MESA/BOOGIE® BASS 800D

SUBWAY® BD-800™

Owner's Manual

Greetings from the Home of Tone®

…You, smart player and intuitive human, have put your trust in us to be your amplifier company. This is something that we do not take lightly. By choosing this instrument to be part of your musical voice, you have become part of the MESA family… WELCOME…and to those of you who are already part of the MESA family, we thank you for returning to your roots. Our goal is to never let you down. Your reward is that you are the new owner of an amp bred of fine heritage, benefitting from the many pioneering and patented MESA circuits as well as fresh, cutting-edge research and development efforts leading to this new and exciting model. We feel confident that this amp will inspire many hours of musical satisfaction and lasting enjoyment. It was built with you in mind by players who know the value of a fine musical instrument and the commitment it takes to make great music. The same commitment to quality, value, and support we make to you… our new friend.

SUBWAY® BD-800™

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IMPORTANT SAFETY INSTRUCTIONS

1. Before attempting to use this apparatus, read and follow these instructions for proper use.
2. Keep these instructions.
3. Heed all warnings.
4. Do not use this apparatus near water.
5. Clean only with a dry cloth, do not use any solvent such as benzene, naphtha or paint thinner on apparatus.
6. Do not block any ventilation openings. Install in accordance with manufacturer's instructions.
7. Do not install near any heat sources such as radiators, heat registers, stoves or other apparatus (including other amplifiers) that produce heat. Avoid placing the apparatus in direct sunlight.
8. Do not defeat the safety purpose of the polarized or grounding type plug. A polarized plug has two blades with one wider than the other. A grounding type plug has two blades and a third grounding prong (protective earth connection). The wide blade or third prong is provided for your safety. If the provided does not fit your outlet, consult an electrician for replacement of obsolete outlets.
9. Be sure that the amplifier's rated power supply voltage and frequency matches the voltage and frequency of your power source BEFORE connecting amplifier to the power source. The amplifier's rated power supply voltage and frequency are clearly indicated on the back panel near the power inlet, and the power cord's plug should match the power source in your region.
10. Protect the power cord from being walked on, pinched, or from excessive stress, particularly at the plug and attachment point of the apparatus.
11. Only use attachments and/or accessories specified by the manufacturer.
12. Refer all servicing to qualified service personnel. Servicing is required when the apparatus has been damaged in any way, such as the power plug or cord is damaged, liquid has been spilled or objects have fallen into the apparatus, the apparatus has been exposed to rain or moisture, does not operate normally or has been dropped.
13. To ensure proper ventilation, ensure that there is a minimum of 4" (10cm) of space at the rear of the apparatus. The ventilation should not be impeded by covering the ventilation openings with items such as newspapers, cloth, tapestries, curtains, etc. Do not impede ventilation by placing objects on top of the apparatus which extend past the rear edge of the cabinet.
14. No naked flame sources, such as lighted candles or oil lamps, shall be placed on the apparatus.
15. The apparatus shall not be exposed to dripping or splashing, and insure that no objects filled with liquids, such as vases or beverages, are placed on the apparatus.
16. The AC plug is the mains disconnect, the plug shall remain accessible after installation.
17. **WARNING:** To reduce the risk of fire or electric shock, do not expose this apparatus to rain or moisture.
18. **WARNING:** Do not defeat the safety grounding pin on the power cable, it is there for your safety.
19. **WARNING:** Do not open or perform any internal modifications on this apparatus.
20. **WARNING:** Do not attempt to repair the apparatus, or replace parts within it (except where this manual provides specific instructions directing you to do so). Refer all servicing to your retailer, the nearest authorized Mesa Boogie Service Center, or authorized Mesa Boogie distributor in your region.
21. **WARNING:** Always disconnect the apparatus from the power source before changing fuses, tubes or removing the chassis for service. Use only the same type and rating as specified on the back of the apparatus when replacing a fuse.
22. **WARNING:** Disconnect apparatus from the power source during a lightning storm or when unused for long periods of time.
23. **WARNING:** This apparatus is heavy. Insure that the apparatus remains stable after installation.
24. **WARNING:** In areas where children may be present, use additional precautions as needed to protect the children from the hazards presented by the unit. This includes risk of electric shock, burns and toppling over.
25. **CAUTION:** This apparatus contains hot components and surfaces. Avoid direct contact with heated tubes and other components. Insure that any factory installed guards remain installed.
26. **CAUTION:** Avoid contact with moving fan blades that may be present within the apparatus or cabinet.
27. **CAUTION:** Tube envelopes are glass and can present a hazard if broken. Always turn apparatus off, disconnect from the power source, and allow to cool before changing tubes.
28. **CAUTION:** To avoid damaging your speakers and other equipment, turn off the power of this and all connected equipment before making or changing connections. Power apparatus up with the volume levels set to minimum, and slowly increase to desired level.
29. **CAUTION:** Always insure that the proper speaker load is connected to the apparatus before operating the apparatus. Failure to do so may cause damage to the apparatus.
30. **CAUTION:** Do not use excessive force when handling cords, jacks, buttons, switches and controls. Never unplug the apparatus from the power source by pulling on the wire, use the plug body.
31. **CAUTION:** This apparatus, in combination with speakers and/or headphones, may be capable of producing sound levels that could cause permanent hearing loss. Do not operate for a long period of time at high levels, or at a level that is uncomfortable, without hearing protection. If you experience any hearing loss or ringing in the ears, you should immediately stop using the apparatus and consult an audiologist.

[rev. 12/18/2020]

PRODUCT COMPLIANCE INFORMATION

NOTICE: This device complies with Part 15 of FCC Rules and with Industry Canada license exempt RSS standard. Operation is subject to the following two conditions:

• This device may not cause harmful interference
• This device must accept any interference received, including interference that cause undesired operation.

Suppliers Declaration of Conformity for SUBWAY BD-800

Responsible Party

Gibson Brands Inc.
209 10th Ave S Ste 205,
Nashville, TN 37203
United States

Telephone: + 1 615 933 6000

SUBWAY® BD-800™

Operating Instructions

OVERVIEW

Congratulations on your new SUBWAY BD-800™, and welcome to the MESA/Boogie® family! First, we would like to thank you for choosing us as your amplifier company and trusting us to be part of creating your musical voice. This is something we never take for granted, and you'll find that we are here and ready to assist you should you ever need help or just have a question. Our goal is to help you get the most out of your new amplifier and deliver your best performance. We are confident that your new amplifier will bring you many years of reliable service, as well as provide inspiration that helps you discover new dimensions and possibilities in your music.

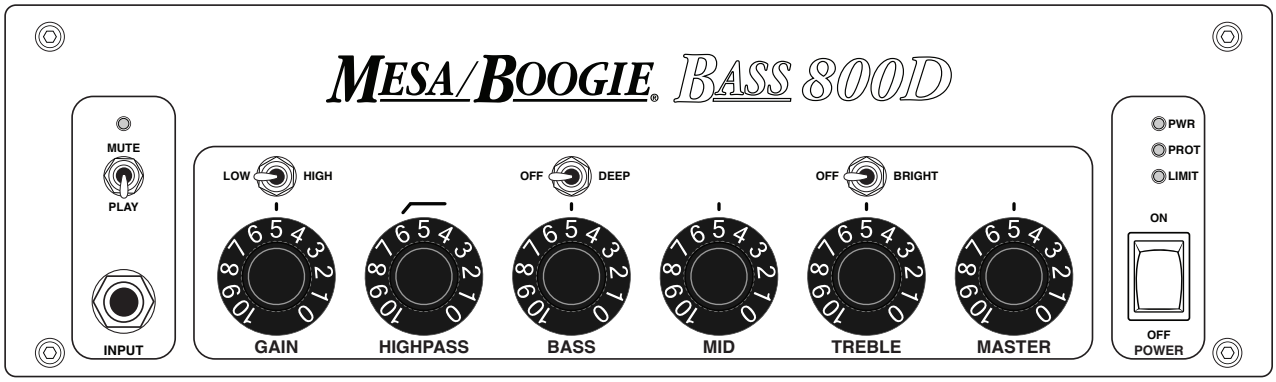
You have chosen an amplifier bred of a fine heritage, and this latest model is another testament to our legacy of tone. Its lineage can be traced back to the very first MESA amplifier ever built, the MESA 450 Bass Head. In fact, the first five MESA amplifiers built in the Lagunitas mountain shack were bass amplifiers…a little-known piece of trivia that is often overshadowed by our world-renowned reputation for guitar amplification. However, we've always loved the bass, and have—since day one—been committed to elevating its stature through our art form. The MESA bass story continued with the first rack-mount chassis bass amplifier in 1980, the D-180. The mid-eighties saw the introduction of the BASS 400, and later, in 1988, the BASS 400+ with its stunning pitch, punch, and power delivered by an additional six 6L6s power tubes for a total of twelve 6L6 power tubes in its mighty power section.

During its 20-year build cycle, the Bass 400/400+ went on to become a classic used by the world's most talented bassists for two decades. Paul McCartney, Mark King, Stanley Clark, Jack Blades, Michael Anthony, Blasko, and Bootsy Collins are but some of the international stars that put the Bass 400/400+ center stage to anchor the band. Those iconic amplifiers still bring top dollar when you can find one changing hands on the pre-owned market. After the Bass 400/400+, MESA pioneered an entire line of tube-driven MOSFET bass amplifiers (including the legendary Walkabout), further expanding our presence in the bass market. Then came the highly successful SUBWAY line of bass products, with performance, quality, advanced technologies, and features that have become industry-leading benchmarks. Throughout all of these product evolutions and innovations, our longstanding commitment to respecting our heritage and tradition of tone has always been a guiding precept.

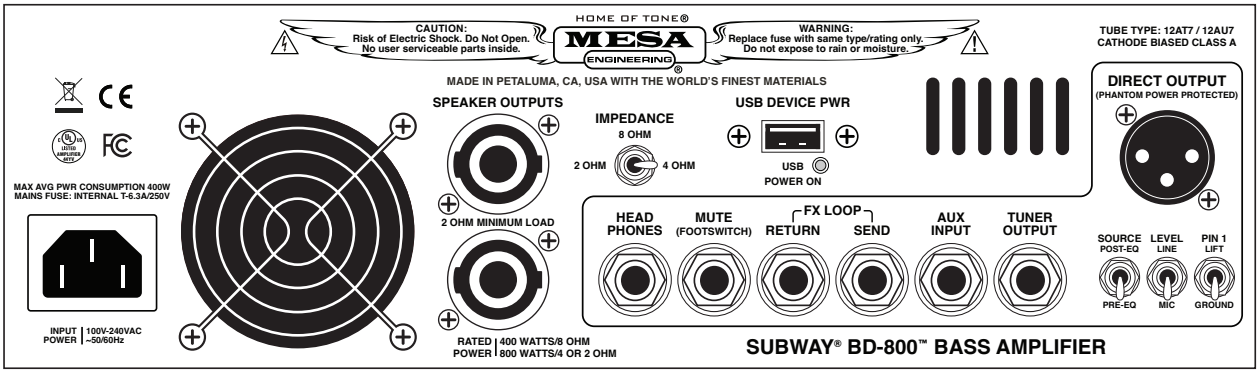
Fast forward to 2019 and the 50th anniversary of the Mesa/Boogie company. While looking through the company's archives, studying some of Randall Smith's legacy bass amplifier designs, and talking with the team working at the company when the Bass 400/400+ were being developed, we were especially drawn to the story of those models. In discussing this with Randall, it became clear that there were additional paths and evolutions that these amplifiers might have taken had today's technology been available back then. We listened to our many player's thoughts and wishes for a resurrection and a fresh take on this classic legacy…OUR LEGACY. By combining Randall's classic yet updated tube circuitry and voicings with our proven SUBWAY technology and manufacturing techniques, we have created what we believe reflects the very best of both worlds. The SUBWAY BD-800 has a sound and feel that is clearly based on the Bass 400/400+ while including some useful enhancements along with our tour-proven, rock-solid 800-watt, 2-ohm stable class D power amplifier. It has

the performance, features, and tone that today's top players expect. The SUBWAY BD-800 is built in Petaluma, CA, with the world's finest materials

FRONT VIEW: SUBWAY® BD-800™



REAR VIEW: SUBWAY® BD-800™



OVERVIEW: FRONT PANEL

INPUT:

The SUBWAY BD-800 begins with the front panel input section, which is comprised of the INPUT jack and MUTE/PLAY switch. The INPUT jack feeds a high-impedance J-FET input amplifier which provides appropriate loading for all active and passive pickups (including most piezo types). It also provides a buffered phase coherent TUNER output that may be used for active signal splitting if desired. In the "up" (MUTE) position, the MUTE/PLAY switch silences the signal from the INPUT jack to the SPEAKER output, HEADPHONE output, and DIRECT OUTPUT (also known as a DI). This allows for silent tuning with a tuner connected either in line from the instrument or to the amplifier's TUNER OUTPUT jack. A red Indicator (tally) LED illuminates to let you know the output is muted. In the "down" (PLAY) position, the LED will be turned off and the outputs are now live. The preamp section includes a hybrid J-FET and12AT7 (or 12AU7) vacuum tube variable GAIN stage for low noise and wide dynamic range.

