DIGILENT®

A National Instruments Company

Phoenix

Technologies Ltd.





Digilent Company Profile

Digilent Inc., a National Instruments company, is the world leader in academic and research technology solutions. We manufacture embedded development tools and test and measurement device for rapid prototyping and training.

Since our founding in 2000, Digilent has partnered with different leading semiconductor companies including Xilinx, Microchip, Analog Devices, Texas Instruments and Imagination Technologies to bring products with the latest embedded & electronics technology.

We also offer resources including teaching material, sample labs, shared curriculums that enable our educators to teach the latest technology. It's no wonder that our products can be found in over 1000 Universities in more than 70 countries! In addition, current engineers and makers can accelerate the hardware and system development through our tools.

Our expert team of engineers, combined with our manufacturing services and worldwide distribution has made us an ideal partner for several leading technology providers. Our services extend to providing design expertise, creating academic products for private label and even co-marketing a product into the academic space. We want to enable our partners to be successful through well designed, high quality and well manufactured hardware.

Digilent Activities

Design Automation Conference

The Design Automation Conference (DAC) is recognized as the premier conference for design and automation of electronic systems. At Digilent, our mission is to help create more engineers by providing development boards and instruments for rapid prototyping. Thus, we are present at DAC 2016 for the first time to highlight our new hardware platforms for engineers.

Embedded World

Digilent and its German distributor, Trenz Electronic, have participated Embedded World since 2009. We showcase the latest technology every year.

Digilent Design Contest EU

The Digilent Design Contest provides an opportunity for students from Europe to use the latest technology in electronics and digital design. It's the ideal place for students to be able to indulge their imaginations and to develop challenging projects. These projects are then shared with the community and then defended live in front of a jury comprised of industry and academic representatives.

Various workshops in Europe

Digilent held various workshops with their distributors and technology partners in Europe

Digilent Product Portfolio

FPGA Development Board

Instrumentation

Microcontroller Development Board

JTAG Programmer

Peripheral Modules (Pmod)

Software – LabVIEW Home

Digilent FPGA Development Board

Programmable logic technologies, such as field-programmable gate arrays (FPGAs), are an essential component of any modern circuit designer's toolkit. With their expansive capabilities uniquely suited to a wide array of applications, FPGAs are ideal for solving many of the problems facing the rapidly evolving technology sector. The key benefits of programmable logic technologies include immense flexibility, cost savings over custom silicon, and increased performance by hardware parallelism.

For over a decade, we have proudly worked with Xilinx to expand our expertise and facilitate the development of new and exciting technology. We provide training and research platforms through our partnership with the Xilinx University Platform, enabling aspiring engineers the world over. Together, we look forward to empowering the next generation of circuit designers!

Artix-7 FPGA Development Board

Kintex-7 FPGA Development Board

Zynq-7000 FPGA Development Board

Virtex-7 FPGA Development Board

Digilent Entry Level FPGA Boards Comparison

	Cmod S6	Cmod A7	Arty	Arty Z7-20	Basys 3	Nexys A7
Digilent Part Number	410-282	410-328/410-328-35	410-319	410-346-20	410-183	410-292
Actual Dimensions of the Board	0.7"x2.6"	0.7"x2.75"	3.4"x4.3"	3.5"x4.9"	2.8"x4.8"	4.3"x4.8"
FPGA						
FPGA Architecture	Spartan-6	Artix-7	Artix-7	Zynq-7000	Artix-7	Artix-7
Part Number for the IC	XC6SLX4-2CPG196	XC7A15T-1CPG236C XC7A35T-1CPG236C	XC7A35T-L1CSG324-1L	XC7Z020-1CLG400C	XC7A35T-1CPG236C	XC7A100T-1CSG324C
FPGA Family	XC6SLX4	XC7A15T XC7A35T	XC7A35T	XC7Z020	XC7A35T	XC7A100T
Integrated Processor	-	-	-	650 MHz Dual Arm Cortex™-A9	-	-
Number of Logic Slices	600	2600/5200	5200	13300	5200	15850
Number of DSP Slices	8*	45/90	90	220	90	240
Amount of On-Chip RAM	27 KB	112.5/225 KB	225 KB	630 KB	225 KB	607.5 KB
Number of Clock Management Tiles	2**	5	5	4	5	6
Available Options for Programming the FPGA	JTAG/ Quad-SPI Flash	JTAG/ Quad-SPI Flash	JTAG/ Quad-SPI Flash	JTAG/Quad-SPI Flash/ SD Card	JTAG/Quad-SPI Flash/USB MSD	JTAG/Quad-SPI Flash/ USB MSD/microSD
Support for XADC IP core	No	Yes	Yes	Yes	Yes	Yes
Off-Chip Memory						
Capacity of On-Board Static RAM	-	512 KB	-	-	-	-
Amount of DDR Memory	-	-	256 MB	512 MB	-	128 MB
DDR Revision/Version	-	-	DDR3L	DDR3	-	DDR2
DDR Bus Speed in transfers per second	-	-	667 MT/s	1050 MT/s	-	667 MT/s
Width of the DDR Bus	-	-	16 bit	16 bit	-	16 bit
Capacity of On-Board Flash Memory	16 MB	4 MB	16 MB	16 MB	4 MB	16 MB
Storage Expansion On-Board	-	-	-	microSD	-	microSD
Power Options						
Board can be Powered over USB	Yes	Yes	Yes	Yes	Yes	Yes
Board can be Powered with a Barrel Jack Connector	-	-	7-15 V	7V-15V	5V	4.5-5.5V
Board can be Powered through Header Pins	5-15V	3.3-5V	7-15 V	7V-15V	5V	4.5-5.5V
The Board has Power Monitoring Capability	No	No	Yes	No	No	No
The Board has another power input connection	-	-	-	-	-	-
USB Functionality						
Is there a USB-UART Bridge	No	Yes	Yes	Yes	Yes	Yes
Is there on-board JTAG programming circuitry	Yes	Yes	Yes	Yes	Yes	Yes
Is there a USB-HID Port	No	No	No	No	Yes	Yes
Is there a USB-OTG Port	No	No	No	Yes	No	No
Does the Board have Support for DPTI/DSPI or DEPP with Adept	DEPP	No	No	No	No	No
Available Communication						
Number of Ethernet ports	-	-	1 (100 Mbps)	1 (1000 Mbps)	-	1 (100 Mbps)
Number of Small form-factor pluggable transciever ports	-	-	-	-	-	-
PCI capabilities	-	-	-	-	-	-
Number of SATA ports	-	-	-	-	-	-
On-Board Video Connectivity						
Number of DisplayPort Connectors	-	-	-	-	-	-
Number of HDMI Connectors	-	-	-	1 Source, 1 Sink	-	-
VGA connector color bit depth	-	-	-	-	12 bit	12 bit
On-Board Audio Connectivity						
Audio Codec On-Board	-	-	-	-	-	-
Other Audio Peripherals	-	-	-	PWM Audio Output	-	PDM Microphone, PWM Audio Output
On-Board Interfaces						
Number of 7 Segment Digits	-	-	-	-	4	8
Number of On-Board Switches	-	0	4	2	16	16
Number of On-Board Push-Buttons	2	2	4	4	5	5
Number of On-Board LEDs	4	2 + 1 RGB	4 + 4 RGB	4 + 2 RGB	16	16 + 2 RGB
On-Board OLED Screens	-	-	-	-	-	-
Other Discrete On-Board I/O	-	-	-	-	-	3-axis Accelerometer, Temperature Sensor
On-Board Expansion Connectors						
Number of Pmod Connectors	-	1	4	2	4	5
Total Number of FPGA I/O Pins connected to Pmods (all I/O's are 3.3V)	-	8 I/O	32 I/O	16 I/O	32 I/O	40 I/O
Number of FMC's	-	-	-	-	-	-
Total Number of FPGA I/O Pins and Transcievers Connected to FMC's	-	-	-	-	-	-
Supported Voltages for FPGA I/O connected to FMC's	-	-	-	-	-	-
Other Expansion Connectors Available	-	DIP Pins	Arduino/chipKIT Shield Connector	Arduino/chipKIT Shield Connector	-	-
Total Number of FPGA I/O Pins and Transcievers Connected to Other Expansion	-	44 I/O (2 analog)*****	49 I/O (6 analog)*****	49 I/O (6 analog)*****	-	-
Supported Voltages for FPGA I/O connected to Other Expansion	-	3.3V	3.3V	3.3V	-	-
Accessories						
USB A to micro-B cable	-	-	-	-	-	1
12V 3A Power Supplies	-	-	-	-	-	-
Vivado Design Suite Voucher	-	-	-	-	-	-
4 GB SD Card	-	-	-	-	-	-

* DSP Blocks are DSP48A1
** CMT have 2 DCMs and 1 PLL
***These values are listed as base 2 values (Kibi/Mebi/Gibi). So 1KB=1024B and 1MB=1024KB
****For FPGA I/O, only pins connected to LA, HA, HB and CLK0-3 are counted. Additional FPGA I/O may be connected to other FMC pins
*****Several pins on this connector have been voltage-scaled and connected to XADC pins of the FPGA so that they can be used as single-ended 0-3.3V analog inputs
****** NetFPGA-1G-CML includes one PmodUSBUART and Two 1' Cat5e Ethernet cables

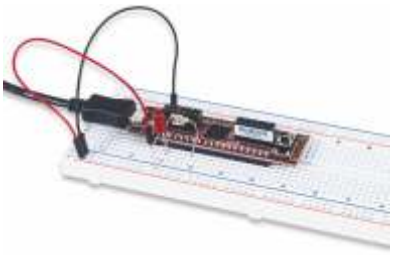
Digilent Application Specific FPGA Boards

	Nexys Video	Genesys 2	Zedboard	NetFPGA-1G-CML******	NetFPGA-SUME
Digilent Part Number	410-316	410-300	410-248	6015-410-001	410-301
Actual Dimensions of the Board	5.3"x5.3"	5.8"x6.8"	6.3"x6.3"	4.2"x7.7"	4.4"x9.8"
FPGA					
FPGA Architecture	Artix-7	Kintex-7	Zynq-7000	Kintex-7	Virtex-7
Part Number for the IC	XC7A200T-1SBG484C	XC7K325T-2FFG900C	XC7Z020-1CSG484CES	XC7K325T-1FFG676	XC7V690T-FFG1761-3
FPGA Family	XC7A200T	XC7K325T	XC7Z020	XC7K325T	XC7V690T
Integrated Processor	-	-	667 MHz Dual Arm Cortex™-A9	-	-
Number of Logic Slices	33650	50950	13300	50950	108300
Number of DSP Slices	740	840	220	840	3600
Amount of On-Chip RAM	1642.5 KB	2002.5 KB	630 KB	2002.5 KB	6615 KB
Number of Clock Management Tiles	10	10	4	10	20
Available Options for Programming the FPGA	JTAG/Quad-SPI Flash/ USB MSD/microSD	JTAG/Quad-SPI Flash/ USB MSD/microSD	JTAG/Quad-SPI Flash/	JTAG/BPI Flash/ USB MSD	JTAG/Parallel Flash
Support for XADC IP core	Yes	Yes	Yes	Yes	Yes
Off-Chip Memory					
Capacity of On-Board Static RAM	-	-	-	4.5 MB (QDR)	27 MB (QDR)
Amount of DDR Memory	512 MB	1 GB	512 MB	512 MB	8 GB
DDR Revision/Version	DDR3	DDR3	DDR3	DDR3	DDR3 SODIMM
DDR Bus Speed in transfers per second	800 MT/s	1800 MT/s	1066 MT/s	1600 MT/s	1700 MT/s
Width of the DDR Bus	16 bit	32 bit	32 bit	8 bit	128 bit
Capacity of On-Board Flash Memory	32 MB	16 MB	16 MB	-	-
Storage Expansion On-Board	microSD	microSD	SD	SD	-
Power Options					
Board can be Powered over USB	-	-	-	-	-
Board can be Powered with a Barrel Jack Connector	12V	12V	12V	-	-
Board can be Powered through Header Pins	12V	-	-	-	-
The Board has Power Monitoring Capability	No	Yes	Yes	Yes	Yes
The Board has another power input connection	-	-	-	2x3 PCI Auxiliary	2X3/2X4 PCI Auxiliary
USB Functionality					
Is there a USB-UART Bridge	Yes	Yes	Yes	No	Yes
Is there on-board JTAG programming circuitry	Yes	Yes	Yes	Yes	Yes
Is there a USB-HID Port	Yes	Yes	No	No	No
Is there a USB-OTG Port	No	Yes	Yes	No	No
Does the Board have Support for DPTI/DSPI or DEPP with Adept	DPTI/DSPI	DPTI/DSPI	No	No	No
Available Communication					
Number of Ethernet ports	1 (1000 Mbps)	1 (1000 Mbps)	1 (1000 Mbps)	4 (1000 Mbps)	-
Number of Small form-factor pluggable transciever ports	-	-	-	-	4 (10 Gbps)
PCI capabilities	-	-	-	PCIe Gen2 x4	PCIe Gen3 x8
Number of SATA ports	-	-	-	-	2 (6 Gbps)
On-Board Video Connectivity					
Number of DisplayPort Connectors	1 Source	1 Source, 1 Sink	-	-	-
Number of HDMI Connectors	1 Source, 1 Sink	1 Source, 1 Sink	1 Source	-	-
VGA connector color bit depth	-	16 bit	12 bit	-	-
On-Board Audio Connectivity					
Audio Codec On-Board	ADAU1761	ADAU1761	ADAU1761	-	-
Other Audio Peripherals	-	-	-	-	-
On-Board Interfaces					
Number of 7 Segment Digits	-	-	-	-	-
Number of On-Board Switches	8	8	8	-	-
Number of On-Board Push-Buttons	5	5	7	4	2
Number of On-Board LEDs	8	8	9	4	2
On-Board OLED Screens	128x32 Monochrome	128x32 Monochrome	128x32 Monochrome	-	-
Other Discrete On-Board I/O	-	-	-	-	-
On-Board Expansion Connectors					
Number of Pmod Connectors	4	5	5	2	1
Total Number of FPGA I/O Pins connected to Pmods (all I/O's are 3.3V)	32 I/O	40 I/O	32 I/O	16 I/O	8 I/O
Number of FMC's	1 Low Pin Count	1 High Pin Count	1 Low Pin Count	1 High Pin Count	1 High Pin Count
Total Number of FPGA I/O Pins and Transcievers Connected to FMC's	72 I/O + 1 Transciever (3.75 Gbps)	166 I/O + 10 Transcievers (10.3125 Gbps)	72 I/O	100 I/O + 4 Transcievers (6.6 Gbps)	72 I/O + 10 Transcievers (13.1 Gbps)
Supported Voltages for FPGA I/O connected to FMC's	1.2V, 1.8V, 2.5V, 3.3V	1.2V, 1.8V, 2.5V, 3.3V	1.8V, 2.5V, 3.3V	1.2V, 1.8V, 2.5V, 3.3V	1.8V
Other Expansion Connectors Available	-	-	AMS Connector	-	QTH Connector
Total Number of FPGA I/O Pins and Transcievers Connected to Other Expansion	-	-	8 I/O	-	8 Transcievers (13.1 Gbps)
Supported Voltages for FPGA I/O connected to Other Expansion	-	-	1.8V, 2.5V, 3.3V	-	-
Accessories					
USB A to micro-B cable	1	1	1	2	1
12V 3A Power Supplies	1	1	1	-	-
Vivado Design Suite Voucher	-	1	-	-	-
4 GB SD Card	-	-	1	-	-

