

# VL-ZedBOARD : Zynq - 7000 Development Board + (Pmod +PCAM)

## Description

ZedBoard is a low-cost development platform based on the AMD Zynq™-7000 All Programmable SoC (AP SoC). It provides all the essential hardware required to design and deploy systems running Linux®, Android®, Windows®, or other OS/RTOS environments.

## FPGA / SoC

Device: Zynq XC7Z020-1CSG484CES

Architecture: Dual-core ARM® Cortex®-A9 with 7-series FPGA fabric

Integrated ADC: Dual-channel, 1 MSPS XADC

## Memory

DDR3 SDRAM: 512 MB (128M × 32)

QSPI Flash: 256 Mb

## Power

On/Off power switch

12 V @ 5 A external AC/DC adapter



## Programming & Debug

USB-JTAG programming using Digilent SMT1-equivalent circuit

JTAG access to Programmable Logic (PL)

Processing System (PS) JTAG pins accessible through PS Pmod

## Connectivity & Interfaces

10/100/1000 Mbps Ethernet

USB 2.0 OTG

SD Card slot

USB 2.0 Full-Speed USB-UART bridge

## Expansion & I/O

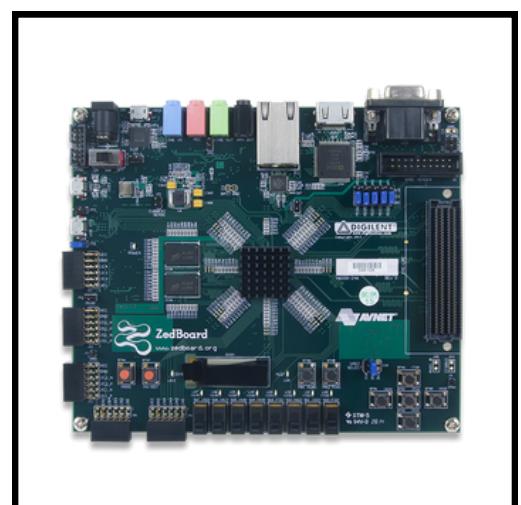
Five Digilent Pmod™ compatible headers (2 × 6)

1 × PS Pmod

4 × PL Pmods

One LPC FMC connector

One AMS header



## User Controls & Indicators

Reset Buttons: 2 (1 PS, 1 PL)

Push Buttons: 7 (2 PS, 5 PL)

Slide Switches: 8 (PL)

User LEDs: 9 (1 PS, 8 PL)

DONE LED: 1 (PL)

## On-Board Oscillators

33.333 MHz (Processing System)

100 MHz (Programmable Logic)

## Display & Audio

HDMI output

VGA output (12-bit color)

128 × 32 OLED display

Audio line-in, line-out, headphone, and microphone support

# Pmods And Pcams

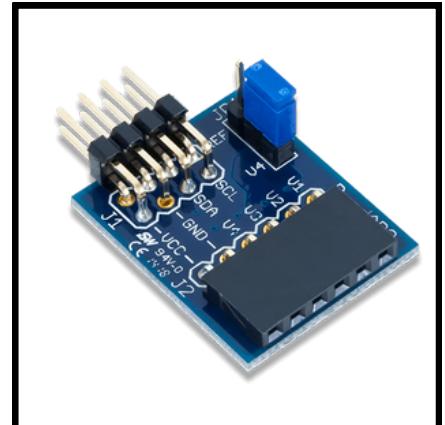
## Pmod AD2 – Analog-to-Digital Converter Module

### Description

The Pmod AD2 is an analog-to-digital converter powered by the Analog Devices AD7991. Users may communicate with the board through I2C to configure up to 4 conversion channels at 12 bits of resolution.

### Features

- Up to four 12-bit analog-to-digital converter channels
- On-board 2.048 V voltage reference
- Jumper selectable reference input
- Small PCB size for flexible designs – 1.0 in × 0.8 in (2.5 cm × 2.0 cm)
- Follows Digilent Pmod Interface Specification 1.0.0



### What's Included

- Pmod AD2
- Custom antistatic Pmod packaging

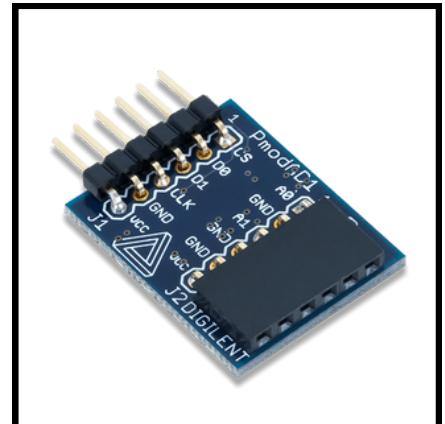
## Pmod AD1 – Analog-to-Digital Converter Module

### Description

The Digilent Pmod AD1 is a two channel, 12-bit analog-to-digital converter that features the Analog Devices AD7476A. With a sampling rate of up to 1 million samples per second, this Pmod is capable of excelling in even the most demanding audio applications.

