



UAV & Robotics Platform

Overview

Ideally suited for UAV or drone developments, this Xilinx® Zynq® UltraScale™ MPSoC Unmanned & Robotics Platform (URP) stands out from alternatives because it is fully software programmable while maintaining flexibility to customize unique requirements. The URP is a feature-rich, highly-integrated, small form-factor, off-the-shelf solution. It enables and accelerates developments spanning a breadth of domains including:

- Image processing and compression with two high-res cameras
- Multi-motor drive with high-efficiency high-RPM controller IP
- Inertial measurement with position and environmental sensors
- Autonomous navigation and control, algorithms and autopilot
- High performance low latency deterministic embedded compute
- Algorithm acceleration using Software programming of PL kernels

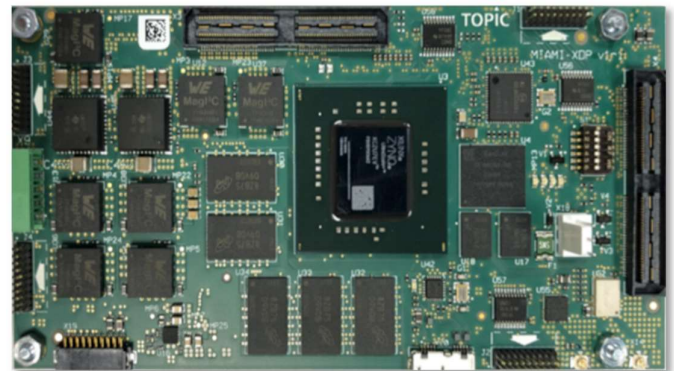
Embedded software and algorithm developers can quickly get running with this software programmable platform, immediately leveraging Xilinx technology.

Hardware developers and low-level embedded firmware developers can leverage the URP to quickly get running and customizing from on a working foundation.

This URP is equally useful for rapid prototyping and production systems. Documentation is provided, including user guide, board and PL platform design, and embedded drivers with Linux BSP. Topic Dyplo flow and QDesys Motor Control IP licenses are included for use on each purchased board. Topic offers additional platform customization services.

Platform advantages

- Accelerated development, quickly demonstrate tangible results
- Integrate alternative solutions to single URP board, reduce SWAP
- Fully software programmable; no prerequisite for FPGA expertise
- Included Linux BSP, PL IP wrapper, and embedded drivers
- Easy out-of-the-box bring-up of integrated URP solution
- Interact with URP via Wi-Fi connection to embedded GUI
- Enables focused development on Vision, Nav, motors, ML/AI etc.



URP Key features

- SoC-based – Xilinx Zynq UltraScale+ MPSoC XCZU7EV / 5EV
- Communications – WiFi & Bluetooth
- Positioning – GPS chip, Pressure sense, 3-axis accelerometers + gyros
- Motor Control – 4x efficient high-RPM drivers for a power stage supporting BLDC motors up to 30V@15A
- Imaging – 2x MIPI 4k60fps camera sensor, customizable processing/ISP
- Video Codec – H.265/264 w/ 4k60fps
- Autopilot-Capable – support to host PX4 and ROS along-side Linux
- DSP / ML / AI Compute – software-based algorithm development flows
- Battery Management Interface – dedicated SMBus/I2C bus connector
- Expansion and Payload – via Samtec headers with GPIO and 16Gbps GTs
- Reliability and Certification – Xilinx and Topic qualifications, expertise in avionics, auto, industrial, and medical
- Size – 135mm x 68.4mm x 10mm
- Temperature – Ambient -40°C to +85°C

