AS5163

12 bit Programmable Magnetic Angle Position Encoder

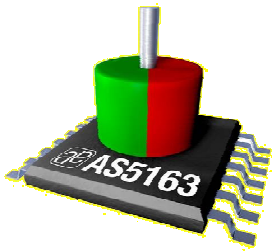
AS5163-DB-1.0 Demoboard

OPERATION MANUAL

1 General Description

The AS5163 is a contactless magnetic angle position sensor for accurate angular measurement over a full turn of 360°. A sub range can be programmed to achieve the best resolution for the application. It is a system-on-chip, combining integrated Hall elements, analog front end, digital signal processing and best in class automotive protection features in a single device.
To measure the angle, only a simple two-pole magnet, rotating over the center of the chip, is required. The magnet may be placed above or below the IC.
The absolute angle measurement provides instant indication of the magnet's angular position with a resolution of 0.022° = 16384 positions per revolution. According to this resolution the adjustment of the application specific mechanical positions are possible. The angular output data is available over a 12 bit PWM signal or 12 bit ratiometric analog output.

The AS5163 operates at a supply voltage of 5 V and the supply and output pins are protected against overvoltage up to +27 V. In addition the supply pins are protected against reverse polarity up to – 18 V.



2 The AS5163 Demoboard

The AS5163 demoboard is a complete rotary encoder system with built-in microcontroller and graphical LCD display.
The board is externally supplied with a 9V battery for standalone operation.

