

HP Z Workstations graphics card options



[Quick reference guide](#)

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Professional graphics solutions for HP Z Workstations

HP is proud to exclusively offer professional graphics choices on all of our HP Workstations—from the HP ZBook 15u G3 and G4 to the HP Z840.

HP's professional graphics line-up is perfect for users who are running business critical applications based on OpenGL and DirectX® who require stability, reliability, great performance, additional support, and application-specific features and optimization for things like complex design modeling, dataset manipulation, visual effects and visualization.

Desktop Workstations graphics support matrix¹

Platform		HP Z1 G3	HP Z2 Mini G3	HP Z240 SFF	HP Z240 Tower	HP Z440	HP Z640	HP Z840
Graphics	Category							
Intel® HD Graphics 510	Office 2D	•		•	•			
Intel® HD Graphics 530	Office 2D	•	•	•	•			
Intel® HD Graphics P530	Entry	•	•*	•	•			
AMD FirePro™ W2100	Entry 3D			•	••	••	••	••
AMD FirePro™ W5100	Mid-range 3D				•	••	••	•••
AMD FirePro™ W7100	High End 3D				•	•	••	••
AMD RadeonPro™ WX 7100	High End 3D				•	•	••	••
NVIDIA® Quadro® M1000M	Entry 3D	•						
NVIDIA® Quadro® M2000M	Mid-range 3D	•						
NVIDIA® Quadro® K420	Sub entry 3D			•	••	••	••	••
NVIDIA® Quadro® K620	Entry 3D			•	•	••	••	••
NVIDIA® Quadro® K1200	Mid-range 3D			•	••	••	••	•••
NVIDIA® Quadro® K2200	Mid-range 3D				•	••	••	•••
NVIDIA® Quadro® M620	Entry 3D		•					
NVIDIA® Quadro® M2000	Mid-range 3D				•	••	••	•••
NVIDIA® Quadro® M4000	High End 3D				•	••	••	•••
NVIDIA® Quadro® M5000	High End 3D					•	••	•••
NVIDIA® Quadro® M6000 (12 GB)	Ultra 3D						•	••
NVIDIA® Quadro® M6000 (24 GB)	Ultra 3D						•	••
NVIDIA® Quadro® P5000	Ultra 3D					•	••	•••
NVIDIA® Quadro® P6000	Ultra 3D						•	••
NVIDIA® Tesla® K40	Ultra 3D					•	•	••
NVIDIA® NVS™ 310	Pro 2D			••	••	•••	••••	•••••
NVIDIA® NVS™ 315	Pro 2D			••	••	•••	••••	•••••
NVIDIA® NVS™ 510	Pro 2D			•	•	••	••	••

Key Legend:

- single
- dual
- triple
- quad

Note: *Premium solution can be configured to use both discrete and integrated GPUs.

Desktop Workstations integrated graphics spec summary

Graphics Module	Intel® HD Graphics 510	Intel® HD Graphics 530	Intel® HD Graphics P530
Graphics Category	Office 2D	Office 2D	Entry 3D
Memory (shared with system)	up to 1.7 GB	up to 1.7 GB	up to 1.7 GB
Execution Units	12	24	24
DirectX Support	12	12	12
OpenGL Support	4.4	4.4	4.4
Max Resolution (DP)	4096x2304 @ 60Hz	4096x2304 @ 60Hz	4096x2304 @ 60Hz
Max Displays	3	3	3
Video Outputs:			
HP Z1 G3	1x DP 2x Thunderbolt™	1x DP 2x Thunderbolt™	1x DP 2x Thunderbolt™
HP Z2 Mini		3x DP	3x DP
HP Z240 SFF	3x DP	3x DP	3x DP
HP Z240 Tower	2x DP 1x DVI-I	2x DP 1x DVI-I	2x DP 1x DVI-I
ISV Certified	No	No	Yes
Other	OpenCL 2.0	OpenCL 2.0	OpenCL 2.0

Desktop Workstations AiO graphics spec summary

Graphics Module	NVIDIA® Quadro® 1000M	NVIDIA® Quadro® M2000M
Graphics Category	Mid-range 3D	Mid-range 3D
Memory (dedicated memory)	2 GB GDDR5	4 GB GDDR5
Memory Bandwidth	40 GB/s	64 GB/s
Cores	512	640
Power	45W	55W
Host Interface	MXM 3.1 Type A	MXM 3.1 Type A
DirectX Support ²	12	12
OpenGL Support	4.4	4.4
Max Resolution (DP) ³	4096x2160 @ 60Hz	4096x2160 @ 60Hz
Display Pipelines	4	4
Video Outputs:		
HP Z1 G3	1x eDP 1x DP 2x Thunderbolt™	1x eDP 1x DP 2x Thunderbolt™
ISV Certified	Yes	Yes
Other	CUDA®	CUDA®

