Technology Update
Understanding P2 Workflow

Using P2 HD with
CANOPUS EDIUS BROADCAST

P2HD when it counts

Panasonic
ideas for life

USING P2 WITH GRASS VALLEY EDIUS BROADCAST

Computer/OS specifications:

- Pentium 4 3.0GHz or better
- 512MB of RAM, recommended 1GB
- Windows XP (Home or Pro) with Service Pack 2
- DirectX 9.0 or later
- Graphics card with hardware-based DirectDraw overlay and 32-bit color display at 1024x768; 128MB of memory is required when editing HD.
- One free USB 1.1 or 2.0 port for hardware dongle
- A sound card
- EDIUS Broadcast version 4.6 or later (must be "Broadcast").
- For AVC-Intra support, the optional AVC-Intra License Option for EDIUS Broadcast (available from Grass Valley, store part # 646245, $999.00) is required.

Overview:

This paper will provide current and prospective P2 customers a step-by-step understanding of how to use P2 with Grass Valley EDIUS Broadcast version 4.6 or later. EDIUS is a nonlinear editing package (NLE) that works incredibly well with P2 and integrates with P2 to provide exceptionally fast editing. Using EDIUS, a user can actually edit directly from the P2 cards, skipping the entire footage ingestion process. EDIUS supports native-codec editing directly from the original P2 card files in all their original formats, so no transcoding or file conversions are necessary. Because of this, an EDIUS user can edit footage literally within seconds of shooting it. This paper will lay out the processes for using P2 footage within the EDIUS Broadcast NLE software package.

Note: "EDIUS Broadcast" is a specific version/package of Canopus/Grass Valley EDIUS software. P2 is not supported in EDIUS Pro or EDIUS Neo; only the "Broadcast" version has support for MXF files, P2 cards, DVCPRO HD, and AVC-Intra (when using the optional AVC-Intra License Option.) Also, EDIUS Broadcast includes a hardware dongle that is required for access to the MXF, P2, DVCPRO HD and AVC-Intra features.

EDIUS Broadcast has always supported the DV, DVCPRO, DVCPRO50, and DVCPRO HD formats; new with version 4.6 is the ability to view and edit AVC-Intra formats (if you've installed the optional AVC-Intra License Option). EDIUS has the ability to edit AVC-Intra natively, directly from the P2 cards or directly from a hard disk. However, be aware that EDIUS is a native 8-bit editing application, and as such it cannot preserve the full 10-bit quality of original AVC-Intra footage.

Regardless of what type of footage you're using, EDIUS preserves the footage in its native format, as it was originally recorded and in the same MXF file structure as it was recorded.

EDIUS also preserves any camera metadata in your footage files throughout the edit process. Any metadata that you've uploaded into the camera will be attached to your clips and will be viewable at any stage of the edit process. This metadata will also be archived when you archive your camera-original footage, providing for easy sorting and searching through your footage archive. EDIUS also provides for adding metadata to any clips that you export from the timeline (providing that you choose to export your clips as P2-compatible MXF files).

Acquisition in the Field:

Footage must be acquired in normal MXF-compatible means, principally on P2 cards or on the FireStore FS-100 or FS-100-160. If acquiring on P2 cards:

a) Footage can be edited directly from the cards

b) Footage on the cards can be transferred to the P2 Store, and edited directly from the P2 Store.

c) Footage on the cards can be transferred to a hard disk, and edited from that hard disk. EDIUS 4.6 optionally provides the ability to transfer footage to a hard disk while simultaneously allowing instant editing of the footage from the P2 card (meaning, you can edit instantly from the P2 card, and EDIUS will transfer the footage from the P2 card onto your hard disk simultaneously, in a background process. When the transfer is done, EDIUS will seamlessly and automatically re-link your project to use the copy of the footage on the hard disk instead of the P2 card).

Acquisition in the Studio:

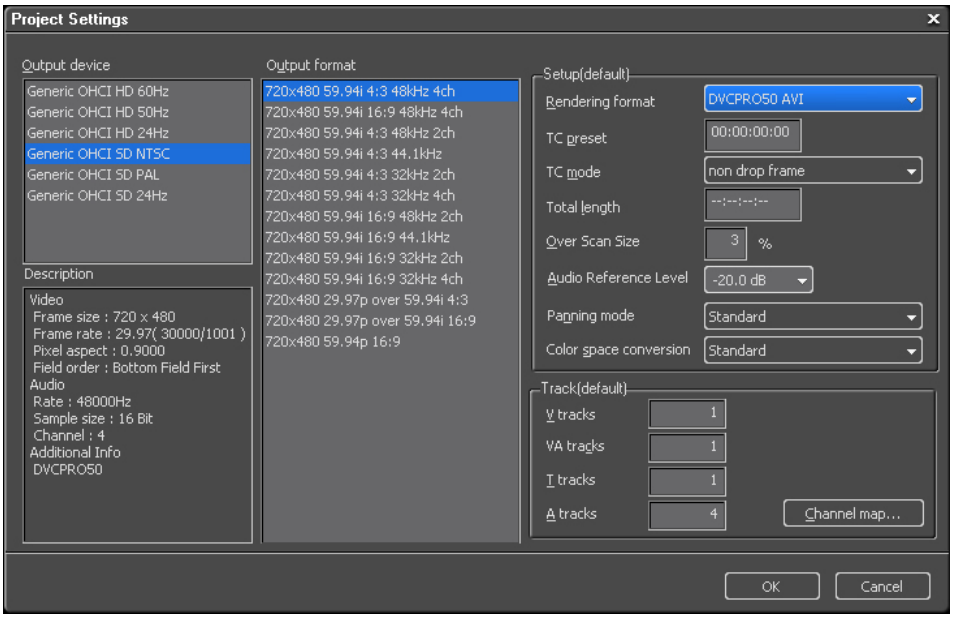
Footage may be acquired using any of the above means; additionally, footage can be captured directly by EDIUS Broadcast through a IEEE 1394 (Firewire) cable. EDIUS supports IEEE 1394 capture of DV, DVCPRO, DVCPRO50, DVCPROHD 720p and DVCPROHD 1080. AVC-Intra is not supported via 1394 streaming.

Regardless of how you acquire footage, it's vital that you archive it before erasing your P2 cards. Whether archiving to data tape, or optical disc, or hard disk, make sure that you copy the entire contents of the card (CONTENTS folder and LASTCLIP.TXT file) to an archival media before formatting or erasing the cards. Some uses (such as news stations) may not wish to archive all the original footage; for selective archiving, you can use a database management software application such as Panasonic's P2CMS or Imagine Software's HD Log or TEP/HD. See the "Archiving" section at the end of this paper for more details.

Preparing for the Edit:

When first starting an edit session, you must make sure that the hardware dongle is inserted in one of your computer's USB ports, and then you should run the EDIUS Pro editing software.

EDIUS brings up a project selection dialog box. Choose the type of project that matches the timebase and resolution of the footage you intend to edit. EDIUS Broadcast supports standard-definition in 4:3 and 16:9, and high-definition in 16:9, all in various frame rates. Choose the mode that best matches your footage.



If a project preset already exists that matches your intended footage, you can select it in the "New Project" window by double-clicking it, or by selecting it and then choosing the "Start" button near the lower right corner of the screen. If you don't see an appropriate project preset, create your own by clicking on the "New Preset" button at the bottom center of the screen.

There are many potential project presets, but the simplest way to navigate the menu is to start in the upper left corner with "Output Device." EDIUS uses Open Host Controller Interface (OHCI) devices such as IEEE 1394 output devices. If you're working with DV, DVCPRO, or DVCPRO50, choose one of the "Generic OHCI SD" presets, depending on your frame rate (NTSC, PAL, or 24Hz for 24p). If you're working with high-definition footage, choose one of the "Generic OHCI HD" presets, depending again on your frame rate (60Hz/USA, 50Hz/Europe, or 24Hz for 24p).

Once you've selected the appropriate "Output Device" you then need to select your "Output Format" based on the specific type of footage you're editing. You'll find an existing preset suitable for any of the P2 formats. There are many choices, but there'll be one that's right for your footage.

Be aware that EDIUS allows you to freely mix and match footage timebases and resolutions; you can inter-mix 1080 footage and 720 footage and SD footage, you can inter-mix 30p and 24p and 60p and 60i footage all on the same timeline. EDIUS Broadcast will conform any footage to match the preset that you select here.

Standard Definition (DV, DVCPRO, and DVCPRO50)

When working with standard-definition footage (DV, DVCPRO, and DVCPRO50), be sure to choose the right aspect ratio (either 4:3 or 16:9), and choose the appropriate project frame rate. Also, in the lower left corner is a "Description" window that will tell you which formats are appropriate for each Output Format; EDIUS has notations for DV, DVCPRO50, DVCPROHD (in both 1080 and 720 modes) and AVC-Intra 50 and AVC-Intra 100. (**Note:** there is no separate notation for DVCPRO; you can use the DV/DVCAM presets).

For 30p footage, choose the Generic OHCI SD NTSC Output Device, and then choose the appropriate "720x480 29.97 over 59.94i" Output Format (either 4:3 or 16:9).

For 24p, choose the Generic OHCI SD 24Hz Output Device, then select your Output format based on whether you want to use 16:9 or 4:3 and also whether you'll be outputting 3:2 pulldown (the "23.98p over 59.94i" presets) or 24pA pulldown (the "23.98pA over 59.94i" presets).

