



DEVELOPMENT GUIDE

# ARTiGO A820

Linux BSP v4.0.1

**Copyright**

Copyright ©2017-2018 VIA Technologies Incorporated. All rights reserved.

No part of this document may be reproduced, transmitted, transcribed, stored in a retrieval system, or translated into any language, in any form or by any means, electronic, mechanical, magnetic, optical, chemical, manual or otherwise without the prior written permission of VIA Technologies, Incorporated.

**Trademarks**

All brands, product names, company names, trademarks and service marks are the property of their respective holders.

**Disclaimer**

VIA Technologies makes no warranties, implied or otherwise, in regard to this document and to the products described in this document. The information provided in this document is believed to be accurate and reliable as of the publication date of this document. However, VIA Technologies assumes no responsibility for the use or misuse of the information (including use or connection of extra device/ equipment/add-on card) in this document and for any patent infringements that may arise from the use of this document. The information and product specifications within this document are subject to change at any time, without notice and without obligation to notify any person of such change.

VIA Technologies, Inc. reserves the right the make changes to the products described in this manual at any time without prior notice.



## Revision History

Version	Date	Remarks
1.00	08/31/2018	Initial release



## Table of Contents

<b>1. Introduction</b> .....	<b>1</b>
1.1 BSP Package Content .....	1
1.1.1 Source Code Folder Contents .....	1
1.1.2 Firmware Folder Contents .....	1
1.1.3 Document Folder Contents .....	1
1.1.4 Tools Folder Contents .....	1
1.2 Version Information and Supported Features .....	2
<b>2. Build Environment Setup</b> .....	<b>3</b>
2.1 Configuring Linux Host Machine .....	3
<b>3. Image Build</b> .....	<b>4</b>
3.1 Extracting the ARTiGO A820 BSP .....	4
3.2 Upgrading the BSP patch to v4.2.1 .....	4
3.3 Machine Configuration .....	4
3.4 Building an SD Card Image .....	4

# 1. Introduction

This Development Guide explains how to setup the necessary build environment in order for users to customize the Linux kernel and create their own system image for the ARTiGO A820 system.

The ARTiGO-A820 Linux BSP v4.0.1 is developed based on the NXP fsl-yocto-L4.1.15\_1.1.0-ga (Yocto 2.0 Jethro) and enables hardware features that are defined on the ARTiGO A820 system.

## 1.1 BSP Package Content

There are three folders in the package as listed below.

Source code folder	Description
VIA_iMX_Yocto2.0_SRC_v4.2.0.tar.bz2	Source code
VIA_iMX_Yocto2.0_PATCH_v4.2.1.tar.bz2	v4.2.1 patch file
Firmware folder	Description
ARTiGOA820_Yocto2.0_BIN_v4.0.1.tar.gz	Yocto EVK system image and installation script files
Document folder	Description
ARTiGO-A820_Linux_EVK_v4.0.1_Quick_Start_Guide_v1.00_20180831.pdf	Quick Start Guide
ARTiGO-A820_Linux_BSP_v4.0.1_Development_Guide_v1.00_20180831.pdf	Development Guide

**ARTiGO-A820 Linux BSP content**

### 1.1.1 Source Code Folder Contents

**VIA\_iMX\_Yocto2.0\_SRC\_v4.2.0.tar.bz2:** A complete and static Yocto BSP including the ARTiGO A820 meta-files and all the pre-downloaded required software packages to enable a complete offline build.

**VIA\_iMX\_Yocto2.0\_patch\_4.2.1.tar.bz2:** A complete and static Yocto BSP patch including the updated ARTiGO A820 meta-files to enable a complete offline build.

### 1.1.2 Firmware Folder Contents

**ARTiGOA820\_Yocto2.0\_BIN\_v4.0.1.tar.gz:** contains installation script files and the precompiled U-boot and image for evaluating the ARTiGO-A820 system.

### 1.1.3 Document Folder Contents

**ARTiGO-A820\_Linux\_EVK\_v4.0.1\_Quick\_Start\_Guide\_v1.00\_20180831.pdf:** The Quick Start Guide provides an overview of how to boot the Android EVK system image on the ARTiGO A820 system and configure the supported hardware function in the build

**ARTiGO-A820\_Linux\_BSP\_v4.0.1\_Development\_Guide\_v1.00\_20180831.pdf:** This Development Guide explains how to setup the necessary build environment in order for users to customize the Linux kernel and create their own system image for the ARTiGO A820 system.

