



KALEIDO MULTIVIEWER

KALEIDO SOFTWARE V11.3.0

Product Comparison Guide

M770-9904-108

2021-01-22

www.grassvalley.com

FCC Compliance

In order to comply with FCC/CFR47: Part 15 regulations, it is necessary to use high-quality, triple-screened Media or Monitor cable assemblies with integrated ferrite suppression at both ends.

Patent Information

This product may be protected by one or more patents.

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Title	Kaleido multiviewer Product Comparison Guide
Part Number	M770-9904-108
Revision	2021-01-22, 14:14

Kaleido Product Comparison Charts

Product	Kaleido-XQUAD single & dual	Kaleido-X16-D Kaleido-X16-S	Kaleido-MX Kaleido-MX 4K	Kaleido Modular KMV-3911 KMX-3901	Kaleido Modular-X KMX-3901	KMX-49N1-9x2 KMX-49N1-18x4 KMX-49N1-27x4 KMX-49N1-36x4 KMX-49N1-54x4	KMX-3921-9x2 KMX-3921-18x4 KMX-3921-27x4 KMX-3921-36x4 KMX-3921-54x4	Kaleido-X (4 RU)	Kaleido-X (7 RU)	Kaleido-X (14 RU)	Kaleido-IP X330 X130	Kaleido-IP X320 X120	Kaleido-IP VM
Category	Compact, pre-configured, turnkey			Scalable modular				Highest layout flexibility with integrated routing			IP Multiviewer		
Frame size (RU)	½	1	1 or 3					4	7	14	1	1	
Densité 3 mini				•	•								
Densité 3				•	•								
Densité 3+ (FR1 & FR4)					•		•						
GV Node						•							
Video inputs (total)	4 or 8 ¹	16	Up to 64	8	Up to 64	9, 18, 27, 36 or 54	9, 18, 27, 36 or 54	Up to 32	Up to 96	Up to 192	Up to 128 decoded streams ²	Up to 128 decoded streams ³	Up to 64 decoded streams ³
Video inputs per input module			16		16	9	9	16	16	16			
Analog video⁴		•						•	•	•			
SDI⁴	•	•	•	•	•	•	•	•	•	•			
IP					Uncompressed ⁵	Uncompressed ⁶					Compressed & uncompressed	Compressed & uncompressed	Compressed
NMOS											IS 04/ 05	IS 04/ 05	
Analog audio⁷		Up to 128	Up to 128		Up to 128			Up to 256	Up to 768	Up to 1536			
AES3 audio⁷		Up to 128	Up to 128		Up to 128			Up to 256	Up to 768	Up to 1536			
MADI audio			Up to 64 ⁸		Up to 64 ⁸	Up to 256 ⁹	Up to 256 ⁹						
Dolby-E audio¹⁰		Optional	Optional ¹¹		Optional	Optional	Optional	Optional	Optional	Optional			
Compressed audio, except Dolby-E											• ³	• ³	• ³
Displays	Single: 1 Dual: 2	X16-S: 1 X16-D: 2	Up to 4	Up to 2	Up to 4 (2 per card)	Up to 4 (2 for the 9x2)	Up to 4 (2 for the 9x2)	Up to 4	Up to 8	Up to 12	Up to 2	Up to 2	0
Display rotation		•	•		•	•	•	•	•	•	•	•	•
Router outputs		2							Up to 48	Up to 96			
Streaming outputs					Up to 4 uncompressed ⁵	Up to 4 uncompressed (2 for the 9x2)					Up to 2 ST 2110-20	Up to 2 ST 2110-20	1 ST 2110-20
Cascading of multiple units		Up to 3 units for 48 inputs on 2 displays ¹²		Up to 3 units for 24 inputs on 2 displays									

¹ XQUAD-DUAL has 8 inputs; XQUAD has 4 inputs plus an optional 4 with a software license.

² See Kaleido-IP decoding capability table (below) for further detail.

³ See Kaleido-IP decoding capability table (below) for further detail.

⁴ See Input signal formats table below for more details.

⁵ Using KMX-3901-IN-IP kit. See Input signal formats table below for more details.

⁶ Using GV Node to provide signals.

⁷ Using Audio Bridge Terminal (ABT). One ABT provides 64 or 128 channels, analog or digital (AES3).

