DEVELOPMENT GUIDE

ARTiGO A630

Linux EVK v1.0.1

1.00-08292017-093200

Revision History

Version	Date	Remarks
1.00	08/29/2017	Initial release.

Table of Content

1. Introduction

This Development Guide explains how to build the Debian system image for the ARTIGO A630 system in order to begin evaluating the platform.

The ARTiGO A630 Linux BSP v1.0.1 is developed based on the debian-8.6.0-lxde-player (Debian 8.6) and it enables hardware features that are defined on the ARTiGO A630 system.

1.1 BSP Package Content

There are four folders in the package as listed below.

Source code folder	Description
ARTiGO_A630_Linux_source_code.zip	Kernel source code and U-Boot source code
Firmware folder	**Description**
ARTiGO_A630_Linux_EVK_v1.0.1.zip	Debian EVK system image and installation script files
Document folder	**Description**
ARTiGO_A630_Linux_BSP_v1.0.1_Development_Guide_v1.00_20170829.pdf	Development guide
ARTiGO_A630_Linux_EVK_v1.0.1_Quick_Start_Guide_v1.00_20170829.pdf	Quick Start Guide
Tools folder	**Description**
arm_201103_gcc4.5.2.tgz	Toolchain

1.1.1 Source Code Folder Contents

ARTiGO_A630_Linux_source_code.zip: A complete and static Debian BSP including the ARTiGO A630 meta-files and all the pre-downloaded required software packages to enable a complete offline build.

1.1.2 Firmware Folder Contents

ARTiGO_A630_Linux_EVK_v1.0.1.zip: contains installation script files and the precompiled U-boot and image for evaluating the ARTiGO A630 system.

1.1.3 Document Folder Contents

ARTiGO_A630_Linux_BSP_v1.0.1_ Development_Guide_v1.00_20170829.pdf: The Quick Start Guide provides an overview on how to boot the Linux EVK system image on the ARTiGO A630 and configure the supported hardware functions in the build.

ARTiGO_A630_Linux_EVK_v1.0.1_ Quick_Start_Guide_v1.00_20170829.pdf: This Development Guide explains how to build the Debian system image on the ARTiGO A630 system in order to begin evaluating the platform.

1.1.4 Tools Folder Contents

arm_201103_gcc4.5.2.tgz: is a toolchain, which is a set of software development tools for building images for the ARTiGO A630 system.

1.2 Version Information and Supported Features

- U-Boot version: 1.1.4
- Kernel version: 3.4.5
- Evaluation image: Debian 8.6
- Development based on WM8980
- Supports SPI with eMMC boot
- Supports HDMI display
- Supports HDMI audio output
- Supports Micro USB 2.0 OTG port
- Supports Debug UART connector
- Supports 10/100Mbps Ethernet
- Supports Line-out and Mic-in
- Supports EMIO-5531 USB Wi-Fi & Bluetooth module
  - Supports Bluetooth A2DP and SPP profile
- Supports EMIO-2531 miniPCIe Wi-Fi & Bluetooth module
  - Supports Bluetooth A2DP and SPP profile
- Supports EMIO-2550 miniPCIe Mobile Broadband module
- Supports GPIO, UART and Watchdog timer

2. Build Environment Setup

This section guides you through setting up the build environment for development on the host machine. All instructions are based on Ubuntu14.04 LTS x64.

To make sure that the build process completes successfully, we recommend at least 120GB of disk space and 15GB of combined memory and swap space on the host machine.

2.1 Configuring Linux Host Machine

The following packages are required for the Linux development environment. The required packages can be installed using the commands below.

Extract the **arm_201103_gcc4.5.2.tgz** file to /usr/local/arm/ (If this folder does not exist in the system, please create it manually).

```
$ sudo tar -xzvf arm_201103_gcc4.5.2.tar.gz -C /usr/local/arm/
```

The cross compiler will be found in the **/usr/local/arm/arm_201103_gcc4.5.2/** directory.

Add the toolchain path in **~/.bashrc** file.

```
$ vi ~/.bashrc
export PATH=/usr/local/arm/arm_201103_gcc4.5.2/mybin/:$PATH
```

Make sure that the host machine is connected to the network and run the packages update.

```
$ sudo apt-get update
```

Install the required software packages for cross-compilation.

```
$ sudo apt-get install git-core gnupg flex bison gperf build-essential \
zip curl zlib1g-dev libc6-dev lib32ncurses5-dev lib32z1 lib32ncurses5 lib32bz2-1.0 \
x11proto-core-dev libx11-dev libgl1-mesa-dev g++-multilib mingw32 tofrodos \
python-markdown libxml2-utils u-boot-tools
```

3. Image Build

This section explains how to build U-Boot and Kernel binary for the ARTiGO A630 system.

3.1 Extracting the ARTiGO A630 BSP

The ARTiGO_A630_Linux_source_code.zip includes u-boot-1.1.4.tar.gz and Kernel_3.4.5.tar.gz.

Use the following command to extract the contents of the BSP.

```
$ unzip ARTiGO_A630_Linux_source_code.zip
```

3.2 Building the U-Boot Binary

This section describes how to build the U-Boot image from the source code.

Use the following command to extract the U-Boot source code.

```
$ tar -xzvf u-boot-1.1.4.tar.gz
```

In order to use the default configurations type the following command.

```
$ cd /u-boot-1.1.4
$ make wmt_config
```

To build the U-boot image with the ARM cross compiler.

```
$ make -j8 zuboot
```

When the process is completed, the **zuboot.bin** file will be stored in the u-boot-1.1.4 directory.

3.3 Building the Linux Kernel

This section describes how to build the kernel binary from the source code.

To begin, extract the kernel source code.

```
$ tar -xzvf Kernel_3.4.5.tar.gz
```

To use the default configuration and compile the kernel type the following command:

```
$ cd /Kernel_3.4.5
$ make vab630_linux_defconfig
$ make clean
$ make -j8 ubin
```

When the compilation process is completed, the uzImage.bin file will be stored in the Kernel_3.4.5 directory.

After the compilation, the /u-boot-1.1.4/ and /Kernel_3.4.5/ directory will contain the resulting binary files, as shown in the table below.

Binary files	Description
zuboot.bin	U-Boot boot loader
uzImage.bin	Kernel for ARTiGO A630

Binary files generated

In order to install the Linux system on the ARTiGO A630 system, please follow the commands below on how to copy the binary files into the ARTiGO_A630_Linux_EVK_V1.0.1 folder.

First, change these file names from zuboot.bin to u-boot.bin.

```
$ cd /u-boot-1.1.4
$ mv zuboot.bin u-boot.bin
```

Next, extract the package from the ARTiGO_A630_Linux_EVK_V1.0.1.zip, and then copy u-boot.bin and uzImage.bin files into the ARTiGO_A630_Linux_EVK_V1.0.1 folder.

```
$ cd /u-boot-1.1.4
$ cp -f u-boot.bin ARTiGO_A630_Linux_EVK_v1.0.1/bspinst/u-boot.bin
$ cd /Kernel_3.4.5
$ cp -f boot.img ARTiGO_A630_Linux_EVK_v1.0.1/bspinst/uzImage.bin
```

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