

CONFIDENTIAL

Ethernet AVB Software

Release Note: Software

R-Car H3/M3/M3N/E3/D3 Series

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How to Use This Manual

- **[Readers]**

This manual is intended for engineers who develop products which use the R-Car H3/M3/M3N/E3 processor.

- **[Purpose]**

This manual is intended to give users an understanding of the functions of the R-Car H3/M3/M3N/E3 processor device driver and to serve as a reference for developing hardware and software for systems that use this driver.

- **[How to Read This Manual]**

It is assumed that the readers of this manual have general knowledge in the fields of electrical

— engineering, logic circuits, microcontrollers, and Linux.

→ Read this manual in the order of the CONTENTS.

— To understand the functions of a multimedia processor for R-Car H3/M3/M3N/E3

→ See the R-Car H3/M3/M3N/E3 User's Manual.

— To know the electrical specifications of the multimedia processor for R-Car H3/M3/M3N/E3

→ See the R-Car H3/M3/M3N/E3 Data Sheet.

- **[Conventions]**

The following symbols are used in this manual.

Data significance: Higher digits on the left and lower digits on the right

Note: Footnote for item marked with Note in the text

Caution: Information requiring particular attention

Remark: Supplementary information

Numeric representation: Binary ... 0bxxxx, or xxxxB

Decimal ... xxxx

Hexadecimal ... 0xxxxx or xxxxH

Data type: Double word ... 64 bits

Word ... 32 bits

Half word ... 16 bits

Byte ... 8 bits

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1. Introduction

This manual explains the package construction of Ethernet AVB Software and restrictions of the current release.

This software is provided based on the GNU General Public License (GPLv2), MIT and BSD License.
Please handle this software according to the conditions of each license.

Please operate this software on Yocto recipe package v5.9.0 for R-Car H3/M3/M3N/E3/D3 and R-Car H3e/M3e/M3Ne/E3e Series. It contains in Yocto recipe for Ethernet AVB Software.

This software requires the following software.

AVnu/OpenAvnu	Site URL	https://github.com/AVnu/OpenAvnu
	Clone URL	https://github.com/AVnu/OpenAvnu.git
	Hash value	ff076e83234d2207f33447b9bd6d1646d9245566
	Tag	-
AVnu/gptp	Site URL	https://github.com/Avnu/gptp
	Clone URL	https://github.com/Avnu/gptp.git
	Hash value	0baef8a36a13105112862919aac0f1eed21a44ea
	Tag	-
Linux PTP project	Site URL	http://linuxptp.sourceforge.net/
	Clone URL	https://sourceforge.net/projects/linuxptp/files/v2.0/
	File name	linuxptp-2.0.tgz
	md5sum	d8bb7374943bb747db7786ac26f17f11
	sha256sum	0a24d9401e87d4af023d201e234d91127d82c350daad93432106284aa9459c7d

2. List of Ethernet AVB Software Contents

The following is included in this software.

2.1 Software (Hosted in github.com)

NO.	Contents	URL	License	Tag
1	AVB Streaming Driver	https://github.com/renesas-rcar/avb-streaming	Dual MIT/GPLv2	v2.19.0
		671bf9c3249551cb182ff23fa67da4844098bd24		
2	Media Streaming Engine	https://github.com/renesas-rcar/avb-mse	Dual MIT/GPLv2	v0.16
		47eee6031ee5514204ca51cf8ab2b74631ccdb22		
3	Media Clock Recovery Handler	https://github.com/renesas-rcar/avb-mch	Dual MIT/GPLv2	v0.9
		b234c4c867e9e4b9cc7cb00f483a43a36e3d3427 + apply patch file: 0001_fix_mch_open_wrong_initialization_order.patch (attachment) How to apply: patch -p1 < 0001_fix_mch_open_wrong_initialization_order.patch		
4	AVB Applications	https://github.com/renesas-rcar/avb-applications	MIT & BSD	v2.19.0
		73ce24224c57c910a2dd22cd52eec97b8289f898		

2.2 Documentation (Multimedia Reference Software for Linux Doc)

NO.	Contents	File name	version
1	Release Note (This document)	RENESAS_RCH3M3M3NE3D3_EAVB_ReleaseNote_E_v2.20.0.pdf	2.20.0
2	Start-Up Guide	RENESAS_RCH3M3M3NE3D3_EAVB_StartupGuide_UME_v2.31.pdf	2.31
3	AVB Streaming Driver User's manual	RENESAS_RCH3M3M3NE3D3_EAVB_AVBStreaming_UME_v2.31.pdf	2.31
4	Media Streaming Engine User's manual	RENESAS_RCH3M3M3NE3D3_EAVB_MSE_UME_v2.31.pdf	2.31
5	Media Clock Recovery Handler User's manual	RENESAS_RCH3M3M3NE3D3_EAVB_MCH_UME_v2.31.pdf	2.31

2.3 Documentation (Application Note)

NO.	Contents	File name	version
1	Launcher Application Application Note	RENESAS_RCH3M3M3NE3D3_EAVB_LauncherApplication_ANE_v2.31.pdf	2.31
2	Simple application Application Note	RENESAS_RCH3M3M3NE3D3_EAVB_SimpleApplication_ANE_v2.31.pdf	2.31

