1 General Overview

The AS5050/AS5055 is is a single-chip magnetic rotary encoder IC with low voltage and low power features.
It includes 4 integrated Hall elements, a high resolution ADC and a smart power management controller.
The angle position, alarm bits and magnetic field information are transmitted over a standard 3-wire or 4-wire SPI interface to the host processor.

The absolute angle measurement provides instant indication of the magnet's angular position with a resolution of:

- AS5050: 0.35° = 1024 positions per revolution
- AS5055: 0.09° = 4096 positions per revolution

The AS5055 is available in a small QFN 16-pin 4x4x0.85mm package and specified over an operating temperature of -20 to +85°C.

2 The AS5050/AS5055 Demoboard

The AS5050/AS5055 demoboard is a complete rotary encoder system with built-in microcontroller, USB interface and graphical LCD display.
The board is USB powered or externally supplied with a 9V battery for standalone operation.

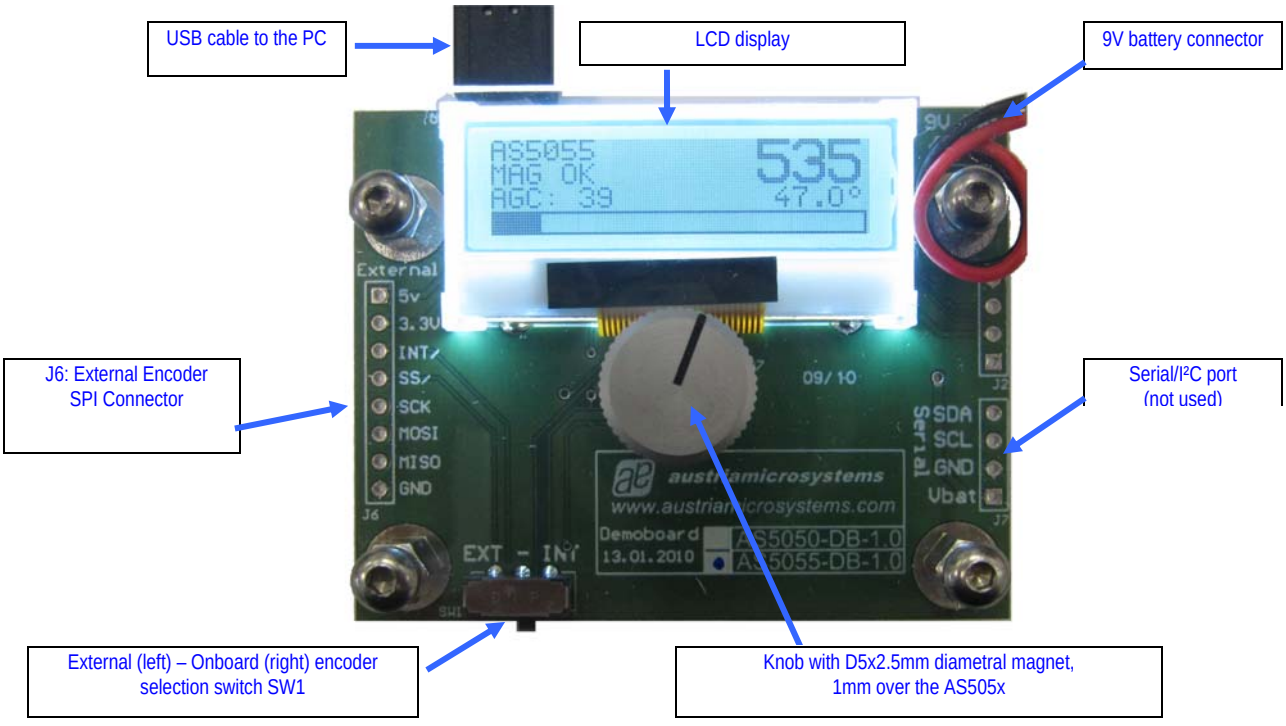

Figure 1: AS5050/AS5055 Demoboard hardware with mounted magnet knob

3 Operating the AS5050/AS5055 Demoboard

The AS5050/AS5055 demoboard can be used in several ways:

- 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.

- As standalone unit supplied by an USB port

Connect the demoboard to a PC using a USB/USB cable (included in demoboard shipment). The board is supplied by the 5V supply of the USB port. No other connections are required.

3.1 Hardware Indicators and Connectors

3.1.1 Graphic LCD display

The LCD display shows the realtime absolute angle position of the magnet and the absolute value of the angle.
Turning the knob clockwise will increase the angle value until 359° then 0°.