PREAMP:

The preamp section includes a hybrid J-FET and 12AT7 (or 12AU7) vacuum tube variable GAIN stage for low noise and wide dynamic range. The GAIN switch sets the gain of the input stage. In the LOW position it reduces gain to prevent unwanted distortion from very high output basses and pedals. In the HIGH gain position, it allows for more overdrive.

TONE SHAPING:
Tone shaping on the SUBWAY BD-800 includes original concepts from Randall's Bass 400/400+ designs and combines them with some circuitry updates and new features to work even better with today's high-performance "super-speakers." First is the precision variable HIGHPASS filter, which blocks unwanted sub-sonic signals as well as being useful for specific tone shaping functions (especially related to preamp overdrive). The next feature is a tube gain stage (V1A and V1B) which directly drives the "Boogie tone stack" EQ. This is essentially the same EQ/tone stack design that Randall has favored going back 50 years, just updated with a new extended midrange control. The characteristics of the design are in part responsible for the more aggressive voicing of this classic "old school tone."

MASTER SECTION:
The master section of this amplifier contains a useful feature that makes this model stand out as an "amplification solution" and not just another bass amplifier. The tone stack output feeds a transparent, fully buffered "pre-master volume" effects loop, which can also serve as an insert point. This allows an external preamp (pedal or rack mount) to be substituted in place of the onboard preamp via the EFFECTS RETURN jack while maintaining fully adjustable output volume using the MASTER VOLUME control.

The power amplifier section also includes two unique "internal features" (i.e., non-user adjustable), integrated within the rear panel IMPEDANCE selector switch circuitry. They are output symmetry and damping factor. These features track with impedance selection to maintain performance that is consistent with the Bass 400/400+ from 8 ohms all the way down to 2 ohms.
The internal (non-adjustable) power amplifier overdrive symmetry management system is a similar circuit to what is found on the SUBWAY TT-800. It alters how the signal enters and exits the soft-clipping portion of the output tube emulation circuitry. The power amplifier damping factor circuit, similar to what is found on the SUBWAY WD-800, affects the inherent looseness of the power amplifier coupling with the speaker load, which provides more bounce (or bloom) and makes the amplifier feel more interactive. Combined, these features help provide the feel and sound of the 400+ tube power amplifier with the SUBWAY BD-800's Class D solid state power section by automatically adjusting both parameters as you move the IMPEDANCE selector switch on the back panel to match the connected speaker load.

POWER SWITCH AND STATUS LEDS SECTION:
The POWER switch is used to turn the amplifier on and off (no surprise here), the STATUS LEDs show the operating conditions of the master section. Details on what the POWER, PROTECT, and LIMIT LEDs can tell you are discussed later in the manual.

OVERVIEW: REAR PANEL

On the rear panel, you will find the AC mains inlet on a standard IEC "C14" connector. The SUBWAY BD-800 contains an auto-ranging universal power supply that can accept and operate on any voltage between 100-120 volts & 220-240 volts AC, 50/60Hz without the need for any user adjustments or fuse change. This feature makes these amplifiers ideal for the international touring musician who plays in a variety of global regions. The only thing necessary to make the amplifier work is a correct power (mains) cable that matches the power outlet/receptacle in the region. It is important for the mains power to be grounded/earthed for safety as well as EMC (electro-magnetic compatibility) reasons.

Next are parallel connected NL4 speakON® connectors (jacks), which are wired with the amplifier positive to terminal "1+" and the amplifier negative to terminal "1-". All standard speaker cables with either NL2 or NL4 connectors (plugs) will be wired this way. There is an IMPEDANCE selector switch provided to properly match the power amplifier to the load. It is very important that this switch be in the correct position to match the connected speaker load. For less common load impedance values (e.g., 6 ohms or 2.67 ohms), always use the next lower IMPEDANCE setting. As an example, for all loads below 4 ohms, the correct switch setting is the 2-ohm position.

The SUBWAY BD-800 is equipped with a HEADPHONE output which will drive all common headphones and IEM earpieces between 8 and 32 ohms. It also has a MUTE footswitch jack that mutes the signal when the tip is shorted to the sleeve. Additional connections are provided for a serial master EFFECTS LOOP, an AUX input, and a TUNER output.

A particularly useful feature that sets your new SUBWAY BD-800 apart from the rest of the market is the inclusion of a studio grade XLR balanced DIRECT OUTPUT (also referred to as a DI), complete with PRE-EQ/POST-EQ signal routing switch, MIC/LINE level switch, and PIN 1 LIFT/GROUND switch. Noteworthy attributes of the DIRECT OUTPUT include full phantom power protection, high RFI (radio frequency interference) immunity, and extreme tolerance to ground potential differences.

Another unique feature of the SUBWAY BD-800 is the inclusion of a USB charging port, which allows you to charge most USB-connected devices. This can be handy when rehearsing with an MP3 player, tablet, or phone. Please note that cell phones and even tablet-type devices can sometimes introduce unusual and/or intermittent noise/unwanted signals through instrument pick-ups or even poorly shielded instrument cables, depending on where they are located relative to the phone/device. If you experience something like this, try repositioning your instrument, cables, and/or the phone/device.

OVERVIEW: TUBES/VALVES

The SUBWAY BD-800 uses specially designed circuitry to exploit the advantages of modern lightweight technology to replicate the unique characteristics of Randall's earlier legacy designs. This involved a design approach called "blueprinting," where we take the response curves of the original circuits and overlay response curves of prospective new circuits to match up various key parameters (e.g., frequency, filters, dynamics, linearity, clipping/overdrive responses). Once we matched up the curves as closely as we could and added the proposed augmentations, we shared these results with the original design team (yes, many are still here!). They shared their thoughts on which differences they might have chosen during the original design process with the benefits of hindsight and had they enjoyed access to today's technology. This included extensive discussions regarding changes in desired feature sets, music styles, playing styles, speakers, instruments, and player expectations and needs. Like with the SUBWAY WD-800 and SUBWAY TT-800, the SUBWAY BD-800 circuit design, using 12AT7 or 12AU7 tube types, was consistently chosen as best meeting the above criteria.
V1: This tube handles the voltage and current gain as well as driving the "Boogie tone stack EQ" network. As the GAIN control is turned up, you will reach a point where this tube will begin to overdrive. Given that the channel is strongly based on the Mesa Bass 400/400+ topology, this will produce that classic Mesa Bass 400/400+ signature tube growl. Generally, a 12AT7 is the preferred tube for this position because it tends to overdrive a little bit earlier and has a bit looser feel to the overdrive. If you prefer a cleaner, punchier, less colored tone when driven hard, a 12AU7 may be a better choice, but the difference is generally pretty small. In our experience, a 12AX7 tube type produces inferior

results in this position because it doesn't have sufficient current to drive the tone stack with the necessary authority. The amplifier ships from the factory with a 12AT7 in this position. This tube uses an adjustable bias feature to accommodate the wider tolerances found in modern tubes (see below for procedure). By being able to set the operating point on the tube's load line (rather than letting it fall where it may), optimum amplifier performance can be maintained while accommodating the wider variation in manufacturing tolerances seen in tubes produced today. It's not that today's tubes are bad, just that the earlier era tubes were (generally) more strictly screened/graded to provide consistently tighter tolerance parts.

CHANGING THE TUBE/VALVE:
In the rare event of a V1 tube failure (these tubes should last 7,500-10,000 hours on average), the tube may be replaced by using the following instructions:

1. Wash your hands before changing tubes. This minimizes any contamination of the tube envelope by what may be on your hands.
2. Disconnect the amplifier from the power source by removing the power cord-set and allow it to sit for two minutes to discharge any remaining voltage that may be present within the amplifier.
3. Using a #2 Phillips screwdriver, remove the 14 cover screws (being careful not to lose any of them). Helpful hint... counterclockwise to loosen and clockwise to tighten.
4. Remove the old tube by gently rocking slightly from side to side while pulling up on the glass envelope. The glass tube envelope will not be hot if you are following these instructions (especially step 2).
5. Carefully check that there are no bent pins on the new tube and correct any that you might find. To straighten bent pins, use a pair of needle-nose pliers to gently straighten the pins back into the correct pattern. Install the new tube by aligning the skipped pin with the skipped socket contact and gently but firmly insert the pins into the socket while gently rocking the tube slightly from side to side.
6. For the highest performance, the SUBWAY BD-800 preamp tube has an adjustable bias. Setting the bias must be done by a qualified person using a DC volt meter because the amp must be powered up during this procedure. With no signal connected, power the amplifier up and allow the circuit to stabilize for 1 minute. Set the trim pot TR1 so that the DC voltage from the bias test point (located to the left of the tube) to the chassis reads 22VDC. Skipping this step and placing the control in the 12:00 position won't damage the amplifier but may not extract the greatest possible performance out of the tube.
7. Reassemble the amplifier, being sure not to cross-thread the cover screws, tighten snugly bit **do not** over-tighten.

INSTANT GRATIFICATION:

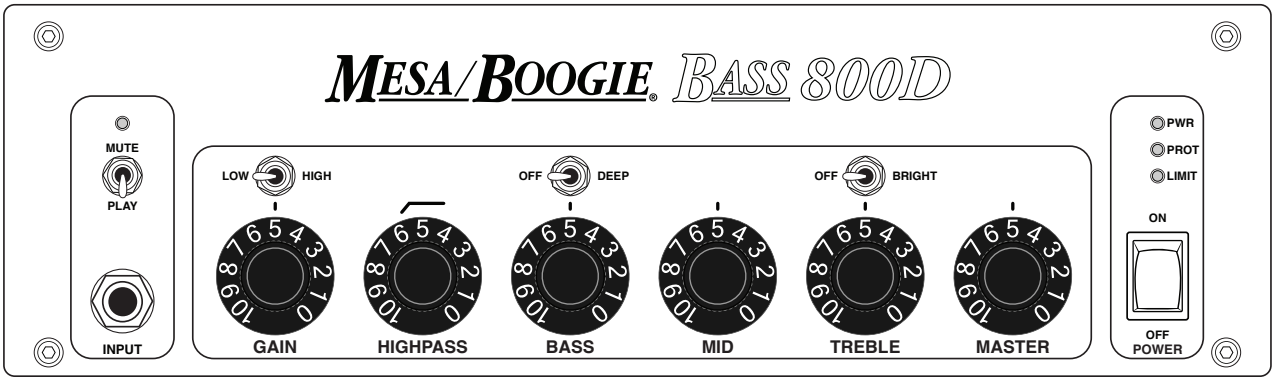
Start with the POWER switch off, the MUTE switch up (muted position), and the GAIN knob fully counterclockwise so that the 0 on the knob is in the 12:00 (straight up) position. Next, set the IMPEDANCE selector switch on the back of the amplifier to match the total impedance of the connected speakers (never set this switch to an impedance higher than the impedance of your total speaker load). If you are only using headphones or IEMs, the position of the IMPEDANCE selector switch does not matter. Now plug in your bass.