### Features

- Two channel, 12-bit analog-to-digital converter
- Simultaneous A/D conversion at up to one MSa per channel
- Two 2-pole Sallen-Key anti-alias filters
- Small PCB size for flexible designs – 0.95 in × 0.8 in (2.4 cm × 2.0 cm)
- 6-pin Pmod connector with SPI interface



### Product Compliance

HTC: 8473301180

ECCN: EAR99

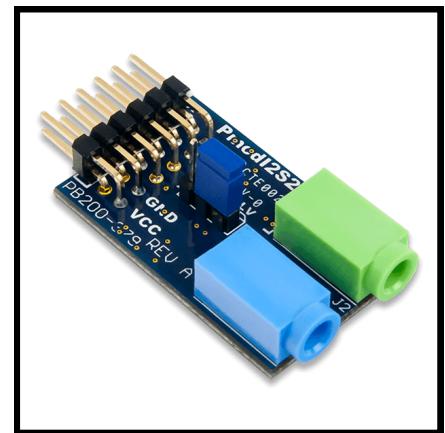
### What's Included

- Pmod AD1
- Custom antistatic Pmod packaging

## Pmod I2S2 – Audio Codec Module

### Description

The Digilent Pmod I2S2 features a Cirrus CS5343 Multi-Bit Audio A/D Converter and a Cirrus CS4344 Stereo D/A Converter, each connected to 3.5 mm audio jacks. These circuits allow a system board to transmit and receive stereo audio signals via the I2S protocol. The Pmod I2S2 supports 24-bit resolution per channel at input sample rates up to 108 kHz.



### Features

- Stereo 24-bit A/D and D/A converters for I2S audio input and output
- Standard 1/8" (3.5 mm) stereo audio jacks
- Optional automatic serial clock generation for audio input
- 12-pin Pmod port with two I2S interfaces
- Follows the Digilent Pmod Interface Specification 1.2

### Product Compliance

HTC: 8473301180

ECCN: EAR99

### What's Included

- Pmod I2S2
- Custom anti-static Pmod packaging

## Pmod AD5 – High-Precision Analog-to-Digital Converter Module

### Description

The Pmod AD5 is an analog-to-digital converter that utilizes a fourth-order sigma-delta modulator, a programmable gain array, and on-chip digital filtering, all powered by the Analog Devices AD7193. With 24 bits of resolution on up to 8 different analog input channels, users may read highly accurate voltage measurements with an RMS noise as low as 11 nV through SPI.



### Features

- High-precision 24-bit sigma-delta analog-to-digital converter
- 4 differential or 8 pseudo-differential input channels
- Ultra-low noise performance
- Programmable gain from 1 to 128
- Flexible digital filter with fast settling option
- Two SMA connectors
- Small PCB size for flexible designs – 1.9" x 0.8" (4.8 cm x 2.0 cm)
- 6-pin Pmod connector with SPI interface
- Follows Digilent Interface Specification Type 2

### What's Included

- Pmod AD5
- Custom antistatic Pmod packaging

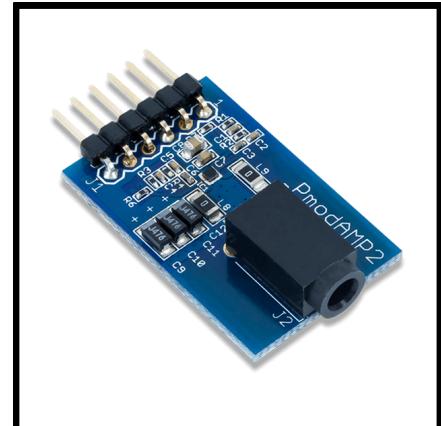
## Pmod AMP2 – Audio Amplifier Module

### Description

The Pmod AMP2 is a low-power audio amplifier through the use of the Analog Devices SSM2377. With digital gain options and a pop-and-click feature, users are able to drive a variety of monophonic outputs by providing a digital or analog signal.

