RD9000

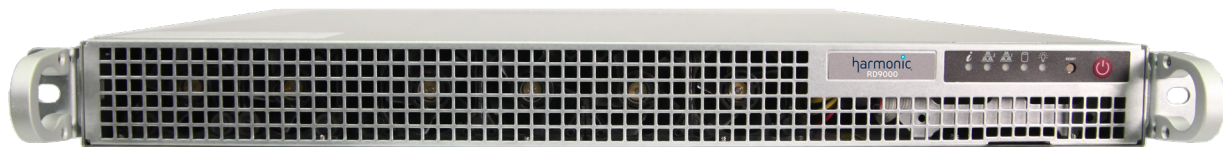## MULTI-FORMAT PROFESSIONAL DECODER

The Harmonic RD9000 multi-format professional decoder enables rapid, reliable deployment of eye-catching UHD content for contribution and primary distribution applications.

With a significant increase in UHD TV sets hitting the market, content providers and broadcasters are looking for a solution to address the needs of early adopters. Compact and reliable, the RD9000 real-time professional decoder is the answer. Designed to ensure high performance, the RD9000 delivers pristine UHD for an immersive, high-resolution experience.

Innovative Technology

RD9000 is software-based multi-format professional decoder that is perfect for contribution and primary distribution applications. The platform's software architecture provides content providers and broadcasters with maximum flexibility, which is paramount in today's market.

RD9000 is extremely agile. It can decode a single MPEG-2 HD and can be reconfigured in no time to decode 4 x HD AVC or 1 x UHD HEVC. It already provides the very latest technologies like UHD HDR (High Dynamic Range) along with WCG (Wide Color Gamut), BISS-CA descrambling or SMPTE2110 video over IP with NMOS capabilty.

The licensing is very limited and most of the features like HEVC 4:2:2 decoding or 16 channels audio decoding per video are integrated by default.

Combined with Harmonic's ViBE CP9000 HD/UHD contribution encoder, the RD9000 multi-format professional decoder offers users a pristine UHD contribution solution.

Versatile and Future-Proof

RD9000 software-based decoder featuring any-format and any-codec is the reference decoder for any contribution and primary distribution use case.

Supporting HDR and WCG via a flexible, software-based design, the RD9000 is future-proof .

RD9000 already supports SMPTE-2110 uncompressed video over IP outputs. Additionally, the RD9000 decoder supports DVB/SMPTE standards and is interoperable with professional encoders.

World-Class Service and Support

Harmonic stands behind the RD9000 professional decoder with comprehensive service and support programs, including system design, service deployment, technical support and network maintenance. World-class service plans and a global network of flexible and responsive support professionals help ensure our customers can deliver outstanding "anytime, anywhere, any-device" video experiences.

HIGHLIGHTS

- Up to 4 x SD/HD or 1 x UHD decoding
- Multi-format MPEG-2/H.264/HEVC 4:2:0/4:2:2 8/10 bit
- Two models up to 70Mbps or up to 160Mbps
- 16 audio channels per video

- Compact and low-power appliance
- SDR, HDR and WCG BT.2020
- Inputs: DVB-S2X, IP, ASI, HLS, RTMP, SRT, Zixi or file based
- Ouputs: IP, ASI, 4x3G-SDI, 12G-SDI or SMPTE-2110

- NMOS with SMPTE2110 output
- BISS-CA descrambling
- Seamless redundancy
- Down-conversion
- Dual AC PSU

RD9000 rear panel - DVB-S2X input and 12G or 4x3G-SDI outputs

RD9000 rear panel - DVB-S2X input and S2110 outputs

SPECIFICATIONS

INPUT/OUTPUT

DVB-S2/S2X	4 x RF input L-Band: 950MHz to 2150MHz QPSK, 8PSK, 16APSK, 32APSK
MPEG over ASI	Up to 4 x ASI inputs
MPEG over IP input	RJ-45 10/100/1000 UDP or RTP SRT input Zixi input CBR or Null-stripped TS RTP & SMPTE-2022/Cop3 FEC Unicast / Multicast IGMP V1/V2/V3 Hitless redundancy SMPTE 2022-7
SRT input	Caller / Listener / Rendez-vous Decyption: AES-128, AES-256
Zixi input	Connect or pull mode Decyption: AES-128, AES-256
HLS input	Pull mode Up to 50 Mbps AES-128 decryption
RTMP input	Pull mode RTMP / RTMPS / RTMPT / RTMPTS MP4 / FLV containers H264 video AAC/MP3 audio
De-scrambling	BISS 1 mode &, E BISS 2 mode 1, E, CA (BISS-CA)
Outputs	12G or 4 x 3G-SDI output & Genlock 2 x 25G for HD/UHD Video over IP SMPTE 2110 MPEG over ASI MPEG over IP

