



THUNDERFUNK BASS AMPLIFIER
OWNER'S MANUAL

Thunderfunk, Inc
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Thunderfunk Bass Amp Owner's Manual

Congratulations on the purchase of your Thunderfunk Bass Amplifier.

Thunderfunk Bass Amps are designed to be versatile, lightweight, and powerful, with built-in Enhancer and Limiter, designed for the working bass player, amplifying the natural quality of the bass instrument. Please take the time to review this manual and to send in your warranty registration card.



Photo by Todd VanSelus

- **CAUTION** -- Ears are your most important piece of equipment, and cannot be replaced.
- Use common sense. **DO NOT** operate at high volume levels or at levels that are uncomfortable.
- If you ever experience any ringing in the ears, your body is telling you something: **TURN DOWN**.
- If you suspect hearing loss, consult a health care professional.

Questions about operating features not addressed in this manual can be answered by your Dealer.

A couple secrets behind the Thunderfunk tone are:

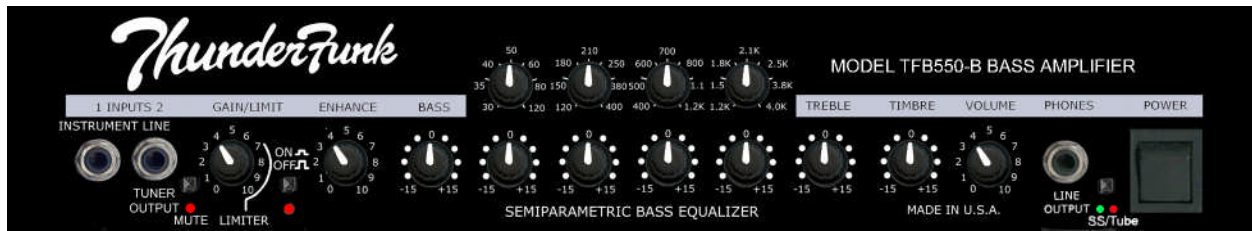
Thunderfunk Bass Amps are pure op-amp and transistor solid state designs – made famous by such classic designs as the Acoustic 360, and the AMP BH-420. They use the largest high-quality power transformers that can be packed into two rack spaces. Half the weight of the amp is the power transformer, and it is conservatively controlled by 800-watts worth of power transistors.

Other key elements of the amp's tone are a whopping amount of power supply filter capacitance, so dynamics are maintained even at the highest levels and lowest frequencies, and the use of high quality film and silver mica caps providing a punchy mid-range, and a sweet high end that even makes piezo tweeters sound good.

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FRONT PANEL FEATURES

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Dual Input Jacks – The left jack is designed for a standard Switchcraft “280” ¼ inch plug, from either a passive or active bass system. Passive systems have been around since the invention of the electric bass, and active systems typically include a 9-volt battery inside the Bass, or use an external supply, e.g., some Alembic models.

The second ¼ inch plug can be used in two ways, and both inputs can be utilized at the same time.

- The first application is as a line-level mono insert. The output from an alternative source such as a drum machine, CD/tape player, or even a mix from the PA can be added. Set the volume for the second source using the remote controls. This can be used for practicing or live use.
- The second ¼ jack can also be used to provide an output signal to your tuner. NOTE: Since the second input doubles as a signal input, the Mute Switch will kill both inputs.

Mute Switch with LED indicator - This pushbutton mutes the input signal, with the Red LED lighting to indicate muted operation. **Since the second input “tuner out” jack doubles as an input, it is also muted by the Mute Switch.**

Gain/Limit with LED indicator – This control sets the preamp gain of the amp, and sets how much limiting is done when the Limiter Switch is pushed IN.

The Gain Control works in conjunction with the Volume Control (the last knob on the right). While you might think of the Volume Control as a “Master Volume” it is not. The amp is designed to not distort. If you want a “Fuzz Bass” you should use a pedal in front of the amp, or through one of the Effects Loops (back panel)

Limit Switch – The Limiter is engaged when the Limit Switch is pushed IN. In this position, the Limiter will prevent the input signal from exceeding a preset level and is adjusted by the Gain/Limit Control.

