

Precise Time Stamping

Matrox DSX SDK provides developers with several system clock sources to time stamp temporally critical operations. The operations could include real-time playout or any non real-time rendering mode with guaranteed AV synchronization. The system clocks support 23.98, 24, 25, 29.97, 30, 50, 59.94, and 60 fps frequencies for all interlaced and progressive scan formats. Within each of the system clock frequencies, video and audio data with different frame rates and resolutions can be processed and synchronized. Therefore, you can support SD, HD, 3G, and 4K, all in the same process.

Advanced Fail-Safe & Disaster Recovery

Matrox DSX hardware is controlled through our Topology API that leverages and complements our hardware capabilities. At the heart of the Topology API is the patent pending Matrox Control Engine (MCE) which controls the flow of video and audio through the system and also provides advanced failsafe capabilities. The MCE provides a sophisticated system recovery scheme with seamless transition between standard application control and failure recovery. For live production workflows, recovery can be completely glitch-free without any pipeline losses.

The hardware is controlled through groups of elements that allow a user application to ingest, playout or modify video, audio, and VANC data. These elements can be grouped in a logical fashion to form a desired workflow (topology). For ultrafast development requirements, topologies can also be saved and loaded during runtime within an application.

Easy Graphical Prototyping Tool

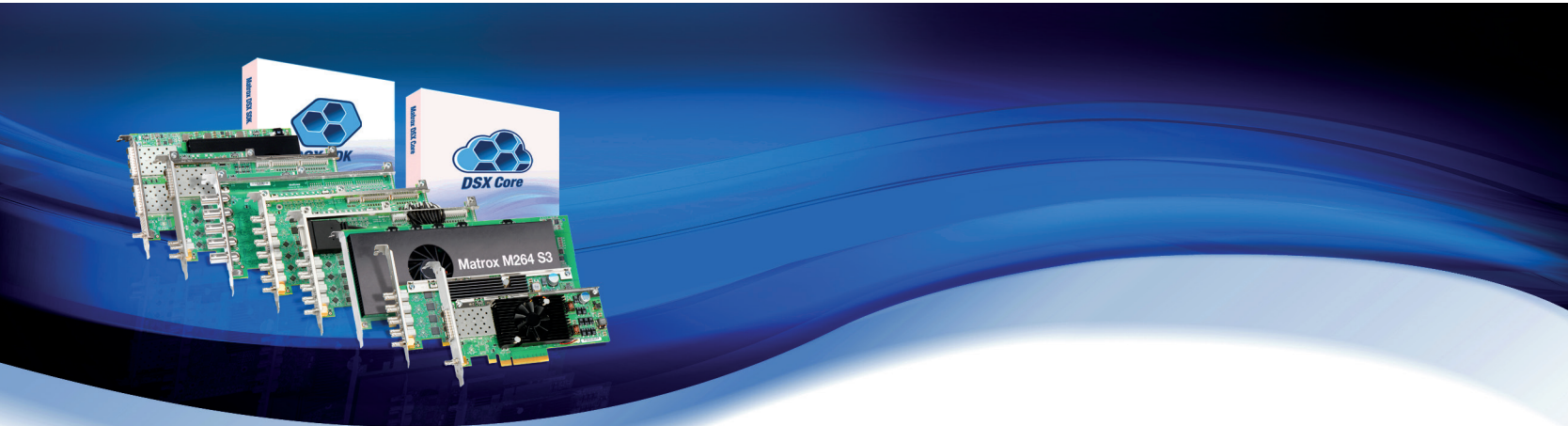
The Topology Builder application is a Java-based Windows and Linux graphical prototyping tool that is provided with Matrox DSX SDK. It visually depicts all the components in the Topology API allowing users to build their workflows in the same logical fashion as developers would programmatically code their application. Topology Builder can be used by both developers as well as those without any programming knowledge. Users can simulate and validate complex workflows even before writing a single line of code. They can simply drag and drop the components to create a workflow (topology) and test it.

Topology Builder features a powerful and versatile live window that can be used to display or monitor the video content at different stages of the workflow. The live window is capable of single pixel representation to enable identification of artifacts and other issues for debugging purposes. It also includes fill/key display, VU meters, timecode, and ancillary data, along with the ability to freeze images.

