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IUPAP INTERNATIONAL UNION OF PURE AND APPLIED PHYSICS

USAC TRICENTENARIA Universidad de San Carlos de Guatemala

1st Mesoamerican Workshop on Reconfigurable X-ray Scientific Instrumentation for Cultural Heritage

Development Board: Zynq SoC

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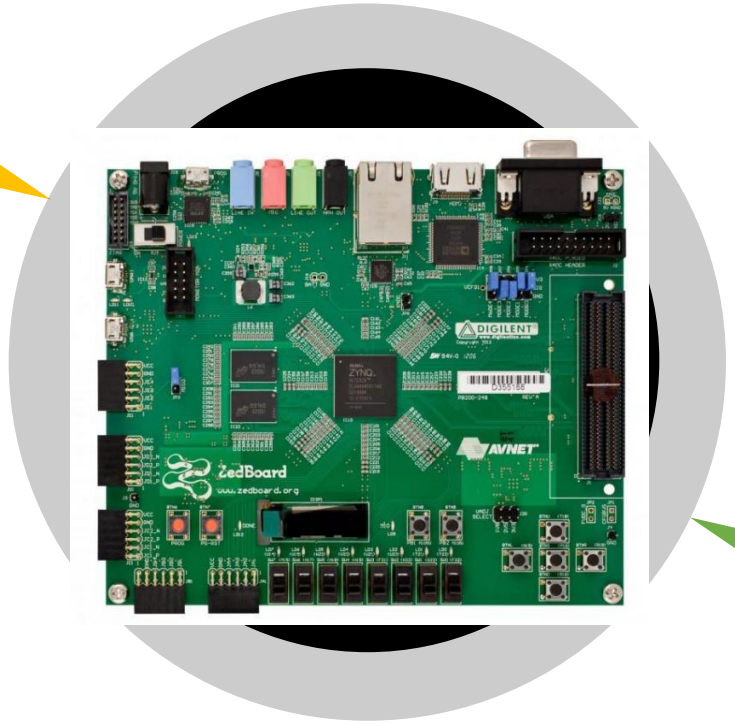
Zynq Evaluation and Development Board

AVNET

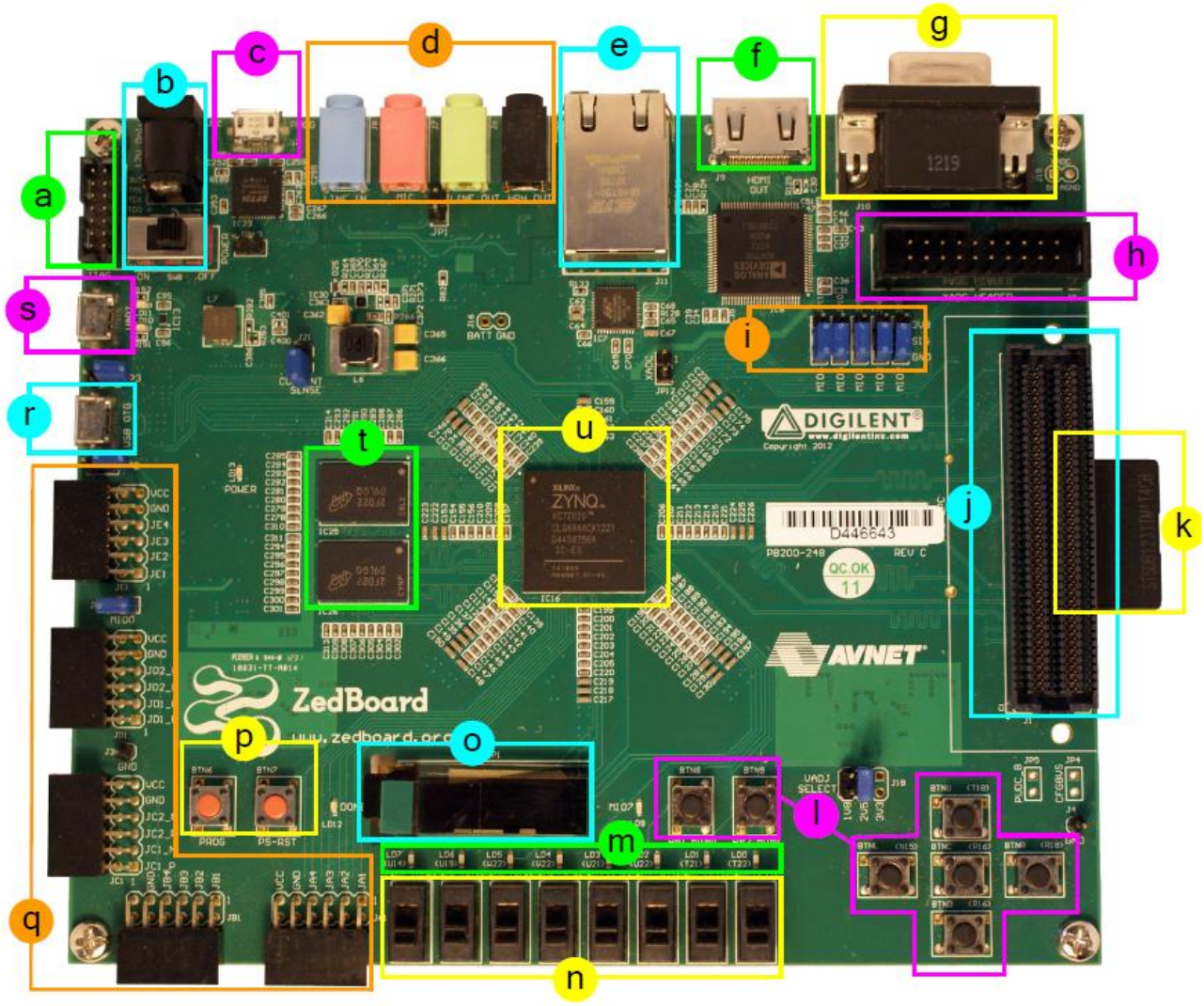
ZedBoard™ is a complete development kit for designers interested in exploring designs using the AMD Xilinx Zynq®-7000 All Programmable SoC. The board contains all the necessary interfaces and supporting functions to enable a wide range of applications.
The expandability features of the board make it ideal for rapid prototyping and proof-of-concept development.



DIGILENT

ZedBoard™ is a low-cost development board for the Xilinx Zynq-7000 all programmable SoC (AP SoC). 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.

