

GV K-Frame XP

Compact Video Production Center



All new, no-compromise 4K UHD/HD IP and SDI switcher.

Introduction

Today, producing premium 4K content frequently requires bandwidth and processing capacity that can only be achieved by combining traditional resources. This complexity makes production difficult and at times limits the creative effects that are available in HD productions. The new GV K-Frame XP from Grass Valley is a no-compromise 4K UHD/HD, IP and SDI video processing engine that alleviates these limitations.

The GV K-Frame XP – Compact video production center is the next entry to Grass Valley's K-Frame X line of production switchers. The XP introduces a new generation of single-raster 4K UHD products for live production. Paired with any of Grass Valley's Kayenne, Karrera, Korona or KSP panels, GV K-Frame XP provides unsurpassed 4K UHD connectivity with every input and output supporting 4K UHD 2160p signals.

Switching in 4K Feels the Same as Switching in HD

Unlike competitive switchers claiming to support 4K UHD, Grass Valley's new GV K-Frame XP production switcher does not internally break down a 12G input into smaller streams or only allow connection to a subset of available I/O connectors. Whether you are producing content in HD, 3G or 4K UHD, there is no reduction in physical I/O count or processing capability resulting in maximum signal density and complete utilization of all available resources.

When you walk into a control room on a mobile truck or studio outfitted with GV K-Frame XP, switching a show in 4K UHD feels the same as switching in HD. It's the same workflow for the operator. Creative limitations vanish with smooth "full-raster" effects available on every keyer.

Multiformat production in a hybrid environment has never been easier. No re-cabling or external equipment is required to alternate between HD and 4K UHD. Internal conversion provides simple utilization of existing HD, SDQS or 2SI resources, while new 12G sources can be used directly in either IP with single-stream 4K UHD on 25 GbE SFPs or SDI.

Expanded Production Capability

This next-generation production switcher is built on an all-new hardware platform that is not only ready for future production requests, it provides expanded capability for today's productions as well. GV K-Frame XP – Compact supports up to 6 M/Es, every M/E has six keyers with all keyers supported by a full raster 2D DPM with perspective and optional chromakey capability. An additional option is Grass Valley's unique floating pool of up to 16 iDPMs usable in either HD or 4K UHD without losing resources by coupling or pairing. With an eight-channel built-in ImageStore for stills and movies with audio — including HDR support — the replay storage capacity of 128 GB (over 1 minute of 4K UHD) assures your confidence that you are prepared for any event.

Undiminished I/O Count in Any Format

The GV K-Frame XP – Compact provides more 4K UHD processing per RU than any other competitor, while providing all the features and functions you've come to expect in a Grass Valley switcher. A maximum I/O footprint of 80x40 connections remains the same in HD and 4K UHD 2160p. The undiminished I/O count is the same regardless of whether you are producing in all IP, all SDI, or any combination of I/O boards. And to keep it simple, the I/O boards for the GV K-Frame XP are the same as the current GV K-Frame X.

