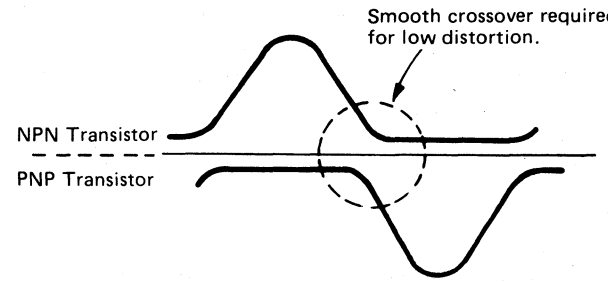
■ TECHNICAL INFORMATION

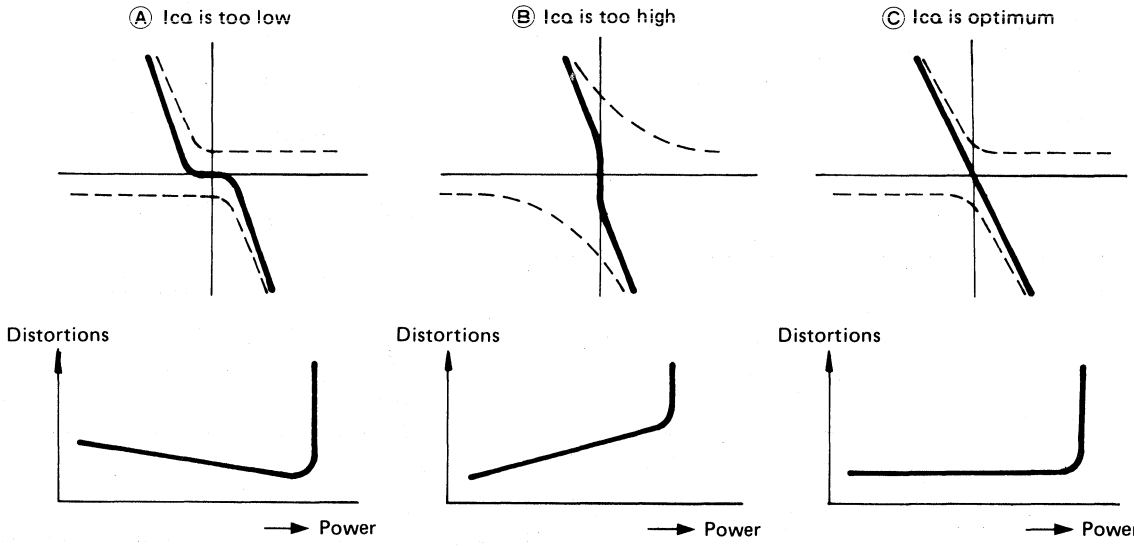
Technics New Class A amplifier circuitry eliminates switching and crossover distortion. To further improve fidelity a "computer drive" circuit has been incorporated to eliminate transient distortion in music signal reproduction.

• Power transistor idling current (Icq)

The idling current through the power transistors is adjusted so that crossover distortion is minimized when switching from the NPN transistor to the PNP transistor in a complimentary design (Fig. 1).
If Icq is not adjusted properly, distortion will result as in Fig. 2.



[Fig. 1]

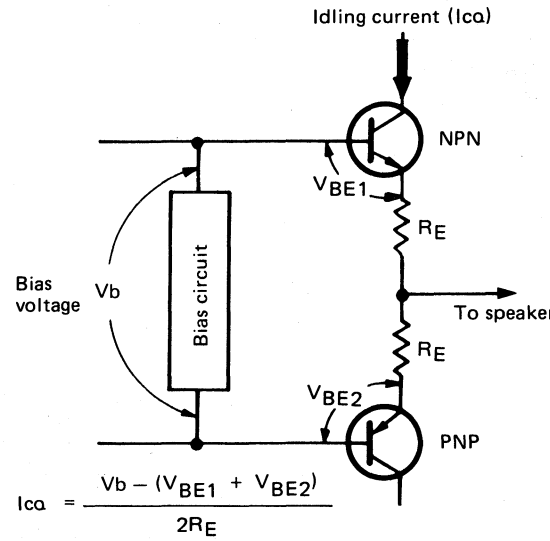


Relationship between idling current level and cross-over distortion.

[Fig. 2]

• Idling current and bias current

Idling current is determined by the bias voltage (Vb) of the bias circuit and the V_{BE} of each power transistor (Fig. 3). The V_{BE} varies according to the temperature of the transistor. This temperature varies instantaneously with the music signal. Unfortunately, with current designs, these instantaneous fluctuations cannot be detected due to the placement of the thermal sensor and the slow temperature change of the heat sink. Attempts have been made to include a thermal sensor as part of the output power pack. However, most power packs do not include a thermal sensor. Also, this method does not work if discrete components are used. We are still faced with the problem of stable bias operation and fast response to abrupt changes in temperature.

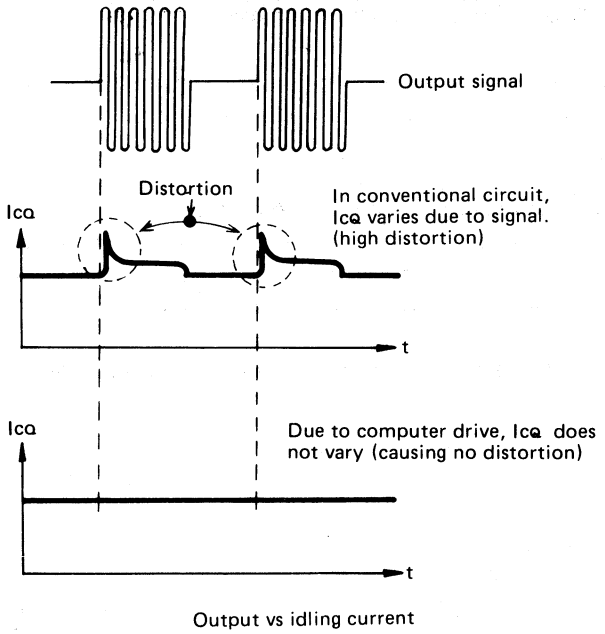


[Fig. 3]

• Computer drive system

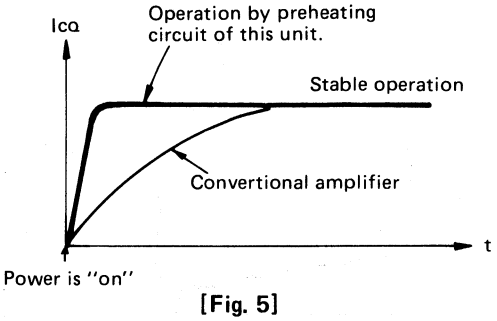
Knowing the thermal and signal characteristics of the power transistors, a system can be designed to calculater the instantaneous temperature changes and adjust for the optimum idling current. Information regarding th transistor ambient temperature and the input music signal is obtained through sensors and fed to a computer. Th computer calculates the optimum idle current and maintains it at a constant level by varying the bias voltage. Figure 4 illustrates the relationship of the output signal and the idling current. Figure 6 is a block diagram of the "computer drive" system.

Generally, it takes several minutes for the power transistors to reach the temperature of stable operation after the power is turned on. To ensure stable and optimum performance quickly, the microcomputer forces a large amount of idling current through the power transistors for a short time. This rapidly "preheats" the transistors and the heat sink. Figure 6 illustrates the stable operation level for the convertional and new computer drive system.



Output vs idling current

[Fig. 4]



[Fig. 5]

[Fig. 6]