* DSP Blocks are DSP48A1
** CMT have 2 DCMs and 1 PLL
***These values are listed as base 2 values (Kibi/Mebi/Gibi). So 1KB=1024B and 1MB=1024KB
****For FPGA I/O, only pins connected to LA, HA, HB and CLK0-3 are counted. Additional FPGA I/O may be connected to other FMC pins
*****Several pins on this connector have been voltage-scaled and connected to XADC pins of the FPGA so that they can be used as single-ended 0-3.3V analog inputs
****** NetFPGA-1G-CML includes one PmodUSBUART and Two 1' Cat5e Ethernet cables

Carrier Modules (Cmod)

The Digilent Cmod is FPGA & MCU in breadboard friendly DIP form factor and is perfect for rapid prototyping. A Cmod allows the user to choose what I/O they would like to have. The super tiny form-factor makes it easy to embed into a small project including digital logic circuits, processor designs, embedded systems or prototyping ASIC designs Users program Cmods simply through the built-in USB connection.



Compatible Pmod

Cmod S7

The Digilent Cmod S7 is a small, 48-pin DIP form factor board populated with 36 pins and built around a Xilinx Spartan-7 FPGA. The 32 FPGA digital I/O signals, 2 FPGA analog input signals, an external power input rail, and ground are routed to 100-mil-spaced through-hole pins, making the Cmod S7 well-suited for use with solderless breadboards. At just 0.7" by 3.05" inches, it can be loaded in a standard socket and used in embedded systems. The board also includes a programming ROM, clock source, USB programming and data transfer circuit, power supplies, LEDs, and buttons.

- Xilinx Spartan-7 FPGA (XC7S25-1CSGA225C)
- 4 MB Quad-SPI Flash
- 36 pins are populated on the four header
- 32 total FPGA I/O
- 2 Single-ended 0-3.3V analog inputs to XADC
- 2 pins are to power the board when it is not connected to USB host
- Powered from USB or 5V external supply connected to DIP pin 24
- General Purpose IO
- 2 Buttons
- 4 LEDs
- 1 RGB LED
- USB-JTAG programming circuitry
- USB-UART bridge
- One 12-pin Pmod connector

Compatible Pmod

Cmod A7

The Digilent Cmod A7 is a small, breadboard friendly 48-pin DIP form factor board built around a Xilinx Artix-7 FPGA. We offer two flavors - Cmod A7-15T and Cmod A7-35T. The only difference between the Cmod A7-15T and Cmod A7-35T is the capabilities of the FPGA found on the board.

- XC7A15T-1CPG236C for A15T / XC7A35T-1CPG236C for A35T
- USB-UART bridge
- GPIO: 2 LEDs, 1 RGB LED, 2 Push Buttons
- 48-pin DIP connector with 44 Digital I/O and 2 Analog inputs (0-3.3V)
- One Pmod connector with 8 Digital I/O
- USB-JTAG Programming Circuitry
- Powered from USB or external 3.3-5.5V supply connected to DIP pins

Related Items

Solderless Breadboard Kit: Large

- 3x 630 tie point terminal strips included
- 5x 100 tie point distribution strips included

Breadboard Wire Kit

- 140 pieces of pre-trimmed .22ga jumper wires, in various lengths and colors

USB A to Micro B cable

Digilent FPGA System Boards

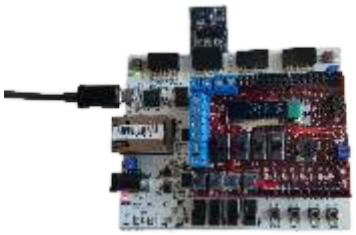
- Xilinx XC7A35T-1CPG236C
- Memory: 256MB DDR3, 16MB Quad-SPI Flash
- Digilent USB-JTAG port for FPGA programming
- Connectivity: USB-UART Bridge ,10/100 Mbps Ethernet
- Connectors: 4 Pmod connectors, Arduino/chipKIT Shield connector
- GPIO: 4 Switches, 4 Buttons, 1 Reset Button, 4 LEDs, 4 RGB LEDs
- Powered from USB or any 7V-15V source

Open source soft core processor
This Vivado IP Integrator project implements a Microblaze system with cores that communicate with all of the peripherals on the Arty A7. This design can be used as a catch all hardware design for most Microblaze applications using ARTY.

Arty A7

Arty A7 is a ready-to-use development platform designed around the Xilinx Artix-7™ an. It was designed specifically for use as a MicroBlaze Soft Processing System. When used in this context, Arty becomes the most flexible processing platform you could hope to add to your collection, capable of adapting to whatever your project requires. Unlike other Single Board Computers, Arty A7 isn't bound to a single set of processing peripherals: One moment it's a communication powerhouse chock-full of UARTs, SPIs, IICs, and an Ethernet MAC, and the next it's a meticulous timekeeper with a dozen 32-bit timers. Additionally, with the universally popular expansion headers (Arduino™ R3 Headers and our Pmod™ headers) make the board perfect for makers and hobbyists.

Pmod
Compatible Pmod



- Xilinx XC7A35T-1CPG236C
- USB HID Host for mice, keyboards and memory sticks
- 12-bit VGA output
- USB-UART Bridge
- Serial Flash
- Digilent USB-JTAG port for FPGA programming
- 4 Pmod ports: 3 Standard 12-pin Pmod ports, 1 dual purpose XADC signal / standard Pmod port
- GPIO: 16 user switches, 16 user LEDs, 5 user pushbuttons, 4-digit 7-segment display
- Powered from USB or any 5V source

Basys™3 Artix-7 FPGA Board

The Basys3 is an entry-level FPGA board designed exclusively for the Vivado Design Suite, featuring Xilinx Artix 7-FPGA architecture. The board consists of complete ready-to-use hardware, a large collection of on-board I/O devices, all required FPGA support circuits, and a free version of development tools. It is well suited for digital design including.

Pmod
Compatible Pmod

Basys 3 has been adopted by EE214 Design of Electronic Circuits at Washington State University. The class materials are open and available at http://www.eecs.wsu.edu/~ccole/ee214/projects.php

Basys3 Abacus Demo
The abacus demo can perform 4 arithmetic functions including subtraction, multiplication, division and modulo on two 8-bit numbers. This open-source project is based on Verilog HDL and perfect for beginners to understand the combinatorial and sequential logic design and arithmetic circuit. The abacus works by setting the slide switches to your desired operands and then selecting an operation with the buttons. The result will be displayed on the 7 segment display.

Digilent FPGA System Boards

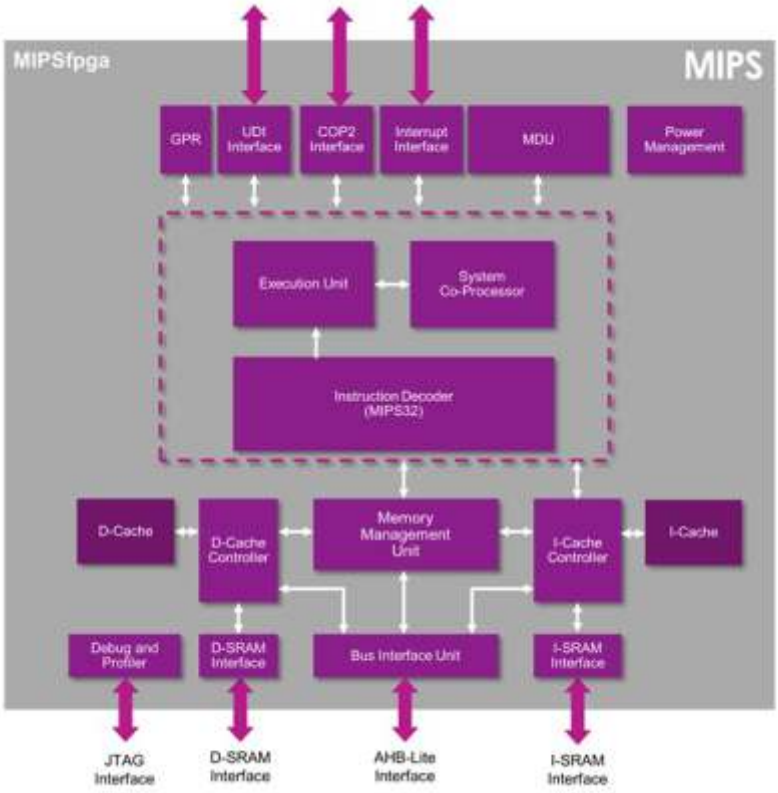
Pmod
Peripheral Modules
Compatible Pmod

Nexys A7

The Nexys A7 can host designs ranging from introductory combinational circuits to powerful embedded processors. Several built-in peripherals, including an accelerometer, a temperature sensor, MEMs digital microphone, speaker amplifier and plenty of I/O devices allow the Nexys A7 to be used for a wide range of embedded designs or digital systems without needing any other components.

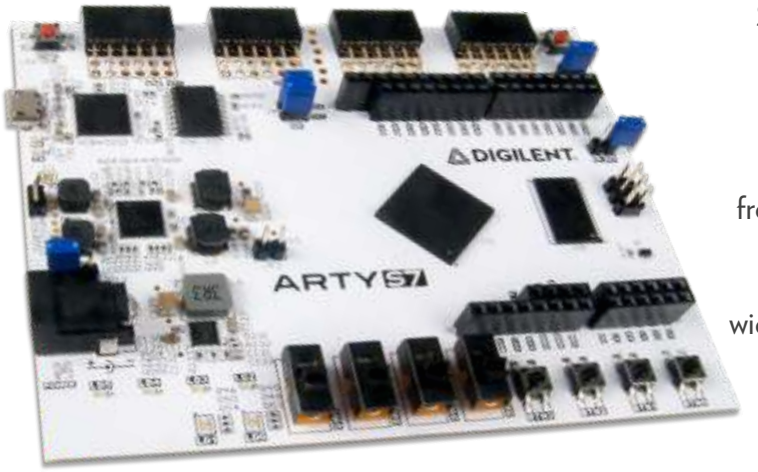
- XC7A100T-1CSG324C
- 128MiB DDR2
- Connectivity: USB-UART Bridge, USB HID Host ,10/100 Ethernet PHY
- On board sensors: 3-axis accelerometer &Temperature sensor
- Audio I/O: PDM microphone, PWM audio output
- 12-bit VGA output
- Connectors: Micro SD card connector, Four Pmod ports including Pmod for XADC signals
- Digilent USB-JTAG port for FPGA programming
- GPIO: 16 user switches, 6 user LEDs, Two 4-digit 7-segment displays, Two tri-color LEDs
- Powered from USB or any 5V source

Digilent MIPS Academic Program - Embedded Processor on Nexys A7
MIPSfpga is the real "industrial" RTL, non-obfuscated, and available freely for academic use. The core is a real configuration of the MIPS microAptiv family found in many embedded devices, including the popular PIC32MZ microcontroller from Microchip.
The MIPSfpga comes with compatibility to the Digilent Nexys A7. Stay Tune with Digilent MIPS academic program



Digilent FPGA System Boards

Arty S7: Spartan-7 FPGA Board for Makers and Hobbyists



The Arty S7 board features new Xilinx Spartan-7 FPGA and is the latest member of the Arty family for Makers and Hobbyists. The Spartan-7 FPGA offers the most size, performance, and cost-conscious design engineered with the latest technologies from Xilinx and is fully compatible with Vivado Design Suite. Putting this FPGA in the Arty form factor provides users with a wide variety of I/O and expansion options. Use the dual row Arduino® connectors to mount one of the hundreds of hardware compatible shields available, or use the Pmod ports with Digilent's pre-made Pmod IP blocks for a more streamlined design experience.

