During zero signal conditions the quiescent current, $I_{CQ}$, which flow in the $Q_8$ and $Q_9$ output transistors is the sum of $I_{CQ_1}$ determined by bias 1, and $I_{CQ_2}$ determined by bias 2 and 3.

Therefore,

$$I_{CQ} = I_{CQ1} + I_{CQ2}$$

Where,

$$\left.\begin{aligned} I_{CQ1} &= \frac{V_{F1} - (V_{BE4} + V_{BE5} + V_{BE6} + V_{BE7} + V_{BE8} + V_{BE9} + V_{D1} + V_{D2})}{2R_E} \\ I_{CQ2} &= \frac{2V_{F2} - (V_{BE6} + V_{BE7} + V_{BE8} + V_{BE9} + V_{D3} + V_{D4})}{2R_E} \end{aligned}\right\} \cdots \text{formula 2}$$

When a signal is being reproduced, if, for example, the signal is swinging through the positive half-cycle, the current $I_O$ will flow in the positive side of the output stage, and the voltage generated across the emitter resistance will be $R_{E1} \times I_O$.

Therefore, the negative output side's collector current determined by bias 1 will decrease but because bias 3 operates as a fixed voltage source, the quiescent current $I_{CQ2}$ across the base emitter junctions of $Q_7$ and $Q_9$ will be maintained by forward bias so that the transistors will not be turned off. The same thing happens during reproduction of the negative half cycles since bias 2 provides forward bias for positive output transistors $Q_6$ and $Q_8$ so that quiescent current $I_{CQ2}$ is maintained. Because none of the transistors switch on and off there is no switching distortion generated during signal reproduction.

In addition, the load seen by $Q_4$ and $Q_5$ varies very little during positive and negative signal swings, even at the zero cross-point. At the same time, $Q_4$ and $Q_5$ operate in a class A emitter follower so that the voltage amp ($Q_2$) operates into a load having no nonlinearity. The result is that the circuit as a whole offers performance that is equivalent to class A amps yet completely eliminates the problems of class B amps.

In the synchro-bias circuit, the diodes $D_1$ and $D_2$ through which the signal passes, and the other diodes $D_3$ and $D_4$ through which the current for nonswitching output transistor operation during signal reproduction passes, are all high speed diodes which precisely follow the signal, even at high frequencies.

Bias 2 and Bias 3 operate in such a way that the positive and negative signal swings and zero cross-points are perfectly synchronized, and it is from this synchronization that we have given the circuit its name "synchro-bias".

Employing SLPT's (super linear power transistors), high speed diodes, and other advanced semiconductor technology, along with our concentrated power block configuration to prevent electromagnetic induction distortion, this "new class A" power amplifier as an entire component performs with the same outstanding quality that until now has been possible only with class A amps.