KEY FEATURES

- GV K-Frame XP – Compact video production center: 8 RU frame (with internal power supplies)
- 80x40 I/O footprint supports both IP and SDI offerings:
 - IP I/O boards come in two bi-directional configurations:
 - 16x8 and 8x4 IP boards, both accept either 10 GbE or 25 GbE SFPs
 - IP boards accept standard SMPTE ST 2110-20/30/40, TICO for SMPTE ST 2022-6, and SMPTE ST 2022-7 for redundancy
 - SDI I/O boards come in three offerings: 16x8, 16x8 with “gearbox” functionality, and 8x4 with conversion
 - 8x4 conversion board for frame sync and format conversion, up/down/cross converts with direct connection (HD→4K and 4K→HD)
 - MatchSync functionality is found on both the 16x8 with “gearbox” and the 8x4 with conversion
- 4K UHD 2160p sources can be handled in a variety of ways: Two (2) single streams on a 25 GbE SFP, one on (1) 12G-SDI link, one (1) on a 10 GbE SFP with TICO compression, 2SI or SDQS quad link on four (4) 3G-SDI or IP
- Conversion modules enable conversion to/ from HD and 4K UHD 2160p (2SI or SDQS) on inputs and outputs and between 2SI and SDQS. Both SDI “gearbox” and conversion boards support 12G-SDI single link sources as well as quad link 4K UHD
- Maintain the same functionality and feature DNA as the current K-Frame X: Up to 6 M/Es, spread over two new VPE (Video Processing Engine) boards
- Six (6) full function keyers per M/E with 2D DPMs with perspective per keyer
- Up to 16 optional 3D iDPMs, spread over two new DPM (Digital Picture Manipulation) boards
- Supports HD, 1080p 3G, 12G, 4K UHD and HDR (HLG and PQ) with ability to set HDR (HLG and PQ) payload ID on each output
- Internal 8-channel ImageStore for stills and movies with video, key and audio (up to 128 GB of storage)
- E-MEMs, Macros and show files are fully compatible with K-Frame and K-Frame X
- Multiviewers (up to 4, licensable)
- Compatible with all Kayenne, Karrera, Korona and KSP panels
- Rugged modular design on both control surface and chassis for field reconfiguration and serviceability
- Four (4) independent suites capability in both HD or 4K UHD
- MatchSync aligns incoming SDI signals with IP inputs in a mixed format environment
- Automation application control under GV Ignite and GV Pace, or other third-party applications
- On-panel triggered integration with graphics devices: ChyronHego LyricX or PRIME, and Ross Video XPression (via Ross Talk)

Feature/Function	GV K-Frame XP – Compact
Frame Processing	4K UHD 2160p (full-raster), 1080p, 1080i, 720p
Video frame	8 RU frame (with internal power supplies)
1080p 3G I/O (IP, SDI)	HD and 4K-2SI or SDQS are supported
12G SDI I/O (4K 2160p)	4K UHD 2160p – SMPTE ST 2082-10
4K UHD 2160p IP I/O	4K UHD 2160p single-stream IP
HDR capability	10-bit, HLG or PQ
I/O type	SDI, IP or mixed
I/O footprint	Up to 80x40 I/O in either full SDI, full IP or mixed
IP connector type	SFPs: 10 GbE or 25 GbE
Other connectors	2 MediaPort Inputs
Mix/effects	Up to 6 M/Es each with six (6) full keyers with 2D DPMs
Internal ImageStore	8-channel (video+key) — stills or movies with audio, maximum storage up to 128 GB (Licensable as 32 GB, 64 GB, or 128 GB)
Conversion	Optional inputs: up to 16 SDI with frame syncs and format converters / Outputs: up to 8 SDI format converters
2D DPMs	2D DPM with perspective associated with every keyer
3D DPMs	Up to 16 floating 3D iDPMs with effects
Control surface	Any Kayenne, Karrera, KSP, and Korona control surface runs on any K-Frame video processing engine. (Available in multiple configurations)
Software panel option	KSP touchscreen GUI software available with optional tactile custom keyboard

SPECIFICATIONS

The initial release will support 12 Frame Operating Modes (FOMs):

- 2160p 59.94 Hz
- 2160p 50 Hz
- 2160p 29.97 Hz
- 2160p 23.98 Hz
- 1080p 59.94 Hz – Level A
- 1080p 50 Hz – Level A
- 1080p 29.97 Hz
- 1080p 23.98 Hz
- 1080i 59.94 Hz
- 1080i 50 Hz
- 720p 59.94 Hz
- 720p 50 Hz

Mechanical Specification

- Frame:** Compact frame
- Depth:** 63.2 cm (24.90 in.)
- Width:** 44.7 cm (17.60 in.)
- Height:** 34.5 cm (13.97 in.)
- Weight:** 59.7 kg (125 lbs.)*
- RU:** 8 RU

Inputs

80 inputs with the optional capability of converting 4K 2SI inputs into a single internal 12G input

Outputs

40 outputs with the optional capability of converting a single internal 12G output into a 4K 2SI or SDQS quad link output

GPI+Tally I/O

16x GPI + 16x GPO + 64x Tally

Audio Standards

Audio will be passed as:

- SDI: Embedded
- SMPTE ST 2022-6
- Embedded (Transport SMPTE ST 2110-30 AES67 at 48 kHz, Level A and B)

* Frame weight is with three power supplies. A single supply weighs 2.5 kg (5.4 lbs.).

