

Headcode reference standard Headphone Amplifier Topology Defining the Art in Amplifier Technology

TRIAD Audio specializes in reference quality high-end Amplifier systems of such accuracy and definition that for the first time you are transported to your own world of Musical Nirvana. The reason for us to create such Amplifiers is because we became dissatisfied with any one commercially available audio amplifier (Including those at the high end). Most High quality High end Amplifiers get some points correct however leave gaping holes in other parts of the musical experience. Some fine amplifiers have punch and dynamics however may introduce Grain thus distracting from the musical experience, while other amplifiers may have clarity yet be gutless and sound compressed. Again this is distracting from the musical experience. This led us to an exhausting research and engineering effort to define what a Reference Quality amplifier should be. The result of this effort is the **Bi-Code** Amplifier Topology, This Design operates with such linearity that a new level of sonic purity is obtained for audio amplifiers.

The name implies the design of the circuitry. The **Bi-Code** topology utilizes ultra performance bipolar Transistors exclusively in our fully discreet component Amplifiers. These devices are operated in the most linear Amplification circuit known to electronic science, the cascode. The advantages of the Cascode gain stage over other Circuit configurations are dramatically improved High frequency Response and ultra low Distortion. Cascode gain stages are extensively used in the input differential amp in most Premium IC Op-Amps. This first stage of amplification is ultra critical and IC manufactures exploit the virtues of the Cascode gain block to provide a front end that is transparent and will not burden the source with a radical change in input currents with the changing audio signal. The Thinking at TRIAD Audio is that since the Cascode gain Stage is so linear it only makes sense to continue the use of this highly linear Cascode design throughout the entire amplifier. Cascode gain Blocks are used from the first Input stage of the Amplifier all the way including the output Stage. The Resulting amplifier possesses such Linearity at all signal levels that a new level of sonic purity is obtained. In Cascode operation, one Transistor is used as the Active Gain device and another is used as a shield and maintains a consistent operating environment for the Active Transistor.

Cascoding provides an ideal gain stage that is devoid of The Inconsistencies that plague other topologies, so we start with a naturally clean gain stage. We use proprietary enhancements to the Cascode to further improve upon its natural Linearity. The resulting "Enhanced" Cascode is as close to the proverbial Straight wire with gain as technically possible, the removes the requirement of large amounts of overall negative feedback to obtain superb Performance specifications. The Distortion performance of Phil Larocco's **Bi-Code** Topology is as good prior to the application of negative feedback as many other Amplifiers are after application of Negative feedback. With The **Bi-Code** Topology TRIAD Audio is Defining The Art In Audio Amplifiers since the Headcode is based upon this Ultra linear amplification Method, The Bar is now Raised For reference Quality Headphone Amplification.

More than just a one trick pony the Headcode continues with

A Completely Symmetrical, True complementary topology from input to output takes advantage of the natural tendency of complementary Circuits to cancel out distortion. To Fully Exploit this virtue the Headcode uses dual Supper matched Log conforming instrumentation grade dual NPN and Dual PNP silicone nitride triple passivation differential amplifier transistors in Casscode and arranged as complementary Differential Amplifiers for the input stage. By Casscoding these splendid devices Thus open loop distortion is substantially Reduced by treating these specially connected tandem pairs as a single device.

The class A second voltage gain stages are also cascoded with Dual Supper matched Complementary transistors. This stage supplies the majority of open loop voltage gain rather than using the first differential stage as in most designs thereby allowing a natural, wide open loop bandwidth with ultra low noise and excellent D.C. stability without distortion producing servo control.

Although true complementary design from input to output and casscode operation have been used on their own and produced amplifiers of great respect, it took our creative vision plus esoteric concepts and component parts To synergistically merge both into one splendid amplifier. In casscode operation one device acts as a constant voltage load shielding the other from voltage changes with the signal. Furthermore, the devices see only half the rail voltage permitting employment of these superb transistors that otherwise would be voltage limited and not usable in conventional amplifier designs. This extends ultra transparent performance to four times the power output of conventional amplifiers. Symmetry is also throughout nature so it only makes sense that a symmetrical arrangement be employed to further enhance the monotonic nature of the Headcode Amplifier.

The complementary symmetrical design from input to output by virtue of the inverse PNP/NPN transistor relationship naturally eliminates even order harmonics by self-cancellation allowing the limited use of overall feedback to remove simple distortions. Each stage is completely stable on it's own so that transient distortions characteristic of feedback amplifiers don't occur with The Headcode design. The high slew rate that's equal for both ascending and descending waveforms is naturally inherent to our topology so no artificial slew enhancement is needed. Slew enhanced designs look good on paper but sound strained and grainy on mid and high frequency transients. The **Bi-Code** Topology has a monotonic distortion curve. Monotonic in nature is the rule and circuits that are no monotonic are not natural sounding. The superb Linearity of the Headcode is maintained for all signal levels thus providing consistent purity of the Audio information from the Blackest hole of silence to the Full Power of a Jet aircraft taking off the Headcode maintains it's composure and provides the listener with a complete picture of the music regardless of level, frequency or waveform> As much musical information as is presently possible is conveyed to the listener. You hear subtle nuances that previously were unnoticed. The eerie black Background of silence will give you Goosebumps again

The Finest output Stage is now available for your Headphones

The triple Darlington Casscode connected output stages are also cascaded allowing utilization of high speed, high current devices to be safely operated into difficult Headphone loads. The single ended push pull class A pre-drive and driver topology present a constant impedance to the output transistors under all signal conditions. With all loads the damping factor to the Headphones are relatively constant across the D.C.-20,000 Hz bandwidth. The tremendous Current gain afforded by the triple Darlington output stage provides for dynamics to die for regardless of what headphones are used. The Dynamic contrasts appear to be endless with the Headcode and breath new life into difficult to Drive Headphones. The Abundance of available output current (3 Amps RMS SOA) when combined with an RMS output voltage of 15 volts you are assured that at no time are your headphones ether voltage or current starved at any listening level you want. (Please listen responsibly to protect your hearing)

The complete freedom from listener fatigue with uncanny transparency will captivate you! The effortless dynamics even into difficult loads will bring out the natural life of all recordings without the typically overblown, larger than life presentation one comes to expect of solid-state amplifiers.

