

Multimedia Group Activity Report

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Team

Status

Tasks

Future



Multimedia

- Kieran Bingham (UK) – FDP
- Kuninori Morimoto (JP) – Sound
- Laurent Pinchart (FI) – DU, VSP, Team Lead
- Niklas Söderlund (SE) – VIN
- Ulrich Hecht (DE) – HDMI



Multimedia – Team

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Multimedia

		Gen2	Gen3
Capture	VIN	Upstream	Public
	CSI-2	N/A	Prototype
	ISP	N/A	No
Codec	JPU	Upstream	Upstream
	VCP (Video Codec)	No	No
	iVDP1 (Low-Latency Video Decoder)	No	No
	iVCP1 (Low-Latency Video Encoder)	N/A	No



Multimedia – Overview

		Gen2	Gen3
Processing	VSP	Upstream	Upstream
	DRC (Dynamic Range Correction)	No	No
	IMP-X (Image Recognition Engine)	No	No
	IMR (Distortion Correction Engine)	No	No
	FDP	Public	Public
Bus Access	DCU	N/A	No
	2D-DMAC	No	N/A
	FCP	N/A	Public (No Decompression)



Multimedia – Overview

		Gen2	Gen3
Display	DU	Upstream	Upstream
	CMM (Color Management Module)	No	No
	DOC (Display Output Checker)	No	No
	HDMI	N/A	Prototype
	LVDS	Upstream	Upstream
	TCON	Prototype	Prototype
	GP2D	External	External
	GPU	No	No



Multimedia – Overview

		Gen2	Gen3
Sound	Audio DMAC	Upstream	Upstream
	SCU (SRC, CTU, MIX, DVC)	Upstream	Upstream
	SSIU	Upstream	Upstream
	SSI	Upstream	Upstream
	ADG	Upstream	Upstream
	HDMI output	N/A	Prototype
	ADSP	No	No



Multimedia – Overview

- VIN
 - Redesigned driver merged in v4.8
 - Gen2 fully supported
 - Gen3 support in progress, requires Media Controller
 - UDS (scaler) not supported
- CSI-2
 - Patches posted
 - Media Controller support to be developed
 - CSI-2 to VIN routing painful
- ADV7482
 - Prototype available
 - Supports CVBS (analog) and HDMI inputs
 - Upstreaming would require significant work



Multimedia – Capture

- VSP
 - Most features implemented (Gen2 & Gen3)
 - CLU & LUT merged in v4.8
 - HGO available, targeting v4.9
 - Missing SHP (lacking documentation), ILV, BRS, UIF, HGT
 - Image partitioning support in progress
 - Request API in progress
- FDP
 - Driver posted for upstream review
- FCP
 - Merged in v4.8 with limited features (clock & power domains)
 - Missing data compression and decompression support



Multimedia – Processing

- **DU**
 - Most features implemented (Gen2 & Gen3)
 - VSP integration available
 - IPMMU integration missing
- **RGB & LVDS**
 - Available upstream
- **HDMI**
 - Available for Gen2 (on-board)
 - Prototype for Gen3 (SoC)
 - Gen3 upstreaming will require limited refactoring
- **TCON**
 - Prototype available (Cogent)



- Audio Input/Output
 - Most features implemented
- HDMI output
 - Prototype available
 - Hotplug support missing
 - Requires new DT bindings for integration for video



Multimedia – Sound

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Multimedia

- VIN
 - IPMMU Integration
 - Gen3 support
 - CSI-2
 - UDS (Scaler)
 - Interlacing
- VSP
 - Image partitioning
 - Fixed alpha (Gen3)
 - Rotation (implemented, pending image partitioning)
 - Request API
 - Suspend/Resume



Multimedia – Tasks

- DU
 - IPMMU integration (through VSPD + FCP on Gen3)
 - Gen3 HDMI output
 - 3-planes formats
- Sound
 - HDMI output with DT bindings
 - HDMI hotplug



Multimedia – Tasks

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Multimedia

- Test procedures documented in the elinux.org wiki (<http://elinux.org/R-Car/Devices>)
- Test tools for DRM/KMS and V4L2 collaboratively developed (yavta, mediatext, kmsxx, ...)
- Test scripts for automated test suite
[git://git.ideasonboard.com/renesas/vsp-tests.git](https://git.ideasonboard.com/renesas/vsp-tests.git)
- Multiple bugs and regressions caught already
- More tests to be developed



Multimedia – Tests

- New API require open-source userspace implementation
- Not just test tools but integration in a major graphics stack (X11, Wayland, Android HWC)
- Userspace patches need to be accepted by maintainers



Multimedia – Upstreaming

- VCP3, VCP4: H.264, H.265, VP8, ... (depending on instance)
 - iVCP1C: H.246/AVC low-latency decoder
 - iVDP1C: H.264/AVC (& JPEG) low-latency decoder
 - Documentation not available
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- V4L2 Upstream API now includes good support for codecs
 - Industry is moving to V4L2 (including Android)
 - V4L2 codecs developed and submitted upstream (Mediatek, Qualcomm, ...)



Multimedia – Codecs