Video Standards

IP Video Standards:

- SMPTE ST 2110-20/30/40
- SMPTE ST 2022-6 with TICO

4K UHD Mode:

- SMPTE ST 2082-10 (12G SDI)
- SMPTE ST 425-5:2014 Quad Link 2-Sample-Interleave (2SI)
- SMPTE ST 425-5:2014 Quad Link Square Division Quad Split (SDQS)
- SMPTE ST 2110-20/30/40
- SMPTE ST 2022-6 with TICO

3G Mode:

- SMPTE ST 424 section 4 – Level A – 1080p 50/59.94/60 Hz

HD Mode:

- SMPTE ST 292-1 1080i25/29.97/30/50/60 Hz ±5%
- SMPTE ST 292-1 720p50/59.94/60

Serial Digital Video Inputs

Interface:

- 4K 12G video format SMPTE ST 2082
- 3G video formats SMPTE ST 424-2006
- HD video formats SMPTE ST 292-1998
- SD video formats SMPTE ST 259-1997 ITU-R BT.656 (requires K-FRM-IO-CONV-X module)

Return loss:

- ≥ 4 dB, 6.0 GHz to 12 GHz
- ≥ 15 dB, 5 MHz to 1.5 GHz
- ≥ 10 dB, 1.5 GHz to 3.0 GHz

Type of connector: 75Ω BNC (SMPTE ST 259)

Nominal amplitude: 800 mVp-p terminated

Input impedance: 75Ω

Max. cable length: using Belden 1694A type cable

- 4K 12G video 60m (197 ft.) typical
- 3G video 140m (459 ft.) typical
- HD video 200m (656 ft.) typical
- SD video 350m (1,148 ft.) typical

Serial Digital Video Outputs

Interface:

- 4K 12G video format SMPTE ST 2082
- 3G video formats SMPTE ST 424-2006
- HD video formats SMPTE ST 292-1998
- SD video formats SMPTE ST 259-1997 ITU-R BT.6560 (requires K-FRM-IO-CONV-X module)

Return loss:

- ≥ 4 dB, 6.0 GHz to 12 GHz
- ≥ 15 dB, 5 MHz to 1.5 GHz
- ≥ 10 dB, 1.5 GHz to 3.0 GHz

Type of connector: 75Ω BNC (SMPTE ST 259)

Nominal amplitude: 800 mVp-p across 75Ω

Rise and fall times:

- 4K 12G: ≤ 45 ps between 20% and 80% amplitude
- 3G & HD video formats ≤ 135 ps between 20% and 80% amplitude
- SD video formats, 400 to 1400 ps between 20% and 80% amplitude

Timing jitter:

- 4K 12G video format ≤ 2.0 UI
- 3G video formats ≤ 2.0 UI
- HD video formats ≤ 1.0 UI
- SD video formats ≤ 0.2 UI

Alignment jitter:

- 4K 12G video format ≤ 0.3 UI
- 3G video formats ≤ 0.3 UI
- HD video formats ≤ 0.2 UI
- SD video formats ≤ 0.2 UI

