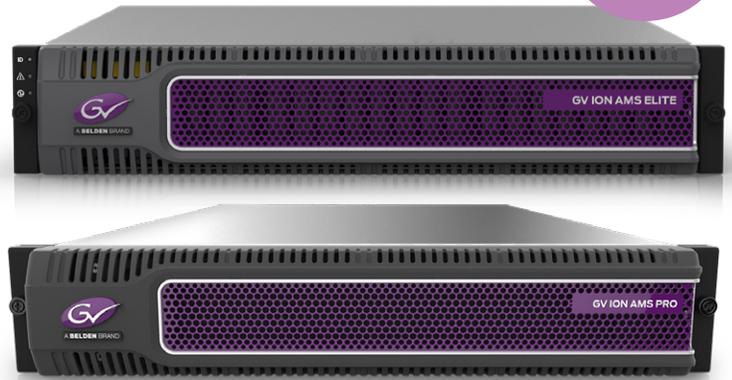


GV ION

Advanced Media Storage (AMS)



The GV ION product portfolio provides the most versatile array of storage solutions, both SAN and NAS technologies, which have been optimized for broadcast production.

GV ION AMS Elite storage from Grass Valley has been customized and honed for the past two decades to maximize performance in video production environments. When coupled with Grass Valley's resilient server platform, our storage solution offers a best-in-class experience both in terms of video quality-of-service as well as system up time.

GV ION AMS Elite SAN Provides:

High Performance: Grass Valley's SAN architecture has been optimized for users who seek high performance video storage and playback workflows where quality of service is a must!

Flexibility: Preconfigured, bulletproof systems can be deployed quickly and easily, reducing the cost associated with storage deployments, which integrate seamlessly with our GV ION AMS Pro NAS storage.

Resiliency: Grass Valley has collaborated with NEC Storage for over two decades to create a powerful SAN storage platform which has been architected with one goal in mind: Unprecedented video performance for Grass Valley customers.

GV ION AMS Elite (K2) storage has been proven in every broadcast environment imaginable over the past two decades. It was designed with the user in mind, specifically for video to be written efficiently and at the speeds necessary for demanding broadcast workflows.

GV ION AMS Pro storage is a culmination of Grass Valley's expertise in broadcast and Dell/EMCs years of industry leading storage hardware and software in the IT sector. By partnering with Dell/EMC, we have been able to create a storage solution that meets the demands of today's modern IT needs — yet powerful, fast and reliable enough to meet the demands of your broadcast production needs.

GV ION AMS Pro NAS Provides:

Agility: IT storage solutions that have been bundled and packaged to enable users to standardize storage technology across an entire facility or organization.

Simplicity: Once racked, a system can be brought online quickly.

Flexibility: Agile platforms that strike the balance between large capacity and high-performance. The EMC Isilon Hybrid platform offers an unprecedented level of channel density while the X-Series storage strikes the balance between cost and performance.

With a platform that is flexible and scalable, GV ION AMS Pro storage is an investment that delivers on performance and scalability. A GV ION AMS Pro system that is deployed today can be expanded and supported throughout the life of the product. There are no limitations restrict the node or drive type.

GV ION AMS Pro vs. Elite

When determining storage needs, multiple factors must be considered during the ordering process. The Grass Valley Configuration Tool will help you model various storage solution options. GV ION AMS Pro and Elite tiers can be customized to meet the following user requirements:

Unique Business Goals

As an organization, are you committed to storage consolidation across the entirety of your facility? If the answer is yes, GV ION AMS could be the right solution.

Scalability

How important is the ability to quickly and easily expand and grow your storage based on future needs? If the answer is yes, both tiers support this but our NAS product offering with *GV ION AMS Pro* has significant scale out advantages.

Quality of Service

Does your workflow require a guaranteed QOS? If the answer is yes, *GV ION AMS Elite* is your preferred solution.

Latency Requirements

If your workflow requires low latency access to record and playback of video files, *GV AMS ION Elite* is a good fit, however GV ION AMS Pro can also be considered.

Other important factors:

Number of play and record channels

Every system is different, depending upon the use case and configuration, systems can be designed to have hundreds of channels or none at all. Knowing what the needs are, short term and long term, can help us effectively design the specific system to meet the current requirements and have room to grow in the future.