Arty S7 was designed to be MicroBlaze™ soft processor ready and comes out of the box ready to use with the Xilinx free WebPack. Additionally, with the on-chip analog-to-digital converter, users can configure up dual conversion channels at 12 bits of resolution on Arty S7.

- Arty S7 comes is two variants: XC7S25-CSGA324 FPGA or XC7S50-CSGA324
- Internal clock speeds over 450 Mhz
- 1 MSPS On-chip Analog-to-Digital Converter (XADC)
- Programmable Over JTAG and Quad-SPI Flash
- 256 MB DDR3L with 16-bit bus @ 667 Mhz
- 128 MB Quad-SPI Flash
- 100 MHz External Clock
- 4 Pmod™ Ports
- Two Standard 12-pin Pmod connectors
- Two High-speed 12-pin Pmod connectors
- USB-UART bridge
- Arduino/chipKIT Shield connector
- Powered from USB or any 7V-15 V external power source
- USB-JTAG Programming
- 4 Switches
- 4 Buttons, 1 Board Reset Button, 1 FPGA Reset Button (total 6)
- 4 Green LEDs, 2 RGB LEDs (total 6)

HD Video Processing FPGA Boards

The Digilent HD video processing board, powered by Xilinx latest 7 series FPGA, is targeted for high definition (HD) video acquisition, processing, and display applications. The built-in memory makes full HD video input and output stream seamlessly over the on-board mini Display or HDMI connectors. An FMC connector and four Digilent Pmod ports allow the addition of peripherals to further expand the functionality. An open source DisplayPort IP, created by a Digilent community member, is available. The video targeted reference design enables an immediate start to software, firmware and hardware development. With the High Level Synthesis in Xilinx Vivado free Webpack, users can accelerate the HD video processing design and implement it on Digilent hardware platform.

We have two flavors which are Nexys Video and Genesys 2

Open Source HD Video

Mandelbrot on Genesys 2

The Mandelbrot project uses about 100,000 flip-flops, 150,000 LUTs, and 640 DSP slices on Xilinx Kintex 7 FPGA. Each pixel is recalculated every time. The MMCM in Xilinx Vivado is used to generate various clocks in the system.
Details:
http://hamsterworks.co.nz/mediawiki/index.php/Genesys2_Mandelbrot

Open displayport IP on Nexys Video

A 1080p HDMI movie was fed to HDMI input port of the Nexys Video and then output video signals to a mini-DisplayPort and to the DisplayPort input of the 4K monitor. The video is displayed in 2160p (3840×2160) at 30Hz.
Details:
http://hamsterworks.co.nz/mediawiki/index.php/DisplayPort

HD Video Processing FPGA Boards

Nexys Video

- Artix-7™ XC7A200T
- Up to 3.75Gbps GTP transceivers
- Memory: 512MB 800MHz DDR3, User EEPROM, 32Mbyte quad-SPI flash
- Video I/O: HDMI sink and HDMI source, Mini DisplayPort source
- Audio codec w/ four 3.5mm jacks
- 10/100/1000 Ethernet PHY with included unique MAC address
- USB-UART bridge
- USB HID host
- Dedicated onboard USB port for JTAG programming and data transfers
- Fully-populated 160-pin FMC LPC connector
- microSD card slot for nonvolatile storage (card not included)
- Four Pmod™ ports including one for analog-to-digital converter (XADC)
- Onboard user interfaces: 128x32 monochrome OLED display, 5 user push buttons, 8 user switches, 8 user LEDs
- Includes USB A to micro-B programming cable and one 12V, 3A wall power supply with US and EU adapters

Pmod
Compatible Pmod

Genesys 2

- Kintex-7 XC7K325T-2FFG900C
- 200MHz oscillator
- Memory: 1Gb DDR3 (32 bit), 256Mb QSPI Flash
- Video: 1 HDMI sink and HDMI source, 1 Display port sink, Display Port source and 16-bit VGA output
- I2S Codec Audio Output
- 10/100/1000 Ethernet PHY
- 1 FMC High Pin Count Connector
- microSD card slot for nonvolatile storage (card not included)
- 4 Standard 12 pin Pmod connector including one for analog-to-digital converter (XADC)
- USB-UART Bridge
- USB HID Host and USB OTG
- Digilent USB-JTAG port for FPGA programming and communication
- On board user interface: 1 128x32 OLED Display, 8 user LEDs, 5 user pushbuttons
- Includes USB A to micro-B programming cable and one 12V, 3A wall power supply with US and EU adapters
- Includes USB A to Micro-B programming cable and one 12V, 3A wall power supply with US and EU adapters and Vivado Design Suite voucher

Pmod
Compatible Pmod

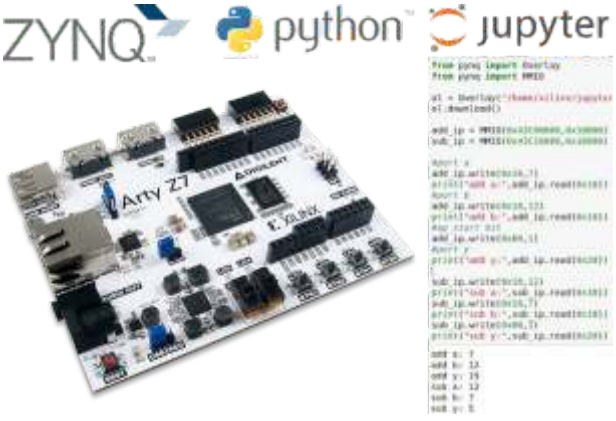
Zynq SoC ARM / FPGA Board

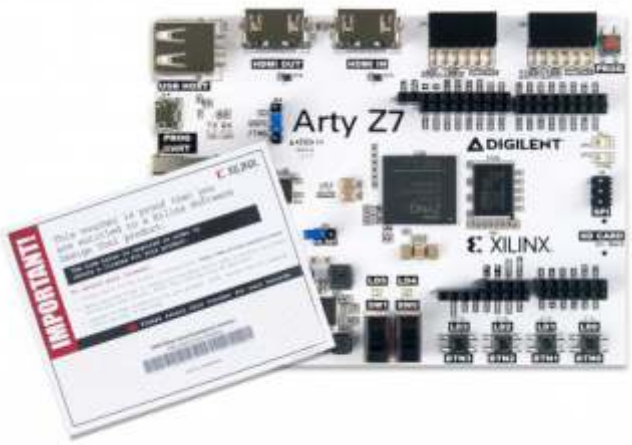
Digilent Zynq SoC platform is powered by Xilinx Zynq-7000 All Programmable SoC with a dual-core ARM® Cortex-A9 processor and the Xilinx 7-series FPGA. Users can build and include hardware accelerators in the programmable logic to meet bandwidth demanding applications, combined with industry leading ARM processor, lending itself to innovative, yet practical, applications including

- Embedded Linux
- Embedded Systems
- HD Video Processing
- RTOS development
- Motor Control
- Embedded Processing
- Software acceleration
- Signal Processing

Compatible to latest SDSoC™ Development Platform

Digilent Zynq SoC platform is compatible to the SDSoC™ development environment which provides a familiar embedded C/C++ application development experience including an easy to use Eclipse IDE and a comprehensive design environment. SDSoC delivers system level profiling, automated software acceleration in programmable logic, automated system connectivity generation, and libraries to speed programming.





Compatible to Python

A new open-source framework that enables embedded programmers to exploit the capabilities of Xilinx Zynq All Programmable SoCs (APSoCs) without having to design programmable logic circuits. Instead, the APSoC is programmed using Python and the programmable logic circuits are imported as hardware libraries and programmed through their APIs in essentially the same way that the software libraries are imported and programmed.

Python for Zynq

Arty Z7

Digilent Arty Z7-20 is perfect for software, hardware, and systemdevelopers to build Embedded Vision applications.
The Arty Z7-20 enables maker pros, engineers, system integrators and designers to get started quickly on their embedded vision designs. The ready-to-use development platform builds on Xilinx All Programmable SoC Zynq 7020. It is targeted at custom video applications and capable of real-time video processing through the on board 512MB DDR3 and HDMI inputs and outputs.

User can use SDSoC™ development environment from Xilinx, which provides a C/C++ ASSP-like programming experience to improve productivity for system architecture definition and application development. The combined a versatile Arty Z7-20 hardware platform with SDSoC, software development tools can let users build a range of embedded vision systems.

- Zynq-7000 AP SoC XC7Z020-1CLG400C
- 512MB DDR3 with 16-bit bus @ 1050Mbps
- 16MB Quad-SPI Flash with factory programmed
- HDMI sink port (input)
- HDMI source port (output)
- PWM driven mono audio output with 3.5mm jack
- High-bandwidth peripheral controllers: 1G Ethernet, USB 2.0,
- Programmable from JTAG, Quad-SPI flash and microSD card
- Two standard Pmod ports including 6 Single-ended 0-3.3V Analog inputs to XADC 4 and Differential 0-1.0V Analog inputs to XADC
- Arduino/chipKIT Shield connector
- Powered from USB or any 7V-15V external power source

Target Applications:

1. Embedded Vision
2. Embedded Systems
3. Motor Control

PYNQ Z1

Python Productivity for Zynq - A Special Project from Xilinx University Program

The PYNQ-Z1 board is designed to be used with PYNQ, a new open-source framework that enables embedded programmers to exploit the capabilities of Xilinx Zynq All Programmable SoCs (APSoCs) without having to design programmable logic circuits. Instead, the APSoC is programmed using Python and the code is developed and tested directly on the PYNQ-Z1. The programmable logic circuits are imported as hardware libraries and programmed through their APIs in essentially the same way that the software libraries are imported and programmed.

The PYNQ-Z1 board is the hardware platform for the PYNQ open-source framework. The software running on the ARM A9 CPUs includes:

- Web server hosting the Jupyter Notebooks design environment
- The IPython kernel and packages Linux
- Base hardware library and API for the FPGA
- For designers who want to extend the base system by contributing new hardware libraries, Xilinx Vivado WebPACK tools are available free of cost.

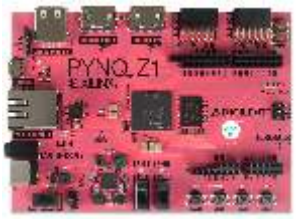
To find out more about PYNQ, please see the project webpage at www.pynq.io. Here you will find materials to help you get started and a forum for contacting the supporting community.

- ZYNQ XC7Z020-1CLG400C 512MB DDR3 with 16-bit bus @ 1050Mbps 6MB Quad-SPI Flash with factory programmed globally unique identifier (48-bit EUI-48/64™ compatible).
- Powered from USB or any 7V-15V source (see recommended products)

- USB-JTAG Programming circuitry
- USB-UART bridge
- USB OTG PHY (supports host only)
- Gigabit Ethernet PHY
- Electret microphone with pulse density modulated (PDM) output 3.5mm mono audio output jack, pulse-width modulated (PWM) format
- HDMI sink port (input) and HDMI source port (output)
- 4 push-buttons
- 2 slide switches
- 4 LEDs
- 2 RGB LEDs
- Two standard Pmod ports
- Arduino/chipKIT Shield connector

Target Applications:

1. Embedded Vision
2. Embedded Systems
3. Motor Control



Cora Z7: Zynq-7000 Single Core and Dual Core Options for ARM/FPGA SoC Development

The Digilent Cora Z7 is a ready-to-use, low-cost, and easily embeddable development platform designed around the powerful Zynq-7000 All-Programmable System-on-Chip (APSoC) from Xilinx. The Zynq-7000 architecture tightly integrates a single or dual core 667MHz ARM Cortex-A9 processor with a Xilinx 7-series FPGA. This pairing grants the ability to surround the processor with a unique set of software-defined peripherals and controllers, tailored for the target application.

The Cora Z7's wide array of hardware interfaces, from a 1Gbps Ethernet PHY to analog-to-digital converters and general-purpose input/output pins, make it an ideal platform for the development of a vast variety of embedded applications. The small form factor and mounting holes make the Cora Z7 ready to be used as one component of a larger solution. The on-board SD Card slot, Ethernet, and Power solution allow the Cora Z7 to operate independently of a host computer.

