Pegasus5 R12 / Pegasus5 R12 Pro
Application Note

Optimizing Workflow Efficiency for High-Resolution Media Production

High-capacity HDD and hybrid HDD/NVMe storage over Thunderbolt 5

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PROMISE TAIWAN
Hsinchu, Taiwan
sales@tw.promise.com

PROMISE EUROPE
Eindhoven, The Netherlands
sales@eu.promise.com

PROMISE MEA
Dubai, UAE
sales@mea.promise.com

PROMISE CHINA
Beijing, China
sales@cn.promise.com

PROMISE UNITED STATES
Newark, CA, USA
sales@promise.com

PROMISE INDIA
Mumbai, India
sales@in.promise.com

PROMISE JAPAN
Tokyo, Japan
sales@jp.promise.com

Contact us

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1. Executive Summary

The rapid growth of 4K, 6K and 8K video, multicamera production, visual effects, digital photography and other data-intensive creative workloads has increased the demand for storage that can combine high capacity with sustained performance. For many creators, the storage system is no longer simply a repository for completed projects; it is an active part of the production workflow.

The PROMISE Pegasus5 R12 is designed to address this requirement with a compact 12-bay desktop architecture, Thunderbolt 5 connectivity and PromiseRAID technology. The system supports up to twelve 3.5-inch SATA HDDs and up to 288 TB of raw HDD capacity when configured with 24 TB drives. PROMISE specifies performance of up to 3,000MB/s.
The Pegasus5 R12 Pro expands the architecture into a hybrid 12 + 4 platform, combining twelve 3.5-inch SATA HDD bays with four M.2 2280 NVMe SSD slots. This allows high-capacity HDD storage and high-performance NVMe storage to be used within one desktop enclosure. PROMISE specifies up to 6,000MB/s NVMe performance for mixed workloads.

This application note examines how the Pegasus5 R12 and R12 Pro can be integrated into professional media workflows, including direct-attached editing, high-capacity project storage, hybrid HDD/NVMe workflows and host-based network file sharing. It also presents storage benchmark results from the Pegasus5 R12 using six- and twelve-HDD configurations.

2. The Storage Challenge in Modern Creative Workflows

Professional media workflows generate large files and often require several data-intensive operations at the same time. An editor may need to read multiple video streams while writing project files, render data, cache files or exports. As resolution and project complexity increase, storage must deliver sufficient capacity and throughput without becoming a bottleneck for the workstation.

A practical storage platform should address four areas:

- Capacity — enough space to keep large media libraries and active projects online.
- Performance — sufficient sustained throughput for high-resolution media and large-file transfers.
- Data protection — RAID and drive-management capabilities appropriate for the production environment.
- Workflow flexibility — the ability to support different classes of data, from large media libraries to performance-sensitive active projects.

The Pegasus5 R12 addresses these requirements with a twelve-drive HDD architecture. The Pegasus5 R12 Pro adds an NVMe tier for workflows that benefit from substantially higher storage performance.

