



# **KALEIDO MULTIVIEWER**

KALEIDO SOFTWARE V11.2.0

## **Product Comparison Guide**

M770-9904-107

2020-11-10

[www.grassvalley.com](http://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 | M770-9904-107                                |
| Revision    | 2020-11-10, 11:19                            |

## Kaleido Product Comparison Charts

| Product                                 | Kaleido-XQUAD<br>single & dual   | Kaleido-X16-D<br>Kaleido-X16-S                          | Kaleido-MX<br>Kaleido-MX 4K | Kaleido Modular<br>KMV-3911<br>KMV-3901   | Kaleido<br>Modular-X<br>KMX-3901  | KMX-49N1-9x2<br>KMX-49N1-18x4<br>KMX-49N1-27x4<br>KMX-49N1-36x4<br>KMX-49N1-54x4 | KMX-3921-9x2<br>KMX-3921-18x4<br>KMX-3921-27x4<br>KMX-3921-36x4<br>KMX-3921-54x4 | Kaleido-X<br>(4 RU)                                | Kaleido-X<br>(7 RU) | Kaleido-X<br>(14 RU) | Kaleido-IP<br>X330<br>X130             | Kaleido-IP<br>X320<br>X120             | Kaleido-IP<br>VM                      |
|---|----------------------------------|---|-----------------------------|---|-----------------------------------|--|--|--|---------------------|----------------------|--|--|---------------------------------------|
| <b>Category</b>                         | Compact, pre-configured, turnkey |   |                             | Scalable modular                          |                                   |  |  | Highest layout flexibility with integrated routing |                     |                      | IP Multiviewer                         |  |                                       |
| <b>Frame size (RU)</b>                  | ½                                | 1   | 1 or 3                      |   |                                   |  |  | 4  | 7                   | 14                   | 1                                      | 1                                      |                                       |
| <b>Densité 3 mini</b>                   |                                  |   |                             | •   | •                                 |  |  |  |                     |                      |  |  |                                       |
| <b>Densité 3</b>                        |                                  |   |                             | •   | •                                 |  |  |  |                     |                      |  |  |                                       |
| <b>Densité 3+ (FR1 &amp; FR4)</b>       |                                  |   |                             |   | •                                 |  | •  |  |                     |                      |  |  |                                       |
| <b>GV Node</b>                          |                                  |   |                             |   |                                   | •  |  |  |                     |                      |  |  |                                       |
| <b>Video inputs (total)</b>             | 4 or 8 <sup>1</sup>              | 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 <sup>2</sup> | Up to 128 decoded streams <sup>3</sup> | Up to 64 decoded streams <sup>3</sup> |
| <b>Video inputs per input module</b>    |                                  |   | 16                          |   | 16                                | 9  | 9  | 16   | 16                  | 16                   |  |  |                                       |
| <b>Analog video<sup>4</sup></b>         |                                  | •   |                             |   |                                   |  |  | •  | •                   | •                    |  |  |                                       |
| <b>SDI<sup>4</sup></b>                  | •                                | •   | •                           | •   | •                                 | •  | •  | •  | •                   | •                    |  |  |                                       |
| <b>IP</b>                               |                                  |   |                             |   | Uncompressed <sup>5</sup>         | Uncompressed <sup>6</sup>  |  |  |                     |                      | Compressed & uncompressed              | Compressed & uncompressed              | Compressed                            |
| <b>NMOS</b>                             |                                  |   |                             |   |                                   |  |  |  |                     |                      | IS 04/ 05                              | IS 04/ 05                              |                                       |
| <b>Analog audio<sup>7</sup></b>         |                                  | Up to 128   | Up to 128                   |   | Up to 128                         |  |  | Up to 256  | Up to 768           | Up to 1536           |  |  |                                       |
| <b>AES3 audio<sup>7</sup></b>           |                                  | Up to 128   | Up to 128                   |   | Up to 128                         |  |  | Up to 256  | Up to 768           | Up to 1536           |  |  |                                       |
| <b>MADI audio</b>                       |                                  |   | Up to 64 <sup>8</sup>       |   | Up to 64 <sup>8</sup>             | Up to 256 <sup>9</sup>   | Up to 256 <sup>9</sup>   |  |                     |                      |  |  |                                       |
| <b>Dolby-E audio<sup>10</sup></b>       |                                  | Optional  | Optional <sup>11</sup>      |   | Optional                          | Optional   | Optional   | Optional   | Optional            | Optional             |  |  |                                       |
| <b>Compressed audio, except Dolby-E</b> |                                  |   |                             |   |                                   |  |  |  |                     |                      | • <sup>3</sup>                         | • <sup>3</sup>                         | • <sup>3</sup>                        |
| <b>Displays</b>                         | Single: 1<br>Dual: 2             | X16-S: 1<br>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                                     |
| <b>Display rotation</b>                 |                                  | •   | •                           |   | •                                 | •  | •  | •  | •                   | •                    | •                                      | •                                      | •                                     |
| <b>Router outputs</b>                   |                                  | 2   |                             |   |                                   |  |  |  | Up to 48            | Up to 96             |  |  |                                       |
| <b>Streaming outputs</b>                |                                  |   |                             |   | Up to 4 uncompressed <sup>5</sup> | Up to 4 uncompressed (2 for the 9x2)   |  |  |                     |                      | Up to 2 ST 2110-20                     | Up to 2 ST 2110-20                     | 1 ST 2110-20                          |
| <b>Cascading of multiple units</b>      |                                  | Up to 3 units for 48 inputs on 2 displays <sup>12</sup> |                             | Up to 3 units for 24 inputs on 2 displays |                                   |  |  |  |                     |                      |  |  |                                       |