Matrox DSX Developer Products

Build on a Solid Foundation

Matrox provides reliable hardware and comprehensive software tools designed in tandem to ensure the highest, trouble-free performance. For over 40 years OEMs have depended on Matrox to create many of the world's finest broadcast graphics systems, channel-in-a-box systems, video servers and other PC-based video equipment used around the world in even the most demanding environments. Staying at the forefront of evolving broadcast technology, Matrox has helped customers navigate smoothly from analog to SDI, SD to HD then UHD, and now SDI to SMPTE ST 2110. Our investment of over a million man hours in perfecting flexible building blocks lets developers easily create a full range of products.



Hundreds of satisfied OEMs worldwide rely on Matrox technology for 24/7 on-air reliability. Our renowned engineering support ensures rock-solid products get to market faster. You're in good hands when the products you invest in are backed by a company that has been developing video technology for over 40 years.

Full Range of Hardware

Matrox DSX hardware components are designed for optimal performance, flexibility and scalability. They share a memory-centric architecture that provides high-speed transfers of video, audio and graphics data between I/O peripherals, co-processors, the CPU and host memory. Onboard DMA engines allow data transfers to occur without any intervention from the CPU. Some products also feature onboard compositors, scalers, and codecs to offload CPU or GPU processing.

Matrox X.mio5 Q25 – ST 2110 network card for IP workflows from HD to 4K

Matrox DSXLE4 IP – Multi-channel video I/O over 10 GbE

Matrox X.mio3 12G – Multi-Channel 12G SDI I/O with advanced hardware-based processing

Matrox X.mio3 IP – Multi-channel video I/O over 10 GbE with advanced hardware-based processing

Matrox M264 Family – Multi-channel 4:2:2 10-bit H.264 encoder and decoder card

Matrox X.mio3 FH - Multi-channel SD, HD, 3G and 4K SDI I/O card with advanced hardware-based processing

Matrox X.mio3 LP – Low-profile, multi-channel SD, HD, 3G and 4K SDI I/O card with advanced hardware-based processing

Matrox DSX LE4 FH - Multi-channel SD, HD, 3G and 4K SDI I/O card

Matrox DSX LE4 LP – Low-profile, multi-channel SD, HD, 3G and 4K SDI I/O

Cloud-based Media Processing Software

Matrox DSX Core - a complete set of 100% software-only modules for media processing in virtualized broadcast infrastructures based on Matrox DSX SDK. Modules include versatile file reading and writing, a large selection of software codecs and video effects, IP streaming and a precise system clock for accurate frame control and AV synchronization that is essential for real-time media processing in broadcast workflows. OEMs can easily build IP- and file-based video applications such as ingest and playout servers, channels in a box, encoders and transcoders for broadcasters and service providers to use in media datacenters.

Industry-Leading Hardware

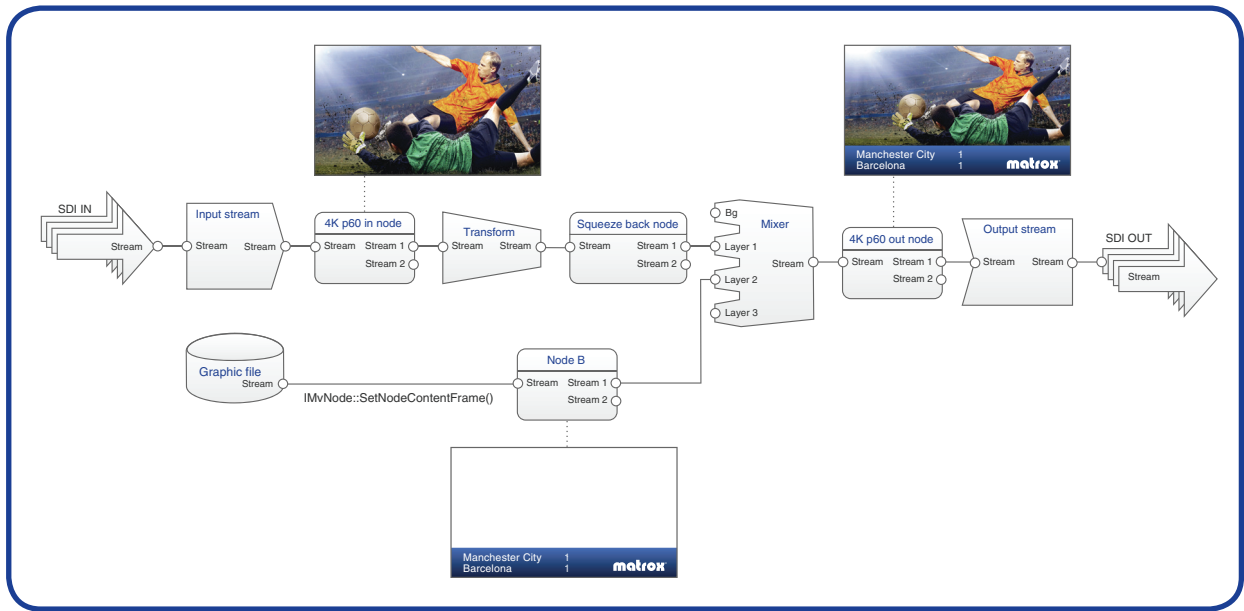
- Full range of multi-channel I/O cards (ST 2110 and SDI)
- Multi-channel 4:2:2 10-bit H.264 encoder cards
- Onboard motion adaptive de-interlacer (MADI), scaler and video mixer
- Frame synchronization with audio resampling
- HANC and VANC support
- Built-in failsafe mechanisms
- 24/7 reliability

