



OWNER'S INFORMATION FOR
MODEL 2250

MODULAR DIRECT-COUPLED
VACUUM TUBE DRIVEN
TWO CHANNEL POWER AMPLIFIER

UTILIZING



VACUUM TUBE TECHNOLOGY

Concept & Design: B K Butler

Patented in the USA
Worldwide patents pending

"Tube Driver", "Tube Driver Blue", "Thermionic" and Blue Tube illumination appearance / method are trademarks of or patented by BK Butler

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Congratulations

Please accept our sincere thanks and congratulations for making your musical choice Butler Audio. This new *USA-Patented* technology from BK Butler promises to become a classic design, just as his former efforts have in the professional music and auto sound industry.

After more than 25 years of tube audio experience in the Professional Music Industry with some of the world's greatest musical talents, BK Butler has now created an entirely new class of home audio and theater amplifier products. With careful emphasis on the achievement of practical "all tube" response characteristics, Butler Audio's Tube Driver® BLUE technology satisfies even the most critical vacuum tube audiophiles.

The Past is the Future[™]

For the first time in the history of tube amplifier design, the original "Edison Effect," or the *essence* of pure Thermionic vacuum tube emissions have been fully utilized to yield very low distortion and produce "all tube" type musical response characteristics in a multi-channel home amplifier. With painstaking efforts and great attention to detail, BK Butler has balanced the sonic response, load and transfer characteristics of individually selected twin triode vacuum tubes to operate under optimum conditions in this open-ended ZERO global negative feedback circuit topology.

Previous hybrid designs employing vacuum tubes generally utilized tubes only in impedance-isolated preamp or driver stages. However, Butler places the triodes exactly where they should be: DC - Coupled through the output power devices to the speakers. Therefore, the tubes are positioned to naturally and actively respond to the speaker load. This also completely eliminates one of the most inefficient and non-musical components in a typical tube power amplifier: the Output Transformer. Without hundreds of feet of phase-shifting, musicality-robbing wire and many pounds of induction-generating core iron to overcome, Butler's newly patented current-multiplying DC coupling circuitry allows the output driver tubes to directly operate into the fixed ratio-reduced speaker output load. This novel design results in the production of authentic power vacuum tube characteristics hundreds of times greater than normal capabilities of the driver tubes.

Comparable in concept to precision racecar active power steering, Butler allows the tubes to "power steer" the audio output signal directly into your speakers. The result: A superlative marriage of tube and solid-state technology without the limitations of either. Literally, you get the reliable, efficient power capability of solid-state with all the greatly extended dynamics, warmth and musicality of the highest quality vacuum tube design available today.

Product Description:

Butler Audio Model 2250 is a vacuum tube-driven 2-channel power amplifier. Each channel Power Module is completely independent and includes separate RCA input and 5-way speaker output binding posts, vacuum tube, rectifier & filter capacitors, electronic components, protection and output power devices, etc.

A separate 5-way speaker output binding post is provided for Mono operation. An internal AC Relay is included internally for remote operation from a pre-amp capable of providing a voltage of 8 - 13V DC (either polarity) via the 3.5mm input jack on the rear panel.

Note: Leave the front panel AC Power switch in the "OFF" (down) position for remote operation.

Power Output:

Each channel is powered by a separate secondary winding from the massive 2KW-rated power toroid transformer. This yields a power rating of 250 Watts, RMS per channel into 8 Ohms, both channels operating simultaneously. Each channel is also capable of producing 400 Watts, RMS per channel into 4 Ohms. An appropriate source of 120VAC nominal input line voltage with a minimum current supply of 12A is required. 230-240 VAC models require approx. 50% of the current rating of 120V models.

Protection:

Listed below are the various types of internal protection provided for unexpected conditions:

- 1) AC input fuse for protection against any major system power fault. Do not replace with a fuse of higher current rating.
- 2) Protection against AC input line transient voltage spikes and surges.
- 3) Slow vacuum tube filament warm-up: Provides safe, *fully regulated*, slow turn-on 6.3VDC for the tube heater filaments. This technique promotes longest tube life.
- 4) Turn-on and warm-up transient delay: This circuit will not allow the speaker relay to close (connect power module output to speaker posts) for a delay of approximately 20 - 30 sec. after turn-on. This provides for safe vacuum tube warm-up and output stabilization.

Note: Due to normal component tolerance differences, one power module will probably click "on" earlier than the other.

- 5) Main DC Power (+/- 75V) Fuses: A red LED will be visible from the front panel adjacent to the tube of the affected channel if a fault condition causes a fuse to open.