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

<sup>2</sup> See Kaleido-IP decoding capability table (below) for further detail.

<sup>3</sup> See Kaleido-IP decoding capability table (below) for further detail.

<sup>4</sup> See Input signal formats table below for more details.

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

<sup>6</sup> Using GV Node to provide signals.

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

<sup>8</sup> MADI and Audio Bridge Terminal cannot be used simultaneously.

<sup>9</sup> Each MADI connection uses up one SDI input.

<sup>10</sup> Dolby-E audio level meters and metadata extraction only. No listening capability.

<sup>11</sup> From embedded audio only. Not available with discreet audio coming from Audio Bridge Terminal.

<sup>12</sup> 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 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 |
|---|--|-----------------------------|---|--------------------------------------|----------------------------|--|--|-----------------------------------|-----------------------------------|-----------------------------------|-----------------------------------|-----------------------------------|---------------|
| Images per display  | Single: up to 4 <sup>13</sup><br>Dual: up to 8 | Up to 64                    | Up to 64 <sup>14</sup>                        | Up to 8<br>(up to 24 when cascading) | Up to 64 <sup>14</sup>     | 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   | •  | •                           | •   | •                                    | •                          | • <sup>15</sup>  | • <sup>15</sup>  | •                                 | •                                 | •                                 | •                                 | •                                 | •             |
| Multi-room  | •  | •                           | •   | •                                    | •                          | •  | •  | •                                 | •                                 | •                                 | •                                 | •                                 | •             |
| Clustering  | •  | •                           | •   | •                                    | •                          | •  | •  | •                                 | •                                 | •                                 | •                                 | •                                 | •             |
| Penalty box & channel cycling using Monitor Wall Destinations <sup>16</sup> | •  | •                           |   |                                      |                            |  |  | •                                 | •                                 | •                                 | •                                 | •                                 | •             |
| Analog audio outputs  |  | 2                           | Up to 4 <sup>17</sup>                         |                                      | •                          |  |  | 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 <sup>18</sup>                         |  |                             |   |                                      |                            | • <sup>19</sup>  | •  |                                   |                                   |                                   |                                   |                                   |               |
| 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<br>500 W in 3RU                  | 24W                                  | 16x2: 80W<br>64x4: 270W    | 9x2: 30 W<br>54x4: 180 W   | 9x2: 30 W<br>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<br>3G-SDI                                 | HDMI<br>3G-SDI              | 4K HDMI 2.0<br>4x3G-SDI<br>HDMI 1.3<br>3G-SDI | HDMI<br>3G-SDI <sup>20</sup>         | HDMI<br>3G-SDI             | Multi-format SFP (optical, DIN, HDMI mini)                           | Multi-format SFP (optical, DIN, HDMI mini)                           | DVI RGBHV<br>3G-SDI <sup>21</sup> | DVI RGBHV<br>3G-SDI <sup>21</sup> | DVI RGBHV<br>3G-SDI <sup>21</sup> | DisplayPort or HDMI <sup>22</sup> | DisplayPort or HDMI <sup>23</sup> |               |

