

Kayak HD

DIGITAL PRODUCTION SWITCHER

Installation and Service Manual

SOFTWARE VERSION 6.8.0

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the most watched worldwide

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Grass Valley Web Site

The www.thomsongrassvalley.com web site offers the following:

Online User Documentation — Current versions of product catalogs, brochures, data sheets, ordering guides, planning guides, manuals, and release notes in .pdf format can be downloaded.

FAQ Database — Solutions to problems and troubleshooting efforts can be found by searching our Frequently Asked Questions (FAQ) database.

Software Downloads — Software updates, drivers, and patches can be downloaded.

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Preface

About This Manual

This Kayak HD Installation and Service Manual provides installation, configuration, and service information for the Grass Valley Kayak HD Digital Production Switcher. This manual is designed for technical personnel responsible for installing and maintaining Kayak HD systems.

Standard Documentation Set

The standard Kayak HD documentation set consists of:

- User Manual
- Installation and Service Manual
- Release Notes

The User Manual contains background information about the Kayak HD Digital Production switcher and describes operating procedures. This manual can be used while learning about Kayak HD and for enhancing your basic knowledge of the system.

The Installation and Service Manual contains information about installing, configuring, and maintaining the system. The service section of this manual is in preparation.

The Release Notes contain information about new features and system enhancements for a specific software version, and also includes software installation procedures. Always check the release notes for your current system software before you begin operating your system.

Other Documentation

Communication protocols of Kayak HD are available upon request for developers and software engineers to use to design editor and other external interfaces to the Kayak HD system.

Regulatory Notices

Certifications and Compliances

FCC Emission Control

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial

. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense. Changes or modifications not expressly approved by Grass Valley Group can affect emission compliance and could void the user's authority to operate this equipment.

Canadian EMC Notice of Compliance

This digital apparatus does not exceed the Class A limits for radio noise emissions from digital apparatus set out in the Radio Interference Regulations of the Canadian Department of Communications.

Le présent appareil numérique n'émet pas de bruits radioélectriques dépassant les limites applicables aux appareils numériques de la classe A prescrites dans le Règlement sur le brouillage radioélectrique édicté par le ministère des Communications du Canada.

EN55022 Class A Warning

For products that comply with Class A. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.

Canadian Certified Power Cords

Canadian approval includes the products and power cords appropriate for use in the North America power network. All other power cords supplied are approved for the country of use.

Canadian Certified AC Adapter

Canadian approval includes the AC adapters appropriate for use in the North America power network. All other AC adapters supplied are approved for the country of use.

FCC Emission Limits

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesirable operation. This device has been tested and found to comply with FCC Part 15 Class B limits for a digital device when tested with a representative laser-based fiber optical system that complies with ANSI X3T11 Fiber Channel Standard.

Certification

This product has been evaluated for Electromagnetic Compatibility under the EN 55103-1/2 standards for Emissions and Immunity and meets the requirements for E1/E2 environment.

This product complies with Class A (Control Panel) and Class B (Frame). In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.

This product has been evaluated and meets the following Safety Certification Standards:

Category	Standard	Designed/tested for compliance with:
Safety	ANSI / UL60950	"Standard for Safety of Information Technology Equipment - Safety - Part 1: General Requirements", (ANSI/UL 60950-1, First Edition, Dated April 1, 2003, with revision through and including November 26, 2003.)
	IEC 60950	"Standard for Safety for Information Technology Equipment - Safety - Part 1: General Requirements", (IEC 60950-1, First Edition, 2001, Corrigendum 1:10-2002)
	CAN/CSA C22.2, No. 60950	"Standard for Safety of Information Technology Equipment - Safety - Part 1: General Requirements", (CAN/CSA-C22.2 No. 60950-1-03, First Edition Dated April 1, 2003, with revisions through and including November 26, 2003)
	EN60950	Safety of Information Technology Equipment, including Electrical Business Equipment.
	73/23/EEC	Low Voltage Directive

Category	Standard	Designed/tested for compliance with:
EMI	EMC Directive 89/336/EEC via EN 55103-1 and 2	Audio, Video and Entertainment Lighting Control for the European Community.
	EN 55103-1 standards	Electromagnetic compatibility. Product family standard for audio, video, audio-visual and entertainment lighting control apparatus for professional use. Part 1 Emissions, Environment E1/E2 EN 55022: Class A (Control Panel) and Class B (Frame) Radiated and Conducted Emissions EN 61000-3-2: Power Line Harmonic Emissions, Radiated Magnetic Field Emissions, Peak Inrush Current
	EN55103-2 standards	Electromagnetic compatibility--Product family standard for audio, video, audio-visual and entertainment lighting control apparatus for professional use. Part 2 Immunity, Environment E1/E2 EN 50082-1: Immunity EN 61000-4-2: Electrostatic Discharge "ESD" Immunity EN 61000-4-3: Radiated RF Electromagnetic Field Immunity EN 61000-4-4: Electrical Fast Transient/Burst "EFT" Immunity EN 61000-4-5: Surge Immunity EN 61000-4-6: Conducted RF Immunity EN 61000-4-11: Voltage Dips, Short Interruptions and Voltage Variations Annex A - Radiated Magnetic Field Immunity Note: This only applies to assemblies sensitive to magnetic fields
	US FCC Class A	CISPR Pub. 22 (1985)
	Canada FCC Industry Canada	
	Australia & New Zealand:	AS/NZS 3548

Safety Summary

Read and follow the important safety information below, noting especially those instructions related to risk of fire, electric shock or injury to persons. Additional specific warnings not listed here may be found throughout the manual.

WARNING Any instructions in this manual that require opening the equipment cover or enclosure are for use by qualified service personnel only. To reduce the risk of electric shock, do not perform any servicing other than that contained in the operating instructions unless you are qualified to do so.

Safety Terms and Symbols

Terms in This Manual

Safety-related statements may appear in this manual in the following form:

WARNING Warning statements identify conditions or practices that may result in personal injury or loss of life.

CAUTION Caution statements identify conditions or practices that may result in damage to equipment or other property, or which may cause equipment crucial to your business environment to become temporarily non-operational.

Terms on the Product

The following terms may appear on the product:

DANGER — A personal injury hazard is immediately accessible as you read the marking.

WARNING — A personal injury hazard exists but is not immediately accessible as you read the marking.

CAUTION — A hazard to property, product, and other equipment is present.

Symbols on the Product

The following symbols may appear on the product:



Indicates that dangerous high voltage is present within the equipment enclosure that may be of sufficient magnitude to constitute a risk of electric shock.



Indicates that user, operator or service technician should refer to product manual(s) for important operating, maintenance, or service instructions.



This is a prompt to note fuse rating when replacing fuse(s). The fuse referenced in the text must be replaced with one having the ratings indicated.



Identifies a protective grounding terminal which must be connected to earth ground prior to making any other equipment connections.



Identifies an external protective grounding terminal which may be connected to earth ground as a supplement to an internal grounding terminal.



Indicates that static sensitive components are present which may be damaged by electrostatic discharge. Use anti-static procedures, equipment and surfaces during servicing.

Warnings

The following warning statements identify conditions or practices that can result in personal injury or loss of life.

Dangerous voltage or current may be present — Disconnect power and remove battery (if applicable) before removing protective panels, soldering, or replacing components.

Do not service alone — Do not internally service this product unless another person capable of rendering first aid and resuscitation is present.

Remove jewelry — Prior to servicing, remove jewelry such as rings, watches, and other metallic objects.

Avoid exposed circuitry — Do not touch exposed connections, components or circuitry when power is present.

Use proper power cord — Use only the power cord supplied or specified for this product.

Ground product — Connect the grounding conductor of the power cord to earth ground.

Operate only with covers and enclosure panels in place — Do not operate this product when covers or enclosure panels are removed.

Use correct fuse — Use only the fuse type and rating specified for this product.

Use only in dry environment — Do not operate in wet or damp conditions.

Use only in non-explosive environment — Do not operate this product in an explosive atmosphere.

High leakage current may be present — Earth connection of product is essential before connecting power.

Dual power supplies may be present — Be certain to plug each power supply cord into a separate branch circuit employing a separate service ground. Disconnect both power supply cords prior to servicing.

Double pole neutral fusing — Disconnect mains power prior to servicing.

Use proper lift points — Do not use door latches to lift or move equipment.

Avoid mechanical hazards — Allow all rotating devices to come to a stop before servicing.

Cautions

The following caution statements identify conditions or practices that can result in damage to equipment or other property

Use correct power source — Do not operate this product from a power source that applies more than the voltage specified for the product.

Use correct voltage setting — If this product lacks auto-ranging power supplies, before applying power ensure that the each power supply is set to match the power source.

Provide proper ventilation — To prevent product overheating, provide equipment ventilation in accordance with installation instructions.

Use anti-static procedures — Static sensitive components are present which may be damaged by electrostatic discharge. Use anti-static procedures, equipment and surfaces during servicing.

Do not operate with suspected equipment failure — If you suspect product damage or equipment failure, have the equipment inspected by qualified service personnel.

Ensure mains disconnect — If mains switch is not provided, the power cord(s) of this equipment provide the means of disconnection. The socket outlet must be installed near the equipment and must be easily accessible. Verify that all mains power is disconnected before installing or removing power supplies and/or options.

Route cable properly — Route power cords and other cables so that they are not likely to be damaged. Properly support heavy cable bundles to avoid connector damage.

Use correct power supply cords — Power cords for this equipment, if provided, meet all North American electrical codes. Operation of this equipment at voltages exceeding 130 VAC requires power supply cords which comply with NEMA configurations. International power cords, if provided, have the approval of the country of use.

Use correct replacement battery — This product may contain batteries. To reduce the risk of explosion, check polarity and replace only with the same or equivalent type recommended by manufacturer. Dispose of used batteries according to the manufacturer's instructions.

Troubleshoot only to board level — Circuit boards in this product are densely populated with surface mount technology (SMT) components and application specific integrated circuits (ASICs). As a result, circuit board repair at the component level is very difficult in the field, if not impossible. For warranty compliance, do not troubleshoot systems beyond the board level.

System Overview

Introduction

The Grass Valley Kayak HD™ digital production switcher is an affordable, compact, and flexible system that offers an array of high-end features for everything from live studio and mobile production to small corporate studios and editing applications. The Kayak HD switcher leverages many of the features found in the Grass Valley KayakDD2™ and Zodiac™ switchers. The result is a compact system with superior image quality and features not found in any other product.

Kayak HD Switcher Models

Three models are available:

- Kayak HD 100C, which includes a 1 M/E Control Panel and a compact 4 RU Video Processor Frame
- Kayak HD 150C, which includes a 2 M/E Control Panel and a 4 RU Video Processor Frame frame equipped with one M/E module
- Kayak HD 200C, which includes a 2 M/E Control Panel and a 4 RU Video Processor Frame frame equipped with two M/E modules

Standard Features

- Switchable between several HD formats
- Fully digital 10-bit, 4:2:2 inputs, outputs
- Compact 4 RU lightweight frames
- Low power consumption
- Hot swappable, front removable modules and power supplies

- Intuitive menu with touch screen
- One DPM Channel standard with planar 3D effects, remaining channels optional, adding non-linear effects (Software License Key (SLK))
- Two high-quality chroma keyers standard
- Number of M/Es:
 - One for Kayak HD 100C
 - 1.5 for Kayak HD 150C
 - Two for Kayak HD 200C

Note .5 M/E includes cuts and mixes, no wipes or iDPM, with simple linear/luminance keyers and no chroma keys.

- Number of inputs:
 - 24 for Kayak HD 100C, 150C
 - 48 for Kayak HD 200C
- Number of outputs:
 - 12 for Kayak HD 100C, 150C
 - 24 for Kayak HD 200C
- Video outputs programmable as M/E, Program or Aux bus outputs
- GPI inputs:
 - Eight for Kayak HD 100C, 150C
 - 16 for Kayak HD 200C
- GPI/Tally Outputs:
 - 32 for Kayak HD 100C, 150C
 - 64 for Kayak HD 200C
- Four full-function keyers per full M/E, each with linear and luminance keying
- Five background generators include black, white, and three color backgrounds
- Test Pattern Generator
- Two analog reference inputs (tri-level sync and black burst) and HD/SD serial digital input reference
- White or colored pushbutton keycaps (factory installed, choose when ordered)
- Freeze frame buffer on every full-function keyer
- Two main wipe generators and 4 keyer wipe generators per M/E
- YUV Color correction on every keyer and background bus

- Internal four-port Gigabit Ethernet (10/100/1000 base T) switch
- Eight serial ports for external machine control

Options

- Internal six-channel RAMRecorder option for video clips and stills
- Three additional iDPMs and Kurl effects package with Page Turn, Page Roll, Spheres, Ripples, Splits, Mirrors, and Slits
- RGB color correction option (SLK) on every keyer and background bus
- Dual Chromatte™ chroma keyers
- Remote monitoring and diagnostic support via NetCentral software
- I/O expander module adds 24 inputs, 12 outputs, 8 GPI Inputs, and 32 GPI/Tally Outputs
- KHD-PSU internal redundant power supply unit
- KDD-PSU rack-mounted remote power supply unit for remote (or additional) control panels
- MatchDef™ dual video source scalar for matching multiple different SD and HD sources into the production format

Supported Control Protocols

- VTRs (BVW-75)
- AMP (Advanced Media Protocol). For Profile PVS, XP, K2, M Series, and Turbo DDRs. Available for RS422 Serial or Ethernet.
- Servers (Louth VDCP, Odetics)
- Routers/ Routing Control Systems (Trinix™, Venus™, Triton™, and third party routers;
- Control Systems (Grass Valley Andromeda™ and third-party systems)
- Grass Valley under monitor displays
- Grass Valley external Remote Aux Panels
- ESAM II for audio-follow-video applications
- Edit controllers (native and Grass Valley Model 100 and 200)

System Components

Kayak HD Control Surfaces

Kayak HD Production Switcher systems use a control panel with an integrated menu display (color TFT with touch-screen).

Kayak HD 100C systems use a 1 M/E panel, and the Kayak HD 150C and 200C systems use a 2 M/E Control panel.

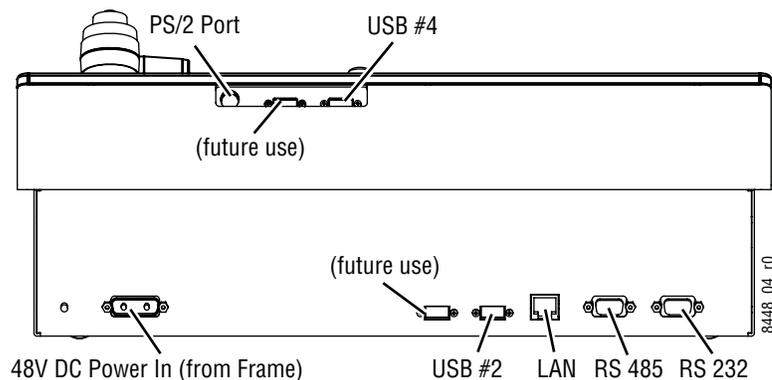
The Sidepanel program, which runs on a user-supplied Windows PC, can also be used to control the Kayak HD system.

1 M/E Control Panel

Figure 1. 1 M/E Control Panel, Top View



Figure 2. 1 M/E Control Panel, Rear View



1.5 and 2 M/E Control Panel

Figure 3. Kayak HD 150C, 200C, and 200 Control Panel

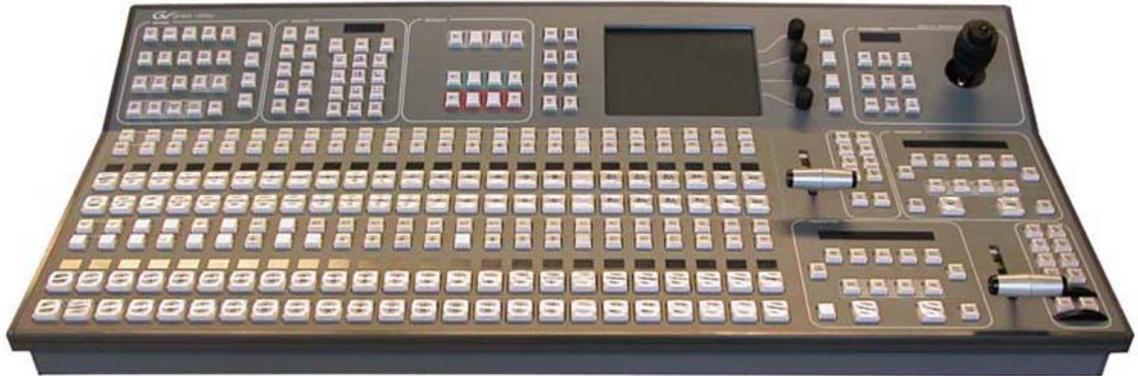
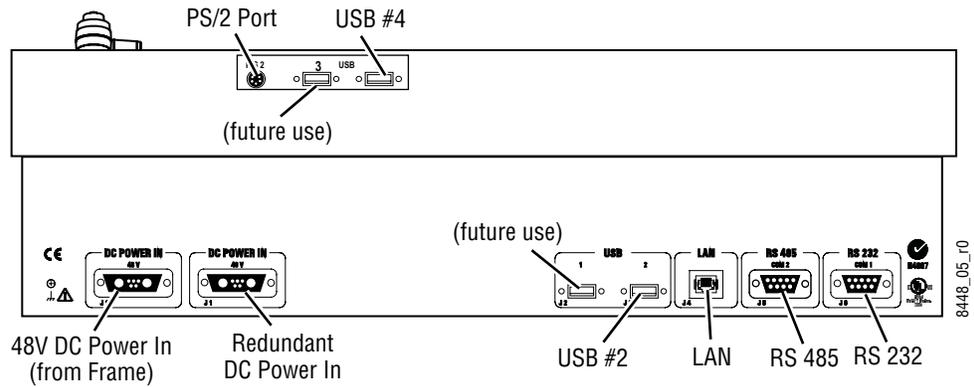


Figure 4. 2 M/E Control Panel, Rear View



Kayak HD Video Processor 4 RU Frame

Figure 5. Kayak HD 4RU Frame, Front View with Door Removed

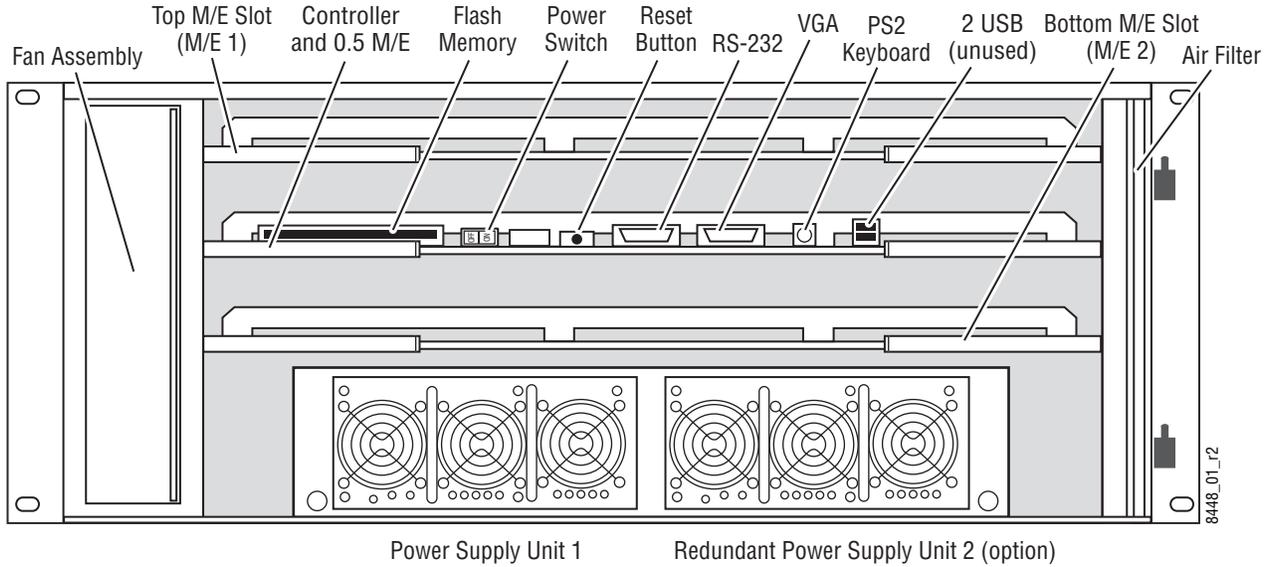
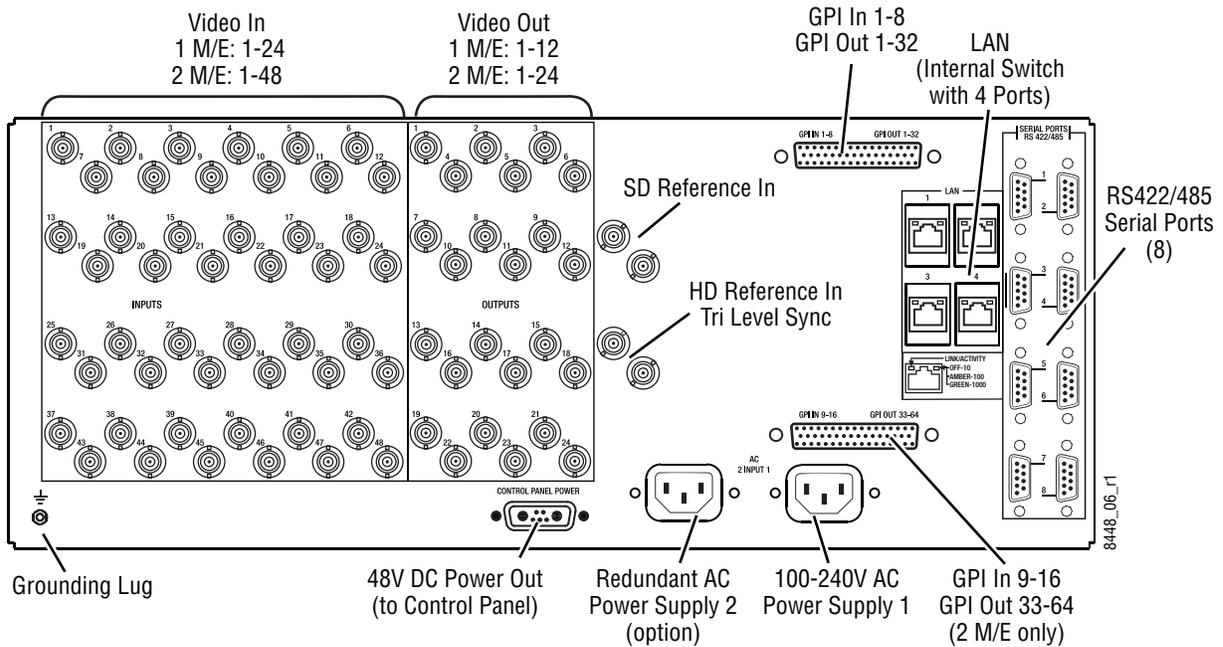


Figure 6. Kayak HD 4RU Frame, Front View with Door Removed



KDD-PSU Power Supply Option

The KDD-PSU option is a one-rack unit, wide range AC power supply providing power for a remotely-mounted Kayak HD Control Panel or for each additional Control Panel connected to the same processor chassis.