The SUBWAY BD-800 is really a very simple amplifier to get great tone from, right from the start. Begin with the GAIN switch in the low gain position, the DEEP and BRIGHT switches off, and the HIGHPASS filter set so the number 2 or 3 on the control knob is in the 12:00 (straight up) position. Then set the BASS, MID, and TREBLE EQ controls so the number 5 on the control knobs are in the 12:00 (straight up) position and set the MASTER control so the number 6 is in the 12:00 (straight up) position.

Next, turn the POWER switch on, flip the MUTE switch down (play position), and turn the GAIN control up until you reach your desired volume with your bass.

With your volume set, experiment a bit with the GAIN, DEEP, and BRIGHT switches, HIGHPASS filter, and EQ. You may be surprised with the range of tone shaping in the low end and low mids you have available using combinations of DEEP on, and/or increased BASS EQ tempered by increased HIGHPASS filter settings. The more time you spend with your new amplifier, the easier and quicker it will become to get to the tone that's in your head.

FRONT PANEL (CONTROLS AND FEATURES):



INPUT JACK
This standard 1/4" (6.35mm) TS (tip-sleeve) jack is the instrument INPUT that feeds the first stage monolithic J-FET input buffer amplifier of the SUBWAY BD-800. This stage is inherently transparent, and directly feeds the TUNER output (pre mute) and DI out when the DI out is set to the "PRE-EQ" position (which is post-mute).

MUTE SWITCH
This switch (and its associated red indicator/tally LED) mutes the audio signal being sent to all outputs except the TUNER OUT jack. This enables silent tuning with either a tuner connected to your instrument cable and then through to the amplifier or to the TUNER OUTPUT jack. When the switch is in the up (MUTE) position, the red LED will illuminate and NO audio will be present at the DIRECT OUTPUT, HEADPHONE, or SPEAKER OUTPUT jacks. This switch can also be used to place the amplifier into a silent standby mode before and between sets so you can be immediately ready to play without touching any of the other controls. When using the MUTE FOOTSWITCH functionality, this switch must be placed in the down (PLAY) position for the footswitch to operate properly.

GAIN SWITCH
This switch sets the gain of the input stage. Reducing gain (using the LOW position) can prevent unwanted distortion from very high-output basses and pedals. Increasing gain (using the HIGH position)

can provide for more overdrive in the preamp. Often (though not always), an active bass may have a signal level up to 10 dB greater than a typical passive bass. If you find that you are operating the GAIN control near the low (counterclockwise) end of the control's rotation, setting the GAIN switch to the LOW (left) position will reduce the input sensitivity (gain) by ~10 dB. This can allow greater control range and freedom from overload with high-output active basses and/or effects pedal(s). Operating in the HIGH gain (right) position will make it easier to overdrive the preamp and increase the harmonics being produced. This switch does not lower the input impedance of the amplifier like some active/passive switches, nor does it "suck tone" like the input pads on some other amplifiers.

GAIN CONTROL

This control determines the gain (drive level) of the 12AT7 (or 12AU7) vacuum tube gain stages (V1A & V1B). Overdriving these gain stages may add a desirable tonal characteristic to your playing style. To increase the amount of overdrive beyond what the range of this control allows, simply switch the input GAIN switch to the high gain position as explained above. When using significantly overdriven tones, you may find it helpful to back down on the TREBLE EQ a bit to reduce harshness. Additionally, reducing the BASS EQ and/or increasing the HIGHPASS filter setting will often help improve clarity and focus of your sound. These tube gain circuits draw inspiration from elements of our legacy amplifiers, primarily the Bass 400/400+. If it's part of your tone goal, this tube gain stage is designed to be overdriven, so give it a try. You will find that it is also monstrous when run clean. When using heavier overdrive, it's generally more pleasing to turn off or reduce the tweeter level if your cabinets have adjustable controls for the high-frequency driver(s). Note that the GAIN control operates in a linear fashion, meaning that an increase in gain continues in equal increments throughout the entire rotation of the control. As the amount of overdrive is increased by turning the GAIN control up beyond the clean area of operation, the resulting volume increase can be compensated for (as required) by turning the MASTER control down.

HIGH PASS FILTER

This control sets the low-frequency roll-off point of the amplifier channel and is an important feature in maintaining control over the extreme low end (especially under high drive conditions). This precision four-pole filter is comprised of two cascaded two-pole filters, one fixed with a turnover frequency that is set at approximately 22 Hz and a second variable filter that enables the overall low-frequency roll-off to be adjusted from 25 Hz to 125 Hz. While variable HPFs have been standard fare within the pro audio industry for decades, this feature has only appeared in bass guitar amplifiers within recent years (with some notable exceptions). This filter provides mechanical protection for the speaker(s) against over-excursion. It does this by reducing the power to the speaker(s) below the frequency range that a cabinet provides adequate acoustic loading to the speaker(s). This is one of the primary (and preventable) causes of premature speaker failure, especially with compact speaker cabinet products that are driven very hard. A second use for this filter is to roll off the very low end when overdriving the amplifier. This prevents the signal from becoming muddy and preserves the naturally musical growl and grit of the overdriven signal. A third use is for rolling off low frequencies when boosting the bass EQ control (and/or using the DEEP switch), allowing for some unique low and low mid voicings. A fourth use is for reducing the sub-bass (and sometimes higher) frequencies that can get out of hand in a boomy or acoustically challenging room. This is a highly versatile "Swiss Army Knife" kind of control, and experimentation will be helpful in all of these applications. "0" on the knob corresponds to 25 Hz, and "10" on the knob corresponds to 125 Hz, the frequencies in between are linearly proportional throughout the rotation of the control. (e.g., 5 corresponds to 75 Hz).

BOOGIE TONESTACK EQ

This EQ section is heavily based on the legacy Bass 400/400+ tone stack, but also stretches back to Randall's earliest days, hand-building amplifiers in a Lagunitas mountain shack (a converted dog kennel). Starting with the Mesa 450, the path was set, and along with the contributions by Randall, Doug, Mike, Jim, Garey, and Dan, the rest is history. All of these legacy amplifiers have this tone stack in common, and this amplifier takes that original design to a new level. Specifically, it includes more refined and smoothly/seamlessly operating BASS-MID-TREBLE controls with an updated mid circuit, which provides expanded range of the mid portion of the EQ. Even though this is a passive tone network, additional makeup gain circuitry makes it even more useable and toneful than before by reducing inherent losses through the passive network. These are evolutionary steps in our path...evolution being something we have done continuously and thoughtfully over the past 50 years.

With each of these controls, turning the control knob to the right (clockwise) will increase the presence of what you hear in their respective frequency range, while turning them to the left (counterclockwise) will decrease the presence of what you hear in their respective frequency range.

- **BASS CONTROL**
  This control is a shelving-type filter responsible for the amount (or volume) of low frequencies present in the signal, relative to the rest of the spectrum. Low frequencies (<80 Hz) are responsible for the "depth," "bottom," "roundness," and "feel" of the tone. The HIGHPASS filter control and DEEP switch, combined with the BASS control, add multiple dimensions of tone sculpting. As mentioned earlier, by steeply rolling off areas in the low end with the HIGHPASS filter when boosting the bass EQ control (and/or using the DEEP switch) you can get some unique bass/low mid voicings.

- **MID CONTROL**
  This control is responsible for the amount (or volume) of midrange present in the signal, relative to bass and treble. There is an inherently mild mid-dip present in this design around 500Hz. This is characteristic of this style of tone stack EQ. For a stronger, flatter response, you will find that having this control set with the number on the control knob between 6 and 9 in the 12:00 (straight up) position will get you there. The midrange is responsible for the articulation and perception of pitch, especially in the lowest octave of the instrument. This is because of how the harmonic spectrum is distributed in the output of a bass guitar's signal.

- **TREBLE CONTROL**
  This control is a shelving-type filter responsible for the amount (or volume) of high frequencies present in the signal, relative to the rest of the spectrum. High frequencies (>2.5 kHz) are responsible for the "bright," "airy," "clarity," and "shimmery" character of the tone. In this classic circuit, there is quite a bit of high-frequency boost available, which might appeal to some styles (especially slap). It also works nicely with tweeterless cabinets to help get a little more upper register presence in the tone. For most players, this control's sweet spot will be found when numbers between 2 and 7 on the control knob are in the 12:00 (straight up) position.

DEEP SWITCH

This switch engages the DEEP filter, our take on classic low-frequency enhancement and extension. Engaged, there is a mild boost in the very low-frequency response while also lowering the effective high pass filter frequency. This combination brings a more round, thicker, fatter response in the low end. When using this feature with small (compact-style) cabinets, and especially with lower HIGH-

PASS filter settings (e.g., below ~45 Hz), be aware of the possibility of speaker damage due to overpowering at higher volumes.

BRIGHT SWITCH
This engages the BRIGHT filter, which causes a rising response at higher frequencies much like the switches found on many popular classic tube amplifiers. Engaging this filter can bring some "sizzle and bite" into the tone.

MASTER VOLUME CONTROL
This control is responsible for the level of the signal being sent to the power amplifier and determines the overall playing volume of the SUBWAY BD-800. Using the MASTER volume control along with the input GAIN control allows optimal control over playing volume and the character of the output (i.e. overdrive and/or tube emulation). For example, if you are using high input gain to achieve an overdriven tone, it will likely be necessary to adjust the MASTER volume control lower to obtain a reasonable playing volume and to avoid excessive overdriving of the power amplifier. Likewise, if you are looking for a very clean tone, you may wish to start with a lower input GAIN control setting and use a higher MASTER volume control setting to obtain the desired playing volume. The MASTER volume control operates in a linear fashion, meaning that equal increments of increase in volume continue throughout the entire rotation of the control. Although our hearing is not linear and this type of control doesn't offer as obvious a perceived change in volume with small adjustments as logarithmic volume controls, you get a much finer adjustment capability without losing anything in actual amplifier output or performance.

POWER AMPLIFIER SYMMETRY & DAMPING
These are "hidden controls" that are not directly user adjustable. They are integrated into the IMPEDANCE selector switch and its associated load impedance tracking circuitry. Because of their impact on the tone and feel of the power amplifier, some discussion of what symmetry and damping are will help you understand why these features are so important to many players without them even realizing it. These features are a continuation of the research that led to the development of the SUBWAY WD-800's well-received power amplifier damping control, and the SUBWAY TT-800's overdrive symmetry control and coupled damping factor and impedance matching circuitry.

