

## Re: Inductor arrangement for boosting low-voltage piezo drive

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- *From:* "Roger Lascelles" <[despam\\_rklasl@xxxxxxxxxxxxxx](mailto:despam_rklasl@xxxxxxxxxxxxxx)>
  - *Date:* Fri, 3 Jun 2005 18:35:05 +1000
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"Clifford Heath" <[no@xxxxxxxxxxxxxxxx](mailto:no@xxxxxxxxxxxxxxxx)> wrote in message  
[news:429f07c7\\$0\\$20631\\$afc38c87@xxxxxxxxxxxxxxxxxxxxxxxxxxxx](mailto:news:429f07c7$0$20631$afc38c87@xxxxxxxxxxxxxxxxxxxxxxxxxxxx)  
> I've developed an MSP430 (TI low-power 3V uP) device that drives a  
> small piezo in push-pull from two pins at 2KHz, and it's not loud  
> enough. The device has a requirement of very low quiescent power,  
> and although it flashes an LED at the same time, should be audible  
> to an older person by the side of a noisy road, so far as possible.  
> I realise that frequency range is a problem, hence the LED :-).  
> I haven't finalised selection of the piezo, but I see different  
> ones with capacitances ranging around 0.02uF. I don't want to  
> produce a higher drive voltage all the time, as they don't beep  
> very often and at present the thing idles with the RTC running at  
> under 1uA.  
>  
> I was thinking of trying the following arrangement:  
>  
> Connect each end of the piezo by a series L (SMT inductor?) to +3V,  
> and each end also to the collector of an NPN BJT in common emitter  
> mode. Drive the base of each transistor in push-pull, and let the  
> inductors ring the voltage, hopefully up to 6V or so, as in a  
> boost-mode power supply.  
>  
> It doesn't seem crucial to me to get the thing running at resonance,  
> but if possible, I guess I'd calculate the frequency using half the  
> piezo's capacitance and the L, aiming for the natural resonance of  
> the piezo – does that sound right?  
>  
> Anyhow, I'm confident that this drive arrangement will work, but  
> is there a better way? Am I missing something? is it sensible and  
> possible to get SMT inductors in a suitable size?  
>  
> Clifford Heath.

I suggest driving your piezo element from an audio squarewave generator.  
You can tune around and see if frequency makes much difference.

You don't say what kind of transducer you have. If it is a bare brass plate  
with piezo on top, it will not be very efficient. You can get elements with

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a little resonator box on top, and these are much more efficient – the resonator performs acoustic impedance matching. You have to get the frequency right for each model of resonator transducer. Squarewave drive is OK for these.

Roger

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• **References:**

- ◆ **Inductor arrangement for boosting low-voltage piezo drive**

◇ *From:* Clifford Heath

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