

M-AUDIO

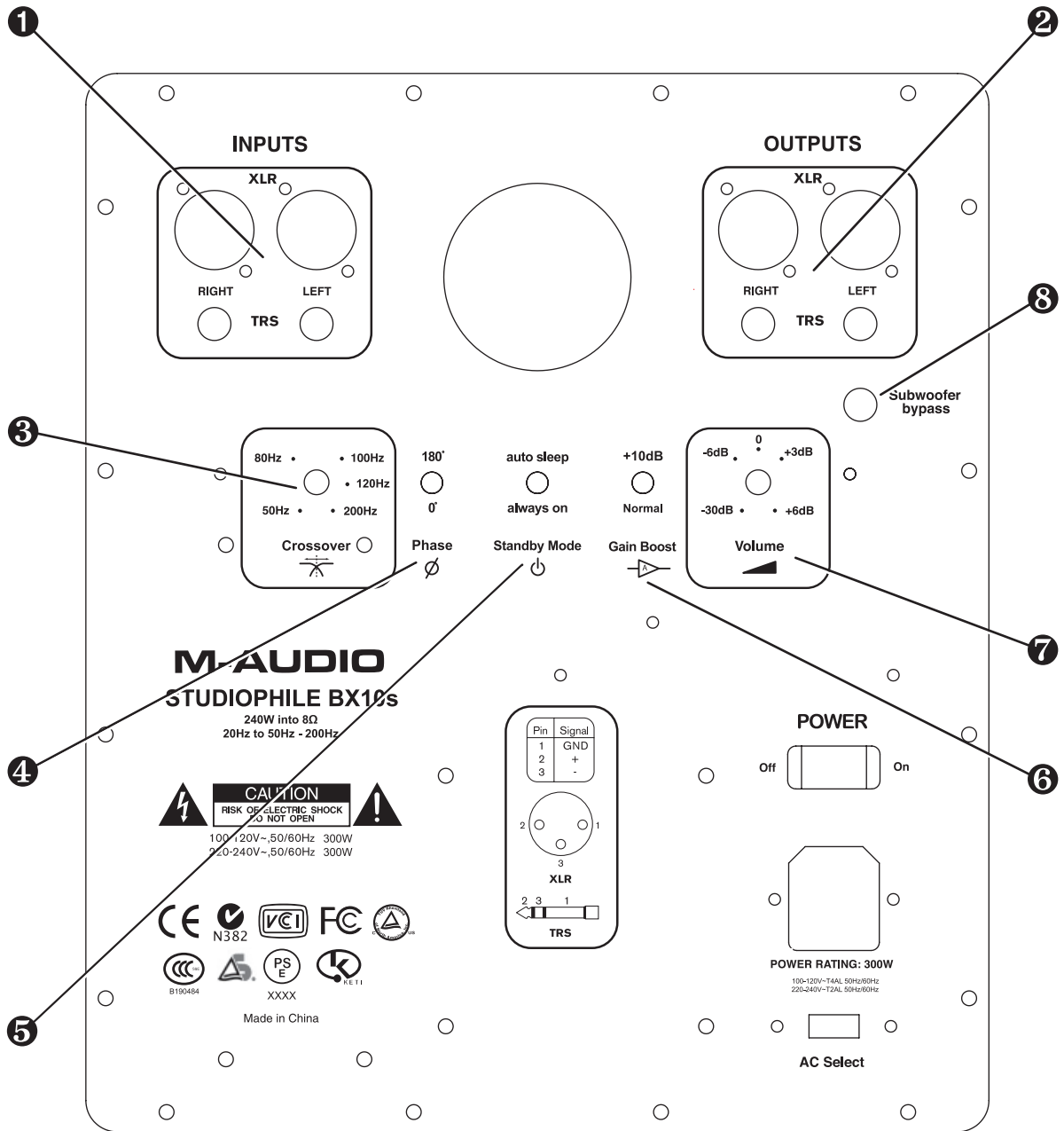


Studiophile BX10s

User Guide

English

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Introduction

Thank you for choosing the Studiophile Series BX10s active subwoofer. M-Audio is well known for direct-field studio loudspeaker monitors, and now after extensive research and development, we are proud to present the Studiophile BX10s subwoofer.