Feature-Rich Software

- Comprehensive set of software modules
- Constantly evolving and future proof
- Vast selection of codecs
- Extensive file format support
- Advanced tools for quick app development
- Windows and Linux*
- Built on over 40 years of experience

Unlimited Development Support

- Experienced applications engineers dedicated to you
- Sample apps with source code to accelerate development
- Online developer forum
- Complete user guide and online help
- Optional training and design review programs
- Feature customization to meet your specific workflows



Realtime mixing of two UHD streams using Topology Builder for Matrox X.mio3 hardware.

* Some software modules are not supported in Linux.

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Digital Video Solutions

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Matrox DSX SDK

Be it developing dedicated hardware or virtualized IP systems, you can accomplish it all in record time with Matrox DSX SDK’s software modules. It gives you a comprehensive set of powerful development tools to build your solutions faster. Its versatile file reading and writing modules, along with a large selection of industry-standard codecs, are key components for those building video servers to ensure interoperability in any broadcast environment.

A high performance threading model is designed to make the most efficient use of host CPU and hardware processing. The sophisticated time-stamping and clocking mechanism guarantees video and audio synchronization. The GPU transfer module provides the low latency and high throughput transfers to and from GPU memory that provide the repeatable and consistent delay mandatory for live graphic-centric productions. The built-in ancillary data manipulator helps OEMs who need to handle closed captioning and time code in their applications for SD and HD. The scaler module facilitates up/down/cross and colorimetric conversions between SD and HD making it easy for OEMs who need simulcasts. A set of software video effects such as 2D DVE are provided for applications that need host processing. With the integrated IP streaming modules, you can easily implement end-to-end IP solutions.

Benefits of Matrox DSX SDK

Proven

With over 40 years of enabling successful development in live and post production, Matrox DSX SDK provides the reliability and stability that is required for mission critical on-air broadcast operations.

Complete

All the key functions are included so there is no need to patch in third-party SDKs which could result in high maintenance and instability.

Easy

A unique prototyping tool, Topology Builder, lets you test your ideas without writing a single line of code. A vast set of sample apps, with source-code, lets you model your own code, shortening development and testing.

Precise

Sophisticated, built-in system-clocking and time-stamping mechanisms in the SDK guarantee frame accurate control of all components with very fine granularity. This allows developers to maintain synchronization and frame accuracy even in complex real-time applications.

