

Owner's Manual

Black Ice Audio

Fusion F100

**MonoBlock Tube Power Amplifier
With the Jim Fosgate Odyssey Circuit**

Black Ice Audio

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Dear Customer:

We want to take this opportunity to thank you for purchasing the Black Ice Audio Fusion F100 Monoblock Tube Power Amplifier. The unit comes with either EL34 or 6550 power tubes depending on what was ordered. The company that stands behind your amplifier draws on two decades of tube design and manufacturing experience. In addition to our engineering knowledge, Black Ice Audio is committed to provide its customers with the highest level of quality sound at an affordable price. Black Ice Audio has achieved this goal through modern design, quality parts, expert craftsmanship and strict attention to efficient purchasing and production. We are confident that your amplifier will provide you with years of listening pleasure.

Before using this unit, please take the time to carefully read and understand the safety instructions and operating procedures before you install or attempt to operate your Fusion F100 integrated amplifier. Becoming familiar with important facts about your amplifier and its correct operation will help assure safe usage, maximum musical satisfaction, and reliable operation. Take special care to follow the warnings indicated on the unit itself as well as the safety suggestions found in the owner's manual. Be sure to read the section on tube layout which gives information on tube replacement and biasing. The effort you invest now will be well rewarded as time goes by.

Sincerely
Black Ice Audio, Inc.

Important

Please Check your unit's bottom panel and record in the space below:

Model Number: Fusion F100

Serial Number:

Please fill out the warranty card enclosed with this package. If the warranty card is not sent in, the warranty time will be reduced to one year. Keep your owner's manual and receipt in a safe place for future reference.

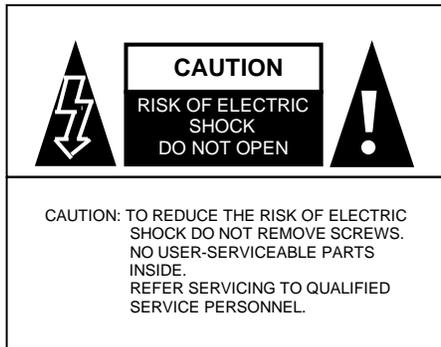
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SAFETY PRECAUTIONS

IMPORTANT SAFEGUARDS

PLEASE READ CAREFULLY ALL THE FOLLOWING IMPORTANT SAFEGUARDS THAT ARE APPLICABLE TO YOUR EQUIPMENT.



The lightning flash with arrowhead symbol, within an equilateral triangle, is intended to alert the user to the presence of uninsulated “dangerous voltage” within the product’s enclosure that may be of sufficient magnitude to constitute a risk of electric shock to persons.



The exclamation point within an equilateral triangle is intended to alert the user to the presence of important operating and maintenance (servicing) instructions in the literature accompanying the appliance.

SAFETY

- 1) **Read the Safety Instructions in the Owner's Manual** - All the safety and operating instructions should be read before the product is operated.
- 2) **Retain the Owner's Manual** - The safety and operating instructions should be retained for future reference.
- 3) **Heed Warnings** - All warnings on the product and its operations should be adhered to.
- 4) **Follow Instructions** - All operating and use instructions should be followed.
- 5) **Power Sources** - This product should be operated using only the type of power source indicated on the marking label. If you are not sure of the type of power supply to your home, consult your product dealer or local power company.
- 6) **Grounding** - This product is equipped with a three-prong plug. Always use an electrical outlet that is grounded. If you do not know whether the outlet is grounded, consult your electrician or local power company.
- 7) **Power Cord Protection** - Power supply cords should be routed so that they are not likely to be walked on or pinched by items placed upon or against them, paying particular attention to cords at plugs, convenience receptacles and where they exit from the product.
- 8) **Fuses** - For continued protection against fire hazard, replace fuses with the same type and rating of the fuses specified. When changing fuses, completely remove the AC cord from the amplifier.
- 9) **Tubes During Operation** - While operating your amplifier, do not touch the glowing tubes since this may result in a severe burn.
- 10) **Overloading** - Do not overload wall outlets, extension cords or integral convenience receptacles to avoid the risk of a fire or an electric shock.
- 11) **Lightning** - For added protection for this product during a lightning storm or when it is left unattended and unused for long periods of time, unplug it from the wall outlet.

