![Grass Valley logo](GV Grass Valley)

AMPP Edge Agile Compute Node

Scalable I/O and processing nodes for Grass Valley's Agile Media Processing Platform.

AMPP® Edge provides the on-prem-ise I/O and compute resources for AMPP applications as part of the GV Media Universe workflows.

AMPP Edge is a turnkey Linux Ubuntu server perfect for AMPP customers requiring signal contribution and transmission in and out of the AMPP SaaS platform, securely and with the lowest latency possible across any network. Optionally, AMPP Edge can run on the Windows Server OS platform.

In addition, AMPP Edge offers the ability to host various AMPP appli-cations such as Flow Monitors, Clip Players, Multiviewers, Recorders, Master Control, Replay, Switch-ers and more, enabling production and broadcast operations from anywhere.

AMPP Edge enables remote view-ing using the AMPP Flow Monitors to stream sources anywhere to an internet browser on a PC. This allows for low latency and secure streaming of multiviewer outputs from truck/ venue, or camera feeds to producers in remote locations.

AMPP Edge is available in three models:

- GVAMPP-HW-STD
- GVAMPP-HW-XL-4000
- GVAMPP-HW-XL-5000

All models offer similar features and functions, and they differ only in their compute capacity and hardware specifications.

The STD version is rackmount server for installation in facilities, trucks and flypacks equipped with racks — it offers redundant power supplies and RAID-1 SSDs. The XL version is a 2 RU version for the most demand-ing applications like Alchemist® Live X and K-Frame™ CS X. The XL is also available with up to 2 I/O expansion cards SDI or ST 2110.

AMPP Edge offers SDI and SMPTE ST 2110/ST 2022-6/7 IP I/O options for signal acquisition and transmission up to UHD formats. IP routing is com-pliant with NMOS IS-04 and IS-05.

Key Features

- Turnkey servers for AMPP customers managed by Grass Valley® DevOps team
- 1 RU and 2 RU rackmount or standalone versions
- Available with redundant power supplies and RAID file system
- SDI and IP interfaces for signal contribution or transmission
- Supports UHD and HDR
- IP interface compliant to SMPTE ST 2110, ST 2022-6/7 and NMOS IS-04/IS-05
- Low latency and secure streaming to and from AMPP SaaS platform
- Supports RIST and SRT ARQ streaming

AMPP Edge Use Cases

AMPP Edge for Remote Monitoring

In the context of remote working, a simple use case of an AMPP Edge is to stream local sources, from a venue or an outside broadcast (OB) truck, to a tablet or PC with just a web browser and an internet connection. For example, multiviewer outputs are acquired from the OB truck and streamed to production staff members anywhere in the world, which allows them to participate in the production without being physically present.

- Production-grade monitoring experience:
  - High quality (full HD resolution)
  - Low latency (as low as 2-3 frames)

- Accessible via standard home internet connection:
  - Low bandwidth (~5 Mb/s)
  - Secured with encryption and authentication
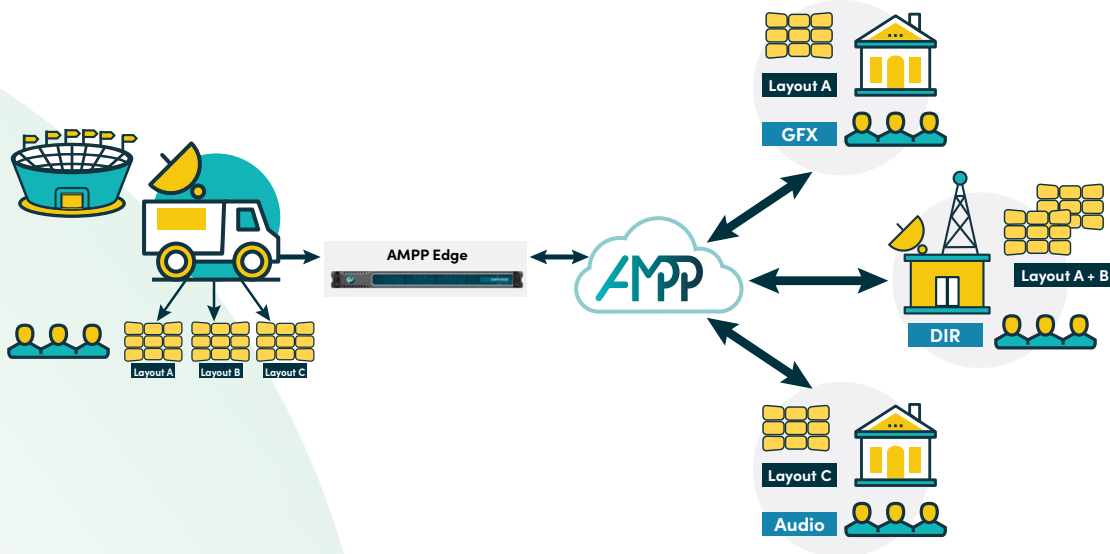
## AMPP Edge for Global Routing

