



AMD Windows Catalyst Driver
Release Notes

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1. Overview

Windows Embedded Catalyst Drivers include a set of drivers to enable Graphics and peripheral devices on selected development platforms.

2. New In this Release

- Catalyst (Graphics):
 - o For Legacy platforms, driver supports both Win 7 & Win 10.
- Chipset:
 - o Package integrated with SMBus, SPI, Watchdog and Serial drivers
 - o SMBus and WDT drivers added in Legacy mode
 - o Required I/O applications available explicitly, outside package.
 - o UART enhanced up to 4M support for both UART and Serial drivers
 - o WHQL certified I2STD driver

3. Windows Driver Support

Legacy Graphics Driver Support Win 7 & Win 10 64 bit	20.50.23.04
Windows Chipset Driver	AMD_Software_2.16.12.341
OS Support	Windows 7 x64 Windows 10 20H2 x64 Windows 10 RS5 x64
Platform	MF, PF, BF, BE, SE, LX, eKB, dGPUs

Graphics Driver support Win 10 64 bit	20.50.23.01
Windows Chipset Driver	AMD_Software_2.16.12.341
OS Support	Windows 10 20H2 x64 Windows 10 RS5 x64
SoC Family (Platform)	V2000 Platform (Celadon) R1000 Platform (Bilby) V1000 Platform (Bilby) Polaris dGPU MF, PF, BF, BE, SE, LX, eKB, dGPUs

4. SW Driver & SoC support

SoC	AMD Program	Windows 7	Windows 10 RS5	Windows 10 20H2
		64 bit	64 bit	64 bit
V2000 Series	Renoir FP6		X	X
R1000 Series	Picasso / RV2 FP5		X	X
V1000 Series	Raven FP5		X	X
eKB	Kabini	X	X	X
SE, LX	Mullins	X	X	X
BE	Kaveri	X	X	X
MF	Carrizo	X	X	X
BF	Carrizo	X	X	X
PF	Stoney Ridge	X	X	X

dGPU	Program	Windows 7	Windows 10 RS5	Windows 10 20H2
		64 bit	64 bit	64 bit
E8860	Venus	X	X	X
E8870	Strato	X	X	X
E8950	Amethyst	X	X	X
E9260	Coruja	X	X	X
E9550	Hontza	X	X	X
E9171x Series	Boum	X	X	X
E9390	Ellesmere	X	X	X
E9560	Ellesmere	X	X	X
E9565	Ellesmere		X	X

Legend:

- X- supported
- Blank- Not supported

5. Supported feature list

Features Group	Features category	V2000 Series	R1000 Series	V1000 Series	Legacy SoC	dGPU
3D	OGL 4.6	Yes	Yes	Yes	Yes	Yes
3D	Vulkan	Yes	Yes	Yes	Yes	Yes
Display	4K Cinema	Yes	Yes	Yes	Yes	Yes
Display	Number of displays	Refer display support table below	Refer display support table below	Refer display support table below	Refer display support table below	Refer display support table below
Display	DP MST	Yes	Yes	Yes	Yes	Yes
Multimedia	H.264 decode	Yes	Yes	Yes	Yes	Yes
Multimedia	H.265 decode	Yes	Yes	Yes	No	No
Multimedia	VP9 decode	Yes	Yes	Yes	No	No
Multimedia	10-bit decode	Yes	Yes	Yes	PF: Yes Other: No	No
Audio	DP Audio	Yes	Yes	Yes	Yes	Yes
External discrete graphics card (dGPU) validation	Refer table for dGPU pairing	No	R1305G & R1102G: No, V1000, R1505G & R1606G: Yes	Yes	Yes	Yes
Eyefinity	Auto Eyefinity (MST)	Yes	Yes	Yes	Yes	Yes
Eyefinity	Mixed rotation	No	n/a	n/a	Yes	Yes
Eyefinity	Mixed Alignment	Yes	Yes	Yes	Yes	Yes
Eyefinity	Tiled display SLS(4x1,3x1,2x1etc..)	Yes	Yes	Yes	Yes	Yes
Eyefinity	Mixed Tiled display (2x2 ,1x3 etc...)	Yes	Yes	Yes	Yes	Yes
Eyefinity	Tiled Groups (1x2+1 ,1x2 + 1x2 etc...)	Yes	Yes	Yes	Yes	Yes
Eyefinity	Multi GPU (Eyefinity on single GPU)	No	Yes	Yes	Yes	Yes

