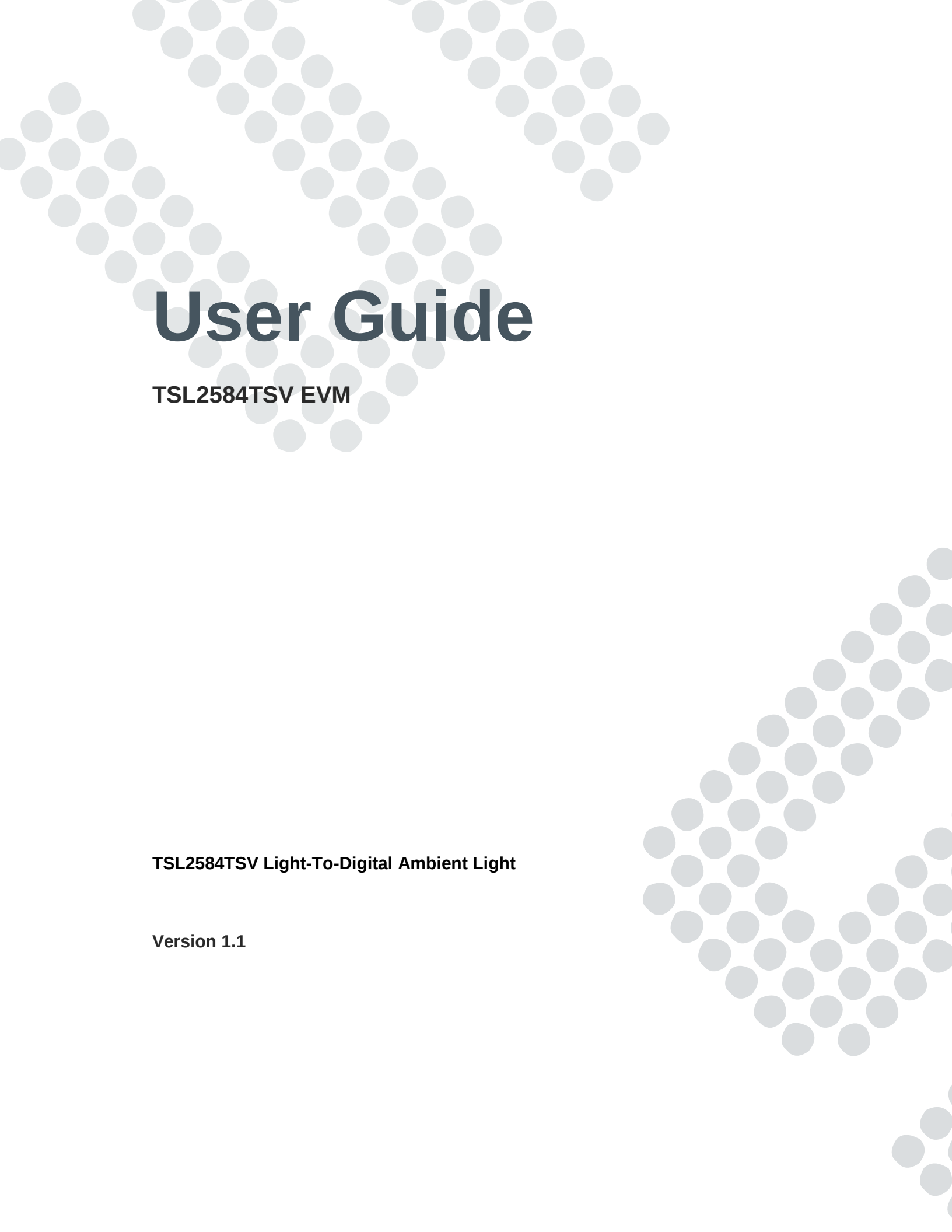




User Guide

TSL2584TSV EVM

TSL2584TSV Light-To-Digital Ambient Light

Version 1.1



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TSL2584TSV

The TSL2584TSV is a very-high sensitivity light-to-digital converter that transforms light intensity into a digital signal output. The device combines one broadband photodiode (visible plus infrared), one infrared-responding photodiode, and a photopic infrared-blocking filter on a single CMOS integrated circuit.

