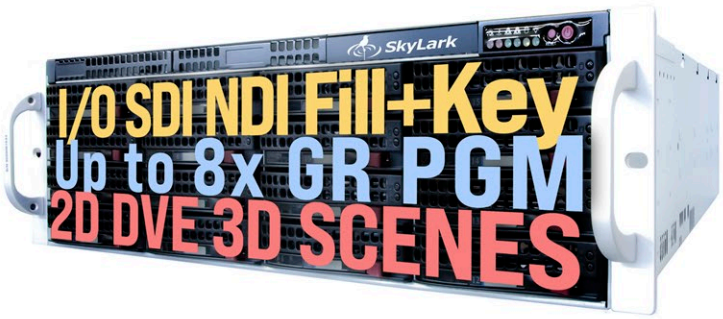
SL NEO 5000 Servers
On Air Graphics

- Universal On Air Graphics & Channel Branding Solution
- Up to 8x HD PGM, up to 2x UHD PGM Channels. Live Inputs, Fill+Key I/O
- 8x Graphics & Title Players + Logo Layer for each PGM Channel
- Internal Keying (overlay Graphics on the input video) or External Keying (Fill+Key)



The SL NEO 5000 is a fully automated interactive Character Generators for Live Production and Channel Branding. Maximum number of output HD Programs - 8 (up to 8x Capture and 8x Output Ports). For UHD: up to 2x Capture and 2x Output Ports for 2x UHD Programs.

At the basis of on-air graphics technology is the playback of multilayer dynamic compositions with text/file/live elements and parametrization of objects with data from external sources.

Main Features

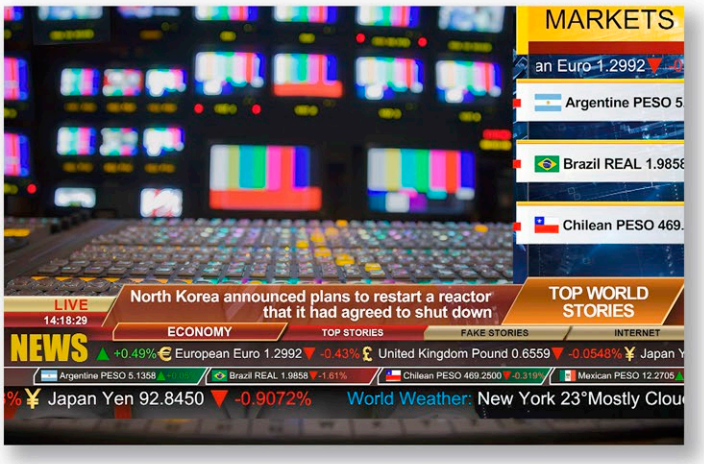
Basic design elements

Titles, roll or crawl lines on dynamic backgrounds

The number of such objects is not limited. They can be randomly combined with any other objects. The content of the text can be dynamically changed by reading the information from external sources.

SMS chats, weather, currency exchange rates

Data from external sources - text information that is read from txt- or xml-files, or comes from providers of information services in the form of RSS-resources and is displayed by the graphic "engine" of SL NEO server as crawl lines, scrolling lists or alternating text lines.



Typical examples are info-bars, SMS chats, news crawls, weather information and currency rates.

SL NEO platform has its own **RSS server** that generates a local RSS resource, which in turn uses one or more folders with txt- or xml-files as a source of text data. The RSS data is transferred to the appropriate graphical compositions and parameterizes the text layers.

Clocks, Animations, Live Video and 2D DVE

- Visualization of the current time is implemented in the form of "digital" and "analog" clocks of arbitrary design with animation and audio. It is possible to create collages for several time zones, direct and reverse counters, displaying weather readings and other information.
- Animations can be played from sequences of TGA/PNG/PSD files, or from avi/mov files with an alpha-channel.

  Compositions can contain transitions and 2D effects, PIP elements, video from server inputs, mixes of audio tracks.
- A composition can contain several layers of text, "picture-in-picture" objects, backgrounds and frames, layers of text strings with data (TXT, RSS).
- All objects can be set as the key-point motion paths, each composition can contain audio. Audio is mixed in the program signal and output in SDI/NDI FILL or in a separate AES line.