- **OUTPUT SYMMETRY**
  The overdrive symmetry control circuit provides dynamic adjustment to the symmetry of the output soft clip circuitry waveform, just like how many tube phase inverters and tube output stages behave in real-world tube amplifiers. This works in conjunction with the internal damping factor management, which automatically adjusts to the connected load impedance like an output transformer via its impedance taps. This feature's contribution becomes apparent the closer to output stage limiting that the amplifier is played. Its action is somewhat subtle, with as much of an impact on feel as on tone. Just like with the bass guitar, perfect symmetry of the waveform is not necessarily a desirable attribute. By altering the symmetry in the power amplifier's overdrive management circuitry, the overdrive character becomes more round and forgiving, as well as allowing added interaction with the symmetry (or asymmetry) of the bass guitar itself. Some players may perceive this as an added richness or dimensionality to the amplifier when driven hard.

  Why is this important? Symmetry management changes how the amplifier enters and exits

a power amplifier overdrive event on a cycle-by-cycle basis. The greater the symmetry, the tighter and more abrupt the signal enters and exits overdrive. Perfectly symmetrical “clipping” is often described as having the greatest “compression effect” and feels a little stiffer and more “solid-state like.” As the overdrive event becomes less symmetrical, the signal enters the overdrive region more gradually and with a progressive effect, which acts more like a soft knee compressor. It tends to be more forgiving and less abrupt, retaining a more dynamic feel (like a tube power amplifier), with greater articulation and character.

- **OUTPUT DAMPING**

  One of the primary differences between solid state and tube power amplifiers is how tightly the speaker is coupled to the power amplifier’s output stage. All amplifiers have some resistance (more correctly, impedance) between the power circuitry and the speaker. This impedance greatly affects how tightly the amplifier can control the speaker. High damping means that there is stronger coupling (less impedance) between the amplifier’s output circuitry and the speaker, and the feel will be tighter and more controlled. Low damping means that there is less coupling (more impedance) between the amplifier’s output circuitry and the speaker, and the feel will be looser and less controlled. Because a speaker presents a complex impedance, this “lower damping” interaction will vary with frequency and can be responsible for a bit more “bloomy,” organic feel. This is usually most noticeable at lower frequencies resulting in a softer, less distinct edge to the notes and a bouncier playing feel.

  Generally, tube amplifiers fall into the low damping category while solid state amplifiers fall into the medium to high damping category. Speakers have mass, and the force required to accelerate the mass back and forth comes from the power generated by the amplifier. The power is delivered through the voice coil sitting within the magnetic gap of the speaker’s motor. This means that to accurately accelerate and decelerate the cone at each end of its travel requires efficient power delivery to the speaker. As the power delivery becomes less efficient, the force becomes less and the cone accelerates and decelerates more sluggishly, corresponding to undershoot and overshoot of the cone. This, plus native voicing, are the most likely scientific explanations for the “bloomy,” slightly “round bottom” feeling reputation that many tube amplifiers enjoy.

  In tube amplifiers, the impedance between the output stage and the load is high (resulting in a low damping factor of maybe 50), while in a solid state amplifier, the impedance between the output stage and the load is low (resulting in a high damping factor of maybe 500 to 1000). These are inherent properties of the respective topologies. These damping factor numbers also vary with frequency, as does the speaker impedance, so the interaction is quite complex actually.

  What does this all mean? With lower damping, the amplifier will tend to feel a little looser (especially on the low end), a little bloomy, and more organic. While there will be some tonal differences (e.g., less sharply defined note edges), it’s really more of a feel difference. With higher damping, the amplifier will feel a little tighter and more controlled on the bottom end, and to some players, it may feel more “immediate,” but to others, it will feel dryer or more sterile. A lower damping factor setting has been integrated into the load impedance management circuitry, modeled after the parameters found on the Bass 400/400+ power amplifiers. This characteristic will be most noticed by the more “feel based” players but likely appreciated by all.

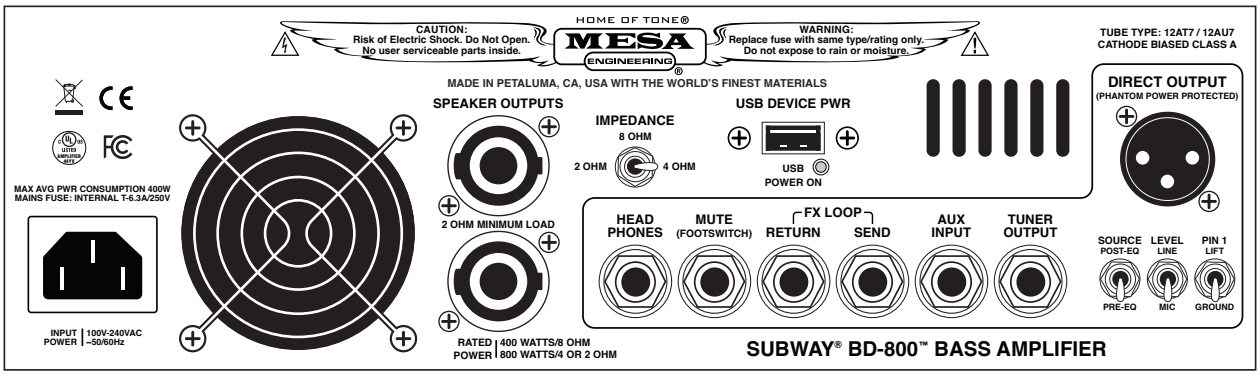
POWER SWITCH
This switch turns your amplifier on and off by disconnecting it from the power.

POWER LED
This blue LED indicates that the amplifier is connected to a power source, is switched on and operating correctly. If this LED is not on, double-check the power source, and be sure the power cable is firmly inserted into the IEC power inlet socket. Note that there is protection circuitry built in that prevents the amplifier from starting up multiple times within a 20 second window. If you turn the amplifier on, then off the on again, there will be ~20 second delay in the power-up sequence.

PROTECT LED
This red LED indicates that the amplifier has entered protect mode and is either protecting itself from an external fault (e.g. blocked ventilation, shorted speaker cable, defective speaker), or that there is an internal fault within the amplifier itself. Verify that it's not a fault external to the amplifier by disconnecting all cables (except the power cable) from the amplifier. If the protect LED is no longer lit, the problem is most likely a shorted speaker cable or defective speaker. Testing with a set of headphones can also help to narrow down the problem, as the headphone signal is derived post-power amplifier using a frequency compensated, cabinet emulation network. If the headphones work, it's most likely something external to the amplifier after the speaker output jacks (defective speaker cable or speaker).

LIMIT LED
This amber LED indicates that the power amplifier is nearing maximum power and is entering the soft clip/limit output tube emulation mode. Soft clip/limit output tube emulation mode mimics many of the desirable characteristics of tube amplifier output stage overdrive while eliminating the common solid state clipping artifacts. There is approximately 6dB of range in this circuit. Driving beyond this, of course, will cause gradual output stage clipping. It's acceptable for this amplifier to operate in output stage overdrive mode (if that's the tone you are after) with the LED flashing (on) roughly 25% of the time.

REAR PANEL (CONTROLS AND FEATURES):



IEC POWER INLET
This power inlet conforms to the IEC C-14 type standard, and is to be used with a cordset containing a matching connector, and appropriate plug for the intended market.

OPERATING POWER REQUIREMENTS

The SUBWAY BD-800 is designed with a universal, auto-ranging power supply that automatically adjusts to line voltages between 100-120V and 220-240V, 50 Hz or 60 Hz. The power supply is internally monitored by advanced supervisory protection circuits and contains a non-user replaceable fuse that opens in the unlikely event of a major failure. This fuse will not open under any non-destructive fault and is not a typical/normal replacement item. There are NO USER SERVICABLE PARTS (except the preamp tube) inside the chassis. The amplifier is designed to be used with grounded or earthed power, meaning that the chassis is always maintained at ground/earth potential even in the unlikely event of a gross failure within (or external to) the amplifier. Never remove the grounding/earthing pin from the power plug or alter the power cable in any way.

COOLING FAN

The SUBWAY BD-800 incorporates a low-speed, high-reliability cooling fan, which allows it to safely drive difficult loads (including down to 2 ohms) at very high duty cycles. Be sure this fan inlet is not blocked or impeded. Restricted airflow will cause the amplifier's protection circuits to shut the amplifier down due to a thermal fault condition. This quiet, low-noise fan will always run at a low speed. Air flows into the chassis from the back and out through the side and rear slot vents.

SPEAKER OUTPUTS

The SUBWAY BD-800 is rated to drive a minimum 2-ohm load (with the IMPEDANCE selector switch set to the 2-ohm position), meaning either four 8-ohm cabinets or two 4-ohm cabinets. The amplifier incorporates a pair of speakON® NL4FC connectors wired is parallel that mate with either NL2MP or NL4MP plugs. Please use genuine Neutrik® brand connectors on your speaker cables since the knock-off plugs have proven problematic to our industry. Always remember to check the IMPEDANCE selector setting when hooking up your speaker cables and then double-check it before you begin playing...switches sometimes get bumped and inadvertently changed. The IMPEDANCE selector switch needs to be set to the combined speaker load connected to the amplifier.

Cables using speakON NL2 plugs contain only 1+/1- terminals and will always be correctly wired for use with the amplifier, but cables using speakON NL4 connectors can come with different wiring configurations. If using cables with speakON NL4 connectors, they may be constructed with standard 2-wire cable, which must be wired 1+ to 1+ and 1- to 1-. If the cable contains 4 wires, that's usually ok because terminals 2+ and 2- are connected to the second pair of wires and simply not used.

The cables to avoid are what are called speakON NL4 bridge mode cables, which are typically 2-wire, and wired 1+/1- on the speaker end and 1+/2+ on the amplifier end (used for pro audio power amplifiers that support this specific bridged termination). These cables SHOULD be clearly marked, but sometimes they are not, so be aware of the possibility when buying or troubleshooting cables. Bridging cables will never have speakON NL2 plugs at the amplifier end, they will always be speakON NL4.

Why use speakON cables and not the "old favorite" ¼" (6.35 mm) connector? There are several important reasons: the first being that with updates to global safety regulations, amplifiers like the SUBWAY BD-800 require "touch-proof connections" for shipment to some regions. A second reason is that the power amplifier's internal topology is BTL (bridge-tied load). This means that neither output terminal is at ground potential, so touch-proof connectors provide an added layer of safety to the system. A third reason is the often poor quality and minimal surface area of the 1/4" (6.35mm)

connection. While at low power levels this is not much of an issue, at higher power levels, it becomes a high-potential failure point. A fourth reason is that one common failure mode of amplifiers occurs when the 1/4" (6.35 mm) speaker cable works loose at the speaker cabinet. When this occurs, the tip can become shorted to the sleeve within the speaker jack's bushing creating a short circuit to the amplifier's speaker output. While this amplifier is protected against such faults, it's not good practice to test this protection feature on a regular basis, or at all, for that matter.

Never connect the speaker output(s) to anything except a speaker. This especially means not to an external DI, even a speaker level DI or "load box," because the Subway WD-800 utilizes a BTL (bridged) output power amplifier. On a bridged amplifier, the minus terminal that is normally at ground is actually a driven output that swings above and below ground at peak voltages of over 100V and peak current of almost 30 amperes. Using a DI, the normal shell or ground terminal of the DI is not at ground at the amplifier's end but may be connected to the console (mixer) circuit ground bus at the console's end. This would cause the amplifier to drive dangerously high currents into circuitry that does not expect to see those levels and is generally not protected from this kind of fault. So, in addition to possibly damaging your amplifier, you could also damage a (potentially) very expensive console/mixer.