Once a signal is acquired locally using an AMPP Edge, it can be routed to any other AMPP Edge anywhere in the world, or to an AMPP cloud instance running on cloud infrastructure providers. Once the signal reaches its destination, it is delivered back locally as an SDI or IP source. This easily accomplished using the AMPP routing service. Local signals can be acquired and delivered in SDI or IP (SMPTE ST 2110, SMPTE ST 2022-6/7, NDI, MPEG-TS and more).

- Intelligent timing: outputs from multiple locations all co-timed

- Low latency: Edge-Cloud-Edge round trip in less than 1 second

- Easy connectivity: automatically routes streams across multiple networks

- Streams include video, all audio channels and the complete ancillary data
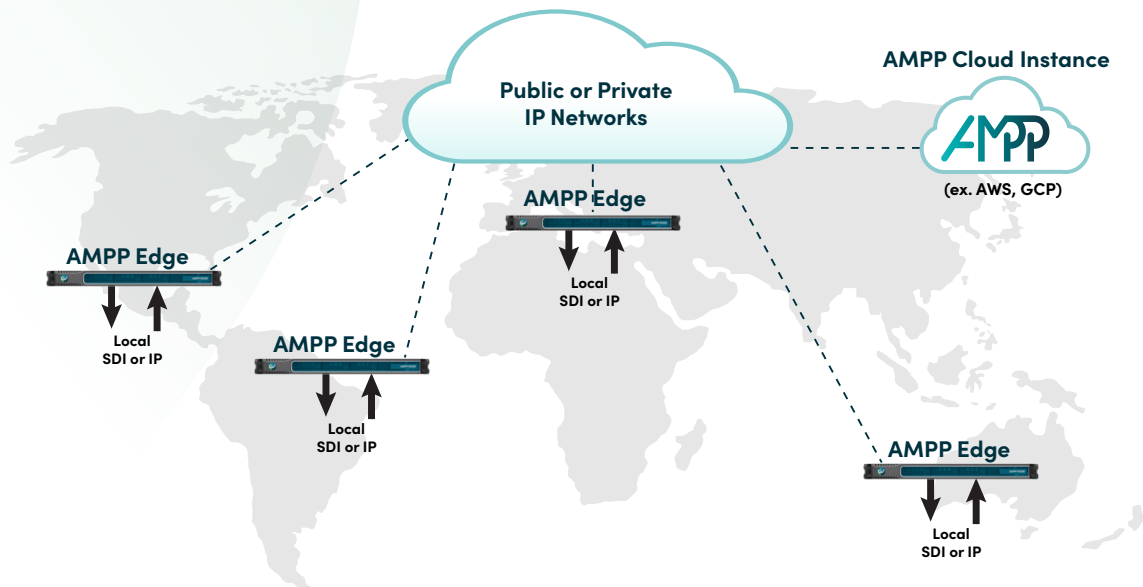
AMPP Edge for Contribution