SAFETY PRECAUTIONS CONTINUED

INSTALLATION

ENVIRONMENT

- 1) **Water and Moisture** - Do not use this product near water - i.e., near a bathtub, wash bowl, kitchen sink or laundry tub; in a wet basement; or near a swimming pool or the like. Damp basements should be avoided.
- 2) **Heat** - The product should be situated away from heat sources such as radiators, heat registers, stoves or other appliances that produce heat. Also avoid putting the unit in the direct rays of the sun.
3. **For indoor use only.**

PLACEMENT

- 1) **Ventilation** - This product should not be placed in a built-in installation or rack unless proper ventilation is provided, or the manufacturer's instructions have been followed. Never place anything on top your amplifier that could obstruct the airflow and cause the electron tubes to overheat and damage the amplifier. Do not place your amplifier in a closed bookcase; overheating could result.
- 2) **Foreign Material** - Care should be taken to prevent objects from falling into and liquids from spilling into the unit. Do not subject this unit to excessive smoke, dust, mechanical vibration, or shock.
- 3) **Surface** - Place the unit on a flat level surface.
- 4) **Accessories** - Do not place this product on an unstable cart, stand, tripod, bracket or table. The product may fall causing serious injury to a child or adult and serious damage to the product. Use only with carts, stands, brackets or tables recommended by the manufacturer or sold with the product. Any mounting of the product should follow the manufacturer's instructions and should use a mounting accessory recommended by the manufacturer.
- 5) **Carts** - A product and cart combination should be moved with care. Quick stops, excessive force and uneven surfaces may cause the product and the cart combination to overturn.
- 6) **Wall or Ceiling Mounting** - The product should be mounted to a wall or ceiling only as recommend by the manufacturer



MAINTENANCE

Cleaning - Unplug this product from the wall outlet before cleaning. Do not use liquid cleaners or aerosol cleaners. Use a damp cloth for cleaning. Do not use any type of abrasive pad, scouring powder or solvent such as alcohol or benzene.

SERVICE

- 1) **Object and Liquid Entry** - Never push anything through the openings of this product which could touch dangerous voltage or other hazards. Refer all servicing to qualified service personnel.
- 2) **Damage Requiring Service** - Unplug this product from the wall outlet and refer servicing to qualified service personnel under the following conditions:
 - a) When the power-supply cord or plug is damaged.
 - b) If liquid has been spilled or objects have fallen in the product.
 - c) If the product has been exposed to rain or water.
 - d) If the product does not operate normally when following the operating instructions, adjust only those controls that are covered by these instructions. Improper adjustment of other controls may result in damage that will often require extensive work by a qualified technician to restore the product to its normal operation.
 - e) If the product has been dropped or damaged in any way.
 - f) When the product exhibits a distinct change in performance - this indicates the need for servicing.
 - g) When the unit needs broken tubes to be replaced.

- 3) **Replacement Parts** - When replacement parts are required, be sure the service technician uses replacement parts specified by the manufacturer or parts with the same characteristics as the original part. Unauthorized substitutions may result in fire, electric shock or other hazards.

- 4) **Tube Replacement** - Should it become necessary to replace your tubes, carefully follow the instructions in your Owner's Manual. When replacing your tubes, remove the AC power plug from the wall and allow thirty minutes for the high voltage capacitors to discharge.

Getting Started

The Back Story: Suffice to say that Jim Fosgate (nicknamed “Foz”) is a World-Class Engineer and is the vision and expertise behind the Fusion F100. His repertoire of achievement spans every category of audio electronic devices from two channel audio, car audio, surround sound, headphone amplifiers to digital audio equipment. If one wants to experience a “live experience of audio”, Foz’s sound room epitomizes the fusion of his designs in preamplifiers, amplifiers, source devices, cables and speakers. His proficiency is not a matter of a blind squirrel finding an acorn. It is based on decades of document research and experimentation of every possible major circuit approach, followed up by Foz building and auditioning the circuits himself. Many people have asked us about the model number Fusion F100 which is rather like a fighter jet designation. The F in the model number represents an abbreviation for Foz, and 100 denotes the new replacement for the JD 1000 which has been in the Jolida Inc. product lineup for over 20 years.

Another aspect of Foz’s expertise is manufacturing acumen. His designs reflect that somebody has to make the stuff and complications are not the friend of manufacturers. Foz’s circuits are second to none in terms of sound reproduction, but when the added dimension of creating a unit that uses accessible parts, ease of assembly and cost effectiveness, World-Class Engineer is not a complement, it is an identification of fact.

About Your Fusion F100

Before working on the design of the F100, we asked a simple question, “What do listeners want”. Many listeners in general want speakers to disappear with a natural organic three-dimensional sound, tight clear bass, extended highs without glare and a rich full midrange. Out of that objective came a circuit design we call the Odyssey. Essentially the Odyssey is a dual phase V drive circuit. The underlying basis is a fully balanced differential push pull circuit.

Black Ice Audio’s Fusion F100 Single Channel Vacuum Tube Amplifier is an example of state-of-the-art vacuum-tube technology as it exists today. This unit contains the Jim Fosgate newly designed Odyssey circuit. This product was designed to provide: 1) a power amplifier that would deliver musical accuracy 2) a significant value based on a high performance to price ratio 3) a vacuum tube unit that would exceed the reliability of solid-state units. Parts quality is the best currently available, and the overall circuit layout is maximized for sonic purity.

