

Sense the power of light

amu OSRAM

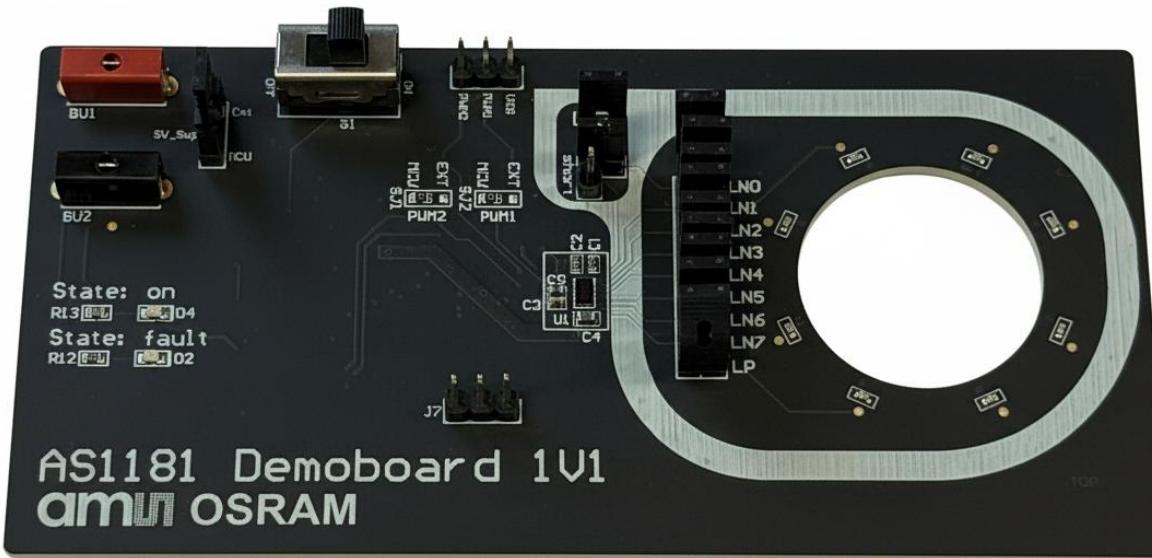
AS1181 EVK Quick Start Guide

Hardware and GUI-SW Description

QG001053 • v1-00 • 2025-Oct-17

AS1181 Demoboard 1V1

How to get started?



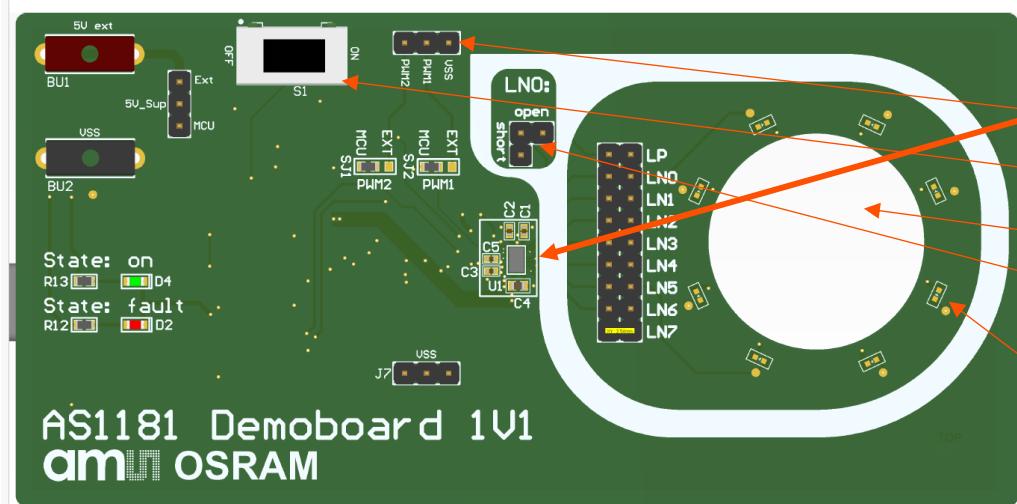
The main purpose of this Hardware is to provide customers an evaluation platform of AS1181.

This platform includes a simple PC GUI software to allow configuration of the device and test different modes.

On the backside of the PCB a “seeed studio ESP32” MCU is placed to act as bridge between USB and I²C/I3C of AS1181.

