Section 1 – K-Frame Technical Architecture

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Section 1 – K-Frame Technical Architecture

- System Overview
  - Features
  - Interfaces
  - Options
- Panels
  - Kayenne Panels & Modules
  - Karrera Panels
  - GV Korona Panels
  - Menu Panel
  - Karrera Soft Panel (KSP)
- System Communications
  - Processors
  - Control Flow
- Video Flow
  - Inputs / Outputs
  - K-Frame 9 ME and 5 ME Flow
  - K-Frame S-series 6 ME Flow
  - K-Frame V-series 6 ME Flow
  - ME Video Flow
  - System Timing

- Note: This course does not cover the earlier Kayenne 1.5G Frame

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1-2

The Kayenne and Karrera systems use the same software and hardware platforms prior to version 5. Starting with Version 5, the new 3 GB compliant "K-Frame" was available. The same hardware is used for Karrera and Kayenne Panels and Menus. Older systems will remain at version 4.x.

The S-series frame was added with Version 8.0 software replacing the earlier Compact frame.

This course is intended to cover all products and covers the differences between hardware and software as needed. When specifics are not called out, assume that they are the same for both products.

Section 1 – Objectives

Section Objectives

- Be able to describe the system architecture of a Kayenne or Karerra system and it's components
- Understand how the System components communicate with each other
- Understand the different features of the various K-Frame hardware
- Explain what options are available and how to determine what options are installed and Licensed
- Be able to describe the functional components of the Kayenne and Karrera panels
- Understand the video flow though the frames
- Understand the basic components of an ME
- Be able to explain what the difference between a Physical and Logical ME
- Understand the basic timing requirements of the switcher hardware

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1-3

The Kayenne and Karrera systems use the same software and hardware platforms prior to version 5.

Starting with Version 5, the new 3 GB compliant "K-Frame" will be available. The same hardware is used for Karrera and Kayenne Panels and Menus.

Older systems will remain at version 4.x.

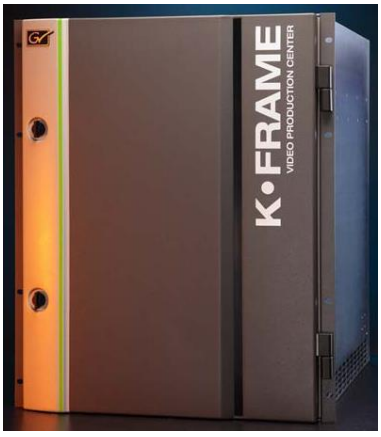
This course is intended to cover all products and covers the differences between hardware and software as needed.

When specifics are not called out, assume that they are the same for both products.

K-Frame (3G) Features

- K-Frame - SD/HD Switcher
- Large Frame (4 Dual ME boards + Controller ME)
- 13 RU + 1 RU for Power Supply
- Compact Frame (2 Dual ME boards + Controller ME)
- 6 RU frame +1 Ru for Power Supply
- Optional Image Store Board

- K-Frame S-series - SD/HD Switcher
- Up to 6 Mix Effects Banks (2 Triple ME boards)
- Integrated Image Store (Optional via License)
- 6 RU with Integrated Power Supply



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1-4

The “K-Frame” is the latest in Switcher Technology from Grass Valley. This frame incorporates 1080p (2.97 Gb/S) Serial capability along with 270 Mb/S (SD 525 / 625) and 1.485 Gb/S (HD 720p / 1080i) rates.

The K-Frame is available in 2 sizes, 6 RU and 13 RU. Each requiring a 1 RU PS.

Mix Effect (ME) boards are dual ME. Each board contains 2 sets of ME circuitry. This allows the small frame to carry 2 boards for a total of 4 MEs and the large frame to hold 4 boards for 8 MEs.

The S-series frame (also 6RU) can hold the Dual or the Triple ME boards. When used with the Triple ME boards there is no Controller ME. The S-series has internal power supplies.

All Keyers are complex, meaning they are not limited in features in any way.

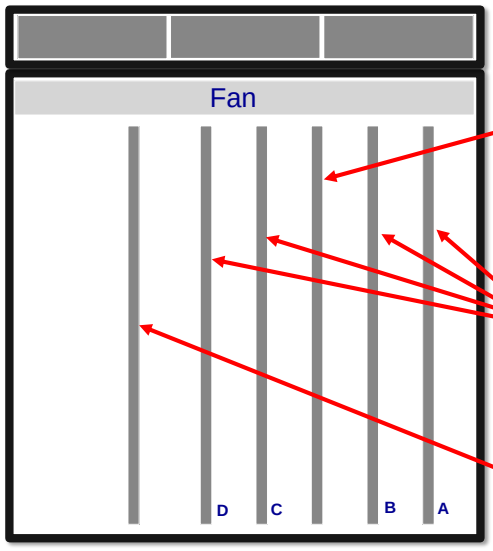
All ME Video Paths (Keys) have dedicated resizers called “2D DPMs”. This allows the repositioning of any Key in “X and Y” space, plus a size and border function. (54 total)

The iDPM (full DVE) channels are floating and assignable. There are a maximum of 16 in the large frame and 8 in the Compact or S-series frame.

Any ME can also be assigned as an eDPM if licensed. This too has 2D-DPM capability.

K-Frame layout – Large Frame

External Power Supply Frame



9 MEs – Dual ME boards

Controller Board with XPT,
1 dedicated MultiViewer and
the Controller ME

Dual ME boards (A1-2, B 1-2, C 1-2, D 1-2)
each with hardware for 4 iDPMs

Image Store

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1-5

The K-Frame incorporates 1080p (2.97 Gb/S) Serial capability along with 270 Mb/S (SD 525 / 625) and 1.485 Gb/S (HD 720p / 1080i) rates.

The frame is available in 2 sizes, 6 RU and 13 RU. Each requiring a 1 RU PS. The Large frame is shown here.

Mix Effect (ME) boards are dual ME. Each board contains 2 sets of ME circuitry. This allows the small frame to carry 2 boards for a total of 4 MEs and the large frame to hold 4 boards for 8 MEs.

The K-Frame contains an ME on the Frame processor board, called the Controller ME thus creating 9 MEs per frame respectively. (The Controller ME does not have access to the iDPMs)

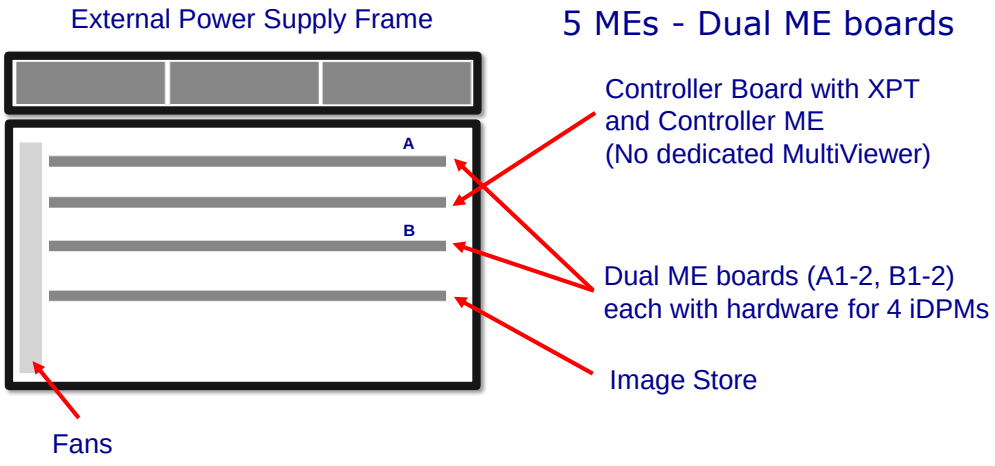
All Keyers are complex, meaning they are not limited in features in any way

All ME Video Paths (Keys) have dedicated resizers called “2D DPMs”. This allows the repositioning of any Key in “X and Y” space, plus a size and border function. (54 total)

The iDPM (full DVE) channels are floating and assignable. There are a maximum of 16 in the large frame and 8 in the smaller frame.

Any ME can also be assigned as an eDPM if licensed. This too has 2D-DPM capability

K-Frame layout – Compact Frame



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1-6

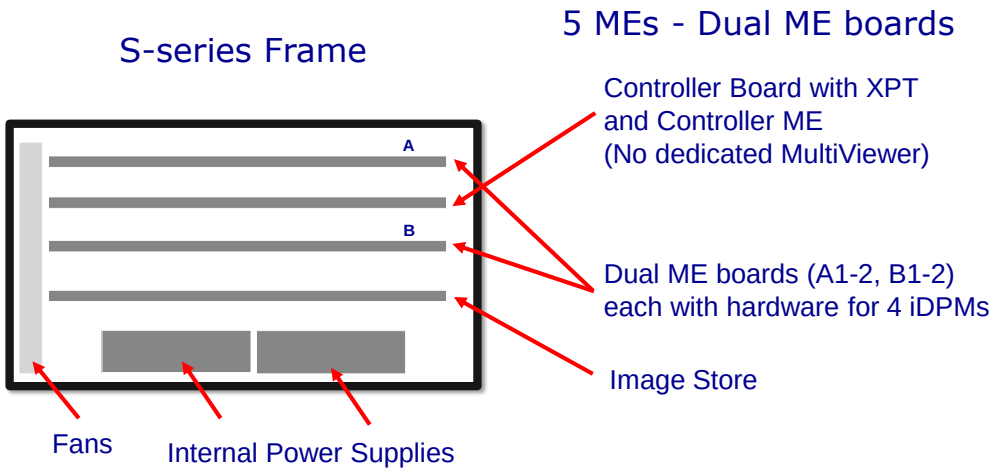
The Compact Frame holds the same boards as the large frame.

It is limited to 2 Input modules, 2 Output Modules, 2 ME modules and 4 Modular I/O boards.

The Controller card has the main CPU, the Controller ME, the Video Xpt. Sync and background circuitry.

It does not have a MultiViewer.

