Spectrum™ X

ADVANCED MEDIA SERVER SYSTEM

The Harmonic Virtualized Spectrum™ X advanced media server system brings new levels of efficiency, simplicity and reliability to broadcast ingest, production and playout workflows. Available as an appliance or software-only solution to run on customer-provided hardware. Leveraging the power of commercial off-the-shelf (COTS) computing, the virtualized solution offers new deployment options and advanced features.

Designed for mission-critical production and playout applications, Spectrum X combines file, baseband and transport stream ingest with comprehensive integrated channel playout (ICP) capabilities, including HTML5 graphics, branding, DVE, and live switching of baseband and compressed IP sources. By reducing the number of discrete devices required to produce and distribute branded programming, Spectrum X lowers capital expenditures, simplifies workflows and reduces operational costs. The system's high density, low power consumption and rock-solid reliability further reduce operating expenses while providing high availability.

The software-based Spectrum X supports a broad range of SD and HD formats up to 1080p (3G). Ultra HD support includes SDR/HDR conversion including tone mapping and tone expansion. It can operate as a true channel-in-a-box (CiaB) or as part of a Spectrum shared storage infrastructure that includes everything from simple ingest and playout to feature-rich ICP capabilities. All functionality is available via software license keying, resulting in a highly flexible system that allows the easy addition of new codecs, CiaB functionality, IP I/O and other advanced features to baseband I/O when needed.

Open APIs for the conventional Spectrum appliances and the new virtualized Spectrum X enable control of media workflows under a single user interface to suit exact workflow requirements, making it easier to deliver content on any platform to any end user.

Fully compatible with Spectrum MediaDirector and MediaCenter servers, and Harmonic's Polaris playout management system, Spectrum X fits seamlessly into existing broadcast infrastructures. In combination with the Harmonic MediaGrid, users have greater expansion possibilities for all workflows from Ingest to MCR playout, utilizing the same high availability shared storage and intelligent media management. By integrating SDI and IP I/O on the same chassis, Spectrum X also eases the migration to IP playout workflows, allowing broadcasters to transition away from baseband at their own pace.

The highly scalable Spectrum X system is ideal for a wide range of applications, including:

- CiaB and ICP workflows
- Studio production
- Hybrid baseband and IP playout environments
- Integrated master control room (iMCR) workflows
- News production
- Disaster recovery

The Spectrum X media server system offers a high-quality, comprehensive approach to production and channel playout. With its function integration, workflow flexibility and cost-efficiency, Spectrum X powers new revenue-generating services while delivering a low total cost of ownership. The virtualized Spectrum X solution allows users to utilize their IT budgets to get the Harmonic-compatible hardware they need while still getting the benefits of the industry-leading Spectrum X platform.

HIGHLIGHTS

- Easy-to-deploy ingest and playout system for baseband and IP workflows
- Supports a broad range of SD, HD and Ultra HD formats with SDR/HDR tone mapping and tone expansion
- Integrates SDI and IP I/O on the same chassis to ease migration to IP workflows
- Adaptable to all production and playout applications, including integrated channel playout, channel- in-a-box and integrated master control
- Integrated video graphics and branding, using industry-standard authoring tools
- Single and dual integrated DVEs for sophisticated content presentation
- Plug and play compatibility with Harmonic Spectrum media servers and Harmonic MediaGrid shared storage
- Open control architecture makes CIAB/ICP available to Harmonic Polaris and third-party automation systems
- COTS HP 2-RU chassis running Spectrum X Linux-based core software

Virtualized Spectrum X ADVANCED MEDIA SERVER SYSTEM

SPECIFICATIONS

FEATURE SUMMARY

Branding & Graphics	Adobe® Creative Cloud compatibility Integrated DVE; single and dual 2D DVE mode Independent branding for each primary and simulcast channel Up to eight layers of graphics per channel Static and animated graphics, logo, full-screen slate, rolls, crawls, voice-over
Graphics Formats	PNG, JPG, TIFF, GIF, FLV, Targa, WEBM, MP4, with HTML5
Master Control Switching (MCS)	1-6 live inputs (configurable) Switch between live and recorded clips Key + fill support
Confidence Monitor	Low-latency, low-resolution version of ingested or playing video & audio, streamed over IP
Automation Support	Polaris Play, Spectrum Media Studio All Oxtel protocol automation systems (Ethernet or RS-422) Clip playback control via Spectrum API, VDCP (RS-422) and VDCP-over-IP
Audio Watermarking	Kantar® Media Watermarking
Delay Service	Realtime program delay capability
Captions & Subtitles	Localized and customized open captions Live & file-based open- and closed-caption insertion
EAS Support (U.S. only)	Text and audio sourced from customer's EAS equipment.
Loop Record Service	Continuously records short clip segments from an incoming video feed

