SONY

Multi Port AV Storage Unit

PWS-4500

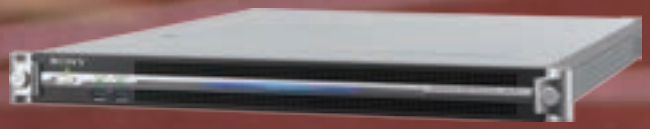
4K

4K/HD Live Server System

4K Live

Reality, Emotion, Excitement

Delivers True-to-life Entertainment



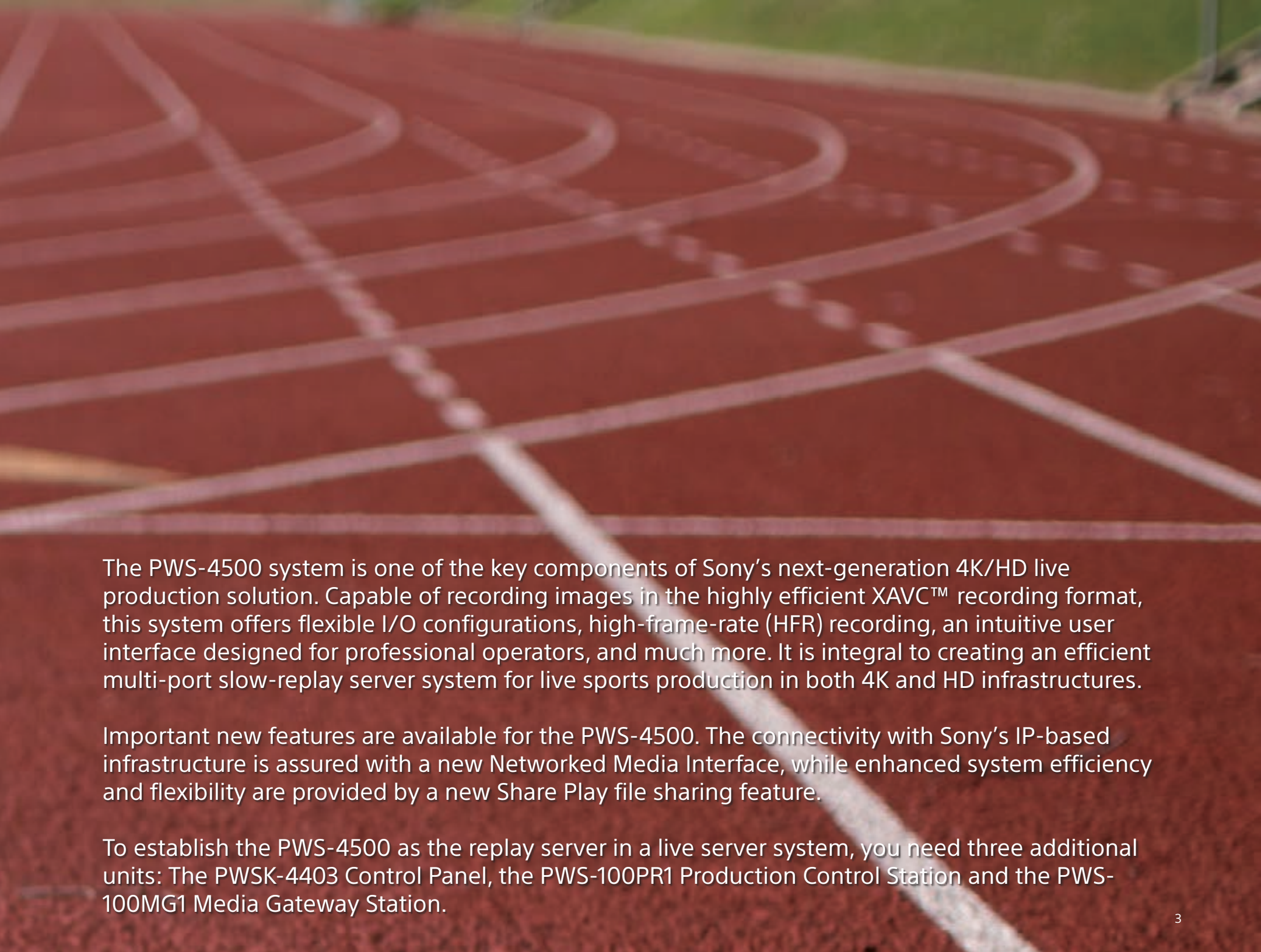
Production Control Station
PWS-100PR1

Media Gateway Station
PWS-100MG1

Multi Port AV Storage Unit
PWS-4500

USB Control Device
PWSK-4403

Recording Control Station
PWS-100RC1



The PWS-4500 system is one of the key components of Sony's next-generation 4K/HD live production solution. Capable of recording images in the highly efficient XAVC™ recording format, this system offers flexible I/O configurations, high-frame-rate (HFR) recording, an intuitive user interface designed for professional operators, and much more. It is integral to creating an efficient multi-port slow-replay server system for live sports production in both 4K and HD infrastructures.

Important new features are available for the PWS-4500. The connectivity with Sony's IP-based infrastructure is assured with a new Networked Media Interface, while enhanced system efficiency and flexibility are provided by a new Share Play file sharing feature.

To establish the PWS-4500 as the replay server in a live server system, you need three additional units: The PWSK-4403 Control Panel, the PWS-100PR1 Production Control Station and the PWS-100MG1 Media Gateway Station.

PWS-4500 4K/HD Live Server System Features

Highly efficient XAVC format

The PWS-4500 is capable of recording up to four 4K video signals/eight HD video signals and 16 audio channels (uncompressed, 24-bit, 48 KHz) using the very efficient XAVC recording format, which is an open format supported by over 70 leading A/V companies and all major non-linear editing software.