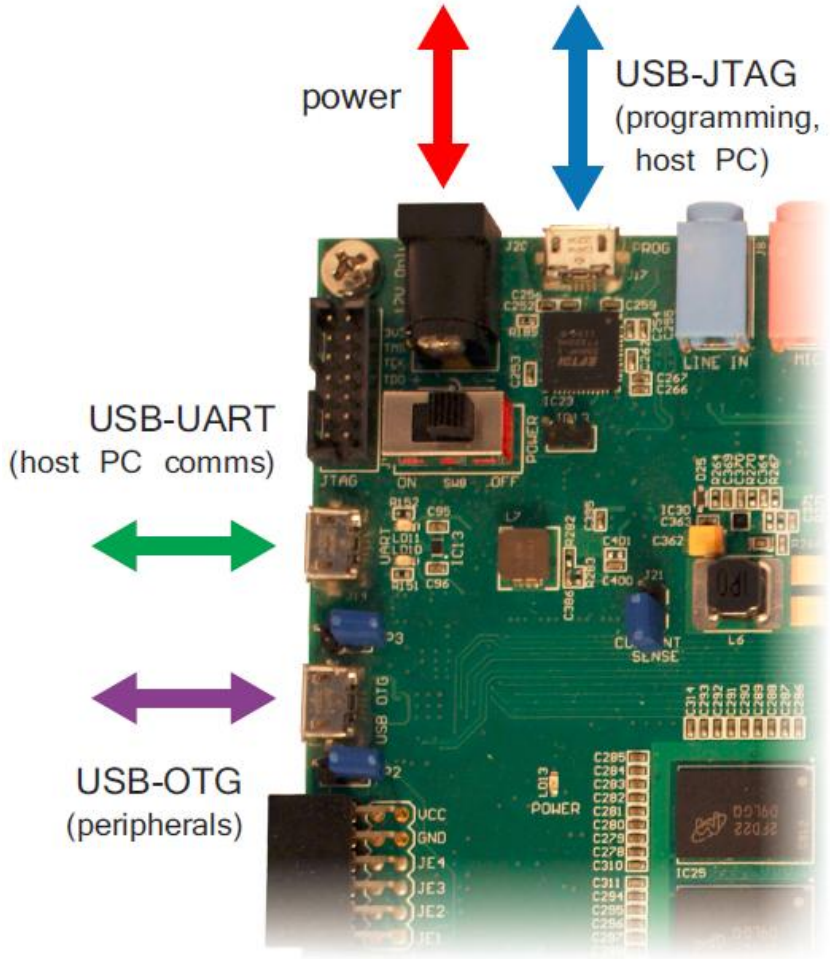
ZedBoard Main Components



a Xilinx JTAG connector
b Power input and switch
c USB-JTAG (programming)
d Audio ports
e Ethernet port
f HDMI port (output)
g VGA port

h XADC header port
i Configuration jumpers
j FMC connector
k SD card (underside)
l User push buttons
m LEDs
n Switches
o OLED display
p Prog & reset push buttons
q 5 x Pmod connector ports
r USB-OTG peripheral port
s USB-UART port
t DDR3 memory
u Zynq device (+ heatsink)

