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Digitally Controlled Sine-Wave Generator

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The circuit of **Figure 1** produces an accurate variable-frequency sine wave for use as a general-purpose reference signal. It includes an 8th-order elliptic, switched-capacitor lowpass filter (IC3) that is clocked with a 100kHz square wave generated by microcontroller IC2. (Any other convenient squarewave source is also acceptable.) The microcontroller is clocked by a 10MHz oscillator module. A voltage supervisor (IC1) ensures correct operation in the event of a power failure. IC3 sets the filter's cutoff frequency at 1/100 the clock frequency.

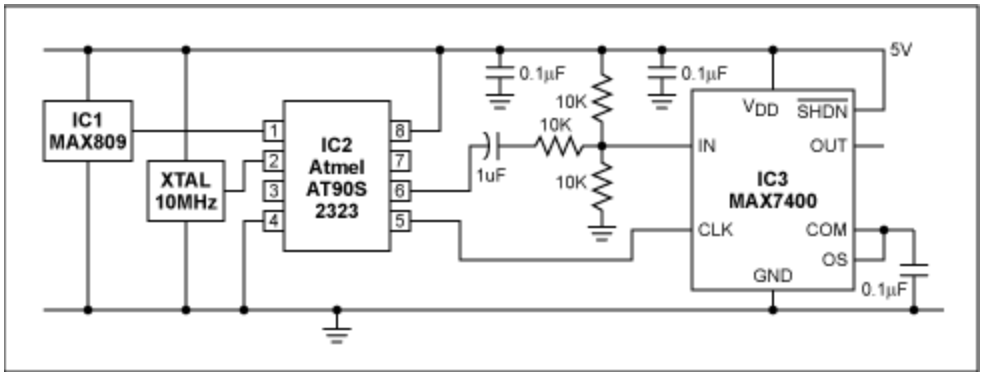

Figure 1. By removing harmonics from a square wave, this circuit generates an accurate and adjustable sine-wave output.

The 8th-order elliptic filter's sharp rolloff sharply reduces the harmonic amplitudes in a 1kHz square-wave input, thereby producing a near-perfect 1kHz sine wave at its output. Using divider-chain logic or a processor, you can then create a digitally adjustable sine-wave source by adjusting the clock and input frequencies while maintaining a ratio of 100:1 between them.

To prevent clipping at the positive and negative peaks, attenuate the input signal and superimpose it on a dc level of $V_{CC}/2$. The result (for a 5V input) is a 2.25V peak-to-peak output.

Related Parts		
MAX7400	8th-Order, Lowpass, Elliptic, Switched-Capacitor Filters	Free Samples
MAX809	3-Pin Microprocessor Reset Circuits	Free Samples

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