SPEAKER IMPEDANCE

All speakers have a "rated nominal impedance." Impedance is the resistance to AC electrical signal that the amplifier is tasked with delivering. The lower the speaker's impedance, the greater the current that the power amplifier must provide. The lowest impedance that the SUBWAY BD-800 amplifier is capable of driving safely is 2 ohms (with the IMPEDANCE selector switch in the 2-ohm position). Examples of common 2-ohm speaker load configurations are a parallel connection (the standard connection of virtually all speaker cabinets) of either two x 4-ohm cabinets or four x 8-ohm cabinets. Note that measuring speaker cabinets using an ohm meter will not give accurate results because ohm meters read DC resistance, not AC impedance (technically, the combination of resistance and reactance). AC impedance will always be greater than the DC resistance. For example, an 8-ohm speaker will typically measure between 5 and 7 ohms, and a 4-ohm speaker will typically measure between 2.5 and 3.5 ohms when measured with an ohm meter (or digital multimeter).

SPEAKER POLARITY (OR PHASE)

All speakers have "polarity." A speaker that is wired in accordance with the current industry standard will move forward when a positive DC voltage is applied to the positive terminal of the speaker. While this is a well-established standard, there are also deviations from this standard. This can occur by legacy (e.g., early JBL drivers), by faulty repair (e.g., an incorrectly wired cabinet or defective reconing parts), or by a manufacturer choosing to simply ignore the standard. If a multi-driver speaker cabinet or a pair of speaker cabinets does not appear to have the expected output or low end, it's always a good idea to double-check that all drivers move forward with positive DC voltage (no more than a 9-volt battery) momentarily applied to the + terminal (this will be the 1+ terminal on a speakON connector or the tip on a 1/4" (6.35 mm) connector), and the minus voltage of the battery connected to the 1- terminal of the speakON or the sleeve of the ¼" (6.35 mm) plug. If you find that on a multi-speaker cabinet, one speaker moves out while the other does not move, it's likely that the non-moving driver has either failed or has become disconnected. If one driver moves out while the other driver moves in, it's likely that the driver moving in is wired incorrectly, or if in a sealed cabinet, is failed or disconnected and is merely being moved in the opposite direction by coupling to the air mass inside the cabinet itself. Being aware of these possibilities can often help when troubleshooting something

that doesn't appear to be performing quite right.

IMPEDANCE SELECTOR SWITCH

The SUBWAY BD-800 is equipped with an IMPEDANCE selector switch to match the amplifier's drive capabilities to the connected speaker load. This is important for two reasons. The first is that proper matching ensures proper performance and prevents damage to the amplifier. The second is that the power amplifier behavior, including damping control, tracks the load matching via the IMPEDANCE selector switch, which improves the playing feel and dynamics. The IMPEDANCE selector switch needs to be set to the combined speaker load connected to the amplifier.

The table below will help you choose the correct switch position for any valid combination of cabinets you might want to use:

SPEAKER COMBINATION	CALCULATED LOAD	IMPEDANCE SWITCH POSITION	POWER DISTRIBUTION PER CABINET
1 x 8 ohm cabinet	8 ohms	8 ohms	100% to the single cabinet
2 x 8 ohm cabinets	4 ohms	4 ohms	50% to each cabinet
3 x 8 ohm cabinets	2.67 ohms	2 ohms	33% to each cabinet
4 x 8 ohm cabinets	2 ohms	2 ohms	25% to each cabinet
1 x 4 ohm cabinet	4 ohms	4 ohms	100% to the single cabinet
2 x 4 ohm cabinets	2 ohms	2 ohms	50% to each cabinet
1 x 8 ohm + 1 x 4 ohm cabinets	2.67 ohms	2 ohms	33% to the 8 ohm cabinet 66% to the 4 ohm cabinet
2 x 8 ohm + 1 x 4 ohm cabinets	2 ohms	2 ohms	25% to each 8 ohm cabinet 50% to the 4 ohm cabinet
1 x 2 ohm cabinet	2 ohms	2 ohms	100% to the single cabinet

As illustrated by two of the cases in the above table (specifically 2.67-ohm loads), for any situation where a speaker load falls between 2 and 4, or 4 and 8 ohms, you should select the lower impedance of the two numbers the load falls between. Although not shown above and not all that common, when using a 6-ohm speaker cabinet (i.e., a load between 4 and 8 ohms), the IMPEDANCE selector switch should be set to the 4-ohm position. For all loads above 8 ohms, the IMPEDANCE selector switch should be set to 8 ohms. As already mentioned, you should NEVER connect a speaker load lower

than 2 ohms, but you can safely run the SUBWAY BD-800 without any speaker load connected like when just using headphones or using the SUBWAY BD-800 to only provide a DI signal. If you are only using headphones or IEMs, the position of the IMPEDANCE selector switch does not matter.

HEADPHONE OUTPUT

The SUBWAY BD-800 includes a 1/4" (6.35 mm) TRS tip-ring-sleeve headphone output jack, which will drive all common headphones and IEM earpieces between 8 and 32 ohms (and many well above 32 ohms). It is not necessary to have a speaker connected to the amplifier when using headphones, it is completely safe to operate the amplifier without a speaker load. It's advisable to use caution whenever sticking a sound source in your ear, as damaging volume is possible, especially from "bass player accidents," and when volume is factored over a long period of time. The headphone output contains mild cabinet emulation circuitry that is not present at any of the amplifier's other outputs. This output should not be connected to anything but headphones, earbuds, or IEM earpieces.

MUTE FOOTSWITCH

This footswitch jack is used in conjunction with a standard latching one-button footswitch terminated with a 1/4" (6.35 mm) tip-sleeve plug. When the tip is shorted to the sleeve, the signal is muted. (Note that the front panel MUTE switch must be in the down (PLAY) position for this function to work. If it is not in the PLAY position, the front panel switch overrides the footswitch and places the amplifier in mute mode regardless of the position of the footswitch). When in the mute mode, the signal is only available at the tuner output jack. The signal is muted at the speaker output, headphone output, effect send output, and DI output. MESA sells a SUBWAY BD-800 specific footswitch (one button) separately through our authorized dealers and distributors, our parts and accessories online store, and through our Customer Service department.

EFFECTS LOOP

A serial (series) effects loop is provided, consisting of 1/4" (6.35 mm) effects send and effects return jacks, for connecting "serial" line level outboard effects devices such as compressors, limiters, and gates. The loop may also be used with parallel outboard devices such as delays, reverbs, harmonizers, octavers, etc., by using the wet-dry mix control on the outboard device to mix the dry with the processed signal. This loop is located right before the MASTER volume control and is also intended to be used as "PREAMP OUT / POWER AMP IN" connections for the linking of two amplifiers in a master-slave configuration, or for using just the preamp or power amplifier individually. In a master/slave configuration, the MASTER volume control on each amplifier is then used to set the volume between the two amplifiers. The MASTER volume control functions as a power amplifier input level control when using the SUBWAY BD-800 as a stand-alone power amplifier. The effects loop's RETURN jack contains an internal "normal switch" that interrupts the signal whenever a plug is inserted into the return jack, and automatically bypasses the effects loop when the plug is removed. Because of this switch location, the effects send jack may be used as a post EQ, pre-MASTER volume output, even when the power amplifier section is not being used.

AUX INPUT

This amplifier is provided with a 1/4" (6.35 mm) TRS AUX INPUT. This TRS stereo jack contains circuitry to properly sum left and right channels from an MP-3 player, i-device, or laptop as many of these new devices do not contain adequate onboard circuitry for proper summing from stereo to mono without distortion. The signal injection point is right before the master volume control, so you will use the connected device's volume control to balance the level between your bass and the playback device.

Note that for best performance, a 1/8” (3.35 mm) TRS to 1/4” (6.35 mm) TRS cable (also called a stereo cable) should be used. This kind of cable will always match between devices and allow the amplifier’s automatic summing circuitry to work properly. For upright players, this input can be used to plug the output of your upright’s outboard preamp (such as our ROSETTE, SUBWAY, or SUBWAY PLUS PRE-DI) into the power amplifier (using a 1/4” [6.35 mm] TS plug if the signal is mono). The level of this input is controlled by the MASTER volume on the SUBWAY BD-800 as well as the controls on your outboard preamp. Note that this input, because of the summing feature, will not work with balanced TRS signals like a microphone or DI output. Balanced TRS signals are intended for differential inputs, not summing inputs like the one on this AUX INPUT connection.

DIRECT OUTOUT (DI OUT OR DI)

A feature that sets your new SUBWAY BD-800 apart from the rest of the market is the inclusion of a studio-grade XLR balanced direct output (sometimes referred to as a “DI OUT” or just “DI”). This output is capable of driving balanced analog lines as long as 500 feet, is fully phantom power protected, is noise resistant, and stability compensated for a reliable, low noise floor high-quality signal. This output follows the pro audio standards of pin 2=non-inverting, pin 3=inverting, and pin 1=ground. The design of every known console in the world follows this wiring standard.

DIRECT OUTPUT SOURCE SWITCH

This switch selects the signal source routing that is used to derive the DIRECT OUTPUT (DI) signal. In the PRE position, the signal is sourced directly from the input buffer. Muting the amplifier by the front panel mute switch (or optional footswitch) mutes this output to allow for silent tuning. In the POST position, the signal is sourced from the output of the equalizer section and before the MASTER volume control. Generally, for PA use, the FOH (front of house) engineer will probably prefer a PRE EQ send. This is because the capability of the PA system is likely significantly different than your stage rig, and the EQ that you use to sound good on stage may not work well on a bigger system and/or in a larger acoustic space out front, or in the context of the mix. If you use the overdrive capability of the amplifier or you use effects in the effects loop, then the POST position is a better choice, however, you will need to work with your FOH engineer to ensure that the EQ that you use on stage will work well for the FOH mix. For recording, depending on the tracking goals of the engineer, either PRE or POST (and maybe both) might be used. When using the amplifier as a preamp (into a pro audio power amplifier or powered PA cabinet, for example), generally the POST position would be used.

DIRECT OUTPUT LEVEL SWITCH

This switch selects the level of the DIRECT OUTPUT (DI) signal. MIC LEVEL is about 20 dB lower than LINE LEVEL and should be used when the receiving device (mixing console or recording interface) is unable to handle LINE LEVEL without distorting or clipping. When in doubt, ask the person who will be receiving the signal which level they would prefer. When using the amplifier as a preamp (into a pro audio power amplifier or powered PA cabinet for example), generally LINE LEVEL would be selected (unless using a powered speaker that can only accept a mic level signal).

DIRECT OUTPUT PIN 1 LIFT SWITCH

This switch connects or lifts the circuit ground/earth/common connection from pin 1 on the XLR DIRECT OUTPUT connector. Balanced outputs do not rely on pin 1 (the shield connection) to transmit a signal to the console or mixer. While pin 1 is always connected to the console’s or mixer’s master ground bus, sometimes (due to differences in potential of a building’s ground/earth system) currents will flow between grounds. If there is a common ground connection, hum may result. This is frequently referred

to as a “ground loop.” Lifting the ground at the source (bass amplifier) end allows the cable’s shielding to the console’s input to remain in place while breaking the ground current flow that is responsible for inducing hum into the audio signal-carrying pair of conductors. One thing that complicates this is that at very high (radio) frequencies, ground is not “really” ground, so additional techniques are incorporated within this network that allow two simultaneously functional grounding spectrums within the same network, providing added RFI (radio frequency interference) rejection. The general rule is to start with pin 1 lifted, and if there is noise, try connecting it and see if the noise level drops. It should also be noted that there are a lot of other possible causes for noise and this switch is only one potential solution for ground loop noise between the console/mixer/PA/FOH system and the bass amplifier. This switch only works with the DI OUTPUT jack.

