AS7150 EVM

User Guide

Proximity and optical force sensor

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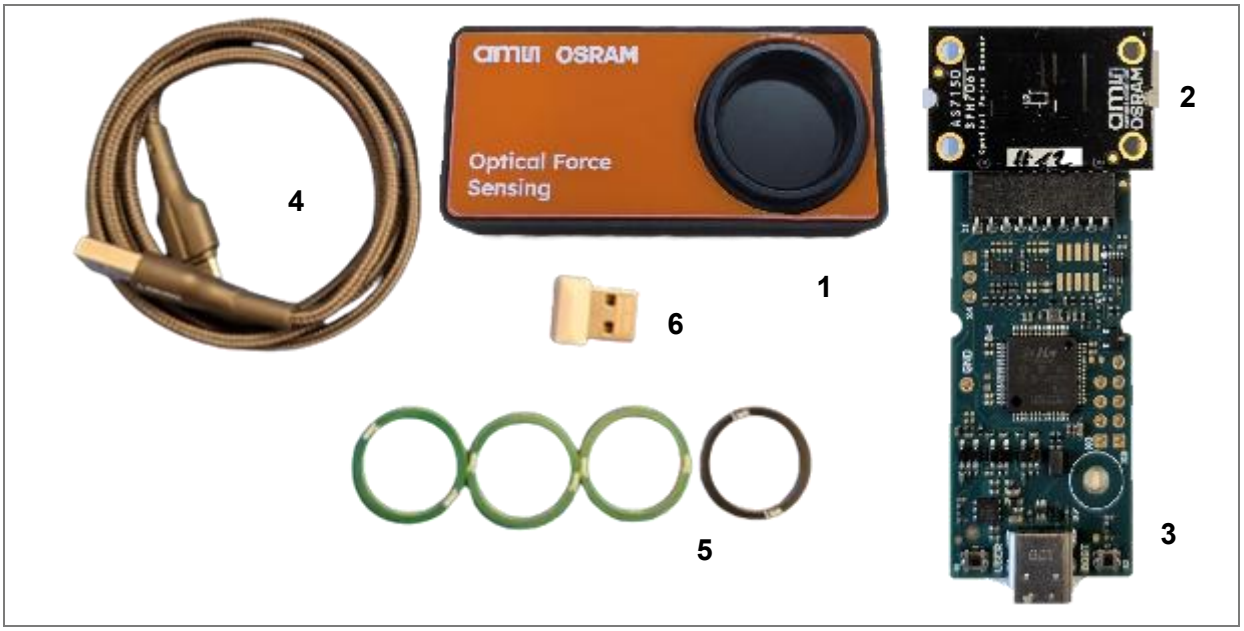
1 Introduction

The AS7150 is an Analog Front End (AFE) device for a low-noise, high-dynamic range proximity detection solution optimized for optical force sensing applications. The current implementation includes the SFH 7061 Optical Front-end (OFE) which contains Photodiodes (PDs) and an IR Emitter. The Output of the SFH 7061 is processed by the AS7150 AFE. It is mounted on a Daughter Board (DA) connected to the microcontroller board (EVM). Both PCBs are already mounted in the EVM housing to allow a fast start of the device validation. The current force sensor package contains a decoupled OFE and AFE to allow for a flexible package design depending on the application.

1.1 Kit content

Figure 1: Evaluation kit content



No.	Item	Description
1	EVM Housing	Contains electronics and a button with height adjustment.
2	AS7150 Daughter Board	PCB with AS7150 AFE and SFH 7061 OFE installed.
3	EVM Controller Board	Used to communicate from the USB to I²C.
4	USB Cable (A to USB-C)	Connects EVM controller to the PC.
5	Distance spacers	Used to change the distance between the surface and sensor.
6	USB stick	It contains software and documents.

1.2 Ordering information

Product type	Ordering code	Description
AS7150 EVM	Q65115A2651	AS7150 Evaluation Kit

2 Getting started

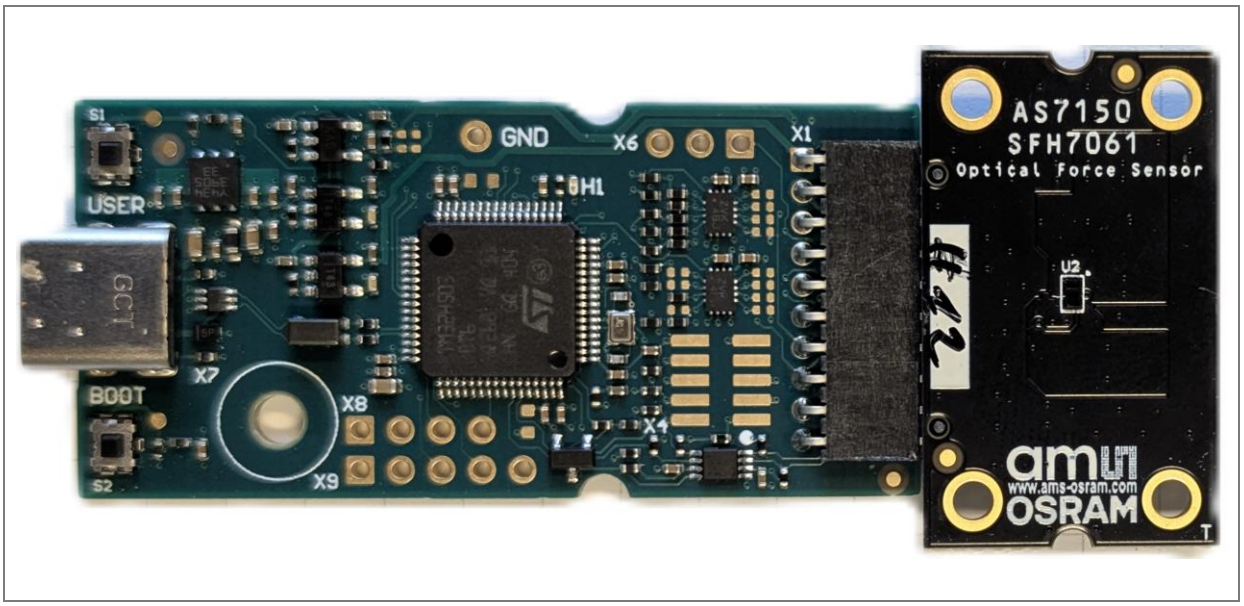
Install the software before connecting any hardware to the computer. Follow the instructions in the AS7150 EVM Quick Start Guide (QSG) to install the software, which installs all necessary software parts such as the device's graphical user interface (GUI).

This user guide identifies and describes the controls available on the GUI. Combined with the AS7150 datasheet, the QSG, and application notes available on ams-osram.com, there should be enough information to evaluate the AS7150 device.

3 Hardware description

The hardware consists of the EVM Controller, the AS7150 daughter board (DA), and a USB interface cable. The EVM controller board provides power and I²C communication to the daughter board through a ten-pin connector. When the EVM controller is connected to the PC through USB, a green LED on the board lights up to indicate the system is receiving power.