Desktop Workstations graphics spec summary

Graphics Module	NVIDIA® NVS™ 310	NVIDIA® NVS™ 315	NVIDIA® NVS™ 510	NVIDIA® Quadro® K420	AMD FirePro™ W2100	NVIDIA® Quadro® K620	NVIDIA® Quadro® K1200	NVIDIA® Quadro® M620
Graphics Category	Pro 2D	Pro 2D	Pro 2D	Sub Entry 3D	Entry 3D	Entry 3D	Mid-range 3D	Entry 3D
Memory (dedicated memory)	1 GB DDR3	1 GB DDR3	2 GB DDR3	2 GB DDR3	2 GB DDR3	2 GB GDDR5	4 GB GDDR5	2 GB GDDR5
Memory Bandwidth	14 GB/s	14 GB/s	28.5 GB/s	28.8 GB/s	14.4 GB/s	28.8 GB/s	80 GB/s	80 GB/s
Cores	48	48	192	192	320	384	512	512
Power	20W	20W	35W	41W	26W	45W	46W	
Host Interface	PCIe x16, Gen 2	PCIe x16, Gen 2	PCIe x16, Gen 2	PCIe x16, Gen 2	PCIe x8, Gen 3	PCIe x16, Gen 2	PCIe x16, Gen 2	PCIe x16, Gen 3
Form Factor	single slot, Half Height	single slot, Half Height	single slot, Half Height	single slot, Half Height	single slot, Half Height	single slot, Half Height	single slot, Half Height	Motherboard down
DirectX Support ²	11/11	11/11	11/11	11/11.2	11.2/12	11/11.2	11/12	12
OpenGL Support	4.3	4.3	4.3	4.4	4.4	4.4	4.4	4.5
Max Resolution (DP) ³	2560x1600 @ 60Hz	2560x1600 @ 60Hz	3840x2160 @ 60Hz	3840x2160 @ 60Hz	5120x2880 @ 60Hz ⁴	4096x2160 @ 60Hz	5120x2880 @ 60Hz ⁴	4096x2160 @ 60Hz ⁴
Max Displays	2	2	4	2 or 4 with DP MST	2	2 or 4 with DP MST	4	4
Video Outputs	2x DP	DMS-59	4x mini-DP	DP and DL-DVI	2x DP	DP and DL-DVI	4x mini-DP	4x DP 1.2
Included Video Cables:								
CTO	None	1x DMS-59 to Dual DVI	4x mini-DP to DP	None	None	None	4x mini-DP to DP	None
AMO	2x DP to DVI	1x DMS-59 to Dual DVI	4x mini-DP to DP	1x DP to DVI	None	1x DP to DVI	4x mini-DP to DP	None
ISV Certified	No	No	No	Yes	Yes	Yes	Yes	Yes
Other	Nview®	Nview®	Nview®	CUDA®, Mosaic™	OpenCL 2.0	CUDA®, Mosaic™	CUDA®, Mosaic™	CUDA®, Mosaic™, Nview®

Desktop Workstations graphics spec summary (continued)

Graphics Module	AMD FirePro™ W5100	NVIDIA® Quadro® K2200	NVIDIA® Quadro® M2000	AMD FirePro™ W7100	AMD RadeonPro™ WX 7100
Graphics Category	Mid-range 3D	Mid-range 3D	Mid-range 3D	High End 3D	High End 3D
Memory (dedicated memory)	4 GB GDDR5	4 GB GDDR5	4 GB GDDR5	8 GB GDDR5	8 GB GDDR5
Memory Bandwidth	96 GB/s	80 GB/s	105 GB/s	176 GB/s	224 GB/s
Cores	768	640	768	1792	2304
Power	<75W	68W	75W	150W	130W
Host Interface	PCIe x16, Gen 3	PCIe x16, Gen 2	PCIe x16, Gen 3	PCIe x16, Gen 3	PCIe x16, Gen 3
Form Factor	single slot, Full Height	single slot, Full Height	single slot, Full Height	single slot, Full Height	single slot, Full Height
DirectX Support²	11.2/12	11/11.2	12/12	11.2/12	12/12
OpenGL Support	4.4	4.4	4.5	4.4	4.5
Max Resolution (DP)³	5120x2880 @ 60Hz ⁴	5120x2880 @ 60Hz ⁴	5120x2880 @ 60Hz ⁴	5120x2880 @ 60Hz ⁴	5120x2880 @ 60Hz ⁵
Max Displays	4 or 6 with DP MST	3 or 4 with DP MST	4	4 or 6 with DP MST	4 or 6 with DP MST
Video Outputs	4x DP	2x DP and DL-DVI	4x DP	4x DP	4x DP 1.4
Included Video Cables:					
CTO	None	None	None	None	None
AMO	None	1x DP to DVI	None	None	None
ISV Certified	Yes	Yes	Yes	Yes	Yes
Other	OpenCL 2.0 Eyefinity DirectGMA FreeSync	CUDA® Mosaic™	CUDA® Mosaic™	AMD® Sync OpenCL 2.0 Eyefinity DirectGMA FreeSync	AMD® Sync OpenCL 2.0 Eyefinity DirectGMA FreeSync HDR Ready VR Capable

