

DXF-EXP-V Series

PCIe expansion module and GPUs for Dell EMC PowerEdge FX2s

GPU accelerators to modernize Dell EMC PowerEdge FX2 infrastructure

Powerful GPU accelerators for PowerEdge FX2

The Amulet Hotkey DXF-EXP-V is a unique PCIe expansion module that brings graphics virtualization and compute acceleration to Dell's FX2s platform. For new deployments or when modernizing existing FX2 infrastructure, GPUs enable organizations to:

- **Extend ROI:** to further enhance the FX2 business value
- **Enhance User Experience:** with graphics / remote display protocol offload
- **Boost Productivity:** with rapid graphics and GPU compute acceleration

Flexibility to handle demanding and evolving workloads

Use GPU acceleration to support new and tough workloads across the entire organization. Deploy in private, public or hybrid cloud environments that require performance, agility and flexibility. PowerEdge blade servers and DXF-EXP-V modules combine Intel Xeon processor and NVIDIA Tesla GPU accelerator performance with the efficiency of blades and the cost benefits of rack-based systems to support workloads such as:

- **Virtual desktops:** including simplifying Window 10 VDI migration
- **Application Delivery:** such as 3D CAD and enhanced e-store applications
- **Virtual workstations:** with advanced visualization and computing
- **GPU accelerated computing:** for IoT, HPC, big data analytics, AI, deep/machine learning and more

Uniquely architected for scalability and efficiency

Amulet Hotkey designed the DXF-EXP-V module and GPU cards in collaboration with Dell EMC and NVIDIA product engineering teams to deliver superior scalability, reliability and performance. Support up to 8x GPUs in an FX2s enclosure or mix-and-match GPUs and IO cards to expand server IO capacity or for native Fiber Channel ports.

DXF-EXP-V PCIe expansion module for Dell EMC PowerEdge FX2s



1 - DXF-EXP-V module with four PCIe 3.0 slots for GPUs and low-profile IO cards.
2 - Module release lever. 3 - FX2s PCIe expansion slot connectors

Key Features and benefits

- Unique PCIe module that enables GPU accelerators in PowerEdge FX2s
- Increase agility, flexibility and efficiency while supporting tough new workloads
- Designed to fit inside the FX2s chassis to maintain FX2 architecture and density advantages
- Four PCIe 3.0 slots per module
- Up to 2x modules in a 2U FX2s chassis for:
 - Up to 8x GPU for 128GB vRAM
 - Up to 4x dual-socket servers
 - Optional FPGA or IO low-profile PCIe cards

Powerful GPU Accelerators

- DXF-G-P6 card with NVIDIA Tesla P6
- NVIDIA Tesla P6 advantages compared to the previous generation Tesla M6:
 - 2x GPU memory
 - 1.7x performance
 - 1.5x video encoder performance
 - Up to 16 users with 1GB vRAM each

Easy Installation and Management

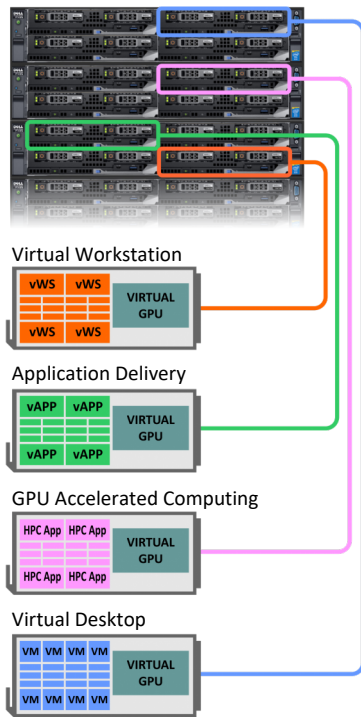
- Designed to fit into the FX2s enclosure PCIe expansion slots
- Fully integrated with FX2 management tools for simple and rapid deployment
- Supports the standard FX2s PCIe slot mapping and configuration options

Developed in partnership with...

