



Avid Editing Systems & Pro Tools Interoperability

The Industry's Leading Audio Workflows

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Introduction

Nothing sells a story like a great sound track. Over the past decade, Avid and Digidesign have worked together to provide the industry's most complete and flexible audio workflows. Whether you work in an Avid Unity™ environment with Pro Tools and Media Composer® directly connected, or whether a Wide Area Network (WAN) separates picture editorial and the audio house, Avid has you covered.

Audio workflows can be surprisingly complex. Many factors must be considered when designing audio workflows:

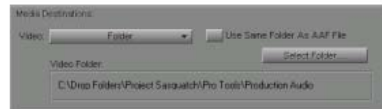
- Project Formats – How are SD and HD workflows supported? Are 24 frame projects supported?
- Video Media – What video media CODECs are supported?
- Video Metadata – What information about the video cuts is provided? How is this displayed in Pro Tools?
- Audio File Formats – Which audio formats are supported?
- Audio Parameters – What audio information comes across? Is it possible for the Pro Tools user to “inherit” the rough mix created by the Avid picture editor?
- Interconnection and Storage Configurations – What workflows are best for “sneakernet,” LAN and WAN interconnection? Can audio and video files be shared in real time on storage servers?
- Ease of Workflow – How many steps does it take to send audio and video data between systems?
- Workflow Reliability and Repeatability – Is it possible to create workflow “macros” for repeatability? Are iterative workflows supported?

The good news is that Avid takes all these facets into consideration when designing and testing audio workflows. Whatever angle you look at, no other vendor provides the depth and breadth of audio post production workflows that Avid provides today. Avid Media Composer includes a comprehensive export window that streamlines audio workflows across the board. Features include:

- Copy/Consolidate to Any Directory – Makes “sneakernet” and LAN workflows simpler than ever
- DigiDelivery Integration – Enables bulletproof WAN workflows
- Audio and Video Mixdown During Export – Ensures that the intent of the Avid picture editor is conveyed fully to the Pro Tools operator
- Export Follows Mark In/Out and Selected Tracks – Allows the Avid editor to export select portions of the sequence to Pro Tools
- Integration with Avid Interplay – Pro Tools is integrated with Avid Interplay, enabling new team-based workflows with Pro Tools version 7.3 and higher.

Copy/Consolidate to any directory

One of the challenges with audio workflows is ensuring that the audio team has access to all the production media, including all applicable sound takes. To make this easier, Avid editing systems can Copy or Consolidate video and audio media to any directory. Export to a USB2 or 1394 drive, a network share, or any arbitrary subfolder on any device you can mount – you control where the exported media goes. And when the sequence is updated and exported again to the same directory, only new media files are exported, making updates a snap.



Combine this capability with the ability to transcode to other video formats during export and several powerful workflows are possible:

- Set up a network share on a Pro Tools system and copy/consolidate audio and video media directly to that system.
- Set up a “drop folder” on a server and copy audio media to that folder. Because the export function will not overwrite files which already exist in the folder, exporting a new version of the sequence will copy only new material to the drop folder. This speeds up the iterative creative process while organically aggregating all production audio for the project in a single central location.
- Set up a network share on a laptop and then create an Export template which transcodes your video media to DV25 and places it on the laptop share, along with all the audio files. When it's time to leave the edit suite, take your media and project with you by simply grabbing your laptop.

This added flexibility takes media management to a whole new level, making it easy to design unique workflows where you control exactly where your audio and video media goes during Export.

DigiDelivery integration

What if it were easy to send a video guide track with all audio media to any Pro Tools system in the world? What if it were possible to encrypt the data so that it didn't fall into the wrong hands? And what if this process were as easy to use as email?



With DigiDelivery, all this is possible. Avid editing products support direct integration with DigiDelivery, making it easy to send and receive large files over the WAN without per-use or subscription fees. You just install either turnkey Linux appliance – SERV|LT (80 GB cache) or SERV|GT (500 GB) – and you have

a plug-and-play WAN workflow. Any file you can export from an Avid system can be easily uploaded to the DigiDelivery server and sent to any recipient with an internet connection.