AMPP supports all common local input and output formats including SMPTE ST 2110, NDI and SDI for easy connecting to your existing devices. Global inputs and outputs allow you to stream between different AMPP fabrics and lets you choose the best possible transport for low-latency and high-quality streaming. Supporting RIST and SRT for reliable transport even over public Internet, AMPP gives you a wide variety of profiles to fit your needs.
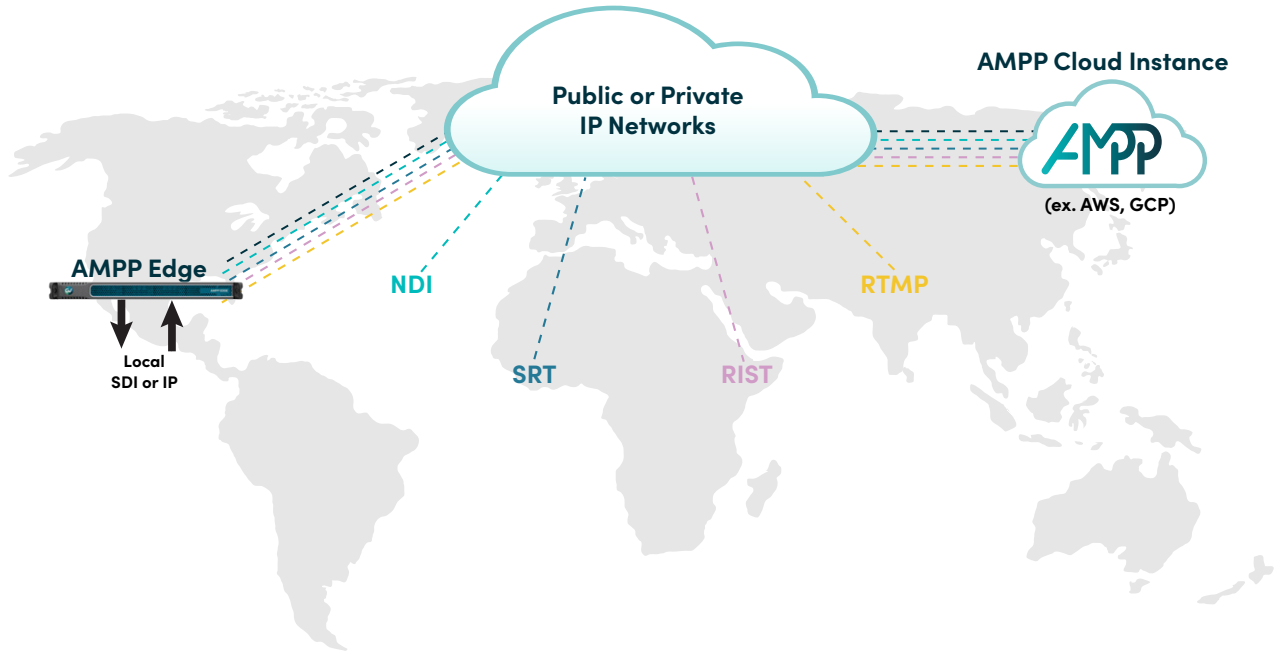
Spin Up AMPP Processing Applications

In addition to signal I/O and contribution, an AMPP Edge offers on-premise compute resources to run AMPP Applications: master control or live production switcher, audio mixer, graphics and more!

