ARC EM Software Development Platform

Highlights

- Supports wide-range of ARC EM-based configurations
- Downloadable platform packages easily configure hardware and software
- 16MB PSRAM and SPI Flash Memory
- Audio Line In/Out, UART, SPI, I²C, ADC interfaces
- WiFi (802.11b/g/n)/Bluetooth 4.0 with worldwide regulatory compliance (FXX, IC, CE, ETSI, TELEC)
- On-board 9-axis sensor and MEMS microphones
- JTAG Debug and NEXUS Trace support
- Micro-SD Card slot
- Extensible with Arduino, Digilent Pmod, MikroBUS connectors and a generic 50-Pin Headers
- embARC Open Software Platform support
- MetaWare Development Toolkit support

Target Applications

- IoT
- Sensor fusion
- Voice

The DesignWare® ARC® EM Software Development Platform (SDP) is a flexible platform for rapid software development on the ARC EM processors and EM processor based subsystems. It is intended to accelerate software development and debug of ARC EM processor-based systems for a wide range of ultra-low power embedded applications such as IoT, sensor fusion, and voice applications. It includes an FPGA-based hardware board with commonly used peripherals and interfaces for extensibility. Downloadable platform packages containing different hardware configurations enable the board to be programmed with different ARC EM processors and subsystems. The packages also contain the necessary software configuration information for the toolchain and embARC Open Software Platform. The Development Platform is supported by MIPS' MetaWare Development Tool Kit, which includes a compiler, debugger and libraries optimized for maximum performance with minimal code size. The embARC Open Software Platform (OSP), available online from embarc.org, gives developers online access to device drivers, FreeRTOS, middleware and examples that enables them to quickly start software development for their ARC-based embedded systems.

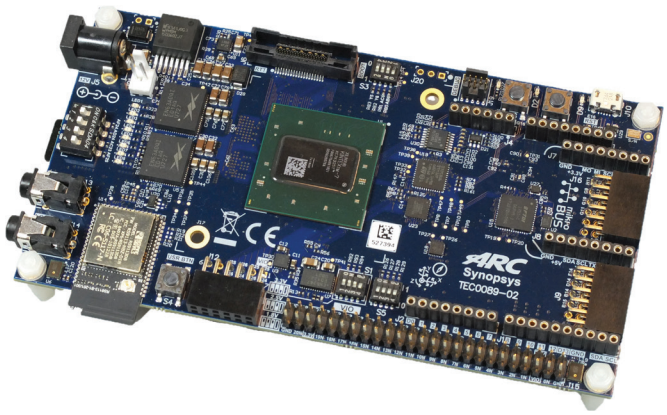

Figure 1: ARC EM Software Development Platform hardware

Each hardware configuration includes an ARC EM processor and subsystem with 16MB of PSRAM, 16MB of SPI Flash and a wide range of peripherals such Audio Line In/Out, UART, SPI, I²C, and ADC. An on-board module providing WiFi/Bluetooth functionality and a 9-D motion sensor enable fast development of IoT applications. Two digital MEMs

microphones can also be used for the development of voice applications. The hardware is extensible using the popular Arduino® interface and extension is also possible with Digilent® PmodTM Interfaces, MikroBUSTM headers and a 50-pin header. Debug and trace are handle with USB/JTAG interfaces and a NEXUS interface for ARC Real-Time Trace (RTT). The board includes a micro-SD card slot for loading application software.

Board Features

FPGA

- Xilinx® Kintex®-7 XC7325T-2

Memory

- PSRAM (16 MB)
- SPI Flash (16 MB quad-mode XiP)

Interfaces

- Audio line in/out
- USB data port (JTAG/UART/access to configuration memory)
- Micro-SD Card
- Wi-Fi®/Bluetooth® module
- UART, SPI, I^2C
- 8-channel ADC
- 9-D motion sensor
- 2 digital MEMs microphones
- RTT Nexus, JTAG

Extensions

- Arduino Interface headers (UNO Rev3 compatible)
- MikroBUS headers
- Digilent Pmod Interfaces (3x)
- Generic Pin Header (50 pins)