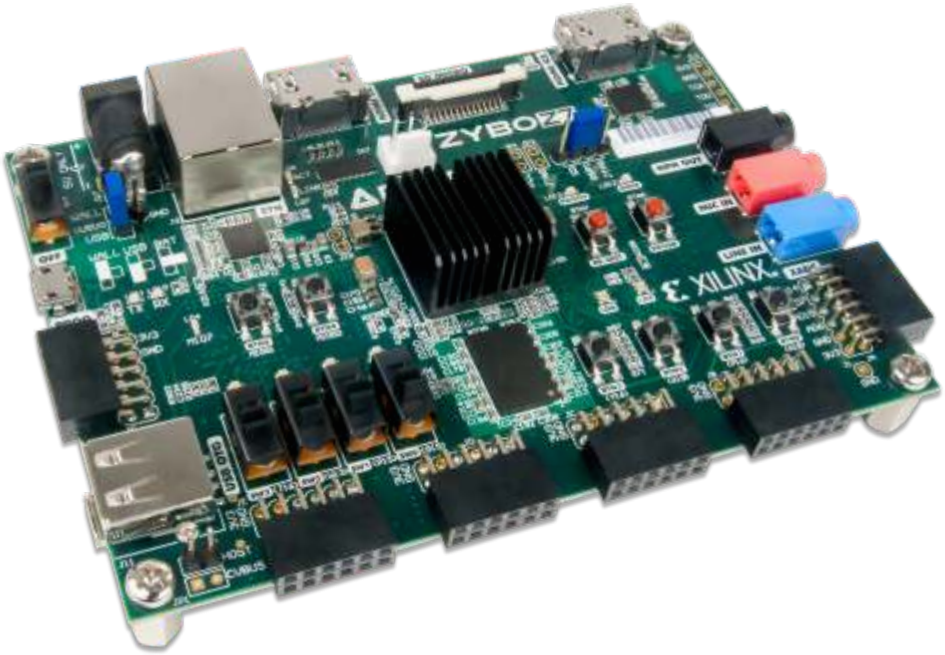
Product Variant	Cora Z7-07S	Cora Z7-10
Zynq Part	XC7Z010-1CLG400C	XC7Z007S-1CLG400C
ARM Processor Cores	2	1
1 MSPS On-chip ADC	Yes	Yes
Look-up Tables (LUTs)	17,600	14,400
Flip-Flops	35,200	28,800
Block RAM	270 KB	225 KB
Clock Management Tiles	2	2

Full support for Vivado and Petalinux design environments
667 MHz Cortex-A9 processor with tightly integrated Xilinx FPGA (option between Dual Core and Single Core options)
512 MB DDR3 memory
Arduino shield and Pmod connectors for add-on hardware devices
USB and Ethernet connectivity
Large array of general purpose input/output ports for any number of different custom solutions
Small form factor and mounting holes
Programmable from JTAG and microSD card

ZYBO Z7 Zynq-7000 ARM/FPGA SoC Platform

Accelerate Embedded Software Development. Hardware-Software Co-Design

The Digilent ZYBO Z7 is the newest addition to the popular ZYBO line of ARM/FPGA SoC Platform. ZYBO Z7 comes in two Xilinx Zynq-7000 variants: ZYBO Z7-10 features Xilinx XC7Z010-1CLG400C. ZYBO Z7-20 features the larger Xilinx XC7Z020-1CLG400C.



The ZYBO Z7 surrounds the Zynq with a rich set of multimedia and connectivity peripherals to create a formidable single-board computer, even before considering the flexibility and power added by the FPGA. Hardware designer and software developer can seamlessly integrate your FPGA and CPU functionality. The ZYBO Z7's video-capable feature set includes a MIPI CSI-2 compatible Pcam connector, HDMI input, HDMI output, and high DDR3L bandwidth. Attaching additional hardware is made easy by the ZYBO Z7's Pmod connectors, allowing access to Digilent's catalog of over 70 Pmod peripheral boards, including motor controllers, sensors, displays, and more. ZYBO Z7-20 comes with SDSoC voucher.

- Xilinx XC7Z010-1CLG400C / XC7Z020-1CLG400C
- 1 GB DDR3L with 32-bit bus @ 1066 Mhz
- 16 MB Quad-SPI Flash
- Gigabit Ethernet PHY
- USB OTG PHY with host and device support
- Pcam camera connector with MIPI CSI-2 support
- HDMI sink port (input)
- HDMI source port (output)
- Audio codec with stereo headphone, stereo line-in, and microphone jacks
- Pmod connectors
- Powered from USB or any 5V external power source
- ZYBO Z7-20 comes with SDSoC voucher

The SDSoC™ development environment provides a familiar embedded C/C++ application development experience including an easy to use Eclipse IDE and a comprehensive design environment for heterogeneous Zynq® All Programmable SoC.

HD Video Processing Ecosystem

Pcam 5C: 5 MP Fixed Focus Color Camera Module

Target Applications:

- Mobile Phone
- Entertainment
- Digital Still and Video Camera

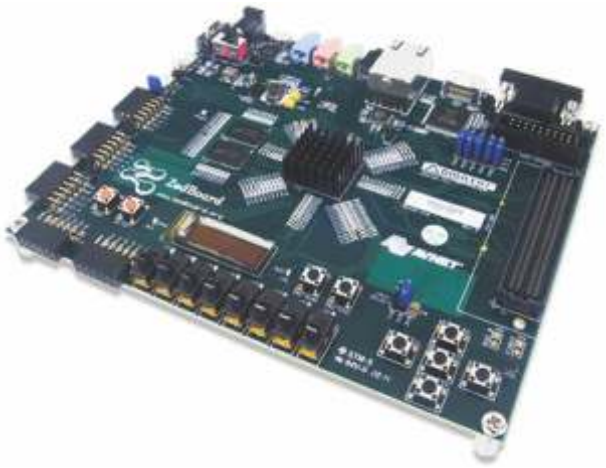
The Pcam 5C is an imaging module meant for use with FPGA development boards. The module is designed around the Omnivision OV5640 5 megapixel (MP) color image sensor. This sensor includes various internal processing functions that can improve image quality, including automatic white balance, automatic black level calibration, and controls for adjusting saturation, hue, gamma and sharpness. Data is transferred over a dual-lane MIPI CSI-2 interface, which provides enough data bandwidth to support common video streaming formats such as 1080p (at 30 frames per second) and 720p (at 60 frames per second). The module is connected to the FPGA development board via a 15-pin flat-flexible cable (FFC). The Pcam 5C comes with a set of open source Vivado IP cores on FPGA and Zynq host boards, a 10 cm flat-flexible cable and a factory-installed fixed focus lens with M12 lens mount, so it is ready to use out of the box.

- 5MP color system-on-chip image sensor Omnivision Ov5640
- 15-pin FFC connector for image data
- Dual lane MIPI CSI-2 image sensor interface
- Supports QSXGA@15Hz, 1080p@30Hz, 720p@60Hz, VGA@90Hz and QVGA@120Hz
- Output formats include RAW10, RGB565, CCIR656, YUV422/420, YCbCr422, and Standard M12 lens mount for lens interchangeability
- Ships with 10 cm cable and factory installed fixed-focus lens
- Small PCB size for flexible designs (4.0 cm x 2.5 cm)
- 1×7 straight 100-mil header for access to auxiliary camera signals
- Works with Pcam compatible Digilent development boards
- *JPEG compressed output is a feature of the OV5640, but is currently untested on this module

Zynq SoC ARM / FPGA Board

ZedBoard

Compatible Pmod

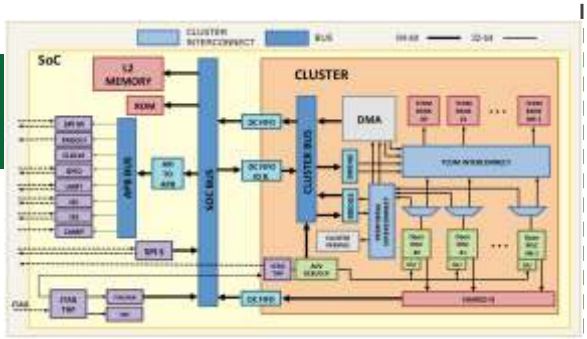


- Zynq-7000 AP SoC XC7Z020-CLG484
- Memory: 512 MB DDR3, 256 Mb Quad-SPI Flash, 4 GB SD card
- Video I/O: 1080p HDMI, 8-bit VGA
- I2S Audio CODEC
- 10/100/1000 Ethernet PHY
- USB OTG 2.0 and USB-UART
- 128 x 32 OLED Display
- Low-pin count (LPC) FMC connector
- Six Pmod™ ports including one for analog-to-digital converter (XADC)
- GPIO: 6 pushbuttons, 8 slide switches, 8 LEDs
- Onboard USB-JTAG Programming
- Includes Micro-USB cable, 12 V AC/DC power supply (UK plug adapter not included)

ZedBoard is built around Zynq-7000 AP SoC XC7Z020-CLG484. This board contains everything necessary to create a Linux, Android, Windows® or other OS/RTOS based design. Additionally, several expansion connectors expose the processing system and programmable logic I/Os for easy user access. User can start first hardware design on Zynq through getting started guide

Free 32-bit processor (PULP) core based on RISC-V plus peripherals with ZedBoard

PULP (Parallel Ultra-Low-Power Processing-Platform) is a joint project between the Integrated Systems laboratory (IIS) of ETH Zurich (IIS) and the Energy- efficient Embedded Systems (EEES) group of UNIBO to develop an open, scalable hardware and software research platform.
Available at http://www.pulp-platform.org/



Related Items

Zynq SDSoC voucher

- This voucher is only for use with the ZedBoard or Zybo. To download SDSoC development too, please visit http://www.xilinx.com/products/design-tools/software-zone/sdsoc.html

HD Video Processing Ecosystem

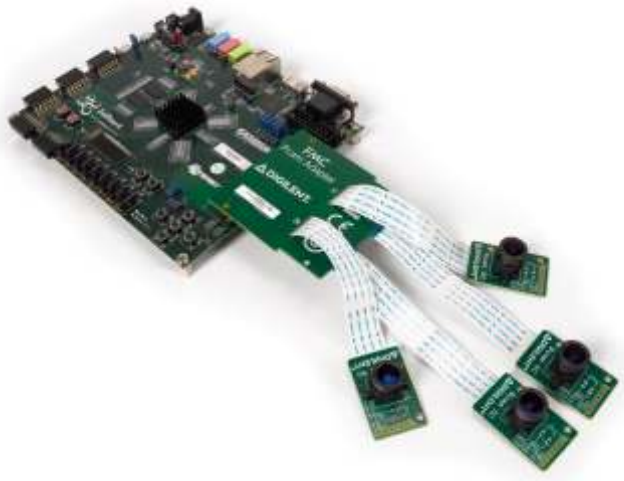
FMC Pcam Adapter

The FMC Pcam (CSI-2 interface) Adapter is a cost-effective way to add cameras to your FPGA or APSoC development board with the high speed, FMC connector. The FMC Pcam Adapter is designed to work with Digilent's Pcam camera solutions and comes in two versions: dual (to connect two cameras) and a quad (to connect four).

The FMC Pcam Adapter enables designers to develop multiple camera systems by allowing the attachment of low-cost camera modules to higher speed development boards. Application areas include: developing higher speed engines for video processing, advanced video algorithms, video content analysis, processing digital video in real time, intelligent vision solutions, and any embedded vision application.

On board the FMC Pcam Adapter are system-side connectors which use level translators from MIPI-FPHY to LVDS and LVCCMOS. It is compatible with a VADJ voltages 1.8 – 3.3V. To read more about the technical specifications, please visit the FMC-Pcam Adapter Reference Manual.

- Two/Four Pcam system-side connectors
- Level translators from MIPI D-PHY to LVDS and LVCMOS
- Male FMC LPC connector for digital signals
- Compatible with a wide range of V_{ADJ} voltages (1.8V – 3.3V)



Because of the clocking sensitivity to video processing solutions, we recommend that you check your host board (carrier cards's) FMC specifications to determine if the FMC Pcam Adapter will work for you.

If you are using Digilent System Boards, the FMC Pcam Adapter is compatible with the following FMC enabled Digilent Boards: ZedBoard, Nexys Video, Genesys 2, and NetFPGA-1G-CML.

High Performance Networking Solutions

The NetFPGA project is a group to develop open source hardware and software for rapid prototyping of high-speed, hardware-accelerated networking systems. The NetFPGA project is enabled by Field Programmable Gate Array (FPGA) technology so that users can process packets at line-rate. Open source materials developed by the group or contributed by community members are at www.netfpga.org

- Xilinx Virtex-7 690T
- Four SFP+ interface (4 RocketIO GTH transceivers) supporting 10Gbps
- PCI-E Gen3 x8 (8Gbps/lane)
- Two 512Mbits Micron StrataFlash (PC28F512G18A)
- Xilinx CPLD XC2C512 for FPGA configuration
- QTH Connector (8 RocketIO GTH transceivers)
- Two SATA-III ports
- One HPC FMC Connector (10 RocketIO GTH transceivers)
- Three x36 72Mbits QDR II SRAM (CY7C25652KV18-500BZC)
- Two 4GB DDR3 SODIMM (MT8KTF51264Hz-1G9E1)
- Digilent USB-JTAG port for FPGA programming
- User LEDs and Push Buttons

NETFPGA-SUME

Pmod
Compatible Pmod

The NetFPGA-SUME board is the ideal development board for high-performance and high density networking design. It is powered by Xilinx Virtex-7 690T which is optimized for system performance and integration. The platform has been used in academic and industrial researches including networks security, software defined networking, high-performance network systems. Researchers from University of Cambridge and Stanford University have published a paper "NetFPGA SUME: Toward 100Gbps as Research Commodity" in IEEEExplore. In the paper, the author pointed out that NetFPGA SUME can be used as a true 300Gb/s fully non-blocking un-managed Ethernet switch. NetFPGA SUME provides an important technology by serving as a platform for novel datacenter interconnect architectures.