<sup>13</sup> 8 with a software license.

<sup>14</sup> 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.

<sup>15</sup> Horizontal only.

<sup>16</sup> Requires [iControl Penalty Box](#).

<sup>17</sup> Except for the 16x4 model (0)

<sup>18</sup> See Input formats table below for more details.

<sup>19</sup> Requires KMX-4921.

<sup>20</sup> KMV-3901 does not have SDI outputs.

<sup>21</sup> With optional KXO-HDM module.

<sup>22</sup> DisplayPort to HDMI active adapter included

<sup>23</sup> DisplayPort to HDMI active adapter included

| Product                                    | Kaleido-XQUAD<br>single & dual        | Kaleido-X16-D<br>Kaleido-X16-S        | Kaleido-MX<br>Kaleido-MX 4K                                      | Kaleido Modular<br>KMV-3911<br>KMV-3901 | Kaleido<br>Modular-X<br>KMX-3901                    | KMX-49N1-9x2<br>KMX-49N1-18x4<br>KMX-49N1-27x4<br>KMX-49N1-36x4<br>KMX-49N1-54x4 | KMX-3921-9x2<br>KMX-3921-18x4<br>KMX-3921-27x4<br>KMX-3921-36x4<br>KMX-3921-54x4 | Kaleido-X<br>(4 RU)                                     | Kaleido-X<br>(7 RU)                                     | Kaleido-X<br>(14 RU)                                    | Kaleido-IP<br>X330<br>X130 | Kaleido-IP<br>X320<br>X120 | Kaleido-IP<br>VM |
|--|---------------------------------------|---------------------------------------|--|---|---|--|--|---|---|---|----------------------------|----------------------------|------------------|
| <b>SDI<br/>Display resolutions</b>         | 1280x720p<br>1920x1080p<br>1920x1080i | 1280x720p<br>1920x1080p<br>1920x1080i | 1280x720p<br>1920x1080p<br>1920x1080i<br>3840x2160 <sup>24</sup> | 1280x720p<br>1920x1080p<br>1920x1080i   | 1280x720p<br>1920x1080p<br>1920x1080i<br>3840x2160p | 1920x1080i<br>1920x1080p   | 1920x1080i<br>1920x1080p   | 1280x720p<br>1920x1080p <sup>21, 25</sup><br>1920x1080i | 1280x720p<br>1920x1080p <sup>21, 25</sup><br>1920x1080i | 1280x720p<br>1920x1080p <sup>21, 25</sup><br>1920x1080i |                            |                            |                  |
| <b>DVI/HDMI<br/>Display resolutions</b>    | Up to 1920x1200                       | Up to 1920x1200                       | Up to<br>3840x2160 <sup>26</sup>                                 | Up to 1920x1200                         | Up to 1920x1200                                     | 1920x1080i<br>1920x1080p<br>3840x2160 <sup>26</sup>                              | 1920x1080i<br>1920x1080p<br>3840x2160 <sup>26</sup>                              | Up to<br>1920x1200                                      | Up to<br>1920x1200                                      | Up to<br>1920x1200                                      | Up to<br>3840x2160         | Up to<br>3840x2160         |                  |
| <b>Custom DVI/HDMI display resolutions</b> | •                                     | •                                     | •  | •                                       | •   |  |  | •   | •   | •   | •                          | •                          |                  |
| <b>DXF-4K DVI/HDMI optical extender</b>    | •                                     | •                                     | •  | •                                       | •   |  |  | •   | •   | •   | •                          | •                          |                  |

