

# ***BONES***

**All Tube Guitar Amplifier  
By Fortin Amplification, Inc.**



## **Owners Manual**

© 2008 FORTIN AMPLIFICATION, INC.

# FORTIN

Congratulations and thank you for purchasing the Fortin BONES guitar amplifier! As the name implies the BONES is just that, a stripped down “bare bones” amplifier. With modern styling and a simple & intuitive front panel layout, BONES is extremely versatile and completely inspiring from the first note played. It retains all the detail of your instruments and playing dynamics as well as front-end coloration from stomp box pedals. Take some time to familiarize yourself with this manual and discover all the features BONES has to offer. Please do not hesitate contacting us with any questions you might have.

Cheers,  
*Mike Fortin*

FORTIN AMPLIFICATION, INC.  
Whitby, Ontario Canada  
[www.fortinamps.com](http://www.fortinamps.com)

## **IMPORTANT SAFETY INSTRUCTIONS**

Your Fortin amplifier is a professional instrument. Please use common sense, read, understand and follow all instructions in this manual and warnings on the back of the amplifier.

- ▶ Do not store or operate this amplifier in or near moist/wet areas.
- ▶ Do not place any objects filled with liquids on or near the amplifier.
- ▶ Do not obstruct the air space in front or behind the amplifier.
- ▶ Do not use the AC power supply cord if it has been pinched or abraded.
- ▶ Do not defeat the safety feature of the polarization blade or ground pin of the AC power supply cord or inlet.
- ▶ Do not place this amplifier near heat sources such as heat registers, radiators or other products that produce heat.
- ▶ Always insure that the amplifier is properly grounded. Always unplug the AC power supply cord before moving amplifier, removing any fuses/tubes/chassis. Always replace fuses with correct type and rating.
- ▶ The AC power supply cable should be unplugged from the outlet when left unused for long periods of time, or during electrical storms.
- ▶ No user serviceable parts inside. Refer servicing to qualified personnel only.
- ▶ Fortin amplifiers and speaker enclosure systems are capable of producing high sound pressure levels. Exposure to these levels may cause temporary or permanent hearing damage.

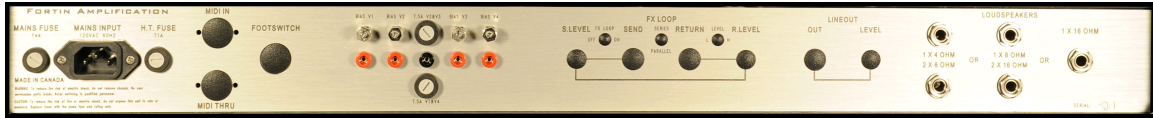
## BONES Functions

### FRONT PANEL, LEFT TO RIGHT



1. **INPUT** – Plug in your guitar or stompbox here.
2. **GAIN** – Sets the amount of overdrive.
3. **BRIGHT** – High frequency boost that becomes less active as GAIN is increased.
4. **BASS** – Passive/Interactive low frequency equalization.
5. **BOOST** – Preset amount of gain boost. Active in VOICING M & H only.
6. **MIDDLE** – Passive/Interactive midrange frequency equalization.
7. **VOICING L/M/H** – Selects amount of tube gain stages. **L** = 2 stages, **M** = 3 stages, or **H** = 4 stages.
8. **TREBLE** – Passive/Interactive high frequency equalization.
9. **DEPTH** – Power amp control of low frequency interaction between amplifier and speakers.
10. **PRESENCE** – Power amp control of high frequency variable feedback.
11. **MASTER** – Controls the overall output volume of the amp post EQ.
12. **STANDBY** – Turns on high voltage to the tubes.
13. **POWER** – On/Off switch for the mains electric power to the amplifier.

