DEVELOPMENT GUIDE

QSM-8Q60

Linux BSP v3.0.2

1.00-03052018-114500

Revision History

Version	Date	Remarks
1.00	03/05/2018	Initial release

Table of Contents

1. Introduction

This Development Guide explains how to set up the necessary build environment in order for users to customize the Linux kernel and create their own system image for the QSM-8Q60 and QSMDB2 carrier board.

The QSM-8Q60 Linux BSP v3.0.2 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 QSM-8Q60 and QSMDB2 carrier board.

1.1 BSP Package Contents

There are four folders in the package as listed below.

Source_code	Description
VIA_iMX_Yocto2.0_SRC_v4.1.1.tar.bz2	Source code
VIA_iMX_Yocto2.0_patch_4.1.3.tar.gz	BSP patch file
Firmware folder	**Description**
QSM-8Q60_Yocto2.0_BIN_v3.0.2.tar.gz	Yocto EVK system image and installation script files
Document folder	**Description**
QSM-8Q60_Linux_EVK_v3.0.2_Quick_Start_Guide _v1.00_20180305.pdf	Quick Start Guide
QSM-8Q60_Linux_BSP_v3.0.2_Development_ Guide_v1.00_20180305.pdf	Development Guide
Tools folder	**Description**
BT_Config.zip	Contain Bluetooth configuring files

AMOS-820 Linux BSP content

1.1.1 Source Code Folder Contents

VIA_iMX_Yocto2.0_SRC_v4.1.1.tar.bz2: A complete and static Yocto BSP including the QSM-8Q60 and QSMDB2 meta-files and all the pre-downloaded required software packages to enable a complete offline build.

VIA_iMX_Yocto2.0_patch_4.1.3.tar.gz: A complete and static Yocto BSP patch including the updated QSM-8Q60 and QSMDB2 meta-files to enable a complete offline build.

1.1.2 Firmware Folder Contents

QSM-8Q60_Yocto2.0_BIN_v3.0.2.tar.gz: contains the sd_installer tool to create a system installer Micro SD card for installing a pre-compiled OpenEmbedded filesystem on the QSM-8Q60 module and used with the QSMDB2 carrier board.

1.1.3 Document Folder Contents

QSM-8Q60_Linux_BSP_v3.0.2_Development_Guide_v1.00_20180305.pdf: This Development Guide explains how to set up the necessary build environment in order for users to customize the Linux kernel and create their own system image for the QSM-8Q60 module and QSMDB2 carrier board.

QSM-8Q60_Linux_EVK_v3.0.2_Quick_Start_Guide _v1.00_20180305.pdf: The Quick Start Guide provides an overview on how to boot the Linux EVK system image on the QSM-8Q60 module and configure the supported hardware functions and I/O defined on the QSMDB2 carrier board.

1.1.4 Tools Folder Contents

BT_Config.zip: contains the three Bluetooth configuration files for A2DP support.

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 and LVDS display
- Supports HDMI audio output
- Supports AUO LVDS capacitive touch panels (through USB interface)
    - o AUO 10.4” G104XVN01.0 LVDS panel (1024×768)
    - o AUO 7” G070VW01 V0 LVDS panel (800×480)
- Supports COM 1, COM 3 (TX/RX) and COM 2 as a debug port
- Supports COM 4, COM 5, COM 6 and COM 7 (RS-232/RS-485/RS-422)
- Supports two FlexCAN TX/RX
- Supports Gigabit Ethernet (LAN1)
- Supports 10/100Mbps Ethernet (LAN2)
- Supports Line-in, Line-out, and Mic-in
- Supports VNT9271 USB Wi-Fi dongle
- Supports EMIO-1541 miniPCIe Wi-Fi module
- Supports EMIO-2531 miniPCIe Wi-Fi & Bluetooth module
    - o Supports Bluetooth A2DP and SPP profile
- Supports EMIO-2550 miniPCIe 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 or higher 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:

```
$ 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 the Ubuntu 12.04 install the code/text as below:

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

On the Ubuntu 14.04 and newer versions install the code/text 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 QSM-8Q60 module and QSMDB2 carrier board.

3.1 Extracting the QSM-8Q60 BSP

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

```
$ tar xvf VIA_iMX_Yocto2.0_SRC_v4.1.1.tar.bz2
```

3.2 Upgrading the BSP Patch

First, remove the **via-release-bsp/sources** folder the (QSM-8Q60), next extract the BSP patch **VIA_iMX_Yocto2.0_patch_4.1.3.tar.gz**, then finally patch the BSP into the **/via-release-bsp/** folder.

```
$ rm -rf via-release-bsp/sources/
$ tar xvf VIA_iMX_Yocto2.0_patch_4.1.3.tar.gz -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-qsm8q60” in the command below.

```
$ cd via-release-bsp
$ MACHINE=imx6qsm8q60 source via-setup-release.sh -b build-qsm8q60
```

3.4 Building a Firmware Installer

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

```
via-release-bsp/build-qsm8q60$ bitbake via-image-gui
```

After the compilation, the **via-release-bsp/build-qsm8q60/tmp/deploy/images/imx6qsm8q60/FirmwareInstall/image** 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 the QSM-8Q60_Yocto2.0_BIN_v3.0.2.tar.gz file from EVK folder.

Next, copy the new image folder to /sd_installer to replace the original image folder in order to update the Firmware Installer.

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