



Application Note

AS3935

Demonstration Kit Setup – Lightning Emulator and Lightning Sensor

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1 General Description

Getting the AS3935 demonstration kit operational is not trivial due to environmental influences and positioning issues. Good operation depends on the positioning of the lightning emulator in relation to the lightning sensor. Furthermore, the environment in which the demonstration kit will be set up plays a crucial role for the performance. These issues will be discussed in this application note

2 Demo Kit Contents

The AS3935 Demo Kit comprises the following items:

- 1 AS3935 Lightning Sensor Board
- 1 AS3935 Lightning Emulator Board
- 2 CR2032 Coin Cells (required for the Lightning Sensor Board)
- 2 CR2450 Coin Cells (required for the Lightning Emulator Board)
- 1 USB Cable
- 1 USB Stick

3 Start-Up Procedure

- Insert the 3V battery CR2032 in the battery holder on the Lightning Sensor Board.
- Insert the 3V battery CR2450 in the battery holder on the Lightning Emulator Board

3.1 Positioning Guide

Position the Lightning Emulator Board and the Lightning Sensor Board as shown in Figure 1. The antennas of the two boards **should be parallel to each other and have to be in the same plane** to achieve optimum performance. Keep a distance of approximately 10-15 cm between both boards. A printable reference is given in Figure 2. Feel free to play with the distance, but be aware that lightning events might be detected as disturbers if the emulator is too close to the sensor.

Figure 1: Orientation of the Lightning Emulator Board antenna relative to the Lightning Sensor Board antenna

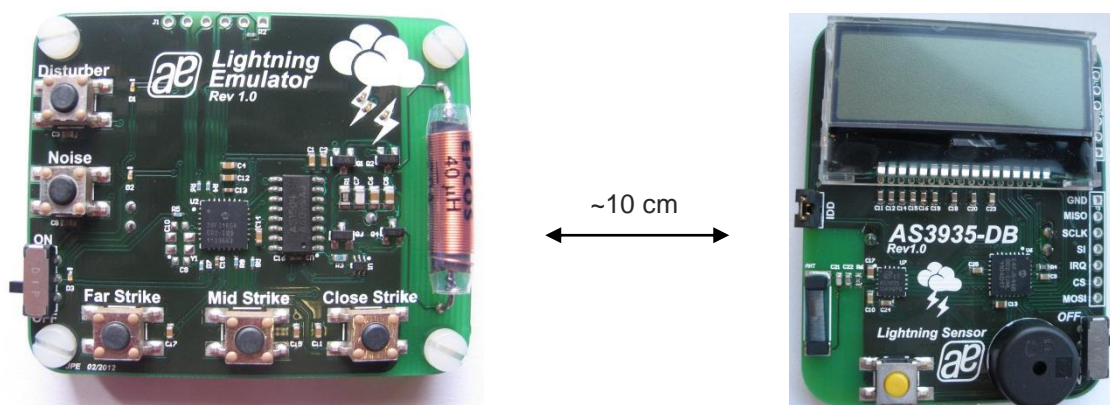
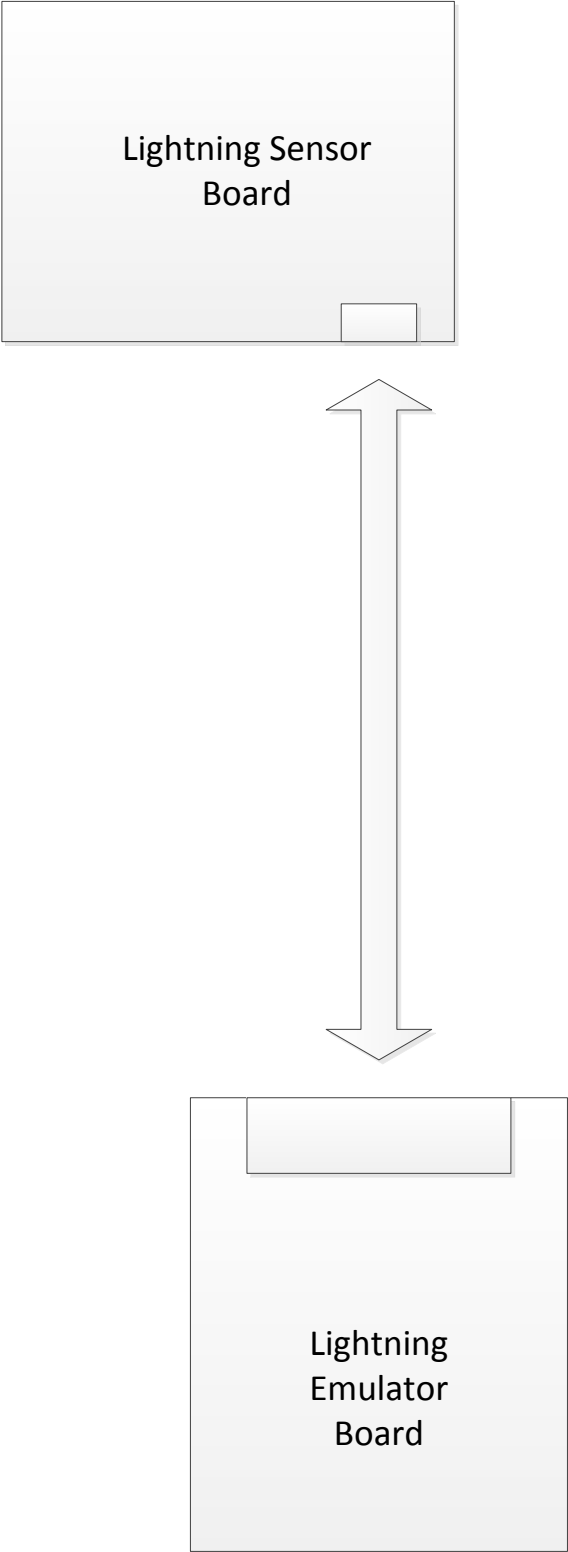


