

ARC IoT Development Kit

Highlights

- ARC EM9D-based Data Fusion IP Subsystem
- Rich set of I/O including USB On-the-Go (OTG), SDIO, GPIO, multiple serial interfaces, ADC, PWM and eFlash, SRAM and SPI Flash memory
- Real-Time Clock (RTC)
- Bluetooth module with worldwide regulatory compliance (FCC, IC, CE, ETSI, TELEC)
- On-board 9-axis sensor (gyro, accelerometer, and compass)
- Free software includes embARC Open Software Platform (OSP)
- Low-cost JTAG debugging via USB cable
- Extensible with Arduino, Pmod, mikroBUS connectors and a 2x18 extension header

Overview

The DesignWare® ARC® IoT Development Kit includes a silicon implementation of the ARC Data Fusion IP Subsystem as well as a rich set of peripherals commonly used in IoT designs such as Bluetooth, USB, analog-to-digital converter (ADC), pulse width modulator (PWM) and on-board 9-axis sensor. The IoT Development Kit is supported by Synopsys' ARC MetaWare Development Toolkit, which includes a compiler, debugger and libraries optimized for maximum performance with minimal code size. In addition, the [embARC Open Software Platform](#) gives developers online access to device drivers, application examples and a suite of free and open-source software that speeds software development for ARC-based embedded systems.



Figure 1: ARC IoT Development Kit hardware

Figure 1 shows the development board with the ARC IoT SoC. It is a silicon implementation of the ARC EM9D-based ARC Data Fusion IP Subsystem running at 144 MHz on SMIC's 55-nm, ultra-low power process. The SoC also integrates a wide range of common peripheral interfaces including USB, UART, SPI, I²C, real-time clock (RTC), ADC, PWM and secure digital input-output (SDIO). The IoT Development Kit has an on-board Bluetooth low-energy module for connecting to wireless networks and a 9-axis (gyro, accelerometer and compass) sensor for developing wearable and other IoT applications. The ARC IoT Development Kit is very extensible through the available Arduino, mikroBus and Pmod connectors.

For debugging and trace, JTAG debug probes can be connected via the debug header. It is also possible to use a standard USB cable for debugging.

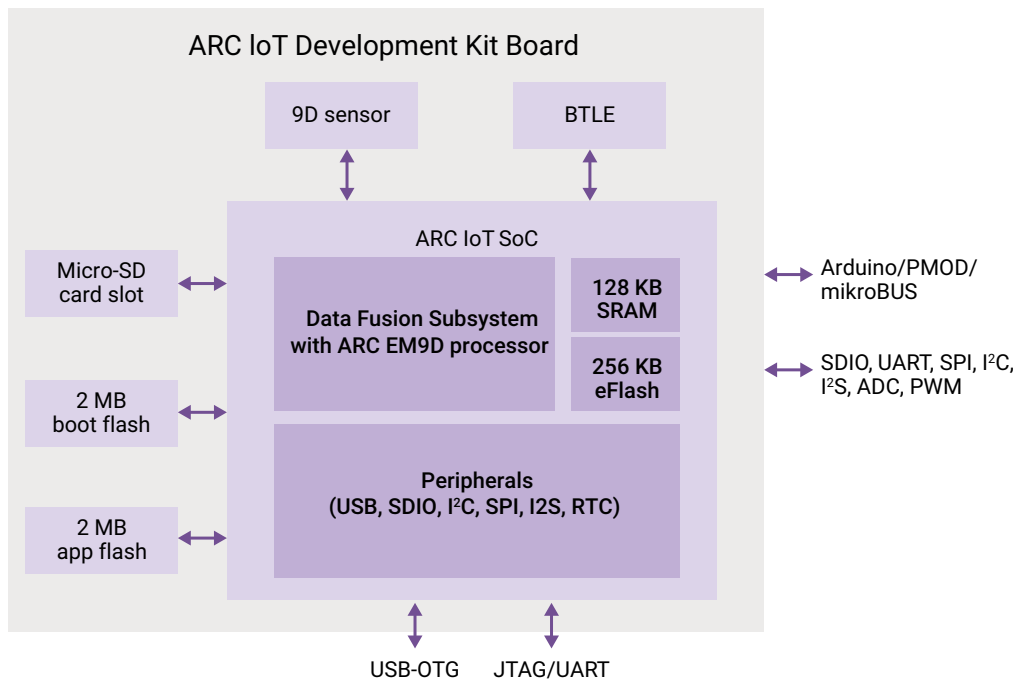


Figure 2: ARC IoT Development Kit Block Diagram

Board Features

- ARC IoT SoC
 - 144 MHz EM9D based Data Fusion Subsystem
 - 256KB Closely Coupled Memory for instructions
 - 128KB Closely Coupled Memory for data
 - 32 KB X-Memory
 - 32 KB Y-Memory
 - USB 2.0 OTG, 2x SDIO
 - eFLASH (256 KB), SRAM (128 KB)
 - Multiple peripherals including RTC, I²C, SPI, etc.
- Memory
 - 2x SPI Flash (2 MB)
- Interfaces
 - USB2.0 OTG
 - USB Data port (JTAG/UART)
 - Micro-SD Card
 - 9D Sensor
 - Bluetooth Low-Energy module
 - ADC (16 channels)
 - JTAG
 - Power Management IC
- Extensions
 - Arduino Interface headers (UNO R3 compatible)
 - mikroBUS headers
 - Pmod Interfaces (2x)
 - Extension header (2x 18 pin)

Tools and Software

The ARC IoT Development Kit is supported by a robust ecosystem of development tools and software including the ARC MetaWare Development Toolkit, which enables the development and debugging of highly optimized, high-density code. In addition, Synopsys' [embARC Open Software Platform](#) gives software developers online access to a comprehensive suite of free and open-source software such as device drivers, FreeRTOS, IoT middleware, and application examples that ease the development of code for IoT applications. The software in the embARC Open Software Platform includes popular IoT protocols REST, HTTP, CoAP, MQTT, JSON, LWM2M and networking stacks such as lwip and commonly used security protocols such as mbedTLS.

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

Extensibility

The ARC IoT Development Kit is extensible through the available Digilent Pmod, mikroBUS and Arduino connectors and additional extension headers.

Deliverables

- Hardware platform board
- All documentation and software is available from www.embarc.org

About DesignWare IP

Synopsys is a leading provider of high-quality, silicon-proven IP solutions for SoC designs. The broad DesignWare IP portfolio includes [logic libraries](#), [embedded memories](#), [embedded test](#), [analog IP](#), [wired and wireless interface IP](#), [security IP](#), [embedded processors](#), and [subsystems](#). To accelerate prototyping, software development and integration of IP into SoCs, Synopsys' [IP Accelerated initiative](#) offers [IP prototyping kits](#), IP software development kits, and [IP subsystems](#). Synopsys' extensive investment in IP quality, comprehensive technical support and robust IP development methodology enable designers to reduce integration risk and accelerate time-to-market.

For more information on DesignWare IP, visit synopsys.com/designware.