UAV & Robotics Platform (URP)	URP-EV712	URP-EV512
SOC technology		
Technology	XCZU7EV-2FBVB900I	XCZU5EV-2FBVB900I
Logic cells (K)	504	256
CLB LUTs (K)	230	117
Flip Flops (K)	461	234
Block RAM (Mb)	11.0	5.1
UltraRAM (Mb)	27.0	18.0
DSP slices	1728	1248
PS MGT transceivers	3 (1x on-board USB 3.0, 2x to extension header)	
PL MGT transceivers (GTH)	12 (4x to extension connector, 4x to expansion connector #1, 4x to expansion connector #2)	
Processor Units		
Application Processor Core	Quad-core ARM® Cortex™-A53 MPCore™ up to 1.33GHz	
Memory w/ECC	L1 Cache 32KB I / D per core, L2 Cache 1MB, on-chip Memory 256KB	
Real-Time Processor Core	Dual-core ARM Cortex-R5 MPCore™ up to 533MHz	
Memory w/ECC	L1 Cache 32KB I / D per core, Tightly Coupled Memory 128KB per core	
Graphics Processing Unit	Mali™-400 MP2 up to 667MHz	
Memory L2 Cache	64K	
Memory resources, Connectivity, Embedded sensors		
Dynamic SRAM memory	4Gbyte DDR4 x72 (including ECC support)	
Flash (NAND and NOR) memory	On-board: eMMC (8Gbyte), 2x Quad-SPI (64Gbyte). On-connector: SD-card, NVMe (PCIe) M2 SSD	
EEPROM memory	On-board: 32Kbit I2C for production data, series number, MAC addresses and user parameters	
PS linked High-Speed Connectivity	PCIe® Gen2 (x2), 1x USB3.0, SATA 3.1, DisplayPort, 2x Tri-mode Gigabit Ethernet	
PL linked High-Speed Connectivity	PCIe® Gen3 (x4), MIPI, HDMI, Aurora (4 lanes), 10/40/50Gbit Ethernet	
Sensors	Bosch BMI088 (3-axis accelerometer + 3-axis gyroscope), Bosch BMM150 (geomagnetic), Bosch BME680 (environmental), uBlox ZOE-M8B-0 (GPS)	
Connectivity (user interfaces)	Murata LBEE5KL1DX (Wi-Fi/BlueTooth), USB 3.0 via micro AB connector	
User adaptable interfaces interfaces on SoM (with a base platform configuration provided)		
Video connectivity (2x 4Kp60)	2x MIPI video input via 30 pins I-PEX connector (Leopard LI-IMX274-MIPI camera compatible)	
Motor drive connectivity (4x)	4x 20 pin header, 3V3 logic + supply, 14 FPGA controlled signals	
Extension connector (1x)	120 pins Samtec QSH-060 (2xPSGTR, 4xPLGTH, 3x PS + 16x PL 1V8 logic signals)	
Expansion connectors (2)	120 pins Samtec QSH-060 (4xPLGTH, 3x PS + 16x PL 1V8 logic signals)	
Power supply		
Input	9-16Vdc, max. 4A, via dedicated 5 pins board connector, including PMbus/I2C capabilities	
<i>Important notice!</i>	<i>To drive a motor, a separate supply has to be applied directly to the motor drive stages. The URP does not provide sufficient power to drive motors!</i>	
Software		
Bootloader / BSP	Vivado board specification file, PCIe boot support option	
Boot options	JTAG, dual quad SPI, eMMC NAND flash, SD-card NAND flash	
Operating System	Topic Linux BSP including bootloader, PETA Linux	
Dypl® compatible platform	Yes, license included with the board	
Mechanical and environmental		
Dimensions	135.0mm x 68.4mm x 10mm (length x width x height)	
Temperature grade	Industrial (complete board)	
Qualification tests		
EMC/EMI	EN 55032, IEC 61132, EN 61326, IEC 55024	
Optional add-on boards		
URP-CAMA	Leopard LI-IMX274-MIPI camera pack	
URP-MOCA	Motor driver and motor pack	
URP-DESK	Desktop extension pack	
URP-SDR	3 rd party SDR boards are available; contact Xilinx or Topic for further detail	