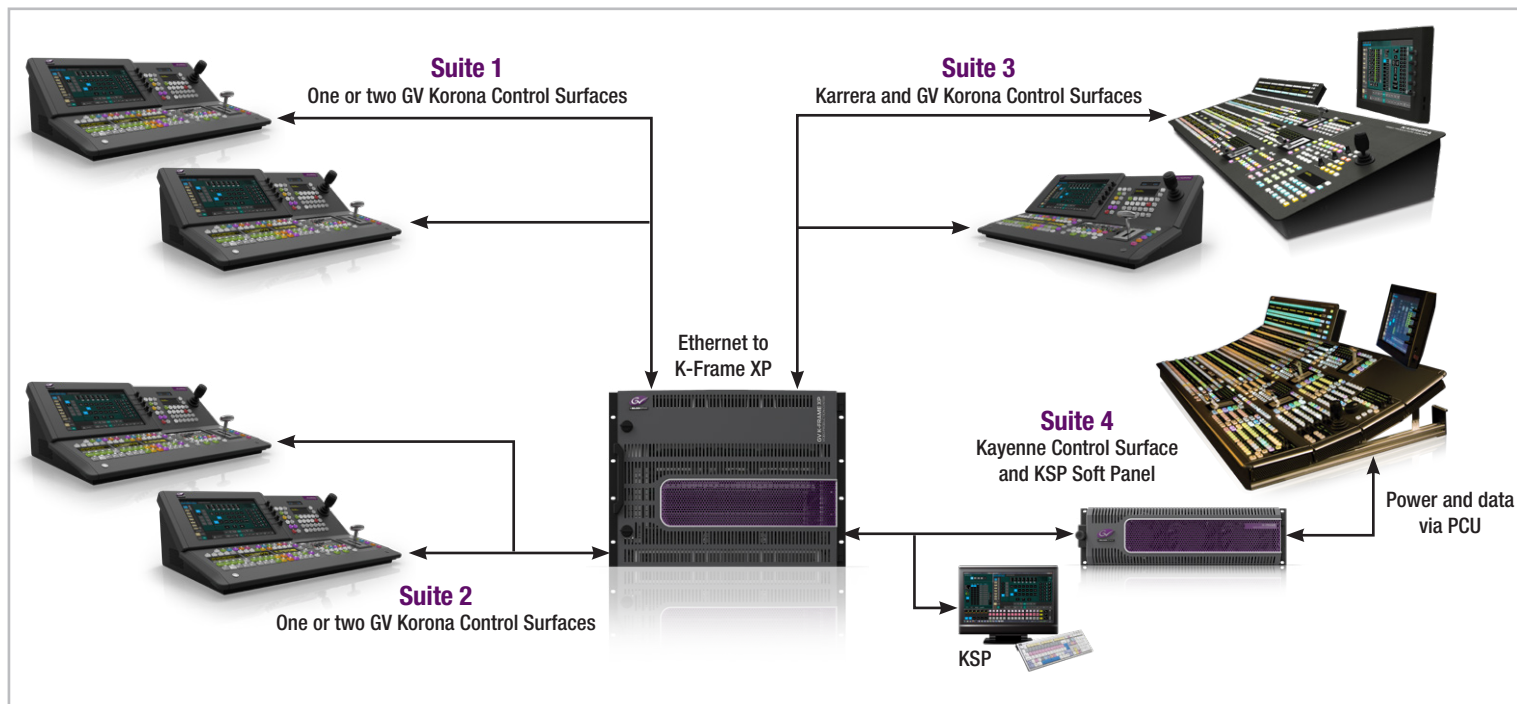
Output impedance: 75Ω

DC offset: <500 mV with 75Ω termination

Ancillary and embedded data: Blanked or passed (user selectable)

EDH: Blanked

Four Suites with K-Frame XP – Compact



SPECIFICATIONS (CONT.)**Reference Input****Analog:** Black or Tri-level sync**Digital:** SDI – SMPTE ST 425-1**PTP:** IEEE 1588-2008 Precision Time Protocol with SMPTE ST 2059-2 PTP Profile, out of band**Analog Reference Input****Video standard:** Analog black or Tri-level sync**Return loss:** >40 dB, up to 5 MHz**Connectors:** 2 BNC loop-through**Impedance:** 75Ω external termination**Communications****Connections:**

