

VTL

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MB-450 Series III Signature Monoblock Amplifier

*Owner's Manual*

MAKING TUBES USER FRIENDLY

# VTL MB-450 Signature Monoblock Amplifier

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4774 Murrieta Street, Suite 10

Chino, CA 91710, USA

Phone 909.627.5944 • Fax 909.627.6988

Email: [mail@vtl.com](mailto:mail@vtl.com) • <http://www.vtl.com>

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# Introduction

*Congratulations on your purchase of the VTL MB-450 Signature Monoblock Amplifier – an advanced- technology vacuum tube amplifier engineered for outstanding sonic performance.*

VTL is delighted to welcome you as a new owner of our MB-450 Series III Signature monoblock power amplifier. This precision-engineered high-performance amplifier will provide you with many years of trouble-free listening pleasure. This newest iteration of the long-standing MB-450 platform is a full re-working of the complete amplifier, with a fully balanced input stage driving a differential phase splitter and a push-pull output stage with an improved, balanced output transformer, all combining to bring the sonic performance of the venerable 450 platform to even greater heights. The Series III also incorporates VTL's advanced Auto Bias and Fault Sensing technology--features formerly available only with our flagship Reference products. A revised power supply and improved electronics give the MB-450's an ultra-fast transient response and a dynamic range that discerning music and film lovers will instantly notice and appreciate. We thank you for selecting this amplifier for your home audio/theater system, and trust that you will enjoy its musical distinction for years to come.

To get the most benefit from your purchase, we recommend that you take time to familiarize yourself with the features of this product. Please take a few minutes to read through this owner's manual, as it contains all of the installation procedures needed to connect your new amplifier to the rest of your system, and details the many functions that it can perform. After you have finished reading this manual, please put it in a safe place for future reference.

## The Origin of the MB-450 Signature Monoblock Amplifier

The MB-450 Signature Monoblock Amplifier (including its predecessors) has been a core model in the VTL line for over 20 years. With the release of the Deluxe 300 monoblocks in the late 80's, VTL successfully introduced a high power amplifier that could drive a wide range of speakers and yield outstanding performance for a reasonable price. The model evolved incrementally over the years, including a name change to the MB-450 Signature Monoblocks in 1996.

With the release of the MB-450 Series II Signature Monoblocks in 2007, the Smart Tube Technology first introduced in the flagship Siegfried Reference monoblocks in 2004 became an essential standard feature in the VTL Signature monoblock family. This system encompasses logic-controlled automatic biasing--which continually checks each tube for optimal performance--and an array of fault-sensing diagnostics that alert users to the operating status of each tube. The "smart tube" technology puts an end to the guesswork formerly inherent in large tube amplifiers, making the new MB-450s easier to use and maintain. Other technology that has trickled down from the Siegfried amplifier includes a precision-regulated power supply and upgraded circuitry components.

The MB-450 Series III Signature Monoblock incorporates even greater technological improvements with the goal of enhancing the amplifier's ability to drive a diverse range of speaker types. These include a re-designed fully balanced differential input stage driving a differential phase splitter and a lower impedance push-pull output stage with a dramatically improved, fully balanced, interleaved and coupled output transformer. As a result, the MB-450 has attained new thresholds of sonic performance, with greatly improved bass tightness and dynamics.

Compared to former versions of the MB-450, the Series III offers an unrestrained sense of openness, tighter and more controlled bass, and an ease and musical neutrality that give you the most satisfying listening experience.

## Circuit overview:

An all-tube amplifier, the MB-450 Series III is the culmination of VTL's most advanced thinking in performance engineering. A proprietary regulated power supply, high-grade parts, and an automatic tube bias system ensure ultra high fidelity audio reproduction, while tube fault diagnostics and user feedback offer the ultimate in usability and convenience.

The audio amplifier is comprised of a fully balanced differential input stage driving a differential phase splitter and a lower impedance push-pull output stage with a dramatically improved, fully balanced, interleaved and coupled output transformer. Furthermore, the new design in the Series III amplifier incorporates a shorter, faster and fully balanced negative feedback loop, with zero global negative feedback. The revised negative feedback loop completely eliminates ringing and requires no capacitor compensation to maintain critical phase integrity and information.

Further engineering innovations for the MB450 Series III include a variable Damping Factor feedback control that allows the user to precisely adjust the amplifier's output impedance by setting the amount of negative feedback to one of four possible levels. Impedance can now be varied to suit the listener's taste, and to improve control of the loudspeaker loads to deliver best performance.

Adjustable precision-regulated bias and screen supplies keep the operating point of the output tubes constant even under AC and main power supply fluctuations, and stabilize the power supplies for greater tonal stability and sonic integrity especially during complex, dynamic signal conditions.

All critical voltages in the power supply are precision regulated for consistent and predictable performance under a wide variety of conditions. Large energy storage reservoirs mean that the amplifier is capable of delivering huge peak current swings into demanding loads for powerful musical performance.

Optimized operating voltages and timed current inrush limiting dramatically extend tube life, with low idle current draw on all stages. An ever-warm position further lowers idle current while keeping all voltages present so the circuit remains warm when not in use.

The amplifier can run in one of two operating modes: Tetrode or Triode. The user can change mode either in standby or in power-on mode. Users often prefer one mode to another, depending on the type of music. For example, tetrode may offer a wider sound stage and greater dynamics for complex and demanding symphonic music, while triode may work better for small ensembles or solo instruments.

Comprehensive fault sensing monitors the status of the output tubes, and alerts the user to any adverse conditions. In the case of a problem in any of the output tubes, the amplifier will immediately shut down. The tube fault is indicated on the front panel, as well as by a blinking LED on the top deck next to the faulty tube making diagnosis and tube replacement easy.

The logic-controlled automatic bias system is designed to keep the tubes at peak performance and operates completely outside of the signal path. The tube biasing circuit checks and adjusts the tube bias values automatically during the power-on sequence, as well as when the amplifier is at idle (i.e. when no music signal is being amplified.), and drops out of the circuit path when music signal is detected.

## Symbol Conventions used in this guide

Certain symbols are used in this owner's manual to draw your attention to important points being discussed. For your own safety and that of your equipment you should note and heed the warnings that follow these symbols.