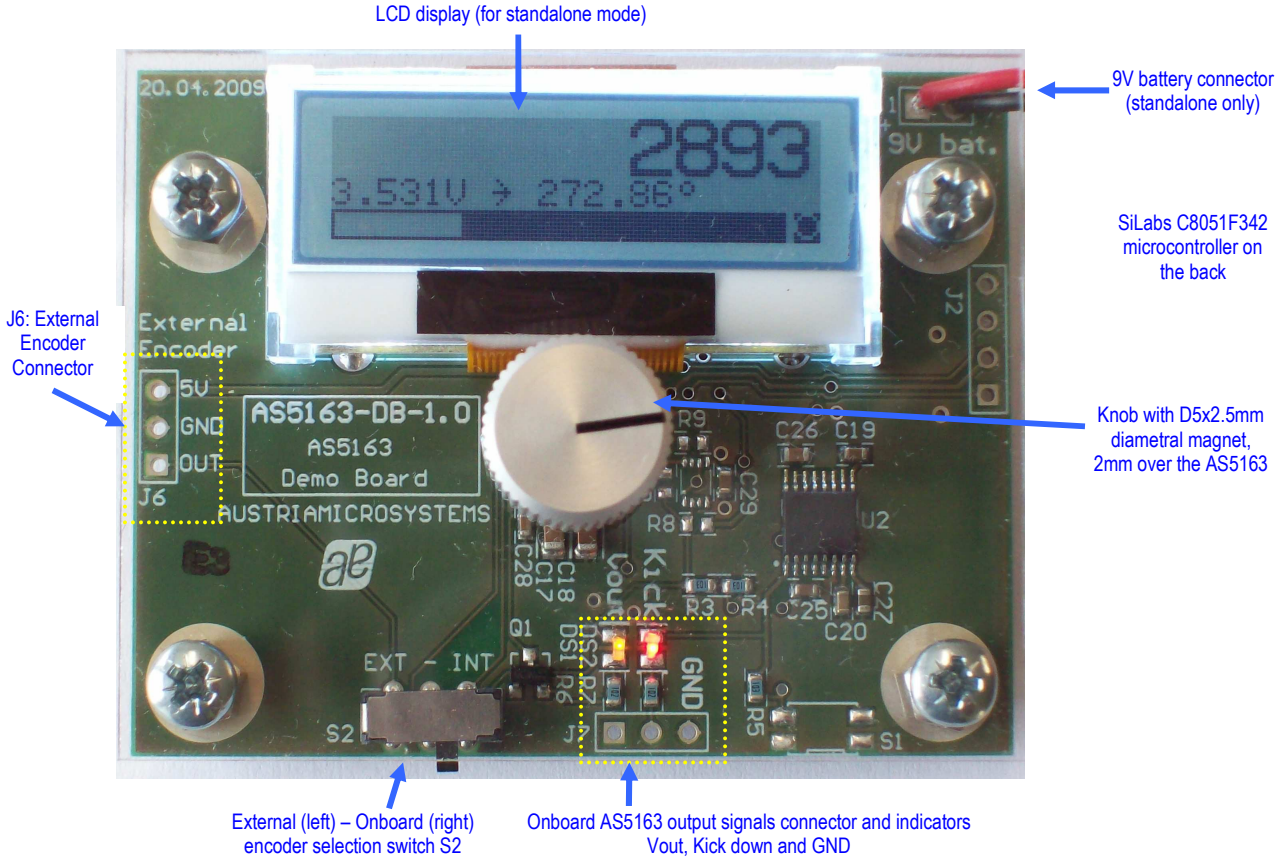


Figure 1: AS5163 Demoboard hardware with mounted magnet knob

Operating the AS5163 Demoboard

The demoboard can be used only

- **As standalone unit supplied by a 9V battery**

Connect a 9V battery to the battery connector on the top right side of the board. No other connections are required.

All AS5163 devices mounted on this demoboards, are pre-programmed parts with following settings:

- 360deg full range operation
- 0.5V to 4.5V analog output
- Kick down not activated

2.1 Graphic LCD display

The LCD display shows the realtime angle position of the magnet, the output voltage and the corresponding 12 bit value (related to the output voltage of 0.5V-4.5V).
Turning the knob counter-clockwise will increase the angle value until 359.9°, then 0°.

If the magnet is too far away from the encoder, “Error: Magnet is missing!!” will be displayed.

Figure 2: LCD display

2.2 Vout LED

The Vout LED is connected to the output of the AS5163. The output is analogue and proportional to the angle of the magnet.
Viewing the output signal on the LED results in brightness, that is proportional to the angle of the magnet. When the angle of the magnet is at 0° (~0.5V), the LED is almost dark. Turning the knob counter-clockwise towards higher angles increases the brightness of the LED.

2.3 Kick LED

He kick down is not activated in this version of demoboard, hence the Kick LED is always ON.

2.4 Encoder selection switch

The switch S2 selects the encoder which communicates with the microcontroller.

1. Right position (default): Onboard AS5163

2. Left Position: External AS5163 connected on J6
   The signals of the interface (OUT) and the power supply (5V, GND) of an external device can be connected directly to J6. In this configuration, this data is displayed on the LCD.

An AS5163 can be attached to J6 and evaluated. See figure 3.

