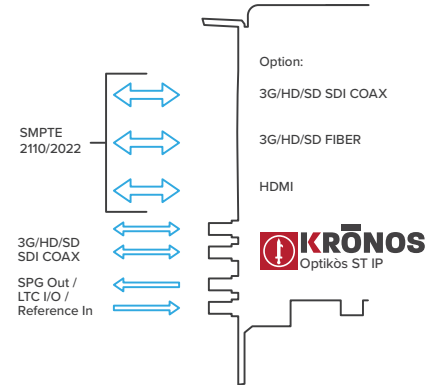
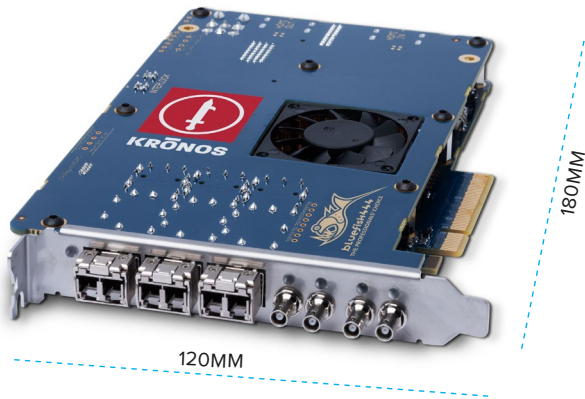


**A HYBRID SMPTE 2110/2022 IP VIDEO CARD FEATURING INTERCHANGEABLE SFP+ INTERFACES FOR SDI VIA COAX OR FIBER, & HDMI**



MAJOR FEATURES FOR KRONOS OPTIKOS 3G ST IP	K4502	K4502	K4502
Maximum IP Streams	6	<i>Optional AUX/IO via STEM</i>	YES
SMPTE 2110-20/30/40	YES	<i>LTC I/O (HD-BNC), RS-422 (RJ45), AES Audio I/O (DB25)</i>	<i>EX-1</i>
SMPTE 2022-7	YES	<i>Analogue Audio I/O (2 x 3.5mm TRS), RS-422 (RJ45), AES Audio I/O (DB25)</i>	<i>EX-2</i>
SMPTE 2022-6	YES	<b>Embedded audio</b>	YES
Interchangeable SFP+ Interfaces (SDI COAX/SDI FIBER/HDMI SFP+ Modules)	3	<b>Low-latency hardware keys</b>	4
Bi-directional SDI (HD-BNC)	2	<b>Bundled Software BlueToolbox and BlueSigGen</b>	YES
1.5G HD/SD-SDI	2	<b>Colour space converter</b>	YES
3G-SDI (Level A+B)	2	<b>Customisable pixel formats and rasters</b>	YES
Dual Link 1.5G (4:2:2/4:4:4:4)	YES	<b>Multi-card support</b>	YES
Dual Link 3G (Level A+B)	YES	<b>Thunderbolt compatible</b>	YES
LTC I/O	YES	<b>Full-duplex DMA</b>	YES
Reference IN / SPG OUT	YES	<b>VBI, HANC &amp; VANC</b>	YES
Interlocking I/O	YES	<b>NVIDIA GPU Direct</b>	YES
Bypass relays	1	<b>Stereoscopic/3D Imaging</b>	YES

**OPTIKOS3G ONLINE CONFIGURATOR**

[WWW.BLUEFISH444.COM/KRONOS-OPTIKOS3G-SFP-CONFIGURATOR.HTML](http://WWW.BLUEFISH444.COM/KRONOS-OPTIKOS3G-SFP-CONFIGURATOR.HTML)

**CROSS-PLATFORM SUPPORT WITH INDUSTRY-LEADING 3RD-PARTY SOFTWARE**



For a comprehensive and up-to-date list of supported software, visit [bluefish444.com/software](http://bluefish444.com/software)

# KRONOS OPTIKOS 3G ST IP FEATURES

SPECIFICATIONS	KRONOS OPTIKOS3G ST IP
Width	18.4MM (SINGLE SLOT PCIE)
Internal Length	167MM (HALF LENGTH PCIE)
Total Length	180MM
Height	111MM (FULL HEIGHT PCIE)
Total Height	120MM
Weight	300G
Power requirement	PCI 12V 2A

VIDEO I/O	
<b>SMPTE IP Video</b>	
ST2110-20/30/40	6
ST2022-6/-7	6
NMOS, EMBER+, REST API for Discovery and Configuration	YES
10Gb Multimode Fiber	YES
Clean Switch and Frame Sync option	YES

SDI	
SD SMPTE 295M	2
HD 1.5G SMPTE 292M	2
3G (Level A+B) SMPTE 424M	2
Dual Link 1.5G SMPTE 372M	YES
Dual Link 3G	YES
12/10/8-bit 4:4:4:4 SDI	YES
12/10/8-bit 4:2:2:4 SDI	YES

REFERENCE	
PTP ST 2059-1 SMPTE 2110 locking	YES
Reference IN / SPG OUT (Dedicated HD-BNC's)	YES
Interlocking I/O supporting KRONOS and Epoch   Neutron cards	YES

