

New!

Avid Media Composer 3.0 support
for inexpensive HD monitoring



matrox MXO™

Monitor • Output • Convert

Product Guide / Release 2.1 / August 2008



matrox
Digital Video Solutions

Table of contents

Key features	3
Inexpensive HD monitoring	4
Interlacing artifact elimination	4
DVI monitor calibration	5
Super black and super white monitoring on the DVI display	5
Pixel-to-pixel mapping on the DVI display	5
“Virtual bezel” on the DVI display	6
Monitor HD projects on your SD monitor	6
Frame-accurate, broadcast-quality HD/SD output	7
Frame accurate output	7
Realtime HD to SD downscaling	7
Genlockable HD/SD scan conversion for flicker-free video output of your computer desktop	8
Avid Media Composer 3.0 support	8
Region of interest	8
How does Matrox MXO work?	9
Mastering Mode video output resolutions	9
Presentation Mode video resolutions	9
Specifications	10

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Matrox MXO is a versatile, all-in-one monitoring, output, and scan conversion device for the Mac that you'll use in many different ways. Because it's small and portable, it makes your laptop a mobile editor. And because it's hot swappable, you can easily move it to any workstation in your facility.

Matrox MXO is ideal for:

- Inexpensive HD monitoring
- Frame-accurate, broadcast-quality HD/SD output
- Genlockable HD/SD scan conversion for flicker-free video output of your computer desktop

Key features

- Inexpensive HD and SD monitoring – now you can trust your Apple Cinema Display or other DVI monitor, even for color grading
- Frame accurate, broadcast-quality audio/video output in HD and SD with guaranteed a/v sync
- Genlockable HD/SD SDI, HD/SD analog component, Y/C, and composite outputs with up to 8 channels SDI embedded audio output and stereo audio monitoring
- Realtime downscaling of HD projects to SD resolution with proper color space and aspect ratio conversion for monitoring and output
- WYSIWYG video output from QuickTime-based applications
- Genlockable HD/SD scan conversion for flicker-free video output of your computer desktop with any application
- Portable, hot-swappable versatility

Inexpensive HD monitoring

Matrox MXO turns your Apple Cinema Display or other DVI monitor into an artifact-free, true-color video display you can trust, even for color grading. It's packed with features that make it the ideal monitoring solution for Final Cut Pro, Apple Color, Adobe After Effects, and other QuickTime-based applications. You won't need to buy expensive HD monitoring equipment or the SDI-to-DVI converter required for preview with some I/O cards. In addition MXO's realtime downscaling feature also lets you view your HD projects on an SD monitor.

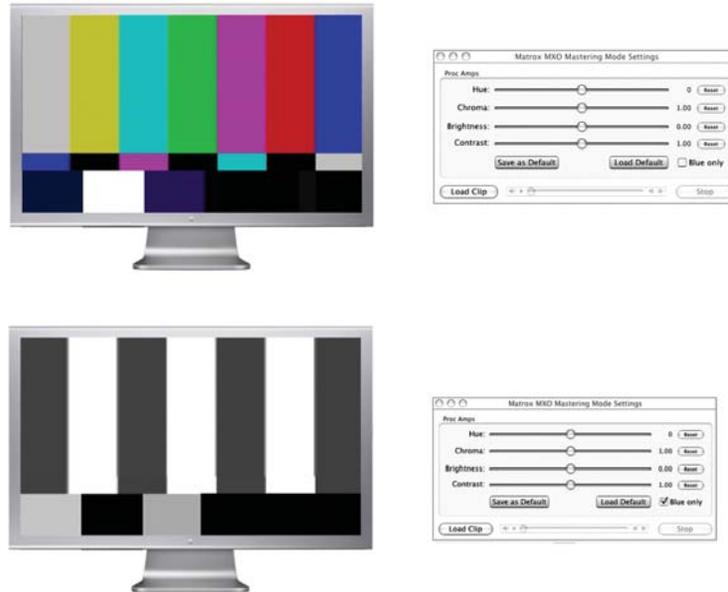


Interlacing artifact elimination

When scaling your video to full-screen to match the resolution of your display, MXO uses a special interpolation technique rather than simple line doubling to provide the best possible viewing experience without "jaggy" aliasing artifacts. If you preview interlaced video on your computer display, you've no doubt noticed tearing due to interlacing artifacts in the displayed image. The progressive display inherent in computer monitors is ideal for graphics, but when it comes to displaying interlaced video you see those annoying artifacts. Matrox MXO solves this problem, letting you enjoy artifact-free previews.

