

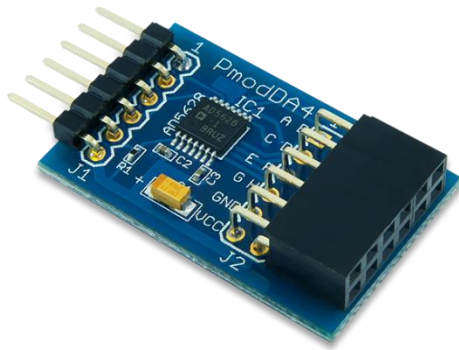
## PmodDA4™ Reference Manual

Revised May 24, 2016

This manual applies to the PmodDA4 rev. B

### Overview

The Digilent PmodDA4 is an octal, 12-bit digital-to-analog converter module.



The PmodDA4.

Features include:

- Eight channel, 12-bit DAC
- Capable of eight simultaneous outputs
- High-speed DSP compatible
- Power-down function capability
- Low power consumption
- Small PCB size for flexible designs 1.2" × 0.8" (3.0 cm × 2.0 cm)
- 6-pin Pmod connector with SPI interface
- Follows [Digilent Interface Specification](#) Type 2
- Example code available in [resource center](#)

## 1 Functional Description

The PmodDA4 utilizes [Analog Devices AD5628](#) to provide a signal DAC capable of 8 simultaneous output channels. With its internal reference voltage of 2.5V, a resolution of approximately 1 mV can be achieved.

## 2 Interfacing with the Pmod

The PmodDA4 communicates with the host board via the SPI protocol. By driving the Chip Select (CS) line to a logic level low voltage, users may send a series of 32 bits of information with the data clocked into the appropriate register on the falling edge of the Serial Clock (SCLK). Once the 32nd bit of information has been clocked in, the command that was sent in the data stream is executed.

An example data stream of how the 32 bits are to be sent to the module is provided below from the [AD5628 datasheet](#).

DB31 (MSB)				Command Bits				Address Bits			
X	X	X	X	C3	C2	C1	C0	A3	A2	A1	A0
Data Bits											
D11	D10	D9	D8	D7	D6	D5	D4	D3	D2	D1	D0
DB0 (LSB)											
X	X	X	X	X	X	X	X	X	X	X	X

Table 1. Example data stream from the AD5628 datasheet.

Users should note that the PmodDA4 by default attempts to use an external reference voltage. However, as there is no external reference voltage provided on the Pmod, users must write to the register to program the chip to use its internal reference voltage of 2.5V. The data stream required to change this is provided below:

Internal REF Register (DB0)	Action
0	Reference off (default)
1	Reference on

Table 2. Internal reference register from the AD5628 datasheet (table 10).

DB31 to DB28	DB27	DB26	DB25	DB24	
X	1	0	0	0	
Don't Cares		Command bits (C3 to C0)			
DB23	DB22	DB21	DB20	DB19 to DB1	DB0
X	X	X	X	X	1/0
Address bits (A3 to A0) - don't cares				Don't cares	Internal REF register

Table 3. 32-bit input shift register contents for reference set-up command from the AD5628 datasheet (table 11).

The various commands and addresses available for the on-board AD5628 can be found on page 22 of its [datasheet](#).

## 2.1 Pinout Description Table

Pin	Signal	Description
1	~CS	Chip Select
2	MOSI	Master-Out-Slave-In
3	(NC)	Not Connected
4	SCLK	Serial Clock
5	GND	Power Supply Ground
6	VCC	Power Supply (3.3V/5V)

Any external power applied to the PmodDA4 must be within 2.7V and 5.5V; however, it is 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 1.2 inches 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.

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