USB DEVICE POWER

This connector provides power to USB devices that might be used in conjunction with practicing, recording, jamming, or even performing. It may also be used to recharge phones, MP-3 players, iPods, LED task lights, and any number of devices. This port follows the PC USB 2.0 standard, is rated at 500 mA maximum current, and conforms to the Apple USB charge current control standard. While this charge port will work with most devices, there are some that do not conform to any current demand/limit standards or must be operated from a high current or proprietary USB charge port only. These devices will either charge more slowly or possibly not at all. Due to the lack of uniformity/consistency in the device manufacturers following standards, as well as continual evolution/changing of the standards, this port is offered as a convenience only.

This USB device power can also be used to drive any number of USB devices, including power converters that provide 9-volt pedal power. Because pedal power devices step up the voltage from 5 to 9 volts, the available current decreases to ~300 mA at 9V.

NOTE that if you are charging cell (mobile) phones or some tablet-type devices while they are still turned on/operating, they will emit periodic bursts of RF energy as they communicate with cell towers and/or Wi-Fi networks. This is frequently the source of randomly appearing noise that players notice. Relocate the phone/tablet device farther away from the bass and/or amplifier (e.g., take it out of your pocket or move it off the top of the amplifier), switch the phone to airplane mode (meaning it does not send or receive signals), or shut it off entirely).

DISCUSSION ABOUT SMPS & CLASS D FROM THE DESIGN TEAM

QUESTION: What makes this new amplifier so lightweight?

ANSWER: This amplifier uses new technology, both an SMPS (Switch-mode Power Supply) and a Class D power amplifier (often referred to as switching or pulse width modulation (PWM) amplifier) to decrease the size and weight. These designs are carefully implemented and fully tested to ensure robust, reliable performance in real-world conditions night after night.

QUESTION: How can such a lightweight amplifier deliver solid bass? I thought an amp had to be heavy to produce deep bass.

ANSWER: By operating in a non-linear fashion (with power devices that are either fully on or fully off) the output stage no longer has to accommodate reactive load inefficiencies, overly sensitive protection of “safe operating areas,” and dissipate waste heat from output devices operating within their linear region. This means more power and better low-frequency control with less heat. The pro audio industry has been using this technology almost exclusively in the large-scale touring market for decades, driving massive arena and stadium subwoofers night after grueling night on the road. In fact, much of the technology in our power amplifiers comes directly from the touring pro audio world where high product reliability and durability are essential.

QUESTION: How do I know that these amplifiers will be reliable?

ANSWER: The designer of the Subway amplifier project has over 25 years of SMPS/Class D amplifier experience in bass amplifiers, as well as in touring pro audio equipment. We have worked closely with the European engineering team on the development and testing of the Class D power modules used in our amplifiers. This engineering relationship goes back over 25 years to when Class D bass amplifier applications were in their infancy. All of this is further backed up by extensive Subway product use on real-world stages with world-famous musicians in front of real audiences, night after night, which has proven the reliability of the entire Subway bass amp line.

QUESTION: Why is the power supply so small and lightweight?

ANSWER: An SMPS is just like any other power supply, except for the fact that it operates at a much higher frequency (>100 kHz) than a traditional power supply (either 50 Hz or 60 Hz). A high operating frequency reduces the size of the transformer’s core, which in turn reduces the length of the wire wound around the core. Since most of the weight of a power transformer is in the core and the copper wire, reducing those elements reduces size and weight. All of this helps provide the exceptional performance of these smaller transformers under even the most demanding load conditions.

QUESTION: How does the SMPS work?

ANSWER: Without getting too technical, a switch-mode power supply takes the incoming AC mains (50-60 Hz) power and rectifies it to a high voltage direct current (HVDC). This HVDC is then filtered/stored in the input filter capacitors as reserve energy for discharge as needed into dynamic loads. This HVDC is then chopped/switched >100 kHz into high voltage, high frequency alternating current (HVHFAC) that is fed through a high-frequency transformer which converts the HVHFAC into low

voltage, high frequency alternating current (LVHFAC). This LVHFAC is then rectified and filtered into low voltage direct current (LVDC) that the power amplifier's circuitry uses. The output rail voltage is then continuously sampled and compared with a precision reference voltage. If the rail voltage falls, the PWM duty cycle increases (almost instantaneously) to correct this drop, thus holding the rail voltages solid regardless of input voltage sag or load placed on the power supply. This is called a "regulated" power supply.

QUESTION: Why is the Class D power amplifier so small and lightweight?

ANSWER: A Class D amplifier operates its output stage non-linearly, meaning that the output devices are switched either fully on or fully off at a switching frequency of about 500 kHz. This "cutoff-saturation" switching minimizes waste heat by avoiding operation in the wasteful "linear range," and without the waste heat, there's no need for the large, heavy aluminum heatsinks.

QUESTION: How does the Class D amplifier work?

ANSWER: In Class D amplifiers, the analog audio signal is converted into a PWM (pulse width modulated) pulse train representation of the analog audio signal (similar to the A/D converter in a PWM digital audio recorder) at +5 volts conventional logic level. This PWM signal is level shifted upwards by large switching power MOSFET transistors (that operate non-linearly to avoid waste heat) to high voltage and current. The resulting high-level PWM signal then passes through a high-power "low pass reconstruction filter" that extracts the original but level-shifted (amplified) audio signal from the PWM signal which feeds your speakers. Class D is not "digital;" it is non-linear analog technology, sharing some fleeting similarities with its digital counterpart. (Disclaimer: This is a simplified description; there are many details omitted, but the basic operational function is accurate. There is a lot of engineering that goes into making a high-performance, robust, safe, and reliable design.)

QUESTION: Why does this amplifier use a 12AT7 (or 12AU7) type tube/valve and why do you not recommend a 12AX7 type tube/valve?

ANSWER: This amplifier uses these tube models, along with additional circuitry and techniques, to accurately model some specific response and feel elements of our legacy bass amplifier models without the negative artifacts that are more common to many 12AX7 approaches. In fact, using a 12AT7 in the legacy bass amplifier models was a fairly common user modification. This type of circuitry was first adopted in the SUBWAY WD-800. It received such positive player feedback that we also used it in the SUBWAY TT-800 and now the SUBWAY BD-800.

TROUBLESHOOTING

In the event that your amplifier appears not to work correctly, often enough the problem is not with the amp, but a related piece of equipment. This is why it's necessary to take a deliberate, systematic approach to troubleshooting in order to correctly identify and fix the problem. Yes, believe it or not, we have seen all of these things many times.

SYMPTOM: No audio output:

Is the power LED lit and do the tally LEDs over the function switches work?

NO: Possible causes to check in this order are

1. Verify that the power source is live (e.g., plug another piece of equipment or a lamp into the receptacle and verify that the receptacle is actually hot), that the IEC power cable is not damaged and is fully inserted into its socket on the amp, and that the power outlet you just verified is live.
2. Verify that nobody unplugged your amp or extension cord, flipped a "wall switch" off, or turned off your power strip when you weren't looking (if so, blame the guitar player or the drummer...even if they say they didn't do it, either one is a likely suspect, then simply restore the power and enjoy the rest of the gig).
3. If these do not solve your problem, it's possible that your amplifier has failed. Give our Customer Service department a call and we will help you get this resolved.

YES: Possible causes to check in this order are:

1. Defective speaker cable and/or cabinet (try connecting a known good speaker cable and cabinet).
2. Defective bass and/or cable (test with known good bass and instrument cable).
3. Defective pedals/effects/pedalboard (plug the bass directly into the amplifier input, bypass everything else in front of the amp).
4. MUTE/PLAY switch not in "PLAY" position or mute footswitch turned on (turn the mute function off).
5. Problem with the effects loop (a cable plugged into the effects return will interrupt the internal signal flow; this is by design), there is a problem with an effects device or connecting cable(s), there is an intermittent connection due to dust or debris inside the effects return jack – in all these cases, try removing all external devices and connecting cables from the effects loop jacks. You can also try externally bypassing the effects loop with a single shielded patch/instrument cable connected to both the effects input and output jacks).
6. Gain or Master controls turned down too far (turn the controls up).
7. Will the amp play with a signal fed into the AUX INPUT or EFFECTS RETURN jacks? If so, the problem is with the preamp. It's possible that the tube/valve has failed. (Substitute a known good 12AT7 or 12AU7 type tube and see if this restores audio. Please note that preamp tube failures are rare and these tubes typically have a very long service life, so don't jump immediately to this as a cause).
8. There is indeed a problem with the amp. Call our Customer Service department, and we will help you resolve this

SYMPTOM: Distorted audio output:

1. A weak or defective battery in an onboard bass preamp or a connected effect pedal can cause distortion (replace the battery).
2. With very hot 18V basses, it may be possible to overdrive the amp's first stage preamp when in high gain mode (switch to low gain mode). It may also be possible to overdrive the inputs of some pedals.
3. Gain structure problem if using pedal-based effects in the effects loop. The amp's effects loop operates at line level. Most pedals operate at instrument level, so it's quite possible to overdrive effects pedals designed exclusively for instrument-level signals. (Try unplugging effects from the effects loop. If the distortion disappears, try using the effects between the bass and the input of the amp).
4. Slightly intermittent cable somewhere in the system (this can be a damaged/defective instrument cable, patch cable, or speakON plug with a loose screw where the speaker wire terminates inside the connector – fix or replace as necessary).
5. Defective and/or blown speaker(s) and/or crossover electronics in a cabinet (test with a known good cabinet; repair cabinet as needed).
6. Possible failing tube/valve in the preamp (substitute with a known good 12AT7 or 12AU7). Please note that preamp

tube failures are rare and these tubes typically have a very long service life, so don't jump immediately to this as a cause.

7. Possible incorrect tube/valve installed in the preamp. These circuits are designed for use with 12AT7/12AU7 tube types. 12AX7 tubes do not have enough drive capability to work well in these circuits and will result in decreased levels, dynamic range, and increased distortion. (Replace the incorrect tube with 12AT7/12AU7 types).
8. There is indeed a problem with the amp. Call our Customer Service department, and we will help you resolve this.

SYMPTOM: Noise (low-frequency hum) in audio:

1. Defective instrument cable, effects pedal(s), and/or problem with bass (unplug instrument cable from amplifier, if hum goes away, this means that the noise is coming from outside the amplifier. Try a known good instrument cable and/or bass, plug effects (and associated patch cables) back in one at a time to see if one or more are causing the problem).
2. Problem with cables or a device in the effects loop (remove send and receive cables from the amp's effects loop to identify the source of the noise, correct as necessary).
3. Power source wiring is not grounded/earthed (check all wiring for missing grounding/earthing pins, have qualified electrician check building power wiring for missing ground/earth connections and correct as necessary).
4. External stray magnetic field present coupling into the pickups, especially single coils (one clue that this may be the cause is when the volume level of the hum changes with position of the bass. Possible causes are large power transformers located near the performance area, if this occurs when you get close to another instrument amp it may be due to stray field from its power supply).
5. Cellular (mobile) phones and some tablet type devices, emit periodic bursts of RF (radio frequency) energy as they communicate with cell towers and/or WiFi networks. This is frequently the source of randomly appearing noise that players notice. (relocate the phone/tablet device farther away from the bass and/or amp (e.g. take it out of your pocket or move it off the top of the amp), switch the phone to airplane mode (meaning it does not send or receive signals), or shut it off entirely.
6. This amp model contains a tube/valve in the preamp, it's possible that you are experiencing the beginning of a tube/valve failure (replace tube/valve with a known good tube/valve of the correct type to see if this resolves the problem) Please note that preamp tube failures are rare and these tubes typically have a very long service life so don't jump immediately to this as a cause.