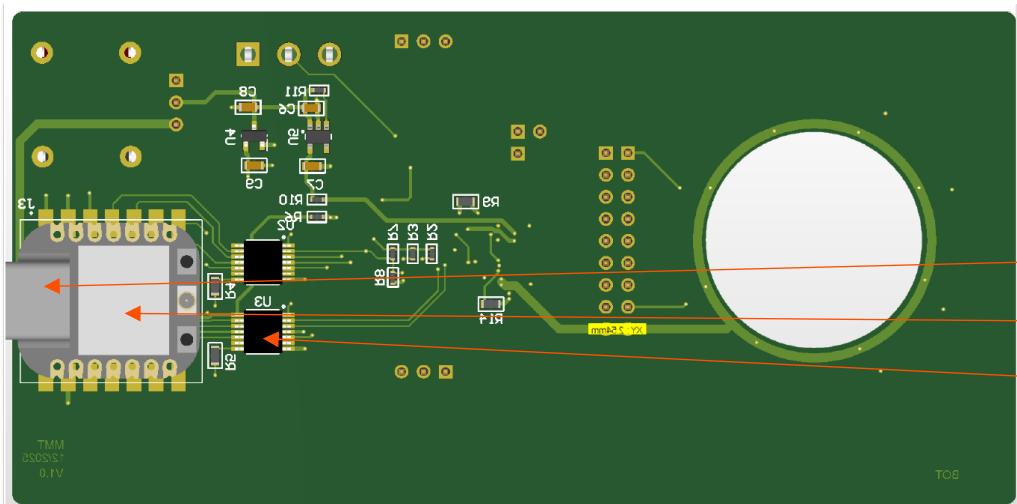
AS1181 Demoboard 1V1

Hardware Description TOP & BOT side



TOP Side:

- U1 AS1181: 8-channel AR & VR LED Driver
- Connector for external Trigger/PWM Signals
- S1: ON/OFF Switch
- External camera mounting hole
- Force Fault Jumper: OPEN & SHORT LED simulation channel 0
 - OPEN channel 0 = Remove jumper
 - SHORT channel 0 = Set jumper
- 8 x SFH 4043 (940nm) LEDs
- BU1 & BU2: External 5V supply for lab usage (optional)
- Status LEDs: D4 = ON & D2 = FAULT