Eyefinity	Multi GPU (Eyefinity on both GPU)	No	Yes	Yes	No	No
Eyefinity	Bezel Compensation	Yes	Yes	Yes	Yes	Yes
EDID management	Advance Feature	Yes	Yes	Yes	Yes	Yes
Custom timing	Advance Feature	No	Yes	Yes	Yes	Yes
10-bit color	Advance Feature	Yes	Yes	Yes	Yes	Yes
dGMA	OpenGL	No	R1305G& R1102G: No, V1000, R1505G &R1606G: Yes	Yes	BE: Yes Other: No	Yes
dGMA	OpenCL	No	R1305G& R1102G: No, V1000, R1505G &R1606G: Yes	Yes	BE: Yes Other: No	Yes
Peripherals	AHCI Drivers	Yes	Yes	Yes	Yes	Yes
Peripherals	AMD PSP Drivers	Yes	Yes	Yes	Yes	Yes
Peripherals	USB 3.0 Driver	Yes	Yes	Yes	Yes	Yes
Peripherals	eMMC driver (HS400 mode only)	No	Yes	Yes	No	No
Peripherals	Ethernet driver	No	Yes	Yes	Yes	Yes
Peripherals	Audio driver	Yes	Yes	Yes	Yes	Yes
Peripherals	GPIO2	Yes	Yes	Yes	Yes	Yes
Peripherals	I2C	Yes	Yes	Yes	Yes	Yes
Peripherals	UART	Yes	Yes	Yes	Yes	Yes
Peripherals	SMBUS	Yes	Yes	Yes	Yes	Yes
Peripherals	Watchdog	Yes	Yes	Yes	Yes	Yes
Peripherals	SPI	Yes	Yes	Yes	Yes	Yes
Peripherals	GPIO	Yes	Yes	Yes	Yes	Yes
Peripherals	Serial	Yes	Yes	Yes	No	No

6. SoC Display support

APUs	Max No of display
V2000 Series	4
R1305G / R1102G	3x 1080p / 2x 1080p
R1000 Series	3
V1000 Series	4
MF, BF	3
PF	2
BE	3
SE, LX	2
eKB	2
E9260	5
E9550	6
E9171	5
E9172	5
E9173	3
E9174	5
E9175	5
E9390	4
E9560	4
E9565	6

7. Multi GPU (APU+ dGPU) pairing support

APU (iGPU)	dGPU
R1505G, R1606G	E9260, E9550, E9171, E9172, E9173, E9174, E9175, E9390, E9560, E9565
V1000 Series	E9260, E9550, E9171, E9172, E9173, E9174, E9175, E9390, E9560, E9565
MF, BF	E9260, E9550, E9171, E9172, E9173, E9174, E9175, E9390, E9560, E9565(MF)

8. Platform configurations

a. V2000 Platform (Celadon)

V2000 Platform (Celadon)	
SoC	V2000 Series
OPN Details, Base Frequency	V2516 (6C/12T 2.1GHz CPU, 6CUs GPU, 15W) V2718 (8C/16T 1.7GHz CPU, 7CUs GPU, 15W) V2546 (6C/12T 3.0GHz CPU, 6CUs GPU, 45W) V2748 (8C/16T 2.9GHz CPU, 7CUs GPU, 45W)
BIOS version	RCO1003A
VRAM setting	8GB
RAM (DDR4)	2x8GB SODIMM 2667 MT/s (Celadon socketed) 2x16GB SODIMM 3200 MT/s (Celadon DM Non-Nova)
Display Convertors / Dongles Used	DP Direct Cable, HDMI Direct Cable, DP-HDMI converter, Type C- DP, Type C -HDMI, Type C Direct Cable
Storage disk	M.2 NVME

b. R1000 Platform (Bilby)

