R2514/R2544 Linux Driver Beta Release Notes

1. Overview

AMD's Linux® Driver's includes open source graphics driver for AMD's embedded platforms and other peripheral devices on selected development platforms.

New features supported in this release:

1. Main line kernel 5.18 stable support.
2. R2544/R2514 Beta

2. Linux® kernel Support

1. 5.18.0 stable

3. Linux Distribution Support

1. Ubuntu 22.04

4. Component Versions

The following table shows git commit details of the sources and binaries used in the package.

The patches present in patches folder of this release package has to be applied on top of the git commit mentioned in the below table to get the full sources corresponding to this driver release. The sources directory in this package contains patches pre-applied to these commit ids.

Component Name	Version	Commit ID	Source Link for git clone
Kernel	5.18-stable	4b0986a3613c92f4ec1bdc7f60ec66fea135991f	https://github.com/torvalds/linux/tree/v5.18
Libdrm	2.4.110	56f81e6776c1c100c3f627b2c1feb9dcae2aad3c	https://github.com/freedesktop/mesa-drm.git
Mesa	21.3.5	22e263e54026efa153acaa08a0751d8aad9c8799	https://github.com/mesa3d/mesa.git
Ddx	21.1.0	6b7bca48773712abb507d03d6bc0e1ca177e02ed	https://github.com/freedesktop/xorg-xf86-video-amdgpu.git
Gstomx	1.0.0.1	5c4bff4a433dff1c5d005edfceaf727b6214bb74	git://people.freedesktop.org/~leoliu/gstomx
Wayland	1.15.0	28f962d688331291d693aa15c8f9ef45f40b8701	https://github.com/wayland-project/wayland
libva	2.8	3cc2212c38630ffcdc6b38e0bd867845adee5ed9	https://github.com/intel/libva.git
libvdpau	1.1.1	af517f56d64118520aa0c8456318dd9ec3307e94	https://github.com/freedesktop/libvdpau.git
LLVM	14.0	1f9140064dfbfb0bbda8e51306ea51080b2f7aac	https://github.com/llvm/llvm-project
Firmware	Master	705f19ac52c81fdc7f62e8221a1938189be69ebc	https://git.kernel.org/pub/scm/linux/kernel/git/firmware/linux-firmware.git
Vulkan	refs/tags/v-2022.Q2.1	e7e058da85413c179c6191137f4bb2eb0cecf7df	https://github.com/GPUOpen-Drivers/AMDVLK/commits/v-2022.Q2.1
Supported Applications			
LunarG Vulkan SDK	1.2.182	NA	https://vulkan.lunarg.com/sdk/home#linux
Vulkan CTS	1.2.2.2		https://github.com/KhronosGroup/Vulkan-CTS.git
RGP	1.10	NA	https://github.com/GPUOpen-Tools/radeon_gpu_profiler/tree/v1.10

5. Features Supported on R2000 APU

Supported features are shown in the following table.

Feature Group	Feature supported	R2000
2D	2D acceleration	Yes
3D	EGL 1.4, 1.5, EGL extensions.	Yes
3D	OGL 4.5, OGL 4.6	Yes
3D	GLX 1.4	Yes
3D	DRI3 support	Yes
3D	DRI3 updates (VDPAU, VAAPI)	Yes
3D	Vulkan Open Source	Yes
2D	10 bit Display	NA
Audio	DP Audio supports for standard	Yes
Audio	I2S Audio	Yes
Display	EDID(Basic)	Yes
Display support	X and Desktop support	Yes
Display support	Tear Free Desktop	Yes
Display support	Partial support RandR 1.4 capabilities	Yes
Display support	Kernel Mode Setting	Yes
Display support	4K60HZ display support	Yes
Display support	Multi-GPU support (Refer table below for dGPU pairing)	No
Display support	No of Displays supported (Refer display support table below)	-
Display support	4K cinema	No
Display support	DP MST	Yes
Display Support	Single Large Surface (SLS)	No
Play back	Play back support MPV player using VAAPI / VDPAU	Yes
Play back	Play back support for Gstreamer using VAAPI, gstomx (not recommended)	Yes
Play back	1080p 24fps, 30 fps and 60fps video play back	Yes
Play back	4k 30fps video play back	Yes
Play back	4k 60fps video play back	Yes
Power Management	Power Play support to re-clock	Yes
Power Management	initial GPU reset support	Yes
Power Management	Power Play sysfs interface for manually selecting clock speeds	Yes
VDPAU Post Processing	Deinterlace	Yes
VDPAU Post Processing	Edge Enhancement	Yes
VAAPI Postprocessing	Deinterlace	Yes
Transcode	4k Encode	Yes
Video Quality	Scaling and color space conversion (CSC)	Yes
Video Quality	Pull down detection and Deinterlacing	Yes
Video Quality	Support for software scaling	Yes
Video Quality	Support for hardware scaling	Yes
Video Quality	10-bit Decode with 10 bit render	No

Compute	OpenCL	No
dGMA –OpenGL		NA
dGMA - OpenCL		NA
fTPM		Yes
RJ45	1G	No
	10G	No
SFP+ (connector)	1G	No
	10G	No
eMMC	BC	Yes
	HS200	Yes
	HS400	Yes
SD Card	SD UHS I – SDR50	Yes
	SD UHS I – SDR104	Yes
	SD UHS I – SDR104	Yes
I2C		Yes
SPI Kernel Driver *		Yes

*****Bilby platform only

*****To make use of SPI kernel driver on Bilby Platforms, Required BIOS which has enabled SPI Entry in the ACPI table. Default BIOS doesn't have this. Please contact FAE for the required BIOS.