⁸ MADI and Audio Bridge Terminal cannot be used simultaneously.

⁹ Each MADI connection uses up one SDI input.

¹⁰ Dolby-E audio level meters and metadata extraction only. No listening capability.

¹¹ From embedded audio only. Not available with discreet audio coming from Audio Bridge Terminal.

¹² Can be cascaded with one Kaleido-IP to create a hybrid (SDI & compressed) monitor wall.

Product	Kaleido-XQUAD single & dual	Kaleido-X16-D Kaleido-X16-S	Kaleido-MX Kaleido-MX 4K	Kaleido Modular KMV-3911 KMV-3901	Kaleido Modular-X KMV-3901	KMX-49N1-9x2 KMX-49N1-18x4 KMX-49N1-27x4 KMX-49N1-36x4 KMX-49N1-54x4	KMX-3921-9x2 KMX-3921-18x4 KMX-3921-27x4 KMX-3921-36x4 KMX-3921-54x4	Kaleido-X (4 RU)	Kaleido-X (7 RU)	Kaleido-X (14 RU)	Kaleido-IP X330 X130	Kaleido-IP X320 X120	Kaleido-IP VM
Images per display	Single: up to 4 ¹³ Dual: up to 8	Up to 64	Up to 64 ¹⁴	Up to 8 (up to 24 when cascading)	Up to 64 ¹⁴	9, 18, 27, 36 or 54	9, 18, 27, 36 or 54	Up to 64	Up to 64	Up to 64	Up to 64	Up to 64	Up to 64
Free image repetition		•	•		•			•	•	•	•	•	•
Image overlap (PIP)		•						•	•	•	•	•	
Source image cropping	•	•	•	•	•	• ¹⁵	• ¹⁵	•	•	•	•	•	•
Multi-room	•	•	•	•	•	•	•	•	•	•	•	•	•
Clustering	•	•	•	•	•	•	•	•	•	•	•	•	•
Penalty box & channel cycling using Monitor Wall Destinations ¹⁶	•	•						•	•	•	•	•	•
Analog audio outputs		2	Up to 4 ¹⁷		•			Up to 4	Up to 8	Up to 12			
AES3 audio outputs		2						Up to 4	Up to 8	Up to 12			
Background input		•						•	•	•			
GPI IO/IN/OUT	0/8/2	0/32/4	8/20/0	Via GPI-1501	Via GPI-1501	Via GPI-1501	Via GPI-1501	72/0/0	72/0/0	144/0/0	Via GPI-1501	Via GPI-1501	Via GPI-1501
SNMP	•	•	•	•	•			•	•	•	•	•	•
High Dynamic Range sources processing ¹⁸						• ¹⁹	•						
3D	•	•		•				•	•	•			
RS-422 serial port	1	2	Up to 2	1	Up to 2			Up to 2	Up to 4	Up to 6			
LTC		2	Up to 5	1 (from URS)	Up to 5 (incl. URS)	1 (from URS)	1 (from URS)	Up to 6	Up to 12	Up to 18			
Reference input		•	•	From URS	•	From URS	From URS	•	•	•			
Processing delay @ 59.94 Hz	16 to 33 ms	33 ms	33 ms	16 ms	33 ms	16 ms	16 ms	33 ms	33 ms	33 ms			
Processing delay @ 50 Hz	20 to 40 ms	40 ms	40 ms	20 ms	40 ms	20 ms	20 ms	40 ms	40 ms	40 ms			
Power consumption	24 W	250 W	150 W in 1RU 500 W in 3RU	24W	16x2: 80W 64x4: 270W	9x2: 30 W 54x4: 180 W	9x2: 30 W 54x4: 180 W	600 W	1500 W	3000 W			
DVI/HDMI output automatic resolution from display (EDID)	•	•	•	•	•			•	•	•			
Phase locked output		•	•	•	•	•	•						
Router output signal type		3G-SDI, HD-SDI, SD-SDI				3G-SDI, 2022- 6/7, 2110			HD-SDI, SD- SDI	HD-SDI, SD-SDI			
Display output connectors	HDMI 3G-SDI	HDMI 3G-SDI	4K HDMI 2.0 4x3G-SDI HDMI 1.3 3G-SDI	HDMI 3G-SDI ²⁰	HDMI 3G-SDI	Multi-format SFP (optical, DIN, HDMI mini)	Multi-format SFP (optical, DIN, HDMI mini)	DVI RGBHV 3G-SDI ²¹	DVI RGBHV 3G-SDI ²¹	DVI RGBHV 3G-SDI ²¹	DisplayPort or HDMI ²²	DisplayPort or HDMI ²³	

¹³ 8 with a software license.

