

AS5163

12 bit Programmable Magnetic Angle Position Encoder

AS5163-AB-1.1 Adapterboard OPERATION MANUAL

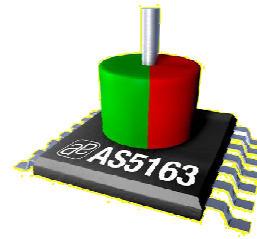
1 General Description

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 $0.022^\circ = 16384$ 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 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 Adapter board

2.1 Board description

The AS5163 adapter board is a simple circuit allowing test and evaluation the rotary encoder quickly without building a test fixture or PCB. The PCB requires only a 3-wire connection: 5V power supply, GND and the output connection (KDOWN is optional). Only pin 1, 3, 5, and 7 of JP1 are connected. Capacitor C1 and C2 (both 2.2uF) is buffering the LDO outputs VDD3 and VDD5; C3 (1uF) is placed between VDD and GND.

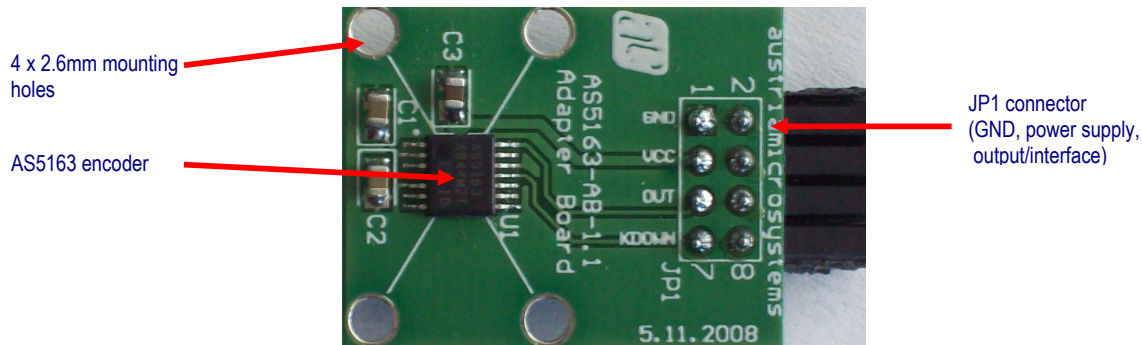


Figure 1: AS5163 Adapterboard

2.2 Mounting the AS5163 adapter board

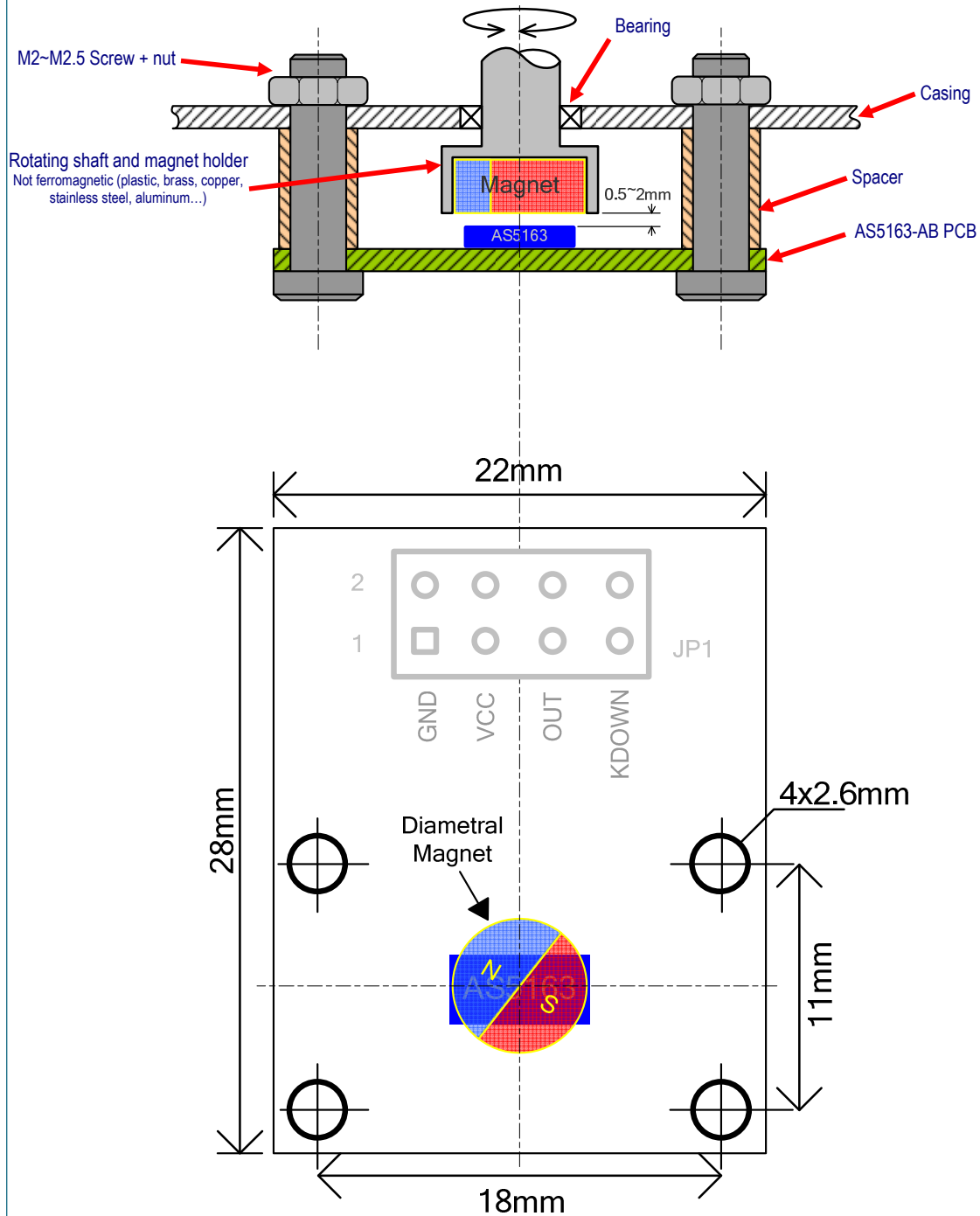


Figure 2: AS5163 adapter board mounting and dimension

A 6x2.5mm (typ. Magnet) diametric magnet must be placed over on under the AS5163 encoder, and should be centered on the middle of the package with a tolerance of 0.5mm.

