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Case
resetting ism330dhcx or Ism6dsiox from software

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Case Number	Date/Time Opened	Support Agent	Case Status	Category	Created By
00152476	2/19/2022 9:45 AM	zuzana j	Working	Product / Application	Gaute Hope

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Zuzana JIRANKOVA (/s/profile/0053W00000dL7QAE) (Employee)
Yesterday at 2:22 AM (/s/feed/0053W00001QOMrjSAH)

Dear Gaute,

I checked internally if it is possible to use the FIFO mode as you would like to use it. It is possible to read the data periodically from FIFO in FIFO mode, but you need to read it before it gets full. If it gets full, you need to reset it by setting Bypass mode and then set the FIFO mode. For this purpose you can use watermark and FIFO_WTM_IA bit feature where you can set after how many samples you want to be notified (this can be driven to INT). Continuous mode works similarly to FIFO mode, but as soon as it reaches end of FIFO, it starts to overwrite the old samples. All the details are written in the application note I posted in my last message.

Kind regards,

Zuzana Jirankova

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GHope.1 (/s/profile/0053W000002n8b8QAAQ) (Customer)
18 hours ago

Ok, thank you very much.

Best regards, Gaute

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Write a comment...

Zuzana JIRANKOVA (/s/profile/0053W00000dL7QAE) (Employee)
February 25, 2022 at 2:39 AM (/s/feed/0053W00001NXwzSAH)

Dear Gaute,

Sorry for my late reply. Also I'd like to apologize that I am not very experienced in Rust so I don't want to interpret the code incorrectly.

In sensor config I noticed 2 things:

- CTRL3_C (12h): You enable the Boot bit, it is not necessary to do it in each initialization so it is possible to skip it
- CTRL9_XL(18h): Is the DEN feature enabled on purpose?

From line 262: self.imu.fifoctrl.mode(2c, fifoctrl::FifoMode::FifoMode)?;

I suppose you are using FIFO mode of FIFO. I am not sure if you interpreted FIFO mode correctly. In FIFO mode, the buffer continues filling until it becomes full. Then it stops collecting data and the FIFO content remains unchanged until a different mode is selected. (from AN5398 section 9.7.2 https://www.st.com/resource/en/application_note/an5398-ism330dhcx-alwayson-3d-accelerometer-and-3d-gyroscope-with-digital-output-for-industrial-applications-smicroelectronics.pdf (https://www.st.com/resource/en/application_note/an5398-ism330dhcx-alwayson-3d-accelerometer-and-3d-gyroscope-with-digital-output-for-industrial-applications-smicroelectronics.pdf))

As illustrated on Figure 28, after FIFO becomes full, the data should be read and then the FIFO should be reset by putting it into Bypass mode and back to FIFO mode.

Maybe you are searching for Continuous FIFO functionality (described in section 9.7.2 of AN5398)?

Kind regards,

Zuzana Jirankova

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GHope.1 (/s/profile/0053W000002n8b8QAAQ) (Customer)
4 days ago

Hi Zuzana,

thanks very much for your reply. The DEN feature is accidentally enabled. I don't use the interrupts.

I tried out several different FIFO-modes and my plan is to continuously sample at a fixed frequency. So I put it in FIFO mode and I read it from most frequently in an RTC interrupt where I drain any available samples. When I read the FIFO length goes down and keeps filling up as long as it does not run full (i.e. I drain it frequently enough). The FIFO should have alternating Gyro and Accel samples which I put together in a AHRS fusion as a single sample. Is this incorrect use? Are the samples I collect even though I have not reset the FIFO by first setting it to Bypass valid? This way I get an overflow error when I don't sample often enough, and I know that timing is off.

In continuous mode: can I just keep draining the FIFO and let it run in the same way (without the FIFO reset after drain)? I guess the overflow flags will be set there as well if I do not read it fast enough.

I suspect that there might have been a brown-out prior to the original incident of irrecoverable FIFO.

Best regards, Gaute

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Write a comment...

