

DSPeaker

Anti-Mode™ X2
Anti-Mode™ X2D
User's Guide



Recycling information

Anti-Mode™ X2 is marked according to the **Waste Electrical and Electronic Equipment Directive**. There are take-back systems in place that help to preserve nature and natural resources when products are disposed of appropriately. If you need to dispose of this product, use the take-back system that has dedicated collection facilities for electronic equipment. Do not put the product into household waste disposal!



Anti-Mode™ X2 is manufactured using parts and processes that follow the EU directive of the Restriction of the use of certain Hazardous Substances in Electrical and Electronic Equipment (RoHS).

Safety Instructions

- The unit shall not be exposed to dripping or splashing of liquids and no objects filled with liquids should be placed on the unit.
- Anti-Mode™ X2 has been designed for normal indoor use. Use of the device outdoors, in humid or other extreme environments, may cause reduced performance.
- Anti-Mode™ X2 is intended to be used with cables of up to 3m in length. With longer cables, observe electrostatic discharge precautions when connecting or disconnecting them to avoid damage to equipment. Longer cables may also be susceptible to electromagnetic interference.
- **CAUTION:** The remote control contains two AAA batteries. Only replace it with the same type and in the correct orientation!



WARNING: Do not ingest battery, Chemical Burn Hazard!

Keep batteries out of reach of children and dispose of the used battery appropriately. If a battery is swallowed, it can cause severe internal burns in just 2 hours and can lead to death. If you think batteries might have been swallowed or placed inside any part of the body, seek immediate medical attention

If the battery compartment does not close securely, stop using the remote control and keep it away from children.

- When the unit is in stand-by mode, the display is turned off.
- **CAUTION:** The power supply shipped with the unit is 12VDC 1.6A with 2.1mm/5.5mm connector, center positive. Only connect power supplies with specifications of 12VDC and 0.6A or higher.

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1. Overview

What's included in the box

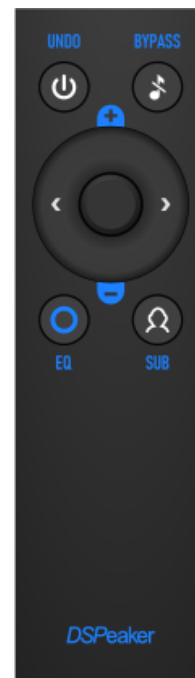
- ✓ The Anti-Mode™ X2 or Anti-Mode™ X2D unit
- ✓ A power supply for your country / region
- ✓ A calibration microphone
- ✓ An infra-red remote controller (with batteries)
- ✓ This guide

Not included

- ✓ USB Type-C cable is not included

Remote Control Layout

The remote control layout is depicted on the right. When this guide references a button, it usually refers to a press of the corresponding button. ● represents the center button (Ok / Confirm).



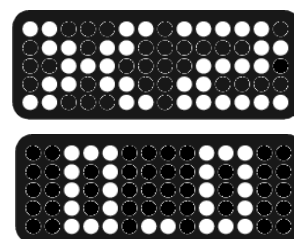
Basic Information

Anti-Mode™ X2 is an automatic room & speaker optimizer with a preamplifier function. Running the automatic calibration procedure using the provided microphone is required to utilize the optimization feature and to establish the correct speaker configuration when a subwoofer is used. See Chapter 2 Calibration on page 9 for details. Anti-Mode™ X2D is a variant that provides digital stereo outputs instead of analog stereo. The differences between variants are noted when applicable.