PCU to video frame: LAN cable 100m (328 ft.) max. length
 Control panel to PCU: dedicated cables, choice of 7.5m or 15m
 Menu panel to PCU: dedicated cables, choice of 7.5m or 15m
 Audio AES67: 2x SFP for AES67 (SFP may be Fiber or RJ-45)
 Machine control: 8x RS-422
 PTP: 2x SFP

Interoperability:

The Video Production Centers are interoperable with the GV Orbit, GV Convergent, Sirius, IQ Edge, Encore, Jupiter, SMS-7000 and NV9000 routing control systems; LDK Series and LDX Series cameras using Connect Gateway, VISCA controlled PTZ systems; and with the K2 Summit, sQ servers, legacy Profile servers, and T2 iDDRs

Supported Control Protocols

The Video Production Centers support Ethernet and serial AMP protocol (standard in all systems), serial BVW and Odetics protocols, as well as controlling devices using PBus II and GPIs

Serial BVW-75 for VTR control

AMP (advanced media protocol) for Profile PVS, Profile XP Media Platform, K2, M-Series, Turbo iDDR and T2 iDDR systems over Ethernet and serial

Grass Valley native protocol for routers/routing control systems (Trinix/Trinix NXT, Venus, Triton, NVISION and third-party routers; Jupiter, Encore and NV9000 router control systems)

Grass Valley Sirius

NVISION Native Router Control Protocol NP0017

Ethernet tally

Grass Valley remote Aux Panels via Ethernet

Grass Valley editor protocol for edit controllers and external control

VDCP Serial and Ethernet

RossTalk protocol support for direct control of XPression graphics engine

Single-point-of-control integration for graphics with ChyronHego Click Effects PRIME

iControl

NMOS IS-04 and IS-05

Power**Video Processing Frame 8 RU:**

Line voltage: 100V-240 VAC ±10% power factor corrected
 Automatic line-voltage sensing for 120V and 240V sources
 Line frequency: 50/60 Hz ±5%

Kayenne Control Panel:

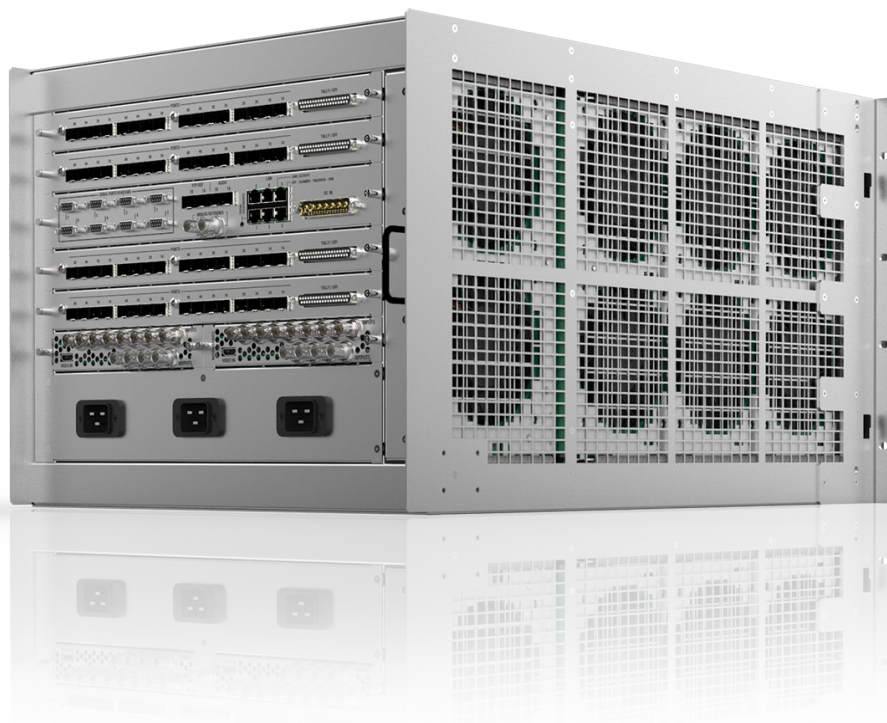
Line voltage: 100V-240 VAC ±10% power factor corrected
 Automatic line-voltage sensing for 120V and 240V sources
 Line frequency: 50/60 Hz ±5%
 Power consumption: max. panel configuration 600W
 Leakage current: <2.5 mA