Zuzana JIRANKOVA (/s/profile/0053W00000dL7QAE) (Employee)
February 21, 2022 at 8:46 AM (/s/feed/0053W00001NXwzSAH)

Dear Gaute,

Would it be possible for you to share with me the initialization routine and the register dump of the sensor after the initialization is complete? Could you also share with me the code of FIFO read routine?

Thank you,

Zuzana Jirankova

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GHope.1 (/s/profile/0053W000002n8b8QAAQ) (Customer)
8 days ago

Hi Zuzana,

Yes, the code is open-source. The driver I am using (and partially developing) is here: <https://github.com/sousandrei/ism330dhcx> (<https://github.com/sousandrei/ism330dhcx>). I initialize the device like this: <https://github.com/gauteh/sf/blob/main/sf-buoy/src/waves/mod.rs#L199> (<https://github.com/gauteh/sf/blob/main/sf-buoy/src/waves/mod.rs#L199>).

The FIFO enable code is: <https://github.com/gauteh/sf/blob/main/sf-buoy/src/waves/mod.rs#L239> (<https://github.com/gauteh/sf/blob/main/sf-buoy/src/waves/mod.rs#L239>).

Which uses this module in the driver:

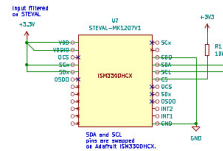
- * <https://github.com/sousandrei/ism330dhcx/blob/main/src/fifoctrl.rs> (<https://github.com/sousandrei/ism330dhcx/blob/main/src/fifoctrl.rs>)
- * <https://github.com/sousandrei/ism330dhcx/blob/main/src/ifo.rs> (<https://github.com/sousandrei/ism330dhcx/blob/main/src/ifo.rs>)
- * <https://github.com/sousandrei/ism330dhcx/blob/main/src/fifostatus.rs> (<https://github.com/sousandrei/ism330dhcx/blob/main/src/fifostatus.rs>)

One notable difference from the ST cube driver is that I read the FIFO tag and FIFO sample in one go, though I don't think this comes into play in this situation.

I communicate with the ISM330DHCX over I2C from an RTC interrupt routine: <https://github.com/gauteh/sf/blob/main/sf-buoy/src/waves/mod.rs#L324> (<https://github.com/gauteh/sf/blob/main/sf-buoy/src/waves/mod.rs#L324>) this is where I check the status flags of the FIFO, and the error manifests.

Note that it is fairly seldom that the error happens and I am not able to recover, usually the following routine: <https://github.com/gauteh/sf/blob/main/sf-buoy/src/waves/mod.rs#L166> (<https://github.com/gauteh/sf/blob/main/sf-buoy/src/waves/mod.rs#L166>) manages to get the device working again. However, when I can't I need to manually power-cycle the device since I don't (currently) have control over the power of the device from the host MCU.

I've hooked the STEVAL up as described in the schematic.



Best regards, Gaute

Like

Jacob WOODRUFF (</profile/0053W000000zExQA>) (Employee)
February 21, 2022 at 8:35 AM (</feed/0053W00001NXWP3SAP>)

Hi Gaute,

Thank you for submitting your request, it is being escalated to our specialist team.

Regards,

Jake
ST Support

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GHope_1 (</profile/0053W000002n8BQAC>) (Customer) created this case.
February 19, 2022 at 9:45 AM (</feed/0053W00001NVn6SAD>)

00152476
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Case Details

Production Forecast: 100 to 999

Project Name: wave-buoy

Case Description:

Hi,

I sometimes get the ISM330DHCX stuck in a FIFO full or latched condition. Normally I can recover by disabling the FIFO and re-booting the device. I also try to trigger the software reset, with some delays in between. However, it sometimes comes back with the FIFO error flags still on. Is there anything else I can do to restart the device? Toggle the CS pin? I am using it over I2C in the simplest mode + FIFO. I am testing using one of the STEVAL boards, and in a rust program. Power-cycling fixes the issue, but that would require more circuitry to do.

Best regards, Gaute

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steval_ssm (/s/content/document/0692W00000K2aT0A1)
Feb 21, 2022 • 14 KB • image

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