Software Manual

AS560X

Demo Software

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1 Introduction

The Demo Board Software was designed to show the features and benefits of AS6500 IC. It also provides and easy use to evaluation and lab programming interface.

The Software supports different hardware applications:

- DemoBoard: AS560X-DK_ST
- USB I&P Box Programmer
  (The AS560X demo software is integrated in the USB I&P Box software)

Note: The software is not intended for use in production and must not be used for this purpose.

2 Getting Started

The AS560X demo software is ideal for demonstration the AS560X product features. This first steps describes how to connect and use an AS560X demo kit together with the AS560X Demo Software and the adapter board.

1st Install the AS560X Demo Software

The Software is located on the USB drive that comes with a Demo Kit or it can be downloaded from our webpage. After Installation run the software.

2nd Check the Hardware Setup

Set-up the hardware correctly. For details refer to the specific hardware manual. Of the USB I&P Box or of the AS560X-DK_ST.

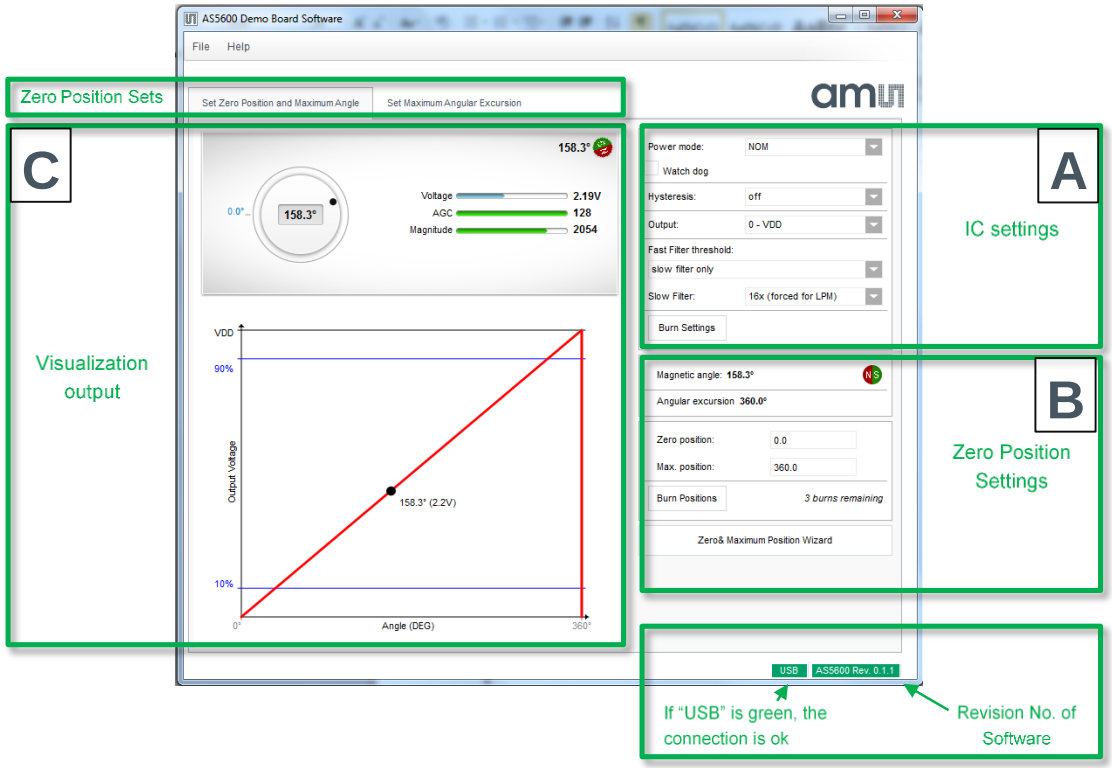
Note: It might be necessary to perform a firmware update on the Demo Kit if a wrong firmware was detected. In this case, the user will be prompted to allow an automatic firmware upgrade.

3rd Start using the software

Following parts of the software are used to perform a configuration and to read-out the AS5600. Refer to Figure 1 for reference.