For example, you may utilize an export template to initiate the transfer of a QuickTime movie with AAF audio to a Pro Tools user half way around the globe – all with one simple command from the File Menu in Media Composer. The recipient gets an email notification automatically and then downloads the data using any internet connection. The encryption key is transparently provided to the recipient so the files are automatically unlocked after transfer. And once the files have been downloaded by the recipient, the DigiDelivery server can be configured to automatically delete the material so the server's storage never needs to be cleaned up.

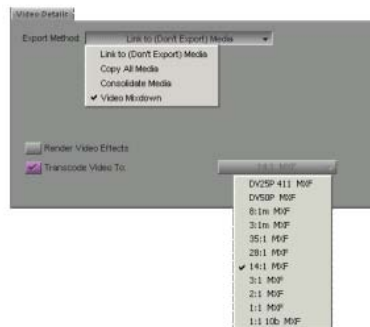
DigiDelivery can be used in a variety of workflows, including review and approval, project transfer between Avid editing systems, graphics workflows – any workflow that requires sending large files efficiently and easily across the WAN.

Video Mixdown during export

Avid editing systems support a broad range of SD and HD project formats as well as real-time visual effects plug-ins. For many projects, the Avid timeline contains several different layers that contain video media and effects that cannot be played back by Pro Tools in real time.

To make it easy and efficient to send an Avid video guide track to Pro Tools, Avid editing products can create video mixdowns during export. This capability provides several benefits:

- Flattening – Creating a video mixdown generates a single file that can be played by Pro Tools|HD® (with Avid Mojo® or AVoption™|V10). This eliminates any possibility that the Pro Tools user will be missing any visual elements in their timeline. And it creates a single file with the minimum quantity of data, making it optimal for WAN transfers.
- Video metadata – Unlike other video formats like QuickTime, an AAF (Advanced Authoring Format) file can include a single video mixdown file for playback by Pro Tools while also including complex edit information (for example video clip names and scene markers) that can be displayed in Pro Tools.
- Transcode – The Video Mixdown command can generate a flattened file at a variety of compressed resolutions. This makes it easy to send a DV25 reference track to Pro Tools, even if the Avid system is working at uncompressed.



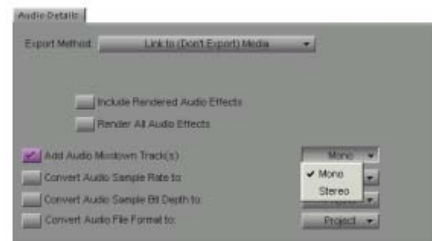
- Speed – Rather than rendering each effect on each layer, then transcoding and exporting with handles, the Video Mixdown function combines several of these processes, greatly speeding up the video export process. In many cases, creating an Avid video mixdown during export is several times faster than exporting a lower-resolution QuickTime movie.

QuickTime Avid DNxHD Codec for Video Export

As of October 2009, a new QuickTime codec is available that enhances the workflow of both Media Composer video editors and Pro Tools audio post professionals if they are using QuickTime video playback in audio post. The new codec has been optimized for superior playback performance within Pro Tools. Unlike codecs from Apple or others, the Avid DNxHD QT codec can be exported much faster from Avid video editors, offers superior playback performance and picture quality in Pro Tools, and has reduced storage requirements.

Audio Mixdown during export

In most post production workflows, basic audio assembly is started by the picture department. And Avid editing systems also enable basic mixing using controls like Clip Gain, Keyframe Gain (“rubber banding”), Clip Pan, Track Pan, Avid EQ and AudioSuite™ Plug-ins. While the temp mix created in the Avid editing system may not have all the finesse of a professional audio mix, it is very helpful to send temp mixes to the Pro Tools operator as an audio guide track.



When included with the raw production audio, a temp mix can convey the intention of the picture editor. It is also beneficial for the Pro Tools user to have this audio guide track as a sync reference, so that it is easy to see if a clip has been moved out of sync, and by how much.