3. Notice

- The Ethernet AVB Software works on the Yocto recipe package for R-Car H3/M3/M3N/E3/D3 Series.
So please read the Yocto recipe package's documents and build environment, before setting up the Ethernet AVB Software.
- The Ethernet AVB Software works on the following environment.
 - R-Car H3-SiP System Evaluation Board (Salvator-X).
 - R-Car M3-SiP System Evaluation Board (Salvator-X).
 - R-Car H3-SiP/M3-SiP/M3N-SiP System Evaluation Board (Salvator-XS).
 - R-Car E3 System Evaluation Board (Ebisu-4D)
 - R-Car D3 System Evaluation Board (Draak)
- Firmware version of Summit X430/X440 Switch
We recommend the latest firmware for the Summit X430/X440 Switch. Please refer to the web site (https://gtacknowledge.extremenetworks.com/articles/How_To/How-to-Obtain-and-Upgrade-EXOS) about the firmware updating.
- Firmware version of MOTU AVB Switch
We recommend the latest firmware (v1.10+667) for the MOTU AVB Switch. If you use the old firmware, gPTP does not work correctly. Please refer to the web site (<http://motu.com/avb>) about the firmware updating.
- When using MOTU AVB switch, should be enable SRP and gPTP protocols. Because MOTU AVB Switch discard the AVTP streaming traffic if not using these protocols.
- Support of Controller Rule is not included in the AVDECC function of Application. If use AVDECC function, please prepare the AVDECC Controller yourself. For details, please see Ethernet AVB Software Launcher Application Application Note Chapter 9.
- The sysfs I/F specification of the MSE has been significantly changes by AVB Software v2.6.0 release version. For details, the specification change points are described in "Chapter 8.1 Sysfs Comparison List" of MSE User's Manual. please see that document.

4. Change History

4.1 v2.0.0

- Support AVB Streaming driver, Simple application.

4.2 v2.1.0

- Add functions and fix issues following list.

No.	Module	Description
#69468	AVB Streaming driver	Add using new interrupt method support

4.3 v2.2.0

- Add functions and fix issues following list.

No.	Module	Description
#84986	AVB Streaming driver	Patches adapt based on R-Car H3 Linux BSP v3.2.0

4.4 v2.3.0

- Support Media Streaming Engine (MSE) driver, AVB Launcher Application.
- Add functions and fix issues following list.

No.	Module	Description
#76581	All	Change host in Github.com
#79289	AVB Streaming Driver	Support build the Linux Kernel loadable module
#79966	AVB Streaming Driver	Add API I/F for in kernel modules.
#69481	MSE Core	Support Media Streaming Engine (MSE) core modules
#69482	MSE Core	Support packetizer for AVTP IEC61883-6 format
#69483	MSE Core	Support packetizer for AVTP AAF-PCM format
#69486	MSE Core	Support packetizer for AVTP CVF H.264 D13
#80918	MSE ALSA	Support ALSA adapter for Audio streaming
#80921	MSE V4L2	Support V4L2 adapter for Video streaming
#84684	Launcher Application	Support AVB Launcher application.
#84683	mrpdummy	Support SRP dummy application.
#84682	Simple Application	Restructuring code

4.5 v2.4.0

- The yocto recipe for integration of the Ethernet AVB Software were merged in the Renesas Yocto Recipe package v2.9.0.
- Add support of the R-Car M3.
- Add functions and fix issues following list.

No.	Module	Description
#89995	All	The yocto recipe for integration of the Ethernet AVB Software were merged in the Renesas Yocto Recipe package v2.9.0.
#90804	AVB Streaming Driver	Add R-Car M3 support
#90480	MSE V4L2	Fixes the issue of the overflow that intermediate calculation value in the CBS (Credit Based Chapter) parameter.
#89224	MSE V4L2	Fixes this restriction In using GStreamer, Does not working correctly connect to omxh264enc and v4l2sink for MSE V4L2.

4.6 v2.5.0

- The yocto recipe for integration of the Ethernet AVB Software were merged in the Renesas Yocto Recipe package v2.12.0.
- Add Media Clock Recovery Handler (MCH) driver.
- Add functions and fix issues following list.

No.	Module	Description
#69486	MSE Core	Support packetizer for AVTP CVF H.264
#69487	MSE Core	Support packetizer for AVTP CVF MJPEG
#69488	MSE Core	Support packetizer for AVTP CRF
#69492	MCH Core	Add Media Clock Recovery Handler (MCH) core modules
#96874	Simple Application	Add "-a" option to specify the destination address.
#96875	Launcher Application	Support MAAP with maap_daemon in Open-AVB.
#98364	Launcher Application	Add example ini and script files that use case of MSE Audio and Video.
#88699	UM Startup Guide	Add description regarding MSE and Launcher application.
#98907	AVB Streaming Driver	Fix kernel panic when doing avbtool "-S" option.
#98910	AVB Streaming Driver	Fix issue that does not unregister allocated ID of char device files at module unload.
#90966	MSE Core	Fix cannot finish by signal in audio listener.
#97108	MSE Core	Fix initialize error at static link in kernel.
#90481	MSE ALSA	Fix issue that does not fixed value of stream_data_length field in a stream.
#92772	MSE ALSA	Fix issue that transmission interval is too short.
#93526	MSE ALSA	Fix load error for R-Car v3.3.0 BSP (based on Upstream v4.6).
#88746	MSE V4L2	Fix issue that does not working correctly send to H.264 video streaming in some conditions with using GStreamer.
#97423	MSE V4L2	Fix wrong value in type field.
#98093	MSE IEC61883-6	Fix issue that corrupted stream data.
#91791	libmsrp	Fix the definition value of SRP stream rank.
#97316	Launcher Application	Fix cannot start avblauncher at "-g" option is not specified.
#98647	Launcher Application	Fix issue that the conversion was wrong in the following parameters: \$MODE\$, \$SRP\$ and \$GTPP\$

4.7 v2.6.0

- The sysfs I/F specification of the MSE has been significantly changes by this release version. For details, the specification change points are described in "Chapter 8.1 Sysfs Comparison List" of MSE User's Manual. please see that document.
- The yocto recipe for integration of the Ethernet AVB Software were merged in the Renesas Yocto Recipe package v2.16.0.
- Fix and add about following restrictions and functions. for details, shown below tables.

