Kernel driver apds990x

Supported chips: Avago APDS990X

Data sheet: Not freely available

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Description

APDS990x is a combined ambient light and proximity sensor. ALS and proximity functionality are highly connected. ALS measurement path must be running while the proximity functionality is enabled.

ALS produces raw measurement values for two channels: Clear channel (infrared + visible light) and IR only. However, threshold comparisons happen using clear channel only. Lux value and the threshold level on the HW might vary quite much depending the spectrum of the light source.

Driver makes necessary conversions to both directions so that user handles only lux values. Lux value is calculated using information from the both channels. HW threshold level is calculated from the given lux value to match with current type of the lightning. Sometimes inaccuracy of the estimations lead to false interrupt, but that doesn't harm.

ALS contains 4 different gain steps. Driver automatically selects suitable gain step. After each measurement, reliability of the results is estimated and new measurement is triggered if necessary.

Platform data can provide tuned values to the conversion formulas if values are known. Otherwise plain sensor default values are used.

Proximity side is little bit simpler. There is no need for complex conversions. It produces directly usable values.

Driver controls chip operational state using pm_runtime framework. Voltage regulators are controlled based on chip operational state.

SYSFS

chip_id

RO - shows detected chip type and version

power_state

RW - enable / disable chip. Uses counting logic

1 enables the chip 0 disables the chip

lux0_input

RO - measured lux value

sysfs_notify called when threshold interrupt occurs

lux0_sensor_range

RO - lux0_input max value.

Actually never reaches since sensor tends to saturate much before that. Real max value varies depending on the light spectrum etc.

lux0_rate

RW - measurement rate in Hz

lux0_rate_avail

RO - supported measurement rates

lux0_calibscale

RW - calibration value.

Set to neutral value by default. Output results are multiplied with calibscale / calibscale_default value.

lux0_calibscale_default

RO - neutral calibration value

lux0_thresh_above_value

RW - HI level threshold value.

All results above the value trigs an interrupt. 65535 (i.e. sensor_range) disables the above interrupt.

lux0_thresh_below_value

RW - LO level threshold value.

All results below the value trigs an interrupt. 0 disables the below interrupt.

prox0_raw

RO - measured proximity value

sysfs_notify called when threshold interrupt occurs

prox0_sensor_range

RO - prox0_raw max value (1023)

prox0_raw_en

RW - enable / disable proximity - uses counting logic

- 1 enables the proximity
- 0 disables the proximity

prox0_reporting_mode

RW - trigger / periodic.

In "trigger" mode the driver tells two possible values: 0 or prox0_sensor_range value. 0 means no proximity, 1023 means proximity. This causes minimal number of interrupts. In "periodic" mode the driver reports all values above prox0_thresh_above. This causes more interrupts, but it can give _rough_ estimate about the distance.

prox0_reporting_mode_avail

RO - accepted values to prox0_reporting_mode (trigger, periodic)

prox0_thresh_above_value

RW - threshold level which trigs proximity events.