Each Fusion F100 Monoblock comes with 4 pieces of EL 34 or 6550 power output tubes and 2 pieces of 12AX7 for the pre-amp tubes. With Exact Biasing, one can use either EL 34/6CA7s or 6550s. Please note that the tube types KT88 through KT150s can be used in place of the 6550s. The Fusion F100 is rated at 140 watts per channel RMS with the 6550s and 120 watts per channel with EL 34s.

The F100 has glass integrated into the cosmetic design at the front panel and the transformer cover. The on/off control is touch activated. For biasing, the amp has a simple process Exact Biasing which is adjusting a screw for each tube that is measured by a built-in amperage meter. This is placed conveniently on the top panel of the amp.

Construction and Testing

Like every Black Ice product, your Fusion F100 has been carefully hand-crafted, using precision mechanical parts. Electronic components and assembly procedures are similar to those used in the manufacture of scientific equipment and musical instruments. To assure consistent performance, each F100 is visually inspected at several assembly points, tested, and electronically profiled prior to shipment.

This time-consuming perfectionist approach in the design and manufacture of audio equipment is intended to provide the best in musical satisfaction with lasting value.

Handling Vacuum Tubes

Many may not have had experience handling vacuum tubes. However, most people have handled incandescent light bulbs which is very similar to dealing with vacuum tubes. As with light bulbs, you should not touch a vacuum tube when it is on or you can burn yourself. Similarly, if a tube is dropped on a hard surface the tube will break. When you replace a tube, you should make certain the unit is powered down or in the off position and that the tube has cooled down. Never force a tube into a socket. You should treat the tube gently when holding or replacing it. The precautions needed when handling a light bulb will give you a good guide on how to handle a vacuum tube.

Packaging

Save all the packaging in a dry place. Your Black Ice Audio, Inc. amplifier is a precision electronic instrument and should be properly packaged any time shipment is made. Because of its weight (50 pounds), it is highly probable that the unit will be damaged during shipment if repackaged in a box and packing other than that designed for the unit.

You may have occasion to return the unit to the factory for service or shipment of the unit may be required for some other situation. Should shipment prove necessary, the original packaging may save your investment from unnecessary damage, delay and expense.

Unpacking

The Fusion F100 is packed within a custom-made impact absorbing foam wrap that holds the amplifier in the carton. Because of the unit weight and because it is a precision electronic instrument, reasonable care should be taken when unpacking the unit and preparing it for use.

It is best to unpack a unit in a large open work area with two people on hand. The carton should be set upright in the center of the work area and a small knife used to carefully slit or lift the taped edges of the outer carton's top flaps. Fold the flaps to the sides and carefully lift out the top inner foam that covers the amplifier. **Please note that the tubes are in this top foam cover.** One person should hold the box while another lifts the amplifier out and places the unit on a flat surface. Very carefully remove the cloth cover. Now, while your memory is fresh, reassemble the carton system for future use.

Accessories

- 1 AC Power Cord
- 1 Tuning Wand/Bias adjustment screwdriver
- 1 Gloves
- 1 Cleaning Chamois
- 1 Cloth cover
- 2 12AX7 vacuum tubes
- 4 EL34, 6550 or KT150 vacuum tubes

Preparation for Use

1. Place your amplifier on a flat surface.
2. Your Fusion F100 amplifier is shipped with the vacuum tubes in foam protected against vibration. The tubes can be installed by matching the "V1" on the amplifier with the "V1" on the tube and so on. On the larger power output tubes, there is a key on the middle plastic. Make sure the pins and key of the tube are lined up with the holes in the socket and never use excessive force when putting the tube into the socket. The unit is biased at the factory at 118 VAC. **However, we do recommend that you bias the unit on first turn on.** See bias instructions.

Note: Contact Enhancers are not recommended for use on vacuum tube contact pins. With continual exposure to heat and air, these substances can form gummy, dust-collecting residues which actually reduce

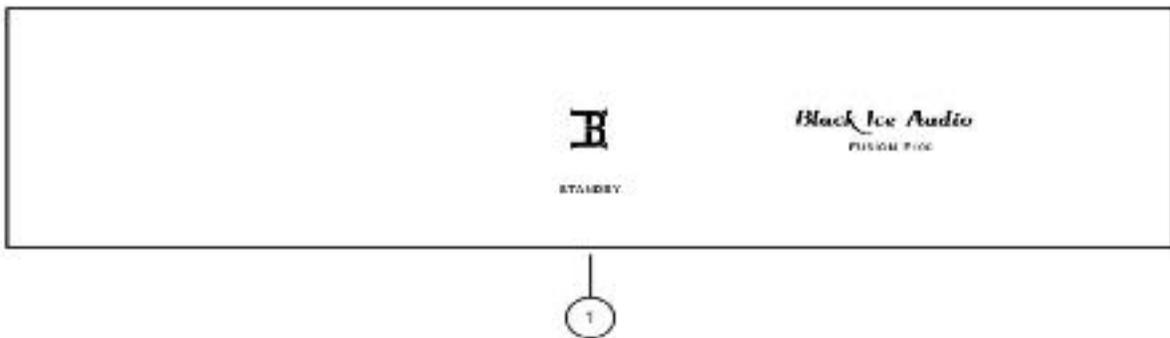
contact and degrade sonic performance. Proper external use of contact enhancers -- on interconnect plugs, speaker connections, etc. -- is subject to the discretion of the owner.