A. Perform the desired configuration
B. Perform the required angle programming. Use the wizard function for reference.
C. Verify the results

Figure 1:
General Software Instructions (Example: AS5600)

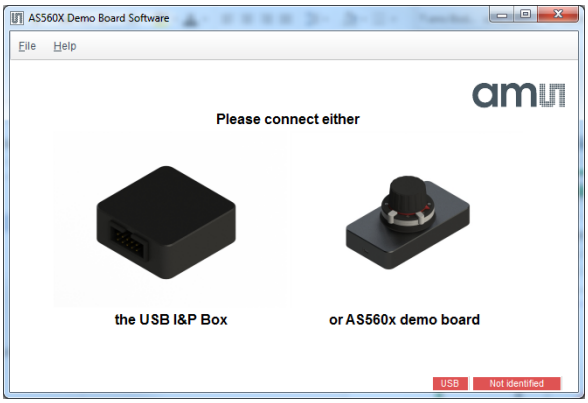


3 Detailed Description

Find the detailed description of the demo software below.

3.1 Start Screen

Figure 2:
Demo software start screen

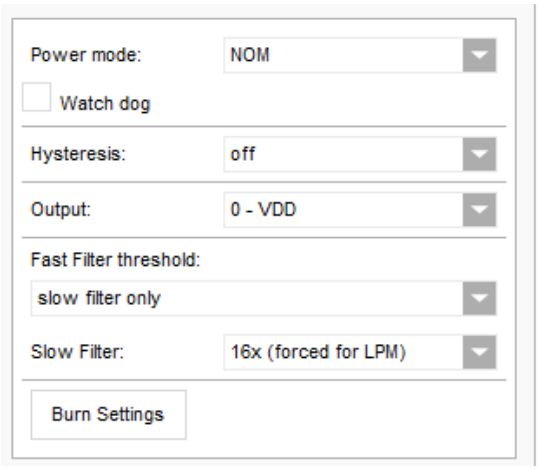


Note: Please connect a hardware if the status line at the bottom of the window shows a red box with the message: "Not Identified"

3.2 General AS560X description

3.2.1 IC settings

Figure 3:
AS560X Settings



Note: For details refer to the product datasheet.

3.2.1.1 Power Mode

Three low power modes are available.

Figure 4:
AS560X Power Modes

Power Mode	Polling Time (ms)
NOM	Always on
LPM1	5
LPM2	20
LPM3	100

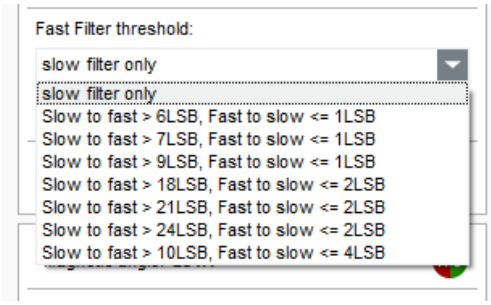
3.2.1.2 Watchdog

If the angle doesn't change, the AS5600 automatically enters LPM3 after one minute.

3.2.1.3 Fast filter threshold

The fast filter improves noise suppression during fast angle changes.

Figure 5:
AS560X Fast Filter Threshold

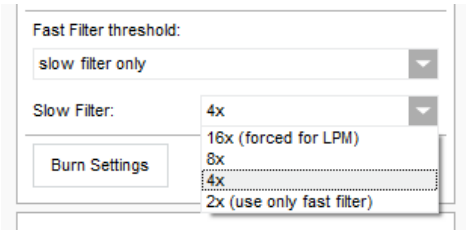


Example: The fast filter threshold is set on “Slow to fast>6LSB, Fast to slow<=1LSB”. This means when the angle changes with minimum 6 LSB the fast filter is activated. When the angle changes with maximum 1 LSB the slow filter is activated.

3.2.1.4 Slow filter step response

The fast filter improves noise suppression during slow angle changes. The slow filter response time can be set under Slow Filter. The response time of the slow filter is depending on the sampling time.

