

# **Matrox DSX Core**

## **Installation and User Guide**

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**Your notes**



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# 1

## **Introducing Matrox DSX Core**

This chapter provides an overview of the DSX Core product.

## Matrox DSX Core overview

Matrox DSX Core is a complete set of software modules for virtualized broadcast infrastructures based on the Matrox DSX SDK. It enables the full set of the media processing development tools of the Matrox DSX SDK including file reading/writing, memory management, IP streaming, synchronization, and the large selection of software codecs and effects in a virtual environment.

## System requirements

Matrox DSX Core is currently supported on Windows 7 64-bit and later.

## How DSX Core works

DSX Core allows developers to access the DSX SDK software modules without requiring Matrox hardware to be installed on their systems. The typical setup of DSX Core would follow a client/server model, where a DSX Core dongle is connected to a system acting as a license server for virtual machines (VMs) acting as clients.

### About the dongle

The DSX Core dongle is a small form factor USB key that offers a unique serial number. A DSX Core dongle contains one or more seats depending on the licenses purchased.



The DSX Core dongle must have a LAN/WAN connection to the VMs requesting licenses, making it usable in all private or public cloud systems. The DSX Core dongle does not need to be hosted in the same physical location as the servers hosting the VMs.

### About DSX Core licenses and seats

When you purchase a DSX Core dongle, you will need to use the Matrox dongle field upgrade website to add seats to the dongle and assign a number of DSX Core licenses (available in 32-core blocks) to those seats.

#### DSX Core license

Each license defines a DSX Core product that has a maximum number of 32 CPU cores visible to the OS. For example, one XCORE/P/500 product license allows you to run all the software modules included in this product (perpetually) on a system of 32 cores or less. The DSX Core license is the unit used to build the seats in the dongle.

#### DSX Core seat

A DSX Core seat defines one virtual or physical machine (running on one OS) that can run the Matrox SDK. A seat can have one or more DSX Core license(s) associated to it, and each seat has a unique serial number.

If you intend to use the seat on a system (physical or virtual) with more than 32 cores, you will need to purchase multiple DSX Core licenses. For example, if you want to use a seat on a system with 40 cores, you will need two DSX Core licenses, making that seat available for systems of up to 64 cores.

Field upgrading is available to create new seats or modify existing seats in an already-deployed dongle.

## License availability and expiration

Seats allow operation in perpetuity with a pre-defined term of service with SDK support and updates. After the service expiration date, the seat remains functional but no longer allows any new updates. Additional service plans may be purchased.

A VM can acquire and use a unique seat that is available on the license server. When a seat is checked out, it is not available to any other VM until it is released to the license server. As long as communication with the license server is maintained, the VM owns that seat and is free to operate for as long as necessary.

In the case where the license server and a VM lose communication, the VM will continue to operate on its checked out seat. If communication with the license server is not re-established within a grace period, the seat expires and becomes available at the license server for another VM to acquire. In the unlikely event that a VM completely disappears and cannot be retrieved or restored, the license can be manually released through a separate command line application (see “[License manager applications](#)” on page 13) that is included with the DSX Core installation program. The number of times you can manually release a license is limited.

## DSX Core system clock

Each seat provides a system clock based on NTP (Network Time Protocol) that is designed to work in VMs. It provides four (4) ticks per second for accurate frame control and A/V synchronization.

## Supported SDK software modules

DSX Core provides access to the following software modules of the Matrox SDK:

- File Reader and File Writer
- Software codecs, effects, scaler, and compositor.
- VANC manipulator
- IP streaming capability
- An NTP-based system clock
- mvTopologyBuilder sample application

For more information, see the *Matrox DSX Topology API User Guide* which is automatically installed on your computer when you install the Matrox SDK.

## Your notes

# 2

## **Installing DSX Core and configuring your DSX Core license**

This chapter explains how to install the Matrox software for using DSX Core in a server or client workflow, and how to set up your DSX Core seats.

## Installation overview

Software installation for DSX Core consists of installing the DSX Core client and/or server programs, and then configuring your DSX Core dongle with the required seats.

- 1 Read the installation prerequisites.  
See [“Installation prerequisites”](#) on page 6.
- 2 Install DSX Core client and server, either as a typical installation or silent mode.  
See [“Installing the Matrox software”](#) on page 6.
- 3 Install the Matrox DSX SDK.  
See [“Installing the Matrox SDK”](#) on page 7.
- 4 Configure your DSX Core license.  
See [“Configuring your DSX Core license”](#) on page 8.