Our designers created the BX10s from the ground up; then we employed some of Los Angeles' top mix engineers to help us test and refine the design—ensuring that it meets the most demanding needs for professional and project studio monitoring environments. The goal was to develop a subwoofer that integrates seamlessly with the M-Audio BX5a and BX8a active studio monitors, extending the low-frequency response of the total monitoring system down to 20Hz. Moreover, the BX10s is versatile enough to work well with any combination of active studio monitors in a 2-channel stereo or multichannel surround environment.

For professional engineers at commercial studios and home studio owners alike, the BX10s helps set a new standard in studio monitoring.

What's in the Box?

Your Studiophile BX10s box contains:

- One BX10s active powered subwoofer with removable driver protection grill
- One detachable AC power cord
- One non-latching footswitch for subwoofer bypass function
- Four removable cone-shaped feet
- This manual

Studiophile BX10s Features

Subwoofer Driver

The drive unit contains a 10-inch composite diaphragm, high-temperature voice coil, and damped rubber surround. It is designed to deliver a tight and punchy low-frequency response (in contrast to the “boomy” or hyped response characteristic of underdamped subwoofers). The driver's high Bl factor (electromagnet force factor) creates a powerful motor that allows the cone to follow the input signal very accurately, resulting in a low-frequency extension par excellence. Furthermore, the driver's large magnetic structures are shielded to ensure the subwoofer unit won't wreak havoc with nearby devices that may be susceptible to magnetic-field interference.

Power Amplifier

In order to generate a powerful, tight bass response, the BX10s uses a 240-watt amp, featuring a custom discrete transistor architecture. The amplifier has a carefully designed damping factor which, in conjunction with the mechanical and electromechanical systems built into the driver, helps eliminate the natural tendency of the driver to “ring” after input stimuli have ceased. This is chiefly responsible for the BX10s' extremely accurate and controlled bass response. You will notice that kick drums and staccato bass notes reproduced by the BX10s are tight and solid, as though coming from a large acoustic suspension system.

Bass Reflex Port

The BX10s has a vented enclosure—containing a custom bass-reflex port tube with a circular cross section on the rear of the cabinet. The port provides a means for the rear output of the driver to contribute to the total output of the system—but only over a very narrow range of frequencies centered around a “Helmholtz resonance” (determined by the compliance and mass of the air in the port tube). The port effectively gives the subwoofer a smooth response down to 20Hz, and since its low-frequency contribution complements that of the front-firing woofer driver, the woofer stays linear and distortion-free throughout the passband (because its movement stays within its maximum excursion limits).

Enclosure

Like the other components, the BX10s' enclosure has an important role in shaping the overall sonic response. In order to provide more stable performance, the BX10s employs a special high acoustic efficiency medium density fiberboard (MDF) and unique interior reinforcement designed to absorb vibration and impact generated as the subwoofer reproduces high SPL signals and transients. Additionally, the cabinet uses carefully placed acoustic foam to absorb internal reflections and dampen standing waves; the acoustic foam also converts the air system inside the cabinet from an adiabatic process into an isothermal one, making the enclosure behave as though it were larger—resulting in a system more capable of reproducing very low frequency signals naturally and evenly.

Versatile Crossover

You can use the BX10s in a variety of monitoring contexts, from 2-channel to multichannel (e.g., 5.1) systems, and as an accompaniment to practically any direct-field monitors. To this end, we've provided a versatile yet efficient way to tailor the response of the subwoofer to work well in any typical monitoring system. For use in a 2-channel system, there is a linked high-pass/low-pass filter control that allows you to adjust the crossover frequency. You can set it anywhere from 50Hz to 200Hz. It splits the signal by routing everything below that frequency to the subwoofer and everything above it to your main monitors. And by using a 4th-order Linkwitz-Riley topology, the circuit enables you to achieve the flattest net response through the crossover point. For multichannel systems, the BX10s can reproduce just the output of the LFE (low-frequency effects) channel, or it can reproduce the bass from some or all of the main channels using conventional multichannel bass management schemes. In this multichannel context, you can simply “open up” the BX10s fully by setting it to 200Hz (for use with external bass managers), or you can set it to 120Hz (to comply with the Dolby Digital standard for the LFE band limit). Further, there's a 10dB boost switch that allows you to migrate easily between your calibrated 2-channel and 5.1-channel Dolby Digital levels.