Add functions following list.

No.	Module	Description
#101011	AVB Streaming Driver	Add new API get_linkspeed in Kernel I/F.
#105797	AVB Streaming Driver	Update base version to R-Car v3.4.0 BSP (based on Upstream v4.9)
#97940	MSE Core	Revise Sysfs I/F specification.
#99922	MSE Core	Support packetizer for AVTP IEC61883-4 (MPEG2-TS)
	MSE V4L2	Support V4L2 device for MPEG2TS stream.
#102171	MSE Core	Support ioctl I/F for user application.
#105140	MSE Core	Remove duplicated header from Streaming driver.
#105799	MSE Core	Update base version to R-Car v3.4.0 BSP (based on Upstream v4.9)
#109546	MSE Core	Support MSE Adapter I/F for Kernel modules.
#100785	MSE ALSA	Add support some ALSA formats following. - Channels 1-24ch - Sampling rate 8kHz-192kHz - PCM Format Integer 16bit-32bit
#100854	MSE ALSA	Add "alsa_devices" of the module parameter for configuration MSE devices at timing of module load.
	MSE V4L2	Add "v4l2_video_devices" and "v4l2_mpeg2ts_devices" of the module parameters for configuration MSE devices at timing of module load.
#109083	MSE ALSA	Support that Talker and Listener can operation simultaneously on a single ALSA card device.
	MSE V4L2	Support that switching between Talker and Listener on a single V4L2 device.
#98614	MSE V4L2	Add support some V4L2 Video formats following. - Picture resolution H.264: 80x80-3840x3840, MJPEG 8x8-2040x2040 - Framerate 1fps-60fps
#101047	MSE V4L2	Add support 0/0 framerate setting. If framerate is 0/0, video frames are transmitted according to the timing of v4l2sink buffer queueing.
#102031	MSE V4L2	Support H.264 AVC (without Start Code) data format
	MSE CVF H264	Support CVF H264 Single NAL format
#109877	MSE MCH	Support MCH adapter for interface to MCH
	MCH	Support kernel I/F for MSE.
#69500	libavdecc	Add library to support Protocol IEEE 1722.1 (AVDECC).
#69511	Launcher Application	Support AVDECC with libavdecc
#102456	Launcher Application	Add example ini and script files that use case of MSE MPEG2TS.
#109267	Launcher Application	Update example ini and script files to adapt MSE new sysfs I/F specification.
#112599	Launcher Application	Remove export XDG_RUNTIME_DIR in example scripts.
#110193	Simple Application	The config file of ptp4l update to linuxptp v1.6.
#105142	libeavb avbtool	Remove duplicated header from Streaming driver.

Fix issues following list.

No.	Module	Description
#99447	MSE Core	Fix issue that wrong usage of some Kernel API (hrtimer, kalloc, mutex and spinlock).
#104196	MSE Core	Fix Kconfig dependency issue that missing marking MSE_ADAPTER_EAVB as dependent on RAVB_STREAMING.
#105578	MSE Core	Fix inappropriate network device name.
#108855	MSE Core	Fix the wrong value of AVTP_CRF_TYPE
#100106	MSE IEC61883-6	Fix to set the correct data block counter to dbc field
#102105	MSE IEC61883-6	Fix the stream data length does not contain the CIP header length.
#105112	MSE IEC61883-6	Fix issue that wrong value of tu field in AVTP header.
#104192	MSE CVF H264	Fix issue that bytes_per_frame parameter does not reflected in case of CVF H264.
#105073	MSE CVF H264	Fix the stream data length does not contain the h264_timestamp field length.
#105900	MSE CVF H264	Fix buffer overrun problem, if M bit is not set.
#109673	MSE V4L2	Fix issue that sending multi stream of video or mpeg2ts
#102361	MCH	Fixes in-tree compilation error for the avb-mch kernel module

Fix restrictions following list.

No.	Module	Description
#99053	MSE Core	The calculated CBS parameter is incorrect when link speed is 1Gbps.
#90482	MSE ALSA	Frame interval is always work with 1000 packets per second.
#97414	MSE ALSA	Module unload and reload does not working correctly.
#98376	MSE ALSA	Audio channels cannot specified other than two channels.
#98651	MSE ALSA	Audio sample format does not work other than S16_LE.
#98558	MSE V4L2	If the V4L2 Adapter module loaded before the EAVB Adapter module load, show the log message that is "mse_core/[mse_open] network adapter module is not loaded". However module load is successful.
#98614	MSE V4L2	Video framerate cannot specified other than 1/15, 1/30 and 1/60.
#99296	MSE V4L2	Module unload and reload does not working correctly.
#76224	MCH	User's Manual is not contains current release.

4.8 v2.7.0

- The yocto recipe for integration of the Ethernet AVB Software were merged in the Renesas Yocto Recipe package v2.17.0.
- Update Open-AVB Commit ID in Yocto Recipe.
- Fix and add about following restrictions and functions. for details, shown below tables.

Add functions following list.

No.	Module	Description
#108315	AVB Streaming Driver	Use generalized compatible string at device tree match.
#105174	MSE Core	Add configuration option for Sysfs and ioctl. - CONFIG_MSE_IOCTL - CONFIG_MSE_SYSFS
#110518	MSE Core	Improve error checking for calculation CBS parameters in packetizer.
#110705	MSE Core	Add configuration option for each packet formats. - CONFIG_MSE_PACKETIZER_AAF - CONFIG_MSE_PACKETIZER_IEC61883_4 - CONFIG_MSE_PACKETIZER_IEC61883_6 - CONFIG_MSE_PACKETIZER_CVF_H264 - CONFIG_MSE_PACKETIZER_CVF_H264_SINGLE_NAL - CONFIG_MSE_PACKETIZER_CVF_MJPEG
#112908	MSE Core	Enable configuration of the MCH Adapter.
#113586	MSE Core	Add parameter checking for validate parameter combination related media clock recovery.
#112329	MSE V4L2	Modify the name of V4L2 device name.
#112359	MSE ALSA	Modify the MSE device mapping from ALSA sound card to PCM device. And then the max number of the ALSA Adapter devices extend from 2 to 8.
#69493	MCH	Add Media Clock Recovery for Audio.
#109306	MCH	Add get time by gPTP Timer.