A limiter is used to squeeze the sound into a smaller dynamic range. It can be used to restrict excessively loud signals from going through the amp, such as clicks, and pops when playing a “slap” bass style. It is also used to “raise” the lower level signals to a higher level by “limiting” the higher level signals. Its effect is similar to a compressor. But, while a compressor squeezes all the signals continuously, a Limiter “clamps” the higher level signals only, thereby allowing you to set a higher overall Volume level without creating excessively high “peak” signals.

A small time delay is built into the Limiter to prevent it from “riding” the low frequencies, causing an audible “pumping” effect. Using any limiter or compressor will affect your sound, so you should adjust it by ear. A red LED is provided to indicate when the Limiter is taking affect. The higher you set the Gain/Limit control, the more the Limiter will clamp the signal, and the longer the LED will light. Excessive use of the Limiter will add a distorted sound to your instrument. Some bass guitars with weak output signals will not fire the limiter.

Setting the Limiter – Turn down the Gain/Limit, and Volume controls on the amp. Make sure the Limit Switch is pushed IN. Then turn the volume and tone controls on your bass all the way up and also set any effects to as high an output level as you will use. Now play the instrument aggressively, and turn the Gain/Limit control up until the red LED indicator light flashes on. Now increase the Volume Control

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until you have the level you wish to play at. To have a more “compressed” signal increase the Gain/Limit control as needed, and balance this by decreasing the Volume control to a proper overall level. Once this knob is set, it generally will not need to be adjusted until you change instruments or effects.

To play without the Limiter you can either press the Limit Switch to the OUT position, or set the Gain/Limit control low enough so that the red LED never lights.

RED LED Limiter Indicator – used with the Gain/Limit control, it lights when the input signal crosses the threshold of the limit circuit, and limiting is taking place. It might also light when the Limiter is switched off, but the LED can be ignored. The circuit is not limiting.

Enhance Control – This tone-shaping control changes the instruments harmonic effect, giving the bass a more identifiable, penetrating tone. When set to the minimum level, it is effectively out of the circuit. As you advance the knob, the sound tightens up, boosting the very low, upper middle and, high frequencies, while adding a dip in the lower middle frequencies. This brings out the fundamental notes by reducing frequencies that mask them, and it enhances the high-end transients, similar to techniques often used for recording bass in the studio. The effect is especially noticeable when “slapping” on the bass guitar, and becomes more “transparent” as the control is turned to maximum. Adjust this control to taste.

TONE CONTROLS

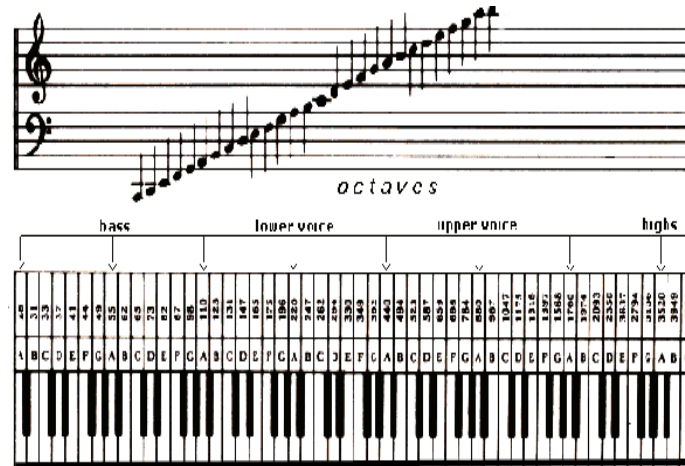
To match your speaker cabinets and the bass instrument to the room you are playing in, a very wide range of tone shaping is available. While the amps are renown for sounding great flat, you can also dial in nearly any tone imaginable. A little can go a long way; excessive boost or cut in any one area may destroy your tone, while a single boost or cut can make a world of difference.

Overall bass and treble adjustments are made with the Bass and Treble controls, which control a broad range of the frequency spectrum. Many players use these controls to compensate for acoustic situations, relying on the Enhance and Parametric controls to achieve their sound. Experiment! Add bottom to fill in a low volume gig. Adjust the lower-mid's to compensate for that dead spot on your vintage neck. Add midrange to cut through the mix. Lower the high end to reduce fret noise and string squeak.