High Definition 720P (DVCPROHD or AVC-Intra 50)

For a 720P project in DVCPROHD or AVC-Intra 50, select a preset based on your frame rate: for a 720/24p project choose "Generic OHCI HD 24Hz" and "960x720 23.98p over 59.94p"

- For a 720/30p project, choose "Generic OHCI HD 60Hz" and "960x720 29.97p over 59.94p."
- For a 720/60p project, choose "Generic OHCI HD 60Hz" and "960x720 59.94p."

High Definition 720P (AVC-Intra 100)

In 720P, AVC-Intra 100 uses a different frame size than AVC-Intra 50 or DVCPROHD.

- for 720/24p, select “Generic OHCI HD 24Hz” and “1280x720 23.98p.”
- for 720/30p choose “Generic OHCI HD 60Hz” and “1280x720 29.97p.”
- for 720/60p choose “Generic OHCI HD 60Hz” and “1280x720 59.94p.”

High Definition 1080P or 1080i (DVCPROHD)

For a 1080/24p project, choose “Generic OHCI HD 24Hz” and “1280x1080 23.98p over 59.94i” or “1280x1080 23.98pA over 59.94i.”

- for a 1080/30p project, choose “Generic OHCI HD 60Hz” and “1280x1080 29.97p over 59.94p.”
- for a 1080/60i project, choose “Generic OHCI HD 60Hz” and “1280x1080 59.94i.”

High Definition 1080P or 1080i (AVC-Intra 50)

For a 1080/24p project, choose “Generic OHCI HD 24Hz” and “1440x1080 23.98p”

- for a 1080/30p project choose “Generic OHCI HD 60Hz” and “1440x1080 29.97p.”
- for a 1080/60i project choose “Generic OHCI HD 60Hz” and “1440x1080 59.94i.”

High Definition 1080P or 1080i (AVC-Intra 100)

For a 1080/24P project, choose “Generic OHCI 24Hz” and “1920x1080 23.98p.”

- for a 1080/30P or 1080/60i project, choose “Generic OHCI 60Hz” and “1920x1080 59.94i.”

Preparing Footage for Import:

If the footage currently exists on P2 cards, no preparation is necessary. P2 cards can be read by either a PCMCIA/CardBus slot on a laptop computer, or through an AJ-PCD20P five-slot Memory Card Reader, or through a AG-PCS060 P2 Store portable drive or AG-HPG10 P2 Gear portable viewer/player/recorder or AJ-HPM110 P2 Mobile field recorder/player (when being used as a pass-through slot), or through a USB-equipped P2 Camcorder such as the AG-HVX200A in “USB Device” mode. You can also use CardBus-to-ExpressCard adapters such as the Duel Adapter or the Addonics ADEXC34CB; these products allow laptop computers with ExpressCard slots to be able to use the P2 cards. Finally, if working with a desktop computer you can use a PCI-to-PCMCIA adapter to add a P2-compatible slot to your desktop computer.

If the footage has been captured through IEEE 1394 live capture, no preparation is necessary; EDIUS will automatically add captured footage files to the project bin.

If the footage has been transferred to a hard disk or is currently on a P2 Store, no preparation is necessary; just plug-in the hard disk. If the footage is on a P2 Store, plug the P2 Store into a USB 2.0 port (and ensure that the P2 Store is in PC-compatible mode). The P2 Store can appear to the computer in one of two ways:

a) As a series of sequential external drive letters (such as J:, K:, L:, etc) where each card that’s been copied to the P2 Store appears as its own drive, or:

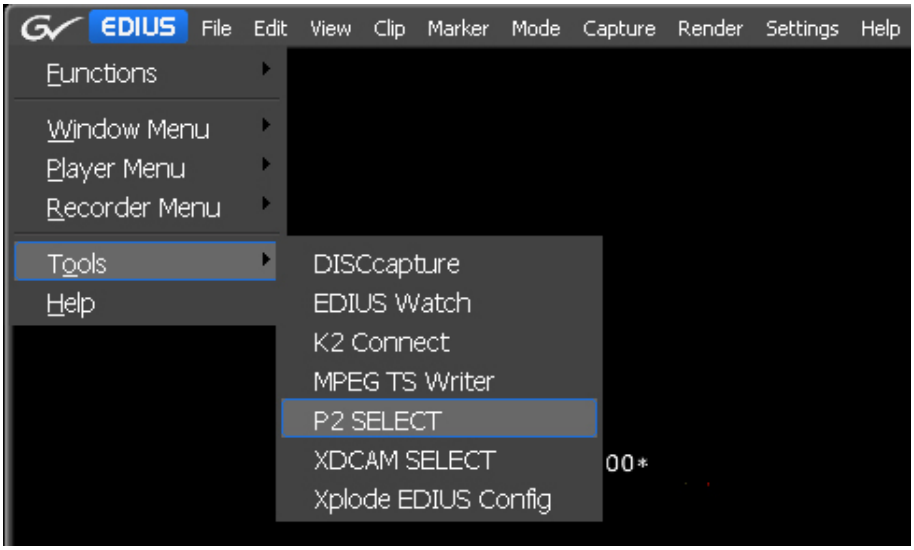
b) As one large external drive, where each card that’s been copied to the P2 Store appears as its own subdirectory on that drive.