K-Frame layout – S-series Frame



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1-7

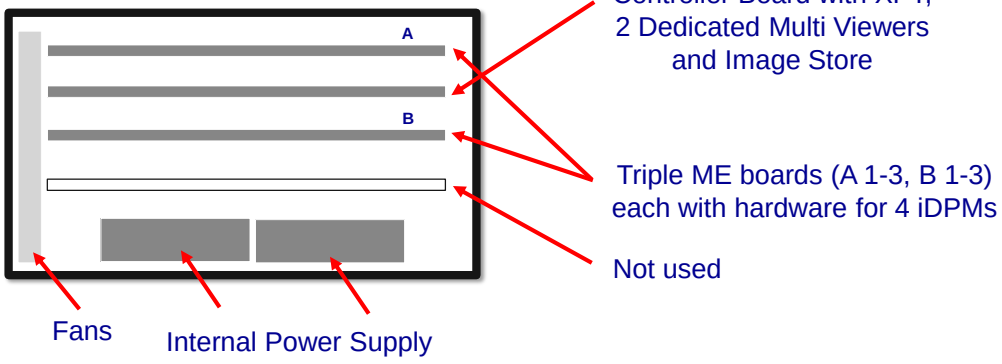
The S-series frame can hold the same boards as the Compact frame.

In this case it operates exactly as the Compact Frame with 6 Keyers per ME and 5 MEs total.

K-Frame layout – S-series Frame

S-series Frame

6 MEs - Triple ME boards



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1-8

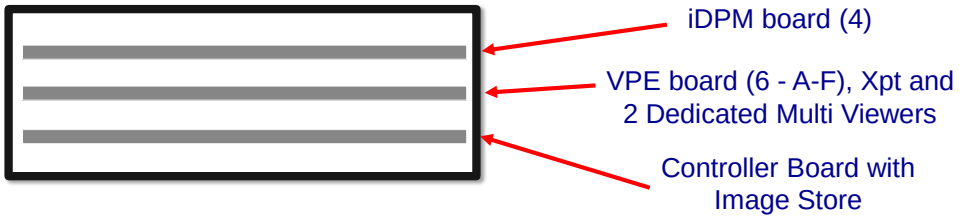
The S-series frame can also be populated with the new triple ME boards. These have 3 MEs each plus 4 iDPM channels.

The Controller has 2 dedicated MultiViewers, the Crosspoint and the Image Store. The Image store frame slot is not used.

Boards can not be mixed with the older Dual ME boards or older controller.

K-Frame layout – V series Frame

V series 3RU Frame



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1-9

The V-series frame can also be populated with three boards.
The VPE board which 6 VPEs and the Xpt.
The Controller has 2 dedicated MultiViewers, and the Image Store.
The optional iDPM board with 4 iDPM channels.

K-Frame System Features

- User configurable Colored Sources, Bus Mapping & Color of Buttons
- Multi-Suite Operation - Standard
- Split ME and Programmable Clean Feed (PCF) Operation - Option
- Configurable Stripe assignments for up to 10 MEs
- 6 Identical Keyers per ME (S-series and V-series has 4 per ME)
  - Each Keyer has a Dedicated “2D Resizer” (2D-DPM) Option for all or none
- 1000 E-MEMs, 100 R-MEMs and 999 Macros
- 31 Definable E-MEM Levels
- Granular Timelines
- Up to 16 “internal” iDPMs (DVE) K-Frame, (8 in S-series, 4 in V-series)
  - 4 per ME board (Option via license)
- Up to 2 MEs can be used as an eDPM - 1 per Suite (Option)

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1-10

The Kayenne Control Panel is comprised of Stripes. They may be viewed as ME Banks but can control any ME, Primary or Secondary.

A Stripe may be split into Primary and Secondary Partitions but only within the same Suite.

Multi-Suite operation is now standard on Kayenne and Karrera. This is the ability to operate multiple panels with a single frame. This may act as multiple or separate switchers, or as an assistant panel to the primary panel.

Split Mode (Double Take Option) allows an ME to be used as two separate, ME’s utilizing the hardware resources.

Programmable Clean Feed (PCF) Allows the ME to produce 4 ME outputs with selectable Key assignments per output.

E-MEMs (Effects Memory) allows effects to be saved and recalled.

R-MEMs (Router Memory) allows router salvos or multi takes to be controlled by the switcher.

Macros allow a user to program and remember a sequence of button presses in the order that they are executed.

Granular Time Lines allow the user to only store or remember the elements that are desired to change.

DPM is an abbreviation for Digital Picture Manipulator. This may also be called a DVE (Digital Video Effect) or Transform Engine.

K-Frame System Features

- ImageStore: 2 V+K Pairs In (1 per Suite), 10 V+K Pairs Out (4VK in, 8 VK out in V-series)
  - Image Store 'Movies' added in v 6.0
- 2 or 4 channel (in and out) Clip Store for short or long clips (Option)
- 2 Key Stores standard on each Keyer (2V+2K) (None in S-series or V-series)
- Video Processing (YUV Std)
- Color Correction (RGB Option) per Bus, per Input and per Aux Output
- Integrated Router / DDR / VTR / GPI / PBus II control
- Control of certain LDK Camera functions
- Modular Input / Output Assemblies, up to 32 scalable I/O, 16 in S-series (Option)
  - Set Def and Match Def Processing
- ME View (added in v6.0) (Option) (Not available in V-series)
- MultiViewers (total of 4 in K-Frame, 2 in S-series) (v7.0) (Option)

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Starting with Software Version 2.0, the Clip Store Option became available. This uses the preconfigured Grass Valley K2 Summit 4 channel (4 V + 4 K) Server or the K2 Solo 2 Channel server for on demand video clip recording and playback. Recall or playback is quick, no more waiting for clips to load. Any clip length may be used.

Each ME has a dedicated but volatile 4 channel frame store. This can be used as Key Store 1 (V+K) and Key Store 2 (V+K).

Source Rules allows for the control of multiple keys from other functions.

Router control of the Grass Valley Encore and Jupiter control systems is done by Native Protocol.

Set Def (Option) allows for 2 outputs per ME card to be configured for a different video standard than the switcher is operating in. This option also allows for aspect ratio conversion.

Match Def (Option) allows for 4 inputs per ME card to be configured for a different video standard than the switcher is operating in.

Key Chaining is new in version 2.0 and allows for a key or multiple keys to be activated when another key is selected. This may be on the same or a different ME.

Comparison of K-Frame and S and V series

Feature	K Frame V series (3 RU)	K Frame S series (6RU)	K Frame Compact (6RU)	K Frame Large (13RU)
MEs (VPEs)	Up to 6	Up to 6	Up to 4 + Controller	Up to 8 + Controller
Keyers per ME	4 Full Keyers	4 Full Keyers	6 Full Keyers	6 Full Keyers
Key Stores	None	None	2 per Keyer	2 per Keyer
2DPM Option	All Keyers	All Keyers	All Keyers	All Keyers
Inputs	32	64	64	160
Outputs	16	32	32	64
Match Def/Set Def or Modular I/O	Available on all above (Optional)	16 Not Included above	16 Not Included above	32 Not Included above
Image Store	8 V+K	10 V+K	10 V+K	10 V+K
MultiViewers	2 (dedicated)	2 (dedicated)	4 – Using MEs	3 - using MEs and 1 dedicated

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The K-Frame S series Chassis replaces the earlier K-Frame 'Compact' chassis.

The Compact Chassis used the same boards as the 13 RU chassis shown but was limited to 2 Dual ME boards for 4 ME plus the controller.

Most features listed are also optional and depend on the hardware present and the licensing.

The V series chassis is the latest addition to the K-Frame series. In addition to the 32 SDI inputs it also has Media I/O (4 in, 2 out)

Karrera & Kayenne Hardware Options (1)

K-Frame:

- Up to 4 Dual Video Processor Cards (8-MEs) in the 12 RU Large Frame or 2 Dual Video Processor Cards (4-MEs) in the 6 RU Compact Frame
- Input and Output Cards, Modular I/O and IP I/O
- ImageStore Card (Standard and Compact frames only)
- External Clip Store 2 or 4 Channel (V+K per channel)

K-Frame S-series:

- Up to 2 Triple Video Processor Cards (6 - MEs) in the 6 RU Frame
- Input and Output Cards, Modular I/O and IP I/O

K-Frame V-series:

- 1 Video processor card (6 - VPEs) in a 3RU Frame
- 1 iDPM card (4 Channels)
- 4 Input and Output Modular I/O cards (8In - 4 Out), and IP I/O

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1-13

The I/O Expander cards are ME assemblies that have input and output circuitry but do not contain any ME processing hardware. They will allow 24 signal inputs and 12 outputs to be connected and used in the video frame per expander card. These cards also contain the ability (if licensed) to operate the Match Def input Scaling Option but will not support Set Def even if licensed.

I/O expander cards are not required for the K-Frame.

The 2.5 ME Frame comes fully loaded standard with 2 power supplies.

Karerra & Kayenne Hardware Options (2)

Kayenne Control Panels:

- Device Control Module (DCM) for Machine Control
- Second Menu Processor and Display Panel
- Satellite single and double wide Panel Modules

Karrera Control Panels:

- Local Aux Panel (Power & Data provided from main panel)
- Kayenne Style Menu Panel & Articulated Arm
- Compact / Fanless Windows Menu PC & Bracket

GV Korona Panels:

- Integrated Menu

Karrera Soft Panel (KSP) – Software and Keyboard

For any system:

- External Ethernet “Remote” Aux Panels (Single or Multi)

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1-14

Two Power Supplies are standard in the Control Panel processing Unit frame (PCU).

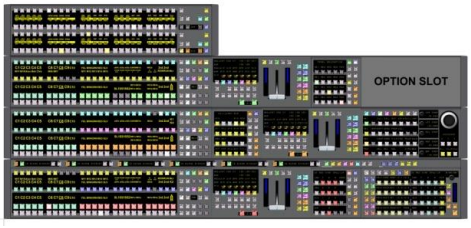
The Karrera Soft Panel is a software option only. It does include a custom GV keyboard. The customer is to supply a 1920 X 1080 touch Windows 7 PC.

The Karrera Local Aux Panel is an option but the 2 and 3 ME panels include a configurable 16 channel Aux control section.