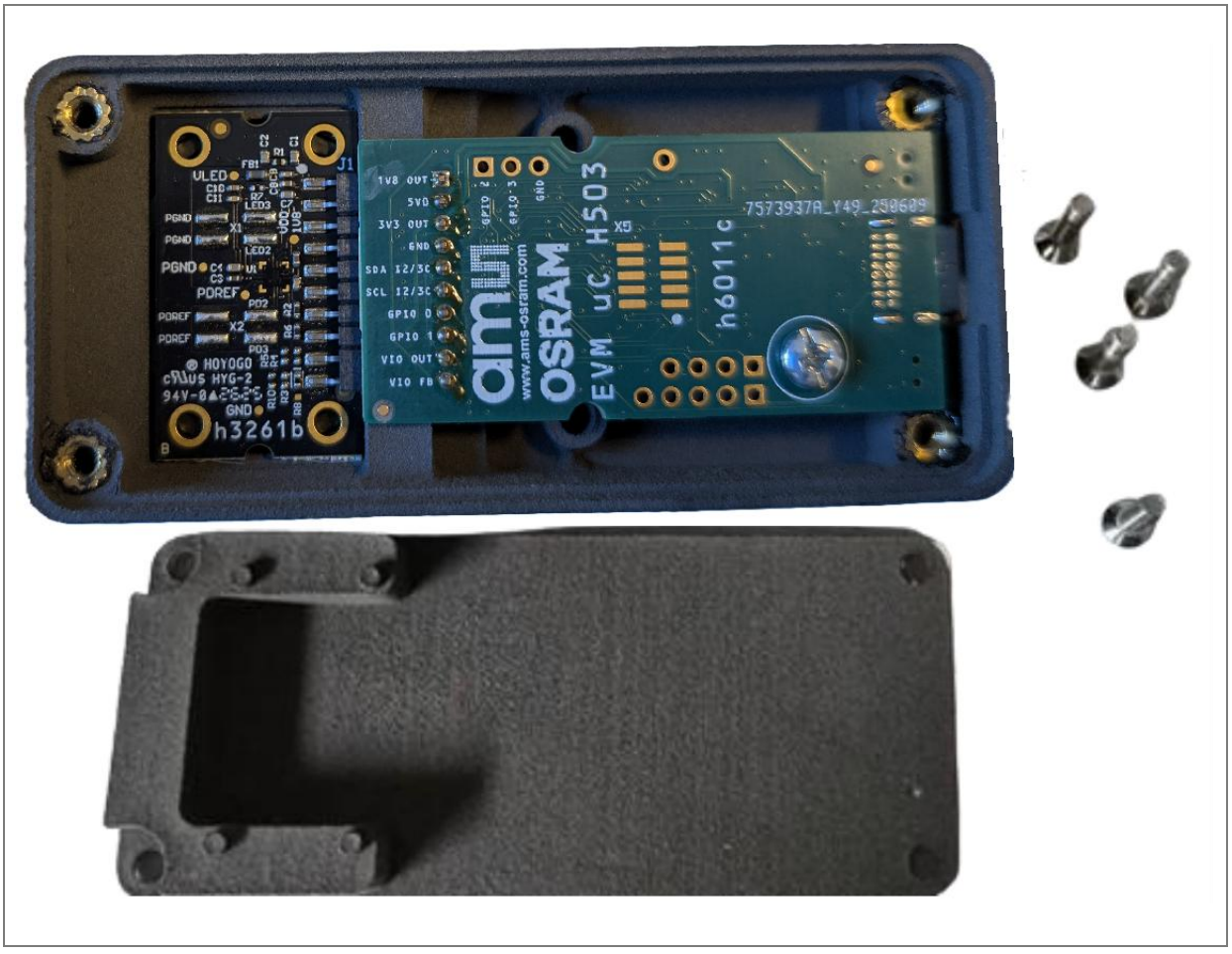
Figure 2: Evaluation kit hardware



3.1 Accessing the EVM and daughter board

The EVM and DA are usually mounted in the housing but can easily be accessed by loosening the four screws on the back of the housing. After carefully removing the housing back cover, the EVM and DA will be visible from the backside. When the last screw is loosened, the EVM and the DA can be removed from the housing and used for other validation purposes or environments.

Figure 3: AS7150 EVM and DA in the housing



Attention:

When reconstructing, ensure that the back cover is mounted correctly without applying too much pressure. The back cover is designed to automatically fix and center the DA with the four alignment pins.

3.2 Adjusting surface material and optical distances

EVM housing validates the AS7150 for two main use cases: Optical Force Sensing (OFS) and proximity measurements. To achieve this, the front of the housing is designed to be flexible with a removable tube. By loosening the two hexagonal screws (S1) on the side of the housing, the tube can be removed for proximity measurements (Figure 4).

Figure 4: AS7150 with the tube removed

It is possible to easily change the optical distance between the surface of the black button and the AS7150 device for validation purposes by using different combinations of the included spacers and adjusting the inner ring screw as needed.

Information:

The surface height of the button is set at a high height to avoid direct contact with the AS7150 device. The 0.8 mm thin ABS surface is deformed by approximately 0.6 mm after a hard press. The SFH 7061 device (OFE) height is 0.5 mm, which means the minimum distance should be 2 mm.

$$\text{Distance to device (unpressed)} = 2\text{mm distancer} - 0.5 \text{ package height} = 1.3 \text{ mm}$$

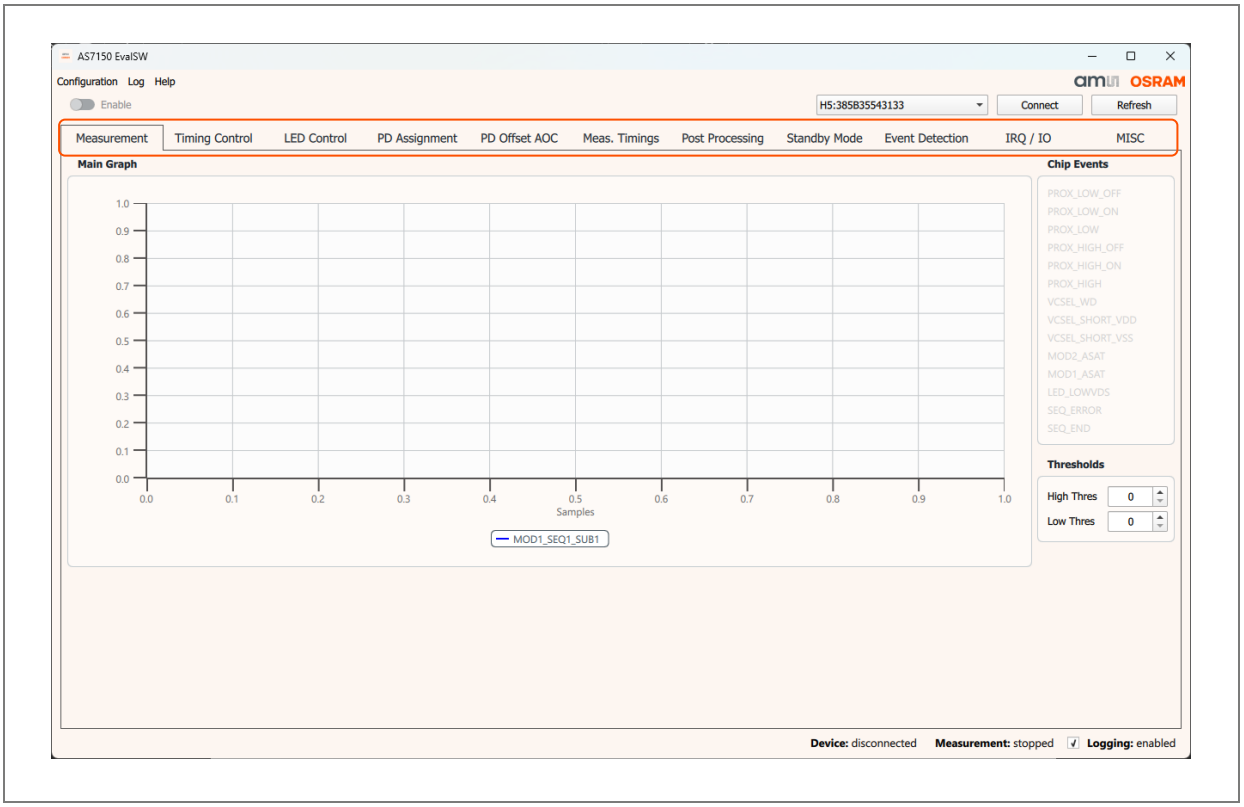
$$\text{Distance to device (pressed)} = 1.3\text{mm} - 0.6\text{mm} = 0.7\text{mm}$$

The third possibility of the housing design is to change the material of the button's surface by creating new circular probes.

4 Software description

The main window of the GUI (Figure 5) contains the menu bar at the top of the page and a main measurement graph. The connection page is displayed after starting the AS7150 GUI application. The AS7150 GUI application can only be used with a connected AS7150 device. Therefore, all the measurement controls are disabled until the device is found.

Figure 5: Main GUI window



The main window contains eleven menu bars to the following pages:

- Measurement – Live view of the measurement data.
- Timing Control – To configure the timing of measurement cycles.
- LED Control – To select LEDs for sub-samples and change LED currents.
- PD Assignment – To select the Photodiodes to use with the sub-samples.
- PD Offset AOC – To configure the Offset for measurements from a Photodiode.
- Meas. Timings – To configure the measurement times and signal processing.
- Post Processing – Choose how to process the digital signal.
- Standby Mode – Time required for each block to stabilize before starting measurement.
- Event Detection – To configure which event should trigger an interrupt.
- IRQ/IO – Interrupt request Input/Output control.
- MISC – Contains information on the reference, FIFO control and Control Block Generation.
- Help – Contains information about the AS7150 GUI application.

4.1 Software-to-hardware connection

On startup, the software automatically connects to the hardware. On successful initialization, the software displays a main window, containing controls pertinent to the connected device. If the software detects an error, an error window appears. If “Device not found or is unsupported” appears, verify the correct daughterboard is properly connected to the EVM controller board. If “Cannot connect to EVM board” appears, verify the USB cable is connected. When the EVM controller is connected to the PC through USB, a green LED on the board lights to indicate the system is getting power. The LED will remain lit until an application opens the controller. The light will then be switched off so that it will not interfere with any light measurements. If the EVM board disconnects from the USB bus while the program is running, it displays an error message and then terminates. Reconnect the EVM board and restart the program.

Information:

If an AS7150 device is connected to the PC and not shown on the connections page, please click the refresh button in the GUI (Figure 5) to restart searching for connected devices. If the device is still not found, please check the USB cable and the connections.

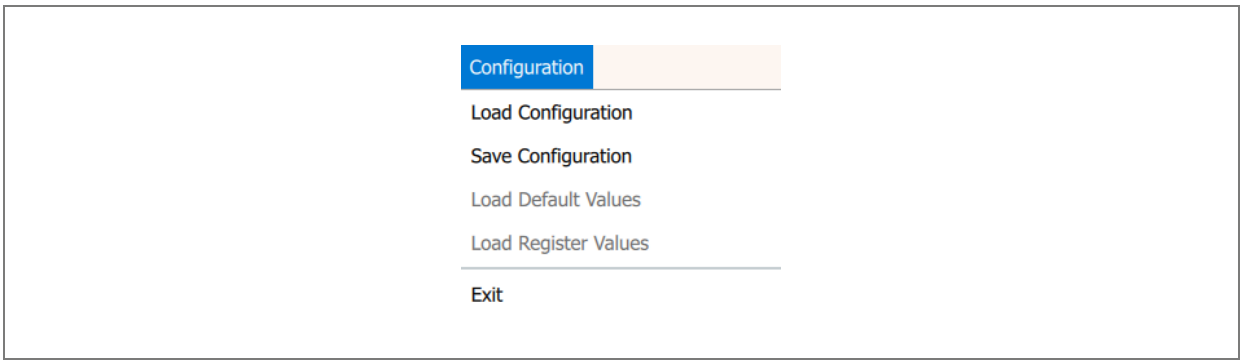
4.2 System menus

Pull-down menus labeled **Configuration**, **Log**, and **Help** are located at the top of the main window. The **Configuration** menu allows configurations to be added and saved for measurements. The **Log** menu controls the logging function, and the **Help** menu offers version and copyright information for the application.