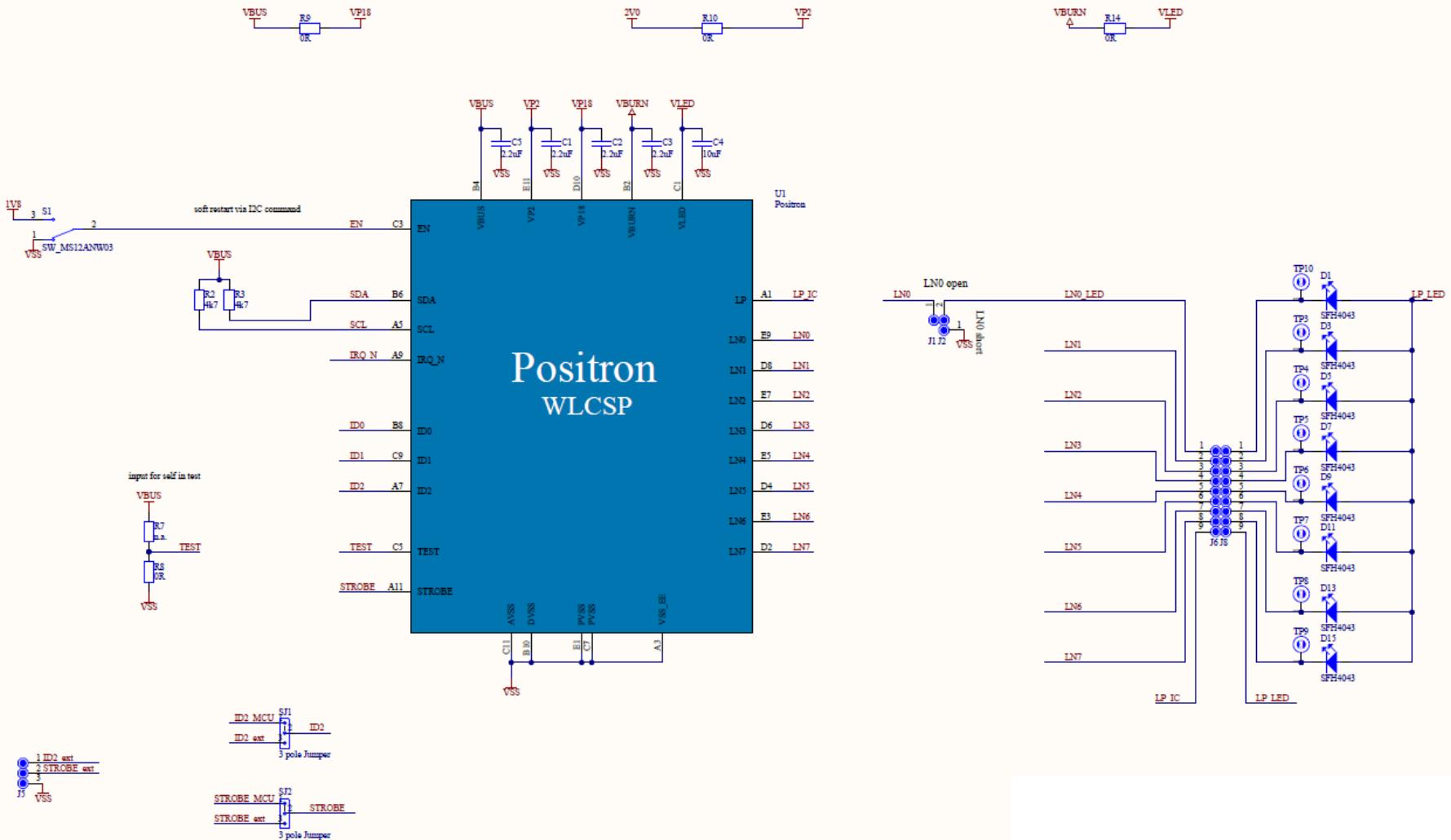


BOT Side:

- USB Type C connector
- “seeed studio” ESP32 MCU
- Level shifter

AS1181 Demoboard Schematic

Circuit Diagram of AS1181 Demoboard



Download latest AS1181 PC GUI Software from github

github.com/ams-OSRAM/as1181_evk_gui

as1181_evk_gui (Public)

main 1 Branch 2 Tags

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swei-ams-osram Update Demoboard image f5c09e8 · 4 minutes ago 5 Commits

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README

AS1181 LED/VCSEL driver with enhanced safety features

AS1181 is an 8-channel highly integrated self-contained LED/VCSEL driver for near to eye applications such as Augmented Reality (AR) and Virtual Reality (VR) glasses. The device integrates extended safety monitoring functions to ensure eye safe operation. These safety monitors include LED short detection, LED open detection, LED overcurrent protection, LED on time monitor as well as temperature shutdown and a built-in-self test (BIST). The device is configurable via a serial wire interface (I²C or I_C) with interrupt and provides two Strobe/PWM inputs to synchronize illumination with up to two external cameras for binocular eye tracking systems. The LED current is individually programmable per channel, and it can drive up to 2 IR LEDs per current sink with a minimum ON time of 10µs and a maximum current of 66mA per channel. General purpose LED driving applications can be supported via a direct PWM input applied at the Strobe pin and it can drive RGB or white LEDs considering a maximum forward voltage of 5V. The device comes in a tiny wafer-level-chip-scale package (WLCSP) with 0.4mm pitch and dimensions of 2.9mm x 1.75mm x 0.5mm (L x W x H).

About

PC GUI software for AS1181 LED driver

Readme

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as1181_evk_gui repository:

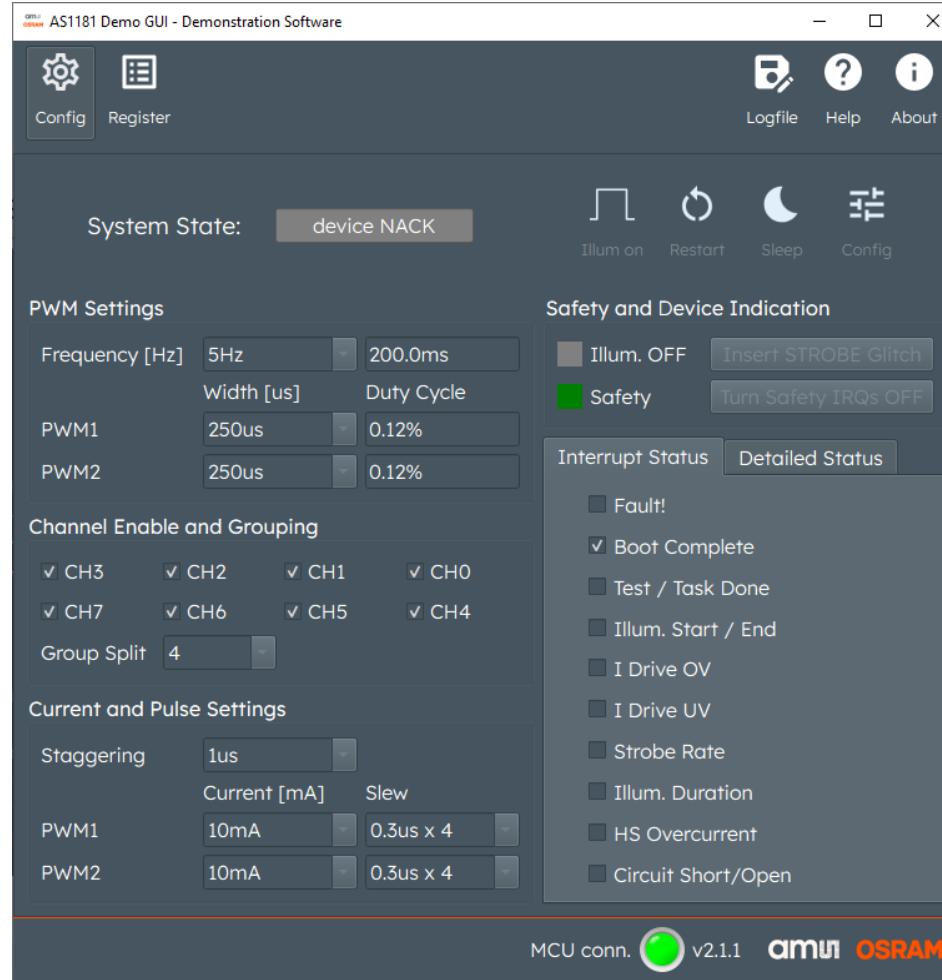
- Download latest GUI software release

AS1181 GUI Software Description

Launch AS1181 demo app from downloaded software container & connect USB-Type C cable to provided connector

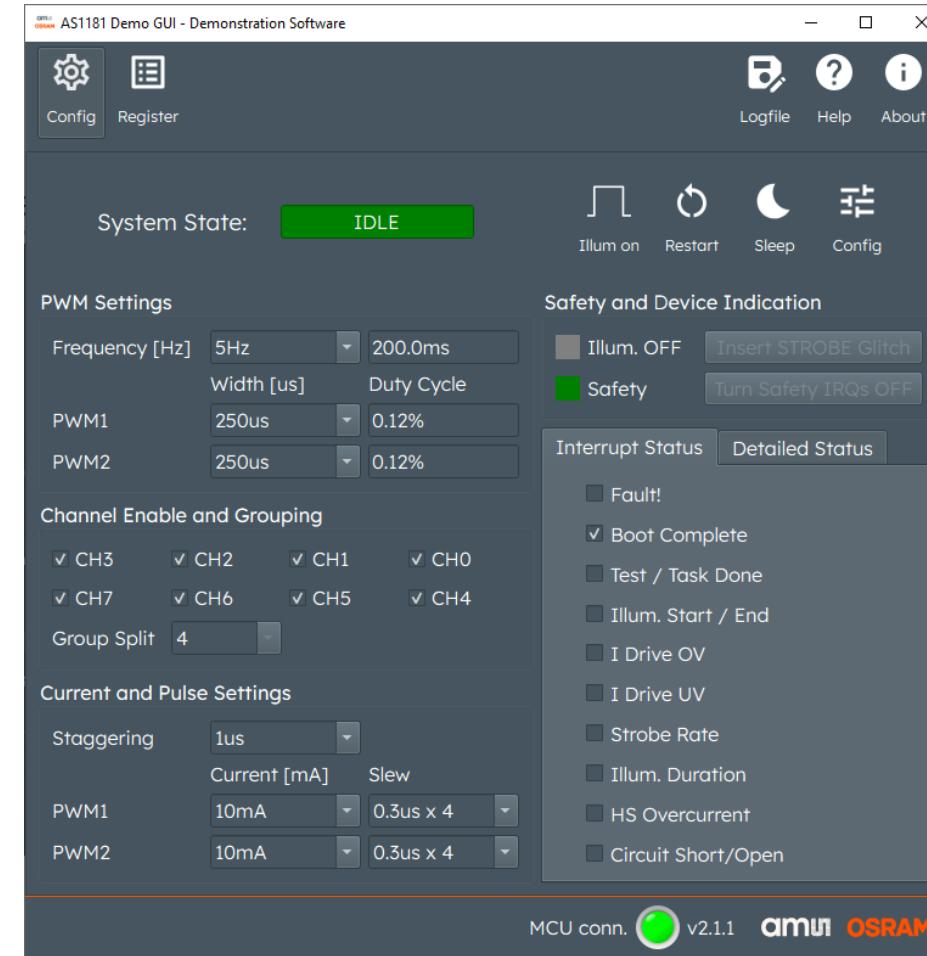
S1 = OFF:

D4 = OFF & System State = device NACK



S1 = ON:

D4 = ON, System State = IDLE, IRQ Boot Complete is set



System States of AS1181

IDLE, CONFIG and SLEEP Mode

After power on reset AS1181 powers up in IDLE mode.

From IDLE it is possible to access “SLEEP” or “CONFIG” mode by clicking the respective buttons in the GUI.



SLEEP: E.g., power saving mode

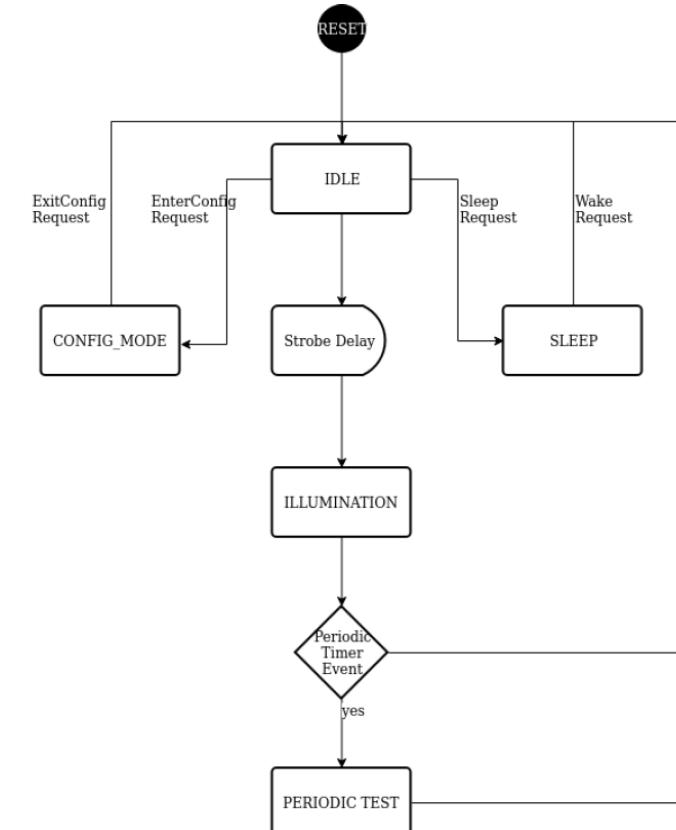


CONFIG: E.g.: To configure the device (Change LED current, Turn on/OFF IRQs)



Note: ILLUMINATION can only be started from IDLE state.

Before pressing “Illum ON” Config or Sleep mode needs to be left by clicking on it again.