Display support:

Platform	**No of display(s)**
R2312, R2314, R2514	3
R2544	4

6. HW codec support

Codec	API	Middleware/framework
H.264 decode	VAAPI, VDPAU, OMX	ffmpeg-VAAPI, ffmpeg-VDPAU, gst-VAAPI, gst-OMX
H.265 decode	VAAPI, VDPAU, OMX	ffmpeg-VAAPI, ffmpeg- VDPAU, gst-VAAPI, gst- OMX
H.265 10bit->8bit decode (PF & V1000 only)	VAAPI	ffmpeg-VAAPI
MPEG2 decode	VAAPI, VDPAU, OMX	ffmpeg- VAAPI, ffmpeg- VDPAU, gst-VAAPI, gst- OMX
MPEG4 Part2 decode	VDPAU	ffmpeg- VDPAU
VC1 decode	VAAPI, VDPAU	ffmpeg- VAAPI, ffmpeg- VDPAU, gst- VAAPI
H.264 encode	VAAPI, OMX	gst-VAAPI, gst- OMX,
VP9 decode	VAAPI	Ffmpeg-VAAPI

7. Platforms Supported

1. R2000

8. Tested platform configurations

The following tables show the system configuration that was used for testing the driver package.

R2000	
APU	R2000
OPN's	R2312, R2314, R2544. R2514
APU TDP	12-25W, 12-35W
BIOS version	RBP1001A
VRAM setting	4GB
RAM	16GB
Display Convertors / Dongles Used	DP to HDMI, HDMI
Storage disk	SSD, M.2

9. Multi GPU Pairing

Not supported.

10. Known Issues/Limitations

R2000 issues:

1. Stutter observed for video playback through chromium browser.
2. Glitches observed with zoom calls on 3x4k/1080p display configuration.
3. Lag observed with teams video conference, PPT, browser on 3x4k display configuration.
4. Stutter and lag observed with 4k videoplay back with thin client config.
5. Stutter observed at times on secondary displays with 3x4k config.
6. One of the display goes blank after boot with 3xTrue 2K MST configuration.
7. Minor stutter observed at times with vaapi playback with MST-4K@30hz.
8. One of the Monitor goes blank after Hotplug of display cable which is connected to SUT in MST Daisy chain.
9. One Monitor(1 of 3) goes blank after booting to OS in MST Daisy chain configuration of 3xTrue 2k.
10. All monitors goes blank after executing S3 in MST Hub configuration & Daisy chain configuration.

Common Issues:

1. IO Page fault logs observed while loading the I2S module.
2. HP Z27s monitor resolution change does not take effect sometimes.
   Recommendation: Not to use the monitor since the monitor issues HPD pulse during Changing resolution causing to revert to previous/native resolution sometimes.
3. Hotplug root node of DP MST monitors in daisy chain or via Hub fails.
   Workaround: To always connect or disconnect monitors in MST configuration one by one and not at root node level.

Third Party Issues/Limitations:

1. Terminal switching results in hard hang randomly. Issue root caused gnome which is third party component.
   https://bugs.launchpad.net/ubuntu/+source/gdm3/+bug/1758512 .
2. Switching to console mode upon hotplug results in soft hang. Issue root caused gnome which is third party component.
   https://bugs.launchpad.net/ubuntu/+source/gdm3/+bug/1758512 .
3. Stutter can be observed when stream framerate and monitor refresh rate are different. This is expected phenomenon. Stutter cab be minimized with interpolation option in mpv. But it can introduce corruption and other side effects.

Troubleshoot

This release supports the latest 2 Long Term Linux Kernels. The user-space components are selected with the best possible availability of stable components at the time of release.

The user-space components are available to the users through open source policy. Please be adviced to upgrade the open source user-space components as per need and resolution through latest user-space.

The Embedded release for open source component is based on Ubuntu 18.04.1 distribution.

Here are a few troubleshoot pointers for resolution for non-amdgpu components.

1. In multi-GPU use-case, a monitor connected to APU doesn't come up while boot during multiscreen rendering. The monitor connect to dGPU loads correctly.
   This issue happens because of gnome desktop environment used by 18.04.1. The gnome desktop environment does not support multi-screen configuration. To fix this issue, use XFCE desktop environment.
2. dmesg points to "Bandwidth validation fails", one of the monitors gets blackout after connecting more than 2 - 4K monitors on MF
   When display load fails the bandwidth validation, there is no fallback mechanism provided through the Linux OS. Under such situation, customers can reduce the refresh rates or resolution of monitor for the getting the monitor lightup.
3. Unigine Heaven Pro shows white screen
   Follow the following steps to allow GLSL #extension directives in the middle of shaders

1. Install driconf (sudo apt-get install driconf) 2. Run driconf (sudo driconf) 3. In application settings add Unigine heaven if it does not exist (application name: Unigine Heaven, Executable name: heaven_x64) 4. Add: Allow GLSL #extension directives in the middle of shaders: Yes (using "add setting" button. You can remove all other settings if present) 5. Retry unigine heaven

4. Suspend/Resume with and without playback
   Use systemctl suspend rather than pm-suspend.

   Below link suggests the usage of systemctl suspend.
   https://askubuntu.com/questions/1792/how-can-i-suspend-hibernate-from-command-line
   More details on why systemd is preferred over other tools
   https://wiki.archlinux.org/index.php/Systemd

11. Support

Please contact your Field Applications Engineer for support on this release.