¹⁴ Up to 32 when every video window is associated with audio meters and a time code monitor. Up to 16 when a layout is used to monitor color teletext.

¹⁵ Horizontal only.

¹⁶ Requires [iControl Penalty Box](#).

¹⁷ Except for the 16x4 model (0)

¹⁸ See Input formats table below for more details.

¹⁹ Requires KMX-4921.

²⁰ KMV-3901 does not have SDI outputs.

²¹ With optional KXO-HDM module.

²² DisplayPort to HDMI active adapter included

²³ DisplayPort to HDMI active adapter included

Product	Kaleido-XQUAD single & dual	Kaleido-X16-D Kaleido-X16-S	Kaleido-MX Kaleido-MX 4K	Kaleido Modular KMV-3911 KMV-3901	Kaleido Modular-X KMX-3901	KMX-49N1-9×2 KMX-49N1-18×4 KMX-49N1-27×4 KMX-49N1-36×4 KMX-49N1-54×4	KMX-3921-9×2 KMX-3921-18×4 KMX-3921-27×4 KMX-3921-36×4 KMX-3921-54×4	Kaleido-X (4 RU)	Kaleido-X (7 RU)	Kaleido-X (14 RU)	Kaleido-IP X330 X130	Kaleido-IP X320 X120	Kaleido-IP VM
SDI Display resolutions	1280×720p 1920×1080p 1920×1080i	1280×720p 1920×1080p 1920×1080i	1280×720p 1920×1080p 1920×1080i 3840×2160 ²⁴	1280×720p 1920×1080p 1920×1080i	1280×720p 1920×1080p 1920×1080i 3840×2160p	1920×1080i 1920×1080p	1920×1080i 1920×1080p	1280×720p 1920×1080p ^{21, 25} 1920×1080i	1280×720p 1920×1080p ^{21, 25} 1920×1080i	1280×720p 1920×1080p ^{21, 25} 1920×1080i			
DVI/HDMI Display resolutions	Up to 1920×1200	Up to 1920×1200	Up to 3840×2160 ²⁶	Up to 1920×1200	Up to 1920×1200	1920×1080i 1920×1080p 3840×2160 ²⁶	1920×1080i 1920×1080p 3840×2160 ²⁶	Up to 1920×1200	Up to 1920×1200	Up to 1920×1200	Up to 3840×2160	Up to 3840×2160	
Kaleido Software Supported Versions	Not applicable	≥5.22 to <11.0.0	-MX: ≥7.00 to <11.0.0 -MX 4K: ≥7.70 to <11.0.0	≥5.00 to <11.0.0	≥7.00 to <11.0.0	KMX-4911: ≥8.70 to <11.0.0 KMX-4921: ≥9.00 to <11.0.0	≥10.00 to <11.0.0	See ISM <11.0.0	See ISM <11.0.0	See ISM <11.0.0	≥11.2.0	≥8.60	≥8.40
Custom DVI/HDMI display resolutions	•	•	•	•	•			•	•	•	•	•	
DXF-4K DVI/HDMI optical extender	•	•	•	•	•			•	•	•	•	•	

²⁴ Using quad link 1080p SDI (square division)

²⁵ Only with KXO-DUAL3 and KXO-DUAL3-B. Not supported on KXO-DUAL.

²⁶ With 4K HDMI 2.0 adaptor.

Input signal formats – Analog, SDI and uncompressed video over IP

Discontinued products are italicized.