Bass Control – This tone control is a shelving type, providing a boost or cut of 15dB starting at 80 Hz. Frequencies above this are not really affected, but frequencies below are boosted uniformly. The control is flat at the 12 o'clock position, for an easy and fast flat setting.

Semi-Parametric Controls - There are four pairs of semi-parametric controls. These let you boost or cut the sound at the specific frequencies, compensating for room and speaker variations, different playing styles and instruments, etc, without conflicting settings. The upper knob selects the frequency, and the knob immediately below selects the amount boosted at that frequency, providing a 15 dB boost or cut adjusted in a fixed one-octave bandwidth.

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(Chart complements of Leonard Audio)

Open Strings (about): “B” @ 31 Hz, “E” @ 41 Hz, “A” @ 55 Hz, “D” @ 73 Hz, “G” @ 98 Hz, “C” @ 132 Hz.

Frequency Controls – These four controls are provided for selection of the low, low-middle, upper-middle, and high frequencies you may wish to boost or cut.

Boost/Cut Controls – Located beneath each Frequency Control, these controls will boost or cut the selected frequency by +/-15 dB. They are flat at their 12 o’clock position, and the control is detented so it is easy and fast to set the individual EQ controls to flat.

A simple turn from one dot to the next creates a difference. Remember that a little can go a long way.

- The first knob is often associated with “Solid”, especially in the 50Hz area. At lower volumes, you may wish an increase to fill out the bottom end – similar to the “loudness” control on your stereo –while at louder settings, consider a cut here. This is also a good knob to help out less than full range cabinet designs, adding back the “-3 dB” often seen in specifications. Since “-3 dB” is halve the power of “0 dB”, a cabinet designed for the full range of the instrument will always sound better.
- The second knob has been found to be useful for filling in the dead spot so common on many necks –the one about ½ way up on the “G” string. The top three bands control frequencies where your sound starts to get defined as human hearing starts to sharpen. The right amount of midrange gives you clarity and punch, but be careful: too much can sound harsh.
- Finger noise may be found between 500 and 1000 Hz, and the third knob can be used to subtract unwanted noise and optimize the finger effect. Those using a slap or pop style will find this useful to eliminating harshness by adjusting upper midrange frequencies. This is also a useful range to adjust the “honk” prevalent in some speaker cabinets.
- The fourth knob can help add a top end “snap” that dull-sounding speaker systems or pickups lack, as well as compensate for an old set of strings.

To learn how the parametric controls work, try this: Boost the level control in one section, so you will more easily hear the frequency you are adjusting. Then rotate the frequency control directly above it. After you identify what frequency you’re adjusting, return to the level control to adjust it to the desired amount of boost or cut. Contour the sound to your liking. When you become experienced with parametric adjustment, you can of course skip most of the above, but parametric EQ is a very powerful tool that is easy to overuse. When in doubt, use less.

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Fun with the Parametric: To determine the low frequency response of your speakers, add boost using the lowest frequency parametric control. You'll hear an increase in low frequency response. While playing the lowest note on your bass, turn the frequency control down until the low frequency response disappears. Turn it back up until you hear the boost again. Look at what frequency the control is set to. That's the low frequency response of your speaker cabinet.

Treble Control – This tone control is a shelving type, providing a 15 dB of boost or cut at slope starting at 2000 Hz, which is above the fundamental notes of even a standard guitar. Frequencies below this are not really effected, but frequencies above it are boosted uniformly. The control is detented at the 12 o'clock position for an easy and fast flat setting.

This may be a good place to discuss harmonics. It is the sound of natural and addition vibrations that distinguishes one instrument from another. They are why a piano sounds different than a guitar, for example, and are a primary reason you have a unique sound.

Harmonics can be defined as weaker vibrations that are higher than and mathematically coordinated with the fundamental notes. Harmonics are caused by an infinite variety of factors, including for example where and how you pluck a string, the type of string, the wood the bass is made from, the response of the amplifier, speakers, etc.