- Xilinx Kintex®-7 XC7K325T-1FFG676 FPGA
- 200 MHz oscillator
- Four 10/100/1000 Ethernet PHYs with RGMII
- X4 Gen 2 PCI Express
- X16 4.5 MB QDRII+ static RAM (450 MHz)
- X8 512 MB DDR3 dynamic RAM (800 MHz)
- 1 Gbit BPI Flash
- Crypto-authentication chip
- High pin count FMC connector
- Two Pmod™ connectors
- SD card slot
- GPIO: Four LEDs and four push buttons
- Digilent USB-JTAG port for FPGA programming
- Powered using a standard ATX power supply with PCIe 6 pin or 6pin+2 connector
- Includes USB micro cables, Pmod USBUART & Cat5e Ethernet cables

NetFPGA-1G-CML

Pmod
Compatible Pmod

The NetFPGA-1G-CML is a versatile, network hardware development platform featuring a Xilinx Kintex®-7 XC7K325T FPGA and includes four Ethernet interfaces capable of negotiating up to 1 GB/s connections. The NetFPGA-1G-CML is designed to support the Stanford NetFPGA architecture. 512 MB of 800 MHz DDR3 can support high-throughput packet buffering while 4.5 MB of QDRII+ can maintain low-latency access to high demand data, like routing tables. Rapid boot configuration is supported by a 128 MB BPI Flash, which is also available for non-volatile storage applications. The standard PCIe form factor supports high speed x4 Gen 2 interfacing. The FMC carrier connector provides a convenient expansion interface for extending card functionality via Select I/O and GTX serial interfaces. The FMC connector can support SATA-II data rates for network storage applications. The FMC connector can also be used to extend functionality via a wide variety of other cards designed for communication, measurement, and control.

It is fully compatible with Xilinx Vivado and ISE Design Suites as well as the Xilinx SDK for embedded software design. The reference designs are available through the NetFPGA GitHub Organization (http://www.github.com/cmlab/netfpga-1g-cml/wiki).

JTAG Programmers

Programming Solutions

Digilent produces a variety of high-speed JTAG and SPI USB2 programming solutions that work seamlessly with all Xilinx tools. Our free Adept software allows custom applications to drive JTAG and SPI operations, and to exchange data with target systems.



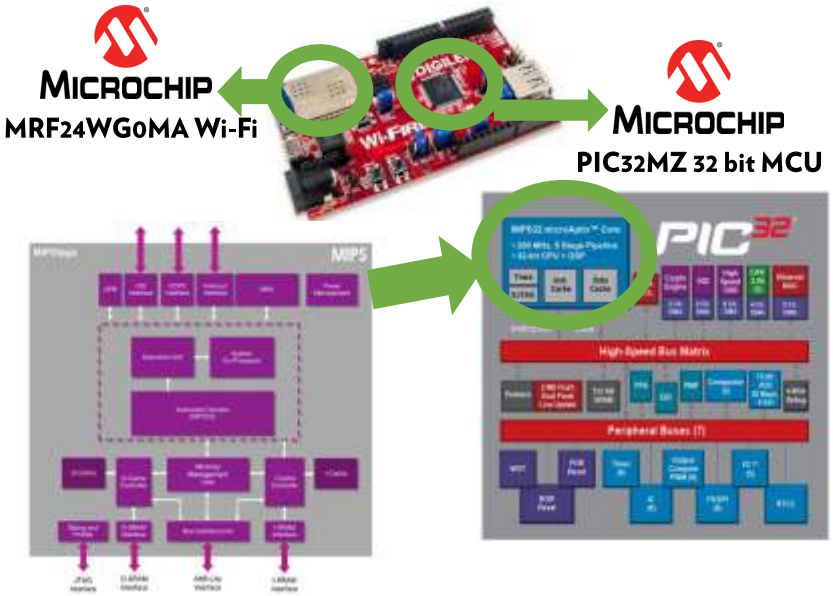

	JTAG-SMT2-NC	JTAG-SMT2	JTAG-HS3	JTAG-HS2
Max Speed	30 Mhz	30 Mhz	30 Mhz	30 Mhz
Voltage Range	1.8 - 5 V	1.8 - 5 V	1.8 - 5 V	1.5 - 5 V
Xilinx Native Support	ISE 14.1+ Vivado2013.1+	ISE 14.1+ Vivado2013.1+	ISE 14.1+ Vivado2013.1+	ISE 13.2+ Vivado 2012.1+
Xilinx Plug-in Support	ISE 13.1+	ISE 13.1+	ISE 12.1+	ISE 12.1+
Digilent Adept Support	✓	✓	✓	✓
PC Interface	USB	USB	USB	USB
Onboard USB Connector	✗	✓	✓	✓
Target Board Connector Interface	13-Pad SMT	11-Pad SMT	14-Pin	6-Pin,14-Pin
4-Wire JTAG	✓	✓	✓	✓
2-Wire JTAG	✓	✓	✗	✓
ZYNQ-7000 PS_SRST Support	✓	✓	✓	✗
SPI Support	✓	✓	✗	✓

Digilent MIPS Academic Program - The Connected Microcontroller Lab

This semester-long course is based on Wi-Fire. It takes students through the basic microcontroller and I/O, through real-time operating system concepts and advanced processor architecture, and finally into cloud connectivity.

Why 32-bit?

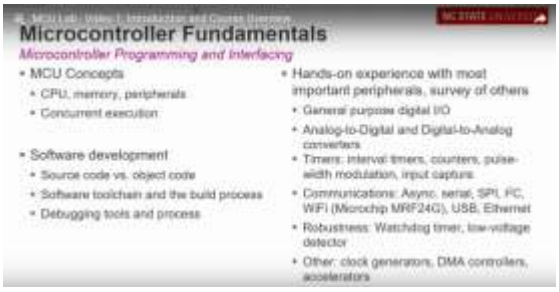
Connecting an embedded system to the cloud to create an IoT device demands significant processing resources and code support. 32 bit microcontrollers without the complexity of Linux are in the "sweet spot" of providing powerful resources whilst simplifying software issues. Industry has a growing need for embedded systems developers and the requirements for connectivity are driving a rapid transition to 32 bit.



Topics

- Embedding a computer in a system – Why and how?
- Fundamentals: MCUs vs. computers, connectivity, hardware and software.
- Software Design: Concepts, tools and debugging.
- Basic Digital I/O Ports: Reading switches and lighting LEDs.
- Basic Concurrency: Concepts, run-to-completion tasks and interrupts.
- Using Peripherals: Analog interfacing, timing & counting, communications, interfacing with Arduino shields
- Advanced Concurrency: Concepts of task pre-emption and real-time kernels, building multithreaded applications with semaphores, mutexes and queues on FreeRTOS.
- Improving CPU throughput: What's under the hood? Processor architecture, memory systems & caches, software analysis & optimisation
- IoT: Overview, Cloud services, building a Cloud system

A series of lab videos available in Digilent YouTube Channel!



PIC 32 Microcontroller Board

Multi-Touch Display Shield Smart Display

The Multi-Touch Display Shield is a gorgeous 2.8" touchscreen display with a powerful on-board microcontroller that performs graphics processing tasks. The display is a capacitive touchscreen with QVGA resolution (320×240) and 2 finger multi-touch support.
The most compelling aspect of the Multi-Touch Display Shield is the programming experience provided by its Multi-TouchDisplay System (MTDS) Firmware and the associated libraries. These allow you to design sleek, stylish user interfaces quickly and with very little code. The timing dependent tasks are handled by the firmware, so integrating the display into existing projects is also a snap. Some of the key functionality provided by the libraries include the ability to draw basic shapes and text, draw images stored on microSD with binary transparency, draw buttons and easily check if they have been pressed, and check the status and location of the user's two fingers. The libraries are supported in Arduino IDE and Xilinx SDK, and have been tested with Ardiuno, chipKIT, and Arty host boards.

- 2.8" QVGA (320x240) display
- 16 bits per pixel color
- 2 point capacitive multi-touch
- 200MHz, 32-bit PIC32MZ based graphics driver
- On-board libraries with 100+ API functions
- microSD memory card slot

WiFire™ IoT

The Wi-FIRE is powered by the latest PIC32MZ with 200MHz operation speed, 2MB of Flash, 512kB RAM, High Speed USB and a 50MHz SPI. User can make use of the Wi-FIRE and Imagination Technologies' Creator IoT Framework to implement the IoT application.

- Microchip® PIC32MZ2048EFG100 (200 Mhz 32-bit MIPS, 2M Flash, 512K SRAM)
- Microchip MRF24WG0MA WiFi module
- 80Mhz operating frequency
- Micro SD card connector
- 50 MHz SPI
- USB 2.0 Full-Speed / Hi-Speed OTG controller with A and micro-AB connectors
- 43 available I/O pins
- 12 analog inputs
- 3.3V operating voltage
- 7V to 15V input voltage (recommended)
- 30V input voltage (maximum)
- 0V to 3.3V analog input voltage range
- High efficiency, switching 3.3V power supply providing low power operation

Basic I/O Shield

Pmod
Compatible Pmod

The Basic I/O Shield is an input/output expansion board designed for use with PIC 32 microcontroller boards. The Basic I/O Shield is designed to provide a range of input/output devices suitable for beginners learning about microcontrollers and various types of I/O devices, or for use by more advanced user to provide inputs or outputs for their own projects.

- 256Kbit I2C EEPROM
- 128x32 pixel OLED graphic display
- I2C temperature sensor
- I2C daisy chain connector
- 4 open drain FET drivers
- Analog potentiometer
- 4 push buttons & 4 slide switches
- 8 discrete LEDs

Pro MX7

Pmod
Compatible Pmod

The Pro MX7 is the perfect PIC32-powered platform for communications projects. It combines 10/100 Ethernet, two ECAN interfaces, and USB 2.0 OTG. Additional I/O is provided via 6 Pmod™ connectors. The board also includes an integrated programmer / debugger circuit for connection with Microchip MPLAB®.

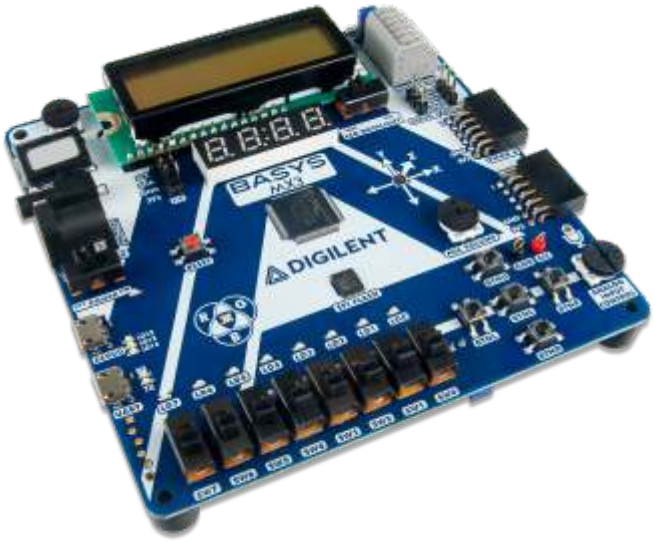
- Microchip® PIC32MX795F512L
- 512KB internal program flash memory
- 128KB internal SRAM memory
- USB 2.0 compliant full-speed On-The-Go (OTG) controller with dedicated DMA channel
- 10/100 Ethernet controller
- Two CAN network controllers
- Up to four serial peripheral interfaces (SPI)
- Up to six UART serial interfaces
- Up to four I2C serial interfaces
- Five 16-bit timer/counters
- Five timer capture inputs
- Five compare/PWM outputs
- Sixteen 10-bit analog inputs
- Two analog comparators

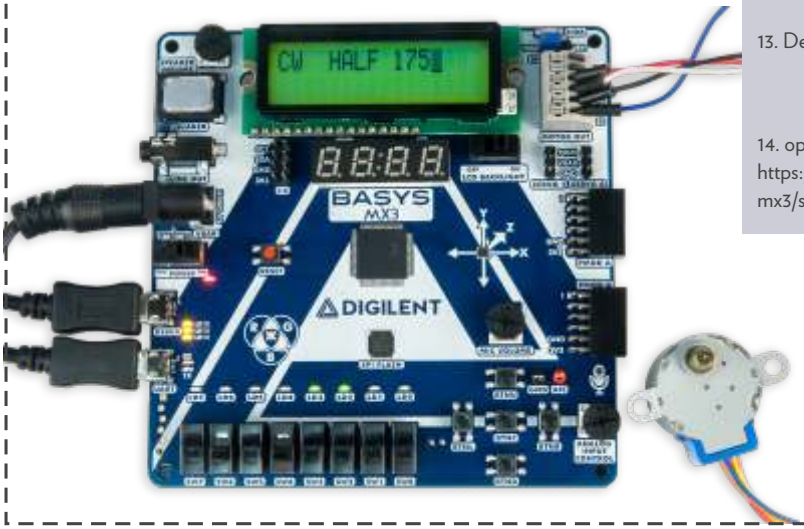
PIC 32 Microcontroller Board

Basys MX3 PIC32MX Trainer Board

Recommended for Embedded Systems Courses

The Basys MX3 is a true MCU trainer board designed from the ground up around the teaching experience. Featuring the PIC32MX370 from Microchip plus an exhaustive set of peripherals, students gain exposure to a wide range of embedded systems related concepts while using a professional grade tool set.
Accompanied by free and open-source coursework, including 7 in-depth teaching units and 15 complete labs, the Basys MX3 is a versatile MCU trainer board ideal for teaching introductory embedded systems courses.