### Features

- Filterless, high-efficiency audio amplifier
- Monophonic audio output
- Standard 1/8" (0.32 cm) mono speaker jack
- Micropower shutdown mode
- Pop-and-click suppression
- Digital gain select
- Small PCB size for flexible designs – 1.25" × 0.8" (3.2 cm × 2.0 cm)
- 6-pin Pmod connector with GPIO interface
- Follows Digilent Pmod Interface Specification Type 1



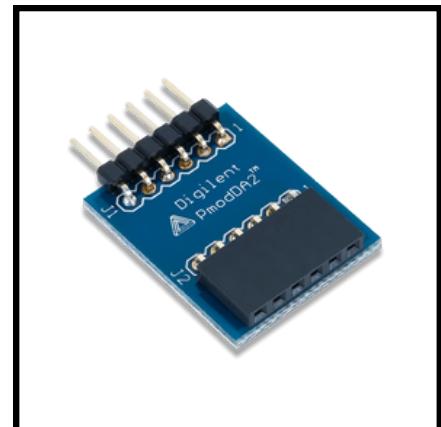
### What's Included

- Pmod AMP2
- Custom antistatic Pmod packaging

## Pmod DA2 – Digital-to-Analog Converter Module

### Description

The Pmod DA2 is a 12-bit digital-to-analog converter powered by the Texas Instruments DAC121S101. As it is able to simultaneously convert two separate channels of digital information provided over an interface similar to SPI, users can easily compare the two reconstructed signals.



### Features

- 12-bit digital-to-analog converter
- Two simultaneous conversion channels
- Very low power consumption
- Small PCB size for flexible designs – 1.0" × 0.8" (2.5 cm × 2.0 cm)
- 6-pin Pmod connector with GPIO interface
- Library and example code available in resource center

### What's Included

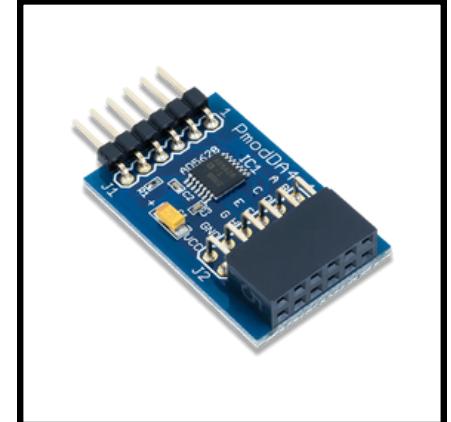
- Pmod DA2
- Custom antistatic Pmod packaging

## Pmod DA4 – Multi-Channel Digital-to-Analog Converter

### Module

#### Description

The Pmod DA4 is an 8-channel, 12-bit digital-to-analog converter powered by the Analog Devices AD5628. By communicating with the device through SPI, users may send different analog values on individual channels or output to all eight channels simultaneously.



#### Features

- 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" x 0.8" (3.0 cm x 2.0 cm)
- 6-pin Pmod connector with SPI interface
- Follows Digilent Interface Specification Type 2
- Example code available in resource center

#### What's Included

- Pmod DA4
- Custom antistatic Pmod packaging

## Pmod DA3 – High-Resolution Digital-to-Analog Converter

### Module

#### Description

The Pmod DA3 is a 16-bit digital-to-analog converter powered by the Analog Devices AD5541A. The single-ended SMA output provides a clean, guaranteed monotonic analog output from the information provided through an interface similar to SPI.



#### Features

- High-resolution, 16-bit digital-to-analog converter
- Low-noise analog output
- SMA connector
- 2.5 V reference voltage
- Small PCB size for flexible designs – 1.2" x 0.8" (3.0 cm x 2.0 cm)
- 6-pin Pmod connector with GPIO interface
- Follows Digilent Pmod Interface Specification Type 1

#### What's Included

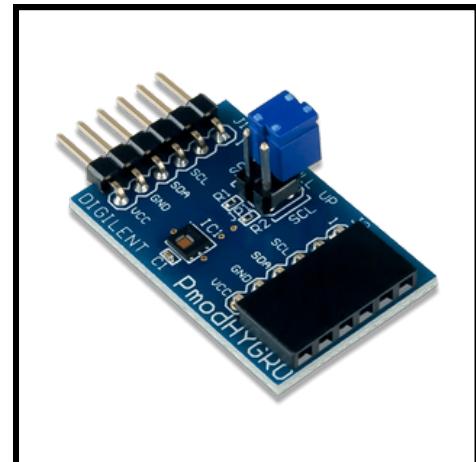
- Pmod DA3
- Custom antistatic Pmod packaging