## Installation prerequisites

Before you install the Matrox software, you must do the following to ensure a successful installation:

- Refer to the Matrox DSX Release Notes for supported operating systems and other important information.
- To install Matrox software, you must log onto an account on your Windows system that has Administrator privileges.



**Note** Matrox hardware cannot be installed on a computer using DSX Core.

## Installing the Matrox software

To install the Matrox software, do the following:

- 1 Run the DSX-TopologyUtils.exe installation program, then follow the onscreen instructions.
- 2 After you accept the license agreement, select one of the following:
  - **Matrox DSX Topology**  
This is **not** used for DSX Core. This is the typical installation for using Matrox hardware, such as an X.mio3 or DSX LE4 card.
  - **Matrox DSX Core client**  
Use this installation option for the computer that will use a DSX Core seat for SDK development. The *CodeMeter* application and the *mvLicenseManager* application will also be installed.
  - **Matrox DSX Core server**  
Use this installation option for the computer that will function as the license server for the other computers that will use the DSX Core seats. The



*CodeMeter* application and the *mvLicenseManager* application will also be installed.

- 3 Click **Next** to continue with the installation.
- 4 Click **Finish** when complete.

The Matrox software is installed.

## Installing the Matrox software in silent mode

When launched with the */silent /dsxcoreclient* or */silent /dsxcoreserver* command line switch, the only thing displayed to the user during the installation is the progress bar. All prompts and messages are bypassed. If needed, your system is automatically restarted when the installation is complete. Silent mode is useful when you do not have a user present to confirm the various prompts that appear during a standard installation. For example, you can use silent mode to install the Matrox software on multiple systems over a network.

### Remarks

- On certain Windows systems, you must disable User Account Control before attempting silent mode installation.
- Although the Matrox DSX License Agreement is only displayed during a standard installation, acceptance of the agreement is implied when installing in silent mode.

## Installing the Matrox SDK

After you install the Matrox software (see [“Installing the Matrox software”](#) on page 6), you must install the Matrox SDK. You can run either SDK installation program (*DSX.sdk.exe* or *DSX-TopologySdk.exe*) as they will both be used for developing DSX Core-based applications.

To access the related Programming Reference Library online Help and the compiled source code for the DSX sample applications included in the Matrox SDK installation, you must have Microsoft Visual Studio installed on your computer.

- 1 Run *DSX.sdk.exe* or *DSX-TopologySdk.exe*.
- 2 Follow the onscreen instructions to complete the installation of the Matrox SDK on your computer.

The Matrox SDK is installed.

## Configuring your DSX Core license

When you initially purchase DSX Core, the dongle is not yet configured for DSX development. You must use the Matrox Dongle Field Upgrade website to add DSX Core seats and assign licenses to those seats. After you create the seats, you will receive an update file that you will use to update the DSX Core dongle. For more information on this process, see the application note *Dongle field upgrade procedure (Configuring DSX Core Licenses)* on our [website here](#).

## Uninstalling the Matrox software

You can remove the Matrox software or Matrox SDK by choosing the “Uninstall” option that is available for each component in the start menu.



**Note** Make sure to close all running applications, especially Google Chrome, before uninstalling. Otherwise, you will be forced to reboot your system.

On a Windows 10, Windows 8.1, or Windows Server 2012 system, the tiles for uninstalling the Matrox software and SDK may not be added to the Apps view. If this occurs, you can uninstall as follows:

- 1 In Control Panel, switch to Small icons view, then choose **Program and Features**.
- 2 Choose the Matrox DSX-TopologySdk or Matrox DSX-TopologyUtils.
- 3 Click **Uninstall**, then click **Next**.
- 4 After Matrox DSX-TopologySdk or Matrox DSX-TopologyUtils has been successfully removed from your computer, click **OK**.

The software is uninstalled from your computer.

# 3

## **Getting Started with DSX Core**

This chapter explains what to do after the installation is complete, and explains how to get started with DSX Core development.

## Getting started with DSX Core development

After you have installed DSX Core and configured your DSX Core dongle, you will have access to the software-based modules of the Matrox DSX SDK.