The "Warning - Pay Particular Attention" symbol used is:

And the "Warning – Observe These Precautions for Your Safety" is:



## Electrical Safety Notice

Electrical voltage from power cables can be hazardous. We recommend that the power cord used with this unit be connected to a properly grounded (three-prong) AC outlet. There are also hazardous voltages present inside the unit. To prevent electrical shock, avoid removing the cover of this amplifier, and under no circumstances remove it while the unit is powered on.



Warning – Under no circumstances should any attempt be made to circumvent the ground system to the AC line for any reason. Using a ground lifted system can be potentially extremely dangerous, both to persons that might come in contact with the unit, and to the unit itself, and proper RF shielding cannot be attained without a secure ground connection.



*Damage to the unit that is the result of improper AC connection and grounding will not be covered under the warranty.*

Prior to connecting this amplifier to any audio or video equipment in your system, make sure this unit's power (and the rest of the equipment connected to its input and output channels) is turned off. Adding or removing input or output cables to the amplifier while the system is powered on can cause damage to the amplifier and possibly also to the rest of the system.



## Water and Moisture

The amplifier should be kept away from sources of water or moisture. If liquid enters the unit it must be immediately returned to your dealer for servicing. Under no circumstances should you try to power the unit on - the hazardous voltages present in this unit, when combined with liquid, can result in serious injury upon even the slightest contact.



## Location and Ventilation



Warning – To avoid risk of failure due to overheating, do not stack chassis components

The amplifier emits heat and needs proper ventilation to ensure long operational life.

Ensure that the amplifier is installed in a location that is stable and well ventilated. If the amplifier is placed in a built-in installation, ensure that there is adequate room for air to flow through the



ventilation openings. Allow at least 12 inches clearance on the top and around the sides of the chassis of the amplifier.

*The warranty does not cover units that are damaged due to overheating from incorrect installation.*

Tiptoes or other isolation accessories may prove useful in reducing mechanical vibrations or other external vibrations that might affect sonic performance, and we have found that such accessories can offer distinct sonic improvements when used correctly. In all cases you should be sure to install this amplifier in a location that is stable.

*The warranty does not cover damage due to the unit falling.*

Do not place the amplifier next to heat sources such as radiators, stoves or other appliances.

Do not place the amplifier where small children might be able to tamper with the equipment. If it is not possible to place the amplifier out of the reach of small children it is recommended that you remove power cables when the equipment is not in use.

## Servicing



Do not attempt to service the amplifier beyond the procedures described in this manual. For all other service and questions, please contact your authorized VTL dealer or the factory.

## Operational Warnings



→ It is critical for proper sonic performance of this component that it be properly configured for the mode of operation while playing. If a balanced signal is applied to the inputs the amplifier must be configured for balanced operation, and vice-versa.



→ Always make all connections before powering the amplifier on. Ensure that interconnect cables are firmly seated and that there is no visible damage to the cables.

*Connecting or disconnecting the amplifier while powered on can damage the output stage. Such damage will not be covered under the warranty.*



**Warning:** The MB-450 Series III is a fully balanced design with a balanced output. Care should be taken so that neither output is ever grounded.

**Warning:** Do not connect a sub-woofer to the output of the amplifier unless you are sure that the subwoofer input is fully balanced and that neither phase can become grounded.

Please consult your authorized VTL dealer or the VTL factory customer support department if you have any questions on the fully balanced connection of the amplifier.



→ **Do not attempt to disassemble the amplifier chassis or remove any covers from the amplifier.** Always consult with your VTL authorized dealer or the VTL factory support department before attempting any service work on any VTL unit.



→ **Do not touch the tubes after the amplifier is turned on.** Tubes can get very hot while the amplifier is operating. Turn off the amplifier and allow the tubes to cool down before attempting to work with the tubes.



→ Tube components can be heavy and awkward to lift, with the weight unevenly distributed. You should not attempt to move the unit without help. The amplifier weighs approximately **120 lbs. (55 Kg)**.



→ Use only the same type and rating of fuses as specified in the owners' manual and marked on the unit.

*Using fuses that exceed the ratings or attempting to bypass any fuses can cause an extremely hazardous condition and will void the warranty.*

# Getting Started

## Before starting

The MB-450 Signature Monoblocks are shipped in cartons and wrapped in thick plastic. The plastic is not strong enough to support the unit, and may tear if you try to lift the unit out of the box with it. Also there are protruding switches which could break if the unit is not properly handled, and in addition to the awkward, unbalanced heavy load the unit has a cleaning polish on it which makes it slippery and hard to grasp. We have found that the best way to remove the amplifier from the box is as follows:



1. With the box on a thick carpeted floor, fold back all the flaps of the top of the carton, leaving all the packing foam in place. Remove all power cords, Owner's Manual packages etc. from the carton and save these for future use. Roll the carton onto one long side on top of the flap.
2. Roll the box once more onto the open top and, making sure that none of the flaps is trapped under the carton, lift the carton off the unit.
3. Lift the top foam away from the upside down unit and carefully cut away the plastic from around the amplifier.
4. Lift the amplifier up and away from the packaging so that it lands on its four rubber feet. Then lift away the packaging and set all the packaging in the carton.
5. When lifting the unit be sure to only lift it from the bottom under the transformers. Be careful not to break any switches. Be sure to only set the amplifier down on its bottom side on the four rubber feet on a stable surface. Setting it on any other side may damage protruding components.

If the unit is too heavy or too awkward to lift then do not attempt to do this by yourself, but rather find someone to help you. Save the carton and all packaging for any future shipment of the amplifiers.

**Warning: This unit is extremely heavy, and weighs over 100 lbs. Unpacking should be done by two or more people who are capable of lifting a heavy load. Ensure that the amplifier would not fall and injure someone. Do not attempt to lift the unit yourself.**

Check to make sure that no physical damage has occurred during shipping of the unit. There should be no rattles inside the amplifier chassis. Look through the top cover and check to see that the tubes appear properly seated in their sockets, and that no tubes are white on top. Contact your VTL dealer immediately if any physical damage is detected.

## Replacing tubes



**Turn off the rear rocker switch and remove the power cable before removing any covers from the amplifier.**

Follow the steps below to remove the cage of the amplifier:

1. Locate the left and right covers on the cage. With a #2 Phillips screw driver, remove the four flat head screws on the top side of the two covers.



