



matrox MXOTM

A must-have for Final Cut Pro users!
Portable broadcast-quality audio/video output for the Mac

Product Guide / November 2006



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Matrox MXO connects to your Mac computer or laptop to provide broadcast-quality audio/video output. You can view your Apple Final Cut Pro projects or the output of other QuickTime-based applications such as Apple Soundtrack Pro and Motion, as well as Adobe After Effects as they will actually appear on TV and record them frame accurately to tape with perfect a/v sync – no drop frames, no repeat frames. Other cool features that save you time and streamline your editing workflow include realtime HD to SD downscaling, and hardware acceleration of DVCPROHD, HDV, and Dynamic RT segments to full output resolution so Final Cut Pro can do more for you in real time. As an added bonus, Matrox MXO also provides flicker-free output of your computer desktop so you can easily broadcast and record Keynote and PowerPoint presentations, web browser sessions, and software application training.

Matrox MXO is a cost-effective external box that's easy-to-use and portable. It will save you so much time, you'll wonder how you ever worked without it!

Key features

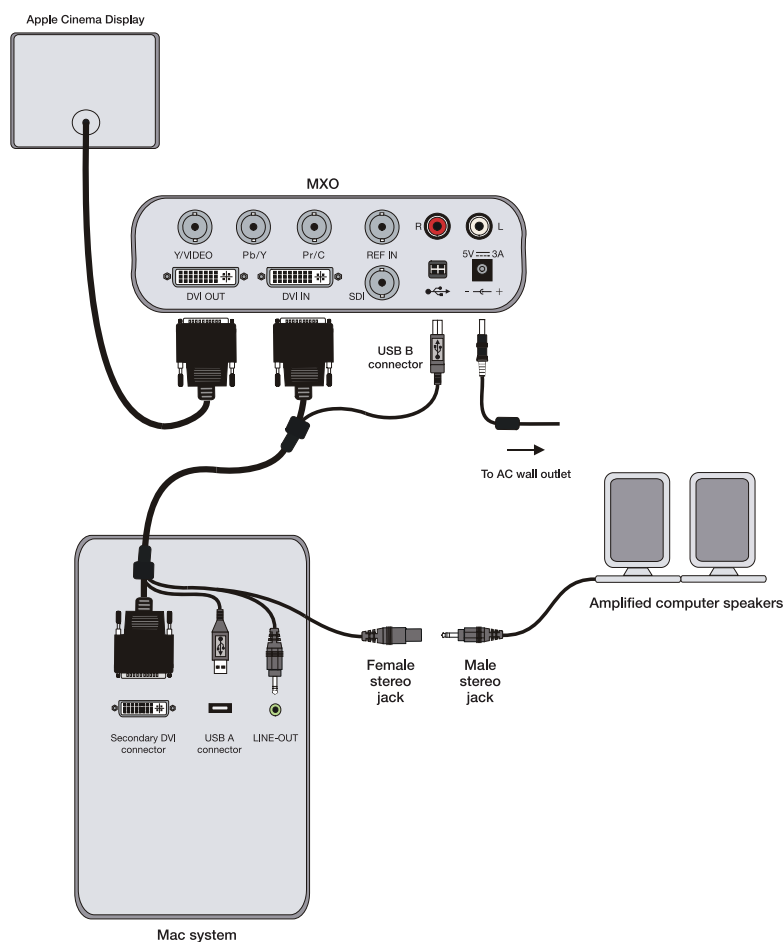
- Frame accurate, broadcast-quality audio/video output in HD and SD with guaranteed a/v sync
- Universal compatibility – designed to run on both Intel- and PowerPC-based Mac computers and laptops
- Portable, hot-swappable external box
- Realtime downscaling of HD projects to SD resolution with proper color space conversions
- Inexpensive HD and SD monitoring – interlacing artifact elimination and gamma correction when previewing video on a Cinema Display or other DVI monitor
- Hardware acceleration of DVCPRO HD, HDV, and Final Cut Pro Dynamic RT segments to full output resolution to save processing power for other operations
- 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
- Flicker-free, broadcast-quality video output of your computer desktop with any application



Connecting Matrox MXO to your Mac

Matrox MXO is an easy-to-use external box. It does not occupy a precious slot in your computer and it has its own power supply. It is also hot swappable, so it can be easily moved from one station to another. MXO provides universal compatibility with PowerMacs, iMacs, and laptops that have a DVI connector. It is more versatile than an I/O card because it works with PCI-X PowerMacs and the newer PCIe PowerMacs. It also supports SDI cable lengths needed for broadcast facilities (300 meters in SD, 100 meters in HD). Please visit the support section of the Matrox website for a complete list of compatible devices.