DVI monitor calibration

Matrox MXO lets you adjust and control your DVI monitor exactly like you would a broadcast HD/SD monitor. Controls for hue, chroma, contrast, brightness, and blue-only are provided. This unique control gives you completely accurate color representation so that you can use your ACD or DVI monitor even for color grading.



Super black and super white monitoring on the DVI display

Matrox MXO provides super black and super white monitoring, expanding your viewable color range.

Pixel-to-pixel mapping on the DVI display

Matrox MXO provides user-selectable 1:1 pixel mapping, providing accurate monitoring on your DVI display in the following resolutions:

- 720x486 (NTSC)
- 720x576 (PAL)
- 1920x1080
- 1280x720



“Virtual bezel” on the DVI display

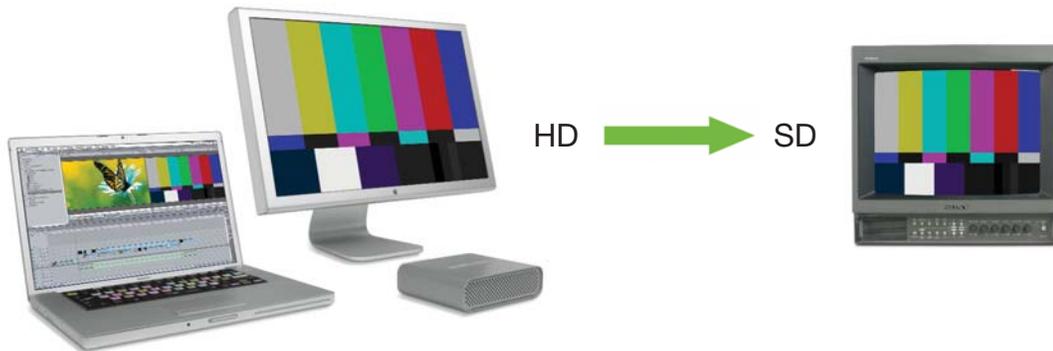
Matrox MXO lets you select a pre-defined resolution to mimic the monitor bezel found on all TVs. For example, this feature can be used to simulate a safe title area so you can check title placement on your DVI monitor. You can create your own bezel or select from the following resolutions:

- 720x486 (NTSC)
- 720x576 (PAL)
- 1920x1080
- 1280x720



Monitor HD projects on your SD monitor

Matrox MXO provides realtime HD to SD downscaling so that you can use your SD monitor to preview and/or record an SD master of your HD project in real time. MXO provides proper conversion of the HD color space to the SD color space and proper aspect ratio conversion to anamorphic, letterbox, and center cut. The scaling is done in hardware, placing no burden on the CPU and GPU, so you have more processing power available for your application.