Preparing on-Air Graphics

Networked Graphics Editor allows you to create and edit titles and graphic compositions. It is a module within the application's Air Manager, News Cut, connect and interacts with SL NEO Media Database.

Graphics Editor includes tools for creating mulrilayered Graphics use 32-bit animation with begin, loop, end fragments, 2D DVE: pip, zoom, mix and wipe transitions with keypoints.

For text rendering, text objects can be parameterized with the data contained in the main playlist lines.

All source materials for and results of the work are stored on SL NEO 5000 Server array, allowing for network collaboration between multiple users and instant playback of created compositions. Rendering is performed by the SL NEO Server directly during playback.

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Squeeze Back

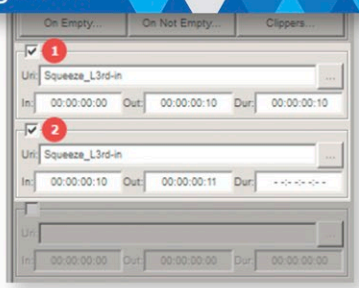
Squeeze Back is a method for displaying additional information (such as ads and promotions) that reduces the image size of the current playlist event in order to display ads on a free area of the screen.

The SL NEO 5000 Series Servers allow you to implement this feature in 2 modes:

1). With saving the duration and soundtrack of the main event (only reducing the size is used),

2). With increasing the video playback speed of the main event (the original sound is played, the duration is reduced). This mode is most useful for the final titles of movies.

Squeeze Back effects are playing using templates created in the built-in Graphics Editor.



Graphics Playback

The SL NEO 5000 Server allows you to playback graphical compositions in several modes.

In the production studio can be used lists from pre-prepared templates and compositions with manual start. Playback is possible according to the schedules, the type of starting is set for each event: manually, by time, by external command or sequentially.

When working as part of a playout system, the SL NEO 5000 Server is controlled from the external automation system. SL NEO 2000 and 3000 series servers can control the 5000 server via XML-RPC using the SL NEO platform's common control protocol. From third-party automation systems, SL NEO 5000 controlled using Chyron CII or SL NEO control protocol.

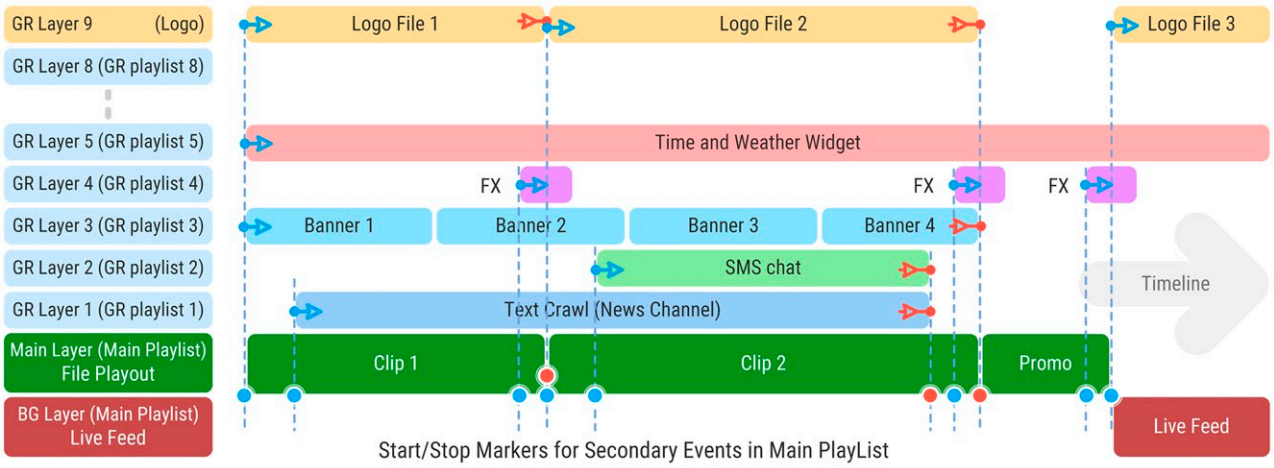
The Final Program is a composition containing 2 layers:

- Full Screen Clear Program from external Playout System,
- Graphics Program from SL NEO 5000: final video/audio mix of all graphics layers. Graphics Program can be issued as NDI/SDI Fill + Key, or use SL NEO 5000 server's internal overlay mode on the incoming Clear Program signal).

