Indian Institute of Information Technology Tiruchirappalli

Chips to Startup Programme (C2S)

Special Manpower Development Program for Chips to System Design (SMDP-C2SD)

Category-II: Development of Application Oriented Working Prototype of IPs/ASICs/SoCs

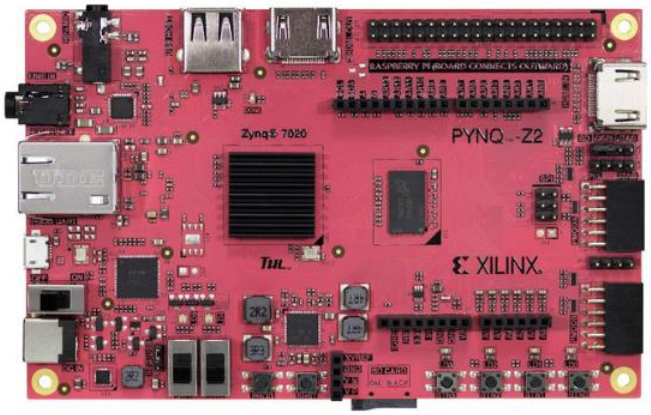
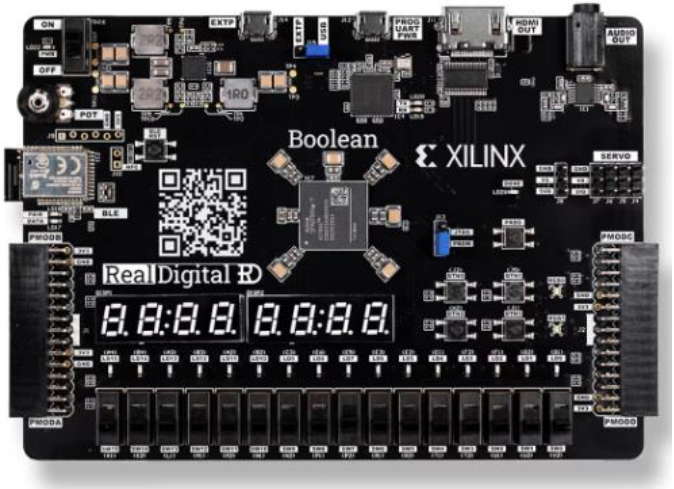
Project Title: Ultra Low Power SHAKTI RISC V Based Lightweight Edge AI Processor for IoT enabled Healthcare Applications

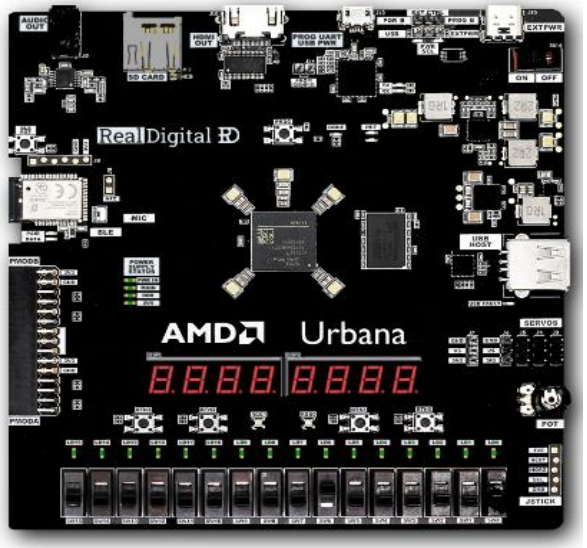
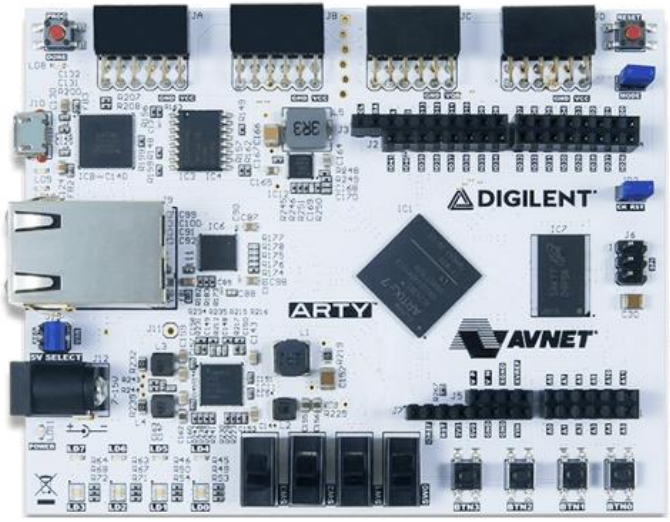
Hardware Details