Bitrate/codecs, what flavors?

Codecs have different bitrate options. The needs of a commercial playout system utilizing a long GOP codec at 35 Mb/s is different than a production house editing 4K UHD video at 600 Mb/s.

Bandwidth/video requirements

Once the codec requirements have been determined, bandwidth calculations are performed to take into consideration the number of play and record channels, quantity of users, and the amount of file transfers, just to name a few. The GV Configuration tool enables assistance in modeling various scenarios.

Storage/drive density and performance

Rather than thinking of a system in terabytes of storage, it is better to think of it in terms of hours. How many hours of video do you plan to consistently store in your system? How long are storage files expected to stay on the system? How many hours of video storage do you need to operate your system effectively?

Types of GV ION AMS Elite storage:

- Nearline – Proxy & Archive
- Production – Optimized for Enterprise-level Broadcast Video
- On-line – High Performance/High Bandwidth Video: Supporting 3G & Replay

Budget constraints

The delicate balance between price and performance is a constant factor. To make the process simpler and streamlined, Grass Valley has created a tool that allows the sales team to design a system. It will select the right drives, both in terms of speed and size, to allow for the right amount of bandwidth with the right amount of hours required. This creates an efficient and cost effective storage solution that meets all the requirements.

GV ION AMS Pro

GV ION AMS Pro offers limitless expandability combined with scalable performance. Provided on a platform known for IT security while eliminating commonplace infrastructure storage silos.



KEY FEATURES

- | | | |
|--|--|---|
| <p>Simplicity</p> <ul style="list-style-type: none"> • Single volume, single file system architecture • Elimination infrastructure silos, islands of management | <p>Scalability and efficiency</p> <ul style="list-style-type: none"> • Scale performance and capacity predictably • Expands easily from 10s of TB to 10s of PB • Up to 80% storage utilization | <p>Strategic analytics</p> <ul style="list-style-type: none"> • In-place, high-performance data analytics <p>Availability and data protection</p> <ul style="list-style-type: none"> • Highly resilient architecture can withstand multiple simultaneous failures |
|--|--|---|

When determining which ION AMS Pro solution you should consider, Grass Valley should always be included in your discussions. Below is a high-level characterization of our ION AMS Pro packages.

SPECIFICATIONS

ION AMS H600 Specifications

Chassis capacity*1:
 600 GB SAS: 72 TB
 1.2 TB SAS: 144 TB

SAS drives (2.5" 512N) per chassis: 120

Number of nodes per chassis: 4

ECC memory (per node): 256 GB

Front-end networking (per node): 2 x 40 GbE (QSFP+)

Typical power consumption @ 240V (per chassis): 1700 Watts (@25°C)

Maximum power consumption @ 240V (per chassis): 1990 Watts

Typical thermal rating: 5840 BTU/hr

ION AMS H500 Specifications

Chassis capacity: 120, 240, 480 TB chassis

HDD Drives (3.5") per chassis: 60

Number of nodes per chassis: 4

ECC memory (per node): 128 GB

Front-end networking (per node): 2 x 10 GbE (SFP+ or twin-ax copper)

Typical power consumption @ 240V (per chassis): 1330 Watts (@25°C)

Maximum power consumption @ 24V (per chassis): 1910 Watts

Typical thermal rating: 4,540 BTU/hr

ION AMS H400 Specifications

Chassis capacity: 120, 240, 480 TB chassis

HDD Drives (3.5") per chassis: 60

Number of nodes per chassis: 4

ECC memory (per node): 64 GB

Front-end networking (per node): 2 x 10 GbE (SFP+ or twin-ax copper)

Typical power consumption @ 240V (per chassis): 1120 Watts (@25°C)

Maximum power consumption @ 240V (per chassis): 1560 Watts

Typical thermal rating: 3,800 BTU/hr

ION AMS H600/H500/H400 Environmental Specifications

Power supply:

Isilon H400 and Isilon H500: Dual-redundant, hot-swappable 1050W (low line) 1100W (high line) power supplies with power factor correction (PFC); rated for input voltages 90-130 VAC (low line) and 180-264 VAC (high line)

