# Microcontroller controls analog phase shifter

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**Analog Devices** › AD5227

*Nick Ierfino*

*EDN*

Phase shifters find use in a variety of circuits, but variation in amplifier and capacitance tolerances usually makes it difficult to control the exact phase shift that precise control circuitry requires. The circuit in Figure 1 can control the phase shift from input to output by using IC3, an AD5227 64-step-up/step-down control digital potentiometer, to replace the value for the resistance. The formula of the center frequency of the output is

$$F_{CENTER} = \frac{1}{2\pi RC}.$$

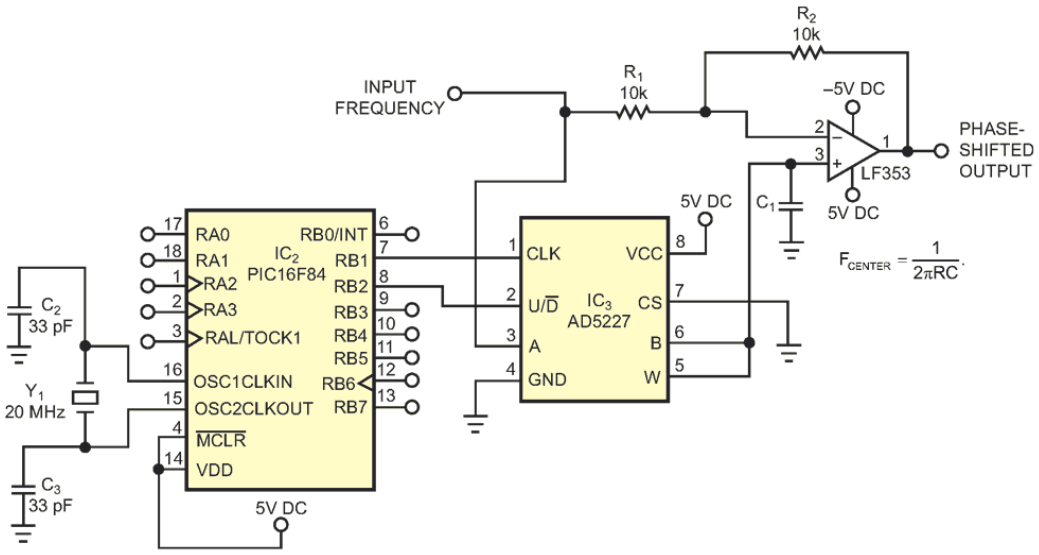


*Figure 1.* ***A PIC16F84 sets the resistance of the AD5227 digital potentiometer, precisely controlling the phase shift of the output with respect to the analog input.***

Different ranges of resistance are available for the AD5227. This example uses a 10-kΩ value. By stepping through the 64 points, the 720-kHz input sine wave rotates several times from 0 to 360°. The AD5227 acts as a potentiometer, in which A and B are the extremes and W is the wiper.

This example uses $IC_2$, a PIC16F84 microcontroller with a crystal frequency of 20 MHz. This microcontroller has a theoretical potential performance of 5 MIPS

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and should serve many purposes in PLL (phase-locked-loop) circuitry. You could use any microcontroller or even an FPGA to control the AD5227.

## Materials on the topic

1. Datasheet Analog Devices AD5227
2. Datasheet STMicroelectronics LF353
3. Datasheet Microchip PIC16F84

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