Power output is sufficient for two 1 M/E systems or one 2 M/E system.

Grass Valley recommends that customers purchase this option if the distance from the Frame to the Control Panel is more than 100 meters.

Figure 7. KDD-PSU



Video Signal Flow

The basic video signal flow ([Figure 8 on page 25](#)) of the Kayak HD system has been designed for operational flexibility. For example, all the outputs from the M/E are routed back to the video crosspoint matrix, making all these signals accessible to the entire system.

The video inputs to the Video Processor frame can be mapped to any of the crosspoint buttons.

Internally generated white, black and three color backgrounds are also available sources, as are the six RAMRecorder outputs. This source-to-button mapping is performed through the touchscreen menu and can be stored as a user profile for any number of individual users. Button mapping is the same on all buses.

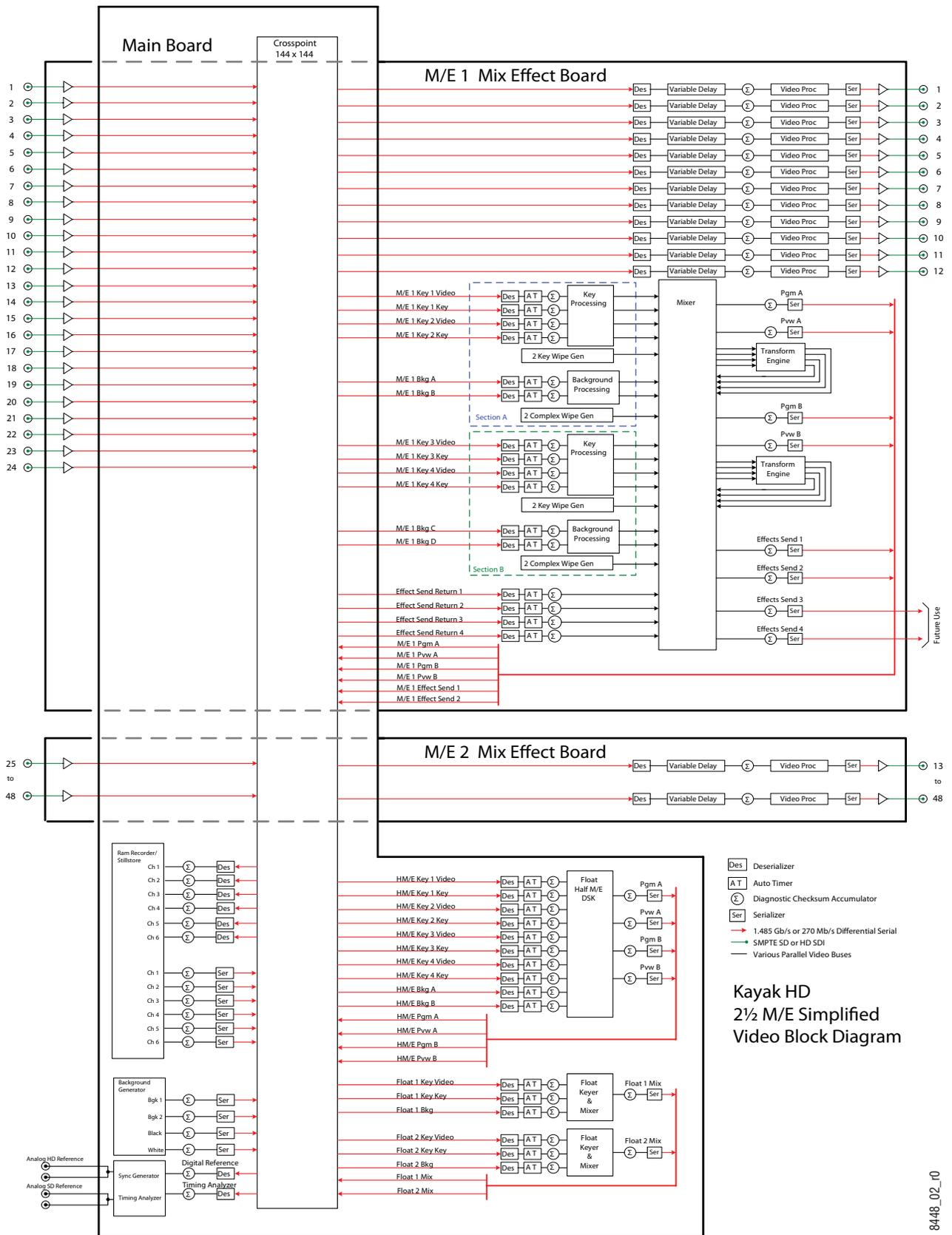
The selected video on each bus is deserialized and reclocked before entering the video processing circuitry. Video processing is available for each separate M/E background, Key, and Utility bus. In addition, contrast, brightness, and hue can be adjusted on a bus-by-bus basis.

Each M/E has four full-function keyers with optional internal Digital Picture Manipulator effects. Each keyer has access to its own wipe generator as well as a pair of standard floating chroma keyers which may be assigned to any keyers in the system. Two complex wipe generators serve each M/E, providing a wide range of wipe choices with modulation, rotation and multiplication of each one. Wipe signals can also be taken from the two Utility buses on the M/E.

The outputs from M/E Program, Preview, and clean feed are fed back to the crosspoint circuitry for the selection on the Auxiliary buses as well as the clean feed output.

The Aux bus outputs can be utilized in a number of ways. Every Aux bus provides individually adjustable safe area and crosshair (center cross) capability. Each AUX bus is timed to the reference.

Figure 8. Kayak HD Video Signal Flow



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Installation

Pre-Installation Procedures

Before you physically install the Kayak HD system, familiarize yourself with the tools required, physical specifications, and safety and power requirements covered in this section.

System Survey

Check all parts received against the packing list enclosed with your shipment, and examine the equipment for any shipping damage. Immediately report any missing or damaged items to the carrier and to your Thomson Grass Valley Service Representative.

Line Voltage

Kayak HD components utilize auto-ranging power supplies which accommodate 100 - 240V. No switch settings are required, nor are any possible.

Required Tools

The following tools are required for installation, but are not supplied:

- Medium flat blade screwdriver,
- Medium Philips cross head screwdriver,
- #10, #15, & #20 Torx screwdrivers, and
- 1/4 inch Hex driver.

Safety Requirements

To prevent injury or equipment damage, read, understand, and follow all installation safety precautions.

CAUTION The Video Processor frame weighs approximately 8.3 kg (18.3 lb). Provide appropriate equipment to support the frame during installation.

WARNING Electrical potential is still applied to some internal components even when power to the frame is off. To prevent electrical shock when working on this equipment, disconnect the AC line cords from the AC source before working on any internal components. Residual voltage may be present immediately after unplugging the system; wait thirty seconds to allow capacitors to discharge before working on the system.

CAUTION To avoid static damage to sensitive electronic devices, protect the Kayak HD system from static discharge. Avoid handling frame modules in a high static environment. Use a grounding strap when handling modules, and touch the frame before you remove any modules.

WARNING Operate only with covers and enclosure panels in place — Do not operate this product when covers or enclosure panels are removed.

Installation Tasks

After completing the Pre-Installation procedures, the recommended installation tasks given in this section are:

1. Unpack the equipment.
2. Install the Kayak HD Video Processor frame.
3. Install the Kayak HD control panel(s).
4. Connect all cables between Kayak HD devices.
5. Connect cables to video inputs and outputs.
6. Connect the power cables.

Power up and configuration, including setting IP addresses, is covered in detail in the following sections of this manual.

General Rack Mounting Instructions

The maximum ambient temperature for this unit is 40-degrees C (104-degrees F).

Installing the frame in a closed or multi-unit rack assembly together with other units could increase the maximum ambient temperature for this unit.

If the unit is installed in a rack, no ventilation openings should be blocked or otherwise covered. Make sure you install the frame so that you allow for cooling airflow.

Make sure that you mount the unit in the rack so that it is evenly balanced to prevent damage to the frame and to avoid creating a hazardous condition.

When connecting the unit to the supply circuit be sure that the supply circuit of the rack is not overloaded. The unit must be well-grounded using the ground connector on the rear. When connecting the unit in a closed or multi-unit rack assembly together with other units be sure that the sum of the touch (leakage) currents for all power supplies does not exceed 3.5 mA.

Video Processor Frame Installation

4 RU Compact Frame Dimensions

Figure 9. Kayak HD 4 RU Frame Dimensions

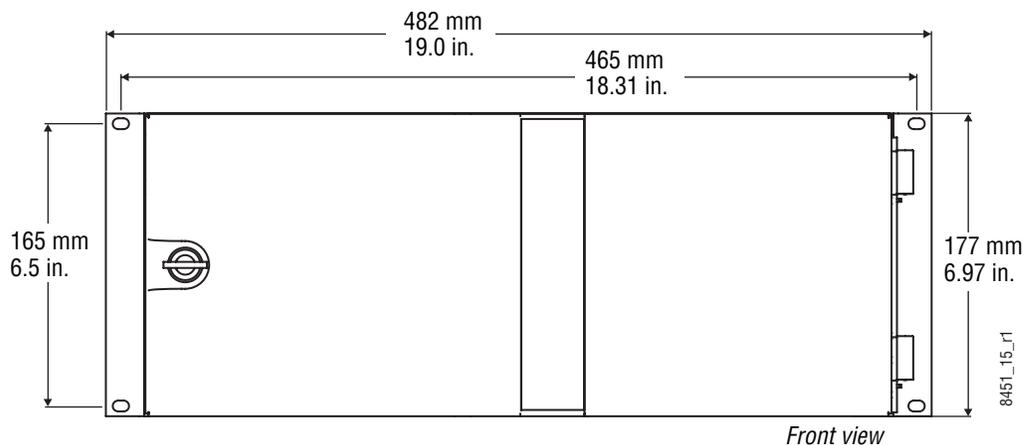
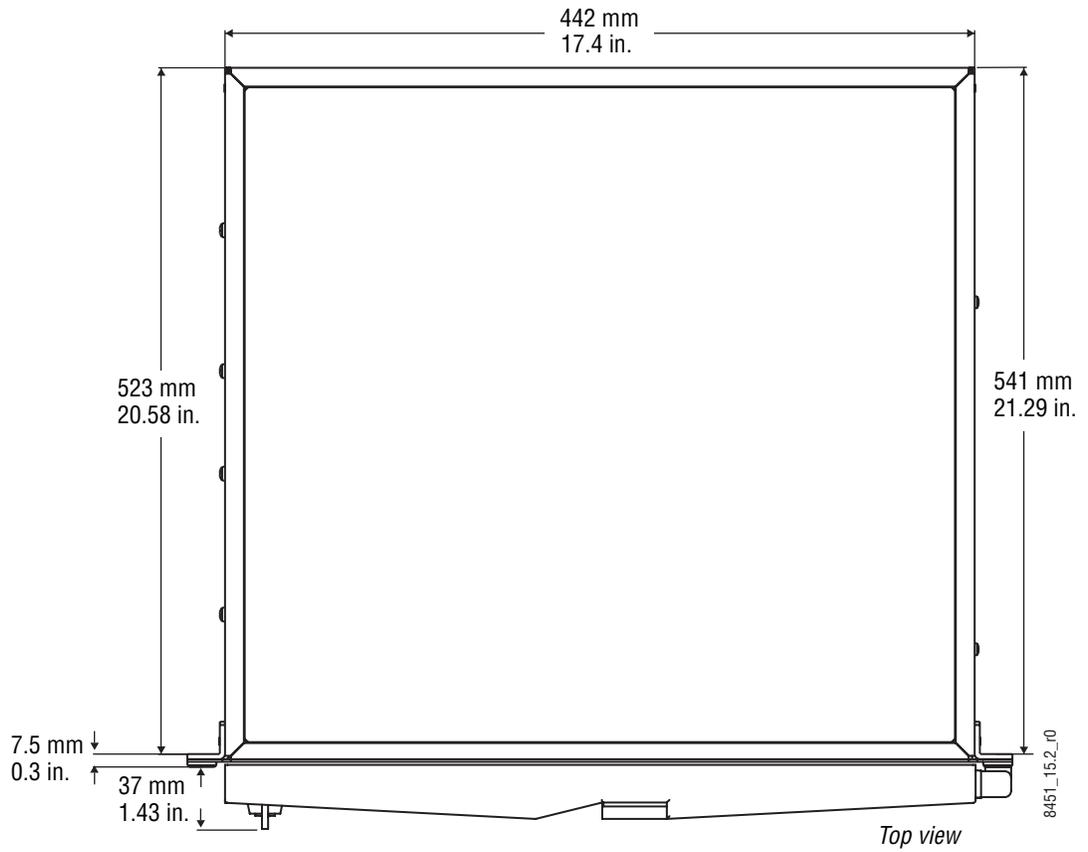
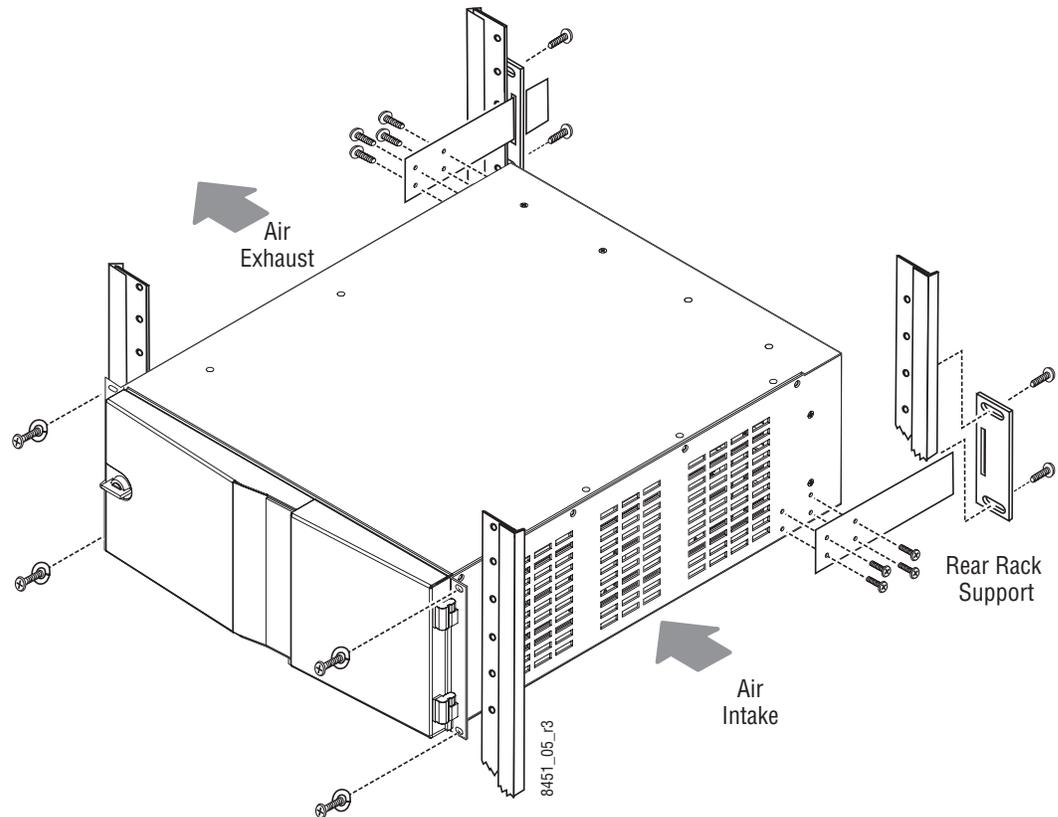


Figure 10. Kayak HD 4 RU Frame Dimensions



4 RU Compact Frame Rack Mounting

Figure 11. Kayak HD 4 RU Compact Frame Rack Mounting



CAUTION Mounting using only the front rack ears is sufficient for fixed installations. Additional support, like the rear rack support or slide rails, is required for mobile applications.

The Rear Rack support provides additional support and stability for the Kayak HD frame to ensure that it remains horizontal.

Make sure to provide adequate ventilation for the Kayak HD Frame. When installing the frame in the rack, take care that no ventilation holes are blocked. This can prevent cooling air from reaching the frame and cause it to overheat.

There are air intake holes on the right side of the frame (as you face the frame front) and air exhaust holes on the left.

CAUTION A minimum vertical clearance of 7.62 mm (0.3-in.) above the Kayak HD 4 RU Compact frame door is required to remove the door. When installing the Kayak HD 4 RU Compact frame in the rack, take care to leave room for removal of the front door. The front door lifts off vertically and must have sufficient clearance room in order to remove it. If you have equipment mounted too close to the Kayak HD 4 RU Compact Frame, you may not be able to remove the door.

Internal Redundant Power Supply Option

This option provides redundant power for the Kayak HD video processor chassis and control panel. It slides into an extra power supply slot in the video processor chassis.

Figure 12. KHD-PSU Internal Redundant Power Supply Option



Removing and Replacing the Kayak HD Frame Door

WARNING Be very careful when opening the Kayak HD frame door. Take precautions to avoid electrical shock from components by following the safety precautions described in detail in *Warnings on page 14* and in *Cautions on page 15*. In particular you want to avoid the possibility of electrical shock by powering down the system and unplugging all equipment before working on internal components. In addition you should wear a grounding strap to prevent electrical damage to sensitive electronic components.

CAUTION Operate only with covers and enclosure panels in place — Do not operate this product when covers or enclosure panels are removed.

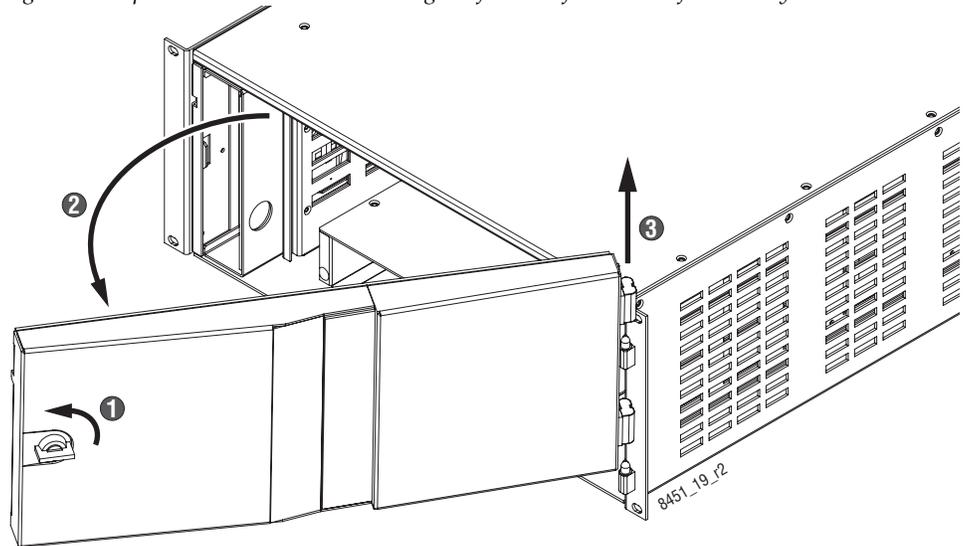
You need to take care not to damage the door by following the procedures described below.

Note A minimum vertical clearance of 7.62 mm (0.3-in.) above the Kayak HD 4 RU Compact frame door is required to remove the door. When installing the Kayak HD 4 RU Compact frame in the rack, take care to leave room for removal of the front door. The front door lifts off vertically and must have sufficient clearance room in order to remove it. If you have equipment mounted too close to the Kayak HD 4 RU Compact Frame, you may not be able to remove the door.

To remove the Kayak HD frame door:

1. Turn the lock on the front door of the Kayak HD Frame 180-degrees counterclockwise to unlock it.
2. Open the door to less than 90-degrees from the Frame.
3. Holding both ends of the Frame door, lift the door vertically to remove it from the hinge pins. Be careful not to damage the door. Refer to [Figure 13](#).

Figure 13. Open the door to less than 90-degrees from the frame and lift vertically



To replace the Kayak HD frame door:

1. Holding both ends of the Frame door, position the door hinges over the two vertical pins on the frame.
2. Using both hands to hold the door at opposite ends, gently lower the door so that its hinges are placed on the two pins. Be careful not to damage the door.
3. Turn the lock on the front door of the Kayak HD Frame 180-degrees clockwise to lock it.

