Gated oscillator with rapid start

The transistor is used as a conventional phase-shift oscillator, with its operating frequency determined by C_2, C_3, C_4, R_5, R_3, and the input impedance of the transistor. With the components shown the frequency of operation is about 1kHz.

With $+5V$ present at the input, diode D_1 is forward biased via R_1, thus almost 100% negative feedback is applied to the oscillator via D_1 and C_1 preventing oscillation. When the input signal goes to 0V, diode D_1 is reverse biased, removing the negative feedback. At the same time, the edge of the input pulse is applied to the transistor base, thus "kicking-off" the oscillator on its first half-cycle.

The value of C_1 is chosen so that the oscillator starts rapidly, but with no overshoot on the first half-cycle.

The first half-cycle is always in phase with the falling edge of the input signal.

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