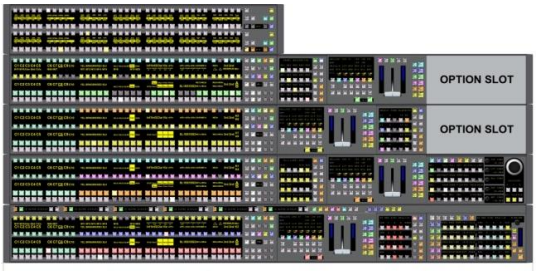
Kayenne Control Panels

KAYN-PNL-100-15

KAYN-PNL-200-25



KAYN-PNL-300-25



KAYN-PNL-400-35

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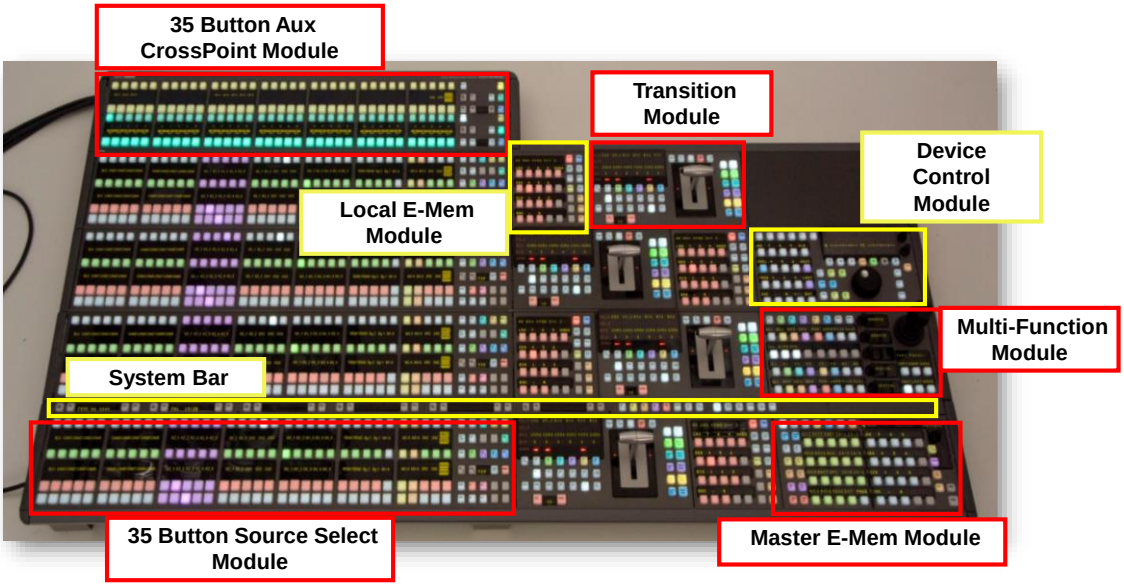
1-15

There are 4 different Kayenne Panels.

Each panel is modular so that modules can be rearranged within a stripe as needed.

Kayenne Control Panels – Module Assembly



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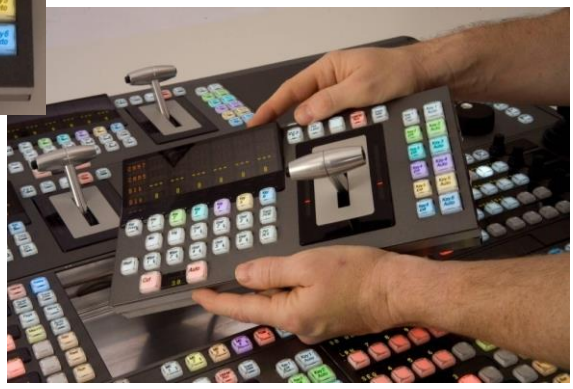
1-16

The following Kayenne modules are available:

- KAYN-PNL-TRM - Transition Module
- KAYN-PNL-LEM - Local E-MEM Module
- KAYN-PNL-MEM - Master E-MEM Module
- KAYN-PNL-MFM - Multi-Function Module
- KAYN-PNL-SRC-35, 25, 15 - Source Module, available in 35, 25, and 15 button widths.
- KAYN-PNL-AUX-35, 25 - Local Aux Module, available in 35 and 25 button widths.
- KAYN-PNL-BAR-35, 15 - System Bar, available in two sizes to match various Control Panel widths.
- KAYN-PNL-DCM - Device Control Module, available as an option for 3 and 4-ME panels and as a satellite panel module.

Kayenne Panel Modules



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1-17

The Stripe Tray to Panel Module cables are NOT Ethernet.

The RJ-45 connectors carry 48 Volts D.C. and a proprietary data format.

Do not plug these into anything but Panel Modules!

Kayenne & Karrera Menu Panel & Arm

Menu Panel with Articulated Mounting Arm without PC for use on Kayenne

Menu Panel with Optional Karrera Menu PC (Fanless PC) & Mounting Brackets

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1-18

The Kayenne panel includes a menu panel and utilizes a PC located in the PCU frame (Panel control Unit) .

The Touch Screen Menu resolution is 1280 x 768.

The menu display requires 48 Volts D.C. This is supplied via the large multi-pin connector from either the Kayenne PCU frame or a brick power supply.

The Menu Panel has 4 usable USB “type 2” ports. All 4 of the ports are usable by the Windows XP processor. Clips and still may be stored to the hard drive for use with the Image Store via USB.

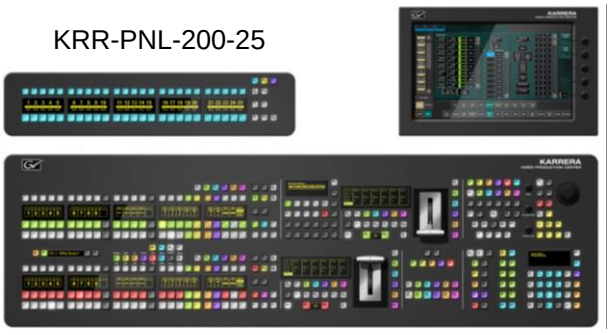
The menu panel may also display video from an external DVI–D source when connected to the bottom of the panel.

For use with Karrera, this menu is an option and may have a fanless PC secured via a bracket to the back of the display. Power for the PC will come from the 12 Volts supplied by the Karrera Panel. Menu Display power will be 48 V.D.C. supplied by a brick supply.

When a DVI–D source is used in place of a PCU, the Type “B” USB connector will be activated and connected to the Touch Screen controller and the 4 USB ports.

Karrera 2 ME Control Panels

KRR-PNL-200-25



KRR-PNL-200-25C

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1-19

Note that the K Frame S-series frame typically is used with the Karrera panel. The main difference is that there are 4 Keyers active instead of 6.

Three varieties of the Karrera panel are available:

- 25 Button 2 ME (Wide Panel, Original)
- 25 Button 3 ME (Narrow and Taller Panel)
- 35 Button 3 ME

Aux panels are also available in both 25 and 35 button models.

Menu Panels, Processors and Aux Panels are options.

Karrera 3 ME Control Panel

KRR-PNL-300-35

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1-20

Three varieties of the Karrera panel are available:

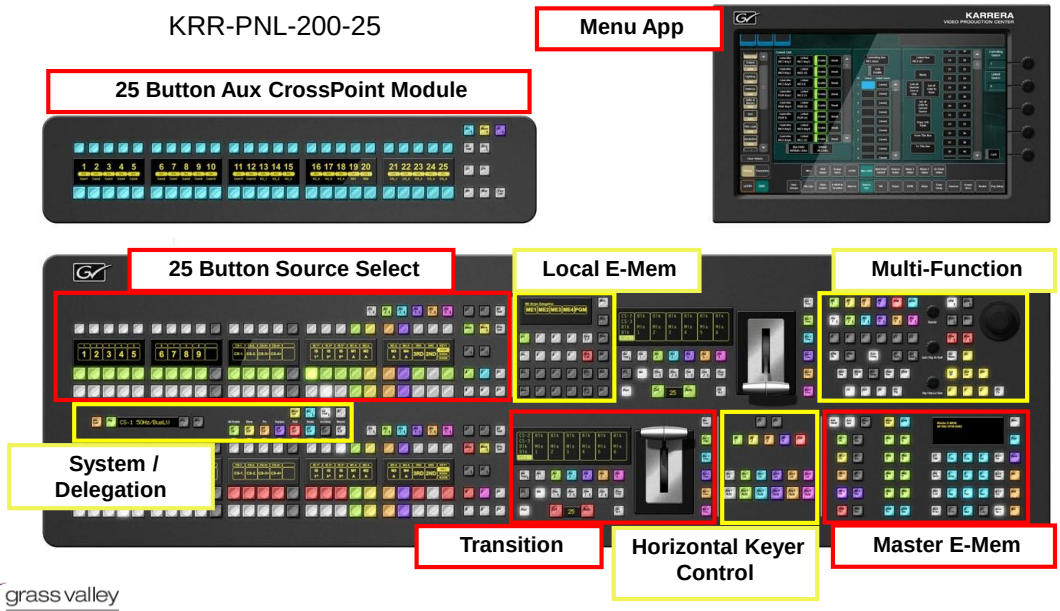
- 25 Button 2 ME (Wide Panel, Original)
- 25 Button 3 ME (Narrow and Taller Panel, New)
- 35 Button 3 ME

Aux panels are also available in both 25 and 35 button models.

Menu Panels, Processors and Aux Panels are options.

Karrera Control Panels

KRR-PNL-200-25



While being a smaller panel than the Kayenne, all major functions are present.

Some functions will need to be performed on the menu application.

GV Korona Control Panels 1 and 2 ME

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1-22

While being a smaller panel than the Kayenne and Karrera, all major functions are present.

Many functions need to be performed on the menu application.

A 3ME panel is also available.

Karrera Soft Panel

Panel and Menu Applications
Run Together

1-23

KSP Feature consists of the KSP software, Keyboard and License for the K-Frame.