Desktop Workstations graphics spec summary (continued)

Graphics Module	NVIDIA® Quadro® M4000	NVIDIA® Quadro® M5000	NVIDIA® Quadro® P5000	NVIDIA® Quadro® M6000 12 GB	NVIDIA® Quadro® M6000 24 GB	NVIDIA® Quadro® P6000
Graphics Category	High 3D	High 3D	High 3D	Ultra 3D	Ultra 3D	Ultra 3D
Memory (dedicated memory)	8 GB GDDR5	8 GB GDDR5	16 GB GDDR5X	12 GB GDDR5	24 GB GDDR5	24 GB GDDR5X
Memory Bandwidth	192 GB/s	211 GB/s	288 GB/s	317 GB/s	317 GB/s	432 GB/s
Cores	1664	2048	2560	3072	3072	3840
Power	~120W	~150W	180W	~250W	~250W	250W
Host Interface	PCIe x16, Gen 3	PCIe x16, Gen 3	PCIe x16, Gen 3	PCIe x16, Gen 3	PCIe x16, Gen 3	PCIe x16, Gen 3
Form Factor	single slot, Full Height	dual slot, Full Height	dual slot, Full Height	dual slot, Full Height	dual slot, Full Height	dual slot, Full Height
DirectX Support ²	12/12	12/12	12/12	12/12	12/12	12/12
OpenGL Support	4.4	4.4	4.5	4.4	4.5	4.5
Max Resolution (DP) ³	5120x2880 @ 60Hz ⁴	5120x2880 @ 60Hz ⁴	5120x2880 @ 60Hz	5120x2880 @ 60Hz ⁴	5120x2880 @ 60Hz ⁴	5120x2880 @ 60Hz
Max Displays	4	4	4	4	4	4
Video Outputs	4x DP	4x DP and DL-DVI	4x DP 1.4 and DL-DVI	4x DP and DL-DVI	4x DP and DL-DVI	4x DP and DL-DVI
Included Video Cables:						
CTO	None	None	None	None	None	None
AMO	None	None	None	None	None	None
ISV Certified	Yes	Yes	Yes	Yes	Yes	Yes
Other	Quadro® Sync GPUDirect SLI® CUDA® Mosaic™	Quadro® Sync GPUDirect SLI® CUDA® Mosaic™	Quadro® Sync II GPUDirect GPU Boost 3.0 SLI® CUDA® Mosaic™ VR Ready	Quadro® Sync GPUDirect SLI® CUDA® Mosaic™	Quadro® Sync GPUDirect SLI® CUDA® Mosaic™	Quadro® Sync II GPUDirect GPU Boost 3.0 SLI® CUDA® Mosaic™ VR Ready

Mobile Workstations graphics support matrix

	HP ZBook 15u G3	HP ZBook 15u G4	HP ZBook Studio G3	HP ZBook 15 G3	HP ZBook 17 G3
Intel® HD Graphics 520	•				
Intel® HD Graphics 530			•	•	•
Intel® HD Graphics P530			•	•	•
Intel® Iris™ Pro Graphics P580			•	•	•
Intel® HD Graphics 620		•			
AMD FirePro™ W4190M	•	•			
AMD FirePro™ W5170M				•	
AMD FirePro™ W6150M					•
NVIDIA® Quadro® M1000M			•	•	•
NVIDIA® Quadro® M2000M				•	•
NVIDIA® Quadro® M3000M					•
NVIDIA® Quadro® M4000M					•
NVIDIA® Quadro® M5000M					•

Key Legend:

- single

Mobile Workstations integrated graphics spec summary

Graphics Module	Intel® HD Graphics 520	Intel® HD Graphics 620	Intel® HD Graphics 530	Intel® HD Graphics P530	Intel® HD Graphics P580 ¹
Graphics Category	Office 2D	Office 2D	Office 2D	Entry 3D	Entry 3D
Memory (shared with system)	up to 1.7 GB	up to 32 GB	up to 1.7 GB	up to 1.7 GB	up to 1.7 GB
Execution Units	24	24	24	24	72
DirectX Support	12	12	12	12	12
OpenGL Support	4.4	4.4	4.4	4.4	4.4
Max Resolution (DP)	4096x2304 @ 60Hz	4096x2304 @ 60Hz	4096x2304 @ 60Hz	4096x2304 @ 60Hz	4096x2304 @ 60Hz
Max Displays ¹	2	3	3	3	3
ISV Certified	No	No	No	Yes	Yes
Other	OpenCL 2.0	OpenCL 2.0	OpenCL 2.0	OpenCL 2.0	OpenCL 2.0

