

Re: sample & hold: maxima – minima

Source: <http://sci.tech-archive.net/Archive/sci.electronics.design/2005-10/msg02915.html>

- *From:* sonos <sonos@xxxxxxxxxxxxxx>
 - *Date:* Fri, 21 Oct 2005 08:42:01 -0500
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Somewhere on usenet Thu, 20 Oct 2005 10:50:51 -0700, Tim Wescott wrote:

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> sonos wrote:
>
>> Hi,
>>
>> a 10mV ac 1kHz signal, an analog integrator, and an 8 bit adc on a
>> microcontroller.
>>
>> 1. what is the best way to build a SH for:
>> a. the peak of the ac signal
>> b. the trough of the ac signal
>>
>> would this involve a standard SH, with diodes?
>>
>> thanks to any and all replies.
>>
>>
> Do you want something that follows the envelope by itself, doesn't
> require any commands from the microprocessor, but forces you to
> compromise between error and speed, or do you want something that does
> require some interaction with the microprocessor but will acquire a true
> maximum and minimum within one cycle of the AC?
>
> For the first you don't even need a sample & hold, per se, you just need
> an amplifier followed by a plain old rectifier circuit:
>
>
> A = 500
> Peak
> \ .-->|-----o-----
> Signal In || \ \ |
> o-----||-----|>-----o |
> || / || Trough
> /'--|<--o-----|-----
> ||
> o----- . o-----
> |||
> |||
```

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> ---- .-. ---- .-.
> ---- || ---- ||
> |||||
> | '-' | '-'
> ==== |==== |
> 2.5V | 2.5V |
> ====
> 2.5V 2.5V
> created by Andy's ASCII-Circuit v1.24.140803 Beta www.tech-chat.de
>
> This circuit amplifies the AC signal from 10mV up to 5V (you did say
> 10mV peak-peak, yes?), then (assuming it's centered around 2.5V) does
> envelope detection with the two diodes. The circuit is definitely
> optimized to reduce my design time as well as component count. The
> restrictions on this are:
>
> * The peak ranges from 2.5V to 5V, so it only uses 1/2 the ADC range
> * The trough ranges from 2.5V to 0V, ditto
> * Peak and trough are offset by the diode drops, which will vary with
> temperature
> * The voltage will sag between peaks; the higher your RC time constant
> the less sag you'll see but the longer it'll take to track a signal
> that's diminishing.
>
> A more accurate way to do this would be to make the following changes:
>
> * Use a pair of AC coupled amps, both of which center the output on 0V
> (or whatever your ADC minimum voltage is). Make one of them inverting
> for the negative-going wave.
> * Use precision peak detect circuits to charge the caps.
> * Use fairly low-value resistors, and cut them out of circuit for the
> period you want to actually measure. You could use a 4066 or other
> suitable switch for this.

thank you.

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• **References:**

◆ **[sample & hold: maxima – minima](#)**

◇ From: sonos

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