R1000 Platform (Bilby)	
SoC	R1000 Series
OPN Details, Base Frequency	R1505G (B2 15W), 2400 MHz R1606G (B4 15W), 2600 MHz R1305G (LP B4 8W) 1500 MHz R1102G (LP B2 6W) 1200 MHz
BIOS version	RBB1206A
VRAM setting	4 GB
RAM (DDR4)	2x 8GB (LP B2 6W supports single 8GB DIMM)
Display Convertors / Dongles Used	DP to HDMI, DP to VGA, DP to DVI, mDP
Storage disk	M.2 SATA SSD

c. V1000 Platform (Bilby)

V1000 Platform (Bilby)	
SoC	V1000 Series
OPN Details, Base Frequency	V1807B (4C 45W 3.35GHz CPU, 11 GPU CUs) V1756B (4C 45W 3.25GHz CPU, 8 GPU CUs) V1605B (4C 15W 2GHz, 8 GPU CUs) V1202B (2C 15Q 2.3GHz, 3 GPU CUs) V1500B (16W NPU), 2200 MHz V1780B (45W NPU), 3350 MHz

BIOS version	RBB1206A
VRAM setting	4 GB
RAM (DDR4)	2x 8 GB
Display Convertors / Dongles Used	DP to HDMI, DP to VGA, DP to DVI, mDP
Storage disk	M.2 SATA SSD

d. Pademelon

Merlin Falcon Based DB-FP4 Pademelon Platform	
SoC	Merlin Falcon Series
OPN Details, Base Frequency	RE421BAAY43KA, 2100 MHz RE418GAAY43KA, 1800 MHz RE216GAAY23KA, 1600 MHz
BIOS version	RPD130CB – Pademelon BIOS
VRAM setting	2 GB
RAM	8 GB
Display Convertors / Dongles Used	DP to HDMI, DP to VGA, DP to DVI, mDP
Storage disk	Magnetic Disk

Brown Falcon Based DB-FP4 Pademelon Platform	
SoC	Brown Falcon Series
OPN Details, Base Frequency	GE217GAAY23KA, 1700 MHz
BIOS version	RPD130CB– Pademelon BIOS
VRAM setting	2 GB
RAM	8 GB
Display Convertors / Dongles Used	DP to HDMI, DP to VGA, DP to DVI, mDP
Storage disk	Magnetic Disk

Prairie Falcon Based DB-FP4 Pademelon Platform	
SoC	Prairie Falcon Series
OPN Details, Base Frequency	GE224IAVY23AC, 2400 MHz GE215JAWY23AC, 2000 MHz GE220IAVY23AC, 2200 MHz GE212JAWY23AC, 1200 MHz
BIOS version	RPD130CB– Pademelon BIOS
VRAM setting	1 GB
RAM	4 GB
Display Convertors / Dongles Used	DP to HDMI, DP to VGA, DP to DVI, mDP
Storage disk	Magnetic Disk

e. OH+

Steppe Eagle Based DB-FP4 Eagle Platform
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SoC	Steppe Eagle Series
OPN Details, Base Frequency	GE424HIYJ44JB, 2400 MHz GE412HIYJ44JB, 1200 MHz GE222GITJ23JB, 2200 MHz GE212JIYJ23JB, 1200 MHz
BIOS version	ROP100J
VRAM setting	2 GB
RAM	8 GB
Display Convertors / Dongles Used	DP to HDMI, DP to VGA, DP to DVI, mDP
Storage disk	Magnetic Disk

f. Lamar

Bald Eagle Based DB-FP4 Eagle Platform	
SoC	Bald Eagle Series
OPN Details, Base Frequency	RE427BDGH44JA, 2700 MHz RE425BDGH44JA, 2500 MHz
BIOS version	TALAM142
VRAM setting	2 GB
RAM	8 GB
Display Convertors / Dongles Used	DP to HDMI, DP to VGA, DP to DVI, mDP
Storage disk	Magnetic Disk

g. dGPU

E9260 dGPU	
VBIOS version	015.050.000.001.000000 E9260 - D1170100_103 015.050.000.000.007442 E9260 - D0151100_102 015.050.000.001.000000 E9260 – D0151200_106
VRAM setting	1 GB
RAM	4 GB
Display Convertors / Dongles Used	DP to HDMI, DP to VGA, DP to DVI, mDP
Storage disk	HDD

