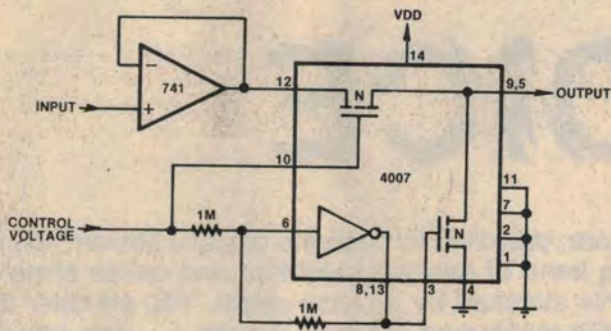


CIRCUIT & DESIGN IDEAS

A low cost voltage controlled amplifier



While working on the design of a low cost and simple voltage controlled amplifier (VCA) for a synthesiser, I came up with this circuit. It has since been superseded in my design by a low distortion VCA involving pulse width modulation

techniques. However, I present the original circuit for those readers who may have less critical applications for it.

Its operating principle is quite simple. The input signal, buffered by a 741 (or similar device), is fed into the voltage

divider formed by the two FETs. The inverter and the two resistors form a unity gain, high impedance inverting buffer so that the control voltage is fed directly to the series FET and ($V_{DD} - \text{control voltage}$) is fed to the shunt FET.

As the control voltage is raised from 0V to V_{DD} the output varies from very well cut off to complete signal transmission, if the output is buffered.

The 741 is required on the input since the input impedance of the divider can drop as low as $1k\Omega$ with $V_{DD} = 5V$ and $V_C = 2.5V$, and as low as 400Ω with $V_{DD} = 9V$ and $V_C = 4.5V$. The 741 must have a dual supply since all signals have zero offset.

To avoid distortion the signal level should be kept below about 20mV RMS. This conforms with the $V_{SS} - 0.3V$ limit set for the 4007 CMOS device.

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