ZedBoard Main Connectors

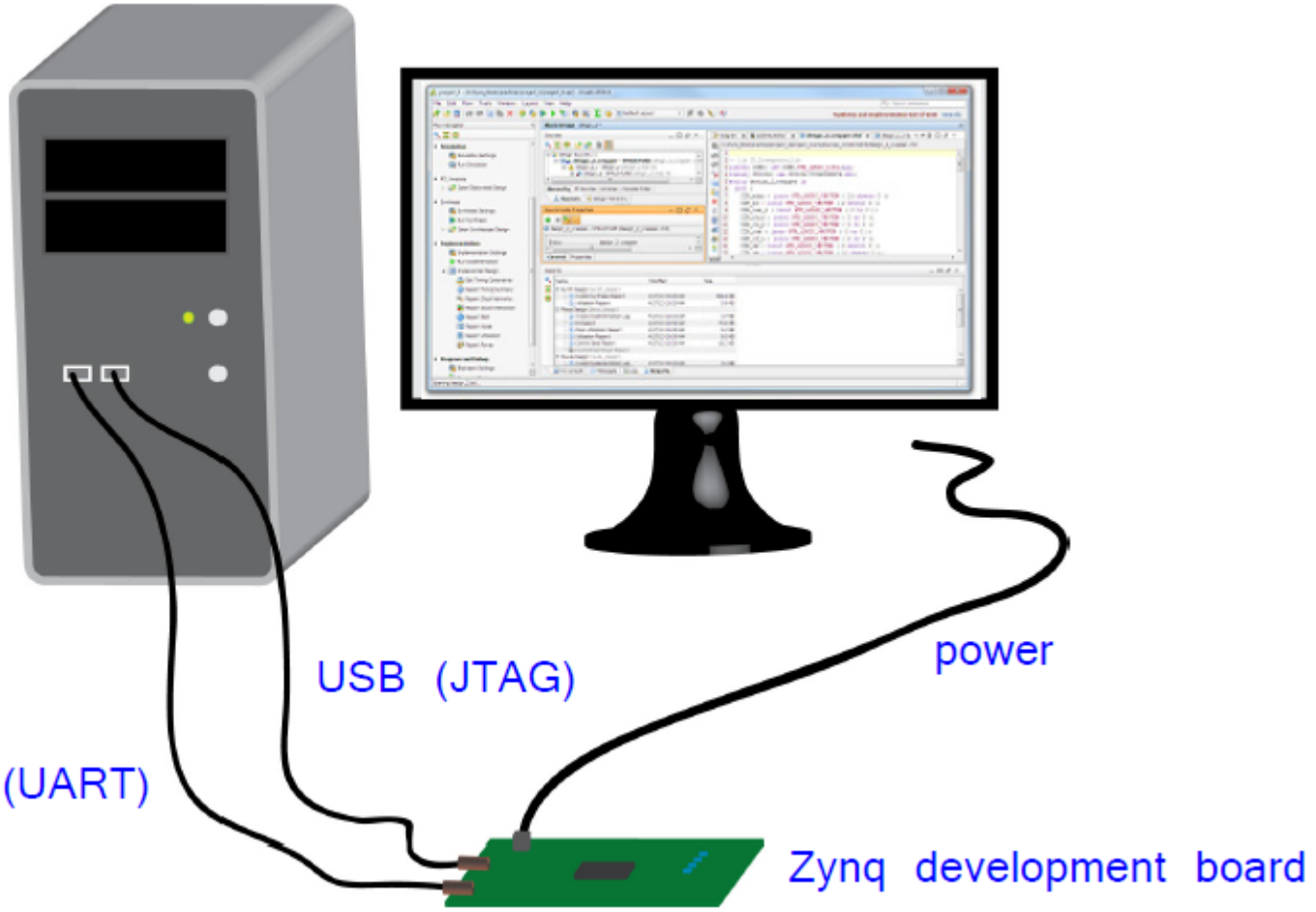


Connection Between PC-ZedBoard

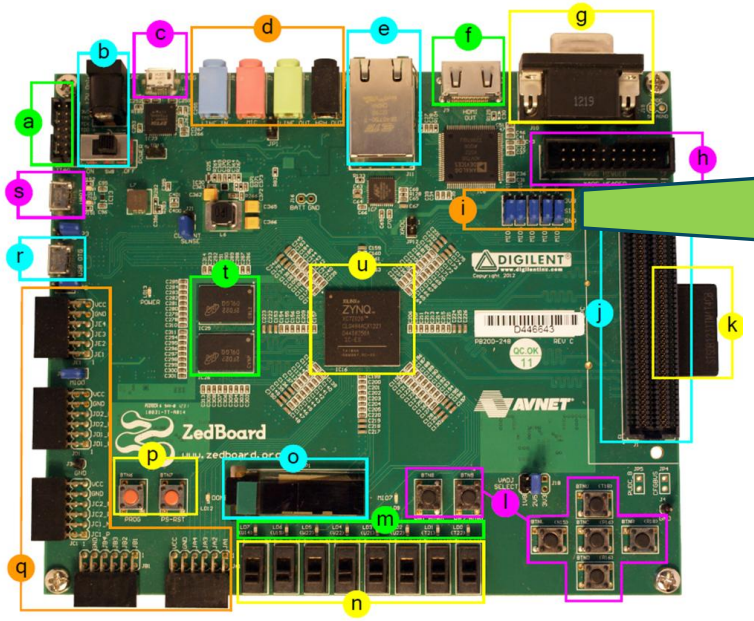
Windows / Linux computer

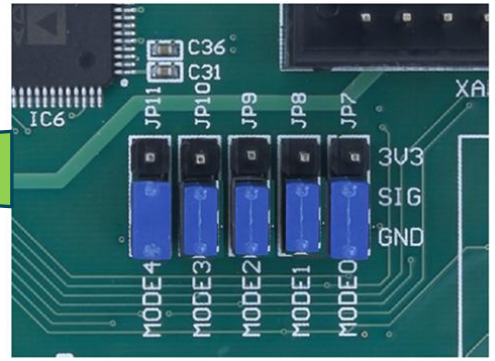
16GB/32GB+ RAM

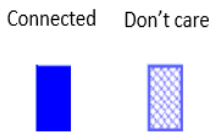
Xilinx design tools

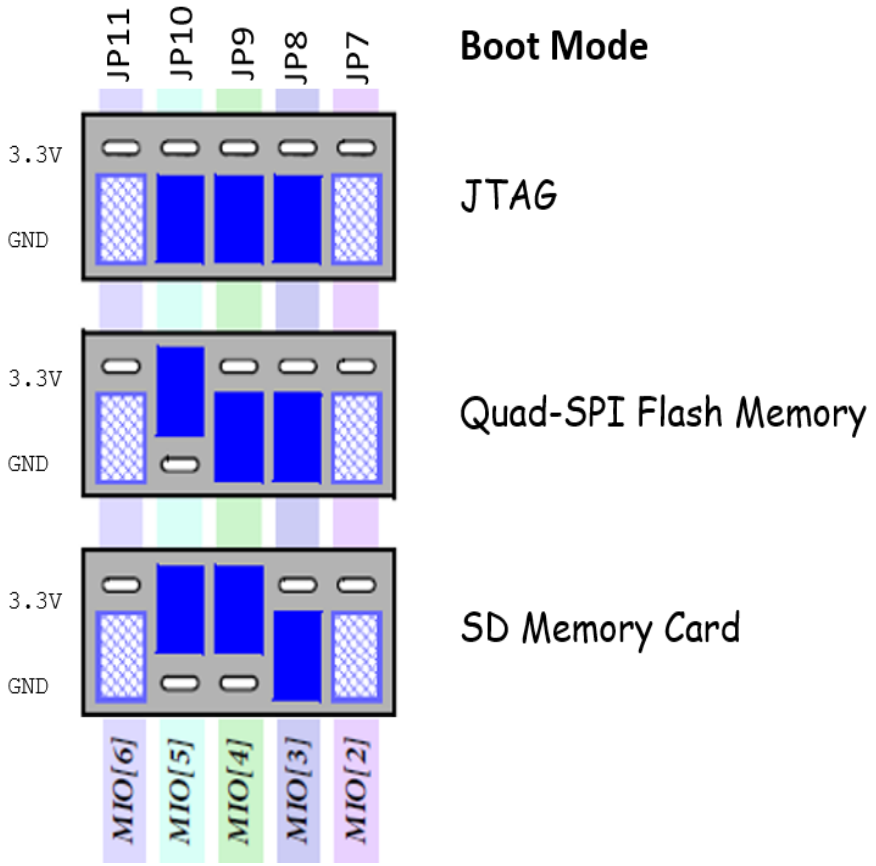