The magnet status indicator is related to the magnet position. If the magnet is too close to the encoder, “TOO CLOSE” will be displayed. If the magnet is too far away from the encoder, “TOO FAR” will be displayed.

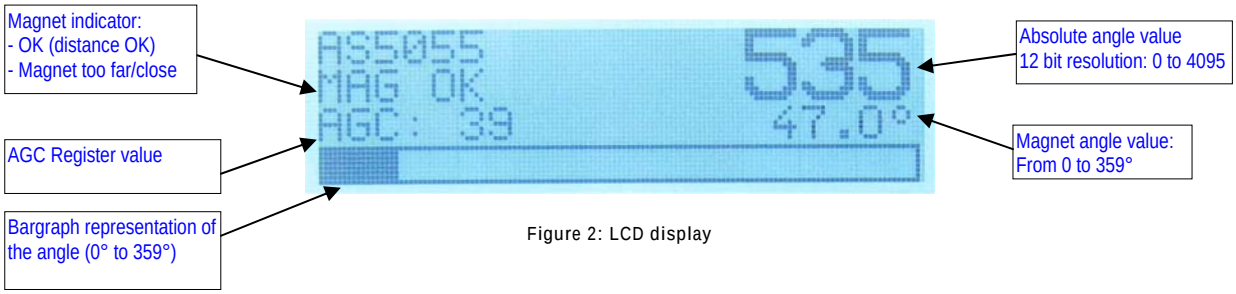

Figure 2: LCD display

3.1.2 Encoder selection switch

The switch SW1 selects the encoder which communicates with the microcontroller through the SSI bus:

1. Right position (default): Onboard AS5050/AS5055

2. Left Position: External AS5050/AS5055 connected on J6
   The signals of the synchronous serial interface (MOSI, MISO, SCK, SS/) and the power supply (3.3V, GND) of an external device can be connected directly to J6. In this configuration, the data of the serial interface are displayed on the LCD.