Control Panel Installation

1 M/E Control Panel

Figure 14. Kayak HD 100C Control Panel Dimensions 1 of 2

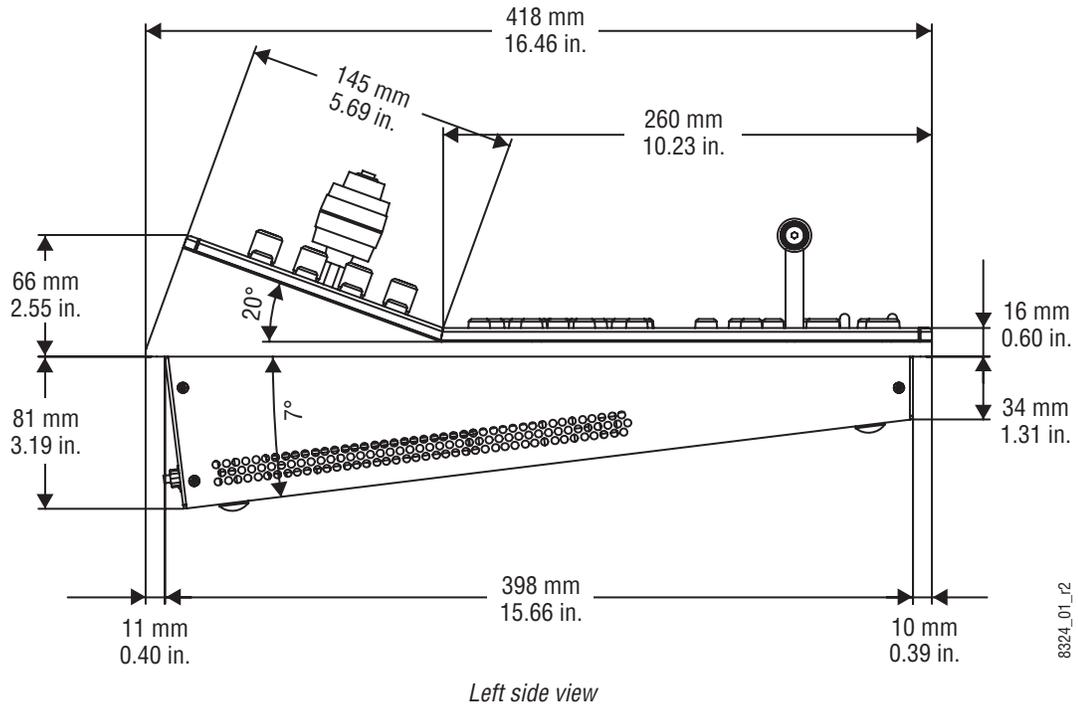
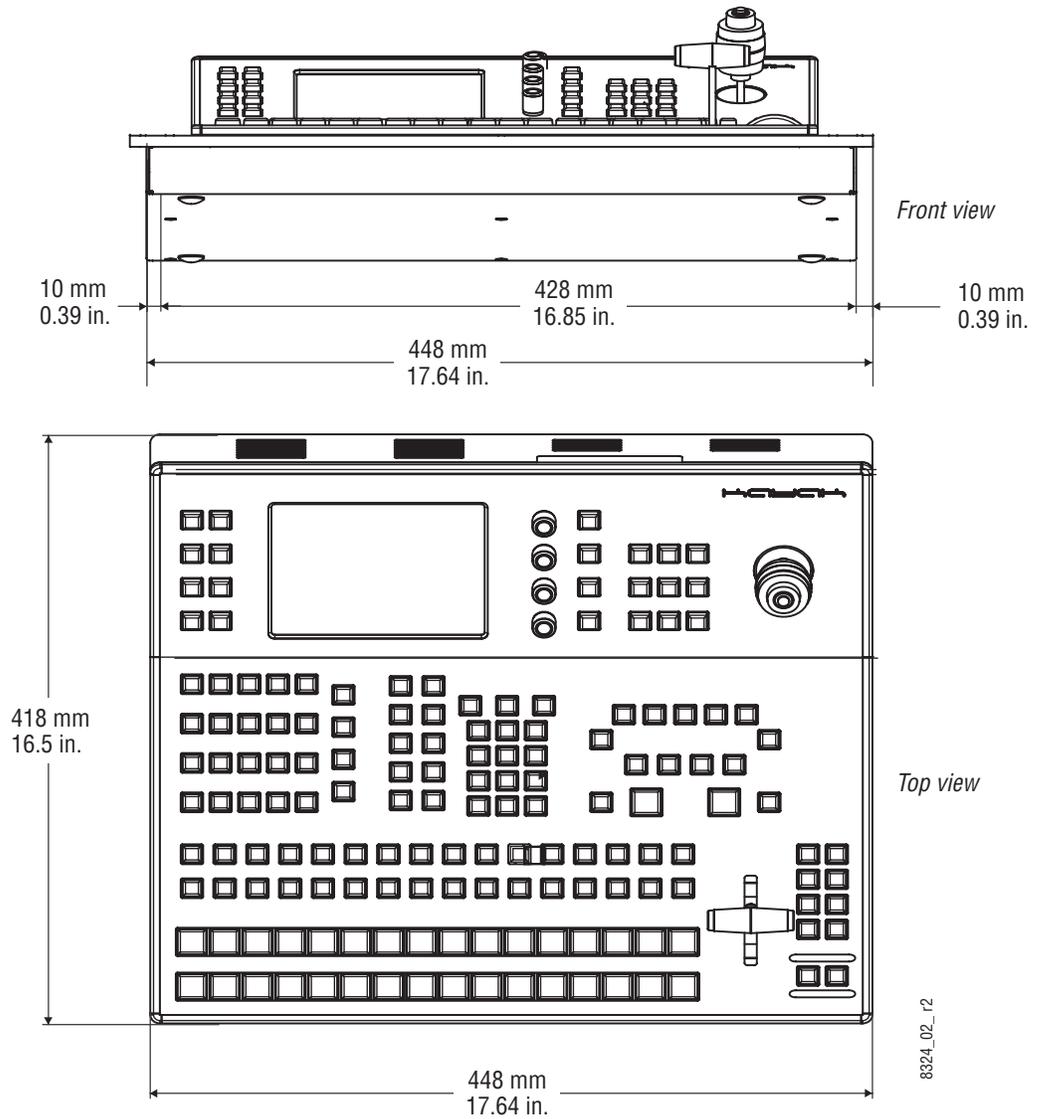


Figure 15. Kayak HD 100C Control Panel Dimensions 2 of 2



2 M/E Control Panel

Figure 16. Kayak HD 150C and 200C Control Panel Dimensions 1 of 2

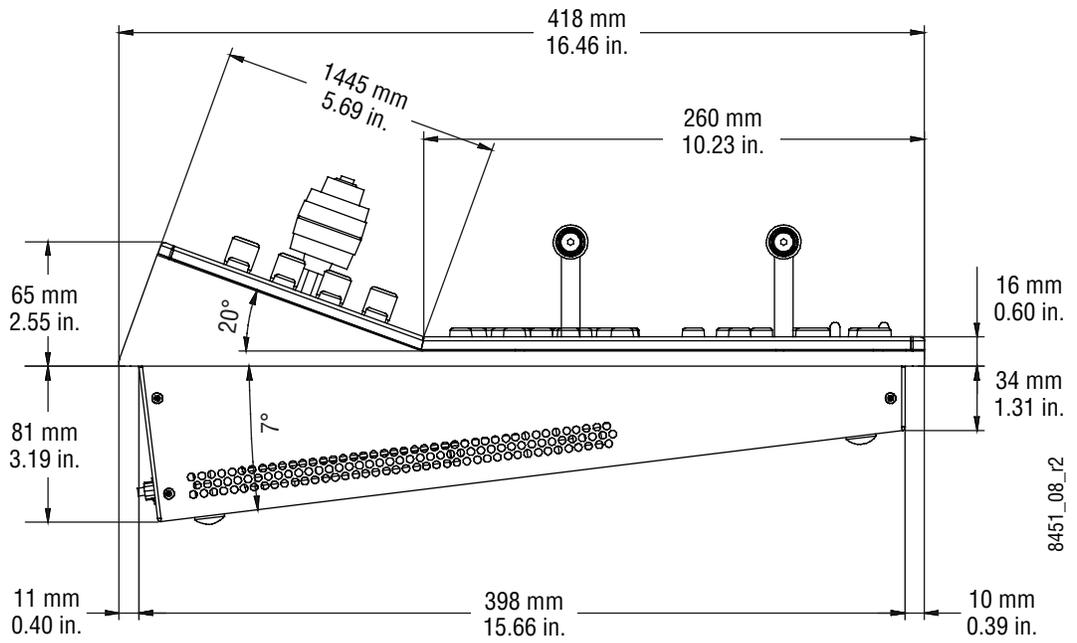
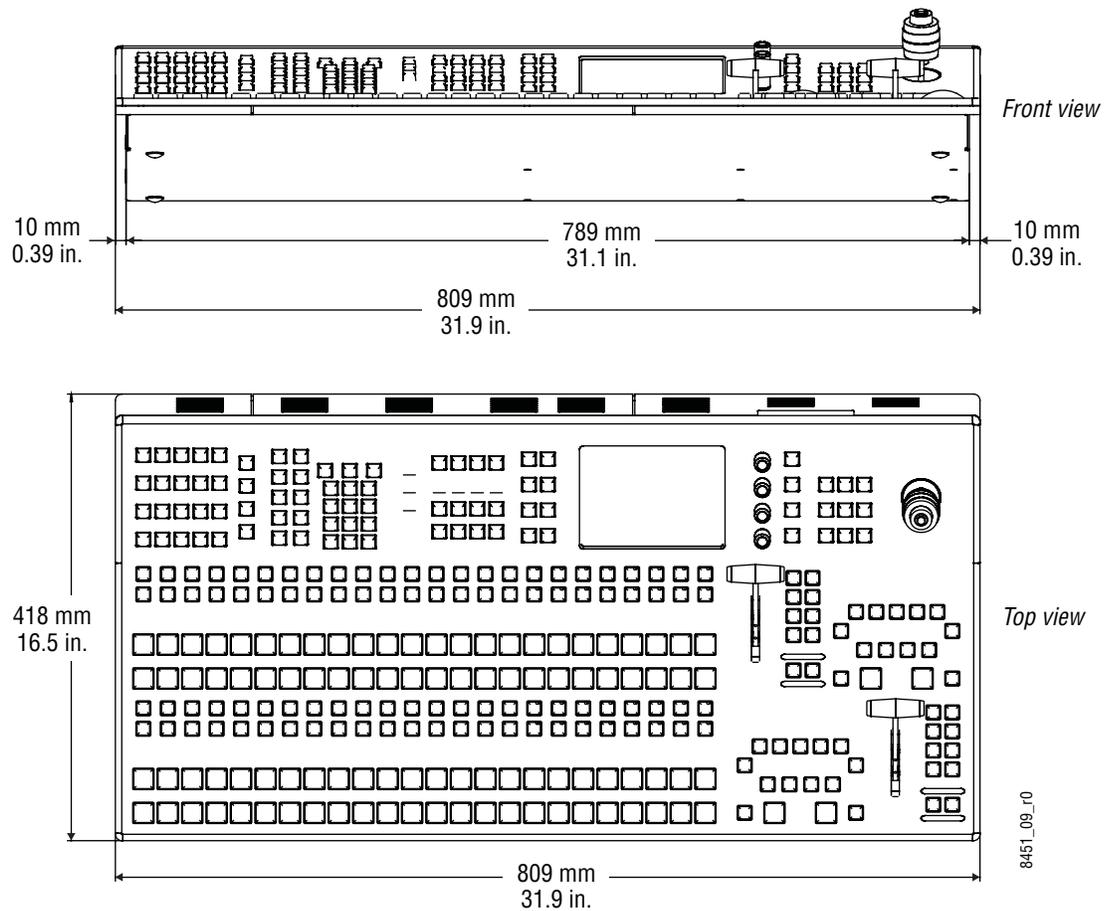


Figure 17. Kayak HD 150C, 200C, and 200 Control Panel Dimensions 2 of 2



Panel Mounting Options

Kayak HD control panels may be placed on a table or similar stable surface, or they may be recessed into a control console in an appropriately sized cutout.

Table Top Use

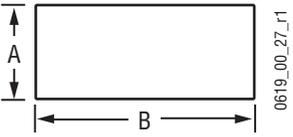
High-friction feet prevent inadvertent movement of the panel. The panel is ventilated at its sides. Ensure that production materials and other equipment does not block the ventilation holes on the sides of the panel.

CAUTION At least 2 in. (50mm) of open space on the sides of the panel is required for proper air flow.

Surface Mount Cutout Dimensions

Table 1. Kayak HD Surface Mount Cutout Dimensions

Cutout Dimensions		
Control Surfaces	A	B
Kayak HD 150C, 200C	400 mm (15.75 in.)	791 mm (31.14 in.)
Kayak HD 100C	400 mm (15.75 in.)	430 mm (16.93 in.)

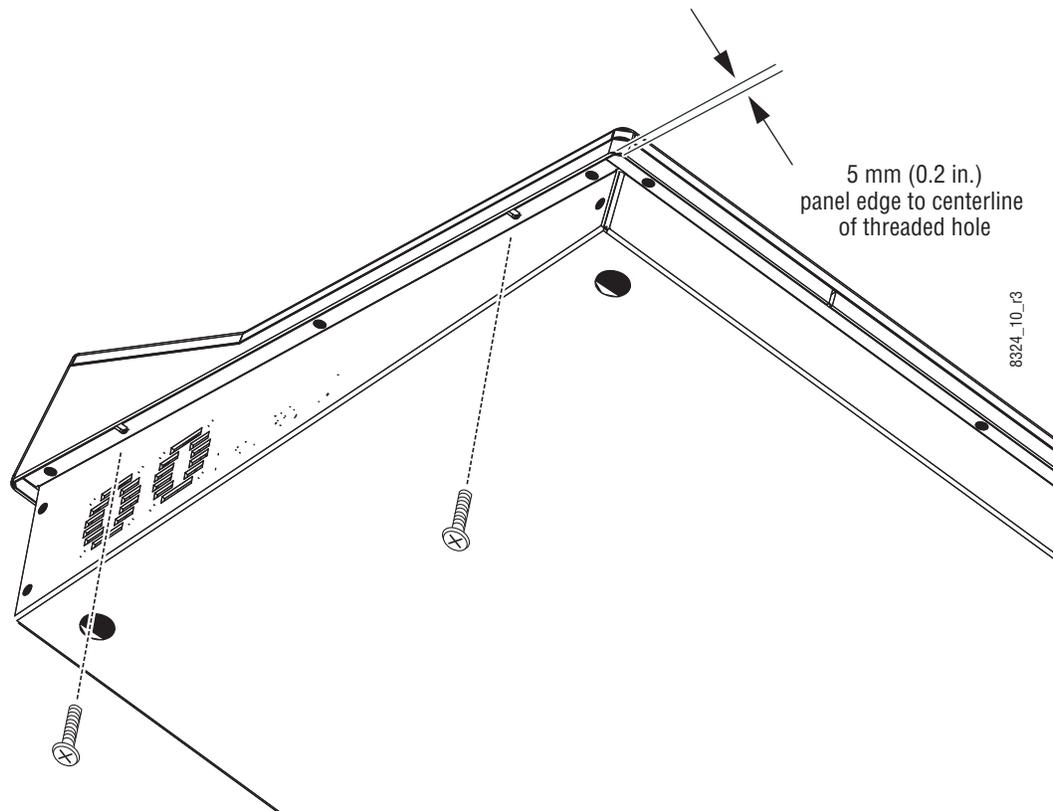


CAUTION At least 50 mm (2 in.) of clear space on the sides of the panel below the mounting surface is required for proper air flow. Provide at least 50 mm (2 in.) of clear space in the rear of the panel for cable clearance.

Securing Panels to Mounting Surface

When mounting the panel in a tabletop cutout, four M4 threaded holes (two each on the left and right side of the panel) are available for securing the panel in the cutout ([Figure 18](#)).

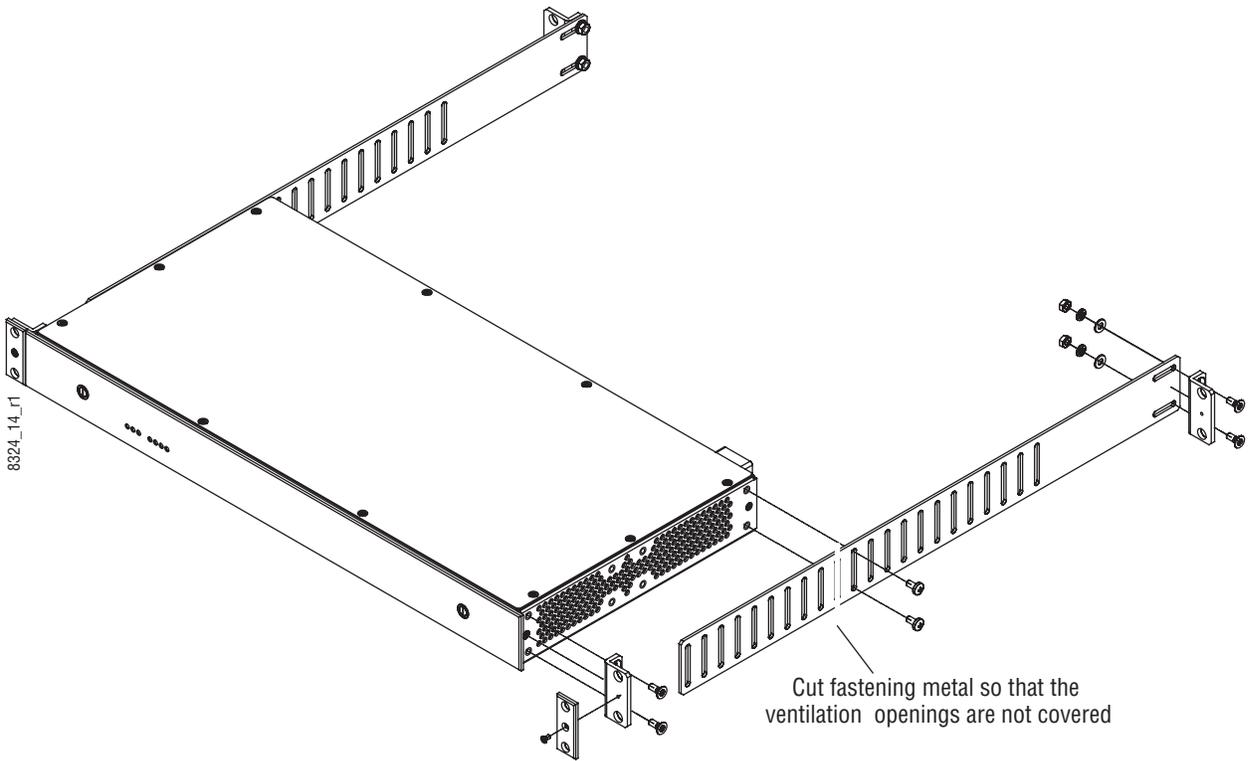
Figure 18. Kayak HD Panel Mounting Holes



KDD-PSU Power Supply Option

The KDD-PSU is a 1RU frame designed for rack mounting as shown in [Figure 19](#).

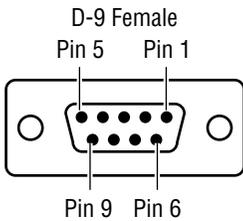
Figure 19. KDD-PSU Rack Installation



Pin Assignments

RS 422/485 Port

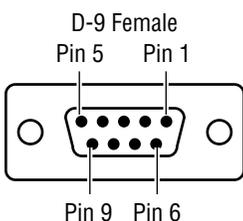
Table 1.

Socket	Pin	Bus Controller	Tributary
 <p>D-9 Female Pin 5 Pin 1 Pin 9 Pin 6</p>	1	Chassis Ground	Chassis Ground
	2	RxA (-)	TxA (-)
	3	TxB (+)	RxB (+)
	4	Signal Ground	Signal Ground
	5	Not used	Not used
	6	Signal Ground	Signal Ground
	7	RxB (+)	TxB (+)
	8	TxA (-)	RxA (-)
	9	Chassis Ground	Chassis Ground

There are 8 RS485 ports that can be used for Machine Control of various devices, or for switcher control by an external controller.

RS 232 Port

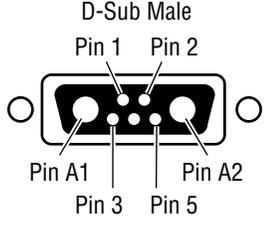
Table 2.

Socket	Pin	Signal
 <p>D-9 Female Pin 5 Pin 1 Pin 9 Pin 6</p>	1	Chassis Ground
	2	Transmit Data
	3	Receive Data
	4	Not used
	5	Signal Ground
	6	Not used
	7	Clear to Send
	8	Request to Send
	9	Not used

There is an RS232 serial port, a keyboard port, and a VGA video output located on front of the Controller Board. These ports are used for diagnostics. If you need to use these ports to diagnose problems with the Kayak HD switcher, please contact your Grass Valley Customer Service Representative.

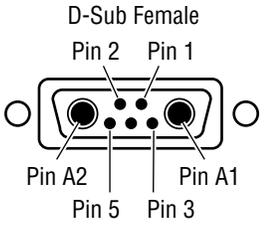
Control Panel DC Power In

Table 3.

Socket	Pin	Signal
 <p>D-Sub Male Pin 1 Pin 2 Pin A1 Pin A2 Pin 3 Pin 5</p>	A1	48 V (+)
	A2	48 V (-)
	1	-
	2	-
	3	-
	4	-
	5	-

Frame DC Power Out

Table 4.

Socket	Pin	Signal
 <p>D-Sub Female Pin 2 Pin 1 Pin A2 Pin A1 Pin 5 Pin 3</p>	A1	48 V (+)
	A2	48 V (-)
	1	-
	2	-
	3	-
	4	-
	5	-

Tally Adapter

Build a tally adapter cable with the provided connector and 50-pin ribbon cable (customer supplied). Cut to the desired length.

Figure 20. Tally Adapter



GPI / Tally Connections

The Kayak HD GPI / Tally system has 32 universal relays that interface source tally and GPI Output information to an external system through the Tally Port connector. The channels can be assigned in the Setup menu.

Tallies are a source attribute and relays are automatically assigned to a source when source definitions are defined in the Setup menu during initial system configuration. The nominal rating specification for each relay is 2 A, 30 V.

GPI Inputs

The purpose of the GPI In pins is to provide a stimulus from the customer's equipment to the switcher.

A simple connection between the two connectors activates the corresponding input. This kind of control is suitable for a connection to a relay contact or to an open-collector output.

WARNING When connecting to an open-collector output, there is no ground potential isolation between the Video Processor frame and controlling devices. The internal opto-couplers are supplied separate (galvanically insulated) voltage (12V fan supply).

Since the circuit ground is led out of the device, the cabling has to be shielded for this kind of control. Non-shielded cables may cause EMC and/or ESD problems.

To activate a GPI In you must provide switch closure between a particular GPI In pin and one of the two GPI In Com pins (Pins 1 and 34).

GPI Outputs

The purpose of the GPI Out pins is for the switcher to provide a signal to the equipment deployed in the video production studio. All GPI Out pins are programmable and they serve to provide Tally functions for customer equipment. The format used for determining which GPI Out pins should be connected is:

GPI Out Number Letter provides closure to GPI Out Common Letter

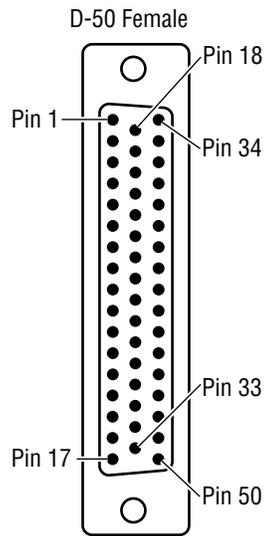
EXAMPLE: Pin GPIOut1A provides closure to pin GPIOutCommonA (which is Pin 37).

All GPI Out pins are in groups of four. Letter groups are isolated from each other.

Most customers prefer to use a single Common group. To achieve a single Common bus it is necessary to physically connect GPIOutCommonA to GPIOutCommonB to GPIOutCommonC to GPIOutCommonD and so forth until you have jumpered all the GPICommonOut pins to each other in series.