Connections

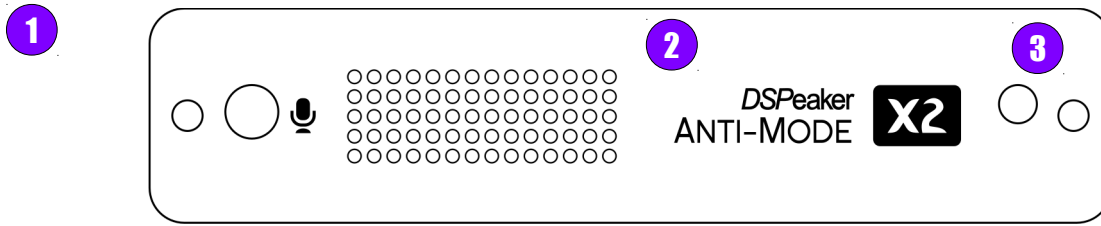
Connect the stereo analog output (or a digital output if you have Anti-Mode X2D) to a pair of powered speakers or to your amplifier. If you have a subwoofer, connect it to the "sub" output connector. Up to 3 digital audio sources can be connected: Optical S/PDIF using Toslink, USB Audio 1.0 using USB-C, and Coaxial S/PDIF. If an analog audio source is connected to the "Line In" inputs, the Coaxial S/PDIF input connector can not be used at the same time.

Then connect the power supply to the wall socket and the plug to the Power input of the Anti-Mode X2. The unit will automatically start and show "X2" on the screen. After that "0.0" is shown shortly if there is no calibration data. The channel mode of the active profile is shown otherwise.



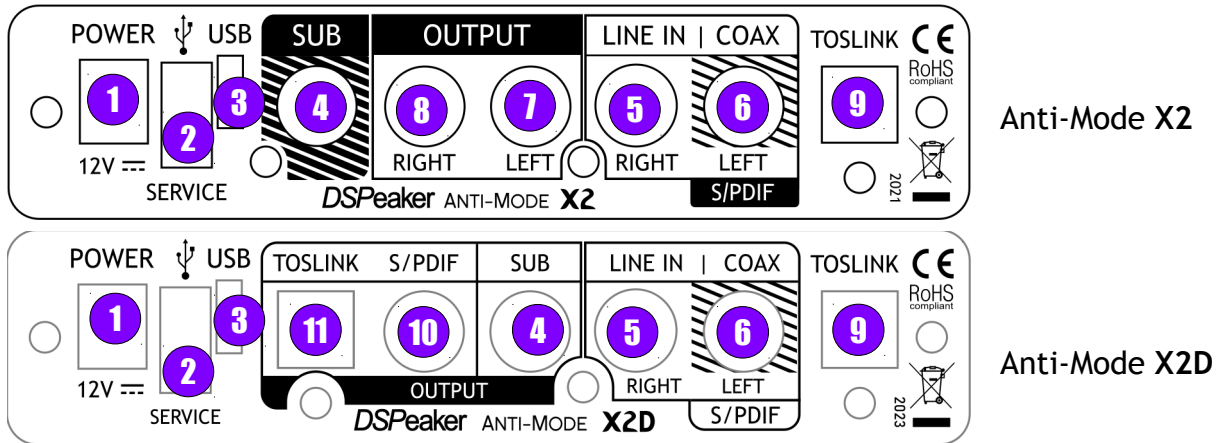
If your amplifier doesn't have a gain setting or it is set quite high, remember to check the volume setting of the Anti-Mode X2. The default volume is -40dB, you may need to increase it for normal operation.

Front Panel



- (1) Microphone connector with insertion detection
- (2) Matrix display (3) IR receiver

Rear Panel

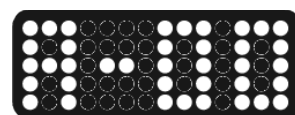


- (1) Power supply connector, 12VDC 0.6A - (2.1mm/5.5mm, center positive)
- (2) USB host port for firmware update using a USB memory stick.
- (3) USB audio device connection (for USB Type-C cable). Up to 96kHz 24-bit stereo linear PCM.
Notice: The audio input must be selected to be USB in the Anti-Mode X2 for the computer to be able to discover the device.
- (4) Subwoofer output (connection optional)
- (5,6) Left and Right analog inputs / (6) Coaxial S/PDIF input
Notice: Stereo analog input and coaxial S/PDIF inputs are mutually exclusive.
- (9) Toslink Optical S/PDIF input
Notice: You can connect CD/DVD players, TVs, media servers, and other audio sources to the digital inputs as long as they provide stereo uncompressed PCM audio up to 192kHz / 24 bits. Compressed formats are not supported.
- (7,8) Left and Right analog outputs (Anti-Mode X2 only)
- (10,11) Digital S/PDIF coaxial and optical Toslink outputs (Anti-Mode X2D only)