Subwoofer Bypass/Defeat

If you connect the enclosed footswitch to the Subwoofer Bypass jack on the back of the BX10s, you can use it selectively to bypass the BX10s (including the amp, driver, and crossover), and send the full-bandwidth program directly to your main monitors. This way you can audition mixes with and without the low-frequency extension the BX10s provides—all from the convenience of your mix position. As a visual indicator, the blue power LED on the front baffle of the subwoofer flashes red when it's in bypass mode. (Note: you can use any binary footswitch—such as an electronic keyboard sustain pedal—but we've provided one for your convenience.)

Phase Select

Because low-frequency signals have long wavelengths compared to the dimensions of most rooms, subwoofers often tend to cause room modes and cancellations that can be quite dramatic. For this reason, we've included a phase inversion switch, which—as the name suggests—causes a π (or 180°) phase shift in the subwoofer's output. This can allow you more degrees of freedom in choosing where to locate the BX10s (and consequently, the crossover frequency phase alignment) in your monitoring environment.

“Sleep” Mode

By enabling this mode, the subwoofer will fall into standby in the absence of an input signal, using less power and muting the output; the presence of an input signal can then “wake up” the subwoofer and it will revert to normal operation. When the BX10s is “asleep” the LED on its front face turns a solid red.

Setting Up the BX10s

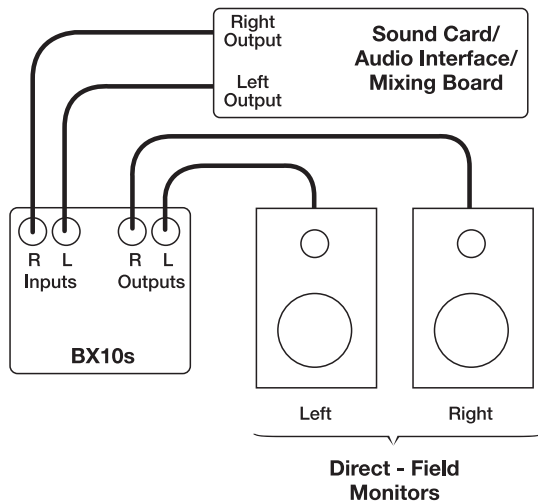
AC Voltage Select: Since the BX10s contains its own amplifier, it must be connected to a power outlet using the detachable AC cable provided. Note that the “AC Select” switch (located below the IEC socket for the mains power cord) is user-selectable for 100-120V~50/60 Hz or 220-240V~50/60Hz operation. Before you do anything, make sure the AC voltage select switch is set to the appropriate position for your location.

Warning: Use of improper voltage/selector switch combinations may result in hazardous conditions and/or damage to speaker components not covered by speaker warranty.

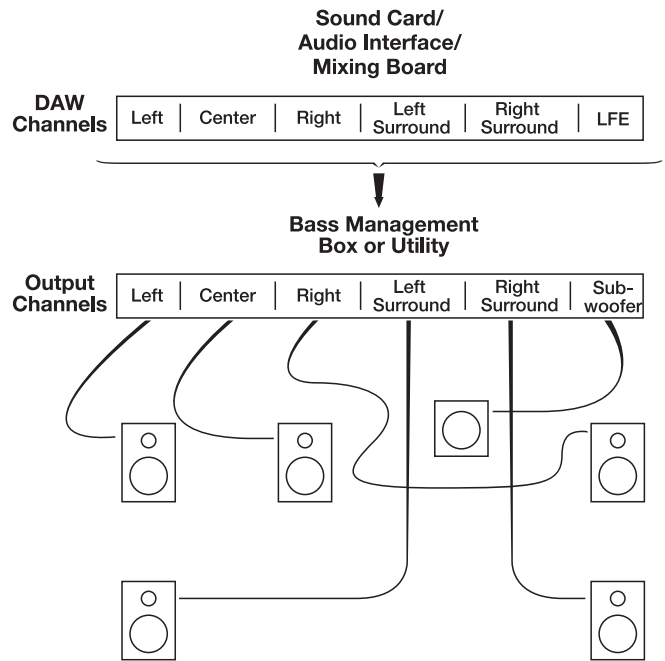
Connecting Audio

2-Channel Stereo Operation: Connect the main left and right outputs of your mixing console, audio interface, or sound card to the XLR or TRS balanced inputs ❶ on the back of the BX10s; then route the left and right XLR or TRS balanced outputs ❷ to your direct-field monitors. (While the TRS inputs and outputs will work with unbalanced cables, we strongly recommend you use balanced cables—in doing so, you’ll have better immunity to inductively coupled noise from power cables, etc.)