If footage was acquired on the FireStore FS-100 or FS-100-160, you will first have to run the FireStore "Organize P2" command before attempting to import footage into EDIUS Broadcast. Attach the FireStore via a IEEE 1394 cable; make sure to plug the cable into the FireStore's COMPUTER I/O port, not its DV I/O port.

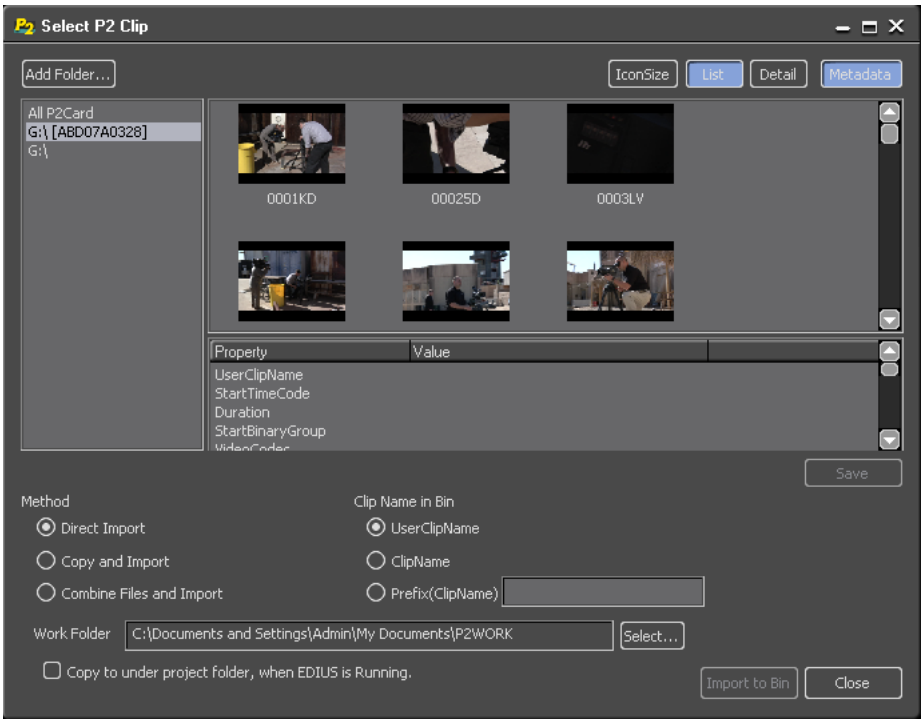
Importing Footage:

EDIUS Broadcast has the ability to directly import P2 MXF files. While it is technically possible to drag files from your computer's desktop or Windows Explorer and drop them right into a bin or onto the timeline, this is not the recommended workflow. There is a much better way using the P2 Select tool.

In the upper left corner, click the EDIUS menu, and choose TOOLS, and then P2 SELECT. (Alternately, you can choose CAPTURE and P2 SELECT; either way it will result in starting the P2 Select tool).



The P2 Select window then appears.



The P2 Select window shows available P2 cards, and clips that are on those cards. P2 cards (or volumes on a P2 Store) are shown by drive letter (in the above example, G: is an actual P2 card, and the name "ABD07A0328" is the serial number of that card). The list will also show various folders that have been added as "virtual P2 cards." To add a new folder to the available list, choose the Add Folder button. To view the contents of any folder or card, select it in that list. In the above example, we're viewing the contents of the card itself.

Once you've selected a card to import from, you can choose which particular clips to import. Select the clips via thumbnail; SHIFT-click or CONTROL-click

to select multiple clips to import.

Also, choose the method of importing you'd like to use. "Direct Import" will immediately add the clips to your project bin, but will leave the files in their current location (ideal for editing directly from a P2 card, or from an external hard disk where you've already offloaded your clips). "Copy and Import" will immediately import the clips from their existing location into your bin, and simultaneously it will start to copy the files off of the source directory and make a duplicate on your computer's hard disk in the "Work Folder" that you specify. When the copying process is complete, EDIUS will re-link the file in your bin to the newly-copied clip.

