

Re: Small low-cost embedded board for model airplane

Source: <http://coding.derkeiler.com/Archive/General/comp.arch.embedded/2006-09/msg01527.html>

- *From:* CBFalconer <cbfalconer@xxxxxxxx>
 - *Date:* Sun, 24 Sep 2006 16:11:59 -0400
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Robert Adsett wrote:

Paul Carpenter wrote:

albertgoodwill@xxxxxxxx "Albert Goodwill" wrote:

- * ADC (Analog to Digital Converter)
- 13 channel (simultaneous sample hold is desirable)
- 16 bits resolution
- it will be used to capture 1000 samples/ second

<snip>

I would have expected for these types of sensors a sampling rate of 10 to 20Hz per channel giving 130 to 260 samples per second. Considering the nature of the sensors being slow response and the application simultaneous sample and hold seems unnecessary.

<snip>

Following are the sensors to be connected to the embedded board

Sensors with analog outputs

- * 3 axis accelerometers (0-5v or 0-3.3v analog outputs)
- * 3 axis gyros (0-5v or 0-3.3v analog outputs)
- * 3 axis magnetosensors (0-5v or 0-3.3v analog outputs)
- * 2 pressure sensors (0-5v or 0-3.3v analog outputs)
- * 2 current sensor (0-500mv outputs)

Except for the current sensors, the rest have response times, that mean the output changes if you are lucky at 10Hz. See comments above about A/D. I actually doubt that the current sensors (probably for measuring power supply load to this board and main radio control) actually need to be monitored

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more than 1Hz anyway.

I would also question the need for 16bits of resolution. I doubt any of these sensors have more than 10 or at most 12 bits worth of signal. Actually I wouldn't be surprised if 8 bits was overkill.

Albert, you need to ask what is the resolution you need for acceptable results and also what resolution the sensors are capable of.

The OP might also reconsider the need for sample and hold. A characteristic of successive approximation a-d converters built out of d-a conversion is that they always measure a value that existed somewhere within the conversion period. A further advantage is that the multiplexing can be done entirely digitally, so that the cost of an added channel is that of a single comparator (and possibly a front end op-amp). D-a converters are generally much cheaper. The front end op-amp can easily implement anti-aliasing filtering, besides the gain and impedance matching.

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Some informative links:

[<news:news.announce.newusers](mailto:news:news.announce.newusers)

[<http://www.geocities.com/nnqweb/>](http://www.geocities.com/nnqweb/)

[<http://www.catb.org/~esr/faqs/smart-questions.html>](http://www.catb.org/~esr/faqs/smart-questions.html)

[<http://www.caliburn.nl/topposting.html>](http://www.caliburn.nl/topposting.html)

[<http://www.netmeister.org/news/learn2quote.html>](http://www.netmeister.org/news/learn2quote.html)

[<http://cfaj.freeshell.org/google/>](http://cfaj.freeshell.org/google/)

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