### 1.1.4 Tools Folder Contents

**BT\_Config.zip:** contains the Bluetooth A2DP configuring file.

## 1.2 Version Information and Supported Features

- U-Boot version: 2015.04
- Kernel version: 4.1.15
- Evaluation image: OpenEmbedded-core built with Yocto 2.0 Jethro
- Development based on NXP fsl-yocto-L4.1.15\_1.1.0-ga (Yocto 2.0 Jethro)
- Supports SPI with eMMC or Micro SD boot (default)
- Supports HDMI display
- Supports HDMI audio output
- Supports COM1 (RS-232/RS-485), Onboard COM as debug port
- Supports Gigabit Ethernet (LAN 1)
- Supports 10/100Mbps Ethernet (LAN 2)
- Supports VNT9271 USB Wi-Fi dongle
- Supports EMIO-1541 miniPCle Wi-Fi module
- Supports EMIO-2531 miniPCle Wi-Fi & BT module
  - Supports Bluetooth A2DP and SPP profile
- Supports EMIO-2550 miniPCle Mobile Broadband module
- Supports Watchdog Timer, GPIO and RTC

## 2. Build Environment Setup

This section guides you through setting up the build environment for development. All instructions are based on using Ubuntu 12.04 LTS and later versions.

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 Yocto development environment. The required packages can be installed using the bash script below:

```
#!/bin/bash

# Install dependant packages
$ sudo apt-get install gawk wget git-core diffstat unzip texinfo gcc-multilib build-essential chrpath socat

$ sudo apt-get install libsdl1.2-dev xterm sed cvs subversion coreutils texi2html docbook-
utils python-pysqlite2 help2man make gcc g++ desktop-file-utils libgl1-mesa-dev libglu1-mesa-
dev mercurial autoconf automake groff curl lzop asciidoc
```

The tool to create images for use with the U-Boot boot loader, “**mkimage**”, is provided by different packages in Ubuntu 12.04 and in newer Ubuntu releases.

On Ubuntu 12.04 install it as below.

```
$ sudo apt-get install uboot-mkimage
```

On Ubuntu 14.04 and newer versions install it as below.

```
$ sudo apt-get install u-boot-tools
```

## 3. Image Build

The section explains how to use the source code to build and update the u-boot and image to the firmware installer on the ARTiGO A820 system.

### 3.1 Extracting the ARTiGO A820 BSP

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

```
$ tar jxvf VIA_iMX_Yocto2.0_SRC_v4.2.0.tar.bz2
```

### 3.2 Upgrading the BSP patch to v4.2.1

First, remove the **via-release-bsp/sources** folder, next extract the BSP patch **VIA\_iMX\_Yocto2.0\_patch\_4.2.1.tar.gz**, then finally patch the BSP into the **/via-release-bsp/** folder.

```
$ rm -rf via-release-bsp/sources/
$ tar jxvf VIA_iMX_Yocto2.0_patch_4.2.1.tar.bz2 -C ./via-release-bsp
```

### 3.3 Machine Configuration

The **via-setup-release.sh** script creates the build directory with the Yocto configuration files for your target machine.

This script has the following optional parameter:

- **-b**: set the name of the build directory. For example “-b build-artigoa820” in the command below.

```
$ cd via-release-bsp
$ MACHINE=imx6artigoa820 source via-setup-release.sh -b build-artigoa820
```

### 3.4 Building an SD Card Image

This BSP provides the “via-image-gui” Yocto image as default. Use the “bitbake” command to create the U-boot and image file.

```
$ via-release-bsp/build-artigoa820$ bitbake via-image-gui
```

After the compilation, the **via-release-bsp/build-artigoa820/tmp/deploy/images/ \${MACHINE}/via-image-gui--sd\_installer/** directory will contain the resulting binaries, as shown in the table below.

Binary	Description
u-boot.bin	U-Boot boot loader
rootfs.tgz	Root file system
boot/ imx6q-vab820.dtb	device tree
boot/ zImage	Kernel image

**Binary files generated by bitbake**

Extract EVK/ ARTiGOA820\_Yocto2.0\_BIN\_v4.0.1.tar.gz file.

Next to copy the new image folder to **/sd\_installer** to replace the original image folder in order to update the Firmware Installer.





### Taiwan Headquarters

1F, 531 Zhong-zheng Road,  
Xindian Dist., New Taipei City 231  
Taiwan

Tel: 886-2-2218-5452  
Fax: 886-2-2218-9860  
Email: [embedded@via.com.tw](mailto:embedded@via.com.tw)



### USA

940 Mission Court  
Fremont, CA 94539,  
USA

Tel: 1-510-687-4688  
Fax: 1-510-687-4654  
Email: [embedded@viatech.com](mailto:embedded@viatech.com)



### Japan

3-15-7 Ebisu MT Bldg. 6F,  
Higashi, Shibuya-ku  
Tokyo 150-0011  
Japan

Tel: 81-3-5466-1637  
Fax: 81-3-5466-1638  
Email: [embedded@viatech.co.jp](mailto:embedded@viatech.co.jp)



### China

Tsinghua Science Park Bldg. 7  
No. 1 Zongguancun East Road,  
Haidian Dist., Beijing, 100084  
China

Tel: 86-10-59852288  
Fax: 86-10-59852299  
Email: [embedded@viatech.com.cn](mailto:embedded@viatech.com.cn)



### Europe

Email: [embedded@via-tech.eu](mailto:embedded@via-tech.eu)