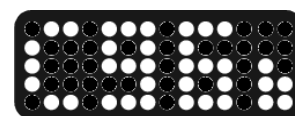
Home Screen

Home Screen is the default view of the user interface. It indicates the selected input and volume. An alternative view displays the current sampling rate for the digital audio sources (or three dots for unspecified rate) and a signal level indicator. To select the alternative view, press ● and ◀ on the remote controller. To select the default view, press ● and ▶.

In the default view, the volume level is displayed as decibel attenuation. "00" represents the maximum and "-70" represents the smallest value possible. Please note that use of tone controls (or mismatch in detected speaker levels) may result in reduced maximum volume available. In a calibrated unit the maximum volume is usually from "-00" to "-03" decibels.



In the alternative view example, "C" indicates the coaxial input, "96" indicates 96kHz rate. If all 10 dots in the signal level bar are lit, the signal is at maximum level. Each dot represents 3 dB. If no dots are lit, the signal level is -30 dB or lower.



Selecting Input

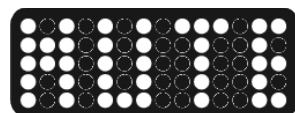
Use ◀ and ▶ to select the active input. This function is available in the home screen. The selected input becomes active when the unit returns to the home screen.

Abbreviation	Mnemonic	Full Name
A	ANA	Analog stereo input
O	OPT	Optical S/PDIF (Toslink) up to Stereo 192kHz / 24 bits
C	COX	Coaxial S/PDIF up to Stereo 192kHz / 24 bits
U	USB	USB Audio (USB-C) Stereo PCM 48kHz or 96kHz / 24 bits

Adjusting Volume

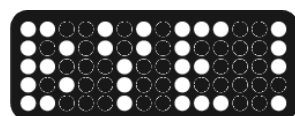
Use + and - to adjust volume. This function is available in the home screen. In a calibrated unit the maximum volume is normally between 0dB and -3dB.

Press ● to mute the output. Press any button to return to normal volume.



Standby

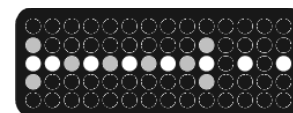
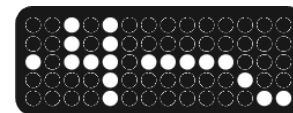
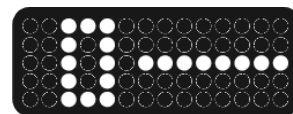
● switches the unit from active to a low-power stand-by state and vice versa.



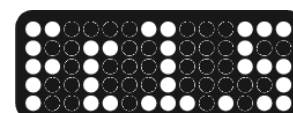
Tone Control

🔍 opens the real-time tone adjustment. You can adjust bass, midrange, and treble according to your personal preference. Use ⬅ and ➡ to select a region to adjust. Use + and - to adjust filter gain in the chosen region.

Keep 🔍 pressed to fine tune the parameters of each filter. Bass and Treble filters support adjustable range. Use ⬅ and ➡ to make the range narrower or wider (defaults for bass: 80Hz, 120Hz, 200Hz, 320Hz, 500Hz, for treble: 1.5kHz, 2kHz, 4kHz, 8kHz, 12kHz). Press 🔍 or 🔍 to accept the new value, or ⏻ to cancel the adjustment.

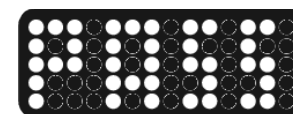


The mid-range filter supports user-selectable bandwidth and also a variable center frequency. After choosing the bandwidth (Q values: 2.00, 1.00, 0.50, 0.25, and 0.15. Smaller Q value leads to a wider bandwidth: $bw = f_c/Q$), at the "Fc" prompt, use ⬅ and ➡ to select a new center frequency. Target frequency is shown in kilohertz (kHz) unit on the display, e.g. "1.5" means a center frequency of 1500 Hz. Press 🔍 or 🔍 to accept or ⏻ to cancel the adjustment.