4.2.1 Configuration

The Configuration menu contains the following functions:

Figure 6: Configuration menu



Click **Load Configuration** to load a preset configuration and **Save Configuration** to save the current configuration being used.

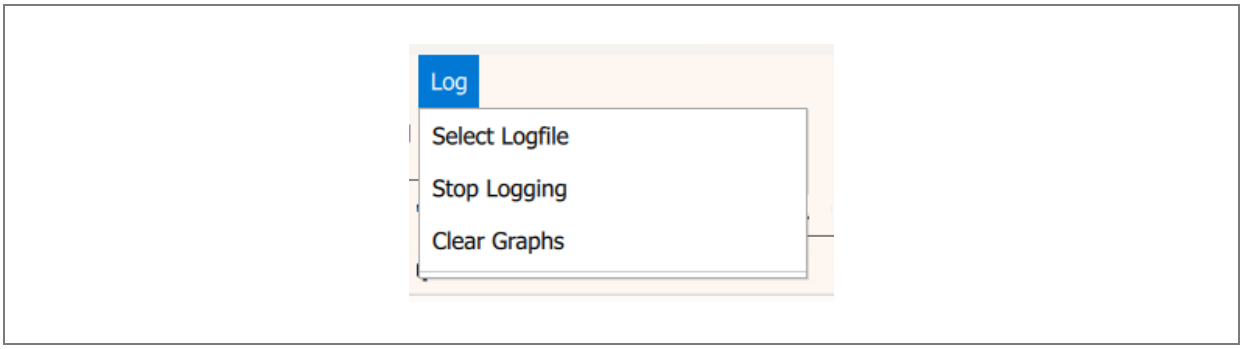
When the JSON configuration files are saved in the default directory, they will be displayed in the list. If the required configuration is not in the list, use the folder dialog to search for the file.

The last used preset configuration or the last imported configuration will be set as the default configuration for the next time the application starts.

4.2.2 Log menu

The Log menu controls the logging function and saves the log data to a file. Log data accumulates in memory until discarded or written to a data file.

Figure 7: Log menu



Click **Select Logfile** to open a dialog window and select the CSV file for your measurement.

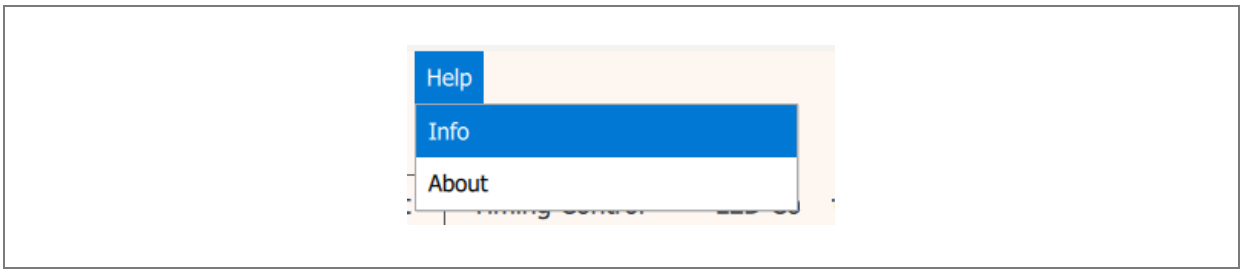
Click **Stop Logging** to stop the logging function. Once logging stops, the user may store the data in a file or continue collecting additional data by clicking Start Logging again.

Click **Clear Graphs** to clear the measurement from the Main Graph in the main GUI window.

4.2.3 Help menu

The Help menu contains two functions: **Info** and **About**.

Figure 8: Help menu



The **Info** function displays a dialog box (Figure 9) showing the software version and library information. Click the OK button to close this window and continue.

The **About** function displays a dialog box (Figure 10) showing the version and copyright information for the application and library. Click the OK button to close this window and continue.

Figure 9: AS7150 EVM GUI info window

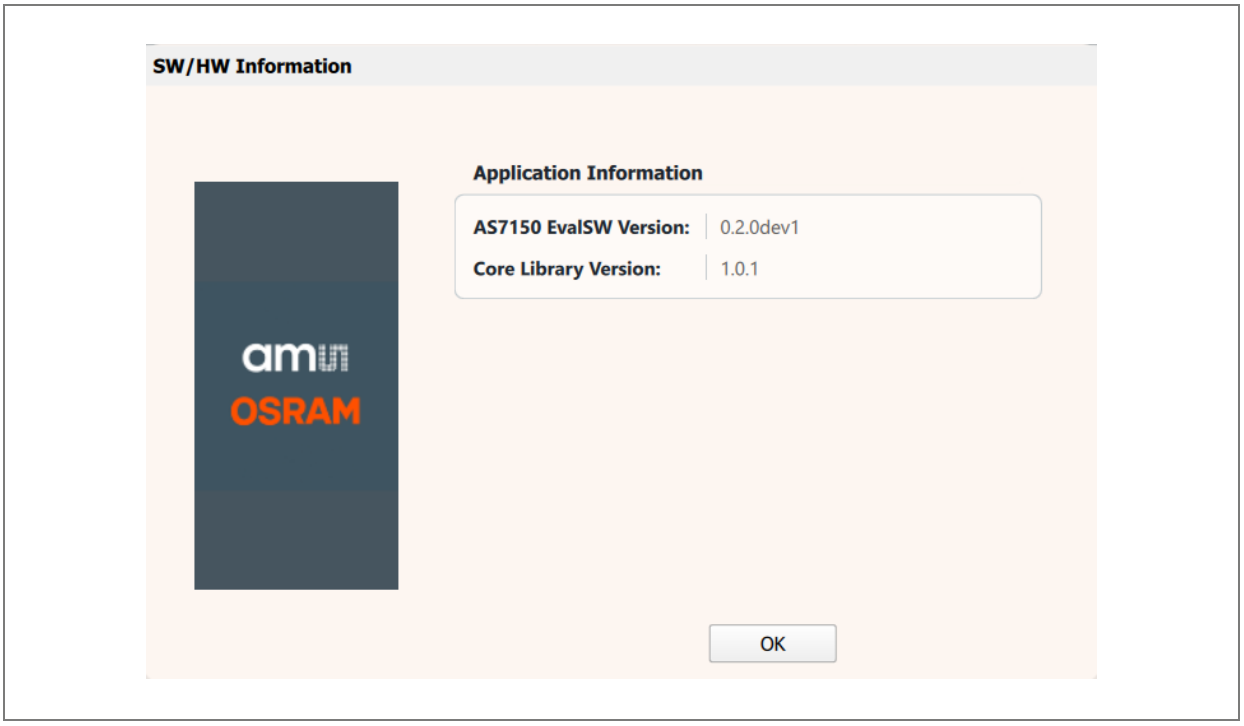


Figure 10: AS7150 EVM GUI about window

4.3 Measurement page

The Measurement page (Figure 5) includes three areas: The Main Graph, Chip Events and Thresholds.

4.3.1.1 Main graph

The Main Graph displays the measurement in a plotting window.

4.3.1.2 Chip events

This tab shows the following events:

- PROX_LOW_OFF – Proximity interrupt status register. Is 1 when counts cross above low threshold of proximity measurement.
- PROX_LOW_ON – Proximity interrupt status register. Is 1 when counts fall below low threshold of proximity measurement.
- PROX_LOW – Proximity detection low register. This is not an interrupt.
- PROX_HIGH_OFF – Proximity interrupt status register. Is 1 when counts fall below high threshold of proximity measurement.
- PROX_HIGH_ON – Proximity interrupt status register. Is 1 when counts cross above high threshold of proximity measurement.
- PROX_HIGH – Proximity detection high register. This is not an interrupt.
- VCSEL_WD – VCSEL safety watchdog register. Is 1 when VCSEL on-time violation is detected.
- VCSEL_SHORT_VDD – Safety status register when VCSEL short circuits to VDD.
- VCSEL_SHORT_VSS – Safety status register when VCSEL short circuits to VSS.
- MOD2_ASAT – Modulator 2 reached unsaturation.
- MOD1_ASAT – Modulator 1 reached unsaturation.
- LED_LOWVDS – Indicator for low voltage to LED driver.
- SEQ_ERROR – Is set if a measurement is not started due to high sampling frequency.
- SEQ_END – Status information, if the sequencer is stopped.