Isilon H600: Dual-redundant, hot-swappable 1450W power supplies with power factor correction (PFC); rated for input voltage 180-265 VAC (optional rack mount step-up transformer for 90-130 VAC input regions)

Operating environment:

Compliant with ASHRAE A3 data center environment guidelines

Dimensions:

Height: 7" (17.8 cm)
 Width: 17.6" (44.8 cm)
 Depth (front NEMA rail to rear 2.5" SSD cover ejector): 35.8" (91.0 cm)
 Depth (front of bezel to rear 2.5" SSD cover ejector): 37.6" (95.5 cm)

Weight:

ION AMS H600: 215 lbs. (97.5 kg)
 ION AMS H500: 250 lbs. (113.4 kg)
 ION AMS H400: 245 lbs. (111.1 kg)

Minimum service clearances:

Front: 40" (88.9 cm), rear: 42" (106.7 cm)

ION AMS X210 Specifications

Typical power consumption @ 100V: 400 Watts
Typical power consumption @ 240V: 400 Watts
Typical thermal rating: 1,370 BTU/hr

ION AMS X210 Environmental Specifications

Front-end networking: 2x 1 GbE Ethernet and 2x 10 GbE (SFP+ or Twinax copper)

Power supply: Dual-redundant, hot-swappable 650W power supplies with power factor correction (PFC)

Operating environment: 50° F to 95° F (10° C to 35° C), 5% to 95% relative humidity, non-condensing

Dimensions: Height: 3.48" (8.8 cm), Width: 18.87" (47.9 cm), Depth: 28.5" (72.4 cm)

Weight: 61 lbs (27.7 kg)

Minimum Service Clearances

Front: 35" (88.9 cm), rear: 14" (35.6 cm)

*1 Usable capacity will be lower than the raw capacity reflected in this specification sheet.

ORDERING

The *ION AMS H600* is the Gen 6 storage best characterized as *EXTREME DENSITY/MID CAPACITY/HIGH PERFORMANCE*. The H600 comes with the option of 600 GB or 1.2 TB SAS drives. The compute power per node is very high, with 2.4 GHz 14 Core CPU and 256 GB of RAM. The H600 includes front end connections of 40 GbE. All Grass Valley bundles are turnkey solutions that include the *SmartConnect* policy-based client failover with load balancing feature.

Workflows:

- Ingest/Playout
- Uncompressed Editorial
- Color Grading, Finishing

AMS-H600-4N-600G

EMC Isilon H600 4 Node Cluster with 600 GB Drives

AMS-H600-4N-1T

EMC Isilon H600 4 Node Cluster with 1 TB Drives

AMS-H600-6N-600GB

EMC Isilon H600 6 Node Cluster with 600 GB Drives

AMS-H600-6N-1T

EMC Isilon H600 6 Node Cluster with 1 TB Drives

AMS-H600-8N-600GB

EMC Isilon H600 8 Node Cluster with 600 GB Drives

AMS-H600-8N-1T

EMC Isilon H600 8 Node Cluster with 1 TB Drives

AMS-H600-10N-1T

EMC Isilon H600 10 Node Cluster with 1 TB Drives

The *ION AMS H500* is the Gen 6 workhorse of video storage best characterized as *HIGH CAPACITY/OPTIMIZED PERFORMANCE*. The H500 comes with the option of 2 TB, 4 TB or 8 TB SATA drives. The compute power per node is high, with 2.2 GHz 10 Core CPU and 128 GB of RAM. The H500 includes dual front end connections of 10 GbE. All Grass Valley bundles are turnkey solutions that include the *SmartConnect* policy-based client failover with load balancing feature.

Workflows:

- Compressed Editorial
- Conform
- Workhorse Media Storage

AMS-H500-4N-2T

EMC Isilon H500 4 Node Cluster with 2 TB Drives

AMS-H500-4N-4T

EMC Isilon H500 4 Node Cluster with 4 TB Drives

AMS-H500-4N-8T

EMC Isilon H500 4 Node Cluster with 8 TB Drives

AMS-H500-6N-2T

EMC Isilon H500 6 Node Cluster with 2 TB Drives

AMS-H500-6N-4T

EMC Isilon H500 6 Node Cluster with 4 TB Drives

AMS-H500-6N-8T

EMC Isilon H500 6 Node Cluster with 8 TB Drives

AMS-H500-8N-2T

EMC Isilon H500 8 Node Cluster with 2 TB Drives

AMS-H500-8N-4T

EMC Isilon H500 8 Node Cluster with 4 TB Drives

AMS-H500-8N-8T

EMC Isilon H500 8 Node Cluster with 8 TB Drives

AMS-H500-10N-2T

EMC Isilon H500 10 Node Cluster with 2 TB Drives

AMS-H500-10N-4T

EMC Isilon H500 10 Node Cluster with 4 TB Drives

AMS-H500-10N-8T

EMC Isilon H500 10 Node Cluster with 8 TB Drives

The *ION AMS H400* is another option of Gen 6 EMC storage best characterized as *HIGH CAPACITY/OPTIMIZED PERFORMANCE*. The H400 comes with the option of 2 TB, 4 TB or 8 TB SATA drives. The compute power per node is medium, with 2.2 GHz 4 Core CPU and 64 GB of RAM. The H400 includes dual front end connections of 10 GbE. All Grass Valley bundles are turnkey solutions that include the *SmartConnect* policy-based client failover with load balancing feature.

Workflows:

- Compressed Editorial
- Conform
- Workhorse Media Storage

AMS-H400-4N-2T

EMC Isilon H400 4 Node Cluster with 2 TB Drives

AMS-H400-4N-4T

EMC Isilon H400 4 Node Cluster with 4 TB Drives

AMS-H400-4N-8T

EMC Isilon H400 4 Node Cluster with 8 TB Drives

AMS-H400-6N-2T

EMC Isilon H400 6 Node Cluster with 2 TB Drives

AMS-H400-6N-4T

EMC Isilon H400 6 Node Cluster with 4 TB Drives

AMS-H400-6N-8T

EMC Isilon H400 6 Node Cluster with 8 TB Drives

AMS-H400-8N-2T

EMC Isilon H400 8 Node Cluster with 2 TB Drives

AMS-H400-8N-4T

EMC Isilon H400 8 Node Cluster with 4 TB Drives

AMS-H400-8N-8T

EMC Isilon H400 8 Node Cluster with 8 TB Drives

The *ION AMS X210* is the Gen 5 storage best characterized as *LOW CAPACITY/HIGH PERFORMANCE*. The X210 comes with the option of 1 TB, 2 TB or 4 TB SATA drives. The compute power per node is in the mid-range, with 2.2 GHz 4 Core CPU and 48 GB of RAM. The X210 includes front end connections of 10 GbE. All Grass Valley bundles are turnkey solutions that include the *SmartConnect* policy-based client failover with load balancing feature.

Workflows:

- Ingest/Playout
- Basic Media Storage

AMS-X210-3N-1T

EMC Isilon X210 3 Node Cluster with 1 TB Drives

AMS-X210-3N-1TN

EMC Isilon X210 3 Node Cluster with 1 TB Drives, no SSDs

AMS-X210-3N-2T

EMC Isilon X210 3 Node Cluster with 2 TB Drives

AMS-X210-3N-4T

EMC Isilon X210 3 Node Cluster with 4 TB Drives

GV ION AMS Elite



Purpose-built storage for high performance and efficiency with a proven track-record of dependability and quality of service.

KEY FEATURES

Stability

- Long track record of stable, dependable performance
- Maintains open-storage technology supporting industry standards

Quality-of-Service

- Built-in QOS with dynamic-bandwidth allocation guarantees available video/audio bandwidth while sharing the rest for edit clients and file transfers
- Redundant components include hot-swappable power supplies, fans, disk drives, RAID controllers, mirrored system drives

Workflow Flexibility

- Multiple options to meet the exact requirements for online, production and near line storage
- Storage supports 10k RPM SAS drives for highest-performance online storage or 7.2k SAS drives for lowest cost/GB of storage

High Performance — Designed/Purpose-built for Video

- Block-based storage writing for higher performance and efficient usage
- High bandwidth connectivity

Eco-friendly Energy Saving Technology

- Lower-power CPU, autonomous control, high temperature environments

The GV Configuration tool should be used to determine any system configuration containing or using GV ION AMS Elite. The following is a brief overview of the GV ION AMS Elite ordering options.