Basic State Diagram

Turning on Illumination

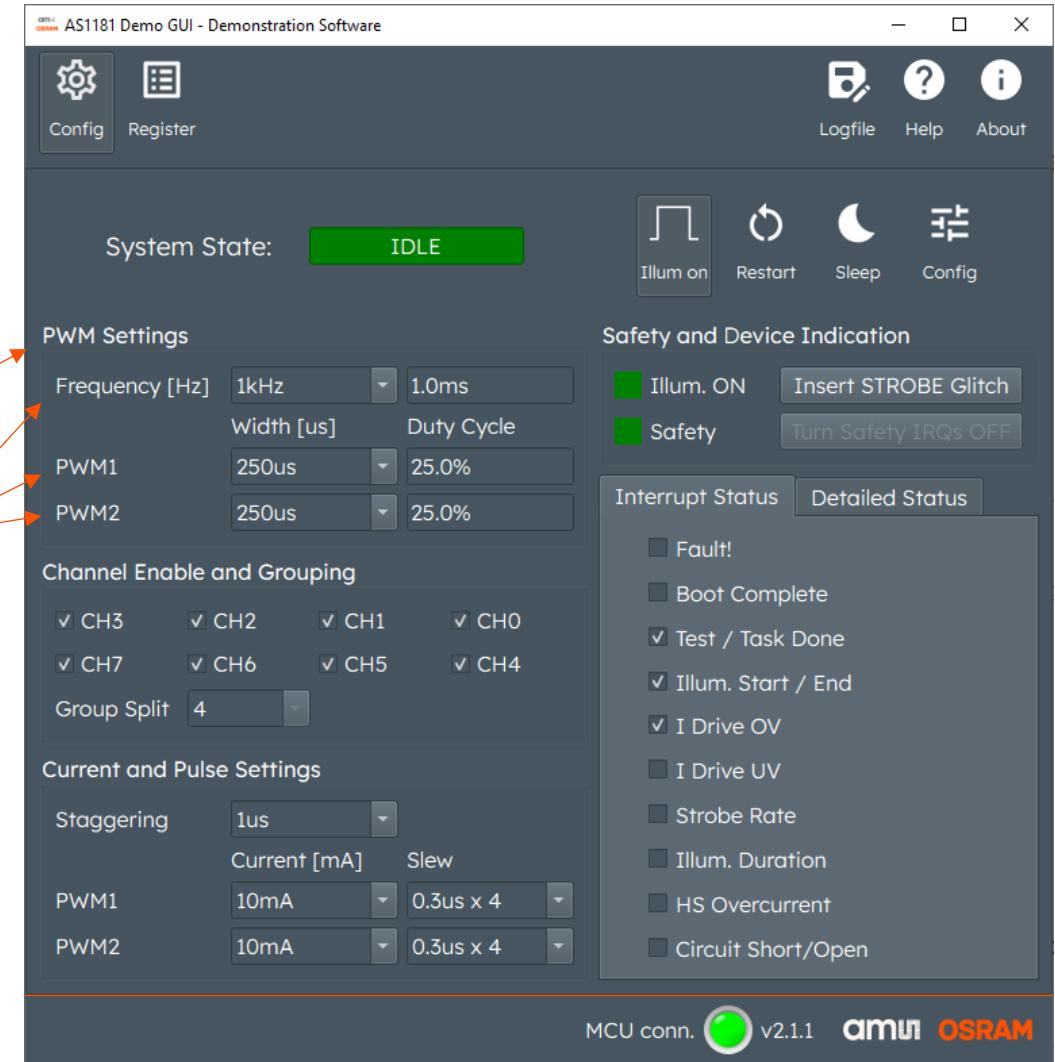
Note: IR LEDs assembled on Demoboard are not visible for human eye. Pictures below taken with camera.

AS1181 has several modes to trigger illumination:

- Illumination time set and controlled by AS1181 and triggered via external strobe
- 1 PWM input for all channels
- 2 PWM inputs for configurable group of channels
- AS1181 Demoboard is pre-configured for 2 PWM inputs
 - ESP32 is generating PWM signals according to the “PWM Settings Tab”
 - User can configure Frequency and Duty Cycle of both PWM signals
- Depending on the “Group Split” configuration the PWM inputs are assigned to different channels. e.g.:
 - Group Split 4 = PWM 1 for CH0-3 and PWM 2 for CH4-CH7
 - Group Split 2 = PWM 1 for CH0-1 and PWM 2 for CH2-CH7



