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Parallax Forums > Public Forums > Propeller
Chip > **Hitachi H48C Tri-Axis Accelerometer
as seismometer?**

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Dave F
Registered Member

Posted Yesterday 11:19 AM (GMT -8)



Date Joined Nov 2004
Total Posts : 11

Hi All,

I was looking at the specs of the Hitachi H48C Tri-Axis Accelerometer the other day and began wondering if anyone has attempted to use this unit to measure ground movements (earthquakes and tremors).

Wikipedia notes that earlier MEMS cantilever weight systems tended to be too noisy and were not sensitive enough for this application. But the H48C is a fairly recent development, and has a 12 bit A/D output. While this is nowhere near the 24 bit output of professional seismographs, yet it might be adequate for a strong-motion velocity sensor type of seismograph. And it is a full three axis unit in one package!

Anyway, thought I would put out the question to the forum. Anyone played with this?

Dave

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Dave F
Registered Member

Posted Yesterday 11:27 AM (GMT -8)



I guess I should have mentioned that I am looking for prop specific applications.

Date Joined Nov 2004
Total Posts : 11

Dave

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hover1
I have 3 Propellers



Date Joined Sep 2007
Total Posts : 612

Posted Yesterday 12:01 PM (GMT -8)



Most new notebooks have a 3-axis Accelerometer to detect a free fall condition to spin down the hard drive. Given that, this is what Stanford University is doing for earthquake detection.

<http://qcn.stanford.edu/>

Jim

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Dave F
Registered Member



Date Joined Nov 2004
Total Posts : 11

Posted Yesterday 2:45 PM (GMT -8)



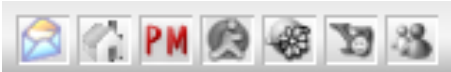
Thanks Jim,

That is really interesting.

Dave

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kf4ixm
Registered Member



Date Joined Feb 2009
Total Posts : 145

Posted Yesterday 3:03 PM (GMT -8)



i have done some experimenting with the 2 axis memsic 2125 for siesmic readings. i authored a post hear while back about this, but for the life of me i can't find it right now with the search. i used a basic stamp 2 though. i used the 2125 to detect the s and p-waves usually monitored for siesmic activity. then i had a small bs2 program that would take the readings, debug them as actual g-force values and had two servo's set up to replicate pen movements of a siesmograph, (n-s and e-w movements). i've been wanting to get a 3-axis to monitor all three axis of movement. it was pretty sensitive though, i could detect a train moving down the tracks at about 3/4 a mile away just mounted to a pole concreted in the ground. pretty much all "professional" siesmographs are anchored to solid bedrock in the ground to detect actual siesmic activity and not noise, (like from a train 3/4 mile away). im just starting with the propeller myself, so i can't be much help there, but it can be done!

Post Edited (kf4ixm) : 2/12/2010 11:12:32 PM GMT

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hover1
I have 3 Propellers



Date Joined Sep 2007
Total Posts : 612

Posted Yesterday 3:38 PM (GMT -8)



@kf4ixm

Is this the post you were refering to?

<http://forums.parallax.com/forums/default.aspx?f=5&m=411960>

Jim

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Leon
Registered Member



Posted Yesterday 3:42 PM (GMT -8)



I once asked one of my contacts at Analog Devices about using their accelerometers for seismic measurements. He said that some people were doing it.



Leon

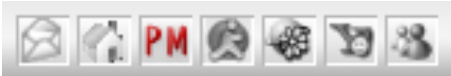
Amateur radio callsign: G1HSM



Date Joined Aug 2004
Total Posts : 2540

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Dave F
Registered Member



Date Joined Nov 2004
Total Posts : 11

Posted Yesterday 8:37 PM (GMT -8)



@kf4ixm

That is a cool project! That is exactly the sort of feedback I was looking for. It looks like hover1 successfully found your post. I enjoyed reading that thread also. Even though I am considering using the prop for this idea, your BS2 code is very useful.

@hover1

Thanks for finding kf4ixm's post for us.

@Leon

Thanks for the info. It is encouraging to know that the idea has merit.

Dave

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kf4ixm
Registered Member



Posted Today 7:49 AM (GMT -8)



yes, that was it! thanks hover1! i have kinda moved this project to the back burner for the time being while trying to educate myself on the prop. i do plan on moving my idea to the prop eventually. i had originally planned on designing a paper drum system that would have one revolution per hour, index over and resume the next hour. having to change the paper every 24 hours. one for n-s measurements, one for e-w measurements, and one for z up down measurements and transform the debug out of all data to a .csv file to the usb stick datalogger. one thing i did notice while playing with the debug out's was that the more you debug out, the slower the servo's respond, because of the



Date Joined Feb 2009

Total Posts : 145

fact that debug out statements take some time to process and execute. this may not be a problem for the prop. keep us informed on your project!

Also, i had found doing some research and watching a series on either the science channel or nat geo channel about plate tectonics, i discovered that the north american plate actually moves southwest by approximately 3" per year. this got me to thinking about upgrading the system to include a hm55b compass and gps sensor into this system to actually monitor the plate movement of the sensor array. one would of course have to take into account of magnetic declination, which for my position is +4° 23' EAST. (see here for you area)

I know a couple of years back when i checked it was around the 3 degree range, so it does change over time, i'm just not sure by how much. i for one would be interested in seeing what the gps position and plate orientation is before and after a seismic event. i know gps is gonna have some variations between readings, but my plan was to gather data over an hour, average that hourly data, then log the hourly data and 24 hour data average. also using a high gain gps antenna, like helical or offset dipole arraignment, (like ones for we-fax i have built before) to receive the most satellites possible across the entire horizon instead of just looking up as in patch type antenna's.

Post Edited (kf4ixm) : 2/13/2010 5:07:05 PM GMT

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Dave F
Registered Member



Date Joined Nov 2004

Total Posts : 11

Posted Today 10:15 AM (GMT -8)



@kf4ixm

I'll bet the prop will be able to take care of those Basic Stamp speed issues for you. Especially since you can load various processes into individual cogs where they can do their thing without disturbing other parts of your program. And not only that, there are all those cool prop objects just waiting to make your life easier by having already written code functions that you can just 'plug in' like a black box to do things for you.

If you are teaching yourself about the prop, I would highly recommend Andy Lindsay's Propeller Education Kit Fundamentals material. I have used it for several years with my beginning electronics students. It is very well written and progresses

smoothly from concept to concept. And by the time you are finished with it you will have a good grasp of Spin programming fundamentals. As a bonus, the whole .PDF document is built right in to the Propeller Tool software. You can get to it under the Help menu in the Prop Tool.

Happy Spinning.

Dave

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kf4ixm
Registered Member



Date Joined Feb 2009
Total Posts : 145

Posted Today 12:14 PM (GMT -8)



Thanks Dave! I'm now reading the 'programming and customizing the multicore propeller microcontroller' book i got this week. thats one reason i wanted to move my project to the prop for the speed, and i plan on using a cog for each sensor (accelerometer, compass and gps) and a cog for the datalogger. i will for sure check out the pdf you mentioned.

Thanks again!

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