Easily configure and spin up a complete media worfklow, including built in live monitoring with flow monitors and multiviewers.
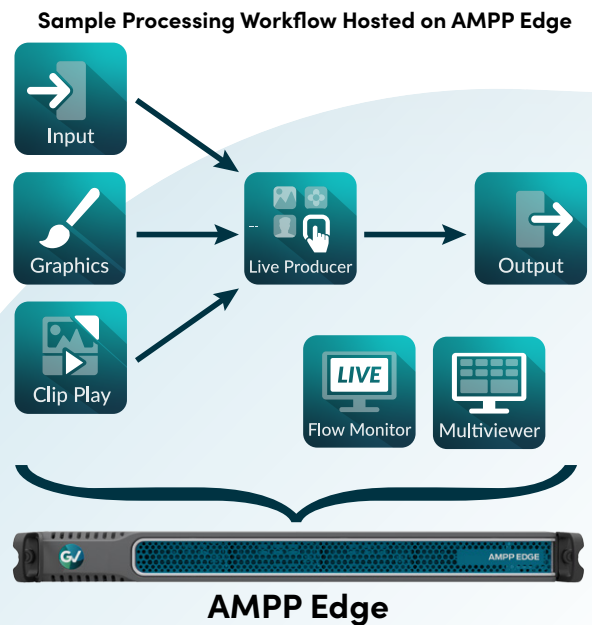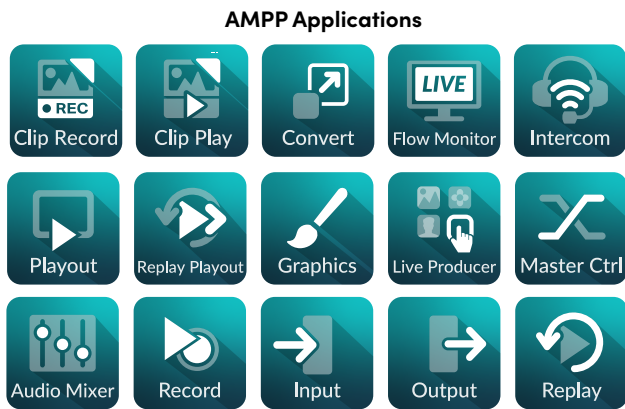
AMPP Grid

AMPP Grid provides data center scalability by allowing multiple nodes to work in unison as a single pool of compute. The total I/O of the system grows as more AMPP Edge devices are added. Systems connected with AMPP Grid can grow incrementally, adding a node at a time to effectively manage cost. AMPP Grid can be used with Linux OS only. To build a system with AMPP Grid in different locations, SMPTE ST 2110 links between those locations are required.
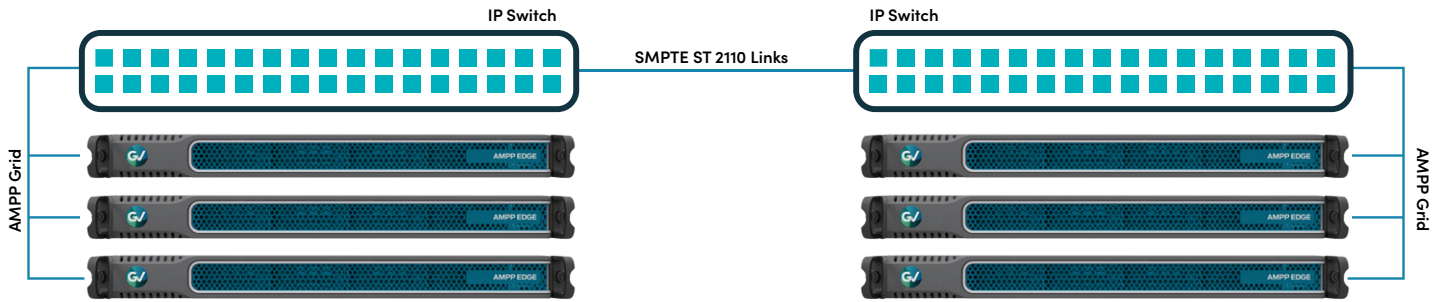
Specifications

I/O

SDI with EC9735 expansion option:

8x SD/HD/3G-SDI configurable inputs or outputs HD-BNC connectors

- 3G-SDI Level A (SMPTE ST 425-1 Level A Mapping)
- 3G-SDI Level B-DL (SMPTE ST 425-1 Level B Dual-Link Mapping)
- 3G-SDI Level B-DS (SMPTE ST 425-1 Level B Dual-Stream Mapping)
- Quad Link 3G-SDI (SMPTE ST 425-5)
- HD-SDI (SMPTE ST 292)
- SD-SDI (SMPTE ST 259)