In a 4K workflow, a single XAVC file is created and recorded to the PWS-4500, which is easily handled by non-linear editing systems in the postproduction stage. The PWS-4500 records 4K/HD XAVC intra frames between 960 Mbps (4K 50p/59.94p) and 100 Mbps (1080, 50i/50.94i) in HD. XAVC fits perfectly into the growing 4K live production environment. You can explore creative possibilities in both 4K and HD live production.

Sony provides a range of optional codec software such as the PWSL-DH45 and PWSL-PH45.
With the optional PWSL-DH45 codec, the PWS-4500 can record files as Avid DNxHD® 220x/145/45, which is an ideal fit for the Avid DNxHD® postproduction environment.
And with the optional PWSL-PH45 codec, the PWS-4500 can record files as Apple ProRes 422 HQ or Apple ProRes 422, which is ideal for the Apple ProRes postproduction environment.

Flexible configuration for 4K and HD

The system can be configured flexibly, using various option boards and software. Starting from a highly cost-effective 4-channel HD production recorder as a most basic configuration, you can expand to a 4-channel 4K recorder/HD 8-channel recorder solution with a Networked Media Interface. Simply choose the optimal configuration based on your requirements.

4K/HD HFR recording and replay

The PWS-4500 records camera feeds captured at a high frame rate with Sony's live camera systems, and can instantaneously replay them in very smooth slow motion at HD 2x and 3x as standard. You can also achieve HD 4x, 6x, and 8x, and 4K 2x slow-motion replay using the following optional software:
- HD 4x, 6x, and 8x: PWSL-HF45 HFR software
- 4K 2x: PWSL-HR45 4K/HD Cut Out software and PWSL-HF45 HFR (High-frame-rate) software

The intuitive operability of the PWS-4403 Control Panel helps you to control slow-motion replay – simply make full use of its jog dial, fader lever, and industry-standard button layout.

Large-capacity memory storage

A large 2 TB of memory is provided as standard, enabling six-hour recording in 4K and 24-hour recording in HD. You can expand this up to 8 TB by installing optional memory boards (PWSK-4401).

HD cut out from 4K

With PWSL-HR45 4K/HD Cut Out software installed on the PWS-4500, a full HD picture can be cut out from up to 3 recorded 4K sources. Each cut out sequence uses key frames referenced to timecode, position & zoom level for fast, intuitive and creative operation. And also, you can select Live Zoom mode.

4K/HD simultaneous recording

The PWS-4500 can simultaneously create and record HD files from a 4K camera feed, and you can use those HD files as proxy material.

Redundant power supply

To assure high reliability, the PWS-4500 comes with a redundant power supply unit as standard.

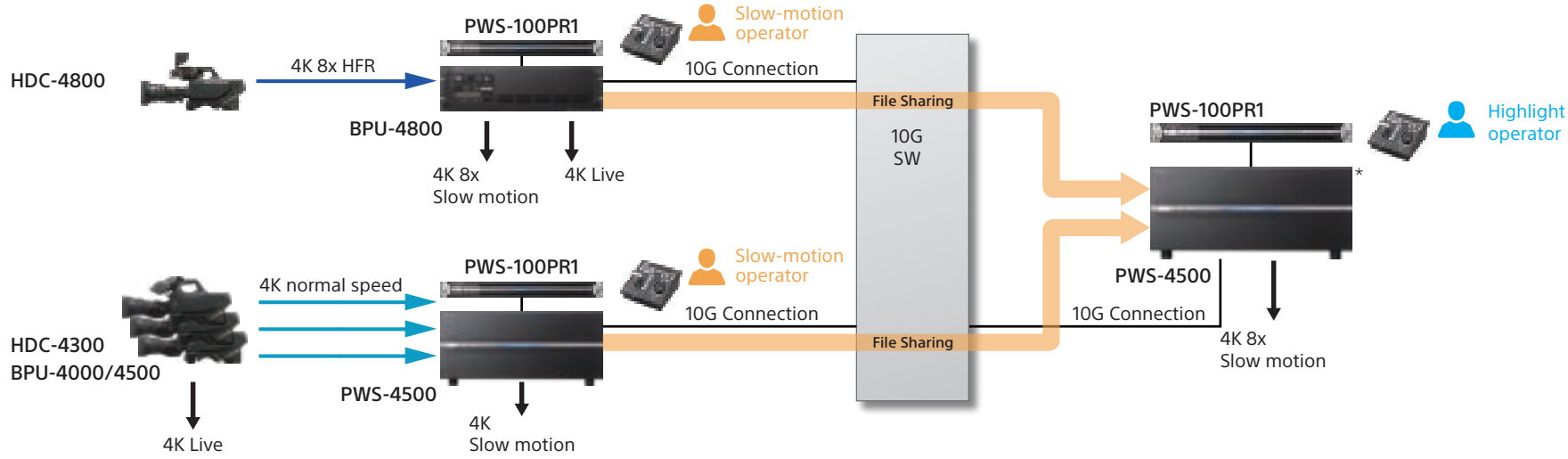
PWS-4500 4K/HD Live Server System Features

Connectivity with next-generation IP-based infrastructure

There has been a rapid increase in demand for “beyond HD” resolution, and professionals expect 4K and higher frame rates in the studio and the OB truck production environment. But there is a bandwidth bottleneck in the current 3G SDI-based production infrastructure. To create a future-proof practical solution to this industry demand, Sony has been developing a next-generation production infrastructure using 10 GbE IP networking, culminating in a practical solution for IP live production systems – the Networked Media Interface. This interface is available with the PWS-4500 system. You can connect with any IP live production environment simply by adding the optional PWSK-4506F Networked Media Interface Board, allowing video and audio signals to be received and transmitted over an IP network.