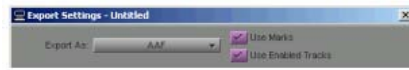
This capability is analogous to a legacy workflow that was common practice in the era of video tape: listening to a rough cut mix on a U-matic offline master tape to understand the intent of the video editor and to check synchronization.

Avid editing products can include an audio mixdown track (mono or stereo) along with the raw production audio tracks. This is enabled by a simple checkbox in the export settings, making it easy to add this facet to any workflow.

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Export follows Mark In/Out and selected tracks

Sometimes the Avid picture editor is ready to send only one scene to audio sweetening. Or perhaps there are alternate



tracks which should not be sent. To make it easier to send only certain aspects of a sequence to Pro Tools, AAF export can send only the content between Mark In and Mark Out. It is also possible to send only selected tracks. This means that it is not necessary to duplicate a sequence and modify the dupe before exporting to Pro Tools, eliminating several steps in the workflow.

Integration with Avid Interplay

Pro Tools version 7.3 and higher supports integration with Avid Interplay, enabling enhanced collaborative workflows. This integration provides three primary benefits:

- Team-based workflows – Pro Tools will be directly integrated with the Interplay database, enabling Pro Tools users to check out AAF sequences, perform audio sweetening, and integrate finished audio into the AAF sequence. All with a very simple streamlined workflow. This integration will allow the Pro Tools user and the Avid video editor to work in parallel within a managed workflow.
- Versioning – The Avid Interplay database supports version control, storing a record of what revisions were made to a sequence, who made them, and at what time. Tracking of sequence revisions allows the user to see all the versions of the sequence that were created and, if desired, to roll back to an earlier version. This enables Interplay to store the rough cut version of a sequence, the finished version with sweetened audio, and every revision in between – all under a single sequence name.
- WAN workflow – The integration between Pro Tools and Avid Interplay will allow WAN-connected Pro Tools users to connect to Interplay and easily Import/Export sequences, transferring sequence metadata and any associated media files between the two locations.

The result is a simplified workflow:

Step 1: Publish from Avid. The Avid video editor publishes an AAF sequence for Pro Tools by checking it into Interplay. The Pro Tools Interplay integration takes advantage of the innovative multi-resolution workflows of Interplay, where clips and sequences can exist at multiple resolutions. This allows the video editor to work on an HD sequence, for example, and in parallel allow the Pro Tools to playback the same sequence at DV25 resolution.

Step 2: Import into Pro Tools. The Pro Tools user can then open this sequence from the Pro Tools File Menu, linking to shared audio and video files on Avid Unity storage.



Step 3: Sweetening. The Pro Tools user completes audio sweetening and then exports the sequence to the Interplay database using a command in the Pro Tools File Menu. This action triggers a check-in of a new version of the sequence that contains the video created by the Avid picture editor and the audio sweetened by the Pro Tools user.

Step 4: Review and Delivery. With the sweetened audio in place, the finished sequence can be reviewed using Pro Tools, Avid Interplay Assist, or an Avid editing system. The sequence can also be sent to a video server or opened in an Avid editing system for digital cut to tape or export to a file.

Video project formats

The Digidesign team has implemented AAF import for a wide variety of project formats. Any standard definition sequence you can create on an Avid editing system can be imported into Pro Tools, including 23.976 and 24 fps projects – all without wholesale conversion.



Pro Tools currently does not support all HD edit rates. Although Digidesign plans to update Pro Tools to support all HD edit rates in a future version, for the time being it is advisable to convert HD sequences to SD before exporting from Media Composer to Pro Tools.

Avid video options

Pro Tools and Avid DNA™ video peripherals combine the powerful audio post production features of Pro Tools with integrated support for import and playback of Avid video media. Today, Pro Tools|HD systems can be configured with Avid Mojo or Digidesign® AVoption|V10 hardware for real time ingest and playback of Avid video.