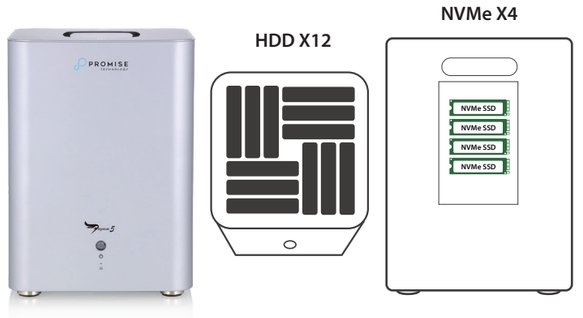
3. Pegasus5 R12 and R12 Pro Overview

Model	Pegasus5 R12	Pegasus5 R12 Pro
General Information		
Form Factor	12-Bay Tower	12 + 4-Bay Hybrid Tower
Drive Support	12 x 3.5" SATA HDD	12 x 3.5" SATA HDD + 4 x M.2 2280 NVMe SSD
MAX Capacity	HDD: 48 TB (4 TB x 12) up to 288 TB (24 TB x	HDD: 48 TB (4 TB x 12) up to 288 TB (24 TB x12) + 4 x NVMe SSD slots, each supporting 1 TB up to 8 TB
Interface type	Thunderbolt™ 5 80 Gbps or USB4 v1/v2 (with PCIe tunneling support)	
Thunderbolt™ Port	Thunderbolt™ 5 ports x 3 (one for host connection, two for downstream daisy chain)	
External Monitor	Downstream Thunderbolt™ 5 port can connect up to three 4K / dual 6K or single 8K monitor	
Power Delivery	85W (Thunderbolt™ host and USB4 host)	
Port Type	USB Type C	
RAID & Features		
RAID Flexibility	RAID 0/1/5/6/10/50/60 (HDD only)	HDD:RAID 0/1/5/6/10/50/60 NVMe: Windows OS: RAID 0/1/5; macOS: RAID 0/1
Performance Use	Up to 3,000 MB/s	Up to 6,000 MB/s NVMe performance for mixed workloads.
Hot Spare*	Yes	
Max LUN	128	
Hot Swap*	Yes	
Software Highlights		
Supported OS	Windows 11 / macOS 15 and above	
Management Tool	WebPAM 5.0, CLI	
Product Specific features	Intelligent Cooling, Drive SMART Health Polling	
Additional Features	Promise Plugin for Adobe® Premiere® Pro, Adobe® Photoshop®	

PROMISE specifies three Thunderbolt 5 ports: one upstream host connection and two downstream ports for daisy-chain connectivity. A downstream Thunderbolt 5 port can also support compatible display configurations, including a single 8K@60Hz display, dual 4K@240Hz displays, or up to three 4K displays, depending on host capabilities and system configuration.

The exact behavior and supported display configurations of a daisy-chain topology should be validated against the host system and connected devices.

Pegasus5 R12 PRO



4. Key Technologies and Workflow Benefits

4.1 Thunderbolt 5 Connectivity

Thunderbolt 5 provides an 80Gbps host interface designed for high-bandwidth storage and other demanding peripherals. For the Pegasus5 R12 series, this interface provides a high-speed connection between the desktop storage system and the workstation while retaining the convenience of a compact external enclosure.

4.2 High-Capacity 12-Bay Design

The twelve 3.5-inch SATA HDD bays provide a large-capacity storage foundation for media libraries, project files, archives and other large datasets. With supported 24 TB HDDs, the R12 platform can scale to 288 TB of raw HDD capacity.

4.3 Hybrid HDD/NVMe Architecture on R12 Pro

The R12 Pro adds four M.2 2280 NVMe SSD slots to the twelve HDD bays. This allows storage resources to be organized according to workload requirements: HDDs can provide high-capacity storage while NVMe SSDs can be assigned to active projects or other workloads that require higher performance.

4.4 PromiseRAID and Data Protection

PromiseRAID provides multiple RAID levels for the HDD tier, allowing users to balance usable capacity, performance and redundancy. On the R12 Pro, the NVMe tier also supports RAID configurations, with supported levels differing between Windows and macOS.

4.5 Predictive Data Migration

PROMISE's Predictive Data Migration (PDM) continuously analyzes drive health and can proactively migrate data when a drive shows signs of potential failure. PDM is intended to reduce exposure to drive failure and complement, rather than replace, a separate backup strategy.

4.6 Drive Monitoring and Serviceability

The platform includes drive health monitoring and hot-swap/hot-spare support for supported 3.5-inch SATA HDDs. These capabilities are designed to help reduce downtime and simplify maintenance in production environments.

5. Installation and Configuration

5.1 Hardware Setup

1. Place the Pegasus5 on a stable surface with adequate airflow around the enclosure.
2. Connect the power cable and turn on the system.
3. Connect the host workstation to the Pegasus5 upstream Thunderbolt 5 port using the Thunderbolt cable.
4. Install and access the WebPAM 5.0 management software and verify the enclosure and installed drives.
5. Create or verify the desired RAID configuration and storage volume before placing production data on the system.

5.2 Thunderbolt Daisy-Chaining

The Pegasus5 R12/R12 Pro provides two downstream Thunderbolt 5 ports for compatible daisy-chain devices. A typical topology connects the workstation to the Pegasus5 upstream port and then connects a downstream port to another compatible Thunderbolt device.

6. Connect the workstation to the Pegasus5 upstream Thunderbolt 5 port.
7. Connect a downstream Thunderbolt 5 port to the next compatible Thunderbolt device.
8. Continue the chain only within the supported topology of the host and connected devices.
9. Validate the complete chain under the intended workload before using it for production.

