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Z BY HP DISCRETE GRAPHICS QUICK REFERENCE GUIDE

DISCRETE GRAPHICS SOLUTIONS FOR Z BY HP WORKSTATIONS

HP is proud to offer discrete graphics choices on all of our Z by HP workstations—from the HP ZBook family to our ultimate workstation, the HP Z8.

HP's professional graphics line-up is perfect for users who are running business critical applications 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.

Note: Currently, Z2 Mini, Z2 SFF, Z2 Tower, Z1 Entry Tower and all ZBooks support CPUs with built-in integrated graphics. Please refer to platform quickspecs for details on the CPU integrated graphics supported in that platform.



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Platform		HP Z2 Mini G5	HP Z2 SFF G5	HP Z2 Tower G5	HP Z2 SFF G8	HP Z2 Tower G8
Graphics	Category					
NVIDIA® Quadro® P400	Entry 3D	-	• •	• •*	• •	• •*
NVIDIA® Quadro® P620	Entry 3D	•**	• •	• •*		
NVIDIA® T400	Entry 3D		• •	• •	• •	• •
AMD Radeon™ Pro WX 3200 MXM ¹⁰	Low-end 3D	•**	-	-	-	-
AMD Radeon™ Pro WX 3200	Low-end 3D	-	• •	• •	•	• •
NVIDIA® T600	Low-end 3D		• •	• •	• •	• •
AMD Radeon™ Pro W5500	Mid-range 3D	-	-	•	-	•
AMD Radeon™ Pro W5700	High-end 3D	-	-	•	-	•
NVIDIA® Quadro® P1000	Mid-range 3D	-	•	• •*		
NVIDIA® T1000	Mid-range 3D		•*	• •**	•*	• •**
NVIDIA® Quadro® P2200	Mid-range 3D	-	-	• •	-	-
NVIDIA® Quadro® T1000 MXM	Mid-range 3D	•**	-	-	-	-
NVIDIA® Quadro® T2000 MXM	Mid-range 3D	•**	•**	-	-	-
NVIDIA® Quadro RTX™ 3000 MXM	High End 3D	•**	•**		•	
NVIDIA® Quadro RTX™ 4000	High End 3D	-	-	•	-	•
NVIDIA® RTX™ A4000	High End 3D			•		•
NVIDIA® Quadro RTX™ 5000	Ultra 3D	-	-	•*	-	•*
NVIDIA® Quadro RTX™ 6000	Ultra 3D	-	-	•*	-	-

Key Legend:

- single
- • dual

NOTE

*Please refer to platform specifications and ordering guides for applicable configuration restrictions
 **MXM are custom graphics modules for space-constrained designs – WX 3200 (4GB), P600 (4GB), P620 (4GB), P1000 (4GB), T1000 (4GB), T2000 (4GB), RTX™ 3000 (4GB)



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Platform		HP Z4 G4	HP ZCentral 4R	HP Z6 G4	HP Z8 G4
Graphics	Category				
NVIDIA® Quadro® P400	Entry 3D	••	•	••	••
NVIDIA® Quadro® P620	Entry 3D	••	-	••	••
NVIDIA® T400	Entry 3D	••	••	••	••
AMD Radeon™ Pro WX 3100	Low-end 3D	••	-	••	••
AMD Radeon™ Pro WX 3200	Low-end 3D	••	-	••	••••
NVIDIA® T600	Low-end 3D	••		••	••
AMD Radeon™ Pro W5500	Mid-range 3D	••	-	••	••*
AMD Radeon™ Pro W5700	High-end 3D	••	-	•	••
AMD Radeon™ Pro WX 7100	High-end 3D	••	-	••	••••*
AMD Radeon™ Pro WX 9100	Ultra 3D	•	-	•	•
NVIDIA® Quadro® P1000	Mid-range 3D	••	•	•••	••••
NVIDIA® Quadro® P2200	Mid-range 3D	••	••	••	••••
NVIDIA® T1000	Mid-range 3D	••	•	••	•••
NVIDIA® Quadro® GV100	Ultra 3D	••*	-	-	•••
NVIDIA® Quadro RTX™ 4000	High End 3D	••*	••	••*	••••*
NVIDIA® Quadro RTX™ 5000	Ultra 3D	••*	•	•	••*
NVIDIA® Quadro RTX™ 6000	Ultra 3D	••*	•	•	••*
NVIDIA® Quadro RTX™ 8000	Ultra 3D	••*	•	•	••*
NVIDIA® RTX™ A4000	High End 3D	••	••	••	••••
NVIDIA® RTX™ A5000	Ultra 3D	••*	•	••	•••
NVIDIA® RTX™ A6000	Ultra 3D	••	•	•	••