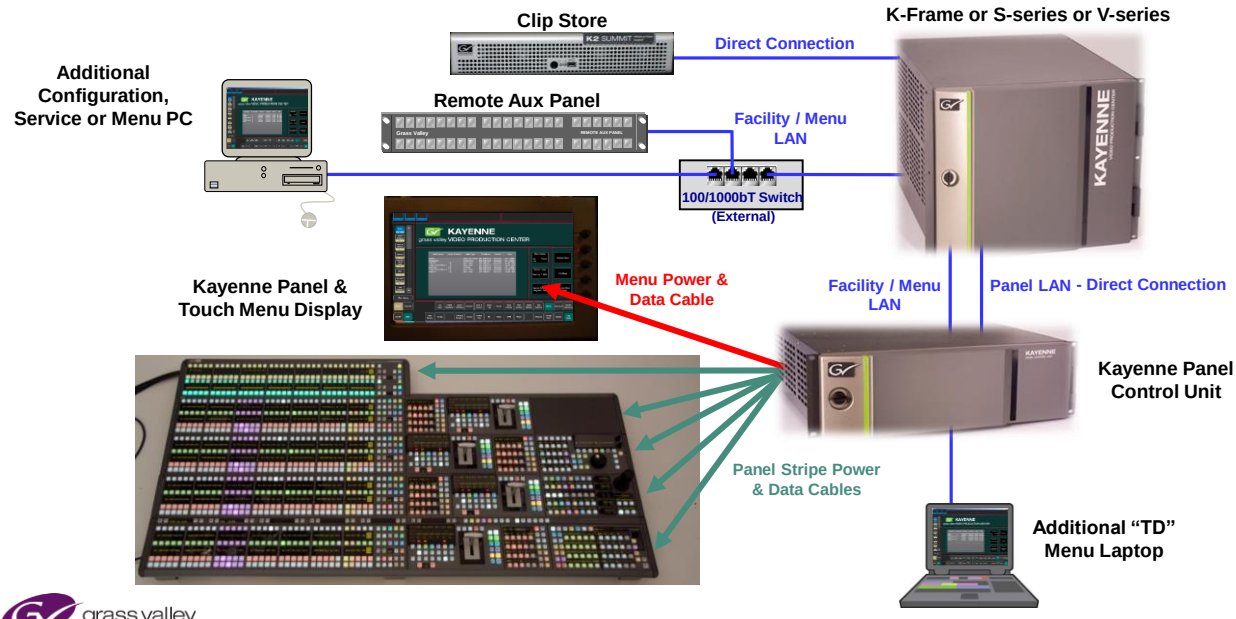
Customers purchase their own PC

Dell or HP touch screen self contained PC recommended.

Display must have a native 1920 x 1080 resolution.

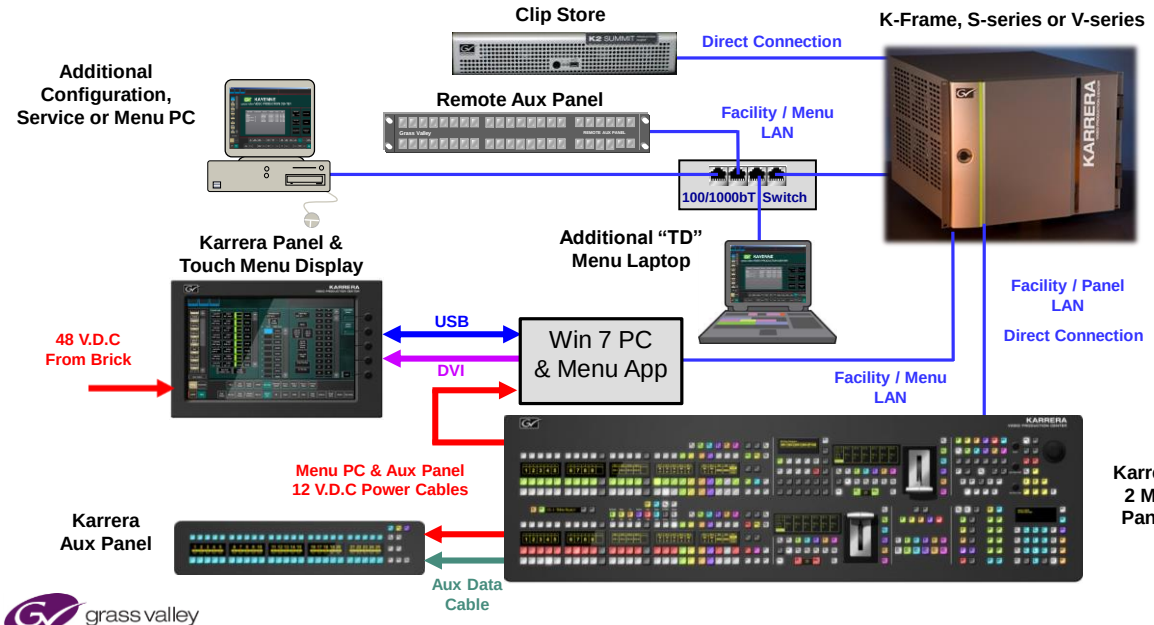
- Ordering Model information: KRR-LIC-1ME-GUI
- The Karrera Soft Panel (KSP) is a Windows Version 7 Application.
    - Two applications running at all times, Menu and Panel.
    - A PC is NOT supplied by Grass Valley.
    - Software and a custom Keyboard are supplied.
    - The option must be licensed in the Karrera Video Frame.
    - Certain HP and Dell Touch PCs have been qualified by GV Engineering.
- The software is written for a Touch Screen with a resolution of 1920 x 1080.
- The Menu Application is an overlay on top of the “Soft Button Board”.
- The Menu operates the same as if on a dedicated menu panel or PC.

Kayenne System Communications



- The Clip Store, Panel LAN and Menu/Facility LAN must be connected as shown with no Ethernet switches or Routers between the components and the Frame.
- Kayenne and Kayenne-XL systems use a panel constructed of "Stripes". Each row on the panel or Mix Effects bank is comprised of panel modules to create a stripe.
- Panel Modules may be assembled into the Stripe Trays in any order desired.
- Each Stripe communicates with the Kayenne Panel Control Unit (PCU) via it's own proprietary Power and Data Cable.
- The Menu "Touch" Display Panel uses a different proprietary Power and Data Cable to communicate with it's processor in the PCU.
- The PCU communicates with the Kayenne frame using 2 Ethernet (10, 100, 1000bT) connections.
- PCU to Stripe and Menu cables are available in either 7.5 or 15 meter lengths.
- There are 4 network ports on the rear of the Kayenne Frame and 6 on the PCU. Grass Valley requires that the connections (menu AND panel) between the PCU and Kayenne frame are dedicated and not run through a switch.
- The connection between the ClipStore and the Kayenne Frame must also be dedicated and not run through a switch.

Karrera System Communications



The Clip Store, Panel LAN and Menu/Facility LAN must be connected as shown with no Ethernet switches or Routers between the components and the Frame.

The Karrera system uses a panel constructed of internal "Stripes". Each row The Menu "Touch" Display Panel is an option on Karrera. When supplied by GV, it will use a different (than Kayenne) proprietary Power and Data Cable set to communicate with it's standalone Windows 7, 64 bit PC. This is a small fanless "brick" PC and can mount on the articulated arm directly behind the menu panel with the supplied bracket.

The Optional Aux Panel has separate Power and Data connections to the rear of a Karrera Panel. The RJ-45 connector (Stripe Data, not ethernet) does NOT carry power.

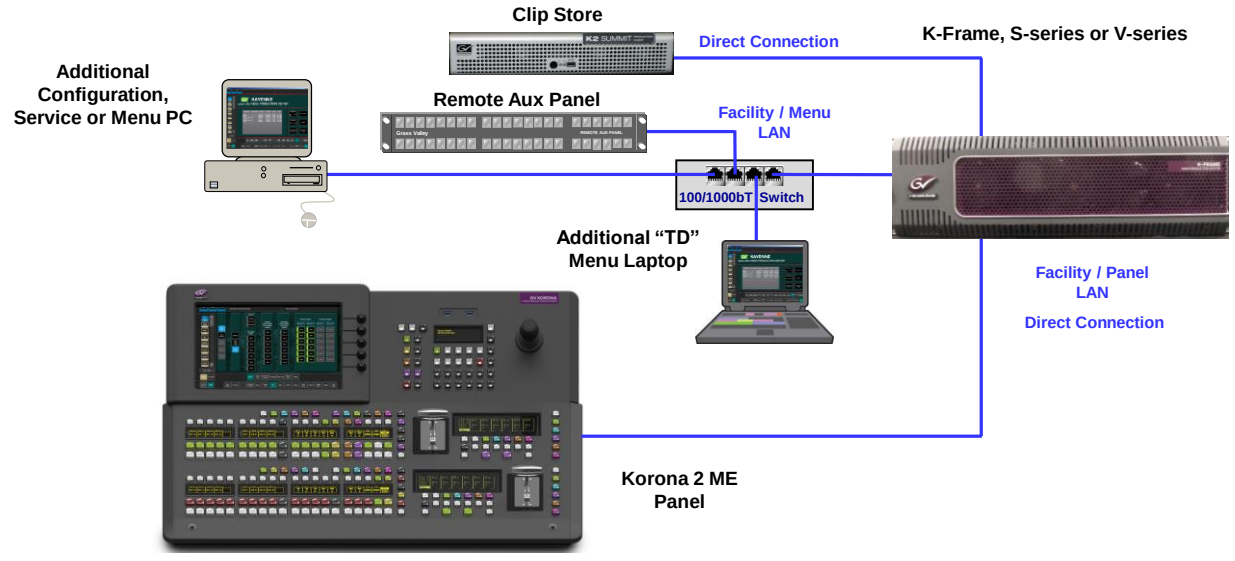
The Panel and Menu both communicate with the Karrera frame using 2 Ethernet (10, 100, 1000bT) frame connections.

Other devices may communicate with the Karrera frame via Ethernet.

There are 4 network ports on the rear of the Karrera Frame. Grass Valley requires that the connections between the frame and panel & Menu are dedicated and not run through a switch.

The connection between the ClipStore and the Karrera Frame must also be dedicated and not run through a switch.