Operating and Adjustment Procedure

1. Make sure you have read and complied with the CONTROL AND CONNECTION instructions prior to attempting to operate your unit.
2. Make sure your Fusion F100 is properly connected to a high-current power receptacle via the attached power cord (see Connections).
3. Attach the audio sources and speakers to the Fusion F100.
4. Before you turn the amplifier on, make sure the speaker connections are properly connected. Never run the amplifier without speakers connected since this may damage the transformers. When turning the unit on, make sure the volume control of the preamplifier is at its lowest point.
5. Your Fusion F100 will now operate satisfactorily.

The amplifier should always be turned on and off via its own power on-off switch. Further, other discrete components of an audio system should be turned on first. Otherwise, with some equipment, the amplifier will reproduce warm-up thumps, etc., some of which could be harmful to your speaker system.

Controls and Their Functions: Front Panel

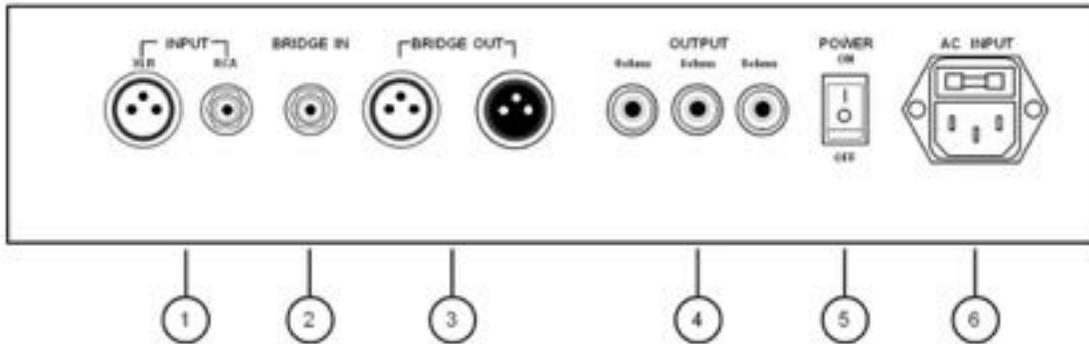


1. **Power switch:** On the rear of the amplifier is the main on/off switch that can turn the amplifier totally off. When the rear switch is on the amplifier will be in standby. Press the Black Ice Audio Logo to turn the amplifier on. The Black Ice logo should light up and the meter light will turn on. Within a few seconds, the tubes on the top panel will begin to glow a soft orange color. The amplifier is ready for operation.

Please Note, all of our amplifiers have a digital safety circuit. Should a tube fail, the amplifier will turn off to standby. The logo which is the on/off switch on the front panel will not illuminate.

It is normal for a vacuum tube power amplifier to run quite "warm", and if used for prolonged periods, "hot" to the touch. All components are operating at safe, conservative levels and will not be damaged. Do not touch the tubes during operation or for ten minutes after the unit is turned off, otherwise touching may result in a burn. Keep children away from the unit. Further, other discrete components of an audio system should be turned on first. Otherwise, with some equipment, the amplifier will reproduce warm-up thumps, etc, some of which could be harmful to your speaker system.