“Share Play”: Efficient file sharing via 10 GbE IP networking

Once clips have been recorded by a PWS-4500 server connected to a dedicated 10 GbE IP network, the new Share Play feature enables these clips to be shared among all connected PWS-4500 servers. This delivers a more efficient workflow. For example, PWS-4500 server operators can view the other network servers’ clips, and can playback and output any of these clips from their own local server. There is no need to push or pull clips between different servers.
In addition, the Share Play feature can also be utilized when the PWS-4500 is connected to the HDC-4800 4K/HD Ultra High Frame Rate Camera System together with its dedicated 4K Baseband Processor BPU-4800 via the network.



*Optional PWSL-HR45 4K/HD Cut Out Software and PWSK-4505 BPU Share Play Board are required to be installed in the PWS-4500.

Multi Port AV Storage Unit

PWS-4500

The PWS-4500 can be used as a multi-channel recorder using the very efficient XAVC recording format; it supports 4K to HD resolutions. The unit features high-speed, high-capacity memory storage and supports transfers over IP, so it fits well into the network infrastructure.

USB Control Device

PWS-4403

The PWS-4403 is a USB control device that has jog dial, fader lever, and an industry-standard button layout. It provides you with smooth and intuitive operation in combination with the PWS-100PR1 Production Control Station.

Production Control Station

PWS-100PR1

Viewer Mode

1-Device Mode & 2-Device Mode

Playlist Mode

Cut Out Mode

The PWS-100PR1 is a 1U rack-mount server with pre-installed PWA-PRC1 Production Control Software. Together with the PWSK-4403 control panel, it provides an intuitive GUI for slow replay control and high-light editing on the PWS-4500 system, and offers a touch-panel capability.

The GUI supports:
- Viewer mode – to monitor all input and output signals on each port of the PWS-4500
- 1-Device Mode & 2-Device Mode – the GUI is split into two areas: a clip management area and a signal view area
- Playlist mode – to make a playlist
- Cut Out mode – to operate HD Cut Out from a 4K signal

Media Gateway Station

PWS-100MG1

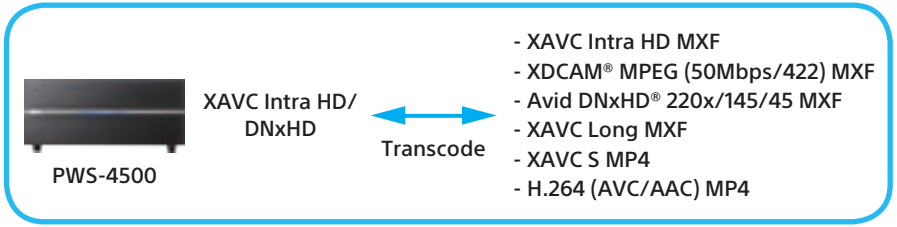
Clip Transfer Display

Material Preview Display

The PWS-100MG1 is a 1U rack-mount server with pre-installed PWA-MGW1 Media Gateway Software. It allows you to archive recorded files from PWS-4500 servers to removable media such as a USB HDD and Sony's Optical Disk Archive*. Additionally, you can retrieve files from removable media to the PWS-4500 server. Other available features include chase transfer, check-in to NLE**, and material previews.

By installing optional PWA-MGW1B Video Transcode Software on the PWS-100MG1, you can also achieve video transcoding when archiving and retrieving files. This feature now supports the following file formats.

- XAVC Intra HD MXF
- XDCAM® MPEG (50Mbps/422) MXF
- Avid DNxHD® 220x/145/45 422 MXF
- XAVC Long MXF
- XAVC S MP4
- H.264 (AVC/AAC) MP4



*Sony's Optical Disk Archive cannot be used for chase transfer from the PWS-4500.
**Transferring files to NLE's database to get them recognized as usable materials in the systems.

Recording Control Software (v1.2)

PWA-RCT1

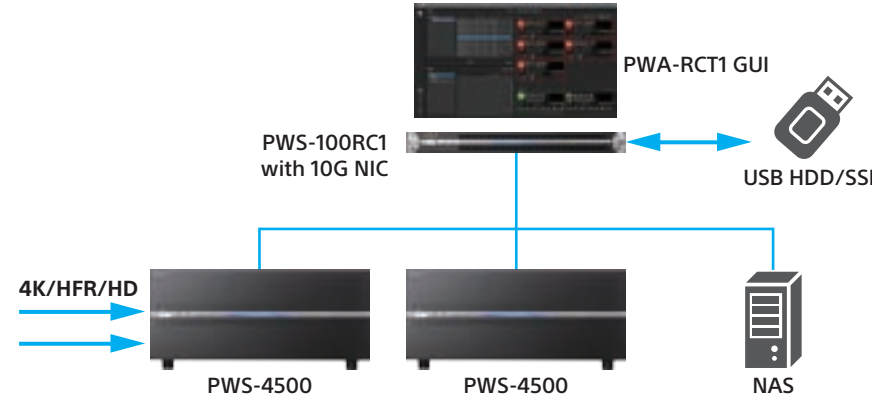
PWA-RCT1 is Windows-running (10, Embedded 8 and 8.1) application software designed to trigger REC/PLAY/STOP/File transfer to the PWS-4500. With its intuitive and user-friendly GUI, this software allows you to easily control each PWS-4500 port. It also helps you to easily manage recorded materials so that they can actually utilize the PWS-4500 as a simple multi-port straight recorder (instead of a slow-replay server) in both 4K and HD production environments.

The auto chase transfer function enables effective recording and archiving. It can be implemented when you start recording to the PWS-4500.