Figure 6:
AS560X Slow Filter Settings

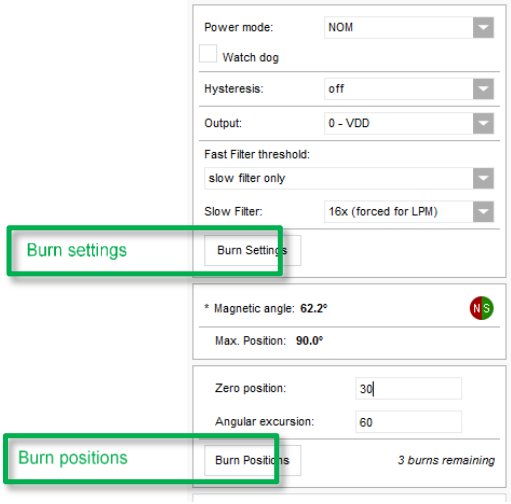


Example: Slow Filter is set on 2x. This means that the step response is twice larger as the sampling time.

3.2.1.5 Permanently programming

The AS560X comes with an internal OTP block which allows the user to permanently program an output range as well as a configuration. There are two command available which will affect different registers. The Burn Settings command is used to burn a configuration and angular range. A Start and Stop position is programmed using the Burn Angle command. For details refer to the datasheet.

Figure 7:
AS5600Setting an Angular Range



3.3 AS5600 specific description

The GUI Elements of the AS5600 are described below in detail.

3.3.1 Visualization

Figure 8:
Visualization of the user defined range

Example settings: Zero Position= 30°
Maximum Position= 90°

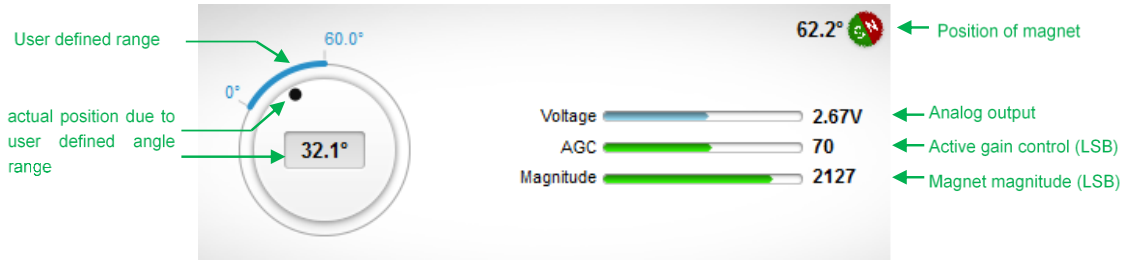
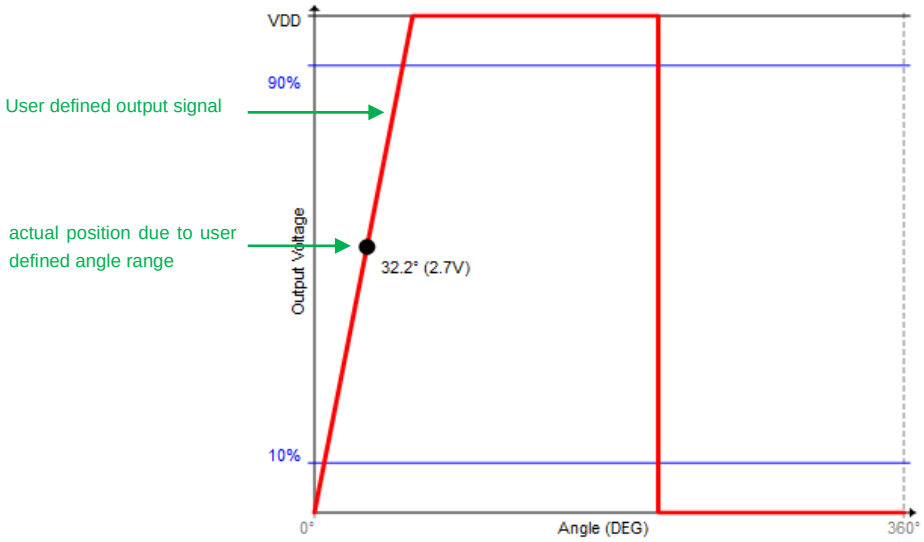