Graphics Program from SL NEO 5000 consists of 8 independent Graphics Layers and one logo Layer. Each Layer is a virtual player with a title generator. Each player can be set to play a a selected graphics composition or use its own playlist. Logo player has a minimum of functions and play a selected graphics file or composition.

Virtual players are components of the Program Player server module, which acts as an automated playout system for a single program. The final video/audio module renders directly during playback.

Graphic events are linked to events in the main playlist. Linking a "secondary" graphic event to a "primary" event means starting/stopping a "secondary" event synchronously or from time shift from the start/stop of the "primary" event.



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Software Modules Connection Diagram for SL NEO 5000 Servers Series

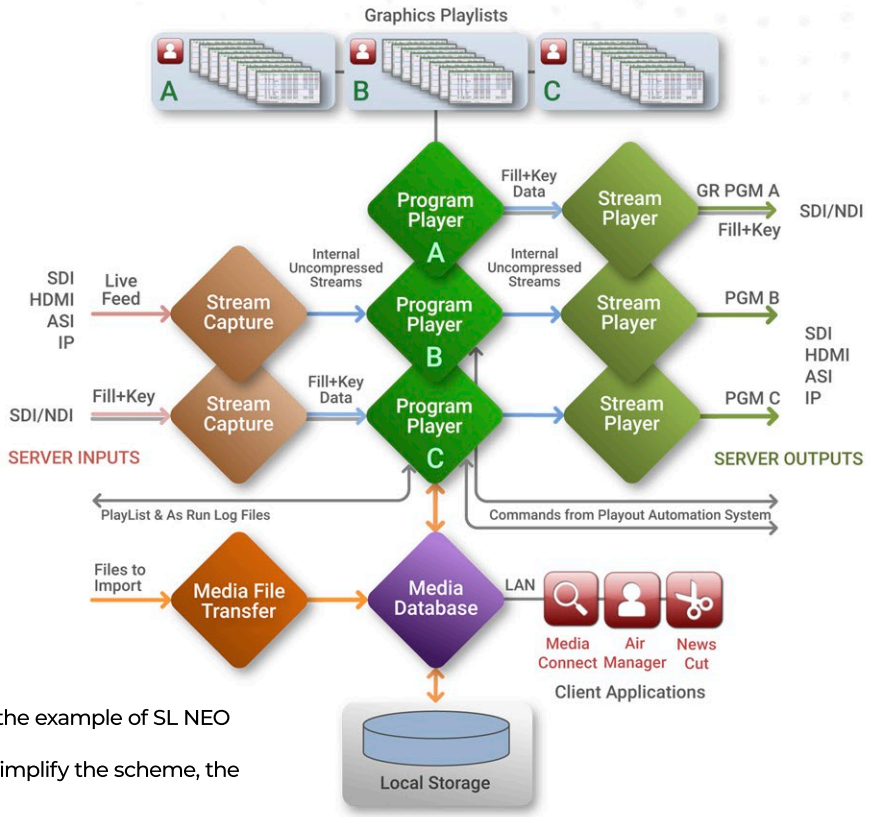
The diagram shows three possible uses for the SL NEO 5000 server.

A. In a Live production studio, the Server 5000 series plays compositions with graphic files and titles, generates Fill + Key, controlled by the operator through the **Air Manager** client application.

B. Server overlays the graphic on the incoming signal in internal keying mode. The **Program Player "B"** module can be controlled from an external automation system or controlled by the operator.

C. In an automated playout system server receives a pair of Fill and Key signals from an external system (e.g. from a sports broadcast graphics).

