

**Revision:** September 9, 2013

**Note:** This document applies to REV A of the board.

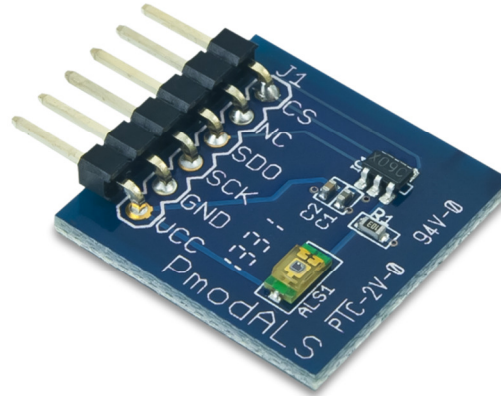
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## Overview

The Digilent PmodALS demonstrates light-to-digital sensing through a single ambient light sensor. Digilent Engineers designed this Pmod around the Texas Instruments ADC081S021 analog-to-digital converter.

Features Include:

- 3-wire SPI™ communication interface
- 8-bit resolution



## Functional Description

The PmodALS utilizes a single ambient light sensor (ALS) for user input. The amount of light the ALS is exposed to determines the voltage level passed into the ADC, which converts it to 8-bits of data. A value of 0 indicates a low light level and a value of 255 indicates a high light level.

The ADC081S021 is placed in normal mode by bringing the CS pin low, and will deliver a single reading in sixteen SCLK clock cycles.

## SPI Interface

The PmodALS communicates through a 3-wire Serial Peripheral Interface (SPI) to deliver converted data from the Texas Instruments ADC081S021. *Note: The Texas Instruments ADC081S021 is read-only.*

Table 1 describes the Pmod board header pin functions. These are the control signals as named on the ADC081S021.

To establish a communication interface, connect the CS pin to the SS signal and the SDATA to the SDI signal on the host board.

Users can access data from the ADC081S021 by reading in a 16-bit word via SPI. The ADC081S021 will produce both leading and trailing zeros around the 8-bits of data. For more information on the leading and trailing zeros, please refer to the device data sheet available at [www.ti.com](http://www.ti.com).

Pin	Signal	Description
1	CS	Chip Select
2	NC	Not Connected
3	SDATA	Serial Data Out
4	SCLK	Serial Clock
5	GND	Power Supply Ground
6	VA	Power Supply (3.3V/5V)

**Table 1**

Connector J1- SPI Communications  
Interface Connector Signal Description

## Power Supply

Any external voltage applied to VCC must be kept between 2.7V and 5.25V to avoid damaging the PmodALS. It is recommended to operate the board at 3.3V

Standard Pmod headers on Digilent boards provide both 3.3V and 5.0V power supplies for Pmods. Make sure that the jumper next to the Pmod header is shorted to the 3.3V supply.

**Note:** For more information on the PmodALS, see the schematic at: [www.digilentinc.com](http://www.digilentinc.com). For a detailed review of the ADC081S021, including communication modes, please refer to the ADC081S021 Data Sheet available at [www.ti.com](http://www.ti.com).