DELLEMC

NVIDIA

PowerEdge FX2 GPU Acceleration Deployment Examples



The DXF-EXP-V PCIe expansion module enables the flexibility and agility to quickly deploy a wide range of GPU accelerated workloads.

Rapid and automated workload deployment

The DXF-EXP-V module is fully integrated into the chassis thermal management system for quick implementation with minimal risk. This includes embedded thermal and PCIe management capabilities of the iDRAC and FX2s Chassis Management Controller (CMC). The Dell OpenManage systems management portfolio simplifies IT operations including server configuration management that automates bare-metal server and OS deployment.

Simplify Migration to Windows 10 VDI and App Delivery

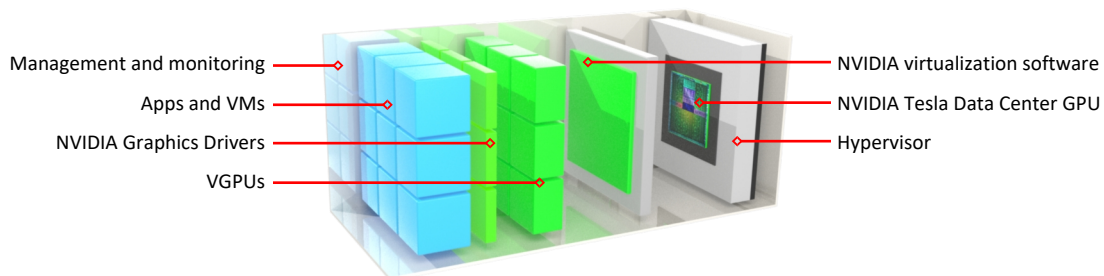
The increased graphics demands of Windows 10 applications drives the need for GPU acceleration to offload server CPUs and to improve the use experience. GPUs also enable organizations to realize VDI benefits for performance workstations with the density and efficiency of the FX2 architecture combined with graphics and compute acceleration.

Software Defined Agility and Flexibility

Incorporating GPUs into PowerEdge FX2 deployments creates a powerful base for a software-defined data center stack of virtualized compute, storage, and networking resources. Together they are ideally suited for workloads that require both CPU and GPU compute resources including IoT, big data analytics, HPC, AI and learning frameworks. NVIDIA Tesla drivers and software support more than [550 GPU-accelerated applications](#).

Using one or more FD332 storage blades is an excellent option for enabling hyperconverged infrastructure (HCI) with dense virtual SAN clusters by combining compute and storage blocks. It can help consolidate applications like Hadoop that require low-cost scale-out storage. It is also a great fit for database-driven centralized software that needs scale-up and scale-out capability.

Software Defined Data Centre



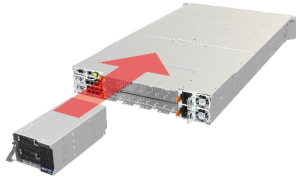
Solution Stack Frameworks

	Virtual Desktop	Application Delivery	Virtual Workstation	Virtual GPU Accelerated Computing	GPU Accelerated Computing
NVIDIA Software	GRID vPC	GRID vAPP	Quadro vDWS	Learning/HPC Framework	Learning/HPC Framework
				Quadro vDWS	Tesla Drivers
Virtualization Software	VMware Horizon Citrix XenDesktop	VMware Horizon APP Citrix XenApp	VMware Horizon Citrix XenDesktop	Optional	Optional
Hypervisor	VMware vSphere Citrix XenDesktop				Optional
GPU Accelerator	1 or 2 DXF-EXP-V modules per FX2s chassis for : 2x PCIe slots per blade: DXF-G-P6 GPU(s), optional low-profiles FPGA/IO card 4x PCIe slots (2 blades max): DXF-G-P6 GPU(s), optional low-profile FPGA/IO cards				
FX2 Blade Server	PowerEdge FC630, FC640 CoreStation VFC630, VFC640				

DXF-EXP-V Series PCIe Expansion Modules

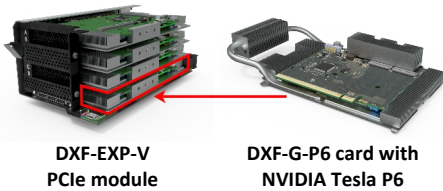


To provide powerful GPU acceleration for demanding workloads, the DXF-EXP-V PCIe expansion module supports multiple GPUs and low-profile PCIe cards. Amulet Hotkey has developed unique GPU accelerator cards for the DXF-EXP-V module in collaboration with NVIDIA.