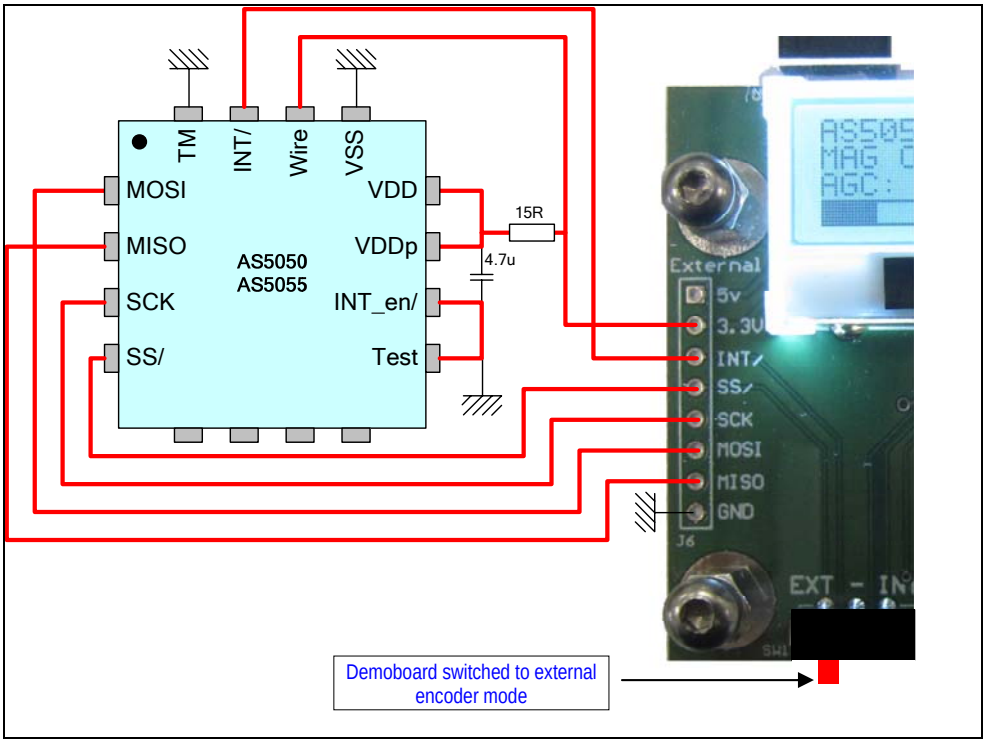

Figure 3: external AS5040/AS5140 connection to the demoboard

4 AS5050/AS5055 Demoboard, Schematics, block diagram

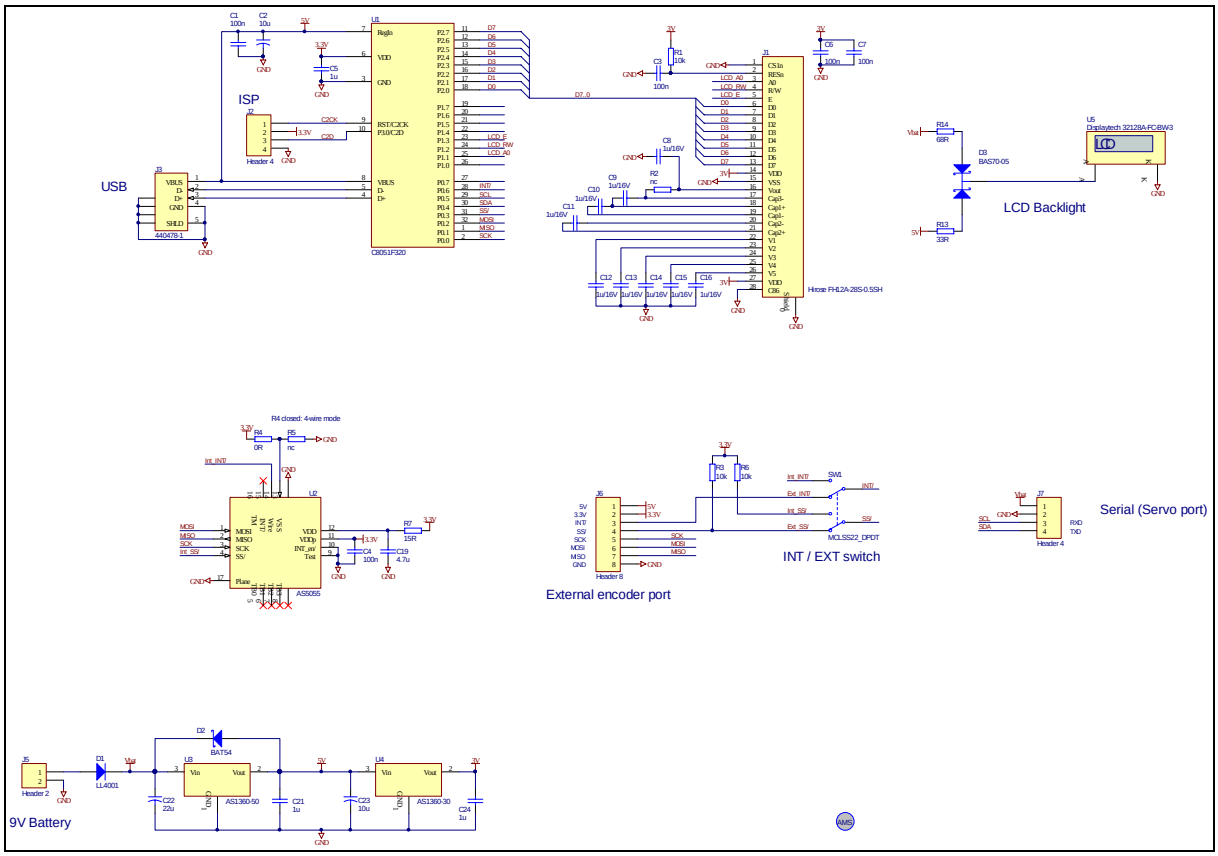

Figure 7: AS5050/AS5055 Demoboard schematics

Note:
On AS5050-DB-1.0 / AS5055-DB-1.0 PCB, U2 pin 16 is connected to VSS, causing a higher power consumption of the AS5050/AS5055 than expected. Pin 16 has to be left floating, it has been corrected on PCB versions 1.1.