- 6) DC Offset Voltage at Speaker Output: Continuous monitoring circuit immediately opens the speaker relay upon the detection of any excessive DC voltage level.
- 7) Short circuit protection: In addition to the Main DC Power Fuses, mentioned in #4 above, this continuously active circuit becomes active to the speaker output below a load of approx. 2 ohms. It will prevent a catastrophic over-current condition for the output devices in the case of a direct short circuit between the + and - output speaker binding posts.
- 8) Over Temp Circuit Breaker: Opens the speaker relay if the heatsink temperature exceeds 115 deg. C. If this occurs, the amp should automatically begin operate again after the temperature has decreased sufficiently.

NOTE: BE CERTAIN THAT AIR FLOW IS COMPLETELY UNRESTRICTED ABOVE AND BELOW THE AMPLIFIER. IF RACKMOUNTED, LEAVE AT LEAST A STANDARD SINGLE SPACE BETWEEN THE NEXT PIECE OF EQUIPMENT (TOP AND BOTTOM) OR PROVIDE FORCED AIR COOLING. THIS AMP IS DESIGNED FOR USE ONLY AT ROOM TEMPERATURE WITH ADEQUATE VENTILATION AND CIRCULATION.

***IMPORTANT: COOL OPERATION = LONGEST LIFE AND RELIABILITY!
DO NOT OPERATE WITHIN A COMPLETELY CLOSED CABINET OR ENCLOSURE!
LET YOUR AMP BREATHE!***

Use and Operation:

Important: Do not apply power until you have read and understand this section! Connect or disconnect cables only with amplifier OFF.

Note: Your new Butler Audio amp is designed to operate in stereo with ONE separate speaker system connected per channel. Connect "Speaker Outputs" to speakers only! DO NOT SHORT ANY SPEAKER OUTPUT POST TERMINAL TO ANY OTHER SPEAKER OUTPUT POST TERMINAL. CONNECT EACH SEPARATE SPEAKER LOAD ONLY BETWEEN THE SPEAKER POSTS OF PAIR CHANNEL. WHEN USING MONO MODE (BRIDGED), BE SURE TO SELECT THE "MONO" SETTING (DOWN POSITION) OF THE STEREO/MONO SWITCH.

Front Panel Power Switch:

Supplies main AC power to the amplifier. The ON position is up and will be indicated by the blue LED indicator and the glow of the tubes through the front panel louvers.

Rear Panel Remote Jack:

This 3.5mm standard mini phone jack is connected to a heavy duty AC relay that parallels the operation of the Front Panel Power Switch. Therefore if remote operation is desired, leave the switch in the OFF (down) position. Whenever an 8 - 13V DC voltage is supplied to the jack (either polarity) the amp will be turned ON just as if the front power switch were used. It will not harm the amplifier if the front panel power switch is turned ON with the relay activated, but this will disable the remote function until it is switched OFF again.

Inputs:

The high-quality gold plated RCA-type input jacks will easily accept the line-level signal supplied from most pre-amplifiers. The input gain has been internally preset to equal full (250 Watts) output at 8 ohms for an input sensitivity of 2.0 Volts. The input impedance is a very compliant 47K Ohms which accepts a wide range of signals without undue loading.

It is good practice to keep the shielded connecting audio cables as SHORT as possible. Cable lengths longer than 10 feet are not recommended and excessive length cables should *never* be coiled. Use the proper cable lengths; the performance and sound quality of this amplifier is worth it!

Speaker Output Binding Posts:

Gold plated heavy duty 5-way binding posts with large custom-machined gold plated hex drive nuts have been supplied to accommodate virtually any type of speaker connection. Speaker wire should be kept as short as possible and away from input cables. Shielded cables must NEVER be used, as this may cause high frequency loss and introduces a needless capacitive load to the amplifier. ***DO NOT SHORT ANY POST TO ANY OTHER POST!***

Speaker Phasing:

Upper post, **RED** ring, is **POSITIVE**.

Lower post, **BLACK** ring, is **NEGATIVE**.

Correct speaker phasing is essential for optimum operation.

Note: Never short ANY speaker post to ANY other speaker post! Connect 1 separate speaker load to each channel. Use center binding post pair for MONO operation ONLY!

MONO Operation:

Place Stereo / Mono switch in MONO position (Down). Connect a 6 – 8 Ohm (nominal) minimum speaker load between the center binding post pair. Use Channel 1 input RCA jack only.