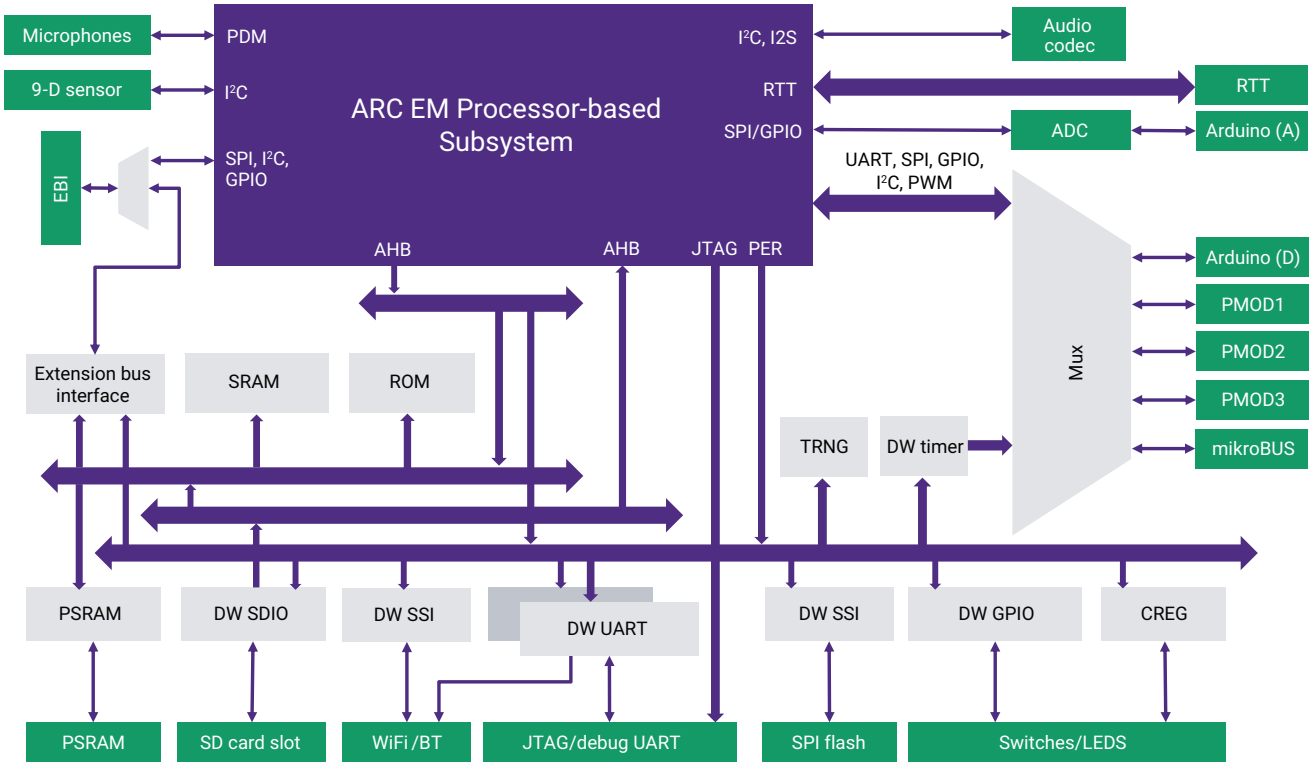

Figure 2: ARC EM Software Development Platform block diagram

Hardware—Platform Packages

The ARC EM Software Development Platform can be configured for different ARC EM processor-based systems with downloadable platform packages. Each platform package contains an encrypted FPGA bitstream, a Tools Configuration File for the MetaWare tools, software header files for embARC OSP and a User Guide.

The hardware is configured by connecting the ARC EM SDP to a PC. The ARC EM SDP will appear as a mass-storage device and the downloaded FPGA bitstream can easily be programmed into the FPGA by a simple drag & drop operation.

There are 7 platform packages available for download (Table 1):

Category	Core	Subsystem
RISC	ARC EM4	Sensor and Control Subsystem
	ARC EM6	Sensor and Control Subsystem
DSP	ARC EM5D	Data Fusion Subsystem
	ARC EM7D	Data Fusion Subsystem
	ARC EM9D	Data Fusion Subsystem
	ARC EM11D	Data Fusion Subsystem
Security	ARC EM7D + ESP	Data Fusion Subsystem

Table 1: Available platform packages

Software—embARC Open Software Platform

The embARC OSP supports the ARC EM Software Development Platform with pre-integrated and verified software stacks for FreeRTOS. The software includes many protocol stacks for IoT and embedded applications. Each downloadable platform package contains header files to build the used by embARC OSP software for the hardware configuration.

Tools

The ARC EM Software Development Platform is supported by MIPS' ARC MetaWare Development Toolkit, enabling the development and debugging of highly optimized, high-density code. Each downloadable platform package includes a Tools Configuration File that will configure the compiler and debugger for use with the hardware configuration.

Debug and Trace

A USB cable can be connected to the board for debugging with the MetaWare Debugger. There are also 10-pin and 6-pin debug connectors for Ashling Opella-XD, Lauterbach and Digilent HS1 and HS2 probes and cables.

ARC Real-Time Trace is available for both off-chip and on-board DDR trace. Off-chip trace is supported using an Ashling Ultra-XD pod or a Lauterbach Trace Pod.

Extensibility

The ARC EM Software Development Platform is extensible through the available and Arduino, Digilent Pmod, mikroBUS connectors. There is also a generic 50-pin header for extension use.

Deliverables

- Hardware platform board
- 100-240V AC power adapter
- All documentation and software available from http://www.embarc.org

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For more information, visit **www.mips.com/arc.**