- XLR PIN 1 and TRS sleeve = signal ground (shield)
- XLR PIN 2 and TRS tip = signal positive (+)
- XLR PIN 3 and TRS ring = signal negative (-)



Multichannel (e.g., 5.1-channel surround) Operation: If you’re mixing or monitoring a multichannel source, you undoubtedly have an external bass management system and/or you may be sending the LFE (low-frequency effects) channel directly to the subwoofer with no additional signal redirection. In this scenario, you can route your subwoofer audio signal to either the left or right input on the BX10s. Further, you should bypass the BX10s’ internal crossover by setting the crossover control to the 200Hz position (fully open).



Adjusting the Back Panel Controls

Crossover control* ❸: we’ve touched on this topic already, but to complete the discussion, consider the following:

- The crossovers of most A/V home theater systems are set to 80Hz (assuming they’re being used with a subwoofer). So if you’re mixing multichannel material using the BX10s, we recommend you start with the 80-Hz setting as a reference to approximate a typical end-user listening environment.
- For easy compliance with Dolby Digital, DTS, and THX recommendations, we’ve provided calibrated markings on the crossover dial for 80Hz, 100Hz, and 120Hz positions (in addition to 50 Hz and 200 Hz).
- If you’re using the BX10s with M-Audio’s BX5a direct-field monitors in a 2-channel setup, we recommend you start with 80Hz as your crossover point and adjust it to suit your particular acoustic environment.
- If you’re using the BX10s with M-Audio’s BX8a direct-field monitors in a 2-channel setup, we recommend you start with 50Hz as your crossover point and adjust it to suit your particular acoustic environment.

Phase control ❹: as we mentioned before, this switch inverts the signal (the phase angle from 0° to 180°) that goes to the subwoofer amplifier. (If you’re operating a 2-channel system with the built-in crossover, the phase function does not affect the signal going to your direct-field monitors.) You can select the appropriate position of this switch by listening to the way the sound from the BX10s blends with the rest of your system. There is no “right” or “wrong” position, per se—but logically you want the subwoofer to be “phase coherent” with your direct fields at the crossover frequency. One way to determine this phase coherence is by playing a sine wave signal at the crossover frequency you’ve selected and put the phase switch in the position that gives you the strongest output.

Standby Mode ❺: this function allows the BX10s to go to “sleep” if you’re not using it. In a sense, it’s like an “audio screen saver.” When the switch is set to “always on” the subwoofer will be continuously alert and operating; whether or not you’re using it, it’ll stay on. When the switch is set to “auto sleep” and there is no audio input signal for at least 15 minutes, the BX10s will go into a low-standby mode and its amp will mute; an input signal as small as 7mV will “wake up” the subwoofer and it will reproduce sound normally. (Note that the blue power LED turns red when the BX10s is asleep and it reverts back to blue upon awaking.) The “auto sleep” mode can be useful if you want to conserve energy. In sleep mode, the power draw falls to one-tenth the maximum current.

Gain Boost* ⑥: no matter what the setting of the “Volume” knob, you’ll add 10dB of gain by switching in this function. It’s really most appropriate for multichannel operation: Dolby Laboratories requires the LFE channel to be encoded at -10dB relative to the other channels for Dolby Digital. So if your BX10s is calibrated to have an even level response relative to your main monitors, and if you’re using the BX10s solely as your LFE reproducer, you can engage the gain boost and perform your multichannel mix with the levels set appropriately.

Volume ⑦: you should always send a line-level signal to the BX10s inputs. When the volume control is all the way up, 85mV of pink noise at the input will produce 100dBA output SPL at one meter from the front baffle. The volume control affects the level going to the BX10s amplifier and does not affect the level of the BX10s’ outputs that feed your direct-field monitors. Generally, we recommend that you try to get the flattest, most even system response between your subwoofer and your direct-field monitors—so depending on the acoustics of your environment and how you’ve set up your signal path and levels, you should spend a few minutes calibrating the respective levels of the subwoofer and each of your main monitors. If you have access to pink noise signals and/or swept sine waves (linear and logarithmic), they can be of great help for ensuring your system has the smoothest tonal balance from top to bottom.