Configuring the ZedBoard - Options









256 Mbit- Serial NOR Flash

PMOD

10/100/1000 Ethernet Phy

USB OTG

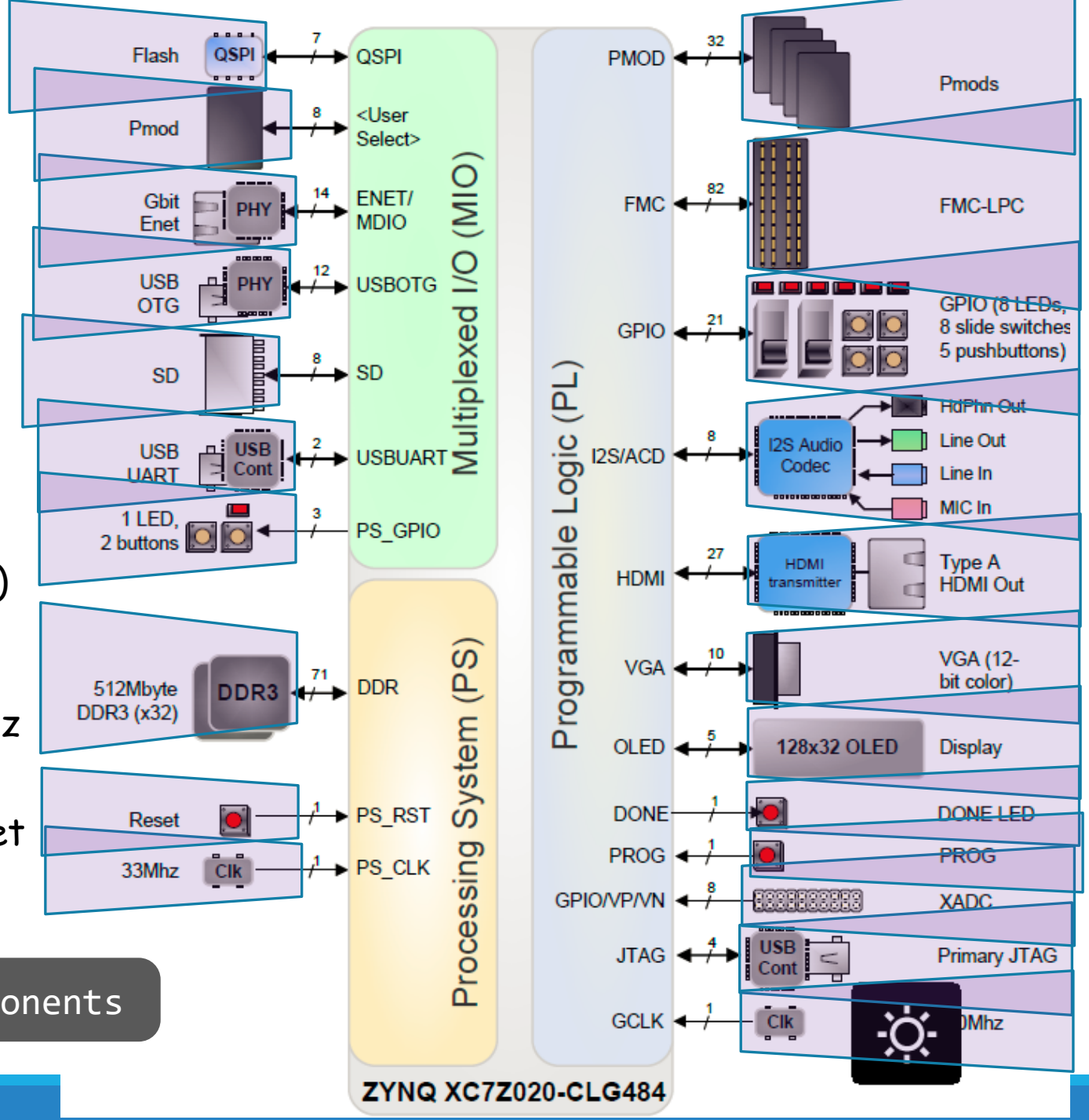
SD Card

USB-UART

LD9 (PS)
Buttons (PS)

512MB (32 bits)533MHz

Processor Subsystem Reset
Clock



PMOD

LPC FMC Connector
68 Single Ended
34 Differential

LEDs (8)

User I/O
Push Buttons(5)
DIP Switch(8)

