

# CineStore®

## Server Package



### Interoperability for the content

CineStore® Solo G3 is a fully interoperable and future proofed DCI compliant advanced Digital Cinema Hybrid server offering both JPEG2000 and MPEG-2 play-back capabilities with seamless transition. Interoperability means that whoever provides the exhibitor with some content, in either the DCI recommended JPEG2000 or the widely used MXF Interop MPEG2 compression scheme, then the Solo G3 will be able to play it out. Of course this only happens if the exhibitor is granted the right to do it.

### Flexible and Upgradeable

CineStore® Solo G3 Digital Cinema Decoder is based on an innovative single chip FPGA solution capable of JPEG2000 and MPEG2 decoding, providing a real competitive advantage in front of the ASIC solutions. The FPGA can be fine-tuned and reprogrammed according to needs, which is not the case of the ASIC. MPEG2 being decoded within the same FPGA than JPEG2000 means that the security level provided is the same for both and is the one requested by the DCI. This flexibility also allows you to easily use other frame rates than the classical 24p.

### The CineStore® Solo is the heart of a Digital Cinema installation

On one side it receives the content on a standard mobile hard drive connected through Ethernet, e-SATA or USB2 link, as well as on the advanced SATA CineDisk media. On the other side it interfaces with any DLP Cinema™ projector with CineLink™. CineStore® Solo manages all the connections (GPI I/O, Ethernet or Serial) with the theatre automation systems. It also provides Gigabit Ethernet links to interconnect with the cinema network and exchange content with central libraries. It can switch the projector video sources and the audio sources.

### The state-of-the-art play-back system

The redundant internal storage can hold at least 20 hours in JPEG2000 and 40 hours of high quality content in MPEG2. The show editor assembles detailed show lists with pre-show ads, logos, teasers, trailers and movies. It incorporates theatre automation cues: sound and light level, intermission, curtains... The play-back engine automatically manages multiple content formats, title versions, languages and subtitling, and of course the 35mm clips can be integrated within the same show.

### Digital Cinema: security is the key point

Security on the Solo is among the best on the market. It allows the distributors to provide the exhibitor with their digital content in complete confidence. This precious content is protected all the way from post-production to exhibition. The movies remain securely stored in their original encrypted form until playback time. During playback, they are decrypted on the fly through the internal system. Before being provided to the projector, the content is watermarked, enabling piracy to be tackled. It targets a level of security equal to the FIPS140-2 level 3.

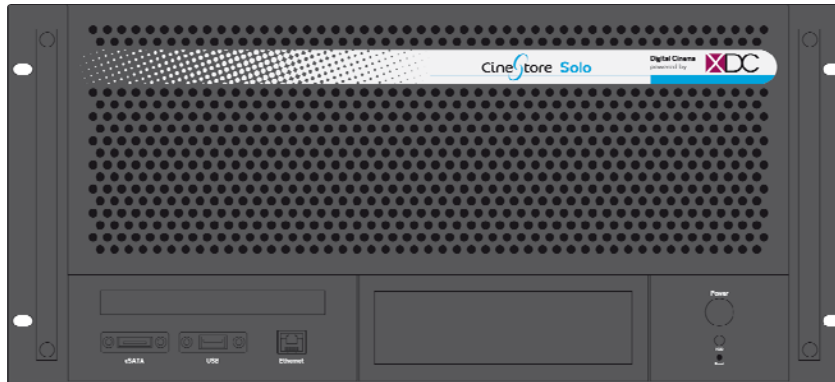
### The CineStore® Solo: an integrated service platform.

The system is built with an advanced integrated monitoring system. It informs the projectionist of the projector status, the integrity of the delivered content, key validity ... Moreover, the Solo server is an integrated service platform collecting and delivering all kinds of technical information to the XDC Network Operating Centre (NOC). These automatic system health reports can be generated and sent to the CineStore® Data – XDC's central management system – to allow pro-active preventive maintenance actions. Corrective support actions can also be carried out remotely through CineStore® Data enhanced tools.

# CineStore<sup>®</sup> Solo G3 interfaces

## Front Panel: the Ingest Interfaces

- ✚ Internal SATA CineDisk for high speed ingest with auto powered media, physically interoperable with other server manufacturers (Promise or CRU)
- ✚ External e-SATA disk interface.
- ✚ External USB 2.0 disk or key interface.
- ✚ Ethernet interface for future proved external Ethernet Hard Disks.
- ✚ DVD-ROM for advert or low resolution content.