Subwoofer Bypass ⑧: this is a 1/4” mono jack for connecting a non-latching footswitch like the M-Audio SP-1 or any sustain pedal for a keyboard controller. In 2-channel situations, toggling the footswitch triggers a relay circuit that mutes the subwoofer output and reroutes the full-bandwidth audio signal directly to your direct-field monitors. In essence, it takes the subwoofer (with its crossover) completely out of the signal path so you can easily audition your mixes both with and without the presence of the BX10s subwoofer’s low frequency extension—all from your mixing position. This function can also be useful for multichannel operation. Further, if all you have is a latching footswitch (which is normally open), you can still use it to operate this function. Note that when the BX10s is in bypass mode, the blue power LED on its front face turns red.

**For more information on using a subwoofer for multichannel applications, please visit www.dolby.com, www.dtsonline.com, or www.thx.com.*

Placing the BX10s

The “location location location” cliché doesn’t only apply to the real estate market. It’s equally (if not more) applicable to the subject of loudspeakers and room acoustics. As you can imagine, where you place the BX10s in your room can have a huge impact on how it will sound. In fact, any well-designed, powerful subwoofer can sound like a complete dud in your monitoring setup if you’ve placed it poorly. (This tenet applies for any loudspeaker, but it’s especially true for low-frequency reproducers like subwoofers.)

There are lots of opinions on the best method to determine the optimal location for your subwoofer—in fact, if you ask three different studio engineers, they’ll probably give you six different answers. But we can’t emphasize enough how important this issue is, so please take a little time to think about subwoofer placement—keeping in mind that the shape of your room, its dimensions (including ceiling height), the wall construction, and any acoustic treatment you have can all conspire to affect the subwoofer’s apparent performance. Remember, also, that the frequency of any given signal is inversely proportional to its wavelength—so, for example, at 40Hz, one wavelength is about 8.5 meters or 28 feet; at 80Hz one wavelength is a little over 4 meters, or 14 feet; etc.

Where to start: first of all, you should always place the subwoofer on the floor when you are using it—never on a table or speaker stand. One theory suggests that the best position for a subwoofer in a 2-channel system is on the floor half-way between your left and right direct-field monitors, with its front facing forward and in the same plane as the direct-field speakers. From there, you can adjust the subwoofer’s position until it is most “correct.” Another theory dictates that you should start with the subwoofer in a corner of the room’s floor, where the adjacent walls can help the subwoofer maximize the amount of sound it radiates; and then you can adjust the position to suit your specific monitoring setup. Both of these methods are valid, but there’s yet another method that a lot of mix engineers have employed with great success—i.e., by exploiting the law of bilateral symmetry.

With this method, you would place the BX10s in the chair in your listening position. (Presumably, this is at the apex of an isosceles triangle between your left and right direct-field monitors.) Play some music with substantial bass frequencies into the BX10s at a comfortable listening level. (Pink noise works great for this too.) Crawl around the floor of your room and listen for a place where the sound is “fullest” but also “tight” sounding. Wherever that is—bingo!—that’s where your BX10s will go. If you want to be more precise, you can use a 1/12th-octave real-time (spectrum) analyzer instead of your ears and perform the same exercise. (If you do this, make sure you play pink noise as the test signal and observe where the spectral response is smoothest and has greatest low-frequency extension.)

Please note that because low-frequency signals radiate omnidirectionally, you may find that the best location sonically for the BX10s is quite inconvenient—like in an area of your studio with a lot of foot traffic. If this is the case, you can simply flip the Phase switch on the BX10s’ back panel and repeat the exercise, hoping for a more convenient outcome.

Finally, once you’ve placed the BX10s where you believe it will sound best, give yourself a sanity check and play some material along with direct-field monitors, listening from your standard mix position. (Make sure the BX10s level, phase, and crossover are set appropriately.) If something is asked, try out some new subwoofer locations. As always, please feel free to experiment with different locations (and different directions for facing the driver)... you may inadvertently find a better way to place the subwoofer even if you think its current location already sounds good.