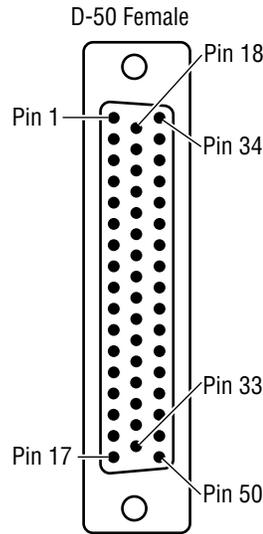
4 RU Frame GPI/O – Tally (GPI In 1-8, GPI Out 1-32)

Socket	Ribbon Cable	50-Pin D-Sub		Signal
	1		1	GPIInCom
	2	34		GPIInCom
	3		18	GPIIn1
	4		2	GPIIn2
	5	35		GPIIn3
	6		19	GPIIn4
	7		3	GPIIn5
	8	36		GPIIn6
	9		20	GPIIn7
	10		4	GPIIn8
	11	37		GPIOutComA
	12		21	GPIOut1A
	13		5	GPIOut2A
	14	38		GPIOut3A
	15		22	GPIOut4A
	16		6	GPIOutComB
	17	39		GPIOut5B
	18		23	GPIOut6B
	19		7	GPIOut7B
	20	40		GPIOut8B
	21		24	GPIOutComC
	22		8	GPIOut9C
	23	41		GPIOut10C
	24		25	GPIOut11C
	25		9	GPIOut12C
	26	42		GPIOutComD
	27		26	GPIOut13D
	28		10	GPIOut14D
	29	43		GPIOut15D
	30		27	GPIOut16D
	31		11	GPIOutComE
	32	44		GPIOut17E
	33		28	GPIOut18E
	34		12	GPIOut19E
	35	45		GPIOut20E
	36		29	GPIOutComF
	37		13	GPIOut21F
	38	46		GPIOut22F
	39		30	GPIOut23F
	40		14	GPIOut24F
	41	47		GPIOutComG
	42		31	GPIOut25G
	43		15	GPIOut26G
	44	48		GPIOut27G
	45		32	GPIOut28G
	46		16	GPIOutComH
	47	49		GPIOut29H
	48		33	GPIOut30H
	49		17	GPIOut31H
	50	50		GPIOut32H



4 RU Frame GPI/O – Tally (GPI In 9-16, GPI Out 33-64)

Socket	Ribbon Cable	50-Pin D-Sub	Signal
	1		1 GPIInCom
	2	34	GPIInCom
	3	18	GPIIn9
	4		2 GPIIn10
	5	35	GPIIn11
	6	19	GPIIn12
	7		3 GPIIn13
	8	36	GPIIn14
	9	20	GPIIn15
	10		4 GPIIn16
	11	37	GPIOutComJ
	12	21	GPIOut33J
	13		5 GPIOut34J
	14	38	GPIOut35J
	15	22	GPIOut36J
	16		6 GPIOutComK
	17	39	GPIOut37K
	18	23	GPIOut38K
	19		7 GPIOut39K
	20	40	GPIOut40K
	21	24	GPIOutComL
	22		8 GPIOut41L
	23	41	GPIOut42L
	24	25	GPIOut43L
	25		9 GPIOut44L
	26	42	GPIOutComM
	27	26	GPIOut45M
	28		10 GPIOut46M
	29	43	GPIOut47M
	30	27	GPIOut48M
	31		11 GPIOutComN
	32	44	GPIOut49N
	33	28	GPIOut50N
	34		12 GPIOut51N
	35	45	GPIOut52N
	36	29	GPIOutComP
	37		13 GPIOut53P
	38	46	GPIOut54P
	39	30	GPIOut55P
	40		14 GPIOut56P
	41	47	GPIOutComQ
	42	31	GPIOut57Q
	43		15 GPIOut58Q
	44	48	GPIOut59Q
	45	32	GPIOut60Q
	46		16 GPIOutComR
	47	49	GPIOut61R
	48	33	GPIOut62R
	49		17 GPIOut63R
	50	50	GPIOut64R



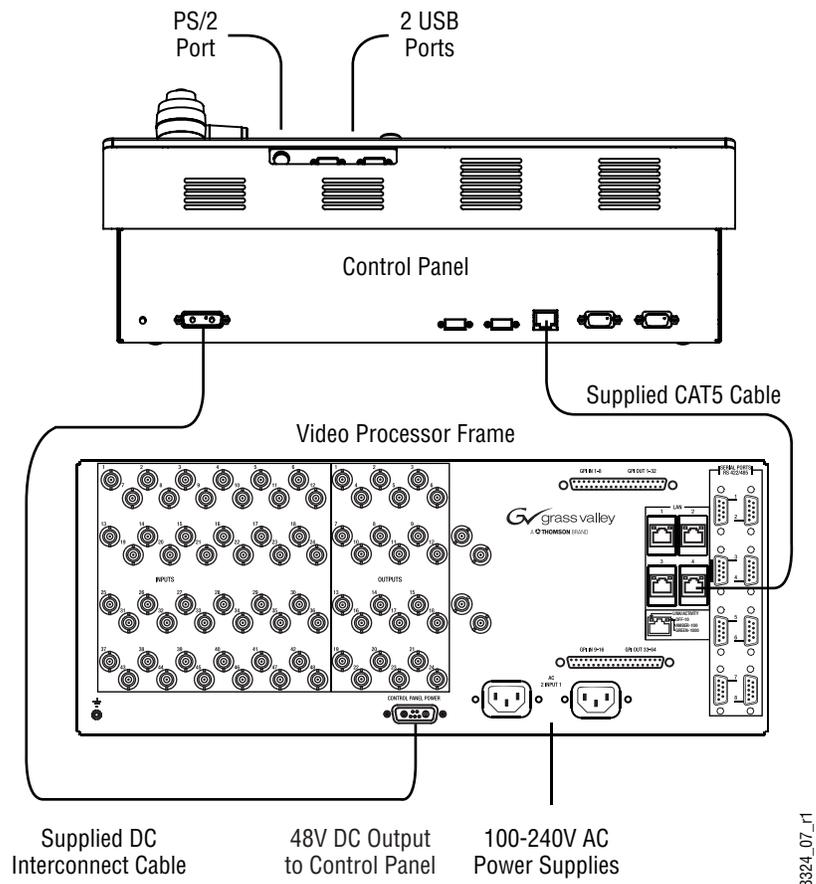
Cabling

The Kayak HD system uses Ethernet, serial, and USB connections. Tally and GPI/O control are also available. A simple Kayak HD system consisting of a Control Panel and Video Processor frame does not require connection to an external Ethernet Local Area Network (LAN). The video processor frame incorporates an Ethernet switch for this purpose.

There are two AC power supply inputs to the frame. If the redundant power supply option is installed, power can be provided by one or both line cords to two different AC circuits.

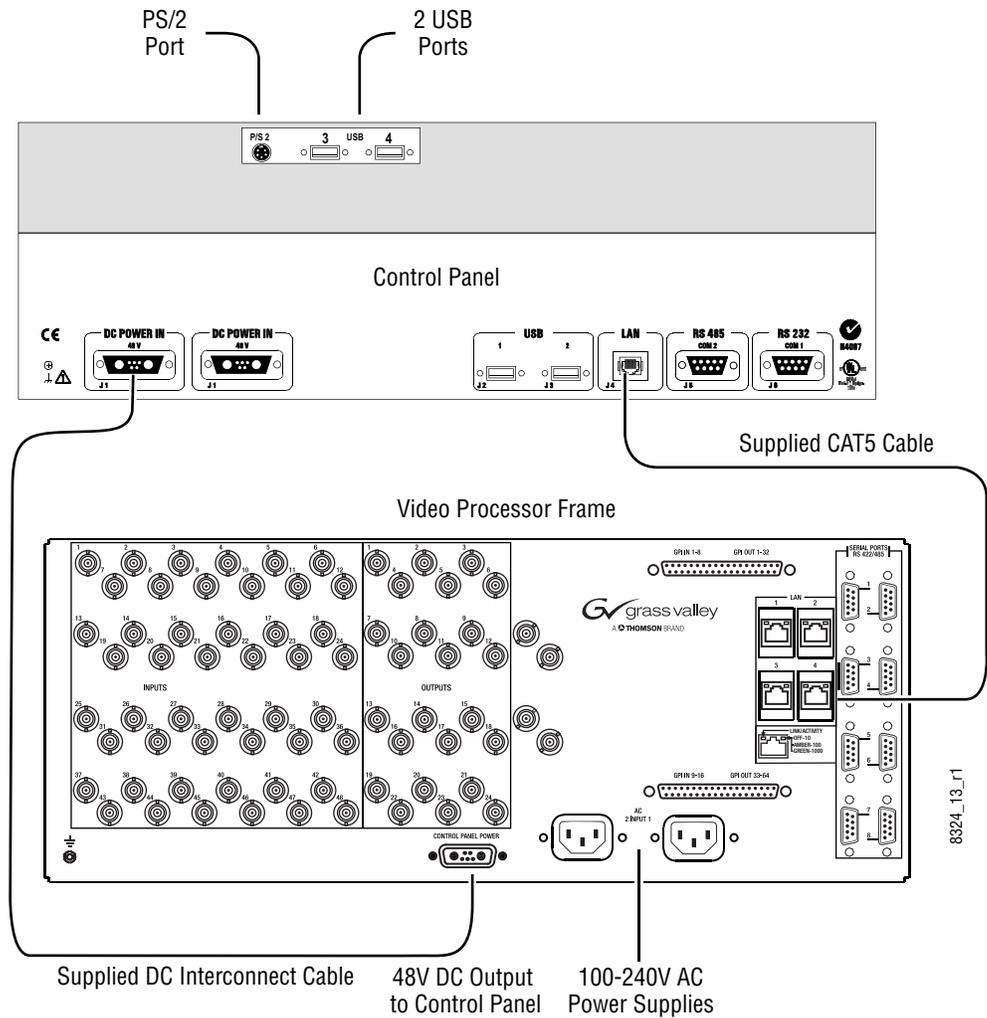
Kayak HD 100C Control Cabling

Figure 21. Kayak HD 100C Standard Control Cabling



Kayak HD 150C and 200C Control Cabling

Figure 22. Kayak HD 150C or 200C Standard Control Cabling



Mouse Connection

A standard PS/2 mouse can be connected to the rear of the control panel if desired. Be sure to power down before installing the mouse.

Network Cabling

Ethernet Switches and Hubs

A Kayak HD system requires a LAN when components other than a Control Panel and Video Processor frame are connected, or when external network access to a file system is desired. An appropriately-sized Ethernet switch may be required. An existing facility Ethernet switch (not hub) can support Kayak HD if an adequate number of ports are available.

A hub can be used only if there is a need to exceed 328 ft. (100 m) between a Control Panel and Video Processor frame. If a hub is used, connect the hub to the switch via the Uplink port, or through a peer-to-peer crossover cable.

[Table 5](#) details Ethernet specifications. All Ethernet components are to be supplied by the customer except the CAT5 crossover cable provided

Note The supplied crossover cable works with the Kayak HD switcher because the frame has an auto-sensing Ethernet switch.

Table 5. Ethernet Specifications

Cables	Type	10BaseT and 100BaseT compatible. Category 5 cable, 8 conductor twisted pair. The system will work at 10BaseT with reduced performance. 100BaseT components are highly recommended.
	Connectors	RJ-45 male connector at each end of cable.
	Length	10BaseT: 984 ft. (300 m) maximum. 100BaseT: 328 ft. (100 m) maximum. Use hub or switch to exceed maximum cable runs.
Switch	Speed	10/100/1000 Mbps
	Ports	RJ-45 auto-negotiating 10/100 Mbps; number of ports required is dependent upon system size. Frame ports are capable of 1000 Mbps. Using a 1000 Mbps Ethernet switch enhances RAM Recorder transfer speeds.
	Unmanaged	Recommended. Configuration not required, but does not provide remote monitoring capability.
	Managed	May be used. Requires configuration, but offers remote monitoring capability.

CAUTION An existing facility Ethernet switch (not hub) can support Kayak HD if an adequate number of ports are available. Keep your facility network and technical network separate in order to avoid network traffic negatively affecting Kayak HD system operation.

The Kayak HD backplane has four RJ45 Ethernet connectors for its built-in Ethernet switch, each capable of 10/100/1000 Mbps. All Ethernet connectors share the same speed- and direction-sensing features.

One Ethernet connector must connect to the Control Panel. It may go through a switch to make the Control Panel connection, but at least one connector must be connected from the Frame to the Control Panel somehow.

One Ethernet connector may be connected to the Facility LAN if desired. The other two Ethernet connectors may be connected to other devices if needed.

Note If you do connect these extra Ethernet connectors to other devices, please note that these other devices will not communicate if the switcher frame is turned off for any reason. For that reason, it is preferable to connect Ethernet ports coming from the switcher only to other devices that are switcher-related.

Factory Network Settings

The default factory setting for the IP address is

- 192.168.0.70 for the video processor frame
- 192.168.0.73 for the control panel

The Device Setup menu allows to change the IP address. It is only allowed to change the last octet of the IP address (to accommodate Kayak HDs on the same network).

Note In order to integrate Kayak HD devices into an existing network, ask the local network administrator for the subnet mask of the network. Before changing IP addresses always set the subnet masks of the Kayak HD devices to the mask of the local network. If all changes are made and a frame is not visible to the panel, press 'Rescan' in the "Device Control" menu of the panel.

Video Cabling for all Kayak HD Switchers

All Kayak HD system video inputs and outputs are configurable. For cabling configuration flexibility, each external primary input can be mapped to any Kayak HD panel source select button, as can each internal video system source. Any Kayak HD system video signal, such as M/E program, preview, clean feed, or PGM/PST, can be mapped to any output bus to be accessed on a specific connector, or an output bus can act as an auxiliary bus.

Inputs

Non-looping video inputs on the back of the Video Processor frame are numbered 1 through 24 and 25 through 48 on the 4 RU frame. Each accepts a 270 MHz serial digital video signal, or 1.485 Gb. The number of inputs that are active depends on the number of full mix/effects or I/O Expansion modules that are installed in the chassis. There are 24 inputs active for every mix/effects module and expansion module installed.

Outputs

The outputs on the back of the Video Processor frame are numbered 1 through 12 and 13 through 24 on the 4RU frame. All of the outputs carry the same video format, as determined by standard selected and by the reference signals connected. The number of outputs that are active depends on the number of full mix/effects or I/O Expansion modules installed in the chassis. There are 12 outputs active for every mix/effects and expansion module installed.

Reference Input

There are two separate, looping reference input pairs. The upper pair accepts analog 525 or 625 composite video. Burst is not required, but typically facility reference color black is used. Kayak HD can auto-sense whether the reference is 525 or 625 and can change the internal standard accordingly.

The lower looping reference input pair is for HD production and uses analog tri-level sync.

75-ohm termination of one of each of these looping inputs is required, either directly on the adjacent connector or at the end of a daisy chain looping to other equipment.

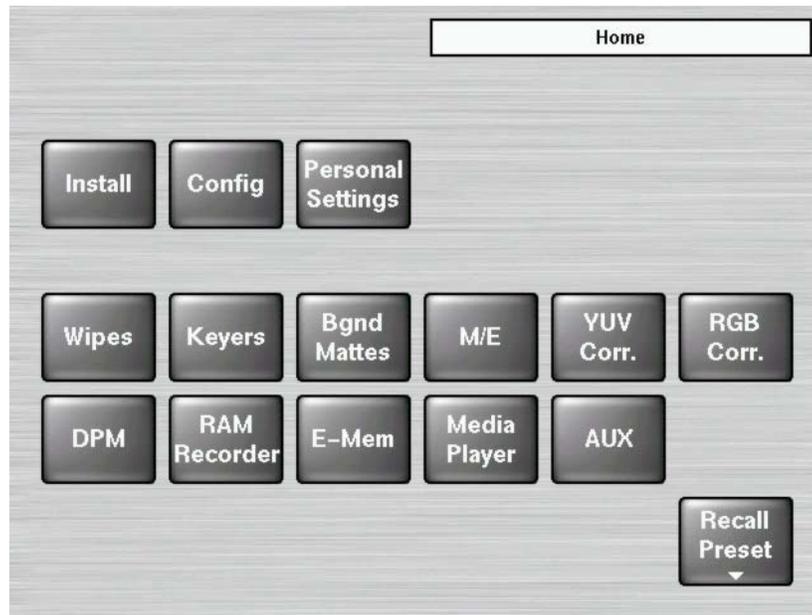
Any one of the SDI inputs can also be used as reference in the respective standard.

Kayak HD Video Timing

Kayak HD Home - Install Menu

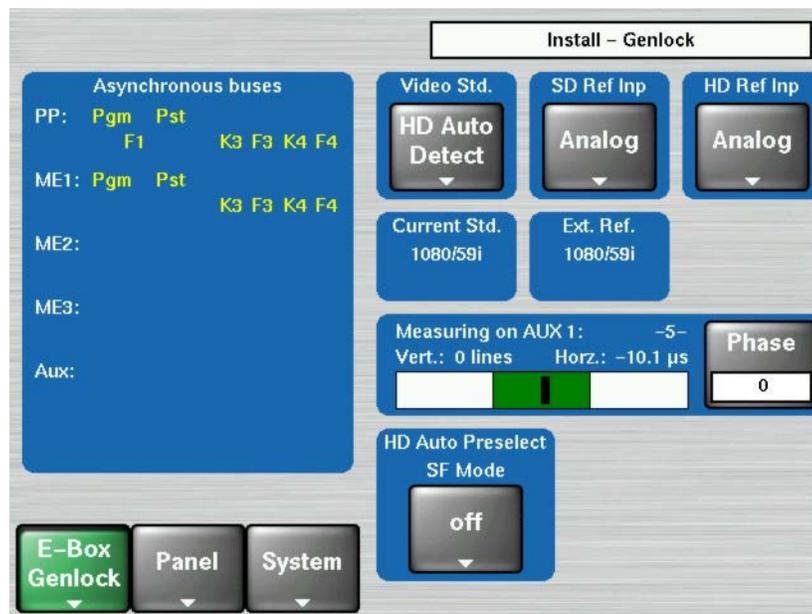
1. To begin setting the Video Timing for the Kayak HD switcher press the Home key on the switcher control panel to go to the **Home** menu on the Kayak HD switcher menu screen.

Figure 23. Kayak HD Home Menu



2. Press the **Install** button in the upper left-hand corner of the menu.
3. Press the **E-Box Genlock** button to display the **Genlock** menu. The **Genlock** menu reports the status of the Kayak HD system sync generator. It is used to switch between HD and SD operating modes and to adjust the internal system timing.

Figure 24. Genlock Menu with Video Signal in Green Legal Timing Window



There are three buttons on the upper right-hand side of the **Genlock** Menu that affect video timing. These buttons are primarily used by Engineering when setting up the switcher.

- The first button is located in the **Video Std.** data pad (shown as **HD Auto Detect** in [Figure 24](#)). This button selects the Video Standard that you want to use for the Kayak HD switcher. Press this button to display a list of the possible video standards, including **HD Auto Detect** and **SD Auto Detect**. Select the video standard you want to use for the switcher.
- The second button is in the **SD Ref Inp.** data pad (shown as **Analog** in [Figure 24](#)). This button is used to select the SD (Standard Definition) Reference source which can be either the SD Analog Reference or any one of the serial digital video inputs to the switcher. The digital input must match the video standard that the switcher is running (the one you selected from the **Video Std.** data pad).
- The third button is in the **HD Ref Inp.** data pad (shown as **Analog** in [Figure 24](#)). This button is used to select the HD (High Definition) Reference Input video source which can be either the HD Analog Reference or any one of the serial digital video inputs to the switcher. The digital input must match the video standard that the switcher is running (the one you selected from the **Video Std.** data pad).

There are two displays showing the Current Standard and External Reference settings that have been selected for your switcher:

- The currently selected video standard is reported in the **Current Std.** field in the middle of the **Genlock** menu.
- The incoming reference signal rate is reported in the **Ext. Ref.** field (to the right of the **Current Std.** field).

If you are using **Auto Detect** the video standard you have selected persists until a different video standard is detected and locked for use by the switcher.

If the reference signal is temporarily lost, the Kayak system will continue using the previous reference standard and a **NONE** status will be reported.

Note The Kayak HD cannot support both SD and HD at the same time; you must choose one mode or the other. If you change the mode from SD to HD (or vice versa) then the Kayak HD hardware must reprogram itself to process the change. This takes a minute, but you only have to do it when changing from HD to SD, or from SD to HD.

The Asynchronous buses window in the upper left of the **Genlock** menu shows an overview of the buses for the entire switcher:

- PP
- ME1
- ME2
- ME3
- AUX

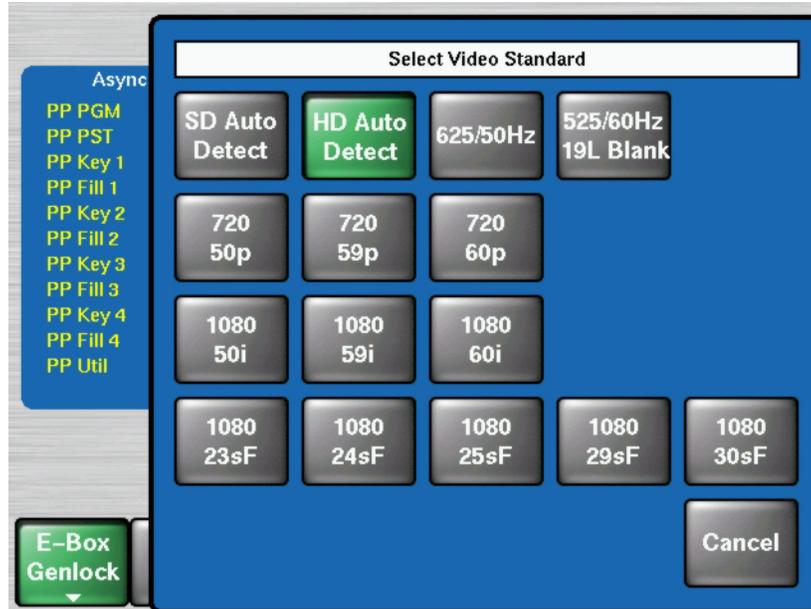
If any bus is displayed in the **Asynchronous buses** window that means that the bus input is not in sync and the timing for its video sources must be re-adjusted.

Select the Video Standard

1. At the top of the **Genlock** menu press the button shown in the **Video Std.** data pad. The **Select Video Standard** menu displays.

Note In [Figure 24](#) the button is displayed as **HD Auto Detect**, but a different video standard may be selected on your switcher.)

Figure 25. Select Video Standard Menu

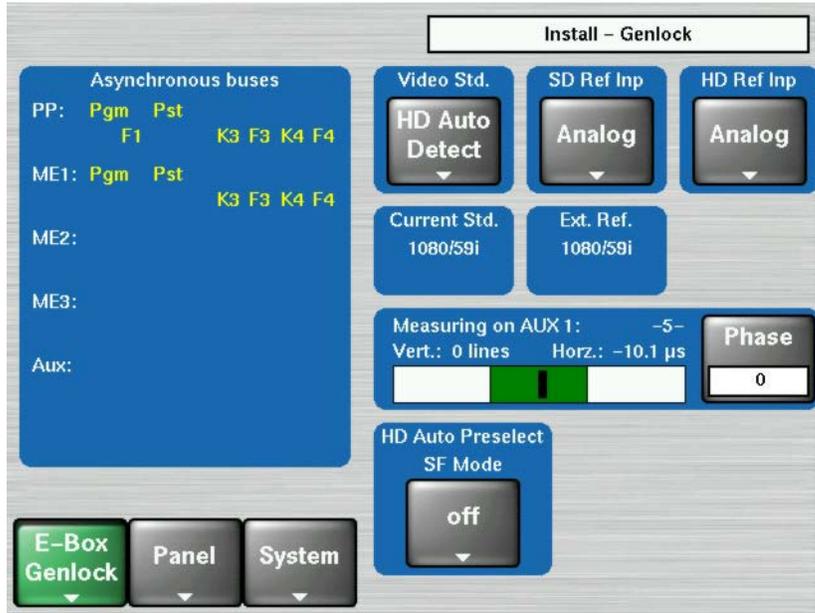


2. Press to select the video standard you wish to use for the Kayak HD switcher. If you select either **SD Auto Detect** or **HD Auto Detect** the Kayak HD system will automatically determine the appropriate video standard to apply for your switcher based on the external reference. After you select a video standard the **Genlock** menu displays.