Fix issues following list.

No.	Module	Description
#115110	AVB Streaming Driver	Fix does not print out avb_desc type field if using trace point function.
#116128	AVB Streaming Driver	Fix problem regarding the CBS parameter calculation.
#104181	MSE Core	Fix streaming stop sequence.
#112125	MSE Core	Fix the problem that stop streaming before streaming process done. Revise buffer management to wait for streaming done. And also wait closing if streaming process is not completed.
#112369	MSE Core	Fix wrong definition of the max values of fps_denominator and fps_numerator in mse_media_video_config.
#114827	MSE Core	Fix the definition for the maximum size of bytes_per_frame. And add the definition for the minimum size of bytes_per_frame. The new specification of bytes_per_frame from 128 to 1476.
#116030	MSE Core	Fix resource allocate race issue at open.
#113047	MSE V4L2	Fix resource releasing process at probe.

Fix restrictions following list.

No.	Module	Description
#89132	MSE ALSA	In case of Talker and Listener are connected directly, sound skipping occurs
#69493	MCH	MCH is dummy stub in current release.
#104950	MSE Core	After the streamid used at once, The same streamid cannot be received on another device, since the setting of streamid is not canceled if streaming process is closed.
#110194	MSE Core	In case of CRF transmission, CBS calculation does not work well
#110392	MSE Core	In case of streaming bitrate is set 100Mbps, CBS calculation error occurred however streaming process cannot stop.
#110002	MSE IEC61883-4	In case of video and MPEG2TS streaming, delay time parameter does not reflect AVTP timestamp.
#104346	MSE CVF H264	CVF H264 transmission of 50Mbps is interrupted by buffer overrun after streaming out 128 packets
#98664	MSE CVF MJPEG	In case of CVF MJPEG streaming, if the input data is corrupted, kernel panic will occur.
#105078	MSE CVF MJPEG	In stream of CVF MJPEG format, stream_data_length field of AVTP header is wrong.
#105462	MSE CVF MJPEG	Cannot reflect the bytes_per_frame parameter of sysfs to CVF MJPEG streaming.
#104540	MSE CVF MJPEG	CVF MJPEG reception of 50Mbps is interrupted by buffer overrun
#104180	MSE ALSA	Interval of TX frames has too large jitters for stream class setting.
#105062	MSE ALSA	Cannot transmit 8KHz audio sample with speaker-test application.
#110391	MSE ALSA	Number of ALSA adapter devices is limited by limitation for sound cards of ALSA framework.
#110499	MSE ALSA	samples_per_frame parameter has range from 0 to 740, however it is limited to the lower limit 2 and the upper limit 128.
#97380	MSE V4L2	In case of running Talker, It may happens "kernel BUG at mm/slub.c:1508! Internal error: Oops - BUG" in V4L2 adapter
#104996	MSE V4L2	In case of MPEG2TS transmission, buffer overrun error will occur if the data is high bitrate and variable bitrate.
#109702	MSE V4L2	The tspackets_per_frame parameter does not work well, so it does not recommend changing from default.
#109707	MSE V4L2	In case of MPEG2TS streaming, AVTP timestamp is wrong.
#110390	MSE V4L2	In case of streaming of IEC61883-4 without PCR, The data comparison result of Talker and Listener does not match.
#110393	MSE V4L2	In case of reception of CVF H264 AVC format, Internal data flow error happened on GStreamer pipeline.

4.9 v2.8.0

- The yocto recipe for integration of the Ethernet AVB Software were merged in the Renesas Yocto Recipe package v2.19.0.
- Fix and add about following restrictions and functions. for details, shown below tables.

Fix issues following list.

No.	Module	Description
#118319	MSE Core	Fix range overflow in parsing streamid of sysfs I/F.

4.10 v2.9.0

- The yocto recipe for integration of the Ethernet AVB Software were merged in the Renesas Yocto Recipe package v2.21.0.
- Fix and add about following restrictions and functions. for details, shown below tables.

Add functions following list.

No.	Module	Description
#123044	MCH	Add Timer functions based by Hardware PTP Time.

Fix issues following list.

No.	Module	Description
#126429	AVB Streaming Driver	Fix DMA-API device driver frees DMA memory with different size.
#123138	AVB Streaming Driver	Fix problem of can setting out of range value of 'major' parameter.
#104111	MSE Core	Add invalid calling state checking of MSE Adapter I/F in Kernel API.
#105378	MSE Core	Fix overflow problem of timer delay value calculation by some conditions of frame rate parameter (e.g. 1/30 fps).
#109021	MSE Core	Reduce idling time in streaming pipeline process by queueing of transmission request.
#123393	MSE Core	DMA allocation via dma_alloc_coherent fails without CONFIG_OF.
#124025	MSE Core	Fix overrun output area in parsing of u16/u32 values.
#126136	MSE Core	Fix resource leakage at probe when error occurred.
#126153	MSE Core	Fix problem of can setting out of range value of 'major' parameter.
#101352	MSE V4L2	Reduce data concatenate processing of fragment data for MPEG2-TS and MJPEG.
#118236	MSE CVF MJPEG	Fix problem of EOS marker position and progressed position mishandling in packetize buffer if condition of small picture size of MJPEG.
#126016	MSE CVF H264	Fix problem that the setting value of bytes_per_frame parameter is not effects if CVF H264 format.
#119151	MSE IEC61883-4	Fix problem that streaming stopping process stall at occurred short of data.
#126286	MSE IEC61883-4	Fix problem that send the broken payload stream if no PCR value in MPEG2-TS stream.

