AMD Embedded Linux Driver 2023.30 Release Notes

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Chapter 1 Overview

Note: This Ubuntu software package shall be used for evaluation purposes only. Customers using this package in production environments or using this package for further distribution must ensure that Ubuntu license terms are adhered to. Contact your AMD FAE for more information.

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

New features supported in this release:

- Kernel 6.1.49 LTS support.
- V3000 SW LED enabled for SFP+ and Backplane
- AIC3 10G phy enabled.
- Bug fixes.

Chapter 2 Linux® Kernel Support

- 6.1.49 LTS

Chapter 3 Linux Distribution Support

- Ubuntu 22.04.2

Chapter 4 Component Versions

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

The patches present in the patches folder of this release package must be applied on top of the git commit mentioned in the following 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	6.1.49-LTS	024f76bca9d0e29513fa99e1cd0f86bfa841743b	*https://github.com/gregkh/linux/commits/v6.1.49*
Libdrm	2.4.115	ee558cea20d1f9d822fe1a28e97beaf365bf9d38	*https://gitlab.freedesktop.org/mesa/drm/-/tree/libdrm-2.4.115*
Mesa	23.1.4	8b0202e4b49150c9341dc8ddb92a06c8f8032877	*https://gitlab.freedesktop.org/mesa/mesa*
Ddx	23.0.0	7025aefcdf9673665588cf291c5d71beb39cce89	*https://gitlab.freedesktop.org/xorg/driver/xf86-video-amdgpu*
Gstomx	1.0.0.1	5c4bff4a433dff1c5d005edfceaf727b6214bb74	*https://cgit.freedesktop.org/~leoliu/gstomx/commit/?id=5c4bff4a433dff1c5d005edfceaf727b6214bb74*
Wayland	1.22.0	b2649cb3ee6bd70828a17e50beb16591e6066288	*https://github.com/wayland-project/wayland*
libva	2.17.0	df3c584bb79d1a1e521372d62fa62e8b1c52ce6c	*https://github.com/intel/libva/tree/2.17.0*
LLVM	16.0.6	7cbf1a2591520c2491aa35339f227775f4d3adf6	*https://github.com/llvm/llvm-project*
Firmware	Master	312c61f5a6c9c6a313383a8f0c2b02711ec15262	*https://git.kernel.org/pub/scm/linux/kernel/git/firmware/linux-firmware.git*
Vulkan	2023.Q1.3	4d2a2893fd210f7e9aa9fb7531561351946bf122	*https://github.com/GPUOpen-Drivers/AMDVLK/commits/v-2023.Q1.3*
Supported Applications			
LunarG Vulkan SDK	1.2.182	NA	*https://vulkan.lunarg.com/sdk/home#linux*
Vulkan CTS	1.3.6.0		*https://github.com/KhronosGroup/VK-GL-CTS/tree/vulkan-cts-1.3.6.0*
RGP	1.10	NA	*https://github.com/GPUOpen-Tools/radeon_gpu_profiler/tree/v1.10*

Chapter 5 Features Supported on Ryzen™ Embedded processors

Supported features are shown in the following table.

Feature Group	Feature Supported	V3000
2D	2D acceleration	NA
3D	EGL 1.4, 1.5, EGL extensions.	NA
	OGL 4.5, OGL 4.6	NA
	GLX 1.4	NA
	DRI3 support	NA
	DRI3 updates (VDPAU, VAAPI)	NA
	Vulkan Open Source	NA
2D	10 bit Display	NA
Audio	DP Audio supports for standard	NA
Audio	I2S Audio	NA
Display	EDID (Basic)	NA
Display support	X and Desktop support	NA
	Tear Free Desktop	NA
	Partial support RandR 1.4 capabilities	NA
	Kernel Mode Setting	NA
	4K60Hz display support	NA
	Multi-GPU support (see table below for dGPU pairing)	NA
	Number of displays supported (see display support table below)	NA
	4K cinema	NA
	DP MST	NA
	Single Large Surface (SLS)	NA
Play back	Play back support MPV player using VAAPI / VDPAU	NA
	Play back support for Gstreamer using VAAPI, gstomx (not recommended)	NA
	1080p 24fps, 30 fps and 60fps video play back	NA
	4k 30fps video play back	NA
	4k 60fps video play back	NA

