

Re: Are low/lower cost USB Oscilloscope's any good?

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- *From:* Charlie Edmondson <[edmondson@xxxxxxxx](mailto:edmondson@xxxxxxxx)>
  - *Date:* Wed, 13 Dec 2006 16:17:40 -0800
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bill.sloman@xxxxxxxx wrote:

Charlie Edmondson wrote:

Joerg wrote:

PeteS wrote:

Joerg wrote:

Hal Murray wrote:

I've  
been  
impressed  
with  
these  
guys:  
<http://www.cleverscope.com/>  
--  
they  
seem  
to  
have  
a  
solid  
understanding  
of

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what  
terms  
like  
"noise"  
and  
"jitter"  
mean,  
unlike  
many  
of  
the  
cheap  
scopes  
out  
there.

A friend has  
one. He's  
very happy  
with it.

One of the  
advantages  
of a PC  
based scope  
is that it  
doesn't take  
up much  
room on  
your  
desktop.

But why are they so slow?  
At least the ones I have seen  
were. We  
designed 400MSPS  
converter boards even back  
in the late 80's and  
early 90's. It ain't rocket  
science.

The company I work for doesn't have much  
of a budget for test

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equipment, but we have a budget for boards (yeah I know) so I was considering making a pretty fast scope / analyser using a quad set of 500MS/s A-Ds and a couple of fast FPGAs and some memory.

It won't be perfect, but it might do the job and save 'that budget'.

That's a strange way of looking at the financial bottomline. Look at the (realistic) number of paid hours you'll be working on that one-off project and then compare that to a nice used Tek scope. Now copy your boss on that.

I have opted for the used Tek scope for my lab :-)

Back when I work at UC Santa Barbara, we had the same problem. Equipment budgets needed to be approved, and were severely limited, so often it was decided to build things rather than buy them. Why buy a \$5000 control system when you can get the parts for \$500 and just have a guy put it together and then go install it?

The success story was the video distribution system for the campus. Basically, it was a 16x256 channel switcher, with balance baseband (6MHz) video on twinax, stereo sound and a two way intercom on each channel. They built it in the 60s using RTL, and they were finally going to start to replace it in 1993. The problem? They couldn't find the RTL chips anymore for repairs, and some new buildings going in were going to cut some of those custom multi-core twinax cables and they couldn't replace or re-run them. The replacement would be on fiber.

The horror story I was directly involved with. There was this one building on campus that was basically four large lecture halls arranged in a square, operated by a facility manager that had very specific goals for any controls. He specified what the controllers would look like: It had to be BIG (at least 3" x 9") and had to be HARD WIRED (so the professors couldn't walk off with them!) The lighting control had to be done with a pot, so you could pre-set your levels. The buttons needed to be lighted and at least 1" square...

Then, my boss got involved. He was an EE, and had been in charge of the A/V maintenance dept before being promoted. He thought that touch tone signalling would be just the thing, and directed one of the techs to

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build the electronics. He directed another tech to run the cables for the control. He then gave the cable tech a student helper (me!) to help run the cables and install all the electrical boxes.

Note, of course, that none of these specifications were ever written down. The cable guy decided that a five conductor cable would be fine. Power, TT control signal, ground, lighting control power, and the lighting level signal. He then got the cable and ran it all over the building. Approximate cost, counting his and my time – \$2000.

Then, the guy designing the electronics went on a bender, and never built it, or even designed it! The cabling guy 'found other employment' and the project needed to be passed on. So, they gave it to the new student A/V design engineer – ME!

First realization – five conductors weren't enough. The wires weren't even twisted! The cabling guy was an electrician, and had decided that audio didn't really need all that fancy twisting and stuff. So, everything was going to share that one ground wire...

I built the prototype, using parts lying around the place, and got it to work. Only took me about 3 months, so only cost the department about another \$1000. Successfully demonstrated the prototype, installed it in one of the lecture halls, and was given the go ahead to go into production for the rest of the building. I designed the PC boards, but when the EE department decided it would take 6 weeks to fab them, I was put on to another project, and one of the techs was given the actual installation duties.

Of course, I made two big mistakes on the boards, so the tech had to 'improvise' modifications. He built up the boards, tested them in the lab, and started installing them. He put in the power supplies, mounted and hooked up the boards, and powered them up. They worked for about 2–6 hours, then died giving up magic smoke!

After a week of trouble shooting ( the project was once again 'my baby') I found the problem. I had originally used an off board +5 supply for the electronics, but on redesign, had moved the 7805 onto the individual boards. I had then specified 24 VDC supplies for the main power. When installing the power supplies, the tech had found a whole bunch of really nice unregulated 24 VDC supplies in a cabinet that he then installed for the main power. However, since we were using only a tiny fraction of the power needed, these supplies were a little overkill. They were also 28 VDC supplies (for some cameras or something...) and when unloaded, put out about 40 VDC. This overvoltage was cooking the 7805's

Finally, after about 3 years, the project was abandoned, and a real, commercial system was installed. I figure the department spent between \$10K to \$15K on trying to get that system to work. The commercial system cost \$4K.

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Yes, I spec'd and installed the commercial system! I was the 'official' campus A/V engineer by that time!

Wherever I've worked, rule one has always been, don't develop anything you can buy. Academics do have delusions about developing stuff in no time with no bugs, but university workshops know better.

Well, I have also seen the same sort of thing on the commercial side, too, where a boss didn't want to upset the budget apple cart to get something he felt the 'boys' should be able to just whip up out of teh parts room...

Charlie

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