This section provides the basic information you will need to get started, but you will need to refer to the *Matrox DSX Topology API User Guide* for more details. You can also access the *Matrox DSX Topology API Programming Reference Library* online help from within Visual Studio.

## Working with the interfaces

The main interfaces used to control DSX Core with the DSX Topology API are the **IMvSystemConfiguration** and **IMvCardConfiguration** interfaces. The **IMvSystemConfiguration** interface is the entry point to the DSX Topology API. The **IMvCardConfiguration** interface is obtained using an enumerator, and gives access to the services needed to control a DSX Core seat.

### Acquiring the system and card configuration interfaces

To acquire the **IMvSystemConfiguration** and **IMvCardConfiguration** interfaces:

- 1 Call the **::CoCreateInstance()** method using the class ID *CLSID\_MvSystemConfiguration* to acquire the **IMvSystemConfiguration** interface.
- 2 Call the **IMvSystemConfiguration::CreateCardEnumerator()** method to enumerate DSX Core seats in the system.
- 3 Call **IMvSystemConfigurationCardEnumerator::Next()** to obtain a pointer to the **IMvCardConfiguration** interface for a specific DSX Core seat.
- 4 Check that each card configuration interface (**IMvCardConfiguration**) is controlling the appropriate DSX Core seat by calling **IMvCardConfiguration::GetCardInformationCount()** and **IMvCardConfiguration::GetCardInformation()**.
- 5 Repeat steps 3 and 4 until the call to **IMvSystemConfigurationCardEnumerator::Next()** returns *MV\_E\_END\_OF\_ENUM*.

The user application must retain the pointer to the **IMvSystemConfiguration** interface, and the **IMvCardConfiguration** pointers for the DSX Core seats that you want to configure. Multiple processes on a VM can use the same DSX Core seat.

## Obtaining a Flex Engine for processing buffers using the card configuration interface

If you would like to use buffers that were obtained from the Matrox DSX.sdk, a Flex Engine is required for processing these buffers. The Flex Engine is the central module in the Matrox DSX.sdk and the **IMvFlexEngine** interface provides the user application with the methods to gain access to all of the Flex modules and components. For more information, see the *Matrox DSX.sdk User Guide*.

To obtain a Flex Engine, the user application must first acquire the **IMvCardConfiguration** interface from the Flex Engine you would like to obtain as follows:

```
TMvSmartPtr<IMvCardConfiguration> pJCardConf;
    // Acquire the correct card configuration interface by enumerating all the
    // card configuration interfaces in the system configuration.
```

Once this is done, the user application can query for the Flex Engine as follows:

```
TMvSmartPtr<IMvFlexEngine> pJFlexEngine;
oHr = pJCardConf->QueryInterface(IID_IMvFlexEnginePrivate,
(void**)&pJFlexEngine);
```

### Remarks

- When a Flex Engine is obtained in this way, the resolution of the Flex Engine will always be NTSC.
- If you need to create surfaces, use **IMvFlexEngine::CreateSurfaceEx()** to get the correct scan mode.
- The Flex Engine modules will work in any resolution no matter the resolution of the Flex Engine.

## Creating system topologies

Once the **IMvSystemConfiguration** and **IMvCardConfiguration** interfaces have been acquired, and the pointer for the DSX Core seat that you want to configure has been retained, you can create a system topology for that seat.

The system configuration interface, **IMvSystemConfiguration**, allows the user application to create new system topologies and enumerate existing system topologies. You create a system topology using the **IMvSystemConfiguration::CreateSystemTopologyEx()** method, and the **IMvSystemConfiguration::CreateSystemTopologyEnumerator()** method allows the user application to enumerate the already created system topologies. Once a system topology is created, the **IMvSystemTopology** interface is used to create the nodes and streams to be able to modify video, audio, and VANC data. For more information, see *Matrox DSX Topology API User Guide*.

### Implementing a system clock

DSX Core uses the universal clock (**IMvSystemClockUniversal**) from the DSX system clock, which is implemented and controlled by the **IMvSystemClock** interface. However, the universal clock must be created before creating the system topology. Otherwise, it will not be available for selection when the system topology is created. The universal clock is created by calling **IMvSystemConfiguration::CreateUniversalClock()**. For more information on the universal clock and how to implement it, see the *Matrox DSX Topology API User Guide*.