AUDIO

HDMI

VGA

OLED

Done Blue LED

Program Push Button

Analog Mixed Signaling (AMS) Connector

USB-JTAG

PL Clock Source
100MHz

ZedBoard: main components

ZedBoard Hardware User Guide

ZedBoard

(Zynq™ Evaluation and Development) Hardware User's Guide

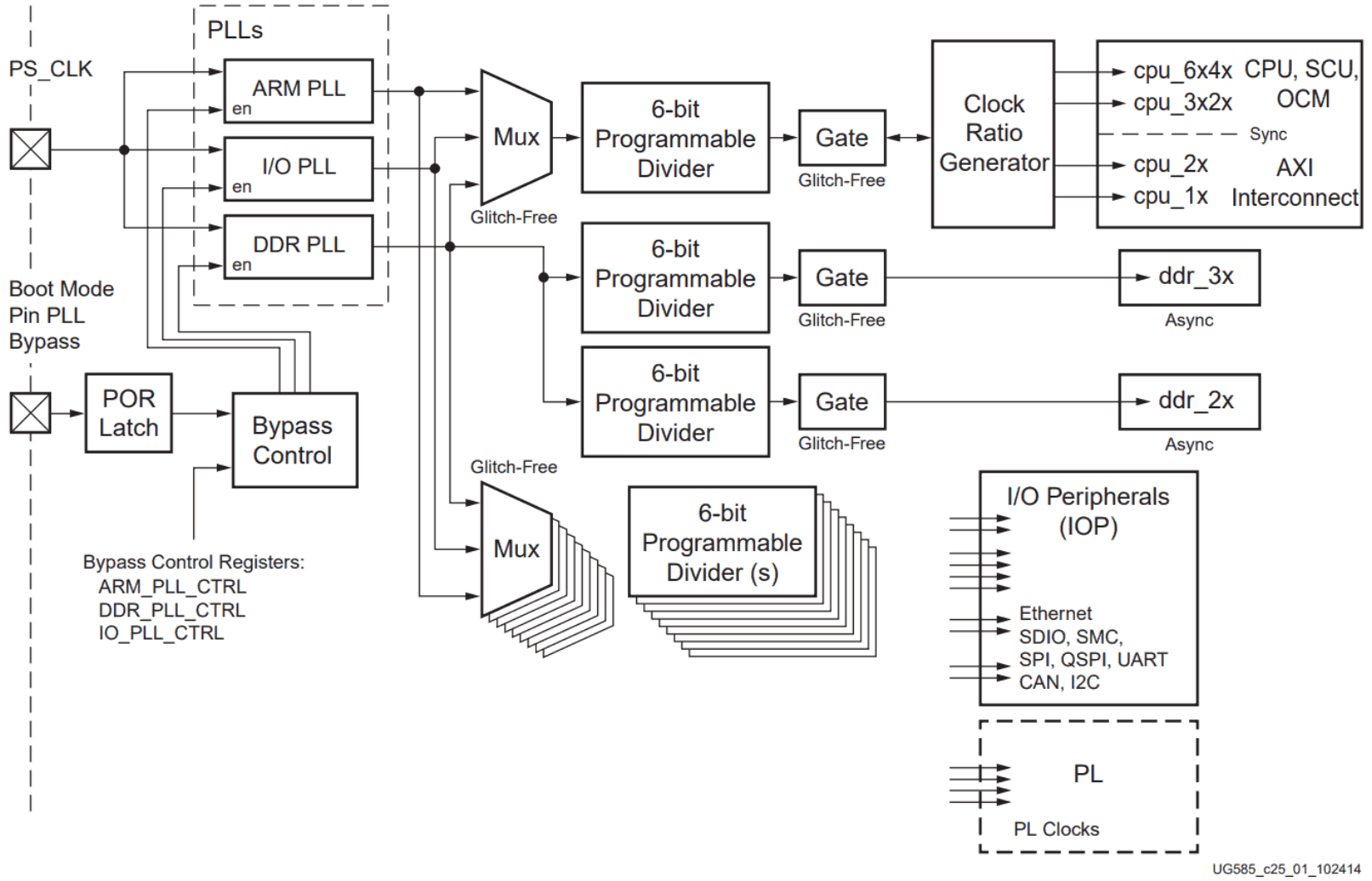
Version 2.2
27 January 2014

ZedBoard Clock Sources

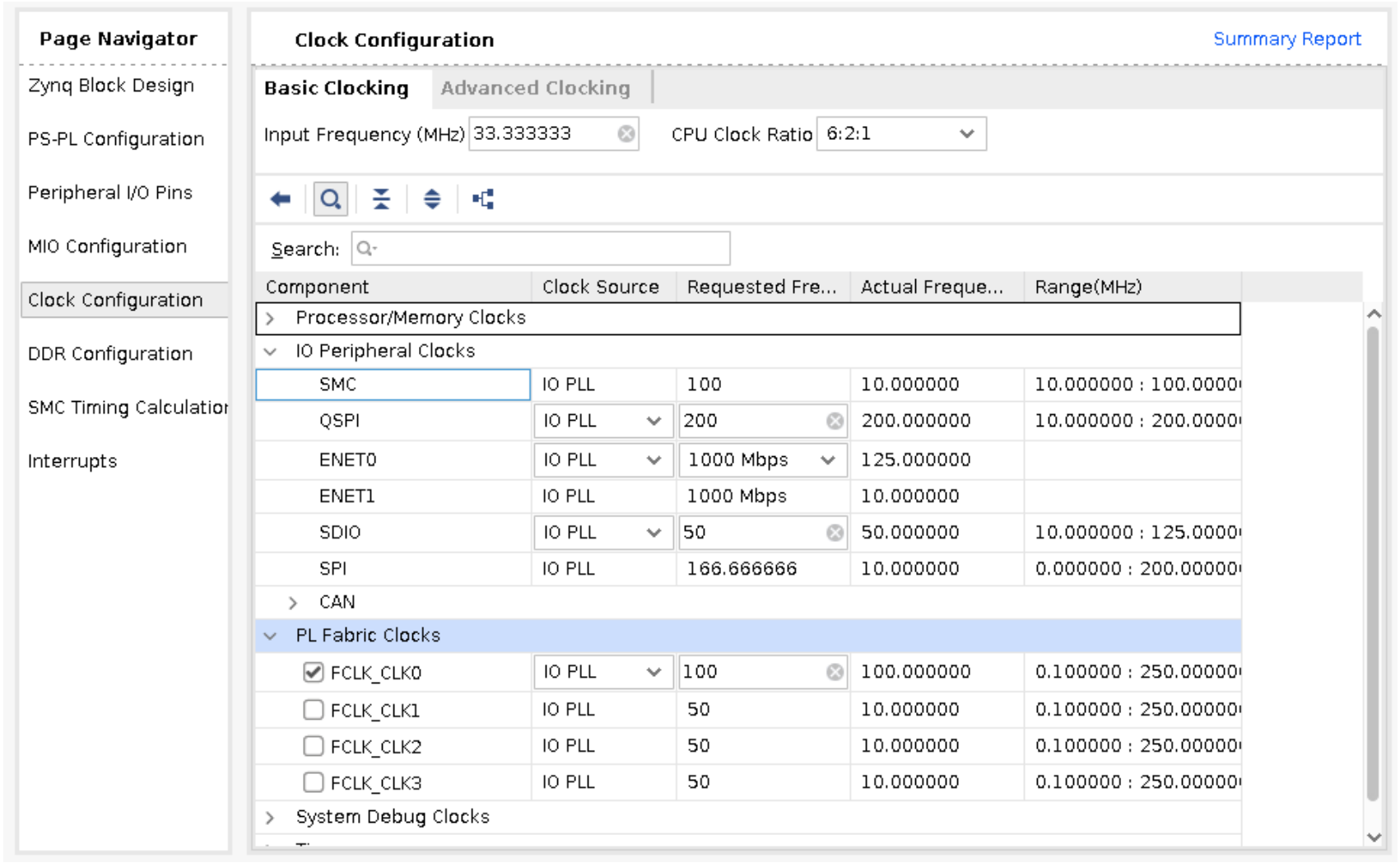
2.5 Clock sources

The Zynq-7000 AP SoC's PS subsystem uses a dedicated 33.3333 MHz clock source, IC18, Fox 767-33.333333-12, with series termination. The PS infrastructure can generate up to four PLL-based clocks for the PL system. An on-board 100 MHz oscillator, IC17, Fox 767-100-136, supplies the PL subsystem clock input on bank 13, pin Y9.

Zynq Clock Resources



Zynq Clock Resources – Configuration in Vivado



ZedBoard Available I/Os for the User (1)

2.7 User I/O

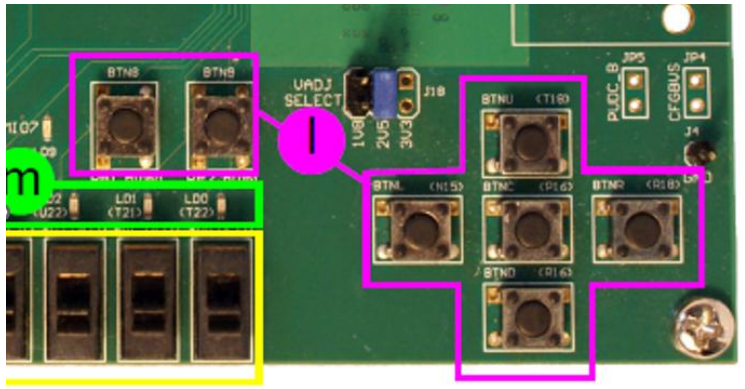
2.7.1 User Push Buttons

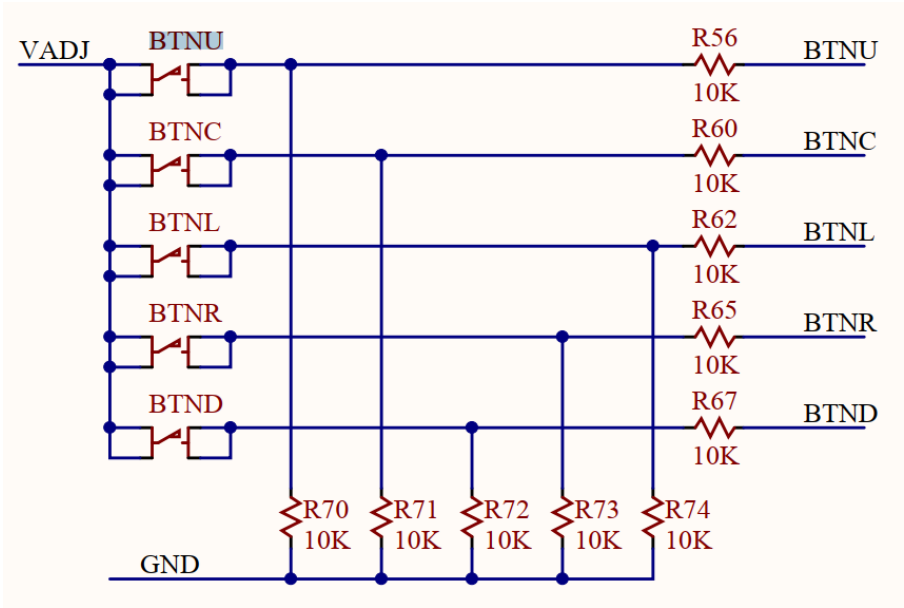
The ZedBoard provides 7 user GPIO push buttons to the Zynq-7000 AP SoC; five on the PL-side and two on the PS-side.