Mobile Workstations discrete graphics spec summary

Graphics Module	AMD FirePro™ W4190M	NVIDIA® Quadro® M1000M	AMD FirePro™ W5170M	NVIDIA® Quadro® M2000M	AMD FirePro™ W6150M	NVIDIA® Quadro® M3000M	NVIDIA® Quadro® M4000M	NVIDIA® Quadro® M5000M
Graphics Category	Entry 3D	Mid 3D	Mid 3D	Mid 3D	Mid 3D	High 3D	High 3D	Ultra 3D
Memory	2 GB GDDR5	2 GB GDDR5 ⁴	2 GB GDDR5	4 GB GDDR5	4 GB GDDR5	4 GB GDDR5	4 GB GDDR5	8 GB GDDR5
Cores	384	512	640	640	896	1024	1280	1536
Power	<30W	45W	45W	55W	65W	75W	~100W	100W
Host Interface	On system board	MXM 3.1 Type A ²	MXM 3.1 Type A	MXM 3.1 Type A	MXM 3.1 Type B	MXM 3.1 Type B	MXM 3.1 Type B	MXM 3.1 Type B
DirectX Support	11.1	12	12	12	12	12	12	12
OpenGL Support	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4
Max Resolution (DP)	3840x2160 @ 60Hz	4096x2160 @ 60Hz	4096x2160 @ 60Hz	4096x2160 @ 60Hz	4096x2160 @ 60Hz	4096x2160 @ 60Hz	4096x2160 @ 60Hz	4096x2160 @ 60Hz
Display Pipelines ³	2	4	6	4	6	4	4	4
ISV Certified	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Other	OpenCL 2.0	CUDA®	OpenCL 2.0	CUDA®	OpenCL 2.0	CUDA®	CUDA®	CUDA®

Graphics accessories

DisplayPort to DVI-D	Single link DVI-D support (max 1920x1200 @ 60Hz) Part number: FH973AA
DisplayPort to dual link DVI	Dual link DVI-D supports 2560x1600 @60Hz Part number: NR078AA
DisplayPort To HDMI 4k Adapter	Supports audio over DP, supports UHD up to 30Hz and True 4K up to 24Hz (HDMI 1.4) Part number: K2K92AA
DisplayPort to VGA	VGA support Part number: AS615AA
DMS-59 to dual DVI-I	Transmits two DVI-I signals via single connector and split into 2 DVI-I connectors Part number: DL139AA
DMS-59 to dual VGA	Transmits two VGA signals via single connector and split into 2 VGA connectors Part number: GS567AA
DMS-59 to dual DisplayPort	Transmits two DP protocols via single connector and split into 2 DP connectors Part number: XP688AA
DVI to VGA	VGA support Part number: VE053AA
6-pin to 8-pin Power Adapter	Z workstation PSU adaptor for graphics Part number: N1G35AA
6-pin to Dual 6-pin Power Adapter	Z workstation PSU adaptor for graphics Part number: F5J05AA
NVIDIA® Quadro® Sync	For Quadro® M4000, M5000, M6000 applications Part number: G5K57AA
NVIDIA® SLI® Connector	For Quadro® M4000, M5000, M6000 applications Part number: PP654A
NVIDIA® 3D Stereo Bracket	For Quadro® M4000, M5000, M6000 applications Part number: K0A25AA

Resources, contacts, or additional links

AMD FirePro™ Professional Graphics
amd.com/en-us/solutions/workstations

NVIDIA® Quadro® Graphics
nvidia.com/object/hp_workstations.html

High Performance Computing
www8.hp.com/us/en/campaigns/workstations/gpu-computing.html

Learn more at hp.com/go/leadershipgraphics

HP Z Desktop Workstation notes

1. Please refer to platform specifications for applicable configuration restrictions.
2. 1st/2nd where 1st is DirectX HW level version support, 2nd is SW API DirectX version support.
3. Not all video outputs of the graphics card may support the stated Max Resolution. See the card QuickSpecs for details and any restrictions.
4. Two video card DP outputs must be cabled using two DP cables to a 5k (5120x2880) display that accepts dual DP inputs (such as the HP Z27q).
5. 2x dual DP 1.3 cabled 5K displays max, or 1x single cable DP 1.4.

HP ZBook Mobile Workstation notes

1. For actual platform video outputs, refer to the mobile workstation platform specifications.
2. On system board for the HP ZBook Studio G3.
3. See Mobile Workstation system specifications for display output types and max displays supported.
4. 4 GB GDDR5 configuration offered on HP ZBook Studio G3 only.

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