Fix restrictions following list.

No.	Module	Description
#115307	MSE ALSA	Lost trailing data when streaming stopped.
#115312	MSE IEC61883-4	Lost trailing data when streaming stopped on Talker.
#116798	MSE V4L2	If multiple open the same video device, print out log message of "v4l2 device is opened".
#117778	MSE CVF MJPEG	The problem happen that stream transmission speed is too slowly if the data size per picture is huge.
#117924	MSE ALSA	In this version, there is a difference in audio timestamp phase by each Listener device.
#117938	MSE CVF H264	In case of H264 transmission, the stream payload data often corrupted if the data is high bitrate.

4.11 v2.10.0

- The yocto recipe for integration of the Ethernet AVB Software were merged in the Renesas Yocto Recipe package v2.23.0.
- Fix and add about following restrictions and functions. for details, shown below tables.

Fix issues following list.

No.	Module	Description
#127463	MSE Core	Fix missing initialization of crf_index_network at mse_close.
#128129	MSE Core	Fix the problem that the internal state becomes illegal due to the parallel operation of start and stop processes.
#128675	MSE Core	Fix to disable MPEG2-TS PCR adjustment when no PCR exist in stream
#130695	MSE Core	Fix pointer dereferencing error code returned from platform_device_register_sample and class_create when module loading.
#128330	MSE V4L2	Fix illegal memory access by releasing buffer being processed
#127342	MCH Core	Fix missing parameter checking in MCH/PTP API.
#129705	MCH Core	Fix the timer interrupt occursion at an unintended timing.
#129903	MCH Core	Fix the wrong feedback to clock source correction settings.

4.12 v2.11.0

- Add support of the R-Car M3N.
- Updates are document only in this release.

4.13 v2.12.0

- Update OpenAvnu Commit ID in Yocto Recipe. This OpenAvnu update includes destructive changes in the IPC specification of gPTP daemon and MAAP daemon. The Launcher application is affected by this change. Be sure to combine the Launcher application included in this release with the new daemons.
- The yocto recipe for integration of the Ethernet AVB Software were merged in the Renesas Yocto Recipe package v3.4.0.
- Fix and add about following restrictions and functions. for details, shown below tables.

Add functions following list.

No.	Module	Description
#139350	AVB Streaming Driver	Follow the change of kernel API from v4.9 to v4.14
#139593	AVB Streaming Driver	Expand the ring size of AVTP frame buffer to 256. This change aim to improve stability at high load. If application depends the ring size of AVB Streaming driver, that should be following this changes.
	MSE Core	
	Simple Application	
#135904	MSE H264	Add support multi slice coded H.264 stream.
#137697	MSE Core	Optimize resource management to reduce statically allocated memory and improve code readability.
#137698	MSE Core	Add support to handle module reference count for managing module dependency.
#139442	Launcher Application	Add support to update gPTP Grandmaster ID with AVDECC
#145925	Launcher Application	Follow the update of MAAP daemon IPC specification. New MAAP daemon became able to handling multiple address reserve. Therefore a restriction regarding MAAP daemon remove from Launcher application note.
#145935	Launcher Application	Follow the update of gPTP daemon IPC specification.

Fix issues following list.

No.	Module	Description
#134518	MSE IEC61883-6	Fix wrong data conversion between audio sample and AVTP payload in case of using S24_LE and S24_BE format.
#142375	MSE CVF MJPEG	Fix out-of-range access to array variable when input JPEG data include invalid DQT.

4.14 v2.13.0

- The yocto recipe for integration of the Ethernet AVB Software were merged in the Renesas Yocto Recipe package v3.6.0.
- Add support of the R-Car E3.
- Fix and add about following restrictions and functions. for details, shown below tables.

Add functions following list.

No.	Module	Description
#149731	AVB Streaming Driver	Remove unnecessary checking of major parameter.
#141743	MSE Core	Add resync feature to recovery from stream disruption.
#149091	MSE Core	Remove unnecessary checking of major parameter.
#118418	MCH Core	Add auto selection of avtp_clk_freq value.

Fix issues following list.

No.	Module	Description
#148279	MSE H.264	Fix the last picture may be not sent when running as as video talker.
#148407	MSE IEC61883-4	Fix cannot stop streaming with data size aligned by MPEG2TS packet.
#148350	Simple Application	Fix make install and make clean failure on TOPDIR.

Fix restrictions following list.

No.	Module	Description
#148867	MSE H.264	Due to version update of GStreamer Good Plugins included in Renesas Yocto Recipe package v3.4.0, the procedure of MSE User's Manual 7.2.1 does not working correctly.

4.15 v2.14.0

- The yocto recipe for integration of the Ethernet AVB Software were merged in the Renesas Yocto Recipe package v3.7.0.
- Fix and add about following restrictions and functions. for details, shown below tables.

Fix issues following list.

No.	Module	Description
#152284	MSE Core	Fix to restart to sending packets when not in time for the interval.
#156728	MSE H.264	Fixed the problem of setting both S bit and E bit of FU header, when CONFIG_MSE_PACKETIZER_CVF_H264_SINGLE_NAL=n.

4.16 v2.15.0

- The yocto recipe for integration of the Ethernet AVB Software were merged in the Renesas Yocto Recipe package v3.9.0.1.
- Fix and add about following restrictions and functions. for details, shown below tables.

Add functions following list.