Initial hardware setup

The software should be installed prior to connecting any hardware to the computer. Follow the instructions found in the Quick Start Guide (QSG). This will load the required driver for the USB interface and also the control software and graphical user interface (GUI).

The hardware consists of the EVM Controller v2.1a or v2.1c, the TSL2584TSV EVM daughterboard, a USB interface cable and USB Memory Stick.



When the USB cable is connected, the green LED should flash indicating that power is being received via the USB interface, and the controller board processor is running. If the green LED does not flash, check the USB cable connections; unplug the USB cable and try again. If the green LED still does not flash, check the PC for USB error messages.

See the Resources section at the end of this document for additional assistance.



1 Establishing basic functionality

The software should be started using the `ams->TSL2584TSV_EVM->TSL2584TSV_EVM` command in the Windows menu or by double clicking the `AOS_EVM.exe` file from the installation directory. The default installation directory, depending on the device and the operating system you are using, is:

`C:\Program Files\ams\TSL2584TSV_EVM Windows 32 bit operating systems`

`C:\Program Files (x86)\ams\TSL2584TSV_EVM Windows 64 bit operating systems`

A different install path may be selected by the user. When started, the TSL2584TSV window will open on the PC.

The balance of this document identifies and describes the controls available on the GUI. In combination with the TSL2584TSV datasheet, the QSG and application notes available on the ams website, www.ams.com. There should be enough information to allow evaluation of the TSL2584TSV device.

2 TSL2584TSV EVM graphical user interface (GUI)

2.1 Software overview

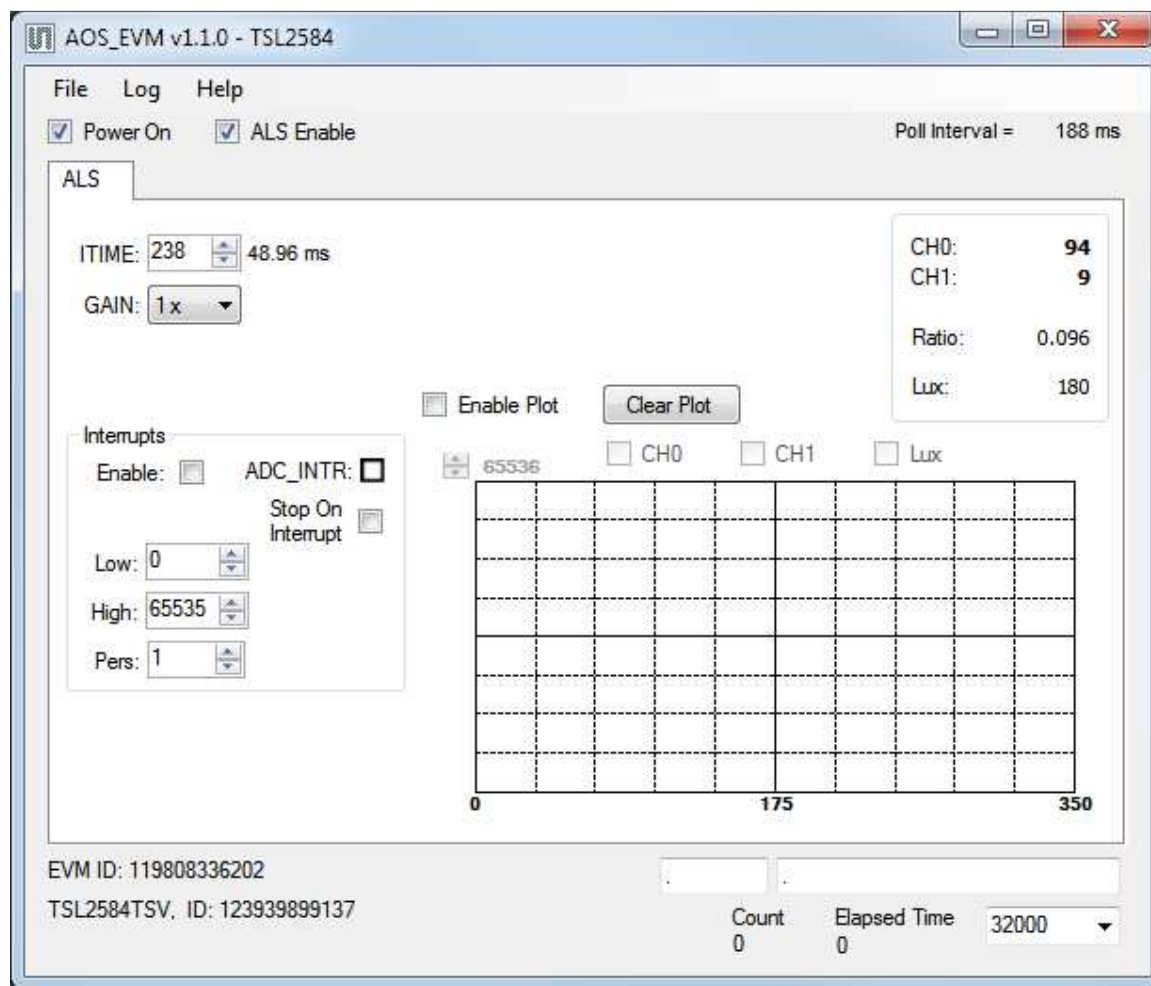
On successful initialization the software displays a main window, containing controls pertinent to the connected device. If the software detects an error it will display an error window.