Timbre Control — This unique control is great for making rapid and useful adjustments to the overall tone. One use is to compensate for different instruments, for example changing a Rickenbacker to a "P" bass. Another use is to make a quick mid-set change from a Funk to a Reggae song. Like the Enhance control, it is a complex adjustment of both treble and bass on one knob. Use it to range from a full to a punchy bass tone. Turned down you get a deep, full-bass tone, and turned up you get a tight, punchy-bass tone.

It is suggested you start with the Timbre at the 12 o'clock setting, set the EQ for the speakers and room, and then experiment. The control is detented, for an easy and fast flat setting and removal from the circuit.

TONE REVISITED

How you set your EQ depends on style, equipment, the room, cabinet placement, audience quantity, etc.

When playing in different rooms, cabinet placement and room acoustics play a critical roll, for everyone but especially for bass. Many clubs, auditoriums, rehearsal halls, etc. tend to naturally enhance the frequencies below 50Hz, while people in the room absorb the higher frequencies. This is called Frequency Enhancement, and sometimes it is good, sometimes it causes difficulties.

Low frequencies do tend to be omni-directional – you can't really tell where they are coming from. Placing the cabinet on a raised wooden stage will acoustically couple it and significantly boost fundamental frequencies. Setting it against the wall can couple the walls to your speaker cone, and placement in a corner can add even more effect. Combine all these and excessive "boominess" is a common result. It is not heard on stage, but often is at the back of the room. To be felt as well as heard, try backing off the bass a little while boosting the upper-mids or treble a bit.

When playing with other musicians, it is not unusual for instrument frequencies to interfere with each other. This is Frequency Masking. EQ settings that once seemed so perfect, don't work well in a different room.

While a Thunderfunk is often used "flat" with no additional EQ, the sound next to the cabinet WILL be different than it is in other places in the room. This phenomena is universal and is often more noticeable in the audience than on stage, and it is not uncommon for the bass sound to seem a little thin on stage and the same time sound quite muddy at the back of the room.

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The good news is the Thunderfunks can be adjusted to nearly any tone imaginable. Ultimately it boils down to experience, a good and trained ear, and practice.

If you get a sound check, or play the same place often, move around to hear what it sounds like in different places. Try new things. Get someone you trust to help, but remember: a little goes a long way, and a couple of dB's of EQ, or relocation of the cabinet, or a different cabinet may be all you need to solve these issues.

One other item: if you have guitar players in the band, ask them to follow the Les Paul rule. Les Paul's cardinal rule is this: point guitar speakers directly at the guitar player's ear. Between us bass players, everyone will be glad when that happens.

Volume Control – Adjusts the overall amplifier output. The actual volume of your electro-acoustic system is determined by many elements, the most important being the sensitivity of the speakers. A speaker system with a sensitivity that is 10 dB more than another speaker system will sound TWICE as loud.

Thunderfunk bass amps are capable of producing sound levels that can cause permanent hearing loss. This is especially true in when additional sound sources, such as when headphones are used. Also, please respect the ears of the audience that has come out for you.

Phones/Line Output – This built-in front panel jack can be used for either headphones, or as a line-out connection. You can use a standard ¼ phone plug in either stereo or mono configuration, however the output will be mono, and is driven by the power amp.

If you want to practice silently through headphones, speakers do not need to be connected in the back. If you use it as a line-out connection, remember this output is after the entire preamp and power amp circuitry, so all controls and setting are reflected at this jack.

Power – This switch turns the system on or off. There is a Green LED to indicate power is applied, and the fuse is good. If the indicator light does not come on, either the AC power cord is disconnected, the wall outlet isn't working, the fuse is blown, or for some other reason there is no power to the unit.

The power to the amp is slow-start, meaning that the unit will not come on instantly, saving your ears and speakers from the "POP" often associated with high power equipment. When turned on, there is a couple of seconds delay before the mute circuit allows the preamp signal to get to the power amp. Similarly, the amp shuts down without the "POP" caused by DC bias shifts in other amps not similarly equipped.

It is still considered good practice to set the master volume control at minimum when powering the amp up and down, and when plugging or unplugging your instruments. This will prevent any unexpected signal from being sent to your speakers.