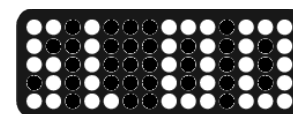
By-Pass Mode

Pressing 🔍 and then 🎧 enters a bypass mode. In this mode the Anti-Mode™ room correction is not active. Some enhancements made by the system remain active. These include the crossover between subwoofer and main channels in the 2.1 configuration and speaker level matching. Press any button to leave the bypass mode, then 🔍 or 🔍 to return to the home screen



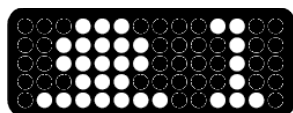
Subwoofer Output Level

Pressing 🔍 and then 🎧 allows to change the relative subwoofer level. This setting is only relevant if you have calibrated with the 2.1 configuration. Pressing 🎧 again returns to the tone control view, then 🔍 or 🔍 returns to the home screen.









Sound Profiles

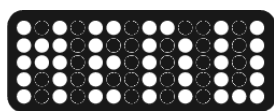
Anti-Mode X2 supports 3 sound profiles that can be used to store different settings for different situations. You can switch between the profiles in real time by pressing the 🎧 button. Use the + and - to select a profile when prompted and 🔍 to confirm.



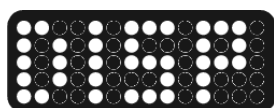
The current volume, profile, home screen style, and the chosen input are global settings. Any other changes you make will be automatically saved in the currently active profile. When you calibrate the unit for the first time all 3 profiles are written. You can calibrate a second or third time and only the active profile is affected.


Menu

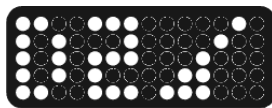
Press  to enter the menu. Press  and  to select between menu items, and  to change its value. Press any other button to close the menu, but note that  chooses the default home screen and  chooses the alternative home screen.



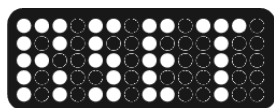
 to return



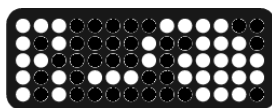
 to adjust →




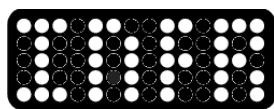
 /  or  /  to adjust brightness.  to return.




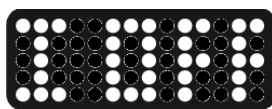
 pressed →





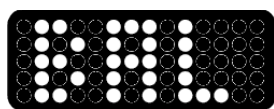
 pressed down for 6 seconds until the settings are reset and "OK" is briefly displayed.









 to adjust →

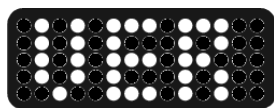



 /  or  /  to toggle infrasonic filter.  to return.

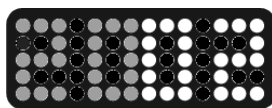


 to adjust →

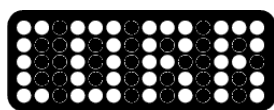
 /  or  /  to adjust balance.  to return.









 to show →










Shows the day and month of the current firmware version.



 to adjust →

 /  or  /  to choose full-range or low-frequency correction.  to return.

Remote Button Summary

-  Standby / cancel / return from menu
-  Mute / toggle bypass in EQ mode
-  Choose sound profile / adjust subwoofer level in EQ mode
-  Enter / leave EQ mode
-  Adjust volume / choose menu option / adjust value
-  Change input / adjust value / home screen type
-  Menu / OK / Confirm

2. Calibration

Anti-Mode™ X2 features a powerful and automatic Anti-Mode™ algorithm, which measures and corrects the combined response of the connected speakers, optional subwoofer, and the room, producing a result without undesirable peaks in the response.