The airgap between the magnet and the encoder casing should be maintained in the range 0.5mm~2mm.

The magnet holder must not be ferromagnetic. Materials as brass, copper, aluminum, stainless steel are the best choices to make this part.

3 AS5163 adapter board and pinout



Figure 3: AS5163 adapter board connectors and encoder pinout

Pin# Board	Pin# AS5163	Symbol Board	Type	Description
JP1 - 1	5, 8, 12	GND	S	Supply ground
JP1 - 2		GND		Not connected
JP1 - 3	1	VCC	S	Positive supply pin (overvoltage protected)
JP1 - 4		VCC		Not connected
JP1 - 5	15	OUT	DIO/AIO	Output and interface pin. Can be programmed as analog or PWM output. As well used for programming.
JP1 - 6		OUT		Not connected
JP1 - 7	11	KDOWN	DO_OD	Kick down functionality
JP1 - 8		KDOWN		Not connected

Table 1: Pin description

Pin types: DIO/AIO multi purpose pin
 DO_OD digital output open drain
 S supply pin

4 Operation cases

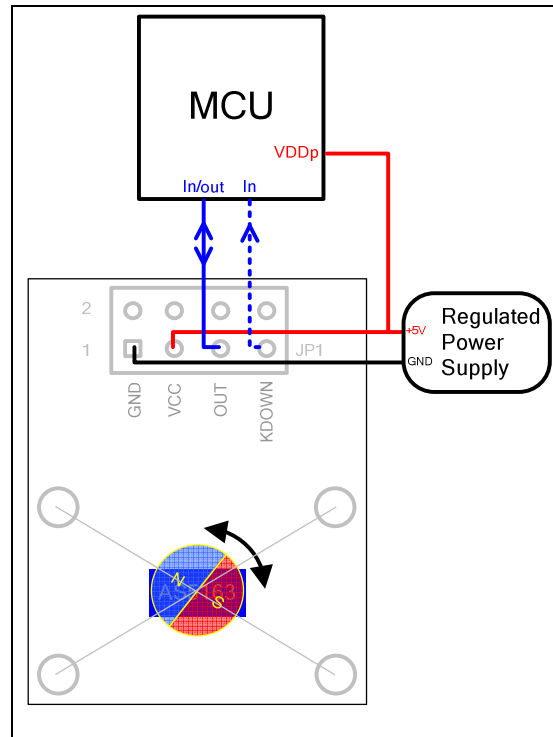


Figure 4: Operation cases with the adapter board

The OUT pin (JP1 – 5) is used as output as well as programming interface. The AS5163 provides a pulse width modulated output (PWM) and an analog output mode. Both modes are programmable in terms of output-voltage and corresponding angle.