### Releasing DSX Core seats

A DSX Core seat is released when all processes on a VM have released the Flex Engine interfaces (if used), the card configuration interfaces, and the system configuration interfaces, and destroyed all topologies associated to that seat.

## DSX Core sample application

The *mvSimpleDSXCoreTopologies* sample application has been created to demonstrate how to get started with DSX Core. It demonstrates how to create a DSX Core profile and how to instantiate a universal clock.

After you install the SDK, all the Matrox sample applications including this one can be found at the default location *C:\Program Files\Matrox DSX-TopologySdk\Bin*.

## License manager applications

There are two separate but related applications available for managing DSX Core licenses:

- **mvLicenseManager** A command line application that allows you to directly control the DSX Core server and modify the available seats. See “Using [mvLicenseManager](#)” on page 13.
- **mvslLicenseManager** A sample application included with the license manager API that you can use to develop your own applications for managing licenses. See “Using [mvslLicenseManager](#)” on page 14.

### Using mvLicenseManager

The application *mvLicenseManager* is automatically installed when you install the DSX Core server or client. It is located in the folder *C:\Program Files\Matrox\DSX-TopologyUtils\System64*.

To start the application you must run it from the command line. Type any of the following commands and press **ENTER** to execute it:

- **list**  
List all the seats on the network and their availability.
- **listlocal**  
Lists all the seats on the local machine and their availability.
- **rl**  
Similar to **listlocal** but with the added option to manually release a reserved seat.
- **updatedongle -f=file**  
Allows you to update a DSX Core dongle with a RAU (remote activation update) file obtained from the Matrox OEM update website.  
Type **updatedongle -f=file** where the *file* parameter represents the absolute path to where the RAU file is located on your computer or network. For example, if you have the file on your computer at the location *C:\RAU file\<filename>*, you would type *updatedongle -f=C:\RAU file\<filename>*.
- **showserverlist**  
Lists the servers that are specified for use with DSX Core client machines.
- **setserverlist -l=ip\_address1,ip\_address2...**  
If your DSX Core client machines are on a different subnet than your server machines, use this option to specify the server IP addresses so the client machines can see them.  
For example, if you want the IP addresses 192.168.12.34 and 192.168.45.67 to act as servers you would type

**setserverlist -l=192.168.12.34,192.168.45.67** and press **ENTER**. You can add as many IP addresses as you want as long as you follow the proper syntax (IP addresses separated by commas).

- **setserverlist -c**

Clears the list of servers that you have specified for use with DSX Core client machines. You cannot clear specific servers. This command clears **all** servers.

## Using *mvLicenseManager*

The application *mvLicenseManager* is a sample application used to demonstrate the capability offered with the public interface **IMvfDSXCoreLicenseManager** and companion structure **SMvLeaseInfoPublic**. You can use this interface and structure to develop your own application for DSX Core license management.

The methods in this interface provide much of the same functionality as the standard *mvLicenseManager* application (see “[Using mvLicenseManager](#)” on page 13), but not all the same commands are available. The available methods in the **IMvfDSXCoreLicenseManager** interface are:

- **Reset()**
- **Next()**
- **Skip()**
- **UpdateKeyWithRaUFile()**
- **SetServerList()**
- **ClearServerList()**
- **GetServerCount()**
- **GetServerAt()**

More information on these methods and their companion structure is available in the C++ header files *MvFlexAPI.h* and *mvDefinitions.h* that are included with the DSX SDK. You can view these header files in the *Matrox DSX Topology API Programming Reference Library* online help (see “[Where to find more information](#)” on page 15).



## Where to find more information

The Matrox DSX documentation is in PDF format (get Adobe Reader [here](#)), and is available in the following places:

- In the “Documentation” folder on the FTP site where you download the DSX drivers and installation programs.  
The documents available on the FTP site are a portion of the complete set of documents available to you when you install the SDK. We have included on the FTP site only the documents you’ll need to get started.
- After you install the DSX-TopologySdk, additional DSX documentation is available on your machine at the default location *C:\Program Files\Matrox DSX-TopologySdk\Documentation*.
- You have access to the *Matrox DSX Topology API Programming Reference Library* online help from within Visual Studio.

## Where to find technical support

If you require assistance with any aspect of Matrox DSX development, our OEM application engineers are standing by to help you. Contact them at <http://www.matrox.com/video/en/support/developer/private/>.

**Your notes**

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