<sup>24</sup> Using quad link 1080p SDI (square division)

<sup>25</sup> Only with KXO-DUAL3 and KXO-DUAL3-B. Not supported on KXO-DUAL.

<sup>26</sup> With 4K HDMI 2.0 adaptor.

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

Discontinued products are italicized.

| Format  |                           |                  | Kaleido-X<br>4 RU, 7 RU, 14 RU |           |          |                  |                 | Kaleido-X16 | Kaleido-Modular |                 | Kaleido-MX<br>Kaleido-MX 4K<br>Kaleido-Modular-X |                | KMX-4911    | KMX-4921    | KMX-3921 | Kaleido-IP<br>X320<br>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 |          |                            |
| <b>Analog 525</b>   | NTSC-N,J PAL-M            |                  | •                              |           | •        | •                |                 | •           |                 |                 |  |                |             |             |          |                            |
| <b>Analog 625</b>   | PAL-B/G, I, D/K, N, SECAM |                  | •                              |           | •        | •                |                 | •           |                 |                 |  |                |             |             |          |                            |
| <b>601 525</b>  | ST 125:1995               | ST 259           | •                              | •         | •        | •                | •               | •           | •               | •               | •  | •              | •           | •           | •        | Optional                   |
| <b>601 625</b>  | EBU Tech. 3267            | ST 259           | •                              | •         | •        | •                | •               | •           | •               | •               | •  | •              | •           | •           | •        | Optional                   |
| <b>720p 23.98/24/29.97</b>                                      | ST 296                    | ST 292-1         | •                              | •         |          | •                | •               | •           | •               | •               | •  | •              |             |             | •        |                            |
| <b>720p 30</b>  | ST 296                    | ST 292-1         | •                              | •         |          | •                | •               | •           |                 |                 | •  | •              |             |             | •        |                            |
| <b>720p 50/59.94</b>  | ST 296                    | ST 292-1         | •                              | •         |          | •                | •               | •           | •               | •               | •  | •              | •           | •           | •        | Optional                   |
| <b>720p 60</b>  | ST 296                    | ST 292-1         | •                              | •         |          | •                | •               | •           |                 |                 | •  | •              |             |             | •        | Optional                   |
| <b>1080i 50/59.94</b>   | ST 274                    | ST 292-1         | •                              | •         |          | •                | •               | •           | •               | •               | •  | •              | •           | •           | •        | Optional                   |
| <b>1080i 60</b>   | ST 274                    | ST 292-1         | •                              | •         |          | •                | •               | •           |                 |                 | •  | •              |             |             | •        | Optional                   |
| <b>1080p 23.98/24/29.97</b>                                     | ST 274                    | ST 292-1         | •                              | •         |          | •                | •               | •           | •               | •               | •  | •              |             |             | •        |                            |
| <b>1080p 30</b>   | ST 274                    | ST 292-1         | •                              | •         |          | •                | •               | •           |                 |                 | •  | •              |             |             | •        |                            |
| <b>1080p 50/59.94 level A</b>                                   | ST 425-1                  | ST 424           | Optional                       | Optional  |          |                  |                 | Optional    | Optional        | Optional        | Optional   | Optional       | •           | •           | •        | Optional                   |
| <b>1080p 50/59.94 level B-DL</b>                                | ST 425-1                  | ST 424           | Optional                       | Optional  |          |                  |                 | Optional    |                 |                 | Optional   | Optional       |             |             | •        |                            |
| <b>4K UHD (Quad Link, Square division) 25/29.97</b>             | ST 2036-1                 | ST 425-5         |                                |           |          |                  |                 |             |                 |                 | Optional <sup>27</sup>                           |                |             |             |          |                            |
| <b>4K UHD (Quad Link, Square division) 50/59.94</b>             | ST 2036-1                 | ST 425-5         |                                |           |          |                  |                 |             |                 |                 | Optional <sup>27</sup>                           |                |             |             |          |                            |
| <b>4K UHD (Quad Link, 2SI) 25/29.97</b>                         | ST 2036-1                 | ST 425-5         |                                |           |          |                  |                 |             |                 |                 |  |                |             |             |          |                            |
| <b>4K UHD (Quad Link, 2SI) 50/59.94</b>                         | ST 2036-1                 | ST 425-5         |                                |           |          |                  |                 |             |                 |                 |  |                |             |             |          |                            |
| <b>1080p 50/59.94 with High Dynamic Range (PQ, HLG, S-Log3)</b> | ITU-R BT.2100             | ST 424           |                                |           |          |                  |                 |             |                 |                 |  |                |             | •           | •        |                            |