Select the Video Reference Source

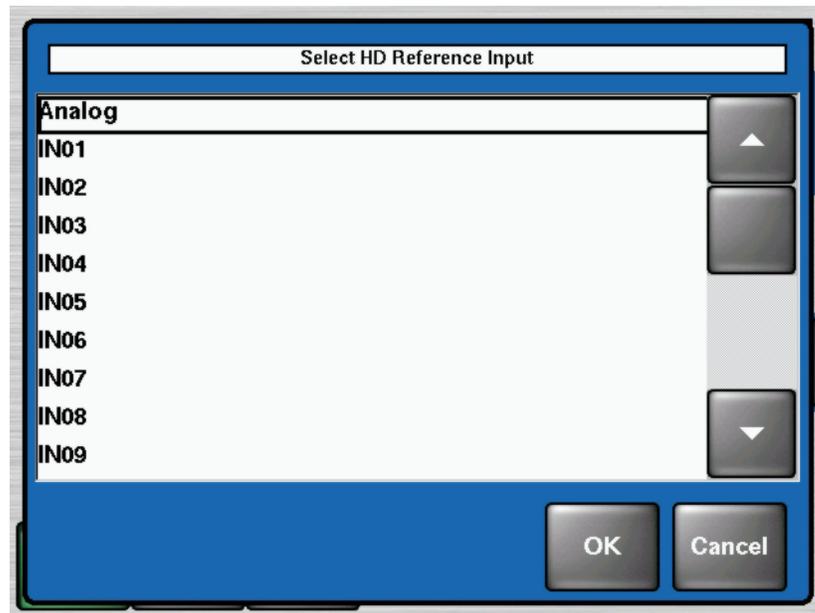
1. At the top right of the **Genlock** menu press the button shown in the **HD Ref Inp** data pad. The **Select HD Reference** Input menu displays a scrolling list of HD Reference Inputs from which to choose.

Figure 26. Genlock Menu



Note In Figure 26 the **HD Ref Input** button displayed reads **Analog**, but your switcher may be using a different HD Reference signal.

Figure 27. Select HD Reference Input Menu



2. Press on the arrows to scroll through the list. Press to select the name of the HD Reference Input signal you want to use. These signals correspond to video inputs associated with the physical inputs on the back of the Kayak HD frame.

Select SF Mode

The Kayak HD system supports 1080sf (segmented frame) video formats at 23.9, 24, 25 and 30 fps. Segmented frame video captures a frame of video progressively, but displays the frame as two interlaced fields.

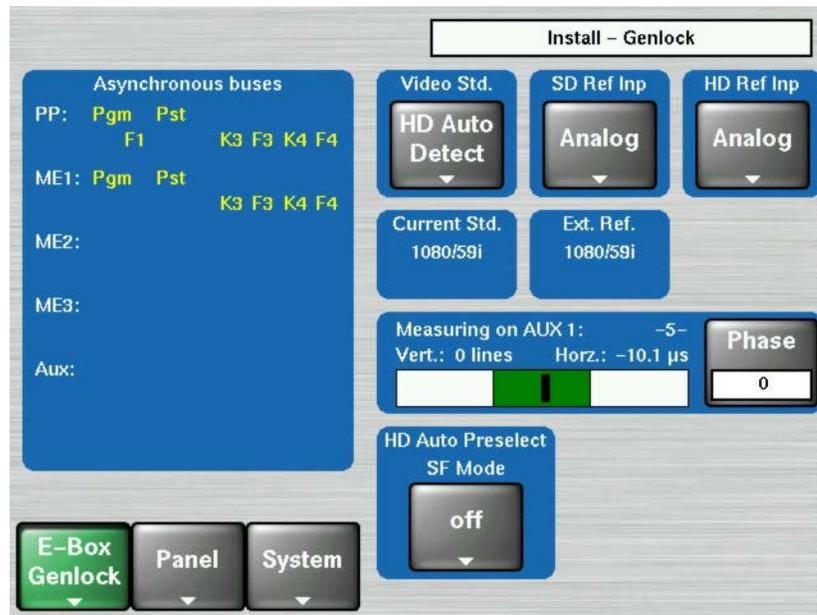
This can give a slightly different look to the resulting video playback. Interlaced and segmented frame video requires different internal system video processing techniques. These include changes to crosspoint cut points, wipe pattern geometry, and interpolation.

When using **Auto Detect** the Kayak system automatically detects the line and frame rate of the incoming video reference signal and reports its sync reference status on the menu. However, the system cannot always directly determine whether the incoming video is interlaced or segmented frame. If HD Auto Detect is selected as the video standard you must set the SF Mode manually for some rates.

Because 1080-24/23.9 fps video is only produced in segmented frame, the system always uses segmented frame processing whenever it operates with a 1080-24/23.9 fps sync signal.

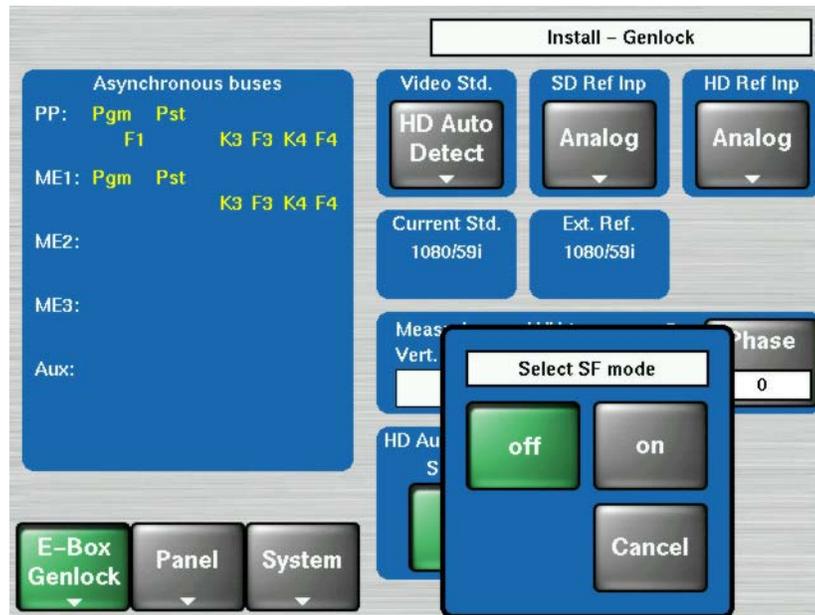
To select the SF mode for the Kayak HD switcher:

Figure 28. Genlock Menu with HD Auto Preselect SF Mode Data Pad



1. From the bottom of the **Genlock** menu press the button located in the **HD Auto Preselect SF Mode** data pad (shown in [Figure 28](#) as set to **off**). The **Select SF mode** dialog box displays.

Figure 29. Genlock Menu with Select SF Mode



- Press to select either **off** or **on** to set the SF video format for your Kayak HD switcher.

Adjust Internal System Timing

The Genlock Phase Knob (located to the right of the menu screen) adjusts/moves the switcher's internal system timing with respect to the selected reference. Adjusting the Phase affects the phase of all inputs and outputs of the switcher with respect to the external reference.

Grass Valley recommends that you use the AUX1 bus to check the video timing of all inputs. This compares the video source selected on the AUX1 bus to the switcher's internal system timing.

One method to determine the correct system timing phase is to select a source on the AUX1 bus and then adjust the switcher's phase to center the source in the timing window. Record this phase setting. Repeat this process for all external video sources.

Note Internal video sources cannot be measured and do not show up in the measurement window when selected.

Find the average Phase value by adding the highest and lowest Phase numbers together and then divide by two.

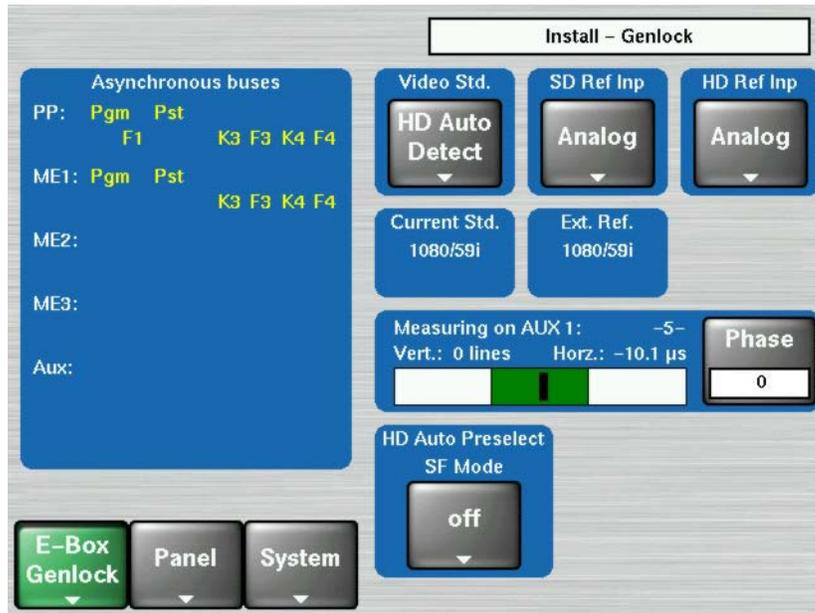
Now recheck all sources with the new average Phase number. Fine tune the Phase adjustment if necessary.

There may be some sources that still do not fall within the legal timing window. For these sources you will have to go back to the video source itself and change its timing with respect to reference until it appears within the legal timing window.

To Adjust the Internal System Timing on the Kayak HD:

1. Press the **Home** button on the Kayak HD Control Panel.
2. On the menu screen press the **Install** button.

Figure 30. Genlock Menu with Legal Timing Source



3. Press the **E-Box Genlock** button at the bottom left-hand corner of the screen. The **Genlock** menu displays.

Note The **E-Box** button displays the name of the current **Install** menu. If the **Genlock** menu is not displayed, press the **E-Box** button and select **Genlock**.

4. On the Kayak HD control panel press a key to select a video source from the AUX 1 bus. You need to check all video sources for timing.

5. Observe the vertical black cursor in the timing window to see how the source you have selected compares with the internal system timing.

Now adjust the internal system timing by physically turning the **Genlock Phase Knob** located to the right of the menu screen, third knob from the top. This adjusts the switcher sync in relation to the Reference you have selected.

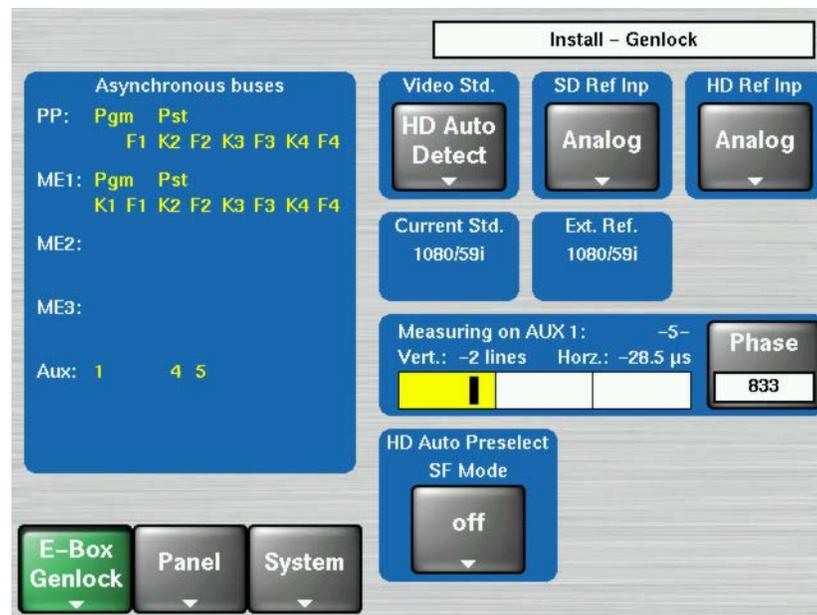
Turn the **Genlock Phase Knob** to position the vertical black cursor as close as possible to the middle of the green legal timing window. The vertical black cursor must be in the green and not moving.

Position the black cursor (representing the timing for the video source you have selected for AUX 1) near the center of the legal timing window. (See [Figure 30](#).) Green indicates that the source is within legal timing and yellow means that the source is outside legal timing window limits ([Figure 31](#)).

The text in the Phase button to the right of the Timing Window displays the timing phase in pixels.

6. Write down the Phase number for each source to help determine the average Phase number for all sources.
7. Once you have checked the timing for the first video source you selected from the AUX1 bus, you must repeat the process for every other video source on the AUX1 bus. Select all video sources and record their Phase number.
8. Find the average Phase value by adding the highest and the lower Phase numbers together and then divide by two.

Figure 31. Genlock Menu with Illegal Timing Source



9. Now set the Phase as close as possible to the average number.
10. Recheck all video sources on AUX1 for timing. Fine tune the Phase adjustments if necessary.

There will always be a few video sources that may be out of legal timing range, even after you have adjusted the switcher for the best average timing for all sources. In that case, you need to go to the video source itself and adjust its timing.

11. Check the Asynchronous buses display. If any buses are displayed or blinking, that bus input is not in sync and the timing for its video sources must be re-adjusted.

CAUTION If you change the Video Standard setting in the **Genlock** menu, you must go back and check the timing for all video sources once again.

Note If you add additional M/Es to your switcher you must also recalibrate your video timing to make sure all sources are within the new smaller green legal timing window.

Kayak System Control via PC

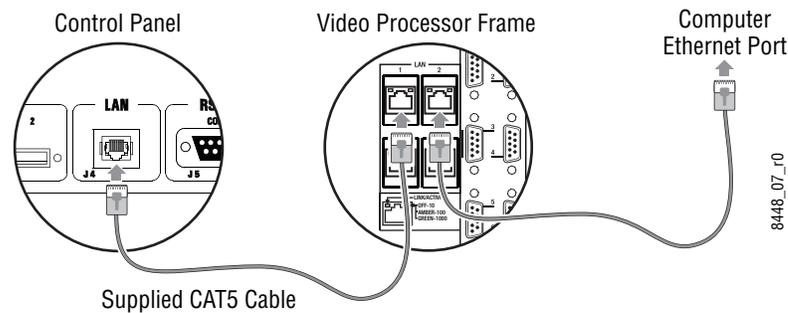
Connecting a PC / Laptop to a Kayak HD System

To connect a computer to the Kayak HD you will need:

- Laptop or desktop computer with an available Ethernet port
- 2 Ethernet Cables (1:1)

Connect the computer, frame, and the Kayak HD Panel as shown in [Figure 32](#).

Figure 32. Connecting a Computer to the Kayak HD



Configure your computer to connect to the Kayak HD by specifying the IP address for your computer using this format:

IP Address 192 . 168 . 0 . xxx

Subnet Mask: 255 . 255 . 255 . 0

To set the Identification for your computer and workgroup change your Network Properties to reflect your computer name and workgroup (if required).

Configuration

Introduction

This section provides system configuration information for the Kayak HD Digital Production Switcher. Refer to the latest *Kayak HD Release Notes* for information specific to your current software version.

Configuration Steps

Kayak HD system configuration includes the following basic steps:

1. Power up the system.
2. Install the Sidepanel software on a PC or laptop computer.
3. Configure Devices and set their IP addresses.
4. Calibrate the Touchscreen.

Panel adjustments generally are not required, but may be necessary on some systems. The latest software is pre-installed at the factory.

Installing the Sidepanel Software on a Computer

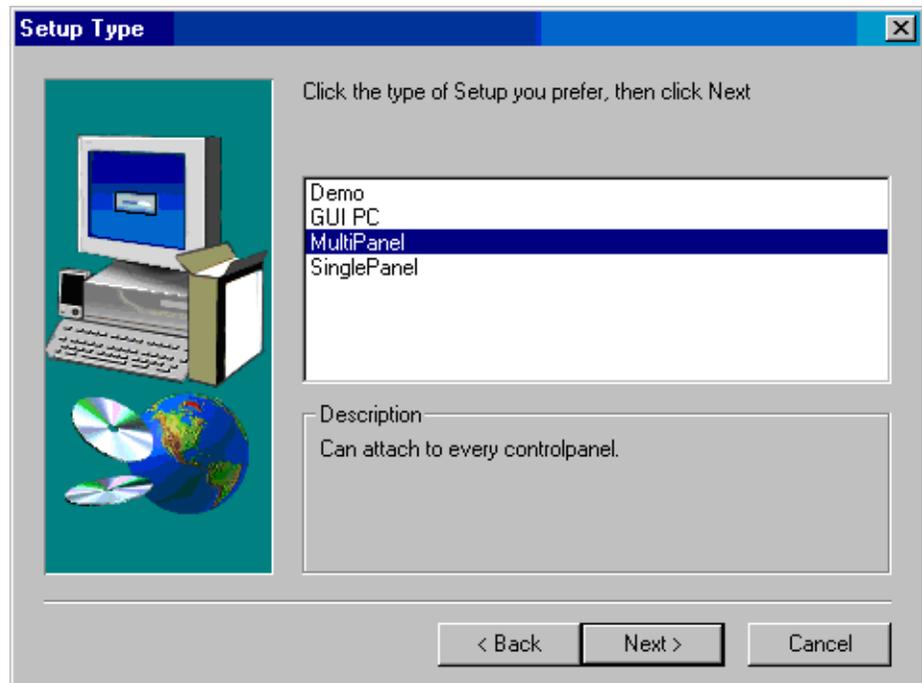
1. Connect your computer to the Kayak HD. (Refer to [Figure 32 on page 60.](#))
1. Insert the Kayak HD Software CD into your computer's CD-ROM drive.
2. Navigate to this directory on the CD-ROM:
`\Kayak\OperatingSoftware\Ds0206\ds0206.xxx\DS0203.4xx\Disk1`
3. Double-click on the **Setup.exe** icon to launch the application file. The **Sidepanel Software Installation Welcome** screen displays.

Figure 33. Sidepanel Software Installation Welcome Screen



4. Click **Next**.

Figure 34. Sidepanel Software Setup Screen



5. Choose the type of installation you wish to perform:

CAUTION Be careful when selecting the type of software installation to use. This setting cannot be changed later.

Demo: Demo version, no connection to a panel or a frame.

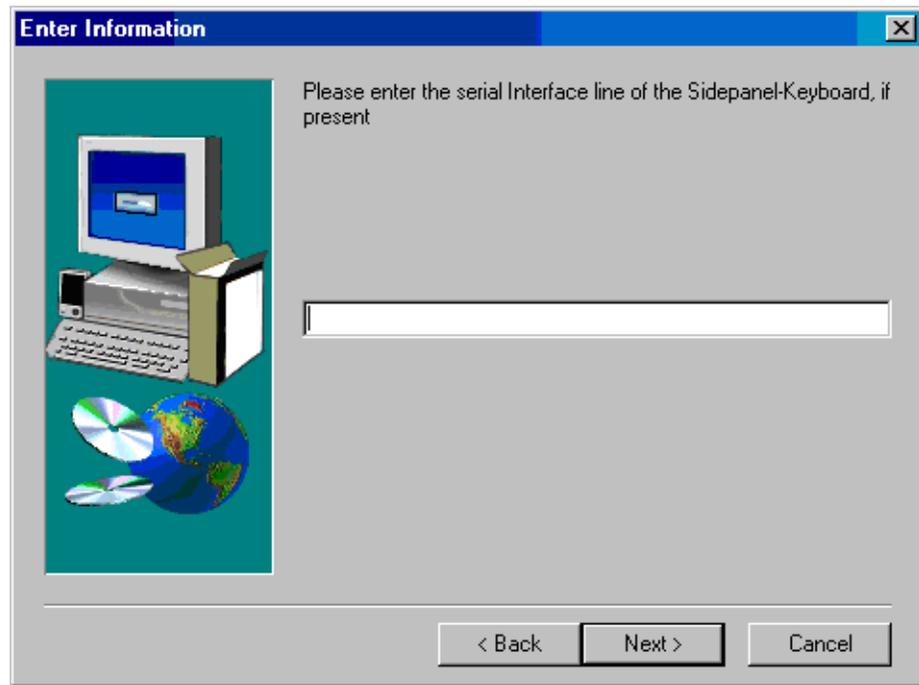
GUI PC: Connection only to a frame, not to a panel.

MultiPanel: Connection to frame and panel.

SinglePanel: Connection to a specified panel during the installation.

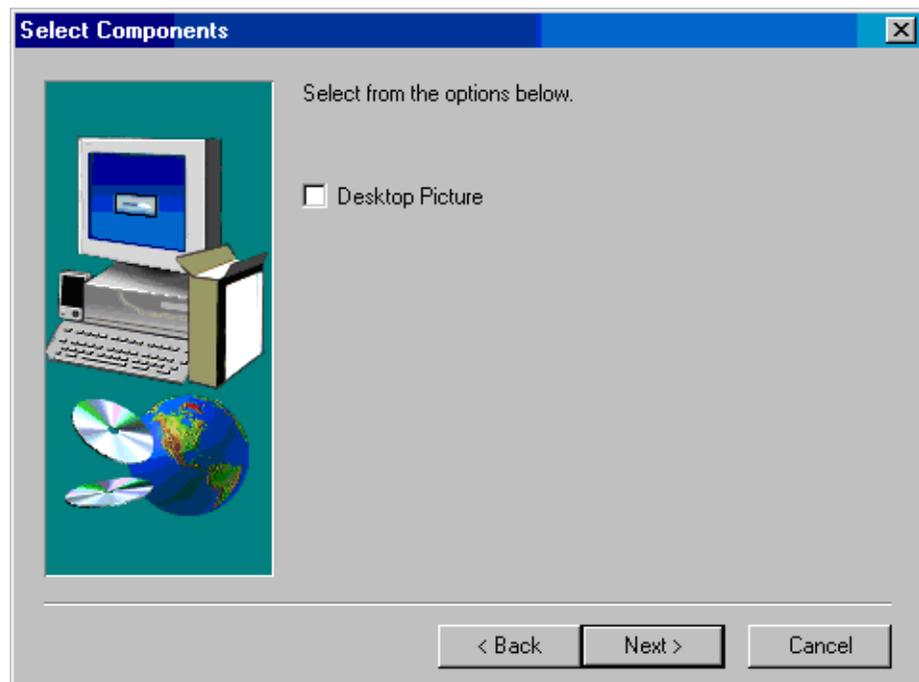
6. Click **Next**.

