



Frontier

User guide



01. Introduction

Thank you for choosing the Output Frontier studio monitors. The Frontier studio monitors are the result of a collaborative effort between Output and Barefoot Sound, using the expertise of both companies to create an extraordinary set of loudspeakers. The coaxial design not only shrinks the size of the speakers, but also mechanically time aligns the drivers, which eliminates lobe tilt, and other issues that often cause inaccuracies in classic two way monitor designs. We took great care in creating a studio monitor that will give you an accurate representation of your mix with the ability to translate well across other systems, and be pleasant to listen to, allowing you to mix for hours without fatigue.

Even if you have a lot of experience with mixing and recording, please take time to read through this guide, which will help you get the most out of your loudspeakers.

Box Contents

- Frontier studio monitors (2)
- IEC Power Cables (2)
- PET Isolation Pads (2)
- Safety Guide (1)

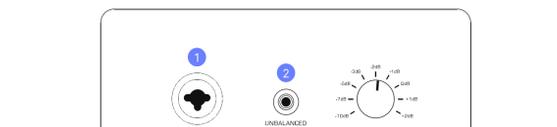
Support

For complete system requirements, compatibility information, and product registration, visit the Output website: www.output.com/frontier.

For additional product support, visit: www.output.com/support

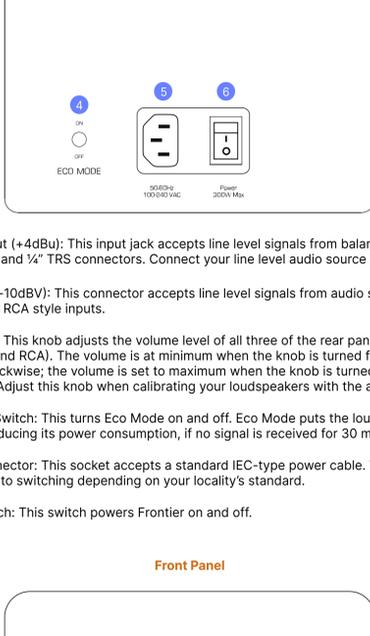
02. Specifications

Frequency Response	45Hz to 25kHz
Crossover Frequency	3000 Hz
Low Frequency Amplifier Power	100W
High Frequency Amplifier Power	100W
Polarity	Positive pressure with positive voltage
Input Impedance	20K Ohms
Input Sensitivity	87dB @ 1m @ -15dBv
Power	265 W max
Protection	Output current limiting; over temperature; transient on/off protection to prevent 'pops'; subsonic filter; external main fuse
Cabinet	Walnut Hardwood Base with Painted MDF Upper Cabinet
Eco Mode Power Draw:	280mW
Size (W x H x D)	332 x 230 x 200 mm (13 x 9 x 7.9 in)
Weight	7 kg (15.6 lbs)



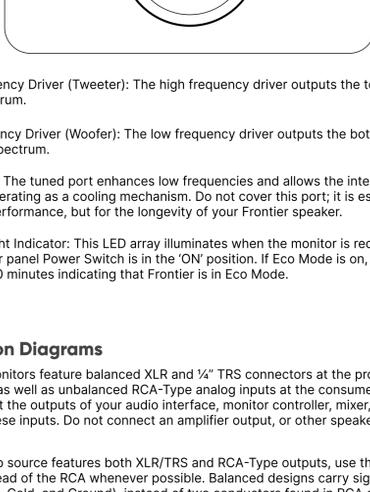
03. Features

Back Panel



1. Combo Input (+4dBu): This input jack accepts line level signals from balanced XLR connectors and 1/4" TRS connectors. Connect your line level audio source to this jack.
2. RCA Input (-10dBV): This connector accepts line level signals from audio sources with unbalanced RCA style inputs.
3. Level Knob: This knob adjusts the volume level of all three of the rear panel inputs (XLR, TRS and RCA). The volume is at minimum when the knob is turned fully counter-clockwise; the volume is set to maximum when the knob is turned fully clockwise. Adjust this knob when calibrating your loudspeakers with the audio source.
4. Eco Mode Switch: This turns Eco Mode on and off. Eco Mode puts the loudspeaker into standby, reducing its power consumption, if no signal is received for 30 minutes.
5. Power Connector: This socket accepts a standard IEC-type power cable. The power supply is auto switching depending on your locality's standard.
6. Power Switch: This switch powers Frontier on and off.