2. Locate the two screws on the side of the left and right covers. Remove these two screws with the #2 Phillips screw driver also.



3. Save these screws in a safe place so that they can be re-used to fasten the cage back to the amplifier.
4. Remove the left and right covers of the cage and locate the tube sockets for the output tubes on the deck of the amplifier. For the MB-450 amplifier, there should be a total of 8 sockets for the output tubes, 4 on the left side and 4 on the right side of the cage covers.
5. Insert the output tubes into each of the output tube sockets from tube # 1 to # 4 on the left side of the cover and 5 to 8 on the right side of the cover.



Hold onto the upper portion of the tube towards its tip. Lower the tube onto the socket, making sure that the pins from the tube matches the holes in the socket. There are either two pins on the tube which are spaced at a wider distance from each other than the rest of the pins (9 pin miniature tubes), or there is a locating keyway in the middle of the tube (8 pin octal tubes). Make sure that these locators go into the side of the socket which matches. Press the tube firmly into its socket, using a gentle force and a slight “rocking” motion. When the tube is properly and completely inserted into the socket it should be firmly implanted and does not give in to any movement at all when you try to rock it.

5. After the output tubes are firmly located in their sockets, restore the left and right top covers back onto the cage. Fit the original screws onto cover and use the #2 Phillips screw driver to tighten the screws. Do not overtighten and make sure the screws are in securely.



Notes for the servicing technician:

1. If any of the tubes should become loose, please follow the procedure to remove the covers on the cage so you can access the tubes.
2. Remove the protective cage on the top deck of the amplifier. The cage is mounted with two screws on the front panel, three screws on each side of the amplifier, and three screws on the back panel. Loosen the screws and lift the wire cage slowly and carefully. Do not let the cage touch or hit any of the tubes inside the amplifier. Keep the cage and the screws in a separate place while you're working on the amplifier.
3. Make sure that the amplifier is not connected to the power outlet and not turned on. Use your fingers to hold onto the upper portion of the tube towards its tip. Gently rock the side of the tube to see if there is any movement in the tube. If there is any movement, that means the tube has come loose. Press the tube firmly into its socket, using a gentle force and a slight "rocking" motion.
4. Repeat the above test for the rest of the tubes. There are a total of eight output tubes and one input tube and one driver tube in each amplifier.
5. After you've examined all the tubes to make sure that they are firmly placed in their sockets, you can put the protective cage back onto the amplifier unit. Tighten the screws to make sure that the cage is securely fastened to the unit.

## Connecting Your Amplifier to your system

The MB-450 amplifier is a self-contained unit with the amplifier and power supply sections on one chassis. The amplifiers are setup to work in this configuration, and under no circumstances should you attempt to take the amplifier apart.

1. Connect all source components (e.g. CD, Tuner, Tape, DAT, Turntable etc.) to the preamplifier. Follow the instructions on your preamplifier and source component manuals to connect these components together.
2. Connect the power amplifier to the output channel of the preamplifier. The interconnect cable between the amplifier and the preamplifier links the input channel of the power amplifier to the output channel of the preamplifier. The amplifier, which is going to drive the left channel of your speaker system, should be connected to the left output channel of the preamplifier. The same applies to the right channel amplifier.
3. Select the input connector type. The amplifier supports two types of input connectors – the RCA input and the balanced (XLR) input. Place the interconnect cable firmly into the input jack which matches the type you have, and firmly insert the interconnect cable into the input jack marked "INPUT". Locate the switch marked XLR on one side and RCA on another side near the input jack and flip the switch to the side that matches the cable you are using. For example, if you use RCA input cables, flip the switch to the RCA side and plug the RCA cable to the connector marked RCA.
4. Connect the loudspeaker cable to your amplifier. There is a pair of speaker binding posts in the back of your amplifier for connecting your loudspeaker cables to the amplifier. These binding posts are marked "+" and "-" above the posts and "SPEAKER" in between the posts. For example, if you are connecting the monoblock amplifier to the left channel speaker, you should take the speaker cable connected to the left speaker and connect it to the amplifier's "SPEAKER" binding posts. First, loosen the binding posts on the amplifier. Take the red connector from the speaker cable and connect it to the "SPEAKER" binding post marked "+". Take the black connector from the speaker cable and connect it to the "SPEAKER" binding post marked "-". Tighten the binding posts by hand, using a nut-driver (3/8"). Be careful not to over-tighten the posts, as you may break the connection inside the amplifier if you exert too much force on the posts.

## Voltage Setting

Your power amplifier has been set by the factory to the correct voltage for your country where you made your purchase. The voltage setting should be marked on the Serial Number Badge located on the back panel of your amplifier. Check to make sure that this complies with your local voltage rating before plugging in and turning on your amplifier.



Your amplifier is shipped with a 20A power cord which matches the requirements of your country. If you need a replacement and you are not sure what the appropriate cord should be, consult your authorized VTL dealer or the VTL factory customer support department.

## Power Source for your Amplifier

Your *MB-450 Series III Signature Monoblock* power amplifier is a high-performance, high power amplifier capable of outputting over 400 watts per monoblock. To assure that you can operate your power amplifier under the best conditions for the optimal results, you should plug the unit directly into a wall AC outlet, preferably one separate outlet for each unit. Do not plug your amplifier into a light extension cord or into the back of another component. This will starve the amplifier of current and significantly impact the performance of your system.



See the chapter on Specifications for the power consumption requirements of your amplifier.

**Warning:** The MB-450 Series III is a fully balanced design with a balanced output. Care should be taken so that neither output is ever grounded.