VIDEO PROCESSING

Performances: two models	RD9020: UHD up to 70Mbps RD9080: UHD up to 160Mbps
Nb of services	1 x UHD or up to 4 x SD/HD
Codec	HEVC / H.265 MPEG-4 / AVC / H.264 MPEG-2
Decoding Profiles	HEVC: Main10 422 Level 5.1 AVC/H.264: Up to Hi422@L4.2 MPEG-2: up to 422@HL
Chroma sampling	4:2:0, 4:2:2
Bit Depth	8, 10-bit
Resolution	3840x2160p (UHD) 1920x1080p 1920x1080i 1280x720p 720x576i 720x480i
Frame Rates	60, 59.94, 50, 30, 29.97, 25, 24, 23.97
Down conversion	Any format / frame rate above
HDR	HDR10, PQ10, HLG
Wide Color Gamut	BT.709, BT.2020
Ancillary	HDR metadata (SMPTE 2108) Closed Caption (CEA-708) Teletext OP-47 (SMPTE RDD-08) SMPTE 2031 SCTE 104 (SMPTE 2010) VANC pass-through (SMPTE-2038) VPID

PHYSICAL

Dimensions (H x W x D)	1.7 x 17.2 x 16.9 in (1 RU) 4.3 x 43.7 x 42.9 cm (1 RU)
Weight	26.7 lbs / 12kg
Power Consumption	190 W
Input Voltage	100-240 VAC
Cooling	Front to rear airflow
Features	Dual AC PSU

ENVIRONMENTAL

Operating Temperature	41° to 104° F 5° to 40° C
Storage Temperature	23° to 113° F -10° to 70° C
Maximum Humidity	90%
Electromagnetic Compliance	CE marked in accordance with the 93/68/EEC (22/07/93) directive EN 55022 EN 55024 EN 61000-3-2
Safety	IEC 60950 and EN 60950 UL 60950

AUDIO PROCESSING

Performances	16 audio channels per video
Audio codecs	MPEG1 Layer 2 AAC-LC, HE-AAC V1, HE-AAC V2 Dolby® Digital (AC-3, E-AC-3), Dolby-E, Dolby ATMOS

Decoding Formats & bitrates	
MPEG-1 Layer II 2.0	64-256 kbps
AC-3 2.0	128-448 kbps
AC-3 5.1	384-640 kbps
DD+ (E-AC-3) 5.1	192-448 kbps
AAC-LC/HE-AAC 2.0	32-160 kbps
AAC-LC/HE-AAC 5.1	96-448 kbps
Output format	Linear PCM Pass-through
Embedded audio	Up to 8 audios per video

CONTROL AND MONITORING

WEB-browser User interface
Restful API and SNMP
Firmware update via WEB User Interface
RJ-45 Ethernet 10/100/1000

ORDERING INFORMATION

HARDWARE ELEMENTS

Part Number	Description
RD9020-1U-2AC-SRV	Decoder Up to 4xHD or 1xUHD AVC/HEVC, 4:2:0/4:2:2, up to 70Mbps
RD9080-1U-2AC-SRV	Decoder Up to 4xHD or 1xUHD AVC/HEVC, 4:2:0/4:2:2, up to 160Mbps
RD9X00-HW-SDI-ASI-4	12G-SDI or 4 x 3G-SDI output & ASI input card
RD9X00-HW-DVBS2X	DVB-S2X card with 4 x RF input
RD9x00-SMPTE-UHD	HD/UHD over SMPTE 2110 output card, 2x25Gbps

SOFTWARE LICENSES

Part Number	Description
RD9X00-LIC-UHD	Enable 1xUHD or 4xHD service decoding
RD9X00-LIC-SRV	Enable 1xSD/HD service decoding
RD9X00-LIC-HLS	HLS input license
RD9X00-LIC-RTMP	RTMP input license
RD9X00-LIC-SRT	Secure reliable transport SRT input license
RD9X00-LIC-ZIXI	ZIXI input license
RD9X00-LIC-IP	IP output license
RD9X00-LIC-ASI	ASI output license
RD9X00-LIC-NMOS	NMOS for SMPTE2110 output license
RD9X00-LIC-BISS2	BISS2 descrambling license (BISS-CA)