Pegasus5 R12 / R12 Pro

6. Performance Evaluation

The original test program evaluated the Pegasus5 R12 using twelve-HDD and six-HDD configurations and the Pegasus5 R12 Pro using twelve-HDD and six-HDD configurations with four NVMe SSDs. RAID 0, RAID 5 and RAID 6 were tested on both macOS and Windows over Thunderbolt. The media workload used for the evaluation was 3840 × 2160 at 30fps in ProRes 4444 XQ.

6.1 Test Environment (Pegasus5 R12)

Parameter	macOS Test Platform	Windows Test Platform
Operating system	macOS 16	Windows 11
Host system	MacBook Pro	Gigabyte AI TOP 100 Z890
Processor	Apple M4 Max	Intel Core Ultra 9 285K; NVIDIA GeForce RTX 5090
Application	Final Cut Pro 10.4.4	Not used for storage benchmark
Storage	Pegasus5 R12	Pegasus5 R12
HDD configuration	12 × 24 TB or 6 × 24 TB	12 × 24 TB or 6 × 24 TB
RAID levels	0, 5, 6	0, 5, 6
Video format	3840 × 2160, 30fps, ProRes 4444 XQ	3840 × 2160, 30fps, ProRes 4444 XQ
Benchmark	AJA	Crystal Disk
Interface	Thunderbolt	Thunderbolt

6.2 Measured Results (Pegasus5 R12)

Platform	Drive Count	RAID	Read (MB/s)	Write (MB/s)
Mac	12	0	2,511	2,302
Mac	12	5	2,398	1,697
Mac	12	6	2,277	1,454
Mac	6	0	1,708	1,766
Mac	6	5	1,449	1,440
Mac	6	6	1,150	1,149
Windows	12	0	3,651	3,325
Windows	12	5	1,769	2,513
Windows	12	6	1,627	2,315
Windows	6	0	1,477	1,706
Windows	6	5	1,028	1,419
Windows	6	6	924	1,173

6.3 Test Environment (Pegasus5 R12 Pro)

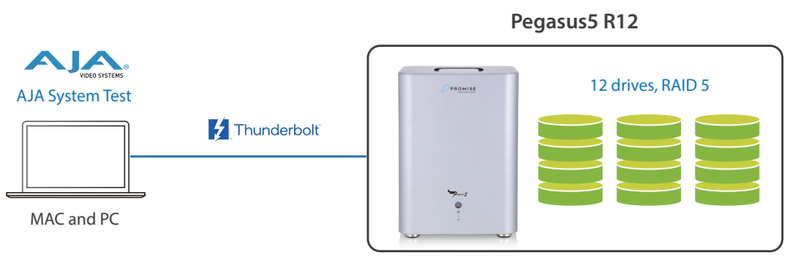
Parameter	macOS Test Platform	Windows Test Platform
Operating system	macOS 16	Windows 11
Host system	MacBook Pro	Gigabyte AI TOP 100 Z890
Processor	Apple M4 Max	Intel Core Ultra 9 285K; NVIDIA GeForce RTX 5090
Application	Final Cut Pro 10.4.4	Not used for storage benchmark
Storage	Pegasus5 R12 Pro	Pegasus5 R12 Pro
HDD configuration	12 × 24 TB or 6 × 24 TB	12 × 24 TB or 6 × 24 TB
NVMe configuration	4 x 4 TB	4 x 4 TB
RAID levels	0, 5, 6	0, 5, 6
Video format	3840 × 2160, 30fps, ProRes 4444 XQ	3840 × 2160, 30fps, ProRes 4444 XQ
Benchmark	AJA System Test	Crystal Disk
Interface	Thunderbolt	Thunderbolt

6.4 Measured Results (Pegasus5 R12 Pro)

Windows NVMe Policies: Better Performance enabled, Enable Write caching on the NVMe devices.

Platform	Drive Count	RAID	HDD Read (MB/s)	HDD Write (MB/s)	NVMe Read(MB/s)	NVMe Write (MB/s)
Mac	12	0	1,900	1,561	6,100	5,437
Mac	12	5	1,873	1,308	6,207	5,457
Mac	12	6	1,705	1,183	6,491	5,589
Mac	6	0	1,547	1,372	6,193	5,441
Mac	6	5	1,399	1,143	6,264	5,456
Mac	6	6	1,142	1,083	6,286	5,448
Windows	12	0	1,619	1,475	4,475	4,636
Windows	12	5	1,780	1,349	4,753	4,656
Windows	12	6	1,740	1,189	5,027	4,848
Windows	6	0	1,357	1,366	4,752	4,648
Windows	6	5	1,208	1,084	5,027	4,725
Windows	6	6	967	935	5,088	4,784

Note: These results are configuration-specific measurements from the test environment described above. They should not be interpreted as guaranteed performance. Storage throughput can vary with drive model, RAID configuration, host hardware, operating system, filesystem, benchmark software, cable, firmware and workload.