Figure 2: Positioning guide



3.2 Power Up

Turn on the Lightning Sensor Board via the ON/OFF – switch. When you switch on the board you will see the austriamicrosystems logo on the LCD screen. After that the internal LCO and RCO are calibrated. The calibration results are displayed on the LCD. After successful calibration the Lightning Sensor Board goes into **sense mode** ready to record lightning events.

Turn on the Lightning Emulator Board via the ON/OFF – switch. When the board is powered, the blue LED flashes once a second.

3.3 Operation

Lightning events are simulated by pressing the buttons 'far strike', 'mid strike', and 'close strike' on the Lightning Emulator Board. Detected lightning events will be displayed on the LCD screen of the Lightning Sensor Board. Furthermore, the buzzer on the Lightning Emulator Board will give a signal for each detected event. If a lightning is detected which is closer than previous events, the buzzer will signal once. For a lightning event further away to previous events the buzzer will signal twice.

The display will first show "Lightning Detected!" and the energy which is calculated for this particular event. After that, it informs the user on whether the storm is approaching or departing and the distance to the head of the storm.

If the 'Disturber' button is pressed, the Lightning Sensor Board will show "Disturber detected". The sensor is then automatically switched off for 1.5s.

If the 'Noise' button is pressed, the Lightning Sensor Board will show "Noise Level too high". In this state no lightning events can be detected.

The AS3935 stores several recently detected lightning events to predict the direction the storm is moving. This memory can be cleared via a long-press (>1s) of the button on the Lightning Sensor Board. The display then shows "Statistics Cleared!"

Detected lightning events are stored with a timestamp. It is therefore possible to read the detected lightning events from the chip and create a history. The AS3935's clock is displayed on the LCD screen after a short press of the button on the Lightning Sensor Board. The clock settings can be adjusted with the GUI. Further information on how to change register settings via the GUI are given in the application note **AS3935_EvalManual_EN_v3**.

This application note can be found on the 'Product Portal' with the following link:

http://intranet.office.amsiag.com/sites/products/portal/ProductDocuments/0_Public/AS3935_EvalManual_EN_v3.pdf

4 Operation Environment

The AS3935's detection mechanism is sensitive towards noise from outside sources. Operation directly next to disturber sources like computers or cell phones might have a weaker performance of the demonstration kit as consequence or even prevent it from working. These noise sources will have the same influence on the Lightning Sensor Board as the functions 'Disturber' and 'Noise' of the Lightning Emulator board. Furthermore, some disturbers like cell phones create noise that can actually trigger lightning events. It is therefore recommended to operate the demonstration kit in an adequate environment, which can be found by scanning the "test area" with your sensor board. To do so move the sensor Lightning Sensor Board to 4-6 different trail positions in an area of approx..