## REAR PANEL, LEFT TO RIGHT



1. **MAINS FUSE** – Protection for AC power faults.
2. **MAINS INPUT** – AC wall power via IEC cord to a grounded outlet.
3. **HT FUSE** – Protection for high voltage faults.
4. **MIDI IN\*** – Connects to external device via MIDI OUT or THRU. 7 connector with outside pin 1 and pin 7 supplying 9VAC at 1.5A to power external Midi pedals.
5. **MIDI THRU\*** – Routes Midi to other devices.
6. **FOOTSWITCH\*** – Connect your footswitch here.
7. **BIAS CONTROLS** – Bias adjust pots and test points. Tubes fused in pairs at T.5A.
8. **S.LEVEL\*** – FX loop send level.
9. **FX LOOP\*** – FX loop on or off.
10. **SEND\*** – Send jack connects to effects input.
11. **SERIES/ PARALLEL\*** – Selects the FX loop operation.
12. **RETURN\*** – Return jack connects to effects output.
13. **LEVEL L / H\*** – Sets recovery gain structure for FX Loop. Set to L for rack effects and H for stomp box pedals.
14. **R.LEVEL\*** – Effects level in SERIES and effects mix in PARALLEL.
15. **LINEOUT\*** – Unbalanced signal tapped off the output transformer. Use a shielded cable to send a signal to the effects rack, mixer input, or to another amp's input or effects return to slave.
16. **LEVEL\*** – Lineout adjustable line level.
17. **LOUDSPEAKERS** - Paralleled wired jacks for 1 or 2 - 16 ohm, 1 or 2 - 8 ohm and single 4 ohm cabinets.

\* Optional

## **BONES Operation**

### **INITIAL SET UP**

First, start off by connecting a good quality speaker cable to one of the five, self-explanatory LOUDSPEAKERS jacks on the back of the BONES amp, then to a speaker cabinet. Next, if you have the optional footswitch / Midi, connect them up and set the front BOOST switch to the off position and the VOICING L/M/H switch to the M position; otherwise disregard this step. Before connecting the AC power supply cable to the MAINS INPUT, set the POWER and STANDBY switch in the off or down positions. Now, plug in the AC power supply cable to amplifier's MAINS INPUT and AC outlet. Put the POWER switch in the on or up position. Take the next minute or so to set the BASS, MIDDLE, TREBLE controls to 12 o'clock, BRIGHT off, BOOST off, VOICING L/M/H to L, GAIN and MASTER controls to zero. Plug in a good quality shielded instrument cable from your guitar and or stomp box pedal(s) to the INPUT jack on front of the amplifier. At this point you can place the STANDBY switch in the up position. Now we are ready to explore the range of tones available in the BONES amplifier.

### **TONE EXPLORATION**

The BONES amplifier was developed to deliver an astonishing array of tones in a simple and intuitive package. Beside the use of top quality parts, special attention was given to the grounding system that gives the BONES tons of detail to the tone. This is why the amplifier loves pedals and different guitars so much. You can dial in luscious, spanky clean to the perfect crunch with plenty of girth to searing, cabinet exploding overdrive. All these tones are possible from bedroom level to the MASTER volume wide open. It truly is like having 3 completely different amplifiers at your fingertips. So let's go over some of the features in more detail. Note that the control setting suggestions may vary due to the different type of guitars and pickup configurations used.

**VOICING L:** This switch sets up the BONES with 2-12AX7 preamp gain stages. This is excellent for players that love that wide open, late 60's British vibe. This is the lowest gain setting of the BONES. The BOOST switch is inactive in this mode. With the GAIN control setting at 11 o'clock and lower, in conjunction with MASTER volume set beyond 2 o'clock, will give you some stellar clean tones with loads of dynamics. The BRIGHT switch engages a treble boost and the amount is dependent on the GAIN control setting. Higher settings of the GAIN control, less effect the BRIGHT switch will have and the opposite with lower GAIN control settings. For a great plexi type of tone, set the MASTER completely open in the clockwise position, set the GAIN control at 2 o'clock, BRIGHT switch ON, tone stack as desired, Depth off and Presence at 1 o'clock.

**VOICING M:** This switch sets up the BONES with 3-12AX7 preamp gain stages. This setting gets into some meaty overdriven tone while still remaining very open sounding. Placing the BOOST switch ON adds more gain and girth to the tone. The BRIGHT switch functions the same as described above but now with the added tube stage, the upper harmonic quality has shifted. Varying the GAIN control will give you different degrees of attack and sharpness to the tone. Place the BRIGHT switch off and the tone gets rounder and warmer sounding that stays even with the movement of the GAIN

control. Higher settings of the GAIN control will give you more distortion and sustain. It will have enough gain for most lead work with a nice balance of punchy percussiveness. This setting also cleans up nicely when you roll back your guitar's volume.