Pull-downs provide a known default state, pushing each button connects to Vcco.

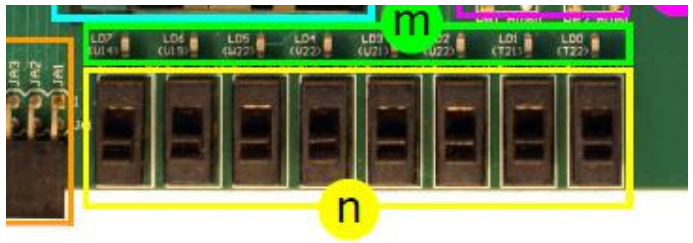
Table 12 - Push Button Connections

Signal Name	Subsection	Zynq pin
BTNU	PL	T18
BTNR	PL	R18
BTND	PL	R16
BTNC	PL	P16
BTNL	PL	N15
PB1	PS	D13 (MIO 50)
PB2	PS	C10 (MIO 51)





ZedBoard Available I/Os for the User (2)

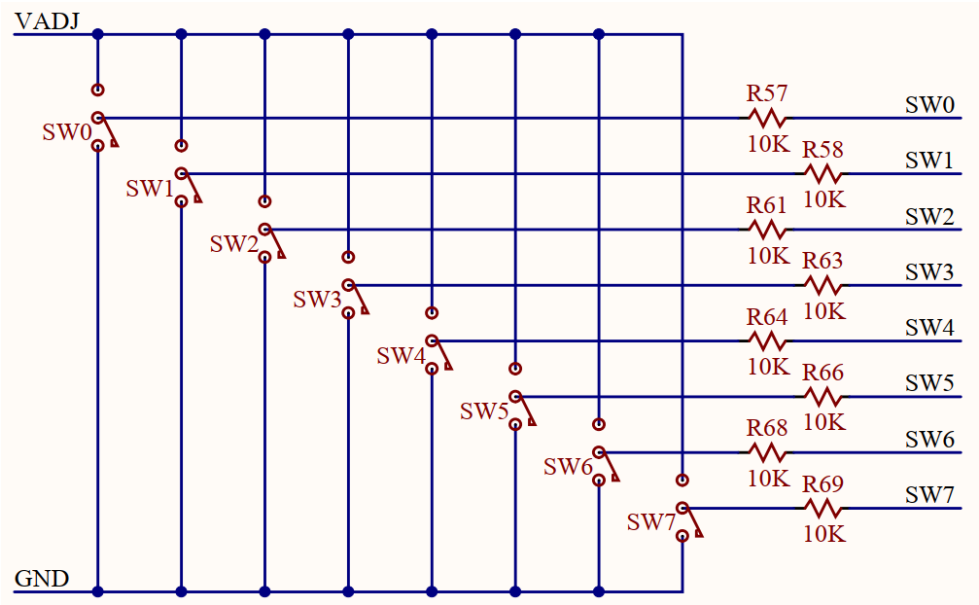


2.7.2 User DIP Switches

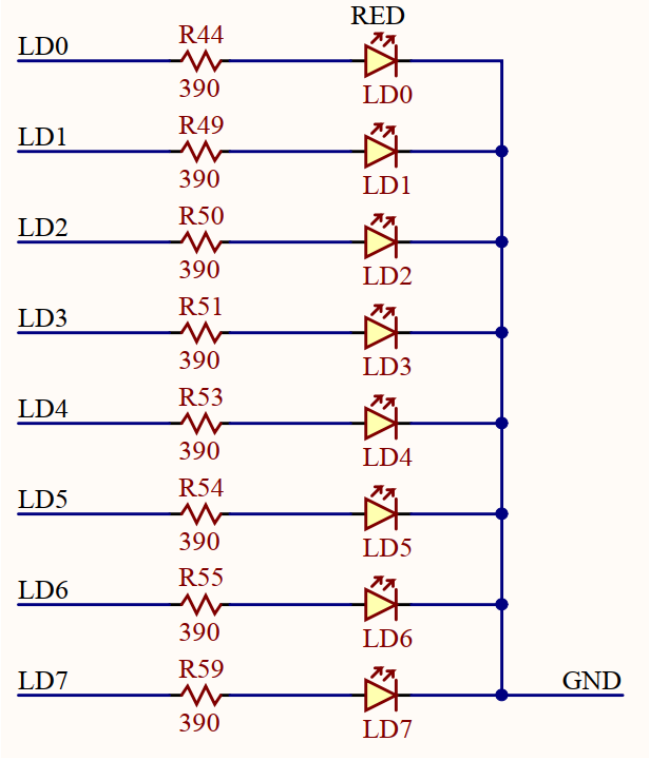
The ZedBoard has eight user dip switches, SW0-SW7, providing user input. SPDT switches connect the I/O through a 10kΩ resistor to the VADJ voltage supply or GND.

Table 13 - DIP Switch Connections

Signal Name	Zynq pin
SW0	F22
SW1	G22
SW2	H22
SW3	F21
SW4	H19
SW5	H18
SW6	H17
SW7	M15



ZedBoard Available I/Os for the User (3)



2.7.3 User LEDs

The ZedBoard has eight user LEDs, LD0 – LD7. A logic high from the Zynq-7000 AP SoC I/O causes the LED to turn on. LED's are sourced from 3.3V banks through 390Ω resistors.