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REAR PANEL FEATURES



The back panel (TFB550-B shown) gives all the connectivity one could ask for. Use it as a fully integrated amplifier, as a DI, as a preamp, as a Power Amplifier. Use the features stand-alone, or combined. (Note: The voltage selector switches are under the cover plate, above the AC power connector)

RECORDING OUTPUTS

Direct Instrument Balanced Output – This DI Output is a balanced XLR connector, a buffered but otherwise exact replica of the instrument input except at line level. This can be routed to another amplifier or a mixing console for pure instrument tone unadulterated by any front panel settings. This can also be routed to a tuner.

Post EQ and Limiter Balanced Output – This is a balanced XLR output jack, with a variable output adjusted by the Record Level control. The branch for this is AFTER the Gain/Limiter, Effects Loop 1, all the EQ controls, the Enhancer, and the Timbre controls, but before the front panel Volume (next to the power switch), the Effects Loop 2, and the Power Amp. Signals from this XLR are therefore fully controlled and tone shaped by the preamp; it can be routed to a mixing console, direct to the PA or direct to another Power Amp/Speaker System. Pin 2 is the + signal.

You can also use this DI Output and a special XLR to Phone jack cable to daisy chain several Thunderfunk slave amps together, matching the setup with one set of preamp controls working all the power amp and speaker systems simultaneously. See your dealer for more information on possible setups.

Record Level – This controls the line level strength being sent from the XLR balanced output jack.

Effects Loop 1 – This is a standard loop with low-impedance line level out and high-impedance line level back in. The branch is after the Gain/Limiter, and Enhance controls, but before the EQ section and the Timbre, Volume controls.

Effects Loop 2 – This is also a standard loop with low-impedance line level out and high-impedance line level back in. The branch is made after all the preamp features, including Gain/Limiting, Enhance, EQ, and the Volume and Timbre controls.

Plugging a ¼ inch jack into the Effects Send of this loop provides a 1-volt maximum line level signal out. This can be routed to your choice of effects unit, a mixing console, another power amp/speaker system, etc. The preamp is still routed to the internal Power Amp. (NOTE: Some external power amps require more than 1-volt to be driven to full power.)

When plugging a line level return signal via the ¼ inch jack into the Effects Return of this loop, all the preamp features are disconnected. Only the line signal from the inserted ¼ inch jack is sent to the Power Amp. You can use the return signal for the device at the Effects Send of this loop, or bring a mono signal

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from a mixing console or another preamp to the Power Amp input of the Thunderfunk. This is where you would connect the special XLR to Phone jack cable, mentioned in the Post EQ Balanced section of this manual, to connect or "daisy chain" several Thunderfunk slave amps together, matching the setup with one set of preamp controls working all the Thunderfunk slave power amps.

Speaker Output – These two ¼ inch jacks are wired in parallel to accept traditional speaker connection cables. There are also Speakon Connectors (the TFB420 has one, while the TFB550 has two) to accept modern speaker connections. **The total speaker system impedance may not be lower than 4 Ohms. Doing so will void the warranty.**

Your speaker system should be chosen for the characteristics of your amplifier, your style, and your application. If you will only be using one cabinet, a 4 Ω model will draw the most power from your amplifier. If you will generally be using two cabinets, they should be 8 Ω models so their combined impedance will be 4 ohms. Cabinets with 10" speakers sound different than cabinets with 15" speakers.

Beware of 2x10 cabinets that are rated at 4 ohms. They will draw maximum power from the amp and may not be rated for so much power. Adding a second 2x10 - 4 Ω cabinet will load the amp to 2 ohms, and could possibly overheat the amp depending on how hard it's driven. The amp will produce only a slight amount of additional power at 2 ohms and the fan should definitely be left on. It is not a good idea to run the amp this way.

As a reminder, the actual volume of your system is determined by many elements, the most important being the sensitivity of the connected speakers. A speaker system with a sensitivity that is 3 dB higher will, for the same volume, will use about ½ the power of the lower sensitivity speaker system.