GV Korona System Communications



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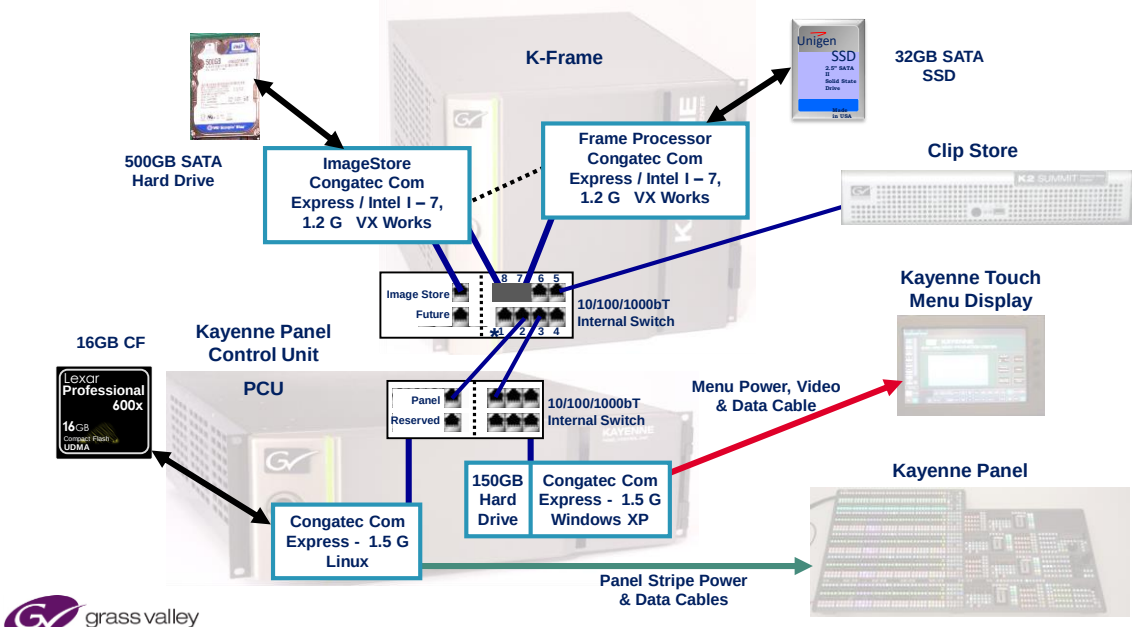
1-26

The GV Korona panel has a single network connection to the frame..
It can connect to a K-Frame, S-series of V-series chassis.

K-Frame Processor Communications (w/Kayenne PCU)



The K-Frame Video Congatech Com Processor boots from the Video Frame 16 GB Sata II Solid State Hard Drive (SSDD). This frame does not contain a removable CF card. All data, Configurations, E-MEMs and NV Ram are written to this drive.

There are 2 different versions of the Frame Processor Board for the K-Frame. The different size frames dictate which board is used. They are NOT interchangeable. The 6 RU frame uses a 144 x 144 Cross Point chip and a smaller number of video paths and drivers. The 13 RU frame uses a 288 x 288 Cross Point chip and has a dedicated Multiviewer chip..

This Frame Processor board runs VX Works operating system. This board is NOT backwards compatible to Kayenne or Karrera frames.

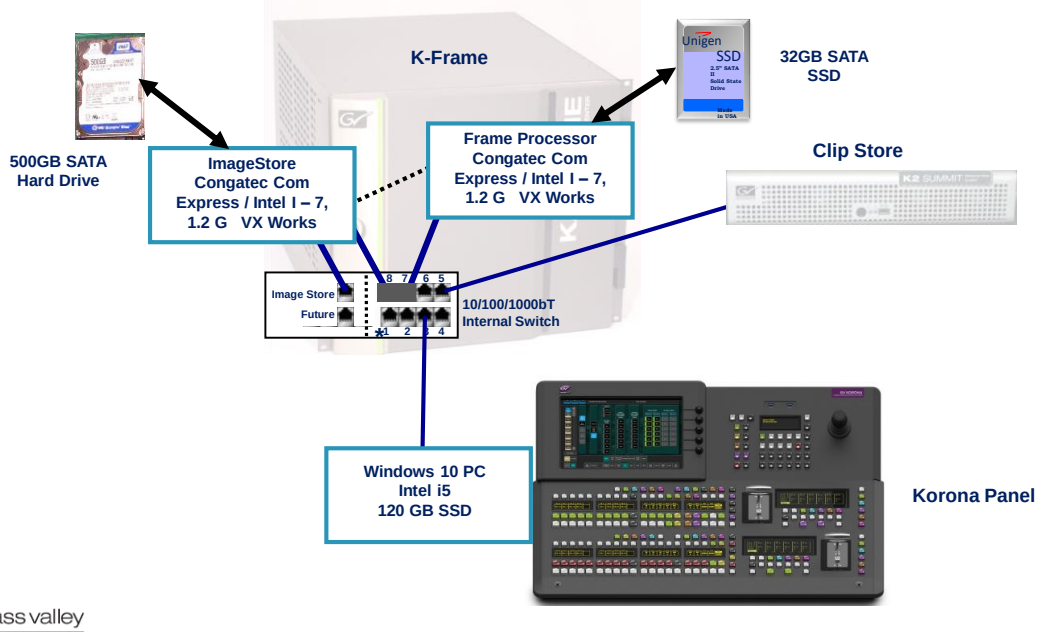
The K-Frame uses an optional ImageStore board. This board also communicates directly to the rear frame network connections for external storage.

The Video Frame E-Net switch port #1 is configured from the factory as a diagnostic connection to a PC running WireShark. When this port is in Diagnostic mode (DIP switch 1), an adjacent LED will be illuminated. This port will then mirror all communications from all ports.

The Clip Store, Panel LAN and Menu/Facility LAN must be connected as shown with no Ethernet switches or Routers in- between the network components.

In v11 software the PCU must be upgraded to Windows 10.

K-Frame Processor Communications (w/GV Korona)



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The GV Korona panel runs on asingle Windows 10 Processor.
It has a single network connection to the frame.
This connection carries all menu and panel functions.

K-Frame External Interfaces

- 50 Pin D-Type Connector (Located on the Input Boards):
  - 8 GPI Inputs per (Opto-isolated, ground closure)
  - 32 Outputs Relays (24 Tally and 8 GPO)
- 8 RS-422/485 Ports (DB-9):
  - Peripheral Bus II Protocol (PBus II)
  - Editor: GVG 100 & 200 Protocols
  - 32 VTR/Device Control: AMP, Odetics, VDCP, BVW
    - 28 Assignable for External devices, 4 dedicated for ClipStore channels
- 6 Ethernet RJ-45 Connectors on Video Frame (1 for IS and 1 Not Used)
- 6 Ethernet RJ-45 Connectors, on PCU Frame (Kayenne panels only)
  - Ethernet Tally option
  - Ethernet Machine control

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The Clip Store counts as 2 or 4 of the 32 controllable devices.

The video frame has four RJ-45 Facility LAN connectors on the rear panel. These ports are connected to an internal auto-sensing, auto negotiating layer 2 switch located on the frame processor board. The frame processor and Image store CPUs are also tied internally to this device. Connections from the Kayenne PCU panel port and Facility LAN ports should be connected here for reliable gigabit operation. Additional network devices may also be tied to this switch.

The Kayenne PCU frame has six RJ-45 Facility LAN connectors and one Panel RJ-45 connector on the rear panel. These 6 ports are connected to an internal auto-sensing, auto negotiating layer 2 switch located on the PCU board. The PCU Windows Menu processor is also tied internally to this device. The panel processor is connected directly to the Panel port. Connections from the PCU Panel LAN port and Facility LAN port should be connected directly to the Video Frame network ports for reliable gigabit operation. Additional network devices may also be tied to this switch.

The Karrera Panel has a single Ethernet port. This is to be directly connected to the video frame for control.

K-Frame Video I/O Modules

K-Frame Video Input and Output Modules:

- All Inputs and Outputs operate at the assigned frame operating serial digital rate: 270 Mb/S, 1.485 Gb/S or 2.97 Gb/S
- 32 Inputs per rear Input Card
- 4 Scalable Inputs and Outputs per Modular I/O Assembly (Optional)
  - There are 4 scalars on the Modular I/O card that can be used on either the inputs or the outputs of the module
  - The Input scalars will covert he input format to the frame operating rate and can be set for automatic
  - The Output mode of the scalars can be set for any of the available SDI formats
- IP Modular I/O card with 4 IP I/O connections and 1 SDI I/O (Optional)
- 16 Outputs per rear Output card

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The K-Frame utilizes a mid-plane board. This allows tor front and rear access with circuit boards.

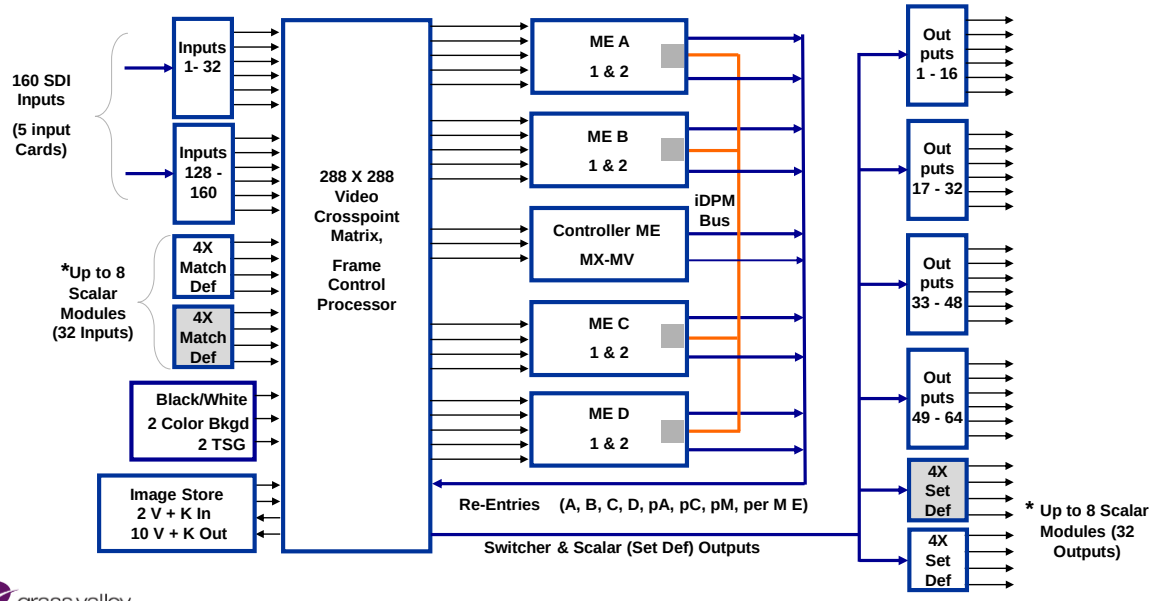
Input boards carry 32 input BNCs, provide Equalization and reclocking before sending the sources to the mid-plane and then to the Frame processor Cross Point chip.