SYMPTOM: Noise (high-frequency hiss and hash) in audio:

1. If the noise goes away when the instrument cable into the amp is unplugged, the cause of the noise is external to the amp (possibly due to an active preamp pedal or bass with the treble turned all the way up, a weak or failing battery in your bass or a pedal/effect, defective onboard bass preamp, or connected effect(s)).
2. This amp model contains a tube/valve in the preamp; it's possible that you are experiencing the beginning of a tube/valve failure (replace the tube/valve with a known good one to see if this resolves the problem). Please note that preamp tube failures are rare, and these tubes typically have a very long service life, so don't jump immediately to this as a cause.
3. If there is neon, fluorescent, or LED lighting close by, it's possible that EMI (electromagnetic interference) is radiating into the pickup wiring (try turning off such lighting or even just changing your physical position relative to the light source to see if the noise goes away. If it goes away or changes significantly, it could be an arcing secondary wire on the neon lighting, a failing ballast or tube on fluorescent lighting, or a failing/defective power supply on LED lighting causing radiated EMI that is being picked up by your instrument or a poorly shielded instrument cable)
4. Cellular (mobile) phones and some tablet-type devices emit periodic bursts of RF (radio frequency) energy as they communicate with cell towers and/or Wi-Fi networks. This is frequently the source of randomly appearing noise that players notice. Relocate the phone/tablet device farther away from the bass and/or amp (e.g., take it out of your pocket or move it off the top of the amp), switch the phone to airplane mode (meaning it does not send or receive signals), or shut it off entirely.
5. Power source wiring is not grounded/earthed: Check the power cord and any extension cords/power taps for missing grounding/earthing pins, have a qualified electrician check building power wiring for missing ground/earth connections and correct as necessary.
6. Problem with connecting cables and/or a device in the effects loop: Be sure you are using only undamaged instrument/line-level signal/patch cables. Disconnect send and receive cables from the amp's effects loop to verify that this is the source of the noise, correct as necessary.
7. Tweeter turned all the way up in a quiet room: You may need to turn the tweeter down under such conditions,

especially if the sensitivity of the tweeter greatly exceeds that of the low-frequency drivers with the tweeter turned up.

SYMPTOM: Noise or popping/clicking sound in audio:

1. Popping while playing, especially one string: Check bass set-up to be sure there are adequate clearances between the string and pickup pole pieces.
2. Popping while just sitting there or when touched: Under dry environmental conditions, electrostatic discharge may be the cause. Try an antistatic mat on the floor or a humidifier in the room.
3. Popping when tapping on or hitting the amplifier: This amp model contains a tube/valve in the preamp. It's possible that you are experiencing the beginning of a tube/valve failure. Replace the tube/valve with a known good one to see if this resolves the problem. Note that at very high gain and channel volume positions, no tube/valve will be perfectly quiet in this regard. Additionally, preamp tube failures are rare, and these tubes typically have a very long service life, so don't jump immediately to this as a cause.

SYMPTOM: Protect LED turns on:

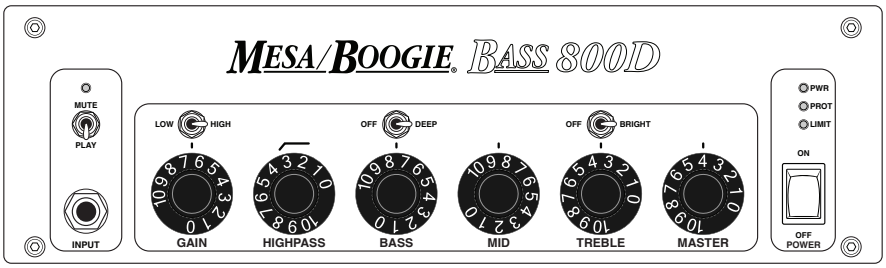
1. Disconnect all cables except the power cable. If the amp is no longer in protect, try plugging in just the speaker cable. If the amp goes immediately into protect, there is likely a fault with the speaker cable. Then, plug the speaker cable into the speakers. If the amp goes immediately into protect, one possible cause is a defective primary driver/speaker. Another possible cause is a defective or damaged crossover and/or high-frequency driver that is presenting an illegal load to the amplifier and the protection circuit is working correctly. Try a known good speaker cabinet from another manufacturer to rule this possibility out. If the amp works correctly with another speaker cabinet, call Customer Service for assistance. This issue is more common with "do it yourself" speaker projects with incorrectly designed/built crossovers. All amps with PWM carriers like the SUBWAY BD-800 are sensitive to stored reactive energy in defective crossover tank circuits.
2. Protect circuit shuts down amp while playing at low to moderate volumes: Possible shorted speaker cable. Try a known good speaker cable.
3. Protect circuit shuts down amp at moderate to high volumes: Verify that the total load to the amplifier has not fallen below 2 ohms and that the impedance switch is set to match the impedance (combined impedance) load of the speaker(s) connected to the amp. Possible causes are incorrect pairing of multiple speaker cabinets, incorrectly labeled speaker cabinets that were repaired or modified without relabeling, defective driver that develops shorted voice coil wire turns as the voice coil warms up.
4. Power source voltage falling below acceptable values due to improper wiring and/or an extension cable that is too long for its wire size/gauge. Seek the help of a qualified electrician to address problems as needed.

SYMPTOM: No (or slow) USB charging of connected device:

1. Is this an Apple device? There are several program-controlled charge rates available for Apple products, varying from 100 mA all the way up to 2.1 A. The charge port supports the 500 mA standard, which will charge the larger devices more slowly than the higher-powered dedicated chargers.
2. Is this an Apple iPad or other large tablet? When operating an iPad or tablet, the current draw of the screen alone will be close to 500 mA so the charging rate will be very low. However, operating with a charged battery while also connected to the charge port on the amp will greatly extend the battery life during use.
3. Is this an Android phone that Qualcomm QC enabled? This charger does not support the QC protocol and will charge at the slower 500 mA rate only if the device software allows it.
4. Does your device use a USB-C connector? While it won't charge at the higher rates supported by the USB-C standard, it should be backward compatible with the 500 mA standard.