Figure 9:
Output Graph

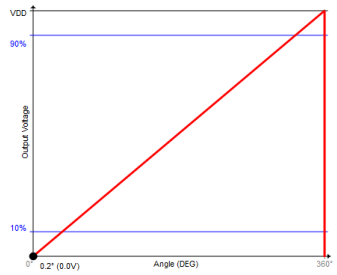


3.3.2 Output Options

Three output signal types are closeable:

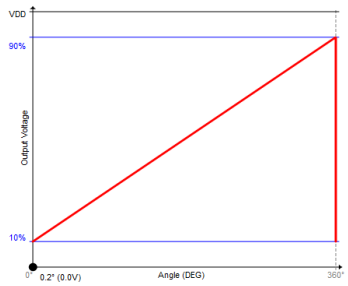
- Analog output signal: 0-VDD
- Analog output signal: 10%- 90%VDD
- PWM output

Figure 10:
AS560X Analog output 0-VDD



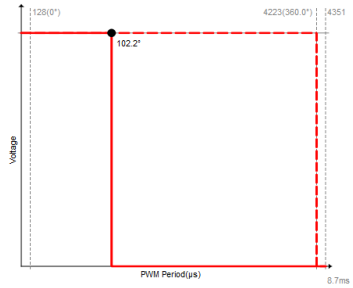
Minimum possible limit is 0V and maximum possible limit is VDD voltage.

Figure 11:
AS560X Analog output 10%-90%VDD



Minimum possible limit is 10% from VDD voltage and maximum possible limit is 90% from VDD voltage.

Figure 12:
AS560X PWM output

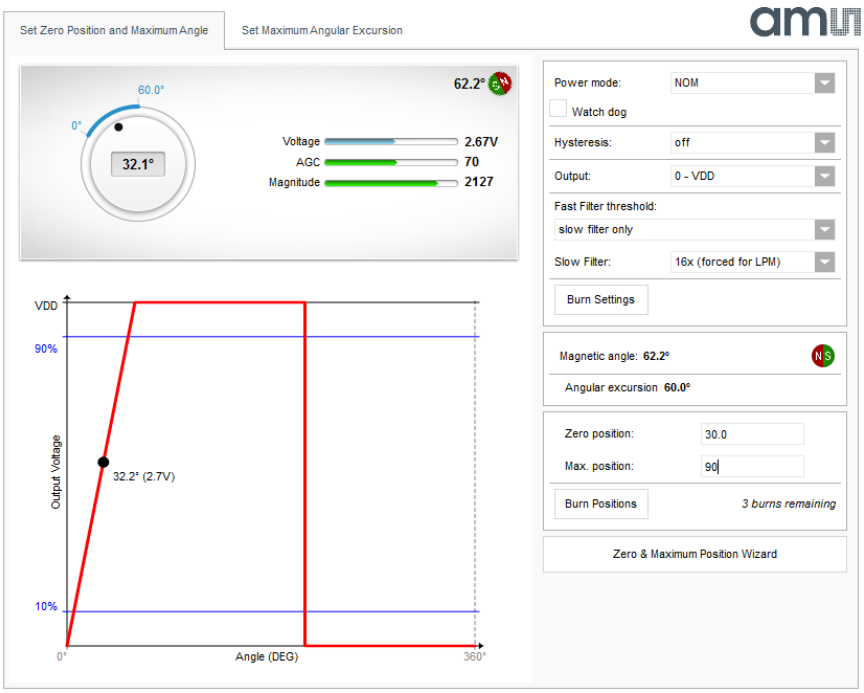


Four different PWM frequencies can be chosen.

3.3.3 Setting Zero Position and Maximum Angle

For detail description how to set zero position and maximum position see “Zero & Maximum Position Wizard”. When a position is set the actual output values and the visualization graph are adapt to the new setting.