Optional Modular I/O assemblies may be used for Set Def and Match Def Scaling functions and / or additional normal inputs and outputs. Each module has 4 Scalar Circuits, 4 input and 4 output BNCs. These may be configured in any combination of Set Def and / or Match Def inputs and outputs with a MAXIMUM of 4 Scalar functions. There are 3 modes of operation that can be configured on a connector by connector basis: Match Def, Set Def and Bypass.

The “Match Def” option allows the format of the incoming video to be changed as long as the input is in the same Vertical timing system. For example: If the switcher is operating in the 1080i / 59.94 format, then the Match Def inputs may accept 480i, 720p or 1080p formats as long as they are both 59.94 Hz vertical. Match Def will then convert them to 1080i for correct processing.

There is 1 set of Reference input Loop-Thru BNC connectors. The switcher frame may be referenced by Color Black or Tri-Level Sync for any mode. Tri-Level Sync is NOT required for HD operation. The switcher may also be referenced from any of the SDI input signals.

K-Frame Video Flow 9 ME (13 RU)



The grey boxes in the ME represent the 4 channels of iDPM that are on each ME board. The orange line indicates that these are available for routing to any Keyer in any ME

* Modular I/O assemblies may be used as input hardware, output hardware or a combination of both. There are 8 module slots in the rear of the Standard Frame for a total of 64 I/O connections but with only 32 conversion functions.

When Match Def (Input Scaling) is used for any of the input connectors on a Modular I/O assembly, the companion output connectors on the same unit are standard outputs only. The inverse is true as well. When outputs are used for Set Def, the companion input channels are standard or same format as the operating format of the switcher.

When Modular I/Os are used as additional inputs in the Standard Frame, for configuring, they start at Source Number 161 and go to 192.

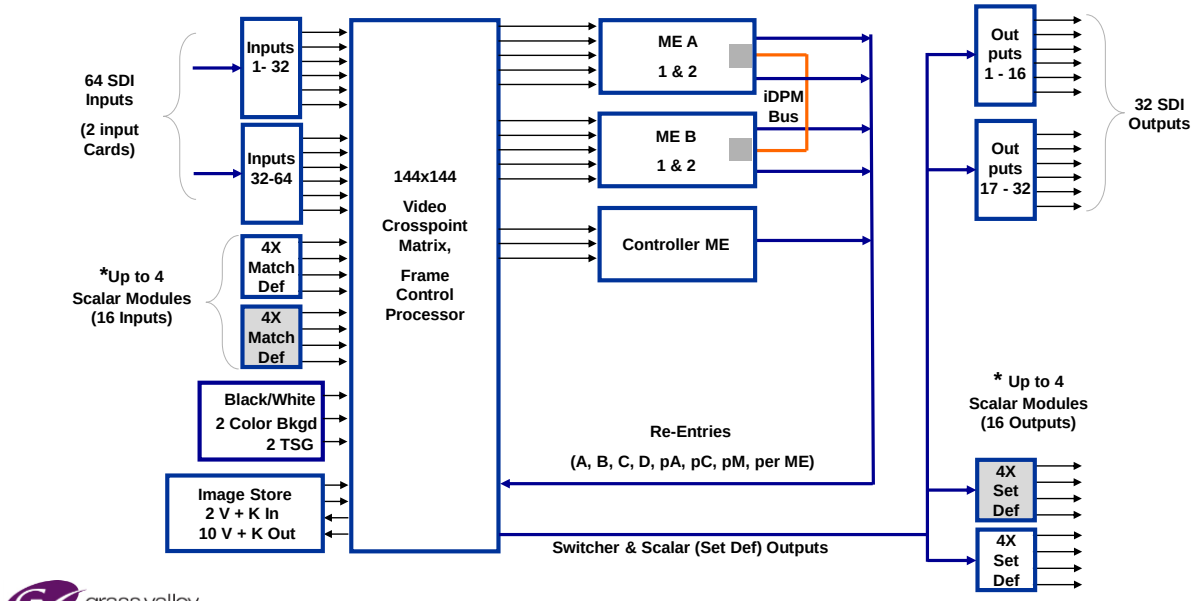
When Modular I/Os are used as additional outputs in the Standard Frame, for configuring, they start at Output Number 65 and go to 96.

The Large frame has a different Controller card to the Compact Frame.

This card has a larger Crosspoint chip and additional hardware dedicated for use as a MultiViewer. (MX-MV)

All Switcher outputs are configurable as to function.

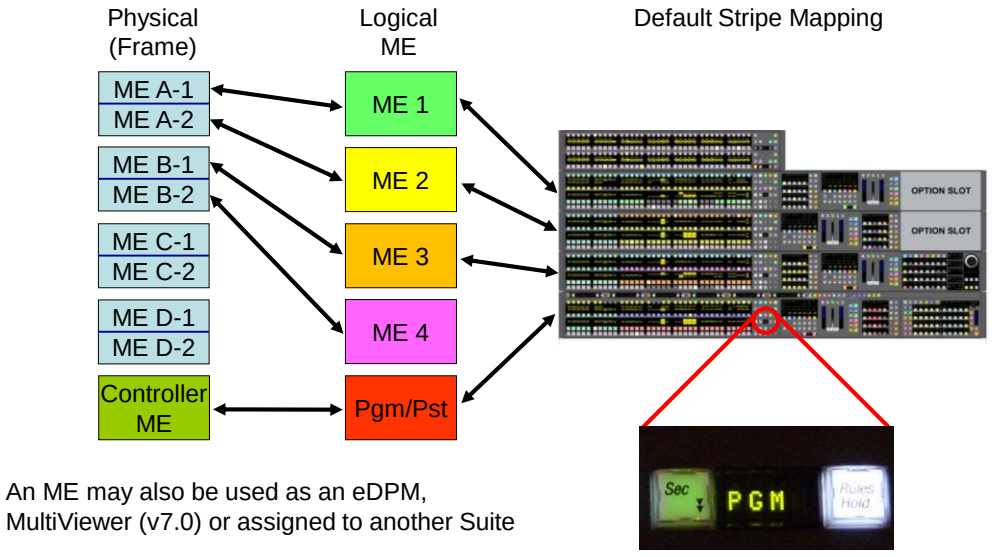
K-Frame Video Flow 5 ME (6 RU) - Compact frame



The Compact Frame does not have the MultivViewer hardware on the Controller board.

It also only has provision for 2 Input modules, 2 Output Modules and 2 ME boards with a maximum of 8 iDPMs. (4 per ME board)

K-Frame Physical v Logical Mapping - 9 ME (13 RU)



An ME may also be used as an eDPM, MultiViewer (v7.0) or assigned to another Suite

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Note that The ME hardware is required to be used as a MultiViewer but it does not need an ME license. An ME can be used as an eDPM but does require an ME license.

ME A through ME D refer to physical hardware slots in the frame. Each ME Slot now carries a dual ME card or 2 separate sets of ME circuitry. Each slot is now labeled as the slot letter name with a 1 or 2 suffix.

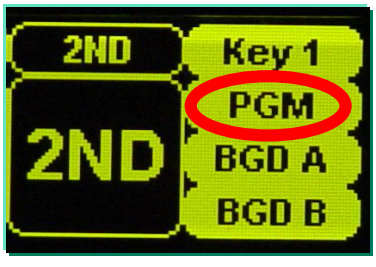
The Controller ME is identical to the full MEs except iDPM capability

As seen above left, the Physical Frame ME hardware may be Logically Mapped to any ME Name. Refer to the: "Eng Setup / Acquire Resources" menu.

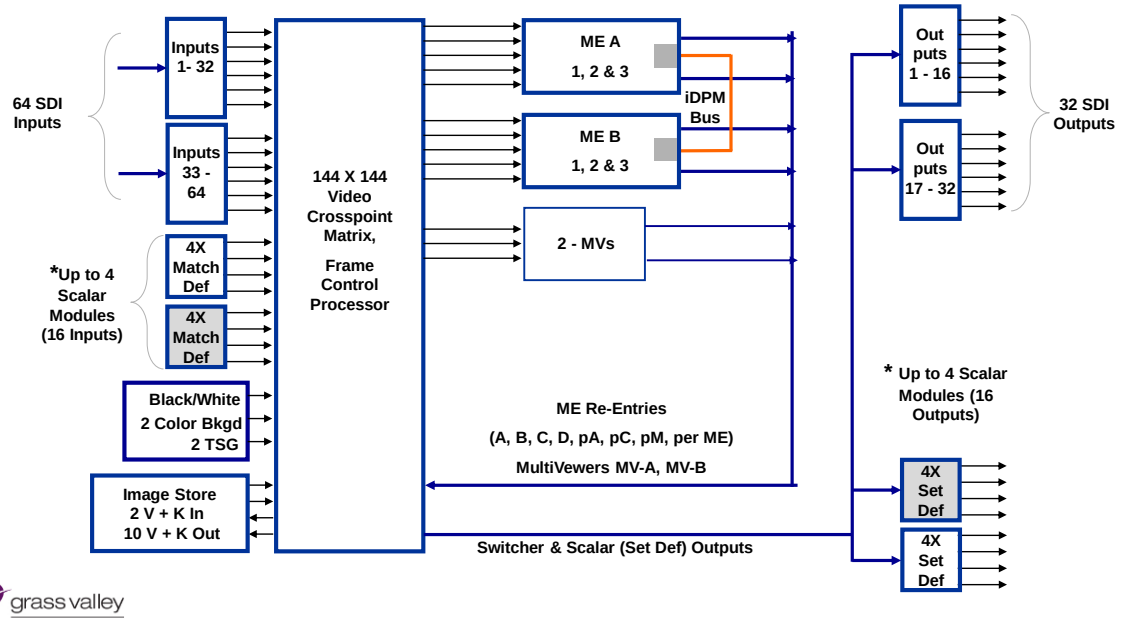
As seen above center, the Logical ME Name may then be applied or mapped to any operating position (Stripe) on the Panel (or Panels in the case of multiple Suite delegations). Refer to the "Local E-Mem" panel, "Delegation Mode". Once configured the operator only sees the Logical names in menus and panel displays.