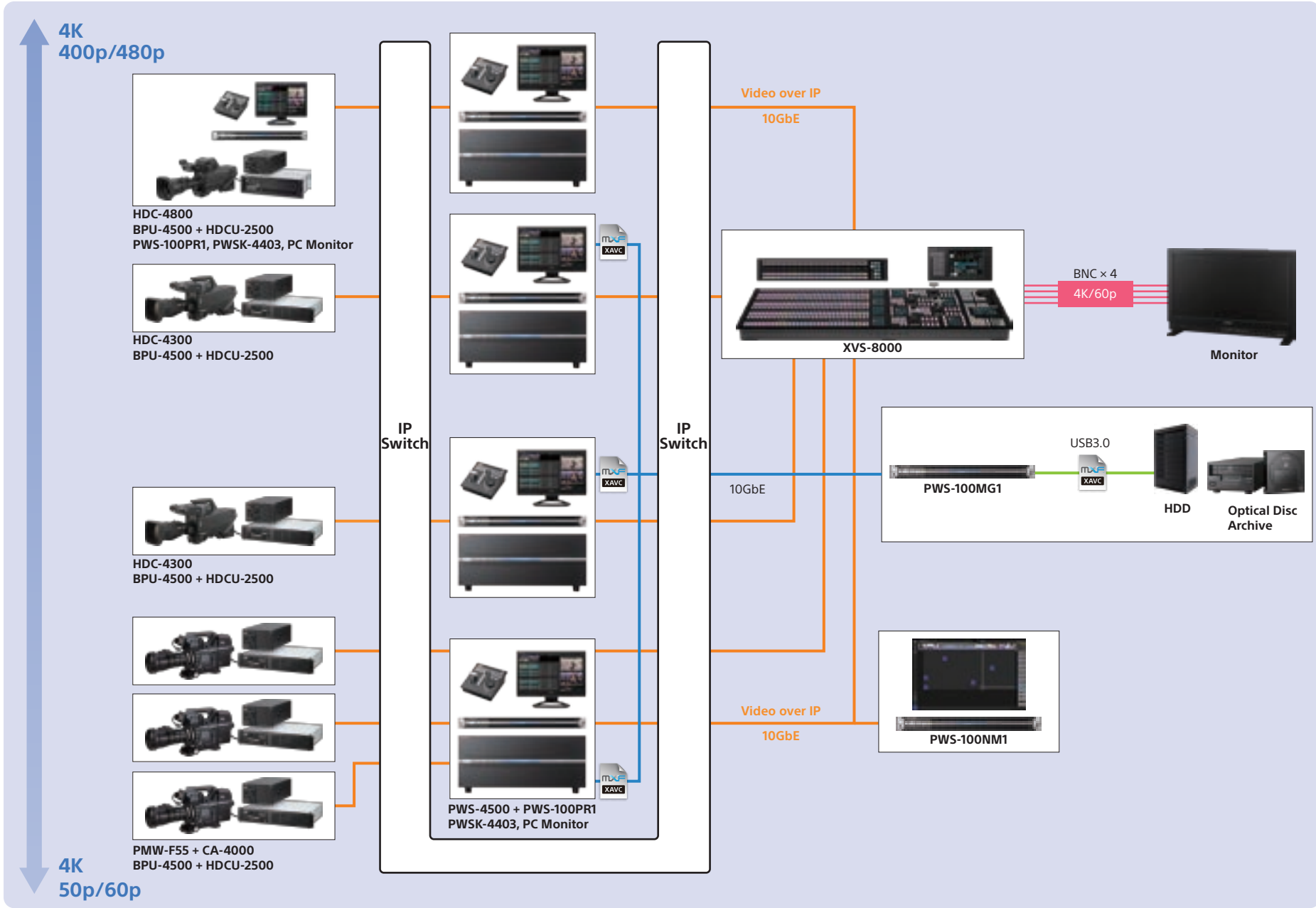
Recording Control Station

PWS-100RC1

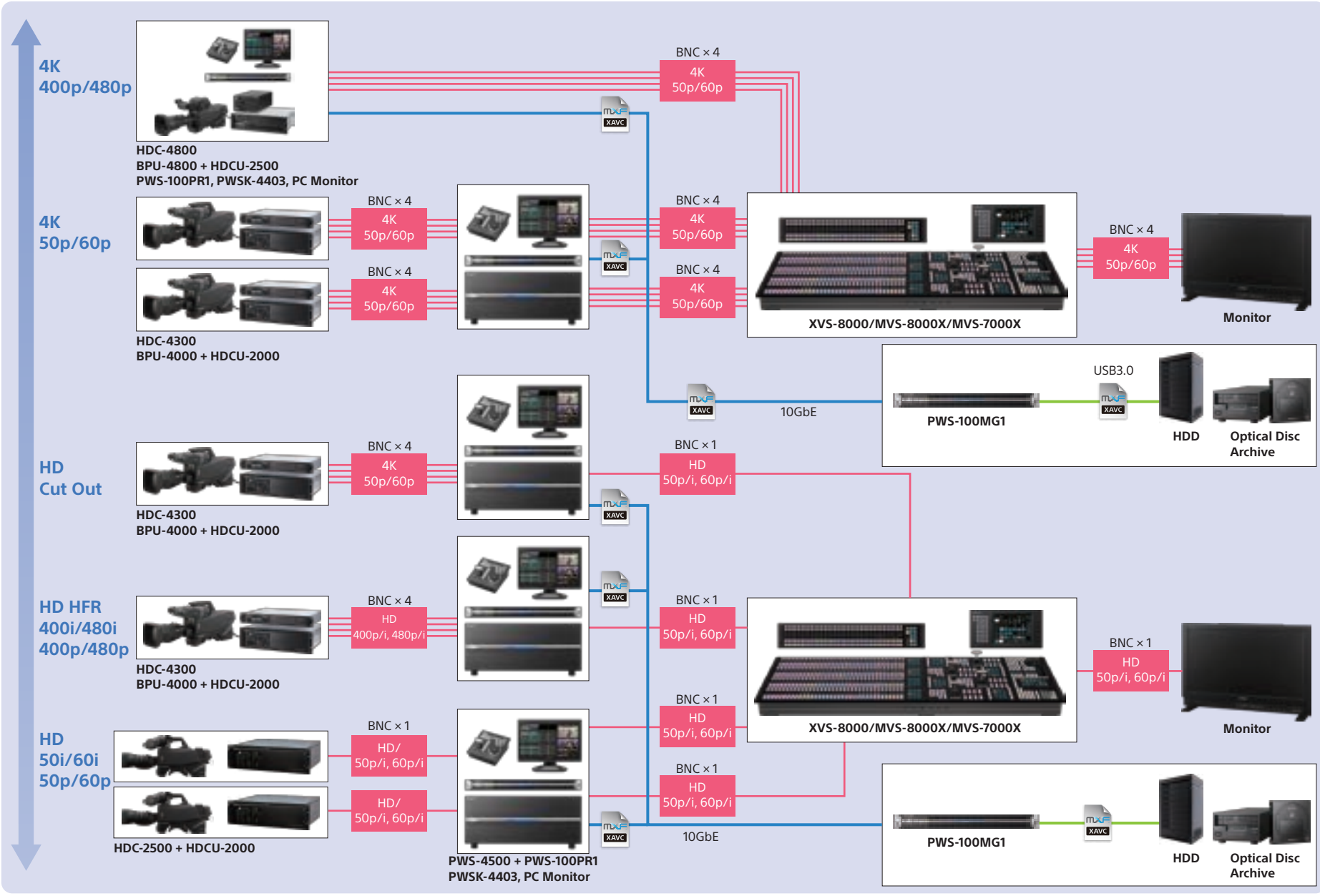
The PWA-100RC1 is a turnkey 1U rack-mount server with pre-installed PWA-RCT1 Record Control Software.



4K Live Workflow (IP-based system)



4K/HD Live Workflow (SDI-based system)



- In HD HFR (high frame rate), the supported HFR varies depending on the camera
- In HD 50i/60i and 50p/60p, up to 6 cameras can be connected to each PWS-4500

4K Live Production System Components

HDC-4800 Live Camera System

HDC-4800 4K/HD Ultra High Frame Rate Camera
BPU-4800 Baseband Processor Unit

The HDC-4800 Live Camera System delivers full-resolution 4K images at up to 8x slow motion, and includes a dedicated 4K baseband processor, the BPU-4800, with a built-in server function for up to four hours of 4K 480p recording. This all-in-one solution for UHFR recording and playback makes it easier for broadcast production personnel to deliver superb slo-mo coverage of sports and other live events.

- Full-resolution 4K images at up to 8x slow motion
- Full HD cutout
- The Share Play function is available when the HDC-4800 Live Camera System is connected to the PWS-4500 server.

Baseband Processor Unit

BPU-4000
BPU-4500

Baseband processor units offer real-time 4K digital signal processing and the signal can be simultaneously down-converted to an HD signal and output when connected to the HDC-4300, the PMW-F55 live camera, or F65 live camera via an optical fiber cable. The BPU-4500 which comes with IP interfaces makes a good combination with the PWS-4500 and the XVS-8000 for IP live production.

- HD Cut Out and HFR (high-frame-rate) operation can be achieved by installing the following optional software on the BPU-4000 or BPU-4500:
  HD Cut Out: SZC-2001
  HFR: SZC-4002

4K/HD System Camera

HDC-4300

