# Spectrum X

## ADVANCED MEDIA SERVER SYSTEM

harmonic

**The Harmonic Spectrum™ X advanced media server system brings new levels of efficiency, simplicity and reliability to broadcast ingest, production and playout workflows.**

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 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) and Ultra HD. 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.

Fully compatible with Spectrum MediaDirector and MediaCenter servers, and Harmonic Polaris™ playout management systems, Spectrum X fits seamlessly into existing broadcast infrastructures. 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
- Integrated master control room (iMCR) workflows
- Studio production
- News production
- Hybrid baseband and IP playout environments
- 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.

## HIGHLIGHTS

- Easy-to-deploy ingest and playout system for baseband and IP workflows
- Supports a broad range of SD, HD and Ultra HD formats
- 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
- Compact 1-RU chassis saves rack space and power

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# SPECIFICATIONS

## FEATURE SUMMARY

| | |
|---|---|
| Branding & Graphics | Adobe® Creative Suite® compatibility<br>Integrated DVE; single and dual 2D DVE mode<br>Independent branding for each primary and simulcast channel<br>Up to eight layers of graphics per channel<br>Static and animated graphics, logo, full-screen slate, rolls, crawls, voice-over |
| Graphics Formats | PNG, JPG, TIFF, GIF, Targa and FLV files |
| Master Control Switching (MCS) | 1-6 live inputs (configurable)<br>Switch between live and recorded clips<br>Key + fill support |
| Typefaces | All standard font formats are supported |
| Automation Support | Polaris Advance, Polaris Elite, Polaris Play, Polaris Live<br>All Oxtel protocol automation systems (Ethernet or RS-422)<br>Clip playback control via Spectrum API or VDCP (RS-422) |
| Audio Watermarking | Kantar® Media Watermarking |
| Delay Service | Realtime program delay capability |
| Captions & Subtitles | Localized and customized open captions<br>File-based open- and closed-caption insertion |
| EAS Support (U.S. only) | GPI triggers EAS mode Selects predefined EAS template Data and audio sourced from customer's EAS equipment |

## RASTER

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

## 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 |
| AVCU | I-Frame, Level 5.2, 422, 10-bit, 50p/60p |

## MEDIA STORAGE OPTIONS

- Choice of four internal 3.5" 2-, 4- or 6-TB, 7,200-RPM SAS drives
- 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 MediaGrid as MXF OP1a wrapped media
- Preview from MediaGrid via GbE

## AUDIO PROCESSING

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

## DATA

| | |
|---|---|
| Closed and Open Captions | EIA-608, EIA-708 |
| Ancillary Data | VBI, VANC |
| Reference | Analog black with color burst |

## CONNECTIVITY

| | |
|---|---|
| SDI Input | Up to four SD/HD channels, one UHD channel<br>Up to two Live inputs in standard channel mode<br>Up to six Live inputs in combined channel mode |
| SDI Output | Up to four SD/HD channels, one UHD channel<br>Up to two simulcast outputs per channel<br>Independently configurable up/down/crossconversion |
| IP I/O | Quad 1GE ports for TS ingest<br>Optional dual 10GE ports for 2022-6 I/O |
| Connectors | RS-422, AES, LTC and GPIO (multi-pin connector; available adapter cable)<br>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 | 505 W (max) |

## PHYSICAL

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|---|---|
| Dimensions (W x H x D) | 17.67 in x 1.7 in x 27.75 in (1 RU)<br>44.9 cm x 4.32 cm x 70.5 cm |
| Weight | 37.5 lbs/17.0 kg (with HDDs)<br>29.5 lbs/13.4 kg (without HDDs) |