**VOICING H:** This switch sets up the BONES with 4-12AX7 preamp gain stages. This setting gets you into the soaring modern high gain tones. Placing the BOOST switch on adds even more gain and thickness. The BRIGHT switch adds the cut and teeth to the tone and as stated above, is dependent on the GAIN control setting. Higher settings of the GAIN control with the BOOST and BRIGHT switch ON, will bring in a singing lead tone with the perfect balance of compression without losing note definition. Setting the GAIN control to 12 o'clock with all the switches on, tone stack as you wish, DEPTH at 11 o'clock, PRESENCE at 2 o'clock, and MASTER volume at 3 o'clock gives you a seriously vicious rhythm and lead tone in one that really hits you in the chest.

**DEPTH, PRESENCE & MASTER:** These are controls for the power amp section of the BONES. The DEPTH control should be used sparingly to keep the amp's bass response tight. Higher settings will give you a looser low end tone. The PRESENCE control from the off position to 1 o'clock will give you an imaging effect. Higher settings will give you a sharper focus for extra cut. As the MASTER is turned up, it will affect the DEPTH and PRESENCE. It is best to think of them all together when making adjustments as they are interactive.

As you can see, by experimenting with combinations of the control settings plus all the different output tubes that the BONES can accept, you can cover an astonishing array of tones. To embellish this entirely new found tonal palette, let's move on to the optional FX Loop.

### **FX LOOP \***

This all-tube, full audio bandwidth effects loop is designed to be completely transparent. You can use stomp box pedals or rack effects in this loop. Set the FX LOOP switch to the OFF position for remote switching. Even though the loop is completely transparent, the purists can have peace of mind knowing that when the FX LOOP switch is OFF, it is completely taken out of the signal path via relay. This loop allows you to operate it as a series or parallel effects loop via the SERIES/PARALLEL switch.

#### **SERIES FX LOOP:**

This basically works as an insert patch point. The SEND jack plugs into the effects unit's input jack. The RETURN jack plugs into the effects unit's output jack. The audio path of the amplifier is interrupted and 100% of the signal is being sent to the SEND jack. It must be noted that when nothing is plugged into the SERIES selected FX LOOP and the FX LOOP switch is in the ON position, no sound will be heard out of the speakers. You must complete the audio path with an effects unit or patched instrument cable. The S.LEVEL control is used to adjust the amount of signal being sent to an effects unit. With stomp box pedals there are usually no input level indicators. In this case you will have to use your ears to set the S.LEVEL. Set the S.LEVEL up to the maximum setting just before you start to hear the undesirable front end clipping of your effects pedal. This setting of the S.LEVEL will usually be quite low for pedals. Setting the S.LEVEL for rack units is

easier since they have input indicators. You will have to experiment with your rack effects to obtain the best signal to noise ratio by trying different S.LEVEL & R.LEVEL settings in conjunction with the input & output level controls of your rack effects unit. On the R.LEVEL control, bring this up to match the signal level when the FX LOOP switch is turned off (for footswitchable loop) or when the effects pedal is turned off. Toggle back and forth to set levels. Place the LEVEL switch in the L position for stomp box effects. This will give the return side of the loop the make up gain it needs. Place the LEVEL switch in the H position for rack effects units. This will give the return side of the loop less gain because of the typical higher output levels of rack effects units.

#### PARALLEL FX LOOP:

This works as a side chain. Your original, dry tone is unaffected allowing you to mix in the amount of effects. The SEND jack plugs into the effects unit's input jack. The RETURN jack plugs into the effects unit's output jack. Unlike the SERIES setting of the loop, when set to PARALLEL with nothing plugged into the loop, it will pass signal. The S.LEVEL control is used to adjust the amount of signal being sent to an effects unit. With stomp box pedals there are usually no input level indicators. In this case, again, you will have to use your ears to set the S.LEVEL. Set the S.LEVEL up to the maximum setting just before you start to hear the undesirable front end clipping of your effects pedal. This setting of the S.LEVEL will usually be quite low for pedals. Setting the S.LEVEL for rack units is easier since they have input indicators. You will have to experiment with your rack effects to obtain the best signal to noise ratio by trying different S.LEVEL & R.LEVEL settings in conjunction with the input & output level controls of your rack effects unit. Place the LEVEL switch in the L position for stomp box effects. This will give the return side of the loop the make up gain it needs. Place the LEVEL switch in the H position for rack effects units. This will give the return side of the loop less gain because of the typical higher output level of the rack effects units. In the PARALLEL loop, the R.LEVEL control now acts as an effects mix control. It will bring in the effects and mix it with the original unaffected signal. At higher S.LEVEL settings the effects will become louder than the original unaffected signal if it is desired.