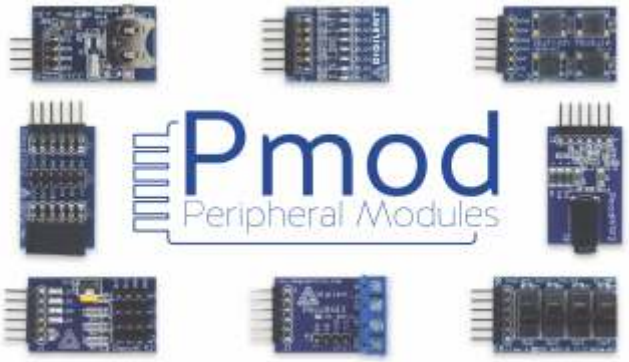


1. Microchip PIC32MX370F512L Microcontroller
2. 4 MB SPI Flash
3. Onboard USB UART (USB Micro cable required, NOT INCLUDED)
4. Powered from USB or 5 V external power source
5. USB-UART Bridge
6. Onboard 3-axis, 12-bit accelerometer
7. Onboard FIR-compatible IrDA Module
8. Onboard Audio Input and Output
    a. Thumbwheel potentiometer for adjusting mic volume
    b. PWM driven mono audio output with onboard speaker
    c. Thumbwheel potentiometer for adjusting speaker volume
    d. 3.5 mm jack for line out connection to external amplifier/speaker system
9. Onboard Displays
    a. 2x16 LCD Character Display with LED backlight
    b. 4-Digit Seven Segment Display with red LEDs
10. Onboard Dual H-Bridge Motor Driver
    a. Supports up to two 1.5 A Brushed DC Motors or one stepper motor
    b. Supports motor voltages up to 11 V
    c. 2 Servo Connectors
11. Analog Input Control (AIC)
    a. Thumbwheel potentiometer for varying analog input between 0 to 3.3 V
    b. Two wire loops for ground and AIC
12. Expansion Connectors
    a. Two 2×6 Pmod host ports
    b. SPI, UART, GPIO, PWM, analog in
    c. One I²C connector
13. Debugging
    a. On-board 30-pin Analog Discovery 2 connector
    b. On-board USB programmer/debugger
    c. Program/debug the PIC32MX370 directly from MPLAB / MPLABX
14. open-source teaching units complete with 15 labs at https://reference.digilentinc.com/reference/microprocessor/basys-mx3/start#coursework for undergraduate embedded systems coursework

Pmod™ Peripheral Modules

The industry's most flexible add-on board standard

Open, flexible and thoughtfully designed, Pmod™ is an established add-on board standard offering an ideal way to bridge programmable logic and microcontroller boards to the physical world. With our line of over 80 modules and counting, users can easily augment the capabilities of system boards by adding sensors, actuators, communication, user input and much more, all while staying within the Pmod Ecosystem. From rapid prototyping to learning the basics, it is our goal to get users up and running with useful data in just a matter of minutes.



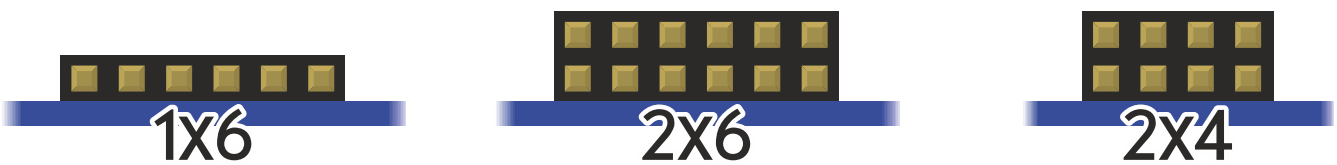
How do they work?

Pmods communicate with system boards using 6, 8 or 12-pin connectors that are designed to plug directly into Pmod™ host ports. Take advantage of standard interfaces including SPI, I²C, UART, GPIO, H-bridge and I²S.

SPI | I²C | UART | GPIO | H-bridge | I²S

How do I use them?

Through the Pmod Standard users know what to expect from their Pmod™. The Pmod Standard lays out guidelines for form factor, communication protocols and interface specification, as well as access to a target audience through reference manuals, code examples, user guides, and technical support.

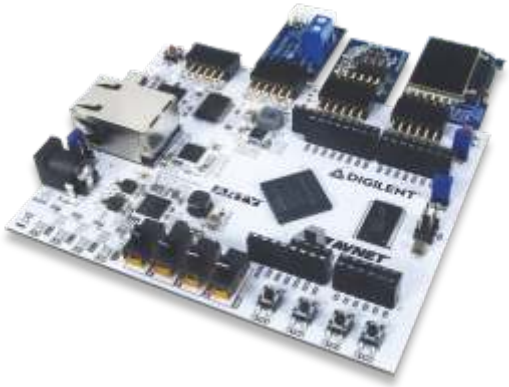


reference.digilentinc.com/pmod

Pmod™ Peripheral Modules - The Pmod Ecosystem

The Pmod Ecosystem: Bridging your FPGA or microcontroller board to the physical world through hardware design and software support. It's our goal to get users up and running with useful data in just a matter of minutes. Need some help? You'll find libraries and example designs on the Digilent wiki.

Pmod connectors are designed to plug directly into Pmod host ports on all Digilent FPGA boards.

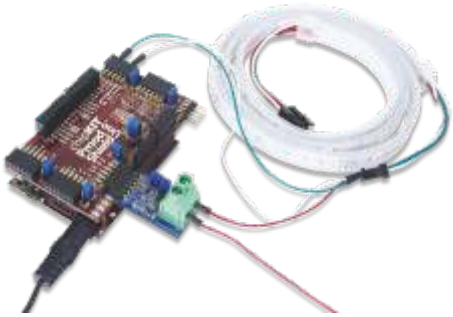


Arty board with four 2x6-pin Pmod host ports

Basys 3 board with four 2x6-pin Pmod host ports

You can find Pmod host ports on our microcontroller boards as well.

Create embedded systems with input and output Pmods and Pro Mx7



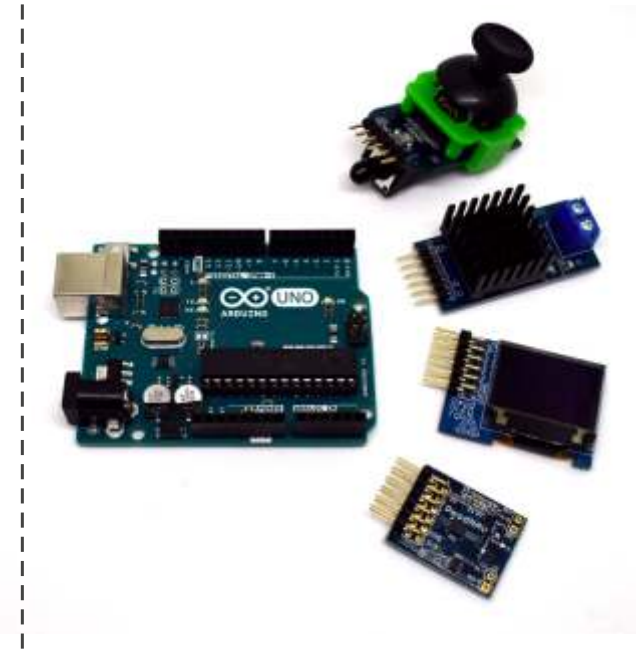
The Pmod Shield adds five 2x6-pin Pmod host ports to the Uc32

We also carry a growing line of Pmod accessories and related products.

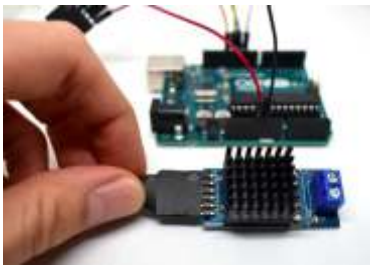
PCB ruler, Pmod clip, UART crossover cable, 6 & 12-pin Pmod extension cables, 6-pin MTE cable, SMA-to-aligator cable, DC

Pmod™ Peripheral Modules - The Pmod Ecosystem

We offer a range of application notes for using Pmods with Arduino Uno



You can begin your Pmod and Arduino Uno project by visiting the new Digilent Projects website (https://projects.digilentinc.com/) to browse from 40+ Pmods with supporting project code (many of which also include Fritzing images) and other Digilent related projects. Each project will open with a short description where you can learn about the project outcomes, the difficulty level, and project needs (i.e. the "things" you will be using).



You can connect Pmods with Raspberry Pi through the latest Pmod HAT Adapter

The Pmod HAT Adapter, an adapter board from the 40-pin Raspberry Pi header to Pmod, was designed in collaboration with DesignSpark, a community site by RS Components. By plugging the Pmod HAT into any Raspberry Pi board that uses the 40-pin GPIO header, you can break out the header signals to Pmod ports for quick access to Digilent's diverse line of Pmod add-on boards. Just boot your Pi board with the Pmod HAT attached for easy plug and play functionality.

DesignSpark engineers have created a handful of Python projects with Digilent Pmods including the AD1 A/D converter, HB3 H-bridge driver, ISNS20 current sensor, MIC3 MEMS microphone, OLEDrgb RGB display, and TC1 thermocouple module

Pmod™ Peripheral Modules - New Pmods

All new Pmods come with libraries and example code for getting started with Digilent FPGA and microcontroller boards.

Pmod CAN

The Pmod CAN is a CAN 2.0B controller with an integrated transceiver. The embedded Microchip MCP25625 chip connects directly to the physical CAN bus and meets automotive requirements for high-speed (1 Mb/s), low quiescent current, electromagnetic compatibility, and electrostatic discharge.

Pmod NAV

The Pmod NAV combines a 3-axis accelerometer, 3-axis gyroscope, 3-axis magnetometer, plus a digital barometer to provide users with 10-DOF functionality. Features include 16-bit full scale registers for acceleration, rotation, and orientation, 24 bits of resolution for pressure data, embedded temperature sensors for compensation and 12-pin Pmod connector with SPI interface.

Pmod DPG1

Measure differential pressure using the Pmod DPG1 which combines a piezoresistive transducer and 12-bit analog-to-digital converter. Packaged with a 61 cm long polyvinyl tube, the Pmod DPG1 can safely measure a pressure differential up to 10 kPa. It is temperature compensated and calibrated and communicates over a 6-pin Pmod connector with SPI interface.

Pmod ESP32

The Pmod ESP32 provides an easy and cost effective way to add wireless communication to any host platform or project. It uses the fully certified ESP-WROOM-32 Wi-Fi + BLE + BT module from Espressif Systems. It is suitable for a wide variety of applications, from low-power sensor networks to more demanding tasks such as music streaming. The Pmod form factor is perfect for quickly turning your board into a powerful IoT platform using the pre-loaded AT command firmware, or for evaluating the ESP32 radio itself. The ESP-WROOM-32 can be used successfully as a peripheral or as a standalone device.

Pmod MTDS

The Pmod MTDS is a gorgeous 2.8" touchscreen display with a powerful on-board PIC 32 MZ microcontroller that performs graphics processing tasks. The display is a capacitive touchscreen with QVGA resolution (320×240) and 2 finger multi-touch support. The Multi-Touch Display System (MTDS) Firmware and the associated libraries allow users to design sleek, stylish user interfaces very quickly and effectively.

Pmod HYGRO

Directly measure relative humidity and ambient temperature at very low power. The Pmod HYGRO is highly accurate and perfect for at home and battery powered environmental monitoring systems. Other features include good stability at high humidity, 14-bit measurement resolution, internal resistive heating element for driving off condensation and 6-pin Pmod connector with I^2C interface.

Pmod SSR

The Digilent Pmod SSR is a solid state relay that features IXYS' CPC1908J. The Pmod SSR uses a switch controlled by a single GPIO pin and is rated to block up to 48 Volts and switch up to 6 Arms continuous current. It provides 2500Vrms of input to output isolation.

Pmod™ Peripheral Modules - Pmods by Function

Our ample assortment of Pmods are grouped into six different categories based on their functionality; input, output, communication, connector, power, and miscellaneous. These categories contain audio amplifiers, GPS receivers, seven-segment displays, accelerometers, analog-to-digital converters, and much more!

PmodACL 

PmodOLEDrgb 

PmodWiFi 

PmodCON4 

PmodISNS20 

PmodTPH2 

Input

These Pmods primarily collect information about the outside world, either inherently like the Pmod ACL or those that require a physical input such as the PmodK YPD, and submit the information to the host board by using their assigned communication protocol.

Output

These Pmods primarily output information that was given to them by the host board. Examples of this style of Pmod include visual Pmods such as the Pmod CLS, the PmodHB5 to drive motors, and the Pmod DA4 to get a desired analog output.

Communication

These Pmods are capable of sending and receiving data to communicate with a host board. By enabling access to an outside source or system, communication Pmods augment the capabilities of any project; internet access with the Pmod WiFi, additional flash memory through the Pmod SF2, even an external serial port with the Pmod RS232!

Connector

Connector Pmods are designed to offer a solution for mechanical connectivity, allowing the user to choose a Pmod based on its specific application, such as the Pmod CON4, and properly connect between an external source and the host system.

Power

These Pmods provide a hassle-free approach to routing external power to an outside component while protecting the host board from damage.

Miscellaneous

The Pmods within this category have unique characteristics and extra peripheral functions that set them apart from the standard classification.

