

RakunLS1, Qseven SBC module with LS1021A

Software user manual for Layerscape SDK



TABLE OF CONTENTS

| | |
|---|-----------|
| 1 GENERAL | 5 |
| 1.1 About this document..... | 5 |
| 1.2 Revision history..... | 5 |
| 1.3 Acronyms and abbreviations..... | 5 |
| | |
| 2 INTRODUCTION | 6 |
| 2.1 Device overview..... | 6 |
| | |
| 3 DEVELOPMENT HOST SETUP | 7 |
| 3.1 Prerequisite..... | 7 |
| 3.2 Installing LSDK..... | 7 |
| 3.3 Add support for Rakun LS1..... | 7 |
| | |
| 4 BUILDING SOFTWARE IMAGES | 8 |
| | |
| 5 DEPLOY IMAGES | 9 |
| 5.1 SD card – using development host..... | 9 |
| | |
| 6 BOOT TARGET | 11 |

ILLUSTRATION INDEX

INDEX OF TABLES

| | |
|--------------------------------|---|
| Table 1: Revision history..... | 5 |
| Table 2: Acronyms..... | 5 |

1 GENERAL

1.1 ABOUT THIS DOCUMENT

This document describes software implementation of the RakunLS1 Qseven module using Layerscape SDK 18.12.

1.2 REVISION HISTORY

| Revision | Date | Notes |
|----------|--------------|-----------------|
| 1.0 | 23. May 2019 | Initial version |

Table 1: Revision history

1.3 ACRONYMS AND ABBREVIATIONS

| Acronym | Meaning |
|---------|-------------------------------------|
| LSDK | Layerscape Software Development Kit |

Table 2: Acronyms

2 INTRODUCTION

2.1 DEVICE OVERVIEW

RakunLS1 is a Single Board Computer based on Freescale's LS1021A processor, member of the QorIQ Layerscape 1 family. It features up to 5000 CoreMarks of CPU power, 1GB DDR3L memory with ECC, 1GB NAND Flash memory, 32MB qSPI NOR flash, 10/100/1000 Ethernet PHY, 4 6Gb/s SerDes Lanes used for SGMII/PCIe/SATA, PWM channels, CAN bus, UARTs etc.

It is in a Qseven form factor and offers interfaces, used in telecom and industrial applications.

It runs Linux operating system.

3 DEVELOPMENT HOST SETUP

3.1 PREREQUISITE

- installed Ubuntu 18.04 on development machine (tested on x86_64 and ppc64le host architecture)

3.2 INSTALLING LSDK

Download LSDK from Freescale WEB side (NOTE: registration requested):

- Layerscape SDK URL: https://www.nxp.com/support/developer-resources/run-time-software/linux-software-and-development-tools:CW_BSP
- download version 18.12

Uncompress download image:

- `~$ tar -xzf flexbuild_lsdk1812_update_010719.tgz`

3.3 ADD SUPPORT FOR RAKUN LS1

Download LSDK 18.12 RakunLS1 patch:

- `~$ git clone https://svn.borea.si/publicgit/flexbuild-patches.git -b LSDK-18.12-rakunls1`

Apply RakunLS1 patch for LSDK:

- `~$ cd flexbuild_lsdk1812_update_010719`
- `~$ patch -p1 < ../flexbuild-patches/flexbuild.patch`

4 BUILDING SOFTWARE IMAGES

Run script to prepare build environment:

- `~$ cd flexbuild_lsdk1812_update_010719`
- `~/flexbuild_lsdk1812_update_010719$ source ./setup.env`

Fetch external repositories requested by LSDK:

- `~/flexbuild_lsdk1812_update_010719$ flex-builder -i repo-fetch`

Build firmware image:

- `~/flexbuild_lsdk1812_update_010719$ flex-builder -i mkfw -m rakunls1 -b sd`

Build boot partition image:

- `~/flexbuild_lsdk1812_update_010719$ flex-builder -i mkbootpartition -a arm32 -m rakunls1`

Create Ubuntu root filesystem:

- `~/flexbuild_lsdk1812_update_010719$ flex-builder -i mkrfs -r ubuntu -a arm32 -m rakunls1`

Merge Ubuntu root filesystem with kernel modules and custom app components:

- `~/flexbuild_lsdk1812_update_010719$ flex-builder -i merge-component -a arm32`

Build compressed target root filesystem:

- `~/flexbuild_lsdk1812_update_010719$ flex-builder -i compressrfs -a arm32`

5 DEPLOY IMAGES

5.1 SD CARD – USING DEVELOPMENT HOST

Plug SD card reader with inserted SD card to development host.

Write builded images to SD card (replace sdX with target SD card device):

- `~/flexbuild_1sdk1812_update_010719$ flex-installer -b build/images/
bootpartition_LS_arm32_lts_4.14 -r build/images/rootfs_ubuntu_bionic_LS_arm32.tgz -f build/
images/firmware_rakunls1_uboot_sdboot.img -d /dev/sdX`

Unmount target filesystems on SD card:

- `~/flexbuild_1sdk1812_update_010719$ sudo umount /run/media/sdX2`
- `~/flexbuild_1sdk1812_update_010719$ sudo umount /run/media/sdX3`

6 BOOT TARGET

Plug SD card into Rakun LS1 carrier board and apply power. System will boot into Ubuntu system.

Default login :

- username: user
- password: user

```
U-Boot 2018.09-g546ec0f8a5 (May 23 2019 - 08:23:57 +0000)

CPU:   Freescale LayerScape UnknownE, Version: 2.0, (0x87081320)
Clock Configuration:
      CPU0 (ARMV7):1000 MHz,
      Bus:300 MHz, DDR:800 MHz (1600 MT/s data rate),
Reset Configuration Word (RCW):
      00000000: 0608000a 00000000 00000000 00000000
      00000010: 10000000 08007920 60025a00 21046000
      00000020: 00000000 00000000 00000000 20038300
      00000030: 20024900 001b7340 00000000 00000000
Model: Rakun LS1
Board: Rakun LS1
I2C:   ready
DRAM:  1 GiB
Using SERDES1 Protocol: 16 (0x10)
MMC:   FSL_SDHC: 0
...
Ubuntu 18.04.2 LTS localhost ttyLPO

localhost login:
```

7 OTHER

Refer to NXP Layerscape SDK documentation for additional information.