No.	Module	Description
#171768	MSE Core	Add transmit timing adjust feature on MPEG2TS talker.
#171775	MSE Core	Add output timing adjust feature on video listener.

Fix issues following list.

No.	Module	Description
#180149	AVB Streaming Driver	Fix buffer overflow when write_stq.
#157847	MSE Core	Fixes NULL pointer dereference at streaming stopping.
#153942	MSE AAF	Fix wrong output position calculation.

Fix restrictions following list.

No.	Module	Description
#163960	MSE IEC61883-4	When the block size is divisible by the MPEG2-TS packet size (188 or 192 byte), incorrect data is mixed in the transmission data.

4.17 v2.16.0

- The yocto recipe for integration of the Ethernet AVB Software were merged in the Renesas Yocto Recipe package v3.15.0.

Fix and add about following restrictions and functions. for details, shown below tables.

Fix issues following list.

No.	Module	Description
#156725	MSE Core	Add filter of outliers in create avtp timestamp.
#188207	MSE Core	Fix problem that the streaming might be stalled.
#190710	MSE Core	Fix missing bit mask at difference calculation of M2TS timestamp.
#175971	Launcher Application	Fix cmake error of jdk's avdecc if not doing submodule update
#194182	Launcher Application	Update example script affect by changed MSE usage.

4.18 v2.17.0

- Add gptp in yocto recipe as new structure in AVnu project.
- Update OpenAvnu in yocto recipe to remove handling for gptp.
- The yocto recipe for integration of the Ethernet AVB Software were merged in the Renesas Yocto Recipe package v5.1.0.

Add functions following list.

No.	Module	Description
#313489	AVB Streaming Driver	Follow the change of kernel API and Macro definitions from v4.14 to v5.10
	MSE Core	
	MSE ALSA	
	MSE V4L2	
	MCH PTP	

4.19 v2.18.0

- The yocto recipe for integration of the Ethernet AVB Software were merged in the Renesas Yocto Recipe package v5.5.0.
- Add R-Car D3 support
- Fix and add functions as following tables

Fix issues following list.

No.	Module	Description
#323541	AVB Streaming Driver	- Fix Segmentation fault when insmod ravb_proc.ko - Fix syntax error when build module with Linux kernel.
	MCH Core	- Fix syntax error when build module with Linux kernel
	MSE Core	- Fix syntax error when build module with Linux kernel - Fix incorrect using of_dma_configure()
#326355	MSE Core	- Fix potential deadlock during audio transmission start

Add functions following list

No.	Module	Description
#326355	AVB Streaming Driver	Support Adjust kthread RT priority via module parameter
#324534	AVB Streaming Driver	Support Generate TX IRQ once per buffer

4.20 v2.19.0

- The yocto recipe for integration of the Ethernet AVB Software were merged in the Renesas Yocto Recipe package v5.9.0.
- Fix and add functions as following tables

Fix issues following list.

No.	Module	Description
#339842	AVB Streaming Driver	- Fix error when rmmod ravb_streaming.ko on D3
#343727	Launcher Application	- Fix issue no element "vspfiter" in script
#342143	AVB Streaming Driver	- Fix MSE IRQ Optimization Handling

Add functions following list

No.	Module	Description
#339844	Launcher Application	Update avblauncher script to use SW codec to verify for audio/video transfer in D3
#315983	MSE Core	Change workqueues to kthreads to improve for performance.
#333191	MSE Core	Add option to configure the video packetizer by frames
#342139	MCH Core	Add module param to choose AUDIO_CLKOUT

4.21 v2.20.0

- The yocto recipe for integration of the Ethernet AVB Software were merged in the Renesas Yocto Recipe package for Linux kernel 5.10.194.
- Fix and add functions as following tables

Fix issues following list.

No.	Module	Description
#368490	AVB MSE Driver	- Synchronization and memory handling issues.
	AVB MCH Driver	
#OTLINT-7565	MCH PTP	- Fix issue ptp_queue not synchronized with its deinit.
#OTLINT-7072	MSE Core	- Fix Semaphore taken in atomic context.
#OTLINT-7054	MCH Core	- Fix wrong initialization order.
#OTLINT-7057	MSE Core	- Fix wrong initialization order.

Add functions following list

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No.	Module	Description
#368085	AVB MSE Driver	Extend logging and tracing capabilities of the Renesas AVB stack.
	AVB MCH Driver	
	AVB Streaming Driver	
#OTLINT_9132	RAVB Streaming	- Fix missing synchronization to prior stream leads to stream.

5. Restrictions

[D3]

No.	Module	Description
#313492	AVB Streaming Driver	<p>D3 cannot streaming. There is issue of meeting "not AsCapable" and system hang/Bus error</p> <p>Current workaround:</p> <p>+ Edit arch/arm64/boot/dts/renesas/r8a77995.dtsi to disable using IPMMU</p> <pre> --- a/arch/arm64/boot/dts/renesas/r8a77995.dtsi +++ b/arch/arm64/boot/dts/renesas/r8a77995.dtsi @@ -803,7 +803,7 @@ resets = <&cpg 812>; phy-mode = "rgmii"; rx-internal-delay-ps = <1800>; - iommu = <&ipmmu_ds0 16>; + //iommu = <&ipmmu_ds0 16>; #address-cells = <1>; #size-cells = <0>; status = "disabled"; </pre> <p>+ Edit drivers/net/ethernet/renesas/ravb_main.c to delay clock rate</p> <pre> --- a/drivers/net/ethernet/renesas/ravb_main.c +++ b/drivers/net/ethernet/renesas/ravb_main.c @@ -961,6 +961,11 @@ static const struct soc_device_attribute ravb_quirks_match[] = { { /* sentinel */ } }; +static const struct soc_device_attribute r8a77995[] = { + { .soc_id = "r8a77995", .revision = "ES*.*" }, + { /* sentinel */ } +}; + /* PHY init function */ static int ravb_phy_init(struct net_device *ndev) { @@ -1878,6 +1883,11 @@ static int ravb_set_gti(struct net_device *ndev) if (!rate) return -EINVAL; + /* Workaround for D3: Delay frequency 2MHz */ + if (soc_device_match(r8a77995)) { + rate = rate - 2000000; + } inc = 1000000000ULL << 20; do_div(inc, rate); </pre>

6. Confirmation result

Ethernet AVB Software is tested on the following network configuration in each version.