IP with EC9733/EC9734 expansion option:

- Dual 10G/25G SFP (EC9733) or Dual 100G QSFP (EC9734)
- SMPTE ST 2022-6
- SMPTE ST 2022-7
- SMPTE ST 2110-20 uncompressed video over IP
- SMPTE ST 2110-30 PCM audio over IP
- SMPTE ST 2110-40 ancillary data over IP
- NMOS IS-04 and IS-05 discovery, registration and connection management
- SMPTE ST 2059 PTP synchronization

WAN/LAN transport:

- SMPTE ST 2022-2/MPEG-TS
- RIST/TR-06 Basic and Main Profile
- SRT
- RTMP(S)
- NDI

Encryption and protection:

- Flex-FEC
- DTLS-SRTP encryption

Video codecs:

- AVC/H.264: 4:2:0 or 4:2:2, 8- and 10-bit
- HEVC/H.265: 4:2:0 8- and 10-bit

Audio codecs:

- AAC
- Opus

Video Formats

Resolution: 480 (NTSC), 576 (PAL), 720 (HD), 1080 (full HD), 2160 (UHD)

Scan: Interlaced or progressive

Frame Rate (Hz): 23.97, 24, 25, 29.97, 50, 59.94

SDI I/O:

- (3G Level A) 1080p50/59.94
- (UHD quad-link) 2160p59.94 and 2160p50

Audio

SDI and SMPTE ST 2110/ST 2022-6: Up to 16 tracks per channel

Input: 48 kHz, 16- or 24-bit digital audio

Reference Genlock (with EC9730/EC9732 options)

