

Digilent PmodSF2™ 128Mbit SPI Serial PCM Module Reference Manual



1300 NE Henley Court, Suite 3
Pullman, WA 99163
(509) 334 6306 Voice | (509) 334 6300 Fax

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Overview

The Digilent PmodSF2 is a Digilent Pmod™ peripheral module that provides 128Mbit (16Mbyte) of Serial Phase Change Memory (PCM). This memory is accessed through a legacy SPI (Serial Peripheral Interface) compatible serial interface. The module is also capable of new Quad I/O or Dual I/O SPI protocol. This module provides easily accessible non-volatile memory storage for various Digilent programmable logic and embedded control system boards.

Features include:

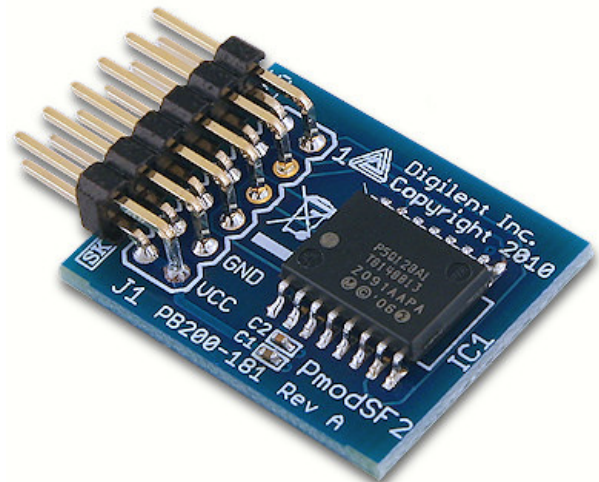
- Micron Omneo™ P5Q PCM 128Mbit, Quad/Dual/Single Serial Interface
- a 12-pin header Pmod interface connector
- more than 1,000,000 write cycles
- high program performance with low power
- small form factor (0.80" x 1.00").

Functional Description

The Digilent PmodSF2 is used for easily accessible non-volatile memory storage for various Digilent programmable logic and embedded control system boards.

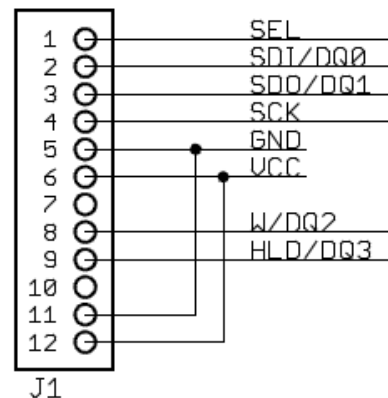
The flash memory on the PmodSF2 is provided by a Micron Omneo™ P5Q PCM integrated circuit. This memory is organized as 128 sectors of 131,072 (128K) bytes each. Each sector is organized as 1024 pages of 128 bytes each.

Flash memory must be erased before new data can be written. The P5Q PCM supports byte alterability, which allows direct overwrite and eliminates erase operation. For legacy



Digilent PmodSF2

SPI Header



Block Diagram

compatibility, P5Q PCM supports emulated erase operation. P5Q allows for a bulk erase or erase of individual sectors. After a sector has been erased, individual bytes within the sector can be written as well as complete pages. Additionally, the entire memory may be written as a single write operation.

Flash memory will eventually wear out after many erase/reprogram cycles. The P5Q PCM supports more than 1,000,000 erase/program cycles per sector before the memory wears out. Normally flash memory wear-out is not an issue in routine operation. However, be aware that bugs in the control software may inadvertently cause many erase/program cycles to happen quickly. This could result in premature wear-out of the memory.

The legacy SPI interface standard uses four signal lines. These are SS, slave select; MOSI, master out slave in; MISO, master in slave out; and SCK, serial clock. These signals map to the following signals on the P5Q PCM part as described in the Micron datasheet: SS corresponds to the Chip Select signal, \bar{S} ; MOSI corresponds to Serial Data Input, D; MISO corresponds to Serial Data Output, Q; and SCK corresponds to the Serial Clock signal, C. See the Micron datasheet for descriptions of the Dual and Quad modes of operation, as well as the use of the Write Protect (\bar{W}) and Hold (\bar{HLD}) signals.

A system board interacts with the PmodSF2 module by sending commands over the SPI interface. Depending on the command sent, the system board will then send memory data to, or receive memory data from, the module.

The P5Q PCM provides commands to perform sector erase, bulk erase, page program, and write commands as well as other miscellaneous commands. Please refer to the Micron data sheet for the Omneo™ P5Q PCM IC for detailed information on the operation of this integrated circuit.

The PmodSF2 is designed to work with either Digilent programmable logic or Digilent embedded control system boards that have 12-pin header connectors into which the PmodSF2 will connect directly.

The PmodSF2 requires a 2.7V to 3.6V supply voltage. This power supply voltage (3.3V) is available on all Digilent system boards and is provided as part of the 12-wire Pmod interface

standard. Digilent system boards that provide Pmod interface connectors allow jumper selection of the power supply voltage being provided to the Pmod. Ensure that the system board is jumpered to provide 3.3V to the module before applying power to the board.

For detailed information on the P5Q PCM, see the Micron data sheet available at http://www.numonyx.com/Documents/Datasheets/210052_P5Q_DS.pdf

Table 1: Connector J1 Signals

Pin	Signal
1	SS (\bar{S})
2	MOSI (D/DQ0)
3	MISO (Q/DQ1)
4	SCK (C)
5	GND
6	VCC
7	Not Used
8	\bar{W} /DQ2
9	\bar{HLD} /DQ3
10	Not Used
11	GND
12	VCC

Note: The PmodSF2 is intended for direct connection to boards with 12-pin Pmod headers only. It is not intended for use with Pmod cables.