## Pmod HYGRO – Humidity and Temperature Sensor Module

### Description

The Pmod HYGRO is a relative humidity sensor with an integrated temperature sensor for highly accurate measurements at low power. Using the Texas Instruments HDC1080, users can determine the relative humidity of the environment with up to 14 bits of resolution. The Pmod HYGRO is designed to digitally report relative humidity and ambient temperature upon request by the host board. Up to 14 bits of resolution for each sensor may be collected by allowing for longer conversion times. A resistive heating element can be enabled to test the sensor or to drive off condensation that accumulates on the sensor after prolonged exposure to high-humidity conditions.

Note: The Pmod HYGRO is also featured in the Arty S7 Pmod Pack, a bundle designed to expand project possibilities by utilizing a variety of peripheral modules well suited for the Arty S7 FPGA.



### Features

- Relative humidity accuracy:  $\pm 2\%$
- Temperature sensor accuracy:  $\pm 0.2^\circ\text{C}$
- Good stability at high humidity
- Up to 14-bit measurement resolution
- Internal resistive heating element
- 6-pin Pmod connector with I<sup>2</sup>C interface
- Pass-through Pmod host port for daisy chaining
- Library and example code available in the resource center

### What's Included

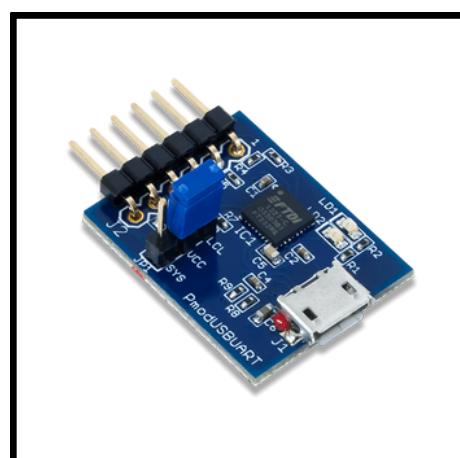
- Pmod HYGRO
- Custom antistatic Pmod packaging

## Pmod USBUART – USB to UART Interface Module

### Description

The Pmod USBUART provides a USB to UART cross-conversion through the FTDI FT232R. Users may send data in either direction on the Pmod and receive the converted data in the appropriate format.

Note: There are two UART signal pin assignment conventions in use on Digilent products. This product uses the new signal assignment convention. Connecting a product using the new convention with one using the old convention requires the use of a UART crossover cable (not included).



### Features

- USB to serial UART interface
- Micro USB connector
- Option to power the system board through the FTDI chip
- Small PCB size for flexible designs – 1.0"  $\times$  0.8" (2.5 cm  $\times$  2.0 cm)
- 6-pin Pmod connector with UART interface
- Follows the Digilent Pmod Interface Specification Type 4

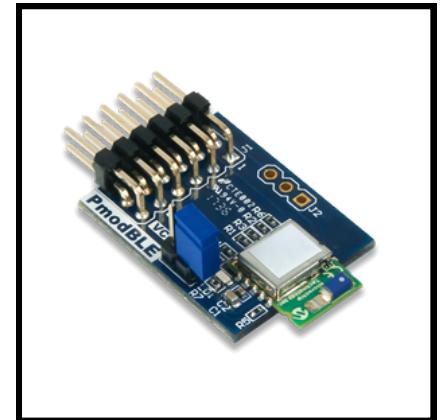
### What's Included

- Pmod USBUART
- Custom antistatic Pmod packaging

## Pmod BLE – Bluetooth Low Energy Module

### Description

The Digilent Pmod BLE is a powerful peripheral module designed for use with any UART-enabled development board. It uses the Roving Networks RN4871 to provide a fully integrated Bluetooth Low Energy interface. The onboard Bluetooth stack enables easy connection and communication with Bluetooth 4.x devices using simple UART commands. The module supports multiple built-in and customizable GATT services, making it a versatile, low-power wireless solution.