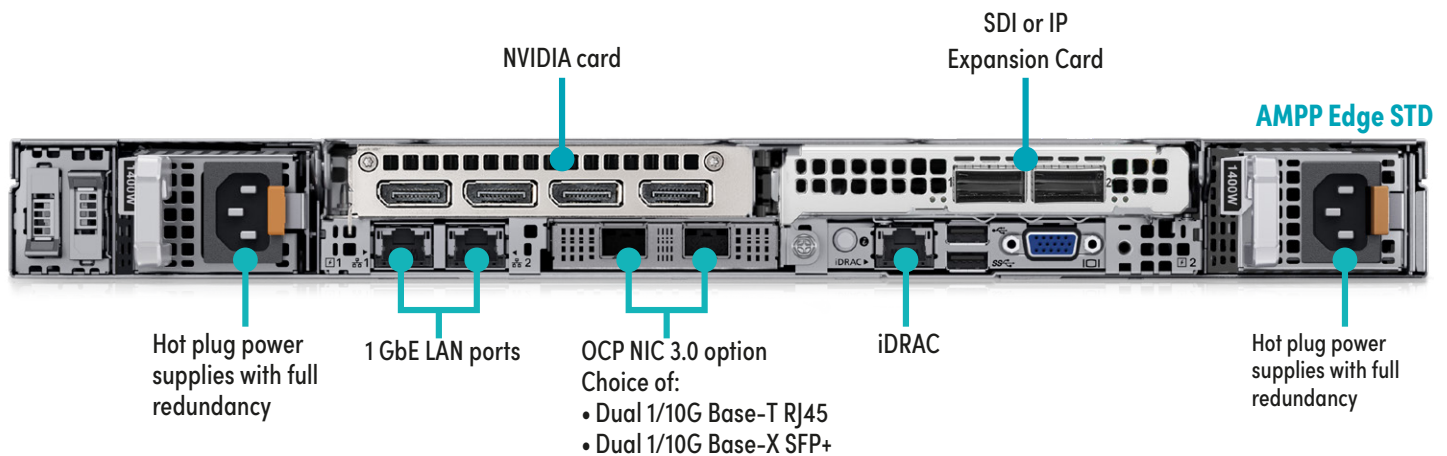Blackburst analog and tri-level sync

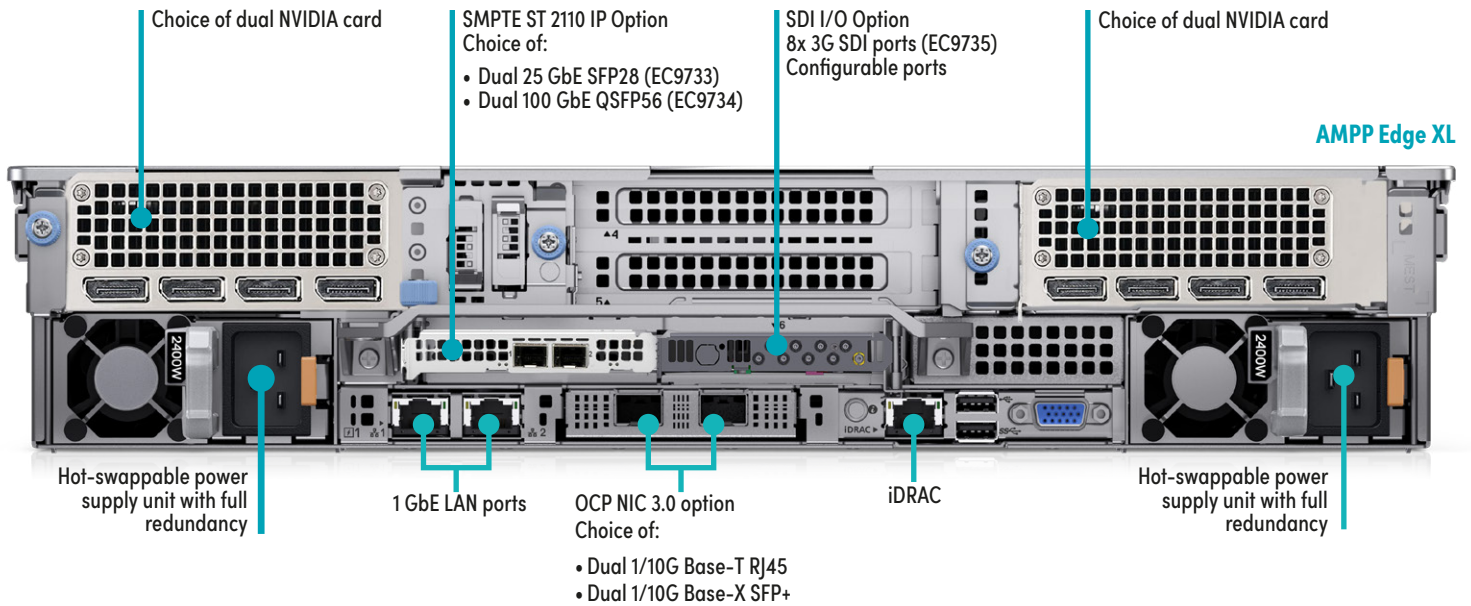Single DIN 1.0/2.3 connector

Supported on-premise I/O formats:
- SDI (with EC9735)
- SMPTE ST 2110 with NMOS IS-04/05 support (with EC9733/EC9734)
- SMPTE ST 2022-6/7 (with IP expansion option)
- NDI, including fill & key

Codecs and wrappers:
- H.264, H.265
- SRT
- RIST
- Zixi
- And more!