Figure 35. Sidepanel Keyboard Serial Interface screen



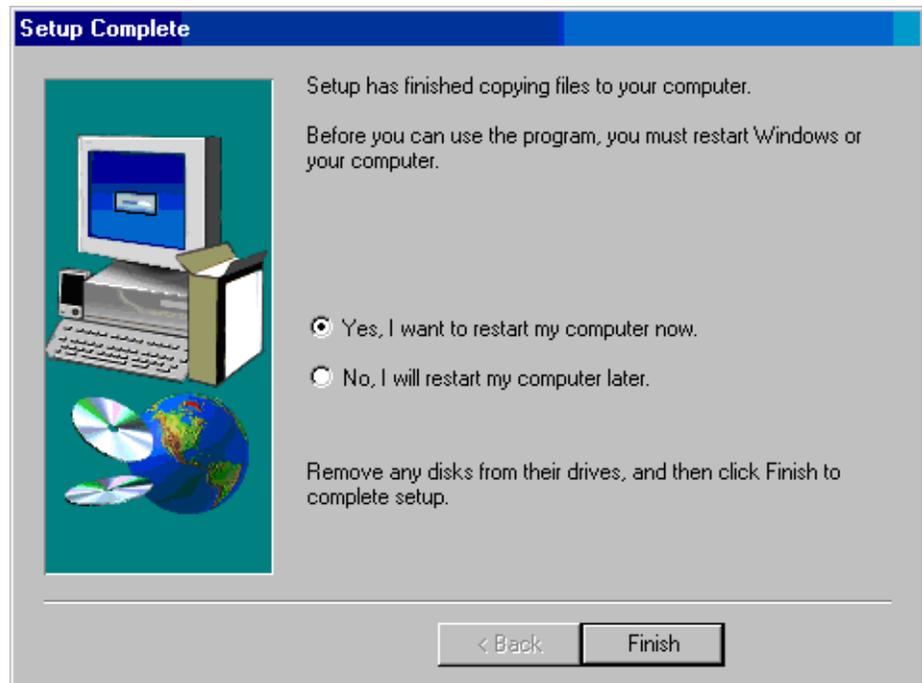
7. Enter the serial Interface line of the Sidepanel Keyboard (if available) and click **Next**.

Figure 36. Sidepanel Software Desktop Picture Option



8. Click to select the checkbox for **Desktop Picture** and click **Next**.

Figure 37. Sidepanel Software Restart Screen



9. Click to select the checkbox for “**Yes, I want to restart my computer now**” and click **Finish**.

To complete the computer connection to the Kayak HD after the computer has rebooted:

1. Launch the Sidepanel software application
2. Right-click the **Menu** button and select the **Startup** option
3. Click to select the box for E-Box at the top of the screen. A blue line displays in the bottom of the box to indicate that it has been selected.
4. Click to select the box for **Panel** (if available) at the top of the screen. (The **Panel** box is active only if you selected to install the Sidepanel software in **MultiPanel** mode.)
5. Click to select the name and IP address for the frame from the scrolling list at the bottom of the screen.
6. If needed, click to select the name and IP address for the panel
7. Click the **Connect** button to connect the frame to the panel and to the computer Sidepanel software for this session.
8. Click **Attach** to make the connection from the frame to the panel and to the computer Sidepanel software persistent so that it will remain after the computer reboots.

Device Configuration

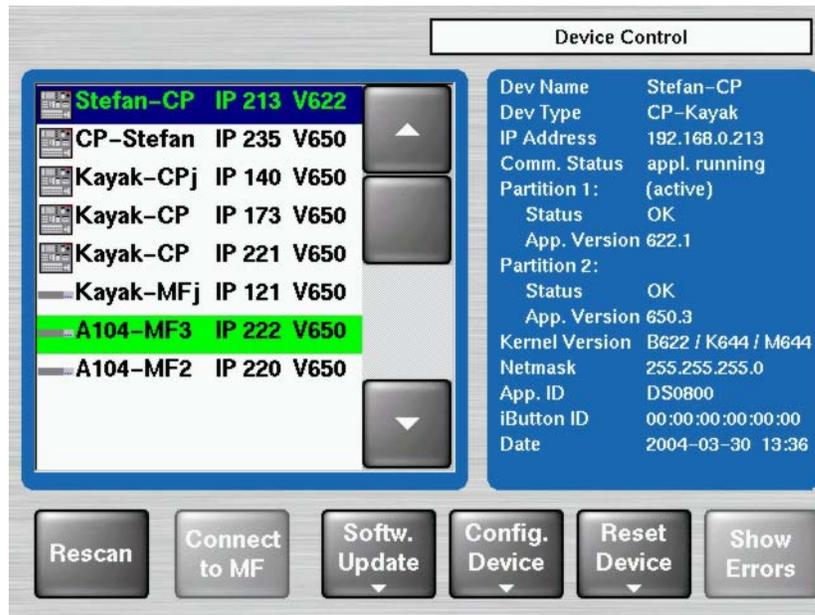
Configure Device Menu

You can change device configuration data from the Kayak HD **Configure Device** menu.

To display the **Configure Device** menu:

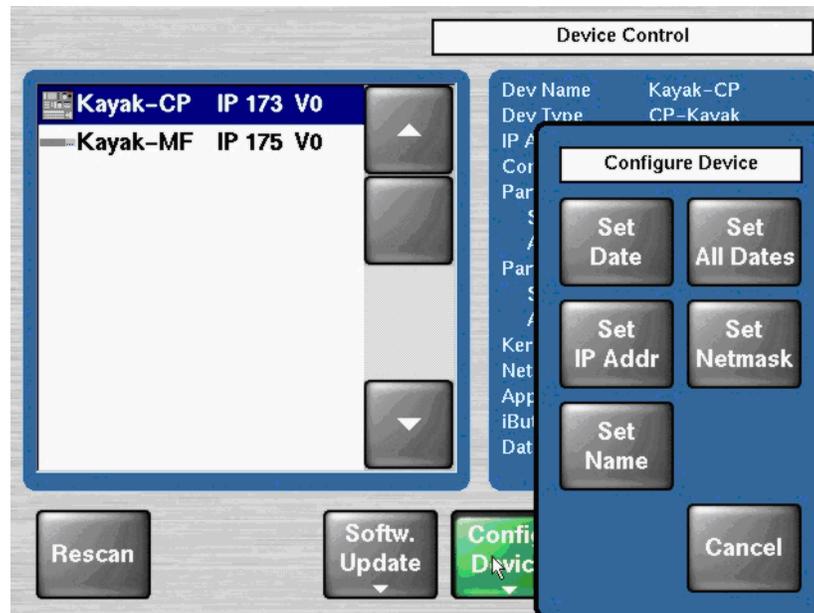
1. From the Kayak HD **Home** menu screen, click the **Install** button.
2. Click **System**.
3. Click **Device Control**. The **Device Control** menu displays.

Figure 38. Device Control Menu



- Click the **Config. Device** button at the bottom of the **Device Control** menu screen to display the **Configure Device** menu

Figure 39. Configure Device Menu



From the Configure Device menu you can change configuration data using these buttons:

- **Set Date:** Date and time of the selected device
- **Set all Dates:** Date and time of all connected devices
- **Set IP Addr:** IP Address of the selected device
- **Set Netmask:** Net mask of the selected device

Note The **Set Netmask** function should be used only by a qualified network administrator. Using different netmasks for MF and CP can create communication problems with network devices.

- **Set Name:** Logical device name. The default logical device names are **Kayak-MF** or **Kayak-CP** but you can change them.

Set Date and Time in Config Device Menu

Figure 40. Config Device Menu



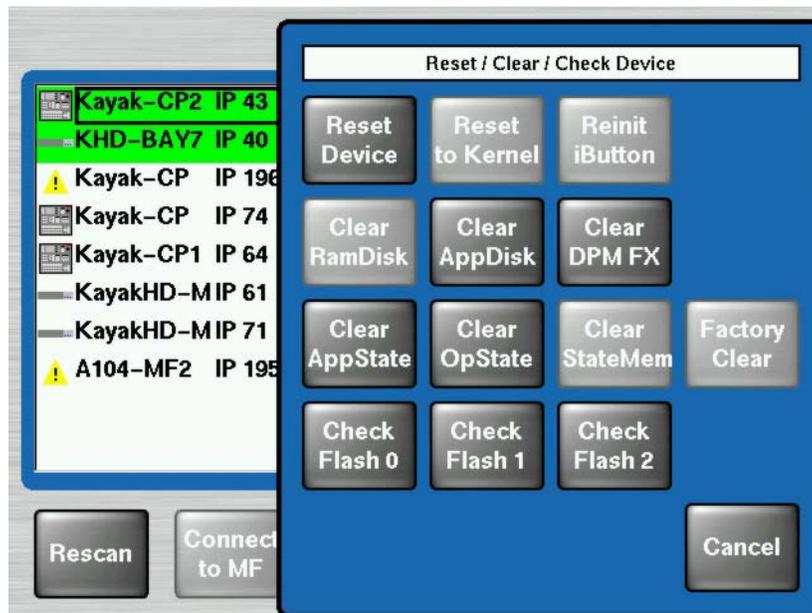
1. From the **Device Control** menu click to select the name of either the panel or the frame from the scrolling list on the left.
2. From the **Config Device** menu click **Set Date** to set the date and the time for the panel or frame you selected.
3. Click **Set All Dates** to set the date and time for all connected devices.

Reset / Check / Clear Device Menu

From the Device Control menu you can click the **Reset Device** button to display the **Reset/Check/Clear Device** menu. Only qualified users should attempt to configure these functions:

- **Reset Device:** Start/Restart the device
- **Clear RamDisk:** Re-initialize the RAM disk area on the flash
- **Clear AppDisk:** Re-initialize the Application disk area on the flash
- **Clear AppState:** Deleting the Application State
- **Clear OpState:** Deleting the Operational State
- **Clear StateMem:** Re-initialize the State Memory Partition
- **Check Flashx:** File system check of four flash partitions

Figure 41. Reset / Clear / Check Devices Menu



Main Panel Adjustments

Touchscreen Calibration

To open the **Touchscreen Calibration** menu:

1. From the Kayak HD **Home** menu click **Install**. The **Touchscreen Calibration** data pad displays on the screen.

If the **Touchscreen Calibration** data pad is not displayed at first, click the **Panel Misc.** button at the bottom of the screen, then click **Calibr.**

You can also use the following shortcut:

Menu Lock + User 3

2. In the **Touchscreen Calibration** data pad click the **Start Calibr.** button.
3. The **Touchscreen Calibration** menu displays a simple set of instructions explaining how to calibrate the touchscreen. You are asked to touch a red dot in various corners of the menu screen so that the system can optimize the touchscreen display.

Maintenance

Introduction

This section provides routine maintenance information for servicing the Kayak HD Digital Production Switcher, including software updates, updating the CPLD firmware, troubleshooting and diagnostics, and battery replacement.

Servicing Precautions

Before performing any type of maintenance or troubleshooting of the Kayak HD Digital Production Switcher, read the complete [Safety Summary](#) at the front of this manual. The [Safety Summary](#) describes all of the pertinent safety issues and recommended precautions for working with the Kayak HD Digital Production Switcher.

Tools Required

Some of the system installation tools listed in [Required Tools on page 27](#) may be required for maintenance procedures.

Troubleshooting and Diagnostics

The Kayak HD Digital Production Switcher is designed for ease of service and includes diagnostic functions for fast and effective troubleshooting of the system. This information is for troubleshooting a Kayak HD system that was installed and working properly prior to experiencing any failures.

Grass Valley Customer Service FAQ Database

Many answers to common questions can be found by searching the Grass Valley Customer Support Frequently Asked Questions (FAQ) database. Instructions for accessing the FAQ database can be found in *Contacting Grass Valley on page 2*.

Grass Valley Web Site

The URL for the Grass Valley web site can be found on [page 2](#). Visit the website for documentation, software updates, online support (including FAQs), spare parts information, and a link to the File Transfer Protocol (FTP) site.

Software Update

Recommended USB Flash Drives

Kayak HD software installation requires a USB Flash Drive. A 128MB USB flash drive is supplied with your switcher. The following types of USB flash drives are approved for use with the Kayak HD switcher:

- APACER USB Flash Drive (HandySteno) 256MB (USB1.1)
- APACER USB Flash Drive (HandySteno) 256MB (USB2.0)
- APACER USB Flash Drive 128MB (USB1.1)

Note These first three APACER USB flash drives require a cable adapter for the Kayak HD USB 4 slot.

- APACER Handy Steno HT202 USB 2.0 Flash Drive 128MB
http://www.apacer.com/apacer_english/product_html/handy_steno11.asp
- TRANSCEND JetFlash Type TS256MJFLASHA (USB2.0)
<http://www.transcend.com.tw>
<http://www.transcendusa.com>
- MEMOREX Thumb Drive USB 256 MB
<http://www.memorex.com/products>
- SanDisk Cruzer Mini 256MB, SanDisk Cruzer Mini 128MB

<http://www.sandisk.com/consumer/cruzermini.asp>

- Twinmos Mobile DiskIII 128MB

Note USB Setup does not detect this device as a removable device.

<http://www.twinmos.com>

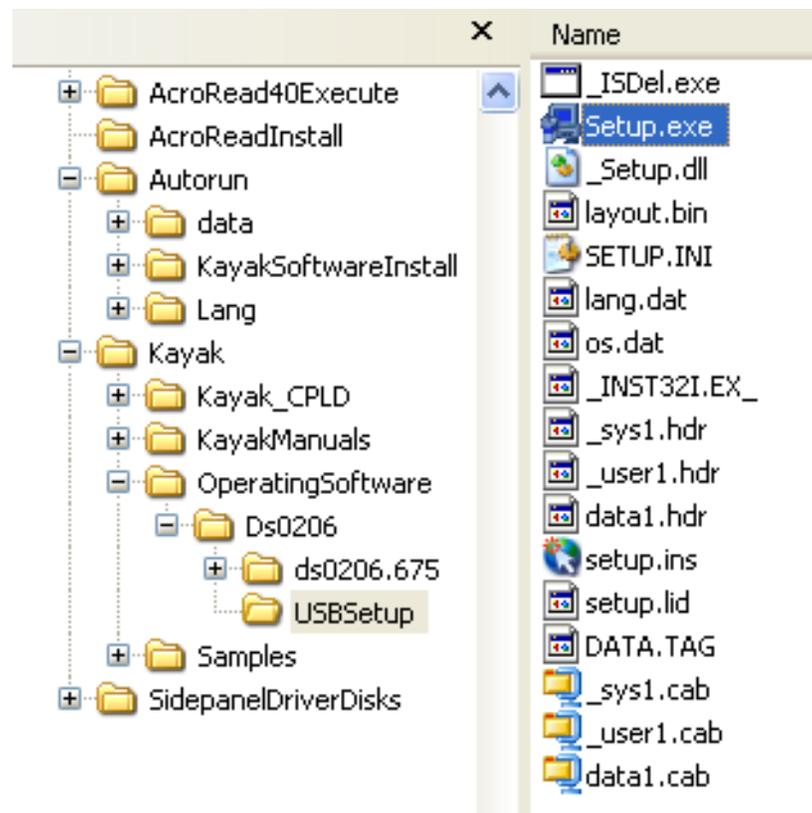
- PQI Corp.: Intelligent Stick 1GB, CoolDrive 512MB, CoolDrive 1GB

<http://www.pqi1st.com/products/istick.asp>

Installing Software on the USB Flash Drive

1. Plug a USB flash drive into a standard desktop PC or laptop.
2. Insert the software installation CD-ROM.
3. Open the **USBSetup** directory.

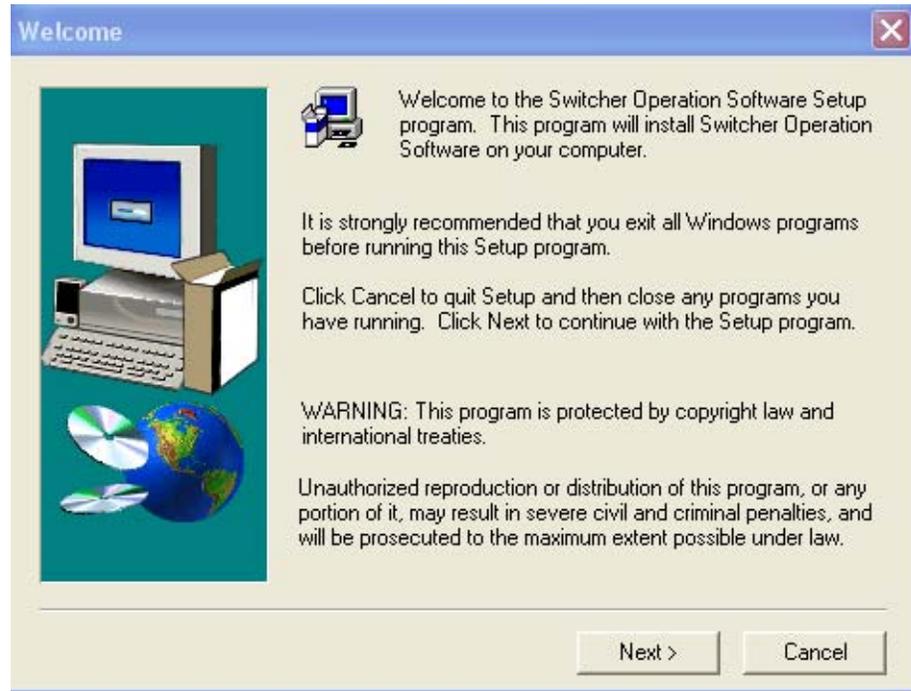
Figure 42. USB Setup Directory



4. Double-click the **setup.exe** icon to launch the installation program.

5. Press the **Next** button inside the **Welcome** window.

Figure 43. Welcome screen



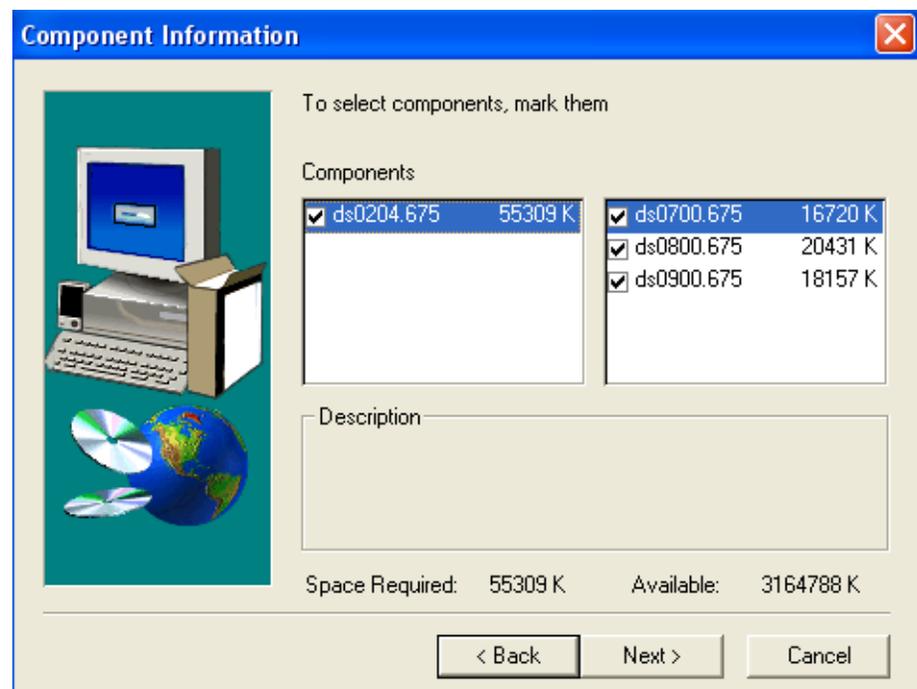
6. The installation program scans the system for removable devices to determine the destination folder. If the folder displayed doesn't match your USB installation device, choose another folder by clicking the **Browse** button to navigate to the directory you want.

Figure 44. Choose Destination Location screen



7. Click **Next** to display the **Component Information** window.

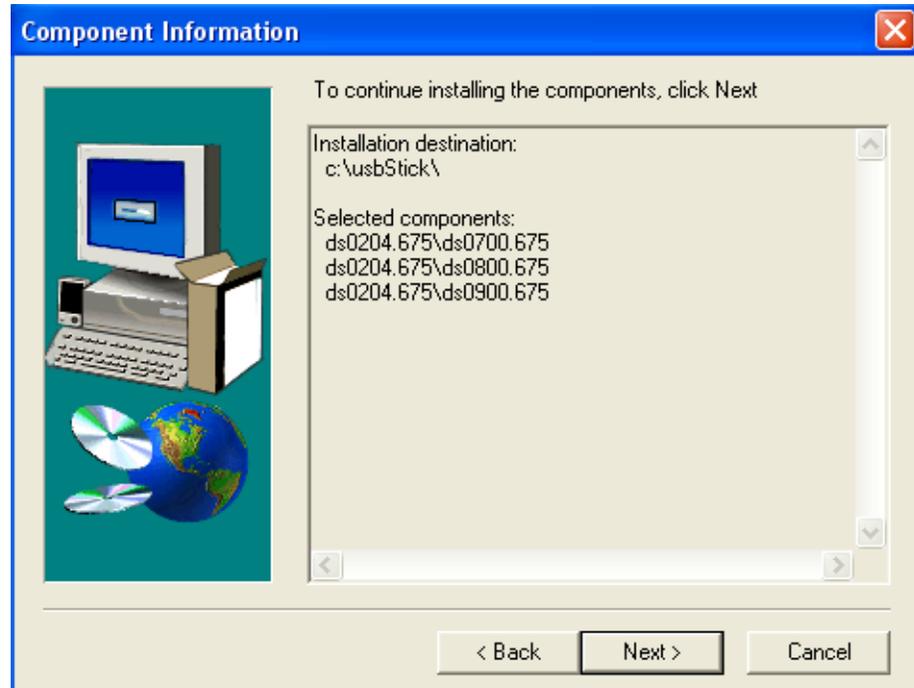
Figure 45. Component Information Window



8. Click to select the checkbox for the version of the software you want to install on your USB device. You can select more than one version.

9. Click **Next** to see an overview of the components you selected before you continue installation.

Figure 46. Overview of Selected Components



10. Click **Next** to start the installation.

Note Grass Valley recommends installing software onto the USB flash drive directly from the original CD-ROM. Never delete or change files on an successfully installed USB flash drive. This prevents failure of the Kayak HD software installation process.

Note USB ports 1 and 3 are not supported on Kayak HD control panel.

11. When the installation has completed remove the USB flash drive from your computer and take it to the Kayak HD control panel.

Loading and Updating Software

CAUTION You must have the correct software already installed on your USB flash drive before you plug it into the Kayak HD switcher USB port. If the software is not yet installed, install it using the process described in *Installing Software on the USB Flash Drive* on page 75

1. Plug the USB flash drive into either USB port 2 or 4 on the Kayak HD control panel. If the USB flash drive doesn't fit (mechanically) into the USB 4 slot use the extension cable that comes with your switcher as an adapter.