If “Device not found or is unsupported” appears, verify that the correct daughterboard is properly connected to the motherboard. If “Cannot connect to EVM board” appears, verify the USB cable is connected. A green LED on the EVM Controller will flash to indicate that the USB cable is connected and providing power to the system.

If the EVM board is disconnected from the USB bus while the program is running it will display an error message and then terminate. Reconnect the EVM board and restart the program.



The main window for the TSL2584TSV is shown below.



Clicking on the red "X" will close the window and terminate the application.

The checkboxes near the top of the window power on the chip and enable the ALS function. The ALS tab contains controls for the remaining functions and displays status and data from the device as it operates.

2.1.1 Device ID Information

The lower left corner of the window displays the ID number of the EVM motherboard, identifies the device being used and displays the ID of the device.



2.1.2 Log Status and Control Information

The lower right corner of the window contains status information and controls for the logging function:

Count 0	Elapsed Time 0
	32000 ▼

This section contains two text boxes that are stored in the log file data and used to build the file name for the log file. If you change the data in these fields, the new values will be stored with all new log data. The default log file name will be based on these values at the time the log file is written. If nothing is entered in these boxes they default to a period (“.”).

Sample default file name:

TSL2584TSV_A-B-C_1-2-3_Log.csv

— From DigitalLightSensor.exe

— From User Input

The **Count** value displayed is a count of the number of samples currently in the log buffer.

The **Elapsed Time** value indicates the elapsed time since data logging was started.

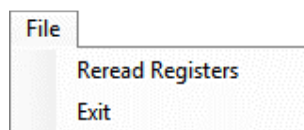
The final field in this section controls the number of log samples that will be collected before logging is automatically stopped and the log data is stored. If the count of log entries reaches the amount shown in this field the program will stop the logging function and pop up a window asking for a file name to save the collected data.

2.1.3 System Menus

At the top of the window there are three pull-down menus labeled “File”, “Log”, and “Help”. The File menu provides basic application-level control. The Log menu is used to control the logging function, and the Help menu provides version and copyright information for the application.

2.1.3.1 File Menu

The File menu contains the following functions:



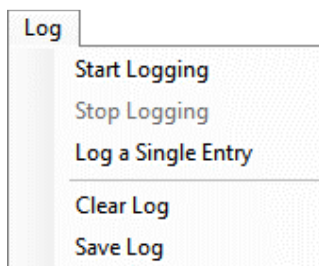
The **Reread Registers** function forces the program to re-read all of the control registers from the device and display them on the screen. This does not read the status and ALS result registers, because those registers are continually read while the program is running.

Click on the **Exit** command to close the main window and terminate the application.



2.1.3.2 Log Menu

The Log menu is used to control the logging function and to save the log data to a file. Log data is accumulated in memory until it is discarded or written to a data file.