Beyond Class A is the **Accu~track** Biasing of the Output stage employed in the Headcode This technique Provides for optimum Bias of the output transistors and elimination of crossover distortion under Dynamically Changing Output Conditions the **Accu~track** Bias circuits use two separate bias Generators. One bias is fixed and thus provides a reference for the second Bias circuit. The second bias circuit monitors the actual output voltage and current levels and adjusts the standing bias current in the output stage as required by the consistently changing output Dynamic conditions. In the Headcode Amplifier Dynamic Biasing is naturally accomplished by Referencing The Output stage upper casscode to the Amplifier Output as opposed to The conventional practice of referencing this to a fixed potential such as the power or ground By using the output as the reference the upper casscode is no longer referenced to a fixed potential but however is changing along with the output signals to maintain an ideal amount of Bias current for the Output Circuitry that is changing in response to the amplifiers output conditions at any given instant and change the bias to the optimum amount on the Fly. Our Proprietary arrangement of the Headcode output stage Lumps the upper and lower casscode's to form one stage and thus removes the excessive phase shift that plague conventional Multistage output designs. This way the huge current gain of the Tipple Darlington output stage may be utilized without the stability issues of lesser designs and allow us to have our cake and eat it. The Headcode design dose not compromise one parameter at the expense of another.

DEFINITIVE TEMPERATURE STABLE DISCRETE COMPONENT POWER SUPPLY

The foundation of any audio Amplifier is the power supply so it would make sense we include state of the art technology for power deliverers in the Headcode and indeed we have obsessed the power supply details to the Lunatic Fringe. Unlike the trend in High End Audio our power supplies are designed around an intelligent scheme rather than mealy follow the present trend of dumb brute force thinking prevailing in High End to day.

The AC mains power enters the Headcode via a filtered IEC power cord receptacle. This removes Radio frequency interference and other High Frequency noise that otherwise would contaminate the AC mains power entering the unit. The AC from this filter delivered to The Ultra low noise Torrid power transformer. These Transformers are specified at both 50 and 60 Hz and includes two 115 volt windings to allow international voltage operation from 100-230 VAC@50/60 Hz. the output from the power transformer is impressed upon a Full wave Bridge rectifier using Complementary PNP/NPN power transistors as a continuation of the Headcode's fully symmetrical complementary design. Primary Reservoir storage is provided by a low ESR high temperature 18,000uF Capacitors for Long life and high performance. A fully discrete component complementary circuit topology is utilized to maintain the same balanced symmetry as the Headcode's Amplifier circuitry so as to maintain natural balance as is done thought the Headcode

Pre-regulation circuitry makes the job easier for the primary regulation stage. By providing a clean and stable DC power source with extremely low noise the primary regulation circuitry will free from contaminated by the massive amounts of noise present upon the raw DC supply output. A conventional regulated power supply only contains one Voltage regulation section. The voltage regulation stages receive power directly from the raw DC output from the Rectifiers and Reservoir capacitor. These methods Places the High ripple of the capacitors by the rectifier diodes, upon the input of this Regulator and thus makes the conventional regulator unsuitable for test and measurement proposes The Lab Power#9 Pre-regulation Stage removes this entire Grunge and allows the post regulation circuitry to merely dust off any small remaining noise and Ripple. The Pre-regulation stage executed with precision-engineered highly stable Fully Discrete transistor circuitry. The topology of this stage optimized for the function of providing a precise regulated voltage to the secondary voltage regulator circuitry, at extremely low output impedance, over an extremely wide frequency range. This stage is also negative feedback Free for the best in Transient response. A fast response is required to effectively deal with the high frequency EMI Grudge.

The Post regulation Circuitry designed from the ground up for Extreme DC precision and vanishing low noise. The Pre-Regulation stages supply this superb post-regulation stage with an ideal clean DC power, Because of this design the techniques employed to achieve DC Precision and Low noise are used hear. At the heart of this stage is a fully discrete component Error Amplifier, An error amp is commonly used in a circuit where error correction is required. The output of the whole system now fed back into the input of the Error amp. This will allow the amp to compare the output (of the whole system) to the input signal and correct as needed. The error amp when used in a circuit, which needs little current at its output, can still monitor the output and correct as needed. This Error amp stage utilizes ultra low noise bipolar small signal transistors of the type generally reserved for use in low noise Audio Electronics such as Microphone preamplifiers.

The Headcode will soon be available in several different versions from a Portable unit to a standard stereo model and continuing with the Reference quality Dual mono and TRIAD versions the First of which is presented hear so as to introduce you to this superb Reference standard amplifier

TRIAD Audio is confident once you hear this Amplifier you will be so pleased with the sound you hear that other Amplifiers may seem pale in comparison

Manufactured exclusively in the USA by the hand of extraordinary craftsman with pride by

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The Headcode can be auditioned at this authorized TRIAD Audio Agent

Exclusively Available in this area at