Karrera Control Panel:

Line voltage: 100V-240 VAC ±10% power factor corrected
 Automatic line-voltage sensing for 120V and 240V sources
 Line frequency: 50/60 Hz ±5%
 Power consumption: max. 200W
 Leakage current: <2.5 mA

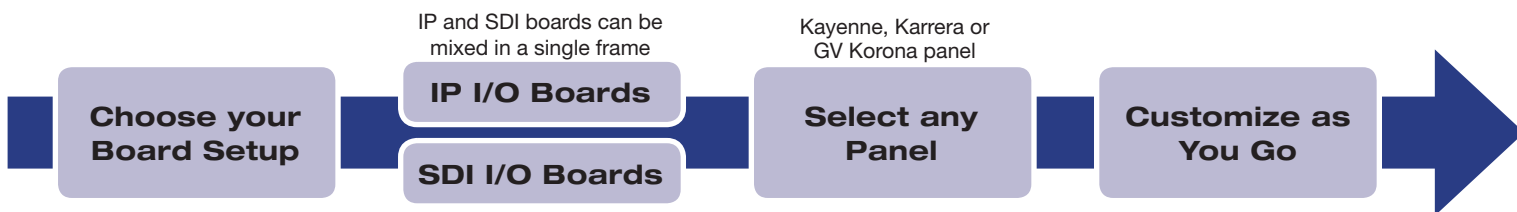
GV Korona Control Panel:

Line voltage: 100-240 VAC ±10% power factor corrected with automatic line-voltage sensing for 120V and 240V sources
 Line frequency: 50/60 Hz ±5%
 Power consumption: max. 60W
 Leakage current: <2.5 mA

Environmental Conditions**Storage temperature:** -20 to 70°C (-4 to 158°F)**Operating temperature:** 0 to 40°C (32 to 104°F)**Relative humidity:** 0-95% (non-condensing)**Electromagnetic environment:** E2 (according to EN55103-1, -2)

ORDERING

Look for the system nomenclature that includes panel type/size and video processing frame size, then add your options; or build your system à la carte.



- SDI I/O boards come in three types: 16x8, 16x8 with “gearbox” functionality, and 8x4 conversion
- IP I/O boards come in two configurations: 16x8 and 8x4
- 8x4 conversion board for frame sync and format conversion, up/down/cross converts with direct connection

K-FRM-100CXP**GV K-Frame XP, Compact SDI-based 8 RU Frame**

GV K-Frame XP Compact SDI-based (8 RU) frame including two PS, standard controller processor module with built-in ImageStore, 32 SDI inputs/16 SDI dual-channel outputs comprised of two (2) K-FRM-IO-FULL-X-GB modules capable of 4K UHD, 3G and/or 12G with “gearbox” functionality, one (1) K-FRM-VPE-XP module capable of licensing three (3) M/Es, 8 GPI inputs and 8 GPI outputs, 32 tally, AMP, 999 macros, 1,000 E-MEMs. Frame has a 6 M/E maximum with 6 keyers per M/E; 80 inputs/40 outputs maximum.

K-FRM-CXP-I**GV K-Frame XP, Compact IP-based 8 RU Frame**

GV K-Frame XP Compact IP-based (8 RU) frame including two PS, standard controller processor module with built-in ImageStore, IP bidirectional I/O, 32 inputs/16 outputs comprised of two (2) K-FRM-IO-FULL-X-I modules, one (1) K-FRM-VPE-XP module capable of licensing three (3) M/Es, 8 GPI inputs, 8 GPI outputs, 32 tally, AMP, 999 macros and 1,000 E-MEMs. Frame has a 6 M/E maximum with 6 keyers per M/E; 80 inputs/40 outputs maximum. (SFPs must be ordered separately*). Frame can also be licensed for SMPTE ST 2022-7 redundancy by utilizing option: K-FRM-LIC-IO-RDND-X.