Click **Start Logging** to start the logging function. Each time the program polls the ALS information from the device, it will create a new log entry showing the raw data values, the calculated lux value, the values of various control registers, and the values entered by the user into the text fields near the bottom right corner of the window.

Click **Stop Logging** to stop the logging function. Once logging is stopped, the data can be written to a file, or you can continue collecting additional data by clicking Start Logging again.

The **Log a Single Entry** command, will cause logging to be start, collect one single entry, and immediately stop again. This function is not available when logging is already running.

Click **Clear Log** to discard any data that has already been collected. If there is data in memory, which has not been saved to disk, this function will display a prompt asking if you to verify that it is OK to discard the data. If the log is running when this function is clicked, the log will continue running after the existing data is discarded.

Click **Save Log** to save the collected log data to a data file. This will stop the logging function, if it is active, and display a file dialog box for you to specify where to store the logged data. The default file name, as described above, will be displayed, but you may change the file name if you wish.

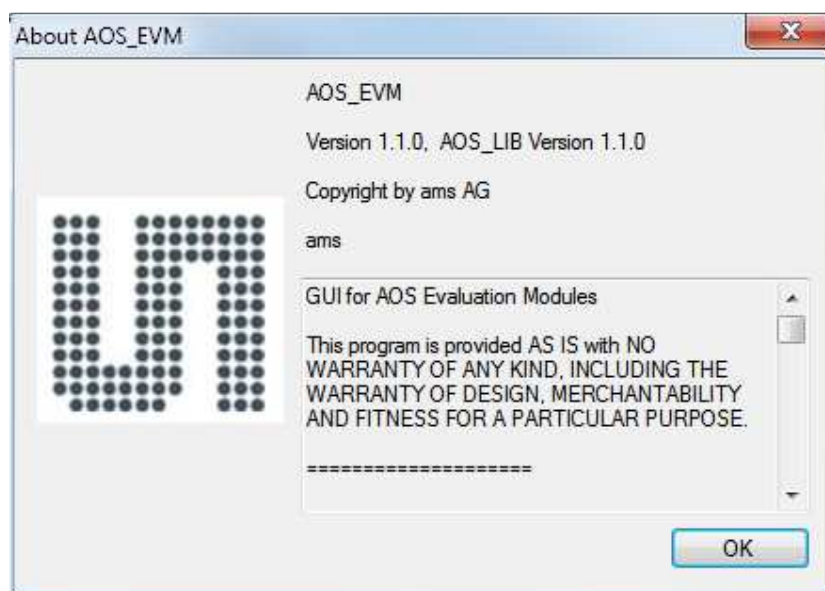


2.1.3.3 Help Menu

The Help menu contains a single function; About.



The **About** function displays a dialog box showing the version and copyright information for the AOS_EVM program and library.



Click the OK button to close this window and continue.

2.1.4 System Level Controls

Immediately below the top menu bar there are two checkboxes that are used to control the system level functions of the TSL2584TSV device.

The **Power-On** checkbox controls the PON function of the TSL2584TSV. When this box is checked, the power is on and the device can operate. When this box is unchecked, the power is off and the device will not operate (The control registers can still be written, but the device will not function).

The **ALS Enable** checkbox controls the ADC_EN function of the TSL2584TSV. When this box is checked, the device will collect and report ALS data as programmed. When this box is unchecked, the ALS functions will not operate.

2.1.5 “ALS” Tab

The main portion of the screen contains a single tab, labeled ALS. The controls in this tab are divided into 4 sections, each performing a separate function.



2.1.5.1 ALS Controls

The top left corner of the ALS tab contains two controls; one to set the ALS integration time and another to control the ALS gain.

The **ITIME** control sets the time of the ALS integration. ITIME can be adjusted in 2.72ms steps. This register functions as a count-down value so ITIME=255 is the minimum integration time (2.72ms) and ITIME=1 is the maximum integration time (693.6ms). Note that ITIME=0 is a special manual mode which uses specific I2C commands to start and stop the integration cycle. Because of the high timing accuracy required to execute in this mode, it cannot be supported in the AOS_EVM software. The actual integration time, in milliseconds, is displayed next to this control. If 0 is selected, the time display will be shown as “Manual Mode”.