Matrox MXO lets you connect multiple devices for simultaneous output. The MXO cable, included in the kit, connects MXO to your Mac.



MXO connections

- DVI input
- USB input (for control)
- Analog genlock input
- Power input
- DVI output (drives secondary Apple Cinema Display or other DVI monitor)
- Left and right RCA stereo output
- Your choice of one of the following output combinations:
 - HD SDI (SMPTE 292M) output with embedded audio and simultaneous analog component HD output
 - SD SDI (SMPTE 259M) output with embedded audio and simultaneous analog component SD output
 - SD SDI (SMPTE 259M) output with embedded audio and simultaneous Y/C and composite output

“Mastering Mode” workflow enhancements for Final Cut Pro and other QuickTime applications

Using Matrox MXO in “Mastering Mode” lets you enjoy artifact-free previews and is the easiest way to get video out of Final Cut Pro or other QuickTime-based applications when you’re looking for an alternative to FireWire. It offers many workflow enhancements that will improve your editing and content creation experience.

Frame accurate recording

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 repeat frames. The Matrox MXO driver, 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. 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.



Matrox MXO provides frame-accurate video output for insert editing and print-to-tape with guaranteed a/v sync.



Matrox MXO lets you drive video monitors and VTRs directly from your laptop.

Realtime downscaling of an HD project to SD resolution

Matrox MXO features broadcast-quality NTSC and PAL output of downscaled HD projects 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. The scaling is done in hardware, placing no burden on the CPU and GPU, so you have more processing power available for your application.

Inexpensive HD and SD monitoring

If you use your desktop monitor for previewing video (i.e. Apple's Digital Cinema Mode [Apple Key (Command) + F12] in Final Cut Pro), Matrox MXO improves your experience in two ways. It provides high quality scaling of your video to match the native resolution of your display and it eliminates interlacing artifacts. 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 fact, MXO provides better HD video definition with pixel-to-pixel mapping on a flat panel (1920 x1200) than you will get on a more expensive professional HD monitor which is typically limited to approximately 800 lines of resolution.

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 cleans up the signal so you enjoy artifact-free previews in 4:3 and 16:9. It also provides hardware gamma correction so you see the correct brightness on your screen. You can easily view your work to ensure proper aspect ratio and verify exact color temperature.



Your video previews never looked so good! Matrox MXO eliminates interlacing artifacts and provides high-quality video scaling to match the native resolution of your display.

Hardware acceleration of DVCPRO HD and HDV to full output resolution

Matrox MXO accelerates DVCPRO HD and HDV to full output resolution saving processing power for other operations so you get better realtime performance from your digital content creation applications.

Codec	Native resolution	Output resolution
DVCPRO HD NTSC	1280 x 1080	1920 x 1080
DVCPRO HD PAL	1440 x 1080	1920 x 1080
DVCPRO HD 720p	960 x 720	1280 x 720
HDV	1440 x 1080	1920 x 1080

Hardware acceleration of Dynamic RT segments to original frame size

In Dynamic RT editing mode, Final Cut Pro automatically reduces frame size to let you preview non-realtime segments of your project at a better frame rate. With the MXO hardware upscaler, these segments are accelerated to their original frame size, saving processing power for other Final Cut Pro operations, so you get better realtime performance.

Mastering Mode editing resolutions

HD			NTSC	PAL
DVCPRO HD 720p 23.98 (59.94 output)	DVCPRO HD 1080i 25	HDV 1080i 25	NTSC DV	PAL DV
DVCPRO HD 720p 59.94	HDV 720p 29.97 (59.94 output)	HDTV 1080i 29.97	NTSC DV50	PAL DV50
DVCPRO HD 1080i 29.97	HDV 1080i 29.97	HDTV 1080i 25	NTSC DVCPRO	PAL DVCPRO

Supported output resolutions in Mastering Mode

- 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.

“Presentation Mode” for flicker-free video output of your computer desktop

In “Presentation Mode”, Matrox MXO 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. It can also be used to create software application training. MXO will downscale the desktop resolution to the video output format you select. If the desktop resolution is smaller than the video output format, it will be presented centered on the video output. 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.

Recommended desktop display resolutions in Presentation Mode

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

Supported video output resolutions in Presentation Mode

- 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.

System requirements

Please visit the support section of the Matrox website for lists of compatible devices.

Specifications

General

Universal compatibility

Intel- and PowerPC-based computers and laptops

Video standards

NTSC, PAL, NTSC-EIAJ, 1080i, 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

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