Remote Operation:

If remote operation is desired, the 3.5mm mini phone jack is provided on the rear panel. Connecting cable may be either shielded or unshielded. Supply voltage should be between 8 and 13 V DC, either polarity, from the preamp or other remote source.

Note: Remember to leave the front panel power switch "OFF" (down) for remote operation

Specifications:

Model TDB-2250

Power rating, RMS:	250 Watts per channel, 8 Ohms, (Both channels operating) 400 Watts per channel, 4 Ohms 800Watts Mono, 8 Ohms*
Frequency Response:	20 - 20,000 Hz, +/- 0.5dB
Distortion (THD):	Less than 0.10% at 8 Ohms Less than 0.15% at 4 Ohms
Input Sensitivity	2.0V for 150 Watts into 8 Ohms
S/N ratio:	Better than 120dB, "A" Weighted
Slew Rate:	15V / uSec.
Vacuum Tube Complement:	One 6SL7GC twin triode per channel
Idling Consumption:	Approx. 40Watts (Approx. 0.3A @120VAC or 0.15A @ 230VAC)

Full Power AC Consumption:

Model	Power (Nominal)	Current @120VAC,	@230VAC
2250: @ 8 Ohms @ 4 Ohms	720 Watts 1200 Watts	6A 10A	3A 5A

Dimensions: 17" W x 16" D x 8.5" H (with Feet)
(7" H without Feet)

Weight : 43 Lbs. (19.2 Kgs.)

*** DO NOT OPERATE AT FULL POWER IN MONO MODE WITH
LESS THAN NOMINAL 6 – 8 OHM SPEAKER LOADS.**

Cable Quality:

Within reasonable limits, it has been our experience that you get what you pay for in cables. A good set of shielded input connection cables coupled with large gauge, high quality low-loss speaker wire is well worth the investment. Do not degrade the remarkable performance of your amplifier with inferior connecting cables.

The Marvelous Vacuum Tube:

Triode Vacuum Tubes were the first method of practical audio amplification patented in 1907 by Lee De Forest. At first, he used an open flame to produce thermionic emissions, but later found an electrically heated filament was much more practical.

The first triodes were inefficient and often very mismatched in performance. Thankfully we now have reliable sources of precision manufactured triode tubes, which are very consistent in quality and performance.

Over the years, BK Butler has experimented with virtually every type of audio vacuum tube. In 1992 he obtained a large Vacuum Tube Analyzer formerly used by the FAA to test and analyze radar tubes for aviation control towers. This old but very high-quality apparatus enabled him almost unlimited control to adjust and experiment with virtually every conceivable parameter of any tube. For example, input and output pins could be reassigned. B+ voltages and bias currents switched to any desired value or configuration. During these test, it was noted that a Phantom voltage was being generated.

It turned out to be nothing less than the original thermionic effect that one of Edison's assistant technicians (a Mr. Hammer) discovered in the late 1800's while testing early light bulbs. He noted a blue glow around the positive pole in a vacuum bulb and a blackening of the wire and the bulb at the negative pole. At first, this was referred to as "Hammers Phantom Shadow", but later Edison took credit for the discovery himself (as was his practice) and re-dubbed it as "Thermionic Emission". More tests followed and soon the first vacuum tube diode was invented. Limited at first to rectifying AC into DC, Edison failed to make the one essential step needed for tubes to achieve useful amplification.

However, around 1906, Lee De Forest vastly improved the 2-electrode vacuum tube diode by adding the crucial element: a third electrode, or control grid. The rest is history. The successful invention of the amplifying vacuum tube triode, which could regulate the thermionic emissions of electrons from heated cathode, became the foundation for our modern electronics industry. Without De Forest's great insight and marvelous discovery, you would probably not be enjoying your new Butler Audio amplifier!

Tube Reliability:

It's interesting to note that until the 1960's, tubes were used in every area of electronics including aviation. When people flew on a commercial airliner, they literally trusted their lives on tube-powered avionics. So, aside from a common-sense warning to take care not to break the glass, there is very little reason to be concerned about the 6SL7GC tubes within your amplifier. Without them, the musicality of your amp would greatly diminish!

Butler's design has reduced the electronic stress on the tubes to less than 5% of rated value and NO dangerously high voltages are needed for operation. Therefore, heat production from the tubes is minimal. BK Butler has been a pioneer in the use of low-voltage vacuum tubes and time has proven him correct in his long assertion that correctly employed, vacuum tubes don't need lethal voltages to be highly musical. (Just ask **Eric Johnson** - repeatedly voted by ***Guitar Player Magazine*** as the world's best guitarist, **Billy Gibbons of ZZ Top**, or **Pink Floyd's David Gilmour** if BK Butler's low voltage tube guitar pedals aren't the most reliable and best sounding ever made!)