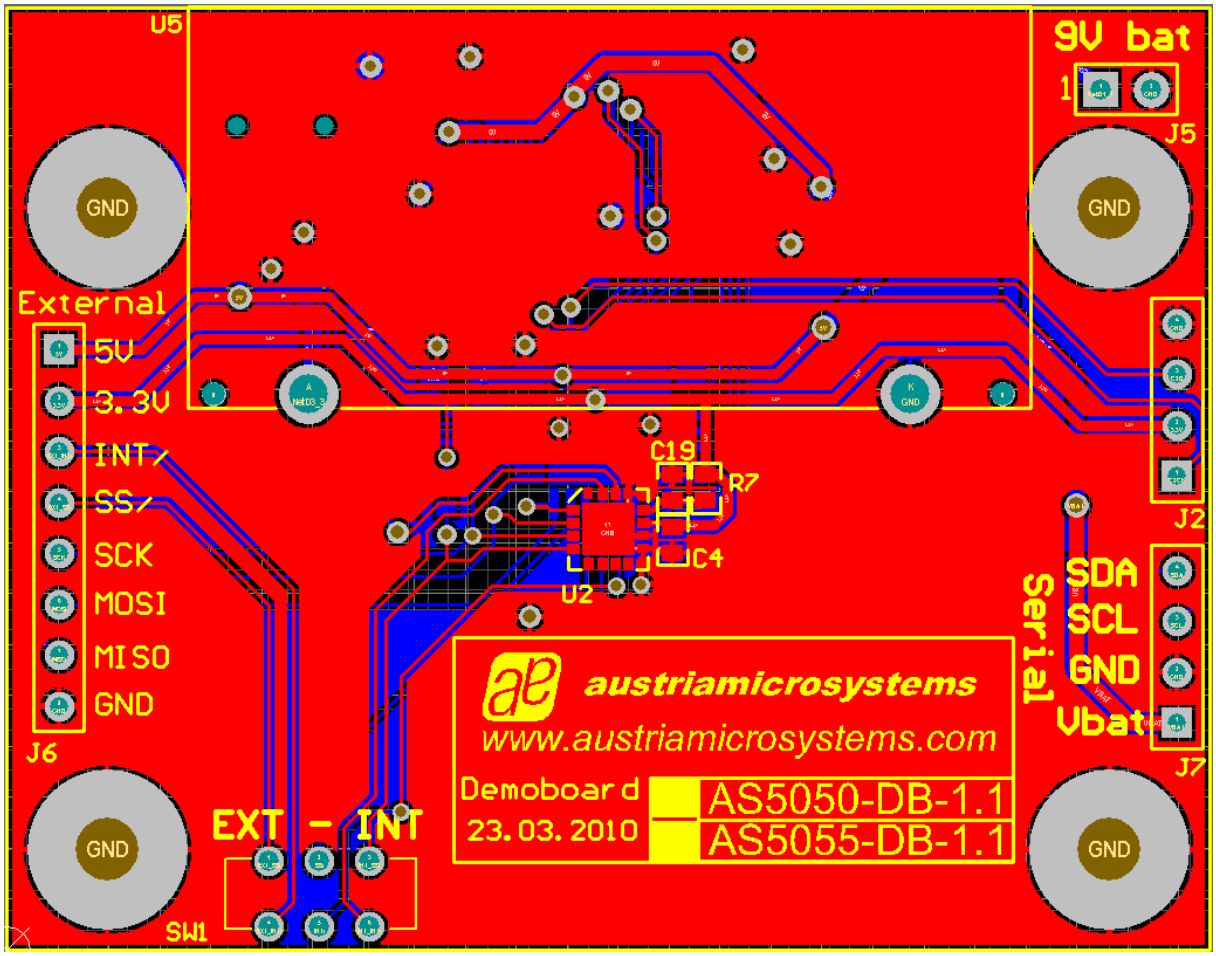

Figure 4: AS5050/AS5055 Demoboard PCB Layout

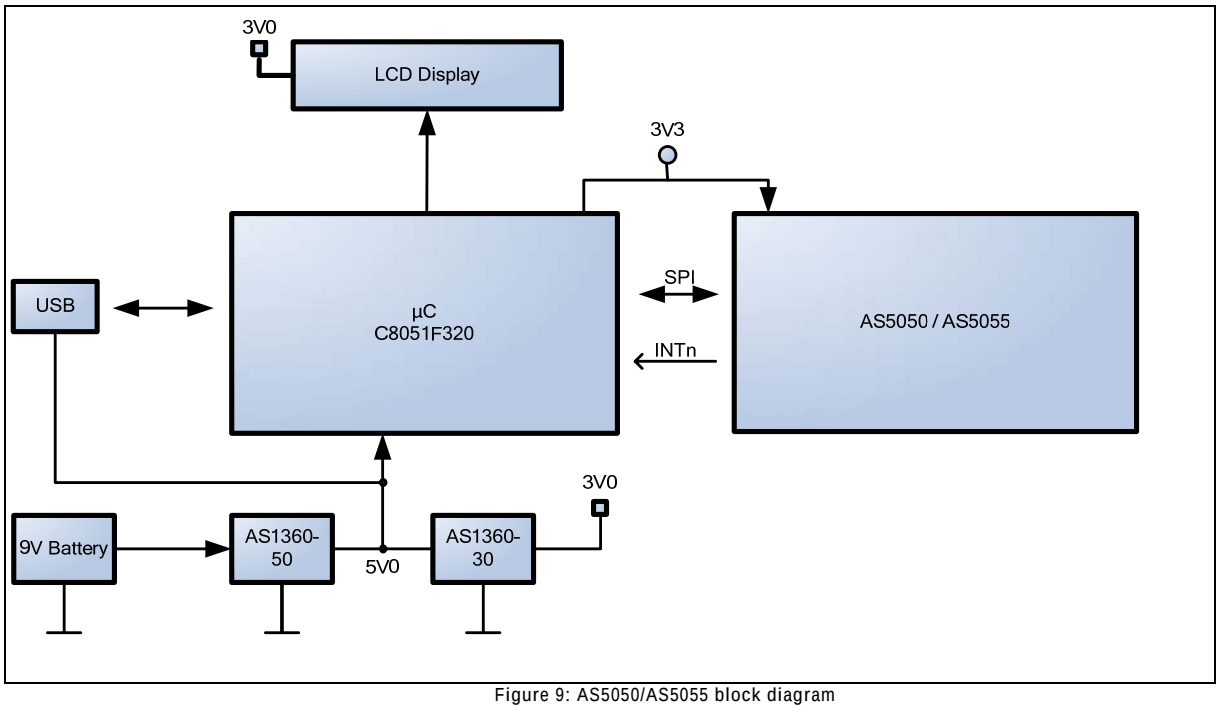

Figure 9: AS5050/AS5055 block diagram

Index

Revision History

Revision	Date	Description	
R1.0	March.23, 2010	First version	
R1.1	May 31, 2010	Pin 16 on AS505x floating on PCB >1.1	

Contact

Headquarters

austriamicrosystems AG
A 8141 Schloss Premstätten, Austria
Phone: +43 3136 500 0
Fax: +43 3136 525 01
industry.medical@austriamicrosystems.com
www.austriamicrosystems.com

Sales Offices

austriamicrosystems Germany GmbH
Tegernseer Landstrasse 85
D-81539 München, Germany
Phone: +49 89 69 36 43 0
Fax: +49 89 69 36 43 66

austriamicrosystems Italy S.r.l.
Via A. Volta, 18
I-20094 Corsico (MI), Italy
Phone: +39 02 4586 4364
Fax: +39 02 4585 773

austriamicrosystems France S.A.R.L.
124, Avenue de Paris
F-94300 Vincennes, France
Phone: +33 1 43 74 00 90
Fax: +33 1 43 74 20 98

austriamicrosystems Switzerland AG
Rietstrasse 4
CH 8640 Rapperswil, Switzerland
Phone: +41 55 220 9008
Fax: +41 55 220 9001

austriamicrosystems UK, Ltd.
88, Barkham Ride,
Finchampstead, Wokingham
Berkshire RG40 4ET, United Kingdom
Phone: +44 118 973 1797