FACTORY SAMPLE SETTINGS

FAT CLASSIC ROCK



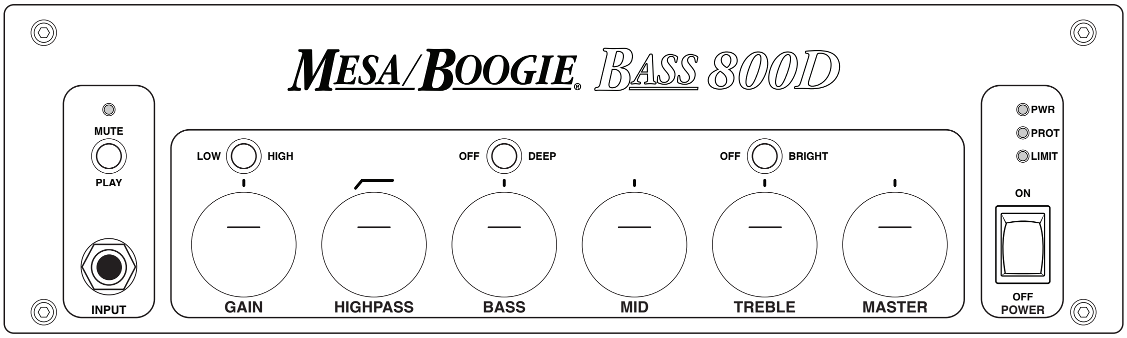
MODERN ROCK/METAL

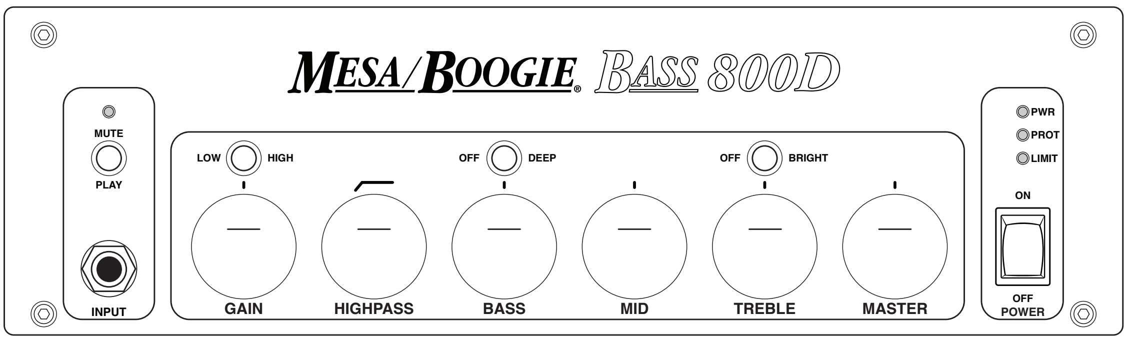
ROUND R&B

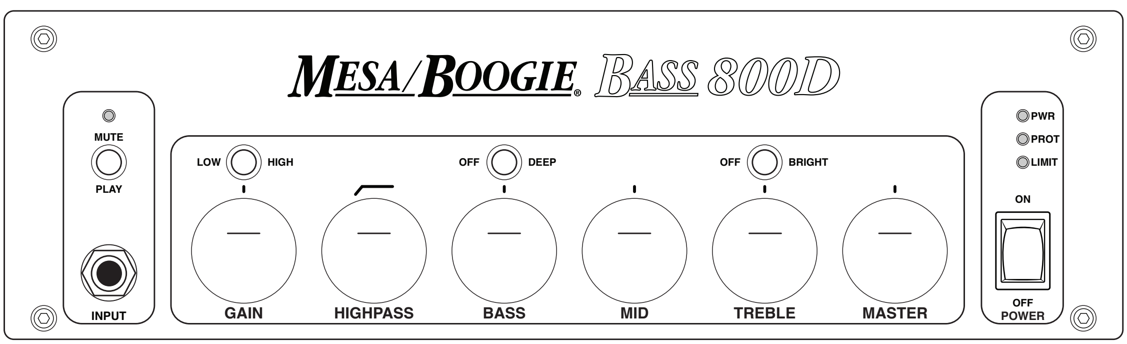
SLAP FUNK FINGER STYLE

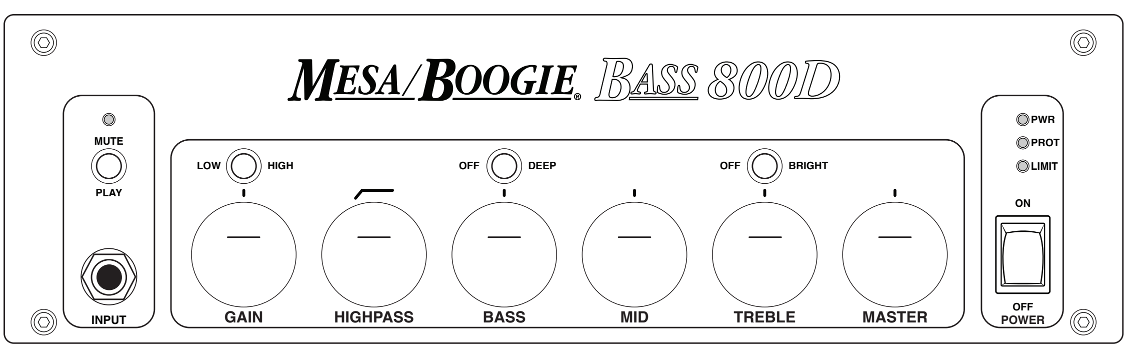
REGGAE

USER SETTINGS









SPECIFICATIONS

Output Power Rating:	400 watts RMS @ 8 ohms, 10% THD (includes preamp O/D THD) [note 1] 800 watts RMS @ 4 ohms, 10% THD (includes preamp O/D THD) [note 1] 800 watts RMS @ 2 ohms, 10% THD (includes preamp O/D THD) [note 1]
Signal to Noise Ratio:	-74 dB (20-15 kHz, unweighted, controls at (#5) position)
Available Gain (nominal):	38 dB (low gain), 47 dB (high gain) [note 2]
Maximum Undistorted Input Level:	0 dBu /775 mV (low gain), -12 dBu /187 mV (high gain) [note 3]
Switched Tone Shape Filter:	DEEP: +4 dB at 50 Hz (moderately interactive with HPF and Bass EQ) BRIGHT: +2.5 dB at 2 kHz (moderately interactive with Mid and Treble EQ)
High Pass Filter:	1 low pole fixed, 2 pole variable, 18 dB/octave, 25 Hz – 125 Hz
Equalization:	Bass/Mid/Treble: Interactive legacy MESA Boogie tone stack “flat” is approx: Bass = #2, Middle = #9, Treble = #1 (“classic” position)
Instrument Input Impedance/Sensitivity:	>1 Meg ohm, -10 dBu nominal, (gain & master at #5 position)
Aux Input Impedance/Sensitivity:	10 K ohm, +4 dBu [note 4] (post-master volume controls)
Effects Return Impedance/Sensitivity:	20 K ohm, +4 dBu [note 4]
Effects Send Impedance/Sensitivity:	<1 K ohm, +4 dBu [note 4]
DI Output Impedance/Sensitivity:	<1 K ohm, -28 dBu mic position, -10 dBu line position [note 4]
Power Amplifier Damping:	~50 at 2, 4 or 8 ohms [note 5]
Preamp Tube/Valve Complement:	12AT7 or 12AU7, V1 = gain amp, [note 6]
Power Requirements:	100-120/220-240 VAC, 50/60 Hz, 400W, auto-ranging power supply
Size:	12.00 (305mm) wide x 10.15” (258mm) deep x 3.45” (88mm) high [note 7]
Weight:	Approx. 6.7 lbs (3.04 kg)

[note 1]: Area under the curve, with preamp harmonics management, >25% duty cycle, impedance switch set to match load, 12AU7 tube type
[note 2]: Gain/volume controls set to the #5 position, from input jack to speaker output
[note 3]: Gain/volume controls set to the #5 position (at effects send jack)
[note 4]: Nominal levels; there’s typically a min. of 12 dB of additional gain for signals below and 12 dB of headroom above nominal levels
[note 5]: < 1 kHz
[note 6]: Circuits optimized for 12AT7/12AU7 tubes/valves, measurements made with a 12AT7. (12AX7 tube type not recommended.)
[note 7]: Chassis only, not including feet and controls

MESA Boogie continually develops new products and improves existing ones. For this reason, specifications and information in this manual are subject to change without notice.

SERVICE INFORMATION

USA /CANADA Customer Support:
For technical support, troubleshooting, tone questions, settings help, and more...
707-778-6565, Monday-Thursday, 9 AM-5 PM Pacific Time
NOTE: If a Customer Service Rep is not available when you call (helping other customers), PLEASE leave a voice message with a phone number and a good time to call, and WE'LL CALL YOU BACK!

INTERNATIONAL Customer Support:
For warranty and technical support, please contact your LOCAL MESA DISTRIBUTOR. Use this link to search the web for your local distributor's contact information:

www.mesaboogie.com/support/

PLAYER NOTES AND REMINDERS

MUTE LED
#394201

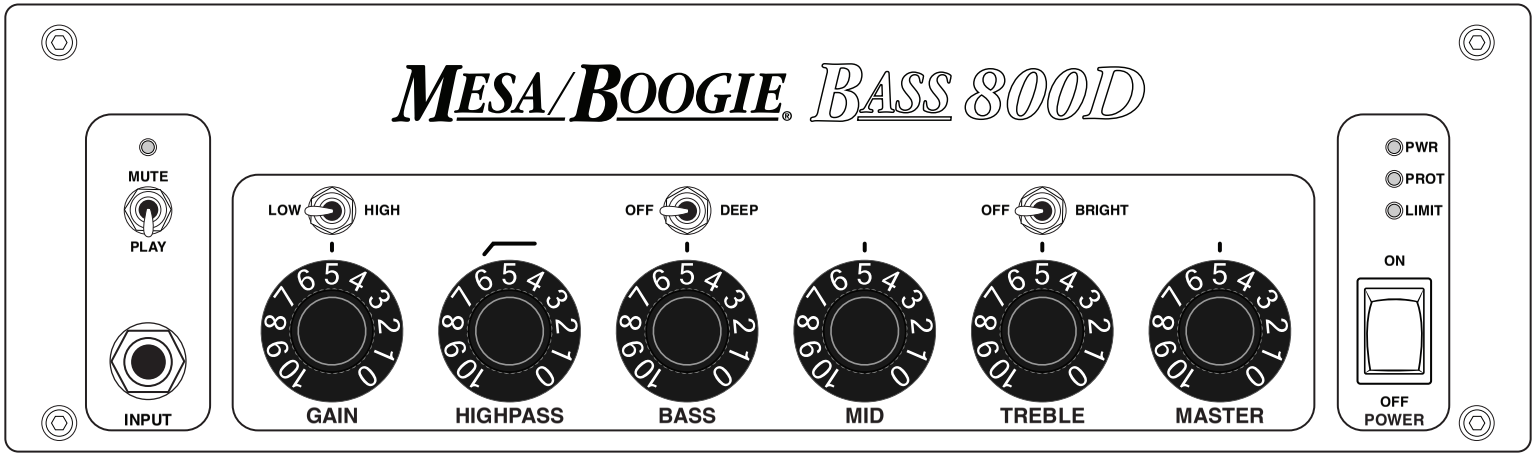
MUTE SWITCH
#607431

GAIN SWITCH
#607431

DEEP SWITCH
#607431

BRIGHT SWITCH
#607431

PWR LED #394261
PROT LED #394201
LIMIT LED #394251



JACK
#619354

POT
#595101

POT
#595102

POT
#595101

POT
#595020

POT
#595101

POT
#595101

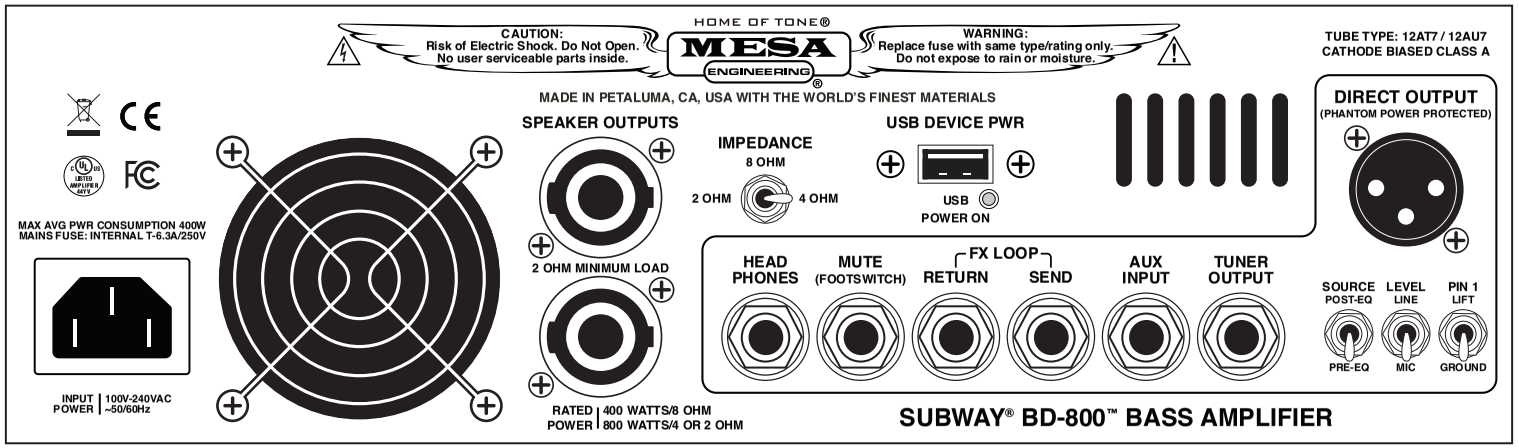
PWR SWITCH
#600118

IMP. SWITCH
#607443

USB JACK
##620100

USB LED
#394232

XLR JACK
#620553



IEC JACK
#613713

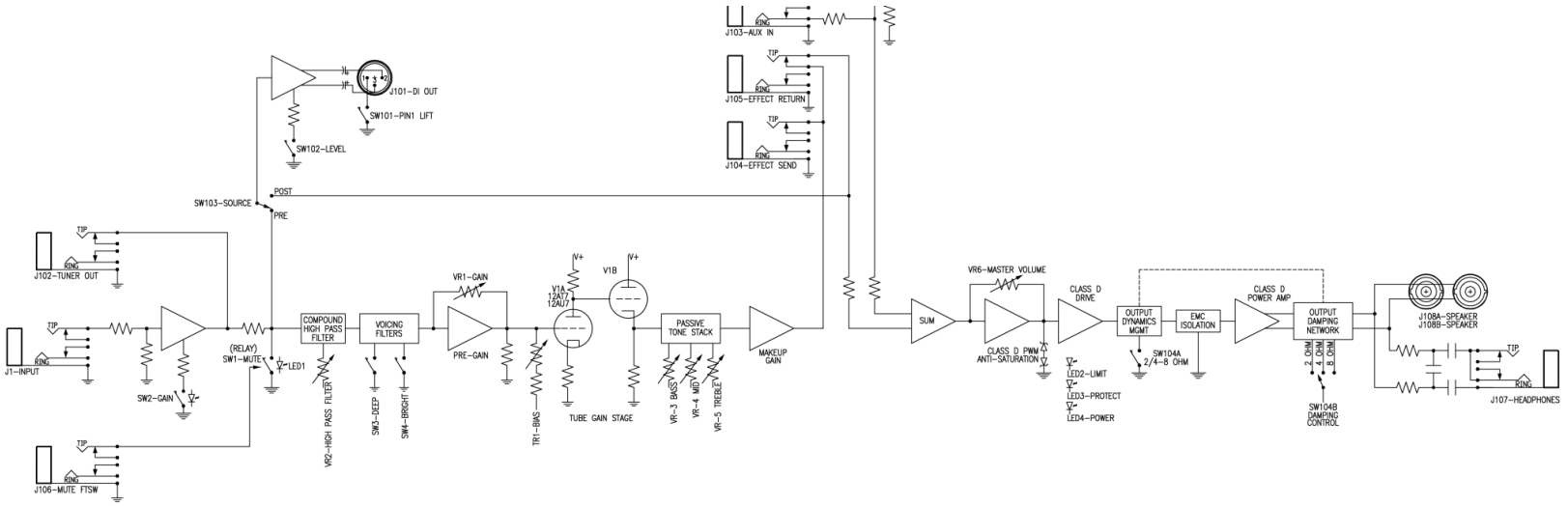
FAN
#783140

SPEAKER JACKS
#620563

JACKS x6
#619354

PWR SWITCH x3
#607334

MESA/BOOGIE® BASS 800D



SUBWAY BD-800 BLOCK DIAGRAM

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