



**austriamicrosystems AG**

**is now**

**ams AG**

The technical content of this austriamicrosystems application note is still valid.

**Contact information:**

**Headquarters:**

ams AG  
Tobelbaderstrasse 30  
8141 Unterpremstaetten, Austria  
Tel: +43 (0) 3136 500 0  
e-Mail: [ams\\_sales@ams.com](mailto:ams_sales@ams.com)

Please visit our website at [www.ams.com](http://www.ams.com)

# AS5263

## 12 bit Redundant Automotive Angle Position Sensor

# AS5263-DB Demoboard

## OPERATION MANUAL

### 1 General Description

The AS5263 is a redundant, 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  $0.022^\circ = 16384$  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 AS5263 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 AS5263 Demoboard

The AS5263 demoboard is a complete rotary encoder system with built-in microcontroller and graphical LCD display. The board is externally supplied with a 9V battery or by the USB connection (standalone operation only).

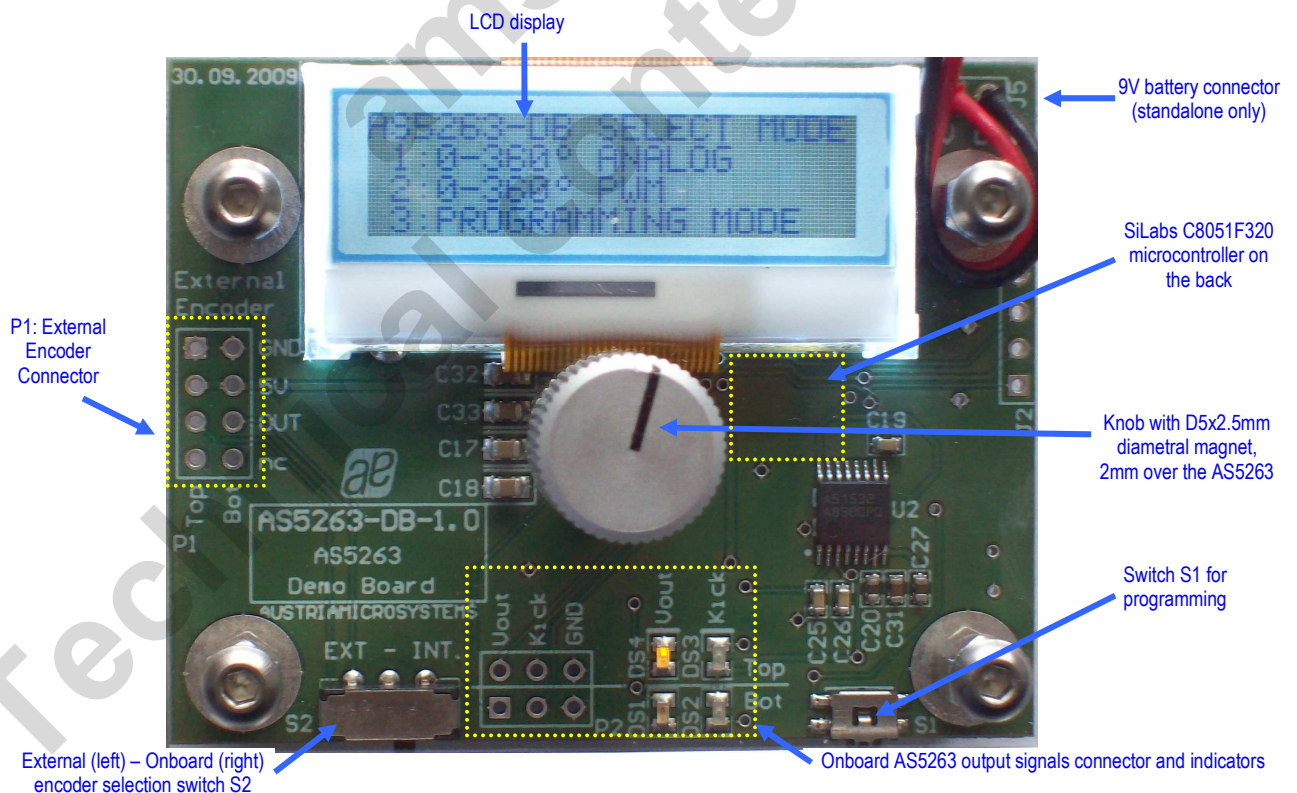


Figure 1: AS5263 Demoboard hardware with mounted magnet knob

## 2.1 Operating the AS5263 Demoboard

The demoboard can be used only

- **As standalone unit supplied by a 9V battery or the USB connection**

Connect the demoboard with one of above mentioned supplies. No other connections are required.