4.3.1.3 Thresholds

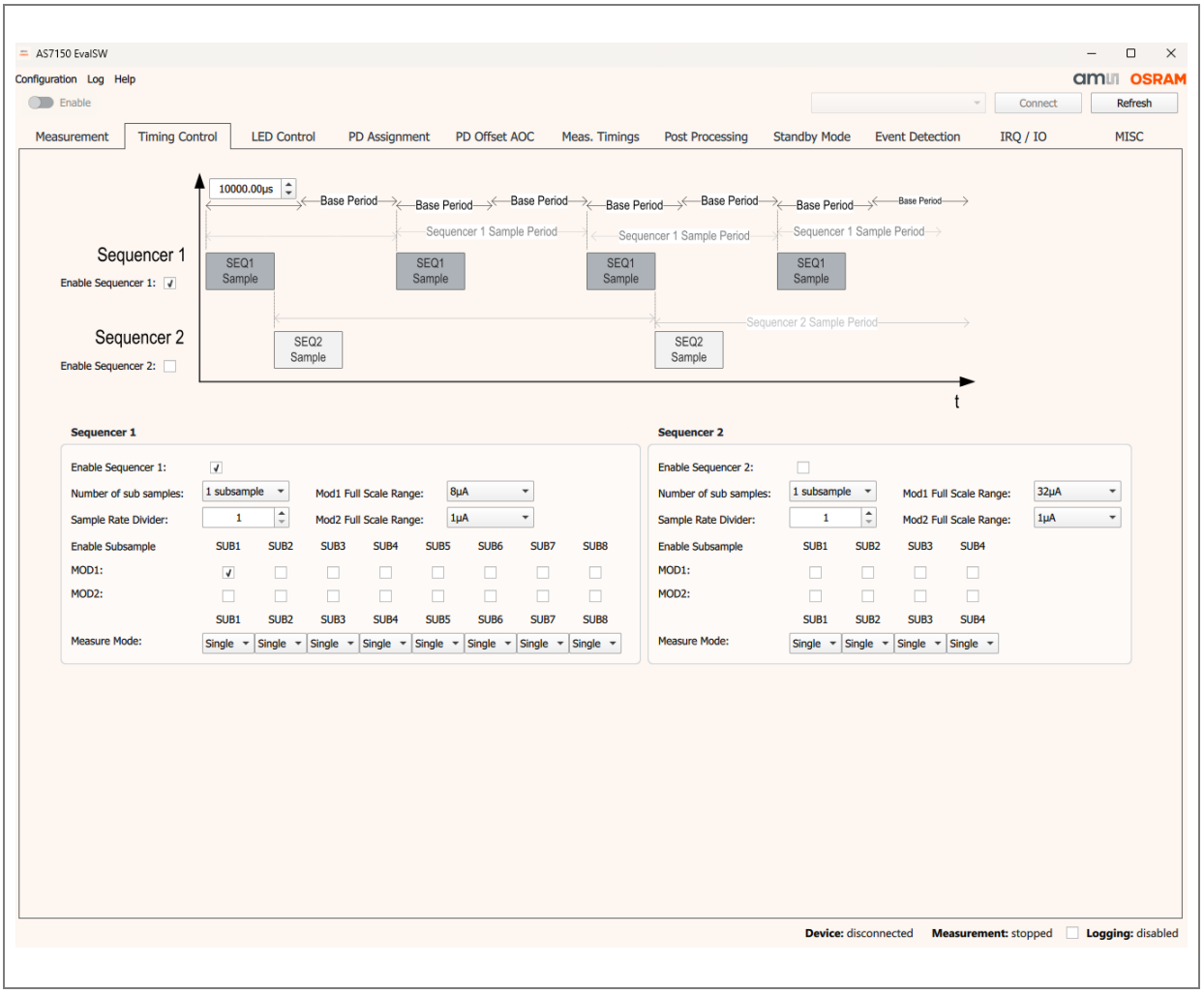
This tab contains the following controls:

- High Thres – High proximity threshold used for triggering event, not an interrupt unless enabled in IRQ.
- Low Thres – High proximity threshold used for triggering event, not an interrupt unless enabled in IRQ.

4.3.2 Timing control page

The Timing Control page (Figure 11) contains controls for timing, sampling rate, modulator selection and measurement modes of Sequencer 1 and Sequencer 2.

Figure 11: Timing control page



- **Enable Sequencer 1 or 2**: Checking this box enables the respective sequencer for continuous measurements.
- **Number of sub-samples**: The desired number of subsamples ranging from 1 to 8 for Sequencer 1 and 1 to 4 for Sequencer 2 could be activated from this dropdown menu.
- **Base Period**: This is the input clock signal for Sequencer 1 and 2 derived from on chip oscillator using base period divider. The sample rate divider uses the base period to calculate the sampling frequency for a Sequencer.

- **Sample Rate Divider**: This defines the sampling frequency for the sequencers, based on base period. Higher the value of Sample rate divider, lower the frequency of sampling for the sequencer. The value is typically more for Sequencer 2 than Sequencer 1.
  – For example, when the Base Period is set to 1000µs using base period divider, this is given as input for Seq1 and 2 dividers. When Seq2 divider is set to 2, this means that the sampling Time period of Sequencer 2 is 2 x 1000µs = 2000µs.
- **Mod1 Full Scale Range**: This maps the maximum analog to maximum possible digital value for modulator 1 during ADC conversion. AS7051 uses 16-bit resolution for ADC conversion. This means 0 to 1µA will be converted to 0 to 65,535.
- **Mod2 Full Scale Range**: This maps the maximum analog to maximum possible digital value for modulator 2.
- **Enable sub-sample:** Register map to choose the modulator for respective sub-sample. Multiple Modulators could be chosen for a sub-sample.
- **Measure Mode:** Choose between different modes to compensate for ambient light. This measures the intensity with the LED **OFF** and subtracts this value from the measurement taken with the LED **ON**. For detailed information, refer to the datasheet.

4.3.3 LED control page

The LED Control page (Figure 12) contains controls for the LED currents and assignment of LEDs between sub-samples for Sequencer 1 and Sequencer 2.

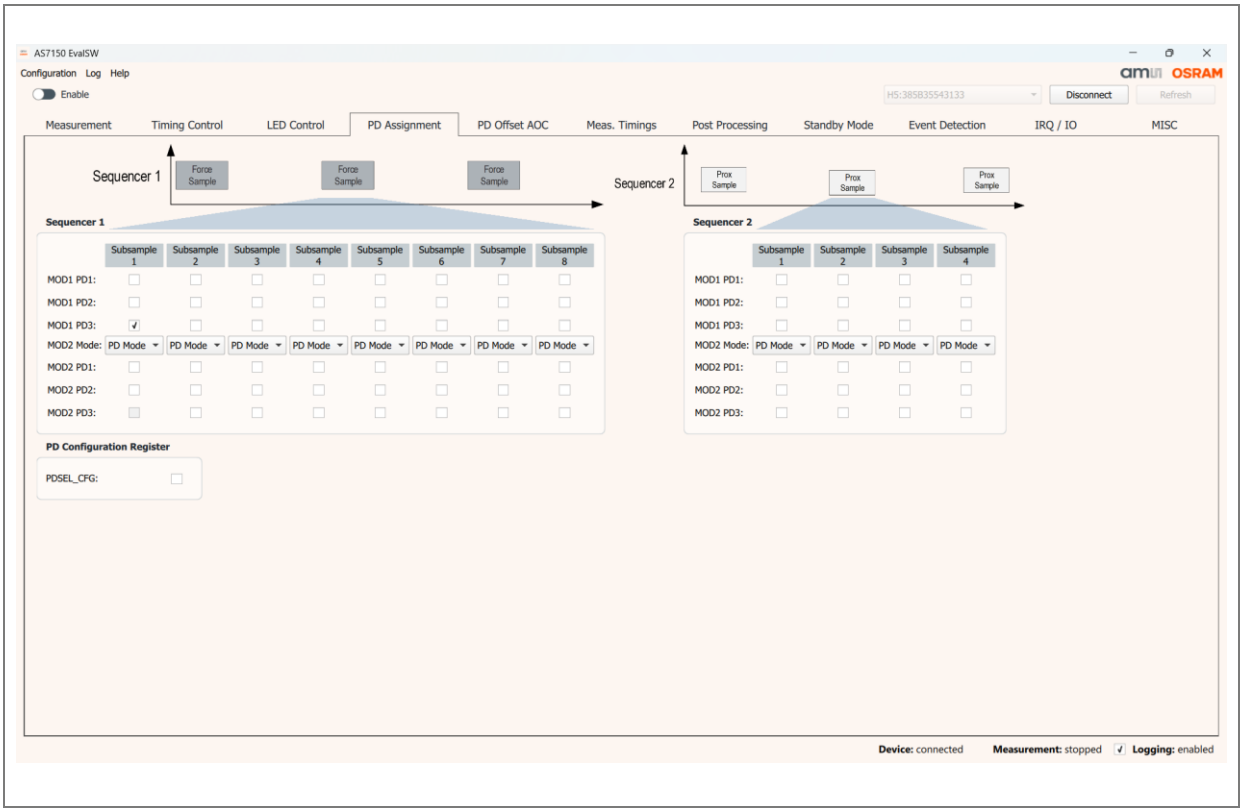
Figure 12: LED control page

- Choose which LED to be turned ON for each sub-sample of a sequencer. It is possible to turn ON multiple LEDs for a given sub-sample as the device features individual LED driver for each LED.
- LED current remains the same for all the sub-samples of a sequencer. The current does not have to be the same between the sequencers. When no LED is chosen, the measurement data would be based on ambient light or from an external source.

4.3.4 PD assignment page

This page contains the assignment of photodiodes and modulators to each sub-sample. The dropdown menu of MOD2 Mode is used to choose between the measurement of PD output or different voltage values of AS7150.