**Things to keep in mind:** When using effect units in the FX LOOP in PARALLEL mode, you must set the effects unit's mix control to 100%. By not doing so will cause phasing cancellations. Using the FX LOOP in SERIES mode will send 100% of the amp's signal out of the SEND jack. Please use caution as to the quality of the effects unit you want to put your entire tone through. This is a non "tone sucking" loop. If transparency is not achieved, then it is most likely caused by improper setting or application of the FX loop. The use of high quality, name brand patch cables for all FX loop applications is highly recommended. Inexpensive, "no name" patch cables are often the cause of tone loss in FX loop routing scenarios.

\* Optional

## BIAS CONTROLS



This is a powerful feature and tool for exploring more tonal possibilities with the BONES amplifier. You can mix and match different tube types together for an almost unlimited range of tones. More on this later. Since there is individual bias adjustment for each tube, there is no need to obtain matched tubes! BONES will accept EL34, 6CA7, KT77, 6L6, 5881, KT66, 6550, KT88, KT90, KT100 type tubes and any other derivations of the above. The output power will range from 100 to 180 watts RMS depending on the output tube selection. The added benefit of having output tubes fused in pairs is in case of tube failure, you will be able to finish your gig. Only a small volume reduction and slight tonal change will occur.

Biassing the BONES amp is simple and does not require removal of the chassis. You will need a simple voltmeter or digital multimeter set to the lowest DC voltage range, typically 200mV (millivolts). Please note that some meters display may indicate 25.0 for 25 mV and others may display .025 for 25 mV. *Make sure you know your meter and refer back to the meter's owners manual to be certain.* Then follow these directions:

1. Unplug any cords from the INPUT, make sure the MASTER volume control is turned all the way down, counterclockwise. Unscrew the lock nuts on all the bias pots located on the rear panel, then turn all the bias controls all the way down, counterclockwise. Connect a load to the appropriate speaker jack, plug in the AC cord and turn on the amplifier. Wait a few minutes then put the STANDBY switch in the up position.
2. Put the black negative probe lead of your meter into the black tip jack. Place the

positive red probe lead in the red tip jack of BIAS V1. Referring to the recommended bias settings below, slowly adjust the corresponding bias pot while paying attention to its sensitivity. Make a note of your bias setting if you are using 2 or 4 of the same tubes.

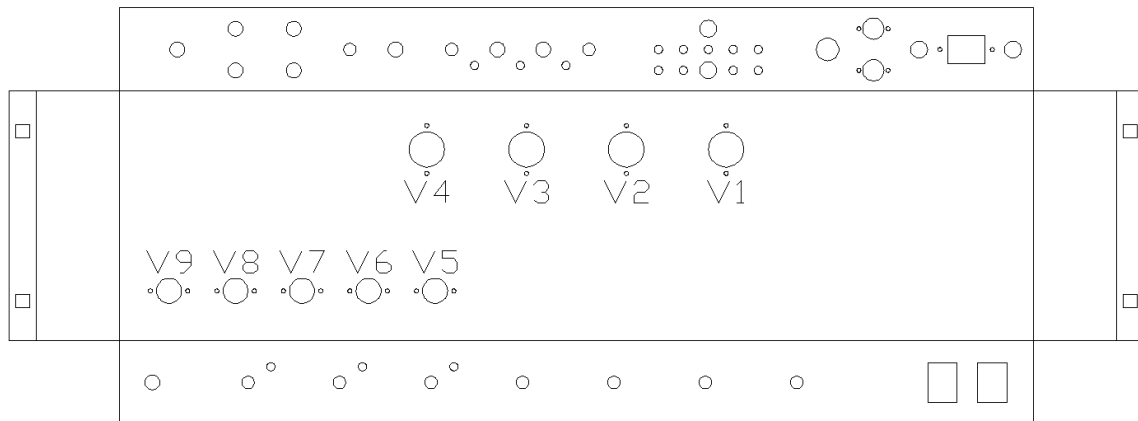
3. Repeat step 2 for BIAS V2, BIAS V3, & BIAS V4. Then recheck and make further adjustments as necessary.
4. Once the bias is set, tighten down the lock nuts on the bias trim pots, but not too tight. Now you are ready to play.

