

TECHNICAL DESCRIPTION

POWER AMPLIFIER

The Phase Linear Model 700 consists of two independent direct coupled linear power amplifiers combined to form a single, dual channel unit capable of extremely high power output. Please refer to the schematic diagram (Illustration 7) for the following circuit description of the individual power amplifier.

The low level input stage employs a wideband low noise FET input integrated circuit operational amplifier (Op Amp) to provide high open loop voltage gain for minimum distortion. The input signal is applied to the noninverting input of the Op Amp while the inverting input receives a portion of the final output voltage forming a negative feedback loop. A transistor functioning as a voltage level shifter couples the output signal of the Op Amp to a common emitter amplifier. The common emitter amplifier stage, biased for class A operation, is capable of swinging the full power supply voltage of 200 volts, providing the

final voltage gain of the amplifier. The output stage forms a unity voltage gain buffer, capable of delivering the required current.

A bootstrap arrangement is used to provide a high impedance load for the common emitter stage and at the same time increases the amount of drive current available to the positive predriver transistor allowing symmetrical saturation. Control of the amplifier idle current is accomplished with a transistorized biasing circuit (V_{be} multiplier) which regulates the bias conditions of the predriver, driver, and output transistors. The bias regulator transistor is mounted on the output stage heat sink assembly to achieve proper thermal tracking and prevents the possibility of thermal runaway.

The output stage of each channel employs 10 high current, high voltage silicon power transistors arranged in a quasi-complementary format and

biased for true class B operation. Most of the required bias current is carried by the driver transistors, resulting in very high circuit efficiency. In this design, the driver and predriver transistors serve to provide current amplification of the output signal from the common emitter stage to a level required by the parallel connected output transistors.

Voltage and current levels of the output transistors are monitored continuously during amplifier operation by the built-in, dual-slope protection circuit. The protection circuit consists of two transistors, one operates when the amplifier output is positive and the other operates when the amplifier output is negative. If the voltage and current levels in the output transistors become excessive, the protection transistors will conduct to divert drive current entering the predriver transistors; thereby limiting the current flow in the output stage to a safe value.