Fuse – As needed, and only after disconnecting the power cord from the amplifier, remove the fuse by using a standard flat screwdriver, twisting counterclockwise about 1/8th turn. The spring-loaded fuse will partially pop out for easy replacement. **REPLACE WITH ONLY THE SAME SIZE AND TYPE** as labeled on the back of the amp. **DO NOT USE FAST BLOW FUSES.** (See "Voltage Selector" section below)

Power Cord – A standard power cord is attached, rated for 120 VAC at 600 watts. In an emergency, spare power cords are available at computer, and Radio Shack stores.

Voltage Selector - The TFB550 is designed to operate at 50 or 60 Hz. To set the voltage for different areas around the world, remove the two screws that attach the Voltage Selector Coverplate, located at the far left, above the AC input connector. A voltage setting guide is printed under the plate. To set for 100 volts (Japan) the top switch should be set to 100V and the bottom switch set to +0V. For 120 volts, set the top switch to 100V and the bottom switch to +20V. For the EU determine what your actual voltage is. Although the EU has "standardized" on 230 volts, countries still run between 220 and 240 volts. For 220 volts set the top switch to 220V and the bottom switch to +0V. For 240 volts, set the top switch to 220V and the bottom switch to +20V. For 230 volts, set the amp to operate at 240 volts.

FUSE: If you change from 100-120 volts to 220-240 volts, or back, you need to also change the value of the Fuse. The fuse is an American 3AG size slo-blo rated at 6-¼" for 100-120 volts, and 3 amps for 220-240 volts. You should always check the voltage selector switches whenever you're unsure of what the amp is set to.

You can operate the amp in the U.S. at 240 volts if you set the switches to 240 volts.

Plugging the amp into 100-120 volts when the selector switches are set to 220-240 volts **WILL NOT DAMAGE** the amp. **HOWEVER**, plugging into 220-240 volts when the switches are set to 100-120 volts **WILL DAMAGE** the amp.

Power cords are **NOT** supplied with amps that are shipped to countries that operate on voltages other than 120 volts. Always check the switch settings before plugging the amp in for the first time.

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Thermal Issues – The Thunderfunk bass Amp was originally designed without a fan. This allows super-quiet operation for studio and TV work. However, the amps do now have fans with an on/off switch. If the amp is being used where the noise of the fan isn't a problem, turn it on. If you're in the studio, leave it off. It's up to you. With or without the fan, the bottom of the amp gets hotter than the top, so you should avoid putting other equipment underneath it if installed in a rack mount. The amp itself is designed to handle as much heat as it can generate AS LONG AS THE LOAD IS KEPT TO A 4 OHM MINIMUM.

Thermal Tip: Power Transistors fail not so much from overheating, as from thermal cycling. It's from the growing and shrinking of the transistors due to a rapid change in temperature. For this reason it is advised that if the amp comes in from cold storage, for example from the trunk of your car in winter, you should allow time for the amplifier to warm to room temperature before turning it on. This should only take 30 minutes, as aluminum is an excellent thermal conductor, with a low thermal mass. To warm the amp up faster, turn the amp ON after a few minutes, but don't play through it. Make sure the fan is ON to circulate room temperature air through it for another 10 minutes. This will allow it to warm itself thoroughly at a low-heat level before you play through it. It's the idea of letting it warm slowly, to prevent thermal stress cracks in the transistors. It doesn't hurt the amp to turn it on when it's cold, as long as you're not playing through it. It also doesn't hurt to operate the amp without a speaker attached. For the same reason, it's not necessary to turn the amplifier off between sets. It generates heat in direct relation to how much power it's putting out. When you're not playing through it, it's not getting hot, and the fan is actually cooling it off.

MECHANICAL AND ELECTRICAL ISSUES

Electricity and Water DO NOT Mix. Operating the amp near water can put your life at risk. Your amplifier should therefore always be stored and operated away from moisture or water.

Your amplifier is sturdy, but it is also a delicate instrument. While Thunderfunks are made for the road, care should be taken not to drop, throw, drive over, or otherwise suffer unusual abuse.

