

App Note 502: Interfacing SPI Real-Time Clocks (RTCs) with a Microcontroller

This application note describes how to interface Dallas real-time clocks (RTCs) with a SPI interface to a microcontroller.

Dallas Semiconductor offers a variety of serial Real Time Clocks (RTCs). A number of these use the Motorola SPI interface to communicate with a microprocessor.

This application note is intended to help customers understand the basics of the SPI interface.

Overview

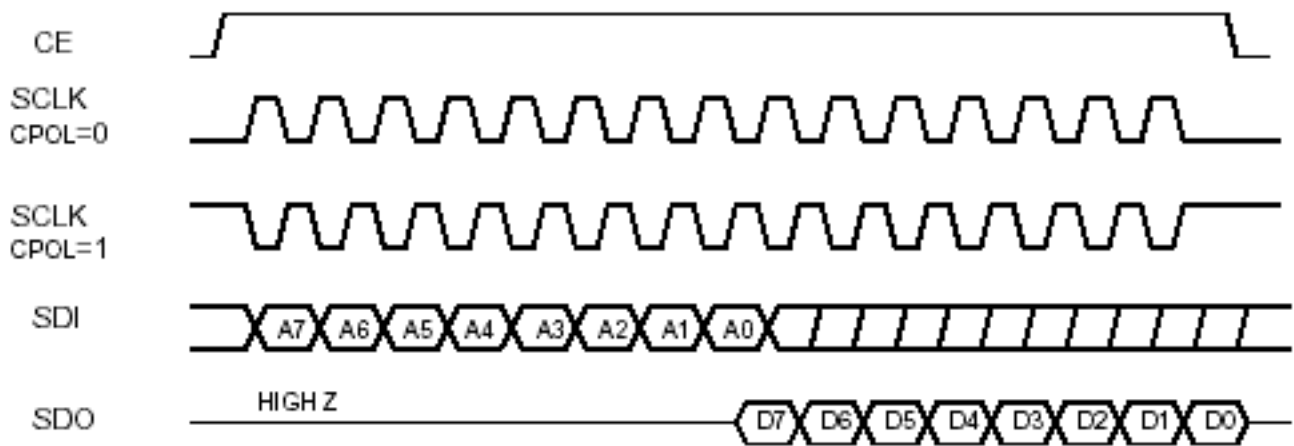
Figure 1 shows a typical single byte read and single byte write for the DS1306. Other SPI parts may have a different command byte structure. However, the timing sequence remains the same. Note that data are clocked into the RTC on the rising edge of SCLK. The RTC outputs data on the falling edge of SCLK.

Note that during a read, the clock goes from reading the command byte to outputting data on one SCLK cycle. The processor must release the data line after the rising clock edge (after T_{cdh}). The RTC takes control of the data line on the falling edge of the clock.

NOTE

SCLK must be in the proper idle state before the slave is enabled.

Single Byte Read



NOTE

CPOL is the "Clock Polarity" bit that is set in the control register of the microcontroller. The CPHA bit polarity in the microcontroller must be set to a "1" (if applicable).

Single Byte Write

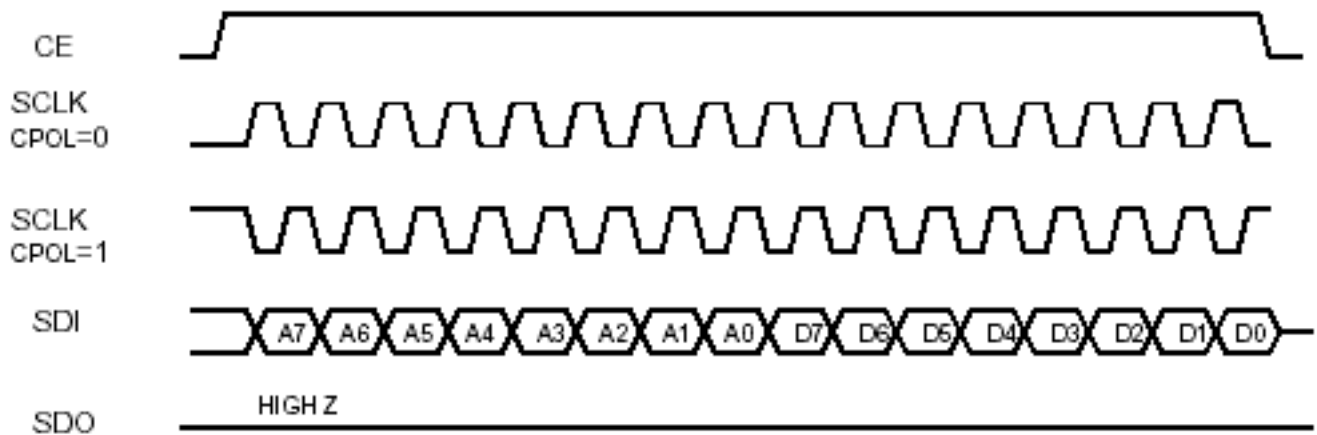


Figure 1. Data Transfer Summary

NOTE

In burst mode, CE is kept high and additional SCLK cycles are sent until the end of the burst.

At the beginning of a data transfer, SCLK should be low. If SCLK is high when CE is brought active, the RTC may interpret that as a low to high transition of SCLK.

An example of SPI code, written for the DS1306, is available at:

<ftp://ftp.dalsemi.com/pub/timekeeping/SPI1306.c>

Summary

Following the information above will help insure that SPI communication routines will function correctly.

More Information

DS1305: [QuickView](#) -- [Full \(PDF\) Data Sheet](#) -- [Free Samples](#)

DS1306: [QuickView](#) -- [Full \(PDF\) Data Sheet](#) -- [Free Samples](#)