

Re: Data Acq. Concept Help

Source: <http://sci.tech-archive.net/Archive/sci.electronics.design/2005-07/msg02842.html>

- *From:* "MK" <nospam.please@xxxxxxxx>
 - *Date:* Fri, 22 Jul 2005 07:29:53 +0100
-

"schmoester" <to_schmoe@xxxxxxxx> wrote in message
<news:1121969322.755745.250510@xx>

> Hi Michael,

>

> Gentlemen, thanks for the ideas! I'm a EE that's been doing software
> for the past 10+ years so I really appreciate the advice. If I do a
> good job with this I may get more HW projects :-)

>

> I was thinking 8 to 12 ch. ADC chips I2C or SPI controlled. The larger
> mux/single ADC might be easier, but possibly less reliable; if it fails
> I'll loose a larger group of channels. That's probably why you
> elaborated on the protection required, which I will surely provide
> regardless. Maybe the more stringent pcb requirements for the ADG731
> mux would make a stronger case for the 8 to 12 channel devices as well?
> I will think further on the tradeoffs--I think it's a good idea.

>

> I don't believe I can combine all signals on a single board for the
> following reason. The signals into the module are from a string of 2+
> VDC battery cells so I have a high common mode issue that requires some
> isolation so not all channels be on the same board. For e.g. 64ch per
> board ($64 \times 2.75 \text{ V} = 175 \text{ V}$), which I will handle by using difference
> amp front end and isolating between boards. ($210 \times 2.75 \text{ V} = 578 \text{ V}$) This
> was probably overlooked from my original post.

>

> The Lantronix XPorts are ~ \$50 each so for 4 boards is 200.00 bucks.
> I don't think I can get away with 1 board. Not to mention the required
> hubs for the network.

>

> On the other hand, Cypress USB on the PSoC is ~ \$2.00/chip, or the
> EZ-USB (8051 on board) probably similar price. I'll still need a
> PC-104 board to interface with the USB based boards, and ethernet
> interface to a central data collection computer. USB enables easy
> bench tests of the boards with LabView and any PC, and seems to provide
> quite a flexible product. I'm seeing advantages with my original
> concept.

>

> I would like to avoid the PC-104 boards: Maybe one XPort put somewhere
> in a module could take it's place and provide the ethernet interface to

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- > a central computer, but then how do I collect the data off the boards
- > via USB? PC-104 does seem like overkill, but would enable data
- > formatting and preprocessing i.e. averaging (not required) and possibly
- > diagnostic functions (are required).
- >
- > All in all, I'll have 9 modules (to clarify, each module acquires data
- > from 210 high common-mode inputs, some temperature measurements, etc.
- > 225 signals, plus a few spares) into the 4? boards we're discussing,
- > with some type of ethernet access to a central computer that collects
- > all the measured data from each of the modules (9 x 225+ signals total)
- >

Hello,

You never told us about the hard bit !

(I remember an earlier thread about this and I think the suggestions were relay multiplexors).

You'll have trouble if you try and float the boards at different DC voltages – just imagine trying to debug some 3.3V logic with 500V DC on top.

I don't think that any of the difference amplifiers like TI INA117 (only 200V) can cope with 600V common mode so you end up with an isolation amplifier, which is expensive or making your own difference amps (with precision resistor issues like drift and trimming).

If you can steal power from the cells you are measuring then there are little AVR processors which will run from 2V and have built in voltage references and 10 bit A-D converters. You could use one per cell and let them talk to a central processor via an opto-coupler. You would have to expect to steal an average current of perhaps 50uA from the cell which may not be possible.

Michael Kellett

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- *Follow-Ups:*
 - ◆ **Re: Data Acq. Concept Help**
 - ◇ From: schmoester
 - *References:*
 - ◆ **Data Acq. Concept Help**

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◇ *From:* schmoester

◆ **[Re: Data Acq. Concept Help](#)**

◇ *From:* martin griffith

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◇ *From:* schmoester

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