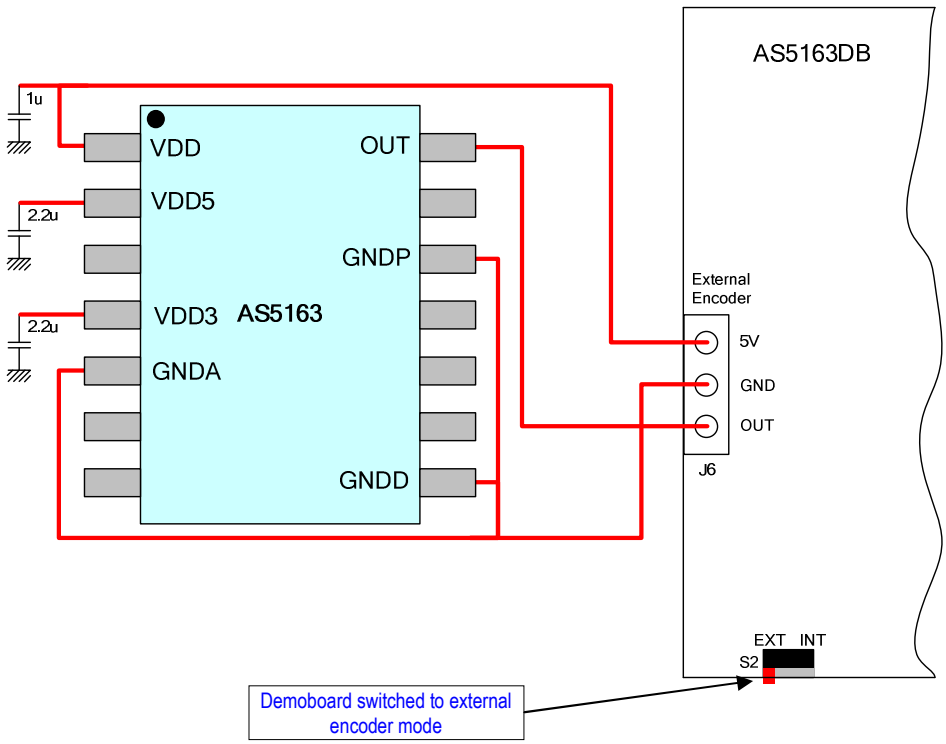


Figure 3: external AS5163 connection to the demoboard

2.5 AS5163 Demoboard Schematic and Blockdiagram

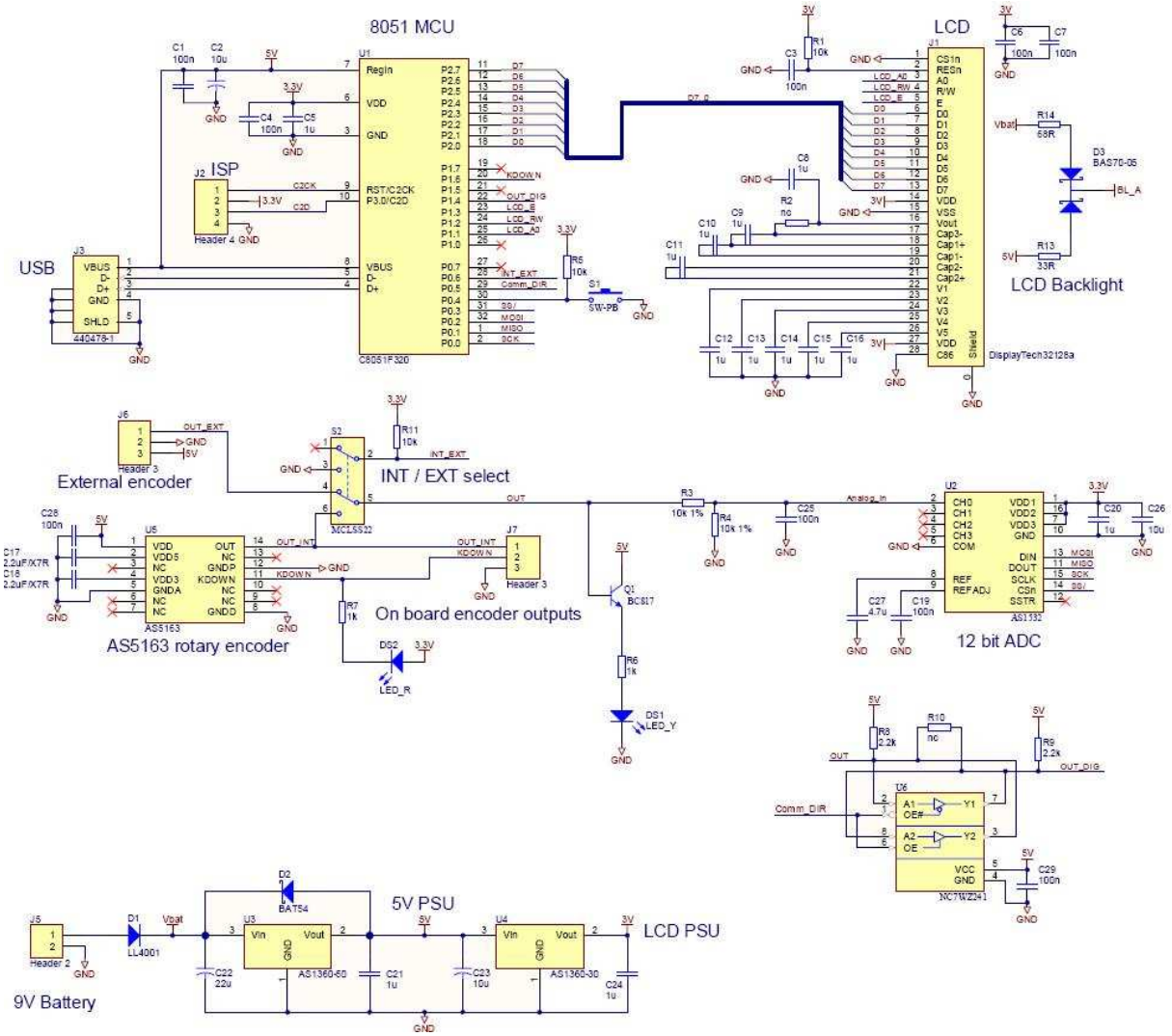


Figure 4: AS5163 Demoboard schematic

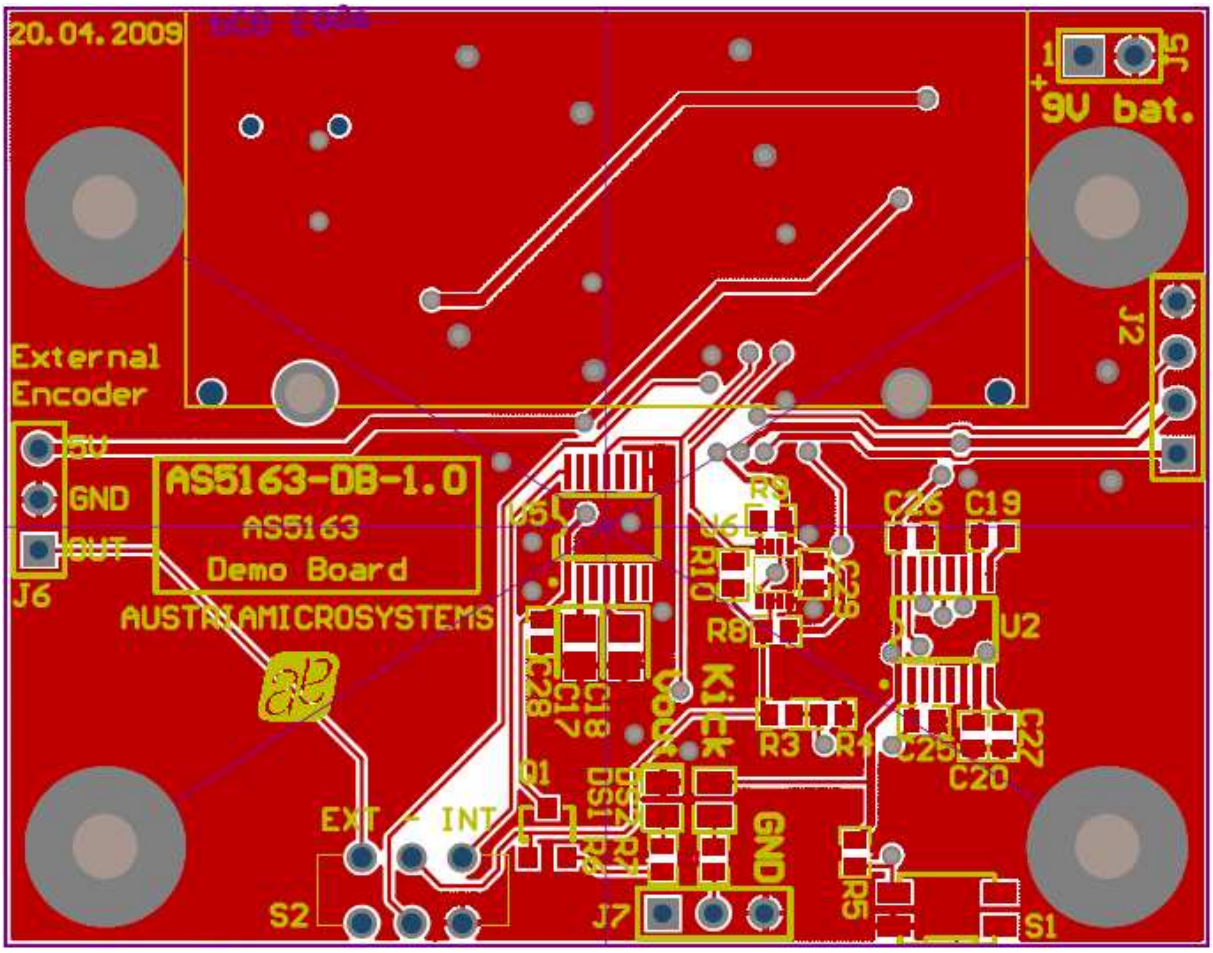


Figure 5: AS5163 Demoboard PCB Layout

Revision History

Revision	Date	Description
1.0	June 2009	First version
1.1	April 2010	Change in General Description

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Contact Information

Headquarters
austriamicrosystems AG
A-8141 Schloss Premstaetten, Austria
Tel: +43 (0) 3136 500 0
Fax: +43 (0) 3136 525 01

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