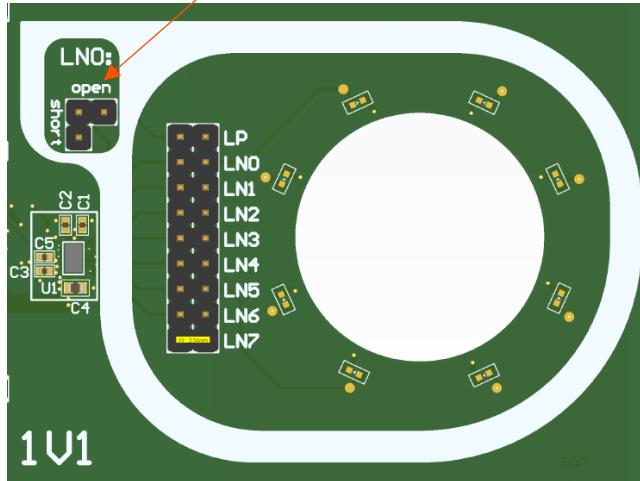
Different PWM settings per Group



Force Error Detection

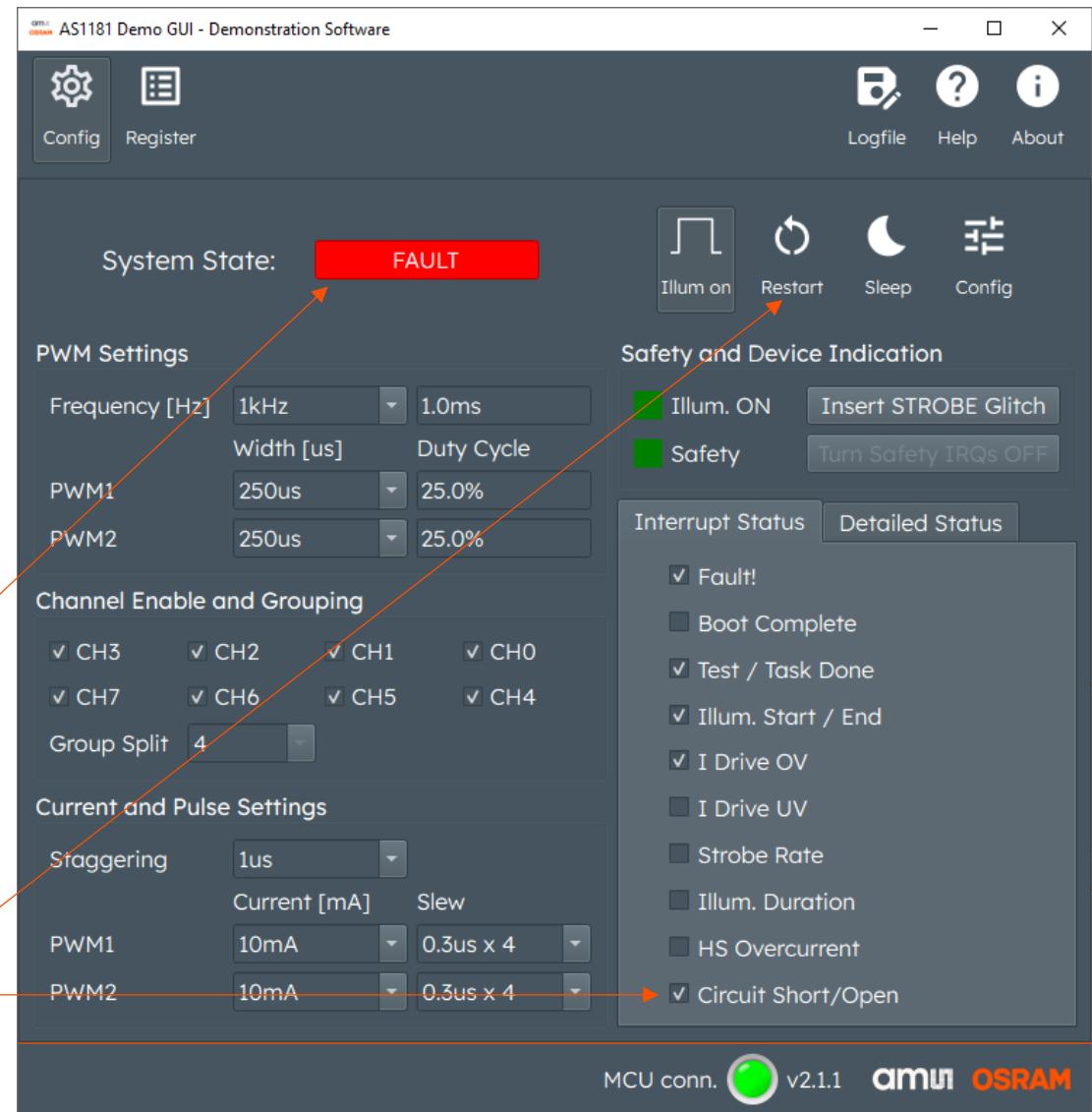
Simulate LED Error

AS1181 provides several safety checks. Some can be simulated by removing Jumper “OPEN” below or setting Jumper “SHORT”. This simulates OPEN or SHORTED LED on channel 0.