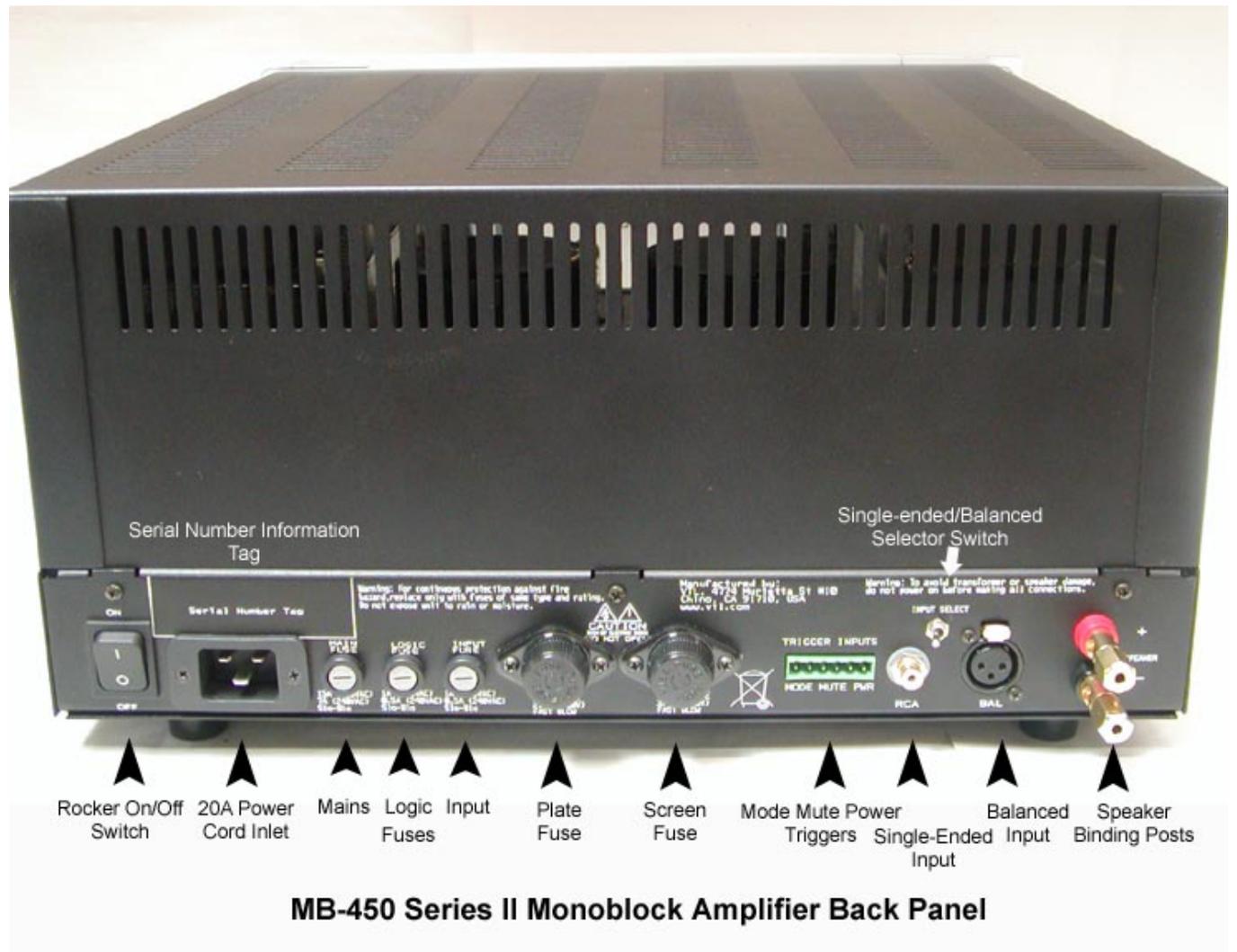
**Warning:** Do not connect a sub-woofer to the output of the amplifier unless you are sure that the subwoofer input is fully balanced and that neither phase can become grounded.

Please consult your authorized VTL dealer or the VTL factory customer support department if you have any questions on the fully balanced connection of the amplifier.

# Operating the Amplifier

## Turn On to Standby Mode

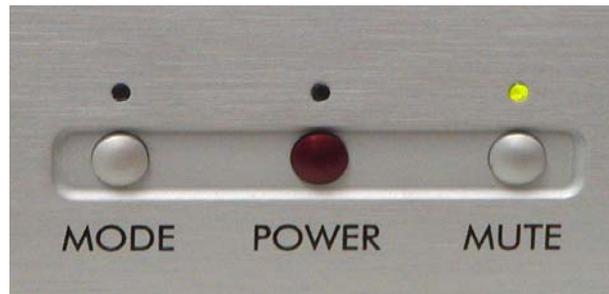
With the 20A power cord supplied with the amplifier, connect the amplifier to the AC and turn on the rear rocker switch. This powers on the Logic supply and the top deck LEDs next to each output tube will turn on once and off in sequence to identify the tubes, going from tube 1 to tube 8.



If the amplifier is ready for power up within five seconds after the rocker is turned on the Mute LED on the front panel will turn on green to indicate that the amplifier is now in standby mode.



During standby mode only the Mute LED is on green, and the Power and Mode LEDs are not lit. The amplifier is ready for the power up command, either from the front panel Power button or the rear Trigger input labeled POWER.



The amplifier can be left in this mode continuously since the Logic supply draws very little power (~5W.)

If the amplifier shows a red fast flashing Mute LED then it is not ready for power up. Refer to the Fault section of this manual for instructions on how to identify and clear faults.

## From Standby Mode to Power On Mode



To power the amplifier on press the red Power button. The Mute LED will start blinking red and the Power LED will light blue, indicating that the amplifier is going through the power on cycle. The Mode LED will indicate the last used mode: green for Tetrode mode and red for Triode mode.

During standby mode the user can also change tetrode triode mode by pressing the mode button once to toggle between modes, and the Mode LED will change between red and green to indicate the mode that the amplifier will power up in.

The power on cycle takes about 30 to 45 seconds. During this time the deck LEDs next to the output tubes blink about 20 seconds into the power on cycle, indicating that the auto bias system is adjusting the bias voltage of the output tubes. The top deck LEDs will each stabilize in turn indicating that the output tubes have reached their operating points, which is required before the Mute relay is released to allow signal.

If at any time during this sequence the Power LED turns off and the Mute LED flashes fast red then there is a fault, either Red Tube or Power. See the Fault section.

When the Power on cycle is completed the Mute LED turns off and the Power and Mode LEDs remain on.

If there are any low tubes that cannot be biased the Mute LED will blink slow green, but the amplifier will still operate.



The amplifier is now ready to play music.

