

# Re: major electronics analysis project help needed TIA

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*Source:* <http://sci.tech-archive.net/Archive/sci.electronics.design/2005-06/msg00548.html>

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- *From:* "Don Baker" <n2mcg@xxxxxxxxxxx>
  - *Date:* Sat, 4 Jun 2005 09:37:51 -0400
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I did a similar data acquisition system for the 757 about 3 years ago. If you email directly with a good email return address then I will gladly share my experiences and the approach we used.

Don

"JB2" <none@xxxxxxxx> wrote in message  
<news:le93a1p01c4r25epbepqtgba3ipln94uvc@xxxxxxxxxxx>  
> On Sat, 04 Jun 2005 05:33:19 GMT, in alt.engineering.electrical you  
> wrote:  
>  
>>JB2 <none@xxxxxxxx> wrote:  
>>>I have to log 150 discrete inputs, some AC and others DC, voltages and  
>>>currents. I plan on using simple inductive pickups and voltage probe  
>>>points.  
>>  
>>How often do you need to log each input?  
> Still to be determined, but preliminary data acquisition will need to  
> be during major changes in flight profiles, such that sample rates may  
> only be required when user selects the need and not a continuous  
> sampling.  
>  
>> Do some inputs need to be logged more often than others?  
> No, in fact would rather have all samples at the same time for  
> comparative analysis.  
>  
>>What kind of voltage and current ranges do you need?  
> Gen output is 40kVA three total & One 1kVA  
> 115v 1 phase 400Hz 650 amps  
> 115v 3phase 400 Hz  
> 220v 2Phase 400Hz  
> 28 vDC 200 amps max. There are two TRs tied together in parallel, EA  
> max 100 amps. Loss of various equipment will be executed and data  
> sampled for future capabilities and emergency procedures. The main  
> concern is the capability of the TRs to handle various loading  
> configurations but data for all sources is required.  
>

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>> Do you need analog measurements for everything, or is  
>> digital OK for some of the inputs?  
> Data will be used for reporting purposes, future calculations and  
> modeling. I will probably end up building a more accurate model than  
> currently exists (current model is solely analytical, no hard data  
> available) All the sources are analog, but how those samples are  
> obtained, I don't think will make a difference. I thought simple  
> inductive pickups that feed analog to dig conv for recording.  
>  
>  
>> How accurate does each analog reading need to be?  
> Big question! I would want at most  $\pm 2\%$ . I suspect any more  
> deviation may make modeling too inaccurate.  
>  
>>  
>>> Any suggestions?  
>>  
>> The 150 channel requirement is a biggie. If you don't need to log each  
>> input that often, it's not as big of a deal, but if you need high data  
>> rates, it may get a little expensive.  
>>  
>>> I know I'll need a DAC, just not sure which would work best.  
>>  
>> Budget?  
> LOL yea right. in house resources availability of equipment., Next  
> week I can check what's available, for now, I'm simply attempting to get  
> a solid foundation for a POA.  
>  
>> If you have plenty of somebody else's money, and you don't need  
>> to log each channel more than once every several seconds, go buy a data  
>> logger like a Fluke Hydra. This is essentially a good auto-ranging  
>> multimeter with a DP21T switch on the input leads. Some models can only  
>> output the data immediately over a serial port, while some can store data  
>> in an internal memory. The potential problem here is that it costs  
>> US\$2,000–\$3,000 for 20 channels, and you need to do that seven and a  
>> half times. You might be able to buy one data logger and multiplex the  
>> inputs to it with external silicon, switches, or relays. You need a  
>> 40P8T contact arrangement...  
> Outstanding suggestion  
>>  
>> Instead of trying to log everything at once on a laptop, it might work  
>> better to select smaller boards with 10 or 20 inputs and let each board  
>> log to local memory, then download all the boards at the end of the  
>> flight. This may also tend to reduce the number of wires strung around  
>> the aircraft, if you can locate the boards near the measurement points.  
>> You need some kind of sync between the boards... they all have to start  
>> their clocks at the same time, or get individually synchronized to GPS  
>> or WWV, or you need to string a wire between them. You may also have to  
>> be careful where you put the boards physically... if they make the  
>> aircraft radios go screwy the pilot will not be happy with you.  
> I do have GPS signals available

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>>  
>>This may be obvious, but it's probably a bad idea for there to be just  
>>one person trying to fly the plane and operate the data logging at the  
>>same time. If one-man operation is required, the interface to the data  
>>logging has to be very simple, or even something that can be started  
>>before takeoff by someone else and stopped after landing.  
> I have a crew on board, flight crew, technicians, engineers (me) 707  
> A/C  
>  
>  
>>I'm somewhat curious as to what you're doing... most of the people that  
>>want to do something like this probably work for an aircraft  
>>manufacturer and in that case I would think they'd just buy  
>>off-the-shelf stuff. But hey, maybe you're building an experimental  
>>jet in your garage. :)  
> I wish LOL no.... DOD trying to avoid using \$\$\$\$ contractors, We  
> have the resources, but money is limited and this is my 1st project of  
> this magnitude that I'm heading up.  
>  
>>  
>>Once you can answer most of the questions above – in other words, when  
>>you can state your requirements more clearly – you may want to  
>>cross-post or post to sci.electronics.design for more good input.  
>>  
>>Matt Roberds  
> thanks Matt

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• **References:**

- ◆ **[REQ: major electronics analysis project help needed TIA](#)**  
◇ From: JB2

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