## Rear Panel: the Theater Interfaces

### User interface

- ✚ PS-2 or USB ports for additional keyboard and mouse.
- ✚ 15 pin high density for VGA, 15 inches Touch Screen Monitor

### Projector

- ✚ Dual HD-SDI interfaces for 2k content,
- ✚ Dual-Dual HD-SDI for future 4k integration (optional)

### Audio

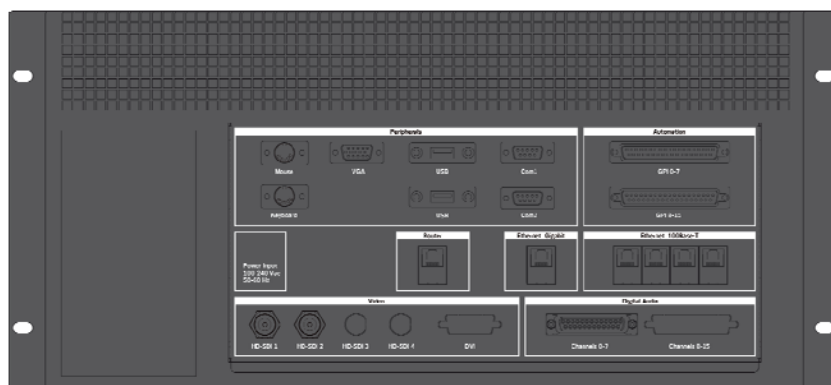
- ✚ 1 DB25 connection for 8 digital channels
- ✚ 1 DB25 connection for 8 additional digital channels required by DCI (optional)

### Theater Automation

- ✚ 16 GPIO In/Out for theater automation control
- ✚ 2 RS-232 interface for audio and projector control
- ✚ 100 base-T RJ-45 Ethernet connections for projector control






### Theater Local Area Network

- ✚ 100 base-T RJ-45 Ethernet connections for control and Plaza TMS communication
- ✚ 1000 base-T RJ-45 Ethernet connections for content download from the central library








# CineStore® Audi interfaces

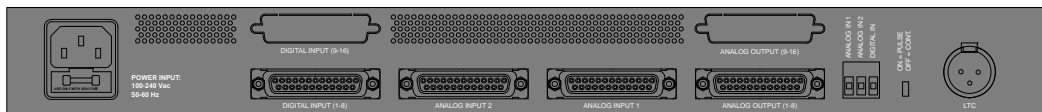
## Front Panel: manual selection and monitoring

-  External 1 source selection
-  External 2 source selection
-  CineStore Solo digital audio selection
-  Audio mute
-  Hardware reset



## Rear Panel: sources input and output connections

-  DB25 external 1 analog audio connector
-  DB25 external 2 analog audio connector
-  DB25 Cinestore® Solo digital audio connector
-  DB25 16 channels digital input extension board (optional)
-  DB25 16 channels analog output extension board (optional)



## Physical deliveries

### CineStore® Solo G3

- ✚ Image Media Block currently targeting DCI compliancy including Philips CineFence™ forensic marking, JPEG2000, MPEG2 decoding and AES decryption. 3D feature included
- ✚ High quality and robust chassis specifically designed for digital cinema
- ✚ State of the art electronic components with its operating system
- ✚ 16 GPI I/O automation interface board
- ✚ DVD ROM for ingesting content
- ✚ Embedded high speed SATA bay for high speed DCP ingest, avoiding the need of power supply cables (Promise or CRU)
- ✚ e-SATA external connector for high speed DCP ingest
- ✚ USB2.0 connector for low speed DCP ingest or KDM
- ✚ Gigabit Ethernet communication board
- ✚ RAID-5 controller with 1Terabyte net storage on 4\*500Gbytes disks including one hot spare for a transparent reconfiguration in case of failure.
- ✚ Hardware firewall

### CineStore® Audi

- ✚ CineStore® Audi analogue sources switcher
- ✚ CineStore® Audi D/A converter
- ✚ CineStore® Audi galvanic insulation

### Miscellaneous

- ✚ High quality 15" robust touch screen designed for industrial applications
- ✚ Touch screen to server interface cables
- ✚ RJ-59 HD-SDI cables from server to projector
- ✚ DB25 digital audio connectors linking CineStore Solo and CineStore Audi
- ✚ DB37 GPI I/O cable
- ✚ Power supply cables