## Mute and Unmute

While the amp is powered on, the user can mute the amplifier by pressing the Mute button on the front panel or applying a signal to the Mute Trigger. The Mute LED turns solid red and the amplifier's input is muted. The deck LEDs next to the output tubes are turned off while the amplifier is in mute.

To unmute the amplifier, press the Mute button again, and the Mute LED will blink red to indicate that the amp is unmuting. The deck LEDs will all blink to indicate that the tubes are being biased. When the unmute cycle is completed and the tubes are all at their operating points, the Mute LED is turned off. The deck LEDs are steady if no music is playing, with occasional flickers as the output tube bias is adjusted.

When the amplifier is in Mute mode, the output tubes are drawn down to a very low trickle current with noticeably lower heat output to conserve tube life. The amplifier can be left overnight in this condition, but longer than this is not recommended.



## Tetrode /Triode Switching

The Mode button or the Mode Trigger can be used to toggle the operating mode of the amplifier between the Tetrode and triode modes. The user can change mode either in standby or in power on mode. The Mode LED will be lit red or green when the amplifier is powered on to indicate which mode the amplifier is in. Green indicates that the amplifier is in Tetrode mode and Red indicates that the amplifier is in the half power Triode mode.

After the amplifier completes its Power on cycle, the user can press the Mode button at any time to toggle between the tetrode and triode modes. The Mute LED lights to a steady red immediately after the Mode button is pressed and no signal will be allowed during this changeover period. In the middle of this switch over sequence, the user will hear a clicking sound and the color of the Mode LED will change its color to correspond to the new Mode selected. The Mute LED will start blinking red indicating that the amplifier is unmuting and the tubes are being biased to the operating point corresponding to the new mode. For example switching from Tetrode to triode mode, the Mode LED will change from green to red.

The user can also change tetrode triode mode during standby mode. Press the mode button once in standby mode to toggle between modes. The next time the amplifier is powered on it will come up in the new mode with the appropriate Mode LED indication and the tubes will be brought to the operating point of this new mode.





AMPLIFIER IS ON IN TRIODE MODE

### Deck and Deck LED Indications





## Power off the amplifier into Standby mode

Press the Power button to change the amplifier from power on mode to standby mode. The Power and the Mode LEDs will both be extinguished during standby mode. During Standby mode the Mute LED remains lit either solid green, to indicate ready for re-power, or, in the case of a fault, flashing red, indicating not ready for re-power.



All deck LEDs are turned off in Standby mode, unless there is a tube fault being indicated. Please refer to the Fault section for a full description of how faults are displayed in this amplifier.

## Power off the amplifier at the rocker switch

If the user wishes to completely turn off the amplifier, turn the rocker switch in the back of the amplifier to the off position. All LEDs on the front panel should be completely turned off in this mode.



Amplifier is turned off from Rocker

## Using the DF switches

The variable DF is an adjustable Damping Factor control that allows the user to adjust the output impedance of the amplifier.

The two sets of DF switches are located on the deck of the amplifier in front of the 12BH7 driver tube. Please remove the cage of the amplifier to access the switches and store the screws from the cage in a safe place for reuse. Always mute the amplifier prior to changing the setting of the DF switches and use a long handle tool to access the switch to prevent your hand from accidentally touching the hot tubes.



There are four possible settings of the DF switches: Low, Medium, High and Max. Please check to make sure that the switches in both amplifiers are in the same position. There is no right or wrong position, and the switches are provided to allow adjustment to better suit the listener's taste and to offer better control to loudspeakers that may need it.

#### DF Switch Settings

1. **LOW:** Both switches are positioned towards the back of the amplifier. This is the lowest damping factor setting, the least loudspeaker control, and most natural sound.



**Figure 1. LOW DF setting**

2. **MED:** The Left switch forward towards the front panel, and the right switch back towards the back of the amplifier. This setting allows for better loudspeaker control, with some impact on sound quality



**Figure 2: MED DF Setting**

3. **HI:** The Left switch back towards the back of the amplifier and the right switch forward towards the front panel. Best loudspeaker control, with a little more impact on sound quality, but on speakers that need the control the sonic improvement is clear.



**Figure 3: HI DF Setting**

4. **MAX:** Both switches forward towards the front panel. This setting provides the maximum damping factor, but sonic impact could be noticeable.



**Figure 4: MAX DF Setting**

Please consult your authorized dealer on the most optimum DF setting for your system.

## Fault indication

During the Power On cycle or while the amplifier is operating, if the Power LED goes off and the Mute LED blinks fast red, then this is an indication of a fault, either a tube fault or power fault. Please check the Deck LEDs next to each tube to see if you can locate a LED that is lit green. Follow the instructions in the following sections to determine which type of fault has occurred. **Do not turn off the rocker switch in the back of amplifier until you have determined which type of fault has occurred and the faulty tube is replaced.**

### Tube Fault

1. Tube red Fault - Mute LED blinking Red, deck LED green

When any output tube draws excessive current and cannot be controlled by the autobias system the amplifier will shut down with a fault indication shown by the Mute LED blinking fast red and the Power and Mode LEDs off. The top deck LED next to the faulty tube will be blinking green rapidly, with all other deck LEDs off.



### 2. High Current TUBE Fault -- Mute/Power/Mode LEDs off, deck LED green

When an output tube draws excessive current and cannot be controlled or indicated by the autobias system the amplifier will shut down with a faulty tube indication with all front panel LEDs turned off. In this condition the top deck LED next to the faulty tube will be on solid green

### 3. TUBE green Fault -- Mute LED blinking green, deck LED green

During the Power on cycle or while the amplifier is in operating mode, if the Mute LED blinks slow green and the amplifier continues to play music, this signals a green tube fault condition. When an output tube has a non-critical fault, such as low (or no) current draw, the amplifier will indicate this fault with a slow blinking green Mute LED. From above the amplifier look down onto the deck and there will be a slow blinking green LED next to one of the output tubes. This output tube is the one that is causing the green tube fault. This tube could either be open on one of its connections or the filament might not be working, or the tube could be completely out of the socket. Either way the Autobias system will be unable to bring the tube up to full power.