Figure 13: PD assignment page



4.3.4.1 Sequencer 1 and 2

- **Register map**: Assignment of PDs for sub-samples between modulators.
- **MOD2 Mode**: Modulator 2 can also be used to measure voltages across different within the AS7150 module in addition to measuring the PD values. This could be selected from the dropdown by choosing the option TV/MUX. When TV/MUX is selected, the register selection for MOD2PD1, MOD2PD2, MOD2PD3 would be used to choose which voltage to be measured. Refer TV MUX selection for more details. When PD Mode is chosen for MOD2, same PD cannot be used for MOD1 and MOD2 simultaneously.

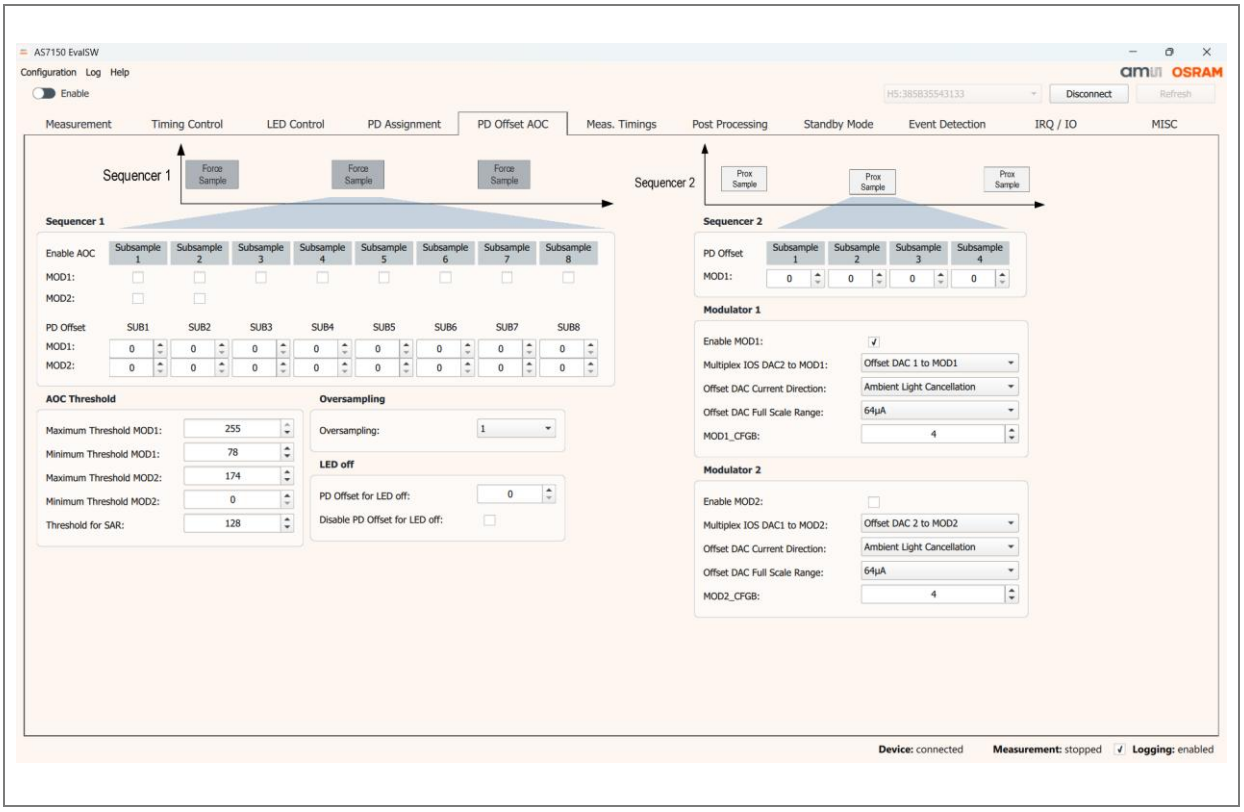
4.3.4.2 PD configuration register

Controls the connection for internal reference voltage between VCM_PPG(unchecked) or VSSA(checked).

4.3.5 PD offset AOC

This page contains the offset handling for PD counts. This offset enables effective handling of crosstalk from different light source within the system, ambient light leak or internally reflected IR light with latency from same source. Additionally, this offset value can also be used for baseline adjustment of PD counts.

Figure 14: PD offset AOC page



4.3.5.1 Sequencer 1

- **Enable AOC** – The register map is used to select Automatic Offset Correction (AOC) for each of sub-samples of Modulators. This feature automatically calculates the ambient light and compensates the measurements.
- **PD Offset** – Counts of PD to offset the measured value for each sub-sample of Modulator 1 and Modulator 2. The PD offset registers will be overwritten if the AOC is active and takes effect immediately.

4.3.5.2 AOC threshold

- **Maximum Threshold MOD1** – Defines the maximum threshold for reducing ambient light offset current in Modulator 2 sub-samples. The AOC offset is applied when the photodiode (PD) value exceeds this threshold.
- **Minimum Threshold MOD1** – Defines the minimum threshold for increasing ambient light offset current in Modulator 2 sub-samples. The AOC offset is applied when the photodiode (PD) value exceeds this threshold.
- **Maximum Threshold MOD2** – Defines the maximum threshold for reducing ambient light offset current in Modulator 2 sub-samples. The AOC offset is applied when the photodiode (PD) value exceeds this threshold.
- **Minimum Threshold MOD2** – Defines the minimum threshold for increasing ambient light offset current in Modulator 2 sub-samples. The AOC offset is applied when the photodiode (PD) value exceeds this threshold.
- **Threshold for SAR** – Threshold limit for triggering an event to allow system to detect, when the signal crosses the value mentioned here.

4.3.5.3 Oversampling

Choose the oversampling rate between 2 to 128 for better SNR. Higher Oversampling results in better SNR but also increases the power consumption due to additional load on ADC modulator.

4.3.5.4 LED off

- **PD Offset for LED Off**: Ambient light compensation offset value for double and triple sampling during LED off phase.
- **Disable PD Offset for LED Off**: Enable or disable the AOC during the LED Off measurement phase in double sampling and triple sampling measurement mode for a sub-sample.

4.3.5.5 Sequencer 2

- **PD Offset**: Choose the Offset value for MOD1 for sequencer 2 for Ambient light compensation.

4.3.5.6 Modulator 1

- **Enable MOD1**: To enable the ADC Modulator 1.
- **Multiplex IOS DAC2 to MOD1**: This bit allows to connect the offset DAC1 or 2 to be connected to modulator 1 for calibration purposes.
- **Offset DAC Current Direction**: This register controls the current direction of the offset DAC for modulator 1. **Please do not change this register.**
- **Offset DAC full scale range**: This register allows for the full-scale configuration of the offset DAC value for ADC modulator 1 which is used for ambient light cancellation.
- **MOD1_CFGB**: This register controls the current reference scale factor for the DAC current reference of modulator 1. Although multiple values are possible, please choose either 4(0.625) or 7(1.000).

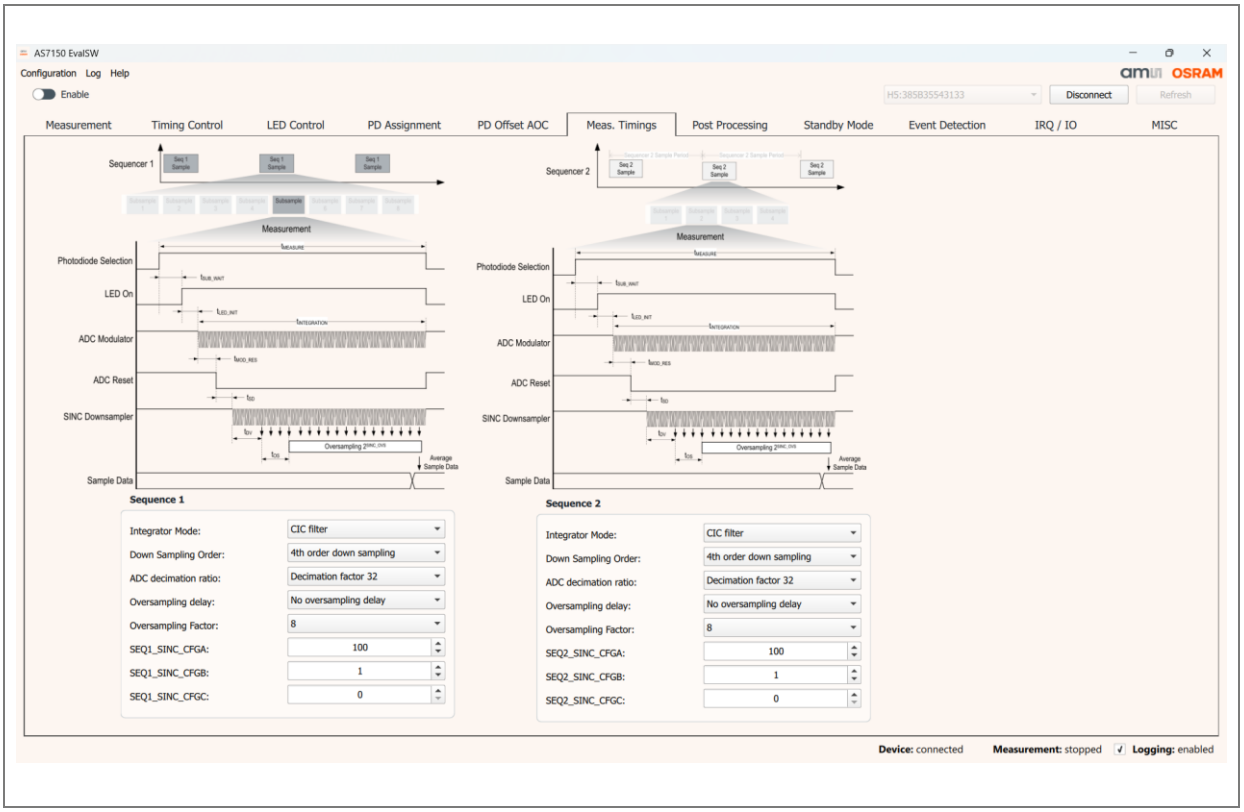
4.3.5.7 Modulator 2

- **Enable MOD1**: To enable the ADC Modulator 2.
- **Multiplex IOS DAC2 to MOD2**: This bit allows to connect the offset DAC 1 or 2 to be connected to modulator 2 for calibration purpose.
- **Offset DAC Current Direction**: This register controls the current direction of the offset DAC for modulator 2. **Please do not change this register.**
- **Offset DAC full scale range**: This register allows for the full-scale configuration of the offset DAC value for ADC modulator 2 which is used for ambient light cancellation.
- **MOD1_CFGB**: This register controls the current reference scale factor for the DAC current reference of modulator 2. Although multiple values are possible, please choose either 4(0.625) or 7(1.000).