What this means to you is that the tubes installed in your new Butler amplifier should last as long as the other high quality electronic components in the design. No special tube care, replacement, matching, biasing or maintenance is usually necessary. In the unlikely event a tube becomes faulty* , each tube is connected to the power module via a high-reliability multi-pin connector so replacement is simplified.

Finally, the most likely reason you invested in your new Butler Audio amplifier was to enjoy the sonic superiority vacuum tubes create. Please enjoy this revolutionary design BK Butler worked so long to produce. We're confident you'll have many trouble-free years of listening pleasure!

- Everyone at Butler Audio, Inc

** The only external visual check possible by the customer is to look through the front panel louvers for the 2 glowing orange/red tips at the top of each tube during operation. The blue illumination should continue, but if a particular channel becomes inoperative and its tube has no glowing filament tips, that tube is likely defective and should be replaced.*

Warranty & Repair Policy:

All Butler Audio products are manufactured using the finest parts and materials available. Butler Audio Tube Driver Blue home audio amplifiers are warranted against manufacturing defects in material and workmanship for a period of five (5) years from the original date of purchase, if purchased at an authorized Butler Audio retailer. The original purchaser must complete a Butler Audio Warranty Registration Card including the purchase date and the authorized Butler Audio Dealer name and address and mail it to Butler Audio Inc., Warranty Dept., PO Box 460572, Aurora, CO 80046-0572 within 14 days of purchase. Otherwise they are covered by a 90-day warranty. This warranty is transferable IF the secondary purchaser retains the original purchaser's sales receipt.

During the warranty period, Butler Audio will repair or replace (at its sole discretion) without charge, (pending inspection of the product's condition) valid defects in material and workmanship. If an amplifier is determined to be defective within the first 90 days from the original date of purchase, Butler Audio will replace the defective amplifier with another new amplifier or with an amplifier we deem to be equivalent (over-the-counter exchange). After the first 90 days and until the end of the five (5) year warranty period, Butler Audio will repair or replace the amplifier (with an amplifier we deem to be equivalent) at our sole discretion. Proof of Purchase (sales receipt) is required for all warranty requests.

This warranty does NOT cover the following :

- a) Damage to any of the metalwork (i.e. heatsink, endplates, etc.)
- b) Damage caused by abuse, misuse, accident, theft or any act of GOD
- c) Damage caused by improper use or installation
- d) Any cost or expense related to removal, re-installation or shipping
- e) Service performed by anyone other than Butler Audio, Inc
- f) Subsequent damage to other components
- g) Any amplifier not purchased from an authorized Butler Audio retailer
- h) Any amplifier purchased outside the USA. Amplifiers purchased in another country are covered only by that country's distributor and not by Butler Audio.

Any removal, alteration or tampering of the serial numbers or tampering with the inside of the amplifier will result in voiding the warranty.

Butler Audio reserves the right to determine and make final judgment as to the cause(s) of any defects. Any product determined to be free from defects will be returned, freight collect.

No person is authorized by Butler Audio to assume any other liability in connection with the sale of these products.

Return (RMA) Procedures

Product(s) determined to be defective require a **R**eturn **M**erchandise **A**uthorization number (**RMA#**) to be issued by Butler Audio prior to return. To receive an RMA#, completely fill out the Butler Audio RMA form and fax it to the main office. Once received, an RMA number (RMA#) will be issued and faxed back. Returns will NOT be accepted without an RMA#. All returns must be packaged in their original box to prevent damage during shipping and must include a copy of the RMA form. Restocking charges will apply for any and all missing parts or repackaging materials. No credit invoices will be issued (repair or exchange only). Please call or fax:

Butler AUDIO

Ph: (303) 766-4504 • Fax: (303) 766-5032

Service Information and updates may be found at WWW.BUTLERAUDIO.COM

Returns must be sent prepaid via UPS/FedEx or similar carrier to facilitate any necessary tracking. The RMA number issued must be clearly marked on the outside of the shipping box. Butler Audio assumes no responsibility for damage incurred during shipping. A copy of the completed RMA form showing the assigned RMA#, signed by an authorized Butler Audio representative and a copy of the original sales receipt must accompany all returns. All returns are processed in the order they are received. Repaired unit(s) will be returned by the same shipping method they were received in (i.e. Ground, Next Day Air, Second Day Air, etc.). If expedited return service is required or requested, please contact your Butler Audio representative for details.

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