This is a warning indicator only since the amplifier can continue to operate without the need to shut down immediately, as balance across the output transformer is maintained with the system shutting off the corresponding tube in the push pull pair. When the amplifier is powered on there should be a corresponding tube on the other side of the amplifier where the LED is turned off – this tube is the other tube in the push pull pair and does not require replacement.

Note that this condition is not saved in memory, and a complete loss of power to the amplifier will cause it to not be able to remember the green fault, and when the amplifier is re-powered it will attempt to bias again, and if the condition is still there it will display the low tube again.

However the tube indicated by the slow flashing should be changed as soon as possible, as in this condition output power will be lowered and sonic performance will be affected. Also, because it affects the ability of the amplifier's fault

sensing system to be able to operate properly, a second low tube will cause the amplifier to shut down and indicate replacement of both tubes.





### Power Fault -- Mute LED blinking fast red, no deck LED lit

A loss of high voltage at any time during power up or operation will cause a condition where the Power and Mode LEDs are both off and the Mute LED is blinking fast red with no corresponding tube fault identified by the deck LEDs next to the output tubes.

If this condition occurs, power off the amplifier with the rocker switch and remove the power cord. Check with a multimeter that both Plate and Screen fuses are good. If either one of the fuses are open, replace the fuse with the same value as indicated in the Data Specification section of this manual, and re-power, after allowing 5 minutes to drain the power supplies.

**If both fuses are good, then refer servicing of your amplifier to your authorized VTL dealer or service technician.** The internal fuse could be blown and the amplifier must be returned to the VTL dealer for servicing.

### Replacing tubes



**Turn off the rear rocker switch and remove the power cable before removing any covers from the amplifier.**

Follow the steps below to remove the tube covers on the cage of the amplifier and depending on which tube(s) you are going to replace, you may only need to remove either the left or the right cover where the tube is located.

2. Locate the left and right covers on the cage. With a #2 Phillips screw driver, remove the four flat head screws on the top side of the cover.



2. Locate the two screws on the side of the left and right covers. Remove these two screws with the #2 Phillips screw driver also.



3. Save these screws in a safe place so that they can be re-used to fasten the cage back to the amplifier.
4. Remove the tube cover and put it aside in a safe place.



5. Look down onto the deck of the amplifier to locate either a fast flashing or slow blinking green LED next to one of the output tubes. This is indicating that this is the faulty tube that is causing the problem.
6. Replace the bad tube with a known good tube of the same type.



6. Install the tube covers back to the cage by tightening the screws with a No. 2 Phillips screw driver and following the steps below to reset the tube fault.



## Resetting a Tube Red Fault

After the bad tube has been replaced, reset the fault condition using the following procedure:

1. Turn the rocker switch off for a few seconds and then turn the rocker switch on and the Mute LED will be blinking in red indicating the stored tube fault.
2. Hold the Mute button for 20 seconds until the blinking red Mute LED changes to a steady green LED – This tells the Auto Bias/Fault Sensing system that the bad tube has been replaced. Once the fault is cleared, the amplifier will allow re-power.



3. Before re-powering check the Plate and Screen fuses on the back of the amplifier. Using a multimeter, check the continuity of the Plate and Screen fuses to see if they are open. If either of the fuses is open, replace it with a good fuse of the same value and type, as indicated in the Data Sheet section of this manual.

**Contact VTL or your authorized VTL dealer to purchase replacement fuses of the same type.**

**WARNING:** If the plate or screen fuse is open, it is recommended that the amplifier be re-powered only after waiting for at least for 5 minutes to let the power supplies drain.

**WARNING:** Do not clear the fault and re-power the amplifier without first replacing the faulty output tube, as doing so could potentially damage the circuitry.

## Reset High Current Tube Fault

If the fault indication corresponds to the High Current Tube fault with all LEDs front panel LEDs off and a solid green LED next to the output tube on the deck, replace the faulty tube with a known good tube of the same type. Check the Plate and Screen fuses to see if they are good, and replace if necessary. Re-power the rocker switch to reset the fault condition and re-power the amplifier.

## Clearing a green tube Fault

Turn off the amplifier with the Power button on the front panel and remove the cage of the amplifier following the steps listed in section 8.3.

Replace the indicated tube with a new tube, and re-power the amplifier. The amplifier will automatically re-bias the tubes and if all tubes are drawing current properly then the green tube fault will be cleared.



The tubes used in your MB-450 Signature monoblock Amplifier are specially matched and tested for best performance. Please contact your VTL dealer or VTL factory service department to order the matched replacement tubes.

**WARNING:** use only tube types and tube brands that are recommended by VTL. VTL specified replacement tubes are available from your authorized VTL dealer or the VTL factory service department. Any damage incurred to units that use non-VTL approved tubes will not be covered under the warranty.

## Trigger functions

For remote controlled convenience this amplifier offers 3 x 12V triggers to toggle the Power, Mute and Mode functions that are on the front panel of the amplifier for use with a central remote system. Please contact your authorized VTL dealer to set up and configure the trigger system for your amplifier.

### Power On Trigger

The amplifier can be toggled between standby and power on mode using the Power Trigger.

Using a 12V trigger to power the amplifier on or off

This amplifier is equipped with a 12V (AC or DC) input that can be used to power the amplifier on or off, if the rear AC rocker switch is in the ON position.

The connector used is a polarized Phoenix type female connector, for which males are readily available, and which is designed to prevent shorts during connection.

Triggers are used to power on/off the amplifiers from an outside source in the system, such as the preamplifier. Trigger outputs are typically 12 Volt systems (either AC or DC), connected via hardwired connection between components. The trigger input on this amplifier reacts to a holding voltage: When the

trigger voltage is applied the amplifier will power up if the rear rocker switch is in the ON position, and when the hold is released, the amplifier automatically powers down.

In all cases the front panel power button takes precedence to power down. If the amplifier is powered on via the front panel button then applying the trigger voltage will not cause a change. If either the trigger voltage is released or the front panel power button is pressed the amplifier powers down. If the trigger voltage is left on, but the power button is pressed then the amplifier will power down, and will stay off unless the trigger voltage is cycled down and then back up.

#### Mute Trigger

The amplifier can be toggled between the muted and unmuted modes while it is in power on mode by using the Mute Trigger.