Fax: +44 118 973 5117

austriamicrosystems AG
Klaavuntie 9 G 55
FI 00910 Helsinki, Finland
Phone: +358 9 72688 170
Fax: +358 9 72688 171

austriamicrosystems AG
Bivägen 3B
S 19163 Sollentuna, Sweden
Phone: +46 8 6231 710

austriamicrosystems USA, Inc.
8601 Six Forks Road
Suite 400
Raleigh, NC 27615, USA
Phone: +1 919 676 5292
Fax: +1 509 696 2713

austriamicrosystems USA, Inc.
4030 Moorpark Ave
Suite 116
San Jose, CA 95117, USA
Phone: +1 408 345 1790
Fax: +1 509 696 2713

austriamicrosystems AG
Suite 811, Tsimshatsui Centre
East Wing, 66 Mody Road
Tsim Sha Tsui East, Kowloon, Hong Kong
Phone: +852 2268 6899
Fax: +852 2268 6799

austriamicrosystems AG
AIOS Gotanda Annex 5th Fl., 1-7-11,
Higashi-Gotanda, Shinagawa-ku
Tokyo 141-0022, Japan
Phone: +81 3 5792 4975
Fax: +81 3 5792 4976

austriamicrosystems AG
#805, Dong Kyung Bldg.,
824-19, Yeok Sam Dong,
Kang Nam Gu, Seoul
Korea 135-080
Phone: +82 2 557 8776
Fax: +82 2 569 9823

austriamicrosystems AG
Singapore Representative Office
83 Clemenceau Avenue, #02-01 UE Square
239920, Singapore
Phone: +65 68 30 83 05
Fax: +65 62 34 31 20

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