Your BX10s Warranty

Warranty Terms

M-Audio warrants products to be free from defects in materials and workmanship, under normal use and provided that the product is owned by the original, registered user. Visit www.m-audio.com/warranty for terms and limitations applying to your specific product.

Warranty Registration

Thank you for registering your new M-Audio product. Doing so immediately both entitles you to full warranty coverage and helps M-Audio develop and manufacture the finest quality products available. Register online at www.m-audio.com/register for the chance to win M-Audio giveaways.

The web sites mentioned above are examples only and are in no way associated or affiliated with M-Audio or Avid Technology, Inc. M-Audio does not guarantee the performance or availability of these services. Studiophile BX10s is not endorsed, sponsored, or approved by these companies.

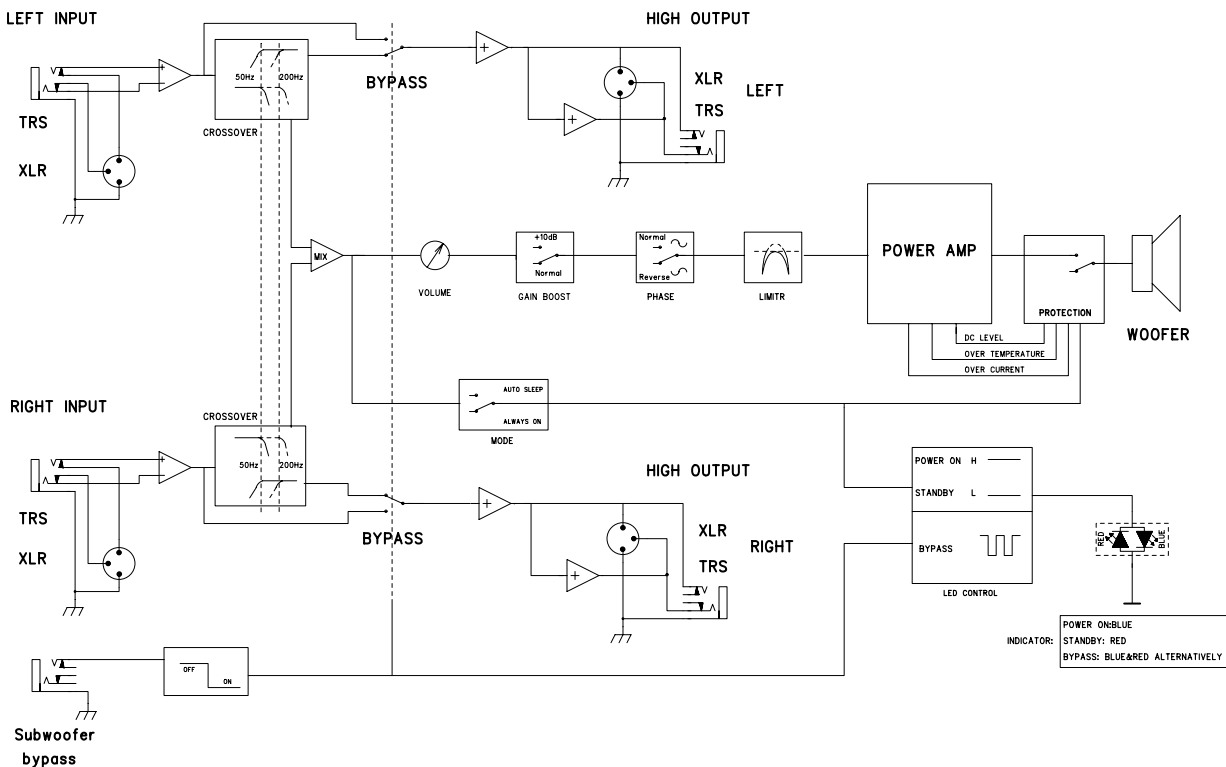
Appendices

Appendix A - Technical Specifications

Type	Bass-reflex active powered subwoofer
Woofer Driver	10-inch composite (treated paper/fiberglass) cone with high-temperature voice coil and damped rubber surround
Frequency Response	20Hz – 200Hz (-3dB points)
Crossover	HP/LP linked filter sweepable from 50-200Hz; 24dB/octave 4th-order alignment
Input Sensitivity	85mV pink noise input produces 100dBA output SPL at one meter with volume control at maximum
Amplifier	240 VA average power into 8 Ω, discrete transistor design
S/N Ratio	86dB (A-weighted)
THD at rated power, mono mode	0.019% (175 W)
Inputs	Two XLR balanced inputs; two TRS balanced/unbalanced inputs
Outputs	Two XLR balanced outputs for satellites
Controls	Volume/Gain control, 10 dB bass boost switch, sleep mode switch, phase inverse switch, variable crossover control, subwoofer bypass footswitch jack
Input Impedance	20k ohms balanced, 10k ohms unbalanced
Maximum input level	+20dBu
Auto turn off time	15 minutes
Auto turn on input sensitivity	7.3mV
Protection	Over temperature, turn-on/off transient, subsonic filter, external mains fuse, DC protection, over current protection
Indicator	Power On (blue) or Standby/Bypass (Red)
Power Requirements	Dual-voltage (selectable by rear-panel switch) for either 100-120V/~50/60Hz or 220-240V/~50/60Hz; powered via detachable grounded IEC cable