#### Mode Trigger

The amplifier can be toggled between the triode and tetrode modes while it is in power on mode by using the Mode Trigger.

# Care and Maintenance of your VTL Amplifier

## Break In Period

Your VTL amplifier is a pure tube product designed to give you the continued optimum performance over a long time period. Even though the amplifier has undergone a burn-in cycle in the VTL factory, the tubes and circuits will require further usage and burn-in to reach maximum performance. During the first 100 hours of usage the amplifier will undergo noticeable improvements in sound. To break in the amplifier you can leave it on with a music source connected to it and playing with the volume control turned to low level. Do not leave the amplifier on if you are not home.

## Power-on Period

We recommend that your amplifier should be set to Mute mode when you are done with your listening session but you intend to return to your listening session within the same day or in a couple of hours. You can turn off the amplifier using the Power button if you are done with your listening session for the day and leave the amplifier in standby mode. If you are not going to use the amplifier for an extended period of time, we recommend that you turn off the amplifier from the rocker switch located on the back panel of the amplifier.

## Tube Types

The VTL MB-450 Series III Signature Monoblock amplifier uses a total eight 6550C tubes for the output stage and one 12AT7 and one 12BH7 tube for the input and driver stages.

## Tube Life

Your VTL amplifier has been designed to ensure long tube life. Total tube life generally lasts on the average about 3000 hours depending on the usage pattern. Your amplifier is designed with a logic controlled automatic tube biasing and fault sensing system that will inform you when a tube should be changed. Please follow the procedures written in this manual to determine which tube in your amplifier should be replaced when the amplifier indicates a tube fault condition.

We recommend a complete replacement of all tubes in your amplifier after 3000 hours of usage, which will restore the amplifier to a “like new” sound quality. As the tubes age beyond their peak performance they begin to lose their ability to provide full power. This usually results in some loss of control in the bass and a general softening of the sound in the upper frequencies.

Your VTL dealer or VTL factory service department will be happy to assist you with the re-tubing process.

Note: use only tube types and tube brands that are recommended by VTL. VTL specified replacement tubes are available from your authorized VTL dealer or the VTL factory service department. Any damage incurred to units which use non-VTL approved tubes will not be covered under the warranty.



## Changing the Screen, Plate, Mains, Logic, B+ Input Fuses



Rocker On/Off Switch    20A Power Cord Inlet    Mains Fuses    Logic Fuses    Input Fuse    Plate Fuse    Screen Fuse    Mode Mute Power Triggers    Single-Ended Input    Balanced Input    Speaker Binding Posts

### MB-450 Series II Monoblock Amplifier Back Panel

The amplifier has one Screen fuse that is rated at  $\frac{3}{4}$  A fast acting 600V fuse as well as a Plate Power supply fuse rated at 2.5A. fast acting 600V fuse.

The Mains fuse is a 15A Ceramic Slow Blow fuse for 100/120V and 7A Ceramic Slow Blow for 220/240V AC.

The Input and Logic fuses are both 1A Ceramic Slow Blow for 100/120V and 0.75A Ceramic Slow blow for 220/240V AC.

There is also a non-user serviceable Raw B+ fuse housed in a PC board mounted fuse holders located inside the amplifier. This fuse is to be serviced only by an authorized service Technician.

To test whether a fuse is opened or not, place the two probes from a Multimeter on the two metal ends of the fuse. Turn the Multimeter to the Ohm setting or the milliOhm setting. The milliohm setting in many meters can be used for continuity test as well and the meter will beep when the fuse has good continuity. When the fuse is in working condition, the meter will indicate a small resistance readings on the ohm setting. If the reading is zero or the meter doesn't beep, then the fuse is likely to be opened.

To change the either the Screen or Plate fuse or any of the AC fuses first ensure that the unit is powered off, and disconnect the AC power cord from the unit. Move the amplifier so that you can work with the panel in the back of the amplifier chassis.

The type of fitting used for the AC fuses is called a bayonet fit, which describes the action needed to remove the fuse cap. Locate the Main fuse holder, and loosen it by inserting a flat head screwdriver into the slot and turning the screw head approximately one quarter of a turn in a counter-clockwise direction while pressing inwards. The fuse cap should spring out from its housing with the fuse held inside the cap. Take the fuse out and replace it with a new one, and insert the fuse cap back into the holder, pushing it downward while turning it in the clockwise direction to lock it in place. Use the same procedure to replace the output stage protection fuses.



**WARNING:** For continued protections against fire hazard only replace the fuse with the same type and rating as was specified for the amplifier by the VTL factory. If you have problems locating the correct fuse contact your VTL dealer or the VTL factory service department.

**WARNING:** Before powering on the amplifier after a fuse change, it is extremely important to find the problem that caused the fuse to blow in the first place. Consult your dealer or the VTL factory and inform them of the fuse problem.



## Cleaning

Your VTL amplifier should be dusted occasionally with a damp non-abrasive cloth. You should not use any solvents for cleaning the front panel, as this can damage the lettering and the finish. It is recommended that you use a contact cleaner such as Pro-Gold on the input and output connectors regularly to ensure optimum sound and proper signal conducting capability.

## Transporting MB-450

If you should ever need to ship your amplifier and need help doing so, ask your VTL authorized dealer to give you assistance in packing the unit into the carton for the amplifier. Your dealer should also be able to arrange for new cartons to be sent to you and help you with the packing should you require it. Always ship the amplifier with the original carton and foam supplied by VTL. We recommend that you ship the amplifiers on a pallet to avoid shipping damages as they are very heavy and not suitable for ground shipping.

## Troubleshooting

1. When I power on the amplifier from the rear rocker switch, nothing happens. What should I do?

Check to make sure that the power cord is properly connected to the amplifier's Power AC inlet as well as the AC outlet from the wall. If there is no problem with the power source, check the fuse unit in the back panel of the amplifier with a Multimeter. If the fuse is blown, replace it with a new fuse, and try turning the power on the amplifier again. If the problem still persists, contact your authorized VTL dealer or the VTL factory immediately.

2. When I try to power on the unit, the *Mute LED* blinks at a fast rate, and I cannot turn on the amplifier from the Power On button. What is the problem?