CODECS

SD	
MPEG-2	3-24.9 Mbps LGOP; 25-50 Mbps I-frame
DV	DV 25, DVCPRO25, DVCPRO50
HD 1.5 G (1080i 50/60, 720p 50/60)	
MPEG-2	18-85 Mbps LGOP; 50-100 Mbps I-frame
DV	DVCPRO HD
XDCAM HD	18, 25, 35, 50 Mbps
RP 2027 Class 50/100 (Generic)	Class 100, 1920x1080i (25/29.97 Hz); 1280x720p (50/59.94 Hz)
AVC-Ultra (Panasonic)	Class 50 and Class 100, 1920x1080i (25/29.97 Hz); 1280x720p (50/59.94 Hz)
XAVC-I Class 100 (Sony)	Class 100, 1920x1080i (25/29.97 Hz); 1280x720p (50/59.94 Hz)
XAVC-L	High 422, Level 4, 25, 50 Mbps
AVC-LongG	Record: 25, 50 Mbps; Playback: 12, 25, 50 Mbps
VC-3 (SMPTE 2019-1)	120, 145, 220 Mbps
ProRes	122, 147, 220 Mbps; SQ and HQ modes
HD 3G (1080p 50/60)	
AVC I-Frame	XAVC-I, AVC-Intra , AVC-I RP 2027 Class 100 (generic)
XAVC-L	XAVC, High 422, Level 4.2, up to 50 Mbps
AVC-LongG	35, 40, 45, 50 Mbps
AVCU-LongG	12, 25, 50 Mbps
VC-3 (SMPTE 2019-1)	190, 220, 367, 440 Mbps, HQX mode
ProRes	440 Mbps, LT mode
UHD	
XAVC	I-Frame, Class 300, 422, 10-bit, 50p/60p L-Gop 10bit 4.2.2 200mbs 50p/60p
AVCU	I-Frame, Level 5.2, 422, 10-bit, 50p/60p
VC-3 (SMPTE 2019-1)	145-180 Mbps, LB mode
ProRes	821 Mbps LT mode

RASTER

SD	525i @ 29.97 fps 625i @ 25 fps
HD 1.5 G	1080i @ 25, 29.97 fps 720p @ 50, 59.94 fps
HD 3G	1080p @ 50, 59.94 fps
UHD 4 x 3G	2160p @ 50, 59.94 fps

MEDIA STORAGE OPTIONS

Choice of four or eight internal 3.5" 2-, 4-, or 6-TB HDDs or 1.9-TB SSDs
3+1 modified RAID 4 (single parity)
Connect to Spectrum MediaCenter (MCP-2200 series) via GbE
Connect to Spectrum SAN (MediaDirector, MCP-2250 series) via GbE
Ingest to Harmonic MediaGrid as MXF OP1a wrapped media
Preview/Playout from Harmonic MediaGrid via 1GbE or 10GbE

AUDIO PROCESSING

Channels	SMPTE 299M/272M, up to 16 embedded per video channel
Formats	Uncompressed: 16, 24, PCM @ 48 kHz Compressed: audio pass-through, Dolby® encode and decode
Features	Audio up-mix and down-mix, Audio loudness control Audio track swapping; track tagging, language rules Audio mix effects; VO insertion

DATA

Closed, Open, Live Captions	EIA-608, EIA-708
Ancillary Data	VBI, VANC
Reference	Analog black with color burst, PTP for IP I/O

CONNECTIVITY

SDI Input	Up to four SD/HD channels, one UHD channel Up to two Live inputs in standard channel mode Up to six Live inputs in combined channel mode
SDI Output	Up to four SD/HD channels, one UHD channel Up to two simulcast outputs per channel Independently configurable up/down/crossconversion
IP I/O	Optional dual 10GE ports for NDI® I/O Optional dual 10GE ports for Ingest/Play from MediaGrid Optional dual 25GE ports for UHD/HD 2022-6 / 2110 IP I/O
Connectors	RS-422, AES, LTC and GPIO (multi-pin connector; available adapter cable) Two 1GE ports for connection to the Server, SystemManager, file transfer or API control
Server Interface	Private, point-to-point, non-switchable gigabit Ethernet to MediaDirector or MediaCenter Server

POWER

Power Supplies	Dual, hot-swappable Platinum efficiency
Power Consumption	580W at 30C, 680W at 35C (max)

PHYSICAL

Dimensions (W x H x D)	17.53 in x 3.44 in x 28.75 in 2RU 44.55 cm x 8.74 cm x 73.03 cm
Weight	53.5 lbs/24.1 kg (with 8 HDDs) 46 lbs/20.8 kg (with 4 HDDs) 38.5 lbs/17.5 kg (without HDDs)