Key Legend:

- single
- dual
- triple
- quad

NOTE

*Please refer to platform specifications and ordering guides for applicable configuration restrictions



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HP Z DESKTOPS: DISCRETE GRAPHICS SPEC SUMMARY

Graphics Module	NVIDIA® Quadro® P400	NVIDIA® Quadro® P620	NVIDIA® Quadro® P620 MXM ¹⁰	NVIDIA® T400	AMD Radeon™ Pro WX 3100	NVIDIA® T600
Graphics Category	Entry 3D	Entry 3D	Entry 3D	Entry 3D	Entry 3D	Low-end 3D
Graphics Memory	2 GB GDDR5	2 GB GDDR5	4 GB GDDR5	2 GB GDDR5	4 GB GDDR5	4 GB GDDR5
Memory Bandwidth	Up to 32 GB/s	Up to 64 GB/s	-	Up to 80 GB/s	Up to 96 GB/s	Up to 160 GB/s
Cores ¹¹	256	512	512	384	512	640
Power	30 W	40 W	25 W	30 W	35 W	40 W
Form Factor ⁶	single slot, Half Height	single slot, Half Height	MXM ¹⁰	single slot, Half Height	single slot, Half Height	single slot, Half Height
DirectX Support	12	12	12	12_1	12	12_1
OpenGL Support	4.5	4.5	4.5	4.6	4.5	4.6
Max Resolution (DP) ¹	5120 x 2880 @ 60 Hz	5120 x 2880 @ 60Hz	5120 x 2880 @ 60 Hz	7680 x 4320 @ 60 Hz	5120 x 2880 @ 60Hz ²	7680 x 4320 @ 60 Hz
Max Displays	3	4	4	3	4 or 6 with DP MST	4
Video Outputs	3x mini-DP	4x mini-DP	-	3x mini-DP 1.4	1x DP and 2x mDP 1.4	4x mDP 1.4
Included Video Cables:						
CTO	None	None	-	None	None	None
AMO	2x mini-DP to DP	2x mini-DP to DP	-	None	1x mini-DP to DP	None
ISV Certified	Yes	Yes	Yes	Yes	Yes	Yes
Other	GPU Boost 3.0, CUDA®, Mosaic™	GPU Boost 3.0, CUDA®, Mosaic™	CUDA®	Vulcan, CUDA®, Mosaic™	AMD® Sync, OpenCL™ 2.0, Eyefinity, DirectGMA, FreeSync, HDR Ready	Vulcan, CUDA®, Mosaic™



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Graphics Module	AMD Radeon™ Pro WX 3200	AMD Radeon™ Pro WX 3200 MXM ¹⁰	NVIDIA® Quadro® P1000	NVIDIA® Quadro® P1000 MXM ¹⁰	NVIDIA® Quadro® T1000 MXM ¹⁰	NVIDIA® T1000
Graphics Category	Low-end 3D	Low-end 3D	Mid-range 3D	Mid-range 3D	Mid-range 3D	Mid-range 3D
Graphics Memory	4 GB GDDR5	4 GB GDDR5	4 GB GDDR5	4 GB GDDR5	4 GB GDDR6	4 GB GDDR6
Memory Bandwidth	Up to 96 GB/s	-	Up to 80 GB/s	-	-	Up to 160 GB/s
Cores ¹¹	640	640	640	640	768	896
Power	56 W	41 W	47 W	40 W	50 W	50 W
Form Factor ⁶	single slot, Half Height	MXM ¹⁰	single slot, Half Height	MXM ¹⁰	MXM ¹⁰	single slot, Half Height
DirectX Support	12	12	12	12	12_1	12_1
OpenGL Support	4.5	4.6	4.5	4.5	4.6	4.6
Max Resolution (DP) ¹	5120 x 2880 @ 60Hz ²	5120 x 2880 @ 60Hz ²	5120 x 2880 @ 60 Hz	5120 x 2880 @ 60 Hz	5120 x 2880 @ 60 Hz	5120 x 2880 @ 60 Hz
Max Displays	4 or 5 with DP MST	5	4	4	4	4
Video Outputs	4x mDP 1.4	-	4x mini-DP	-	-	4x mini-DP
Included Video Cables:						
CTO	None	-	None	-	-	None
AMO	2x mini-DP to DP	-	2x mini-DP to DP	-	-	2x mini-DP to DP
ISV Certified	Yes	Yes	Yes	Yes	Yes	Yes
Other	AMD® Sync, OpenCL 2.0, Eyefinity, DirectGMA, FreeSync, HDR Ready	OpenCL™ 2.0	GPU Boost 3.0, CUDA®, Mosaic™	CUDA®	CUDA®	GPU Boost 3.0, CUDA®, Mosaic™