4.3.6 Meas. timings

This page provides timing control settings for a single sub-sample, including photodiode selection, LED on/off timing, ADC modulator start/stop offsets, ADC reset delay, SINC down-sampler delay, oversampling delay, and oversampling factor for Sequencer 1 and Sequencer 2.

Figure 15: Measurement timings window



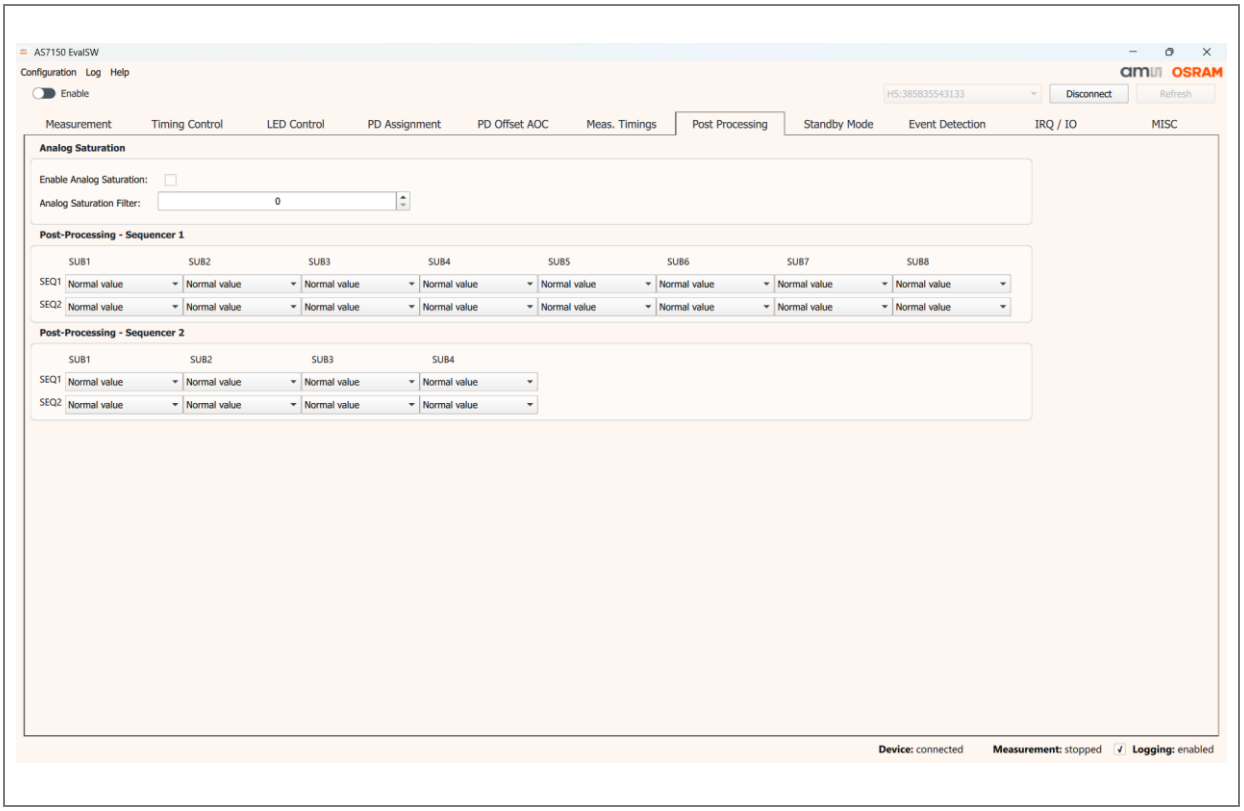
4.3.6.1 Sequence 1 and 2

- **Integrator mode**: Choose the filter operation mode of sequencer down sampling filter. Default filter operation mode is a CIC filter.
- **Down Sampling Order**: Order of down sampling SINC Filter. 4^{th} or 5^{th} orders could be selected.
- **ADC Decimation ratio**: ADC decimation ratio of sequencers which is applicable for both ADC modulators.
- **Oversampling delay**: In case embedded oversampling filter function is enabled this register allows to configure a delay before data from the SINC down sampler is used for the oversampling calculation for sequencer.
- **Oversampling Factor**: ADC oversampling filter of sequencers whose input signal is the decimation filter output of the ADC modulator.
- **SEQ1_SINC_CFGA:** Register, encapsulating Oversampling and Decimation factors. Please refer to the datasheet for detailed description for Sequencer 1.
- **SEQ1_SINC_CFGB**: Register, encapsulating Oversampling Delay, Down sampling order and Filter mode for Sequencer 1.
- **SEQ1_SINC_CFGC**: Register for controlling sequencer 1 start delay.
- **SEQ2_SINC_CFGA**: Register, encapsulating Oversampling and Decimation factors. Please refer to the datasheet for detailed description for Sequencer 2.
- **SEQ2_SINC_CFGB**: Register, encapsulating Oversampling Delay, Down sampling order and Filter mode for Sequencer 2.
- **SEQ2_SINC_CFGC**: Register for controlling sequencer 2 start delay.

4.3.7 Post processing

This page has three main controls: Analog Saturation, Post-Processing – Sequencer 1 and Post-Processing – Sequencer 2.

Figure 16: Post processing window



4.3.7.1 Analog saturation

- **Enable Analog Saturation**: It enables the detection of modulator saturation and manipulation of the saturated data with fixed values.
- **Analog Saturation Filter**: The register configures the minimum length of the input pulse to be detected as analog saturation. The minimum detection length is configured with the asat_fil register value multiplied with the oscillation period of the digital modulator clock (modclk).

4.3.7.2 Post-processing – sequencer 1

To configure the post processing function for each sub-sample and Modulator of Sequencer 1. Choose between the values:

- 0: Normal value
- 1: Inverted value
- 2: Value – read pp_offset register value
- 3: Write value to pp_offset register

4.3.7.3 Post-processing – sequencer 2

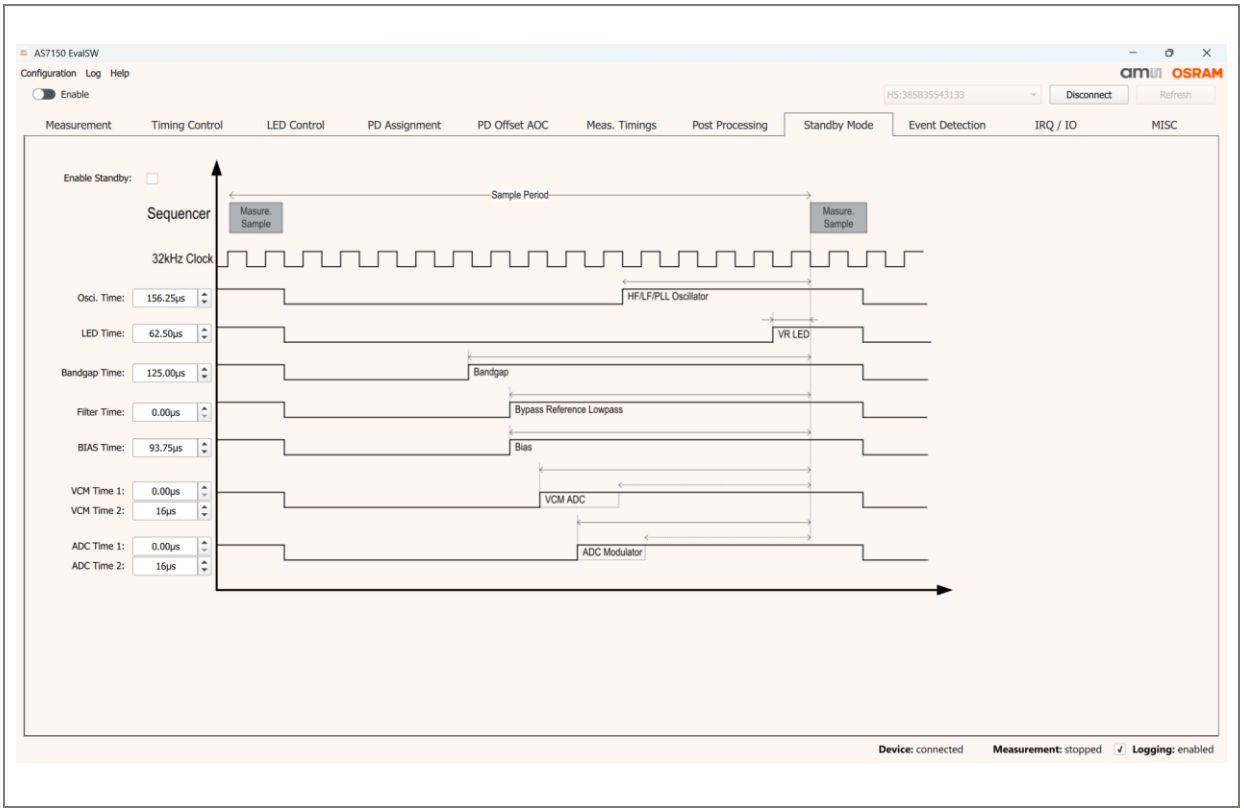
To configure the post processing function for each sub-sample and Modulator of Sequencer 2. Choose between the values:

- 0: Normal value
- 1: Inverted value
- 2: Value – read pp_offset register value
- 3: Write value to pp_offset register

4.3.8 Standby mode page

The time required for different power blocks to stabilize could be specified here. Please be informed that the optimized settings are already in use and adjustment of them is only necessary in special cases.