Front Panel



1. High Frequency Driver (Tweeter): The high frequency driver outputs the top range of the audio spectrum.
2. Low Frequency Driver (Woofer): The low frequency driver outputs the bottom range of the audio spectrum.
3. Tuned Port: The tuned port enhances low frequencies and allows the internal circuitry to be treated, operating as a cooling mechanism. Do not cover this port; it is essential not only for audio performance, but for the longevity of your Frontier speaker.
4. Frontier Light Indicator: This LED array illuminates when the monitor is receiving power and the rear panel Power Switch is in the 'ON' position. If Eco Mode is on, this array will dim after 30 minutes indicating that Frontier is in Eco Mode.

04. Connection Diagrams

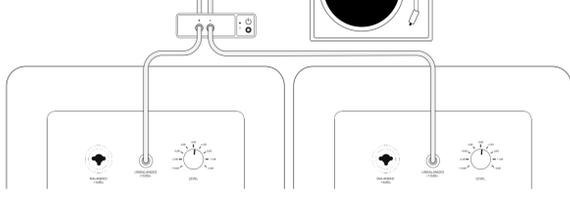
Frontier studio monitors feature balanced XLR and 1/4" TRS connectors at the professional +4dBu standard, as well as unbalanced RCA-Type analog inputs at the consumer -10dBv standard. Connect the outputs of your audio interface, monitor controller, mixer, or other line-level device to these inputs. Do not connect an amplifier output, or other speaker level signals to these inputs.

Tip: If your audio source features both XLR/TRS and RCA-Type outputs, use the XLR or TRS connectors instead of the RCA whenever possible. Balanced designs carry signal over three conductors (Hot, Cold, and Ground), instead of two conductors found in RCA cables (Hot and Ground). This results in lower noise, less interference, and overall better fidelity. If the only option is RCA cables, do your best to keep them as short as possible.

Scenario 1



Scenario 2



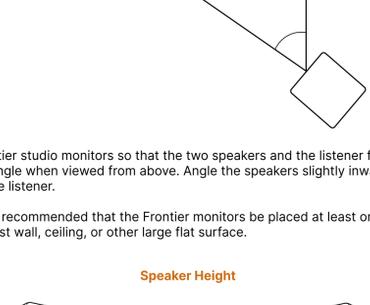
Scenario 3



05. Setup

The placement of your Frontier studio monitors (whether on speaker stands or your desktop workstation) will affect the performance of the loudspeakers. If given the option, speaker stands are preferred to minimize reflections from your desk. Due to the coaxial design, Frontier can be placed on its bottom or side without affecting the performance. Use the following tips to achieve the best performance:

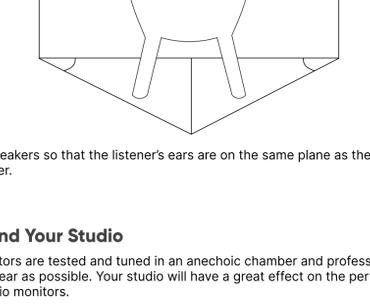
Speaker Placement



Place the Frontier studio monitors so that the two speakers and the listener form an equilateral triangle when viewed from above. Angle the speakers slightly inward so that the drivers face the listener.

In general, it is recommended that the Frontier monitors be placed at least one foot away from the nearest wall, ceiling, or other large flat surface.

Speaker Height



Position the speakers so that the listener's ears are on the same plane as the high frequency driver.

06. Frontier and Your Studio

The Frontier monitors are tested and tuned in an anechoic chamber and professionally treated rooms to be as linear as possible. Your studio will have a great effect on the performance of your Frontier studio monitors.

In professional studios, acousticians carefully determine the size and shape of the control room, construction materials, and which acoustic treatment must be applied to various surfaces. Then, they arrange studio monitors and furniture in a way that lends itself to the best sound. All of this ensures that the room will not inaccurately color the playback sound.