Three classes of storage allow a GV ION Elite system to be configured and tailored for specific business needs and budgets.

Online	Production	Nearline
Very High Performance	Balanced Performance/Capacity	High Capacity
Best Price/Performance	Balanced Price/Capacity/Performance	Best Price/Capacity
Best for Ingest & On-Air Playout	Best for Ingest & Production Editing	Best for Quick-Access-Archive

SPECIFICATIONS

Server Chassis Specifications

Power requirements:

Voltage: 110/220V
Frequency: 50/60 Hz
Consumption: 670 W

Dimensions and weight:

Height: 1 RU, 43 cm (1.7 in.)
Width: 45 cm (17.6 in.)
Depth: 77 cm (30.4 in.)
Weight: 16.3 kg (35.8 lbs.)

Environmental:

Operational temperature: 10°C to 35°C (50°F to 95°F)
Operating relative humidity: 20% to 80%
Operating maximum vibration: 0.25G
Operating altitude: -16m to 3,048m (-50 ft. to 10,000 ft.)

Redundancy:

System drives: Yes
Power supplies: Yes
Cooling/fans: Yes

10 Gb/s iSCSI ports: 1 on K2 iSCSI servers

10 Gb/s FTP/CIFS ports: 1 on FTP/NAS heads

1 Gb/s FTP/CIFS ports: 1 on K2 iSCSI servers

8 Gb/s Fibre Channel ports: 2

RAID Chassis Specifications

Power requirements:

Voltage: 110-240 VAC ±10%
Frequency: 50/60 Hz
Consumption: 660 VA/640W
Primary chassis power: 2,118 BTU/W
Expansion chassis power: 1,470 BTU/W

Dimensions and weight:

Height: 2 RU, 86 cm (3.4 in.)
Width: 44 cm (17.5 in.)
Depth: 54 cm (21.3 in.)
Weight with 24 drives:
Main chassis: 31 kg (68 lbs.)
Expansion chassis: 29 kg (64 lbs.)

Environmental:

Operational temperature: 5°C to 40°C (41°F to 104°F)
Non-operating temperature: -10°C to 60°C (14°F to 140°F)
Operating relative humidity: 10% to 80%
Non-operating relative humidity: 5% to 80%
Operating maximum vibration: 0.25G

Redundancy:

Power supplies: Yes
Cooling/fans: Yes
Controllers: Optional
Fibre Channel interface: 2x 8 Gb/s ports

Drives per chassis:

12x 3.5 inch drives per chassis for production and nearline storage with 7 expansion chassis. Total drives=96
24x 2.5 inch drives per chassis for online and direct attached storage with 3 expansion chassis. Total drives=96

Total drives per controller: 144

Expansion chassis per controller: 11

Cache memory: 4 GB

Bandwidth:

Total: 100-800 MB/s
FTP/CIFS: 100 MB/s

ORDERING

The first step in the process to select a drive for an online, nearline or production system. Two options exist:

K2-SVR-XXX

K2 Server with 10 Gb iSCSI port for use in online and production systems

K2-SVR-NH10GE

K2 Server with 10 Gb FTP port for use in online, production, and nearline systems

Next, a GV ION AMS Elite chassis must be selected; the following options are available for online, nearline or production systems:

Online**K2-ONL3-xxxx-Ry-RSP**

Redundant single controller primary chassis: Used for building redundant systems with a single primary controller (i.e., a L10-L30 style system).

K2-ONL3-xxxx-Ry-RMP

Redundant multiple controller primary chassis: Used for building redundant systems with multiple primary controllers (i.e., a L40 style system).

K2-ONL3-xxxx-Ry-EXP

Expansion chassis: Used for adding more drives to either of the configurations above. Up to 11 expansion chassis can be added behind a primary chassis.

Production**K2-PR03-xxxx-Ry-RSP**

Redundant single controller primary chassis: Used for building redundant systems with a single primary controller (i.e., a L10-L30 style system).

K2-PR03-xxxx-Ry-RMP

Redundant multiple controller primary chassis: Used for building redundant systems with multiple primary controllers (i.e., a L40 style system).

