



October 23, 2020. Linux BSP for Renesas R-Car V3M/V3H, Release 7.0.0 Base

Linux BSP for Renesas R-Car V3M/V3H, Release 7.0.0 Release Notes

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Linux BSP for Renesas R-Car V3M/V3H, Release 6.0 Base Release Notes

1. Introduction

This report contains information about Linux BSP for Renesas R-Car V3M/V3H package including install and usage instructions and restrictions of the current release.

2. Contacts

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3. Revision History

Date	Rev	Description of Changes	By	Affiliation
September 21 2018	1.0	Initial version	Roman Meshkevich	Cogent Embedded
October 17 2018	1.1	Update test information, change log, versioning	Andrey Dolnikov	Cogent Embedded
November 22 2018	2.0	Update to release 4.0	Dmitry Shifrin	Cogent Embedded
August 19 2019	3.0	Update to release 5.0	Vladimir Barinov	Cogent Embedded
October 13 2019	3.1	Update to release 5.0.1	Vladimir Barinov	Cogent Embedded
December 5 2019	3.2	Update to release 5.0.2	Valentine Barshak	Cogent Embedded
May 8 2020	4.0	Update to release 6.0	Vladimir Barinov	Cogent Embedded
July 16 2020	5.0	Update to release 6.0.1	Andrey Dolnikov	Cogent Embedded
September 14 2020	6.0	Update to release 6.0.2	Andrey Dolnikov	Cogent Embedded
October 23 2020	7.0	Update to release 7.0.0	Andrey Dolnikov	Cogent Embedded

4. Terminology / Glossary

Term	Definition
HDMI	High-Definition Multimedia Interface
USB	Universal Serial Bus
NFS	Network File System
LCD	Liquid-crystal display

5. Reference documents

Rev	Document
1.0	Yocto BSP 7.0.0 for Renesas R-CAR V3M and V3H SoCs. Test plan
1.0	Yocto BSP 7.0.0 for Renesas R-CAR V3M and V3H SoCs. Test report

6. Change History

6.1 Revision 3.0 Base

1. Fixed cropping issue in test application that shows camera sensor image (utest-cam-imr-drm).
2. Changed CMA assignment. CMA memory can be changed in runtime by modifying Linux kernel parameters.
3. QoS was enabled on V3H. By default V3H uses QoS version 20180901.
4. Fixed ca-certification yocto recipe.
5. Added option to capture and save camera sensor images in utest-cam-imr-drm test application.
6. QSPI driver: fixed issues related to non-block aligned access (used in JFFS2), DMA support for read operations.
7. Added support camera sensors: AR0143, AR0233, 0x3A, GM4200, IMX390.

6.2 Revision 4.0 Base

1. Yocto: Updated base version to 2.4.2
2. Linux kernel: Updated version to 4.14.35

6.3 Revision 5.0 Base

1. Yocto: Updated base version to 2.4.3
2. Linux kernel: Updated version to 4.14.75

6.4 Revision 5.0.1 Base

1. Update to common rootfs and common kernel Image
2. Added ISP UIO fix, set UIO drivers as loaded by default instead V4L
3. Added UIO CSI2 driver
4. Deploy Release Notes and installed packages list to rootfs

6.5 Revision 5.0.2 Base

1. Fixed ARM-Trusted-Firmware V3H/V3M CPG initialization
2. Fixed V3HSK ES1.0 eMMC U-Boot and Linux kernel issues
3. Fixed Linux kernel RPC QSPI flash DMA issue
4. Fixed U-Boot Generic Ethernet issues
5. Fixed U-Boot V3H Gether packet corruption issue
6. Added dummy CSI2 nodes to V3HSK/V3MSK device tree

6.6 Revision 6.0 Base

1. Use reference Renesas BSP 3.21.0
2. Add CSI, VIN, ISP, VSP, DU, LVDS generic-uio bindings
3. Replace custom UIO drivers (IMR, IMP) with generic one
4. Enable Context ID tracing (PID_IN_CONTEXTIDR)

6.7 Revision 6.0.2 Base

1. Add support for missed IMP interrupts
2. Update UIO devices naming
3. Add IPMMU domain information for UIO devices

6.8 Revision 7.0.0 Base

1. Use reference Renesas BSP 4.1.0
2. Disable IPMMU support in Linux kernel and provide UIO access
3. UIO devices: Adjust naming

