ARC labs handbook

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OVERVIEW

This is a handbook for ARC labs which is a part of ARC university cour. It's written to to help students who attened the ARC university courses and anyone who is interested in ARC to get started in ARC processor development. It describes all the basic elements of ARC labs and how to finish the labs with step by step approach.

This book can be used as a Lab teaching material for ARC university courses at undergraduate or graduate level with majors in Commuter Science, Computer Engineering, Electrical Engineering; or for professional engineers.

This handbook includes 12 labs currently (more labs will be added in the future), which can be classified into 3 levels:

- Level1: ARC basic

The labs in this level cover the basic topics about ARC, e.g., the installation of tools, hello world, interrupts.

- Level2: ARC advance

The labs in this level cover the advanced topics about ARC, e.g., RTOS, customized linkage.

- Level3: ARC exploaration

The labs in this level will cover some complex applications.

Most of labs are based on the embARC Open Software Platform (OSP) is an open software platform to facilitate the development of embedded systems based on DesignWare® ARC® processors.

It is designed to provide a unified platform for DesignWare® ARC® processors users by defining consistent and simple software interfaces to the processor and peripherals, together with ports of several well known FOSS embedded software stacks to DesignWare® ARC® processors.

For more details about embARC OSP, please refere its online docs

1.1 Supported Hardware Platform

The following hardare platforms are supported in this handbook:

- ARC EM Starter Kit
- ARC IoT Development Kit

1.2 Reference

Here is reference for this hand book.

Item	Name
1	ARC EM Databook
2	MetaWare docs
3	ARC EM Starter Kit User Guide
4	ARC GNU docs

GETTING STARTED

Use this guide to get started with your ARC labs development.

2.1 Software Requirement

- **ARC Development Tools** Choose **MetaWare Toolkit** and/or **ARC GNU Toolchain** from the following list according to your requirement.

    - MetaWare Toolkit

        * Premium MetaWare Development Toolkit (2017.09) The DesignWare ARC MetaWare Development Toolkit builds upon a 25-year legacy of industry-leading compiler and debugger products. It is a complete solution that contains all the components needed to support the development, debugging and tuning of embedded applications for the DesignWare ARC processors.

        * DesignWare ARC MetaWare Toolkit Lite (2017.09) A demonstration/evaluation version of the MetaWare Development Toolkit is available for free from the Synopsys website. MetaWare Lite is a functioning demonstration of the MetaWare Development Toolkit, but has a number of restrictions, including a code-size limit of 32 Kilobytes and no runtime library sources. It is available for Microsoft Windows only.

    - ARC GNU Toolchain

        * Open Source ARC GNU IDE (2017.09) The ARC GNU Toolchain offers all of the benefits of open source tools, including complete source code and a large install base. The ARC GNU IDE Installer consists of Eclipse IDE with ARC GNU plugin for Eclipse, ARC GNU prebuilt toolchain and OpenOCD for ARC

- Digilent Adept Software for Digilent JTAG-USB cable driver

- Tera Term or PuTTY for serial terminal connection, 115200 baud, 8 bits data, 1 stop bit and no parity (115200-8-N-1) by default.

Note: If using embARC with GNU toolchain on Windows, install Zadig to replace FTDI driver with WinUSB driver. See How to Use OpenOCD on Windows for more information.

Check the following items and set development environment.

- Make sure the paths of the above required tools for the MetaWare toolkit and ARC GNU toolchain are added to the system variable **PATH** in your environment variables.

- We recommend users to install ARC GNU IDE to default location. Otherwise you need to make additional changes as below.

    - If running and debugging embARC applications using **arc-elf32-gdb** and OpenOCD for ARC, make sure 1) the path of **OpenOCD** is added to the **PATH** in your environment variables, and 2) modify **OPENOCD_SCRIPT_ROOT variable** in *<embARC>/options/toolchain/toolchain_gnu.mk* according to your **OpenOCD** root path.

– If running GNU program with using the GNU toolchain on Linux, modify the **OpenOCD** configuration file as Linux format with LF line terminators. **dos2unix** can be used to convert it.

Note: Check the version of your toolchain. The embARC software build system is purely makefile-based. make/gmake is provided in the MetaWare toolkit (gmake) and ARC GNU toolchain (make)

2.2 Install Software Tools

2.2.1 Install Metaware Toolkit

2.2.2 Install ARC GNU Toolchain

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