The amplifier is indicating that there is a tube fault in your amplifier. Refer to Chapter 3 on how to identify which tube causes the fault, and how to replace the faulty tube and clear the fault.

3. I am getting a noise and hum coming from my speakers when I turn the amplifiers on. What can I do to eliminate the noise?

It is recommended that you connect your audio components to a good clean AC ground in your system, and for quietest operation it is recommended that all components be plugged into the same ground potential (or same AC outlet.) In single ended mode a ground loop hum can result from a difference in ground potential between different components in the system and it is recommended that the system be operated in the balanced mode to defeat ground loop problems. Under no circumstances should you attempt to defeat the ground with a ground lifter cheater plug, as serious damage to the components and yourself could result. If the noise persists you should either contact your dealer or the VTL factory to try to resolve this problem.

4. I am getting a noise and hum coming from my system when I plug in a video source. What can I do to eliminate the noise?

The noise may be coming in from your video cable system. First disconnect the video component from the system to see if this will solve the problem. If it does then you will need to try to lift the ground from the cable TV wire by means of a cable ground-lifting transformer available from most electronics stores. If the problem still persists contact your VTL authorized dealer or the VTL factory service department.

5. I am getting a ringing noise from the amplifier when I touch or bump it. What should I do?

One or more of the tubes in the amplifier may be microphonic and the source of the problem. Follow the procedures listed in this manual to remove the tubes and change them for new ones.

# Specifications

## *MB-450 Series III Signature Monoblock power amplifier*

Vacuum Tube Complement	8 x 6550C, 1 x 12AT7, 1 x 12BH7
Output Power 20 Hz – 20kHz, into 5 ohm load	Tetrode = 425 watts Triode = 225 Watts
T.H.D. 20 Hz – 20 kHz @ 450W Tetrode	< 2.5%
T.H.D. 20 Hz – 20 kHz @ 200W Triode	< 2.5%
Input Sensitivity @ 450 W Tetrode	2.0 V
Input Impedance	42K Ohms
Optimum Load Range	4 - 8 ohms
S/N Ratio @ 450 W Tetrode	-110dB, 120 Hz
S/N Ratio @ 200 W Triode	
Power Consumption	Idle = 300 W Full Power = 1000 W
Primary Mains Fuse Rating	100/120V = 15A Ceramic Slo Blo 220/ 240V = 7A Ceramic Slo Blo
Input Fuse	100/120V = 1A Ceramic Slo Blo 220/240V = 0.75A Ceramic Slo Blo
Logic Fuse	100/120V = 1A Ceramic Slo Blo 220/240V = 0.75A Ceramic Slo Blo
B+ Fuse Rating	Plate Fuse -- 2.5A fast acting 600V Screen Fuse – 0.75 fast acting 600V
Dimensions	W = 18.5 inches (48cm), D = 18 inches (26cm), H =9 inches (23 cm)
Weight	93 lbs (42Kg) per monoblock unpacked 110 lbs (50 Kg) packed

# Warranty

Your VTL amplifier/amplifier is covered by a limited warranty against defects in materials and workmanship for a period of 90 days from date of purchase by the original purchaser only when purchased from an authorized VTL dealer. A further optional limited non-transferable five-year warranty is available to the original purchaser only upon proper registration of ownership within 30 days of date of first purchase. The warranty period begins on date of first sale to the end user, or one year after shipment from the VTL factory, whichever is the earlier.

Proper registration is made by filling out and returning to the factory the warranty card attached to this general warranty statement, along with a copy of the original sales receipt as proof of the original date of purchase, within 30 days of purchase. Only one registration card is issued with each unit. If the warranty registration card has already been removed then this is not a new unit, and is therefore not warranted by the factory. If you believe this to be a new unit then please contact the factory with the details of purchase.

This warranty is provided by the dealer where the unit was purchased, and by VTL Amplifiers Inc. Under the terms of the warranty defective parts will be repaired or replaced without charge, excepting the cost of tubes. A six-month warranty on tubes is available with the correct recording of the serial number of the amplifier on your warranty registration card and mailing it with your purchase receipt to VTL.

If a VTL product fails to perform properly under the above warranty then the purchaser's sole remedy shall be to return the product to the authorized VTL dealer or to VTL Amplifiers Inc, where the defect will be repaired without charge for parts and labor. The product will then be returned via prepaid, insured freight, method and carrier to be determined solely by VTL Amplifiers Inc. All returns to the factory must be in the original packing and accompanied by a Return Authorization, (new packing will be supplied for a nominal charge if needed), accompanied by a written description of the defect. This must be shipped to VTL Amplifiers Inc via insured freight at the customer's own expense. Charges for unauthorized service and transportation costs are not reimbursable under this warranty, and all warranties, express or implied, become null and void where the product has been damaged by misuse, accident, neglect, modification, tampering or unauthorized alteration by anyone other than VTL Amplifiers Inc., including the use of non-factory approved tubes.

This warranty applies only to units used in residential non-commercial use. The warrantor assumes no liability for property damage or any other incidental or consequential damage, whatsoever which may result from failure of this product. Any and all warranties of merchantability and fitness implied by law are limited to the duration of the expressed warranty. All warranties apply only to VTL products purchased and used in the USA.

Some states do not allow limitations on how long an implied warranty lasts, so the above limitations may not apply to you. Some states do not allow the exclusion or limitation of incidental or consequential damages, so the above exclusion may not apply to you.

This warranty gives you specific legal rights and you may also have other rights that vary from state to state.

## Warranty Registration

Warranty registration for VTL products is valid in the USA only. International VTL customers should consult their local VTL dealer regarding product registration and warranty procedures.

To obtain valid US warranty service, please fill out the enclosed VTL Warranty Registration card and mail it to the following address with a **copy of your original bill of sale** within the first thirty days of purchase:

**VTL Warranty Registration**  
**4774 Murrieta Street, Suite 10**  
**Chino, CA 91710**  
**USA**

To help you keep a record of the serial number and purchase information, please enter the following information into this manual.

**Product Model Number:** \_\_\_\_\_

**Serial Number:** \_\_\_\_\_

**Purchase Date:** \_\_\_\_\_

**Authorized Dealer:** \_\_\_\_\_

### Service Notes

Date	Service	Initials
_____	_____	_____
_____	_____	_____
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