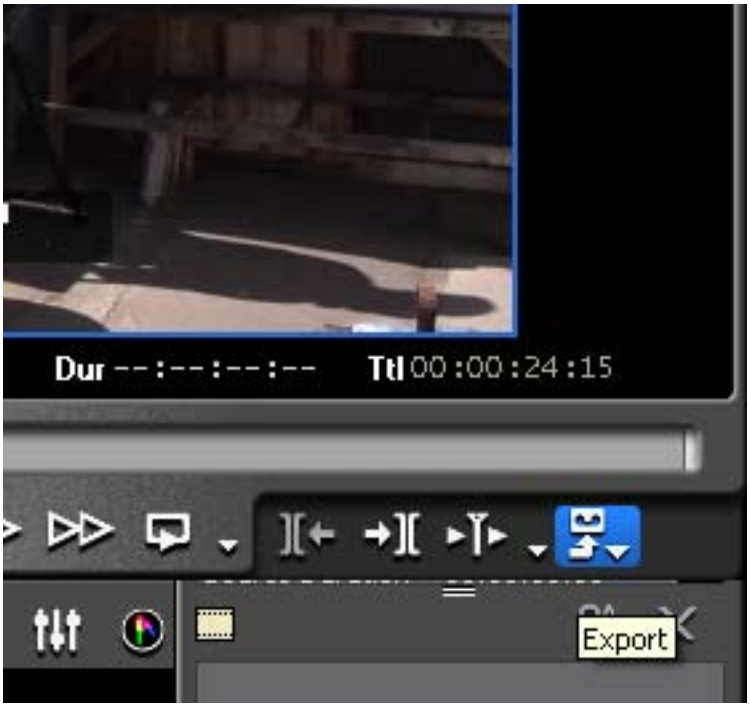
You can also choose what name will be displayed for each clip in the bin. You can choose "ClipName" to view based on the original MXF filename, or "User Clip Name" to view the clips according to the name you've assigned in the metadata. Also, you can assign a custom prefix to each import; this can be used to identify or separate clips based on "reel number" or "card number" or "day shot" or any other prefix you've decide to use to organize your footage.

Using the P2 Select tool is the best way to add files to a project. The P2 Select tool will import all necessary files – audio, video, metadata, etc. – and keep them all together throughout the editing process. While it is possible to simply drag a video file from a P2 folder right to your bin, this is not recommended because only the video would be imported – audio and metadata would not automatically be imported. However, using the P2 Select tool, all components are brought in and kept together.

Using "Copy and Import" allows you to copy files to your computer's hard disk, thus freeing up the P2 card, P2 Store or FireStore to be erased and used again in the field. Using "Direct Import" allows you to instantly edit up to six streams of high-definition footage right off of a P2 card.

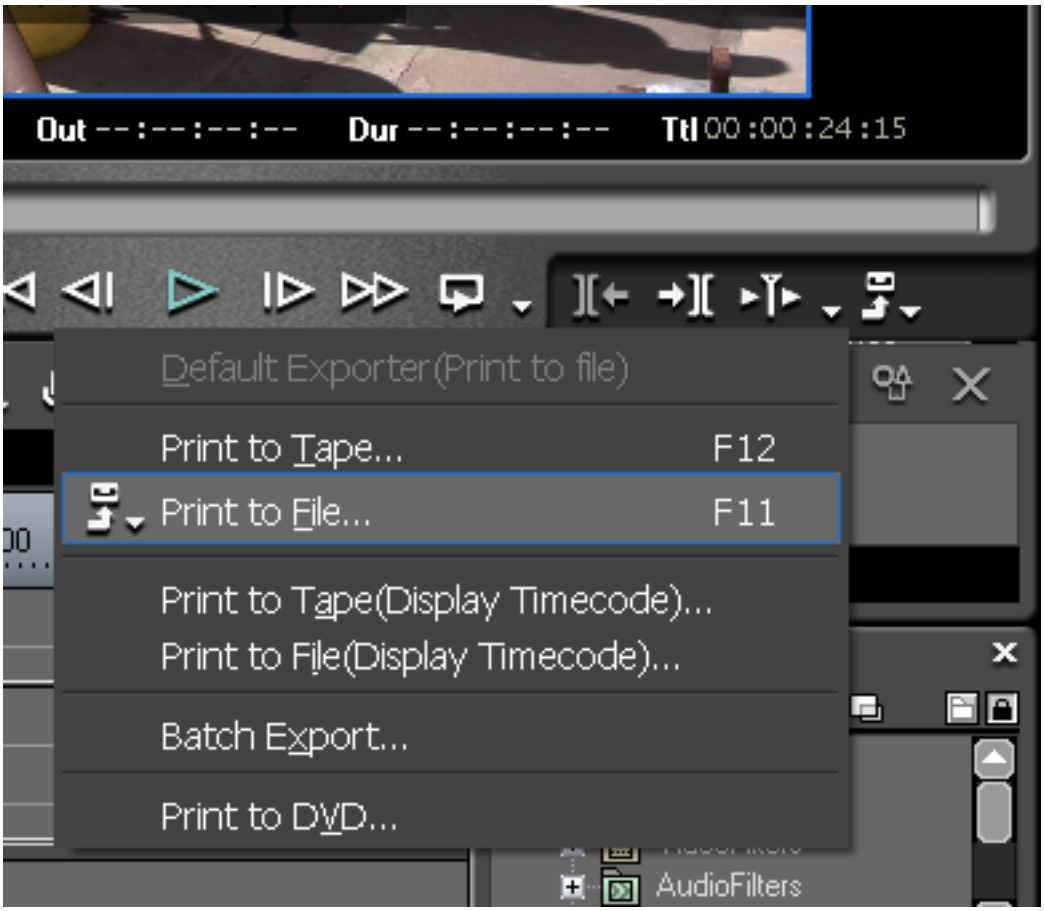
Outputting Footage:

Once your project is edited, you can export the footage in a variety of ways, including directly back to a P2 card or to a "virtual card" on a hard disk or other archival media.

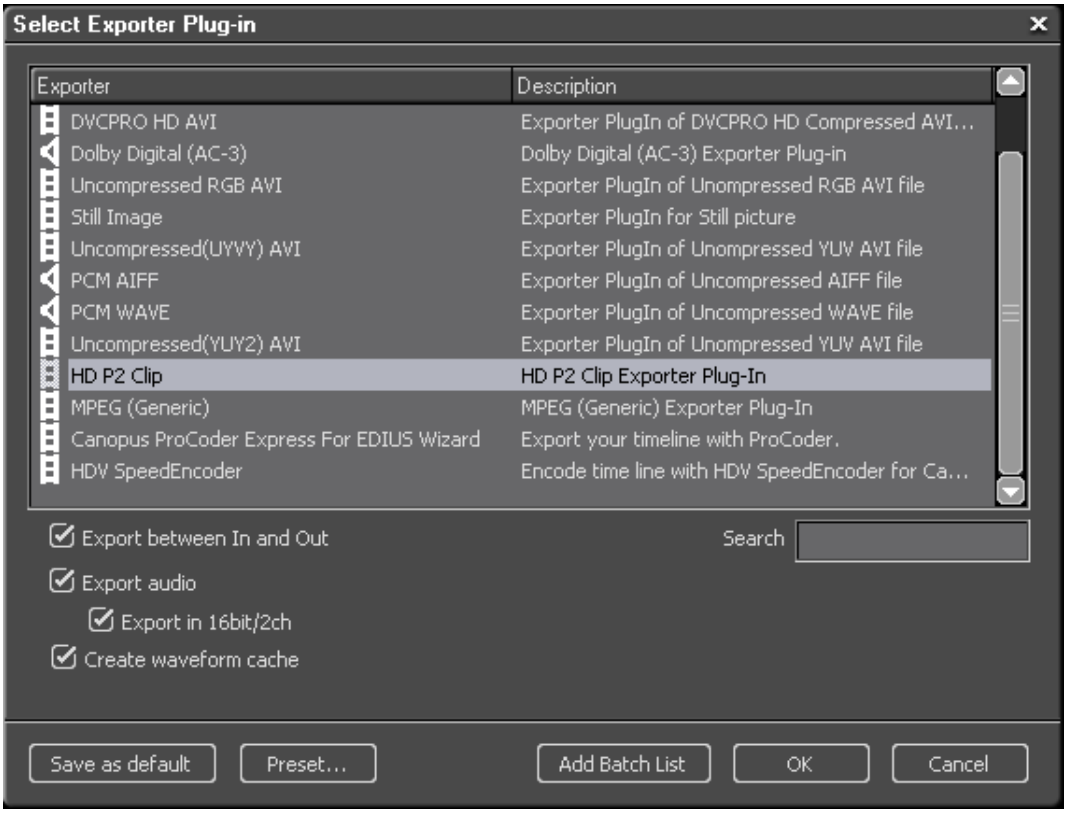


First, choose File->Print->Print To File, or simply click on the "Export" button at the lower right corner of the playback monitor

and choose Export->Print To File:

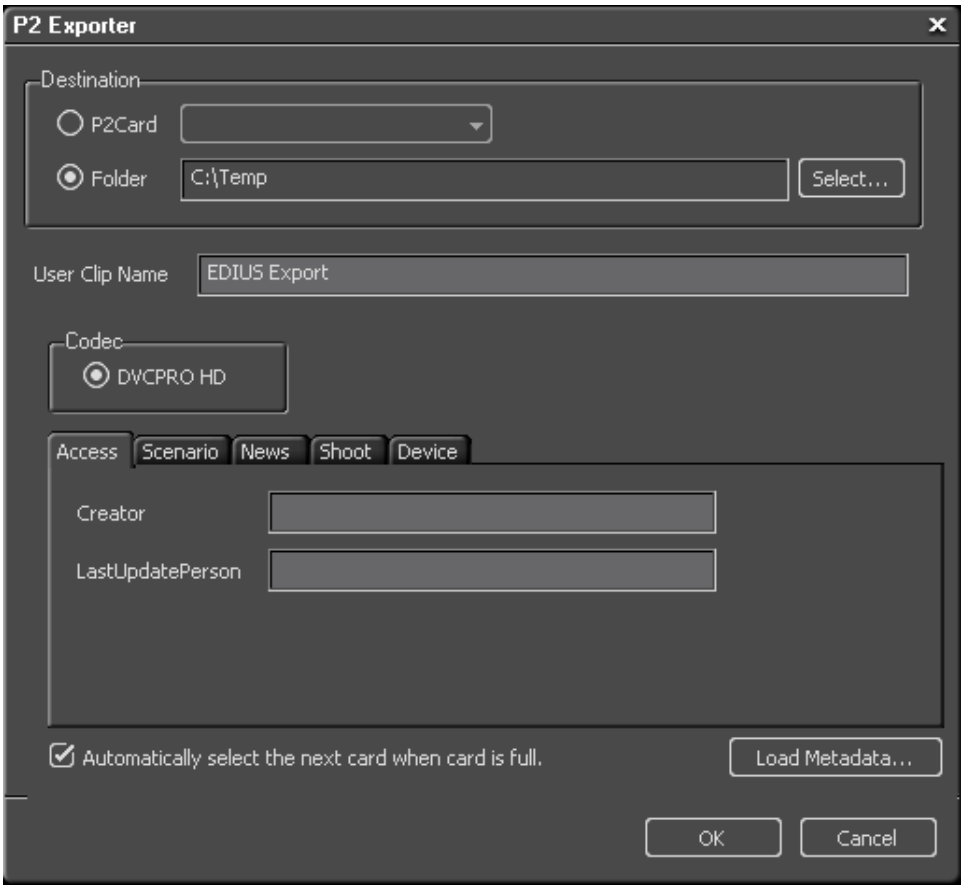


This brings up the Select Exporter dialog box:



You can choose to export your footage in a variety of ways, but for the purposes of this paper we'll demonstrate how to export your footage back out to a P2 card (or to a "virtual card" on a hard disk). The HD P2 Clip export option exports as DVCPRO HD, and is available if you selected a project that is compatible with a DVCPRO HD mode (for example, if you're working in a 1280x1080 or 960x720 timeline). If you're working in a timeline that is incompatible with any of the HD export options, the HD P2 Clip exporter will not be available. If you chose to work in a standard-definition timeline, you'll have the option of using the standard-definition P2 Clip Exporter.

So, assuming that you chose an appropriate high-definition timeline at the beginning of your edit, choose "HD P2 Clip Exporter."



This dialog box presents several options for exporting your footage, and what metadata settings you'd like to add, as well as whether you'd like to have the footage span across multiple cards if your exported footage is too large to fit on one card.

You can also select to export your timeline to a P2 card or a folder on your hard disk, which will be treated as a "virtual P2 Card". If you wish to export to a folder, choose the "Select..." button and the system will bring up a standard "Browse For Folder" dialog box, asking you where you want to store the exported footage. The P2 Exporter will automatically create the P2 CONTENTS folder and associated subfolders in the directory that you specify.

Next, you can set the User Clip Name and metadata. These fields will be exported with your footage, and any information you add in these fields will stay permanently attached to your footage. **Note:** User Clip Name does not change the name of the files on the card (i.e., the file will still be named according to standard P2 naming conventions, such as 0001BG.MXF); instead, specifying a User Clip Name writes your selected name into the metadata of the P2 files.

You can specify all the other P2 metadata fields individually, or you can also load a metadata file from a previously-saved XML file on your hard disk or other storage media.

When you select “OK” the system will begin exporting your footage in a P2-compatible format onto your P2 card or “virtual card” on your hard disk.

Exporting Footage To Other Formats:

Nothing about EDIUS Broadcast or the MXF workflow limits you to only working with the files as MXF or P2 files. You can, of course, export your footage to DVD-compatible MPEG-2 files, or downconvert to standard-definition (even DV files), or to any format. Use the Grass Valley ProCoder tool to export files in a format other than P2 MXF file format.

Archiving Footage:

P2 Cards are not permanent data storage media items. They are meant to be used as “temporary containers”; you fill them up with footage, use that footage, and then archive the footage onto a permanent storage format before you re-use the card. If editing straight from the card, you can archive either before or after the edit process. But if you intend to erase the card and record more footage onto it, obviously it’s vital to properly archive the card’s contents before erasing it.