The Kick down (KDOWN) is an optional connection, used for instance in gas pedal applications.

For further information, please refer to datasheet.

5 Programming the AS5163

For programming the AS5163 only 3 connections (VCC, GND and OUT) are necessary; please refer to Figure 4. It is recommended using the AS5000-Programmer and a connectionboard AS5x63-CB, shown in Figure 5, for fusing the device.

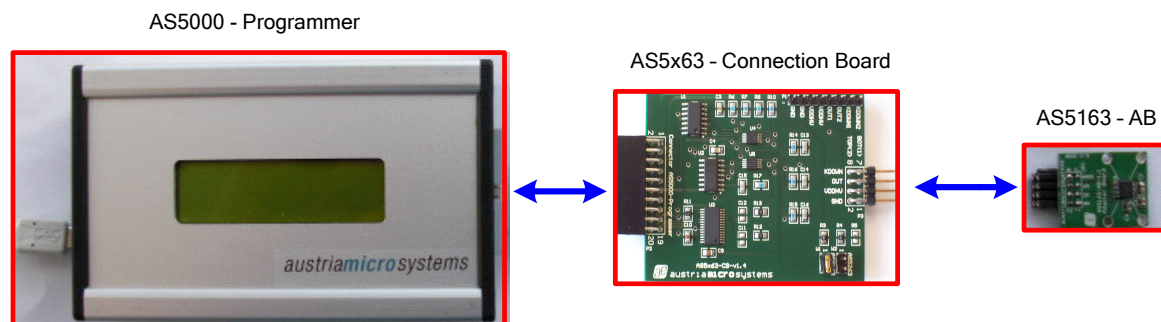


Figure 5: Recommended programming setup

More details concerning this programming tool can be found in application note AN_AS5163–10.

6 AS163 adapter board hardware

6.1 AS5163-AB-1.1 schematics

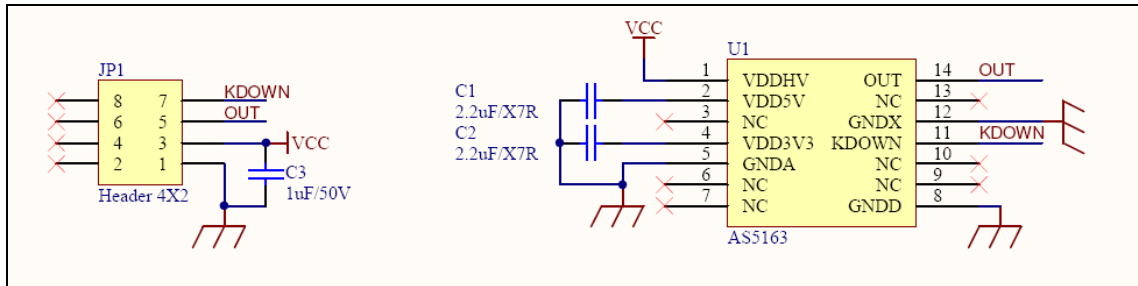


Figure 6: AS5163-AB-1.1 adapterboard schematics

6.2 AS5163-AB-1.1 PCB layout

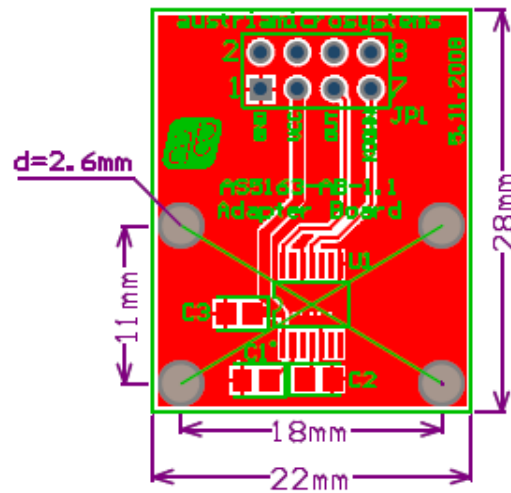


Figure 7: AS5163-AB-1.1 adapter board layout

Revision History

Revision	Date	Description
1.0	June 2009	First version
1.1	December 2009	Update of General Description (Chapter 1)

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