

To interface with Standard SPI:

Hi Techies,

From my understanding the following implementation is the way to interface AS5030 with standard SPI interface from CPU. Please correct me if any misunderstanding.

From AS5030 Adapter Board User Manual:

<http://www.austriamicrosystems.com/Support/Design-Resources/Demoboards/Rotary-Encoders/AS5030-AB-Adapterboard>

Adapterboard Operation Manual

6 AS5030 adapterboard hardware

6.1 AS5030-AB-2.0 schematics

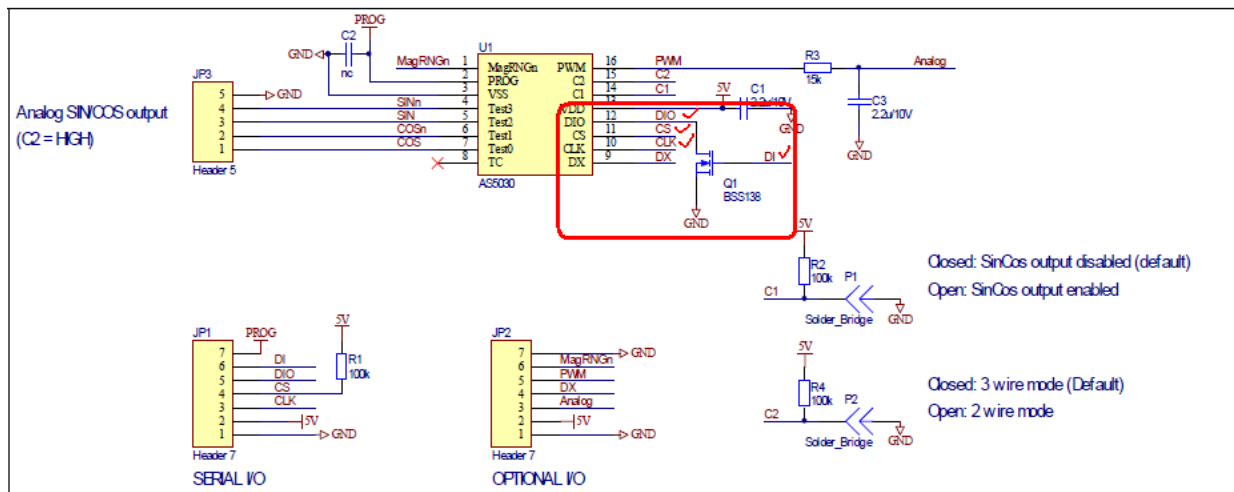
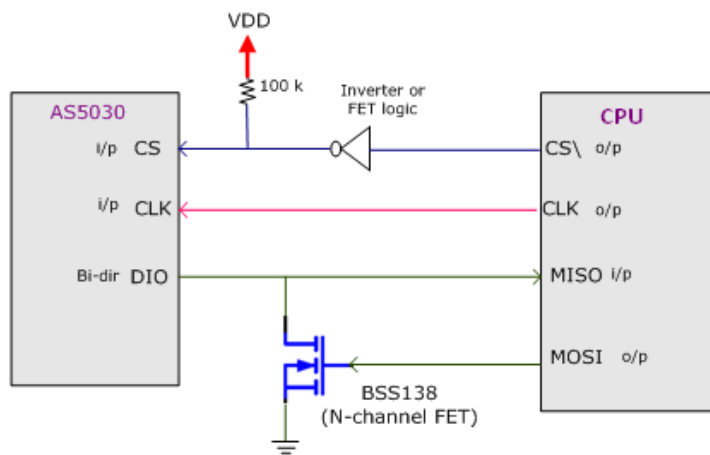


Figure 11: AS5030-AB-2.0 adapterboard schematics

By simply adding FET logic like below, we can interface standard SPI from CPU...



