Piezoelectric transducers are common in ultrasonic and acoustic-alarm-signaling applications. To get enough acoustic power from a piezoelectric transducer, you must power the device with a frequency at or near its resonant frequency. Furthermore, the driving voltage should be as high as the transducer allows.

A transformer circuit drives the transformer and the transducer at resonant frequency. You must usually build and optimize these transformers for the transducer you are using—a time-consuming job. You can, however, drive the piezoelectric transducer without the transformer using the circuit in Figure 1.

The circuit includes an oscillator using Schmitt trigger IC\textsubscript{1A}. The frequency depends on resistor R\textsubscript{1} and capacitor C\textsubscript{1}. You must select both components to fit the oscillator frequency with the resonant frequency of the piezoelectric transducer. You can replace R\textsubscript{1} with a variable resistor and change the value to maximize the voltage on the transducer.

The driver includes the five additional inverters of IC\textsubscript{1}, IC\textsubscript{1B} through IC\textsubscript{1F}. A voltage tripler comprises diodes D\textsubscript{1} and D\textsubscript{2} and the surrounding components. The amplifier comprises Q\textsubscript{2}, and the piezoelectric
driver comprises $Q_1$ and $Q_2$.

Diodes $D_1$ and $D_2$ come in one BAS40-04 package. Alternatively, you can use double transistors for $Q_1$, $Q_2$, and $Q_3$. You can replace the oscillator with a microcontroller if you have one available. The circuit works with supply voltages of less than 10V. You can use it in 3.3V systems, but you should then use a 74HC14 inverter for the oscillator and the driver. You can also use additional voltage-doubler stages to get even more driving voltage for the transducer.