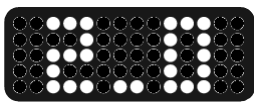



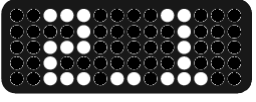
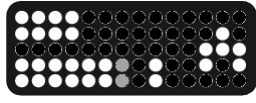
During the calibration process the Anti-Mode algorithm measures the acoustic environment by playing various tones through your audio system. This will take a few minutes to complete.

The measurement process is designed to be resilient against background noise, but it can be beneficial to choose a moment when the listening room is relatively quiet. It is also a good idea to turn off any noisy equipment such as air conditioning for the duration of the measurements.

Before the calibration

- Fix the microphone firmly in place so that the microphone capsule end is secured at the center of the primary listening position, at about ear height. Do not keep the microphone in hand!
- If your system features a subwoofer that has an adjustable low-pass filter, it is good to disable the filter, or set the cut-off frequency to the maximum value. With Anti-Mode the best place for a subwoofer is near the corner of the room.
- Make sure your active speakers or power amplifiers and/or subwoofer are connected to the correct outputs of the Anti-Mode X2 and turned on.
- With a subwoofer, adjust volumes so that the speakers and subwoofer are about equally loud. If the difference is too large during calibration you are prompted to adjust the subwoofer volume. If the subwoofer's volume cannot be adjusted, adjust the speaker volume in the opposite direction.

Running the calibration

- Turn on the Anti-Mode X2 unit. Connect the microphone cable to the microphone input in the front panel. The unit enters the calibration mode automatically.
-  /  to choose the system configuration "2.0" for stereo speakers (or when a subwoofer is integrated with them), or "2.1" when a subwoofer is connected directly to the Anti-Mode X2. Subwoofer-only alternatives are 0.2M (dual mono), 0.2 (stereo subs), and 0.1. Subwoofers are connected to the left and right outputs in these modes. Press  to confirm the channel configuration. 
- Noise starts playing and you can adjust the calibration volume using  / . The volume setting is shown as a bar at the top and the sound pressure level picked up by the microphone as a bar at the bottom. Adjust the level until the noise is clearly audible from the speakers and the bottom bar reaches the vertical line, then start calibration with . 
- The calibration performs several clearly audible frequency sweeps. The number of sweeps depends on the chosen system configuration. After the calibration is finished, the display prompts you to remove the microphone. 

Congratulations, your system has been optimized! Now it is a good time to put on some of your favorite music and enjoy the improved sound.

Notice: The automatic calibration process targets a balanced overall sound, with slightly elevated response towards the low bass region. The response can be adjusted in multiple ways to suit your personal taste.



FOR BEST RESULTS: When calibrating a system with a subwoofer, set the built-in lowpass filter of the subwoofer to bypass or to the highest available cutoff frequency. With Anti-Mode the best place for a subwoofer is near a corner of the room.



PLEASE NOTE: After Anti-Mode gets rid of room resonances, it may appear that the result sounds good, but is lacking in bass. You may have grown used to the exaggerated bass response caused by room resonances. Listening for a while will accustom you to the new more balanced sound.

If you feel that you need to increase the overall bass level, you can adjust the subwoofer output level or use tone controls.



3.Hints and Tidbits

This chapter fills this page with some more or less useful trivia about the product, most useful first.

- ✓ In the 0.0 uncalibrated mode, the subwoofer output will reproduce the low-passed version of the stereo outputs. There is no cross-over in this mode.
- ✓ The first calibration after a factory reset creates all profiles. Further calibrations only overwrite the current profile. You can have different channel configurations in each profile.
- ✓ In the 2.1 mode, the cross-over frequency is 80Hz. Adjustment is possible with the dspeaker console.
- ✓ You can connect more than one subwoofer using daisy-chaining or a Y-splitter. The Anti-Mode calibration is only concerned about the combined response of all of the speakers, subwoofers, and the room. Use the same volume setting in each sub, you do not need to adjust them to appear equally loud at the listening position. Only their combined response with the room matters.
- ✓ When there is no S/PDIF signal detected while the OPT or COX input is selected, the alternative home screen shows three dots.
- ✓ You can select the ANA input while coaxial is connected and active without ill effects. If you have the right analog input connected you can switch between right-channel-only analog mode and coaxial two-channel mode. A more useful idea is to have an external RCA switchbox. (You can also select the COX input while the stereo analog input is active without ill effects.)