Cabinet	Vinyl-laminated MDF
Dimensions	15 in. (h) x 15 in. (w) x 15 in. (d); 38.1 cm (h) x 38.1 cm (w) x 38.1 cm (d)
Shipping Weight	54.6 lbs, 24.75 kg

* Above specifications subject to change without notice

Appendix B – Block Diagram



M-Audio USA 5795 Martin Rd., Irwindale, CA 91706	
Technical Support	
web:	www.m-audio.com/tech
tel (pro products):	(626) 633-9055
tel (consumer products):	(626) 633-9066
fax (shipping):	(626) 633-9032
Sales	
e-mail:	sales@m-audio.com
tel:	1-866-657-6434
fax:	(626) 633-9070
Web	www.m-audio.com

M-Audio U.K. Floor 6, Gresham House, 53 Clarendon Road, Watford WD17 1LA, United Kingdom	
Technical Support	
e-mail:	support@maudio.co.uk
tel:(Mac support):	+44 (0)1765 650072
tel: (PC support):	+44 (0)1309 671301
Sales	
tel:	+44 (0)1923 204010
fax:	+44 (0)1923 204039
Web	www.maudio.co.uk

M-Audio France Floor 6, Gresham House, 53 Clarendon Road, Watford WD17 1LA, United Kingdom	
Renseignements Commerciaux	
tel :	0 810 001 105
e-mail :	info@m-audio.fr
Assistance Technique	
PC :	0 820 000 731
MAC :	0 820 391 191
Assistance Technique	
e-mail :	support@m-audio.fr mac@m-audio.fr
fax :	+33 (0)1 72 72 90 52
Site Web	www.m-audio.fr

M-Audio Germany Kuhallmand 34, D-74613 Ohringen, Germany	
Technical Support	
e-mail:	support@m-audio.de
tel:	+49 (0)7941 - 9870030
fax:	+49 (0)7941 98 70070
Sales	
e-mail:	info@m-audio.de
tel:	+49 (0)7941 98 7000
fax:	+49 (0)7941 98 70070
Web	www.m-audio.de

M-Audio Canada 1400 St-Jean Baptiste Ave. #150, Quebec City, Quebec G2E 5B7, Canada	
Technical Support	
e-mail:	techcanada@m-audio.com
phone:	(418) 872-0444
fax:	(418) 872-0034
Sales	
e-mail:	infocanada@m-audio.com
phone:	(866) 872-0444
fax:	(418) 872-0034
Web	www.m-audio.ca

M-Audio Japan アビッドテクノロジー株式会社 エムオーディオ事業部 : 〒460-0002 愛知県名古屋市中区丸の内 2-18-10 Avid Technology K.K. : 2-18-10 Marunouchi, Naka-Ku, Nagoya, Japan 460-0002	
カスタマーサポート (Technical Support)	
e-mail :	win-support@m-audio.jp
e-mail (Macintosh 環境専用) :	mac-support@m-audio.jp
tel :	052-218-0859 (10:00~12:00/13:00~17:00)
セールスに関するお問い合わせ (Sales)	
e-mail:	info@m-audio.jp
tel:	052-218-3375
fax:	052-218-0875
Web	www.m-audio.jp

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