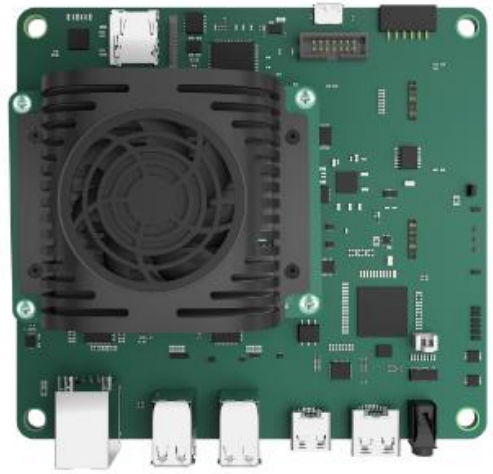
S.No	Item/Description	Part Number/Item ID	Quantity
1	Pynq Z2	1M1-M000127DVA	6
2	Pmod KYPD: 16-Button Keypad	410-195	6
3	Pmod OLEDrgb: 96 x 64 RGB OLED Display Pmod	410-323	6
4	Pmod DA2: Two 12 bit DIA Outputs	410-113	6
5	Pmod TPH2: 12-Pin Test Point Header	410-135	40
6	Boolean Board	Boolean Board	16
7	Urbana Board	Urbana Board	2
8	Arty A7-100T	410-319-1	1
		USB Cable	1
9	KRIA KR 260	SK-KR260-G	1
10	KRIA KV Video	SK-KV260-G	1
		HW-BACCP01-SK-G	1
11	Pynq ZU	2M1-M00009300G	1
12	Zynq Ultrascale + MPSoC ZCU104	EK-U1-ZCU104-G	1
Total Cost		**8,59,302/-**	

Note: Hardware sponsored by MeitY in association with CDAC

Hardware Details

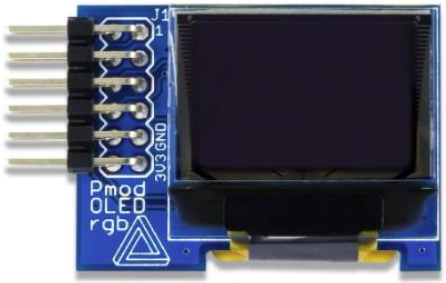
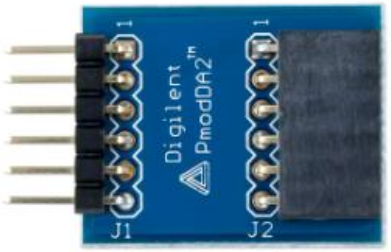
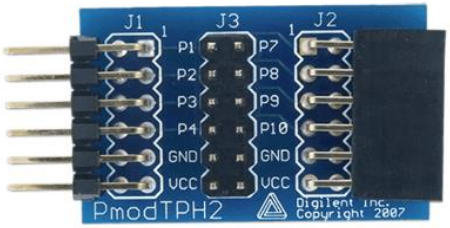
S.No	Name of the Hardware	Equipment Details	Description
1	Pynq Z2 [1M1-M000127DVA]		• Device: Zynq Z7020 • Memory: 512MB DDR3 • Storage: MicroSD • Video: HDMI In & Out ports • Audio: ADAU1761 codec with HP + Mic, Line in • Network: 10/100/1000 Ethernet • Expansion: USB host (PS) • GPIO: 1x Arduino Header, 2x Pmod*, 1x RaspberryPi header* • Other I/O: 6x user LEDs, 4x Pushbuttons, 2x Dip switches • Dimensions: 3.44” x 5.51” (87mm x 140mm) *PYNQ-Z2 RaspberryPi header shares 8 pins with 1 Pmod
2	Boolean Board		• A Xilinx XC7S50-CSG324A Spartan 7 FPGA • 16 Slide switches, 16 LEDs, 4 Pushbuttons and 2 RGB LEDs • An 8-digit seven segment display • A stereo PWM audio-out port • A 1080P HDMI port • Four servo connectors (conventional or continuous rotation) • On board analog-to-digital converter • USB2 high-speed port for programming and user UART port • Four Pmod – compatible expansion ports

3	Urbana Board		• An AMD XC7S50-CSG324A Spartan 7 FPGA • 128 Mbytes DDR3 SDRAM (x16 bus width) • Bluetooth 5.0 low energy radio based on the Nordic nRF52 • 16 slide switches, 16 LEDs, 4 pushbuttons and 2 RGB LEDs • An 8-digit seven-segment display • A stereo PWM audio-out port • USB host port for peripherals • A 1080P HDMI output port (with VGA to HDMI IP) • Four servo motor connectors • Analog-to-digital converter • USB2 high-speed port for programming and user UART port • Two Pmod compatible expansion ports
4	Arty A7-100T [410-319-1]		• Features the Xilinx Artix-100T FPGA • 256MB DDR3L/16MB Quad-SPI Flash • UART, SPI, I^2C, 10/100 Ethernet • On-board programming • Powered from USB or any 7V-15V source • Hardware compatibility with ‘shield’ add-on boards • 4 Pmod connectors for unlimited expansion • 4 Switches, 4 buttons, 8 LEDs (4 RGB)