<sup>27</sup> One extra KMX-3901-IN card is needed for every two 4K UHD signals to input.  
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## 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 →<br>Model ↓ | MPEG-2 SD<br>Main, 8 Mb/s | MPEG-2 HD<br>Main, 20 Mb/s | H.264 SD<br>High, 2 Mb/s | H.264 HD<br>High, 10 Mb/s | H.265 SD<br>Main10, 2 Mb/s | H.265 HD<br>Main10, 5 Mb/s | H.265<br>1080p50/59, Main10, 5 Mb/s | H.265 4K<br>Main10, 25 Mb/s, Main Tier | H.265 4K<br>Main10, 125 Mb/s, High Tier |
|--------------------|---------------------------|----------------------------|--------------------------|---------------------------|----------------------------|----------------------------|-------------------------------------|--|---|
| X100               | 24                        | 8                          | 12                       | 6                         |                            |                            |                                     |  |   |
| X110               | 48                        | 16                         | 24                       | 12                        |                            |                            |                                     |  |   |
| X300               | 64                        | 24                         | 32                       | 16                        |                            |                            |                                     |  |   |
| X120               | 128                       | 45                         | 84                       | 18                        | 64                         | 16                         | 10                                  | 2                                      | 1                                       |
| X310               | 128 <sup>28</sup>         | 64                         | 100                      | 24                        | 84                         | 20                         | 12                                  | 2                                      | 1                                       |
| X320               | 128 <sup>28</sup>         | 90                         | 128 <sup>28</sup>        | 36                        | 128                        | 32                         | 20                                  | 4                                      | 3                                       |
| X130               | 128 <sup>28</sup>         | 100                        | 128 <sup>28</sup>        | 39                        | 109                        | 35                         | 22                                  | 5                                      | 4                                       |
| X330               | 128 <sup>28</sup>         | 128 <sup>28</sup>          | 128 <sup>28</sup>        | 72                        | 128 <sup>28</sup>          | 52                         | 32                                  | 6                                      | 5                                       |
| 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 →<br>Model ↓                  | SMPTE ST 2022-6<br>1080i 50/59.94 | SMPTE ST 2022-6<br>1080p 50/59.94 | SMPTE ST 2110-20 1080i<br>50/59.94 | SMPTE ST 2110-20 1080p<br>50/59.94 |
|--------------------------------------|-----------------------------------|-----------------------------------|------------------------------------|------------------------------------|
| X100                                 |                                   |                                   |                                    |                                    |
| X110                                 |                                   |                                   |                                    |                                    |
| X300                                 |                                   |                                   |                                    |                                    |
| X120                                 | 28                                | 14                                | 32                                 | 16                                 |
| X310                                 |                                   |                                   |                                    | A                                  |
| 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                                   |                                   |                                   |                                    |                                    |

<sup>28</sup> 128 maximum stream limit reached before machine limit.