7. Application Workflows

7.1 Direct-Attached Storage for Video Editing with Pegasus5 R12

A video production workstation can use the Pegasus5 R12 as direct-attached storage for active media and project files. The large HDD array provides the capacity required for large source libraries, while Thunderbolt 5 provides the high-speed connection between the storage and host.

- 4K, 6K and 8K video editing
- Multicam production
- Post-production and color workflows
- Large project and asset libraries
- Audio production and sample libraries
- Photography and digital-content workflows

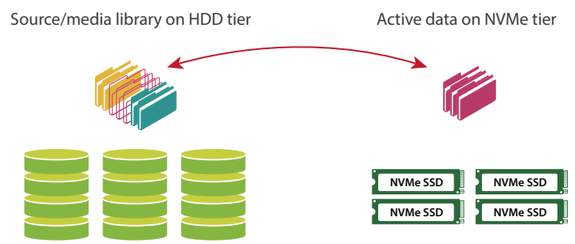
Whether a particular project can be edited without proxies depends on codec, bitrate, number of simultaneous streams, effects, application behavior and workstation capability. These variables should be validated in the target environment.

7.2 Hybrid Editing Workflow with Pegasus5 R12 Pro

The Pegasus5 R12 Pro is designed for workflows that benefit from separating high-capacity data from high-performance data. A production team can use the HDD tier for large media libraries while reserving the NVMe tier for active or performance-sensitive workloads.

Storage Tier	Typical Data	Workflow Role
HDD	Source media, completed projects, large asset libraries	High-capacity primary/nearline storage
NVMe	Active project data or render data	High-performance working tier

The exact placement of data should be determined by the application and workflow. NVMe performance is not automatically transferred to HDD volumes; the benefit comes from intentionally placing performance-sensitive workloads on the NVMe tier.

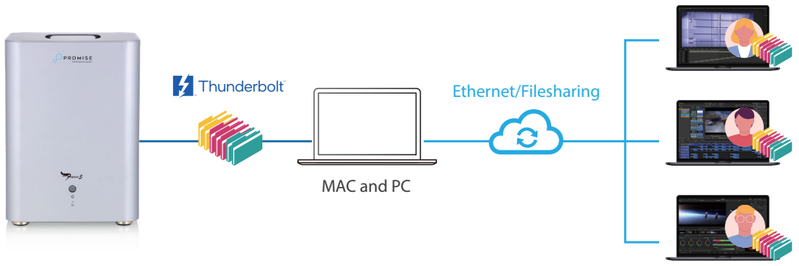


7.3 Host-Based Network File Sharing

The Pegasus5 R12/R12 Pro is a direct-attached storage platform, not a native Ethernet NAS appliance. However, a host computer can share a mounted Pegasus5 volume over a network using its operating system's file-sharing services.

- Connect the Pegasus5 to the primary workstation through Thunderbolt.
- Mount and verify the Pegasus5 volume on the host.
- Enable the operating system's file-sharing service and add the desired Pegasus5 volume or folders.
- Configure user permissions and network access.

In this architecture, the host workstation handles network file sharing. The resulting client performance depends on the host's Ethernet interface, network infrastructure, sharing protocol, filesystem and number of concurrent users.



8. Capacity Planning and Expansion

The Pegasus5 R12's 12-bay design gives production teams the flexibility to scale storage as project requirements grow. A studio can begin with a smaller number of HDDs and add drives as its media library, project volume, and storage requirements increase, subject to the supported RAID configuration and expansion capabilities of the installed firmware and management software.

For example, a small video production studio may initially configure a Pegasus5 R12 with eight 20 TB HDDs, providing 160 TB of raw storage capacity. As the studio takes on larger 4K and 8K projects, additional storage may be required. The remaining four drive bays provide room for future expansion, allowing the system to accommodate up to twelve HDDs and 240 TB of raw capacity using 20 TB drives.