5	KRIA KR 260 [SK-KR260-G]		• Device: Zynq™ UltraScale+™ MPSoC EV (XCK26) • Form factor: SOM + Carrier Card + Thermal Solution • Starter kit dimensions: 119mm x 140mm x 36mm • Thermal cooling solution: Active (Fan + Heatsink) • System logic cells: 256K • Block RAM blocks: 144 • Ultra RAM blocks: 64 • DSP slices: 1.2K • Ethernet interface: 4x 10/100/1000 Mb/s RJ-45s, 1x SFP+ Cage • DDR memory: 4GB (4 x 512Mb x 16 bit) [non-ECC] DDR4 • Primary boot memory: 512Mb QSPI • Secondary boot memory: SDHC card • Device Security: Zynq UltraScale+ MPSoC hardware root of trust (RoT) in support of secure boot. Infineon TPM2.0 in support of measured boot. • Video: x1 SLVS-EC Gen2 x2 lane interface, DisplayPort 1.2a Output for 1920 x 1080 at 60Hz • I/O expansion: x4 Pmod 12-pin interface, x1 Raspberry Pi HAT header with 26 I/Os • USB3.0/2.0 interfaces: x4
6	KRIA KV Video [SK-KV260-G HW-BACCP01-SK-G]		• Device: Zynq™ UltraScale+™ MPSoC • Form factor: SOM + Carrier Card + Thermal Solution • Starter kit dimensions: 119mm x 140mm x 36mm • Thermal cooling solution: Active (Fan + Heatsink) • System logic cells: 256K • Block RAM blocks: 144 • Ultra RAM blocks: 64 • DSP slices: 1.2K • Ethernet interface: One 10/100/1000 Mb/s • DDR memory: 4GB (4 x 512Mb x 16 bit) [non-ECC] • Primary boot memory: 512Mb QSPI • Secondary boot memory: SDHC card • Device Security: Zynq UltraScale+ MPSoC hardware root of trust (RoT) in support of secure boot. Infineon TPM2.0 in support of measured boot.

			• Image sensor processor: OnSemi AP1302 ISP • IAS MIPI sensor interfaces: x2 • Raspberry Pi camera interface: x1 • Pmod 12-pin interface: x1 • USB3.0/2.0 interface: x4 • DisplayPort 1.2a: x1 • HDMI 1.4: x1
7	Pynq ZU [2M1-M00009300G]		• Zynq Ultrascale+ XCZU5EG • 4GB DDR4 • Mini DisplayPort • HDMI In and Out • Composite USB 3.0, USB 3.0 Host • WiFi & Bluetooth • Audio codec • Camera Serial Interface (CSI) • User LEDs, buttons and switches • Expansion interfaces include FMC (LPC), SYZYGY, Pmod, Raspberry Pi connector, and Grove

8	Zynq Ultrascale + MPSoC ZCU104 [EK-U1-ZCU104-G]		• Featuring the Zynq UltraScale+ XCZU7EV-2FFVC1156 MPSoC • Configuration: (USB-JTAG FT4232H, Dual Quad-SPI flash memory, MicroSD Card) • Memory: (PS DDR4 64-bit Component, Quad-SPI flash, Micro SD card slot) • Control & I/O: (4x directional pushbuttons, DIP switches, PMBUS, clocks, and I2C bus switching, USB2/3) • Expansion Connectors: (FMC LPC (1x GTH), 3 PMOD connectors, PL DDR4 SODIMM Connector – 64 bit) • Communication & Networking: (USB-UARTs with FT4232H JTAG/3xUART Bridge, RJ-45 Ethernet connector, SATA (M.2) for SSD access) • Display: (HDMI 2.0 video input and output (3x GTH), DisplayPort (2x GTR)) • Clocking: (Programmable clocks, System clock, user clock, Jitter attenuator) • Power: (12V wall adaptor or ATX)
9	Pmod KYPD: 16-Button Keypad [410-195]		• 16 momentary push-buttons • Can detect simultaneous button presses • Isolated rows and columns • 12-pin Pmod port with GPIO interface • Follows the Digilent Pmod Interface Specification Type 1

10	Pmod OLEDrgb: 96 x 64 RGB OLED Display Pmod [410-323]		• 96×64 pixel RGB OLED screen • 0.8“ x 0.5” graphical display • 16-bit color resolution • 16 brightness settings • Two low-power display shutdown modes • 12-pin Pmod connector with SPI interface • Features a Solomon Systech SSD1331 display controller
11	Pmod DA2: Two 12 bit DIA Outputs [410-113]		• Features the Texas Instruments Dac121s101 • 12-bit digital-to-analog converter (x2) • Two simultaneous D/A conversion channels • Very low power consumption • 6-pin Pmod connector with GPIO interface
12	Pmod TPH2: 12-Pin Test Point Header [410-135]		• Provides simple test-point access • Test the signals between your 12-pin Pmod and its host board