The **Program Player "C"** module is controlled from an external automation system, but operator can control a separate Graphics Layer and inserting of external graphics.



Types and interconnections of Software Modules on the example of SL NEO Server 5000 series configuration:
2 Capture Ports, 3 Program Channels, 3 Outputs. To simplify the scheme, the base module is not shown.

The Name of the Base Model of the SL NEO Server is made up of the values of the 5 variables located after the name of the product line:

SL NEO S F.C.P H A

S	F	C	P	H	A
First Digit of the SL NEO Series Number	Maximum Video Operating Mode	Number of Capture Ports	Number of PGM CH and Output Ports	Type of Hardware I/O Board (Brand)	Useful capacity of the Array in Tb
SERIES	**FORMAT**	**CAPTURE**	**PLAYOUT**	**HARDWARE**	**ARRAY**
S = 5 - 5000 Series On Air Graphics Servers	F = 2 – HD 1080i 50/60	for F = 2, C = 0...8	for F = 2, P = 1...8	H = D – Dektec DTA	SDI + Audio Embedded
	F = 3 – 3G 1080p 50/60	for F = 3, C = 0...6	for F = 3, P = 1...6	H = A – Dektec DTA	DVB/ATSC ASI (SPTS)
	F = 4 – UHD 2160p 50/60	for F = 4, C = 0...2	for F = 4, P = 1...2	H = M – Matrox DSX LE3/4	SDI + Audio Embedded
	The 5000 series models do not have REC channels. Capture Ports are used for Live Events in PGM Channels. Some models also have no Capture Ports (C=0): In these cases, Models work like a Graphics File Playout Servers.		Each PGM Channel is paired with a Output Port: in Basic configurations their number is identical.	H = N – Nvidia NIC	IP: SMPTE ST 2110/2022-7
				H = E – Onboard 1GbE Port	IP: NDI, HLS, RTMP
					SPTS IP: RTP, UDP, SRT, Zixi
				H = B – BlackMagic SDI I/O	SDI + Audio Embedded
				H = H – BlackMagic HDMI	HDMI + Audio Embedded

The 5000 Series Servers work with SDI and NDI over IP either in full-screen mode with internal keying or in Fill and Key Input/Output mode.

The suffix "FK" is added to the Capture/Playout variables in the name of models with Fill and Key support.

Example:	SL NEO 53.2.4FK D4
Max mode:	3G 1080p 50/60
Number of Capture Ports:	2
Number of PGM and Output Ports	4x (Fill+Key)
Hardware: Dektec DTA	I/O: SDI + Audio Embedded
Internal Array:	Useful capacity 4 Tb

Ordering Information

To order the SL NEO 5000 Series Server, send us the following information:

- Base Model Name,
- Capture/Output Ports formats (HD/3G/UHD, fps), types (SDI/HDMI/ASI/Ethernet) and number,
- Types and protocols for I/O IP Streams,
- PGM Channels formats (HD/3G/UHD, fps) and number,
- External Data Sources for Graphics and Closed Captions,
- Information about redundancy scheme,
- Type (internal, external) and useful capacity of RAID-array,
- Required Hardware and Software Options,
- Required Client Licenses.

The Client Applications are pre-installed on the server platform, and one set of Client Software for installation on a workstation is included with each SL NEO Server.

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Technical Specifications for SL NEO 5000 Servers

Hardware configuration, including CPU/HDD models, number and types of I/O Boards depends on the selected SL NEO Server Model and set of Options.