## Technical features

Feature		Functionality	Notes	
Picture format	✓	1920x1080 / 24p / 4:2:2 / 10bits		
	+	1920x1080 / 25p / 4:2:2 / 10bits		
	✖	1920x1080 / 30p / 4:2:2 / 10bits		
	+	2048x1080 / 24p / 4:4:4 / 12 bits		
	⊗	2048x1080 / 48p / 4:4:4 / 12 bits		
	✖	4096x2160 / 24p / 4:4:4 / 12 bits		
	⊗	HD Interlaced	De-interlaced to projector	
Video Outputs	✓	Single link HD-SDI		
	✓	Dual link HD-SDI		
	⊗	3D Stereoscopic double single HD-SDI signal		
	✖	Dual-Dual link HD-SDI		
MPEG2 Picture Compression	+	MPEG2 <b>MP@HL</b> , extended up to 160 Mbps	4:2:0, 8 bits, YCbCr.	
	✓	Variable Bit Rate / Constant Bit rate		
	✓	Long GOP / I only (Short GOP)	Long GOP enables up to 30% additional file size savings	
JPEG 2000 Picture Compression	✓	JPEG2000 : 2K, extended up to 250 Mbps	4:4:4, 12 bits, X'Y'Z'.	
	✓	JPEG2000 : 4K, extended up to 250 Mbps	4:4:4, 12 bits, X'Y'Z', play out in 2K	
Audio format	⊗	Uncompressed 96 kHz / 24 bits per sample	Up to 16 channels,	
	✓	Uncompressed 48 kHz / 24 bits per sample	8 channels, optional upgrade to 16 channels	
	+	Uncompressed 48 kHz / 16 bits per sample	8 channels, optional upgrade to 16 channels	
	✓	Configurable audio delay	From 0 to 3 seconds	
Audio I/O	✓	8x Unbalanced Analog Outputs (Dolby Level)	DB25 connector out of the CineStore Audi	
	+	16x Balanced Digital Outputs	Out of the Solo G3	
	+	16x Balanced Analog Outputs	Out of the CineStore Audi	
	✓	2x 8x Unbalanced Analog Inputs (Pass Through)	DB25 connector.	
	✓	Multiple sources switching	CineStore Audi remote control from the Solo Automation	
Subtitle Format	✓	TI CineCanvas™	Timed text & PNG sub-picture. Available only with DLP-Cinema projectors.	
	✖	Sub-picture overlay		
Packaging Format	✓	DCP MXF Interop (Mpeg2 & Jpeg2000)	Disney MXF Interop compliant	
	✖	DCP MXF SMPTE (Jpeg2000)		
	⊗	DVB TS		
	✓	KDM Transitional 1 SMPTE	SHA1 MXF Interop KDM not supported anymore	
Composition	✓	Multi-Reel / Multi Language / Multi Version	Reel to reel seamless splicing	
	✓	Multi Composition Sequencing	Easy pre-composed list handling (typ. advertisement)	
Ingest	✓	Ingest from media or external library	Fully automatic media and content detection	
	+	Ingest while playing	From 15 to 65MB/s, with automatic speed adaptation	
	✓	PKL, CPL, player's KDM	Signature and Hash code (SHA1,SHA256) verification	
Content Management	✓	Multiple Time Window	Possibility to extend or to get spotted projection period	
	✓	Local Import/Delete	Semi automatic	
Media	✓	CineDisk SATA	XDC Mobile Media	
	✓	e-SATA; USB2 & 1000BT Mobile Hard Drive		
	✓	DVD		
	⊗	LAN Directory Access	Through Gbit Ethernet Connection, Ingest FTP	
	✖	Media and Data Integrity Check	Media Checker	
	Forensic Marking	✓	DCI Invisible Video Forensic Marking	Philips CineFence validated
		⊗	DCI Inaudible Audio Forensic Marking	Philips CineFence currently tested
✓		MXF Interop Watermarking	PNG based	
DCI Security	✓	Secure Communication	ITM over TLS	
	✖	Secure Image Media Block, FIPS140-2 level3 certified	Ongoing certification at the NIST	
	+	Secure IMB Firmware update		
	+	Secure Logs and Audits		
	✓	Entitlement	System, Content, Key, TW with secure validation	

Legend:

+	✓	⊗	✖
New Feature	Fully validated	Under Test	Work in Progress, Future Option



The graphical user interfaces are designed specifically to ease operational constraints in the cinema booth. These are the results of years of feedback from operational people who are working with the system every day.

While operating the Digital Cinema complex, you take the most of the easy to use touch screen user interface.

Thanks to the ergonomic user interface design, even very accurate operations, like show edition can be performed through the easy to use touch screen interface.