CONNECTIONS Rear Panel



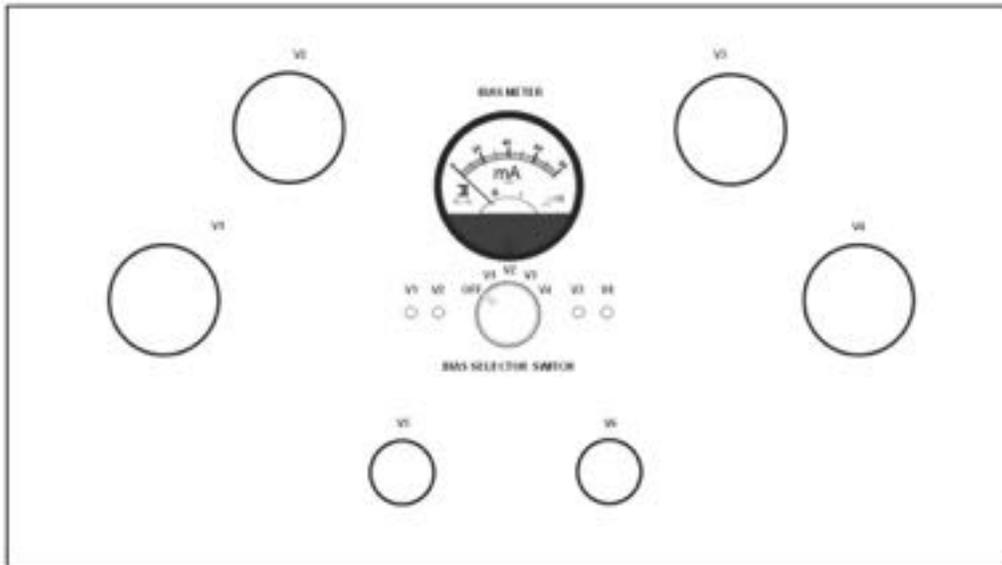
1. **Audio Signal Connection Input Jacks:** Use these jacks to connect analog audio signal RCA interconnect or XLR interconnect from your preamplifier to the power amplifier.
2. & 3. **Bridging Input and Output:** If you wish to combine two of the Monoblocks, these inputs and outputs can be utilized. Please note, if you bridge the power amplifiers, you will increase power to 240 watts with EL34s and 280 watts with 6550. These jacks simplify the process of bridging the power amplifiers. What is required for each channel is one XLR cable and one RCA cable. For doing both sides you would need 2 XLR cables and 2 RCA cables.

To Hookup: Connect the RCA cable to the Bridge in and attach the other end to the Bridge in of the amplifier you are doubling up on. In the same manner, you would connect the XLR to the Bridge out and attach the other end to the Bridge out of the second amp. Done. You do not need to do anything else.

4. **Speaker Terminals:** Your amplifier has one set of speaker outputs. The output channel is designed to handle one speaker. Simply connect the "negative" or "-" speaker lead to "0" post and the "positive" or "+" speaker lead to 4 or 8 ohm post, as required (check the impedance of your speakers and connect them to the correct ohm post). Make sure that the polarity of the speaker wire is correct, that is the black, "-", or negative speaker terminal, is wired to the "0" terminal on the Fusion F100 and the red, "+", or positive speaker terminal is wired to the "4" or "8" ohms. If these wires are reversed (reversed polarity), the sound will be unnatural and will lack bass (out of phase).
5. **Main Power Switch:** In the On position the unit will be in standby, if the switch is in the off position, the unit will be totally shut down.
6. **AC Power Connection and Fuse Holder:** It is suggested to place the main power on-off switch on the panel of the Fusion F100 in the "Off" position before connecting the power line cord to AC power. The Fusion F100 amplifier must be connected to a wall AC power receptacle, or a similar heavy-duty source. Avoid the use of extension cords. If they must be used, use 14-gauge or heavier cord. The power cord on your Fusion F100 has a standard three-prong grounding plug to provide maximum safety when it is connected to a ground wall receptacle. If there is any question regarding the safety of grounding procedures, be certain to seek competent help with the installation. In the upper half of the IEC is the fuse holder with an extra fuse. When replacing the fuse, make sure that your Fusion F100 unit is unplugged from the wall. To replace the fuse, pull the cover out as if you were pulling a tray straight off a table. For 110 - 120 VAC (Household AC current) a 6.3 amp slow-blow fuse and for 200-240 VAC use a 3.15 amp slow-blow fuse.

VACCUUM TUBE LAYOUT

Top Panel



This section is dedicated to those who do not have an abundant amount of experience with tube amplifiers. The above drawing is an illustration of the top panel of your Fusion F100. Your amplifier uses a complement of 6 tubes spread over three vacuum tube types. This tube complement is made up of 4 pieces of 6CA7/EL34s or 6550s and 2 pieces of 12AX7s. Please note that the vacuum tube type KT88 to KT150 can be used in place of the 6550s. The placement of the tubes in their correct socket is critical. If you need to replace a tube, consult the tube layout for positioning. The placement of your tubes in your amplifier is:

- V1 = 6550/EL34 tube type
- V2 = 6550/EL34 tube type
- V3 = 6550/EL34 tube type
- V4 = 6550/EL34 tube type
- V5 = 12AX7 tube type
- V6 = 12AX7 tube type

These tubes are readily available at Specialty Audio stores, guitar amplifier stores in your local area, mail order houses for guitar and audio equipment as well as internet sites that specialize in vacuum tubes (search Vacuum Tubes) The majority of professional guitar amplifiers sold are tube driven since the music industry uses the best sounding amplifiers for professional reasons. The vacuum tubes in your Fusion F100 amplifier are rated for 3,000 hours of life. The average usage of an audio amplifier is 500 hours per year or 10 hours a week so changing the power output tubes should be every 6 or more years. Our experience is the 12AX7s (smaller front tubes) should last 6,000 hours. There is no exact method for determining the life of the tube since the life expectation is a combination of how the tube was built, how it is used, and how long it is operated.