Frame-accurate, broadcast-quality HD/SD output



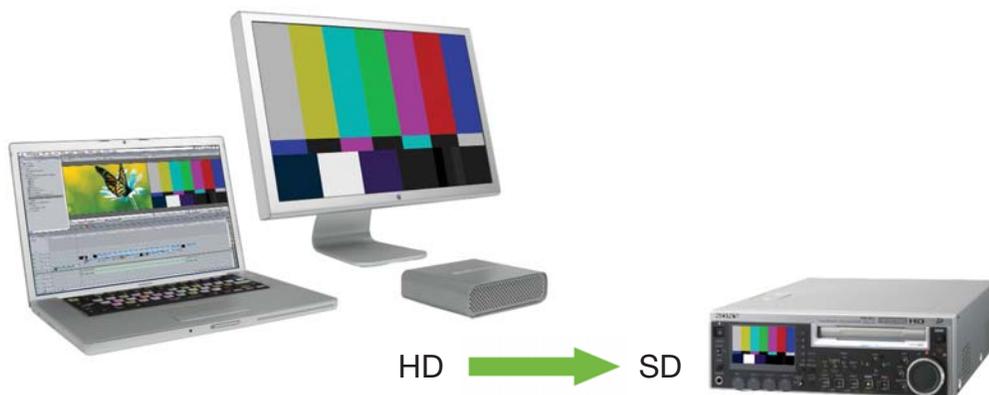
Frame accurate output

Matrox MXO provides frame accurate output for all QuickTime-based applications that support the V-out component including Final Cut Pro, Color, Soundtrack Pro, Motion, and Adobe After Effects. It features genlockable HD/SD SDI with up to 8 channels of embedded audio, HD/SD analog component, Y/C, and composite outputs, and stereo audio monitoring. Genlock timing offset controls can be used to align your video output relative to your external genlock source to compensate for cable delays within your facility. Simultaneous SDI and analog outputs in HD or SD let you view your project on a broadcast video monitor and record to tape at the same time. A third-party RS-422 adapter is required for deck control.



Realtime HD to SD downscaling

Matrox MXO provides realtime HD to SD downscaling so that you can record an SD master of your HD project in real time. MXO provides proper conversion of the HD color space to the SD color space and proper aspect ratio conversion to anamorphic, letterbox, and center cut. The scaling is done in hardware, placing no burden on the CPU and GPU, so you have more processing power available for your application.



Genlockable HD/SD scan conversion for flicker-free video output of your computer desktop

Matrox MXO is a high-quality scan converter that is genlockable, with timing offset controls. In "Presentation Mode", it mirrors the contents of your secondary desktop and displays it as high quality SDI and analog video simultaneously. This mode can be used, for example, to record, display, or broadcast Keynote and PowerPoint presentations or web browser sessions such as Google Earth. It can also be used to create software application training. A flicker reduction filter ensures solid, stable video output. The system's audio playback will be routed to the analog audio outputs and to all stereo pairs in the embedded SDI signal.

One-to-one pixel mapping is provided in HD for optimal desktop recording. In SD, MXO lets you map from 640x480 to 720x486 (NTSC) and 800x600 to 720x576 (PAL).



Avid Media Composer 3.0 support

Matrox MXO gives Avid editors a very low-cost HD monitoring solution. In Presentation Mode you simply connect the HD component or SDI output of the MXO to an HD monitor. You also have the flexibility to print preview copies of your project to tape simultaneously.

Region of interest

MXO also lets you select a region of interest of any size within a larger resolution and have that window output for broadcast or recording. Presets for NTSC, PAL, 720p, and 1080i/PsF are provided.



How does Matrox MXO work?

When Matrox MXO is used with QuickTime-based applications that support the V-out component including Final Cut Pro, Color, Soundtrack Pro, Motion, and Adobe After Effects, it operates in "Mastering Mode". Matrox MXO patent-pending technology uses the DVI port on your Mac computer in a unique way to provide frame-accurate audio/video output for insert editing and print-to-tape with guaranteed a/v sync. Normally when previewing video from a QuickTime application, the native YCbCr video (sometimes inaccurately called "YUV" video) is converted to the RGB color space for output over the DVI connection. The frame rate of the RGB video does not match the standard for broadcast video. For example, it may be 75 Hz rather than the 59.94 Hz standard for NTSC. The frame sequence, therefore, inevitably includes dropped and/or repeat frames. Matrox MXO, on the other hand, takes the YCbCr video from the QuickTime application and sends it directly out over the DVI connection with time-stamping information that allows the MXO box to reconstruct the frame sequence at the broadcast standard frame rate. It also sends eight digital audio tracks that are then embedded in the SDI signal in perfect sync with the video.