NVIDIA card

SDI or IP Expansion Card

AMPP Edge STD

Hot plug power supplies with full redundancy

1 GbE LAN ports

OCP NIC 3.0 option
Choice of:
- Dual 1/10G Base-T RJ45
- Dual 1/10G Base-X SFP+

iDRAC

Hot plug power supplies with full redundancy

Choice of dual NVIDIA card

SMPTE ST 2110 IP Option
Choice of:
- Dual 25 GbE SFP28 (EC9733)
- Dual 100 GbE QSFP56 (EC9734)

SDI I/O Option
8x 3G SDI ports (EC9735)
Configurable ports

Choice of dual NVIDIA card

AMPP Edge XL

Hot-swappable power supply unit with full redundancy

1 GbE LAN ports

OCP NIC 3.0 option
Choice of:

- Dual 1/10G Base-T RJ45
- Dual 1/10G Base-X SFP+

iDRAC

Hot-swappable power supply unit with full redundancy

Ordering

AMPP Edge Nodes

GVAMPP-HW-STD

AMPP Edge — GV turnkey rack servers for HD/UHD I/O and edge processing workflows. Linux Ubuntu OS-based. Includes NVIDIA graphics card. Requires either EC9735 for SDI workflows or EC9733/EC9734 for SMPTE ST 2110 IP workflows.

GVAMPP-HW-XL-4000

AMPP Edge — GV turnkey server for advanced AMPP I/O and edge processing workflows. Linux Ubuntu OS-based. Includes two NVIDIA GPUs. Requires either EC9735 for SDI workflows or EC9733/EC9734 for SMPTE ST 2110 IP workflows.

GVAMPP-HW-XL-5000

AMPP Edge — GV turnkey server for advanced AMPP I/O and edge processing workflows. Linux Ubuntu OS-based. Includes two high-performance NVIDIA GPUs. Requires either EC9735 for SDI workflows, or EC9733/EC9734 for SMPTE ST 2110 IP workflows.

Optional Windows Server OS

GVAMPP-OS-WIN

AMPP Edge Operating System — Windows Server

AMPP Edge I/O Options

EC9735

SDI expansion card — Deltacast video card (PCI-express). Provides 8 SDI ports independently configurable as input or output.

EC9733

IP expansion card — ConnectX-6 NIC — Dual 10G/25G NVIDIA/Mellanox IP interface card with SFP+ interfaces. Requires SFP-10G or SFP-25G (Must use 25G SFP for UHD). Includes Rivermax license and silver 1 year support.

EC9734

IP expansion card — ConnectX-6 NIC — Dual 100G NVIDIA/Mellanox IP interface card with QSFP interfaces. QSFPs not included. Includes Rivermax license and silver 1 year support.

SFP-10G

Two (2) 10 GbE SFP modules required for EC9733 card

SFP-25G

Two (2) 25 GbE SFP modules required for EC9733 card

GVAMPP-HW-D10G-BT

AMPP Edge OCP NIC 3.0 card — dual 1/10G Base-T RJ45

GVAMPP-HW-D10G-BX

AMPP Edge OCP NIC 3.0 card — dual 1/10G Base-X SFP+

GVAMPP-HW-D10G-SR

Optical transceivers — 2x 1/10G SR 850 nm SFP+ optional for GVAMPP-HW-D10G-BX

GVAMPP-HW-D10G-LR

Optical transceivers — 2x 10G LR 1310 nm 10 km SFP+ optional for GVAMPP-HW-D10G-BX.

Disk Space Expansion

SSD-1920

Internal 1.92 TB SSD drive

SSD-3840

Internal 3.84 TB SSD drive

Recommended Hardware Specification

You may purchase equipment for the operation of the AMPP platform independently. The equipment should meet the specified requirements listed in the table below:

Component	Recommended HW Specification
CPU	Intel Xeon 5th Generation
GPU	NVIDIA L4
IP Card for SMPTE ST 2110	Connectx 6 dx (with Rivermax license)
RAM	At least 128 GB 5600 MT/s DDR5 (all channels populated)
SSD drive for OS	At least 480 GB, mixed use

Example:
- Dual Intel Xeon Gold 6548Y+ Processor
- NVIDIA L4 GPU
- Connectx 6 dx dual 100G card
- 256 GB 5600 MT/s DDR5 RAM memory (16x 16 GB RAM modules)
- SSD SATA drive 480 GB, mixed mode

If you choose to use your own hardware, Grass Valley are not responsible for any incompatibilities or platform-related errors.