E9390 MXM dGPU	
VBIOS version	015.050.000.001.010957 E9390 – C954e101_101
VRAM setting	2GB
RAM	8GB
Display Convertors / Dongles Used	DP to HDMI, DP to VGA, DP to DVI, mDP
Storage disk	HDD

E9550 MXM dGPU	
VBIOS version	015.050.000.001.008379 E9550 - E9580100_102
VRAM setting	2 GB
RAM	8 GB
Display Convertors / Dongles Used	DP to HDMI, DP to VGA, DP to DVI, mDP
Storage disk	HDD

E9560 MXM dGPU	
VBIOS version	015.050.000.001.010957 E9560 – C954e101_101
VRAM setting	2GB
RAM	8GB
Display Convertors / Dongles Used	DP to HDMI, DP to VGA, DP to DVI, mDP
Storage disk	HDD

E9565 dGPU	
VBIOS version	015.050.000.001 E9565 102-D50101-00
VRAM setting	2GB
RAM	8GB
Display Convertors / Dongles Used	mDP
Storage disk	M.2, HDD

E917X dGPU	
VBIOS version	015.050.002.001.009207 E9171 - D1240300.004
	015.050.002.001.009143 E9172 - D1171200.103
	015.050.002.001.009506 E9173 - D0912400.103

	0.15.050.002.001.009559 E9173 - D0912200-103 015.050.002.001.000000 E9173 - D3620100-103 015.050.002.001.009142 E9174 - D1171100.101 0.15.050.002.001.009509 E9175 - D1380100.103
VRAM setting	1 - 2GB
RAM	2 - 4 GB
Display Convertors / Dongles Used	DP to HDMI, DP to VGA, DP to DVI, mDP
Storage disk	HDD

9. SW Package

SW Component	WHQL certified drivers	Catalyst Installer Package	Chipset Installer Package	Comments
Display	Yes	Yes	No	Includes Graphics Drivers
PSP	Yes	No	Yes	
SBDrv:acpi	Yes	No	Yes	
SBDrv:SFH	Yes	No	Yes	
SBDrv:SFHI2C	Yes	No	Yes	
SBDrv:I2C	Yes	No	Yes	
SBDrv:SMBus	Yes	No	Yes	
SBDrv:UART	Yes	No	Yes	Max 4M baud-rates
Audio:ACPBUS	Yes	Yes	No	
Audio:HDMI	Yes	Yes	No	
Audio:SWR	Yes	Yes	No	
Audio:HDABUS	Yes	No	No	I2S not applicable on V2000.
Audio:I2S	Yes	Yes	No	
Audio:I2STDM	Yes	Yes	No	
XGBE	Yes	No	Yes	Not applicable for V2000
Ryzen Power Plan	Yes	No	Yes	For V2000, “AMD Processor Power

				Management Support” gets installed as provisional package.
IOV	Yes	No	Yes	
SMBUS	Yes	No	Yes	
CIR	Yes	No	Yes	
USB 3.1	Yes	No	Yes	
GPIO	Yes	No	Yes	
Serial	Yes	No	Yes	Drivers: UART with COM interface. Max baudrate: 115200, 3M, 4M bauds
Watchdog	Yes	No	Yes	

10. SW Package - Graphics Driver Version

Graphics driver package is also termed as 'ESE Q4 Driver' or 'Radeon Software'.

Below are its release number and AMDVER details.

Release Number	AMDVER
20.50.23.01	27.20.15023.1003
20.50.23.04	27.20.15023.4002

This package contains various independent drivers. Below are the version numbers of Radeon software and other drivers included. The same should also be visible at Radeon Software->System->Software.