Connected only by a standard FireWire cable, the Digidesign AVoption|V10 interface enables



Pro Tools|HD systems to work with virtually all standard-definition Avid video media, including all JFIF and AVR resolutions, uncompressed SD, DV25 and DV50, MXF, IMX MPEG50, multicam, interlaced, and 24p/25p progressive scan. AVoption|V10 even allows you to mix different video resolutions in the timeline. Component, composite, S-Video, and Serial Digital Interface (SDI) I/O are all included.

Avid Media Station|PT software, included with AVOption|V10, allows you to perform automated capture and conform of both audio and video with full machine control. It also enables you to import an EDL or open an existing Avid sequence. The ability to render effects and export sequences for use in Pro Tools affords audio engineers complete control of the entire AAF/OMF/MXF export process. Custom “Send to Pro Tools” templates automate the export process, ensuring that you get the video and audio files exactly as you need for use in Pro Tools. You can also import audio from a Pro Tools system into Media Station|PT to verify audio is in sync with the original video, lay back audio and video to tape with full machine control, or export digital movies for review, mastering, or web distribution.

AVOption|V10 also includes DigiTranslator™ 2.0 software for easy OMF, AAF, and MXF interchange, and fully supports record and playback of audio and video with Avid Unity shared storage.

AVOption|V10 is available for Windows XP only.

Built in a rugged anodized aluminum case, Avid Mojo is compact enough for portable use and powerful enough to serve as the core of a video editing suite.






Avid Mojo enables Pro Tools|HD editors to open sequences created with Avid editing systems, play back video via an external monitor, tab from cut to cut in the Pro Tools video track, and export finished audio for re-integration into an original Avid sequence. Avid Mojo works with many popular Avid video resolutions, including uncompressed SD, DV25 and DV50, 15:1s, and several 24p/25p progressive-scan resolutions. Avid Media Station|PT conform/render/layback software and DigiTranslator 2.0 for AAF, OMF, and MXF file interchange are also available separately with Avid Mojo.

Customers can buy Avid Mojo along with Media Station|PT software as part of an Avid Mojo/ Media Station|PT bundle. Media Station|PT software can also be purchased separately. The Avid Mojo Component Video I/O option enables component video sources to connect via Avid Mojo’s built-in S-video and composite video jacks.

Both Avid DNA options for Pro Tools offer several advantages over QuickTime video:

- Import and play back Avid video clips on the Pro Tools Video track with near sample-accurate precision against audio tracks
- Digitize video to the Pro Tools Timeline
- Spot individual video clips to new locations in the Pro Tools Video Track
- View video edits and clip names in the Pro Tools Video Track
- View the Pro Tools Video Track as a series of picture frames
- Play video on an external monitor
- Import and play back true 24p and 25p progressive scan sequences created in Avid editing systems

The following table summarizes the supported formats of Pro Tools LE and HD in different configurations.

Video Format	 Pro Tools HD with AVOption V10 (Windows XP Only)	 Pro Tools HD with Avid Mojo SDI (Windows XP & OS X)	 Pro Tools HD or LE No Avid DNA Hardware (Windows XP & Mac OS X)
QuickTime Movie	✓	✓	✓
DV25 4:1:1	✓	✓	
DV25 4:2:0	✓	✓	
DV25 24p 4:1:1	✓	✓	
DV25 25p 4:2:0	✓	✓	
DV50	✓	✓	
IMX 50	✓		
JFIF 10:1m	✓		
JFIF 4:1m	✓		
JFIF 15:1s	✓	✓	
JFIF 4:1s	✓		
JFIF 2:1s	✓		
JFIF 20:1	✓		
JFIF 10:1	✓		
JFIF 3:1	✓		
JFIF 2:1	✓		
JFIF 8:1m 24p	✓		
JFIF 3:1m 24p	✓		
JFIF 35:1 24p	✓	✓	
JFIF 28:1 24p	✓	✓	
JFIF 14:1 24p	✓	✓	
JFIF 3:1 24p	✓		
JFIF 2:1 24p	✓		
1:1	✓	✓	
MXF:1	✓	✓	
AVR 77	✓		
AVR 75	✓		
AVR 70	✓		
AVR 12	✓		
AVR 9s	✓		
AVR 8s	✓		
AVR 6s	✓		
AVR 4s	✓		
AVR 3s	✓		
AVR 2s	✓		
AVR 6m	✓		
AVR 4m	✓		
AVR 3m	✓		
AVR 2m	✓		

Audio formats

Pro Tools supports a broad range of audio file formats, sample rates and bit depths. And although Pro Tools does not support mixing of sample rates or bit depths in the timeline simultaneously, DigiTranslator can import AAF files that contain mixed formats, converting to a uniform format in the process.

