

HIGH SLEW RATE AMPLIFIER

The slew rate of the op-amp has been increased by increasing the overall current generating capability, by the addition of a pair of transistors. These transistors increase the output voltage range by allowing the voltage to swing to within OV5 of either supply rails. The output of the op-amp hardly moves at all. Without an input signal, the output voltage is 0 V and the op-amp drains approximately 2 mA from the supply rails.

This current passes through the 180R resistors and sets up a voltage which is not quite sufficient to turn on either transistor. When a positive voltage is applied to the input, the op-amp tries to swing negative but it has a 47R (R4) resistor connected from its output to ground. Thus, as it tries to swing negative, it draws lots of current from the negative rail. This current flows through R5, and in doing so turns on Q2. This transistor then pulls R2 down and thus provides negative feedback. The same sequence of events occurs when the input is negative except that R3 and Q1 are then involved. Thus the high current capabilities of discrete transistors are combined with a high voltage gain of an op-amp to produce a moderately powerful amplifier. The voltage gain is set by R2/R1.

Transistors Q1 and Q2 introduce a phase shift, which may give rise to a high frequency instability and oscillation. This can be cured by some frequency compensation applied to the amplifier or by increasing the overall voltage gain.