Pmod™ Peripheral Modules - Complete Pmod List

ACL	3-axis digital accelerometer module.
ACL2	Ultra-low power 3-axis MEMS accelerometer.
AD1	Two channel, 12-bit analog-to-digital converter module.
AD2	Four channel, 12-bit analog-to-digital converter module.
AD5	24-bit analog-to-digital conversion on 4 or 8 inputs.
ALS	An easy-to-use ambient light sensor.
BTN	Four momentary push buttons for easy user I/O.
CDC1	Learn capacitance-to-digital conversion with two buttonpads.
CMPS	Accurate 3-axis digital compass with an I²C interface.
ENC	Rotary encoder with integral pushbutton for easy user I/O.
GPS	Accurate satellite positioning for any embedded system.
GYRO	Three-axis digital gyroscope + temperature sensor.
IA	Measure your circuits impedance over an I²C interface.
JSTK	2-axis joystick with three pushbuttons and two LEDs.
KYPD	16-button hexadecimal keypad with a simple interface.
LS1	Four-input infrared light sensor, perfect for line-followers.
MAX-SONAR	Ultrasonic range detector with one-inch resolution.
MIC3	A handy MEMS microphone with adjustable gain.
RTCC	A real-time clock/calendar with battery backup.
SWT	Four slide switches for basic I/O.
TC1	Accurate thermocouple module with 14-bit resolution.
TMP2	Temperature sensor / thermostat control module.
TMP3	Temperature sensor accurate to within 1°C.

8LD	Eight high-brightness LEDs in a compact package.
AMP2	High efficiency, 2.5 watt class-D mono audio amplifier.
AMP3	Digital input, 2 watt class-D stereo audio amplifier.
CLP	16 x 2 character LCD with a simple parallel interface.
CLS	16 x 2 character LCD supporting SPI, I²C, & UART protocols.
DA1	Four channels of 8-bit digital-to-analog conversion.
DA2	Two channels of 12-bit digital-to-analog conversion.
DA3	Single channel, 16-bit digital-to-analog conversion.
DA4	Eight channels of 12-bit digital-to-analog conversion.
DHB1	Dual H-bridge module that drives 2 DC motors or 1 stepper motor.
DPOT	A 256 position SPI-compatible digital potentiometer.
HB3	2A H-bridge module with external feedback support.
HB5	2A H-bridge module with external feedback support.
IS	Take digital audio in any major format and output to a headphone jack.
LED	Four high-bright LEDs in a compact package.
OLED	Compact, easy-to-read OLED graphic display.
OLEDrgb	96 x 64 pixel graphical OLED with 16-bit color.
R2R	Resistor ladder based 8-bit digital-to-analog converter.
SSD	Two digit, high-bright seven segment display for clear output.
STEP	Stepper motor driver for any 4 or 6-pin stepper motor.
BT2	Full-featured Bluetooth radio with a simple UART interface.
NIC100	A complete Ethernet interface for your Digilent board.
RF2	Add IEEE 802.15.4 RF communication to your project.

RS232	A serial interface module for UART communication.
RS485	For all your isolated communication needs.
SD	Read from & write to SD memory cards of any capacity.
SF	16Mbit Serial Flash for accessible non-volatile storage.
SF2	16MB PCM memory for accessible non-volatile storage.
USB UART	USB to serial UART interface, the perfect replacement for RS232.
WiFi	WiFi communication for Microchip®-powered host boards.
BB	Convenient breadboard prototyping for your Pmod projects.
CON1	Route your projects data signals to screw terminals.
CON3	Drive up to four R/C servo motors from your system board.
CON4	Two RCA jacks plus convenient signal routing.
DIP	Use your Pmods in DIP sockets and solderless breadboards.
IOXP	I/O expander with 19 configurable I/Os & an I²C interface.
LVLSHFT	Fully-configurable digital logic level shifter.
PS2	Add a standard PS/2 mouse/keyboard port to your project.
RJ45	Extend your 6-pin Pmod connections greater distances via an RJ-45 cable.
ISNS20	Quick, accurate current sensing with a digital SPI interface.
OC1	Four open-collector BJTs to drive high current applications.
OD1	Four open-drain MOSFETs to drive high current applications.
PMON1	System power monitor using a standard I²C interface.
TPH	An easy way to test signals between a Pmod and its host.
TPH2	An easy way to test signals between a Pmod and its host.

Digilent Instrumentation Family

Professional Electronics, without the constraints of a lab.

Start engineering on your schedule with Digilent Instrumentation. Modern engineers have to balance dynamic work environments without sacrificing technical standards.
From troubleshooting on the production line, to viewing a few signals on the way to a business meeting, to jet-setting to a customer location; engineering problems can happen anywhere. With the perfect balance between portability and performance, our tools are designed to fit any work style.

Our Instrumentation hardware comes with WaveForms 2015, an industry ready software toolset. WaveForms 2015 was designed with the user in mind, providing a professional user interface with the option to customize to your needs. With one quick download and installation, it detects and customizes its tools and user interface to the instrumentation device connected. With Mac, Linux, and Windows compatibility, WaveForms 2015 and Digilent instrumentation can turn any computer into a versatile portable benchtop.

Digilent Instrumentation Family Comparison Table

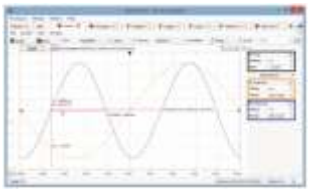
	Analog Discovery 2	Digital Discovery	Electronics Explorer	OpenScope (Kickstarter)
WaveForms Compatibility	Mac, Windows, Linux with WaveForms 2015	Mac, Windows, Linux with WaveForms 2015	Mac, Windows, Linux with WaveForms 2015	Chrome, Safari, Firefox, and Edge Browsers with WaveFormsLive
Oscilloscope	2 channel, 14 bit, 100MS/s, 30Mz+ bandwidth, +-25V differential	NA	4 channel, 10 bit, 40MS/s, 100MHz, +-20V	2 channel, 12 bit, 6.25MS/s, 2MHz, +-20V
Waveform Generator	2 channel, 14 bit, 100MS/s, 12MHz+ bandwidth,+-5V	NA	2 channel, 14 bit, 40MS/s, 20MHz, +-10V	1 channel, 10 bit, 10MS/s, 1MHz+ bandwidth, +-3V
Network Analyzer	1Hz to 10MHz, Bode, Nyquist, and Nichols plots	NA	1mHz to 4MHz, Bode, Nyquist, and Nichols plots	NA
Spectrum Analyzer	2 channel, noise floor, SFDR, SNR, THD, Harmonic measurements, and More	NA	2 channel, noise floor, SFDR, SNR, THD, Harmonic measurements and more	NA
Voltmeter	2 channel, +-25V	NA	4 channel, +-20V	NA
Data Logger	Logging DC, True RMS, DC RMS, and math functions	NA	Logging DC, True RMS, DC RMS, and math functions	NA
Logic Analyzer	16 channel, 100MS/s, 3.3V CMOS, and 1.8V or 5V tolerant	Up to 32 channel, up to 800MS/s, 1.2V to 3.3V CMOS	32 channels, 100MS/s, 3.3V CMOS	10 channel, 50MS/s, 3.3V CMOS
Pattern Generator	16 channel,100MS/s, 3.3V CMOS	16 channel, 100MS/s, 1.2V to 3.3V CMOS	32 channels, 100MS/s, 3.3V CMOS	NA
Digital IO	16 channel, virtual buttons, switches, LEDs, 7-seg, progress bar, slider	24 channel, virtual buttons, switches, LEDs, 7-seg, progress bar, slider	32 channels, virtual buttons, switches, LEDs, 7-seg, progress bar, slider	10 channel, shared with LA, 4 LEDs, 1 BTN
Power Supplies	(-) channel 0 to -5V, (+) channel 0 to 5V, 500mW via USB, 2.1W via Aux supply, up to 700mA perchannel	4 channel, 1.2V to 3.3V, up to 100mA, programmable voltage and threshold	2 reference voltage supplies with 10mA, 1 3.3/5V up to 2A supply, (+) channel 0 to 9V at 1.5A, (-) channel 0 to -9V at 1.5A	2 channel +-4V, 50 mA per channel
Protocol Analyzer	UART, SPI, I2C, more protocols in the Logic Analyzer	UART, SPI, I2C, more protocols in the Logic Analyzer	UART, SPI, I2C, more protocols in the Logic Analyzer	NA
Script Editor	JavaScript Interface	JavaScript Interface	JavaScript Interface	NA
Triggers	2	2	4	NA
Customizability	WaveFormsSDK available for Custom Applications	WaveForms SDK available for Custom Applications	WaveForms SDK available for Custom Applications	Open source Hardware and Software

Analog Discovery 2 - High-Performance Pocket-sized All-in-One Instrument

Analog Discovery 2 is the most affordable all-in-one instrument with the performance required for real engineering challenges. Makers and hobbyists can debug embedded systems, electronics, robotics or sensors with the free and easy to use software. Engineers and designers can perform automated testing & control with LabVIEW and Python drivers. Connect Analog Discovery 2 to any PC (Mac, Linux, or Windows) over high-speed USB.

With the release of MATLAB 2018b, the Analog Discovery 2 is now included as one of the many hardware devices supported by MATLAB Data Acquisition Toolbox. This lets you perform the following tasks in MATLAB:

- Read data from Analog Discovery 2 oscilloscope channels (analog input)
- Control and generate data from Analog Discovery 2 waveform generators (analog output)
- Configure the sampling rate of the Analog Discovery 2
- Characterize ICs and measure behavior of the circuit and IC components
- Trigger the start of your data acquisition
- Find and display Digilent Analog Discovery 2 device settings

Features:

- Two-channel USB digital oscilloscope (14-bit, 100Msample/sec)
- Two-channel arbitrary function generator
- Stereo audio amplifier to drive external headphones or speakers with replicated AWG signals
- 16-channel digital logic analyzer (3.3V CMOS, 100Msample/sec)
- 16-channel pattern generator (3.3V CMOS, 100Msample/sec)
- 16-channel virtual digital I/O including buttons, switches, and LEDs – perfect for logic training applications
- Two input/output digital trigger signals for linking multiple instruments (3.3V CMOS)
- Data logger
- Network analyzer – Bode, Nyquist, Nichols transfer diagrams of a circuit. Range: 1Hz to 10MHz
- Spectrum Analyzer – power spectrum and spectral measurements (noise floor, SFDR, SNR, THD, etc.)
- Digital Bus Analyzers (SPI, I C, UART, Parallel)
- Two programmable power supplies (0...+5V , 0...-5V)

Waveforms:

Waveforms 3 is the newest release of our powerful multi-instrument software application. Like the previous version of Waveforms, it seamlessly connects to our USB portable oscilloscope, logic analyzer, and function generator products such as Electronics Explorer and both versions of the Analog Discovery, adding full Mac OS X and Linux support. This software, coupled with the hardware instrumentation, brings a powerful suite of instruments to enable analog and digital design on your personal computer. Designed with a clean, easy to use graphical interface for each instrument, Waveforms 3 makes it easy to acquire, visualize, store, analyze, produce and reuse analog and digital signals.

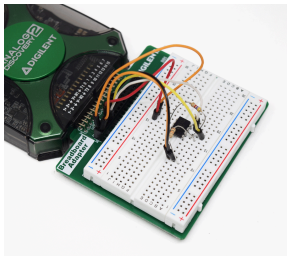
Analog Discovery 2 - High-Performance Pocket-sized All-in-One Instrument

Recommended Portable Lab Tools

Analog Parts Kit

The Analog Parts Kit contains a large selection of components perfect for creating a wide variety of useful circuits & devices. Featuring Analog Devices components, the kit includes transistors, resistors, capacitors, diodes, sensors, and variety of useful ICs including Op Amps, convertors, and regulators. Finally, the kit also comes with an assortment of lead wires, a solderless breadboard, and a screwdriver. A complete list and description of components can be found on the Digilent website.

Breadboard Adapter



The Breadboard Adapter is intended to be used with the Analog Discovery tool to provide a prototyping surface with a secure connection.

Large Breadboard Kit

The Breadboard Adapter is intended to be used with the Analog Discovery tool to provide a prototyping surface with a secure connection.

Discovery BNC Adapter

The Discovery BNC adapter board is intended to be used with the Analog Discovery™ tool to enable the use of standard BNC terminated test leads and probes. It provides BNC terminations to each of the two oscilloscope channels on the Analog Discovery

BNC Oscilloscope x1/x10 Probes (Pair)

A pair of BNC-terminated oscilloscope probes, perfect for use with the Analog Discovery 2 in conjunction with the Discovery BNC Adapter.

Mini Grabber Test Clips (6-pack)

These micro-hook test clips allow the Analog Discovery 2's signal wires to be connected to component leads, wires, and other circuit components.

Impedance Analyzer

With the Impedance Analyzer accessory, the Analog Discovery will automatically select the most appropriate configuration for the attached unknown impedance. The Impedance Analyzer is loaded with the 2×15 Analog Discovery connector, which makes it compatible with Analog Discovery 2 as well as Analog Discovery Legacy. The Impedance Analyzer for Analog Discovery was designed with automatically adjusting reference resistors and relays to aid in use of the Impedance Analyzer tool in WaveForms.

Breadboardable Dual Output USB Power Supplies

Every circuit needs a power supply, but simple, low cost, portable, and reliable power sources can be hard to come by. The PowerBRICK family provides the solution to all of those requirements. There are four options to choose from: 12V, 9V, 5V, or 3.3V. PowerBRICKS are designed to easily plug directly onto your breadboard for simple, low profile integration. Powered by 5V from a standard USB, each PowerBRICK can provide up to 1.1W of power. PowerBRICKS can also be daisy-chained to provide more than one +/- Vout pair, but total power output for the entire chain should not exceed 2.2W.