No	Use case	Network configuration			Version
		Talker	AVB Switch	Listener	
1.1	Simple	H3/Salvator-X (Simple Talker)	-	H3/Salvator-X (Simple Listener)	v2.0.0-v2.3.0 v2.5.0-v2.10.0 v2.12.0-v2.13.0 v2.19.0
1.2		M3/Salvator-X (Simple Talker)	-	M3/Salvator-X (Simple Listener)	v2.4.0-v2.10.0 v2.12.0-v2.13.0 v2.18.0 v2.19.0
1.3		M3N/Salvator-X (Simple Talker)	-	M3N/Salvator-X (Simple Listener)	v2.11.0 v2.18.0
1.4		E3/Ebisu (Simple Talker)	-	E3/Ebisu (Simple Listener)	v2.13.0 v2.18.0
1.5		H3/Salvator-X (Simple Talker)	MOTU AVB Switch (FW Ver. v1.0.6+474)	H3/Salvator-X (Simple Listener)	v2.0.0-v2.3.0 v2.5.0-v2.10.0 v2.12.0
1.6		M3/Salvator-X (Simple Talker)	MOTU AVB Switch (FW Ver. v1.0.6+474)	M3/Salvator-X (Simple Listener)	v2.4.0-v2.10.0 v2.12.0
1.7		M3N/Salvator-X (Simple Talker)	MOTU AVB Switch (FW Ver. v1.0.6+474)	M3N/Salvator-X (Simple Listener)	v2.11.0
1.8		H3/Salvator-X (Simple Talker)	MOTU AVB Switch (FW Ver. v1.1.0+667)	H3/Salvator-X (Simple Listener)	v2.13.0-v2.16.0 v2.17.0 v2.19.0
1.9		M3/Salvator-X (Simple Talker)	MOTU AVB Switch (FW Ver. v1.1.0+667)	M3/Salvator-X (Simple Listener)	v2.13.0 v2.18.0 v2.19.0
1.10		E3/Ebisu (Simple Talker)	MOTU AVB Switch (FW Ver. v1.1.0+667)	E3/Ebisu (Simple Listener)	v2.13.0 v2.18.0
1.11		H3/Salvator-X (Simple Talker)	Summit X440 (FW Ver. 15.7.3.1 patch1-6)	H3/Salvator-X (Simple Listener)	v2.0.0-v2.2.0 v2.5.0-v2.10.0 v2.12.0-v2.16.0 v2.17.0 v2.19.0
1.12		M3/Salvator-X (Simple Talker)	Summit X440 (FW Ver. 15.7.3.1 patch1-6)	M3/Salvator-X (Simple Listener)	v2.4.0-v2.10.0 v2.12.0-v2.13.0 v2.18.0 v2.19.0
1.13		M3N/Salvator-X (Simple Talker)	Summit X440 (FW Ver. 15.7.3.1 patch1-6)	M3N/Salvator-X (Simple Listener)	v2.11.0 v2.17.0 v2.18.0
1.14		E3/Ebisu (Simple Talker)	Summit X440 (FW Ver. 15.7.3.1 patch1-6)	E3/Ebisu (Simple Listener)	v2.13.0 v2.18.0
1.15		D3/Draak (Simple Talker)	-	D3/Draak (Simple Listener)	v2.18.0 v2.19.0
1.16		D3/Draak (Simple Talker)	MOTU AVB Switch (FW Ver. v1.1.0+667)	D3/Draak (Simple Listener)	v2.18.0 v2.19.0
1.17		D3/Draak (Simple Talker)	Summit X440 (FW Ver. 15.7.3.1 patch1-6)	D3/Draak (Simple Listener)	v2.18.0 v2.19.0
1.18		M3N/Salvator-X (Simple Talker)	MOTU AVB Switch (FW Ver. v1.1.0+667)	M3N/Salvator-X (Simple Listener)	v2.18.0
2.1	Audio	H3/Salvator-X (MSE ALSA, AAF-PCM)	-	H3/Salvator-X (MSE ALSA, AAF-PCM)	v2.3.0 v2.6.0-v2.10.0 v2.12.0-v2.13.0 v2.18.0 v2.19.0
2.2		H3/Salvator-X (MSE ALSA, IEC61883-6)	-	H3/Salvator-X (MSE ALSA, IEC61883-6)	v2.3.0 v2.6.0-v2.10.0 v2.12.0-v2.13.0 v2.18.0 v2.19.0
2.3		H3/Salvator-X (MSE ALSA, AAF-PCM)	MOTU AVB Switch (FW Ver. v1.0.6+474)	H3/Salvator-X (MSE ALSA, AAF-PCM)	v2.5.0-v2.10.0 v2.12.0
2.4		H3/Salvator-X (MSE ALSA, IEC61883-6)	MOTU AVB Switch (FW Ver. v1.0.6+474)	H3/Salvator-X (MSE ALSA, IEC61883-6)	v2.5.0-v2.10.0 v2.12.0
2.5		H3/Salvator-X (MSE ALSA, AAF-PCM)	MOTU AVB Switch (FW Ver. v1.1.0+667)	H3/Salvator-X (MSE ALSA, AAF-PCM)	v2.13.0-v2.16.0 v2.17.0