The solution incorporates advanced design engineering and thermal management to fit up to four GPUs into each DXF-EXP-V module. Two modules in the FX2s chassis PCIe expansion slots support up to eight GPUs for a total of 128GB vRAM with up to 4x dual-socket servers in only 2U of rack space.

GPU accelerated blade server configuration examples:



DXF-EXP-V PCIe module

DXF-G-P6 card with NVIDIA Tesla P6

1x GPU

+ optional LP PCIe card per blade for up to 4 servers

2x GPU

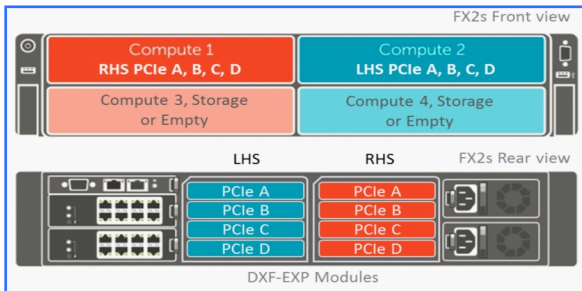
Per blade for up to 4 servers

4x GPUs

Per blade for up to 2 servers¹

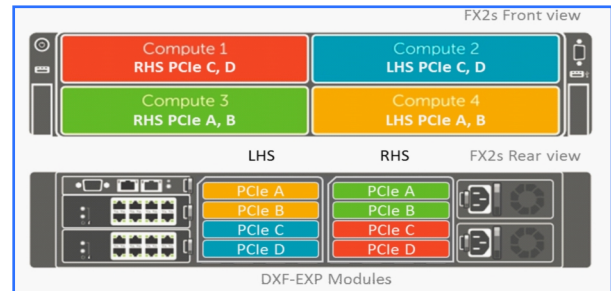
1 - Remaining FX2 bays can support non-GPU accelerated servers or FD332 storage blades

PCIe Slot Mapping



PCIe Slot Mapping with Storage Blades or Manual Configuration

Four PCIe slots can be assigned to a compute blade for up to two blades in an FX2s chassis. Slot reassignment is automatic when using FD332 storage blades in the remaining bays. Alternatively, the CMC can be used to manually reassign PCIe slots.



PCIe Slot Mapping with Computer Blades

When using four compute blades in an FX2s chassis, two PCIe slots are automatically mapped to each blade. No additional configuration is necessary.

Ordering Information

DXF-EXP-V Module Kits	Amulet Hotkey P/N ²	Tesla P6 GPUs	DXF-EXP-V Modules
	KT-DXFV-0003	2	1
	KT-DXFV-0004	4	1
	KT-DXFV-0001	4	2
	KT-DXFV-0002	8	2
PCIe card / PSU Options	Amulet Hotkey P/N	Kit Details	
	DXF-X710 ^{2, 3}	Intel X710 2x 10GbE Converged NIC	
	DXF-QLE2692 ^{2, 3}	Qlogic QLE2692 2x 16Gbps Fibre Channel HBA	
	Dell-450-AGFW ⁴	2x 2400W hot-swap power supply unit for FX2s chassis	

Notes: 2 – Contact us to discuss custom DXF-EXP-V expansion module kit configurations
 3 – Contact us if the low-profile PCIe card you need is not listed
 4 – Dell P/N. Can be ordered as part of Amulet Hotkey Kit KT-FX2S-0001 or from Dell.com