Figure 13:
AS5600 Main screen with Zero Position and Maximum Angel setting



3.3.4 Setting an Angular Range

For detail description how to set zero position and angel excursion see “Zero Position & Angle Offset Wizard”. When a position or excursion is set the actual output values and the visualization graph are adapt to the new setting.

3.4 AS5601 specific description

The GUI Elements of the AS5600 are described below in detail.

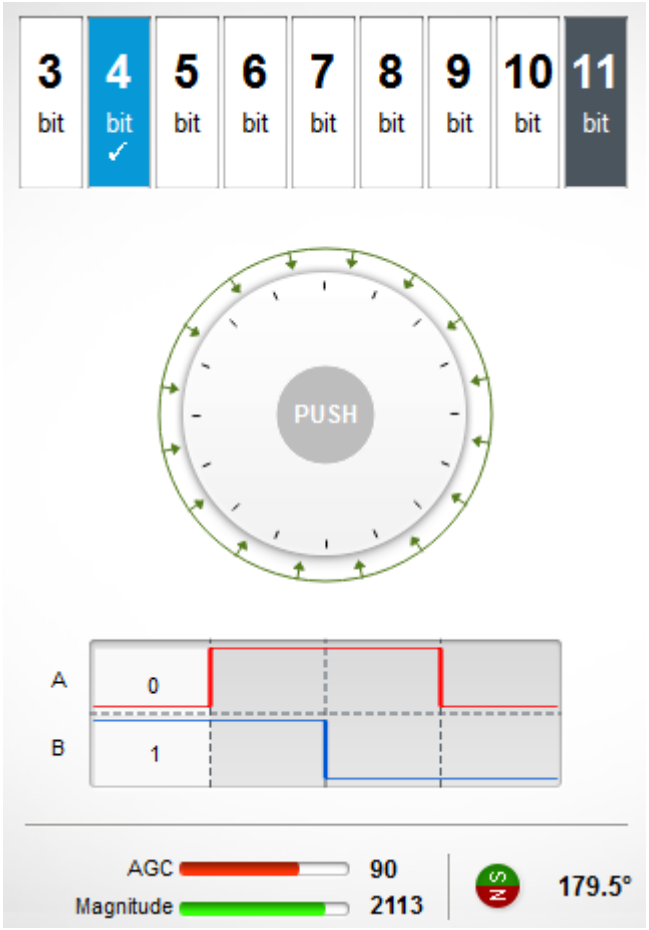
3.4.1 Visualization

The output of the AS5601 is sown in the GUI on the left side and shows a menu to set the resolution at the top. Below that, a round knob display is indicating the electrical and mechanical positions as well as the push output.

Under the knob display, there is a graph showing the AB signal. This may be deactivated for some software versions of the USB I&P Box software.

At the bottom, the AGC value as well as the magnitude level is indicated.

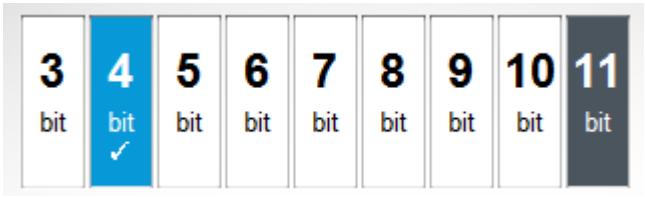
Figure 14:
AS5601 Visualization



3.4.2 Setting the resolution

The first step is to set up the correct number of output cycles for the incremental interface. This is done by setting the resolution. For example for a grid with 16 positions we set up a resolution of 4bit to get four output cycles over a full turn. The change of the incremental signal would change one count per position.