Responsive

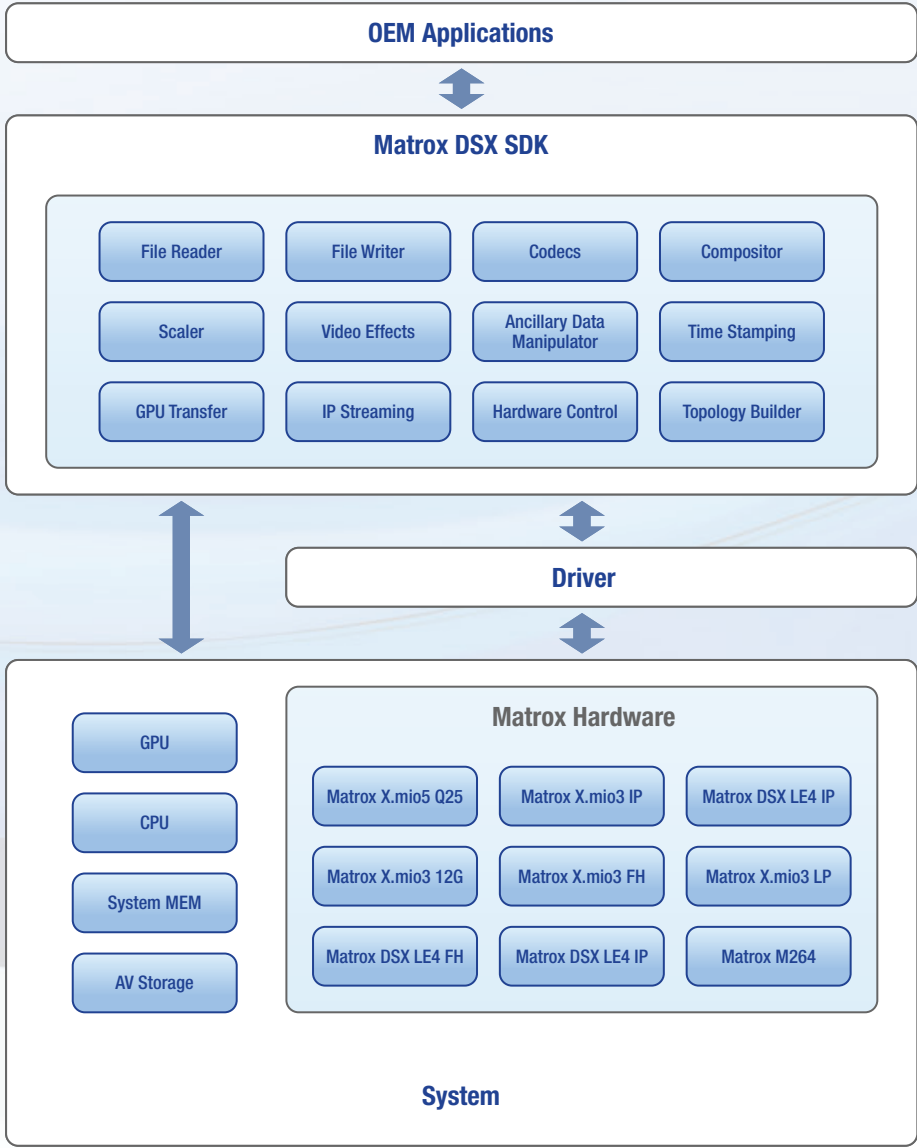
DSX SDK provides the low latency and stability required for processing graphics in live broadcast environments. Exceptional video buffer handling ensures that there are no dropped frames or glitches.

Scalable

With each new release, new feature sets are constantly added to adapt to new technologies and requirements. With a unified API and different market requirements, a single development effort allows the creation of multiple grades of products with varying features based on market needs.

Robust

Matrox Control Engine (MCE), a patent pending technology, provides higher-level, worry-free failsafe control. If the application fails, live video and audio bypass kicks in for seamless switching.



Matrox DSX SDK – Key Building Blocks for Developers

Matrox DSX SDK offers software modules that are designed to give you the widest latitude to develop cost-effective 4K, HD, and SD video products to satisfy the specific needs of your customer base.

Robust File Reader and Playlist

The Matrox File Reader module provides ready-to-use playlist capability for OEM developers to implement applications like video playout servers. The playlist function supports multiple video and audio elements, all of which can have different file and codec formats. Each video and audio element can be a whole file or part of a file (with the duration defined with trim in and trim out operations). Developers can also take advantage of the smooth scrubbing and seeking capability for searching content within the playlist.

The Matrox File Reader module can support non-standard files. To guarantee 24/7 reliability, the Matrox File Reader module undergoes automated regression tests for each software release based on a database with thousands of hours of media assets collected throughout the years from worldwide broadcasters.