7. Package structure

Linux BSP for Renesas R-Car V3M/V3H package is :

- *yocto_src*: Snapshot of all Yocto layers required to build BSP from the scratch.
- *scripts*: contains script files that allow to build current release and meta-docs layer with release notes
- *sdk*: contains Linux and Windows SDK for application development.
 - poky-glibc-x86_64-core-image-minimal-aarch64-toolchain-2.4.3.sh – self-extracting Linux SDK
 - poky-glibc-x86_64-core-image-minimal-aarch64-toolchain-2.4.3.zip – Windows SDK
- *boards*: contains board specific prebuilt binaries (per each board supported):
 - Linux kernel and corresponding device tree files:
 - “Image-<revision-id>-<board name>-<build time>.bin”
 - “Image-<revision-id>-<board name + extension name if applicable>-<build time>.dtb”
 - Root filesystem archive and image:
 - “core-image-minimal-<board name>-<buildtime>.rootfs.tar.bz2”
 - “core-image-minimal-<board name>-<buildtime>.ext4.gz”

Note that Linux kernel image and device tree files are also located under ‘/boot’ directory.

This document is included into rootfs under ‘root’ directory.
 - Manifest file named “core-image-minimal-<board name>-<buildtime>.rootfs.manifest”. This is a list of packages used on Root File System. The <buildtime> is a unique version number.
 - Firmware images including u-boot, cr7 loader, ARM Trusted Firmware, CA53 Loader, Loader (boot parameters, certification).

8. Supported elements and known issues

This chapter describes SoC IP blocks and software components supported by the current BSP version. For more details and test results please see “Yocto BSP 7.0.0 for Renesas R-CAR V3M and V3H SoCs. Test report”.

8.1 Supported elements

Supported item	Description and comments
HDMI + display unit	Supported
PCI-E + NVME	Supported. PCI-E x2 performance issues
UIO generic driver for: ISP, VIN, CSI2, IMP, IMR, DU, VSP, LVDS, VIP, FCPR	Supported
CAN / CANFD	Supported
CPU	Supported. System freeze after multiple on/off of CPU cores
Ethernet	Supported.
IMR v4l2 driver	Supported
CSI v4l2 driver	Supported
VIN v4l2 driver	Supported
QSPI	Supported
PMIC	Supported
Uboot	OK
Rootfs complexity	OK
Linux loading	OK
Kernel modules load/unload	OK

8.2 Camera sensor support

This table contains summary of all supported cameras

Board	Extention board	Extention function	Kernel dtb	Camera type	Max supported cameras	Tested	Notes
eagle	n/a	-	Image-r8a77970-eagle.dtb	imi21 / imi20	4	+	
condor	n/a	-	Image-r8a77980-condor.dtb	imi21 / imi20	4	+	
v3hsk	vbm v2 gmsl	-	Image-r8a77980-vbm-v2.dtb	imi21 / imi20	4	+	Power 9V
v3hsk	vb 4ch	-	Image-r8a77980-vb-4ch.dtb	lmi23 / imi24	4	+	Power 11V
v3hsk	vb 8ch	-	Image-r8a77980-vb-8ch.dtb	lmi23 / imi24	8	+	Power 11V
v3hsk	vbm v3 fpdlink	-	Image-r8a77980-vbm-v3.dtb	lmi23 / imi24	4	+	Power 11V
v3msk	vbm v2 gmsl	-	Image-r8a77970-vbm-v2.dtb	imi21 / imi20	4	+	Power 9V
v3msk	vbm v3 fpdlink	-	Image-r8a77970-vbm-v3.dtb	imi24	4	+	power 11 V 4 cameras simultaneously can cause artifacts due to lack of bandwidth
v3msk	vbm v3 fpdlink	-	Image-r8a77970-vbm-v3.dtb	imi23	4	+	power 11 V

8.3 Known issues

1. PCI-E + NVME – Write performance is about 290MB/s. Such value is closer to PCI-E x1 than PCI-E x2
2. V3H AVB Ethernet outbound speed is about 700-800Mbit/s in some tests.