Format			Kaleido-X 4 RU, 7 RU, 14 RU					Kaleido-X16	Kaleido-Modular		Kaleido-MX Kaleido-MX 4K Kaleido-Modular-X		KMX-4911	KMX-4921	KMX-3921	Kaleido-IP X320 X120
Name	Scan format	Serial interface	KXI-16HSV3	KXI-16HS3	KXI-16SV	<i>KXI-16HSV</i>	<i>KXI-16HS</i>		KMV-3911	<i>KMV-3901</i>	KMX-3901-IN	KMX-3901-IN-IP	Via GV Node	Via GV Node		
Analog 525	NTSC-N,J PAL-M		•		•	•		•								
Analog 625	PAL-B/G, I, D/K, N, SECAM		•		•	•		•								
601 525	ST 125:1995	ST 259	•	•	•	•	•	•	•	•	•	•	•	•	•	Optional
601 625	EBU Tech. 3267	ST 259	•	•	•	•	•	•	•	•	•	•	•	•	•	Optional
720p 23.98/24/29.97	ST 296	ST 292-1	•	•		•	•	•	•	•	•	•			•	
720p 30	ST 296	ST 292-1	•	•		•	•	•			•	•			•	
720p 50/59.94	ST 296	ST 292-1	•	•		•	•	•	•	•	•	•	•	•	•	Optional
720p 60	ST 296	ST 292-1	•	•		•	•	•			•	•			•	Optional
1080i 50/59.94	ST 274	ST 292-1	•	•		•	•	•	•	•	•	•	•	•	•	Optional
1080i 60	ST 274	ST 292-1	•	•		•	•	•			•	•			•	Optional
1080p 23.98/24/29.97	ST 274	ST 292-1	•	•		•	•	•	•	•	•	•			•	
1080p 30	ST 274	ST 292-1	•	•		•	•	•			•	•			•	
1080p 50/59.94 level A	ST 425-1	ST 424	Optional	Optional				Optional	Optional	Optional	Optional	Optional	•	•	•	Optional
1080p 50/59.94 level B-DL	ST 425-1	ST 424	Optional	Optional				Optional			Optional	Optional			•	
4K UHD (Quad Link, Square division) 25/29.97	ST 2036-1	ST 425-5									Optional ²⁷					
4K UHD (Quad Link, Square division) 50/59.94	ST 2036-1	ST 425-5									Optional ²⁷					
4K UHD (Quad Link, 2SI) 25/29.97	ST 2036-1	ST 425-5														
4K UHD (Quad Link, 2SI) 50/59.94	ST 2036-1	ST 425-5														
1080p 50/59.94 with High Dynamic Range (PQ, HLG, S-Log3)	ITU-R BT.2100	ST 424												•	•	

²⁷ One extra KMX-3901-IN card is needed for every two 4K UHD signals to input.
M770-9904-108

Kaleido-IP decoding capabilities

Numbers represent the maximum video decoding capacity when only this format is used and head streaming is disabled. Actual performance may vary according to the content's complexity. This table and accompanying notes should only be used as general guidelines. The absolute maximum video decoding capacity is 128 streams under all conditions. Audio decoding capacity is limited only by processor usage. To achieve the numbers shown below, specialized knowledge and network equipment is required for implementation (for example, shaping traffic at the sender); contact Grass Valley for more information.

- If one head streaming is enabled, decoding capacity is reduced by 4%. If two head streaming is enabled, decoding capacity is reduced by 8%.
- Halving the bit rate increases the decoding capacity by approximately 33%. Doubling the bit rate decreases the decoding capacity by approximately 25%.
- Using H.265 with Main profile instead of Main10 increases the decoding capacity by approximately 25%.
- Using 4:2:2 instead of 4:2:0 will decrease the decoding capacity. Benchmark results are not yet available for 4:2:2.
- If uncompressed sources are mixed with compressed sources, the Kaleido-IP's decoding capacity for compressed signals is cut half.

Video decoding capacity

Codec → Model ↓	MPEG-2 SD Main, 8 Mb/s	MPEG-2 HD Main, 20 Mb/s	H.264 SD High, 2 Mb/s	H.264 HD High, 10 Mb/s	H.265 SD Main10, 2 Mb/s	H.265 HD Main10, 5 Mb/s	H.265 1080p50/59, Main10, 5 Mb/s	H.265 4K60p Main10, 25 Mb/s, Main Tier	H.265 4K60p Main10, 125 Mb/s, High Tier
X110	48	16	24	12					
X310	176	64	100	24	84	20	12	2	1
X120	128	45	84	18	64	16	10	2	1
X320	226	90	170	36	144	42	28	5	4
X130	128	100	128	38	100	32	22	5	4
X330	236	156	230	78	176	64	45	8	6
VM	•	•	•	•	•	•	•	•	•

- The uncompressed decoding capacity shown below uses Kaleido Software version 11.2.0 with a Kaleido-IP equipped with the KIP-OPT-ETH-2C option (X120 / X320) or with the KIP-OPT-ETH-1X option (X130 / X330). The HDMI output resolution is set to 1080p.