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Graphics Module	NVIDIA® Quadro® T2000 MXM ¹⁰	NVIDIA® Quadro® P2200	AMD Radeon™ Pro W5500	AMD Radeon™ Pro W5700	AMD Radeon™ Pro WX 7100	NVIDIA® Quadro® RTX™ 3000 MXM ¹⁰
Graphics Category	Mid-range 3D	Mid-range 3D	Mid-range 3D	High-end 3D	High-end 3D	High-end 3D
Graphics Memory	4 GB GDDR6	5 GB GDDR5X	8 GB GDDR6	8 GB GDDR6	8 GB GDDR5	6 GB GDDR6
Memory Bandwidth	-	Up to 200 GB/s	Up to 224 GB/s	Up to 448 GB/s	Up to 224 GB/s	-
Cores ¹¹	1024	1280	1408	2304	2304	2304
Power	60 W	75 W	130 W	205 W	130 W	60 W
Form Factor ⁶	MXM ¹⁰	single slot, Full Height	single slot, Full Height	dual slot, Full Height	single slot, Full Height	MXM ¹⁰
DirectX Support	12_1	12	12_1	12_1	12	12_1
OpenGL Support	4.6	4.5	4.6	4.6	4.5	4.6
Max Resolution (DP) ¹	5120 x 2880 @ 60 Hz	5120 x 2880 @ 60Hz	7690 x 4320 @ 60 Hz ^{7,9}	7690 x 4320 @ 60 Hz ^{7,8}	5120 x 2880 @ 60 Hz ²	5120 x 2880 @ 60 Hz
Max Displays	4	4	4	6	4 or 6 with DP MST	4
Video Outputs	-	4x DP 1.4	4x DP 1.4a	5x mDP 1.4a and 1x USB-C AltMode port	4x DP 1.4	-
Included Video Cables:						
CTO	-	None	None	None	None	-
AMO	-	None	None	None	None	-
ISV Certified	Yes	Yes	Yes	Yes	Yes	Yes
Other	CUDA®	GPU Boost 3.0, CUDA®, Mosaic™	OpenCL 2.0, FreeSync, HDR Ready, Radeon™ Pro Software, AMD Eyefinity, Radeon™ ProRender, Unified Video Decoder, Video Code Engine, VR Ready	OpenCL 2.0, FreeSync, HDR Ready, Radeon™ Pro Software, AMD Eyefinity, Radeon™ ProRender, Unified Video Decoder, Video Code Engine, VR Ready	AMD® Sync, OpenCL™ 2.0, Eyefinity, DirectGMA, FreeSync, HDR Ready, VR Ready	CUDA®