### Features

- Bluetooth Smart 4.2 BLE compatible
- Low-power Bluetooth radio for wireless connectivity
- ASCII command interface over UART
- UART transparent service for serial data streaming
- Secure communication with 128-bit AES encryption and whitelist capability
- Customizable GAP, GATT, SM, L2CAP, and integrated public profiles
- 12-pin Pmod port with UART interface

### Product Compliance

HTC: 8517620090

ECCN: 5A992.c

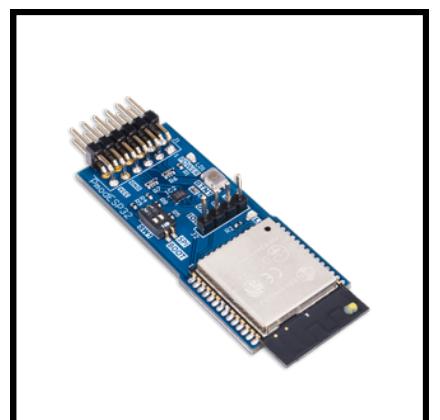
### What's Included

- Pmod BLE
- Custom anti-static Pmod packaging

## Pmod ESP32 – Wi-Fi & Bluetooth Communication Module

### Description

The Pmod ESP32 provides an easy and cost-effective way to add wireless communication to any host platform or project. It is based on a fully certified Espressif ESP32 module supporting Wi-Fi, Bluetooth, and Bluetooth Low Energy. The Pmod form factor allows rapid IoT prototyping using pre-loaded AT command firmware or direct evaluation of the ESP32 as a peripheral or standalone device.



### Features

- Wi-Fi, Bluetooth LE, and Bluetooth communication
- 20.5 dBm RF output power at the antenna
- User button for processor reset after mode switch
- User switch for UART / SPI interface selection
- Low-power sleep modes for battery-powered applications
- 12-pin Pmod connector with SPI and UART interfaces
- Follows Digilent Pmod Interface Specification Types 2A and 3A

### Product Compliance

HTC: 8471500150

ECCN: 5A992.c

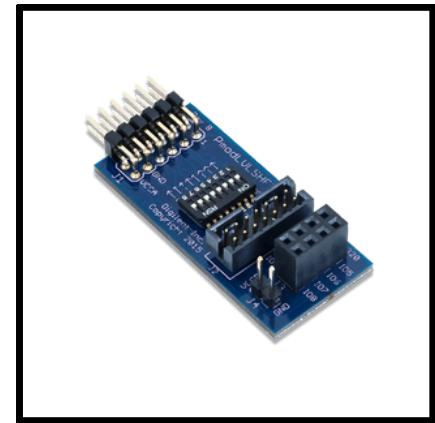
### What's Included

- Pmod ESP32
- Custom anti-static Pmod packaging

## Pmod LVLSHFT – Logic Level Shifter Module

### Description

The Digilent Pmod LVLSHFT is a digital logic level shifter based on the Texas Instruments SN74LVC1T45 transceiver. It is designed to translate logic signals between different voltage levels, making it ideal for applications such as JTAG programming or interfacing devices operating at different logic standards.



### Features

- Digital logic level shifter
- Translates logic signals between two user-supplied voltage levels
- 2 × 7 JTAG header
- Eight miniature switches for logic level configuration
- Supports voltage range from 1.8 V to 5.5 V
- Small PCB size for flexible designs – 1.8" × 0.8" (4.6 cm × 2.0 cm)
- 12-pin Pmod connector with GPIO interface

### What's Included

- Pmod LVLSHFT
- Custom anti-static Pmod packaging

## Pcam 5C – 5 MP Camera Module

### Description

The Pcam 5C is a high-performance camera module designed for use with Digilent FPGA and SoC development boards. It is based on the Omnivision OV5640 5-megapixel image sensor, featuring advanced image processing functions such as automatic white balance, black level calibration, and image enhancement controls. High-speed data transfer is achieved through a dual-lane MIPI CSI-2 interface.



### Features

- 5 MP color system-on-chip image sensor (OV5640)
- Dual-lane MIPI CSI-2 interface
- 15-pin FFC connector (Raspberry Pi compatible)
- Supports QSXGA@15 Hz, 1080p@30 Hz, 720p@60 Hz, VGA@90 Hz, QVGA@120 Hz\*
- Output formats: RAW10, RGB565, CCIR656, YUV422/420, YCbCr422, JPEG
- Standard M12 lens mount for interchangeable lenses
- Small PCB size for flexible designs – 4.0 cm × 2.5 cm
- 1 × 7 straight 100-mil header for auxiliary signals
- Compatible with Pcam-ready Digilent development boards

\* Only RAW10 format is officially supported by Digilent.

### Product Compliance

HTC: 8525803010

ECCN: EAR99

### What's Included

- Pcam 5C
- 10 cm ribbon cable
- Factory-installed fixed-focus lens
- Custom Digilent packaging