Format → Model ↓	SMPTE ST 2022-6 1080i 50/59.94	SMPTE ST 2022-6 1080p 50/59.94	SMPTE ST 2110-20 1080i 50/59.94	SMPTE ST 2110-20 1080p 50/59.94
X110				
X310				
X120	28	14	32	16
X320	56	28	64	32
X130 with 1 High-Speed Network Card	40	24	48	24
X330 with 1 High-Speed Network Card	56	28	64	32
X130 with 2 High-Speed Network Cards	80	40	96	48
X330 with 2 High-Speed Network Cards	80	40	96	48
VM				

Codec support by streaming mode

Streaming mode →		RTMP ²⁸	MPEG-DASH <small>SOON</small> ^{28, 29}	HLS ²⁸		Transport Stream	RTSP	RTSP/ES	RTP/ES	Uncompressed	
Protocols		RTMP	DASH	HLS rev.20 ²⁹ <small>SOON</small>	HLS	MPEG-TS	RTSP		Elementary stream	SMPTE ST 2022-6	SMPTE ST 2110
			fMP4								
Video codec	H.265/HEVC		Optional ³⁰	Optional ³⁰	Optional ³⁰	Optional ³⁰	Optional ³⁰				
	H.264/MPEG-4 AVC ³¹	•	•	•	•	•	•	•	•		
	MPEG-4 ³²							•	•		
	MPEG-2 ³³				•	•	•				
Audio codec ³⁴	AAC ³⁵ LATM				Optional	Optional	Optional				
	AAC ³⁵	Optional	Optional	Optional	Optional	Optional	Optional	Optional			
	AC-3 (Dolby Digital)		Optional	Optional	Optional	Optional	Optional	Optional			
	E-AC-3 (Dolby Digital+)		Optional	Optional	Optional	Optional	Optional				
	MPEG-1 Layer 2				•	•	•	•			
	MPEG-1 Layer 3	•			•	•	•	•			
SMPTE ST 2022-6 audio & video										Optional ³⁶	
SMPTE ST 2110-20 (RFC 4175 video)											Optional ³⁶ : Narrow, Narrow Linear, &Wide
SMPTE ST 2110-30 (PCM audio)											Optional ³⁶ : Levels A & B
SMPTE ST 2110-31 (AES audio)											
SMPTE ST 2110-40 (Ancillary data)											Optional ³⁶ : Ancillary Timecode (ATC) EIA-608 EIA-708 OP-47 Teletext Active Format Description (AFD)

Contact Grass Valley if you have additional requirements.

²⁸ Limitations may apply depending on stream content, usage of a content delivery network and/or encryption mode. Please contact Grass Valley to submit a playlist file for reviewing.

²⁹ Please contact Grass Valley for information.

³⁰ One license is required to decode unlimited HD/SD streams and one to decode unlimited 4K streams.

³¹ Streams encoded only with P-frames are not supported.

³² MPEG-4 Part 2 (MPEG-4 Visual) decoding capacity is identical to H.264.

³³ Including unencrypted Digicipher 2 (DCII).

³⁴ Up to 48kHz. Some limitations apply when the sample rate is different than 48kHz.

³⁵ Including LC-AAC, HE-AAC (SBR) & HE-AACv2 (SBR+PS).

³⁶ One license is required to decode uncompressed audio, video & ancillary streams. Also requires an optional high bit rate network card.



Grass Valley Technical Support

For technical assistance, contact our international support center, at 1-800-547-8949 (US and Canada) or +1-530-478-4148.

To obtain a local phone number for the support center nearest you, consult the Contact Us section of Grass Valley's website (www.grassvalley.com).

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Corporate Head Office

Grass Valley
3499 Douglas-B.-Floreani
St-Laurent, Quebec H4S 2C6
Canada
Telephone: +1 514 333 1772
Fax: +1 514 333 9828
www.grassvalley.com