The HDC-4300 delivers superb 4K images* thanks to its three 2/3-inch 4K imagers with Sony's recently designed optical system, supporting ITU-R BT.2020 and providing a wide color gamut. It works directly with B4 lenses, allowing you to use B4-mount high-power large lenses to capture sports scenes with deep depth of field.

- 4K 2x slow motion
- HD 8x super slow motion

* SZC-4001 software option is required to enable 4K capture.

PMW-F55 Live Camera

PMW-F55 4K Camera
CA-4000 Camera System Adaptor

The PMW-F55 4K camera with a super 35 mm 4K CMOS image sensor utilizes a modular design, allowing the set-up to be quickly changed between movie and live modes. It's ideal for live 4K shooting when used in combination with the CA-4000 camera system adaptor. Together, the CA-4000 and BPU-4000 allow easy integration of the PMW-F55 for any live production environment.

- HD 6x super slow motion

Camera Control Unit

HDCU-2000
HDCU-2500

The full-rack-size HDCU-2000 and half-rack-size HDCU-2500 are available, so you can supply power to the camera, interface with peripheral equipment, and transfer intercom, tally, prompter, audio, and other signals.

SDI-IP Converter Board

NXLK-IP40F

The NXLK-IP40F SDI-IP Converter Board is ideal for interconnecting SDI equipment with an IP- based infrastructure. The option board allows 4K/HD/SD switchable signals via 3G-SDI ports and using fiber optical cables with SFP+ transceiver connections. It's capable of network redundancy and clean video switching for professional video production needs.

Multi-format Video Switcher

XVS-8000

The XVS-8000 is a powerful switcher supporting IP interfaces. The maximum configuration is 5 M/E, 40 inputs, 12 assignable outputs for 4K and various format converter functions, and powerful functions for 4K production. The ICP-7000 X-Panel offers very flexible panel configuration with a modular style design, OLED display, RGB XPT buttons, and an LCD button pad.

