**Triggering a PICAXE chip from a PIEZO sounder by Gareth Evans**

A long time ago I saw a circuit that triggered a 555 mono-stable from a simple piezo sounder, used in ‘reverse’ in that it was turning movement into electricity rather than as it’s designers originally intended, electricity into sound (movement). The circuit was intended for a ‘money box’ type project, from what I can recall turning on some LED’s for a few seconds and the piezo element was simply glued to a surface that would register the tap of the coin arriving – thin plywood or MDF for instance.

Fast forward at least 10 years and of course PICAXE (or similar devices like GENIE or Arduino) have a firmly established foothold in our curriculum, offering as they do superb functionality and flexibility for a very reasonable sum, not quite as cheap as a good old (first sold in 1971!) 555.

Using just some of the PICAXE functions, a fairly serious project can be realised in just a few lines of code, but it all revolves around that trigger event, a ‘tap’ or the ‘clunk’ of falling coinage!

Deciding to make some progress on this I started with Google which quickly led to an ‘instructable’ ([www.instructables.com](http://www.instructables.com)) and then to the authors website (<http://ijprojects.blogspot.com/2011/12/echo-box-using-picaxe-08m-complete.html>) in the form of an ‘echo box’. This largely pointless product simply recorded a series of taps and the time between them, before replaying the same tap pattern using a small ‘pager’ motor to provide the ‘echo’ of the ‘tap’.

I tried the circuit on my nearest 08M and yes, it did work, but was very finicky regarding the strength of tap and would often ‘react but not react’, pointing to the chip re-setting as soon as it started. It sat on the bench for a few days....until I concluded that although the negative going pulse from the piezo was being limited to -0.7 volts by the suggested diode, the positive one was not and on a decent strong ‘tap’ the high voltage was upsetting the PICAXE. So why not use a Zener diode across the piezo sounder? When forward biased it will still limit at -0.7 volts, but best of all, when reversed biased (what I deduced was causing the problem) it will conduct at the Zener voltage (in this case 5 volts) and very effectively clip the spike to acceptable levels. It worked like a dream, so the project was on!

I like the PICAXE08M and I like the 08M2 even more – it’s got 8 times the code space!

The software is very simple, it sits in a loop waiting for an input on a pin, and when seen, it operates a small RC servo with a flag attached (waving the flag), flashes some LEDs using the two outputs and plays a tune at the end.

A visit to the excellent forum at [www.picaxeforum.co.uk](http://www.picaxeforum.co.uk) led to some power saving tips to improve battery life whilst still offering great functionality. The input circuit is shown below – it really is that simple. Glue the sounder (e.g. Rapid Electronics p/n 35-0044) upside down onto the underside of your box lid or ‘landing plinth’. It might even be possible to use it for making noises too if you drill a sound out hole in your board – work in progress I suppose!

 Output to PICAXE Input - high on impact, no pull-down needed.

 5 volt Zener & 1M resistor across piezo, glue assembly to substrate.

 0 volts

I have also been experimenting with the slower configurable clock speeds on the 08M2 part – very low current consumption, suitable for endless battery power (20uA) is entirely possible, with a software switch to higher clock speeds if needed. There is almost no end to what can be achieved with these modern wonders!

Another obvious project (found on the forum) was to read the value of a potentiometer with the built in A/D and then perform a variety of Red Green B lue functions with LEDs on 3 of the output pins, i.e. combinations of RGB, endless fader, fire effect and so on. A simple idea but with endless applications – please share your successes!

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