K-FRM-IO-FULL-X-I**GV K-Frame X IP Input/Output Module (16x8 IP I/O)**

Bidirectional I/O adds 16 IP inputs & 8 IP outputs, SFP connector cages can be stuffed for either 10 GbE or 25 GbE (SFPs must be ordered separately*), one board per slot. Board can also be licensed for SMPTE ST 2022-7 redundancy by utilizing option: K-FRM-LIC-IO-RDND-X.

K-FRM-IO-X-I**GV K-Frame X IP Input/Output Module (8x4 IP I/O)**

Bidirectional I/O adds 8 IP inputs & 4 IP outputs, SFP connector cages can be stuffed for either 10 GbE or 25 GbE (SFPs must be ordered separately*), one board per slot. Board can also be licensed for SMPTE ST 2022-7 redundancy by utilizing option: K-FRM-LIC-IO-RDND-X.

K-FRM-IO-FULL-X**GV K-Frame X SDI Input/Output Module (16x8 SDI I/O)**

Adds 16 inputs and 8 dual channel outputs of 3G-capable signals, 4 GPI inputs, 4 GPI outputs, 16 tally, one board per slot.

K-FRM-IO-FULL-X-GB**GB GV K-Frame X SDI Input/Output Module (16x8 SDI I/O)**

Adds 16 inputs and 8 dual channel outputs of 3G and/or 12G with “gearbox” functionality. 4 GPI inputs and 4 GPI outputs, 16 tally, one board per slot.

K-FRM-IO-CONV-X**GV K-Frame X SDI Input/Output Conversion Module (8x4 I/O)**

Adds 8 inputs and 4 outputs with licensable video up/down/cross converters on each input and output SD and HD sources, including 1080p and UHD, one board per slot. Supports conversion between SD, HD, 1080p, and quad-link UHD 2SI or SDQS and gearboxing of 2160p (Licensed with option: K-FRM-LIC-SETMAT-X).

K-FRM-VPE-XP**GV K-Frame XP Video Processing Engine Module**

Video Processing Engine module has three (3) VPEs each can be licensed as M/Es, multiviewers, and/or eDPM (Licenses required). Processing is done in full-raster 4K 2160p, 1080p, 1080i or 720p. Each M/E includes: 6 full function keyers (each keyer includes: video and key inputs, 2D DPM with perspective, Wipe Mask generator, Key Store and Chroma Keyer (license required)); Cut/Mix/Wipe Transitions; 2 full Wipe Generators; 4 background and 2 utility inputs; 1 Program, 4 Program/Cleanfeed, 3 Preview, 1 M/E View (license required) outputs; supports DoubleTake (license required).

K-FRM-DPM-XP**GV K-Frame XP DPM Module**

Adds iDPM capability to the K-Frame XP; each module supports up to eight (8) licensed V/K channels of floating iDPMs or assignable to an eDPM (Licenses required).

K-FRM-PSU-XP**GV K-Frame XP power supply****GV-RAP-100 & GV-RAP-200**

Remote Aux panel options

NOTE: GV K-Frame XP based “System” part numbers as well as “License option” part numbers will be added to this document at a later date. For additional information, please ask your sales representative or the appropriate switcher product manager.

* Note: Item SFP-ETH10G-RT-M85-LC is the 10 GbE SFP and K-FRM-IO-SFP10-25G is the 25 GbE SFP validated by Grass Valley. Both are orderable as an option for the GV K-Frame X IP I/O boards:

- K-FRM-IO-FULL-X-I
- K-FRM-IO-X-I



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