					v2.18.0 v2.19.0
2.6		H3/Salvator-X (MSE ALSA, IEC61883-6)	MOTU AVB Switch (FW Ver. v1.1.0+667)	H3/Salvator-X (MSE ALSA, IEC61883-6)	v2.13.0-v2.16.0 v2.17.0 v2.18.0 v2.19.0
2.7		H3/Salvator-X (MSE ALSA, AAF-PCM)	Summit X440 (FW Ver. 15.7.3.1 patch1-6)	H3/Salvator-X (MSE ALSA, AAF-PCM)	v2.5.0-v2.10.0 v2.12.0-v2.16.0 v2.17.0 v2.18.0 v2.19.0
2.8		H3/Salvator-X (MSE ALSA, IEC61883-6)	Summit X440 (FW Ver. 15.7.3.1 patch1-6)	H3/Salvator-X (MSE ALSA, IEC61883-6)	v2.5.0-v2.10.0 v2.12.0-v2.16.0 v2.17.0 v2.18.0 v2.19.0
2.9		D3/Draak (Simple Talker)	-	D3/Draak (Simple Listener)	v2.18.0 v2.19.0
2.10		D3/Draak (Simple Talker)	MOTU AVB Switch (FW Ver. v1.1.0+667)	D3/Draak (Simple Listener)	v2.18.0 v2.19.0
2.11		D3/Draak (Simple Talker)	MOTU AVB Switch (FW Ver. v1.1.0+667)	D3/Draak (Simple Listener)	v2.18.0 v2.19.0
3.1	Camera	H3/Salvator-X (MSE V4L2, CVF H264 D13)	-	H3/Salvator-X (MSE V4L2, CVF H264 D13)	v2.3.0 v2.6.0-v2.10.0 v2.12.0-v2.13.0 v2.18.0 v2.19.0
3.2		H3/Salvator-X (MSE V4L2, CVF H264 D13)	MOTU AVB Switch (FW Ver. v1.0.6+474)	H3/Salvator-X (MSE V4L2, CVF H264 D13)	v2.5.0-v2.10.0 v2.12.0
3.3		H3/Salvator-X (MSE V4L2, CVF H264)	MOTU AVB Switch (FW Ver. v1.0.6+474)	H3/Salvator-X (MSE V4L2, CVF H264)	v2.5.0-v2.10.0 v2.12.0
3.4		H3/Salvator-X (MSE V4L2, CVF MJPEG)	MOTU AVB Switch (FW Ver. v1.0.6+474)	H3/Salvator-X (MSE V4L2, CVF MJPEG)	v2.5.0-v2.10.0 v2.12.0
3.5		H3/Salvator-X (MSE V4L2, CVF H264 D13)	MOTU AVB Switch (FW Ver. v1.1.0+667)	H3/Salvator-X (MSE V4L2, CVF H264 D13)	v2.13.0-v2.16.0 v2.18.0 v2.19.0
3.6		H3/Salvator-X (MSE V4L2, CVF H264)	MOTU AVB Switch (FW Ver. v1.1.0+667)	H3/Salvator-X (MSE V4L2, CVF H264)	v2.13.0-v2.16.0 v2.17.0 v2.18.0 v2.19.0
3.7		H3/Salvator-X (MSE V4L2, CVF MJPEG)	MOTU AVB Switch (FW Ver. v1.1.0+667)	H3/Salvator-X (MSE V4L2, CVF MJPEG)	v2.13.0-v2.16.0 v2.17.0 v2.18.0 v2.19.0
3.8		H3/Salvator-X (MSE V4L2, CVF H264 D13)	Summit X440 (FW Ver. 15.7.3.1 patch1-6)	H3/Salvator-X (MSE V4L2, CVF H264 D13)	v2.5.0-v2.10.0 v2.12.0-v2.16.0 v2.18.0 v2.19.0
3.9		H3/Salvator-X (MSE V4L2, CVF H264)	Summit X440 (FW Ver. 15.7.3.1 patch1-6)	H3/Salvator-X (MSE V4L2, CVF H264)	v2.5.0-v2.10.0 v2.12.0-v2.16.0 v2.17.0 v2.18.0 v2.19.0
3.10		H3/Salvator-X (MSE V4L2, CVF MJPEG)	Summit X440 (FW Ver. 15.7.3.1 patch1-6)	H3/Salvator-X (MSE V4L2, CVF MJPEG)	v2.5.0-v2.10.0 v2.12.0-v2.16.0 v2.17.0 v2.18.0 v2.19.0
4.1	MPEG2TS	H3/Salvator-X (MSE V4L2, IEC61883-4)	-	H3/Salvator-X (MSE V4L2, IEC61883-4)	v2.6.0-v2.10.0 v2.12.0-v2.13.0 v2.18.0 v2.19.0
4.2		H3/Salvator-X (MSE V4L2, IEC61883-4)	MOTU AVB Switch (FW Ver. v1.0.6+474)	H3/Salvator-X (MSE V4L2, IEC61883-4)	v2.6.0-v2.10.0 v2.12.0 v2.19.0
4.3		H3/Salvator-X (MSE V4L2, IEC61883-4)	MOTU AVB Switch (FW Ver. v1.1.0+667)	H3/Salvator-X (MSE V4L2, IEC61883-4)	v2.13.0-v2.16.0 v2.17.0 v2.18.0 v2.19.0
4.4		H3/Salvator-X (MSE V4L2, IEC61883-4)	Summit X440 (FW Ver. 15.7.3.1 patch1-6)	H3/Salvator-X (MSE V4L2, IEC61883-4)	v2.6.0-v2.10.0 v2.12.0-v2.16.0 v2.17.0 v2.18.0 v2.19.0

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