Panasonic makes available two free software programs for managing P2 contents. The first, P2 Viewer lets you view the clips on your P2 cards or on “virtual cards” on your hard disk and allows you to delete clips, copy clips from one place to another, and also lets you edit or add metadata to your clips, which can be enormously helpful when you want to search for footage in the future! The other free software program is the P2 Contents Management Software or “P2CMS”. This software includes all the basic footage-viewing functionality of the P2 Viewer program but also includes basic database management capabilities. It lets you ingest footage into a master database system and selectively extract footage files from that system, either onto a hard disk or directly back onto a P2 card. P2CMS includes the ability to search and retrieve clips based on the information contained in each clip’s metadata; this can make organizing and retrieving your clips simple.

Using either P2 Viewer or P2CMS can greatly simplify the data management of P2 cards; both programs are designed to work with the clips in their entirety as clips, rather than as individual computer files. Copying a clip from a P2 card onto a hard disk using P2 Viewer is as simple as drag and drop; executing the same “copy” operation from Windows Explorer would involve copying no less than 6 (and as many as 8) individual files and, accordingly, is more prone to errors. Panasonic recommends you use the P2 Viewer or P2CMS programs to move and manage P2 card contents.

P2 Viewer and P2CMS can be downloaded from the Panasonic Broadcast website at:
http://www.panasonic.com/business/provideo/support/software_downloads.asp

Data from a P2 card should not be thought of as “video data”; instead, it is computer data and should be archived as such. You do not need to archive your P2 data onto video tape; instead, you can archive onto any computer-readable media. If you explore the data on a P2 card, you’ll see that each P2 card is viewed by the computer as a removable-storage disc drive. It should be archived just like you would archive any disc drive. Common archival methods include:

a) storing the footage on external removable hard disks
b) exporting to data DVD-R or DVD+R
c) exporting to data Blu-Ray optical discs
d) archiving footage on data tape drives such as DLT or LTO tapes

When archiving, you want to store all the originally-recorded data in its original form. Don’t just archive certain portions or certain files, but backup the entire contents of the card. Additionally, it is vital to keep and preserve the directory structure and archive the entire CONTENTS directory and the “LASTCLIP.TXT” file, if any. For these reasons, Panasonic recommends using the P2 Viewer or P2CMS programs to copy the card contents, as these programs automatically handle all directory organization tasks.

To archive to an external hard disc without using P2 Viewer or P2CMS, create a new directory on the external hard disc for each card you intend to archive (for example, if you had three cards to archive on to your external drive "K:" you'd create the following folders: "K:\Reel_1\", "K:\Reel_2", and "K:\Reel_3"). Then simply use Windows Explorer to drag the complete contents of the appropriate P2 card, dragging the CONTENTS and LASTCLIP.TXT into one of those directories on your external hard disk.

Another common archival process is to use optical discs, such as recordable data DVDs or Blu-Ray discs. A 4GB P2 card can be archived onto a regular 4.7GB DVD-R or DVD+R; an 8GB P2 card can be archived onto a dual-layer DVD-R. 16GB and larger cards may be able to be archived onto data Blu-Ray discs. To archive onto a data DVD-R, you'll need a DVD burner as well as a DVD burning application (such as Nero AG's "Nero", which supports making data DVDs. **Note:** you do not want to create a playable video DVD, you want to create a **data** DVD. Then, using your DVD burning application, create a data DVD image that consists of one card's CONTENTS and LASTCLIP.TXT and burn one DVD per card.

Data tape, such as DLT or LTO tape, can be used to archive large amounts of data; an LTO-3 tape holds hundreds of gigabytes of data. Use a data backup program to create large archives of card data directly onto high-capacity LTO or DLT tapes. Quantum manufactures tape archiving drives that are specifically engineered to understand MXF files and are especially appropriate for archiving P2 files, including the Quantum SDLT600A and the Quantum LTO 3A.

It is also possible to archive your DV data files onto DV tape, or your DVCPRO50 files onto DVCPRO50 tape, or DVCPRO HD data files onto DVCPRO HD tape. This workflow would involve importing the files into an EDIUS timeline, and then using the Export button to Export->Print To Tape to export the footage onto the videotape. Archiving to videotape is a familiar process, but archiving to a data storage medium such as hard disk, optical data disc, or data tape, offers significant advantages over archiving to video tape, including preserving all the metadata and the clip-based nature of the footage. Additionally, AVC-Intra is not offered in a videotape format, so direct archiving of original AVC-Intra footage to videotape is not possible without some manner of data transcode. A mastering-quality videotape format such as Panasonic's D-5 HD would make a good match for preserving the quality of AVC-Intra footage. AVC-Intra footage can be archived losslessly onto data tape or optical or hard disks.

Written by Barry Green of Fiercely Independent Films, Inc, February 2008. Barry Green is the author of the HVX Book and publisher of several training DVDs on P2 camcorders and the P2 workflow, available at www.hvxtraining.com.