Signal Processing Unit

NXL-FR318

The NXL-FR318 is a versatile unit in a 3U rack-mountable frame capable of holding up to 18 option boards such as an SDI-IP converter board, and audio/video multiplexing or de-multiplexing boards according to your needs. Two power supplies provide redundancy for high reliability.

IP Live System Manager Station

PWS-100NM1

The PWS-100NM1 IP Live System Manager Station comes with pre-installed IP Live System Manager software that allows you to set up, control, and reconfigure an IP live production system. It offers the ability to monitor multiple video streams on the same screen while they are transmitted over an IP network at any location on the network.

4K OLED Master Monitor

BVM-X300

The BVM-X300 has a 30-inch 4K OLED panel (4096 x 2160) offering inherent superb TRIMASTER EL™ OLED monitor performance. In addition, the BVM-X300 supports High Dynamic Range mode and a wide color gamut conforming to DCI-P3 and most of the ITU-R BT.2020 color space.

Recording time

Video Format				Data Rate	Max. (2TB)	Max. (8TB)
4096x2160	XAVC Class480	4:2:2 10bit	59.94p, 50p	960 Mbps (59.94p)	4 hours	16 hours
			29.97p, 25p, 24p, 23.98p	480 Mbps (29.97p)	7 hours	31 hours
4096x2160	XAVC Class300	4:2:2 10bit	59.94p, 50p	600 Mbps (59.94p)	6 hours	24 hours
			29.97p, 25p, 24p, 23.98p	300 Mbps (29.97p)	11 hours	47 hours
3840x2160	XAVC Class480	4:2:2 10bit	59.94p, 50p	960 Mbps (59.94p)	4 hours	16 hours
			29.97p, 25p, 23.98p	480 Mbps (29.97p)	7 hours	31 hours
3840x2160	XAVC Class300	4:2:2 10bit	59.94p, 50p	600 Mbps (59.94p)	6 hours	24 hours
			29.97p, 25p, 23.98p	300 Mbps (29.97p)	11 hours	47 hours
1920x1080	XAVC Class100	4:2:2 10bit	59.94p, 50p	200 Mbps (59.94p)	15 hours	61 hours
			59.94i, 50i, 29.97p, 25p, 23.98p	100 Mbps (59.94i)	27 hours	110 hours
	Avid DNxHD® 220x	4:2:2 10bit	59.94p, 50p	440 Mbps (59.94p)	8 hours	34 hours
			59.94i, 50i, 29.97p, 25p, 23.98p	220 Mbps (59.94i)	16 hours	64 hours
	Avid DNxHD® 145	4:2:2 8bit	59.94p, 50p	291 Mbps (59.94p)	12 hours	49 hours
			59.94i, 50i, 29.97p, 25p, 23.98p	145 Mbps (59.94i)	22 hours	91 hours
	Apple ProRes 422 HQ	4:2:2 10bit	59.94p, 50p	440 Mbps (59.94p)	7 hours	30 hours
			59.94i, 50i, 29.97p, 25p, 23.98p	220 Mbps (59.94i)	14 hours	57 hours
	Apple ProRes 422	4:2:2 10bit	59.94p, 50p	293 Mbps (59.94p)	10 hours	42 hours
			59.94i, 50i, 29.97p, 25p, 23.98p	147 Mbps (59.94i)	19 hours	78 hours
1280x720	XAVC Class100	4:2:2 10bit	59.94p, 50p	100 Mbps (59.94p)	27 hours	110 hours
	Avid DNxHD® 220x	4:2:2 10bit	59.94p, 50p	220 Mbps (59.94p)	15 hours	61 hours
	Avid DNxHD® 145	4:2:2 8bit	59.94p, 50p	145 Mbps (59.94p)	22 hours	91 hours
	Apple ProRes 422 HQ	4:2:2 10bit	59.94p, 50p	220 Mbps (59.94p)	13 hours	55 hours
	Apple ProRes 422	4:2:2 10bit	59.94p, 50p	147 Mbps (59.94p)	19 hours	78 hours

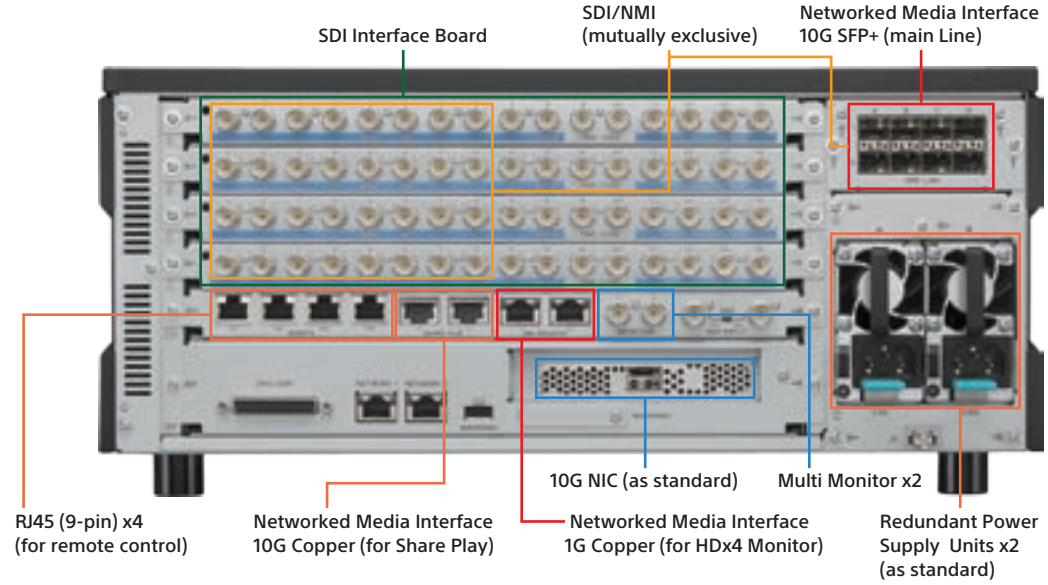
Note

- The above chart is for normal-speed recording. When HFR recording is executed, the recording time may be reduced (for example, in 2x speed recording, the recording time is halved).
- For Avid DNxHD® 220x and Avid DNxHD® 145, you need optional PWSL-DH45 software.
- For Apple ProRes 422 HQ and Apple ProRes 422, you need optional PWSL-PH45 software.
- HFR can only be used for XAVC formats.