S. No	SW Driver Description	Version
1	Radeon Software Version	For 20.50.23.01: 2021.0406.1641.30047 For 20.50.23.04: 2021.0511.1249.23070
2	Radeon Software Edition	Adrenalin
3	Driver Packaging Version	20.50.23.01-210406A-366255C 20.50.23.04-210511A-366259C
4	2D Driver Version	8.1.1.1634
5	Direct3D®	9.14.10.01486
6	OpenGL®	26.20.11000.148202
7	AMD Audio Driver	10.0.1.18
8	Vulkan™ Driver	2.0.179
9	Vulkan™ API	1.2.170

11. Issues Fixed from previous SW package release

a. R1000 & V1000 Platform (Bilby)

1. 4-wire UART works only with 115200 baud-rate on R1000 & V1000 Platform
Workaround: Use 2-wire UART to use 3M baud-rate
2. “Try Complex Eyefinity” is not available in Radeon UI
3. BSOD is observed when running reboot cycles with Eyefinity enabled
4. Flashing the already flashed BIOS using SPI tool causes system boot failure.
Flashing any other BIOS doesn't cause any issues

b. V2000 (Celadon)

5. One of the display blank out observed while performing Reboot/Shutdown function with MST Daisy chain
6. DP display blank out observed with hotplug/ hot unplug on USB-DP3 HDMI and USB-DP2 HDMI ports ,
7. One of the displays goes blank while performing Reboot and S3 function, 4xDP
8. Flickers observed on EDP display during Restart, Sleep, Display projection and sometime system kept at idle.
9. HDMI Display Blank out on USB-DP2 HDMI port and USB-DP3 HDMI port
10. HDMI Display Blank out on USB-DP2 HDMI port and USB-DP3 HDMI port with DP-to-HDMI(Passive or DP++) dongle .
11. Sporadically display blank out observed after waking system from MSB state with 1x2 Eyefinity configuration”
12. Sporadically Eyefinity disabled after system resumes from MSB state in Mixed arrangement”
13. Adjust bezel compensation option not available with FILL mixed Eyefinity arrangement”

12. Known Issues/Limitations

a. V2000 Platform (Celadon)

1. Display flicker observed with TypeC-to-HDMI converter cable
Workaround:
Use TypeC-to-DP cable. OR
Use “ Type-C to HDMI is working with CableCreation make cable“
2. Chipset driver installs power plan “AMD Processor Power Management Support” in provisional packages.
3. Modern Standby is not supported on RS5 with SATA SSD.
Workaround: Use NVMe M.2 disk
4. BIOS settings required for Modern Standby (default settings):
 - I. AMD PBS -> S3/Modern Standby Support = <Modern Standby Enable>

- II. AMD PBS -> Modern Standby Type = <Modern Standby + S0i3>
- III. AMD PBS -> Reduced Hardware Support = <Enabled>
- 5. BIOS settings to enable S3:
 - I. AMD PBS ->S3/Modern Standby S3 enable
 - II. Boot UEFI OS Fast Boot Option --> Disable
- 6. BIOS Settings to avoid yellow bang with I2C and UART enabled in BIOS:
 - I. Setup Utility->AMD PBS->NFC Support->Disabled
 - II. Setup Utility->AMD PBS->ALS Support->Disabled
 - III. Setup Utility->AMD PBS->Touch Panel Support->Disabled
 - IV. Setup Utility->AMD PBS->Touch Pad Support->Disabled
- 7. Frequently (3/5 times) one of the display blank out observed while performing Reboot function with MST HUB
- 8. Observed one of the display's resolution downgrading to 1280x720 resolution with 3 display connecting 1st time after flashing fresh OS

b. R1000 & V1000 Platform (Bilby)

- 9. SD Card as bootable device does not support High Speed (HS) and at UHS I – DDR50
- 10. Frames Drop and video lag are observed with H.265 video playback using Windows Media Player.
Workaround: Use M&Tv app.
- 11. MPEG/H.264 playback stutter observed after switching from windowed mode to full screen and vice versa
- 12. Blurriness is overserved in system after enabling Freesync. The issue is specific to Windows 10 RS5 OS
Workaround: If the issue is observed change the monitor resolution to 4k
Workaround: Flash the BIOS again using Dediprog
- 13. ROM Armor is unsupported feature for SPI ROM driver. No plan to enable ROM Armor in the future.

R1000-LP R1305G / R1102G Only

- 14. AGM GPU Info capture with video playback causes BSOD or hang issue. There is no problem if other AGM logs are captured during the playback
- 15. S3 resume fails after around 250 cycles

XGBE (R1000 / V1000 Series)

- 16. 1G & 10G network do not establish with backplane mode selected in BIOS.
- 17. Link UP fails in normal reboot following to PXE boot.
Workaround: Do complete power cycle or hot-plug of ethernet ports.