Feature Group	Feature Supported	V3000
Power Management	Power Play support to re-clock	NA
	Initial GPU reset support	NA
	Power Play sysfs interface for manually selecting clock speeds	NA
	S3	Yes
	S5	Yes
VDPAU Post Processing	Deinterlace	NA
VDPAU Post Processing	Edge Enhancement	NA
VAAPI Postprocessing	Deinterlace	NA
Transcode	4k Encode	NA
Video Quality	Scaling and color space conversion (CSC)	NA
	Pull down detection and Deinterlacing	NA
	Support for software scaling	NA
	Support for hardware scaling	NA
	10-bit Decode with 10-bit render	NA
Compute	OpenCL	NA
dGMA –OpenGL		NA
dGMA - OpenCL		NA
fTPM		Yes
RJ45-10G-Base-T (Marvell PHY)	10M	Yes
	100M	Yes
	1G	Yes
	2.5G	Yes
	10G	Yes
SFP+ (connector)	10M	Yes
	100M	Yes
	1G	Yes
	10GBASE_KR [AN=OFF, ON]	Yes
	2.5G [AN=OFF]	Yes
	10G	Yes
AIC1 – Inphi CS4223 Optical Fiber PHY (SFP+)	10M/100M/1G/10G	Yes
AIC1 – TI DS125 Series Re-Timer (SFP+)	10M/100M/1G/10G	Yes
AIC2 – 1G-Base-T (Marvell 88E1512P)	10M/100M /1G	Yes
AIC2 – 10G-Base-T (Marvell AQR113C)	10M/100M/1G/2.5G/10G	Yes

Feature Group	Feature Supported	V3000
AIC3 – 1G-Base-T (Broadcom BCM54220)	10M/100M /1G	Yes
AIC3 – 10G-Base-T (Broadcom BCM84892)	100M/1G/2.5G/10G	Yes
eMMC	BC	No
	HS200	No
	HS400	No
	(USB/PCIe to eMMC bridge)	Yes
SD Card	SD UHS I – SDR50	No
	SD UHS I – SDR104	No
	SD UHS I – SDR104	No
Peripherals (I/O)	I2C	Yes
	USB	Yes
	USB 4.0	Yes
	SATA	Yes
	UART	Yes
	WDT	Yes
	SMBUS	Yes
	SPI Kernel Driver	Yes

Chapter 6 Platforms Supported

Embedded SoC Version	Models/OPN's	AMD Customer Reference board
Ryzen Embedded **V3000** Series	V3C48, V3C44, V3C18I, V3C18, V3C16, V3C14	FOX

Chapter 7 Tested Platform Configurations

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

V3000 Series	
CPU	V3000
OPNs	Latest Revision: AIC1; AIC2 ; AIC3; B1-DVT Sampels: V3C48;V3C18i;V3C44; V3C14; V3C16;V3C18;
Board Type	Fox, Direct Mount
TDP	V3C48 (8-core 45W CPU) V3C44 (4-core 45W CPU) V3C18I (8-core 15W CPU extended temperature) V3C18 (8-core 15W CPU) V3C16 (6-core 15W CPU) V3C14 (4-core 15W CPU)
BIOS version	RFX1007A
Memory (DDR5)	2x16 GB [Direct Mount]
DIMMs	DDR5, 4800 MT/s
Storage disk	Samsung M.2 NVME 500 Gb and SATA SSD Crucial 250 Gb
Ethernet connectors	• 10G SFI Optical: Finisar (FTLX8574D3BCV and FTLX8574D3BCL), Intel (FTLX8574D3BCV-IT) • 10G Optical DAC: Fiberstore (SFPP-A020) • 10G KR (Backplane): Molex DAC cable (747521101) and AMPHENOL SFP DAC CABLE (571540002) • 1G Bel SFP [SFP-1GBT-06] and Finisar [FCLF8520P2BTL]

Chapter 8 Issues Fixed

Chapter 9 Known Issues/Limitations

V3000 Issues:

1. Use Ethernet DAC cable of length <= 5 meters.
2. V3000 is cpu variant, so make sure to add “nomodeset” in grub param
3. V3000 need to use in headless mode. If display is needed, then use E9175 dGPU
4. UART provisioned for 1 x4 wire and 4 x2 wire modes only
5. On Fox RJ45 and 2.5G or 1G speed selection in BIOS, hot-plug and hot-insert of cable always triggering speed switching to 10G. Issue specific to V3C18i OPN.
6. Ethernet feature not supported in this release:
   a. PPS not enabled.
7. Ethernet stability issues
   a. AIC1 InPhi Phy 10G link stability issue in P2P mode only; mitigating with switch as link partner instead of another Fox
   b. Link detection issues on SFP Port 0/1 for 1G speed with FS copper module (SFP-GB-GE-T 1000BASE-T) with Cat 5 UTP cable
   c. Link up failure issue after S3 on SFP+ Connector, with 1G/100M/10M as speed and 1G Bel modules connected on both the ports
   d. Link up issues after S3 on AIC2-1G-BaseT phy ports
   e. AIC3 BCM 10G phy has link stability issues for 100M/2.5G/1G speed modes, when using “ifconfig <i/f> down” command
8. Refer “FOX Platform User Guide (ID: 57102)” from *https://devhub.amd.com/reference-platform/fox/* for USB-C J60 port, RJ45, AIC1, AIC2 and AIC3 rework details

Chapter 10 Support

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