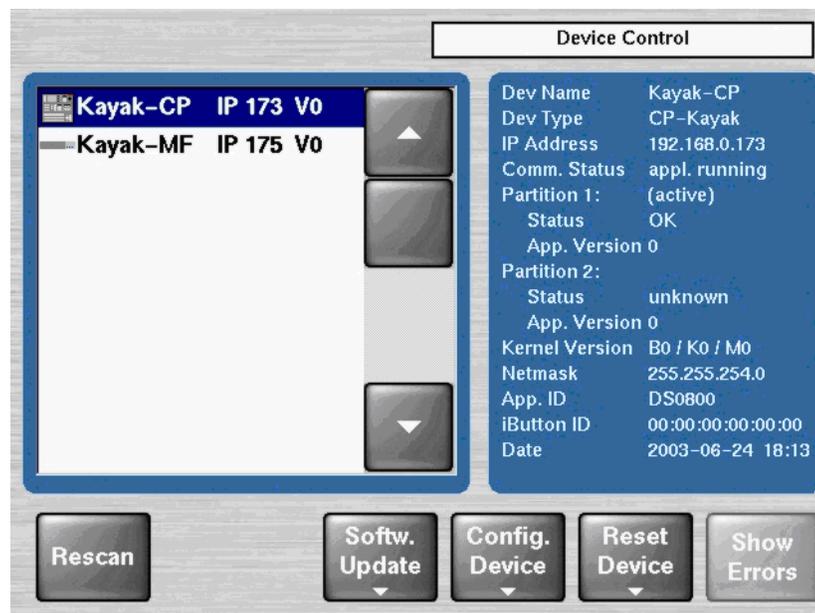
Note If the control panel software recognizes a valid Kayak release version on the USB flash drive the **Device Control** menu launches automatically. If the **Device Control** menu does not display when you plug in the USB flash drive, install the software using the process described in *Installing Software on the USB Flash Drive* on page 75

2. The **Device Control** menu displays all connected network devices with the last three digits of the device's IP address and the version of software installed.

Kayak-MF = Frame

Kayak-CP = Control Panel

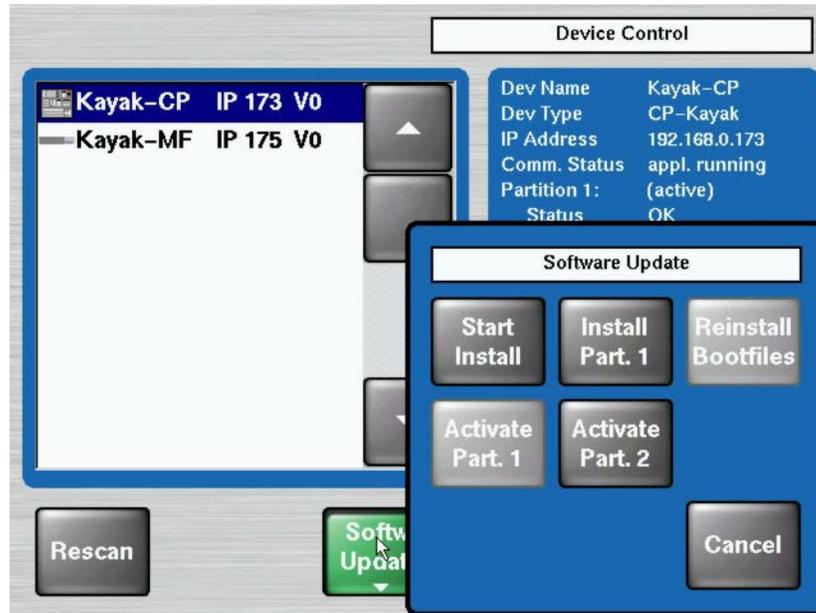
Figure 47. Device Control Menu



3. Select the device for software installation from the scrolling list in the **Device Control** menu.

4. Click the **Softw. Update** button. The **Software Update** dialog box displays.

Figure 48. Device Control Menu with Software Update Dialog Box



- Click either the **Start Install** or the **Install Part.x** button. The correct software will be installed in the respective device (MF or CP) automatically.

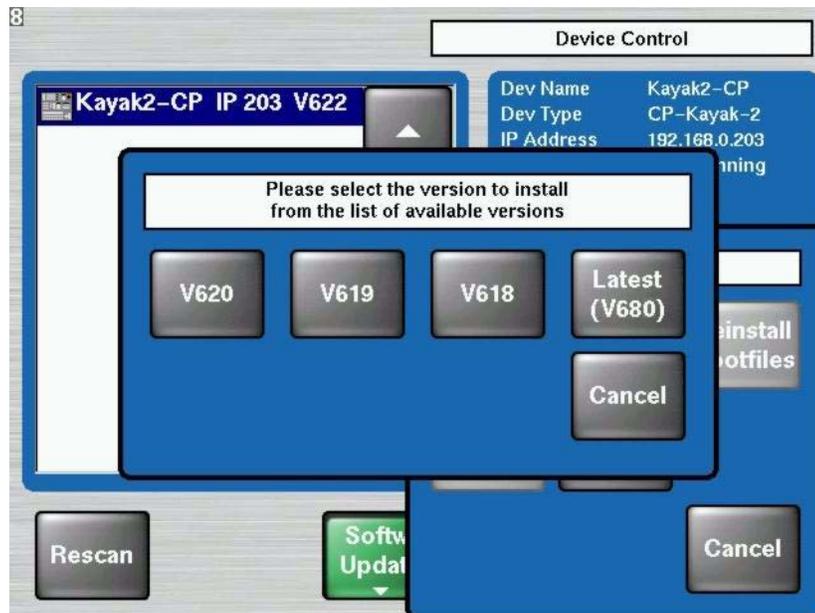
Two partitions are available on the USB flash drive for the application software.

Clicking **Start Install** installs the software in the non-active partition by default (recommended).

Clicking **Install Part.x** installs the software in the partition containing the current active software.

After clicking the **Start Install** (or the **Install Part.x**) button a dialog box displays the software versions available for installation.

Figure 49. Start Installation Procedure



Installation Procedure

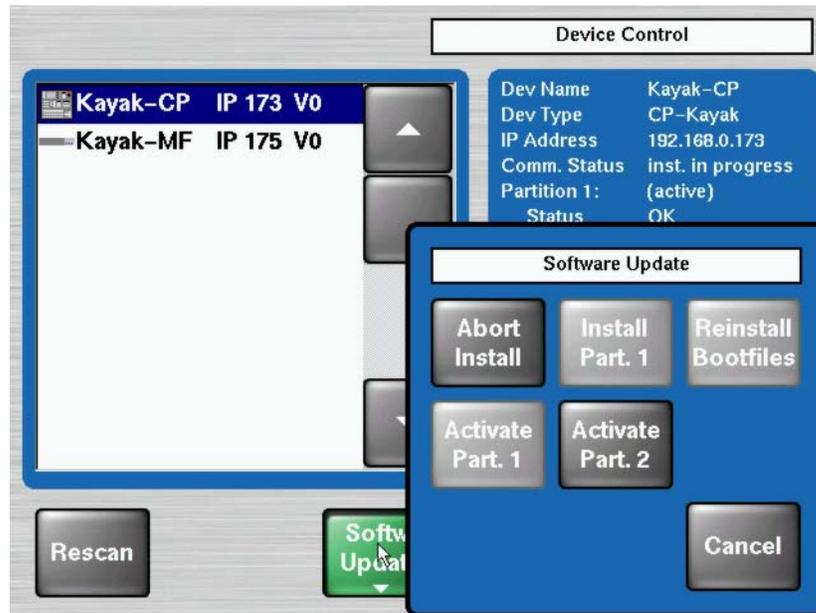
CAUTION Do not remove the USB flash drive during installation.

CAUTION Do not abort installation while installing on the Active partition! If you stop the installation process on the Active partition the switcher will not function.

1. Click to select the software version to install from the dialog box display. Installation begins immediately with progress displayed as a percentage.

If you need to cancel the Installation click the **Abort Install** button in the **Software Update** menu. If you cancel the installation, the system displays the status `inst. failed` as shown in [Figure 51 on page 83](#). The partition used for the cancelled installation is no longer available for use and cannot be activated.

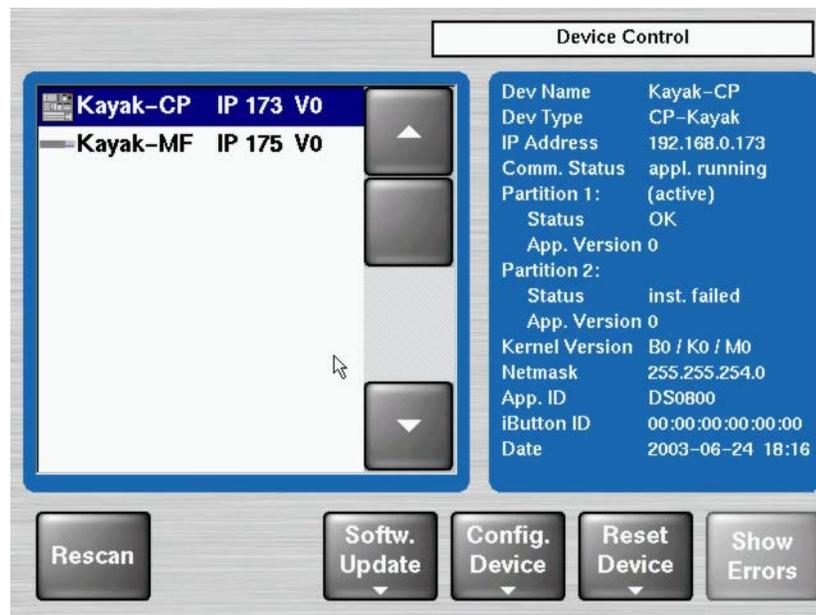
Figure 50. Abort Install Button



CAUTION Use only the **Abort Install** button to cancel installation. Do not interrupt the installation using any other method.

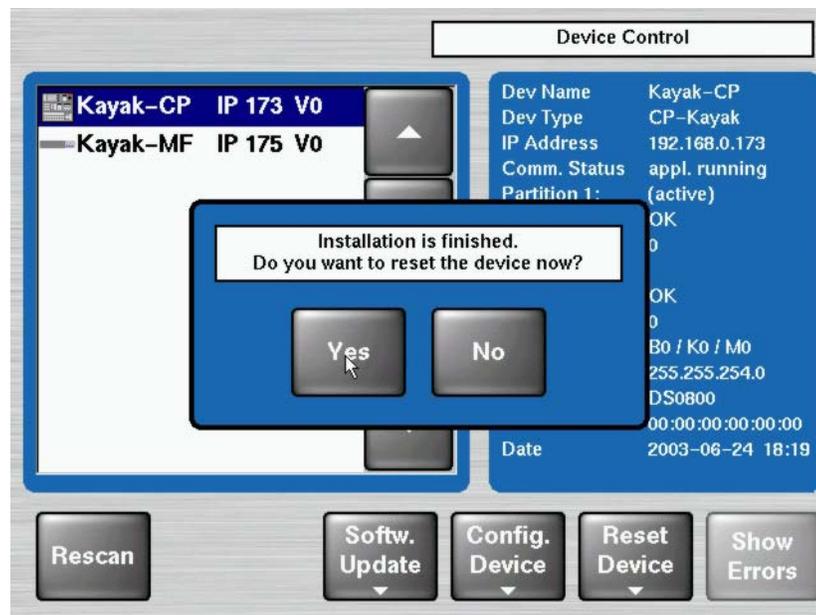
CAUTION Do not cancel the installation by turning off power to any device.

Figure 51. Device Control Installation Failure Status on Partition 2



2. After finishing the installation procedure, a dialog box displays the question, Do you want to reset the device now?

Figure 52. Finish Installation



- Note** Verify that the active partition shows the new software version you just installed (e.g., 6.8.0) before restarting the device.

3. If the active partition shows that the new software was successfully installed click **Yes**. The installed software is available only after you restart the system.

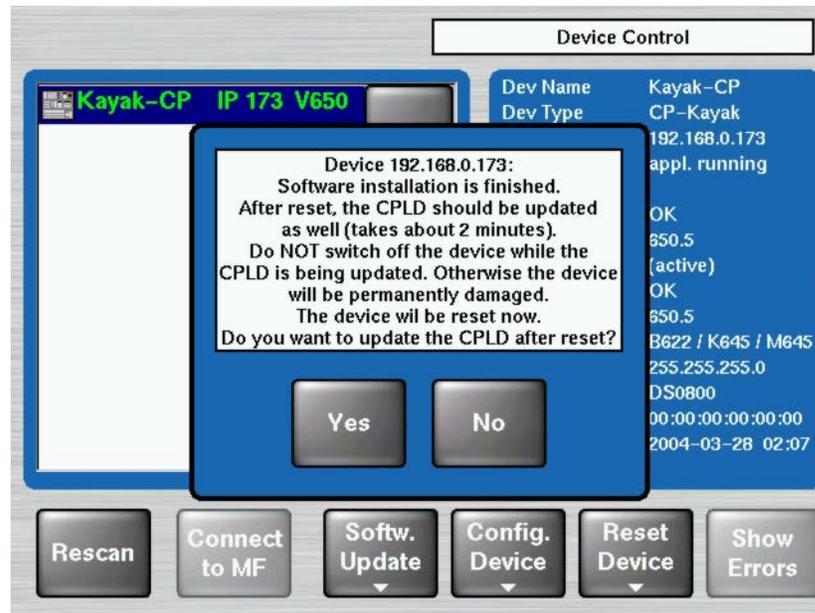
Note Always restart each device after upgrading its software.

Updating the CPLD Firmware

At the end of each installation process the system checks to determine if a CPLD update is necessary. This is done by comparing the versions of the installed CPLD firmware files in flash memory with the current CPLD version tags stored within an EEPROM of each hardware board. If the version of at least one file is newer an update of the CPLD is necessary and the user is notified.

The system displays a dialog box like the one in [Figure 53](#) asking if you want to update the CPLD software after you reset the device.

Figure 53. CPLD Update



Click **Yes** to confirm the CPLD update (recommended) or click **No** to skip it.

After confirming the update, the device is restarted and the CPLD is updated. The currently installed file name and the update progress are displayed in the Device Control menu.

CAUTION Caution: Do not turn off power to the device while the CPLD update is running because this can permanently damage the device!

CAUTION Do not change to any menu other than the **Device Control** menu after initiating an CPLD update on a Kayak frame. Changing menus prevents you from being able to monitor the update process.

After the CPLD update is finished the system must be restarted to set the device for normal operation.

Troubleshooting and Diagnostics

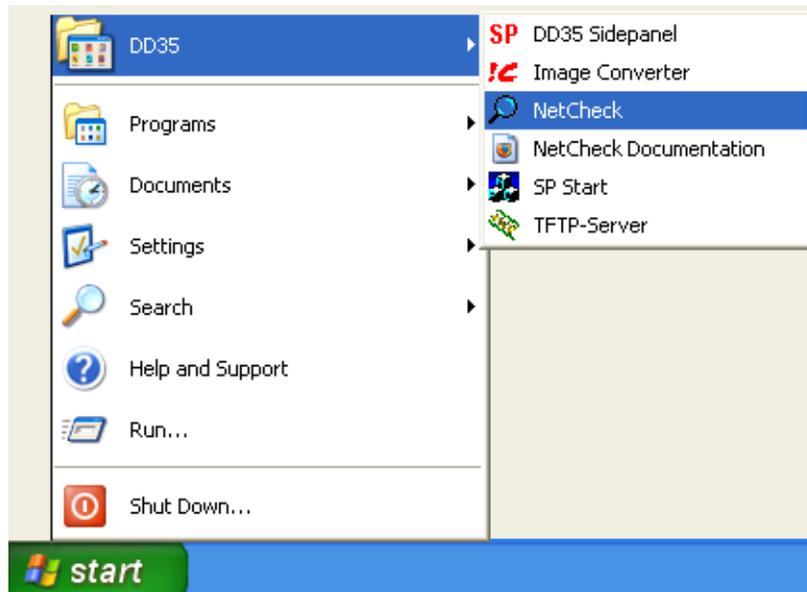
Network Problems with Sidepanel

After the installation of the Sidepanel software use the Netcheck application to test your connection and to analyze network stability.

1. Launch the Netcheck application from the Start menu following this path:

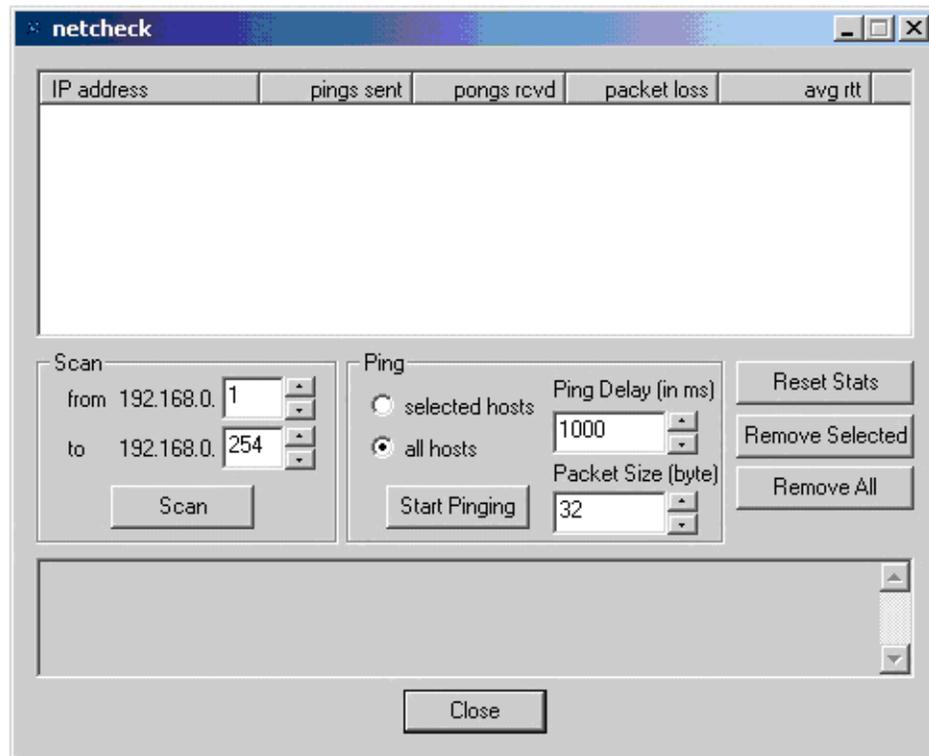
Start - DD35 - Netcheck

Figure 54. Path to the Netcheck Software



After starting the program the Netcheck screen displays.

Figure 55. Netcheck Screen



2. The IP range can be changed if required. Click on the **Scan** button to display all network components in the IP address pane of the Netcheck window.
3. In the **Ping** section of the Netcheck window, click to select the checkbox for either
 - **selected hosts**
 - **all hosts**

The default Ping Delay is 1000 ms and the default Packet Size is 32 bytes. You can change this setting if required.
4. Click on the **Start Pinging** button and the listing for the pings displays in the upper part of the Netcheck window. (The **Start Pinging** button toggles to **Stop Pinging**.)
5. When the required ping information has been obtained, click the **Stop Pinging** button. Grass Valley recommends that you test your connection using a minimum of 1000 pings to check for problems.

Note The packet loss should not be higher than 0.1%. If the packet loss is higher check your network. Possible reasons for network errors are unscreened cables, problems with switches and hubs, or a network segment with excessive traffic.

6. Click the **Reset Stats** button to reset the ping values in the upper part of the Netcheck window.
7. Click the **Remove Selected** button to delete any network components you have selected from the Netcheck window.
8. To scan the network again click on **Remove All** and then click Scan.

Note Firewalls and antivirus software may block computer network connections to the Kayak HD. Some operating systems have a separate internal software firewall that is turned on by default. If you are experiencing network problems try turning off all firewall and antivirus software including that which comes with the operating system.

Lost LAN Connection

If the panel has lost the IP address, and therefore does not connect automatically, you can re-connect to the frame.

1. Press these buttons all at the same time in the Transition panel:

Black Preset + Trans PVW + Key3

This switches the Effects subpanel into address entry mode.

2. Type in the last group of the frame IP address (Example: If the address is 192.168.0.70 type in 70) and press **Enter**.
3. The panel will load `systemfiles` and should then re-connect to the frame.

Problems with Network Configuration

When an IP address of a Kayak HD frame has been changed in order to integrate the devices into an existing network and the subnet mask of the device does not fit to the mask of the network, the connection between frame and panel will be lost.

In this case establish a serial terminal connection to the frame and replace the IP address.

CAUTION This should be done only by qualified service personnel.

1. Open a command tool (terminal shell) and type in the following command:

```
sysIPAddressSet "<old IP address>"
```

Example: `sysIPAddressSet "192.168.0.71"`

2. Press **Rescan** in the Device Control menu of the panel. The frame should now be visible.
3. If the frame is still not visible, reboot both the frame and the panel.

Note In order to integrate Kayak HD devices into an existing network, ask the local network administrator for the subnet mask of the network. Before changing IP addresses always set the subnet masks of all Kayak HD devices to the mask of the local network. If all changes are made and a frame is not visible to the panel, press **Rescan** in the control panel Device Control menu.

Network configuration defaults:

- IP address frame: 192.168.0.70
- Subnet Mask frame: 255.255.255.0
- IP address panel: 192.168.0.73
- Subnet Mask panel: 255.255.255.0

Running Panel Tests

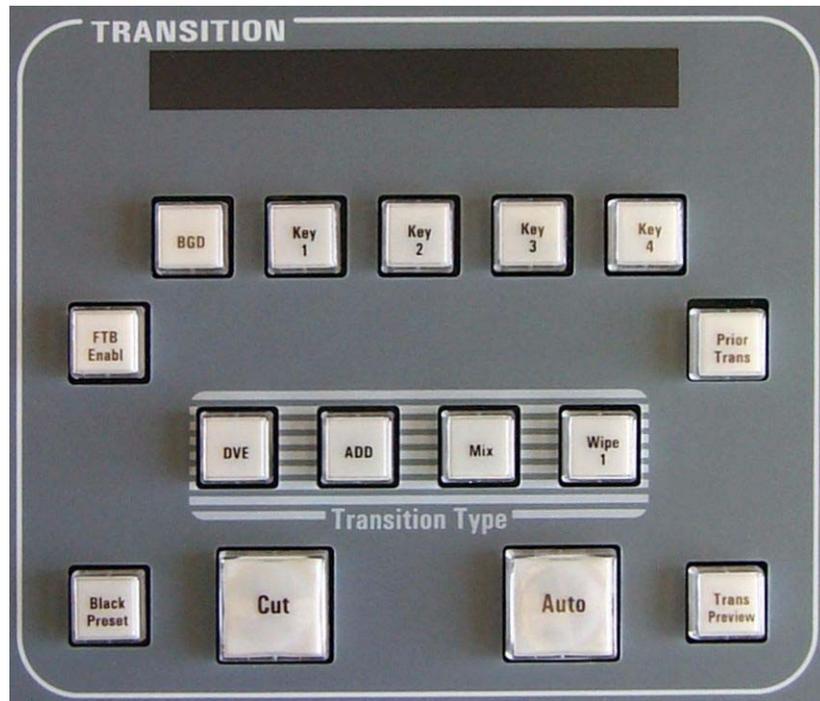
A series of test procedures are available to check the function of the Kayak HD Control Panels.