The **Gain** control is a pulldown menu which lets you select the analog gain of the device. The values that can be chosen are 1x, 8x, 16x, and 111x.

2.1.5.2 Interrupt Controls

The lower left corner of the ALS tab contains controls for the interrupt functionality of the device. The ADC_INTR signal can be triggered when the CH0 data values are higher than a programmed low threshold or higher than a programmed high threshold.

The **Enable** checkbox is checked to enable the ADC_INTR signal. Checking this box, allows the interrupt signal to be generated.

The **ADC_INTR** indicator indicates whether the interrupt is active. When the interrupt is NOT active, this will display an empty box. When the interrupt is active, this box will be marked. Clicking on this box will clear the interrupt signal. (Note, depending on the remaining register settings the interrupt may be raised again immediately.)

The **Low** and **High** controls allow you to set thresholds for the CH0 data value. If the CH0 value is less than the low threshold or more than the high threshold for more times that specified in the persistence register, the interrupt will be activated.

The **Pers** control sets the persistence value. It controls how many consecutive times that a threshold must be exceeded before the interrupt is raised. A setting of 0 for this register will cause the interrupt to be raised after every ALS cycle, regardless of the threshold settings. Setting this value from 1 through 15 requires that the threshold must be exceeded for 1 to 15 consecutive cycles before the interrupt is raised.

Checking the **Stop On Interrupt** checkbox causes the device to stop processing ALS data whenever the interrupt is raised. To continue processing ALS data, the interrupt must be cleared either by clicking on the ADC_INTR indicator or by disabling and enabling the interrupt.

2.1.5.3 ALS Output Data

The top right corner of the ALS tab displays the data which is output by the device.

CH0 displays the raw Channel 0 ADC count.

CH1 displays the raw Channel 1 count.

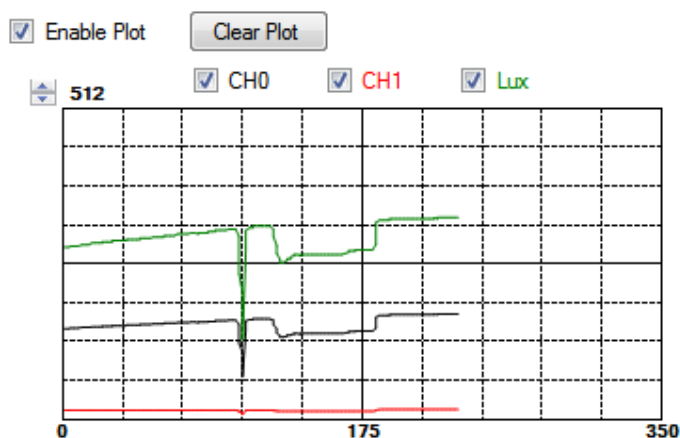
Ratio displays the ratio of CH1 to CH0.

Lux displays the calculated lux value which is a function of CH0, CH1, ITIME, and Gain.



2.1.5.4 ALS Data Plot

The remaining portion of the ALS tab is used to display a running plot of the collected ALS values and the calculated lux values. The last 350 values are collected and plotted on the graph. As additional values are added, the old values will be deleted from the left side of the graph.



The **Enable Plot** checkbox activates the plotting function. Data will only be plotted when this box is checked.

The **CH0**, **CH1**, and **Lux** checkboxes control which values will be displayed on the plot. Only the checked values will be displayed.

Click the **Clear Plot** button to discard the current data and continue plotting the new data. Note, if the Clear Plot button is clicked while the plot is disabled, the data is discarded, but the actual plot will not be updated until the plot function is re-enabled.

The **Scale** of the Y-axis of the plot can be adjusted by clicking on the small up and down arrows at the top left corner of the plot. The scale can be set to any power of 2 from 64 through 65536.

3 Resources

TSL2584TSV datasheet

TSL2584TSV EVM Quick Start Guide (QSG)

Designer's Notebooks

For additional information regarding the TSL2584TSV, please refer to the datasheet. For information regarding the installation of the TSL2584TSV EVM host application software please refer to the TSL2584TSV EVM Quick Start Guide.

Designer's Notebooks dealing with various aspects of optical measurement and optical measurement applications are available. All content is available on the ams website, www.ams.com.