The Karrera Panels use the same configurable mapping of hardware to Control Surfaces.

The Karrera Panel will display stripe to ME delegation at the right end of the CrossPoint display.



K-Frame S-series Video Flow 6 ME (6 RU)



The grey boxes in the ME represent the 4 channels of iDPM that are on each ME board. The orange line indicates that these are available for routing to any Keyer in any ME

* Modular I/O assemblies may be used as input hardware, output hardware or a combination of both. There are ONLY 4 module slots in the Compact Frame for a total of 32 I/O connections but with only 16 conversion functions.

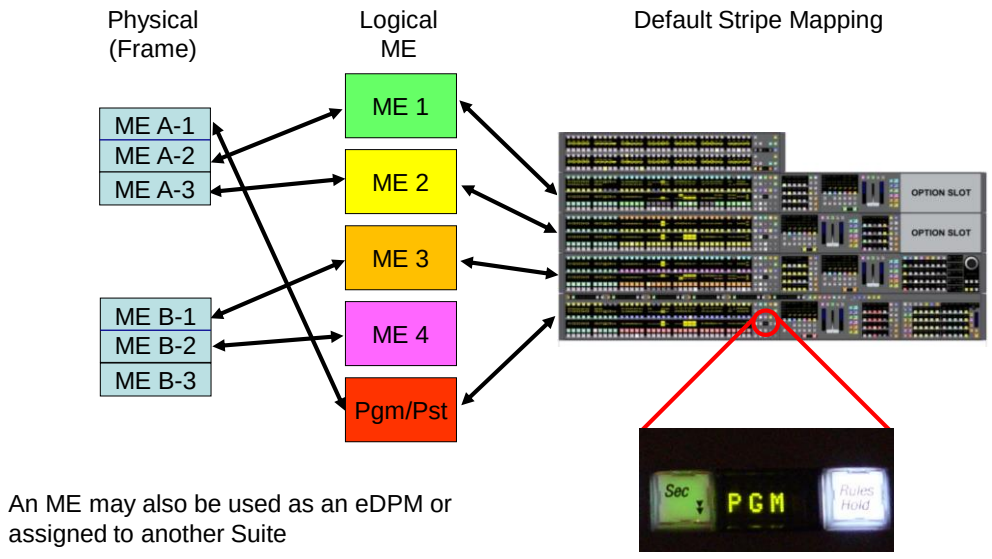
When Match Def (Input Scaling) is used for any of the input connectors on a Modular I/O assembly, the companion output connectors on the same unit are standard outputs only. The inverse is true as well. When outputs are used for Set Def, the companion input channels are standard or same format as the operating format of the switcher.

When Modular I/Os are used as additional inputs in the Compact Frame, for configuring, they start at Source Number 161 and go to 176.

When Modular I/Os are used as additional outputs in the Compact Frame, for configuring, they start at Output Number 65 and go to 80.

The ME Viewer Output is called PVW M.(pM)

K-Frame Physical v Logical Mapping – S-series - 6 M E (6 RU)



An ME may also be used as an eDPM or assigned to another Suite

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An ME can be used as an eDPM but does require an ME license.

ME A through ME B refer to physical hardware slots in the frame. Each ME Slot now carries a Triple ME card for 3 sets of separate sets of ME circuitry. Each slot is now labeled as the slot letter name with a 1, 2 or 3 suffix.

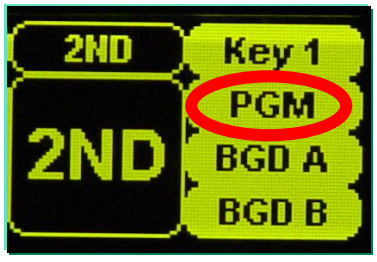
There is no Controller ME in the S-series systems.

As seen above left, the Physical Frame ME hardware may be Logically Mapped to any ME Name. Refer to the: "Eng Setup / Acquire Resources" menu.

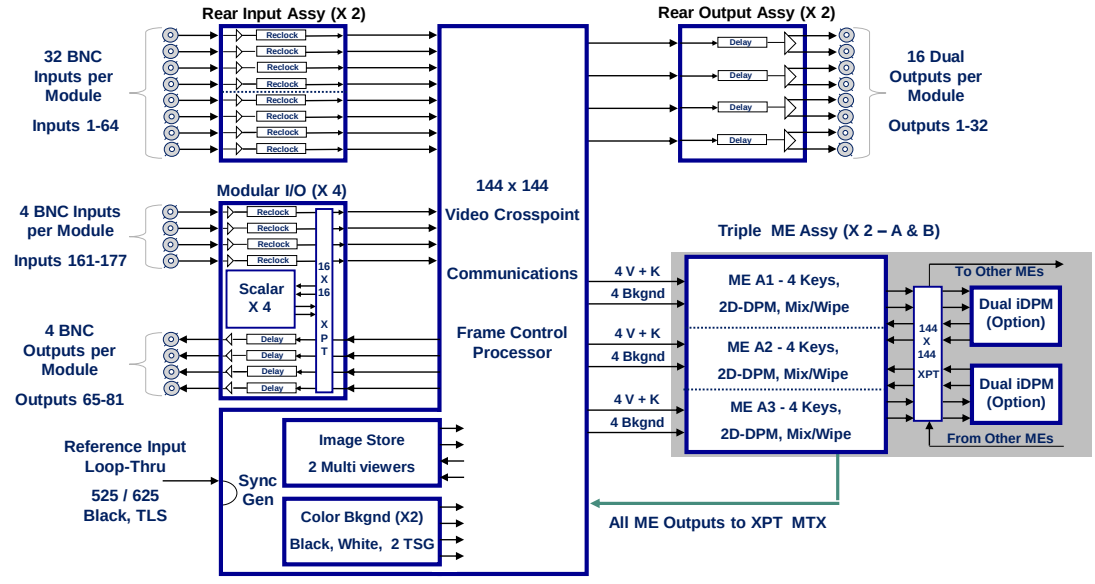
As seen above center, the Logical ME Name may then be applied or mapped to any operating position (Stripe) on the Panel (or Panels in the case of multiple Suite delegations). Refer to the "Local E-Mem" panel, "Delegation Mode". Once configured the operator only sees the Logical names in menus and panel displays.

The Karrera Panels use the same configurable mapping of hardware to Control Surfaces.

The Karrera Panel will display stripe to ME delegation at the right end of the CrossPoint display.



K-Frame Video Flow - S-series 6 ME



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Timing Notes:

Inputs are equalized and reclocked on the Input boards before entering the crosspoint circuits.

Outputs come from the M E boards as untimed serial data, through the crosspoint matrix and are then fed to the Output boards. The data is then processed, delayed and sent out via the output connector assembly.

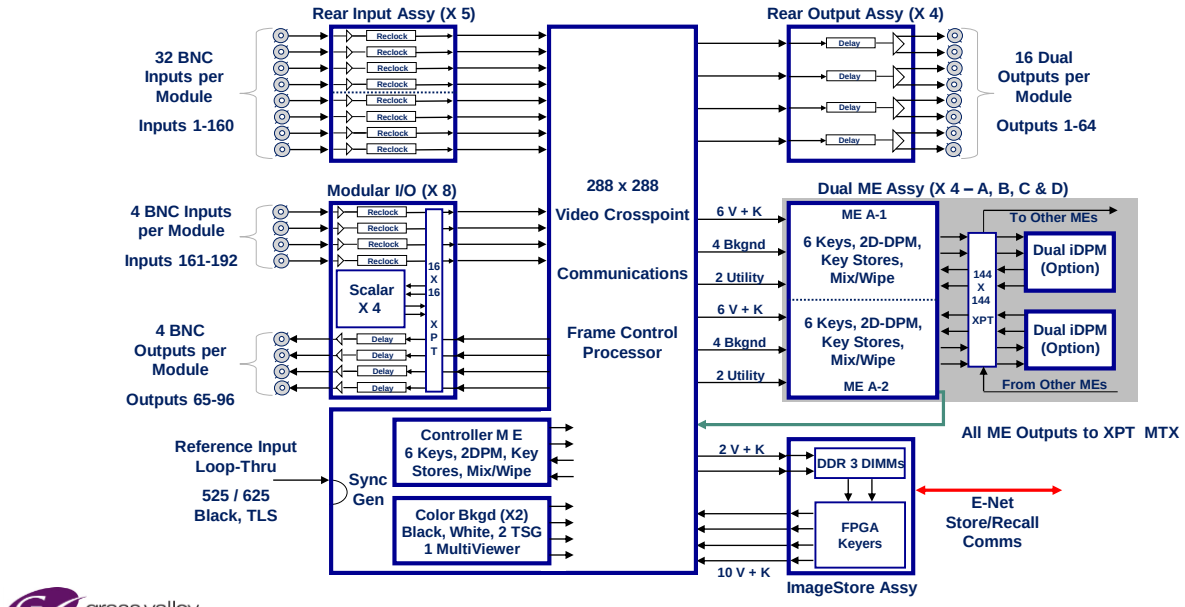
Unlike the original Kayenne frame, this system has one genlock reference loop-thru. All operating formats may be locked to analog Color Black, HD Tri-Level Analog Sync or from any of the serial digital video inputs.

If a signal is outside of that timing window, it will be vertically off by one line, either up or down. There is no guarantee that it will frame properly.

Internal reference may be moved to be either early or late a small amount in comparison to the selected genlock source. This function may aid in capturing an input into the auto-timing window.

Dual iDPM modules are a license option. Each Dual Video Processor board contain 2 iDPM channels for a total of 4 iDPMs. A fully optioned 13RU Frame may contain 16 floating Transform Engines.