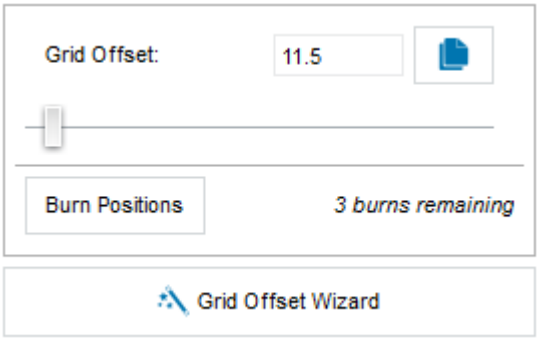
Figure 15:
AS5601 Resolution setup

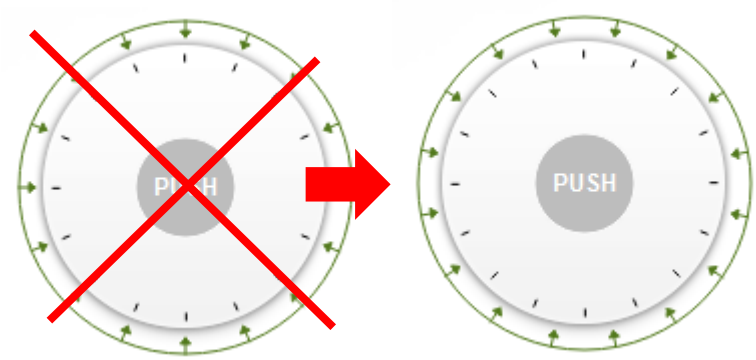


3.4.3 Setting the grid offset

To move the electrical switch position exactly between two mechanical positions please follow the Grid Offset Wizard Instructions.

Figure 16:
AS5601 Grid offset configuration





3.4.4 Setting the push threshold

To configure the push threshold, calculate the correct value and enter it into the textbox as shown below.

Figure 17:
AS5601 Push threshold configuration

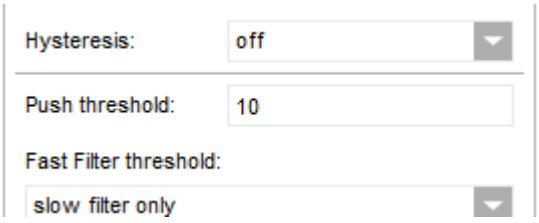


Figure 18:
AS5601 Push threshold calculation

$$PUSHTHR = \frac{AGC_{NOPUSH} - ACGPUSH}{2}$$

$$(Exampe = \frac{90-56}{2} = 17)$$

4 Firmware Update

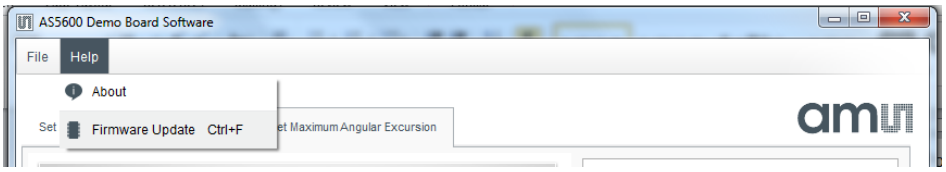
Depending on the current version of the hardware it might be necessary to perform a firmware update. The firmware update can be performed using the software if an old version of the firmware was detected by the software. If the hardware doesn't detect a compatible device, the firmware must be uploaded in bootloader mode.

4.1 Firmware Update

These steps are required to update the firmware.

1) click on Help -> Firmware Update
2) Open bin file

Figure 19:
Firmware update menue



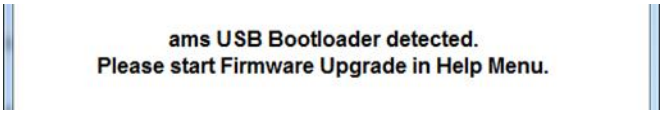
4.2 Firmware update in bootloader mode

Perform following steps to reinitialize the firmware.

1) Open USB I&P Box Programmer
2) Short pin3 and 4 (see picture) to enable the bootloader mode
3) Start Demo Board Software
4) Click on Help -> Firmware Update
5) Open bin file for bootloader

Figure 20:
Firmware update – enable bootloader mode

Figure 21:
Start screen - bootloader detected



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7 Revision Information

Version 1-01

Changes from 1-00 (2014-Jul-2) to current revision 1-01 (2014-Jul-2)	Page
Added AS5601 software description.	

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