

APPLICATION NOTE 2081

Digitally Controlled Sine-Wave Generator

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.

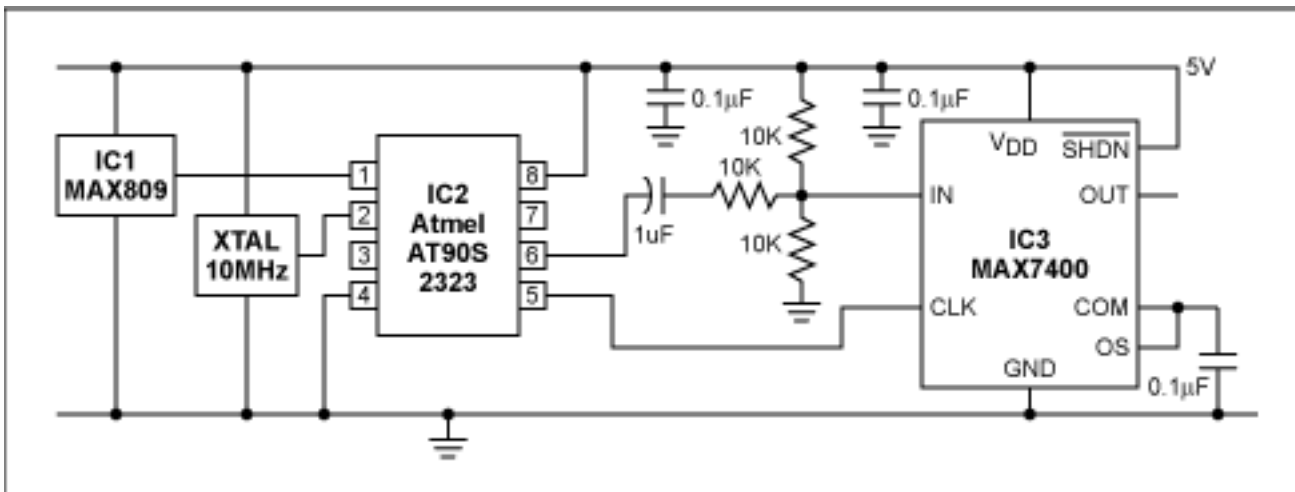


Figure 1. By removing harmonics from a square wave, this circuit generates an accurate and adjustable sine-wave output.

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. For the microcontroller shown, software to implement this idea is available for [download](#). (.asm, 4K)

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.

A similar version of this article appeared in the May 15, 2003 issue of *EDN* magazine.

Application Note 2081: www.maxim-ic.com/an2081

More Information

For technical questions and support: www.maxim-ic.com/support

For samples: www.maxim-ic.com/samples

Other questions and comments: www.maxim-ic.com/contact

Keep Me Informed

Preview new application notes in your areas of interest as soon as they are published. Subscribe to [EE-Mail -](#)

[Application Notes](#) for weekly updates.

Related Parts

MAX7400: [QuickView](#) -- [Full \(PDF\) Data Sheet](#) -- [Free Samples](#)

MAX809: [QuickView](#) -- [Full \(PDF\) Data Sheet](#) -- [Free Samples](#)

AN2081, AN 2081, APP2081, Appnote2081, Appnote 2081

Copyright © by Maxim Integrated Products

Additional legal notices: www.maxim-ic.com/legal