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Graphics Module	NVIDIA® Quadro RTX™ 4000	NVIDIA® Quadro RTX™ 5000	NVIDIA® Quadro RTX™ 6000	NVIDIA® Quadro® GV100	AMD Radeon™ Pro WX 9100
Graphics Category	High-end 3D	Ultra 3D	Ultra 3D	Ultra 3D	Ultra 3D
Graphics Memory	8 GB GDDR6	16 GB GDDR6	24 GB GDDR6	32 GB HBM2	16 GB HBM2
Memory Bandwidth	Up to 416 GB/s	Up to 448 GB/s	Up to 672 GB/s	Up to 870 GB/s	Up to 483 GB/s
Cores ¹¹	2304	3072	4608	5120	4096
Power	160 W	265 W	295 W	250 W	250 W
Form Factor ⁶	single slot, Full Height	dual slot, Full Height	dual slot, Full Height	dual slot, Full Height	dual slot, Full Height
DirectX Support	12_1	12_1	12_1	12	12
OpenGL Support	4.6	4.6	4.6	4.5	4.5
Max Resolution (DP) ¹	7680 x 4320 @ 60Hz	7680 x 4320 @ 60 Hz	7680 x 4320 @ 60 Hz	5120 x 2880 @ 60Hz	7680 x 4320 @ 60Hz ⁵
Max Displays	4	4	4	4	6
Video Outputs	3x DP 1.4a and VirtualLink ⁴	4x DP 1.4a and VirtualLink ⁴	4x DP 1.4a and VirtualLink ⁴	4x DP 1.4	6x mDP 1.4
Included Video Cables:					
CTO	None	None	None	None	None
AMO	None	None	None	None	2x mini-DP to DP
ISV Certified	Yes	Yes	Yes	Yes ³	Yes
Other	Quadro® Sync II, CUDA®, Mosaic™, VR Ready	Quadro® Sync II, GPUDirect, GPU Boost 3.0, NVLink/SLI®, CUDA®, Mosaic™, VR Ready	Quadro® Sync II, GPUDirect, GPU Boost 3.0, NVLink/SLI®, CUDA®, Mosaic™, VR Ready	Quadro® Sync II, GPUDirect, GPU Boost 3.0, CUDA®, Mosaic™, VR Ready, Multi-GPU Scalability NVLink (2-way)	AMD® Sync, OpenCL™ 2.0, Eyefinity, DirectGMA, FreeSync, HDR Ready, VR Ready



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Graphics Module	NVIDIA® Quadro RTX™ 8000	NVIDIA® RTX™ A6000	NVIDIA® RTX™ A5000	NVIDIA® RTX™ A4000
Graphics Category	Ultra 3D	Ultra 3D	Ultra 3D	High-End 3D
Graphics Memory	48 GB GDDR6	48 GB GDDR6	24 GB GDDR6	16 GB GDDR6
Memory Bandwidth	Up to 672 GB/s	Up to 768 GB/s	Up to 768 GB/s	Up to 448 GB/s
Cores ¹¹	4608	10752	8192	6144
Power	295 W	300 W	230 W	140W
Form Factor ⁶	dual slot, Full Height	dual slot, Full Height	dual slot, Full Height	single slot, Full Length
DirectX Support	12_1	12_1	12_1	12_1
OpenGL Support	4.6	4.6	4.6	4.6
Max Resolution (DP) ¹	7680 x 4320 @ 60 Hz	5120 x 2880 @ 60 Hz	5120 x 2880 @ 60 Hz	7680 x 4320 @ 60 Hz
Max Displays	4	4	4	4
Video Outputs	4x DP 1.4a and VirtualLink ⁴	4x DP 1.4a	4x DP 1.4a	4X DP 1.4
Included Video Cables:				
CTO	None	None	None	None
AMO	None	None	None	None
ISV Certified	Yes	Yes	Yes	Yes
Other	Quadro® Sync II, GPUDirect, GPU Boost 3.0, NVLink/SLI®, CUDA®, Mosaic™, VR Ready	Quadro® Sync II, GPUDirect, GPU Boost 3.0, NVLink, CUDA®, Mosaic™, VR Ready	Quadro® Sync II, GPUDirect, GPU Boost 3.0, NVLink, CUDA®, Mosaic™, VR Ready	Quadro® Sync II, GPUDirect, GPU Boost 3.0, CUDA®, Mosaic™, VR Ready, Vulkan



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HP ZBOOKS: CURRENT DISCRETE GRAPHICS OFFERINGS

Platform		HP ZBook Power G7	HP ZBook Studio G7	HP ZBook Fury 15/17 G7	HP ZBook Firefly 14/15 G7	HP ZBook Firefly 14/15.6 G8
Graphics	Category					
NVIDIA® Quadro® P520	Entry 3D				•	
NVIDIA® Quadro® P620	Entry 3D	•				
NVIDIA® T500	Entry 3D					•
NVIDIA® Quadro® T1000	Mid-range 3D	•	•	•		
NVIDIA® Quadro® T2000	Mid-range 3D	•	•	•		
NVIDIA® Quadro RTX™ 3000	High-end 3D		•	•		
NVIDIA® Quadro RTX™ 4000	High-end 3D		•	•		
NVIDIA® Quadro RTX™ 5000	High-end 3D		•	•		

Key Legend:

- single



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Platform		HP ZBook Create G7	HP ZBook Studio G8	HP ZBook Power G8	HP ZBook Fury 15.6/17.3 G8
Graphics	Category				
NVIDIA® T600	Low-end 3D			•	
NVIDIA® T1200	Mid-range 3D		•	•	•
NVIDIA® RTX™ A2000	Mid-range 3D		•	•	•
NVIDIA® RTX™ A3000	High-end 3D		•		•
NVIDIA® RTX™ A4000	High-end 3D		•		•
NVIDIA® RTX™ A5000	Ultra 3D		•		•
NVIDIA® RTX™ 3060	High-end 3D		•		
NVIDIA® RTX™ 3070	High-end 3D		•		
NVIDIA® RTX™ 3080	High-end 3D		•		
NVIDIA® GeForce RTX™ 2070	High-end 3D	•			
NVIDIA® GeForce RTX™ 2070 Super	High-end 3D	•			
NVIDIA® GeForce RTX™ 2080 Super	High-end 3D	•			
AMD RADEON™ Pro W6600M	High-end 3D				•

Key Legend:

- single



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Graphics Module	NVIDIA® Quadro® P520	NVIDIA® Quadro® P620	NVIDIA® T500	NVIDIA® RTX™ 3060	NVIDIA® RTX™ 3070	NVIDIA® RTX™ 3080
Graphics Category	Entry 3D	Entry 3D	Entry 3D	High-end 3D	High-end 3D	High-end 3D
Memory	4 GB GDDR5	4 GB GDDR5	4 GB GDDR6	6 GB GDDR6	8 GB GDDR6	16 GB GDDR6
Cores ⁴	384	512	896	3840	5120	6144
Power	18 W	25 W	18 W	60 W	80 W	80 W
DirectX Support	12	12	12	12 Ultimate	12 Ultimate	12 Ultimate
OpenGL Support	4.5	4.5	4.5	4.6	4.6	4.6
Max Resolution (DP) ¹	Determined by CPU ⁵	5120 x 2880 @ 60 Hz	Determined by CPU ⁵	5120 x 2880 @ 60 Hz	5120 x 2880 @ 60 Hz	5120 x 2880 @ 60 Hz
Display Pipelines ¹	3	4	4	4	4	4
ISV Certified	Yes	Yes	Yes	Yes	Yes	Yes
Other	CUDA®	CUDA®	CUDA®	CUDA®	CUDA®	CUDA®

Graphics Module	NVIDIA® Quadro® T1000	NVIDIA® Quadro® T2000	NVIDIA® Quadro RTX™ 3000	NVIDIA® GeForce RTX™ 2070	NVIDIA® GeForce RTX™ 2070 Super
Graphics Category	Mid-range 3D	Mid-range 3D	High-end 3D	High-end 3D	High-end 3D
Memory	4 GB GDDR5/6 ³	4 GB GDDR5/6 ³	6 GB GDDR6	8 GB GDDR6	8 GB GDDR6
Cores ⁴	768	1024	2304	2304	2560
Power	50 W	60 W	80 W ²	80 W	80 W
DirectX Support	12	12	12	12	12
OpenGL Support	4.5	4.5	4.5	4.5	4.5
Max Resolution (DP) ¹	5120 x 2880 @ 60 Hz	5120 x 2880 @ 60 Hz	5120 x 2880 @ 60 Hz	5120 x 2880 @ 60 Hz	5120 x 2880 @ 60 Hz
Display Pipelines ¹	4	4	4	4	4
ISV Certified	Yes	Yes	Yes	No	No
Other	CUDA®	CUDA®	CUDA®	CUDA®	CUDA®

Graphics Module	NVIDIA® Quadro RTX™ 4000	NVIDIA® GeForce RTX™ 2080 Super	NVIDIA® Quadro RTX™ 5000	AMD RADEON™ Pro W6600M
Graphics Category	High-end 3D	High-end 3D	High-end 3D	High-end 3D
Memory	8 GB GDDR6	8 GB GDDR6	16 GB GDDR6	8 GB GDDR6
Cores ⁴	2560	2944	3072	1972
Power	80 W	80 W	80 W	80 W
DirectX Support	12	12	12	12 Ultimate
OpenGL Support	4.5	4.5	4.5	4.6
Max Resolution (DP) ¹	5120 x 2880 @ 60 Hz	5120 x 2880 @ 60 Hz	5120 x 2880 @ 60 Hz	5120 x 2880 @ 60 Hz
Display Pipelines ¹	4	4	4	4
ISV Certified	Yes	No	Yes	Yes
Other	CUDA®	CUDA®	CUDA®	OpenCL 2.0, Vulkan 1.2