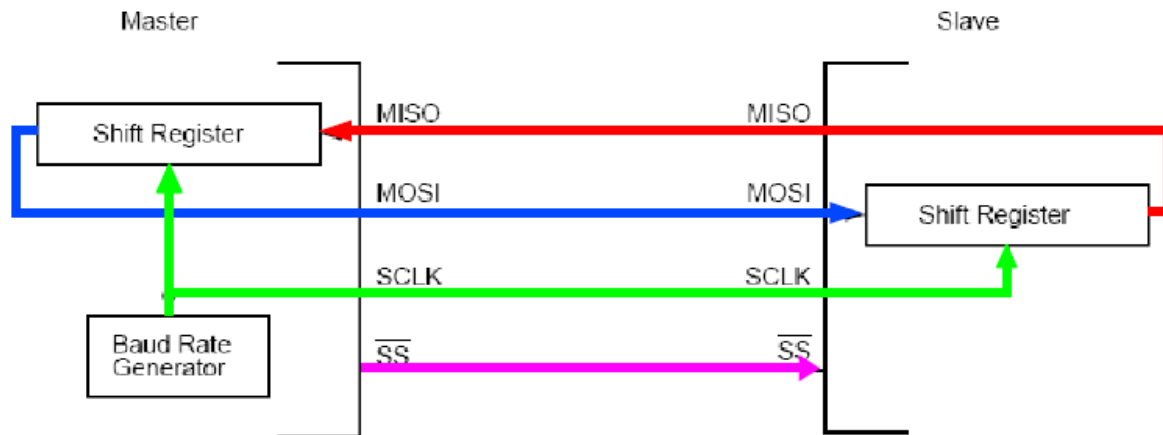
How it works –some basics:

N-Channel FET Operation:

Gate is 1 (logic high) => FET will ON

Gate is 0 (logic high) => FET will be OFF

SPI Basics:



As per SPI, MOSI would out the data from Master shift register (bit-by-bit) and MISO will receive the data from slave shift register (bit-by-bit).

Now come to our point:-

Need to send command for 5 clocks. Available commands

8.2.1 16-bit Read Command

Command	Bin	Hex	D15	D14	D13	D12	D11	D10	D9	D8	D7	D6	D5	D4	D3	D2	D1	D0
RD ANGLE	00000	00	C2	lock	AGC 5:0						Angle 7:0							

8.2.2 16-bit Write Command

These settings are temporary; they cannot be programmed permanently. The settings will be lost when the power supply is removed.

Command	Bin	Hex	D15	D14	D13	D12	D11	D10	D9	D8	D7	D6	D5	D4	D3	D2	D1	D0
EN PROG	10000	10	1	0	0	0	1	1	0	0	1	0	1	0	1	1	1	0
SET PWR MODE	10001	11	ULP/ LPn	PSM	0													
DIS HYST	10011	13	HYS	0														
DIS AGC	10101	15	0	0	0	0	0	rst	0	0	0	AGC 5:0					FA	

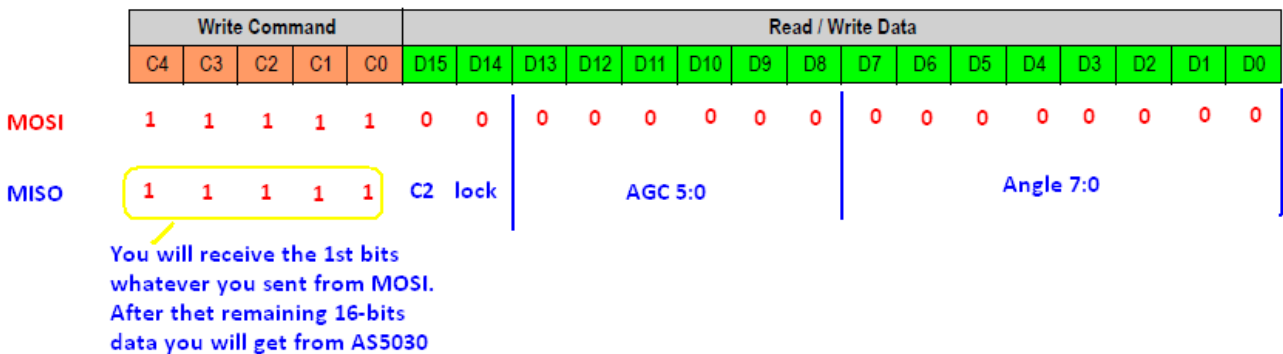
1st 5 clk, we need to write command. So MOSI from CPU should send command for 1st 5 clocks.

MOSI is connected to the Gate of the N-channel FET (Q1).

So when the MOSI is high (1) from CPU, the FET will switch ON and the DIO line will be connected to GND. So the DIO will read as 0. If you want provide 0 for AS5030 in command bit then need to send 1 from MOSI (CPU). So only the first 5-bits should be given as per your command requirement. All the other bits (if it is 16-bit register) written to 0. After 5 bits, since you are writing 0 the FET will OFF and DIO line will output the data and it will be received by our CPU MISO.

For example:

Read AGC and Angle command



So the same way, we can use for other commands. The 16-bit write and as well 18-bit write commands.

So for write command, only thing we need to send inverted command bits (5-bits) from MOSI for writing command and other bits should be written 0 from MOSI.

I hope this understanding is correct and helps you.