Sample Rates	Supported by Avid Editors	Supported by Pro Tools	Comment
32 kHz	✓	N/A	Pro Tools will convert 32 kHz files to another sample rate during import
44.1 kHz	✓	✓	
48 kHz	✓	✓	
88.2 kHz, 96 kHz, 176.4 kHz, 192 kHz	N/A	✓	Avid systems do not currently support these sample rates
Mixed Sample rates in a sequence	✓	N/A	Pro Tools will convert mixed sample rates to a uniform sample rate during import
Bit Depths	Supported by Avid Editors	Supported by Pro Tools	Comment
16-bit	✓	✓	
24-bit	✓	✓	
Mixed bit depths in a sequence	✓	N/A	Pro Tools will convert mixed bit depths to a uniform bit depth during import
File Formats	Supported by Avid Editors	Supported by Pro Tools	Comment
WAV	✓	✓	
AIFC	✓	✓	
SDII	N/A	N/A	SDII is no longer recommended because it is not a cross-platform file format
MXF (PCM Descriptor)	✓	✓	Pro Tools supports MXF audio as read-only

Audio parameters

Most nonlinear editors send very basic audio information to Pro Tools. Why settle for just clips on a timeline? Avid editing systems send additional audio metadata, so the Pro Tools user can choose to inherit audio decisions made during picture editorial.

- Clip definitions, including audio file references and track layout
- Clip Names
- Clip Gain
- Track Gain (“rubber-banding” automation)
- Clip Pan
- Crossfades (including location and duration)
- Rendered AudioSuite Effects
- Broadcast WAV metadata

Sending Audio from Pro Tools to Avid Editing Systems

There are three different methods for sending audio from Pro Tools to Avid editing systems:

- **Export Tracks as AAF** – From the Pro Tools File Menu, you can export selected tracks from a Pro Tools session, creating an AAF file with associated media. You must then transfer the media files to the appropriate media files folder on an Avid editing system (e.g., OMFI MediaFiles folder or Avid MediaFiles folder) and import the AAF file. The result will be an audio sequence with associated clips in your Avid bin. You can then integrate this audio sequence with other sequences in the project. This workflow makes it possible to send “prelay” audio tracks from Pro Tools to Avid. It also makes it possible to send several mixes or submixes (stems) back to the Avid system.
- **Bounce to Disk** – If you use Bounce to Disk to create a rendered mix file in the form of an interleaved WAV file, you can import this WAV file into an Avid bin. The result will be a new clip with the correct start time code. This is a quick and easy way to render a mix and import it into an Avid system.
- **Export Regions as Files** – You can export individual “regions” of audio from Pro Tools. These files can be imported into an Avid bin, creating new audio clips. This workflow is helpful when some raw audio clips (e.g., voice-over takes, sound effects, music cuts) need to be exported to an Avid system without any timing information.

Shared Storage Workflows

The following table summarizes the current qualified workflows for Pro Tools on Avid Unity shared storage:

Storage System	Pro Tools LE  Windows XP	Pro Tools HD  Mac OS X	Pro Tools LE  Window XP and Mac OS X
Avid Unity MediaNetwork (2-Gb)	✓	Push/Pull	Push/Pull
Avid Unity MediaNetwork (4-Gb)	✓	Push/Pull	Push/Pull
Avid Unity LANshare	Push/Pull	Push/Pull	Push/Pull
Avid Unity ISIS	Push/Pull	Push/Pull	Push/Pull

For the latest qualified storage configurations, please visit <http://www.digidesign.com>.

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