All AS5263 devices mounted on this demoboards, are un-programmed parts. Following settings can be chosen:

1. Full range operation pre-settings: 0-360deg / 0.5V-4.5V / analog
2. Full range operation pre-settings: 0-360deg / 0.5V-4.5V / PWM
3. Free programming: 0-360deg / 0.2V-4.8V (reduced voltage range, due to the upper and lower failure band) / analog or PWM

### Mode selection

After connecting the board to the supply, follow these steps:

1. By turning the magnet knob counter-clockwise a marker appears
2. Select desired option and press button S1 to confirm
  - First and second option (pre-settings for analog and PWM) shows now the programming parameters to be set. Confirm these settings by pressing S1 again.  
The demoboard is programmed and provides now
    - a) the read back analog values on the header P2 at pin Vout and on the display. The display shows "analog mode active".
    - b) the PWM signal on the header P2 at pin Vout only. The display shows "PWM mode active".
  - Third option (free programming) shows the start angle selection on the display. Chose the start angle with aid of the magnet knob and press S1 again (*the angle is set in degree, the analog output voltage in Volts and the PWM output voltage in % of VDD*). Please continue accordingly, until the display shows "analog mode active" or "PWM mode active".  
The clamping levels CLL and CLH are automatically set to the chosen start/end voltage levels.

**Note:** As long as the demobaord is not active (in free programming mode only), one can return to main menu by pressing button S1 for about 2 seconds.  
Resetting the demoboard is done by disconntecing the supply!

## 2.2 Graphic LCD display

The first display shows the main menu right after startup.



Figure 2: LCD display – Main Menu

The LCD display shows the output voltage corresponding to the chosen output characteristic (only in analog mode).



Figure 3: LCD display – Active Mode

If the magnet is too far away from the encoder, "Magnet Err" will be displayed.



Figure 4: LCD display – Missing Magnet

### 2.3 Vout LED

The Vout LED is connected to the output of the AS5263. The output is analog 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 the start point, the LED is almost dark. Turning the knob towards higher angle values, increases the brightness of the LED.

### 2.4 Kick LED

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

### 2.5 Encoder selection switch

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

1. Right position (default): Onboard AS5263
2. Left Position: External AS5263 connected on P1
  - The signals of the interface (OUT) and the power supply (5V, GND) of an external device can be connected directly to P1. In this configuration, this data is displayed on the LCD.

An AS5263 can be attached to P1 and evaluated (see Figure 5). The picture shows only the connection for the bottom die. For using the top die, please connect the open pins of the external device accordingly.