To run the Control Panel tests, simultaneously press the buttons:

BlackPreset + Trans Preview + BGD (or Key 1... Key 4)

in the **TRANSITION** control panel.

Figure 56. Kayak HD Control Panel Detail - Transition Panel



Local Panel Test Mode 1 (Button Test):

1. Simultaneously press the buttons:
Black Preset + Trans Preview + BGD
2. Now press and hold down a button. This test displays the logical address of the button pressed.

Local Panel Test Mode 2 (LED Test):

1. Simultaneously press the buttons:
Black Preset + Trans Preview + Key1
2. In this test the light for the button pressed is lit. The associated LEDs under the panel light when the button is pressed and held.

Special test buttons:

BGD, Key1 - Key4	Turns on associated LEDs under the panel
Shift, Make (PGM+PST+Delegation)	Turns on the Uncal LEDs under the panel
Key1 Cut / Key4 Cut	Turns on the arrow (Fader) LEDs

Note The **Uncal** (Uncalibrated) light indicates that the selected source is out of legal timing range or that the video associated with the selected source is being processed.

Local Panel Test Mode 3 (Group Test / On Air Highlight Test):

1. Simultaneously press the buttons:
Black Preset + Trans Preview + Key2
2. In this mode, whole button groups are switched on or off all at once by pressing any source button in the group. In the key bus, program and preset can be also switched between white and red by pressing any source button in that group.

Local Panel Test Mode 4 (Connect Mode):

1. Simultaneously press the buttons:
Black Preset + Trans Preview + Key3
2. This is a method for connecting to a frame without using the Sidepanel software. Simply enter the last byte of the IP address and confirm by pressing the **Enter** key.
3. When you are finished exit the test mode by simultaneously pressing the buttons **Black Preset + Trans Preview + Key3**. This locks the frame so that no one can control it.

Local Panel Test Mode 5 (Color Test):

1. Simultaneously press the buttons:

Black Preset + Trans Preview + Key4

2. In this mode select a key group on the Effects Subpanel, and then use the buttons **Key1-Key4** to select the different display colors.

Key1 = White

Key2 = Red

Key3 = Green

Key4 = Blue

Most groups have only white LEDs, but the four bus rows use both white and red and the number block uses all four colors.

Press the following transition buttons to change the brightness:

DVE Dark in large steps

ADD Dark in small steps

Mix Bright in small steps

Wipe Bright in large steps

Lifetime of the Internal Battery

Battery life of the Kayak HD internal battery is dependent on the operating time of the switcher.

Table 6. Lifetime of the Internal Battery

Capacity	GV #	Type
1000 mA/h	146013800	CR 2477

Note If the switcher has a low battery and cannot save the date and time, a low-battery warning displays.

Changing the Batteries

Change the Kayak HD Frame Battery

CAUTION Operate the Kayak HD frame only with covers and enclosure panels in place — Do not operate this product when covers or enclosure panels are removed.

WARNING Be very careful when opening the Kayak HD frame door. Take precautions to avoid electrical shock from components by following the safety precautions described in detail in *Warnings on page 14* and in *Cautions on page 15*. In particular you want to avoid the possibility of electrical shock by powering down the system and unplugging all equipment before working on internal components. In addition you should wear a grounding strap to prevent electrical damage to sensitive electronic components.

1. Turn off all power to the frame before opening it.
2. Using a grounding strap, open the door to the Kayak HD frame and remove the controller board.

Figure 57. Kayak HD Frame Controller Board with Battery in center of board



Figure 58. Kayak HD Frame Controller Board Battery

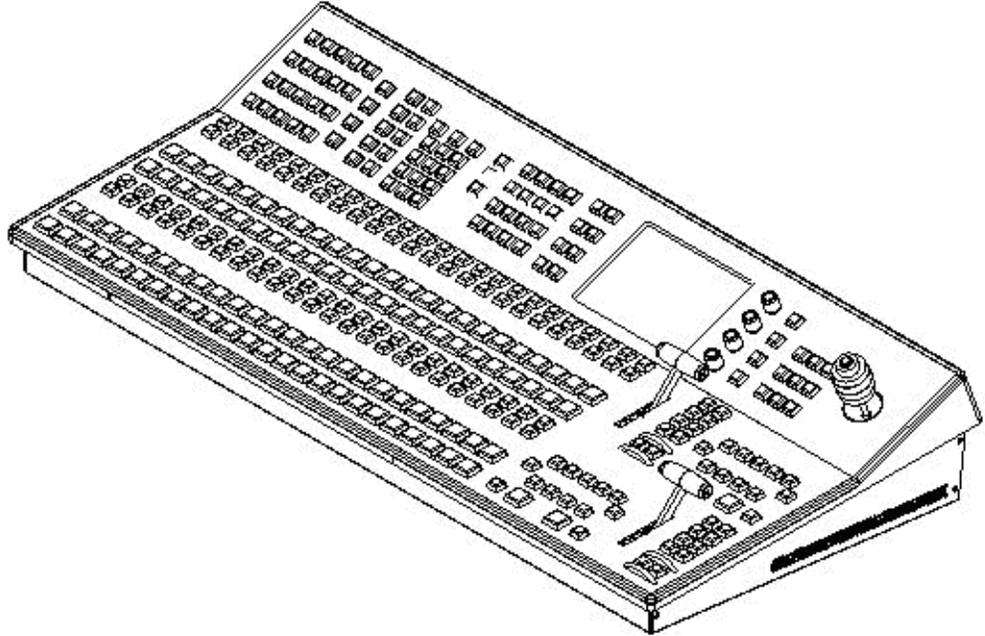


3. Remove the old battery by lifting the clip holding it in place.
4. Put the new battery in place and secure the clip.
5. Re-insert the frame controller board and close the frame door.
6. Check the frame BIOS after replacing the frame battery using the procedure described in *Frame BIOS Settings* on page 96.

Change the Kayak HD Control Panel Battery

1. Loosen the sixteen screws around the control panel.

Figure 59. Kayak HD Control Panel (2 M/E Panel)



2. When all screws are loosened, lift the top of the panel carefully. The battery is located on the side of the internal CPU board.

Figure 60. Battery on the Control Panel CPU Board

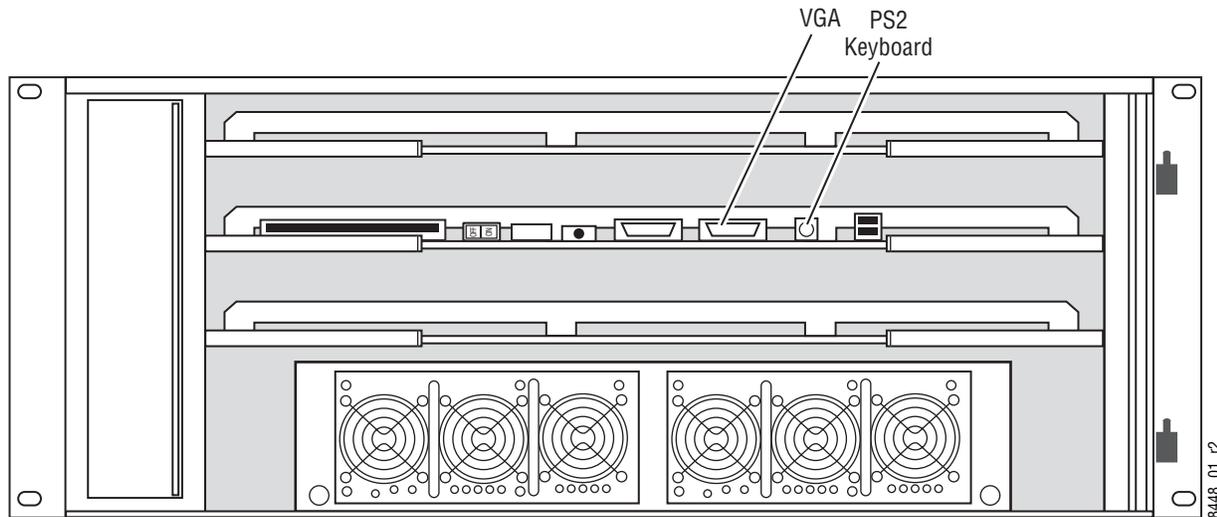


3. Remove the old battery by lifting the clip holding it in place.
4. Put the new battery in place and secure the clip.
5. Close the panel and fasten all screws.
6. Check the panel BIOS after replacing the panel battery using the procedure described in *Panel BIOS Settings on page 97*.

Settings

Frame BIOS Settings

Figure 61. Side View PS/2 and VGA Sockets on the Kayak HD Frame



1. Connect the keyboard to the PS2 connector and the VGA plug to the VGA socket.

To display the BIOS Menu, press the **F2** key during boot process of the switcher.

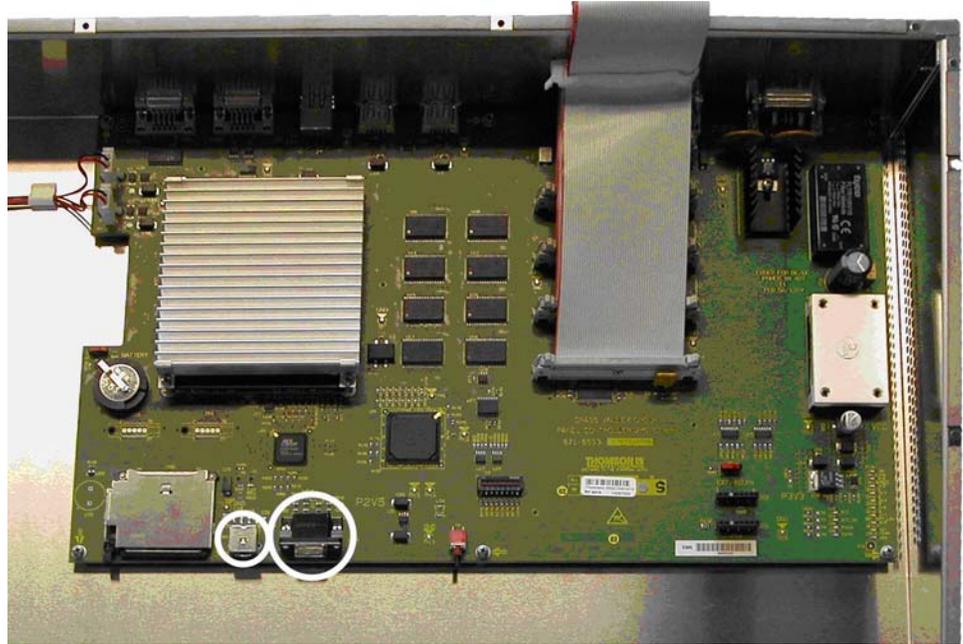
1. Load **BIOS Setup Default** with the key **F9** and confirm by clicking **Yes**.
2. In the **Advanced** menu set the options **PNP OS installed** and **Halt On Errors** to **No**.
3. In the **Advanced - PCI Configuration** menu change the **PCI-Interrupt Settings** set the option **PCI IRQ** line 1 to 10.
4. In the **Advanced - I/O Device Configuration** menu disable **Legacy USB Support**.
5. In the **Boot - Boot Device Priority** menu modify the boot arrangement so that **Removable Devices** is first followed by the **Hard Drive**. The boot order of other devices is not important.

Note The **Hard Drive** acts as the Primary Master for booting even if the **Compact Flash Card** is positioned at the top of the boot arrangement.

6. Save the changed BIOS settings with the Key **F10** and confirm with **Yes**.

Panel BIOS Settings

Figure 62. Top View PS/2 and VGA Sockets on the Kayak HD Panel



1. Connect the keyboard to the PS2 connector and the VGA plug to the VGA socket.
2. To display the **BIOS** Menu, press the **F2** key while the switcher is booting.
3. Load **BIOS Setup Default** with the key **F9** and confirm with **Yes**.
4. In the **Advanced** menu set the options **PNP OS installed** and **Halt On Errors** to **No**.
5. In the **Advanced - Advanced Chipset Control** menu change the display settings in the menu **Boot / Display Control** by setting the **Display Mode** option to **CRT only**.
6. In the **Advanced - PCI Configuration** menu change the **PCI-Interrupt Settings** by setting line 1 of the **PCI IRQ** option to 10.
7. In the **Advanced - I/O Device Configuration** menu enable both the **Legacy USB Support** option and the **USB Host Controller** option.
8. In the **Boot - Boot Device Priority** menu modify the boot arrangement so that **Removable Devices** is first followed by the **Hard Drive** (as the Primary Master). The boot order of other devices is not important.

Note The **Hard Drive** acts as the Primary Master for booting even if the **Compact Flash Card** is positioned at the top of the boot arrangement.

9. Save the changed BIOS settings with Key **F10** and confirm with **Yes**.

Specifications

Kayak HD Systems

Table 7. Kayak Mechanical Specifications

Component	Depth	Width	Height	Weight ^a	Rack Units
Control Surfaces					
Kayak HD 100C	418 mm (16.5 in.)	448 mm (17.6 in.)	145.796 mm (5.74 in.)	7 kg (15.4 lbs)	n/a
Kayak HD 150C, 200C, 200	418 mm (16.5 in.)	809 mm (31.8 in.)	145.796 mm (5.74 in.)	10 kg (22 lbs)	n/a
Frames					
Kayak HD Compact 4 RU Frame					
Kayak HD 100C and 150C	546.10 mm (21.5 in.)	441.96 mm (17.4 in.)	177.8 mm (7 in.)	16.329 kg (36 lbs)	4
Kayak HD 200C	546.10 mm (21.5 in.)	441.96 mm (17.4 in.)	177.8 mm (7 in.)	17.69 kg (39 lbs)	4
KDD-PSU Remote Panel Power Supply Option	240 mm (9.45 in.)	482 mm (19 in.)	44 mm (1.73 in.)	2.8 kg (6.2 lb.)	1

^a All weights approximate.

Table 8. Environmental

Storage temperature	-20 to 70 deg C (-4 to 158 deg F)
Operating temperature	0 to 40 deg C (68 to 104 deg F)
Relative humidity	0-95% (non-condensing)
Electromagnetic environment	E2 (according to EN55103-1, -2)

Table 9. Control Panel Connection

Type of connection	10/100 Base T
Protocol	TCP(UDP)/IP
Cable and connectors	CAT5 UTP, RJ45 connectors;
Max. Cable Length	100m / 300ft
1 Frame and up to 4 Panels connect without use of external hub/switch.	

Table 10. Power

4 RU Frame	
Line voltage	100V-240V AC +/-10% autorange, power factor corrected. Automatic line-voltage sensing for 120V and 240V sources.
Line frequency	50/60Hz +/- 5%
Power consumption	max. 400W
Leakage current	< 2.5 mA
DC-OUT for control panel	48V DC, max 3A
Kayak HD 100C Control Panel	
DC-IN	48V DC In, max 1.3A
Power consumption	max. 50W
Kayak HD 150C, 200C, 200 Control Panel	
DC-IN	48V DC In, max 1.3A
Power consumption	max. 60W
KHD-PSU Option	
Line voltage	100V-240V AC +/-10%, power factor corrected
Line frequency	50/60Hz +/- 5%
Power consumption	400W
Leakage current	< 2 mA at 250V AC
KDD-PSU Frame (Remote Control Panel Power Supply)	
Line voltage	100V-240V AC +/-10%, power factor corrected
Line frequency	50/60Hz +/- 5%
Power consumption	max. 375W
Leakage current	< 2 mA at 250V AC

Table 11. Serial Digital Video Inputs

Format	ITU-R656, SMPTE 259M, 270Mbit/s. SMPTE 292M, 1.5Gbit/s
Number of Inputs	Kayak HD 100C, 150C: 24 Kayak HD 200C: 48
Return loss	> 15 db, 5 MHz to 1.5 GHz
Type of Connector	75 ohm BNC (SMPTE 259M)
Interface	HD Video Formats SMPTE 292M-1998 SD Video Formats SMPTE 259M-1997
Nominal Amplitude	800mV peak-to-peak terminated
Autophasing range	TBD
Channel Coding	conforms to SMPTE 259M, SMPTE 292M
Ancillary Data	Blanked or passed (user selectable)

Table 11. Serial Digital Video Inputs

Embedded audio	Blanked or passed (user selectable)
EDH	Blanked
Input Impedance	75 ohm
Max cable length	HD Video 100 meters using Belden 1694A type cable
	SD Video 300 meters using Belden 1694A type cable

Table 12. Serial Digital Video Outputs

Format	ITU-R656, SMPTE 259M, 270Mbit/s. SMPTE 292M, 1.5Gbit/s
Number of Outputs	Kayak HD 100C, 150C: 12 Kayak HD 200C: 24
Return loss	> 15 db, 5 MHz to 1.5 GHz
Type of Connector	75 ohm BNC (SMPTE 259M)
Interface	HD Video Formats SMPTE 292M-1998 SD Video Formats SMPTE 259M-1997
Nominal Amplitude	800 mv peak-to-peak across 75 ohm
Rise & Fall Times	400 to 1400picoseconds 75 ohm termination between 20% and 80% amplitude
Jitter	ITU R 601/656
Output Impedance	75 ohm
DC Offset	< 50mV with 75 ohm termination

Table 13. Analog Reference Input

Video Standard	For HD Video: Tri-level Sync, Analog equivalent to the standard being used
	For SD Video: Color Black, Analog equivalent to the standard being used
Return loss	> 40dB, up to 5 MHz
Connectors	2 each BNC loop through for both HD and SD inputs
Impedance	75 ohm external

Table 14. Kayak HD Video Standards

HD Mode		SD Mode	
1080i 29.97/30	SMPTE 274M Table 1-4, 5	525i 59.94	SMPTE 259M
1080i 25	SMPTE 274M Table 1-6	625i 50	SMPTE 259M
1080p 24/23.976	SMPTE 274M Table 1-10, 11		
1080sF 24/23.976	SMPTE 211 Table 1-15, 16		
720p 60/59.94/50	SMPTE 296 Table 1-1, 2		

Control Interfaces

Supported GVG100 Commands

Name	Command Code	Remark								
CROSSPOINT BUS COMMAND	C1-C4 41-44	<p>Crosspoint interpretation:</p> <table border="0"> <tr> <td>GVG code</td> <td>Interpretation</td> </tr> <tr> <td>00H</td> <td>BLK</td> </tr> <tr> <td>01H...0x08H</td> <td>INPUT 1...8</td> </tr> <tr> <td>09H</td> <td>COLOR BGD 1</td> </tr> </table> <p>All other codes directly address the internal crosspoint numbers of the switcher.</p>	GVG code	Interpretation	00H	BLK	01H...0x08H	INPUT 1...8	09H	COLOR BGD 1
GVG code	Interpretation									
00H	BLK									
01H...0x08H	INPUT 1...8									
09H	COLOR BGD 1									
ANALOG CONTROL COMMAND	C5	<p>Only Write supported: [Control# (EX) - ControlName] [00H (01H) - Transition Lever Arm] GVG100 max value of 0xFFFF is linear translated to the DD transition maximum of 0x7FFF</p>								
PUSHBUTTON COMMAND	C6 (C7)	<p>Only Write C6 -> on C7 -> off Supported are: Program Bus Crosspoint 0-9 / 00H - 09H / C6 AUTO TANS / 0BH / C6 DSK MIX / 0CH / C6 DSK ON / 0DH / C6,C7 WIPE / 0EH / C6 MIX / 0FH / C6 Preset Bus Crosspoint 0-9 / 10H -19H / C6 REVERSE WIPE / 1DH / C6,C7 FADE TO BLACK / 1FH / C6 Key Bus Crosspoint 0-9 / 20H -29H / C6 GVG100 Wipe Pattern / 30H -39H / C6 BKGD / 48H / C6,C7 KEY / 49H / C6,C7 CUT / 4AH / C6 KEY ON / 52H / C6,C7</p>								
WIPE PATTERN SELECT COMMAND	C8	<p>Only Write GVG100 related wipe numbers are directed to the corresponding wipe pattern in the DD switcher (00H -> Vertical Wipe, 01H-> Left Corner Wipe,...). All other pattern codes directly address the internal wipe pattern of the switcher.</p>								
TRANSITION MODE COMMAND	CA	Only Write								

Name	Command Code	Remark
TRANSITION RATE COMMAND	CC/CD/FD	Only Write
LEARN E-MEM REGISTER	DA	
RECALL E-MEM REGISTER	DB	
ALL STOP COMMAND	F2	
TRANSITION PUSHBUTTON SELECT COMMAND	FB	Supported are: Program Bus Crosspoint 0-9 / 00H - 09H AUTO TANS / 0BH DSK MIX / 0CH DSK CUT / 0DH WIPE / 0EH MIX / 0FH Preset Bus Crosspoint 0-9 / 10H -19H REVERSE WIPE / 1DH FADE TO BLACK / 1FH Key Bus Crosspoint 0-9 / 20H -29H GVG100 Wipe Pattern / 30H -39H BKGD / 48H KEY / 49H CUT / 4AH KEY CUT / 52H

Note Every M/E related command affects the DD35/XtenDD/Kayak **PP** M/E stage by default. To affect another M/E use the **Editor M/E Mapping** feature. The GVG **DSK** command is always translated to Key3 in the **PP** “mapped” M/E stage.

Note Standard GVG200 protocol timing is used. Commands are executed in the third field after response. If there are timing problems, fix them by changing the timing parameters of the editor.

Supported GVG200 Commands

Name	Command Code	Remark
TRANSITION MODE COMMAND	CA	Only Write
TRANSITION RATE COMMAND	CC/CD	Only Write
TRANSITION PUSHBUTTON SELECT COMMAND	FB	
CROSSPOINT BUS COMMAND	C1-C4 (C1-CF for aux) 41-44 (41-4F for aux)	<p>Crosspoint interpretation:</p> <p>GVG code Interpretation 01H...0x14INPUT 1...20 15HME1 OUT 16HME2 OUT 17HCLEAN FEED 18HMAIN OUT 21HME3 OUT 25H...27HCOLOR BGD 1...3 30H...4BHINPUT 21...48</p> <p>AUX busses:</p> <p>The number of Aux Busses is not limited. If the effect address is 07H (= AUX Crosspoint) the lower nibble of the command code will be interpreted as the AUX bus number. Up to 15 Aux Busses can be controlled.</p>
PUSHBUTTON COMMAND	C6 (C7 for REV,KEY CUT keyer 1, KEY CUT keyer 2)	Only MIX,WIPE, REV and KEY CUT are supported. MIX and WIPE will switch the currently selected buttons for next transition to the given state.
WIPE PATTERN SELECT COMMAND	C8	Only Write
ALL STOP COMMAND	F2	
LEARN E-MEM REGISTER	DA	
RECALL E-MEM REGISTER	DB	

Note The GVG **DSK** command is always translated to the Kayak HD **PP** mixer effect.

Note Standard GVG200 protocol timing is used. Commands are executed in the third field after response.

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