CONNECTIONS

The most quiet, dynamic and musical results are achieved when all instrument, effects, line-level, and other source connections are made with high-quality shielded cables. There is much fuss these days about recent improvements in these connections. Use your own judgment. The use of speaker cables for line connections will result in excess noise, and is not recommended.

Speakers should be connected with high quality speaker cables. The lower the gauge number, the thicker the wire, and the more power will be delivered to your speaker system. Speaker cable lengths should be kept as short as possible for the same reason. The use of instrument cables for speaker connections can cause damage and malfunction.

RECOMMENDED SPEAKER-WIRE GAUGE GUIDE

Maximum recommended wire length at 4 ohms. Running at 8 ohms reduces the power to 300 watts, and you can easily double the recommended wire length for a particular gauge.

18 gauge = 10 feet or less
16 gauge = 15 feet
14 gauge = 20 feet
12 gauge = 30 feet
10 gauge = 50 feet

This is for a 5 amp rating, although the amp can put out over 10 amps, in practice, this is not on a continuous basis. This chart is for a rated 50% duty cycle, which is still above average usage, which I estimate is actually at 20%.

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RACK EARS

Removeable Rack ears are standard on the TFB550-B. They extent 1" out of each side of the amplifier and are attached with four screws and nuts. On the TFB420 Serial numbers 100-299, the ears are attached by removing the top cover and then the side-strap carry handle, and attaching the ears using Four #10-24 x 1/2" or #10-32 x 1/2" screws and lock nuts. Remove the top cover only after disconnecting the power cord from the amp, and waiting 10 minutes for the voltage inside to dissipate. Care should still be taken not to touch anything inside the amp when the cover is off. To remove the top cover take out the 8 flat head screws visible on the top, and then the two large screws at both ends of the amp on the bottom. These screws are #10-24 x 1/2" on amps with serial numbers below TFB299 and #10-32 x 1/2" on serial numbers TFB300 and higher.

On TFB420 Serial Numbers TFB300 and up, and all TFB550 amps, the ears are attached without removing the top cover. First remove the side-strap carry handle, and use Four #10-32 x 1/2" screws to attach the rack ears using the permanently installed "PEM" nuts. The newest rack ear design has alternate holes to either mount the handle flush with the faceplate, or to mount it 1/2" forward of the faceplate in order to recess the faceplate for added protection of the front knobs and switches.

In either case the two front side-mounted bumper feet will have to be removed to mount the rack ears.

NOTE: If the bottom bumper feet are removed to mount the amp in a rack DO NOT put the bumper mounting screws back into the amp for storage. Store separately.

AMPLIFIER SPECIFICATIONS

TFB550-B Serial Numbers 600 and up

AC POWER: 100-120-220-240 volts, 50/60 Hz

FUSE SIZE: 3AG 6.25 Amps Slo-Blo for 100-120 volt operation
3.00 Amps Slo-Blo for 220-240 volt operation

PREAMP: Gain/Limiting, Enhance, Bass, Semi-Parametric Tone Control, Treble, Timbre, Mute, and "The Switch."

POWER: 550-watts into 4 ohms
300- watts into 8 ohms
2 OHM OPERATION IS NOT RECOMMENED

DIMENSIONS: 17" wide x 3 1/2" high x 10-1/2" deep (19" wide with rack ears)

WEIGHT: 16 pounds (Add 1 pound for rack ears)

OPTIONS: Rack Mount Ears, Flight Case

TFB550-A Serial numbers 500-599

AC POWER: 100-120-220-240 volts, 50/60 Hz

FUSE SIZE: 3AG 6.25 Amps Slo-Blo for 100-120 volt operation
3.00 Amps Slo-Blo for 220-240 volt operation

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PREAMP: Gain/Limiting, Enhance, Bass, Semi-Parametric Tone Control, Treble, Timbre.

POWER: 550-watts into 4 ohms
300- watts into 8 ohms
2 OHM OPERATION IS NOT RECOMMENDED

DIMENSIONS: 17" wide x 3½" high x 10-1/2" deep (19" wide with rack ears)

WEIGHT: 15 pounds (Add 1 pound for rack ears)

OPTIONS: Rack Mount Ears, Flight Case

TFB420

AC POWER: 120 volts, 60 Hz USA model; 120 or 220-240 volts 50-60 Hz export model

FUSE: 120 volt operation, 5 Amps Slo-Blo; 220-240 volt operation, 2½ Amps Slo-Blo

PREAMP: Gain/Limiting, Enhance, Bass, Semi-Parametric Tone Control, Treble, Timbre.