K-Frame Video Flow 9 MEs (13 RU Detail)

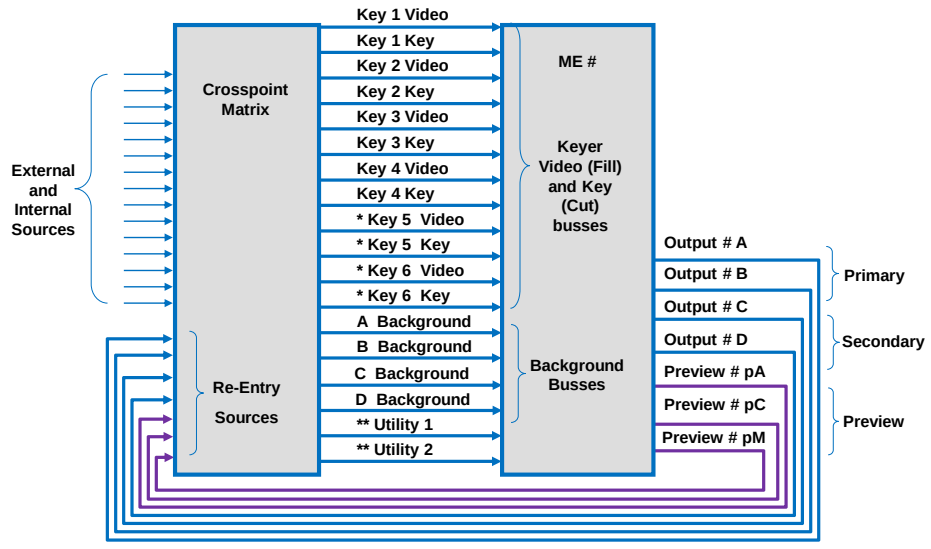


The Larger frame hold 2 additional Dual Video Processor boards and has more Input, Output and Modular I/O capability.

The Controller card has a larger Video Crosspoint chip and an extra MultiViewer chip and is therefore not compatible with the smaller K-Fames.

The Compact Frame Controller card has a 144x144 Xpt chip and does not have the dedicated Multi Viewer hardware.

3G K-Frame ME Video Flow



Two Sets per Dual Video Processor (3 on Triple ME boards)

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ME Mode Notes:

* Key busses 5 and 6 only exist on the Dual ME boards.

** The Utility busses U1 and U2 only exist in the K-Frame Dual ME boards. These are used for backgrounds for the Secondary Partition in Split Mode described below.

The C and D busses act as Utility busses for the S-series frame.

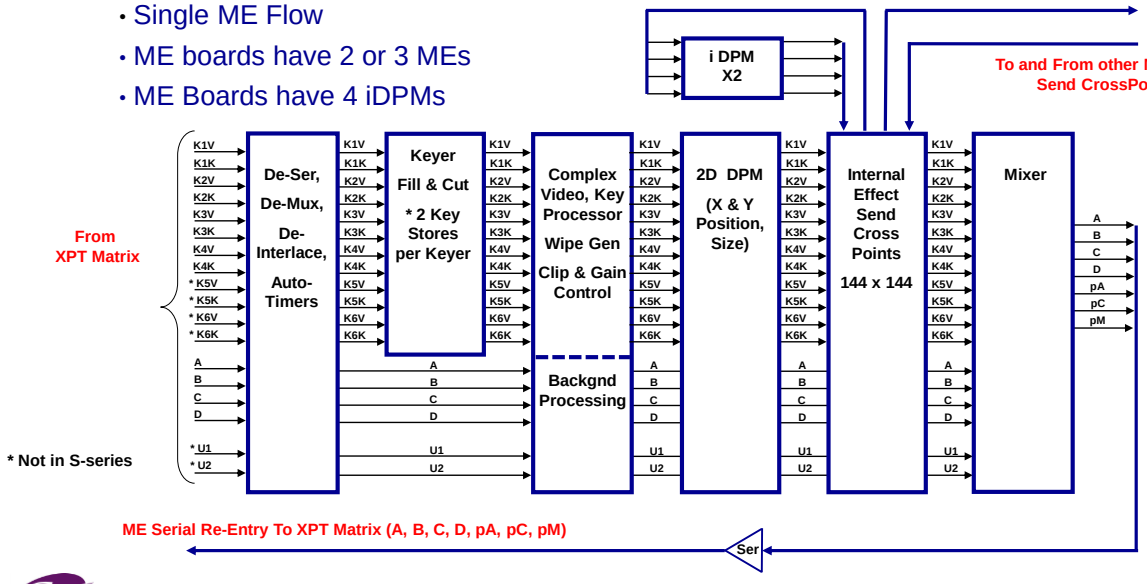
The other Difference is the ME View output (pM) active with v6.0 software.

Each Mix Effects can be configured for different operating modes.

1. Normal Mode. Main output is A – all keys active. B, C and D are clean outputs – No keys active.
2. Programmable Clean Feed Mode (PCF) (Flexi-Key) – Provides controllable keys on all 4 ME outputs
3. Split Mode. (Double Take) – Enables Primary and Secondary ME functions. Keys can be assigned to either Primary or Secondary. Utility busses are Secondary backgrounds.
4. Split / Layered mode configures an output as a Key channel. If in Split mode, the Primary side Key will be output B and the Secondary side Key will be output D.

K-Frame ME Video Flow (Detail)

- Single ME Flow
- ME boards have 2 or 3 MEs
- ME Boards have 4 iDPMs



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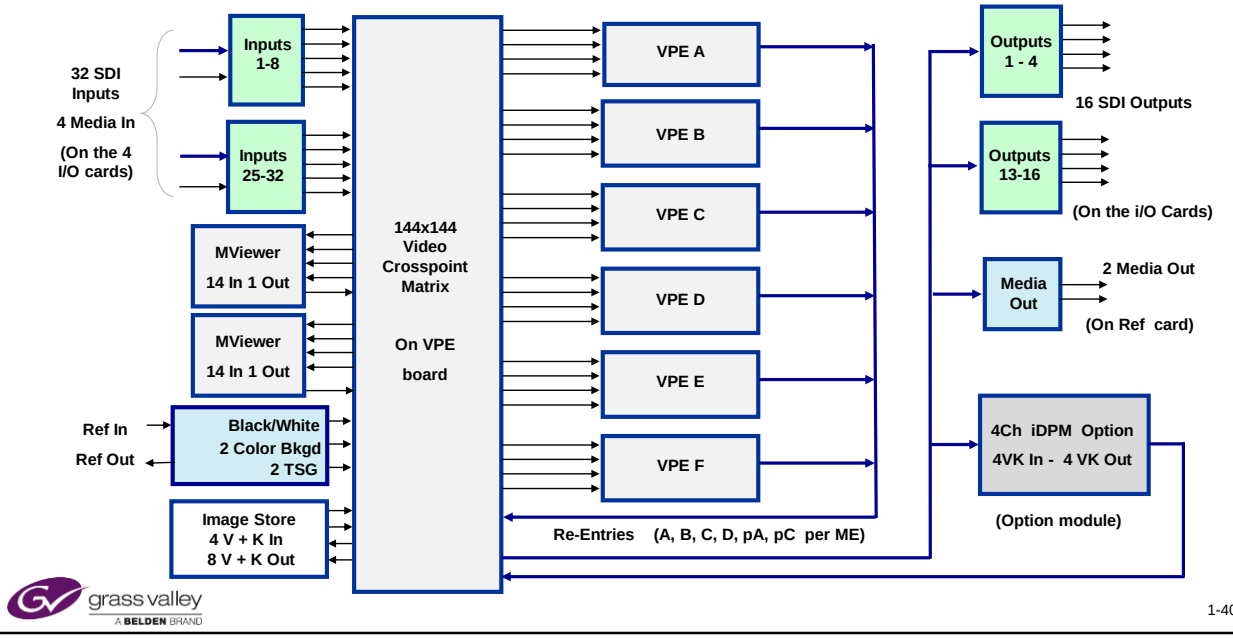
ME Notes:

iDPM processing is assignable to any ME, any Key. The Keyers no longer have their own dedicated Transform Engine as in the Kayenne and Karrera frames. iDPMs are floating, accessed through the Effects Send menus. Each Dual ME board may contain up to 4 optional iDPM Licenses. A Standard frame may then have a maximum of 16 Transform Engines.

The K-Frame contains a 2D DPM (Resizer) on every ME Keyer path. This allows for X & Y transforms and Picture Size to be adjusted. This will not allow for Z-space transforms or rotation of any kind. But this is perfect for repositioning and sizing keys

• The S-series Triple ME boards do not have Keys 5 and 6 or Key Stores on any of the Keyes 1-4..

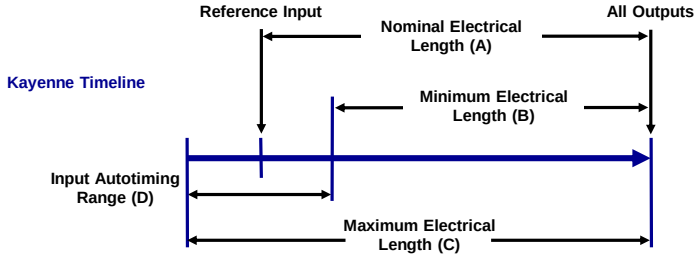
K-Frame V-series Video Flow - 6 VPE (3 RU)



The K-Frame V-series houses 3 boards from the front.

The reference Out is NOT a generator it is an output from the Reference input.

K-Frame Timing



Mode	A	B	C	D
525i / 29.97	61.46 µs	59.36 µs	63.56 µs	+/- 8.69 µs
625i / 25	61.68 µs	59.36 µs	64.00 µs	+/- 8.88 µs
720p / 59.94	19.79 µs	17.34 µs	22.24 µs	+/- 2.02 µs
720p / 50	21.96 µs	17.34 µs	22.24 µs	+/- 4.23 µs
1080i / 29.97	23.50 µs	17.34 µs	29.66 µs	+/- 5.73 µs
1080i / 525	26.46 µs	17.34 µs	35.56 µs	+/- 8.68 µs
1080p / 59.94	13.70 µs	8.67 µs	18.52 µs	+/- 2.87 µs

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Timing Notes:

There may be a very slight difference in measurable delay between different versions of software.

All paths through the switcher will be of equal delay or length of time except when using eDPM or iDPM channels. This will add 1 frame length to the signal being transformed.

If an input signal is before or ahead in time of the auto timing window, a one line vertical shift up may occur when selecting this signal.

If an input signal is after or late in time compared to the auto timing window, a one line vertical shift down may occur when selecting this signal.

Embedded Audio (Ancillary Data) may be passed or stripped from paths through the switcher as configured in the Eng Setup / Video Settings Menu.

All values are for K-frame systems.