Server Hardware

Supermicro 2...4U chassis, two power supply modules in hot backup.
One or two Intel Xeon Gold CPU, 48/96Gb DDR4 RAM,
SSD for OS, two onboard 1GbE ports.
Built-in hardware RAID-10, 4x or 8x SE SAS 3.5" RE 4 or 8Tb array useful capacity.
OS Windows Server 2022 x64

I/O Ports & PGM Channels

Capture Ports HD/SD: 1...4, Capture Ports UltraHD: 1...2
PGM Channels HD/SD: 1...4, PGM Channels Ultra HD: 1...2
Output Ports HD/SD: 1...4, Output Ports UltraHD: 1...2

Video Formats and Color Spaces

625i/525i, 720p, 1080i/1080p, 2K cinema 2048x1080p, 2160p
25/29,97/50/59.94/60 fps
Color Spacing: BT.601/709/2020, SMPTE ST2084, ARIB STD-B67

I/O Streams: Interfaces, Protocols, Codecs

SDI: SD/HD/3...12G SDI, 4x 3G SDI/Embedded Audio
IP: SMPTE ST 2110, SMPTE ST 2022-7
IP: NDI, HLS, RTMP, UDP, RTP, SRT, Zixi, RIST, MPEG-DASH
SDI/NDI: Fill+Key I/O modes
DVB/ATSC IP UDP/RTP Unicast/Multicast SPTS/MPTS
DVB/ATSC ASI: SPTS/MPTS
Video Codecs: MPEG2/H.264/HEVC
Audio: 48kHz/16/24 bit PCM, ADPCM, MPEG-1 L-II/III, AAC, AC3

I/O Ancillary/MPEG2 TS Data

OP-42/47 Teletext, CEA-608/708 Closed Captions
DVB/ATSC Subtitles, EPG
SCTE-104/SCTE-35 markers with metadata
VBI/VANC Data: VITC, AFD, WSS

I/O Interfaces & Boards

Dektec DTA-2172/2174B/2175/2178/2179/2195 SDI/ASI Boards
Dektec DTA-2160/2162 ASI/IP Boards with FEC
Mellanox ConnectX Network Adapters
Matrox DSX LE3/LE4 Boards
DataPath Vision RGB Boards
Blackmagic DeckLink Boards
Standard Ethernet Interfaces
IEEE1394 Interfaces
DirectShow Devices

Other Protocols

SNMP (Hardware/SL NEO Software Monitoring)
NTP/PTP Client, SMB/CIFS, FTP

Video Codecs (File Playout)

SD/HD

DV25, DVCPRO25, DVCPRO50, DVCPROHD100, HDV
IMX 30/40/50
XDCAM EX SP/HQ, XDCAM HD LP/SP/HQ.422
DNxHD 120/145/180/220
AVCHD
XAVC 50/100/200, XAVC Long GOP
AVC-Ultra 50/100/200
AVC-Ultra Long G (12/25/50)
PRORES HQ/SD/LT
MPEG-2 I-Frames/Long GOP
H.264 L I-Frames/Long GOP

Ultra HD

H.264 8/10 bit
XAVC 300/480, XAVC Long GOP
AVC-Ultra 300/480, AVC-Ultra Long G
PRORES SQ/HQ
DNxHR SQ/HQ
HEVC 8/10 bit

Audio Codecs (File Playout)

RAW 16/24 Bit PCM, ADPCM, MPEG-1 L-II/III, AAC, AC3

File Containers

MXF-OP1A, MXF-D10
Avid MXF (OP-Atom)

Sony XDCAM HD/422 (MXF-OP1A)
Sony XAVC 50/100/200/300/480/LongGOP (MXF-OP1A)
P2 AVC-Ultra 50/100/200/300/480/LongG (MXF-OP1B)

Microsoft AVI, MPEG PS/TS
QuickTime MOV, DV DIFF
MP4, MPG, GXF

Still Graphics (single files and sequences)

JPG, BMP
With Alpha: PNG, TGA, TIFF, PSD

Video Codecs with Alpha

Uncompressed
TGA, QTRLE
Speed HQ, Lagarith
Key from a separate file
JPGA codec for AVI

File Containers for Video with Appha

Microsoft AVI
QuickTime MOV
Audio supported

Hardware & Software Options

Hardware Options

GPIO (Including one of supported USB GPIO and Software License, up to 8 IO Ports: Ontrak ADU200, ADU2X8)
GPU Board
Increase Internal RAID Array Capacity
2x SSD in RAID-1 for System