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Graphics Module	NVIDIA® T600	NVIDIA® T1200	NVIDIA® RTX™ A2000	NVIDIA® RTX™ A3000	NVIDIA® RTX™ A4000	NVIDIA® RTX™ A5000
Graphics Category	Low-end 3D	Mid-range 3D	Mid-range 3D	High-end 3D	High-end 3D	Ultra 3D
Memory	4 GB GDDR6	4 GB GDDR6	4 GB GDDR6	6 GB GDDR6	8 GB GDDR6	16 GB GDDR6
Cores ⁴	896	1024	2560	4096	5120	6144
Power	25 W	35 W	35 W	80 W	80 W	80 W
DirectX Support	12_1	12_1	12 Ultimate	12 Ultimate	12 Ultimate	12 Ultimate
OpenGL Support	4.6	4.6	4.6	4.6	4.6	4.6
Max Resolution (DP) ¹	5120 x 2880 @ 60 Hz	5120 x 2880 @ 60 Hz	5120 x 2880 @ 60 Hz	5120 x 2880 @ 60 Hz	5120 x 2880 @ 60 Hz	5120 x 2880 @ 60 Hz
Display Pipelines ¹	4	4	4	4	4	4
ISV Certified	Yes	Yes	Yes	Yes	Yes	Yes



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HP VR BACKPACK AND Z1 ENTRY TOWER: CURRENT DISCRETE GRAPHICS OFFERINGS

		HP VR Backpack	HP Z1 G6	HP Z1 G8
Graphics	Category			
AMD Radeon™ R7 430 (DP+VGA)	Office 2D	-	• • *	• • *
AMD Radeon™ R7 430 (2DP)	Office 2D	-	• • *	• • *
NVIDIA® Quadro® P400	Entry 3D	-	•	•
NVIDIA® Quadro® P620	Entry 3D	-	•	•
NVIDIA® Quadro® P1000	Entry 3D	-	•	•
NVIDIA® Quadro® P2200	Mid-range 3D	-	•	•
AMD Radeon™ RX 550X	Mid-range 3D	-	•	•
NVIDIA® GeForce RTX™ 2060 Super	High-end 3D	-	•	•
NVIDIA® GeForce RTX™ 3060	High-end 3D	-	-	•
NVIDIA® GeForce RTX™ 3070	High-end 3D	-	-	•
NVIDIA® Quadro RTX™ 4000	High-end 3D	-	•	-
NVIDIA® GeForce RTX™ 2080 (mobile)	Ultra 3D	•	-	-
NVIDIA® GeForce RTX™ 2080 Super	Ultra 3D	-	•	-
NVIDIA® Quadro RTX™ 5000	Ultra 3D	-	•	-

Key Legend:

- single
- • dual

NOTE

*2nd PCIe slot is not x16, may only be x4 electrically



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HP VR BACKPACK AND Z1 ENTRY TOWER: DISCRETE GRAPHICS SPEC SUMMARY

Graphics Module	AMD Radeon™ R7 430 (DP+VGA)	AMD Radeon™ R7 430 (2DP)	AMD Radeon™ RX 550X
Graphics Category	Office 2D	Office 2D	Mid-range 3D
Graphics Memory	2GB GDDR5	2GB GDDR5	4GB GDDR5
Memory Bandwidth	Up to 17 GB/s	Up to 17 GB/s	Up to 192 GB/s
Graphics Memory Bus	64-bit	64-bit	128-bit
Power	<50W	<50W	50W
Auxiliary Power Connector(s)	-	-	-
Form Factor ²	Single slot, Half Height	Single slot, Half Height	Single slot, Half Height
Max Resolution (DP) ¹	4096x2160 @ 60Hz	4096x2160 @ 60Hz	5120x2880 @ 60Hz
Max Displays	2	2	2
Video Outputs	DP+VGA	2xDP	HDMI+2xDP
ISV Certified	No	No	No