Handling a tube amplifier is not complicated even though most people are used to solid state. Replacing tubes every six years or more and taking time to bias the amps are not difficult especially with the Exact Biasing System. What you get with a tube amplifier is a reliable piece of electronic equipment that can give you years of service. Many people remember tube equipment in terms of old radios in the 1940s and 1950s. However, in the past, tube equipment was known for its reliability and, in fact, vacuum tubes currently are still in widespread use. Radar, microwave ovens, ham radios, guitar amplifiers, cat scanners, X-ray machines, plastic sealing machines and power radio transmitters, to name a few types of equipment, still use vacuum tube technology.

However, the real reason to have vacuum tubes in an amplifier is the quality of sound it produces. There has been a perennial debate over whether solid state amplifiers sound better than vacuum tube amplifiers. To be sure, solid state proponents also have pointed to the problems of tube amplifiers in terms of hot vacuum tubes

that can burn you or your children and the need to replace the tubes. However, the critics of tube amplifiers cannot argue against the beauty of sound reproduction. A tube amplifier matched with an appropriate speaker can produce a magical sound. The hard, brittle and edgy presentation of many solid-state amplifiers is in sharp contrast to the rich, lush liquidity and sound presentation or sound stage of a tube amplifier. The midrange and treble are smooth and silky with crystal clear sound definition. As for bass, solid state can produce a harder bass sound; but a good tube amp can still deliver a punch in the lower end. Simply put, have your friends listen to the sound; of a tube amplifier and they will probably want to know where you purchased it.

Replacing Your Tubes

When you replace the 6550/EL34 vacuum tubes in your unit, you will have to re-bias as explained in the next section. When you replace the 12AX7s, you do not have to re-bias the amplifier.

1. Should you replace your tubes make certain the main switch is in the off position and make certain the unit has not been operating for at least thirty minutes. This allows the capacitor to discharge and the tubes to cool down.
2. To remove a vacuum tube, use your thumb, index finger and middle finger to gently grasp the vacuum tube on all sides. Hold the tube in the same manner as you would hold an incandescent light bulb. To extract the tube from the socket, gently rock the tube from side to side while pulling up on it until the tube pins have been freed from the socket. Never use excessive force.
3. When replacing the tubes, make certain that the right part is being placed in the socket, e.g., V1=6550, etc.
4. The EL34/6550 socket is keyed with a middle plastic pin on the bottom of the tube. Holding the tube with the thumb, index finger and middle finger, line up the plastic pin and the metal pins with the socket and gently push down on the tube until it is seated. For the 12AX7, line the pins with the holes in the socket and push the tube down. Never try to force the tube into the socket. If the tube does not go easily into the socket, check to make certain the pins are lined up and that you are using the right tube.

Biasing

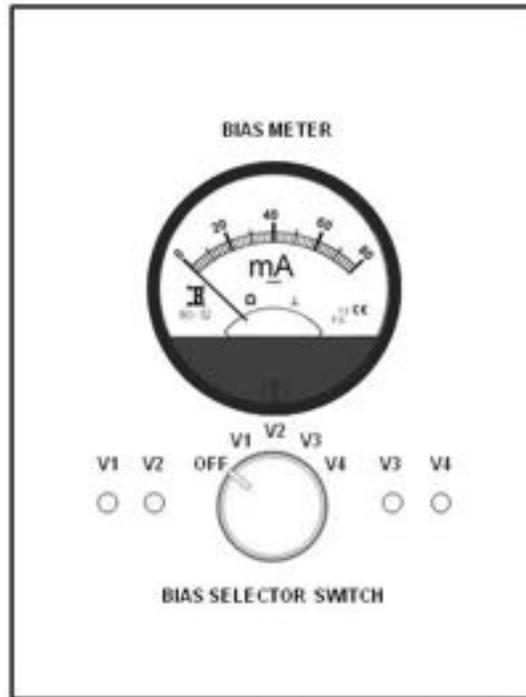
For your Information:

When mentioning you will have to bias your amplifier under certain circumstances, there can be a moment of panic. On the F100, biasing is a simple matter of using the Exact Biasing system. Essentially it is turning a potentiometer screw clockwise or counterclockwise and setting it to the right level that is shown in the meter. Biasing is simply to make certain the tubes are electrically operating in a similar manner, i.e., that the tubes are pushing out approximately the same amount of electrical power. Biasing is a simple procedure requiring only one tool and ten minutes of your time. 1 thru 3 outlines when biasing is needed. They are:

1. When you first receive the amplifier, there is a possibility that the bias may have to be adjusted on the amplifier. The unit's bias is set at the factory, but there are two major factors, which can cause a change in the bias setting. First, significant vibration during shipping can affect the tubes or cause minute movements in the bias trim potentiometers and thus change the bias setting. Secondly, AC voltage levels can vary from one geographical region to another and thus the AC voltage can be different from the Black Ice Audio testing voltage of 118 volts which can raise or lower the bias setting.
2. Black Ice Audio recommends to also bias if there is a reduction in the volume due to the natural wear of the tube over time, or when new electron tubes are installed.
3. In general, after the initial biasing, you do not have to bias the Fusion F100 for six months. There will be fluctuations in the bias of the amplifier that are due to either the changes in voltage (in some regions of the country the voltage can vary depending on the time of day or on what type or how much electrical equipment is operating in a given home) or because the thermal balance of a tube may be such, that the tube after it has been on for one minute will not have the same bias after it has been operating for five hours.

