Team 10

I2C Protocol for FastScanning

Recent Changes

To let Jack/Sam know what has last been changed.

Overview

SPI protocol is used to communicate between the fast-scanning subsystem of the ATMega328p with the Raspberry Pi. The bulk of the processing will be done on the 328p to only transmit the processed data to the RaspPi.

I2C Specifications

SPI MODE 0

RASPBERRY PI configured as SPI Master.

ATmega328p configured as SPI Slave.

SPI Data Packet Configuration

The ATmega328p will be configured to act like a SPI Slave device that returns the Hall sensor reading from the corresponding address sent by the MOSI. It'll multiplex the hall sensor PCB column upon the SPI command from MOSI.

Bit	7	6	5	4	3	2	1	0
BYTE1	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**COL2**	**COL1**	**COL0**

- Bit 7:4 – COLn

These bits will select, multiplex and sample the column and return the Hall sensor readings on the column with MISO. See below for the details on the MISO Data.

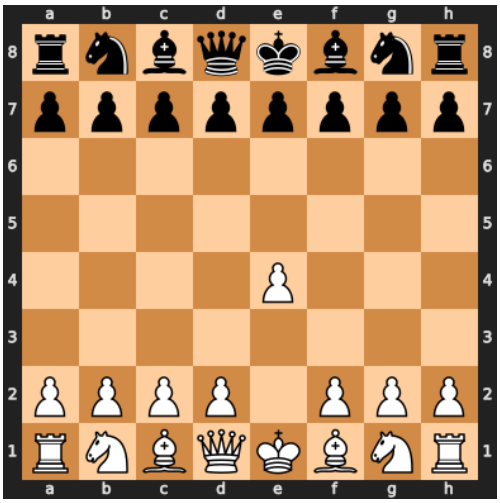
No.	TYP4	TYP3	COL2	COL1	COL0	TYPE/CATEGORY
0	0	0	0	0	0	Column A
1	0	0	0	0	1	Column B
2	0	0	0	1	0	Column C
3	0	0	0	1	1	Column D
4	0	0	1	0	0	Column E
5	0	0	1	0	1	Column F
6	0	0	1	1	0	Column G
7	0	0	1	1	1	Column H

Defining the MISO Data

Bit	7	6	5	4	3	2	1	0
Data	**DAT7**	**DAT6**	**DAT5**	**DAT4**	**DAT3**	**DAT2**	**DAT1**	**DAT0**
Rank	**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**

*A presence of a piece in the location DATx is signified by a 1.

Example



MOSI: 0x04; 0b00000100 (Master Pi request data on Col E)

MISO: 0b10010011 (Slaves sends the data from Col E)

MOSI: 0x02; 0b00000010 (Master Pi request data on Col B)

MISO: 0b11000011 (Slaves sends the data from Col B)