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

As a next-generation media server system, Spectrum X offers a new approach to production and channel playout. With its function integration, workflow flexibility and cost-efficiency, this next-generation server powers new revenue-generating services while delivering 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.
## 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, overlay controls
| Graphics Formats | PNG, JPG, TIFF, GIF, FLV, WEBM, MP4, with High ML5 or SWF
| 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 DV
| HD 1.5 G (1080i 50/60, 720p 50/60) | MPEG-2 DV
| HD | XDCAM HD
| RP 2027 Class 50/100 (Generic) | XAVC-1 Class 100 (Sony)
| AVC-Ultra (Panasonic) | XAVC-I Class 100 (Sony)
| XAVC-I Class 100 (Sony) | AVC-LongG
| XAVC-L | AVC-CU-LongG
| VC-3 (SMPTET 2019-1) | ProRes
| HD 3G (1080p 50/60) | XAVC-L, AVC-Intra, AVC-I RP 2027 Class 100 (generic)
| XAVC-L | XAVC-I, High 422, Level 4.2, up to 50 Mbps
| AVC-LongG | 35, 40, 45, 50 Mbps
| AVCU-LongG | 12, 25, 50 Mbps
| VC-3 (SMPTET 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
| XAVC | L-Gop, 10bit 4:2:2 200mbs 50p/60p
| VC-3 (SMPTET 2019-1) | I-Frame, Level 5.2, 422, 10-bit, 50p/60p
| ProRes | 145-180 Mbps, LB mode
| | 821 Mbps LT mode

### MEDIA STORAGE OPTIONS

| Choice of four or eight internal 3.5” 2-4, or 6-TB HDDs or 19-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 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 | Quad 1GE ports for TS ingest
| 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 | Ethernet to MediaDirector or MediaCenter Server

### POWER

| Power Supplies | Dual, hot-swapable 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)
| Power | 46 lbs/20.8 kg (with 4 HDDs)
| | 38.5 lbs/17.5 kg (without HDDs)

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