Standards-Compliant File Writer

The Matrox File Writer module provides OEMs with an easy and integrated way of capturing video, audio and ancillary data (such as closed captions, AFD, timecode, etc.) to many different industry standard file formats encapsulating different codecs. Using the Matrox File Writer ensures that assets are safeguarded in industry standard compliant formats. The Matrox File Writer includes productivity tools to streamline workflows such as the appending of video and audio to existing files. This allows for significant time savings in live studio recording where costly post production steps to append and consolidate files can be avoided.

When used in conjunction with the Matrox File Reader, the Matrox File Writer simplifies complex live production workflows with the built-in support for time delay and instant replay. Time delay (TD) functions allow for file playing and capture to be done simultaneously. Instant replay (IR) functions allow for a segment of a live video capture that has already been telecast to be replayed immediately.

The combined Matrox File Reader and File Writer modules can also offer advanced capabilities for faster than real-time file transcoding, and for file consolidation without decoding and re-encoding the essence.

Extensive File Formats and Codecs

A constantly expanding selection of codecs (DVCPRO HD, MPEG-2, XDCAM HD AVC-Intra, H.264, Apple ProRes, Avid DNxHD, and more) and extensive file formats are supported (GXF, MXF, MOV, AVI, MPG, MP4, PitchBlue, and more) to meet evolving needs.

High-Performance Software Compositor

The Matrox Compositor module provides the capability to mix multiple streams (or layers) of video, animation files, or graphics into one output video stream. The compositor supports upstream compositing with video and alpha outputs, and downstream compositing as final video output.

Key features include:

- Infinite-layer compositing
- Support for YUV, YUVA and RGBA as input video formats
- Support for standard broadcast resolutions or custom resolutions (such as logos)

High-Quality Software Scaler

The Matrox Software Scaler module can perform up/down/cross conversion between broadcast or custom resolutions. It can also be used to provide smooth and graceful 2D DVE effects on video streams that are subsequently fed into a compositor. In addition, it can be used as a down-scaler to provide proxy video for preview or streaming purposes.

Key features include:

- Up/down and cross conversion
- Sub-pixel positioning and scaling for smooth motion
- 1/256 pixel accuracy in 8-bit
- 1/1024 pixel accuracy in 10-bit
- YUV 4:2:2 and YUVA 4:2:2:4

Versatile Video Effects

- High quality chroma/luma keyers for virtual studio applications
- Three-way selective color correction
- Fade, wipe and dissolve effects
- Dynamic motion control for speed changes with field or frame repeat or blending
- Timecode generator

Advanced Ancillary Data Handling

Ancillary data is as important as video in broadcast applications. Matrox DSX SDK allows seamless processing, extraction, insertion, and manipulation of ancillary data. It handles both HANC and VANC packets to cover common metadata needs of broadcasters. Matrox DSX SDK also enables conversion of VANC packets from one video standard to another, or from one specification to another (such as CEA608 to SMPTE 334 for closed captions). For example, VANC data in an NTSC clip can be converted and used for a 1080i clip.

Native SMPTE ST 2110

The new Matrox ST 2110 receiver module works with generic Network Interface Controllers (NIC) to capture video, audio and ANC data through the IP connection. This enables the capture of ST 2110 in datacenters and in virtualized environments that cannot access ST 2110 network cards.

Built-In IP Streaming

Multiple industry standard protocols are supported in the Matrox SDK including RTP and RTSP with mpeg2 TS (transport stream). RTMP sender is supported to easily stream live video to cloud and web server.

Instant NDI Connectivity

Simply add native Network Device Interface (NDI) support. This DSX SDK module enables products to find, send, and/or receive video streams over IP, with an encoding algorithm independent of resolution and frame rate supporting up to 4K, along with 16 channels (and more) of floating-point audio. This integrated module instantly facilitates connectivity and interoperability with many existing NDI devices.

Low-Latency GPU Transfer

The Matrox GPU Transfer module provides low latency and high throughput transfers to and from GPU memory. These efficient data transfers support both DirectX and OpenGL based rendering. The efficient data transfer path applies to both I/O cards and host file playback to GPU memory. The GPU Transfer module also provides a repeatable and consistent delay that is mandatory for live graphics.

Matrox DSX SDK

Formats and Codecs Supported