EMEA Sales

+44 (0)20 7960 2400
emeasales@amulethotkey.com

N America & Canada Sales

+1 (212) 269 9300
ussales@amulethotkey.com

LATAM Sales

latamsales@amulethotkey.com

APJ Sales

+61 409 930 884
apsales@amulethotkey.com

Defence and Security

security@amulethotkey.com

Technical Support

eurosupport@amulethotkey.com
ussupport@amulethotkey.com
latamsupport@amulethotkey.com
apsupport@amulethotkey.com



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Related Products



[CoreStation VFC640](#)
14G blade server to refresh FX2s



KT-FX2S-001 FX2s enclosure
upgrade kit for FX2 deployments

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DXF-EXP-V Module Specifications

Form factor:	PCIe card module for Dell EMC PowerEdge® FX2s enclosure Fit up to 2x DXF-EXP-V modules per 2U enclosure	
PCIe slots:	Four PCIe 3.0 x8 expansion slots (mechanically x16) for GPU accelerators and low-profile PCIe cards such as FPGA and IO cards	
	DXF-EXP-V Slot	DXF-G GPU
	Slot A	Yes
	Slot B	Yes
	Slot C	Yes
	Slot D	Yes
		Low-profile Card
		Yes
		Yes ⁵
		Yes
		Yes ^{5, 6}
	<i>Note 5: Maximum height of 100mm above and 1.5mm below the card PCB</i>	
	<i>Note 6: Maximum card length of 153.9mm</i>	
GPU Accelerators:	See DXF-G-P6 GPU card below.	
IO expansion:	Support for low-profile PCIe IO cards: <ul style="list-style-type: none"> DXF-G-X710 Intel X710 (2x 10GbE) DXF-QLE2692 QLogic QLE2692 (2x 16Gbps Fiber Channel) Contact us if the IO card you want is not listed	
Management:	Fully integrated with the FX2s Chassis Management Controller (CMC) and blade server iDRAC for system configuration and lifecycle management	
PCIe Slot Mapping:	The DXF-EXP-V module PCIe slots are automatically mapped by the FX2s to compute blades. This includes automatic PCIe slot re-assignment when storage blades are installed in the FX2s enclosure. Manual PCIe Slot reassignment can be configured using the CMC	
Power / cooling:	Up to 70W per slot for low-profile PCIe cards and up to 90W per slot for Amulet Hotkey GPU cards supplied by the FX2s enclosure	
	For maximum flexibility, Amulet Hotkey recommend using 2400W PSUs (Dell 450-AGFW) in FX2s enclosure with DXF-EXP-V PCIe modules	
	Contact us if the low-profile card you want is above 70W per slot	

DXF-EXP-V Module Specifications

Card Type:	Low-profile PCIe 3.0 x8
GPU:	NVIDIA Tesla P6
GPU Memory:	16GB GDDR5, 256-bit bus width, 192.2 GB/s memory bandwidth
CUDA Cores:	2048
Performance:	Single-precision (FP32) up to 6.169 TFLOPS
vGPU Profiles:	Maximum 16x vGPU instances (1GB Profile) vGPU profiles for 1GB, 2GB, 4GB, 8GB and 16GB
GPU Drivers / Software:	Virtual: NVIDIA Quadro vDWS, GRID vPC/vAPP software Bare-metal: NVIDIA Tesla drivers for HPC applications and compute frameworks
Virtualization:	Virtual Desktop: VMware Horizon, Citrix XenDesktop Application Delivery: VMware Horizon Apps, Citrix XenApp Hypervisor: VMware vSphere, Citrix XenServer
Video Engine:	Hardware-accelerated video engines with support for HVEC (H.264) and AVC (H.265) for video transcoding / remote display protocol acceleration. 2x Encode Engines (NVENC), 1x Decode Engine (NVDEC)
Remote Display Protocols:	Supports multiple remote display protocols including VMware Blast Extreme, Citrix HDX, Mechdyne TGX, Teradici PcoIP
Power:	90W maximum

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Flexible and Efficient Data Center Optimized Solutions!