K2-PR03-xxxx-Ry-EXP

Expansion chassis: Used for adding more drives to either of the configurations above. Up to 11 expansion chassis can be added behind a primary chassis.

Nearline**K2-NL3-xxx-Ry-RSP**

Redundant single controller primary chassis: Used for building redundant systems with a single primary controller (i.e., a L10-L30 style system).

K2-NL3-xxx-Ry-RMP

Redundant multiple controller primary chassis: Used for building redundant systems with multiple primary controllers (i.e., a L40 style system).

K2-NL3-xxx-Ry-EXP

Expansion chassis: Used for adding more drives to either of the configurations above. Up to 11 expansion chassis can be added behind a primary chassis.

GLOBAL SERVICES

Effectively including servers, storage and media I/O within a complete live, playout or news solution depends on meeting specific workflow and media infrastructure needs. This includes configuring the individual products to function as a solution; integrating with third-party control, management, operations and business systems; and meeting the bandwidth, transfer and format flexibility requirements of today's complex media environments. **Grass Valley Global Services** provides the expertise and experience to help media professionals define requirements, design solutions and implement world-class, file-based facilities.

Professional Services

System functionality and performance tuning requires understanding user requirements. The ability to specify technical needs, required interfaces, bandwidth and workflow needs requires an in-depth knowledge of both the technology and the environment. Grass Valley Professional Services includes systems engineers with among the world's highest level of expertise. However, project success requires more than technical knowledge. To complete the picture, Grass Valley provides expert project management to capture specifications, plan resources, schedule and budget. The combined professional services team has the competencies and experience to insure a successful implementation.

Commissioning

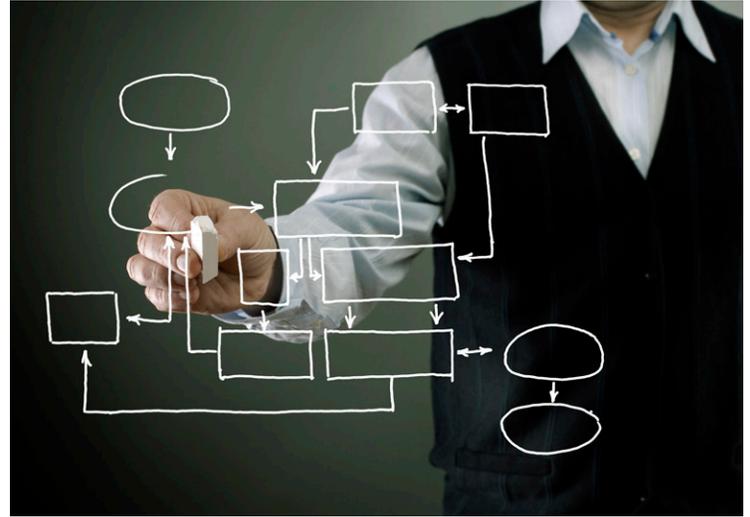
Grass Valley insures the best use of K2-based systems by personally handling the initial setup and commissioning. Field engineers have the experience, knowledge and skills necessary to bring a variety of systems to life—both as product sets, and in the broader context of complete solutions.

Training

Operational and technical training set the foundation for success. Our trainers are experienced in broadcast and in the operational and technical nuances of different K2-based deployments. On-site training is available to bring users up to speed as quickly as possible.

Support Agreements

Uptime, risk and financial predictability are the hidden variables in total cost of ownership. The ability to manage these is what makes support agreements cost-effective tools for business optimization. Recording, playback and playout equal revenue: downtime, missed commercial spots, slow performance and playout errors have severe financial impacts. Elite Support Agreements are designed for these critical environments where very high uptime and quick problem resolution is required. They provide 24x7 technical phone support, call center prioritization, service level objectives, software updates/upgrades and advance parts exchange. Elite Support Agreements insure that users have both operational efficiency and financial predictability.



GLOBAL SERVICES PROVIDES:

- Unequalled depth of industry knowledge and technical expertise
- Over 50 years of worldwide experience
- Complete set of services:
- Strategic advice
- System architecture
- Workflow analysis and design
- Project management
- Integration and implementation
- Performance optimization
- Technical and operational training
- Educational services
- Address today's challenges and prepare for tomorrow's opportunities

GVB-2-0801B-EN-DS



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