1 m by 1 m around the demo set up. Make sure that you get no “noise level too high” (Fig 4) or “disturber detected” readings on our sensor demoboard at any of the 4 - 6 trail positions. In case you get such a reading look for noise / disturber sources like computers, mobile phones or other electronic devices and remove them from your test environment.

The distance to noise sources for which the demonstration will work correctly is shown in Figure 3. Setups which will influence the Lightning Sensor Board's performance or prevent the demonstration from working at all are depicted in Figure 4 to Figure 7.

Figure 3: Distance of the DemoKit setup to other electronic devices for correct performance



Figure 4: The noise level close to a LCD Screen is too high for correct operation.



Figure 5: Although the Lightning Sensor Board might display 'Listening', its sensitivity is strongly influenced by the disturber and the DemoKit will not function correctly.



Figure 6: Here the setup is still too close to noise sources. The demonstration will not work.

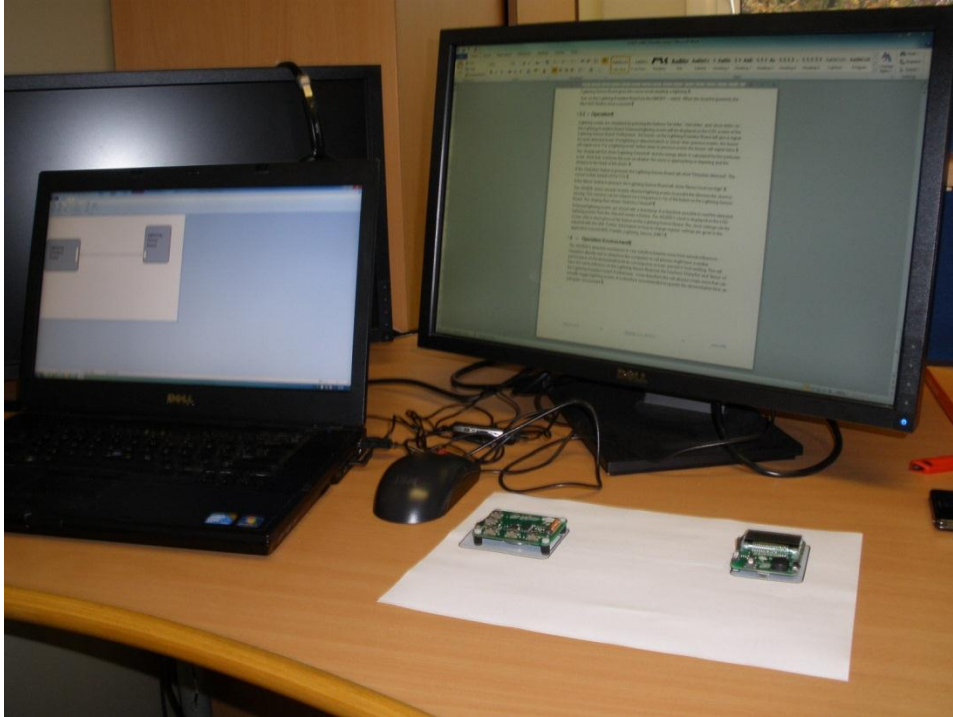


Figure 7: The cell phone is too close to the Lightning Sensor Board. Especially when the cell phone's display is turned on the Lightning Sensor Board will not work as intended.



5 Contact Information

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Note: This product is intended to be used as an early warning indicator for lightning related storms. It does not guarantee accuracy or predict exact strike locations. By using the part, the user shall be aware that he cannot just rely on the indication in order to prevent accidents caused by lightning strikes. ams expressly states that the user must follow the generally known and recommended instructions how to behave in the event of lightning strikes. In no event shall ams or its suppliers be liable for any direct, indirect, incidental, special, exemplary or consequential damages (including, but not limited to procurement of substitute goods or services, loss of use, data or profits, or business interruption) arising out of user's disregarding of such warnings and instructions.

7 Revision Information

Changes from 1-00 (2012-Oct-24) to current revision 1-01 (2014-Jul-07)	Page
Update to corporate format	1-9

Note: Page numbers for the previous version may differ from page numbers in the current revision.