Multi Port AV Storage Server

PWS-4500 Rear

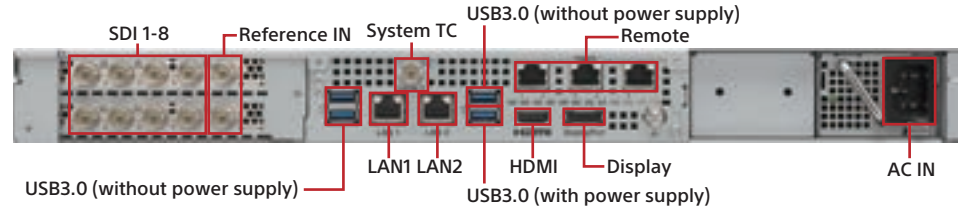
Standard Configuration



Standard Configuration with optional boards installed.

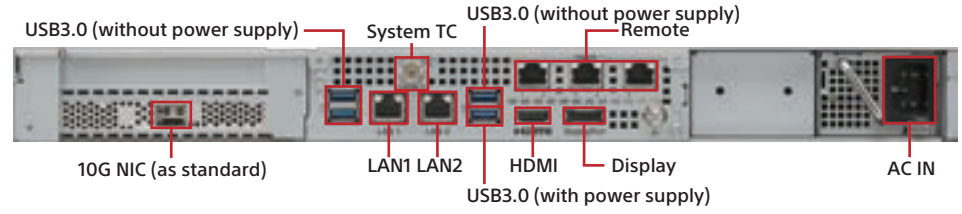
Production Control Station

PWS-100PR1 Rear



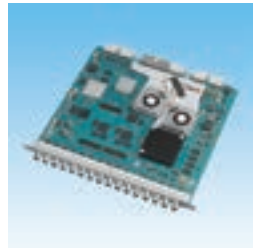
Media Gateway Station

PWS-100MG1 Rear



Optional Accessories

PWSK-4401
Internal Memory Array (2 TB)



PWSK-4504
SDI Interface Board

PWSK-4505
BPU Share Play Board

PWSK-4506F
Networked Media Interface Board

OTM-10GSR1
SFP+ Transceiver Module

Optional Software

PWSL-HR45
4K/HD Cut Out Software
for PWS-4500

PWSL-HF45
HFR (High-frame-rate) Software
for PWS-4500

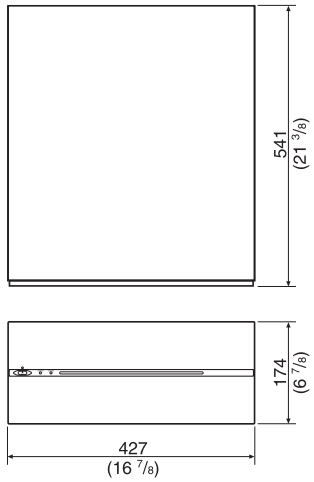
PWSL-DH45
Avid DNxHD® Codec Option
for PWS-4500

PWSL-PH45
Apple ProRes Codec Option
for PWS-4500

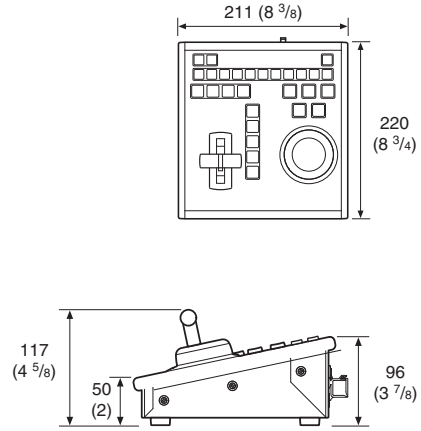
PWA-MGW1B
Video Transcode Software
for PWS-100MG1

Dimensions

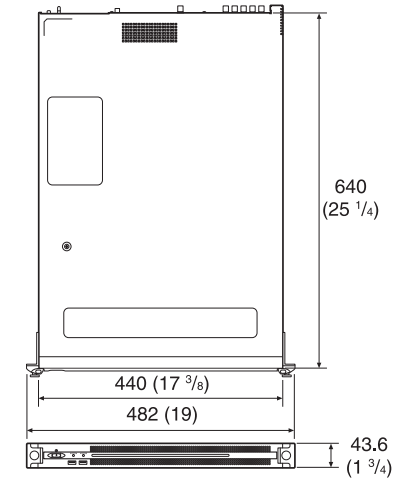
Unit: mm (inches)