Figure 17: Standby mode window



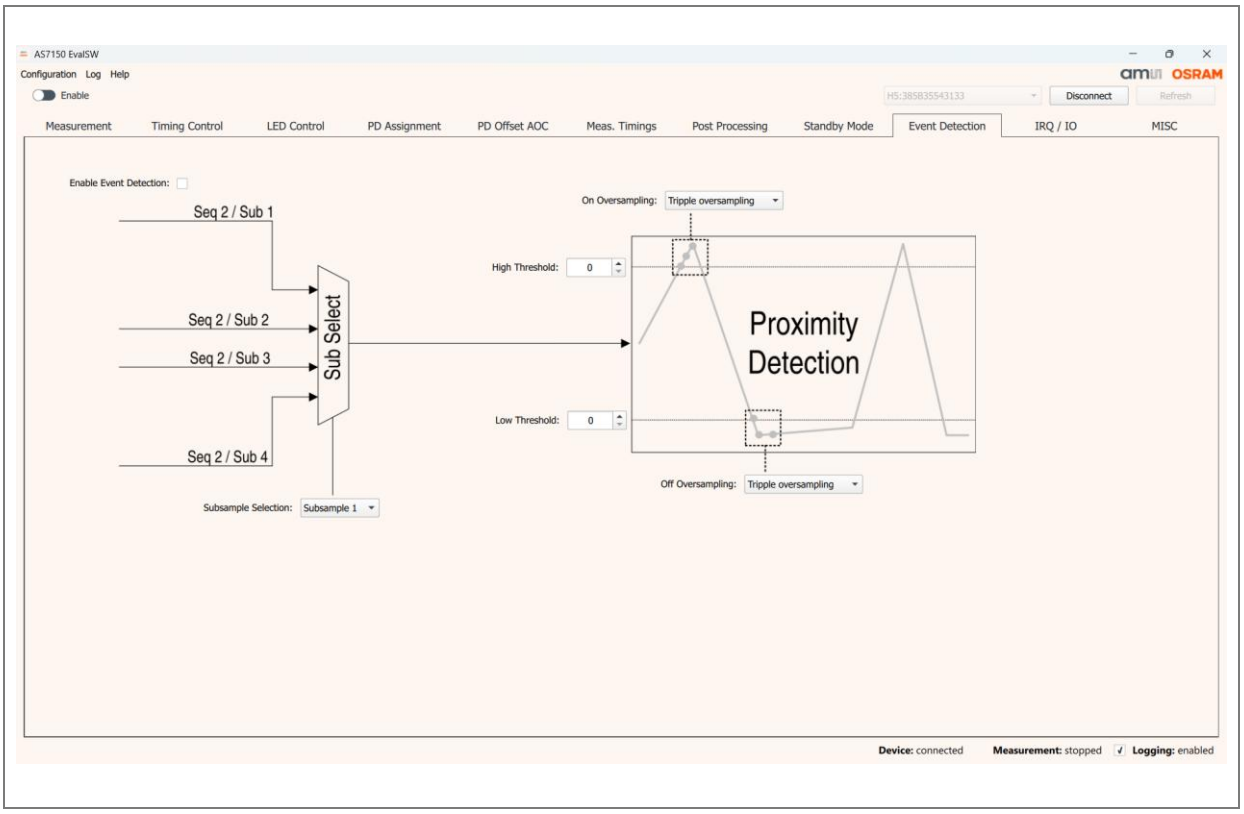
- **Enable Standby**: To enable standby between measurements to save power. The standby time depends on the sampling time. Standby yields better power saving in most cases. But in cases where the measurement frequency is high, the power saved is negligible.
- **Oscl. Time**: Time required to enable the HF/PLL Oscillator before starting the measurement.
- **LED Time**: Time required to enable voltage reference for the LED drivers.
- **Bandgap Time**: Time required to enable on chip bandgap and bias reference current.
- **Filter Time**: Time required to enable the bypass functions of the low pass filter.
- **BIAS Time**: Time required to enable the bias voltage block of the current DAC.
- **VCM Time 1 and 2**: Time required for VCM circuit to stabilize to be used for ADC.

- **ADC Time 1 and 2:** Time required for ADC 1 and 2 to stabilize before processing the PD inputs.

4.3.9 Event detection page

To configure the upper and lower thresholds and number of over samples of proximity measurement from Sequencer 2 to trigger an internal event. This event does not trigger interrupt unless chosen in the Interrupt Request (IRQ) control.

Figure 18: Event detection window



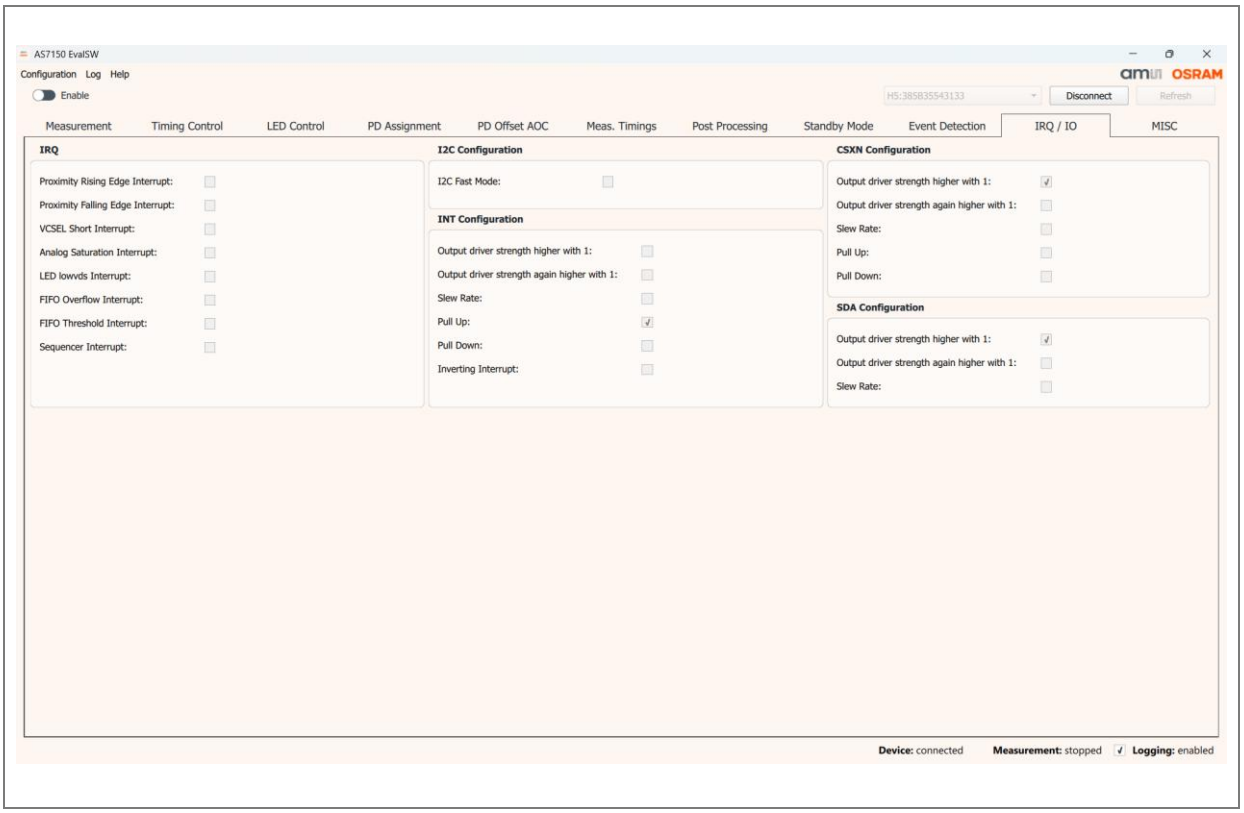
- **Enable Event detection**: Enable event detection based on proximity measurement from sequencer 2.
- **Subsample Selection**: Sub-sample to be used for Event detection. Sequencer have a maximum of 4 sub-samples to choose from.
- **High Threshold**: When the PD count exceeds this value, the Event is triggered after the configured on oversampling period.

- **Low Threshold**: When the PD count falls below this threshold, the event is triggered after the configured Off oversampling period.
- **On Oversampling**: Number of samples taken after the signal exceeds the High Threshold before triggering the event.
- **Off Oversampling**: Number of samples taken after the signal drops below the Low Threshold before triggering the event.