INTERCHANGEABLE SFP+ MODULES	MODULE	STREAM
<b>SDI</b>		
3G/HD/SD Reclocked SDI Coaxial (2in/2out/1in/1out)	3*	6*
3G/HD/SD SDI Singlemode Fiber (2in/2out/1in/1out)	3*	6*
<b>HDMI</b>		
HD/SD HDMI 1.4a Type D (Micro-HDMI)	3*	3*

ANCILLARY	
<b>HANC</b>	
RP-188 timecode	YES
16 channels of embedded audio per Memory Channel	YES
Video payload ID	YES
Custom packets	YES
<b>VANC</b>	
Closed Captioning	YES
3 Line VITC	YES
Custom packets	YES

AUDIO I/O	
16 channels of embedded audio IN per Memory Channel	YES
16 channels of embedded audio OUT per Memory Channel	YES
Dolby digital pass-through SDI	YES

OPTIONAL AUX LTC I/O VIA INTERLOCK	
LTC I/O (BNC) Aux shield	EX3

OPTIONAL AUX I/O VIA STEM PORT	
LTC I/O (HD-BNC), RS-422 (RJ45), AES audio I/O (DB25)	EX1
Analogue audio I/O (2 x 3.5mm TRS), RS-422 (RJ45), AES audio I/O (DB25)	EX2

MAJOR HARDWARE FEATURES	
Interchangeable SFP+ Interfaces (SDI COAX/SDI FIBER/HDMI SFP+ Modules)	3
High-performance, 3G bypass relays	1
Low-latency hardware keyers	4
Fully programmable 4 x 4 x 33-bit colour matrix	YES
12-bit video signal path throughout	YES
Automatic cross-locking and phasing across formats	YES
Audio sample-rate converters	YES
<b>(MR2) MASTER ROUTING RESOURCE</b>	
ISIM (Input Stream Integrity Management)	YES
4K/UHD HDR HFR modes	YES*
8-lane PCI-Express Gen3 (16-lane compatible)	YES
Full-duplex DMA data transfer bandwidth	YES
LTC I/O (Via reference BNC)	YES
LTC I/O (Via Interlock) *requires EX3	YES
STEM Port	YES

VIDEO FORMATS	
<b>SUPPORTED YUV SDI &amp; IP VIDEO MODES</b>	
(2K) 2048 x 1080p/PsF @ 23.98, 24, 25, 29.97, 30 FPS	YES
(2K) 2048 x 1080P/PsF @ 48, 50, 59.94, 60 FPS	YES
(HD) 1920 x 1080p/PsF @ 23.98, 24, 25, 29.97, 30 FPS	YES
(HD) 1920 x 1080p/PsF @ 48, 50, 59.94, 60 FPS	YES
(HD) 1920 x 1080i @ 25, 29.97, 30 FPS	YES
(HD) 1280 x 720p @ 23.98, 24, 25, 29.97, 30, 50, 59.94, 60 FPS	YES

SUPPORTED YUV SDI VIDEO MODES	
(SD) 720 x 576i @ 25 FPS PAL	YES
(SD) 720 x 486i @ 29.97 FPS NTSC	YES

SUPPORTED RGB SDI VIDEO MODES	
(2K) 2048 x 1080p/PsF @ 23.98, 24, 25, 29.97, 30 FPS	YES
(HD) 1920 x 1080p/PsF @ 23.98, 24, 25, 29.97, 30 FPS	YES
(HD) 1920 x 1080i @ 25, 29.97, 30 FPS	YES
(SD) 720 x 576i @ 25 FPS PAL	YES
(SD) 720 x 486i @ 29.97 FPS NTSC	YES

SUPPORTED HSDL SDI VIDEO MODES	
(2K) 2048 x 1556PsF @ 14.98, 15 FPS	YES

SUPPORTED UHD YUV SDI VIDEO MODES	
(4K) 4096 x 2160p @ 23.98, 24, 25, 29.97, 30 FPS	YES
(4K) 4096 x 2160p @ 48, 50, 59.94, 60 FPS	YES*
(UHD) 3840 x 2160p @ 23.98, 24, 25, 29.97, 30 FPS	YES
(UHD) 3840 x 2160p @ 48, 50, 59.94, 60 FPS*	YES*

SUPPORTED UHD RGB SDI VIDEO MODES	
(4K) 4096 x 2160p @ 23.98, 24, 25, 29.97, 30 FPS*	YES*
(UHD) 3840 x 2160p @ 23.98, 24, 25, 29.97, 30 FPS*	YES*

SUPPORTED PIXEL FORMATS	
2VUY, YUVS, BV8, V210, AYUV _ 4224, AYUV _ 4444, YV12, I420	YES
ARGB, BGRA, RGB24, Cineon, DPX, RGB48	YES
Customisable hardware pixel or video format engine	YES

\* Supported by the exchanging of interchangeable SFP+ modules

[WWW.BLUEFISH444.COM/KRONOS-OPTIKOS3G-SFP-CONFIGURATOR.HTML](http://WWW.BLUEFISH444.COM/KRONOS-OPTIKOS3G-SFP-CONFIGURATOR.HTML)

Bluefish444 contact [sales@bluefish444.com](mailto:sales@bluefish444.com), or visit [bluefish444.com/contacts](http://bluefish444.com/contacts)