>

Thanks for using AUDIFIED products.