## Codec support by streaming mode

| Streaming mode →                  |                                | RTMP <sup>29</sup> | MPEG-DASH <small>SOON</small> <sup>29, 30</sup> | HLS <sup>29</sup>                               |                        | Transport Stream       | RTSP                   | RTSP/ES  | RTP/ES            | Uncompressed           |   |
|-----------------------------------|--------------------------------|--------------------|---|---|------------------------|------------------------|------------------------|----------|-------------------|------------------------|---|
| Protocols                         |                                | RTMP               | DASH  | HLS rev.20 <sup>30</sup><br><small>SOON</small> | HLS                    | MPEG-TS                | RTSP                   |          | Elementary stream | SMPTE ST 2022-6        | SMPTE ST 2110   |
|                                   |                                |                    | fMP4  |   |                        |                        |                        |          |                   |                        |   |
| Video codec                       | H.265/HEVC                     |                    | Optional <sup>31</sup>                          | Optional <sup>31</sup>                          | Optional <sup>31</sup> | Optional <sup>31</sup> | Optional <sup>31</sup> |          |                   |                        |   |
|                                   | H.264/MPEG-4 AVC <sup>32</sup> | •                  | •   | •   | •                      | •                      | •                      | •        | •                 |                        |   |
|                                   | MPEG-4 <sup>33</sup>           |                    |   |   |                        |                        |                        | •        | •                 |                        |   |
|                                   | MPEG-2 <sup>34</sup>           |                    |   |   | •                      | •                      | •                      |          |                   |                        |   |
| Audio codec <sup>35</sup>         | AAC <sup>36</sup> LATM         |                    |   |   | Optional               | Optional               | Optional               |          |                   |                        |   |
|                                   | AAC <sup>36</sup>              | 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 <sup>37</sup> |   |
| SMPTE ST 2110-20 (RFC 4175 video) |                                |                    |   |   |                        |                        |                        |          |                   |                        | Optional <sup>37</sup> :<br>Narrow, Narrow Linear, &Wide  |
| SMPTE ST 2110-30 (PCM audio)      |                                |                    |   |   |                        |                        |                        |          |                   |                        | Optional <sup>37</sup> :<br>Levels A & B  |
| SMPTE ST 2110-31 (AES audio)      |                                |                    |   |   |                        |                        |                        |          |                   |                        |   |
| SMPTE ST 2110-40 (Ancillary data) |                                |                    |   |   |                        |                        |                        |          |                   |                        | Optional <sup>37</sup> :<br>Ancillary Timecode (ATC)<br>EIA-608<br>EIA-708<br>OP-47 Teletext<br>Active Format Description (AFD) |

Contact Grass Valley if you have additional requirements.

<sup>29</sup> 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.

<sup>30</sup> Please contact Grass Valley for information.

<sup>31</sup> One license is required to decode unlimited HD/SD streams and one to decode unlimited 4K streams.

<sup>32</sup> Streams encoded only with P-frames are not supported.

<sup>33</sup> MPEG-4 Part 2 (MPEG-4 Visual) decoding capacity is identical to H.264.

<sup>34</sup> Including unencrypted Digicipher 2 (DCII).

<sup>35</sup> Up to 48kHz. Some limitations apply when the sample rate is different than 48kHz.

<sup>36</sup> Including LC-AAC, HE-AAC (SBR) & HE-AACv2 (SBR+PS).

<sup>37</sup> 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](http://www.grassvalley.com)).

An online form for e-mail contact is also available from the website.

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