Outside of the professional world, most studios are set up in preexisting rooms where the size and shape cannot be manipulated or altered. However, this does not mean you cannot mix with accuracy—great mixes can be achieved in all sorts of "normal" rooms if you take care in planning your setup.

The proximity of your Frontier studio monitors to the walls, and particularly corners, will greatly change their frequency response. Because low frequencies radiate in all directions, proximity to surfaces will greatly exaggerate those frequencies, so take care to move your speakers as far away from walls and corners as practically allows. Also, keep in mind that while higher frequencies are more directional, so are their reflections, so judicious use of wall treatment can go a long way in making a humble room sound great.

07. Using a Subwoofer

If you plan to use a subwoofer with your pair of Frontier studio monitors, you will need to filter out the low frequency sounds from the input signal to the Frontier loudspeakers, so both the subwoofer and Frontier speakers are not playing back the same frequencies. This would greatly exaggerate those frequencies while you mix. Most professional subwoofers have built in crossovers and filters, so in this scenario, it would be best to have your subwoofer between the signal source and your Frontier loudspeakers in the signal chain.

08. Calibrating

Calibrating your monitors is essentially matching volume between all of your studio monitors, and making the 0dB level of your source, whether a DAW or a mixer, match a certain real life decibel level. You're going to need an SPL meter, and if you do not have a dedicated meter, there are many smartphone apps that do an adequate job—just make sure to remove any phone case, and be careful not to cover the microphone with a finger. Also, make sure that any app has the more flat C-Weighted filter option.

It is important to calibrate your studio monitors for the health of your ears, but also for accurate mixes, since we cannot hear certain frequencies as well at quiet levels, and at loud levels, we hear certain frequencies much clearer. It is absolutely critical you do this if you are using multiple sets of monitors to reference off each other. We usually perceive louder as better, especially after long mixing sessions, so if different sets of monitors are not at the same level, you will have a very frustrating mixing experience.

In general, you will only have to do this once when setting up your new Frontier set.

Calibration Levels

The standard calibration level is 85dB matching 0dB from the source. This is not an arbitrary number. 85dB is very close to the more flat portion of the equal loudness contour—that is, the volume level at which we hear frequencies equally. However, this level was also intended for very large spaces, such as cinemas. 85dB in a normal sized mixing environment is going to be very loud. It is important you calibrate the level that's appropriate for your room. The following chart is a standard reference level. Keep in mind that the actual calibration will be about 3dB louder than the chart when both monitors are playing back simultaneously (you calibrate one at a time).

Room Size (square feet)	Single Monitor Reference Level
>6000	82dB
3000-6000	80dB
1500-3000	78dB
450-1500	76dB
<450	74dB

Method of Calibration

There are many methods to calibrate your studio monitors, but the one described here is one of the most common. This method is not subjective, so it is also accurate. All you need is some pink noise and your meter. This is also easier with some assistance. If no one is available, you will need a mount for your meter.

This method assumes that you are using a DAW. If you do not have a DAW, you will need an audio source that can generate full bandwidth pink noise. There are many free samples available for download that you can play through your computer's standard audio player. Full bandwidth pink noise presents equal energy per octave—this is different than white noise which presents equal energy per frequency band. Do not calibrate with white noise.

1. Place the SPL meter in the listening position. Most meters are designed to have the microphone pointed at the ceiling rather than the source, but check the manual or the documentation with the phone app.
2. Set both Frontier monitor levels to -10dB, and turn both of them off.
3. Load your sound generator and start playing pink noise. Make sure the levels in your DAW are set to 0dB, and that your audio interface, or mixer, is set at unity gain.
4. Turn on the left Frontier, and slowly increase the gain on the back of the loudspeaker until you reach the appropriate level on the chart. When you have reached that level, turn off the speaker.
5. Turn on the right Frontier, slowly increase the gain on the back of the loudspeaker until it has reached the same level.
6. Turn off the sound generator.
7. Turn on the left Frontier.
8. Sit down in the mix position, and play some music that you are familiar with. You may need to slightly change your speaker position until you have a balanced sweet spot to mix from.