4. Firmware update, Export, Settings Import

The firmware of Anti-Mode™ X2 is updated using a USB memory stick.

- Download the firmware file (FIRMWARE.X2) and copy it to the USB memory's root directory. Make sure the USB memory is using the FAT filesystem format. Some sticks are formatted with the exFAT filesystem, which is not supported.
- Put the Anti-Mode X2 unit to standby with .
- Attach the USB stick to the "SERVICE" USB port on the rear panel of the Anti-Mode X2.
- Turn on the Anti-Mode X2 with  and wait until the system automatically installs the firmware.
- Do not remove the USB stick during the update process. After finishing installation the system reboots, and the home screen is displayed. Now the USB stick can be removed.

When USB stick is present during startup, in X2D a click on subwoofer output may be produced.

The firmware is not updated if the unit already contains the same version of the firmware. In this case, after checking the contents of the USB stick the unit will start normally.

If you encounter problems during the update, make sure the USB stick is properly connected and contains the firmware file. If the problem persists, try copying the firmware file again on a different USB memory stick. Make sure the USB memory is using the FAT filesystem format. Some USB memory sticks may not be compatible with the firmware update.

Export and DSPeaker Console

In addition, if a USB memory stick is connected during power-on, Anti-Mode X2 creates files containing the responses of each profile as RESPn.SVG . You can view these e.g. with a web browser.

If the USB memory stick has a file AM-X2.TXT, settings are read from it, otherwise the file is created. The settings can be modified in a web browser, see <https://www.dspeaker.com/dspeakerconsole> for details.

5. Manufacturer



VLSI Solution / DSPeaker

Hermiankatu 8

FIN-33720 Tampere

FINLAND

Email: info@dspeaker.com

Contact

Website: www.dspeaker.com

Technical Support: support@dspeaker.com

Sales Support: info@dspeaker.com

6. Technical Specifications

Interfaces

- Analog stereo RCA input or 1 coaxial S/PDIF digital input (mutually exclusive)
- 1 optical S/PDIF digital input
 - S/PDIF: 16 to 24 bits PCM, 32 / 44.1 / 48 / 88.2 / 96 / 176.4 / 192 kHz
- USB Audio input (USB Type-C)
 - USB Audio 1.0 stereo 24-bit 44.1kHz / 48kHz / 88.2kHz / 96kHz PCM (no drivers required)
- Analog stereo RCA output (X2) / Stereo S/PDIF coax / optical Toslink output (X2D)
- Analog subwoofer RCA output
- Microphone input
- IR receiver for remote control
- Service USB port for firmware update

Analog Specifications (typical)

- Frequency Range (analog to analog): 5Hz to 22kHz
- Analog input: 2.3 Vrms (max), SNR 100dB, THD (-6dB level) < 0.002 %
- Stereo output (X2): 2.2 Vrms (max), SNR 107dB, THD (-6dB level) < 0.0015 %
- Digital output (X2D): 96 kHz, 24 bits (regardless of input rate)
- Subwoofer output: 2.3 Vrms (max), SNR 100dB, THD (-6dB level) < 0.03 %
- Power consumption: active 1.5W, stand-by: 0.1W

Firmware Highlights

- Anti-Mode™ 3 room calibration algorithm
- Cross-over for speakers and sub(s), automatic balance
- Tone controls
- Firmware update using a USB memory stick

Mechanical

- Unit Weight: 0.3 kg
- Unit Dimensions: 126mm (width) x 80mm (depth, without cables) x 28mm (height)
- Measurement microphone and remote control included