Before you start. When you use the Exact Biasing system you will need the small screwdriver/Tuning Wand that came with your unit.

Biasing Layout Top panel



Exact Biasing:

A quick and easy method to bias the amplifier, to make certain the tube is at the right bias point or to re-bias. For this type of biasing only a small plastic handled Tuning wand that comes with your unit is needed. **It is important to note the V1, V2, V3, and V4 bias levels are increased by turning the bias adjustment screw clockwise and the bias levels are decreased by turning the bias adjustment screw counterclockwise.**

1. To start the process, turn the unit on with the volume knob turned to zero. No audio source should be playing at this time.
2. Allow the unit to warm up for at least five minutes.
3. To check your bias, simply turn the bias selector switch to V1, V2, V3 or V4. **The meter reading for EL34s/6CA7s is 40 milliamps plus or minus 5 milliamps. The meter reading for 6550 tubes is 50 milliamps plus or minus 5 milliamps.** If the reading falls within those parameters, adjusting the bias is not necessary. Please note, that if you are reading the meter while music is playing, the reading will fluctuate.
4. To bias the V1 tube, set the Bias Selector switch to V1. Then take the tuning wand, and with the cupped end, insert it into the V1 hole. Increase the milliamps by turning the screw clockwise and decrease the reading by turning the screw counterclockwise. Follow the same pattern to bias the V2, V3 and V4 tube. Please note that if the meter reading fluctuates while music is playing, this is normal.
5. Re-bias the tubes again after the initial first bias pass. The reason is that all the tubes use the same power supply voltage. Increasing amperage to one tube will reduce the amperage from the other three tubes. In like manner, decreasing the amperage from one tube will increase the amperage to the other three tubes.

Please Note, if this is the first time you are biasing the amp, we suggest leaving the amp on for about two hours to stabilize the tubes. Recheck the bias and bias as needed.

We are often asked why we do not put an automatic biasing system in the unit. Auto-biasing is a well-known design known by engineers for over 40 years. It is a circuit in which a series of resistors in the core of the bias design. However, it has a significant negative impact on the performance of the unit. It will reduce power and it will introduce distortion into the signal path. Exact Biasing will not reduce power, nor will it introduce distortion since it merely senses the level of current going through the bias path rather than trying to alter and control it. Although Exact Biasing requires a minimum effort, the dividends of power and sound performance are worth the investment.

Note: The two most common errors in biasing the Black Ice Audio amplifier are:

1. Turning the bias screws the wrong way.
2. Attempting to "tweak" the bias levels by ear without using the meter on the amplifier which reduces optimum performance.

Servicing

Because of its careful design and exacting standards of manufacture, your Fusion F100 amplifier should normally require only minimal service to maintain its high level of performance.

CAUTION: The Fusion F100 amplifier contains sufficient levels of voltage and current to be lethal. Do not tamper with a component or part inside the unit. Even with the power turned off, a charge remains in the energy storage capacitors for some time. Refer any needed service to your authorized Black Ice Audio dealer or other qualified technician.

Questions regarding your amplifier may be referred to the Customer Service Department of Black Ice Audio: (301) 953-2014.

We hope you enjoy your musical experience.

LIMITED WARRANTY

The Black Ice Audio Fusion F100 MonoBlock Tube Power Amplifiers are warranted for the period stated from the date of the original purchase.

1. Chassis and Transformers	3 years
2. Electron Tubes	1 year or 1,000 hours whichever comes first

WHO IS PROTECTED BY THIS WARRANTY

Your Black Ice Audio warranty protects the original owner, so long as the original bill of sale is presented when warranty service is required. In addition, the warranty card included with your amplifier must be submitted within thirty days of purchase otherwise the warranty will be good for only 1 year.

WHAT IS COVERED BY THE WARRANTY

Your Black Ice Audio warranty covers all defects in material and workmanship with the following specified exceptions. These are: (1) Electron tubes are warranted for one year or 1,000 hours which ever comes first; (2) damage caused by accident, unreasonable use or neglect (including the lack of reasonable and necessary maintenance); (3) modifications to the amplifier; (4) damage occurring during shipment (claims must be presented to the carrier); (5) damage to or deterioration of any accessory or decorative wooden surface; (6) damage resulting from failure to follow instructions contained in your owner's manual; (7) damage resulting from the performance of repairs by someone other than Black Ice Audio or an authorized Black Ice Audio warranty station; (8) any Black Ice Audio unit on which the serial number has been effaced, modified or removed; (9) units used as demonstration or display models prior to purchase by the original consumer owner; (10) units used for the purpose other than home use.