Additional Hardware Ports

SD/HD/3/6/12G, 4x3G SDI, HDMI, ASI I/O Ports
NVIDIA ConnectX 10/25/40/50/100/200G Ports for SMPTE ST2110/2022-7
1G Ethernet Ports for UDP/RTP IP with SMPTE 2022-1 FEC
Standard 1/10G Ethernet Ports for IP Streams, Control, File Transfer
RS-232/422/485, i-Link/IEEE1394 Hardware Ports
AES I/O for Matrox DSX Boards

Software Options

Transfer Manager PRO
SCTE-104/SCTE-35 Generation (for Single PGM Channel)
EBU R128 Loudness Normalization (for Single Output Port)
CEA-608/708, OP-42/47 Live Closed Captions (generation from Live Data Source or from Files, for Single PGM Channel)
DVB/ATSC Subtitles (generation from Live Data Source or from Files, for Single PGM Channel)
Main - Backup PGM Channel Sync (for Single PGM Channel)
NVENC Assistance (for File Encoding or Output Stream Encoding)
Avid Unity/Interplay Support (for REC Channels)
Web Application Server
TS Mux (up to 16x SPTS in 2x Groups)

Client Applications

Air Manager, Rec Manager, News Cut

Additional I/O Ports & Channels (SD/HD or UHD Software Licenses)

Capture Port (SDI/HDMI, ASI/IP with DeMux and Stream Decoding, all supported Protocols including SDI/NDI Fill+Key)
Output Port (SDI/HDMI, ASI/IP with Stream Encoding, all supported Protocols including SDI/NDI Fill+Key)
MultiScreen Processor (4, 8, 16 or 24 Inputs Software License)
REC Channel (Full Res + Proxy)
PGM Channel with Full Graphics (8 GR Layers + Logo Layer)
PGM Channel with Lite Graphics (1 GR Layers + Logo Layer)
Graphics for PGM Channel (additional GR Layers)

Device Server Software Licenses

Chyron CII (Slave mode for Single PGM Channel)
TSL5 UMD (Master mode for Single Device)
Ember+ (for Junger Audio Devices. Master mode for Single Device)

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- PGM Channels formats (HD/3G/UHD, fps) and number,
- Codecs and Containers for Media Files,
- External Data Sources for Graphics and Closed Captions,
- Information about redundancy scheme,
- Type (internal, external) and useful capacity of RAID-array,
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I/O Interfaces and Protocols for Media Data
Internal Keying Mode: Input Stream Decoging, overlays Graphics, mix Audio, Encoding

SDI						HDMI		IP				ASI
4x3G	12G	6G	3G	HD	SD	1.4	2.0	ST 2110	ST 2022-7	NDI	DVB	ATSC
IP												
UDP	RTP	RTSP	SRT	ZiXi	RIST	RTMP	HLS	MPEG-DASH				

I/O Interfaces and Protocols for Fill+Key

SDI						IP
4x3G	12G	6G	3G	HD	SD	NDI

I/O Media and Metadata Files

Full Screen I/O, Import files with Alpha channel (see full list in Tech Spec)