POWER: 400 watts into 4 ohms, 240 watts into 8 ohms, and 160 watts into 16 ohms.
2 OHM OPERATION IS NOT RECOMMENDED.

DIMENSIONS:

Serial Numbers 100-199: 17" wide x 3½" high x 9-1/2" deep (19" wide with rack ears)
Serial Numbers 200-399: 17" wide x 3½" high x 10" deep (19" wide with rack ears)
Serial Numbers 400-499: 17" wide x 3½" high x 10-1/2" deep (19" wide with rack ears)

WEIGHT: 15 pounds (Add 1 pound for rack ears)

OPTIONS: Rack Mount Ears, Flight Case

Thunderfunk amps are under constant development, and we reserve the right to make changes or improvements at anytime, without notice.

Questions about Thunderfunk products should be directed to your Dealer, or researched online at <http://www.thunderfunk.com>. Our Dealers are selected to provide knowledgeable and professional electric bass specialists to help you get what you need. That said, Thunderfunk is always available for assistance. Our greatest asset is a happy customer, with your continued use of Thunderfunk systems and equipment, and positive word of mouth.

For service and repair contact:

Thunderfunk, Inc
1503 W Lincoln Rd
McHenry, IL 60051-7815
(815) 8363-1110

david.funk@thunderfunk.com

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WARRANTY

Your Thunderfunk Bass Amp is warranted against defects in workmanship and materials for a period of TWO YEARS after original purchase. In the event of apparent malfunction, first please make sure everything is plugged in correctly, and your connecting cords are good. Some warranty restrictions apply: The amp must be purchased from an authorized dealer, and the warranty is extended only to the original buyer. Speakers are not covered by this warranty. You're responsible for freight charges both ways.

Please complete this for your records, and then cut and mail the next page to register your Thunderfunk Warranty. Keep the original receipt as proof of purchase for Warranty

Date of Original Purchase: ____/____/____ Serial Number: _____

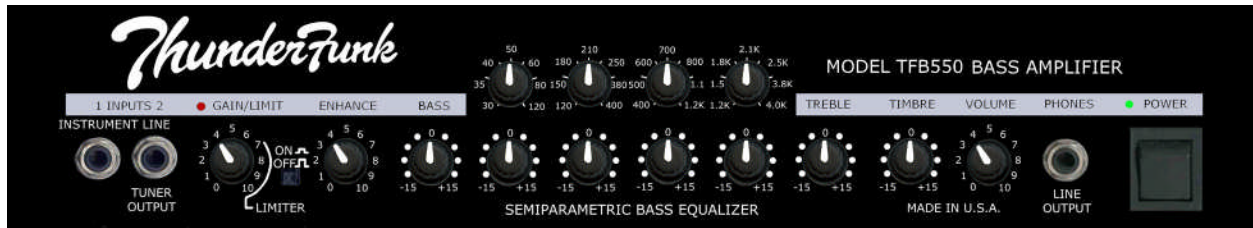
Dealer: _____

Address: _____

City _____ State _____ ZIP _____

Thunderfunk Bass Amp Owner's Manual

WARRANTY REGISTRATION PAGE



Thunderfunk Serial Number _____ is warranted against defects in
Materials and workmanship for a period of 2 years after the Date of Original Purchase.
I understand that this warranty is extended only to the original buyer, as registered below, when
purchased from an authorized dealer.

A copy of the receipt may also be mailed to us for backup in case you lose yours.

Date of Original Purchase: ____/____/____ Serial Number: _____

Dealer: _____

Address: _____

City _____ State _____ ZIP _____

Purchased by: _____

Address _____

City _____ State _____ ZIP _____

Mail this page to:

Thunderfunk, Inc
1503 W Lincoln Rd
McHenry, IL 60051-7815
(815) 363-1110