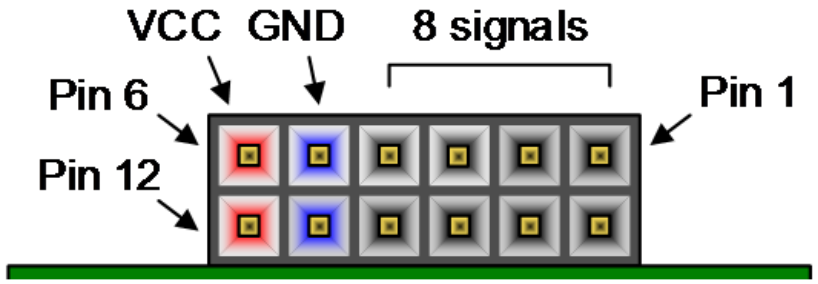
Table 14 - LED Connections

Signal Name	Subsection	Zynq pin
LD0	PL	T22
LD1	PL	T21
LD2	PL	U22
LD3	PL	U21
LD4	PL	V22
LD5	PL	W22
LD6	PL	U19
LD7	PL	U14
LD9	PS	D5 (MIO7)

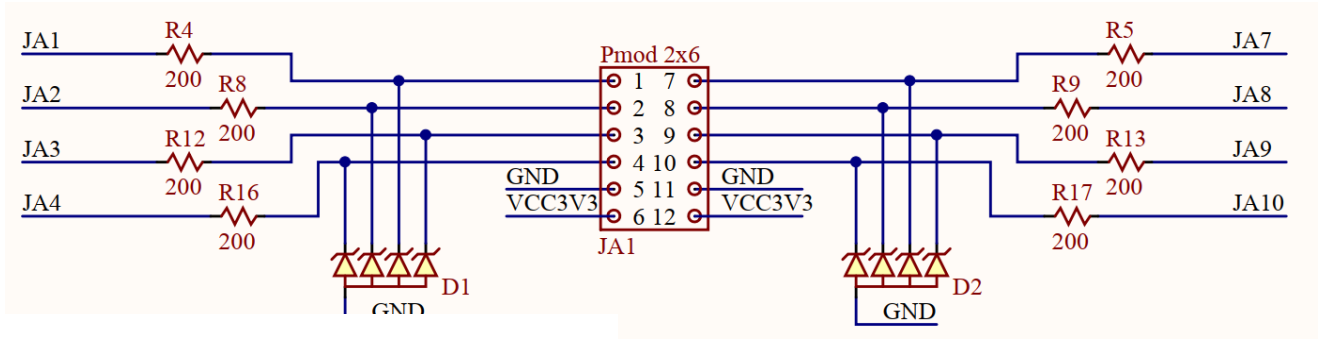
ZedBoard PMOD Connectors

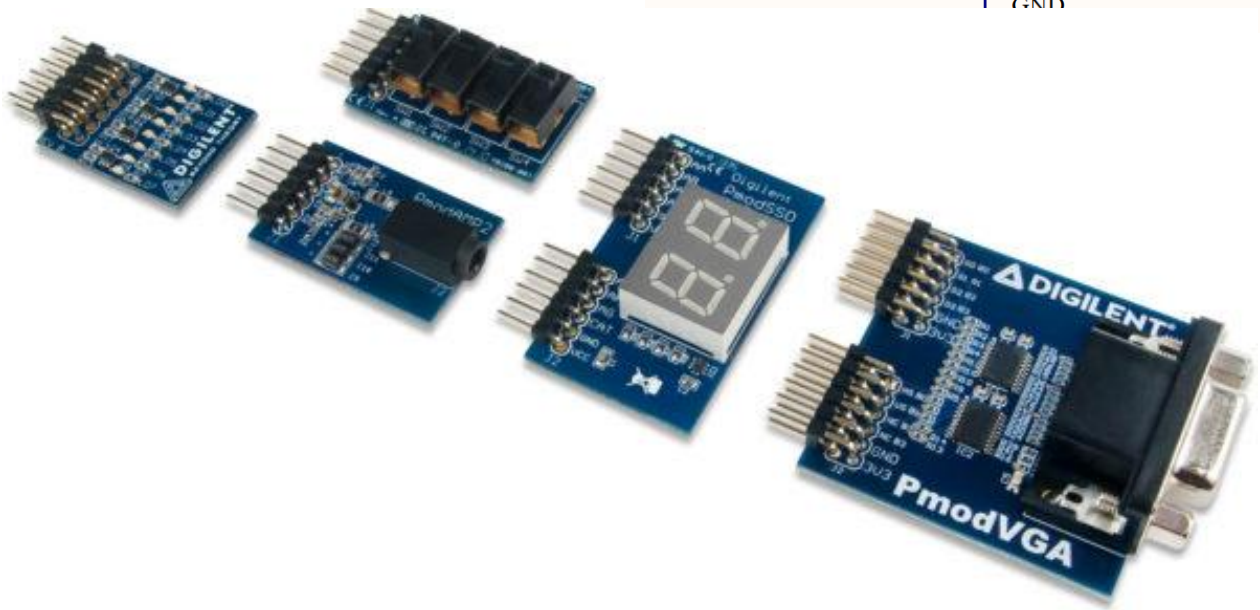
Table 16 - Pmod Connections

Pmod	Signal Name	Zynq pin	Pmod	Signal Name	Zynq pin
JA1	JA1	Y11	JB1	JB1	W12
	JA2	AA11		JB2	W11
	JA3	Y10		JB3	V10
	JA4	AA9		JB4	W8
	JA7	AB11		JB7	V12
	JA8	AB10		JB8	W10
	JA9	AB9		JB9	V9
	JA10	AA8		JB10	V8