**Recommended Bias Settings:**

EL34/6CA7/KT77	25mV to 35mV
6L6 /5881/KT66	30mV to 42mV
6550	35mV to 51mV
KT88	44mV to 61mV

**Note:** The upper range of the recommended bias settings should be considered a maximum setting. Feel free to experiment within the given ranges to suit your taste. It is normal for tubes to drift a little, especially when they are new, and will stabilize after a few hours of use. Also, bias will drift with variations in AC line voltage. This is not a big deal so don't get obsessed by constantly checking the bias to keep it at your chosen settings. To balance out the currents of the output tube when using 4 of the same type of output tubes, place one meter probe (black or red) into BIAS V1 red tip jack then the other meter probe into the BIAS V4 red tip jack. Then adjust either one of the corresponding bias pots to get a 0 reading on your meter. Repeat the above for BIAS V2 and BIAS V3. If you are using 2 different output tube types, (e.g. 2-KT88 and 2-EL34), place the 2-KT88s in either V1 and V4 or V2 and V3 positions, then the 2-EL34s in the remaining positions and follow the above procedure to balance out the currents. *Special note for the adventurous souls:* When using a different tube type in each position, please keep the imbalance to a maximum of + or - 15mV DC. Using this simple formula of  $(\text{BIAS V1} + \text{BIAS V2}) - (\text{BIAS V3} + \text{BIAS V4}) = \text{maximum plus or minus } 15\text{mV DC}$  will ensure optimum performance. Nothing will happen to the amp if it exceeds this value but you may experience an audible hum in the output and loss of low end response at extreme volume settings. Mixing different tube types is an easy and fun way to combine characteristics of your favorite tubes for a "best of both worlds" approach. Although tone is subjective, all tubes have their own distinct sonic character and "feel" that you can use to your advantage in further fine tuning your BONES amplifier. Taking this approach one step further, you can also experiment with different preamp tubes.

## TUBE LAYOUT & FUNCTION



V1 - V4      Class A/B power output tubes: EL34, 6CA7, KT77, 6L6, 5881, KT66, 6550, KT88, KT90, KT100

V5            Phase Inverter: 12AX7

V6\*          FX Loop: 12AT7 only.

V7            4<sup>th</sup> gain stage & Cathode follower: 12AX7

V8            2<sup>nd</sup> and 3<sup>rd</sup> gain stage: 12AX7

V9            1<sup>st</sup> gain stage: 12AX7

\* Optional

## TIPS & SIDE NOTES

If you want a half power function without the removal of tubes, simply pull out either the T.5A V1&V4 or T.5A V2&V3 fuse located with the bias controls. The transformers were designed to take serious abuse. No need to do math to figure out the correct impedance when doing so. Experiment with different impedances and go with what sounds best to you. If you wish to keep the intended sonic design, then select the amplifier's impedance at ½ (half) the value of the speaker load when in half power mode. For example, a 16 ohm speaker cabinet plugs into the 8 ohm LOUDSPEAKERS jack of the amplifier. You can also turn the optional FX LOOP into a volume boost, a second master volume if you will, by taking a small instrument cable and jumping the SEND and RETURN jacks in either SERIES or PARALLEL mode. Then using one or both controls, engage the loop on and off to adjust your level of volume boost.

## **LIMITED WARRANTY**

Subject to the obligations and exclusions listed below, this Fortin Amplification product is warranted against manufacturing defects in materials and workmanship for the period of 5 (five) years from the date of purchase, with the exception of the tubes, fuses and speakers where applicable, which carry a 90 day warranty. The warranty period starts on the date of purchase by the original owner.

### Obligations:

This warranty will be honored only on the presentation of the original proof of purchase. Products are to be returned freight prepaid, to and from, Fortin Amplification. Warranty repairs must be authorized. Fortin Amplification is not liable for any freight or duty charges (if applicable).

### Exclusions:

This warranty shall not cover adjustment of user operated controls as explained in the appropriate instruction manual, or products that have been altered or have missing, or defaced serial numbers. This warranty shall not apply to the aesthetics of accessory items including but not limited to, cabinets, cabinet parts, or knobs. This warranty does not apply to unpacking, setup, installation, or the removal and reinstallation of products for repair. This warranty shall not apply to repair or replacements necessitated by any cause beyond the control of Fortin Amplification including, but not limited to, any malfunction, defects, or failure caused by or resulting from unauthorized service or parts, damaged or broken tubes, incorrect line voltage, improper maintenance, modification or repair by the user, abuse misuse, neglect, accident, fire, flood, or other Acts of God. Fortin Amplification does not authorize any party to assume for it any other obligation or liability. In no event shall Fortin Amplification be liable for any damages arising from the use of this product, or for any delay in the performance of this warranty due to causes beyond our control.