PowerBrick 3.3V

- Input voltage 5 V
- Output voltages +/- 3.3 Vcc (320 mA max.)

PowerBrick 5V

- Input voltage 5 V
- Output voltages +/- 5 Vcc (200 mA max.)

PowerBrick 9V

- Input voltage 5 V
- Output voltages +/- 9 Vcc (130 mA max.)

PowerBrick 12V

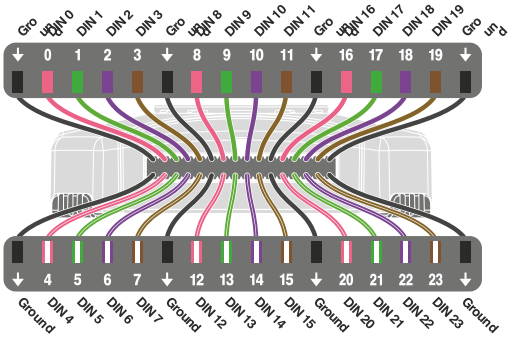
- Input voltage 5V
- Output voltages +/- 12 Vcc (100 mA max.)

Digital Discovery

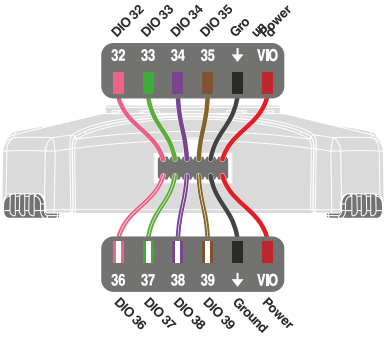
High Performance Pocket Sized Logic Analyzer with Built-in Pattern Generator

The Digilent Digital Discovery is a combined logic analyzer and pattern generator instrument for the embedded debug. Makers, hobbyists, engineers and designers can use Digital Discovery to debug, visualize, and simulate digital signals for embedded projects. Connect Digital Discovery (Mac, Linux, or Windows) over high-speed USB. It comes with Free application software Waveforms 2015

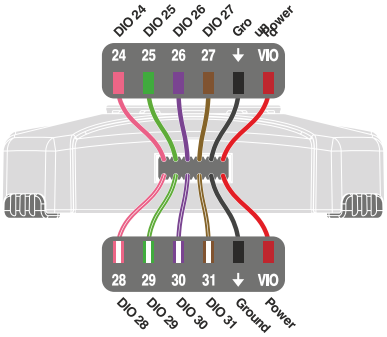
High-Speed Digital Inputs



Digital Inputs/Outputs (right side)



Digital Inputs/Outputs (left side)



HW resources

- 24 high-speed input pins (DIN0...23), 100MHz bandwidth, ----560kΩ||10pF accessible through one 2×16 connector
- 2Gbit DDR3 acquisition buffer for DIN pins
- 16 digital I/Os (DIO24...39) arranged in two Pmod-style (2×6) connectors
- Output buffer: 32K samples/channel for DIO pins
- Automatic or manual strength and slew settings for outputs.
- User programmable DIN and DIO LVCMOS voltage levels from 1.2V to 3.3V (5V compatible)
- User power supplies, 1.2V to 3.3V, available in the two Pmod-style connectors (100mA max)

Other features

- USB bus powered
-Free Waveforms 2015 software runs on Windows, Mac OS, and Linux
- Cross-triggering between Logic Analyzer, Pattern Generator or external trigger
- Data file import/export using standard formats
- 80X80X25mm, 80g (without accessories)
- Includes: USB cable, fly-wire accessories

Waveforms Virtual Instruments

Logic Analyzer
- Uses DIN and DIO pins
- Up to 800MSps input sample rate with 8 inputs (and the High Speed Adapter)
- Up to 200MSps with 32 inputs
- Multiple trigger options including pin change, bus pattern, etc
- Digital Bus Analyzers (SPI, I C, UART, Parallel)

Patterns generator
- Uses DIO pins
- Algorithmic pattern generator or buffer based patterns
- ROM Logic for implementing user defined Boolean functions and State Machines
- 100MSps max output sample rate (50MHz maximum output frequency).

Protocol controller
- DIO pins are used for UART send and receive, SPI read and write, I C read and write capable

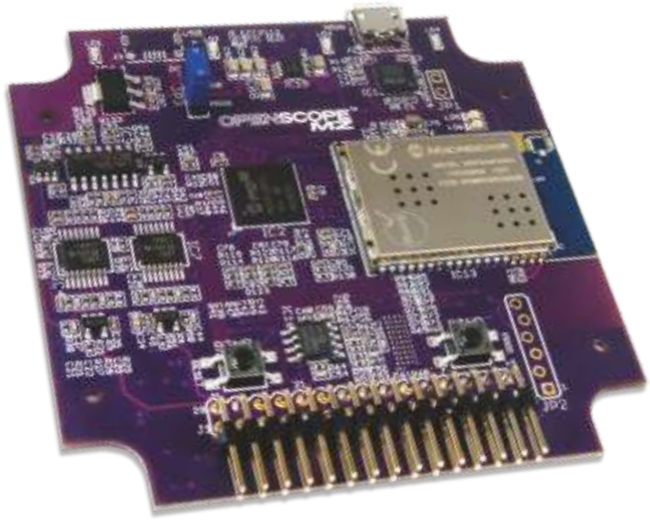
Static I/O
- DI/O pins can be configured as virtual buttons, LEDs, switches, slider, progress bar, and seven segment display

Supplies
- Sets the user power supply and logical levels, pull resistors, output strength

Script
- Advanced functions

OpenScope MZ

Professional open-source instrumentation for everyone.



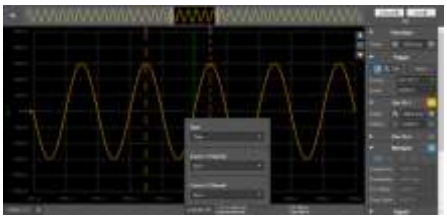
What is OpenScope?

OpenScope is a portable multi-function programmable instrumentation module. What does that mean? It's a device that you connect to your computer (through Wi-Fi or a USB cable) that allows you to acquire, analyze, visualize, and control signals from circuits, sensors, and other electronic devices. Unlike typical USB instruments, OpenScope can also be programmed to run standalone like an Arduino or Raspberry Pi, but with high-speed precision analog and digital I/O. OpenScope also comes with WaveForms Live, which is a free, open-source, JavaScript-based software that runs in a browser and is inspired by our extremely popular software tool, WaveForms 2015.
Using the OpenScope + WaveForms Live, you will be able to con gure the OpenScope to be an Oscilloscope, a Function Generator, a Logic Analyzer, a Power Supply, and even a Data Logger.
We designed OpenScope as a tool that you can use to troubleshoot your projects on the go (e.g. real-time monitoring of a mobile robot or UAV), monitor long-term (create an IoT device to capture, calculate, and log readings over many hours or days), and gain a deeper understanding of electronics through visualizing what's happening inside of the circuit.

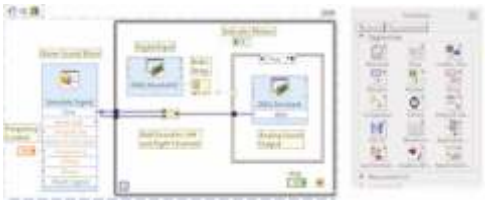
- 2 scope channels with 12 bits @
- 2MHz bandwidth and 6.25 MS/sec max sampling rate
- 1 function generator output with 1MHz bandwidth and 10MS/sec update rate
- 10 user-programmable DIO pins with
- 25MHz update rates
- User-programmable power supplies providing up to 50mA and 4V power
- USB bus powered or externally powered
- On-board WiFi
- Browser-based WaveForms Live multi-instrument software
- Re-programmable through the Arduino IDE or Microchip MPLABX IDE

Why did we make OpenScope?

Simply put, our mission is to make learning and using electronics accessible to all. In the path of learning and using electronics, instrumentation is required to view what's really happening at the circuit level. Instead of spending hundreds or even thousands of dollars on conventional benchtop instruments, we've created a tool and powerful instrumentation, we are empowering makers, hobbyists, engineers, and new learners to design and debug their most innovative products!



NI LabVIEW Home Bundle


LabVIEW Home Bundle

NI LabVIEW is a graphical programming platform used by millions of engineers and scientists for problem solving, data acquisition and analysis, instrument control, automated testing and validation, prototyping, and more.

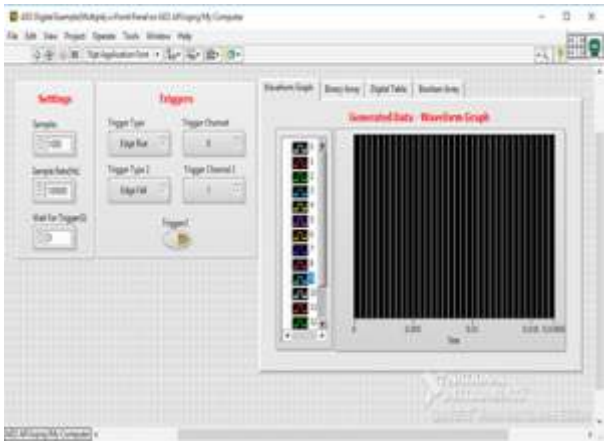
Now, there's LabVIEW Home, which has been targeted at makers, allowing anyone to program visually, using icons and wires to connect hardware and other applications in a single environment.

What can you have in LabVIEW Home Bundle?

- Unique graphical programming environment for accelerated development
- Extensive support for a wide range of measurement hardware, I/O, and buses
- Drag-and-drop interaction for quickly building graphical user interfaces
- Extensive signal processing, analysis, and math functionality
- Includes added functionality for text-based math and control logic

Analog Discovery + LabVIEW

The Digilent Analog Discovery Toolkit for LabVIEW makes it easy to automate your Digilent instruments with LabVIEW software. It includes analog and digital measurement VIs that allow you to specify the number of samples and at what rate you want to acquire. These simple VIs enable you to enjoy all the features of the LabVIEW environment, allowing you to take full advantage of these powerful measurement devices.



National Instruments has provided a set of seven example labs designed to show exactly that. They are a free download and available to anyone.

Lab 1: RC Circuits

Lab 2: Active & Passive Filters

Lab 3: Amplifier Frequency Response

Lab 4: Full Wave Rectifier

Lab 5: Amplifier Modulation & Demodulation

Lab 6: UART Serial Communication

Lab 7: SPI Communication

NI myRIO Accessory Board

Digilent is your source for products, parts, and accessories for National Instruments' academic product line, including the NI myRIO, myDAQ, and ELVIS. Digilent offers official NI products as well as Digilent-branded products that are fully compatible with NI hardware.

myDigital Protoboard

- Power supply connector for stand-alone use
- 1260 tie point breadboard area
- Seven-segment LED displays
- 4 push buttons, 4 slide switches
- Discrete LEDs
- Onboard 3.3/5VDC power regulator
- Uses the Mini System Port (MSP) connector

myProto Protoboard

- Access all your myDAQ's signals on a breadboard
- 3 onboard user LEDs
- 1 10K Potentiometer
- 2 Audio Jacks
- External power connector for breadboard circuits
- Power switches on all power supplies
- Uses the Mini System Port (MSP) connector

Shield Adapter

- Uses the myRIO Expansion Port (MXP) connector
- Signal and power lines adapted to the standard Arduino™ Uno footprint.
- I2C is hardwired to A4 and A5 pins and adheres to the revised Arduino Leonardo standard
- Standard 34-pin female breakout
- Switch allows users to select between UART and DIO pins 0 and 1
- No external power required for shields operating at 3.3V or 5V

NXT Sensor Adapter

- Uses the myRIO Expansion Port (MXP) connector
- Supports both passive and digital NXT sensors (under 9V)
- 3 Lego® Mindstorms® NXT sensor connectors
- No external power required
- 34-pin female breakout allowing direct user access to signal pins

Motor Adapter

- Uses the myRIO Expansion Port (MXP) connector
- Can be configured to work with 2 DC motors, 1 stepper motor, or 2 RC servos
- Current control and sensing built in
- 6V-16V input voltage
- Over-current supply protection
- 34-pin female breakout allowing direct user access to signal pins
- External power supply connections
- Two 1.5A full h-bridge outputs
- Two on-board quadature encoders
- Internal PWM current control
- Power LED indicator

High Current Adapter

- Uses the myRIO Expansion Port (MXP) connector
- Supports 3V - 16V output voltage (external power supply required)
- 4 Open drain outputs
- Continuous current: 3.0A (25°C) / 2.2A (85°C)
- Peak output current: 4.1A (t<5s)
- 4 Standard 3 terminal relay outputs
- Common, Normally Closed, Normally Open
- Relay output max switching voltage: 30V
- Rated Current: 1A
- 34-pin female breakout allowing direct user access to signal pins

MXP Breadboard & MXP Wirewrap

The MXP Breadboard provides a 300 tie breadboard & 50 tie bus bar on an expansion card compatible with the myRIO Expansion Port (MXP). The MXP Wirewrap provides a large 14x21 hole prototyping area on an expansion card compatible with the myRIO Expansion Port (MXP). Wirewrap functions as an I/O breakout, with bus traces for GND, 3.3V, & 5V on either side of the prototyping area.

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