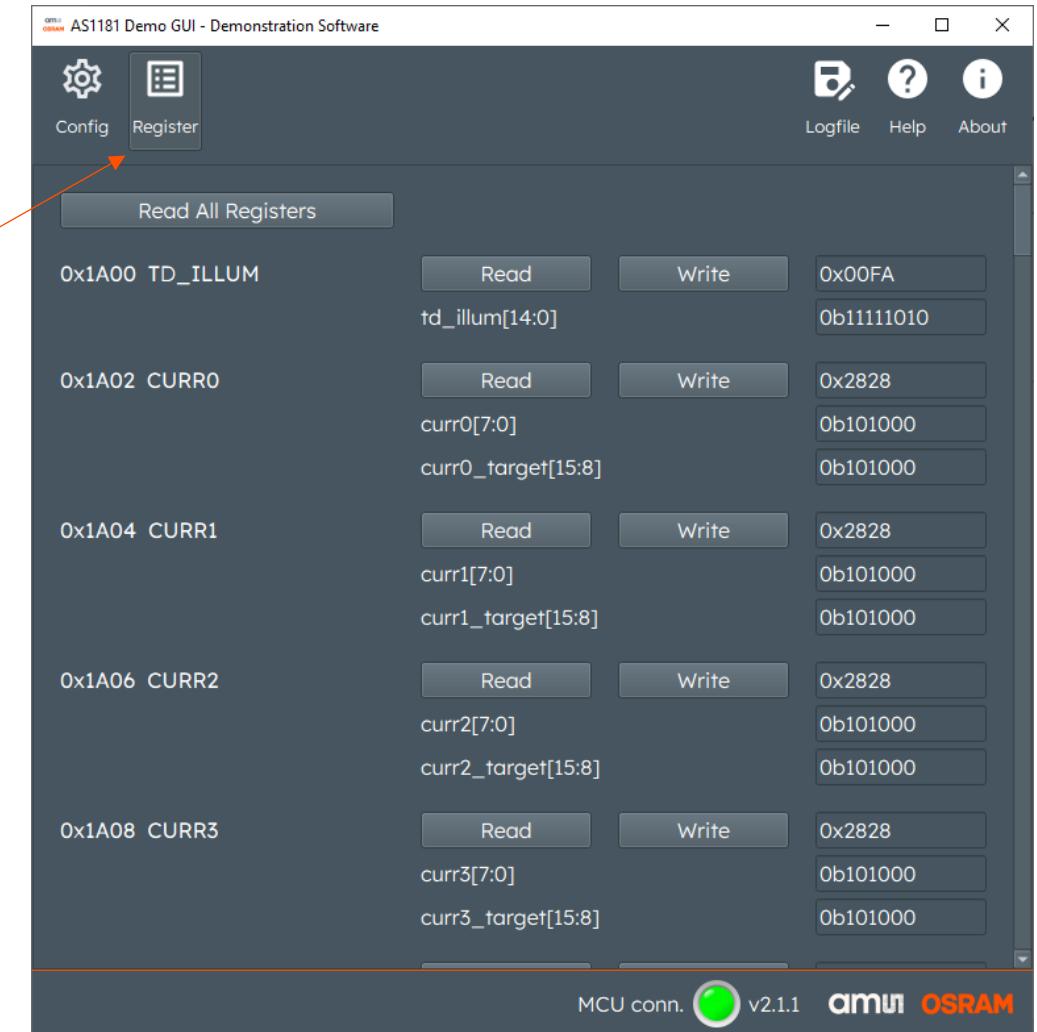
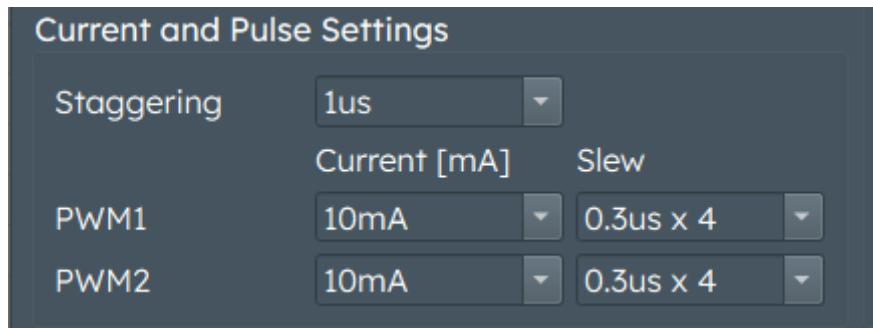
As soon as the Jumper is removed during active ILLUMINATION or before power-on-reset the System State is changing to “FAULT”, D2 illuminates “RED” and respective Interrupts are set.

To clear the “FAULT” – “FAULT” needs to be removed, and ⁹“Restart” needs to be pressed.



Other Configuration possibilities with the GUI Software

- In CONFIG Mode it is also possible to configure “Staggering”: This is a configurable delay [μ s] from channel to channel (TD_STAGGER)
- For very short LED pulses also the Slew Rate of the current sources can be configured. Slew Rate is defined with step time [μ s] x number of steps.
- For advanced use all registers of AS1181 can be accessed via the “Register” Tab.
- Please refer to the AS1181 Datasheet for all configuration possibilities



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