This approach allows the studio to increase capacity within the same physical enclosure rather than replacing the storage system as its requirements grow.

Key Benefits of the 12-Bay Design

- High-Density Storage: The 12-bay enclosure provides substantial storage capacity while maintaining a compact desktop footprint.
- Scalable Capacity: Users can populate available drive bays according to current requirements and expand as storage needs increase, where supported by the selected RAID configuration.
- Thunderbolt 5 Connectivity: High-speed Thunderbolt 5 connectivity provides the bandwidth needed to access large media datasets and transfer content between the Pegasus5 and the host workstation.
- PromiseRAID Technology: Multiple RAID configurations allow users to balance usable capacity, performance, and data protection according to their workflow requirements.
- Serviceability: The drive-bay design simplifies drive installation and replacement, helping reduce maintenance time.
- Workflow Continuity: Expanding within the existing enclosure can help avoid replacing the entire storage platform as the production environment grows.

Expansion Considerations

Before expanding an existing storage configuration, end-users should consider the following:

- Drive Compatibility: Use supported and qualified HDD models. When expanding an existing RAID configuration, follow PROMISE recommendations regarding drive capacity and compatibility.
- RAID Configuration: Expansion capabilities depend on the existing RAID level, pool configuration, firmware, and management software. Verify that the intended expansion operation is supported before making changes.
- Data Protection: Back up critical production data before modifying a RAID configuration, storage pool, or volume.
- Performance Requirements: Adding drives can increase available capacity and may affect aggregate storage performance, but actual performance depends on the RAID level, drive models, workload, and host configuration.
- Pool and Volume Planning: For larger production environments, consider how storage volumes should be organized before deployment. Separate pools or volumes may be useful when different workloads require isolation or different performance characteristics.
- Software and Firmware: Always verify the current WebPAM documentation for the installed firmware and software version before performing pool or volume expansion.

Planning for Future Growth

A 12-bay architecture can help production teams plan storage in stages. A studio may begin with eight HDDs for its current projects and later populate additional bays as its media library grows. This provides a path to increase storage capacity while retaining the same Pegasus5 R12 enclosure, workstation connection, and overall workflow architecture.

The actual usable capacity will be lower than the raw capacity when RAID protection and filesystem overhead are taken into account. The final usable capacity also depends on the selected RAID level and storage configuration.

9. Data Protection and Operational Reliability

Production storage should be designed around both availability and recoverability. RAID can protect against certain drive failures while PDM and drive-health monitoring can help identify problems before a failure occurs. Neither replaces an independent backup.

- Use RAID 5 or RAID 6 when redundancy is required for a multi-drive HDD workload.
- Use hot-spare capability where appropriate for supported HDD configurations.
- Monitor drive health and system alerts as part of normal operations.
- Maintain an independent backup or secondary copy of critical production data.
- Test restoration procedures rather than assuming that RAID alone provides data recovery.

10. Deployment Recommendations

Requirement	Recommended Approach
Large-capacity media library	Pegasus5 R12 with an appropriate HDD RAID configuration
4K/6K/8K editing from high-capacity storage	Pegasus5 R12; validate codec, stream count, RAID and workstation
High-performance active projects plus large capacity	Pegasus5 R12 Pro with HDD and NVMe tiers
Render workloads	Pegasus5 R12 Pro NVMe tier, subject to application and OS support
Team access to a Pegasus5 volume	Use host-based file sharing with a capable workstation and high-speed network
Higher data protection requirement	Select the appropriate PromiseRAID level and maintain independent backup

11. Conclusion

The Pegasus5 R12 and Pegasus5 R12 Pro provide flexible desktop storage architectures for modern professional media workflows. The Pegasus5 R12 combines twelve HDD bays, high-capacity storage and Thunderbolt 5 connectivity in a compact platform designed for demanding creative applications.

The Pegasus5 R12 Pro extends this approach with four M.2 NVMe SSD slots, creating a hybrid storage platform that can combine large-capacity HDD storage with a high-performance NVMe tier. This architecture is particularly useful when large media libraries and performance-sensitive active workloads need to coexist in the same desktop storage platform.

Performance ultimately depends on the complete workflow. Media format, codec, stream count, RAID level, drive model, filesystem, host system and application all influence the result. The benchmark data in this application note demonstrates the performance of the tested R12 configurations, while production deployments should be validated using the intended hardware and workload.