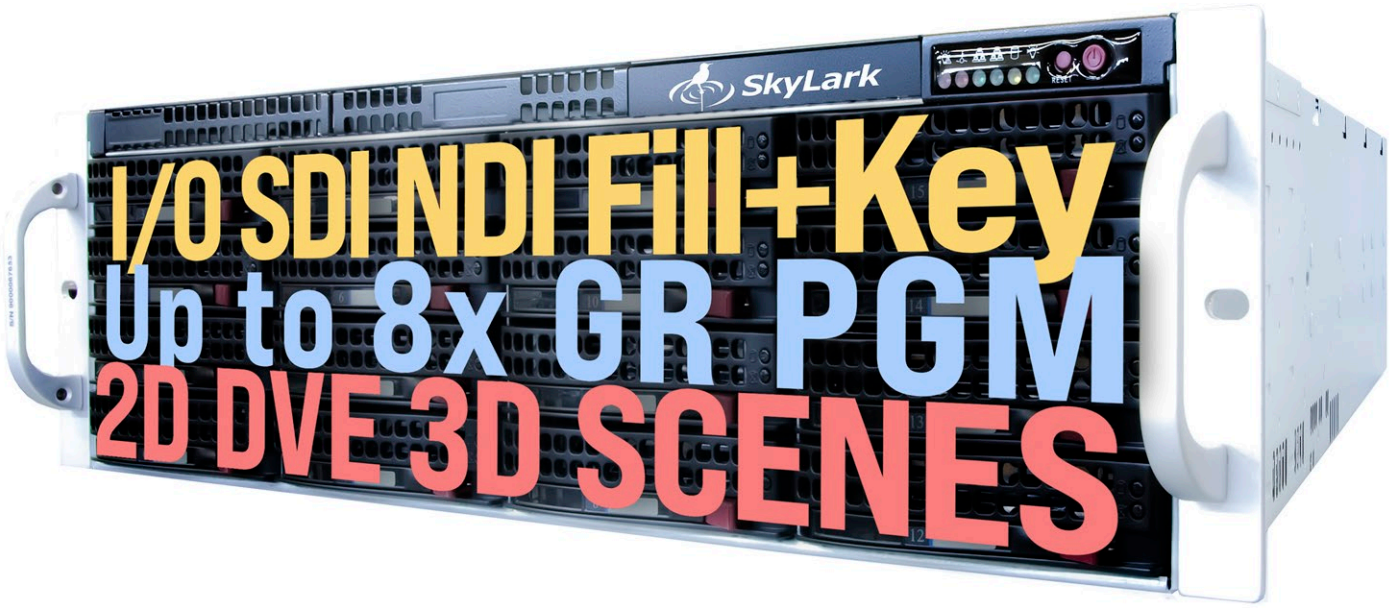
Audio/Video/Metadata								Still Graphics and Sequences			
MXF				MPEG	AVI	MOV	MPG	BMP	JPG	PSD	PNG
OP	OP1A	OP1B	D10	PS	TS	DV	DIFF	MP4	SLG (XML-based GR templates)		

Input Data for Synchronization, Data from External Systems, Schedule files

NTP	PTP	Bi-Level Sync	Tri-Level Sync
CII	GPI	SL NEO Control Protocol via XML-RPC or REST	
PLAY Schedules Files		EDL Files	

Log Files, Data for Controlling External Systems, SNMP Monitoring

As Run Log Files	Tech Log Files	EDL Files
SL NEO Control Protocol via XML-RPC or REST	TSL5 UMD Data	GPO
SNMP Data (from Hardware & SL NEO Software)		



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I/O Interfaces and Protocols for Media Data
Internal Keying Mode: Input Stream Decoging, overlays Graphics, mix Audio, Encoding

SDI | HDMI | IP | ASI
4x3G | 12G | 6G | 3G | HD | SD | 1.4 | 2.0 | ST 2110 | ST 2022-7 | NDI | DVB | ATSC
IP
UDP | RTP | RTSP | SRT | ZiXi | RIST | RTMP | HLS | MPEG-DASH

I/O Interfaces and Protocols for Fill+Key

SDI | IP
4x3G | 12G | 6G | 3G | HD | SD | NDI

I/O Media and Metadata Files

Full Screen I/O, Import files with Alpha channel (see full list in Tech Spec)
Audio/Video/Metadata | Still Graphics and Sequences
MXF | MPEG | AVI | MOV | MPG | BMP | JPG | PSD | PNG
OP | OP1A | OP1B | D10 | PS | TS | DV | DIFF | MP4 | SLG (XML-based GR templates)

Input Data for Synchronization, Data from External Systems, Schedule files

NTP | PTP | Bi-Level Sync | Tri-Level Sync
CII | GPI | SL NEO Control Protocol via XML-RPC or REST
PLAY Schedules Files | EDL Files

Log Files, Data for Controlling External Systems, SNMP Monitoring

As Run Log Files | Tech Log Files | EDL Files
SL NEO Control Protocol via XML-RPC or REST | TSL5 UMD Data | GPO
SNMP Data (from Hardware & SL NEO Software)