PWS-4500



PWSK-4403



PWS-100PR1/PWS-100MG1/PWS-100RC1

Specifications

PWS-4500		
General		
Recording format		XAVC, Avid DNxHD®, Apple ProRes
Power requirements		100 V to 127 V AC / 200 V to 240 V AC
Power consumption		Max. 480 W
Operating temperature		5°C to 40°C (41°F to 104°F)
Storage temperature		–20°C to +60°C (–4°F to +140°F)
Humidity		25% to 90% (non-condensing)
Mass		22 kg (48 lb 8 oz) (with all options installed)
Video (422 format)		
Sampling frequency		Y: 74.25 MHz, Pb/Pr: 37.125 MHz
Quantization		8/10 bits
Compression		XAVC, Avid DNxHD®, Apple ProRes
Audio (Digital audio signal format)		
Sampling frequency		48 kHz (video sync)
Quantization		24 bits
Headroom		20 dB/18 dB/16 dB/15 dB/12 dB/9 dB (selectable)
I/O connectors (When ENCODER mode is selected (per board))		
SDI Input (1 to 4)		BNC (x4) HD SDI (1.485 Gbps) SMPTE ST 292-1/BTA-S004B compliant 3G SDI (2.97 GHz) SMPTE ST 424 Level A, B
SDI Output (INPUT MONITOR 5 to 8)		BNC (x4) HD SDI (1.485 Gbps), 3G SDI (2.97 GHz) Does not satisfy the SDI signal standard, and should be used for input signal monitor applications only.
MONITOR		BNC (x2) HD SDI (1.485 Gbps) SMPTE ST 292-1/BTA-S004B compliant
TIME CODE Input		BNC (x1) 0.5 to 5 Vpp, 10 kΩ
TIME CODE Output		BNC (x1) 1.5 Vpp, low impedance
DIGITAL AUDIO (AES/EBU) Input		BNC (x4) CH 1/2 to CH 7/8, AES/EBU format, unbalanced When connecting devices for AES/EBU signal input/output, use a cable whose length is less than 300 meters (984 feet).
I/O connectors (When DECODER mode is selected (per board))		
SDI Output (1 to 8)		BNC (x8) HD SDI (1.485 Gbps) SMPTE ST 292-1/BTA-S004B compliant 3G SDI (2.97 GHz) SMPTE ST 424 Level A, B
SDI Output (MONITOR)		BNC (x2) HD SDI (1.485 Gbps) SMPTE ST 292-1/BTA-S004B compliant
TIME CODE Output		BNC (x1) 1.5 Vpp, low impedance
DIGITAL AUDIO (AES/EBU) Output		BNC (x4), CH 1/2 to CH 7/8, AES/EBU format, unbalanced
File sharing	SHARE PLAY 1 to 2	RJ-45 (x2) Network Interface 10G Copper
Monitoring	NMI MONITOR 1 to 2	RJ-45 (x2) Network interface 1G Copper
	MONITOR	HD SDI (1.485 Gbps) SMPTE ST 292-1/BTA-S004B compliant
Reference	REF INPUT	BNC (x2) including 1 loop through, 75 Ω with terminal switch, HD (tri-level sync), SD (Black Burst), NTSC: 0.286 Vpp, 75 Ω, PAL: 0.3 Vpp, 75 Ω
Remote	REMOTE1/2 to REMOTE7/8	RJ-45 (x4)
	GPIO (25P)	25-pin D-Sub, female (x1)
	NETWORK 1 to 2	RJ-45 (x2), 1000BASE-T
	MAINTENANCE	USB (x1)
	NETWORK	SFP+ (x1) 10GBASE-SR/LR (Add-in Card) *1 *2

Supplied accessories		
Operation guide (1), Installation manual (1), Operation manual (CD-ROM 1), Cable: RJ45-DSUB (4)		
PWSK-4403		
General		
Power requirements		12 V DC / 1A
Operating temperature		5°C to 40°C (41°F to 104°F)
Humidity		20% to 90%
Mass		1.7 kg (3 lb 12 oz)
Connectors		
USB		USB 2.0 (Type-B) (x1)
PWS-100PR1 / PWS-100MG1		
General		
Power requirements		100 V to 240 V AC, 50/60 Hz
Power consumption		235 W
Operating temperature		5 °C to 35 °C (41 °F to 95 °F)
Storage temperature		–20°C to +60°C (–4°F to +140°F)
Humidity		20% to 90% (relative humidity)
Mass		14 kg (30 lb 14 oz)
CPU		
Processor		Intel Core i7-3770 (3.4 GHz)
Memory		8 GBytes, SO-DIMM (DDR3) (x2)
Drive (m-SATA)		60 GBytes
Drive (HDD) (PWS-100MG1 only)		2.5-inch, 500 GBytes (x12)
Expansion bus		PCIe Gen2 8Lane (30 W) (x2)
Inputs/outputs		
LAN	PWS-100PR1 PWS-100MG1	RJ-45 (x2) 1000BASE-T, 100BASE-TX RJ-45 (x2) 1000BASE-T, 100BASE-TX, SFP+ (x1) 10GBASE-SR/LR (Add-in Card)*1 *2
USB (front panel/rear panel)		Super Speed USB (USB 3.0) Type A (6, 2 on front and 4 on rear) Front: Power delivery support (900 mA/port) Rear: Power delivery support on bottom right port (900 mA),not supported on other three ports
HDMI		Type A (x1) HDMI Ver. 1.4a, 1920 × 1200 maximum resolution, 60 Hz
DisplayPort		DisplayPort (x1) DisplayPort Ver. 1.1a,2560 × 1600 maximum resolution, 60 Hz
REF IN (PWS-100PR1 only)		BNC (x2) SMPTE-318M compliant, HD tri-level sync (0.6 Vp-p/75 Ω/sync load) or SD black burst/composite sync (0.286 Vp-p/75 Ω/sync load)
SDI 1 to 4 (PWS-100PR1 only)		BNC (x8) HD: SMPTE-292M compliant, SD: SMPTE-259M compliant

*1 : Network card connected to the unit (Intel Ethernet Converged Network Adapter X520-DA1)
*2 : Available only when an SFP+ module is installed.

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