Mastering Mode video output resolutions

The following video output standards are supported:

Editing	Output	Downscaled output
NTSC	NTSC	N/A
PAL	PAL	N/A
720p at 23.98 fps	720p at 59.94 fps	NTSC
720p at 25 fps	720p at 50 fps	PAL
720p at 29.97 fps	720p at 59.94 fps	NTSC
720p at 50 fps	720p at 50 fps	PAL
720p at 59.94 fps	720p at 59.94 fps	NTSC
1080p at 23.98 fps	1080PsF at 23.98 fps	N/A
1080p at 23.98 fps (at 29.97 fps)	1080PsF at 29.97 fps	NTSC
1080p at 25 fps	1080PsF at 25 fps	PAL
1080p at 29.97 fps	1080PsF at 29.97 fps	NTSC
1080i at 25 fps	1080i at 25 fps	PAL
1080i at 29.97 fps	1080i at 29.97 fps	NTSC

Presentation Mode video resolutions

Recommended desktop display resolutions for optimal results:

- 640x480 for NTSC
- 800x600 for PAL
- 1920x1200 for 1080i
- 1280x800 for 720p

Supported video output resolutions:

- CCIR 601 NTSC 720x486 interlace at 29.97 frames/sec.
- CCIR 601 PAL 720x576 interlace at 25.00 frames/sec.
- HDTV 1920x1080 interlace at 29.97 frames/sec.
- HDTV 1920x1080 interlace at 25.00 frames/sec.
- HDTV 1280x720 progressive at 59.94 frames/sec.

Specifications

General

Universal compatibility

Intel- and PowerPC-based computers and laptops

Video standards

NTSC, PAL, NTSC-EIAJ, 1080i, 1080p, 720p

Regulatory compliance

FCC Class A, CE Mark Class A, C-Tick Mark, VCCI
RoHS Directive 2002/95/EC

Dimensions

134mm (L) × 161mm (W) × 45mm (H)

External AC/DC adapter

100-240 VAC 50-60 Hz
Input: IEC320-C8 inlet
Output: +5V DC, 3A max., 2.5mm barrel type
Dimensions: 95mm (L) × 54mm (W) × 32mm (H)

Total power consumption

10 watts

Connections

DVI input and output

DVI-I (single-link) 29-pin female connector

Genlock reference input

SD analog black burst (bi-level) or HD tri-level sync
BNC connector (75 Ω), terminated
Timing offset controls provided

SDTV SDI output

SD-SDI with 8 channels of embedded SDI audio
24-bit, 48 kHz
BNC connector (75 Ω)
Compliant with SMPTE 259M-C, SMPTE 272M

SDTV S-Video & composite video output

PAL, NTSC, NTSC-EIAJ
Frequency response: +/- 0.25 dB max to 5 MHz
2T pulse response: 0.5% max
Diff. Gain and Diff. Phase: < 2%
BNC connectors (75 Ω)

SDTV analog component video output

Betacam, Betacam SP (NTSC & NTSC-EIAJ)
SMPTE/EBU N10 (PAL)
Frequency response Y: +/- 0.25 dB max to 5 MHz
Frequency response Pb, Pr: +/- 0.2 dB max to 2 MHz
Component channel delay: +/- 3ns
Component S/N (Y, Pb, Pr): > 54 dB, unified weighted
BNC connectors (75 Ω)

HDTV SDI output

HD-SDI with 8 channels of embedded SDI audio
24-bit, 48 kHz
Compliant with SMPTE 292M, SMPTE 299M
BNC connector (75 Ω)

HDTV analog component video output

Supported video formats: 1080i 50, 1080i 59.94, 720p 59.94
Compliant to EIA-770.3
Frequency response Y: +/- 0.3 dB max to 28 MHz
Frequency response Pb, Pr: +/- 0.4 dB max to 14 MHz
Component channel delay: +/- 0.5 ns
Component S/N (Y, Pb, Pr): > 57 dB, unified weighted
BNC connectors (75 Ω)

Accessories

MXO cable – DVI and system audio
loop-through, 1 meter
External AC-DC adapter
Power cord
Y/C video adapter