Graphics Module	NVIDIA® Quadro® P2200	AMD Radeon™ RX 580	NVIDIA® GeForce RTX™ 2060 Super	NVIDIA® GeForce RTX™ 3070	NVIDIA® GeForce RTX™ 3060
Graphics Category	Mid-range 3D	High-end 3D	High-end 3D	High-end 3D	High-end 3D
Graphics Memory	5 GB GDDR5X	8GB GDDR5	8 GB GDDR6	8 GB GDDR6	12 GB GDDR6
Memory Bandwidth	Up to 200 GB/s	Up to 256 GB/s	Up to 448 MB/s	Up to 448 MB/s	Up to 360 MB/s
Graphics Memory Bus	160-bit	256-bit	256-bit	256-bit	192-bit
Power	60W	150W	175W	220W	170W
Auxiliary Power Connector(s)	-	6pin	8pin	12pin (adapter)	8pin PCI
Form Factor ²	Dual slot, Full Height	Dual slot, Full Height	Dual slot, Full Height	Dual slot, Full Height	Dual slot, Full Height
Max Resolution (DP) ¹	5120x2880 @ 60Hz	5120x3200 @ 60Hz	7680x4320 @ 60Hz	7680x4320 @ 60Hz	7680x4320 @ 60Hz
Max Displays	4	4	3	4	4
Video Outputs	4x DP 1.4	3xDP+HDMI	HDMI+DP+DVI	3xDP+HDMI	3xDP+HDMI
ISV Certified	Yes	No	No	No	No



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HP VR BACKPACK AND Z1 ENTRY TOWER: DISCRETE GRAPHICS SPEC SUMMARY

Graphics Module	NVIDIA® Quadro RTX™ 4000	NVIDIA® GeForce RTX™ 2080 (mobile)	NVIDIA® GeForce RTX™ 2080 Super
Graphics Category	High-end 3D	Ultra 3D	Ultra 3D
Graphics Memory	8 GB GDDR6	8GB GDDR6	8GB GDDR6
Memory Bandwidth	Up to 416 MB/s	Up to 448 MB/s	Up to 448 MB/s
Graphics Memory Bus	256-bit	256-bit	256-bit
Power	160W	150W (Max-P)	250W
Auxiliary Power Connector(s)	8pin	-	6pin+8pin
Form Factor ²	Single slot, Full Height	Motherboard-down	Dual slot, Full Height
Max Resolution (DP) ¹	7680x4320 @ 60Hz	7680x4320 @ 60Hz	7680x4320 @ 60Hz
Max Displays	4	4	4
Video Outputs	3xDP 1.4a and VirtualLink ³	Defined by system & dock	3xDP+HDMI
ISV Certified	Yes	No	No

Graphics Module	NVIDIA® Quadro RTX™ 5000
Graphics Category	Ultra 3D
Graphics Memory	16 GB GDDR6
Memory Bandwidth	Up to 448 GB/s
Graphics Memory Bus	256-bit
Power	2650W
Auxiliary Power Connector(s)	6pin+8pin
Form Factor ²	Dual slot, Full Height
Max Resolution (DP) ¹	7680x4320 @ 60Hz
Max Displays	4
Video Outputs	3xDP 1.4a and VirtualLink ³
ISV Certified	Yes