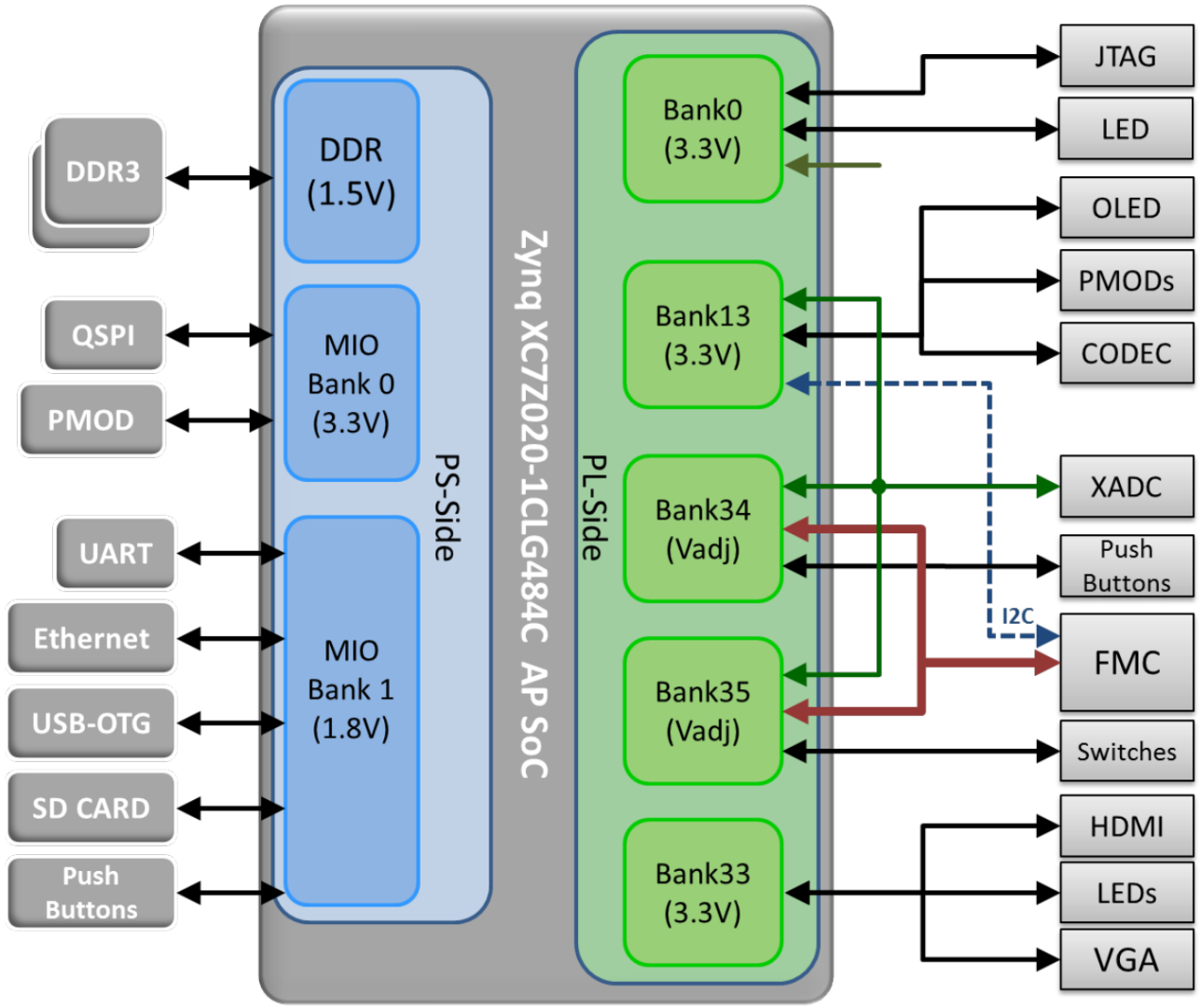
ZedBoard PMOD Boards

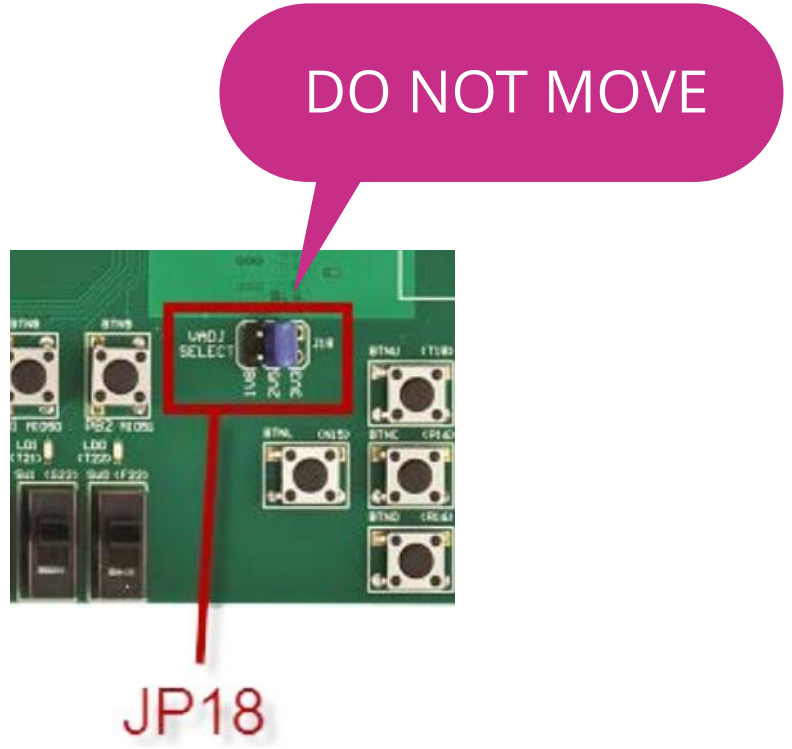




https://digilent.com/reference/pmod/start

ZedBoard Bank Power Voltages

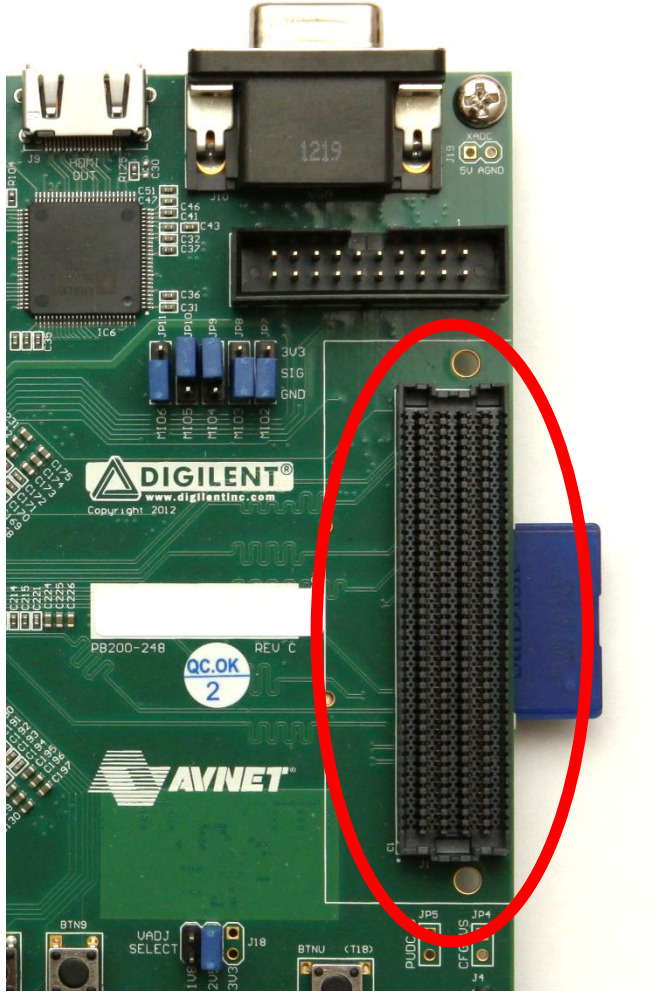




Vadj is selectad by JP18:

- 1.8V
- 2.5V
- 3.3V

LPC FMC Connector



LPC: Low-Pin-Count

FMC: FPGA Mezzanine Card

- ✓ The LPC FMC exposes 68 single-ended I/O, which can be configured as 34 differential pairs.
- ✓ ADC500: an ICTP MLAB board is plugged into the LPC FMC and will be used in the final lab.

ZedBoard + ICTP-INFN ADC500