4.3.10 IRQ/IO page

This page contains the controls for Interrupt request and Input/Output controls.

Figure 19: IRQ/IO window



4.3.10.1 IRQ

- **Proximity Rising Edge Interrupt**: Is triggered when the proximity count exceeds the configured High threshold limit in Event detection.
- **Proximity Falling Edge Interrupt**: Is triggered when the proximity count falls below the configured Low threshold limit in Event detection.
- **VCSEL Short Interrupt**: Interrupt for VCSEL safety logic.
- **Analog Saturation interrupt**: Interrupt is released once an analog saturation of ADC modulator 1 or ADC modulator 2 is detected.
- **LED lowvds Interrupt**: Is triggered when a low voltage condition on LED1, LED2 and LED3 current sinks which means that the configured LED current cannot be guaranteed anymore.
- **FIFO Overflow Interrupt**: Is triggered when the FIFO overflows. When this interrupt is released for host notification, the data samples get lost.
- **FIFO Threshold Interrupt**: If the FIFO level is bigger than the FIFO threshold level, defined in the FIFO Threshold register in MISC, an interrupt is released.
- **Sequencer Interrupt**: The Interrupt enable register for the sequencer.

4.3.10.2 I²C configuration

- **I²C Fast Mode:** This bit enables the I²C fast mode plus operation mode with up to 1MHz clock frequency.

4.3.10.3 INT configuration

Configuration of Interrupt Pin.

- **Output driver strength higher with 1**: Control the output driving current of Interrupt pin together with Output driver strength Analog Gain.
- **Output driver strength higher with 1**: Control the output driving current of Interrupt pin together with Output driver strength.
- **Slew rate**: Allow for a change of slew rate for interrupt pin.
- **Pull Up**: Enable the internal pullup resistor for Interrupt pin.
- **Pull Down**: Enable internal pull-down resistor for Interrupt pin.
- **Inverting Interrupt**: Change the polarity of Interrupt pin.

4.3.10.4 CSXN configuration

Chip select pin configuration used for SPI communication.

- **Output driver strength higher with 1**: Control the output driving current of Chip select pin together with Output driver strength Analog Gain.
- **Output driver strength higher with 1**: Control the output driving current of Chip select pin together with Output driver strength.
- **Slew rate**: Allow for a change of slew rate for Chip select pin.
- **Pull Up**: Enable the internal pullup resistor for Chip select pin.
- **Pull Down**: Enable internal pull-down resistor for Chip select pin.
- **Inverting Interrupt**: Change the polarity of Chip select pin.

4.3.10.5 SDA configuration

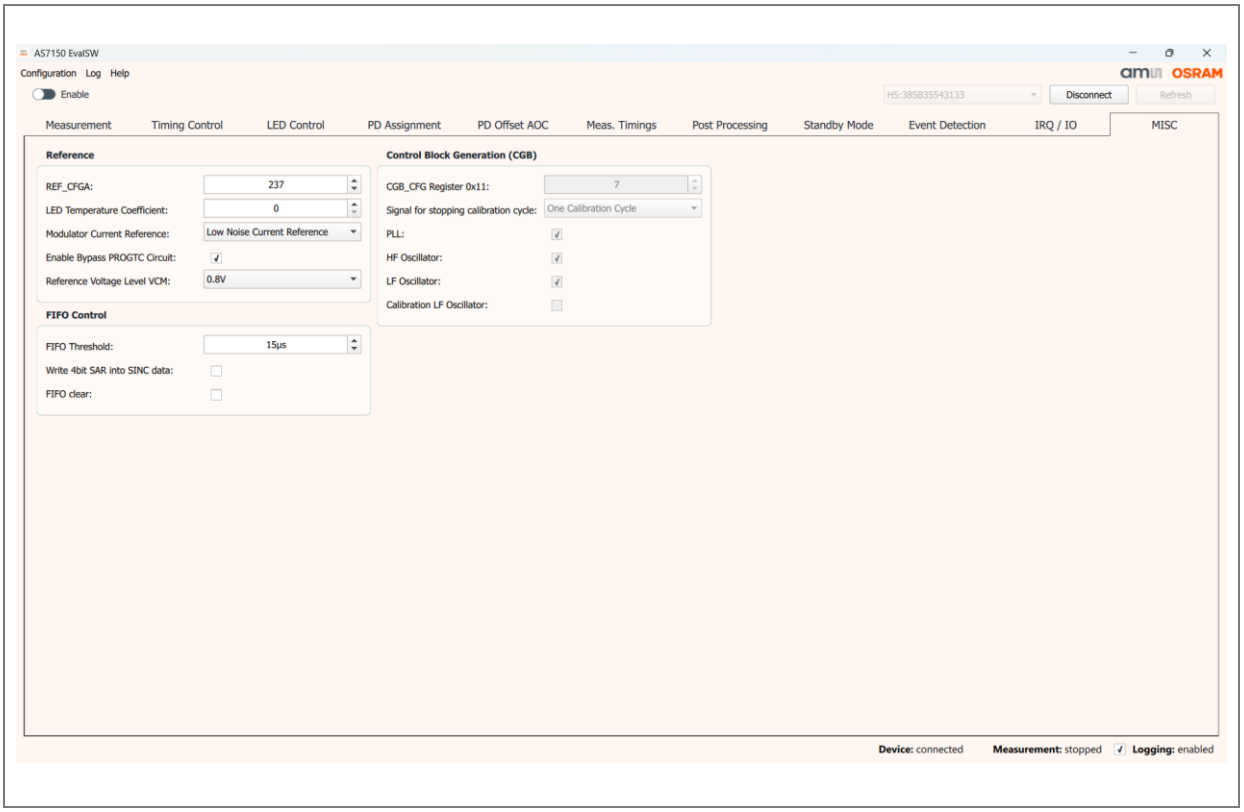
Configure the output characteristics of SDA pin.

- **Output driver strength higher with 1**: Control the output driving current of SDA pin together with Output driver strength Analog Gain.
- **Output driver strength higher with 1**: Control the output driving current of SDA pin together with Output driver strength.
- **Slew rate**: Allow for a change of slew rate for SDA pin.

4.3.11 MISC page

The miscellaneous (MISC) page contains three main controls namely Reference, FIFO control and Control Block Generation.

Figure 20: MISC window



4.3.11.1 Reference

- **REF_CFGA**: This encapsulates different features of AS7150, with each bit mapped to the feature as listed below:
  - 7: Enable Bandgap
  - 6: Enable low noise voltage source for LED reference current
  - 5: Enable VCM PPG buffer
  - 4: Enable internal Bandgap startup
  - 3: Enable Voltage reference for LED driver and Led buffer
  - 2: Enable reference current Bias reference of ambient light DC offset
  - 1: Control the tail current of VCM Buffers (Do not change)
  - 0: Low pass filter bypass mode of internal bandgap voltage for faster device startup.
- **LED Temperature Coefficient**: Configures temperature coefficient for the LED current.
- **Modulator Current Reference**: Enables a low noise current reference for the offset compensation current DAC.
- **Enable Bypass PROGTC Circuit**: Bypass enable bit for the temperature compensation circuit for the LED current.
- **Reference Voltage level VCM**: Controls the voltage level of the common mode buffer.
  - 0: 0.8V VCM Voltage level
  - 1: 0.75V VCM voltage level

4.3.11.2 FIFO control

- **FIFO Threshold**: Threshold limit after specified limit of FIFO to trigger FIFO Threshold interrupt when enabled.
- **Write 4bit SAR into SINC data**: Enable this to write the 4 pulse measurements used for SAR algorithm for Ambient light compensation into SINC Data.
- **FIFO clear**: This self-clearing bit deletes the FIFO on-chip memory.

4.3.11.3 Control block generation

Choose the contents of control block to be written into FIFO.

- **CGB_CFG Register 0x11**: This encapsulates the peripheral control of Clock pulse generators. Bit to functionality mapping is shown below.
  - 0: Enable internal 32KHz low frequency Oscillator
  - 1: Enable internal 2MHz High frequency Oscillator
  - 2: Enable internal PLL for 20MHz clock to operate ADCs.
  - 6: When set, the calibration of 32KHz Low Frequency Oscillator is started.
  - 7: Defines the frequency of calibration for 32KHz Oscillator.
- **Signal for stopping calibration cycle**: Defines the frequency of calibration for 32KHz Oscillator.
- **PLL**: Enable or disable PLL pulse generator (20 MHz).
- **HF Oscillator**: Enable or Disable High Frequency Oscillator (2 MHz).
- **LF Oscillator**: Enable or Disable Low Frequency Oscillator(32KHz).
- **Calibration LF Oscillator**: Enable or disable calibration of Low Frequency Oscillator.

5 Resources

For additional information regarding the AS7150, please refer to the datasheet. For information regarding the installation of the AS7150 EVM host application software, please refer to the AS7150 EVM Quick Start Guide.

Designer's Notebooks dealing with various aspects of optical measurement and optical measurement applications are available.

Referring documents:

- AS7150 Datasheet
- AS7150 EVM Quick Start Guide (QSG)

6 Revision information

Definitions

Draft / Preliminary:
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Changes from previous version to current revision v1-00	Page
Initial production version	

- Page and figure numbers for the previous version may differ from page and figure numbers in the current revision.
- Correction of typographical errors is not explicitly mentioned.

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