

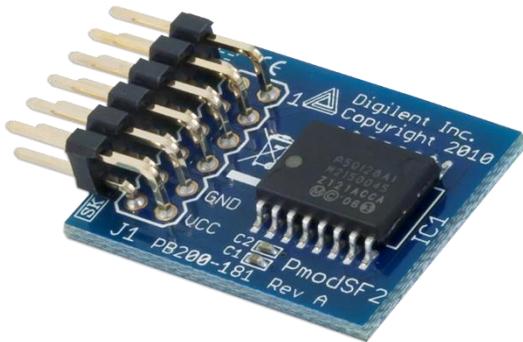
## PmodSF2™ Reference Manual

Revised April 12, 2016

This manual applies to the PmodSF2 rev. A

### Overview

The Digilent PmodSF2 provides 16MB of serial phase change memory (PCM).



*The PmodSF2.*

Features include:

- 16MB of serial phase change memory (PCM)
- 128Mbit, quad/dual/single serial interface
- More than 1,000,000 write cycles
- 8 Super Page programming regions for a total of 128 sectors
- Small PCB size for flexible designs 1.0" × 0.8" (2.54 cm × 2.0 cm)
- 12-pin Pmod port with SPI interface
- Library and example code available in resource center

## 1 Functional Description

The PmodSF2 utilizes [Micron® P5Q PCM](#) to provide easily accessed non-volatile memory to system boards. As PCM supports bit-alterable page writes, it lasts much longer than flash memory and can support over 1,000,000 page write cycles per sector.

## 2 Interfacing with the Pmod

The PmodSF2 communicates with the host board via the SPI protocol. By bringing the Chip Select line low, users may issue a single byte instruction code to memory chip. A table of available commands taken from the P5Q datasheet is provided below.

Instruction	Description	One-byte Instruction Code	Number of Address Bytes	Number of Dummy Bytes	Number of Data Bytes
WREN	Write Enable	0x06	0	0	0
WRDI	Write Disable	0x04	0	0	0
RDID	Read Identification	0x9F	0	0	1 to 3
		0x9E	0	0	1 to 3
RDSR	Read Status Register	0x05	0	0	1 to ∞
WRSR	Write Status Register	0x01	0	0	1
READ	Read Data Bytes	0x03	3	0	1 to ∞
FAST_READ	Read Data Bytes at Higher Speed	0x0B	3	1	1 to ∞
DOFR	Dual Output Fast Read	0x3B	3	1	1 to ∞
QOFR	Quad Output Fast Read	0x6B	3	1	1 to ∞
PP	Page Program (Legacy)	0x02	3	0	1 to 64
	Page Program (Bit-alterable write)	0x22	3	0	1 to 64
	Page Program (On all 1s)	0xD1	3	0	1 to 64
DIFP	Dual Input Fast Program (Legacy)	0xA2	3	0	1 to 64
	Dual Input Fast Program (Bit-alterable write)	0xD3	3	0	1 to 64
	Dual Input Fast Program (On all 1s)	0xD5	3	0	1 to 64
QIFP	Quad Input Fast Program (Legacy)	0x32	3	0	1 to 64
	Quad Input Fast Program (Bit-alterable write)	0xD7	3	0	1 to 64
	Quad Input Fast Program (On all 1's)	0xD9	3	0	1 to 64
SE	Sector Erase	0xD8	3	0	0
BE	Bulk Erase	0xC7	0	0	0
DP	Deep Power-down	0xB9	0	0	0

Table 1. Available commands from the P5Q datasheet.

The memory address bits range from 0x000000 to 0xFFFFF with each individual page consisting of 64 bytes a piece. Users that wish to simply use the memory module without concerning themselves with the dual/quad input output communication may use the same library that is available for the PmodSF2 without any issue.

Pin	Signal	Description
1	~CS	Chip Select
2	MOSI/DQ0	Master-Out-Slave-In
3	MISO/DQ1	Master-In-Slave-Out
4	SCK	Serial Clock
5	GND	Power Supply Ground
6	VCC	Power Supply (3.3V)
7	NC	Not Connected
8	W/DQ2	Write Protect
9	HLD/DQ3	Hold
10	NC	Not Connected
11	GND	Power Supply Ground
12	VCC	Power Supply (3.3V)

Table 2. Pinout description table.

Any external power applied to the PmodSF2 must be within 2.7V and 3.6V; it is strongly recommended that Pmod is operated at 3.3V.

### 3 Physical Dimensions

The pins on the pin header are spaced 100 mil apart. The PCB is 1 inch long on the sides parallel to the pins on the pin header and 0.8 inches long on the sides perpendicular to the pin header.