



GOLDMUND TECHNICAL NOTE NUMBER 4

THE MIMESIS AMPLIFICATION STAGE

All MIMESIS amps and preamps are built around the same amplification stage, which is a discrete operational amplifier of the highest possible quality.

With a bandwidth of several MegaHertz, a slew rate around 1000 Volts/microsecond, ultra low distortion, perfect DC response, and a noise contribution in the single decibel range, this operational amplifier displays the highest electronic performance attainable.

EXCEPTIONAL VERSATILITY

The same schematic can be used from a low noise phono stage to the driving circuit of a 300W amplifier. It can be powered by $\pm 35V$ to $\pm 85V$. By simple adjustment of its gain, feedback, and slew rate limits, the same schematic is usable and easily optimized for each function. Even inverting and non-inverting stages can be made using this very same amplification stage.

EXCEPTIONAL HEADROOM

With a power supply around $\pm 60V$, the preamplifier circuits built around the GOLDMUND amplification stage can receive and produce signals of nearly 40V RMS. The dynamic range possible allows the GOLDMUND circuitry to compete with tube designs. Thanks to the very low level of noise, this quality provides a dynamic range of unique extension even in the lowest level preamplifier stages.

The high input impedance (>1 MegaOhm) and very low output impedance (<10 Ohms) provided by the high power (close to 3 watts) output stage allow long connections and a very wide range of applications, including driving low value volume and balance potentiometers which are much better in sound than high value ones.



LOWEST POSSIBLE COLORATION

The input circuitry of the GOLDMUND amplification stage is potted to insure thermal stability. This technique also allows the lowest possible coloration by microphonic effect, by preventing low level signal transistors from vibrating. The sonic result is exceptional transparency.

No capacitor is needed in the GOLDMUND amplification stage schematic. Only the smallest values in the picofarad range are used to tune the slew rate, depending on where the stage is used in the component schematic. As the stage is DC coupled, no capacitors are needed between stages either. With the absence of capacitors in the signal path and the exceptional rejection of power supply capacitor noise, the GOLDMUND amplification stage is free from any capacitor sound, the most difficult coloration to avoid in conventional electronics.

A minimum quantity of resistors is used in the signal path. The 1% metal film model selected displays the lowest possible coloration. In the best GOLDMUND products (GOLDCUBE, MIMESIS 9.2, MIMESIS 2.2) Vishay resistors are used in the signal path, despite their very high cost.

Transistors have been selected for their minimum sonic thumbprint. The double inverted symmetrical topology makes the negative and positive part of the signal travel in the same type of transistors to symmetrize the non-linearity of these transistors.

The low coloration allows multiplication of this same kind of stage without the typical sound alteration.

EXTREME SPEED

The very high speed of the amplification stage allows the design to be made with negligible frequency tuning. Without phase correction the stage displays perfect (0 degrees) phase response in the audio bandwidth. Thus the linearity can be made perfect and the stability of the whole design is maintained with ease and without the strong frequency limitations usually adopted (very detrimental for sound quality).

SHORT PROPAGATION DELAY

The propagation delay of the stage, typically less than 80ns, allows negative feedback to be tailored without significant TIM induced distortion. Depending on the position of the stage in the amplification line, this capability allows the designer to use a needed amount of

negative feedback without detrimental sonic effects. The stability and low inherent distortion contribute to free the choice of extremely low or moderate values without significant sonic differences, and allow a perfect purity of the signal.

THERMAL STABILITY

To insure a very low DC offset, and keep this offset very constant, the input circuitry of the amplification stage is potted. This technique allows the temperature difference between input transistors to be kept very small. More, due to the very symmetrical topology, the temperature changes have very limited effect on this offset.

This explains why the best MIMESIS products are fully DC coupled without the usual impractical limitations inherent in this kind of design, and without the sonically imperfect DC servo-loop usually encountered in transistor design. This is one important contribution to the famous "liquid" sound and very clean bass response of the MIMESIS line.

POWER SUPPLY REJECTION

The schematics used provide rejection of power supply imperfection of nearly 100dB. The typical induced power supply noise is thus not perceptible. Since the schematic is also very symmetrical, even an unstabilized power supply can be used, and the typical high frequency noise of regulators can be avoided.

EASY MAINTENANCE

The total symmetry and use of inverted transistors in each signal path provides high insensitivity to transistor matching. Replacement of a transistor doesn't affect the balance of the design nor the sound quality.

The pluggable input module allows also maintenance to be made without dangerous fluctuation of the sonic quality.

A single adjustment for each stage compensates for DC offset differences between modules so that a quick DC tuning is the only adjustment needed after a transistor or input module replacement.