18. High CPU Utilization noticed on few boards while running TCP/UDP IPv4 dual-port bidirectional traffic using NTTTCIP Tool
19. Direct Peer to Peer network connection using 1G, 10G fiber channel is not supported on both SFP+ and RJ45 ports.
Workaround: Use External Switch for e.g. NetGear to perform Peer to Peer data transfer.
20. Can't concurrently enable SFP+ and RJ45 interfaces.
21. On RJ45 rework boards, use Marvel-Phy-firmware (default version x3310fw_0_3_4_0_9445) for both 1G/10G. Check required BIOS settings to enable RJ45 interfaces.
22. 2.5G mode works only with SFP+ DAC cable without using any switch. Verified using FS DAC cable attached with SFP transceivers. Check BIOS settings to enable 2.5G speed.
23. 2.5G Network connectivity fails after suspend resume
24. Can't mix 2.5G & 1/10G Ethernet SFP ports
25. No IEEE 1588 Timestamp support
26. No receive split header support
27. Following features should be functional but have not been fully validated: Priority and VLAN (VLAN Priority Control), RMON Counter, and VLAN support
28. Sporadically, network-connections may show inappropriate network-name instead of corporate network name
29. Sporadically, doing disable/enable interface may not function well.
Workaround: Restart the system
30. Network icon may give slow or no response on hot-unplug of 2.5G SFP+ and sporadically on 10G modules
Workaround: Disable/enable interface
31. Sporadically, 2.5G mode may take longer time to get LINK after boot or suspend/resume.
Workaround: Disable/enable interface
32. Sporadically, system may hang when run bi-directional traffic on dual ports for long time
33. Observed delayed or no LINK with Intel 10G SFP AFBR-709DMZ-IN2 and few Finisar 10G SFP modules.
34. On low power products, 10G throughput is less than 50% for both TCP & UDP protocols. Use Jumbo frames and multi-threaded applications for better network throughput.
35. 10G UDP throughput on MTU 1500 can be improved with multiple threads and jumbo frames.
36. Sporadically, changing to MTU-9014 fails.

c. V1000 Platform (Dibbler only)

37. SD Card as bootable device does not support UHS I - DDR50
38. BSOD is observed on V1605B after installing Q2-2018 platform stack

Workaround: Use external power supply to get rid of this issue

d. **Prairie Falcon**

39. BSOD is observed on Suspend/Resume after booting on Windows installed on eMMC storage

e. **Multi-GPU (mGPU)**

40. Supported configuration: iGPU and 1xdGPU. We do not support 2x dGPU

41. H.265 video corruption observed during dragging of video from iGPU to dGPU

f. **Eyefinity (R1000, V1000, V2000)**

42. Tearing with Eyefinity: All displays will be tear free only if all displays are using the same timing and same connector type

43. Tearing observed during window drag with Mixed dimension Eyefinity Configuration

44. Display blank out is observed for Eyefinity in portrait mode.

45. Sporadically system restart is observed during Video playback with Eyefinity enabled

46. Sporadically (2/10) Display blank out, system hang, BSOD is observed during video playback with Eyefinity arrangement

47. Resolution mismatch occurs with 5x1 SLS configuration. This is applicable only to dGPU

48. Eyefinity is not functional with mix of DP and HDMI monitors

13. Notes on Validation

1. The driver for RS5 OS is tested after installing following Win10 RS5 OS updates: [KB4465065](#), [KB4505658](#), [KB4509095](#) and [KB4512937](#)
2. Below are the SFP/RJ45 modules used in the XGBE validation:

Type	Model
1G SFP - RJ45	BEL
1G SFP - RJ45	Finisar
10G SFP+ passive direct cable	Finisar
10G SFP optical	Finisar
10G SFP optical	Intel

14. Notes on older legacy dGPU

dGPU	E6460	Seymore	Driver: x - 15.201.1701	Win 7 32/64, Win 10 RS5 64bit
dGPU	E6760	Whistler		

15. Support

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

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