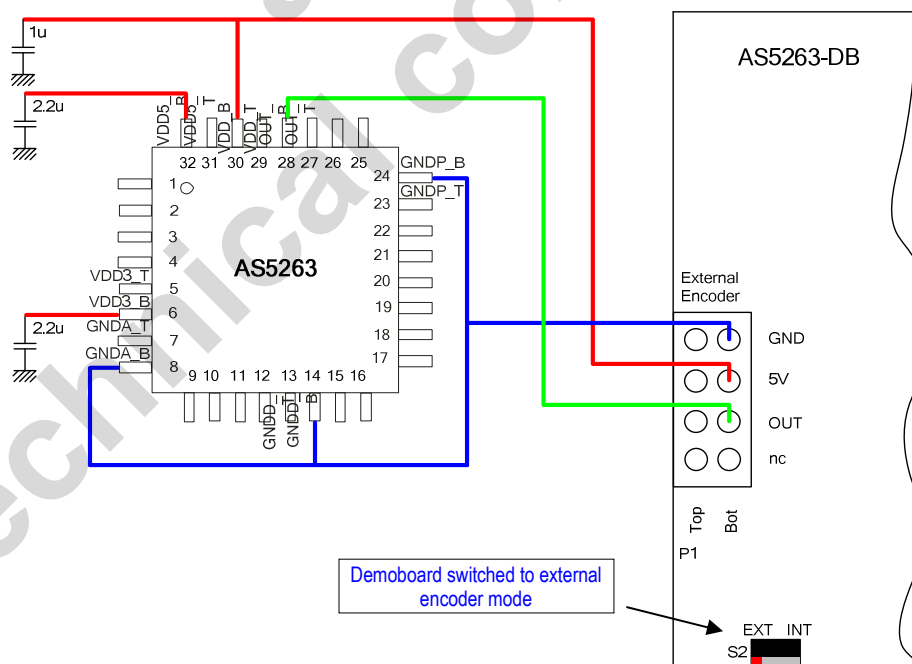


Figure 5: external AS5263 connection to the demoboard

## 2.6 AS5263 Demoboard Schematic and Blockdiagram

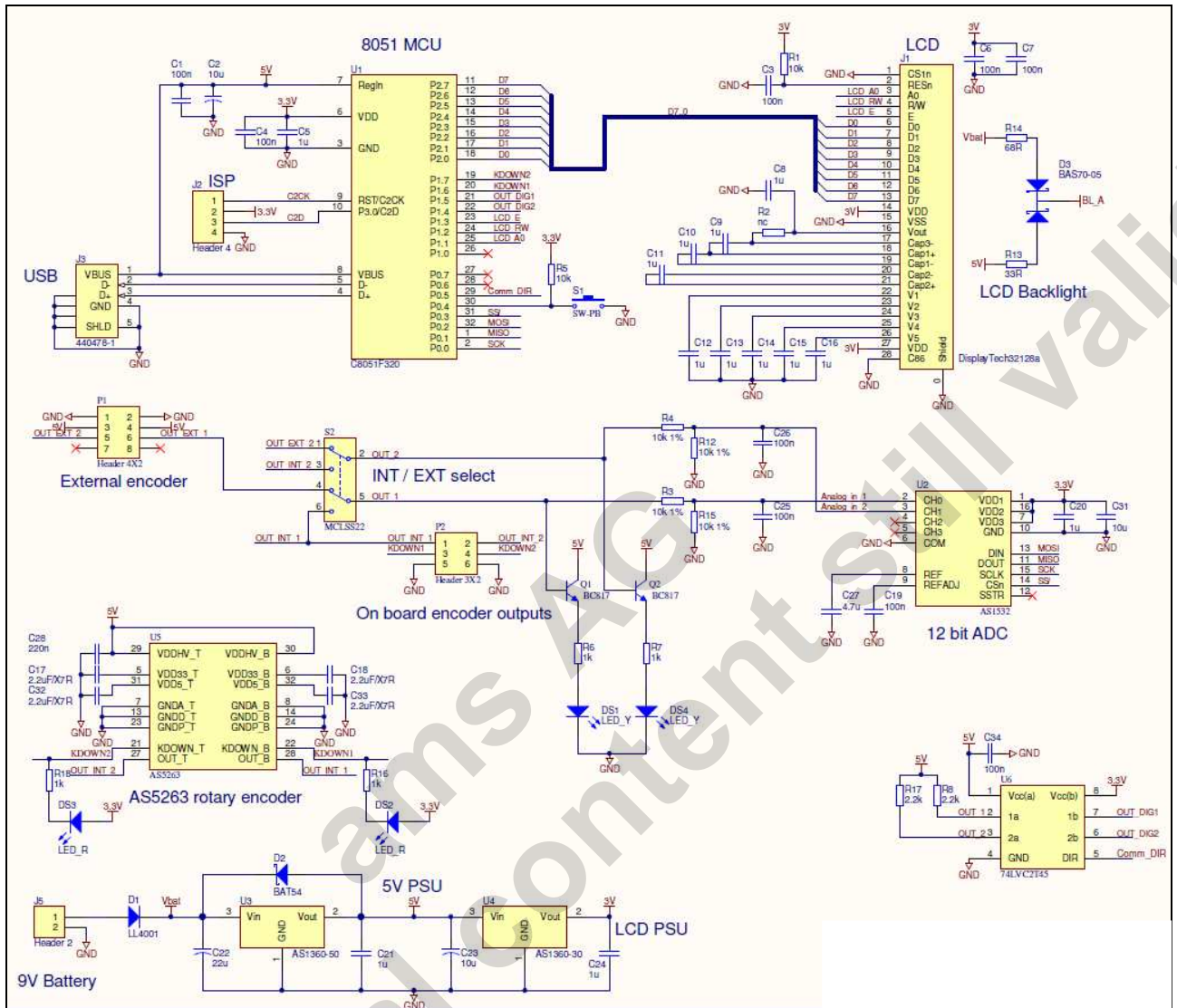


Figure 6: AS5263 Demoboard schematic

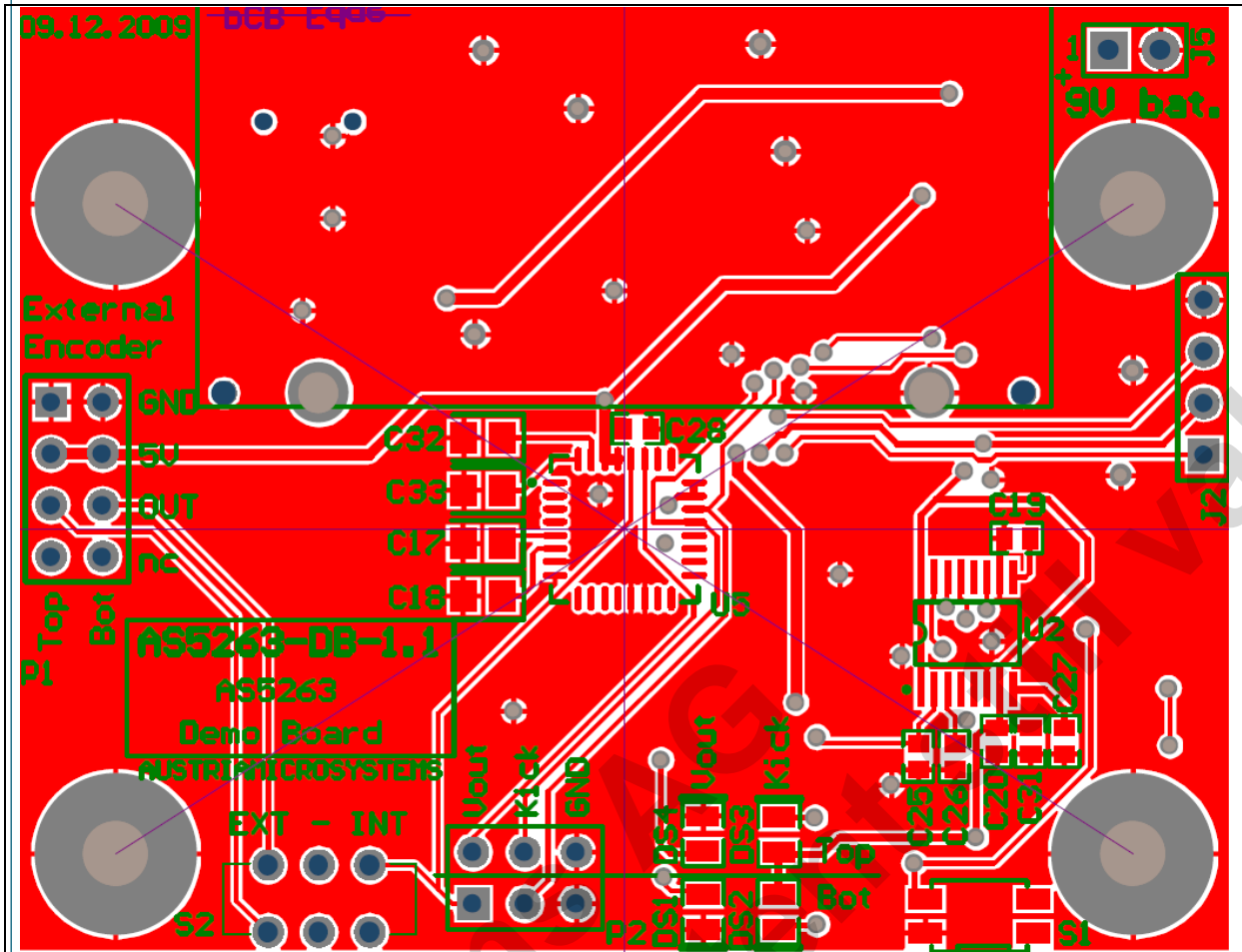


Figure 7: AS5263 Demoboard PCB Layout

## Revision History

Revision	Date	Description
1.0	June 2010	First version

## Copyrights

Copyright © 1997-2010, austriamicrosystems AG, Schloss Premstaetten, 8141 Unterpremstaetten, Austria-Europe. Trademarks Registered ®. All rights reserved. The material herein may not be reproduced, adapted, merged, translated, stored, or used without the prior written consent of the copyright owner. All products and companies mentioned are trademarks or registered trademarks of their respective companies.

## Disclaimer

Devices sold by austriamicrosystems AG are covered by the warranty and patent indemnification provisions appearing in its Term of Sale. austriamicrosystems AG makes no warranty, express, statutory, implied, or by description regarding the information set forth herein or regarding the freedom of the described devices from patent infringement. austriamicrosystems AG reserves the right to change specifications and prices at any time and without notice. Therefore, prior to designing this product into a system, it is necessary to check with austriamicrosystems AG for current information. This product is intended for use in normal commercial applications. Applications requiring extended temperature range, unusual environmental requirements, or high reliability applications, such as military, medical life-support or lifesustaining equipment are specifically not recommended without additional processing by austriamicrosystems AG for each application. The information furnished here by austriamicrosystems AG is believed to be correct and accurate. However, austriamicrosystems AG shall not be liable to recipient or any third party for any damages, including but not limited to personal injury, property damage, loss of profits, loss of use, interruption of business or indirect, special, incidental or consequential damages, of any kind, in connection with or arising out of the furnishing, performance or use of the technical data herein. No obligation or liability to recipient or any third party shall arise or flow out of austriamicrosystems AG rendering of technical or other services.

## Contact Information

### Headquarters

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

For Sales Offices, Distributors and Representatives, please visit:  
<http://www.austriamicrosystems.com>