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GRAPHICS ACCESSORIES

DisplayPort™ to DVI-D	Single link DVI-D support (max 1920x1200 @ 60 Hz) Part number: FH973AA
DisplayPort™ to HDMI True 4K Adapter	Supports audio over DP, supports UHD up to 30 Hz and True 4K up to 24 Hz (HDMI 1.4) Part number: 2JA63AA
DisplayPort™ to VGA	VGA support Part number: AS615AA
6-pin to 8-pin Power Adapter	HP Z Workstation PSU adaptor for graphics Part number: N1G35AA
NVIDIA® 3D Stereo Bracket	For NVIDIA® Quadro® M4000, M5000, M6000, P5000, P6000, RTX 4000, RTX 5000, RTX 6000, RTX 8000, and NVIDIA® RTX A4000, RTX A5000, RTX A6000 applications Part number: KOA25AA
NVIDIA® Quadro® Sync II	For NVIDIA® Quadro® P4000, P5000, P6000, GP100, GV100, RTX 4000, RTX 5000, RTX 6000, RTX 8000, and NVIDIA® RTX A4000, RTX A5000, RTX A6000 multi-display applications Part number: 1WT20AA
HP (Bulk 12) miniDP-to-DP Adapter Cables	To connect additional displays to graphics cards with miniDP ports Part number: 2KW87A6
HP Single miniDP-to-DP Adapter Cable	To connect one additional display to graphics card's miniDP port Part number: 2MY05AA
HP NVIDIA® GV100 NVLINK Bridge Kit (Pair)	To connect two GV100 graphics cards for GPU-compute scaling Part number: 3NZ66AA
Quadro RTX NVLink 2-slot Bridge	To connect two RTX 5000 graphics cards for GPU-compute scaling in Z4 G4 or Z8 G4 Part number: 6FY12AA
Quadro RTX NVLink 3-slot Bridge	To connect two RTX 5000 graphics cards for GPU-compute scaling in Z6 G4 Part Number: 6FY14AA
Quadro RTX NVLink High-Bandwidth 2-slot Bridge	To connect two RTX 6000 or two RTX 8000 graphics cards for GPU-compute scaling in Z4 G4 or Z8 G4 Part number: 6FY11AA
Quadro RTX NVLink High-Bandwidth 3-slot Bridge	To connect two RTX 6000 or two RTX 8000 graphics cards for GPU-compute scaling (not currently recommended for normal Z4/Z6/Z8 G4 configurations) Part number: 6FY13AA
NVIDIA® NVLink 2-slot Bridge	To connect two RTX A5000 or two RTX A6000 graphics cards for GPU-compute scaling in Z4 G4 or Z8 G4 Part Number: 340L2AA
NVIDIA® NVLink 3-slot Bridge	To connect two RTX A5000 graphics cards for GPU-compute scaling in Z6 G4 Part Number: 340L3AA



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ADDITIONAL RESOURCES

Resources, contacts, or additional links

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

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

Learn more about our Z workstations at hp.com/z

SOURCES AND LEGAL DISCLAIMERS

HP Z Desktop Workstation notes

- ¹ Not all video outputs of the graphics card may support the stated Max Resolution. See the card QuickSpecs for details and any restrictions.
- ² 2x dual DP 1.3 cabled 5k displays max., or 1x single cable DP 1.4.
- ³ Tested by select ISVs.
- ⁴ As of December 2019, VirtualLink's USB-C (data) can be disabled via BIOS setting.
- ⁵ 6x DP 1.3 4K @60 Hz or 3x 5K @60 Hz or 1x 8K @60 Hz.
- ⁶ "Half Height" is also known as "Low Profile", "Single Slot" is also known as "Single Width", and "Dual Slot" is also known as "Dual Width".
- ⁷ Some video display modes such as 7680x4320@60Hz require the use of DSC (Display Stream Compression).
- ⁸ Up to 6x 4K@60Hz, up to 3x 5K or 8K @60Hz, up to 3x 4K@120Hz.
- ⁹ Up to 4x 4K@60Hz, up to 2x 5K or 8K @60Hz, up to 2x 4K@120Hz.
- ¹⁰ HP custom graphics module using mobile GPU for space-constrained designs.
- ¹¹ Different graphics architectures 'Cores' cannot be directly compared. Cores is useful for comparing graphics that are of the same architecture, usually designated by common prefix letter(s) in the model name.

HP VR Backpack and Z1 notes

- ¹ Not all video outputs of the graphics card may support the stated Max Resolution. See the card QuickSpecs for details and any restrictions.
- ² "Half Height" is also known as "Low Profile", "Single Slot" is also known as "Single Width", and "Dual Slot" is also known as "Dual Width".
- ³ As of December 2019, VirtualLink's USB-C (data) can be disabled via BIOS setting.

HP ZBook Mobile Workstation notes

- ¹ See mobile workstation system specifications for display output types and max displays and resolutions supported.
- ² HP ZBook 15 G6 uses 65 W MaxQ RTX 3000, and all GPUs are on the system board.
- ³ ZBook G6 generation implemented GDDR5, whereas ZBook G7 generation implemented GDDR6
- ⁴ Different graphics architectures 'Cores' cannot be directly compared. Cores is useful for comparing graphics that are of the same architecture, usually designated by common prefix letter(s) in the model name.
- ⁵ The entry notebook design used here requires the CPU's graphics engine to drive all display signals. Hence, it is the CPU's graphics that determines what maximum display resolution is possible to support. The maximum resolutions of the notebook's CPUs are documented in the respective notebook's QuickSpecs.

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