HOW TO OBTAIN WARRANTY PERFORMANCE

If your Black Ice Audio unit ever needs service, write to us at Black Ice Audio Inc., PO Box 218, Brookeville, MD 20833 (Att. Customer Relations Department). We may direct you to an Authorized Black Ice Audio Warranty Station or ask you to send your unit to the factory for repair in which case we'll supply a Service Return Authorization and complete shipping instructions. Either way, you'll need to present the original bill of sale to establish the date of purchase. Please do not ship your Black Ice Audio unit to the Maryland address without our prior written authorization.

If service under this warranty is not necessary, but you have questions regarding the installation or operation of your unit, please write to our Customer Relations department at the address above.

WHO PAYS FOR WHAT

Black Ice Audio will be happy to pay all labor and material expenses for all repairs covered by this warranty. If necessary, repairs are not covered by this warranty, or if a unit is examined which is not in need of repair, you will be charged for the repairs or examination.

Although you must pay any shipping charges incurred in getting your unit to an authorized warranty station or to the factory, we will pay return shipping charges if the repairs are covered by the warranty. Please be sure to save the original shipping cartons because a nominal charge will be made for additional cartons.

LIMITATION ON IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR PARTICULAR PURPOSE ARE LIMITED IN DURATION TO THE LENGTH OF THIS WARRANTY, UNLESS OTHERWISE PROVIDED BY STATE LAW.

EXCLUSION OF CERTAIN DAMAGES

BLACK ICE AUDIO'S LIABILITY IS LIMITED TO THE REPAIR OR REPLACEMENT AT OUR OPTION, OF ANY DEFECTIVE PRODUCT AND SHALL IN NO EVENT INCLUDE INCIDENTAL OR CONSEQUENTIAL COMMERCIAL DAMAGES OF ANY KIND.

SOME STATES DO NOT ALLOW LIMITATIONS ON HOW LONG AN IMPLIED WARRANTY LASTS AND/OR DO NOT ALLOW THE EXCLUSION OF INCIDENTAL OR CONSEQUENTIAL DAMAGES, SO THE ABOVE LIMITATIONS AND EXCLUSIONS MAY NOT APPLY TO YOU.

This warranty gives you specific legal rights and you may also have other rights which vary from state to state. We sincerely thank you for your expression of confidence in Black Ice Audio products. The amplifiers have been painstakingly assembled by highly trained crafts' people. It should give you many years of musical enjoyment.

Fusion F100

Technical Specifications:

Rated Output Power:	140 W per channel at 8 ohms, 25Hz to 60KHz with 6550 Tubes 120 W per channel at 8 ohms, 28Hz to 72KHz with EL34 Tubes
Frequency Response:	(at 1 watt into 8 ohms) 8Hz to 130KHz \pm 1dB
Bandwidth:	15Hz to 80KHz \pm 3dB; 0dB 60 W 1KHz
Distortion THD:	Less than 1% at 20 V output, 28Hz to 15KHz
Circuit Type:	Fully Balanced differential push pull
Input Impedance:	100Kohms
Input Sensitivity:	1V at 1KHz for 120/140 watt output
Output Impedance:	4 ohms and 8 ohms
Negative Feedback:	Less than 4.5 dB
Noise and Hum:	95dB below rated output
Tube Complement:	4 pcs. EL34 or 6550 power output; 2 pcs. 12AX7A/ECC83
Power Requirements:	110V-120 VAC 60Hz 1 watt-standby, 450 watts maximum (220 VAC 50Hz option)
Dimensions:	13.5 inches (34cm) wide by 15.5 inches (40cm) deep by 8.75 inches (22 cm) high
Weight:	41 pounds (19 Kg) net, approximately 48.5 pounds (22 Kg) packaged
Warranty:	Three year limited parts and labor. One year or 1000 hours whichever comes first on Black Ice Audio Tubes.
Bias Settings:	40 milliamps \pm 5 mA for EL 34s, 50 milliamps \pm 5 mA for 6550s
Fuse:	110 - 120 VAC, 6.3 Amp slow blow; 200 - 240 VAC, 3.15 Amp slow blow Size 5mm X 20mm

Construction Details and Features:

- o **Features:** Uses EL34,6550 or KT150 tubes. Can be easily bridged with two cables. and touch sensor on/off switch.
- o **Custom Wound Audio Transformers** with a core of German grain-oriented silicon steel. The output transformers are based on the Hafler design.
- o **Exact Bias System: Top panel bias testing terminal with bias adjustment controls and built-in meter.**
- o **State of the Art Components:** Gold plated RCA input jacks, Black Ice Audio coupling caps.
- o **Low Feedback Design:** Only 4.5 dB

Black Ice Audio/Black Ice Audio

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